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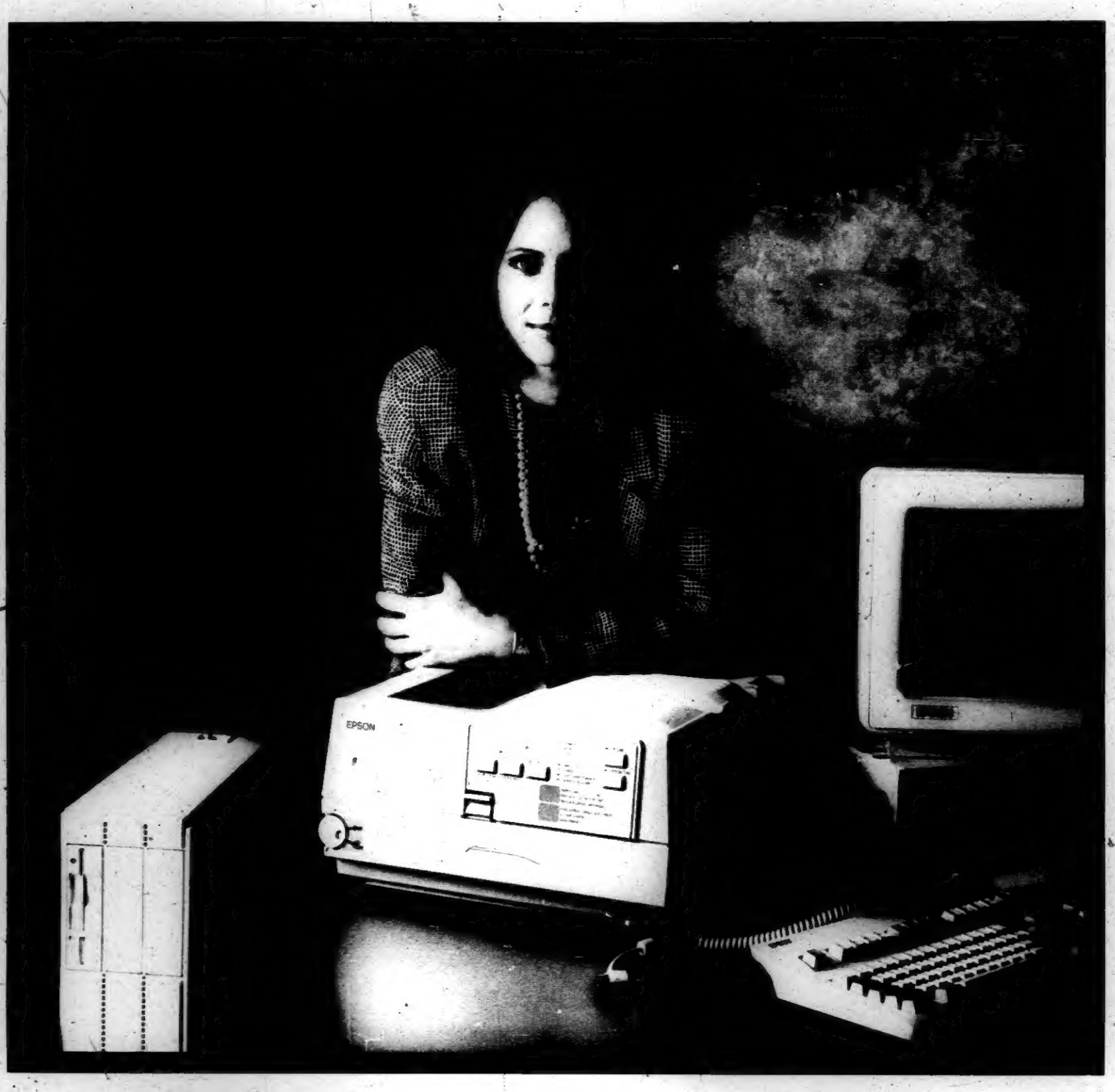

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Inventing the future

Seers find favor in business community as corporations seek strategic technology

BY MITCH BETTS

Don't look now, but there could be a futurist in your future.

Users and vendors in the computer community are turning to outside consultants who specialize in "futures research" to help with the eye-glazing task of strategic planning.

It has always been easy to ridicule futurists for their fuzzy philosophies and outlandish predictions of disposable clothes and nuclear-powered aircraft. But some Fortune 500 corporations are shelling out cash to futurists in the hope that they can help identify competitive opportunities and potholes in the road ahead.

Furthermore, since they tend to be generalists, futurists can help MIS managers put information technology in the context of other societal changes, such as trends in the economy, demographics and government policy.

"Any profitable company that wants to stay profitable has to plan for the future," says Jeffry A. Alperin, assistant vice-president for corporate technology planning at Aetna Life & Casualty Co. in Hartford, Conn. To that end, Alperin uses the services of The Futures Group in Glastonbury, Conn., and the Institute for the Future in Menlo Park, Calif.

Planning for the future does not mean predicting the future or even preparing for it, Alperin says: It means *inventing* the future.

"Aggressive companies are thinking about how they're going to mold the future. The dialogue [with futurists] is about who's molding the future now and who might mold the future next," he says.

Although it is hard to describe tangible benefits from the use of futurists, Alperin says the consultants helped his office with research work on expert systems and electronic information services such as videotex.

The corporate offices most likely to use futurists are business planning departments and a relatively recent addition to the corporate organizational chart — technology planning departments.

"Maybe five years ago, we planned technology less coherently. Now, the corporate planning department and the technology planning department are much more closely aligned," Alperin says.

RICHARD OSAKA

One beneficial role for the futurist is to act as an interpreter, or liaison, between business managers and MIS managers, according to Richard Adler, director of the teleservices program at the Institute for the Future.

Interest in futures research is apparent in various parts of the computer community. For example, MIT has a 17-part program to study MIS management in the 1990s, and the Diebold Group, Inc. has developed a model of the computer industry in the 21st century [CW, Nov. 16].

The futures business is not booming, however. The Center for Futures Research at the University of Southern California closed down in 1987 because of a lack of financial support. "Farsightedness is simply not in fashion," the center reported.

While U.S. corporations are aware that their environment is changing rapidly, they have also "become very short term-oriented," according to Edward Cornish, president of the World Future Society in Bethesda, Md.

"They feel like they've got to get through the present [financial] quarter and the next quarter. They can't think too much about the long term when they've got some takeover artist on their tail," Cornish says.

He estimates that the number of futurists employed within corporations will rise from less than 200 in 1960 to 4,000 by 1990, while other firms turn to outside think tanks and consultants.

But Cornish acknowledges that there are no hard statistics on the number of futurists, in part because they rarely use the title of futurist. "You never know where there might be a futurist lurking under some title" such as vice-president of corporate planning, he says. In addition, those who call themselves futurists can range from amateur "future-oriented thinkers" to scholarly professionals.

David Pearce Snyder, a consulting futurist in Bethesda, says the computer industry, including IBM and Data General Corp., made heavy use

Continued on page 4

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COMPUTERWORLD

Inventing

CONTINUED FROM PAGE 2

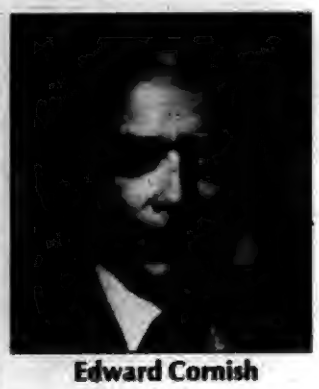
of outside futurists in the early 1980s. But futurist contracts with computer vendors took a nosedive during the industry slump that lasted from 1985 to 1986. The budget for consultants is the first thing to be cut during a financial crunch, he says. Nevertheless, some segments of the economy are eager to hear what futurists have to say. The biggest users are the health care industry, the heavy manufacturing industries, the education and training community and even some government agencies, Snyder says.

The health care industry, which is struggling with a variety of cost-cutting pressures, will be hard hit in the 21st century, when there will be a tremendous increase in the number of elderly people who will require health care, he says.

He predicts that there will develop a move away from expensive hospital care and toward more home-based medical care using high-tech monitoring and diagnostic devices.

Organizations turn to futurists "when their back is to the wall" and nothing else seems to work, Snyder says.

Manufacturers started to use futurists in 1985 and 1986 because their companies' huge investments in automation in the early 1980s did not pay off



Edward Cornish

in big productivity gains as they had hoped, Snyder says.

"They realized they needed some advice on how to sustain a long-haul commitment to technology," he says.

Government agencies have become more attentive to futures research because they now realize that major budget cuts will soon force them to increase their productivity by making better use of information technology, futurists say.

For example, a 1986 report by the U.S. Congress's Office of Technology Assessment listed a variety of information technologies — from expert systems to computer conferencing — that could be adopted by federal agencies. Contributing to the report was a futurist think tank, J. F. Coates, Inc. in Washington, D.C.

Automation blues

Joseph F. Coates, president of the think tank, warns that the single biggest threat now facing the computer community's future is the failure to understand the effects of office automation on workers.

For example, office automation radically changes the flow of authority and responsibility in an organization. "It isn't a matter of information flowing up or down anymore. Now you have information flowing in networks, in any direction the worker wants it to flow," Coates says.

In addition, he says that many vendors and office managers have ignored the importance of ergonomics, such as comfortable chairs and desks and proper lighting for VDT users.

"For the next decade, one of the biggest concerns of the Occupational Safety and Health Administration is going to be improving the white-collar workplace," Coates predicts. "But the industry has chosen to ignore looking at that."

Indifference

MIS managers and vendors are indifferent to the concerns of employees using computer systems, Coates charges, "because it's technicians selling to technicians."

One group that is trying to understand the broad human implications of the information age is the Information Industry Association (IIA), a trade group for information service companies.

David Pearce Snyder

The single biggest threat now facing the computer community's future is the failure to understand the effects of office automation on workers.

The IIA's decision to start a futures research project can be traced back to a 1985 speech by Robert Weissman, president of Dun & Bradstreet Corp., who challenged the industry to ensure that the information revolution is a boon, not a bane, to mankind.

He encouraged the IIA to focus what he called "the long-term direction of our industry and the public policy framework in which it can most effectively operate for the good of all."

The first major step in that project was to sponsor a report, "The Information Millennium," by Clement Bezold and Robert L. Olson, both members of the nonprofit Institute for Alternative Futures in Alexandria, Va.

Four views

The four alternative scenarios for the year 2000 presented in the report range from the optimistic to the pessimistic (see chart lower left). There is the technology-dominated scenario driven by a booming economy and a scenario in which technology is harnessed for personal growth and social advancement.

On the gloomier side, there is the aptly titled "Things Bog Down" scenario and an authoritarian scenario similar to George Orwell's *1984*, in which a Big Brother government uses technology to watch and control its citizens.

In each case, the futurists consider plausible trends in technology, the information industry, society and government policy.

For example, each scenario addresses the effects of artificial intelligence, hypertext, systems interoperability, cultural values, the world economy, proprietary rights, computer literacy and privacy issues.

The report provides background material that should help IIA members develop their own long-term plans for their corporation as well as influence government information policy, Weissman says in the preface.

"The challenge," he says, "is to crystallize our vision of the information millennium and to do what we can to try to bring about the kind of information society that we believe will most fully realize the incredible promise of the information revolution."

Year 2000: Alternative futures for the information industry

The next 15 years could be Orwellian, Utopian or something in between

High-tech information society:
Driven by a booming economy, advanced information technologies are rapidly incorporated into new products. Expert systems are used for routine text processing and routine decision making (such as the basic qualifications for a loan). Speech recognition and synthesis are used for order taking and other routine customer interaction.

Creative society:
Technological progress is rapid — the same as in the high-tech scenario — but there is a profound change in values. Enhanced productivity is sought not only for financial success but increasingly for personal growth and social advancement. Privacy is protected diligently by industry and government. The big technology breakthrough is in neural networks.

Things bog down:
Technological progress is slower than expected and worsened by expensive and tragic failures by artificial intelligence systems in business and the military. Privacy problems worsen. Information gaps between the rich and poor amplify inequalities. U.S. manufacturers lose market share to foreign competition in more and more areas of information technology.

"1984" and beyond:
An economic depression, an AIDS epidemic and terrorist incidents lead the public to accept greater government controls and surveillance. A "freedom fighter" underground of computer hackers emerges. Technology advances are driven by government policy. After the depression, businesses rapidly adopt information technologies to enhance productivity.

INFORMATION PROVIDED BY THE INFORMATION INDUSTRY ASSOCIATION AND THE INSTITUTE FOR ALTERNATIVE FUTURES
CW CHART: AMY J. SWANSON

From chief MIS role to futurist

Consultant was once the MIS manager at the IRS

The career path of futurist David Pearce Snyder is as unusual as it is logical.

From 1971 to 1974, Snyder was chief of information systems at the Internal Revenue Service. After that, he worked as the IRS's chief of strategic planning until 1981, at which time he launched a business as a consulting futurist in Bethesda, Md.

Why go from MIS chief to planner to futurist? For one thing, Snyder got frustrated working with engineers. "I didn't like being the only generalist surrounded by technologists," he says.

But there was a more significant reason: Snyder realized that insufficient planning was causing the IRS to install computer systems that would become overloaded in just a few years, and he felt the desire to design flexible systems that would be able to grow to meet future needs.

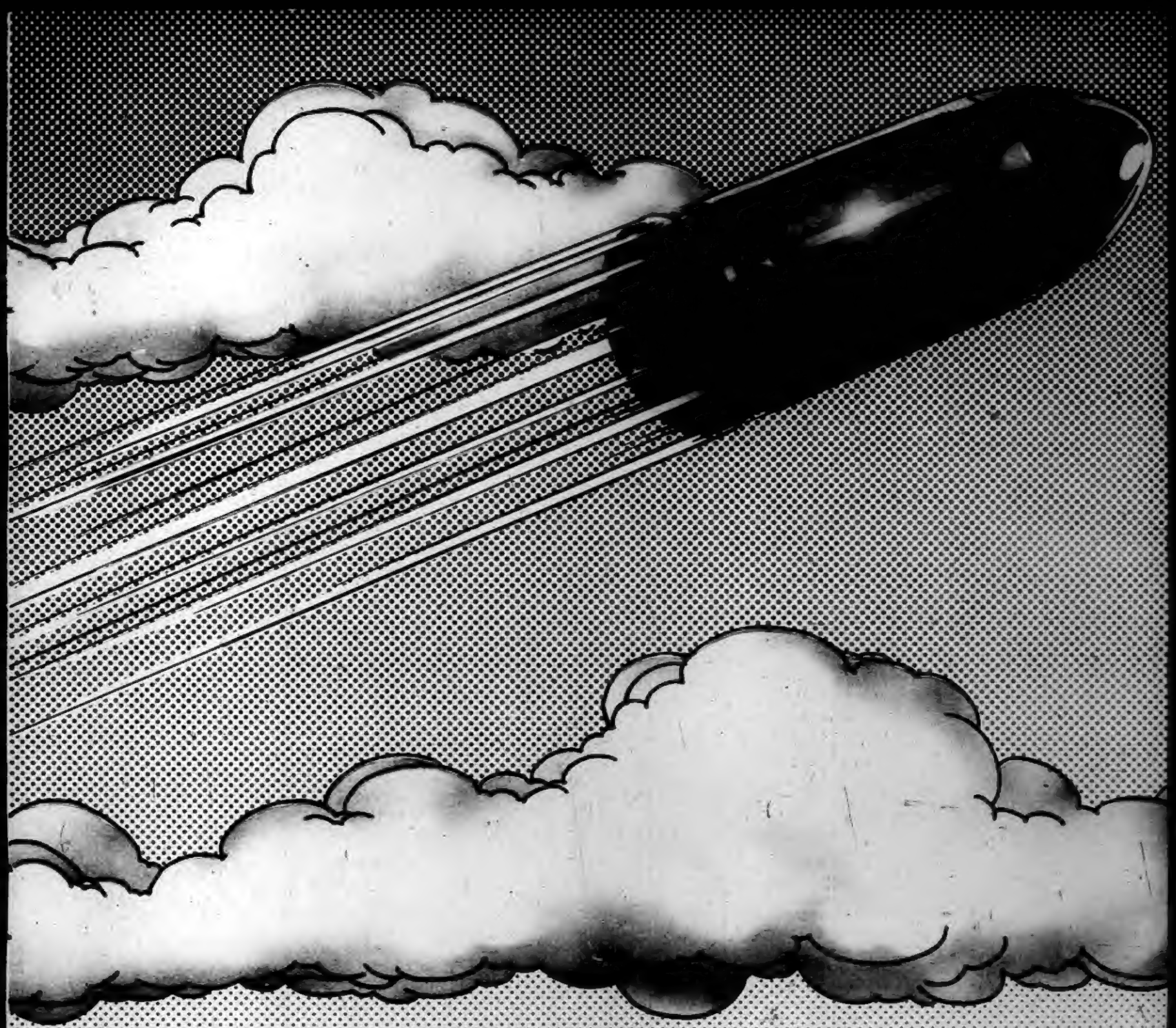
"I became much more interested in figuring out how to better plan for the future, generally," he explains.

In addition, Snyder found that the biggest problems relating to information systems were people problems. "The technology was powerful, but the much greater problem was getting people to understand it and to have the right people with the right skills to use it," he says.

Snyder also scorns those people who focus only on technology as though it exists in isolation.

"A futurist has got to be a generalist, because the world is not a specialized place. The future is everything that's going to happen, not just technology," he says.

MITCH BETTS



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Economic preview

Unless the government intervenes, we may be headed for 'the recession of '89'

BY ALAN ALPER

The stock market crash of Oct. 19, dubbed "Black Monday," is expected to have a rippling effect on the nation's economy in 1988 as consumer confidence wanes and economic growth slows to a trickle. The situation could lead to an outright recession in 1989, unless the U.S. government takes quick remedial action to bolster its sagging economy, economists suggest.

Most economists, however, say the stock market slide was a reaction to — and not a cause of — the declining value of the dollar and intractable U.S. federal deficit and trade imbalances.

Historically, downturns in the nation's economy have caused many companies to place strict limitations on information systems spending. In the past, many chief executives viewed information systems as an expense item, not a vehicle for competitive advantage.

"Information systems were viewed as fat, as opposed to muscle," notes Eric Knutsen, managing parter of consulting services at the Gartner Group, Inc. in Stamford, Conn.

Although many companies now embrace information systems as competitive weapons, the weak economic prognosis for 1988 may not bode well for MIS. Top executive support may waver.

"Much of what is said is pure rhetoric," Knutsen says. "The historical view still prevails in the corporate suite."

Weak consumer spending and increased inflation in the U.S. were two telltale signs of impending economic trouble prior to October's "Black Monday," the memorable day the Dow Jones industrial average tumbled 508 points, losing one-quarter of its value and leaving investors with an estimated $1 trillion loss on paper. The heavy losses have also undermined consumer confidence, which economists say could translate into a weakened economy late in 1988.

The possibility of a worldwide recession hinges almost entirely on the extent to which the U.S. can trim its budget and trade deficits, economists emphasize.

White House and congressional negotiators have agreed to measures that would reduce the estimated $170 billion U.S. budget deficit by some $30 billion this fiscal year and an additional $45 billion next year, figures that exceed the mandatory deficit reduction of the Gramm-Rudman-Hollings law.

What remains to be seen is how effectively Congress can enact budget cuts and agree on tax increases in order to meet the deficit reduction goals that have been set.

"The United States must get its spending in line with revenues," comments Nigel Gault, an economist with Data Resources, Inc. in Lexington, Mass. "If that happens quickly, then we think the U.S. can get by with weak growth in 1988 and no recession."

RICHARD OSAKA

Modest growth in '88

Many economists agree. A recent issue of the "Blue Chip Economic Indicators" newsletter reports that the consensus among 49 economists nationwide is that the Gross National Product will grow by 1.9% in 1988.

That figure is almost a full percentage point lower than projections that had been reported before Black Monday and six-tenths of a point lower than estimated growth for 1987.

The majority of economists surveyed say the economy is heading for a recession that most likely will start in 1989. Only one in five says he sees a recession starting in 1988, the report states.

Bob Eggert, publisher of the newsletter, says that despite the projections for only modest growth next year, there are some positive signs.

"Interest rates have come down, and there's been some moderation of inflation," Eggert says. "With the stock market situation, people are moving cash to their savings accounts."

The recent decline in the value of the dollar is viewed as a mixed

Continued on page 8

MIS is slow to brake on spending

MIS executives planning capital expenditures and staffing requirements are, for the most part, taking a wait-and-see attitude regarding the unfavorable economic outlook.

Many MIS executives insist they have not yet finalized budgets, and those who have emphasize that money allocated will not necessarily be spent at planned levels. Few firms seem inclined toward knee-jerk belt-tightening lest they lose momentum on automation projects critical for long-term competitiveness.

"Those companies that feel the pinch will most likely try to squeeze as much out of their people as their hardware," notes Steve Jocelyn, an analyst with International Data Corp.

Software before staff

Michael Webber, senior vice-president at The Diebold Group, Inc., a New York-based research firm, says personnel is the first area companies usually reduce. They then scrutinize telecommunications and computer hardware procurements, he adds. Software has become almost sacred, he suggests, and will be touched only if absolutely necessary.

According to economist Nigel Gault and an economic forecast revised after the crash by Data Resources, Inc., capital spending for information technology is expected to increase by 9.7% in 1988. "We revised our figures downward slightly," Gault says.

Larry Stouder, information center manager at Continental Grain Co. in New York, says his firm has not eliminated any capital expenditures. "We're going ahead and purchasing PCs and LANs," he says. "I haven't been told not to."

Some are cutting back

Yet, other companies seem unwilling to commit to increased capital expenditures until confidence in the economy is restored. John Koski, an assistant vice-president at Johnson & Higgins, a New York-based insurance brokerage, says his firm will significantly slash its purchases of microcomputers in 1988 in response to soft business prospects.

"We're looking at a 20% to 25% reduction," he notes, adding that final budget decisions have not yet been made.

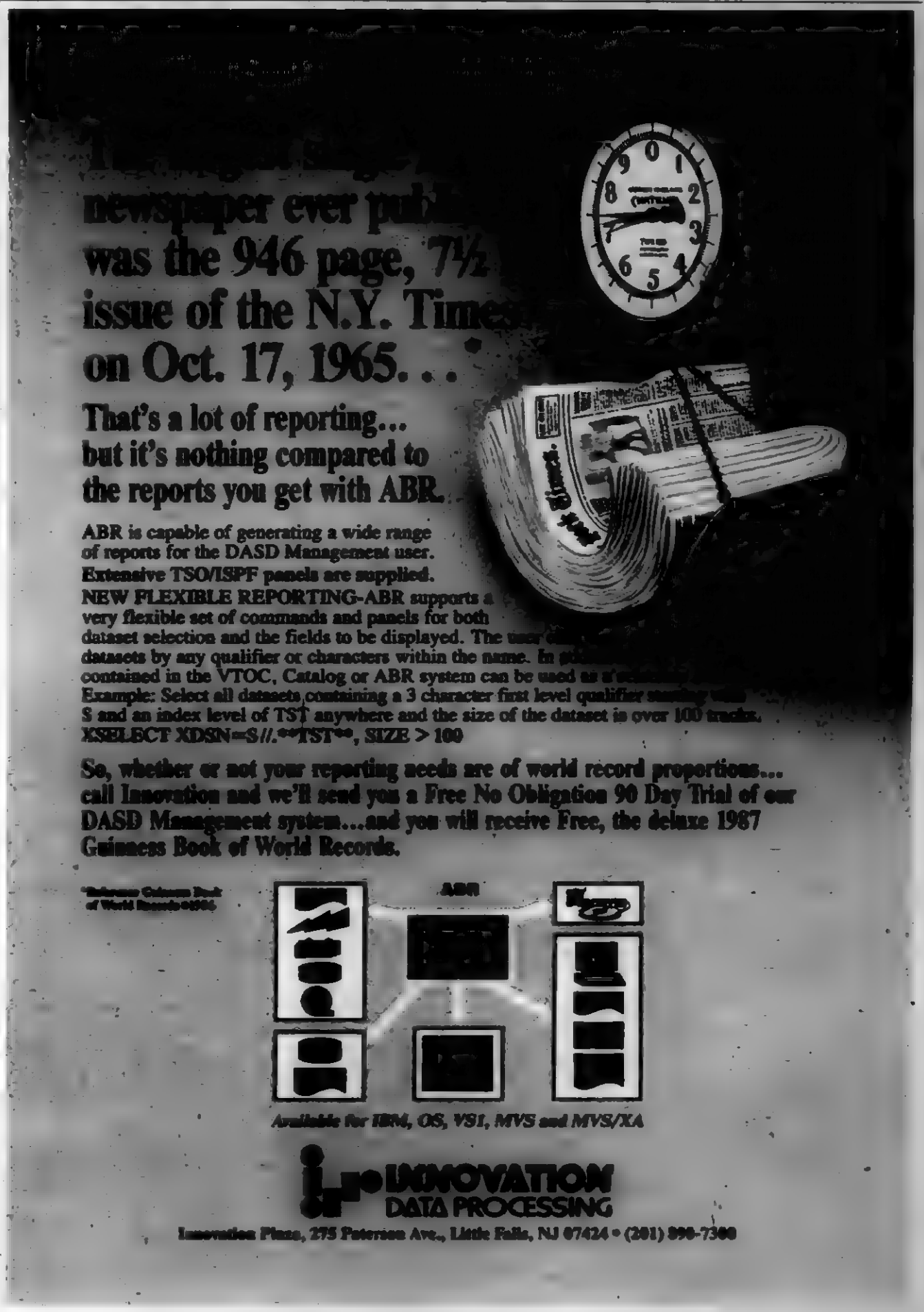
Executive recruitment companies report a slowdown in activity. Some financial services companies have put a freeze on new hires and are not as apt to fill vacant positions as they were before the stock market slide.

"There's been a significant decrease in recruitment activity," says Hermina Grunfield of the Alwood Group, Inc. in New York. "But most MIS people are still high in demand, as opposed to traditional groups."

Hiring for critical microcomputer-related projects seems to be less affected by budget cuts than is hiring for mainframe-oriented jobs. "There's not as much demand for Cobol mainframe programmers as for people with Unix, C or DOS backgrounds," Grunfield says. "That will be true with or without a recession."

Bob Noddin, president of Metamicro Computer Consulting, Inc., says his firm has not yet received word that companies are pruning budgets for consulting and training services. "Some people are increasing their use of consultants because it eliminates paying fringe benefits while keeping key projects going."

ALAN ALPER



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Hartford, CT	2/23
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Philadelphia	2/4
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Pittsburgh	2/2
Portland	1/27
Raleigh, NC	2/2
Rochester, NY	1/28, 3/16
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Salt Lake City	1/27
San Diego	2/23
San Francisco	2/3, 3/16
San Jose	2/23
Seattle	1/26, 3/10
St. Louis	2/25
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Preview

CONTINUED FROM PAGE 6

blessing, economists say. While the dollar's plummet reflects weakness in the U.S. economy, it could work to lessen the trade deficit by making U.S. goods more competitive overseas and foreign products more expensive here.

Aftermath

A softer economy in 1988 will no doubt hurt most industries to varying degrees. At press time, economists and analysts were waiting for data on the impact of the stock market collapse before revising their economic outlooks for 1988.

Congress is looking carefully at programs where management is screwing up as areas to cut. Cuts will be made . . .

BOB DORNAN
Federal Sources, Inc.

The following, therefore, is a series of thumbnail sketches of economic expectations and MIS spending projections for various sectors of the economy throughout 1988.

Financial services. The financial services industry will be the first sector of the economy to be affected by the instability and volatility of the world's stock markets.

Many of Wall Street's brokerage firms, in particular, are expecting their five-year span of uninterrupted growth to come to a screeching halt in 1988. Lower earnings or outright losses as well as layoffs could well resound throughout the financial community this year.

"Financial services companies are bound to cut back on spending," Data Resources' Gault notes. "The extent to which they are spending for computers is something that will be looked at, too."

Ken Goldstein, an economist with the Conference Board in New York, agrees, noting that many Wall Street firms have already investigated ways to cut expenses.

"Somebody told me a story about a guy who lost his job the Tuesday after Black Monday and who was asked to come in the next weekend to help the company catch up with its paperwork," Goldstein recalls. "The cutbacks have begun."

For banks, insurance companies and thrift institutions, the economic outlook is extremely dependent on the ebb and flow of interest rates, economists say. Although tough to call, the prognosis is that, barring unforeseen circumstances, interest rates will most likely remain low throughout 1988.

Financial services businesses, which have become major users of information processing technology, will most likely continue purchases when competitive advantage is at stake and could boost investments in making existing systems more efficient. Less critical projects will most likely be deferred to a later time.

"The industry, after years of unbridled growth, will attempt to do more with less," one Wall Street MIS executive says.

Manufacturing. The decline of the value of the dollar will most likely benefit manufacturing firms that export their goods overseas. Computer and chip manufacturers, durable goods makers and appliance manufacturers may be able to recapture lost domestic market share, since Japanese-made products have increased in price.

"I've seen a cautious approach to business prospects in 1988 for manufacturers," notes Paul Clermont, a principal with consulting firm Nolan, Norton & Co. in Lexington, Mass. "Many expect modest growth but are not making optional expenditures. Some people have gotten smarter over the past years and are spending what they need to remain competitive."

Eric Knutsen

The Conference Board's Goldstein agrees, noting that the stock market's impact on capital spending could wane during the next few months if deficit reduction plans are put into place and consumer spending accelerates.

"Clearly, things that are not needed immediately, like office automation equipment, could be cut out," he says. "Things needed to remain competitive, such as factory automation gear, are less likely to be as severely impacted."

Government. Although limited by federal budget cutting, the government's procurement of information processing technology is expected to grow because of a number of ongoing modernization programs. The government is expected to spend $13.4 billion on new information technology in 1988, plus $4 billion on personnel to program, maintain and operate the new equipment, according to Bob Dornan, an analyst with Federal Sources, Inc. in Washington, D.C.

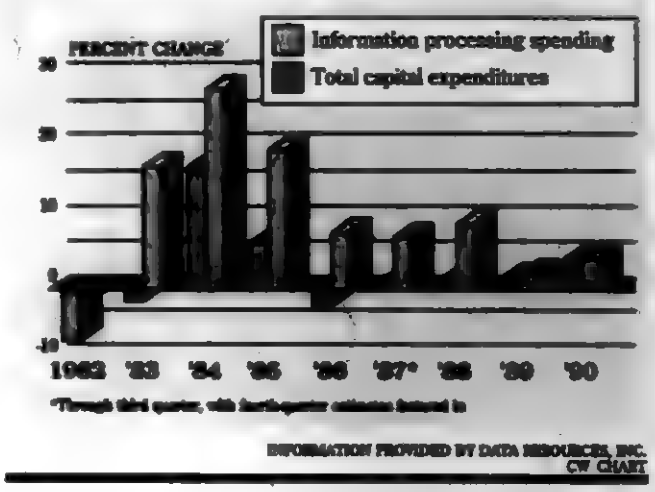
"Much of the spending already takes into account tighter budgets," Dornan says.

Even though budget cutting may hurt some departments, critical efficiency programs — like ongoing automation of the Social Security Administration — will unlikely be affected.

"Congress is looking carefully at programs where management is screwing up as areas to cut," Dornan suggests. "Cuts will be made even if the programs are cost-justified."

Total capital expenditures vs. information processing spending

Projected percent increase or decrease, based on previous year's results



*Through third quarter, with fourth-quarter estimates factored in

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CW CHART

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And the survey says . . .

When the stock market crashed, firms throughout the world moaned collectively as their Wall Street-traded stock took a stupendous free-fall. In the crash's wake, economists frantically revised U.S economic forecasts, and businesses instinctively tightened their belts.

But how will such an event affect MIS hiring and spending? *Computerworld* asked 100 MIS executives in four strategic markets what economic scene they forecast for 1988, whether they expect a slowdown in the economy and what a lagging economy might mean for capital expenditures like mainframe computers.

Below are the questions and results.

Do you expect 1988's national economy to be slower or more robust than 1987's economy?
Slower: 59% More robust: 23% No change: 18%

Do you anticipate a recession in 1988?
No: 76% Yes: 22% Don't know: 2%

In the event of a recession, how, in your opinion, will MIS be affected?
A. Staff cutbacks. No: 77% Yes: 22% Not sure: 1%
B. Budget reductions. No: 50% Yes: 49% Not sure: 1%
C. Hardware acquisition reductions. No: 60% Yes: 39% Not sure: 1%
D. Special project cutbacks. No: 52% Yes: 47% Not sure: 1%

Do you expect your MIS purchasing and acquisition plans for 1988 to be affected by recent stock market fluctuations?
No: 74% Yes: 20% Don't know: 6%

Are you planning, at this time, to increase or decrease your MIS budget as a whole in 1988?
Increase: 54%? Decrease: 14% Neither: 31% Not sure: 1%

By what percent?
Average increase *(52 respondents)*: 14%
Average decrease *(4 respondents)*: 17%

Are you currently planning to increase or decrease your MIS staff in 1988?
Increase: 34% Decrease: 5% Neither: 59% Not sure: 2%

By what percent?
Average increase *(31 respondents)*: 20%
Average decrease *(4 respondents)*: 15%

Are you currently planning to increase or decrease your software development efforts in 1988?
Increase: 55% Decrease: 6% Neither: 34% Not sure: 1% Not applicable: 4%

By what percent?
Average increase *(49 respondents)*: 21.3%
Average decrease *(4 respondents)*: 8.8%

Do you expect to increase or decrease your large-system (mainframe hardware) expenditures in 1988?
Increase: 33% Decrease: 8% Neither: 46% Not applicable: 13%

By what percent?
Average increase *(30 respondents)*: 27.5%
Average decrease *(4 respondents)*: 18%

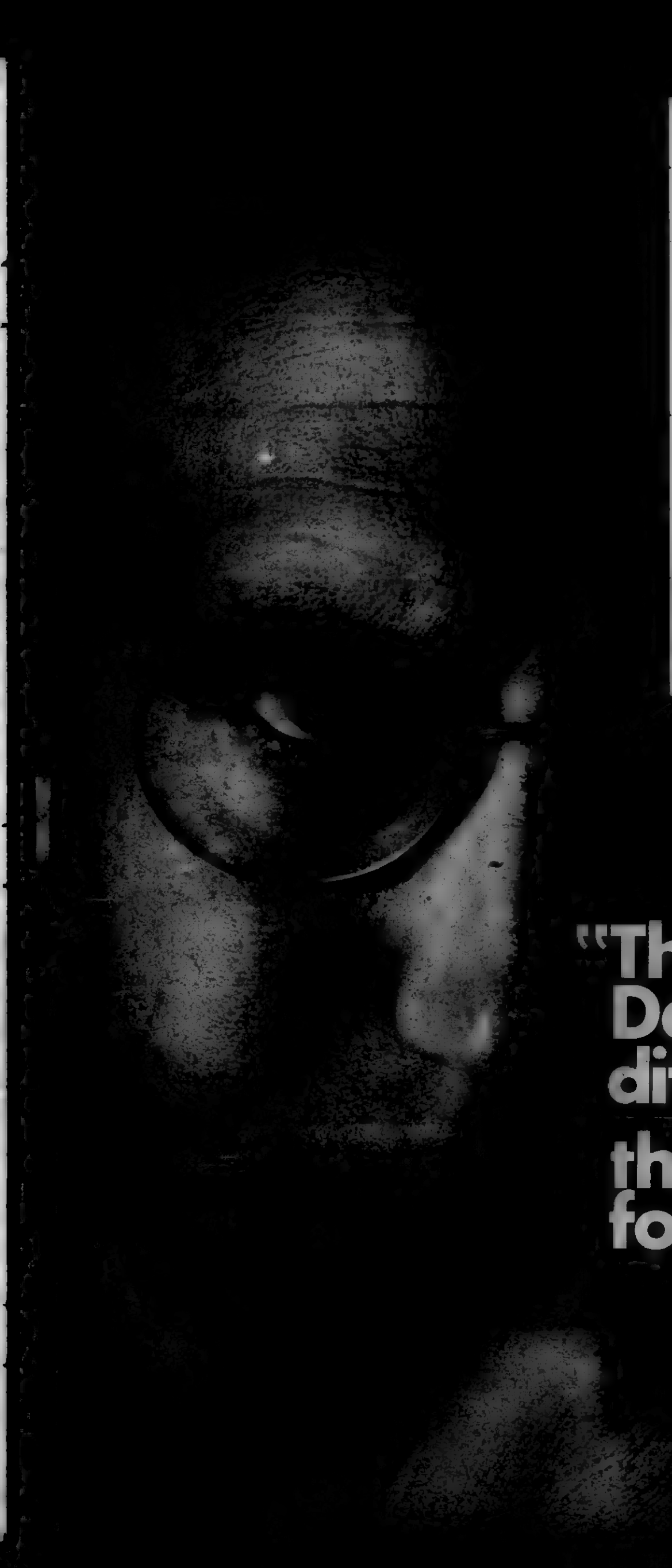
Do you expect to increase or decrease your mid-range system expenditures in 1988?
Increase: 30% Decrease: 4% Neither: 56% Not sure: 2% Not applicable: 8%

By what percent?
Average increase *(27 respondents)*: 36.3%
Average decrease *(2 respondents)*: 2%

Do you expect to increase or decrease your microcomputer and workstation hardware in 1988?
Increase: 45% Decrease: 6% Neither: 40% Not sure: 2% Not applicable: 7%

By what percent?
Average increase *(41 respondents)*: 22.3%
Average decrease *(4 respondents)*: 15%

Will MIS expenditure increases or decreases exceed those of the corporation as a whole?
No: 62% Yes: 25% Not sure: 13%



And for companies like Southern States, Maguire Insurance Group and the NCNB National Bank of North Carolina.

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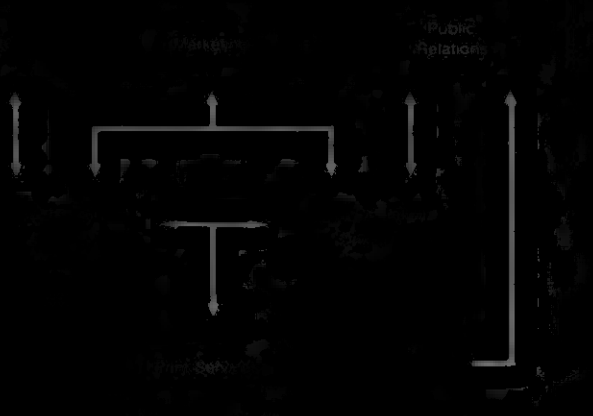

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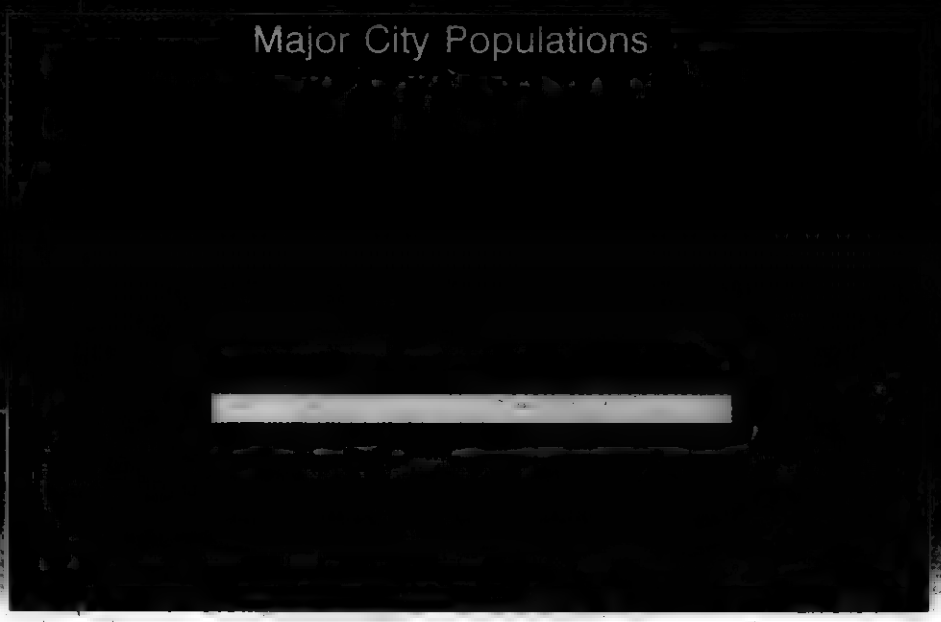

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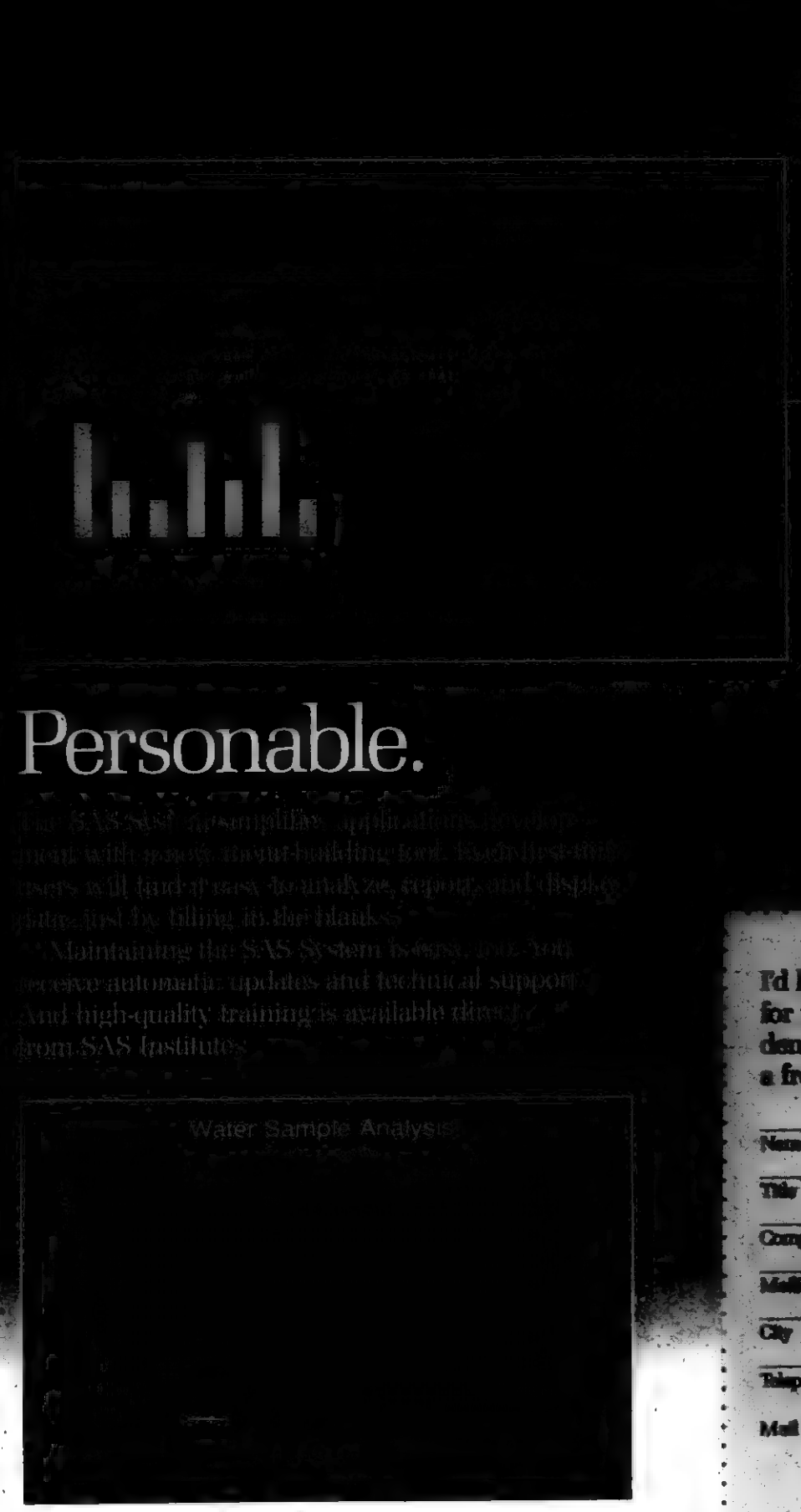

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Dubious distinctions

Computerworld *bestows odious honors upon a hapless few*

Let's face it, 1987 wasn't always a year to write home to Mom about.

From the Iran-Contra hearings to the stock market convulsions, '87 kept us glued to our newspapers long after we should have been bent over our keyboards working. And the computer industry, try as it might, was not immune to 1987's problems. The past year was one marked by snafus — announced products that never showed up, touted trends that faded into the woodwork and hot companies that seemingly fell off the face of the earth.

Computerworld has compiled the following list of these odious honors — our version of the Flying Fickle Finger of Fate Awards — to pay a final tribute to those who shocked and bemused us during the past year. And the awards go to . . .

.....

Lt. Col. Oliver North: You can shred, but you can't hide

North and his secretary, Fawn Hall, try to shred and alter printouts of computer messages as part of a cover-up of the Iran-Contra scandal. But they forget that originals are stored in a central computer archive. Despite the shredding, an implementation of IBM's electronic mail product, Professional Office System, at the National Security Council provides the Tower Commission with a first-hand, contemporaneous account of the events surrounding the affair.

RICH TENNANT

Better luck next time

In October, 11 months after a high-profile Comdex/Fall '86 announcement of its Silk — a contender against Lotus Development Corp.'s 1-2-3 — Daybreak Technologies, Inc. files for bankruptcy under Chapter 11 protection.

.....

Too much too late

Thanks to the plunge in takeover stocks when Ivan Boesky pleads guilty to insider trading, Comdisco, Inc. reports a loss of $20 million not long after its confident diversification into the risk arbitrage business. When the stock market crashes, the same unit loses $100 million on paper. In November, Comdisco's board votes to exit the risk arbitrage business.

.....

Once is not enough

A top marketeer at Relational Technology, Inc., after extolling the merits of the firm's Ingres relational data base management system over competitor Oracle, Peter Tierney resigns to take the top marketing job at Oracle Corp., where he will extol the merits of its Oracle relational DBMS against . . . you guessed it.

Edward Zander makes a similar move from an upper-level marketing post at Apollo Computer, Inc. to a comparable position at archrival Sun Microsystems, Inc.

.....

Is anybody there?

Seemingly dropping off the face of the earth, Canaan Computer Corp. goes out of business, not bothering to tell many customers or OEMs.

Vapor where?
At one point in 1987, Lotus Development Corp. has 11 products on the "vapor list."

.....

Creative language class
In November, IBM announces that it has shipped one million Personal System/2s. In fact, IBM's definition of "shipped" is that products have moved from the factory to the warehouse. At this point, there's no way to tell how many have actually been sold.

.....

Always a bridesmaid
After three unsuccessful attempts to merge with other companies, 3Com Corp. finally succeeds on the fourth attempt, tying the knot with Bridge Communications, Inc.

.....

Good idea, bad execution
Lotus's Signal stock quote system, designed to handle market declines of up to 99 points, cannot track the Dow Jones industrial average's 508-point nosedive on Black Monday.

.....

Let's make a deal
Since exiting the Winchester disk drive business in 1986, Computer Memories, Inc. looks for a way to deploy $24.8 million in cash and cash equivalents. Even an agreement to merge with Herndale Film Corp., a motion picture distributor, is canceled.

.....

Him with foot in mouth
In the face of popular and growing support for Manufacturing Automation Protocol (MAP), Digital Equipment Corp.'s Ken Olsen asks, "Why do we need another network?" He implies that DEC's proprietary Decnet is ready and waiting for factory networking applications. According to a source who attends his speech, Olsen says a standardized networking scheme would be like a Russian truck — functional but boring; nobody would want it. In the meantime, DEC is hard at work supporting MAP with compatible products.

.....

He did it his way
Promoting his autobiography, John Sculley, chief executive officer of Apple Computer, Inc., is all over the media. His face appears just about everywhere but the cover of *Field & Stream*. And he apparently decides promotion is as good a reason as any to embarrass himself and Steve Jobs by telling how Jobs cried at the board of director's meeting at which he was ousted from Apple.

.....

Oops
For the first time ever in IBM history, Chief Executive Officer John Akers leads the industry giant to its second straight year registering a drop in profits.

.....

Those were the days
At one time the biggest computer conference in the world, the National Computer Conference is mismanaged so badly by the American Federation of Information Processing Societies and NCC organizers that it turns into an also-ran, abandoned show that time passed by.

.....

Oh. . . . Never mind
On Jan. 20, 1987, Enmasse Computer Corp. issues a press release announcing a new product line. Enmasse subsequently issues a release dated Jan. 19, 1987, saying the company is ceasing its manufacturing and sales operations.

.....

Better never than late?
Infoloans, a hot integrated loans package for banks, was scheduled for a March release, but the product's developer, Uccel Corp. (now Computer Associates, International, Inc.), drops hints that it will be off schedule. Finally, in May, the company says it will announce a new shipment date by June. In June, Uccel does so. The release will be at year-end 1988 — almost two years behind schedule.

.....

The best-laid plans
Former National Security Advisor John Poindexter signs a computer security memo that creates such a storm of controversy that Frank Carlucci, his replacement, has to rescind it. The memo requires U.S. agencies to search data bases for unclassified information too sensitive to be disclosed and raises the specter of government censorship.

.....

Can't win for losing
Facing the ultimate double whammy in U.S trade sanctions, Toshiba Corp. is nailed. First, Toshiba laptops are slapped with 100% punitive tariffs in connection with the U.S.-Japan semiconductor trade dispute. Then, Congress considers a total ban on Toshiba imports after a subsidiary is found to have been selling advanced technology to the Soviet Union. Some irate members of Congress take to "Toshiba-bashing" literally, standing outside the Capitol with sledgehammers and slamming away at Toshiba radios.

.....

What, me worry?
The only organization to oppose the continuation of the widely used Data Encryption Standard (DES) for safeguarding computer and communications data, the National Security Agency worries that a major code-breaking effort by the Soviet Union's KGB could ruin the standard. But the rest of the computer world says DES is just fine.

.....

Just following orders
In the aftermath of the stock market crash Oct. 19, the practice of computer-aided program trading takes the heat. Members of Congress suggest that use of the software drove the velocity of the already rapidly declining market. Others point out that computers do only what people program them to do and that program trading cannot be used as a scapegoat for the market's demise.

TRENDSETTERS

Dennis Klinger's "things to do" list for the next few months includes switching his company from its Motorola, Inc. minicomputers to IBM System/36s and 38s and rearchitecting about 75% of the total system portfolio.

The vice-president of MIS at Ryder Truck Rental, Inc. in Miami says the switch-over is an activity that involves one million lines of code. "We didn't just convert but totally rearchitected the systems portfolio to handle the changes in the businesses," Klinger says.

If that burden were not heavy enough, Klinger also looks after a slew of computers, from an IBM 3080 and an Amdahl Corp. 5860 to the minis and hundreds of personal computers, mostly from IBM. He says he has other projects in the works as well.

True systems

"We are moving as aggressively as we can toward end-user computing, and we've been a big subscriber of the information center concept. We're also moving to an implementation of the true executive information system," he says.

The corporation's philosophy is to leverage its resources, assets, people and facilities, Klinger explains, saying that he and his staff are working to integrate the systems to parallel that corporate objective.

To meet those goals, Klinger constantly puts his staff to the test, sending them into the field to see what the users do and bringing in users to see what MIS is all about.

Client objectives

"I believe that MIS people in our organization need to understand the business and be a value-added contributor," Klinger maintains. "I try to make each MIS person understand the objectives of our clients — the users. To do that, they need to understand the needs of our company's customers, and then they make any suggestions on how MIS can help."

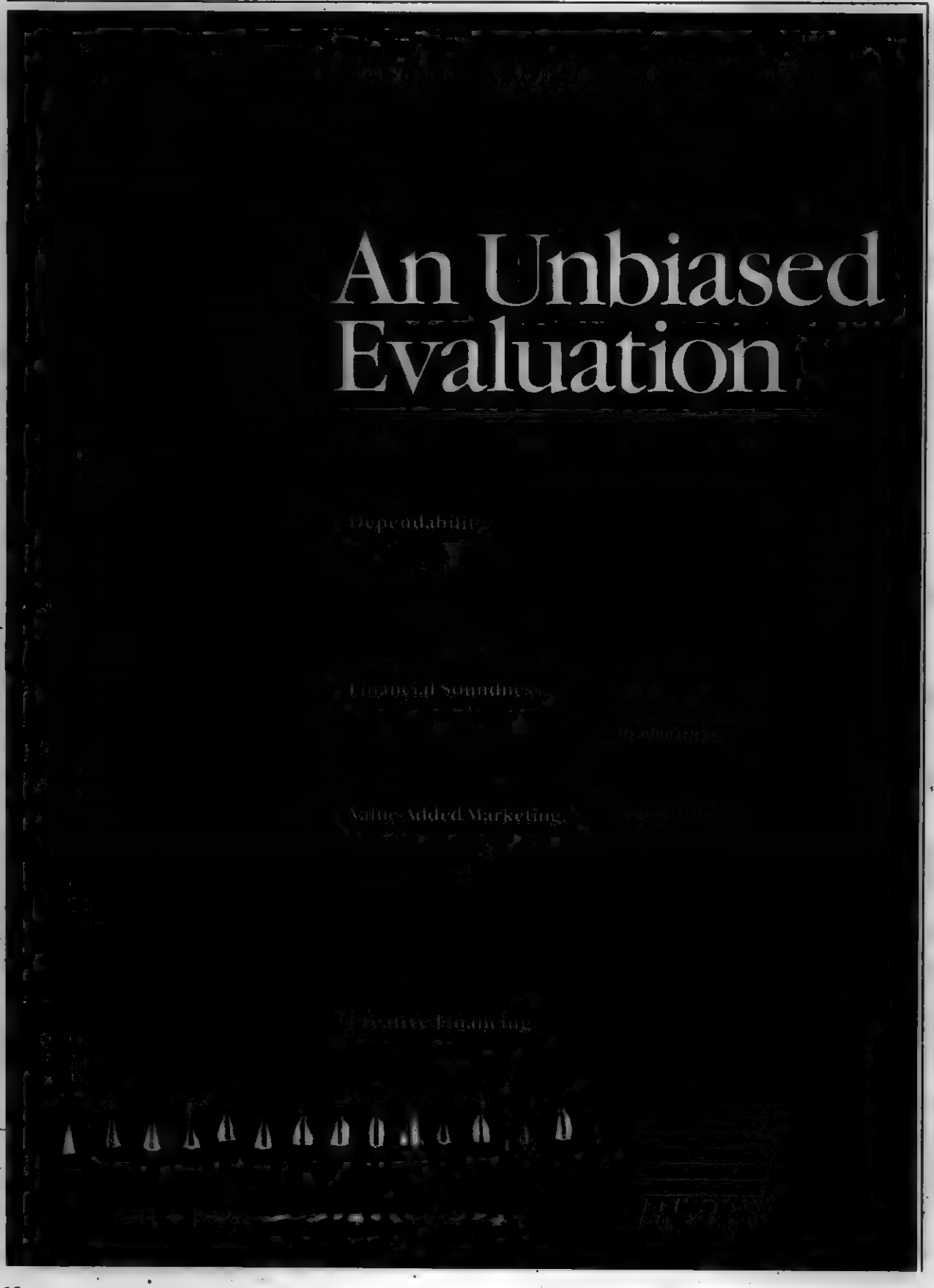
Klinger says that while he does not consider his shop to be on the "bleeding edge" of technology, his philosophy is to implement what is practical. "We have to know what the bleeding edge is and try to forecast that," he says. "But we will only implement it when it is practical for our company.

"It's like steering a barge in a river," he adds. "You may go slow, but you need to know when to turn long before the guys driving the speedboats do. You need to plan ahead."

ALAN J. RYAN

We are moving as aggressively as we can toward end-user computing, and we've been a big subscriber of the information center concept.

DENNIS KLINGER
Ryder Truck Rental, Inc.



Forecaster

How much power?

A prediction of MIPS[1] ratings for computing devices

[1] Million instructions per second
[2] An embedded computer resides in the device it controls

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CW CHART

Workhorse operating systems square off

Vendors look to fix system shortcomings

BY CHARLES BABCOCK

When the power goes out at an IBM MVS/XA installation, system operators scramble to go through shutdown and start-up procedures.

When the power is lost at a Digital Equipment Corp. VAX site, VMS reboots and reconfigures itself.

Tasks presented to MVS/XA are dependent on CLIST commands or IBM's intricate, hard-to-learn JCL, which tells the operating system exactly what resources are needed for the job. Tasks presented to VMS can frequently take the form of statements such as Copy, for copying files, or Purge, for getting rid of files. If a user forgets the commands, VMS supplies a Help screen.

"When you expose IBM system operators to the DEC world, they can't believe how easy it is to operate," says Michael J. Schowalter, a veteran of the IBM mainframe world who is now director of DEC programs at Software AG of North America, Inc. in Reston, Va.

But any operating system represents a set of trade-offs, and no operating system does everything well. VMS's ease-of-use attributes do nothing to improve its lackluster performance on some workhorse tasks where MVS/XA shines. As IBM and DEC enter another year of their broadening rivalry, both will attempt to address the weak points of their production operating systems.

Customers will look at the price/performance ratio of millions of instructions per second (MIPS) available in a DEC Vaxcluster vs. those on a mainframe and wonder which one offers the better investment. With DEC claiming it can offer cheaper MIPS, attention will probably turn to the respective merits of each company's operating system. In particular, customers will want to assess system overhead, ease of use and transaction processing capabilities.

Does this mean DEC will continue to push relentlessly upward toward IBM's control of the data processing center? Not exactly. Whatever ground IBM has to concede on the first two issues — that VMS has less overhead and is easier to use — it will not yield at all on the third: transaction processing.

PHILIPPE WEINBERGER

On a high-volume, I/O basis, VMS and the Vaxcluster are plodding beasts of burden compared with the sleek thoroughbred of MVS/XA on an IBM 3090 mainframe. VMS is capable of 10 to 15 transaction/sec. compared with 200 transaction/sec. under MVS/XA for standard IMS transactions or 1,000 transaction/sec. with IMS Fast Path. But processing power, like beauty, can reside in the eye of the beholder.

"VMS enables you to distribute data and processing power across machines with a minimum number of operating personnel. But if your application requires the movement of tremendous quantities of data quickly, MVS/XA justifies its overhead in systems and operations personnel," says W. W. D. Dowdell, director of research and development at McCormack & Dodge Corp. in Natick, Mass., who is familiar with both the mainframe and minicomputer worlds.

Direct comparison of VMS and MVS/XA is nearly impossible, given that they represent the yin and yang of system software; they have, for all practical purposes, come out of two different worlds. But a sense of how they evolved, along with recent comments from their respective chief developers, offers a look at what direction the two are headed in.

MVS/XA grew out of the batch processing world of IBM's early 370 operating systems: OS/VSI, DOS/VS and DOS/VSE. When needs changed and users demanded more on-line, interactive capabilities, IBM began adding subsystems to MVS the way the first car builders added mechanical devices to carriages.

"The fact that there has to be a transaction processing monitor shows MVS comes out of the batch processing world," says Stuart Miller, president of Software AG

and previously an operating system designer for the former Sperry Corp. In addition to TSO or CICS, MVS is also sold with what amounts to a job-entry subsystem, JES2 or JES3, Data Facility Product for disk management and 12 or so other components for communications and other functions, giving the operating system a total of eight to 10 million lines of code.

Roger J. Heinen Jr.

"As measured by the number of moving parts, the System/370 operating system is undoubtedly mankind's most complex single creation," says Gary D. Brown in his widely read text, *System/370 Job Control Language*.

"If I were a data center manager, I would prefer MVS/XA, because it's a much better at processing transactions, much tighter and easier to control" from end-user intrusion, says Gerald P. Thompson, superintendent of computer projects at the U.S. Department of Energy's Savannah River Plant in Aiken, S.C. The uranium-processing site has three IBM mainframes interconnected with dozens of VAXs.

VMS, occupying about 500K bytes of VAX main memory, has a more compact, well-tailored look. Many of the functions added onto MVS were built into VMS, Miller says. These include peer-to-peer communications, job scheduling, system configuration and self-restart capability.

Thompson says he prefers VMS for a distributed environment in which the end user will take greater responsibility for his own computing. VMS "is easier to work with for developing applications," he says.

Science roots

DEC's roots place it close to the scientists and engineers who were using small computers in time-sharing environments. To this day, a VAX captures and processes each keystroke from a terminal as it is made, unless a server is installed to route them forward in blocks.

Roger J. Heinen Jr., one of the key developers of VMS at DEC's Nashua, N.H., site, says the DEC operating system includes a number of subtleties that are not widely recognized. Its paging algorithm, for example, does not rely on the common, least recently used measure for determining which pages of data go to disk.

VMS randomly moves pages from main memory into cache, where they can be called back quickly if needed. It then periodically sweeps the cache contents out to disk. The random-caching scheme is more effective, Heinen claims, because data used once is more likely to be needed again than least recently used statistics tend to indicate.

To compete with IBM, however, VMS will have to evolve into more of a transaction processor and a more intelligent manager of a Vaxcluster, DEC observers say.

"The first question I have for a DEC customer is how many terminals are you going to use? That could be the Achilles' heel of the system," Schowalter says.

Processing terminal transactions bogs down a VAX, although Heinen says VMS is a better transaction processor than is generally recognized. Most VAX application writers are trained to take advantage of its time-sharing capabilities. On a VAX, a transaction has to be assigned a higher priority than other time-shared tasks or it will be interrupted, Heinen explains.

"The traditional way of designing systems for VMS have not taken advantage of its transaction processing capability," Dowdell agrees.

VMS Version 5.0

In Version 5.0 of VMS, expected to be out in the second quarter of 1988, DEC is believed to be planning to introduce symmetrical multiprocessing, which will allow VMS to manage dual or quad processors as equals rather than one acting as master and the other as an underutilized slave. A quad-processor machine [CW, Nov. 2], in particular, would allow DEC to improve its transaction processing rates, although other constraints might surface.

The main source of bottlenecks, on top of instruction throughput, is managing I/Os, which depend on disk speed, channel speed, the Vaxcluster's record-locking mechanism and a dozen other factors. In order to exploit the maximum potential of a CPU, they must be resolved at each spot for smooth throughput.

Heinen claims the DEC development team is aware "each bottleneck has to be relieved in sequence. Every one we've identified, we can fix."

DEC will have to adopt some such approach if it brings out a multiprocessor CPU that some customers may wish to devote to high-transaction applications.

In addition, the DOE's Thompson recommends that DEC add more functions to VMS that can be managed remotely, so that users can be added to a remote system or backups can be made without a human operator.

Comparing IBM's MVS/XA and DEC's VMS

CW CHART

As measured by the number of moving parts, the System/370 operating system is undoubtedly mankind's most complex single creation.

GARY D. BROWN
Author, System/370 Job Control Language

Lock management can be a bottleneck on a cluster, since multiple CPUs are trying to access the same files in a data base and are hammering away at a lock manager that sits between the CPUs and the disks. Heinen says he is not able to comment on how its performance might be improved in future versions of VMS.

What is needed, suggest Software AG officials, is a virtual lock manager or a software mechanism like a data base manager that handles file contention inside the CPU. This would reduce I/Os and greatly speed access to records and transaction processing.

In that situation, each CPU would have to be associated with particular volumes of direct-access storage devices that it managed for the cluster. That way, an application could remain independent of any particular CPU in the cluster, and data could remain available to any application.

Schowalter says he thinks With MVS/XA, IBM continues to attack the constraints on I/Os and instruction throughput on a number of fronts. Its ability to do so capitalizes on the mainframe's strengths: offloading routine tasks, such as channel selection, to auxiliary processors; and making use of huge amounts of real memory, both in the form of main CPU memory and an innovation with the 3090 known as expanded storage.

Expanded storage is reserve memory in boards of silicon chips controlled by the paging supervisor of the operating system but not addressable by programmers. Through expanded storage, IBM has temporarily reversed the lead virtual memory usually enjoys over real memory. It has included in the 3090s a potential capacity for 16 terabytes of expanded storage, vs. the current 2G-byte virtual memory limit.

The existing 1G byte of expanded storage in the 3090Es

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has the effect of allowing freer use of MVS/XA's virtual memory without concern for whether it would engender I/Os.

One immediate effect was to allow huge buffers for IBM's DB2, playing up another IBM strength, managing large amounts of data. As DB2 data base designers learn to tap the large buffers, they will be able to load large tables into the CPU, speeding the performance of a relational data base, according to IBM observers.

In MVS/XA's most recent release, Release 2.2, IBM added a feature called Data In Virtual. It allows a data set in virtual storage defined by an application to be loaded into expanded storage inside the CPU. Normally, the application keeps data in a combination of CPU memory and auxiliary storage, such as disk drives.

"When you have data in virtual storage, you want it as close to the processor as possible. You don't want to do all those I/Os. That's where expanded storage comes in," says Richard Butler, the head of IBM's MVS/XA development lab near Poughkeepsie, N.Y.

MVS/XA is very weak communicating with other systems — even IBM systems.

GERALD P. THOMPSON
U.S. Department of Energy, Savannah River Plant

Once Data in Virtual became available, the application programmer would be able to put his data in virtual storage instead of worrying about moving it back and forth between CPU memory and "brown and round," as Butler calls disk drives.

Keeping data in virtual memory reduces complexity, Butler notes, and MVS/XA will be developed for additional productivity boosts in this realm, he says.

Although expanded storage is a hardware device, its management by MVS/XA is an example of how hardware and software development must proceed in tandem under the management of the operating system. The challenge, according to Butler, is to allow the operating system "to keep your resources in balance."

Upgrade with 3090F

IBM is expected to introduce an upgraded version of MVS/XA when it announces the 3090F series of processors in early 1988. William S. Husband, senior consultant for the Meridien Group in Deerfield, Ill., predicts that IBM will have increased the address word size from 31 to 38 bits and calls the operating system MVS/XB when it reaches that point.

Butler says there is "no such term as MVS/XB" and refuses to speculate on when the word size will be increased again. MVS/XA split away from MVS/SP when IBM announced an increase in the word size from 24 to 31 bits in 1981.

Although IBM officials concede that MVS/XA is a complex system, they say that their development efforts are driving toward incorporating more subsystem functions, such as VTAM file management, into the core operating system and toward reducing complexity in other areas.

IBM views requiring skilled operators as a constraint on MVS/XA operation and will seek to automate more human functions in the operating system and in related products, such as Netview, Butler says.

Thompson says he wishes IBM would improve MVS/XA's ability to interconnect with other systems, since he is responsible for linking the mainframes to an extensive Decnet network. "MVS/XA is very weak communicating with other systems — even IBM systems," he says.

Richard Butler of IBM's MVS/XA development lab

Husband says he believes IBM is working on increasing the number of CPUs that can be managed by MVS/XA and thinks expanded storage and its extensions will allow remote CPUs to be tightly coupled via high-speed fiber-optic buses.

Increasing the number of addressable CPUs may one day allow MVS/XA to address 370 architecture workstations and tightly integrate them with mainframe resources, he says.

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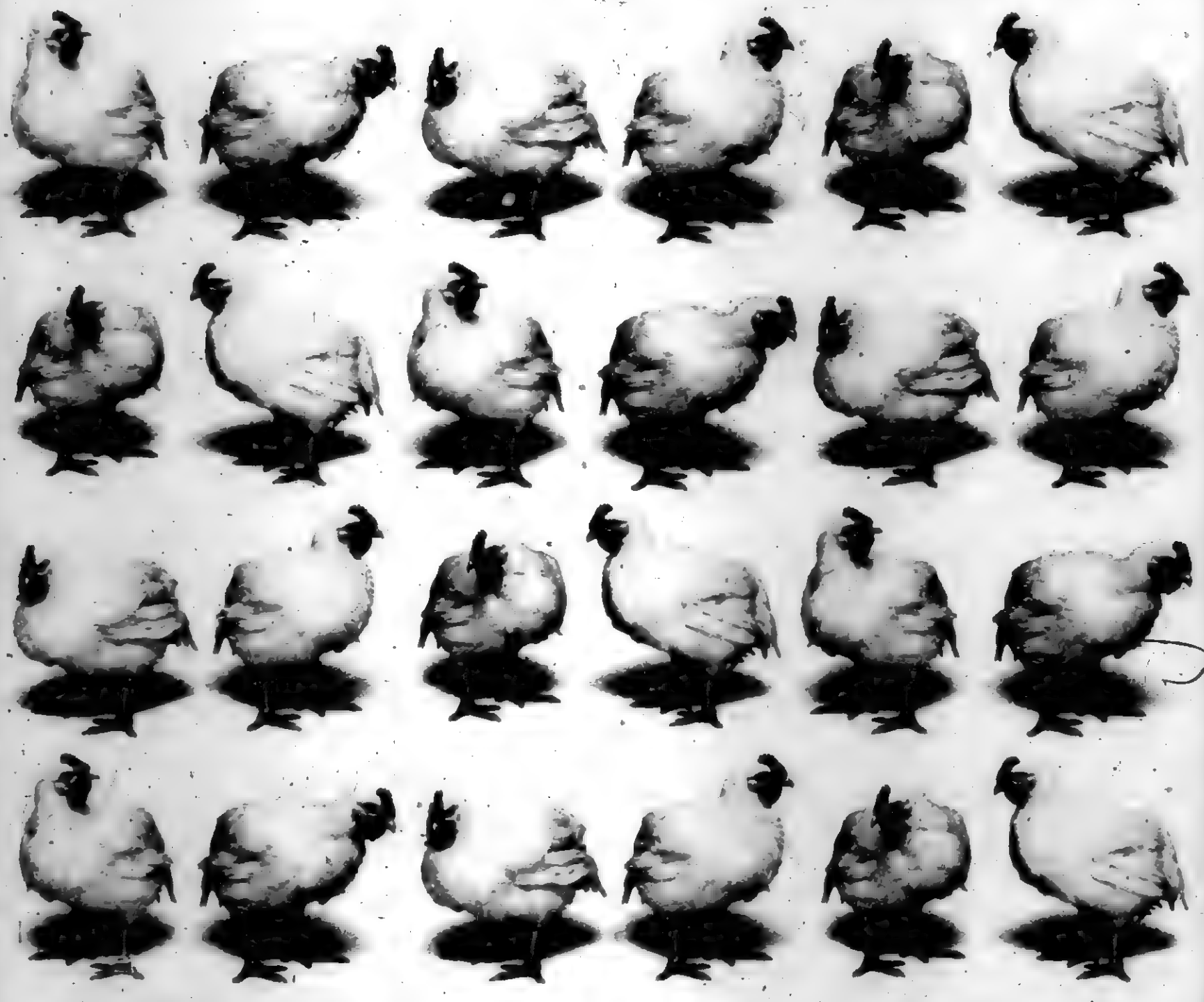

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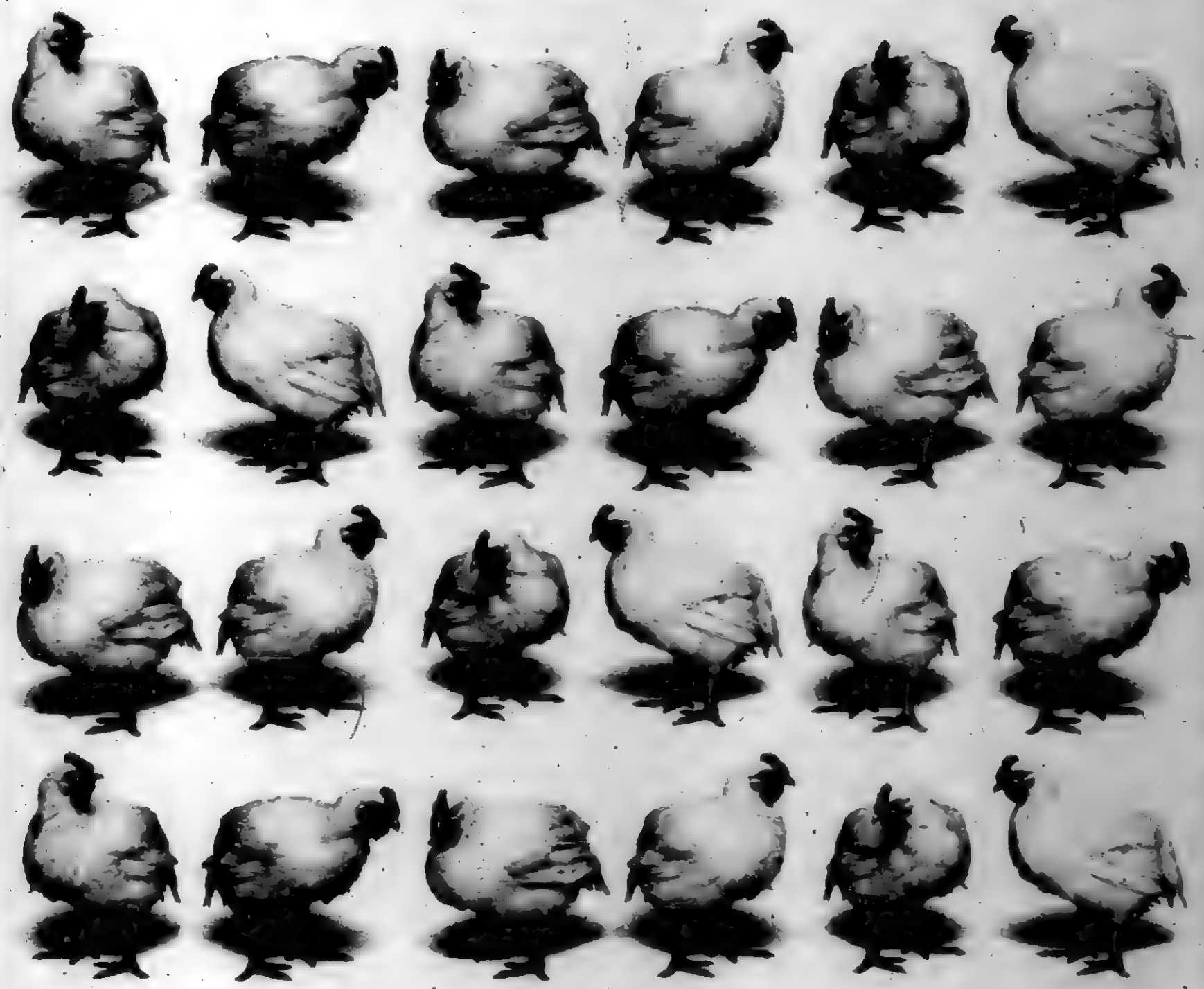

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A good view from both sides of the fence

In looking for informed comment on IBM's MVS/XA and Digital Equipment Corp.'s VMS, *Computerworld* turned to two pivotal spokesmen who have wide experience in both the IBM mainframe world and the DEC VAX environment.

W. W. D. Dowdell, formerly a principal with Software International Corp. in Andover, Mass., was the developer of the Masterpiece integrated accounting package for that company. Masterpiece was designed for IBM mainframes but has since been ported onto the VAX. In mid-1987, Dowdell moved to the Natick, Mass., accounting applications vendor McCormack & Dodge Corp., where he currently serves as director of research and development.

Michael J. Schowalter sold more than $1 million worth of Software AG of North America, Inc.'s DEC product line — in one year — before becoming the firm's DEC programs director. Prior to that, he was a programmer for the Chubb & Sons insurance group, working with IBM mainframes. Schowalter also served as MIS director for a number of companies.

Spokesmen for both M&D and Software AG say many of the companies' IBM mainframe customers are also users of VAX minicomputers, necessitating expertise in both vendors' environments.

Schowalter suggests that DEC might improve its poor transaction processing performance on the VAX line by devoting a high-performance Vaxcluster CPU to handling transactions. To process queries and updates, the CPU would use its own internal lock manager in virtual memory instead of using the cluster's external, I/O-dependent lock manager. The CPU would be restricted to using volumes of direct-access storage devices dedicated to it, rather than to the cluster. Applications on other CPUs, however, would still have access.

Roger Heinen Jr., a leading member of DEC's VMS development team, says that what Schowalter describes is a partitioned data base. "The notion that locks are a bottleneck [to transaction processing] is not strictly true," he says. Nevertheless, "it's a real good suggestion and one, among several, that we are looking at."

Schowalter says that if DEC wanted to market a machine with more mainframe-like capabilities, it would give the system a high millions of instructions per second (MIPS) rate. He says the multiprocessor "Polar Star" VAX that is now under development will reportedly offer 22 MIPS. With Version 5.0 of VMS, he says, the machine could become DEC's mainframe-like transaction processor.

W. W. D. Dowdell

Schowalter and Dowdell point out that IBM's 3090 mainframe and DEC's VAXs can both run large applications because both MVS/XA and VMS offer a 2G-byte virtual memory environment. Both companies report that they are planning to increase the limit, though few customers in either camp have designed applications that are bumping up against the memory barrier.

To date, the 3090's data and I/O management capabilities give it a heavy advantage in running large, data-intensive applications, Dowdell says. "Opening a file is fairly heavy overhead to a minicomputer. It has to work to set up tables and connections and mediate between users. It adds up in a hurry." DEC has helped improve the efficiency of the VAX by making main memory inexpensive to add, Dowdell says.

Disk access is still comparatively slow on the VAX in relation to the speed of IBM 3380 disk drives. This is another factor that works in IBM's favor for transaction throughput.

While he acknowledges that VMS is easier to write applications for and easier to use, Dowdell says MVS/XA, with its many subsystems, is easier to fine-tune to specific large tasks.

CHARLES BABCOCK

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DUQUESNE SYSTEMS

IBM's VM gets spit-and-polish treatment

Advances leave users confused but happy

PHILIPPE WEINBECKER

BY ROSEMARY HAMILTON

With a series of announcements in 1987, IBM took a big step and declared VM the end-user operating system for its strategic 370 line of computers — and users are all for it.

The remainder of the decade will be short on such dramatics, but there will be additional steps taken to solidify this role for VM in the IBM mainframe world, company executives said in a recent interview.

The IBM executives would not commit themselves to dates for upcoming VM announcements, but they did detail what will occur during the next few years.

In a nutshell, IBM will be streamlining the operating system by reducing the number of versions and aligning and improving the ones that will remain. In other words, it is time to give VM some polish.

The flurry of VM activity has been applauded by VM shops recently. Users say the move to streamline the operating system signals a stable future, something they were not so sure of a few years ago.

One IBM VM customer expresses concern that there may have been too much VM activity in 1987 for users to digest. "My concern is that there may have been too many announcements with long lead times," says Thomas O'Leary, director of MIS technology at North American Philips Corp. in New York. "We haven't put in [VM/SP] Release 5 yet, and they've already announced Release 6. But I still think the story for users is bullish, and we shouldn't be apprehensive."

Other users agree with O'Leary's conclusion. "The streamlining plus the big push for VM and [IBM's] Systems Application Architecture tell me VM will be a dominating operating system of the future," says Luke Marvin, manager of systems software at Analog Devices, Inc. in Norwood, Mass.

IBM's concern for VM developed as it became clear that end-user computing was becoming increasingly important. Add to that IBM's increased competition with Digital Equipment Corp. — its VAXs run an end user-oriented operating system, VMS — and IBM had a real need for a strong interactive operating system for users running mid-range and mainframe systems.

IBM turned to VM because it was the only 370 operating system that was originally intended for heavy end-user interaction. "It is the best 370 vehicle to provide end-user computing," says Lois Dimpfel, manager of the IBM Kingston Programming Center in Kingston, N.Y.

For the same reason, VM was of little interest to IBM a decade ago, when end-user computing and distributed processing did not have the significance they do today. Users claim IBM tried to kill off the operating system many times; but IBM stops short of saying the operating system was almost "killed." Instead, William Vance, director of VM programming, prefers to describe it this way: "It certainly wasn't being invested in the way it has been since then."

North American Philips' O'Leary, a VM user since 1969, says IBM's current VM activity is motivated primarily because of DEC. "There's a general impression that for years, [VM users] have been the malnourished children, and that now, IBM realizes that and is filling our plate," O'Leary says. "My feeling is this more concerns the war with DEC that they won't admit to, and VM, especially with the 9370s, is their big weapon."

But users who say that whatever IBM's motivation may be, they will reap rewards from it. One user, who asked not to be identified, says that by streamlining the operating system, IBM will be bringing badly needed uniformity to the VM world. Currently, if he moves between the various VM systems, there are varying degrees of problems with applications. He says those problems range from the trivial to simply not being able to run the application at all.

To other users and industry observers, IBM's declaration in 1987 of

VM's importance and its subsequent plans for it are way behind schedule.

"To me, [IBM] is finally catching up with the things that fell through the cracks," says Mark Turpin, a consulting analyst for computer systems integration at the Southern Co. in Atlanta. "Things like device support and Systems Network Architecture support always came last to VM. They are finally making it a strategic product."

Scaling down to two

Behind schedule or not, IBM is currently planning to reduce the number of VM versions to two. Eventually, there would be one version, VM/SP, for the 370 hardware, such as the current 9370s, and another, VM/XA SP, for the 370 processors that support the XA architecture, such as the 3090 line.

In a nutshell, IBM will be streamlining the operating system by reducing the number of versions and aligning and improving the ones that will remain.

VM/IS would be considered a subset of VM/SP and not a separate version, Vance adds.

IBM's Arthur Olbert

Other than this distinction between the 370 and XA versions, however, VM is intended to appear as one version to users, which is not the case today. With the current XA and SP versions, each has up-to-date features that the other needs and does not yet have. The goal is to bring the two in line with each other.

In the case of Transparent Services Access Facility, the current Release 5 of VM/SP supports it, while Release 1 of XA does not. Meanwhile, Release 1 of XA has the bimodal Conversational Monitor System (CMS), which was just introduced for Release 6 of VM/SP. Release 1 of XA reportedly will be out in March. Release 6 of VM/SP will reportedly be out in the fourth quarter of 1988.

"What we want to achieve is that we no longer want the functional differentiation that we have today, which currently means the applications and program products have different interfaces to deal with," Vance says.

To arrive at just two VM versions, at least two current versions will need to be eliminated.

One slated to be phased out is the High Performance Option (HPO) of VM/SP, according to Dimpfel. VM/SP HPO was introduced to accommodate high-end 370 users before the XA architecture was available.

Second to be phased out is VM/XA SF, which was the initial VM for the XA architecture, Dimpfel adds. This release could not take full advantage of the XA architecture, however, and was used primarily to guest other operating systems like MVS/XA or the closely related VM/SP.

These two versions will be merged into the new high-end offering, VM/XA SP, which was introduced in mid-1987.

Narrowing the number of versions to two will help in providing as close to one VM environment across all 370 processors as is possible. IBM plans to eventually offer one CMS for both VM/SP and VM/XA SP.

Each VM version will use its own control program. As the overseer of the VM environment, the control program is more closely tied to the actual hardware. As a result, the XA version cannot be exactly like the 370 version, since there are fundamental differences in the hardware each supports. IBM intends to make them as functionally equivalent as possible, Vance says.

The CMS component, however, does not have such restrictions. The new CMS that was introduced with VM/XA SP last year is the basis for the future CMS that will run under both versions of VM.

End-user functions next

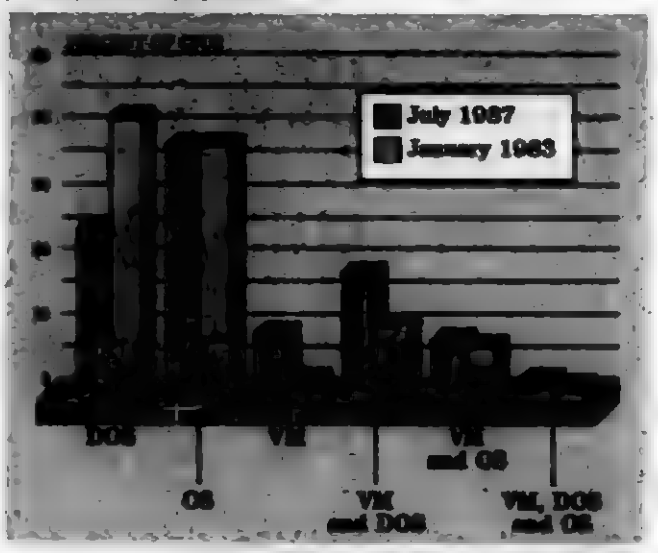
Second to the VM structural changes that will be announced during the next few years will be improvements to the end-user facilities of VM, company executives say. IBM plans to achieve this by adding facilities such as file sharing, which was introduced in late 1987 as part of VM/SP Release 6 and is slated for availability in 1989.

The goal is to make it easier to write and use applications in the VM environment, according to Arthur Olbert, manager at the IBM Endicott Programming Center in Endicott, N.Y. where such products as VM/SP

Continued on page 26

Operating system mix

U.S. IBM and plug-compatible manufacturers' mainframes: January 1983 vs. July 1987



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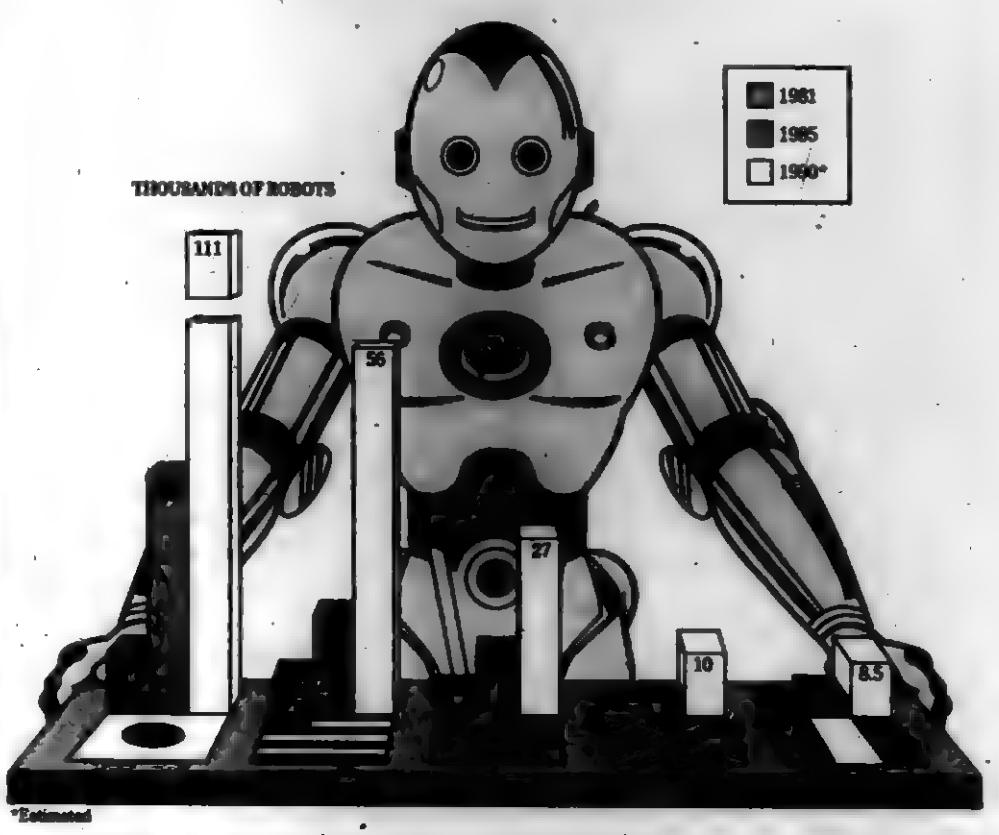

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TRENDSETTERS

James Montgomery admits that he gets "right down in the trenches" with his employees. Using this hands-on approach to management, he runs a tight ship in the information services shop at United Pacific Insurance Co.

As vice-president of the group at the firm's Federal Way, Wash., facility, Montgomery says he knows each of his 75 workers personally and that he stays close to what they're doing. "We establish project dates, and we meet them. We do that by working very closely together," he says. "I don't go sit in my office all day."

Montgomery started working at Union Pacific in 1964. Five years later, he left the company to return to California. He spent the next decade working for an independent software company, running a service bureau in Los Angeles and acting as a consultant. In 1982, he returned to Federal Way and United Pacific.

Now, after holding his current position for 2½ years, Montgomery is in charge of a totally IBM shop featuring an IBM 3090 Model 150E. During the next several months, his largest task will be closing up the Washington shop to merge it with United Pacific's corporate headquarters in Philadelphia. Those of Montgomery's employees affected by the consolidation will be awarded severance packages, he says, while some of them will be moving to the Philadelphia site.

When he gets there, Montgomery will take over part of the information services department as the vice-president of home office systems. His management philosophy will be part of his baggage. Key to running a tight MIS ship, Montgomery says, is building a service organization. "Most of my peers don't see themselves in a service capacity, but they are," Montgomery says. "They have customers and have to service those customers."

Service, Montgomery says, is a trend that information services organizations are being pushed toward, "and that's where most all of us are going to have to be over the next few years to survive."

ALAN J. RYAN

FUTURISTS

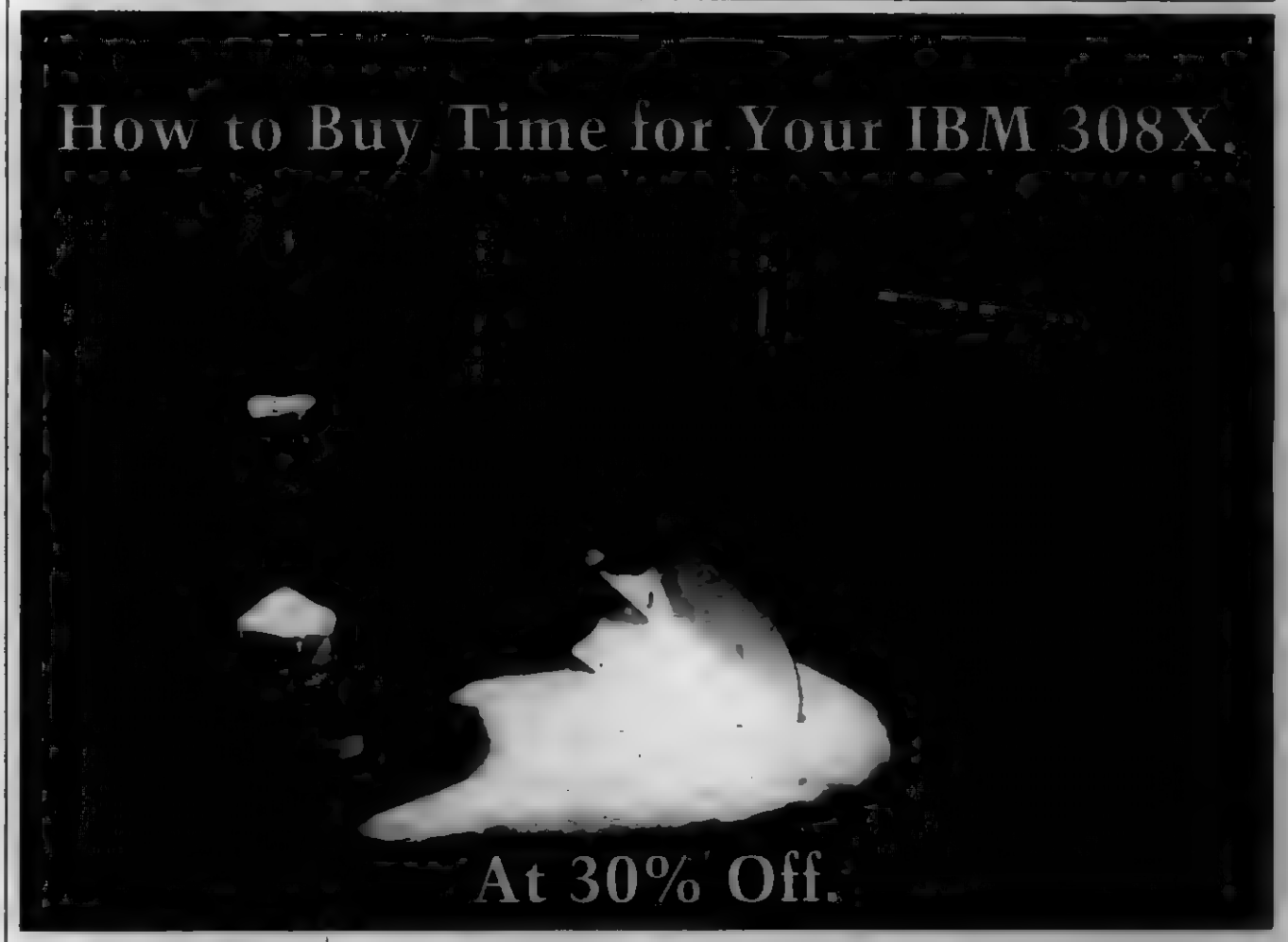
Cutbacks in MIS hiring will not result from the current downturn in the economy, says Steven Young, manager of technical search at New York-based recruiting firm Pencom Systems, Inc.

"Although there's always the possibility of wage freezes, hiring will continue to expand because the technology continues to expand," Young says. "Companies still have applications that must be supported and maintained."

But Young also stresses that MIS workers must keep abreast of what is happening in the industry and develop a specialized niche in order to remain attractive as employees. Managers must make those opportunities available to interested staff members, Young says.

"Employers who fail to provide support for anyone seeking to broaden his area of expertise will find themselves losing the cream of the crop," Young warns. "If the opportunity to learn and advance is not there, a good worker will look for other possibilities."

SUZANNE WEIXEL



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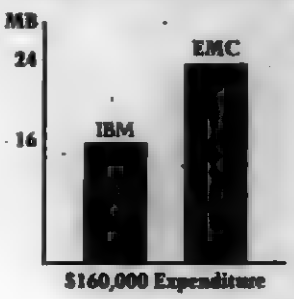
EMC uses state-of-the-art technology and production methods to offer our 308X upgrade at 30% lower cost than IBM. A 16MB upgrade from IBM is priced at $160,000. For that same price you could buy 24MB of EMC main storage. That's an additional 8MB of main storage or a savings of $50,000. Either way you save with EMC. EMC also features coterminous leases and trade-up credits so the return on your investment continues after your purchase.



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Forecaster

Growing technologies

Estimated volume of shipments by 1990

	1981	1990	Average annual growth rate
Robotics	100,661	1,220,922	99.9%
[illegible]	[illegible]	[illegible]	[illegible]
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CW CHART

TRENDSETTERS

When is processing data faster on PCs than it is on mainframes? When you're at Echlin, Inc.

Richard Hock, Echlin's MIS director, has found a way to keep his company on the cutting edge in data processing while saving the firm more than $200,000 annually.

Echlin is an automotive replacement parts manufacturer in Branford, Conn., that previously used an IBM 4341 mainframe for its processing. But Hock recently converted Echlin's DP work load to nine microcomputers, including Compaq Computer Corp. Deskpro 386s and IBM Personal Computer ATs.

Hock says the 2.8-million instruction per second (MIPS) rating on the Deskpro 386 makes it faster than many larger systems. On the entire IBM System/38, he explains, the highest MIPS rating is 1.64, and the IBM 9300 line offers no MIPS rating higher than that of the Compaq machine, either. The 4381 Model 13 is the first model that exceeds the MIPS rating of Compaq's Intel Corp. 80386-based microcomputer, he adds.

The 26-year DP veteran says his department is basically running one application per micro. "We did a study 2½ years ago," Hock says, "and proposed that we would save $300,000 by switching to micros." Hock says the project was a low-risk venture. "The only thing that we would be out would be the cost of the microcomputers and the network if we couldn't go further."

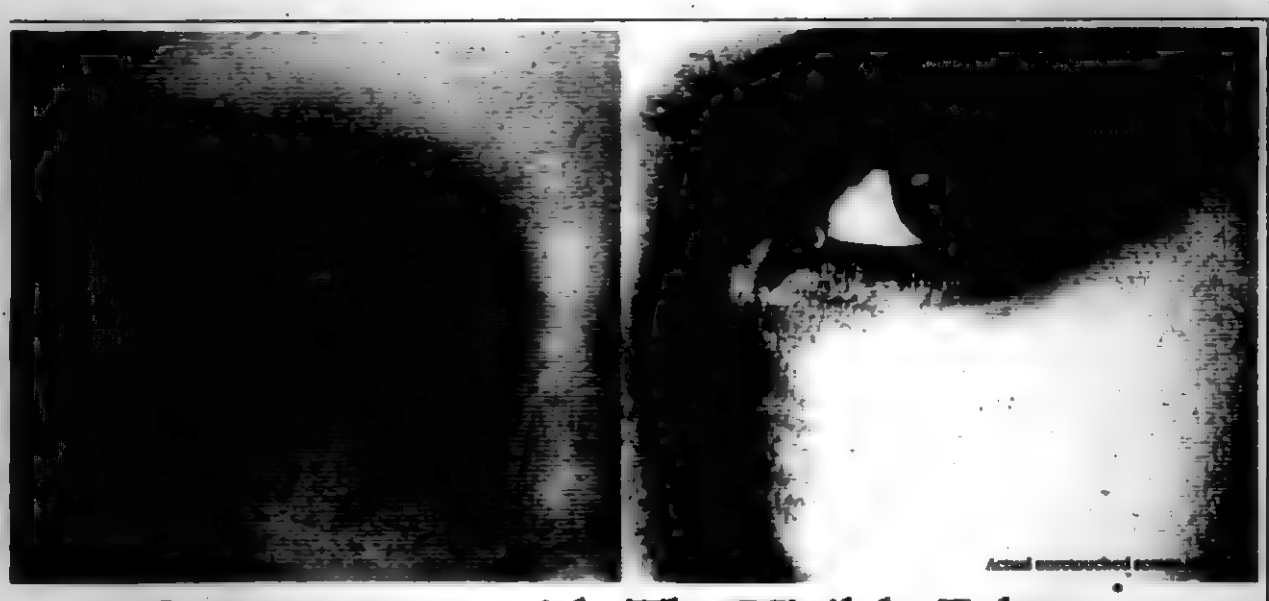
Since then, the company has moved one application at a time onto a Novell, Inc. local-area network. Files are stored in a proprietary file server, the Novell S/Net. Users on the system select a password-protected application, and the software, data files and computer programs are downloaded from the file server to the micro. When the job is completed, it is sent back to the file server.

"We've got complete protection, just as we would in the mainframe," Hock stresses.

By mid-January, Hock says, the final application will be moved to the micros. "We've reduced our [total processing] cost from $900,000 to $700,000 and have another $100,000 to go," he says. Additionally, maintenance on the mainframe was $70,000; that cost has been reduced to approximately $20,000. Hock also eliminated some $60,000 to $65,000 in software rental from IBM and dissolved four jobs, he says.

How did he come up with such a radical idea? Hock, having held his current post at Echlin for more than nine years, says he encourages participation from his employees. "The original idea about the micro project came from one of my staff," he says. "I believe giving staff members as much responsibility as possible makes them happy and produces the best results."

ALAN J. RYAN



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IBM's VM

CONTINUED FROM PAGE 24

and VM/IS were designed.

"Applications are the things customers focus on. There's a broad range of applications on VM/CMS today," Olbert says. "But we want more. The way to get more is to encourage people to give us more and make it easier for them."

Along this line, there will be program products announced this year for the high-end version of VM system, VM/XA SP, Dimpfel says.

Dimpfel acknowledges that so far, no third-party vendors have announced XA support in their applications. "We have just recently gone out and described the interfaces to them," she says. "You'll see that unfold over time."

From the MIS trenches

Technology outlook for 1988

It's easy to elicit predictions for the coming year from consultants and analysts. But what do the people who put computing technology into action have to say about 1988? What are their plans? And what technologies do they have on their wish lists?

Computerworld senior writer Stanley Gibson asked those questions of some of the nation's top MIS executives. Here are their answers.

MICHAEL A. KAMINSKI
Manager of the Manufacturing Automation Protocol (MAP) program for General Motors Corp. in Warren, Mich.
"We will see the beginning of implementations using MAP 3.0 and, in the process industry — which includes chemical, petroleum, pulp, paper and food processing companies — will see increased emphasis on TOP [Technical and Office Protocol]. However, TOP will also be used increasingly in the aerospace and auto industries."

GARY BIDDLE
Vice-president of MIS at American Standard, Inc. in New York.
"Next year, you're going to see a lot more information engineering, in the form of CASE [computer-aided software engineering] tools. There will also be artificial intelligence products that will improve programmer productivity.

"I also hope to see more confirmation of what IBM's mid-range strategy is going to be as the 9370s are rolled out. I don't see Silverlake as having a large impact in the Fortune 500."

GEORGE DINARDO
Executive vice-president at Mellon Bank NA in Pittsburgh.
"I'm looking for more fiber optics as well as laser disks. We want to eliminate microfiche with laser technology.

"I also hope for continued improvement of disk and I/O technology. I also would like to see the so-called 'hyperchannel' that will provide mainframe-to-mainframe connectivity. That's the super-secret technology IBM has that everyone knows about."

EUGENE F. BEDELL
Vice-president and manager of information services at First Boston Corp. in New York.
"This year, we will begin the obsolescence of the programmer and the birth of programming at a higher level. Programming will be done by systems analysts using CASE technology.

"And we'll begin to see true integration of PCs, departmental computers and mainframes. Instead of the PC hanging off the mainframe, the mainframe will hang off the PC."

DUDLEY COOKE
General manager of information systems for Sun Company, Inc. in Radnor, Pa.
"I am looking for advances in networking voice mail. A company like Sun has multiple locations and multiple private branch exchanges. What we want to do is network those systems together so that a person who calls one location can leave a message for someone at another.

"We also want to tie voice mail into IBM's Professional Office System. Later, we want to have voice recognition on the screen."

JOSEPH BROPHY
Senior vice-president at Travelers Insurance Co. in Hartford, Conn.
"We are moving aggressively with expert systems technology, not for exotic applications but as a bread-and-butter tool. We are putting editing modules in a rules-based format because it is easier to change rules than spaghetti code. We have at least 40 expert systems applications in development. We'll see more production systems expressed as expert systems protocols."

MICHAEL HESCHEL
Vice-president of information systems at Baxter Healthcare Corp. in Deerfield, Ill.
"There will be more electronic data interchange usage, including electronic payments, especially in our business.

"I also see a price/performance reduction in mainframes. The IBM 3090F models will be here in the first quarter, and there will be another price reduction in the last quarter. Eventually, you will have the computing power of at least an IBM 3081 on a desk."

MICHAEL SIMMONS
President of Fidelity Systems Co. in Boston.
"We are working on integrating our local-area networks with our wide-area network. Since we are a dispersed, around-the-clock operation, very soon, if not already, the network itself will become our computing facility.

"We also look forward to more use of CASE. CASE is the latest buzzword. The industry is buzzword-driven after all. You can't write code in stone, so you will have to go to CASE eventually."

A coming revolution in mainframe storage

IBM seen moving away from 14-in. disks

BY JAMES CONNOLLY

Change in the world of mainframe storage, which moved at an evolutionary pace for almost 25 years, is set to accelerate to a revolutionary rate.

Since the mid-1960s, the heart of an on-line storage system has been the 14-in. disk drive attached to a host CPU. Evolutionary change has brought faster access times, faster channels, cache and storage management software.

Now, storage industry observers say, IBM plans radical changes with smaller — possibly 5¼-in. — disks as replacements for the standard, 14-in. IBM 3380 disk systems. In addition, recent IBM product introductions and development efforts indicate that the relationship between storage devices and mainframes is in a transition that will speed up through IBM projects with code names like Summit and Jupiter.

Some observers report that Summit, the expected follow-on to the IBM 3090 mainframe, will feature clusters of IBM 370-type CPUs linked via a bus and pools of storage devices. Jupiter reportedly focuses on storage-management software and a back-end data base machine and will off-load storage-related tasks from the CPU.

Summit will probably be announced in 1989 for 1990 deliveries, according to Framingham, Mass., market research firm International Data Corp. (IDC). Summit will feature faster CPUs and clustering capabilities that unite multiple 370-architecture machines on a high-speed bus, IDC analyst David Vellante says.

Analyst Rick Martin, of the New York investment firm Sanford C. Bernstein & Co., says Jupiter, IBM's eight-year project to manage storage, now is called Ole because it will result in an off-load engine that will manage data bases.

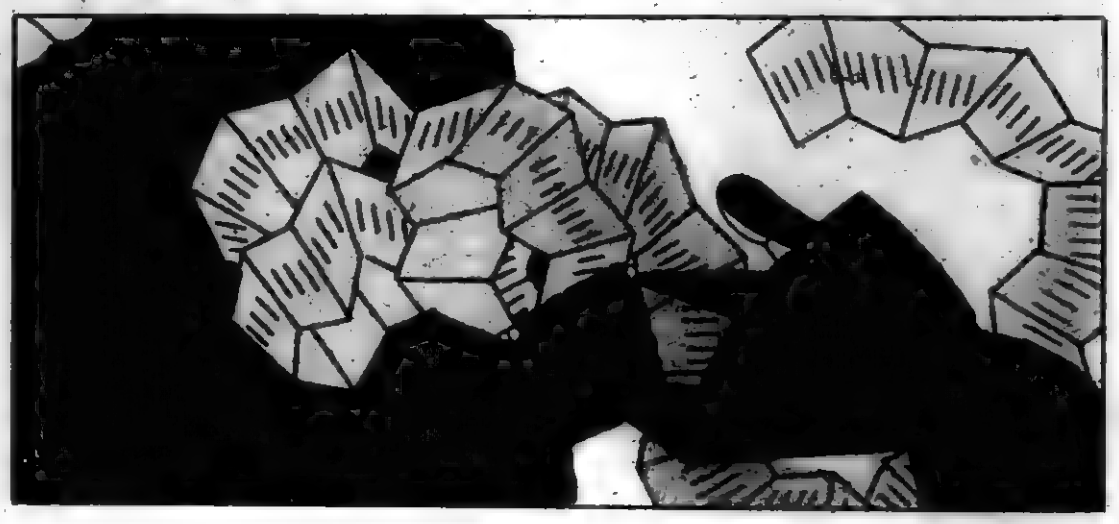
IBM already has begun moving data management and intelligence away from the CPU. That trend is likely to continue with Ole, as direct-access storage devices (DASD) and IBM 3990-type controllers handle much of their own backup and space management. Some observers expect the Summit-type clusters to access pools of storage devices through fiber-optic channels instead of having dedicated strings of DASD for each CPU.

Arrays of low-cost 5¼- or 8-in. drives and high-speed 10¾-in. disks could replace the 14-in. 3380 within a year or so.

Fred Moore, director of worldwide product marketing for peripherals maker Storage Technology Corp., says he sees "a slow-growing possibility" that IBM will offer a quad-density 3380. But he also thinks the mid-1990s will see user-installable and -maintainable rack-mounted disks in sub-14-in. form factors.

Speculation about new IBM DASDs began almost immediately after IBM announced its third generation of 3380 disk drives, the 3380 Models J, K and CJ2, and its 3990 storage controllers just four months ago.

"Looking at the Js and Ks, we think they could be only a 12- to 18-month product line," says Louise M.



PHILIPPE WEISBECKER

Biggs, a senior industry analyst for San Jose, Calif., market research firm Dataquest, Inc. Biggs is one of several analysts who expects sub-14-in. drives.

That next generation is expected to replace the 2.5G-byte Model J, which IBM presents as a drive for customers demanding high performance because of its 12-msec seek time, and the 7.5G-byte Model K, which IBM touts for its capacity.

Biggs says IBM will emphasize capacity and price in the new drives. "I'm starting to question the philosophy that has been espoused for the past few years about people wanting high performance. The market is still capacity driven. There are only a few users who will pay a premium for performance," she says.

Biggs also observes that replacing the 3380 in 1988 would continue the IBM pattern of eight-year product cycles for DASDs and controllers. She highlights the growth of the disk market as it has paralleled demand for CPU power. "In 1986 alone, IBM shipped more in the way of gigabytes of high-end DASD than they did in the entire eight years of the 3350 program," she says.

Dataquest's Louise Biggs

Replacements for 3380

An analyst specializing in the disk drive market, James N. Porter, president of Disk/Trend, Inc. in Mountain View, Calif., says he expects not one but two replacements for 3380s.

Porter expects a high-performance drive with 10½-in. disks and 50% more throughput than the 3380 Model J later in 1988. He also predicts the new model will have a 5.5-msec latency time, 9- to 10-msec positioning time and 6M byte/sec. transfer rate, compared with an 8.3-msec latency, 12-msec positioning time and 3M byte/sec. transfer rate for the Model J.

"Not all IBM customers want this type of drive. This is not everyman's drive. It's a superperformance drive," Porter says, noting that some performance-oriented customers today load disks to only 30% capacity.

Porter sees most customers wanting the second 3380 replacement, which will use 5¼-in. disks when announced in the second half of 1989. That drive reportedly will be rack-mounted in arrays. Porter says the 3990, not the user, will know if it is accessing 5¼- or 10½-in. disks.

Several analysts say that packaging smaller disks in arrays, whether they use 5¼- or 8-in. media, will help users utilize 3990 features such as dual copy, which allows a user to write the same file to separate disks.

Bernstein's Martin says the next DASD will use disks of about 10 in. with a capacity of 75,000 byte/track, compared with the 50,000 byte/track capacity of the 3380s. The disks will support greater transfer rates, Martin says. "If you spin a 10-in. platter with 75,000 byte/track at the same speed as a 3380, you can get more than 4.5M byte/sec. If you go faster, you get 6M bytes."

Another performance advantage of the next generation is that IBM plans to use separate read and write heads moving at different speeds with different degrees of precision because positioning a head for a read can be more general than for a write, Martin says.

In general, the analysts concur that conversion headaches will keep IBM from abandoning count-key-data storage in favor of a more efficient fixed-block method. They also agree the 3990 plays a key role in off-loading data management from the CPU.

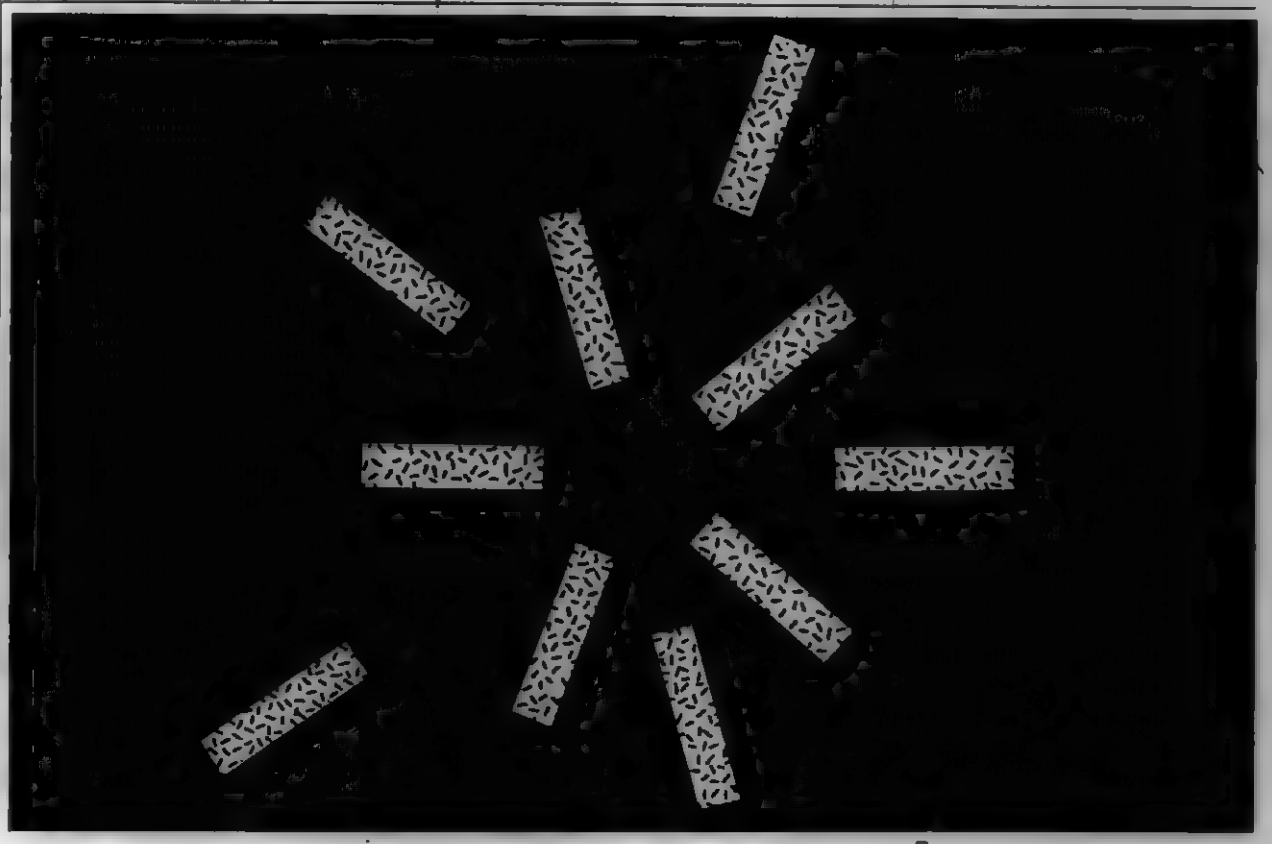
Biggs notes that, with four times the cache of the 3880 at 256M bytes, IBM "is endorsing the idea of keeping more information in random-access memory, rather than writing it out to disk."

She says that trend will continue because the cost of cache dropped 60% in three years while the manufacturing efficiency of disk drives slowed.

Both she and Vellante note that a key feature of 3990s, particularly in transaction processing, is their ability to write to, rather than just read, cache.

Vellante outlines a scenario in which clusters of mainframes, some of them Summit CPUs and others 3090s, are linked by a high-speed bus. He says that in the near term, the bus, which he likens to the Digital Equipment Corp. VAXBI, may run at 18M byte/sec.

Vellante says 3990-type controllers will hang off that bus with the CPUs effectively sharing controllers and their storage devices in storage pools.



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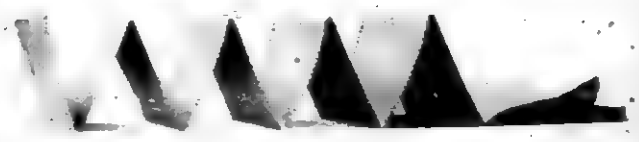
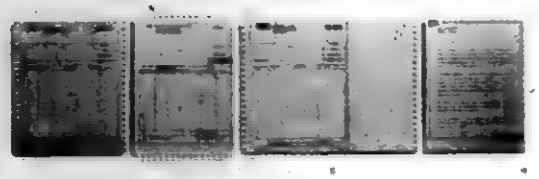
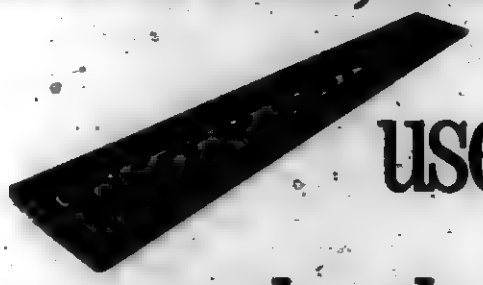
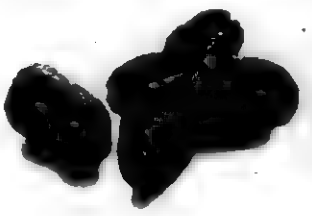
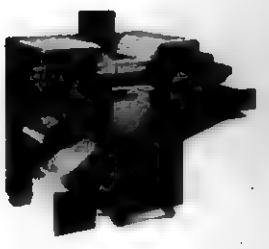
If we said our printer did 90 pages a minute, used fanfold paper,  printed  electronic forms, didn't take up much space,  used a new non-impact technology, was extremely reliable, and didn't cost  a fortune,

you'd say  Bull.

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IBM hiked the channel speeds between 3090 hosts and controllers from 3M byte/sec. to 4.5M byte/sec. in September, but Vellante is among those expecting fiber-optic channel rates to rise to 6M byte/sec. in 1988. He says the 3990 has the potential to arbitrate various channel speeds, depending on the application, which is only one of the ways the 3990 is different from the 3880.

"You have to look at the 3990 as basically the equivalent of a 3090 Model 180E. They have a ton of cache in there now and can go for more with even denser memory chips," Vellante says of the controller, due to ship in July.

He says some 3990 features and offerings such as IBM's Disk Facility Product (DFP) software are parts of Jupiter. Once Summit and Jupiter are in place, the CPU will be relieved of many tasks, such as backing up disks with 3480 tape subsystems, according to Vellante.

Vellante also predicts that in 1988, IBM will take steps to allow direct connections between 3990s and the 3090's expanded storage, thus bypassing main memory and relieving the CPU of one more transfer function.

Disk/Trend's Porter

One IBM competitor expects elements of Jupiter, launched at the behest of the IBM users group Guide International Corp., to be announced in early 1988. Don Murphy, vice-president of sales for the Systems Software Marketing Division of Sterling Software, Inc. in Sacramento, Calif., says IBM knows the value of storage management.

"The message to me is that for many years, IBM had mixed allegiances on storage management because they wanted to sell more DASDs. Now they need storage management to sell DASDs. IBM is alluding to a quad-density drive. Those devices exceed the capability of data center personnel to manage the space," Murphy says.

Jupiter software and utilities being planned by vendors including Sterling will move data up and down the hierarchical pyramid often used to rank an organization's data, according to Murphy. That pyramid assigns the most frequently accessed data to the fastest, yet smallest, storage area at the pyramid's peak, in memory. The least accessed data is assigned to the broad pyramid base, represented by less-expensive off-line tape storage. In between lie technologies such as DASD, electronic disks, cache and expanded storage.

Murphy sees a trend toward users allocating data sets to logical pools based on user-set parameters. For example, parameters might say at what age a data set is moved from DASD to tape and will specify what related data sets are moved with it, while allowing users to intercede if the data is needed.

'Filling gymnasiums'

Storage Technology's Moore estimates that less than 10% of IBM mainframe sites actively manage storage. "That's got to come way up. Otherwise, people will be filling gymnasiums with DASD and won't have any way of managing it," Moore says.

But he claims storage management software is lacking. He cites as key failings the shortage of storage management software for IBM VM and the inability of even IBM MVS-based software to differentiate between types of DASD — electronic disks and varied densities of cached and noncached magnetic disks — and 3480-type tape drives — manually loaded and autoloaded such as Storage Technology's 4400 library.

Moore speculates that an I/O engine serving multiple hosts and storage pools even for MVS is at least five years away. He notes the trend toward shared DASD is well under way because a recent Guide survey showed that an average of 2.2 processors now share disk subsystems.

He says he expects outboard movement of data from disk to tape with little or no CPU involvement by 1990 and users seeing logical views of data without concern for where that data is in the storage system by 1992.

Bernstein's Martin, who reports that Ole/Jupiter is aimed at developing a data base engine, warns people not to think of Summit as a CPU. Instead, he says a new CPU, Jupiter/Ole, clustering, a new front-end processor, the new disks and the 3990 all are elements of Summit that will be phased in over the course of several years. "When you've got all of the pieces together, then you've got what people call Summit," he says.

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Storage management approaches

When asked what storage products they want IBM and its competitors to provide, managers recently focused on storage management software, the system-managed storage capabilities requested by IBM users group Guide International Corp. and reportedly being addressed by IBM's Jupiter project.

"The area where we have had a lot of effort in recent years and [in which] IBM appears to be coming along is storage management," says Ed McDonald, division manager for information processing at Texaco, Inc. in Houston.

"I would like to get the end user and application programmer away from having to have any knowledge of the media," McDonald continues, "and away from knowing whether or not they need single-capacity or dual-capacity direct-access storage devices [DASD] or cached DASD or tape."

I would like to get the end user and application programmer away from having to have any knowledge of the media.

ED MCDONALD
Texaco, Inc.

He says IBM has made progress toward a system-managed storage product, particularly with its Data Facility Hierarchical Storage Manager (DFHSM) offerings, but that he does not expect a full-featured system-managed storage product before 1990.

He notes that carrying out system-managed storage not only requires new product development by vendors but also means user organizations will have to identify all user data and classify it for hierarchical storage.

McDonald says that he is less concerned with the exact type of media — for example, whether a disk is 14 in. in diameter or smaller — than he is with the reliability of the storage device. He does, however, see a potential need for an archival storage system that supports fast writing, even if the read capabilities are slow.

'Very labor-intensive'

James Everitt, capacity planner for Weyerhaeuser Information Systems in Tacoma, Wash., says, "My interest is not so much in the hardware itself as the integration of the hardware and software. It is very labor-intensive to manage these large blocks of DASD."

He would like system-managed storage, he says, but thinks it is five to eight years away from complete implementation. One of first things he would like to see is more use of 3480s in relationship to DFHSM.

Everitt reports that his company has not committed to 3380 Model J or K drives and that most of the firm's concentration has been on older 3380 A04 and B04s. He says they do the job and cost less than the denser disks.

Greg Parker, a performance analyst and capacity planner for Mountain Bell in Salt Lake City, adds, "I'd like to see a simple method, some tool, for plugging in cost accountability so we aren't always talking about space." Parker questions the value of the offering of increasingly denser disks, such as the triple-density 3380 Model K and the rumored quad-density follow-on product.

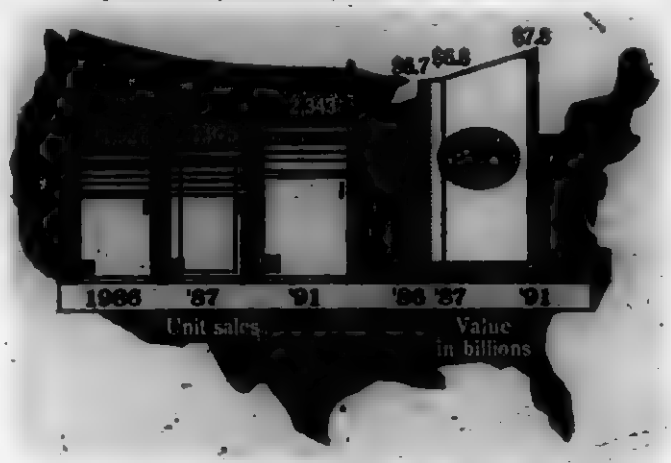
He claims his concerns about the denser disks center on the trade-offs that are being made in sacrificing performance for a lower cost per megabyte of storage. Parker says he is concerned about the new devices and their impact on performance.

JAMES CONNOLLY

Forecaster

How many mainframes, and what will they cost?

A prediction of U.S. mainframe sales and their values



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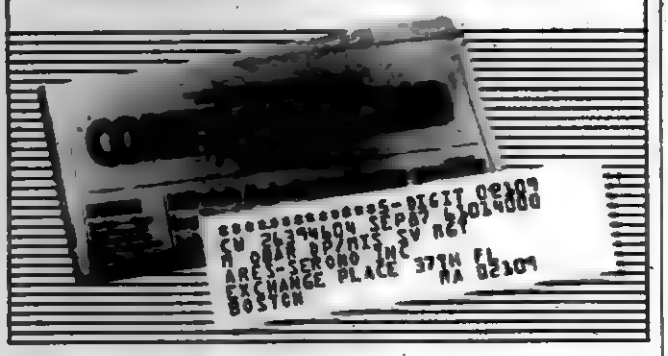
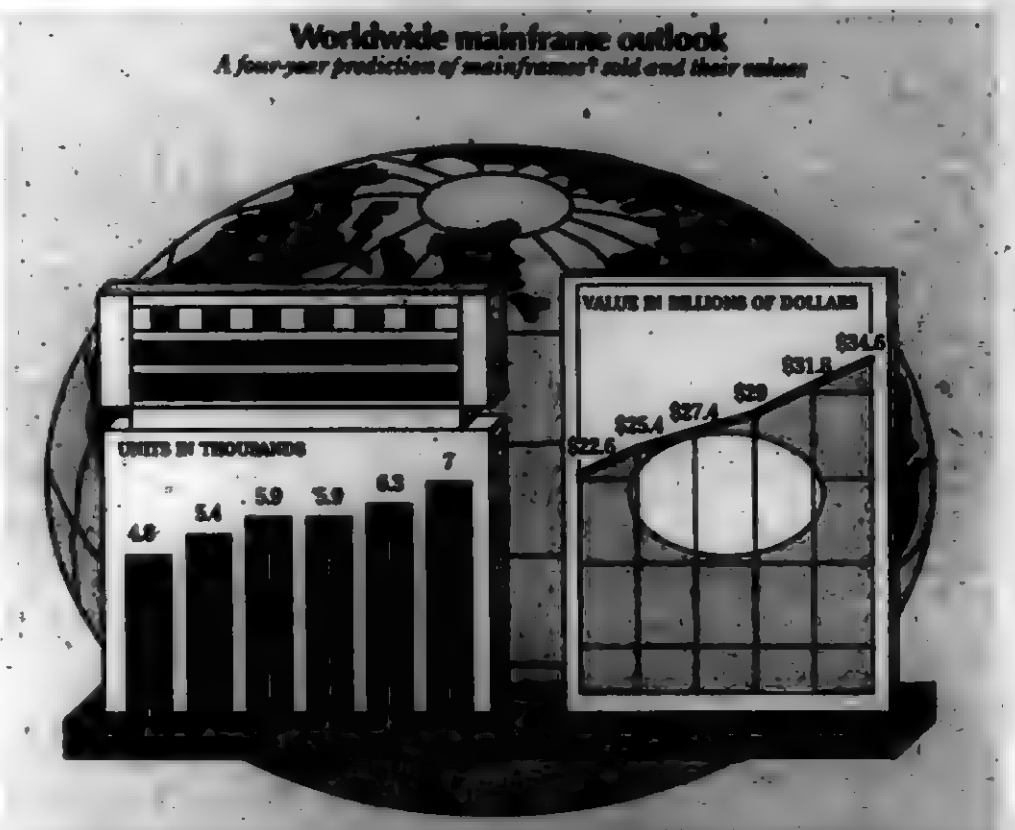


Forecaster

Worldwide mainframe outlook

A four-year prediction of mainframes sold and their values*



*Includes supercomputers and traditional mainframes such as IBM's 3090, 3080 and 3000 series and similar equipment.

INFORMATION PROVIDED BY *COMPUTER INDUSTRY ALMANAC*
CW CHART

Optical storage: An option

People waiting for optical disks to impact mainframe-class on-line applications may have a long wait — possibly forever — according to industry observers.

"Optical storage has been four years out for the last four years, and that is a tough statement for us, because we went so far as to announce our own product back in 1983. The role for optical may be in the write-once read-many area," says Fred Moore, manager of worldwide product marketing for Storage Technology Corp.

Louise Biggs, a senior industry analyst for San Jose, Calif., market research firm Dataquest, Inc., adds that optical media will be slower than magnetic disks and more expensive than tape drives for several years.

Cartridge search

However, she says, optical disk storage has a place in the mainframe world, particularly in areas in which users want all data on-line without the bother of an operator searching for tape cartridges.

Alternative storage technologies may have the greatest opportunity to compete with magnetic disk and tape subsystems — the area most analysts call mass storage — in which limited on-line access to large quantities of information is required.

Alternative storage technologies may have the greatest opportunity to compete with magnetic disk and tape subsystems — the area most analysts call mass storage — in which limited on-line access to large quantities of information is required.

It is an area of the market in which IBM once offered its 3850 honeycomb-style cartridge system.

'Near-line' storage

Moore touts his firm's 4,400 automated tape library for what Storage Technology calls "near-line" storage. He is joined by Don Murphy, vice-president of sales for Sterling Software, Inc.'s Systems Software Marketing Division, who says that one of the strengths of automated libraries is that they use standard media.

James N. Porter, president of Disk/Trend, Inc., adds, "Storage Technology is going to be a huge hit with its library. IBM won't have another mass-storage device for another four or five years." He says that what IBM eventually offers for mass storage may be optics-based.

Dataquest's Biggs maintains that there is a mass-storage role to be played for tape and optical disk systems and notes that digital audio tape may also become a factor.

In addition, she says that mid-range systems users may be more willing to experiment with storage options than are those at large data centers, which cannot as easily survive a storage subsystem failure. She singled out Tandem Computers, Inc. as one example of a systems vendor that is moving ahead with optical technology.

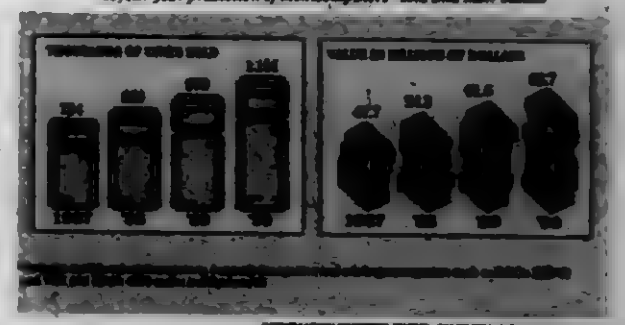
She says one area to watch, for those interested in which storage technologies hold promise, is the mid-range processor field, which includes medium-size business systems and engineering workstations. She notes that those workstations need large on-line storage capacities for even simple engineering drawings.

JAMES CONNOLLY

Forecaster

Worldwide mini outlook

A four-year prediction of minicomputers' sold and their values



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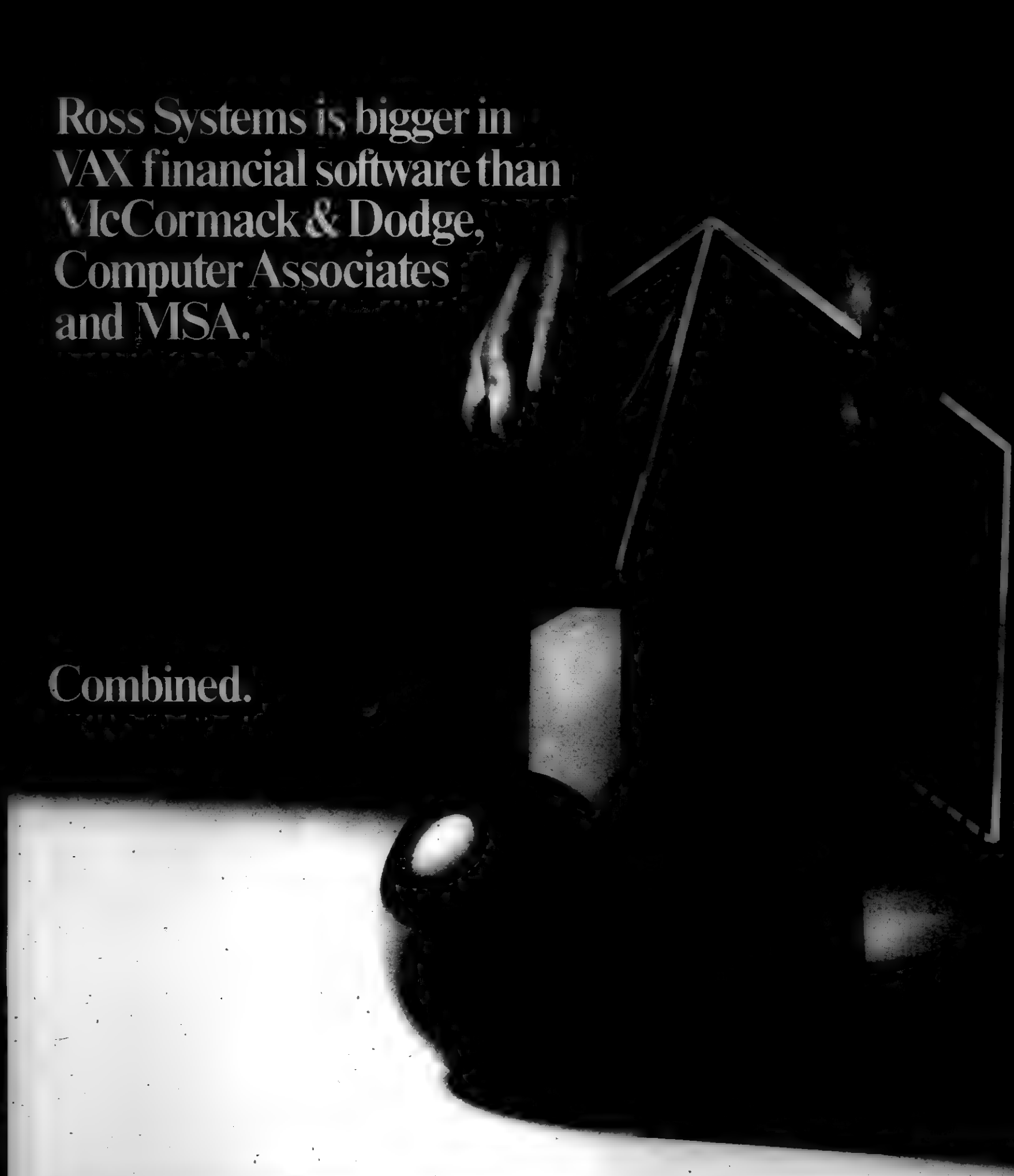

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How to play a proactive role

Seeking to play a greater role in shaping business direction?

Well, Darwin John, corporate vice-president for information systems at Scott Paper Co., plays a proactive role in his company, and he has several suggestions for aspiring managers who want to ensure that their voices are heard above the din.

While John recommends schooling and experience, he emphasizes the importance of managers' looking at the world in a certain way.

To be exact, he looks at the world in a way that he describes as systematic, conceptual, holistic or seeing how things fit together.

"One of my beliefs is that you can approach things at one of three levels," says John, who worked in engineering and finance before going into information systems.

The first is an operational level — one at which facts and numbers are found to prove that something is one way or another.

The second is an issue level — reconciling evidence with experience.

The third is a conceptual or principle level — trying to discover or create something new, an MIS architecture, for example.

"Any particular question probably can be addressed at one or another level," John maintains.

"People tend to approach things on one level. I believe one of the shifts that those of us that are trying to run MIS organizations have to do is move up that scale.

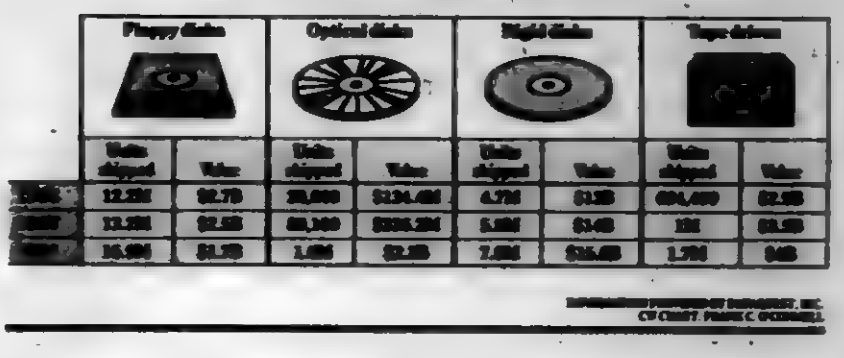
"The nature of our field and where it's going is discovering new things," John adds. "We need to be comfortable at that level."

DAVID LUDLUM

Forecaster

How many memory devices, and what will they cost?

A U.S. projection of four memory options and their values



	Floppy disks		Optical disks		Hard disks		Tape drives	
	Units shipped	Value	Units shipped	Value	Units shipped	Value	Units shipped	Value
[illegible]	12.2M	$2.7B	20,000	$134.4M	4.7M	$13B	604,000	$2.9B
[illegible]	13.5M	$2.8B	68,300	$356.2M	5.8M	$14B	1M	$3.5B
[illegible]	16.9M	$3.7B	1.4M	$2.2B	7.8M	$16.4B	1.7M	$4B

[illegible]
CW CHART: FRANCIS OCONNELL

FUTURISTS

A problem that has been frustrating users for years is coming to a head, says Robert R. Ackerman Jr. Listen, he claims, and you can hear the growing roar of users clamoring for standards.

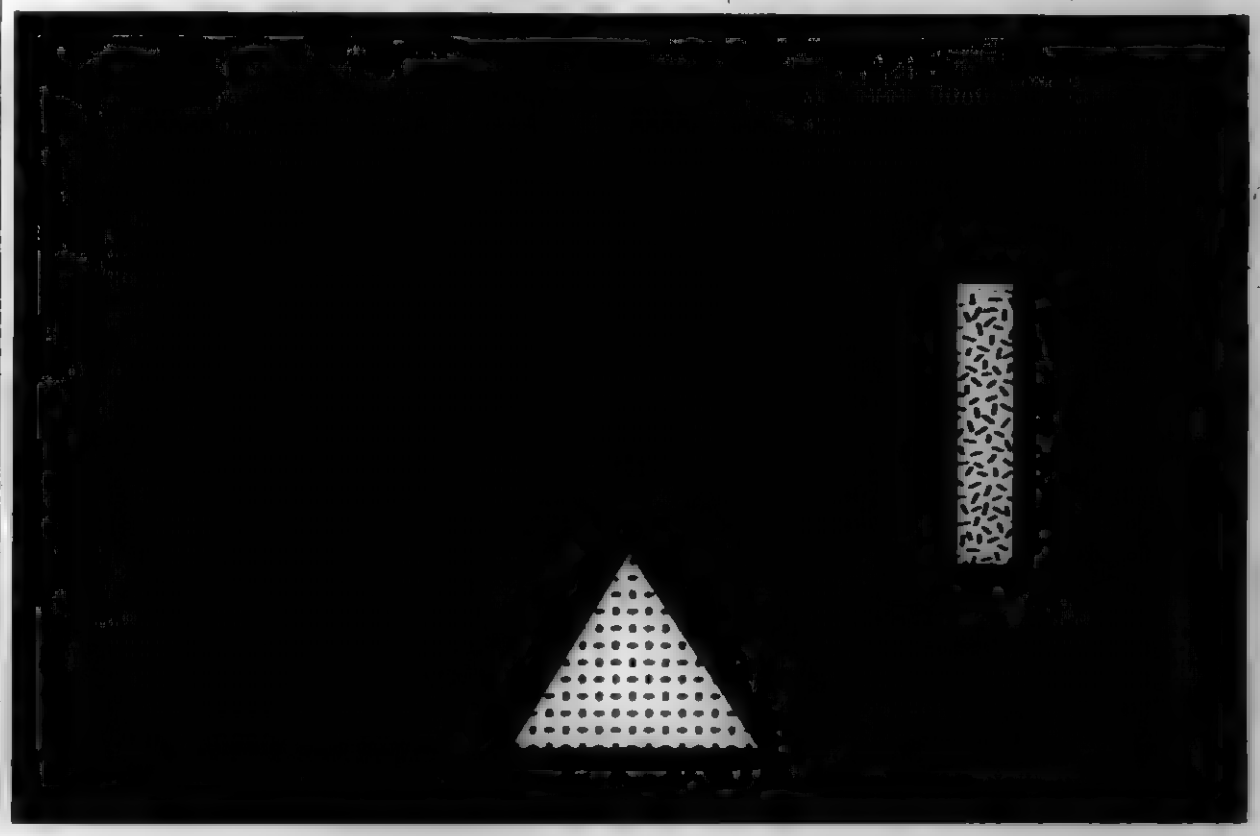
Ackerman is the chief marketing officer of X/Open, a nonprofit group of systems vendors committed to developing a common application environment for the computer industry. "In the past, the government led the push for standardization. Now, the commercial segment is starting to focus their procurements on standards and standards-based technology. . . . To increase productivity and reduce costs, they need vendor-independent applications," he says.

Ackerman says the supply side of the marketplace is going to have to come up with products based on standards as well as implement standards within vendors' own proprietary strategies.

"The single-vendor shop is a thing of the past. Today, the user needs tools and resources that provide maximum flexibility so he doesn't end up in a proprietary cul-de-sac. The users' need for compatible systems from different vendors is what's going to drive standardization in the years to come.

"It is not going to be easy to get the vendor community to cooperate in areas where they have historically competed," he concludes. "That is the challenge. That is the solution."

SUZANNE WEIXEL



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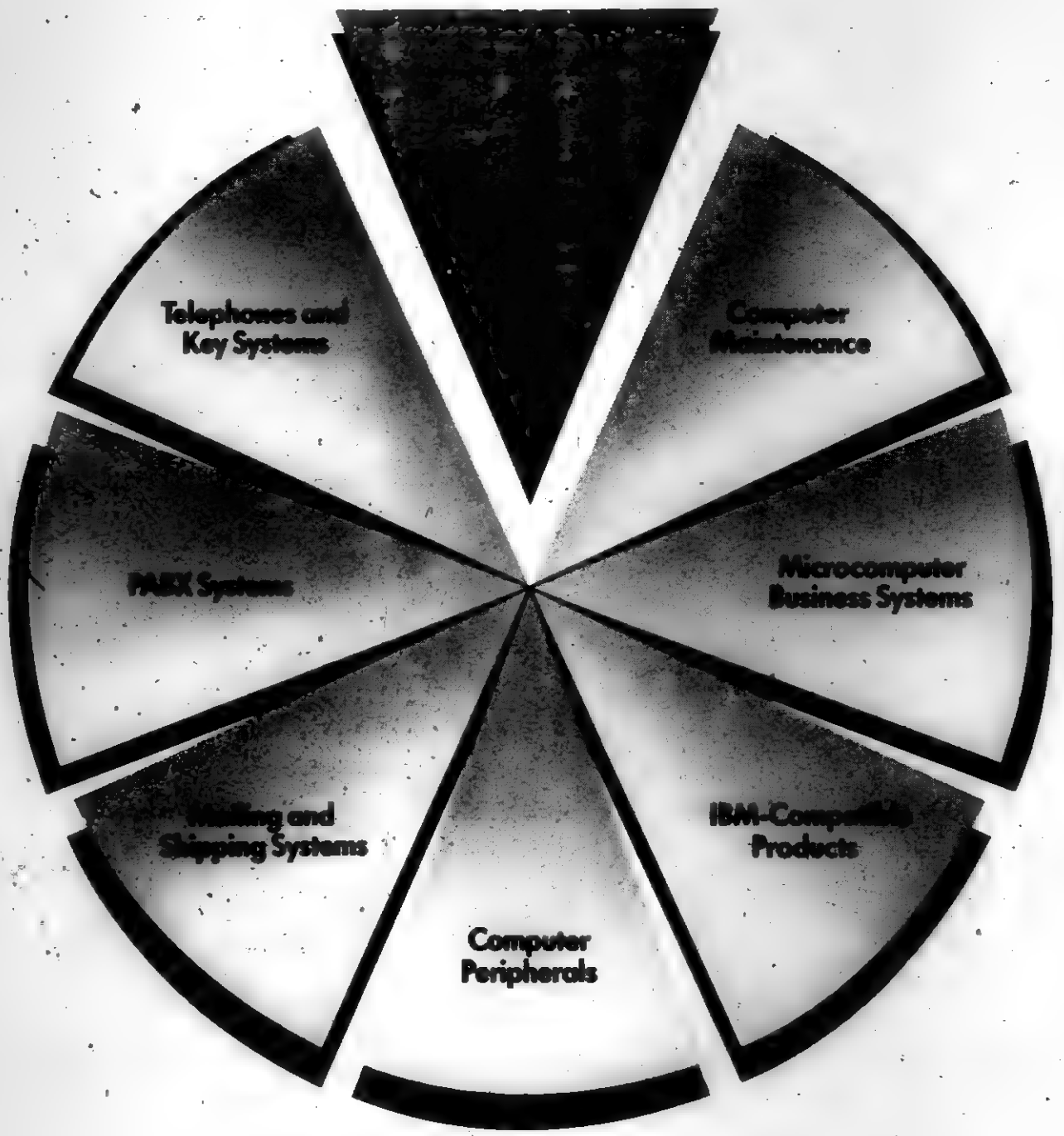

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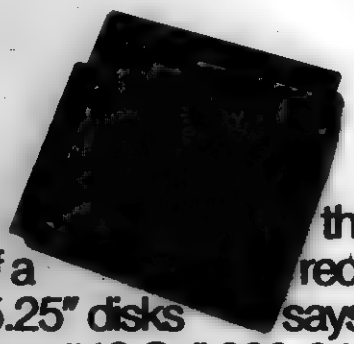


Who's the #1 floppy disk in terms of overall quality? BASF. The author of a recent performance test* of 18 leading double-sided, double-density 5.25" disks says that the #1 diskette is made by BASF. Shouldn't the brand you buy be #1? Call 800-343-4600 for the name of your nearest supplier.

*Based on a survey conducted by Memcon Corp., reported in the October 26, 1987 *Computer Reseller News*.

BASF

Waiting for OS/2

Uncertainty clouds the horizon for users

TERRY ALLEN

BY DOUGLAS BARNEY

By the time this story hits the street, IBM will have shipped OS/2, the large-memory multitasking operating system; a couple of OS/2 applications will likely have been released; and very, very few users will have installed any of it.

Despite all the complaints of personal computers being hamstrung by the aging Microsoft Corp. MS-DOS, there are still no groundbreaking applications to compel users to move to OS/2. And those few brave souls who take the first plunge in search of extra memory can expect a nightmare in converting to the latest in microcomputer operating systems.

For individuals, converting to OS/2 means upgrading applications, dealing with megabytes of MS-DOS-held data and making sure the machine has enough memory and disk storage to handle the burden of a large multitasking system.

For corporations, this burden is simply multiplied by the number of users planning the move. In many larger companies, thousands of PCs must be readied, thousands of applications upgraded and users retrained. Just tracking down warranty cards and finding those vendors that offer upgrades promises to be an agonizing task.

In addition, it is expensive. To run OS/2 and the Presentation Manager, the machine must have an Intel Corp. 80286 or 80386 processor, IBM Enhanced Graphics Adapter graphics, some 3M bytes of random-access memory, a hard disk and a mouse. Add to that the $325 cost of the operating system, software upgrades and user retraining, and it could reach several thousand dollars per PC.

It is no wonder that MIS professionals are putting off the move to OS/2 — for at least a year, in most cases.

In fact, it will be nearly a year before all the OS/2 pieces themselves are available for MIS scrutiny. Although the operating system core is currently shipping, the Presentation Manager, its Apple Computer, Inc. Macintosh-like interface, will not be available until October, according to co-developers IBM and Microsoft.

And with many key software players focusing the bulk of development on the Presentation Manager, a meager selection of software is expected throughout most of 1988. "It will be a relatively slow phase-in because I don't see the vendors all delivering OS/2-compatible versions immediately," says Mike Schmidt, manager of systems planning and administration for Moody's Investors Service, Inc. "But it is inevitable that people will move in that direction once the operating system and applications are delivered."

Users hold back

Most users are content to wait for the Presentation Manager and its applications to arrive, or even longer, before installing OS/2 on anything more than an evaluation basis. Even leading-edge firms such as General Electric Co. and Manufacturers Hanover Corp. say they expect at least two years to pass before OS/2 moves in.

"I think it is going to be a long time before OS/2 becomes a standard. People have enough trouble with DOS. OS/2 is going to completely throw them for a loop," says Frances D. Mendelsohn, information center manager at the U.S. Food and Drug Administration.

Just how long is long? According to Forrester Research, Inc. in Cambridge, Mass., OS/2 will become the standard microcomputer operating system by 1990. But based on extensive interviews with users, that means a nearly wholesale shift in 1989 and 1990, for there will be little or no activity in 1988.

"I don't think OS/2 will shake out before the end of next year. It will

probably be two years before IBM puts all the functionality into OS/2 anyway," says Richard H. Heinrich, manager of statistical processing for Central Steel & Wire Co. in Chicago.

Another user agreed. "We don't feel that a move to OS/2 at this particular time is going to do us a lot of good," says Robert Goldberg, vice-president of Old Stone Bank in Warwick, R.I.

Won't be budged

U.S. West Direct, which produces the Yellow Pages, will not move horizontal productivity applications to OS/2 for two to three years, according to James Jennings, a U.S. West technology analyst active in in-house OS/2 applications development.

The only factor that could speed up OS/2 implementation schedules is a blockbuster application. "If Lotus comes out with a version of 1-2-3 for OS/2 that is absolutely phenomenal, we will go for it. If not, we won't," says Tom Cornell, a consultant with Peat, Marwick, Main & Co.'s airport consulting services area.

But the applications that will be available in the first half of 1988 will not exploit the full capabilities of OS/2, such as its graphical user interface and advanced interapplication data sharing.

Behave yourself

"Vendors are merely developing well-behaved applications that run under OS/2," says Jeff Tarter, publisher of "Soft-Letter," a Cambridge, Mass.-based newsletter. These applications, which include Lotus Development Corp.'s 1-2-3 Release 3 and Borland International's Paradox, should do little to lure users into the expensive world of OS/2.

Many expect the first blockbuster to be a Presentation Manager product. Lotus hopes to hit it big with a graphics-based version of 1-2-3, but is also hedging its bets with an character-mode OS/2 version of 1-2-3 due out in spring 1988.

Nearly all users interviewed are anticipating the move to OS/2 to be largely a move to the Presentation Manager. "We

OS/2's the ticket

Microsoft Corp.'s MS-DOS barely cut it. Unix was too demanding on hardware. So for Mobil Corp. Senior Geologist James G. Cook, OS/2 seems to be the answer.

Cook is responsible for a geologic workstation that currently works under MS-DOS. The only problem is that when the system, which does sophisticated mapping among other things, computes, it often takes hours. Meanwhile, highly paid Mobil employees are idle waiting for the system to complete its mission.

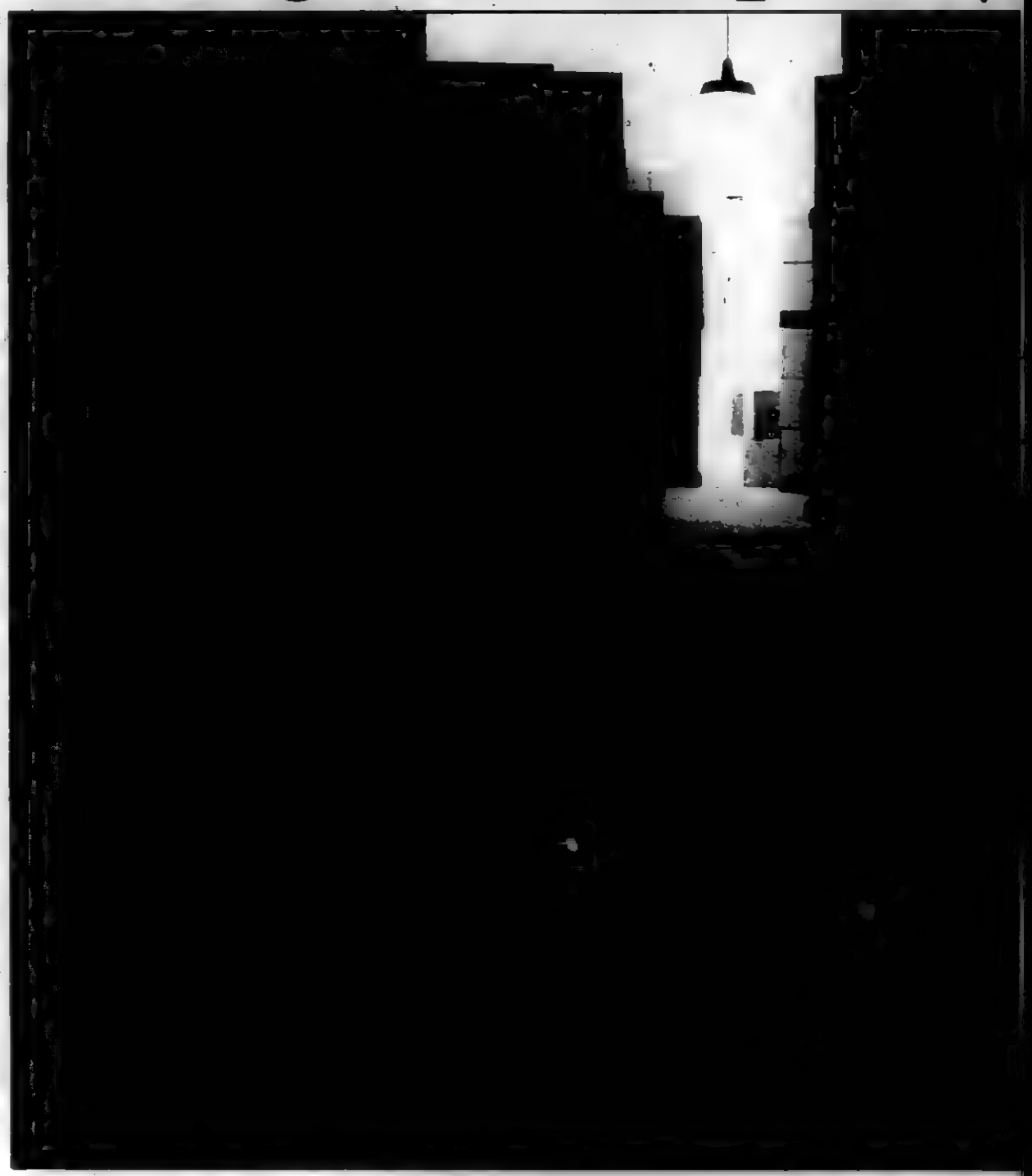
"Once it starts computing, you have lost the machine. Since this is the major workstation for most of the geologists, it is disconcerting not to be able to do anything else for extended periods of time," Cook explains.

With OS/2, however, the system can compute merrily while users perform other tasks, an approach that saves both money and user frustration.

Because the Presentation Manager component of OS/2 will not be available until late next year, Mobil will move first to the OS/2 kernel. Cook will later port the system to the Presentation Manager. Initial pieces should be up and running by the third quarter of 1988 and will run mainly on IBM Personal System/2 Model 60 computers.

DOUGLAS BARNEY

One of the best things nothing to do with power,



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are developing some applications under the existing Windows environment in anticipation of moving to OS/2 Presentation Manager. We are trying to get into the SAA world, and we think that is where it is going to be," U.S. West's Jennings explains, referring to IBM's Systems Application Architecture.

"In our environment, [the interface] is very important because we have such vatrious systems around," Jennings adds. "We need to access multiple mainframes and want the applications to look the same to the end user."

Another user agrees. "It is my belief that OS/2 without the Presentation Manager isn't much of a product. One of the big selling points is its Mac-like interface. If you don't go with that, you end up with something like you have now with DOS," Peat Marwick's Cornell says.

But one user is still skeptical, and points to the failing of Microsoft Windows as an example.

'A barrier'

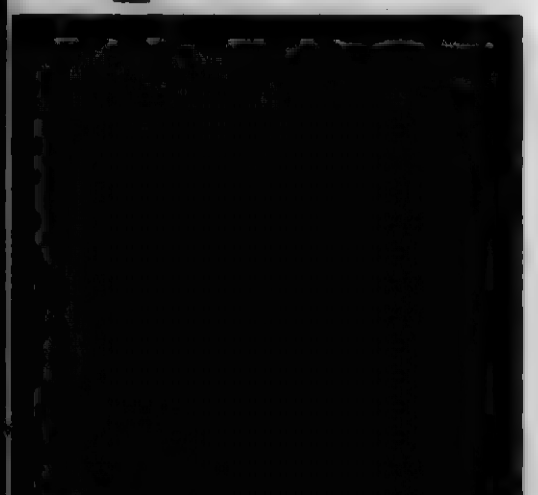
"Power users resent Windows. It is a barrier between them and their work," the FDA's Mendelsohn says. "If God wanted me to use a mouse, he would have given me a third hand."

Mouse convert Cornell sympathized but disagrees with Mendelsohn. "I despised mice," Cornell says. "Now I can't live without them."

While MIS have may the final say as to whether OS/2 becomes a new operating system

Continued on page 44

about VEGA VGA has speed or compatibility.



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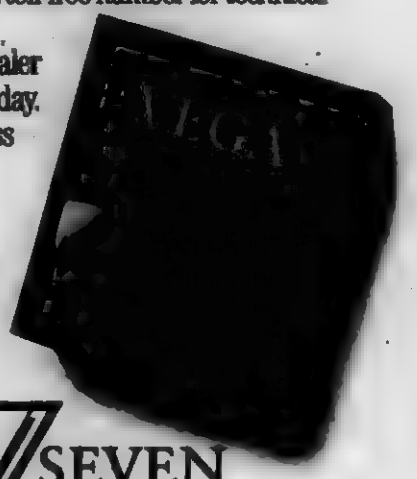

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The yellow pages go high-tech

People looking up the local pizza joint in the yellow pages do not generally think about microcomputer operating systems, but James G. Jennings does.

As a technology analyst for US West Direct, Jennings is responsible for automating the production of the yellow pages directories, and OS/2 holds some promise in this area.

US West Direct has not made a final decision, but signs are pointing toward using OS/2 as the operating systems base for a universal workstation that can access a variety of host computers through a common user interface.

The firm is currently developing the system under Microsoft Corp.'s Windows but hopes to port it to the Presentation Manager when it becomes available late in 1988.

Jennings is following the Presentation Manager path because it represents one of the first steps toward IBM's Systems Applications Architecture. "At the point in time with the release of new compilers, we assume that we will be able to develop portable software," Jennings says.

The system will be based on IBM Personal System/2 Model 50s and will be used for service processing, order processing, customer service and manufacturing.

DOUGLAS BARNEY

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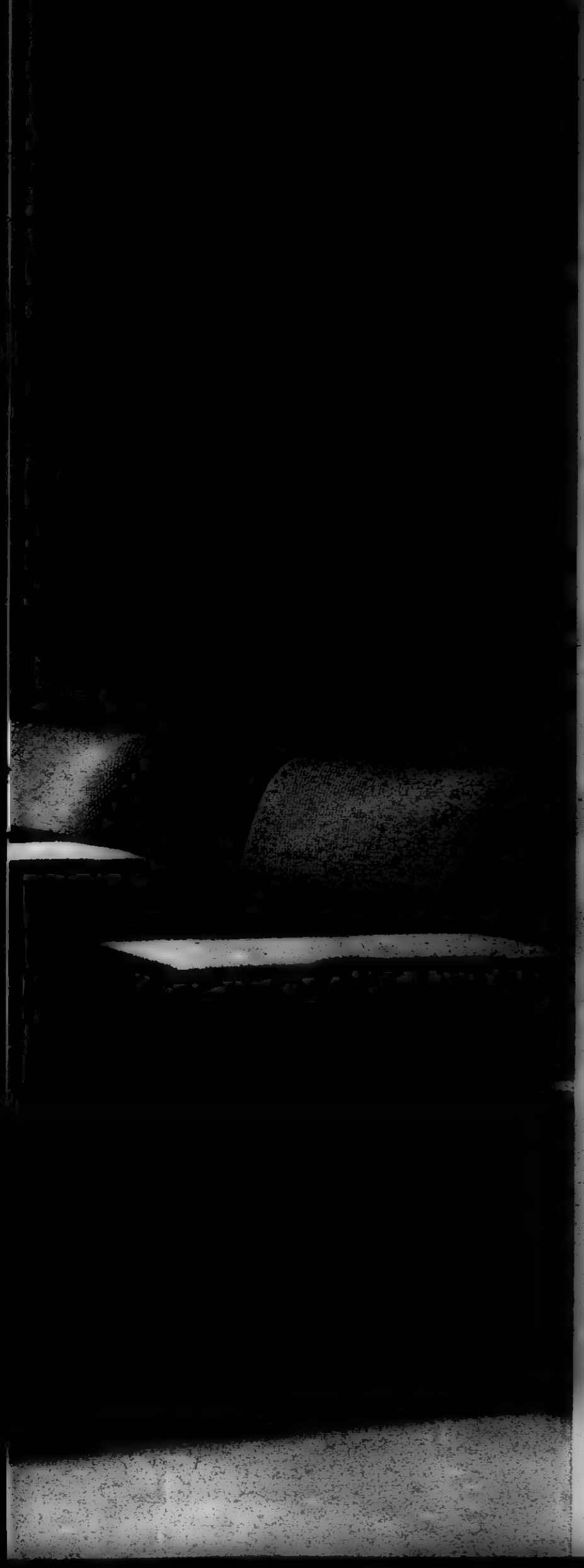

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OS/2

FROM PAGE 41

standard, most users maintain that they will let individuals decide whether OS/2 is right for them. "We are in no position to say no to people," Moody's Schmidt explains.

IBM's OS/2 Extended Edition, which includes proprietary data base and communications functions and is due out in July 1988, might prompt some true Blue shops to adopt OS/2 sooner than expected.

"The communications part interests us a great deal because our information center is part of a mainframe computer center, and we are always fostering micro-to-mainframe communications," Mendelsohn proclaims.

OS/2 Extended Edition is also part of some firms' long-range planning.

The Extended Edition "does make sense for us because we are going to end up in two to four years with a significant amount of distributed processing and distributed data bases. And that is the way that IBM is going," U.S. West's Jennings says.

But not everyone is convinced that OS/2 or its Extended Edition is the right direction in which to go.

Sam Craig, an applied technology analyst for Monsanto Co., which is exploring distributed data base technology, remains unmoved. As he explains, OS/2 Extended Edition "doesn't mean a whole bunch to us."

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Breaking barriers

Tom Cornell of Peat, Marwick, Main & Co. forces company personal computers to work like mainframes, even though Microsoft Corp.'s MS-DOS makes this a difficult task.

Cornell is currently looking to OS/2 to break some of the MS-DOS bottlenecks and get even more processing out of his PCs.

While undecided as to his exact OS/2 course, Cornell expects to use OS/2 primarily to gain access to large amounts of addressable memory. He needs the memory to run complex simulations on a PC that formerly required mainframe computers.

Cornell, who works in Peat Marwick's airport consulting services area, already has the PC horsepower in the form of Compaq Computer Corp. Deskpro 386 computers. And the 32M-byte limit on a single hard-disk partition has been lifted with the help of MS-DOS 3.31.

To break that nagging 640K-byte random-access memory barrier, Cornell has looked at and decided against both Unix and Lotus/Intel/Microsoft Expanded Memory Specification techniques.

Although the signs are pointing clearly to OS/2, Cornell still has a few reservations. One flaw is the loss of processing speed when running in OS/2's protected mode. Part of the speed degradation is because of protected mode. Another element involves the recommendation against software developers writing directly to hardware, a popular way of boosting performance under MS-DOS.

"All of our software writes directly to the registers on the [IBM Enhanced Graphics Adapter] cards," Cornell says.

Despite these potential limitations, Cornell is leaning toward moving his software to OS/2 and the IBM and Microsoft Presentation Manager and moving forever away from the limits of MS-DOS.

DOUGLAS BARNEY

Showdown at clone corral

With its PS/2 line, IBM bushwhacks competitors' price/performance advantage

BY JAMES A. MARTIN

IBM Personal Computer compatibility. How could such a simple concept inspire so many different meanings and create so many concerns, questions and controversies?

In light of IBM's Personal System/2 announcements last April, the question is easily answered. All you need is an industry heavyweight that has lost a good chunk of its low-end market share to the persistent nibbling of clone vendors and, in response, introduced a group of redesigned personal computers.

What has caused users and compatible vendors concern is that the PS/2s are 80% IBM-made; the products boast little in the way of off-the-shelf parts that dominated the PC, PC XT and AT. End result: PC users face a new de facto standard, and compatible vendors like Compaq Computer Corp. face a difficult decision — how will they compete?

And if they do compete with these products, will users be interested? In the past, many users took advantage of the lower prices and higher performances offered by a variety of PC-compatible systems, from the most expensive Compaq models to low-cost Korean clones.

In the PS/2 Micro Channel world, however, users are still interested in price/performance advantages but are concerned about issues such as efficient mainframe connectivity as well. And even those who remain unconvinced of the Micro Channel's value may still stick with IBM's PS/2 just to be safe.

The cost of compatibility

Creating systems compatible with the PS/2 is risky and complicated for many reasons, one being the formidable legal issues compatible vendors must consider.

After all, IBM has posted all the necessary warning signs. Anyone who trespasses on IBM territory with a 100%-compatible PS/2 clone without the Big Blue blessing will be shot on sight.

IBM's Entry Systems Division President William Lowe makes it clear that IBM intends to protect its PS/2 investment. "If we feel they have been copied, we will take action," Lowe told an American Electronics Association gathering this fall.

TERRY ALLEN

It seems clear that the first vendor to release a PS/2-compatible system without IBM approval will be sued, says Richard Shaffer, editor and publisher of "Computer Letter," a microcomputer industry newsletter based in New York. "Not many people want to take that hit," Shaffer says.

A small company with "nothing to lose and everything to gain" might make the first bold move, he adds, but only one of Compaq's size and strength would "have the funds to fight IBM's lawsuit."

IBM further complicates the compatibility picture by saying that it is not interested in licensing the Micro Channel as a whole but that it will talk to vendors on an individual basis about licensing various portions of the bus structure. Thus, IBM has successfully told potential competitors everything, yet nothing.

Good strategy

"There's nothing illegal about keeping your competitors in the dark, and in fact, it's a good strategy," Shaffer says. He adds that it is actually in IBM's best interest to keep the competition confused.

"There's a lot of controversy around these legal issues," says Tim Bajarin, executive vice-president of Creative Strategies Research International, Inc., a Santa Clara, Calif., consulting firm. "IBM will, in the long run, license this technology, but it will require a company-by-company evaluation process; and based on the normal IBM bureaucracy, it could forestall any legal PS/2 compatibles until as late as mid-1989."

Chips and Technologies, Inc. President and Chief Executive Officer Gordon A. Campbell disagrees. He says licensing for the Micro Channel won't be a barrier. "Anyone who wants an agreement from IBM," he says, "can probably get one."

Shaffer points out, however, "It's in the interest of Chips and Technologies, Phoenix Technologies Ltd. and the rest to say PS/2 compatibles are the wave of the future. But the future may be coming a little slower than they say."

Traditionally, being first to market with a PC product is seen as being

the most direct route to leading that market.

In the PS/2-compatible market, however, no one seems overly eager to take the first dip into those icy, uncertain waters, although it is safe to say that just about every compatible vendor is busy developing its own PS/2 compatible.

Compaq has hinted that it has a Micro Channel bus structure program, despite company President Rod Canion's remarks about the PS/2 being equivalent to "New Coke."

Tandy Corp. has said it will wait for others to make the first move before launching a product.

"If there's a market need, we'll offer it," says John Patterson, Tandy's vice-president of research and development.

Compaq has hinted that it has a Micro Channel bus structure program, despite President Rod Canion's remarks about the PS/2 being equivalent to 'New Coke.'

A Hewlett-Packard Co. spokesman says, "We will absolutely be compatible." Zenith

Tim Bajarin

Data Systems, Wyse Technology, Dell Computer Corp. and others are said to be beyond the wait-and-see stage.

Meanwhile, Chips and Technologies and Western Digital Corp. both have promised that the chip sets necessary to build a 100% PS/2 Micro Channel compatible will be available to OEM customers by the end of 1987.

Given traditional product development time, the two companies speculate that the first true PS/2 compatibles will be introduced by the time Comdex/Spring '88 is held and that they will be shipped by next summer.

What's compatible?

Because of IBM's hard-line stance, there are questions as to what PS/2 compatibility will actually mean, at least in the near term.

So far, Compaq and AST Research, Inc. have introduced Intel Corp. 80386-based microcomputers with fast, proprietary bus structures designed to compete against the speed and performance of PS/2 Micro Channel models.

AST's Premium/386, for example, offers the multiple processing capabilities found in the Micro Channel but on an AT bus structure.

In essence, these machines can be viewed as the first functional PS/2 compatibles without tasking the risk of being hardware compatible.

Toeing the line

AST and Compaq have released the first interim solutions to the PS/2 compatible question, strategically toeing that uneasy line between similar and sued. If successful, these vendors and others could fragment the PS/2 marketplace with their alternative approaches, some observers warn.

Add-in board vendors and end users would be placed in a precarious position if that occurred.

Board vendors would be faced with developing products for different PS/2 standards, and the ongoing user dilemma of whether to buy a clone or not could be exacerbated by further choices.

"We believe we have a good shot at having a second PS/2 standard," says AST's Bob Kutnick, director of strategic projects. "But over the long term, if a vendor can provide the exact Micro Channel, that would be the preferred solution."

Are users interested?

Morever, the question that begs to be answered is a simple one: Are end users really that interested in the Micro Channel at this point?

According to Dataquest, Inc., some 1.2 million PS/2s were shipped worldwide in 1987, with 2.35 million expected to be shipped in 1988.

Of those figures, Dataquest predicts that, at most, only half were Models 50, 60 and 80 — those with the Micro Channel bus. The remaining half were predominantly the AT-bus Model 30s.

"Most people who are buying Micro Channel models are buying them because of IBM, not because of the Micro Channel," Shaffer says. "They bought it because IBM said it will be important in the future. Actually, most users are very confused about all this. If you stopped 100 people on the street, only about two could tell you the benefits of the Micro Channel. IBM has a lot of educating to do."

A PS/2 Micro Channel compatible could be attractive for its price as well as its availability, according to Brian Donati, senior technology analyst for the Microcomputing and Office Services at Firestone Tire & Rubber Co.

Forecaster

What will computer technology be like in the year 2000?

- ☑ 30 million to 100 million component/chip
- ☑ 20- to 40-million instructions per second micros
- ☑ Parallel architectures
- ☑ 3G bytes on a read-write-erase compact disk
- ☑ Fiber-optic capacity increased 10 to 100 times
- ☑ End-to-end digital phone system
- ☑ Extensive expert systems
- ☑ High optical character recognition performance
- ☑ Speaker-independent speech recognition with 10,000 to 20,000 words of continuous speech
- ☑ Good speech synthesis
- ☑ High-resolution, bit-mapped, flat screen displays
- ☑ High-performance nonimpact printing
- ☑ Research breakthroughs in wafer-scale integration, very high-level languages, optical switching
- ☑ Product developments in superconductivity, neural networks, cellular cost performance
- ☑ Prices will have declined on most technologies by 5% to 35% per year

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Information corporate DP executive[2]	$66,800	$70,474	$74,350	$78,439	$82,753	$87,304
Corporate systems and programming executive[3]	$66,400	$70,032	$73,905	$77,979	$82,258	$86,782
Documentation clerk	$16,100	$16,825	$17,582	$18,373	$19,200	$20,064
Computer operator for C	$15,100	$15,780	$16,490	$17,232	$18,007	$18,817
Data entry operator	$15,[illegible]	[illegible]	[illegible]	$16,622	$17,412	$18,196

[1] Such as vice-president of MIS
[2] Such as MIS director
[3] Such as director of systems and programming

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Microscope

"We've had some trouble getting parts and pieces for our PS/2s, like an IBM 3270 connection card and Token-Ring cards, and compatibles in the market could help that situation," Donati says. Currently, Firestone has some 125 PS/2s, 90% of which are Model 50s and many of which are networked.

Taking tests

But any kind of compatible would be run through rigorous tests before any orders were made, Donati says, because of earlier connectivity problems experienced on IBM compatibles.

Several users queried by *Computerworld* say that although they are not convinced the Micro Channel will be of any great benefit to their companies, they would rather stick with IBM on the PS/2 than risk buying a compatible.

While admitting he does not know all the benefits of the Micro Channel, Donati says it is clear that the new bus structure would run OS/2 more efficiently than an IBM Personal Computer AT-bus micro.

"OS/2 has been our major interest in the Micro Channel models, not the Micro Channel itself," Donati adds.

Several other users queried by *Computerworld* said that although they are not convinced the Micro Channel will be of any great benefit to their companies, they would rather stick with IBM on the PS/2 than risk buying a compatible.

But I know what I like

"I know very little about the Micro Channel," says Richard Murphy, manager of the personal computer division of Sun-trust Banks, Inc. in Orlando, Fla.

"But I know that we prefer to stay with the IBM brand name. In connectivity situations, for example, we don't want any problems connecting a compatible to our IBM mainframe for downloading," Murphy says.

"I don't understand the bits and bytes of the Micro Channel," says Tim Hensley, director of information technologies at Clorox Corp. in Oakland, Calif., which has some 150 Model 50s.

"I do know we're getting better performance on these machines in throughput and that we are pretty committed to IBM. We look at value beyond the purchase price, and you don't want to have training, maintenance and support spread out over several vendors," he says.

Time to send in the clones

Personal computer-compatible vendors that want to succeed in the IBM Personal System/2 market must have stronger ties with software vendors. After all, it is most likely that OS/2 Extended Edition capabilities can be duplicated in compatible software specifically for non-PS/2 micros.

"The software houses are going to have to think about compatibility themselves," says Chips and Technologies, Inc. President and Chief Executive Officer Gordon A. Campbell. "I think we'll see hardware and software vendors working more closely together than before," he adds.

"The future lies with software developers," says Neil Colvin, chairman and chief executive officer of Phoenix Technologies Ltd., which recently announced a read-only memory BIOS line of products for Micro Channel compatibility.

"The developers have the leverage of saying they won't write to this or that standard if it's not the right environment. That is the real challenge of PS/2," Colvin states.

Ultimately, according to Colvin, the micro industry needs to look beyond hardware compatibility and standards.

"We need to look at an architecture that consolidates software environments and that exploits new hardware immediately. We need to allow migration across product lines. The Unix System V operating system has so far met many of those goals, so we do know this is at least possible."

JAMES A. MARTIN

TRENDSETTERS

When medium-size companies find it difficult to enforce their own protocols, pressuring vendors is the next best thing. So that's what Poloroid's Peter Duray is doing.

"We're trying to force the vendors to be more integrated sooner, much as large companies like General Motors and Boeing are doing" with Manufacturing Automation Protocol and Technical and Office Protocol, says Duray, who is the information technology manager at Polaroid Corp. in Waltham, Mass.

According to Duray, Polaroid is not a big enough company to enforce its own protocols. "But we're wise enough to tell the vendors that they need to do it for us," he adds.

Duray says Polaroid is interested in gateways between IBM and Digital Equipment Corp. "We're trying to get vendors to push the International Standards Organization's Open Systems Interconnect Model suite as quickly as possible," he adds. "We'd rather be there than in a temporary gateway solution."

Polaroid's corporate data center handles nearly all the corporation's worldwide data processing. The company runs IBM 3081 mainframes and "just about everything from DEC — Microvaxes to VAX 8800s," Duray says. The company's PCs are predominantly IBM Personal Computers and Apple Computer, Inc. Macintoshes.

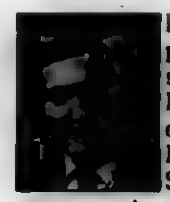
In connectivity, Polaroid is on the leading edge with DEC's Decnet, IBM's Systems Network Architecture, Transmission Control Protocol/Internet Protocol and CCITT X.25 networks, Duray says.

A group of eight people work under Duray, and he says using participative management is one way to motivate them.

"Because of the nature of our work in evaluating new technologies, people have to be challenged, and they have to be independent thinkers," he stresses.

ALAN J. RYAN

FUTURISTS



In the next couple of years, says William W. Marks, president of POC-It Management Services, Inc., a management consulting firm based in Santa Monica, Calif., MIS will be run more like a business within a business.

According to Marks, as the functions of information services are distributed throughout an organization, the position of chief information officer will be accepted by top-level management. The CIO will assume the responsibility of coordinating and managing information services for different departments, Marks says.

"There is a developing trend toward viewing departments using information services as clients, not users," Marks says. "These clients will require an MIS person devoted to overseeing the planning and implementation of their data processing needs. Without this account executive type, the distribution and the management of the distribution will run amok."

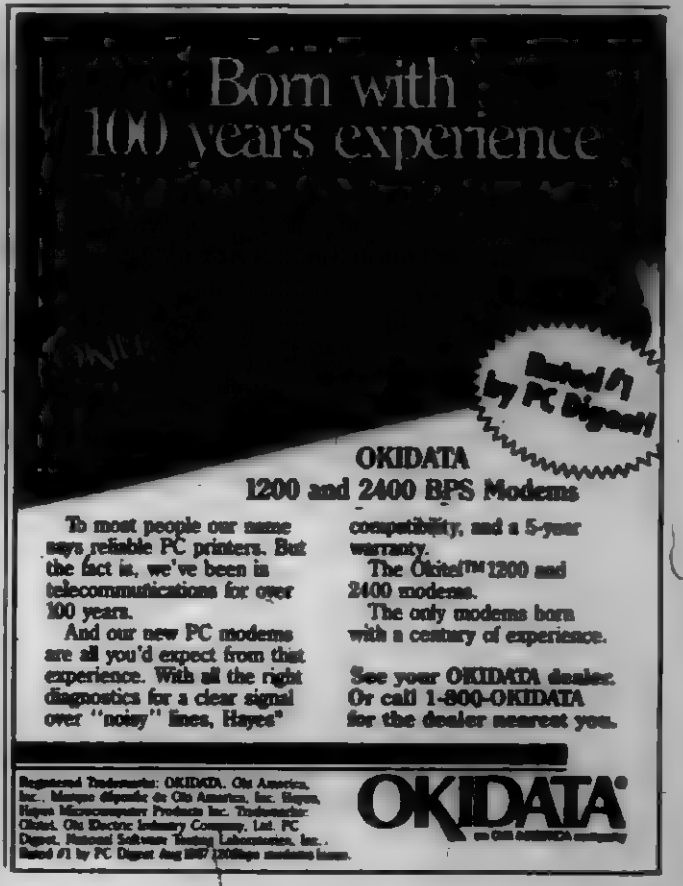
"As computers become more user friendly, computer crime becomes more abuser friendly," says Buck BloomBecker, director of the National Center for Computer Crime Data.

"Computer crimes are being committed by a wide range of people," BloomBecker says. "Information on committing computer crime is spreading through the typical criminal information channels, so in addition to kids who learn computing in school and employees who use computers at work, regular street criminals are learning how to commit computer crimes."

BloomBecker says increased prosecution should help curb the tide of computer crimes markedly. He explains that computer criminals have not been widely prosecuted because the law — and lawyers — have not been able to catch up with them until now. "Now that computer crime laws are in place, victims have reached the stage where they can believe in prosecution."

Equally significant in BloomBecker's mind are the civil law responses to computer crime and the growing awareness of morality in the country. "In addition to the justice system beginning to follow through on computer crime, society as a whole is becoming concerned with ethics," he maintains.

SUZANNE WEIXEL



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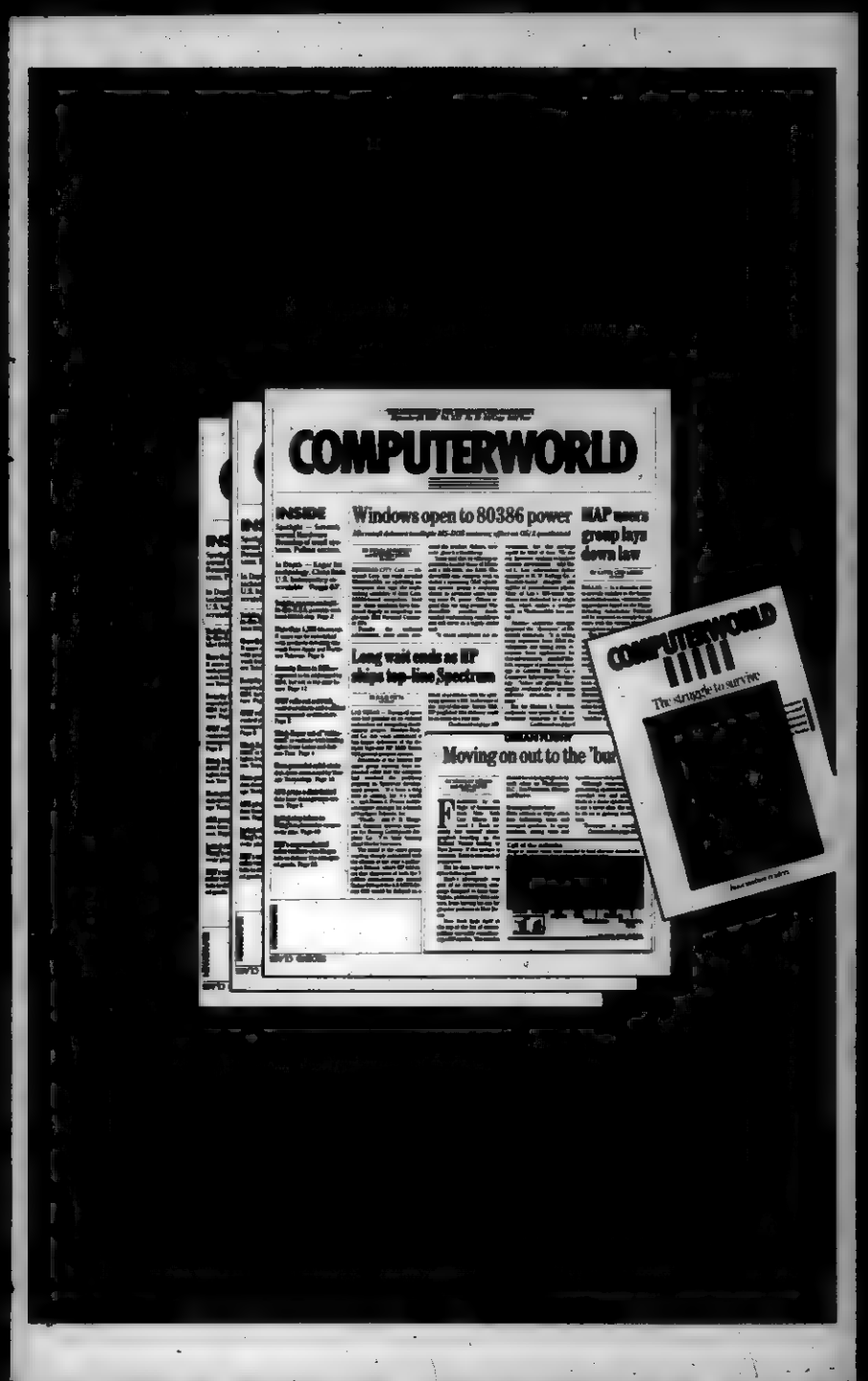
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   32. Programmer, Methods Analyst
   35. Dir., Mgr., Suprv., OA/WP
   36. Data Comm. Network/Systems Mgt.
   OTHER COMPANY MANAGEMENT
   11. President, Owner/Partner, General Mgr.
   19. Vice President/Asst. VP
   13. Treasurer, Controller, Financial Officer
   41. Engineering, Scientific, R&D, Tech. Mgt.
   51. Sales/Mktg. Mgt.
   OTHER PROFESSIONALS
   60. Consulting Mgt.
   70. Medical, Legal, Accounting Mgt.
   80. Educators, Journalists, Librarians, Students
   99. Others _____
   (Please specify)

3. **COMPUTER INVOLVEMENT** (Circle all that apply) Types of equipment with which you are personally involved either as a user, vendor, or consultant.
   A. Mainframes/Supermins
   B. Minicomputers/Small Business Computers
   C. Microcomputers/Desktops
   D. Communications Systems
   E. Office Automation Systems
   F. No Computer Involvement

336001-4

What's a manager to do about PS/2 line, OS/2?

Companies hedge their bets with AT-class PCs

BY ED SCANNELL

Personal computer purchases for MIS managers during the last few years have been a straightforward proposition. With IBM's Personal Computer series as the standard, the toughest decision they had to make was deciding how many PCs to buy relative to the number of compatible machines.

But when IBM introduced its semicompatible Personal System/2 family and OS/2 operating system early in 1987, life got a lot tougher for MIS managers overnight.

During the next two years, MIS managers will still be deciding how to best balance the number of IBM and compatible computers, but for entirely different reasons.

What changes the nature of this decision is that MIS managers do not fully understand how the PS/2's new bus structure and OS/2's multitasking capabilities benefit their users.

Most say they believe current industry-standard hardware running under Microsoft Corp.'s MS-DOS adequately addresses their users' needs for the foreseeable future. But with IBM halting production on its PC line and making claims that OS/2 and its applications will run better on the PS/2s than on PC AT-compatible machines, the company is putting pressure on corporations to make a choice.

Unfortunately, MIS managers will not know how much the PS/2s can help them until there are applications available that take full advantage of OS/2.

"We're committed to the Micro Channel and PS/2s but not OS/2, because we don't know what it will do for us," says Phillip Gordon, manager of office systems for Charles Schwab & Co. "I know there are places where we can use multitasking here, but it requires a heavy commitment in terms of cost."

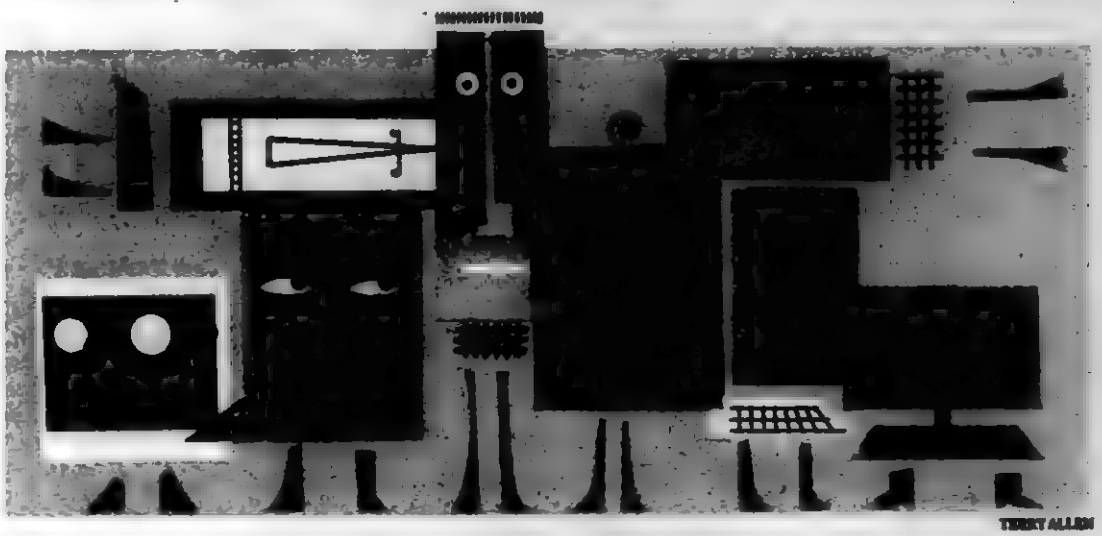
While the first applications for OS/2 Standard Edition 1.0 are expected this month — namely ports of existing programs — applications that take advantage of OS/2 Extended Edition and the Presentation Manager won't be out until late 1988.

Despite this uncertainty, many large corporations plan to buy PS/2s along with a healthy number of high-end AT-compatible systems.

These systems, equipped with either Intel Corp. 80286 and 80386 processors, Enhanced Graphics Adapter or Video Graphics Array graphics and between 20M and 40M bytes of memory, can comfortably run at least OS/2 Standard Edition. It remains unclear whether compatible machines will run OS/2 Extended Edition.

"I have a bunch of orders on my desk now for [Compaq Deskpro] 386s, 286s and a few PS/2s, just to get our feet wet," says Ron Goldfarb, manager of office automation for Pratt & Whitney's Administration Group, in summing up the feelings of many. "We are going for the power but not necessarily the PS/2s. We are waiting for the [PS/2] third-party guys to catch up."

While the "True Blue" corporations are buying PS/2s in large numbers, they are doing so more because of the system's price/performance



TERRY ALLEN

values than any long-term computing strategy. With versions of OS/2 ranging from $325 to $795 and requiring significant investments in upgrading existing hardware, even the True Bluers need concrete evidence that the PS/2-OS/2 combination gives them a quantum leap in added functionality.

Not sold on high price

While his firm represents an extreme example, Jeff Ehrlich, manager of product technology for General Electric Co.'s Corporate Information Technology, says it will cost $5 million to upgrade one quarter of the company's 30,000 PC users to OS/2 Extended Edition. That figure does not include the cost of OS/2 Extended Edition-specific applications and extra hardware.

"It could cost me $20 million and for what? What can I do that I couldn't do before?" Ehrlich asks. "There isn't a strong lean toward OS/2 at this point. I don't consider it something I have to worry about now." Ehrlich indicates, however, that the majority of the systems the company will buy during the next few years will be PS/2s.

Travelers Insurance Co. also plans to buy a significant number of PS/2s during the next year. However, Ron Bristol, the company's vice-president of computer science, admits he is concerned about how he can cost-effectively tie those systems in with his current base of PC ATs and XTs. Of the 13,000 systems Travelers has, many are Intel 8088-based XTs, which are not compatible with OS/2.

Mixing old with new

"Our biggest problem in 1988 will be blending our XTs and ATs into a mixture [of PS/2s] under OS/2. We want to maximize the use of our two operating systems — [MS-DOS and OS/2] — without costing ourselves a fortune," Bristol says.

Travelers will only give OS/2 to PS/2 users until applications are available that allow both PS/2 and AT and XT users to work together, Bristol says.

However, Bristol says he will buy more PS/2s than AT-compatible machines so as not to lock himself out of any opportunities to run the more advanced software that will be running only on the PS/2s. He said that kind of thinking got a lot of people who were working with mainframes in trouble in the past.

"You don't want to be in a situation where you are staying with the old machines. People used to think it was smart to buy second-hand mainframes, but they cost themselves money on maintenance and missed opportunities. We'll probably see that with PCs," Bristol says.

A bit surprisingly, many companies say they plan to buy 80286-based systems such as IBM's PS/2 Models 50 and 60 and Compaq Computer Corp.'s Deskpro 286 in larger numbers than they do 80386-based machines. Despite the tag — which may not be justified — that the 80286 chip is "brain-damaged," many prefer its price/performance values to those of the more powerful 80386s. Many MIS managers say they will buy a few 80386s but use them only as local-area network servers.

'Money well spent'

"I have told anybody who'll listen to buy a 286 machine because it's money well spent," said Mary Nelson, an information center manager at Loews Corp. "Even if you choose not to go with OS/2, you still have a machine that runs your applications faster."

While most large companies say they prefer buying new systems to get ready for OS/2 and its applications, they say they will also upgrade existing 8088- and 80286-based systems with processor and memory boards. Most think it is an appropriate alternative for the minority of their users. Some, however, think it can create problems further down the road.

"We try to stay away from that [upgrade boards], because there's always a piece of software that comes along that doesn't work, and you've got a problem," Travelers' Bristol says. "But every once in a while, you have to go buy an [AST Research] Rampage board."

Processor boards

Robert Core, director of strategic planning for Electronic Data Systems Corp.'s Dealer Information Division, also says he feels processor boards are not an entirely satisfactory solution for his company and probably many others from either a function or price standpoint.

"It's not just a matter of putting a faster processor in the machine, it's a matter of the peripherals being underpowered [as a result]," Core says. "You have to spend $2,000 to $2,500 for a processor [upgrade], and for that much you could buy a new system."

But processor board upgrades are becoming more popular among MIS managers, according to Rich Bader, co-general manager of Intel Corp.'s Personal Computer Enhancement Operation. At November's Comdex/Fall '87 show, Bader says several MIS managers committed to buying 1,000 of the company's processor upgrade boards such as the Inboard 386/PC. He added that many of those boards are still going to power us-

Continued on page 53

Announcing an acquisition that sounds as good on Main Street as it does on Wall Street.

When CIS acquired CMI Corporation recently, all the related parties benefitted. From customers throughout the United States and Canada, to individual and institutional investors, this deal made news by making sense.

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Continued from page 50

ers and not clerical and administrative workers, who could also benefit from the increased speed and power.

"Nobody thinks of using a 386 for a word processor, but that was when word processors were like electronic typewriters," Bader says. "But now with what-you-see-is-what-you-get functions and context-sensitive Help files, you have some fairly compute-intensive uses of word processors."

Waiting game

With OS/2 and the Presentation Manager to be delivered before the end of the year, few MIS managers plan to buy significant numbers of Intel 8086- or 8088-based systems next year. While some will upgrade the 8088s and 8086s they have, many more say they will relegate those machines to low-level tasks.

However, some MIS managers admit they are buying so many 80286- and 80386-based systems that they cannot find uses for their 8088s fast enough. Some say they are now beginning to stockpile a growing number of them. While they would like to sell them or give them away, MIS managers point out that the book value on these systems is higher than the street price, which means they would sustain a big write-off.

"It's a financial problem for some companies," GE's Ehrlich says. "We can't do anything with them, but we can't afford to give them away."

A few companies say they would minimize the uncertainty and general aggravation imposed by the PS/2s and their multitasking operating system by buying more Apple Computer, Inc. Macintoshes.

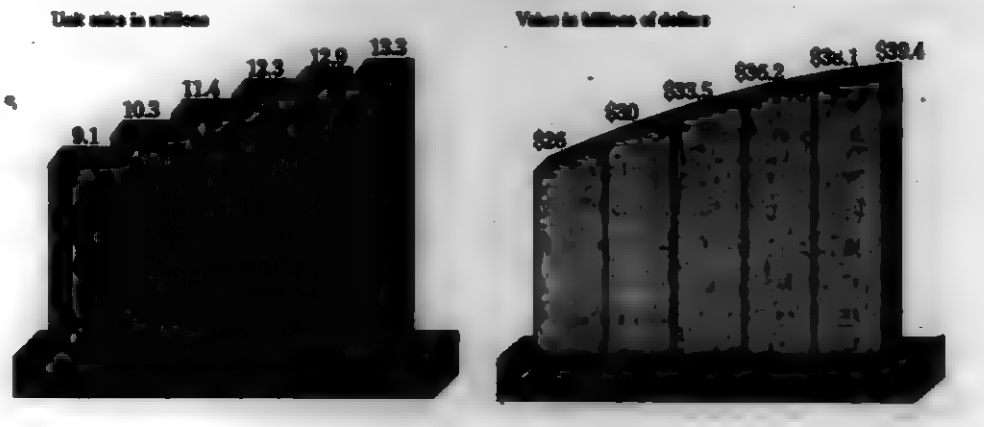
The Macintosh has a graphical interface and a multitasking operating system that's virtually invisible to users — although not quite as feature-rich as OS/2. The Mac also has generally superior applications compared with the MS-DOS-compatible applications that are available today.

"What some people do on the PC is juvenile compared to what you can do on the Mac," GE's Ehrlich says. Some PC users "haven't seen the kind of software that's available on the Mac."

Forecaster

How many PCs, and what will they cost?

A six-year projection of U.S. personal computer sales and their values



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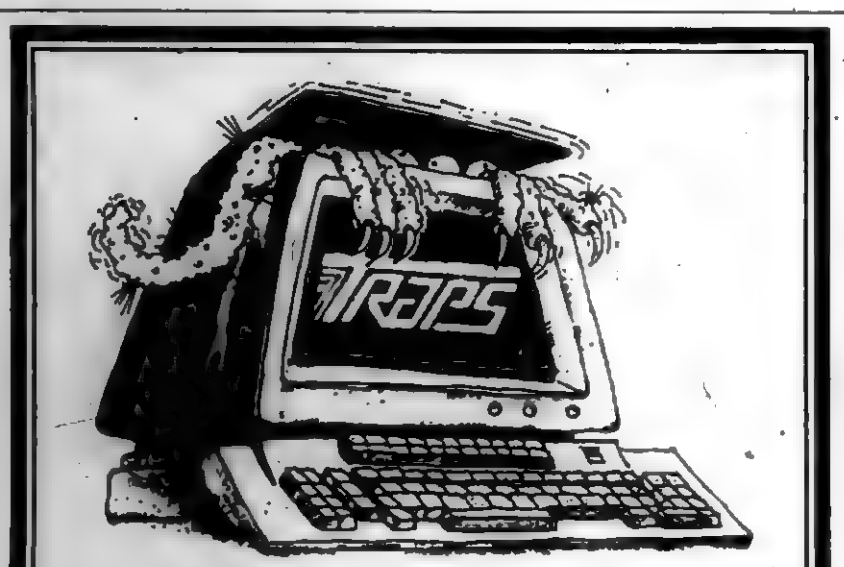

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TRENDSETTERS

In 1981, when Brian Camenker was considering changing his brand of microcomputer, he joined the IBM PC Users Group of the Boston Computer Society to assist him in making his decision.

At the time, Camenker was an Apple Computer, Inc. Apple II Plus software programming consultant. But "when the PC first came out," he explains, "I wanted to find out whether or not I should get one. I went to the meetings to see if the IBM PC was worthwhile and decided it was."

Camenker, who is now the users group's director, says he has watched the group grow from a few hundred users to its current size of 15,000 members.

Users groups, Camenker says, play an increasingly important role in the industry. Vendors realize the importance of users groups and listen to their ideas. "Big vendors often ask us what we think," he says.

And Camenker, through various posts he has held in the users group, tells them. As he jokingly recalls, "I was able to tell Bill Gates that if they don't improve DOS, a clone will take over his marketplace."

In addition to his duties with the users group, Camenker, 34, holds down a full-time job as a senior systems analyst at Dynamics Research Corp.'s Andover, Mass., division headquarters. He is the top-ranking PC expert at Dynamics Research.

In the users group, Camenker stresses education. "We do the best we can to help users of PCs. We help new users learn about PCs and also help experienced users learn how to use the PC more effectively. But we also show people that there are some things PCs aren't good for."

In 1982, while the rest of corporate America was keeping IBM in designer-label pinstripe suits, Dick Webb was investigating Apple Computer, Inc. Macintosh specifications for Peat, Marwick, Main & Co. auditors.

The partner in charge of audit technology at Peat Marwick's executive offices in Montvale, N.J., says he chose the Apple micro for its ease of use when it became available in 1984.

Today, he says, "It's nice to know that the rest of the world thinks the graphics interface is the way to go."

Peat Marwick has invested in some 8,000 Macintoshes worldwide, with approximately 5,500 in use in the U.S.

During the last 12 months alone, Webb has approved the purchase of an additional 2,000 units, bringing the average ratio of auditors to machines to 1-to-6. He says he hopes to eventually have a Macintosh assigned to each new auditor when the employee walks in the door.

Webb says the computers

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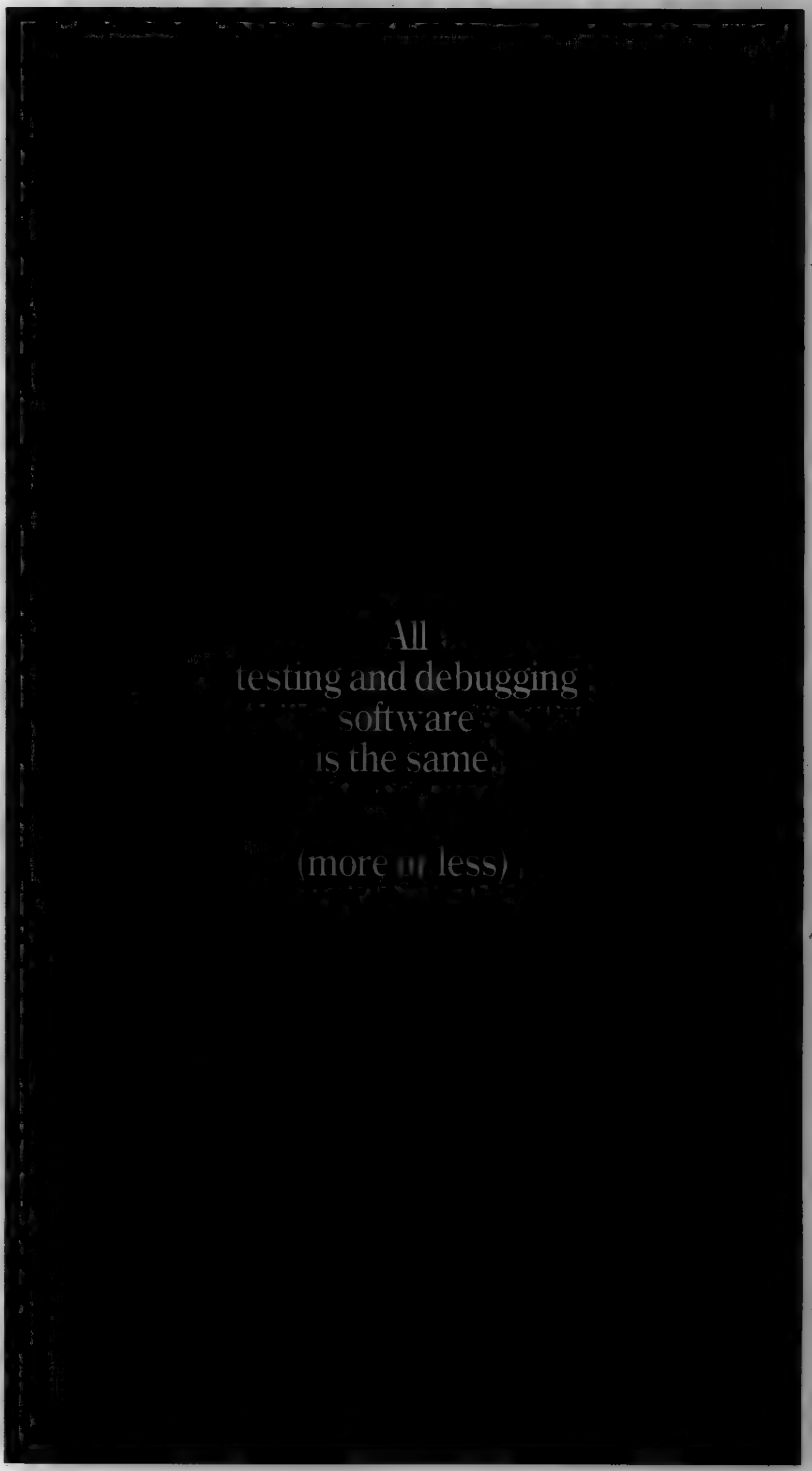

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Continued from page 52

were originally purchased to help auditors with clerical, nonjudgmental-type tasks. But the Macs are being used in meatier applications now.

Using the Apple products gives his firm an edge over the competition, he says.

"I think virtually all the other Big Eight accounting firms are using [IBM and compatible] personal computers," Webb says. "We think the Mac is providing us with an advantage, because it's easier for our people to use, and training time is significantly less."

Backing up claims that his auditors are proficient in many applications, Webb cites a recent study that Apple commissioned, which shows that the average IBM Personal Computer and compatible user uses his computer for about 30 minutes daily and is proficient in two applications. The average Mac user, the study shows, uses that unit for 2½ hours per day and is proficient in six applications.

To keep up with the latest trends in computing, Webb's office frequently acts as a beta-test site for new Apple products. And to keep up with the latest trends in auditing, each year Webb brings in 10 to 15 auditors — for a period of 15 to 18 months — to help develop customized software.

The program has proven very successful since its inception in 1981. "We can say to people, 'Better be sure you're doing it right, because you're the one who's going to be using it.' "

ALAN J. RYAN

Self-reliance has become a necessary choice of the new generation of personal computer users at Pepsico, Inc.

Elizabeth Menten, information center manager at Pepsico's Purchase, N.Y., corporate headquarters, says one of her main goals is working to support self-reliance among PC users at her firm. "We're training them to help themselves," she says.

While the number of hours Menten and her staff devote to user support has remained steady, the need for support has grown as the company's workstation penetration has surpassed 60%. "We can't get any more staff," she says, "so users have to support themselves more and more."

'Their own leaders'

Menten says this attitude also applies to her six-member information center staff, with each member assigned to a particular area of expertise, such as electronic mail or local-area networks. "They are their own leaders. I give them direction, but they have to recognize that this [job responsibility] is their tool and their opportunity," Menten explains.

A former consultant at the Gartner Group, Inc., Menten says she has found that the users she had been writing about as a consultant are just as hungry for technology as she had imagined.

To keep up with the sophisticated audience, Menten devotes much of her time to evaluating what she calls "hot" technologies.

Some areas she currently is investigating include executive information systems and desktop publishing.

Pepsico also keeps on top of technology by acting as a beta-test site for some software products. Beta testing, Menten says, "gives us the opportunity to find out what advantages there are to a product and what potential problems there are."

Pepsico is primarily an IBM shop, Menten says, with an IBM 3081 mainframe, a System/36 minicomputer, Personal Computers, PC XTs and ATs and Personal System/2 Model 50s, 60s and 80s.

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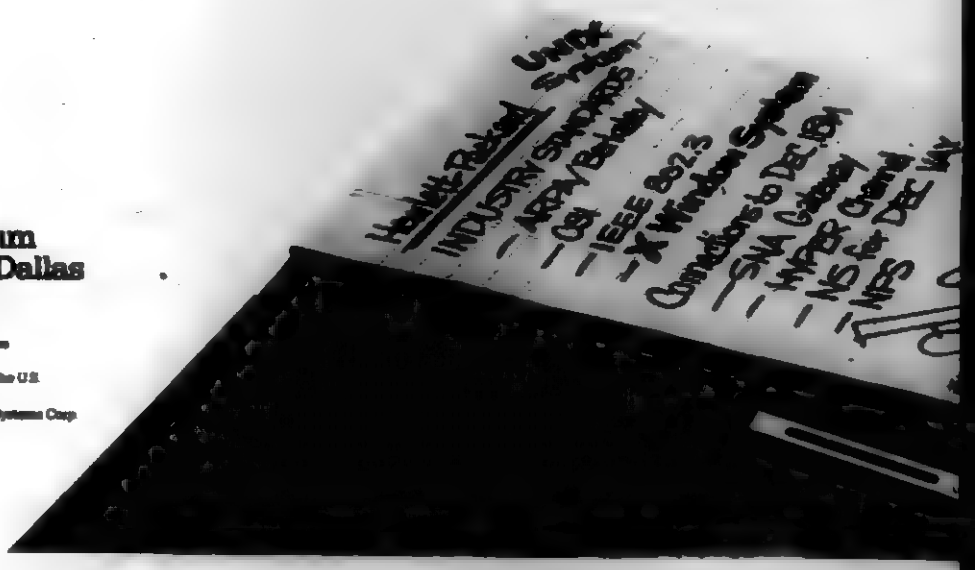

Microscope

Joseph Vincent follows a participative management style: "I believe you should use all the brains you have and all you can borrow. I want the professional opinion of those working for me; I don't want them to just echo me."

As director of computer performance and capacity planning, Vincent helps keep mammoth health organization Humana, Inc. on top of the latest technology.

He and his staff work out of the company's block-long secure data center in Louisville, Ky., where they assess new technologies and make purchase recommendations in addition to ensuring that the company's existing equipment works correctly.

The data center currently houses an IBM 3090 Model 600E and an IBM 3084 Model QX. The mainframes are part of a network that includes various types of minicomputers at each of the 80-plus Humana-owned and -operated hospitals nationwide. Information is sent to Louisville during off-hours via leased lines.

Vincent, who has 27 years of MIS experience, got his start in the military and has seen the inside of both government and private-sector shops. "In general, one MIS shop is pretty much like another," he maintains. "The challenge is to understand the business and how to apply technology to the business."

While Vincent makes purchase recommendations, upper management makes the ultimate decisions. "I do my homework, so my recommendations are based on sound analysis," he says. "I'm fortunate that the people I work for know that I know what I'm doing and take my recommendations at face value."

Currently under Vincent's evaluation is the Teradata Corp. DBC 1012 computer, a data base machine that contains disks and software and could prove useful in managing the 600,000 member names in the Humana health insurance program.

"The MIS department here isn't fighting PCs," says Thomas O'Leary Jr. "We're leading the charge and always have been."

O'Leary is director of MIS technology at North American Philips Corp., a $4.5 billion manufacturing company that is run primarily on IBM equipment, from 3090s to Personal Computers. At the company's headquarters in New York, there is nearly a 1-1 ratio of personal computers to the more than 400 employees.

For the past two years, O'Leary has been buying microcomputers based on Intel Corp.'s 80286 microprocessor. But now, he says, he is looking hard at IBM's Personal System/2. "We've been waiting for third parties to come up with boards for things we use on the PC AT, like Irma cards, on the PS/2," he says. "As those things become available, we'll probably start getting more PS/2s."

But, O'Leary concedes, micro buying decisions are becoming more difficult. "The user has the best of all worlds now; he really can't make a bad decision. With a three-year life cycle, the user will get his money's worth out of . . . a 286," he says. "But we can also say that in the same period, how much more use could he get out of the [Intel 80386]?"

And then there is Apple Computer, Inc.'s Macintosh personal computer.

"The Mac is finally on its way into corporate America. We're about ready to bless it. Connectivity is the single issue, and it is the thing that kept the Mac out of here."

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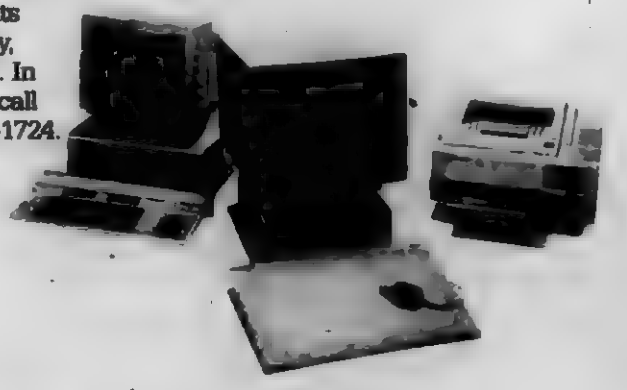

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CNE

Flexible PC plans best, not grand designs

Users favor building-block strategies

TERRY ALLEN

BY STEPHEN JONES

Those innocuous little boxes that were once the menace of MIS have managed to nuzzle their way into the hearts of corporate America.

But guiding an MIS shop down a path lined with microcomputers is no easy task. It means dismantling old mainframe-dominated strategies, roping in technologies that consistently buck standardization and finding enough money to glue an integrated system together.

Most MIS executives have taken a proactive role in embracing the microcomputer, but such issues have made the union a loose one. Instead of relying on the five- and 10-year plans that have formed the basis of traditional centralized mainframe strategies, today's executives are focusing on a generic set of rules.

Companies such as General Electric Co. and Bank America Corp. are following game plans that are flexible enough to ride the changing tides of the micro industry but rigid enough to provide uniformity throughout the corporation.

"You have to avoid the trap of a big, grand design for MIS," says John Konvalinka, managing partner and chief information officer with Arthur Andersen & Co. in Chicago. "We're implementing our [micro] plan in an evolutionary sense, like a series of building blocks."

For American business, the building blocks are piling up fast. MIS is gobbling up micros at breakneck speed, while mainframe acquisitions plod considerably behind.

Market research firm International Data Corp. (IDC) reports that U.S. shipments of personal computers have soared from $1.9 billion in 1981 to $16 billion in 1987. Mainframe deliveries, on the other hand, have grown by about $5 billion in the same period, from approximately $4 billion to $9 billion. By 1991, micro shipments are expected to jump to $22.2 billion while mainframes barely climb to $10 billion.

In 1987 alone, IDC estimates, MIS spent in excess of 50% more on micros than it did on mainframes.

Shelling out that kind of money requires some dramatic changes at a number of corporate levels.

At San Francisco-based Bank America, micro acquisition has become such a focal point for MIS that purchases for end users are now a line item in the bank's systems investment budget. Phil Newbold, vice-president of business support systems, says the budget changes were the result of the firm's decision to increase micro spending by 400% over the next three years.

Increased funds are needed for both the purchase and implementation of a fully integrated data processing environment, with the brass ring being a seamless path from high-powered PCs to the host. Mark Tebbe, who advises corporations on micro strategies as president of Chicago-based Lante Corp., estimates that a switch to consolidated computing can increase micro-related expenditures by as much as 50%.

"People are looking at the big picture — how the PC can fit into their overall corporate goals, and that is going to cost some money," Tebbe says.

Armed with a fistful of cash, MIS managers are grappling with the details of integration. Strategies vary according to a company's particular business, its existing MIS configuration and the attitude of resident systems gurus.

While some companies are relying on minicomputers as the go-between from the desktop to the mainframe, a cadre is lining up behind local-area networks.

For companies like Mutual Benefit Life Insurance Co. in Newark, N.J., LANs are a welcome alternative to a current system of simple emulation through IBM 3270 terminals. By installing a LAN, Mutual Benefit expects to create true cooperative processing between its host and micros while linking up a string of disparate hardware in the process.

More important, however, is the

need to catch a new wave in MIS that is expected to build with IBM's OS/2 Extended Edition and Systems Application Architecture, says Mary Alice Johnson, information center manager at Mutual Benefit. LANs are expected to play a big role in the implementation of those products. "As a company, you have to put yourself in the best position to take advantage of what is coming down the road tomorrow," Johnson says. Mutual Benefit plans to move on to IBM Token-Ring LANs if a pilot program is successful.

A LAN's ability to load and retrieve data from the mainframe does not guarantee the efficient use of that information, though. Companies have realized

Companies have a lot of data but not much real information, because they don't know what it means.

MARK TEBBE
Lante Corp.

that they have a slew of data bases containing unknown, incorrect and redundant data. "Companies have a lot of data but not much real information, because they don't know what it means," Tebbe says.

Bankamerica got around the problem by going through the arduous task of breaking down and sifting through mainframe data that had been stored in compartmentalized chunks. After 2½ years of analyzing systems records, the bank has established the "corporate data store," a body of data that has been assembled, unified and documented for access by end users.

While data base information can be tapped by a user with a PC, it will be several years before the data store is completed, says Arnold Birenbaum, vice-president of end-user computing at Bankamerica. Companies are using that kind of downloaded information for everything from simple spreadsheet number crunching to application development on PC workhorses.

Of the 9,000 workstations connected to the host at The Travelers Corp. in Hartford, Conn., about 1,600 are used for application programming. Developers use PC-based development tools to write applications code that is uploaded to the mainframe, according to Bob Fredette, who runs the company's computing resource center.

But putting such development power in the hands of the masses can lead to problems if it is not done under the watchful eye of MIS, executives say. San Francisco-based Wells Fargo & Co. follows a strategy aimed at maintaining a degree of consolidation in each of its divisions while pumping more power and flexibility onto an end user's desk top.

"You need a strategy to control growth and make sure access to certain applications is not dependent on an individual. The application can become useless if that person leaves the company," warns C. James Saavedra, senior vice-president and manager of Wells Fargo's wholesale loan services division.

Despite the flurry of interest in micros, some organizations have found that their rank and file users are still wary of jumping on the PC bandwagon.

That forces MIS to market its wares to corporate users. Last year at Arthur Andersen, MIS set up a mock information center running every piece of equipment around which the company had standardized its integration plan. The center, which features everything from Wang Laboratories, Inc. and Zenith Data Systems laptops to an IBM mainframe, was so successful in winning over skeptical users that the company has made it a permanent display and training center.

Such efforts are admirable, but MIS has a long way to go before seamless integration exists. In fact, most managers agree that the dust being kicked up by today's loosely defined micro strategies shows no signs of settling soon. "There's as much confusion as ever," says Bob Hilton, a consultant at Systems Planning Institute, Inc. in Atlanta.

But if MIS continues to chip away at the problems inherent with any strategy for linking micros to mainframes, that confusion could yield some calming results.

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FUTURISTS

OS/2, IBM's Systems Application Architecture (SAA) and end users are going to make 1988 an interesting year for software developers, says John P. Imlay Jr., chairman and chief executive officer of Atlanta-based Management Science America, Inc.

"The sale of personal computers is dramatic right now," Imlay says. "OS/2 opens the door for software innovation, and it will be interesting to see how people take advantage of it," he adds, referring to the operating system jointly developed by IBM and Microsoft Corp.

Imlay says that when products come out that run under the new operating system, "We should see multitasking and all those other things IBM promised. We'll have the chance to find out the true potential of the Personal System/2." In addition, Imlay says, the lack of a standard in fourth-generation languages inhibits improvements in productivity.

SAA illustrates some of the problems involved in standardization in the industry, he says. "Many independent developers have fourth-generation languages and productivity tools now, and they show significant improvement in programming time over standard Cobol programming, but there's no standard.

"Then IBM comes along, waving SAA, claiming it is going to standardize everyone. Can they pull it off? Can they come out with quality, competitive products worthy of becoming a standard? And if they do, will the independent industry accept it? These are big question marks to watch in the future," he says.

Finally, Imlay says, 1988 will be a year of end-user, rather than data processing, tools.

"The challenge for the developer in 1988 will be making software simple," he says. "The end user should be able to do his own inquiries, his own screen building, his own screen painting. The end user should start getting what he needs."

When Mary-Ellen Quintana tracks trends among today's working women, she doesn't always like what she sees in the computer industry.

Lately, says Quintana, a member of the executive committee of the New York City Chapter of the Association of Women in Computing, the approximately 250 chapter members have been voicing concern about the lack of career growth opportunities for women.

"Women working within corporations find they follow a career path only so far before they hit their heads on a glass ceiling," Quintana claims. "It's not something you can see, but sooner or later, you bump up against it."

As a result, Quintana says, more women are looking for alternatives. "In the next few years, we are going to see brilliant and capable women — frustrated by that glass ceiling — strike out on their own. They will explore such options as consulting, entrepreneurial ventures and not-for-profit organizations," she says.

Another area of concern, Quintana adds, is the tendency to label programming as "woman's work." She finds that a programmer's job is assuming the role that the stenographers' pool of the '80s held in the past.

"Women turn to programming to get a foot in the door," Quintana explains. "Once inside, they discover that not only is the route up the career path slow and tedious but, because of the number of available programmers, the pay scales are decreasing as well.

"Unfortunately, this trend will continue until women are encouraged to pursue other areas in the industry, such as those involving hardware and planning," she adds.

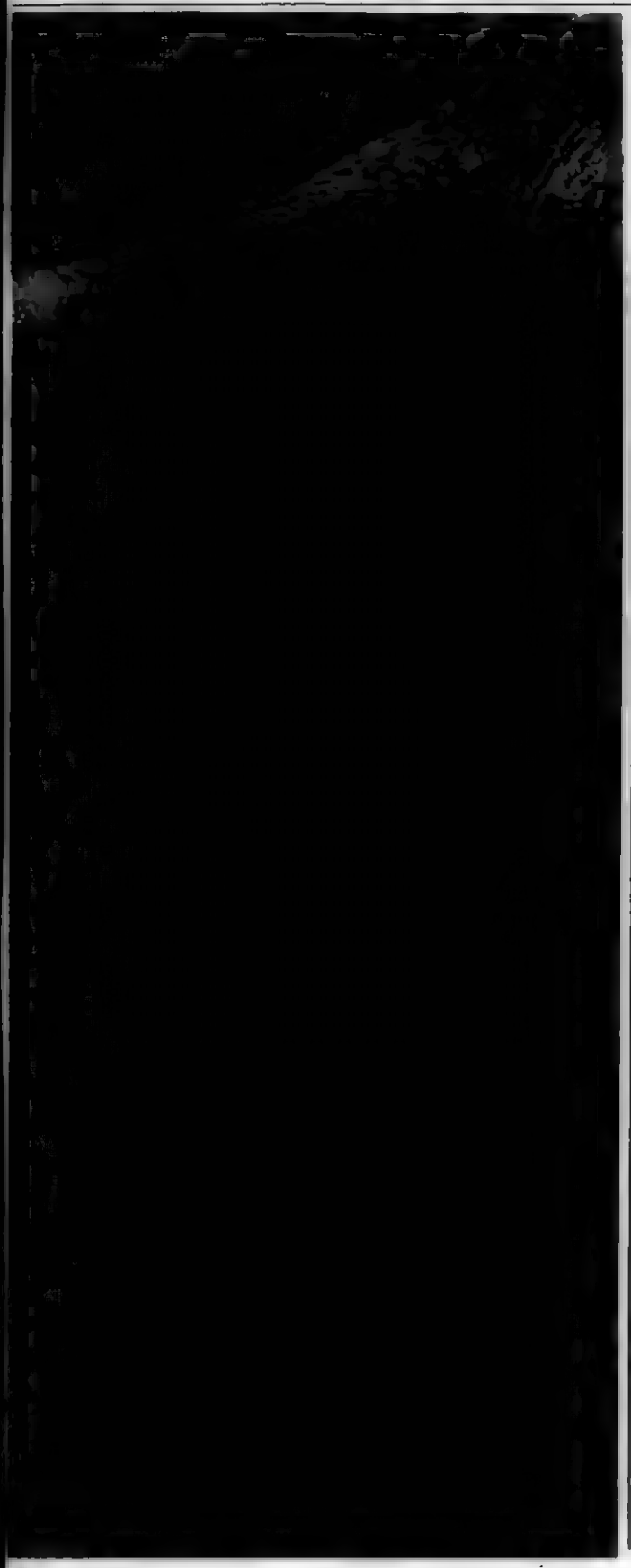
Quintana asserts, however, that as qualified women leave corporations, employers will realize their loss. And, she adds, "in time, we hope policies will change and that more and more women will get through that ceiling."

Will you have less computing power in 1988? Probably not, says Bruno Bassi, publisher of "Computer Economic Report," a monthly newsletter. Although Bassi senses concern among computer users about the current downward trend of the economy, he says he is optimistic about 1988's computer spending.

"There are two possible responses we will see," Bassi says. First, he suggests, the economic downturn could induce capital spending cuts that would include the purchase of computer systems. The second response, however, relies on the well-entrenched theory that data processing investments are a way to cut costs in the long term.

Bassi predicts the second scenario. "The economy is not going to adversely affect the users in the computer industry," he says, "both because of the industry's competitive position and because of the cost-saving nature of a data processing investment."

SUZANNE WEIXEL



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CCWL28

Net management war

To the users go the spoils of easy control

BOB SAUNDERS

BY ELISABETH HORWITT

The rival camps are forming. Opposing standards are being raised. Prepare yourself — The Great Network Management War is about to begin.

The outcome of the battle will determine which vendor protocols will form the basis of the new industry standard — and, more importantly, whose products will act as controllers for everyone else's networking equipment.

Who will benefit from such a confrontation? The users, who will be left some hefty spoils: the ability to monitor, control and configure multivendor networks from a central vantage point.

"We do want to have one console where all the network statistics show up, but so far there is no one package to do it and no vendor that wants to," says Harry Regis, vice-president of systems and network engineering at Merrill Lynch & Co.

"The challenge in the next few years is to integrate the islands of different vendors' network management systems," says Dixon Doll, chairman of Ann Arbor, Mich.-based consulting firm DMW Group, Inc.

In the last couple of years, and particularly in the last six months, vendors have promised to link up to their competitors' systems either on a case-by-case basis, through joint development agreements or through common protocols such as IBM's Netview or the Open Systems Interconnect (OSI) standard.

Users still have doubts, however, that vendors will rally around a single standard, particularly if it means dispensing with their own proprietary value-added features. "It would be great if vendors agreed on a standard way to do alerts and diagnostics, but they want to keep their customers with proprietary code," Regis says.

IBM and AT&T, he continues, have "what they call integrated network management," but neither provides a way to reconfigure T1 networks or monitor bandwidth smaller than the 1.5M bit/sec. T1 rate. "That's what we need," he says.

Vendors such as IBM, Digital Equipment Corp., Hewlett-Packard Co., AT&T, Timeplex, Inc., Digital Communications Associates, Inc. (DCA), Codex, Inc. and Avanti Communications Corp. have all said they would support the OSI standard when it matures sometime in the next two to three years.

If it is able to live up to its promise, OSI will provide uniform ways for different systems to exchange, collect and store information and, at the same time, will leave room for vendors to provide value-added features that are geared toward their particular set of equipment.

Thus, a mature OSI standard would free users from having to funnel network management information through one type of node and vendors from having to rewrite their software for each type of equipment they wanted to hook into.

That is the OSI ideal; the question that the next year or two should resolve is whether some major player will usurp the standard's role before it has a chance to mature. "While standards groups are trying to develop the perfect product, blemished products from AT&T, IBM, DEC and others will be making steady inroads," cautions William H. Mayhaum, vice-president of the DMW Group.

Industry sources say Netview is currently the most viable candidate for a de facto network management standard.

Of 107 IBM Systems Network Architecture (SNA) sites polled recently by market research firm International Data Corp., 70.1% said they were confident that Netview would be established as a de facto standard.

No other major system vendor has come up with a competitive offering that is based, as Netview is, on existing widely installed products. More than 83% of IBM mainframe sites that use network management

software have installed one or more components of Netview, according to a recent survey by West Hartford, Conn.-based research firm Focus Research, Inc.

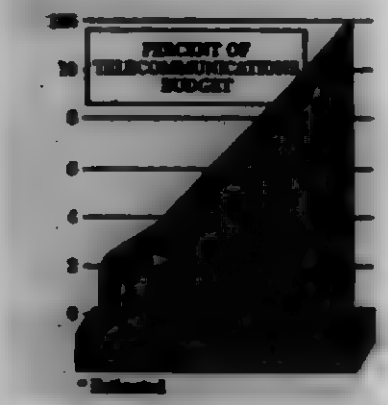
More than 25 vendors have pledged to send network data to Netview via IBM's Netview/PC interface. And IBM shops are pressuring those users who have not already hooked up with Netview, according to Maybaum. One such company is Westinghouse Electric Corp., which currently has an extensive IBM computer installation linked by T1 switches from Infotron Corp. and General Datacomm, Inc. and modems from Racal-Vadic and AT&T.

Currently, the manufacturer uses each vendor's management system to troubleshoot problems on its own equipment, according to Westinghouse's manager of computing and communications, W. Edward Hodgson.

Westinghouse would like to manage its T1 equipment through Netview but has been waiting for IBM to first deliver certain enhancements to the product. "All of the communications equipment would have to interface with Netview through Netview/PC, which provides monitoring and data collection" but not the means for correlating the data and making decisions, Hodgson notes. The company will probably wind up writing its own applications using IBM C-lists and an artificial intelligence shell from Gold Hill Computers, Inc., he says.

AT&T and DEC have announced plans to make documentation for their own architectures available to vendors that want to link up to their systems — just as IBM has done.

Growth of network management and control budget



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Catching the hare

AT&T and DEC may, however, have a hard time catching up with Netview's lead. "AT&T's critical problem is crossing its own product lines for comprehensive network management," Maybaum notes. "Add multivendor management and the problem gets worse." Maybaum also questions whether AT&T can generate support for Unified Network Management Architecture, given that a lot of vendors have already committed to IBM's Netview and do not have unlimited software budgets.

AT&T has been using OSI compatibility as a rallying cry to bring in vendor support to UNMA. According to Judith Brinsfield, department head of unified network management for AT&T/Bell Laboratories, the vendor incorporates OSI protocols into its system whenever possible and makes the documentation available to other vendors and to the International Standards Organization to accelerate OSI development.

DEC has not yet officially announced its comprehensive network management architecture. However, it is planning an "all-out promotional campaign for a comprehensive product that will compete with Netview" in its ability to manage both data and voice systems, according to DMW Group's Doll.

One likely scenario for the next few years is for DEC, AT&T and IBM to go to war over whose network management architecture will become the de facto standard.

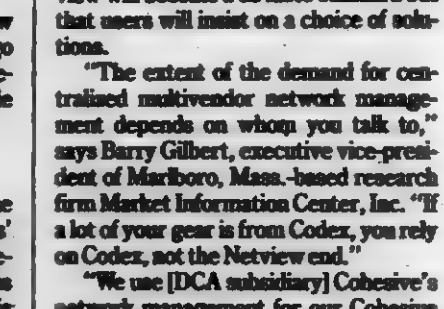
Winner take all

Whichever system wins would become the focal point to which other vendors' equipment would send network management data. This would give tremendous power to the vendor, particularly if it is IBM, since others would have to implement its management and communications protocols in their systems.

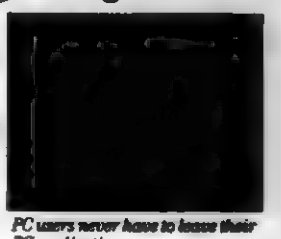
Industry sources predict that Netview will become a de facto standard but that users will insist on a choice of solutions.

"The extent of the demand for centralized multivendor network management depends on whom you talk to," says Barry Gilbert, executive vice-president of Marlboro, Mass.-based research firm Market Information Center, Inc. "If a lot of your gear is from Codex, you rely on Codex, not the Netview end."

"We use [DCA subsidiary] Cohesive's network management for our Cohesive T1 network; for our IBM system, we use [Netview components] NCCF and NPDA," reports Eric McCafferty, director of technical services for Community



How to get your PCs on speaking


PC users never have to leave their PC application.

You've got a lot invested in the many elements of your Data Processing operation. Mainframe applications programs. PC software applications. And the necessary micro-mainframe links. But your PCs and mainframe still aren't talking the same language.

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Your end-users wait for special requests to be processed. Then they perform the time-consuming task of re-keying data, inviting human error. And, even if your PCs are linked, end-users must leave their favorite PC programs to work with micro-mainframe links and mainframe query languages. Another stumbling block in the path of creating a smooth exchange of information.

The Application Connection® (T-A-C) from Lotus® is a mainframe and micro software product that lets you realize your investments in mainframe applications, micro-mainframe links and PC applications by connecting them for a fast, secure, uncomplicated exchange of information.

Leon Smith

Mutual Insurance Co. in Cincinnati. "Integrating different network segments would be nice, but at this time, I see little useful information gathered by Netview or by anyone else's offering. Each vendor reports real well on their own products but offers very generic reports on other vendors' equipment." McCafferty's complaint should be addressed in the next year or two as IBM and its growing band of Netview supporters write Netview applications to control and monitor multivendor networks.

But corporate users may not buy into IBM's scenario of managing the whole network from the SNA side. "We can't justify spending the dollars and resources to pull together the four PCs and software packages we have now into one centralized system," McCafferty says.

Several firms say they prefer to maintain separate management systems for DEC and IBM installations.

"Of course, the ideal would be to have the universe accessible from one terminal, but we have found that DEC and IBM packages are best for managing their own environments," says Leon Smith, a vice-president at Bankers Trust Co. "We have Decnet, SNA and X.25, and no one product allows you to manage all three." Will international standards help? "There's a lot of 'not here yet, can't say.' "

Integration case by case

Concluding that many users are unwilling to wait for IBM's Netview or the Open Systems Interconnect standard to mature, networking vendors are pursuing multivendor network management on a case-by-case basis.

How do they accomplish this? Oftentimes by forming alliances with companies whose products complement their own.

The idea, according to Chuck Halquist, director of marketing for Avanti Communications Corp., is to meet the needs of network managers "whose centers look like war rooms and who would really like one network management terminal to look at, not 10."

Such alliances are designed to provide network management across a broader range of products than one vendor can provide alone.

One common relationship of this type involves a computer vendor and a networking firm, such as Digital Equipment Corp. and Northern Telecom Corp.; Hewlett-Packard Co. and Timeplex, Inc. (this alliance may be broken off if Timeplex is acquired by HP's rival, Unisys Corp.); and IBM and Network Equipment Technologies Corp.

Vendors with complementary networking products may also agree to mesh management systems. Almost as soon as Digital Communications Associates, Inc. (DCA) acquired T1 vendor Cohesive Network Corp., the two companies began integrating their respective network management offerings.

DCA is working on a similar project with Racal-Milgo. And both Avanti and Timeplex have indicated that they will work with other vendors that want to link with their systems.

"We don't want to reinvent the wheel," Avanti's Halquist says. "We're saying if someone happens to have a Paradyne system, they can use windows on our Sun Microsystems workstation to access it."

So far, none of the above alliances has borne any commercial fruit, but 1988 may be the year we see this happen.

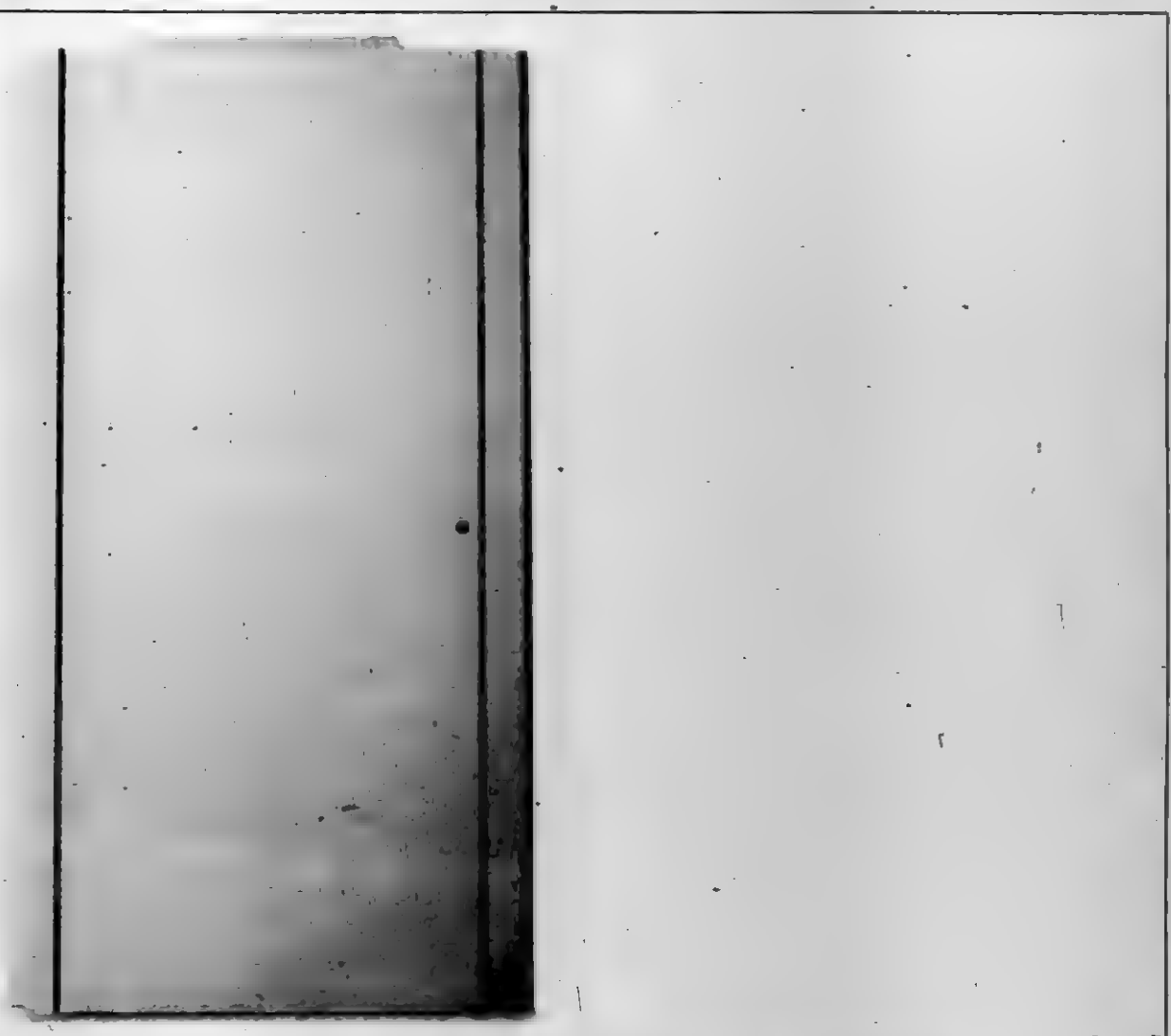
Centralized system

Meanwhile, Avant-Garde Computing, Inc. offers a way for users to provide centralized monitoring of a number of different network management systems, including Netview. Avant-Garde's product, Netcommand, supports a variety of terminal modes, allowing the user to call up views of various network monitoring systems as different windows on the monitor, the vendor claimed.

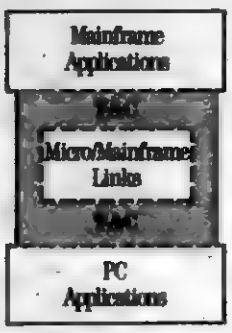
Netcommand also has a filtering and prioritizing facility that can be customized to screen out all but the most relevant network alert information, according to Roger Greene, Avant-Garde's director of communications.

Users may still have several different network management systems, each designed for a different brand of equipment — but at least they "don't have to rush from one terminal to another to keep track of everything," Greene says.

ELISABETH HORWITT



terms with your mainframe.

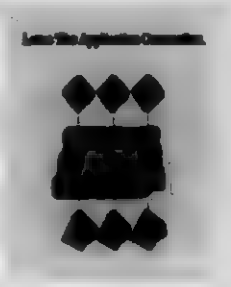


T-A-C creates a complete connection, making it the only product available that allows your end-users to securely access a variety of mainframe applications from within their PC applications. For example, from within 1-2-3,® a user can easily extract sales information from a DB2 database.

T-A-C connects to many mainframe applications such as DB2, SAS,® FOCUS and others. And many PC applications such as 1-2-3, dBASE® and Symphony.®

So, if you find that the number of end-user requests you are faced with is growing, but your return on DP investment is not, T-A-C from Lotus can help you get your PCs on speaking terms with your mainframe.

To receive more information about T-A-C, call Lotus at 1-800-345-1043 and ask for product CJ-2540.



Lotus T-A-C

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Net managers untangle wiring knots

With luck, '88 will be the year vaporware dies

BOB SAUNDERS

BY PATRICIA KEEFE

It has been a long, lonely haul these past two years for many network managers, suddenly thrust as they were onto the hot seat as corporations struggled to communicate.

After hacking their way through a jungle of competing wiring and connectivity schemes in 1986, many network managers stumbled through pilot projects in 1987, reaping at last solid ideas about their corporate networking needs.

Much to the dismay of those users, some eagerly clutching communications shopping lists, too many vendors managed to sail through 1987 on a cloud of vaporware, raising too many promises and not enough substance. If that were not bad enough, users today face major shifts in technology at the microcomputer and mid-range levels that threaten, at the very least, to skew many a well-plotted connectivity blueprint.

The year was no piece of cake, but 1988 will be different. After working like dogs in the dark for the last two years, network administrators have made their decisions, drawn up game plans and fattened their budgets.

Looking for substance

Nineteen eighty-eight will be a building year for network installations, be they ground-up revamps or expansions of existing implementations. Clearly, MIS is looking for substance, and it will vote with its dollars. New and experienced users are expected to turn up the heat on network suppliers, which will be expected to put up or be shut out of corporate network strategies.

"I think you'll see many organizations press the vapor issue with a lot of suppliers, because they are under pressure to make some decisions," says a network manager in a large New York-based financial organization. Following a successful token-ring pilot, he plans to expand the number of token-rings within the firm.

Still, it can be hard to get vendors to react, warns a senior network project manager for one of the largest insurance companies in the world. Primarily an IBM shop, it hopes to link Big Blue to an infiltration of Digital Equipment Corp. and Wang Laboratories, Inc. equipment. "We had a major problem getting vendors to move off the fence with respect to [interconnectivity] — even IBM, and we're an IBM shop. We literally had to drag them into the ball game," he recalls. As a result, this user feels trapped in the pilot mode. "We don't feel comfortable in saying 'This is a fully deployed system,' " he says.

Still other users say they are tired of hearing about grandiose networking schemes, be they proprietary "open" network architectures, Integrated Services Digital Network or Open Systems Interconnect (OSI).

"The vendors are all big on making announcements, but when it comes down to a concrete resolution to existing problems, they can't deliver," the insurance network manager complains. "They all want to sell you a box to hang off the system somewhere, but no one is giving you a true solution to your problems."

The specific problems he is referring to often involve the down-and-dirty details of communications; such mundane matters as security, administration, applications and, more and more, network integration.

Integrating networks

A significant segment of network users have already shifted their focus beyond the islands of work group networks. Their top priorities in 1988 are the integration of heterogeneous networks and network management — the more automated the better (see story page 61).

"The vast majority of networks today are in their own little world. Tying them into the mainstream of the corporate network will be a major MIS issue in 1988," says Thomas White, president of Infonetics, Inc., a Santa Clara, Calif.-based consulting firm.

Fortune 1,000 companies have,

on average, 13 separate wide-area networks and hundreds of remote local-area networks, according to Forrester Research, Inc., a market research firm in Cambridge, Mass.

Houston-based M. W. Kellogg Co.'s 1988 networking plans include tying more LANs and devices to the corporate backbone, says David Lee, information center manager. M. W. Kellogg has an IBM mainframe attached to DEC Vax-clusters. An Ethernet backbone links terminals and a printer together. "We're heavily into DEC," Lee says. Even so, file sharing between IBM Personal Computers and the VAX and between PCs and mainframes is becoming more and more an issue.

The drive toward network integration has not escaped the vendor community, particularly at the low end. For example, a key concern reflected in many of the mergers that have swept the communications industry during the last 12 months is interconnectivity, be it integrating dissimilar stand-alone work group LANs, tying local and remote sites into a backbone or linking LANs to hosts.

Encouraging words

Another encouraging note is that many vendors are readying mature versions of current gateway products. "A lot of the gateways [available in 1987] were 'rough and ready,' and it took a lot of tinkering to make them work," says David Terrie, president of Scituate, Mass.-based Newport Consulting. "Vendors and users worked out a lot of bugs in the last year, and so we'll see much more solid products next year."

Beyond the basic physical connection, network managers are also concerned with sending data back and forth between dissimilar mail and office automation systems. The goal is to provide a clear path to corporate data.

At companies like M. W. Kellogg, file sharing and peer-to-peer relationships will become an area of focus in 1988.

It is critical that this capability not require a massive reworking of users' existing communications and systems investments. "Being able to leverage [our installed mixed-vendor base] would probably be a major issue," says John Prusinski, a telecom manager at First National Bank of Chicago, who wants to integrate data from a half-dozen token-ring networks and several AT&T Starlans with the bank's private branch exchange.

Prusinski says he wants to be able to monitor an integrated voice/data network with one system. "It would be of tremendous help if we could get IBM and AT&T to work together," he says.

TCP/IP interconnectivity

Possibly the hottest area in network integration is Transmission Control Protocol/Internet Protocol (TCP/IP), a Unix-based government standard for interconnectivity able to link incompatible systems together. The year was punctuated by announcements of support from vendors racing to embrace the protocol suite.

Clearly, 1987 was a heady year for TCP/IP. Spurred by user demand and a vocal group of TCP/IP suppliers, even IBM and DEC were forced to announce grudging support for the protocol.

TCP/IP first picked up steam earlier in the year, as vendors sought to provide restless users with an interim solution pending the outcome of discussions concerning that layer of the OSI model. But as it became clear that the ISO's resolution of that issue might be three to five

TRENDSETTERS

When Texaco, Inc. became interested in using the "giant brain" called a computer back in 1955, J. Leslie Hodges was one of the people chosen to review the technology.

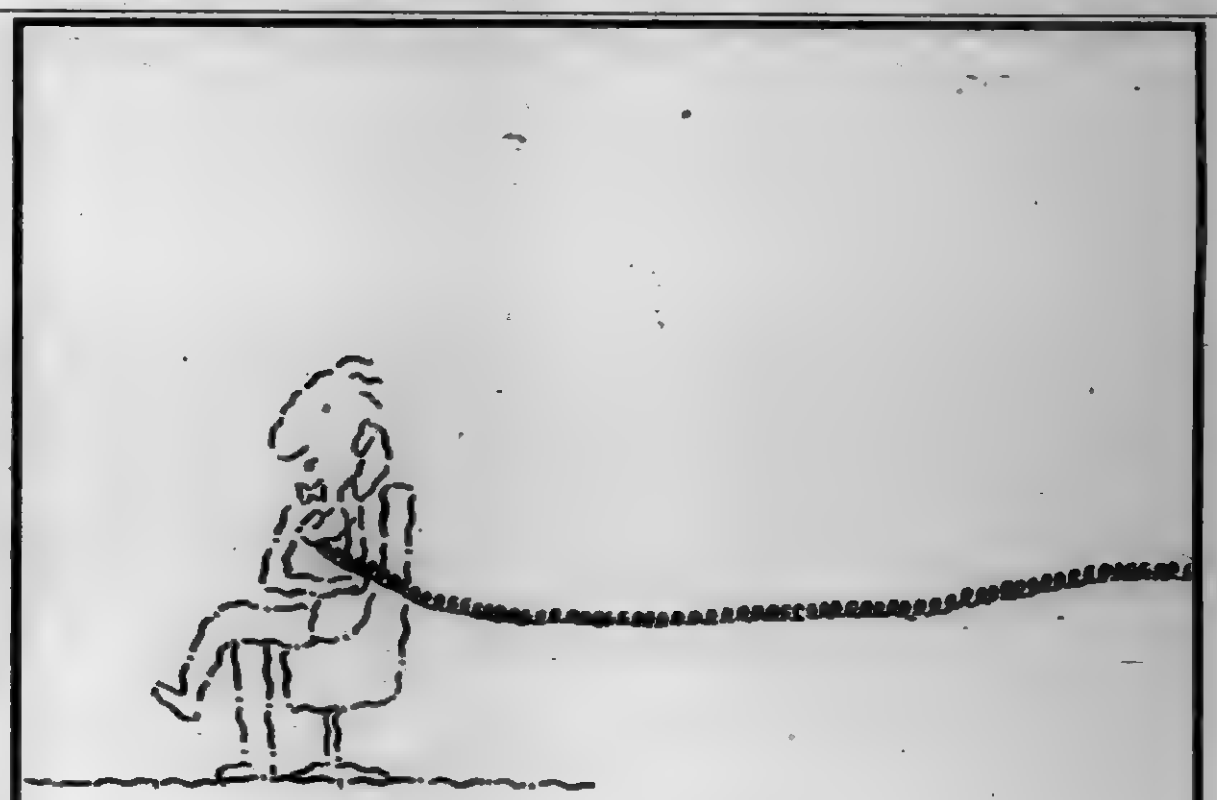
Hodges is still reviewing new technologies today, but now he is the mammoth oil company's general manager of computers. The post he has held for 15 years puts him in charge of Texaco's computer facilities worldwide.

The added edge of technology makes Texaco a strong competitor in the very competitive oil industry, Hodges claims. Technology currently in use encompasses a wide spectrum — from Cray Research, Inc., IBM, Univac and Digital Equipment Corp. to Data General Corp., Datapoint Corp. and a vast range of personal computers, he adds.

Because of its large size, the firm is often asked to beta-test products and is involved in the early shipment programs of many vendors; Hodges says this is often advantageous in keeping Texaco on the leading edge of the computer industry's curves, twists and turns.

Texaco's size also gives the company a very large user community. Hodges says this user base often provides him with useful suggestions. Recently, Texaco U.S.A. requested microcomputers to automate its oil fields. Hodges and his team built the micros that will be used chiefly in refinery process control.

ALAN J. RYAN



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years away, many dug in their heels.

"OSI is where we want to be in the future, but we'll be taking a very hard look at TCP/IP next year," M. W. Kellogg's Lee says. Users "just can't wait that long for the magic of OSI," Infonetics' White says. "They've got to [integrate] now."

That temporary fix, TCP/IP, now shows strong signs of blossoming into a robust alternative to OSI. "Next year is one of those critical transition periods where TCP/IP may get enough support and enhancements to become a long-term viable alternative to OSI," says Harry Saal, president of Network General Corp.

One obstacle is the recent inability of the TCP/IP Network Management and Gateway Monitoring Work Groups to settle on a standard for network management, similar to the standard for Nethios agreed upon earlier in the year. A decision, however, is expected within the first quarter of 1988.

Gary Weis

Another issue is whether current users of TCP/IP, having invested in that technology, will switch to OSI several years down the road, White says. The answer seems to be no, which is why speculation abounds that the ISO will adopt the TCP/IP platform for absorption into OSI.

At the same time, supporters of TCP/IP are hedging their bets. Many have announced plans to support the first four layers of the OSI model. And with good reason. As of 1990, all government requests for proposals must be OSI-based, claims Frank Dzubeck, president of Communications Network Architects, Inc. in Washington, D.C.

Migration costs

On a lower level, network managers face an equally challenging integration issue: intermixing their current PCs and LANs with the new wave of IBM desktop systems — the Personal System/2s — and those machines' companion operating systems, OS/2 Standard Edition and OS/2 Extended Edition. Migration costs and interoperability problems, such as moving files between different operating systems, could stall implementation of the new microcomputer generation on networks.

"When you are looking at OS/2 Extended in the server, is the user going to have to upgrade from IBM's PC LAN Program to the Extended Edition? Will there be additional requirements on the machine? And what's this all going to cost?" White asks. These are not trivial questions by any means.

Some users have already decided the cost trade-off is worth the increase in capabilities. Gary Weis, a vice-president of the Data Communications and Software Services Division of Sears Communications Network, Inc. in Chicago — a Sears, Roebuck & Co. subsidiary — is looking forward to using OS/2 on the server, especially to eliminate the memory constraints inherent in Microsoft Corp.'s MS-DOS. Sears has one of the largest IBM Systems Network Architecture networks in the country and is a major user of electronic data interchange.

The Travelers Insurance Co. has already decided to standardize on the PS/2 and is wasting no time installing those machines on its IBM Token-Ring LANs.

Still, until applications using OS/2 are available, it is hard to determine whether networks sporting a mix of the old and new will suffer through a generation gap of incompatibilities. On the whole, network managers do not seem too concerned. They are more interested in OS/2 Extended Edition anyhow, and analysts do not expect that version to really take off until 1990.

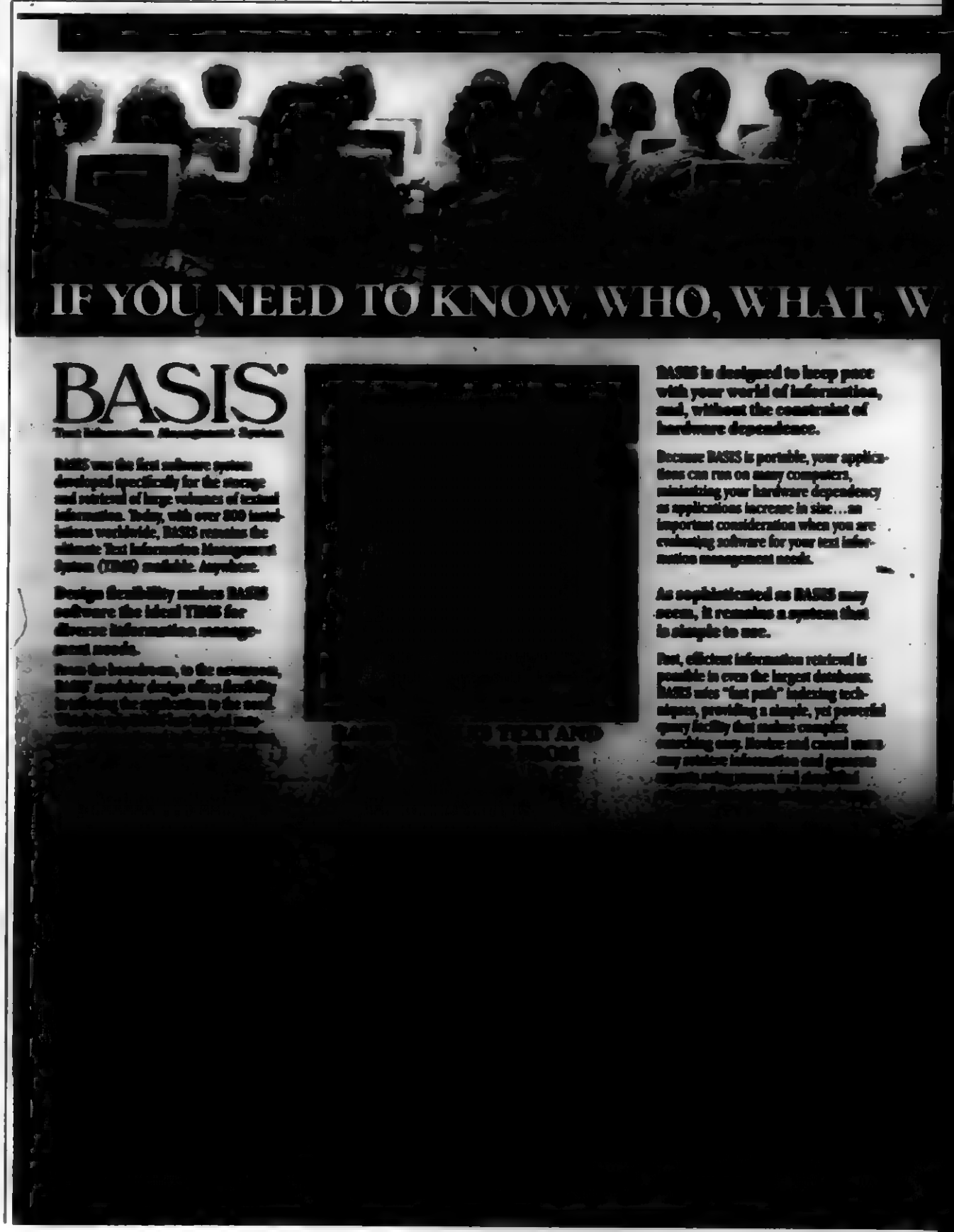
The SAA future

Even farther on the horizon, beyond OS/2 Extended Edition with its communications and data base managers, lies Systems Application Architecture (SAA), IBM's blueprint for connectivity, which is at least two years away from producing any commercially available products.

Despite obvious annoyance with vaporware, network managers are convinced SAA represents the technology of the future — if not the key to the promised LAN.

"SAA, from an architecture standpoint, will be come increasingly important to the Sears family of companies," says Sears' Weis, adding that SAA will have a much more profound affect on the builders of network applications.

"The technology steerers here will



follow SAA intently," says the communications manager for the New York-based financial institution. "If we sit back and wait, we'll do a disservice to the organization."

But no one expects SAA to be much of an issue in the coming year. While the progressive users gear up to embrace SAA once it becomes available, observers say the vast majority of network users will have spent the last twelve months figuring out who is responsible for the current tangle of installed communications equipment. Having resolved that problem, 1988 will be spent figuring out what to do with what they have got.

Token rings taking competition by storm

There just doesn't seem to be any doubt about it. There's a gale force brewing off the network coast, and its name is token ring.

Fueled by a furious flurry of promises during the last two years and fed by multiple waves of product introductions in 1987, this tempest is expected to batter the competition in 1988.

And if the recent past is any indication, even IBM will have problems keeping abreast of demand. First announced in October 1984, IBM's Token-Ring network began shipping during March and April 1986 and has faced chronic board shortages ever since. Ellen Hancock, president of IBM's Communication Products Division, told analysts at a recent briefing that IBM is unsure of the demand for Token-Ring because the company has never been able to fill it. She went on to promise to rectify all component shortages by the first quarter of 1988.

At another recent seminar, Maurie Prauner, IBM's manager of local-area network products, told *Computerworld* that 85% to 90% of IBM's top 250 customers have accepted the Token-Ring as a major architecture. IBM's Token-Ring shipment volume increased five times from 1986 to 1987, he said, adding that IBM expects the volume to double again next year.

More specifically, IBM has installed more than 12,000 Token-Ring networks supporting more than 200,000 users, according to Terry R. Lautenbach, vice-president and group executive of the Information Systems & Communications Group at IBM while speaking to a group of financial analysts last month.

The number of token-ring nodes installed annually in the U.S. market will double between 1986 (9,664) and 1987 (19,328), doubling again in 1988 (38,656), according to "The IBM Directions Report," a publication of Los Altos, Calif.-based International Technology Group.

Taking over Ethernet territory

Ethernet, in particular, will feel the brunt of the token-ring's surge in popularity.

In a recent survey, about 150 users were asked whether their first consideration for their company's next LAN would be a token-ring rather than Ethernet configuration. Users responded in one of four categories: 16% said "definitely;" 26%, "possibly;" 35%, "uncertain;" and 23%, "definitely not," according to Cecilia Brancato, who conducted the study and currently works as a senior analyst with Oppenheimer & Co. in New York.

Figures obtained from several market research firms show token-ring, or IEEE 802.5, sales experiencing quite a leap in the course of 1987, so much so that many analysts agree that its sales have overtaken Ethernet in the personal computer LAN segment.

According to The Yankee Group in Boston, Ethernet sales in the PC market will plunge 50%, dropping from a high market share of 32.5% in 1986 to an estimated 16.2% in 1988.

Conversely, token-ring market share is expected to triple between 1986 and 1988, jumping from 13.1% in 1986 to 30.7% in 1987 to 39.3% in 1988, The Yankee Group says.

Sales are expected to accelerate so fast that by 1990, token-ring products will command a 46.9% market share, leaving Ethernet a distant second with its 10.3% market share, the research firm adds.

Although Ethernet is expected to retain the upper hand in the general-purpose, or departmental, network market, market share for that technology is, nonetheless, declining.

The Yankee Group pegs Ethernet market share at 60.6% in 1986, estimating a drop in share to 50.1% this year and, by 1988, sinking yet another 6.4%.

Token-ring sales, on the other hand, are on the rise. Market share jumped 14.1% in 1987 from the previous year's sales of 13.4%. Market share will inch up another 5% to 32.6% next year, The Yankee Group estimates.

PATRICIA KEEFE

LAN applications: Some assembly required

Availability is limited, performance uneven

BY KATHY CHIN LEONG

There is no greater childhood letdown than ripping open a Christmas present and reading, "Batteries not included." Today's local-area network users face a similar discouragement. The applications software "batteries" do not come with prepackaged LANs. Like toy accessories, programs for networks are each sold separately.

Users seeking such software face several confusing obstacles, including the following:

- The variety of applications for networks is limited.
- The software that is available fails to support all LANs.
- The software behaves differently on individual networks, so performance varies.

Vendors are equally confused. They must decide exactly which applications should be converted and how much change should be made to the original programs. And, importantly, whether or not the software will sell.

Microsoft Corp.'s Adrian King, director of operating systems and product marketing, notes that companies such as Microsoft only make network versions of single-user software "when it makes sense. Some things are not necessary for a network," King says. Of the myriad of applications software at Microsoft, only Microsoft Word, Multiplan and Project are available in network versions.

Opinions vary when experts are asked how much network software is actually being sold. According to Chuck Stegman, product manager of networks at Businessland, Inc., network software sales are doing well. "It is growing. There is definitely a demand for these products," Stegman says.

In fact, he says that for "every question I get from customers about communications software to mainframes, I get two or three questions about LAN software."

At MBI Business Centers, Inc. in Rockville, Md., a corporate account manager explained that sales of network versions of single-user packages are strong and steady.

"Many large companies standardize on the software they use. When they begin to install LANs, they naturally buy the network version of that product," the account manager explains.

Despite these glowing reports, consultant Gary Kwok of the Larquest Group in Santa Clara, Calif., says users, accustomed to unattached workstations, are slow to change. "People do not understand what the network version of a package really does," Kwok says.

Unlike a single-user version, network versions, or "network-aware" software packages, take into consideration file- and record-locking features and allow users more flexibility in terms of peripheral sharing and document merging, according to some consultants.

Pricing

In addition to lack of education, cost may prevent many users from buying a proliferation of networking software. While network versions are

BOB SAUNDERS

cheaper per workstation than single copies, users are still dismayed at the high prices. Ashton-Tate Corp.'s Multimate Advantage, normally priced at $595 for one user, is tagged at $1,195 for a three-user license.

"I'm not satisfied with these types of licensing arrangements," says Dave Lively, manager of special projects at GTE North, Inc. in Westfield, Ind. "Things are still overpriced. If you are going to make networking software available, then you should make the costs

Thomas White

substantially lower," he says.

Bill Thompson, a senior planning analyst at Black & Decker Corp. agrees. "The expense of the licensing agreements makes it difficult for us to look at network software seriously," he says.

Single-user products

When network versions are not available, users work around the limitations. For example, many corporations have made Lotus Development Corp.'s 1-2-3 a company standard, and until recently, no official network version of 1-2-3 existed.

At one East Coast site, users have been sharing copies of 1-2-3 on a network. The network administrator stressed that there are copies of 1-2-3 for each user as well, justifying the use of the package. "We make sure that we have paid for as many copies as there are users on the network," he explains.

According to Charles Hanes, manager of technical consulting at Lanquest, copy-protected single-user applications such as 1-2-3 can be run on a network if the protection schemes are unblocked. To do this, users must create a program themselves or purchase commercially available software that would get around the copy-protection mechanisms.

Single-user applications without copy protection can be loaded on a network file server. And the majority of applications on the market can be shared, consultants agree. Yet, there is one inherent danger in sharing a single-user program. According to Hanes, if users intend to share files, they must make sure they do not use the same name, or else they will overwrite the original file.

And there are other concerns. Steve Schneider, end-user computing manager at Bausch & Lomb, Inc.'s Professional Products division in Rochester, N.Y., must do his share of programming gymnastics to make these applications run on the company's 3Com Corp. LANs. "I fool around with the network utilities to make the software think it is still working with a single user," he notes.

The primary bottleneck in cramming single-user programs on a network is the limitation in output, Schneider said. Single-user packages assume that a printer or plotter is directly attached to the workstation, and no allowance is made for connections via a file server.

Other users have discovered that in order to get full cooperation from single-user software, workstation configurations should be identical.

GTE's Lively says he discovered some single-user packages, such as 1-2-3, do not allow default customization for groups of users. For instance, if someone has a different monitor brand on the network, the file server will not communicate with that monitor.

SCIENCE/SCOPE®

The highest resolution ever obtained for scanning ion microscopy, representing a two-fold reduction in probe size, has been demonstrated by Hughes Aircraft Company. Using a focused ion beam microprobe, features as small as 15 nanometers—approximately 100 diameters of an atom—have been clearly resolved in images of nickel crystals in a wire mesh. This size resolution increases the utility of this technology for high-resolution chemical analysis of surfaces and as a microfabrication technique. Such ultra-high resolution may permit the fabrication of the smallest microelectronic structures ever made—structures in which electron movement is confined as never before, and in which new properties of quantum physics take effect.

A spacecraft to be sent to explore Earth's planetary twin will use a sophisticated sensor to beam back the first detailed map of Venus. NASA's Magellan Mission will carry a synthetic aperture radar (SAR) and an altimeter antenna to peer below Venus' dense, noxious carbon dioxide/sulfuric acid atmosphere. The sensor, built by Hughes, has a resolution of 100 meters, superior by a factor of 10 over the resolution of current surface data. During a projected eight-month period, the spacecraft will map over 90 percent of the Venusian surface, sending data back to Earth regarding geological processes that formed the planet. The Magellan Mission is scheduled for launch aboard the Space Shuttle in April 1989.

Hughes quality inspectors are using a voice input system on the production line to significantly reduce time and cost during the inspection of advanced radar modules. A major advance in speech-recognition technology, the Hughes-built system combines computers and artificial intelligence techniques with software programming designed by Hughes. The computers, with a vocabulary of up to 1,000 words, give verbal instructions, repeat the inspector's words for verification using a built-in voice synthesis feature, and then record the information. Introduced on the APG-65 radar production line, additional voice input systems are being installed on other radar production lines.

The United Kingdom Infrared Telescope (UKIRT) in Hawaii was the first to use a new infrared focal plane array, which has caused a technological revolution in infrared astronomy. The Hughes-built microchip "sandwich" provides sharp, fast infrared images of our solar system and the galaxies. Astronomers can now obtain a better look inside mysterious clouds of dust and gas, known as nebulae, to learn more about the life cycle of stars. The array also produces, for the first time, fine-grain infrared images of objects within nebulae that were previously hidden.

Hughes needs engineers, scientists, and programmers to forge new frontiers in aerospace radars, weapon control systems and avionics, airborne displays, aerovehicle data links, airborne countermeasures, and processors. Current openings are for people experienced in design, development, test and manufacture for systems engineering, project/program management, design of circuits and mechanisms, and bringing these to reality through the application of advanced manufacturing techniques. Send your resume to Hughes Radar Systems Group, Engineering Employment, Dept. S3, P.O. Box 92426, Los Angeles, CA 90009. EOE. U.S. citizenship required.

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HUGHES

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And some applications packages do not let users configure drivers above the "F" level. "We designate drivers using A to Z around here," Lively says. Even if the product is rich in both features and functionality, this driver limitation is enough for the product to be rejected.

Network versions of single-user applications allow users to send and retrieve files using one copy of the application. Network versions prevent file overwrite and let a number of peripherals be shared by the work group. But not all network versions of software act alike, which further muddies the issue of ease-of-use and setup.

The real differences among packages are noticed in each product's method of record and file locking, read/write capabilities and memory requirements.

The single-user and network versions of Ashton-Tate's Dbase III Plus are the same product with "network-aware" features. Hence, the application code is the same. However, network users must purchase the Dbase III Plus LAN Pack in addition to Dbase III Plus. While the memory requirement for Dbase III Plus is normally 384K bytes for workstation nodes, when running an IBM Token-Ring network, the suggested workstation memory is 512K bytes or more.

A new type of software category — "work group software" — will evolve to take networking beyond the peripheral sharing stage.

Obviously, users are not very happy with the unpredictability of existing software. "With MS-DOS as a single-user operating system, it is difficult to make multiuser functions available," explains Thomas White, president of Infonetics, Inc. in Santa Clara, Calif.

Data base wars

In a recent report, Infonetics found that data base programs were the key standalone applications needed for use on a LAN, followed by vertical market programs, spreadsheets and word processing products. Exactly 26% of the respondents surveyed said they needed data base applications on their networks.

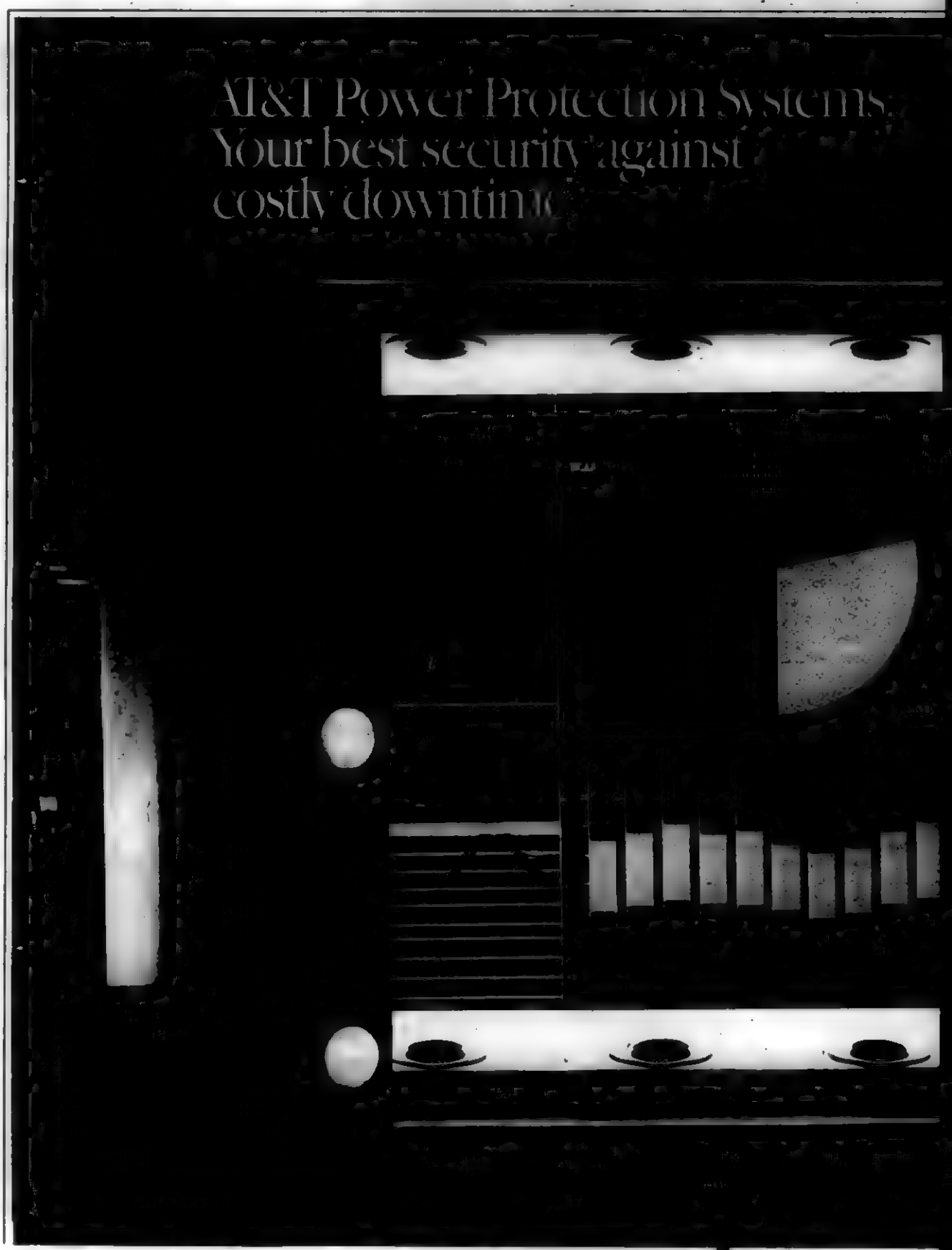
According to Nina Burns, an industry analyst at Infonetics, "It's clear that the LAN environment is perfect for data base applications. It's been in the minicomputer environment for years." Burns notes that there are fewer than 20 network versions of data base products on the market.

Atlantic Richfield Co. (Arco) in Los Angeles has previewed several data bases for network use, but has not come to any buying decision. "We are not comfortable yet with what is on the market," says Alan Brittner, Arco's manager of systems services. "In terms of security and data integrity, the micro data bases are not at the level of mainframes and minicomputers." According to Brittner, the company's LAN will eventually tie into the IBM mainframe environment. "I want to make sure that my people will have the kind of rich applications and features they can get on mainframes."

Two years down the road, many of these issues will be resolved. The advent of Intel Corp. 80386-based microcomputers and the IBM OS/2 multitasking operating system will speed up network transactions significantly. More and more vendors will be unlocking copy-protected programs, and porting over single-user applications to multiuser versions of software will become natural. A new type of software category — "work group software" — will evolve to take networking beyond the peripheral sharing stage. For example, Broderbund Software, Inc.'s For Comment package alleviates the hassle of manually passing around a hard copy document for review. The network version lets up to 15 "reviewers" attach their comments to an author's original word processing file.

While LANs will not come bundled with third-party network application software in the future, users will have more choices, and those software "batteries" should work without second guessing.

Prices of network software vs. single-user applications



FUTURISTS

When it comes to technology, the only perfect marriage is between the family and the computer.

Or so claims Rowan Wakefield, the founding editor of "American Family, the National Newsletter on Family Policy" and a member of the board of directors of the World Future Society.

"The computer is a multipurpose technology, and the family is a multipurpose social institution. Put them together, and you've got a truly empowered family.

"We already have what I call empowering software. The computer has made available in the home such basic services as tax preparation and will writing, but what about bringing traditionally outside services such as education and medical diagnostics into the living room?

"What happens when your kid can access a complete school curriculum at home? Does that mean we no longer need schools? Does software that allows medical self-diagnosis mean we no longer need doctors? It's only a matter of time before the technology and the applications become available to the general public," Wakefield says.

Not one to just sit around and talk, Wakefield has organized a computer users group from his home in remote Deer Isle, Maine. The 85-member group is trying to raise $7,000 to establish a dedicated line to the University of Maine at Orono that would allow them to tap into the Plato/Novanet educational computer system there. Sitting in their homes, users could have access to between 20,000 and 30,000 lessons ranging from fourth grade to graduate school level.

"As we empower the family through the use of technology, we are going to have to rethink the relationships between the family and service providers," Wakefield says.

"The role of the teacher or doctor will not disappear, but it will change dramatically, becoming more difficult. That's frightening to a lot of people, but it's something we are going to have to face."

According to James Botkin, big business must help educate people about technology.

Botkin, executive director of the Alliance for Learning, says, "Corporations spend more on education than all of the post-secondary institutions in the U.S., and the corporate guys aren't fielding football teams.

"Corporate education is putting traditional education to shame," he claims, pointing to internal education programs of companies like AT&T, GM and Du Pont. These firms use computers as well as information technology in an extremely innovative way, Botkin maintains, and they have the financial resources for it.

Botkin, the author of *The New Alliance*, which describes the partnerships between industries and universities, and *No Limits to Learning*, which describes how ill-prepared the world's education systems are to face the future, says the gap between the level of technology used in corporate education and that used in schools is widening. "This will lead to an outcry on the part of the public, the colleges and the universities," he says. "They will demand their share of technology."

Botkin maintains that businesses must start supporting technology in the education systems of the U.S. Why? Because "ultimately, the education world is the business world's source for innovative and creative ideas. That's something business can't afford to forget," he says.

Videodisk technology will ultimately open the home to computer technology, says Lane Jennings, co-author of *Xanadu: House of Tomorrow*, a book about the house of the future.

"Currently, consumers don't know what to ask for," says Jennings, who is also a writer for a documentary television production house and the production editor for *Future Survey* magazine. "Somehow, the public needs to be taught to think in terms of what they would like to use technology for that they can't right now."

Jennings says increased videodisk implementation in the 1990s will lead to changes in the home. "Once there is a single medium that can store information in every format for which we now use different formats, people will become excited about it," he explains.

According to Jennings, the new generation of computer-literate children will ignite this application of computers in the home. "Kids now are learning to think in terms of electronic environments. Knowing what they want, and feeling comfortable using it, will allow genuinely useful computer applications to enter the home," Jennings says.

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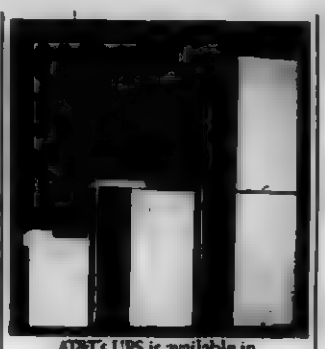

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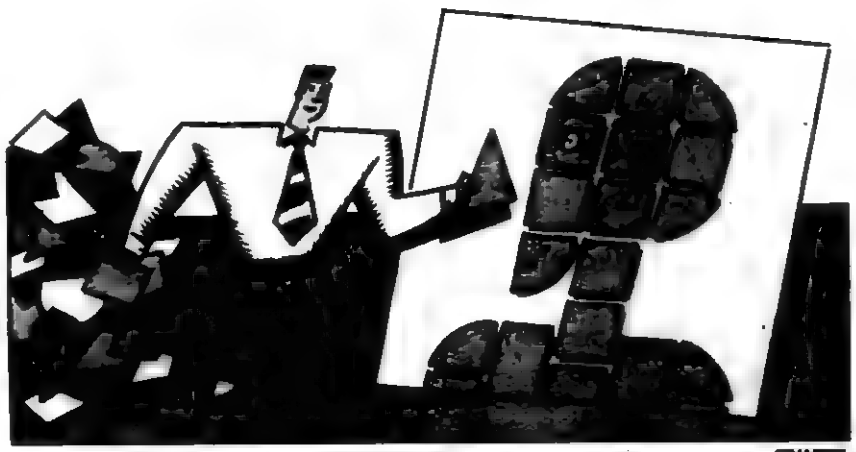
Systems integrators

Where should MIS managers draw the line?



TIM LEWIS

BY CLINTON WILDER

Three years ago, Morse Shoe, Inc. in Canton, Mass., faced a choice that has become increasingly common for information systems executives.

The $585 million retailer and distributor needed a sophisticated merchandise information system to get sales data from its 1,100 retail outlets to its merchandising department. The project was the textbook kind of strategic — or "mission-critical" — application of computer technology that is rapidly changing and elevating the MIS function in U.S. corporations.

But Morse Shoe went outside its MIS operation and chose a commercial systems integrator, Computer Partners, Inc. in Waltham, Mass., to design the system.

"At the time, we did not have a large enough or experienced enough staff to embark on that and be able to deliver it on time," explains Norman Weiser, Morse's vice-president of MIS. "We had no on-line development experience. It was necessary to bring in proven expertise as we developed our own staff."

The type of partnership that has worked well for Morse Shoe, however, conceivably poses a threat to the role of the MIS department in other organizations that are planning to use their information systems to gain a competitive advantage.

With commercial systems integration services being aggressively marketed by an increasing number of traditional federal government integration firms, hardware vendors and Big Eight consultants, user companies are struggling to define the role of MIS in the design of complex systems directly involved with the firm's business strategy.

"We're talking about sets of applications that are closest to the end users but may be farthest from the DP operation," says Cato D. Carpenter, a software and services analyst with Baltimore-based Alex Brown & Sons, Inc. "Who is going to be responsible for building those strategic systems? The answers aren't terribly clear at this point."

The potential systems integrator-MIS conflict is a major difference between commercial and government integration projects. While government agencies with limited data processing resources have been content for years to let companies like Computer Sciences Corp. and Electronic Data Systems Corp. handle tasks like hardware procurement and applications development, those same tasks have been the province of MIS directors in the commercial world.

"The whole notion of bringing in a third party can be seen as a threat, no matter what business you're in," says Karen Kugel, manager of the computer services program at International Data Corp. (IDC), a market research firm in Framingham, Mass. "It's an issue of control; you feel that an outside party will be learning the nuts and bolts of your operation."

The conflict often stems from the origin of the integration project in a part of the company far away from the data center. A computer-integrated manufacturing project on the factory floor, for example, can be consummated between an operations or manufacturing executive and the third-party integrator.

"MIS grew up with the mainframe," says William G. Rankin, a Deere & Co. engineering executive who now heads the company's own systems integration unit, Deere Tech Services (see story page 78). "The smaller, multivendor environment that grew up from engineering and shop floor applications was a whole different experience."

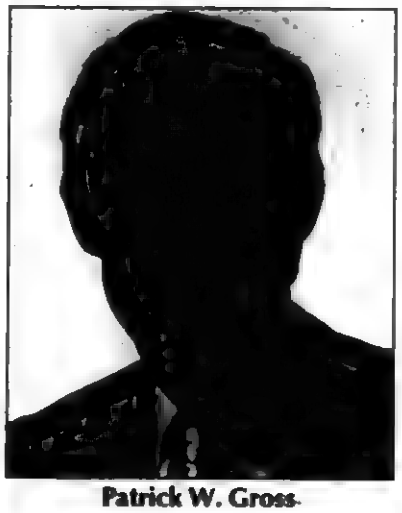
"People on the manufacturing side are often further up the technology learning curve than MIS people doing payroll applications," says Jim Burns, partner in charge of the systems integration practice at Arthur Andersen & Co. in Chicago. "You constantly run into the problem of who's going to be in charge. There's

a need for someone to sit on top of the whole project."

At an increasing number of U.S. corporations, however, conflict is avoided or minimized — often in creative ways. To Weiser at Morse Shoe, for example, the roles of Computer Partners (now a Computer Sciences subsidiary) and his own MIS staff were clearly defined from the outset.

"They made it clear that they don't want to be our MIS staff," Weiser says. "They're here for ad hoc development work, and our people have to know how to take over when they leave. Many people in the company outside our department don't know that [Computer Partners employees] aren't part of Morse. It's a very integrated relationship — but one that we both know will end."

Baker & Taylor Co., a New York-based book distribution unit of W. R. Grace & Co., achieved a similar cooperative relationship with systems integrator American Management Systems, Inc. (AMS) in Arlington, Va. AMS developed and installed Libris, a strategic system to automate book ordering by Baker



Patrick W. Gross

& Taylor's library customers. Like Morse Shoe, Baker & Taylor felt it did not have the internal resources to develop the system itself.

The success of that project depended on a strong understanding by Baker & Taylor's MIS department of what role it could and could not play, according to Patrick W. Gross, an AMS cofounder and chairman of the AMS executive committee.

"The MIS function should really understand the business and the business strategy; it has to be an interaction with top management," he says. "The most successful leaders are those who will keep an open mind, not simply wonder whether they can keep a project for themselves."

"You suffer as an MIS director from a certain myopia in your own systems environment," IDC's Kugel adds. "A third party brings a different perspective and is aware of several technology options. The MIS director should owe it to himself to hear what they have to say — and more and more Fortune 500 companies are."

That open mind must extend to the systems integration vendor as well, however. "To really make the project work, the vendor has to be both all-knowing and humble," says Richard Peterson, a Parsippany, N.J.-based principal consultant with market research firm Input. "To sell the job initially, you have to pretend you're God. If you get the job, you have to say, 'I want to work with you, and here's where you can do a lot.' You can't have a holier-than-thou attitude toward your MIS counterparts, but I'm not sure all vendors can turn that off."

As important as attitude is the ability to identify where the MIS expertise best fits into a particular project. One logical place to start is in the communications interfaces between the strategic system and the firm's existing technology.

"The networking and telecommunications area is a driver for MIS involvement," says Dennis Sigloh, director of systems integration for IBM's Information Systems Group. "If you're dealing with voice/data integration and network control and management systems with large T1 backbone networks, you're going to need MIS and someone on the telephone side as well. We see those requirements in all of our industries."

Infant stages

In many ways, commercial systems integration is "still in its infancy," says Carpenter of Alex Brown. Despite some recent highly visible contracts, such as Allegis Corp.'s United Airlines project with IBM, a large number of users have not plunged into major systems development work with third-party integrators.

But as more executives view information technology as a vehicle for business strategy, MIS directors will face the choice of how to tackle the development and implementation of those strategic systems. A systems integrator may not always be the best choice but will be an option worth considering.

"In the largest organizations, my guess is that they will be willing to go with the outside vendor if that vendor has met with success in other organizations," Carpenter says. "MIS people are smart, but most are inherently risk-averse. They can still control the basic

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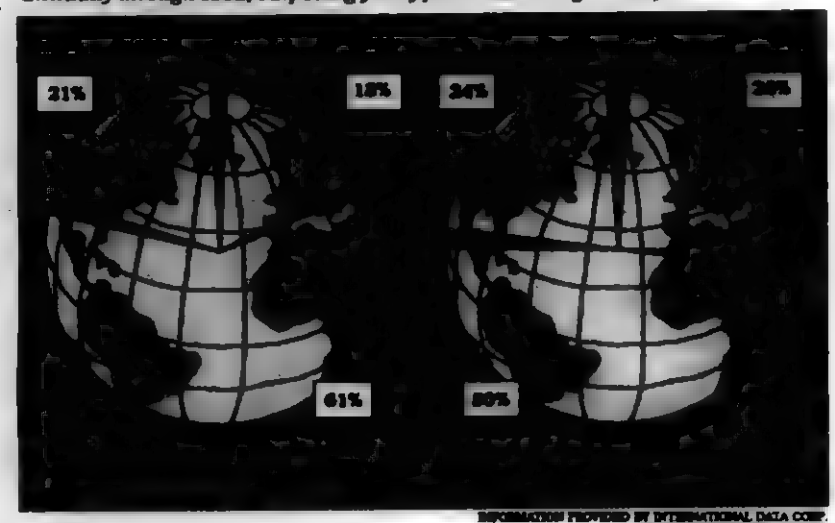
hardware and systems software, and probably the data base. All they're giving up is the riskiest part — developing new systems."

The need for commercial systems integrators to do "missionary work" has lessened considerably, says Roderick M. Bryden, chairman of SHL Systemhouse, Inc. in Ottawa, Canada, whose commercial clients include Motorola, Inc. and Safeway Stores, Inc. Bryden says MIS departments are becoming increasingly comfortable with systems integrator partnerships as technology and the strategic application of it becomes more complex. "Five years from now," Bryden says, "I think it will be as unusual to develop and integrate all of your own systems as it will be to build your own microcomputers."

Worldwide systems integration market, 1986 and 1992
IDC projects that the commercial systems integration market will grow 26% annually through 1992, outpacing yearly federal market growth of 15%



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
GW GRAPH: MITCHELL J. BAYER

Taking integration in-house

MOLINE, Ill. — Deere & Co. does not have to hire a systems integrator for its factory automation projects. Why? Because Deere has developed its own integration group — and hopes to sell its services to other companies.

Deere Tech Services grew out of the farm equipment maker's engineering department, which had tackled internal projects ranging from factory simulation modeling to the first commercial installation of Manufacturing Automation Protocol (MAP). Formalized as a Deere business unit in October 1986, Deere Tech Services has doubled in size to 40 employees since then.

"We used traditional systems integrators in here before," says William G. Rankin, Deere Tech Services' vice-president and general manager. "We used to think we needed the grandiose solution before we could do anything ourselves. But we took on smaller pieces of it and, in the process, built a significant skill base. We found that companies that visited Deere were asking if what we were doing was for sale."

Deere Tech Services is currently bidding for outside systems integration business and will be a subcontractor for the U.S. Air Force's MAP/Technical and Office Protocol demonstration at a Baltimore trade show in June.

Rankin is particularly proud of the unit's software development work, which uses sophisticated computer-aided software engineering tools on networked workstations.

'Substantial software skills'

"People hear about John Deere and software, and they think it's Fortran stuff hacked out in the back room," he says. "But we have really substantial software skills."

Deere Tech Services is very separate and distinct from Deere's corporate MIS function. "They use our computer facilities, sell some services that run on our machines and look to us for certain kinds of specialized help," explains Robert Buhen, Deere's director of computer systems. "But they have generally done the whole thing themselves."

On the horizon, however, Rankin sees a growing interaction with the MIS operation.

"Even though we're coming from very different environments, our MIS group is recognizing growth opportunities for computer technologies on the shop floor," Rankin says. "I think the major connecting points will deal with relational data bases and telecommunications and networking issues."

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Technology on the rise in vertical markets

Computing has become less a general-purpose technology and increasingly a series of different technologies tailored to specific tasks, such as factory automation, education and transaction processing. In 1987, this trend gathered momentum. In 1988, it is expected to continue.

What technologies can we expect to see more of in vertical markets? *Computerworld* senior writer Stanley Gibson polled top specialists to learn just what technologies the new year will provide.

On the auto industry: BEN MILBRANDT, electronic data interchange (EDI) manager at Navistar International Transportation Corp. in Chicago:

"EDI will have expansive growth in 1988. It will be like a snowball tumbling downhill. Three years ago, people asked, 'What is EDI?' Back then, there were 50 people at the ANSI X.12 meeting. This year, there were 500.

"Now, there is a virtual explosion in EDI. People are finding it's easy to use, and they want to do more of it."

On the oil industry: ALLEN N. SMITH, manager of corporate systems for Atlantic Richfield Co. in Los Angeles:

"In the oil business, the challenge will be to continue to provide services with limited budget growth and constraints. The most outstanding technical challenge our shop faces is integrating local-area networks."

On the retail industry: JOHN CHAY, vice-president of the information systems division of the National Retail Merchants Association in New York:

"There will be bar codes on all kinds of merchandise, even on boutique items and clothing. Those kinds of detailed standards and specifications are already defined. It's just a question of implementing them.

"Also, people want more powerful terminals at the point of sale, so they can look up prices on the terminal and access other data."

On health care: FRED PIRMAN, senior vice-president of information systems for Humana, Inc. in Louisville, Ky.:

"We are trying to leverage our technology in a competitive environment. We are installing a system that automates processes in a hospital, including a patient's medical records, physician's orders, X-rays and pharmacy records. All of this will be on-line. Data will be captured at the point of care in bedside terminals. Forty percent of nurses' time is spent recording what they do. This [system] will reduce that to 5%."

On government: ROBERT L. ROSS, director of Agency Liaison Officers Programs of the General Services Administration:

"The largest change in federal government purchasing seems to be the large amount of microcomputers that agencies are buying: 20,000, 30,000, even 40,000. In addition, many agencies are looking very seriously into desktop publishing. Also, we are trying to be better buyers. We are using systems integrators more. Instead of buying hardware, we are attempting to buy solutions."

On aerospace: JOE MCGRATH, director of MIS at Avco Aerospace in Nashville:

"I would like to see some of the software companies offer a connection between Cadam [from Cadam, Inc.] and our manufacturing, . . . to extract the necessary parts descripton from an engineering parts list, which derives from a Cadam drawing, and to go from the parts bill to the manufacturing bill that would drive the MRP II system. Either someone helps us with it, or we will keep chipping away and eventually do it ourselves."

On education: MIKE LAWSON, associate professor of economics, chairman of the MIS department and director of the MIS master's degree program at Boston University:

"There is a movement to bundle PC programs with textbooks. In addition, textbook makers are giving students problems that have to be solved on a personal computer. This integrates the use of computing into their thinking. Most major business schools have put in microcomputers over the years. Now they face integrating them successfully in networks."

On publishing: PAT STADEL, administrative vice-president and director of administrative services at Addison-Wesley Publishing Co. in Reading, Mass.:

"We are going to see increasing use of computers in publishing. We will see more telepublishing. Authors will write their books on PCs and transmit the texts to editors. Editors will then transmit the texts to the printers. Someday, customers will request book chapters electronically. They will be downloaded to a PC, then copied under a site license."

CIOs: Top-tier managers for MIS strategy

The label misleads, but function is needed

TIM LEWIS

BY JULIE PITTA

Chief information officer. The title implies that the MIS executive has stepped out of the computer room and into the executive office. But to many in MIS, the CIO title is, at best, a source of irritation.

"I think it's a bad title," says Ron Brzezinski, vice-president of information systems for Quaker Oats Co. "It sets you apart from your peers and gives the MIS professional too much of the spotlight.

Information services "is supposed to be as transparent to the company as possible," Brzezinski continues. "I've heard that a CIO is supposed to influence corporate culture and leverage technology to create a competitive environment. A good information services professional does that without any special label."

"I've never thought about changing my title to CIO," adds Harvey Shrednick, vice-president of information services for Corning Glass Works. "The title wouldn't give me any more relevance. It doesn't mean anything."

William Synnott, senior director for The Yankee Group in Boston and a former MIS executive, claims to be the first to have coined the phrase "chief executive officer," several years ago in his book *Information Resource Management*. The emergence of the CIO is a reflection the changing role of MIS within American corporations, Synnott adds.

The MIS community's aversion to the CIO title is likely the result of the title not reflecting the tasks. In some cases, the title has been used as a perk for the hard-working MIS professional rather than as a recognition of his changing role within the organization, Synnott says. "At Christmas, there's a Santa Claus on every corner, but they're not all real," he explains.

Controversy surrounding the CIO title may have contributed to its slow acceptance. "I think the trend toward CIOs has slowed in the last six months because of some adverse publicity," says George Ruzmak, vice-president of the Index Group, Inc. in Cambridge, Mass. "Some companies are reexamining the title or getting skeptical about it." An even greater reason for its failure to catch on quickly can be traced to the continued grappling by corporate America to understand where MIS fits within the overall organization.

Mike McMahon of Rolm Corp. is a CIO who fell victim to his company's struggle with the role of MIS. Recently, McMahon's title was changed from CIO to manager of communication services. "It created confusion," he explains. "Some people misinterpreted what it meant — they thought I was an officer of the company, which I was not.

"CEOs are still trying to understand what role [information services] should play within the organization," he continues. "In some circles, information services is still viewed as an expense rather than a weapon."

Although estimates vary, those who have been named CIOs are an exclusive group. Harold Cypress, vice-president of the Western region for John Diebold & Associates in New York, says he believes only a dozen CIOs exist within corporate America.

"There are fewer CIOs than the world thinks there are," concedes George Colony, an industry analyst for Forrester Research, Inc. in Cambridge. Of the 15,000 names in Forrester's data base of MIS professionals at Fortune 1,000 companies, not one carries the title of CIO.

According to one CIO, between 50 and 75 executives attended a CIO symposium sponsored by Arthur Andersen & Co. last year, making that gathering more an intimate group than a crowd. Of those attending, not all officially carried the title.

While card-carrying CIOs may be scarce, industry observers say a new type of MIS professional is emerging within large corporations, although not quickly enough. According to

Continued on page 84

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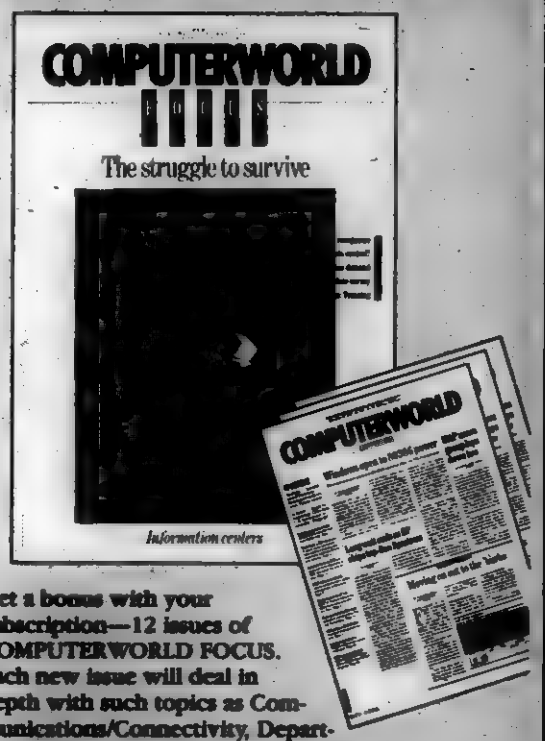

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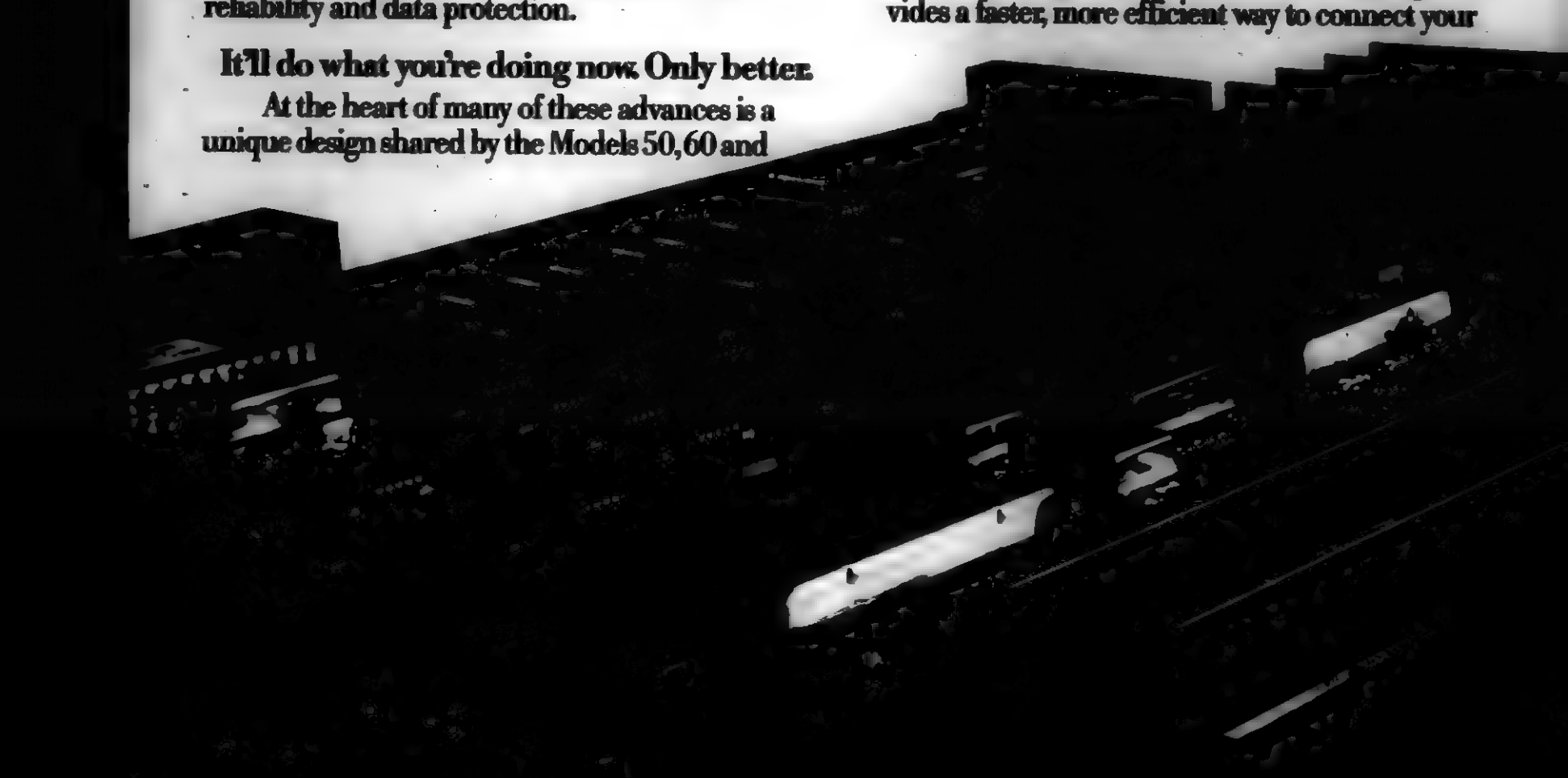

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CIOs

CONTINUED FROM PAGE 80

Synnott's estimates, "at least half" of the Fortune 200 has an MIS professional acting in what he calls a CIO-like role.

"The MIS director is a day-to-day operations guy who runs the data centers, builds systems and networks," Synnott explains. "The CIO deals principally with long-term strategy. He is the architect of the firm's information resources.

"Whether they actually use the title CIO, there will be people filling this role within the organization," he maintains.

What represents perhaps the greatest difference between a CIO and a traditional MIS executive is the degree to which each influences the organization.

Unlike the stereotypical MIS director — hidden in the computer shop surrounded by chugging mainframes — a CIO is a member of the senior management team.

"Most importantly, it has to do with the reporting arrangement," says Michael Carrico, CIO at American Medical International, Inc. "A traditional MIS director generally reports to the chief financial officer. I'm one of five people who report to the chairman."

George Ruszaak

"I have a better understanding of the corporate strategy," says Rick Adam, newly appointed CIO at Goldman, Sachs & Co. "I'm included in senior management meetings."

Strategy part of the job

Acceptance to the senior management team implies responsibility for overall corporate strategy. Further, it recognizes that information systems is a strategic tool.

CIOs say they have abandoned the day-to-day operations of the MIS department, leaving them in the hands of an MIS professional strictly charged with those responsibilities.

Instead, CIOs act as part of the "management console," setting corporate direction and helping to implement it. They bring to senior management the ability to use information services to a strategic advantage.

"You have to think like and behave like a senior executive as opposed to a functional executive," Index Group's Ruszaak says. "You deal with issues that cut across organizational boundaries and functional units."

"What a good MIS executive does is connect the technology to the business," adds Darwin John, vice-president of information systems for Scott Paper Co. "Technology is something that can make a difference competitively."

While John has not been appointed CIO — nor does he want to be — he is also a member of the new class of MIS professional. Like Carrico and Adam, he reports to the chief executive and has abandoned day-to-day operations in favor of strategic planning.

Not enough MIS professionals have the power accorded to Carrico, Adam and John, experts say. "Some of the people who call themselves CIO are carrying it more in title than in function," Carrico says.

Ideally, a CIO should act as an adviser on a broad variety of business issues, but many who act in that role find themselves segregated from the mainstream of the business, Diebold's Cypress says. Many have access to senior management only through MIS steering committees. Not only do they not play a role in setting strategy, they also are not apprised in advance of new business initiatives.

Companies that have failed to integrate information services into the mainstream stand to suffer, Cypress says. "The function of CIO is critically important to the American corporation, even though the title has not gone over," Cypress maintains.

Information-intensive industries — like financial services — have been among the first to recognize the importance of information services. Not surprisingly, those corporations have offered their MIS professionals more clout within the organization, experts say.

But where will corporations find the MIS professionals needed to fill the top role? Synnott says the division between CIOs who have risen up the ladder through the MIS organization and those who have migrated from outside the data

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Dudley Cooke

processing shop is currently evenly split. But he believes the scales will tip toward the CIO-type who has a general-business background rather than a technological one.

"A lot of senior managers feel more comfortable appointing a business person who can learn the technology, rather than a technical person who must learn the business," he explains. "A lot of technologists have not bothered to learn about the business that the corporation's in," he adds.

MIS professionals can suffer from the same short-sightedness of which some have accused senior management: A failure to understand the many facets of their corporations.

"I've been very impressed with a lot of the information services people I've met," says Dudley Cooke, general manager of the information systems division for the Sun Company, Inc. "If you have a good technology background, and you've learned the business along the way, then you're qualified.

"There are some people who all they want to do is talk technology," he continues. "They'll never make the shift."

"You need to change, grow and develop and become more connected to the business," advises Scott Paper's John. "Otherwise, someone will come over from the business side to do it for you."

CIOs: Not an elitist group

Goldman, Sachs & Co.'s Rick Adam is a business-card carrying member of what can be described as an exclusive sector — chief information officers at large companies.

Adam is not new to the club. For four years, he was CIO for Chicago-based Baxter Healthcare Corp., a post he left last month to take over Goldman Sachs' MIS organization. How exclusive is the grand order of CIOs? At a CIO symposium sponsored by Arthur Andersen & Co., Adam was one of 50 to 75 attendees.

Although the title has come under fire from some long-time MIS professionals, Adam says a need exists for a CIO within large organizations. Whether or not that person officially holds the CIO title is not important, he maintains.

A title "is not critical," Adam says. "In corporations, senior management is often given the title of officer. That part of the title indicates that the MIS director has risen in the hierarchy. The 'chief'

The 'chief' portion of the [CIO] title shows that the firm looks to one person to be responsible for all information systems, not just a portion of them.

RICK ADAM
Goldman, Sachs & Co.

portion of the title shows that the firm looks to one person to be responsible for all information systems, not just a portion of them."

After three years as vice-president of information systems at Baxter Healthcare, Adam was made CIO, an appointment he calls an acknowledgement of his changing role rather than a promotion.

"My job didn't change," he says, noting that he was already included in senior management meetings at Baxter Healthcare. "It was a recognition by the company that information systems had become more important."

Like many who head information systems at large companies, Adam, 41, came to MIS from the business side. Before moving into MIS at Litton Industries, Inc., he was a marketing representative for IBM. He holds a general engineering degree from the U.S. Military Academy at West Point and an MBA from Golden Gate University in San Francisco.

Adam says he combines his business acumen with his technology background to "make sure that systems technology supports the objectives" of the company. He has a tall order to fill at Goldman Sachs, which is in the midst of a move from Unisys Corp. to IBM hardware.

JULIE PITTA

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Rockart's Wired Society

Sloan School administrator tells MIS chiefs to find a vision for the future, then share it

Once dominated by isolated computers serving basic support roles, corporate information systems are evolving into complex data networks. They will soon link departments within companies and companies with suppliers and customers in "The Wired Society."

This vision of the world in the 1990s is that of John F. "Jack" Rockart, director of the Center for Information Systems Research at MIT's Sloan School of Management. Author of the Critical Success Factors strategic planning method, Rockart spoke with Computerworld senior writer Michael Sullivan-Trainor concerning the dynamic role MIS executives will play in this future society.

ALAN WITSCHONKE

CW: How should MIS executives prepare for what is coming?

ROCKART: They should visualize their jobs as involving two major roles: one, ensuring that the computer network supporting their company is there and, secondly, being the staff information technology gatekeeper, responsible for educating the line managers as to how to utilize technology effectively.

CW: How is that different from what they are doing now?

ROCKART: Both are proactive roles. There also ought to be a document that sets a vision of the way the organization will be using information technology five to 10 years from now. That vision ought to be shared with the rest of senior management.

That is very different from thinking about how to support all the users who come to the information technology organization with needs. Helping them prioritize their needs has been the reactive role that the head of information technology played in the past. Unfortunately, that is not the way the game ought to be played these days, because the technology can make a difference to the success or failure of an organization.

CW: You have suggested that line managers will be the leaders of "The Wired Society." How will that affect MIS executives?

ROCKART: As the use of information technology grows throughout the organization, the information technology person's job changes significantly.

Many years ago, the DP manager was really a programmer and systems analyst. He developed batch systems with a few people around him in one central location.

As we went to on-line systems, the head of information technology slowly but surely became a matrix manager, moving more into a staff role. His job was to make sure that each of the functions of the corporation was doing good planning, career management and so on. He became more of a consultant.

Then, as we moved to the user era with personal computers and fourth-generation languages, the head of information technology's job changed from managing transaction processing systems to managing those systems as well as managing the retail use of computing. Another major segment, the management of end-user computing, was added.

CW: What will be added to the role in the future?

ROCKART: As we work toward "The Wired Society," people want to get access to data anywhere, from any point in the organization. A major role for the head of information technology will be the development of the computing, software, network and data architecture, which allows people to communicate from anywhere.

That is not a small job. The data architecture, in particular, is a real bear. If that alone were the job, it would be very significant. But that is not the only part of it.

Another major part is persuading line management proactively of the things it has to do to make sure the corporation is making the best use of the technology.

The original DP manager doing batch processing was essentially an accounting clerk. This new manager will either be one of the chief executives of his firm or in the top six or seven on the management board.

CW: What does this mean for the MIS organization? Will it diversify into other departments?

ROCKART: Will it completely go to other departments? Hell, no.

Managing the networking infrastructure cannot be delegated to other departments. There has to be a strong central technology organization whose job is to ensure there is a common, consistent computer and network structure. There must be an organization capable of working between and among functions and divisions to help them not only manage data within the division but also manage data across the organization.

CW: Will you need some aspects of both a centralized and a distributed structure to support a large organization?
ROCKART: There's no doubt about it. At one extreme, you are not going to centralize your manufacturing process control computer. At another extreme, it does not make sense today to have an accounting department in every division, warehouse or branch office.

The idea today is to use the technology in the best way possible to cut down on the total number of people — both information technology people and clerical people of various sorts — and still remain responsive to the needs of customers.

What you're seeing today are guys who are not as capable technically as they used to be. They cannot maintain that same depth of technical expertise.

CW: What will happen to the need for the head of information technology to possess technical expertise?
ROCKART: What you're seeing out there today are guys who are not as capable technically as they used to be. They cannot maintain that same depth of technical expertise. What you have are people with enough understanding of the technology to manage technical experts. A significant number of the new heads of information technology do not come from information technology. They come from other parts of the business.

CW: So the executives will have to place more trust in certain key technically oriented subordinates?
ROCKART: No more trust than a good executive puts into anybody stationed beneath him. If you know something well, you can judge a single expert beneath you. But if you don't know something well, you triangulate in on the truth. These guys are getting advice from one or more key subordinates and occasionally fro... outside people, vendors, consultants and their peers.

CW: Much of what the new information technology executive is becoming seems to be part of the chief information officer concept. Is "CIO" a transitory title or an indication of the future?
ROCKART: I have come to believe it is a misleading title. It makes one believe that the chief information officer is in charge of the information in the organization — and he is not. The head of manufacturing is the chief manufacturing information guy.

You will find that the title is not being used in too many organizations. What we have are senior vice-presidents for information technology and vice-presidents of information systems.

CW: What would be a good alternative title?
ROCKART: I prefer the chief information technology officer, because that is really his role — managing information technology, advocating it.

But the title should get away from "chief" entirely.

The chief financial officer started off with a slightly negative overtone, but it has become very respectable. There is good acceptance of the fact that somebody has to be overseeing the finances for the organization. It is not yet clear that somebody has to be overseeing information for the organization.

Managing the networking infrastructure cannot be delegated to other departments. There has to be a strong central technology organization.

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BY GLENN RIFKIN

Out on a limb. Predictions. Predictions. The weatherman predicts seasonal temperatures, partly cloudy. You wear a spring jacket and open-toe shoes. A 10-inch snowfall buries your car.

Look ahead. 1988. What's in store for MIS? What are the headlines in *Computerworld*? Outrageous. "Princess Di leaves Chuck, runs off with Fortune 500 telecom manager." "OS/2E late; sets off major disturbances in Persian Gulf." "Steve Jobs, John Sculley reunite for *Apple: The Movie*."

Let's face it. 1987 had become so boooorrrringgg that the stock market *had* to crash. Look at some of the headlines, for crying out loud. "AIX gives multiuser hue to PS/2." Oooh. Stop the presses! "Amdahl kills Aspen plan, favors Unix." Get me rewrite! Hold page one!

If you liked those, 1988 should be a delight, a day at the beach. So let's get on with it. What will the major stories for '88 be? Who will be the newsmakers? The snoozemakers? What will make you MIS mavens tingle with excitement at the thought of Monday morning and a brand, spanking new issue of *Computerworld*?

High end becomes low end. In an unprecedented bit of strategic marketing, IBM declared that the 3090 series was actually a desktop system designed to put mainframe MIPS at the fingertips of corporate end users. In repositioning its product line, IBM insisted that the new strategy would not affect Personal System/2 sales.

"Because OS/2E will probably never really ship, we figure that we can convince MIS to fill its PS/2s with water and glitter and use them as paperweights. The 3090 may take more desk space, but that's really their problem. Think of the margins we get on those suckers," said Bill Go, IBM's vice-president for overpriced systems.

Users contacted by *Computerworld* expressed concern about the new direction but were generally satisfied with IBM's reason for the change.

"The move seems reasonable to me," said Nimbus Wilson, MIS director at Johnson Aircraft and Boat Parts, Inc. in Schenectady, N.Y. "But then again, I bought Displaywriters."

BAL HAFFORTH

Sources inside the company admitted that a delay in implementing the new idea was developing around whether to continue using characters from a canceled TV show to sell the new product. Internal IBM memos indicated that management was torn between featuring an actor dressed as Julius Caesar or Mr. Ed.

In a related development, IBM admitted that the 9370 was actually a hoax. The long-awaited departmental system was revealed as an 8100 in a new cabinet. Insiders revealed that the company, stymied in attempts to fend off Digital Equipment Corp.'s mid-range, decided to rename and repackage the old controversial system and rerelease it.

One user claimed that he caught on to the ruse when he discovered sections of a 1978 *Poughkeepsie Times-Gazette* used for packing material in his first 9370 delivery.

DEC bites Apple. Despite months of denial, DEC has purchased an equity stake in Apple Computer, Inc. Under the $1.3 billion deal, which reportedly caused DEC to close a money market account, the Maynard, Mass., giant will assume ownership of 24% of Apple's stock. Under terms of the agreement, DEC will paint sections of its mill headquarters in pastel colors, and Apple will immediately cease its Friday afternoon beer blasts.

DEC President Ken Olsen, in a prepared comment, said, "Let's forget the prepared comments and just ramble a bit. First of all, have I told anyone here about interactive computing? Well, that's what DEC is all about. And so is Apple. We've always been good friends.

"Oh, I guess that Jobs kid was pretty arrogant. But, he's gone, so what the hey. We had so much cash that we had to buy something, and, frankly, we don't know how the heck to build a personal computer."

John Sculley, out on the 15th consecutive month of his book tour, was unavailable for comment, but he sent word through his public relations

department that he was actually brought to tears over the deal. "This is insanely great," he said in a prepared statement. "I suppose MIS will have to take us seriously now."

Details of the proposed sales operation were sketchy, but insiders suggested that the two companies would field one huge sales force dressed in dark suits, T-shirts and running shoes.

Computer Associates buys itself. Finally running out of acquisition candidates, software conglomerate Computer Associates made business history by initiating a hostile takeover of itself.

The $50-billion giant, having bought out virtually every major software supplier in 1987, found itself without further avenues of conquest, so bored executives decided to instigate what many Wall Street observers believe is a first-of-its-kind self-buy-out.

Computer Associates declared itself twice as big as it was and notified shareholders it would be known as CA².

Under terms of the agreement, Computer Associates declared itself twice as big as it was and notified shareholders that it would henceforth be known as CA². Although neither of the Wang brothers were available for comment, it was rumored that Computer Associates executives, all former leaders of Computer Associates acquisitions, plotted the takeover for several months before confronting the Wangs with the idea.

The Wangs reportedly fought the proposal initially but later recanted and decided to lead the takeover effort themselves.

MIS wants more. For an unprecedented fifth year in a row, MIS managers stated emphatically that they would like to earn more money. In a *Computerworld* survey of 1,500 MIS professionals, the theme was clear: give us more!

In the survey, a surprising 74% said they wanted a substantial increase in salary, while another 16% indicated they would welcome a "big, fat raise" but could live with a bigger Christmas bonus. The other 10% insisted they were satisfied with their current salaries, but the first 90% accused them of lying.

IBM unveils the Year of the Customer's Pets. After achieving little success with its vaunted Year of the Customer campaign, IBM today announced a twist on that strategy. Big Blue unveiled a campaign aimed at the domesticated house pets of its customers. According to a company spokesman, the campaign will focus on creating a closer bond between MIS professionals and their pets.

"We at IBM believe that a person's cat or dog means more to them than these big old mainframes, so we've decided to make that relationship even better through special feline and canine discounts," read the official statement.

An IBM marketing vice-president, who insisted on anonymity, revealed that if the campaign does not succeed, IBM is going to revert to what he called "the Chinese restaurant placemat" campaign starting with the Year of the Goat.

OSI achieved. After nearly a decade of promising to conform to the International Standards Organization's Open Systems Interconnect protocols, major vendors agreed that the protocols had all been met and the issue would simply never be mentioned again.

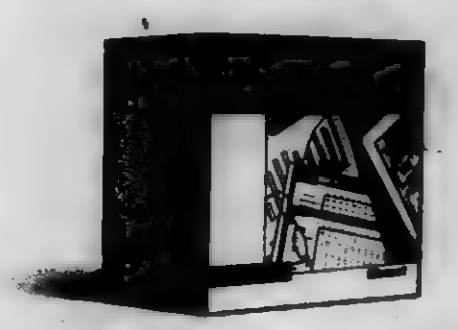
Industry leaders rock for world peace and high margins. In an unprecedented gathering of computer industry leaders, the presidents and chief executive officers of virtually every major computer vendor joined together to record a music video in support of world peace. The song entitled "We Are The MIPs" was written by Microsoft Chairman "Dollar" Bill Gates, who sang lead vocals.

Among the prestigious gathering were such luminaries as Jumpin' John Akers and William "Big House" Lowe, Ken "Lightnin' " Olsen, Michael "Baritone" Blumenthal, Jim "Blind Lemon" Manzi, John "Soda Water" Sculley, Steve "Tears on My Pillow" Jobs, Easy Ed Esber, Fiddlin' John Imlay, Philippe "Genghis" Kahn, who played saxophone, and consultant Jammin' James Martin, who played lead guitar.

"It was really an emotional gathering," Blumenthal declared. "I think the song can become a real standard," Manzi added. "I just wish Gates didn't write it."

Proceeds from sales of the record and video are expected to be paltry due to what the recording engineer called "the worst song I've ever heard." But the group was undaunted. "We wanted to let the world know that the slump is over, margins are better and we're all rich as hell," Gates said with a smile.

Stop your soul searching.



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SOFT TALK

Charles Babcock

SAA strategic software step

A few years ago, the general manager of IBM's site in Endicott, N.Y., was commenting on the nature of his job to the hometown newspaper.

One of the revealing things he said was that the development side of the site, the Glendale lab, functioned in competition with other IBM development sites. There had once been a move to phase out the Glendale site, but the staff kept coming up with so many compelling products that the advocates of trimming and development concentration never succeeded in getting it closed.

What emerged was a picture of IBM as a series of competing divisions and competing sites within a division, rather than a monolithic company. That decentralization had a lot to do with IBM's success in the 1960s and 1970s, but it has come back to haunt the firm in the '80s.

The incompatibility of IBM's mid-range computers is the most commonly cited example, but incompatibility among software products, or "software pollution," as Michael Brands of the Gartner Group puts it, is equally compelling.

"The following overlaps or conflicts have become institutionalized: CICS vs. IMS, IMS vs. DB2, CMS vs. TSO, JES2 vs. JES3. . . . Users are unserved. We receive constant questions

Continued on page 94

Referential integrity for DB2?

Consultant claims new release of DBMS allows cross-checking of keys

BY CHARLES BABCOCK
CW STAFF

WHITE PLAINS, N.Y. — The next release of IBM's DB2 will include a limited form of referential integrity, according to Shalin Atre of Atre International Consultants, Inc. in Rye, N.Y.

DB2 Release 4.0, expected out in the spring or early summer, reportedly will include a form of referential integrity that allows the cross-checking of primary and foreign keys. For example, DB2 could enforce an integrity rule that would forbid the deletion of any customer name from one table if the customer has an outstanding account in another table, Atre said.

She described what she expects in Release 4.0 as "context integrity," or an ability to enforce integrity rules across the rows and columns of a table. She said DB2 users will have to wait several years for a more sophisticated form of referential integrity that would govern domains.

With domain integrity, a data base administrator could direct DB2 to review all figures submitted to a salary table and reject any that did not fall within a $15,000 to $150,000 range or some similar set of parameters, Atre said.

'Don't believe it'

Gary P. James, senior manager and technical director in the advanced technology and integration group at Arthur Andersen & Co. in Chicago, said he doubts that IBM will be able to include referential integrity, in any form, in Release 4.0.

"Off the top of my head, I don't believe it will be in there," he said. But Atre said she has been informed by well-placed IBM employees that the feature will be included.

Both James and Atre noted that IBM is under pressure from major customers to incorporate referential integrity into the relational data base management system because they have grown accustomed to its protections in IBM's IMS and other traditional DBMS offerings. As users push DB2 applications into production use, they become increasingly concerned about reliability issues, James said.

Slowdown in pace

In addition, Atre noted that DB2 is expected to reach 2,000 installations by April or May. That number reflects a slowdown in the rapid pace of sales that occurred over the previous 12-month period.

Atre said IBM is trying to enhance DB2 for production use, improving its reliability rather than attempting to implement all phases of relational technology as quickly as possible.

IBM will offer improved utilities in the next release, including a utility to do group authorizations of access to the data base and group revocations, Atre said. Currently, DB2 administrators are limited to authorizing and revoking access on an individual basis.

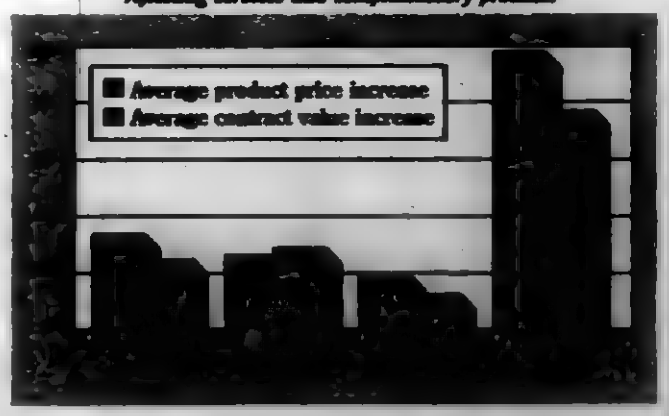
James said DB2 users are getting impatient for the ability to do outer joins or to combine files on the basis of foreign keys as well as primary keys. They also want to update views of the data base or a logical table derived from two or more existing tables. The way DB2 works now, an update must go back to the underlying base tables of a view to do an update — a cumbersome process compared with updating the view itself, James said.

Atre said she thinks the ability to update views will be included in Release 4.0.

Data View

The fine print

Survey of software vendors indicates contract values, or total sales orders, have outstripped product price increases, reflecting services and complementary products



INFORMATION PROVIDED BY CRAUSHAW AND ASSOCIATES, INC.

4GL fuses flexibility of 3GLs

BY NELL MARGOLIS
CW STAFF

GLENDALE, Calif. — Progeni Systems, Inc. staged a mid-December debut for Filetab-D, a fourth-generation systems development package that the firm claimed combines the efficiency of a fourth-generation language with the comprehensiveness and flexibility of third-generation languages.

The 'D' stands for Digital; Filetab-D, for which Progeni is the U.S. distributor, is the first Digital Equipment Corp.-based entry from 21-year-old British software manufacturer National Computing Centre Ltd. According to Chris Stanford, National Computing Centre's software group director, the product was designed to bridge the programming language generation gap.

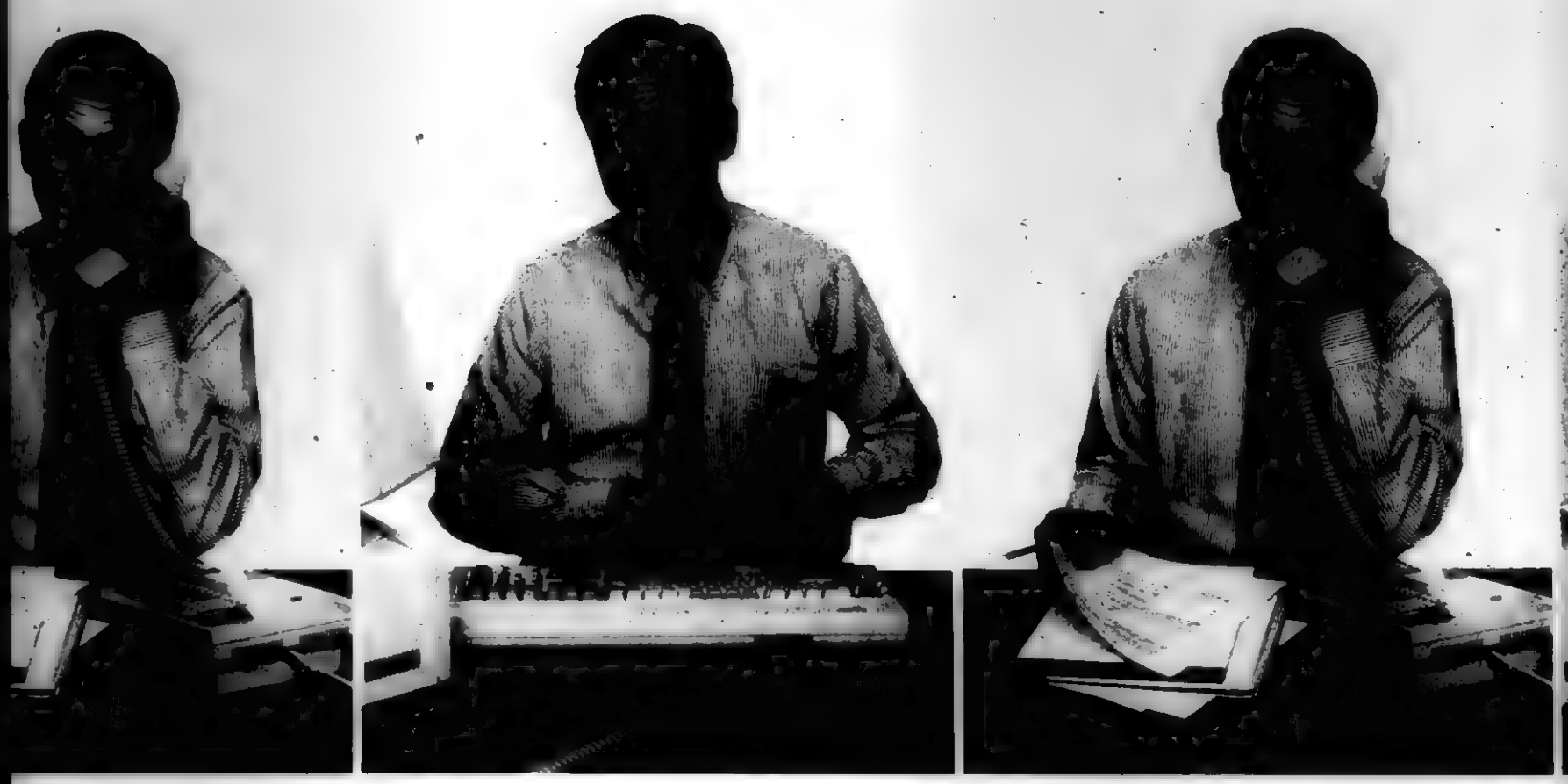
"Fourth-generation languages [traditionally] are quite efficient — but at a cost," Stanford said. Productivity gains often are eroded by shortfalls in completeness and continuity.

Filetab-D, a compiled language, offers the payoff without the trade-offs, said Judy Mann, a Progeni customer support consultant. A decision table-based programming language with built-in automatic report-generating ability, Filetab-D yields understandable code that is easy to maintain and modify, Mann said.

The language can read and write to all DEC RMS files — a particular boon to users who need to convert old files. Filetab-D also interfaces with both DEC's hierarchical data base management system, DBMS,

Continued on page 94

The new IBM 9750 Business Communications System.



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grow, it grows. Yet it's much smaller than its predecessor, the ROLM CBX II, and it's easier on power and air conditioning.

On the other hand, its traffic-carrying capacity is tremendous. The 9751 can be configured so it's virtually impossible to block.

And its 9000AE (for Advanced Engine) processor not only gives you every digital advantage (like ROLM PhoneMail® and Least Cost Routing), it has reserve power to handle these applications under heavy use and to let you add new applications as you need them.

When ISDN standards are established, the IBM 9751 will be able to work with them. It was built with ISDN in mind, to provide both the power and bandwidth that ISDN usage (for voice, data and image) will demand.

In fact, the 9750 Business Communications System is a key part of IBM's telecommunications future. Combined with all of IBM's other ways to connect systems, it gives you new freedom to run things your way, to broaden the usefulness of your networks, and to control their expense. To learn more, call your IBM ROLM Systems representative or Authorized ROLM Distributor.

IBM®

Babcock

FROM PAGE 91

and conjectures about product convergence and demise," Braude writes in a Gartner Group strategic report, "Systems Application Architecture: A Critical Analysis."

Screen handling with one IBM product is functionally different from the next. Interactive test facilities vary from CICS to IMS to IBM Cross System Product and Cobol, he adds.

By naming a set of interfaces, protocols, programming languages and other software conventions, IBM hopes to redirect its own efforts and those of third-party vendors onto narrower, more compatible ground. Braude says software pollution inhibits customer growth and gives users a reason to look at alternative vendors. IBM is fighting back with a statement of direction and a proposed solution, but ones that still have a long way to evolve.

One of the reasons IBM came up with its announcement on SAA is support for customer growth horizontally. Much of what IBM does encourages vertical growth — that is, expansion of the glass house, the corporate data processing department using IBM 370 mainframes and DOS/VSE or MVS.

The major growth area of the '80s, however, has been the information center and other forms of end-user computing, with an emphasis on personal computers, mid-range machines, IBM's VM and more powerful workstations.

A major reason for IBM's stance with SAA is that it will provide better support for applications that move across these horizontal platforms. It will also allow users, once they gain familiarity with one IBM interface, to use it with additional products. And SAA promises to leverage skills devoted to software development, a key asset in the modern corporation, by making them applicable across several operating environments, Braude writes.

While users can applaud all of these goals, there is little in SAA that immediately brings us closer to users' goals. SAA is a gathering of designated software products, something like the eclectic collection of shiny objects by a crow or pack rat. To call this collection an architecture is stretching the point, although, as Braude says, "SAA is a strategy . . . and IBM must be awarded its due for surfacing a software strategy."

What SAA does is focus resources, both inside and outside IBM, on certain software environments, which high-level interfaces may one day bring together. With SAA, IBM is cutting its losses, but it has yet to achieve a grand design.

But, as Braude says, SAA is a first step. "If IBM sustains these initiatives, we believe it will achieve a large net gain in software effectiveness," he says.

Babcock is Computerworld's senior editor, software & services.

AVAILABLE ON IBM 9370

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4GL

FROM PAGE 91

and Oracle Corp.'s relational SQL-based Oracle DBMS; an interface to DEC's relational SQL-based VAX RDB/VMS is promised for an early 1988 delivery.

Vadim Computer Management Group Ltd. in Kelowna, British Columbia, used Filetab-D to migrate its business applications software, which was written in Basic, to the VAX. "It's a lot like C in terms of power and flexibility," said Vadim President Mike Schleppe, whose company also found that "using Filetab-D, we could reduce our program size by 40% to 50%. The programs ran faster, too, and we were able to eliminate a majority of the sorts," he added.

However, Schleppe said Vadim found that utilities were lacking in Filetab-D — a deficit Vadim has now corrected. The Programmers Toolkit, a Vadim-designed set of utility programs aimed at guiding a new user into Filetab-D, is being marketed by Progeni.

Available immediately on DEC's VAX/VMS and PDP systems, Filetab-D is priced from $8,000 to $52,000, depending on the CPU size.

SMALL TALK

William Zachmann

See to shining C

If I were responsible for information systems in a business organization today, my first New Year's resolution would be to use the C programming language for new application development.

While frequently associated with Unix, C is no more necessarily linked to Unix than Microsoft and IBM's OS/2 is to the latter's Personal System/2. In fact, C can be used on virtually every hardware system and operating system environment that will matter in the next few years.

C is also the language of choice for OS/2 software, whether by software vendors or by the growing number of users that are starting to build serious applications on personal computer- and other microprocessor-based platforms. An inherently structured language, C makes languages like Cobol and Fortran look as obsolete as the Model T Ford.

Granted, there *is* a real business value in sticking to the devil you know. So we are going to continue using Cobol, Fortran and Basic. Nevertheless, for us

Continued on page 96

Those thrilling accounting tools

State of the Art's Samuels says Big Eight input has stifled the yawns

David Samuels knows that getting the industry excited about accounting software is like trying to get an 8-year-old excited about spinach. But Samuels, president and chief executive officer of State of the Art, Inc., believes that accounting software's day in the sun is coming soon.

One reason for Samuels' optimism is the growing involvement of the Big Eight accounting firms — along with many regional accounting companies — in supporting and selling accounting software to corporations. Samuels attributes his firm's rise to among the top two or three accounting software vendors to its association with some 1,650 certified public accountants.

Samuels recently spoke with

David Samuels

Senior Editor Ed Scannell about the current state of the accounting software market and what the future holds.

What is the biggest misconception users have about accounting software?

The biggest misconception is that it is too difficult to learn and operate. There is a fear factor that's not premised on computerised accounting but on the accounting function in general. Many users don't understand the internal accounting function. Their fear is that they aren't organized enough to move into the computerised process, and they are hesitant to make the change until they are.

How can vendors allay those fears?

What we are trying to do is incorporate the public accounting profession into this whole process. We advise end users to work closely with their accounting firms to organise their internal accounting first and foremost, then have their accountants clearly understand our software, so that the process of going from an organized manual system to a well-disciplined computerised one is made easy by the professional whose business is accounting.

Has the way accounting software has been distributed held it back?

Absolutely. Accounting software has been predominantly retail-distributed since 1977. Those that have been charged with the responsibility of selling the applications have not had an understanding of internal accounting and have never been properly trained. Also, accounting software has never been a sexy segment of the software industry.

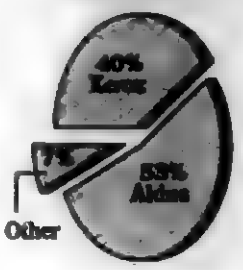
Continued on page 96

Data View

Desktop publishing software

Supplier market share in Fortune 1,000

PERCENT OF SITES



INFORMATION PROVIDED BY COMPUTER INTELLIGENCE

Business Benchmark finds Xenix cruising past OS/2

BY ALAN J. RYAN
CW STAFF

CHICAGO — IBM's OS/2 Release 1.0 may run up to seven times slower than Microsoft Corp.'s Xenix, according to tests by an independent software house last week.

In tests conducted by Neal Nelson & Associates involving 17 types of work and up to 20 concurrent tasks, Microsoft's Xenix — which is The Santa Cruz Operation, Inc.'s Unix Release 5.2.2 with an Intel Corp. 80386 kernel and an 80386 compiler — was faster in 13 cases, with a maximum 700% difference. OS/2 was faster in three cases, with a maximum 85% difference, the firm said.

OS/2, IBM's first multitasking operating system, was jointly developed by IBM and Microsoft and was shipped by IBM Dec. 4.

The tests were conducted using Neal Nelson's Business Benchmark, a multitasking throughput program that measures how a computer slows down under an increasing work load. The tests were conducted on a 2,048K-byte, 16-MHz IBM Personal System/2 Model 80 with a 70M-byte enhanced small device interface disk.

The benchmarking software reportedly measured the computer on different types of work, including both calculation- and disk-intensive tasks. Business Benchmark, available now, prepares a report that shows the relative speed of any two computers in each of the categories through a range of one to 100 simultaneous tasks.

One test compared OS/2 and Xenix for a task that included 16- and 32-bit integer math, function calls, loops and sequential and random disk I/O. OS/2

Continued on page 96

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Accounting tools

CONTINUED FROM PAGE 95

Our products have never received the proper industry attention.

Why?
It is a much harder topic to understand. We are not talking about a single-module spreadsheet application. We are talking about 10- to 13-module integrated accounting systems, where each individual application within that library has hundreds and hundreds of technical accounting capabilities.

What will it take for accounting software to gain more visibility?
For the first time in 10 years, accounting [software] is reaching new levels of visibility. The bottom line is that the pricing is still relatively affordable and the engines [of today's microcomputers] are now powerful enough to support very intensive accounting applications. Also, general economic factors throughout the U.S. have compelled managers to be more attentive to their accounting systems and use accounting information to better manage their businesses.

What have low-cost packages from firms like DAC Software, Inc. done to increase demand?
What DAC has done to stimulate not necessarily demand, but sales, is to sell complete accounting systems for $69. With regard to DAC and the other low-end products, a counterpart of mine a couple of years ago said buying accounting software is like buying gum at the end of the candy counter. When you offer a seven-application package for $69, you haven't created demand, you have created a low-cost option for people to take a look at.

How is accounting software being used in corporations today?
In a Fortune 500 company, you see microcomputers doing departmental accounting with microcomputer-based application software. As you come down from Fortune 500s into the bulk of corporate America, these types of microcomputer applications are responsible for their internal accounting systems.

Xenix

CONTINUED FROM PAGE 95

showed more degradation, as the multitasking activity increased, than did Xenix. Differences ranged from 300% to 600%, with OS/2 always running more slowly than Xenix, according to the firm.

Another test compared the operating systems in a task performing 100,000 calculations with 64-bit double-precision floating-point numbers. Here, OS/2 was faster, with differences ranging from 40% to 50%, the company said.

The benchmark tests involved word processing, electronic mail, spreadsheet, accounting, data base management and programming.

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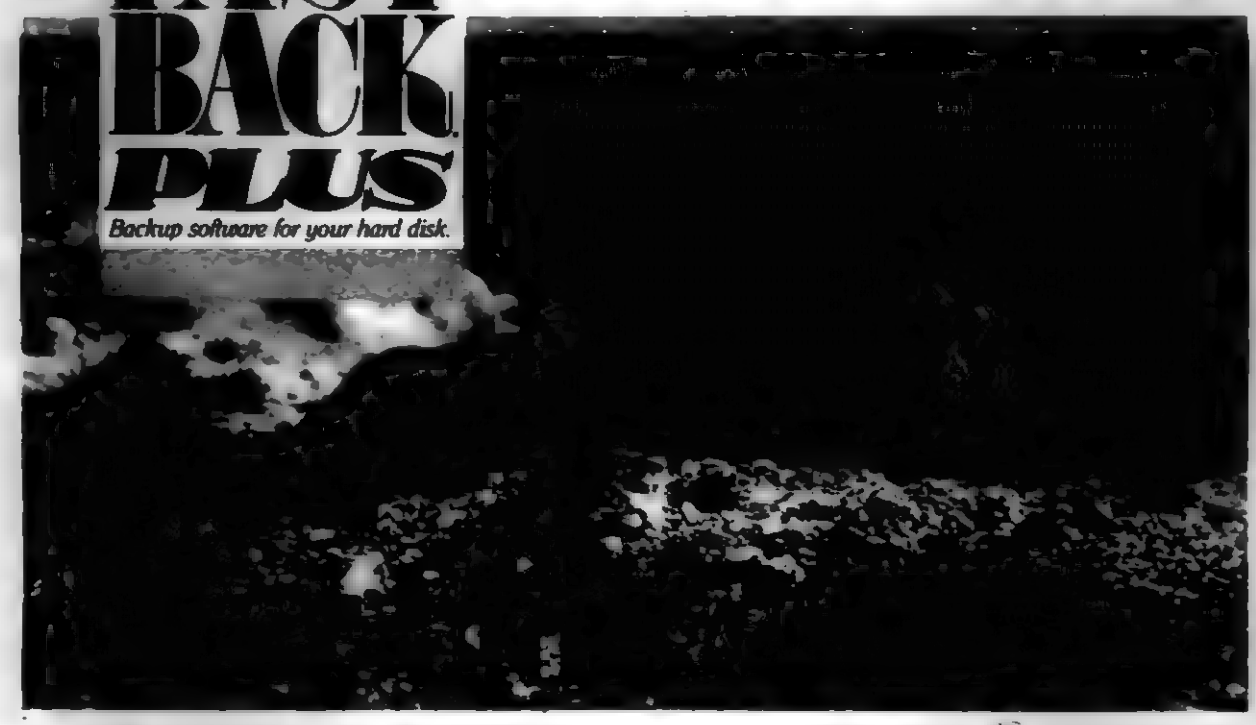

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Zachmann

CONTINUED FROM PAGE 95

old dogs who are willing to learn a few new tricks, much better languages that provide substantial productivity improvements are readily available.

And while you can make a case for alternatives like Pascal, C has some obvious benefits, not the least of which is its inclusion by IBM into Systems Application Architecture (SAA). For information systems professionals working in IBM shops, the mere fact that C carries the SAA blessing and Pascal doesn't is more than enough to carry the day.

The problem, of course, is how to learn the new trick. If your mental model of programming absolutely requires a DATA DIVISION or FORMAT statement, starting to look at things differently can be a real problem. After all, what self-respecting information systems professional wants to be reduced to the status of junior programmer by learning a new language?

Private lessons
Still, the rewards for doing so are enormously compelling. But how do you go about it? Buying a terrific C compiler for personal computers like Borland's Turbo C or Microsoft's Quick C and slogging through the manual will work for some. Great books like those published by Microsoft Press can help too. But for a lot of us, private instruction makes the most sense.

Well, if you promise not to tell anyone, I'll let you in on where I am getting some of that valuable instruction. It is from The C Workshop, an extremely well-done instructional package available from Oakland, Calif.-based Wordcraft for $69.95.

The package includes a Kernihan and Ritchie Standard C compiler, a convenient text editor, on-line tutorial, book and exercises.

Yup. If I were running information systems in a big organization, I think I'd offer a free copy of The C Workshop to anybody on my staff who wanted one and encourage them to learn C. Then I'd be certain to have a newly refurbished and remotivated core of professionals in my organization, ready and eager to build major applications using less costly micro million instructions per second (MIPS) instead of the high-priced MIPS my competitors still rely on.

Zachmann is vice-president of research at International Data Corp.

DATA STREAM

Elisabeth Horwitt

Don't open until . . . ?

What many MIS managers would have liked to see under their Christmas trees this year were real, installable products to help them link their multivendor computing and communications resources into a single, integrated enterprisewide network.

Instead, they got a lot of mysterious packages with tags that read, "Don't open until October 1988," as well as assemble-it-yourself kits with several pieces missing.

Take the Integrated Services Digital Network (ISDN) standard — please. Site trial activity abounded last year, but all it really proved was that existing services can run over ISDN links. Still missing are commercial applications that will convince users to replace their existing lines with ISDN services.

Currently, the industry seems to be trapped in a vicious circle, with service vendors like AT&T and the Bell operating companies saying they don't want to leap into ISDN until there is enough ISDN equipment on the market, while private branch exchange and T1 vendors are holding back on ISDN support until the services are there.

It does not bode well that AT&T reportedly has delayed introduction of its Primary Rate Interface service until the

Continued on page 98

Making tracks to automate

Railway-developed system monitors inventories, speeds yard operations

BY PATRICIA KEEFE
CW STAFF

JACKSONVILLE, Fla. — It's 1 p.m. Do you know where 12 railroad cars filled with machine parts are? Despite varying degrees of automation, some rail companies would not be able to answer that question either accurately or with any great speed.

Not so at CSX Rail Transport, a $13 billion transportation company. The Richmond, Va., firm had the vision to create a high-technology division that developed information processing and networking tools to manage and monitor its operations with far more efficiency.

Led by Bruce Freeman, CSX's high-tech Casey Jones, the division built a custom-designed Terminal Yard Management System (TYMS), a completely automated railcar inventory and management system that speeds rail yard operations — the nucleus of every railroad. One key element of this system is a sophisticated network that provides efficient tracking of cars and goods within the terminal yard labyrinth by quickly communicating accurate information to the railroad switchmen.

The heart of the system

At the heart of CSX's 22,000-route-mile rail network, the TYMS operates on dedicated communications links to an IBM 3090 Model 400 host in an MVS/XA environment. Printers, CRTs and Rabbit Software Corp.'s CTI 5000 controllers are hung off a mix of leased multidrop lines and microwave installations throughout CSX rail yard properties. The TYMS keeps switching crews and equipment operating by providing scheduling instructions from numerous remote printer locations deep within the company's rail or switching yards.

Automation was not a new idea at CSX, but the old system lacked a yard-management function with an integrated data base philosophy. Facsimile machines and stand-alone computing provided some relief by automating information about switching assignments, but this equipment was considered little more than an interim solution. The new TYMS needed to integrate all of the company's transportation systems for data sharing purposes.

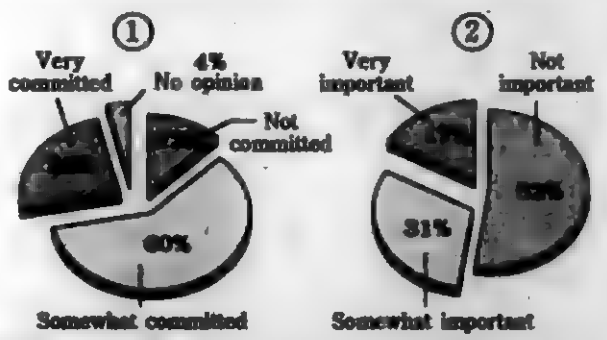
In order for the system to be used as an in-route planning tool, it had to provide data efficiently to the remote boxes deep in the yards. To accomplish this, the

Continued on page 99

Data View

Users evaluate
(1) IBM's commitment to OSI* and
(2) the standard's importance to their firms

Levels of commitment appear to be well matched, based on a survey of 107 IBM Systems Network Architecture customer sites



*Open Systems Interconnect

INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

IBM NET MANAGEMENT

VAX linked to Netview

Systems Strategies, Inc. has announced IBM Netview support for its VAX Link software family, which provides communications between Digital Equipment Corp. VAXs and IBM mainframes.

VAX Link is the first IBM-to-DEC connectivity software to support IBM's centralized network management system, according to Systems Strategies. Any of three new software packages from the New York-based software firm will make a VAX or Microvax appear as a device on an IBM Systems Network Ar-

Continued on page 99

Host links undercut IBM 3737

BY ELISABETH HORWITT
CW STAFF

MINNEAPOLIS — Computer Network Technology Corp. (CNT) has aimed two channel-based host networking products directly at IBM's channel-to-channel product line.

Channelink 5137 provides remote channel-based communications links for one or two hosts at speeds of up to 3M byte/sec., CNT said. The 5137 can handle up to six remote full-duplex links, each of which can support transmission rates of up to 4M bit/sec., according to the vendor.

In contrast, IBM's 3737 can only attach to one mainframe channel locally and provides remote communications with another 3737-equipped mainframe over a single 1.5M bit/sec. T1 link.

The 5137 is said to be able to handle up to 256 concurrent logical application connections between multiple mainframes. It supports T1 and international CEPT industry standards. The device is said to be plug-compatible with IBM's 3737 and support IBM's VTAM channel-to-channel program, so that VTAM applications can run unchanged over a 5137-based network.

Pricing for a 5137 supporting one IBM channel and two high-speed serial links is $45,000, while a 5137 with two IBM channels and two links costs $58,000.

Costs for the 5137-based networks are between 30% and 80% of the cost of a comparable 3737 configuration, CNT claimed. The base price for a

Continued on page 98

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For more information write to Forest Computer Inc., 1749 Hamilton Road, Okemos, MI 48864 or call (517) 349-4700.

forest computer

Horwitt

CONTINUED FROM PAGE 97

second quarter.

One hopeful sign for 1988 is the formation of an organization whose goal is to foster user input into vendors' decisions about which ISDN applications and products to develop first.

Telecom circus

The ISDN hoopla reflects the fact that many heavy hitters have focused their energies on telecommunications. Companies like DEC, IBM and AT&T are racing to extend their network management systems into the telecom world.

IBM has its Netview campaign, and AT&T has Unified Network Management Architecture. DEC, meanwhile, is trying to get PBX vendors to support its Computer Integrated Telephony program and should be announcing its universal network management system early in 1988. As with the ISDN effort, the telecommunications drive is partly an honest attempt to meet the corporations' multivendor networking needs.

These "architectures" and "programs" are still far from providing solid commercial solutions, however. Even IBM's Netview, the furthest along of the management systems, is missing many pieces, particularly for multivendor systems. And both AT&T and DEC's offerings are still on the drawing boards.

Sterile marriages?

MIS managers in a hurry to integrate their multivendor computing and communications resources have looked hopefully at network-oriented matings that started in 1986 and continued through 1987.

Last year, Unisys agreed to acquire Timeplex; Digital Communications Associates acquired network software firm Fox Research (and wooed but lost Ungermann-Bass), and 3Com married Bridge Communications. Also, IBM and Network Equipment Technologies (NET) entered a joint development agreement that could eventually lead to NET's acquisition, sources predict.

The IBM-NET venture, and possibly the Unisys-Timeplex union, should provide intelligent integration of host and T1 networking. 3Com's strengths in IBM Personal Computer networking complement Bridge's multivendor networking thrust, which is based on Transmission Control Protocol/Internet Protocol (TCP/IP) and Open Systems Interconnect (OSI) protocols.

But it may take a while before we see the fruits of these unions. It certainly has taken a long time to see marriages from earlier years produce anything beyond low-level links between their respective systems.

OSI: where's the beef?

OSI has perhaps the feeblest excuse for not achieving more solidity in 1987, since the standard has been in the works for close to a decade. Unfortunately, OSI efforts are still bogged down in the upper layers: Support of the X.400 electronic mail specifications, for example, has been lackadaisical, particularly among service vendors. Other major missing pieces are OSI network management protocols, which will not be ready for at least another couple of years.

Manufacturing Automation Protocol (MAP), an OSI offshoot geared to the factory floor, lost some of its impetus while users and vendors awaited the arrival of Version 3.0 of the specifications. The floodgates should be opened in June with the Enterprise Network demonstration of multivendor interoperability under Versions 3.0 of MAP and its office-oriented sibling, Technical Office Protocol.

Meanwhile, TCP/IP shows no sign of graciously disappearing in favor of OSI. Indeed, vendors have been working together to resolve the de facto standard's long-standing interoperability problems.

This past year has seen a rash of announcements extending the protocol's support to new systems — including IBM's 9370 mid-range system. Maybe that's why the same users who said in a recent survey that they plan to support OSI also said they plan to expand their TCP/IP networks.

OSI HAS PERHAPS the feeblest excuse for not achieving more solidity in 1987, since the standard has been in the works for close to a decade.

Horwitt is a *Computerworld* senior editor, networking.

Host links

CONTINUED FROM PAGE 97

3737 is $72,000, and multiple 3737s must be used to channel-attach multiple hosts.

The Channelink 5188 is said to support simultaneous full-duplex channel-to-channel communications between multiple IBM hosts over local links. Featuring a multiprocessor architecture and 10M bytes of buffer storage, the device can handle between two and eight IBM host channels, CNT said. The 5188 is base-priced at $27,000 for a two-channel host-to-host configuration. In contrast, IBM's 3088 is base-priced at $50,000. Both the 5137 and 5188 are available immediately.

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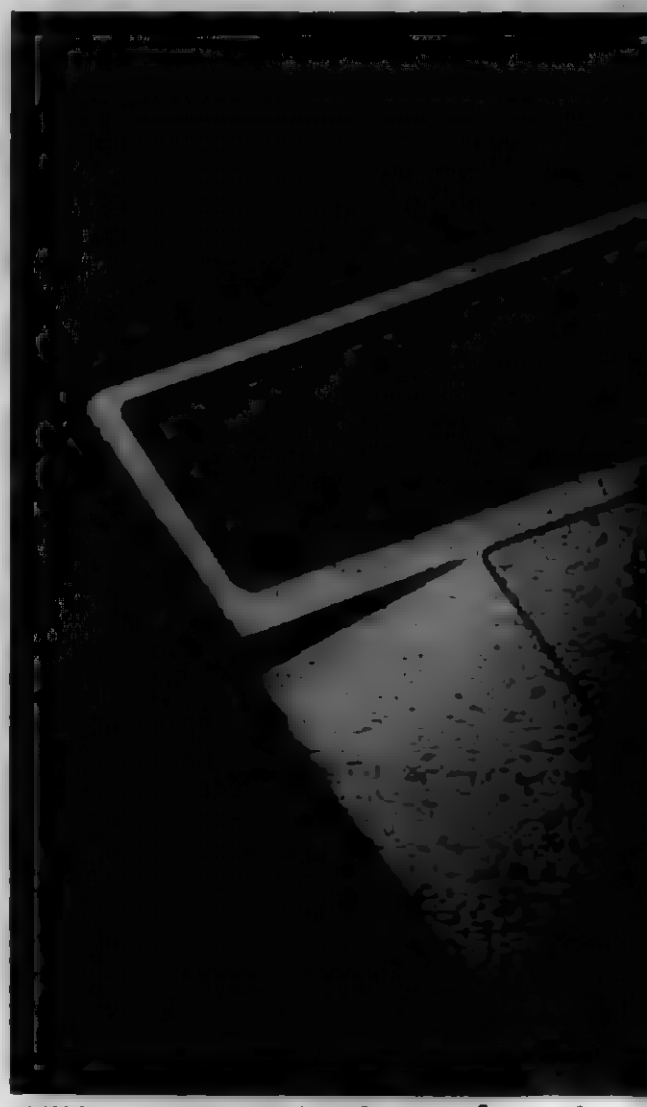

Datability eases PC-VAX retrieval

NEW YORK — Micro-to-mainframe software introduced recently by Datability Software Systems, Inc. is said to make it easier for IBM Personal Computer users to save and retrieve files on a Digital Equipment Corp. VAX-based server.

Remote Access Facility File Access and Control Software (RAF-FACS) embeds itself in popular IBM PC software packages. When a user keys in a request to store or retrieve a file, a screen automatically pops up with a variety of options for locating or storing a document.

System administrators can customise the parameters of the application screen, designating which fields can be used for sorting and retrieving or for storing a document for later retrieval. Documents can be retrieved by company name, project name, security group or key word, according to a Datability representative.

RAF-FACS is provided as an upgrade to Datability's Remote Access Facility, a PC-to-VAX communications software package that is said to allow PCs to maintain up to 14 virtual disks on a VAX. It supports Lotus Development Corp.'s 1-2-3 and Wordperfect Corp.'s word processing software and will be expanded to support others, the company said.

The software is available now and costs $495 for the first 50 copies.

Netview

CONTINUED FROM PAGE 97

chitecture (SNA) network, allowing it to be monitored by an IBM host running Netview, the vendor said. VAX Link will support the Netview/PC interface sometime in the future, according to Systems Strategies.

These following are the three VAX Link programs:

- VAX Link/SNA 3270, which provides DEC systems with on-line access to an IBM host.
- VAX Link/SNA RJE, for batch file transfers between DEC and IBM hosts.
- VAX Link/APPC, which supports peer-to-peer communications using LU6.2, IBM's SNA networking protocol.

BGS Systems, Inc. of Waltham, Mass., has introduced a facility said to collect performance data from SNA software and hardware monitors, passing it directly into BGS's Bestnet Network Performance Management System.

Bestnet Gateway allows MIS managers to collect network data from multiple sources for an overall picture of network performance, the company said. The gateway is said to support non-IBM as well as IBM data sources.

Emcom Corp. and Duquesne Systems, Inc. have entered into an agreement with BGS to develop software components that will pass performance-measurement data through Bestnet Gateway.

The Emcom component will allow the company's NCS 70 users automatically to access and utilize line data for building circuit modeling scenarios. The Duquesne component will provide a similar link for that company's Netspy system.

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Tracks

CONTINUED FROM PAGE 97

facsimile machines in the remote boxes were replaced with printers for easier maintenance and to provide printer alarm/monitoring capabilities. Next, the remote printers needed to be linked back to a wide variety of modems, CRTs, office printers and an IBM 3090 mainframe.

"That was a big enough challenge in itself," Freeman said. "But we had more concerns because we had to provide dial backup. We were adding printers in locations where we did not currently have communications facilities, and we needed to support some means to monitor the status of these remote peripherals."

His solution lay in Rabbit's CTI 5000 workstation controllers, which support RS-232 twisted-pair-based printers using limited-distance modems. The CTI 5000 sounds an alarm when any remote printer is down. A visual signal also occurs on the control panel, indicating the printer port that requires attention.

These monitoring features were crucial for CSX. When crews do not receive switching instructions, negative events mushroom quickly, translating into missed schedules and a breakdown in the level of delivery service that can erode customer satisfaction and cost millions of dollars. The controllers also enable the TYMS to intermix connections for coax terminal and printers, ASCII terminals, printers and modems.

Today, CSX's rail system is made up of 126 major rail yards, or terminals, located in 99 U.S. cities. Currently, 30 rail yards are operating under the company's state-of-the-art TYMS, with each yard using a minimum of two CTI 5000 controllers. Freeman said crews are bringing the balance of CSX's rail yards into the TYMS environment at the rate of between two and six yards per month. Accelerated estimates forecast completion of a system-wide TYMS at all 126 CSX rail yards by the end of 1988.

Initiated in January 1985, the TYMS project has three phases. Today, Phase One — the base switching package — is operational. Phases Two and Three will provide enhancements and interfaces between the TYMS and the company's process control computers at its major switching yards.

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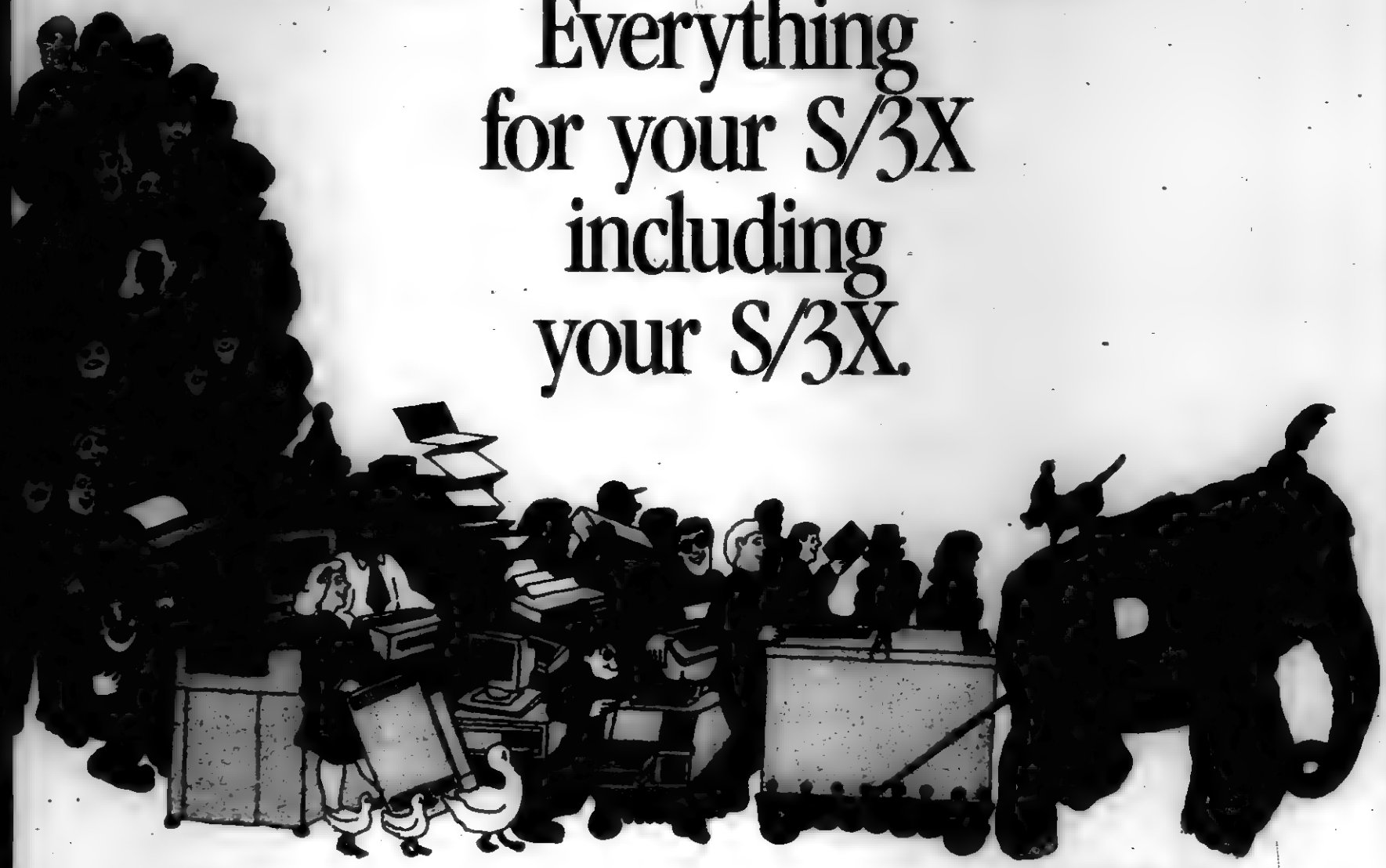

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HARD TALK

Stanley Gibson

Technology marches on

Those who believe that after 40 years, computing is reaching middle age had better reconsider. Presentations at the recent First Boston technology conference show that progress is not slowing up a bit — all signs are that computers will get steadily more powerful and less expensive well into the next century.

The three-day gathering in Boston showcased some 90 high technology firms, from obscure start-ups to IBM.

One field that continues to attract investors' attention is the near-supercomputer market, which has been fertile start-up territory for the past few years. That niche, already somewhat loosely defined, is expanding both upward and downward.

Saxpy Computer claims its "matrix supercomputer," which will ship in the first quarter of 1988, will offer performance above that of a supercomputer. Its price will be in the departmental computer range, the vendor says, despite its embedded departmental computer, a DEC VAX. It sounds like either the supercomputer or the VAX is being thrown in free.

Continued on page 102

Wang takes promised first step

High-end dual-CPU VS 7320 gives users 1.9 times more performance

BY JAMES CONNOLLY
CW STAFF

LOWELL, Mass. — Wang Laboratories, Inc. is taking its long-promised first step into multiprocessing with a high-end dual-CPU VS 7320 minicomputer.

The introduction, which was scheduled for Dec. 28, is intended to provide Wang VS 7310 users with a growth path to a system that offers 1.9 times more performance. The vendor had promised the VS 7320 would be announced by the end of 1987 when the VS 7310, a uniprocessor with room for a second CPU, was introduced in January 1987.

The VS 7320 features tight coupling and symmetrical processing, under which both CPUs run tasks autonomously while sharing memory and other system resources. Wang claimed the VS 7320 can perform up to 255 concurrent tasks and support 192 workstations, which is the architectural limit of the VS operating system.

Gerry Paul, vice-president for systems in Wang's research and development group, said that despite the increased performance, Wang is focusing the VS 7320 on commercial processing rather than the technical arena.

"Number one, we see it being used by our existing users who are growing their applications and growing their number of users and, number two, new customers who need a machine of this power," Paul said.

Truly symmetrical

Paul said the VS 7320 is a true symmetrical system in which both CPUs can run the operating system and applications and in which neither CPU acts as a master in assigning tasks.

Wang said the El Paso Natural Gas Co. in El Paso, Texas, recently began the first field tests on the VS 7320. Officials for the gas company said they chose the system for its ability to handle large numbers of CPU-intensive calculations in a gas well accounting application. General availability is scheduled for third-quarter 1988.

The VS 7320 can be configured with 16M or 32M bytes of memory and with 32K bytes of cache memory per CPU. Prices start at $350,000, with the 32M-byte model costing $390,000. A VS 7310-to-VS 7320 upgrade costs $125,000.

Wang declined to rate the VS 7320 in millions of instructions per second (MIPS). However, if the VS 7320 proves to be 1.9 times more powerful than the VS 7310, it would be rated at about 6.4 MIPS, based on Wang's performance claims.

DataView

Most fitting

Users say NCR Tower is most often the correct minicomputer in minicomputer vendors' original proposals

NCR Tower	94
Concurrent Computer Series 3200	93
AT&T 3B5/15/20	92
Honeywell DPS 6	92
DEC PDP-11	91
IBM System/36	91
MAI Basic Four	10
DEC Microvax	9
Hewlett-Packard HP 1000	6
Harris H Series	5
Apollo Domain System	50
DEC VAX 8600, 8650	29
IBM System/38	25
Unisys System 80	20

INFORMATION PROVIDED BY DATAPRO RESEARCH CORP.
CW CHART

CSPI offers VMEbus processor

BILLERICA, Mass. — CSP, Inc. (CSPI) recently expanded its focus from offering array processors for Digital Equipment Corp. systems to offering those array processors for use with Motorola, Inc. VMEbus-based systems.

CSPI's Quickcard is a single-board array processor that performs 32 million floating point operations per second (MFLOPS). Quickcard features seamless programming for VMEbus-based systems in the Fortran-77 and C languages.

The company's previous product, the Mini-Map array processor, was designed for use with DEC PDP-11, VAX and Microvax systems.

Target audience

CSPI said it expects the VMEbus-based Quickcard to be targeted at areas such as seismic processing, medical imaging, beam forming and real-time signal processing.

Each dual-height, dual-depth Quickcard is available with 128K or 512K bytes of memory, the vendor said.

Up to four Quickcards can plug into the VMEbus card cage to provide up to 2M bytes of memory and 128 MFLOPS. Quickcard is dual-ported to permit concurrent I/O and processing.

Quickcard for VMEbus-based systems costs $9,500.

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Cumulus terminal digs at Hewlett-Packard user lode

HCT display emulates HP's 2392/A, 2394/A and is compatible with 700/90 series

PALO ALTO, Calif. — Cumulus Technology Corp. targeted the Hewlett-Packard Co. user community last month with a 15-in. diagonal alphanumeric display terminal.

The HCT display emulates HP's 2392/A and 2394/A terminals and is compatible with HP's 700/90 series of terminals. According to a company spokesman, it is suitable for block-mode and forms-cache applications.

The terminal features a paper-white flat-display screen, a 13- by 16-char. matrix and a 75Hz refresh rate that virtually eliminates flicker, according to the spokesman.

Other features include 80- or 132-col. display, dynamic focusing for avoiding distortion near the edges of the screen image, dual printer ports, built-in tilt-and-swivel and an HP 2394 A-compatible keyboard.

Desktop features built in

Also provided are built-in desktop accessories, including a calculator, calendar, personal file system, notepad and on-line Help. Eight pages of nonvolatile memory and 16K bytes of display memory are standard.

According to the spokesman, display performance is enhanced by the use of very-large scale integration technology that reduces heat and power consumption and requires fewer parts than HP terminals. A sleep mode automatically shuts down the terminal's circuitry after it has been inactive for a period of time, he said.

Cumulus's HCT display terminal, which is priced at $795 and is available now, comes with a limited five-year warranty.

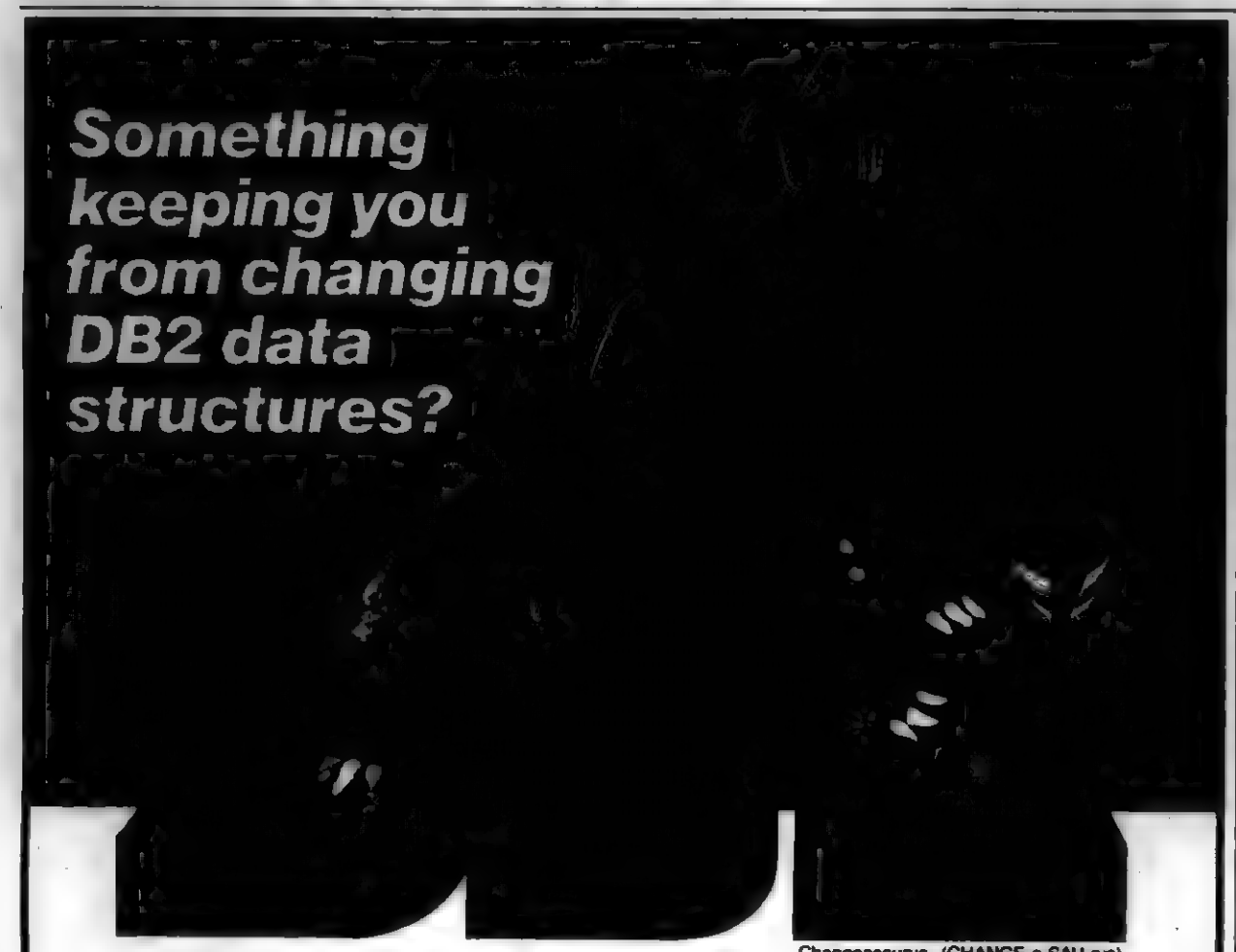
NCR ITX adds compact disk

DAYTON, Ohio — NCR Corp. recently added a compact disk subsystem for use with its ITX series of mid-range systems.

The NCR 6092 subsystem, including the disk controller, one or two disks and all internal cables, was designed to fit in a cabinet that measures 13½ by 19½ by 5 in.

Intended for use with the NCR 9300IP, 9400IP and 9500 systems, the NCR 6092 is available with 133.7M or 267.4M bytes of formatted storage, officials said.

Available now, the single-disk 133.7M-byte model costs $8,205. The two-disk 267.4M-byte model costs $11,900.



Changeasaurus—(CHANGE-a-SAU-rus)

It's not that you can't make a change; it's what happens when you do make a change. Changeasaurus, that jealous guardian of the DB2 catalog, is dangerous when provoked. Because of the demands of Changeasaurus, DBAs have spent upwards of 50% of their time battling complex change procedures.

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Gibson

CONTINUED FROM PAGE 101

Stellar Computer will soon announce a graphics supercomputer in workstation form, or what it calls a "personal supercomputer." The processor will do 25 to 30 million instructions per second, 40 million floating-point operations per second and have 100M bytes of memory, the vendor claims.

Others, such as Multiflow Computer and Scientific Computer Systems, are aiming for the more traditional near-supercomputer, or "Crayette," market.

No competition in sight?

As is to be expected, the entrepreneurs of these companies are bubbling over with optimism. Each boldly asserts there is no competition in the niche he is targeting. Experience shows, however, that some niches do not materialise, while others shrink up or disappear.

Nonetheless, it is clear that users are about to have computing choices as never before.

While entrepreneurs are developing new computing concepts and architectures, the establishment — IBM — is making advancements of its own.

"In the next decade, you're going to see tremendous technical progress," declares Pat Toole, vice-president of IBM's Information Systems Division and a member of IBM's corporate management board. He claims that IBM is now filing for 16 patents per day.

Toole says users can anticipate the introduction of the 4M-bit chip running at 65 nsec in the near future. Meanwhile, he says, a 16M-bit chip is on the horizon.

Toole went on to say that 64M- and 256M-bit chips will be able to be made from silicon and current photolithography techniques. After that, photolithography will cease to be adequate. But the Thermal Conduction Module, the heart of IBM's mainframe line, will last as long as silicon is used, according to Toole.

So what could be better? In both new and established computing architectures, improvements are being made at a steady rate. The only limitations would seem to be those of our imaginations in putting the new technology to use.

Gibson is a Computerworld senior writer.

COMPUTER INDUSTRY

INDUSTRY INSIGHT

Clinton Wilder

In the name of justice

We may never know whether IBM now regrets its decision to submit its software licensing differences with Fujitsu to the binding arbitration process. But if it does, the boys from Big Blue should stop gnashing their teeth for a moment and look at the position in which former equity partner Intel now finds itself.

A little more than three years after it first filed a microprocessor copyright infringement suit against NEC, Intel is back at square one. And 15 months and Lord knows how many millions of dollars in legal fees after receiving a favorable ruling in the case, Intel gets to start all over again. All because the judge in the case owned $82 worth of Intel stock.

The intent here is not to argue the legal or ethical merits of NEC's successful challenge to U.S. District Judge William A. Ingram after his stock ownership was disclosed several months ago. It is simply to point out the potential legal labyrinth that can entrap high-tech companies seeking restitution, retribution or justice through the courts.

It's ironic that a case that was supposed to drag on because of the intricacies of microcode will now continue for at least two more years because a judge overlooked a tiny part of his investment portfolio. It is difficult

Continued on page 104

Prime's takeover bid lauded

Proposed Computervision buy-out would create $1.5B CAD/CAM giant

BY ROSEMARY HAMILTON
CW STAFF

NATICK, Mass. — Prime Computer, Inc.'s effort last week to carve out a larger stake in the computer-aided design and manufacturing (CAD/CAM) field through a hostile takeover bid for Computervision Corp. was warmly embraced by analysts and some of Prime's current customers.

Computervision, the CAD/CAM industry pioneer that fell on hard times in 1985 and has slowly been making a comeback, did not immediately reject Prime's offer to pay $391.5 million for the company. However, Computervision President and Chief Executive Officer Robert L. Gable issued a statement that he has previously "rejected the idea that there was a technical fit between the companies."

Computervision moved to have a Delaware court affirm the validity of an antitakeover plan approved by stockholders last February that, if invoked, could significantly increase the price Prime would have to pay to complete the buy-out.

The proposed takeover would create a $1.5 billion company with more than half its sales realized from CAD/CAM and related markets. One market research firm said the merger would result in Prime becoming the second largest vendor of CAD/CAM products, behind IBM; another firm with a broader interpretation of the market said Prime would jump from eighth place in the market to third, behind Digital Equipment Corp. and IBM.

In an interview last week, Prime CEO Joe Henson said the takeover attempt comes after "repeated attempts to do this in a friendly manner."

The stock market reacted positively, bidding up Computervision's stock by more than $4 last Monday.

However, Timothy McCollum, a vice-president at Dean Witter Reynolds, Inc., said that while Prime's business system users should not be affected by the proposed merger in the short term, it could present a problem to them in the future.

Prime "could end up focusing too much on the CAD/CAM business," McCollum said. "It's something to watch out for."

If Prime were to concentrate all its resources in the CAD/CAM area, it "might tend to neglect the non-CAD/CAM user," said Louis Bergsagel, assistant data processing manager at Pacific Water Works in Seattle, where Prime systems are used for office automation and data processing. But Bergsagel said he is more inclined to believe that a larger market share for Prime would benefit all users.

At Philadelphia-based Sandmeyer Steel Co., where Prime systems are used for a variety of business applications and some CAD, data processing manager David Caldwell welcomed the idea of a Prime-Computervision union. Such a union "could mean a lot to us if it goes through," and reliance on Prime as primary

Continued on page 104

Data View

DG's hardware woes

A 6.7% decline in equipment sales in the last two years has kept Data General's revenue flat

INFORMATION PROVIDED BY DATA GENERAL CORP.
CW CHART

Retrial for Intel suit

BY JAMES A. MARTIN
CW STAFF

SAN JOSE, Calif. — The federal judge presiding over Intel Corp.'s lawsuit against NEC Home Electronics, Inc. has disqualified himself from presiding over any future hearings and vacated his landmark 1986 decision that computer chip microcode can be copyrighted as

Continued on page 104

Chen, IBM to become partners

BY CLINTON WILDER
CW STAFF

WHITE PLAINS, N.Y. — The first IBM supercomputer moved a major step closer to reality with IBM's recent announcement of a partnership with the company founded in October by former Cray Research, Inc. systems designer Steve Chen.

In its first-ever equity investment in a start-up, IBM will take a minority interest in Supercomputer Systems, Inc. that will basically launch that company. A small group of IBM designers will be assigned to work with Supercomputer Systems to develop an advanced supercomputer. That product will carry the Supercomputer Systems name but will be jointly marketed by Eau Claire, Wis.-based Supercomputer Systems and IBM, according to an IBM spokesman.

"It has always been IBM's intention to be a supercomputer vendor in the long term," said Gary Smaby, a vice-president of Minneapolis investment firm Piper, Jaffray & Hopwood, Inc. "This is truly a unique relationship for IBM, and no company in the supercomputer business should take it lightly."

Although the Supercomputer Systems machine is expected to have a development cycle of about five years, the pairing of Chen's technical talent and IBM's marketing muscle could pose a threat to market leader Cray, analysts said.

"Cray has always said that their long-term competition will be NEC Corp. and IBM," said Jeffry Canin of Hambrecht & Quist, Inc.

ADR cofounder Goetz resigns

BY ALAN ALPER
CW STAFF

PRINCETON, N.J. — Martin Goetz, cofounder and senior vice-president of Applied Data Research, Inc. (ADR), has resigned to become chief executive officer of Syllogy Corp., a small, privately held systems software firm in Hackensack, N.J.

Goetz's departure was not unexpected, observers said, citing his diminished role at ADR since its acquisition by Ameritech in late 1985. In 1986, Goetz relinquished ADR's presidency to Dennis Strigl, an executive from an Ameritech sister company, to become chief technology officer.

"Clearly, it's not surprising that this happened," said Ken Burke, a software analyst with Alex Brown & Sons, Inc. in Baltimore. "It suggests to me that he was not perfectly comfortable in the new role within the context of a large operation."

Goetz will move to Syllogy at the end of January. In an interview after his announcement, Goetz said he was looking forward to "rolling up my sleeves" at Syllogy and working in a more entrepreneurial environment.

The 25-member firm was started six years ago by Stan Rintel, a cofounder of Syncsort, Inc., and Azra Sasson, a coholder of that company's Syncsort patent. Rintel will remain president of Syllogy, while Sasson will continue as senior vice-president of development.

Goetz said he became uncomfortable with his "advisory role" at ADR because it did not allow him to influence ADR's strategic direction.

Goetz, 57, is considered the driving force behind ADR's technological efforts. With John Bennett, ADR's chief executive officer who recently retired [CW, Dec. 14], Goetz is credited with building ADR into a potent force in the mainframe systems software business. He ran the firm's software product division from its inception in 1968 until being named president in 1984.

"There's never a good time to lose a guy like Marty Goetz," Strigl said, "but we're doing well, and Marty wanted to get back to a position where he had hands-on control of R&D, sales and marketing."

Syllogy, which had revenue of about $1 million in its fiscal year ended Oct. 31, is making a transition from a consultancy to a product-oriented company. The firm recently released its first product, a package that compiles individual changes rather than every instruction in a program [CW, Dec. 14].

Goetz said he hopes to remain involved in systems software development for a long time.

"I want to be like this guy I just read about at J. C. Penney's, who stayed active in the field till he was 90," he concluded.

Intel suit

CONTINUED FROM PAGE 103

intellectual property.

In a Dec. 18 memorandum, U.S. District Judge William A. Ingram said that because of the $82 worth of Intel stock he unwittingly held at the beginning of the hearings, he would disqualify himself from any past and future decisions in the case. As a result, Ingram's September 1986 ruling that microcode, like software programs, was intellectual property and therefore protected by copyright laws [CW, Sept. 29, 1986] must be reconsidered by another federal court in 1988.

Most analysts, however, said they think another judge will reach the same conclusion. "The original ruling was sound, and when it's retried, microcode will again be confirmed as proprietary," said Drew Peck, a semiconductor analyst with Donaldson, Lufkin & Jenrette, Inc.

NEC counsel Linnet C. Harlan said his company is hoping for a different ruling from the next judge because Ingram did not review new evidence concerning NEC's "clean room" microcode development process before the disclosure of his Intel stock. A clean room development environment is said to protect developers from accidentally or intentionally duplicating another's software codes or microcodes.

The U.S. District Court will assign another judge to hear evidence in a new trial expected to begin in three to six months.

Posner to cut Borland ties

Ron Posner, a former Ashton-Tate Corp. and Ansa Software executive who joined Borland International, Inc. in July when it bought Ansa, will sever all ties with Borland.

Posner was quoted last week as saying his mission to integrate the Ansa and Borland sales forces is complete and that he may explore new challenges with venture capital-funded software start-ups.

Wilder

CONTINUED FROM PAGE 103

enough to get an arcane technology dispute resolved before that technology is obsolete in the marketplace. But in the NEC-Intel case, microprocessor technology has taken a backseat to legal technicality.

What next?

What will be the next delay? The court stenographer's dog ate the transcript?

The NEC attorneys, one supposes, were simply doing their job. In corporate law, the game is to win for your client, not necessarily to keep the wheels of justice spinning. And that is why the system can be so frustrating and inadequate for resolving computer vendor disputes.

Even before Ingram removed himself and voided all of his prior actions last month, Intel had already become frustrated enough to seek alternate action. The Santa Clara, Calif., chip maker went to the U.S. Customs Service requesting confiscation of the NEC V series microprocessors in dispute.

Customs refused the request. But even if Intel had won, it would have opened another legal can of worms concerning a federal court's jurisdiction over a federal regulatory agency. What fun.

Whether the arbitration path that IBM and Fujitsu elected would have been appropriate for NEC and Intel is hard to say; the cases involve legal issues as disparate as the difference between source code and microcode. But even if IBM is secretly appalled — and crying all the way to the bank — because Fujitsu will see parts of its source code, one has to think that IBM and Fujitsu are in a much better position than their respective counterparts in the U.S. and Japan.

Early in 1987, a column ran in this space titled "The year of the lawyer" [CW, March 2]. Ingram's resignation from the NEC-Intel case — and the prospect of two more years of proceedings — made for a fitting end to it.

Wilder is Computerworld's senior editor, computer industry.

Prime

CONTINUED FROM PAGE 103

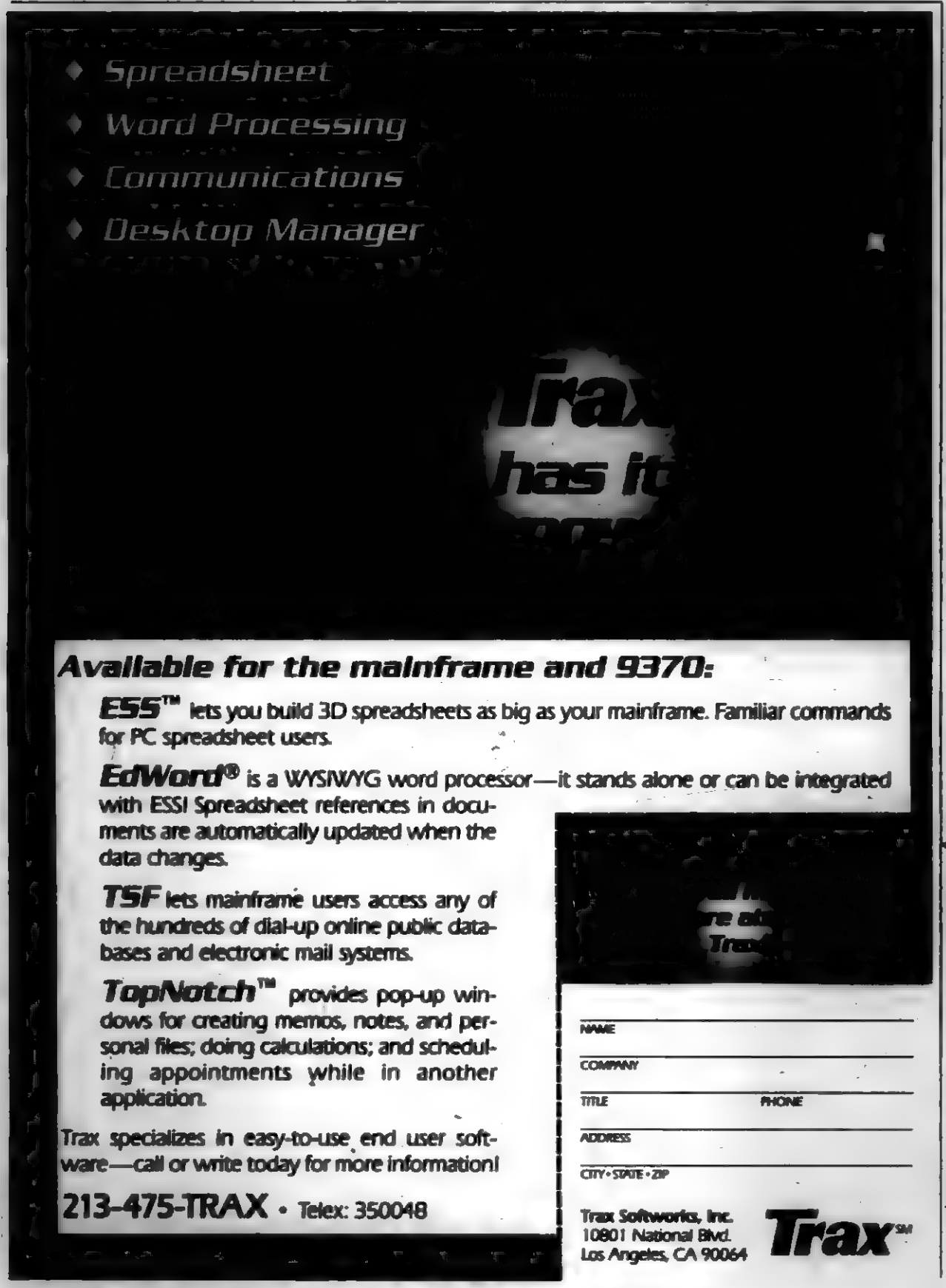
CAD supplier would be a distinct possibility, Caldwell said.

The proposed acquistion would bring Computervision stockholders $13.50 per share, according to the initial Prime offer. That price is 40% greater than what Computervision stock was trading for prior to the offer.

Henson would not say whether Prime will offer a higher price if Computervision rejects the initial offer, but he added that Prime "will consider the substance of their communications."

Both Prime and Computervision's CAD/CAM customers should benefit from the deal, analysts said. "Computervision customers will get a vendor that's much more stable," while Prime customers will realize greater options from their vendor, said Charles Foundyller, president of Daratech, Inc., a CAD/CAM market research firm in Cambridge, Mass.

Senior writer Nell Margolis contributed to this report.



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MANAGEMENT

TAKING CHARGE

David Ludlum

The plot thickens

The year 1988 will see the corporate chain of command stepping up its pressure for information systems managers to think and act like general business managers rather than technologists.

Economic uncertainty will undoubtedly spur management's drive to find more efficient and effective uses for all corporate resources, including information systems.

Market research is just one example of a function crying for a melding of business and technical acumen.

Who's doing what

An interesting thing to look for as the year unfolds is whether it will be more common for MIS managers to assume broader business roles or general managers to gain control of MIS organizations.

Some say MIS executives have an advantage in assuming broader business roles because of their exposure to various departments and the departments' interactions. But others are skeptical about the extent to which MIS executives will encroach on other business

Continued on page 108

Management by motivation

Westinghouse's Hodgson fosters friendly team approach

BY ELISABETH HORWITT
CW STAFF

W. Edward Hodgson is one MIS executive who can truly claim that his door is always open — because he has no door. The head of computer and communications operations at Westinghouse Electric Corp.'s Morristown, N.J., computer center, Hodgson's cubicle is indistinguishable from those that surround it. He habitually trades barbs with engineers and systems programmers over the walls of adjoining cubicles.

Hodgson's ongoing, easygoing interactions with his staff epitomize the management style he has used to motivate some sweeping changes in communications and computer operations both at Westinghouse and at a growing number of other companies.

The key word is "motivate;" Hodgson gets things done not by forcing his views on people or riding herd on subordinates but by convincing them that going along with his plans is in their own best interest.

Hodgson's primary means of eliciting enthusiasm from his staff is to make them feel like full participants, not just followers, in his schemes.

A family type

"He gave us the project" of improving systems availability, says Ron Dessi, a senior communications engineer who has worked with Hodgson for eight years. "He gives us assistance when we need it, but he doesn't dictate. He's the friendliest manager I've worked for — a family environment-type person."

Westinghouse communications engineer Hank Barletta agrees. "He only pushes when he needs to," he says. "He says, 'You're on your own' and 'Do it the best way you think' a lot."

On the other hand, Hodgson will not hesitate to push — or even yell — if that is what it takes to get people to join one of his projects. "I'm outspoken. If people resist, I'll threaten them bodily," he jokes.

Hodgson's strong belief in group participation may stem from his family background — he is the oldest of nine children. "We are all friends, and we all show up at reunions," he says.

Hodgson has been at Westinghouse since 1956, when he arrived from IBM. In 1982, when he took over computer and communications operations at Westinghouse's Livingston, N.J., computer center, which has since moved to Morristown, Hodgson made improved service availability a top priority. Although Westinghouse is a 24-hour seven-day-a-week operation, data center services were only available 80% of the time. Hodgson set a goal of 99%-plus availability and reached it through several innovative measures.

PROFILE
W. Edward Hodgson

Position: *Manager for computers and communications, Westinghouse's Morristown, N.J., computer center.*

Mission: *Motivating and training staff; bringing users into network standards efforts.*

One of the most effective was a "pay-for-skills" program. A lot of system downtime resulted from programmers not knowing how to handle routine problems, Hodgson says. "They sat around with their hands in their pockets, waiting for a systems operator to

Continued on page 107

Ex-MIS chief enjoys life as an entrepreneur

BY ROSEMARY HAMILTON
CW STAFF

As 1987 came to a close, Niels Schulz, an MIS director turned business owner, could reflect on three years of some hard-learned lessons. But he has no regrets.

Schulz recently passed the three-year point after launching the Wethersfield, Conn.-based Info-Point Corp., which offers consulting services to users of Hewlett-Packard Co. hardware. For Schulz, Info-Point's beginning marked the end of a 21-year career in MIS and the start of an education in running a business.

Niels Schulz

Schulz says he had toyed with the idea of opening his own firm for many years. When he finally took the plunge, he and his staff faced some initial problems, but he says they have made the necessary adjustments to the business world.

The biggest hurdle was selling. "From an intellectual standpoint, we understood it, but we had never done it," he says of his staff, all of whom had worked in MIS. "In the first year, I think we gave away as much as we sold."

Continued on page 108

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CALENDAR

JAN 10-15

77th Annual National Retail Merchants Association Convention. New York, Jan. 10-13 — Contact: Registrar, NRMA, c/o Geary Conferences, Inc., P.O. Box 3018, Frederick, Md. 21701.

International Symposium and Exposition on Electronic Imaging Devices and Systems '88. Los Angeles, Jan. 10-15 — Contact: Society for Imaging Science and Technology, 7003 Kilworth Lane, Springfield, Va. 22151.

Neural Network Applications Conference. Los Angeles, Jan. 11-12 — Contact: Russell Webb, Institute for International Research, Inc., Suite 1212, 310 Madison Ave., New York, N.Y. 10017.

10th Annual Conference on Computer Graphics. San Diego, Jan. 13-15 — Contact: Carol Every, Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

Designing the Debit Card Account. Miami, Jan. 13-15 — Contact: Linda Munby, Meeting Coordinator, Electronic Funds Transfer Association, Suite 1000, 1726 M St. N.W., Washington, D.C. 20036.

Strategic Planning for New Technologies: The Role of the Planner in the 1990s. New York, Jan. 15 — Contact: Aida Rivera, Executive Programs, 1221 Avenue of the Americas, New York, N.Y. 10020.

Amiexpo. Los Angeles, Jan. 16-18 — Contact: Amiexpo, Suite 303, 211 E. 43rd St., New York, N.Y. 10017.

JAN 17-21

Third Conference on Hypercube Concurrent Computers and Applications. Pasadena, Calif., Jan. 19-20 — Contact: Patricia McLane, Jet Propulsion Laboratory, MS 180-305, Pasadena, Calif. 91109.

1988 Optical Disk Systems Conference. Phoenix, Jan. 20-22 — Contact: Jean O'Toole, CAP International, One Snow Road, Marshfield, Mass. 02050.

Third Annual Technology in The Law Practice: The Lawyer's Personal Workstation. Dallas, Jan. 20-22 — Contact: The Conference Desk, Inc., 3701 Fairmont St., Dallas, Texas 75219.

Military and Space Graphics: New Applications and Future Requirements. Cape Canaveral, Fla., Jan. 21 — Contact: Tanya Wilson, National Computer Graphics Association, Suite 200, 2722 Merrilee Drive, Fairfax, Va. 22031.

JAN 21-30

Conference on Interactive Videodisk Systems. Clearwater, Fla., Jan. 24-26 — Contact: Institute for Graphic Communication, Inc., 375 Commonwealth Ave., Boston, Mass. 02115.

The Desktop Communications Conference. Anaheim, Calif., Jan. 25-27 — Contact: Infonetics, Inc., Desktop Communications Conference, Suite 100, 3235 Kifer Road, Santa Clara, Calif. 95051.

Measuring Quality and Productivity in a Data Processing Environment. Orlando, Fla., Jan. 25-27 — Contact: Quality Assurance Institute, 9222 Bay Point Drive, Orlando, Fla. 32819.

Communications Networks '88. Washington, D.C., Jan. 25-28 — Contact: IDG Conference Management Group, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

Florida Instructional Computing Conference. Kissimmee, Fla., Jan. 25-28 — Contact: McRae and Co., P.O. Box 12187, Tallahassee, Fla. 32317.

Second Annual Conference on Improving Productivity in EDP System Development. Tucson, Ariz., Jan. 25-29 — Contact: Applied Computer Research, Inc., P.O. Box 9280, Phoenix, Ariz. 85068.

DB2/SQL Users Group Meeting. New York, Jan. 26 — Contact: DB2/SQL Users Bulletin, Box 580, Wall St. Station, New York, N.Y. 10005.

JAN 31-FEB 6

Financial Investment Management Exposition & Conference. Los Angeles, Feb. 2-3 — Contact: FIM-West, P.O. Box 4440, New York, N.Y. 10163.

Society For Computer Simulation: Multiconference. San Diego, Feb. 3-5 — Contact: SCS, P.O. Box 17900, San Diego, Calif. 92117.

Strategic Planning for New Technologies: The Role of the Planner in the 1990s. Chicago, Feb. 5 — Contact: Aida Rivera, Executive Programs, 1221 Avenue of the Americas, New York, N.Y. 10020.

FEB 7-13

Building an Effective Standards Program. Orlando, Fla., Feb. 8-10 — Contact Quality Assurance Institute, 9222 Bay Point Drive, Orlando, Fla. 32819.

International Conference on Computers and Law. Santa Monica, Calif., Feb. 8-10 — Contact: Michael Krieger, ICCL 88, P.O. Box 24619, Los Angeles, Calif. 90024.

Focus on Operations-VIII: Profile of the Professional. Las Vegas, Feb. 8-11 — Contact: International Association for Computer Operations Managers, 742 E. Chapman Ave., Orange, Calif. 92666.

Data Storage Interface Week. San Jose, Calif., Feb. 8-12 — Contact: Technology Forums, Suite 280, 80 W. 78th St., Chanhassen, Minn. 55317.

CAP '88 Conference and Exhibition on Desktop and Workstation Publishing Systems. Washington, D.C., Feb. 9-11 — Contact: Computer Aided Publishing, Suite 200, 90 W. Montgomery Ave., Rockville, Md. 20850.

Usenix Technical Conference. Dallas, Feb. 9-12 — Contact: Usenix Conference Office, P.O. Box 385, 16051 Pacific Coast Highway, Sunset Beach, Calif. 90742.

Second Conference on Applied Natural Language Processing. Austin, Texas, Feb. 9-12 — Contact: Donald Walker, Bell Communications Research, MRE 2A379, 445 South St., Morristown, N.J. 07960.

Interex Computing Management Symposium. Anaheim, Calif., Feb. 10-13 — Contact: Interex Conference Department, 680 Almanor Ave., Sunnyvale, Calif. 94086.

FEB 11-20

Bruno Blenr 88, The 14th IBM-Compatible Exposition & Conference. New York, Feb. 16-18 — Contact: Susan Werlinich, Expocomm International, Inc., 3 Independence Way, Princeton, N.J. 08540.

Specscon '88. Paris, Feb. 18-19 — Contact: IDG Conference Management Group, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

FEB 21-27

11th Annual Personal Computing Forum. Naples, Fla., Feb. 21-24 — Contact: Sylvia Franklin, Adventure Holdings, 375 Park Ave., New York, N.Y. 10152.

The 10th Annual Electronic Printing Systems Conference. San Jose, Calif., Feb. 21-25 — Contact: S. Thomas Dunn, EPS '88 Conference Chairman, Suite 1, 1855 E. Vista Way, Vista, Calif. 92084.

LOCAL HAPPENINGS

FOR THE EAST

Northport, N.Y., Jan. 12. Data Processing Management Association (DPMA), Suffolk County Chapter. Local Area Networks, with The Computer Station. Windjammer Restaurant, Rt. 25A. 6 p.m. Contact: Monika Mac Lean, Suffolk County DPMA, 257 Depot Road, Huntington Station, N.Y. 11746.

New York, Jan. 13. Association for Women in Computing, New York Chapter. Documentation for Hardware and Software panel discussion. Manufacturers Hanover Trust Co., 270 Park Ave. 5:30 p.m. Contact: AWC, P.O. Box 2293, Grand Central Station, New York, N.Y. 10163.

Harrisburg, Pa., Jan. 13. Association for Systems Management (ASM), Central Pennsylvania Chapter. Local Area Networks, with Thomas Slick of Taico, Inc. O'Hara's Restaurant. 5:30 p.m. Contact: Mark Anderson, 800 Acri Road, Mechanicsburg, Pa. 17055.

Boston, Jan. 18. Society for Management of Professional Computing. Digital Equipment Corp. Directions in Distributed Computing. Anthony's Pier 4. 11:45 a.m. Contact: SMPC, 715 Boylston St., Boston, Mass. 02116.

SOUTHEAST

Chamblee, Ga., Jan. 12. ASM, Atlanta Chapter. Data Planning Concepts, with Barbara Helmer of Data Architects. Holiday Inn Chamblee-Dunwoody, 4386 Chamblee-Dunwoody Road. 5:30 p.m. Contact: Jane Roberts, HBO & Co., Suite 1000, 1 Ravinia Drive, Atlanta, Ga. 30346.

Charlotte, N.C., Jan. 21. ASM, Queen City Chapter. Managing for the Future, with Robert E. Roberson of the University of South Carolina. Cosmos Steak House, 5100 E. Independence Blvd. 6 p.m. Contact: Robert Yearwood, Metro Information Services, Suite 140, 7 Parkway Plaza, Charlotte, N.C. 28217.

Lafayette, La., Jan. 21. DPMA, Acadiana Chapter. Monthly meeting. Evangeline Steak House, Highway 167 S. 6:30 p.m. Contact: Debra Billaud, Guaranty Bank and Trust Co., 4th Floor, 200 W. Congress, Lafayette, La. 70502.

MIDWEST

Des Moines, Iowa, Jan. 11. ASM, Des Moines Chapter. Assertive/Aggressive/Passive Communication, with Kay Prihoda of Growth Systems. Howard Johnson Inn, Merle Hay Road. 5 p.m. Contact: Joleen Montag, Integrated Resources Life Insurance Co., 3737 Westown Pkwy., West Des Moines, Iowa 50265.

Sylvania, Ohio, Jan. 13. ASM, Toledo Chapter. Artificial Intelligence, with Richard Ach of AT&T. The Someplace Else. 5:30 p.m. Contact: Dale R. Briggs, Systems Division, Marathon Oil Co., 539 S. Main St., Findlay, Ohio 45840.

Kalamazoo, Mich., Jan. 13. DPMA, Southwestern Michigan Chapter. Monthly meeting. Contact: William J. Hosken, The Upjohn Co., 7171 Portage Road, Kalamazoo, Mich. 49001.

WEST

Walnut Creek, Calif., Jan. 20. ASM, East Bay Chapter. Monthly dinner meeting. Contact: ASM, 33 Robert Road, Orinda, Calif. 94563.

San Francisco, Jan. 21. Association for Computing Machinery, Golden Gate Chapter. The Changing Role of Supercomputers, with Bruce Gerber. Seven Hills, 252 California. 5:30 p.m. Contact: James M. Spitze, The Systems Consulting Consortium, Inc., P.O. Box 2231, Stanford, Calif. 94305.

Santa Monica, Calif., Jan. 23. DPMA, Los Angeles Chapter. 1988 Installation Dinner Dance. The Chronicle Restaurant, 2640 Main St. 6 p.m. Contact: DPMA, P.O. Box 1047, Hollywood, Calif. 90078.

Motivation

CONTINUED FROM PAGE 105

show up." Hodgson hit on a training program to enable programmers to handle a greater number of situations themselves. But he solicited reactions before going ahead with his plan, and many people told him frankly that they saw no advantage in further education, since Westinghouse awarded promotions strictly on a seniority basis.

Hodgson solved that problem by convincing top management to award promotions to employees who completed training courses. This needed a "selling job," he says. "Management thought we would give away the store — that everyone would get a senior position."

Partly to quiet these fears, Hodgson instituted tests to ensure that employees had actually acquired the skills they were studying. "Only we had to call it 'learning reinforcement,' because it's illegal to give that type of test," Hodgson chuckles.

Desai got promoted from operator to his present position through the pay-for-skills project. Before Hodgson, "You worked, got paid, went home and there was no improvement," he recalls.

At first sight, Hodgson has a visionary look, with intense blue eyes and a full head of white hair. After minutes of conversation, however, the main impression he gives is of enjoying himself. Relaxed and direct, he laughs with pleasure at the new independence of his programmers and operators. "We hardly ever hear from them now; they can do most things themselves," he says.

Now Hodgson is cajoling and harrying communications managers in other companies to unite in an effort to influence vendors' standards-development efforts [CW, Dec. 21].

As with the service improvement project, he is faced with a two-way sales job. "The vendors and carriers are afraid of giving away the store by giving users too much control of the standards effort," he says. And communications managers who are already working 10-hour days are reluctant to spend extra time sitting in on meetings, Hodgson says. "They say, 'My company doesn't want to spend the money or the time,' but in five years, standards will save a lot of both," he adds. He still is looking for a better means of motivating his colleagues.

Hodgson's dedication to the standards issues is reflected in his favorite pastime — "sitting in front of a hot fire on a rainy night with a cup of hot coffee and going over standards documents."

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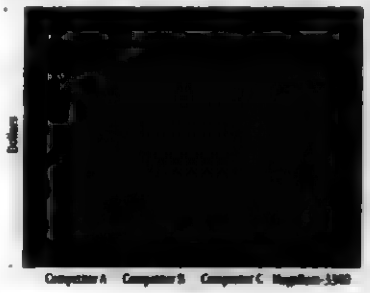

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Ex-MIS chief

CONTINUED FROM PAGE 105

In the second year of business, Info-Point worked on polishing its act and, Schulz says, became experienced in "being evaluated as a vendor." The next step, completed in November, was to hire a person with sales and marketing experience.

The company also became a reseller of manufacturing software from MCBA, Inc. as well as of three other microcomputer packages for manufacturing applications. In addition, the company markets point-of-sale microcomputer software that it designed.

A second problem that emerged for Schulz has not yet been resolved. He considers himself a hands-on MIS professional, and what appealed to him most about a consulting firm was the on-site client work.

But as Info-Point's president, he finds he is responsible for a long list of administrative and sales duties. As the client list has grown, Schulz has found he is spending less time working directly with customers and more time overseeing the business.

Rather be consulting

"If I had my way, I'd do [consulting] all the time," he says. "But, on average, I spend 30% to 50% of my week on consulting." Ideally, Schulz says, he would like to spend about 80% of his week wearing his consultant's hat.

To achieve this ideal, the first step will be to off-load the sales work to his new hire. Eventually, he will delegate more administrative duties to his staff.

Despite drawbacks, Schulz says he is pleased with his move out of MIS. He says the client relationships are refreshing after dealing with management within a corporation. The work is not an ongoing process for clients, he says. "It's a set project, and so the objectives are much clearer. We get projects done much faster," he adds.

Schulz describes himself as a person who likes not having to answer to someone.

"If you see some work that you don't want, you don't have to take it," he says. "If you're receiving a weekly paycheck, you can't do that."

Info-Point can be considered a spin-off from Loctite Corp., a maker of industrial adhesives. The company was undergoing a worldwide conversion to IBM hardware. There had been several different vendors' equipment being used at various divisions. At corporate headquarters, Schulz was responsible for an HP 3000 installation.

Employer was first client

Schulz wanted to continue working in an HP 3000 environment. That desire came together with his notion of a consulting firm. He put forth a proposal to management that would allow him to leave Loctite with six staffers. They would set up Info-Point as an independent business that would spend nearly all its time servicing Loctite during the conversion from the HP system to IBM. The time spent with Loctite would gradually decrease during the next few years, until the company had completely moved over to IBM.

The plan was approved by Loctite, and Schulz was in business. In the first year, the company won 15 small assignments in addition to its work on the Loctite account, Schulz says. In 1987, while the Loctite relationship was phased out, the company logged nearly 60 consulting assignments, he said.

"I have found that it's turned out to be a lot more work than I expected," Schulz says. "I'd say that if you're going out on your own to get away from working harder, don't do it."

Plot thickens

CONTINUED FROM PAGE 105

functions and stress the role of personal characteristics rather than organizational issues.

James Emery, a professor at The Wharton School in Pennsylvania, says information systems managers may take on other information-intensive activities, but the ability to handle broader duties will depend more on their individual capabilities.

Managers make a move

Michael Vitale, an assistant professor at Harvard Business School in Cambridge, Mass., says he expects general managers to run information systems more often than MIS managers and to take over business functions.

Likely candidates are general managers whose departments stand to gain the most from information systems, Vitale says.

Similarly, MIS executive recruiter Herb Halbrecht recently predicted that most of those employees who apply systems to strategic business needs will be general managers rather than systems veterans.

MIS managers who broaden their roles will do so on the basis of their abilities, style, charisma and general-business smarts, Halbrecht says.

A recurring theme of this scenario involves the needs of the person who applies information systems to business, which may well be determined by the characteristics of the individuals on hand rather than any grand corporate strategy.

Ludlum is Computerworld's senior editor, management.

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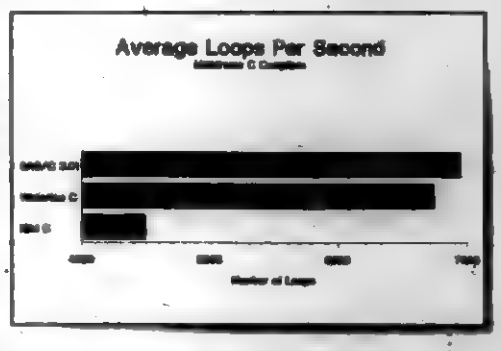

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COMPUTER CAREERS

MIS looks ahead to a mixed bag

Finance, defense jobs tight; but manufacturing, service industries grow

BY ALAN RADDING
SPECIAL TO CW

While 1988 may not be the best year to break into financial services, other areas, such as manufacturing, will provide new employment opportunities for MIS professionals, according to recruiters.

"1988 is going to be a good year, but not as strong as 1987," predicts Jack Erdlen, president of Management Dimensions, a high-tech recruiting firm in Wellesley, Mass.

Not all the attention is focused on financial services. There are fears that employment in government may drop because of budget cutbacks, new defense treaties may curtail defense industry employment and pressure to contain health care costs may restrict employment opportunities there.

By contrast, a resurgence in manufacturing, based in part on the weakened U.S. dollar and stronger exports, and the widely reported growth of the services segment of the economy point to areas of opportunity.

"Defense has been stagnant for the past two years, but I think there is some optimism. The new treaties shouldn't affect R&D where most of the computer professionals are employed," says Howard Levin, director and owner of RSVP Services, a Cherry Hill, N.J.-based recruiting firm.

Erdlen sees changes coming in the defense industry, including cutbacks, but those changes are in the long-term. Frank Goldschmidt, data processing placement manager at Robert Half Accountemps of Boston, reports current openings among several defense-related clients in his area.

Health care fit and trim

Goldschmidt also sees strong growth potential in the health care industry, which is part of the growing service-oriented economy. Erdlen says that the pharmaceutical industry continues to expand, while Levin senses a shift in the manufacturing industries. "They have been down, but I see a change coming," Levin says.

Early evidence suggests that MIS professionals will enjoy strong demand in most industries. For example, Skip Battle, managing director at Arthur Andersen, a Chicago-based MIS consulting firm that serves a number of industries, notes, "We have a bigger recruiting budget than last year."

According to a recent survey of 13,000 U.S. firms by Manpower, Inc., an international employment firm based in Milwaukee, hiring for all professions, including MIS, in the first quarter of 1988 will be as strong as in any comparable period in the last five years.

Overall, 21% of the firms surveyed intend to increase employment during the first quarter of 1988, compared with 19% a year ago. Only 12% of the firms intend to cut back employment in the first quarter, compared with 14% last year.

In fact, things appeared to be very strong in the months following the October stock market crash. This past November was "pretty good, and going into 1988 things look very well," Levin says. "By contrast, 1987 started out very slowly. The first five months were not good, but we had a booming summer."

Employment professionals see 1987 as a strong year overall for MIS hiring, the best in nearly 2½ years, according to Majorie Freedland, senior vice-president at Deutsch, Shea & Evans, a New York-based communications and research firm that tracks the High Technology Recruitment Index (HTRI).

For the third quarter of 1987, the HTRI hit 119, and the single-month figure for September reached 128. For the previous two years, the HTRI never passed 108 in the third quarter. The HTRI is based on the volume of recruitment advertising directed to engineers and scientists in major U.S. newspapers and technical journals each month.

> **HIRING FOR ALL PROFESSIONS, including MIS, in the first quarter of 1988 will be as strong as in any comparable period in the last five years.**

But watch out

Freedland's enthusiasm is countered by her warning that the employment outlook as reflected by the HTRI "may be buffeted by the current gyrations in the financial area," she says. In addition, cutbacks in federal spending and a major drop in consumer and business spending, which could trigger recessionary trends, could push down the HTRI in the coming months.

According to the U.S. Department of Labor, the financial services industry (including insurance and real estate) currently employs 41,396 computer systems analysts and electronic data processing professionals. That number is expected to climb to 70,587 by 2000, a 70.5% increase. The industry also employs 68,332 programmers, which is expected to climb to 107,696 by 2000 for a 57.6% increase.

The Manpower survey suggests that the financial services industry, including insurance and real estate, will continue its five-year growth spurt in most regions of the country. According to its survey, 20% of the financial services companies plan to increase hiring, while only 8% will decrease employment.

The jobs for computer systems analysts and EDP professionals will rise 33% by 2000 in the manufacturing sector, while programmers will see a 26.3% increase, according to the Labor Department. In the transportation, communications and utilities sector, systems analysts and EDP professionals will enjoy a 62% increase by the end of the century, while the number of programmers will increase 41%.

In the area of wholesale and retail trade, systems analysts and EDP professionals will experience an 87.6% gain, while the programmers trade will increase 63.5%. In the services sector, systems analysts will enjoy a 140% gain. Opportunities for programmers in the services area will increase 110%.

Radding is a Boston-based author specializing in business and technology.

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Bjorn Nordemo
Vice President
Data Arts & Sciences, Inc.
Weston, MA

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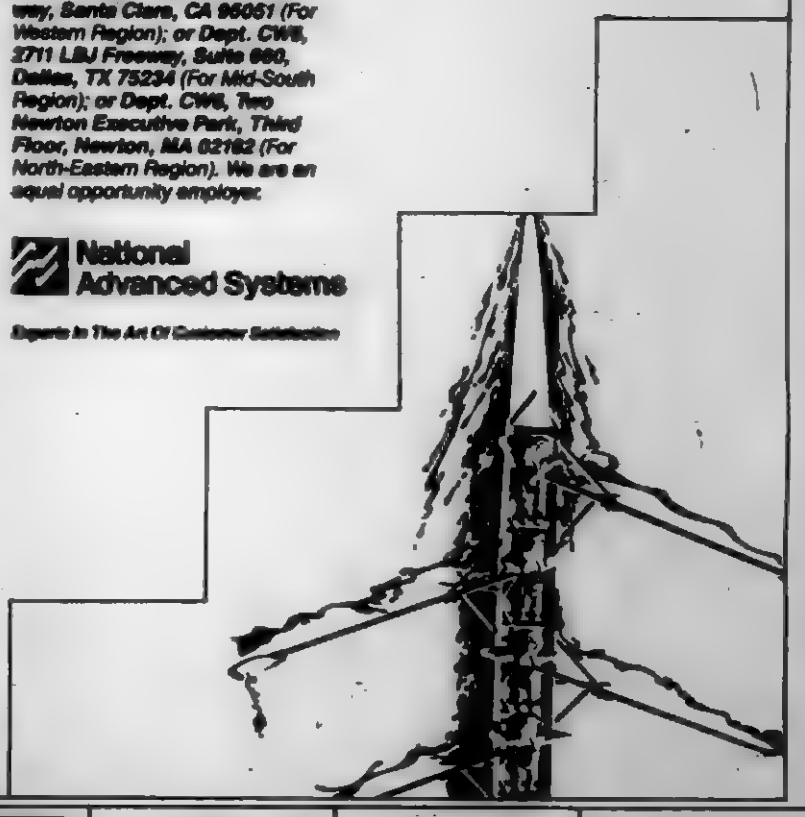

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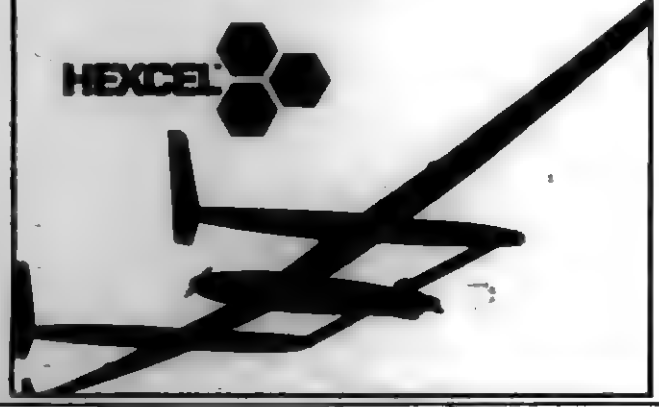

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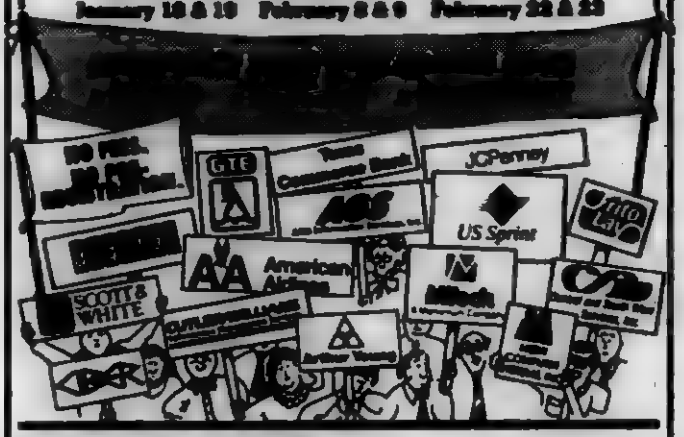

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MARKETPLACE

Heavy trading as supply increases

by ELIZABETH LOZANO
DATA SUPPLIED BY
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The market experienced a flurry of activity this week, as a number of lessors, VARs and large users "dumped" both real and vapor-ware IBM 089s and 339s. As anticipated, dealers scrambled for these boxes, while the prices and profits soared as in previous years, there is a scramble as some traders dump equipment for end-of-year cash. Others are buying before their fiscal year's budget is real located. Thanks to the tax system, this makes an active market at year end.

The IBM PC experienced an increase in trading volume. The basic machine with 256K RAM, 2 floppy drives, monochrome monitor, adapter and DOS closed down slightly, at $700. The XT 086 closed down slightly as well, at $1300, experiencing similar conditions. The AT models, in contrast, continue to hold high values and to be in extremely short supply. The AT 099 model held firm at $2300, while the AT 339 closed up $50, at $3150. PS/2 tradig continues to be sluggish as a whole, although the models 50 and 60 are experiencing a marginal increase in demand. Fact is few users want the new PS/2.

Compaq trading was a mixed bag this week. The original luggable, the Portable I closed down at $750. The Portable II closed up at $1725, with users settling for this machine in the face of a short supply of Portable IIIs. The Portable III closed up at $2625. The luggable 10 megabyte machine, the Plus, closed even at $1200, experiencing a decrease in both demand and supply. In contrast, Compaq 286 and 386 trading volume was high. The Deskpro 286 closed at $2200, with a mid-week increase of supply leading to a marginal drop in price by the end of the week. The 386 Deskpro closed at $4300 with short supply conditions throughout the week.

Macintosh trading was heavy. The 512 closed even at $800, with supply and demand evenly matched. The 512e was also steady, but trading volume was on the up-swing and the price is expected to fall from its current value of this popular machine. The SE closed at $1950, with few machines available on the MacUsed market.

Closing prices report

for the week ending December 18, 1987

Machine	Closing Price	Recent High	Recent Low
IBM PC 076	$ 700	900	575
IBM XT 086	1300	1425	900
IBM XT 089	1950	2050	1300
IBM AT 099	2200	2900	2250
IBM AT 339	3150	3300	2800
Compaq Portable I	750	975	650
Compaq Portable II	1725	1800	1550
Compaq Portable III	2625	2750	2300
Compaq Plus	1200	1300	1200
Compaq Deskpro 286	2200	2500	2200
Compaq Deskpro 386	4300	4400	4000
Macintosh 512	800	875	650
Macintosh 512e	1000	1100	875
Macintosh Plus	1350	1450	1300
Macintosh SE	1950	2150	1700
Macintosh II	4000	4200	3500
HP LaserJet Plus	1200	1300	975
Toshiba T1100+	1250	1450	1000
Wang PC	800	1000	750

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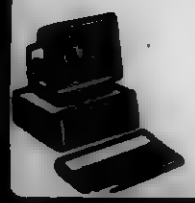

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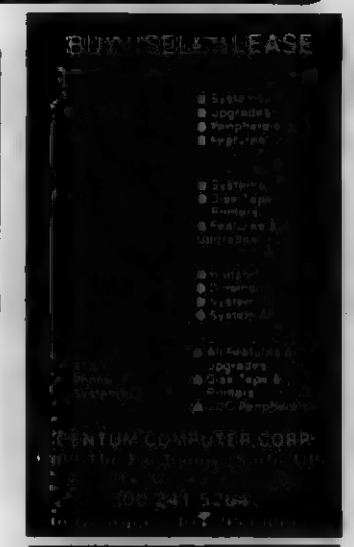

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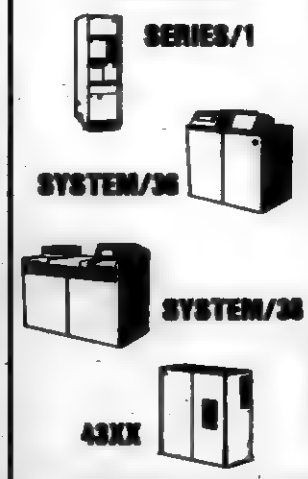

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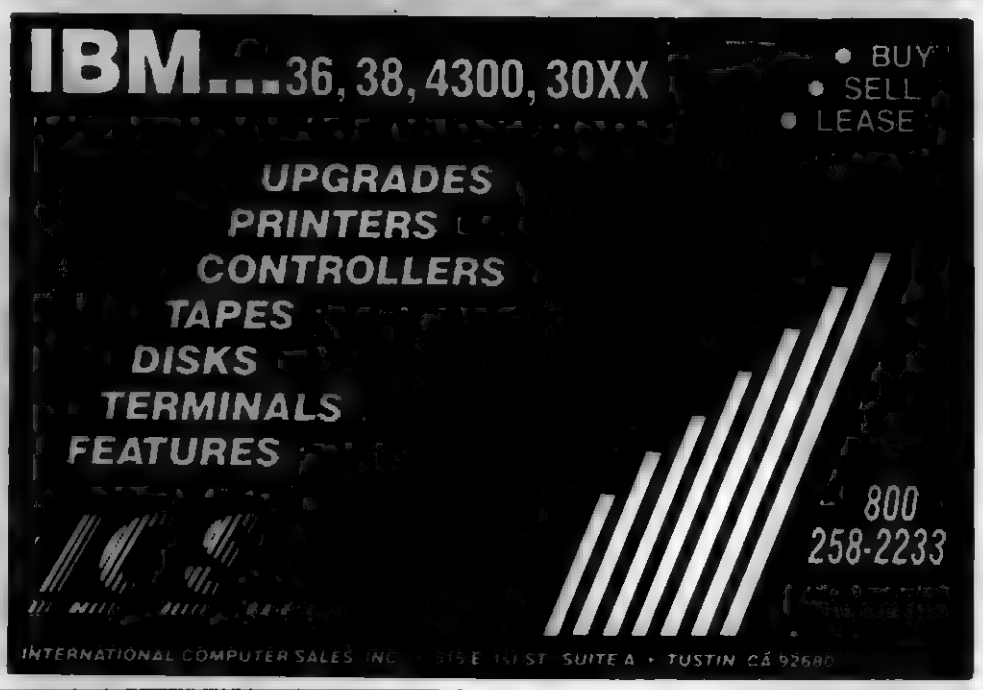

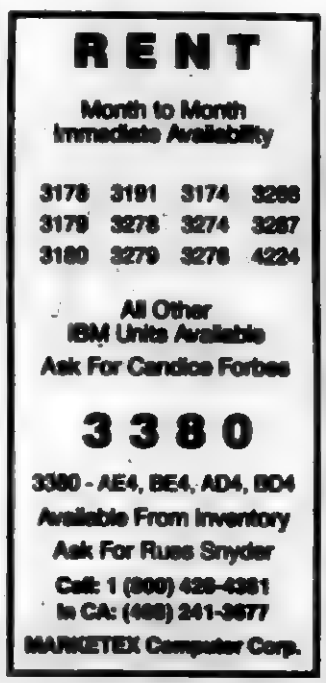

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In-house staff loss is contractors' gain

Budget cutbacks afford opportunities for course and materials vendors

BY LAURA DIDIO
SPECIAL TO CW

Budgets for MIS and end-user training, particularly in the financial services, insurance and oil industries, are expected to be tight this year, according to training coordinators.

But the vendors of training courses and materials see cutbacks of in-house training staffs within these companies as an opportunity to expand their services.

"Our clients are adding personal computers, but they are not increasing the training support staff," says Leon Weisburgh, chairman of the New York-based Personal Computer Learning Centers of America, which supplies on-site training to Fortune 500 firms.

Using your wits

Budget cuts mean that MIS departments must seek alternative ways to provide training. For example, at Unum Life Insurance Co. in Portland, Maine, the training staff is seeking in-house volunteers to provide additional training.

"We have been scaling down our MIS training and have been told to hold the line on costs," instructor Sue Redkey says.

Another alternative to hiring an in-house staff is to contract with training vendors. "We could be on an unparalleled growth curve if we can justify the cost of training at individual companies," says Tony Keating, district manager for Naperville, Ill.-based Deltak Training Corp., another independent training firm that serves the Fortune 500.

Personal Computer Learning Centers' Weisburgh says that cutbacks of MIS training staffs are proving a boon for his company. "The fact that so many firms are downsizing their in-house commitments to information systems training helped our business grow 65% in 1987, and we may see our revenue double next year," he says.

Cuts in budget allocations for training are the result of sluggish business conditions and mergers rather than direct reductions in training, Weisburgh says.

"Whenever there is a drop in profits, training budgets are the first to come under the knife," he says. "When you see a merger, you can be sure that cuts will follow — when Philip Morris took over General Foods and Texaco and Penzoil merged, there was massive consolidation."

Deltak's Keating also sees belt-tightening. "In the past couple of years, everything related to MIS funding has been questioned, examined and must be justified," he says. "A few years ago, it was easier for us to get contract renewals and put new training programs in place. But that situation is being severly curtailed."

Likewise, Linda Rode, president and owner of DP Training Resources in New York, says that MIS training budgets will not expand in 1988. "They will hold to present levels or be lower."

Rode's company counts many large banks and securities firms among its clients, and those firms were the hardest hit by October's stock market crash. "People are still conducting the training that needs to be done," she says. "So far, the cutbacks have not been on the scale of those that occurred seven or eight years ago during the 1981 recession. Now, corporations are being more cautious about how they spend their training dollars, and the market is very competitive."

To adjust to the new environment, Rode's company plans to expand its services to address several different types of training. "We will offer MIS training in applications development software and CASE programming tools," she says. "We also see a significant demand in the office environment for DB2 training."

Hiring, not firing

Although many companies are cutting back or freezing their training budgets, there are exceptions to this trend, even in the service industries. MIB, Inc., a Westwood, Mass.-based service bureau for life insurance companies, will increase its budget this year, according to Ron Millman, education and development specialist.

The Technical Learning Center for the New York telephone company is also beefing up its MIS training curriculum counter to the general trend. "The main reason for the increase is that just about everyone in the organization is getting personal computers," says Al Jung, associate director at the center. "In 1987, the number of training courses we offered was greater than the aggregate total number of courses we offered for the previous three years of 1984 through 1986."

Training at the center encompasses end-user and technical instruction on PCs, minicomputers and mainframes.

DiDio is a free-lance writer based in Boston.

January 18
COMPUTERWORLD
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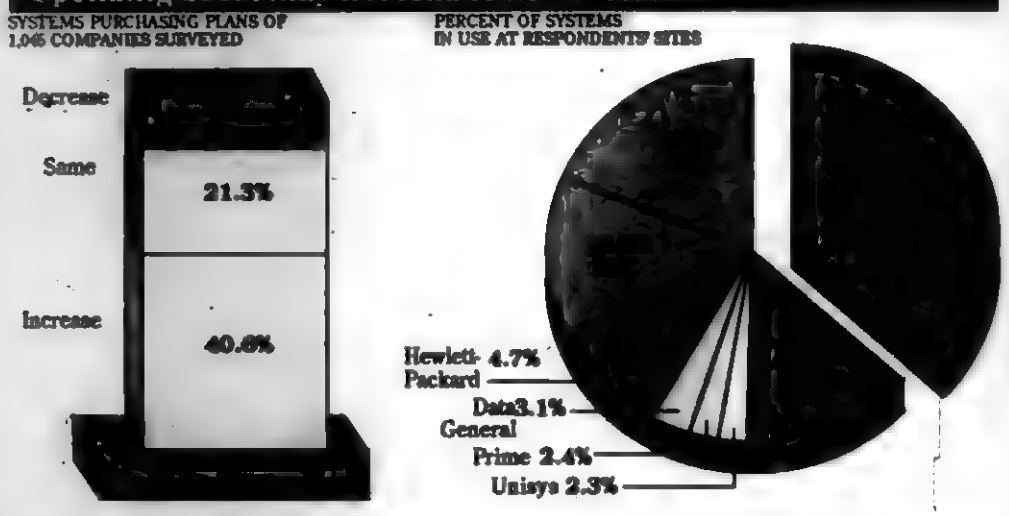
TRENDS

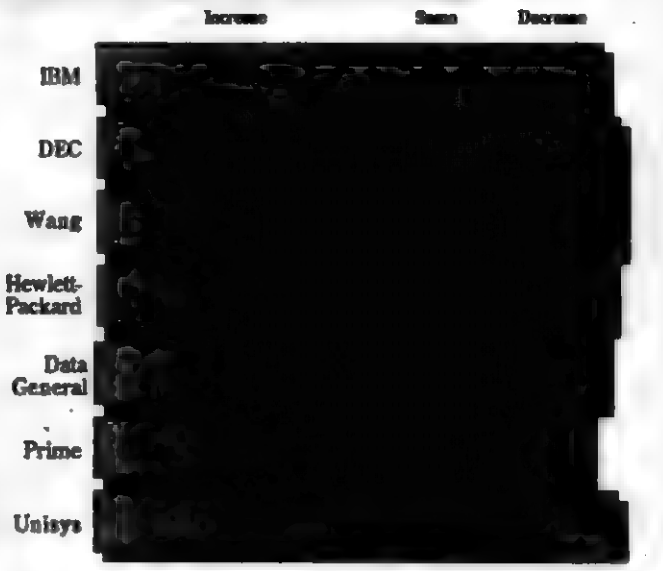
Departmental systems

Spending boost may not lead to new installations



Users are buying

Wang comes back; DEC still strong



INFORMATION PROVIDED BY THE SIERRA GROUP

There will not be many new customers for departmental computer vendors next year, which means the battle between IBM and Digital Equipment Corp. will become even more fierce, according to The Sierra Group in Tempe, Ariz.

A recent Sierra Group survey of 1,045 MIS executives showed that 32.6% of user sites with departmental systems plan on buying more next year. But only 7.9% of sites without departmental systems plan on making a purchase.

"This market is not expanding," said Merrily Shinyeda, president of The Sierra Group. "Vendors are going to have to take business from competitors to grow."

The increasing use of personal computers and local-area networks is one of several reasons the departmental market has reached a saturation point, Shinyeda said.

As vendors fight over a nearly stagnant market, DEC will be more successful at stealing business than rival IBM in 1988, the survey said. Currently, IBM's share of the departmental market is ahead of DEC's by 5%.

DEC continues to grab business at accounts that have traditionally belonged to IBM, Shinyeda noted. Of IBM mainframe shops surveyed with departmental systems, 14.8% had DEC equipment. Nearly 31% used IBM departmental systems.

In addition, DEC users surveyed gave their vendor a higher satisfaction rating than IBM users. DEC tied with Hewlett-Packard Co. for first place, while IBM came in third.

Shinyeda also said more DEC accounts are planning purchases for the upcoming year than IBM sites. "IBM has an uphill battle" in 1988, Shinyeda concluded.

However, both IBM and DEC have more to do than worry about each other. There is a second tier of departmental computer vendors that share almost 18% of the market. Among this group of five vendors, Wang Laboratories, Inc. tops the list with a 5% market share. HP, Prime Computer, Inc., Unisys Corp. and Data General Corp. are closely positioned, with each holding between 2.3% and 4.7% market shares.

The Sierra Group predicted that HP will emerge as the strongest second-tier competitor, primarily because it scored so high in user satisfaction.

ROSEMARY HAMILTON

INSIDE LINES

Done Deal? It looks like Ashton-Tate, which has been romancing SQL DBMS vendors in search of an OS/2 server product, has finally scored. According to well-connected (isn't that what SQL is all about?) sources, Ashton-Tate came to terms with tiny Interbase Software Corp. in Tyngsborough, Mass. Ashton-Tate, which has promised an OS/2, SQL-based server product, has apparently invested in Interbase and will obtain the marketing rights to a still-unfinished OS/2 server product. Interbase will remain free to market its products to other areas, such as the engineering marketplace. The deal is expected to be formally announced in one month.

PFS:Gone. Janelle Bedke, one of the computer industry's highest ranking female executives, has resigned as president of Software Publishing Corp. to pursue personal interests. In a related move, company investor Jack Melchor took over the chairman's post from founder Fred Gibbons, who will replace Bedke as president. Melchor, a Software Publishing board member, is also a director of 3Com and Zitel. Bedke will remain on the board.

Don't open till Jan. 5? Withholding the name of the first customer and the actual shipment date, Prime Computer recently claimed to have met its deadline by delivering its high-end, dual-processor 6550 superminicomputer before the end of the fourth-quarter of 1987. Prime is expected to release further details on Jan. 5.

New wrapping paper. Graphics supercomputer developer Dana Computer in Sunnyvale, Calif., has changed its name to Ardent Computer Corp., citing trademark conflicts with similarly named firms. Allen Michels, the former Convergent Technologies founder who started Dana, said the name Ardent "reflects the zeal with which our team has met the challenge of defining and creating the first of a new class of computer." Silicon Valley lore has it that Dana was named after the San Jose, Calif., street address of the home where the company was founded.

Indigestion. One-third of all computer industry acquisitions end up being divested by the acquirer because they don't work out, according to a new study by the Cerberus Group. The Frenchtown, N.J.-based research firm concluded that the highest success ratio came to buyers making deals to round out product lines, acquire technology or extended markets and product lines in which the buyer already participated.

Lumps of coal in the stocking? Heavy competition at the high end, dwindling profit margins and decreasing sales are troubling the T1 industry. Network Equipment Technology (NET), once the undisputed ruler of the high-end T1 networking market, is reportedly losing some ground — and contracts — to Digital Communications Associates and Timeplex.

The company is said to be cutting prices, and therefore profit margins, to boost sales; additionally, the contract for IBM to resell NET equipment has reportedly hit some bumps, with IBM reputedly accusing NET of undercutting its bids and NET, in turn, claiming that IBM is encroaching on its own direct-sales outlets.

Meanwhile, T1 vendors Infotron, General Datacomm and Paradyne are all potential candidates for acquisition, one source suggested, since their sales have been dropping and their margins thinning. General Datacomm in particular is said to be in deep trouble, with some recent layoffs and disappointing sales reported.

Throw me a lifeline. One user of Microsoft's Works recently abandoned ship after trying to learn the program for two weeks. He said he was drowning in its 800 pages of documentation. "It's a neat program, but in the race to have new features, Microsoft has forgotten what normal people can do," another user said.

Jumping in. Data General and Xerox said they will announce a new PC-based desktop composition product early in January. The three-tiered product will be targeted at corporate publishing.

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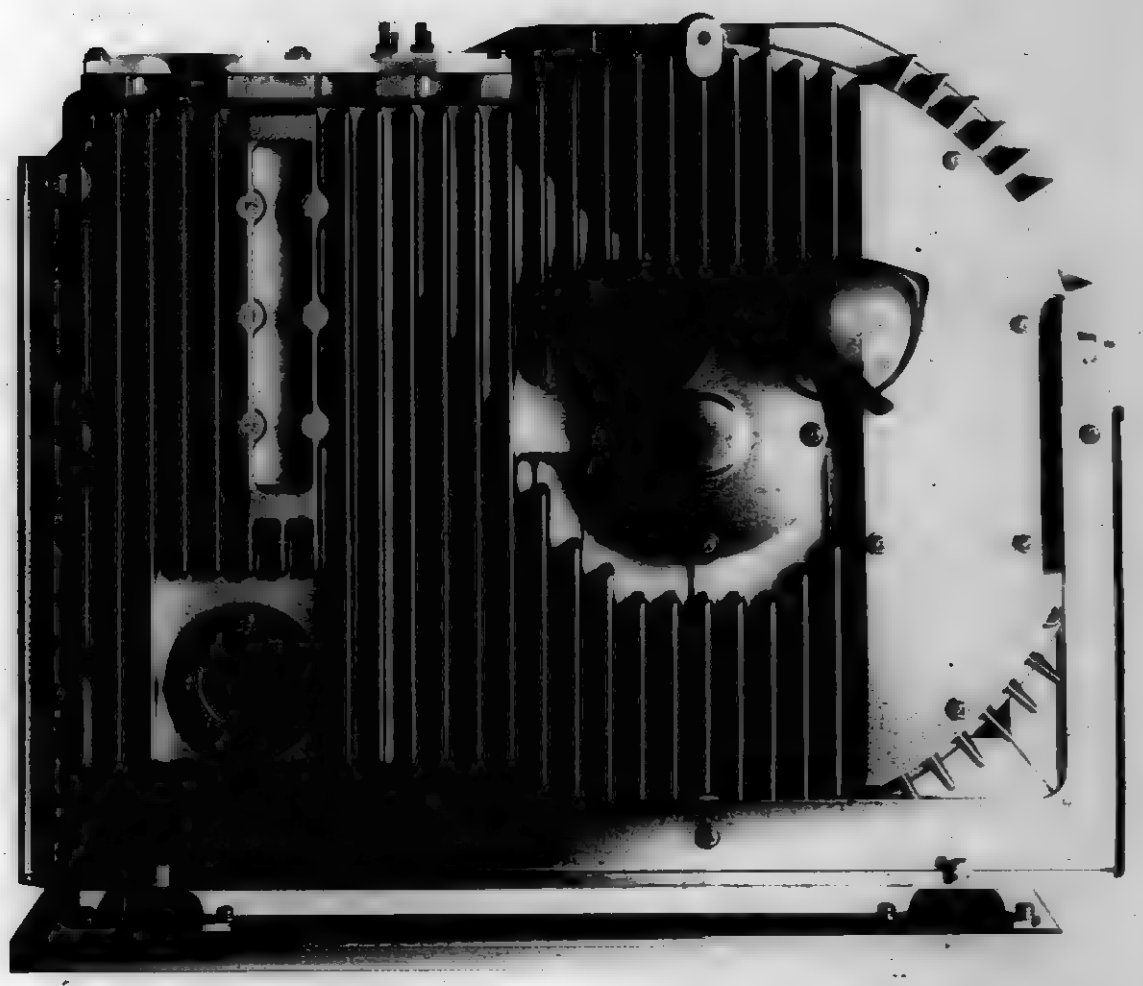

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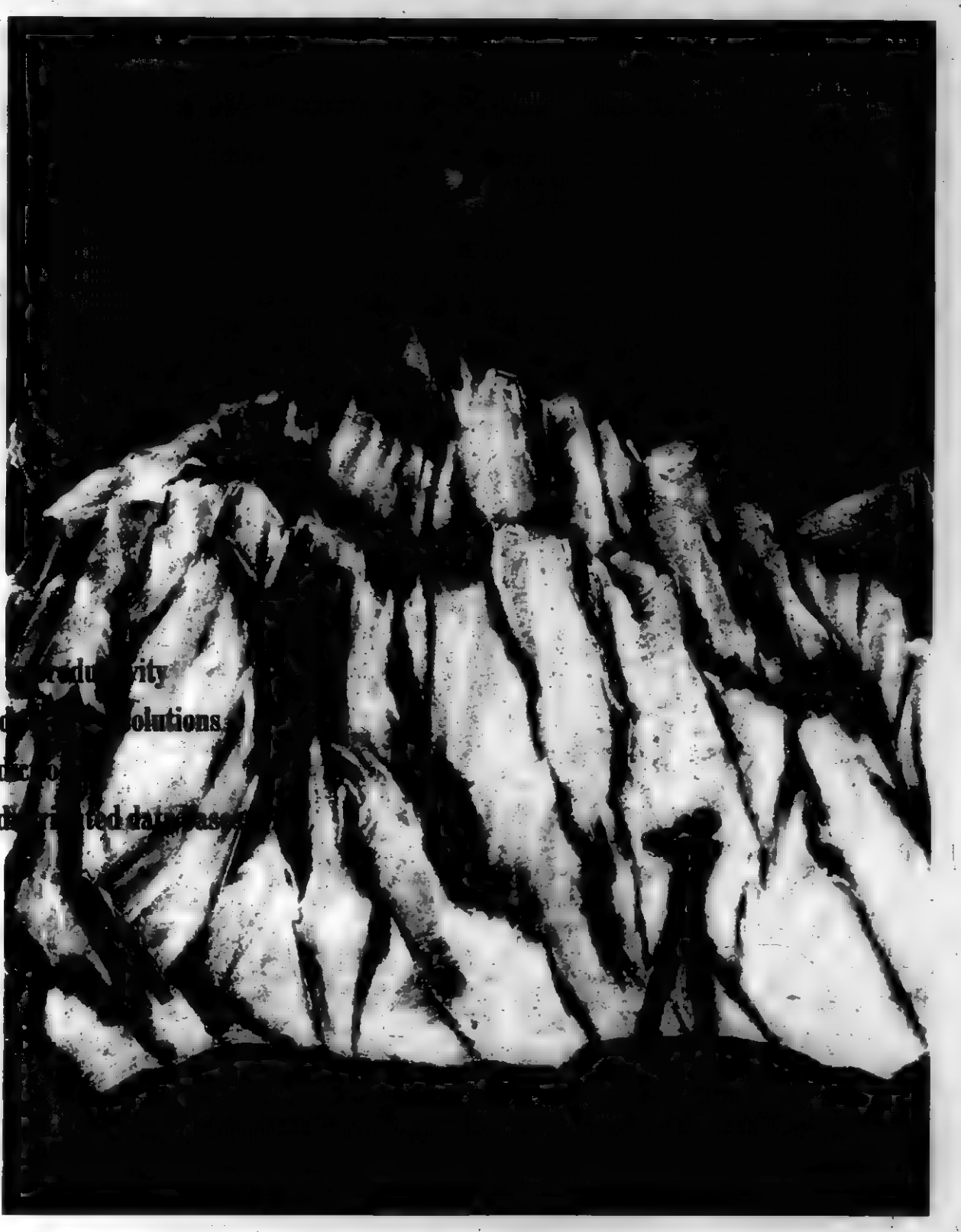

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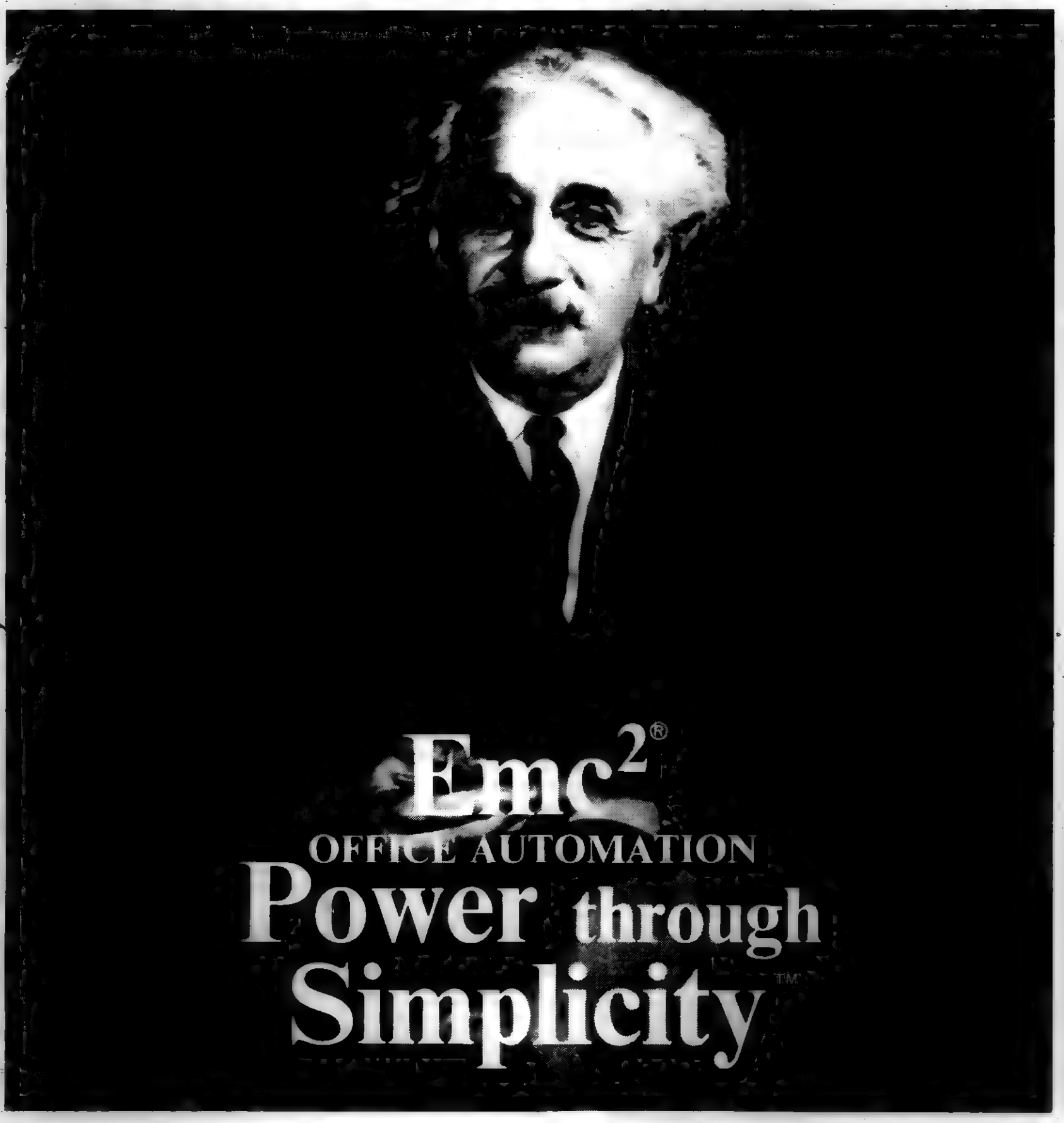

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in focus

DIRECT CONNECTION TO PRODUCTIVITY There is a deep bond between connectivity and productivity that, when understood, can help organizations reach their corporate goals. The author examines how adopting computer-based forms to convey business information can enhance individual knowledge, group cooperation and enterprise goal monitoring. By strengthening the machine-to-machine links, you can fortify the people-to-people links as well. By Paul Strassmann. *Page 16.*

STRATEGY, NOT TECHNOLOGY A recent poll of communications professionals by *Computerworld Focus* found that this group is turning its concentration from technology to its application. Gaining an advantage in a competitive world through strategic use of technology is paramount for them. Discover the other subjects — promised offerings, competing vendors and standards and government regulations — about which your peers feel strongly. By Michael Tucker. *Page 23.*

Distributed data bases

By Stan Kolodziej. Advances in data base technology, especially the success of the relational market behind such standards as SQL and DB2, are making many MIS managers take a second look at distributed data base management systems. With LAN vendors playing their part and moving applications from minicomputers and mainframes to networked PCs, true distributed DBMSs may soon be here. *Page 35.*

Can you ignore EDI?

By Patricia Keefe. Many companies that have converted to electronic data interchange systems quickly find out that these tools are a competitive necessity. Time savings, personnel reductions and elimination of geographic barriers are just some of EDI's oft-cited benefits. With an ANSI standard poised to ease EDI systems incompatibility, the EDI market is expected to really take off. *Page 39.*

COVER BY SCOTT REYNOLDS

SPECIAL SECTION

LAN analysis

At what point do you turn to outside personnel for network installation and maintenance? Should you handle these sometimes laborious tasks yourself? Stan Kolodziej scrutinizes these critical issues and talks to the users, vendors and consultants who are grappling with these questions. Plus, analyst Lee Doyle examines the importance of IBM's OS/2 LAN Server to you. Begins on page 27.

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A communications consultant says the future is IBM's Systems Application Architecture. *Page 10.*

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Blue Beat
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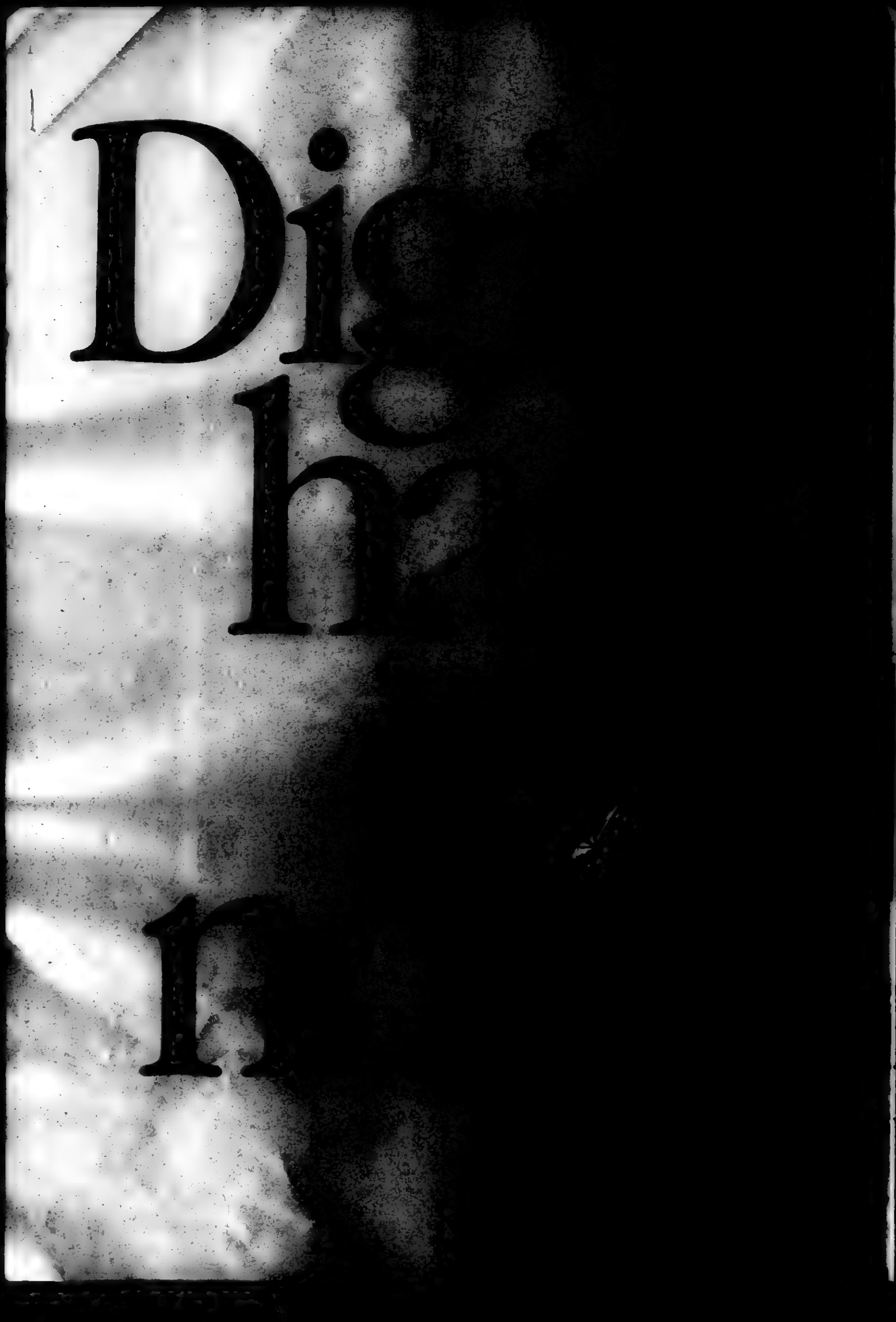

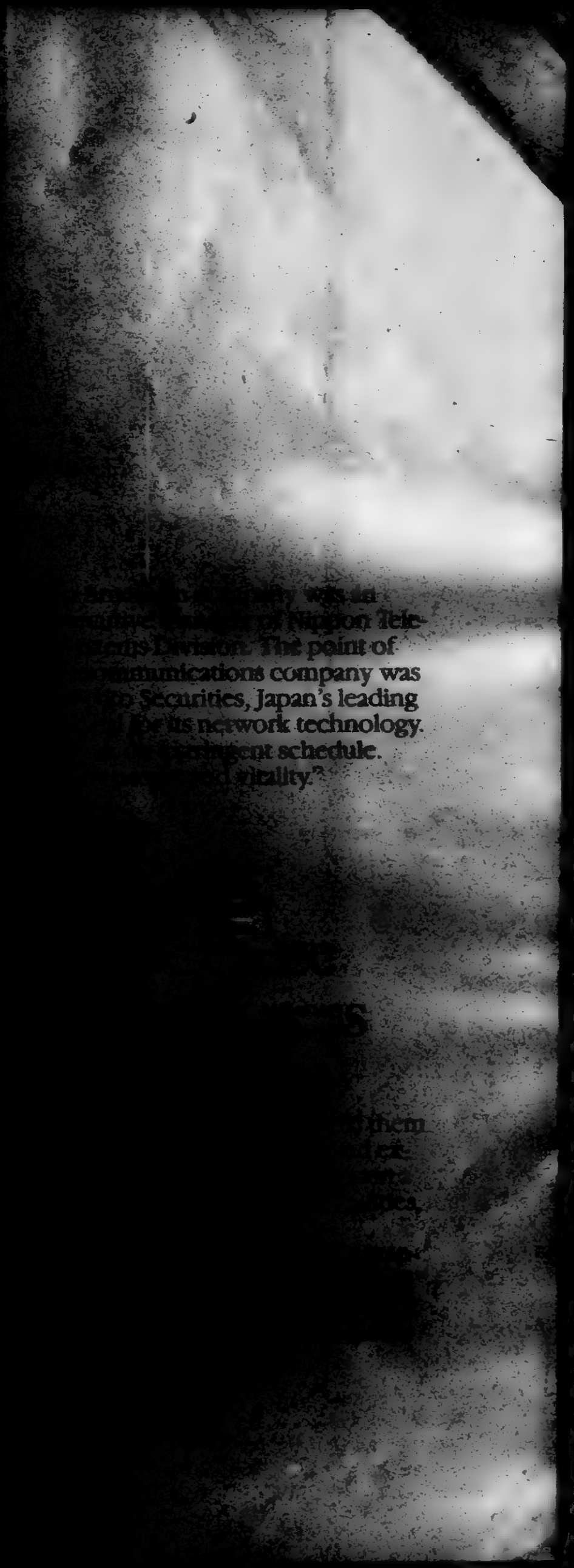

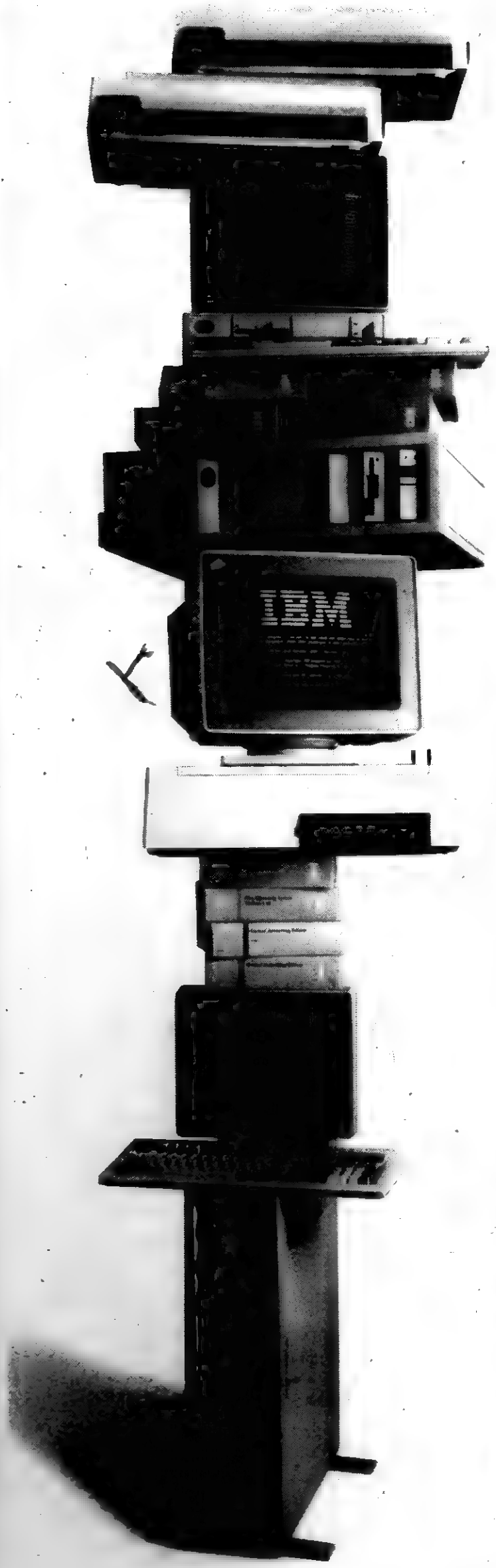

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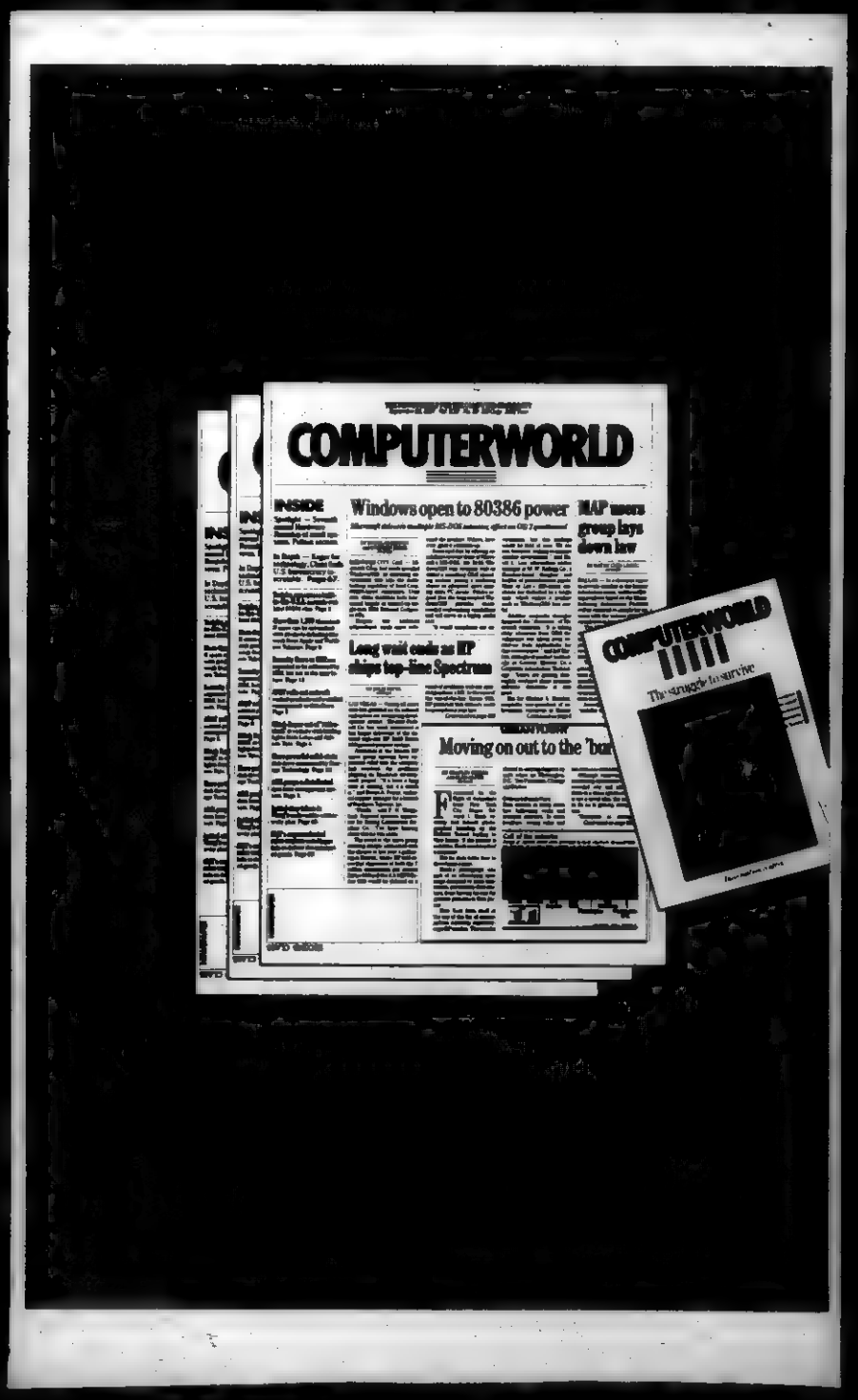
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   A. Mainframes/Supermins
   B. Minicomputers/Small Business Computers
   C. Microcomputers/Desktops
   D. Communications Systems
   E. Office Automation Systems
   F. No Computer Involvement

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FROM THE EDITOR

Greene in judgment

Is U.S. District Judge Harold H. Greene helping anyone with his recent opinion concerning the Modified Final Judgment? Certainly not the regional Bell holding companies, which must now operate for another three years under the business restrictions imposed on them when they were spun off from AT&T. Judge Greene has firmly shut the door on the holding companies' research and development activities involving manufacturing. Although Greene allows the firms to develop software, which is certainly a part of the equipment used in public-switched telecom networks, he has clamped the lid on any R&D efforts to manufacture that equipment.

Greene's recent decision also stepped on the toes of the Department of Justice, chastising it for failing to investigate violations that have taken place since the Modified Final Judgment.

On the other hand, AT&T, other interexchange carriers, the equipment manufacturers and information service providers undoubtedly applaud the decision. Their contention is that the holding companies pose a serious anticompetitive threat even when operating under current restrictions and, therefore, could create a truly unfair stranglehold on their competitors if the bonds are loosened.

Greene explained his ruling by citing that the "decree was aimed at preventing the anticompetitive practices in which the Bell system was assumed to have been engaged in the past." Another consideration of the decision, however, is how these restrictions will affect the information industry as a whole. Under the current rules, little incentive exists for the regional holding companies to promote or experiment with new technologies. At the core of the disagreement over the rulings has been a failure to define terms and intent clearly. The rulings have not always been specific enough to avoid disagreement and confusion over what is to be allowed and what is not. Therefore in the future, for instance, the Bell companies may be forced to divest subsidiaries involved in R&D and curtail future acquisitions.

Judge Greene is trying to define various stages and components of the information industry and its technology that are already well integrated or still evolving. Few in the industry can do this with any great confidence. Putting these key decisions in the hands of a jurist outside of the industry is a dangerous gamble.

Ann Dooley

Soviets in glass houses shouldn't throw stones

I was appalled by Mr. Baidak's letter (*CW Focus*, Nov. 4, 1987) decrying the quality of information at the Information USA expo in the Soviet Union. It isn't that a Soviet journalist should not be heard or that we should censor his views (we are, after all, committed to free speech), but it is the Mount St. Helen's of impertinence that a spokesman of a dictatorship of the proletariat can preach to us about a lack of a free flow of information.

CW Focus readers may be appropriately reminded on the 70th anniversary of the Bolshevik revolution that one of the main accomplishments of that revolution was the total and permanent control of all information by the Soviet Communist party. The concept of the free flow of information in the Soviet Union is unknown. With this as background, Mr. Baidak's criticism sounds very hollow, indeed.

On the other hand, I wholeheartedly agree with Mr. Baidak's observation that the Soviet Union is lagging behind the U.S. in information management technology.

I believe that our lead will remain, not because Soviet engineers and scientists are any less competent than ours, but because the ruling ideologues cannot allow their citizens free access to information and, therefore, to the machinery that processes it. As long as that is the case, the Soviet Union will be drooling for our information technologies.

We develop technologies and products for markets and customers. What may seem like toys and second-grade stuff to Mr. Baidak and the Soviets are consumer and business products to us.

What is on display at our technology exposition is not merely software and hardware but products that a free-spirited nation offers to its consumers who are free to choose how to use the tools. Some use them for entertainment, some for investing, some for education, and there are even those who use them to write letters to editors. But most important, the users are free to choose. So, if our youngsters want to learn about programming for engineering and scientific uses, they are free to do so, but they don't *have to*.

It may be that our messengers at the Information USA expo could use some technical training, but that would not change our fundamental way of thinking, nor would it change the contents of our exhibit.

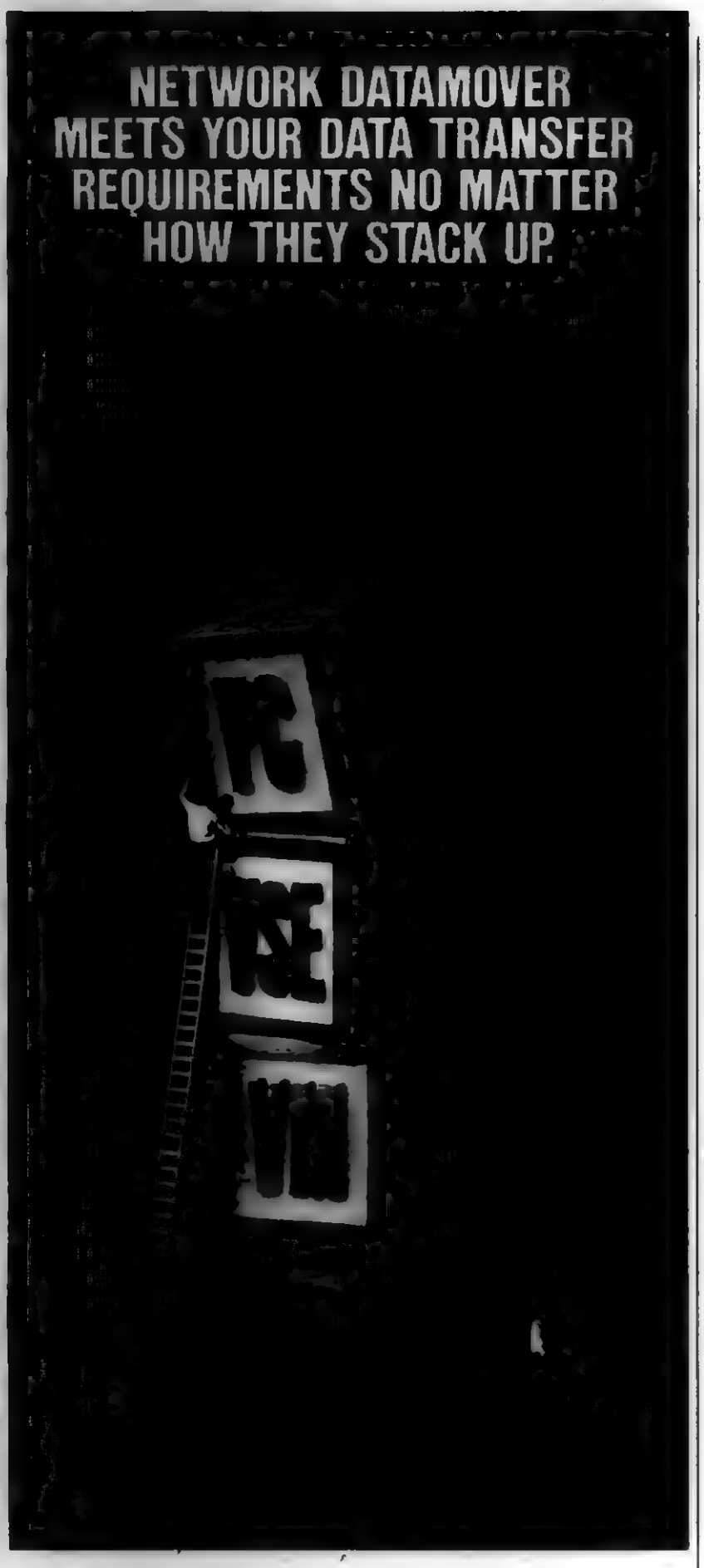
Tibor G. Sacheres
Vice-President, Engineering
Telesis Communications, Inc.
Eatontown, N.J.

Reader challenges analyst's prognosis for mainframes

William Zachmann's viewpoint article titled "Mainframe dinosaurs" in the November 4 issue of *Computerworld Focus* has him back with his prognostications on the demise of mainframe systems, mainframe suppliers and all the sundry people unfortunate enough to be involved. In keeping with tradition, Mr. Zachmann gives no facts that the reader might use to exercise judgment on the wisdom of his blabberings.

If Mr. Zachmann really believes that it is the "economics of the transition to second-generation information systems that will provide the dynamic of change," he should be called upon to produce some documentation of facts, trends or other data that provide support for his sweeping conclusions.

Continued on page 10



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VIEWPOINT

MANAGER'S CORNER

In defense of MIS's honor

Jim Young

When people make a commitment to something, they tend to become righteous and even a little defensive. Information systems should be important enough to be one of those commitments.

Those of us who have chosen the information systems profession like to believe we have selected a worthy and valuable field of endeavor. Unfortunately, others can easily jeopardize our sense of mission and our feeling of self worth by trivializing them, placing our role in corporations on par with that of computer games. While we can dismiss some of these reactions as having been generated by harmless ignorance, there are more devastating and deliberate innuendos that imply our profession is without moral responsibility.

The cause of this feeling is varied. Many have asserted that because programming is a task of applying inflexible rules, the whole profession is trained to be mechanical and robot-like. They further claim that the focus of the information systems profession is on machines and technology, not on humanitarian and social issues. They go so far as to say one reason for excluding MIS from company leadership positions is that senior management simply does not trust the motives of MIS professionals in recommending technology. This image is unacceptable to me and should be a cause for alarm in a profession that is playing an increasingly pivotal role in society.

Bad to the bone?

I like to think there is nothing intrinsically bad in computing. However, like anything else, technology can be abused. And just as recent problems with pit bull dogs ultimately reflect on the animals' owners, so, too, computer misuse ultimately reflects on the keepers of technology, namely, MIS. Our profession has traditionally assumed the stewardship of technology, including the responsibility to lobby for and guide the prudent and fair deployment of computing. Likewise, we certainly should recognize and address concerns in this area, remedying problems and correcting misconceptions.

After the recent collapse of the stock market, many MIS professionals were accused of being tainted by association with computer-generated trading, a technology that contributed to the instability of free markets. I know nothing about programmed trading, and I am no expert on the mechanics of the stock market. But I do get indignant at the offhandedness of the accusations that the computer was responsible and that technicians contributed to the misuse by following its orders.

Programmed trading may have been a "loose cannon on the deck." However, I cannot believe that information systems professionals did not evaluate the possibility of what occurred. For that reason, I have to think that either the inanimate computer is being vilified because it is an easy culprit or, if programmed trading is to blame, it is due to obscure and complex reasons that were not obvious to an otherwise concerned MIS.

Everyone in business must face and deal with the broad ethical issues. In addition, there is a growing body of ethical issues unique to such selected areas as information systems. Being a professional is not just possessing special skills but also taking charge of the responsible use of those skills. Moreover, a true professional can apply these skills to make moral judgments, such as recognizing areas of danger or harmlessness that a layman might not detect. In no area is this professional responsibility more important than in information systems. The specialized ethics of MIS go beyond not pirating software. It is exercising the responsible use of computing.

In dealing with other MIS professionals, I give them credit for the same integrity I like to think I practice. A doctor once justified the past practice of not testifying in court against another doctor by saying this custom was not a mutual protection pact but respect for the situational and circumstantial decisions or actions of another professional.

The opportunities for social abuse go beyond stock market program trading. Abuse might involve invasion of privacy, job elimination, depersonalization of work or use of technology in illegal or unsavory ways. Our job is to prevent the technology that we manage from contributing to any of these or other undesirable ends.

And our job goes further. It requires that we not be enamored with the technology or with building empires to our skill. Rather, we must be driven by the benefits we can give to organizations and even to society. Many of the nuclear scientists at Alamogordo, N.M., now regret the weapon they created but said that, at the time, they were too caught up with the excitement, the challenge and the science to think of the consequences. As professionals, we cannot be so in love with the technology that we are not in a position to judge when it is used unwisely.

Because we are in a position to be knowledgeable of risks, we must advise of the dangers. We all are aware of the duty to protect our organizations from computer abuse. We also have a duty to prevent companies from becoming inadvertent computer abusers or irresponsible

Continued on page 10

Young is managing director of MIS for the Wheeler Group, a division of Pitney Bowes, Inc. in Hartford, Conn.

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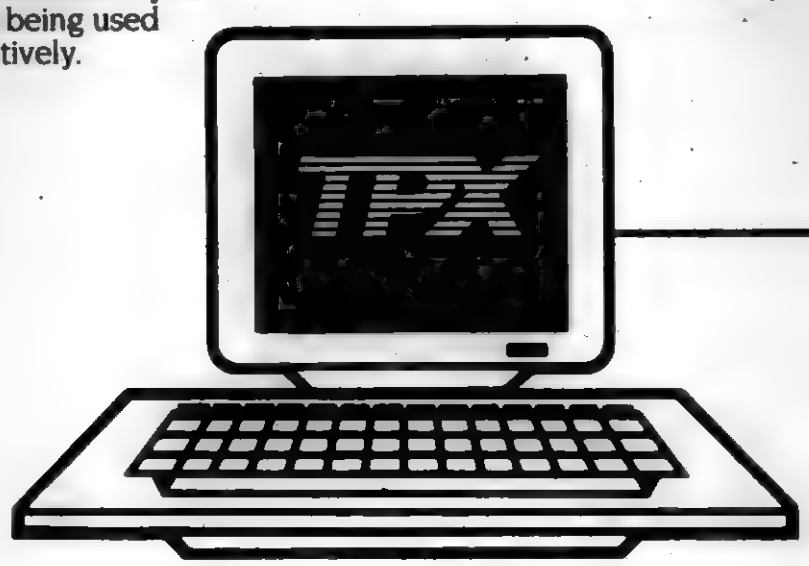

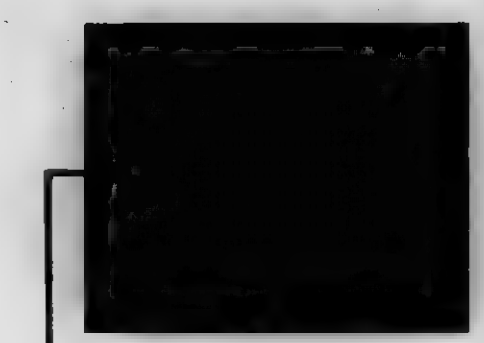

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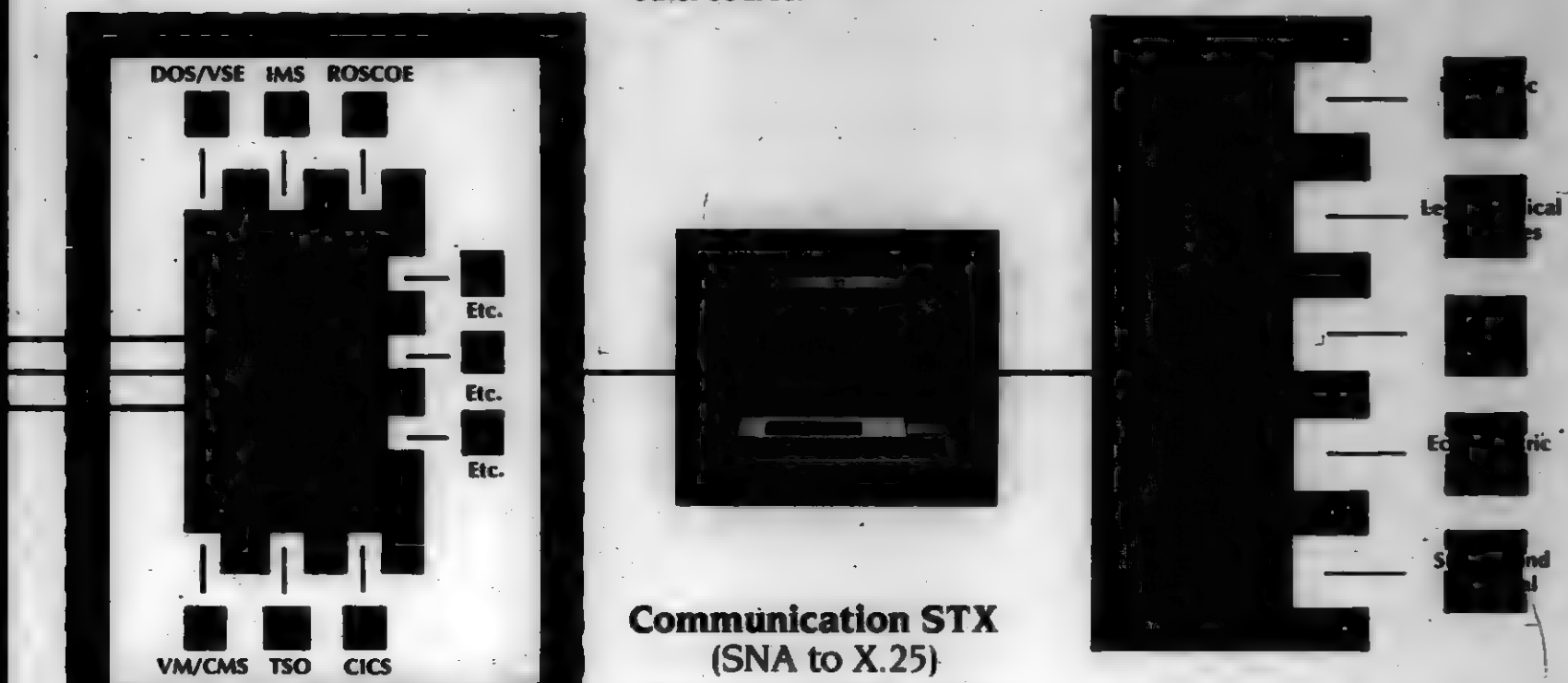

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Q AND A

John Pickens

Communications consultant says IBM's SAA is the future, pure and simple

John Pickens is the director of communications architecture at Communications Solutions, Inc. in San Jose, Calif. The company offers both consulting and software to hardware vendors that wish to integrate their products into IBM networks. In effect, Pickens is one of the people to whom the suppliers to MIS turn in an attempt to second-guess IBM.

Computerworld Focus Features Editor Michael Tucker recently spoke with Pickens on the future of IBM connectivity given the recent announcements concerning IBM's Systems Application Architecture (SAA).

How do you personally define SAA?

Relative to communications, SAA is a specification of a standard set of services, each of which has a set of standard interfaces. Those interfaces will ultimately be provided across the entire collection of IBM systems — quite literally, everything from the personal workstation to the System/36 and 38 to the 370. At the same time, SAA also is intended to imply open protocols as well as open interfaces. So vendors in a multivendor environment can have access, with IBM's support, to the IBM world with software using such protocols as LU6.2, LU2 and so on.

What is the relationship of SAA to the International Standards Organization's Open Systems Interconnect (OSI) model?

What IBM is doing with SAA is describing a set of services that will be provided by IBM across multiple environments. Now, as for OSI, IBM has recently added OSI services as one of the collections of services that shall be offered to applications programmers. That announcement has not been made yet [Editor's note: as of December 1987], but it has been discussed with consultants.

And if you looked at the SAA diagrams, you can see that both OSI services and IBM's Systems Network Architecture [SNA] services are to be available under the common SAA interface.

What this means is that IBM is clearly committed to SNA as its premier functional architecture. That will not change. But there are applications that require direct native mode access into OSI services. So IBM is handling that, first, by providing OSI-to-SNA gateways, and second, by providing native mode interfaces into OSI that can be accessed through SAA.

This, by the way, should sound familiar. We tell our consulting clients that the most effective way to gain access to SNA is to implement SNA as a native mode service in your equipment. This makes it possible for our customers to gain first-class citizenship in the services of SNA.

What IBM is doing with OSI is exactly the same thing in reverse. In fact, if I were to look forward 10 years from now, I would expect to see every computer system, whether personal computer or mainframe, running both OSI and SNA.

So the future is an equal balance between SNA and OSI?

No, not equal at all. Given the power and maturity of SNA, I think you'll see 80% to 90% of the functionality provided by SNA.

There's been a lot of talk about SAA being closed to non-IBM vendors. Is it?

To understand that, you need to build a mental diagram of SAA. Draw a block and label it "SAA." At the top of the block write "interface," and that interface is used by applications programers to utilize the services of SAA.

At the very bottom of the block is another interface, and that interface goes to the network. It's through this network interface that the SAA architectures are translated into specific protocols like LU6.2.

Now go inside that block. Draw vertical lines that divide the block into components. Label these components as LU6.2, Distributed Data Management [DDM], relational data base and the like. These vertical components are in turn linked by internal, horizontal interfaces. If we look at the horizontal interfaces between those components, we would find they are not open. They are not specified by SAA.

Indeed, they shouldn't be. The details of the interfaces are specific to the systems on which they're implemented. On a Microsoft Corp. MS-DOS machine, they might be a software interrupt, in an IBM OS/2 unit, they're a call in protected mode, and on a System/36, they are some other kind of mechanism.

But the point is, they're closed. And that's what people are usually talking about when they say that SAA is not open. The challenge for the entire industry is whether one of those central, vertical components, with its closed horizontal interfaces, could be replaced by someone's third-party product — say, by a non-IBM relational data base. And I don't have an answer to that yet.

But in my judgment, what IBM really has done is fueled the demand for networking. Even with what may be a closed environment for individual workstations at the horizontal level, there is still a significant opportunity for hardware vendors to tie in through the protocol interface at the bottom of the block.

So your clients are hardware vendors and not MIS-oriented end users?

Not entirely. I see an increasing customer base among end users. There are holes in IBM's current networking strategy. We've seen quite a lot of interest on the part of end users in doing something about [these holes].

For instance, if you look at SNA on workstations from IBM today, you'll see that it consumes large amounts of memory. [The amount is] so large that if you install SNA and put it together with the memory requirements for MS-DOS and the memory requirements of whatever compiler the applications developer is using, you'll discover that you have only 10K bytes left for application programs.

What people have come to us for is a distributed implementation of SNA in which the bulk of the SNA code is located in a dedicated SNA machine, while a much reduced — and I mean *much* reduced — layer of software is implemented on each of the workstations. This provides more room for applications. In addition, the SNA gateway is a single address on an SNA network that is shared by dozens, maybe hundreds, of workstations.

IBM's plan to solve the problem is to have 5M to 8M bytes of memory on every machine running OS/2. And two to three years from now that doubtlessly will be a very common strategy. But in the meantime, end users can still integrate their existing investments in MS-DOS-based machines via this gateway method.

Is IBM really serious about SAA? Is the company interested in distributed computing using SAA or anything else?

I think what you're referring to is the common belief that IBM is committed to selling only mainframes.

But I think that's wrong, particularly if you look at the success of the Entry Systems Division and, now, the Communications Products Division. Both of these divisions have distributed processing as a mandate. I believe that IBM is being driven to SNA, SAA and distributed computing by its customer base. End users are pushing for distributed processing.

What does SAA mean for the industry as a whole?

We are telling our clients that with SAA, IBM has laid down the gauntlet and said, "If you want to play in this game, here is what you've got to have." You need Advanced Program-to-Program Communications, LU6.2 and 3270 capabilities and LU2. You need to have Document Interchange Architecture for documentation and office automation services. You need to have SNA distribution services. You need DDM for remote file access.

We continue the story by saying that not only do you need these protocols, but you also need to be manageable as if you were a native SNA device.

In addition, we tell our clients there are certain areas that are closed, and we'd recommend staying away from them.

Such as?

In particular those areas that are in the transport network itself. We're seeing hints of closure in two places: subarea networks and communications controllers. You may recall some months ago there was a small stir created when IBM changed the status of some of its documentation for protocol elements in SNA. It moved that material from public documentation to documentation that's only available under software license. I don't consider that a major move, but I do think it's a signal.

Why is IBM starting to close the transport network?

The positive and friendly perspective is that IBM is making a major redesign and has to go through a great deal of work before it can open things up again. Or you can look at it as a competitive move and say that this is the area in which IBM is really going to make SNA networks work well, and the company doesn't want other vendors to put their products in that segment of the network architecture.

Assuming it is the latter, who are the targets?

I think it would be the vendors of communications controllers — possibly Amdahl and NCR.

What should MIS professionals know about SAA?

Well, what they really should know about are the interfaces — particularly, the LU6.2 interface — because those are what they will be using to develop new distributed applications.

Letters

Continued from page 5

Some young and inexperienced systems executives probably believe what he says because it sounds good and certainly fits with industry hype.

J. Robert Riggs
President
J. Robert Riggs Co.
Dallas

Insurance firm runs dual LU2, LU6.2 line

I read your Nov. 4, 1987 issue on micro strategies with great interest. I am concerned about the accuracy of the article titled "A cooperative effort: Sharing the processing load." The article contained the following statement: "Another problem with APPC is the way LU6.2 devices are defined in SNA. At this time, you can define a line to support either an LU6.2 device for cooperative processing or an LU2 device for IBM 3270 emulation. The line cannot support both types of devices concurrently."

This statement is not true. The American Family Insurance Group has had LU6.2 devices and LU2 devices defined and supported concurrently on the same line for about one year. The devices are IBM 5364s that have both LU6.2 applications and LU2 applications in production. While this firm is an early user of LU6.2 applications, it has found the environment to be very stable for applications requiring tight synchronization between mainframe-based and distributed data.

Byrne Chapman
MIS Technical Support Manager
American Family Insurance Group
Madison, Wis.

MIS's honor

Continued from page 6

computer users.

These are moral judgments and are highly situational. It is difficult for outsiders to make determinations. Each person must evaluate his role in the light of organizational and societal good. Is this judgmental? Yes. Is it easy to align with business goals? Yes. But if we value our profession and our status, the duty of assessing moral boundaries will be a strong factor controlling our vision of what is right. Ethics practiced individually can reinforce self-esteem. Practiced across the MIS profession, ethics have the power to ensure the technology is used benignly. And it is this shield of moral responsibility that will protect our profession from the irresponsible accusations of others.

news & analysis

UPDATE

OSI delays have helped bolster support for TCP/IP

The communications industry has produced a surprise or two recently.

Witness the ground swell around the Transmission Control Protocol/Internet Protocol (TCP/IP). This mid-level International Standards Organization (ISO) networking protocol was supposed to be temporary help, an intermediate stage before the ISO's Open Systems Interconnect (OSI) stepped in. TCP/IP has turned the tables and is proving many detractors wrong by gathering much more market support than was initially expected.

TCP/IP has found its feet through users in the government and now the commercial markets.

"I've noticed a perceived need for more intersystems connectivity," explains Chuck Newton, president of Newton-Evans Research Co. in Ellicott City, Md. "TCP/IP is providing a proven, workable link. We found much more support in the commercial area for TCP/IP than we thought existed."

Newton says TCP/IP is also getting a boost from the fact that OSI seems to be perpetually off in the distance, and he doesn't think a workable OSI model will be available in the U.S. for another 24 months.

As for the Manufacturing Automation Protocol (MAP), which is based on OSI, Newton says it is fading. MAP is still being discussed, ad infinitum, but that's just the point. There is a lot of talk but, as yet, few installations for interested customers to look to as reasons to get excited about MAP.

Not all roses

Not that everything is coming up roses for TCP/IP. The U.S. Department of Defense recently stated its intention to drop TCP/IP in favor of OSI, and Bridge Communications, Inc., a Mountain View, Calif., subsidiary of 3Com Corp., has introduced an OSI-compatible communications server that could presage the arrival of other OSI communications products on the market.

Even more significant is an announcement by Netwise, Inc. in Boulder, Colo. The company has introduced a number of tools that automatically generate OSI standards-based network software for distributed applications.

According to David Andrus, Netwise's chief executive officer, the Netwise tools can operate with several languages, such as C, Fortran and Cobol, and support OSI, MAP, Digital Equipment Corp. Decnet, IBM Systems Network Architecture and Advanced Program-to-Program Communications and TCP/IP networking protocols.

"OSI is coming, and we'll be ready," Andrus explains. "Until then, however, developers can use our tools to program in the current system environments we're supporting."

Roses have thorns

TCP/IP is also a thorn in IBM's side, according to Doane Perry, a senior telecommunications consultant at International Data Corp. (IDC), a research firm in Framingham, Mass.

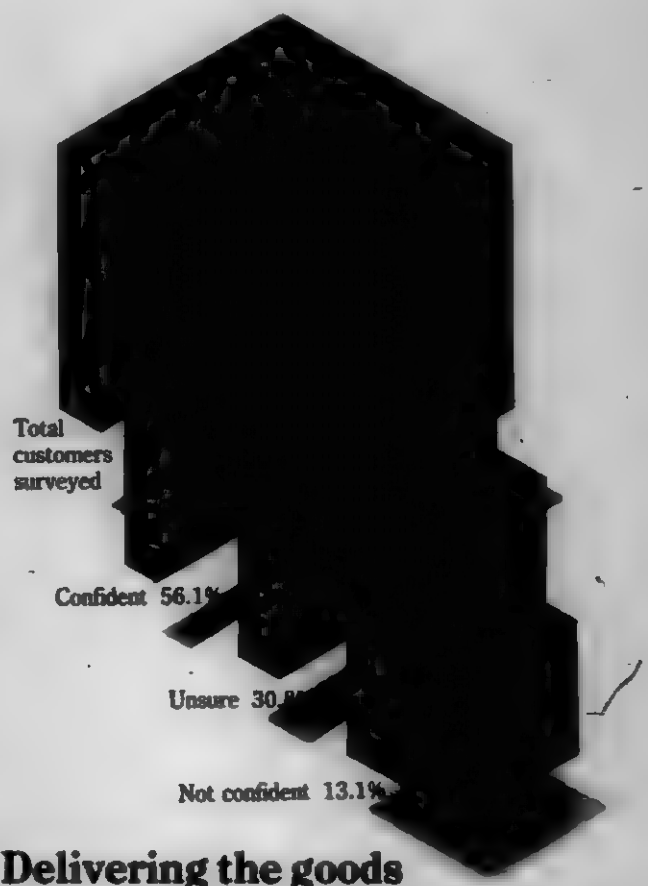
"IBM is troubled by TCP/IP because there is demand for the standard," Perry says. "On one hand, IBM can't ignore potential TCP/IP profit, but on the other, IBM would rather not be sidetracked from its current commitment to OSI and Systems Application Architecture," Perry explains.

Leaving TCP/IP, Newton says he sees a trend in the continuing proliferation of telecommunications solutions and products that have been spilling into the market and confusing the lives of U.S. telecommunications managers.

"Microprocessors are at the root of this trend," according to Newton. "Integrators are putting these processors to work in all kinds of telecommunications products, but buyers are waiting for a clear product or direction to emerge. The telecommunications market is not like the computer industry. Computer executives can always turn to IBM, but AT&T has failed to emerge as the IBM of the telecom industry."

And who benefits from this confusion in the telecom arena? User-side consultants and, hopefully, telecommunications managers, Newton says. He

Continued on page 13



Delivering the goods

Are customers confident that IBM will meet proposed delivery dates for its network products?

INFORMATION GATHERED FROM AN INTERNATIONAL DATA CORP. SURVEY OF 107 IBM SYSTEMS NETWORK ARCHITECTURE SITES.

GRAPHIC BY BRUCE SANDERS

Group formed to provide mobile satellite service

Private communications vendors, under the direction of the Federal Communications Commission, are forming a joint venture to provide mobile satellite communications services to U.S. consumers. The move is being hailed by many as a great leap forward for space-based personal communications. However, some observers fear the venture will create a new communications monopoly.

For years, people have talked about truly mobile satellite communications. A mobile satellite service (MSS) would be a system under which any land, air or sea vehicle — or even an individual carrying a pocket communications device — could link to the world via communications satellite.

The advantages of an MSS would be immense. Remote areas, no matter how far removed from civilization, would not be isolated any longer. A downed airplane pilot, a stranded motorist or a distressed hiker could simply phone for help, even if he were in the middle of Antarctica.

Technologically, an MSS has been possible for some time, but vendor disputes over communications protocols, business strategies and so forth have kept such projects on the ground. However, in 1987, the FCC stepped in to resolve the issue. It directed all serious would-be MSS vendors to form a joint venture that would collaborate on a single space-based communications service. Further, the FCC required each of the vendors to prove its financial viability by depositing $5 million into a common escrow account.

Continued on page 12

Cable-based nets get competition from unconventional LAN media. Page 13.

E-mail just isn't the same anymore

Just when you thought it was safe to send an electronic mail message to a colleague, along comes group productivity software to complicate matters. On the surface, group productivity software is difficult to categorize. The software seems to cover a lot of common ground with related products such as distributed data bases, relational data base management systems, integrated office systems and executive information systems, not to mention the more traditional E-mail systems, which focus on the bread-and-butter functions of calendaring and scheduling.

Howard Case, vice-president of marketing at Conetic Systems, Inc. in San Leandro, Calif., says the company's group productivity software, Higgins, differs from such integrated office systems as All-In-1 from Digital Equipment Corp. and Comprehensive Electronic Office from Data General Corp. in two major areas.

"Traditionally, integrated systems are minicomputer based and emphasize word processing," Case explains. "Higgins is based on personal computers and runs over a local-area network. We also give regular electronic mail functions over wide-area communications."

Case adds that Higgins is built on the company's own relational data base, which enables users to have personal data bases available on more than one server.

"I guess that's pretty close to what distributed data bases are about," Case claims. "Once [Microsoft Corp.'s] MS-DOS 3.1 and record-locking facilities became available, we could open up the networking and data base features of group productivity software."

According to Erin Zabriskie, a marketing representative at Orem, Utah-based Wordperfect Corp., whose Wordperfect Office group productivity package is scheduled for release in March 1988, Wordperfect Office is also relational in nature.

"The product's scheduler facility can take variables from users' work schedules and automatically coordinate the best times and places to arrange meetings and other events," she says.

"Wordperfect Office then sends an update message to the users involved," she adds.

User productivity

"Such group productivity software is helping people discover that linking personal computers together finally produces more user productivity," explains Molly Upton, vice-president of applied technologies at International Data Corp., a market research firm in Framingham, Mass.

"Group productivity software is different from executive information systems because it hasn't been predesigned to screen information and put it into graphics. Group productivity systems are also different from other systems because they are PC based and their target user markets are not as specifically focused," she says.

Yet Upton also argues that there will be a market convergence among group productivity software and other integrated productivity software in the future.

To increase sales and market share, both vendors of executive information systems and integrated office systems will be opening up their target user bases to the middle management area and incorporating personal computers into their products.

Middle management and PCs are already two important components found in group productivity software. One area in which group productivity software might remain distinct, however, is in its ability to service more narrowly defined work group situations among people who share common work concerns. "Most of our customers operate within work groups of 20 to 30 people," Case explains. "That's what we're targeting."

The Coordinator may signal a way in which group productivity software can carry out the work group approach.

The Coordinator is a group productivity system that runs on both Novell, Inc. LANs and much larger networks. Action Technologies, Inc., the Emeryville, Calif., developer of The Coordinator, has produced a relational type of networking software that reportedly enables users to create their own distributed data bases.

Behind the scenes, The Coordinator's software sifts through data bases to collate communicated data into categories, which Action Technologies claims can provide more meaning to users than the usual electronic mail offerings.

Yet, almost as an afterthought, the firm hastens to add that The Coordinator also provides regular E-mail calendaring and scheduling features. Apparently, there are still many users out there who prefer the more simple staple of E-mail services. — SK

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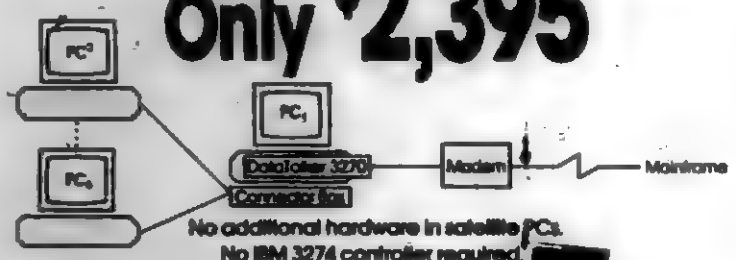

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Mobile satellite

Continued from page 11

The survivors of the latter requirement numbered only eight. The group was made up of Hughes Communications Mobile Satellite Services, Inc. in Los Angeles; Mobile Communications Corp. of America — Space Technologies Corp. in Jackson, Miss.; Mccaw Space Technologies, Inc. in Portland, Ore.; Mobile Satellite Corp. in Malvern, Pa.; North American Mobile Satellite in Washington, D.C.; Satellite Mobile Telephone Co. in New York; Skylink Corp. in Boulder, Colo.; and Transit Communications, Inc. in Pasadena, Calif.

Partners in the sky

Under FCC pressure, the eight agreed to form the MSS Consortium, which functions as a profit-making general partnership jointly owned by all the participants. The consortium will cooperate on the construction of a satellite, on its launch and on the operation of space-based services thereafter.

In November 1987, the eight announced they had reached an understanding "regarding the key principles that will govern fundamental business, structure and procurement decisions of the MSS Consortium." In other words, the group is now free to address the technical issues that continue to keep MSS from becoming reality.

Partisans of the consortium say the arrangement is the quickest, most efficient way of getting MSS functions to the consumer. But the consortium also has its critics. Some observers feel that individual vendors' services should be made competitive and that the FCC-mandated consortium has effectively created a monopoly situation. Even some of the eight members will privately admit to reservations about the arrangement. "It doesn't sound very good for the consumer," says one company officer, who asked not to be named. "We've fought for years for competitive services, but we lost that battle. So now that we've done our civic duty, we'll take the money and run."

Champions of the consortium argue that the arrangement is actually the only means by which to get space-based communications to consumers. Billy J. Parrott, president of Satellite Mobile Telephone (the only minority enterprise in the big eight), argues that the sheer costs of an MSS require that as many vendors as possible share the expenses. "The satellite has to be built, the spacecraft has to be launched. . . . We'll spend nearly $300 million even before we get the bird launched," he claims. "It's an awesome investment. What the FCC is saying is rather than one person or company making that investment, do it jointly."

Parrott compares an MSS with an interstate highway system. The government builds and maintains state highways at public expense but then allows trucking firms to compete for business using those roads. So, too, he says, will the government allow the MSS Consortium to set up the space-based system and then allow ground-based communications wholesalers outside the consortium to compete for business using the system.

"People forget that there will be two aspects of this setup," Parrott says. "The space-based consortium will be only part of it. The ground-based side of the business is where the business will be. Eventually, I suspect, the ground investment will be greater than the space investment."

But monopoly or public service, the group expects to have its satellite built by 1988 and launched by 1990. — MT

Update

Continued from page 11

adds that one fallout from the situation is a requirement for more centralized telecommunications functions.

Another elusive standard, the Integrated Services Digital Network (ISDN), is getting closer to acceptance. Despite AT&T's recent decision to hold off producing preliminary ISDN tariffs for another year and despite undelivered promises of vendors, ISDN technology should prevail.

"There's some definition about what the 1990s will bring with ISDN," Newton says. "Users are thinking about applications and pricing. Momentum is building."

IDC analyst Perry points to IBM's recent declaration that it would support at least a formal, standardized version of ISDN in the future as a solid indication that ISDN is picking up speed.

EDI heats up

One definitely hot area in communications is electronic data interchange (EDI), which Newton claims is getting more commitment from the retailing, manufacturing and distribution markets.

Despite initial technical and marketing problems with EDI, Newton says that a refinement of EDI services and a push toward standardization on the part of the Transportation Data Coordinating Committee (TDCC) and other EDI standards committees are pushing EDI ahead.

The recent creation of an international EDI users group and the American National Standards Institute's finalization of its X.12 networking standard are also expected to spur interest in EDI (see story page 39).

Storming the walls

Meanwhile, Unisys Corp.'s recent purchase of Timeplex, Inc. is being seen by many as a direct assault on IBM's network fiefdom.

Timeplex is the largest U.S. manufacturer of T1 multiplexers, and the move to purchase the company is a good way for Unisys to integrate private branch exchanges and other communications products into its expanding computer lines, according to industry watchers.

The Unisys/Timeplex marriage raises some interesting questions, however, about Timeplex's existing IBM account.

Most of Timeplex's customers use IBM mainframes, which compete directly with Unisys systems. Many of these same customers also use IBM's Netview network management system.

"It will be interesting to see if Unisys lets Timeplex service its Netview customers in the future," Perry says. "It should make for an interesting arrangement." — SK

dB

By Rich Tennant

Wireless LANs seek to usurp cable's role

Alternative local-area networks are coming. Trying to capitalize on the expensive installation costs of traditional cable-based LANs, developers have been working on a variety of technologically diverse LAN media to catch user interest.

Solutions range from radio frequency (RF) to infrared LAN transmission, so-called wireless LANs.

Ray-Net Communication Systems, Inc., a West Vancouver, British Columbia, company that has developed Ray-Lan, an RF LAN, claims that the initial high installation costs of Ray-Net network nodes will be more than offset later when customers invariably have to reconfigure their networks.

What it's got

Ray-Lan's main components are an IBM Personal Computer adapter board, an RF transceiver that is placed near the workstation and proprietary software that is compatible with Novell, Inc.'s Advanced Netware LAN operating system.

Reconfiguring Ray-Lan simply entails placing workstations and transceivers at new locations within the distance parameters of Ray-Lan RF transmissions. This action obviates the high costs of removing and relaying computer cable, the norm in today's LAN installations, the vendor said.

Though Ray-Net insists its product will eventually find widespread use in mainstream commercial office applications, the company is initially targeting niche industrial and distribution applications in which the need for wireless applications will outweigh some of the drawbacks of RF transmission, such as slow transmission speed or line-of-sight requirements.

"I can see RF LANs in niche applications that require frequent [network node] movement," explains Brad Baldwin, an industry analyst for the Telecommunications Industry Service at Dataquest, Inc., a San Jose, Calif., market research firm.

"These would be applications in which you're possibly sending and receiving data from a moving vehicle or boat or in warehouses or heavy shop-floor situations in which laying cable could be awkward and is only temporary. I think there are still too many trade-offs with wireless LANs for the commercial area," he says.

One such trade-off is speed, or rather, lack of it. Ray-Lan's transmission speed of 19.2K bit/sec. is slow when compared with a LAN rate of 1M bit/sec. from AT&T's Starlan.

Another wireless LAN technology under development, infrared transmission, suffers from line-of-sight considerations that limit its transmission distance considerably.

"Bouncing [data] transmissions off a central point on a ceiling to workstation receivers around the office is not going to convert a lot of people to infrared," Baldwin suggests.

Problem upon problem

"Just the idea that these wireless technologies are so different from regular LAN technology is enough of a drawback," according to Lee Doyle, a senior analyst at International Data Corp., a Framingham, Mass., research firm. "The fact that there are distinct trade-offs with wireless LANs just adds to these problems."

Both Baldwin and Doyle, on the other hand, point to same-premise unshielded twisted-pair telephone wiring as a medium that offers some real relief to LAN users.

"Unshielded twisted-pair LANs offer a 10M bit/sec. Ethernet LAN transmission rate," Baldwin explains, "which is the same rate as current thin-wire Ethernet."

Unshielded twisted-pair LANs offer high bandwidth and easy reconfiguration and installation (most office buildings already have adequate unshielded twisted-pair wiring installed on their premises), although initial installation costs per node average about $500 above that of current Ethernet LAN installations.

Another limitation is the transmission distance that is technologically feasible between the network wiring closet and a workstation node. In the case of an unshielded twisted-pair LAN, that distance is currently at a maximum of approximately 300 feet, well below existing Ethernet networks' average of about 1,000 feet.

Michael Clair, vice-president of marketing and sales at Synoptics Communications, Inc., the Mountain View, Calif., developer of the Lattisnet unshielded twisted-pair LAN, claims recent studies indicate that most workstations are within 300 feet of wiring closets, so added installation costs are unnecessary.

Synoptics, whose product was introduced in August 1987, has some stiff competition. Digital Equipment Corp. introduced its unshielded twisted-pair LAN adapter in September 1987 at Decworld, and 3Com Corp. followed suit the same day with its own offering.

Hewlett-Packard Co. is scheduled to start shipping its product in July 1988, and both Wang Laboratories, Inc. and Western Digital Corp. are developing their own unshielded twisted-pair LANs. The field is getting crowded.

"We still recommend that our customers use regular coaxial cable because it gives greater transmission distances and is less affected by external interference," says Gail Daniels, a marketing manager at DEC. "If they cannot use coaxial, then unshielded twisted-pair LANs can be an option.

Synoptics' Clair stresses that unshielded twisted pair is not merely a compromise technology.

'No shortcuts'

"The unshielded twisted-pair rate is 10M bit/sec. and can provide true IEEE 802.3 Ethernet networking," Clair explains. "There are no shortcuts taken here."

To emphasize the issue, Clair points to several studies recently carried out by some regional Bell holding companies as well as Novell, which pitted Lattisnet, representing unshielded twisted-pair, against some thin-wire Ethernet networks.

"There was no throughput degradation or bad data on the part of the twisted-pair," Clair claims. "In fact, in certain cases, Lattisnet outperformed the other networks." — SK

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TCP/IP alive and well — until full OSI arrives

Despite general industry agreement that the International Standards Organization's Open Systems Interconnect (OSI) model will eventually be the standard for data communications, other communications protocols — particularly the Transmission Control Protocol/Internet Protocol (TCP/IP) — refuse to die. In fact, TCP/IP, the current standard for communications in Unix systems, is still very much with us.

Indeed, in recent weeks, several firms have entered or reaffirmed their faith in the Unix-oriented protocol. Some observers suggest this trend spells trouble for the OSI model, but the majority opinion is that TCP/IP is actually functioning as a conduit to OSI.

TCP/IP is one of the oldest of the current communications protocols. It was developed along with the Unix operating system and, like Unix, was put together in a distributed fashion by independent researchers operating in many different efforts at universities and private and government research laboratories. It has had particular influence among military researchers. Today, TCP/IP is the single most common method of linking Unix-based computers, especially those Unix machines from different vendors.

Unix at the root

The key word here is Unix. Many of the same researchers and vendors who initially developed TCP/IP to span different Unix boxes are now interested in linking machines with different operating syetems. Many are now involved with the OSI effort and are being assisted by computer users who demand multivendor connectivity.

The OSI model is now well defined enough that there exist several firms to sell OSI-based communications software. One such vendor is Retix Internetworking Co. in Santa Monica, Calif. "It's a myth to say that OSI is still only an architecture in formation," says Charles Criss, Retix's vice-president of sales and marketing. "Parts of it are now sufficiently firm that you can write software [based on it], as we have."

Retix currently offers not only OSI communications software but also a number of development, testing and validation tools that enable buyers to put together their own OSI-compatible applications.

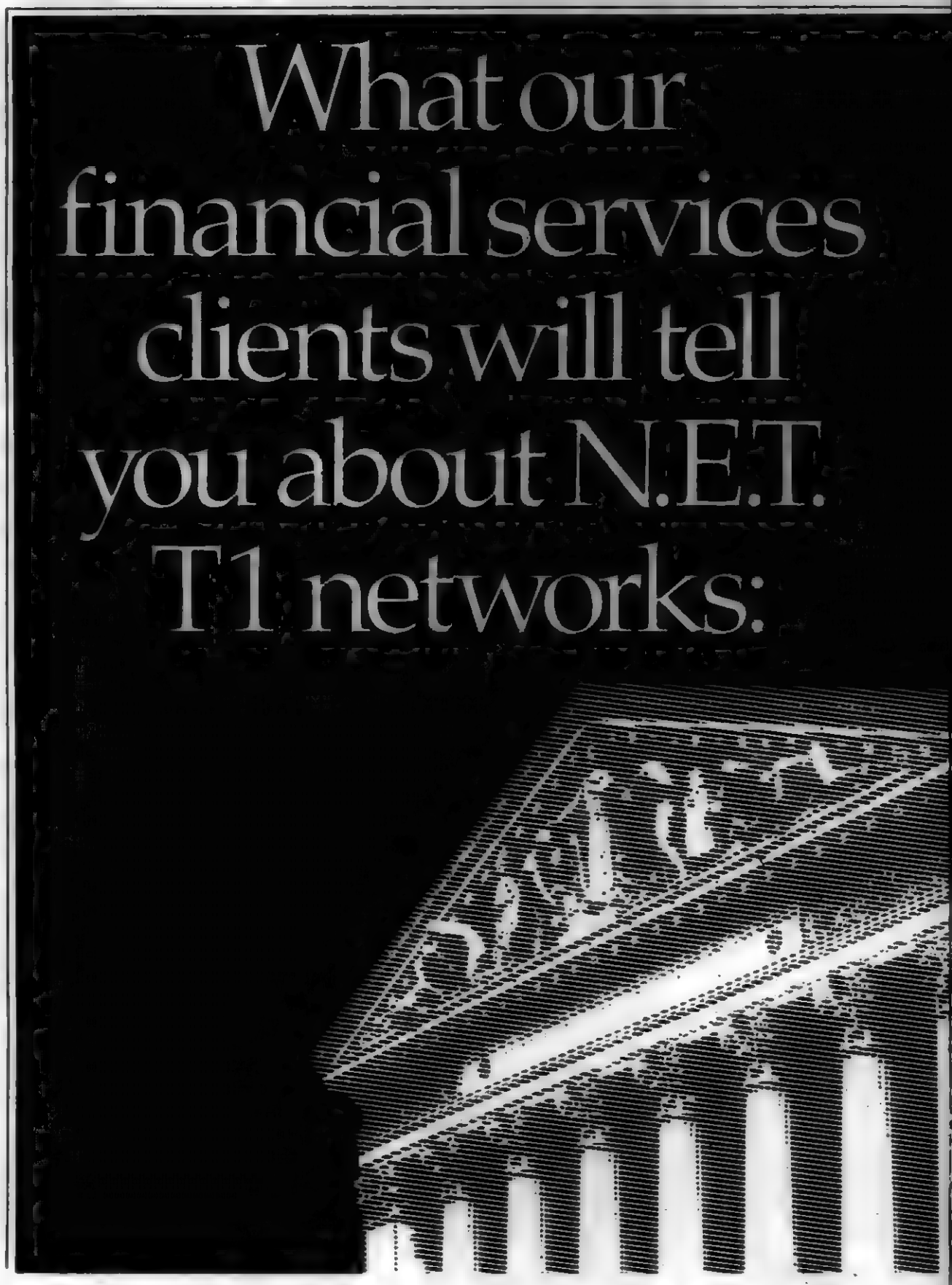
Also, there is now an extensive support infrastructure for developers and MIS professionals working with OSI. Training in the protocol, for instance, can be obtained from several seminar houses. Omnicom, Inc., in Vienna, Va., recently announced a one-week series of classes titled "Omnicom Week," which promises to make MIS staff OSI literate in just five days.

Yet TCP/IP endures and prospers. TCP/IP vendors have reportedly increased in number in the last year. Meanwhile, major hardware vendors are taking every possible step to have TCP/IP in their offerings. Even Digital Equipment Corp. in Maynard, Mass. (which had been rumored to have its own standards to offer), announced last November that it had licensed the Fusion TCP/IP networking software from Network Research Corp., located in Oxnard, Calif. In fact, in recent company literature, DEC has called TCP/IP the emerging "de facto standard for interconnecting heterogeneous computer systems."

As for the TCP/IP vendors, they have so far declined to enter the OSI market. Subhash Bal, vice-president of marketing for TCP/IP vendor Excelan, Inc. in San Jose, Calif., claims his company could have an OSI product within a year. But Excelan has chosen instead to remain focused on TCP/IP and recently announced a product to extend that protocol to Microsoft Corp. MS-DOS systems.

Why the difference between the market reality of TCP/IP and the almost universal endorsement of OSI? Bal explains the situation as simply a question of timing. Like most TCP/IP vendors, he feels that OSI ultimately will win out, but right now, TCP/IP is finally becoming an industry in its own right. "People who sell OSI are almost exactly where we were several years ago," he says. "Then, people who bought TCP/IP were just experimenting. Well, today, TCP/IP is well known, and people are actually using it. OSI, meanwhile, is what they're buying as an experiment."

If that is the case, then the question for both communications buyers and vendors is how fast and when they will be asked to convert to OSI software from TCP/IP. Some vendors are suggesting that the transition may be painless. They are hoping that gradually all communications software, including that based on TCP/IP, will take on more OSI features with every release and upgrade, until, finally, there will be no difference between OSI and earlier standards. — MT



Foes DEC, IBM take fight to net management arena

Network management seems to be emerging as the new battleground for archrivals IBM and Digital Equipment Corp. Each seems to have abandoned its attempts to dominate networking media and instead has focused on the control of data communications through network management.

However, third-party vendors could yet give the titans unexpected competition.

IBM was the first of the giants to promote network management as a fundamental business strategy; its network manager is Netview. When first introduced in 1986, Netview was a single product, but it has rapidly grown until now it is an entire group of offerings that range from mainframe-based systems to a personal computer version.

Some analysts have suggested the personal computer version is the most important of the Netview products. They suggest that it foreshadows a long-term IBM philosophy of distributed computing in which entire networks are managed from small, dedicated workstations.

Status enhanced

Netview's status was enhanced by several features announced in October. These additions included products that give network operators the power to distribute software, analyze data and transmit data files within large voice and data networks.

DEC, meanwhile, is also making an issue of network management, though the company has not grouped network management functions within a single product line.

Instead, DEC officials say that the company offers a group of different management products that can be selected or rejected according to users' needs.

DEC's detractors, however, claim that the VAX maker lacks a coherent network management product line. "If DEC doesn't come out with a Netview buster pretty damn quick, its products will end up as just another bundle of boxes on IBM's System Network Architecture," according to one user, who asked not to be named.

DEC's defenders, however, point out that the company's Decnet contains extensive network management functionality. They also cite DEC's recently announced computer-integrated telephony (CIT) program, which the company says will ultimately link DEC data networks with the voice networks of leading private branch exchange vendors.

Thus, the CIT program has the look of an embryonic Netview.

In effect, then, both firms seem to be

> **"If DEC doesn't come out with a Netview buster pretty damn quick, its products will end up as just another bundle of boxes on IBM's System Network Architecture."**
> AN ANONYMOUS USER

adopting a strategy under which they assume voice and data networks will contain not only dissimilar machines but also dissimilar networking media and software.

Rather than attempting to impose proprietary standards on either, the companies now want only to control the management function. They seem to be operating on the philosophy that "if you can't beat 'em, manage 'em."

However, there are other options in the management business. Third-party hardware and software vendors also sense a market opportunity. Cincinnati-based Cincom Systems, Inc., for instance, is one of the many vendors to get into network management. Its Net/Master product for IBM machines is a direct competitor to Netview.

Better than IBM

Cincom's fans claim it is actually superior to the Big Blue product.

Other vendors, notably Digital Communications Associates, Inc. in Alpharetta, Ga., have called for the imposition of standards on network management so that it will be as removed from proprietary domination as networking media is today.

Thus, if DEC and IBM really are attempting to shoot it out at the management level, it may be that both will not only have to deal with each other but with snipers as well. — MT

News section written by *Computerworld Focus* staff members Stan Kolodziej and Michael Tucker.

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DAVID FLANERTY

A direct connection to productivity

BY PAUL STRASSMANN

Connectivity and productivity are tied more closely than many organizations realize. Communications and connectivity technologies have the dangerous potential to increase the complexities of managing people and systems thus increasing costs and delaying productivity gains. To avoid these difficulties, managers need to simplify business procedures and carefully assess the technology from a human standpoint.

Numerous studies corroborate that management communications (overhead) is the single largest cost factor in U.S. businesses. The costs of management communications, especially for such things as company meetings, exceed the expenses for direct labor and for the used cost of capital in most cases. In the average U.S. firm, management studies indicate, the total cost of management communications currently exceeds net profits by a factor of three to five. Excessive costs of administration, coordination and innovation not only detract from profits but also cause inadequate competitive responses.

What is at the root of these self-inflicted injuries, and how can they be avoided? And what is the role of information technology to alleviate the symptoms of cumbersome decision making?

Even though electronic mail, computerized scheduling, on-line simulation of pricing decisions and easy connectivity to distributed data bases could reduce delays and excessive costs, the sad truth is there are too many circumstances involved for companies to take advantage of all of these features and deliver much-improved results.

Account for human factors in your goals

In examining a broad spectrum of management practices, one often wonders why it should take so much time and money to accomplish goals. For example, a modification of pricing policies is one situation that can be cumbersome, consultation intensive and time consuming. I have observed similar patterns in product development, in deciding on plant location, in reorganizing, in budgeting and in major project proposals.

I recently reviewed a project in which 150 hours of coding and testing called for the completion of elaborate phase-program management procedures, a demand that required an additional 900 hours worth of proposals, feasibility studies, checkpoint reviews, audit sign-offs and installation verification efforts.

After adding all of the communications time for coordination and consultation on this much grander scale, it's no wonder why some projects can legitimately end up with $800 toilet seats, $1,700 wrenches and $650 coffee pots.

To explain how connectivity relates to productivity, I will extend the scope of the seven layers of the International Standards Organization's (ISO) Open Systems Interconnect (OSI) to include all the means by which management communicates. If the objective of OSI protocols is to achieve smooth electronic network transparency, I will now classify the managerial communications processes in similar terms that smooth the transparency of verbal and written communications.

In one pricing policy case (see story page 18), 99% of the costs were not incurred from making changes to the billing programs to reflect what management wanted. Rather, more than $70,000 was spent on meetings either to arrive at the pricing decision or to communicate it.

Strassmann retired from Xerox Corp. in 1985. His career in computers began in 1954 and includes 20 years as a chief computer executive and seven years as vice-president of strategic planning. His 1985 book, *Information Payoff*, has received worldwide acclaim, and its sequel, *Computer Payoff — The Business Value of Information Technology*, will be published this year.

Top management's decision time was negligible. Phone conversations were about 10% of the cost; systems analysis and programming about 10%; text creation, editing and printing less than 10%. Theory would then dictate that the process was only 1% cost-efficient because only a decision by top management and a change to the pricing tables were absolutely essential. By similar reasoning, the entire process was only 3% efficient in scheduling if one presumes the company president directly activates an expert system.

What, then, consumes 99% of costs and 97% of the schedule? The culprit is the lack of connectivity in management communications.

When I examine what was said at management meetings, transcripts of phone calls, electronic mail messages, memoranda and intracompany bulletins, they rarely make any sense taken in isolation. These channels of information are repetitious, loaded with extraneous data and incomplete. Managerial conversations make sense only to someone who can decode them based on a familiarity with the corporate culture.

The network equivalent of this phenomenon is the elaborate de-encryption protocols that are present in defense intelligence networks. Experienced corporate staff members reveal the presence of such routines when they explain their conclusions by referring to their company's method of operating, claiming, "That's the way we do things here."

In addition to the presence of company-specific or function-specific codes, such as MIS or accounting jargon, I find that organizational connectivity is further confounded by the presence of a large number of messages that are either parochial, contradictory or ambiguous. Confronted with such a system design, organizations can survive only by interposing into their networks costly compensatory protocol conversion processes (staff meetings), error correction routines (requests for departmental comments) or noise suppression devices (executive directives).

Company chaos

Each company laboriously formulates forms, methods, procedures, approval signatures, field bulletins and fine print on invoices to create some order through standardization in this noisy setup.

In contrast with communications standards promulgated by the Consultative Committee on International Telephony and Telegraphy, the American National Standards Institute and the like, corporate standards makers are also standards enforcers and standards beneficiaries in terms of the power they wield in dictating how decisions are made.

This situation is why corporate standards need to be continually negotiated and redefined via time-consuming message exchanges. The difficulty is to find effective communications designs, even when organizational costs dominate and when connectivity occurs only after overcoming information transmission barriers.

How can we deal, then, with the question of a comprehensive communications design that will include not only electronic technology connectivity, defined by the layered model of OSI protocols, but also organizational connectivity, defined as the decoding of the personal filters that have a decisive effect on the overall performance of management systems?

I propose that network analysts interested in designing productive management systems must also consider designing three additional layers of protocols that are incremental to the seven OSI technology layers. These added layers are organizational connectivity protocols. Level 8 would consist of individual knowledge gaining, Level 9 would deal with group cooperation, and Level 10 would pertain to enterprise goal setting.

• **Individual knowledge gaining.** Much of the time consumed by people in conversation is taken up by the exploration of relationships between new and old information. In terms of systems analysis, this process is one of pattern matching in which any new information is fitted in as a modification to existing knowledge.

In this sense, the meaning of connectivity is the ease with which someone can accomplish such a fit. It follows, therefore, that productivity is the measure of how one evaluates the costs of knowledge acquisition.

Most of us have little understanding of how unstructured management information can be organized for easy understanding. Typically, information presented to management is unbalanced in content and format. For instance, a pricing policy proposal contains precise data about revenue, legal aspects and implementation methods but lacks insights into competitor response, sales force motivation and administrative difficulties. When a pricing policy revision is proposed, each manager from various departments, such as legal, MIS, marketing, product planning and so on, will wish to find out whether the proposal disrupts existing relationships.

Because each department's interests are different and each person assigned to the review has a unique backround and expertise, there is no way of constructing a proposal that would anticipate all of the questions. Consequently, even the most carefully prepared management proposal will be unsatisfactory and consume a disproportionate amount of time placating unexpected yet potentially critical points of view.

A new way to organize

To improve the productivity of the existing management decision processes, companies must change the way knowledge is organized for communication. The current approach is becoming increasingly unaffordable; it relies on an author to predefine a tightly articulated proposition for a diverse audience. This method invariably triggers discussions, comments, replies and revisions because the proponent of an idea cannot anticipate the needs of every reader or listener.

Companies can realize a great improvement in the current originator-driven communications approach when they recognize that the knowledge-gaining needs of individuals differ in content, format and scope.

Instead of delivering precooked and predigested communications, future connectivity will have to recognize that all readers and listeners are unique and reveal their concerns only through interaction with the source of an idea.

As a solution, I see a reorientation in companies from originator-oriented to acquirer-oriented connectivity. Readers and listeners will create their own texts and scripts from organized idea elements provided by the authors. The new formats will look more like reuseable software code or program subroutines than a tablet with sentences engraved in it.

Much of the current thinking, which concentrates on this associative representation of data, is embodied in software packages such as Owl International, Inc.'s Guide, Apple Computer, Inc.'s Hypercard and Xerox Corp.'s Notecards. These products use new ways for knowledge representation to help organize ideas for management.

New standards are emerging that will specify the software environment for the sharing of ideas, concepts and assumptions so managers can add information to their own store of knowledge in ways that current, formless communications do not allow.

These formats will describe what I designate as the eighth level of communications. In this way, connectivity can be extended to include an individual's accumulated personal experience as

Ineffective communications wreak havoc on pricing policy

EXAMINING THE STEPS a computer manufacturer took to make a minor change in pricing policy illustrates the relationship between productivity and connectivity. The procedure went as follows:

- **Step 1.** Staff meeting to discuss a proposal by finance to revise pricing (Elapsed time: 4 days; Hours used: 32; Phone calls: 60; Copies: 200).
- **Step 2.** Agreement to draft a proposed policy revision. Appointment of a working group (Elapsed time: 7 days; Hours used: 8; Phone calls: 6; Copies: 30).
- **Step 3.** Actual work on policy revision (Elapsed time: 4 days; Hours used: 21; Phone calls: 25; Copies: 60).
- **Step 4.** Draft distributed for review (Elapsed time: 2 days; Hours used: 40; Phone calls: 10; Copies: 400).
- **Step 5.** Redistribution of draft for review within various functional organizations (Elapsed time: 13 days; Hours used: 220; Phone calls: 130; Copies: 540).
- **Step 6.** Coordination of staff comments, including reconciliation of opposing views and clarification of intent (Elapsed time: 2 days; Hours used: 25; Phone calls: 20; Copies: 40).
- **Step 7.** Meetings to review consolidated staff comments (Elapsed time: 7 days; Hours used: 18; Phone calls: 60; Copies: 360).
- **Step 8.** Release of summary recommendations for management approval (Elapsed time: 2 days; Hours used: 11; Phone calls: 4; Copies: 100).
- **Step 9.** Management approval (Elapsed time: 1 day; Hours used: 5; Phone calls: 2; Copies: 25).
- **Step 10.** Administrative implementation begun, including negotiation with systems and programming to process changes (Elapsed time: 30 days; Hours used: 65; Phone calls: 110; Copies: 680).
- **Step 11.** Policy distributed (Elapsed time: 42 days; Hours used: 1,020; Phone calls: 270; Copies: 7,600).
- **Step 12.** Systems implementation, including field briefing and revisions to control system (Elapsed time: 15 days; Hours used: 600; Phone calls: 122; Copies: 620).

The above case is a fairly typical corporate scenario that involves a great deal of coordination. The entire process, in terms of its connectivity events, can be presented graphically in the form of a flow chart, because all activities required verbal or written exchanges either in meetings, in print, by phone or via electronic mail.

The entire process had a total elapsed time of 129 days, cost well more than $100,000 and proved ineffective because the long lead time eliminated about one-third of the potential profits available from the pricing change.

The two critical variables: schedule and administrative costs.

As long as management tolerates and even promotes ineffective communications processes when conducting business, the outcome of projects will be predictable — high costs and low levels of efficiency. — PAUL STRASSMANN

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an essential element in knowledge transmission.

• **Group cooperation.** The word "communication" is derived from the Latin *communis*, or sharing. Therefore, even if a person can overcome an individual's limitations in understanding a message, he still must reach an agreement that will result in improved productivity.

Much of the time that was spent by managers on the pricing policy change involved negotiation of priorities. All hierarchical organizations must allow for costs (also known euphemistically as "management coordination") such as the price of expertise and specialization. The problem is that if the experts do not connect well in their efforts to harmonize action, the productivity of the entire coordinative process will degrade.

The more experts that are necessary to conclude a project, the greater the arithmetic probability of disharmony. Theoretically, there are six combinations in which four experts can disagree. By increasing the number of experts to five, the opportunity for differences of opinion rises to 24. If a person needs to run an idea by more than 10 groups, the probability of reaching a low-cost agreement vanishes.

Enter expert systems

How does a company balance the need for expertise in an increasingly interrelated world and the necessity to reduce the costs of cooperation? Decentralization is one answer, except that it creates costs through increased dependence on suppliers and on distribution intermediaries. Information networks offer a solution out of this coordination dilemma. Much of the existing procedural know-how can be placed into computers in the form of expert rules.

The result of installing expert systems will be to cut down on the number of times specialists are involved in decisions. Network-resident, rule-based applications will be accessible without the overhead of meetings, memoranda, reviews and presentations and will account for a gradually rising share of man-hours. Only unresolved differences and exceptions will thus warrant the investment of costly "management coordination" time.

I see the emergence of network-based expert servers, constructed either for intracompany needs or available on an industrywide basis, as a professional services business. For easy access to such expert servers and for smooth integration of the results produced by diverse rule-based systems, there will have to be new standards so that a broad spectrum of expert services can interact within a decision maker's personal workstation. These standards define the ninth level of communications. In this way, the concept of connectivity can include the sharing of accumulated group experiences.

• **Enterprise goal setting.** An article that discusses the relationship between productivity and connectivity would be incomplete without addressing the issue of how even the most efficient network-based organization, managed by the smartest computer-aided executives, can fail.

A pricing policy approval process based on knowledge-sharing and expert rules that delivers results at a fraction of the current cost seems to be the answer to any company's needs; nevertheless, there still may be some doubt as to whether the setup will alienate customers or aid competitors. The concept of effective connectivity is incomplete until a company provides for a means by which to confirm that its managers have dealt with the environment outside their examination of intraorganizational matters.

Layer 10, which I designate as the external connectivity protocol, must be present at all times, automatically searching for threats and opportunities not anticipated by any of my internal compulsions to secure seamless and transparent communications.

How does a company construct such a system? How does the company acquire sufficient inputs to operate such a system? And how does the company communicate its findings to administrative management, whose purpose it is to maintain predictability, consistency and stability rather than responsiveness to external disturbances? The answers to these questions are not easy, even though there exist a few hints of how such systems could be designed.

For instance, automated supermarket checkout computers are used to collect information about the movements and shifting market shares of grocery products. In another case, a telecommunications company uses a monitoring system to evaluate the decisions of lost and gained customers. This system serves as a sensitive indicator of customer reactions to various levels of service. On a much grander scale, The Strategic Planning Institute in Cambridge, Mass., has developed diagnostic methods for competitive benchmarking of business performance.

Sophisticated sources

As a broad range of market intelligence and competitive diagnostic services becomes available, this information will have to be easily accessible as an integral element of each firm's MIS department. The presence of internally and externally generated sources of intelligence will call for standardization of knowledge assessments so that management can cope with enormous amounts of totally unpredictable inputs. The network designs serving such needs will bear a resemblance to today's advanced military command and control systems.

The standards that will permit an automated evaluation of diverse sources of external intelligence define the tenth level of communications. By this means, the concept of connectivity has been extended beyond the conventionally accepted technical definitions as a prerequisite for supporting managers who are concerned with the viability of the long-term goals of their firm.

The present definitions of electronic network connectivity can continue to be viewed primarily as a technological matter, even though some vendors tend to obscure the purpose of these efforts.

In examining the bond between productivity and connectivity, I had to explore what lies beyond the technological issues. The fact is that even if all the costs of information handling are fully accounted for, the costs of technology will be always dwarfed by organizational costs.

This brings me to the key question: Is there a valid relationship between productivity and connectivity? The reply is an emphatic yes. The enhancement of individual knowledge, of group cooperation and of enterprise goal monitoring are all dependent on the adoption of computer-based forms for conveying information for managerial uses.

After the full implementation of the OSI protocol is safely set on its course to secure fluent machine-to-machine links, companies will finally start designing the connectivity that delivers the only productivity that matters — people-to-people links. ✦

Getting the terms straight

HOW CAN WE DEFINE productivity and connectivity? There is a difference in how one calculates the productivity of machine tools as compared with computers. Machines have measurable output; their productivity is the ratio of the quantity of output divided by the quantity of input. Such arithmetic simplicity is possible because the value of the output is close to its cost. When computers are used as a production machine, such as in the printing of invoices, the simple I/O definition applies.

In cases involving connectivity, however, information technology is used as a communications channel to convey information to people. The cost of such a connection is about $3 to $7 per hour for intersite transmissions, and about 20 cents to 90 cents per hour for local networks. Including allocated expenses, the full cost of managerial, professional and administrative people is anywhere from $40 to $200 per hour. There is always an expectation that the value of the transmitted information would be a multiple of the total cost of a connection.

This great disparity between the costs of a communications technology and its total use value leads to the conclusion that the productivity of conveying information can be measured only by observing the effectiveness of the recipients of the information. Measuring the physical output, such as transaction counts, is not relevant as a measure of productivity.

The definition of productivity requires the measurement of organizational performance. The technical questions of signaling frequencies, protocol formats and interface conventions are important but influence only the costs of technology rather than its value. But how can we define connectivity? Technical connectivity issues of interest to communications standards groups, such as the Ethernet interfaces or peer-to-peer file access under IBM's Systems Network Architecture, are challenging but secondary to the more key concern of whether a recipient understands what the sender is saying.

The total cost of communications, in any business, is five to 20 times greater than the expenses for computers and telecommunications. To evaluate the effectiveness of total costs, I make a distinction between the costs of people and technology involved in management information and the costs applied to operations information.

Operations information is an integral part of the costs of a product or service, such as order entry transactions, airline reservations or the completion of financial trades. Connectivity, necessary to secure operational effectiveness, is well understood. From an executive standpoint, the purposes and affordability of operational information systems are clear. Investments can be justified against clearly defined productivity objectives. Evaluating whether the connectivity is effective is accomplished by comparison against planned targets.

The problem with this setup is that applications concerned with operational systems may represent only 20% to 60% of the total information technology budget. Businesses allocate large shares of their resources in support of management information needs, including accounting, control, personnel, sales, production, research and development and other applications.

Information technology is applied here to assist management in sustaining the organization in its innovation, coordination, motivation and administration tasks. These functions can be seen as the required countermeasure to the tendency of all organizations to revert to disorder.

I define connectivity, therefore, as the capacity of the electronic medium to assist management in keeping a business organized. In this sense, the missions of management, organization and communications are identical. After all, management processes are primarily a communications activity for preventing the forces of entropy and disorder from taking over. — PAUL STRASSMANN

Strategy, not technology

Survey finds MIS stresses critical business goals

BY MICHAEL TUCKER

Bombarded by a seemingly endless barrage of communications products, a number of MIS and telecom users and managers say they want to turn their focus from the technology itself to the application of that technology to gain a strategic advantage. As end-user systems grow more powerful, *Computerworld Focus* has learned, the drive to achieve a strategic advantage seems to intensify proportionately within information systems management.

A recent survey of MIS and telecom professionals by *Focus* found that the group as a whole was looking for solutions. Those interviewed vented their frustrations about new and promised offerings and expressed their views on new applications of old technologies, new vendors in the business, government regulations, competing standards and the continuing flux in the communications industry.

Those managers surveyed were all over the map, both geographically and technically. Some people had investments in communications no more sophisticated than a simple twisted-pair line to a mainframe; others were looking for real-time operations in networks that span the globe.

Yet despite these differences, their comments did reveal a few common themes. For instance, all those questioned were concerned less by technology and more by the problems of integrating technology into their organizations to handle existing problems, preferably at an affordable price. "It's like the operating system," said one respondent, who asked not to be named. "I don't give a damn about whether it's MVS or VM or Unix or whatever. It's applications I need. I want something I can buy today that will actually handle my problems. As for all this stuff about X.25 and T1 and SNA . . . God! That just makes me tired."

Tucker is *Computerworld Focus*'s features editor.

RICHARD IRWIN

Moreover, all the respondents hinted that their communications desires reflected a single distant objective. To each, communications is only a means to the end of providing a strategic advantage for his corporation.

Indeed, each was concerned with extending his corporate mainframe downward to end users' desktops sometime in the remote future.

Many of the respondents said they felt that their central issue was meeting data communications requirements while at the same time staying within budget. Cost was, in fact, the single most cited concern.

When questioned about technological issues, Gary Ho, director of data communications for Los Angeles-based Transamerica Information Services, said, "Right now, our biggest concern isn't technology but cost. Our hottest button is keeping the price down. But then, that's everybody's hot button."

To each respondent, communications is only a means to the end of providing a strategic advantage for his corporation.

It certainly is for Dave Docken, senior systems analyst for the Colorado Bureau of Investigation in Denver. "For our purposes," he explained, "the biggest issue is still line costs. We're not a big network, but those costs are what kill us, particularly when we have to link between AT&T and one of the services provided by carriers."

One MIS and communications manager, who asked not to be named, was even more forceful in stating his case. His firm had just decided to go with IBM's Systems Network Architecture (SNA) as its dominant environment. "SNA is a ghoul," he claimed. "It just chews up so much money, so much manpower, so much everything, . . . and it really doesn't let you talk across different vendors' boxes. It just sits there and swallows your budget for pretty well nothing in return."

Beyond budgetary concerns, some respondents reported that the sheer capacity of their systems was their most pressing need. "Transmission speed isn't much of an issue to us," said Don Harmon, manager of communications services for Otter Tail Power Co. in Fergus Falls, Minn. "The thing that I could use the most is more capacity. I have only one line, and when that goes down, we have to rely on public phone lines."

Harmon also wishes for improved technology. For instance, he would like to have an increased ability to manage his network, but mostly he seeks "nothing too exotic — just capacity and reliability rather than technology."

Budgetary concerns and the desire to have upper management provide more transmission capacity are both part of what might be called the "social issues" of data communications. Indeed, the datacom people surveyed cited the issue of matching corporate data communications technology with corporate culture almost as often as they did cost.

One manager of telecommunications for a large insurance company, who agreed to talk to *Focus* only under the condition he not be named, said his company is currently considering major purchases to upgrade its datacom capacity.

Cultural concerns

The manager said that his biggest concerns were purely cultural. "The question for us is how to prepare ourselves for networks," he said. "We've had some experience with local-area networks, and our users seem to understand the value of LANs. Now the problem is how to fit a LAN into the greater setting of the company. What's the term? How do we use [LANs] to gain a 'strategic advantage?' "

Gaining a strategic advantage with information systems is also a concern of Lee Co. in Shawnee

Mission, Kan., a clothing maker perhaps best known for its Lee brand jeans. The firm inhabits a volatile market in which customers are frequently young and fickle, competition is fierce and success is ever threatened by rapid changes in areas as diverse as fashion trends and tariff restrictions on textile imports.

"The biggest concern for us is dealing with our customers and vendors," said Patrick Powers, datacom manager for Lee. He explained that his company has just begun to get into the SNA environment. "We've got about 16 lines to let us talk, mainframe to mainframe, with our suppliers and customers."

He also stressed cost as one of his major worries. The network "has some interesting advantages. It's a shortcut around a lot of problems, but with the cost of all that upgrade equipment and the training that goes along with it, you can't call it a money saver," Powers claimed.

But ultimately, Powers' biggest worry is making Lee more competitive in a cutthroat industry in which every bit of information must be used to gain some sort of advantage.

Not technophiles

"We're not doing this because we love the technology. And we're not doing anything new. We're doing it to keep up with the competition," he said. In effect, the network allows Lee to practice a variant of just-in-time manufacturing under which the firm can vastly reduce the time and effort it takes to order raw materials or fill orders.

Powers noted that gaining a strategic advantage is not easy, even in terms of merely establishing the necessary data links. "I find it exciting to be able to talk to all our customers and vendors mainframe to mainframe," he said. "But it's work. It'll take a year, at least. We've got more than 130 customers and suppliers on the network, and by the time we get them all up, that year will be gone."

The search for a strategic advantage was the subtext of virtually all the respondents' answers. It was particularly apparent among those MIS officers whose end users work with systems more powerful than a common PC.

Indeed, there was almost a direct relationship: The more powerful the end-user system, the more that strategic advantage became a driving MIS issue.

Solution nailed down

For instance, Miami-based Gang Nail Systems, Inc., a company that manufactures and sells connector plates, the steel plates that builders use to link wooden beams in large wooden roofs, has an extensive network linking the company to its customers.

Yet when asked what he wanted for communications, William Moore, the firm's manager of computer services, said, "Other than making it go away entirely? . . . That's exactly what we're trying to do — we are trying to make it all go away."

According to Moore, Gang Nail "makes its money in its steel. But we also have some computer-aided design [CAD] programs that buyers can use to do their designs. You see, you can't give the steel plates away if the customers don't know how to use them."

But buyers often found that designing large wooden structures wasn't easy. Until recently, Gang Nail's design programs ran on the company's mainframe, which customers could dial up via a modem to access the software. This capability meant that Gang Nail had to maintain what amounted to an entire dial-up information service.

Moore's dedicated campaign to limit data communications used the micro as its weapon. "We're getting more and more powerful machines at lower and lower costs," he explained. "Now there are micros powerful enough to run our CAD programs."

In particular, Gang Nail is fond of Sun Microsystems, Inc. workstations. As a result of this preference, Moore noted, "We became a Sun OEM, and we sell the machines to our customers pretty inexpensively." Now, instead of dialing into Gang Nail's

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mainframe to run the company's software, customers obtain the software and run it directly at their own sites.

They still access Gang Nail's machines for some additional technical information, but traffic on the company's network is "down to a tenth of what it was before," he claimed.

Economics of the situation

Just like other sites, at Gang Nail the issues are not technological but economic. "The limiting factor for us," Moore said, "is cost. Some of Sun's customers are pushing them for higher performance. But for us, 2 million instructions per second [MIPS] to 4 MIPS is just fine. Now, if we could just drive the price a little further down, we'd be happy."

Meanwhile, strategic systems in the purest sense of the term can be found at the U.S. Defense Communications Agency in Washington, D.C. Ernest C. Smith, assistant deputy director for computing at the Joint Data Systems Support Center, said that, for his agency, datacom is not so much an issue in itself as it is "the vehicle by which we link different sites."

He noted that most of his problems are not much different from those of any other DP professional. "There's the normal round of problems we've all got to solve — especially security problems, because most of what we do is classified. In particular, we'd like to have different levels of security in the same environment, but it doesn't seem possible to get that from vendors," Smith explained.

Where his needs differ from those of other MIS managers surveyed is in speed. His systems need to be able to get information from one side of the globe to the other and back again in real time.

The center's task is to give civilian and military authorities the power to react instantly to any worldwide development. It must be able gather data from anywhere — even if that spot is an active war zone — flash it back to Washington, combine it with supporting information from a hundred different data bases, present it in a style that is most useful to decision makers and then carry their judgments back to commanders in the field at more than a thousand different locations. And the center must accomplish all this while keeping the information free of errors and secure from the attentions of unfriendly powers.

As daunting as this mission might seem, Smith did not say he feels the task is greatly removed from existing technology. According to him, the far bigger problem lies in the corporate culture of the user organizations. "The technology is out there," Smith said. "It's just a question of getting it into our environment. And the process of doing that seems to get longer every day."

At first glance, Smith's communications requirements seem removed from the needs of mainstream MIS. That perception is to be expected, given the unique nature of his business. Few other DP professionals are called upon to assist executives in managing war and peace.

Yet there is more in common between the Defense Communications Agency and corporate telecommunications than one might think. Increasingly, large companies are global in scope, and their executives must operate in real time on the same level. The datacom requirements of, say, an international securities or currency trader are every bit as extreme as those of a battlefield commander.

Moreover, analysts such as Shaku Atre of Atre International Consultants, Inc. in Rye, N.Y., and Michael Packer of The Mac Group, Inc. in Cambridge, Mass., have suggested that the everyday corporate computing requirements of the average frontline business manager will be as demanding as those of the international trader or battle commander.

The analysts predict that, increasingly, these people will need not isolated PCs but rather executive information systems that can pull up corporate data from any one of a dozen different locations, perform meaningful synthesis and analysis of that data, present it to the managers in an understandable style, convey those managers' decisions to field operations and perform it all in real time.

Between two eras

In short, then, what datacom professionals seem to be saying is that their communications wants are now balanced on the edge between two eras — that time embodied by the traditional MIS role and that time embodied by a newer position, which might be called the management of *strategic* information systems.

As such, the managers' main concerns have more to do with the culture than the technology of their organizations. They are being called to balance social factors, such as cost and end-user requirements, with long-term business needs.

Such an assignment calls for skills quite different from those that MIS and datacom managers have traditionally possessed. It requires that data communications professionals be able to communicate as much with individuals within their companies as with machines. They have to have the marketing skills of a consultant — or a missionary.

Those skills aren't easy to come by. Marvin Liebow, the director of telecommunications at Washington, D.C.-based Amtrak National Railroad Passengers, Inc., put it bluntly: "The problem with communications is in justifying its cost. It's the same problem that you have with justifying the cost of an interstate highway. You can't do so until it's built, and [by then,] you've got traffic on it." ◆

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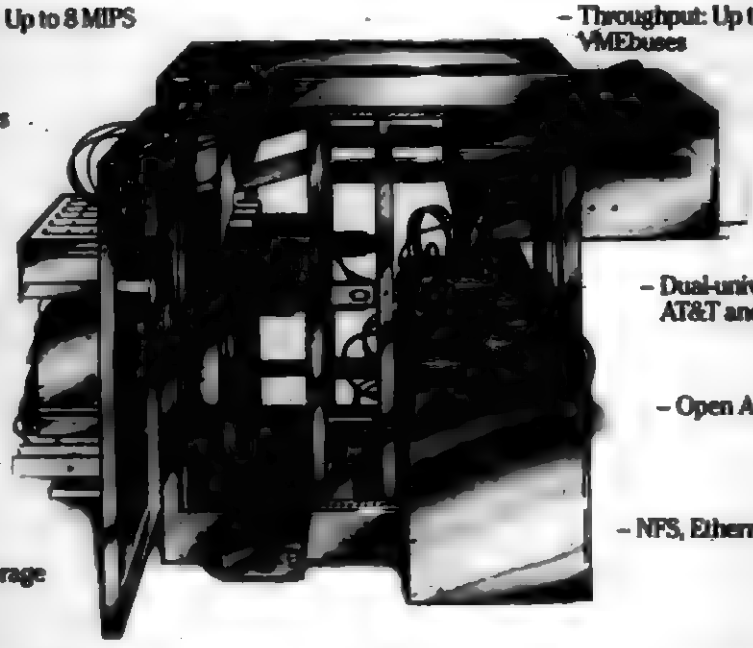

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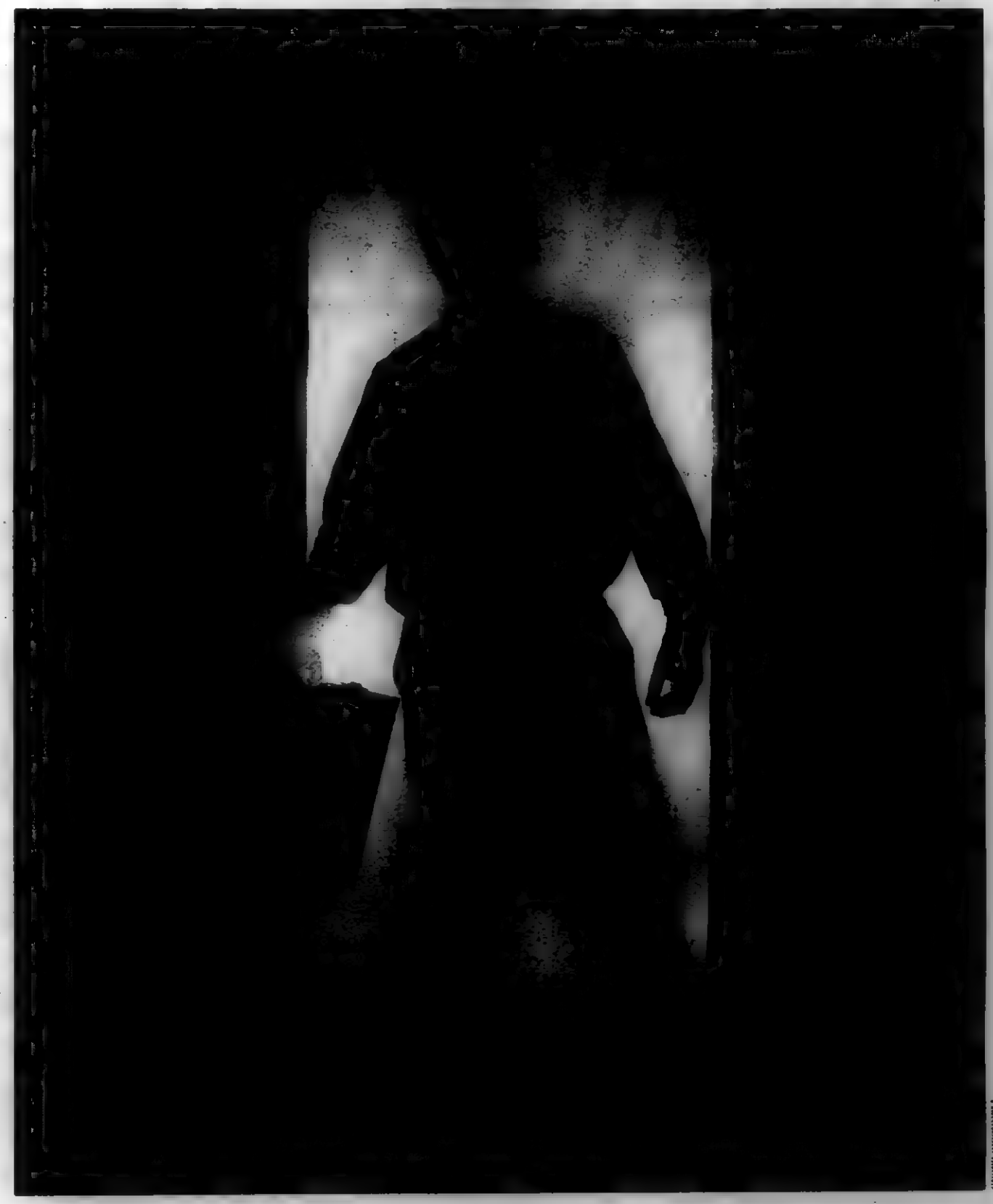

GEOFF O'CONNELL

When it's time for the LAN man

BY STAN KOLODZIEJ
SENIOR EDITOR

"I recently visited a client who was moving into a new office building and also having a local-area network put in. During the following days, I watched the progress of the various contractors, the builders, the electricians, the plumbers and the LAN technicians.

"The LAN people by far had the most problems. What I quickly saw was how the other contractors were better trained to anticipate problems and more skilled at working together. The LAN installation was anything but smooth. In fact, it was a nightmare."

Jim Weber, president of Insight Technology, Inc., a consulting service in Piscataway, N.J., claims that during the course of his job, he sees many scenarios similar to the one he describes above.

In fact, as an increasing number of LANs and larger networks are installed in corporations, companies expect the level of expertise required to install and maintain them to also be on the rise. The problem, many user corporations say, is that LAN vendors and value-added resellers (VAR) have failed to keep up.

"I think many companies are disappointed with the existing level of service from network vendors and VARs," Weber says.

"There has been a sharp increase in the past few years in the number of companies that have gained experience and skill in having their first LANs installed. These companies have either installed their own LANs or watched their LANs being put in. Either way, they have become more critical. Many of these companies now feel they have reached the stage at which they can take the experience and try to install networks themselves."

Find out what the OS/2 LAN Server means to you. Story begins on page 33.

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LAN ANALYSIS

As networking becomes a big business and a vital part of corporate competitive strategies, the ability of firms to find adequate outside installation and maintenance help will become a growing concern. Linda O'Keefe, a director of the Office Systems Industry Service at Dataquest, Inc., a San Jose, Calif., research firm, goes so far as to predict that the servicing of corporate networks will become one of the key computer issues in the next decade.

A recent study by The Ledgeway Group, a Lexington, Mass.-based research firm, points out some network findings that could serve as signposts pointing to the 1990s.

Using results tabulated from nearly 1,000 corporations, The Ledgeway Group found that, in 1987, nearly 70% of the respondents' networks were installed by in-house staff and only 30% by outside vendors and dealers. That is a big turnaround from 1986. In that year, Ledgeway tabulated, in-house staff installed about 40% of networks, and outside installers put in nearly 60%. The studies covered corporate voice and data networks as well as LANs.

It's mine, leave it alone

"It appears that there might be a possession factor at work," says Rod Brown, a vice-president at Ledgeway. "Once users get networks installed, they might not want to give them over to outside help."

Michael Goulde, a senior analyst at The Yankee Group in Boston, agrees that despite the fact that networks are tough products to install, requiring a good deal of integration of wires, adapters, software and the like, there is a steady rise in the number of corporations doing in-house installations.

"I think that situation is being stimulated somewhat by the fact that many value-added resellers don't have the expertise to handle LAN installations," Goulde explains. "VARs are adding vertical software applications to LANs and are offering network management training, but they are still restricted by resources in what they can do with LAN installations.

"Installing LANs is not like installing personal computers. It's a big job, and LAN vendors have become cautious about which VARs they will allow to install their networks. Poor installation jobs can be interpreted as poor performance of a vendor's product," he adds.

And when companies don't have what they consider a viable alternative, they end up installing the LAN themselves.

At the U.S. Army base in Fort Stewart, Ga., Chuck McCallar, a computer specialist and programmer/analyst, says his group cut its network teeth in 1987 by installing some smaller LANs built on Intel Corp.'s Opennet network, which uses Intel's Systems 310 and 320 as network servers running Microsoft Corp.'s Xenix operating system.

"It was a learning process and difficult at times, but the hands-on approach is the best way to learn," says McCallar, who had the advantage of having worked as a computer consultant for a year before his current position. McCallar cautions, however, that there are times when it might be better to go outside for help.

"I occasionally get calls from people who are trying to expand their existing networks and have run into problems," McCallar explains. "They have installed networks and think it will be easy to reconfigure them, but they find network buses won't work together, motherboards are incompatible, the software they were told is multiuser isn't and so on. Vendors are at fault. Most users choose products available in the market that vendors say are standard. A lot of times [the components] just don't work together."

A job for Freud

To add to the difficulties, McCallar claims, there is often a psychological barrier to hurdle when installing networks.

"People have learned that PCs are stand-alone and have little idea of how difficult it is

stringing these stand-alone devices together into a network," McCallar explains. "The vendors tell you that everything is easy to install, but there is a horrific learning curve involved. With LANs, I think you only start getting your money's worth [about] six months after the installation."

John Schmidt, systems analyst at American Hardware Insurance Group in Minneapolis, installed three IBM Token-Ring LANs a year ago and says that the big surprise was how much time was consumed.

Software troubles

"The network hardware wasn't difficult, but the software gave us problems," Schmidt says. "At first we used IBM's LAN operating system but found it difficult to fine-tune to give us maximum performance. We opted for Novell, Inc.'s Netware operating system instead."

Working with a colleague and buying the necessary LAN components from a local VAR, Schmidt says that the only time they called for outside help was for the creation of some insurance-rating software for their networked IBM Personal Computers. "There's something to be gained by doing it yourself," Schmidt says. "But there is definitely a time trade-off."

The manager of the information center at a Colorado rubber products manufacturer says his firm had to rely on a local dealer to handle the conversion of an older Datapoint Corp. network to a Novell LAN.

"The dealer was responsible for the [network] specs and installation," the manager says. "We wanted the new [Novell] network because it was microcomputer based and more in line with our corporate computing philosophy. We would have tried [the network conversion] but we ran into a tangle trying to recompile existing Datapoint applications over to the Novell operating system."

Fortunately, the manager says, his company came across a small software house that offered Datapoint-to-Novell software conversion. Even so, the manager explains, the software firm had to "thread the needle" to make the software transference a success.

"It was a learning experience for us," the manager says. "We have plans for some more LANs, and I think with the proper network parts inventory in place, we can try it ourselves."

> **"There's something to be gained by doing it yourself. But there is definitely a time trade-off."**
>
> JOHN SCHMIDT
> AMERICAN HARDWARE INSURANCE GROUP

Some other interesting points came out of The Ledgeway Group study. For instance, while the number of corporations handling network installations in-house is on the rise, users apparently now are looking more to outside help for what the research firm calls more "intellectual networking considerations," such as network design and integration with other LANs and larger networks. In fact, many user corporations now expect such intellectual services bundled into vendor network product offerings.

The Ledgeway Group attributes a good deal of these expectations to a maturation of the networking market. In 1985, the research house says, users needed network planning, installation and support. In 1986, there was more concern with the maintenance of existing networks. In 1987, user requirements switched to improving existing networks.

As existing LANs become bigger and are plugged into larger wide-area networks, often international in scope, the design elements of these networks will become an important concern for users, The Ledgeway Group reports.

Andrea McCurdy, a research analyst at The Yankee

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Group, says she also sees more organizations seeking outside help when integrating corporatewide networks with LANs.

Dramatic change

"I agree that there are now a lot of people installing their own networks at the LAN level," McCurdy says. "But the situation changes dramatically when these smaller networks become part of larger, more sophisticated backbone networks. At this level, most firms are [giving] both installation and maintenance of LAN and wide-area space to outside sources."

Robert Guaraldi, president of Valinor, Inc., a network VAR in Westford, Mass., says his company spends a lot of time setting up network support groups within client companies.

"You can tell me that corporations are installing more networks themselves, but I can reply from experience that even the largest companies have few resources available in-house to handle networking," Guaraldi says. "A large part of our business involves setting up LAN support groups in client corporations to handle LAN installations and other network concerns. But we will still have to support these groups over the years."

Initial network installation is hard enough, Guaraldi says, but he claims that networking is now generally so complex that clients need a constant update and supply of network resources to keep them current and competitive.

"Once you emerge from an initial networking stage, you can run right into trouble," Guaraldi says. "Suddenly, you're into data center designs, structural designs, gateways and communications with remote systems — networking design elements that users rarely foresee. We can help because we have dealt with a much broader spectrum of issues than most users have. It's our job."

Synergism of elements

Many corporate users, according to Nathan Roseman, president of LAN Services, Inc. in New York, are entering the synergism stage of networking, or putting the network elements — such as PCs, servers, gateways, network backup and disaster recovery — together. At this level, networks suddenly become more strategically important and also harder to manage. It's simply too much to handle for many corporate networking groups.

"When you're transferring files among small and large systems, even an older technology like protocol conversion can be a problem," the U.S. Army's McCallar explains. "For a start, you can lose graphics characters and timing sequences for error checking. At a certain point, networking becomes a big chess game. That's why I feel service and maintenance agreements are absolutely essential with networks today. Unless you have a computer guru who can do it all, I think maintenance contracts are worth the price."

American Hardware Insurance's Schmidt claims that his Novell network is so reliable that his company doesn't need a maintenance contract. "But that's at the local-area network level," Schmidt says. "At the host communications level, we have had to bring in our MIS expert, whom we call 'the CICS man.' It becomes complex."

The manager at the Colorado rubber company says that a local VAR wanted nearly $6,000 per year for a maintenance contract to work on a 16-workstation LAN. "Instead, we hired a maintenance man, purchased some network backup components and put together a backup LAN in case of a failure," the manager says. "We just have to hope that the LAN problem won't be in the file server. As for merging with some of our larger data networks, we might have to call in help for that."

Guaraldi says that while many corporations are stabilizing around current network standards, the constant merging of voice channels with transmission media and technologies, such as twisted pair, Ethernet and token ring, is bringing more need for contact with corporate telecommunications people.

On one hand

"It's funny. On one hand, networking standards make it easier to install and maintain networks," Guaraldi explains. "On the other hand, there is now a need to coordinate more complex network technologies and design factors."

According to Richard C. Munn, president of The Ledgeway Group, customers are past the network improvements stage and are now looking for products that facilitate self-support of already-installed networks.

As a result, Munn says, there is a growing market for network diagnostic, testing and monitoring/analysis equipment that enables network users to fine-tune and manage these growing networks and reduce reliance on outside help. IBM's Netview/PC and Token-Ring Network Trace and Performance Program systems, for example, were designed to monitor IBM networks from the mainframe down to PCs, and there are other such systems coming onto the market that penetrate to the file and record levels of LAN workstations.

About to reach the market are other promising LAN transmission technologies that should help users in the installation of their own LANs. Obviating the need to install special LAN cabling, companies such as 3Com Corp., Hewlett-

Continued on page 34

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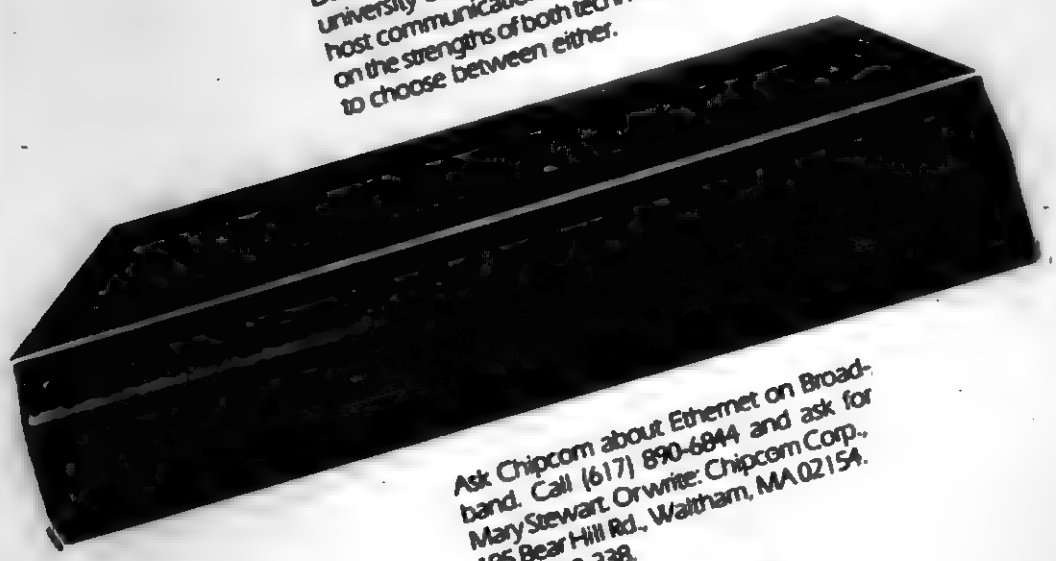

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The LAN server dilemma

BY LEE DOYLE
SPECIAL TO CW FOCUS

IBM's recent announcement of its OS/2 LAN Server has created tremendous confusion in the market for personal computer networks. Users, already knee-deep in numerous local-area network hardware and software choices, now must evaluate a new IBM network operating system.

Why should PC users and large organizations be interested in the OS/2 LAN Server? What are the advantages of the OS/2 LAN Server over existing operating systems from 3Com Corp. and Novell, Inc.? Why should we wait until November for IBM to introduce this product? This article seeks to answer these questions and dispel the fear and uncertainty surrounding PC LAN operating systems.

Despite confusion over operating systems, PC LANs continue to represent a viable option for work group communications and multiuser applications. International Data Corp. (IDC), a Framingham, Mass.-based research firm, predicts tremendous market growth and increased penetration of PC LANs in all types of organizations.

IBM's OS/2 LAN Server is targeted to large organizations that wish to tie their personal computers to IBM mainframes and minicomputers. As its name implies, the LAN Server was designed for PCs that run OS/2, not IBM PC-DOS. Users in small organizations, individuals with PCs running PC-DOS and no plan to upgrade to OS/2 and firms that do not intend to connect their PCs to larger IBM systems should not consider buying the OS/2 LAN Server. LAN operating systems designed for PC-DOS or Microsoft Corp. MS-DOS-based PCs (like 3Com's 3+ and Novell's Advanced Netware) will continue to be the best options for most users for the next few years.

IBM announced four products that impact PC LANs:

- OS/2 Extended Edition 1.0. OS/2 Extended Edition 1.0 implements Systems Applications Architecture (SAA) on the workstation through the Communications Manager and the Data Manager. Version 1.0, which does not include the Presentation Manager (Microsoft's Windows) or LAN support, is available in July. It costs $795.
- OS/2 Extended Edition Version 1.1. This version, which includes the Presentation Manager and LAN support, will be available in November. The price is $795.
- OS/2 LAN Server Program. The LAN Server Program is an extension of OS/2 Extended Edition that provides LAN service for OS/2 Extended and PC-DOS workstations. Available in November, it costs $995.
- PC LAN Program 1.3. This is an upgrade to IBM's PC LAN Program for PC-DOS PCs that offers users increased security and administrative features. PC-DOS workstations must upgrade to Version 1.3 to access the OS/2 LAN Server. Availability is July. It costs $225.

The OS/2 LAN Server extends the functions of OS/2 Extended Edition to a work group of PCs. IBM licensed part of Microsoft's LAN Manager — the Redirector and Server — for use in the LAN Server.

Much like the LAN Manager, IBM's LAN Server offers application developers the ability to design new distributed applications that can run between different PCs on the LAN. A feature called Remote Program Execution allows one PC to request another workstation to sort a data base without having physical access to the data. Other significant features include improved security and administration, windowing, multitasking and extended memory addressing.

IBM's goal for the LAN Server is to provide communications between the LAN and larger systems via SAA. At the workstation level, OS/2 Extended Edition's Communications Manager supports extensive communications, including LU6.2, between PCs and larger IBM systems. IBM's long-term emphasis is on LU6.2 for intra- and supra-LAN communications. But the announced version of OS/2 LAN Server does not support intra-LAN communications via LU6.2. The LAN Server does not provide backward compatibility with most existing PC-DOS LAN applications through support of Netbios and Microsoft's Redirector.

This comes as no surprise. IBM has a terrible track record when it comes to PC LAN operating systems.

In 1985, IBM introduced the PC LAN program, a product plagued by bugs, poor performance and a limited user interface. Almost three years later, IBM's PC LAN program is still way behind Novell in terms of features and performance. In fact, many large IBM shops in the Fortune 500 still regard Novell as the leader in PC LANs.

The question now is, Will the OS/2 LAN Server be any better? Even before its introduction, the OS/2 LAN Server will have the following limitations:

- **Cost.** To achieve the benefits of the $995 OS/2 LAN Server, workstations must run the $795 OS/2 Extended Edition, which requires an Intel Corp. 80286 or 80386 processor with 3M bytes or more of random-access memory. It will cost a typical IBM Personal Computer AT user more than $2,000 just to be able to run OS/2.
- **Delays.** The OS/2 LAN Server offers many features, such as improved security and administration, that Novell's Advanced Netware already offers today. Why should users wait?
- **Lack of software.** OS/2 applications that take advantage of the features of Extended Edition and the LAN Seryer are anywhere from one to three years away.
- **SAA support.** OS/2 LAN Server does not offer full SAA support for LANs. The LAN Server is based on Netbios, which SAA does not support, and will not support LU6.2 and, thus, SAA, until at least 1989.

Migration to OS/2 requires a tremendous commitment by an organization in terms of cost, support, development of new applications and belief in IBM's announced but undelivered products. Besides, most OS/2 applications, which will enhance the productivity of end users, are 18 months to two years away.

Doyle is manager of strategies for microcomputers and office systems at International Data Corp., a market research firm in Framingham, Mass.

LAN ANALYSIS

IDC's research indicates that only a small percentage, perhaps as little as 5%, of all corporate users will migrate to OS/2 before 1989.

The IBM announcements create considerable confusion for PC LAN software developers. Developers can continue to write PC-DOS applications to the existing de facto standards — Microsoft's MS-Net, Redirector and Netbios. IDC figures indicate that more than 250,000 PC-DOS-compatible LANs were installed by year-end 1987. Given this installed base, the slow rate of OS/2 sales and the ability to run Netbios applications under the LAN Server, this option represents a safe bet for many developers.

Developers can also write to OS/2 Extended Edition and LAN Server. Many large software vendors (certainly Lotus Development Corp.) are predicted to start development for IBM's SAA environment. However, IDC does not expect Extended Edition applications for workstations until 1989 at the earliest. LAN applications for the Extended Edition will probably await implementation of LU6.2 support in the LAN Server.

Don't forget Microsoft, 3Com: Software developers may also want to write to Microsoft's and 3Com's LAN manager products. While similar to IBM's LAN Server, these products will not be completely compatible.

They can also write to Novell's Advanced Netware. Novell products are not currently compatible with OS/2 or the LAN Server.

This multiplicity of standards is likely to delay development of new OS/2-based LAN applications until the confusion surrounding LAN application standards and third-party support is resolved.

3Com was certainly hoping that IBM would implement Microsoft's LAN Manager (specifically, "named pipes," which is Microsoft's protocol for PC-to-PC communications over a LAN) in the LAN Server. Because IBM did not take this course of action, 3Com, in partnership with Microsoft, says it will develop an OS/2-based operating system that is compatible and competitive with IBM's LAN Server.

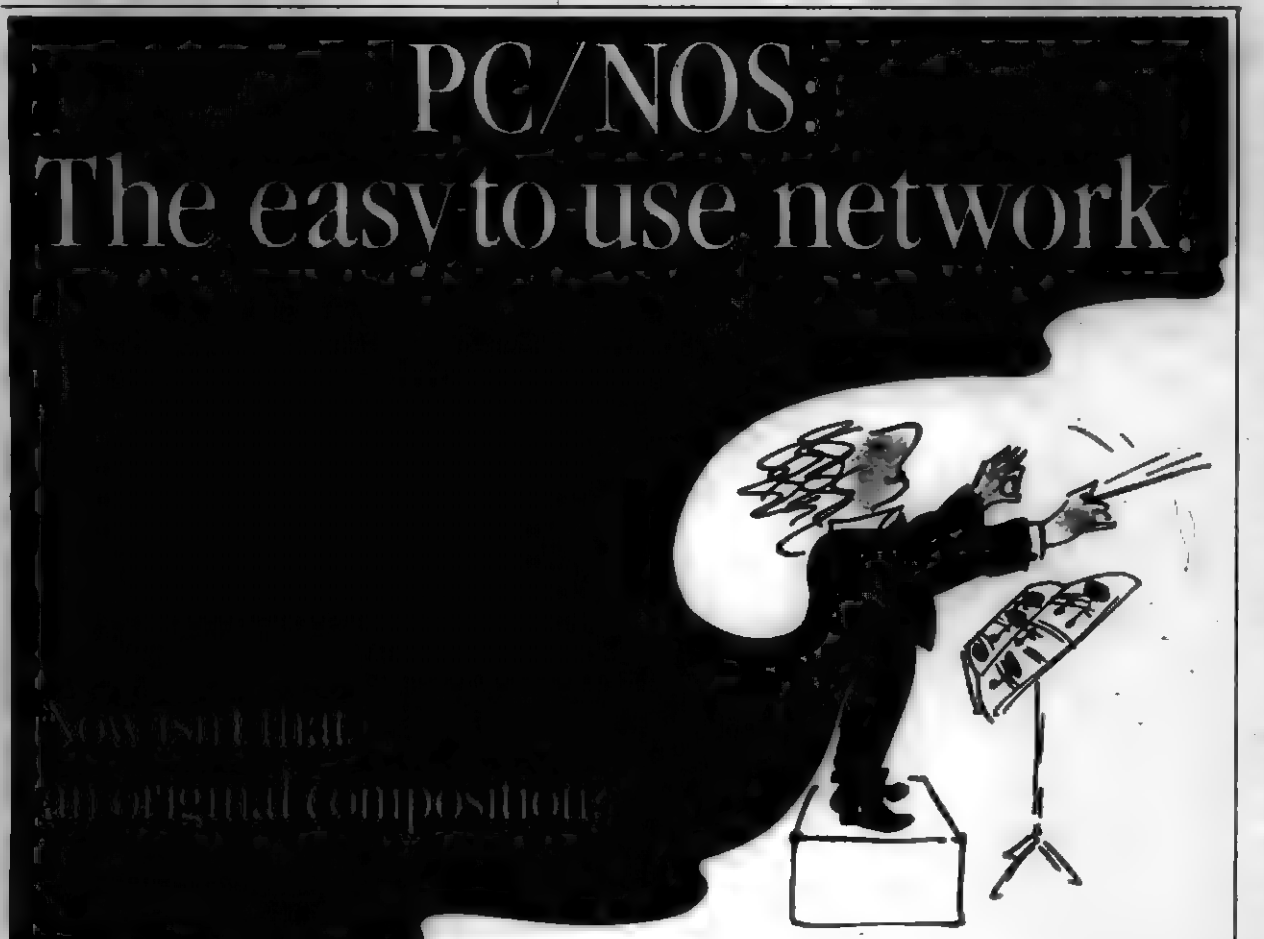
3Com has announced 3+Open, its OS/2 LAN product, which will implement LU6.2, named pipes, Netbios and Redirector, for delivery in June 1988. 3+Open will support MS-DOS, OS/2 and Apple Computer, Inc. Macintosh workstations.

Novell is said to be the leader in PC LAN operating systems in terms of functionality and market share. Many of the features that IBM is promising for late 1988, Novell already delivers, including logon security. Despite this competitive advantage, Novell must implement OS/2 and OS/2 Extended Edition support in Advanced Netware this year if it wants to compete with IBM in large accounts. IDC reports that Novell most likely will implement OS/2 support via a coprocessor running within an IBM Micro Channel-based Personal System/2 during 1988.

Despite considerable confusion about LAN operating systems, users need not be paralyzed. Organizations that have installed non-IBM LAN operating systems can continue to make valuable use of these products while waiting to evaluate IBM products.

Organizations currently looking to install PC LANs have a more difficult choice. If the firm is committed to IBM, if it plans to implement OS/2 and SAA within the next two to three years and if it requires communications between the LAN and large IBM systems for its LAN application, then it should wait and implement OS/2 Extended Edition and the LAN Server. However, if PC-DOS workstations will continue to be dominant, if the organization is skeptical of SAA or if its LAN was designed for primarily intra-LAN applications, then it should evaluate and implement current LAN operating systems products, including those from Novell and 3Com.

Most non-IBM LAN vendors are committed to support of OS/2, OS/2 Extended Edition and the LAN Server. IDC expects Novell, 3Com and Microsoft to deliver products, compatible with IBM's offerings, during 1988 and 1989. Thus, current Novell and 3Com customers will get a migration path to OS/2 and SAA. ◆



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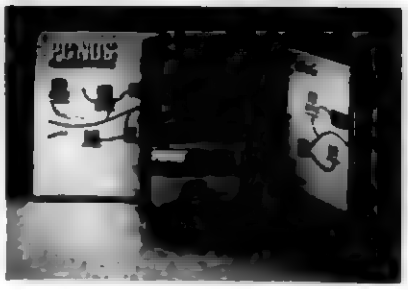

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LAN man

Continued from page 32

Packard Co. and Digital Equipment Corp. are developing LANs using same-premise unshielded twisted-pair wiring with data transmissions to 10M bit/sec.

Other possibilities include wireless LANs using radio frequency to transmit data from workstation to workstation, LANs based on infrared transmission and LANs carrying data over voice networks. Though such alternate technologies promise benefits such as ease of LAN installation and reconfiguration as well as lower costs per node, each will also be burdened with such trade-offs as slow transmission speeds and limited operating distances.

According to some, there will always be LAN service vendors.

"We've been in this business five years," Guaraldi says. "What's interesting is that there is still a great deal of reliance, even among the biggest corporations, on outside firms for the installation and maintenance of networks — even LANs. I don't see that situation changing for quite some time." ◆

Pulling for distributed data bases

What's holding things up?

BY STAN KOLODZIEJ

From the beginning, distributed data base management systems have been on the defensive. Called on the carpet about problems with file and record locking, data integrity and security, vendors of distributed DBMSs have usually been short on answers in the past. But now vendors are coming up with better answers. Advances in data base technology are making many MIS managers take a second look at distributed DBMSs.

Benefits are spilling over from the success of the relational systems market, which is being stimulated by the movement to settle on the dual standards of IBM's SQL and DB2, its relational DBMS. Because most distributed DBMSs are relational in nature, the success of relational data bases will have a direct effect on the sales of distributed DBMSs.

And also because of the success of relational DBMSs, MIS is focusing more attention on the benefits of distributing these data bases within their companies.

Stephen Gerrard, vice-president of marketing at Applied Data Research, Inc. (ADR), a software development firm located in Princeton, N.J., points to the continual downsizing of mainframes and systems development as helping to lay the groundwork for distributing data bases.

"The hardware and operating system infrastructure will proliferate on IBM 9370s and other departmental machines, [a situation that will help] make the distributed data base concept work," Gerrard explains. "Before the 9370s came along, the distributed part of the data base equation was confined to simply uploading and downloading data."

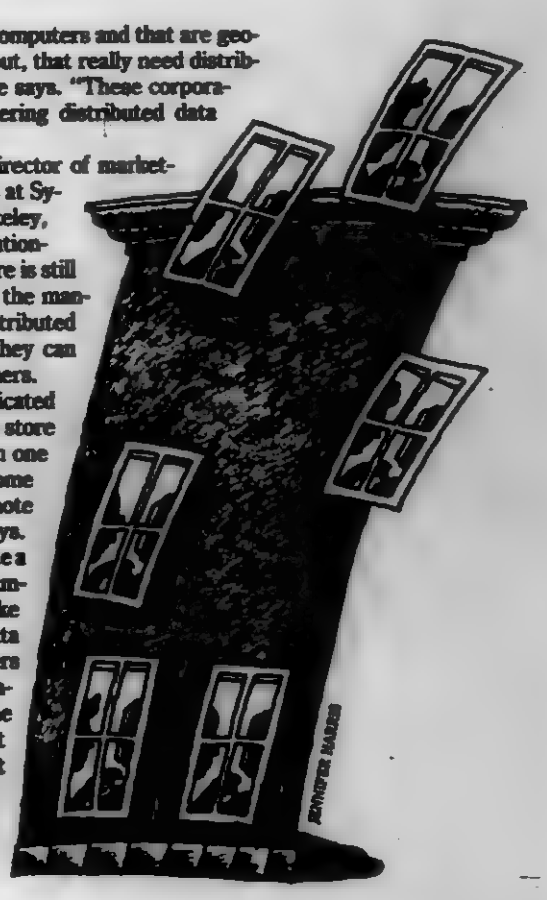
But Gerrard is quick to add that distributed DBMSs will not be right for every corporation.

"It's typically the larger companies, those that have multiple computers and that are geographically spread out, that really need distributed data bases," he says. "These corporations will be pioneering distributed data base technology."

Rich Scheffer, director of marketing communications at Sybase, Inc., a Berkeley, Calif., vendor of relational DBMSs, says there is still work to be done at the management end of distributed data bases before they can attract more customers.

"It gets complicated when you have to store some of your data in one file server and some data in another, remote server," Scheffer says.

"When you update a transaction, for example, you have to make sure that the data bases in both servers are affected simultaneously. That is the kind of simple but critical requirement in distributing data bases that is difficult to carry out," he explains.



Kolodziej is *Computerworld Focus*'s senior editor.

To accomplish this goal requires a data base facility called a Two-Phase Commit, which enables a user to update multiple data base transactions over a network, Scheffer explains.

"However, most distributed DBMSs handle such update integrity at the local-applications level only, not at the network server level," Scheffer says. "I don't think you can handle true distributed data base management from the application level. Until most distributed data base vendors bring in more of such centralized network control, I don't think distributed data bases are going to become a big-ticket item with companies."

Others, however, suggest that distributed DBMS vendors still have some larger wrinkles to iron out.

Ron Ross, a Houston-based lecturer on software and editor of the "Data Base Newsletter," is skeptical that distributed DBMSs can succeed in their current state.

Cosmetic changes

"Maybe I'm a cynic, but I think that most distributed data base management systems have superficial capabilities," Ross explains. "There's still a lot of work to be done with things like transaction updating, data replication and referential integrity," he says. "Vendors claim they have taken care of these problems, but I think a lot of it is cosmetic.

"There are some, like myself, who maintain that data integrity, the ability of allowing multiple users to handle data bases at the same time, is just not there," Ross continues.

"DB2 and many other relational data bases don't even support referential integrity. The future of distributed data bases does not lie in the languages they are written in, it lies in the rules governing the integrity of the data they contain," he says.

Fair enough, but the trade-off, Ross explains, is that the greater the number of data integrity rules embedded within a distributed data base system, the more processing and transmission baggage created.

"What you basically have, then, is a situation in which the more data integrity built into your product, the more complicated it is to handle and run over a network," Ross says.

Even at a low-end level, melding data integrity with networks can be tough.

Ashton-Tate Corp.'s Dbase III Plus data base product, for example, contains networking features that the vendor is aiming at programmers who work in a local-area network environment. There are some problems, however, with file and record locking, but Ashton-Tate is not alone in that regard.

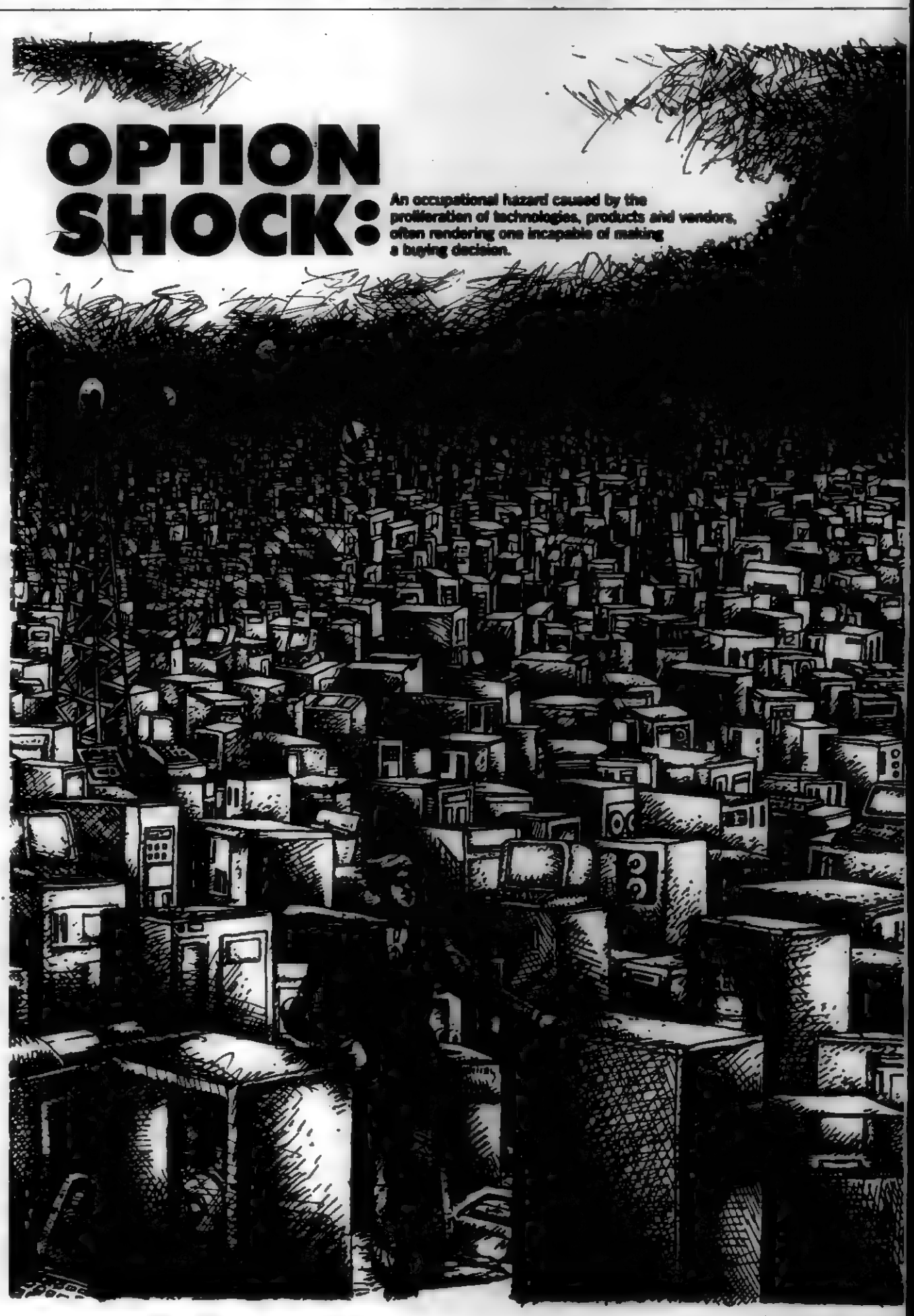
In itself, the concept of file and record locking is simple. When two users on a network wish to look into the same data base at the same time, there is no problem as long as all they want to do is look. However, headaches can occur if the users want to edit the data in the data base at the same time. The trick with file and record locking is in preventing one user from changing a record while the other user is working on it. Adequate file and record locking will enable a second user to access the record only after changes have been made and the record is saved.

The problem with the Dbase networking version stems from the limitations of the record lock function of Microsoft Corp.'s MS-DOS, under which Dbase is written. The MS-DOS function not only locks a record in use from being used by others but also erects a barrier so users cannot get at any data that pertains to that locked record. These steps make it difficult for users who have opened a data base with a locked record to move past it. In essence, what this does is block the part of the logical data base below that record from other users.

IBM has promised that its scheduled 1988 OS/2 networking extensions will resolve MS-DOS's record locking problems.

LAN vendors help out

Ashton-Tate's situation, however, points to the growing presence of networking companies,



especially LAN vendors; in the role of bringing distributed data bases to market.

Novell, Inc., the Provo, Utah, developer of the Netware LAN operating system, for example, has announced marketing alliances with both Oracle Corp. and Ashton-Tate.

Commenting on the Novell alliance, Lawrence J. Ellison, Oracle president and chief executive officer, says, "It will allow many applications that have been handled by minicomputers or even mainframes to be run on networked personal computers."

Ellison categorizes the Novell agreement as a key in completing Oracle's SQL Star distributed data base marketing strategy.

Howard S. Charney, a senior vice-president at Santa Clara, Calif., LAN vendor 3Com Corp., says the company is planning on migrating IBM's OS/2 operating system to 3Com's file servers to enable the development of distributed multitasking applications and data bases over 3Com's LAN.

Novell has even more ambitious plans for the future of distributed data bases. The company has recently begun marketing The Coordinator, a relational data base networking product that breaks down and collates patterns of communication following the theories of visionaries Fernando Flores and Terry Winograd, co-founders of Action Technologies, Inc., the San Francisco company that produces The Coordinator.

Rick Mellinger, Action Technologies' president, says that although at first blush The Coordinator seems like any other electronic mail system, on deeper analysis clients find it to be a software system that can search data bases and bring together disparate trails of communications following the parameters given by individual users.

"You can relate these items by any category you wish," Mellinger says, claiming that The Coordinator is the first of a new class of software tools that will support the integrated and coordinated work of a group of people.

This ability contrasts with what he says are the usual set of software tools that support individuals who happen to work with each other.

> **"MIS managers can no longer raise the drawbridge and keep users out."**
>
> STEPHEN GERRARD
> APPLIED DATA RESEARCH, INC.

According to Mellinger, one component of The Coordinator, the Conversation Manager, has been expanded into the Message Handling Service (MHS), which is basically an operating system. Using MHS, Mellinger says, programmers and software developers will be able to build distributed computer data bases using the same "interpreting" principles The Coordinator employs.

The importance of networking companies in the future of distributed DBMSs is also bound to change the concept of corporate computing.

3Com's Charney, for example, sees distributed data bases and networking "leading to the distributed power of the [corporate] work group."

Michael Radice, group vice-president of Electronic Form Systems, a software developer based in Carrollton, Texas, thinks the availability of distributed data bases will lead to significant savings in corporate software development costs and enable more PC integration with systems development.

Distributed data bases will help create more advanced user interfaces, enabling users to access data in ways that more closely reflect how people think, according to David Liddle, chairman of Metaphor Computer Systems, Inc., a Mountain View, Calif., producer of front-end software for relational data bases.

Perhaps MIS attitudes toward micros will evolve as PCs are incorporated into the infrastructure of distributed data bases and not just used in more

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passive data upload/download roles.

"MIS has learned how to manage a centralized data operation during the past 20 years," Gerrard says. "When you come at them with distributed data bases, and they see the problems with data recovery with breakdowns in recovery restarts across network data base nodes, their immediate reaction is to pull back into a safer centralized approach.

"Yet I think MIS also knows it has to work with end users to wrestle with these issues now and resolve them," Gerrard says. "MIS managers can no longer raise the drawbridge and keep users out. I think that now they realize distributed data bases are going to be the way of the future, and they're more open-minded. But we still have to do some hard selling."

Probably. With MIS retaining a good measure of control over corporate micros, it will also, theoretically, be in the driver's seat when it comes to buying and installing the powerful micros/file servers required to drive networks carrying distributed DBMSs. In fact, MIS no doubt will be scrutinizing distributed DBMSs' benefits and drawbacks at all levels.

Not now, maybe later

"We don't have any real hard need for distributed data bases now, but in the future we might use them to off-load certain information from mainframes," explains Ben Coonfield, senior data base software analyst at Browning-Ferris Industries, Inc., a Houston-based waste management company. "We have remote users, and distributed data bases could lessen their dependence on centralized data bases, which can be slow.

"But at this stage," Coonfield adds, "distributed data bases are pure speculation for us. From what I can see, there are still a lot of software bugs to iron out."

According to Delanie Patrick, vice-president of operations in the Management Services division at McCormick & Co., distributed data bases are somewhat down the line for his firm. An IBM DB2 shop, the Baltimore-based spice manufacturer is at present limited by hardware in what it can accomplish through distributed data bases, Patrick says.

"The other operating units that share our IBM mainframe have IBM System/36s and 38s, not IBM 370s," he explains. "They'll be limited in what they can do in distributing data bases. We're only now slowly migrating to DB2 application development from IBM IMS, and that's going to take some programmer retraining in itself. It's a slow process."

Newsletter editor Ross says MIS is roughly split into two camps, one that wants to move toward distributed data bases and another that is drifting away from the distributed philosophy.

It's not that there isn't a market for distributed DBMSs. Ross agrees that there is indeed a big potential market in those larger firms that become geographically or operationally dispersed "by accident," that is, through a flood of incoming PCs, mergers, the creation of divisions and so on. But Ross thinks most of the distributed DBMSs are not yet ready for market and the potential negative reaction could hurt the field even more.

Short-term solutions

"Relational data bases first came into being as theories and were delivered in reality as long-term projects," Ross explains. "Distributed data bases are another set of theories that are going to take a long time to work out. Anything coming out now will only be a short-term solution."

Don Watford, product marketing support representative at Teradata Corp., a Los Angeles data base machines developer, advises that it will be essential for distributed data bases to meet end-user needs first without disrupting the existing corporate system development structure.

"It's clear that in the future more data will be leaving the corporate mainframe to become the pivotal part of corporate processing," Watford says. "Customers will want to support different hardware systems or platforms against a single data base. And the patchwork of file transfer packages and communications protocols now used are too complex for many users. Common user interfaces are going to be a big step in distributing data bases and making networks transparent."

Because most of the data bases that will be distributed will use relational DBMSs, it reasons that IBM's SQL will probably provide the base upon which many of these common user interfaces will be forged.

"SQL will be an important factor in making data communications transparent to users," Metaphor's Liddle says. "Users should not have to be aware of the hardware and software relationships that exist in separate data bases."

Toe the line

In this industry, it's easy to get involved in technical and marketing details and lose sight of the bottom line. In the case of a distributed DBMS, the bottom line is to make users more productive. But that could take time.

Gerrard, who says that ADR will be coming out in the first quarter of this year with Inforeach, a distributed DBMS, admits that the computer industry in general can only implement the first stages of distributed data bases.

"Whenever a new technology becomes technically feasible, there is a lag," Gerrard explains. "Organizations have to figure out how they are going to use the new technology. That's where we are now with distributed data bases." ◆

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BART GOLDMAN

Can you afford to ignore EDI?

BY PATRICIA KEEFE

It has been suggested that the effect of electronic data interchange (EDI) is much like cocaine. Once users adopt this method for conveying business transactions, it is hard to stop.

While an exaggeration, it is only a slight one. The purveyors of office automation have long since laid to rest the axiom of a paperless office, but corporate America, in its haste to say no to mountainous paperwork and its associated costs, is fast embracing EDI.

EDI facilitates direct computer-to-computer transmission and translation of formatted business information, such as orders, invoices and payments, over intraindustry networks, proprietary systems or public data networks, such as third-party mail services or clearinghouses.

Primary benefits include the elimination of geographic barriers, fewer processing errors, tighter inventory control, personnel reductions and time savings realized from electronic transmission of data between computers. If desired, users can virtually do away with hard copy, enthusiasts claim.

To get some idea of personnel savings, users can take an oft-quoted estimate of $35 to $50 per document, based on 1974 American Association of Purchasing Agents figures, and adjust for inflation.

More recent figures on potential savings can be obtained from such success stories as Chicago-based Navistar International Corp., a truck manufacturer that claims to have cut its truck inventories by a third, or $167 million, in the first 18 months of EDI use. And then there is The First National Bank of Chicago, which reportedly saved about $2.5 million per year in staff attrition.

A less obvious benefit, perhaps, is the likelihood that "implementation of EDI will force MIS to forge closer relationships between departments that need purchasing and invoice information," observes a bulletin from International Data Corp. (IDC), a Framingham, Mass.-based market research firm.

According to analysts, the top four providers of EDI services (based on number of subscribers) are GE Information Services, a unit of General Electric Co.; Sterling Software, Inc.'s Ordernet Division; McDonnell Douglas Corp.; and Kleinschmidt Computers, a division of SCM Corp. Other prominent EDI suppliers include IBM and Control Data Corp., says consultant Victor Wheatman, editor of the "EDI Reporter," published by Input, a market research firm headquartered in Mountain View, Calif.

Fast jumping into the market are communications services providers, such as Western

Keefe is a senior editor of networking at *Computerworld* newspaper, published in Framingham, Mass.

Union Corp., Compuserve, Inc. and Telenet Communications Corp., and computer vendors, including a low-key entrance by Digital Equipment Corp. Late entrants to the EDI market are expected mostly to resell existing services.

Farsighted managers who have already taken steps to implement variations of EDI will reap improved operations and strengthened trading relationships, proponents claim.

And within a few years, businesses that have delayed conversion to EDI will quickly find electronic billing, shipping and ordering a competitive necessity, The First National Bank of Chicago predicted in a white paper presented in 1986.

The bank confidently estimates that during the next decade, approximately 50% of all business transactions will be converted from paper to electronic documents.

First National's figures may not be too far off. Wheatman expects the market to swell during a five-year period as follows: $86 million to $87 million in 1987; $191 million in 1988; $428 million in 1989; $793 million in 1990; and $1.31 billion by 1991. "We expect an 88% average growth rate, mostly in processing and communications," he says.

Jack Shaw, president of EDI Strategies, Inc., a Marietta, Ga.-based consulting firm, adds that the EDI market will double or triple in annual growth rate during the next five years.

Some of the U.S.'s largest and most influential manufacturers and financial institutions are leading the way to EDI acceptance in corporate America.

The list of EDI users is a veritable who's who of the Fortune 1,000: GE Information Services, Ford Motor Co., General Motors Corp., General Mills, Inc., General Foods Corp., 3M Co., K Mart Corp., Procter & Gamble Co., J. C. Penney Co., Sears Roebuck and Co., Consolidated Rail Corp. (Conrail) and Bethlehem Steel Corp. Key banks include Chase Manhattan Bank, Citicorp and Security Pacific Corp.

> **"Doing business without electronic data interchange will soon be like doing business without a telephone."**
>
> EDWARD E. LUCENTE
> IBM'S INFORMATION SYSTEMS GROUP

What these organizations have in common is the financial clout to pull any customer, supplier or buyer into an EDI network.

"A lot of users are getting in on a reactive mode," Shaw explains. "A big customer says, 'Take our orders electronically,' or a major supplier offers more advantageous terms and pricing, so the users decide, 'Gosh, I guess I should do this.' "

IDC claims that this user interest in EDI will increase during the next five years as industry trendsetters shift from EDI pilot projects to full-scale implementations. In some cases, these leadership companies will be abetted by their EDI service providers.

GE Information Services, for example, is considered the largest EDI service provider. And no one markets its services better, according to Sherry Geddes, managing partner of CTPS, Inc., computer and telecom consultants based in Mountain View.

Covering all the bases

"When GE signs up a client for any service, they hold a conference with all the client's suppliers and explain that company ABC has decided to go the EDI route, and this is what they will have to do to continue to be a supplier for this company," Geddes explains. In this manner, signing one client often produces other clients from a handful of smaller, related companies, she adds.

Conrail, another innovator, entices customers who use EDI with a 10% discount, Input's Wheatman states.

EDI picked up some weighty support from IBM at November 1987's 19th National EDI Systems Forum and Exhibit in Washington, D.C. The forum was sponsored by the Transportation Data Coordinating Committee (TDCC) and the Electronic Data Interchange Association.

"Doing business without EDI will soon be like doing business without a telephone," said show keynote speaker Edward E. Lucente, an IBM vice-president and head of IBM's Information Systems Group.

Noting that IBM has already committed to EDI internally, Lucente said the vendor plans to play a stronger role in the EDI market through commercial sales of its 5-year-old Information Network, a time-sharing service based on the company's Systems Network Architecture (SNA). IBM is targeting links to 12,000 of its largest suppliers by 1991, he added.

With that objective in mind, IBM met with actual and prospective EDI users last August in an attempt to boost subscriptions to Information Network.

IBM's viewpoint

How serious is IBM about EDI? "IBM regularly thinks of markets in terms of how big [they are] in relation to mainframes," explains Thomas White, president of Infonetics, Inc., a communications consulting firm in Santa Clara, Calif. The primary source of most EDI documents

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being transmitted today, he adds, is an IBM mainframe, and mainframes are still the major focus of IBM's sales efforts.

While an IBM service may prove attractive to Big Blue shops, analysts note that many such shops already either subscribe to value-added network-based systems or have sunk substantial investments into private networks and may be reluctant to switch.

Additionally, efforts to attract smaller IBM shops could be derailed if those users are forced to conform to EDI network standards mandated by larger business partners.

It is precisely this sort of domino effect that was revealed in a recent survey conducted by Coopers & Lybrand, the Bank Administration Institute and EDI Strategies. The study was underwritten by 12 banks, including Chemical Bank, Bank of Boston and Manufacturers Hanover Trust Co.

The full implementation of EDI is neither for the faint of heart nor slim of wallet. International Data Corp. estimates it will take six to nine months to bring up a major EDI hub within an organization.

Results were compiled from the responses of 600 DP managers, financial managers and EDI coordinators at more than 400 U.S. corporations and included a telephone survey of 125 EDI users and interviews with another 25 EDI innovators.

According to the report, EDI users said they are expanding their EDI activities from purchase order and invoice transactions to include electronic payments.

As such, these users expect their commercial banks to handle EDI-related financial transactions.

"EDI for banks is going to come on strong as EDI becomes more entrenched among users," says Donald Monks, an executive vice-president of product development at New York-based Irving Trust Co., one of the study's co-sponsors.

"Banks are the missing piece," Input's Wheatman agrees. However, before banks and other users can wholeheartedly endorse EDI, there are some nagging technical issues that must be resolved.

Utilizing an umbrella family of standards as a common base, such as the ANSI X.12 data interchange protocols or those sponsored by TDCC, a host of EDI substandards have sprung up, customized to and supported by as many as 30 different industries.

Herein lies the rub. For example, tailoring EDI systems to specific industries shapes up into a poor fit for internetworking in which manufacturing, retail and banking standards collide. But supporting incompatible, parallel EDI networks is expensive and can dredge up numerous management issues.

Also, users could lose some ability to design their own business forms when transaction sets, or electronic forms, are standardized.

Not only must the forms be adapted, but EDI communications, such as the transmission method, the rate at which the transmission is sent and the kind of equipment involved in the transaction, are still evolving.

Different industries have tended to settle on particular third-party networks — the insurance field generally uses Information Network, office systems tend to rely on GE Information Services and so on — which is fine, unless you want to talk to a company outside your industry.

A solution may be in sight, however. "One trend I see in 1988 is private suppliers building gateways to public networks," Wheatman says.

Another cause for concern is whether EDI will add to a growing morass of incompatible message delivery systems instead of combining with existing and emerging communications environments, such as IBM's SNA, electronic funds transfer (EFT) and CCITT's X.400 electronic mail standard.

Reluctant to merge

Right now, many EFT users are reluctant to merge those networks with EDI. Users say they don't want to bog down their EDI transactions, assuming their electronic forms provide for the addition of supplemental information, Infonetic's White says.

He also suggests that combining EFT with EDI will require wider bandwidth, which in turn will necessitate new protocols, all of which White estimates are about five years off.

Information security is also a factor, particularly in the banking community, which is loathe to transmit unprotected financial data. According to users interviewed by Input, the No. 1 EDI-related concern is security.

Given that many users today are still grappling with the integration of departmental and backbone networks, it is doubtful that most would be ready to attempt a merger of parallel intercompany messaging systems.

Moreover, the full implementation of EDI is neither for the faint of heart nor slim of wallet. IDC estimates it will take six to nine months to bring up a major EDI hub within an organization.

This process absolutely cannot be done without the commitment and full support of top management, asserts Irving Trust's Monks — especially, when

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Analysts still optimistic

Despite EDI's apparent drawbacks and limitations, none of the problems has managed to dampen analysts' optimistic market growth projections.

Industry observers' confidence is undoubtedly due in large part to the relief the ANSI X.12 standard offers from the horrors of EDI systems incompatibility. Seen as a flexible, generic business data interchange standard, X.12 is said to be a lightning rod for EDI and has picked up considerable support during the last quarter of 1987.

One example of this support is the Department of Defense's official endorsement of the standard at the National EDI Systems Forum. In addition, various European standards-making bodies have indicated they will move toward X.12.

Industry groups are expected to adapt the basics of X.12 to their specific requirements. According to IDC, Fortune 1,000 companies will use X.12 to automate their purchasing processes but will continue to use private or company-sponsored networks.

Relief related to efforts to rally around X.12 will come in stages. IDC claims that while X.12 will allow for extensive intraindustry document exchange by 1990, it is too broad to facilitate extensive cross-industry traffic until well into the next decade.

For example, although some EDI systems face a relatively painless migration to the ANSI standard, EFT and several developing international standards are incompatible.

Ironing out the wrinkles

Any remaining differences can probably be ironed out with a little effort, Monks says. "The fact that ANSI X.12 won't require any major rewrite jobs is pure and simply why it will succeed," White agrees.

EDI Strategies' Shaw predicts that as standards begin to solidify, the number of EDI service suppliers is expected to jump, expanding the market by as much as 15 to 20 vendors in the next few years. This increasing competition, spurred in part by the Federal Communications Commission's anticipated rejection of a proposed tariff increase, will likely result in lower transmission rates, according to many analysts.

Initially, the FCC proposed imposing access charges on enhanced service providers and information services companies, such as Tymnet from Tymnet/McDonnell Douglas Network Systems Co. and Telenet from Telenet Communications, on the grounds that they should pay their fair share of the cost of connecting to local exchanges. In turn, the additional cost to users of the information services has been estimated at $4 to $5 for dial-up access, essentially doubling the price of a typical transaction. The FCC also reportedly wants to impose the same access charge on private networks.

> **"The fact that ANSI X.12 won't require any major rewrite jobs is pure and simply why it will succeed."**
>
> THOMAS WHITE
> INPONETICS, INC.

"The tariffs issue generated the second greatest amount of negative mail the FCC has ever received, after Christian broadcasting," claims a source who asked not to be identified. "The word around Washington is that the tariffs increase is dead."

As rates drop and competition increases, EDI providers will begin to look for alternative value-added services, Wheatman says.

This means suppliers will likely start to charge for installation and training, while stepping up public awareness programs, Shaw notes.

In particular, Input is expecting the integration of data base and graphics into EDI networks. Integrated graphics would enable users to send specs within a form or even a blueprint via EDI.

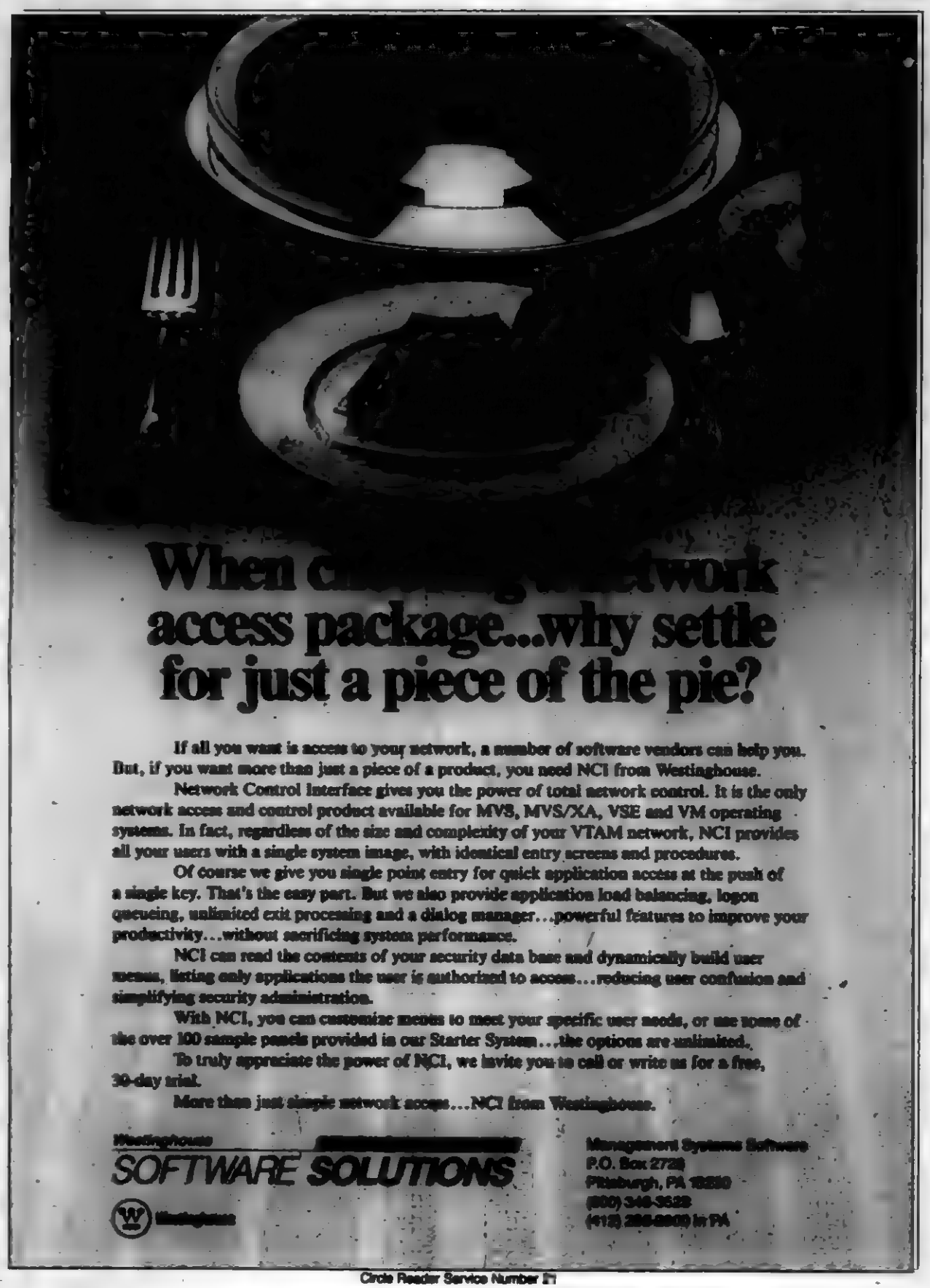
EDI-based data bases are already available on some industry-specific networks, such as those found in the pharmaceutical industry and grocery stores. They provide subscribers with sales, market share and demographics information — invaluable competitive tools, Geddes says.

EDI's potential capabilities and industry trends aside, the technology doesn't mean a thing if it is not a means to an end. Take, for example, the the auto industry, a leading proponent of EDI. Faced with increasing foreign competition, the industry set out to cut $1,500 off the cost of each auto.

It decided it could save at least $500 of that figure in paperwork and determined that EDI could provide the solution. In fact, General Motors and Ford, despite their competitive differences, worked jointly to implement an acceptable, evolving EDI system.

More and more, corporate America is turning to EDI to meet specific goals.

"If you have an objective, then all barriers to EDI begin to be identified as a problem to be resolved, rather than an obstacle to overcome," Irving Trust's Monks says. "Once users catch the fever, it will increase the appetite for EDI." ◆



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products

TECH TALK

Intel, Motorola walk softly, carry a big market niche

By Michael Tucker

Communications, or more precisely, connectivity, has become the hottest issue in the business these days. It's the loudest demand from users, the newest requirement for vendors and the latest opportunity for entrepreneurs and the would-be entrepreneurial enterprise.

But in the process, connectivity is producing some unusual situations. Take Motorola Corp. and its division, Motorola Computer Systems, Inc. (MCS), for instance.

Sometimes it is difficult to remember that Motorola is even in the systems business. You can't forget the company's chips — they have a certain place in history — but complete boxes just don't leap to mind when you think of Motorola.

This lapse of memory attaches itself to all the microprocessor people. You don't think of Intel Corp. as being in the systems business, either. But Intel has a whole line of products that are nothing less than full-fledged computers. These machines range from personal computer motherboards to some really radical boxes like the multiprocessor devices put out by Intel's scientific computing division.

Chip makers play an awkward but enviable role in the systems business

Yet you just don't think of Motorola or Intel in this light. And given these firms' substantial marketing muscle, it's hard to believe the downplaying of their systems role is accidental. That these two are not known as systems vendors, despite the potential for brisk sales of systems, must be because that's the way they like it.

Why is no mystery. To be companies that produce the chips that go into the vast bulk of the world's micros and, at the same time, that compete with micro vendors is, shall we say, awkward.

Intel's position may be the worst in that its reseller list includes the biggest micro vendor of all — IBM. Or more specifically, its resellers include the makers of personal computers running Microsoft's MS-DOS, the standard for business desktop computing. Intel's staff sells a lot of systems into the scientific and engineering markets (in which, in a neat turnabout, they compete directly with Motorola's customers, the workstation vendors), but they can't sell too many commercial systems without ruffling a lot of feathers on a lot of birds.

Mum on motherboards

For Intel, this setup has made for some surreal situations. For instance, in 1987, Intel spokesmen resolutely refused to comment on reports that Intel was selling 80386 motherboards to developers in direct competition with its own board-level customers. As far as you could learn from the firm, Intel was not selling, never sold and never would sell motherboards. Yet at the same time, you could pick up any computer publication and find ads from distributors for Intel 80386 motherboards. These ads even gave the Intel catalog number for the boards.

Motorola's position may be a little better than Intel's in that Motorola has only one customer aiming for the executive's desktop — Apple. But still, it might not do to offend that one customer, because Apple is the only honest-to-goodness major-league player Motorola has.

So, if you are Intel or Motorola, how do you sell your systems to MIS corporate buyers?

Well, Intel has hinted at how. In the summer of 1987, it introduced the 320 Multiserver. This offering is a combined local-area network, compute server and file server based on the 80386. It is meant, quite simply, to link PCs to each other and upwards to corporate mainframes. It will be interesting to see how well the Multiserver does, because it is, in effect, going for the position once promoted for minicomputers.

Now for Intel and others designing 386-based multiuser or server systems, the question will be in the software. These vendors have worked on single-user systems for their entire existence; Will they be able to convert to multiuser systems?

Continued on page 45

Tucker is *Computerworld Focus*'s features editor.

PRODUCT CLOSE-UP

Jnet to links VAX, SNA

Joiner Associates, Inc. has announced that the company's Jnet networking software is scheduled to support an IBM Systems Network Architecture (SNA) option by the beginning of 1988. The announcement is significant not only because it shows the continuing growth of the SNA standard but also because of the Madison, Wis., company's background.

Jnet's function has always been to link Digital Equipment Corp. VAX machines to IBM mainframes. Jnet runs on the VAX and allows the DEC machine to look and act as if it were just another peer node in an IBM store-and-forward network. It is relatively low priced — $8,500 to $25,000, depending on the installation — and easy to use and maintain, the company said.

The SNA option will make the Jnet-equipped VAX look more like a full citizen of the IBM world. It will operate in SNA networks, particularly for batch processing applications, almost as if it were an IBM machine, Joiner officials claimed.

The new characteristic will be useful for Jnet customers. But Jnet's real significance is in its ancestry and close association with Bitnet, an international academic computer network that has successfully joined all manner of machines for years.

The whimsically named Bitnet — the name stands for "Because It's There Net — was originally a few data lines between some cooperating university computer centers. It recently celebrated its fifth birthday,

Continued on page 47

Atari banks on Transputer in its personal workstation rollout. Page 44.

BLUE BEAT

Downsizing days

Deidre Depke

IBM spent much of its time last year focusing on connectivity and communications. These are subjects that came to light through IBM's battle with Digital Equipment Corp. IBM didn't have much choice in the matter; DEC established the battleground through its advertising and sales forces' promises of seamless integration to customers.

So, faced with a declining mid-range market share and corporate accounts that wanted to know why IBM couldn't match DEC's claims, IBM began to respond.

IBM's Systems Application Architecture (SAA), announced last spring, embodies the company's long-term promise of connectivity. SAA is to the late 1980s and early 1990s what Systems Network Architecture (SNA) was to customers back in the 1960s and 1970s. Like SNA, SAA has started its life as a guideline — more theory than product. For SAA to be effective, it must evolve into an architecture of even greater magnitude than SNA.

For the short term, IBM's immediate connectivity focus lies in the mid-range. During the past two years, IBM has made a significant attempt to address its lack of a coordinated mid-range product strategy. Still, IBM has only begun that process.

Today, the firm either actively supports or markets seven distinct product lines in the mid-range: the RT Personal Computer, the System/88, the Series/1, the System/36 and 38, the 9370 and the 4381. To this list, the company will soon add

Continued on page 47

PRODUCTS

Cluster controller to link 80386-based micros in nets

Star Gate Technologies, Inc. in Eastlake, Ohio, unveiled the CC-9000 cluster controller to link Intel Corp. 80386-based microcomputers in networks.

A stand-alone communications controller, the CC-9000 enables 386-based personal computers to support 16 or more terminals and four printers. Using unshielded twisted-pair telephone wiring, the vendor claimed, a user can connect terminals and peripherals that are up to 800 ft away from the PC.

Star Gate added that two CC-9000s on a single host PC with a dual AT&T Starlan network minihub can be arranged to allow multiuser systems to support up to 16 serial and four parallel ports from a single serial slot.

Going the distance

In a system with an 80386 host PC and two cluster controllers, each controller can be located 800 ft from the PC in opposite directions, providing a total linear system length of 1,600 ft. Adding a 50-ft RS-232 distance between terminals, the CC-9000 gives a reported total end-to-end system length of 1,700 ft.

Commenting on the relatively slow programmable maximum bit/sec. rate of 38.4K bit/sec. with a constant speed of 19.2K bit/sec. on all eight channels, Ray Wymer, Star Gate Technologies' cofounder and director of research and development, said that the speed is deceiving. Data buffering helps off-load some of the data processing tasks from the controller's 512K-byte on-board CPU, increasing data throughput on the network.

"Remember, AT&T's Starlan is for smaller networks than are IBM's Token-Ring or thin-wire Ethernet networks," Wymer said. "I feel there is enough bandwidth and speed in Starlan applications right now for our users."

In its initial release, the CC-9000 runs the PC-MOS/386 operating system from The Software Link, Inc. in Atlanta, though Wymer said there will be a Unix version out in 1988. "If it's a fairly well-behaved MS-DOS application, then it will run under PC-MOS/386 without a hitch," Wymer claimed. "PC-MOS also provides file- and record-locking capabilities, which are important in distributed net applications."

The CC-9000 costs $1,495 for an eight-port unit and $1,295 for an upgradable four-port unit. — STAN KOLODZIEJ

Circle Reader Service Number 180

Atari introduces Abaq

Radical chip design may redefine workstation connectivity

Atari Corp. has introduced Abaq, a personal workstation based on Inmos, Inc.'s advanced Transputer 32-bit microprocessor. The Atari machine could signal the beginning of a movement toward the Transputer as the microprocessor of choice in situations that require parallel processing or extreme connectivity.

The Transputer is produced by British company Inmos Ltd., whose U.S subsidiary Inmos is headquartered in Colorado Springs. It has one of the most radical new designs of current microprocessors and differs from conventional processors in that the Transputer is meant expressly for parallel processing and multiprocessing. Its on-chip communications facilities allow it to link directly to other Transputers.

The Abaq workstation boasts an Inmos T-800 Transputer, which is capable of operating at 10 million instructions per second (MIPS) to 12 MIPS. Abaq will run under Helios, a Unix-like operating system from Perihelion Software Ltd. in Somerset, UK.

Until Atari announced the Abaq system last November, most Transputer-based systems were large, scientific machines, such as the Computing Surface from Meiko Ltd. in Bristol, England.

Abaq's sting, however, is in its connectivity. Because it is based on a Transputer, any individual Abaq workstation can be hooked to any other Abaq workstations through nothing more complex than their serial ports.

Users could form local-area networks with very little effort or shape their individual systems into a distributed multiprocessor system.

It is in this use of the Transputer to obtain connectivity that Abaq is unique. Virtually everyone else using the chip has done so to build stand-alone multiprocessor systems.

Sneak preview

As such, the Abaq could be a sign of things to come, as developers discover that the difference between two Transputers in a multiprocessing computer and two Transputers in linked workstations is only a matter of long or short connections.

In addition, the Abaq caps a series of recent Transputer developments. Increasingly, developers who work with microcomputers but who wish to go beyond the industry standard microprocessors — such as the Intel Corp. 80386 — seem to be turning to the Transputer.

For example, Mechanical Intelligence, a research and development organization

-Continued on next page

Theirs takes hours.

Installing and configuring a 3270 or RJE remote host connection for BSC or SNA NETBIOS LANs? With the competition, it'll seem to take forever. While RabbitGATE™ takes just a few minutes. It's so easy that most people don't ever open the user guide.

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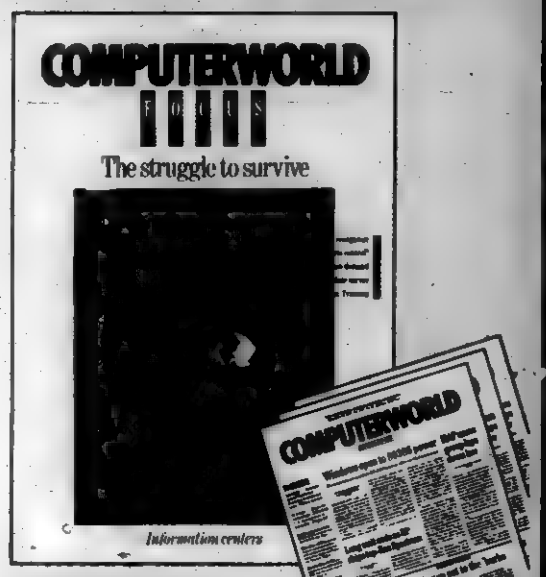

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Continued from previous page

in Cardiff, Calif., recently rolled out a Transputer-based expansion system to bring parallel processing to the Apple Computer, Inc. Macintosh.

Although Mechanical Intelligence is a tiny firm and its product might be dismissed as simply an unusual experiment, there is support for the offering. In August, a noted Apple value-added reseller, San Diego-based Levco (a division of Scientific Micro Systems, Inc., located in Mountain View, Calif.) announced that it

Atari's *Abaq system*

had become the exclusive agent for the Mechanical Intelligence product. Other Transputer-based systems are bound to follow.

While they will probably never seriously challenge the positions of the Intel 80386s and Motorola, Inc. 68030s of the world, Transputer-based systems could cause a few uneasy moments for these leading chip makers. — MICHAEL TUCKER

Circle Reader Service Number 181

Tech Talk

Continued from page 43

(There are already rumors that some of the micro data base vendors are hiring every minicomputer person they can find.)

Which brings us to MCS.

Motorola's foray into the systems market actually began a long time ago with another company, Four-Phase Systems, Inc., a maker of data capture equipment founded in 1969. For the first decade or so, Four-Phase was a profitable little company, but by the early 1980s, it was rapidly being overtaken by events. Its data entry equipment was becoming obsolete in a hurry, yet Four-Phase lacked the research and development funds to modernize. Many analysts expected the company simply to vanish as one more fatality of the micro revolution.

Then, in 1982, Motorola purchased the firm. No one — not even company officials — seems to know why. On one hand, the acquisition made sense. It gave Motorola a captive buyer for its chips that would not directly compete with the scientific and engineering vendors that make up Motorola's customers.

But on the other hand, having a captive and using it effectively are very different things. Even as Motorola attempted to incorporate Four-Phase into its structure, it seemed uncertain about what it wanted out of the company, which it renamed Motorola Computer Systems. At times, MCS seemed to be in the data entry business for good. At other times, however, it appeared to veer toward the value-added reseller market. And on still other days, it appeared to target the small business computer world.

Did Motorola lack a clear strategy? No one but Motorola can tell us, and the firm is not talking.

But if MCS had an uncertain mandate in the past, that seems to be changing as of 1987. Judging from a series of recent product introductions, it looks as though MCS has a focus — and that focus is connectivity.

That's Life

For example, at Comdex/Fall '87, MCS showed a line of departmental-level micros, the 8000 series, some of which are based on Motorola's 68030 microprocessor. MCS was also selling Life, or the Linked Information Environment. The company describes the Life offering as "a unique data capture product that fully integrates data base, networking, print, office and analysis capabilities, providing customized solutions and faster information turnaround time while reducing pressure on MIS resources."

Life is meant to provide connectivity between desktop systems and mainframes using the 8000 machines as the middlemen. The market is still data capture, such as order entry, but MCS obviously has grander aspirations. The company already promotes the product for on-line transaction processing and office automation. And, perhaps, in some new and improved incarnation of the product, the company will target executive information systems as well. Indeed, MCS has already published white papers arguing for a new kind of computer use called "work group computing."

The concept of group computing is not new. People have been busily defining the connectivity market for quite some time. And MCS's success in that market is anything but assured. But that Life exists at all is interesting — at least given the constraints of Motorola's markets, which preclude competition with its own customers.

In other words, Life and the 8000 machines, like Intel's Multiservers, suggest that some of the industry's major players believe the world wants a new kind of microcomputer, a connectivity machine. This device wouldn't quite be a LAN server, or a gateway, or a multiuser system or a departmental computer but, rather, a machine combining the features of all of the above.

And more importantly, Motorola and Intel seem to believe there is a market here. They see a hole between mainframes and PCs. Apparently, they think they can move into that slot before anyone else — that is, their own customers — can do so.

If that market exists, and if Motorola and Intel are really serious about getting into it, the industry might change a bit. After all, DEC, too, was once known chiefly as a maker of components for other people's systems.

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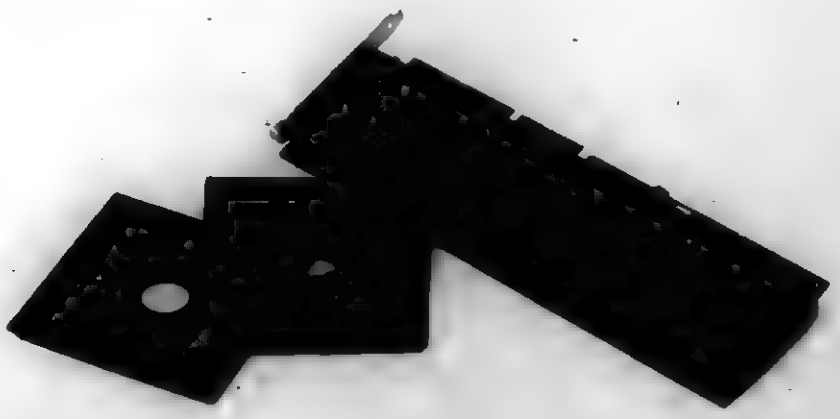

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PRODUCT CHECKLIST

Connect Computer Co. has announced **Lanscope**, a local-area network management system that runs on Novell, Inc.'s Advanced Netware LAN operating system.

Connect Computer claimed that Lanscope eases network implementation, management and network use by employing its universal network data base and workstation menus.

The complete Lanscope network management system is $1,295.

Connect Computer, Suite 220, 9855 W. 78th St., Eden Prairie, Minn. 55344.

Circle Reader Service Number 182

Atari Corp. has introduced **Moses PromiseLAN**, a local-area network that Atari claimed can connect up to 17 personal computers in a star configuration using regular telephone wire.

Atari said that the product meets IBM's Netbios standard, is compatible with IBM Personal Computers and compatibles and provides an interface to the Apple Computer, Inc. Appletalk network, enabling the connection of Apple Macintosh microcomputers to the network.

Moses PromiseLAN costs $599 and is scheduled for shipment in February 1988.

Atari, 1196 Borregas Ave., Sunnyvale, Calif. 94086.

Circle Reader Service Number 183

LAN Systems, Inc. has added two windowing facilities to **Release 2.0** of the **LAN Shell** network menu system.

Features include windows that display screen output from any Microsoft Corp. MS-DOS command; selection of files from a windowed directory listing; and new installation procedures.

According to the vendor, both windows can be placed anywhere on the screen in any size.

The LAN Shell costs $695 per server.

LAN Systems, 599 Broadway, New York, N.Y. 10012.

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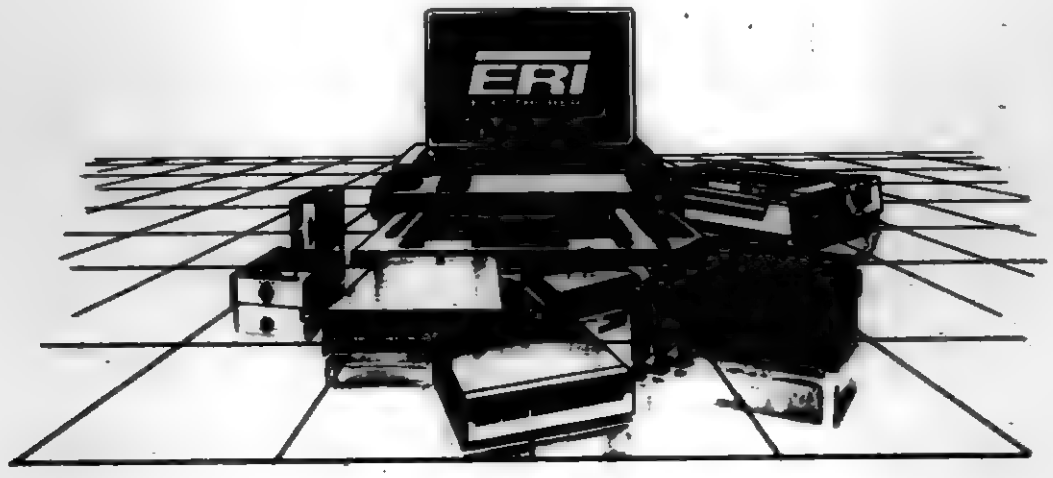

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CALENDAR

Jan. 3-9

Networking the Corporate PC. Denver, Jan. 7-8 — Contact: Digital Consulting, Inc., 6 Windsor St., Andover, Mass. 01810. Also being held Feb. 17-18 in Toronto, Ont., Canada.

Jan. 10-16

Choosing Applications for Expert Systems. Boston, Jan. 11-12 — Contact: Digital Consulting, Inc., 6 Windsor St., Andover, Mass. 01810.

X.25 Packet Data Systems. New York, Jan. 13-14 — Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

Fourth- and Fifth-Generation Data Management Software. Washington, D.C., Jan. 13-14 — Contact: Digital Consulting, Inc., 6 Windsor St., Andover, Mass. 01810. Also being held Feb. 10-11 in New York.

Desktop Publishing: A Practical Tutorial Featuring Product Comparisons. Seattle, Jan. 13-14 — Contact: Digital Consulting, Inc., 6 Windsor St., Andover, Mass. 01810.

Telecommunications Management. Orlando, Fla., Jan. 13-15 — Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

Jan. 17-23

Relational Data Base Management Systems. New York, Jan. 20-22 — Contact: Digital Consulting, Inc., 6 Windsor St., Andover, Mass. 01810. Also being held Feb. 17-19 in Chicago.

The 1988 Optical Disk Systems Conference: Making Order Out of Chaos. Phoenix, Jan. 20-22 — Contact: Jean O'Toole, CAP International, Inc., One Snow Road, Marshfield, Mass. 02050.

T-1 Users. Washington, D.C., Jan. 21-22 — Contact: Teleatrategies, Inc., Suite 100, 1355 Beverly Road, McLean, Va. 22101.

Jan. 24-30

Software Maintenance: Controlling the Computerised Organization. Los Angeles, Jan. 25-27 — Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

Desktop Communications Conference. Anaheim, Calif., Jan. 25-27 — Contact: Susan Sanchez, Infonetics, Inc., Suite 100, 3235 Kifer Road, Santa Clara, Calif. 95051.

Laser Optical Systems: Image Technology and its Implementation. New York, Jan. 26-28 — Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

Jnet

Continued from page 43

and today has hundreds of installations on many different types of machines. It is easily one of the largest nonprofit, educational networks in the world.

Early in its life, Bitnet had to face the problems of linking disparate machines. Quite a lot of connectivity software was written by Bitnet users, and more was discovered or inspired by their efforts.

Among the latter group was Jnet. Though always a commercial product, Jnet has a vast percentage of its users in the academic world. Joiner said it has 280 academic customers at some 620 installations.

Thus, Jnet's particular strength is in its student users who then graduate and carry the product into the commercial world.

Jnet is like the Unix operating system in that it, too, entered MIS on the backs of graduating seniors. — MICHAEL TUCKER

Circle Reader Service Number 186

Blue Beat

Continued from page 43

the much-discussed Silverlake line, a replacement for the System/36 and 38.

While maintaining compatibility with the System/36 and 38 line, Silverlake will be housed in a 9370 form, thereby serving as a clear upgrade path from the System/36 and 38 to the 9370 and vastly improving the connectivity in IBM's mid-range.

But IBM's real connectivity and communications problems don't lie with disparate architectures and operating systems. IBM's connectivity problem lies in its revenue base. Because of their increasing power, particularly when networked departmentally, microcomputers are threatening IBM's minicomputer business. And because of an oversaturated market and increasing power and connectivity of mid-range products, IBM's mainframe business is also in jeopardy. The majority of IBM revenue comes from its largest systems; so as customers opt for smaller systems, IBM has an obvious problem.

IBM addressed the computer downsizing issue in a roundabout way at Comdex/Fall '87 in Las Vegas. At an IBM-sponsored meeting, two industry executives, in speeches doubtless approved by IBM, discussed the implications of this downsizing of the computer base. The Intel Corp. 80386 chip and OS/2 have made the minicomputer effectively obsolete, said Edward Esber, president of Ashton-Tate. "OS/2 and 386 hardware provide the clout of a minicomputer. We expect to get market share from mini vendors," he explained at the meeting.

Charles Wang, chief executive officer of Computer Associates International, Inc., made similar comments. "What today can be classified as a mainframe or a minicomputer will surely be on someone's desk in the future," Wang said.

No denying it

Later, in an interview, Frank King, IBM's vice-president of development in the Entry Systems Division (ESD), did not dispute these assertions, despite the fact that IBM is one of those companies destined to lose large systems market share. "It doesn't make sense to build artificial barriers," he said.

IBM's challenge now is to restructure its revenue base to allow for the downsizing of customer installations. Hence, its serious interest in software development. The company is also focusing on providing connectivity between small and large systems so that it doesn't lose what large systems sales are still out there. For that reason, IBM is working on incorporating VM emulation into the PS/2 and using OS/2's Presentation Manager to provide an interface for large-system software.

And a downsized computer base could also give IBM competitive advantages with companies like DEC and Compaq, which do not have the broad product lines that IBM offers. Eventually, this strategy will alter their ability to compete with IBM.

"The DEC battle is nowhere near as important to IBM as communications between the PS/2 and mainframes. That makes DEC very vulnerable. The key to DEC's future is its ability to move up- and downstream with its products. IBM is in a much better position to provide seamless integration," an IBM supplier says.

Daglas is the former editor of "IBM Watch," a biweekly newsletter published by International Data Group, located in Framingham, Mass.

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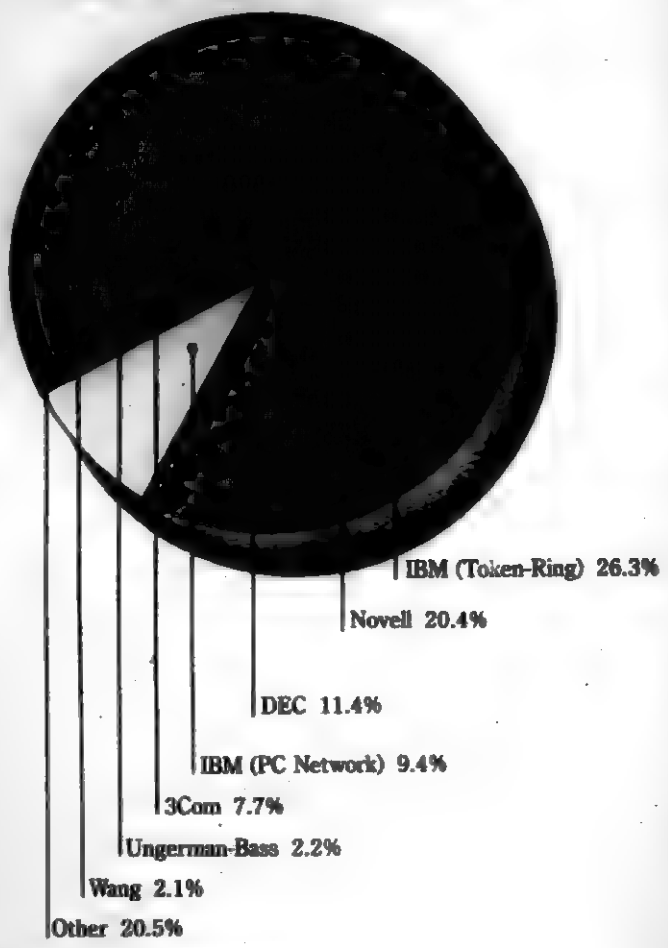
log off

LAN market decisions

Local-area network vendors' share in IBM plug-compatible mainframe sites



INFORMATION GATHERED FROM A FOCUS RESEARCH SYSTEMS SAMPLE OF 1,215 SITES.

GRAPHIC BY BRUCE SANDERS

OF
INTEREST

"We're not doing this because we love the technology. And we're not doing anything new. We're doing it to keep up with the competition."

PATRICK POWERS
LEE CO.

See story page 23

next issue

Software is the main thrust of February's *Computerworld Focus*. We'll seek answers to the software questions lurking behind Intel 80386 servers and see what's new in application development tools and fourth-generation and objective languages. February *Focus* will also cover operating systems like OS/2 and MVS/XA as well as IBM's grand connectivity scheme, SAA. Capping it all is a Special Section on the commercialization of Unix — it's not just for scientists any more.

The busing issue

Michael D. Millikin

After IBM announced its Micro Channel bus architecture, some of its competitors slammed the firm for trying to close the "open" Personal Computer architecture.

Such a reaction completely misses the point. The personal computer has a more complex role to play in future information architectures as a user's window into the corporate network. But to fulfill expectations, these desktop boxes need much more than a powerful CPU — they need to become systems with additional sophistication and capability.

The ultimate significance of the Micro Channel is not that IBM developed it, or that it doesn't accept old Personal Computer AT-style cards, or that it is faster than the old AT bus, or that it identifies add-on cards or even that it offers a true 32-bit bus on the IBM Personal System/2 Model 80. Overshadowing all these pluses is the Micro Channel's ability to support multiprocessing.

Multiprocessing will be a key PC architectural feature in the future and will be especially important in areas such as communications. Under a Micro Channel-style architecture, a coprocessor board will handle those communications-intensive tasks the PC CPU now laboriously manages.

IBM is drawing a lot of heat for its strategy, mainly because such multiprocessing add-in cards are still a long way off, and people have their eyes fixed on the AT bus cards populating the world. But you just can't create as efficient a PC system with an old-style AT bus.

IBM is not the only vendor offering a 16- or 32-bit bus structure supporting multiprocessing, however. AST Research, Inc. recognized the significance of Micro Channel-type multiprocessing and responded with its Smartslot Architecture. Smartslot supports multiple processors while still offering three slots for old AT-type cards.

But AST's efforts aside, there already is a standards-based alternative to the Micro Channel — the Nubus. A technical subcommittee of the IEEE endorsed the Nubus as a standard for 32-bit micros. The Nubus has a bus arbitration scheme that allows up to seven processors to seek control of the bus simultaneously, providing multiprocessor support akin to that of the Micro Channel. Two vendors currently are working with the Nubus: Texas Instruments in its Explorer and 1500 series and Apple in the Mac II.

An opportunity exists for a vendor that creates an Intel 80386-based PC using the Nubus. That vendor could offer support for multiprocessing, have the sanction of a standards body and also have access to add-in cards developed for the Mac II. (In theory, you could interchange Nubus boards between systems.) Such a vendor would be competing functionally with the Micro Channel without having to license IBM technology. Not only that, but users would be that much closer to having systems-quality PCs on their desks.

Millikin is vice-president and senior analyst with Patricia Seybold's Office Computing Group in Boston.

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High-octane Microvaxes roll

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IBM, Fujits...

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Lack of unity endangers the promise of DAT

BY JAMES A. MARTIN
CW STAFF

Although digital audio tape (DAT) is not available yet in the U.S. consumer marketplace, the new media is generating interest ... data storage ...

DAT, or Data DAT (DDAT), as industry insiders call it, promises capacity of up to 1.2G bytes and storage rates of up to 10M byte/min. This represents an improvement over current standard quarter-in. tape cartridge systems with 150M-byte capaci... storage rates of 6M to 7M byte/min.

...ial, speaking to al... ...ters and ana... ...proach the... systems, such as the ... systems, Inc. Sun ... Apollo Computer, In...

...R D
...L K
...Bozman

Unisys adds 1100/90 models

Product line ...

... lower prices, less in maintenance costs

... were advised of t... ...st by the Unisy... ...Brady.

BY STANLE...
CW STA...

BLUE BELL, P... fanfare, Unisys ...placed portion... Corp ...

Storage Tech boosts solid-state ance:

... to the Hitachi ... convers...

BY JAMES CONNOLLY
CW STAFF

LOUISVILLE, Colo. — ... ogy Corp. last w... capacity and ... ...

Codex reveals net manage...

...ge strategy

...grated line of communications prod...

AT&T spells out net contro...

BY ALAN ALPER
and ELISABETH HORWITT
CW STAFF

NEW YORK — AT&T last week announced plans for a unified network management architecture that potentially would allow ... its ...

The architecture is expected to evolve during the next couple of years, AT&T said. The company intends to publish initial NMP specifications within the next few months.

By publishing the ... tions, AT&T ...

... T1 networking ... AT&T spoke ... clear as to which ... ny's existing ... network manage... will be ...

DB2 advantages require nar...

Development benefits over IMS seen ...

... BARCOCK

... bank's Ready T... IMS Fast Path, ... complex DB2 ...

Wang takes Ethernet plunge

VS host links are first step on road ...

BY ELISABETH HORWITT
CW STAFF

LOWELL, Mass. — ... to user demand ... connectivity ...

... vendor networking ...

... can put the entire VS family on Ethernet."

Wang's decision to implement 802.3 on the VS acknowledges growing support for 802.3 as an industry standard as well as user demand for cost-efficient connectivity between VS systems and other vendors' computers.

... ide multivendor com... ...ns through the ISO ...stems Interconnect ... ...ut declined ...

NEC releases hard-disk Multispeed lapt...

WOOD DALE, Ill. — A hard-disk-drive ... of its Multispeed IBM-compatible ... week by NEC ...

electroluminescent ... supertwist LCD ...

640K bytes of nonexpandable ... cess memory and uses a NEC ... that runs at either 4.77 ...

... announce... ...s disap... manage... 125.

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SOFTWARE NOTES

Broker workstation tools ...

... ive Software, Inc. in ..., will provide soft... ...series of intelligent ...kstations to be pro... ADP Financial In... ...n Services, Inc., a ... of Automatic Data ...g, Inc. The work... ...tions will be designed to replace ...quote machines with systems ...that can provide client information, portfolio analysis and modeling options.

Hewlett-Packard ...

Hot future for DP pros

... ...ums pres... ...ge software ... groups. Datas... ...ups is preparing ...ogy protection ...

MAP users group lays down law

BY KATHY CHIN
CW STAFF

... ability gets blown out o... ...ter," said Michael Kolowich, vice-president of corporate marketing and information services

Continued on page 10

IBM slow to reme... ...aky DB2 security

INFORMATION ma... ... to upd...

... Automation ... ...cial applications ...efit program, ...

Not only is development time compressed, but program modifications and maintenance ...

... 4370 ... ...ic ac... ...ributes ... ...about their ... ...cation was not experienced ... IMS and ...

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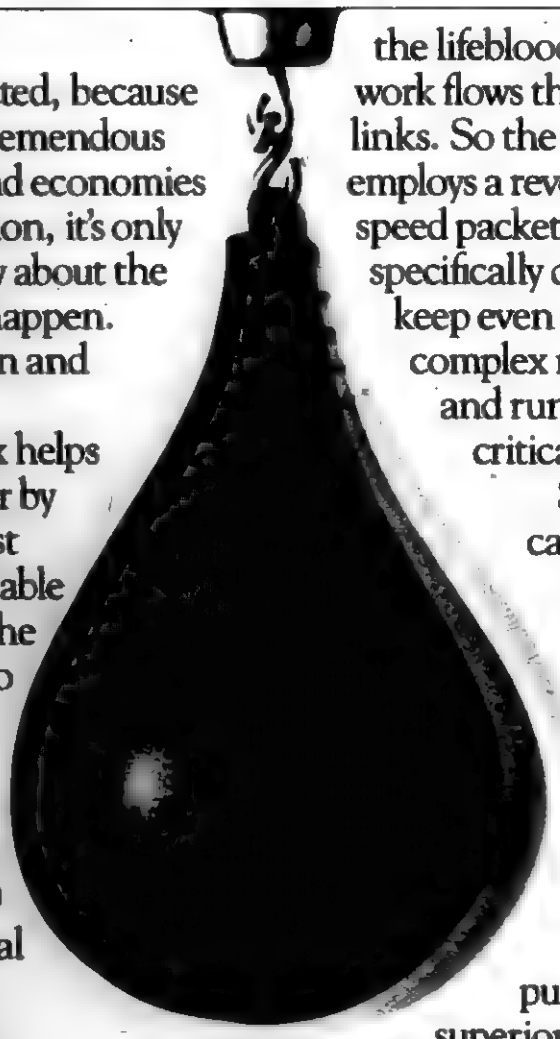

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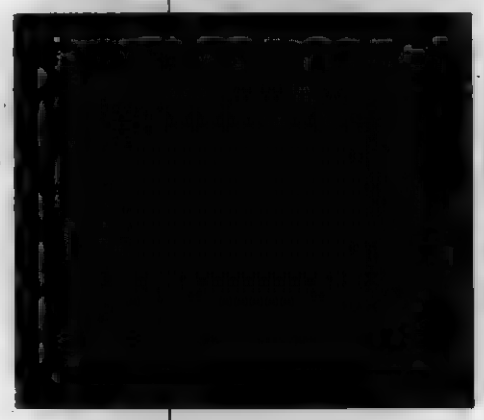

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COMPUTERWORLD

INSIDE

Spotlight — Terminals acquire processing power. Pullout section on terminals and terminal emulation follows page 64.

In Depth — PC support dollars dry up. **Page 61.**

Lining up as the principal partner of fast-charging Sun Microsystems, AT&T inks deal to acquire up to 20% of the workstation vendor. Page 73.

End users with few programming skills are target of two Easytrieve versions being announced by Pansophic Systems this week. Page 12.

Unisys delivers cartridge tape subsystem designed to work with both of its mainframe lines. Page 14.

Prime's buy-out offer rejected by Computervision, but CAD/CAM shakeout seen inevitable. Page 96.

Management focus: Career paths for MIS professionals not inclined toward the executive track. Page 65.

Excel or 1-2-3? Deciding which best suits user needs. Page 29.

NSA to lose control of civilian security measures in legislation awaiting President Reagan's signature. Page 13.

Timeplex to offer modular packet-switched processor in family of products being announced this week. Page 6.

Desktop MIPS war

Coastal rivals ready single-user supercomputers

BY STANLEY GIBSON
and JULIE PITTA
CW STAFF

It's happening again.

In the grand tradition of the computer industry's East Coast-West Coast rivalries, two young companies are set to go head-to-head, pitting new but contrasting technologies and distinct corporate cultures against one another in a race to put near-supercomputer power on a desktop.

Ardent Computer Corp. in Sunnyvale, Calif., and Stellar Computer, Inc. in Newton, Mass., are planning March rollouts for "desktop supercomputers." The machines will reportedly bring 20 million to 60 million instructions per second, 40 million to 60 million floating-point operations per second and elaborate graphics to a single user for less than $100,000.

Art to engineers

The machines fill a gap between current high-end workstations and minisupercomputers, combining features of both. Key applications are expected to be molecular modeling, computational fluid dynamics and computer animation. One goal, the firms said, is to get scientists and engineers to start thinking of their applications in terms of pictures.

Neither product has been formally announced, but the companies have already begun competitively bidding their machines.

Continued on page 8

OS/2 team heads off code fears

BY ALAN ALPER
CW STAFF

NEW YORK — Looking to head off a controversy over minor differences between their versions of the OS/2 operating system, Microsoft Corp. and IBM last week went to great lengths to proclaim that the packages are functionally identical.

The differences between Microsoft's MS OS/2 and IBM's OS/2 relate primarily to hardware configuration support, installation and documentation, company officials said. Those variances are transparent to the average end user, since the application program interface, user interface and command sets of each are exactly the same, the officials added.

Because Microsoft is offering OS/2 to personal computer makers other than IBM, its version supports a broader array of third-party hardware configurations, including support for systems using the IBM Personal Computer AT bus in conjunction

Continued on page 15

Computer firms braced against takeover winds

BY CLINTON WILDER
CW STAFF

ANALYSIS

Prime Computer, Inc.'s use of hostile takeover techniques to acquire Computervision Corp. is a rare strategy among computer vendors — and is likely to remain so.

Even if Prime's $391.5 million buy-out offer is successful, the battle heating up along Massachusetts' Route 128 does not portend a wave of unwanted suitors seeking takeover targets.

In the uncertain financial times following the "Crash of '87," the computer industry should remain relatively insulated from the activities of corporate raiders and conglomerate builders.

Prime's attempted takeover stems not from the financial motivation to take advantage of a depressed stock price but from the strategic desire to dramatically expand its presence in the computer-aided design and man-

Continued on page 96

Mechanically inclined

If Prime's hostile takeover bid to acquire Computervision succeeds, a powerful new force in the CAD/CAM market will emerge

	Revenue[1]	Profit[1]	Employees	CAD/CAM revenue[2]
Prime	$980.3M	$46.9M	8,800	10%
Computervision	$494.7M	−$5.7M	4,700	100%

[1] Last full fiscal year [2] Percent of company's total revenue

CW CHART

Because *anyone* can get a 3090

BY KATHY CHIN LEONG
CW STAFF

What the BMW is to a yuppie, the Cray supercomputer is to a scientist — a symbol of prestige. It's fast, it's powerful, and it's expensive.

Since Seymour Cray began product development at his Chippewa Falls, Wis., lab in 1972, Cray Research, Inc. has delivered more than 130 of the supercomputer behemoths to 113 customers. Users range from Ford Motor Co. in Detroit to Abu Dhabi National Oil Co. in the Middle East.

While large MIS shops can easily order 100 personal computers, when it comes to multimillion-dollar Crays, customers can barely justify one. Whereas an IBM Personal Computer AT can be perched atop a desk, an 11,000-pound Cray X-MP/4 series is often housed in its own chambers with extra supports so that the machine will not penetrate, let alone scratch, the flooring.

Cray customers have unusual computing needs that cannot be met by commercial mainframes. Some zealous Cray users say Crays are needed to ensure that the U.S. remains a leader in aerospace weaponry. Others are convinced that the use of a Cray will enable them to prolong human life through better drug development.

Certainly, Cray isn't the only game in town when it

Continued on page 97

Supercharged

Independent estimate designates Cray as the clear leader in the relatively small but lucrative market for supercomputers

*Excludes internal systems

INFORMATION PROVIDED BY A.G. EDWARDS, HAYMAY & HOPWOOD FORECAST
CW CHART: FRANK C. O'CONNELL

NEWSPAPER

SECOND CLASS

IN THIS ISSUE

Apple harvest. Apple readies three upgradable laser printers — including a low-end Canon LBP-SX-based model and a high-end 68020 unit — and 40M-byte 3½-in. internal hard disk version of the Mac SE for Macworld debut. Page 4.

No experience necessary. Beta-testers praise simplicity of Pansophic's mainframe EZ/IQ and PC-based Easytrieve Plus-NL query and report-writing packages. Page 12.

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6 DP pay increases averaged 7.1% in '87, survey says.

6 Timeplex to roll out packet-switching family tomorrow.

6 LAN users prefer Novell, IBM, study finds.

8 Wang, DEC bail out of Air Force OA contract bidding.

10 M&D teams with Aion to develop, sell expert system development environment.

10 Chips and Technologies chip set enables users to clone PS/2.

13 Senate approves Computer Security Act of 1987, transferring more power to the NBS.

14 Unisys answers IBM with own 3480-type cartridge tape subsystem.

14 NBS submits draft of Cobol 85 compiler test to IBM.

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65 Dual-career tracks: Some don't want to be managers.

65 Computer crime foe nabs public service award.

Quotable

"Any program written for [MS] OS/2 will run on OS/2, whether it's from IBM or any other vendor."

ADRIAN KING
MICROSOFT CORP.

See story page 1.

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Sematech finds home

Semiconductor group chooses Austin as base

BY JAMES A. MARTIN
CW STAFF

AUSTIN, Texas — Sematech, the consortium created last year to help the U.S. semiconductor industry compete against the Japanese, announced last week it has selected this southern Texas city as the site for its headquarters and manufacturing operations.

Sematech plans to set up shop during the first quarter of this year in a 300,000-sq-ft building, a former Data General Corp. manufacturing site. Manufacturing efforts will begin by year's end, a spokesman said.

Austin is also home to Microelectronics and Computer Technology Corp. (MCC), a technology consortium similar in concept, and observers said the two organizations will most likely combine forces in the semiconductor arena.

Overlap in membership

MCC is divided into four research programs, including the semiconductor packaging and integration sectors. The two consortia have in common several corporate members, including National Semiconductor Corp. and Advanced Micro Devices, Inc. Although no formal alliance has been discussed, some type of joint effort between the consortia is likely in the future, according to Jeanne Lock, director of communications for Sematech.

"Austin is a rational decision because of the semiconductor manufacturing infrastructure already in place," said Howard Dicken, president of DM Data, Inc., a semiconductor industry watchdog in Scottsdale, Ariz. "They'll fit in with MCC, Motorola and the others there."

Sematech will employ roughly 7,000 to 8,000 workers, half of whom will be permanent. The others will be on "temporary tour of duty," on loan from a corporation to learn new techniques of manufacturing and bring them back to their respective companies, Locke said.

Texas was chosen as Sematech's home base over 11 other states, including California, Arizona, Massachusetts, North Carolina and Oregon. As a consolation, each of those states will be awarded a $50,000 grant to create semiconductor research projects at the university level.

Sematech was founded last May as a branch of the Semiconductor Industry Association with the purpose of developing advanced chip manufacturing technologies that most companies can no longer afford to develop on their own.

U.S. agency fire harms machines, not data

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The National Rural Electric Cooperative Association (NRECA) spent the holiday season cleaning up after a two-alarm fire that destroyed about 30 terminals and personal computers and spewed black soot throughout the association's data center.

The fire, with temperatures reaching 2,000 degrees, turned several terminals into "black blobs" of melted plastic, according to NRECA spokesman Bob Nelson. "Heat, soot and water took a heavy toll," he said.

The Dec. 21 fire ravaged administrative offices on the third floor of the NRECA building — damages are estimated at $3.3 million — but the computer room on the fourth floor suffered only from smoke and soot, sources said.

"As far as I can tell, every piece of electronic equipment we had on the third floor was lost," said Michael Knapp, the NRECA's supervisor of computer operations. He said much of the equipment on the second floor suffered water damage.

Cleanup duty

I/O Magnetics, Inc., a computer maintenance firm in Columbia, Md., was brought in to clean up the computer room and equipment, including an IBM 4361, a Honeywell, Inc. DPS 8, a Wang Laboratories, Inc. word processing system, disk drives, disk packs, 4,000 reels of magnetic tape and some 100 terminals and PCs, according to John C. Mattey, national account manager.

Knapp said the Honeywell computer is operating but that the IBM 4361 is questionable and may have to be replaced.

The association did not lose any mainframe data but is nevertheless thankful that it had a backup policy of copying data onto magnetic tape for off-site storage, Nelson said. He said other trade associations have inquired about the disaster recovery effort, apparently worried about what would happen if they were struck by fire.

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OS/2 test draws vendor barbs

BY ALAN J. RYAN
CW STAFF

REDMOND, Wash. — Microsoft Corp. and IBM last week criticized an independent benchmark test comparing OS/2 with Unix, likening it to a comparison of dissimilar fruits.

Neal Nelson, originator of the suite of 18 tests that compare the operating systems' speeds in one to 20 simultaneous applications, said he stands behind his findings. The results showed that OS/2 can run up to seven times slower than Unix [CW, Dec. 28, 1987/Jan. 4, 1988].

Microsoft's Xenix, marketed by The Santa Cruz Operation, Inc. as SCO Xenix 386, which was used in the test, is optimized for the Intel Corp. 80386 processor. Nelson "would have to look at SCO Xenix 286 to have a fair comparison," because OS/2 is optimized for an Intel 80286-based processor, said Marty Taucher, a Microsoft spokesman. "It's like comparing apples to oranges."

Nelson, however, argued that comparing OS/2 to Xenix optimized for the 286 chip would be "like comparing an '87 Ford to a '65 Chevrolet." OS/2 and SCO Xenix 386 "are the current products for sale in both categories. If a customer is trying to decide what he wants to buy, this is the choice available," he said. IBM released Version 1.0 of OS/2 Dec. 4.

> "THERE'S a million ways you can do benchmarks, and you get whatever kinds of results you set out to find."
>
> SCOTT BROOKS
> IBM

"There's a million ways you can do benchmarks, and you get whatever kinds of results you set out to find," said Scott Brooks, an IBM information representative for OS/2. "We've done some benchmarks for our own internal use, and OS/2 matched up favorably with Xenix," he added.

Brooks said, however, that he was uncertain about which Xenix version the IBM comparison had used.

Users contacted last week had mixed reactions to the test, with some saying they choose an operating system first to run certain applications and second for its performance.

"Because OS/2 functionally is very much like the Unix-type environment, from a customer's point of view, I would be concerned if the performance is not nearly as good [as that of Unix]," said Henwell Chou, second vice-president at Travelers Insurance Co. in Hartford, Conn., and an early OS/2 user.

But, Chou added, "We cannot make a selection just based on performance, because, primarily, we are based on the application software. However, if we see there is room for IBM to improve their performance, we would voice that concern and ask them to tune their software better."

Another user said the OS/2 vs. Unix comparison might have been acceptable 10 years ago, when the computer industry's evolution was slower. But today, he said, the test represents a closet-type view.

George Kurowski, director of nontraditional information system development at Connecticut Mutual Life Insurance Co. in Hartford, said the test "doesn't necessarily portray an accurate comparison if you project it a year from now."

Disturbing discrepancies

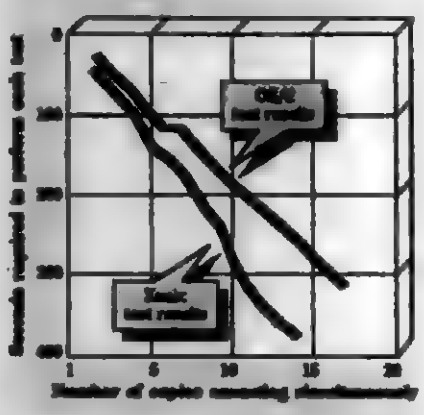
Daniel Cavanagh, senior vice-president of MIS at Metropolitan Life Insurance Co. in New York, said his company is exploring Unix for special applications and OS/2 for other applications. While he said he would not be surprised if the newer operating systems were slower than Unix — which has been in the works for nearly 20 years — he added that if Nelson's results were accurate, the magnitude of the performance differences would be disturbing.

The test results are important, Nelson claimed, because they tell users looking at a distributed network with OS/2 as the operating system that they will have to size their hardware according to the efficiency of OS/2. "If they've been doing testing and development under DOS or Xenix but want to put it under OS/2, they might have to buy a more powerful machine," he added.

Nelson's firm, Neal Nelson & Associates, ran the suite of tests on its OS/2 Business Benchmark software. The comparison was conducted on an IBM Personal System/2 Model 80 with a 70M-byte hard disk, 2M bytes of memory and a 16-MHz clock.

OS/2 vs. Xenix

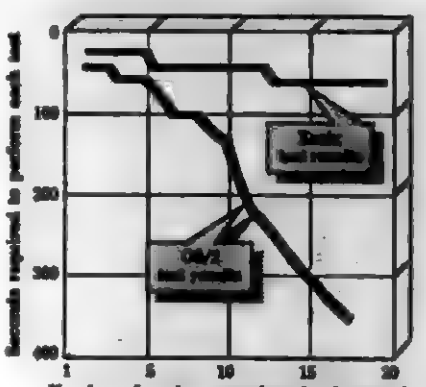
Comparison of OS/2 and Xenix for a task that performs 100,000 calculations with 64-bit, double-precision floating-point numbers— similar to an engineering or scientific application



INFORMATION PROVIDED BY NEAL NELSON & ASSOCIATES
CW CHART

OS/2 or Slow/S2?

Comparison between OS/2 and Xenix for a task that includes 16- and 32-bit integer math, function calls, loops and sequential and random disk I/O



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CW CHART

Apple readies printer crop for Macworld

BY JULIE PITTA
CW STAFF

CUPERTINO, Calif. — Apple Computer, Inc. is expected to launch three laser printers and an upgraded version of its Macintosh SE personal computer next week at Macworld.

Sources who previewed the products said the laser printers offer 300 dot/in. resolution and are based on the Canon U.S.A., Inc. LBP-SX print engine, an upgrade from the LBP-CX engine used in Apple's existing Laserwriter and Laserwriter Plus printers. Both those products will eventually be phased out in favor of the new line.

At the low end of the line is a single-user printer that one user compared with General Computer Co.'s Personal Laserprinter. Its price is expected to be about $2,000.

A mid-range networking printer slated to be introduced at the show is based on Motorola, Inc.'s 68000 microprocessor. At the high end of the line, Apple is expected to introduce a laser printer based on Motorola's 68020 microprocessor.

An external disk drive may be connected to the high-end printer so that multiple jobs may be stored.

All three systems will offer one or two slots to allow upgrades, according to Apple. "The key issue is that they're upgradable," a source said. "Boards can be added so that you can start with one and build it up to be a higher end version."

The printers appear to be an extension of Apple's open architecture philosophy, which began with the introduction of the Macintosh II and the Mac SE PCs last year. A criticism of earlier Apple systems was users' inability to expand them with third-party options. The Mac II and Mac SE were the first Apple systems to offer expansion slots.

Additionally, Apple will introduce a version of its 68000-based Mac SE with a 40M-byte 3½-in. internal hard disk drive. Originally, the Mac SE came configured with either two floppy disk drives or one floppy and one 20M-byte 3½-in. hard drive.

Moving toward standard

"When you look at the MS-DOS world, the move is toward 40M bytes of storage," said Bill Lempesis, a PC industry analyst for Dataquest, Inc. "Most of the [Intel Corp.] 80286-based machines out there are configured with a 40M-byte drive.

"If Apple wants to compete in business with those DOS machines, they need to move to 40M bytes," Lempesis continued. "It's pretty much the standard."

In other introductions, Apple is expected to add a read-only optical disk drive subsystem for the Mac, designed to work with Hypercard from Apple.

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MIS '87 salary gains average 7%

Silicon Valley, Boston, Midwest, Florida lead in pay increases

BY DAVID A. LUDLUM
CW STAFF

SAN MATEO, Calif. — Salaries for data processing managers and professionals climbed an average of 7.1% late last year from a year earlier, with a range of regions sharing relatively strong growth, according to an annual survey.

DP pay increases were paced by salaries at electronics firms in Silicon Valley and the Boston area, manufacturers in Midwestern cities such as Chicago and Minneapolis and fast-growing Florida, according to the survey, which was conducted by recruitment firm Source Services Corp.

"It's not just old people who are moving to Florida. There are the beginnings of a high-tech belt in the Tampa area," said Steve Joffey, vice-president for the EDP Division of Source Services. The survey also indicated some "rebirth" of salary growth in Texas with rising oil prices, Joffey said.

The annual survey measured salaries for 22 DP job titles, including computer operator, five categories each of programmer/analyst and six management classifications.

An individual's pay, however, is likely to hinge on his skills and the specific demands of the job more than on the title, and demand for specific skills varies greatly from city to city, Joffey said.

Variable scale

Programmers are likely to have won larger than average pay raises for skills in data communications and networks, new data bases and fourth-generation languages, particularly in mini- and microcomputer environments, Joffey said.

"Those are the people that are getting ahead faster because they are in more demand," he added.

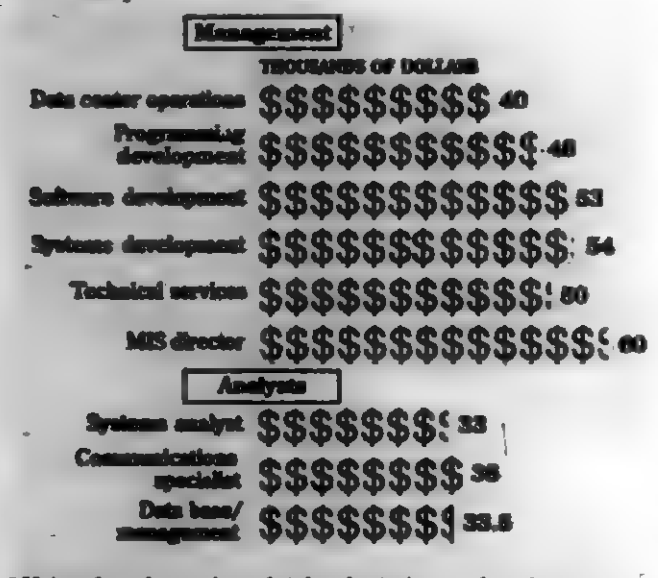
But pay may also vary with a DP worker's knowledge of a specific business and its applications, he said.

"If they're in a geography whereby the thriving business is electronics, and they do payroll and personnel, they're not going to be at the apex of the learning curve in their marketplace. There's a dual problem in every marketplace — business and technology."

A third factor that can drive DP pay higher is "people skills" called for in developing systems from user requirements, Joffey said.

Systems salaries

Median salaries for DP managers and analysts, according to a recent survey*



* Managers' experience varies; analysts have four to six years of experience

INFORMATION PROVIDED BY SOURCE SERVICES CORP.
CW CHART

Timeplex plans family of packet switches

BY ELISABETH HORWITT
CW STAFF

WOODCLIFF LAKE, N.J. — Timeplex, Inc. will fill out its data communications product line with a complete packet-switching family, to be announced tomorrow, the company told *Computerworld* last week.

The Timepac X.25 Packet Switching family will include the Timepac Nodal Processor 100 and 500 packet switches. A single Nodal Processor is said to handle throughput of up to 500 packet/sec. Multiple processors can be clustered together, allowing users to start at the low end and then add switching capacity in a modular fashion, according to Timeplex. The clustered system thus "provides network solutions from entry level to the largest private networks," the spokesman said.

The Nodal Processors are said to automatically perform management and reconfiguration functions during the process of adding new nodes to the packet-switching network. Up to 10,000 nodes can be networked together, Timeplex said.

Another member of the Timepac family, the Timepac Packet Assembler-Disassembler, concentrates data from terminals and hosts so that it can be transmitted over a public X.25 network or to a private network of Nodal Processors, Timeplex said.

With the addition of the Timepac family, "Timeplex now offers all the things you need in a telecommunications shop," said Joaquin Gonzalez, vice-president of enterprise networking strategies at Stamford, Conn., research firm the Gartner Group, Inc. "They're really becoming an end-to-end full-communications supplier." In addition to its X.25 offerings, Timeplex's products include statistical multiplexers and T1 switches.

All in one

More and more Gartner Group clients say they like the idea of having one source for their networking needs because of their increasing emphasis on getting all of their communications devices to work together under a single network management system, according to Gonzalez. "And the only way to ensure that, at least for the next three to five years, is to get everything from one vendor."

While the Timeplex spokesman would not elaborate on how the Timepac family will be integrated with its other data communications product lines, he said that "Timepac is an integral part of the integrated systems Timeplex offers customers to meet their specific networking needs."

Timeplex's ability to provide packet switching also makes the company more attractive to its future acquirer, Unisys Corp., Gonzalez said. "A number of people have been saying that Unisys would do better to buy a packet-switching firm, [based on the belief that] T1 is only a passing fancy, and X.25 is getting hot, especially since IBM began supporting it."

Users: IBM, Novell offer choice LAN products

BY KATHY CHIN LEONG
CW STAFF

SANTA CLARA, Calif. — Local-area network users show a strong preference toward the Novell, Inc. Netware operating system and IBM Personal Computer XT and AT file servers, according to a recent buying trends report. In 1988, the survey forecasts, users will continue to flock to Novell for operating system software and to IBM for Personal System/2 micros as network servers.

In its October survey of 160 institutions, including large and medium-size businesses, universities and federal and state governments, Infonetics, Inc. discovered that Novell topped IBM and 3Com Corp. when it came to operating system software.

In 1987, 38% of the respondents had installed Netware, while 27% of the users had the IBM PC LAN program. 3Com's 3+ operating system had secured installations in 9% of the users' offices.

According to Nina Burns, the analyst who compiled the findings, Novell made a strong showing for several reasons. "Users perceive Netware as having the strong performance these companies require. Novell has a handle on in-depth support of other vendors' hardware products, such as [IBM's] Token-Ring and Ethernet." She also stressed that IBM's relationship with Novell as a Netware reseller has given users confidence in Novell products.

Not good for 3Com

3Com's showing in the operating systems arena was relatively low and is expected to remain at 9% this year. Burns noted that users in the survey said they were confused about 3Com's relationship with Microsoft Corp. and what the LAN Manager could do.

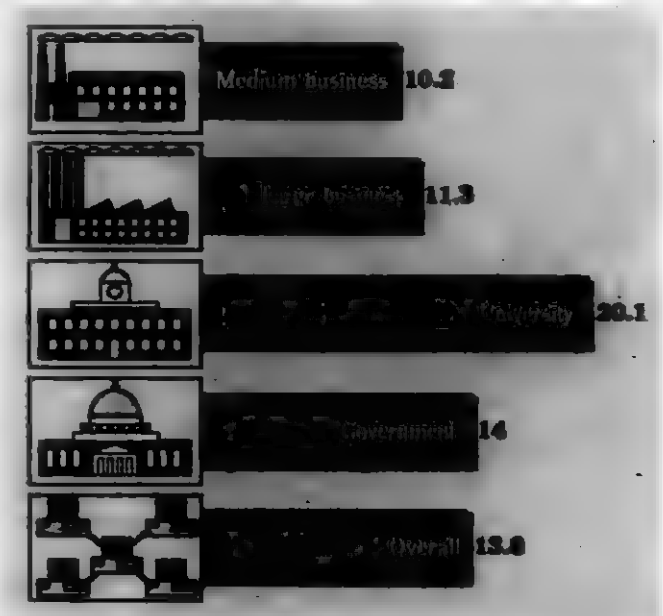
Novell topped IBM mainly because users perceive the IBM LAN program as slow and limited in its support for only IBM products. And even though IBM announced OS/2 Extended Edition with new networking facilities, Burns said that will not impact Netware's clout — at least this year.

Meanwhile, with Novell in second place this time, IBM took the lead in its installed base of file servers, with 51% of the respondents saying they were using PC ATs and XTs in their work groups. Burns stressed that IBM micros were viewed as industry-standard machines that can run various types of operating systems. Also, users with XTs and ATs were able to turn these micros into file servers, thereby saving hundreds of dollars.

Surprisingly, while the PS/2 had been on the market for less than six months, the study showed that 5% of the respondents were using the machines. The purchase of XT and AT file servers will diminish this year, giving way to the PS/2 and other vendors' Intel Corp. 80386-based computers.

Network hub

Recent survey of 160 organizations using local-area networks indicates average number of PCs hooked up to each LAN server



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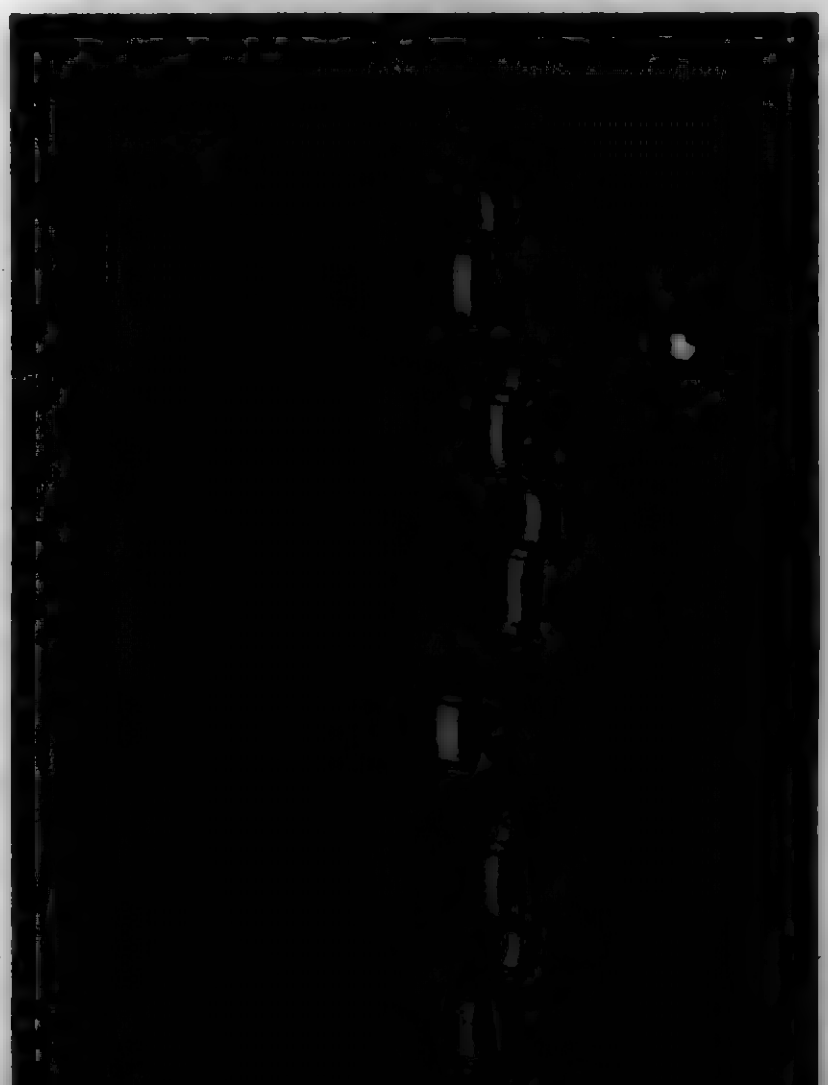
CW CHART: FRANK C. O'CONNELL

VMCENTER II
Smart Economics.



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DEC, Wang bail out of Air Force bid

BY JAMES CONNOLLY
CW STAFF

Both challengers of the U.S. Air Force's bid specifications on a $4.5 billion office automation contract — Digital Equipment Corp. and Wang Laboratories, Inc. — have quietly withdrawn from the bidding process.

The vendors, which last year filed protests claiming that Air Force requirements for AT&T's Unix System V favor AT&T as a bidder, recently notified the Air Force that they will not submit proposals. Wang and DEC told Air Force officials that the time and cost involved in complying with revised requirements prohibited them from bidding.

With the elimination of DEC and Wang from the bidding, AT&T, IBM, Unisys Corp. and Prime Computer, Inc. reportedly remain as major vendors vying for the Air Force contract, which involves supplying up to 20,000 Unix-based mid-range computers along with software, services and peripherals.

DEC's and Wang's letters to Air Force officials were sent Dec. 23, about two months after an administrative law judge partially upheld the vendors' challenge to the bid specifications and called for the Air Force to revise the requirements.

Unequal terms

DEC and Wang charged that the original specifications favored AT&T by calling for AT&T's System V Interface Definition (SVID) and System V Verification Suite.

DEC and Wang claimed the specification left open the possibility that AT&T could unfairly judge other vendors on their compliance with SVID and that requiring the use of SVID — rather than the emerging standard Posix — hurts bidders by forcing them to pay royalties to AT&T.

Although the Air Force revised its request for proposals (RFP) and set a new bid deadline of Dec. 23, DEC and Wang said the revisions still bar them from making competitive bids.

One DEC official said the revisions may have made AT&T's position more favorable.

In a prepared statement, a Wang spokesman last week said, "Even though the RFP was revised as a result of the recent protest, Wang has concluded that the chances of competing successfully for the award were low. In our judgment, it was not economic for us to pursue further this procurement opportunity."

DEC spokesman Frank Donovan said DEC considered re-engineering its Ultrix operating system but discovered that the work could not be done in time to fulfill the contract.

MIPS war

FROM PAGE 1

If nothing else, Ardent has won an early lead in feistiness, boldly claiming superiority and even denigrating Stellar. "Our engineers have done a *stellar* job. Theirs haven't," sniffed Allen H. Michels, chairman and chief executive officer of Ardent.

The rivalry follows the paradigm of American computing in the tradition of Sun Microsystems, Inc. vs. Apollo Computer, Inc.; Alliant Computer Systems Corp. vs. Convex Computer Corp.; and in microcomputers, Apple Computer, Inc. vs. IBM. These contests match competitors from disparate geographic locations in a struggle for sales and technology leadership.

Stellar's Poduska

Stellar Computer, Inc.
Newton, Mass.

Management team: *John William Poduska Sr., chairman and chief executive officer; Arthur Carr, president and CEO.*

Product description: *"Graphics supercomputer."*

Founded: *December 1985.*

Venture capital funding: *A total of $30 million raised in two rounds. Major investors include Poduska, Greylock Management Corp. and Hambrecht & Quist, Inc.*

Number of employees: *100 total; 60 in engineering.*

Anticipated product rollout date: *March 1988.*

Limelight leaders

Ardent and Stellar are both led by executives who are well known to each other and to the industry. Stellar's founder and CEO, John William Poduska Sr., is a founder of Prime Computer, Inc. and Apollo. Ardent, which changed its name from Dana Computer, Inc. in December, is led by Michels, the flamboyant founder of Convergent Technologies, Inc.

"The difference between us and Stellar is that we can do very good graphics, but we compute like a supercomputer. We look like a Cray inside; they look like a workstation," asserted Gordon Bell, Ardent's vice-president of engineering, research and development, referring to Cray Research, Inc. supercomputers. Bell is widely known as the designer of Digital Equipment Corp.'s VAX architecture and Encore Computer Corp.'s Multimax parallel processor.

Stellar's Poduska hesitated to disparage his rival. He professed that Michels and Bell are both longtime friends and that he has deep respect for their abilities.

"There are an awful lot of good people at Ardent. They are capable of doing lots of things," he said.

Poduska, a recent father at 50 years old, preferred to bubble with paternal enthusiasm for his newest offspring, the Stellar workstation. "It's a crackerjack," he exulted.

Despite Ardent's claims of leadership, technical computing analyst Vicki Brown at International Data Corp. (IDC) in Framingham, Mass., said Stellar has been beating out Ardent in early bidding. Poduska, while expressing reservations about the certainty of early orders, said Stellar is winning its share and may be ahead of Ardent in number of victories. He claimed Stellar has some $3 million in orders to date.

But Ardent's vice-president of sales, Steven Blank, strongly disagreed. "We've beaten them four times in a row — everywhere we've been, except for the first bid. They haven't won one since."

That bid, which was at the National Institute for Health in Bethesda, Md., was decided last fall. Both Stellar and Ardent machines performed comparably, but Stellar's price was lower for a complete system, an institute spokesman said.

The heart of the Stellar machine consists of 45 proprietary application-specific integrated circuit microprocessors. Fabrication of the chips was recently completed by LSI Logic Corp. in late December. The processors run the AT&T Unix System V, Release 3.1 operating system for the first time last week, according to Poduska.

The CMOS microprocessors, which are not reduced instruction set computer (RISC) chips, were designed by Stellar engineers on a battery of Sun and Apollo workstations. Poduska said the equipment stands ready as a "cannon" to be aimed at yet more powerful microchips.

In contrast to the in-house design of Stellar's product, Ardent is basing its system, code-named Titan, on a Mips Computer Systems, Inc. RISC processor for integer computing, in combination with a custom-made vector processor. The board set is made by Silicon Graphics, Inc.

Problem chips?

Workstation analyst Charles Foundyller, president of Daratech, Inc. in Cambridge, Mass., expressed some skepticism about Stellar's chances for success using a new, powerful microprocessor of proprietary design. He pointed to development problems encountered by Intergraph Corp.'s Clipper chip and IBM's RT Personal Computer RISC chip.

Poduska countered that the Stellar chips have already been tested extensively in simulation.

Early figures released by both companies to IDC show that Ardent claims a lead in MIPS and MFLOPS and in Gouraud-shaded triangles per second, a measure of graphics performance. Stellar, however, boasts wider bandwidth, which, IDC's Brown says, may be a more significant advantage. "Bandwidth today is the limiting factor. It may give Stellar an edge," she said.

Brown also poked holes in early performance claims. "These things mean nothing until you see one of the machines working. I would never believe what anyone says about graphics benchmarks," she said.

Ardent is claiming a price in the $70,000 range, in contrast to Stellar's, which is close to $100,000.

"In the long-term, the difference will be in software," said Michael Burwen, president of the Palo Alto Management Group. "The major issue will be which company attracts the most third-party developers. That's a complete unknown."

Ardent's Michels

Ardent Computer Corp.
Sunnyvale, Calif.

Management team: *Allen H. Michels, chairman, president and CEO; C. Gordon Bell, vice-president of engineering, research and development.*

Product description: *"Single-user supercomputer."*

Founded: *October 1985.*

Venture capital funding: *$32 million in two rounds, including $13 million from Crown Advisors and Kleiner, Perkins, Caulfield & Byers.*

Number of employees: *88 total; 68 in engineering.*

Anticipated product rollout date: *March 1988.*

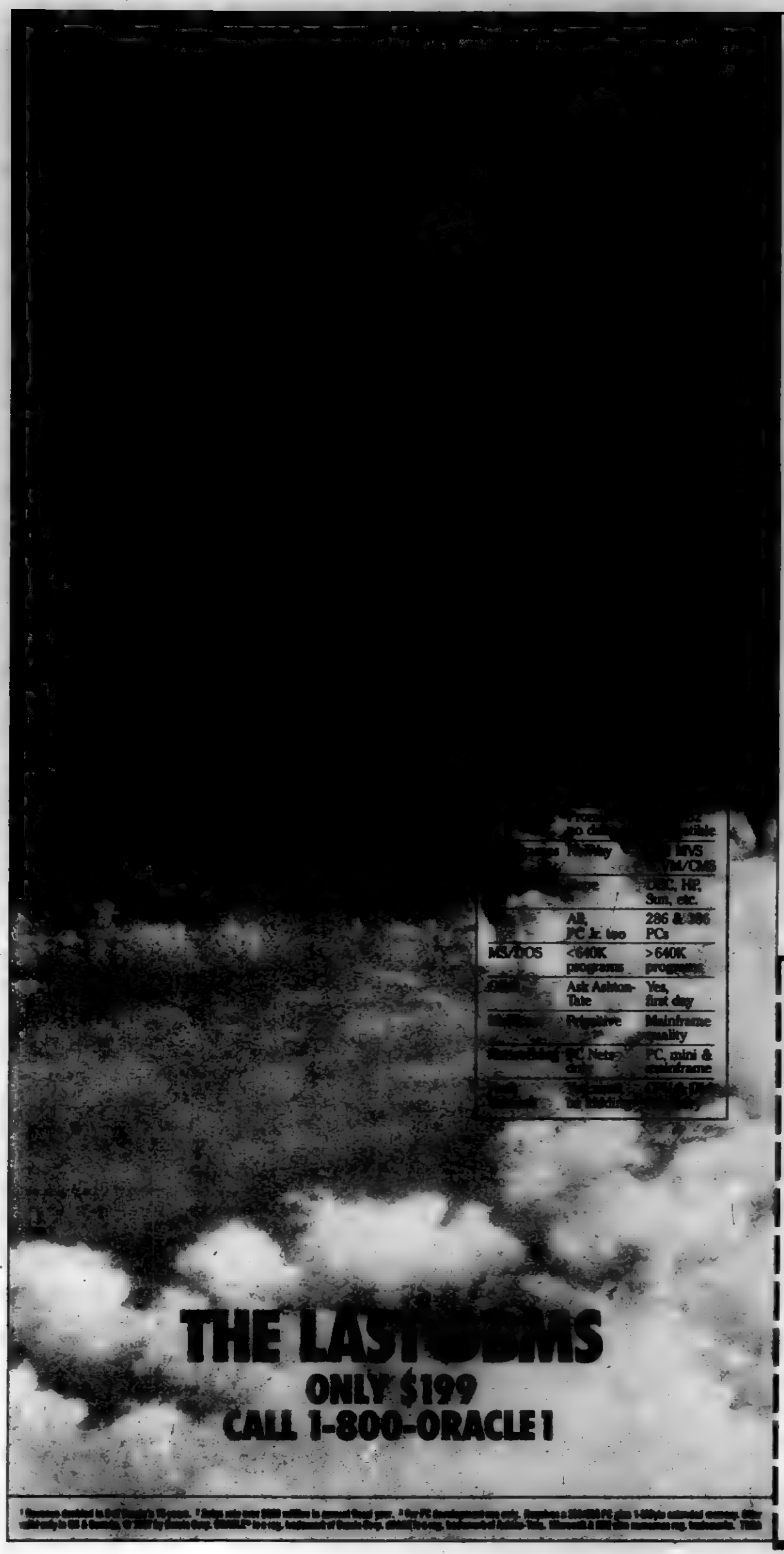
The next step

A new level of workstation performance is expected to develop with March introductions from Stellar and Ardent

Performance	• 25 MIPS[1] integer • 40 MFLOPS[2] double-precision	• 40 MIPS integer • 64 MFLOPS peak, 6 MFLOPS compiled Linpack benchmark
Memory	• 16M to 128M bytes • 320M byte/sec. data transfer to and from main memory, 640M byte/sec. graphics memory bandwidth	• 8M to 128M bytes • 256M byte/sec. bus bandwidth
Operating system	• AT&T Unix System V, Release 3.1	• Unix System V, Release 3.1
Standards compliance	• X Windows, TCP/IP,[3] NFS,[4] PHIGS+[5]	• X Windows, TCP/IP, NFS, PHIGS+
Price	• Less than $100,000	• Less than $100,000

[1] Millions of instructions per second
[2] Millions of floating-point operations per second
[3] Transmission Control Protocol/Internet Protocol
[4] Network File System
[5] Programmer's Hierarchical Interactive Graphics Standard

INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART



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M&D builds onto line

BY CHARLES BABCOCK
CW STAFF

NATICK, Mass. — McCormack & Dodge Corp. sought to graft two emerging technologies onto its product line last week when it announced agreements to jointly market an expert system shell for mainframe applications and jointly develop an interface to an electronic document interchange (EDI) system.

M&D, a supplier of accounting, human resource and manufacturing applications, said it has teamed with Aion Corp. to develop and sell applications built with the Palo Alto, Calif., firm's expert system development environment, the Aion Development System.

M&D is licensed to include Aion's runtime product, the Aion Execution System, into its existing applications. The runtime product would enable M&D applications to issue a call to an inference engine, which can process rules embedded in the application.

A select few

Aion is one of a handful of companies that has provided expert system capabilities for production and data management environments under IBM's MVS and MVS/XA, including CICS, TSO and IMS/DC. Aion products also run under IBM's VM/CMS and on IBM Personal Computers.

M&D already has a project under way that uses the Aion technology to develop internal applications to help M&D technicians provide customer support.

The company also wants to add expertise to some of its mainframe applications. Last year, the firm launched two in a series of personal computer applications that work in conjunction with its mainframe software. Vice-President Rob Kelley said the firm will offer PC-based expert systems as well.

M&D also signed an agreement with GE Information Services in Rockville, Md., to develop interfaces between M&D applications and GE's EDI system.

The pact would allow M&D customers to exchange purchase orders, letters of credit, shipping notices and other business documents by invoking standard electronic formats.

The system makes use of GE's minicomputer and mainframe network, which reaches 750 cities worldwide.

M&D spokesmen said the EDI interface will be incorporated into the next release of M&D's Purchase Order/Millennium package, due out this year.

Embedding the expert system technology is still in the research and development stage, and no time frame has yet been released for when that will become available.

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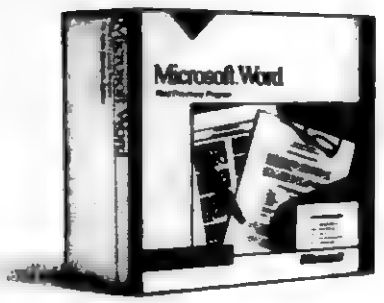

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Chip sets to clone PS/2 functions

BY ED SCANNELL
CW STAFF

MILPITAS, Calif. — Chips and Technologies, Inc. is expected to announce chip sets next week in New York that will allow computer manufacturers to produce systems compatible with IBM's Micro Channel-based Personal System/2 machines, according to sources close to the company.

Chips and Technologies will use a series of BIOS products created by Phoenix Technologies Ltd. The chip sets, combined with the Phoenix products, will allow personal computer makers to deliver Micro Channel-compatible products by mid-year, one source said.

Last month, Phoenix signed a joint development agreement with Western Digital Corp. to create a series of read-only memory BIOS products that, when used with Western Digital's chip sets announced in October, will let manufacturers build Micro Channel-based systems.

While he declined to disclose details of the announcement, Raj Jaswa, Chips and Technologies' senior product marketing engineer, said the company promised late last summer to announce Micro Channel-compatible products this month.

"I think the marketplace is beginning to anticipate some sort of product announcement from Chips. We said [in August] that we would be introducing some PS/2 Micro Channel products in the January time frame," Jaswa said.

What next?

With the necessary tools now available to create a Micro Channel clone, the next question is who will be the first OEM to deliver a system that tests the tough legal stance IBM has taken on defending its proprietary technology.

The technical issues connected with cloning the Micro Channel have been more demanding than the legal ones, Jaswa said. He added that he does not anticipate any legal challenge to emerge from IBM over his company's forthcoming chip sets.

"Our approach has always been toward logical extraction, because it is a time-proven, legal way of reverse engineering. As long as there is no micro code in any device, the legality of reverse engineering has never been questioned," he said.

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Pansophic courts end users in versions of Easytrieve Plus

BY JEAN S. BOZMAN
CW STAFF

OAK BROOK, Ill. — Pansophic Systems, Inc. will announce two variations on its Easytrieve Plus query and report-writing package this week — both designed for end users who have little or no programming experience.

The packages, a mainframe product called EZ/IQ and a personal computer-based product called Easytrieve Plus-Natural Language (NL), have been in beta-test sites since last fall. Early users say both user-friendly Pansophic packages could help make a dent in the backlog existing in applications development at IBM shops running MVS, VM and DOS/VSE. The initial marketing effort is aimed at Pansophic's customer base of 15,000 sites worldwide, 6,000 of which already possess Easytrieve Plus.

EZ/IQ allows a data base administrator to preselect mainframe data from IBM VSAM files and to make the selected data available to end users for query from IBM 3270 terminals. The program then guides end users through prompts and menus in selecting data subsets for inclusion in on-screen reports.

Interface in the works

An extract facility allows conversion to the PC-based formats of Lotus Development Corp.'s 1-2-3 or Ashton-Tate Corp.'s Dbase for later manipulation on an end user's personal computer. Initially, EZ/IQ will run against VSAM only, according to Joan Fee, marketing product manager for Pansophic's Productivity Products division, but an interface to IBM's DB2 is planned for release this fall. EZ/IQ costs between $24,000 and $40,000, depending on CPU configuration.

One early user, Seven Oaks International, Inc., an El Paso, Texas, processor of supermarket coupons, plans to use EZ/IQ to reduce an applications backlog. "EZ/IQ is leaps and bounds ahead of Easytrieve Plus in terms of what you have to do to prepare a query," said Enrique Torres, director of information services at Seven Oaks. "After six hours of on-site training, our end users had learned to navigate the different data types. Our experience with EZ/IQ and with Easytrieve Plus-NL since October has convinced us to install them as productivity tools to help us catch up with an estimated 14,000 hours of work in coding applications."

Pansophic's new PC-based package, Easytrieve Plus-NL, priced at $499, gives end users the chance to pose data base queries in their own words, Fee said. The natural-language interface, developed by Elliot Bay Computing, Inc., a Seattle-based artificial intelligence concern, converts the English language questions into Easytrieve Plus code to be run on an IBM mainframe. The end user can also "teach" the program new vocabulary words, Fee said.

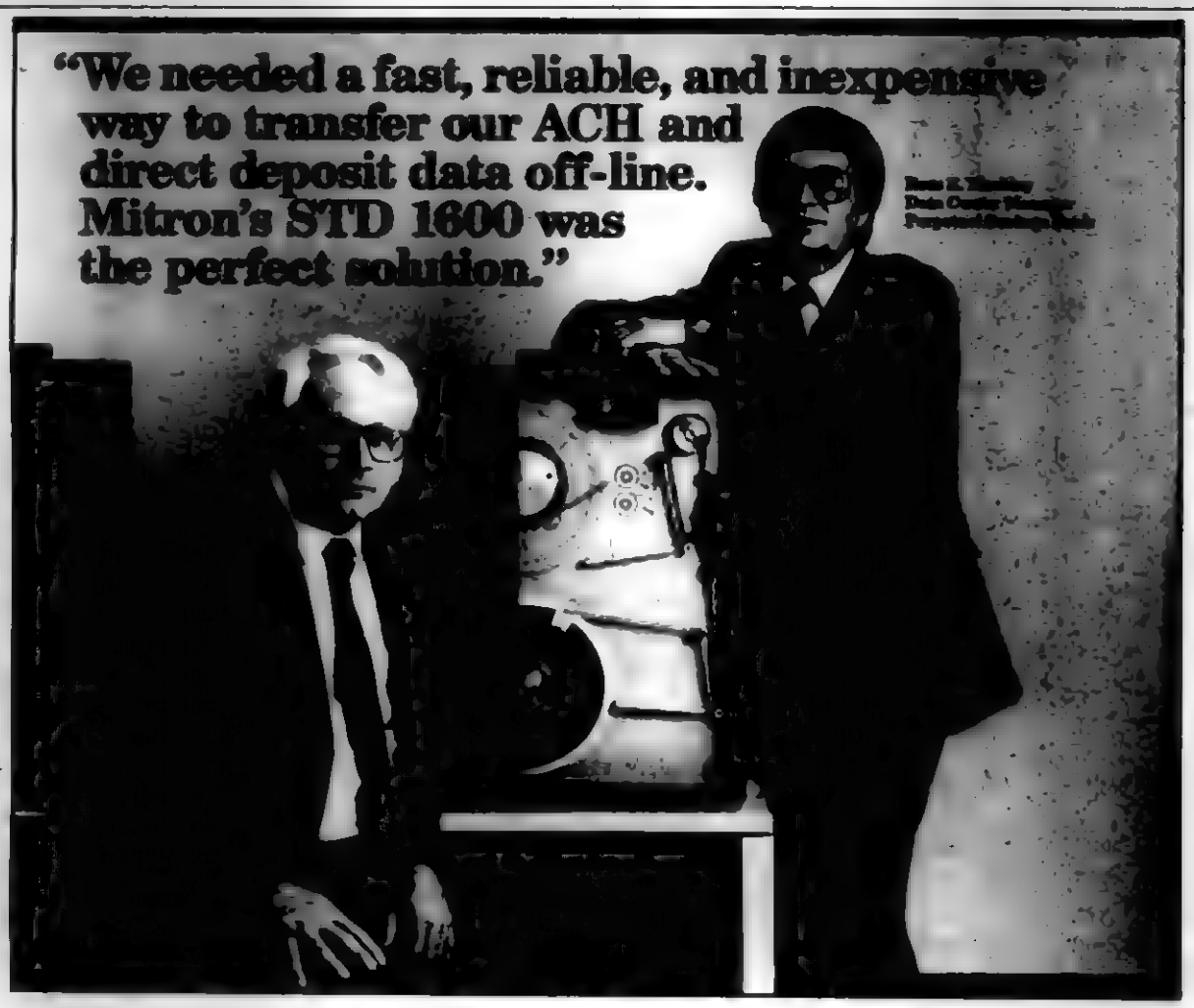
> "EZ/IQ IS LEAPS and bounds ahead of Easytrieve Plus in terms of what you have to do to prepare a query."
>
> ENRIQUE TORRES
> SEVEN OAKS INTERNATIONAL, INC.

"We decided that Pansophic had successfully addressed the report-writing market but that it had missed the potential market for end users who lacked programming experience," Fee said. "Our philosophy with these new products is to provide an open architecture that will allow people throughout a company to access mainframe data." However, Fee cautioned, security is built into both new products so that casual inquiries by unauthorized people cannot be made against the corporate data base.

Paccar, Inc., a Seattle-based manufacturing firm that makes Peterbilt and Kenworth trucks, has been using Easytrieve Plus-NL since last fall. At Paccar, on-line inquiries run all day, while batch queries are run from 6 p.m. to 4 a.m. In the past, that practice has forced end users to wait for programmers to help them create new queries for the mainframe.

"Using Easytrieve Plus-NL, as we have for several months, end users can use natural-language questions to generate their own coded queries," said Margue Hunt, a systems analyst at Paccar. "Later, we check these queries for syntax, compile the queries and run them overnight. That way, the end user has his data when he comes into work the next morning."

For example, Hunt said, an end user can type in, "Is there anybody in the data base named Jones?" and get the response "Yes!" Then, by typing in "Who?" or "In which city?" or "What's his phone number?" the system will deliver the person's personnel description, address or phone number. Underlying the English language queries is a checker that prompts when the questioner's meaning is unclear.



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Congress shifts security power to NBS

Reagan expected to sign act stripping NSA of civilian encryption responsibility

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — In the last few hours of its 1987 session, the U.S. Senate gave final approval to legislation that gives the National Bureau of Standards (NBS) the lead role in setting standards for data encryption, access controls and other security measures in the civilian sector.

The Computer Security Act of 1987, which reportedly will be signed into law by President Reagan shortly, is Congress's effort to strip that power away from the National Security Agency (NSA), an intelligence unit of the U.S. Department of Defense.

Supporters said the legislation will restore civilian control over security programs for civilian information systems. The NBS is part of the U.S. Department of Commerce.

THE ACT specifically requires the NBS to establish security standards and training programs for federal agencies using unclassified information systems.

More than three years ago — under a controversial presidential order called National Security Decision Directive 145 (NSDD 145) — the NSA got authority over both civilian and military computer security policies.

"The central purpose of this legislation is to reject the federal computer security plan set forth in NSDD 145," Sen. Patrick J. Leahy (D-Vt.) said.

Big Brother watching?

Critics in Congress, the Information Industry Association and civil liberties groups viewed NSDD 145 as a step toward military regulation of government information systems and commercial online data services [CW, July 8, 1985]. Leahy said that while the bill is intended to strengthen the security of government information systems, nothing in the bill is meant to restrict the free flow of unclassified government information, such as disclosures made under the Freedom of Information Act.

Data security officers at the nation's commercial banks supported Congress's decision to put the NBS, rather than the NSA, in charge of security standards for the civilian agencies and the private sector. The American Bankers Association has had running battles with the NSA because the intelligence agency wants to replace the Data Encryption Standard, which is widely used in the banking industry [CW, March 23, 1987].

"The decision to put computer security in the hands of the NBS gives banks a signal to continue work on improvements in EFT [electronic funds transfer] security and privacy protection of computer data," said Eddie L. Zeitler, a member of the banking association's data security committee and vice-president of Security Pacific National Bank in Los Angeles.

The Computer Security Act specifically requires the NBS to establish security standards and training programs for federal agencies using unclassified information systems, while security for classified systems is left to the NSA. In addition, a 12-member advisory board will be established to provide advice from the private sector.

In a move that helped gain the Reagan administration's support for the bill, legislators agreed to language stating that the NBS should draw on the technical expertise of the NSA's National Computer Security Center, where appropriate.

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The legislation was originally sponsored by Reps. Dan Glickman (D-Kan.) and Jack Brooks (D-Texas), who guided it to passage by the House of Representatives last June [CW, June 29, 1987].

Computer vendors, including the Computer and Business Equipment Manufacturers Association, had expressed concern that the legislation might create two incompatible sets of security standards, one for the civilian sector and one for defense and intelligence agencies. In statements published in the Congressional Record, senators said they expect the NBS and the NSA to cooperate and produce complementary standards.

"I have been assured by the NBS that once a system has passed muster at the NSA's computer security center, it would not have to go through the NBS process for use by agencies with unclassified systems," reported Sen. William V. Roth (R-Del.).

Leahy said the legislation actually "provides a framework for reconciling the sometimes differing security needs of these distinct communities."

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Tape drive for Unisys 1100 unveiled

BY JAMES CONNOLLY
CW STAFF

BLUE BELL, Pa. — Unisys Corp. has taken the first step in executing its plan to offer peripherals that are compatible with both its mainframe lines by introducing an IBM 3480-type cartridge tape subsystem.

Unisys last week announced the 5073/0899 subsystem and said it was shipped to 15 customers in the U.S., Europe and Japan last month. It is initially available for the Unisys 1100 series.

The Unisys debut comes more than three years after IBM announced the 3480 as the first mainframe-class cartridge drive in 1984.

Technology holdups

Unisys corporate program manager Fred Hanhauser said the delay in developing a Unisys answer to the 3480 was due to the learning curve that OEM suppliers went through in matching IBM's specifications because of the amount of new technology in the thin-film-head 3480. He said the Unisys subsystem is manufactured by Fujitsu Ltd.

However, Hanhauser said that Unisys expects to take the initiative, rather than reacting to IBM, in developing future enhancements for the 5073/0899. He said he also expects the 5073/0899 to be accepted by Unisys customers more quickly than the 3480 was accepted by IBM customers because most large computer users are now familiar with the 3480 technology.

The 5073/0899 is available for use with all models of the 1100 series, from the 1100/60 through the 1100/90. Hanhauser said it will be available for use with Unisys A and V series CPUs during the second half of this year and that an automatic loading feature will be available by the end of the year. He said it will not be compatible with the older Unisys B series.

Hanhauser said the Unisys subsystem is functionally equivalent to the 3480 with a density of 37,871 bit/in., six times the density of older reel-to-reel drives.

The 5073/0899 is available in configurations with up to 16 host connections and 16 drives with dual controllers. A minimum subsystem, which includes a control unit and a dual drive, costs $108,550.

IBM Cobol 85 draft ready

BY CHARLES BABCOCK
CW STAFF

The National Bureau of Standards (NBS) has completed its draft of a report on its test of an IBM Cobol 85 compiler and submitted the report to IBM for comment, according to NBS programming language adviser Mabel V. Vickers.

IBM planned to offer its response on the test of its mainframe Cobol 85 compiler by the end of last week.

The draft report was sent to IBM for comment as part of a standard bureau procedure that gives the vendor an opportunity to review the report before publication.

While no publication date has been set, both an IBM spokesman and a representative of the bureau said they expect the results of the test to be available by the end of this month.

"The NBS will have a response from IBM by today to allow the findings to be published by the end of January," said John H. Mihalec, a spokesman for IBM corporate headquarters in Armonk, N.Y.

Although IBM has not publicly announced a mainframe Cobol 85 compiler, the software is believed to be included in its next version of its VS Cobol II.

IBM requested a private test of the compiler by the NBS in early November. The nondisclosure route is a rarely invoked option under NBS procedures, bureau spokesmen said. The test was disclosed in a Nov. 30, 1987, *Computerworld* story.

It's one thing to fill a document with data, another to fill it with content that makes someone take action. The document that best persuades not only has a typeset appearance, with visual as well as typographic elements, but also has superior content—facts and figures drawn from all possible sources to make a point of view, a point of sale.

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OS/2 team

FROM PAGE 1

with the Intel Corp. 80386 microprocessor or third-party video adapters and displays that IBM does not offer, the two firms explained.

Despite the minor differences, both companies emphasized compatibility. "Any program written for OS/2 will run on OS/2, whether it's from IBM or any other vendor," noted Adrian King, Microsoft's director of product marketing for operating systems software.

Industry analysts last week called the exercise a move to limit fragmentation of the embryonic OS/2 market. For OS/2 to become a success — like its predecessor, MS-DOS — Microsoft has to convince the computing community at large that applications will run on a variety of micros independent of the hardware configuration.

"There's been a fair amount of confusion surrounding OS/2 up until now, so both companies want to show how close each version of OS/2 is," noted Ruthann Quindlen, vice-president of New York-based investment firm Alex Brown & Sons.

By pointing out the minor differences, the companies are attempting to prevent confusion like that which ensued with the debut of IBM's PC-DOS, a derivative of MS-DOS. Early versions of PC-DOS contained five or six utilities that were not offered with MS-DOS, King recalled. As a result, some early programs written for MS-DOS would not run on PC-DOS.

OS/2 was developed as a flexible operating system to be customized by micro vendors to fit their specific hardware configurations and market requirements, King said.

Program code differences in the two versions include the text string, which in IBM's OS/2 reads as "IBM" and in MS OS/2 is displayed as "Microsoft" or "MS." The default shell of each release is identical, although both companies developed different program selectors that are functionally equivalent.

Implementation options

MS OS/2 has optional features that a micro vendor may choose to incorporate into its implementation of the operating system, including a dual-boot facility; alternative mechanisms for switching the processor between real and protected modes; a disk drive with cache; and a disk driver and FDISK command that recognize other disk partition schemes.

Microsoft is providing an installation program with its OEM product that is similar to MS Windows, although micro vendors may choose to modify it or write their own, King said.

IBM chose to write its own installation program. The result is that different micro vendors' implementations will likely have different file layouts and installed sizes and consume different amount of memory, the firms explained.

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vary from page to page and must incorporate extensive changes right up to the last minute. (Isn't that just about every job?) Even the most sophisticated PC-based desktop publishing systems lack this critical ability to handle instant change.

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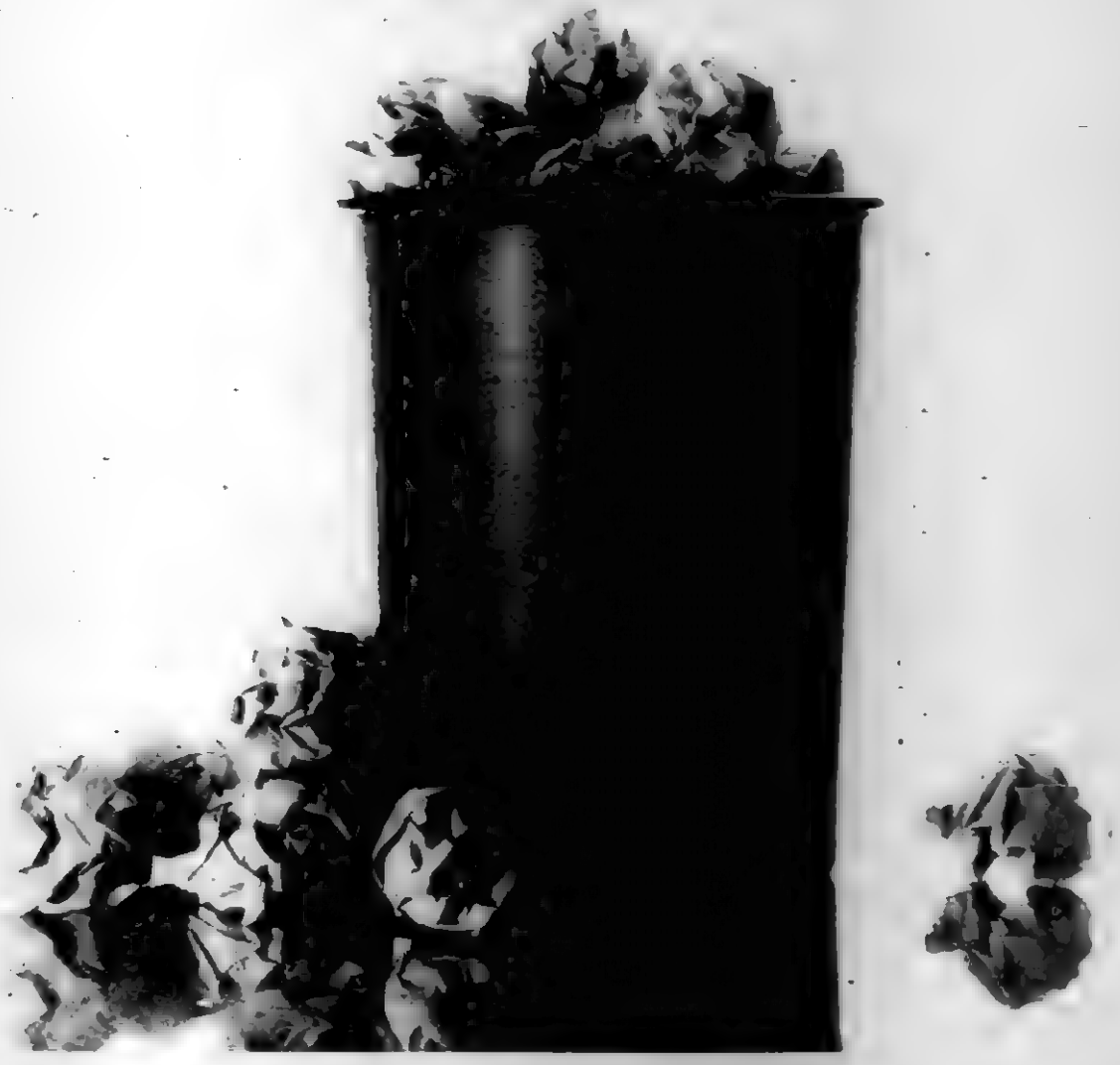


Britton, Lee resign amid loss, layoffs

LOS GATOS, Calif. — Britton Lee, Inc. cofounders David L. Britton and Geoffrey M. Lee have both resigned from the company, which last week announced a steep fourth-quarter loss and plans to lay off 20% of its work force.

The departures of Britton and Lee, effective Jan. 1, leave full control in the hands of President and Chief Executive Officer John C. Cavalier.

Cavalier joined Britton Lee last year after leaving the top post at NCA Corp. when that firm was acquired by Ask Computer Systems, Inc.

Britton Lee experienced a major slowdown in sales of its data base machines in 1987. The 10-year-old firm said it will report a loss of approximately $9 million for the year on revenue of about $25 million.

A fourth-quarter loss of $2.5 million to $2.9 million will include provisions for the layoffs of approximately 50 of Britton Lee's 280 employees.

EDITORIAL

Into the future

Just when you thought the world had all the computing power modern civilization needed — with some futurists calling for a world of tomorrow in which personal computers have replaced mainframes, minicomputers, toaster ovens and stereos — comes a series of announcements that give a slightly different view of the computer world.

Consider the following:

- In March, two aggressive upstarts, Stellar Computer and Ardent Computer, say they'll bring to market machines that pack 20 million instructions per second or more on a desk top.
- IBM has lured supercomputer wizard Steve Chen into its camp with a partnership to launch a more vital and concerted thrust into the budding supercomputer market — a thrust possibly aimed at mainstream commercial markets.
- Sun Microsystems is gambling that it can create its own standard in microprocessor technology with its proprietary reduced instruction set computer architecture, designed to create more workstation and minicomputer systems. Last week, a plan was unveiled that will see AT&T — somewhat of a slumbering giant in the computer field up to this point — take an equity investment of up to 20% in Sun.

Somehow, vendors are convinced that users have an insatiable desire for raw computing power, even if the software to take advantage of that power lags the hardware by years. Up to this point, no one has proven vendors wrong.

However, manufacturers, hospitals, trucking firms and others are moving to catch up to the potential of fully computerized systems. Fortune 500 firms are moving beyond the enterprise computing concept of linking departments and subsidiaries and toward the "extra-enterprise" concept of electronically linking internal systems to suppliers, partners and customers. Decreasing prices of computer systems are making it affordable for smaller companies to join in.

In many respects, the purchasers of computing equipment are in the driver's seat. If today's equipment lacks the required horsepower, purchasers can be assured that tomorrow will bring something more adequate; if the price isn't quite right, wait six months and see how quickly vendors move to maintain a low-cost edge.

The biggest challenge for businesses acquiring computing power lies in sculpting long-term systems acquisition strategies in the face of a never-ending series of technological advances. Overly cautious companies risk losing pace with more innovative competitors, while those that are too eager should worry about being saddled with suddenly expensive invoices as equipment prices erode and suppliers who overreach their potential have to fold or sell out.

Lasting success will come to computer buyers who are on the leading edge but not on the "bleeding edge." A long-term strategy with solid goals, accompanied by a series of flexible acquisition plans, will enable firms to stay on top of technology and be insulated from the inevitable failures of the industry's breakneck pace.

LETTERS TO THE EDITOR

Feels left out

The article "Netview revue steals TCA show" [CW, Oct. 5, 1987] failed to mention that General Datacomm, Inc. also successfully demonstrated the ability to operate with IBM's Netview/PC.

The omission was all the more remarkable given that some vendors were cited that failed to demonstrate the capability but merely claimed compatibility in future offerings.

Daniel L. Young
Vice-President of Marketing
General Datacomm, Inc.
Middlebury, Conn.

Missed the point

In the article "CASE no cure-all" [CW, Nov. 23, 1987], William Inmon made a good point when he stated that computer-aided software engineering (CASE) is a tool but is also the solution with respect to software development.

However, Inmon forgot his own wisdom and proceeded to imply that methodologies are the solution. Any methodology is a tool, just as CASE, fourth-generation languages and others are tools. Implementation of a methodology in software development is no guarantee of success, instant or otherwise.

Indeed, adoption of any tool only means that it has been added to the toolbox. The value of a tool is derived from its proper use. Lack of use, or improper use, can cause more problems than not having the tool at all.

Although adoption of CASE may not be the answer to lack of productivity in a particular organization, adoption of a methodology — whether or not CASE is involved — may not be the answer either.

Note, too, that acquisition of a tool, followed by lack of use or misuse of that tool in an effort to correct for lack of success with another tool, can compound rather than solve the problem.

Thus, an organization that is using CASE and not gaining desired results determines that a methodology is required. After acquiring the methodology, the firm may still not obtain the desired results from the combined use of the methodology and CASE if the tools are not used properly both individually and in combination.

Many factors are involved in a successful MIS installation. These include effective, open-minded management and a team of dedicated professional programmers and analysts. These must then be provided with the tools necessary to do the job and with the leadership and atmosphere in which to do that job correctly.

In an atmosphere where quality and effectiveness are stressed, where the needed tools and training are available, success of the staff and organization is more likely than in an environment where tools are thrown at problems with the idea that they will be the solution.

David Ray Fuller
Information System Manager
Northview Corp.
San Diego

The answer is . . .

I want to respond to a Spotlight on large and medium-scale systems [CW, Sept. 21, 1987] and one on Unix hardware [CW, Oct. 26, 1987].

Pyramid Technology Corp.'s Series 9000 data relative to maximum and typical number of users supported differed in both articles. Regarding the maximum and typical number of users supported, this is largely dependent on specific user applications. Any computer system with wide- or local-area networking facilities can literally connect thousands of users. The level of performance desired by a user for a specific application dictates the typical or maximum user configuration.

Nick Tuttle
Vice-President of Marketing
Pyramid Technology Corp.
Mountain View, Calif.

This week in history

Jan. 9, 1978
Six senators, adding to a growing chorus of complaints, ask the Office of Management and Budget to defer funding for the Tax Administration System, a controversial computer system proposed by the Internal Revenue Service.

Jan. 10, 1983
Charges for dial-up communications services will be drastically altered in 1984 when the Federal Communications Commission imposes a new method of collecting service fees.

*Computerworld **welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor,** Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.*

Getting together with software in '88

AMY WOHL

Remember diskette roulette? If you used five software programs, you had five diskettes. When you wanted to change from data basing to word processing, you did the following:

- Closed the file you were currently using;
- Closed the program;
- Spit the program diskette out of your personal computer;
- Inserted a different program diskette;
- Loaded the program;
- Opened the new program;
- Created or opened a file.

This procedure proved you were a logical, sequential thinker and entitled to use your own PC.

The advent of hard-disk machines eliminated the worst parts of diskette roulette. We still have to load each new program and its inevitable upgrades, but most of the time, we can cruise the DOS directory system, moving freely from program to program and file to file.

Users want more

Users have vociferously proclaimed that this level of integration — all of the necessary software accessible within the same computer — is not enough. What users want is to combine data as well as programs to support the arrangement and rearrangement of their information.

Software vendors try to help by making their programs access, and accessible to, other popular packages. But this access requires an enormous amount of extra work, to say nothing of the productivity lost to the thought processes interrupted by computer administrivia and the need to remember five arcane sets of totally different commands, never mind managing keyboard templates.

Early integrated packages, such as Lotus's 1-2-3, Symphony and Framework, tried to let you get at multiple activities without changing packages. They also included some consis-

Continued on page 18

Wohl is president of Wohl Associates in Bala Cynwyd, Pa., and editor of "The Wohl Report on End-User Computing" newsletter.

The perfect scapegoat for a multitude of sins

AMY SOMMERFELD FIORE

"I couldn't get the report done for this morning. We had a blackout last night."

"Sorry I was late, but, you know — traffic."

"I couldn't fix your computer yesterday. It's a software problem."

Heard it before? Mysterious forces that are clearly beyond our control make the best scapegoats — enigmas like traffic, weather and, best of all, software. If you broaden "software" to mean everything about a computer you can't actually see or touch, then you have a prime target indeed. If the failing machine is not wet, broken or unplugged, then it must be a software problem.

Maintenance personnel have suffered this credibility problem for years. Co-workers even invented jokes in their honor. (How many hardware engineers does it take to change a light bulb? None, it's a software problem.)

Software has big shoes to fill. Professor David Parnas of Queens University in Kingston, Ontario, says, "The reason software is so hard is that we design all the easy jobs into the hardware." Any really predictable, repeatable task is generally hard-wired or coded into chips or boards as firmware. The really difficult, tricky, changeable conditions fall to software to interpret.

Futures trading, medical diagnosis, credit approval, hurricane forecasting, missile guidance — can you see trusting any of these to the sole discretion of a silicon-filled box? Spaghetti or no spaghetti, it's better to turn to a few million lines of Cobol code. That way you can stick in those last few conditions you forgot or update it with the new tax code.

Malleable software may look foolish — those last few conditions tacked on the end hardly seem elegant to an engineer. But it can cover a multitude of hardware design errors, project constraints, management idiosyncracies and the other sundry sins of everything that isn't software.

Fiore is a *Computerworld* senior editor.

Only you can prevent an MIS shortage

Ranks of computer college grads are thinning as students lose interest

FREDERIC WITHINGTON

There is going to be a severe shortage of college graduates coming into the computer field at the entry level, and only you can alleviate it.

According to a Michigan State University study, the academic majors most in demand today are computer science graduates. Employers want to hire more of them than graduates of any other technical field.

Demand is likely to continue, or even intensify, because the central ranks of MIS departments are being depleted. Many of the first generation are reaching retirement age, and many of the younger specialists have been lost to information centers and user departments during recent decentralizations.

A University of California study of college freshmen's preferences shows that only 1.9% of them plan to major in computer science, down from a high of 4.5% in 1983. Those planning careers as computer programmers or analysts number 3.5% of the total, down from 8.8% in 1983. No other technical field has suffered such a decline in interest.

Worse yet, these percentages apply to a declining number of college freshmen because of the drop in the overall population of the age group. Clearly, there is going to be a significant mismatch between supply and demand for entry-level technical people.

Shortages will be even more severe for certain specialties. MIS departments will want to hire network managers and data base administrators as well as experts in departmental, manufacturing and desktop publishing systems. Many colleges are, for the most part, training compiler writers and Cobol programmers. This dichotomy between what is taught and what is needed may be one reason for the decline in interest.

The natural tendency is to knock the educational establishment for doing a bad job. This blame may be justifiably placed, but it is not much help. Colleges can't force freshmen into unwanted fields of study, especially since there is already intense competition for the dwindling supply of students. It also takes time to change the curriculum. Incumbent faculty members aren't qualified in the hot new areas, and the tenure system prevents replacing them.

Help from the field

Only you — managers and senior technicians who currently inhabit MIS organizations — can help. Only you can motivate students and correct their misconceptions about the field. Only you can share experience in the latest techniques and technologies with faculty members. Managers can show students the attractive employment opportunities that await them in MIS. Managers can provide cross-fertilization between their companies and colleges. Senior technicians can share their hard-won knowledge with both students and faculty. What follow are some specific suggestions.

CHRISTOPHER BING

Most high schools run career days for seniors. These programs offer a good chance to influence students before they make college commitments. Send an experienced manager to talk to the students. Better yet, offer a tour of your facilities. The more students have a chance to meet your staff, the better. They will realize that not all computer people are the hackers depicted in the movies.

Offer help to the computer science and MIS faculties at local colleges and universities. A manager can try to arrange a donation of money, equipment or facilities from his employer. Sometimes this contribution provides a welcome tax deduction and a good way of disposing of equipment no longer useful to the organization but of interest to a college.

A manager can arrange to provide guest lectures. These gifts of time can be as welcome as money if the talks are on hot topics that the faculty can't handle, such as network management. Often, members of the MIS staff are good teachers and welcome the chance to organize their own knowledge, which lecturing provides.

The manager can arrange part-time employment for faculty or staff. Such employment would usually be for summers or sabbatical years and could be designed so the faculty member learns useful knowledge and also contributes to the organization.

Student employment could be anything available — part-time data entry and night machine operator jobs look better than waiting tables. And valuable interaction between you and the student occurs. A job upon graduation is a natural consequence.

Your own staff members should be encouraged to volunteer to lecture, tutor or provide tours. Management's approval will usually be forthcoming and isn't even needed if the time commitment falls outside of working hours. Compensation (besides the satisfaction) will be the sharpening of the staff member's knowledge and interaction with others who have fresh viewpoints and may even include an honorarium.

It is easy to make contact. Even if no one knows anyone at the local school or college, a blind letter to the principal or president will usually produce a cordial response. Professional societies are also effective for making connections. All of them value the promotion of academic-industry cooperation, and academics usually attend their meetings. There are youth, fraternal and even church-related organizations that are relevant.

Opportunities abound. But from survey results, not enough MIS managers are taking advantage of them. It is in your company's self-interest to do more.

A 30-year veteran of the computer industry, Withington was a vice-president at Arthur D. Little, Inc. and is now an independent consultant. He has written four books and more than 60 articles and papers.

Together

FROM PAGE 17

tency of interface and data files. But they were not really integrated at the function level.

The big software news for 1988 includes new levels of integration previously unavailable to computer users. This new integration will not ease the task of moving between related software applications — it will eliminate it. Gone will be the need to open and close tasks or move between separate windows that each run a different function. These new integrated products will easily support multiple activities that were previously available separately.

The first area expected to benefit from such integrated products will be a tricky one to name. The as-yet largely unannounced products typically include word processing, graphics editors and the type of format and layout capability that is currently called desktop publishing. Perhaps the products should be called "advanced word processing" or "next-generation word processors," but getting widespread agreement on any particular name is uncertain.

There are two major areas of emphasis that set 1988's integrated software products apart from their predecessors.

First, each product is a fully implemented, high-end tool that frequently offers functionality at a level that equals or exceeds the best dedicated product offering in that market today.

For example, the word processing component of these new packages is not just a simple text editor but a full-blown product, complete with floating footnotes and automatically generated tables of contents and indexes. The graphics editor will understand and utilize color and performance and might handle complex, algorithmically driven functions such as rotation and shading. The layout editor will be competitive with high-end products like Xerox's Ventura Publisher.

Second, the level of integration will be very high. This means the user won't have access to a graphics editor within the word processor; the graphics editor is within the word processor. So the user can maintain full context on the screen and see the effect of work in process in full or nearly full what-you-see-is-what-you-get form while using a different family of tools.

Expect 1988 to be full of advanced word processing announcements — even a few deliveries. For image-oriented applications, Apple's Macintosh will lead the parade, followed by products based on IBM's PCs.

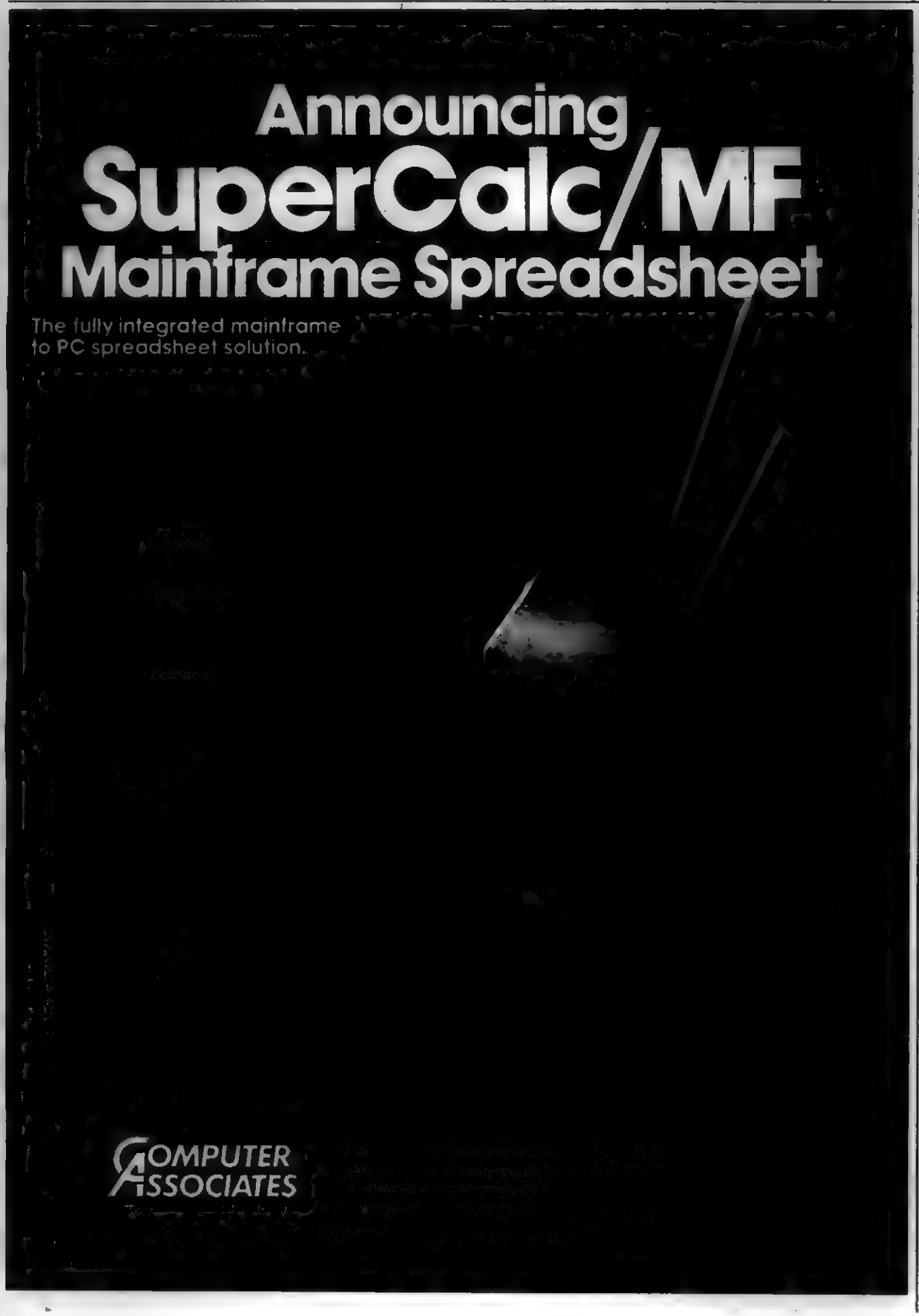
But that's not all

But the integration of word processing, graphics and layout is not the only useful integration, nor is it the end of the process. Imagine a high-end data base with a full word processing function for editing long text fields and a graphics editor for creating graphics within the fields as well as the already available capability (in some quarters) to read graphics files in data base fields.

Or imagine a product that offers data base functionality on text — with little or no additional effort on the user's part — sort of a marriage between Wordperfect and Agenda with a little more formal data base functionality thrown in.

Also, assume that increasing levels of user expectation will now occur. Users will want more and more integration (just as they first demanded color, then rotation and then three dimensions from graphics developers). Eventually, users will go wild and demand that everything be integrated with everything, and integrated packages could get very large. Alternatively, someone will finally figure out how to let us integrate our chosen functions and packages within a single interface and file structure. Both families of software approaches — snapping into a common menu interface and separately marketed menu interfaces — would be possible here.

The power of the new generation of PCs could be used for bigger, faster spreadsheets. But we are certain, at least for some of us, that it will be used instead to allow user-selectable integration, to at last permit us to use computers to support our work, as we see that work.

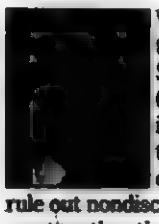


SOFTWARE & SERVICES

SOFT TALK

Charles Babcock

The NBS's black veil



When the National Bureau of Standards (NBS) rewrites its rules on testing compilers, it should rule out nondisclosure agreements, rather than clarify how vendors can go about requesting a private test.

The interpretation of bureau procedures that finds a nondisclosure provision available to those requesting it favors the vendors, while the certification process was set up to benefit users. The tests are used to establish the Certified Compiler List — a blue, 8½- by 11-in., paperbound volume. The list was initially published to aid purchasers in federal agencies but has since become a standard reference work in the industry.

Think of the benefits to users if more light were shed on the validation process. Granted, not every compiler vendor would want to acknowledge that it had rushed a compiler through development, had failed the certification test and had been forced to come back again. On the other hand, it might be useful to customers to have this information exposed to the light of day.

Continued on page 21

Group computing fuels demand

Report predicts software revenues will more than double in five years

BY CHARLES BABCOCK
CW STAFF

MOUNTAIN VIEW, Calif. — Software products are the fastest growing segment of information services and will overtake processing and network services this year, a recent study found.

By 1992, software products will account for almost as much revenue as the entire information services market in 1986, a report from Input, a market research firm here, concluded.

Titled "Software Products Market 1987-1992," the report estimated the entire information services market at $54.6 billion at the end of 1986, with processing and network services contributing $20.9 billion and software products accounting for $19.9 billion. By 1992, software products are expected to account for $52.2 billion vs. $38.2 billion from processing and network services.

Software product revenues are growing at an annual average rate of 21%, compared with a 13% rate for processing services (primarily CPUs of all sizes) and

Continued on page 20

Software to dominate marketplace

Software product revenues are growing faster than those for hardware, professional services or turnkey systems

INFORMATION PROVIDED BY INPUT
CW CHART

Beefed-up MVS, MVS/XA utilities support more functions without sacrificing operation

SUNNYVALE, Calif. — Boole & Babbage, Inc. recently released versions of its IBM MVS and MVS/XA utilities that it said will allow additional procedures to be implemented without bringing down the system.

Resolve Plus Version 2.0.1 for MVS/XA and Version 6.0.1 for MVS/SP are interactive tools for detecting, diagnosing and solving common operating system problems.

Each version includes four new features. The Linklist service allows a user to modify MVS's link list without bringing the system down and then perform an initial program load (IPL). The link list is a directory of program names that the operating system can search to find locations.

The Dview service lets users display any block of data on a storage device, and the Equate service reportedly simplifies the dump procedure by using a modified list of commands.

Finally, the Info service allows users to keep track of IPLs and other basic information on the operating system. The Equate feature is available for the MVS/XA version only; the other services are available on both versions of Resolve Plus.

The products are currently shipping. The MVS/XA version can be licensed for $24,000. The MVS/SP version carries a $19,000 license fee.

Keyfast plugs into VM/CMS

BY SUZANNE WEIXEL
CW STAFF

MAYWOOD, N.J. — H&M Systems Software, Inc. recently ported Keyfast, its on-line direct data entry program, to the IBM VM/CMS operating system. H&M also announced a version of Keyfast for IBM Personal Computers.

Keyfast is a batch-oriented menu-driven program that supports on-line data base validation. It was originally available for CICS environments and is currently installed at more than 2,000 sites, the vendor said.

The VM/CMS version is targeted toward IBM's 9370 computer systems. It is fully compatible with the CICS version, H&M spokesmen said.

The program features a user-oriented interpretive language, built-in edit and check routines and automatic duplication.

Capabilities include adding, inserting, updating, deleting and reactivating records without

Continued on page 20

Inside

- MSA ships real-time version of payroll/personnel module. Page 20.
- Orion announces enhanced word processor for DEC environments. Page 24.

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MSA shipping real-time module

BY ROSEMARY HAMILTON
CW STAFF

ATLANTA — Management Science America, Inc. (MSA) recently began shipping a real-time version of the employee position control module for its Payroll/Personnel System.

The module was designed to work with data in the Payroll/Personnel System, such as the employee master file, and, by doing so, to help users manage employee activity. The software runs under the IBM MVS operating system.

With the module, a human resource manager can be alerted to a job opening and then search the employee master file for staff members with the necessary qualifications, MSA said. The module also automatically updates an employee's job status and related data that would affect his new position. Within an industrial setting, for example, a promotion from the factory floor to a managerial slot could result in a change from hourly pay to a weekly salary..

One user reported that the module is a major improvement over the batch-oriented version MSA has been offering. William Hiers, employee relations manager at the St. Johns River Power Park, an electricity generating site for Jacksonville, Fla., said the real-time module has cut the time he spends on the system from 20 hours a week to two.

Additionally, Hiers said, the new module is more tightly integrated with the Payroll/Personnel System, allowing him to more easily access information.

MSA said the module can be licensed for $17,000 to $35,000.

Demand

FROM PAGE 19

18% for professional services. Turnkey systems are projected to average 11% annual growth through 1992.

The report divided the software market into two segments: one for microcomputers and one for both minis and mainframes. The latter is growing "at a respectable 20%," or above average for information services as a whole, the report said.

"Based on the dramatic growth of mini and departmental systems and the observed slowdown in large mainframe shipments, there is no doubt the majority of the growth is occurring in the mini-portion of the segment," the report added.

The microcomputer segment renewed its explosive growth in mid-1986 after having slowed down during the first and second quarters; it is expected to average a growth rate of 25% per year through 1992.

When viewed across both market hardware segments but divided along systems and application lines, systems products are growing at a rapid pace. Systems control products are growing at a rate of 29%, followed by data center management tools at 23% and application development tools at 22%, Input said.

Keyfast

FROM PAGE 19

rekeying existing information, retrieving data from files and tables or inserting computing values into entry fields.

The personal computer software package is a lookalike of the CICS system, the spokesmen said.

Data keyed on the PC is automatically transferred into the CICS counterpart, where the data can be maintained and processed on the mainframe.

Additional features of Keyfast include multiformat and multirecord screens, direct updating of user files, a data dictionary and the ability to write user exits in assembler, Cobol and PL/I. Help screens and messages are standard.

Keyfast is priced from $10,000 to $30,000. All three versions are available now, the vendor said.

One of the best things
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Babcock

FROM PAGE 19

Nevertheless, bureau thinking on this point is reflected in a comment from Helen Wood, deputy director of the Institute for Computer Sciences and Technology, the testing agency. Wood said, "We are trying not to penalize vendors for bringing forth a product that may not pass the test. Under our procedure, they're given a chance to find out if the product is really bad and clean it up without tarnishing their reputation."

The need to rewrite the bureau rules surfaced when it became clear that IBM had a mainframe Cobol compiler tested by the NBS but had not appeared on the bureau's Certified Compiler List as having a validated compiler or having been scheduled for a test of one.

IBM challenged a Nov. 30 *Computerworld* story that depicted the company requesting and getting a mainframe compiler tested by the bureau without public disclosure. Officials at IBM were angered by what they contended was the appearance that IBM was getting special treatment.

Other vendors were extended the same treatment, IBM asserted. IBM, however, was the only vendor to request a private test since the institute took over certification responsibility from the GSA more than a year ago, according to Wood.

IBM spokesman John Mihalec, on the other hand, suggested that querying vendors of mid-range processors would reveal a compiler producer that had previously used the nondisclosure procedure.

Checks with Hewlett-Packard, Prime, DEC, Wang and Honeywell failed to turn up anyone who could remember requesting an undisclosed test, and Wood doesn't recall such a vendor.

DEC's recently announced VAX Cobol compiler did not appear on the list of approved compilers or products about to be tested, but it was tested the week of Sept. 21, just prior to the Oct. 1 publication of the list. As a tested product, it wouldn't appear in the schedule of tests.

On Dec. 21, when *Computerworld* went to press with its second story on the testing process, Michael McCandless at Micro Focus said he thought his company had requested nondisclosure. In fact, while Micro Focus is one of the few vendors to discuss nondisclosure with the Institute, it never requested that approach, he said in a follow-up call.

IBM officials cited a need to avoid preannouncing their firm's mainframe compiler via an airing in an NBS publication as its reason for asking for nondisclosure. Granted, IBM, with a history of antitrust proceedings, has different legal concerns than other vendors, but Prime spokesman Warren Jacobs aptly points out that the announcement of a product test does not automatically constitute a statement of availability, pricing or even whether it will pass the test. Prime's compiler was an unannounced product at the time it was tested in public.

Have it your way

Indeed, while using a concern about preannouncement as a cloak in this case, IBM has been informing its largest customers of the compiler's existence for nearly four months. As Mihalec says, "While there has been no public announcement, this Programming Request for Price Quotation has been listed since September in an internal data base for IBM branch offices as being available to meet specific customers' needs."

The main drawback of the current procedure is that a vendor can withdraw from a test before it is completed, allowing it to remain behind the cloak of secrecy if it is on the brink of failure. With no completed test, there are no test results and, under current rules, which the bureau wishes to make stronger, the vendor may opt for a test that will not be made public until full results are available.

Why not put this testing process back in the public arena, where it started out in the first place?

Babcock is *Computerworld*'s senior editor, software & services.

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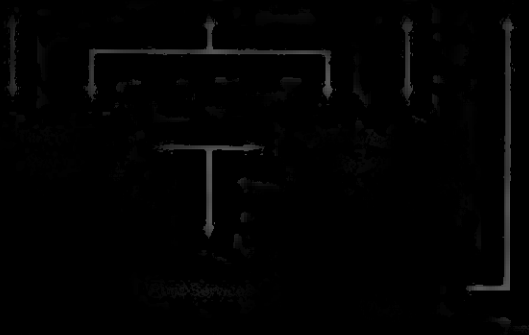

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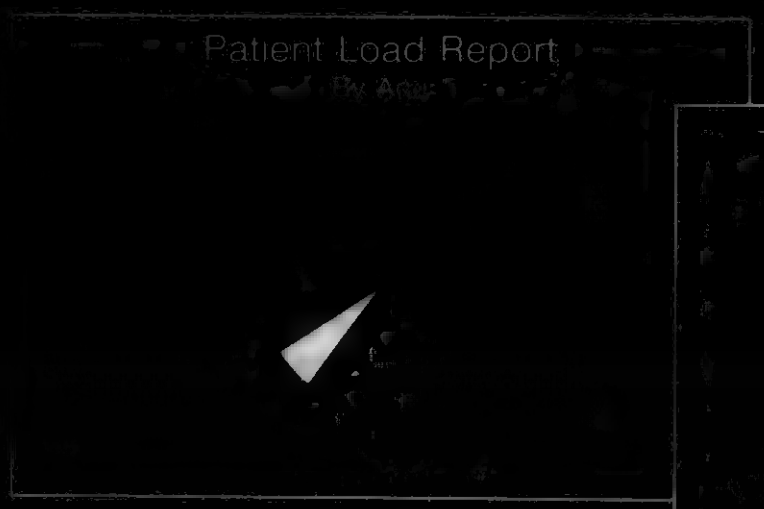

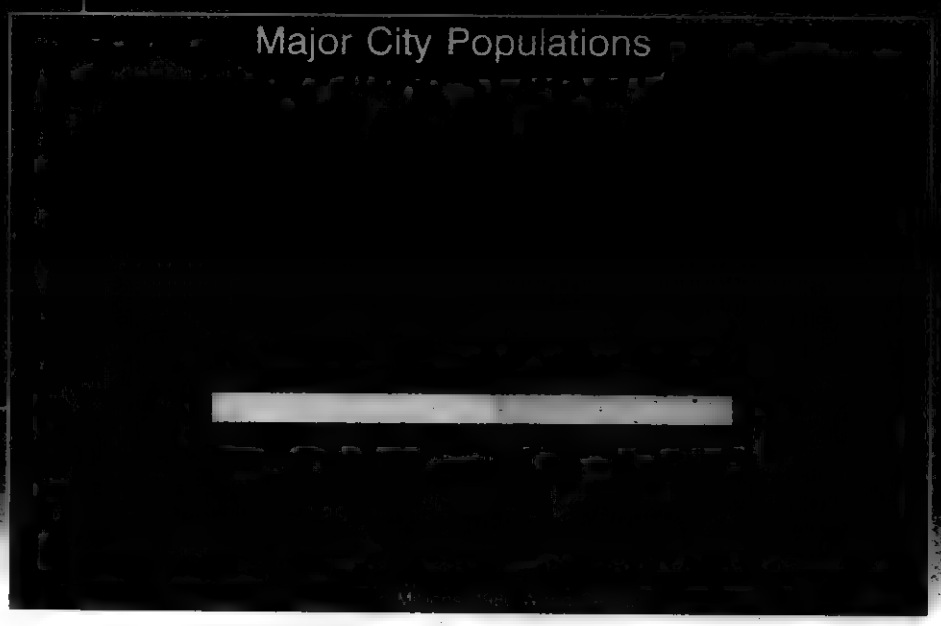

The SAS System runs on the IBM PC AT, XT, and PS/2; IBM 370/30xx/43xx and compatible mainframes; Digital Equipment Corporation's VAX™ series minicomputers and workstations; Data General Corporation's ECLIPSE® MV series; and Prime Computer, Inc.'s 50 series. Not all products are available for all operating systems.

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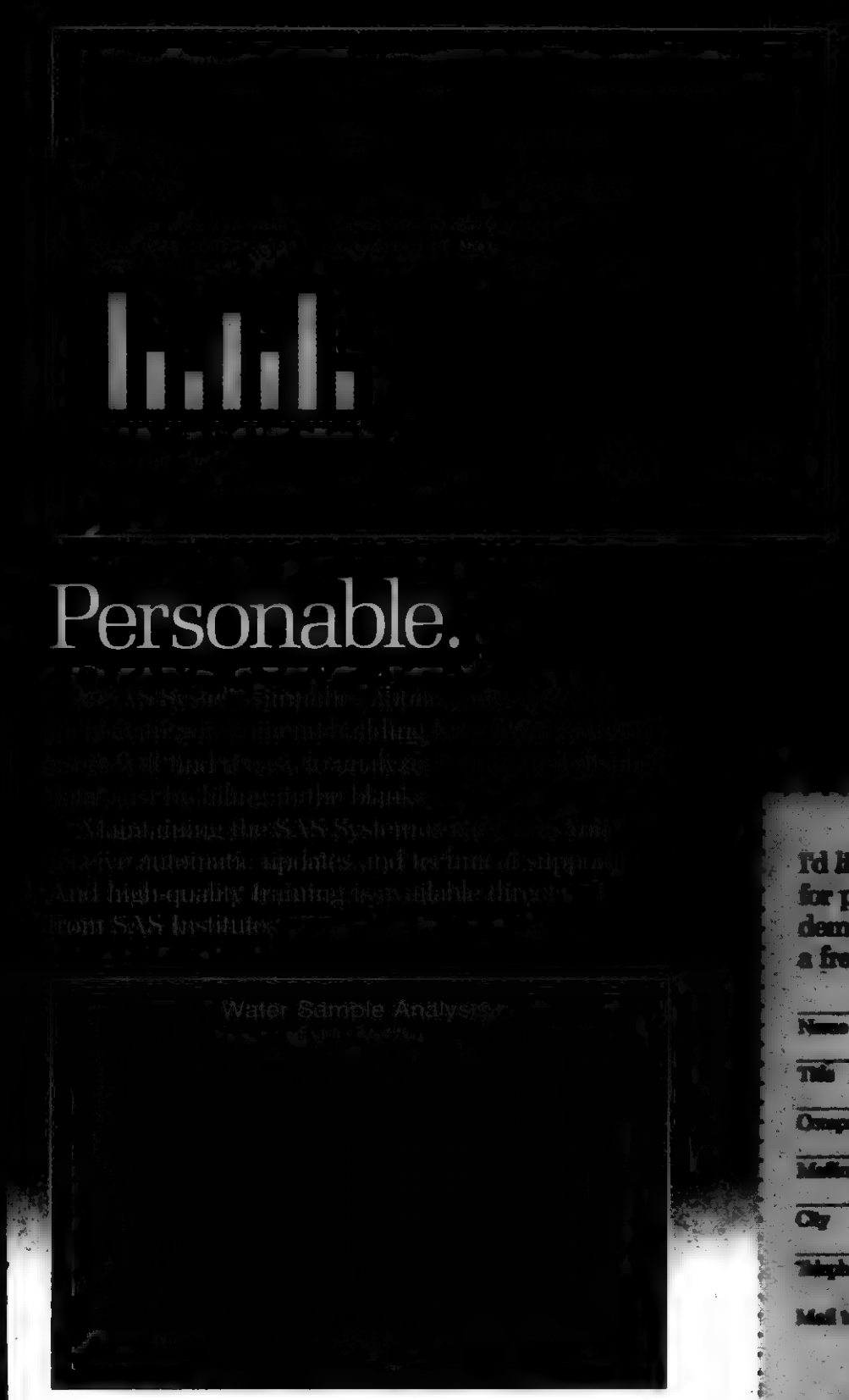

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NEW PRODUCTS

Systems software

A software product said to simulate batch and semicontinuous processes in the biochemical, pharmaceutical, specialty chemical and food industries has been announced by **Batch Process Technologies, Inc.**

Called **Batches**, the software allows users to model the start-up, execution and shutdown of multiproduct and multipurpose processes. The processing steps are modeled as a network of tasks, each with a sequence of subtasks, the vendor said.

Batches tracks the use of resources and other variables, then generates a summary report for each simulation.

Batches is priced from $25,000 to $45,000.

Batch Process Technologies, P.O. Box 2001, 1291E Cumberland Ave., West Lafayette, Ind. 47906. 317-463-6473.

Applications packages

An enhanced version of the **Organon Word Processor** for Digital Equipment Corp. VAX/VMS environments has been announced by **Orion Information Systems.**

Version 2.0 features a text editor with a spell-checker, a calendar scheduler and concurrent command execution between word processing tasks and VMS operations. Other features include a "what-you-see-is-what-you-get" display; use of overlaying rulers for text formatting; the choice of using a menu or a command mode; and the ability to layer operations indefinitely.

Organon costs $2,500 for the VAX and $1,500 for the Microvax.

Orion Information Systems, No. 260, 13741 Foothill Blvd., Sylmar, Calif. 818-364-1692.

Languages

Progress Software Corp. has ported **Progress**, its fourth-generation language and relational data base management system, to Convergent Technologies, Inc.'s CTOS and Unisys Corp.'s BTOS operating systems.

In addition to CTOS and BTOS, Progress runs on Digital Equipment Corp.'s VAX/VMS and Ultrix; Microsoft Corp.'s Xenix and MS-DOS; Unix; and local-area network systems.

Pricing for a full-application development copy of Progress for the CTOS/BTOS environment is $3,000 per cluster. It reportedly will be available in the spring.

Progress Software, 5 Oak Park, Bedford, Mass. 01730. 617-275-4500.

Utilities

Delta IMS Virtual Terminal, a product said to define an IBM IMS/VS network, has been announced by **BMC Software, Inc.**

According to the vendor, the software provides the ability to dynamically modify or add terminals, terminal security, data bases, programs, route codes and transaction codes to the IMS/VS network without risk of service interruption.

Other features include the ability to base storage needs on maximum concurrent demands rather than on maximum network size and enhanced security.

Delta IMS Virtual Terminal is available for IMS/VS 1.3, 2.1 and 2.2. It supports and enhances standard IMS/VS conversational processing, the vendor said.

A perpetual license ranges from $26,550 to $70,800.

BMC Software, P.O. Box 2002, Sugar Land, Texas 77487. 713-240-8800.

Training software

Innovative Software Solutions, Inc. has added **Using Edit/3000** to its Teachme/3000 computer-based training series for the Hewlett-Packard Co. 3000.

The module was designed to train users of HP's Edit/3000 text editor. It features Edit/3000 examples and is accompanied by a workbook of editing exercises. Module topics are grouped by function to be performed and are directly accessible through keyword commands.

The Using Edit/3000 module costs $750. It comes with the Teachme/3000 driver program in addition to an on-line tutorial.

Innovative Software Solutions, 10705 Colton St., Fairfax, Va. 22032. 703-273-5025.

Development tools

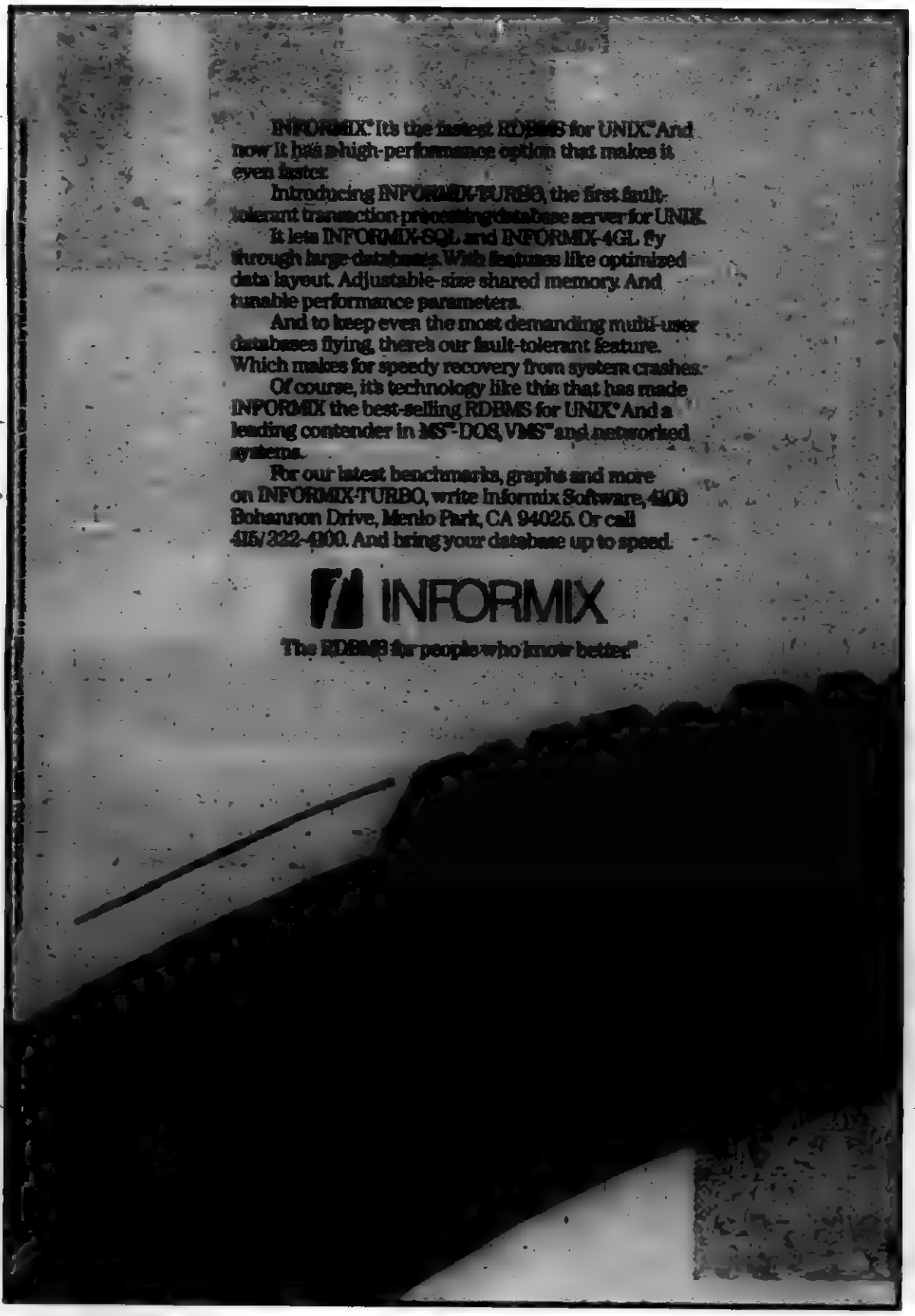
A development environment for creating custom data base applications has been announced by **Plexus Computers, Inc.**

The **Plexus XDP Applications Designer** runs under Microsoft Corp.'s Windows and allows users to develop applications for Plexus's Extended Data Processing System. Tools are included for entering, displaying, manipulating, storing and retrieving structured alphanumeric data and unstructured data in image and text format.

The Applications Designer includes a procedural language, and data base management is handled through SQL statements.

The system costs $2,950. A runtime license costs $595.

Plexus Computers, 3833 N. First St., San Jose, Calif. 95134. 408-943-9433.



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D. Communications Systems
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F. No Computer Involvement

338802-2

MICRO BITS

Ed Scannell

Making it official

Or maybe they'll continue to deny it. There are strong rumors circulating that Microsoft will, in the next week or two, formally announce its deal with Sybase to license its SQL data base. One source tells us Microsoft has decided to formally announce the agreement now because Lotus and IBM have already laid out their SQL plans as well as to take a little steam off the Ashton-Tate announcement this week.

The Taters are expected to announce a deal to license Interbase's data base server product, which also features a full SQL implementation. "Sybase is doing the back-end port, or server port, so they must be far enough along [in development] to be comfortable with making an announcement. Microsoft has to show its direction," one source tells us. Microsoft is expected to deliver the product possibly in this year's second quarter but "certainly no later than the third."

Lotus plays an encore. January will be a busy if not musical month for Lotus. This week,

Continued on page 32

Micro line claims Flex appeal

386-based systems emulate Compaq architecture but use proprietary bus

BY ALAN J. RYAN
CW STAFF

IRVINE, Calif. — Advanced Logic Research, Inc. (ALR) last week announced a series of Intel Corp. 80386-based systems that emulate the Flex architecture used in Compaq Computer Corp.'s Deskpro 386/20.

Called ALR Flexcache 386, the system is available in both 16- and 20-MHz floor-mount versions. They feature ALR's Advanced Cache Memory Dual-Bus Architecture, which is similar to the Compaq bus architecture, according to Dave Kirkey, vice-president of sales at ALR.

However, the ALR and the Compaq buses are not the same, according to Vic Sangveraphunsiri, manager of the enhanced systems group at ALR. "Our bus is proprietary to us. The only thing that is the same as Compaq's is the cache controller chip," he said.

Sangveraphunsiri said the ALR units have a faster memory. "We're using an 80-nsec dynamic RAM, and Compaq is using a 100-nsec dynamic RAM."

The ALR units, like the Deskpro 386, use the Intel 82385 cache memory controller with 32K bytes of 35-nsec high-speed static random-access memory.

The Flexcache memory controller can eliminate CPU wait states 95% of the time by keeping frequently used data close at hand and eliminatng the need for the CPU to address main memory, Kirkey said.

The flexible dual bus provides an open, high-speed data channel that allows up to 60% faster data throughput than the IBM Personal System/2 Model 80-071 with the Micro Channel architecture, ALR claimed.

The ALR computers feature a hard-disk controller that performs with a 1-to-1 interleave. The controller also includes full track buffering on its enhanced small device interface (ESDI) controller, increasing overall disk performance.

The company said it installed high-performance ESDI hard disk drives in 150M- and 300M-byte systems that have a disk-access time faster than 23 msec.

ALR designed the chassis of the 20-MHz models to accept up to two full-height hard disk drives and three half-height devices, which may include a 5¼-in. floppy, a 130M-byte tape

Continued on page 32

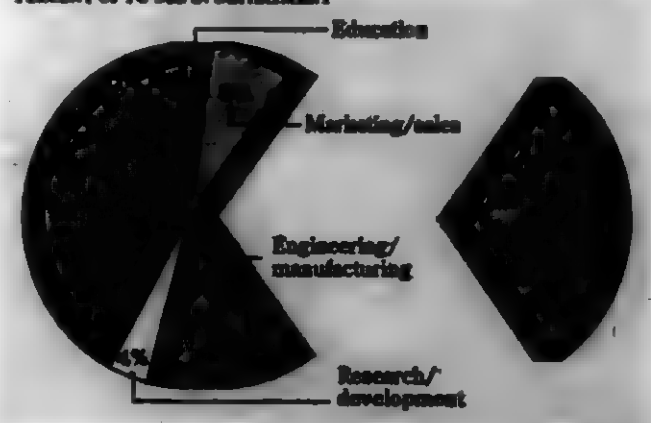
Inside

- Proximity Technology adds data base search tool. Page 36.
- Abra Cadabra enhances human resource system. Page 36.

Data View

Number crunchers

Finance/accounting departments make most use of PCs in large corporations



Slew of Mac products ship — from Claris

BY JULIE PITTA
CW STAFF

MOUNTAIN VIEW, Calif. — Claris Corp., Apple Computer, Inc.'s software subsidiary, last week launched its first products under its own logo, enhanced versions of existing Apple packages and two forms-creation programs.

Claris unveiled upgraded versions of Macwrite, Macproject, Macpaint and Macdraw. Additionally, Claris introduced Smartform Designer and Smartform Manager, two applications software packages for the Apple Macintosh. An enhanced version of Appleworks — a software package for the Apple II also inherited by Claris — will be unveiled this spring.

Macwrite Release 5.0, which remains priced at $125, adds a spelling checker and large-screen support and takes advantage of the faster speeds offered by the Mac SE and the Mac II. Current Macwrite owners can obtain the upgrade by returning their original disk and paying an additional $25. Shipment to dealers begins this week.

Macproject II, priced at

Continued on page 32

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SMALL TALK

William Zachmann

Keep an eye on Windows

The most significant impact of IBM's announcements of OS/2 and the Personal System/2 is that graphical user interfaces will become an integral part of IBM and compatible personal computers.

More important, IBM's adaptation of Microsoft Corp.'s Windows as the OS/2 Presentation Manager assures a standard foundation in the IBM-compatible world for graphics-based user interfaces. The nonproprietary character of the Windows Presentation Manager guarantees that it will be the de facto standard for DOS- and OS/2-based systems.

Microsoft Windows 2.0, which began shipping last month, is an essential element in the movement toward a practical user interface standard for users of IBM Personal Computers and compatible systems. Windows 2.0, priced at just $99, brings the exact look and feel of the Presentation Manager to the screen.

Practically speaking, Windows 2.0 requires at least a fast Intel Corp. 8086-based (preferably an Intel 80286-based and up) system with an IBM Enhanced Graphics Adapter (EGA) and monitor for satisfactory use. The program can run on an older IBM Color Graphics

Continued on page 33

Oracle treads into micro market, brings SQL to new class of users

Oracle Corp. made its mark selling SQL-based data base management systems that run on minicomputers and mainframes. The firm, which has pushed the notion of distributed data bases, is now pursuing microcomputer users with a full version of Oracle that runs on personal computers. Oracle's entrance into the PC market pits the firm against Ashton-Tate Corp., whose Dbase currently outstrips the sales of its competitors.

Oracle Chief Executive Officer Lawrence J. Ellison recently spoke with *Computerworld* Senior Editor Douglas Barney about the dynamics of the micro marketplace and bringing the power of SQL to a new class of users.

Ellison discusses *microcomputer data base technology.*

How do you see microcomputer data base technologies evolving?

I think microcomputer data base technology is evolving in lockstep with the way microcomputers are used. In the past, microcomputers were PCs. They weren't networked to other PCs, nor were they networked to departmental machines or corporate machines. I think that is changing a lot now.

A data base manager used to have to manage someone's personal data base, and that is very different as these machines get larger and get networked to minicomputers and mainframes. At that point, it's very important to have multiuser capabilities, distributed capabilities and recovery. It's very important to adhere to the SQL standard, because the SQL standard is available on mainframes, minicomputers and microcomputers.

With OS/2, which will become popular over the next two or three years, lots of other companies are going to have the opportunity to deliver serious DBMSs.

So it's been the lack of power of microcomputers that has held back microcomputer data bases until now?

Absolutely. There are two ways to look at it. The lack of size has prevented you from doing a large-scale data base on a microcomputer and also from doing networking with microcomputers among themselves, minicomputers and mainframes. It's not clear that you can use a large-scale data base on a microcomputer. It's an interesting situation. If you have a small standalone personal computer, it would be nice to have a large-scale data base on it. In one case, it's a luxury to have it on a standalone PC, but it's an absolute necessity to have it on a PC networked to other PCs and a mainframe.

Could you implement a full relational data base without SQL?

You could, but that's like asking, "Could you run Lotus on something other than MS-DOS?" Sure, you could do it, but no one is really interested in doing that because MS-DOS is now a standard, as is SQL.

When will we see an SQL standard that will allow a variety of SQL-based data bases to talk to each other? The ANSI standard is a bit watered down.

There are two levels in the ANSI standard: ANSI Level 1, which was an interesting compromise; and Level 2, which is the correct standard.

If you look at the ANSI Level 2 standard, you've got a pretty good standard that people will adhere to over time. But there are other things that aren't in the Level 1 standard, such as distributed capabilities. There are a bunch of things that are missing even from Level 2.

Some say porting a host application to PCs isn't the best solution. How do you defend your approach?

MS-DOS has a silly restriction in it that says you can't direct more than 640K bytes. This made sense for old 8088 PCs, because the hardware couldn't address much. But 286 or 386 PCs, which are incredibly fast machines, can direct large amounts of memory. So we just bypassed the [640K-byte] restriction. Anything that runs under 640K was designed for a computer that is now five years old.

How long before the concept of distributed data bases reaches fruition?

I think distributed data bases are going to become very popular with products like Oracle for 1-2-3, in which the PC user can use his friendly interface and access data on minicomputers and mainframes. He's also going to

Continued on page 33

The raging battle between the spreadsheets

BY MORTON ROSENTHAL
SPECIAL TO CW

Information center managers have many things to worry about. But until recently, very little time was spent worrying about which spreadsheet to buy. Many other product categories require evaluation, but for spreadsheets, there has always been Old Faithful, namely Lotus Development Corp.'s 1-2-3. However, the two leading software vendors have decided to wage a war.

Microsoft Corp.'s Excel, for IBM-compatible systems, runs only on IBM Personal Computer AT-class or faster machines, so the upcoming battle is being fought only in certain provinces. Favoring Microsoft in this battle are a graphics user interface, better programming capabilities and more bells and whistles.

Excel runs under Windows 2.0, which gives users a glimpse of what IBM's Presentation Manager under Microsoft and IBM's OS/2 will look like. But the program will not run under OS/2 itself until the Presentation Manager ships in the fall.

Working against Excel is its greater hardware requirement that includes a mouse, lots of memory and disk space. What users get, however, is a product that is at least as good as 1-2-3 Release 2.01 is today.

But the question we have to ask is how much better and for how long? If a company's users are technological junkies and want a head start on using products running in a graphical environment, then recommend Excel. When the Presentation Manager becomes available next fall, that company will be ready.

Also in the running

But Lotus, with its arsenal of weapons, is not leaving users alone either. Its 1-2-3 Release 3 will be out in the first half of this year. It is a product that incorporates many items now on the wish lists of current users: faster recalculation speed, spreadsheet linking, three-dimensional spreadsheets, improved graphics and an UNDO command.

However, 1-2-3 Release 3 is character-based and doesn't have all the pretty things associated with Excel and Windows. The product will support links to other Lotus products and utilities currently available for 1-2-3. Lotus's 1-2-3/G is its next-generation spreadsheet running under the Presentation Manager of OS/2. It reportedly will be released when the Presentation Manager is available next fall. Little is known about 1-2-3/G, but one can be sure it will have the bells and whistles of Excel. That is, until the next version of Excel is released.

Morton Rosenthal

This game of leapfrog, which vendors are sometimes fond of playing, does not always help users, and in fact sometimes results in unnecessary upgrading.

So what to do? We suggest that companies determine whether graphic interfaces are important to its users. If the answer is yes, then the question is whether to switch today to a product that gives a glimpse of the future or wait a year until Lotus's offering is available and Excel really runs under OS/2.

Of course, you do not have to choose sides. Many firms may adopt two spreadsheet standards. Thankfully, companies can choose to avoid the battle.

Rosenthal is chairman and chief executive officer of Corporate Software, Inc., a value-added reseller of software and peripherals based in Westwood, Mass.

"It's 6:33 pm. The lines are down. And she's the closest thing I've got to a technician.

Meanwhile, I've got a sales guy here waiting to close a half-million-dollar deal, and he's screaming 'why didn't my order go through.' I have no clue. My technical staff is home watching the game. And all I keep thinking is whatever happened to that word reliability? If I could have anticipated the problem, at least I would have had a chance. As far as I'm concerned, somebody at headquarters better start talking to AT&T about getting a network management system. Or they can find themselves a new whipping boy.

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Scannell

FROM PAGE 25

the company will formally introduce Modern Jazz at the Mac Expo and Symphony 2.0 the same week. Besides the lack of copy protection, the new Symphony features various enhancements to its spreadsheet and word processing functions, along with a couple of add-ins. Also by month's end, Lotus is expected to introduce a version of its Manuscript word processor. Manuscript and Symphony are set to ship a couple of weeks after the announcement, with Modern Jazz slated for shipment by the end of March.

MIS Gamesmanship 101. Have some of you MIS managers wondered why you get a negative user response to what seemed a logical project? Or a great response to something that appeared to you to be a throwaway idea? Well, wonder no longer. N. Dean Meyer and Associates has introduced Gameplan, an expert system that simulates the political response of an organization to actions MIS managers take. The game teaches the "political dynamics of innovation" by designating you the manager of end-user computing for a hypothetical company. As your game plan unfolds, the expert system critiques your decisions and gives you immediate feedback.

The goal, according to the vendor, is to come up with a series of moves that result in the adoption of new information tools.

Year of the laptop — Part V. Once again, a market researcher predicts the laptop market is about to take off. Venture Development released a study last month that said the revenue growth in the laptop market in 1987 will continue through 1992, when total market revenues will reach $2 billion. Laptop systems have failed to meet their predicted potential because of high prices and the poor quality of their displays, according to the study.

However, improvements in laptop component technology, major new competitors coming into the market, deep price cuts and the "beginnings of a recovery in the personal computer market" will create unprecedented demand for the systems. Hmmm. Well, if the laptop market fails to come through in 1988, it will be in a flat-footed tie with networks for technology trends that failed to materialize.

Until strategic incompatibility do us part. A little more than 60% of all high-tech mergers and acquisitions in the software, services and information industry succeed, while about 35% end in d-i-v-o-r-c-e, according to a recent study by The Cerberus Group. The key to most happy high-tech marriages is a combination of the right price and strategic fit.

Scannell is a Computerworld senior editor, microcomputing.

ALR line

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backup and a 3½-in. 1.44M-byte floppy, adding to the compatability with the new PS/2 systems, according to the spokesman.

List price for the 16-MHz 80386 Model 60 with a 66M-byte hard disk is $4,690. The 16-MHz 80386 Model 100 with a 100M-byte hard disk retails for $5,690. The 20-MHz models, the Model 150 with a 150M-byte hard disk and the Model 300 with a 300M-byte hard disk, sell for $7,490 and $9,990, respectively.

Claris

FROM PAGE 25

$495, is positioned as a medium to high-end project-management tool. Priced at $195, the original Macproject was targeted at entry-level users. Doug Cobb, product manager for Macproject II, said the decision to make obsolete the original product in favor of the more advanced version was made by dealers.

"We wanted them to carry both products, but they wouldn't because of shelf space," Cobb explained. "They wanted only one Macproject, and the one they chose had the higher price point." Shipment begins this week. Current users can upgrade for $145.

The new package can display up to 16 attributes per task and offers hierarchical subproject consolidation and the ability to customize project tables.

Macpaint 2.0 offers the ability to erase the last drawing without destroying the earlier version of the picture. Macdraw II, which is based on new code, allows object and text rotation, increased speed and the rescaling of objects.

Macpaint 2.0 is priced at $125 and is scheduled for shipment this week. The upgrade price for current users is $25. Macdraw II, priced at $395 — reduced from an original $195 — is scheduled for shipment during the second quarter.

Formed last spring, Claris was established to market applications software for Apple products, particularly the Macintosh. Current plans call for the subsidiary to be spun off from Apple by year's end.

Both Apple and Claris officials have reasoned that the formation of Claris will improve Apple's relationship with its third-party software developers, since it removes the Apple logo from that marketplace. Claris and Apple officials have declined to name the amount of Apple's contribution to the subsidiary.

Repackaging and upgrading existing Apple products represents the first phase of Claris's business plan, which also calls for product and technology acquisitions as well as packages resulting from in-house development programs.

Zeisler said Claris will participate in markets in which it has the opportunity to become the leader or No. 2 player. "No one remembers No. 3," Zeisler explained. "It's safe to assume that we won't get into the spreadsheet market. Microsoft Corp. is doing a good job there."

Where we got the idea that something small could be powerful.

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Zachmann

FROM PAGE 29

Adapter or compatible system, but the resolution leaves much to be desired. Similarly, it can run on a 4.77-MHz Intel 8088-based IBM PC XT or compatible. But even with its greatly improved performance over earlier versions, Windows 2.0 is still too slow for most users.

A 6-MHz PC AT or compatible with an EGA or compatible display, however, delivers satisfactory performance for most applications with Windows 2.0. The faster 8-, 10- and 12-MHz PC AT systems (and even 8-MHz 8086-based systems such as the PS/2 Model 30) will do even better.

A better alternative

Until the Presentation Manager is available next fall, Windows 2.0 will be the only practical way for users of 80286-based systems to get a graphics-based user interface. Even after the Presentation Manager is delivered, Windows 2.0 will likely remain a better alternative for many users.

The higher cost of OS/2, along with the amount of resources it requires, should make the Windows 2.0/DOS combination a more practical alternative for some time. Many users will find this combination preferable to spending what it will take to upgrade their systems to run OS/2.

A 10-MHz 286-based system with a single 20M-byte hard disk, for example, is barely sufficient to run OS/2 Standard Edition — even if it has the 3M to 4M bytes of memory that OS/2 needs to do anything useful. Nevertheless, there are many systems of this sort installed with 1M byte of memory or less. At $99, Windows 2.0 will be hundreds of dollars less than the memory and disk (if not system) upgrades that will be needed to support OS/2.

Applications growing

The fact that Windows 2.0 offers the same user interface as the OS/2 Presentation Manager — and does so almost a year sooner at much lower cost — is not sufficient reason to buy it. Sure, some users may want to get an early feel for what the Presentation Manager will be like. But more compelling reasons for using Windows 2.0 are appearing every month — namely the growing number of excellent applications that run under Windows and that will eventually be made available under the Presentation Manager.

Some of the terrific software written for Windows includes desktop publishing applications like Aldus's Pagemaker; graphics design packages like Micrografx's Inavision, Draw and Graph; ZSoft's PC Paintbrush; office automation packages like Palantir Software's Windows Filer, Windows Intalk, Wintext and others; Microsoft's own Excel spreadsheet; and other specialized products.

There is no question that most of the exciting and important software to be developed during the next four or five years will be written for Windows and the OS/2 Presentation Manager. Windows 2.0 offers by far the best and most economical way for the largest number of users to begin taking advantage of that software now.

Unless you are among the elite minority fortunate enough to have a 386-based system (in which case Windows 386 is an even better alternative), I suggest that you run, not walk, to your nearest computer store and get a copy of Windows 2.0. There is no reason to miss out on so much when the cost of admission to the future is so low.

Zachmann is vice-president of research at International Data Corp.

Oracle

FROM PAGE 29

keep some of his personal data on the PC. So the ideal arrangement is to have things that I want to keep locally on my PC but also to be able to get at data remotely on another PC, minicomputer or mainframe. But I want it all to be transparent.

Do you see IBM's OS/2 Extended Edition as being competitive on the micro side?

If I look at all the new competitors entering the PC data base arena in 1988, I think IBM ranks third among my concerns. Both Microsoft and Lotus will be entering the marketplace and, in that order, are my two biggest concerns. IBM has yet to produce a successful PC product. Maybe this will be the first, but maybe not.

Let's assume it becomes successful because it's bundled with a version of the operating system.

That's interesting. OS/2 Extended Edition is a peculiar name for a DBMS. All Extended Edition is is a DBMS and the network driver for LU6.2. If you have an SQL DBMS and a piece of communications software, why, in God's name, did they call it OS/2 Extended Edition? It's a ridiculous name. We could call Oracle OS/2 Extended Edition. It has nothing to do with OS/2. OS/2 was written by and is owned by Microsoft. The only thing IBM does is act as a public relations agency for Microsoft by holding the parties and announcing it a month before everyone else gets it.

How will Oracle take advantage of that product if it becomes popular?

Well, if it did become popular, I suppose we'd do the same thing we do with DB2, which is have a coexistent strategy where we treat the IBM SQL PC's DBMS the same way we treat DB2 — include it in the network computer.

However, I expect that OS/2 Extended Edition will be just as popular as Topview, their great window-management package. IBM put their full marketing muscle behind Topview.

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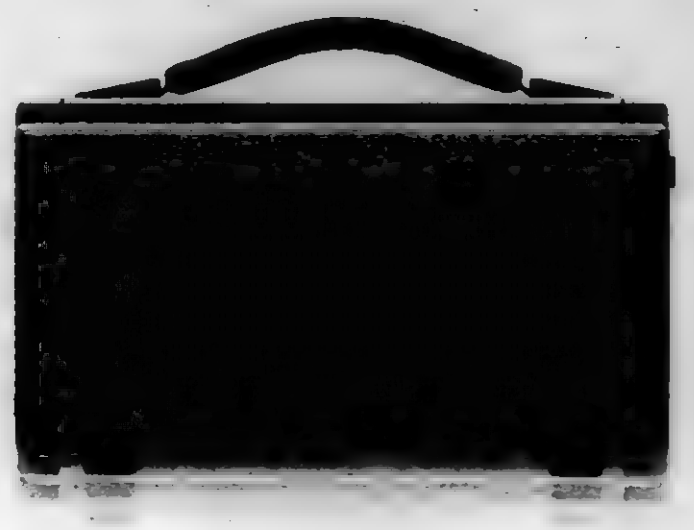

and the new 20-MHz COMPAQ PORTABLE 386™

to inject even more speed into disk-intensive applications and both will run MS® OS/2.

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NEW PRODUCTS

Software applications packages

A data base search software program called **Friendly Finder** has been announced by **Proximity Technology, Inc.**

Friendly Finder searches fixed-length ASCII files and Ashton-Tate Corp. Dbase files. It offers pop-up windows and a macro feature that allows record information to be brought back to the user's current application. According to the vendor, Friendly Finder can find records despite errors typical of data base queries or entries, including typos, abbreviations, missing words or words out of order.

Friendly Finder is priced at $99.

Proximity, 3511 N.E. 22nd Ave., Fort Lauderdale, Fla. 33308. 305-566-3511.

Software utilities

Two versions of a computer-based workstation management system have been introduced by **Leader Systems, Inc.**

Workstation Wizard, available in single-user and network versions, is said to organize the hard-disk system using standard Microsoft Corp. MS-DOS commands for direct access to applications and batch files.

Support is provided for both IBM's Token-Ring and PC Networks. Hardware and direct access to IBM and Novell, Inc. network commands is also standard. Features include an audit trail, a terminal-lock option, context-sensitive Help, 16 colors, an autodialer and access to a four-function calculator.

The single-user version of Workstation Wizard costs $79.95. The network version costs $179.95.

Leader Systems, 814 Livingstone Court, Marietta, Ga. 30067. 404-428-7971.

Development tools

A window management library for Microsoft Corp.'s Quickbasic has been announced by **Software Interphase, Inc.**

Quickwindows provides the Basic programmer with the ability to create windows, pop-up and pull-down menus, Help windows and data entry screens. It features more than 60 functions, the vendor said, which can be accessed through Basic using the CALL statement.

The programmer has control over the style, size and attributes of each window, and each window has its own cursor.

Quickwindows is priced at $79 without source code and $99 with source code. It runs on IBM Personal Computers and compatibles.

Software Interphase, Suite 13, 5 Bradley St., Providence, R.I. 02908. 401-274-5465.

Freeform for the Macintosh, said to provide a uniform user interface to relational data base systems on host computers from such vendors as Digital Equipment Corp., Apollo Computer, Inc. and Sun Microsystems, Inc., has been introduced by **Products Diversified, Inc.**

Freeform is a fourth-generation application development tool that allows the hosts to communicate with Britton Lee, Inc.'s Intelligent Database Machine (IDM). The product includes a screen generator and a report generator.

According to the vendor, IDM can support more than 400 Apple Computer, Inc. Macintosh computers. It handles data bases of up to 10G bytes and provides data sharing among different hosts and operating systems.

Prices for Freeform start at $5,500 for a five-Macintosh license. Britton Lee's IDMs start at $30,000.

Products Diversified, No. 406, 9720 Beechnut, Houston, Texas 77036. 713-771-8357.

Software enhancements

An enhanced version of **Abra 2000**, a human resource system for the IBM Personal Computer and compatibles, has been announced by **Abra Cadabra Software.**

Version 5.5 is said to provide multiuser update capability across IBM PC networks. Other features include a general-purpose mass-update utility, a telephone directory and masked password entry.

Abra 2000 supports networks from Novell, Inc., 3Com Corp. and IBM.

Abra 2000 costs $995. The multiuser network option is an additional $995.

Abra Cadabra Software, 1894 Tanglewood Drive NE, St. Petersburg, Fla. 33702. 813-525-4400.

Data storage

Micro Design International, Inc. has announced the **Laserbank 800**, a write-once read-many (WORM) optical disk.

The Laserbank 800 is said to offer a 65-msec access time and a DOS throughput greater than 200K byte/sec. According to the vendor, the Laserbank 800 emulates a removable hard disk with 800M bytes of storage space.

It interfaces to IBM Personal Computers and compatibles via the vendor's proprietary software and a small computer systems interface card.

The Laserbank 800 costs $9,995; optical cartridges cost $150.

Micro Design, 6985 University Blvd., Winter Park, Fla. 32792. 305-677-8333.

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DATA STREAM

Tom Nolle

Prepare for ONA battles

Common carriers must file their Open Network Architecture (ONA) plans with the Federal Communications Commission by February, after which we'll all have a better idea of just what ONA is going to mean to users, be they businesses or enhanced-service providers.

ONA is a stepchild of divestiture that seeks to remove the restrictions on the divested Bell operating companies' entry into the enhanced-services market while maintaining free competition there. In concept, ONA would require regulated common carriers to publish and tariff the "primitive" service interfaces they themselves might use to provide such enhanced offerings as videotex or information services.

This would assure competitive special service carriers equal access (haven't we heard that one before?) to those backbone facilities they must use to carry their own enhanced offerings to local users. For example, if a local carrier introduces a packet-switching service as an inexpensive way for customers to access its electronic mail offering, then other E-mail vendors ought to be able to offer that same packet-switching service to their own customers — at a comparable cost.

Unfortunately, the language of Computer Inquiry III was

Continued on page 40

Network links Chrysler, dealers

Auto maker's Profs tied to GE Information Services' E-mail system

BY ELISABETH HORWITT
CW STAFF

DETROIT — GE Information Services, a division of General Electric Co., recently completed an electronic mail network for Chrysler Corp. that will support daily interaction between the automotive company and up to 6,500 of its dealerships.

In 1986, Chrysler was looking for a way to allow its 31 zone offices in the U.S. and Canada to stay in touch with the dealerships as well as with Chrysler's 600 district managers, who are assigned to work with specific dealerships on an ongoing basis.

Prior to linking up with the GE network, Chrysler had a "not very sophisticated" system called Dealer Information Access Link, according to David Bartlo, Chrysler manager for field and zone systems.

Each dealer was equipped with an IBM Personal Computer or PC AT that could emulate a teletype terminal, dial into the corporate mainframe and download a file containing the latest dealer information. "But there was no way of directing mail to a specific group of dealers or of getting information back from them easily," Bartlo explained.

Two-way information

Chrysler wanted to build a two-way E-mail system that would allow dealers to access and respond to information provided on the firm's mainframes. The system would also allow district managers on the road to keep in touch with personnel in zone offices, which meant the system would have to interface with an existing E-mail network, IBM's Professional Office System (Profs), which zone office users accessed on a host at Chrysler headquarters.

After evaluating six companies, including MCI Communications Corp. and Western Union Corp., Chrysler chose GE because "they came out on top in terms of service and functionality," Bartlo said. Cost was also a factor in the decision, he added.

GE was "somewhat ahead of their time" in terms of interfacing Profs to the service vendor's own E-mail service, Quik-Comm, according to Bartlo. Messages generated on Profs and addressed to either a district manager or a dealer are now sent on to the Quik-Comm system, which converts them into a format that can be accessed by the IBM PCs used by dealers and by Grid Systems Corp. computers used by Chrysler district managers on the road.

Both types of PCs run a customized version of GE's PC Mailbox, a front-end software package that automates many of the user's dealings with Quik-Comm. "We wanted a neat package to run on a PC and gather and send mail to the system without a lot of intervention by [the user], since [dealerships get] a lot of turnover," Bartlo said. While other bidders had front ends, GE's software was "equal to or better" than its rivals.

The package is "tied tightly to the network, so that you can automatically sign on, send, receive mail and sign off," said David Hall, an account executive for GE. It also is said to permit the creation of messages on the PC before signing onto Quik-Comm.

Electronic forms

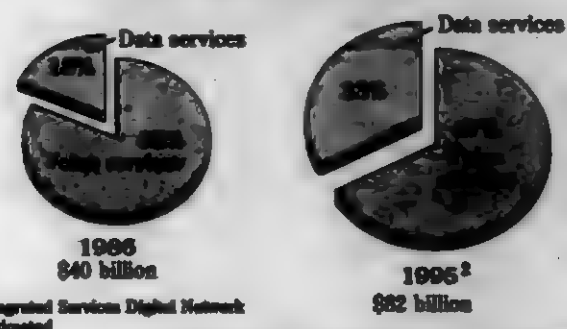
One of the more innovative projects that has come out of Chrysler's relationship with GE, according to Bartlo, is a jointly developed forms-processing package. Chrysler can use the software to develop an electronic form, such as a survey or a sign-up sheet for dealers to join a new incentive program. Chrysler notifies dealers about a new handout via Quik-Comm. Deal-

Continued on page 40

Data View

Data messaging gains in voice transmissions

Aided by ISDN[1] economies, data services should hold a third of the market share by 1995



[1]Integrated Services Digital Network
[2]Estimated

INFORMATION PROVIDED BY BUSINESS TECHNOLOGY RESEARCH
CW CHART

TRW plans TCP/IP offerings

TORRANCE, Calif. — A planned launch later this month of a family of Transmission Control Protocol/Internet Protocol (TCP/IP)-based network products signals TRW Information Networks Division's move away from a traditional emphasis on proprietary protocols.

"We said that we were going to do this last January, and now we actually have the devices," a TRW spokesman said.

With a focus on network management, the line will include the NB2000 series of network bridges, network adapter cards and network management tools targeting local-area markets, the spokesman said. These products will work with TRW's Advanced Connector Unit (ACU) 2000, a TCP/IP-based communications server that shipped in October 1987.

The products will be demonstrated at the Communications Network Conference and Exposition, also known as Comnet, slated for Jan. 25-28 in Washington, D.C. TRW said some of its TCP/IP products have already shipped to early users; the rest will be available after the show.

Continued on page 40

Inside

- Artel bridge connects Ethernet LAN to Artel's fiber-optic backbone. Page 38.
- Rivals claim to be first to offer direct link between network and packet-switching services in Japan. Page 38.
- Racal-Vadic offers synchronous rack-mount modems. Page 46.

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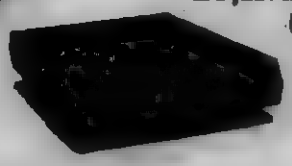

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Artel bridge links networks

HUDSON, Mass. — A bridge recently announced by Artel Communications Corp. reportedly allows users on multiple Ethernet IEEE 802.3 networks to communicate over Artel's 100M bit/sec. fiber-optic backbone.

The Fiberway 802.3 Bridge is an intelligent device that connects one Ethernet local-area network to the backbone. It can learn the addresses of all devices on the network attached to it so that it can restrict local messages to the network and send only remotely addressed transmissions over the backbone, according to Artel spokeswoman Etta Marie McCarthy.

One fiber-optic backbone can support up to 128 of Artel's multiple Fiberway Bridges. Bridges can also communicate over the fiber-optic cable with Artel's Ethernet Accelerator, which links any device with an Ethernet interface to the fiber-optic cable. An Ethernet network is linked to a Fiberway Bridge port via an Ethernet transceiver and a drop cable.

Both the Fiberway Bridge and the Ethernet Accelerator are available in two versions, one of which supports transmission over distances of up to 2,000 ft; the other communicates over distances of up to 13,000 ft. Priced at $19,000, the Fiberway Bridge is slated for volume shipment next month.

Rivals provide direct connection between services in U.S. and Japan

Two U.S. rivals late last month claimed to be the first to provide customers with a direct link between their U.S.-based value-added network services and packet-switching services in Japan.

A direct connection was announced Dec. 18 between GE Information Services in Rockville, Md., and NEC Corp.'s network in Japan. The service will initially support the Information Services division's Quik-Comm electronic mail offering.

It can be accessed by approximately 200 locations in Japan, 650 locations in the U.S. and from more than 80 additional countries around the world, according to GE.

On Dec. 21, Tymnet, a San Jose, Calif., subsidiary of McDonnell Douglas Network Systems Co., unveiled a link between its own service and that of its Japanese affiliate, Network Information Service, Ltd.

Both offerings were made possible by a recent deregulation of the Japanese telecommunications market.

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France offers ISDN service

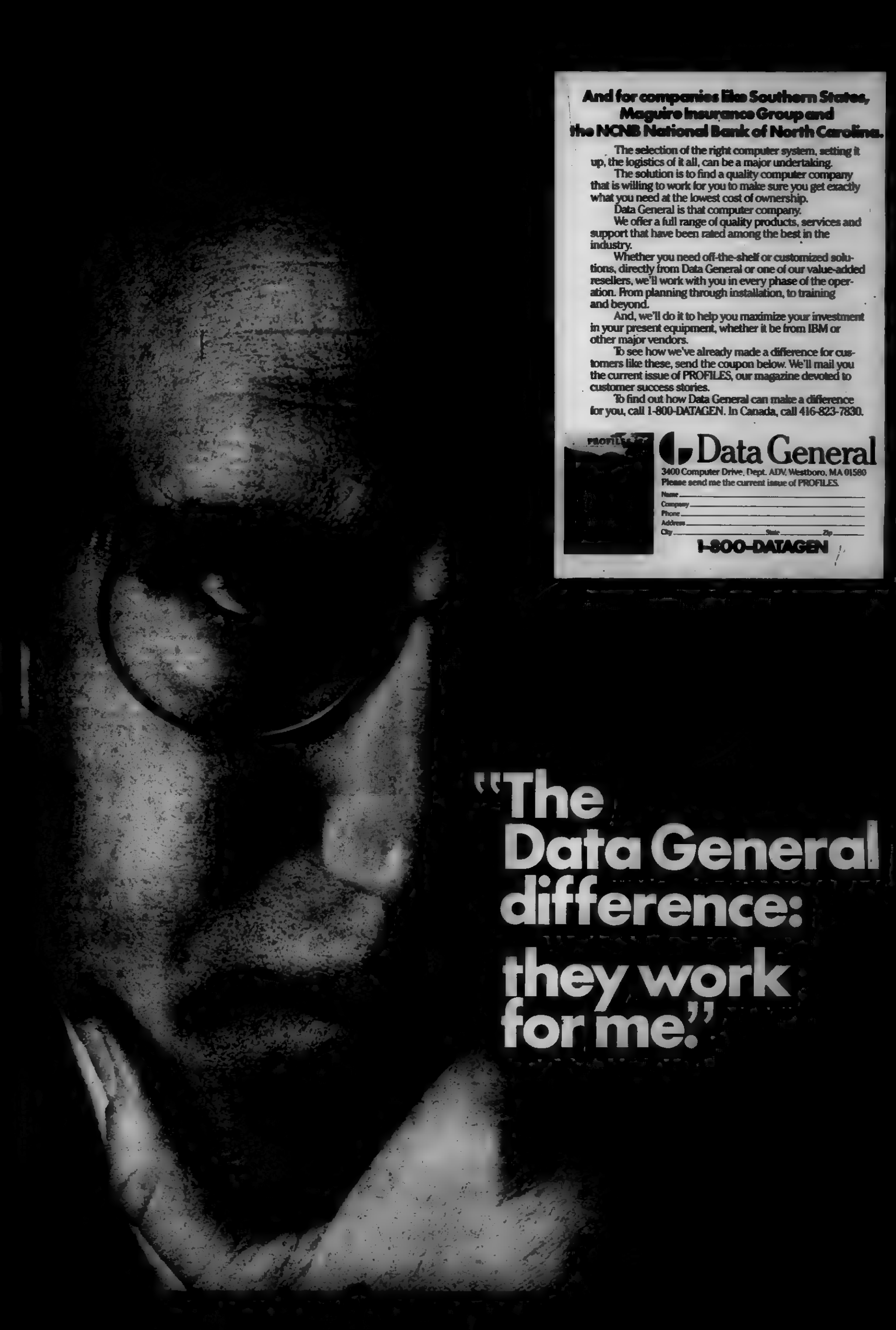
France recently launched its first commercial **Integrated Services Digital Network** (ISDN) offering in the Brittany region. The network will be extended to other parts of the country during the next couple of years, with the first international connections to be added in 1989.

The ISDN service provides basic rate connections, which support two 64K bit/sec. digital channels. Rates range from 34 cents to $1.14 per minute. A primary rate service, which will consist of 30 64K bit/sec. channels (as opposed to the U.S. standard that defines 23 channels), is slated to be offered in France next year.

NCR Comten has announced that its Advanced Communications Function/Network Control Program (ACF/NCP) Version 4.0 will support IBM's Systems Network Architecture (SNA) Network Interconnect feature. This allows communication among nodes on different SNA networks. The vendor said it will continue to offer users the Comten Network Gateway as an alternate way to interconnect multiple SNA networks. Comten ACF/NCP Version 4.0 runs on a Comten 3690/3695 or 5600 communications processor and performs routing functions within an SNA network.

LANwatch Version 1.1, the latest network protocol analyzer software from Boston-based **FTP Software, Inc.**, reportedly analyzes Digital Equipment Corp.'s Decnet, Novell, Inc. and Xerox Network Systems packets. It also monitors network traffic on Pronet-10, Proteon, Inc.'s 10M bit/sec. token-ring network. LANwatch Version 1.0 could only analyze Transmission Control Protocol/Internet Protocol packets running over Ethernet local-area networks.

Datatel, Inc., a manufacturer of data communications equipment based in Cherry Hill, N.J., has earned 156th place in *Inc.* magazine's list of the 500 fastest growing private companies in the U.S. In a separate study published by the *Business Journal of New Jersey* in September 1987, Datatel ranked 10th in rate of growth among New Jersey companies. Datatel was recently acquired by the Dowty Group PLC, a $1 billion company based in Cheltenham, England.



And for companies like Southern States, Maguire Insurance Group and the NCNB National Bank of North Carolina.

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Nolle

CONTINUED FROM PAGE 37

vague on the details of ONA — the court, in essence, said, "We'll know an open interface when we see one."

Carriers' ONA submissions this month are bound to be trial-and-error efforts to satisfy the spirit of the ONA concept. This leaves plenty of room for more court battles between carriers, vendors and regulatory bodies — when the telecom market is already reeling under technological, regulatory and economic changes.

One reason the various parties are likelier to fight than parley is the fact that a lot of them really hate ONA. The regulated carriers see it as a license for competitors to stand back while basic service technology is developed by the carriers at great expense, and then move in to reap the economic benefits. State regulators see it as a means of justifying the investment of residential revenues in the provision of service mechanisms (the ONA interface itself) that will likely be of little use to the residents. Technical specialists believe ONA will yank telecommunications out of the lab and into the courtroom.

Benefits overlooked

What makes the upcoming ONA fight so frustrating is the fact that recent standards efforts will soon open up the carriers' networks in very practical ways. Integrated Services Digital Network (ISDN) promises international standards for interfacing customer-premise equipment with carrier services.

Signaling System 7 (SS7) is a set of protocols that should play a key role in ISDN. SS7 is supposed to allow the switching devices of carriers, and maybe even users, to exchange signaling and control information on a peer-to-peer rather than a hierarchical basis.

This will make it easier for users' and service providers' networking systems to participate in the sophisticated network offerings that carriers will provide through ISDN, including network diagnostics and accounting, call routing and identification. It also will allow enhanced-service providers — the Tymnets and Telenets of the world — to wield network control with the big boys regardless of where their switches attach to the "basic services network."

None of this will satisfy the FCC's current definition of ONA, however — because that definition is an ideal, rather than a rule. No matter what we do as an industry to address the problems of the separation of regulated and enhanced services, concepts like ONA will be interpreted differently by the players in the market, and the user will pay the price of the resulting confusion.

We don't have a government-sponsored telecommunications industry, so many observers seem to feel that the direct setting of standards in the manner of the CCITT and the European Postal, Telephone and Telegraph organizations is inappropriate in the U.S. But is it? What better way to regulate something than to specify how it must appear to its users — whether those users be businesses or enhanced-service providers?

Maybe it's time to consider formalization of standards in a more legal sense, and to avoid the generation of broad pronouncements until they can be fleshed out enough to provide real market guidance.

In the meantime . . . see you in court.

Nolle is president of CIMI Corp., a communications consulting company based in Haddonfield, N.J.

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Chrysler

CONTINUED FROM PAGE 37

ers can download the forms, fill them out and send the data back electronically to the Chrysler host, which can then tabulate the responses. Chrysler is working on a way for dealers to sign up for a program via an electronic signature.

The auto maker's first application of the forms generator, Bartlo said, was designed to improve customer relations. A customer's query or complaint is keyed into the system, and an electronic message is sent to the appropriate district manager and the dealer. One or the other then fills out a form with a recommendation of follow-up and sends it on to the zone office for review and then to headquarters for final resolution.

GE won the Chrysler contract in October 1986, in a bidding war against such competitors as MCI and Western Union, Hall said. Today, all of Chrysler's domestic North American dealers are using the network, except for the newly formed AMC Jeep Eagle division, which will be brought up by June.

TRW

CONTINUED FROM PAGE 37

The NB2000 series covers 11 bridges that provide TCP/IP support for a variety of networks and between a mix of those networks. Six bridges support IEEE 802.3 local-area networks. The other five support remote connections by linking remote 802.3 LANs over T1 lines, fiber and broadband cable. The bridges range in price from $5,495 to $7,195.

Three network adapters for IBM Personal Computers and compatibles will be available in intelligent or nonintelligent versions, and each comes with TRW's OS Connection software. The adapters are priced from $495 to $670.

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NEW PRODUCTS

Local-area network hardware

A subsystem package designed to provide 3Com Corp. network compatibility to an 800M-byte optical disk drive has been unveiled by Spectracom.

The package consists of an optical disk subsystem, a small computer systems interface card, network drivers and software, one blank 800M-byte optical disk from Maxtor, Inc. and documentation. The subsystem also comes with its own power supply and external case.

The package is priced at $5,995.

Spectracom, 90 W. Easy St., Simi Valley, Calif. 93065. 805-527-2326.

Local-area network software

Autodialing Systems Network Architecture (SNA) and bisync software for the IBM Personal System/2 Models 50, 60 and 80 has been announced by CQ Computer Communications, Inc.

A 3270 SNA emulator, called CQ-3270R, supports multiple sessions, 132-col screens, extended data stream, IBM-compatible file transfer and mainframe-controlled windows. It costs from $395 to $795.

The CQ-3770 package provides SNA RJE support as well as support for bidirectional compression and compaction and multiple printers. It costs from $495 to $695. A bisync RJE package, called the CQ-3780, costs $395. CQ-Haste, a bisync package, costs $750.

CQ Computer Communications, 5380 Capital Circle N.W., Tallahassee, Fla. 32303. 904-526-4255.

Links

Teleos Communications, Inc. has introduced the T100U Unibus Controller, said to provide communications between Digital Equipment Corp. VAX computers through T1 network lines.

According to the vendor, the T100U provides a full-duplex data transfer rate of up to 1.53M bit/sec. over T1-compatible transmission systems. Functions include parallel-to-serial and serial-to-parallel conversion, data formatting and deformatting, intelligent buffer management using direct memory-access transfers and VAX cluster-to-VAX cluster wide-area networking.

The T100U costs $4,000. Drivers for VMS, AT & T's Unix System V and the University of California at Berkeley's Unix 4.2 cost $400 each.

Teleos, 2 Meridian Road, Eatontown, N.Y. 07724. 201-389-5700.

Modems/ Multiplexers

A modem said to offer full network node functionality, remote configuration, Class 5 Microcom Networking Protocol (MNP) error correction and diagnostic capabilities has been announced by Western Datacom Co.

The 424 Network Node was designed for operation over standard two-wire dial-up lines or two four-wire leased lines. It features synchronous or asynchronous operation, password protection, downward compatibility with lower classes of MNP, telephone number storage and integral autodialer.

Speed conversion up to 9.6K bit/sec. is supported.

The 424 Network Node is priced at $695.

Western Datacom, P.O. Box 45113, Westlake, Ohio. 44145. 216-835-1510.

A trellis-coded diagnostic modem has been announced by Data Comm for Business, Inc.

The PL 19.2 Plus is a 19.2K bit/sec. synchronous modem for use on four-wire point-to-point leased lines. Fallback speeds of 16.8, 14.4, 12 and 9.6K bit/sec. are supported. Diagnostic tests such as level measurement, status display and loop-backs are performed using an asynchronous terminal as a

Continued on page 46

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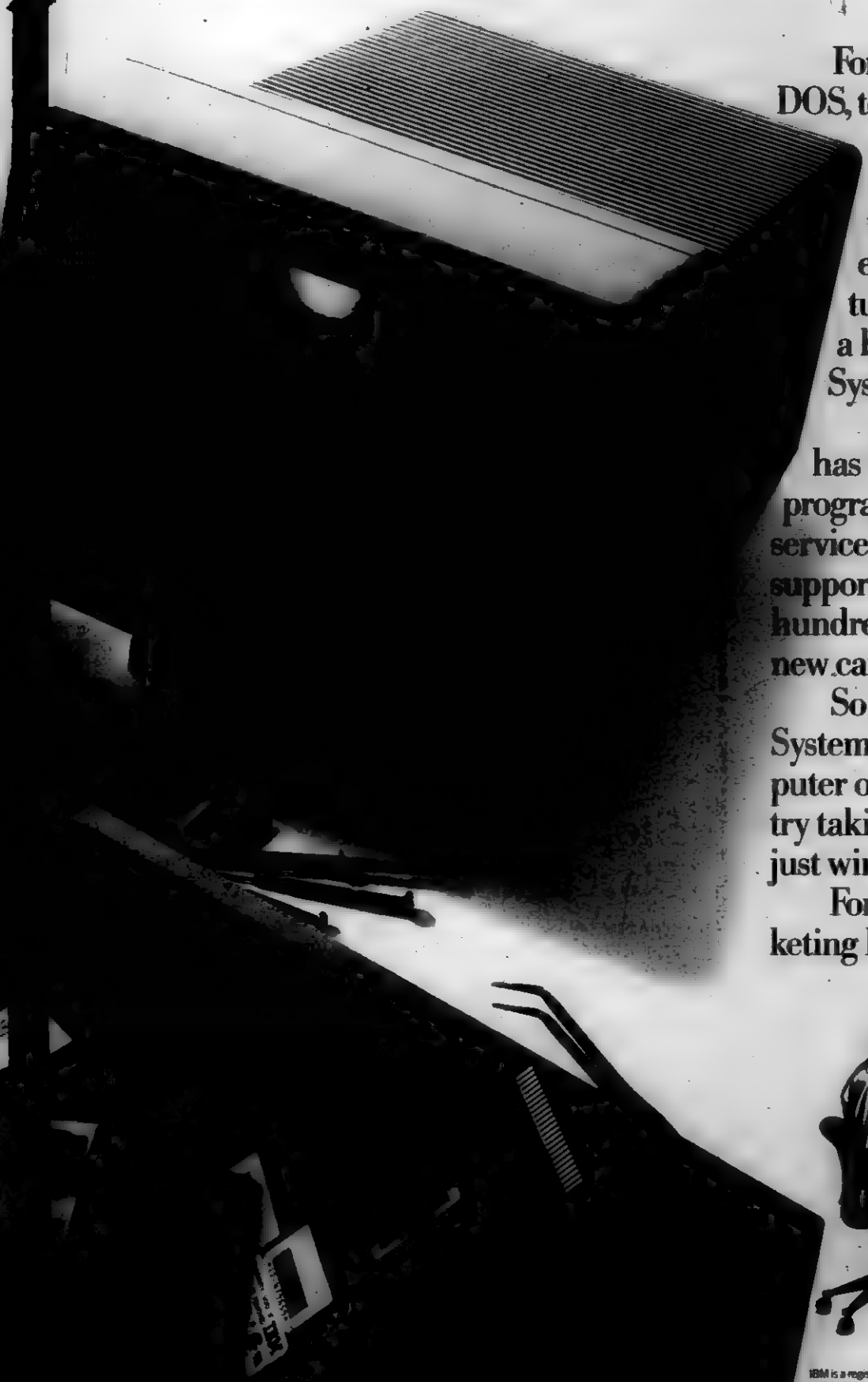

For starters, it's compatible with today's DOS, to protect your investment in hardware and software. It works beautifully with Micro Channel, to make multitasking easier. What's more, OS/2 establishes a consistent look for virtually all software and systems, part of a blueprint for the future we call Systems Application Architecture.

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For the dealer nearest you, call 1-800-447-4700.

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Continued from page 42

control console.

The PL 19.2 Plus is priced at $4,900.

Data Comm for Business, 807 Pioneer, Champaign, Ill. 61820. 217-352-3207.

Two synchronous rack-mount modems have been announced by Racal-Vadic, Inc.

The VA9691FT 9.6K bit/sec. modem and the VA4891T 4.8K bit/sec. modem were designed for use with the vendor's MDS II network management system.

The VA9691FT offers CCITT V.29 and V.27 compatibility. The VA4891T operates as an AT&T 208/201 and CCITT V.27/26 modem. It features automatic modem detection.

Both modems operate over two-wire dial-up and two- or four-wire leased lines.

According to the vendor, up to 16 modems can be mounted in one MDS II chassis.

The VA9691FT costs $1,995; the VA4891T costs $1,695.

Racal-Vadic also announced the VA901 automatic dialer for the MDS II. It offers four Bell 801 dialers per card and costs $1,195.

Racal-Vadic, 1525 McCarthy Blvd., Milpitas, Calif. 95035. 408-432-8008.

Mux Lab's *Double Octopus*

Cabling

The Double Octopus, a cabling product for use in IBM 3270 environments, has been announced by Mux Lab, Inc.

The Double Octopus is said to eliminate coaxial cable leads at the controller side. According to the vendor, ports may be wired from controllers to patch panels or punch-down blocks via a 25-pair feeder cable.

It features a 16-port balun assembly connected via 16 5-ft air cables to a 50-pin male connector. It works in conjunction with the vedor's Monoplex, Monofrill and Economono coaxial baluns.

The Double Octopus costs $470.

Mux Lab, 165 Graveline, St.-Laurent, Que., Canada, 84T-1R3. 514-735-2741.

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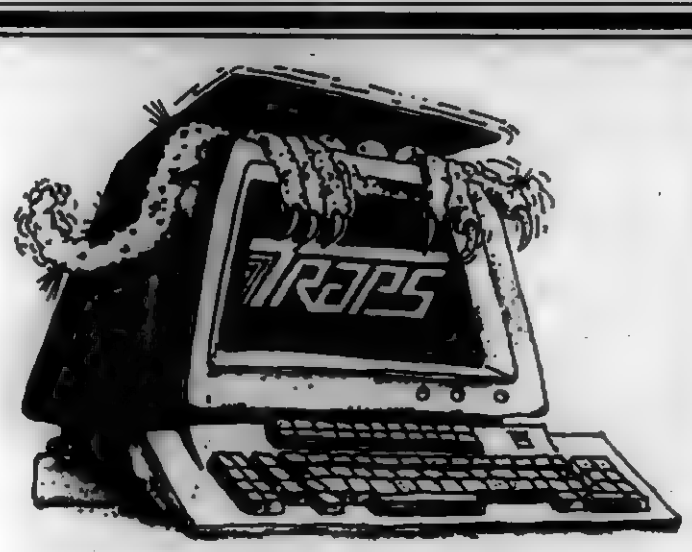

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HARD TALK

James Connolly

IBM dives into supers

A toe-test showed that the water was fine, so now the big guy is jumping into the pool.

IBM made its official entry into supercomputing with the December announcement that it is investing in Supercomputer Systems, Inc., the start-up founded by former Cray Research supercomputer designer Steve S. Chen. Supercomputer Systems expects to deliver a 64-processor supercomputer to rival Cray's high-end systems in the early 1990s.

Supercomputer boosters see IBM's move as an endorsement of parallel processing and supercomputing and as a turnabout in IBM's strategy.

But it should be remembered that IBM has been testing the supercomputing waters for more than two years with its 3090 mainframes equipped with vector processing facilities. IBM has used those 3090s to get into customer sites that might be served by lower end Cray systems and minisupercomputers. In addition, IBM researchers have worked on various projects aimed at developing parallel processors.

With its investment in Supercomputer Systems, IBM is positioning itself for a battle with supercomputer makers such as Cray — the company Chen left after it canceled Chen's Cray MP development effort.

Continued on page 54

Pump maker purges systems

Turns 'doomsday situation' around with System/38, new personnel

BY KATHY CHIN LEONG
CW STAFF

PORTLAND, Ore. — When he came to the MIS operation at Bingham International, Inc. in 1986, Dick Kuiper was downright embarrassed.

Not only were the firm's four host systems incompatible, but they also had not received operating system upgrades in four years. Without system purge routines, disk space was nearing the overflow mark, and no one knew how to flush out old files. He walked into a doomsday situation.

Kuiper, the firm's manager of information systems, says that today, the $30 million pump manufacturer is ready to tackle front-line responsibilities that will make Bingham even more competitive. "Rather than focusing on day-to-day operations, we want to broaden our scope of services to take our company further," he says.

Kuiper wants to capture more data from the field offices and help the engineering and

Dick Kuiper

marketing personnel in post-sales analysis and forecasting. "We want to help them wrap their arms around profit and management," he says.

A single IBM System/38 has replaced the four host systems. New MIS personnel are on board who have brought with them a fresh outlook on systems management.

When Kuiper was hired in June 1986, his mission was clear: Get this shop in shape. After a 16-year stint as MIS director at paper giant Boise Cascade Corp., Kuiper was ready to tackle new opportunities and challenges.

The challenge was monumental. In just one year, the MIS, hardware and software departments were completely replaced. The problems that plagued the operation stemmed back to the 1970s — a time when Bingham was experiencing unbridled growth. According to Kuiper, at that time, "they wanted a computer system fast, and they hired the wrong people." Every two years, a new MIS director joined the firm, bringing in his own form of management and hardware preference.

One decade and four MIS directors later, the MIS department had an IBM 4341 small mainframe, a Prime Computer, Inc. 500 series superminicomputer, a Honeywell, Inc. Level 6 minicomputer and an IBM Series/1 minicomputer. Vital applications such as inventory management, manufacturing resource planning, accounting and order entry resided on separate machines, making cohesive data collection difficult.

The Series/1 was used as a communications controller for terminal-to-mainframe connectivity. But users could only access either the Prime or the IBM system and were not able to transmit data from one host file to another.

'Computing islands'

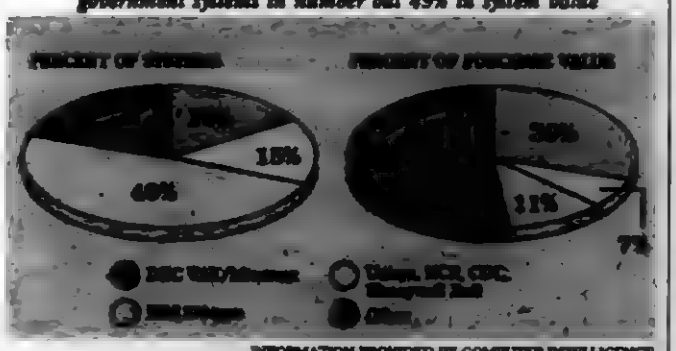
"In many cases, the data transfer was done either through reformatting magnetic tapes or reentering data manually," Kuiper says. "You had these different computing islands, and we had an army of clerks rowboating to each of these islands. The hope was that someday these would be linked all together." However-

Continued on page 52

Data View

Mainframe domination

IBM and compatible mainframes make up 11% of federal government systems in number but 49% in system value



INFORMATION PROVIDED BY COMPUTER INTELLIGENCE

Imagen speeds up printers

SANTA CLARA, Calif. — Imagen Corp. recently extended its line of laser printers with the introduction of two printers that the company claimed achieve true printing speeds of 20 page/min.

The 5320 Imageserver XP and the 6320 Imageserver XP are based on a laser printer engine and a raster-image processor. Like other Imageserver XP models, the new models feature Imagen's Real-Time Rasterization techniques, which were designed to reduce the time required to format data and to allow each engine to print at its rated speed.

The 5320 and 6320 were designed for use in work group environments as shared printer resources.

Support graphics, text

Imagen said the products can handle full-page combinations of complex graphics and text for applications in the computer-aided engineering, design, publishing, printing and document-processing markets.

The 5320 is aimed at applications that involve high-volume

Continued on page 52

Inside

- Micropolis claims SCSI drive exceeds capacity of larger drives. Page 52.
- Xerox develops laser printer set for Ethernet networks. Page 54.
- NCR rolls out high-end development set for Geometric Arithmetic Parallel Processor. Page 55.

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Micropolis develops parallel drive array

CHATSWORTH, Calif. — Micropolis Corp. recently introduced a set of five 5¼-in. Wincester disk drives that, acting together, can exceed the capacity, transfer rate and reliability of many 8- and 9-in. drives, according to the vendor.

The Model 1804 small computer systems interface (SCSI) drive subsystem can store 1.5G bytes of data and provide a sustained data rate of more than 4M byte/sec., the vendor claimed.

The Model 1804 SCSI uses Micropolis 380M-byte drives, each with a 1.25M byte/sec. data rate. Four drives in the assembly combine to appear to the CPU as one drive storing 1.5G bytes of data. The fifth drive offers redundancy and allows a failed drive to be replaced without taking the system off-line.

Drives work together

"The motors of the drives are synchronized," said Tom Kent, Micropolis marketing manager. He said an electronic signal is used to line up all the drives. As a result, the drives perform the same task together. Data is sent to the drives, 1 byte to each disk. A fifth byte, the parity byte, is used to reconstruct data in case of disk failure. It goes to the fifth disk.

Micropolis intends to sell the drive array to builders of superminicomputers, high-end workstations and graphics and image processing systems.

The Model 1804 SCSI has the advantage of having a higher data rate and greater reliability than other OEM drives, Kent said. In order for the array to lose data, two of the drives would have to fail simultaneously, an unlikely condition under normal operating conditions, he said. Should a drive fail, it may be replaced on-site by personnel with minimal training, Kent added.

The Model 1804 SCSI drive system will sell in OEM quantities for $12,000. Evaluation units will be available this quarter for the same price, Kent said.

Imagen

CONTINUED FROM PAGE 49

printing on various sizes of paper, while the 6320 was designed for high-volume duplex printing. The duplex feature allows automatic printing on both sides of a sheet of paper.

Various host protocols allow the printers to be used with systems such as IBM mainframes, Digital Equipment Corp. minicomputers and engineering workstations. The printers support Imagen's Impress language and are compatible with files written for Adobe Systems, Inc.'s Postscript.

The 5320 costs $26,950, and the 6320 costs $29,950.

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Pump maker

CONTINUED FROM PAGE 49

er, no plan for connectivity existed. "People thought it would just one day magically happen."

In the early 1980s, when the demand for industrial pumps tapered off, half the company was laid off, leaving a core of 750 employees. The data processing department, which had 35 employees, was cut to nine people. With more than 75% of the shop gone, many projects were left unfinished. The remaining DP employees found themselves as caretakers of what seemed like a hardware cemetery. There was no wiring-scheme document available to show what was installed in the building. There was no organized information detailing upcoming projects.

But Bingham finally saw that the key to the company's well-being lay in an efficient computer strategy. Management structured the new job so that Kuiper would report directly to the general manager of the company, Gary Loven.

Getting rid of the four older systems and replacing them with a single System/38 turned out to be more cost-effective than keeping them. Whereas Bingham had previously spent $1 million annually on operating costs, the company now spends $500,000 annually.

According to Kuiper's estimates, it would have cost between $4 million and $5 million in software and development time to create a communications link for the four older computers and to upgrade application software.

Since the files had never been purged, the day was fast approaching when the company would fill up its disk storage. The drives had a capacity of 4G bytes. "I really thought that we would have to just close the door on the shop and turn off the lights. It was a doomsday situation," Kuiper says.

The key to the solution was the acquisition of a $1 million System/38 Model 400 with 16M bytes of memory. With it came 100 terminals and 15 printers. New application software was created on the System/38 to handle the various manufacturing and accounting packages that were on the dissimilar machines. Slowly, new people were brought in to replace the previous crew. By mid-1986, a new department was in place.

Today, Kuiper says he is ready to take the company beyond the stage of fighting fires. With a new team and new hardware and software, the department is embarking on a second phase that will pump new blood into the company.

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[1] Based on standardized ETI Benchmark. Results published by FT Systems Newsletter, 1987 ITOM Intnl. Co. [2] Audited results published 10/12/87. [3] Using NonStop SQL.™ [4] Prices for systems: Sequoia $929,000; Tandem $995,000; Stratus $830,000.
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SEQUOIA

Laser printer sights Ethernet users

EL SEGUNDO, Calif. — Xerox Corp. targeted Ethernet network users with the recent introduction of a medium-speed version of its Xerox 3700 Laser Printing System.

According to a company spokesman, the Xerox NS 3700 Laser Printing System Release Four series can be linked with Xerox 6085 and 8010 workstations in an Ethernet local-area network. It offers 300 dot/in. resolution at speeds up to 24 page/min and prints text and graphics documents in paper sizes up to 11- by 17-in.

The printing system was designed for applications requiring specialized graphics publishing capabilities and computer-aided design drawings, the spokesman said. It uses Xerox's Interpress page-description language, which allows the system to receive data from any Interpress workstation or computer via an Ethernet network.

Key features include a 1.5M-byte very large-scale integration image generator, a 50M-byte hard disk and three input sources — a 1,500-sheet main tray, two 250-sheet auxiliary trays and a 2,000-sheet output stacker.

The NS 3700 can produce documents created with Xerox Viewpoint as well as third-party software running on Xerox workstations, the vendor said. The system is also said to produce documents from Digital Equipment Corp. VAX computers running Xerox Network Systems (XNS) software.

As an Interpress printer running XNS protocols, the system is reportedly fully compatible with other networked laser printers from Xerox, including the Xerox NS 8000 Laser CP.

The Xerox NS 3700 costs $33,985. It is available immediately, the vendor said.

Connolly

FROM PAGE 49

What remains to be seen is whether IBM is giving itself fallback security, whereby it can rely on Supercomputer Systems as a supplier if its own development efforts fail or prove too expensive.

It is clear that any alliance with a supercomputer maker will give IBM a range of offerings broad enough to cover — at least on paper — almost all segments of the computer market. That certainly will make IBM a competitor with Cray in arenas that demand high-performance machines — such as the U.S. government market — and could give IBM an edge over Cray, because it can package its own smaller systems with a supercomputer while Cray offers only supercomputers.

IBM also holds an edge over Cray and CDC, which makes supercomputers and smaller systems, just in terms of size. IBM can more easily afford to cut the price on a supercomputer with the knowledge that it can cover that loss with the sale of supplemental systems to the same customer.

International resistance

But the more interesting confrontations may be on the international front, where IBM's offering of a true supercomputer as part of a broad product line puts it up against Japanese vendors — including Hitachi, NEC and Fujitsu — that added supercomputers to their broad, general-purpose computer lines three years ago.

Those vendors have only recently made inroads in the U.S. supercomputer market with U.S. sales logged by Honeywell-NEC Supercomputers and Amdahl on behalf of Fujitsu.

If the partnership of IBM and Supercomputer Systems produces a supercomputer in the early 1990s, it could mean that in five years or less, there will be at least five companies — IBM, NEC, Hitachi, Fujitsu and CDC — offering broad ranges of systems extending into supercomputers.

Connolly is Computerworld's senior editor, systems & peripherals.

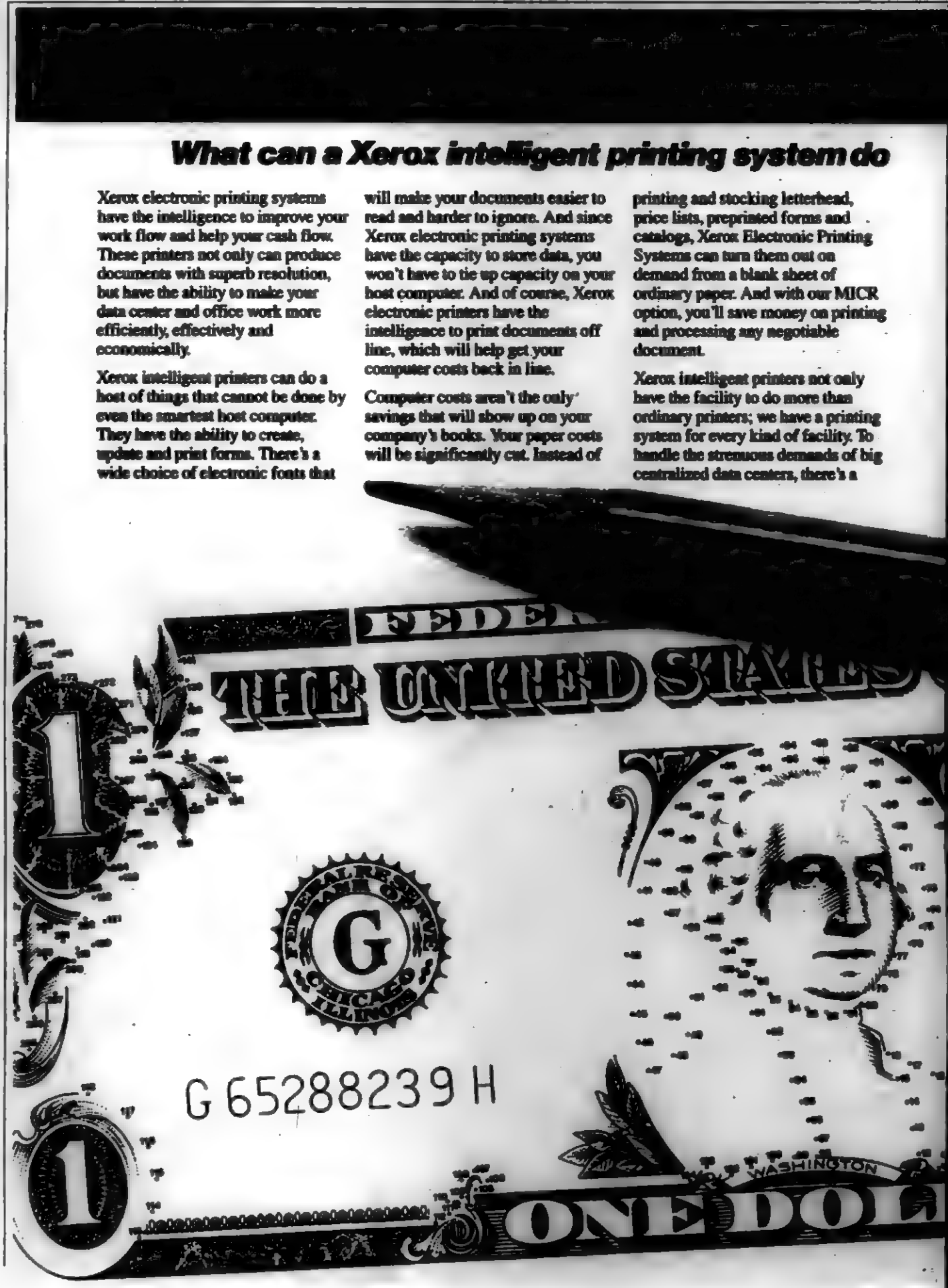
What can a Xerox intelligent printing system do

Xerox electronic printing systems have the intelligence to improve your work flow and help your cash flow. These printers not only can produce documents with superb resolution, but have the ability to make your data center and office work more efficiently, effectively and economically.

Xerox intelligent printers can do a host of things that cannot be done by even the smartest host computer. They have the ability to create, update and print forms. There's a wide choice of electronic fonts that will make your documents easier to read and harder to ignore. And since Xerox electronic printing systems have the capacity to store data, you won't have to tie up capacity on your host computer. And of course, Xerox electronic printers have the intelligence to print documents off line, which will help get your computer costs back in line.

Computer costs aren't the only savings that will show up on your company's books. Your paper costs will be significantly cut. Instead of printing and stocking letterhead, price lists, preprinted forms and catalogs, Xerox Electronic Printing Systems can turn them out on demand from a blank sheet of ordinary paper. And with our MICR option, you'll save money on printing and processing any negotiable document.

Xerox intelligent printers not only have the facility to do more than ordinary printers; we have a printing system for every kind of facility. To handle the strenuous demands of big centralized data centers, there's a



NEW PRODUCTS

Processors

NCR Corp.'s Microelectronics Division has announced a high-end hardware and software development system for its Geometric Arithmetic Parallel Processor (GAPP).

The **NCR45SPDS** development system is a single-instruction multiple-data processor development system that supports the development of operational and algorithmic software for GAPP-based systems. It runs on an NCR PC8 or other IBM Personal Computer AT compatibles.

Pricing starts at $28,500 for a single-array board system.

NCR, 1700 S. Patterson Blvd., Dayton, Ohio 45479. 800-334-5454.

Graphics systems

Ultragraf 88, a three-dimensional interactive computer-aided design and manufacturing display product, has been announced by **Lundy Electronics and Systems, Inc.'s** Computer Graphics Division.

Ultragraf 88 offers resolution of 4,096 by 4,096 pixels. It features Lundy's Ultragrafics software package, which provides standard subroutines for constructing, manipulating and plotting basic shapes and designs. Ultragraf 88 transforms approximately 100,000 3-D vectors per second, the vendor said.

The system includes a 21-in. monochrome monitor with an integrated keyboard and a desk-side controller cabinet. Pricing starts at $45,995.

Lundy Electronics, 1 Robert Lane, Glen Head, N.Y. 11545. 516-671-9000.

Data storage

Two Data General Corp.-compatible disk controllers said to support 5¼-in. hard disk drives with a small computer systems interface (SCSI) have been announced by **Zetaco**.

The **Model SCZ-1** emulates DG's Argus disk subsystem and runs under the AOS and AOS/VS operating systems. It supports up to seven SCSI disk drives and interfaces DG's Burst Multiplexer Channel.

The **Model SCZ-2** emulates and replaces DG's Zebra disk subsystems and runs under the RDOS operating system.

The SCZ-1 costs $5,995. The SCZ-2 costs $2,695.

Zetaco, 6850 Shady Oak Road, Eden Prairie, Minn. 55344. 612-941-9480.

Terminals

Conrac Display Products Group, a Mark IV Industries, Inc. company, has reduced the prices of its **7351** series of ultrahigh-resolution color display monitors.

The 19-in. 7351 features horizontal scan rates from 48 to 64 KHz.

The Model 7350-I features 1,280- by 1,024-pixel resolution. The Model 7351-II offers a standard polished CRT.

The Model 7351-III features 1,024- by 768-pixel resolution with a horizontal scan rate of 47 to 50 KHz. The Model 7351-IV has a high-contrast CRT.

The monitors cost from $2,995 to $3,450.

Conrac, 600 N. Rimsdale Ave., Covina, Calif. 91722. 818-966-3511.

Printers/Plotters

Ioline Corp. has added Hewlett-Packard Co. Graphics Language (HPGL) emulation to its **LP4000** and **LP3700** large-format pen plotters.

The Ioline subset of HPGL output commands was designed to support a command set compatible with such computer-aided design and drafting software as Autodesk, Inc.'s Autocad.

Both plotters emulate Houston Instruments' Digital Microprocessor Plotting Language as well.

Plotters can be field-upgraded by users with the purchase of an HPGL read-only memory, priced at $150.

Ioline, 19417 36th Ave. W., Lynnwood, Wash. 98036. 206-775-7861.

XEROX

for your company? Draw your own conclusions.

Xerox printer that can put out 2 million pages a month. And it gives everything it prints from basic sysout to the most complicated technical document 300 x 300 d.p.i. of clarity. For medium-size data centers, there's a Xerox printer that turns out documents with all the quality and flexibility of a big electronic printer, but at line-printer costs. With Xerox, intelligent printers aren't limited to the data center. Xerox distributed-printing systems bring that same intelligence anywhere in the world you place them. And Xerox desktop laser printing systems are smart enough to handle the industry's widest range of applications for individual PC users, PC clusters or the most sophisticated networks.

Xerox intelligent printing systems are all backed by Team Xerox, one of the largest and most experienced service-and-support groups in the industry. So, what can a Xerox intelligent printing system do for your company? Draw your own conclusions.

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For more information about Xerox Intelligent Printing Systems, call us at 1-800-TEAM-XRX (1-800-832-6979), ext. 242C or clip the coupon below.

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VT 220 compatible with VT220 keyboard layout; 4 pages of memory; choice of screen color, including soft-white; tilt/swivel.
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For your ASCII system: HP 700/41
9 emulation modes; 14″ diagonal display with easier-to-read characters; full-function keyboard; choice of green or amber screen colors.
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*All prices U.S. list.

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IBM 3191 Display Station product of International Business Machines Corp.

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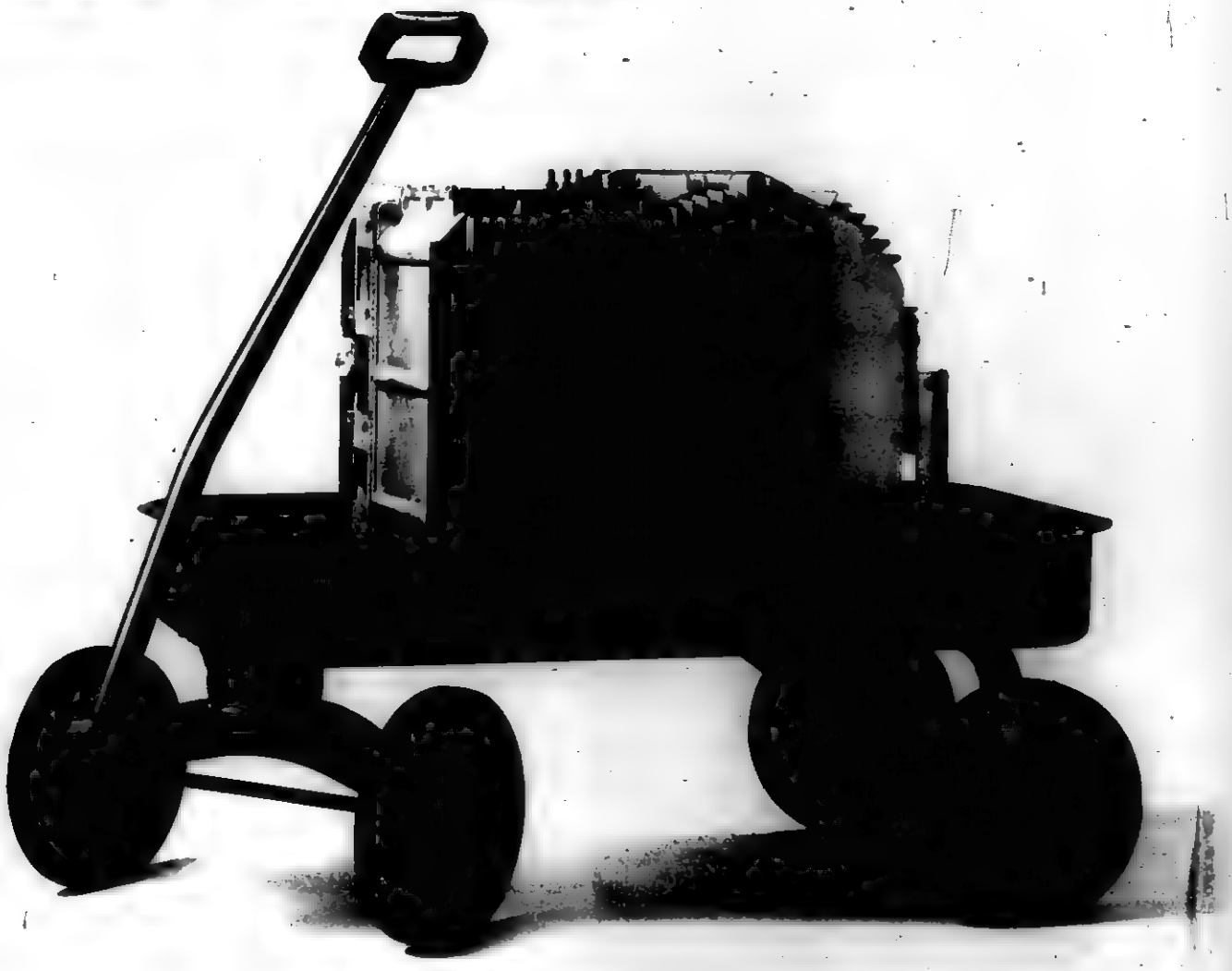

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It's one of our direct access storage device's (DASD) disk enclosures, and it delivers improved reliability, improved availability and greater compactness.

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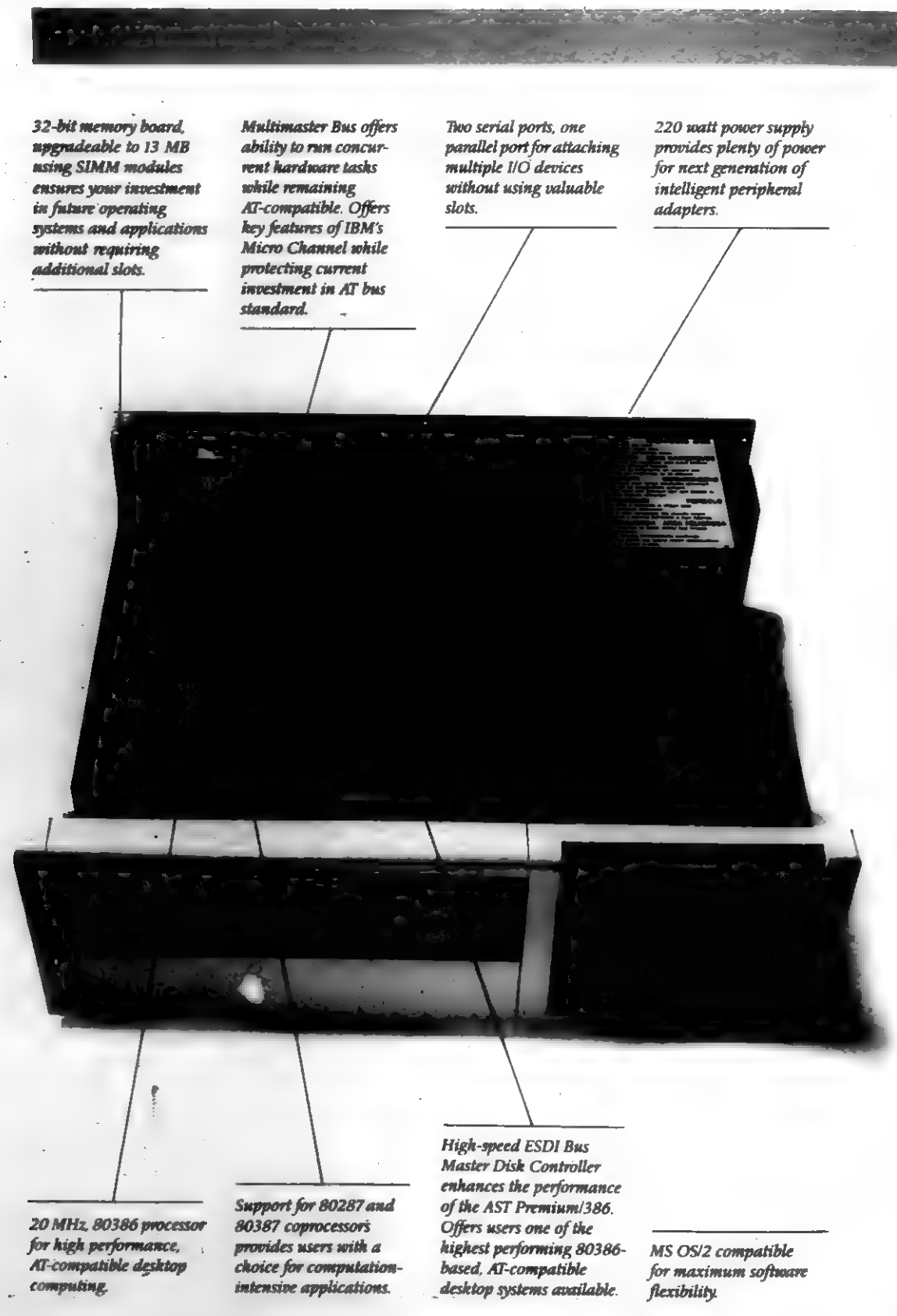
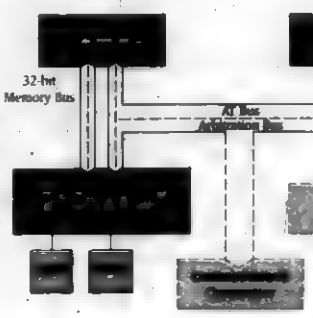


Power That Means Something Better for Everyone. The AST Premium/386 is a sigh of relief to users trying to decide whether to support IBM's® vision of the future, or remain in the industry-standard world of compatible 80386 machines.

With 20 MHz, typical 0-1 wait-state operation, a 32-bit data path from CPU to memory and a fully arbitrated industry-standard bus, the AST Premium/386 is the first 80386-based, AT-compatible computer to provide the crucial multimaster functionality of IBM's Micro Channel™ architecture.

Multimaster Capability. AST's Multimaster Bus is a shared memory architecture that improves performance by eliminating CPU involvement in data transfers. Its ability to accommodate advanced coprocessor and multiprocessor architectures makes the AST Premium/386 the perfect solution for any application that can take advantage of intelligent coprocessors and controllers, such as backend database processing, intelligent graphics controllers for CAD/CAE/CAM or desktop publishing, and intelligent disk controllers for network file servers.

AST Premium/386 Architecture



AST's Multimaster Bus technology allows di
memory for faster overall system throughput

Bus Master Disk Controller. AST's Bus Master Disk Controller actually supervises the transfer of data from its memory across the bus to the system memory without involvement of the CPU or motherboard DMA devices.

In addition to providing ST506 or ESDI compatibility and optional disk caching, AST's intelligent disk controller can be optimized to provide overlapping operations for a multitasking environment.

The Most Compatible 80386 on the Market. Best of all, you can continue to run any of your existing DOS applications on the AST Premium/386, and also take advantage of the more advanced multitasking and multiuser operating systems such as Microsoft's® MS OS/2 and XENIX®.

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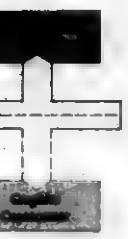

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The AST Premium/386 is no exception. That means building a system using the most advanced technology, including ASIC and surface-mount components. And once it's built, test after painstaking test is conducted to prove that the AST Premium/386 deserves its name.

Support When You Need It, Wherever You Are. dedication to its customers is second to Even though AST's technical support esolves 95 percent of all product ems by phone, on-site repair is avail- 32 U.S. and 3 Canadian centers, with planned.

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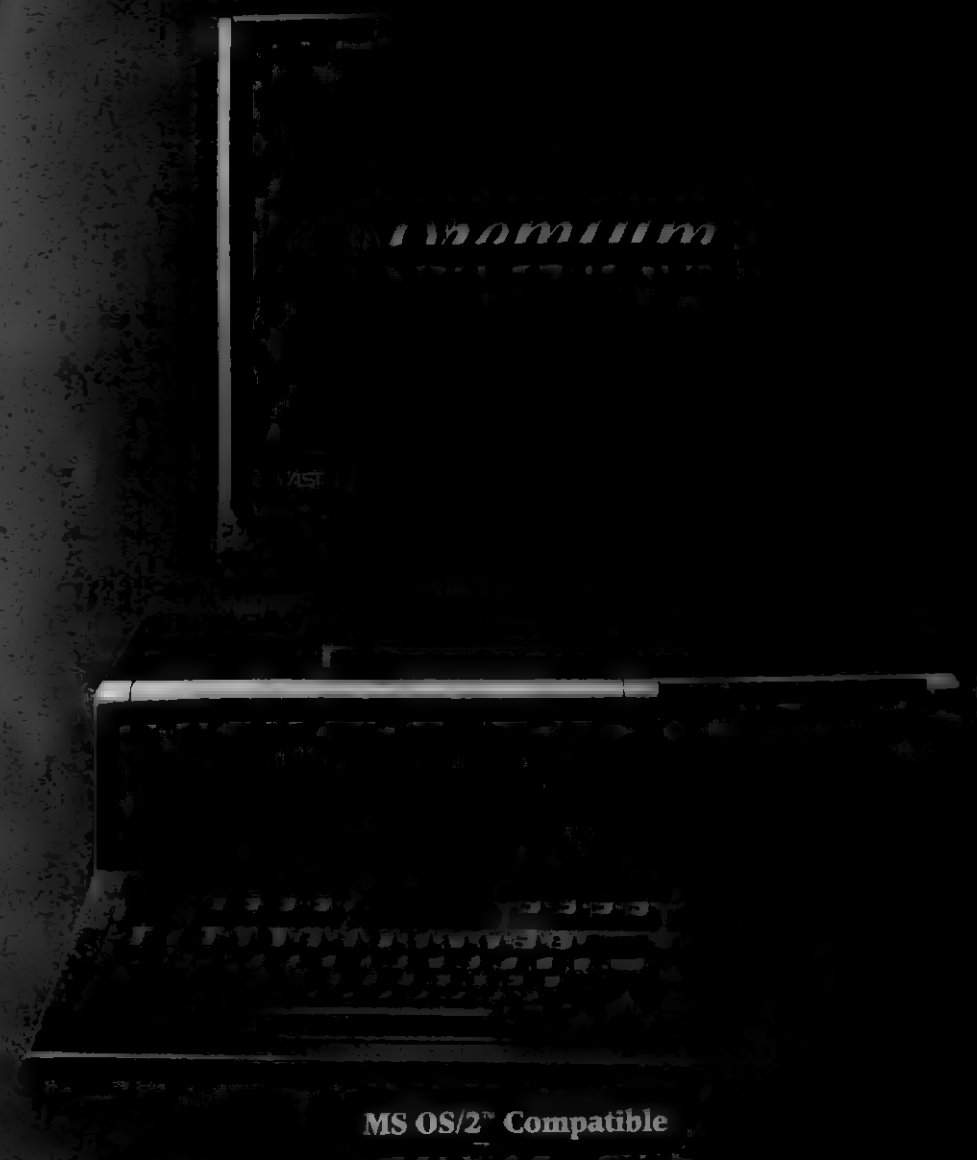

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	AST Premium/386	AST Premium/286	AST Premium Workstation
Microprocessor	80386	80286	80286
Speed (MHz)	20†	10, 8, 6	10
Wait States	0-1	0	1
Standard Memory	Up to 2 MB	1 MB	1 MB
Expandable to	13 MB	13 MB	4 MB
Video Adapter	Optional	VGA/EGA/HGC (most models)	VGA/EGA/HGC module
Expansion Slots	7*	7**	2
Fixed Disk	40, 90, 150 MB	20, 40, 70 MB	40 MB
Diskette Size and Capacity	5¼," 1.2 MB 3½," 1.44 MB	5¼," 1.2 MB 3½," 1.44 MB	5¼," 1.2 MB 3½," 1.44 MB

*Three software selectable speeds for timing sensitive programs.

†One 32-bit dedicated to memory, three AT-compatible 16-bit multimaster and one 16-bit AT-compatible, and two 8-bit in standard models.

**One 8-bit, six 8/16-bit including 2 FASTslots, and four user slots in standard models.

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IN DEPTH

A directory of 1987 feature articles

In Depth presented 81 stories in 1987, covering technical and managerial topics plus implementation strategies. A special focus was PCs and end-user computing, with stories on high-return investments in end-user computing and how IBM's Personal System/2 fits into the network market.

In the technical arena, Chris Date presented 12 rules for distributed data base. In the industry, we reported on IBM as a manufacturing giant, and we explored MIS's climb up the corporate ladder. On a historical note, Alan Westin examined the state of the industry at the time of the Constitution's bicentennial.

Spotlight sections offered readers a pullout buyer's guide to 32 specific product categories, including network management tools, microcomputer security, the IBM DB2 market and the Apple Computer, Inc. Macintosh market.

Executive Report sections covered 12 implementation topics, from capacity planning to computer-aided software engineering. In addition, the section presented two executive roundtables, on software maintenance and hardware servicing.

Focus published 12 issues in 1987, each of which centered around a special section, such as departmental computing, software productivity and information centers.

Eleven special issues included two *Computerworld Extras*, on DEC and IBM, an industrywide salary survey and *Computerworld's* 20th Anniversary issue.

This index is intended to help readers locate articles on subjects of interest from last year. To order a back issue, call or write to the Back Issues Department, P.O. Box 9171, Framingham, Mass. 01701-9171, 617-879-0700, ext. 371. Each issue costs $2, prepaid by check made out to *Computerworld*. Issues published on Jan. 19; Feb. 9 and 23; March 9 and 16; May 4, 11 and 25; Aug. 12 (*Focus*); and Sept. 2 are not available.

For multiple reprints of individual articles, call Nancy Shannon, Rights and Permissions Manager, at 617-879-0700, ext. 304. Reprints are available on 8½- by 11-in. paper in quantities of 100 or more.

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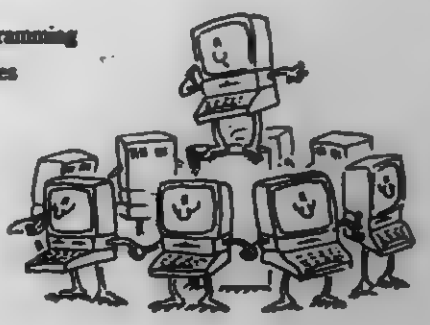

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Micro mismanagement

Four myths about PCs leave support budgets vulnerable to cost cutting

BY ALAN RADDING

Microcomputer management in the corporate environment is headed for a showdown. The problem, micro managers say, is that top management expects microcomputing to get easier and to require less and less corporate support. In fact, the reverse is true.

Consultant Ken Ross, president of Atrium Information Group in Fairfield, Iowa, points to a growing "support gap," citing a 32% decrease in corporate funds being spent on support, despite a surge of powerful new equipment into corporations.

Part of the problem is that microcomputer use in corporations continues to change rapidly, and microcomputer management teams must improvise to keep up. "I've had a business plan in draft form for three years," says Virginia Talamo, microcomputer technology manager at the New York office of Coopers & Lybrand. But Talamo says her plan has never been finalized because the sands of microcomputer support keep shifting.

Trying to keep up with corporate trends in managing PCs can lead you in circles. Early micro users were left on their own. Subsequently, management felt some control was needed and turned the job over to a reluctant MIS, creating a relationship that neither micro users nor MIS management liked.

Management then either set up an in-house department to supervise and support micro end users or contracted with outside support firms to fulfill the task. Costs continued to escalate.

Impatient with the ongoing cost of supporting micro users, top management is now cutting back the micro support departments it created. Often, microcomputing support is bounced back to the MIS department.

Many MIS directors covet the growing investment in microcomputers and cite the rise of connectivity to justify their claims on microcomputing. But Ross argues this can be dangerous. "The biggest mistake a company can make is to have end-user support report to MIS. End-user computing is different from MIS."

Other companies are leaving micro end users on their own once again. Still others rely on outside vendors that offer some of the services that in-house micro management would otherwise provide. In other cases, management is seeking support

ANTHONY RUSSO

Radding is a Boston-based author specializing in business and technology.

- **PCs cost $30,000 each to maintain**
- **Your firm may switch to outside support**
- **What kind of help do 'power users' need?**

from the hardware and software vendors themselves.

Commenting on the convoluted logic and conflicting attitudes that top management frequently applies to microcomputer use, Allen Sneider, partner in the Boston accounting firm of Laventhol and Horwath, says, "In a lot of cases, it is more like micro mismanagement than management." Sneider directs Laventhol's Computer Application Services, which supervises and supports all microcomputing in the firm's Boston office.

Allen Sneider

End users themselves are split on the kind of support they need, if any at all. Novice users require someone to show them which buttons to push to perform basic tasks. Other users, comfortable with their computing abilities to do the work at hand, may choose not to bother progressing any further. Highly experienced users do not need support so much as training on new applications. Some computer devotees do not want micro management exercising any control.

"Management's attitude is that if the work is getting done, they don't complain," says one micro manager at a large New York bank. "But at some point productivity suffers."

Management's pullback from a commitment to micro support comes, ironically, at a time when the number of end users is greatly expanding and the organization's investment in microcomputing is reaching extraordinary levels. With an entire new generation of desktop computers in the pipeline — IBM's Personal System/2, machines based on the Intel Corp. 80386 and the enhanced Apple Computer, Inc. Macintosh — the already hefty corporate investment in microcomputers is likely to skyrocket.

Because of the great investment in microcomputing, now is the time when microcomputer management needs the support of top management the most, says a senior manager in charge of microcomputer support at the New York office of a major financial services firm.

The manager figures it this way: A fully configured microcomputer costs between $3,000 and $4,000. Each computer is accompanied by $1,000 in software. So before the cost of training, maintenance and special overhead associated with microcomputers can even begin to be calculated, an organization is looking at an investment of $5,000 per machine. If an organization has 3,000 machines — typical for a major financial institution — then micros represent an investment of roughly $15 million.

The above calculations represent only the initial cost. In a period of three years, a personal computer will cost an organization $30,000, including the cost of hardware, software, support, maintenance and overhead, Atrium Information Group's Ross says. Is it any wonder that top management is suddenly very concerned about costs?

Simply not true

Part of top management's reluctance to spend money on PC support stems from numerous myths about microcomputing. The greatest myth promises that as the cost of hardware drops, the cost of training drops.

Leslie Fiering

"That simply is not true," says Leslie Fiering, manager of advanced technology at Banker's Trust Co. in New York. Nowadays, because micros are so inexpensive that they are routinely placed on the desks of less astute and less motivated employees, the need — and cost — for support and management control has increased dramatically.

Micro managers are trying to shoot down the falling-cost-of-support myth. According to Franz Sainte, second vice-president of office integration at New York's Chase Manhattan Bank N. A., the truth is that the cost of the latest microcomputer hardware is dropping only in the sense that more computer power can be had for less money than it would have cost in the past.

But, he says, it takes more support, even of the so-called "power users," to harness the advanced capabilities and new microcomputer horsepower.

Management falls prey to other myths as well. For example, despite what vendors promise, computers are not becoming intuitively simple to use.

With the development of micro-to-host communications, local-area networks and multiuser microcomputing, the machines have become more sophisticated and more complicated. Management has yet to come to grips with the power and complexity of microcomputers, according to Sainte.

"At the beginning, management had no idea what [microcomputers] were about," he says. "They thought they were for games." When top managers realized the newly powerful PCs could be a valuable business tool, Sainte says, they changed their minds. "But now management thinks computers are easy to use," he says.

The machines will be as intuitively simple to use as a telephone or a copier only when the machines perform just one task, micro managers argue. But in the corporate environment, microcomputers are used for many different applications, and new uses are constantly being created. "The new products are not easier to use," Ross says. "With multitasking and networking, there are simply more things to go wrong."

Stagnation without support

Another myth is that end users, once trained in the basics, will develop further on their own. "The computer gurus need freedom and will help themselves, but most people will rise only to the minimum level it takes to do their job," says Alex Kask, senior manager of the computer audit department at New York-based Ernst & Whinney.

Without microcomputer support to help move end users beyond a minimum

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competence level, an organization's investment in microcomputer technology can be wasted. For instance, Kask says, "Most people do not use the full power of Lotus."

Kask tries to team up experienced power users with inexperienced users for peer-level training and support, but he notes that this approach is not a panacea for the problem of micro support.

Another myth is that the issue of support will go away by itself in a few years because the current generation of students, familiar with computers, will not need help. But in fact, Kask says, "We're not comfortable with college-trained computer users." His experience has been that most recent college graduates lack basic computing skills and consequently need as much support as any other novice.

No happy ending here

Indicative of the battle micro managers must fight is one manager's experience at a firm where she used to work. Top management at this company unquestioningly embraced all the myths of microcomputer support.

> "SUPPORT groups are the first things to go when times are bad."
>
> VIRGINIA TALAMO
> COOPERS & LYBRAND

Support for micros looked good on the surface. The company established an in-house computer store that also served as an information support center. It was responsible for acquisition, system integration, hot-line support and maintenance. It also took over the purchasing process.

But the company severely underfunded the operation so that there was little staff, the former manager reports. Optimally, micro managers suggest that a support group be staffed at the ratio of one support person for every 250 users.

"We had one person for every 400 users. We couldn't handle all the work," she says.

The support group was put in an impossible situation. "The end users were angry because they didn't get service," she says. Management was angry because it felt it was paying too much. "They were convinced that they could buy support [from outside vendors] in the market for much less," she claims.

After unsuccessfully trying to change management's attitude, she left. Shortly after her departure, management eliminated the support group altogether. The company hired an outside firm to handle acquisition and end-user support.

Immediately, hardware costs jumped 15% compared with what the in-house support group had paid. In addition, the company's purchasing department had to hire more people to handle the microcomputer purchasing that the in-house group had previously handled.

Support costs, mainly training, doubled, and the company lost its hot-line support altogether. It also lost the system integration, research and strategic planning functions that had been handled by the in-house group.

Less than one year later, the company is reestablishing the in-house group but still has not fully learned the lesson. "They are trying to do it with exactly the same staff as before. But now they have many more machines and users," reports the former manager, who maintains private contact with some of her former colleagues.

Ironically, the company's negative attitude about micro management was caused in part by its early progressive attitude toward microcomputers. "They were one of the first to establish a personal computer store, which was held up as a model," she says. "They never experienced the pain" that many companies run up against when they try to standardize and integrate microcomputers into the organization. As a result, the company never appreciated the value of its support team.

Micro managers agree that micro support groups are highly vulnerable to cost-cutting initiatives by a management team that often views them as a costly amenity rather than as providers of a valuable business function.

"Support groups are the first things to go when times are bad," Coopers & Lybrand's Talamo notes.

Beyond the hot line

Like their MIS counterparts before them, microcomputer managers are increasingly shaping their departments to become integral to the organization's business.

"We're concentrating support in each department, evolving to a vertical market type of support, like MIS, which puts its people out with the users," Talamo says.

Micro managers must move beyond thinking only in terms of installation and hot-line support, Banker's Trust's Fiering warns. Otherwise, management will invariably turn to vendors for installation and will rely on experienced end users to help the novices.

Talamo enjoys increased support from top management because she has shown "how micro technology management pays off for the business itself," she says. She has transformed her department from a support function for end users to a technology planning group.

She convinced management that end users were not using the company's 600 microcomputers as effectively as they could be. She also showed management how she could support end users and

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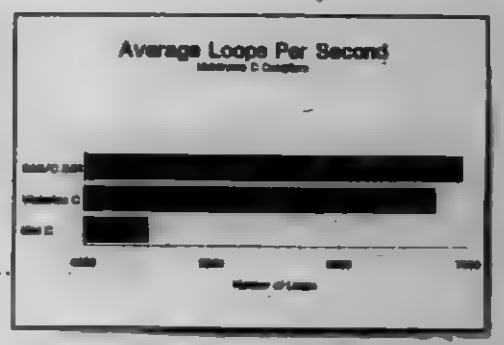

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serve a profitable business function.

To make this kind of transformation successfully, many micro managers will need to change. Their departments, while maintaining ongoing basic training and support for computer novices, will have to become involved in the actual business of the organization and show how desktop technology can be applied to achieve better productivity.

Micro managers must become technologists rather than hand-holders, Fiering says. They must understand the business and be ready to apply their knowledge and skills to solving business problems rather than showing users which buttons to push. For instance, they must be able to envision how a specific business problem can be better analyzed using an advanced spreadsheet technique.

These managers must also become involved in strategic planning, Fiering says. They must understand issues such as compatibility, networking and multitasking and must anticipate how these issues will affect the organization's computer use. Finally, they must be able to make the technology work smoothly.

Micro managers also argue their cases on the basis of a cost comparison with the organization's mainframe computers. "The new micros have almost the same power as many mainframes, and it takes 10 people to support each mainframe, while a micro is supported by one person at a workstation," Sainte says.

Other managers shy away from pushing the mainframe cost comparison too far. "Micros are the low man on the totem pole in the budget battle. The PC budget might be $500,000 while the mainframe budget is millions," Fiering says.

Leaping up

Not all organizations are cutting back on micro support. For instance, Eliot Bank, a small Boston bank, recently went through a major restructuring that included a revamping of its computer systems, says Daniel Beckman, systems manager. Beckman was brought to Eliot last May.

Until this past year, the bank had no more than half a dozen personal computers, he estimates. Since then, the number of PCs in use has jumped to more than 50. Although the bank has traditionally "not been system-heavy," preferring to rely on outside support, Beckman says, it realized it needed to support the micro end users in-house.

To provide that support, Beckman is hiring a full-time person. Management is not griping about the need for or cost of support, and Beckman did not have to go through a formal cost analysis.

"Our top executives have PCs on their desks," Beckman says, which invariably makes them more supportive.

The involvement of top management is key to the level of support micro managers receive. For instance, with the blessing of the Boston general managing partner, Laventhol & Horwath's Computer Application Services in Boston has two full-time people reporting directly to Sneider, who is in the process of adding two more people. In addition, Sneider recently received a budget authorization to spend more than $120,000 for the purchase of new, fully configured 80386 machines. The department already supports 90 micros.

Microcomputers were not always as well managed at Laventhol. "It was easy at the beginning because just a few of us were experimenting with Apple II and Visicalc," Sneider recalls. As the machines became popular, "things got difficult. Too many people were experimenting to too great an excess," he says. The result was "we lost a lot of productivity," he notes.

Sneider realized that the machines had to be managed, supported and controlled. "There was more hardware, more software. It was getting very difficult for the users. We realized we had to make the operation of the machines transparent so that the users could concentrate on their work," he says. With the full support of the managing general partner, Sneider created the Computer Application Services group.

The Boston office is ahead of other offices in developing that kind of microcomputer productivity. "You need a managing partner with some enthusiasm for computers," Sneider says. "It really takes some evangelism."

Support and more

If micro managers are to maintain their independence and if their departments are to grow, they will need top management support, and more. They will have to balance the need to support novice users with the advanced demands being made by experienced end users.

Micro managers will have to communicate a strategy for how their organization is going to productively implement the latest microcomputer advances and help end users take full advantage of the sophisticated technology.

These managers will also have to show how their technology advances the organization's own strategic objectives, and they will have to defend themselves from any designs by MIS to reassert control.

In the end, the nature of end user computing itself will throw the weight of the organization behind micro management: "Why is there end-user computing at all?" Ross asks.

"It is the technology that makes end-user computing possible," he answers. "The business climate is changing so fast that the end user can't wait for MIS to implement a particular solution. He needs fast turnaround. He needs to do it himself. But the average end user isn't a systems professional. He will always need guidance." ●

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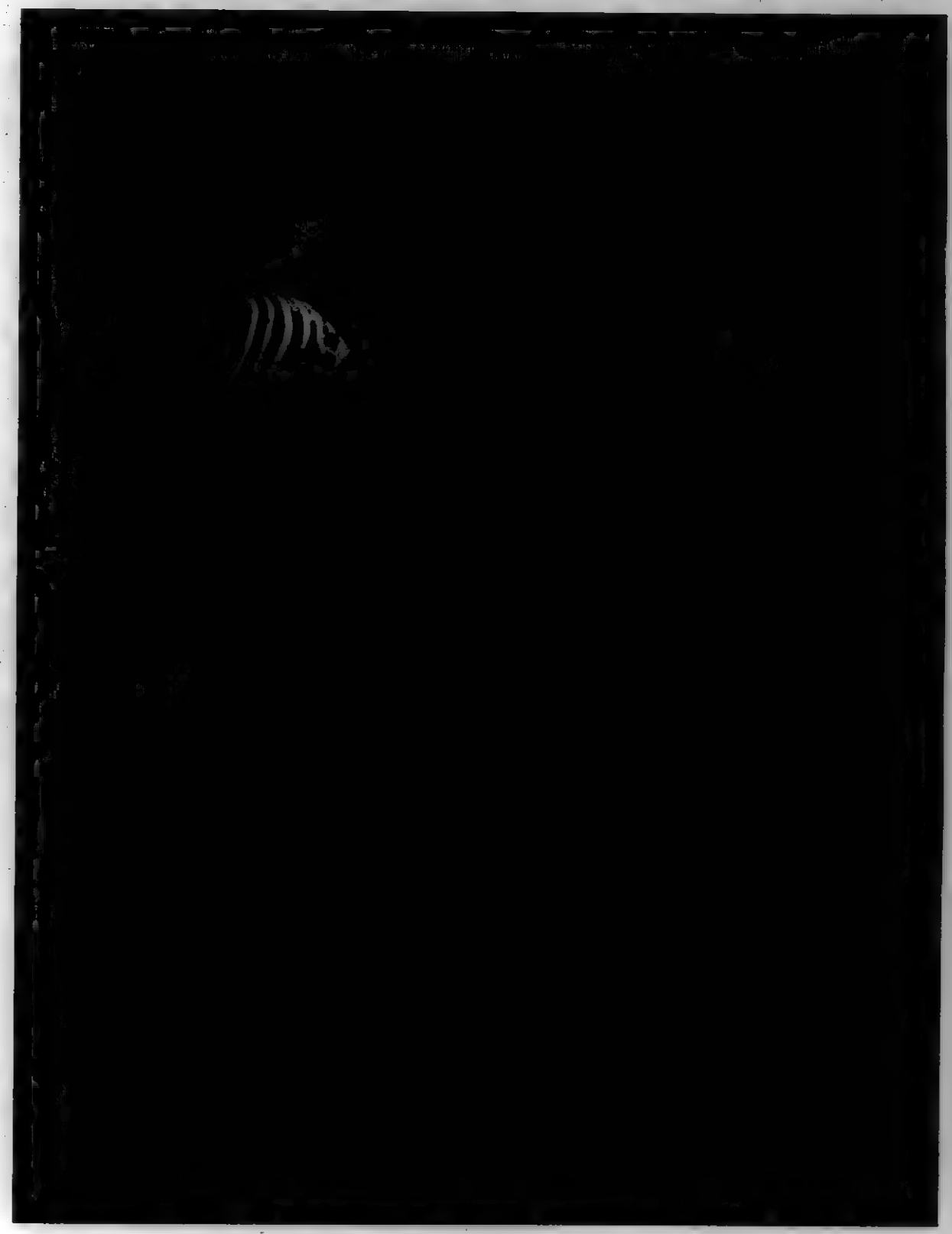

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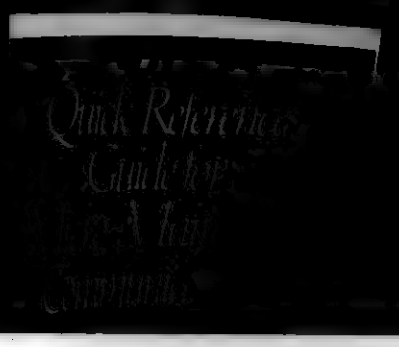

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While conventional terminals battle each other for market share, a new type is challenging PC encroachment

PCs TRIGGER NEW RESPONSE

BY LAURA DIDIO

KAREN STOLFER

The terminal market may have reached maturity, but no one could call it staid or dull. Display terminal vendors are brawling with personal computer makers that have invaded their turf. The air in the overpopulated ASCII/ANSI sector is thick with rumors of mergers, acquisitions and Chapter 11s. Analysts and terminal manufacturers alike predict skirmishes over features and performance, particularly in the beleaguered ASCII/ANSI territory. The most convincing evidence of continued vitality, however, is the emergence of a new species that combines the advantages of both the terminal and the PC and thrives in a local-area network environment.

At this point, "processing terminal" is the most common of several names used to refer to this new breed. The devices are also called "diskless PCs" and "intelligent workstations." As implied by the confusion over nomenclature, this recent entry is not yet fully understood or appreciated.

Market researchers cannot agree on a common name or definition for this type of terminal. Dataquest, Inc. in San Jose, Calif., defines a processing terminal as a product capable of local processing through the use of a microprocessor that is part of the basic product. Processing terminals or diskless PCs provide no removable data storage media and must communicate with a server, controller or computer in which data files are retained.

"It is not a display terminal, because it has local processing power," says Glen Schiller, an industry analyst for the Display Terminal Industry Service at Dataquest. And it is not a personal computer, he adds, because it does not have removable data storage.

International Data Corp. (IDC) in Framingham, Mass., on the other hand, speaks in terms of diskless PCs that have memory capable of running DOS locally and can be connected to any standard LAN.

Analysts agree, however, that the new technology has a promising future.

"Right now, processing terminals or diskless workstations are an embryonic segment of the market," says Greg Blatnick, director of Dataquest's Display Terminal Industry Service. Dataquest estimates that processing terminal shipments, which amounted to only 10,000 units in the first half of 1987, will rise to 85,000 units this year and 200,000 units by 1991.

Eileen O'Brien, a senior research analyst at IDC, says she foresees a time when intelligent workstations, with or without disks, will be the workstations of choice.

How quickly this happens, O'Brien adds, depends to a large extent on progress in the installation of LANs. "The ability to access and use the storage and printing facilities of other systems that are on the network will be an important consideration in determining how many workstations are sold," she says.

"One of the real attractions of a LAN terminal is the ability to bundle it into a LAN connection. It's an easy way to grow your connections on the channel," says Ilene Goldman, an analyst at Smith Barney, Harris Upham & Co. in New York.

Processing terminals will appeal most to

DiDio is a free-lance writer based in Boston.

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organizations that utilize a LAN but do not want to invest in PCs that require interface boards, Blatnick says. These users do not need the disk drive, storage or high cost associated with buying lots of PCs. They do want the ease of use and security that diskless workstations afford.

Financial institutions and insurance companies would be obvious possibilities, Blatnick notes. Other likely prospects include airline reservation and scheduling systems, medical and health care services and the publishing industry.

Processing terminals are not currently a bargain purchase. Only a few product offerings are priced competitively with PCs and display terminals.

Novell, Inc., its subsidiary Santa Clara Systems, Inc. and Hyundai Electronics Industries Co. are, however, involved in a joint venture to develop what they claim is "the industry's lowest cost-per-node diskless personal computer." The device, called PCterminal, is a fully IBM Personal Computer-compatible diskless desktop workstation featuring a built-in Intel Corp. 8088-based network connection based on a high-speed Ethernet interface and a $699 price tag.

The LAN edge

Goldman and other analysts say that LAN companies such as Novell, 3Com Corp. and Banyan Systems, Inc. currently have an edge over terminal makers.

"We've only seen a few diskless workstation offerings from the terminal makers," Goldman says. "They're still a little costly to produce. The manufacturers who will get a head start will be communications firms, like Novell, that have hardware vendors as subsidiaries."

NCR Corp. is one of the biggest players in the processing terminal market. Its latest offering, the NCR 3392, can function as a processing terminal, a PC or a network server, depending on optional hardware additions.

NCR's prospects in the processing terminal market look good. E. F. Hutton & Co. has said it will purchase 10,000 NCR 3390 processing terminals to be installed worldwide during an 18-month period. Additionally, NCR — through its Hauppauge, N.Y., subsidiary Applied Digital Data Systems Corp. (ADDS) — will have the manufacturing strength to fulfill forthcoming product demand.

The Lynk Corp.'s Computinglynk1, which debuted last March, is the only processing terminal on the market for IBM System/36 and 38 users. Like other processing terminals, Computinglynk1 can be upgraded to a full-function PC. Unlike other terminals, however, this one is upgraded by adding an external unit to the basic product.

The most notable processing terminal offerings from terminal vendors come from Televideo Systems, Inc. and Telex Computer Products, Inc.

Televideo's director of terminal marketing, Tim Meadows, says that although LAN companies now have the advantage, "in the long term, the terminal vendors have the edge from the price point and economies of scale in manufacturing."

But the real winners, Meadows says, will be vendors like Televideo and Wyse Technology, which address both the PC and the terminal markets.

Televideo's processing terminals use standard Intel processors. Its Networkstation/286 uses an Intel 80286 processor and features IBM PC AT and network compatibility. The Telex 1220 looks like and can be converted to a full-function PC.

PROCESSING terminals are not currently a bargain purchase. Only a few product offerings are priced competitively with PCs and display terminals.

Wyse's subsidiary Link Technologies, Inc. offers four processing terminal products. Among them is PC Term, a multiuser terminal for IBM PCs. Wyse itself plans to introduce a processing terminal product this year, as do Esprit Systems, Inc. and AT&T.

As the market for this type of terminal develops, Dataquest's Schiller predicts that graphics will become more sophisticated and the need for connectivity techniques more pronounced. "Processing terminals must provide and support one or more LAN protocols until LAN standards are established," he notes.

While the market for processing terminals or diskless workstations is not yet big enough to have affected sales of terminal emulation software, vendors of those products are watching this market's development closely and are adjusting their business plans accordingly.

"We have to begin making a plan of action [to address the diskless PC market] within the next six months, because it's been a constant background request from our end users," says Sandi Plisch, terminal communications product manager at Persoft, Inc. in Madison, Wis.

The real issue for Persoft is that users will be getting their information from a file server and not a hard disk. Currently, the company does not support this method of use.

Eugene Buechele, vice-president of engineering at Communications Solutions, Inc., a 6-year-old supplier of terminal emulation software in San Jose, says he expects the burgeoning diskless workstation market to spur his firm's sales.

"We're just now seeing the demand for processing terminals catch up with dumb terminals," Buechele says. It is a development that makes sense, he says, especially in terms of controlling telecommunications costs. "MIS managers are finding that their largest expenditures to control are telecommunications costs. One means of controlling costs is to do the majority of the data processing at the workstation."

Among the oldest

Excitement in the fully grown terminal sectors is the result mainly of rivalry and the fight for survival. The IBM 3270 and System/36 and 38 environments have reached maturity, as has the ASCII/ANSI arena. That means slowed, although not declining, sales.

The 3270 side has already experienced shakeouts. IDC estimates that IBM has captured nearly 53% of the market, followed by Telex, with a little less than 17%. The next nearest competitors are Courier Information Systems, with just less than 9%; AT&T, with 7%; Lee Data Corp., with 4%; and Harris Corp., with about 3%. That leaves only a few percentage points for also-rans.

According to IDC, domestic 3270 unit terminal shipments were down 7% last year, with an 11% dollar value decline. Although analysts had anticipated a slowdown in the 15-year-old market, they had not expected to see a decline in unit shipments until the end of the decade.

The decline is attributable to several factors, according to Smith Barney's Goldman. One is a decline in mainframe shipments, which eventually influences the sale of 3270 controllers, terminals and printers. Another is the near saturation of batch to on-line systems. In addition, Goldman notes, the closing of the price gap between PCs and terminals has, in many instances, made 3270s "redundant."

Despite market forecasts for flattened growth in the terminal business, IBM continues to see plenty of opportunity. The company has completely overhauled the 3270 product line in the last year. Don Casey, vice-president of hardware development in IBM's Communication Products Division, says the firm is bullish on the future of display terminals. "Clearly, customers are buying both PCs and terminals," he says. "But I haven't yet seen PCs cutting into our terminal sales."

IBM's approach with its 3190

Continued on next page

New strategies for life after boards

BY LESLIE LORD

The market for IBM 3270 terminal emulation products has changed dramatically in the past 18 months.

A number of PC-to-mainframe connectivity options have been blessed by IBM. Under the Systems Application Architecture (SAA) umbrella, OS/2 and the Personal System/2 are the newest introductions to the IBM connectivity strategy. But products that support 3270, LU6.2, distribution function terminal (DFT), Synchronous Data Link Control (SDLC), asynchronous and IBM Token-Ring connections have also been deemed "strategic."

At the same time, third-party vendors of PC-to-mainframe communications products have begun to move beyond board-level terminal emulation to plot long-term strategies for software-based communications capable of outperforming solutions architected by IBM.

Software portage

Although IBM's OS/2 Standard Edition only shipped in December, PC-to-mainframe communications vendors have already begun to port their existing terminal emulation software to the operating system and to design IBM Micro Channel versions of their own emulation boards. For the average terminal emulation user who decides to install OS/2, this means being able to run a program such as Digital Communications Associates, Inc.'s Irma E78 Plus as a task under OS/2 with the same look and feel as it has under Microsoft Corp.'s MS-DOS.

IBM has also announced the future availability of OS/2 Extended Edition, which it says will include embedded support for a wide range of terminal emulations, communications protocols and links and programming interfaces via the OS/2 Extended Communications Manager, as well as access to file transfer, application programming interfaces and system management utilities.

Using IBM's favorite example, a PC user on the Token-Ring could use the Communications Manager to access a 3270 session with an IBM mainframe, an LU6.2 session with another PC on the local-area network and an asynchronous connection with a public data base. Instead of using several different communications adapters and software programs, all that would be needed to accomplish these tasks, either serially or simultaneously, would be OS/2 Extended (or OS/2 Standard and a third-party Communications Manager) and a connection to the Token-Ring.

Not an easy task

Implementing an independent OS/2-compatible Communications Manager engine is no small task, even for veterans of the terminal emulation business. In drastically simplified terms, software development of this nature would involve at least the following basic steps:

- Combining all existing IBM 3270, 3101 and Digital Equipment Corp. VT100 terminal emulation code.
- Adding support for DFT, SDLC, Token-Ring, PC Net, CCITT X.25 and asynchronous links under LU6.2, 3270 and asynchronous protocols.
- Reworking the combination to run on the OS/2 platform.

Beyond that, anyone aspiring to be one release ahead of IBM will also want to add a windowing and graphics interface that conforms to SAA rules.

Still, the potential rewards for this labor promise to be more than commensurate. There is little doubt that many Fortune 1,000 companies will eventually migrate to OS/2 or that a significant number will opt to buy third-party solutions if they are available and offer added value.

The only real question is the extent to which the Communications Manager relies on the Token-Ring as backbone transport. If IBM is betting everything on the Token-Ring, demand for the Communications Manager will not be as quick to take effect.

Given the availability of functional PC-to-mainframe products based on the MS-DOS platform, end users can take their time formulating an OS/2 migration strategy. And, because PC-to-mainframe vendors are making such industrious use of the interval, they can do so in full confidence that when the time comes to move, an ample number of value-added alternatives will be available.

If and when companies standardize on OS/2 Extended Communications Manager as their link to the mainframe, PC-to-mainframe vendors that are serious about staying competitive will have made the transition from providing hardware links to being communications software specialists. ●

Lord is a senior research analyst in the Workstation Market Program at International Data Corp.

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family diminishes the benefit that other vendors might have derived from a second wind, Goldman observes. Considering the average life of a 3270 device ranges from five to seven years, she estimates "we should soon begin to see replacement turnover become a larger factor."

Vendors of 3270-type terminals will not be able to take full advantage of that windfall, however. After systematically chopping prices for the past two years, IBM has now triggered a round of price cutting more drastic than any in recent years.

Volume discounting has reached a fever pitch, observes Goldman, who says IBM is widely believed to be discounting by as much as 45% to 60% on high-volume orders. IBM is hardly unique in this respect, though, she points out. "In a bid situation, the majority of 3270 manufacturers will undercut even their own volume-discount schedules to win contracts."

Eventually, she says, such actions will result in "extreme consolidation in the marketplace."

That consolidation has already begun. Telex, faced with the prospect of a hostile takeover by arbitrageur Asher Edelman last October, began shopping for a suitable partner, which it found two months later. As of this writing, Telex, with $900 million in annual revenue, and Memorex Corp., which recorded sales of more than $1 billion last year, are set to merge.

According to Brian Shemilt, Telex's vice-president of corporate marketing, the merger will result in an entity that owns more than a 20% share of the global terminal market and about 25% of the U.S. market.

Land of giants

Playing in the ASCII/ANSI market has also become a high-stakes game. Although more than 30 vendors make up the market, six or seven players account for 80% of all shipments. "If you aren't doing a run rate of at least 100,000 terminals a year, you're not really competing," Dataquest's Blatnick says.

At the top of the heap is Wyse, which recently reinforced its already considerable strength with the acquisition of Link. Goldman estimates that with this addition, Wyse will be shipping five times as many terminals as its nearest competitor in the ASCII market.

Wyse's major challenge for the upcoming year is filling its huge order backlog.

Wyse WY-30, WY-50 and WY-60 terminals are so popular that distributors say customers are willing to wait months for one of the machines rather than settle for another brand.

Steve Holtzman, Wyse's vice-president and director of product marketing, says Wyse will whittle away at the order backlog with the expansion of its Taiwan facility and the addition of a new facility in Hong Kong.

Wyse's strong showing in the ASCII/ANSI market leaves the other big names, such as Televideo, Ampex Corp., Qume Corp., ADDS and Digital Equipment Corp., playing follow the leader.

Still, according to John Murphy, Ampex's national distribution manager, even runners-up can do well in this market. "Wyse outproduces us by a 2-to-1 margin, while DEC outpaces us by a 1.5-to-1 margin," Murphy says. "But we're pleased with business."

Price wars

Murphy predicts that in 1988 the terminal market will see a trend toward higher performance terminals with the same or slightly higher prices as older models.

"The Taiwanese dollar has been devalued against the U.S. dollar, causing vendors to experience increased pressure on factory margins," he says. "As a result, users won't enjoy the severe retail price erosion they saw two years ago."

Still, Murphy concedes that low-end PC clones are bringing pressure to bear on the terminal market as their prices approach those of high-end terminals.

"This," he says, " has created the gray area of the processing terminal."

It is not just prices but also expectations that have been influenced by PCs, according to Gordon Hope, director of marketing for ADDS. Buyers are now asking for more graphics and more functionality in general. "Today," he says, "PCs are defining what is expected from display terminals or workstations."

And then there's the matter of DEC's VT320. While the company's competitors are happy the device is a "me-too" product, they are distinctly dismayed by its $545 list price — the lowest on the market — which is bound to cause a price war.

"DEC has done a pretty effective job in displacing IBM in the computing arena, but while it was busy with the VAXs, Ampex, Wyse and CIE took a lot of its terminal business away," Murphy says. With the debut of the VT320, "the competition really begins."

CIE Terminals, Inc.'s product marketing manager, Allen Gronsky, offers another perspective on the VT320. "DEC has been an umbrella holder," he says. "With the VT320, they decided to play hardball on pricing. But it's a me-too product."

CIE, which competes mainly in the DEC ANSI market, is shopping for niche markets, according to Don Hazelton, the company's vice-president of marketing for terminals and printers. That doesn't mean CIE has given up on head-to-head competition with DEC, however. Hazelton says the company's new products for the coming year may include VT320, VT330 and VT340 clones.

Other ASCII/ANSI vendors worth watching include Falco Data Products, Inc., Esprit and AT&T, which is a dark horse in the competition.

"AT&T gets ignored in the terminal market, but they're making some very interesting and innovative products," Dataquest's Blatnick says.

AT&T's product marketing manager, Jack Deneberg, acknowledges that his firm's primary focus in the past has been on its own systems. "Now, however, we anticipate more activity in the non-AT&T market and with Unix-based display terminals," he says.

AT&T's strategy, Deneberg says, will be to provide an Intel 80386-based computer running the Unix operating system within a terminal.

Melville, N.Y.-based Esprit, meanwhile, saw sales for its first fiscal quarter of 1988 rise by some 72%, "mainly due to our Express Service and Opus line of ASCII terminals that emulate the Wyse WY-50 and the Opus 4," says product marketing manager Sal Lanuto.

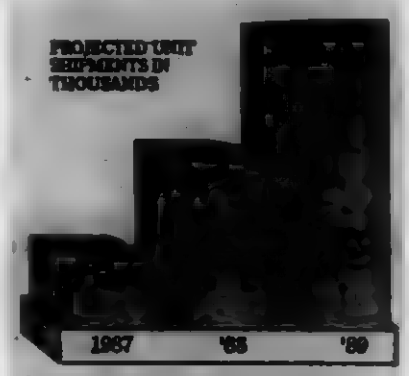
Falco Data Products, which separated itself from the crowd with its Falco 5220, plans to offer a combination of standard terminals in conjunction with peripheral products and multitasking machines for niche markets.

"There's no doubt that the life of a terminal-only supplier is limited," says Don Staub, vice-president of marketing sales, "But we've specifically elected to stay out of the PC business. It's not a high-margin business. We want to deal with VARs and large OEM users."

Market predictions tend to confirm the wisdom of diversification. According to IDC, the modest comeback that the ASCII/ANSI market experienced in 1986 will not last. IDC forecasts that the 9.5% growth rate will taper off, producing a compound annual growth rate in the neighborhood of 5%. •

Emerging hybrid

Processing terminals break new ground in terminal market, with biggest push coming from local-area network vendors*



*Terminals that use a microprocessor for local processing, communicate with a data source and have no removable storage media

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Opting for imitation

BY G. BERTON LATAMORE

Designers and engineers are choosing imitations over the real thing. They are opting for personal computers equipped with software that emulates graphics terminals instead of investing in specialized equipment.

There are several reasons for the shift, says Charles Foundyller, president of Daratech, Inc. in Cambridge, Mass. For one thing, he notes, PCs have made great strides in the last two years in providing graphics capabilities and general computing power. In addition, emulation-equipped PCs are much less expensive than graphics terminals. IBM 5080s sell for $15,000 to $50,000, depending on their configuration. A PC, however, might cost $2,000 to $5,000 and the emulation software less than $1,000.

Convenience is also an issue, according to Foundyller. "PCs are typically the property of individuals with limited desk space who often need to access and review data on various larger systems. The alternative to emulation for these people is to maintain individual terminals for each system in their vicinity, a solution that is expensive and clumsy."

Space-saving

Space conservation is a compelling argument for graphics terminal emulation, as far as Tom Korany, a computer programmer in the Electrical and Electronics Division of Ford Motor Co. in Dearborn, Mich., is concerned. According to Korany, Ford engineers, like the rest of company personnel, will be equipped with IBM Personal System/2s for routine business tasks in the next five years.

"Why," he asks, "should we force them to go to another terminal for design work or have two boxes on their desks?"

Still, there is no denying that differences exist between a full-fledged graphics terminal and a PC playing the role, Foundyller says. A PC's color range and resolution are more restricted; for that reason, emulation generally works best for prep work and visual reference.

Most of the work done at the U.S. Geological Survey (USGS) office in Vancouver, Wash., falls into this category, according to the office's data processing site manager, Ed Brown. Brown's shop runs about 35 IBM Personal Computer ATs running PC4010, a Tektronix, Inc. terminal emulation software package from General Micro Systems in Hopkins, Minn.

The emulation software is used in conjunction with graphics packages on Digital Equipment Corp. and Prime Computer, Inc. systems and for generic communications with IBM mainframes. Brown, the USGS's DP site manager, explains that while the Vancouver office still uses Tektronix terminals for tasks that require high resolution or multiple colors, it has shifted to terminal emulation for the bulk of its work. The PC approach is less expensive and allows users to take advantage of the abilities of the PC, he says.

Graphics terminal emulation makes sense for Victor Urbach, a mechanical engineer with Computer-Aided Engineering Associates in Woodbury, Conn. Urbach says he works out of his home most of the time, using dial-up connections to company computers, and cannot readily access a terminal. He says he also prefers to keep available all the abilities of a PC, such as local file storage.

Urbach runs the EM4010 and EM4105 graphics terminal emulation packages from Boulder, Colo.-based Diversified Computer System on what he describes as a generic IBM PC AT clone at his home in Westbury, N.Y. "We do more analysis than design," he says. There are, he explains, three phases to finite element analysis: preprocessing, in which a model is built; the solution phase, which entails number crunching; and postprocessing, the engineer's inspection and interpretation of the analysis.

"Typically, I would use Ansys-PC/Solid, a solid model subset of Ansys [from Swanson Analysis Systems, Inc. in Houston, Pa.], to create a finite-element model on the PC. Then I send the files to the mainframe, run the heavy number crunching — the solution phase — then use the terminal emulator graphics to study the postprocessing file. I can also treat the PC as a terminal the whole way. In other words, I log on to the mainframe and do all my work interactively."

> A PC's color range and resolution are more restricted; for that reason, emulation generally works best for prep work and visual reference.

Quick draw

At General Electric Co.'s Aircraft Engine Division in Cincinnati, the impetus for emulation is designer productivity. Carl Lawrence-Slater, a GE engineer and computer consultant, says, "If I'm on a Vaxcluster, it may take me a half hour to generate the picture on the screen. Then I zoom in on a detail, and that may take another half hour to generate.

"With Emu-Tek [a graphics terminal emulation package from FTG Data Systems in Stanton, Calif.], I capture the plot," he continues. "Then I sign off the VAX, redefine my windows and zoom in. It takes only a few seconds to generate. That's really handy when five engineers are sitting around waiting for the screen so they can get some work done."

Besides running more than 120 VAXs, the GE facility uses a Cray Research, Inc. Cray X-MP/28, several IBM 3090s and 3084s and Honeywell Bull, Inc. DPS 90s and DPS 80s. Before turning to graphics terminal emulation, GE used Tektronix terminals. Today, the hardware population is split about 50-50 between monochrome terminals and PCs equipped with terminal emulation.

"You can do things with Emu-Tek that you can't do with the terminal," Lawrence-Slater says. "Right now, if I give my people the option of a PS/2 Model 50 or a Tektronix terminal, they almost always choose the PC." ●

Lamamore is a Burlington, Vt.-based free-lance writer.

IBM's DFT: Will it prove a beacon or a flash?

BY STEVE JACKOWSKI

Since its introduction in 1972, the IBM 3270 line of controllers and displays has set an industry standard. An estimated three million 3270-type devices are now installed, of which IBM products represent only 50%.

The trend toward use of personal computers, once thought to signal the end of the 3270 market, has in fact expanded it. By 1985, Digital Communications Associates, Inc. (DCA) shipped more than one million of its Irma 3278 coaxial connection cards for IBM Personal Computers. DCA is now joined by others, such as CXI, Inc., AST Research, Inc., Emulex-Persyst, Inc. and Network Software Associates (NSA), as well as IBM itself.

As 3278 terminal emulation products proliferate, vendors seek methods to differentiate their products. Many provide host file transfer capabilities for PCs. A few actually permit multiple concurrent sessions. This is accomplished by a now highly regarded protocol used between a 3274 controller and the IBM 3290 display system called a distributed function terminal (DFT). IBM developed the 3290 to handle four simultaneous 3270 SNA sessions; DFT permits use of five.

The CUT factor

Original versions of the 3270 control units made use of a limited protocol called control unit terminal (CUT). IBM's 3270 CUT devices rely on the communications controller to perform all communications and display functions for them. DFT assumes the device is intelligent and is capable of handling SNA frames. As such, terminal emulators that support DFT can handle multiple sessions and different types of SNA sessions.

SNA PU2.1 support, which can eliminate the master-slave connections required by PU2, is the cornerstone of IBM's future networking strategy. It moves SNA networks away from their original restrictive and hierarchical structure toward distributed networks that will easily support peer communications via LU6.2.

Considering IBM's move toward outward distribution of intelligence in its networks and support of peer-to-peer connections via PU2.1 and LU6.2, several industry analysts hail DFT as the way, the truth and the light in 3270 terminal emulation. They have challenged the producers of terminal emulation products to confront the future through support of DFT.

While it is impossible to deny the advantages of DFT and while IBM may have indicated a strategic direction in announcing DFT support for OS/2 Extended Edition's 3278 coaxial terminal emulation, potential emulation developers and purchasers should at least consider the other side. DFT may have been developed solely as an interim measure and may well experience a short life cycle.

When IBM introduced the 3290, many customers had multiple terminals to display information from various network management facilities. The 3290 was introduced specifically to permit consolidation of the devices into one single unit.

Now, with the introduction of Netview, which consolidates network management information through software, 3290s are disappearing. Thus, if DFT does survive, it will fall into the category of the 2780 and 3780 — devices that no longer exist but whose communications protocols became de facto standards.

Networking nightmare

DFT's support of multiple LU sessions, which is touted as a great advantage, may also be its single largest drawback. Network configuration management becomes a nightmare as each remote PC suddenly manifests itself to the host as up to five LUs.

In fact, in distributed environments where Systems Network Interconnection is used with IBM 3705 or 3725 front-end processors, a relatively small portion of the network can quickly reach the 256 LU limit of these processors.

> DFT MAY have been developed solely as an interim measure and may well experience a short life cycle.

As DFT devices are added to control units, performance degrades rapidly. The IBM 3270 and 3170 series communications controllers run out of buffer space, the number of real devices connected is quickly limited and execution of certain commands taxes both the controller and the emulated devices. As the DFT proponents suggest, LU6.2, which facilitates peer-to-peer communications, is IBM's chosen direction. But contrary to most industry analysts' opinions, multiple LU sessions through DFT are not a fundamental requirement. An often overlooked feature of LU6.2, called parallel sessions, will allow simultaneous program-to-program, file transfer and terminal communications on a single LU session.

Use of the parallel sessions feature results in a number of benefits. It relieves the controller's responsibility, reduces buffering and configuration requirements on controllers, front-end processors and hosts and optimizes performance in a multisession environment.

It is possible that DFT will be the basis for coaxial-based distributed processing. CUT could, however, work just as well and is probably a better conservative choice, given the uncertain future for coaxial.

While 3270-type devices and terminal emulators will certainly survive into the 1990s, coaxial may not. The ubiquity of twisted-pair and its support by IBM and most local-area network vendors may very well spell the demise of coaxial. ●

Jackowski is lead consultant for Synergy Communications, Inc. in San Francisco.

Display terminals

COMPANY	PRODUCT	EMULATION MODE	DISPLAY CAPACITY (PER PAGE)	MEMORY CAPACITY (IN PAGES)	SCREEN AREA (IN DIAGONAL INCHES)	COLOR OR MONOCHROME	NUMBER OF SIMULTANEOUS SPLIT SCREEN/WINDOWS	NUMBER OF PROGRAM FUNCTION KEYS	TRANSMISSION MODE	ASYNCHRONOUS OR SYNCHRONOUS	TRANSMISSION CODE	RATE OF TRANSMISSION (BIT/SEC.)	FORMAT MODE	PRICE
Altos Computer Systems, Inc. (408) 946-6700	Altos IV	WY-50, WY-100; Televideo 910+, 925	2,000 char.	1	14	Monochrome	1	32	—	Asynchronous	ANSI, ASCII	38.4K	Character, block	Information not provided
	Altos V	DEC VT100, VT220; Altos II	3,432 char.	2	14	Monochrome	2	10 - 32	Full and half duplex	Asynchronous, synchronous	ANSI	38.4K	Character, block	$800
	Altos III	DEC VT100; Televideo 910	3,432 char.	1	14	Monochrome	2	32	—	Asynchronous	ANSI, ASCII	19.2K	Character, block	Information not provided
Ampex Corp. (800) 621-0299 (800) 821-9473 (Calif.)	Ampex 232	IBM PC, Televideo 925	3,300 char.	1	14	Monochrome	1	12	Full and half duplex	Asynchronous	ASCII	38.4K	Block	$539-$550
	Ampex 270	WY-50, WY-50+; Lear Siegler ADM 5; Televideo 955, 950; ADDS Viewpoint A1, A2	3,440 char.	4	14	Monochrome	3	32	Full and half duplex	Asynchronous	ASCII	38.4K	Block	$589
	Ampex 210+	ADDS Regent 251, Regent 20; Viewpoint A1, A2; Hazeltine 1410, 1400, 1500; Lear Siegler ADM 5, 3A, 3A+; Qume 102; Televideo 910, 910+, 920, 912, 925	3,168 char.	1	14	Monochrome	1	14	Full and half duplex	Asynchronous	ASCII	19.2K	Block, line	$430
	Ampex 280	Wyse 350/30; Esprit III Color; ADDS Viewpoint Color A1, A2; Hazeltine 1500; Televideo 910, 920, 912, 924, 925, 950	3,168 char.	—	14	Color	—	32	Full and half duplex	Asynchronous	ASCII	38.4K	Block	$1,095
	Ampex 230+	ADDS Viewpoint A1, A2; Hazeltine 1500; Televideo 910, 920, 912, 924, 914, 925, 950; WY-50	3,168 char.	4	14	Monochrome	1	32	Full and half duplex	Asynchronous	ASCII	38.4K	Block, character	$539
	Ampex 220	DEC VT220, VT102, VT52	3,168 char.	1 - 4	14	Monochrome	1	15	Full duplex	Asynchronous	ANSI	19.2K	Block	$529
Ann Arbor Terminals, Inc. (313) 663-8000	Gnats XL	DEC VT52, VT100	2,400 char.	2	15	Monochrome	Varies	32	Full and half duplex	Asynchronous	ANSI, ASCII	300 - 19.2K	Character, line, block, underline, bold	$1,395
	Ambassador XL	DEC VT52, VT100	4,000 char.	2	15	Monochrome	Varies	32	Full and half duplex	Asynchronous	ANSI, ASCII	300 - 19.2K	Character, line, block, underline, bold	$1,595
	Ambassador GXL	DEC VT52, VT100, Tektronix 4010, 4014	10,000 char.	2	15	Monochrome	Varies	32	Full and half duplex	Asynchronous	ANSI, ASCII	300 - 19.2K	Character, line, block, underline, bold	$2,600
	Guru XL	DEC VT52, VT100, Tektronix 4010, 4014	10,000 char.	2	15	Monochrome	Varies	32	Full and half duplex	Asynchronous	ANSI, ASCII	300 - 19.2K	Character, line, block, underline, bold	$2,395
	VXL	DEC VT52, VT100, Tektronix 4010, 4014	10,000 char.	2	15	Monochrome	Varies	32	Full and half duplex	Asynchronous	ANSI, ASCII	300 - 19.2K	Character, line, block, underline, bold	$2,795
Applied Digital Data Systems, Inc. (800) 231-5445 (516) 231-5400 (N.Y.)	ADDS 1010	ADDS Viewpoint Plus, A1, A2, 3A+; Lear Siegler ADM 3A	1,920 char.	1	14	Monochrome	1	6 - 12	Full and half duplex	Asynchronous	ASCII	19.2K	Character	$395
	ADDS 2020	ADDS Viewpoint A1, A2, Regent 40; Hazeltine 1500; Televideo 910, 920, 925; WY-50	3,432 char.	3	14	Monochrome	1	28 - 56	Full and half duplex	Asynchronous	ASCII	38.4K	Block, character, line	$695
	ADDS 3220	ADDS Viewpoint 122; DEC VT220, VT100, VT52; ANSI X.3.64	3,300 char.	1	14	Monochrome	1	32	Full and half duplex	Asynchronous	ANSI	19.2K	Character	$695
Atlantic Research Corp. Teregent Division (703) 471-6200	TS102	DEC VT200, VT100, VT52, VT102, VT201	80 col.	—	14	Monochrome	—	30	Full duplex	—	ASCII	300 - 38.4K	—	$2,000
AT&T (800) 247-1212	630 MTG	NA	1,920 char.	5	16	Monochrome	7	8	Full duplex	Asynchronous	ANSI	19.2K	Character	$2,595
	629 MTG	Tektronix 4014; CSS/CGI Graphics	1,920 char.	1	14	Monochrome	6	36	Full duplex	Asynchronous	ASCII, ANSI	19.2K	Character	$1,295
	615 MT	DEC VT220, VT100, VT52	1,920 char.	1	14	Monochrome	3	36	Full duplex	Asynchronous	ASCII, ANSI	19.2K	Character	$945
	610 BCT	DEC VT220, VT100, VT52	1,920 char.	1	14	Monochrome	—	16	Full duplex	Asynchronous	ANSI	19.2K	Character	$875
	605 BCT	NA	1,920 char.	1	14	Monochrome	1	36	Full duplex	Asynchronous	ANSI	38.4K	Character	$595
	630 MTG	Tektronix 4014; CSS/CGI Graphics	1,920 char.	1	14	Monochrome	6	36	Full duplex	Asynchronous	ASCII, ANSI	19.2K	Character	$1,295
Boeing Information (617) 266-0900	7107	IBM 3178[1]	2,000 - 3,564 char.	NA	14	Color	7	24	NA	Gould A	SNA[1], Asynchronous	19.2K	NA	$2,995

[1]IBM Systems Network Architecture [2]Binary Synchronous Communications [3]Synchronous Data Link Control

Listings include only those products for which companies provided specific responses to questions.

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. Further product information is available from the vendors.

COMPANY	PRODUCT	EMULATION MODE	DISPLAY CAPACITY (PER PAGE)	MEMORY CAPACITY (IN PAGES)	SCREEN AREA (IN DIAGONAL INCHES)	COLOR OR MONOCHROME	NUMBER OF SIMULTANEOUS SPLIT SCREEN/WINDOWS	NUMBER OF PROGRAM FUNCTION KEYS	TRANSMISSION MODE	ASYNCHRONOUS OR SYNCHRONOUS	TRANSMISSION CODE	RATE OF TRANSMISSION (BIT/SEC.)	FORMAT MODE	PRICE
Beehive International (801) 358-0000	191D	IBM 3191D	2,000 - 3,564 char.	NA	14	Monochrome	7	24	NA	Coaxial A	SNA, bisynchronous	256K	NA	$1,495
	191	IBM 3191	2,000 char.	NA	14	Monochrome	1	24	NA	Coaxial A	SNA, bisynchronous	256K	NA	$1,195
	191DP	IBM 3191DP	2,000 - 3,564 char.	NA	14	Monochrome	1	24	NA	Coaxial A	SNA, bisynchronous	256K	NA	$1,595
	196FR	IBM 3192F	2,000 - 3,564 char.	NA	14	Color	1	24	NA	Coaxial A	SNA, bisynchronous	256K	NA	$2,000
	191DR	IBM 3192D	2,000 - 3,564 char.	NA	14	Monochrome	1	24	NA	Coaxial A	SNA, bisynchronous	256K	NA	$1,695
Calcomp, Inc. (800) CAL-COMP	The Vistagraphic 4500MV	DEC VT100	1,280 x 96 char.	—	19	Color	—	—	—	—	ASCII	19.2K	—	$29,375
Cardinal Technologies, Inc. (800) 722-8004	The APT CPro	DEC VT52	2,000 char.	1	12	Monochrome	1	8	Full and half duplex	Asynchronous	ASCII	9.6K	Character	$325
Cacorp (800) 854-6861 (800) 645-9500 (Calif.)	CE 1	NCR 796-101, 7900 Model 1	3,168 char.	NA	14	Monochrome	NA	14	Full and half duplex	Asynchronous	ASCII	19.2K	Character	$410
	CE 3	NCR 796-301, 7900 Model 3	3,168 char.	NA	14	Monochrome	NA	64	Full and half duplex	Asynchronous	ASCII	19.2K	Line, page	$950
Chi Corp. (214) 881-8882	IDP-SI	Unisys UTS (20, 30, 40, 60, 400); IBM 3278 with 3276 BSC	2,025 or 3,325 char.	9	14	Monochrome	4 (UTS), 1 (3270)	To 2,048 (UTS)	Full and half duplex	Synchronous	UTS, EBCDIC	19.2K	Block	$1,875
	MF-ID	IBM 3278 with 3276 BSC, DEC VT52, VT100, VT102, VT220	2,025 or 3,325 char.	1	14	Monochrome	1	To 2,048 (UTS)	Full and half duplex	Synchronous, asynchronous	EBCDIC, ASCII	19.2K	Block, character	$1,475
	MF-SI	Unisys UTS (20, 30, 40, 60, 400); IBM 3278 with 3276 BSC	2,025 or 3,325 char.	9	14	Monochrome	4 (UTS), 1 (3270)	To 2,048 (UTS)	Full and half duplex	Synchronous	UTS, EBCDIC	19.2K	Block	$1,475
	MF-3270	IBM 3278 with 3276 BSC	2,025 or 3,325 char.	1	14	Monochrome	1	To 2,048 (UTS)	Full and half duplex	Synchronous	EBCDIC	19.2K	Block	$1,125
	MF-UTS	Unisys UTS (20, 30, 40, 60, 400); Unisys 100, 200	2,025 or 3,325 char.	9	14	Monochrome	4	To 2,048 (UTS)	Full duplex	Synchronous	UTS	19.2K	Block	$800
	MF-SD	Unisys UTS (20, 30, 40, 60, 400); DEC VT52, VT100, VT102, VT220	2,025 or 3,325 char.	9	14	Monochrome	4 (UTS), 1 (3270)	To 2,048 (UTS)	Full and half duplex	Synchronous, asynchronous	ASCII, UTS	19.2K	Block, character	$1,475
CIE Terminals, Inc. (800) 864-3322	CIT 326	DEC VT220	1,920 char.	4	14	Monochrome	2	180	Full duplex	Asynchronous	ANSI	19.2K	—	$595
	CIT 101XL	DEC VT100; WY-50; Televideo 910, 920, 925	3,300 char.	4	14	Monochrome	1	16	Full duplex	Asynchronous	ASCII, ANSI	38.4K	—	$645
	CIE 50+	DEC VT100; WY-50; Televideo 910, 920, 925	3,300 char.	1	14	Monochrome	1	16	Full duplex	Asynchronous	ASCII, ANSI	38.4K	—	$595
Computer Communications, Inc. (213) 320-9161	8178 Display Station	IBM 3178	1,980 char.	2	12	Monochrome	1	24	Full duplex	Synchronous	EBCDIC	19.2K	Block	$895
Contemporary Computers, Inc. (813) 581-3700	6191	IBM 3191, 3278	1,920 - 3,564 char.	—	14	Monochrome	1	24	NA	NA	EBCDIC	NA	NA	$1,065
	6192C	IBM 3179-1, 3278, 3192	1,920 - 3,440 char.	NA	14	Color	7	24	NA	NA	EBCDIC	NA	NA	Not provided
	6192D	IBM 3180-1, 3278, 3192	1,920 - 3,564 char.	NA	15	Monochrome	7	24	NA	NA	EBCDIC	NA	NA	Not provided
	6191	IBM 3191	1,920 - 3,564 char.	NA	14	Monochrome	1	24	NA	NA	EBCDIC	NA	NA	Not provided
Courier Information Systems (800) 828-1400	9191	IBM 3191A, 3191B	1,980 char.	1	14	Monochrome	NA	24	Full and half duplex	Synchronous	EBCDIC	19.2K	Block	$1,295
	9193C	IBM 3193C	1,980 char.	1	14	Color	1	24	Full and half duplex	Synchronous	EBCDIC	19.2K	Block	$1,880
	9194D	IBM 3194D	1,920 - 3,564 char.	1,920 - 3,564 char.	14	Monochrome	1	24	Full and half duplex	Synchronous	EBCDIC	19.2K	Block	$1,795
	9210, 9212	IBM 3191, 3179	1,980 char.	1	14	Monochrome	2	24	Full and half duplex	Synchronous	EBCDIC	19.2K	Block	$1,295
	9210	IBM 3193C	1,980 char.	1	14	Color	2	24	Full and half duplex	Synchronous	EBCDIC	19.2K	Block	$1,595
	9220, 9222	IBM 3194D	1,920 - 3,564 char.	1,920 - 3,564 char.	15	Monochrome	2	24	Full and half duplex	Synchronous	EBCDIC	19.2K	Block	$1,595
	9226	IBM 3193D	1,920 - 3,980 char.	1,920 - 3,980 char.	14	Color	2	24	Full and half duplex	Synchronous	EBCDIC	19.2K	Block	$2,295
Cromemco, Inc. (415) 964-7400	C-20	IBM PC XT and compatibles	—	640K bytes	—	Monochrome	Software-dependent	—	Full duplex	Asynchronous	ASCII	To 19.2K	Character	$1,295 (with transmission control software)
	C-15	DEC VT100	1,920 - 6,336 char.	2	12	Monochrome	2	16	Full duplex	Asynchronous	ASCII	38.4K	Character	$795
Cumulus Technology (415) 856-0900	ICT	HP 2392A, 2394A; ANSI X.3.64	3,168 char.	8	15	Monochrome	—	8	Full and half duplex	Asynchronous	ANSI	—	Block	$795
Data General Corp. (617) 366-8911	D220	Proprietary	1,920 char.	1	12	Color	1	19	Full duplex	Asynchronous	ASCII	50 - 19.2K	Character	$2,275
	D407C	Proprietary	1,944 char.	1	12	Color	24	19	Full duplex	Asynchronous	ASCII	50 - 19.2K	Character	$3,175
	D214	DG Dasher; ANSI X.3.64	1,920 char.	—	12	Monochrome	None	15	Full duplex	Asynchronous	ASCII	50 - 19.2K	Character	$795

COMPANY	PRODUCT	EMULATION MODE	DISPLAY CAPACITY (PER PAGE)	MEMORY CAPACITY (IN PAGES)	SCREEN AREA (IN DIAGONAL INCHES)	COLOR OR MONOCHROME	NUMBER OF SIMULTANEOUS SPLIT SCREEN/WINDOWS	NUMBER OF PROGRAM FUNCTION KEYS	TRANSMISSION MODE	ASYNCHRONOUS OR SYNCHRONOUS	TRANSMISSION CODE	RATE OF TRANSMISSION (BIT/SEC.)	FORMAT MODE	PRICE
Data General Corp. (617) 366-8911	D215	DG Dasher; ANSI X.3.64	1,920 char.	1	13	Monochrome	None	15	Full duplex	Asynchronous	ASCII	50 - 19.2K	Character	$995
	D461	DG D400; ANSI X.3.64	1,944 char.	2	12	Monochrome	24	15	Full duplex	Asynchronous	ASCII	110 - 19.2K	Character	$1,495
	D411	DG D400; ANSI X.3.64	1,944 char.	2	12	Monochrome	24	15	Full duplex	Asynchronous	ASCII	110 - 19.2K	Character	$1,195
Datamax USA Corp. (904) 224-8213	DMX 1100	Unisys ET1100	2,000 char.	4K bytes	14	Monochrome	10	20	Full duplex	Asynchronous, synchronous	ASCII	19.2K	Block, character, line	$1,095
	EXT 1278	Unisys T27, IBM 3278	2,000 - 3,000 char.	17	14	Monochrome	17	40	Full duplex	Asynchronous, synchronous	ASCII	19.2K - 38.4K	Block, character, line	$2,495
	EXT 1260	Unisys T27, DEC VT100	2,000 - 3,000 char.	17	14	Monochrome	17	40	Full duplex	Asynchronous, synchronous	ASCII	19.2K - 38.4K	Block, character, line	$1,545
	EXT 1250	Unisys T27	2,000 - 3,000 char.	17	14	Monochrome	17	40	Full duplex	Asynchronous, synchronous	ASCII	19.2K - 38.4K	Block, character, line	$1,495
Datamedia Corp. (800) 343-6330	Columnar/8	DEC VT241	4,480 char.	1	14	Color	1	16	Full and half duplex	Asynchronous, (synchronous optional)	ASCII, ANSI (EBCDIC optional)	38.4K	Character	$2,090
Datapoint Corp. (512) 699-7000	7352	Datapoint 8242, 8200, 8220	2,000 char.	NA	14	Monochrome	Software-dependent	21	NA	NA	NA	NA	NA	$1,495
	7351	Datapoint 8242, 8200, 8220	2,000 char.	NA	14	Monochrome	Software-dependent	21	Full duplex	Asynchronous	ASCII	To 34K	Character	$1,495
Datawatch Corp. (617) 923-9930	Datawatch 220 Tempest Terminal	DEC VT220	3,168 char.	—	14	Monochrome	—	15	Full duplex	—	ASCII	19.2K	Character	$2,595
	Datawatch 240 Tempest Terminal	DEC VT240	3,168 char.	—	14	Monochrome	—	15	Full duplex	—	ASCII	—	Character	$2,995
	Datawatch 241 Tempest Terminal	DEC VT241	—	—	14	Color	—	15	Full duplex	—	ASCII	19.2K	Character	$6,495
Davox Corp. (617) 467-4455	Series 4900, 5900	IBM PC, XT, AT and compatibles; DEC VT220, VT100	3,168 char.	256K bytes	12	Monochrome, color	Unlimited	160	Full duplex	Asynchronous, synchronous	ANSI, ASCII	400K	Character	$2,695, $2,995
Dolch Data Systems Corp. (201) 260-6400	DD220T Tempest Terminal	DEC VT220	1,920 char.	NA	14	Monochrome	2	15	Full duplex	Asynchronous	ASCII	38.4K	Character	$2,745
Digital Equipment Corp. (617) 493-5111	VT340	DEC VT52, VT100, VT241; Tektronix 4010, 4014	3,168 char.	6 (text), 2 (graphics)	13	Color	2	43	Full duplex	Asynchronous	ASCII, ANSI	19.2K	Block, character	$2,935
	VT330	DEC VT52, VT100, VT240; Tektronix 4010, 4014	3,168 char.	6 (text), 2 (graphics)	14	Monochrome	2	43	Full duplex	Asynchronous	ASCII, ANSI	19.2K	Block, character	$1,990
	VT320	DEC VT52, VT100, VT220	3,168 char.	1	14	Monochrome	1	43	Full duplex	Asynchronous	ASCII, ANSI	19.2K	Character	$545-$595
Direct Service & Repair (800) 982-1414	Direct 203	DEC VT200	24, 36, 36 lines	—	14	Monochrome	—	10	Full and half duplex	—	ANSI, ASCII	150 - 38.4K	Block, line, character	$1,195-$1,295
	225	HP 2622, 2645, 3000	1,920 char.	16K - 32K bytes	12	Monochrome	—	8	Full and half duplex	Asynchronous	ANSI	15 - 19.2K	Block, line	$1,195 (CRT)
	230	HP 2622, 2645, 3000; DEC VT100, VT52	1,920 char.	32K bytes	12	Monochrome	—	8	Full and half duplex	Asynchronous	ANSI	19.2K	Block, line	$1,395
	DT9220	DEC VT220, VT100	3,168 char.	64K bytes	14	Monochrome	—	30	Full and half duplex	Asynchronous	ANSI	38.4K	Block, character	$895
	231	DEC VT52, VT100	3,168 char.	64K bytes	12	Monochrome	—	8	Full and half duplex	Asynchronous	ANSI	38.4K	Block, character	$1,195-$1,295
Electro Mechanical Systems, Inc. (217) 359-7125	Touch Information Display	Lear Siegler ADM-3A	1,920 char.	15	12	Monochrome	1	NA	Full and half duplex	Asynchronous	ASCII	300 - 19.2K	Character	$999
Esprit Systems, Inc. (800) 648-4888	Open 200	DEC VT200, VT220	1,920 char.	2 standard, 4 optional	14	Monochrome	—	30	—	—	—	—	—	Not provided
	Open 2	WY-50; Televideo 970, 950, 925; ADDS Viewpoint; Esprit 6110 10+; Hazeltine 1500	3,168 char.	2 standard, 4 optional	14 (flat screen)	Monochrome	2	24 keys	Full and half duplex	Asynchronous	ASCII	To 38.4K	Block, line, character	$695
	Open 4	WY-50; Televideo 925, 950; ADDS Viewpoint; Esprit 6110 10+, 603-4; Hazeltine 1500; Esprit 125; Lear Siegler ADM 3A/5; DEC VT52; Link PC Term	3,168 char.	2 standard, 4 optional	14 (flat screen)	Monochrome	Unlimited	24	Full and half duplex	Asynchronous	ASCII	To 38.4K	Block, line, character	$999
	Open TCP 4	Same as Open 4)	3,168 char.	2 standard, 4 optional	14 (flat screen)	Monochrome	Unlimited	48	Full and half duplex	Synchronous	ASCII	To 38.4K	Block, line, character	$949
	Open 397	Same Open 4, plus DEC VT220, VT100, VT52)	3,168 char.	2 standard, 4 optional	14 (flat screen)	Monochrome	2	30 - 70	Full and half duplex	Asynchronous	ASCII, ANSI	To 38.4K	Block, line, character	$999
	LAN Term	MS-DOS 2.1 - 3.3	—	768K bytes	14	Monochrome	Unlimited	10	Full and half duplex	Asynchronous	ASCII, ANSI	38.4K - 2.5M	—	$995
Falco Data Products, Inc. (800) 835-8765 (800) 538-5383 (Calif.)	Falco 5500	WY-50; Televideo 955, 950, 925, 920, 920; ADDS Viewpoint; Hazeltine 1500; Falco PC Term; Tektronix 4010, 4014; IVM 3101; DG 200	4,000 char.	4 - 7	14	Monochrome	6	12	—	Asynchronous	ASCII, ANSI	38.4K	—	Not provided

SPOTLIGHT

COMPANY	PRODUCT	EMULATION MODE	DISPLAY CAPACITY (PER PAGE)	MEMORY CAPACITY (IN PAGES)	SCREEN AREA (IN DIAGONAL INCHES)	COLOR OR MONOCHROME	NUMBER OF SIMULTANEOUS SPLIT SCREEN/WINDOWS	NUMBER OF PROGRAM FUNCTION KEYS	TRANSMISSION MODE	ASYNCHRONOUS OR SYNCHRONOUS	TRANSMISSION CODE	RATE OF TRANSMISSION (BIT/SEC.)	FORMAT MODE	PRICE
Prime Data Products, Inc. (800) 225-6705 (800) 538-6300 (Calif.)	Prime 3000	WY-50; Televideo 925, 950, 925, 910, 900; ADDS Viewpoint; Hazeltine 1500; Prime PC Term; Tektronix 4010, 4014; IVM 3101; DG 200; DEC VT220, 132, 100, 52	4,000 char.	8 - 15	14	Monochrome	6	12 - 16	—	Asynchronous	ASCII, ANSI	38.4K	—	$795
	Prime 2050	DEC VT220, VT132, VT100, VT52	4,000 char.	4-7	14	Monochrome	6	16	—	Asynchronous	ASCII, ANSI	38.4K	—	$645
	Prime 2000	—	4,000 char.	4-7	14	Monochrome	6	12	—	Asynchronous	ASCII	38.4K	—	$595
	Prime 2050S	DEC VT220, VT100, VT52, VT52; ANSI X 3.64	4,000 char.	4-7	14	Monochrome	6	16	—	Synchronous	ANSI	38.4K	—	$695
Future International, Inc. (415) 463-3814	X92C	IBM 3192C	1,920 - 2,560 char.	5	14	Color	1	24	SDLC	Synchronous	IBM 3270	2.35M	Coaxial A	Not provided
	X91/14	IBM 3191	1,920 - 2,560 char.	5	14	Monochrome	1	24	SDLC	Synchronous	IBM 3270	2.35M	Coaxial A	Not provided
	X91/12	IBM 3191	1,920 char.	5	12	Monochrome	1	24	SDLC	Synchronous	IBM 3270	2.35M	Coaxial A	Not provided
Gould, Inc. (Computer Systems Division) (305) 587-2900	Alphanumeric or Console Terminal	ANSI-compatible	—	16k	14	Monochrome	Software-dependent	30	Full and half duplex	Asynchronous	ASCII, IBM, EBCDIC	19.2K	Character	$900
Hewlett-Packard Co. (800) 367-4772	HP 700/22	DEC VT220	1,920 or 3,168 char.	4	14	Monochrome	1	30	Full duplex	Asynchronous	ANSI	75 - 38.4K	Character	$575
	HP 700/41	WY-30; Televideo 905, 910, 925R; ADDS Viewpoint A2; Lear Siegler ADM3A/ ADM5; Qume QVT-101; Hazeltine 1500	1,920 char.	2	14	Monochrome	2	58	Full and half duplex	Asynchronous	ASCII	300 - 38.4K	Character, block, protect, copy print, transparent print	$375
	HP 700/71	IBM 3191 Models A and B	1,920 char.	1	14	Monochrome	1	24	Proprietary to IBM	Asynchronous	EBCDIC	2.3 MHz	IBM	$695
	HP 700/92	HP 2392A; DEC VT220, VT100, VT52	1,920 or 3,168 char.	8	14	Monochrome	1	16	Full duplex	Asynchronous	ASCII	75 - 38.4K	Block, character	$895
	HP 700/94	HP 2394A; DEC VT220, VT100, VT52	1,920 or 3,168 char.	16	14	Monochrome	1	16	Full duplex	Asynchronous	ASCII	75 - 38.4K	Block, character	$1,095
Honeywell Bull, Inc. (617) 671-6000	HDS-1	ADDS Viewpoint; Hazeltine 1500; Televideo 910, 925; Lear Siegler ADM 3A/5; WY-50	2,000 char.	1	14	Monochrome	2	16	Full duplex	Asynchronous	ASCII	38.4K	Character, block	$695
	HDS-3	DEC VT100, VT220, VT52; WY-50+	1,920 - 3,200 char.	1	14	Monochrome	1	16	Full duplex	Asynchronous	ASCII, ANSI	38.4K	Character, block	$790
	HDS-5	VIP7800, VIP7809, 3.64	2,000 - 3,200 char.	2	14	Monochrome	5	12	Full duplex	Asynchronous	ASCII, ANSI	9.6K	Character, block	$995
	HDS-7	VIP7800, VIP7809, 3.64	2,000 - 3,200 char.	3	14	Monochrome	5	12	Full duplex	Asynchronous, synchronous	ASCII, ANSI	9.6K	Character, block	$1,295
Houston Computer Services, Inc. (713) 568-8000	Plus 10 Model 5	TI 924, 931 plug-compatible	1,920 char.	4	14	Monochrome	1	32	Full and half duplex	Asynchronous	ASCII	50 - 19.2K	Character	$679
	Plus 10 Model 6	TI 924, 931 plug-compatible	1,920 char.	1	14	Monochrome	1	32	Full and half duplex	Asynchronous	ASCII	To 19.2K	Character	$529
	P100 Plus 10 Model 100	TI 924, 931 plug-compatible	1,200 char.	32K bytes	8	Monochrome	1	None	Full and half duplex	Asynchronous	ASCII	300 or 1,200	Character	$995
Human Designed Systems, Inc. (404) 564-1234	HDS-2000	DEC VT220, VT100, VT52; Tektronix 4014, 4010	1,920 - 3,168 char.	4	15	Monochrome	6	120	Full and half duplex	Asynchronous	ASCII, IBM	38.4K	Character	From $995
IBM Contact local IBM sales office	370 Display Model 3193	IBM 3270	1,920 - 3,840 char.	2	15	Monochrome	2	24	Half duplex	Synchronous	EBCDIC	56K - 1.25M	—	$2,495
	370 Display Models 3191A, 3191B	IBM 3270	1,920 char.	1	12	Monochrome	—	24	Half duplex	Synchronous	EBCDIC	56K - 1.25M	—	$1,295
	3192D	IBM 370	1,920 - 3,564 char.	3	15	Monochrome	1	24	Half duplex	Synchronous	EBCDIC	56K - 1.25M	—	$1,795
	370 Models 3191D, 3191E	IBM 3270	1,920 - 2,560 char.	3	14	Monochrome	1	24	Half duplex	Synchronous	EBCDIC	56K - 1.25M	—	$1,423
	370 Display Model 3179	IBM 3270	1,920 - 2,560 char.	1	14	Color	—	24	Half duplex	Synchronous	EBCDIC	56K - 1.25M	—	$2,095
	3192G	IBM 370	1,920 - 2,560 char.	1	14	Color	1	24	Half duplex	Synchronous	EBCDIC	56K - 1.25M	—	$2,795
	3192C	IBM 370	1,950 - 2,560 char.	3	14	Color	1	24	Half duplex	Synchronous	EBCDIC	56K - 1.25M	—	$1,895
	3192L	IBM 370	1,950 - 2,560 char.	3	14	Color	1	24	Half duplex	Synchronous	EBCDIC	56K - 1.25M	—	$2,295
	3192P	IBM 370	1,920 - 3,564 char.	3	14	Color	1	24	Half duplex	Synchronous	EBCDIC	56K - 1.25M	—	$2,095
Measurex, Inc. (617) 688-6370	Acu 327 model	IBM 3277, 3178, 3179, 3180, 3191, 3192-11, 3290	2,000 or 3,000 char.	256	14	Monochrome	1 or 2	80	Full duplex	Asynchronous	EBCDIC	19K	Character	$1,195 - $1,495
IES, Inc. (801) 363-6363	IS 301D	IBM 3191D, 3270	1,920 - 2,560 char.	1	14	Monochrome	NA	24	Half duplex	Synchronous	EBCDIC	2.5M	Menu, block, character	Not provided
	IS 302 D	IBM 3192D, 3270	1,920 - 3,564 char.	4	14	Monochrome	NA	24	Half duplex	Synchronous	EBCDIC	2.5M	Menu, block, character	Not provided

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[illegible], Inc. (201) 249-[illegible]	IS 301A	IBM 3101, 3270	1,980 char.	1	14	Monochrome	10A	24	Half duplex	Synchronous	EBCDIC	2.4M	Menu, block, character	Not provided
	IS 301C	IBM 3101, 3270	1,920 - 2,560 char.	1	14	Color	10A	24	Half duplex	Synchronous	EBCDIC	2.4M	Menu, block, character	Not provided
	IS 301F	IBM 3101F, 3270	1,920 - 3,564 char.	4	14	Color	10A	24	Half duplex	Synchronous	EBCDIC	2.4M	Menu, block, character	Not provided
	IS 306	IBM 3196, 3180-2, System/34, 36, 38	1,920 - 3,564 char.	1	14	Monochrome	1	24	Half duplex	Synchronous	EBCDIC	1M	Menu, block, character	Not provided
	IS 307-1	IBM 3180-2, 3197-1, System/34, 36, 38	1,920 - 3,564 char.	1	—	—	—	—	Half duplex	Synchronous	EBCDIC	1M	Menu, block, character	Not provided
	IS 307-1C	IBM 3179-2, System/34, 36, 38	1,920 char.	1	14	Color	1	24	Half duplex	Synchronous	EBCDIC	1M	Menu, block, character	Not provided
	IS 320	DEC VT220	From 1,920 char.	1	14	Monochrome	1	36	Half duplex	Synchronous	ASCII	9.6K	Character, line	Not provided
Informer Computer Terminals, Inc. (714) 891-1112	Model 207 Portable	IBM 3270, DEC VAX	1,920 or 3,168 char.	16K (DEC), 32K (IBM)	9	Monochrome, color	4	24 (IBM)	Full and half duplex	Asynchronous, synchronous	ASCII, SNA/SDLC* bi-synchronous	To 9.6K	Character	$1,600-$3,400
	Model 294	IBM 3270, DEC VAX	1,920 or 3,168 char.	16K (DEC), 32K (IBM)	9	Monochrome, color	4	24 (IBM)	Full and half duplex	Asynchronous, synchronous	ASCII, SNA/SDLC bi-synchronous	To 9.6K	Character	$1,600-$3,400
	Model 205	IBM 3270, DEC VAX	1,920 or 3,168 char.	16K (DEC), 32K (IBM)	12	Monochrome, color	4	24 (IBM)	Full and half duplex	Asynchronous, synchronous	ASCII, SNA/SDLC bi-synchronous	To 9.6K	Character	$1,600-$3,400
Intecolor Corp. (404) 449-[illegible]	AG1924-29E	Tektronix 4105A; DEC VT100	2,400 char.	2 - 8	20	Color	8	8	Full and half duplex	Asynchronous	ANSI, ASCII	38.4K	Character	$4,195
	Colortrend 210	DEC VT52, VT100	1,920 char.	2	14	Color	None	24	Full and half duplex	Asynchronous	ASCII, ANSI	19.2K	Character	$1,595
	Colortrend 220	DEC VT52, VT100, VT220	2,400 char.	1	14	Color	None	15	Full and half duplex	Asynchronous	ASCII, ANSI	19.2K	Character	$1,495
	AG 640-20E	DEC VT100; Tektronix 4105A	2,400 char.	2 - 8	20	Color	8	8	Full and half duplex	Asynchronous	ASCII, ANSI	38.4K	Character	$3,595
Kimtron Corp. (408) 436-6550	KT-22	DEC VT220, VT100, VT52	3,168 char.	2 or 3	14	Monochrome	1	30	Full and half duplex	Asynchronous	ANSI, ASCII	50 - 38.4K	Character	$689
	KT-22/PC	DEC VT220, VT100, VT52; Kimtron KT-22PC, KT-221X	3,300 char.	3	14	Monochrome	2 - 4	30	Full and half duplex	Asynchronous	ANSI, ASCII, EBCDIC	50 - 38.4K	Character	$749
	KT-22/Advanced	DEC VT220, VT100, VT52	3,168 char.	3	14	Monochrome	4	30	Full and half duplex	Asynchronous	ANSI, ASCII	50 - 38.4K	Character	$749
	KT-5	Lear Siegler ADM 3A/5; DEC VT52, Televideo 920/925; Hazeltine 1500; ADDS Regent 25	3,168 char.	2	14	Monochrome	1	44	Full and half duplex	Asynchronous	ASCII	19.2K	Block, character	$389
	KT-50	Lear Siegler ADM 3A/5; DEC VT52; Televideo 920/925; Hazeltine 1500; ADDS Regent 25	3,168 char.	2	14	Monochrome	1	44	Full and half duplex	Asynchronous	ASCII	19.2K	Block, character	$489
	KT-70PC	Kimtron KT-7, C, KT7IX, KT-7, optional KT-7QNX	2,000 char.	1	14	Monochrome	1	20	Full and half duplex	Asynchronous	ASCII, EBCDIC	19.2K	Block, character	$599
	KT-70	Kimtron KT-7; Televideo 920/925; DEC VT100; DG D100/200	1,920 char.	1	14	Monochrome	1	44	Full and half duplex	Asynchronous	ASCII, ANSI	19.2K	Block, character	$599
Lampar Technologies, Inc. (818) 407-[illegible]	Vision II 4200	DEC VT220	From 1,[illegible] char.	255 lines	14	Monochrome	10A	90	Full duplex	Asynchronous	ASCII	50 - 19.2K	Character	$995
	Vision II 4214 Tektronix Graphic Display Terminal	DEC VT220	From 1,[illegible] char.	255 lines	14	Monochrome	10A	90	Full duplex	Asynchronous	ASCII	50 - 19.2K	Character	$1,295
	Vision II 4300 Tektronix and Regis Graphic Display Terminal	DEC VT220	From 1,[illegible] char.	255 lines	14	Monochrome	10A	90	Full duplex	Asynchronous	ASCII	50 - 19.2K	Character	$1,895
	Vision II 32220-I Industrial Unit	DEC VT220	From 1,[illegible] char.	255 lines	14	Monochrome	10A	90	Full duplex	Asynchronous	ASCII	50 - 19.2K	Character	$2,595
Lee Data Corp (800) LEE-DATA	Models 1222, 2131, 1191, 1192, Series 80	IBM 3270	—	Varies	14	Both	4	24	Full and half duplex	Asynchronous, synchronous	ASCII, EBCDIC	1.2M	Varies	$1,100-$4,000
Liberty Electronics USA, Inc. (415) 745-7000	Freedom 1	Freedom 200; WY-50; Televideo 950; ADDS Viewpoint; Lear Seigler ADM 31	3,168 char.	2 - 4	14	Monochrome	—	44	Full and half duplex	—	ASCII	50 - 38.4K	Character, line	$449
	Freedom 1 ANSI	DEC VT200, VT100, VT52; DG Dasher 210, 211	3,168 char.	1	14	Monochrome	10A	44	Full and half duplex	Asynchronous	ANSI	50 - 38.4K	Character	$469
	Freedom 1 Plus	IBM PC; Freedom 200; WY-50; Televideo 950, 925; ADDS Viewpoint; Lear Siegler ADM 31	3,168 char.	1 - 4	14	Monochrome	10A	44	Full and half duplex	Asynchronous	ASCII	50 - 38.4K	Character	$549
	Freedom 1 Turbo	IBM PC; Freedom 200; WY-50; Televideo 950, 925; ADDS Viewpoint; Lear Siegler ADM 31; DEC VT100, VT200, VT52; DG Dasher 210, 211	3,168 char.	1 - 4	14	Monochrome	10A	44	Full and half duplex	Asynchronous	ASCII, ANSI	50 - 38.4K	Character	$669

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Link Technologies, Inc. (415) 961-9660	Link 125	WY-50; Televideo 925,910; Lear Siegler ADM 3A/5; ADDS A1, A2; VP60	1,920 char.	2	14	Monochrome	1	40	Full and half duplex	Asynchronous	ASCII	38.4K	Character, block, line	$625
	MC3	Link 125, PC Term; WY-50; Televideo 925, 910; Lear Siegler ADM 3A/5; ADDS A1, A2; VP60; DEC VT100; ANSI X.3.64	1,920 char.	6	14	Monochrome	2	40	Full and half duplex	Asynchronous	ASCII, ANSI	38.4K	Character, block, line	$695
	MC10	DEC VT220, VT100, VT52; ANSI X.3.64; WY-50, WY-60; Televideo 955, 950, 925, 910; Lear Siegler ADM 3A, 5, 31; ADDS A1, A2, VP60	1,920 char.	7	14	Monochrome	4	40	Full and half duplex	Asynchronous	ASCII, ANSI	38.4K	Character, block, line	$955
	PC Term	PC Term; Televideo 925, 910; Kimtron KT7 PC	1,920 char.	2	14	Monochrome	1	28	Full and half duplex	Asynchronous	ASCII, PC scan code	38.4K	Character, block, line	$695
	MC1	PC Term; Televideo 925, 910; Kimtron KT7 PC	1,920 char.	2	14	Monochrome	1	28	Full and half duplex	Asynchronous	ASCII, PC scan code	38.4K	Character, block, line	$495
	Link 220	DEC VT220, VT100, VT52, VT132; ANSI X.3.64	1,920 char.	2	14	Monochrome	1	28	Full and half duplex	Asynchronous	ANSI	38.4K	Character, block	$995
The Lynk Corp. (215) 265-3590	Lynkstation/ 196, 196E	IBM 3196, 5291 Model 2	1,920 char.	NA	15	Monochrome	1 (196), 2 (196E)	24	NA	Asynchronous	EBCDIC	NA	—	$1,250-$1,550
	Lynkstation/ 912	IBM 3196, 5291 Model 2	1,920 char.	NA	15	Monochrome	2	24	NA	Synchronous	EBCDIC	NA	—	$1,395
	Lynkstation/ 802	IBM 3180	3,564 char.	NA	15	Monochrome	2	24	NA	Synchronous	EBCDIC	NA	—	$1,635
	Lynkstation/ 197C	IBM 3197C, 3197D	3,564 char.	NA	14	Color	2	24	NA	Synchronous	EBCDIC	NA	—	$1,725
	Computinglynk	IBM 3180, IBM PC	3,564 char.	512K bytes	15	Monochrome	2	24	NA	Synchronous	EBCDIC	NA	—	$2,195
Hasseus Corp. (800) 288-8979	2150-C	IBM 2196C	1,920 - 3,440 char.	1	14	Color	1	36	Full and half duplex	Synchronous	EBCDIC	56K	Block	$1,595-$1,995
	2150-D6	IBM 2196D	1,920 - 3,564 char.	1	15	Monochrome	2	36	Full and half duplex	Synchronous	EBCDIC	56K	Block	$2195-$2,495
	2151	IBM 2191D, 2191E	1,920 char.	1	14	Monochrome	1	36	Full and half duplex	Synchronous	EBCDIC	56K	Block	$1,595-$1,695
	2151	IBM 2191A, 2191B	1,920 char.	1	12	Monochrome	1	36	Full and half duplex	Synchronous	EBCDIC	56K	Block	$1,195
	2150-D	IBM 2196D	1,920 - 3,564 char.	1	15	Monochrome	1	36	Full and half duplex	Synchronous	EBCDIC	56K	Block	$1,795-$2,095
NCR Corp. (513) 445-5000	NCR 4970	ADDS Viewpoint/122; DEC VT220, VT100, VT52; ANSI X.3.64	1,920 - 3,168 char.	2	14	Monochrome	2	22	Full and half duplex	Asynchronous	ASCII	19.2K	Menu, block, line, character	$745
	NCR 4940	ADDS Viewpoint A1/A2; Regent 40; Hazeltine 1500; Televideo 925, 920, 910; WY-50; ANSI X.3.64	1,920 - 3,168 char.	2	14	Monochrome	NA	44	Full and half duplex	Asynchronous	ASCII	50 - 38.4K	Menu, block, line, character	$595
	NCR 4980	NCR 7930, 7900-M1, 7900-M1+, 7901	1,920 - 3,168 char.	2	14	Monochrome	NA	12 - 24	Full and half duplex	Asynchronous	ASCII	50 - 38.4K	Menu, block, line, character	$695
	ADDS 1010	ADDS Viewpoint A1/A2, 3A+; Viewpoint/+; Lear Siegler ADM 3A	1,920 char.	1	14	Monochrome	NA	12	Full and half duplex	Asynchronous	ASCII	110 - 19.2K	Menu, block, line, character	$395
	ADDS 2020	ADDS Viewpoint A1, A2; Regent 40; Hazeltine 1500; Televideo 925, 920, 910; WY-50	1,920 - 3,168 char.	1	14	Monochrome	NA	16 - 32	Full and half duplex	Asynchronous	ASCII	50 - 38.4K	Menu, block, line, character	$695
	ADDS 3220	ADDS Viewpoint/122; DEC VT220, VT100, VT52; ANSI X.3.64	1,920 - 3,168 char.	1	14	Monochrome	NA	22	Full and half duplex	Asynchronous	ANSI	50 - 19.2K	Menu, block, line, character	$695
	ADDS Viewpoint/Color	ADDS Viewpoint/60; Regent 40/60	2,000 char.	2	13	Color	NA	16	Full and half duplex	Asynchronous	ANSI	110 - 19.2K	Menu, block, line, character	$1,295
	ADDS Viewpoint/78	IBM 3278 Model 2 terminal with 3271 controller	1,920 char.	1	12	Monochrome	NA	24	Full and half duplex	Asynchronous	ASCII	110 - 19.2K	Menu, block, line, character	$1,095
	ADDS Viewpoint/78 Color	IBM 3278 Model 2 terminal with 3271 Model 2 controller	1,920 char.	1	13	Color	NA	24	Full and half duplex	Asynchronous	ASCII	110 - 19.2K	Menu, block, line, character	$1,595
Hasseus Corp. (313) 994-6661	IMS 2613	DEC VT52, VT100; ANSI	—	—	12	Both	256	16	Full and half duplex	Asynchronous	ASCII, ANSI	19.2K	Menu	Not provided
	Series 4000	IBM PC AT	—	Software-dependent	14	Color	Software-dependent	20	Full and half duplex	Asynchronous	ASCII	38.4K	Character	$5,000
	Series 2000	ANSI X.3.64	2,000 char.	—	12	Both	2	15	Full and half duplex	Asynchronous	ASCII	38.4K	Character	$3,100
Northern Telecom, Inc. (800) 558-9936	Displayphone 220	DEC VT220, VT100, VT52	1,920 char.	2	9	Monochrome	1	32	Full and half duplex	Asynchronous	ANSI, ASCII	19.2K	Character	$895 or $1,095
Oyster Terminals Ltd. (613) 592-4774	The Oyster Terminal Family	DEC VT100	1,200 char.	1	8.5	Monochrome	—	48	Full and half duplex	—	ASCII	75 - 19.2K	Character	$800

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Prime Computer, Inc. (617) 655-8000	PFT200	NA	3,564 char.	2	14	Monochrome	1	20	Full and half duplex	Asynchronous	ASCII	50 - 19.2K	Block, character	$695
Qume Corp. (800) 223-2479	QVT 203 Plus	DEC VT220	80 or 132 col. x 25 lines	2 or 4	14	Monochrome	—	15	Full and half duplex	—	ANSI, ASCII	To 38.4K	Block, line	$575
	QVT 212 GX	DEC VT100	1,920 char.	1	14	Monochrome	—	4	Full and half duplex	—	ANSI, ASCII	To 19.2K	Line	$995
Ramtek Corp. (408) 988-2211	4000	DEC VT220, VT100	80 col.	NA	19	Color	—	18	Serial or parallel	—	ASCII	To 38.4K	NA	From $30,000
	4322	DEC VT220, VT100	80 col.	4M bytes	15 - 19	Color	—	18	Serial or parallel	—	ASCII	To 38.4K	NA	From $8,995
	4327	DEC VT220, VT100	80 col.	4M bytes	15 - 19	Color	—	18	Serial or parallel	—	ASCII	To 38.4K	NA	From $15,995
Random Corp. (513) 835-0690	Colleague Laptop	DEC VT220	2,000 char.	0	10	Monochrome	1	20	Full and half duplex	Asynchronous	ANSI X.3.64	19.2K	Character	$995
	Colleague Plus Laptop Terminal	DEC VT220	2,000 char.	30	10	Monochrome	1	20	Full and half duplex	Asynchronous	ANSI X.3.64	19.2K	Character	$1,295
Reflex (408) 946-8897	RA2005	DEC VT200, VT100, VT52	1,500 - 3,168 char.	1	14	Monochrome	—	15	Full duplex	Asynchronous	ANSI	9.6K	Block	$695
	RA2000	DEC VT52; Televideo 910, 925; Hazeltine 1500; Lear Siegler ADM 3A; ADDS Viewpoint	1,920 char.	1	14	Monochrome	None	10	Full and half duplex	Asynchronous	ASCII	19.2K	Block	$595
Systems, Inc. (519) 884-3440	KD 600TC	Kimtron PC7; DEC VT52; Televideo 925, 950	2,000 char.	8	User-selectable	Color or monochrome	1	30	Full and half duplex	Asynchronous	ASCII	19.2K	Character	Not provided
	KD 6220	DEC VT220	3,168 char.	1	14	Monochrome	1	14	Full and half duplex	Asynchronous	ANSI	19.2K	Character, block, line	$595
Tandem Computers, Inc. (408) 725-6000	6530 Multi Page Display	Tandem 6530; IBM 3270	1,920 char.	24	14	Monochrome	1	16	Full and half duplex	Asynchronous	ASCII, ANSI, EBCDIC	19.2K	Block, character	$1,695
	6530 High Value Display	Tandem 6530; IBM 3270 (via IBM 3270 host software)	1,920 char.	8	12	Monochrome	1	16	Full and half duplex	Synchronous, asynchronous	ASCII, ANSI, EBCDIC	19.2K	Block, character	$1,495
	6520 High Value Display	Tandem 6530; IBM 3270 (via IBM 3270 host software)	1,920 char.	8	15	Monochrome	1	16	Full and half duplex	Asynchronous, synchronous	ASCII, ANSI, EBCDIC	19.2K	Block, character	$1,495
Tatung Co. of America, Inc. (213) 637-2105	TVT 7261	DEC VT100, VT52	2,000 char.	2 or 4	14	Monochrome	—	12	Full and half duplex	—	ASCII	75 - 19.2K	—	$650
Tekne Computer Products, Inc. (619) 694-0997	179	IBM 3179	1,920 - 3,440 char.	1	14	Color	4	24	Half duplex	Synchronous	EBCDIC	19.2K	Block	$1,695 - $2,145
	698K	IBM 3101 Models D and E	1,920 - 3,564 char.	1	15	Monochrome	4	24	Half duplex	Synchronous	EBCDIC	19.2K	Block	$1,795
	679	IBM 3179	1,920 char.	1	12	Color	4	24	Half duplex	Synchronous	EBCDIC	19.2K	Block	$1,795
	191-4/8	IBM 3191 Models A and B	1,920 char.	1	12	Monochrome	4	24	Half duplex	Synchronous	EBCDIC	19.2K	Block	$1,595
	978	IBM 3178	1,920 char.	1	12	Monochrome	4	24	Half duplex	Synchronous	EBCDIC	19.2K	Block	$1,595
	6579	IBM 3270	1,920 char.	7	14	Color	10	24	Full and half duplex	Asynchronous, synchronous	ASCII, EBCDIC	19.2K	Block, character	$2,995
	C998	IBM 3270	1,920 char.	2	12	Monochrome	10	24	Full and half duplex	Asynchronous, synchronous	ASCII, EBCDIC	19.2K	Block, character	$2,495
Teleray Division of Research, Inc. (612) 941-3300	Teleray Model 20-DDG	DEC VT220; DG D211	3,168 char.	2	14	Monochrome	4	32	Full and half duplex	Asynchronous	ASCII, ANSI	19.2K	Block, character, line, window, selected area, page, memory	$895
	Teleray Model 20-DHP	DEC VT220; HP 700/92	3,168 char.	8	14	Monochrome	6	32 (each mode)	Full and half duplex	Asynchronous	ANSI, ASCII	19.2K	See entry for 20-DDG	$895
	Tel 2	DEC VT100; Honeywell HDS-2	3,168 char.	5,760 char.	14	Monochrome	6	32	Full and half duplex	Asynchronous	ASCII, ANSI	19.2K	See entry for 20-DDG	$980
	Tel 5	DEC VT100; Honeywell HDS-5	3,168 char.	5,760 char.	14	Monochrome	6	32	Full and half duplex	Asynchronous	ASCII, ANSI	19.2K	See entry for 20-DDG	$980
	Tel 7	DEV VT100; Honeywell HDS-7	3,168 char.	5,760 char.	14	Monochrome	6	32	Full and half duplex	Asynchronous, synchronous	ASCII, ANSI	19.2K	See entry for 20-DDG	$1,100
Televideo Systems, Inc. (408) 745-7760	905	Televideo 910, 910+, 912; ADDS Viewpoint A3; Hazeltine 1420, Lear Siegler ADM 3A; ADDS Viewpoint 60	1,920 char.	1	14	Monochrome	1	15	Full and half duplex	Asynchronous	ASCII	19.2K	Block, character, line	$499
	906	Televideo 910, 920	3,168 char.	2	14	Monochrome	1	64	Full and half duplex	Asynchronous	ASCII	19.2K	Block, character, line	$949
	955	Televideo 910, 910+, 912, 920, 925, 950, 970, 970+, 970AR; ADDS Viewpoint A3, Viewpoint 60; Lear Siegler ADM 3A, 31; Hazeltine 1420, 1500; IBM 3101; DEC VT100; DG D200	4,000 char.	7	14	Monochrome	2	128	Full and half duplex	Asynchronous	ASCII, ANSI	19.2K	Block, character, line	$949
Televideo Systems, Inc. (408) 745-7760	9220	DEC VT220, VT100, VT52	3,168 char.	1	14	Monochrome	1	30	Full and half duplex	Asynchronous	ANSI	19.2K	Character	$619

COMPANY	PRODUCT	EMULATION MODE	DISPLAY CAPACITY (PER PAGE)	MEMORY CAPACITY (IN PAGES)	SCREEN AREA (IN DIAGONAL INCHES)	COLOR OR MONOCHROME	NUMBER OF SIMULTANEOUS SPLIT SCREEN/WINDOWS	NUMBER OF PROGRAM FUNCTION KEYS	TRANSMISSION MODE	ASYNCHRONOUS OR SYNCHRONOUS	TRANSMISSION CODE	RATE OF TRANSMISSION (BIT/SEC.)	FORMAT MODE	PRICE
Texas Terminals, Inc. (800) 531-5576 (512) 502-0330 (Call)	Miniterm-101	IBM 3101	1,920 char.	1	12	Monochrome	1	24	Full duplex	Synchronous	EBCDIC	1,200	Block	$1,295
	M-191B	IBM 3191	1,920 char.	1	12	Monochrome	1	24	Half duplex	Synchronous	EBCDIC	2,400	Block	$1,695
	M-191P	IBM 3191	1,920 char.	1	12	Monochrome	1	24	Half duplex	Synchronous	EBCDIC	2,400	Block	$1,995
	M-191L	IBM 3191	1,920 char.	1	12	Monochrome	1	24	Half duplex	Synchronous	EBCDIC	2,400	Block	$1,645
	M-191M	IBM 3191	1,920 char.	1	12	Monochrome	1	24	Half duplex	Synchronous	EBCDIC	2,400	Block	$1,645
Texas Instruments, Inc. (800) 527-3500	Travelmate 1200 Portable	DEC VT100, VT52	80 col. x 16 lines	44K bytes	11.7	Monochrome	—	—	Full and half duplex	—	ASCII	300 - 1,200	Character	$1,295
Unisys Corp. (612) 349-8888	UVT1120	Unisys UT200	1,920 - 3,168 char.	1	14	Monochrome	1	32	Full duplex	Synchronous	ASCII	19.2K	Block	$795
	UVT1121	Unisys UT200L	1,920 - 3,168 char.	1	14	Monochrome	2	32	Half duplex	Synchronous	ASCII	19.2K	Block	$795
	UVT1121 Airline Terminal	Programmable Airline Reservation System	3,960 char.	8	14	Monochrome	—	32	Half duplex	Synchronous	ASCII	19.2K	Block	$895
	UVT1125	Unisys UT200D local workstation	1,920 - 3,168 char.	1	14	Monochrome	None	32	Full duplex	Asynchronous	ASCII	9.6K	—	$795
	UVT1125	Unisys UT530 remote workstation	1,920 - 3,168 char.	1	14	Monochrome	None	32	Full duplex	Synchronous	ASCII	19.2K	Block	$795
	UVT1126	Unisys VT200	1,920 - 3,168 char.	1	14	Monochrome	None	32	Full duplex	Synchronous	ASCII	19.2K	Block	$795
	UVT1126	Unisys UT230T editing terminal	1,920 - 3,168 char.	1	14	Monochrome	2	32	Full duplex	Asynchronous	ASCII	9.6K	Block	$795
	UVT1236	DEC VT220, VT100; ANSI X.3.64	1,920 - 3,168 char.	1	14	Monochrome	None	30	Half duplex	Asynchronous	ASCII	38.4K	Block, character	$995 - $795
Visual Technology, Inc. (617) 458-4903	Visual 601	WY-50; Tektronix 4010, 4014	3,168 char.	2	14	Monochrome	2	32	Full and half duplex	Asynchronous	ASCII	110 - 38.4K	Character, block	$695
	Visual 602	DEC VT100; WY-50; Tektronix 4010, 4014	3,168 char.	2	14	Monochrome	2	30	Full and half duplex	Asynchronous	ASCII, ANSI	110 - 38.4K	Character, block	$695
	Visual 603	DEC VT220; Tektronix 4010, 4014	3,300 char.	1	14	Monochrome	2	30	Full duplex	Asynchronous	ASCII, ANSI	110 - 38.4K	Character	$695
	Visual 630	DEC VT220; Tektronix 4010, 4014	6,600 char.	80	14	Monochrome	2	30	Full duplex	Asynchronous	ASCII, ANSI	110 - 38.4K	Character	$995
	Visual 241	DEC VT241; Regis Graphic	3,828 char.	1	13	Color	2	15	Full duplex	Asynchronous	ASCII, ANSI	110 - 19.2K	Character	$1,895
Wang Laboratories, Inc. (800) 225-0654	42304-75 DP/WP Workstation with Keyboard	3A	2,000 char.	64K bytes	12	Monochrome	4	16	Proprietary	Synchronous	WBCH	4.8K	Mono	$2,300
	2110A Asynchronous Workstation	DEC VT100	2,000 - 3,300 char.	—	14	Monochrome	1	16	Full and half duplex	Asynchronous	ASCII, WBCH, ANSI X.3.64	19.2K	Mono	$995
Wyse Technology (408) 433-1000	WY-60	WY-50, WY-50+, WY-75; ANSI X.3.64; DEC VT100, VT52; DG D200, D210; Lear Siegler ADM 3A/5, 31; Televideo 910, 920, 925, 950, 955; ADDS Viewpoint A2, 60; Hazeltine 1500; IBM 3101, 3161, PC AT	5,808 char.	7	14	Monochrome	2	20	Full and half duplex	Asynchronous	ASCII, ANSI	38.4K	Block, character	$599
	WY-99GT	Tektronix 4010, 4014; Hercules; IBM CGA; WY-50, WY-50+; ANSI X.3.64; DEC VT220, VT100, VT52; Televideo 950, 925, 920, 912, 910; ADDS Viewpoint A2; Hazeltine 1500; Lear Siegler ADM 3A/5, 31	3,432 char.	2	14	Monochrome	2	20	Full and half duplex	Asynchronous	ASCII, ANSI	38.4K	Block, character	$849
	WY-350	WY-50	3,432 char.	1	14	Color	2	32	Full and half duplex	Asynchronous	ASCII	38.4K	Block, character	$999
	WY-85	DEC VT220, VT100, VT52	3,432 char.	1	14	Monochrome	1	30	Full and half duplex	Asynchronous	ANSI	38.4K	Block, character	$599
Xerox, Inc. (213) 679-4511	Industrial Terminals	DEC VT100, VT220	1920 char.	16K - 64K bytes	—	Color or monochrome	16	24 - 32	Full and half duplex	Asynchronous	ASCII, Hazeltine	19.2K	Block	$1,500 - $2,000
Zentec Corp. (408) 727-7062	ADM 12 Plus	Tandem 6510; Lear Siegler ADM 2, 12, 31; Televideo 912, 920, 925, 950; Esprit 6310	1,920 - 3,168 char.	2	14	Monochrome	NA	32	Full and half duplex	Asynchronous	ASCII	19.2K	Character	$584
	ADM 1178	IBM 3278	1,920 char.	1	14	Monochrome	NA	24	Full and half duplex	Asynchronous	ASCII	19.2K	Character	$695
	ADM 220	DEC VT220	1,920 - 3,168 char.	1	14	Monochrome	NA	30	Full duplex	—	ASCII, ANSI	19.2K	Character	$695
	ADM 11	Lear Siegler ADM 3A/5; ADDS Viewpoint, Regent; Hazeltine 1400, 1420, 1500; DEC VT52	1,920 char.	1	14	Monochrome	NA	8	Full and half duplex	Asynchronous	ASCII	19.2K	Character	$595
	8302	HP 2392A, 700/92	3,564 char.	8	14	Monochrome	NA	10	Full and half duplex	Asynchronous	ANSI	19.2K	Block, character	$849

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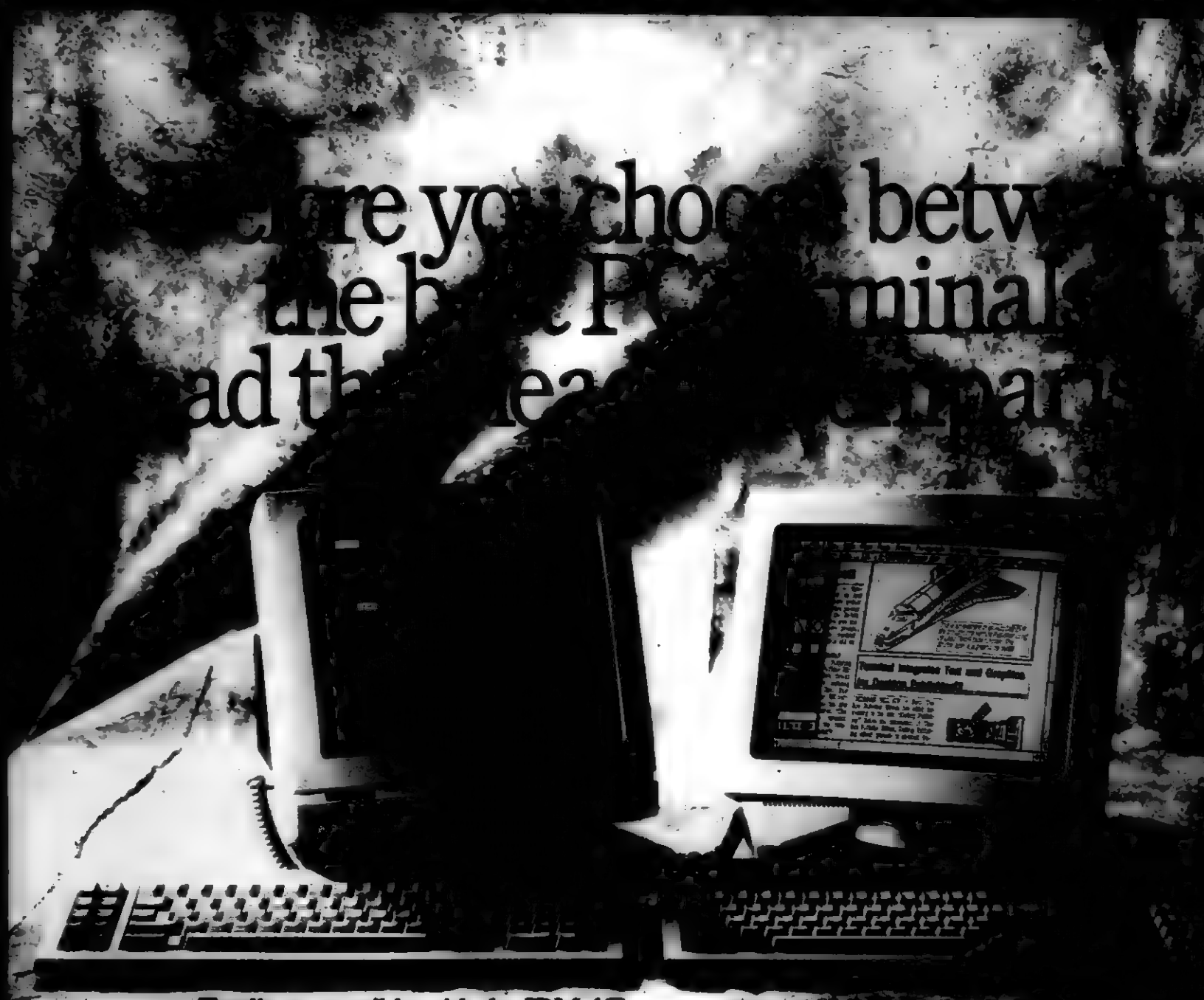

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TAKING CHARGE

Chuck Lasky

Controlling by strolling

Management by walking. No, it's not the latest management theory from Stanford University or MIT. And I certainly can't claim to be the originator of the phrase. I hesitate to call it anything but a technique for managing — a control technique.

I do it a lot. To see me, you may think I like the exercise. It does beat sitting at a desk all day and could be useful in organizations in which you have to keep looking over your shoulder just to keep your job. I've worked in that environment, too. You know, a moving target is hard to hit. But that's another column.

As a manager, you set things in motion in order to accomplish something. But then you have to keep things, or activities, on target. Whether it's for your own department or activities that you perform for others, exercising control is probably the most important aspect of your job once a project is in progress.

So what do you get by walking around? One thing is visibility. People see you, and you see them. If you manage an MIS department, as I do, you quickly learn that many of the people you provide services for view you and your department as, at best, slightly different or a division that always brings the system down when they need it most. Being seen makes you familiar, and familiarity breeds acceptance.

Visibility also brings accessibility. People still like face-to-face contact, especially if you're new on the job or dealing with new users. By being there, you're more apt to hear a few words of praise. You also hear about the problems; and that's important. If things are going wrong, you can't do anything to fix them if you don't hear about them. Too often, a manager finds out too late.

No matter how much you plan and organize and exercise some form of direction and control, some problems are bound to arise. Walking around gives you the informal opportunity to smooth ruffled feathers. It's better to have someone complain face-to-face than to be mentioned on a "nasty-gram"

Continued on page 69

Hands-off managing

Globe-trotting exec practices laissez-faire

BY STEPHEN JONES
CW STAFF

Whether his staff is installing an information system for an airstrip in the steamy jungles of Brazil or trundling a mainframe down the hall from his San Francisco office, H. William Howard follows the same philosophy: Give workers the resources they need and turn them loose.

As vice-president and manager of information services for construction firm Bechtel Group, Inc., Howard uses his hands-off approach with the more than 800 MIS employees he oversees at Bechtel's home office and construction sites across the globe.

"Employees feel that, 'If you think you know so much about a job, why don't you do it yourself?' I learned a long time ago that I don't know enough to do everybody's job," Howard says. "I'm here to provide the tools and the support they need."

Howard, 52, honed his laissez-faire style while managing the installation of MIS shops at a variety of far-flung Bechtel job sites in the mid-1970s — from a power plant in Colstrip, Mont., to a refinery near a Saudi Arabian fishing village.

While working in locales that he says most people have never heard of, Howard learned the benefit of building a crack team of engineers and systems planners that could carry out a mission with little hand-holding. That allowed him to move on to the next project site and, eventually, up the corporate ladder.

"You should be able to tell a guy what needs to be done, not how to do it. If you have to tell him how to do the work, you probably don't need him," he says.

But giving employees too much room can backfire. A stern hand is needed, Howard says, to keep a distant MIS project on track and to provide regular rewards for accomplishments in the field and at home.

Today, Howard uses that philosophy to manage a $50 million DP/MIS budget and to oversee the worldwide administration of Bechtel's information services. Bechtel is reportedly the world's largest privately held company, with annual revenue of about $5 billion.

Despite his wide range of responsibilities, Howard is able to maintain a folksy personal touch that keeps him connected with

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PROFILE
H. William Howard

Position: *Vice-president and manager of information services, Bechtel Group, Inc.*
Mission: *Planning and running a $50 million organization, supporting staff and end users, promoting a pleasant workplace.*

DUAL-CAREER TRACKS

But I don't *want* to be a manager

BY DANA DAVIS
SPECIAL TO CW

Not so long ago, few MIS workers believed there was more than one way to the top. Instead, they thought executive suites were reserved for — well, executives — guys who graduated from business school, wore suits and came up through the corporate ranks via the managerial ladder. Techies, as everyone knew, did not enjoy corner-office views. They worked in basements with big numbers on incomprehensible equipment.

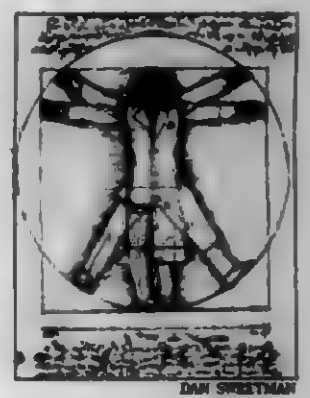
And if a techie wanted to get ahead, it was in his best interest to find a tailor and merge with management. The transformation was sometimes disastrous; while the suit sometimes fit, the new job often didn't.

As a result, companies began to examine dual-career ladders — promotion systems that reward technical personnel with similar pay, perks and titles as those enjoyed by managers, without requiring them to leave their MIS posts.

Big returns

Arthur Andersen & Co., the largest of the Big Eight accounting firms, began employing the dual-track system almost two years ago, says Peter Fuchs, managing director of practice management and planning at the company's Chicago headquarters. "The system allows us to retain and promote excellent technical people," he says.

The company decided to go with the system after studying future technical needs within the financial service marketplace. "In the next three to five years, the



DAN SWEETMAN

technical jobs will require more in-depth and functional skills, higher academic degrees and more experience," Fuchs says.

Those who fulfill the requirements and stay with Arthur Andersen can expect big returns. A five-rung technical ladder consisting of programmer, analyst, senior technical analyst, technical manager and senior technical manager enable technical employees to attain the same promotion levels as their managerial counterparts. "An advanced technical analyst with 10

Continued on page 68

Computer crime foe nabs public service award

BY MITCH BETTS
CW STAFF

PARK RIDGE, Ill. — U.S. Rep. William J. Hughes (D-N.J.), whose persistent efforts led to the passage of federal computer crime laws in 1984 and 1986, was recently chosen as the first recipient of a public service award from the Data Processing Management Association (DPMA).

The DPMA's Information Processing Public Service Award recognizes public officials who have taken leadership roles on issues affecting the information management profession.

William J. Hughes

As chairman of the U.S. House Subcommittee on Crime, Hughes played a major role in writing and enacting the Computer Fraud and Abuse Act of 1984, which mostly covered U.S. government computers, and a more comprehensive version of the law in 1986. The 1986 version outlawed interstate computer crimes involving private-sector computer systems.

Hughes, in a statement accepting the award, criticized common perceptions of computer criminals. "All too often, computer hackers are glamorized by the media as intellectual thrill seekers," he said.

"The public really hasn't grasped . . . that computer hackers are often sophisticated criminals whose illegal conduct is capable of causing enormous damage to business and industry, personal privacy and even our national security."

Hughes, who was vacationing out of the country and could not be reached for comment, said he will work with the DPMA and others to ensure that criminal laws keep pace with technological advances.

"Government and industry must work together to prevent computer-related crimes. When such crimes do occur, we must have laws in place to punish those who are responsible for them," Hughes said.

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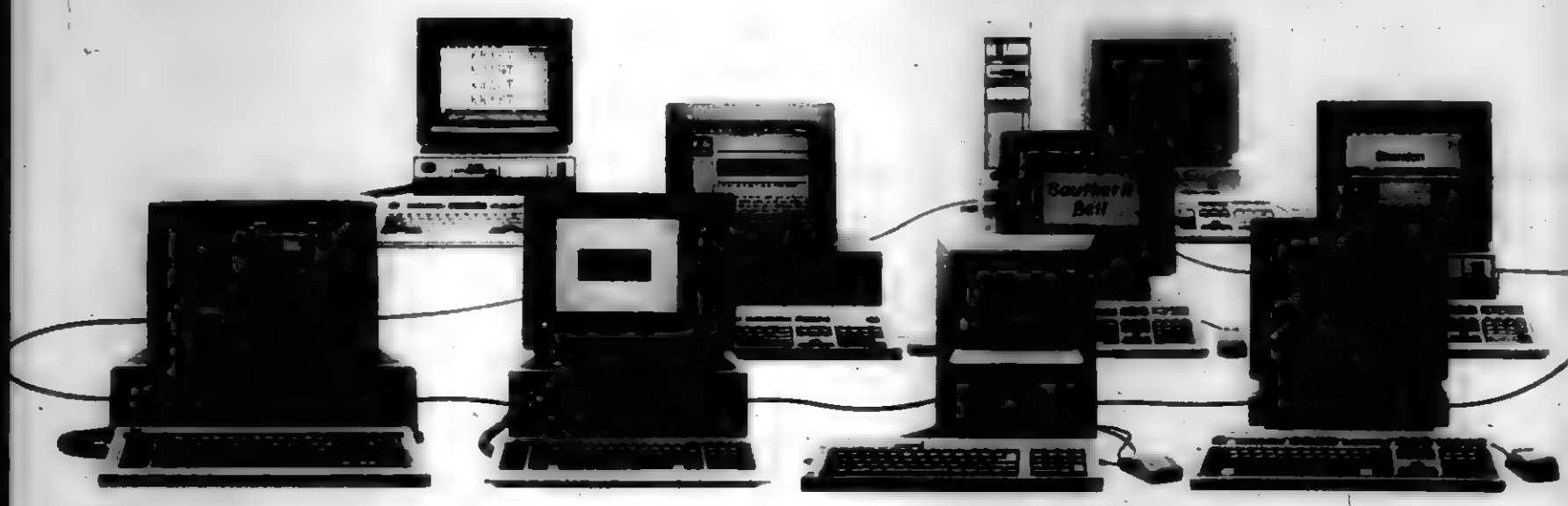

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A manager

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years experience could earn the same amount as a mid-level marketing manager," Fuchs says. "In some exceptional situations," he adds, "a senior technical manager could earn more than some partner classifications."

Fewer than 50 of the 1,000 people Arthur Andersen employs in its domestic and international MIS operations will reach that top technical earning level, Fuchs notes (See chart right).

Dual-track perks

Money, however, isn't the only advantage associated with the dual track, says Loren Heun, information scientist with Upjohn Co. in Kalamazoo, Mich. "We have no set policy on free research time, but individual managers will allow you to spend up to 15% [of your work week] to research areas of particular interest to you and the company," he says.

According to David Miron, principal and organizational analyst with Temple Barker & Sloane, Inc. in Lexington, Mass., other dual-track perks include the following:

- Exposure to the latest technology.
- Opportunities to present papers at professional conferences.
- Chances to meet clients with a variety of complex needs.
- Utilization of technical problem-solving capabilities.
- Added professional recognition.

And the above advantages are in addition to preventing their technical skills from becoming obsolete, Miron says.

Obsolescence can also come about when technicians can't keep up with changes in their field. Consequently, education can become a big factor for technical promotions. "In order to reach that top level of what we call information scientist, that individual will probably need a Ph.D. in computer science along with three to five years of company-specific experience and an extensive knowledge of some specialized systems," Heun says.

"A master's degree with three to five years of company-specific experience can also help you get into positions that are equal to middle management." Such an employee could expect to earn a salary of around $60,000, Heun says.

Besides academic degrees, many companies encourage on-the-track techies to attend a variety of conferences. "We take that process one step further," says John Collins, vice-president of MIS for Hallmark Cards, Inc. in Kansas City, Mo. "We not only send them to the latest classes and seminars, but we'll also send their managers with them," Collins says. That way, managers can gain an added appreciation of the responsibilities of their technical colleagues.

The company itself also receives benefits by using the system. "I haven't seen much job turnover in MIS here," Upjohn's Heun says, "and we've had [the dual tracks] since 1970."

> "I HAVEN'T seen much job turnover in MIS here, and we've had [the dual tracks] since 1970."
>
> LOREN HEUN
> UPJOHN CO.

In addition to job longevity, the system may also inspire company loyalty. "We won't hire from outside to fill our top MIS jobs. These are positions we've reserved for our super-talented technical people," Hallmark's Collins says. "This gives young, highly skilled people the opportunity to work toward a high pay level and status without management responsibilities. They know they have to earn the right to be promoted."

The dual-career track works well for both the company and the individual "because the company doesn't have to contend with so many bad and unhappy managers while also maintaining an excellent group of technical personnel," Miron says.

But that's not to say the system doesn't have a few drawbacks, notes William Cash, vice-president at New York-based consulting firm Cresap.

Administrative hassles

"When setting up the track, there can be a few administrative burdens. For example, how do you pick and choose who occupies the high-level positions? You can define the criteria for a management job more easily than you can define the qualification for a senior technical position," Cash says. "Companies must also decide how many positions they will create. Just how many positions can they afford? What should companies pay for these positions, and what benefits should accompany them?"

In some instances, the dual-track system can foster professional jealousies, Cash warns. "Companies set up the dual track for the best of reasons. They want to motivate and retain employees. But ask yourself what happens when five people are selected from the lab to receive these newly created prestigious jobs — along with the high salary and perks like the corner office, car and big title — and other lab workers say, 'Hey, we do the exact same thing as they do, and we're just as good as they are, so how come we're not getting the promotion?' These same people can understand why they don't get a *management* job. But this situation is obviously different."

Cash says he believes the system has many merits, but he cautions that company management must pay strict adherence to job criteria in order for the system to operate correctly.

At Upjohn, "every job is evaluated on a set criteria," Heun says. "Each job has an extensive written description that accompanies it. That goes for management, secretarial and technical. Employees must fulfill the job criteria before they receive a promotion."

Upjohn's promotional track includes eight rungs. The more than 300 MIS employees can expect to begin as associate systems and programming analysts or systems programming analysts. These positions are similar in pay and perks to a project manager slot on the managerial side.

Similarly, the middle technical levels — systems programming specialist, information system specialist and senior information systems specialist — can be compared with middle managerial posts.

Finally, the top three jobs are reserved for information scientists, who are ranked at levels of 1, 2 or 3, with 3 being the highest. Heun, a Level 2, says only a half-dozen or so make it to Level 3. "It's a difficult position to attain and entails lots of responsibility," he says. Indeed, this individual reports directly to a vice-president or director of information systems, Heun says.

While dual-track career programs may not be for everyone, Collins says he believes the dual system is necessary at Hallmark. "Before, analysts and programmers would peak out salarywise at the uppermost analyst position. But now we've provided a salary ladder equal to management, so that these people can get paid for their specialty without the added responsibility of managing others," he says. "Analysts used to take the management jobs in order to get the salary increase, because it was the only route they had to get ahead."

Crossover programs

In the past, some companies have tried to bring the technical and managerial paths closer together by making it possible for individuals to cross over and back without being labeled as "techie" or "manager."

But that generally doesn't work, Miron says. "People who have too many activities accomplish fewer things. I think the majority of technical people want to grow in their technical skills and be measured on a technical basis."

Collins agrees that the successful cross-over-and-back process is the exception rather than the rule. Although he is has achieved the position of MIS vice-president at Hallmark, he readily admits it wasn't because he took advantage of any dual-career tracks. "I'm just not very technical. That's probably why they made me a manager," he says.

Davis is a research analyst with Information Data Search, Inc. in Cambridge, Mass.

How many will rise to the top?

Of the current MIS employees at three major companies, only a small percentage will achieve the top position on the technical career path ladder

CW CHART

LOCAL HAPPENINGS

NORTHEAST

Bangor, Maine, Jan. 20. Data Processing Management Association (DPMA). Maine Pine Tree Chapter. Leadership Qualities, with former Gov. Ken Curtis. The Bangor Hilton. 5 p.m. Contact: J. Fireweger, Dutra Chemicals, Inc., Searsport, Maine 04974.

New York, Jan. 20. DPMA, New York Chapter. Reviewing Controls in Automated Security Systems. Bookman Restaurant, 15 Bookman St. 5 p.m. Contact: Mary Vogt, 455 E. 83 St., New York, N.Y. 10028.

Boston, Jan. 21. Society for Information Management, Boston Chapter. What Can We Learn from European MIS? with John Thompson of Index Group. Anthony's Pier 4. 11:40 a.m. Contact: SIM, P.O. Box 116, Newton Lower Falls, Mass. 02162.

SOUTHEAST

Charlotte, N.C., Jan. 21. ASM, Queen City Chapter. Managing for the Future, with Robert E. Roberson of the University of South Carolina. Cannon Steak House, $100 E. Independence Blvd. 6 p.m. Contact: Robert Yearwood, Metro Information Services, Suite 140, 7 Parkway Plaza, Charlotte, N.C. 28217.

Lafayette, La., Jan. 21. DPMA, Acadiana Chapter. Monthly meeting. Evangeline Steak House, Highway 167 S. 6:30 p.m. Contact: Debra Hilliard, Guaranty Bank and Trust Co., 4th Floor, 200 W. Congress, Lafayette, La. 70502.

MIDWEST

Fort Wayne, Ind., Jan. 19. ASM, Fort Wayne Chapter. Critical Success Factors for I/S, with Alan Stanford of Ernst & Whinney. Holiday Inn-Downtown, 300 E. Washington Blvd. Contact: Beth Hahill, Suite 103, 10427 Lee Road, Fort Wayne, Ind. 46835.

Hinsdale, Ill., Jan. 19. ASM, Oakbrook, O'Hare and Chicago chapters. Computer Crime, with U.S. Attorney Anton Valukis. Cyprus Restaurant, 500 E. Ogden Ave. 6 p.m. Contact: David P. Miller, 908 W. Glencoe Road, Palatine, Ill. 60067.

Dayton, Ohio, Jan. 19. ASM, Megacity Chapter. Monthly meeting. Officers Club, Wright-Patterson Air Force Base. 5:30 p.m. Contact: S. Beebe-Owen, Western Ohio Pizza, Inc., 2334 Stanley Ave., Dayton, Ohio 45404.

Columbus, Ohio, Jan. 27. ASM, Central Ohio Chapter. Children's Hospital's Use of Computers, with Malcolm Murray of Children's Hospital; Systems Application Architecture, with Dick O'Connor of IBM. Prescott Center for Tomorrow, 2400 Olentangy River Road. 5 p.m. Contact: Deborah Maccora, Columbus Southern Power Co., 215 N. Front St., Columbus, Ohio 43230.

WEST

Walnut Creek, Calif., Jan. 20. ASM, East Bay Chapter. Monthly dinner meeting. Contact: ASM, 32 Robert Road, Orinda, Calif. 94563.

San Francisco, Jan. 21. Association for Computing Machinery, Golden Gate Chapter. The Changing Role of Supercomputers, with Bruce Gerber. Seven Hills, 252 California. 5:30 p.m. Contact: James M. Spitze, The Systems Consulting Consortium, Inc., P.O. Box 3331, Stanford, Calif. 94305.

Santa Monica, Calif., Jan. 23. DPMA, Los Angeles Chapter. 1988 Installation Dinner Dance. The Chronicle Restaurant, 2640 Main St. 6 p.m. Contact: DPMA, P.O. Box 1047, Hollywood, Calif. 90078.

CANADA

Windsor, Ont., Jan. 18. ASM, Canada Chapter. I.S. Productivity, with Bruce Burgess of Gallanos-Hayward & Partners. Caesars Inn. 6 p.m. Contact: Rich Clemmer, 40 Industrial Drive, Elmira, Ontario, Canada, N3B 3B1.

Toronto, January 18. DPMA, Toronto Chapter. Evolution of Computer Architecture, with Ken Kroeker of Hewlett-Packard. Royal York Hotel. 5:30 p.m. Contact: DPMA, Box 1004, Postal Station P, Toronto, Ont. M4Y 2L4.

Hands-off

CONTINUED FROM PAGE 65

most of his staff, says Dennis Slavich, Bechtel's chief financial officer and Howard's superior. Last month, for instance, Howard rented a Santa Claus suit and cruised the floors of the San Francisco office spreading yuletide spirit. "He's very people-oriented — he tries to make the workplace a pleasant place to be," Slavich says.

To keep in touch with staff working outside the head office, Howard spends about half his time traveling to large job sites in the U.S., Europe and Saudi Arabia. He meets with top management at each site, but he also makes a point of talking with end users to "let them know that there's someone who is looking out for them," he says.

At first blush, the diminutive Howard does not come off as a gregarious, hard-driving globe-trotter. But his mild-mannered nature belies an intensity for personal achievement that has exposed him to almost every side of the computer industry. A self-proclaimed "catalyst," Howard's enthusiasm for computing was first sparked in the mid-1960s at IBM, where he excelled in marketing and revenue planning positions.

Bitten by the entrepreneurial bug, he joined five buddies from Stanford University's Graduate School of Business and cofounded System Industries, Inc., a disk subsystems manufacturer in Sunnyvale, Calif. "Bill is soft-spoken, but he is very effective because he backs it up with pertinent facts, not bravado. He's very analytical," says Ed Zschau, a partner with venture capitalist Brentwood Associates in Menlo Park, Calif., and the chief founder of System Industries.

While Howard relies on seasoned professionals to carry out delegated responsibilities, he also emphasizes the need for an infusion of young blood into the company. "Younger people have damn good ideas, and they don't carry a lot of the old baggage of an earlier era with them; you need those kind of ideas to challenge the old ways," he says.

But a real problem, according to Howard, is the feeling among many of today's college graduates that success comes on a silver platter. Paying your dues is sometimes seen as a thing of the past.

"A lot of MBAs come out of college and they get a very high-paying first assignment, and they think that guarantees them entry to the executive suite," he says. "There has to be more patience — people still have to prove themselves."

The 'Godfather'

Howard has been proving himself at Bechtel for the last 15 years and shows no signs of letting up. Slavich describes him as the "Godfather" of Bechtel's new Information Technology Strategic Plan, a complex long-term mission to get the fragmented company on one integrated operating system with complete hardware and software standardization.

"Bill's strongest point is that he is always looking ahead in terms of where technology is going and where we should position ourselves so that we can be the most competitive," Slavich says.

Credited by his peers for being as much a salesman as a technological visionary, Howard spearheaded the development of Bechtel's commercial software business unit.

Howard says that selling a project or a piece of equipment to skeptical company end users demands a lot of talking, teaching and, perhaps most of all, listening to employees' concerns. As mayor and councilman in the Northern California town of Larkspur in the late 1970s, Howard spent much of his time listening to end users of a different sort.

But gearing up for tomorrow's hot technology often demands that the company shed or modify its present plans, Howard says. That can lead to frustration for the manager of information services, but Howard says most ordeals ultimately turn out satisfying: "It's a crazy business, but the information industry is about as exciting as you can get — you never get bored."

Lasky

CONTINUED FROM PAGE 65

sent to your boss. Being there enables you to listen, put yourself in another person's shoes and offer an explanation or suggestion. You have the opportunity to influence or control events and eliminate obstacles, or at least steer around them.

There is another important aspect to walking around that falls into the category of "little favors." You can get a lot of mileage out of meeting and talking with people, even if it's not related to specific projects. Helping others so they will help you is what it's all about.

By now, I've probably angered all those who worship the rigid, formal planning and control methodologies. There are hundreds of software packages to help you plan and control projects. I'm not minimizing the importance of those techniques. But they are not management: Management deals with getting people to do what you want done. To do that, you have to exercise control.

There are few managers who can exercise direct control — that is, give orders. What you have to do is win confidence so you can influence people and events. Management by walking lets you give and recieve information and take the pulse of an organization so you can exercise control and realize objectives.

Lasky is director of MIS for Dorr-Oliver, Inc. in Stamford, Conn.

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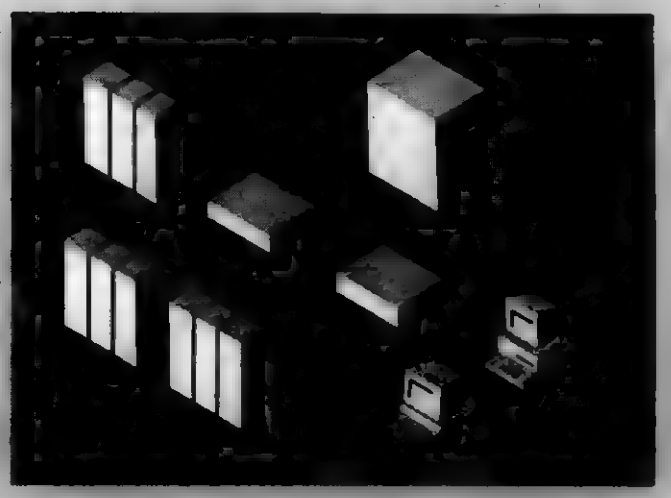

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CALENDAR

JAN. 17-23

Third Conference on Hypercube Concurrent Computers and Applications. Pasadena, Calif., Jan. 19-20 — Contact: Patricia McLane, Jet Propulsion Laboratory, MS 180-205, Pasadena, Calif. 91109.

1988 Optical Disk Systems Conference. Phoenix, Jan. 20-22 — Contact: Jean O'Toole, CAP International, One Snow Road, Marshfield, Mass. 02050.

Third Annual Technology in The Law Practice: The Lawyer's Personal Workstation. Dallas, Jan. 20-23. — Contact: The Conference Desk, Inc., 3701 Fairmont St., Dallas, Texas 75219.

Military and Space Graphics: New Applications and Future Requirements. Cape Canaveral, Fla., Jan. 21. — Contact: Tanya Wilson, National Computer Graphics Association, Suite 200, 2722 Merrilee Drive, Fairfax, Va. 22031.

JAN. 24-30

Conference on Interactive Videodisk Systems. Clearwater, Fla., Jan. 24-26 — Contact: Institute for Graphic Communication, Inc., 375 Commonwealth Ave., Boston, Mass. 02115.

The Desktop Communications Conference. Anaheim, Calif., Jan. 25-27 — Contact: Infonetics, Inc., Desktop Communications Conference, Suite 100, 3235 Kifer Road, Santa Clara, Calif. 95051.

Measuring Quality and Productivity in a Data Processing Environment. Orlando, Fla., Jan. 25-27 — Contact: Quality Assurance Institute, 9222 Bay Point Drive, Orlando, Fla. 32819.

Communications Networks '88. Washington, D.C., Jan. 25-28 — Contact: IDG Conference Management Group, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

Florida Instructional Computing Conference. Kissimmee, Fla., Jan. 25-28 — Contact: McRae and Co., P.O. Box 12187, Tallahassee, Fla. 32317.

Second Annual Conference on Improving Productivity in EDP System Development. Tucson, Ariz., Jan. 25-29 — Contact: Applied Computer Research, Inc., P.O. Box 9280, Phoenix, Ariz. 85068.

DB2/SQL Users Group Meeting. New York, Jan. 26 — Contact: DB2/SQL Users Bulletin, Box 560, Wall Street Station, New York, N.Y. 10005.

Logistex 88. Anaheim, Calif., Jan. 26-28 — Contact: The Material Handling Institute, Inc., Suite 201, 8720 Red Oak Blvd., Charlotte, N.C. 28210.

American Bankers Association 1988 National Security and Risk Management Conference. Orlando, Fla., Jan. 26-29 — Contact: Ed Atwood, ABA, 1120 Connecticut Ave. N.W., Washington, D.C. 20036.

JAN. 31-FEB. 6

Financial Investment Management Exposition & Conference. Los Angeles, Feb. 2-3 — Contact: FIM-West, P.O. Box 4440, New York, N.Y. 10163.

Society for Computer Simulation Multiconference. San Diego, Feb. 3-5 — Contact: SCS, P.O. Box 17900, San Diego, Calif. 92117.

Strategic Planning for New Technologies: The Role of the Planner in the 1990s. Chicago, Feb. 5 — Contact: Aida Rivera, Executive Programs, 1221 Avenue of the Americas, New York, N.Y. 10020.

FEB. 7-13

Building an Effective Standards Program. Orlando, Fla., Feb. 8-10 — Contact: Quality Assurance Institute, 9222 Bay Point Drive, Orlando, Fla. 32819.

International Conference on Computers and Law. Santa Monica, Calif., Feb. 8-10 — Contact: Michael Krieger, ICCL 88, P.O. Box 24619, Los Angeles, Calif. 90024.

Focus on Operations-VIII: Profile of the Professional. Las Vegas, Feb. 8-11 — Contact: International Association for Computer Operations Managers, 742 E. Chapman Ave., Orange, Calif. 92666.

Data Storage Interface Week. San Jose, Calif., Feb. 8-12 — Contact: Technology Forum, Suite 260, 80 W. 78th St., Chanhassen, Minn. 55317.

CAP '88 Conference and Exhibition on Desktop and Workstation Publishing Systems. Washington, D.C., Feb. 9-11 — Contact: Computer Aided Publishing, Suite 200, 90 W. Montgomery Ave., Rockville, Md. 20850.

Usenix Technical Conference. Dallas, Feb. 9-12 — Contact: Usenix Conference Office, P.O. Box 385, 16951 Pacific Coast Highway, Sunset Beach, Calif. 90742.

Second Conference on Applied Natural Language Processing. Austin, Texas, Feb. 9-12 — Contact: Donald Walker, Bell Communications Research, MRE 2A379, 445 South St., Morristown, N.J. 07960.

Interex Computing Management Symposium. Anaheim, Calif., Feb. 10-13 — Contact: Interex Conference Department, 880 Almanor Ave., Sunnyvale, Calif. 94086.

FEB. 14-20

Decpo East 88, The 14th DEC-Compatible Exposition & Conference. New York, Feb. 16-18 — Contact: Susan Werfinich, Expocomm International, Inc., 3 Independence Way, Princeton, N.J. 08540.

Enterprise '88. Paris, Feb. 16-19 — Contact: IDG Conference Management Group, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

FEB. 21-27

11th Annual Personal Computing Forum. Naples, Fla., Feb. 21-24 — Contact: Sylvia Franklin, Edventure Holdings, 375 Park Ave., New York, N.Y. 10152.

The Fifth Annual Electronic Printing Systems Conference. San Jose, Calif., Feb. 21-25 — Contact: S. Thomas Dunn, EPS '88 Conference Chairman, Suite 1, 1855 E. Vista Way, Vista, Calif. 92084.

Effective Methods for Data Processing Quality Assurance. Orlando, Fla., Feb. 22-24 — Contact: Quality Assurance Institute, 9222 Bay Point Drive, Orlando, Fla. 32819.

Fourth Annual Computer Graphics New York. New York, Feb. 22-24 — Contact: David J. Small, Exhibition Marketing & Management Co., Suite 1110; 8300 Greensboro Drive, McLean, Va. 22102.

Vision Guidance For Robotic Systems. Cincinnati, Feb. 23-25 — Contact: Joanne Rogers, Special Programs, Society of Manufacturing Engineers, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

Interactive Instruction Delivery/Learning Technology in the Health Care Sciences. Kissimmee, Fla., Feb. 24-26 — Contact: Society for Applied Learning Technology, 50 Culpeper St., Warrenton, Va. 22186.

FEB. 28-MARCH 5

Telecom '88 Bank Telecommunications Conference. Bal Harbour, Fla., Feb. 28-March 2 — Contact: Ed Atwood, American Bankers Association, 1120 Connecticut Ave. N.W., Washington, D.C. 20036.

Third International Conference on CD ROM. Seattle, March 1-3 — Contact: Sherrie Eastman, Microsoft Corp., Box 97017, 16011 N.E. 36th Way, Redmond, Wash. 98073.

MARCH 6-12

2nd IEEE Conference on Computer Workstations. Santa Clara, Calif., March 7-10 — Contact: Computer Society of the IEEE, 1730 Massachusetts Ave. N.W., Washington, D.C. 20036.

Federal Office Systems Expo (FOSE) '88. Washington, D.C., March 7-10 — Contact: Debbie Murray, National Trade Productions, Inc., Suite 400, 2111 Eisenhower Ave., Alexandria, Va. 22314.

1988 Spring National Design Engineering Show and Conference. Chicago, March 7-10 — Contact: SNDES, 999 Summer St., Stamford, Conn. 06905.

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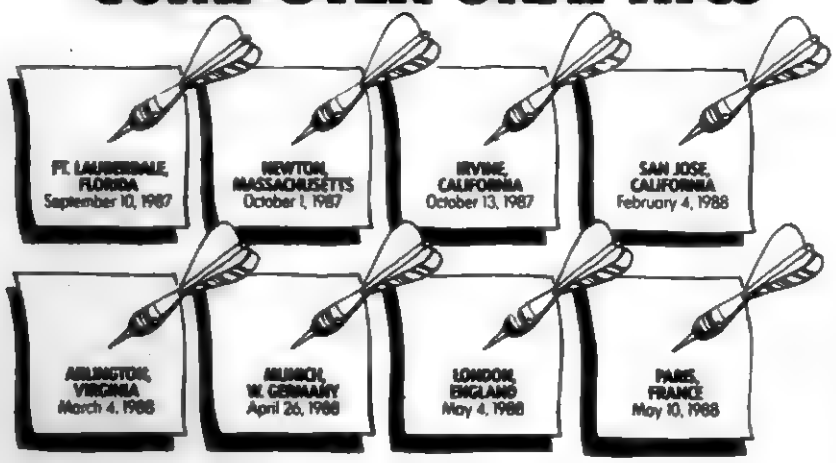

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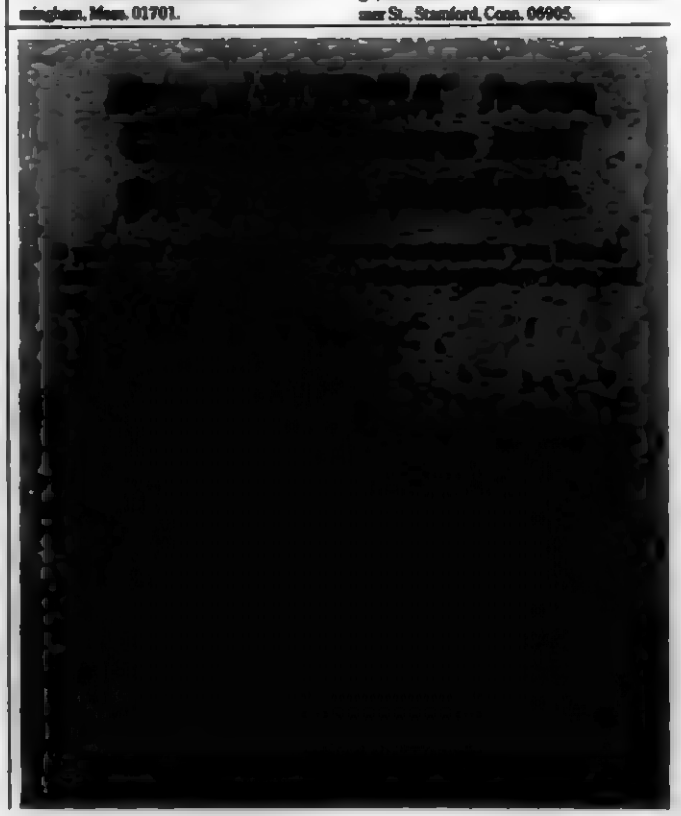


COMPUTER INDUSTRY

INDUSTRY INSIGHT

Bohdan O. Szuprowicz

IBM deploys AI smarts

By default, IBM will become the dominant supplier of expert systems and associated services worldwide during the next few years because independent vendors have not been sufficiently responsive to end-user needs.

This conclusion was reached by New Science Associates, a South Norwalk, Conn.-based artificial intelligence market research firm. The pronouncement was made during the firm's second annual forum on expert systems strategies in Phoenix last month.

Intel 80386-based micros are particularly suitable for the development and deployment of cost-effective expert systems. New Science researchers claim that the increased use will drastically alter the complexion of expert systems markets. The firm estimates that two million

Continued on page 74

AT&T stakes 20% claim in Sun

Investment valued around $300 million; Cassoni to sit on Sun's board

BY ALAN ALPER
CW STAFF

MORRISTOWN, N.J. — Seeking to strengthen its budding relationship with Sun Microsystems, Inc., AT&T last week reached an agreement to acquire up to 20% of the technical workstation vendor over the next three years and gain a seat on Sun's board of directors.

At current stock prices, AT&T's proposed equity investment is valued at approximately $300 million. Vittorio Cassoni, president of AT&T's Data Systems Group, will be nominated to sit on Sun's board at the next directors' meeting in February, AT&T said.

"The intent is for Sun's principal relationship to be with AT&T," noted Bob Holder, director of business development for AT&T's Systems Development Group.

The agreement comes almost three months after the two firms agreed to jointly develop a computing platform based on Sun's Scalable Processor Architecture — a reduced instruction set computing architecture microprocessor — which will run AT&T's Unix System V. [CW, Oct. 26, 1987]. The two companies also agreed to merge Unix System V with Sun's version of the University of California at Berkeley's Unix 4.2.

The investment demonstrates to both potential customers and to the industry AT&T's commitment to the development agreement and ensures that Sun has the resources to fulfill its end of the deal, Holder said. Sun's stock value will likely increase as a result of the deal, a situation which will benefit AT&T as well as other stockholders, he added.

"We're better able to protect our investment, and Sun remains an independent company," Holder noted.

Analysts also interpreted the deal as positive for both firms. "Psychologically, this is good for AT&T," noted Ken Leon, an analyst with Bear, Stearns & Co. in New York. "It gives them greater credibility in the computer industry."

The deal enables Sun to raise money by selling its shares at a premium without actually losing control of the company, analysts pointed out. Given the recent volatility of the world's financial markets, this type of financing arrangement makes sound business sense, observers noted.

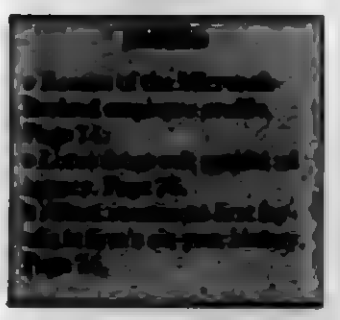
A Sun spokeswoman said proceeds would be used for additional research and development as well as for capital equipment and plant facilities.

Sun would have needed additional capital by late 1988, analysts said, because it would have been unable to rely on internally generated cash to fund its astronomical growth rate, which has exceeded 100% during the last two years.

"They'll need money, because a company eats up cash when it grows as rapidly as Sun has," noted Michael Orsak, an analyst with Robertson, Colman & Stephens, Inc.

Sun has raised money twice during the last 14 months. A secondary public offering in November 1986 brought in $80 million, while a convertible subordinated debenture offering raised $100 million in February 1987.

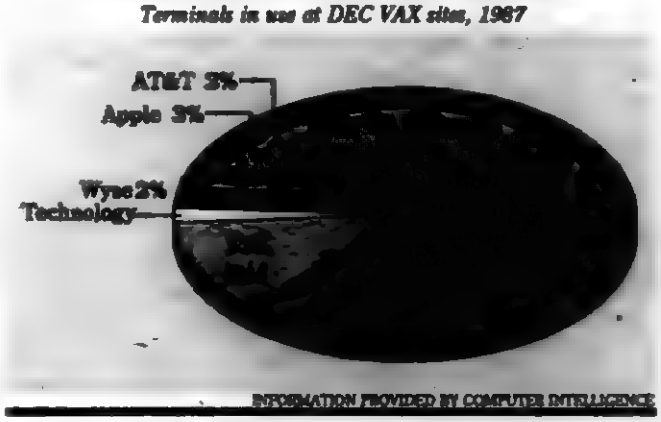
In addition to AT&T's proposed stake, Eastman Kodak Co. also owns 4.5% of Sun.



Data View

Terminal market share: U.S. VAX sites

Terminals in use at DEC VAX sites, 1987



INFORMATION PROVIDED BY COMPUTER INTELLIGENCE

Deja vu at Software Publishing

BY STEPHEN JONES
CW STAFF

MOUNTAIN VIEW, Calif. — It is easy to see why Fred Gibbons might be experiencing a sense of deja vu these days.

Just four months after leaving his post as president of Software Publishing Corp. to become chairman of the company, Gibbons has been tapped to take over his old position and step down as chairman.

The management shuffle occurred abruptly at the end of last month, when former President Janelle Bedke unexpectedly resigned [CW, Jan. 4]. Formerly the chief of operations, Bedke had been president since August 1987. Gibbons resumed his job as president, and Jack Melchor, a longtime Software Publishing director, took over as chairman.

In an interview last week, Gibbons said he plans to follow most of the agenda that Bedke helped him develop. He said he will continue to pump up sales to corporate America with a new direct marketing sales force. He hopes corporate sales, which account for about 25% of the company's orders today, will double to 50% of total sales by 1990.

Fred Gibbons

Like Bedke, Gibbons said connectivity to other software vendors' applications will increase. But he seemed less enthusiastic than Bedke about starting a line of products for Apple Computer, Inc.'s Macintosh.

Bedke, in an interview with *Computerworld* one week before her resignation, was determined to have Software Publishing develop or acquire new Mac products as early as 1989.

"Some of our products are just begging for the Mac interface," said Bedke, who alluded to the possible acquisition of a Mac product in 1988.

Gibbons, however, did not express the same interest. "We will consider the Mac, but only if we have extra resources — right now we have no plans for the Mac," he said.

Bedke's departure comes at a time when the once financially troubled company is showing signs of a rebound but has sent mixed signals to users.

While such events might be viewed as signs of instability, analysts remain optimistic about the company's future.

"I was surprised at the timing of Bedke's resignation, but I don't think it will hurt the company," said Will Edwards, an investment analyst with San Francisco-based Volpe & Covington. "The turnaround is in place, and it shows no signs of letting up."

Feds: Computer industry fastest growing in '88

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The U.S. computer industry is projected to continue its moderate recovery from the slump of 1986 with a 22% increase in sales in 1988, according to the federal government's annual "Industrial Outlook" report.

The U.S. Department of Commerce forecast put the computer industry in the No. 1 position on its list of predictions for the fastest growing industries in 1988. But the 22% figure, which represents a growth rate for the combined hardware and software industries, obscures big differences between the two industry segments.

Furthermore, the projections were based on optimistic economic assumptions, such as a 3.5% increase in the gross national product (GNP) in 1988, and were written before the Oct. 19, 1987 stock market crash. A November 1987 survey by the National Association of Business Economists predicted a 2.1% growth in the GNP for 1988.

The software industry is expected to grow at its regular rate of 24%, while hardware shipments should increase 10% in 1988, which is much lower than the compound annual rate of 18% experienced from 1972 to 1985. The value of hardware shipments declined nearly 4% in 1986 and began to recover last year with an 8% increase, the report said.

"The U.S. computer equipment industry has entered an era of heightened foreign competition, increasing product standardization, aggressive pricing and shorter product cycles," Commerce Department analysts said.

Continued on page 76

Microsoft-Borland scuffle could open exit door

BY STEPHEN JONES
CW STAFF

REDMOND, Wash. — Rob Dickerson's embattled but successful jump from Microsoft Corp. to a job with rival Borland International could open the exit door for other key Microsoft workers previously snagged by a strict "noncompete" employee agreement.

Microsoft tried to enforce the policy, which prohibits an employee from working for a competitor for at least one year after resigning, when Dickerson quit as languages manager Nov. 13, 1987. Borland challenged that policy in court, and the two companies reached an agreement last month that allowed Dickerson to work for Borland.

Although both sides claimed a mutual victory after the out-of-court settlement, analysts said Microsoft had more at stake than blocking a seepage of trade secrets to the competition.

'The short end'

"It looks like Microsoft got the short end of the deal," said Bruce Johnston, an analyst with First Boston Corp. in New York. "They tried to prevent an employee from working for a competitor, and that employee went ahead and worked for the competition anyway."

Borland and Dickerson contested Microsoft's noncompete policy in a U.S. District Court in California, charging that such a covenant was not enforceable outside of Washington, Microsoft's home state. Borland also made Microsoft out to be the bad guy in an impassioned statement that characterized the company as a bully attempting to "lock in its employees with restrictive hiring practices."

"It's hard to enforce that kind of employee agreement, particularly when you cross state lines, and that's what this [case] shows," Johnston said.

Although Microsoft workers may now be able to quit their jobs with more ease, they will not be going to Borland in the immediate future. As part of the settlement, both companies agreed they will not hire an employee from each other for the next six months.

Under the settlement, Dickerson will be prevented from participating in the development and marketing of all batch, macro or programming languages and related toolboxes for a period of nine months after his Nov. 14 start date at Borland.

Dickerson will be allowed to work with Turbo Pascal, Turbo Modula-2 and Turbo Prolog, according to the agreement. An independent micro software expert will be hired to monitor the implementation of the agreement.

Szuprowicz

CONTINUED FROM PAGE 73

386-based micros will be sold this year, 5% to 10% of which will be purchased primarily for expert systems development and applications. This may well account for about 60% of all expert systems hardware procurement in 1988. Workstations, minicomputers, mainframes and specialized LISP machines will make up the other 40%.

IBM is fully aware of these market shifts, which have already been exploited by DEC. DEC became a world leader in AI and expert systems hardware and applications during 1987, deriving about $150 million in revenue in these categories. Rumors emanating from European DEC sources also suggest that the company will come out with an expert system shell product of its own; these rumors were not denied by DEC executives at the New Science forum.

Focus on customer loyalty

A major IBM objective is to keep its users from switching to DEC equipment, and Big Blue is embarking on an ambitious program to become the dominant supplier of AI and expert systems technology in all industries. IBM is currently deploying teams of knowledge engineers to help clients develop strategic expert system applications at several hundred mainframe sites at which ESE products have already been installed.

IBM's AI Projects Office, which develops the company's expert systems market strategy, is believed to have the continuing attention of the highest management levels. The IBM AI committee has already made decisions to enhance ESE products, announced Knowledge Tool software and made special arrangements with Intellicorp for development of an IBM version of that vendor's KEE expert system shell to run on general-purpose mainframes.

New Science analysts say IBM is going to enhance its existing ESE shell by rewriting the system in C, making it much more easily embedded in mainstream data processing systems.

New Science says IBM will announce a 386-based PC version of its enhanced ESE early in the last half of 1988. When that happens, the expert systems market could skyrocket overnight — and give IBM a decided advantage over its competitors.

Szuprowicz is managing consultant of the expert systems practice at Computer Task Group, Inc.

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Lotus settles suit out of court

BY ED SCANNELL
CW STAFF

BOSTON — Lotus Development Corp. last week dropped its suit against Rossin Greenberg Seronick & Hill that accused the advertising company of peddling trade secrets to a competitor [CW, Dec. 14].

The out-of-court settlement included an apology to Lotus from Rossin Greenberg Seronick & Hill as well as a promise not to seek or perform work for any companies manufacturing or selling microcomputer software products for the next 10 months without first gaining Lotus's permission.

Lotus filed suit against the agency Dec. 11, accusing the firm of soliciting business from Microsoft Corp., a major Lotus competitor, by offering Microsoft confidential information about Lotus. The agency filed a countersuit claiming Lotus damaged its reputation.

"Given that Lotus started off saying we tried to sell trade secrets and ended up accepting written assurances we would have given them on Dec. 10, we're happy," said Neal Hill, president of Rosein.

In a prepared statement, Lotus President and Chief Executive Officer Jim Manzi said his company accepts the apology of Rossin Greenberg Seronick & Hill and is "grateful" to see the firm is committed to marketing its experience without using confidential information.

The cover of the four-page brochure Rossin sent to Microsoft, which was designed by two ex-Lotus account executives, read, "You have probably never thought about talking to an agency in Boston." On pages two and three, it said, "But since we know your competition's plans, shouldn't you think about taking a flyer?" The brochure's pocket contained plane tickets from Seattle, near Microsoft's base in Redmond, Wash., to Boston.

Hill said the point of the ad was to highlight the experience Rossin had with Lotus and that it could bring to bear on the Microsoft account, not to imply the company was offering trade secrets.

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Alliant seeks overseas market

LITTLETON, Mass. — Seeking to channel its resources away from the U.S. and into overseas markets, Alliant Computer Systems Corp. last week announced the first layoffs in its six-year history.

The minisupercomputer maker plans to eliminate 40 jobs at its corporate headquarters but hire 50 international sales and support employees. "We've seen the U.S. market slow down substantially," Alliant President Ronald Gruner said. "We have to play a little catch-up overseas."

Alliant hired former Prime Computer, Inc. international sales chief Roger Parsons to head worldwide sales. Parsons was most recently president of Vmark, Inc., a software firm.

Industry

FROM PAGE 73

Sales of mainframes will grow only 5% (about the same as in 1987), sales of micros will grow 14%, and sales of supercomputers will grow 36% in 1988, the forecast said.

The report also made forecasts for several computer-related industries. For example, it said that although the market for data processing services has matured, some organizations still contract for remote processing. Revenues in this industry are expected to grow 13% in 1988, stimulated by activity in the financial services market. Also, revenues for computer professional services, such as custom programming, systems integration and consulting, will grow about 20%.

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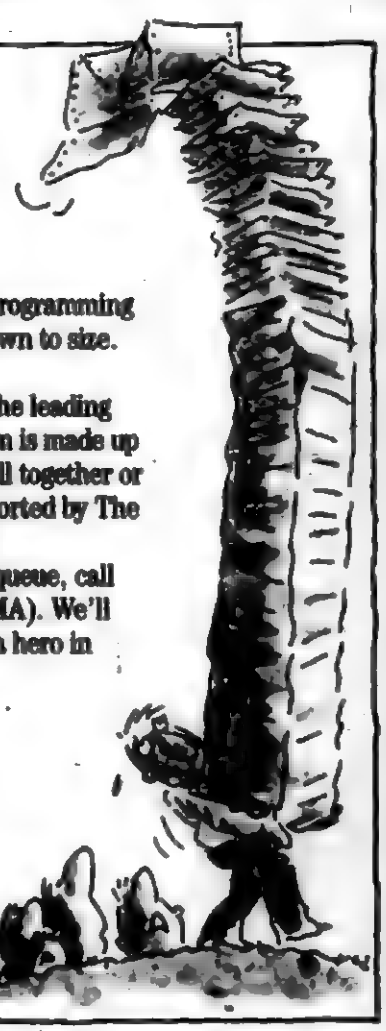

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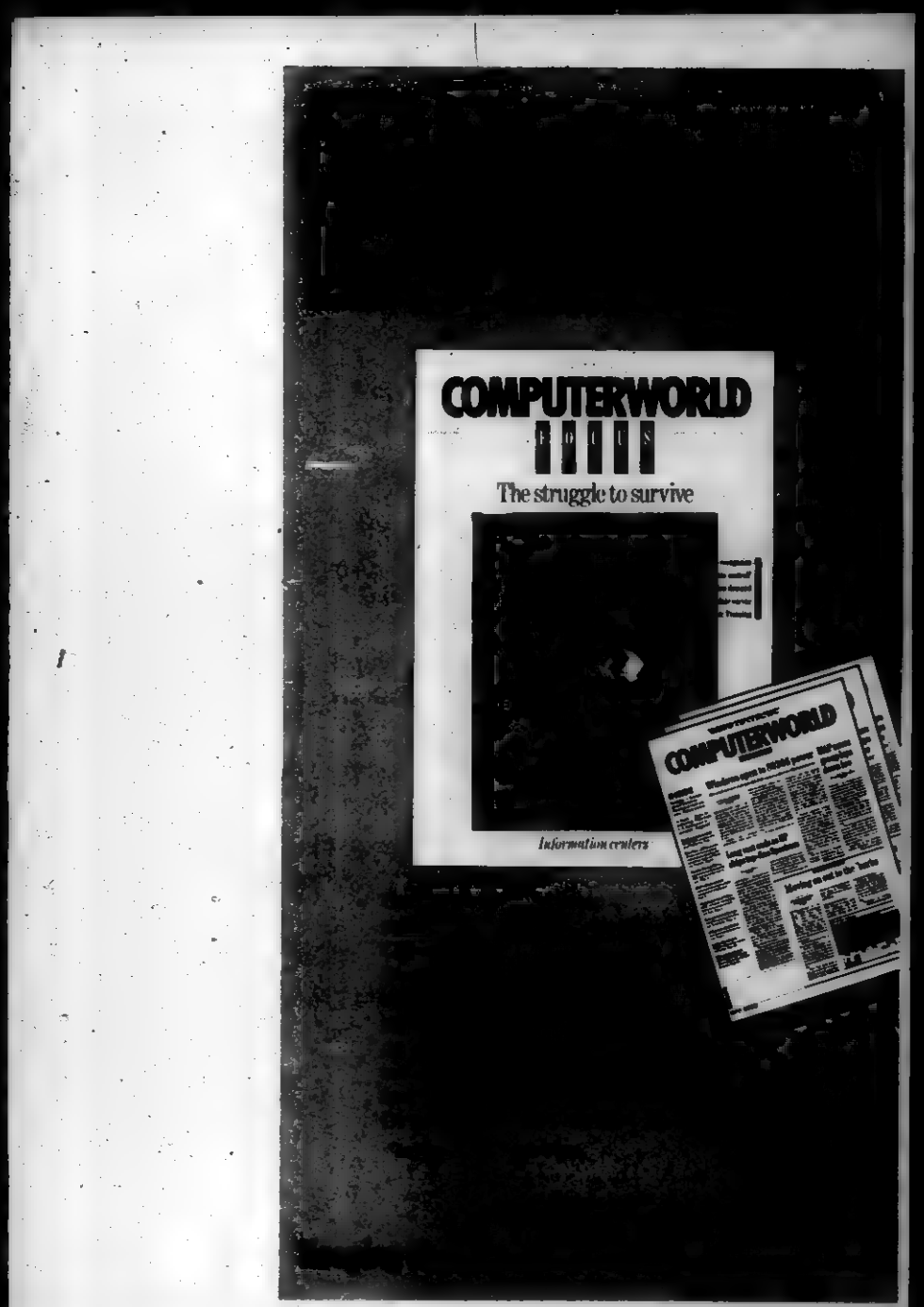
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Knowledge of tools not mandatory

Dearth of experts causes companies to train applications programmers

BY MICHAEL BALL
SPECIAL TO CW

Despite the proliferation of application tools, including code generator and computer-aided software engineering (CASE) packages, companies looking for applications programmers are willing to train candidates for the position rather than expect them to possess expertise in the new methods.

"It would be great if we could find someone who is an expert with these tools, but we don't expect it," says James Lair, senior development center consultant with Dayton-Hudson Corp. in Minneapolis.

Code generators and CASE tools are so new and diverse that they currently affect the performance of the job much more than getting hired. "It's tough," says Betsy Behnke, a systems analyst at San Diego Gas & Electric Co. "The technology is changing so rapidly."

Programmers in demand

With a high demand for applications programmers on a variety of platforms, Behnke's company advertises nationwide and employs consultants while waiting for or training the right people. Regarding CASE tools, Behnke says, "We want people with experience, but it's very hard to find long-term experience. There are a lot of different types of tools, and we expect to train for a specific one on the job."

Likewise, Lair says, "a person walking in here has got a bigger task every year for getting trained and started." The new applications writing aids add yet another layer of complexity. "There is no standard CASE product," he says, "and we recognize that. It's not like Cobol or PL/I. People don't have lists of CASE products on their resumes yet."

Custom training

Bruce Sherman, a Minneapolis-based consultant, agrees. "I don't see a real demand for new skills. Most companies look for well-developed programming skills and teach specific tools on the job."

Companies are also looking for specific kinds of programming experience, he adds. "The hot spot seems to be front-end design tools," Sherman says. "A lot of companies want people who can create and maintain some kind of link with these. There's a lot of noise from data base administration about linking tools with data dictionaries and data depositories."

That sentiment was echoed by Steve Harrison, manager of systems development for Profit Freight Systems in Marietta, Ga. "We definitely look for data base experience," Harrison says.

> "IT WOULD be great if we could find someone who is an expert with these tools, but we don't expect it."
>
> JAMES LAIR
> DAYTON-HUDSON CORP.

At Profit, "we have divided things up," Harrison says. He uses one set of programmers that he calls "the typical Cobol droid" and another set experienced primarily in C for minicomputers and supermicros.

For the latter group particularly, the company is willing to provide training for specific packages, as long as the general skill sets are strong.

"We look for a lot of experience with a number of different languages, and we stay away from people who know only one thing," Harrison continues.

"The candidates who know only one language don't seem to be as innovative, particularly with the hybrid solutions that we often need in applications programming," he says.

Even in an established applications environment, basic skills come first and tool-specific expertise next, according to Bob Peddycord, manager of computer systems development at the Bowman Gray School of Medicine, Wake Forest University in Winston-Salem, N.C. His shop uses McCormack & Dodge Corp. development tools as well as financial packages, but when he next hires, Peddycord says he will look beyond those.

"Of course, I'd like to have someone with specific McCormack & Dodge experience," he says. "But just as important is good business experience, like payroll; someone who really knows what the users are talking about."

What the market will bear

Like other managers, Peddycord accepts that "we have to pay for the good programmers — they still demand top dollar." His perception is that even without the package-specific experience, the good applications programmers will be worth the investment.

In San Diego, Behnke's attitude is similar. She finds the local environment a little less competitive than the rest of California, but it is still one in which she must fight for applications programmers. "I know the Southeast is looking for a lot of people, as they are in Los Angeles," she says. Behnke adds that her utility pays 3% to 5% above the market rate to get the people it needs.

Although there is currently a good pool of programmers with general experience from which to draw, Behnke says that both the nature of the field and the demands of companies may change as the technology matures.

Similarly, Lair sees a greater emphasis on entity relations and data flow diagrams. The days of grinding out applications code may be waning.

"There are a lot of tools to help operations analysts, software maintenance people and those in the development area," he says. "Now when you go into a system to enhance it, there is a small amount of automation. Maybe in a few more years, we'll see people coming out of college with this experience."

Sherman says the nature of the programmer/analyst job is shifting to design and analysis. Code generators are taking over the monotony of writing code. In a few years, as the application programming trade settles on tools, companies will require brand name expertise to match, he says.

Ball is a free-lance writer based in Boston.

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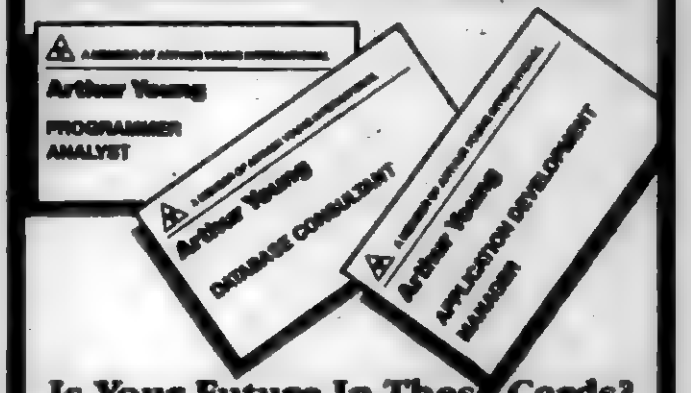

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Vice President
Data Arts & Sciences, Inc.
Weston, MA

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"Our agency specializes in finding computer consultants — designers of systems, evaluators of hardware and software requirements, and computer programmers to mention a few. We recently were introduced to Computerworld as a potential source for finding these consultants," states Bjorn. *"I liked the idea because I know Computerworld has a broad reach — from MIS/DP directors to computer programmers, in multiple industries and multiple markets — and that's what DASI needs."*

"We had four specific positions for MIS/DP consultants that we needed to fill in northern New England. We used the local newspaper on a weekly basis, but people who are willing to move usually aren't reading the local Sunday paper. So, I felt this was a perfect opportunity to try Computerworld," says Bjorn.

According to Bjorn, he's quite satisfied with the results. *"From Computerworld, we filled 75% (3 out of 4) of the positions with the responses from the first week, and the remaining position with the response from the following week. These results alone made my ads in Computerworld worthwhile."*

And Bjorn also recognizes a second benefit to advertising in Computerworld. *"The beauty of using Computerworld is that it's read by people in the computer industry who have a need for consultants, as well as being read by consultants who need to keep up to date on the marketplace,"* says Bjorn. *"So we not only reach qualified candidates to fill our current openings, but we are creating awareness of the services that DASI has to offer,"* says Bjorn.

"We have some great plans for expansion and as we do, Computerworld is going to play a strong hand in helping us accomplish our goals," concludes Bjorn.

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CHICAGO: 2600 South River Road, Suite 304, Des Plaines, IL 60018, (312) 827-4433

LOS ANGELES: 18004 Sky Park Circle, Suite 100, Irvine, CA 92714, (714) 250-0164

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P/A	DEC VAX, RDB or Ingres	GA, NC
P/A	IBM S/38, MAPICS, RPG III	NC, FL
S/A	Insurance (PMS, LIFE/70)	NC, SC
S/A	IDMS, mfg/Dist	GA, TN
P/A	IBM CICS, MVS, COBOL	GA, NC
P/A	IBM S/38, RPG II, mfg	FL, NC
DBA	DB2 (ARF conversion)	FL, GA

CONTRACT

POWR	HP 3000, ASK, MANMAN, COBOL	GA
POWR	IBM S/38, MAPICS, COBOL	NC
P/A	UNIV 1100, IDMS, HP MAPPER	GA
P/A	TANDEM EFT, Ingres, TAL	GA
P/A	Univ Files, DMS II, Batch, COBOL	AL
P/A	NCR Elite, CIF, Batch, COBOL	FL
POWR	IBM S/38, other RPG III	TN
S/A	IBM S/38, mfg, Banking	SC
DBA	DEC VAX, RDB design	SC
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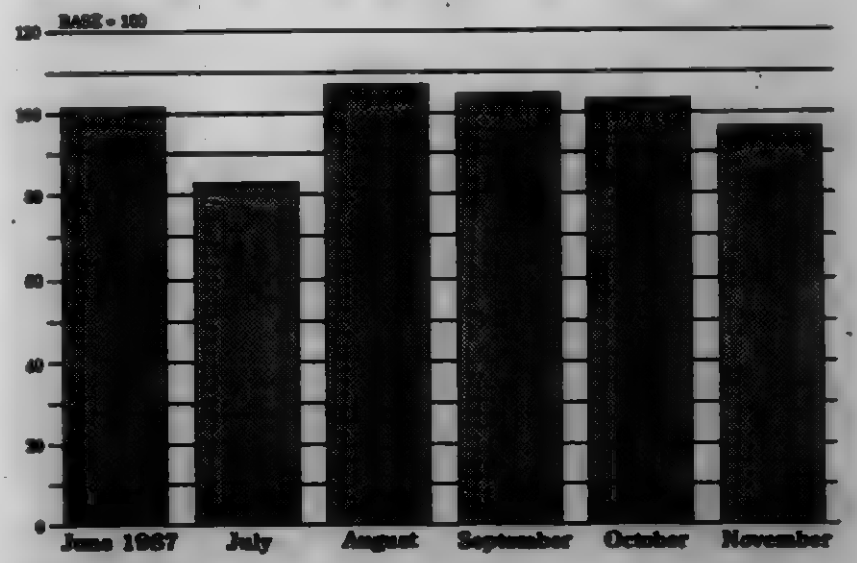
CAREER INDEX

Computer recruitment advertising index*



*Analysis of Computerworld and selected major U.S. newspapers

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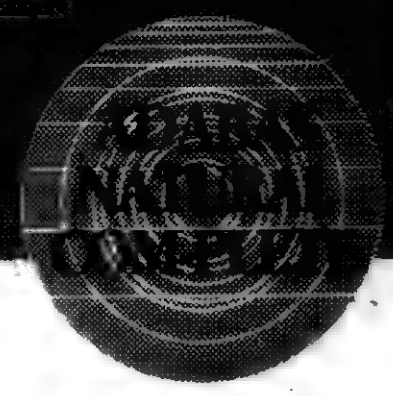

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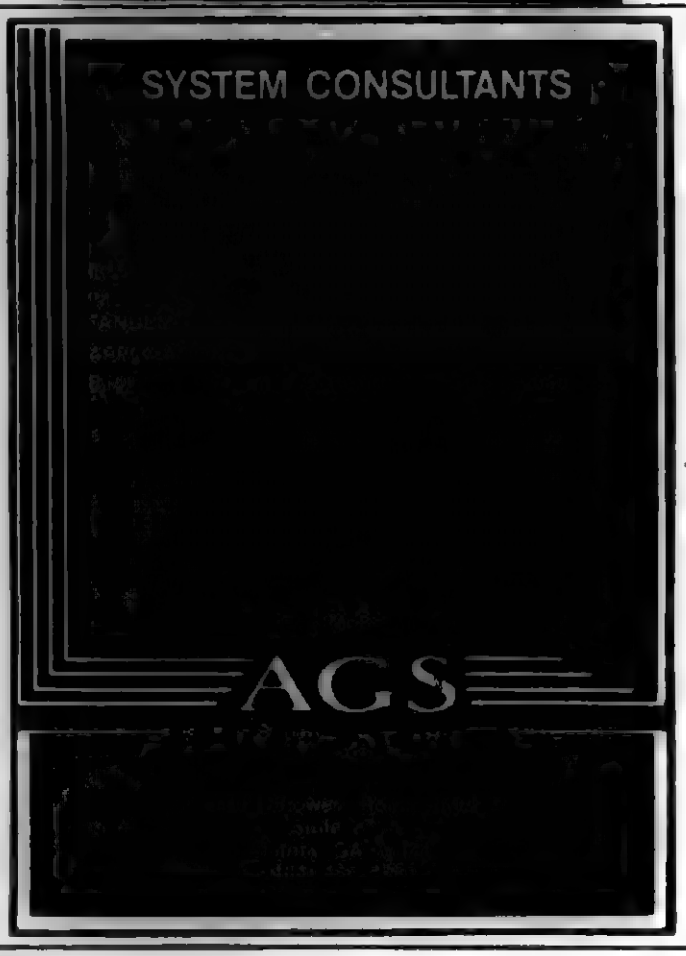

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MARKETPLACE

New year's flood brings tide of older DOS machines

BY ELIZABETH LOZANO
BOSTON COMPUTER EXCHANGE CORP.

Trading volume was high the first week of January as the flood of older DOS machines into the used market began.

IBM trading was flavored by volume deals. The Personal Computer closed even at $700, with matched supply and demand. The PC XT 10M-byte version closed off at $1,300. With prices and demand peaking during the last couple of months, the XT Model 089 dropped slightly, closing at $1,825, under pressure from an increase of supply. The AT Model 099 closed even this week. The AT Model 339, however, rose sharply, closing at $3,500.

In the Compaq Computer Corp. world, trading was sluggish. The only models that experienced high demand and volume the first week of this month were the Portable and Deskpro lines. The Portable I closed even at $725. The Portable II closed even at $1,700, with a marginal decrease in demand. The Compaq Plus closed up at $1,275, experiencing a mid-week supply shortage. The Deskpro 286 also closed up slightly, at $2,175, trading in lower volume than the AT Model 099. Compaq 386 trading was frantic. The Deskpro 386 closed up at $4,350.

Apple Computer, Inc. Macintosh trading maintained a steady pace. The Mac 512 closed up at $850. The 512E held steady at $1,000, with a notable lack of volume transactions. The Mac Plus recovered slightly from a dramatic fall at the end of December, closing at $1,325. The Mac SE and Mac II closed even at $1,900 and $4,000, respectively, with new street prices holding used prices at this level.

The Boston Computer Exchange can be reached at 617-542-4414.

The BoCoEx Index: Closing Prices Report

for the week ending January 1, 1988

IBM PC Model 076	$700	$875	$400
IBM XT Model 086	1,300	1,425	900
IBM XT Model 089	1,825	2,050	1,300
IBM AT Model 099	2,250	2,900	2,250
IBM AT Model 339	3,500	3,700	2,800
Macintosh 512	850	875	650
Macintosh 512E	1,000	1,100	875
Macintosh Plus	1,325	1,400	1,200
Macintosh SE	1,900	2,150	1,700
Macintosh II	4,000	4,200	3,500

INFORMATION PROVIDED BY THE BOSTON COMPUTER EXCHANGE

IBM terminal values spiral downward

BY NANCY DIPALMA
and MARY JACUBOWICZ
INTERNATIONAL DATA CORP.

The secondary market value of the IBM 3179 Model 1 is on the decline. Used values of this color display have dropped roughly $140 since early fourth-quarter 1987 as a result of end users displacing this box for IBM's new 3192 Model C replacement product. Market research firm International Data Corp.'s (IDC) secondary market contacts indicate that values for the 3179 Model 1 will eventually stabilize. IDC expects the terminal to remain a popular choice.

The used market for IBM's 3180 Model 110 monochrome display is in the same downward mode as the 3179 Model 1. Used prices for the Model 110 have dropped approximately $220 since the start of last year's fourth quarter. IDC anticipates used values for this monochrome display to continue dropping as end users remove their older 3180 Model 110 boxes and replace them with the 3192 display. This process will create an oversupply of 3180 Model 110 terminals on the secondary market, which in turn will put downward pressure on the Model 110's used prices.

In October 1987, IBM reduced purchase prices on the 3180 and 3179 System/34, 36 and 38 displays. The 3180 Models 210 and 220 were reduced by approximately 25%, from $1,695 to $1,235. The 3179 Models 200 and 220 were also reduced by roughly 25%, from $1,750 to $1,335.

As a result of this pricing action, used values for the 3180 Model 210 and the 3179 Model 200 have dropped roughly $200. The 3180 Model 220 and the 3179 Model 220 still remain scarce on the secondary market. According to IDC's third-party market sources, used values on the 3180 and 3179 System/34, 36 and 38 displays should match demand for the corresponding computer equipment.

The secondary market situation still remains dismal for the 3274 control units, as used values are still falling. The largest declines have been reported for the 41X models' used prices. Those values have dropped from $500 to $700 in only one month.

IDC can be reached at 617-872-8200.

IBM printer pricing

3800 Model 3	$289,000	First-quarter 1983	20,040 line/min	page, laser	67
4245 Model 12	$31,000	Third-quarter 1985	1,200 line/min	band, impact	78
3262 Model 3	$15,040	NA*	650 line/min	band, impact	50
5224 Model 2	$6,550	Third-quarter 1982	240 line/min	line matrix, impact	73

* Not available

INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.

Deals found in printer arena

BY NANCY DIPALMA
and MARY JACUBOWICZ
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The IBM 3268 Model 2 continues to decline in the used printer market. In the past 12 months, the printer declined 53%, from $5,074 last January to $2,360 now.

The serial matrix IBM 3287s are still in abundant supply in the secondary market. As a result, the market has been very competitive in its pricing of these printers.

IBM's 3800 Model 3 has experienced normal market fluctuation during the last few months. Deals reported on the native Model 3 have ranged from 73% to 50% of retail. The upgraded version of the Model 3 trades for approximately $50,000 less than the native model.

Used values on the IBM 4245 Model 20 remain high. There is a strong demand for this printer.

The IBM 4214 Model 2 has dropped in value recently. The secondary market has reported less interest in this printer and more in IBM's 4224, which offers users greater graphics capabilities. In November, the Model 2's fair market value was 91% of retail ($4,200); it is now trading at 74% of retail, or $3,400.

The holding trend persists for IBM 5224 and 5225 printers. For the past year, the value of these reasonably priced System/34, 36 and 38 printers has been very stable.

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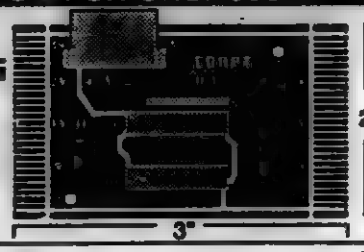

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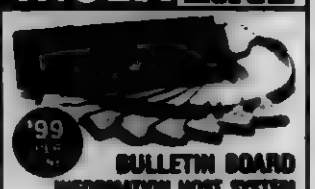

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Feb. 29	Performance Management/ Capacity Planning	Feb. 12
March 14	DBMS	Feb. 26
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April 25	TBA	April 8
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May 23	Data Communications	May 6

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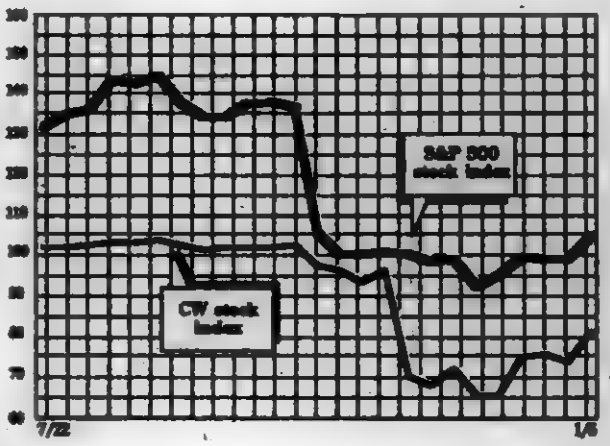

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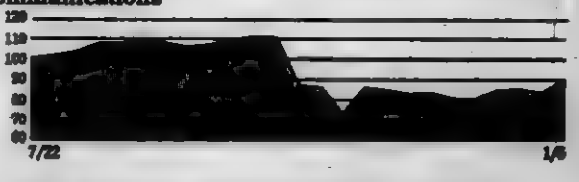
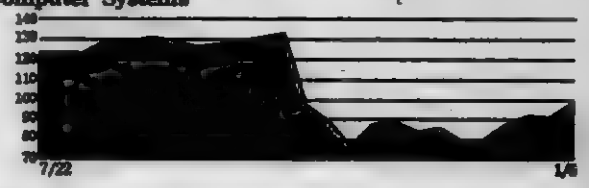
Communications	83.2	89.0
Computer Systems	91.1	98.3
Software & DP Services	96.8	102.5
Semiconductors	61.4	64.5
Peripherals & Subsystems	80.6	87.6
Leasing Companies	94.2	103.9
Composite Index	80.5	86.5
S&P 500 Index	100.5	105.5

Communications



Computer Systems



Software and DP Services

Semiconductors

Peripherals and Subsystems

Leasing Companies

CW CHARTS: AMY J. SWANSON

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JANUARY 6, 1988

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JAN. 6 1988	WEEK NET CHNGE	WEEK PCT CHNGE
	Communications and Network Services					
N	AMERICAN INFO TECHS CORP	100	74	88.25	1.38	1.54
O	ANDREW CORP	19	11	14.50	1.00	7.41
O	ARTEL COMM CORP	5	2	2.13	0.25	13.33
N	AT&T	36	20	28.25	0.75	2.73
O	AVANT GARDE COMP INC	6	2	2.13	0.00	0.00
O	AVANTEK INC	19	7	8.38	0.63	8.06
N	AYDIN CORP	39	16	19.25	0.38	1.99
N	BELL ATLANTIC CORP	80	61	67.00	2.00	3.08
N	BELLSOUTH CORP	44	28	37.13	0.63	1.71
O	COMPRESSION LABS INC	8	2	3.88	1.13	40.91
O	COMPUTER NETWORK TECH	6	2	1.94	0.13	6.89
O	CONTEL CORP	40	28	30.00	1.25	4.35
O	DATA SWITCH CORP	9	4	6.38	0.25	4.08
O	DIGITAL COMM ASSOC	49	26	33.00	5.25	18.92
O	FIBRONICS INT	26	12	20.75	0.50	2.47
O	FIBRONICS INTERNATIONAL INC	11	2	2.50	-0.50	-16.67
O	DYNATECH CORP	44	14	21.75	1.75	8.75
O	GANDALF TECHNOLOGIES	11	6	6.50	0.13	1.96
O	GENERAL DATACOMM INDS	14	3	4.13	0.00	0.00
N	GTE CORP	46	29	35.88	0.25	0.70
O	INFOTRON SYS CORP	12	6	7.00	0.50	7.69
N	ITT CORP	66	42	47.25	3.00	6.78
N	M A COM INC	16	7	10.13	1.13	12.50
O	MCI COMMUNICATIONS CORP	12	6	10.50	0.88	9.09
O	MICOM SYS INC	18	7	8.75	1.13	14.75
O	NETWORK SYS CORP	19	7	9.38	0.63	7.14
N	NORTHERN TELECOM LTD	24	14	18.88	1.25	7.09
O	NOVELL INC	20	12	24.50	0.50	2.08
N	NYNEX CORP	78	56	85.00	1.80	2.36
N	PACIFIC TELESIS GROUP	34	9	35.50	0.88	3.41
N	PARADYNE CORP	9	4	4.13	0.25	6.45
A	PENRIL CORP	6	1	3.38	1.00	42.11
N	PLESSEY PLC	41	23	28.50	1.75	6.31
N	SCIENTIFIC ATLANTA INC	23	9	11.88	0.63	5.56
N	SOUTHWESTERN BELL CORP	48	22	34.75	1.00	2.96
O	3 COM CORP	29	12	21.38	1.13	5.56
O	TIMEPLEX INC	41	17	35.50	2.25	6.77
O	UNGERMANN BASS INC	16	5	7.88	0.63	8.62
N	U S WEST INC	60	43	51.25	1.25	2.50
	Computer Systems					
O	ALLIANT COMPUTER SYS	37	5	8.75	1.00	12.90
O	ALPHA MICROSYSTEMS	6	3	4.50	0.25	5.88
O	ALTOS COMPUTER SYS	17	9	12.13	0.75	6.59
A	AMDAHL CORP	50	19	36.63	1.63	4.64
O	APOLLO COMPUTER INC	25	9	13.63	1.63	13.54
O	APPLE COMPUTER INC	60	22	43.75	0.38	0.86
O	BOLT BERANEK & NEWMAN	35	12	17.50	0.75	4.48
O	BRITTON LEE INC	5	1	1.38	0.13	10.00
O	COMPAQ COMPUTER CORP	78	21	59.00	2.38	4.19
O	COMPUTER AUTOMATION INC	17	4	9.38	0.38	4.17
A	COMPUTER CONSOLES INC	12	2	5.63	2.00	55.17
O	CONCURRENT COMP CORP	24	11	17.13	0.38	2.24
N	CONTROL DATA CORP DEL	35	18	23.25	1.25	5.68
O	CONVERGENT TECH	12	3	4.38	0.44	11.19
O	CONVEX COMPUTER CORP	22	6	8.88	0.80	5.97
N	CRAY RESH INC	126	47	79.63	10.13	14.57
O	DAISY SYS CORP	13	5	7.13	0.80	7.89
N	DATA GEN CORP	38	16	28.00	1.88	7.77
N	DATAPOINT CORP	8	3	4.63	-0.25	-5.13
N	DIGITAL EQUIP CORP	200	108	140.75	3.38	2.46
N	FLOATING POINT SYS INC	17	3	4.25	-0.13	-2.86
N	GOULD INC	24	8	12.63	1.13	9.78
N	HARRIS CORP	42	22	27.38	1.00	3.79
N	HEWLETT PACKARD CO	74	38	59.63	0.88	1.49
N	HONEYWELL INC	91	49	80.75	5.13	6.21
N	IBM	176	102	122.88	5.88	5.02
O	INFORMATION INTL INC	17	9	10.75	0.75	7.50
O	IPL SYS INC	3	2	2.00	-0.13	-5.88
O	MASS COMPUTER CORP	14	5	6.25	1.25	25.00
N	MATSUSHITA ELEC INDL LTD	196	83	181.38	11.38	6.69
O	MEGADATA CORP	7	3	3.63	-0.13	-3.33
O	MENTOR GRAPHICS CORP	39	14	24.75	2.38	10.61
N	NBI INC	14	4	4.25	0.25	6.25
N	NCR CORP	87	48	68.13	2.88	4.56
N	PRIME COMPUTER INC	31	12	17.13	1.38	8.73
O	PYRAMID TECHNOLOGY	12	5	8.50	0.50	6.25
O	STRATUS COMPUTER	41	15	26.75	5.00	22.99
O	SUN MICROSYSTEM INC	48	14	36.75	2.75	8.09
O	SYMBOLICS INC	6	1	1.69	0.25	17.39
N	TANDEM COMPUTERS INC	38	18	27.63	1.00	3.76
N	TANDY CORP	57	28	35.75	2.25	6.72
N	ULTIMATE CORP	37	16	19.63	-0.75	-3.68
N	UNISYS CORP	48	24	35.88	2.00	5.90
A	WANG LABS INC	19	10	13.75	2.25	19.57
	Software & DP Services					
O	ADVANCED COMP TECH	6	1	2.00	0.00	0.00
N	ADVANCED SYS INC	35	18	31.00	0.00	0.00
N	AGS COMPUTERS INC	30	11	17.38	0.25	1.46
O	AMERICAN MGMT SYS INC	20	9	15.38	1.88	13.89
O	AMERICAN SOFTWARE INC	22	6	9.13	0.13	1.39
N	ANACOMP INC	11	4	7.38	0.88	13.46
O	ANALYSTS INTL CORP	10	4	8.25	0.00	0.00
O	ASHTON TATE	33	13	26.75	2.38	9.74
O	ASK COMPUTER SYS INC	17	6	6.38	0.50	8.35
O	AUTODESK INC	34	12	22.00	1.25	6.02
N	AUTO DATA PROCESSING	55	16	44.13	-0.75	-1.67
O	BOOLE & BABBAGE INC	12	5	7.75	1.00	14.81
N	COMPUTER ASSOC INTL INC	37	15	30.88	0.13	0.41
O	COMPUTER HORIZONS CORP	15	7	10.25	0.25	2.50
N	COMPUTER SCIENCES CORP	73	42	51.63	1.88	3.77
N	COMPUTER TASK GROUP INC	18	9	11.13	0.63	5.96
O	COMSHARE INC	28	12	14.75	1.50	11.32
N	CULLINET SOFTWARE INC	14	6	6.13	0.13	2.08
O	CYCARE SYS INC	10	6	6.50	0.50	8.33
O	DUQUESNE SYS INC	33	10	21.75	0.50	2.35
A	DATA ARCHITECTS, INC.	17	7	10.13	0.63	6.58
N	GENERAL MTRS (CLS E)	51	34	38.88	1.75	4.71
O	HOGAN SYS INC	17	5	5.38	0.50	10.26
O	INFORMIX CORP	31	11	23.75	-2.13	-8.21
O	INTELLICORP INC	11	3	3.88	0.00	0.00
O	KEANE INC	10	6	7.00	0.50	7.69
O	LOTUS DEV CORP	49	17	33.50	1.75	5.51
O	MANAGEMENT SCI AMER	21	6	6.75	0.75	12.50
O	MICRO PRO INTL CORP	9	3	3.56	-0.06	-1.71
O	MICROSOFT CORP	78	28	58.50	2.75	4.93
O	MORINO ASSOCIATES INC	24	7	14	0.75	5.66
O	NATIONAL DATA CORP	34	18	27.50	0.50	1.85
O	ON LINE SOFTWARE INTL INC	22	9	12.00	2.25	23.08
O	ORACLE SYS CORP	19	5	15.13	0.63	4.31
N	RANSOPHIC SYS INC	28	11	16.25	2.25	16.07
O	POLICY MGMT SYS CORP	30	15	20.50	1.25	6.49
O	PROGRAMMING & SYS INC	14	7	9.25	1.00	12.12
O	REYNOLDS & REYNOLDS CO	39	14	17.88	1.38	8.33
O	SEI CORP	18	10	15.75	-0.75	-4.55
O	SHARED MED SYS CORP	53	19	23.75	1.13	4.97
O	SOFTWARE AG SYSTEMS INC	19	8	8.38	0.00	0.00
O	SOFTWARE PUBG CORP	17	5	8.25	-0.13	-1.49
A	STERLING SOFTWARE INC	14	6	7.50	1.00	15.38
O	SUNGARD DATA SYS INC	21	10	18.00	2.25	16.36
O	SYSTEMATICS INC	30	18	20.88	2.00	8.04
N	SYS. SOFT INC.	24	7	15	0.75	5.45
O	VM SOFTWARE INC	46	7	10.00	0.25	2.56
	Semiconductors					
N	ADV MICRO DEVICES INC	26	8	10.75	0.75	7.50
N	ANALOG DEVICES INC	34	8	12.13	0.38	3.19
O	ANALOGIC CORP	13	5	6.50	1.00	18.18
O	INTEL CORP	42	14	26.75	2.00	7.48
O	LSI LOGIC CORP	17	7	10.25	0.00	0.00
N	MOTOROLA INC	74	35	52.00	1.75	3.48
N	NATL SEMICONDUCTOR	22	10	12.50	0.25	2.04
N	TEXAS INSTRS INC	80	38	57.63	1.13	1.99
A	WESTERN DIGITAL CORP	33	12	16.75	0.38	2.29
	Peripherals					
O	ALLOY COMP.	13	4	4.75	0.38	8.57
N	AM INTL INC	9	3	3.38	0.75	16.22
O	AST RESH INC	23	6	8.75	1.50	20.69
O	AUTO TROL TECH CORP	9	3	3.75	0.63	20.00
O	BANCTEC INC	16	5	7.75	0.75	10.71
O	CIPHER DATA PRODS INC	18	4	7.50	1.25	20.00
A	COGNITRONICS CORP	5	2	2.75	0.13	4.76
N	COMPUGRAPHIC CORP	28	19	23.00	0.00	0.00
N	COMPUTERVISION CORP	23	7	14.13	0.25	1.80
A	DATAPRODUCTS CORP	24	7	8.63	0.63	7.81
A	DATARAM CORP	9	5	6.38	0.63	10.87
N	DECISION INDS CORP	13	4	10.75	0.38	3.61
N	EASTMAN KODAK CO	71	42	51.88	1.88	3.76
O	E M C CORP MASS	28	10	16.25	0.50	3.17
O	EMULEX CORP	10	4	6.63	0.38	6.00
O	EVANS & SUTHERLAND	40	18	24.00	1.75	7.87
O	ICOT CORP	13	3	4.50	0.63	16.13
O	INTERLEAF INC	24	9	18.75	0.25	1.35
O	IOMEGA CORP	8	1	2.13	0.50	30.77
O	LEE DATA CORP	10	3	3.19	0.44	15.93
O	MASSTOR SYS CORP	6	1	2.13	0.25	13.33
O	MAXTOR CORP	34	6	10.50	1.50	16.53
O	MICROPOLIS CORP	44	13	25.25	1.25	5.21
O	MINISCRIBE CORP	18	5	10.25	0.88	9.33
N	MINNESOTA MNG & MFG CO	84	45	66.00	2.25	3.53
O	MSI DATA CORP	24	12	20.25	1.75	9.46
O	PRIAM CORP	8	1	2.00	0.25	14.29
O	PRINTRONIX INC	13	7	8.75	0.38	4.48
O	QMS INC	27	11	11.50	-2.13	-15.60
O	QUANTUM CORP	36	8	12.50	0.25	2.04
O	RAMTEK CORP	6	3	3.88	0.63	19.23
O	RECOGNITION EQUIP INC	27	7	10.75	0.50	4.88
O	RERON INC	14	5	6.50	0.63	10.64
O	SCAN TRON CORP	17	7	10.75	0.63	6.17
O	SEAGATE TECHNOLOGY	46	10	17.25	2.25	15.00
O	STORAGE TECH CORP	5	1	2.13	0.13	6.25
O	TANDON CORP	7	2	1.94	0.25	14.81
O	TEC INC	7	3	5.88	0.63	11.90
N	TEKTRONIX INC	48	21	25.25	0.63	2.54
O	TELEVIDEO SYS INC	3	1	1.38	0.06	4.72
O	TELEX CORP	102	30	36.75	-0.38	-0.67
O	WYSE TECH	40	11	23.88	1.63	7.30
N	XEROX CORP	66	30	61.13	3.00	5.16
O	XIDEX CORP	14	6	7.00	0.50	7.69
	Leasing Companies					
O	CAPITAL ASSOCIATES INTERNATIONAL INC.	11	4	4.50	0.75	20.00
N	COMDISCO INC	37	12	20.38	1.13	5.84
N	CONTINENTAL INFO SYS	14	6	6.38	0.25	4.08
O	PHOENIX AMERN INC	6	2	2.75	0.25	10.00
O	SELECTERM INC	6	3	3.75	0.38	11.11

EXCH: N—NEW YORK; A—AMERICAN; O—NATIONAL; O—OVER-THE-COUNTER; S—SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

What crash?

Market starts '88 with a bang; IBM leads high-tech charge

Computer stocks rang in the new year on a high note, as a 113-point, four-day advance in the Dow Jones industrial average fueled handsome gains in most leading issues.

IBM led the way with a rise of 7⅛ points to 123⅜, while Digital Equipment Corp. picked up 6¾ points to 141¾ and Microsoft Corp. soared 6¼ points to 60½.

More modest gainers included Compaq Computer Corp., up 3⅛ points to 58½; Unisys Corp., up 2¼ points to 35⅛; Hewlett-Packard Co., up 2 points to 60⅛; and Apple Computer, Inc., up 2½ points to 44½.

Cullinet Software, Inc. — which has been in the stock doldrums since the Oct. 19 crash — enjoyed an 18% rise in Thursday's trading to close at 7⅛, up 1⅜ points for the four days.

Investors were encouraged by AT&T's intention to acquire up to 20% of Sun Microsystems, Inc. Sun jumped 7 points to 40½, and AT&T was up 2¼ points to 29⅛.

Computervision Corp. edged up only ¼ of a point to 14⅛ as the market awaited its response to Prime Computer, Inc.'s $13.50-per-share tender offer, which it declined Friday morning. Prime rose 1⅛ points to 16⅜.

CLINTON WILDER

Pressure on CAD/CAM suppliers

Computervision rejects Prime offer, but shakeout seen as inevitable

BY ROSEMARY HAMILTON
CW STAFF

Prime Computer, Inc.'s bid to buy Computervision Corp. tells the story of the computer-aided design and manufacturing (CAD/CAM) market itself: For most companies, consolidation is now the key to success.

Industry analysts contacted last week said they expect the takeover to happen, noting that Computervision has little power to prevent the $13.50-per-share tender offer made to its shareholders. "I don't see a buyer with a better price waiting in the wings for them," said Raymond Reed, an analyst at Mabon, Nugent & Co.

Late last week, Computervision rejected Prime's bid "as inadequate and not in the best interests of Computervision" and urged shareholders to spurn Prime's offer for their stock. Computervision stock traded at $14 a share late Friday.

May seek white knight

According to the letter, Computervision will consider "the purchase of a substantial business by Computervision" and hinted that it would explore seeking a white knight to blunt Prime's advance.

A Prime spokesman said the company would not comment until it had seen a copy of Computervision's filing to the Securities and Exchange Commission.

Computervision's move came as "no surprise," said Laura Conigliaro, who follows the company for Prudential-Bache Securities, Inc. in New York.

The most important statement in the rejection letter, Conigliaro noted, might be the one between the lines: "What they're really saying is that they reject Prime's offer at that price."

Look out for No. 3

If Prime acquires Computervision, it will leapfrog almost a half-dozen competitors and become the third largest CAD/CAM vendor in the U.S.

Further, the combined effort would have a much better chance of competing against IBM and Digital Equipment Corp., which currently hold the No. 1 and No. 2 slots, respectively.

Prime has grown a respectable business in CAD/CAM. Of the firm's $860.2 million in revenue for 1986, 18% came from CAD/CAM sales. But Prime has remained far behind both IBM and DEC, which are rapidly approaching the $1 billion mark for their CAD/CAM businesses alone.

"The choice for Prime was to either take market share away from a competitor or buy it," said David Burdick, an analyst with Dataquest, Inc. in San Jose, Calif.

Unsettled market

A shakeout of the small niche players has been under way for at least two years. The Prime-Computervision deal would be by far the largest acquisition in this industry, but it actually follows 20 other consolidations that have occurred since the beginning of 1986, according to Vicki Brown, an analyst with International Data Corp. in Framingham, Mass.

Analysts said they expect more acquisitions in the future, although none quite as large as the expected Computervision purchase.

"The [CAD/CAM] industry is undergoing consolidation in the number of players," said Joe M. Henson, Prime's president and chief executive officer, in a recent interview. "That being the case, we made the judgment that we had to get larger, and it became attractive to examine external means of growth. . . . In our view, Computervision, even more than Prime, can't remain independent."

Most analysts said the acquisition makes sense because Prime and Computervision as a team have a much better survival rate.

"Prime was growing, but there was little hope that it would get critical mass. It just didn't have the resources to do that," Conigliaro said.

Takeover

CONTINUED FROM PAGE 1

ufacturing (CAD/CAM) market. As Prime President and Chief Executive Officer Joe M. Henson noted in his letter to Computervision President Robert Gable announcing the tender offer, Prime has repeatedly sought this merger on friendly terms.

So far, the scenario has unfolded in a manner similar to that of the computer industry's most significant unfriendly merger — the multibillion-dollar buy-out of Sperry Corp. by Burroughs Corp. to form Unisys Corp. in 1986. In a saga dating back to 1985, Burroughs Chairman W. Michael Blumenthal made it clear that he wanted a marriage with Sperry. When Sperry was cool to the idea and balked at the offering price in both 1985 and 1986, Blumenthal took his case directly to Sperry's shareholders, thereby crossing into hostile territory.

Last-ditch effort

For both Prime and Burroughs, the tender offer was a strategy of last resort. "Our industry tends to be very acquisitive in the first place," says Harvey Poppel, a principal with Broadview Associates, a Fort Lee, N.J.-based firm specializing in software and services industry marriages. "When there is a logical combination, most companies have the culture to recognize it, and there's no need for hostility."

Many industry observers felt computer vendors would become vulnerable targets as their stock prices plummeted Oct. 19; indeed, scores of vendors announced stock buy-back programs, partially as a takeover defense strategy. There was a brief flurry of three hostile tender offers in the industry at that time, but all three would-be acquirers failed to gain control of their targets.

Arbitrageur Asher B. Edelman, the computer industry's most notable raider (see chart), lost his battle for terminals maker Telex Corp. to a white knight offer from Memorex International N.V. Another white knight, venture capital entity Onset Corp., emerged to rescue mid-range peripherals vendor Decision Industries Corp. from the unwanted advances of leasing firm Econocom International N.V. And Digital Communications Associates, Inc., whose tender offer for Ungermann-Bass, Inc. was particularly timed to take advantage of the market crash, abandoned its takeover effort when its target resisted.

> "OUR INDUSTRY tends to be very acquisitive in the first place. When there is a logical combination, most companies have the culture to recognize it, and there's no need for hostility."
>
> HARVEY POPPEL
> BROADVIEW ASSOCIATES

Current financial market conditions include at least as many factors to *inhibit* hostile takeovers as to encourage them. The so-called junk bonds that have financed scores of hostile deals, including Sterling Software, Inc.'s stunning buy-out of much larger Informatics General Corp. in 1985, have fallen out of favor on Wall Street. Even before Memorex emerged as a bidder for Telex, observers were skeptical about Edelman's ability to fund a Telex takeover.

In addition, Broadview's Poppel points out that the end of the 1980s bull market removes a major spur to the hostile takeover frenzy. "The crash may discourage traditional raiders, because their favorite targets are laggards in a bull market," he says.

Although there have been notable exceptions, the conventional wisdom — that the computer vendor's typical assets of leading-edge technology and human expertise do not fit neatly into corporate raiders' financial formulas — will continue to keep the computer industry relatively free of hostile takeovers. The exceptions have occurred when the acquirer considered its target so crucial to its corporate — not financial — strategy that it was willing to risk the loss of key executives, managers and engineers from the target firm.

Apparently, that is what Prime thinks of Computervision. It is not unlike Computer Associates International, Inc.'s buy-out of Uccel Corp.; while Computer Associates did not have to launch a hostile takeover, it did pay a whopping premium for the dominant market share in key systems software markets.

"Prime is clearly taking a risk here, but it's worth it," says Don Bellomy, editor of International Data Corp.'s industry newsletter. "There are enough synergies in the CAD/CAM area that even a hostile offer for Computervision makes sense."

High-tech hostilities

Outcome of selected hostile takeover attempts involving computer companies

Year	Company	Hostile suitor	Result
1984	Management Assistance	Asher B. Edelman	Edelman wins proxy fight, sells off pieces of Management Assistance
1984	Mohawk Data Sciences	Asher B. Edelman	Mohawk gives Edelman control to ward off threatened buy-out; most of Mohawk is liquidated
1985	Datapoint	Asher B. Edelman	Edelman wins chairmanship of Datapoint, a position he still holds; Datapoint's service business is spun off as a separate independent maintenance firm, Intelogic Trace
1985	Informatics General	Sterling Software	Informatics agrees to a raised acquisition price after fighting earlier offers and becomes a division of Sterling; deal is notable as software industry's first hostile takeover and because Informatics is about five times larger than Sterling
1986	Sperry	Burroughs	Sperry eventually agrees to the industry's largest merger after failing to find a white knight; Unisys, the industry's second largest company, emerges
1987	Telex	Asher B. Edelman	Telex successfully fights off tender offer by agreeing to buy-out bid of white knight Memorex International
1987	Ungermann-Bass	Digital Communications Associates	DCA abandons proposed tender offer after Ungermann-Bass executives resist it
1987	Decision Industries	Econocom International	Econocom drops bid after Decision Industries agrees to white knight offer by venture capital entity Onset, whose offer still awaits shareholder approval

CW CHART

Cray

FROM PAGE 1

comes to supercomputers. ETA Systems, Inc., Honeywell-NEC Supercomputers, Inc. and Amdahl Corp./Fujitsu Ltd. are positioned as formidable competitors. Each of the vendors claims to offer high speed, fast processors and a commitment of technical support to users. More recently, IBM indicated its interest in the market through a partnership agreement backing former Cray designer Steve Chen's plans to develop a next generation of supercomputing machines [CW, Dec. 28, 1987/Jan. 4, 1988].

While comparable supercomputers are currently available, Cray officials boast that Cray dominates two-thirds of the market. With newer Crays on the horizon offering more engine power and performance, the company is branching out into disciplines beyond the military.

"Somehow, there is an aura of mystique surrounding the Cray just because it's a Cray," one user remarks.

Cray supercomputers were designed with the scientific community in mind. One Cray spokesman stresses that while the computers were initially purchased by the government, commercial users are finding other uses for Crays — including machines in the university, petroleum and aerospace arenas.

A typical sales pitch for a Cray would include mention of the system's effective implementation of vector processing, high-speed I/O throughput for computational mathematics and multitasking capabilities.

Super opportunity

Acquiring one of these systems brings great pride to users, who recognize that not everyone gets the chance to use a supercomputer.

"There is a certain amount of prestige attached to the fact that our scientists have access to one of the fastest computers in the world," says David Weber, manager of computing services at Illinois-based Argonne National Laboratories, a research lab operated by the U.S. Department of Energy (DOE) at the University of Chicago.

Currently testing the Cray X-MP/14, Weber stresses that if the acceptance test goes well, several hundred users out of its 2,000-member scientific community will be given the opportunity to log time on the $5.5 million Cray.

From the National Aeronautics and Space Administration's Ames research facility in Mountain View, Calif., approximately 692 scientists in 75 locations nationwide linked via Transmission Control Protocol/Internet Protocol networks are tapping the rich resource of the Cray-2, a 5,000-pound model with up to 2G bytes of main memory.

While it sounds like a large number, Lynda Haines, user liaison for the computer center, says that scientists must submit proposals to get the proper use clearance.

"It is a very valuable resource for us, and there is limited time on the machine," she says. "We want to make sure it is being used for only the state-of-the-art applications. There is quite a demand for it."

Housed in a separate room, the Cray is locked behind a series of doors for security reasons. "Much of what is on the Cray is of a proprietary nature. It is a great resource for us to have access to a special computer such as this, but it must be controlled," Haines adds.

Euphoric state

When the state of Alabama received its Cray X-MP/24 system, Boeing Computer Services, the vendor installing and operating the computer, was ecstatic.

The Cray is the crux of the new $39 million Alabama Supercomputer Network. The day it arrived, Boeing dashed off press releases all over the country announcing the date and exact arrival time of its new 5,000-pound bundle of joy. "We had TV cameras and lots of news coverage when it arrived in Huntsville," says James Woodward, chairman of the Alabama Supercomputer Authority and senior vice-president at the University of Alabama in Birmingham. "It was the biggest news in north Alabama."

When you have a computer system estimated to offer 12,000 times the power of a PC, using the Cray for basic word processing and spreadsheet analysis is as inappropriate as putting ketchup on filet mignon.

At the General Motors technical center in Warren, Mich., some 300 scientists and engineers are using a Cray X-MP/24 to help GM design the "Ultimate Car." George Dodd, chief of the computer science department, says some applications include examining aerodynamics, smoke combustion, structural mechanics and physics of the atmosphere, including ozone layers and smog content.

Via computer modeling, the scientists are able to simulate a wind tunnel with a car driving through it. "We can test for drag, forces on the car and engine cooling. We can do full-scale engineering before the prototype is developed," Dodd says. Engineers are using the Cray to come up with design concepts for new vehicles.

Of course we need one

Ask users why they need a Cray instead of a commercially available mainframe, and they might get indignant.

"If you go with a smaller computer, you're spending all the time manipulating memory and moving data," Dodd explains. "You are not spending time computing."

The Cray is necessary for very heavy computation, he adds. And with applications as long and complex as GM's, running applications on IBM 3081s and 3090s was not practical.

"The jobs we ran on those machines were so big that it took two weeks to get the answer," he says. "You can't do serious research on that basis."

Today, those two weeks of wait-time are whittled down to a few hours. Dodd says the arrival of the Cray has changed the thinking of the staff. The style of research and sense of urgency has also been improved.

Lynda Haines of the Ames research center *displays the 5,000-pound Cray-2, housed in a high-security room at the facility.*

The power and speed of the Cray cannot be underestimated. "The biggest thing we needed was speed," says one anonymous user at Sandia National Laboratories in Albuquerque, N.M., which operates under the DOE. "We need a lot of number crunching around here."

Speed's their creed

Now the Cray is executing tasks five times faster than the former IBM 3033 and 3042 machines. In some cases, applications run 20 to 40 times faster, the user says. At two Sandia Laboratory sites, five Crays are in operation.

The laboratory, which performs research on both nuclear and solar energy, simulates things impractical to test, he says. "We find out how materials perform under stress and see how fluids and gases interact."

A Cray user for more than five years, the user stresses that Crays are used for the mass storage capabilities that are required under the lab's DOE-specific operating system.

When one Du Pont Co. chemical engineer got a computer job done in three minutes on the Cray instead of one hour on the IBM, "he was walking on air," says Fred Van-Catledge, senior specialist at Du Pont's scientific computing division in Wilmington, Del.

Du Pont, a premier Cray user for chemical research, takes advantage of the systems' power to perform complex computational calculations in the development of such products as herbicides and drugs. From their desktop terminals, linked to the Cray, the chemical engineers are able to measure the vibration of an atom and examine the shape of molecules.

Preparing the site

Because the Cray is a complex machine, it has a few unusual features. For one thing, Freon coolant is required with the X-MP/14. The Cray is so sophisticated that users often prefer to sign a maintenance agreement to have Cray personnel perform any changes or additions. At Sandia Laboratories, there is at least one full-time Cray systems engineer on-site.

While mainframes are massive, Crays tend to be even heavier. They weigh anywhere from 5,000 to 11,000 pounds. When Du Pont received its X-MP/24 this month, John Taylor, manager of the Du Pont scientific computing division, says, the department had to run a test on the elevator to make sure it could lift the giant machine to the third floor for installation.

Contrary to popular belief, the Cray is no harder to install than a mainframe, notes Pete Dubois, a system manager at Lawrence Livermore National Laboratory in Livermore, Calif. "We make sure that each machine gets a minimal two-hour checkup once a month. We are finding that with our Crays, that is more than adequate."

And like other mainframes, Crays are expensive to operate. It cost Du Pont $200,000 a month to maintain a Cray 1A, Taylor notes. "It costs us $14,000 a month in electricity alone," he adds. Taylor expects that it will cost $400,000 a month to maintain the new X-MP/24, which will replace the older model.

User unfriendly?

Experienced mainframe computer users at Du Pont and GM have found learning the Cray quite simple. But for the novice user, the Cray software environment does not boast a user-friendly interface.

Under Alabama's contract with Boeing, Boeing must train state staff and university employees — and throw in $40,000 worth of computer time.

"Nowadays, a lot of our chemists and physicists are taking up computer science just to learn how to use a supercomputer," Woodward says. "You cannot tap the power of the Cray until you know its architecture. A bicycle and a race car both are modes of transportation, but you have to learn the unique system."

Unlike other places, where getting access to a Cray can be difficult, novice users are encouraged to use the sophisticated hardware. "This is how they are going to learn," Woodward says. "It's not a useful resource if it is hard to get to."

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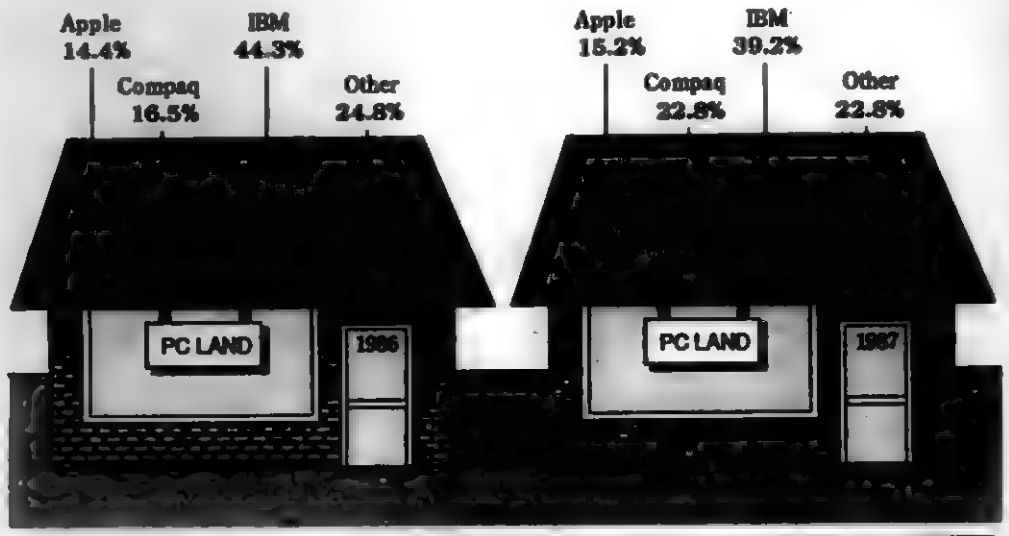
TRENDS

Personal computers

Compaq builds up retail market share

PERCENT OF DOLLAR SALES IN COMPUTER RETAIL STORES, JANUARY THROUGH NOVEMBER



While IBM continued to hold the largest chunk of retail dollars in the personal computer market in 1987, rival Compaq Computer Corp. gobbled up more of the computer giant's market.

IBM's dollar share in the retail market dropped to 39.2% in 1987 from 44.3% the year before. Meanwhile, Compaq climbed to 22.8% in 1987 from 16.5% the previous year.

These figures come from a survey conducted by research firm Storeboard, Inc. in Dallas, which bases its calculations on monthly responses from 400 to 450 retail stores. The firm mails out some 3,500 surveys each month to computer specialty stores.

The survey does not monitor direct sales, which make up approximately one-fifth of IBM's sales, nor does it include sales of value-added resellers or manufacturer-owned retail stores, according to JoeAnn Stahel, vice-president of Storeboard.

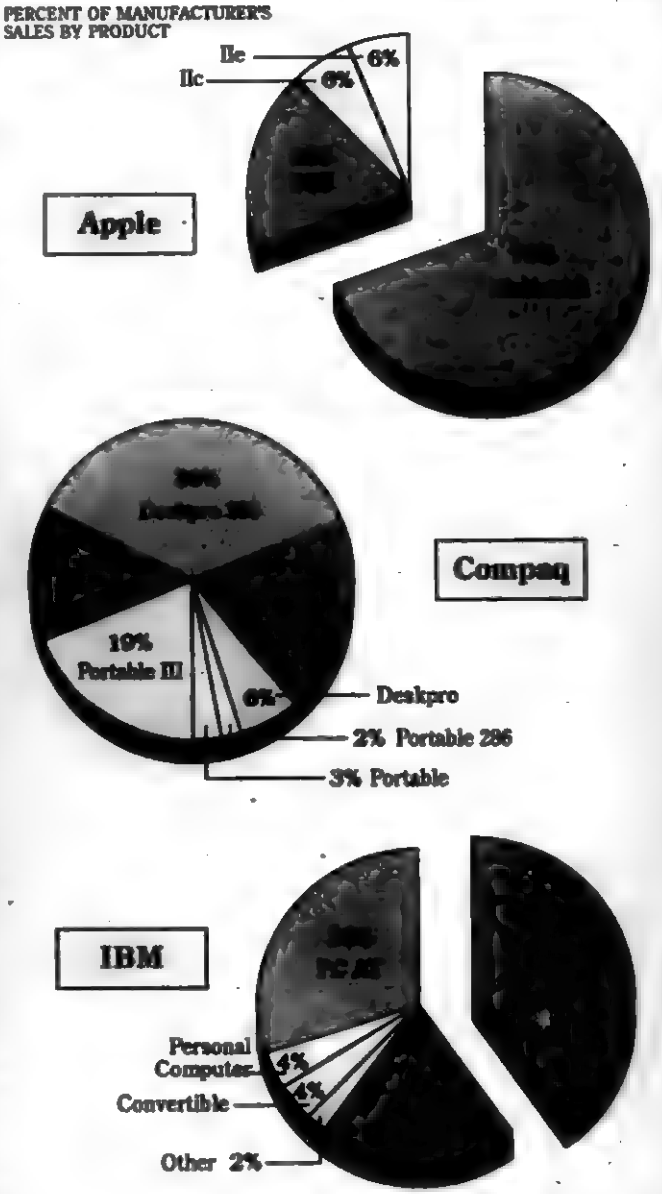
According to the results, which cover the period of January to November for each year, Apple Computer, Inc.'s dollar share rose modestly from 14.4% in 1986 to 15.2% in 1987. Other vendors accounted for 24.8% of dollar sales in 1986 and 22.8% in 1987, the survey showed.

Compaq's 22.8% dollar share last year was aided by sales of the company's Deskpro 386 computer, which made up 35% of Compaq's dollar volume, the study showed. And Apple could credit its Macintosh with about 70% of its dollar sales during the same period.

ALAN J. RYAN

Macintosh, PS/2 the new flagships

PERCENT OF MANUFACTURER'S SALES BY PRODUCT



INFORMATION PROVIDED BY STOREBOARD, INC.
CW CHARTS: AMY J. SWANSON

INSIDE LINES

Will they or won't they? The industry was abuzz last week, speculating about what Ashton-Tate will announce Wednesday. Sources said Microsoft and Sybase will join Ashton-Tate in announcing plans for a joint development project to put a relational data base on Apple's Macintosh. One source added that Ashton-Tate will announce agreements with both Apple and DEC. Many are betting that the company is close to signing an agreement to license Interbase Software's SQL data base, but Interbase told an analyst last week that although a deal is in the works, it will not be announced this week. The same analyst was told that neither Ashton-Tate's Dbase IV nor Dbase for the DEC VAX will be announced.

Try this on for size. Some observers, including a source close to Microsoft, say Ashton-Tate will announce support for the OS/2 LAN Manager, which is being developed by Microsoft and 3Com. Sources also speculate that Ashton-Tate will bundle Apex's Front Runner, which creates memory-resident Dbase-compatible programs, introduce a presentation graphics program developed by Decision Resources and unveil a new version of Framework. Much of this could turn out to be the work of overactive imaginations, but it gives some indication that the Taters are finally on the move. It must be big, though; the firm will have its four top executives at the New York press conference.

Is it reel? At a time when cartridge and cassette tape technologies are moving into the prime of their product cycles — with large systems vendors offering or developing cartridge drives and cassettes handling increasingly larger capacities on small systems — BASF offers a new reason to abandon reel-to-reel technology. BASF hiked prices by 7% on its reel-to-reel computer tape products effective Jan. 1.

Plug it in. More than two years after the IBM 3480 tape-cartridge drive first appeared on the scene, National Advanced Systems has begun to ship its IBM 3480 look-alike. Called the NAS 7480, the $41,000 drive ($62,000 for the controller/drive unit) was shipped in the U.S. and Europe just before Christmas. A spokesman said 12 sites had the drives, but he wouldn't say how many drive units had been installed. Volume shipments aren't expected until June.

Thinking big. A Verbatim Corp. spokesman last week said the company's planned single-sided 50M-byte 3½-in. erasable floppy disk will enter mass production this year. It will likely hit the OEM marketplace early next year and should be available to the general public by mid-1989. The disk itself, with a 70-msec access time including latency, will be priced at around $100, but the drive to run it will cost 10% to 20% more than a comparable Winchester disk drive, the spokesman said. A double-sided 100M-byte disk is in the planning stages, the spokesman said.

Out of the lineup. Chris Herot, who was a major influence in shaping Javelin Software's Javelin, has left the company. Herot is now working for Bit Stream, a Cambridge, Mass.-based digitized type foundry, as vice-president of development. At press time, there was no word from Javelin as to whether the company had found a replacement.

Climb aboard. Microsoft's OS/2 LAN Manager is expected to gain its second OEM next week, when Ungermann-Bass announces plans to license that technology and incorporate it into its Net/One family, according to a source close to Microsoft. "It's about time they announced it," the source said. "There was never any question that they would pick it up." Also hot from the rumor mills are reports that Ungermann-Bass will announce a T1 bridge to compete with rival Bridge Communications and/or the specifications for the Transmission Control Protocol/Internet Protocol drivers it developed for Apple.

Asking for trouble? For reasons best known to itself, Northern Telecom is slated to announce an IBM-compatible front-end processor this quarter, according to an industry source. The source, who requested anonymity, downplayed the switch vendor's chances in a market niche that has already proven rocky for Amdahl and NCR Comten.

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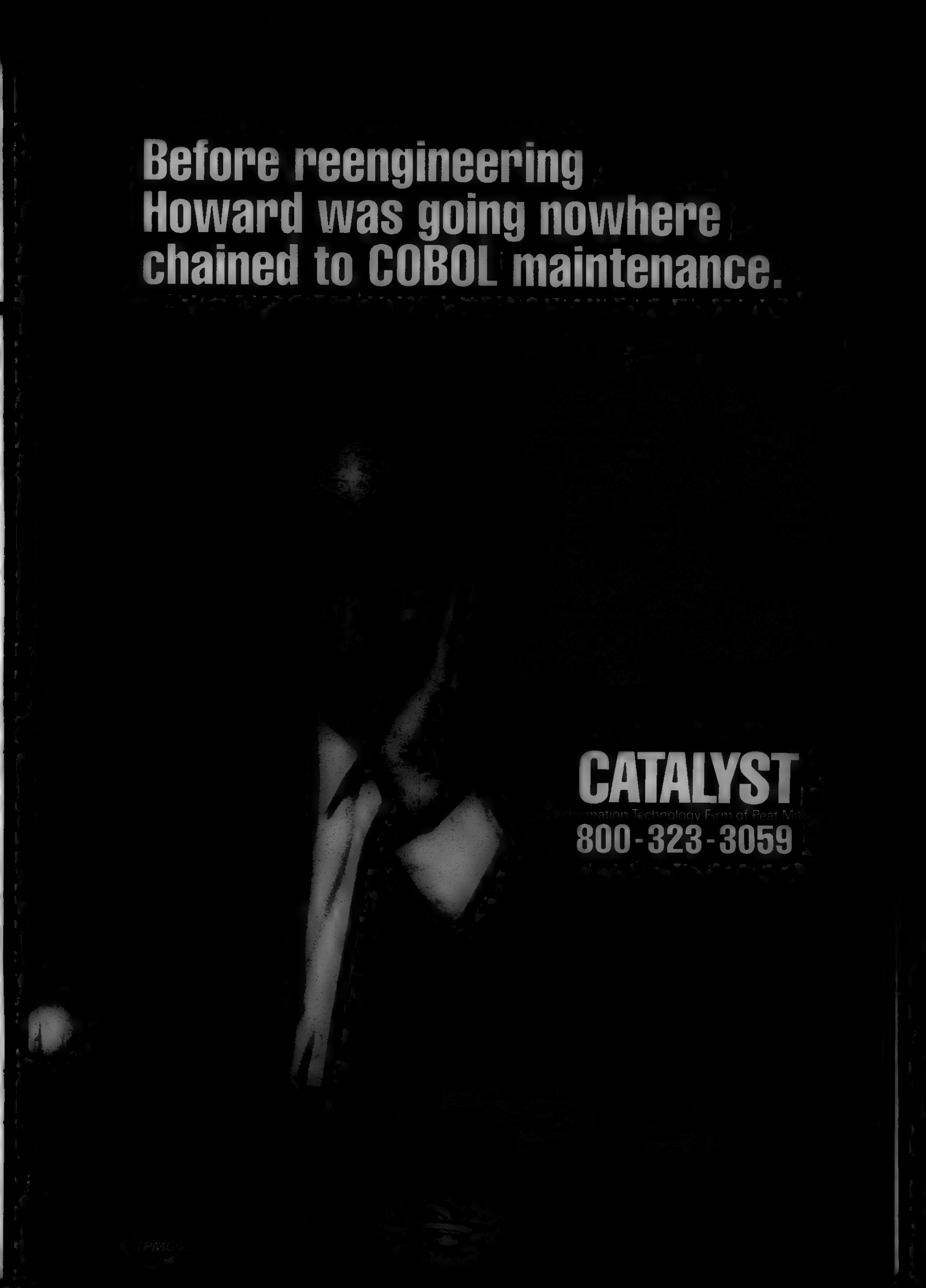

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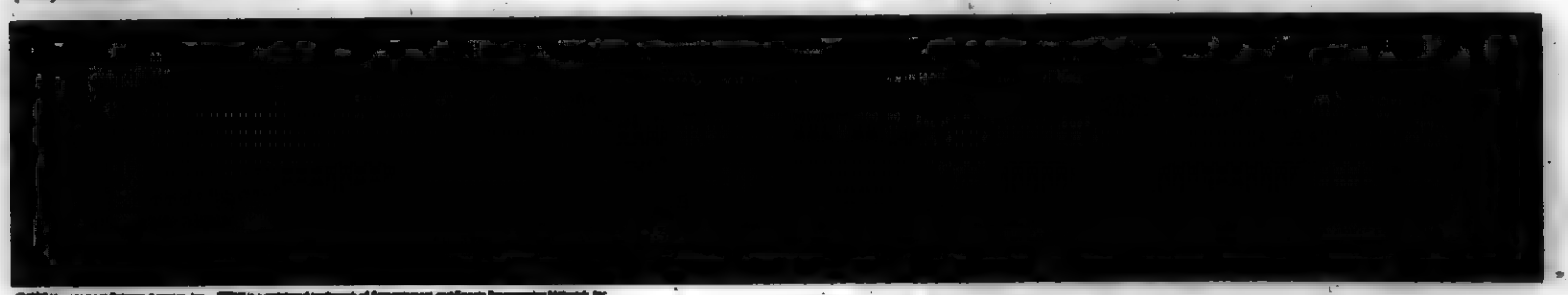

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COMPUTERWORLD

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Promises aplenty as industry leaders ally

Microsoft, Ashton-Tate team up on network DBMS

BY ED SCANNELL
and STEPHEN JONES
CW STAFF

NEW YORK — In an unprecedented display of mutual back scratching, personal computer software giants Microsoft Corp. and Ashton-Tate Corp. said last week they will jointly develop an SQL data base engine for network servers that offers features usually found only on minicomputer and mainframe systems.

SQL Server, which the two companies are developing along with Sybase, Inc., will reportedly reside on an OS/2 server and act as a back-end engine through which data can be stored and retrieved by up to 40 networked personal computer users through SQL commands.

That data can come from any application on the network designed or modified to run under SQL Server's nonproprietary platform.

Developers claimed the high-performance SQL engine will allow networked PCs to carry out jobs that now require larger multiuser systems. The product will include features common to those environments, such as true multiuser capabilities, distributed data base functions and transaction-processing features like security and rollback and recovery.

A retail version of the product will hit dealer shelves during the second half of this year and carry a price tag of $1,500 to $3,000, said Ed Esber, chairman of Ashton-Tate.

May firm up PC standards

Although Ashton-Tate and Microsoft have long been expected to butt heads in the PC data base management system market, analysts said the cooperative effort

Continued on page 8

Their serve

Data base server combines Sybase SQL expertise with Microsoft operating system and LAN technology to allow single-user data base front end to manipulate back end

CW CHART

Users wait on SQL pledges

BY ED SCANNELL
CW STAFF

ANALYSIS

Most large corporations have not implemented a definite microcomputer-based SQL strategy, despite the fact that crucial products from IBM and Microsoft Corp. are only a few months away from release. It may be destiny that SQL will play a significant role on corporate microcomputers, but the technology is still wending its way along technology frontiers.

Joint agreements such as the one signed last week by Microsoft and Ashton-Tate Corp. should help clarify for many MIS managers the shape and direction micro-based SQL technology will take.

Continued on page 8

It's official: DEC and Apple in joint project

BY JULIE PITTA
and PATRICIA KEEFE
CW STAFF

SAN FRANCISCO — Apple Computer, Inc. and Digital Equipment Corp. last week formally unveiled their long-anticipated plans to jointly develop workstation and connectivity products.

The announcement, though long on rhetoric and short on detail, was characterized as a major coup for Apple, which gains a large-systems partner and increased credibility in the business market.

The deal was also seen as a potential answer to DEC's as-yet-unsuccessful search for a workable low-end strategy.

Specifics sparse

But clouding the announcement was a lack of specifics concerning products, pricing and availability. The agreement was signed the morning it was announced. "It was definitely a rush job," an Apple spokesman said, citing his firm's fears that news of the negotiations was leaking out.

Continued on page 121

MIS dream jobs still elude blacks

BY JEAN S. BOZMAN
CW STAFF

Nearly 25 years after Martin Luther King gave his "I Have a Dream" speech on the steps of the Lincoln Memorial, many black MIS professionals say King's dream of equal opportunity is far from realized.

Among MIS professionals, including programmers, systems analysts, operations specialists and managers, fewer than 7% are black. Blacks and Hispanics together constitute less than 10% of the DP work force, according to the U.S. Bureau of the Census. Blacks and Hispanics represent about 20% of the country's population.

While blacks and other minority groups have been able to gain entry into the MIS field, only a few have climbed to the top of the profession.

John Bennett

'A bit discouraging'

"It is difficult and a bit discouraging to try to get ahead in this business unless you're in a company that has an Equal Employment Opportunity obligation or you're working for someone who promotes on the basis of merit," says John Bennett, the former DP director for United Technologies Corp. and one of the most prominent black MIS executives.

Bennett is currently a senior partner with Mueller and Associates, a Hartford, Conn.-based company which is planning on marketing computer-aid-

Continued on page 120

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Alternate routes. A less expensive alternative to routers, LAN-to-LAN T1 bridges are gaining attention from users who want to link geographically dispersed networks. More news is expected at next week's Comnet '88 show in Washington, D.C. Pages 6,7.

Final offer. Prime calls on Computervision once more, this time armed with lawsuits and a $15-per-share offer. Page 121.

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"Computer systems must fit functionally with what the end user does. Ease of use is inversely proportional to the thickness of the user manual."

DR. HOWARD BLEICH
BRIGHAM AND WOMEN'S HOSPITAL

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The computer did it!

Program trading bears brunt of crash fallout

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Computerized stock trading, particularly the strategy of portfolio insurance used by a handful of large investors, played a major role in the stock market's October crash, according to a presidential commission.

In an eerie coincidence, the study by the Presidential Task Force on Market Mechanisms was released Jan. 8, the same day the stock market took another plunge that was blamed on program trading.

In the wake of the report, the New York Stock Exchange (NYSE) Friday imposed, for at least one week, restrictions on program trading on any day when the Dow Jones industrial average moves in excess of 75 points. Under those restrictions, which will be evaluated after this week's trading, NYSE member firms are asked not to use a high-speed order-execution system when the market reaches that volatile level.

Program trading has become controversial because it uses computer models to automatically trade large blocks of stocks or futures [CW, Nov. 2, 1987]. One type of automated trading is portfolio insurance, a hedging strategy designed to protect holdings from declining prices by selling stock index futures.

With Wall Street concerned about fundamental U.S. economic problems, portfolio insurers launched a selling spree early on the morning of Oct. 19 that eventually led to a 508-point drop in the Dow Jones industrial average. The market began to rally from its early morning lows, but at midday, "portfolio insurance sales overwhelmed the rally," the task force said.

The portfolio insurance trades depressed the price of stock index futures, which then triggered another type of automated trading, called index arbitrage.

Striking consequences

"The contribution of a small number of portfolio insurers and mutual funds to the Monday [Oct. 19] selling pressure is . . . striking," said the commission, which is chaired by Nicholas F. Brady and known as the Brady Commission.

For example, one portfolio insurer, who remained unnamed, sold stocks and futures valued at $1.7 billion on Oct. 19, the task force said. "Huge as this selling pressure from portfolio insurers was, it was a small fraction of the sales dictated by the formulas of their models," it reported.

The commission did not call for any ban or severe limits on program trading and steered away from blaming computer technology. Instead, the task force urged the Federal Reserve Board to take on the job of regulating the stock, futures and options markets as a single market.

Duo tries to stop Cobol addendum

BY CHARLES BABCOCK
CW STAFF

An advocate of adding addenda to Cobol 85 and a skeptic of the addendum process have joined forces to try to scuttle the attempt to implement early corrections in Cobol 85.

The unlikely allies, speaking out at the same time but for different reasons, are both members of the X3J4 American National Standards Institute committee that drew up Cobol 85.

Lawrence K. Madison, data processing director at Travelers Insurance Co. in Hartford, Conn., said he opposes the second Cobol 85 addendum because adding corrections to the language threatens to introduce incompatibilities after it has become a standard and has gone into use.

"A user designs and develops a system a certain way and then runs the risk that it will not behave the same way when he gets an updated compiler," Madison said. He said regular correction addenda will result in Cobol 85.1, Cobol 85.2 and so on.

Jerome Garfunkel, a Cobol consultant in Litchfield, Conn., invoked a similar reason in a written comment to the X3J4 committee after the panel, in a 12-5 vote, took up the correction addendum during its Austin, Texas, meeting in December.

In his comment, Garfunkel wrote that the addenda process was established to add optional functions, not corrections, to Cobol without changing any parts of the existing standard. The trigonometric functions proposed in Addendum 1 "would introduce no potential incompatibilities into the language" and could be approved without affecting existing users, he noted.

Garfunkel and Madison agreed that the proposed corrections are so minor they would not affect existing users.

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Chen sees wide use of supers

BY JEAN S. BOZMAN
CW STAFF

EAU CLAIRE, Wis.— Steve Chen expects to see within five years wide commercial use of supercomputer architectures like the one he is developing in partnership with IBM, the former Cray Research, Inc. systems designer said last week.

Chen, who is planning to build a parallel processing supercomputer with more than 100 billion floating-point operations per second of processing power, said he expects to downsize the machine for commercial sale to aerospace and automotive users when it is completed in 1992 or 1993.

"The next crop of scientists and engineers will know how to use supercomputer power," he commented in an interview. Chen, who left Cray last fall and founded Supercomputer Systems, Inc. late last year, is collaborating with IBM in the design of Supercomputer Systems' first product, the SS-1.

Until recently, Chen noted, there were fewer than 200 supercomputers in the world, most of which were owned by government agencies and research laboratories. But Chen said he believes smaller modules could not be sold to commercial customers. "When the machine and the technology is ready, we can look into downsizing it into smaller units that won't be as expensive," he said.

Solutions within seconds

Chen said he wants to achieve a qualitatively different kind of supercomputer use. Cray X-MPs, which he helped design, and Control Data Corp. Cyber 205s take many minutes — or even hours — to complete simulations of car crashes and aircraft flights. "We can solve a problem with the X-MP 4 in two hours, but with our [SS-1], those problems will come down to a few seconds," he said.

What the end user will see is an interactive display of SS-1 supercomputer calculations, something not yet achieved on any machine, Chen said.

To build the SS-1, though, will take more than the $100 million budget Chen had planned to spend for the MP, a breakthrough Cray supercomputer. Cray Chairman John Rollwagen scuttled that effort, saying the MP would require costly breakthroughs in physics research.

Supercomputer Systems employs only about 45 people — most of whom are former Cray workers who were involved in the MP project. Last week, Supercomputer Systems named Dean Nordahl vice-president of finance and administration. Nordahl was previously general manager of financial plans and controls for CDC's Data Storage Products Group.

Since Supercomputer Systems is so small, Chen said, he believes the company will be a sort of systems integrator for supercomputer components obtained from others. Chen is looking to IBM for advanced chip technology, discrete components, peripherals and packaging technology. "IBM can provide us with a very advanced chip, with packaging and with substrate," Chen said, adding that he is not yet planning to add IBM's new superconducting substrates to his plans. "We may stretch the technology a little bit, but we do not need to invent something that is already expected to come out in the next two years."

If other parts are needed, Chen said, he will not hesitate to seek other partners for the supercomputer project. However, he said there will be few partners and that each must meet with IBM's approval. "We will sit down and talk about new partners," Chen said, but he rejected the notion that IBM will have veto power.

United embraces PS/2; 9370s take a backseat

BY JEAN S. BOZMAN
and STANLEY GIBSON
CW STAFF

CHICAGO — IBM's Personal System/2 personal computer played a starring role at a press bash put on last week by Covia Corp., United Airlines' information services subsidiary.

The microcomputer stole the thunder — and much of the functionality — from IBM's 9370, which was once expected to be the guest of honor at such a rollout.

At the 9370's announcement in October 1986, IBM spotlighted United as a key user test site. Later, United became the first 9370 customer, taking delivery of a processor to be used in its Enterprise travel agency management system.

Regarding Covia's subsequent PS/2 focus, John McIntyre, the company's director of product marketing, noted, "We made some significant breakthroughs at the PC level."

A travel agency interface to United's Apollo reservation system, called Focalpoint, took over many features that were meant to be part of the 9370-based Enterprise system, McIntyre said.

"We moved the modules from the [9370] back-room box to the PS/2," McIntyre said. Enterprise, now under Covia's umbrella, was developed by IBM's Federal Systems Division.

McIntyre said an Intel Corp. 80286-based workstation appeared to answer all the major needs of travel agents in connecting to the Apollo system. The 80286-based PS/2 was chosen because of its expected ease of maintenance and because of the options that may be developed in the future from IBM's Micro Channel architecture, McIntyre said.

Focalpoint is based on Microsoft Corp.'s Windows and uses IBM's Token-Ring local-area network.

Covia unveiled a full-fledged travel agency management system based on the PS/2 Models 60 or 80 and called TS2000.

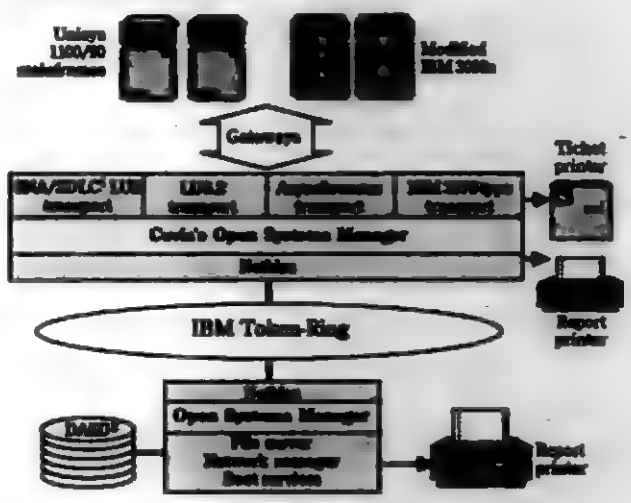
Large firms might require a mid-range computer-based system, which Covia is still developing, McIntyre said. "The package is manufacturer-independent," he said, indicating that IBM's 9370 or 4381 or a non-IBM mid-range processor could be used.

Across the country

Ultimately, Covia aims to put thousands of IBM PS/2 Model 50s and 60s and hundreds of Token-Rings in travel agencies and reservation offices nationwide. Each PS/2 can call up Focalpoint, allowing travel agents to view multiple data bases relating to airlines, rental car and hotel availability. Tying the entire United system together is the Open Systems Manager communications software, a variation on IBM's Netview-based VM/Distributed Systems Node Executive software distribution system.

Friendly ties

United's travel reservation architecture uses most of IBM's communications standards



[1] IBM Systems Network Architecture/Synchronous Data Link Control
[2] Direct-access storage device

CW CHART: FRANK C. O'CONNELL

Additional components of the system are the following:

- IBM 9190s, which are modified IBM 3090 Model 200s, are located at the Apollo system's central computer room in Denver. These 9190s are bound together by a new — and as yet unannounced — IBM high-speed connector. A second mainframe center in the Chicago suburb of Elk Grove Village houses Unisys Corp. 1100/90s used for airline crew scheduling and for tracking arrivals and departures.
- A central command center at Chicago's O'Hare International Airport using 10 miles of IBM Type 2 cable for voice and data transmission across four backbone rings and 23 subrings. Many rings are anchored by a Texas Instruments, Inc. file server. A broadband cable-television system displays television images as well as flight information on 500 of 700 channels.

The O'Hare network runs all operational aspects of United's terminal and public information operation, handling an average of 400 flights per day.

IBM's relationship with the $350 million Covia will be close — but not exclusive, said Covia President Barry Kotar. Covia will design advanced travel and reservation applications for the airline industry and reserves the right to use non-IBM components in its overall systems architecture.

Future decisions on MIS management will be influenced by new partners in Covia, who will own up to 50% of the company. Kotar would not identify which companies are buying Covia shares, but indicated they include other airline carriers.

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Timeplex rolls out wide-area network link

BY ALAN ALPER
CW STAFF

NEW YORK — Staking out a position as a broad-based supplier of wide-area networking gear, Timeplex, Inc. last week introduced a family of packet-switching products to complement its T1 switch product line.

As expected [CW, Jan. 11], Timeplex's Timepac packet-switching family consists of two nodal processors — processing 100 and 500 packet/sec., respectively — and two packet assembler/disassemblers (PAD), one supporting up to eight synchronous devices, the other up to 48 asynchronous devices.

Each PAD allows each device on the network to share two CCITT X.25 links and also supports CCITT recommendations X.3, X.28, X.29 and X.121, the company said.

Breakthrough?

Jeromey Franks, an analyst with the Gartner Group, Inc. in Stamford, Conn., said the Timepac family represents a significant price/performance breakthrough. "The problem has been that you needed to spend $50,000 to get X.25 nodes put in place throughout a network," he said. "With Timepac, it costs considerably less."

The 100 packet/sec. nodal processor lists for $4,990 and is currently available, while the 500 packet/sec. unit is priced starting at $12,945 and will ship in March, the company said. The asynchronous PAD, priced at $1,250, is also available immediately, while the bisynchronous PAD, listing for $4,990, is scheduled to ship in the third quarter, Timeplex noted.

Both processors feature gateways to public X.25 networks and dynamic adaptive routing to take advantage of the most cost-effective communications path. The network automatically reconfigures when a new node is added and bypasses a failed node. All network topologies — including bus, ring, star, tree and mesh — are supported, Timeplex said.

The nodal processors are equipped with integral network management support for diagnosis, accounting and security. Both the nodal processors and PADs can also be managed by Timeplex's network management system, Timeview, the company said.

Timeplex said its Timepac family can be used as the foundation for building both private and hybrid networks.

Industry profits, spirits up at year's end

BY CLINTON WILDER
CW STAFF

On the strength of last week's solid quarterly results from Digital Equipment Corp. and others, the computer industry's financial outlook appeared quite healthy as most major vendors prepare to announce fourth-quarter earnings this week.

DEC's 22% gain in both profits and revenue helped reassure industry watchers concerned about a year-end technology spending drop after the Oct. 19 stock market crash. Tandem Computers, Inc. fueled that fear 10 days ago by announcing that it will not meet its quarterly financial goals; the announcement also ignited a panicky computer stock sell-off and an overall market drop Jan. 8.

DEC's numbers "showed there was no falloff in business near the end of the year, as some had feared," said John Rutledge of Dillon Read & Co. "That's very encouraging and bodes well for 1988."

Softo numbers

Other vendors that either said they anticipated or had reported strong results in the December quarter included Unisys Corp., Stratus Computer, Inc., Intel Corp., Digital Communications Associates, Inc. (DCA) and Automatic Data Processing, Inc.

DEC reported that second-quarter earnings rose 22% over year-earlier levels to $329.5 million, or $2.48 per share. Sales were $2.78 billion, up from $2.27 billion a year earlier. The company said its profits were aided by strong overseas sales and a more favorable tax rate.

IBM, which needed a strong quarter to sustain the apparent recovery that began last summer, is not expected to disappoint.

"It will probably not be a bad quarter. IBM is not cautioning anyone to lower their expectations," said Rick J. Martin of Sanford C. Bernstein & Co. IBM has done this in the past, such as in October 1986, when results were not expected to be good, Martin pointed out.

Recently reported results from key vendors of software, data communications equipment and semiconductors also reflect continued vitality in the wake of the crash. DCA said sales grew 19% to $54.8 million and profits rose 11% to $18.5 million in the quarter ended Dec. 31.

Intel showed further evidence of a chip industry recovery, reporting a 61% sales increase to $572.5 million in the quarter ended Dec. 26. Intel's operating income was $72 million, compared with a loss of $16.4 million one year earlier.

For the year, the chip maker earned $175.5 million from operations, a dramatic turnaround from its $183.3 million operating loss in 1986. Revenue for 1987 increased 51% to $1.91 billion.

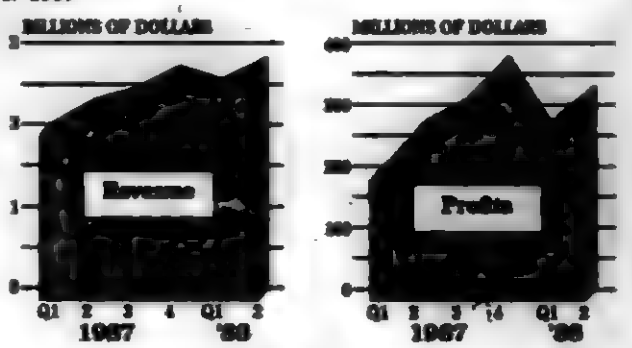
Two of the software industry's fastest growing players, Oracle Corp. and On-Line Software International, Inc., both continued with strong momentum in the quarter ended Nov. 30. Oracle's revenue vaulted 113% to $60.3 million; earnings soared 151% to $7.6 million. On-Line, citing strong gains in overseas sales and maintenance fees, said revenue grew 65% to $21 million and earnings rose 69% to $1.7 million.

The independent computer leasing industry has also shown early signs of fourth-quarter strength. Richard Forsythe, president of privately held lessor Forsythe McArthur Associates in Skokie, Ill., reported that his and other small leasing firms had outstanding fourth quarters.

Senior writer Stanley Gibson contributed to this story.

Roaring along

DEC continued its double-digit growth rate with second-quarter revenue and profits climbing 22% over the second quarter of fiscal year 1987



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CW CHART

Long-distance LANs

Bridges tap T1 power to link dispersed networks

BY ELISABETH HORWITT
CW STAFF

Local-area network bridge vendors have launched the new year with introductions that address their customers' need to link geographically dispersed LANs — without overwhelming their telecommunications budgets.

"The LAN-to-LAN T1 bridge is hot," said Joaquin Gonzalez, vice-president of the Gartner Group, Inc.'s Enterprise Networking Strategies Group.

Gonzalez was referring in particular to a new generation of intelligent bridges that provide increasingly efficient ways for users to connect multiple LANs over 1.5M bit/sec. T1 links. This breakthrough in bridges could provide a healthy boost to the T1 market, he added.

Until recently, companies that wanted to interconnect multiple LANs over remote links had to choose between bridges and routers. While a router can send a message directly to the right destination, a bridge must broadcast the message to all networks — at least the first time around. Several vendors' bridges reportedly remember a node's network address after the initial sending.

But while bridges are protocol-transparent, most routers can handle only one type of networking protocol, such as Digital Equipment Corp.'s Decnet or Transmission Control Protocol/Internet Protocol (TCP/IP).

Taking the bridge

This limitation was one of the main reasons General Motors Corp./Hughes Electronics chose bridges to interconnect a multisite Ethernet system that currently supports some 64 protocols, according to Jack Covert, head of technical support services at Hughes.

Covert admitted that the bridges on Hughes' network sometimes need to broadcast messages, which can use up more bandwidth than if the system used routers. However, wasted bandwidth is not a major concern for the company, which guarantees acceptable user response time by linking all major sites with dedicated lines that support a rate of at least 64K bit/sec., according to Covert. So far, network use reaches only 12% to 14% at peak hours.

The new bridge-router hybrids target companies with smaller bandwidth budgets and fewer networking protocols than Hughes has. Halley Systems, Inc. in San Jose, Calif., is expected to announce one such product, Connectlan, in February. The device can act as both a protocol-transparent bridge and an intelligent router that will support TCP/IP now, and the ISO's Open Systems Interconnect and possibly other protocols later on, according to Halley. Connectlan also offers more efficient use of available long-distance bandwidth by allowing multiple LANs, as well as voice devices, to share one T1 link.

Multiple LANs within one building or area can communicate over Connectlan's broadband backbone. The product will also feature a graphics-based network management system, Halley said. Prices were unavailable.

Vitalink Communications Corp. last week announced two products that address the demands of companies like Hughes for "true Ethernet speeds" across LAN-to-LAN bridges, Covert said.

The two new members of Vitalink's Translan bridge line are said to support up to 3M bit/sec. throughput in both directions.

The products can select the most efficient route from among alternate network paths and can also dynamically switch transmissions to a different route in case a line is down or overloaded, according to Vitalink.

Vitalink's Translan 350 connects Ethernet networks supporting either Xerox Corp.'s Xerox Network Systems or TCP/IP. Transring 550 links token-ring networks over synchronous, high-speed lines ranging from 56K bit/sec. to T1 rates. Both products are said to support up to two T1 links.

Priced at $18,500, Translan 350 and Transring 550 are expected to become available in April.

Routing TCP/IP

Another bridge router device that supports multiple T1 lines was announced late last year by Wellfleet Communications, Inc. in Bedford, Mass. The Link Node and Concentrator Node communications servers provide routing functions for TCP/IP or Decnet devices and bridge transparency for other protocols, according to Mark Strangio, the company's director of product marketing.

"And if IBM gets its stuff together, we'll support LU6.2 and the Token-Ring down the road," Strangio said. The products also allow multiple LANs to share a high-speed line with voice devices, he added.

The Link Node can support up to eight T1 lines and eight Ethernet LANs, with prices starting at $10,800. The Concentrator Node supports 26 T1 lines and 26 Ethernets and is base-priced at $12,000.

T1 vendors sprucing up lines in '88

BY ELISABETH HORWITT
CW STAFF

With 15% of the Fortune 1,000 evaluating T1 network technology for installation by mid-year and with a 40% annual growth rate through 1989, according to Salomon Brothers, Inc., the market for T1 products is taking off again.

Several products have been introduced recently that offer users more efficient use of their existing T1 networks, and more are expected to appear at the Communication Networks Conference '88, or Comnet, which will take place next week in Washington, D.C. Some recent introductions include the following:

• Network Equipment Technologies Corp. (NET) in Redwood City, Calif., last week announced a network processor said to concentrate up to 256 data connections onto a single circuit within an NET IDNX T1 switch.

Developed by NET acquisition Condesign, the SPX is said to provide a cost-effective way for small sites to connect a limited number of asynchronous terminals to an NET backbone T1 network. One SPX can link as few as eight data channels over private lines, or several SPXs can be clustered together to support as many as 1,500 channels and 40 concentrated links, according to NET.

The device supports asynchronous or synchronous channel speeds of up to 19.2K bit/sec. and link speeds of up to 64K bit/sec. Priced at $250 to $350 per channel, the SPX is scheduled to begin shipping in March.

NET also announced a new version of its Enhanced Operator Console software, intended to provide network management across its IDNX switch family, SPX network processor and Series 2000 multiplexers.

Two compression devices said to boost a high-speed line's capacity for carrying data are expected to debut at Comnet.

• Aydin Monitor Systems in Fort Washington, Pa., will introduce the 6441 Quad Transcoder, said to compress four standard Pulse Code Modulation T1 links into a single 1.5M bit/sec. T1 circuit. The device can reportedly handle both voice and data output from a digital private branch exchange or any other T1 device using the D4 format, the vendor said. Available immediately, the unit is priced at approximately $30,000.

• Symplex Communications Corp. in Ann Arbor, Mich., is expected to introduce an eight-channel, dual-trunk addition to its family of data compression devices for leased-line networks. The Datamiser II SDC-8E will allow each line to carry as much as four times its normal traffic load up to a maximum throughput of 15.36M bit/sec., the vendor said. The product will be priced at $9,950.

In addition, several vendors have chosen this month to fill in gaps in their existing T1 product lines:

• Infotron Systems Corp. in Cherry Hill, N.J., plans to announce at Comnet the NX3200, a mid-range member of its NX family of T1 networking products. The NX3200 was designed to support up to eight T1 links and up to 250 channels. It is upgradable to Infotron's NX4600 T1 switch, the company said.

• Datatel, Inc., also in Cherry Hill, is set to unveil at Comnet its DCP9900 T1 Nodal Processor. With a price beginning at $20,000, this modular switch is said to support up to 18 T1 links, each with a throughput of 56K, 64K or 2M bit/sec.

• Datatel is also expected to announce the DCP9060 Sub-Rate Time Division Multiplexer, which can handle between eight and 30 asynchronous or synchronous voice/data channels. It is priced at $2,250.

• Last week, Digital Communications Associates, Inc. announced the System 9000-S, a low-end T1 multiplexer that can handle up to eight T1 trunks. Priced at between $25,000 and $40,000, the 9000-S is set to be available in the third quarter.

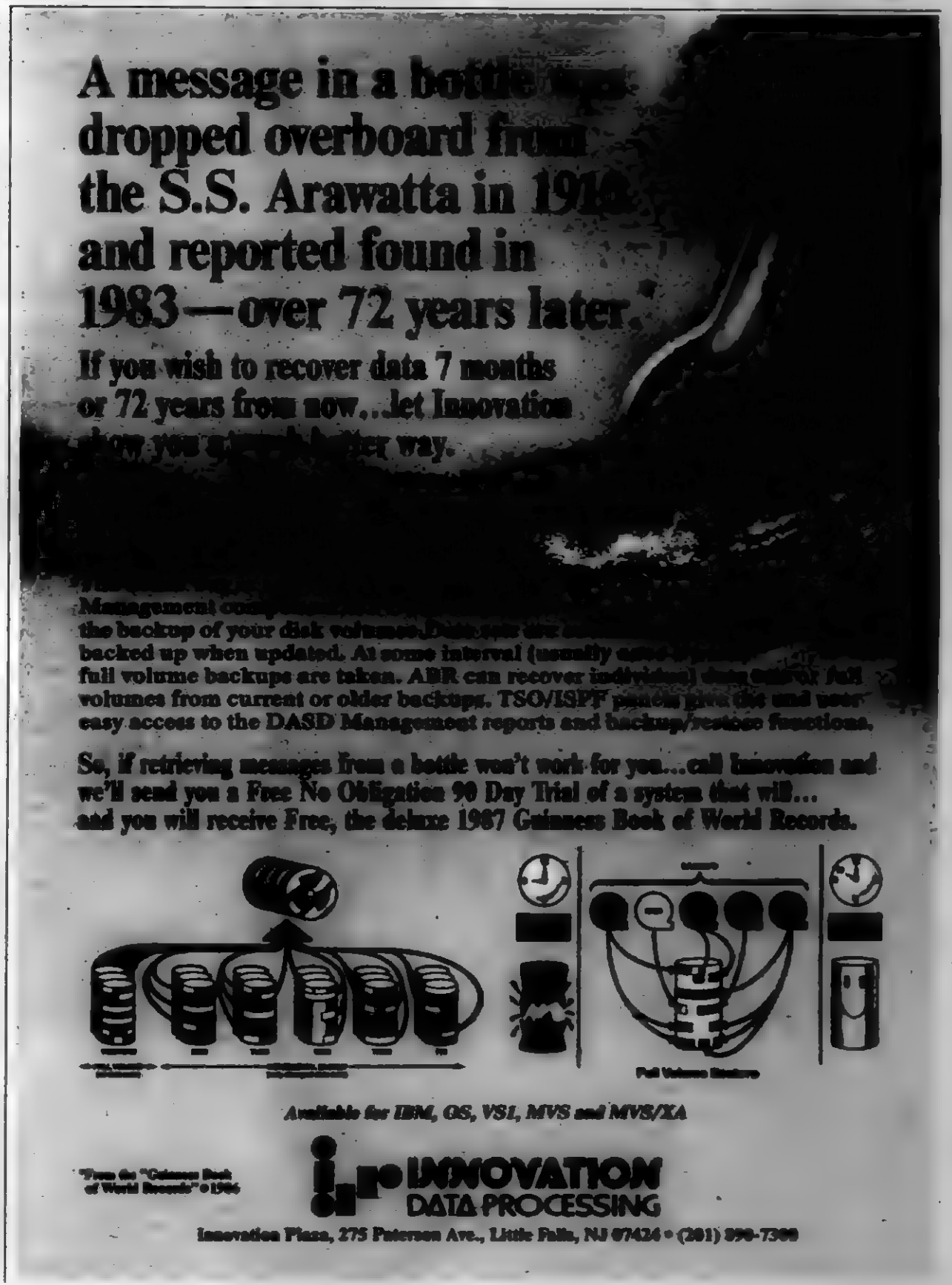
CORRECTIONS

The photos of Allen H. Michels, chairman and CEO of Ardent Computer Corp., and John William Poduska Sr., chairman, president and CEO of Stellar Computer, Inc. [CW, Jan. 11] were transposed.

Gary P. James, technical director in the advanced technology group of Arthur Andersen & Co. in Chicago, said he believes a partial implementation of referential integrity will be in the next release of DB2 but not a full implementation, contrary to a report in the Software & Services section [CW, Dec. 28, 1987/Jan. 4, 1988].

In the chart for the Spotlight on Application Development Tools [CW, Nov. 9, 1987], Magic Software should read Magec Software; the telephone number should read (800) DD-MAGEC.

In the Spotlight on Leasing and Used Equipment [CW, Oct. 12, 1987], the headline for the leasing firms chart on page S7 should read, "Top 10 independent leasing firms." The ranking should be as follows: Comdisco, CIS (CMI), Meridian (Unilease), Computer Financial, Capital Associates, CSA, Computer Sales International, Dataserv, Decimus and Randolph Computer.



Delayed Microvax 3000s ready to begin shipping

BY JAMES CONNOLLY
CW STAFF

MAYNARD, Mass. — Digital Equipment Corp. blamed misunderstandings and an unexpectedly long period of "quality qualification" of disk drives for delays in shipments of the Microvax 3500 minicomputer and Vaxstation 3500 workstation.

The two 3500 systems will be available beginning in April, although orders placed now might not be filled until this summer because of an order backlog, according to Duncan M. Anderson, DEC marketing manager for Microvax systems.

Anderson also said the high-end Microvax 3600 will begin quantity shipments this month, and the Vaxstation 3200 will ship in quantity next month. He said several hundred Microvax 3600s are expected to be delivered by the end of this month.

When the four Microvax 3000 systems were introduced in September, DEC said shipments would begin by the end of 1987 and that volume deliveries of the Microvax 3500 and 3600 were set for early 1988. Anderson said DEC meant to say only that the 3600 would begin shipping by year's end.

He blamed "a very obscure, small problem that was discovered — literally — on the shipping dock" for the failure of the 3600 to ship in December 1987.

Anderson said the Microvax 3500 and Vaxstation 3500 will not be available until April. "The exit from quality qualification into production ramp-up took longer than expected with the RA70. There is not today a quality problem with the 3500s," Anderson said of those systems, both of which use DEC's new 280M-byte RA70 disk drive.

He said delays had been related to reliability, which has been improved. The Microvax 3600 and Vaxstation 3200 use different disk drives.

One analyst speculated that the delay in shipping the Microvax 3500 could hurt DEC by firing up the competition between DEC and IBM at a time when IBM is developing a system, code-named Silverlake, as a follow-on to the IBM System/36 and 38.

"The august thing is that it gives momentum to IBM as they get ready to announce Silverlake," said analyst Bob Randolph of International Data Corp., a Framingham, Mass.-based market research firm.

"With this in mind, if I were with IBM, I'd probably move up my announcement of Silverlake by a month or two," Randolph said, noting the 3500s could be delivered at about the time Silverlake is expected to be announced.

However, analyst Sandra Gant of the Cupertino, Calif.-based market research firm Infocorp, said a delay of a few months for the 3500s is unlikely to hurt DEC. "It really doesn't matter all that much, because for the next few months, there isn't that much that can hurt them, they are on such a roll," she said.

In an unrelated development last week, DEC formally introduced enhancements to two other members of the Microvax line.

Microsoft

FROM PAGE 1

may help solidify standards in the emerging PC network market with a strong SQL engine.

Users, however, were more cautious. Many said they will wait to see which standards emerge before committing to a technology for networked data bases.

Microsoft and Ashton-Tate are trying to position the SQL Server as the de facto open platform standard for third-party developers. Ashton-Tate will be the first to market with a compliant application, shipping a new version of its industry-leading Dbase package with SQL embedded in the program language by the end of this year, claimed Roy Folk, Ashton-Tate's executive vice-president of software. Ashton-Tate guaranteed that existing Dbase applications will be able to run against the SQL Server, providing its huge installed base a migration path to the new software.

Developers unfurled a list of other vendors, including Borland International, Symantec, Blythe Software, Inc. and Information Builders, Inc., that have also pledged to conform to the server standard.

SQL Server features a series of stored procedures that reduce data base access times and reportedly help ensure data integrity in multiuser environments. MIS could also be attracted by the package's transaction-oriented DBMS kernel that allows users to tap the data base while a DP worker carries out backup and recovery and other administrative tasks.

"For users, it's very good in that, for the first time, we'll end up with a standard data base engine based on a technology that is second to none," said Robert Therrien, an analyst with Paine Webber, Inc. in New York. "Standardization would make the front-end [applications] the means of differentiation and the back end a commodity."

Dueling servers

The drive for a standard, however, could touch off a fire storm of competition between Microsoft/Ashton-Tate and Lotus Development Corp., which has announced its own plans for a server-based DBMS compatible with IBM's DB2 mainframe DBMS. A Lotus official said the so-called Lotus DBMS can be made compatible with any SQL engine. However, Lotus and its upcoming DBMS product were conspicuously absent last week from the list of third-party developers pledging server support.

"It's much too early to tell other players like Oracle and Lotus that this is the standard," said Bill Higgs, director of software research for Cupertino, Calif.-based Infocorp.

Some users were equally skeptical about viewing the SQL Server as a standard.

"The concept is on target for what we're doing, but we're not necessarily going to do it with the Microsoft product," said Dan Cwenar, assistant director of systems technology at the Carnegie-Mellon Institute of Technology.

"It looks like a good tool, but a standard has to come from the bottom up, reaching a critical mass gradually," said R. Bruce Johnson, manager of the personal computing resource center at Deloitte, Haskins & Sells in New York.

SQL Server is based on technology from Sybase, located in Berkeley, Calif.

Although it was unclear what Ashton-Tate and Microsoft actually contributed to the package, Microsoft Chairman Bill Gates said SQL Server will incorporate all the functions available on Sybase's current minicomputer server.

Under the agreement, Microsoft has control over SQL Server, licensing it to Ashton-Tate for sale through its retail channels. Microsoft will sell the package to its OEM hardware customers, while Sybase will offer it to its current mid-range users.

Most industry experts praised the Sybase technology and the uncharacteristic show of good faith among two of the three largest PC software vendors. "[This] will have a lot to do with how corporate America uses its data," said Richard Finkelstein, an analyst with Codd and Date Consulting Group.

For its part, Ashton-Tate will get bragging rights to being the first data base application to tie into the open platform SQL engine, in addition to royalties shared with Microsoft from retail sales.

SQL pledges

FROM PAGE 1

Make no mistake, micro-based SQL technology will have its day. Most MIS professionals in large corporations say that standardized SQL on a micro will make users more productive by moving them closer to the data, allow them to use microcomputers as programmer workstations and provide them with a systematic method of accessing data and controlling its integrity throughout the corporation.

"The SQL language supplies the mechanism to get to data without having to follow a path, something a typical end user doesn't know how to do," said Gary James, advanced technology director for Arthur Andersen & Co.'s Advanced Technology Integration Group.

SQL "also allows developers of fourth-generation products to deal more with other parts of a product like the interface," he added.

It also makes a certain amount of financial and functional sense for SQL data bases to be on micros, according to Richard Finkelstein, a vice-president with Codd and Date Consulting Group and Publisher of "SQL Review."

IBM mainframe processing costs run to $150,000 per million instructions per second (MIPS), compared with $25,000 on a personal computer, Finkelstein said.

"As large transaction systems come down, they are easier to implement and cheaper to maintain on a micro platform. Plus, when you network systems together, there is greater extendability. You don't have to upgrade to larger mainframes," Finkelstein added.

Integration No. 1

The first priority of MIS executives, particularly those overseeing multiple IBM hardware platforms, is for SQL to integrate micros as seamlessly as possible with their larger systems.

"The main thing we are interested in is the ability to store some data remotely, have a central core base of data and have tools that access both with full integrity," said Bob Onacky, a senior systems analyst with Commonwealth, Inc. in Chicago.

Only 35 or so employees out of 16,000 are using SQL at Commonwealth, Onacky said. He said it will be years before a significant number of users are using SQL.

"We want SQL, but we want it to be compatible with our stuff on the mainframe," said Howard Foedick, a project leader of relational data bases at Amoco Corp. "We want to write a Cobol program on a PC with SQL that looks similar to a Cobol program you write with DB2."

Seamlessly transporting data from micros to mainframes via SQL would also reduce training costs and increase the value of corporate data, according to several MIS executives.

"If I can train an individual to make use of a system on a mainframe, mini and micro, I'll save a major investment. And by accessing information from micros, minis and mainframes, I've increased the value of the information," said Tim Berry, senior software engineer with Financial Information Trust in Des Moines, Iowa.

What standard?

One factor that impinges on the SQL plans of large corporations is standards. While the ANSI committee has defined one standard, some say it is somewhat watered down.

More important to corporate users, however, is what IBM will do with its SQL embedded in OS/2 Extended Edition, which reportedly will not be available until July.

"From the viewpoint of a typical large IBM-oriented shop, I don't think the ANSI standards are that important. The IBM standards are what is important," Amoco's Foedick said.

Some analysts said they do not expect to see that kind of conflict between ANSI and IBM on SQL standards. Most said they expect both sides to smoothly bridge any important differences.

Locking integrity

Another factor holding up some corporations' plans is the lack of referential integrity — the ability to change one record and ensure that changes are made to related ones — in a micro-based product. Only Sybase, Inc.'s SQL engine has a simulation of that capability.

Referential integrity "is important if it's going to be truly integrated for all our machines," Commonwealth's Onacky said.

It could be some time before a full implementation of referential integrity is put on a micro, because there is no such capability yet on many mainframe data bases, including IBM's DB2.

Senior writer Alan J. Ryan contributed to this report.

Benefit plan

Major benefits of SQL, according to users questioned by Computerworld

- Lets users run personal computers as programmer workstations
- Moves data closer to people working with it
- Cuts down on corporate training
- Secures data and ensures its integrity on a PC
- Gives users a systematic way of accessing data, thereby doing away with ad hoc queries

CW CHART

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† *Digital News*, December 7, 1987. ‡ Gartner Group currently available research.
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PS/2 add-on vendors told to pay up-front fees

Computer Automation claims right to memory card royalties from third parties

BY JAMES A. MARTIN
CW STAFF

IRVINE, Calif. — Computer Automation, Inc. last week charged that add-on board vendors selling IBM Personal System/2 Micro Channel memory cards may be infringing on its patent for a memory address allocation scheme and thus required to pay royalties.

According to Computer Automation, any third-party enhancement card vendor with memory boards for PS/2 Models 50, 60 or 80 will be required to pay a one-time royalty fee of $25,000 or $300,000, depending on the volume of boards produced. Those companies will also have to pay fees ranging from $1 to $5 per unit.

Vendors of PS/2 Model 50-, 60- or 80-compatible machines will be subject to the royalty as well, according to Computer Automation. To date, no vendor has announced or released any PS/2 Micro Channel clones.

One official at a board vendor agreed that the patent appears to be valid but said that any royalties paid by the board vendors would probably not cause board prices to rise noticeably.

In March 1987, IBM agreed to pay a one-time royalty of $100,000, in addition to per-unit costs, for licensing Computer Automation's patent for use in IBM's PS/2 Micro Channel architecture. IBM officials would not comment on the agreement last week.

Computer Automation's Automatic Modular Memory Address Allocation System patent relates to how add-on memory devices provide output signals that enable a computer system to determine a board's memory capacity. The scheme also enables the system's processor to determine the total available memory space.

Not without infringing

"We don't believe that either class of potential licensees can produce PS/2 clones or Micro Channel-compatible memory boards without infringing on our patent," Chairman George Pratt said in a prepared statement.

Not everyone believes their products are infringing on Computer Automation's patent, however.

"To the best of our knowledge, none of our boards infringe on the design in question," said Jane Bator, a representative for Quadram Corp., a third-party enhancement card vendor.

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Phoenix to open design centers around the globe

BY ALAN J. RYAN
CW STAFF

NORWOOD, Mass. — Phoenix Technologies Ltd. last week said it plans to open hardware design centers worldwide, with engineering IBM Personal System/2 compatibles likely being the thrust of the business.

According to Rich Levandov, vice-president of marketing at Phoenix, the company's engineers will staff the centers, working with OEM customers to design PS/2-compatible computers based on Intel Corp.'s 80286 and 80386 chips. The units will be designed within a 16-week time frame, Levandov said.

Also to be designed at the centers are IBM Personal Computer AT-compatible computers and workstations based on Motorola, Inc.'s 68000 microprocessor, also within the 16-week time frame.

"Services will include . . . analysis to consulting but will focus on actual hardware design for clients," Levandov said. Planned sites include Honolulu, which will open within 30 to 45 days, and Europe, Taiwan, Tokyo and South Korea, all of which will open within 90 days, he added. Sites have already opened in Cambridge, Mass., and Scotts Valley, Calif.

"We've predesigned 20 to 25 workstation configurations, and all of those designs are sitting in our computer-aided design system," Levandov said.

Although PS/2-compatible chip sets are still not commercially available from companies like Western Digital Corp. and Chips & Technologies, Inc., Levandov said, Phoenix will be able to design ahead of the availability of the chips, so that when the silicon is readied, it can be dropped into the prototypes and tested.

"We're expecting the first commercial availability of our hardware in the February/March time frame," he added.

Levandov said Phoenix is not worried that IBM will file a copyright infringement lawsuit against it for designing PS/2-compatible equipment.

Phoenix is well schooled on how to create an IBM work-alike BIOS without infringing on IBM's copyrights, Levandov said, adding that the company can design functional compatibility in a manner dissimilar to IBM's design.

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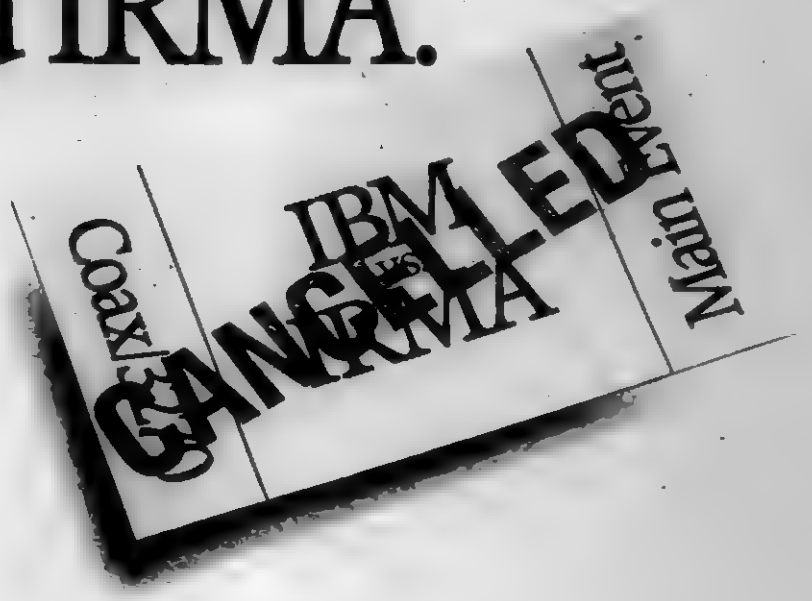

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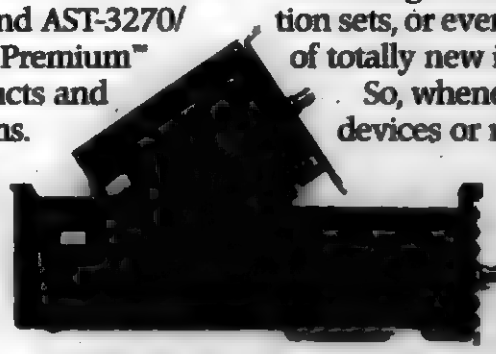

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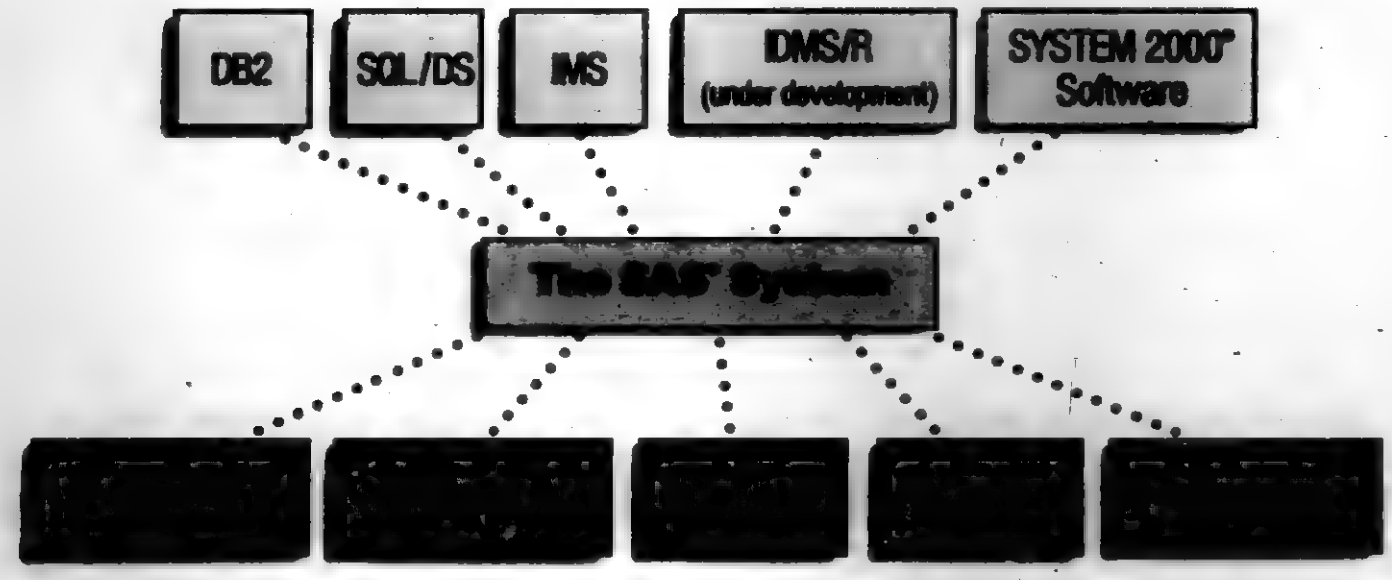

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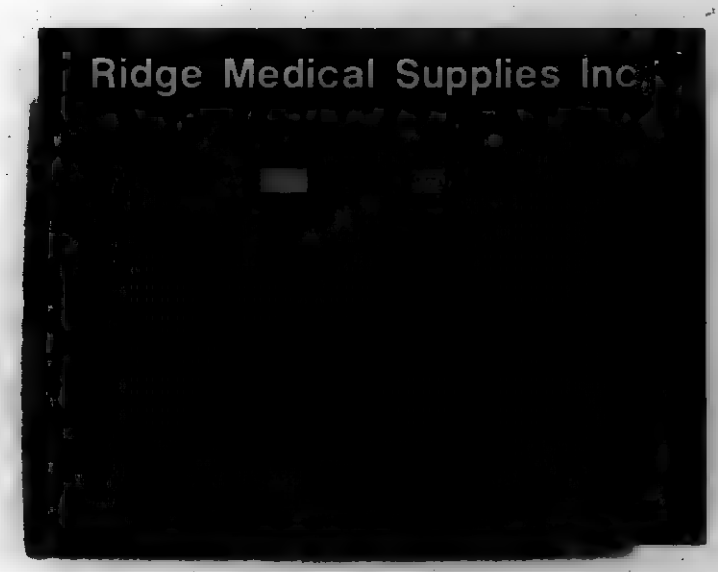

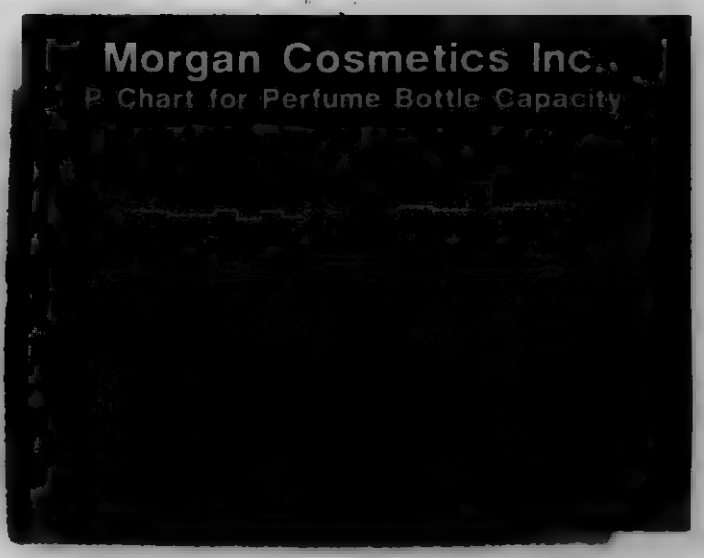

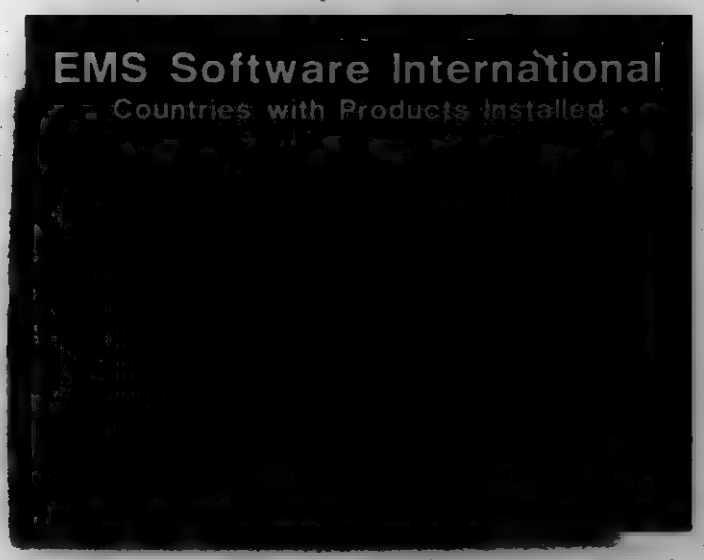

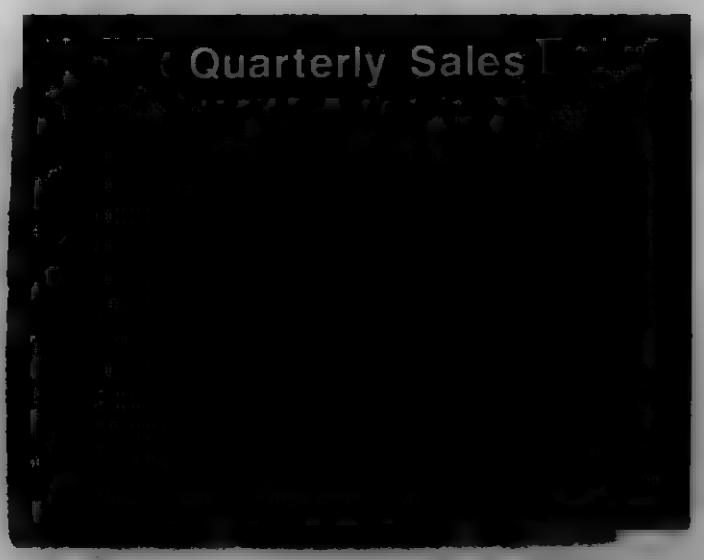

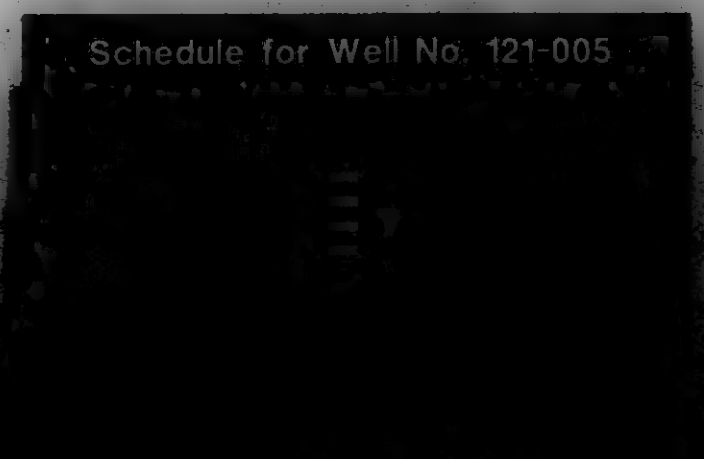

IBM pumps up mid-range channel

BY STANLEY GIBSON
CW STAFF

RYE BROOK, N.Y. — Laying the groundwork for its "System/3X follow-on" processor, also known as Silverlake, IBM last week announced changes in its relations with distributors geared to boosting sales of the yet-to-be-announced machine.

Under the plan, IBM created a new class of dealers, called authorized agents, most of whom will be drawn from its Marketing Assistance Program (MAP). While MAP dealers will continue to make sales calls accompanied by IBM salesmen, authorized agents will be permitted to make sales pitches on their own.

"There is really no way to cover those 4½ million prospects by yourself," said David Thomas, IBM group director of mid-range systems enterprise marketing, referring to an estimated total of potential mid-range customers.

Currently, a third party participates in three out of every four IBM mid-range sales, Thomas said. Most of the dealers who are expected to become authorized agents are experienced in the System/36 and System/38 product lines, according to Thomas.

"There is no question that this is paving the way for Silverlake," said David Andrews, president of ADM, Inc. in Cheshire, Conn., an IBM mid-range consulting firm. Silverlake, which IBM executives have said will be unveiled this year, is expected to combine features of both IBM's System/36 and System/38 and run software written for both.

Andrews and other industry observers say IBM's future in the mid-range hinges on the success of Silverlake, which will be geared to small users and new accounts. Andrews predicted that, over its product life span, Silverlake will outsell the IBM 9370 by a ratio of 8-to-1.

In other moves, IBM simplified its contracts for dealers and eased product ordering requirements. IBM also said it will make joint sales calls with value-added resellers (VAR) and remarketers.

In addition, the firm instituted a program to assist remarketers of competing equipment in converting their application software for use with IBM systems.

Counterattack

The measures are attempts to counter Digital Equipment Corp.'s successful use of third-party sales channels, according to Bob Randolph, a DEC analyst at International Data Corp. in Framingham, Mass.

IBM has "got to do something to counter the Microvax in new customer accounts," Randolph said.

"The thrust [of the authorized agent program] is toward new-account marketing," said Michael J. McGraw, president of Data Systems International in Kansas City, Mo., an early participant in the program.

In getting VARs to transport their software to IBM hardware, Dom DiMauro, program manager for IBM's mid-range application expansion program, said IBM will make its own systems engineers available to firms desiring to convert applications to IBM.

"The purpose is to recruit competitive VARs to write applications for IBM hardware," DiMauro said.

Because of the unique operating system of the System/38, which includes a built-in relational data base, code written for other processors could not take advantage of the System/38's unique qualities without considerable customizing, according to Andrews.

"You could take nonrelational code and run it on Silverlake, but it wouldn't be worth much. If you did that, nobody would buy it. You will have to redesign the code," Andrews said. He added that Silverlake will have many of the System/38's operating system features, including the relational data base.

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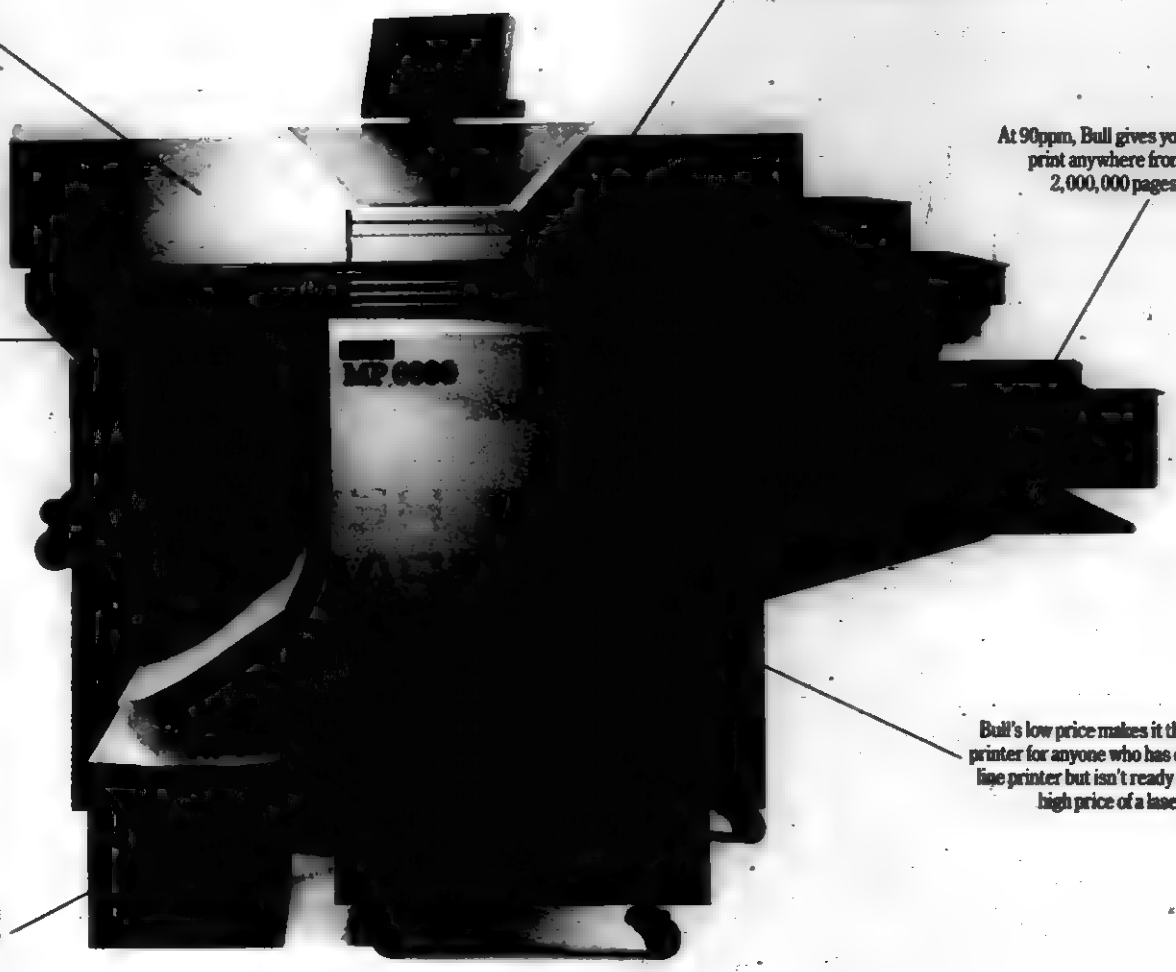

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McDonald's puts ISDN on menu

Fast-food giant finds technology tasty after year-long test

BY JEAN S. BOZMAN
CW STAFF

OAK BROOK, Ill. — First to take a bite out of Integrated Services Digital Network (ISDN) technology one year ago, McDonald's Corp. has decided to make ISDN a regular item on the fast-food giant's menu of telecommunications services.

McDonald's has decided to make ISDN a corporate standard, a move the firm formally announced at a joint conference with ISDN providers Illinois Bell, a Bell operating company, and AT&T Network Services last week.

The decision was made following a year-long test of ISDN devices at corporate headquarters here. Although there have been three ISDN trials nationwide, McDonald's is the first to complete the testing phase and move to paid service, starting at the middle of this year. "We've had three years of exposure to ISDN and one year of hands-on experience," reported Patrick Krause, staff director of telecommunications at McDonald's. "That gives us a tremendous amount of experience in a new technology."

Eying expansion

Unlike private corporate networks that bypass the AT&T national network, ISDN is provided at a regional Bell holding company's central switching offices, not on customer premises. McDonald's plans to expand from 100 to 400 ISDN lines at corporate headquarters this year and to move some workers into an all-ISDN building in August. The integrated voice/data service is provided by a modified AT&T 5 ESS switch in an Oak Brook switching center nearby.

Ameritech, the parent company of Illinois Bell, will begin to sell ISDN service throughout its five-state region after the McDonald's beta test of ISDN is completed in June. The commercial ISDN service, called Ameritech Integrated Digital Network, will be provided first in the Oak Brook area and will then be expanded to other Midwestern cities and states.

Pricing for ISDN service has not yet been finalized, according to Allen Ciner, vice-president of marketing at Illinois Bell, but it will feature a basic service with optional value-added features at additional cost. "The tariff will be filed competitively," Ciner said, "providing benchmark pricing information to all customers, not specific customers — and the packaging of ISDN-based services will be flexible."

> LIKE ANY first user of a product, McDonald's took a risk in testing the unproven ISDN technology in a workplace trial.

Like any first user of a product, McDonald's took a risk in testing the unproven ISDN technology in a workplace trial. However, the risk was limited to 100 voice/data lines, and the special ISDN equipment was provided by vendors such as NEC America, Inc., Fujitsu America, Inc. and Hayes Microcomputer Products, Inc. without charge.

ISDN end users get their choice of 300 voice/data features, including interactive host access from a variety of terminals, automatic display of a caller's phone number, voice mail and an electronic phone directory. Through ISDN links, users in different offices will be able to view electronic reports appearing on callers' screens. Then both parties can edit, review or comment on the text interactively — all while speaking on the phone.

Nixing redundancies

McDonald's MIS managers said they view ISDN as a practical step that will eliminate redundant wiring and the need to establish a private bypass network. "We don't have enough traffic between any two offices to justify the purchase of a dedicated T1 network," Krause said. "ISDN allows us to establish a virtual private network which acts as a transfer point between users and our mainframe hosts." That is important because of the geographical spread of end users at 9,700 McDonald's stores worldwide, 7,000 of which are in the U.S.

ISDN will support a variety of ways to send a file into the main computers. "There are SDLC links, messages from IBM 8100s in the field as well as files that are sent in from regional Unix-based systems," said Carl F. Dill Jr., vice-president of information services at McDonald's, referring to IBM's Synchronous Data Link Control. Sales and inventory information must be uploaded from many terminal types to the corporate Amdahl Corp. 5890 and IBM 3090 mainframes in Oak Brook. International stores send messages via CCITT X.25 packet-switched networks to a set of Tandem Computers, Inc. front-end processors attached to the IBM and Amdahl machines.

The intent of going to ISDN is to eliminate costly redundancy in coaxial cable connections and phone wiring. "We are ridding ourselves of the network spaghetti, as we like to call it," said Bonnie Kos, McDonald's vice-president of facilities and systems.

"ISDN means a lot to our corporation of penny profits and a penchant for details. We make money by scraping every bit of ketchup out of the can, and we believe that ISDN will help us to keep down the cost of our administrative overhead," Kos concluded.

Blimey! British Microsoft branch apologizes for sham Word report

BY RALPH BANCROFT
IDG NEWS SERVICE

READING, England — Microsoft Ltd., British affiliate of Microsoft Corp., last week publicly apologized for a fictitious evaluation report of its word processing package, Word 4.0. The promotional brochure was included in British computer publications and was purported to be an in-house report produced by a company called West Engineering.

Microsoft admitted that the firm does not exist. The evaluation was compiled by Microsoft itself to promote what it saw as the benefits of Word 4.0 when compared with other word processing packages. "Rather than use a simple comparison chart, we wanted to get across to managers the key features of Word in plain English. We used the report format because this is the kind of thing they are used to reading," explained Mark Plant, Microsoft's marketing manager.

According to Plant, it was not until the brochure was printed that the company realized it might be mistaken for a genuine independent evaluation.

"Most people we have spoken to realize that it was a spoof. However, if anyone was misled in thinking it was a report from a real company, then we apologise unreservedly," Plant said.

> "MOST PEOPLE we have spoken to realize that [the phony report] was a spoof. However, if anyone was misled. . . then we apologize unreservedly."
>
> MARK PLANT
> MICROSOFT LTD.

The brochure drew immediate complaints from rival software vendors that the phony report was inaccurate in its conclusions.

Of IBM's Displaywrite 4, the report said, "It fails to meet many of our basic word processing needs, let alone our more specialist users'. As a page-orientated program, it is totally unsuitable for long documents."

Lotus Development Corp.'s Manuscript is criticized in the report because "its specialized approach makes it difficult to learn and use and unsuitable for a lot of basic word processing tasks."

Multimate International Corp.'s Multimate Advantage II, according to the report, "promises fast text processing. But it is fundamentally page-orientated, so formatting and scrolling through long documents is awkward and slow."

Wordperfect Corp.'s Wordperfect 4.2 — currently the UK's top-selling word processing package — is described as lacking "many of the essential facilities which we need. It does not support style sheets, glossaries or outline processing, and it cannot link directly to Lotus 1-2-3 or Microsoft Excel."

Micropro International Corp.'s Wordstar Professional 4, the report says, "has little to recommend it. Its user interface is unfriendly, and the program is difficult to use, without any context-sensitive Help."

Word 4.0 is the only program to escape critical comment. The report concludes: "It offers a wide range of power features, including conditional mail-merge, programmable macros and outlining. Its style-sheet facility makes elaborately formatted, long documents easy to create."

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EDITORIAL

Tough choice

LAST WEEK'S STRATEGIC alliances between some of the industry's largest players may ultimately create as many problems as they solve.

In separate agreements that will affect virtually every MIS organization, Microsoft, Ashton-Tate and Sybase linked up to develop a networked data base management system, while DEC and Apple joined forces to bind their systems more closely together.

These deals will be promoted as bringing stability to key markets. But it would be shortsighted to ignore the overtones of competition in both agreements. Amid all the backslapping and handshaking, the vendors have created a new set of competing standards and another series of difficult choices for MIS.

Microsoft, Ashton-Tate and Sybase's announcement of an open architecture, server-based DBMS for the OS/2 operating system is as much a shot at Lotus as it is a magnet for third-party development activity. Lotus has already announced its server-based product — code-named Lotus DBMS — and plans to deliver it at about the same time as the Microsoft-led triumvirate. Furthermore, IBM has yet to sketch its DBMS plans for network servers. Its OS/2 Extended Edition, also set to debut in the fall, contains data base elements that may or may not play with the competing products.

What a choice for MIS buyers! Are you better off commiting to one of the two independent standards or waiting to see what IBM has up its sleeve? While all three technically use SQL, Ashton-Tate Chairman Ed Esber acknowledged last week that "everyone's SQL is slightly different." And since none of the products will be available for at least six months, there is no way to compare their features in advance.

Also daunting is the wrinkle the DEC-Apple alliance has put in the industry. Apple scored a coup in gaining the endorsement of the most significant non-IBM computer maker. But for DEC, the agreement is driven as much by its two spectacular failures in the personal computer market as its desire to create a strategic partnership. The hidden message is that DEC has all but given up on its efforts to integrate the PC.

What does that mean for its customers with large numbers of PCs, Rainbows or Vaxmates? Will MIS managers increasingly find themselves facing an either-or decision between the IBM standard and the DEC-Apple alternative? The end result may be greater divergence from industry norms rather than broader acceptance.

When decisions like these are necessary, MIS organizations need to step back and evaluate their philosophies toward corporate standards. High rollers with aggressive users might seize the opportunity to adopt new technologies, even if it means being on the bleeding edge. Those who like to play it safe are better off waiting to see which standards truly emerge. And vendors need to respond to their customers' questions about just who is compatible with whom.

LETTERS TO THE EDITOR

Takes exception

I am writing in response to Alan Radding's article, "Race of power vs. position" [CW, Dec. 21, 1987].

With regard to his comments on Paperback Software's VP-Planner, this product was launched in late 1985 by a company with almost no cash. We took on Lotus Development Corp., the leader in the spreadsheet industry.

According to most independent data, including *Computerworld*'s, we have taken 6% of the market in two years. According to a CW table, we are now the No. 2 spreadsheet for the IBM Personal Computer. Microsoft Corp., with Multiplan and Excel, led us in total shipments, but the bulk of those shipments apply to non-IBM microcomputers, such as Apple Computer, Inc.'s Apple II and Macintosh.

If Paperback Software had had the luxury of a multimillion dollar advertising budget, maybe we would have made a bigger splash with our entry.

As for our mispositioning the product as a Lotus clone, not once in any of our advertising campaigns or press releases did we so position the product. Every advertisement we ran strongly stressed our data base capabilities. It was the press that insisted on referring to our product as a Lotus clone despite our repeated attempts to convince journalists who so referred to VP-Planner and to explain to them what the product really was.

In the future, we will be watching to see how CW reports on one of our competitors that, in the last weeks of 1987, introduced a moderately low-priced spreadsheet in one of the greatest blazes of media advertising the industry has seen. That company is reported to have shipped 50,000 units in the last two weeks of December.

Having looked at one of these units with some care, we realized the product was shipped six months early, and what our competitor did was put 50,000 time bombs into the market to blow up under its own feet.

I wonder if CW will have the guts to report accurately on this situation or whether it will simply roll along with prevailing ignorance and tout the company as something other than an also-ran.

The truth is that for many users, the additional power provided by VP-Planner and VP-Planner Plus is irrelevant since the basic spreadsheet capabilities are already far more than they need.

When we introduced VP-Planner in 1985, we could have chosen one of two strategies: price the product high, selling it to the few users who really needed our advanced data base capabilities, or price the product low and go after the market of users who could not afford Lotus's high prices. We made the decision to take the latter path because our calculations showed that it would generate more revenue.

Adam Osborne
Chief Executive Officer
Paperback Software
Berkeley, Calif.

This week in history

Jan. 16, 1978
Technological developments and IBM's willingness to cut prices to become competitive grease a downward spiral for prices of medium- and large-scale computer systems. For example, a 4M-byte IBM 3032 costs less today than the March 1977 price of a 2M-byte 370/158-3 — $2.1 million vs. $2.2 million.

Jan. 17, 1983
The divested Bell operating companies reveal the first two services they will offer after divestiture from AT&T: a 56K bit/sec. circuit-switched service and a local-area data transport service that will support simultaneous voice/data transmission between a user site and a backbone packet-switching network.

Move to Russia

I read the article "From Russia with love" [CW, Nov. 23, 1987].

In my opinion, Saxpy Computer Corp., Tony Yates and Ivan-Pierre Batinic, along with his cronies, ought to take their technology and move to Russia. It is a sad day when traitors are praised because they are responsible for a few more bucks being made due to deals made with our country's enemies.

It is also sad that *Computerworld* does not have something better than this to write about.

Joseph F. Walker Jr.
Bartlesville, Okla.

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.*

How to spot the true colors of a rare breed — the expert

JOHN BARNES

Though we may not wish to admit it, most of us are fully replaceable. Your company — any company — can usually hire someone for about the same price to do the same thing. As the employment agencies like to say, "There are a lot of people out there with your resume."

Sometimes, though, managers need a different breed — the rare expert, the one whose expertise is hard to find and costs accordingly. Every so often, the company needs somebody to "hemulate the fratistat," and, as everybody knows, there are only a dozen or so fratistat hemulators in the world. Unless your company is very big or very lucky, you will have to call in an outside expert.

For the typical manager or project leader, finding the needed expert is just the beginning of the trouble. Aside from guiding him through all the new-kid-on-the-block adjustment problems, you are also trying to supervise something — and someone — you may not quite understand yourself. How do you fly blind without hitting a wall?

Here are a few rules of thumb:

• Something is wrong if the expert you hired is spending most of his time explaining what he does.

You want him to do his specialty, not offer a course in it. If he's spending all his time explaining, several things might be wrong.

Maybe you need to hire more people to make the new system work, and he is trying to turn your current employees into those people. Or maybe he is insecure in his skills and feels the need to show off — obviously not a good sign.

You may be trying to micromanage him, and his explanations are intended to get you off his back. Of course, his time spent explaining can lead to a lack of progress, which leads to panic and, thus, to more micromanagement and so forth in a downward spiral.

MANAGERS have a vested interest in the outside expert; they don't want their decision to look like a blunder. This predisposition to see a good job being done can cloud their perceptions of value.

Or your employees may be picking his brains, getting some unscheduled advanced training.

• Something is right if he goes through a formal process for deciding whether what he does is actually what you need.

BILL RUSSELL

If you don't quite understand exactly what your expert does, you might very easily be trying to buy a Big Mac from Colonel Sanders. A fly-by-night expert doesn't care — he'll take your money and run before you realize what you got. The one you want to hire only accepts clients he can really help.

• Something is wrong if, after a few weeks, the managers are impressed and the engineers aren't.

Once the decision to hire has been made, managers have a vested interest in the outside expert; they don't want their decision to look like a blunder. This predisposition to see a good job being done can cloud their perceptions of value.

Engineers, on the other hand, might dislike the newcomer at first; but if he gets the job done, they will come around fairly quickly.

• Something is right if he wants to talk to people you wouldn't have thought of involving. Chances are that the expert's arcane knowledge applied to your situation will produce impacts you will not be aware of but that he anticipates. Taking responsibility for those subtle second-order effects indicates knowledge and experience plus a commitment to making your project succeed.

• Something is wrong if he spends most of his time talking to people who are far higher than the project on the organizational chart.

This situation might grow out of plain old micromanagement from the top or your vice-president's desire for a more interesting companion at lunch. Whatever the reason, it ought to set off warning bells.

The mark of the true nonproducing expert is to cover all of his political bases. That is how he keeps getting paid without actually *doing* anything useful.

By contrast, a real expert will have little time for or interest in office politics. His focus will be on the work itself. If he is any good, he won't be around long enough for office politics to matter to him.

• Something is right if he starts making plans for turnover to your personnel early.

Ideally, the turnover ought to be planned before the work starts. Good turnover of the project to the staff is the difference between limping along afterward and moving smoothly back into normal operation.

Moreover, if your expert is planning the turnover, it is a good indication that he intends to finish the job and move on — and that's what you're paying him for, isn't it?

Barnes is the Pacific Northwest area manager for ADG, a high-tech marketing organization based in San Pedro, Calif. His first novel, *The Man Who Pulled Down the Sky*, was published by Congdon & Weed. His second novel, *Sin of Origin*, will be published this spring.

Beware of alchemists bearing super gifts

JOHN KIRKLEY

So this guy walks into your office wearing a pointed black hat and a flowing black robe with signs of the zodiac painted all over it, and he says, "Hi, I'm the alchemist."

Then he does something quick with his hands, and the next thing you know, he has this little dish with a stone in it and curls of smoke all around it, and right above it, floating in mid-air, just hanging there, is a little magnet.

"What you see," he says, never taking his eyes off you, "is superconductivity, and it's going to solve all your computer problems.

"I have right here a glossy brochure that describes our new 400-MIPS system, which, as you can see, comes completely housed in an attache case made of handsome, genuine, hand-sewn leather. Get rid of those clunky IBM 3030 systems in your basement. Be the first on the block to own the Super Spectacular Tesla 2000, the computer of the future," he adds.

In today's world of high-temperature superconductor research, there is fertile ground for a little inspired hucksterism.

High-temperature superconductors have the potential to revolutionize the computer industry. With very big bucks at stake, it is no wonder that researchers, scientists and even a few fringe folk are rushing to stake their claims.

Superconductor materials that operate at room temperature could, with minimum power requirements and almost no heat dissipation, provide ultrafast switching devices that operate 50 times faster than today's circuits.

Reputable organizations around the world, including IBM, Hewlett-Packard, AT&T, Westinghouse and European and Japanese firms, are mounting major efforts in the field.

Still locked in the labs

Today, high-temperature superconductor materials are still in the hands of the lab scientists. There is no timetable for the materials to be transmogrified into forms that can be used for practical applications; it could be tomorrow, it could be 10 years from now. No one really knows.

At this juncture, the ultimate consumer — you, the information systems professional — need only observe all the furor with detached interest and wait

Continued on page 23

Kirkley is an industry consultant currently acting as editorial adviser to Patricia Seybold's Office Systems Group. He is based in South Nyack, N.Y.

Explaining the executive MISnomer

MICHAEL SULLIVAN-TRAINOR

As executive vice-president of management information systems, the veteran professional possessed the longest title in the corporation. That distinction did not please him, however, because people still thought of him as the top techie.

"People look at the words MIS Administration on my door and think, 'MISadministration' or 'MISmanagement.' We need a change," he told his chief executive officer.

This wasn't the first time the MIS executive had discussed his concerns with the CEO. They both agreed that something needed to be done.

"I'm glad you brought this up," the CEO said. "I met with the board last night, and I'd like to congratulate you on your promotion to the position of senior vice-president for corporate information."

Finally, the MIS executive had a title that gave him the appropriate status, reflecting the way his role was changing.

Mainframes to meetings

When he started working in data processing 15 years ago, he considered himself a techie. After all, his job was managing the central computer system and its support staff.

But today, he was so far removed from the details of running the systems that he relied on his chief lieutenants to choose the technical managers and on the managers to choose their own programmer, analyst and operations staffs.

His days were spent in meetings. He met with the CEO to set long-range information systems objectives that would help the

Continued on page 23

Sullivan-Trainor is a senior writer at *Computerworld*.

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Doc. Config. Mgmt.	*Numerical Control*
Earth Resources	*Schematic Capture*
ECAD	*Seismic Processing*
Electronic Publishing	*Silicon Compilation*
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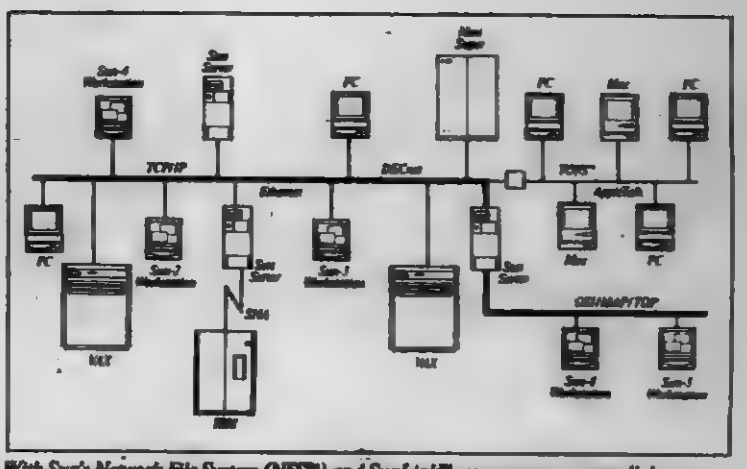

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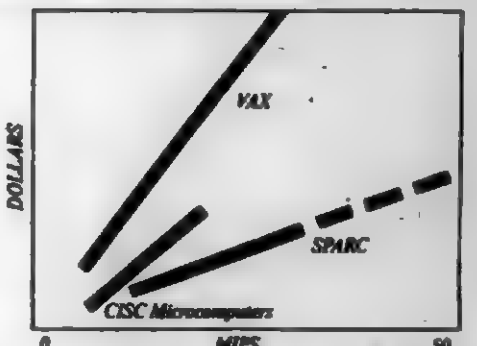

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Alchemists

CONTINUED FROM PAGE 19

for the day when the engineers can take over and make something that you can use.

However, keeping abreast of the latest developments in superconductivity has several benefits.

First of all, it is highly entertaining. Very rarely has there been such a scramble for fame, fortune and Nobel prizes.

Second, you will be up to snuff if the chairman of the board or your chief executive officer asks why you are not installing the Tesla 2000 that he read about in the National Enquirer while he was waiting to check out at the supermarket.

Finally, you will have a good idea who the real superconductor players are, and you will know when the technology is beginning to emerge in usable form.

Beginnings of the boom

The current superconductor boom began in April 1986, when IBM researchers K. Alex Muller and J. Georg Bednorz reported the results of their investigations into the superconducting characteristics of ceramics. They unveiled a material that remained superconductive at almost 40 degrees Kelvin (-388 degrees Fahrenheit). It was the first major breakthrough in a half-century, and the two received a Nobel prize last October.

But it was Paul W. C. Chu's teams at the University of Houston and the University of Alabama that sparked a scientific feeding frenzy when they announced that the combination of four elements — one part yttrium, two parts barium, three parts copper and various amounts of oxygen — achieved superconductivity at the record high temperature of 98 K (-283 F). At higher temperatures, inexpensive liquid nitrogen can be used to cool the ceramic to a superconducting state rather than hard-to-handle and expensive liquid helium.

Immediately, laboratories all over the world went into overdrive. Scientists began sleeping on cots in their labs and living on fast food brought in by dazed assistants. The race was on.

Not only the big, prestigious labs were in on the action. High school students, following Chu's recipe, were cooking up samples of the ceramic substance, immersing them in liquid nitrogen and happily levitating magnets — a phenomenon called the Meissner effect, caused by the characteristic of superconductors to repel magnetic fields.

Since then, claims of high-temperature superconductivity have been coming thick and fast. Among those who made media headlines were researchers at Sumitomo Electric Industries Ltd., Colorado State University, the University of California at Berkeley, the University of Maryland and North Carolina State University.

Other claimants are a 16-year-old high school student from Hawaii and Stanford Ovshinsky, CEO of Energy Conversion Devices, Inc., a Troy, Mich., firm known more for its colorful leader than for a long history of delivering products.

One firm that has produced a product using superconductor technology is Hypres, Inc. in Elmsford, N.Y. Using proven low-temperature superconducting materials, Hypres markets a high-speed (picosecond range) signal processing workstation using Josephson junction technology. Hypres is interested in applying superconductivity to computer technology, but CEO Charles Francisco is taking the long view. "It may be years before the materials research phase is completed," he says.

Hypres currently is investigating these materials, but, as Francisco cautions, don't hold your breath waiting for the practical breakthrough. Many problems of stability, malleability, handling highly magnetic fields and more have yet to be overcome.

So, until the day when credible companies begin to offer technology based on thoroughly engineered high-temperature superconductor materials, stick with silicon, watch the progress of gallium arsenide, be cognizant of what companies are doing with low-temperature superconductors, and, by all means, beware of alchemists bearing briefcases.

MISnomer

CONTINUED FROM PAGE 19

company achieve its business goals. User executives from other divisions always wanted his time to discuss how, together, they could advance divisional goals.

His senior staff members needed constant supervision to keep them in line with the corporate mission and away from the pursuit of technology for its own sake.

The letters spelling out his new title were barely dry on the door before a manufacturing division executive marched into his office demanding to know what this was all about. Was MIS now in charge of the logistics information that he maintained? If that were the case, then he might as well manage the production lines, too, the executive said before storming out.

The senior vice-president's senior managers came in next, saying they were busy enough without taking on the issue of who should be allowed to have what information.

He assured them that he would call a staff meeting soon. Then the new senior vice-president sat back in his chair and pondered how, now that he had a more accurate title, he would go about explaining what it meant.

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SOFTWARE & SERVICES

SOFT TALK

William Inmon

Archival data comes of age

One of the underlying trends of the data processing industry can be characterized as pushing the power of automation toward up-to-date, on-line systems for an increasing number of users. Lost in the rush to embrace new technology and new users, however, is archival data.

Archival data is simply the historical collection of data. The better known cousin of archival data is data that reflects the up-to-the-second value of information — current-value data — which is the focus of systems in banking, insurance and manufacturing. The importance of current-value data is unquestioned.

But as current-value data turns into historical data, the perceived importance of the information often diminishes. At best, archival data is an afterthought. Whatever data happens to be left over at the end of the day is what gets archived.

But the 1990s may turn into the decade of archival data, because there is a world of promise in it. Unlocking the potential of archival data presents opportunities that have, at best, been only vaguely explored.

Continued on page 32

CASE standards debate rages

Sheer number of proposals hampers users, vendors, organizations

BY NELL MARGOLIS
CW STAFF

With headlines still beating out bottom lines in the booming computer-aided software engineering (CASE) industry, pressure is on for standards to ease users' decisions, protect buyers' investments and boost CASE over the barrier between media phenomenon and legitimate market segment.

Standards are beginning to emerge, according to Jay Prakash, president of Strategic Focus, a Mountain View, Calif., consulting firm that recently completed a study of the CASE market.

But, he added, "It won't happen right away — which is all to the good, since standards can stifle creativity and perpetuate less-than-optimal technology."

Staggering statistics

The sheer number of proposed standards is staggering. Tom Kurihara, who heads a standards subgroup of the Institute of Electrical and Electronics Engineers, Inc.'s (IEEE) Task Force on Professional Tools, last month mailed out a list of standards that could be used in creating an open CASE environment. The list, culled from publications of official standards-making organizations, included more than 200 candidates even without the additional suggestions Kurihara was soliciting.

Beyond the wall of bulk looms the wall of definition. Despite the clamor for standards, according to Anthony I. Wasserman, president of San Francisco-based Interactive Development Environments, Inc., "it's not clear what people want to standardize on. Notation? File format? Conversion methods? All of the above?"

The wide variety of structured analysis and design methodologies now in use, Wasserman added, further slows progress toward standards.

"The problem is obvious,"

Continued on page 29

Data View

IBM MVS/XA and VM usage on progressively larger systems

MVS/XA dominates IBM's high-end mainframes, but VM outstrips MVS/XA on the 3083s

INFORMATION PROVIDED BY COMPUTER INTELLIGENCE
CW CHART

SOFTWARE NOTES

Ingres gets consultants

Relational Technology, Inc. has signed up **Computer Task Group, Inc.** as a preferred certified consulting firm for Ingres, its relational data base management system. By June, 100 Computer Task Group representatives will be certified Ingres consultants and 300 staff members will be knowledgeable in Ingres.

Relational Technology has other preferred consulting firms, but they tend to be active in niche markets. Computer Task Group is more of a general

Continued on page 32

Firm ships testing tool

On-Line simplifies use of Datavantage

FORT LEE, N.J. — On-Line Software International, Inc. recently began shipping Release 4.0 of Datavantage, a testing tool for IBM's IMS data base management system and for the DL/1 data access language.

With Release 4.0, On-Line has taken steps to make the product easier to use, as customers had requested, according to Bill Pollack, senior vice-president of technology.

On-Line rolled several new features into Release 4.0. For example, users previously had to assign a new name to an IMS program written in Cobol in the Datavantage environment. Users can now transfer the same program name from the data base to Datavantage, Pollack said. Release 4.0 supports field names of up to 30 characters.

Current Datavantage users under maintenance contracts can upgrade to Release 4.0 free of charge. For new users, Datavantage Release 4.0 can be licensed for $19,000 for DOS and $39,500 for IBM's MVS. The product reportedly runs on all IBM 370 hardware as well as plug-compatible machines.

Inside

- DEC draws up PHIGS version for Vaxstations. Page 33.
- Apollo opens box of Ada programming tools. Page 33.

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CASE

FROM PAGE 25

said Dennis Gaughan, manager of environmental development at the Reston, Va.-based Software Productivity Consortium (SPC), a joint venture of aerospace companies aiming to enhance the quality of defense-oriented software. "We have too many standards, and they all contradict each other. The idea is to choose the meaningful ones and put them to work."

The effort to do so is well under way by users as well as manufacturers and official standards-making organizations. For instance, standards are a top priority at both the IEEE and the SPC, which later this month will host executives of 25 CASE firms for brainstorming on the issue.

Several months ago, Providence, R.I.-based CASE product manufacturer Cadre Technologies, Inc. launched a campaign to extend the Electronic Design Interchange Format (EDIF), already a widely accepted computer-assisted engineering standard, into a standard interchange format that would let users share data files and formats among various CASE products. Under the Cadre plan, each participating company would create its own import and export routines to be translated through EDIF.

IRDS on verge of approval

Meanwhile, the American National Standards Institute (ANSI) is reportedly in the final stages of conferring official standard status on the Information Resource Dictionary System (IRDS). Under development since 1983, IRDS is a fully extensible dictionary that describes and manages information resources used by software developers during the application development process.

IRDS defines four separate interfaces, according to David Carpenter, product development manager at Panaophic Systems, Inc. in Chicago and vice-chairman of the ANSI committee that is shepherding the proposed data dictionary through the steps toward standardization.

Posix, the portable operating system definition in progress under the aegis of the IEEE since the early 1980s, was not conceived of as a CASE standard but is expected to function as one nonetheless. "Posix will have a powerful influence on CASE," the SPC's Gaughan said. "Every toolmaker will know in what environment his tools will work."

Posix is based on AT&T's Unix System V Interface Definition; CASE is largely a creature of the workstation environment, which, in turn, is largely Unix-based. "If we can get down to one Unix, or close to it, all the toolmakers will be on the same playing field," Gaughan said. Now pending approval before the International Standards Organization, Posix is expected to become an official international standard within a few years.

While the EDIF initiative is manufacturer-driven and IRDS and Posix are coming from standards-making organizations, users — or, at least, one major user — are clearly the ones responsible for what is rapidly becoming a de facto CASE programming language standard.

"The U.S. Department of Defense wants to see standards, and the DOD — which is paying very big bucks for software — usually gets what it wants," Interactive Development's Wasserman noted. What the DOD wants is Ada, which last year became a requirement for winning defense-related software contracts.

"Ada is definitely a standard in defense-related work," Cadre President David Banks said. What's more, he added, "In this country, and even more so in Europe, it's beginning to penetrate commercial environments."

"Do I want to see CASE standards? Oooh, yes," said Thomas Flecher, senior manager of systems development at Ernst & Whinney. Flecher, who helped introduce CASE tools to his department at the Big Eight accounting firm's Cleveland headquarters, pointed to interfaces among different CASE tools as particularly desirable. "We've been pushing for these standards with our vendors" with some success, he said.

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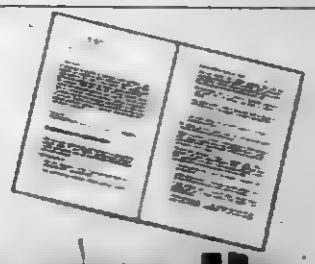

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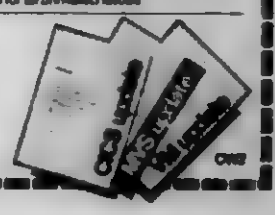

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Inmon

FROM PAGE 25

Consider the problems of archival data. It is bulky. There is usually too much. As a consequence, we often have to store archival data on a nonelectronic medium, such as microfiche.

Archival data, because of its bulk and the medium on which it is stored, is sometimes lost. Once lost, it is never recaptured.

Unlike other forms of data, archival data is stored for unknown future needs.

Archival data is hard to access. Much energy is spent working through the morass that is not of interest to get to the useful data. Furthermore, some archival data needs to be accessed at the individual record level and other data at the summary level.

The use of archival data is often complex because the data is time dependent. Each unit is associated with some moment in time. In some cases, an event triggers a time-variant measurement of archival data. The structure of archival data changes over time. As data is archived, it is prudent to capture not only the content of the data but the structure of it as well.

The challenges of creating and using archival data go on and on. But those challenges are worth addressing. The opportunities for using archival data probably outweigh the difficulties. Some of the potential uses include the following:

- Trend analysis — believable trend analysis — in which many variables may be taken into consideration.
- Demographic analysis — peering into data at a level never before possible. The in-depth analysis that is possible with carefully stored archival data surpasses anything on today's horizon. New insights may be possible where no analyses had ever been done before.

In short, there exists a whole new frontier in archival data. How will the frontier be explored? In a pathological manner? By a well-conceived plan? By an exciting new technology that makes possible entirely new types of processing?

The most likely scenario for successful exploitation of archival data will come from some scientist who develops the Lotus 1-2-3 of the archival world.

The use of archival data depends on the collection and storage of data now, even when there is no obvious need for it. The organization that waits for the use of archival data and the technology to manage it successfully will be a step behind the competition. Positioning for the future requires action now.

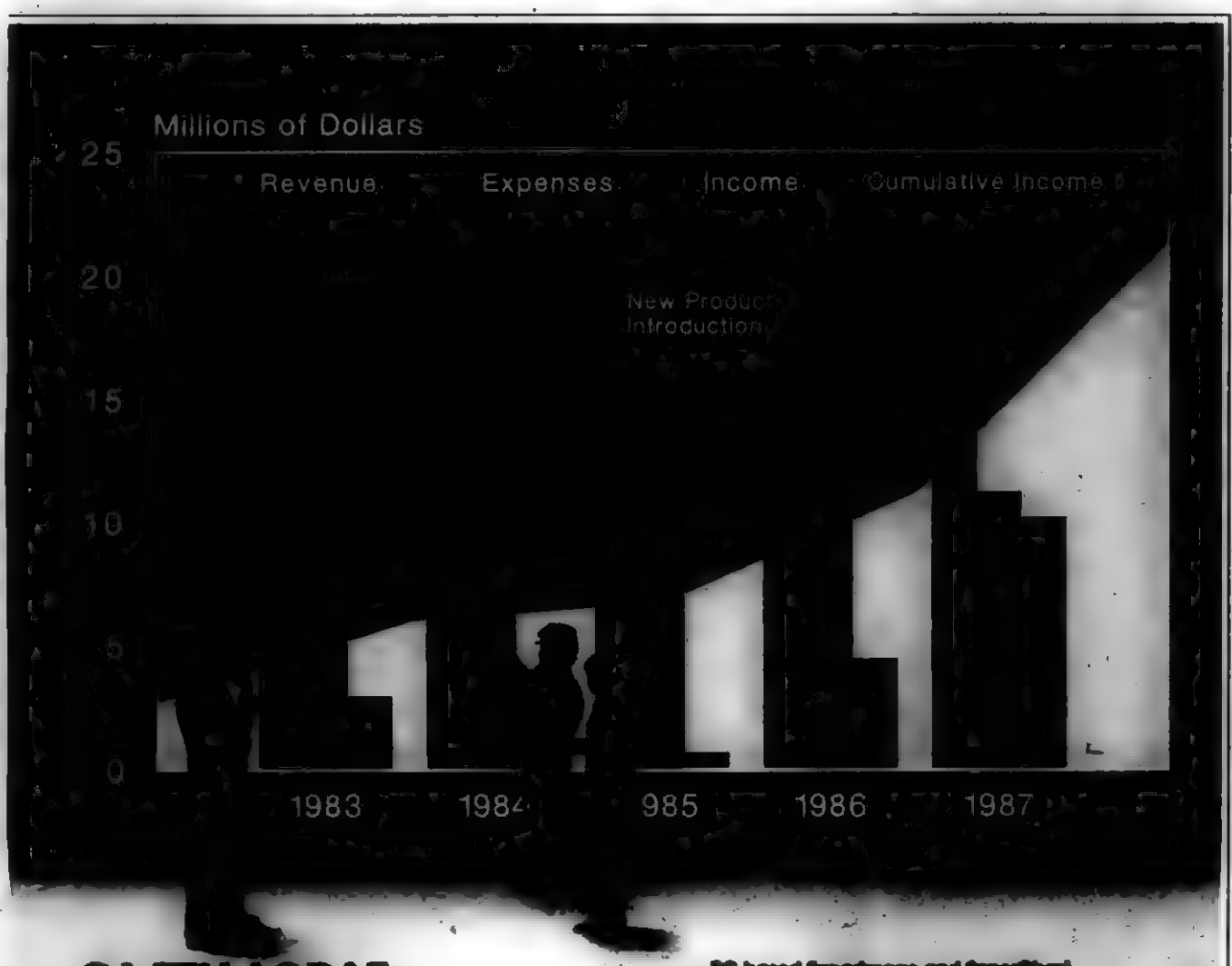
Inmon is a senior principal with American Management Systems in Lakewood, Colo., and an author on the subject of data base design.

Relational

FROM PAGE 25

commercial firm. The move appears to be a way for Relational Technology, with a smaller revenue base, to match Oracle Corp.'s stated intent to establish a staff of 250 consultants.

Two giants formed a quick alliance at the end of 1987. Digital Equipment Corp. said it will comarket the Masterpiece series of financial applications, developed by Software International and now part of software giant Computer Associates International, Inc. The pact is another sign that DEC has rapidly broadened its Cooperative Marketing Program to get more applications available on VAXs.



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NEW PRODUCTS

Systems software

An implementation of the Programmers Hierarchical Interactive Graphics System (PHIGS), an ANSI draft standard for three-dimensional device-independent graphics software, has been announced by **Digital Equipment Corp.**

VAX PHIGS is made up of a 3-D graphics support system that controls the definition, modification and display of hierarchical graphics data. It is a subroutine library packaged as a set of VMS-shareable images. The product manages the organization and display of graphical data stored in a conceptually centralized data base, according to the vendor.

VAX PHIGS software is supported on DEC's Vaxstation II/GPX, Vaxstation II, Vaxstation II/RC, Vaxstation 2000, Vaxstation 3200 and Vaxstation 3500, under VAX/VMS.

VAX PHIGS can be licensed for $3,500.

DEC, 146 Main St., Maynard, Mass. 01754. 617-897-5111.

An **Interactive Expediter** for the **Prism Navigation System**, an IBM mainframe software package that integrates disparate data bases, VSAM files and dissimilar computers, has been announced by **New Software Corp.**

The enhancement allows the Prism system to automatically expedite data flow and resource allocation by interactively and automatically changing job priorities. Statistical data from within CICS and CICS command modules is used to provide work-flow balancing.

The base price for the Prism Navigation System is $150,000.

New Software, P.O. Box 2118, 3 Mill St., Attleboro, Mass. 02703. 617-226-6662.

Applications packages

Quant Systems has ported its **Unix Statistician** to The Santa Cruz Operation, Inc.'s SCO Xenix 286 and 386 as well as Unix.

The vendor said the statistical, graphical and quality-control program has also been enhanced to accept a range of data formats such as direct input, including user-defined ASCII records, DIF, ASCII columns and Unix Statistician formats.

Pricing for the Unix Statistician is hardware dependent. It starts at $750.

Quant Systems, P.O. Box 628, Charleston, S.C. 29402. 803-571-2825.

A problem-solving environment and theorem prover with an automated reasoning system has been announced by **Conversion Systems, Inc.**

Called **Tprover**, the interactive system is said to be capable of using artificial intelligence to solve such problems as advanced mathematical theorems. According to the vendor, Tprover contains a Hewlett-Packard Co. Prolog-like subsystem for unlimited expandability.

Tprover runs on Unix System V and Unix 4.23 and Digital Equipment Corp. VAX VMS and IBM CMS systems. Costs range from $2,500 to $12,000.

Conversion Systems, P.O. Box 597190, 3401 W. Devon Ave., Chicago, Ill. 60645. 312-390-8849.

An enhanced version of the **Aim Job Scheduler** for Unix system job scheduling and work load balancing has been announced by **Aim Technology, Inc.**

The Aim Job Scheduler manages the system job mix and monitors the system job load. It provides reports on program usage and can adjust the job mix in response to changing system use. The enhanced version offers a simplified procedure for setting and modifying job limits.

Pricing ranges up to $15,800, depending on the type of system.

Aim Technology, Suite 203, 3350 W. Bayshore Road, Palo Alto, Calif. 94303. 415-856-8649.

Utilities

VSAM/Editor, a full-function on-line VSAM editor, has been announced by **MB & Associates.**

According to the vendor, the product lets users browse, retrieve, add, modify or delete records on any VSAM file on-line under IBM's CICS or TSO.

VSAM/Editor is priced from $3,900.

MB & Associates, Suite 200, 7921 S. Park Plaza, Littleton, Colo. 80120. 303-794-1740.

Development tools

Apollo Computer, Inc. has introduced the **Domain/Ada Development System**, a set of tools for the development of programs written in the Ada programming language.

The system consists of the Ada compiler, a source level debugger, program library management tools, a runtime system and program-development utilities. It is said to be compliant with the U.S. Military and ANSI Ada standard.

Features include access to Apollo Domain system facilities and user-written routines in Pascal, Fortran 77 and Domain/C; low-level representation clauses to allow control over data layout; and compiler error messages.

Domain/Ada is priced at $6,000.

Apollo Computer, 330 Billerica Road, Chelmsford, Mass. 01824. 617-256-6600.

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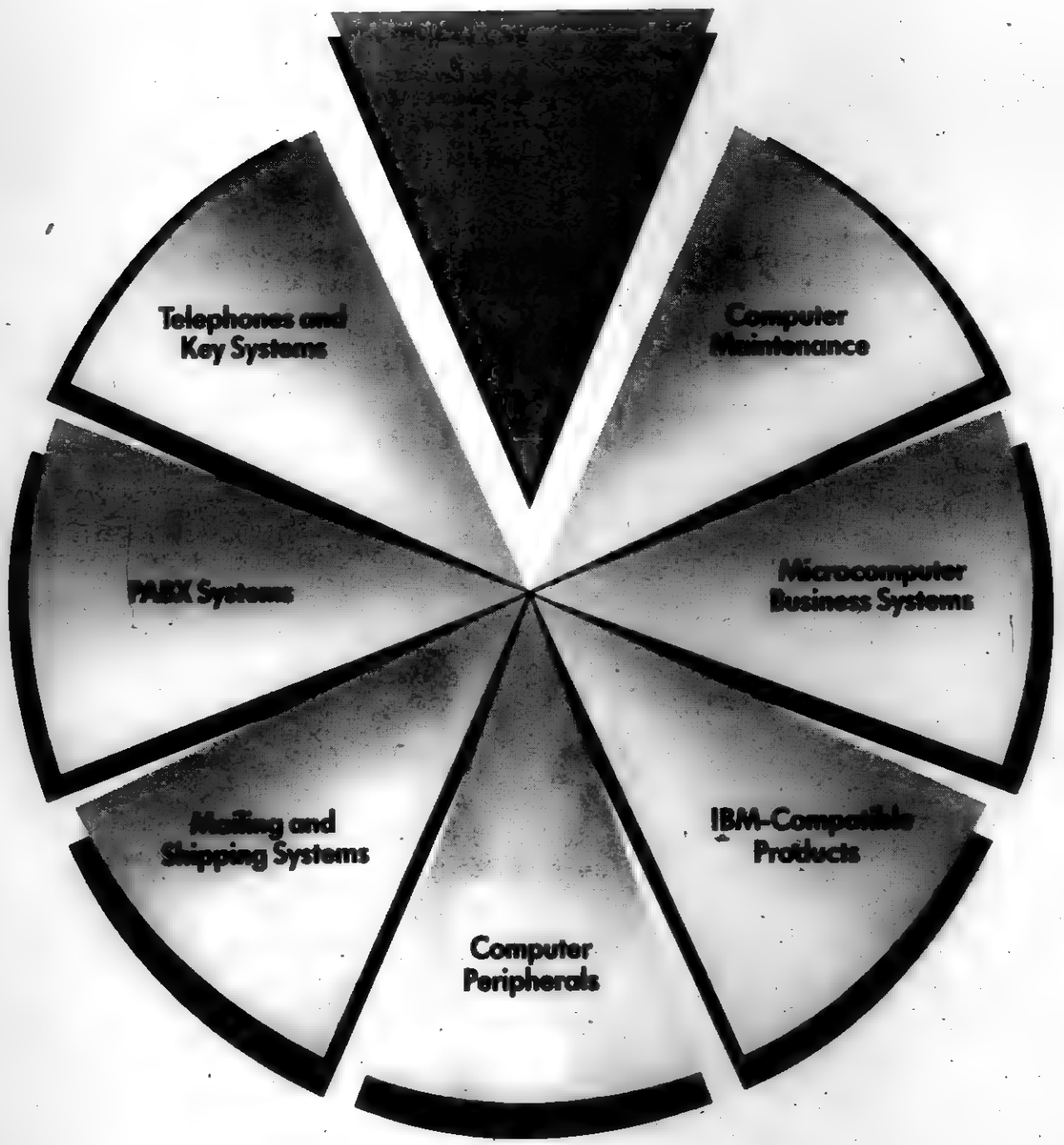

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MICRO BITS

Ed Scannell

Point man leaves Javelin

Javelin blunted. Chris Herot, who was a major technical influence in shaping Javelin's innovative financial modeling package, left the company last month. His departure came at an inopportune time for the financially troubled company, which is seeking venture capital to fund delivery of products it announced in November 1987, as well as new projects.

Herot says all the company's engineers had left the payroll by the end of December 1987, although a few have stayed on as consultants. "It's not like they don't have any [engineers], but people would rather have money than stock," Herot says.

An important reason for the engineers' departures is that the projects Javelin had lined up for this year may have been interesting from a marketing standpoint but weren't innovative enough to keep a highly talented group of people together. "The [Javelin engineers] I had there were real super. There were just five guys who built the whole product," Herot says.

Likewise, Herot says, his decision to leave was prompted by

Continued on page 42

Unprotected Symphony tunes up

BY ED SCANNELL
CW STAFF

CAMBRIDGE, Mass. — Symphony lost its copy protection scheme last week, but it may have found a lot of new friends — some of whom are in high places.

Lotus Development Corp. unveiled Version 2.0 of the five-function program last week. The update is said to allow users to load Symphony onto a hard disk to be shared on a network and to move data more easily from 5¼- to 3½-in. disks.

The lack of copy protection also makes the integrated program a more viable contender for government contracts. The government requires that all software up for bids be unprotected.

Lotus is the last of the major software vendors to remove copy protection, something for which many users and analysts have long criticized the company. The complaints and criticism, however, have not damaged the program's sales much.

Analysts universally agreed that Symphony remains the best selling five-function program. The product accounted for 40% of Lotus's sales last year, according to Donna Simonides, Symphony's product marketing manager.

Analysts have long speculated that the days of five-function programs have been numbered and that owning this market as Lotus has will eventually not count for much. Simonides, however, said she sees Symphony as a long-term player with a solid future in both the Microsoft Corp. MS-DOS and IBM OS/2 environments.

"Symphony is a viable OS/2 product. However, there are no plans now to have a Symphony-G [like Lotus's 1-2-3/G] with a graphical interface," Simonides said.

Simonides declined to say, however, when an OS/2 version

Continued on page 44

Data View

PC processing plans

Percent of intended use of systems at Fortune 1,000 sites

INFORMATION PROVIDED BY COMPUTER INTELLIGENCE

Lotus flop jazzed up

BY JULIE PITTA
CW STAFF

SAN FRANCISCO — Lotus Development Corp. last week took a second shot at the market in which it experienced what many observers agree was its biggest failure. The company introduced a follow-on to its 3-year-old Jazz integrated business package for the Apple Computer, Inc. Macintosh, adding many features that users asked for in the early releases of Jazz and retaining the product's name.

Modern Jazz represents what officials said is a renewed com-

Continued on page 43

DG system strides into publishing

BY ALAN J. RYAN
CW STAFF

WESTBORO, Mass. — Trying to establish a foothold in the corporate desktop publishing market, Data General Corp. has announced a system that allows resources to be shared on personal computers, departmental processors and mainframes.

The company also announced a marketing agreement with Xerox Corp., enhancements to its CEO office automation software and a laser printer.

The CEO 3.0 Desktop Composer package, which works on a DG Dasher/286 computer and on the IBM Personal Computer XT, PC AT and compatibles, incorporates Xerox's Ventura Publisher 1.1 software, customized by DG for its systems. Ventura Publisher has been integrated with CEO and networking software by DG, according to J. David Lyons, DG's vice-president of group marketing.

Continued on page 42

Inside

- Egghead president speaks out on cracking corporate America. Page 39.
- IBM PC Convertible not everybody's favorite ragtop. Page 39.
- Western Computer adds 386-based PC. Page 45.

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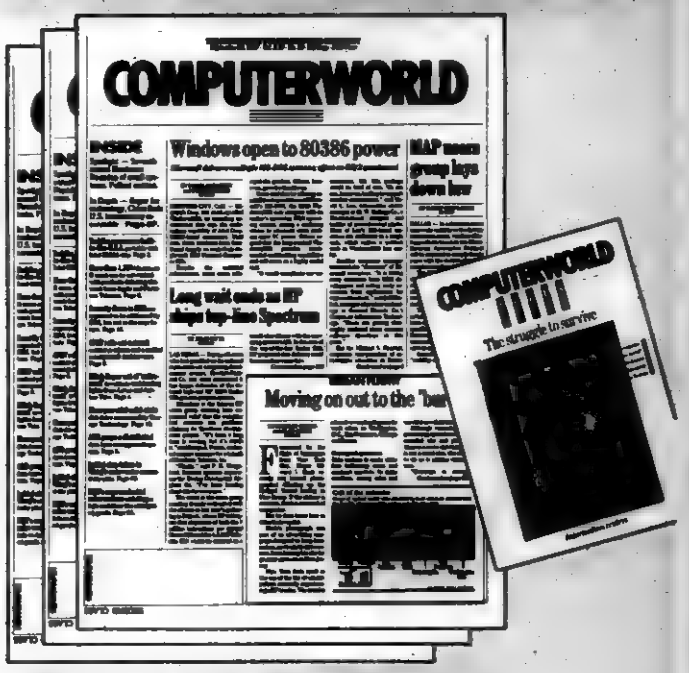

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SMALL TALK

William Zachmann

Tablet eases art ache

With Microsoft Corp.'s Windows 2.0 and Windows 386, not to mention the Presentation Manager, the world of IBM Personal Computers and compatible systems is moving rapidly toward the graphical user interface. Windows, scroll bars and dialogue boxes will soon be standard features of IBM PC-compatible systems.

Conceived at the Stanford University Research Institute and developed at Xerox Corp.'s Palo Alto Research Center, the graphical user interface was first made popular by Apple Computer, Inc.'s Macintosh. Apple cofounder Steve Jobs turned some of the best theoretical work in computer science into usable products.

A key element of the graphical user interface is the pointing device. The intent of Doug Engelbart, inventor of the cursor control device, was to have users simply point to things on the display. This opened the door for many of the ease-of-use features that have made the Macintosh so popular.

Engelbart's invention is an essential element of the Macintosh. With the growing acceptance of Windows, which will accelerate significantly once the Presentation Manager is shipped later this year, mouse cursor control devices are rapidly penetrating the IBM-compatible world.

Long before anybody sold a mouse cursor control device for personal computers, however,

Continued on page 44

'Eggspert' achieves success by coddling users, cracking corporate America

When it comes to microcomputer software, Victor Alhadeff doesn't mind being called an "eggspert." As founder and president of Egghead Discount Software, Alhadeff has woven the egg-word into a myriad of successful software promotions while winning over the hearts and pocketbooks of both consumers and corporate customers.

Corporate America has become an increasingly important piece of the Bothell, Wash.-based software chain's business. In the last year, Egghead has more than doubled the size of its corporate and governmental sales force to 120 people.

Today, with 102 stores scattered across the U.S., Alhadeff has a foot planted on each side of the software path — one with the manufacturers of today's biggest selling programs and one with users seeking quality at bargain prices. He recently shared his opinions on the corporate marketplace and future directions of software with *Computerworld* West Coast correspondent Stephen Jones.

Alhadeff *delights in seeing corporate customers shell out for his low-cost Eggcessories.*

What are the biggest challenges facing corporate users today?

Finding a reliable vendor that can keep up with their needs in terms of the multiplicity of new versions, availability for networks and upgrades to the OS/2 environment. They need support for that transition, and with the increased use of Apple Macintoshes, users need to be informed of what is available on the Mac.

What trends do you see in the corporate environment at this time?

There are two trends. At one end of the bell curve is the power user whose demand for memory and power is insatiable; thus the success of Microsoft's Excel and Intel 80386 machines. At the other end is the PC user who is not technically proficient and requires products that are heavy on ease of use. It's important for a vendor to tailor solutions to meet the needs of both groups.

What vendors are able to appeal to both?

Microsoft Works is a phenome-

Continued on page 43

PC Convertible: Too little too late?

IBM laptop's shortcomings criticized by some; others say they're satisfied

BY JAMES A. MARTIN
CW STAFF

Since its debut in April 1986, IBM's PC Convertible has been widely criticized as being too little too late.

Users and analysts complained first and loudest about the original Convertible's black-on-white LCD that IBM said was designed with a special bonding process to reduce glare. At that time, competitors such as Zenith Data Systems Corp. were already using a much-improved backlit LCD screen. In fact, Zenith won several key federal government contracts because its overall laptop technology was considered more advanced than IBM's.

IBM has enhanced its display twice, first with a supertwist LCD in January 1987 and then with the long-awaited backlit LCD last April.

"We disliked the original display intensely, and by the time they came out with the third display, we were already heavily committed to other laptops," said Bruce Johnson, manager of the PC Resource Center for Deloitte Haskins & Sells in New York, which has about 1,600 portables and laptops.

The PC Convertible offers the advantage of removing the portable display in favor of a larger CRT monitor, enabling the user to transform the laptop into a desktop machine. Although several users queried by *Computerworld* said this was an interesting option, it was not rated as an important one.

PC Convertible

Price: $1,695

- 80C88 CMOS microprocessor
- 4.77-MHz speed
- MS-DOS Release 3.2
- Two 720K-byte 3½-in. microfloppy disk drives
- 256K-byte memory expandable to 640K bytes
- Supertwist or backlit LCDs with 25- by 80-pixel resolution; can be detached for desktop display

The PC Convertible's expansion limitations, lack of a hard disk drive and small keyboard make it an unattractive full-time desktop machine for most applications, according to users and analysts.

On a scale of 1 to 10, the PC Convertible rates about a 6, according to Tim Bajarin, executive vice-president of Creative Strategies, Inc., a consulting firm in Santa Clara, Calif. "The original LCD screen was ridiculous, but the keyboard is still not as ergonomic as other competitive models, and there's no hard disk. The only strength I see in the product is the IBM name," Bajarin said.

Although most analysts said the laptop market has yet to take off, the figures show that a few companies — Toshiba Corp., NEC Corp., Zenith and Tandy Corp. — are doing brisk business in that area. Cupertino, Calif.-based Infocorp estimates

Continued on page 42

Apple taps into desktop niche with new printers

BY JULIE PITTA
CW STAFF

SAN FRANCISCO — Apple Computer, Inc. last week renewed its commitment to the desktop publishing market and bolstered its embryonic efforts in the desktop presentations market with an upgrade of its printer technology.

As expected, Apple rolled out three laser printers to replace its existing Laserwriter and Laserwriter Plus printers at Macworld last week.

Not only does Apple intend to strengthen its presence in desktop publishing — the vehicle that initially launched it into the Fortune 500 — and presentations, but it is also trying to claim a slice of the Microsoft Corp. MS-DOS world with its lowest cost printer ever.

All three printers use Canon U.S.A., Inc.'s LBP-SX engine and offer 300 dot/in. resolution. According to Apple officials, the engine offers up to four times the performance speeds of existing Laserwriter printers and a print life of 300,000 hours, compared with 100,000 hours for the Canon engine used in the existing Laserwriter line. Apple's new printers are upgradable through the addition of controller boards.

At the low end of the line, Apple introduced its single-user Laserwriter SC, which is priced at $2,699 and based on Motorola, Inc.'s 68000 processor. It offers 1M byte of random-access memory and 8K bytes of read-only memory (ROM).

Price appeal

"It's a way to get to customers who didn't go to the Laserwriter because of the cost," said James Gable, product manager for Apple's new printer line. "It puts Apple on a more equal basis with DOS printers. It's not a great machine if you want to do whizzy desktop publishing."

Expected to be the strongest seller in the line, the Laserwriter SC is scheduled for availability in early February.

Apple's mid-range printer, the Laserwriter NT, was designed as a replacement for the Laserwriter and Laserwriter Plus. Priced at $4,599, the printer is based on the Motorola 68020 processor and offers Adobe Systems, Inc. Postscript capabilities. It provides 2M bytes of RAM — compared with 1.5M byte for the current line — and 1M byte of ROM. Availability is scheduled for early February.

Apple's high-end printer, the Laserwriter IINTX, is priced at $6,599 and is also based on the 68020 processor. However, it adds more RAM, ROM and hard disk drive capabilities.

It offers 2M bytes, expandable to 12M bytes, of RAM and 1M byte, expandable to 2M bytes, of ROM. A 20M-, 40M- or 80M-byte hard disk drive can be connected to the printer. Apple officials said the Laserwriter IINTX was designed to support large networks of personal computers, Apple Macintoshes and MS-DOS-based systems. Availability is set for late February.

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COMPAQ®

Scannell

FROM PAGE 37

the diminishing prospect of managing a large engineering group that would create a raft of bold and exciting products.

Herot admits Javelin simply couldn't move its innovative technology to the bottom line. "We built this wonderful product that everyone said was better than anything out there, but even our friends in corporate America couldn't get management to buy something different" than Lotus's 1-2-3, he says.

One thing that may have held Javelin back was ego, Herot says. In retrospect, he says, he thinks the company was a bit too full of itself in believing it could overtake Lotus.

"It was probably a thing the venture capitalist talked us into. If you want to raise a lot of money, you have to tell them you are going to become a big-time software company. Then you start to believe the story yourself," he says.

Herot agrees that Javelin should have positioned its software as a high-end package priced at $1,000 or more, not as a mass-market product competing with 1-2-3. But the company moved in the opposite direction by dramatically discounting the program to $99.95 — albeit on a temporary basis. The promotion was successful, selling about 30,000 copies of the program and generating more than $1 million in revenue. But it couldn't hope to serve as a long-term fix.

It would be a shame to see an interesting and well-designed product like Javelin die without getting a second chance. Maybe the company's guardian angel has some pull with the Big Guy. Or better yet, maybe the Big Guy has some pull at one of the major software companies.

Scannell is Computerworld's senior editor, microcomputing.

DG

FROM PAGE 37

Xerox has licensed DG to market a version of Ventura Publisher in a three-year OEM contract.

DG has combined CEO Desktop Composer with its existing line of publishing packages. They will target corporate publishing needs in banking and financial services, insurance, manufacturing, government and the petrochemical industries.

The CEO Desktop Composer will be configured in three packages. The basic software package, including the CEO Desktop Composer, MS-DOS CEOwrite 2.00 and CEO Connection Revision 3.10 will sell for $1,640. The peripherals package adds a mouse and a 15-in. full-page monochrome monitor to the software for $3,090. The Workstation package includes the software, peripherals and a DG Dasher/286 computer with 640K bytes of memory and a 20M-byte hard disk. It will sell for $6,460.

All the products are available for shipment 60 days after receipt of order.

Convertible

FROM PAGE 39

that some 107,000 units of the Toshiba 1100 series laptops have been shipped worldwide since their 1985 debut, compared with 95,000 Zenith 181 and 183 models. Comparatively, Infocorp counted 46,000 PC Convertibles shipped to date. "There are simply too many other more desirable choices for the consumer," said Abbi Lawrance, a laptop analyst for Infocorp.

IBM has reportedly seen the light, insiders say, and is expected to introduce in April an Intel Corp. 80286-based PC Convertible with a 20M-byte hard disk drive and a gas plasma display screen. An IBM spokesman would not comment on future products.

For certain applications, some users said the current PC Convertible is the machine of choice. At The Prudential Insurance Company of America, for example, some 7,000 to 8,000 PC Convertibles were purchased by the company's agents for making sales calls.

Plug in Ventura and all these play.

You're probably well aware that Xerox Desktop Publishing Series: Ventura Publisher Edition, is, as industry and computer magazines put it, the clear leader in the MS-DOS publishing world. *But*, will it plug and play with your equipment and software, or with the equipment and software you intend to buy?

As you can see below, the answer is yes, 185 times yes. Xerox Ventura Publisher is compatible with more word processing, more graphics packages, and more peripheral options than any other PC publishing program. It runs on a standard IBM XT/AT or compatible—286 or 386 technology; and *does not*

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Xerox 9700 (with interpress)

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PC-DCE—CA Systems International, Inc.
pcEXPRESS—Information Resources
Personal Engineer—Computervi... Corp...

Jazzed up

FROM PAGE 37

mitment to the Mac market. "We have never stopped writing code or marketing products for the Mac," said Pam Campagna, product marketing manager for Modern Jazz.

Many observers questioned Lotus's ability to compete in the Macintosh market after Jazz debuted more than three years ago to disappointing reviews and sluggish sales. Widely criticized for its $595 price and lack of a macro programming language, the product sold 115,500 copies, according to Cupertino, Calif.-based Infocorp. That was well below Lotus's expectations.

Modern Jazz, which is priced at $395 and is set to be available later this quarter, combines the Jazz functions of work sheet, graphics, data base, forms generation, word processing and communication.

Major new features include Hotview, which provides a data integration function, a macro command language and a memory management system with features like sparse-matrix memory management, minimal recalculation and use of all available random-access memory.

Bill Higgs, director of software services at Infocorp, called Modern Jazz "a substantial change for the better." The package runs on Macintosh Plus, Mac SE and Mac II computers with at least 1M byte of random-access memory. Current customers of Jazz 1.0 and 1A can upgrade to Modern Jazz for $95.

XEROX

require XT power. It is also the first desktop publishing program to support all industry-standard page-description languages, including PostScript and Interpress. That means total compatibility with all popular laser printers, including, of course, the Xerox 4045 Laser CP and the Xerox 4020 Color Ink-Jet Printer.

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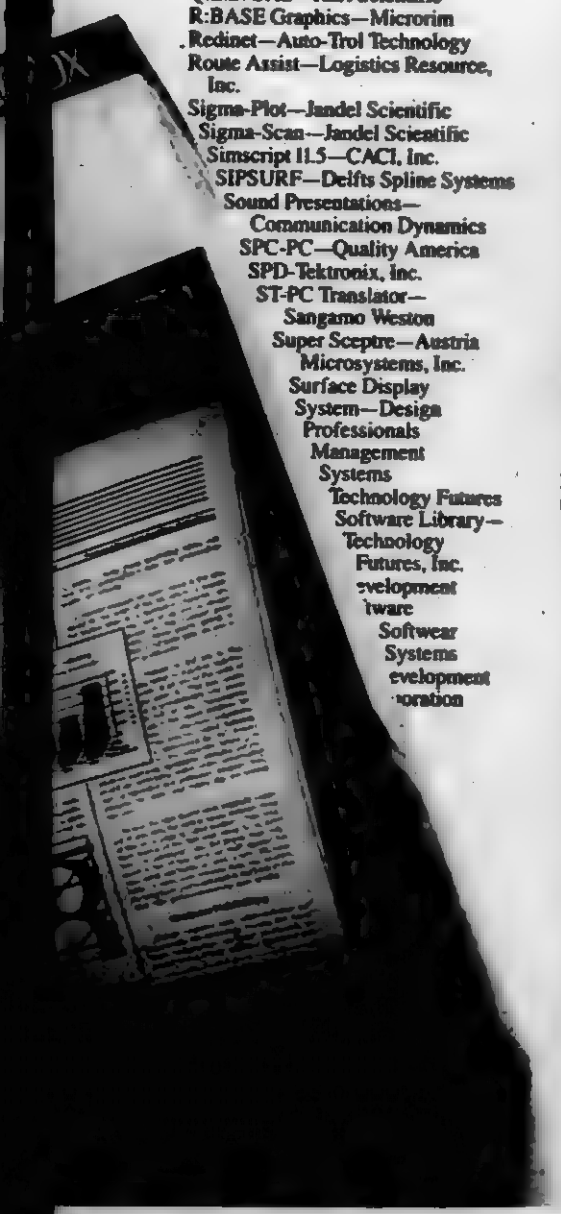

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Eggspert

FROM PAGE 39

nal program for first-time users, and Excel and [Microsoft's] Word are great at the high end. Software Publishing also appeals to first-time users with its PFS series and to more sophisticated users with its Harvard line.

What is going to be the hot software application in 1988?

There isn't going to be a new category emerging like desktop publishing did. If you go out a year from now, CD-ROM will emerge as an important area, with software being written for it. There is also going to be a tremendous growth of network software and networked versions of current applications.

Is information management software, such as Lotus's Agenda, as helpful and necessary as some vendors claim?

I don't think it's a breakthrough. It's nice, but not of the stature of a whole new category of software. It's really just a refinement of a data base manager. In and of itself, it's not a reason to buy a computer.

How important is connectivity to your customers?

Today, it's marginally important. As it is tested more and more, it will become a major factor this year and a gigantic factor next year, especially with OS/2, the Presentation Manager and Windows creating the common user interface.

With the Big Three micro software vendors gaining so much clout, is there still room on retailers' shelves for products from smaller, less known developers?

At Egghead, we pride ourselves on being at the forefront of new applications from new developers. But most hardware vendors are only going to carry the Big Three, and that creates problems for the new companies.

Will software prices continue to climb as functionality improves?

No. They'll stabilize with increased value. When Borland comes out with Quattro and has phenomenal functionality at a reasonable price, that sends a message that other companies can't ignore: You just can't continue to raise prices.

Do you think Fortune 1,000 companies are less price-sensitive than others?

From our perspective they're amazingly price-sensitive, but they are also looking for reliable vendors who will be there tomorrow to provide service and support.

Zachmann

CONTINUED FROM PAGE 39

other types of pointing devices were widely used in specialty applications on traditional mainframe and, more typically, minicomputer systems.

Perhaps the most important of these were graphics tablets. Developed during the 1960s as customized devices for the government, graphics tablets became generally available as standard commercial products in the early 1970s.

A mouse provides an excellent, low-cost pointing device. It should not be taken for granted, however, that the mouse is the best pointing device for all users. There are many instances in which a graphics tablet would be much better.

A mouse is a relative pointing device. The movement of the mouse over a surface is detected by the transducers in the mouse itself and converted into an electrical signal to the adapter card or serial port on the system. Appropriate software then translates this into the movement of a cursor on the screen.

This is an inexpensive way to make a pointing device, since the mouse is quite simple. It uses either a rolling ball or light reflected off a special surface. It is, however, a rather imprecise method.

Tablet better for precision

In situations in which precise cursor positioning or the ability to do freehand sketching is desired, a graphics tablet is an alternative worth considering.

This option is made especially attractive by products like Summagraphics Corp.'s Summasketch line, available in three versions: Summasketch, priced at $449; Summasketch Plus, priced at $599; and Summasketch Professional, priced at $999. All three products embody Summagraphics' 16-year history as a leading supplier of high-quality graphics tablets.

The three differ primarily in size, offering 6- by 9-in., 12- by 12-in. and 12- by 18-in. surfaces, respectively. Summasketch Plus, which I tested, comes with a pen-like stylus, a four-button "puck" with a cross-hair positioning lens and cables to connect with an IBM PC AT-styled parallel port and mouse emulation software.

Summasketch Plus is an appealing alternative to a mouse just for basic cursor control. I'm sure many users will find a graphics tablet preferable to a mouse simply as a matter of personal taste. Where the graphics tablet really stands out, however, is in applications in which its precision and superior freehand sketch capabilities can be fully utilized.

Summasketch is vastly superior to a mouse in any computer-aided design, architectural or mapping application. Offering resolution of up to 1,000 line/in. and accuracy within 0.025 in., it is an essential device for tracing or digitizing.

Serious desktop publishing is yet another application in which the additional precision of Summasketch makes it a much better alternative than any mouse.

Installation is straightforward. Summasketch is widely supported by software that can make use of its capabilities. Mouse emulation software and Microsoft Windows drivers provided with the product will fill in the rest.

Zachmann is vice-president of research at International Data Corp.

Symphony

CONTINUED FROM PAGE 37

will be available, indicating it will be later rather than sooner. "I think we have some time [to get an OS/2 version done]. We expect a slow migration [among Lotus users] to OS/2," she said.

One of the most important reasons for Symphony's continued success is the cost savings it represents, according to Simonides. She said that customers still like the idea of buying an integrated package instead of buying five individual applications.

"Besides cost, they still like the ability to exchange data," she added.

Most of the improvements made to the program were made to the word processing module. They include the ability to automatically reformat paragraphs and to store and paste text. Page orientation has also been made easier.

Changes to the spreadsheet include the following:

- Minimal recalculation, which limits recalculation to cells affected by changes to the worksheet.
- Global zero repression, which displays spreadsheet cells with a value of zero as blank.
- The option of using parentheses or a minus sign to display negative currency.

Lotus upgraded the program's data base by allowing form fields to be edited and the communications module by adding Digital Equipment Corp. VT100 terminal emulation support.

To help its customers better evaluate Symphony 2.0, Lotus is making available Preview Kit, which details the new features of the product and provides information about compatibility, training, upgrades and product support.

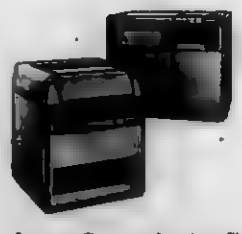
Like the three previous versions of the product, Symphony 2.0 is priced at $695. Users of Releases 1.1 and 1.2 can upgrade for $95, while Release 1.0 users must pay $150. Customers purchasing Release 1.2 within 30 days of the shipment of Release 2.0 can upgrade free of charge.

Lotus will make Release 1.2 available for another 180 days after the shipment of Release 2.0, which is expected to be by the end of next month.

Inside thes
a revolution

NBI, Inc. Model 908

QMS-PS® 800
QMS-PS® 800+
QMS-PS® 800 II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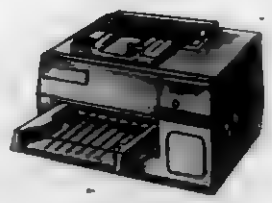
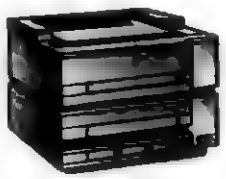
Linotype Company Linotronic™ 300


Digital Equipment Corp.
ScriptPrinter™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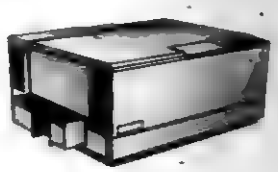
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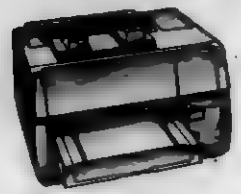
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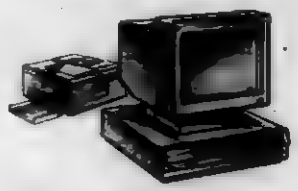
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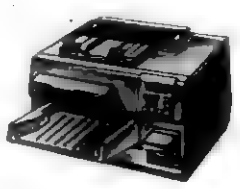
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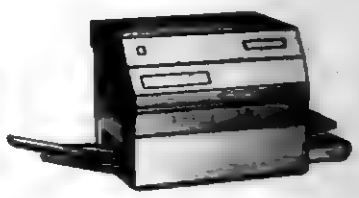
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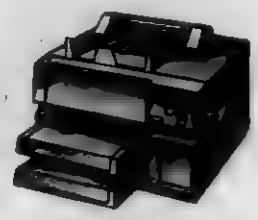
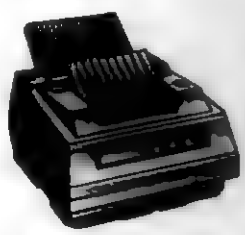
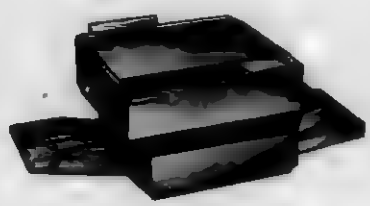

Wang LCS15™

Agfa-Gevaert P400PS™

The Laser Connection PS Jet/PS Jet+™


NEC Information Systems
SilentWriter™ LC-890

QMS-PS® 2400


Apollo Computer Inc.
DomainLaser 26™

NEW PRODUCTS

Systems

An Intel Corp. 80386-based personal computer has been announced by **Western Computer, Inc.**

The **Western 386 Advantage II** features 20-MHz operation speed. It is configured with 1M byte of 32-bit random-access memory, expandable to 10M bytes; eight expansion slots; one 1.2M-byte floppy disk drive; and a 200W-power supply.

The 386 Advantage II costs $2,495.

Western Computer, 17781 Mitchell St., Irvine, Calif. 92714. 714-553-1611.

GW Instruments, Inc. has announced **Macintosh SE Expansion System**, a data acquisition and control hardware front end for the Apple Computer, Inc. Macintosh SE.

Designed for use in industrial control and scientific data-acquisition applications, the expansion system measures the voltage potential output by sensors that convert stimulus information to voltage.

The system costs $1,890, including the vendor's Macadios II data acquisition card.

GW Instruments, P.O. Box 2145, 264 Magr. O'Brien Highway, Cambridge, Mass. 02141. 617-625-4096.

NEW AT MACWORLD EXPO

Compatible Systems Corp. announced **Anytext** and **Anygraph**, IBM Personal Computer to Apple Computer, Inc. Macintosh data translators designed for use in conjunction with Apple File Exchange.

Anytext provides universal translation from any IBM PC-compatible application's text output into Macwrite format. Anygraph provides universal translation of both bit-mapped graphics output and IBM Color Graphics Adapter screen dumps into Macpaint format.

Anytext and Anygraph are available for $95 each. Compatible Systems, P.O. Drawer 17220, Boulder, Colo. 80308. 303-444-9532.

A utility for use in developing small computer systems interface (SCSI) hardware and software for the Macintosh was announced by **Arborworks, Inc.**

SCSI Tool allows users to create, edit and execute SCSI commands. Commands may be entered using hexadecimal or binary code. Also included is a programming language.

SCSI Tool costs $175. Arborworks, 1810 Sunrise St., Ann Arbor, Mich. 48103. 313-747-7087.

A six-port gateway designed to connect non-Apple peripherals to Appletalk networks was announced by **Synaptic Technologies, Inc.**

The ST3 gateway performs user-supplied polling protocols, device-specific data edits and handshaking transparently to applications. It supports 64K bytes of programmable read-only memory and up to 1M byte of downloadable user-supplied applications.

The ST3 costs from $1,495. Synaptic, Suite C106, 16 Hughs, Irvine, Calif. 92718. 714-859-0570.

The **Model 1260S Ministreamer** nine-track tape drive for the Macintosh family of personal computers was introduced by **Qualstar Corp.**

The drive attaches to the SCSI port and offers 250M bytes of storage on an IBM-compatible 10½-in. tape reel. It maintains a constant data rate of 80K byte/sec.

The Model 1260S costs $7,995. Qualstar, 9621 Irondale Ave., Chatsworth, Calif. 91311. 818-882-5822.

An enhanced version of the **Macvision** video digitizer for the Macintosh was introduced by **Koala Technologies**, a Pentron company.

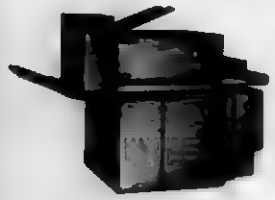
Macvision 2.0 includes such enhancements as the ability to produce screen and printer images with 256 gray shades and output files in such formats as tagged image file format, Adobe Systems, Inc.'s Encapsulated Postscript and a standard Macpaint format.

Macvision 2.0 costs $399. Koala Technologies, 269 Mt. Hermon Road, Scotts Valley, Calif. 95066. 408-438-0946.

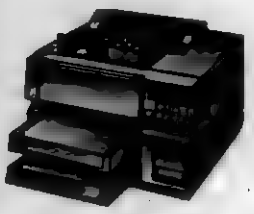
A Fortran compiler that offers numerical computation power for the Macintosh II was announced by **Language Systems Corp.**

The **Language Systems Fortran** implementation supports Standard Apple Numeric Environment (SANE), Apple's implementation of IEEE Standard 754 for binary floating-point arithmetic. It also supports the ANSI-standard Fortran 77 language and certain extensions. It costs $295. Language Systems, 463 Carlisle Drive, Herndon, Va. 22070. 703-478-0181.

se printers
is going on.



Digital Equipment Corp. PrintServer 40™



Texas Instruments OmniLaser™ 2115

Dataproducts Corp. LZR™ 2665

Apple Computer Inc. LaserWriter®
Apple Computer Inc. LaserWriter® Plus

POSTSCRIPT® from Adobe Systems started a revolution in business communications. That's why you'll find POSTSCRIPT in virtually every popular laser printer sold today.

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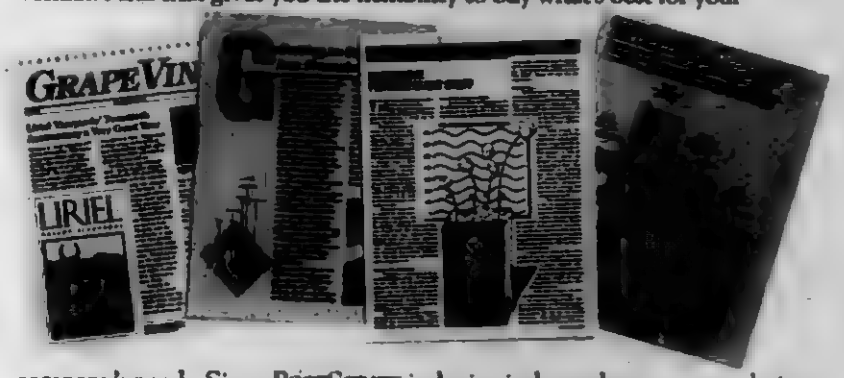
With so many printers to choose from, you won't be tied to a single vendor. And that gives you the flexibility to buy what's best for your



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Or write: NEC Information Systems, Dept. 1610, 1414 Massachusetts Ave., Boxborough, MA 01719.

DATA STREAM

Patricia Keefe

EDI to gain users in '88

Electronic data interchange (EDI) is expected to move beyond today's large implementations in leading corporations and select industries to garner the attention of the masses in 1988.

This year will see EDI studies launched en masse and pilots expanded — or so we are told. Spurring that pilgrimage will be continued progress toward incorporating the CCITT X.400 and X.12 standards into EDI in general and in efforts to minimize the differences between each industry's EDI implementation.

At next week's Communication Networks '88 trade show, EDI novices and advocates alike can catch a glimpse into what could be a roller coaster year for EDI by attending a session called "EDI: What the communications manager needs to know."

The session will report on the status and implications of EDI and interenterprise electronic mail, according to session chairman Walter Ulrich, a partner with Coopers & Lybrand.

Possibly the most exciting — or most frightening, depending on your position — impact of EDI is the fact that it is changing the way companies do business.

Paper-free

On a basic level, EDI represents the paperless invoice. Mountains of paperwork and accompanying armies of clerks can be cut down to manageable size, if not totally eliminated, simply by switching to electronic forms. Orders, billing and payment receipts can all be automated and sent faster electronically than is possible when sending hard copy by standard postal service.

Compiling this information into an electronic data base, whether a private or a public industry data base, also provides reams of information on market demographics, buying trends and so forth at the stroke of a key.

The competitive advantages

Continued on page 51

High-speed modems on upswing

Dial-up products seen flourishing until ISDN gets under way, report says

BY ELISABETH HORWITT
CW STAFF

In the next few years, dial-up modem market segments from 4.8K bit/sec. on up should account for the majority of the modem industry's growth, according to a recent report from International Data Corp. (IDC).

The overall market will rise at a compound annual growth rate of 5% for units shipped, according to the Framingham, Mass., research firm.

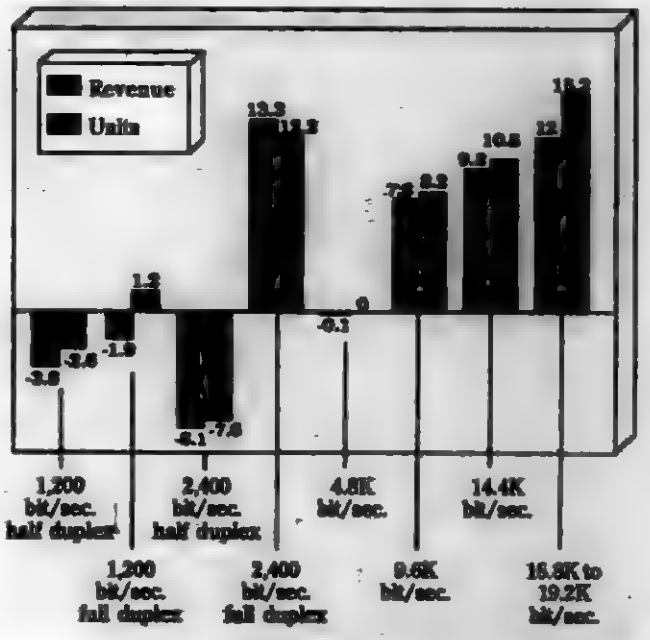
The widening acceptance of the V series of international standards — including V.22, V.29 and V.32 — has promoted intervendor interoperability but has also made network management a top priority, particularly for high-speed modem networks.

Modems used in extensive leased-line and modem-pooled dial-up applications must have enough intelligence to support network management and control systems, IDC said. But most network management systems are still proprietary, making multivendor network management difficult.

Businesses choosing between dial-up and leased-line modems will have to weigh the lower cost of dial-up modems against the more sophisticated network management features of leased-line modems, the report said.

Five-year modem market forecast

Compound annual percent growth by transmission speed, 1987 to 1991



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

Dial-ups catch fire

A major recent trend has been the rapid growth of proprietary dial-up modems supporting speeds from 14.4K to 19.2K bit/sec., as opposed to the 9.6K bit/sec. dial-up modems that support the V.32 standard.

Low availability of V.32 products, coupled with their initially high prices, may have accounted for their low growth in 1986, IDC said. Last year, however, V.32 modems became more widely available, and prices have come down from $3,500 to about $2,400. This should result in a market shift to higher speed dial-up modems, according to IDC.

Leased-line modem sales are being threatened by the decreasing prices and growing availability of digital alternatives such as T1 lines and services, which provide comparable reliability and network management features, the report noted.

On the other hand, the main attraction of dial-up modems is

Continued on page 50

Mac-IBM file swaps supported

BY PATRICIA KEEFE
CW STAFF

OTTAWA — The first asynchronous communications package said to support file exchange between the Apple Computer, Inc. Macintosh and IBM mainframe applications has been introduced by Simware, Inc.

The Mac3270's asynchronous capability eliminates the expense of terminal emulation boards, cluster controllers and coaxial cabling that a synchronous environment requires, according to Peter Hirshberg, manager of large systems connectivity at Cupertino, Calif.-based Apple.

The software is said to support mainframe applications running under IBM's MVS/VTAM, GCS/VTAM, and VM systems and requires no additional hardware beyond a Hayes Microcomputer Products, Inc.-compatible modem.

"We expect Mac3270 will help accelerate Apple's penetration of IBM mainframe sites,"

Continued on page 51

Inside

- GE enhances PC Mailbox application for PCs. Page 54.
- Thomas-Conrad tool provides fault tolerance for Arcnet LANs. Page 54.

X.25 in show limelight

Packet-switch boom to continue at Comnet '88

BY ELISABETH HORWITT
CW STAFF

WASHINGTON, D.C. — Last year's spate of CCITT X.25 packet-switching product announcements is expected to continue at the Communication Networks Conference '88, known as Comnet, which will be held here next week.

Both vendors and users have become increasingly enamored with packet switching, analysts report, for a variety of reasons, including increased IBM support, better intervendor connectivity and the X.25 standard's incorporation into emerging networking standards such as Integrated Services Digital Network and the ISO's Open Systems Interconnect.

Another development that reportedly boosts packet switches' price/performance is the incorporation of off-the-shelf microprocessors. Comnet announcements of this type are slated to include the following:

- Netrix Corp. in Herndon, Va., will introduce the Netrix #1-Integrated Switching System (NSS), which is said to incorporate packet switching, circuit switching and multiplexing in one unit. The system combines X.25 and circuit-switched channels over the same 56K bit/sec. line, with a T1 interface to come later this year, the vendor said. The circuit-switched capability allows the unit to support proto-

Continued on page 50

Micom bolsters TCP/IP line with workstations, software

BOXBORO, Mass. — Micom-Interlan, Inc. has introduced five Transmission Control Protocol/Internet Protocol (TCP/IP)-compatible products.

New Micom-Interlan products based on the de facto networking standard include the following:

- A Novell, Inc. Netware-compatible turnkey TCP/IP workstation priced at $795 and a software-only distribution kit that costs $400.
- The NP722, a protocol processor embedded with TCP/IP software for AT&T Unix System V, Release 3 VMEbus-compatible systems, that costs $2,390. It is the first commercially available board to integrate both Unix System V, Release 3 and a University of California at Berkeley Unix 4.2 interface, the vendor claimed.
- The NP322, a turnkey multibus network protocol processor for the Unix System V, Release 3 environment priced at $2,190. It is said to be the first commercially available board to integrate both a Unix System V, Release 3 and a Berkeley Unix 4.2 socket interface library.
- PC/TCP Version 2.0, the latest upgrade to Micom-Interlan's networking software, which provides IBM Netbios compatibility. Available next month, it is set to cost $480.
- Terminal Server Software

Continued on page 50

CINCOM Is The B

Mr. Donald Brout
Staff Vice President of Information Technology
Nabisco Brands, Inc

PROBLEM:

Choosing a corporate software standard that delivers the full power of relational technology

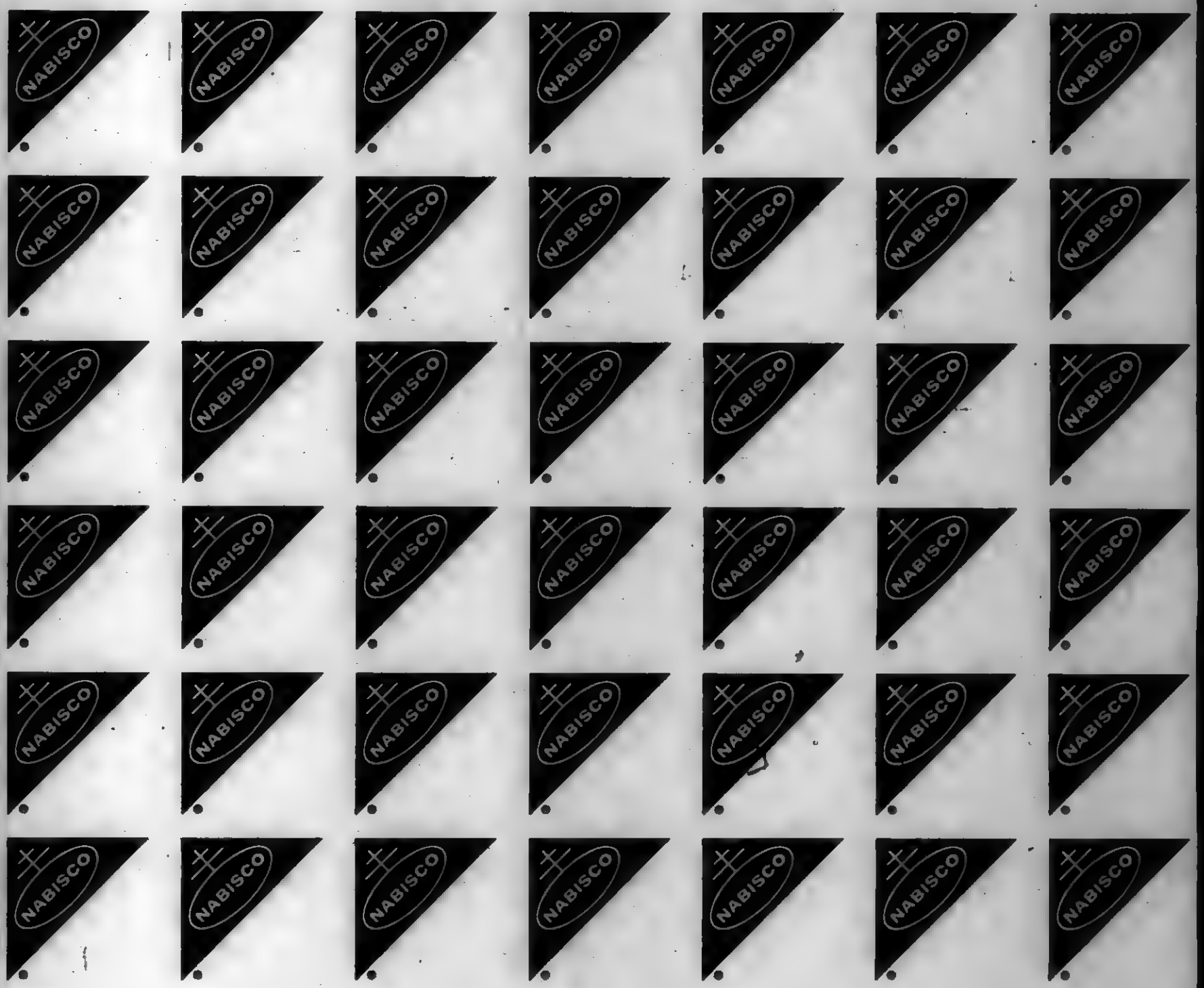
CINCOM SOLVED IT:

With SUPRA Advanced Relational DBMS

When R.J. Reynolds and Nabisco Brands merged in 1985, unfortunately their software systems were far from an integrated mix. The missing ingredient was clearly a complete, compatible family of software powered by a fully relational DBMS, which would serve as the guideline for future software decisions.

"From my perspective, having relational technology was absolutely paramount," said Donald Brout, Nabisco's Staff Vice President of Information Technology. "A system built on a relational DBMS would allow us to respond to change, and reduce both our maintenance load and application backlog."

That need for full relational technology narrowed Nabisco's choice to SUPRA™ from Cincom®. After weighing how SUPRA and its competitors adhered to Dr. E. F. Codd's relational model, Nabisco "concluded that SUPRA is significantly



rand For Nabisco.

ahead of its competitors in terms of relational capabilities, particularly with regard to referential integrity," Brout explained.

SUPRA's advanced relational structure provides Nabisco with the ability to change its business rules dynamically without having to change the applications that accept orders, prepare bills of lading and perform other vital day-to-day business functions. "This will put us in the position of being able to support an ever-changing and ever-improving business environment," noted Brout, whose company also uses MANTIS®, ULTRA Relational DBMS™ and Cincom's Manufacturing System. "We will be in a position to become a supplier of choice for our customers because of our ability to deal with them in an individualized way."

Furthermore, with Cincom products as a corporate standard, Nabisco will reap the rewards of a complete, open software architecture with the ability to operate in both IBM® mainframe and DEC™ VAX™ environments, as well as benefit from Cincom's extensive worldwide service and support.

"The choice of SUPRA and Cincom products was definitely a strategic decision," Brout concluded.

Find out why SUPRA and Cincom are the best strategies for forward-thinking companies like Nabisco. Call us today for more product and customer-success information, or write Marketing Services Department, Cincom World Headquarters, 2300 Montana Avenue, Cincinnati, OH 45211.

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X.25

FROM PAGE 47

cols such as IBM's Systems Network Architecture (SNA) that do not run efficiently over an X.25 network, according to Netrix Vice-President of Marketing Thomas Jones.

Starting at $15,000, the #1-ISS can be configured with up to 16 Motorola, Inc. 68010-based modules, each of which can support up to 63 ports running at 56K bit/sec., according to Jones.

A separate, mouse-driven, graphics-based network management system based on an Apollo Computer, Inc. workstation is priced at $40,000. Both products are set to be be available in the second quarter of this year.

• Plantronics Futurecoms, Inc. in Frederick, Md., will release the PAC.25 Turbo, which is based on the Motorola 68000. The device combines a packet switch, a packet assembler/disassembler (PAD) and a protocol converter in the same unit.

Ports can be configured to provide asynchronous PAD connections or X.25 links and can also support SNA, Telex and X.75 protocols.

PAC.25 Turbo can handle up to 300 packet/sec. and 64K bit/sec. throughput. The device offers network management capabilities. An eight-port unit is priced at $5,225 and is expandable to 42 ports.

• Dynatech Data Communications Group in Woodbridge, Va., will introduce the CPX.25 Model 20 Switch, its new generation of packet switches based on the 68000. The switch can be configured to support up to 20 trunks, each handling 64K bit/sec. throughput. It is said to transmit more than 500 packet/sec. Shipping now, the device is priced at approximately $800 per interface. Dynatech will also show its Model 8 PAD, an eight-port, 68000-based PAD priced at $2,850.

Micom

FROM PAGE 47

Version 1.3 for the NTS100 TCP/IP Ethernet Terminal Server, which reportedly provides expanded TCP/IP functionality and greater performance. It is available in standard and turbo packages that cost $150 and $250, respectively. The turbo version is targeted at high-performance applications such as computer-aided design and graphics.

Micom-Interlan also announced the LAN Detector, a protocol analyzer for troubleshooting and evaluating the performance of local-area network data networks.

Takes all comers

The LAN Detector operates on any Ethernet or 802.3-based LAN. It accommodates a wide range of protocols, including Netware, TCP/IP, Xerox Corp.'s Network Systems, Microsoft Corp.'s MS-Net, Sun Microsystems, Inc.'s Network File System and Digital Equipment Corp.'s Decnet. A set of options enable users to configure the LAN Detector to identify specific problems.

The analyzer can be installed on any IBM Personal Computer AT-class machine and uses Micom-Interlan's NP600 Ethernet or NP600 Starlan Protocol Processor as the network interface.

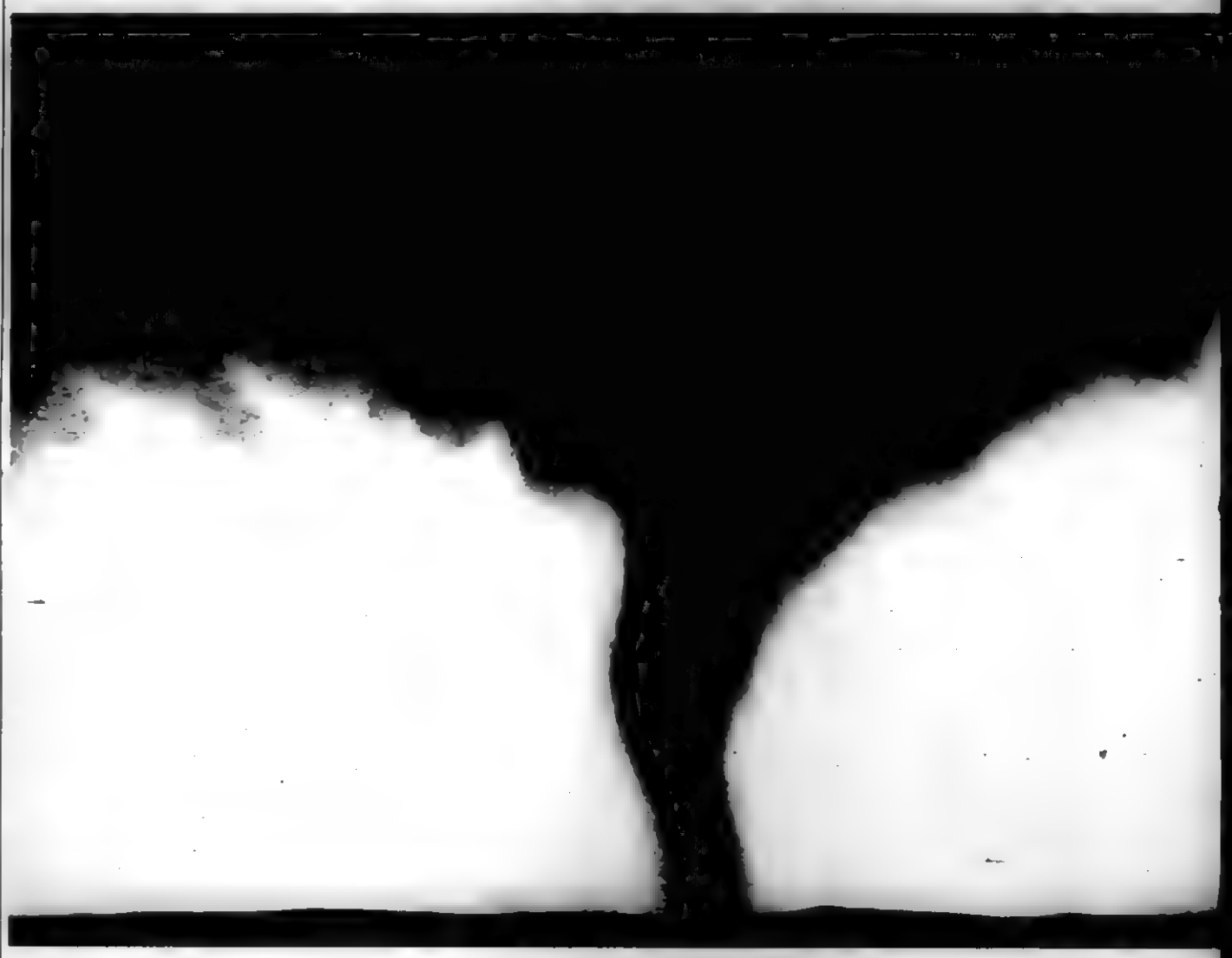
Free demonstration diskettes are available through Micom-Interlan's distribution channels. Pricing for the LAN Detector starts at $11,000.

Modems

FROM PAGE 47

their low cost and ability to serve almost any location in the U.S. Digital network offerings will not begin to compete in terms of geographic availability until Integrated Services Digital Network wins broad industry acceptance, IDC said.

The market for 14.4K bit/sec. multidrop modems could gain a significant boost in the 1988 to 1991 time frame if IBM launches a major marketing thrust in this area, IDC said. Multidrop modems allow multiple devices at different locations to share a single leased analog circuit.



Insurance people have to be ready
for whatever comes across their desks.

At any moment, a tornado, a tidal wave or an avalanche of information can take the people in an insurance company by surprise.

That's why Fireman's Fund chose IBM.

Working closely together, Fireman's Fund and a team of IBM specialists are developing the kind of computer systems an insurance company needs to help avoid disaster, both inside and outside the office.

For instance, IBM's Expert Systems Environment software helps Fireman's Fund put the knowledge of its most senior people into a computer. This means that others with less experience can access the judgment of an expert underwriter when analyzing a risk.

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Keefe

FROM PAGE 47

are tremendous: cost and labor reductions, faster turnaround, immediate access to more accurate data and the elimination of geographic barriers to certain kinds of business. There's also something to be said for using the same forms and the same system to handle multiple supplier relationships.

Of course, there are kinks yet to be worked out. Although not cheap to implement on a wide-scale basis, PC-based EDI systems have removed the cost barrier on the low end.

A key area of concern easily overlooked by many EDI users is the level of auditability and control available with EDI transactions. In the traditional paper-oriented office, hard copy is readily available to double-check for proper business and financial controls. EDI more or less replaces those documents with electronic signals.

Some smaller companies have been forced by large accounts to use a particular EDI system or form despite a preference for another. Users who deal with more than one industry may find themselves saddled with two EDI systems standardized to meet the needs of a particular business. Ulrich concedes that there is not always as much coordination as there could be between the different industries championing EDI.

Interoperability is an issue, but it is being addressed in part with X.400, which functions much like E-mail versions of the Transmission Control Protocol/Internet Protocol suite.

The EDI Council of Canada has designated X.400 the enveloping mechanism for EDI transactions. The U.S. is expected to follow suit.

Would-be users and trading partners can also expect a change in tactics this year from EDI advocates — a swapping of the iron fist for the velvet glove. Whereas 1986 and 1987 saw powerful purchasers demanding that their partners install EDI systems, 1988 will combine grass roots interest with encouragement for voluntary participations.

And instead of threatening the small supplier, EDI users will begin touting the benefits — for both the companies. Banking is an example of an industry hopping on the EDI bandwagon with much encouragement from its customer base.

Keefe is a Computerworld senior editor, networking.

In addition, an office system, running on an IBM 3090 with MVS/XA, was designed using IBM's Distributed Office System (DISOSS) and IBM's Professional Office System (PROFS). It links Fireman's Fund headquarters in California to its branch offices around the country, allowing them instantaneously to send and receive electronic mail, and file it for future retrieval.

With the support of IBM, Fireman's Fund can respond faster and more accurately to its customers' needs. According to Fireman's Fund Systems Vice President, Deems Davis, "IBM is our insurance policy."

Of course, whether you're in the insurance business, or any business, there's one thing you always have to be ready for. Anything.

IBM

File swaps

FROM PAGE 47

Hirshberg said.

Macintoshes made up 4% of the installed base of micros at 9,687 IBM mainframe sites recently surveyed by Computer Intelligence. The number of Macintoshes at those sites is expected to more than double this year, the La Jolla, Calif., market research firm said.

Mac3270 is said to include a Mac-style interface and to allow users to cut and paste data back and forth between IBM 3270 and Mac applications. Apple, which helped Simware implement the Mac-like features, has trained its direct sales force on the product.

Like SimPC, the vendor's PC-to-mainframe software, Mac-3270 reportedly provides a script language, full-screen 3270 emulation and file exchange with corporate IBM TSO and CMS applications via dial-up lines, including CCITT X.25 networks. In addition, it runs in conjunction with Simware's host-based protocol conversion software, Sim3278, and offers Digital Equipment Corp. VT100 and IBM TTY terminal emulation.

Since the script language is the same for the Mac and the IBM Personal Computer, users can create scripts portable from one environment to the other.

Mac3270 runs on the Macintosh 512KE, the Mac Plus, the MacSE and the Mac II and supports the most recent versions of the Mac's Finder and Multifinder software. Set to be available next month, Mac3270 will cost $250. Multiple-copy licenses are available.

Early users include Motorola, Inc. and Chevron Corp.

Buy a quality name without paying for it.

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HP 700/7

Model
HP 700/22

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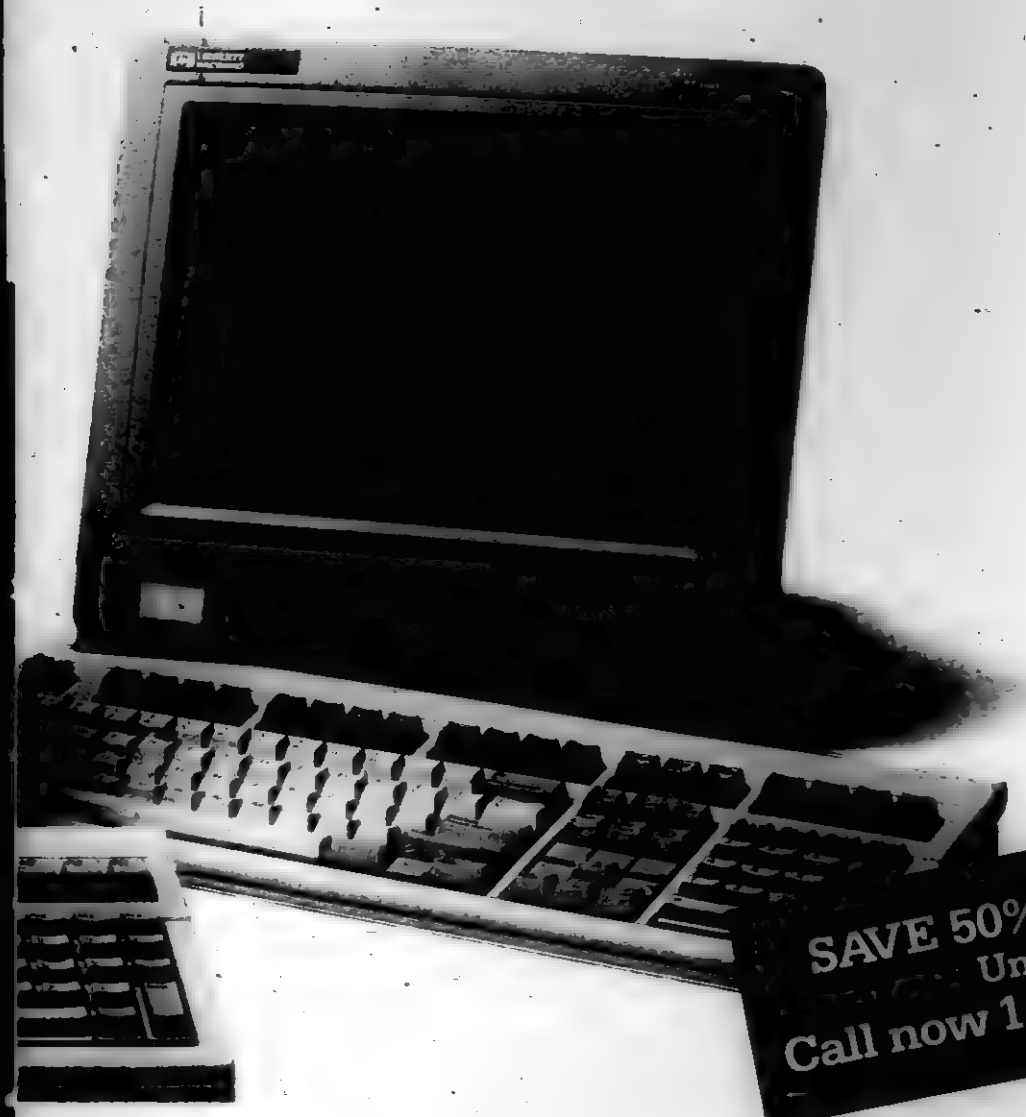

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NEW PRODUCTS

Local-area network hardware

Centrecom 800-BT and 1600-BT, transceivers for single-tap connection of up to 256 computers and peripherals to Ethernet local-area networks, have been announced by **Allied Telesis, Inc.**

Centrecom 1600-BT is a 19-in. rack-mounted product that allows direct connection of eight to 16 devices.

Centrecom 800-BT is an eight-port tabletop version of the same product with read cable connections. Both conform to Ethernet Version 2 and IEEE 802.3 standards.

Centrecom 1600-BT costs $995 for an eight-port configuration and $1,495 for a 16-port unit. Centrecom 800-BT costs $795.

Allied Telesis, Suite 1220, 2685 Marine Way, Mountain View, Calif. 94043. 415-964-2771.

Customer-premise equipment

Advanced Computer Communications has introduced a device said to act concurrently as a packet switch and a concentrator that feeds multiple packet-switched lines into one.

As a local packet switch, the **ACS 8250** links up to eight computer hosts or workstations attached to packet assembler/disassemblers that support the CCITT X.25 protocol.

As a concentrator, it supports up to six packet-switched links and sends them over a single 64K bit/sec. line to an X.25 packet-switched network. Features include a menu-driven, user-configurable routing table and a password-protected net management facility.

The ACS 8250 costs $6,500.

Advanced Computer Communications, 720 Santa Barbara St., Santa Barbara, Calif. 93101. 805-963-9431.

Links

VM Messenger, a communications software package designed for use in the IBM VM/CMS environment, has been announced by **Systems & Telecoms, Inc.**

VM Messenger is said to enable IBM mainframes to handle interchanges between discrete communications services, including electronic mail, international telex and packet switching. It supports E-mail services.

VM Messenger costs about $26,000.

Systems & Telecoms, Suite 100, 12020 Sunrise Valley Drive, Reston, Va. 22091. 703-391-2712.

Electronic mail

GE Information Services has enhanced its **PC Mailbox** software application that allows an IBM Personal Computer to function as an international message center.

Based on GE's global electronic mailbox service, QuikComm, PC Mailbox Version 4.0 features expanded addressing functions that permit addresses to be sent or received from another user's system, the option to print all messages received, the ability to modify a line length, an administrator's program for customizing installations and a program for reporting the status of transferred information.

PC Mailbox Version 4.0 costs $249.

GE Information Services, 401 N. Washington St., Rockville, Md. 20850. 800-433-3683.

Security

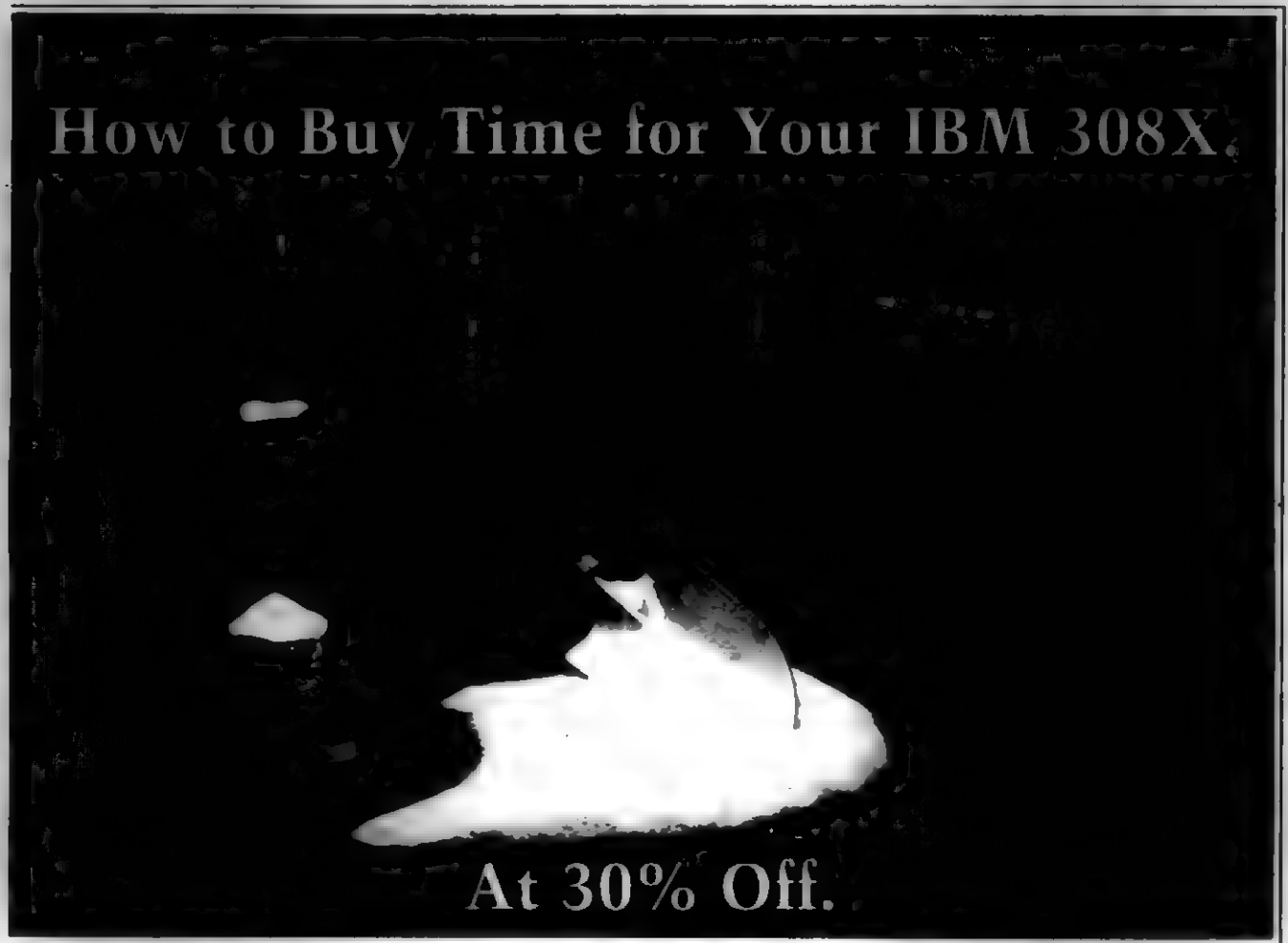
A software package designed to provide fault tolerance for Arcnet local-area networks has been announced by **Thomas-Conrad Corp.**

The **TC6099 Safety-Net** software allows two physical Arcnet LANs to operate in parallel. If one network goes down, the other continues to operate.

TC6099 Safety-Net costs $39.95.

Thomas-Conrad, Suite 1C, 8403 Cross Park Drive, Austin, Texas 78754. 512-836-1935.

How to Buy Time for Your IBM 308X.



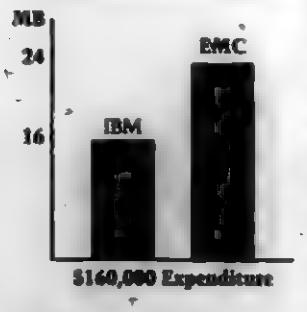
At 30% Off.

1. Invest in EMC.

With the uncertainty surrounding IBM's next move in the mainframe area, adding a few more years to your system's productive life will pay dividends for you down the road. So why buy a new system, when EMC's main storage upgrade gives you the performance you need to make your current system your future workhorse. With EMC you save 30% over comparable IBM upgrades, which means buying time now for your 308X has never been a better decision. The simple "plug and play" design of EMC's upgrade makes improving the performance of your system as easy as adding sand to an hourglass.

2. Maximize Your Savings.

EMC uses state-of-the-art technology and production methods to offer our 308X upgrade at 30% lower cost than IBM. A 16MB upgrade from IBM is priced at $160,000. For that same price you could buy 24MB of EMC main storage. That's an additional 8MB of main storage or a savings of $50,000. Either way you save with EMC. EMC also features coterminous leases and trade-up credits so the return on your investment continues after your purchase.



3. Improve Performance.

By increasing your 308X's main storage capacity, you will improve system response time and increase your users' productivity.

EMC's 308X upgrades are 100% hardware and software compatible with IBM 3081, 3083, and 3084 CPU's. Upgrades are provided in 16MB increments and run all IBM diagnostics. Use of EMC upgrades will have no effect on your IBM maintenance.

4. Add Reliability.

To guarantee the most uptime possible for your 308X system, our upgrades use pre-tested logic components. Then they are subjected to 100-hours of test and burn-in procedures, which include qualification in one of our own 306X computers prior to shipment.

EMC is the leading independent manufacturer of main storage upgrades and other system enhancement products for mainframe and mid-range computers. All EMC products are supported by our worldwide network of sales and service offices.

5. Call EMC.

If you're interested in buying time for your 308X system, call EMC today at **800-222-EMC2** for your free information kit. Our 308X upgrade is the "midlife kicker" that saves you money and improves your 308X's performance.

For more information, call today:
1-800-222-EMC2 ext. 2290
(In MA, call 617-435-1000)

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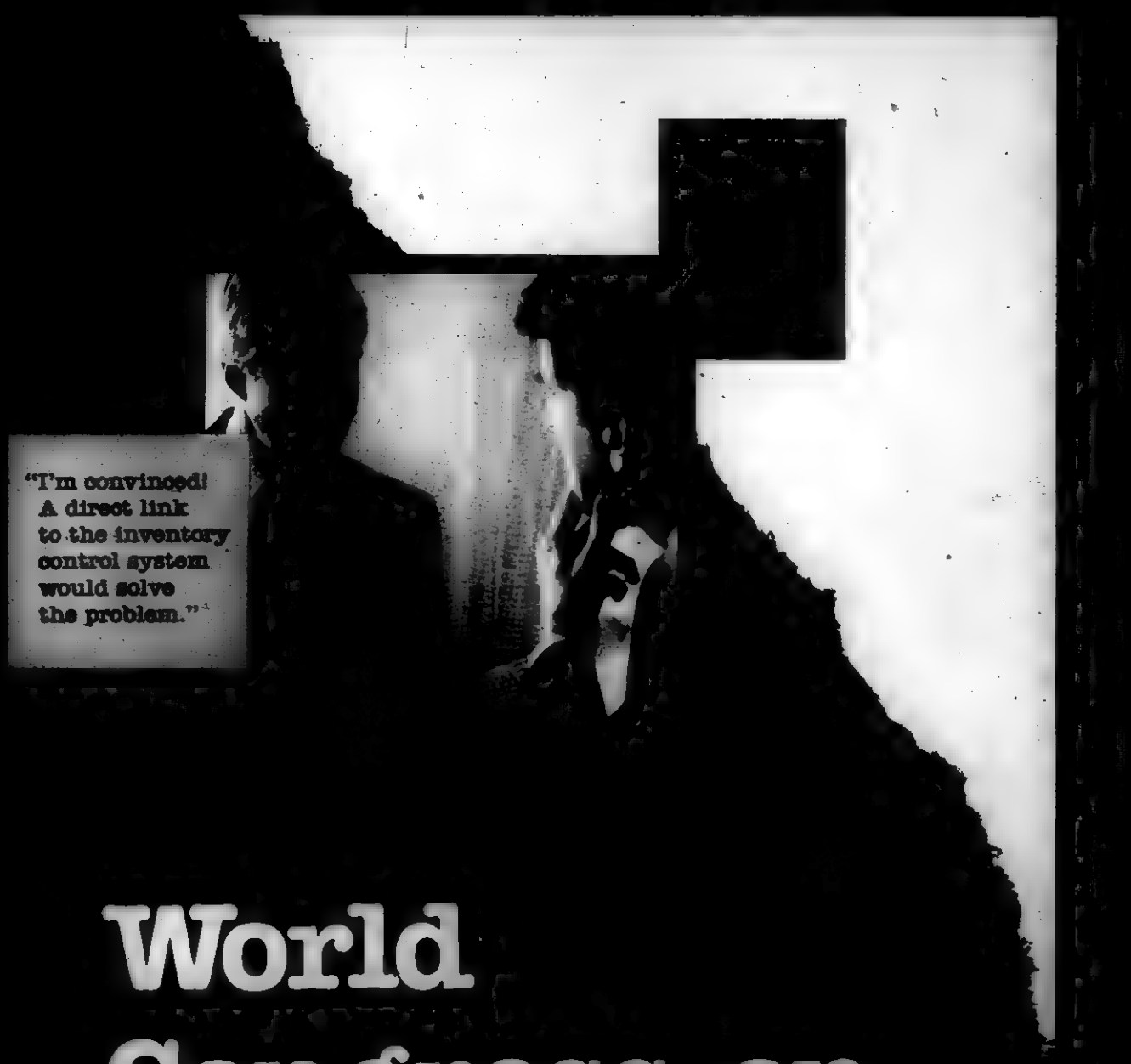

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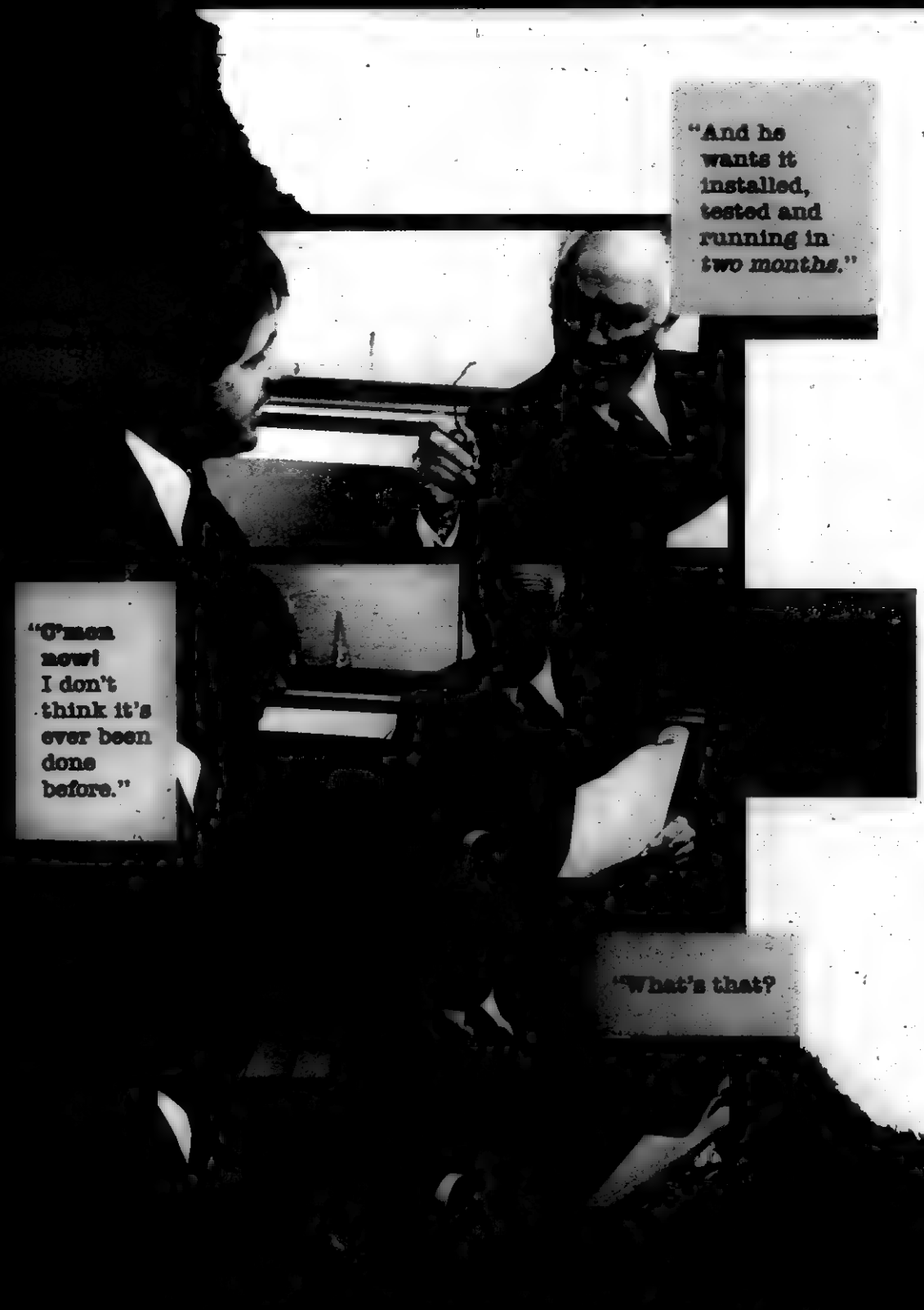

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The World Congress on Computing is the only event in the world created exclusively for you—the MIS/DP professional facing the growing systems challenges of computer-intensive organizations.

Its singular goal is to provide the tools you need to succeed. A tightly focused exposition of applications, systems, products and services. An expert conference program, designed by a distinguished panel of industry leaders, that targets the vital issues common to all MIS/DP professionals – and offers practical solutions. A common ground where the professionals who manage the world's information power will come together to advance their systems, their organizations and their careers.

Find the tools to build your success at the WCC!

Join thousands of your colleagues who will find strategic solutions to their own real-world challenges at WCC. Complete and return the registration form at the back of this brochure today!

Discover Strategic Solutions from the World's Leading Computer Products and Services Suppliers

Hotel and travel discounts for WCC attendees – see page 7.

The WCC exhibit floor represents the global state-of-the-art in computer systems technology. Multinational giants will stand side-by-side with up-and-coming innovators to show you how their products and services can help solve your professional challenges.

You'll find the entire spectrum of hardware, software and services including:

- Minis, Mainframes
- PC Workstations
- Engineering Workstations
- Fault-Tolerant Systems
- Software Solutions
- Printers and Peripherals
- Connectivity and Networking Products
- Communications Products and Services
- Uninterruptible Power Systems
- Data Security Products
- Services
- Supplies, Accessories and more!

These industry leaders have dedicated their time and expertise to making the WCC conference a valuable, information-packed forum relevant to MIS/DP professionals in all industries. We gratefully acknowledge their valuable contributions.

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Senior Vice President
Information Services Department
Freddie Mac

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Sr. Vice President
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American Express

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Consultant

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Wohl Associates

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The World Congress on Computing will be held concurrently with INTERFACE '88, the world's premier industry event for communications/networking professionals.

By attending the WCC, you will automatically have access to the INTERFACE '88 exhibit floor, the largest exposition in the world of data- and telecommunications hardware, software, accessories and services.

The role of communications is to facilitate and enhance the conduct of business and to positively impact the bottom line. This year's distinguished keynoter, a veteran executive and visionary will address the issues of global communications in a worldwide economy, the increased reliance on data as a corporate asset, and the building blocks for computer-enhanced commerce in the twenty-first century.

Resource Management—Exploration, Acquisition, Protection

As an information systems professional, your chief challenge is to keep your information technology focused on organizational goals while you manage a changing and expanding asset base. These sessions deal with mainstream issues of DP Management, examine the newest tools and techniques to help you control them, and probe the promise and the problems that loom on the horizon.

- **RM-1** Strategic Implication for Corporate Networks
- **RM-2** Computing Work Groups: Making Them More Productive
- **RM-3** Information Assets: Where Protection Pays
- **RM-4** Gone Today, Here Tomorrow: Cost Effective Disaster Recovery Solutions
- **RM-5** The Payoff in Project Management Systems
- **RM-6** Improving Capacity Analysis and Management: Timing the Most Efficient Upgrade
- **RM-7** The Enterprise-Wide PC Upgrade Process: Optimizing Results
- **RM-8** On the Trail of More Auditable Systems
- **RM-9** Human Resources: Meeting Your Goals

Managing Databases—A Distribution of Assets

The art of database management has evolved rapidly through hierarchical to relational concepts and systems, and the technology is still moving ahead. Here you will learn the security and accessibility issues involved in distributing databases. About how desktop computers hosting their own databases are becoming integrated through access to larger systems. How evolving standards for SQL may accelerate this trend. Here's your chance to upgrade your knowledge on the dynamics of database management.

- **MD-1** Strategic Planning for Database Integration
- **MD-2** Where Distributed Databases Yield New Solutions
- **MD-3** Tapping the Power in PC Databases
- **MD-4** Online Database Services: International Problem Solvers
- **MD-5** Database Futures
- **MD-6** Database Storage Advances
- **MD-7** Case Studies in Distributed Database Management

Connectivity and Networking—The Mandate and Movement to Integrate

A company's competitive posture depends on the caliber of its information network. The right people must have the right information at the right time. LANs now stretch connectivity to new regions of productivity encompassing micro-to-mini-to-mainframe links. For multinationals, there are public packet vs. private network considerations and a host of trans-border implications to ponder. And there's no other area where standards loom so importantly. These sessions will help you position your operation for the next five years and beyond.

- **CM-1** Connectivity: The Measures of Achievement
- **CM-2** Goals for Network Integration
- **CM-3** Have We Reached the Promised LAN?
- **CM-4** Integrating Work Groups into the Corporate Network
- **CM-5** New Strategies for Multinational Nets
- **CM-6** Doing More on the Private Side of ISDN
- **CM-7** A World of Opportunities for OSI Adapters
- **CM-8** Electronic Mail and Messaging: The Application Catalyst

Real-World Issues/ Real-World Solutions

Applied Software—Directions and Connections

Software decisions continue to drive hardware decisions. New software environments present more difficult make-or-buy decisions. Major new concepts are competing for standardization, and everyone is anticipating productivity from expert systems and new development tools. Hear the latest on CASE, SAA, OS/2, MS/DOS and a host of other software advances.

- **AS-1** New OS Hierarchies: Changing Your Growth Path
- **AS-2** "CASE" Studies for Turning Ideas into Solutions
- **AS-3** Global Strategies for Software Standardization
- **AS-4** Identifying the Best Interactive Development System
- **AS-5** What Price Security?
- **AS-6** Hot Utilities for Higher Returns
- **AS-7** PC Software Successes for 1988
- **AS-8** Midrange OS Wars: Pick a Winner
- **AS-9** Make, Buy, Lease or License Software: Strategies for IC Managers
- **AS-10** Language Lab for 4GL Decision Makers
- **AS-11** Breathing More Life into Old Software

Application Integration—The Driving Forces

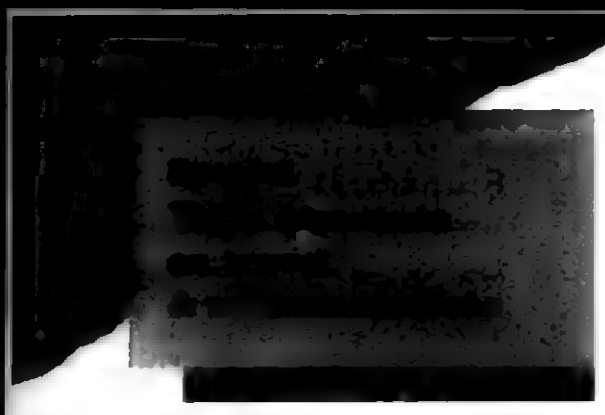
Applications transform general-purpose computers into special-purpose or job-specific systems. Now a new buzzword, enterprise-wide systems, defines attempts to interconnect special purpose systems extending across and beyond the corporate network. New yields from applications integration include better Executive Information Systems, E-Mail, voice messaging and more. Our experts will help you sort the wheat from the chaff and aid in prioritizing your integration strategies.

- **AI-1** Building PC Application Paths to the Information Center
- **AI-2** Enabling Technologies for Office Productivity Improvements
- **AI-3** E-Mail and Message Highways for Today's Enterprise
- **AI-4** Electronic Data Interchange Application Workshops
- **AI-5** CIF Access: Meeting the Distributed Computing Challenge
- **AI-6** Order Processing Acceleration via Transaction Nets
- **AI-7** MAP to MRP: An Update on CIM Successes
- **AI-8** Accounting Systems Honor Roll for '88
- **AI-9** Strategies for Multinational Applications Integration
- **AI-10** Bringing MS-DOS Applications into the Multi-User World
- **AI-11** Document Management: A Convergence of Solutions
- **AI-12** Building Bridges to Scientific/Engineering Application Nets

User Interfacing—More Intelligent Approaches

Today's user interfaces are turning laymen into applications experts. How artificial is artificial intelligence? How expert are expert systems? What do either have to offer information systems executives today? Tomorrow? What's the status of speech recognition and voice synthesis? How will SQL and OMS help users? What standards need to be employed? Discover what new techniques and system enhancements are bound to improve your and users productivity.

- **UI-1** Presentation Graphics: Putting Your Best Image Forward
- **UI-2** Expert Systems Interfaces Developed by Non-Experts
- **UI-3** Simplifying the "Corner Office Computing" Interface
- **UI-4** The Shape of Productivity: Ergonomics Advances Worldwide
- **UI-5** Presentation Managers: From MacII to OS/2 E
- **UI-6** Putting User Interface Standards to Work
- **UI-7** Power of the Spoken Word: Speech Recognition and Synthesis
- **UI-8** Work Group Productivity Enhancements
- **UI-9** Enter the Information Managers: Smart Tools for End Users
- **UI-10** Co-op, Departmental, Work Group: New Computing Environments



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Airfare Savings!

American Airlines is offering substantial fare savings to show participants of the WCC. To obtain the special discounts, reservations must be made through the following number:

American Airlines
1-800-433-1790
6am–11pm EST, 7 days
Refer to File Number: S14481

The special show rates are only available through the phone number listed above. Call, or have your travel agent call for details. Discounts vary and restrictions may apply, but these special discounts will be afforded to each show participant from any city serviced by American Airlines. *Be sure to reference the special file number!*

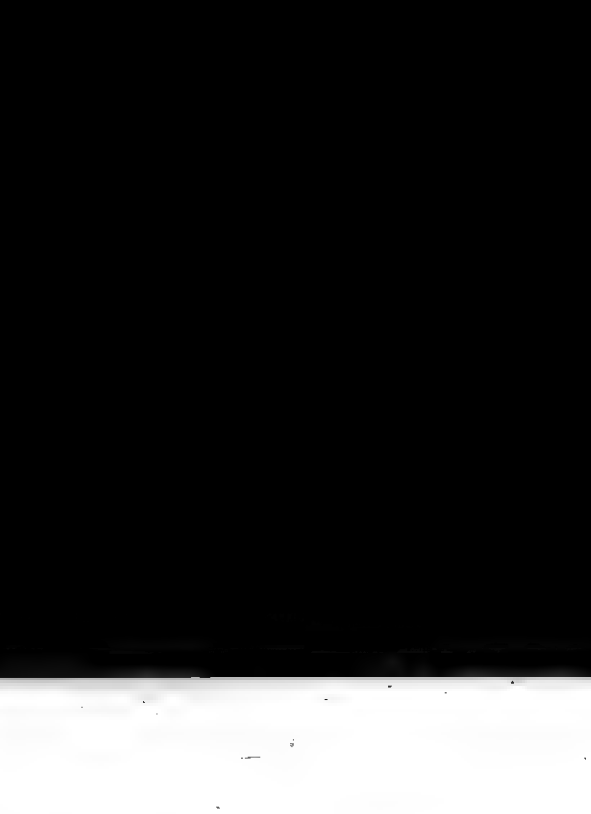
Alamo Rent-A-Car

The official car rental agency for the WCC, Alamo Car Rental, is offering the following special rates:

CATEGORY	DAILY/WEEKLY RATES
Economy Car	$25/115
Compact Car	$27/139
Intermediate Car	$29/159
Standard Car	$32/179
Luxury Car	$35/209

Add $2 per day for 4-door models

Cars are available for rental from March 31 through April 7. For reservations call toll-free, 1-800-732-5252. *Please specify Group ID #50200. Plan Code "GC."* Cars subject to availability.



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5. Holiday Inn City Center
6. Hotel Nikko
7. Hyatt Regency
8. Marriott Chicago
9. McCormick Center
10. Palmer House Hilton
11. The Westin Hotel

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Please print or type the information as you wish it to appear on your badge. **PERSONS UNDER THE AGE OF 16 ARE NOT PERMITTED ON THE EXHIBIT FLOOR.**

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☐ My registration check is enclosed for $ _____
(Make payable to WCC '88)

☐ Please bill me. My purchase order number is _____
(To avoid long lines at the Show, bill must be paid by March 21, 1988)

In the event of cancellation registration fee will be refunded if written notice is received prior to February 26, 1988. If notice is received on or after February 26, 1988, fee will be applied toward registration for WCC '89.

ACCOMMODATIONS

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	Hyatt Regency	$114/124/134	$124/134/144
	Marriott Chicago	$105/116/127	$122/133/144
	McCormick Center	$114/124/134	$130/140/150
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ZL Transportation
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SYSTEMS & PERIPHERALS

HARD TALK

James Connolly

Dynamic dual deb of 1988

Prime Computer's proposed takeover of Computervision dominated talk in the computer industry as the new year began, but Prime also took the initiative on a second front that will be hot this year.

Prime got the jump on its competition by touting its multiprocessing capabilities in a technical briefing held early this month in conjunction with the announcement of the first shipments of Prime's high-end, dual-processor 6550 superminicomputer.

Prime opened the year by using what is likely to be a buzzword in 1988: symmetric multiprocessing. It is a term applied to systems in which two CPUs act as peers that are equally capable of handling I/O tasks and instruction processing. The technology will be heavily promoted by minicomputer companies this year and could be at the heart of high-end superminicomputer and small mainframe competitions involving Prime, DEC, Wang and IBM.

About the time that Prime was shipping its first three 6550s, Wang was announcing its VS 7320 dual processor and

Continued on page 57

GE offers remote computing

Distributed service simulates IBM 9370, provides software alternatives

BY STANLEY GIBSON
CW STAFF

ROCKVILLE, Md. — Responding to demands for distributed processing, GE Information Services, a division of General Electric Co., recently offered a remote service that simulates an IBM 9370 departmental computer while using IBM's MVS/XA.

The Mark 9000 service, which is run on a GE IBM 3090 mainframe, offers software such as MVS/XA, IBM's DB2, DL/1 and CICS and other large mainframe packages not currently offered by IBM on 9370s, the vendor claimed.

"If a client's business requirements include multiple, distributed 9370s, remote access to one 9370, the integration of its 9370 systems with other mainframe systems or a CICS capability, then the Mark 9000 is an alternative," said Lance Pelter, GE product manager.

The Mark 9000 was created in answer to what industry observers see as a key use of the 9370: as a distributed processor that will be managed from a remote central site.

"In our experience, people with big MVS shops may not want to distribute their operations people. This would permit them to save the expense of sending trained MIS personnel to manage remote operations," Pelter said.

The Mark 9000 package includes the operating system, tools, utilities and some 50 software packages. GE is also offering system design, application support and work load profile management assistance. Users also gain access to GE's worldwide teleprocessing network.

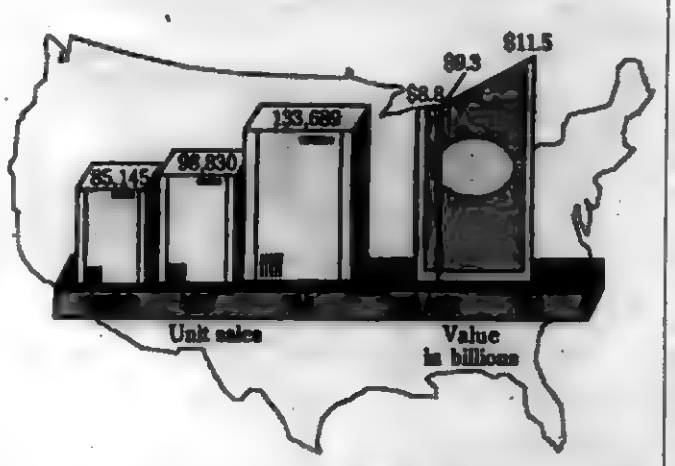
A typical monthly cost for the Mark 9000 service under a three-year contract is $16,000, which is about 4% to 5% less

Continued on page 57

Data View

How many minis, and what will they cost?

A prediction of U.S. minicomputer sales and their values



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CW CHART: AMY J. SWANSON

Encore seeks new markets

BY JAMES CONNOLLY
CW STAFF

MARLBORO, Mass. — Encore Computer Corp. has joined the list of Unix-based computer makers turning their attention from high-performance technical computing toward general-purpose commercial processing.

As Sequent Computer Systems, Inc., with its parallel processors, and Hewlett-Packard Co., with its HP 9000 series, have targeted the commercial market in recent months, Encore is taking steps into the general-purpose computing arena.

Continued on page 58

Topologix aims for the Sun

DENVER — Topologix, Inc. targeted users of Sun Microsystems, Inc. workstations last month with a plug-in parallel processing system called the Topology 1000.

According to a company spokesman, the system offers Sun users increased performance for such applications as image processing, computer-aided design and engineering and computer-integrated manufacturing.

The Topology 1000 consists of customized parallel computer programming software and a custom-designed attached processor board. According to the spokesman, the product's nonbus architecture, in which all elements are linked, permits the construction of computer networks of arbitrary size and topology.

Each attached processor board features four 32-bit microprocessors. According to the

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Inside

- Esprit breaks away from CRT terminals pack with displays for different market segments. Page 58.
- NCR terminal combines night depository, ATM in same unit. Page 60.
- Canon rolls out flatbed image scanner. Page 60.

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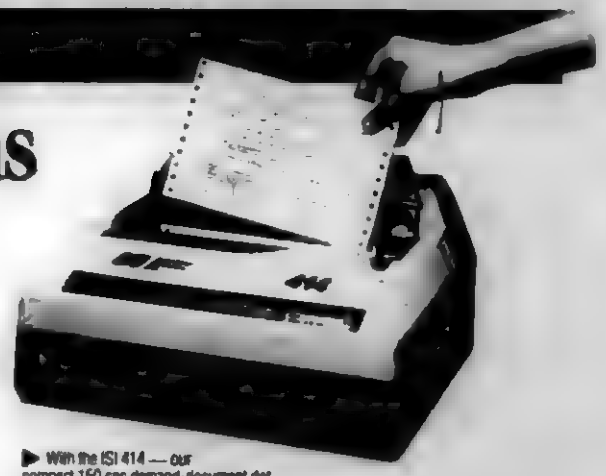

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Topologix

CONTINUED FROM PAGE 55

spokesman, the use of a memory array for each processor provides a peak performance of 80 million reduced instruction set computing instructions per second for each board. Up to eight of the boards can be plugged into one Sun workstation, yielding a peak performance of 640 million instructions per second, according to the spokesman.

Each processor has from 1M to 16M bytes of associated memory. A maximum of 64M bytes of dynamic random-access memory may be utilized per board.

Topologix's Parallel Common LISP and Parallel C software languages are used to perform parallel processing. Both symbolic and numeric parallel processing applications are supported, the vendor said.

VMEbus interface included

Also included in the Topology 1000 are a Motorola, Inc. VMEbus hardware interface, error detecting memory, link buffering and full crossbar switching.

Initial pricing for the Topology 1000 ranges from $24,900 for a basic system, including one attached processor board with 4M bytes of memory running Parallel C, to $34,900 for a system running Parallel Common LISP and Parallel C with 32M bytes of real memory.

Delivery is slated for May, Topologix said.

GE

CONTINUED FROM PAGE 55

then owning a 9370, including software, support and personnel expenses, according to Pelter.

He added that the service is already being used by several customers, including National Westminster Bank PLC in London.

The Mark 9000 service is offered in five different models with varying memory, storage and contract length. All configurations include software, maintenance, systems programming, operations and system support services and a 9.6K bit/sec. leased line.

Although the 9.6K bit/sec. speed is standard for the system, it can also operate at a rate of 56K bit/sec., according to GE.

A user could have a variety of configurations on-site, ranging from a cluster or clusters of 3270 terminals and controllers to IBM Personal Computers or compatibles or a high-speed printer using Digital Communications Associates, Inc. Irma boards.

Appeals to expanding shops

Pelter said he expects to sell the service to both large and small MIS shops. He said user firms of any size that have the desire to rapidly expand to a large number of locations would be potential Mark 9000 customers.

Another likely class of users, according to Pelter, would be those working on short-term projects under tight budget constraints, such as some government contractors, who would not want to make an investment in hardware.

Security is provided by IBM's RACF, a security tool used by GE in its other time-sharing services.

Connolly

CONTINUED FROM PAGE 55

identifying the first user.

Meanwhile, DEC reportedly is preparing for the announcement of its first symmetric multiprocessor, and IBM is said to be readying enhanced versions of the IBM 3090 family, against which DEC and Prime position their high-end systems.

Most industry observers acknowledge that IBM already offers symmetric multiprocessing with the 3090s, although the minicomputer vendors' multiprocessor systems will likely end up competing with low-end uniprocessor 3090s.

What users should be ready for is a flood of claims and counterclaims as each vendor explains why its particular approach to multiprocessing is best. It is unfortunate that there will be no easy answers for those users, even in dealing with major vendors such as Prime, DEC, IBM and Wang.

Get the facts straight

The users' dilemma will be further complicated by the score or more of smaller vendors that are certain to adopt symmetric multiprocessing as their own, even if they merely use the term and don't offer the capability.

Therefore, the onus is on the users to make vendors explain their architectures and their use of the term symmetric multiprocessing, or peer processing, or whatever else they may use as a substitute for the process.

Some of those vendors are likely to make outrageous performance claims, perhaps as far out as saying they have a general-purpose computer-based on 1,000 symmetrical CPUs.

It is up to the user to make the vendor explain details, such as how each processor accesses memory and how tasks are assigned to those processors. Only then can the buyer know if the proposed system might achieve the claimed performance — and can do it in the user's individual environment.

Connolly is Computerworld's senior editor, systems & peripherals.

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Encore

CONTINUED FROM PAGE 55

Encore Chairman Kenneth G. Fisher said the company will continue to sell its Multimax systems to the technical computing and educational communities while riding what he feels will be a wave of success for Unix and Pick Systems' Pick in the commercial world.

He also boasted that Encore can force a generational change in computing — which may force established vendors such as IBM and Digital Equipment Corp. to restructure their price/performance levels and shift to Unix — through what he called Encore's unprecedented price/performance levels and its adherence to standards.

Fisher said Encore plans to use price/performance as "kind of an opener for sales situations" in the commercial market and then emphasize what he called Encore's strengths: connectivity, user interfaces, Unix-based solutions and support.

Encore reported an installed base of 101 Multimax systems as of Dec. 1, 1987. Fisher said commercial-type information processing, including government work, represented 10% to 15% of Encore's business in 1987, but he predicted that commercial processing will make up 50% of that business by the end of this year.

Fisher said Encore wants to provide medium-size companies with host systems or provide large companies with systems to support new applications. He admitted that Encore is unlikely to displace IBM mainframes in large companies.

According to Fisher, Encore holds advantages over other multiprocessor system vendors because of its focus on the Transmission Control Protocol/Internet Protocol (TCP/IP) and the Encore Annex terminal concentrator, both of which provide flexibility and compatibility with various vendors' systems. He said those competing vendors use Unix as their interface with other environments, while Encore relies on TCP/IP.

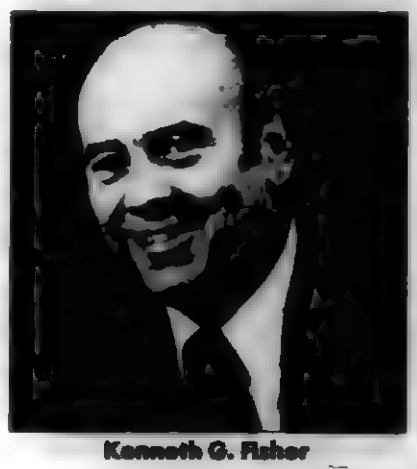
He claimed Encore has proven connectivity products for diverse environments, such as Ethernet, DEC's Decnet and IBM's Systems Network Architecture. He said Encore's varied user interface offerings allow Multimax systems to coexist in environments in which users already run systems such as IBM mainframes and Personal Computers, DEC VAXs and other Unix-based systems.

Going according to plan

Fisher said Encore's bid for the commercial market has been part of the corporate plan since Encore was founded in 1983. He said the current drive is being fueled by the increasing availability of Unix and Pick software and Encore's having established its credibility in the research and education markets.

The number of recognized Unix packages increased tenfold from 400 in 1985 to 4,000 in 1986, Fisher claimed. Encore has campaigned to port major data base management offerings, including Oracle Corp.'s Oracle, to the Multimax.

Fisher also said Encore is focusing its Pick offerings on commercial accounts. In September 1987, Encore allied with VMark Software, Inc. to offer VMark's Pick-based Uni-Verse relational data base management system and applications on the Multimax. According to Fisher, the alliance helps Encore target Pick sites with more than 100 users.



Kenneth G. Fisher

"We bring two things to the party: connectivity and unprecedented power," Fisher said, claiming that most Pick systems have lacked the power to adequately support more than 100 users and have lacked the communications abilities to tie into IBM and other vendors' systems. He claimed Encore's second-generation system, the Multimax 320, can process up to 40 million instructions per second and that a third-generation system based on the National Semiconductor Corp. 32532 chip will provide three times that power.

According to Fisher, Encore's initial success in the general-purpose computing market has been with organizations such as universities — in which Encore has made progress selling systems for research and in which the schools are now using Multimax systems for administration — and in government agencies such as the Internal Revenue Service. But he said Encore now expects to move into companies such as medium-size banks.

The economic effect

"The ideal customer has lots of users, lots of data base requirements and lots of data base activity," Fisher said. "I don't think economics will totally rule the roost. I think people will want to try it before they commit their whole company to it, particularly with a small company like us."

Fisher's comments were met with skepticism by at least one analyst. "I wonder about the strategy, because Unix isn't that strong in the commercial marketplace," said analyst Vickie Brown of Framingham, Mass., market research firm International Data Corp. She noted that Encore may be looking at the commercial market now because it has not penetrated the technical market as deeply as it might have liked.

"I get the sense that they are not really in the technical market. It's just one of those companies that doesn't get the fame. It may be strong to say that they are in no-man's-land, but I'm afraid that may be true," Brown said.

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Esprit breaks away from CRT pack

BY ALAN ALPER
CW STAFF

MELVILLE, N.Y. — Seeking to distinguish itself from the CRT terminals pack, Esprit Systems, Inc. recently unveiled three displays aimed at evolving portions of the marketplace.

One terminal, called Lan Term, is a display targeted at users who need one workstation to run IBM Personal Computer-compatible, Microsoft Corp. Xenix or Pick Systems Pick applications and to share resources and files on a local-area network. Lan Term includes an Intel Corp. 8086-compatible microprocessor for local processing, an IBM Enhanced Graphic Adapter-quality display and an interface for integration into Novell, Inc. Netware LANs.

Carrying a list price of $1,095, the 14-in. terminal comes in a package two-thirds the size of an IBM PC XT. It is offered with 768K bytes of dynamic random-access memory to accommodate most micro applications, Hercules Computer Technology, Inc. graphics compatibility, an RS-232 port for direct connection to a host computer and a parallel printer port. Included is a Novell Netware LT installation diskette.

The product is expected to compete with diskless workstations offered by microcomputer and LAN vendors, noted Sal Lanuto, Esprit's vice-president of marketing. Co-developed with ICM, Inc. in Southgate, Calif., Lan Term's advantage over competing products is that it was designed with display clarity, space restrictions and data security in mind, Lanuto claimed.

"What we're saying is that you don't have to abandon the advantages of a terminal to have an intelligent device on a network," Lanuto explained.

Esprit also introduced a color terminal featuring a screen format of 96 lines by 30 col. and offering windowing, graphics and simultaneous display of 16 foreground and background colors from a 64-color palette. The Picterm CBG terminal is expected to retail for about $1,500.

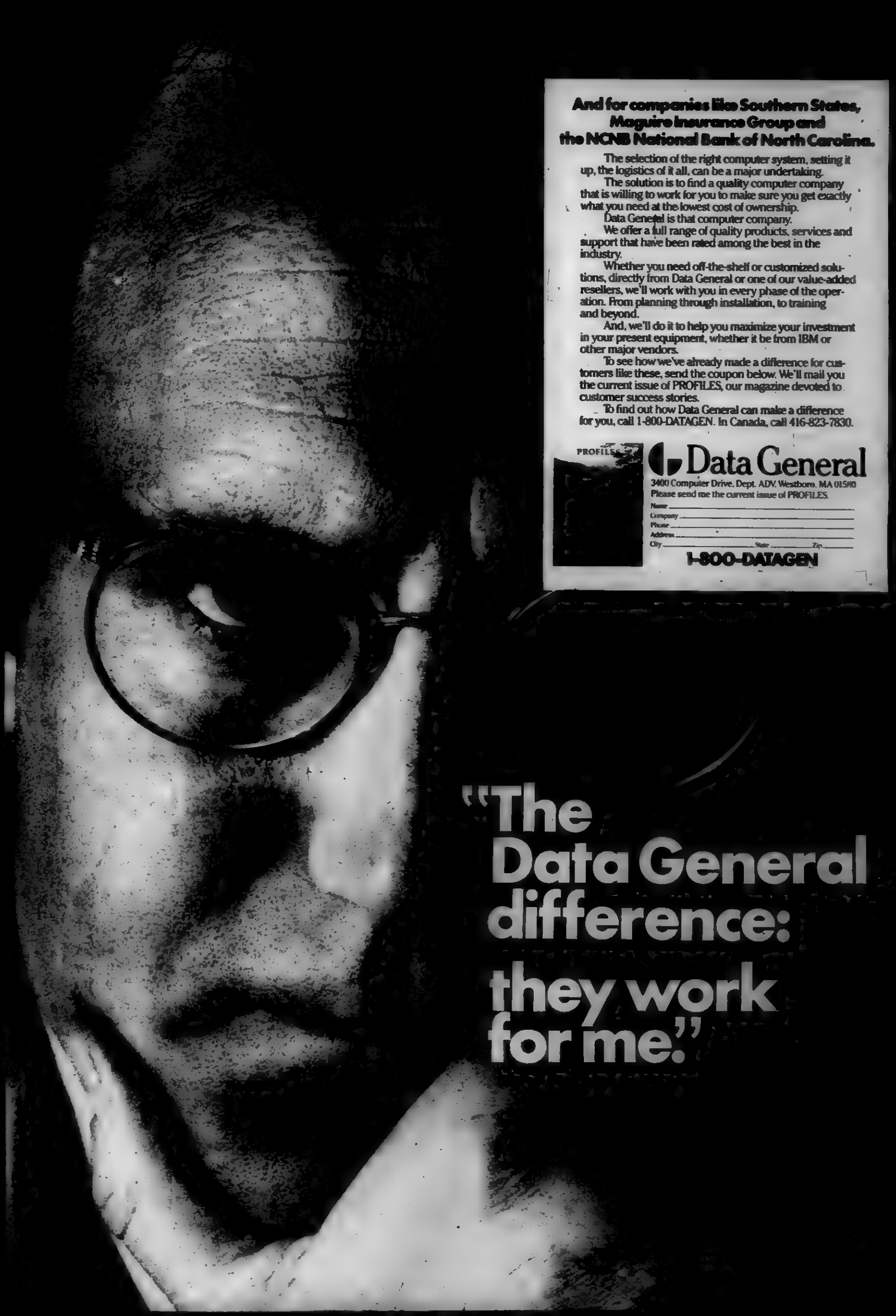
Picterm CBG features a window management facility to handle the display of multiple windows containing text or graphics. The terminal offers character-generated graphics that resemble bit-mapped graphics. Picterm accomplishes this by treating each 2- by 3-in. cell as a computer would address a pixel, noted Ernest Wasserman, Esprit's director of product marketing.

Health care segment targeted

Jointly developed with Meditech, Inc., a medical market software supplier in Watertown, Mass., Picterm CBG is expected to appeal to users in the health care, point-of-sale and financial industries, in which color has been widely accepted as a means of differentiating data, according to Esprit.

Esprit also added a terminal to its Opus family that offers local processing capability and the ability to access or run concurrent applications on two separate hosts. The terminal supports ANSI, ASCII or personal computer protocols and offers a hot key so users can toggle between sessions.

Called 3 In 1, the 14-in. flat-face terminal can display formats of 26 lines by either 80 or 132 col. and comes with a tilt-and-swivel base. It lists for $599.



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NEW PRODUCTS

Processors

An array processor designed for Sun Microsystems, Inc. workstations has been announced by **Mercury Computer Systems, Inc.**

The **Zip 3232-VS** is a single-board 32-bit floating-point array processor system for use in scientific and engineering applications. According to the vendor, the board can process an entire task, consisting of I/O and mathematical algorithms, without host intervention.

The Zip 3232-VS includes two external ports that interface analog-to-digital and digital-to-analog converters at a peak rate of 20M bit/sec., 500K or 2M bytes of base memory and an arithmetic unit that performs 32-bit floating-point computations at a rate of up to 20 million floating-point operations per second.

Prices for the Zip 3232-VS start at $11,000.

Mercury Computer Systems, Wannalancit Technology Center, 600 Suffolk St., Lowell, Mass. 01854. 617-458-3100.

Graphics systems

A prepress workstation with a set of design and color manipulation tools has been introduced by **Coddbarrett Associates, Inc.**

The system, **Insight**, features a 48-bit processor; a 24-bit function coprocessor; 3.2M bytes of memory; a 240M-byte cartridge tape unit; up to three 300M-byte disk drives; 14 card slots; and a color display with 1,536- by 1,152-pixel resolution and 24 bits per pixel for full-spectrum color capabilities.

Input is handled via a standard digitizing tablet, and images can be scanned into the system or imported from prepress production systems. Capabilities include design, rendering and color correction.

The system is priced from $105,000.

Coddbarrett, 65 Ashburton St., Providence, R.I. 02905. 401-273-9898.

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Data storage

A small computer systems interface (SCSI)/VMEbus host bus adapter has been introduced by **Xylogics, Inc.**

Called the **720**, the adapter is a single, standard VME board that controls up to seven SCSI targets with configurations set by the user software. According to the vendor, with optional daughterboards the 720 is capable of controlling 14 SCSI ports and two floppy disk drives.

The 720 host bus adapter combines with Xylogics' 8K-byte first-in, first-out architecture and its Dynathrottle direct memory access control to offer synchronous transfer rates of 4M bit/sec., asynchronous rates of 1.5M bit/sec. and direct memory access speeds of up to 18M bit/sec.

Prices start at $1,795.

Xylogics, 53 Third Ave., Burlington, Mass. 01803. 617-272-8140.

Terminals

A product said to combine a night depository and an automated teller machine (ATM) terminal in the same unit has been announced by **NCR Corp.**

The **NCR 5285** business depository was designed for placement in traditional financial institution branches or sites such as shopping malls. It can be accessed either through the NCR 5085 ATM or by key-lock control.

One feature of the 5285 is its ability to report to the terminal that an item has passed through the depository sensor field. When enough items have accumulated in the safe to block the sensor field, the items are automatically moved to the rear, increasing capacity.

A typical configuration costs $9,450.

NCR, 1700 S. Patterson Blvd., Dayton, Ohio 45479. 513-445-4169.

Printers/Plotters

A family of flatbed plotters in sizes ranging up from D has been announced by **Alpha Merics Corp.**

The plotters are said to be capable of drawing on a variety of material, including paper-thin drafting vellums up to 2 in. thick and wood planks as large as 48 by 96 in. They are compatible with Hewlett-Packard Co.'s HPGL graphics language and, according to the vendor, will run with most computer hardware and computer-aided design and graphics software.

The flatbed plotters are priced from $7,000 to $30,000.

Alpha Merics, 8031 Remmet Ave., Canoga Park, Calif. 91304. 818-999-5580.

Input devices

A flatbed image scanner has been introduced by **Canon USA, Inc.**

The **IX-12F** is said to input text, graphs, drawings, maps and pictures directly into a computer from books or continuously from sheets. It provides an image resolution of 300 dot/in. at a scanning speed of 16 sec./page. It also offers 32-level dithered halftones.

The IX/12F measures 14½ by 21½ by 3½ in. The image scanner is priced at $1,495. The optional 20-sheet document feeder costs $595.

Canon Systems Division, One Canon Plaza, Lake Success, N.Y. 11042. 516-488-6700.

Shaking off 15 years of DP-as-usual

BY JEAN S. BOZMAN

Scene 1: You dream that you're standing in the Community Hospital of Indianapolis, where there were, until recently, 13 different computer systems. There is a single computer center now, and as MIS director, you are involved in the painstaking task of streamlining your system architecture. Eventually, your department will maintain only a handful of computers, including those from IBM, Tandem Computers, Inc. and Digital Equipment Corp.

A series of Tandem systems is already handling patient care systems, lending fault tolerance to this 24-hour-a-day, seven-day-a-week operation. Doctors and nurses can access patient information at any time of the day from terminals scattered throughout the hospital site. Nearby, IBM mainframes still handle the accounting work, while minicomputers dominate in the laboratories.

Scene 2: Hang in there, you're still dreaming. But this time, you're standing in one of the nation's largest for-profit hospital management corporations, Hospital Corporation of America (HCA). You can approach all systems, since they have the same user interface, written by HCA's programming staff of 400.

Unfortunately, you may not be able to send information to all 1,100 other HCA Towers in its 300-plus hospitals because most of the distributed computer systems in HCA's sprawling organization are used as stand-alone departmental processors. Each runs a copy of HCA's RM-COS proprietary operating system. Networking, however, is on the way. In 1988, HCA's information systems group plans to ship 300 copies of HCA's Hlink, a communications program that links 300 Towers systems.

Eventually, there will be one common network, allowing the easy transfer of data through the system and to Nashville headquarters, where IBM mainframes handle administration and decision support.

Scene 3: One final stop before this dream ends. You are now a doctor walking down the corridor of Beth Israel Hospital in Boston. Before seeing your next patient, you must review several lab test results. You approach one of 1,000 ASCII terminals in the hospital and log on using a personal security code.

The on-line data base system you are about to access for your patient's medical records is shared by Beth Israel and its neighboring medical center, Brigham and Women's Hospital. All departmental applications are running on Data General Corp.-based minicomputers.

You quickly scan the lab results, then turn right onto the next corridor to consult with your patient. The lab tests have confirmed your diagnosis.

If you are an MIS professional in the health care industry, be warned: Attempting to reenact this scene for your hospital staff may be hazardous to your health. Most large hospitals host a proliferating series of separate software and hardware systems to accomplish their daily task of patient care. But not for long.

Into the future

The giant known as the American hospital and health care industry, accounting for 11% of the U.S.'s gross national product, is finally shaking off 15 years of DP-as-usual. No longer will mainframes churn out patient bills and medical records far away from and unconnected with scattered minicomputers handling lab tests, radiology reports and pharmacy inventories. Instead, systems made by different manufacturers will communicate as well as capture and compile data flowing through the hospital, no matter what its source.

Why? Because as this tale of three cities points out, a veritable revolution has occurred in the management of hospital information systems, one that got under way in 1983, when the federal government first printed a price list for nearly 470 hospital procedures.

This shopping list, called DRGs, for Diagnostic Related Groups, turned the cost-plus world of hospital accounting on its head. Virtually overnight, hospital administrators began demanding new types of data for cost/benefit analyses.

For perhaps the first time since Medicare became a fact of life in the 1960s, hospitals had to analyze their cost structures — and justify their charges. The minicomputers that had proliferated as hospital departments bought them during the 1970s were simply going to have to be brought under control, one way or the other. Interfaces between centralized financial systems were going to have to be

WARREN GEBERT

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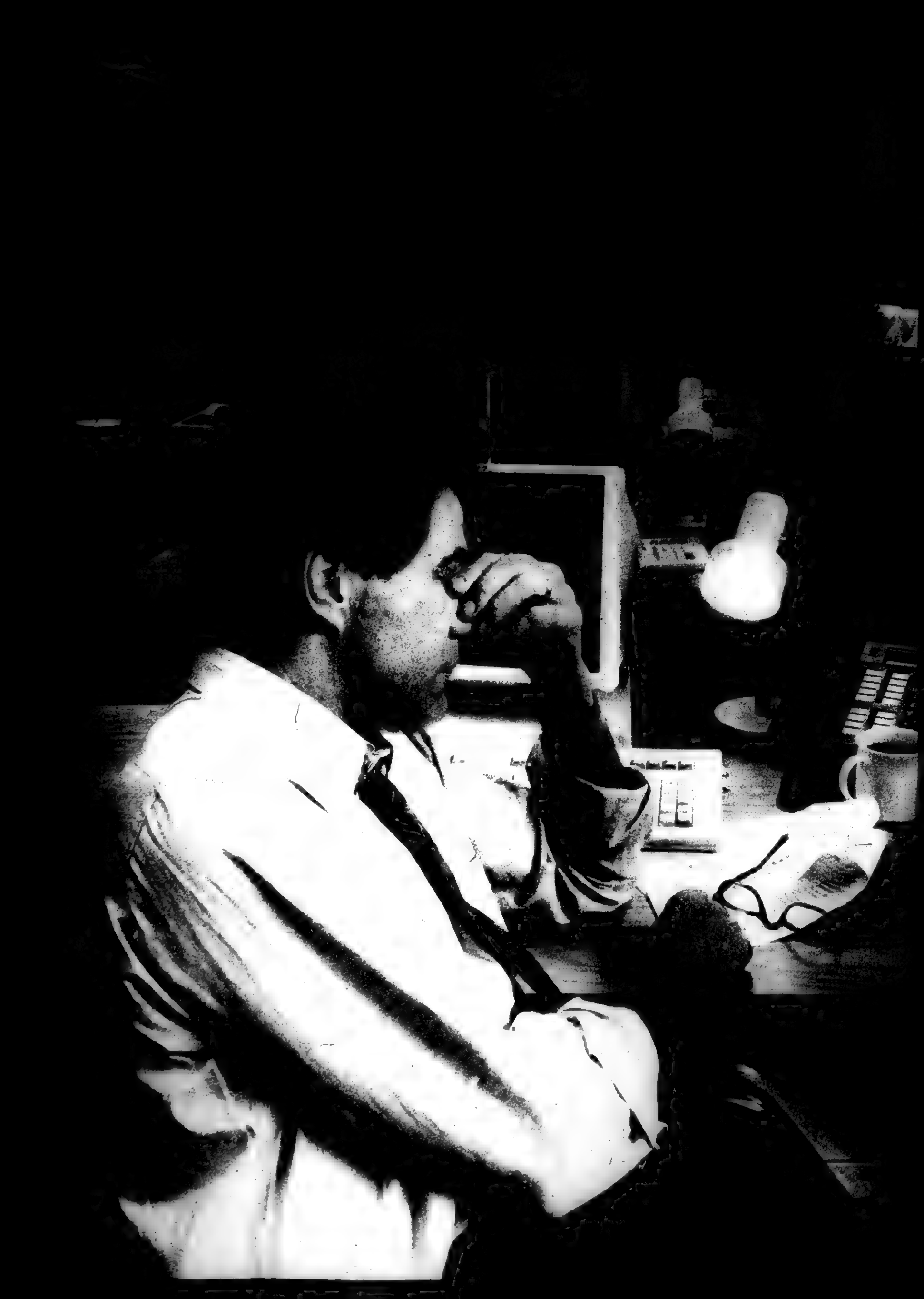
Bozman is *Computerworld*'s Midwest correspondent.



"It's 6:33 pm. The lines are down. And she's the closest thing I've got to a technician.

Meanwhile, I've got a sales guy here waiting to close a half-million-dollar deal, and he's screaming 'why didn't my order go through.' I have no clue. My technical staff is home watching the game. And all I keep thinking is whatever happened to that word reliability? If I could have anticipated the problem, at least I would have had a chance. As far as I'm concerned, somebody at headquarters better start talking to AT&T about getting a network management system. Or they can find themselves a new whipping boy.

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Shaking off

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written so that mainframes could share the information generated within these systems.

"Hospitals finally realized that they need to summarize all the information generated in different departments into a form that is easily digestible by hospital administrators," says Lee Portwood, director of health care operations at Atlanta-based Management Science America, Inc., a provider of medical software applications. "That's forcing a lot of hospitals to throw many systems into the trash and start over."

Words that once conjured up images of manufacturing or financial institutions are now being applied to the evolving hospital scene as hospitals strive to compete for patient care dollars.

Some of the words creeping

"THE KEY to automating hospitals is to look at where the transactions are taking place."

JOHN MEIER
ARTHUR ANDERSEN & CO.

into the hospital MIS manager's lexicon are "transparent interfaces" and "integrated data bases." These will come into play more in the 1990s as a new world of health care emerges — one in which islands of automation will be tied together through communications and common data bases.

Once the fundamental problems of communications and an integrated data base are solved, hospital MIS departments will have to turn their attention to absorbing new technologies. Bedside terminals, artificial intelligence and automation of many time-consuming nursing functions could become as commonplace as bedpans and plastic thermometers by the 1990s. But an infrastructure of real-time information systems that could support the load of all the data being created is far from falling into place.

"Like factories, hospitals have their own islands of automation," says John Meier, regional director of health care consulting at Arthur Andersen & Co.'s Chicago office. "We need to integrate these systems through networking and through the creation of common data bases. The key to automating hospitals is to look at where the transactions are taking place — whether they are at the admitting office, at the nurses' station or at the patient's bedside."

While the hospital of the future will not be built overnight, many large and mid-size hospitals — those with 300 beds or more — are already moving toward compatible systems and communications standards that will allow data to be collected and stored centrally.

No last-place finishers

Community hospitals, thwarted by fewer resources, may lag behind, but they needn't if the appropriate technologies are chosen, says Dr. Howard Bleich, one of the designers of the 4-year-old system at Boston's Brigham and Women's Hospital.

"The development of integrated hospital systems will require a consensus approach to computing within a hospital," says Bleich, a partner in the nonprofit Center for Clinical Computing, which supports systems at both Brigham and Women's and Beth Israel.

"We handle 3,500 pieces of electronic mail a day and handle 5,000 accesses of patient records each day at both hospitals," Bleich says. "And we do it by capturing the data as it is created, wherever it is created, throughout the hospital."

At Brigham and Women's, a single data base record is built step by step as a patient moves from the admitting office to his hospital room. The patient's treatment is tracked as he receives medical tests, and a universal record of his case is developed until he is discharged.

Behind the scenes is a central computer room of 12 DG computers, including Eclipse MV/10000s and MV/20000s, as well as older MV/6000s. This room, along with another at Beth Israel, is served by one computer services staff of 30 operations personnel and 30 programmers, Bleich says. This single-architecture approach is demonstrably effective, since it takes up just 1.5% of Brigham and Women's $275 million annual operating budget, Bleich says. This percentage is far lower than the industry average of 3% or more for DP systems. Patient billing results in payments within 90 days, down from the 175 days required before the system was installed in 1984.

But will this approach fly in other hospitals? Or will it be shot down by those unprepared to make the political concessions that precede the development of

Continued on page 69

Diagnosis with the touch of a finger

BY BECKY BATCHA

After six months in operation, the medical community's first commercially available on-line diagnostic system, DXplain, is winning some praise, taking some knocks and receiving important constructive criticism from doctors who dial in to use it.

"Fantastic. I love it," one physician writes, using an electronic mail feature that DXplain provides.

"Go fish," writes another.

"There was no [system] awareness of iatrodectism [poisoning due to the bite of a spider]," says a third correspondent, adding that "black widow spider bites are common."

Dr. G. Octo Barnett, the system's main developer, sifts through the comments in his office at Boston's Massachusetts General Hospital, where he serves as director of the laboratory of computer science. Barnett takes the praise to heart and shrugs off the criticism, then moves without pause to add spider bites to DXplain's knowledge base of 2,000 diseases and 4,700 symptoms.

Batcha is a free-lance writer based in Boston.

The ability to accept new information from one user and distribute it immediately to others is DXplain's most vital feature, Barnett says. Within three or four days of his addendum, any of the 8,000 doctors who subscribe to the American Medical Association's AMA/Net on-line service will be able to dial up DXplain and learn that a patient exhibiting a puzzling set of symptoms might very well have been bitten by a black widow.

DXplain is a sophisticated decision support program that matches a doctor's observations about a particular patient against its broad knowledge base of symptoms to generate a list of diagnoses that the doctor ought to consider. Unlike most expert system diagnostic tools, which rely on symbolic logic, the program uses straightforward probability and ranking schemes to reach its conclusions.

Barnett and his colleagues at Mass General wrote DXplain in the MUMPS language, which they developed in 1967. They run the system in-house on a cluster of Digital Equipment Corp. VAXs. The AMA helped fund the programming project and continues to support DXplain with a robust marketing effort.

Logic, not reason

Whereas other diagnostic expert systems try to mimic the thought processes a human expert uses to reach a decision, DXplain seeks only to link symptoms with associated diseases. The system can give users suggestions that any doctor with a very good memory might offer to a colleague. "It doesn't have the slightest idea of why," Barnett says.

By leaving out the reasoning behind a decision, DXplain's developers removed an obstacle that has prevented similar tools from reaching the offices of practicing physicians. Diagnostic expert systems typically advance beyond the prototype stage only after many years of fine-tuning — if ever. DXplain, on the other hand, became commercially available within 1½ years after development work began.

Barnett says it will take at least a year of feedback from users and upgrades by Mass General's technical staff to bring the

Continued on page 66

Medical expert systems and diagnostic tools

A sampling of ongoing work

System	Institution	Specialty	Status
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	National Library of Medicine	[illegible]	[illegible]
[illegible]	Yale University	[illegible]	[illegible]
Congestive Heart Failure Program	[illegible] Regional Medical Center	[illegible]	[illegible]
DXplain	Massachusetts General Hospital/ [illegible]	[illegible]	[illegible]
HELP (Health Evaluation through Logical Programming)	LDS Hospital/ University of Utah	Monitoring and diagnosis; gives alerts to doctors; suggests treatment	Running 10 years
NT-Attending	Yale University	Critical care; [illegible]	[illegible]
Internist-1/ QMR	University of Pittsburgh	General internal medicine	[illegible]
Oncocin	Stanford University	Chemotherapy for cancer patients	Used [illegible]
Pathfinder	Stanford University	[illegible]	[illegible]
Puff	Stanford University	[illegible]	[illegible]
Reconsider	University of California/ [illegible]	[illegible]	[illegible]

CW CHART

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Hayes

Diagnosis

CONTINUED FROM PAGE 64

system to the point at which he feels satisfied with its operation. But, he says, this period of give-and-take is part of the plan.

Like MUMPS — an inelegant language that can nevertheless piece together a prototype in no time — the DXplain project rests on Barnett's conviction that the best way to develop an application is to let users suggest changes. "The whole idea is to get them to respond and react to something they can put in their hands — rather than a piece of paper," he says.

By offering DXplain over a nationwide network, Mass General and the AMA are bringing hundreds of minds to bear on the project. Between 10 and 20 comments come in every day from doctors who use the system, multiplying the knowledge of the 13 physicians who served as advisers during the development.

Memory shaker

One of the system's most enthusiastic users is Dr. John Ring, a general practitioner from Chicago who serves as vice-chairman of the AMA's board of trustees.

Ring began using DXplain last summer and now turns to it three or four times a week for help with cases that stump him. He says DXplain jogs his memory the way a good medical text would, calling his attention to diseases he might not have considered. "It is not a doctor in a box, though," he says. "It doesn't make the diagnosis for you."

Users gain access to DXplain by dialing in to AMA/Net, which is marketed by Softsearch, Inc. in Abilene, Texas, and operates primarily through Compuserve, Inc.'s Compuserve Information Service. Membership in the network costs $55 for AMA members, $75 for nonmembers, and DXplain usage fees run to about $40 per hour. A typical session lasts 15 to 20 minutes.

A DXplain session begins with a prompt that requests a patient's age, gender and symptoms. The doctor enters the physical manifestations of the disease, the results of laboratory tests and similar observations; then the system goes to work. Within less than 30 seconds, DXplain searches its data base for matching terms and responds with a list of possible diagnoses, ranked in order of likelihood.

Using menu-based commands, the doctor can then work to clarify the findings. He can, for example, enter additional symptoms, request more information on some of the diseases listed or ask why a particular diagnosis ranks where it does. To justify a diagnosis, DXplain lists all of the patient's symptoms that support the diagnosis; it also lists additional symptoms the doctor might expect to uncover.

DXplain's ability to explain itself is among the system's most important features, according to Barnett, since developers of diagnostic systems have found through the years that doctors will not accept any findings on faith.

Indeed, Dr. Randolph Miller, whose Internist-1/Quick Medical Reference project at the University of Pittsburgh School of Medicine is one of the most highly regarded expert system efforts in the nation, explains that physicians are accustomed to judging information according to the credentials of its source.

Because they cannot tell whether a computer program takes its cue in any particular case from a brilliant diagnostician or a resident fresh out of school, doctors demand elaboration, Miller says. "What you need is a way of saying, 'Is this a bright idea or nonsense?' "

> "IT [DXPLAIN] is not a doctor in a box. It doesn't make the diagnosis for you."
>
> DR. JOHN RING
> GENERAL PRACTITIONER

Another of DXplain's distinguishing features is its broad scope. Most diagnostic software restricts itself to an extremely narrow area of expertise.

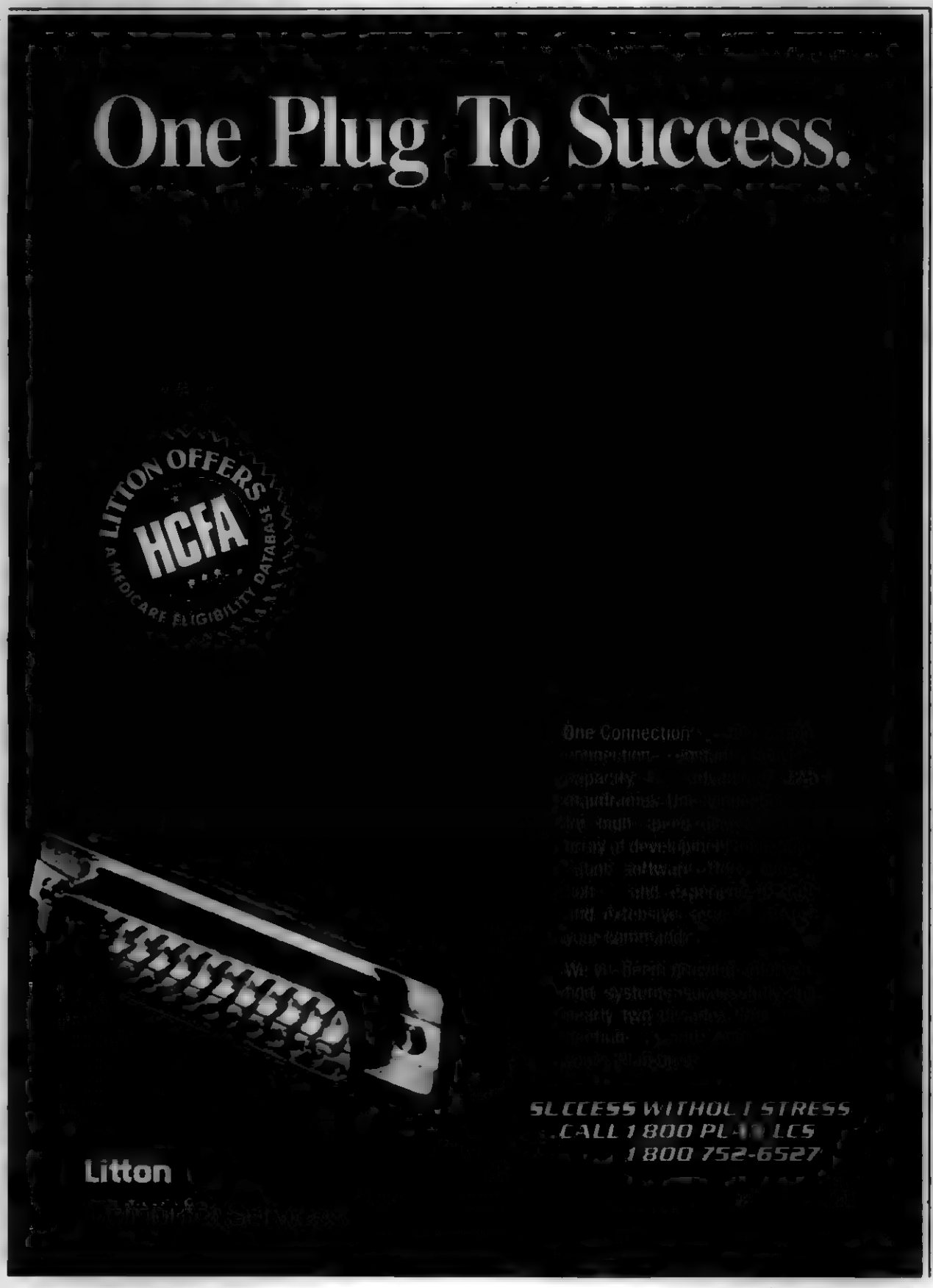
The feature that people in the medical community praise most, however, is the system's practicality. No other software comes close to entering the working physician's life on anywhere near the same scale. As the first widely available diagnostic system of note, Miller says, DXplain marks a milestone in medical informatics.

While a boon to many in the medical field, the system is not without drawbacks, as Barnett is quick to note. For example, although its broad knowledge base appeals to general practitioners, the knowledge is not deep enough to help specialists in any one field. More critically, the system cannot handle causal relationships between symptoms and diseases.

In addition, DXplain's vocabulary needs to grow so the system can understand most of the clinical observations that doctors describe, Barnett says. It currently fails to accept about 10% of all input. DXplain also must be able to recognise more psychological symptoms and diseases and more laboratory test results.

Still, Barnett says Mass General and the AMA have taken the proper approach. By putting something in doctors' hands — even something with gaps and imperfections — he and his colleagues have helped advance the state of the art.

Barnett says he cannot quite imagine what shape DXplain will take once users' suggestions whip it into its final form. "But," he adds, "I'm sure we're on the right trajectory." ●



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INTERVIEW

CIO writes MIS Rx

Are CIOs destined to play a role in the new lean-and-mean health care industry? Yes, says Michael Carrico, American Medical International's chief information officer, but only if they use information systems to meet business goals.

Michael Carrico is a member of an elite management group. He is a CIO in the cost-conscious health care industry. Carrico, as senior vice-president and CIO of American Medical International, Inc. (AMI), is responsible for providing information services to about 45,000 employees in more than 100 hospitals worldwide.

Carrico, AMI's first CIO, joined the company in June 1987. By his own admission, he has no health care background, which he says has been an asset. He does claim a solid set of general management skills and a technical background of 25 years spent providing information system services.

Carrico embarked on his DP career as a computer operator on the night shift, working his way to a degree in economics at the University of California at Los Angeles.

He went on to earn an MBA in finance, work for Douglas Aircraft Co. and start his own business. He came to AMI from Compass Computer Services, Inc. in Dallas, where he was president and chief executive officer for five years.

As CIO of Beverly Hills, Calif.-based AMI, Carrico also holds the title of president of AMI Information Systems Group, Inc., a wholly owned subsidiary. Originally, the subsidiary provided information services to independent health care companies as well as to AMI hospitals. As Carrico came on board, however, the company divested itself of outside interests and is now responsible for providing services solely to AMI's hospitals.

The CIO has overseen a streamlining of the information systems staff and is currently examining the relationship between fundamental information services and AMI's business plan. He recently spoke with *Computerworld* New Products Editor Suzanne Weixel about the role of the CIO in the health care industry.

Why did AMI decide to appoint a chief information officer now?

In the past, the information systems orientation was toward technical people fulfilling technical needs. Today, the goal is to provide systems that are determined by business requirements. The need arose for someone to manage the Information Systems Group [ISG] and to report directly to the chief executive officer.

When the company decided to stop providing information system services to outside hospitals and to focus on internal systems, the decision was made to bring in someone involved in the information systems area who could also be involved in the general management of the company.

AMI is in the health care business, not in the systems development business, so the plan was to make ISG a bona fide service group, its main mission being to support AMI's hospitals. The CIO is a fairly new position all around, as is the reporting relationship it presents.

I am one of five people reporting directly to the chief executive officer. The direct access from information systems to the CEO is revolutionary.

Considering your background, what qualifies you to be a CIO in the health care industry?

A qualified manager can bring the necessary information systems expertise to any industry. If you are capable of determining what you need to know and then bringing your information systems expertise into the context of the business, then you can be effective at the top level of management anywhere.

What specific knowledge does a CIO need to bring to the health care industry?

You've got to have an awareness of how difficult a business environment it is. We are currently in an overcapacity situation, meaning that well into the next century there are going to be more beds than there are patients to put in them.

There is also enormous pressure coming from both the public sector — the Medicare area — and the private sector to bring costs down.

So, although other industries are in competitive situations, ours is in an extremely difficult position as well.

To remain competitive, we not only have to continue to provide the best quality of care possible, we also have to bring costs down. It is absolutely imperative to be a well-managed company in order to make it.

It's a very tough business, but when you look forward to the 1990s and see the size of the piece of the gross national product pie that health care represents, it is a very exciting business to be in.

How does information system services contribute?

The most significant contribution is making sure that the things we do are practical, realistic and supportive of the business. That's where a CIO fits in. The CIO is able to keep the information systems business in perspective with the general company business.

Because of such factors as increased competition and cost-containment measures, the ways we traditionally used to manage the health care business are being challenged.

In the past, I don't think systems were always integrated with the overall business plans. AMI has been a successful health care company — it was the founder of the health care chains back in the '60s — and it's always been profitable. Now, the lack of system integration threatens to catch up with us.

Throughout the industry, companies are becoming so concerned about the costs and risks of developing information systems that if it is possible to buy rather than develop them, they're going to buy.

That's a departure from the norm. I believe that, in the next few years, we will be buying a new information systems architecture to replace our old in-house-developed applications systems.

As a newcomer, are these ideas ones you brought in from outside the health care industry?

The view to buy rather than develop is something I put forward as the rational way to manage the information systems business.

Michael Carrico

ALAN WYSCHOGROD

Senior management agreed and endorsed it as a philosophy to follow wherever practical. I think we can put the software in place faster that way; there's less risk, and we can do it for less money. It makes sense.

What is next for a CIO? Is there a future for the position?

A good CIO is someone with broad management experience. The CIO is just as logical a candidate to become CEO as anyone else in the company. Of course, we'll have to earn our way.

So much of it depends on the individual — your charisma, what kind of manager you are, how effectively you can present your ideas.

As people from information systems become CIOs and achieve a senior management reporting relationship, they will have the opportunity to be judged in the same context as their senior management peers. Then it's just a matter of time and circumstance. ●

Shaking off

CONTINUED FROM PAGE 64

the unified system?

It is important to note that Brigham and Women's computer architecture hinges on some very critical primary conditions. Among these are that there is no separate computer for patient billing (the IBM mainframe was removed several years ago), that every department agreed to use DG-based applications, maintained by a central programming staff, and that data is spread around the institution for easy access by nurses, doctors, technicians and administrators alike.

"Typically, the fiscal system is doing nothing to support end users and patient care, and we don't have a separate fiscal system," Bleich notes. Just one-third of all computing time now goes to fiscal applications; yet user interfaces and their maintenance are just as important, Bleich asserts:

"We believe that computer systems must fit functionally with what the end user does and that ease of use is inversely proportional to the thickness of the user manual," he says.

"WE ARE automating every aspect of the hospital as we try to get our costs down and keep our quality level up."

FRED PIRMAN
HUMANA, INC.

Remarkably, there is no user manual at Brigham and Women's. Instead, supervisors work with MIS to revise screen formats and then pass on information about user access methods directly to end users. Practice sessions in which fake patients are admitted, treated and discharged are used to train new personnel in the computing techniques.

Such a system may be unique in its details, but other hospitals are beginning to build their own systems with similar goals.

"The whole notion of using information systems for competitive advantage is beginning to take hold," says Mark Gross, national director of Health Care Information Services at the consulting firm of Ernst & Whinney in Cleveland.

Why didn't hospitals automate earlier, joining their manufacturing colleagues in gearing up for communications standards and common data bases?

Gross, a longtime observer of the hospital scene, offers a simple answer: "Before the federal cost guidelines came in, hospitals were reimbursed for their costs, so there was no incentive for them to integrate their computer systems."

HCA's move to link all its departmental Towers was first instigated by user requests. According to Terry Armstrong, assistant vice-president of client services for HCA's Information Systems group, "Our users said that these stand-alone systems should talk to each other so that they wouldn't have to re-input data from one stand-alone system to another."

But HCA, according to Armstrong, doesn't believe hospitals need a shared computing environment. "Each department [including laboratory, nursing, radiology, order/entry and pharmacy applications] is a separate production unit, with separate applications supporting its activity," Armstrong says.

Physicians, however, may tap into HCA's Towers or the central site mainframes through a prepackaged IBM Personal Computer AT that has been modified with software from HCA. The PC is installed at physicians' offices to allow the doctors to track their patients' hospital stay.

However, a central mainframe site in Nashville, housing an IBM 3090 Model 200 as well as three IBM 4381s for development and testing, serves the entire HCA system.

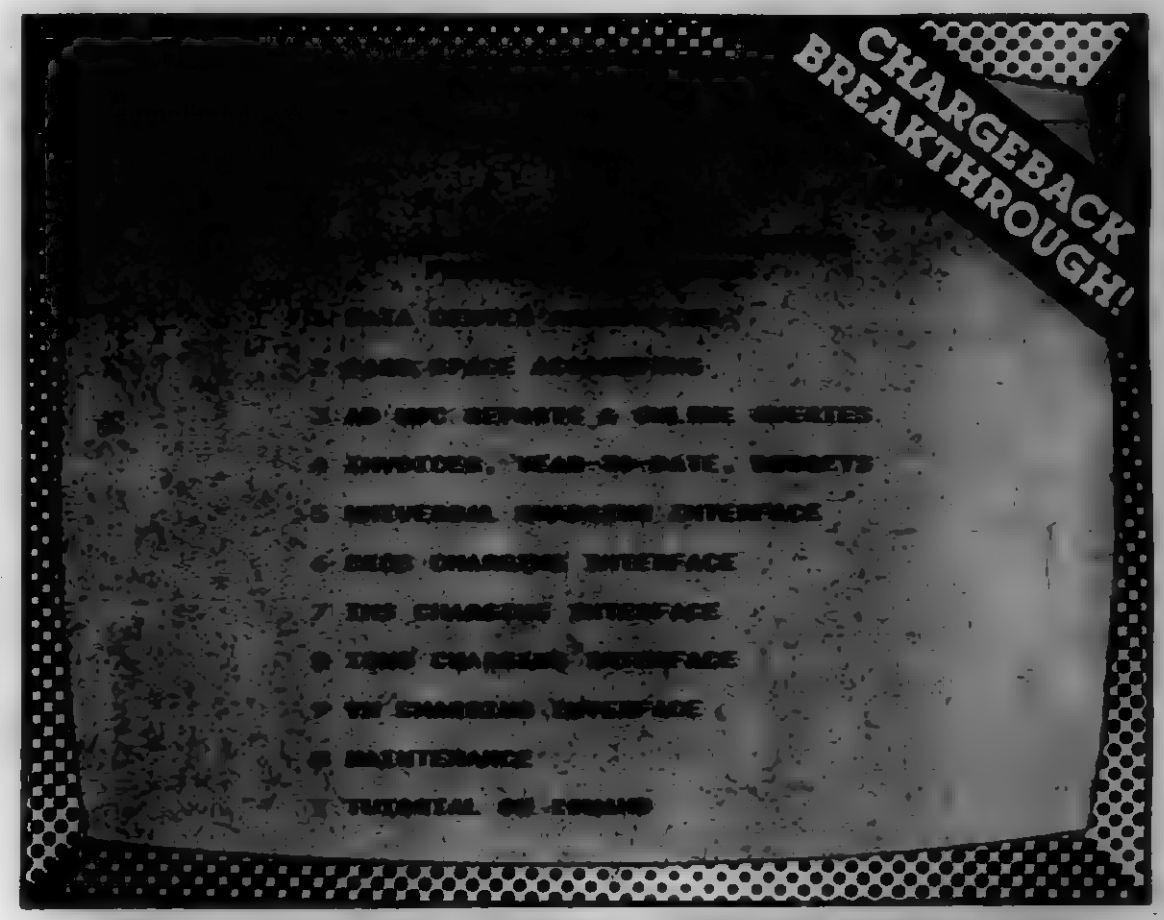
Once all the stand-alone Towers are networked through the Hlink software, Armstrong said, each department will be able to update a centralized data base maintained at the central Nashville site.

Making the transition

The transition to the integrated health care systems of the 1990s need not be abrupt, and hospital MIS managers need not be pioneers. Questions about communications standards have already been answered by international standards like Open Systems Interconnect and Manufacturing Automation Protocol/Technical and Office Protocol. New kinds of relational data base structures are also available, and artificial intelligence is fast becoming a reality.

Bedside terminals are becoming a

Continued on page 74



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So after very careful consideration, Jewish Hospital converted to Financial, Human Resource and Materials Management software systems from Management Science America, Inc.

"Initially, we looked at 15 software companies," said John McGuire, executive vice president of the hospital. "In making our evaluation, we considered solicitations and talked with the users of various systems. We then considered five finalists who gave presentations. Then we narrowed our choice down to two, and ultimately went with MSA."

Why MSA over all the other software companies?

"User satisfaction with their products," was one of the reasons McGuire cited. "Also, MSA's customer service reputation was very good. We feel we made the right choice by going with MSA."

Now that MSA and Jewish Hospital are working together, the hospital is integrating its operational and financial information. According to McGuire, "MSA is helping us take better care of the business side of our hospital...and that lets us take better care of our patients."

If you would like to know more about what we're doing for Jewish Hospital, or what we can do for your business, contact Robert Carpenter in Atlanta at (404) 239-2000.

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Optical disk systems sharpen X-ray image

BY BARBARA SEHR

A picture may be worth a thousand words, but a computerised image of a spinal cord or heartbeat produced by today's generation of ultrasounds and other radiological devices is likely to use up a full megabyte of storage space.

As a result, these images are usually stored on special photographic film and viewed by doctors in much the same way as photographs of a vacation trip. But recent strides in medical imaging technology promise to change the old ways of reading X-rays and other images.

Until recently, computer storage and display technology has been slow in keeping up with the image-gathering devices hospitals commonly use.

A new generation, however, of optical storage systems, image display terminals and software is advancing the versatility of these recording devices. Image storage on optical disks provides users with instant access to the pictures from one central source. Rather than have photographs scattered in different doctors' offices, a hospital network can provide image access to many different doctors at the same time.

Using advanced display systems, these images can be manipulated and refocused. In addition, three-dimensional images can actually bring out detail never before seen by medical technicians. In the most recent advance in software, images can be sent by satellite from remote sites for examination by top radiologists in large medical centers.

> HEALTH care "is a logical place for optical storage. There is a lot of information to be stored and a definite need to preserve it."
>
> RICHARD FISHER
> KALTHOFF-FISHER
> ASSOCIATES, INC.

Health care "is a logical place for optical storage," says Richard Fisher of Kalthoff-Fisher Associates, Inc. in Los Gatos, Calif., and a consultant on imaging for The Yankee Group in Boston. "There is a lot of information to be stored and a definite need to preserve it."

While medical imaging is still a very fragmented and small part of optical storage, pioneers in what is now known as picture archiving and communications systems (PACS) are beginning to spend money to advance the technology's cause.

One sign of increasing interest is an annual conference on the technology scheduled from Jan. 31 to Feb. 5 in Newport Beach, Calif. The conference is sponsored by the International Society for Optical Engineering in cooperation with the American Association of Physicists in Medicine, the American College of Radiology and the Center for Devices and Radiological Health.

The technology recently received a boost from Digital Equipment Corp. when the company announced a joint effort with Siemens Medical Systems, a health care OEM. Under the agreement, DEC will supply VAX processors for Siemen's PACS, along with networking software that will allow the PACS to send the digitized images throughout a network.

A spokesman in DEC's health care industry group says the networking software is the key to the agreement. "The health care community is beginning to recognise that there is more to PACS than hardware," he adds.

DEC is also recognising the importance of PACS through a $100,000 equipment grant to the Malincroft Institute Radiology Center at Washington University in St. Louis. The Malincroft Institute research is one of several PACS demonstration projects now under way, some partially funded by the federal government through the Department of Health and Human Services.

One of the largest projects is funded in part by the National Cancer Institute at the University of California at Los Angeles's (UCLA) medical school. The project began with the conversion of the school's pediatric radiology department to an optical disk-based image storage system. Ultimately, all radiology images at the huge 750-bed teaching hospital will be recorded on an optical disk archiving system developed by Filenet Corp. in Costa Mesa, Calif. When completed, it will enable doctors to look at and manipulate digital images on an imaging system.

The pediatric radiology section at UCLA produces some 209M bytes of images each day. Filenet's optical system stores all of this data on only 29 optical cartridges per year. Because of the experimental nature of UCLA's system, all images are backed up on a second cartridge.

Image display systems, like the one used at UCLA, have taken a quantum leap from the fuzzy, two-dimensional black-and-white displays commonly seen on "state-of-the-art" ultrasound equipment in most U.S. hospitals. Images on present-generation display systems can focus deeply into a spinal column, freeze an area and rotate the image until imperfections are detected.

Software developed for medical imaging systems by William Barrett, an assistant professor of computer science at Brigham Young University in Provo, Utah, allows the images to be rotated on a central axis in real time — meaning doctors no longer need to wait until a film is developed to see an animated rotation of an X-rayed image. "This rotation brings more information about depth [of a captured image]," Barrett says.

Locating the source

According to one vendor, patients have already enjoyed pain-saving results from the emerging technology. Stephen J. Weiss, executive vice-president of Virtual Imaging in Sunnyvale, Calif., recalls one such patient success story.

In this case, a woman complained of severe back pain. Tests using 2-D radiology images suggested the patient undergo delicate surgery. However, even after the operation, the patient still complained about the pain.

Finally, doctors examined images of her spinal chord using Virtual Imaging's system with 3-D imaging capability. The rotation of her spinal chord image detected a microscopic calcium spur. The spur was removed, and the woman's back pain ended. "Ordinary X-rays would never have located the problem," Weiss says.

In another demonstration of PACS, the University of Pennsylvania Hospital in Philadelphia is sending images from a remote diagnostic clinic, located 25 miles from the main hospital, for examination by radiologists at the university.

"It means we don't have to send a radiologist to the clinic to review images and make a diagnosis," says Sridhar Seshadri, lead engineer of the university's PACS project.

The software making the transmission project possible was written at the university, completely overhauling the front end of a Virtual Imaging terminal. The university buys bulk transponder time from a satellite transmission wholesaler.

The primary workhorse monitor of UCLA's system is a Gould, Inc. IGD IP8500 image processor with its own 20M-byte internal image memory and a 1,000- by 1,000-bit resolution. A third monitor being tested is a 1,900- by 1,900-bit resolution Mitsubishi Corp. radiographic review station that has an internal image processor.

Dr. Nicholas J. Mankovich, assistant professor in the Department of Radiological Sciences at UCLA also found "the Mitsubishi terminal to be the best for patient diagnosis." The hardware for the UCLA project was put in place with the installation of a computed radiographic system in September 1985 to create digitized images. The optical archiving system and manipulation monitors were added in the summer of 1986. The entire system is operated on a fault-tolerant basis: Everything in the system is redundant.

In addition, radiological images are still created and stored in the old-fashioned way — on film. "We're still operating in parallel," Mankovich says. "We haven't pulled the plug on the old system yet."

Nevertheless, midway through the evaluation, Mankovich seems assured that his picture archiving and communications system will set the tone for installations in large hospitals across the country. •

Sabir is a free-lance writer based in Seattle.

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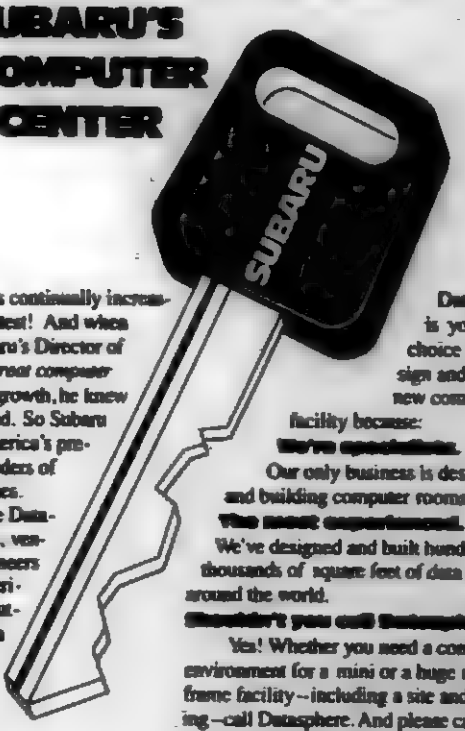

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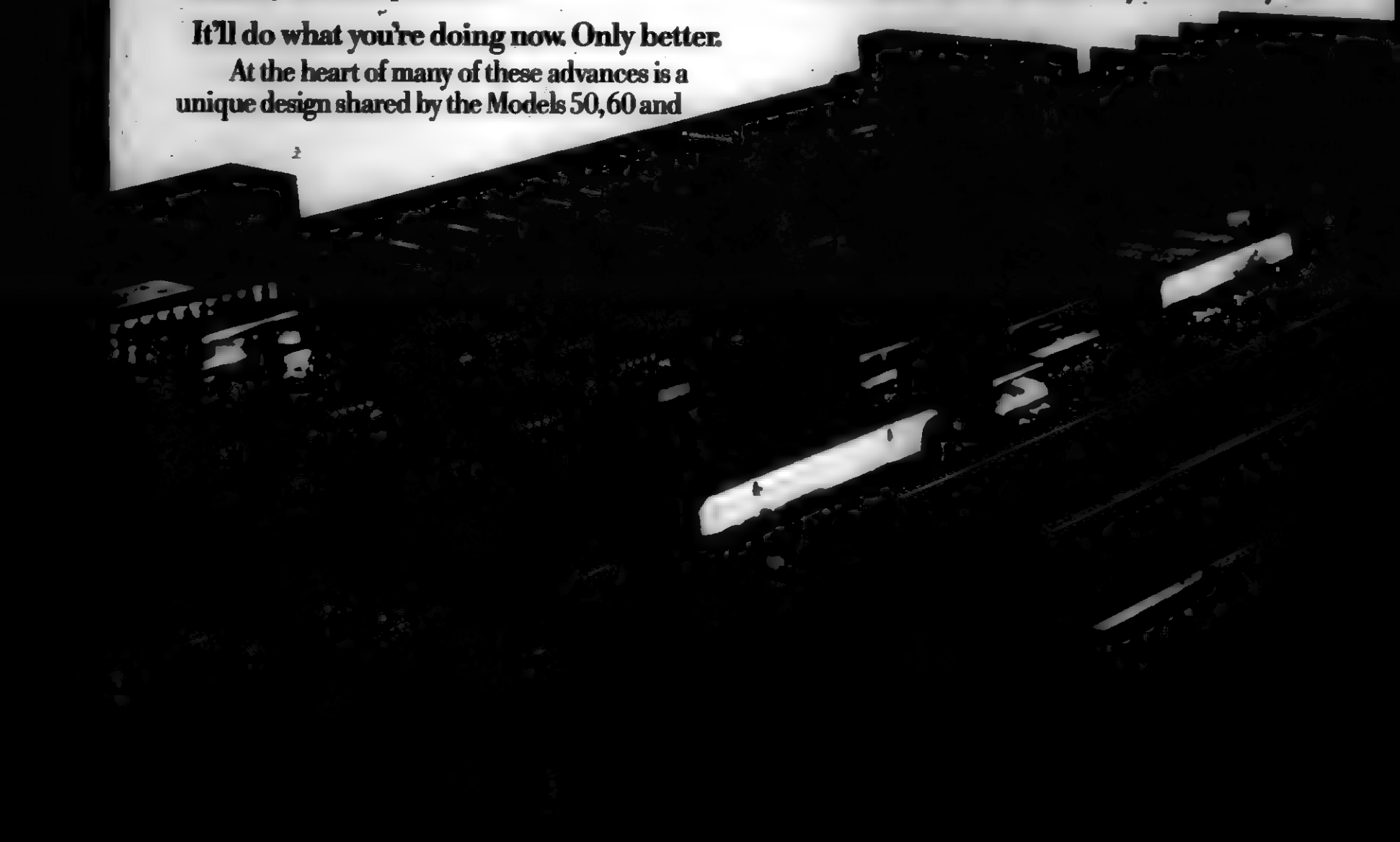

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Shaking off

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reality at a handful of institutions, including Humana, Inc., the Louisville, Ky., operator of more than 400 hospitals throughout the U.S. Physicians' systems, based on IBM Personal Computers, are also being developed as a way to keep doctors on-line with Humana patient care systems.

At Humana, two large IBM mainframes, a 3090 Model 600E and a 3084, handle the bulk of the administrative work, says Fred Firman, senior vice-president of information systems. However, the company is reworking the way in which departments are automated.

"We are automating every aspect of the hospital as we try to get our costs down and keep our quality level up," Firman says. "We are automating processes that are not even touched by the mainframe, such as insurance and laboratory applications."

Humana, which operates 85 hospitals throughout the nation's Sun Belt states, including California, Florida and Texas, is in the middle of a three-year phased implementation of DG-based systems. The new systems, based on MV/6000, MV/10000 and MV/20000 superminicomputers, track patient care throughout Humana's managed hospitals.

The health care company is also marketing a personal computer-based physician system that allows referring doctors to access electronic hospital files at Humana-run hospitals from the comfort of the doctors' offices. Some observers say the hospitals that develop such links with physicians' offices are really ensuring a continued cash flow through repeat business.

Making it simple

As the largest of the for-profit hospital corporations, Humana is a trendsetter. But large, independent hospitals of 600 beds or more, as well as mid-size 300-bed hospitals, are already looking for ways to bridge the unrelated computer systems under their supervision. At Community Hospital of Indianapolis, the focus is on simplifying a complex computing situation that developed in the last 15 years.

"At one time, departments selected software applications first and then bought the hardware to support them," says Martha Roth, assistant director of information systems at the Indianapolis hospital. "That blossomed to the point where we had 13 different computer systems. We did interface them, but operationally, it was costing us a lot to do that."

Now, the trend is moving toward a smaller number of systems, including several Tandem systems to handle patient care and one IBM mainframe to handle financials. Roth says the Tandem system, which has grown in size in recent years, lends around-the-clock uptime to the hospital applications.

"You don't have to take the machine down for backup," she says, "and all our disk drives are mirrored." This means that even if one of six production Tandem CPUs fails, the data is never lost through a cold start. Other Tandem processors are used for testing and developing new applications.

As the revolution in hospital systems continues, there will probably be more fault-tolerant transaction processors, like Tandem's, on the scene. At Eisenhower Medical Center in Los Angeles, four Tandem applications cover most hospital information needs, says Jo Carol Conover, health care industry marketing manager at Tandem in Cupertino, Calif.

"Hospitals really have a need for features like on-line transaction processing," she says. "Theirs is a business that never stops. There is no third shift when it's all right to take the system down."

Tandem systems are used in three ways in the hospital, Conover says: to drive a backbone network that binds departmental systems and remote locations together, as a host for integrated applications and as a stand-alone system for laboratory, pharmacy or radiology applications.

Try it out

Whatever their design, the success of any changeover to new-wave hospital systems will be dependent on MIS's willingness to give new things a try.

"Hospital environments are among the most complex computing environments there are," Conover says. "It's very hard to get people to throw out old systems, especially when they've developed in-house applications to run on those machines." This is why Tandem has to work with consultants and third-party software vendors to develop and market new Tandem-based hospital systems.

Martha Roth

The potential for growth is great, however. According to Conover, Tandem maintains that health care will be one of the company's fast-growing new application areas. In 1987, Tandem gained 26 new customers for its U.S. hospital installations to bring the total to 90.

Whatever the system, end users must be brought into the process if new hospital systems are to succeed. At the University of Missouri-Columbia Hospital and Clinics in Columbia, Mo., nurses are beginning to work with bedside terminals and IBM PC-based applications to customize treatment plans for patients.

"We have a couple of departments that use the new systems all the time," says Lois Nauert, coordinator of nursing information systems. "Some nurses love the systems and would hate it if anyone talked about taking them away." Others are not yet comfortable with the technology, she says, and do not tend to use the systems very much.

The future may have already arrived on some wards of the Missouri hospital, judging from the degree of end-user acceptance. In four of the 20 nursing units, nurses use the bedside systems to create and print medical charts. "The nurses in those units are using the bedside systems to calculate intravenous drip rates and to track a patient's temperature," Nauert says. "They're so glad they don't have to handwrite those patient charts that they've thrown away their pens and paper." ●

Seizing the software market

Seizing an opportunity of major proportions, hardware and software vendors alike are rolling up their sleeves and digging into the medical market. They are preparing applications that meet the new federal reimbursement requirements for medical procedures and writing communications software to tie disparate departmental systems together.

IBM, the market share leader in hospital and health care systems, is reportedly hiring heavily in the Atlanta area, preparing new rafts of medical software to sell. Tandem Computers, Inc., while not selling directly to end users in hospitals, has arranged to make sales of its fault-tolerant equipment through third-party systems integrators like McDonnell Douglas Health Systems Co.

Digital Equipment Corp. and Data General Corp., both strong in laboratory, pharmacy and radiology systems, are trying to leverage that strength into the financial area, once dominated by IBM and the former Burroughs Corp., now part of Unisys Corp.

IBM's Patient Care System and the Burroughs Hospital Information System are the two most firmly entrenched integrated hospital applications. Both combine patient billing with patient care records, allowing administrators to ask "what-if" questions about patient care and its relationship to cost.

"IBM is dominant on the financial side, while DEC is dominant on the clinical side," observes David Rousseau, vice-president of marketing and planning at McDonnell Douglas Health Systems in St. Louis.

McDonnell Douglas, which runs one of the two largest remote data processing operations for hospitals (Shared Medical Systems Corp. in Philadelphia runs the other), is writing new stand-alone hospital applications that clients can use if they decide to drop the remote processing service. Shared Medical Systems is also developing stand-alone systems for its mainframe hospital applications.

The target market for all these systems is hospital information systems managers at hundreds of the largest institutions among the U.S.'s 5,800 hospitals.

JEAN S. BOZMAN

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Tangible losses

How to shape an information policy that won't let data slip through your fingers

BY JAMES SCHWEITZER

Ask almost any business executive, "Who manages your information resources?" and you will hear "I don't know," "We've never thought about it" or "The systems manager."

Despite the real and increasing threat of information exposure or loss, many companies ignore the risk. In survey results published in August 1987, *Computerworld* reported that less than 16% of banks, less than 8% of financial services businesses and less than 5% of manufacturing businesses invested in encryption or port control systems for their networks.

Such data is not conclusive by itself, but it implies that many companies today do not adequately protect their business information. Considering the investment most companies make in information — IBM spends 7% of its sales revenue on information systems — it is strange that so many information executives today spend their time just trying to control data processing costs.

I recently heard about two employees whose job it was to destroy documents from "burn boxes" — repositories in which confidential documents are placed to prevent them from ending up in the public trash system.

The employees, who were janitorial-level workers, made a practice of carefully reading each document before throwing it into the shredder. They apparently had been given no sense of the purpose of their job, which was precisely to prevent such casual perusal by people with no need to know.

ANTHONY RUSSO

Case studies

Information losses can be considered from four viewpoints:

- The circumstance of loss or exposure.
- The identity of individuals stealing, destroying or observing the information.
- The medium (mental, written or electronic) involved in the loss or exposure.
- The value of the information.

Consider some actual cases:

Case 1: The inside job. During labor contract negotiations, managers of a brewery in the UK were surprised to find that union negotiators knew details of the company's financial situation and business plans. The brewery traced the information leak to a data center employee who had been taking printed reports home. The employee had found a customer for the information — the union — and had been making additional income by delivering copies of certain business reports.

Circumstance: Purposeful exposure by an insider.

Identity: Trusted insider.

Medium: Printed report.

Value: High subjective value.

Was there an active program in effect to identify valuable information and train employees about how to handle and protect it? Were supervisors aware that information processed was private to the company? Did anyone

---

Schweitzer is systems security technology manager at Xerox Corp. in Stamford, Conn. He has written five books on information security, including *Computers, Business, and Security* (Butterworth Publishers, 1987) and *Protecting Information in Local Area Networks* (Butterworth, 1988).

• Who keeps your information safe?

• A high-level responsibility

• Dealing with data on paper . . . still

check employees leaving the building to see what they might be carrying out?

Case 2: Electronic leaks. An engineering employee at a well-known computer manufacturer used his network connections to compile a detailed technical description of a new product. A portion of the material was then published in a technical journal, exposing the company's sensitive strategic thrust.

Circumstance: Insider passed information to an outsider.

Identity: Trusted insider.

Medium: Information in electronic form.

Value: High subjective value.

Did the network have sufficient security for the information files that were accessed to assemble the description? Was the originator of the description aware of the data's sensitivity? Had management made clear that such distribution of strategic technical data was regarded as a serious breach of regulations?

Case 3: Leaving no trail. A clerk taking telephone orders for "ABC Corp.," a wholesale distributor, discovered orders could be placed, without her being identified as the originator, for a false address by passing information to an accomplice on customer credit. The clerk's boyfriend rented a truck and picked up orders set up on the warehouse dock. In several months, the two stole thousands of dollars worth of merchandise.

Circumstances: Insider passing data to outsider.

Identity: Trusted insider and untrusted outsider.

Medium: Verbal information via telephone.

Value: Moderate subjective value.

Were customer credit records properly controlled? Was clerk record access justified and the transaction recorded?

From these cases we see that information loss or exposure resulted from two common failings: First, management had not identified, or had not provided suitable protection for, valuable information. Second, employees were not properly screened, trained or motivated.

ENSURING that quality information is provided for business operations is not a one-shot deal or cursory effort.

Up to par

We know that quality information is essential to businesses today — but what, in fact, is it?

Quality information is information that meets management requirements for integrity, reliability and privacy. These characteristics are achieved through the proper management and control of the information resource.

Specifically, quality information results when the following goals are achieved:

- Information is properly identified, classified and managed as an important resource.
- Information systems and manual information procedures are correctly designed, installed, maintained and audited.
- Employees are suitably trained and supervised.
- Controls and separation of duties are established that are appropriate to the information's value.
- Information security is provided based on established policies covering classification and handling.

Ensuring that quality information is provided for business operations is not, therefore, a one-shot deal or cursory effort. Rather, it is a result of carefully planned management efforts that involve almost all aspects of business operations.

Information directives

Managing information is a broad, high-level responsibility involving strategic planning. And management must create a structure of information directives to ensure its control.

The highest level directive of this kind is an information policy. This document briefly spells out management requirements for identifying and controlling valuable information. The policy should cover all important aspects of the subject matter. Most of the ineffective policies I have seen failed because management did not recognize that all information — not just computer-processed information — must be protected. The same data often appears on both typewritten reports and computer printouts. What value is gained by protecting one and not the other?

Limit the policy to permanent requirements. For example, a policy statement that says, "All company classified information shall be marked and protected from exposure, loss and unauthorized change" is a valid policy requirement. But a statement that reads, "Only opaque No: 10 envelopes shall be used to transmit company classified memos" is not.

An effective policy includes these characteristics:

- It is published, promulgated and given visible support by top management.
- It covers all the permanent requirements of management concerning the subject matter.
- It does not include operational details that may vary from time to time or from one operating location to another.
- It meets the tests of longevity (it should seldom if ever need to be changed) and observance (people know about it and follow its prescriptions).

Information being an intangible, many employees find it difficult to understand

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why managing it is important. Furthermore, the steps leading to management control of — and legal rights to — information is often tedious in terms of daily business operations. For these very reasons, writing a sound policy is an essential first step.

Policy contents

In most companies, the information executive and his staff prepare the information policy. Subjects covered include the importance of information to the company, company classification nomenclature and definitions and the responsibilities of key employees, including the executive information manager, the systems manager, the data base manager and the security manager.

IN A typical business today, probably only about 10% of all information should be classified. Less than 1% of all information should be at the highest classification level.

The policy should also cover statements of requirements for the marking, handling and availability of company classified information, defined for each company classification type. These should cover paper handling, data processing and telecommunications. Finally, the policy should include a glossary of terms.

Not everything can be protected effectively. A careful analysis of what is really important can provide better security and reduce the cost of protection.

In the 1960s, the U.S. Strategic Air Command decided that having guards and fences around its air bases was not necessary. Every test attempt at penetration showed that fences kept out only one's friends.

The Strategic Air Command then decided to place guards around only the important things — the airplanes, hangars and critical supplies — and not worry about people coming over the fences. This measure actually increased the level of security where it was really needed, and it saved money.

For the information resource, we need to take a similar approach — identify the truly critical pieces of information and follow a well-planned program for protecting them. Classification is the first step in this process.

In a typical business today, probably only about 10% of all information should be classified. Less than 1% of all information should be at the highest classification level. This tiny fraction represents information available to only a few people, and it should be locked in a safe or encrypted for electronic storage or communication.

The remaining 9% of highly valuable information would be classified at a medium level and be restricted to classes of employees needing it to do their jobs. Finally, all information regarding employee, medical and applicant records should be classified to ensure privacy.

Which is which?

The first task is to identify which information should fall into which of these classifications. While this decision is always a matter of judgment, a set of guidelines is necessary to maintain some consistency.

Keep in mind that classification decisions will be made by many people in widely varying circumstances. Although responsibility for classification rests with the information owner, practical business operation indicates that these decisions be made on the spot by the information originator, probably following instructions set up by the information owner within company policy.

At Xerox Corp., the company guidelines for classifying information are the following:

- Xerox Registered (highest classification): Information that if improperly disclosed could cause serious damage to company operations. Examples: information concerning product strategies and product-related research.
- Xerox Private (middle classification): Information that if improperly disclosed could have a substantially detrimental effect on company operations. Example: customer lists that would be of value to a competitor.
- Xerox Personal (special classification): Information an individual might find embarrassing or detrimental if improperly exposed. Example: personnel and medical records.

These definitions do not mention information retention or legal requirements, which should also be addressed through classification. However, they do provide practical guidelines for people who must make classification decisions.

A classification philosophy

Information should be classified to represent the business requirements for information security and availability and meet legal requirements. We may consider these as falling into two categories:

"Objective" relates to requirements outside the information itself. Generally, these deal with information retention and conservation, which are most frequently required by law or for historical purposes. This classification is typically marked "Retention Schedule X" — the "X" being a number referring to a list showing requirements.

"Subjective" relates to the information itself. Generally, these are requirements relative to the company's need to keep the information private. The

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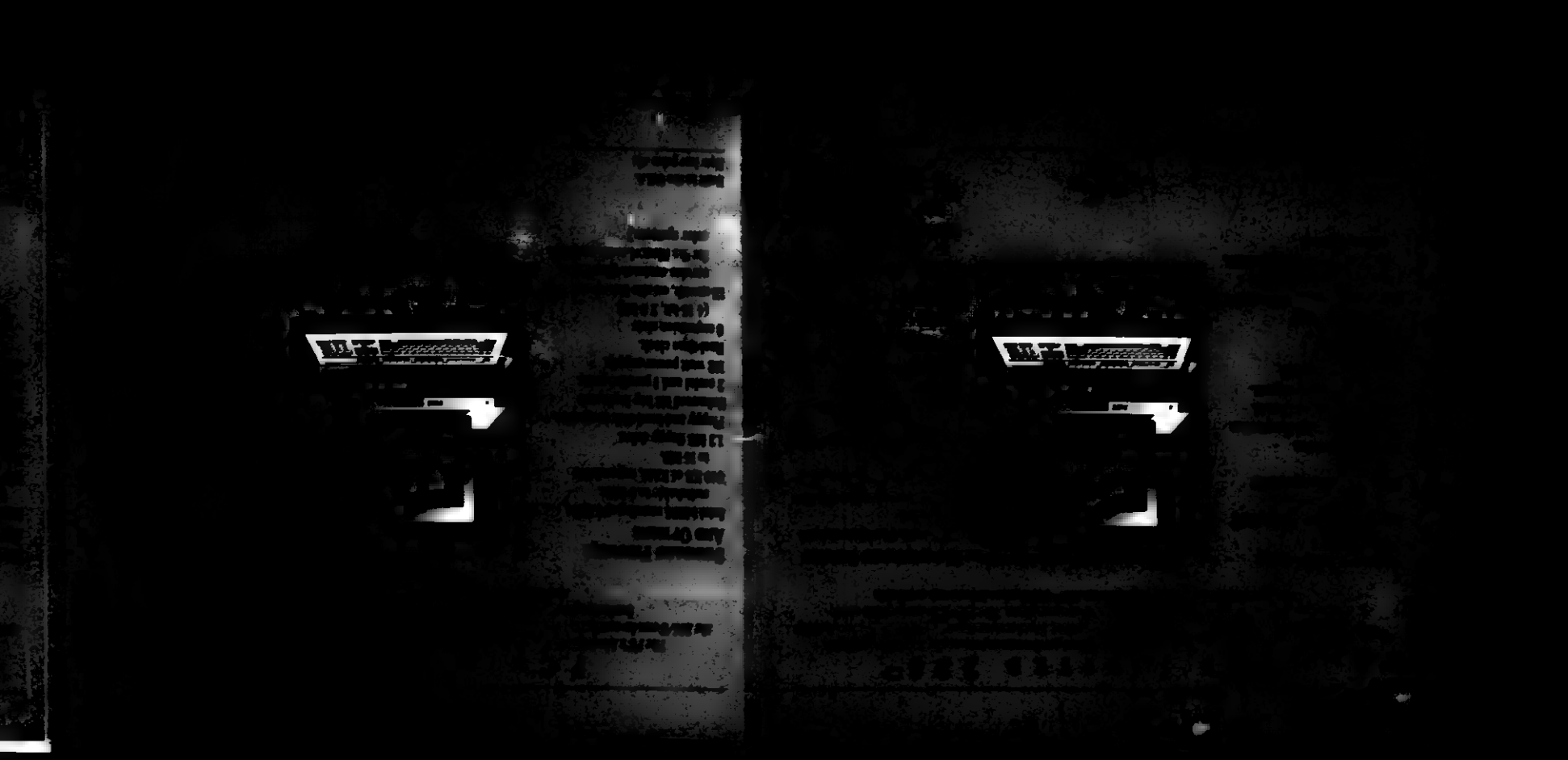

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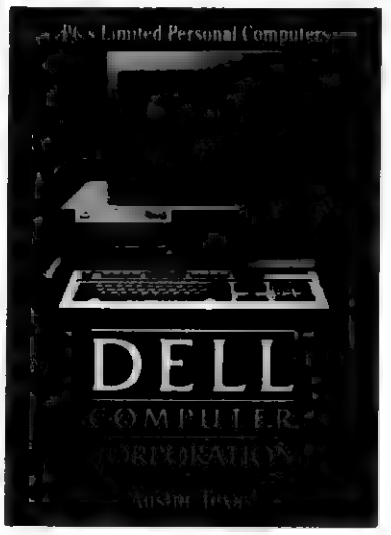

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business privacy requirement usually results in three information groupings:

- Information restricted to a small group. This category is specified when the information is developed by the originator or top management. This is the highest classification.
- Information restricted to a group of employees, not usually specified by name, who require it to perform assigned tasks. This is the middle-level classification. Special subjective classifications, such as medical records, fall within this group.
- All other business information that may not be released to outsiders without the approval of a manager — typically the information owner or the functional executive with responsibility for the information.

PEOPLE often say, "Why mark something valuable? It just shows the bad guys what to steal."

Subjective classification decisions are made in two ways: first by the information owner, who specifies that certain types of information will always be classified at a certain level; second, by various managers and executives, who must make classification decisions on the spot as information develops. Therefore, all employees must receive training on making classification decisions.

Objective classifications are usually made following published company instructions for records retention or concerning requirements of law.

Another consideration is end-of-life. Most information has a fairly short value period. Within a few months, or certainly within a few years, most information has lost all but its historical value.

Therefore, it is a good idea to set expiration dates or periods. This can be done as a standard practice, in policy or by a declassification date. Such practice allows more reasonable destruction practices for records retention purposes and reduces the cost of secure storage for long-term documents and computer records.

Against classification

People often say, "Why mark something valuable? It just shows the bad guys what to steal." Such a position sounds reasonable, but it is not based on solid experience or law.

Major companies with notable success in competitive environments know it is necessary to classify information. Without classification, nothing is protected. And they know that to prove ownership of information in court, they must show a real effort to identify valuable data. Classification is the answer.

The procedures used to protect information follow from its assigned classification. We will follow such a process in an imaginary company, XYZ Corp., which grows and sells specialized ocean plant life developed through genetic engineering.

Daniel James is a biologist at XYZ who has been working to develop more efficient ways of feeding crustaceans. James believes he has found an important and novel form of plants for this purpose. He has just finished writing a report to the XYZ chief scientist concerning this discovery, using his microcomputer word processing system.

James gets out his regulations booklet and looks up definitions of the XYZ. The instructions say that any new research results that could have product implications are to be classified as XYZ Registered, the highest company classification.

From the font file, James retrieves the XYZ Registered logo and places it electronically at the top of his report. At the same time, the system sets a flag on the computer record, which will indicate to all other XYZ systems that this is a registered document that must be handled in special ways.

James now sends the document to a printer. Because of the flag, the printer will not produce the printed paper until James arrives and enters his password. When James retrieves the document from the printer, the XYZ

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At XYZ, all research documents are maintained in a special library. James takes the original document to the library and has a copy made. From now on, no one will be able to get a copy of the document from any source other than the library. James, or any other XYZ employee, is not permitted to make copies of XYZ Registered documents.

Knowing he will be attending a company meeting in Chicago in a week, James informs the librarian. The librarian will send a numbered copy to the XYZ office in Chicago, and James will pick it up there. XYZ Registered documents are not permitted to be carried off company premises.

Should James wish to send the report electronically over XYZ's networks, the communications server in the network at the laboratory will recognize the security flag and encrypt the data before sending it through telecommunications circuits outside company premises.

Finally, James locks the report in a cabinet with a bar and padlock.

This example reflects actual information policies used by highly successful companies in competitive businesses.

If you have never used an information classification system, you may be saying to yourself, "What a lot of bother!" A word to the wise: Many companies have been financially ruined upon discovering they had no redress in court by which they could recover stolen information. They too thought protection was too much bother.

Paul Thomas is the controller for XYZ. Most of the financial reports and analyses he deals with are company-classified at the middle level, or XYZ Restricted. Reports are locked in desks when not in use or when the user is away from his workstation for more than an hour.

When a systems consultant is hired to develop analytical tools for microcomputers, Thomas makes sure the consultant has signed a disclosure agreement to protect XYZ in the event the consultant gains access to confidential information.

MANY companies have been financially ruined upon discovering they had no redress in court by which they could recover stolen information.

Thomas regularly checks his subordinates' information handling practices and frequently walks through copy rooms after working hours to check for documents left behind. (The worst exposure comes from copies of documents inadvertently left in copiers by employees and picked up by maintenance workers or casual passersby.)

Thomas also insists that all sensitive accounting reports be clearly marked with the XYZ Restricted logo. His interest in securing information has made the accounting department an example to other areas of the company. Accounting employees know that information is not to be shared with other employees unless the person has a need to know.

Since the daily routine of work is almost always with the same set of people, this is not a big problem. Requests for information from outside the working group must be approved by Thomas.

Management dream

XYZ is a shining, if imaginary, example of well-managed information. The firm's employees made classification decisions with learned judgment based on knowledge of the purposes and methods of the company's classification scheme. XYZ's workers acted promptly and consistently and were alert to possible security breaches.

Morever, every employee (perhaps with the exception of production workers) was required to understand the purpose and methods involved.

Correct classification of company information, resulting in the proper security, is needed if we are to provide quality information for business purposes. ●

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TAKING CHARGE

David Ludlum

Keep close to the customer

The contemporary cause of applying information technology in order to further corporate strategies sometimes illustrates one of the oldest business maxims: The customer is always right.

Some recent conversations with executives responsible for strategic applications of information systems illustrate this. The executives noted that their concepts started with the goals of getting closer to customers or examining customers' needs.

This underlies the more current maxim that forward-looking information systems managers must think more like businessmen than technologists.

A few years ago, information systems managers at Levi Strauss in San Francisco decided the clothing manufacturer needed closer ties to the retailers that are its customers. The managers formed a committee that spent almost a year talking to retailers about what they wanted, according to Bill Eaton, vice-president for information systems at Levi Strauss.

The talks resulted in Levi-link, a host-to-host information service run by third parties. By providing Levi Strauss with access to retailers' point-of-sale data and allowing retailers to place orders for clothing electronically, the system helps Levi Strauss attune its production to the latest sales trends.

Continued on page 89

Chase nurtures global data center grapevine

BY PATRICIA KEEFE
CW STAFF

NEW YORK — Decentralization does not have to mean isolation. An innovative program under way at The Chase Manhattan Bank NA suggests you can have your cake and eat it, too.

As it approaches its third year of operation, Chase's Data Center Management Program (DCMP) is providing 90 dedicated data centers around the world with peer support, consistency and a sense of community. While credited with saving Chase at least $13 million in the last two years, it costs just $500,000 annually to support.

"Not a bad return on investment," says George Orwicz, program manager and vice-president.

Formally launched in May 1985 at the behest of Elaine Bond, Chase's senior vice-president of corporate systems, the DCMP lets data centers share information, resources and solutions. It also bridges the MIS community to other Chase organizations. Chase spends more than $200 million annually to support the operations of its data centers, which employ about 1,700 people.

Each year, the DCMP assigns a representative to each of its three major hardware vendors: IBM, Wang Laboratories, Inc. and Digital Equipment Corp. The representatives devise programs to foster better understanding of the technology, better vendor relations and better communication between the centers and senior management.

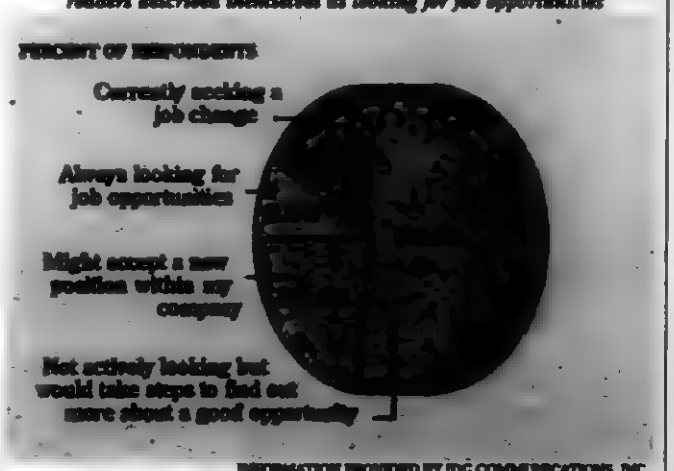
"Two years ago, two data center managers in the same building didn't even know each

Continued on page 91

Data View

Job hoppers

More than one-fifth of 615 respondents to a survey of Computerworld *readers described themselves as looking for job opportunities*



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CW CHART

Picking the Mac

Big Eight exec went out on a limb with Apple

BY DOUGLAS BARNEY
CW STAFF

Like many people trained in accounting, Rick Richardson does not look like a gambler. But as national director of technology development and general partner at Arthur Young, Richardson is not afraid to take chances, even when the firm's entire microcomputing strategy is at stake.

And Richardson has won big. That is exactly what happened in late 1985, when he decided that Arthur Young's microcomputing platform would be the little-tried Macintosh from Apple Computer, Inc. Richardson began to evaluate the Macintosh before it was announced and has never looked back. At Arthur Young, Macintoshes outnumber Microsoft Corp. MS-DOS machines by a 15-to-1 ratio.

Richardson pushed for the Macintosh because of its ease of use and common interface.

"MS-DOS was not easily accepted by everyone in the firm," he explains. But while the Macintosh had been adopted by rival Big Eight accounting firm Peat, Marwick, Main & Co., others at Arthur Young, along with one of its clients, questioned the move to the Macintosh.

'Trotting off the path'

"There was a fair amount of discussion that said, 'IBM rules the world, we are bucking the tide,' and so on. There was a tremendous concern that we may be trotting off the path," Richardson says. But, armed with facts about training costs and the ability of the Macintosh to connect to other systems, Richardson won the battle.

Carl D. Liggio, Arthur Young's general counsel, notes that the Macintosh has brought the firm significant savings in training costs. "We hire 900 people a year, and they have to become proficient in this technology," Liggio says. "You're talking about costs that become unbearable over the long haul."

Richard Young, a regional managing partner and vice-chairman of Arthur Young, recalls that Richardson followed Apple closely in opting for the Macintosh. "He recognized the power that the Macintosh had and that Apple would be able to come out with continually better products," Young says. While acknowledging Richardson's imagination and innovation, Young also stresses that he is accessible to users and aims for practical applications.

"He is the right guy to be in a technical position because he listens well and can take something

Continued on page 89

PROFILE

Rick Richardson

PACH BROTHERS, N.Y.

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Measuring Quality and Productivity in a Data Processing Environment. Orlando, Fla., Jan. 25-27 — Contact: Quality Assurance Institute, 9222 Bay Point Drive, Orlando, Fla. 32819.

Communications Networks '88. Washington, D.C., Jan. 25-28 — Contact: IDG Conference Management Group, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

Florida Instructional Computing Conference. Kissimmee, Fla., Jan. 25-28 — Contact: McRae and Co., P.O. Box 12187, Tallahassee, Fla. 32317.

Second Annual Conference on Improving Productivity in EDP System Development. Tucson, Ariz., Jan. 25-29 — Contact: Applied Computer Research, Inc., P.O. Box 9280, Phoenix, Ariz. 85068.

DB2/SQL Users Group Meeting. New York, Jan. 26 — Contact: DB2/SQL Users Bulletin, Box 560, Wall Street Station, New York, N.Y. 10005.

American Bankers Association 1988 National Security and Risk Management Conference. Orlando, Fla., Jan. 28-29 — Contact: Ed Alwood, ABA, 1120 Connecticut Ave. N.W., Washington, D.C. 20036.

JAN 31-FEB 6

Financial Investment Management Exposition & Conference. Los Angeles, Feb. 2-3 — Contact: FIM-West, P.O. Box 4440, New York, N.Y. 10163.

Society for Computer Simulation Multiconference. San Diego, Feb. 3-5 — Contact: SCS, P.O. Box 17900, San Diego, Calif. 92117.

IBM — One on One. Chicago, Feb. 4 — Contact: Automotive Industry Action Group, Suite 830, 17117 W. Nine Mile Road, Southfield, Mich. 48075.

Strategic Planning for New Technologies: The Role of the Planner in the 1990s. Chicago, Feb. 5 — Contact: Aida Rivera, Executive Programs, 1221 Avenue of the Americas, New York, N.Y. 10020.

FEB 7-13

Building an Effective Standards Program. Orlando, Fla., Feb. 8-10 — Contact: Quality Assurance Institute, 9222 Bay Point Drive, Orlando, Fla. 32819.

International Conference on Computers and Law. Santa Monica, Calif., Feb. 8-10 — Contact: Michael Krieger, ICCL 88, P.O. Box 24619, Los Angeles, Calif. 90024.

Focus on Operations-VIII: Profile of the Professional. Las Vegas, Feb. 8-11 — Contact: International Association for Computer Operations Managers, 742 E. Chapman Ave., Orange, Calif. 92666.

Uniforum 1988. Dallas, Feb. 8-11 — Contact: Uniforum 1988, Suite 205, 2400 E. Devon Ave., Des Plaines, Ill. 60018.

Data Storage Interface Week. San Jose, Calif., Feb. 8-12 — Contact: Technology Forums, Suite 280, 80 W. 78th St., Chanhassen, Minn. 55317.

CAP '88 Conference and Exhibition on Desktop and Workstation Publishing Systems. Washington, D.C., Feb. 9-11 — Contact: Computer Aided Publishing, 90 W. Montgomery Ave., Rockville, Md. 20850.

Usenix Technical Conference. Dallas, Feb. 9-12 — Contact: Usenix Conference Office, P.O. Box 385, 16951 Pacific Coast Highway, Sunset Beach, Calif. 90742.

Second Conference on Applied Natural Language Processing. Austin, Texas, Feb. 9-12 — Contact: Donald Walker, Bell Communications Research Corp., MRE 2A379, 445 South St., Morristown, N.J. 07960.

Interex Computing Management Symposium. Anaheim, Calif., Feb. 10-13 — Contact: Interex Conference Department, 680 Almanor Ave., Sunnyvale, Calif. 94086.

FEB 14-20

Executive Briefings on Automatic Identification. Cleveland, Feb. 16 — Contact: Automotive Industry Action Group, Suite 830, 17117 W. Nine Mile Road, Southfield, Mich. 48075.

Decpc East 88, The 14th DEC-Compatible Exposition & Conference. New York, Feb. 16-18 — Contact: Susan Werlinich, Exposcope International, Inc., 3 Independence Way, Princeton, N.J. 08540.

Enecom '88. Paris, Feb. 16-19 — Contact: IDG Conference Management Group, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

Auto Ideas. Atlanta, Feb. 17-18. Contact: Automotive Industry Action Group, Suite 830, 17117 W. Nine Mile Road, Southfield, Mich. 48075.

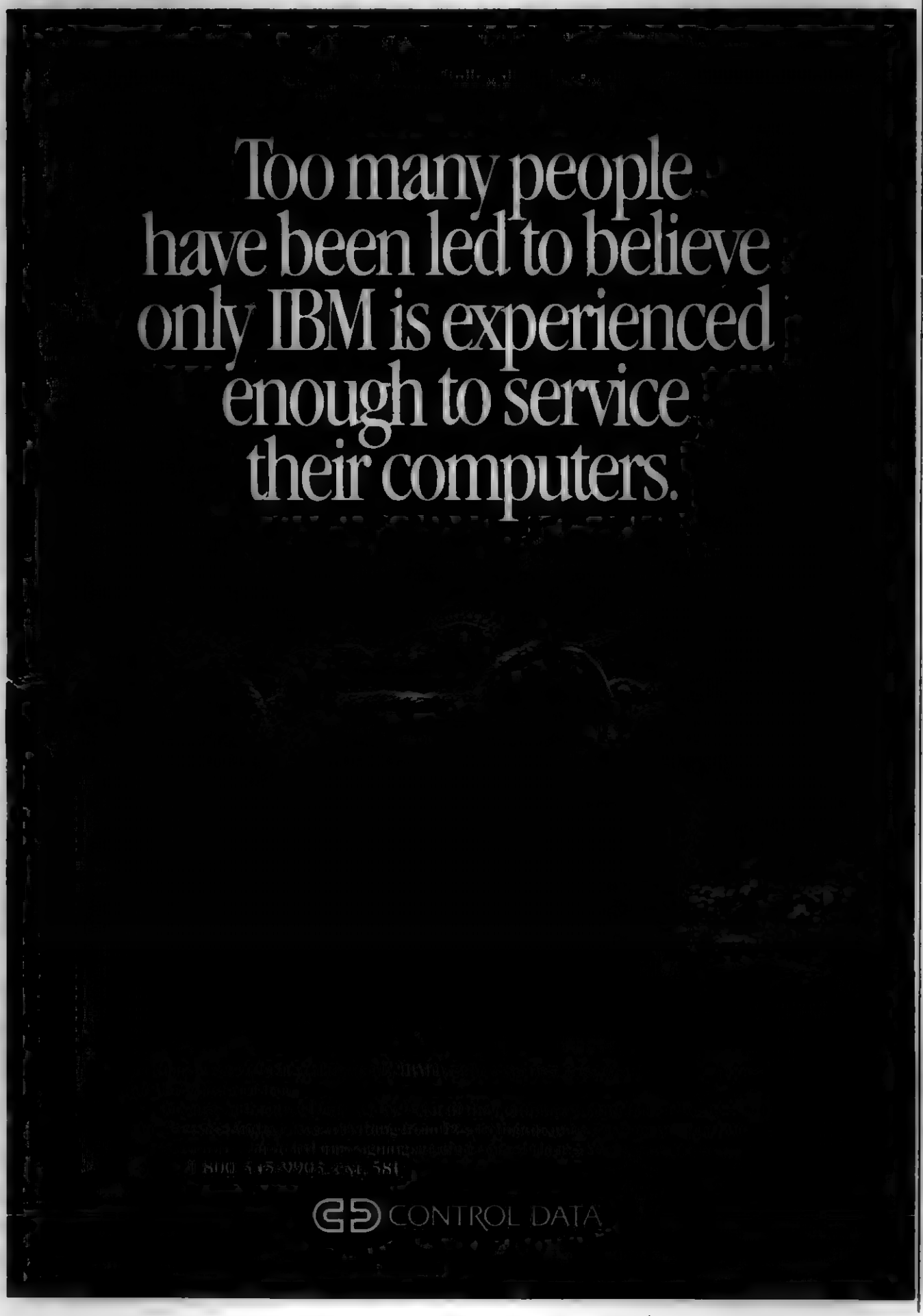
FEB 21-27

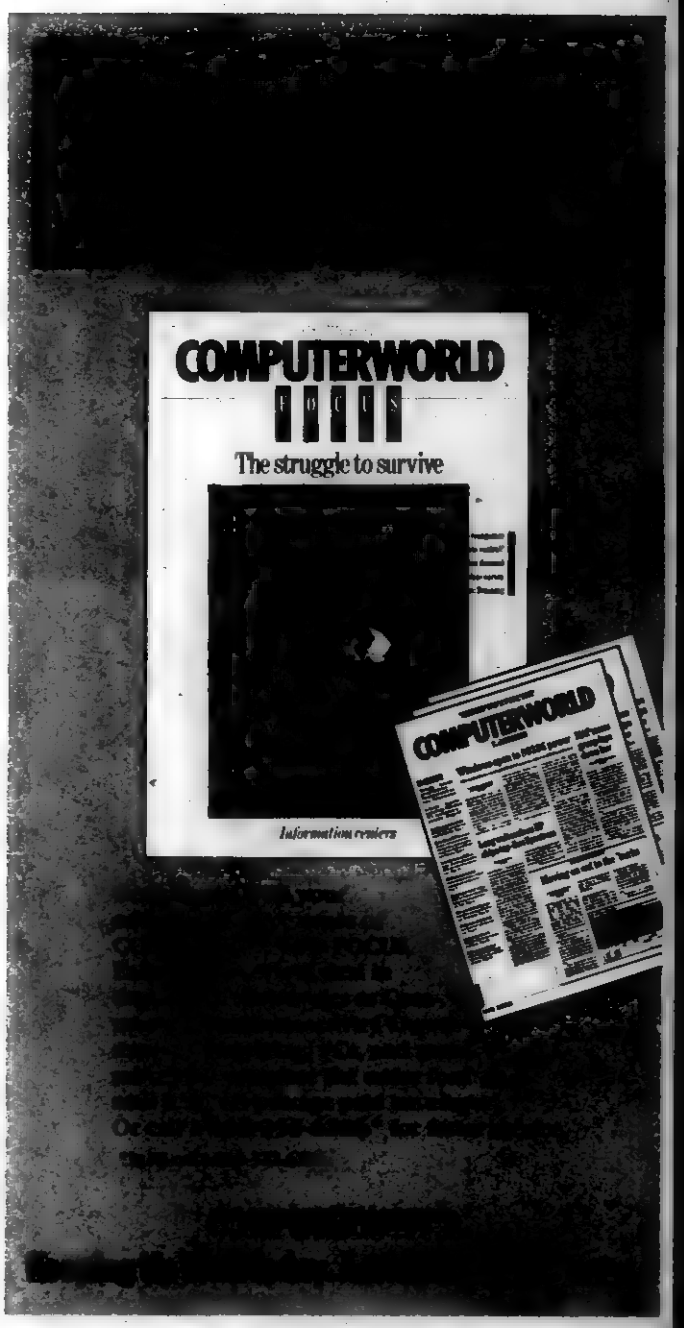
Supercomputing Europe '88. Utrecht, The Netherlands, Feb. 21-23 — Contact: Royal Netherlands Industries Fair, Postbus 8500-3503 RM Utrecht, The Netherlands.

11th Annual Personal Computing Forum. Naples, Fla., Feb. 21-24 — Contact: Sylvia Franklin, Edventure Holdings, 375 Park Ave., New York, N.Y. 10152.

The 19th Annual Electronic Printing Systems Conference. San Jose, Calif., Feb. 21-25 — Contact: S. Thomas Dunn, EPS

Continued on page 88

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LOCAL HAPPENINGS

NORTHEAST

Bangor, Maine, Jan. 20. Data Processing Management Association (DPMA). Maine Pine Tree Chapter. Leadership Qualities, with former Gov. Ken Curtis. The Bangor Hilton. 5 p.m. Contact: J. Fieweger, Delta Chemicals, Inc., Searsport, Maine 04974.

New York, Jan. 20. DPMA, New York Chapter. Reviewing Controls in Automated Security Systems. Beekman Restaurant, 15 Beekman St. 5 p.m. Contact: Mary Vogt, 455 E. 83 St., New York, N.Y. 10028.

Boston, Jan. 21. Society for Information Management (SIM). Boston Chapter. Reengineering: The Solution to Maintenance, Enhancement and Migration, with Charlie Bachman, Anthony's Pier 4. 11:40 a.m. Contact: SIM, P.O. Box 116, Newton Lower Falls, Mass. 02162.

Hunt Valley, Md., Jan. 26. Association for Systems Management (ASM), Baltimore Chapter. The Next Generation of Computer Workstations, with Ronald Weissman of the University of Maryland. Marriott Hunt Valley Inn. 6 p.m. Contact: Eileen Souza, 1904 Brightwood Court, Eldersburg, Md. 21784.

SOUTHEAST

Richmond, Va., Jan. 26. ASM, Richmond Chapter. Data Center Automation or Operatorless Computers, with Will Devries of Paramax, Inc. Holiday Inn/Crossroads, 2000 Staples Mill Road. 5:30 p.m. Contact: Gary Morse, ASM, P.O. Box 32172, Richmond, Va. 23294.

Largo, Fla., Jan. 27. Tampa Bay Relational Technology User Group. Multiple Uses of DB2 at Local Companies. Paradyne Corp., 8550 Ulmerton Road. 8:30 a.m. Contact: Michael Ringer, P.O. Box 2826, Largo, Fla. 34292.

Essington, Pa., Feb. 5. Delaware Valley DB2 and SQL/DS Users Group. The Relational Model and its Implications, with Chris Date. 9:00 a.m. Ramada Inn. Contact: DB2 and SQL/DS Users Group, Suite 505, 3650 Silver Side Road, Wilmington Del. 19810.

MIDWEST

Cleveland, Jan. 27. DPMA, Cleveland Chapter. New Developments in Electronic Communications, with Fred R. Amport Jr. of Amport and Associates. Cleveland Hilton South, Rockside Road and I-77. 6:30 p.m. Contact: Nina Perkins, Consol Corp., 8900 Brecksville Road, Brecksville, Ohio 44141.

Columbus, Ohio, Jan. 27. ASM, Central Ohio Chapter. Children's Hospital's Use of Computers, with Malcolm Murray of Children's Hospital; Systems Application Architecture, with Dick O'Connor of IBM. Fawcett Center for Tomorrow, 2400 Olentangy River Road. 5 p.m. Contact: Deborah Maccora, Columbus Southern Power Co., 215 N. Front St., Columbus, Ohio 43220.

Lafayette, Ind., Feb. 11. DPMA, Sagamore Chapter. Computing at Alcon Laboratories, with Mike Purpura of Alcon. 5:30 p.m. Contact: Joan Vaughan, Alcon MIS department, Box 7500, Lafayette, Ind. 47902.

WEST

Santa Monica, Calif., Jan. 23. DPMA, Los Angeles Chapter. 1988 Installation Dinner Dance. The Chronicle Restaurant, 2640 Main St. 6 p.m. Contact: DPMA, P.O. Box 1047, Hollywood, Calif. 90078.

San Francisco, Feb. 3. Association for Women in Computing, Bay Area Chapter. Ethical and Controversial Issues in the Funding of Computer Science, with Barbara Simons of the Association for Computing Machinery Committee on Scientific Freedom and Human Rights. The Fax Restaurant, 132 Bush St. 5:30 p.m. Contact: AWC, Suite 1044, 41 Sutter St., San Francisco, Calif. 94104.

Continued from page 86

'88 Conference Chairman, Suite 1, 1855 E. Vista Way, Vista, Calif. 92084.

Effective Methods for Data Processing Quality Assurance. Orlando, Fla., Feb. 22-24 — Contact: Quality Assurance Institute, 9222 Bay Point Drive, Orlando, Fla. 32819.

Fourth Annual Computer Graphics New York. New York, Feb. 22-24 — Contact: David J. Small, Exhibition Marketing & Management Co., Suite 1110, 8300 Greensboro Drive, McLean, Va. 22102.

Vision Guidance For Robotic Systems. Cincinnati, Feb. 23-25 — Contact: Joanne Rogers, Special Programs, Society of Manufacturing Engineers, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

Super Graphic Workstations. Monterey, Calif., Feb. 23-25 — Contact: Institute for Graphic Communication, Inc. 375 Commonwealth Ave., Boston, Mass. 02115.

Interactive Instruction Delivery/Learning Technology in the Health Care Sciences. Kissimmee, Fla., Feb. 24-26 — Contact: Society for Applied Learning Technology, 50 Culpeper St., Warrenton, Va. 22186.

FEB. 28-MARCH 5

Telecom '88 Bank Telecommunications Conference. Bal Harbour, Fla., Feb. 28-March 2 — Contact: Ed Alwood, American Bankers Association, 1120 Connecticut Ave. N.W., Washington, D.C. 20036.

Third International Conference on CD ROM. Seattle, March 1-3 — Contact: Sherrie Eastman, Microsoft Corp., Box 97017, 16011 N.E. 36th Way, Redmond, Wash. 98073.

MARCH 6-12

2nd IEEE Conference on Computer Workstations. Santa Clara, Calif., March 7-10 — Contact: Computer Society of the IEEE, 1730 Massachusetts Ave. N.W., Washington, D.C. 20036.

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Ludlum

CONTINUED FROM PAGE 85

An urge to get closer to customers, along with technological developments, led New York Life Insurance to undertake Project Steer, a $150 million effort to overhaul its information systems architecture, according to Michael J. McLaughlin, the company's senior vice-president for information systems and services.

Along with the recognition of the evolution of data base technology, the Project Steer concept arose from the perception of a need to deal with customers as individuals. The project emerged with the central theme that the company direct its processing from a policy-number orientation to a customer orientation.

The concept of keeping close to the customer is also touted by Michael R. Zucchini, executive vice-president and chief information officer at Fleet Financial Group in Providence, R.I. Previously, Zucchini led the development effort of the Confer system at General Re Corp., a reinsurance firm in Stamford, Conn.

The business process

Zucchini says understanding the underlying business process is the most important requirement for developing a strategic system like Confer.

Confer allows General Re customers to use a terminal in their office to get quotations for reinsurance policies, the policies themselves, accounting and billing data and information on policies they hold.

Understanding the business process has to go far beyond what's possible by talking to colleagues within one's company, according to Zucchini. One has to have an understanding of how a customer perceives the products.

Being on the lookout for opportunities to automate, Zucchini launched Confer after speaking with General Re customers, who said the company could help them by making data on their policies available to them. Before Confer, customers who wondered whether they held reinsurance for an insurance policy often conducted an error-prone search of paper files in a warehouse.

Developing Confer took three years and differed from more conventional projects in that MIS employees had to work more closely with marketing professionals.

At that point, interpersonal skills became highly desirable, according to Zucchini. Technical people involved in the project had to develop a good rapport with the General Re marketing staff, which, understandably, is always concerned about protecting the customers.

This situation also underscores the importance of forward-looking information systems managers emulating general business executives.

Ludlum is Computerworld's senior editor, management.

Picking the Mac

CONTINUED FROM PAGE 85

explained as a need and adapt it into a specific application," Young says. "That's a talent not a lot of people have."

Young also says Richardson does not give up easily. "When he has an idea, he is a champion for that idea," Young says.

Richardson, who joined Arthur Young as an auditor before moving onto computer auditing, has a higher profile than most information managers. A recent trip to Microsoft in Seattle is a case in point. While most users would be content with a day-long briefing by product managers, Richardson met with Chairman Bill Gates, discussing and debating in which direction technology such as compact disk/read-only memory is heading.

'More than a casual user'

Indeed, Richardson's job involves consulting numerous vendors, many of which are Arthur Young clients, about product research and design. "I'm more than a casual user, I guess," he says.

For relaxation, Richardson, 43, plays the drums and the organ, delving into "almost everything but opera," particularly big band tunes. He is also an avid photographer, with a darkroom and a gallery at his New Canaan, Conn., home.

Despite his busy work schedule, colleagues describe Richardson as calm and jovial. They say he motivates his staff of 21 by demonstrating the importance of a task and providing an atmosphere in which creativity is encouraged.

"Trying to get a bunch of lawyers to use computers is not the easiest thing in the world," Liggio says, adding that he still goes to Richardson for help. "He is my guru when I am looking at innovative ways of using the computer as a management tool in dealing with litigation," Liggio adds.

And Richardson is not finished automating the legal department. "Assuming all goes well, I will have nothing but a Mac environment," Liggio says.

Richardson, who is friends with author and futurist Alvin Toffler, says some of the vision driving his group's work during 1983 and 1984 was directly inspired by Toffler's book, *The Third Wave*.

Richardson admits to being a bit of a futurist himself. "I spend a lot of time saying, 'Wouldn't it be nice if we could . . .' " But like a poker player holding his cards close to his chest, he declines to comment on inspirations for future initiatives. "We face strong competition in this business," he says.

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Upcoming SPOTLIGHT Issues

Issue	Topic	Ad Closing Date
Feb. 8	DEC-Compatible Software	Jan. 21
Feb. 29	Performance Management/ Capacity Planning	Feb. 12
March 14	DBMS	Feb. 26
March 28	Micro-to-Host-Links	March 11
April 11	PCs (IBM-Compatible) Portables/Laptops	March 28
April 25	TBA	April 8
May 9	Printers	April 22
May 23	Data Communications	May 6
June 6	CASE	May 20
June 20	The SNA Market	June 3
July 11	Disaster Prevention & Recovery Products & Services	June 24
July 25	Productivity Software	July 8

Chase

CONTINUED FROM PAGE 85

other," Orwicz says. "When we started, we didn't know how many [data centers] we had or where they were," adds Vincent Tomasulo, a vice-president in charge of the Corporate Controller's data center.

Today, 90 data centers are working together in the following ways:

- Conducting biannual self-assessments in which centers measure themselves against preset Chase standards.
- Holding peer site reviews through committees composed of managers who identify key issues related to data center management and suggest remedies.
- Cutting costs through centralized bidding and equipment swap lists, thus reaping substantial savings.

Also provided are monthly meetings given by the three hardware groups on career development as well as guidelines for acquisition strategies.

Peer reviews pump program

The heart of the program — peer reviews — are not audits. They let data center staffs make internal contacts and share expertise, primarily management skills. A key benefit is exposure to different methods of approaching the same problems.

Standard operating procedures are set by the DCMP, but they can spring from individual data center managers. "We consolidate these ideas. If we see something interesting being developed in one place, we will promote it across the board," Orwicz says.

Using a standardized Peer Review Guide and led by a coordinator from the DCMP office, the review team typically spends a week examining how the data center is organized, managed and controlled, Orwicz says. Areas covered include human resources, financial issues, technology, environment, risk exposure, planning and control and user relations.

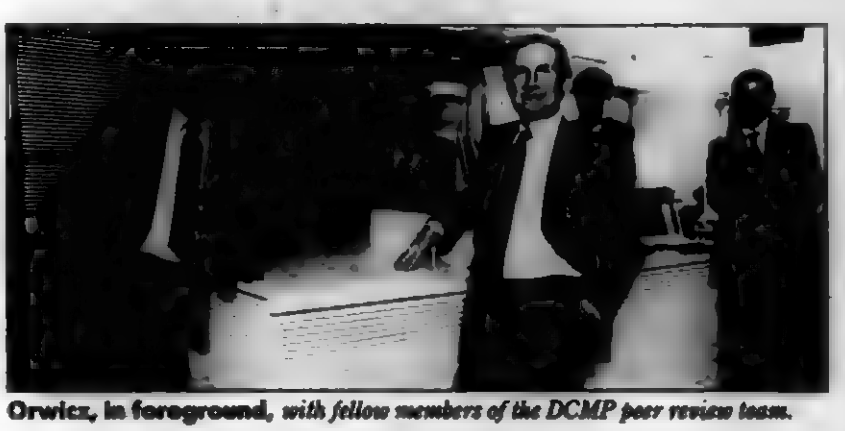
The review provides qualitative analysis and recommendations. After the review site responds, a follow-up visit is conducted.

Familiarity tends to breed relevant advice, according to the manager of a Hong Kong data center, who says he finds it comforting to work with people who understand the issues he faces and can address them. To date, more than 35 reviews have been conducted, involving about 100 reviewers.

Financial savings have been significant, the bank claims. The centers now provide monthly forecasts on equipment needs, letting Chase's Contracts Administration Group negotiate volume discounts, Tomasulo says. In the last two years, Chase has saved more than $12 million in equipment costs using volume procurements. During a recent negotiation, Chase saved $18,000, according to Orwicz.

The DCMP's newsletter publishes a "blue list" of hardware available within the Chase community. This has facilitated equipment swapping between sites, saving more than $950,000 in the last 18 months. There are plans to put a more detailed version of this list into an on-line data base, an effort that will likely take a few years, Orwicz says.

Outside the data centers, the program is being used as a model for other groups within Chase as a way of coalescing the power of the community toward common goals, according to Tomasulo.



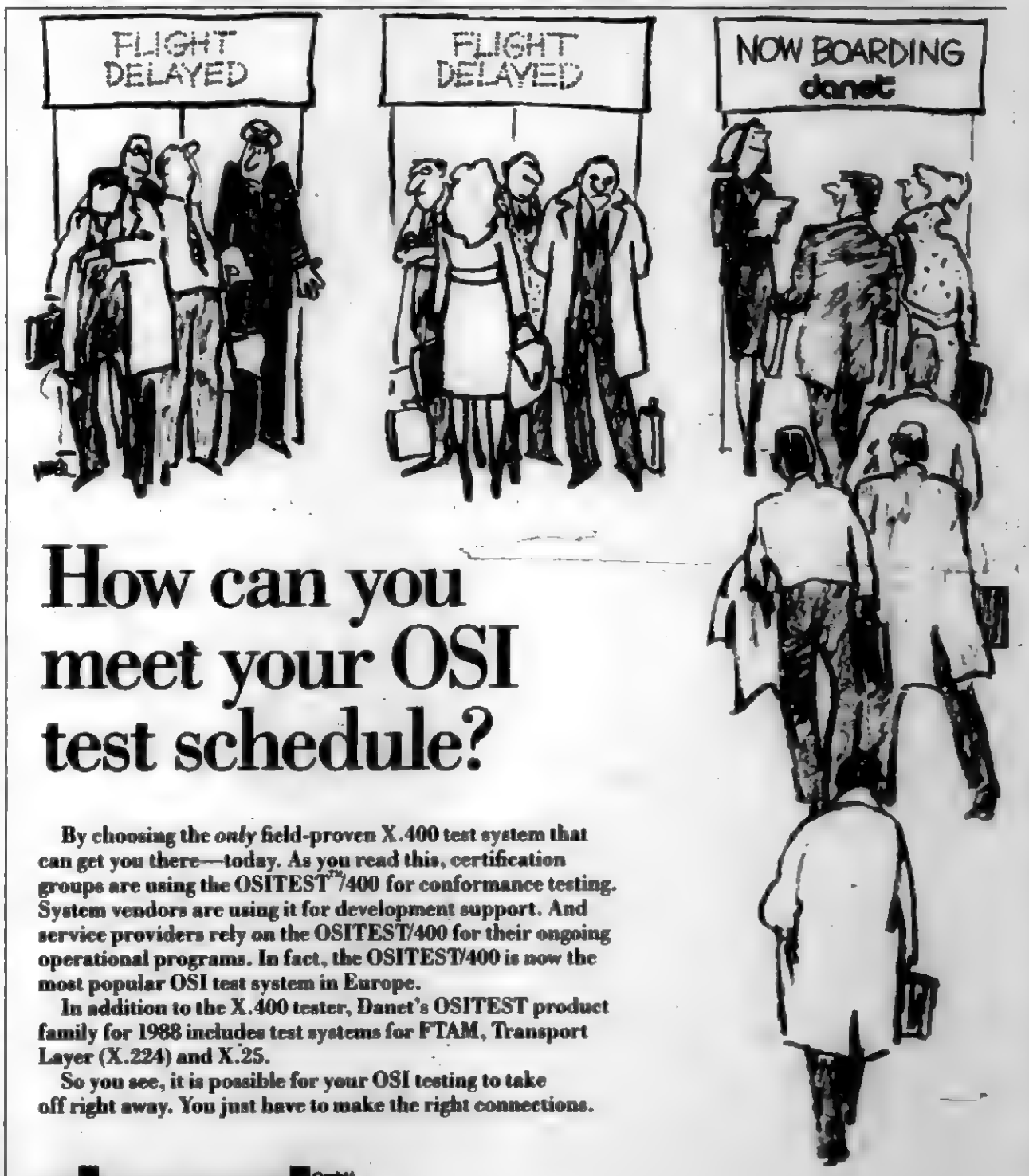
Orwicz, in foreground, *with fellow members of the DCMP peer review team.*

Future plans include broadening peer reviews to include Chase's systems community, networking the data centers and instituting capacity management. The DCMP initiated the idea to network the data centers, although a separate group will execute the project. The foreseeable benefits include sharing applications and resources, contingency planning and elimination of manual tape delivery.

The DCMP is currently developing a set of guidelines for capacity planning as well as a special review dealing specifically with this area. "Our peer reviews are becoming more diversified," Orwicz says.

The DCMP serves as a catalyst, Orwicz says. "We use the resources that we can find throughout the community and form task forces. They, in turn, work on specific projects that benefit the whole community," he says.

In doing so, the project has demonstrated to users the importance of the data center to the business while stimulating support from upper management.



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Realistically, Leasametric Data Communications of Foster City, California, is many companies rolled into one. Along with being a major equipment-rental company, the 25-year-old Leasametric also leases, maintains and sells personal computers, peripherals and networks.

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COMPUTER INDUSTRY

INDUSTRY INSIGHT

Clinton Wilder

High-tech hype strikes

In California, they're blaming the lack of a showcase-clean room and not enough direct participation by the governor. In Massachusetts, in the midst of the coldest winter in years, they're blaming — what else? — the weather.

But down in Texas, they're hailing it as the greatest thing for civic pride since the oil boom days of bumper stickers that said "Freeze a Yankee" and "Last person leaving Michigan please turn out the lights."

All the hype and hand-wringing is for Sematech, the U.S. semiconductor industry's embryonic manufacturing consortium, and its choice of Austin as home. The bidding and wooing war had all the regional one-upmanship of a college basketball championship — with a few extra goodies, like the presidential hopes of Bay State Gov. Michael "Massachusetts Miracle" Dukakis, thrown in.

Clearly, despite the staggering downturn of the semiconductor business a couple of years ago, high tech is still in high fashion among the nation's chambers of commerce. And the three finalists in this recently concluded contest all want to claim

Continued on page 95

Investors: High-tech health robust

Venture capitalists embrace industry; seen as good bet in shaky economy

BY NELL MARGOLIS
CW STAFF

Forget Gorbachev. If the venture capital community crowns a man of the year, 1988 honors are likely to go to the late Charles Darwin.

Survival of the fittest is the name of the game in the post-stock market crash entrepreneurial sector. Prominent venture capitalists say that high-technology companies, particularly those offering new systems architectures and software solutions geared toward increasing productivity, are well positioned to prevail.

Immediately after the Oct. 19 stock debacle, the outlook for high technology seemed bleak. According to Charles Federman, a partner in Broadview Associates, a mergers and acquisitions firm in Fort Lee, N.J., "after the 34.1% drop in information technology sector stocks — a deeper dip than the market took overall — the public market is dead."

Venture capital, however, is anything but dead. Estimates compiled by Venture Economics, Inc., a market research firm in Wellesley, Mass., show a record annual amount of investment dollars raised by independent private venture capital partnerships in 1987, with the majority closing in the second half of the year and much of that after Oct. 19. Final figures, to be released next month, are expected to show an all-time high in disbursements as well.

A new year of plenty

Moreover, the industry as a whole headed into 1988 with a hefty $1 billion in inventory, according to Stevan A. Birnbaum, general partner of Santa Monica, Calif.-based Oxford Partners. "There's plenty of money out there," he said.

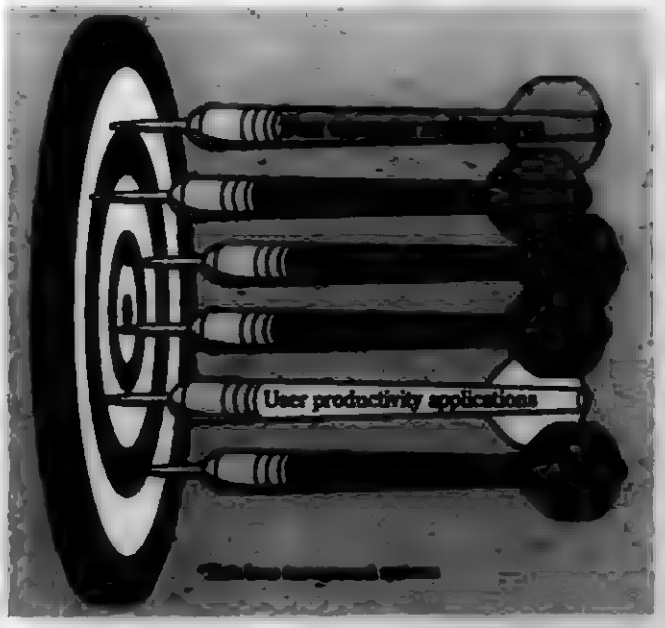
And plenty is likely to be targeted at high-tech companies. Computers and software packages hold the promise of streamlined business practices and increased quality control — in short, competitive advantages that take on heightened, not diminished, importance during shaky economies, said Howard Wolfe, a partner at Baltimore-based New Enterprise Associates.

"I think 1988 is going to be a good year for technology overall," said Jack Carsten, general partner at U.S. Venture Partners in Menlo Park, Calif. Carsten, who joined the ranks of venture capitalists this month after a distinguished 25-year career in the semiconductor industry, placed much of his optimism on an increasingly strong inter-

Continued on page 94

On target

Computer technologies expected to score high in venture capital funding in 1988



CW CHART: FRANK C. O'CONNELL

Brazil heeds U.S. warnings

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Brazil's government appears to be softening the protectionist trade policies that have so angered the U.S. computer industry, but the U.S. drive toward trade sanctions continues.

The Reagan administration is expected to announce sometime this month a list of Brazilian products that will be hit with 100% punitive import tariffs. The action will retaliate against Brazil's Informatics policy, which protects its domestic hardware and software industries from foreign competition.

The U.S. government specifically charged that Brazil's Secretariat for Informatics unfairly blocked Microsoft Corp. from distributing its MS-DOS software in Brazil [CW, Nov. 30, 1987].

From the perspective of the U.S. computer industry, there have been some favorable developments in Brazil since the U.S. sanctions were proposed in November 1987, according to the Computer and Business Equipment Manufacturers Association (CBEMA).

Last month, Jose Sarney, president of Brazil, approved legislation that provides copyright protection for software. In the process, he deleted a provision that would have imposed a

Continued on page 95

Turnaround ace Cavalier reshuffles deck at Britton Lee

BY STEPHEN JONES
CW STAFF

LOS GATOS, Calif. — Corporate turnarounds are nothing new for John C. Cavalier, but his greatest challenge could be awaiting him as the new president and chief executive officer of troubled Britton Lee, Inc.

The manufacturer of shared relational data base systems has been in a tailspin for the last two years. Profits have nosedived into the red, product introductions have been consistently delayed and the company has failed to market its technology to a broad base of users.

Britton Lee's woes are evident in its earnings report for the 1987 fiscal year. The company expects to post a loss of about $10 million on sales of nearly $26 million for the year ended last month. Don Sinsabaugh, managing director of Swergold Chefitz & Sinsabaugh, Inc. in New York, estimated that earnings for the year will amount to a loss of $1.10 per share.

But Cavalier is trying to put the woes of the past behind him and the company. In the last two months, he has reorganized Britton Lee in an attempt to cut costs and return to profitability. Changes include the following:

- Ousting the company's two founders, David L. Britton and Geoffrey Lee, from the board of directors and having them cut all ties to Britton Lee's operation.
- Reducing the work force by 20%, or about 50 employees, from every level of the company.
- Cutting out a layer of management, including vice-president of sales and marketing Skid Pirtle.
- Shuffling the responsibilities and positions of half of the company's 15 top managers.

John C. Cavalier

"It was time for new management, and we realized that we would be better off to run the company with the strategy that we had developed over the last 60 days," Cavalier said. "What was lacking in the company was a consistent strategic direction."

Cavalier built a reputation as a turnaround expert at Santa Clara, Calif.-based NCA Corp. When he stepped in, the systems software vendor had had seven straight quarters of losses. By the time NCA was sold last year, its market value had jumped from $10 million to $44 million.

Cavalier claimed the changes at Britton Lee will pave the way for his plan to cozy up to technological partners and market the company's integrated hardware and software data base machines to Fortune 1,000 companies.

Analysts said a weak point for the company has been a poorly managed sales staff that could not keep up with the anticipated growth of the company. Britton Lee currently has an installed base of 800 data base machines tied to 1,200 multiuser host systems. Customers include AT&T, Ford Motor Co., Du Pont Co. and Mobil Corp. If the company hopes to hold on to those customers and attract others, Sinsabaugh said, it will have to start delivering new products.

"The computer industry is a new product industry, and they just haven't cranked out enough new products. But the company is a fighter, and they still have a good chance of making it," Sinsabaugh said.

High-tech health

CONTINUED FROM PAGE 93

national high-tech market. "We are only beginning to realize the strength of the international currency shifts."

While the crash neither cut off nor diverted the flow of venture dollars from technology, Birnbaum said, it did change certain equations for venture capitalists — equations that, in turn, will affect their investments. "Because we can't count on taking companies public in the near future, we'll have to give up larger shares to get smaller returns," he said.

Thus, there will be a premium on companies with experienced, proven management teams as well as track records for efficiency and distinctive products for which there is perceived market demand. "It is not a great strategy right now to lose money and assume you can raise venture capital," Birnbaum noted.

Being able to show relatively low cash requirements for the next several years will help firms looking for venture financing this year, said John Savage, general partner of Weiss, Peck & Greer Investments, a San Francisco-based venture capital firm with approximately $160 million under management. This factor could benefit software companies — whose emphasis on minds over metal ranks them among the least capital-intensive of businesses — over hardware companies, he noted.

"Software is more likely than hardware to provide uniqueness, to give added value," said Richard Burnes, general partner of Charles River Ventures in Boston.

On the other hand, according to U.S. Venture Partners' Carsten, hardware offers a tangibility advantage. "Software tends to be a harder deal," he said. "The value of the product is often difficult to determine at an early stage, as is the status of competitors' products, as is how much additional capital you'll be required to put in. When you're funding a software company, you never really know when you're at the 50% mark."

Among the best bets in hardware are new architectures — for instance, reduced instruction set computing and other accelerators, Carsten added.

Telecom hot

"Telecommunications is an area we're very interested in," said Jon Bayless, a partner in Dallas-based Sevin Rosen Management Co., which recently announced a new $65 million fund for seed and start-up investments in medical and high-tech companies. "There's going to be continued tremendous growth in this area, based on the transition to fiber optics and the rise of networking."

Also strong — Wall Street notwithstanding — is the business world's hunger for information: more of it that is easier to get at and faster to disperse. Thus, text retrieval software and relational data base management systems — more so if they are distributed and oriented toward transaction processing — made their way onto several venture capitalists' watch lists, as did connectivity products.

"We're looking toward software applications that really do solve problems that users are facing," Bayless said. Sevin Rosen, for instance, has an investment in 4-year-old Landmark Graphics Corp. in Houston, which manufactures computer-aided oil exploration software that provides a means for oil explorers to cut costs and improve their success rates. These efficiencies often mean the difference between survival and extinction in the beleaguered oil and gas industry.

"What builds companies is applications, not technology," said Stanley Pratt, general partner of Wellesley, Mass.-based Abbott Capital Management, Inc., an investment advisory firm with a fund of $320 million to invest in professional venture capital firms. "Productivity increase is the No. 1 factor behind venture capital investments. The question to ask is, How much more productive will the end user be if this company's product comes to market?"

EXECUTIVE CORNER

Unisys Corp. has elected **William L. Morgan** and **Albert F. Zettlemoyer** corporate vice-presidents.

Morgan will serve as vice-president and general manager of the Unisys Peripherals Group, which is headquartered in Santa Clara, Calif.

Zettlemoyer will serve as vice-president and general manager of the Computer Systems Division of Unisys's Defense Systems unit in Eagan, Minn.

Neil Davenport has been elected vice-president of Cray Research, Inc. Davenport began with the company in 1981 as managing director of Cray Research Ltd. in the UK, a position he will continue to hold.

Cray also elected **Edward Masi** vice-president of commercial marketing. Masi has been with Cray since 1980, serving as general manager of the company's U.S. eastern region.

Sevin Rosen Management Co. announced that **Ron Brittian**, formerly vice-president of corporate development and technology at Uccel Corp., has joined the company as a special limited partner. In this role, he will assist in the management of the new $65 million fund recently raised by Sevin Rosen for investment in high-technology companies at the seed and start-up phases.

Wilder

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bragging rights as the U.S.'s high-tech capital.

Californians are miffed to see the industry that gave Silicon Valley its name choose to go elsewhere for this critical research project. Texans have been touchy about California on the technology front since Texas Instruments' Jack Kilby and Fairchild Semiconductor's Robert Noyce raced to invent the integrated circuit in the late 1950s. And Massachusetts is so image-conscious that it changed the Route 128 sign slogans from "America's Technology Highway" to "America's Technology Region."

The lavish public-sector courting was an ironic and enjoyable change for the semiconductor industry, which has spent the better part of three years tugging on the coattails of the federal government for protective and/or punitive measures against its Japanese competitors. That effort continues apace, as the Semiconductor Industry Association urged President Reagan last week to deny Japan's requests to ease trade sanctions. Sematech itself negotiated for months to win generous funding and cooperation from the U.S. Department of Defense.

Austin will no doubt enjoy several more months of hype, hoopla, self-congratulation and ribbon-cutting as Sematech settles into its new digs. But as the excitement subsides, harder questions

CLEARLY, despite the staggering downturn of the semiconductor business a couple of years ago, high tech is still in high fashion among the nation's chambers of commerce.

will emerge.

Can fiercely competitive semiconductor vendors truly work together to develop cooperative fabrication techniques? Will vendors send their top engineers to Sematech? And finally, will the consortium project truly meet its goal of improving U.S. competitiveness?

Skeptics can point to Austin's other highly touted research consortium, Microelectronics and Computer Technology Corp. (MCC) and doubt that the answers to the above questions would be positive.

Although MCC has succeeded in delivering technology advancements to its paying members, it has become better known for the exodus of some key members and its first chairman, retired Adm. Bobby Inman. MCC members and Austinites can credibly point to the consortium as positive, but it has not achieved the status of the computer industry's leading-edge research model that its founders had hoped.

To be fair, however, Sematech's charter is much more focused. Compared with MCC, the goal of improved, cost-effective chip production methods is more tangible and identifiable than the diverse research programs of MCC. And the semiconductor industry is more unified against its common enemy, Japan, than are its counterparts among computer vendors.

The ingredients for success are there, but in any cooperative effort among competitors, the formula is delicate. Although texans are not noted for restraint, "beware the high-tech hype" should be the appropriate watchword in the Lone Star State's capital as Sematech moves forward.

Wilder is Computerworld's senior editor, computer industry.

What ISDN is doing for McDonald's data networking capabilities is no small potatoes.

When McDonald's Corporation took a hard look at its telecommunications needs a few years ago, it saw 9400 restaurants in 46 countries, served by more than 20 networks. And a new restaurant opening every 17 hours.

McDonald's needed a telecommunications system that could grow with it, but one simple enough that the company could concentrate less on telecommunications and more on talking to customers.

The solution: the nation's first customer application of ISDN, the Integrated Services Digital Network, made possible by the cooperation of Ameritech's Illinois Bell and AT&T Network Systems.

McDonald's will use ISDN to send voice, data and video over ordinary telephone lines simultaneously. An AT&T 5ESS™ switch at Illinois Bell will support digital phones, integrated voice/data terminals, facsimile, voice mail, host access and modem pooling, giving McDonald's a real competitive advantage in its data networking capabilities.

"In business language, this means we're going to do an even better job for the 30 million customers that we serve every day," said Bonnie Kos, McDonald's Vice President of Facilities and Systems.

"ISDN provides an information outlet to every workstation, thereby eliminating time-consuming and costly wiring, as well as enhancing messaging and network control capability."

Thanks to ISDN, McDonald's will enjoy better customer service, more current market information, better tracking of product promotions, more efficient inventory control, and reduced administrative workloads.

Ultimately, higher level applications of ISDN on the public switched network will replace most of the company's myriad networks, linking all its offices and restaurants around the world.

As we are doing for McDonald's, AT&T and your telephone company can help your business realize the networking efficiencies and cost savings of ISDN.

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The right choice.

Brazil

CONTINUED FROM PAGE 93

tariff of up to 200% on imported software.

Furthermore, Brazil has appointed a government ombudsman to re-examine the Microsoft decision. The Brazilian press has reported that the ombudsman will make major changes in the decision, perhaps this month, according to CBEMA.

But CBEMA and other U.S. groups said the process toward imposing trade sanctions should continue until the Microsoft case and other trade disputes are resolved. The U.S. is also concerned about charges that a Brazilian company has pirated technology used in Apple Computer, Inc.'s Macintosh.

Move seen too late

A bulletin from the American Electronics Association suggested that Brazil's recent concessions will not be able to stop the U.S. sanctions. "The gesture appears to come too late. Attention [has shifted] to the broader issue of access to the entire computer market," the bulletin said.

Officials at CBEMA and ADAPSO, the computer software and services industry association, said it is especially important for the U.S. to push for free trade policies in Brazil because other developing countries look to Brazil as a trendsetter.

The U.S. proposed a ban on imports of Brazilian computer products and punitive tariffs on $105 million worth of other goods.

At a Dec. 18, 1987, hearing, CBEMA supported the imposition of tariffs but urged the government not to impose any sanctions that would harm the Brazil-based subsidiaries or affiliates of U.S. computer companies.

COMPUTER CAREERS

Dreaming about another career

Behind many professionals lurks a race car driver waiting to escape

BY JANET MASON
SPECIAL TO CW

As the new year gets under way, the thoughts of many MIS professionals turn to the promotions and new jobs that may lie ahead. But an inventive few also envision alternate careers.

Some denizens of the technical trade fantasize about becoming race car drivers or airline pilots, while others dream of running fast-food franchises or pioneering consulting firms.

For most professionals, these avocations will live only in their imaginations or become weekend hobbies. But a small number of dedicated dreamers intend to pursue their visions if and when they tire of their MIS jobs.

To foster new careers, some professionals intend to retire early. Others plan to incorporate the skills from their alternate backgrounds and hobbies into their MIS careers.

For example, if Jim Cataudella were a few years younger, he would be driving fast cars and mingling with Hollywood stars on the Indianapolis 500 racing circuit.

"I wouldn't give it a second thought. I'd walk right out of here without even saying I quit," he says. Instead, the systems programmer with Chase Manhattan Bank NA in New York only fantasizes about pursuing his Indy 500 hobby and concentrates on the more mundane matter of making the transition from a Wang Laboratories, Inc. computer to IBM equipment. Within five years, Cataudella expects to use the knowledge he gains in the IBM environment to work with an IBM network. In 10 years, his plans include managing a voice and data section of the company.

Cataudella's MIS experience combines with his interest in race cars to bring a new dimension to his passion. He is currently interested in the telecommunications and fiber-optics technologies that allow the pit crews at auto races to communicate with the drivers.

Right now, his interest is theoretical. "But who knows," he says, "someday that may be my break into the professional circuit."

Combining skills, careers

Some professionals, especially those who come from non-MIS backgrounds, find it easier to combine their technical skills with alternate careers.

Five years ago, Jane Maborter left social work for a career in MIS. Now she is a systems analyst with the First Pennsylvania Bank NA in Philadelphia. But until six months ago, she still preferred psychology to systems development. At the time, her fantasy was to become a clinical psychologist.

They hope to maintain a freshness and enthusiasm for their work for the duration of their careers.

Enjoying work is the 10-year career goal of Elias Sagianis, technical support manager with AT&T in New York. "In 10 years, I hope to have the same level of fun that I'm having today — the same interest, challenge and fascination wherever I am," he says.

MANY MIS PROFESSIONALS judge their job satisfaction by how much fun they are having. They hope to maintain a freshness and enthusiasm for their work for the duration of their careers.

However, after reaching the five-year mark in MIS, Maborter says she is much more comfortable with the field and would like to incorporate her social work skills and interest in people into her MIS job.

"I want to be somewhere where I keep growing and learning new things," Maborter says. "Then I can start aiming myself toward a position where I can use my interest in people along with my computer skills."

Eventually, in five to 10 years, she hopes this combination will lead to a management position and then perhaps to her own consulting business.

Many MIS professionals judge their job satisfaction by how much fun they are having.

Sagianis manages a team of technical experts involved in identifying applications and providing solutions to problems. His goals are to advance further in management and work in a variety of jobs at AT&T, including direct sales.

"When my job stops being fun, I may pursue another career, such as starting a fast-food franchise," he says.

Early retirement popular

With more companies offering early retirement packages and people's health remaining sound into their later years, retiring early is becoming quite attractive for computer professionals seeking a change.

Michael Watson, a data base administrator for Rockville, Md.-based Computer Data Systems, Inc., dreams of becoming a commercial pilot. But during the next several years, he plans to learn more technical information to become a senior systems programmer.

Watson started flying airplanes 13 years ago after serving time in the U.S. Navy. That experience may incite him to retire early to pursue his hobby as a second career.

New job, same company

Some MIS professionals, such as senior systems analyst James Stanton, find that they can change careers without leaving their current employers.

Stanton, who holds a master's degree in public administration, works for the county government in the Minneapolis/St. Paul area. After going as far as he can in the county's MIS department, he plans to switch back to public administration — maybe in a combined administrative and MIS role.

In his spare time, Stanton develops microcomputer educational software. One of his efforts is a package on the market called If Reelected, which he hopes will take off this year. He has also taught computer classes and would like to teach again in the future. "It doesn't pay very much," he says, "but I hope to get to a point where money doesn't matter that much."

Mason is a Philadelphia-based free-lance journalist.

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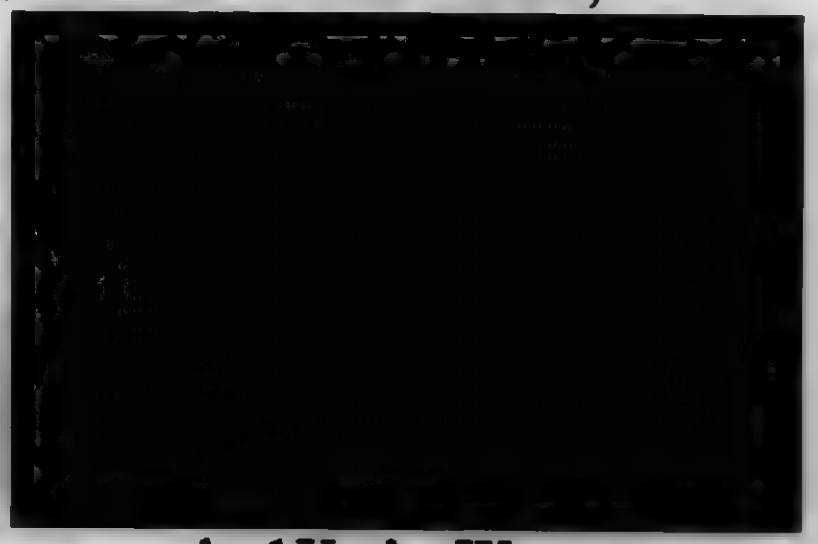

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This individual will be responsible for maintenance and operation of systems software, software selection, modification and problem resolution. Requirements include excellent oral and written communication skills, 3-5 years systems programming experience in CICS, DL/I and RACF. Demonstrated proficiency in Assembler and SMP/E is a must. Working knowledge/experience in ROSCOE, NETVIEW and TSO/E beneficial.

Programmer/ Analyst

The successful candidate should possess 3 years experience in large-scale IBM OS VS1 or MVS environment. Proficiency in COBOL, VSAM, CICS and OS/JCL. Qualified candidates will have a Bachelor's in Computer Science/related field, or possess equivalent work experience in programming/analysis. In addition, individuals must have proven experience in the MVS operating system. Banking experience is preferred.

Moore Financial Group offers excellent salaries, benefits and career growth potential. For consideration, please submit resume to Cindy L. Peterson, AVP and Manager, Corporate Staffing, P. O. Box 8247, Boise, ID 83733. An equal opportunity employer m/f/h. Principals only, please.

MOORE FINANCIAL GROUP

Computers

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For confidential consideration, submit resume with salary requirements to:

Oglethorpe Power Corporation
Human Resources Department
P.O. Box 1349
Tucker, Georgia 30085-1349

Oglethorpe Power Corporation
An Electric Membership Cooperative
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Position Opening for Electrical and Computer Engineering Manager of System Services

The University of Illinois at Urbana-Champaign has an immediate opening for a full-time Manager of System Services in the Department of Electrical and Computer Engineering. The ECE Department operates a computer facility with over 80 UNIX workstations (AT&T, DEC-nVAX, IBM-AT, SUN and Tektronix) and other miscellaneous PC's and microcomputers. Duties and responsibilities will include: 1) Management of several instructional computer laboratories 2) system software installation and maintenance; 3) supervision of departmental network installation, and 4) consulting with professors and teaching assistants.

Minimum requirements include an MS Degree in Electrical Engineering or Computer Science, at least 5 years experience with computer programming, and at least two years experience with the C programming language and some experience with Fortran. The candidate must have experience with UNIX systems internals, demonstrated ability to configure hardware systems and upgrades, and ability to interact effectively with a broad spectrum of faculty and staff.

Salary is highly competitive and depends on qualifications. In order to ensure full consideration, applications must be received by February 15, 1988.

Send resumes including names of at least three individuals who can be contacted for references to Harold Lawler, Assistant to the Department Head, Department of Electrical and Computer Engineering, 1406 W. Green Street, Urbana, Illinois 61801.

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Excellent opportunities exist in Chicago and/or Denver for the systems professional who seeks a leading edge, large scale technical environment. Positions provide support to one of the world's largest private networks built around IBM 90XX/30XX/43XX, 3725's, 3705's, PC XT/AT, and Sperry 1100-93/84 and DCP 40's. We're using MVS/XA, TPF 2.3, VM/CMS, MS/DOS and OS/1100.

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- *IDMS SW Support/CICS Systems Programmers*
- *Capacity Planning & Performance Specialists*
- *NCP/3725 FEP/VTAM Systems Programmers*
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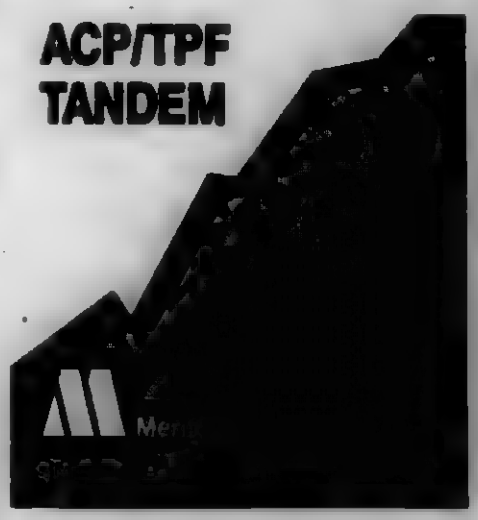

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Qualifications include experience in the management of computing services in an academic environment, effective communication skills, and substantial technical expertise in computing systems. Preference will be given to candidates who have a Ph.D. degree and experience as a member of a university teaching-and-research faculty.

This salary is negotiable, based upon experience and qualifications.

Resumes, complete with resumes and names of three references, should be sent before February 15, 1988, to: Roger A. Salowitz, Vice President and Associate Provost, 202 Administration Building, University of Notre Dame, Notre Dame, Indiana 46556.

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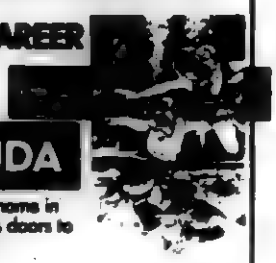

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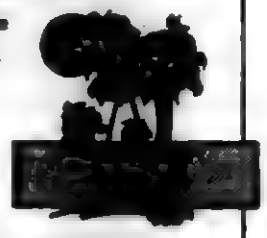

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Position requires BS/CS, 3 years' scientific programming experience on IBM mainframe, knowledge of Fortran, JCL and CLists. Other languages, graphics, demo, and simulation experience helpful. U.S. citizenship required.

This is an exceptional career opportunity for person meeting above requirements. We offer a professional R&D environment and competitive compensation package. Position located in West Lafayette, IN, near major university. Submit resume and salary expectations to HR Mgr., P&A, PO Box 2413, W. Lafayette, IN 47906. EOE

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Must have BA Degree in Computer Science or Data Processing; 1 year experience with business Basic language; minimum of 3 years experience as programmer; minimum of 2 years management experience in a time share center; Background in "computer assisted instruction" operations and software; knowledge of time share hardware and operating software; and general knowledge of micro computers and available software. Must be willing to relocate. $38,000-$40,000 annually. To apply send letter of interest and resume to: Personnel Office, Central Arizona College, Woodruff/Overfield Road, Coolidge, AZ 85228. Position will remain open until filled. EOE.

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Design, develop (using software tools), implement & test software for call processing on a server based distributed operating system for telecommunications. Position requires applying concepts of parallel programming for distributed call processing software & related database for record keeping. Experience not required but must have a Master's degree in Computer Science. Requires a school project in implementing & testing a server based distributed operating system. Graduate study must have included one course in Software Tools & one course in Parallel Programming. Salary offered $38,000 per/yr, 40 hrs per/wk, 8 A.M. to 5 P.M., M-F. Send required resume to Illinois Department of Employment Security, 401 South State Street - 3 South, Chicago, Illinois 60605. Attn: Mrs. S. Childers, Ref. #7588-S. An Employer Paid Ad.

Computer Software Engineer wanted to analyze complex systems; design, develop and implement distribution and manufacturing systems software for Burroughs small and large frame systems using COBOL, ALGOL, Data II, GEMCOS, COMS and 4th Generation language LINC. Requires Bachelor's degree in Mechanical Engineering or Computer Science and two years experience in the job offered or two years related experience as a Computer Systems Analyst. $37,400.00 per year; 40 hours per week. Send resume to 7310 Woodward Ave., Room 415, Detroit, MI 48202. Ref. #72887 "Employer Paid Ad".

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CAREER INDEX

November 1987 computer recruitment advertising activity*

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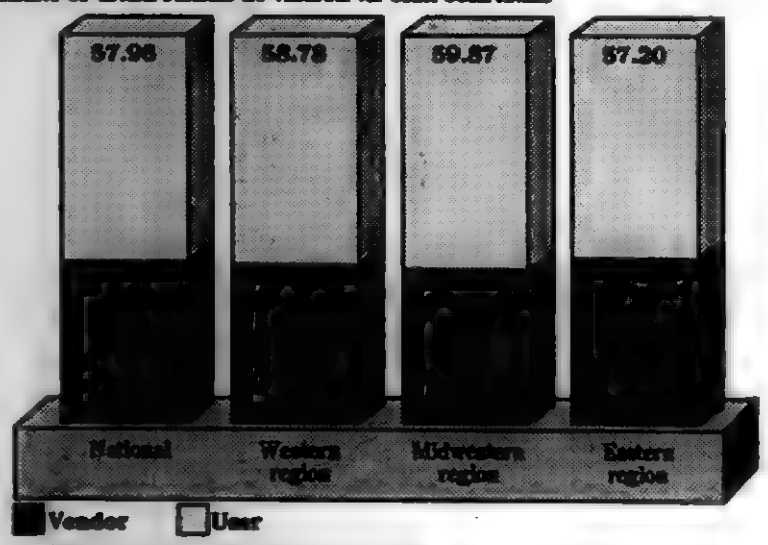

*Analysis of computer recruitment advertising space in Computerworld and selected major U.S. newspapers

INFORMATION PROVIDED BY CW PUBLISHING, INC.'S RECRUITMENT MARKET RESEARCH DATA BANK

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402/333-2863

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Suite 430
Overland Park, KS 66210
913/451-9600

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data processing

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4GL in VM Environment

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You will have project leadership responsibilities in planning and conducting feasibility studies, and in systems analysis, design and development. You will also have key user training and support responsibilities.

A minimum of 2 plus years decision support system development experience in a VM environment is preferred. Knowledge of OMF with SQL/DS, FOCUS, SAS or DB2 desirable, with two or more years MVS/TSO experience. Superior organizational, problem solving, project management and technical training abilities are necessary. BSCS or equivalent preferred.

Miller Brewing Company is a subsidiary of the Fortune 50 Philip Morris Companies Incorporated. We offer competitive salary, complete benefits, and relocation assistance to the attractive, comfortable Milwaukee area. Send resume or letter to: Corporate Recruitment Manager, Dept. #1000-88, MILLER BREWING COMPANY, 3939 W. Highland Blvd., Milwaukee, WI 53201.

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ENVIRON

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This position is responsible for establishing and auditing software policies, standard project procedures, standard programming procedures, documentation standards as well as system security and system archives. The ideal candidate will have five years experience in software quality control preferably in a heavy government regulated industry. Prior work experience should include UNIX, C, PASCAL and fourth generation languages with Sperry 1100 experience an advantage.

For immediate consideration, please submit your resume to:

Mike Harris
ENVIRON CORPORATION
4649 LeBourget Drive
St. Louis, Missouri 63134

EOE/AAP Employer

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EOE

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The person we seek will have at least 5 years experience involving large system project management methods with an IBM environment. This must include the actual implementation of project management methodologies at 2 or 3 prior sites along with the associated knowledge of the impact brought upon a corporation by those changes.

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The successful candidate will be Senior member of the team responsible for maintaining an ADABAS database management system to provide database service, to implement and maintain system security and performance monitoring software and also to develop improved techniques in the use of database software. Responsibilities include installing, maintaining and monitoring Software AG products for both administrative and academic use. Products include ADABAS, NATURAL, NATURAL SECURITY, PREDICT and REVIEW. ADABAS experience preferred; however, any database experience is acceptable.

The Board of Regents Higher Education Computing System (BOR/HECS) is located in Vermillion, South Dakota on the University of South Dakota campus. The computing center is responsible for state-wide administrative computing functions as well as providing academic computing to all state institutions of higher education. The qualified applicant must have graduated from a college or university with a bachelor's degree in computer science or a related field plus three years of data processing project development experience of which two years must be directly related to systems work, or an equivalent combination of education and experience. The maximum starting salary is $36,164 annually.

Vermillion is located near the Missouri River in extreme southeastern South Dakota, 60 miles south of Sioux Falls, South Dakota and 120 miles north of Omaha, Nebraska.

Application and/or resume must be postmarked on or before February 19, 1988. For more information call Rachel Barrett at (605) 677-5047 or send state application form or resume to University of South Dakota, Personnel Office, Slagle Hall 237, 414 E. Clark Street, Vermillion, South Dakota 57069.

The South Dakota Board of Regents is an EOE/AA employer and educational system.

COMPUTER SCIENCE

ANALYST/ PROGRAMMER

Energy Management System (EMS)

Tri-State Generation is a nonprofit, wholesale supplier of electrical power to 25 rural distribution cooperatives in Colorado, Wyoming and Nebraska.

This position is responsible for the development and implementation of realtime software systems.

Five years experience with realtime computer systems software development. Knowledge of electric power SCADA and/or applications software desirable. Leads and Northrup EMS using Gould SEL 3277 computers, with MPX operating system experience desired. FORTRAN programming experience.

Competitive benefits package including relocation assistance.

Submit resume and salary history to or call Pilar Herrera.

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Ext. 161

Tri-State Generation & Transmission Association, Inc.

Dept. 0148
PO Box 33695
12076 Grant St.
Denver, CO 80233

EOE/M/F/H/V

DATA PROCESSING PROFESSIONALS

Senior Systems Analyst Programmer

3 years minimum experience in programming or analysis with one year in systems analyst work. Experience with a system development methodology such as Warnier/Orr, Method - 1 or Yourdon. Heavy experience in manufacturing systems.

Systems Analyst Programmer

1 year minimum computer programming experience. Experience in programming for manufacturing systems preferred.

Both positions require degree and IBM experience on large mainframe. Must be competent in COBOL, CICS, OOS/VSE JCL and experienced in DBMS, preferably ADR DATACOM/DB. Will consider experience in DL1, SQL, DB2 or any relational type DBMS.

Senior Data Base Analyst

Degree preferred. 3 years minimum experience in large data base development projects and/or data base design. Proven experience with ADR DATACOM/DB, Datadictionary and IDEAL. Must be familiar with DOS/VSE Operating System and JCL, VSAM, CICS.

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Computerworld
Box 9171
Framingham, MA 01701-9171

EOE

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ACP/TPF programmer required. Design, develop and implement the Flight Operations System using Assembler, ACP MACRO, and PL/1, in an ACP/TPF real-time environment. Must upgrade and interface Flight Operations System with ACP/TPF core resident programs and file resident programs. Must internally manage data base in such a way that it will be transparent to Flight Dispatch Personnel. Will prepare, analyze and evaluate technical and functional system specifications of software and hardware in order to design and develop this system.

Applicant must have 2 years college credit in Computer Science, Math or Engineering plus two years ACP/TPF Airline Environment programming experience. Salary $636/week for a 40 hour work week.

Apply at the Texas Employment Commission, Fort Worth, Texas, Job Order #4763833. Ad paid for by an equal employment opportunity employer.

SOFTWARE ENGINEER: Develop & design software systems for use within the insurance industry. Able to develop Computer Aided Instruction (CAI), & computer network systems using network error detection, database management, recovery & concurrency control. Proven experience on SNA/ODEM protocol. Must have knowledge of ISO/OSI protocol. Proficient in C & 8086 Assembler. B.S. in Computer Science & 2 yrs. experience, or M.S. in Computer Science & no experience required. Salary: $2,400.00/mo. Job site & interview: Santa Monica, CA. Please send this ad & your resume stating your job qualifications to Job # SK13547, PO Box 9480, Sacramento, CA 95823-0860 not later than 2/6/88.

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Five years experience with VAX equipment, associated higher order language operating systems, and a major relational database which includes three years of detailed experience with the INGRES database system. Also two years experience as a Project Manager of a major ADP support program. BS in Computer Science or related field required.

SYSTEMS ANALYST

Five years ADP experience including three with VAX equipment and four with a major relational database which includes at least two years with the INGRES database system.

DATA BASE ADMINISTRATOR

Five years experience with VAX equipment and an associated higher order relational database language including at least two years as a Data Base Manager for a major activity. BS in Computer Science or related field required.

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U.S. Citizenship required.

Send Resume to:

RD/International, Inc.
722 Edward Wakefield
Williamsburg, VA 23185

EOE

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Will analyze and design modification and enhancements to ACP/TPF operating system software.

Will develop operating system specifications, code, test, install programs to satisfy their programming functional specifications. Responsible for training & supervising work of 2 or more ACP/TPF entry level programmers.

Applicant must possess a bachelors degree or equivalent with major field of study in CS, Math or Engineering plus 2 years experience ACP/TPF airline programming.

Education and experience will be found acceptable if applicant has combination of professional development courses and work experience found to be equivalent to a BS degree in Computer Science. In addition to 2 years of ACP/TPF airline programming.

Salary is $3,042/month for a 40 hour work week.

Apply at the Texas Employment Commission, Ft. Worth, TX. Job Order #4763834. Ad paid by an equal employment opportunity employer.

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Will act as an ACP/TPF Software Engineer Consultant utilizing assembler programming language to upgrade airline reservation systems in ACP/TPF programming environment.

High School education and 4 years ACP/TPF airline programming experience required.

Salary is $15.25/hour for a 40 hour work week. Job location 4300 Amon Carter Blvd., Fort Worth, TX.

Interested applicants please contact Chris Lancashire or Alice Cornet, Computer People, Inc., 2049 Century Park East, Ste. 3360, Los Angeles, CA 90067. 213/551-2947.

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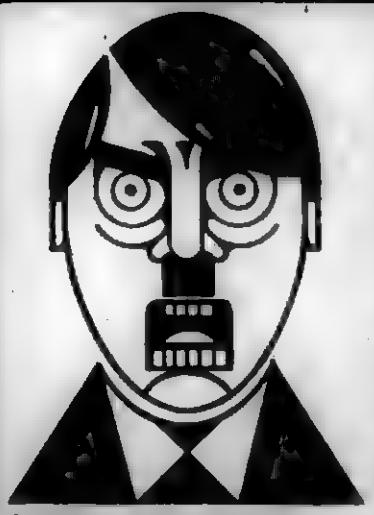

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Chicago, IL 60606 (312) 977-1600

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CLEVELAND: Management Recruiters, Inc.
Shaker Office Tower, Suite 420
East 12th & Euclid
Cleveland, OH 44114 (216) 621-4220

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Dallas, TX 75240 (214) 661-9600

DENVER: Abacus Consultants, Inc.
Denver, CO 80218 (303) 758-5004

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Southfield, MI 48075 (313) 353-4000

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(919) 373-1481

HARTFORD: Data Careers Incorporated
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HOUSTON: Career Consultants, Inc.
Houston, TX 77056 (713) 626-1100

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LOS ANGELES: Superior Personnel, Inc.
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Bloomington, MN 55437 (612) 835-8744

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NEW YORK: Baker Associates, Inc.
New York, NY 10007 (212) 227-7370

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PROGRAMMER ANALYST

The qualified candidate must be experienced in an IBM mainframe environment under VM/DOS/VSE. Programming in COBOL, JCL, strong VSAM and some Systems design experience a must. Financial applications background implementing software packages and command level CICS a definite plus but not essential.

SR. SOFTWARE PROGRAMMER ANALYST

The qualified candidate will have a minimum of 3-4 years hands-on experience with the installation and maintenance of DOS/VSE. At least 1 year of that experience must be with SP2.1. The candidate must be knowledgable in the working of VSAM data management and the DYNAM suite of programs from CA. National runs 6 guest VSE machines under VM. The qualified candidate will be knowledgable of CMS and VM/VSE handshaking to maintain these systems. Good interpersonal skills are necessary. The person filling this position will be supporting others at many different levels of technical expertise.

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If your experience matches one of our requirements listed below, we encourage you to apply.

-Two or more years experience in the design, development and testing of MVS mainframe applications systems using PL/1 and CICS Command Level is required. Experience in VSAM, CMS and Assembler is highly desirable.

-Two or more years experience in the design, development and testing of MVS mainframe application using PL/1 and VSAM required. Experience with IBM PC's and CMS is a plus.

-Two or more years experience on new development projects in an MVS or VAX environment is required. One or more years experience using IBM PC's is desirable. Must be willing to work in a micro-mainframe environment on new development projects. Experience with dBase III and a 4GL such as ORACLE, NOMAD, FOCUS, IDEAL/R or ADABASE is preferred.

-Three or more years experience in the design development, testing and support application systems in a mainframe environment is required. One or more years of project leadership including planning, estimating and supervisory experience is required. Experience with Model 204 Data Base or a 4GL and VAX hardware is a plus.

-Two or more years experience in the development and testing of application systems in a mainframe environment is required. Additionally, one or more years experience in the design coding and testing of programs using Model 204, a 4GL or development in a VAX environment is required.

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Tallahassee, FL 32308
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Computer Services
North Broward Hospital District
1625 S.E. Third Avenue
Ft. Lauderdale, FL 33316

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SYSTEMS ANALYST PROGRAMMER - Support IBM and WANG specifications development in financial and banking network environment. Require Bachelor's in Computer Science or Mathematics, ADABAS, IMS DB/DC, WANG VS, financial and banking data processing background, NATURAL, DYAL 280. Salary: $38,000 per annum. Job location Los Angeles, CA. Reply to CW-85002, Computerworld, Box 9171, Framingham, MA 01701-9171

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Roger Fraumann
Staff Director
Lachman Associates, Inc.
Westmont, IL

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WASHINGTON, D.C.: 1110 Fairview Park Drive, Suite 1040, Falls Church, VA 22042, (703) 876-5100

CHICAGO: 2600 South River Road, Suite 304, Des Plaines, IL 60018, (312) 827-4433

LOS ANGELES: 18004 Sky Park Circle, Suite 100, Irvine, CA 92714, (714) 261-1230

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An IDG Communications Publication

Data Processing

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SYSTEMS ANALYSTS

To qualify, you will need a minimum 5 years experience in a sizeable IBM environment. Proficiency in COBOL and OS/JCL is essential, as are excellent communication skills. Some project management experience is also a plus as successful candidates will be selected to serve in this position through implementation of larger projects on which they have done the analysis and design.

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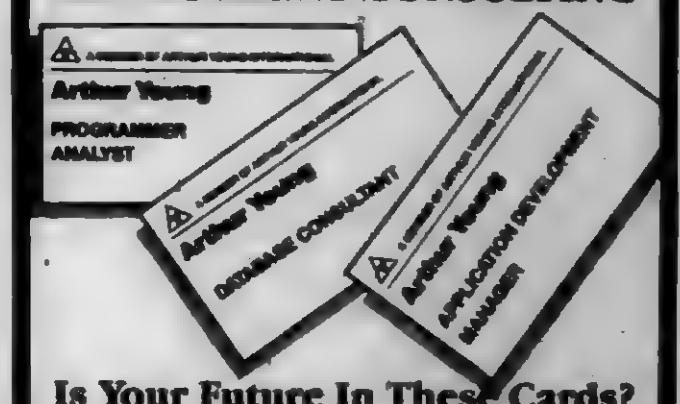

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We are looking for a qualified individual to conduct technology assessment activity and provide high level evaluations of hardware, software, and telecommunications technologies and their impact on existing and future OCLC products, policies and plans. Applicants should have an M.S. in Computer Science plus two years experience in an advanced research and development environment and a broad knowledge of hardware, software, and telecommunications technologies. Knowledge of library automation systems is highly desirable, as well as excellent verbal and written communication skills.

Competitive salary and a comprehensive benefits package will be offered. For position description and company information, contact Bill Wolfe, Employee Relations Specialist, 1-614-764-6068.

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Bjorn Nordemo
Vice President
Data Arts & Sciences, Inc.
Weston, MA

Bjorn Nordemo is Vice President of Data Arts & Sciences, Inc. (DASI), a contract software agency based in Weston, MA. Although they place people in permanent positions, DASI most often places 'contract programming personnel' — consultants who fit special niches for short or long term commitments in corporations in the New England area.

"Our agency specializes in finding computer consultants — designers of systems, evaluators of hardware and software requirements, and computer programmers to mention a few. We recently were introduced to Computerworld as a potential source for finding these consultants," states Bjorn. *"I liked the idea because I know Computerworld has a broad reach — from MIS/DP directors to computer programmers, in multiple industries and multiple markets — and that's what DASI needs."*

"We had four specific positions for MIS/DP consultants that we needed to fill in northern New England. We used the local newspaper on a weekly basis, but people who are willing to move usually aren't reading the local Sunday paper. So, I felt this was a perfect opportunity to try Computerworld," says Bjorn.

According to Bjorn, he's quite satisfied with the results. *"From Computerworld, we filled 75% (3 out of 4) of the positions with the responses from the first week, and the remaining position with the response from the following week. These results alone made my ads in Computerworld worthwhile."*

And Bjorn also recognizes a second benefit to advertising in Computerworld. *"The beauty of using Computerworld is that it's read by people in the computer industry who have a need for consultants, as well as being read by consultants who need to keep up to date on the marketplace,"* says Bjorn. *"So we not only reach qualified candidates to fill our current openings, but we are creating awareness of the services that DASI has to offer,"* says Bjorn.

"We have some great plans for expansion and as we do, Computerworld is going to play a strong hand in helping us accomplish our goals," concludes Bjorn.

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CHICAGO: 2600 South River Road, Suite 304, Des Plaines, IL 60018, (312) 827-4433

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Working in the area of telecommunications feature testing (such as call handling features) responsible for Operator Service Position system. Particular attention given to designing, testing and implementing software for computer network and use of cryptography and data security to analyze security of networking the system. Software is written in "C" programming language and implemented under a UNIX environment. Experience not required but candidate must have completed all degree requirements for receiving a Master's in Computer Science. Graduate work must have included a project in implementing a computer network and one course in Cryptography & Data Security. Salary offered $36,000 per year, 40 hours per week, 9 A.M. to 5 P.M., M-F. Send required resume to Illinois Department of Employment Security, 401 South State Street - 3 South, Chicago, Illinois 60605, Attn: Mrs. S. Chilkiri. Ref. #7583-S. An Employer Paid Ad.

SYSTEMS LIBRARIAN: Required qualifications: master's degree from an ALA accredited institution; substantial experience as a professional librarian in an academic library, including experience with computer based systems. Preferred qualifications: knowledge of library systems analysis, computer hardware/software technologies and MARC; demonstrable communication and organizational skills; experience in planning, procuring, and implementing an online public access catalog and circulation system; experience in writing technical specifications for on-line library systems; and other educational background/training related to the duties of the position. A second master's degree in a subject field is a preferred qualification. Appointment date: July 1, 1988. Salary range $21,336. - $32,988. Correspondence, applications, and confidential papers should be sent by April 15, 1988 to: Mrs. Lillie Parker, University Librarian, Henry Madden Library, California State University, Fresno, Fresno, CA 93740-0094. An Affirmative Action/Equal Opportunity Employer.

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Systems Consultant: Job in Manhattan, NY. Responsible for development of required software involving mathematical analysis of end-user requirements, documentation of hardware and software support of daily parameter requirements for on-line systems, control of distributed parameter systems, analysis for decentralized control of large-scale systems and microprocessor-based controls; and transfer functions and block diagrams as applied to micro-scale systems using knowledge of VAX 11/780, VMS and COBOL. B.S. in Mechanical Engineering, Computer Science, Math or Electrical Engineering, plus 2 yrs. in job offered or 2 yrs. as Systems Analyst using VAX 11/700 series req'd. 40 hrs/wk; $53,500/yr. Send resume or letter in duplicate describing qualifications to: S.B. #947, Room 501, One Main Street, Brooklyn, New York 11201.

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The Applied Computer Analyst will provide analysis of computing problems with regard to feasibility and method; consult with users regarding their computing needs and aid in the development of plans to meet these needs; direct computer programmers engaged in consulting, programming, and teaching functions.

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You'll participate in the design and development of windows software and interact at a detailed technical level with other engineering groups within Digital. Ideally, you'll have the following experience:

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For consideration or more information about the above positions, please send your resume to: L. Taylor, Manager, Dept. 0118-0804, DECwest Engineering Group, Digital Equipment Corporation, 14475 NE 24th, Bellevue, WA 98007. Proof of legal right to work in the U.S. is required.

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— Max Steiner
Director of Marketing
Kenda Systems, Inc.

Max Steiner remembers his days as a salesman, when he would make calls and, invariably, see a copy of *Computerworld* on the desks of his clients. That alone made an impression on Max.

Today, he is Director of Marketing for Kenda Systems, a software services firm with offices in New England, New York and Washington, DC, and specializing in placing contract engineers within the high-tech industry. Having grown by 400 percent annually for the last three years — and having placed several hundred professionals in less than three years, Kenda Systems is an acknowledged leader in the industry.

The impression that *Computerworld* has made on Max early on has been a lasting one. He directs Kenda's advertising. And he directs it to *Computerworld*.

"We are looking for national exposure. First, we want to make people aware of Kenda Systems and then increase the number of resumes sent to us. I believe that greater recognition will lead to greater interest — and understanding of what we can do for people.

"It only follows that we can best accomplish our goals by advertising with the industry leader — it answers all our needs. Computerworld *reaches the qualified software professionals we're looking for.*

"And we have the proof. We've seen as much as a 30 percent increase in resumes coming into our offices. Plus we're getting everything we hoped for: national recognition and responses from top people from all over the country. Clearly, we're quite pleased with the results.

"We're hearing from software engineers who are impressed with the fact that Kenda's in Computerworld. *The bottom line is results. What I'm seeing, thanks to* Computerworld, *is beyond our expectations."*

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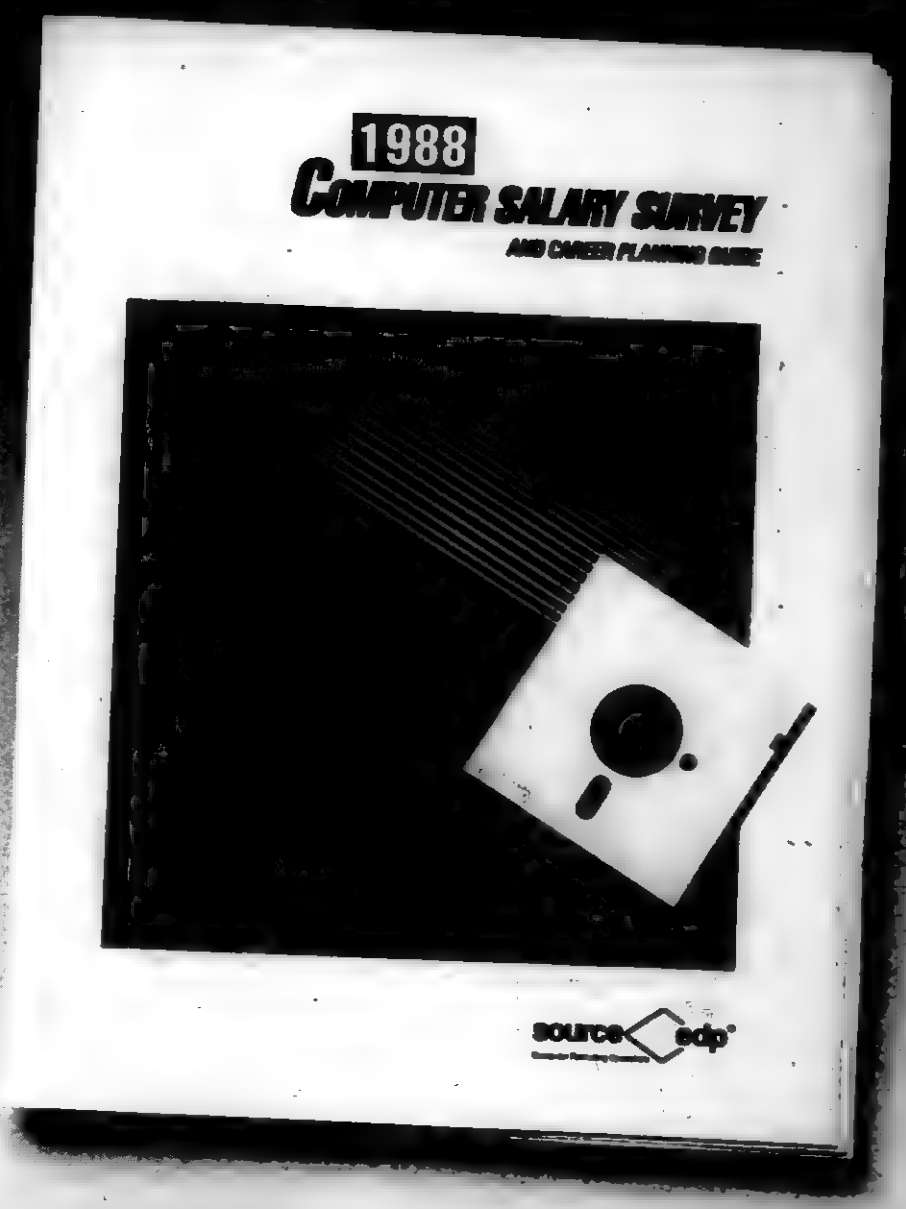

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"...Computerworld has proved to be one of the most effective media for reaching our high-tech target groups."

— Michael Gill
Senior Vice President/
Creative Director
Thompson Recruitment Advertising

Michael Gill is Senior Vice President and Creative Director of Thompson Recruitment Advertising, based in Los Angeles, California. In 1986, Thompson won more EMA awards than its three largest national competitors— combined. The company's advertising goal is a simple but demanding one: To create the most effective recruitment advertising in the marketplace.

Thompson can point to many reasons for its success. And one of the first that comes to mind, Michael says, is Computerworld and its Employment Today section.

"Today's job market continues to change rapidly. It's no longer enough to merely post a job and hope that people will come running. This new competitive marketplace demands that we use many new approaches and do a lot more research. Simple demographics just aren't enough any more. Fortunately, Computerworld understands this need for research that goes beyond numbers alone.

"For us, Computerworld has proved to be one of the most effective media for reaching our high-tech target groups. We've discovered that it is must-reading for many of the high achievers that our clients want to attract.

"In fact, we recommend Computerworld to our clients because we know that it will reach prospects most effectively. Among other benefits is the quality of the publication itself, which reinforces the quality of our campaigns.

"The successful recruiter knows that today's marketplace is highly competitive, and that tomorrow's marketplace will be even more so. At Thompson, we expect that tomorrow, as today, Computerworld will be an invaluable ally in helping us to achieve our mission of creating the most effective recruitment advertising in the marketplace."

Computerworld. We're helping employers and top professionals get together in the computer community. Every week. Just ask Michael.

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MARKETPLACE

'It's going to be a great month'

Volume transactions on the rise; dealers see micro trends emerging

BY ELIZABETH LOZANO
BOSTON COMPUTER EXCHANGE CORP.

The market experienced heavy trading and high profits the week of Jan. 4. Volume transactions of used equipment are on the rise, and trade-in equipment is flooding the market. As one California reseller exclaimed, "It's going to be a great month."

Used equipment dealers are excited about the trends they see in the microcomputer market. There is a growing difference between the interests of small businesses and those of large corporate users.

Smaller users are neither ready nor willing to abandon DOS. When they upgrade, they are primarily buying Intel Corp. 80386-based DOS machines, networks and minicomputers, while large corporate users are buying IBM Personal System/2 models and adopting OS/2, the proprietary operating system developed by IBM and Microsoft Corp.

In spite of IBM's marketing push, there are still a lot of users who are literally missing the bus.

Network and minicomputer resellers are excited as well. OS/2 makes it easier to decide to purchase a minicomputer system instead of dealing with the uncertainties of personal computer networking.

PC trading even

The IBM Personal Computer traded even at $700 for the week ending Jan. 8. The classic 256K-byte, two-floppy disk drive monochrome system experienced a decrease in both supply and end-user demand.

The PC XT Model 086, however, experienced an unexpected sharp increase in demand. With the high price of the 20M-byte Model 089, the 10M-byte Model 086 is worth purchasing and upgrading. The Model 086 closed even at $1,300 with a high trading volume.

The PC AT models also performed well in the week ending Jan. 8. The Model 099 closed down slightly at $2,225, with demand for systems with larger storage increasing. The Model 339, however, continued to increase in value this week and closed at $3,550.

Compaq Computer Corp. trading was a mixed bag. The Portable I closed even with the PC Model 076, dropping down to $700. The Portable II closed even at $1,700 with a decrease in volume. The Portable III, however, was in hot demand and closed up, at $2,600. The 10M-byte luggable Compaq Plus closed down $25 at $1,250, and laptops such as the Toshiba America, Inc. T3100/10 became more available on the used market.

Compaq 286 trading experienced conditions consistent with those of the week ended Jan. 1. The Deskpro 286 model closed even at $2,175. The Compaq 386 models continue to dominate 386 trading, although supply conditions remain unfavorable for buyers. The Deskpro 386 closed up at $4,375, with tight supply.

In addition, Apple Computer, Inc. Macintosh buyers are on a rampage. Used MacSE machines are in high demand. The MacSE closed up at $1,925, with buyers outnumbering sellers by at least 4 to 1.

The Mac Plus, however, took a tumble in the week ended Jan. 8. The machine that took students and the business world by storm closed down at $1,300. The Mac 512E closed even at $1,000, with an increase in demand for quantities.

The Boston Computer Exchange can be reached at 800-BOCOEXX, or 617-542-4414 in Massachusetts.

The BoCoEx Index

Closing prices report for the week ending Jan. 8, 1988

	Closing price	Recent high	Recent low
IBM PC Model 076	$700	$875	$350
XT Model 086	$1,300	$1,425	$800
XT Model 089	$1,850	$2,050	$1,100
AT Model 099	$2,225	$2,900	$2,250
AT Model 339	$3,550	$3,700	$2,800
Compaq Portable I	$700	$975	$600
Portable II	$1,700	$1,900	$1,550
Portable III	$2,600	$2,750	$2,300
Plus	$1,250	$1,300	$1,000
Deskpro 286	$2,175	$2,500	$2,050
Deskpro 386	$4,375	$4,600	$4,000
Macintosh 512	$850	$875	$650
512E	$1,000	$1,100	$875
Plus	$1,300	$1,375	$1,000
SE	$1,925	$2,150	$1,700
II	$4,000	$4,200	$3,500
Hewlett-Packard Laserjet	$875	$960	$500
DEC LQ-P02	$900	$1,050	$350
Wang PC	$825	$1,000	$400

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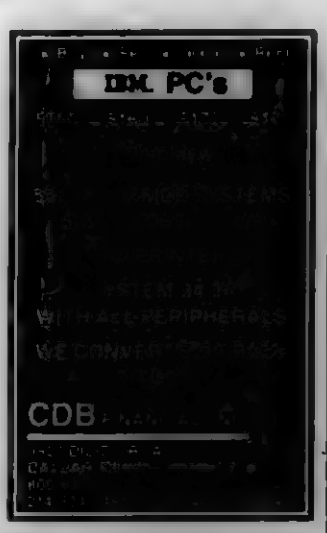

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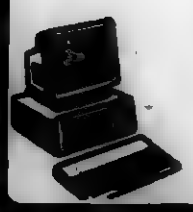

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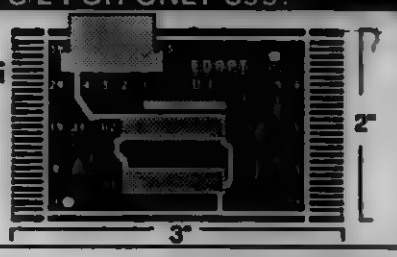

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Poor user training is expensive

BY NAOMI KARTEN
SPECIAL TO CW

Computer training is expensive, no question about it. But what is the cost, or organizational impact, of sending people into the trenches without adequate formal preparation?

For many users, ease of learning does not apply to the cryptic commands and ornery error messages they see on their screen. If training isn't available, repercussions can fall into two categories: limited use of expensive computer equipment and the potential for misuse.

The obvious price of limited use is the cost of the equipment plus employee time, as users flounder away on their own. Less obvious, however, is the lost opportunity — the value of the benefit that could be achieved.

Without training, users take longer to reach a given competency level. Many trainers estimate that learning a specific set of skills takes three to six times as long without training. Most personal computer classes run a minimum of one day; thus, users who learn on their own must devote several days.

But many potential users simply do not bother. Learning from scratch on their own is impossible for many people. So the equipment sits idle.

Other users plunge ahead and learn as much as they can on their own. But since they are forced to take time from other priorities, they rarely reach the same level of competency as trained employees.

Untrained users often make only minimal use of the capabilities of their system. Familiar examples are the failure to use word processing style sheets, spreadsheet range naming functions and Microsoft Corp. MS-DOS batch files.

Because untrained users frequently lack a broad perspective of what computers can do, they are unable to see beyond the bounds of the current application.

That product-oriented focus results in an inability to intelligently apply the technology to solve business problems and identify opportunities.

Karten is president of Karten Associates in Randolph, Mass., and editor of "Managing End-User Computing."

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Computerworld Focus 1988 Schedule

Issue Date	Closing Date	Topic	Show Distribution
Jan. 6*	Dec. 4	Communications/ Connectivity	Communication Networks
Feb. 3	Dec. 31	Software Operating Systems & Languages	Uniforum
Mar. 2*	Jan. 29	Departmental Computing	NCGA/Interface/ WCC
Apr. 6	Mar. 4	Data Security	
May 4	Apr. 1	Communications/ Connectivity	Comdex Spring/ ICA
June 1*	Apr. 29	PC End User Productivity	PC Expo
July 6	June 3	Software	
Aug. 3	July 1	Departmental Computing	
Sept. 7	Aug. 5	Communications	TCA
Oct. 5	Sept. 2	Software Productivity	Unix Expo/Info '88/ Dexpo West
Nov. 2	Sept. 30	PC/Connectivity	Comdex Fall
Dec. 7	Nov. 4	Departmental Computing	

* Search Ad Study Issue

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Micro strategies unfold

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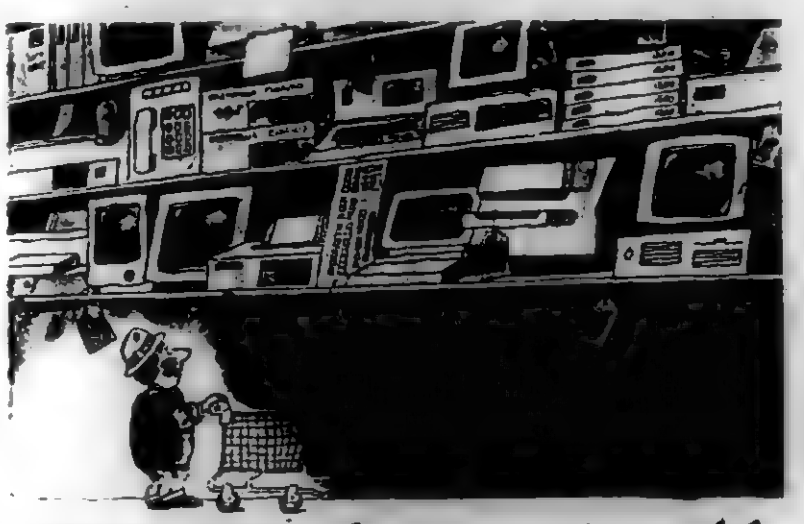

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Feb. 8	DEC-Compatible Software	Jan. 21
Feb. 29	Performance Management/ Capacity Planning	Feb. 12
March 14	DBMS	Feb. 26
March 28	Micro-to-Host-Links	March 11
April 11	PCs (IBM-Compatible) Portables/Laptops	March 28
April 25	TBA	April 8
May 9	Printers	April 22
May 23	Data Communications	May 6
June 6	CASE	May 20
June 20	The SNA Market	June 3
July 11	Disaster Prevention & Recovery Products & Services	June 24
July 25	Productivity Software	July 8

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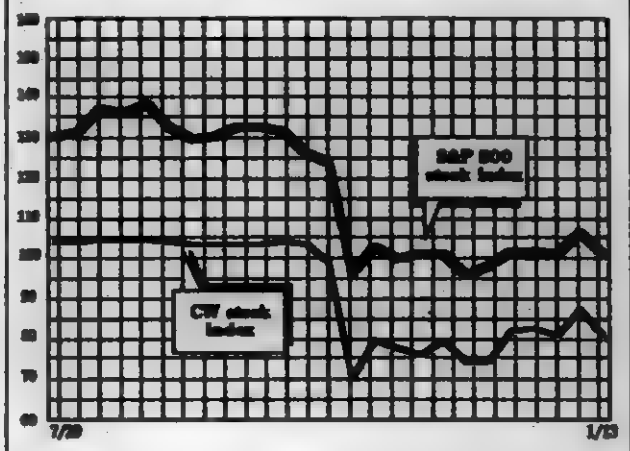

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Peripherals & Subsystems	87.6	82.2
Leasing Companies	103.9	101.1
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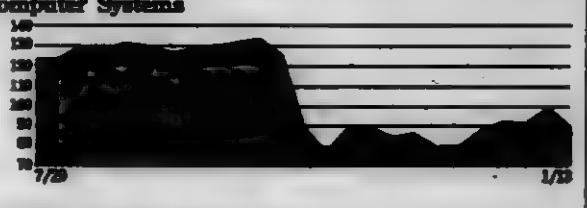
Communications

Computer Systems



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Semiconductors

Peripherals and Subsystems

Leasing Companies

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CLOSING PRICES WEDNESDAY, JANUARY 13, 1988

		PRICE			
		52-WEEK RANGE ($)	CLOSE JAN. 13 1988	WEEK NET CHANGE	WEEK PCT CHANGE
Communications and Network Services					
N	AMERICAN INFO TECHS CORP	100 74	86.38	1.13	1.32
O	ANDREW CORP	19 11	13.00	-1.50	-10.34
O	ARTEL COMM CORP	5 2	2.13	0.00	0.00
N	AT&T	36 29	28.00	-0.25	-0.88
O	AVANT GARDE COMP INC	4 2	2.25	0.13	5.88
O	AVANTEK INC	19 7	7.13	-1.38	-14.93
E	AYDIN CORP	28 16	16.88	-0.38	-1.95
N	BELL ATLANTIC CORP	83 61	68.75	-0.25	-0.37
N	BELLSOUTH CORP	44 39	37.25	0.13	0.34
O	COMPRESSION LABS INC	6 2	3.13	-0.75	-19.35
O	COMPUTER NETWORK TECH	6 2	2.00	0.06	3.20
O	CONTEL CORP	40 26	30.63	0.63	2.08
O	DATA SWITCH CORP	9 4	6.38	0.00	0.00
O	DIGITAL COMM ASSOC	48 20	28.00	-4.00	-12.12
O	DYNATECH CORP	44 14	19.75	-2.00	-9.20
O	FERRONICS INTERNATIONAL INC	11 2	2.69	0.13	5.00
O	GANDALF TECHNOLOGIES	11 5	6.13	-0.38	-5.77
O	GENERAL DATACOMM INDS	14 3	4.00	-0.13	-3.03
N	GTE CORP	40 29	34.63	-1.25	-3.48
O	INFOTRON SYS CORP	12 6	6.75	-0.25	-3.57
N	ITT CORP	58 42	44.13	3.13	8.61
N	M A COM INC	16 7	9.75	-0.38	-3.70
O	MCI COMMUNICATIONS CORP	12 6	10.38	-0.13	-1.19
O	MICOM SYS INC	16 7	8.25	-0.50	-5.71
O	NETWORK SYS CORP	19 7	8.63	-0.75	-8.00
N	NORTHERN TELECOM LTD	34 14	28.13	-0.75	-2.57
O	NOVELL INC	30 12	21.50	-3.00	-12.24
O	NYNEX CORP	78 68	84.25	-0.75	-1.19
N	PACIFIC TELESIS GROUP	34 9	28.63	0.13	0.47
N	PARADYNE CORP	9 4	3.75	-0.38	-9.09
A	PENRIL CORP	4 1	3.25	-0.13	-3.70
N	PLESSEY PLC	41 23	28.38	-1.13	-3.81
N	SCIENTIFIC ATLANTA INC	20 9	11.25	-0.63	-5.26
N	SOUTHWESTERN BELL CORP	48 32	35.13	0.38	1.08
O	3 COM CORP	28 12	18.88	-2.50	-11.70
N	TIMEPLEX INC	41 17	32.25	-3.25	-9.15
O	UNGERMANN BASS INC	16 5	7.38	-0.50	-6.35
N	US WEST INC	69 48	58.38	-0.88	-1.71
Computer Systems					
O	ALLIANT COMPUTER SYS	37 6	7.25	-1.50	-17.14
O	ALPHA MICROSYSTEMS	6 3	4.38	-0.13	-2.78
O	ALTOS COMPUTER SYS	17 9	10.88	-1.25	-10.31
A	AMDAHL CORP	50 19	31.88	-4.75	-12.97
O	APOLLO COMPUTER INC	26 9	11.75	-1.88	-13.76
O	APPLE COMPUTER INC	60 22	42.25	-1.50	-3.43
O	BOLT BERANEK & NEWMAN	28 12	16.88	-0.63	-3.57
O	BRITTON LEE INC	5 1	1.38	0.00	0.00
N	COMPAQ COMPUTER CORP	79 22	52.88	-6.13	-10.38
O	COMPUTER AUTOMATION INC	17 4	8.38	-1.00	-10.67
O	COMPUTER CONSOLES INC	12 2	4.88	-0.75	-13.33
O	CONCURRENT COMP CORP	24 11	16.50	-0.63	-3.65
N	CONTROL DATA CORP DEL	38 15	19.88	-3.38	-14.52
O	CONVERGENT TECH	12 3	3.88	-0.50	-11.43
O	CONVEX COMPUTER CORP	22 6	7.88	-1.00	-11.27
O	CRAY RESH INC	138 47	72.25	-7.38	-9.26
O	DAISY SYS CORP	13 5	5.75	-0.38	-6.26
N	DATA GEN CORP	28 16	26.13	-0.88	-3.37
N	DATAPOINT CORP	9 3	4.38	-0.25	-5.41
N	DIGITAL EQUIP CORP	200 110	122.75	-18.00	-12.79
N	FLOATING POINT SYS INC	17 3	3.88	-0.38	-8.82
N	GOULD INC	24 9	12.88	0.25	1.98
N	HARRIS CORP	43 22	25.88	-1.50	-5.48
N	HEWLETT PACKARD CO	74 38	54.50	-3.13	-5.60
N	HONEYWELL INC	91 49	58.75	-4.00	-6.38
N	IBM	176 102	116.13	-6.75	-5.49
O	INFORMATION RTL INC	17 9	10.13	-0.63	-5.81
O	IPL SYS INC	3 2	1.75	-0.25	-12.50
O	MASS COMPUTER CORP	14 6	8.88	-0.63	-10.00
N	MATSUSHITA ELEC INDL LTD	198 96	175.50	-5.88	-3.24
O	MEGADATA CORP	7 3	3.50	-0.13	-3.46
O	MENTOR GRAPHICS CORP	30 14	20.75	-4.00	-16.16
N	NBI INC	16 4	3.75	-0.50	-11.76
N	NCR CORP	67 39	60.25	-6.88	-9.88
N	PRIME COMPUTER INC	31 12	15.00	-2.13	-12.41
O	PYRAMID TECHNOLOGY	12 5	7.75	-0.75	-8.82
O	STRATUS COMPUTER	41 15	22.75	-4.00	-14.96
O	SUN MICROSYSTEMS INC	48 14	38.38	-0.38	-1.02
O	SYMBOLICS INC	6 1	1.19	-0.50	-29.82
N	TANDEM COMPUTERS INC	38 19	20.25	-7.38	-26.70
N	TANDY CORP	57 28	33.50	-2.25	-6.29
O	ULTIMATE CORP	37 16	16.13	-3.50	-17.83
N	UNISYS CORP	48 34	32.50	-3.38	-9.41
A	WANG LABS INC	19 10	13.25	-0.50	-3.64
Software & DP Services					
O	ADVANCED COMP TECH	6 1	1.88	-0.13	-6.25
N	AGS COMPUTERS INC	20 11	10.25	-1.13	-9.47
O	AMERICAN MGMT SYS INC	20 9	12.38	-3.00	-19.51
O	AMERICAN SOFTWARE INC	22 6	9.25	0.13	1.37
N	ANACOMP INC	11 4	7.00	-0.38	-5.08
O	ANALYSTS INTL CORP	10 4	7.50	-0.75	-9.09
O	ASHTON TATE	30 13	24.75	-2.00	-7.48
O	ASK COMPUTER SYS INC	17 6	7.25	-1.13	-13.43
O	AUTODESK INC	24 12	19.25	-2.75	-12.50
N	AUTO DATA PROCESSING	55 36	38.88	-5.25	-11.90
O	BOOLE & BABBAGE INC	12 5	8.00	0.38	3.23
O	COMPUTER ASSOC INTL INC	37 15	28.25	-2.69	-8.70
O	COMPUTER HORIZONS CORP	15 7	9.63	-0.63	-6.10
N	COMPUTER SCIENCES CORP	73 42	47.50	-4.13	-7.99
N	COMPUTER TASK GROUP INC	18 9	10.75	-0.38	-3.37
O	COMSHARE INC	28 12	12.75	-2.00	-13.56
O	CULLINET SOFTWARE INC	14 4	8.75	0.69	10.29
O	CYCARE SYS INC	18 6	8.13	-0.38	-5.77
O	DUQUESNE SYS INC	28 10	18.00	-3.75	-17.24
A	DATA ARCHITECTS INC	17 7	9.00	-1.13	-11.11
N	GENERAL MTRS (CLS E)	61 27	34.88	-4.38	-11.25
O	HOGAN SYS INC	17 6	5.13	-0.25	-4.65
O	INFORMIX CORP	32 11	20.75	-3.00	-12.63
O	INTELLICORP INC	11 3	3.50	-0.38	-9.68
O	KEANE INC	10 6	7.00	0.00	0.00
O	LOTUS DEV CORP	40 13	26.00	-5.50	-16.42
O	MANAGEMENT SCI AMER	21 6	6.13	-0.63	-9.26
O	MICRO PRO INTL CORP	8 3	3.88	0.00	0.00
O	MICROSOFT CORP	72 28	56.75	-1.75	-2.99
O	MORINO ASSOCIATES INC	23 7	14	0.00	0.00
O	NATIONAL DATA CORP	34 19	26.25	-1.25	-4.55
O	ON LINE SOFTWARE INTL INC	22 9	11.38	-0.63	-5.21
O	ORACLE SYS CORP	19 6	13.25	-1.88	-12.40
N	PANSOPHIC SYS INC	28 11	14.00	-2.25	-13.85
O	POLICY MGMT SYS CORP	30 15	19.25	-1.25	-6.10
O	PROGRAMMING & SYS INC	14 7	8.63	-0.63	-6.78
O	REYNOLDS & REYNOLDS CO	30 14	17.25	-0.63	-3.50
O	SEI CORP	18 10	15.50	-0.25	-1.59
O	SHARED MED SYS CORP	53 19	22.75	-1.00	-4.21
O	SOFTWARE AG SYSTEMS INC	19 8	7.88	-0.50	-6.67
O	SOFTWARE PUBG CORP	17 8	9.00	0.75	9.09
A	STERLING SOFTWARE INC	14 6	6.25	-1.25	-16.67
O	SUNGARD DATA SYS INC	21 15	13.75	-2.25	-14.06
O	SYSTEMATICS INC	30 10	28.38	-1.63	-6.09
N	SYS. SOFT INC	24 7	13	-1.25	-8.62
O	VMI SOFTWARE INC	46 7	8.00	-3.50	-30.60
Semiconductors					
N	ADV MICRO DEVICES INC	28 8	8.50	-1.38	-11.69
N	ANALOG DEVICES INC	26 9	11.00	-1.13	-9.32
O	ANALOGIC CORP	13 5	6.38	-0.38	-3.66
O	INTEL CORP	42 17	24.75	-4.00	-13.91
O	LSI LOGIC CORP	17 7	8.38	-1.00	-9.76
N	MOTOROLA INC	32 25	25.50	-3.13	-11.76
N	NATL SEMICONDUCTOR	22 10	10.88	-1.63	-13.03
N	TEXAS INSTRS INC	35 20	23.75	-7.88	-13.67
A	WESTERN DIGITAL CORP	28 12	13.00	-3.75	-22.39
Peripherals					
O	ALLOY COMP.	13 4	4.50	-0.88	-16.63
O	AMINTL INC	9 3	3.63	0.25	4.65
O	ART RESH INC	25 6	6.88	-0.38	-4.26
O	AUTO TROL TECH CORP	9 3	3.25	-0.50	-13.33
O	BANCTEC INC	15 6	7.88	-0.38	-4.54
O	CIPHER DATA PRODS INC	15 4	6.38	-1.13	-15.00
O	COGNITRONICS CORP	5 2	2.50	0.50	16.16
N	COMPUGRAPHIC CORP	28 20	22.13	-0.88	-3.80
O	COMPUTERVISION CORP	23 7	14.88	0.75	5.31
A	DATAPRODUCTS CORP	24 7	7.75	-0.88	-10.14
A	DATARAM CORP	9 5	6.38	0.00	0.00
N	DECISION INDS CORP	13 4	10.75	0.00	0.00
N	EASTMAN KODAK CO	71 40	48.00	-2.88	-5.54
O	E M C CORP MASS	28 10	14.50	-1.75	-10.77
O	EMULEX CORP	8 4	5.88	-0.75	-11.32
O	EVANS & SUTHERLAND	45 15	23.50	-3.50	-14.89
O	GCT CORP	13 3	4.13	-0.38	-8.33
O	INTERLEAF INC	25 9	16.50	-2.50	-13.16
O	IOMEGA CORP	8 1	2.75	0.69	28.41
O	LEE DATA CORP	10 3	3.00	-0.19	-5.88
O	MAGSTOR SYS CORP	6 1	1.94	-0.19	-8.80
O	MAXTOR CORP	24 6	10.13	-0.38	-3.57
O	MICROPOLIS CORP	44 15	21.25	-4.00	-15.84
O	MINSCRIBE CORP	18 5	8.38	-1.88	-18.29
O	MINNESOTA MNG & MFG CO	98 46	89.75	-5.25	-7.95
A	MSI DATA CORP	24 12	13.63	-1.88	-4.60
O	PRIAM CORP	6 1	1.75	-0.38	-12.50
O	PRINTRONIX INC	13 7	7.38	-1.38	-15.71
O	QMS INC	17 10	9.75	-1.75	-15.22
O	QUANTUM CORP	15 6	10.38	-2.38	-18.69
O	SAMTEK CORP	6 2	3.75	-0.13	-3.23
O	RECOGNITION EQUIP INC	27 7	8.50	-1.38	-11.69
O	XEXON INC	14 6	5.88	-0.63	-9.62
O	SCAN TRON CORP	17 7	10.75	0.00	0.00
O	SEAGATE TECHNOLOGY	48 19	26.25	-1.00	-3.66
O	STORAGE TECH CORP	5 1	1.88	-0.25	-11.76
O	TANDON CORP	7 2	1.88	-0.06	-3.23
O	TEC INC	7 3	3.00	-0.88	-14.89
N	TEKTRONIX INC	43 21	24.38	-0.88	-3.47
O	TELEVIDEO SYS INC	3 1	1.38	0.00	0.00
N	TELEX CORP	102 30	57.63	1.88	3.38
O	WYSE TECH	26 11	22.00	-1.88	-7.85
N	XEROX CORP	68 50	57.75	-3.38	-5.52
O	XIDEX CORP	16 6	6.63	-0.38	-5.36
Leasing Companies					
O	CAPITAL ASSOCIATES INTERNATIONAL INC	11 4	4.50	-0.50	-11.11
N	COMDISCO INC	37 17	17.25	-3.13	-15.34
N	CONTINENTAL INFO SYS	14 6	6.50	0.13	1.96
O	PHOENIX AMERN INC	6 2	2.88	0.13	4.55
O	SELECTERM INC	6 3	4.00	0.25	6.67

EXCH: N—NEW YORK; A—AMERICAN; O—NATIONAL; O—OVER-THE-COUNTER; S—SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. EST, LAST BID
(1) TO NEAREST DOLLAR

Healing

Most tech stocks recover, but DEC, Tandem slip

Friday's stock market rally on news of the lower U.S. trade deficit helped computer stocks recover most of their losses from "Black Friday" one week earlier.

Two key vendors, however, still have a lot of ground to make up. Digital Equipment Corp. had a rough week as three brokerage firms reduced their earnings estimates or bond ratings for the minicomputer maker. DEC, which plunged 11¼ points Jan. 8, sank an additional 11⅛ points in the first four days last week and was unchanged late Friday at 119¾.

Tandem Computers, Inc.'s announced quarterly earnings shortfall touched off the Jan. 8 minicrash and sent Tandem down a whopping 6¾ points that day to 20⅛. The stock lost another ⅝ of a point in four sessions last week and was down an additional ⅝ late Friday to 19½, falling near its 52-week low of 19. IBM gained 1 point in four days to 115⅝ and was up an additional 3¼ points Friday afternoon to 119¾.

Unisys Corp. was trading at 34⅛ late Friday after opening the week at 32. Hewlett-Packard Co. was up modestly to 56⅜ after starting the week at 54½.

CLINTON WILDER

Dream jobs

CONTINUED FROM PAGE 1

ed software engineering tools.

Many black professionals say conservative forces in the Reagan administration have limited progress during the last year. "Things have gotten a lot tighter during the Reagan years, and we still have a long way to go," says Gerard Anderson, a systems engineer at IBM in West Orange, N.J., and president of Black Data Processing Associates (BDPA), a national professional associa-

WALTER P. CALARAN

Bemley *(front left) with operation research assistants Judith I. Matthews and Craig Woodfolk.*

tion based in Philadelphia. But, Anderson declares, "The doors have not closed on us."

"It will take a while to reverse the damage that has been done," Bennett agrees. "Certain departments of government that had oversight or prosecution power seemed to fail to exist during the Reagan administration, giving a signal to the business community."

Professional help

Minorities aiming for DP management seek out professional associations, including BDPA and the Data Processing Management Association (DPMA). Although statistically few DPMA members are black, some 1,000 blacks have joined the BDPA (see chart at right).

There are no statistics on the number of black DP professionals who may have strived for management positions and found the door barred for one reason or another, nor is there any empirical documentation on the role that racism may play.

An oft-cited aspect of the lack of progress is that blacks have limited professional networking opportunities with white managers and so do not have the contacts that often play a role in promotions to management-track positions. One reason blacks turn to BDPA and the DPMA is to develop networking skills and make contacts that may further career paths.

The DPMA says it is aggressively seeking to recruit minority membership, and BDPA — with 30% of its membership classified as entrepreneurial — is strongly urging blacks to pursue corporate management careers.

"We're trying to help black professionals in large corporations make the transition from technical personnel to management" through seminars, networking and outreach to black students, Anderson says.

Seeking opportunities that elude them in the private sector, many black DP professionals go to Washington, D.C., where the federal government and its contractors are required by law to hire and promote minorities.

But frustration is evident even among blacks working in government computer installations.

Stepped over

"In the government, GS-13 is the highest pay level you can go and still be a programmer," explains Norman Keith, a systems analyst with the Internal Revenue Service. "To go to GS-14 and beyond, you'd have to become a manager, and to do that, you have to be sponsored by your manager and by a branch chief." But only a small percent of black systems analysts make the leap to GS-14, he says.

Some blacks in government MIS organizations have faced the shock of training a less qualified person and finding out later that that person will become his manager. "You find a lot of blacks don't move up in their profession because younger white people move ahead of them," says Jesse Bemley, education chairman of BDPA and information manager of the U.S. Army Cost and Economic Analysis Center. "If you're really good, you could appear to be a threat to others who want to move up."

The rules of government hiring have changed subtly during the Reagan administration, some black DP personnel say. "The very definition of a minority has changed in the last few years," says one woman who works for the Department of Defense. "Jobs that once went to blacks and Hispanics now go to white women and Asian people who have only recently become citizens of this country."

Outside of government, many black DP professionals seem resigned to their inability to reach upper levels of management and have chosen to move from one Fortune 500 company to another in pursuit of higher salaries and better benefits, but not a better title.

"Mostly, it's the large company that still has an interest in maintaining some of the affirmative action guidelines that have been somewhat stifled under the Reagan administration," says Kuumba Kazi-Ferrouillet, managing editor of *The Black Collegian*, a New Orleans-based magazine distributed to 1,200 college campuses nationwide. Among the companies credited with trying to reach, train and promote black college students are IBM, AT&T, Digital Equipment Corp. and Xerox Corp.

However, DP placement agencies, such as Lachman Associates, Inc., in Naperville, Ill., report few inquiries from companies looking specifically to fill job positions with minority candidates.

Credit where it's due

Black MIS managers and observers do credit some corporations with promoting the cause of minority hiring. DEC has a corporate affirmative action group that sets goals for the hiring of minority employees and managers.

Joseph Rocha , who manages minority and female employee programs at DEC, estimates that about 10% of DEC's field engineering group staff, which he monitors, consists of minority employees.

While many blacks say they are blocked from the upper rungs of the corporate ladder, lateral mobility is relatively easy.

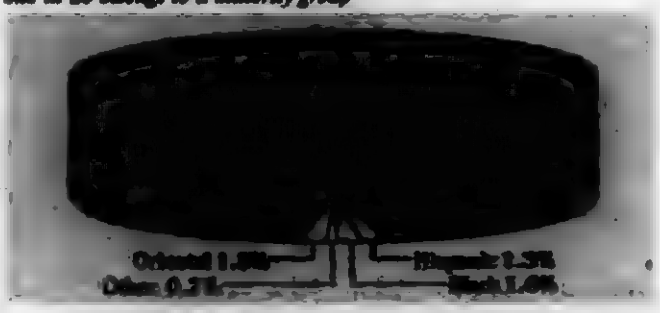
"Once you're in DP, you can always move around," says Audrey Gatling, an applications programmer with Du Pont Co. in Wilmington, Del. Gatling has also worked for Automatic Data Processing, Inc. in Mount Laurel, N.J., and Dow Jones & Co. in New York.

In an attempt to bring more blacks into the DP field, some community-based groups have joined BDPA and are trying to create an interest in computers among black high school and college students. One such group is Bemley's Joint Educational Facilities, Inc., which introduces black high school students to rules-based artificial intelligence and personal computers.

"Since the traditional organizations — the colleges and corporations — aren't turning out enough black people with expertise in computer science, we need to create more grass roots-level groups in the community that can accomplish that goal," Bemley says. "We need to get black students interested in computers early so that they can enter our field in greater numbers by the 1990s."

Barely managing

Survey of 1,850 DPMA members found that only one in 20 belongs to a minority group



INFORMATION PROVIDED BY DATA PROCESSING MANAGEMENT ASSOCIATION
CW CHART

NBS rates IBM Cobol 85 at mid-level

BY CHARLES BABCOCK
CW STAFF

The IBM Cobol 85 compiler tested by the National Bureau of Standards is expected to be an intermediate-level compiler with some high-level features, according to sources familiar with the product.

High-level compilers incorporate the most advanced features of the American National Standards Institute Cobol 85 standard, such as nested programs — similar to PL/I's contained procedures — and external data, similar to Fortran's Common Data. Only Tandem Computers, Inc.'s compiler, which is the first certified high-level product, and a handful of others are on the market now.

The results of the IBM compiler test are expected to be available by the end of this month, but the compiler is not likely to be announced until mid-1988. It will not be made generally available until the fourth quarter of this year, according to William M. Klein, product planner at Application Development Systems, Inc., a San Jose, Calif., Cobol debugger manufacturer. Klein has also been active in the Guide IBM users group's Cobol committee for five years.

The IBM Cobol 85 compiler is expected to take the form of the next release of VS Cobol II, IBM's current Cobol product and its only compiler capable of producing programs in 31-bit mode for the firm's MVS/XA, Klein and other sources said.

"Nested programs are useful primarily for programming projects that have many members of a team. It's extremely difficult to do in a compiler," noted Roger Knights of SPC Systems USA in Seattle, producer of an optional report writer sold by IBM with VS Cobol II. Knights and other sources would not predict which high-level features will be included in the compiler.

Those who've used it

Computerworld also contacted users of IBM's unannounced product that meets the Cobol 85 standard, which IBM spokesmen acknowledged has been available on request since September 1987. The users said they restricted the product's implementation to a few new systems that they do not want to have to convert to the Cobol 85 standard at a later date.

The users noted that the new compiler, when it becomes generally available, will include a Cobol optimizer that will make Cobol 85 programs run as fast as or faster than existing Cobol programs.

"You will not need a third party's optimizer," one user said. "Some of the programs perform superbly today" after compilation by the Cobol 85 product.

This comment runs counter to expectations in some quarters that Cobol 85 programs might be slower because of the structured programming techniques incorporated into the standard. Structured programs are frequently longer than unstructured programs and sometimes have a performance penalty, the users said.

Klein said he expects IBM to unbundle the runtime portion of VS Cobol II from the compiler. The unbundling move would allow one runtime library to be used for all Cobol programs at a site, regardless of whether they meet Cobol 85 standards, he said.

Klein and Knights predicted that the biggest demand for the new compiler will come from large mainframe shops constrained by the 16M-byte addressing limit of MVS/SP programs. To get around the memory limit, programs must be recompiled from 24- to 31-bit mode to take advantage of MVS/XA's 2G-byte ceiling.

IBM is likely to introduce migration aids with the new compiler to ease the transition from Cobol 74, Cobol 68 and earlier versions of the language to Cobol 85, Klein said.

Prime toughens takeover tactics

BY ROSEMARY HAMILTON
CW STAFF

NATICK, Mass. — Prime Computer, Inc. took a hardball approach last week in its attempt to acquire Computervision Corp. with a "final offer" of $15 per share that was packaged with a series of lawsuits.

Prime's latest move came two days after Computervision thumbed its nose at the minicomputer company's original offer of $13.50 per share, made late last month.

Prime also began seeking shareholder consent that would allow it voting rights to shares. If it were to acquire voting rights to a majority of shares, Prime could oust the current Computervision board of directors and replace it with its own people.

The lawsuits are intended to stop a series of takeover measures, including the so-called poison-pill provision and a golden parachute policy, which provides hefty severance deals for top executives.

At press time, a Computervision spokesman said the company was reviewing Prime's latest offer and continues to seek alternative buyers.

Hard pill to swallow

If Prime cannot halt the anti-takeover measures, it will not be able to buy Computervision, a Prime spokesman said. The poison-pill provision would automatically increase the number of outstanding shares greatly once a company acquires 20% of Computervision.

The Prime spokesman estimated that the total number of Computervision shares could increase to as many as 300 million, which would make the purchase of Computervision prohibitive.

Currently, 29 million Computervision shares are outstanding; they would cost Prime approximately $435 million.

Industry analysts contacted last week said Prime's new offering price is not necessarily the final price, although the company said "any further increase would not serve the interests of Prime." Instead, analysts said they consider it the latest attempt by Prime to convince Computervision management to discuss the acquisition.

Until the next final offer

"It's Prime's final offer until they say it isn't anymore," said John Rohal, a senior analyst at Alex Brown & Sons, Inc. in New York.

Laura Conigliaro, a first vice-president at Prudential-Bache Securities, Inc., said that if Computervision is seriously negotiating with another buyer, then Prime will likely increase the price again.

Computervision has said that it is engaged in preliminary discussions with other companies, although it will not identify who the potential buyers may be.

More power to the office

Prime continues trend with superminis

BY JAMES CONNOLLY
CW STAFF

NATICK, Mass. — Prime Computer, Inc. is expected to continue its effort to transfer processing power from the computer room to office environments with the introduction of two mid-range systems tomorrow.

Prime's 4050 and 4150 general-purpose superminicomputers replace the office-class Prime 2755 and 9755, which require a controlled environment. Prime's drive to move more powerful systems into the office dates back to October 1986, when the company introduced the 2755's predecessor, the 2655. Prime is furthering the effort by replacing the 9755 with the desk-high 4150.

The new systems are aimed at distributed processing and are being pitted against IBM's 9370 Models 60 and 90 and Digital Equipment Corp.'s Microvax 3600 and VAX 8530.

"Many people want to be able to distribute power, but a lot of them haven't been able to do it until now because they haven't had the power to stage a lot of users and large data bases on office systems," said Dave Howley, Prime's product manager for mid-range systems.

At a briefing last week, Howley claimed the 4050 and 4150 were designed to run in an office alongside users' desks.

Qualified praise

An analyst briefed by Prime praised the 4050 and 4150 but noted that they are not of the magnitude of Prime's high-end 6550 superminicomputer, which debuted in April 1987.

"As the people at Prime were talking, they seemed to think [the 4050 and 4150] will change their position in the market. But actually, what Prime is doing is continuing to do a good job of enhancing and improving their products," said analyst Sandra Gant of Cupertino, Calif., market research firm Infocorp.

Howley said the systems provide greater performance than did their predecessors at comparable prices. Prime rated the 4050 at 2.8 million instructions per second (MIPS) and the 4150 at 4.1 MIPS, compared with 1.6 MIPS for the 2755 and 3.4 MIPS for the 9755.

The 4050 is said to support up to 128 terminals and the 4150 up to 254 terminals. Each supports up to 32M bytes of memory, which is twice the capacity of the machines' predecessors.

The systems support up to four 496M- or 770M-byte disk drives in office environments. The 4050 can be upgraded to the 4150 through a board swap. Both systems feature a $3,200 optional battery backup.

A 4150 with 24M bytes of memory, a 496M-byte disk drive, a system console and a Primos license costs $191,600. A comparable 4150 with 16M bytes of memory costs $88,000.

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Apple PC

FROM PAGE 1

DEC and Apple did provide a laundry list of connectivity services to be addressed under joint development (see story below).

Specific details will not be available until August, when DEC plans to hold a conference with large users and software developers. The Apple spokesman hinted that Apple will have its first DEC connectivity product ready by then.

A survey of sites already mixing Apple and DEC equipment revealed strong interest in the strategic alliance. However, none of the users said they are willing to put their needs on hold until the two vendors actually deliver a product.

The vendors will rely on the International Standards Organization's Open Systems Interconnect (OSI) model as the basis for a connectivity strategy designed to integrate Appletalk and Decnet/OSI environments. The resulting products should enable Apple users to talk to DEC systems on a process-to-process basis and also enable VAX applications to make full use of the Macintosh's user interface, windowing and graphics.

"The message is that open networks, in particular OSI, are the way to go, as opposed to proprietary heirarchical networks," said DEC Vice-President of Business and Office Information Systems Henry Ancona.

Users have their own laundry lists of what they would like to see from the alliance. Most are using a mixture of public domain communications software, standard protocols and Apple's Macterminal, a terminal emulation package. Along with a mix of third-party offerings, those products provide bare-bones communications functions such as file transfer and virtual disk storage.

"The more transparent you can make the peer-to-peer relationship between departmental computers and workstations, [the better]," said Richard Mandelbaum, vice-provost for computing at the University of Rochester in New York. "I'm hoping that an Apple-DEC venture will lead to greater transparency — not only in the DEC environment but in other environments" as well, he added.

Host connections

Other users said they are looking for host connections for their Macintoshes. "Apple certainly needs to do something to connect to major vendors of mainframe computers, and I think that by hooking up with DEC, they can certainly give IBM a run for their money," said Betty Lacompagnon, director of academic computer services at the University of New Hampshire.

Reports of a pending relationship between the two firms have been off and on for about two years, and even DEC and Apple have sometimes seemed confused.

A month ago, Apple's vice-president of market development, Charles Berger, told *Computerworld* that a formal relationship between Apple and DEC was not a "near-term possibility." He denied any negotiations were under way between the two firms.

The Gartner Group, Inc., a research firm based in Stamford, Conn., estimated that 20% to 30% of all micros installed at VAX sites are Macintoshes.

Senior Editor Ed Scannell and senior writer Alan J. Ryan contributed to this story.

Fruits of their labor

The joint development effort between Apple Computer, Inc. and Digital Equipment Corp. covers the following:

- Distributed applications methodology. Users will be able to access DEC VAX-based services using process-to-process communications.
- Network management. Customers will be able to manage Decnet/ISO Open Systems Interconnect (OSI) and Appletalk networks in a unified way.
- Networking. The as-yet-unreleased Decnet/OSI Phase V product will be used to integrate Appletalk networks into wide-area networks.
- File sharing. Apple Macintosh computers will be able to access files and add to files stored on VAX systems using the Appletalk Filing Protocol.
- Document interchange. Revisable forms documents created on the Mac and the VAX will be interchangeable.
- Data base. Mac applications will be allowed to access data on VAX systems through Decnet/OSI.
- Terminal emulation. Macintoshes will be able to emulate DEC terminals to access computers via Decnet/OSI networks.

Specific details will be revealed at an August conference, DEC said.

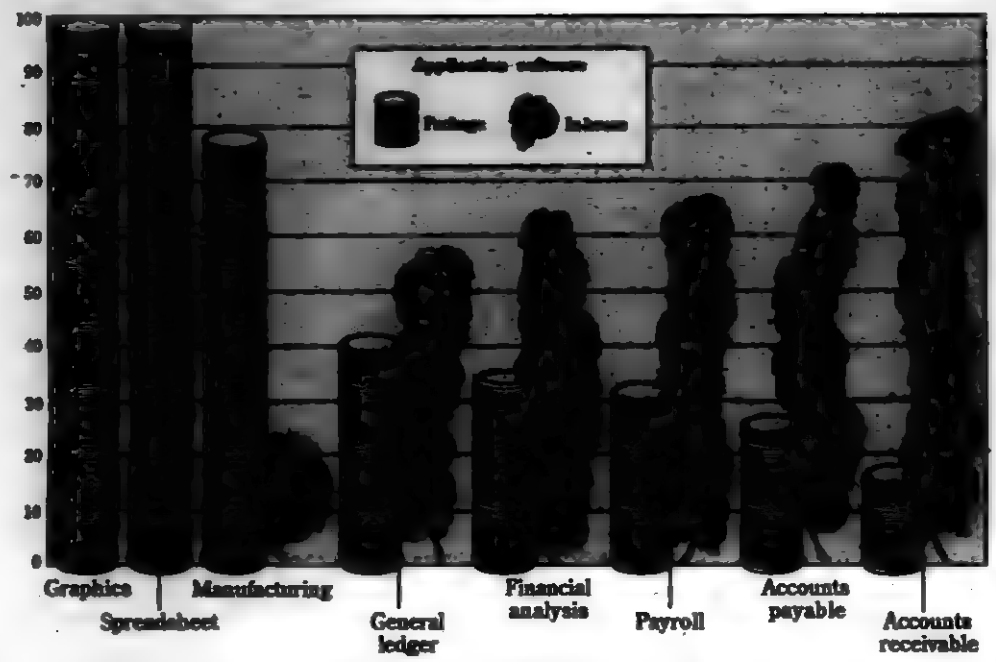
PATRICIA KEEFE

TRENDS

Application software

Newer applications come on packages

PERCENT OF SITES WITH INSTALLED PRODUCT GROUP, IBM U.S. MAINFRAME MARKET



Mainframe users have always had the option of developing programs in-house rather than buying packages from outside vendors. To a surprising degree, some of the most widely used applications stem from an internal development effort.

Data collected from 11,241 IBM mainframe or plug-compatible sites and analyzed by Computer Intelligence, a La Jolla, Calif., market research firm, shows that 82% of all accounts receivable systems, 72% of all accounts payable systems, 71% of all fixed-asset systems and 67% of both payroll and personnel applications were developed in-house rather than purchased from a third-party vendor.

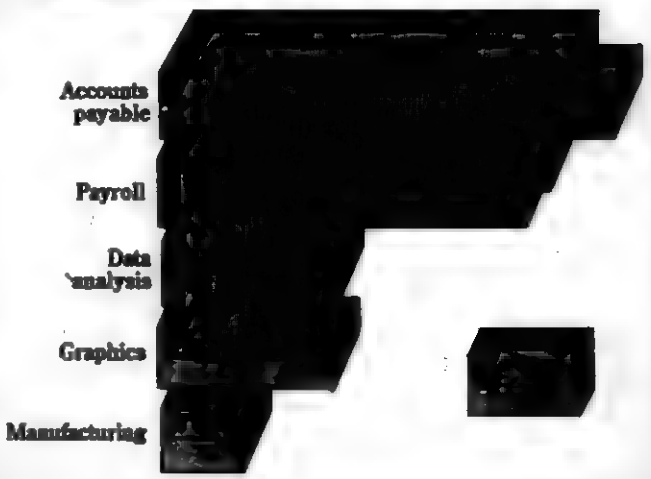
Compared with a year ago, packaged software is making slow headway against the practice of using in-house systems. The percentages, which reflect use as of July 1987, have dropped 3% to 4% since the year-earlier period, with the exception of financial analysis, which stayed even at 64%.

Overall, the use of popular applications is growing broader as such items as graphics programs, spreadsheets and accounts payable have grown by 6% to 14%. Other applications show smaller gains, with the exception of payroll, which may be shrinking as its functions are rolled into human resource applications.

CHARLES BABCOCK

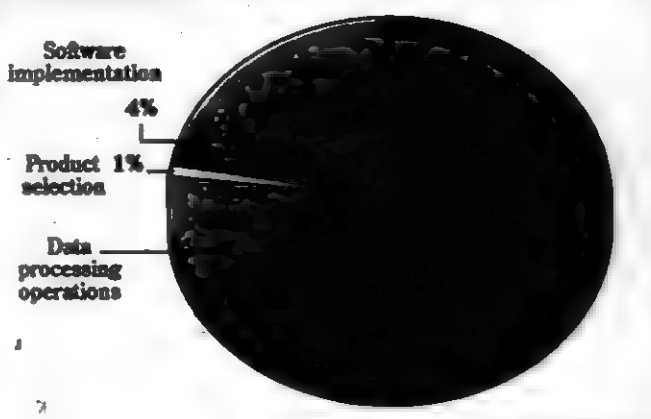
Analysis tools catch on

PERCENT OF SITES USING SELECTED APPLICATIONS, IBM MAINFRAME MARKET



Programmers find plenty of work

TYPES OF CONSULTING USED AT IBM MAINFRAME SITES



INFORMATION PROVIDED BY COMPUTER INTELLIGENCE
CW CHARTS: AMY J. SWANSON

INSIDE LINES

Serving up tidbits. With the Microsoft/Ashton-Tate announcement last week, rumors about what counterpunches Lotus might throw have already started. One source says some Lotus folks were in to see Relational Technology last week, possibly talking about a deal to hook Lotus DBMS to Ingres. And this may not be the only option Lotus could counterattack with. Arity Corp., which Lotus has a stake in, markets an SQL engine, along with some expert systems. That combination might make for an interesting, if not competitive, mix of products against the Microsoft/Ashton-Tate SQL Server.

Stratification. Stratus plans to unveil two systems in its line of fault-tolerant processors tomorrow. The minicomputers are expected to be entry-level machines with a base price starting at less than $100,000, according to a source close to the company. The machines will reportedly have processing power similar to that of current low-end XA2000 models but will have fewer communications ports, thus saving users money on communications controllers.

They keep talking. IBM will offer a version of its RT PC in 1992 or 1993 that will be capable of 100 MIPS, according to Bob Williams, vice-president and general manager of computer-integrated manufacturing systems in IBM's Application Systems Division. Williams' comment came at a recent meeting of IBM users, according to an attendee. Meanwhile, a reliable source tells us that IBM has signed an agreement with Relational Technology to run Ingres under its AIX operating system for the PS/2 Model 80 and RT PC machines. Our source notes that the agreement is another move by IBM to convey its seriousness about Unix to the U.S. government.

Not necessarily the news. In a bizarre chapter in the history of corporate press relations, IBM mainframe peripherals vendor Cambex Corp. in Waltham, Mass., issued a press release earlier this month saying, "Cambex sues EMC for theft of trade secrets." The statement was true — but the suit was filed June 17, 1987. Hopkinton, Mass.-based EMC Corp. promptly fired off a press release of its own, blasting Cambex for misleading information and the "misuse of acceptable news procedures." Cambex President Joseph Kruy says Cambex issued the release because the company intends to renew its previously denied motion for a restraining order. Cambex's counsel is Thomas Christo, who won well-publicized computer user suits against vendors several years ago. Stay tuned.

Waiting for Mr. Goodvibes. IBM may well have had an excellent fourth quarter, if the performance of computer leasing companies during the same period is any indication. Leasing firms had a banner quarter and year, according to Richard Forsythe, president of Forsythe McArthur Associates, Inc. in Skokie, Ill. Historically, the performance of leasing companies has mirrored that of IBM, says Rick Martin, an analyst at Sanford C. Bernstein. IBM has remained mum but is not cautioning anyone to lower expectations, which it has often done prior to down quarters, Martin says.

We read it in the want ads. Data General has been advertising for engineers with IBM connectivity experience, particularly in Netview/PC and OS/2. The company wants communications experts to help define and design its IBM connectivity strategy, says Joseph Forgione, DG director of communications product marketing. DG has a "stated commitment" to support Netview, IBM's network management system, Forgione says, but needs expert help to define the nature of that support. DG is also working on ways to connect OS/2-based products to its hosts and Xodiac network, according to Forgione. Support for Microsoft's LAN Manager is one likely route for DG, he says. Also wanted are senior software engineers to design the next generation of DG's network management system, which must be able to handle large, distributed networks, Forgione says.

Like shooting a sitting DEC. Pundits had a field day with reports last week that DEC's Microvax 3000 family is missing its delivery schedule. One observer suggested a new DEC motto: "Digital has it soon."

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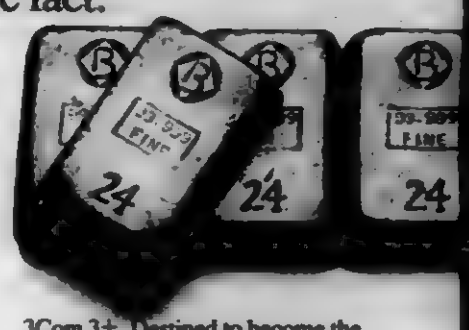

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COMPUTERWORLD

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Spotlight — Don't get tied up in knots over LAN hardware decisions. Pullout section follows page 52.

In Depth — Why the Mac will win — or won't. **Page 61.**

'Skins to tame Broncos? Both the mainframe and PC buck the Super Bowl spread, although their methodologies aren't compatible. Page 2.

MAP/TOP adherents ramp up for this summer's coming-out party. Page 15.

Reverse-engineering IDMS/R applications into DB2 applications is now possible, well-heeled start-up claims. Page 101.

MIS professionals pound Wall Street's pavement with mixed success in wake of financial industry retrenchment. Page 8.

Mac to VAX and everything else is promised in tools being announced this week by Apple and third-party vendors. Page 16.

Breathing the air of DEC's strategy leaves analysts groping for products. Page 4.

PS/2 clone tools unveiled, but no systems vendor has yet declared willingness to test IBM's legal intentions. Page 14.

Management grad, 31, runs up MIS ladder to grab executive rung. Page 67.

Criticism builds as 9370 deliveries lag

BY ROSEMARY HAMILTON and STANLEY GIBSON
CW STAFF

IBM painted an optimistic picture last week of its 9370 series, challenging the growing perception that the company's mid-range line remains an unfulfilled promise.

Nevertheless, a cloud continued to grow over the 9370 as the company acknowledged that its 1987 shipments had fallen short of the announced goal of 5,000 processors.

Analysts cited a lack of 9370-specific applications software, missing connectivity software and mixed messages from IBM on its mid-range direction as reasons for missing the shipment goal. But IBM said it failed to hit the delivery target because it was unable to ramp up production to meet demand.

Dropping VAX killer image

IBM now appears to be backing away from the "VAX killer" image that it tacitly promoted for the 9370.

"There has been a lot of misunderstanding of the 9370. It was announced for IBM 370 users as a distributed processor," said Larry Ford, assistant group executive for mid-range systems, explaining that the 9370 was intended for areas in which 370 skills and programming were already in place.

Once large customers develop customized applications for their corporations, they will order 9370s in large numbers, Ford said, claiming that some 500 large IBM customers are now working on their own 9370 applications.

Just fine for some

Some users who have recently installed 9370s said the system has met their expectations.

Peter Diaz, MIS manager at Minico, Inc. in Phoenix, said he received a custom-configured Model 60 Oct. 15. He said he is in the process of automating Minico's insurance and mini-storage businesses on the system and will be using IBM's VSE operating system. Eventually, he said, he plans to connect 15 IBM Personal Computer XTs and PC ATs and 40 IBM 3270 terminals to the system.

Diaz said he was attracted to the 9370 because of its compatibility with IBM's 4381 and 3090 mainframes, to which he may wish to migrate in the future. He also said some applications modules available for the 9370 were

Continued on page 6

Mid-range muddle

Survey of buying intentions at U.S. IBM and compatible mainframe sites indicates some confusion about IBM's mid-range strategy, which is having little impact on DEC's VAX

INFORMATION PROVIDED BY FOCUS RESEARCH SYSTEMS
CW CHART: FRANK C. O'CONNELL

IBM coding AI strategy

BY CHARLES BABCOCK
CW STAFF

RYE BROOK, N.Y. — IBM is aggressively promoting artificial intelligence for upgrading standard applications in central MIS shops and intends to make it easy for third-party vendors to move their products onto IBM platforms, according to company executives.

To increase the use of AI on its machines, IBM is developing what it calls a knowledge processing architecture. It will allow third-party developers of expert system shells to move their products onto standard IBM hardware platforms, including

Continued on page 14

Server deal shuffles data base deck

BY ALAN J. RYAN and STEPHEN JONES
CW STAFF

Users last week hailed the announcement of a potentially standard-setting data base engine for local-area networks, but analysts said that by signing on to the technology, data base management system kingpin Ashton-Tate Corp. may have mortgaged away its dominant share of that market.

SQL Server, which is slated to ship in the second half of this year, is based primarily on technology from Sybase, Inc. It will be licensed by Microsoft Corp., which, in turn, has licensed Ashton-Tate to sell the product in retail channels. Ashton-Tate has also pledged to support SQL Server in a new release of its Dbase.

However, the value of a retail contract is questionable in a market in which only 30% of LAN software sales are handled through retail channels, according to Thomas White, president and chairman of Santa Clara, Calif.-based consulting firm Infonetics, Inc.

The server will run on Intel Corp.'s 80286 and 80386 microprocessors. It reportedly harnesses the power of IBM and Microsoft's OS/2 operating system and a set of large system utilities to perform tasks that previously required the computing power of a minicomputer or mainframe. Among other benefits, users will be able to simultaneously access the network server with multiple personal computer programs.

Continued on page 100

Oil firm sees gusher in MIS

BY JEAN S. BOZMAN
CW STAFF

HOUSTON — While most oil companies hunkered down for lean times as prices plummeted during recent years, Pennzoil Co. invested $50 million in information systems. That project, initially designed to make the oil company's operations more efficient, last month resulted in the birth of a subsidiary that plans to sell industry-specific applications.

Patrick L. Manning, president of Pennzoil's Strategic Information Services Co. subsidiary, last week detailed plans to establish a profit center from the firm's former MIS operation. Manning said the goal is to gain market share, while others in the oil industry scramble to revamp

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Patrick L. Manning

NEWSPAPER

SECOND CLASS

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Profitable partnership. The Prime-Cydrome alliance bears fruit in the form of a data flow parallel processor intended for scientific, engineering and financial applications. Page 5.

Building bridges. Ungermann-Bass launches Access/One, a protocol-independent enterprisewide networking system to connect departments and buildings that have been wired together. Page 6.

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Quotable

"Pennzoil's top executives were involved on an ongoing basis for the entire four-year project. The thrust has to come from top management in order to make an information plan part of the overall strategic plan for the business."

PATRICK MANNING
STRATEGIC INFORMATION SERVICES CO.

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High-tech consensus: Broncos to get sacked

BY BRUCE HOARD
SPECIAL TO CW

At long last, a battle between micros and mainframes that is meaningful to the common betting man.

In the Super Bowl XXII matchup, the IBM 4341 favors the Washington Redskins by 1½ points over the Denver Broncos, while the IBM Personal Computer and clones are picking the Redskins by 3½.

Backing the 4341 is long-time *Computerworld* forecaster and former press agent to the stars, Bud Goode. On the IBM PC side is the up-and-coming star of radio and tout sheets, Mike Orkin.

Goode still relies on his Fortran-based 173 variables and regression analysis. He still sells his weekly readout to seven National Football League coaches and to CBS analyst Dick Vermeil. He looks at the games in terms of yards per pass attempt and yards allowed per run.

Goode, who picks professional games against the spread in *The New York Post*, has a straightforward football philosophy. "I like the running game on offense, and I like the team that can stop the run on defense. That's the nature of the game. It's a collision sport," he says.

'Micro statistics'

Orkin is backing his floppy disk data base, Pro Football Pointspread Analyzer. He disdains what he calls Goode's "micro statistics," depending instead on such arcane factors as how teams with natural-grass home fields do on artificial turf and how cold-weather teams do at home against warm-weather teams in November.

He and his partner, Richard Drogin, founded Best Bet Software, which sells Pro Football Pointspread Analyzer. Orkin is also chairman of the statistics department at California State University in Hayward.

When he is not lecturing at California State, Orkin can be heard prognosticating on radio stations KGO in San Francisco, KGIL in Los Angeles and KDWN in Las Vegas, an appropriate venue for a man with his skills. He also contributes to "The Gold Sheet," a sports information service known colloquially in some quarters as a tout sheet.

"I won't pick a game unless there are a bunch of factors going well for one team, bad for another and the point spread is right," he says. He and Goode are both backing the Las Vegas line of Broncos by 3½ points.

Goode lauds the aggressive Washington defense, saying, "The 'Skins got fat off the sack this year." For all you unwashed non-sports fans, that means they frequently smashed, bashed or otherwise tackled the opposing quarterback before he could pass the ball.

According to Goode, the Redskins defense averaged 3½ sacks per game. For its part, Denver allowed two sacks per game. If Washington can just beat its average and get four sacks, it is sayonara Broncos, Goode says.

Orkin also focuses on the sack game. "If the 'Skins can blitz Elway, they can win," he observes, citing Denver's quarterback, John Elway. He also points out

Redskins *quarterback Williams to control Super Bowl?*

Denver's tendency to start fast and then stall out in the second half, an occurrence that could prove fatal against Washington, which is noted for its comebacks.

"If the game is close at halftime, Denver will have a hard time winning," Orkin says.

Devotee of the ground game that he is, Goode notes the Redskins averaged 4.24 yards per run during the regular season — which places them seventh in the league — while the Broncos surrendered 4.66, a figure that leaves them 27th in a 28-team league.

Looking at it another way, the league average number of running plays vs. passing plays per game is 1-1. According to Goode's statistics, if Washington, behind quarterback Doug Williams, can control the ball running and up that figure to 1½ running plays to every one passing play, it will be worth five points to them.

Then Denver would have to pass more, an imperative that Goode says could prove fatal to the team and Elway, its star quarterback. "If Elway throws two interceptions, his chances of losing the game are four out of five," he declares.

Hoard is editor of Network World, *an IDG Communications publication.*

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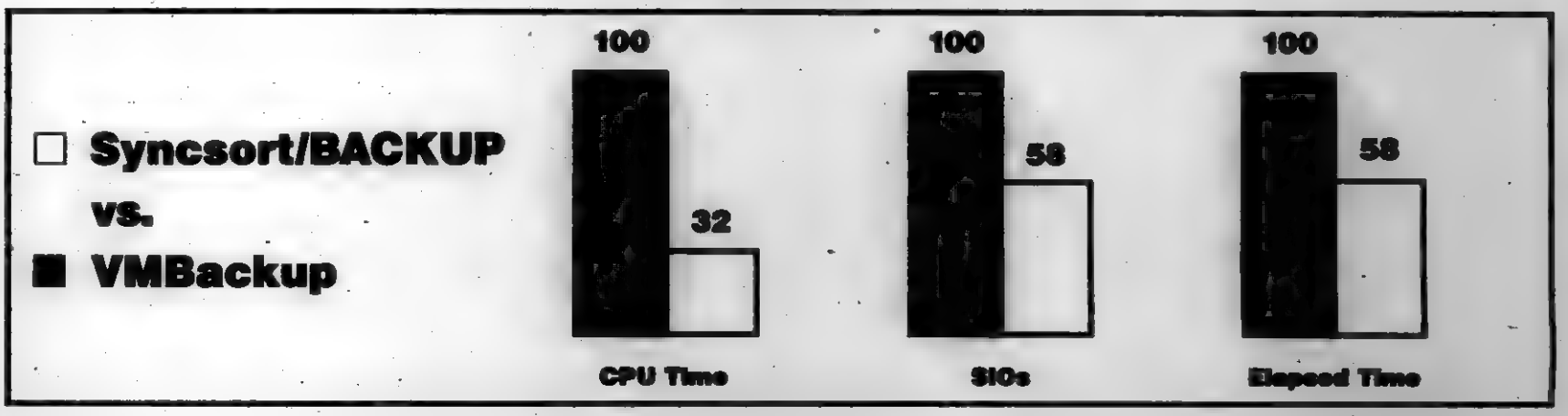

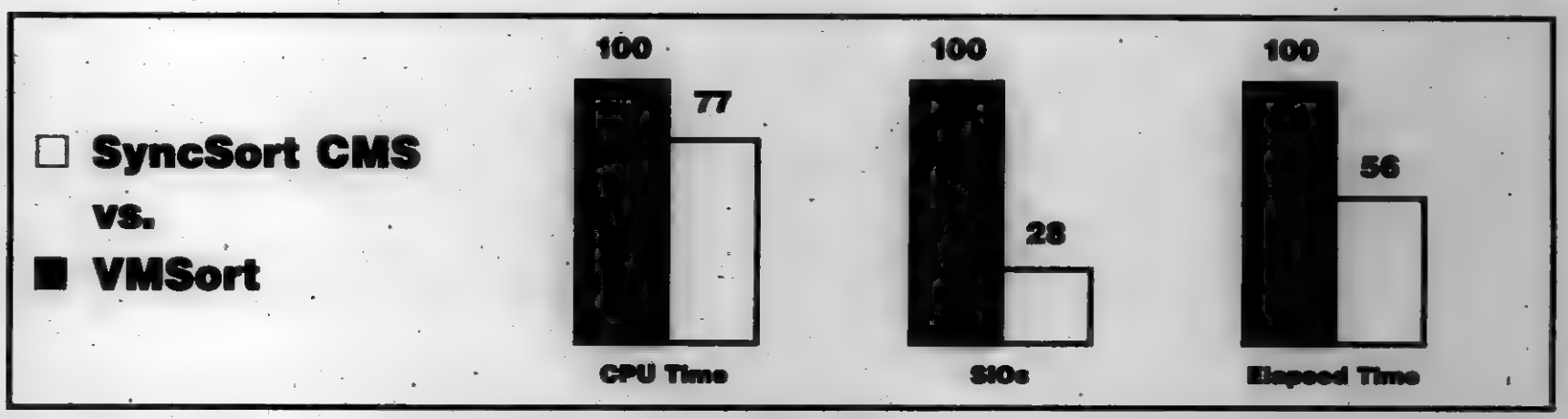

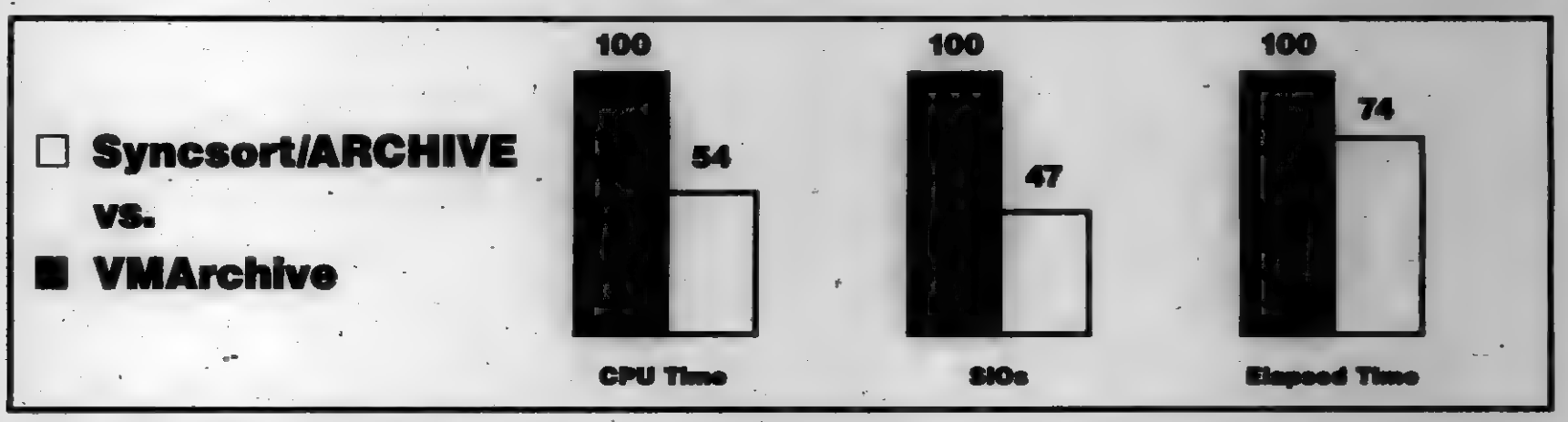

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DEC plugs desktop network strategy

BY STANLEY GIBSON
CW STAFF

BOSTON — Digital Equipment Corp. last week set forth a desktop strategy that it promised will connect Microsoft Corp. MS-DOS, VAX-based Unix and Macintosh systems to DEC VAX/VMS systems.

DEC said it will extend some services of its Decnet/OSI network architecture to IBM OS/2 desktop devices but provided few specifics on how and when that will be accomplished.

DEC also reiterated that it will support Apple Computer, Inc. Macintosh systems at the levels that had been announced four days earlier [CW, Jan. 18].

Significance unclear

Analysts were left puzzled about the significance of the announcement — whether it was intended as a counterblow to IBM's Systems Application Architecture (SAA) or an effort to develop a marketing position.

"It's a marketing positioning announcement, or, less charitably, it's 'Etherware,'" said Marty Gruhn, president of The Sierra Group in Tempe, Ariz.

"This will be important in the future, but don't sell it to me like you have it now," said Frank Dzubeck, president of Communications Network Architects, Inc. in Washington, D. C., referring to DEC's advertising theme, "Digital has it now."

Comparing the DEC announcement with IBM's SAA announcement, made last spring, Dzubeck said, "I think this is a poor second in comparison."

William Strecker, vice-president of product strategy and architecture, said DEC intends to build its network to incorporate the most commonly used single-user operating systems and interfaces. DEC named the strategy Network Applications Support (NAS).

Strecker said the protocols that DEC will support are Data Access Protocol, a Decnet protocol for files since 1975; Microsoft's Server Message Block (SMB); Sun Microsystems, Inc.'s Network File System (NFS); Apple's AFP file sharing protocol; Adobe Systems, Inc.'s Postscript for desktop publishing; Digital Document Interchange Format (DDIF), a DEC internal standard for document processing; and SQL for data base use.

However, precisely what links will be forged or when they will be released was left unsaid. The only date given, Aug. 15, was for the availability of Macintosh tools. However, that date was given the previous week, when the DEC-Apple alliance was announced.

"This is a strategic briefing, not a product announcement," Strecker said. "Many of the capabilities will be available soon."

Dzubeck said SAA, which promises the transparent operation of programs across a wide variety of disparate IBM architectures, offers more than DEC's plan, which will offer only networking applications across different machines. "I doubt you will be able to run a VMS application on a Mac. In that sense, it's not as good as SAA," he added.

> "THIS WILL BE important in the future, but don't sell it to me like you have it now."
>
> FRANK DZUBECK
> COMMUNICATIONS
> NETWORK
> ARCHITECTS, INC.

Although OS/2 support is part of the NAS plan, DEC made no promises of eventual support of the Presentation Manager component of OS/2 on the grounds that it does not yet exist.

In addition, DEC did not announce support for popular local-area network systems sold by Novell, Inc., 3Com Corp. and Banyan Systems, Inc.

During a press conference, Henry Ancona, DEC's vice-president of business and office information systems, was asked if the company's linkup with Apple is part of a new desktop strategy to replace DEC's previous failures with the Decmate and Rainbow personal computers. "No, not at all," Ancona responded, professing continued faith in the Vaxmate.

"I don't believe they have given up on their own desktop machine. This is a pragmatic business decision until they have a VAX on a desk," Gruhn said. She indicated that DEC executives had told her such a desktop VAX will be coming this year.

However, DEC will offer service to the Macintosh within two months, according to the information distributed to analysts. DEC also announced that it will service the IBM-compatible personal computers of Compaq Computer Corp., Ing C. Olivetti & Co., and Zenith Electronics Corp.

Dzubeck said he believes DEC is working on a "Macmate" that will be a Decnet version of the Macintosh in much the same way that the Vaxmate is a Decnet MS-DOS machine.

Fritz Landmann named *Computerworld* publisher

FRAMINGHAM, Mass. — Frederic H. (Fritz) Landmann has been named president of CW Publishing, Inc. and publisher of *Computerworld*.

Landmann, 54, was formerly group vice-president at International Data Group (IDG), the parent organization of CW Publishing, which publishes CW and *Computerworld Focus*. As group vice-president, Landmann was responsible for three IDG Communications publications: *Federal Computer Week*, *Digital News* and *CIO*. IDG Communications is a division of IDG.

"I feel most fortunate to have been selected to lead such a team of high-level professionals on the flagship publication of IDG," Landmann said. "It is the ultimate challenge and responsibility within our corporation."

Landmann began his publishing career in 1960 with Chilton Co., where he served as associate publisher of *Food Engineering* magazine until 1968. His career includes assignments as publisher of *Media-Scope* magazine, a Standard Rate & Data Service, Inc. publication;

Fritz Landmann

group executive with ITT Publishing; and publisher of Penwell Publishing's *Computer Design*. In 1986, Landmann joined IDG Communications as president and publisher of PCW Publishing, where he started *Federal Computer Week*. In late 1987, he was named IDG group vice-president.

He is a graduate of the Wharton School of Business.

Landmann replaces James S. Povec as president of CW Publishing. Povec has been named IDG Communications group vice-president and president of IDG Publishing Ventures.

Repairs prompt MIS move

Hot site aids Manufacturers Hanover

BY JEAN S. BOZMAN
CW STAFF

NEW YORK — It could have been a disaster. Instead, MIS managers at Manufacturers Hanover Trust Co. packed up their data tapes and moved into a Carlstadt, N.J., hot site while their data processing center was closed for electrical repairs in November.

Perhaps it would not have been a physical disaster, admitted Bob Mianno, vice-president and general manager of Manufacturers Hanover Services Corp., but it would have wreaked havoc on his end-of-the-month accounting operations in lower Manhattan.

Mianno said he had not wanted to disclose the hot-site incident until long after it was over.

"We discovered the problem during a routine infrared scan of our electrical wiring," Mianno said last week of the quiet catastrophe. "The fire marshal came and said we had to close down for repairs to fix some frayed wiring that had created a hot spot."

Manufacturers Hanover was uniquely prepared for the problem, since it has maintained offices next to Comdisco Disaster Recovery Services, Inc.'s hot site in New Jersey for the last four years.

Weekend relocation

After learning of the situation on a Wednesday afternoon, Mianno made plans for 20 of his DP staff members to work during the weekend at the Comdisco hot site.

The switch began at 6 p.m. Friday and lasted until 6 a.m. Sunday. By Sunday evening, the wiring repairs at the New York center were complete, and the data tapes were reinstalled at the Manhattan computer center.

Manufacturers Hanover holds a full-dress disaster recovery rehearsal once every quarter for each of its four New York-area IBM mainframe data centers. Networking facilities between the centers add further redundancy to the disaster recovery plan.

"Manufacturers has gone beyond what most of our customers do," said Ray Hipp, president of Comdisco Disaster Recovery Services. "They have built a network backup facility that is almost foolproof."

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Prime-Cydrome effort to bear first fruit

Positions data flow multiprocessor for scientific, engineering, finance fields

BY JAMES CONNOLLY
CW STAFF

The alliance between general-purpose systems vendor Prime Computer, Inc. and start-up minisupercomputer maker Cydrome, Inc. — one of the few such relationships — is set to result in the introduction of a data flow parallel processor today.

What Cydrome calls the Cydra 5 and Prime relabels as the MXCL 5 was described in briefings last week. The move pits the vendors against two established players at the high end of the minisupercomputer market, Convex Computer Corp. and Alliant Computer Systems Corp.

While Cydrome claimed twice the performance of Convex's and Alliant's products, those vendors report they will boost their performances with new systems in March (see story page 55).

The Cydra 5 is intended for scientific, engineering and high-performance financial applications. It was scheduled for announcement in June 1987 but was delayed by the execution of the agreement, according to Cydrome President Andre O. Schwager, and by performance problems, according to one analyst.

Prime, which owns less than 20% of Cydrome, will offer the MXCL 5 to its user base, to new users domestically in the financial and manufacturing sectors and to new overseas accounts. Cydrome will focus on the rest of the U.S. market, including the education, government and utilities sectors.

Analysts noted that Prime and Gould, Inc., which last year supplemented its real-time computer line with a minisupercomputer, are the only U.S. vendors to include minisupercomputers in a broad product line.

'Bringing validity to the market'

"This is the highest performing departmental supercomputer in the industry," Schwager claimed. "We are bringing an established computer company into the market and, therefore, bringing validity to that market."

Gerald V. Butler, Prime vice-president of engineering and scientific products, said Prime chose Cydrome as a partner because of Cydrome's full systems approach. He noted that the Cydra 5 can act as a stand-alone system and that it is strong in scalar and vector processing.

Butler said Prime is also announcing its Pshell and MXlink software, which allows users of Prime 50 series minicomputers to use Prime Primos commands when logged on to the Unix-based MXCL 5.

The Cydra 5 is a multiprocessor that uses data flow technology. The system examines a program the way a systems analyst would look at a flowchart and identifies code that can run in parallel, Schwager said. He added that the Cydra 5 offers an advantage over vector processors because it schedules conditional branches but avoids making predictions for those branches, a practice attempted by some minisupercomputers.

The centralized numeric processor features fine-grain parallelism and a 40-nsec cycle time. Cydrome said 56 operations can run at a time.

The system also includes up to six interactive processors that run coarse-grain parallel processing. Those 32-bit processors handle operating system execution, I/O management and compilation.

The memory subsystem supports 256M bytes of main memory for the numeric processor and 64M bytes of support memory for the interactive processors. Each interactive processor can withstand a sustained transfer rate of 40M byte/sec., according to the vendors.

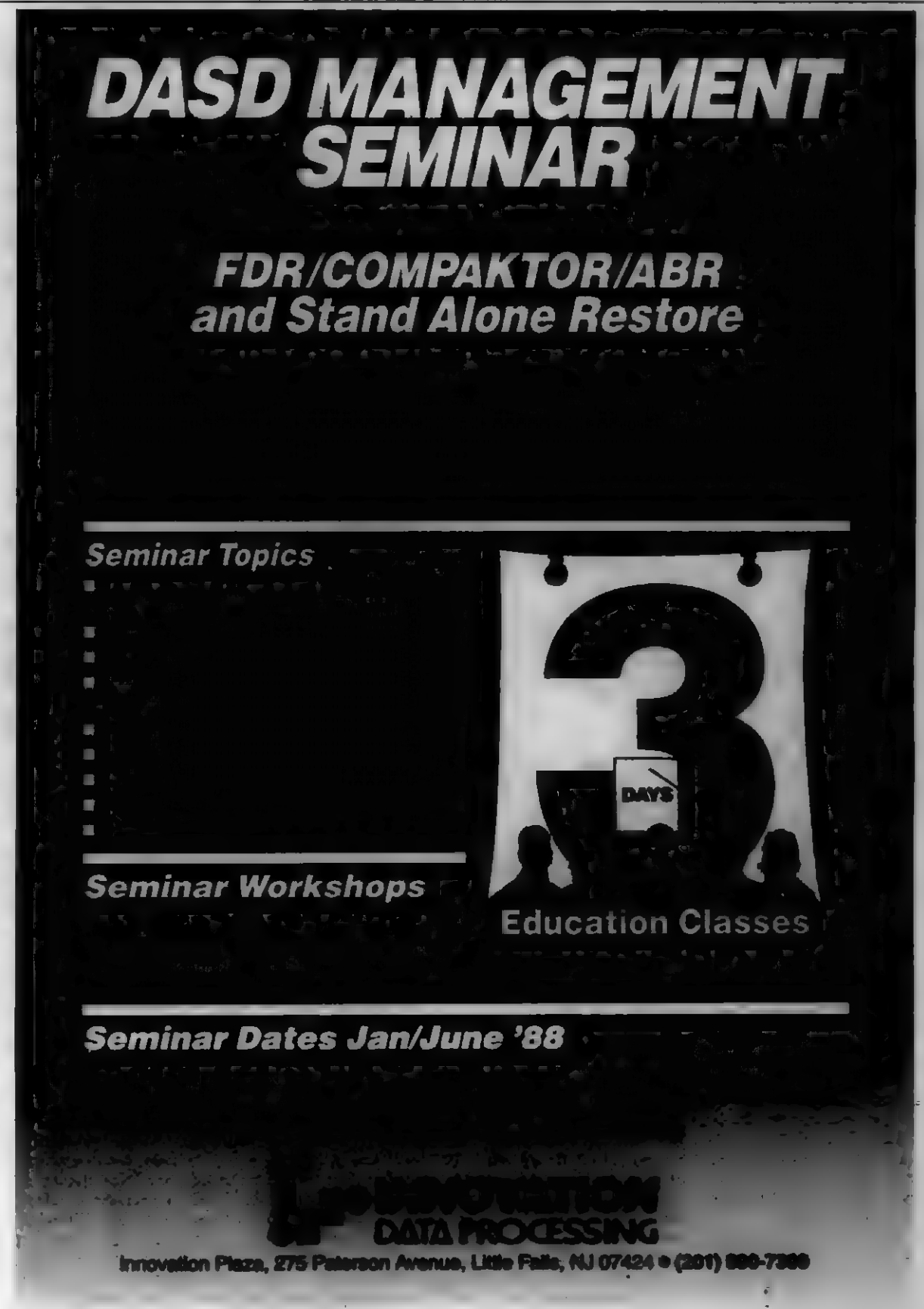
Schwager said the Cydra 5 was tested at 10 million floating-point operations per second (MFLOPS) with the Linpack benchmark and ran the Livermore Loops benchmark with a harmonic mean of 3.7 MFLOPS. He claimed the Cydra 5 ran 2½ to 3 times faster than a Convex C1 on the Fluid Dynamics, Inc. Fidap benchmark.

Analyst Jeffry Canin of investment firm Hambrecht & Quist, Inc. in San Francisco said the promise of higher percentages of realizable performance is of growing interest to users tired of hearing vendors quote unreachable performance figures. He said the alliance is of greater benefit to Cydrome than to Prime.

"It is a very crowded market out there for a company like Cydrome, which, while it isn't too late by its own plan, is kind of late in relation to companies like Alliant and Convex," Canin said.

Analyst Gregory Kosinski of the San Jose, Calif.-based market research firm Dataquest, Inc., said the Cydra 5 is a good performer but fairly expensive. Kosinski added that Cydrome still has to prove the performance of the Cydra 5 and its ability to protect users from having to optimize code on real applications.

The system is available in two models, which differ in the amount and type of memory available. An entry-level Model 1201 system costs $579,000 with 8M bytes of main memory. A Model 1401 with 64M bytes of main memory costs $774,000.



IBM fourth-quarter triumph tempered

BY CLINTON WILDER
CW STAFF

ARMONK, N.Y. — IBM's critical fourth-quarter financial performance played to mixed reviews last week, as a 50% gain in year-to-year profits was mitigated by favorable nonoperational factors such as tax and currency rates.

Although IBM was able to snap its two-year losing streak with full-year earnings 10% higher than in its disastrous 1986, Wall Street chose to concentrate on IBM's less than robust revenue growth. Sales for both the fourth quarter and the year advanced roughly 6%, but 1987 revenue of $54.22 billion was slightly below 1986's $51.25 billion after subtracting favorable currency translations.

While heavy selling of IBM stock helped drive down the entire stock market all week, some analysts said that their colleagues and the investment community had overreacted. "It's always easier to blame the company than to blame your own earnings forecast," said David Wu of S. G. Warburg & Co. "IBM was supposed to be the big recovery hero but became the villain because its comeback wasn't strong enough."

Expenses pared down

Nonetheless, IBM appears to have restored positive earnings momentum, thanks in large part to its well-publicized cost cutting program. Fourth-quarter operating income was up 23% from the weak fourth quarter of 1986 as the firm held its expenses to a tiny 3% rise from the year-earlier period.

Total fourth-quarter profits were $2.08 billion, or $3.47 per share, compared with $1.39 billion, or $2.28 per share, a year earlier. Revenue was $18.01 billion, up from $16.94 billion in the final quarter of 1986.

Full-year earnings were $5.26 billion, or $8.72 per share, up from $4.79 billion, or $7.81 per share, a year earlier. Although IBM's profits were higher than in 1986 and 1985, they were still less than earnings of 1984 ($6.58 billion) and 1983 ($5.48 billion).

"They have some obvious problems to fix, but the long-term outlook is not gloomy at all," said Bob Grandhi of Interstate Securities Corp. "Given the diverse customer base and the cost of systems migration for those customers, their recovery time has been reasonable."

Most observers focused on IBM's ongoing difficulty growing its mid-range business, particularly sales of the 9370 (see story page 1). Annex Research President Bob Djurdjevic said IBM fell $600 million below his firm's 1987 revenue projection because of the 9370 shortfall.

Warburg's Wu said IBM's eroded mid-range market share has affected mainframe customers' perceptions as well, helping high-end competitors such as Amdahl Corp. Amdahl reported its fourth straight quarter of strong earnings and revenue gains last week, fueling a more than threefold jump in yearly profits to $146 million on revenue that grew 56% to $1.50 billion.

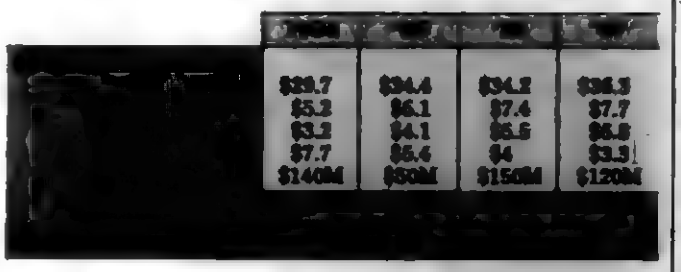
Unit shipments of the IBM 3090 series did increase slightly from 1986 levels, Djurdjevic said. But as IBM nears the end of the 3090's mainframe life cycle, it will need much more growth in minicomputer shipments in 1988 — despite the 3090 F enhancements expected to be introduced in the next few weeks.

"The new models will help, but let's face it, this is a 3-year-old machine," Djurdjevic said. "The mainframe market will be a ho-hummer this year. The growth will come in the mid-range."

Software sales will also be critical, but IBM is coming off a fourth quarter in which software revenue soared 29% to $2.28 billion. For the year, software accounted for 12.6% of total revenue, or $6.83 billion, 24% above 1986 levels.

Other side of the valley

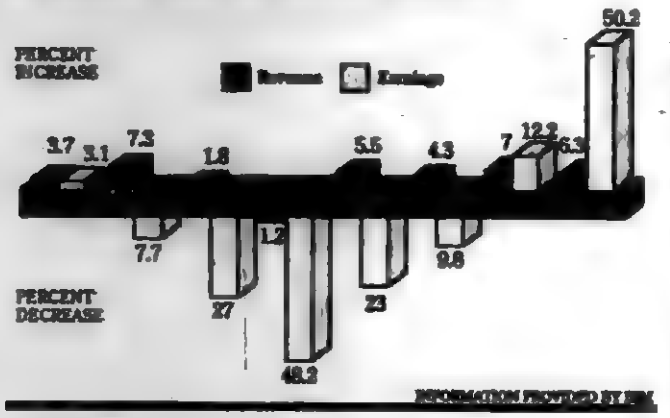
With a strong finish to 1987, IBM begins climb to regain its profitable pinnacle of 1984



INFORMATION PROVIDED BY IBM
CW CHART

Earnings plus

IBM's profits climbed back into the growth category, although analysts said the fourth-quarter boom resulted more from nonoperational factors than from actual performance



INFORMATION PROVIDED BY IBM

9370

FROM PAGE 1

unavailable on competing minicomputers.

But industry observers maintained that the mid-range system has yet to become the networked departmental system at major corporations. In some cases, large companies are still deciding what role the 9370 will play in their organizations.

The Southern Co. in Atlanta reviewed the 9370 and decided to hold off committing to it, according to Mark Turpin, a consultant and analyst for systems integration. Turpin said his company is currently running Digital Equipment Corp. VAXs with All-In-1 office automation software and IBM's Professional Office System (Profs) under IBM's VM at several remote sites.

"We looked at the 9370, but nothing came of it," Turpin said. "We wanted it for the office, but Profs just doesn't do it. It doesn't lend itself very well to it."

Ford said he expects to see wider distributed 9370 use in major firms when many functions that were announced last year, including those for remote operation, become available.

Indeed, the lack of connectivity software topped most analysts' lists of why the mid-range system has not been a big hit.

"You can plug a lot of things into the 9370, but most of the software to utilize those connections still isn't around," said Tom Foth, a software developer at VM Personal Computing, Inc.

Observers said users have been reluctant to embrace the 9370 because there are few applications packages available that have been tailored to the system. Theoretically, any 370 package could run on a 9370. However, many packages would run too slowly on the smaller system or not be suited for a departmental environment.

David Moschella, an analyst with International Data Corp. (IDC) in Framingham, Mass., said IDC estimates that 1987 shipments were in the 3,000 to 4,000 range and that IDC is working on 1988 estimates, which will be in the 6,000 to 8,000 range.

"IBM is having trouble selling the unit. The reason is that IBM has no applications," said Ted Saburese, president of Ultimate Corp. in East Hanover, N.J., a remarketer of the 9370.

The IBM spokesman responded that the company has listed some 900 applications from software vendors that are priced and available for the system.

Observers said most applications for the 9370 are merely relabeled versions of existing mainframe packages.

"You can't take a mainframe package and shoehorn it into the 9370," said Dean Redfern, vice-president of financial systems at McCormack & Dodge Corp. in Natick, Mass.

Redfern said M&D has run its existing packages on a loaner Model 60 it has been testing, but his company has yet to announce products specifically for the 9370. "It's not clear what users are going to want that machine for," he said.

Analysts also said the 9370 has been a victim of confusing marketing tactics. IBM's entire mid-range strategy will remain unclear until the industry sees just how Silverlake, the expected follow-on for IBM's System/36 and 38 lines, will fit into the scheme. Also, the initial thrust of the 9370 as a so-called user-friendly box may have been off the mark.

Some analysts said the VM operating system, even with the VM/IS easy-to-use configuration, has disappointed many users. "The problem is VM is still a mainframe operating system," Foth said. "People expect it to run software like Lotus's 1-2-3. The VM software community has yet to mature to customers' expectations."

System link launched

BY ALAN ALPER
CW STAFF

NEW YORK — Ungermann-Bass, Inc. last week unveiled a system architecture said to enable disparate local-area networks, asynchronous and IBM 3270 terminals to share files and applications over an enterprisewide network.

Called Access/One, the system provides a platform on which protocols, applications services and network management are run. The system is protocol-independent, supporting Xerox Corp.'s Xerox Network Systems and the Transmission Control Protocol/Internet Protocol. It also provides a migration path for future protocols, such as the International Standards Organization's Open Systems Interconnect model, the company said. Network management and support for IBM's Netview are also provided.

The system utilizes an Ethernet backbone. Data is transmitted at 10M bit/sec. over shielded or unshielded twisted-pair wiring. Developed by Ungermann-Bass and Hewlett-Packard Co., the wiring scheme reduces cabling costs and clutter, the Santa Clara, Calif.-based firm said.

At a press conference here, Ralph Ungermann, president and chief operating officer, said the proliferation of multivendor LANs and departmental processors has created an integration nightmare for MIS managers. Access/One will ease the installation of an integrated network over a uniform architecture, easing integration woes, he said.

Getting wired

The company said the system's modular design enables MIS managers to connect departments and buildings that have been wired together. The manager inserts a card corresponding to the particular communications environment into slots in the main unit, which is located in the wiring closet. This also makes moving equipment around the network easier, according to the vendor.

Six cards — the network interface, supervisor, asynchronous interface, 3270 interface, Ethernet concentrator and Token-Ring Concentrator modules — can be arranged in 11 slots in the system's enclosure.

The main system's enclosure, which fits in a traditional telephone wiring closet, is priced separately, as is each module. An entry-level system costs $10,000 and includes a power-supply enclosure, interface card and two or three communications modules.

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Unemployment line forms at the rear

Wall Street layoffs leave programmers pounding the pavement

BY DAVID A. LUDLUM
CW STAFF

When systems programmers showed up for work at E. F. Hutton & Co. a week before Christmas, they found they could not log on to their computer system.

The blocked access was a precaution taken by Hutton's new owner, Shearson Lehman Brothers, Inc., as a safeguard against disgruntled programmers who would be laid off that day, some of them immediately.

In the five weeks since then, many former Hutton systems professionals have found it difficult searching for work as they joined the swelling ranks of computer professionals laid off by New York securities firms and banks since October — ranks now estimated to number about 14,000.

Shearson is expected to lay off as many as 6,000 employees as a result of its merger with Hutton, which had a work force of 19,000.

Former Hutton systems workers have been dismissed, retained by Shearson or asked to stay on during a transition period that is expected to last through May.

Two former members of a Hutton centralized programming unit say they believe about half of their former colleagues who were laid off have found work.

'Not wonderful'

"So far, it hasn't been wonderful," said Frank Schifano, a $25,000-a-year systems programmer at Hutton until Dec. 19, when he was told he was being laid off that day.

Schifano, 35, got two weeks' pay in lieu of notice, along with two weeks' severance pay for his 11 months with Hutton.

Schifano explained that he is not interested in job offers he has received to do Cobol application programming in other parts of the country, like Cleveland.

With the local market for systems programmers "pretty bad," a job placement agent has suggested he consider returning to the technical support work he had done before joining Hutton. But he does not relish a return to night work.

"I'm not crazy about taking a step backwards, but if I have to, I will. If I don't find something in another month, I will," said Schifano, who is single but noted that living in the New York area "ain't cheap."

Elsewhere, Drexel Burnham Lambert, Inc. — regarded as one of Wall Street's more financially sound concerns — dismissed between 40 and 50 computer systems professionals in November.

Systems employees with poor performance appraisals who might have been helped along in previous years were let go, a Drexel manager said.

Earlier this month, Merrill Lynch & Co. laid off 130 workers at its Somerset, N.J., data center, and observers estimated the firm may soon dismiss 2,000 employees as part of a plan announced last month to slash salary costs by 10%.

The plan also calls for salary and hiring freezes and smaller bonuses, a spokesman said.

The personnel cuts are only the most visible moves made by Wall Street systems departments pulling in their horns in response to the bust of the five-year bull market.

Drexel Burnham Lambert, which aims to hold this year's payroll to the level of last year's, is eliminating contract consultants, setting up a billing system for information services and looking for opportunities to downsize equipment, according to a manager there.

Downsizing could involve greater use of lower speed communications lines and elimination of disk drives, both moves facilitated by disposal of leased equipment, according to the manager.

While not laying off systems workers, Goldman, Sachs & Co., which has laid off 400 other employees, is continuing a 6-month-old program to increase efficiency and effectiveness, according to Rick Adam, the newly appointed partner in charge of technology.

In systems, it includes elimination of consultants in favor of in-house talent, scrutinizing bills more closely and paying greater attention to using the capacity of existing equipment before buying more.

There are positive signs. A Merrill Lynch spokesman said that after the firm laid off data center employees this month, it received numerous inquiries about available workers from companies in the New York region.

But any such inquiries are unlikely to come in the financial services industry.

Head for other industry

Kim Graves is facing the prospect of working in another industry after losing his $45,000-a-year job in capacity management at Hutton's systems department.

Graves, 31, who lives in Manhattan, has been trying to do consulting work but is following the job market in case consulting does not pan out.

"I think it's going to be most difficult in the financial services area," said Graves, adding that he believes the field traditionally falls short in employing capacity managers.

A placement agent told him his prospects might be brighter in retailing.

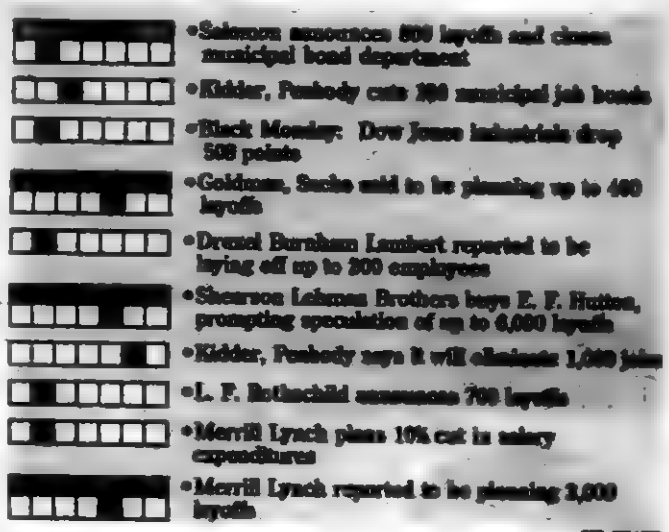
But with no mortgage or dependents and savings that he considers unusual among his colleagues, Graves says he can afford to be patient.

And sometimes he views the layoff as an opportunity to improve his lot.

"I'm trying to maintain the position that being fired is an opportunity, that I really can do anything," Graves said. "I can go and buy a farm in Vermont if I want, or become a professional scuba diver."

Bears take over

Announcements and reports of major layoffs by New York securities firms since October 1987



CW CHART

Sterling management coins takeover bid

BY CLINTON WILDER
CW STAFF

DALLAS — Sterling Software, Inc., which broke new ground in acquisition strategy in 1985, last week announced another software industry rarity — the intention to take the company private by mounting a leveraged management buy-out.

The systems software vendor revealed that it has been discussing a buy-out offer in the range of $9 to $10 per share since mid-December. Sterling spokesman Ray Hannon said the management group is expected to announce its tender offer proposal this week. Leading the group are company Chairman Sam Wyly, Vice-Chairman Charles J. Wyly Jr. and President Sterling L. Williams, none of whom were available for comment.

Setting precedents

Sterling shocked the software industry in 1985 with its successful hostile tender offer for much larger Informatics General Corp. Unfriendly takeovers were considered taboo in software because of an expected mass exodus of programming talent from the takeover targets, but most observers said they feel Sterling succeeded in breathing new life into a firm that had become complacent.

Similarly, there are few industry precedents for taking a public software house private via a management buy-out. According to software industry investment bankers Broadview Associates, systems software and services vendor CGA Corp. is the most notable example. Holmdel, N.J.-based CGA was acquired by a management group and an outside investment firm in 1980 and was later sold in pieces to a variety of buyers.

Broadview's Paul Deninger noted that there have been several instances of corporate software division management groups buying their businesses from larger parents and then taking them private. ISI Systems, Inc., a Boston-based vendor of applications and processing services for the insurance market, was sold by Grumman Corp.'s Grumman Data Systems in such a manner.

"Conducting business is easier when it isn't subjected to the kind of reporting required of a public company," Sterling's Hannon said. "Acquisitions and other growth strategies can be done with less cost and less exposure."

Enhanced Wordperfect due in March

BY ALAN J. RYAN
CW STAFF

OREM, Utah — An upgrade to the world's best-selling word processor, currently one million installations strong, will ship on March 21, a Wordperfect Corp. official confirmed last week.

The most significant change in Wordperfect 5.0 is its vastly increased printer support, according to Pete Peterson, executive vice-president. The latest version also includes new style options, a faster graphics-based preview function, a soft keyboard, a program editor, enhanced macros and the ability to merge text and graphics, Peterson said.

In the current Wordperfect version, "the printer drivers were written with letter-quality printers in mind," Peterson said. "But printers have changed drastically over the last three years. Our highest priority [for Release 5.0] was to support basically everything out there — from the small dot matrix printers to laser printers to typesetters."

Wordperfect 5.0 supports multiple fonts in documents, and formatting those documents has been made simpler, according to Peterson.

Fending off encroachers

Peterson said enhancements in Version 5.0 are intended to prevent encroachment on the company's market share, which is estimated at more than 40%.

"Microsoft [Corp.'s] competitive advantage over us has been in laser printing and its style sheets. With Wordperfect 5.0, we think we will have better printing than anybody else, and we're also including what we call styles."

Styles give users the ability to format documents for consistency or to make global changes.

Wordperfect 5.0's soft keyboard allows users to customize function keys. The graphics-based preview function adds the ability to view documents prior to printing them.

Peterson said a Wordperfect version for the Apple Computer, Inc. Macintosh is currently in beta testing, and a Unix product is due in March. These will fit into the current product line of IBM Personal Computers and compatibles, Commodore Business Machines, Inc.'s Amiga, Atari Corp. machines and Apple II versions.

Wordperfect 5.0 is set to sell for $495. The upgrade cost for current users will be $50 prior to Feb. 29 and $60 after March 1.

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DB2, 9370 lost out on big oil strike

HOUSTON — A four-year effort to redesign Pennzoil Co.'s software applications and voice/data network was based on key IBM products, but Pennzoil planners sidestepped two other IBM offerings: the 9370 processor and the DB2 data base management system.

"We are not driven by technology alone," said Al Abbott, director of information networks at Pennzoil. "We take advantage of technology as it fits our needs. But we are management-driven rather than technology-driven."

For the moment, Pennzoil would rather use IBM Personal Computer-based departmental systems than the stand-alone 9370. In part, Abbott said, the reason is that Pennzoil just spent several years trying to remove stand-alone departmental computers, including the IBM 8100.

In the absence of the IBM 9370, distributed IBM 3274 cluster controllers (see chart above) send mainframe data to remote local-area networks. Pennzoil's two IBM 3084Q mainframes run MVS/XA. IBM's TSO system utility supports queries at Pennzoil's information center while a CICS utility runs transaction programs.

Sticking with Adabas

In the area of data base management, Pennzoil has decided to stick with Software AG of North America, Inc.'s Adabas, first chosen in 1978 for its flexibility and ease of use. Data can be presented as relational or indexed files, said Ronald Martin, director of MIS and user support services at Pennzoil.

When DB2 came along in 1985, Pennzoil managers saw no need to move away from Adabas, Martin said. "We took a good, close look at DB2," he said, "but we weren't satisfied with its performance — which was terrible in Release 1.0 — its security or its difficulty of recovery."

Pennzoil also evaluated Release 2.0 of DB2 but has decided to live without it — for now.

Pennzoil values the separation of its production and inquiry applications, which makes DB2 even less attractive. "DB2 gets you back into the problem we've been trying to avoid," Martin said. "We don't want to mix end-user and production applications, because that may lead to contention for mainframe resources." Instead, the company maintains production data bases for each of Pennzoil's four divisions: Sulphur, Oil and Gas, Petroleum Products and Corporate.

JEAN S. BOZMAN

Business backbone

The voice/data network that Pennzoil's subsidiary will use to build its commercial information services business

INFORMATION PROVIDED BY PENNZOIL CO.
CW CHART

Oil firm

FROM PAGE 1

older oil industry-specific applications that were placed on hold during the mid-1980s downturn in the oil business.

Manning, formerly Pennzoil group vice-president for communications, said there was little risk involved in the venture. "There is no downside risk to it, because all the software we will sell has already been developed," he said.

Profit center spin-offs

Pennzoil's move is one of a series of recent steps by major companies to spin off MIS groups into profit centers. United Airlines earlier this month incorporated its MIS group as a freestanding

> "MYOPIA is a fundamental disease within the MIS community."
>
> KEITH EATON
> STRATEGIC INFORMATION SERVICES CO.

$350 million company, Covia Corp. (CW, Jan. 18).

As corporations restructure, they are trying to squeeze profits from divisions that were formerly viewed as corporate utilities.

Strategic Information Services was incorporated in Nevada as a subsidiary of Pennzoil's Richland Development Co. The business plan has conservative estimates of $35 million in revenue for 1988 and $80 million or more by 1993 — amounts that will more than recoup Pennzoil's $50 million investment.

The target market for the Pennzoil subsidiary's software and services is about 2,200 small to medium-size end-user groups in oil, gas and energy companies. But a few industry giants, including Sohio Petroleum Co. and Atlantic Richfield Co., are reportedly interested in running Pennzoil's industry-specific software.

'Information plan'

That new software is the outcome of a four-year collaboration with Pennzoil consulting firm Arthur Andersen & Co. Since 1983, the two firms worked to devise an "information plan" that would standardize all Pennzoil data bases around the Adabas product from Software AG of North America, Inc., as well as simplify the Pennzoil voice/data network that links 132 corporate sites.

Initially, the revamping project was done to make Pennzoil operations more efficient — and to accommodate changes in government regulations that affected software programs.

After a feasibility study in 1984, Pennzoil MIS staffers and a team of 40 from Arthur Andersen rewrote all major financial and oil-related applications. The mission was to do away with custom system utilities and to focus on custom applications instead, said Keith Eaton, Strategic Information Services executive vice-president, who was vice-president of management information systems for Pennzoil.

Eye doctor needed?

"Myopia is a fundamental disease within the MIS community," Eaton said. "Our information plan was enabled by end-user participation and by bringing the business plan and the computer plan closer together."

Manning credits top Pennzoil executives with keeping the software development project.

"Pennzoil's top executives were involved on an ongoing basis for the entire four-year project," Manning said.

"The thrust has to come from top management in order to make an information plan part of the overall strategic plan for the business."

Faced with an eroding revenue base, the U.S. oil industry

Keith Eaton

has been more inclined to cut back than to invest.

"The chaos and the restructuring of the energy business in recent years led most MIS organizations in this industry to place a moratorium on development work," Manning said. "We're ahead of the curve because we have already made an investment of $50 million in new technology, while other oil companies are only beginning to put together new development efforts."

Oil, gas applications

Strategic Information Services plans to offer that software — primarily industry-specific applications for the oil and gas sector — as well as to provide remote processing services for the same applications on Pennzoil's twin IBM 3084Q computers.

Additional computer capacity will be added as needed, Manning said.

However, the MIS group that will continue to service Pennzoil's internal data processing needs and support the for-sale software is somewhat smaller than the 400-plus staffing level that existed during the height of the development effort.

Manning said the new firm has 272 employees, all of them from Pennzoil's MIS group. The staff includes 20 people who will sell and support the oil industry applications sold to outside companies, he said.

Product groups

Strategic Information Services will provide a broad array of products, grouped in the following four areas: remote time-sharing services, direct software sales, the provision of electronic data interchange services on Strategic Information Services computers and on-site facilities management.

Initially, sales will be restricted to four states — Texas, Oklahoma, Louisiana and Arkansas — in which 60% of the target companies are located. Nationwide sales are scheduled to begin in 1989.

Pennzoil chose to work with Arthur Andersen because of its planning, project management and quality assurance capabilities, Manning said.

Now that Strategic Information Services' software has been developed, Arthur Andersen cannot attempt to participate in the software sales, said Andersen partner Jesse Tutor, who managed his firm's side of Pennzoil's project.

That is because Arthur Andersen will continue in its role as auditor of Pennzoil and as management consultant, according to Tutor.

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Announcing Version 5

Chips and Technologies touts PS/2 clone kit

BY JAMES A. MARTIN
CW STAFF

PALO ALTO, Calif. — Chips and Technologies, Inc. last week unveiled what it says are all the components needed to build an IBM Personal System/2 Micro Channel architecture compatible.

At a press conference here, the company introduced chip sets said to be compatible with the Micro Channel Models 50, 60 and 80 and claimed to provide greater performance with less circuitry.

Chips and Technologies also announced two single-chip products based on IBM's Video Graphics Array.

To round out its PS/2-compatible offerings, Chips and Technologies has aligned with Adaptec, Inc. to provide PS/2 disk controllers and bring small computer systems interface adapters to the Micro Channel environment.

Clone by mid-year?

With these products, an IBM Personal Computer-compatible vendor could market a Model 50 or 60 clone by mid-year and a Model 80 look-alike by next fall, according to Raj Jaswa, Chips and Technologies product manager for systems logic.

Although most, if not all, compatible makers are said to be developing a PS/2 clone, Jaswa said his company has not yet signed any contracts with a vendor.

OEMs are hesitant to introduce a PS/2 compatible because of their uncertainty over IBM's PS/2 patents.

After losing significant market share to IBM PC-, PC XT- and PC AT-compatible makers, OEMs have been told repeatedly by IBM that the company will closely guard the PS/2 against potential patent infringements.

Meanwhile, IBM has been careful not to disclose which pieces of the Micro Channel architecture are patented.

It is unlikely that any vendor will release a PS/2 compatible before those legal questions are answered, analysts said.

IBM's terms

"The patent issue needs to be resolved before we'll see any machines based on the Chips products," said John F. Blokker, an analyst and general partner at Hambrecht & Quist Venture Partners in Menlo Park, Calif. "IBM will eventually license its patents, but on its own terms."

According to Jaswa, Chips and Technologies has "requested licensing on all IBM patents current or future [on which] we might infringe."

However, he added, Chips and Technologies strongly recommends that systems OEMs talk to IBM and obtain licensing themselves for any patents that apply.

Jaswa said several OEMs were in the discussion stage with IBM regarding Micro Channel licenses, but he would not elaborate.

Compact design

The Chips and Technologies Chips/250 is a seven-chip set of system-logic circuitry compatible with the PS/2 Models 50 and 60.

The compactness of the design, according to Jaswa, will enable clone makers to introduce a desktop Model 80 compatible rather than the tower configuration of IBM's model.

While Chips and Technologies was the dominant player in the PC AT chip set business, the company is expected to face stiff competition this year from other suppliers, such as Western Digital Corp., which announced in October that it would release Micro Channel chip sets early this year.

In December, Western Digital said it had signed a development agreement with Phoenix Technologies Ltd. for read-only memory BIOS products.

Focus linked to HP's Spectrum line

Series one of several to offer version of Information Builders' DBMS

BY ALAN ALPER
CW STAFF

NEW YORK — Information Builders, Inc. is expected to disclose a development deal next month with Hewlett-Packard Co. to devise a version of the former's Focus fourth-generation language and data base management system for HP's Spectrum series.

Information Builders' cofounder and president, Gerald Cohen, declined to confirm or deny the impending agreement, but sources close to the company told *Computerworld* they expect an announcement to be made in February. They also said the version would be made available by year's end and would run on HP's line of reduced instruction set computing minicomputers under HPX, HP's proprietary operating system, and Unix.

It is believed that Information Builders will port its version of Focus for Unix, which is written in C, to the HP hardware platform. Since the firm would use its own Unix version, there would be few technological hurdles, sources said. The company would have to tailor the fourth-generation language and DBMS to work with HPX and in conjunction with other tools developed for Spectrum.

HP recently began formally offering Unix to its commercial customers as an alternative to its proprietary operating system. HP supports AT&T's Unix System V, Release 3.1.

'Let's seal the deal'

Both Information Builders and HP are believed to be eager to seal the deal. Having a Focus version for Spectrum would likely provide needed impetus for Spectrum, which, after numerous delays, has yet to live up to HP's expectations. Information Builders would benefit from overlap of its customer base with HP hardware, sources said.

If concluded, the Spectrum port would join numerous other versions of Focus that run on IBM mainframes, Digital Equipment Corp. VAXs, IBM Personal Computers and compatibles and Wang Laboratories, Inc. systems. Pricing of the Spectrum version would be equivalent with that of the VAX on a million-instructions-per-second basis, sources said.

Meanwhile, Information Builders is also said to be investigating the possibility of porting Focus to the Apple Computer, Inc. Macintosh environment. At a meeting last week in New York for about 500 Focus developers, Cohen said his company has begun a discovery project to assess the market requirements for such a product.

"We've determined that it is technologically feasible," he said, "but we're not sure if there is a market for such a product."

Cohen said Information Builders' technology would debut in the Macintosh world within the next few months, when the company begins shipping a version of its Level 5 expert system for the Mac.

In another matter, Cohen said Release 6 of Focus for IBM mainframes will allow users to make use of the added throughput of IBM's MVS/XA by running the fourth-generation language and DBMS above the 16M-byte limit. The release, expected to be unveiled in incremental upgrades throughout the year, would enable users to create separate regions of Focus in a manner similar to that in which CICS and IBM's Time Sharing Option are used.

IBM coding

FROM PAGE 1

the 370 mainframes, on which they are not commonly found today, IBM officials disclosed in a briefing with *Computerworld*.

The effort stems from both the firm's internal use of AI and the success stories of some its largest customers with fledgling expert systems.

It also stems, IBM officials freely acknowledged, from an appreciation of the ability of resource-hungry AI to rekindle demand for "MIPS and disks," said Herbert Schorr, group director of Products and Technology Information Systems at the Information Systems Group's headquarters here.

An availability date was not given for the knowledge processing architecture, and several third-party vendors said that although they believe IBM's intentions are sincere, they think the goal will take a long time to accomplish.

David W. Belote, IBM's manager of market development for knowledge-based systems, said the company wants "the shell vendor to get away from worrying about how to connect to the IBM system." The goal, he added, is "to encourage vendors to think of IBM as the preferred platform for expert system applications." Belote said support will exist for IBM's Personal System/2s and mid-range processors as well as 370s.

In committing itself to providing open pipelines to its hardware platforms, IBM is saying it is willing to cooperate with its competitors. For two years, IBM has been offering a user-friendly shell-building system, Expert System Environment; more recently, the firm has offered a programmer-oriented system, Knowledgetool.

'Wants a winning product'

"It doesn't surprise me at all. That's often what IBM does when it doesn't have a winning product of its own," said Harry Reinstein, president of Aion Corp., one of the few shell makers whose system works in an existing IBM mainframe environment.

Reinstein said large corporate customers like Northern Telecom Ltd., The Prudential Insurance Company of America, Chubb & Sons Insurance and Northern Trust Corp. were customers for the Aion shell last year. Commercial customers want to use inference processing and "high logic" that reflects the rules of running the business in their applications, he said.

Aion and Application Expert, a product from Cullinet Software, Inc., are two of the few well-known shell systems that work in an existing IBM mainframe environment.

"We're interested in plugging into the IBM world. Most of the people we deal with have existing IBM data bases and systems," said Alexander D. Jacobson, chairman of Inference Corp., the Los Angeles producer of the Automated Reasoning Tool.

Schorr said cooperation with third-party vendors has always been part of IBM's strategy for encouraging the use of AI. IBM signed a joint development agreement last year with Intellicorp in Mountain View, Calif., to provide an MVS version of its KEE system.

In addition, IBM has been experimenting with building its expertise into MVS and Systems Network Architecture monitoring software. Its Yorktown Heights, N.Y., research laboratory produced a YES/MVS expert system for managing MVS operations. It worked well at one site but not as well when it was tested at a site with a different system configuration.

"Each customer has a different configuration and installation policy. We need some kind of custom facility with which to tailor an expert system," Belote said.

Nevertheless, success stories like Firemans Fund Corp. and American Express Co. in the use of expert systems is kindling a larger demand among commercial customers, and IBM wants to move as rapidly as possible to meet it.

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MAP/TOP: Live before your very eyes

Supporters unite in OSI cause to develop fictitious, but working, multivendor network

BY KATHY CHIN LEONG
CW STAFF

LONG BEACH, Calif. — In a carefully orchestrated effort to spur support for Open Systems Interconnect (OSI) and multivendor cooperation, the MAP/TOP Users Group and the Corporation for Open Systems (COS) last week detailed the elements of the Enterprise Networking Event, scheduled for June in Baltimore.

The live demonstration will link the computers, robots and programmable controllers of approximately 50 vendors on a Manufacturing Automation Protocol/Technical and Office Protocol (MAP/TOP) network with nodes both domestic and abroad.

MAP and TOP are communications standards supported by General Motors Corp. and The Boeing Co. Both follow the OSI protocols.

Getting strong now

To participating vendors, the demonstration represents months of development and painstaking conformance testing at the Industrial Technology Institute, a MAP consultant in Ann Arbor, Mich., to ensure that their computers communicate with other network devices.

By July, the MAP 3.0 final specification will be available for worldwide use, said Chuck Gardner, chairman of the MAP/TOP Users Group.

As the users group agreed at its last meeting in September 1987, MAP 3.0 will remain stable for the next six years, giving vendors a chance to create products and offering users an opportunity to install test sites without worrying about MAP being a moving target.

The vendor community and supporting organizations will have spent a total of at least $50 million in costs for the demonstration, said Mike Canepa, chairman of the Enterprise Networking Event's steering committee.

THE DEMONSTRATION represents months of development and painstaking conformance testing to ensure that vendors' computers communicate with other network devices.

While Autofact, a similar MAP demonstration held in Detroit in 1985, emphasized the potential capabilities of MAP 2.1, this year's project boasts the new functions inherent in MAP 3.0, which include network management and enhanced messaging specifications. Unlike the Autofact demonstration, vendors must show only products that will be made commercially available.

A bird's-eye view of the floor will reveal one backbone broadband MAP IEEE 802.4 network, including 802.4 carrierband network segments for MAP cell controllers, and one backbone TOP IEEE 802.3 baseband network. Sun Microsystems, Inc. Sun-3 routers will be used to connect the MAP and TOP networks.

In the show floor demonstration, nine key participants will form a fictitious department, each specializing in one aspect of the production and manufacturing scenarios.

For instance, Boeing, working with products from Xerox Corp., NCR Corp. and Digital Equipment Corp., will be in charge of the order entry department.

Using the CCITT X.25 packet-switching Accunet service from AT&T, vendors involved with the Communication Network Manufacturing Applications group will have equipment at the British Aerospace PLC facility in Preston, England. This group will demonstrate its role as a fictitious supplier, using MAP to communicate with the mock manufacturing entity in Baltimore.

The U.S. Air Force, with Hewlett-Packard Co., Intel Corp. and other suppliers, will work to design the fictitious product electronically. At the same time, these vendors plan to demonstrate how the aerospace industry can use MAP technology to change an aircraft engine mount.

Down the line

As the process of manufacturing begins, the Deere & Co. booth will use the MAP network, including products from Concord Communications, Inc. and Advanced Communications, Inc., in coordination with a laser cutting device to saw pieces of the product in its just-in-time manufacturing department.

GM, with products from Allen-Bradley Co., GE Fanuc Automation and Siemens AG, will be involved in the final assembly portion of the demonstration. Robots and a voice-activated speech inspection system will organize the customized goods and guide them out the door. The COS, with equipment from IBM and National Advanced Systems Corp., will prepare the invoice using the OSI FTAM.

"How well MAP is accepted will depend on how well the event works," said John Callahan, managing director at consulting firm Information Technology Research. "When users go to the event, they will be able to tell what's real from the hype."

Wide support waiting for final form

LONG BEACH, Calif. — The usual promises of the potential of MAP were reiterated at last week's MAP/TOP Users Group meeting: cost-effectiveness, eventual shortening of production cycles and increased industrial competitiveness.

The Manufacturing Automation Protocol/Technical and Office Protocol (MAP/TOP) specification received a strong vote of confidence from the existing installed base of MAP users but garnered skepticism from users on the sidelines who said the MAP specification is still too elementary.

"I just don't think I can install MAP tomorrow and have it do the things I do in my network today," said one user who wished to remain anonymous.

Other users at the meeting said MAP must further address such issues as network security.

Anticipation

With emphasis on the June Enterprise Networking Event (see story above), the conference yielded little in major user announcements. In fact, until MAP 3.0 products actually come to market, users agreed that vendors will have a difficult time selling MAP 2.1 products into end-user shops.

Digital Equipment Corp. was noticeably quiet at the meeting, with only brief mentions by other suppliers that DEC gear will be used at the Enterprise Networking Event.

IBM, represented by Ron Bailey, manager of product requirements for manufacturing systems products, again stated the company's support of MAP.

"IBM's SNA and MAP can complement one another in a company," he said, referring to IBM's Systems Network Architecture.

Other vendor announcements included the following:

- Motorola, Inc.'s microcomputer division introduced a Mini-MAP controller board based on DEC's VMEbus. Priced at $995, the board features the new Motorola token-bus controller chip and acts as a network interface to control access to other MAP nodes. Also called the MVME373, the board lets up to eight serial devices communicate.

  It is slated to be available in the fourth quarter of this year.
- A personal computer software product from Marketech called Mapmaker helps users determine how to implement and grow a MAP network. The expert system helps users plan their network and analyzes requirements. It is scheduled to be available in the second quarter of this year. Price has not been determined.
- Retix, Inc., an Open Systems Interconnect (OSI) protocol vendor, announced it is shipping the seven-layer suite of MAP/TOP 3.0 protocols to OEMs and systems integrators. The Retix MAP 3.0 protocol features the OSI FTAM Phase 2 protocol, the X.500 directory protocol and network management.
- Concord Communications, Inc. will expand support for OEMs with a MAP modem tester. It will support broadband, carrierband and fiber-optic modems. Priced at $24,000, the tester includes software, firmware and documentation, the vendor said.

KATHY CHIN LEONG

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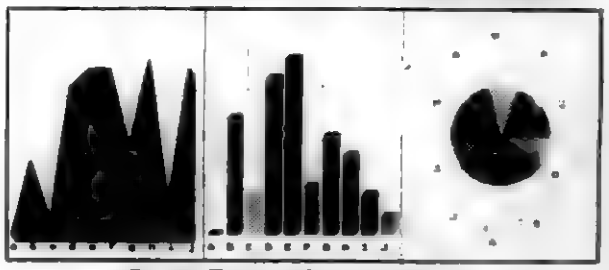

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SNA bonds highlight Mac grasp for host ties

BY PATRICIA KEEFE
and STEPHEN JONES
CW STAFF

ANAHEIM, Calif. — Fulfilling a year-old commitment, Apple Computer, Inc. is scheduled to unveil support for IBM's Systems Network Architecture (SNA) and host environments today, kicking off Infonetics, Inc.'s second annual Infonetics Desktop Communications show here.

Apple reportedly will introduce four communications and networking development products designed to continue the warming trend between MIS and Apple's Macintosh.

Targeted at MIS departments and commercial developers; Macworkstation 3.0 is a programming tool kit designed to provide a platform for Mac-to-host applications as well as high-level access to the Macintosh Toolbox.

Access boosted

Apple claimed programmers can gain full access to, and control over, the Mac's pull-down menus, windows and dialogue boxes without having to learn the specifics of the Mac programming environment.

The tool kit is scheduled for availability next month at a price of $2,500 per site license.

Apple said it will implement LU6.2 for distributed processing on the Macintosh Plus, Macintosh SE or Macintosh II. MacAPPC allows the Mac to talk with other personal computers on a network and to start tasks independently.

The toolbox includes all LU6.2 communications protocols and a set of utilities for installation and configuration of network components. Site licenses for MacAPPC will cost $2,500 and should be available this summer.

APPLE reportedly will introduce four communications and networking products designed to continue the warming trend between MIS and the Macintosh.

Another developer's building block is Apple's coprocessor platform, designed to provide real-time multitasking operating system capabilities. Peter Hirshberg, manager of host systems integration at Apple, described the product as "the fundamental linchpin for future offerings." The coprocessor platform has the ability to provide communications services and run protocol suites.

The coprocessor is built on a Nubus card with a 10-MHz Motorola, Inc. 68000 microprocessor and a Nubus interface. It requires 512K bytes of random-access memory and is slated for availability in February.

Apple is also expected to announce an upgrade to its Appletalk for VMS, which will support Ethernet and the Appletalk Datastream Protocol. Version 2.0 provides additional support for Appletalk protocols in non-Apple environments. Site licensing is scheduled to start in March at a price of $5,000 per site.

Mixed bag

Approximately 25 other products are expected to be introduced by third-party vendors at the show. Some of those offerings include the following:

- Network Innovations, Inc. is scheduled to unveil CL/1, a connectivity language said to let PC software developers access and integrate their own applications, minicomputer and mainframe data and applications.
- Touch Communications, Inc. said it will roll out an ISO Open Systems Interconnect-based network implementation that runs over Ethernet and supports Macintoshes, IBM Personal Computers and DEC VAXs.
- Dayna Communications, Inc. is slated to introduce an electronic mail package for the PC and Mac worlds that features correspondence management and the ability to interface with Action Technologies, Inc.'s The Coordinator mail package.

A number of software vendors are reportedly ready to announce Mac-to-IBM products that use development tools from Apple.

"Apple now has the tools that are fundamentally useful to MIS, allowing MIS to provide all the benefits of the Mac while tying it into existing systems," Apple's Hirshberg said.

Apple caters to MIS

Menu includes support of major standards

BY PATRICIA KEEFE
CW STAFF

CUPERTINO, Calif. — Apple Computer, Inc. executives last week backed up a commitment to MIS with guarantees to provide multivendor integration by supporting the major interoperability standards.

In an interview with *Computerworld*, Peter Hirshberg, Apple's manager of host systems integration, said those standards include IBM's Advanced Program-to-Program Communications, the ISO's Open Systems Interconnect (OSI), Integrated Services Digital Network (ISDN), CCITT X.25 and Transmission Control Protocol/Internet Protocol (TCP/IP).

Those statements are strengthened by recent announcements designed to integrate the Macintosh into major systems environments, most notably IBM and Digital Equipment Corp.'s.

Apple has always catered to the work group and the individual user. But there is a new emphasis at the firm on producing products and tools designed to let MIS get more out of its investments in Macintosh technology, Hirshberg said.

Toward that end, Apple is set to announce a series of development tools integrating the Mac into IBM host and Systems Network Architecture (SNA) environments today at the Infonetics Desktop Communications show in Anaheim, Calif. (See story left).

Using these tools, "an LU6.2 application on another system can be invoked from any Mac system, whether it links directly to an SNA environment or to a server through Appletalk," said Anthony Cagle, Apple's manager of communications product development.

Also significant, according to Hirshberg, is Apple's recognition of the investment MIS departments have in programmers trained in host disciplines. Access to the DEC world is also important. Apple earlier this month unveiled a joint development agreement with DEC under which the vendors will work to integrate their environments under the OSI standard.

Long-term goal: OSI

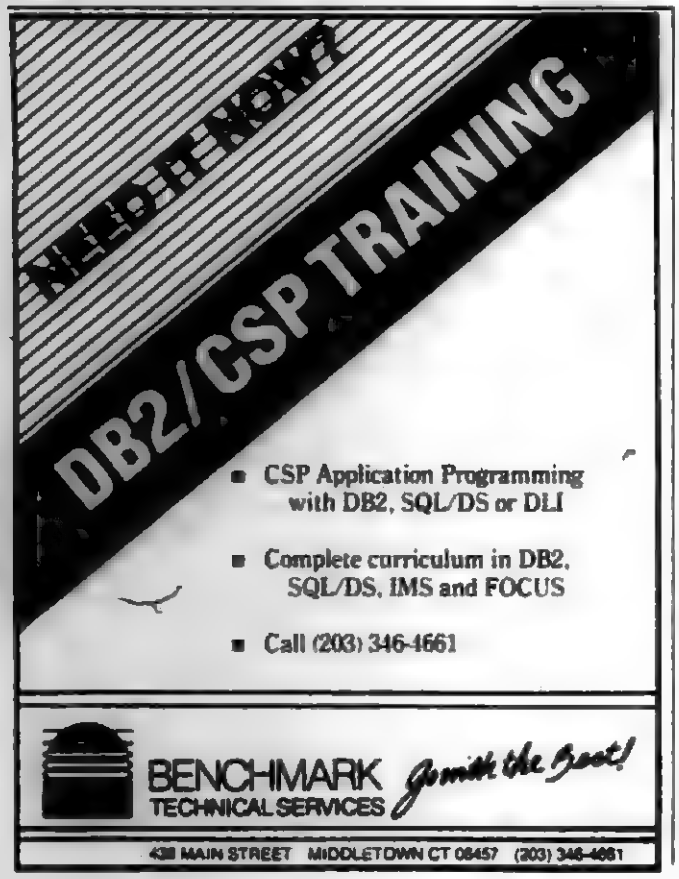
Although Apple has promised to deliver standard TCP/IP drivers to the Macintosh community, OSI is its long-term strategy for multivendor connectivity.

"We see TCP/IP as the stepping stone to OSI," Cagle said.

"Our focus is on moving Apple into the mainstream environment of our customers, which is increasingly OSI," Hirshberg agreed.

Apple is also strongly committed to ISDN. "We are actively pursuing ISDN technology; you can expect an announcement within the year," Hirshberg said, adding that Apple will be involved in ISDN trials.

"There will be a huge deployment of ISDN technology in the U.S., and we are determined to be a part of it," Cagle added.



Language scales Mac-VAX network wall

BY NELL MARGOLIS
CW STAFF

ANAHEIM, Calif. — Network Innovations, Inc. plans to put forth today a communications language that it claimed will connect desktop computer applications to a broad assortment of minicomputer and mainframe data bases using extended SQL commands.

The Cupertino, Calif.-based company, which has marketing agreements with both Apple Computer, Inc. and Digital Equipment Corp., said the first product under its CL/1 language umbrella can be used by developers to connect applications on Apple's Macintosh to data bases on DEC's VAX without making users exit their local programs.

The announcement, which is expected to be made at the Infonetics Desktop Communications show here today, comes less than two weeks after Apple and DEC formed an alliance to link their product lines.

Network Innovations' latest offering is based on ANSI-standard SQL. "If you can use interactive SQL, you can use CL/1," said Network Innovations marketing manager Edward A. Forman. CL/1 is built on a requester-server architecture. The CL/1 Developer's Toolkit for the Macintosh is a set of Mac and VAX software designed to aid the applications developer in creating applications that support the connectivity language.

The CL/1 Server for VAX/VMS, which is installed on each VAX system the user wants to access, processes Mac-based requests and routes them to the VAX through an application program interface (API). Data is also sent back to the Macintosh through the API.

The tool kit will cost $3,500; server prices will range from $3,000 to $23,975, depending on the CPU. Both should ship in the second quarter.

CL/1 supports DEC's own relational data base management system, VAX RDB/VMS, and RMS files as well as third-party market leaders Oracle, from Oracle Corp., Ingres, from Relational Technology, Inc., and Sybase, from Sybase, Inc.

"The critical element," Forman said, "is that all of this is wholly transparent to the programmer. He doesn't have to care whether the data base he needs to access is on a Unix or VMS platform, whether it's Ingres or Oracle or RDB. All he has to know is what information he needs — and CL/1."

CL/1 includes a verb set that consists of 13 standard SQL manipulation verbs plus 32 verbs to handle connectivity procedures, variables and printer resources. The CL/1 package also comes with an API that resides on the desktop computer and an incremental compiler that speeds the translation process by creating reusable code.

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EDITORIAL

Sema-tough

ANYONE SELLING ANYTHING can take a lesson in marketing from the state of Texas — Austin in particular. Earlier this month, the capital of this state, whose economy has been rocked by the oil glut, succeeded in wooing the nation's first semiconductor co-op to settle there. Sematech will pump hundreds of millions of dollars into the local economic chest and directly and indirectly create thousands of jobs (see story page 75).

Sematech will become the second such consortium to settle in the college town. *Computerworld* readers will recall that Austin also got the nod in 1983 from Microelectronics and Computer Technology Corp., which, like Sematech, was courted by municipal suitors all over America.

Essentially, "Big A"-style marketing is a primer on how to treat a prospect. For information managers, the prospects increasingly are the chief financial officers or chief executive officers of the world, who must be administered the hard sell for major projects. Here's the Texas marketing formula:

Mobilize and unify your marketing forces. It was clear to both Sematech and MCC officials that the entire city of Austin was behind its courting efforts. City officials formed a "woo Sematech" organization. A united front was presented by Texas congressmen, the governor's office, local politicos and civic groups.

Trot out the big guns. When Bob Inman, MCC's founding chairman, arrived to inspect the proposed Austin site, he was greeted at the airport by Lady Bird Johnson. Reports surfaced that H. Ross Perot further induced Inman with free use of his jet for a year. With Sematech, Lone Star U.S. Rep. Jake Pickle scored points with the consortium site-search committee by facilitating the U.S. government's loan of $100 million to Sematech. U.S. House Speaker Jim Wright — he's a Texan, too — greased skids in the direction of Austin. Texas Gov. William Clements held more than one tete-a-tete with Sematech officials in the privacy of the governor's mansion. Governors in other contending states put forth feeble efforts by comparison.

Put on your best dress. Let the client know just how good you are. Among the finalists in the Sematech bidding were high-tech strongholds in Massachusetts and California. But the adroit Austinians could easily point to the Sun Belt cost of living, where a new home costs $150,000, compared with $350,000 and up in the other two areas. It's also hard to beat the climate in Austin.

Make 'em an offer they can't refuse. Sematech's people were concerned about the availability of a clean room, so a local task force was organized to build a simulated room. When MCC raised questions about the long-term availability of labor, the state added technology chairs at the University of Texas at Austin and inaugurated a microelectronics research program.

LETTERS TO THE EDITOR

Equal time

I want to respond to the *Computerworld* readers who wrote regarding the article "What threatens mainframe computing" [CW, Oct. 19, 1987].

In particular, I would like to correct misstatements of fact and other misrepresentations that were included in letters published through Nov. 30, 1987.

- The article compared and contrasted the millions of instructions per second (MIPS) rates of mainframes such as IBM's 4381 Model 22, 3090 Model 600E and 370/168 with the IBM Personal System/2 Model 80. I did not state that the PS/2 was the equivalent of a 4381 Model 12.
- People in the data processing industry who made similar comparisons and contrasts include Bill Gates of Microsoft Corp., John Sculley of Apple Computer, Inc. and William Zachmann of International Data Corp.
- I never conceded that it takes several 80386 instructions to perform a 370 instruction. My contention, as stated in the article, is ". . . there is no substantial quantifiable difference between 80386 and 370 machine instructions."
- I never stated that throughput is not an important issue. In fact, I drew attention to how bad basic performance was the dominant determinant of system failure.

The reader failed to understand that mainframes do not constantly write each updated record to disk. They buffer, write to expanded store, cache and log to disk or tape during a transaction. There is absolutely nothing inconsistent with a PS/2 doing the same thing.

- The so-called make-believe hardware and software I had in mind to support my position included Compaq Computer Corp.'s 386, the PS/2 Model 80 and IBM's Token-Ring network.
- The suggestion to lash together hand-held calculators has been adopted by Avis, Inc. Companies such as Echlin, Inc., an automotive parts manufacturer, are lashing together Compaq 386s and Personal Computer ATs, converting from an IBM 4381 environment and estimating $300,000 a year in savings.
- I never stated that there was a conspiracy among MIS directors and managers to perpetuate the use of mainframes.
- Many large corporations are downsizing their data processing installations to minicomputers, Digital Equipment Corp. VAXs and IBM 9370s and System/38s. The preservation of software investment is important, but most of the 20-year-old software is not worth salvaging. The best thing an MIS executive can do is insist that costly technology infrastructure decisions are not based on high-tech superstition about the need for mainframes when less costly PS/2-type solutions will do. How one does this is by emphasizing formal, structured architecture-based systems planning.

Finally, in an editorial titled "Alive and well" [CW, Nov. 23, 1987], we were assured that ". . . early reports of the mainframe's death are exaggerated."

This conclusion is reached after a cavalier dismissal of the 50-to-1 economic benefits of PC MIPS vs. mainframe MIPS, a convoluted assertion of the fallacy that PC MIPS are not the same as mainframe MIPS because, of all things, "disk I/O potential," and the circular proposition that because mainframe power is on desktops and mainframes are here today then they will be here tomorrow.

Fred J. Vinkovich
Coopers & Lybrand
Management Consulting
Services Division
Information Systems Group
Philadelphia

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.*

This week in history

Jan. 23, 1978
Legislation that bolsters the Department of Health, Education and Welfare's (HEW) crackdown on welfare cheaters through computer cross-checks is on the books. The law requires the HEW secretary to make wage information contained in Social Security Administration files available to state and local welfare agencies to help them determine an individual's eligibility for aid or services.

Jan. 24, 1983
Apple Computer, Inc. shakes up the office systems market with its long-awaited Lisa system, a 16-bit microcomputer that reportedly runs several applications simultaneously. The microcomputer maker also brings out the Apple IIE, an enhanced version of the Apple that incorporates very large-scale integrated circuitry.

Round or rectangular, holes don't make the company

EFREM MALLACH

Much of the world is moving to Unix.

A recent study by International Data Corp. measured the percentage of hardware dollar sales for operating systems since 1981 and predicted market share to 1991.

IBM mainframe operating systems now drive 25% of all hardware shipments but should drop slightly. Microsoft's MS-DOS grew to about 20% by 1986, and the combined MS-DOS and OS/2 operating systems should grow no more than 1% by 1991.

Unix shows the biggest predicted gain, from less than 10% today to a about 20% in 1991. If nearly all vendors support Unix, and if Unix standardization means nearly all vendors will have access to the same applications, how will vendors differentiate themselves?

Taking a different shape

People with hairlines like mine may remember Univac's round-hole 90-column punch card. This card format was a sales barrier: Many potential customers had rooms full of tab equipment that used IBM-style cards with rectangular holes and 80 columns.

Eventually, Univac moved to rectangular holes, but not without pain. Odd as it may sound in 1987, people were emotionally wrapped up in the shape of the card holes. They felt Univac's identity was somehow embodied in round holes. Changing to rectangular holes would mean losing this identity.

Of course, Univac didn't lose its identity when it changed to IBM-style cards. Its personnel discovered that a firm's identity is embodied in larger, more important issues.

Honeywell went through a similar process a few years later. Its large-scale systems of the early 1960s used ¾-in. magnetic tape. The rest of the world used ½-in. tape. Honeywell came around, too, but with much wringing of hands and worry about loss of identity, which didn't happen in this case, either.

The same thing has happened in software. For example, a standard Cobol would mean the demise of proprietary languages, with their odd statements matched to unique hardware instructions. If proprietary languages go away, what will distinguish one hardware offering from another? Where is the corporate identity?

A more recent issue involves instruction sets. Nothing defines the essence of a computer as much as its instruction set. With so many systems using the same microprocessors, what differentiates one from another? The problem hasn't materialized in this instance, either. The Intel 80386 is the basis for systems as distinct as IBM's PS/2 Model 80 and Sequent's 27-processor offering.

Now that we're no longer hung up on hole shapes, tape widths, programming languages or instruction sets, what's left? The operating system. Surely nothing could be more important. It defines the entire user visibility of a system: software, user interface and all. What will happen to vendors if the world standardizes on Unix?

No more than happened when the world standardized on a punch-card format. Firms will still differentiate themselves through overall product concepts. A PC running Xenix has little in common with a four-processor Amdahl mainframe running UTS, even though the same applications (with obvious limitations) can run on either one.

Amid the moulding crowd

Even among similar products, differentiation will exist. The NCR Tower, Honeywell Bull XPS-100 and NEC Astra XL families share general features. They run AT&T's Unix System V, use the Motorola 68020, were designed for commercial use and support a few dozen users. Yet they vary in design specifics. Some features appeal more to some prospective buyers than to others.

More importantly, systems vary in the depth and types of support available from their suppliers. Suppliers vary in the types of businesses they understand and can help with, in their willingness to help and in their fees for helping.

They vary in corporate strategies. They vary in distribution channels. In short, they vary in the ways suppliers of most mature products vary: not by technical nuances that have little impact on the suitability of a product for an application but by the needs a firm chooses to meet and how it approaches them.

To the buyer selecting a vendor, these are far more important issues. And they will remain, even if every computer in the world uses the same operating system.

Mallach is a faculty member of the Boston College School of Management and a consultant to user and vendor executives. Based in Needham, Mass., he recently published *Win Them Over: A Survival Guide for Corporate Consultant Relations Programs.*

Knee-deep in unneeded data

Are you brave enough to recommend a disk audit to your users?

NAOMI KARTEN

I am convinced that in 2,000 years, when archaeologists dig up what we think of as the civilized world, what they will find is data. Scads of it. Enough to bury entire cities.

Of course, this find shouldn't be surprising, because what today's technology does — and does well — is encourage people to hang on to what they have.

In the third generation's heyday, things were different. We had to economize. Disk space was a finite asset. We couldn't keep all the data we wanted, no matter how valuable it was.

We weren't exactly suffering from data deprivation. When I was an MIS manager, we kept more than 40 billion characters of data in various data bases and files. Even with the most advanced disk storage available at that time, it made for a pretty crowded computer room.

So we had no choice but to manage the data. That meant purging what was clearly not needed and archiving data that might be needed but not on an active basis.

It meant using tapes galore, and when the number of tapes exceeded the space available, it meant reallocating tapes to newer applications. It meant a formal process was needed to make sure that obsolete data was eliminated and that needed data could be readily retrieved.

Of course, there were some glitches in this process. The first was that someone had to know the right questions to ask. Questions like, Do you really need data that goes back to 1899?

Asking such questions is a waste of time, unless the person asked replies honestly. An example of an honest reply would be, "No, I don't need that data anymore. Why don't you free up the space for a more useful purpose?" Fewer than three people in all of recorded history have ever said that.

The proof of the continued existence of these glitches stares me in the face every time I scan my mail. My family has lived in the same house for 14 years. When we moved in, the previous owner left no forwarding address. He hasn't been seen or heard from since. He was elderly, in less than perfect health and may well be dead by now.

> DOESN'T anybody ever say, "Hmmm, this data base is getting mighty large"?

But he keeps getting mail. In the "Takes the Cake" category of business management, several times a year, stores invite him, as a highly valued customer, to take advantage of a special sale. There's his name, letter-perfect, on the computerized label.

Doesn't anybody ever purge their files? Doesn't anybody ever wonder what it costs to keep sending mail to someone who hasn't shown any sign of existence for 14 years? Doesn't anybody ever say, "Hmmm, this data base is getting mighty large"?

The truth is that today's computer technology makes people lazy. You can store more data and process it faster every year, so why bother cutting back?

Get more than you need

Personal computers add to the data overload immeasurably. When storage was limited to 360K-byte diskettes, people made do with 360K-byte chunks of data.

When hard disks came along, everyone suddenly needed 10M bytes. The space filled up quickly, but before anyone had a chance to worry about it, along came 20M-byte — and 50M- and 100M-byte — drives.

With that kind of space, you have room to play around. Why make a big deal over a file that's no longer needed when there's so much space to grow into? Why make yourself look foolish recommending an occasional disk audit to people who simply can't understand fussing over 20K bytes here and 30K bytes there when they've got 75M bytes at their fingertips?

Multiply that 75M bytes by the number of personal computers out there, and you can't help but be impressed by all that data. The fact that it resides in files with names only eight characters long means you've got to be more than a creative genius to name it all. File-finder utilities are destined to become the software of choice in this generation.

In the year 3988, when archaeologists are busily digging with their teaspoons, one of them will suddenly shout, "Eureka! I've found something."

When he reaches down and picks it up, he'll be surprised to discover it's a 5. Or a 78. Or a 02368KRTN. As they all start digging furiously, they'll quickly realize they're in a bottomless pit of data.

"Curious society they had back then," they'll say.

No more curious, I suppose, than a society that stores computer publications forever, even when the technology becomes obsolete a week after it is reported.

Karten, president of Karten Associates in Randolph, Mass., is a consultant, trainer and lecturer in the management of end-user computing. She is editor of the monthly publication "Managing End-User Computing," published by Auerbach Publishers, Inc.

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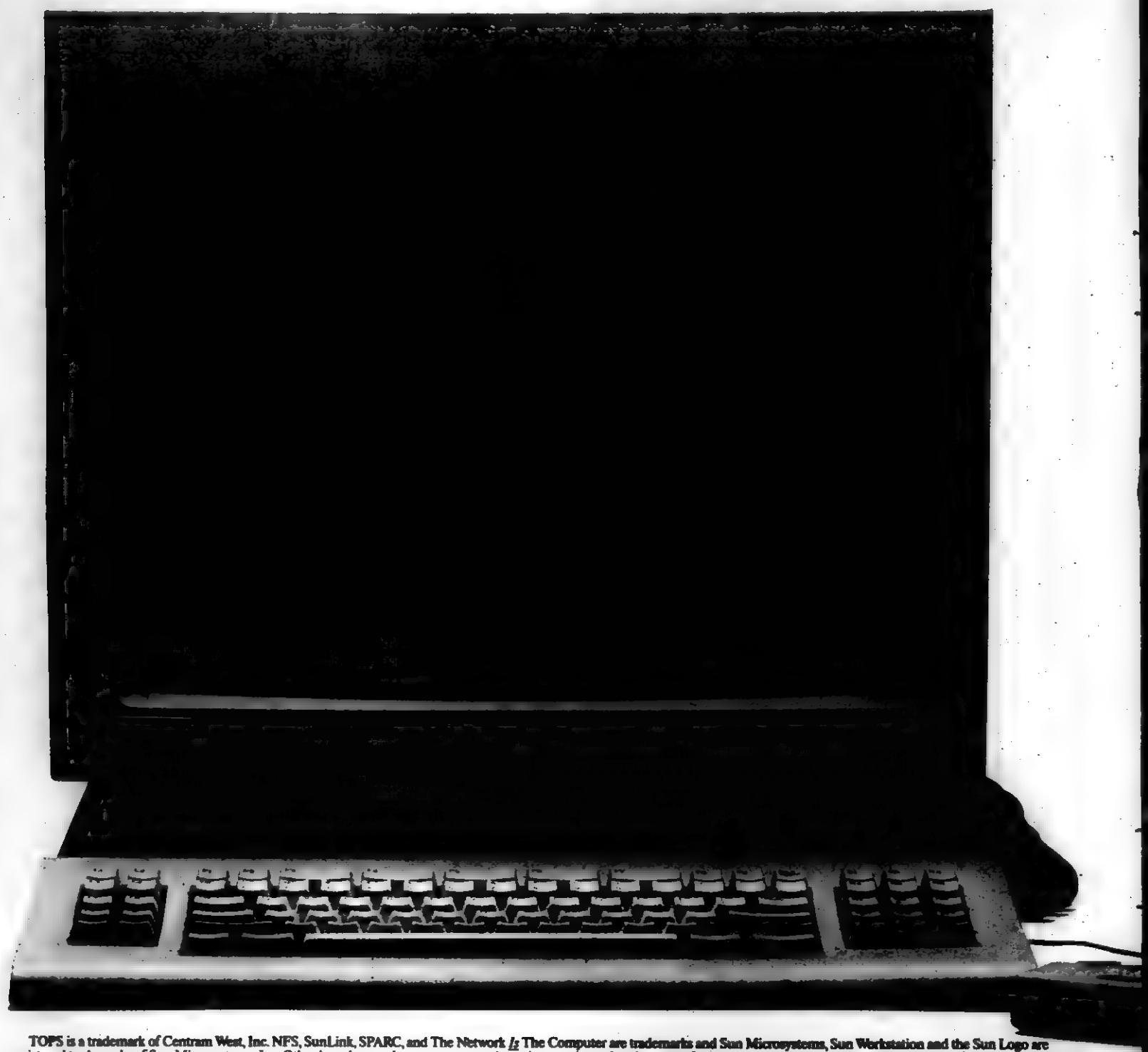

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The box here lists the various software categories, and each category boasts multiple vendors.

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Design/Drafting	*Molecular Modeling*
Doc. Config. Mgmt.	*Numerical Control*
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ECAD	*Seismic Processing*
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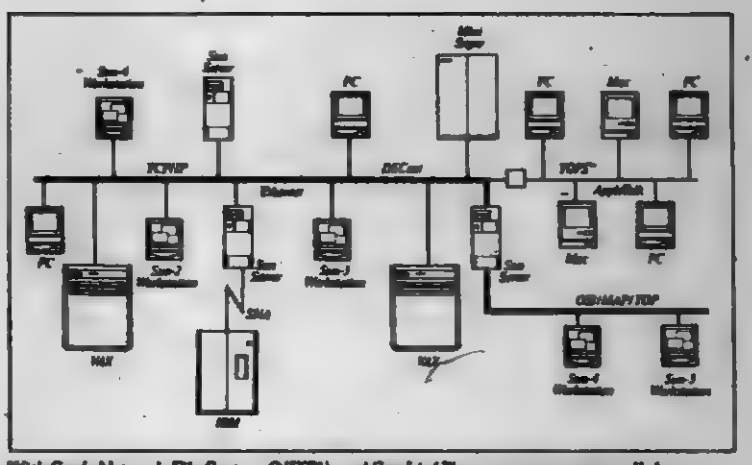

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For the price of a workstation.

Of course, if you like, you can have the most powerful and cost-effective workstation ever created *right now.*

And have your genius recognized immediately.

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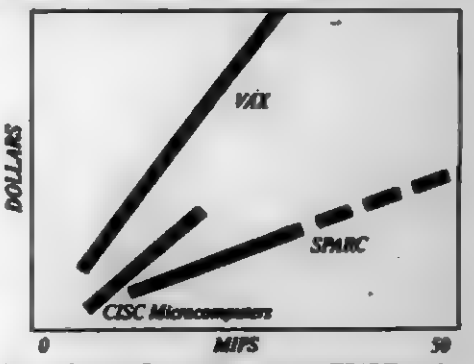

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The Network *Is* The Computer™

'Making it Big' means more than bits and bytes

Making it Big in Data Processing
By Robert Half

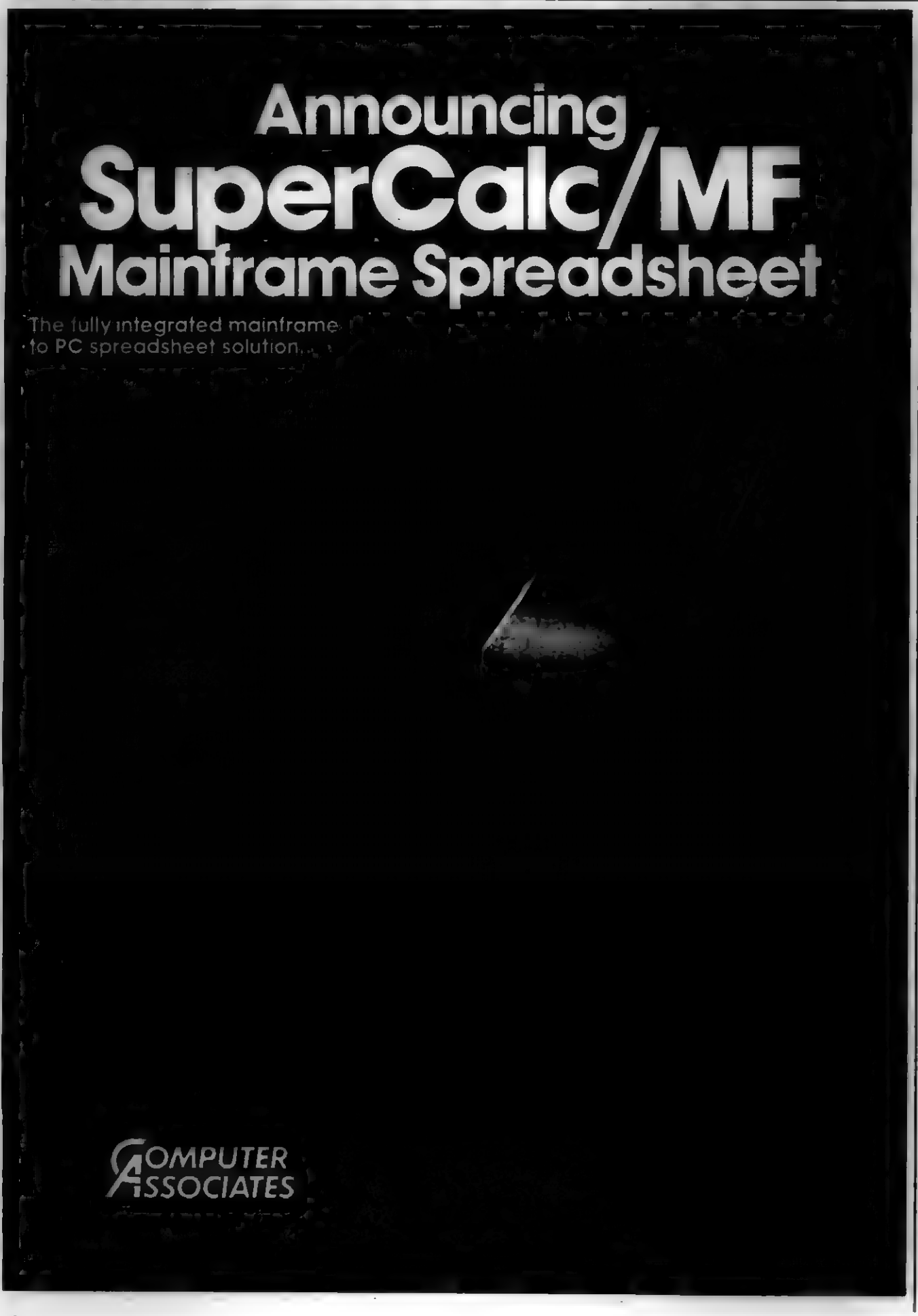
This easy-to-read guide is aimed at those aspiring to enter or rise in the world of DP. Robert Half, chief of the international accounting and DP recruiting firm that bears his name, stresses throughout the book that there is much more to success than just technical knowledge.

Half observes that while computers are becoming increasingly important to business, "the computer tail no longer wags the management dog." Technological expertise is still necessary, he writes, but it is the application of technology that counts in business today.

The increasing role computers play as they are applied to more business needs dictates that, while technical skills are vital for entering the field and growing within it, "loftier DP management jobs demand a well-rounded individual," Half says. Conversely, the career potential for anyone in general business increases with a command of DP.

The book covers self-assessment, education, job hunting, attitudes and strategies for success, management and self-employment. "Where you choose to stop is an expression of your individuality and personal needs," Half writes. Those aiming to leap into the highest echelons of management "are entertaining those dreams at a vital point in the history of DP."

Hardcover, \$17.95, 286 pages, ISBN 0-517-56580-3, by Crown Publishers, Inc., New York.



BOOKS IN BRIEF

In-House Publishing in a Mainframe Environment
By P. C. McGrew and W. D. McDaniel

Unlike many books on desktop publishing, this one provides concise answers to the many general and technical questions involved in document production using an IBM 370 mainframe and the support staff already in place in many corporations.

Hardcover, \$34.95, 296 pages, ISBN 0-02-948982-2, by MacMillan Publishing Co., New York.

The Right Choice: A Complete Guide to Evaluating, Selecting and Installing MRP II Software
By Christopher Gray

Gray provides detailed answers on how to make manufacturing resource planning software work, addressing myths associated with its implementation, showing ways to define system requirements and describing how to negotiate a software vendor-contract.

Hardcover, \$39.95, 258 pages, ISBN 0-939246-09-0, by Oliver Wight Limited Publications, Inc., Essex Junction, Vt.

The Arthur Young Practical Guide to Information Engineering
By Arthur Young Information Technology Group

This book presents an applications-oriented framework for systems planning and development using information engineering, a process by which business information needs are analyzed and appropriate systems are designed and implemented to address those needs.

Hardcover, \$32.95, 182 pages, ISBN 0-471-62920-0, by John Wiley & Sons, Inc., New York.

Manufacturing Intelligence
By Paul Wright and David Bourne

Exploring the changing nature of manufacturing, this book bridges manufacturing and computer science by showing how computer-integrated manufacturing and expert systems can be used to create machines that are autonomous and unattended.

Hardcover, \$37.95, 352 pages, ISBN 0-201-13576-0, by Addison-Wesley Publishing Co., Reading, Mass.

CASE

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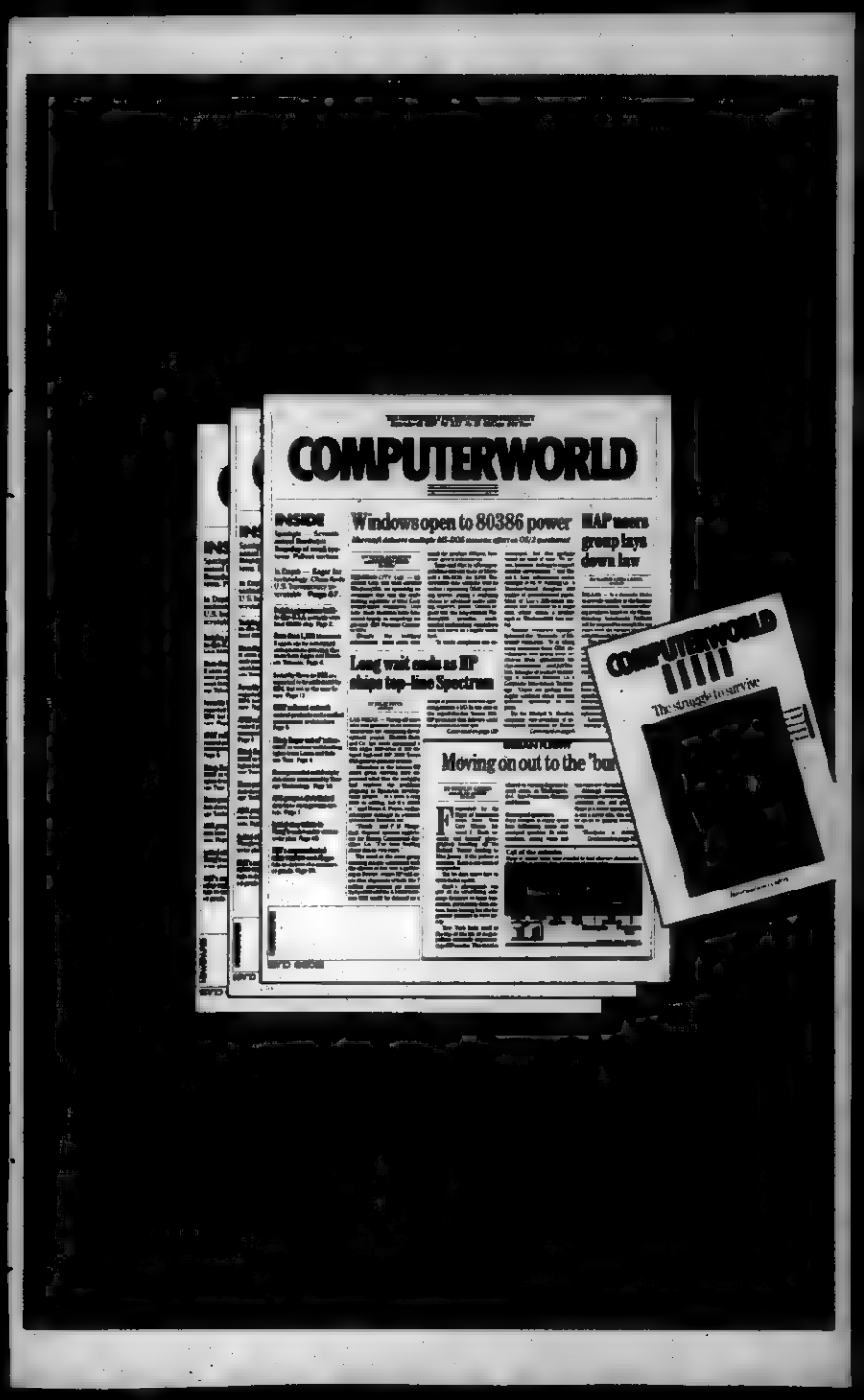
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SOFTWARE & SERVICES

SOFT TALK

Charles Babcock

Cobol 85: If it ain't broke . . .

Two things strike this observer about the current debate over Cobol 85 addenda.

One is that the addenda process is being layered on top of the general revision process of the language, probably to the detriment of that larger activity. And while anyone may comment on an addendum during the public review period, users are inadequately represented in requesting what they want from the standard-setting process as a whole.

Whatever the benefits of an addenda process, it is going to absorb the time and concentration of the X3J4 Technical Committee as the group formulates revisions, submits them for public review and adapts them after taking public opinion into consideration. This investment in time and attention can ultimately contribute to the next full-scale revision of the language, but it is more likely to compete with that larger process.

Part of the task of standard setting, it strikes us, is to focus the attention of the best authorities on a set of revisions to the language. Authorities frequently disagree, as we have seen with Cobol, but they can often achieve a synthesis that can then command public support.

The addenda process fragments the public side of that pro-

Continued on page 30

Few takers for VM/XA

Users wary of communications hang-up

BY ROSEMARY HAMILTON
CW STAFF

IBM's long-awaited release of a production version of its VM/XA operating system is just weeks away, but some users at large shops are saying, "No thanks."

The initial release, VM/XA SP Release 1, which is scheduled for shipment in March, does not have native support of IBM's Systems Network Architecture (SNA). As a result, some users said they are planning to either not install this release or install it for test purposes only.

Native SNA support is expected with VM/XA Release 2, scheduled for shipment in early 1989.

"XA, as we perceive it, isn't viable until SNA is available," said Guy Goubeaux, director of technical support at the Salt River Project, a utility company based in Phoenix. "SNA [support] is at least a year away, and until then, it holds no interest for us."

In a recent interview, Lois Dimpfel, manager of the IBM Kingston Programming Center, noted that native SNA support is a top priority for VM/XA. "One of the driving requirements on the VM/XA operating system is that delivery of that SNA native capability is as soon as possible," she said.

Last week, an IBM spokesman said there have been no changes made to the VM/XA SP shipping schedule.

A critical condition

The native SNA support is critical at large shops, many of which are committed to this networking strategy. "We are an SNA shop. In the VM area, we have just under 1,700 users, and SNA is the way we support them," Goubeaux said.

"We'll see a lot of shops wait-

Continued on page 29

NASD offers traders instant market access

BY ALAN ALPER
CW STAFF

NEW YORK — The National Association of Securities Dealers (NASD) is offering IBM Personal Computer-compatible workstations with an application package to enable its members to automatically monitor all over-the-counter market information.

The workstations are expected to replace a 7-year-old network of Harris Corp. dumb terminals.

The software, developed by a NASD subsidiary, the National Association of Securities Dealers Automated Quotation, Inc. (NASDAQ), allows dealers to create their own data bases for market-minding activities and handles local communications functions, spokesmen said. NASDAQ is continuously broadcasting all market information in compressed mode from its Unisys Corp. Model 1193 in Trumbull, Conn., to dealer workstations on its network.

The workstations will reportedly provide traders continuous access to market information, specifically on precise bid-and-ask prices. Currently, traders using Harris terminals have to repeatedly query the NASDAQ's mainframe complex for the most recent prices.

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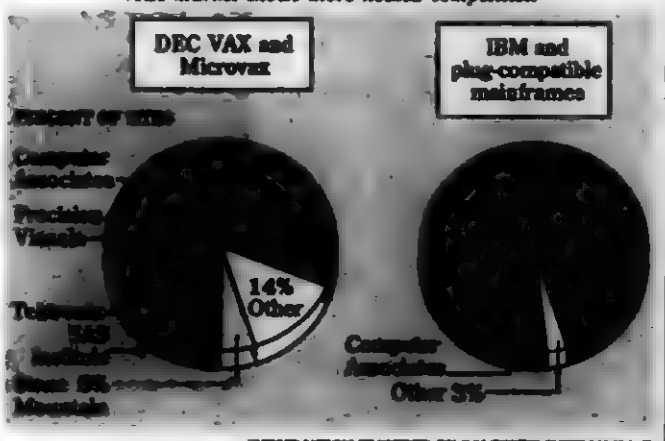
- Alis OA software package now available on VMS. Page 34.

Data View

Vendor market share of graphics software

VAX market shows more heated competition



INFORMATION PROVIDED BY COMPUTER INTELLIGENCE
CW CHART

Pilot, Thorn join for data interchange

BY NELL MARGOLIS
CW STAFF

BOSTON — The U.S. market leader in executive information systems (EIS) and the international market leader in decision support systems (DSS) have joined forces to give users a software package that combines the statistical complexity of DSS with EIS's graphic simplicity.

Under terms of an agreement announced last week, Boston-based Pilot Executive Software, Inc.'s EIS packages and the Thorn EMI Computer Software, Inc. FCS decision support system will allow transparent data interchange between the Pilot data base and FCS financial models, according to Pilot Chairman David Friend.

Under the agreement, British giant Thorn holds exclusive European marketing rights to Pilot's EIS product line, and the companies will jointly market the Pilot line and Thorn's FCS DSS in the U.S.

Using the vendors' data interchange, a Pilot user who, for instance, wants to change an assumption in a query to ask, "How would it change cost projections for 1988 if the price of

Continued on page 29

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Ring out the old, ring in the new

Informix VMS line expands to run programs over Decnet

BY NELL MARGOLIS
CW STAFF

MENLO PARK, Calif. — Informix Software, Inc. rang out the old year by turning its relational data base management system product line into a virtual multiuser data base.

Two software packages slated for shipment this quarter — Netstation and Netdbs — will allow applications created with Informix-4GL, Informix-SQL, Informix-ESQL/C and Informix Datasheet Add-In to run across Digital Equipment Corp. VAX and DOS-based personal computer networks via DEC's Decnet, the vendor said.

At the same time, Informix announced overall performance enhancements of all four of its VMS-based software packages as well as a VMS version of C-ISAM. Originally created for use in hierarchical data bases, C-ISAM is a lower level data-access method that complements SQL to provide high speed to the performance-intensive parts of applications, according to Informix senior product manager Gordon Smith.

Initially offered as a relational DBMS for Unix systems, Informix products moved onto the VAX line of processors last June, and the company continues its offensive into the VMS market with its networking offerings. The move did not require a major product rewrite, according to Smith.

"We designed all of our products with networking in mind from the beginning," Smith said.

The architectural divide

Informix's product line is based on a two-part architecture that separates the SQL engine, or back end, from the user interface, or front-end, tools. The division, Smith said, is natural for networking, as front-end data processing can be done on PCs while back-end data manipulation is handled by VAXs.

The new packages reflect the architectural divide. Netstation bundles Informix front-end tools with a network module to let users access remote data base back-end functions.

Netdbs adds Informix back-end tools to the Netstation mix, allowing the user the option of linking up with a network or flying solo.

Smith declined to quantify either the size of Informix's VMS user base or the percentage of company revenue attributable to the VMS product line.

Informix's Netstation is priced at $635 for Informix-SQL, $795 for Informix-4GL and $475 for Informix-ESQL/C. Netdbs is priced at $1,030 for Informix-SQL, $1,290 for Informix-4GL and $770 for Informix-ESQL/C.

Pilot, Thorn

CONTINUED FROM PAGE 25

oil were to double?" can trigger an FCS model without having to go through the modeling process.

The Pilot packages, which have links to IBM's Professional Office System and Digital Equipment Corp.'s All-In-1 office automation systems, bring users another benefit as a result of the FCS integration. "Since Pilot can talk right through FCS," Friend said, "Pilot users will have the advantage of FCS interfaces to data base systems including IBM's DB2, Adabas, Ramis and Focus."

Pilot software runs on DEC VAX and IBM mainframe and Personal Computer platforms. FCS operates on a wide range of mainframe and minicomputer systems including those from IBM, DEC, Hewlett-Packard Co. and Wang Laboratories, Inc.

DSS, Friend said, is an analytical tool that focuses on sophisticated economic modeling with traditional appeal to research and analysis professionals with programming experience. In contrast, EIS, with its emphasis on highly graphic user interfaces and easy-to-intuit organization, is targeted at nonprogrammer executives seeking bottom-line information.

The marriage of the two, Friend said, is aimed at "upper-middle-level executives — the people between the chief executive officer and the financial analysts who often end up having to assess great amounts of data to come up with important decisions quickly."

Cobol graphics tool to debut

GARDEN CITY, N.Y. — Computer Associates International, Inc. recently announced it will release a graphics tool for Cobol application development next month.

CA-Disspla Cobol is based on the graphics technology Computer Associates picked up with the acquisition of Isaco a year ago.

The product will allow developers to fold graphics capabilities into Cobol code, resulting in applications that include charts and other graphic representations, Computer Associates said.

To incorporate graphics, users must follow a seven-step procedure, according to Terry Baker, a Computer Associates product marketing manager. The steps include a series of commands that bring the graphics environment to the Cobol application. For example, the commands call Computer Associates' graphics source code, identify data to be included in the chart and move it into the chart.

The amount of coding will vary depending on the complexity of the application, Baker added.

CA-Disspla will initially be available for the IBM MVS, MVS/XA and MVS TSO environments. Licenses will range in price from $13,000 to $30,000, depending on the system configuration.

NASD

CONTINUED FROM PAGE 25

"There is zero response time, since all the query information can be programmed from the workstation and resides on [the workstation's] disk," noted Randall Sampietro, a software engineer on the project.

NASD is offering the Unisys Personal Workstations 2 and the Tandem Computers, Inc. PSX series. Both come equipped with 512K bytes of random-access memory, a 25M-byte hard disk drive, a 1.2M-byte floppy and an Emulex Corp. communication card.

Sam Vail, Unisys's branch manager for the NASD account, said he expects that at least 85% of the 32,000 dealers using the Harris terminals will convert to micros during the next 18 to 24 months. So far, however, the conversion has been slowed by cost-cutting measures adopted by many institutions following the Oct. 19 stock market crash, he noted.

NASDAQ has also recently upgraded its capacity to automatically handle large blocks of stock. The association already has an automated system to handle transactions of less than 1,000 shares.

Traditionally, traders had to use the telephone to execute and confirm bid-and-ask prices on large transactions with market makers. On Black Monday, however, many over-the-counter traders were unable to make telephone contact with market makers and, therefore, could not verify with any degree of precision actual selling prices.

NASD spokesman Enno Hobbin said development work on an automated system for large transactions began before the stock market collapse but that delivery was accelerated in the aftermath of Black Monday.

VM/XA

CONTINUED FROM PAGE 25

ing for it," said Clare Fleig, director of systems research at International Technology Group in Los Altos, Calif. "The degree of willingness to go with Release 1 depends on how great their requirement for SNA is."

Fleig said she expects IBM to deliver the SNA support before the first quarter of next year, because "it's bound to have a big impact on their sales."

VM/XA SP received a warm reception from the user community when it was rolled out in mid-1987. Users viewed it as a big step for IBM to introduce a production version of VM for high-end systems. VM/XA SF was already available, but it is a limited implementation of an XA-oriented operating system. As a result, it was used primarily to guest other operating systems and as a conversion aid for users moving to MVS.

Despite supporting IBM's efforts, users also said they are disappointed in the first release of VM/XA SP because it will restrict their plans to move to a fully functional VM/XA environment.

At the Prudential Insurance Company of America in Roseland, N.J., the MIS department plans to install VM/XA SP Release 1 for test purposes, according to Wayne Robinson, manager of software systems.

"We plan to install it to shake it down," Robinson said. "We want to see what's there. That's a project for 1988. It'll give us breathing room for the next release."

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SOFTWARE NOTES

Computer Assistance buys Atre

Atre International Consultants, Inc. in Rye, N.Y., has been sold to **Computer Assistance, Inc.** in Hartford, Conn., a 21-year-old software consulting firm. Shaku Atre, the frequent commentator on fourth-generation languages and data base management systems, will remain president of what will continue to be known as Atre International, but Computer Assistance will use her as a special consultant to its 15 branch offices across the country.

"We have name recognition, and they have infrastructure," Atre said. Both Atre and Thomas McDonaugh, president of 600-employee Computer Assistance, are long-term IBM veterans. Computer Assistance's revenue was $40 million in 1987. Atre International had revenue of less than $1 million.

Chris Date will address the Feb. 5 meeting of the **Delaware Valley DB2 and SQL/DS Users Group** on the relational model and its implications. The meeting will take place at 9 a.m. at the Ramada Inn in Essington, Pa. Those interested in attending can contact the group at Suite 505, 3650 Silver Side Road, Wilmington, Del. 19810.

Babcock

CONTINUED FROM PAGE 25

cedure and threatens to create a series of distracting side debates. This might be an acceptable trade-off if the gains are periodic additions to the language, and Jerome Garfunkel, the X3J4 member from Litchfield, Conn., has been the best advocate of this positive side of the process.

Even without the addenda process, however, the five-year revision cycle for Cobol stretched out to 12 years between Cobol 74 and Cobol 85. With the addenda process, there is a possibility that full-scale revisions will take even longer as the process is sidetracked by debates over a specific addendum and the need to submit it for public review. Debate may soon have to focus on whether the next version of the language should be called Cobol 9X or Cobol 200X.

It is the belief here that the review process already takes too long and that Cobol is too important to be left to the Cobol authorities for more than a decade. The type of revision process advocated by Garfunkel is appealing, but it remains an open question as to whether it can be made to work expeditiously. And Garfunkel is right when he says the process should not be applied to Cobol 85 corrections.

Enter Larry Madison, data processing director at Travelers Insurance in Hartford, Conn., and protege of Joseph Brophy, who orchestrated the public comments on the initial version of Cobol 85 that sent it back to the drawing table.

Madison isn't beating the table with his shoe, but he is a skeptic of the addenda process and has taken a stand alongside Garfunkel, saying the addenda process should not apply to corrections. Normally, these two men are not found in the same camp.

Compiler makers overlooked

Madison is concerned that corrections are mandatory changes that must be adopted by compiler makers and that, therefore, the agreed-upon standard will change from Cobol 85 to Cobol 85.1, 85.2, 85.3 and so on. Any changes to the existing terms of the standard — as opposed to additions to the standard — will open the question of whether existing programs will run the same under a Cobol 85 compiler vs. a Cobol 85.1 or other corrected-version compiler.

The committee clearly wants to incorporate the minor corrections in Addendum Two as soon as possible, and as long as debate focuses on Addendum Two rather than the correction process as a whole, a majority can be found to support it. Committee members who voted for the correction addendum included representatives of Unisys, IBM, NCR, Ryan McFarland and Hewlett-Packard — all compiler writers.

But if attention could be shifted from the specific corrections to the long-term correction process, I think it would raise a howl of protest from users once they discovered they must live with a shifting standard. Among the five votes against taking this course, in addition to Madison and Garfunkel, were representatives of three compiler writers: DEC, Prime and Micro Focus.

As both Madison and Garfunkel point out, we have an alternative to incorporating addenda corrections. The X3J4 committee issues Cobol Information Bulletins (CIB), which could provide interpretations to clarify ambiguous and inaccurate rules every year or even semiannually.

Compiler writers would then be forewarned of what would change in the next full-scale revision of the language and could incorporate changes that had a minimal impact on the existing standard.

"The CIB would not be official. In a sense, it's a reference for compiler writers; an advance warning of things that will probably happen," Madison says.

This approach has its limitations as well, but it has the redeeming virtue of avoiding a shifting standard, and in the end, that is what users want.

Babcock is *Computerworld*'s senior editor, software & services.

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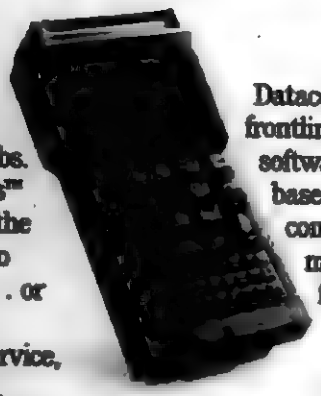

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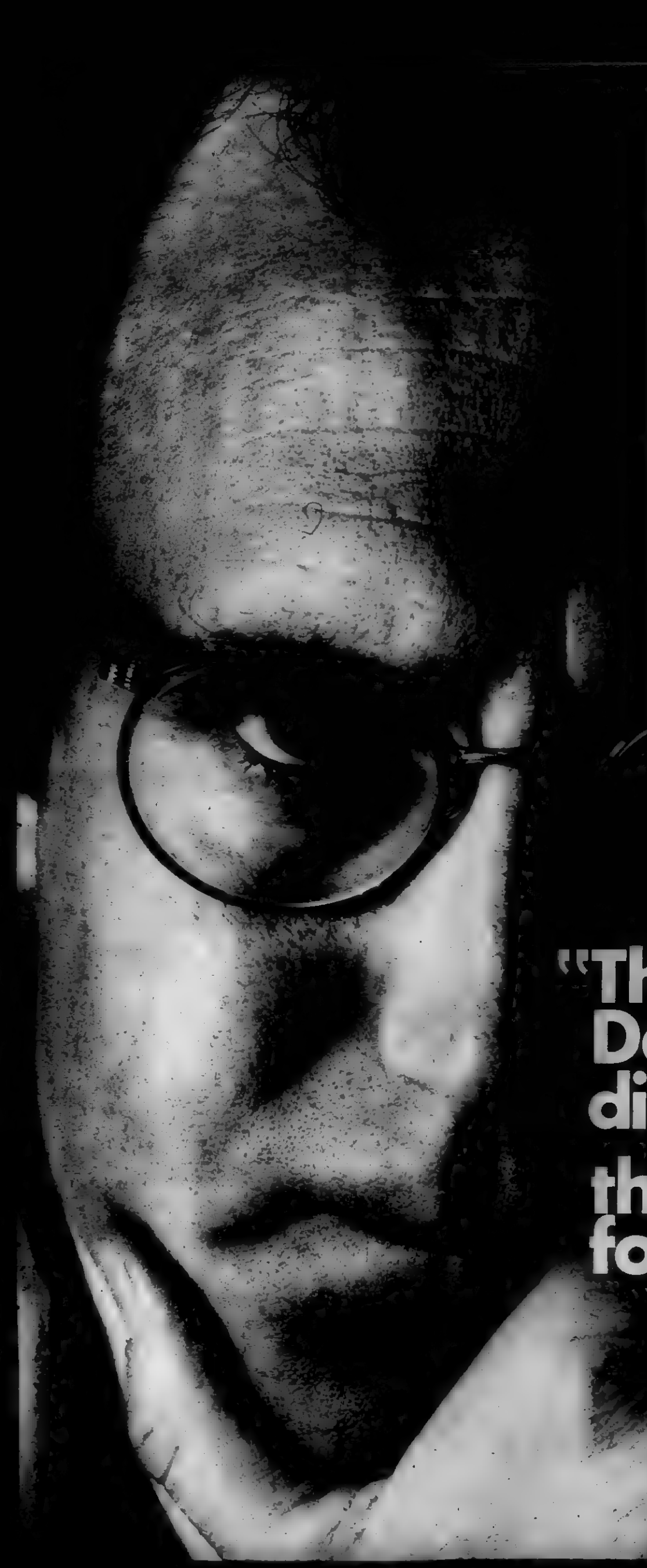

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NEW PRODUCTS

Systems software

Software Partners/32, Inc. has introduced **Jobsys**, a job management software system for Digital Equipment Corp. VAX/VMS systems.

Designed to handle recurring jobs and job dependencies — detached and in batch mode — Jobsys is said to be able to define the point at which a given job will be considered complete and specify that a job will run only when one or more other jobs are done.

The software works as a distributed system, the vendor said. It allows for job scheduling by time of day, week or month or at a given point in a process. Users can submit jobs to any node in a Decnet network hosting the package. In addition, jobs can depend on other jobs wherever located in the network.

Jobsys is priced from $3,000 for a single DEC Microvax II license to $10,000 for a site license.

Software Partners/32, Suite 880, 447 Old Boston Road, Topsfield, Mass. 01983. 617-887-6409.

Applix, Inc. has announced that its **Alis** office automation software package is now available on Digital Equipment Corp.'s VMS operating system.

Alis, which formerly ran only on Unix and derivatives, features such capabilities as multifont word processing, freehand drawing, business graphics, spreadsheets and data base management, according to a company spokesman.

The vendor said the product can now harness VMS's networking ability to provide electronic mail, meeting scheduling and work group information sharing. Alis can also link users working on differing hardware platforms and operating systems.

Alis on VMS is priced from $3,000 to $75,000, depending on system configuration.

Applix, 112 Turnpike Road, Westboro, Mass. 01581. 617-870-0300.

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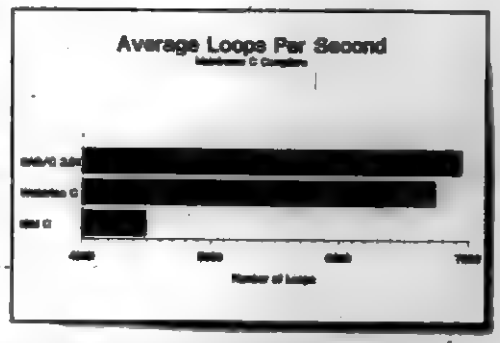

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Mail to: SAS Institute Inc., Attn: CC, SAS Circle, Box 8000, Cary, NC, USA, 27512-8000

Applications packages

Scheduling software designed to run on personal computers and multiuser systems has been announced by **Computer Options, Inc.**

Ace Scheduling is said to feature formulas for job-shop capacity planning, including economic movement quantities, user-defined job priorities, forward and backward scheduling and critical ratios. The information can be generated in reports or graphics, on-screen or in hard copy form. Users reportedly can define capacity down to the individual work center. Temporary variances caused by overtime or machine downtime can also be formulated.

Pricing for the product ranges from $995 to $2,500.

Computer Options, 603 West St., Mansfield, Mass. 02048. 617-339-5515.

Prolib, Inc. has ported its **AutoPCB** program for printed-circuit board (PCB) design to Sun Microsystems, Inc.'s series of engineering workstations.

AutoPCB 5000 for Sun workstations features schematic capture, computer-aided interactive placement, autorouting, a parts library with more than 5,000 parts and postprocessors for artwork preparation and PCB fabrication. It integrates with Autocad from Autodesk, Inc.

AutoPCB 5000 is priced at $7,500.

Prolib, 624 E. Evelyn Ave., Sunnyvale, Calif. 94086. 408-732-1832.

Utilities

Updata Software Co. has ported its **DB/Proedit** ISPF-style editor for IBM DB2 tables to IBM's SQL/DS environments.

DB/Proedit for SQL/DS uses IBM ISPF or Xedit commands. Users can edit, create and load test data and can test embedded SQL with host variables, template new tables and indexes from existing definitions, edit in table or row format, perform system catalog queries and make global changes to tables, according to the vendor.

Annual leases for DB/Proedit are priced from $1,775 to $5,400.

Updata Software, 960 Holmdel Road, Holmdel, N.J. 07733. 201-946-2000.

Development tools

Precision Visuals, Inc. has enhanced the IBM VM/CMS implementation of its **DI-3000** graphics software tools package.

DI-3000 is used for the development of graphics applications, the vendor said. Features include full color, three dimensions, area fill and patterning, debugging aids and picture metafile. According to the vendor, the product is portable across different operating systems and supports non-IBM graphics terminals and hard-copy devices.

Enhancements include support for discontiguous save segments, dynamic memory allocation for segment storage and dynamic nodes, which permit runtime selection of output devices. DI-3000 can also be shared among users in a time-sharing environment, according to the vendor.

DI-3000 is priced from $20,500.

Precision Visuals, 6260 Lookout Road, Boulder, Colo. 80301. 303-530-9000.

MICRO BITS

Ed Scannell

Compaq cuts lead the way

Up to ramping speed. With its recently increased manufacturing capacity, it looks like Compaq is better able to meet demand and has decided to cut prices on its Intel 80286-based product line. The company has dropped the price of its Deskpro 286 line by 10%, bringing the cost of the Model 1 to $2,699 from $2,999, the Model 20 to $3,599 from $3,999 and the Model 40 to $4,499 from $4,999.

This round of price cutting could inspire some similar actions from competitors, including IBM, as competition in the 286-based market heats up.

There have been rumors that IBM will soon cut prices on the Personal System/2 Model 50, which has been selling well of late. However, an IBM spokeswoman last week said the company has no plans to reduce prices on the Model 50.

In fact, she reminded us that IBM raised the price of the PS/2 Model 60 back to its original level on Jan. 1. However, one dealer told us he continues to sell the Model 60 at its reduced price without any harassment from IBM.

Continued on page 39

Oracle engine revs up for 1-2-3

BY ED SCANNELL
CW STAFF

BELMONT, Calif. — Oracle Corp. recently released a data base add-in that reportedly allows Lotus Development Corp. 1-2-3 users to manage data in large or multiple work sheets by giving them access to Oracle's line of host data base management systems.

Christened Oracle for 1-2-3, the product includes the add-in software, the full Oracle distributed relational engine, free support for 90 days and a tutorial. Oracle said the product is priced at $199.

"In using Lotus 1-2-3 as a data base instead of a spreadsheet, 1-2-3 users are using a good tool for the wrong job. Lotus 1-2-3 is for analyzng data, not managing it," said Pete Tierney, Oracle's vice-president of marketing.

And now this update

The program's features include the ability to instantly update the data base by making changes to work sheet cells and to operate in protected mode on Intel Corp. 80286- and 80386-based systems. Full data integrity is provided as well as transaction management and recovery for data integrity.

Besides communicating with Oracle's host DBMSs, Oracle for 1-2-3 users can connect to IBM's DB2 data base located on mainframes and minicomputers.

An added benefit to the program is that it acquaints 1-2-3 users with SQL commands, which can be stored as 1-2-3 functions. Users can retrieve Oracle data through simple menu commands that are transparently converted to SQL statements. Users can also choose to type in SQL statements directly.

Tutoring session

Although the first 90 days of support are free, additional support packages are priced at $50 for three months and $150 for one year.

The company is also putting together a computer-based tutorial that allows users to learn the program at their own pace.

The program is intended to run on 286- and 386-based systems and requires 1-2-3 Release 2.01 and Microsoft Corp.'s MS-DOS 3.0 or higher, 640K bytes of memory, 896K bytes of extended memory, 5M bytes of hard-disk space and a floppy disk drive.

Oracle said it plans to ship the product Feb. 1 and that Oracle for 1-2-3 will be available through its direct sales force, value-added resellers and retailers.

Inside

- Claris VP speaks out on Apple spin-off's goals. Page 37.
- Is Aldus's Freehand too good? Page 37.
- Arche Technologies adds 286-based PC. Page 42.

Data View

Mostly blue

Survey of Fortune 1,000 sites indicates heavy reliance on IBM for personal computers

INFORMATION PROVIDED BY COMPUTER INTELLIGENCE

Lotus rewrites Manuscript

Aims to escape limits of scientific market niche

BY ALAN J. RYAN
CW STAFF

CAMBRIDGE, Mass. — In an effort to broaden the appeal of Manuscript, Lotus Development Corp. plans to announce today an overhauled version of the word and document processor.

Manuscript 1.0, released in December 1986, was targeted at scientific and engineering markets. Release 2.0, set to sell for $495, repositions Manuscript as a product for financial, government and work group applications as well as scientific and engineering areas. It is slated to begin shipping this quarter.

"I found it hard to get people to take a good hard look at [Manuscript] for the business applications that it does so well" because of its original positioning, said Garrett M. Hayes, personal computer coordinator at First Interstate Bancorp in Los Angeles.

Alpha-test users said last week that they are pleased with the changes, asserting that many of the new functions are necessary if Manuscript is to be a viable player in the expanded markets it is trying to corner.

Enhancements include macros, conditional merge and DOS

Continued on page 39

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SMALL TALK

William Zachmann

Demo enters PC derby

It is commonly claimed that the days of software start-up companies are over. Analysts claim that only large, well-funded operations have a chance for success.

The increased complexity of software requires big development staffs supported by big budgets. To get a product known requires big spending for promotion and advertising.

These dour observers stand in relation to Dan Bricklin's company, Software Garden, Inc., and to his Demo II program, like those who claimed that the flight of heavier-than-air devices did to the Wright brothers and their plane at Kitty Hawk.

Demo II, which costs $195, convincingly proves the gloomy prophets of big-money software to be dead wrong.

With no more resources than his own ideas and skills, and with the help of just one assistant, Bricklin has produced and is successfully marketing a product that is both imaginative and has much practical utility.

Demo II is an indispensable tool for the rapidly increasing number of information systems professionals developing micro-based applications.

Demo II is the most useful tool available for prototyping serious IBM Personal Computer-compatible applications, whether they are used as the primary platform or simply as workstations for the user interface.

The program offers a powerful yet easy-to-use facility for

Continued on page 38

Claris developer aims to throw engineers' switches, throttle into Big Three

Apple Computer, Inc.'s software subsidiary Claris Corp. has set itself a lofty goal — to be the No. 1 Macintosh software company. This may be a high ambition for a start-up, but with Apple's clout, Claris is no ordinary start-up.

Claris commenced operation last year with $50 million in sales from Apple's existing products and has access to Apple's dealer network. But it faces a tough battle against the Big Three — Microsoft Corp., Lotus Development Corp. and Ashton-Tate Corp.

As vice-president of product development, it is Yogan Dalal's job to foster a creative environment among Claris's 15 software engineers while injecting the reality of the marketplace into the company's development efforts. The Xerox Corp. alumnus spoke to *Computerworld* senior correspondent Julie Pitta at the recent Macworld Expo in San Francisco, at which he contemplated the futures of the Mac operating system, OS/2 and Unix.

How is Claris identifying market opportunities?

We're observing what companies like Apple are doing with their own business strategies. Apple has indicated it would like to get into the scientific and engineering markets as well as work group applications through Appletalk and now with the agreement between DEC and Apple. This gives us an indication of some general areas that will gain momentum.

Our goal is to discover within those markets what are good market opportunities that might start off as niche markets but will really grow like mad.

Dalal stops, looks, listens *in effort to find right direction for Claris.*

Another way is to understand what is happening to the industry as a whole. The distinction between workstations and personal computers is beginning to blur. [We must] try to independently identify the next confluence of technologies that will bring something like desktop publishing together.

Have you identified any specific categories?

The principal category that we've identified is smart forms. The form is a metaphor for doing business. Everyone is trained to use a form. We're starting off in a niche area, and we plan to expand it. Forms allow the front office and back office to communicate. That's what workstations and minicomputers do. Minis are traditionally viewed as back-office computing, and workstations are front-office machines.

The next area, which is similar but a little fuzzier, is data

Continued on page 38

Aldus's Freehand may be too good for the masses

BY STEPHEN JONES
CW STAFF

Aldus Corp. may find that its Freehand drawing tool offers too much of a good thing for a new segment of corporate users it has targeted. Offering commercial-like capabilities, the high-power drawing program could paint itself into a corner where the only interested customers are professional illustrators.

Freehand is being positioned as an add-in for Aldus's popular Pagemaker desktop publishing package, designed for use by both experienced graphic artists and business professionals who have little or no knowledge of illustration techniques. The idea is that both groups want original, professional-looking graphics.

But one analyst said the advanced graphics tool, with its logarithmic fills and seven levels of magnification, might be too much for an inexperienced user to handle.

"I don't think managers are looking for something this powerful; it may be beyond what they need," said Ed Wong, an analyst with Dataquest, Inc. in San Jose, Calif.

Positioned against Adobe Systems, Inc.'s Illustrator, Freehand costs $495 and is on the verge of shipping, according to Aldus. The product runs on Apple Computer, Inc.'s Macintosh Plus, Mac SE and Mac II, with two 800K-byte disk drives or one hard disk recommended. Output can be sent to any Adobe Postscript-compatible printer.

Freehand

Price: $495

- Displays up to 256 colors on a Macintosh II color monitor
- Requires a Mac Plus, SE or II
- Requires two 800K-byte disk drives or one hard disk
- Requires a Postscript-compatible printer.

Freehand was developed by Altsys Corp. in Plano, Texas, and acquired by Aldus last year to be a logical Pagemaker add-in.

Beta-test users agreed that appealing to corporate America will be a hard sell for Freehand.

"This is a sophisticated artist's tool that won't turn a non-artist into an artist," said Larry Baca, a beta-tester and president of Information Arts, a design consulting firm in Sacramento, Calif. "Like any graphics software, the user shouldn't expect the computer to give him graphics design skills."

Aldus President Paul Brainerd admitted that the education of potential customers is a hurdle for the Seattle-based company. "As we add more and more capabilities, a real challenge is, How do we bring a user up to speed on

Continued on page 39

Massive memory may escape vaporware list

BY ALAN J. RYAN
CW STAFF

SUNNYVALE, Calif. — Massive memory that will fit in a pocket will not be on anyone's vaporware list this fall. That is if Verbatim Corp. releases its 50M-byte 3½-in. optical disk as planned.

The company said its erasable single-sided disk and half-height drive are aimed at the workstation user who finds himself in need of more storage space or needs transportable data.

More storage may be necessitated by such memory-intensive applications as desktop publishing and Apple Computer, Inc.'s Hypercard, as well as capacity-consuming operating systems like Unix and IBM and Microsoft Corp.'s OS/2, according to Chandran Cheriyan, marketing manager of magneto-optic drive and media at Verbatim.

"As you get into applications that require more capacity, like medical imaging applications where CAT scans and X-rays need to be stored, the need for that capacity will continue to grow," Cheriyan said. Because it is erasable, the 3½-in. optical disk will not run out of capacity like a fixed drive would, he added.

In the past, media removability was important in the government and financial sectors, Cheriyan said, because users wanted the ability to lock up their sensitive data.

While that remains true today, transportability is also important so the disk can be shared between multiple systems. Cheriyan added that the technology can be designed into portable computers.

Prices of the Verbatim drive would initially be 25% to 50% higher than comparable Winchester disk drives, Cheriyan said, but he added that prices would likely drop as production is ramped up. The disk will cost approximately $100, he said.

Disk access time for write operation will be less than 70 msec, including latency. For read operation, access time will be less than 50 msec, according to Verbatim. Data transfer rate is reportedly more than 1M bit/sec.

Highflier

Because the optical head in the drive flies more than one millimeter above the surface of the rotating disk, a greater distance than the flying height of a head in a Winchester drive, the possibility of head crashes in the erasable optical drive is reduced, the company said.

Since the disk is single-sided, there is a possibility that Verbatim will bring out a 100M-byte disk in the future. "Most people say the current capacity is sufficient," Cheriyan said, "but I think once the product gets to the marketplace, people will start needing more capacity."

Eastman Kodak Co., which owns Verbatim, is looking to optical technology as the wave of the future, Cheriyan said. "This could potentially be used in electronic photography. People have talked about a filmless camera, where images would be stored on a floppy disk, for years," he added.

Zachmann

CONTINUED FROM PAGE 37

creating a realistic interaction between the user and a hypothetical prototype system. Enhanced features in the new version include the ability to handle bit-mapped graphics images and IBM Enhanced Graphics Adapter and Video Graphics Array support and a host of new command actions.

The basic conceptual model used with Demo II is that of a number of screen image slides linked together to simulate the appearance of an application's screen as the user interacts with an application. Demo II makes it very easy to create a collection of screen images representing the look of the display screen at various stages of running a program.

Placing text on the screen, drawing lines and boxes, creating menus and making graphics displays is easily done. Demo II also has a powerful overlay facility that makes it possible to construct a screen image out of standard templates, changing only those aspects needed for the particular image.

Various forms of menus, data entry forms, dialogue boxes and many other user interface options can be created with Demo II easily and rapidly. Designing screen formats and prototyping applications are examples of tasks that you can do with Demo II.

To put it formally, Demo II is a prototyping tool that treats the user display screen as a finite-state machine in which transitions between states are either timed or initiated by some action by the user at the keyboard.

Similar to Apple's Hypercard software for the Macintosh, Demo II has a somewhat different domain of application but works in a similar manner.

Demo II can also do things like spin a disk drive, make a sound or print something in addition to creating a prototype screen image.

You can look it up

Demo II's documentation is a great example of how to do it right. The 218-page manual should be studied carefully by anyone who wants a lesson in how to produce first-rate documentation. It provides concise, informative, alternative yet complementary views of the program. The Overview chapter in particular, which explains the basic architecture and function of the program, should itself be a model for all documentation on the market.

It also has an excellent on-line facility that includes a tutorial and Read Me information. It uses the facilities of Demo II to do the job, making it an example of effective use of the program.

Demo II is living proof that intelligently designed software can succeed without millions of dollars of development and advertising funds up front.

Zachmann is vice-president of research at International Data Corp.

Claris

CONTINUED FROM PAGE 37

bases. We don't have specific plans, but it's an area we're interested in. The third area is products that we have, such as Macwrite and Macdraw. We plan on evolving these products in the market segments they exist in. For instance, we'll look at word processing and graphics and see how it applies in a work group.

As a developer, who has influenced you most?

There are a number of people who have played a major role in my thinking. People like David Lidell, who's at Metaphor, Charles Xerbe at Metaphor and Bob Metcalfe. They didn't necessarily influence my opinions on workstation applications but they did in terms of development philosophy. There are other people I admire, like John Warnock and Ed Taft at Adobe, for their technical brilliance. I admire Bill Gates and Steve Jobs for their vision and persistence.

Compare the Mac operating system with OS/2. Why do you feel Mac OS is a superior development platform?

OS/2 has a lot of power that one used to think of as being part of the minicomputer world but now is available to microcomputers. I think OS/2 is a powerful operating system but, like most operating systems, it's on a technology curve.

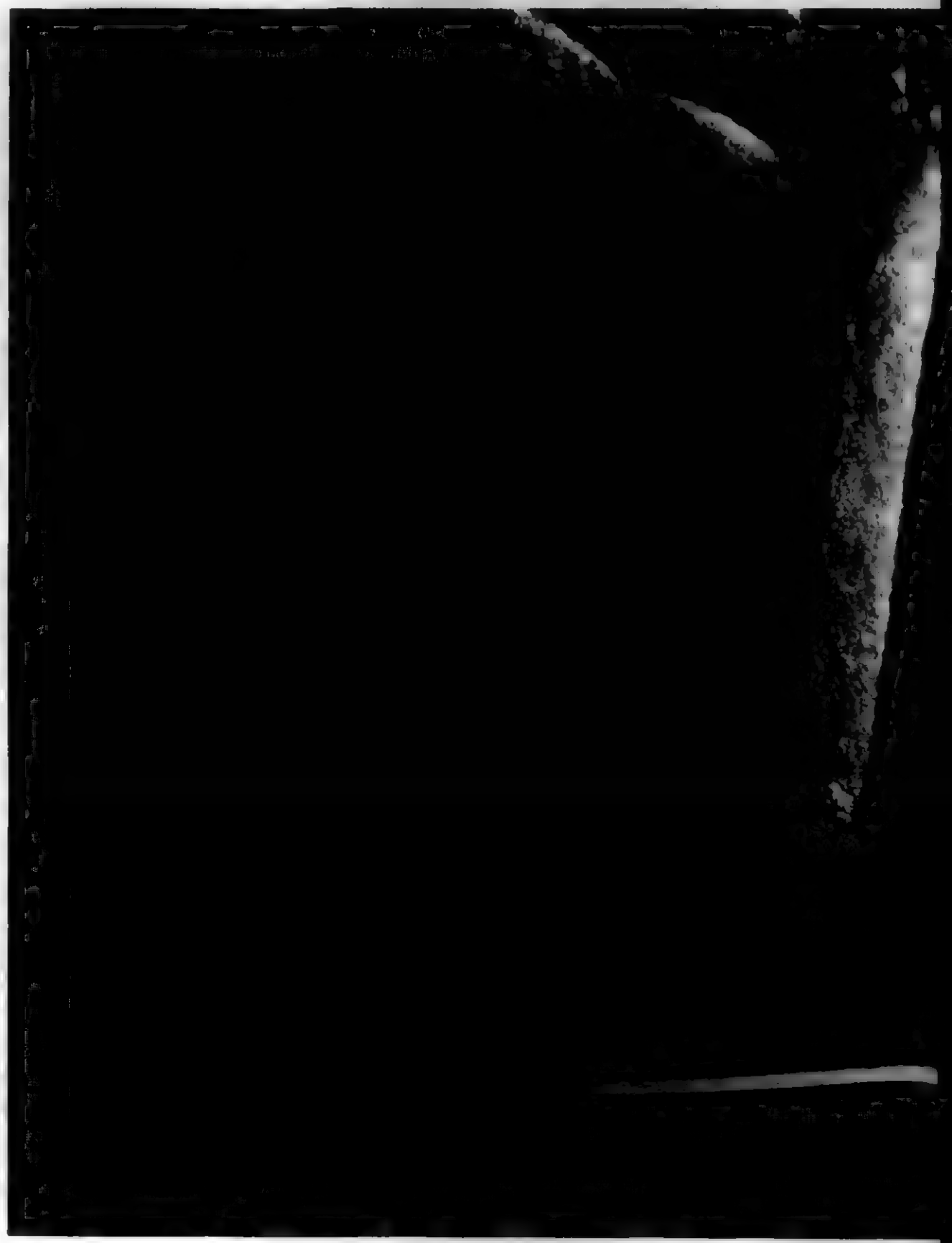
Right now, if you compare the Macintosh operating system to OS/2, it might be deficient in a few areas, like multitasking. But it's had a generation or two of work done on it to make it faster, more reliable and, most important, to make the display parameters better.

What role will Unix play on the desk top?

I think Unix is a very powerful operating system. It grew out of the minicomputer environment and, therefore, has a lot of power and obstacles that make it slow and sluggish. But that's changing.

How will DEC and Apple's arrangement impact Claris?

We're excited about it. It makes our thrust in work group applications in multivendor environments very durable. When you talk about the plumbing necessary to connect workstations and minicomputers, the Apple-DEC announcement will ensure that this plumbing becomes available so that we can concentrate on the applications.



Freehand

CONTINUED FROM PAGE 37

the product?" he said.

In an effort to make Freehand easier to use, Aldus includes a tutorial disk that takes beginning users step by step through fundamental illustration procedures. Designed by Chicago-based Macromind, Inc., the tutorial starts with a how-to for drawing stick figures and moves on to more complicated graphics.

"People are kind of stymied when they first see those tiny Bezier dots, but once they learn how to use it, they really take off," said Judy Suttcliffe, a graphic artist in Santa Barbara, Calif., who is beta testing the product.

ALDUS IS NOT relying solely on Freehand to win over a bigger chunk of corporate America.

Advanced users can follow instructions on 10 design flash cards that explain everything from graduated radial fills to how to transform an object through scaling, rotation and skewing.

With Freehand, users can draw basic shapes and Bezier curves by hand. Special effects include graduated radial, linear and logarithmic fills at any angle as well as the ability to define starting and ending colors for graduated fills.

Freehand has a unique text capability that automatically places a line of text along a curving path defined by a user. Other text features include automatic or manual kerning and variable letter and word spacing.

If those capabilities are too complicated, users can start with basic drawing functions and then move to more advanced effects as they grow more comfortable with the program.

Aldus is not relying solely on Freehand to win over a bigger chunk of corporate America, but it seems clear that the company will have to offer more low-end packages if it hopes to appeal to a wider base of users.

Scannell

CONTINUED FROM PAGE 35

The Compaq price cuts leave the firm's 20M-byte Model 20 only $4 pricier than a comparable Model 50.

Will they take phone orders now? Lotus's agreement with The Charles Schwab Corp. to jointly market Signal is a good move for Lotus. Since the company repositioned Signal from a corporate product to one for individual investors — something Schwab specializes in — the alliance makes a lot of sense. Signal's success in the corporate market has been somewhat less than spectacular.

Break out the Black Flag. It apears that Ashton-Tate had a little trouble stepping on a bug in its Dbase Mac program recently. The bug, which prevents users from copying all relevant records into an index, was first detected last month. Ashton-Tate promised to put a patch on Compuserve as well as mail out a disk to registered users. By the end of the year, users still hadn't received the fix. As it turns out, they hadn't received it because the indexing function on the patch didn't work either. Two weeks later, the company removed the old patch and replaced it with a new one. Ashton-Tate also sent out disks containing the new patch last week to registered users.

Speaking of bugs. Seven out of 10 users experienced a system failure last year, says the Business Products Consulting Group, a market researcher. According to a survey conducted by the company, users without a service contract can expect to wait an average of five days before the problem is fixed. Repairs cost users an average of $257 per failure, according to the study.

Scannell is *Computerworld*'s senior editor, microcomputing.

Lotus

CONTINUED FROM PAGE 35

exit, said Alan Minard, senior product manager of document products at Lotus. Other added features include a spelling checker, a thesaurus, libraries, counters, an integrated outliner and markers that replace the Back Slash command facility of Release 1.0.

Users can import and export files from other word processors either through ASCII files or IBM's Document Content Architecure or by using file-conversion modules put out by third parties, Minard said.

Minard also said Lotus has improved the preview function within the editor so pages can be seen before they are printed. He said Lotus has also added more flexible headers and footers. Work sheet information can be imported automatically. "That's going to make some of the things users do ridiculously easy," First Interstate's Hayes said.

The function will allow users to set up financial reports in advance and then plug in the latest financial figures just minutes before printing the document, according to Lotus.

Current Manuscript users can upgrade to Release 2.0, when it is available, for $75. Users who have purchased Release 1.0 since Dec. 1 can upgrade for free.

What ISDN is doing for McDonald's data networking capabilities is no small potatoes.

When McDonald's Corporation took a hard look at its telecommunications needs a few years ago, it saw 9400 restaurants in 46 countries, served by more than 20 networks. And a new restaurant opening every 17 hours.

McDonald's needed a telecommunications system that could grow with it, but one simple enough that the company could concentrate less on telecommunications and more on talking to customers.

The solution: the nation's first customer application of ISDN, the Integrated Services Digital Network, made possible by the cooperation of Ameritech's Illinois Bell and AT&T Network Systems.

McDonald's will use ISDN to send voice, data and video over ordinary telephone lines simultaneously. An AT&T 5ESS™ switch at Illinois Bell will support digital phones, integrated voice/data terminals, facsimile, voice mail, host access and modem pooling, giving McDonald's a real competitive advantage in its data networking capabilities.

"In business language, this means we're going to do an even better job for the 30 million customers that we serve every day," said Bonnie Kos, McDonald's Vice President of Facilities and Systems.

"ISDN provides an information outlet to every workstation, thereby eliminating time-consuming and costly wiring, as well as enhancing messaging and network control capability."

Thanks to ISDN, McDonald's will enjoy better customer service, more current market information, better tracking of product promotions, more efficient inventory control, and reduced administrative workloads.

Ultimately, higher level applications of ISDN on the public switched network will replace most of the company's myriad networks, linking all its offices and restaurants around the world.

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NEW PRODUCTS

Systems

An Intel Corp. 80286-based personal computer was recently announced by **Arche Technologies, Inc.**

The **Rival 286** offers clock speeds of 8 and 12 MHz; 640K bytes of random-access memory on the motherboard, expandable to 16M bytes; a 200W switching power supply; six 16-bit and two 8-bit expansion slots; one parallel and two serial ports; an open Intel 80287 socket; one 1.2M-byte 5¼-in. floppy disk drive; and a 101-key keyboard. It also features a 14-in. amber phosphor flat-screen display with a tilt-and-swivel base.

The Rival 286 is priced starting at $1,795.

Arche Technologies, 745 High St., Westwood, Mass. 02090. 617-461-1111.

Software applications packages

A stand-alone personal computer-based version of **Automate** electronic-design software has been announced by **Royal Digital Systems, Inc.**

Automate includes schematic capture, simulation and printed-circuit layout. Other features include an operating system-independent data base manager; a library featuring electrical information and graphics-oriented information; and built-in expert system analysis.

Automate for Microsoft Corp. MS-DOS-based systems is priced from $5,700.

Royal Digital, 3600 W. Bayshore, Palo Alto, Calif. 94303. 415-858-0811.

Languages

An **Ada compiler** for IBM's Personal System/2 Model 60 running under DOS has been announced by **Alsys, Inc.**

The compiler is a version of the company's validated V3.2 Ada compiler for the IBM Personal Computer AT and compatibles. The version supports such programming tools as Alsys' Adaprobe debugging and viewing utility as well as cross-referencing, reformatting and recompiling tools.

The PS/2 compiler system includes a 4M-byte PS/2 memory board. It costs $2,995.

Alsys, 1432 Main St., Waltham, Mass. 02154. 617-890-0030.

Software utilities

A personal computer program designed to load data into existing Lotus Development Corp. 1-2-3 and Symphony spreadsheets has been announced by **Research & Planning, Inc.**

In2lot is said to load data into existing spreadsheets by matching labels in an input file to labels in the spreadsheets. Data and formulas already in the spreadsheet are not erased, the vendor said. Individual users can share the same input file for different spreadsheet formats and layouts.

In2lot is priced from $100 to $600.

Research & Planning, Suite 2323, 222 Third St., Cambridge, Mass. 02142. 617-547-5061.

Development tools

An IBM Personal Computer-based version of the dictionary-driven **Magec** Cobol application development system has been released by **Magec Software.**

PC Magec operates under IBM's PC-DOS or Microsoft Corp.'s MS-DOS using the Realia Cobol compiler from Realia, Inc. It is said to allow development of full-function applications on the PC. It includes IBM 3270 emulation and VSAM simulation as well as security and audit trails, on-line documentation, Help key support, data editing, inquiry, windows and browse.

Stand-alone PC Magec costs $9,000. As a workstation for mainframe Magec, prices range from $500 to $1,000.

Magec Software, P.O. Box 260319, Plano, Texas 75026. 214-248-0823.

NEW AT MACWORLD EXPO

A 328M-byte disk drive for the Apple Computer, Inc. Macintosh Plus, Mac SE and Mac II was announced by **Priam Corp.**

Called the **Model EM330**, the Winchester disk drive offers a seek time of 20 msec, a built-in power supply, an interface cable, a driver, utility software and installation and user manuals. It connects to the Macintosh Small Computer Systems Interface (SCSI) port and has a second SCSI port for connecting to other peripherals.

The EM330, part of the Macdisk family of disk drives, costs $4,895. Priam, 20 W. Montague Expwy., San Jose, Calif. 95134. 408-434-9300.

Layered, Inc. announced nine software products for the Macintosh:

Insight Expert Time Billing costs $595; **Insight Expert Inventory** is priced at $595 for the single-user version and $895 for the multiuser version; **Insight Expert Multiuser Accounts Receivable** costs $895; **Insight Expert Multiuser Accounts Payable** is priced at $895; **Insight Forms Design** costs $149; **Insight Export** is priced at $149; **Front Desk Multiuser** costs $99 per user; and **Notes for Ready, Set, Go** is priced at $79.

Layered, 529 Main St., Charlestown, Mass. 02129. 617-242-7700.

Desktop Help, an on-line task-oriented documentation tool for use with the Macintosh, was introduced by **Help Software, Inc.**

Desktop Help is priced at $395. Help Software, 10659-A Maplewood Road, Cupertino, Calif. 95014. 408-257-3815.

A communications software program designed to allow Macintoshes to access the Compuserve Information Service was announced by **Compuserve, Inc.**

The **Compuserve Navigator** adapts Compuserve to the Macintosh with pull-down menus and dialog boxes. Features include an interactive terminal mode and compatibility with Compuserve's version of the B protocol for file transfers and Compuserve's Graphics Interchange Format.

Compuserve Navigator costs $59.95. Compuserve, P.O. Box 20212, 5000 Arlington Centre Blvd., Columbus, Ohio 43220. 614-457-8600.

Eastman Kodak Co. introduced a portable LCD projection pad designed for use with the Macintosh family.

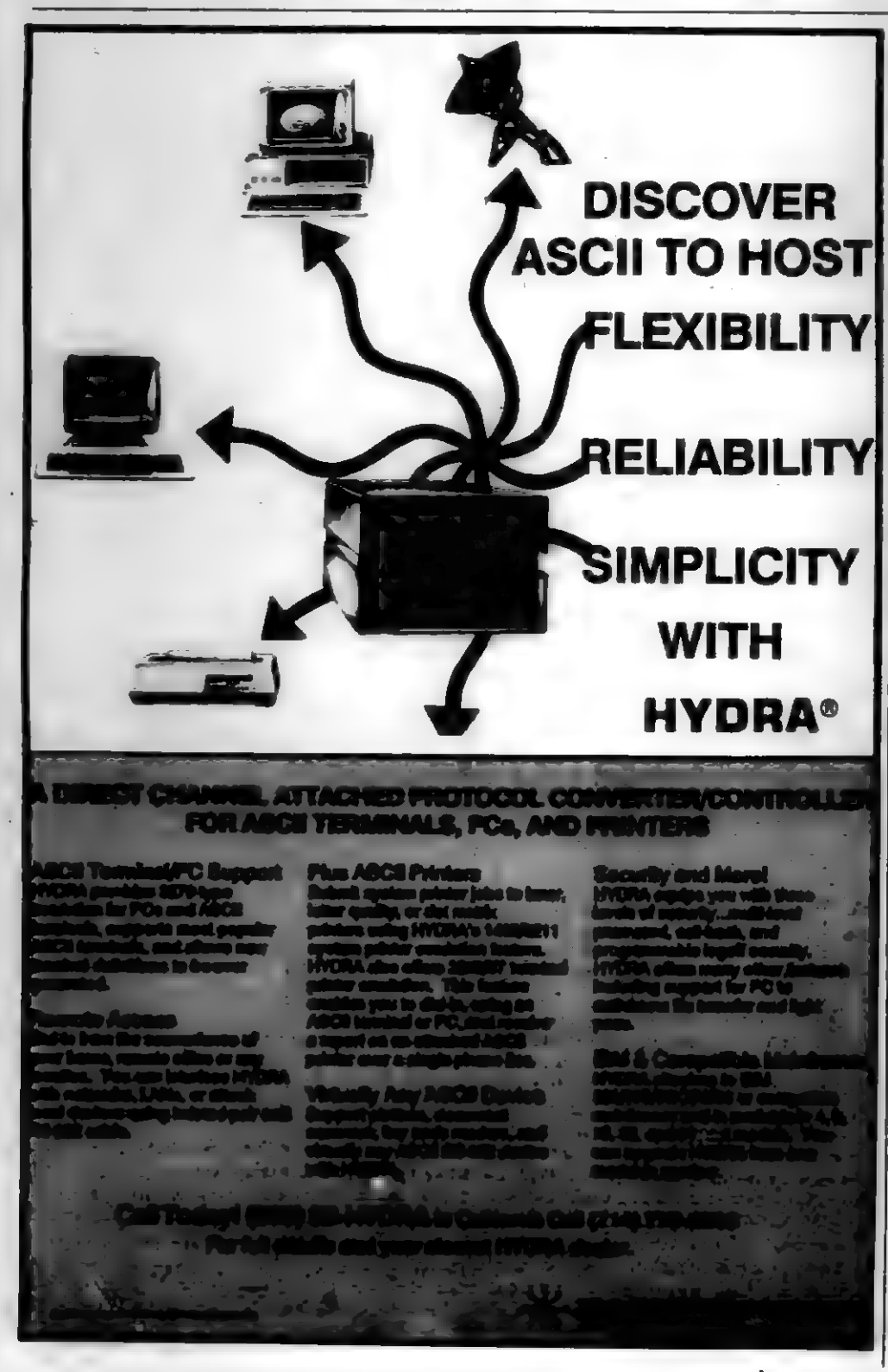
Intended for use in displaying large-screen electronic images for desktop presentations, the **Datashow HR** projection pad offers a resolution of 512 by 342 pixels. It works with any transmissive overhead projector, the vendor said, and such desktop presentations software as Microsoft Corp.'s Powerpoint.

The Datashow HR costs $1,595. Kodak, 343 State St., Rochester, N.Y. 14650. 716-724-3169.

A family of backup tape drives designed for Macintosh computers was introduced by **Irwin Magnetics.**

The drives feature Macintosh-style icons such as pull-down menus and windows; embedded servo technology; multiple icon-driven back up-and-restore options; the ability to back up data files over Macintosh local-area networks such as Appleshare; and an operating rate of 2M byte/min.

The 40M-byte backup tape drive costs $1,395. The 64M-byte model costs $1,595. Irwin Magnetics, 2101 Commonwealth Blvd., Ann Arbor, Mich. 48105. 313-996-3300.



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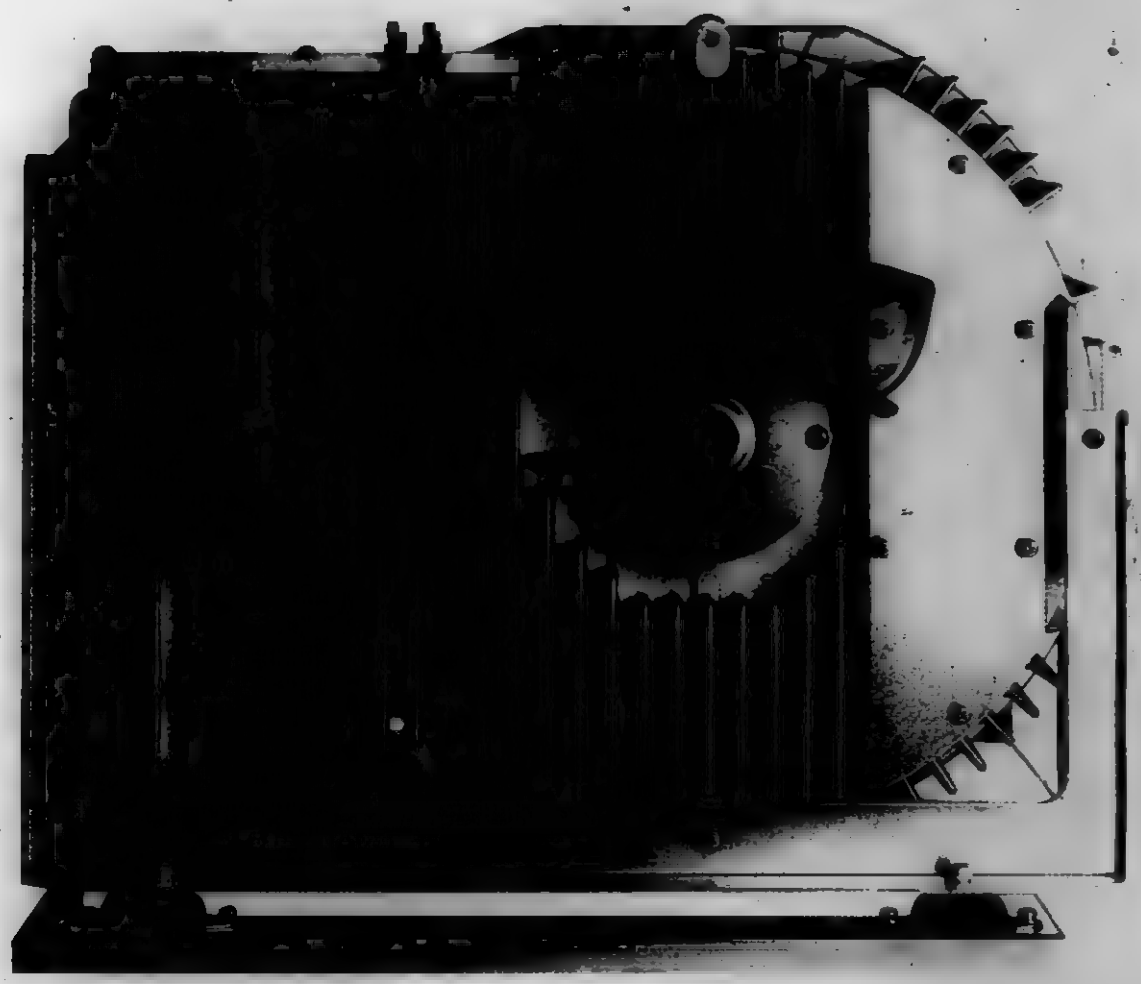

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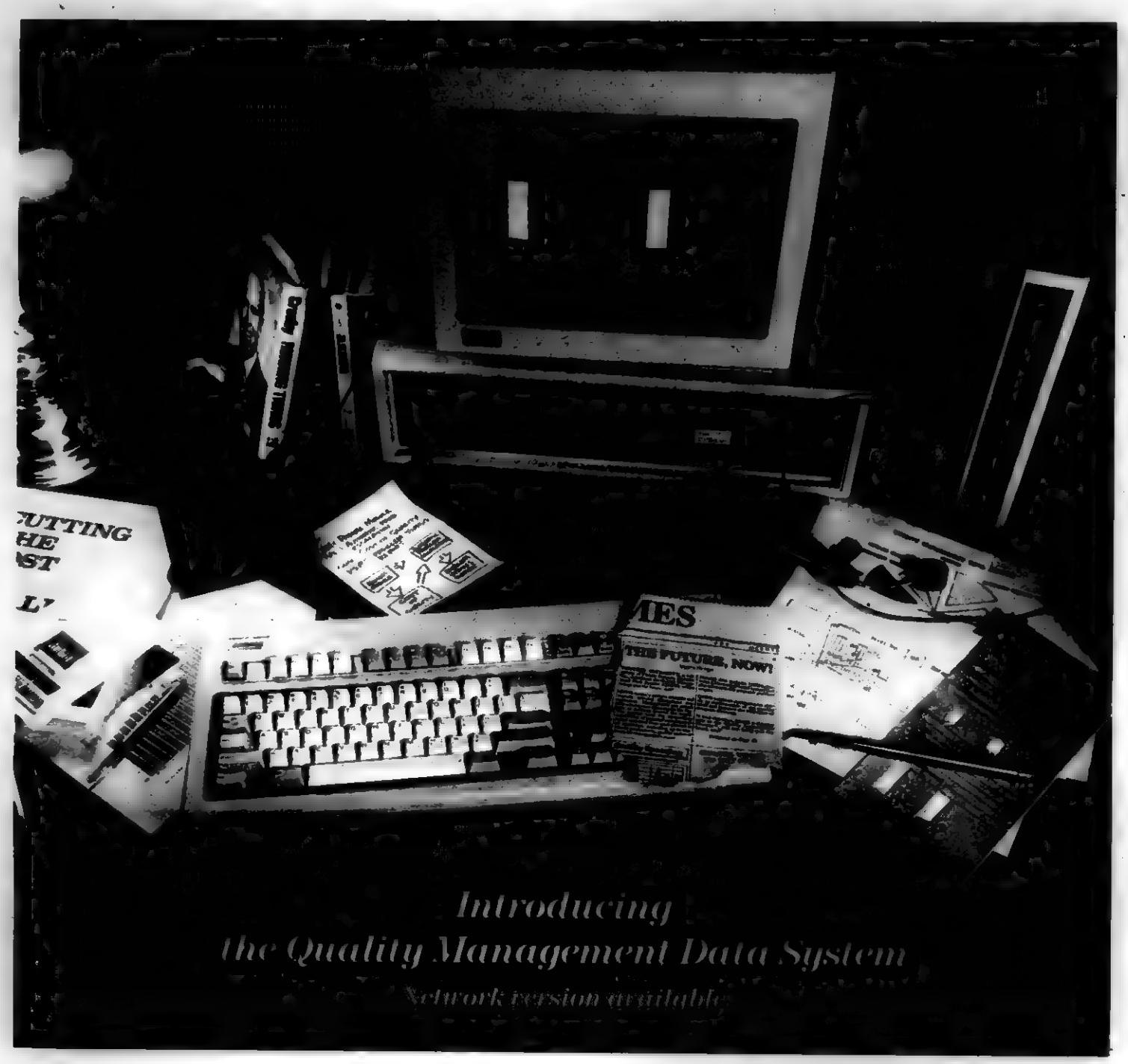

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DATA STREAM

Kathy Chin Leong

Small vendors can be better

It worked for Martha Batorski. Maybe it can work for you.

Not long ago, Batorski, manager of office automation at Los Angeles-based Orion Pictures, was involved in the selection process for a network supplier.

Orion wanted to use the existing twisted-pair wiring in its building since it was going to move out within a year. It also required personal computer access to its IBM 4381 mainframe, as well as a communications link to its Manhattan offices.

The usual heavy hitters — IBM, DEC and Wang — threw their hats in the ring. But none of them won the bid.

The contract went to NBI. That's right, little old NBI, the word processing guys. Who would have thought they knew anything about links and LANs?

As it turned out, the risk Orion took with NBI was well worth it. Internal surveys and technical testing showed that the network is running like a charm, and the nontechnical users now rely on the local-area network to access things like data bases.

Many MIS directors admit they are far too busy to deal with the smaller vendors, even if there are key advantages to their network in terms of savings and support. "We're a Big Blue shop," they say proudly. "We are leery about any other

Continued on page 49

3Com's file server checks in

Early users of 386-based 3Server/400 tout speed, but dealers pan 3+ Share

BY JAMES DALY
CW STAFF

Early users of 3Com Corp.'s 3Server/400 series file servers are lauding its speed, expansion capabilities and ease of use, but some dealers are greeting the machine with a considerably more tepid response because of dissatisfaction with 3Com's 3+Share network operating system.

The 3S/400, along with the more powerful 3S/401, are the latest entries into the burgeoning Intel Corp. 80386-based server market. Santa Clara, Calif.-based 3Com began shipping the 3Server/400 series on Dec. 28, 1987, positioning the products as higher performance alternatives to its Intel 80186-based 3Server3. The new servers have been in the hands of beta-test users since October.

The increased horsepower of the 400 series results from a 16-MHz clock rate, which is twice that of the 3Server3. "We're getting anywhere from 40% to 45% better performance," said Bob Weder, a 3Server3 user who beta-tested the machine for Wordlink, Inc. in Champaign, Ill. "We've also found a degradation rate that's one-tenth that of the 3Server3."

The server models come preloaded with file, print and start services as well as a name server. The 401 model also has a redundant processor that provides automatic backup if the primary processor fails.

The automatic initiation of various services is "a real plus for a novice user," said Chuck Heindel, a beta-test user at General Telephone Co. of Florida, based in Tampa. "It takes away the necessity for a small business to come in and have a consultant set up their system. All you have to do is plop it down, turn it on and go."

The 400 series can also handle more memory than the 3Server3. Both 400 series models come with 2M bytes of 32-bit memory that can be expanded sequentially to 16M bytes with the addition of 2M-byte cards. IBM's OS/2 and the OS/2 LAN Manager will require expanded memory.

The more the merrier

"The expansion slots address a big need in our shop: putting more users on the network," said Joe Krus, a beta-test user for Healthcare International, Inc. in Austin, Texas. "I wish it wouldn't use as much memory as it does, but I can work around that."

Despite these improvements, the servers' reliance on 3+Share has tempered the enthusiasm of some dealers despite the machines' ability to take advantage of 32-bit memory.

"We don't sell their hardware because you have to run their software on it," said Barry Spector, director of sales and marketing at Brown Associates, Inc., a Novell, Inc. shop in Belmont, Mass. "When 3Com's version of the OS/2 network software [3+Open] comes out [in mid-year], we'll have to re-evaluate." Such a version could expand the network servers' ability to run on non-3Com software based on OS/2. Spector's lack of confidence is not unique. A recent survey by Infonetics, Inc., a market research firm in Santa Clara, Calif., of 160 large and medium-size businesses, universities and federal and state governments, found that only 9% had opted for 3Com's operating system. Software from Novell and IBM gar-

Continued on page 49

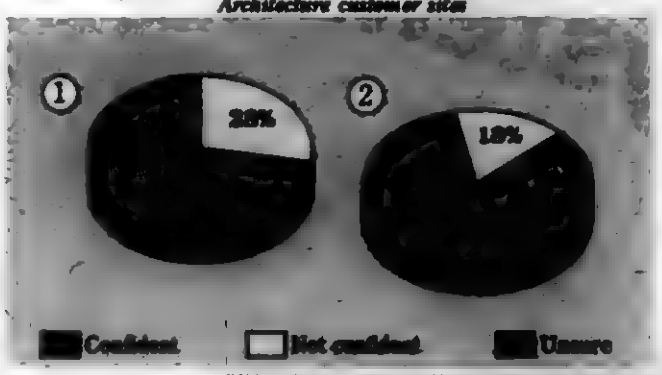
Inside

- 3Com, DEC present revised Ethernet proposal. Page 48.
- Fibercom adds FDDI-conformance products. Page 48.
- Racal-Milgo introduces encryptor option. Page 51.

Data View

Users rate IBM on multivendor networking:
(1) Will it alone meet their needs?
(2) Will it do so through industry standards?

Based on a survey of 107 IBM Systems Network Architecture customer sites



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

Netlink SNA Hub ties in with Netmaster

BY ELISABETH HORWITT
CW STAFF

Netlink, Inc. and Cincom Systems, Inc. have jointly developed an SNA-to-SNA networking product, which they claimed provides far more flexible host-to-host file transfer than anything offered by IBM.

Netlink's new Interhost SNA Hub is said to work in concert with Cincom's Netmaster File Transfer Services to allow hosts on disparate IBM Systems Network Architecture networks to exchange files on a de facto basis over either leased or dial-up connections, according to Netlink Vice-President of Marketing David McCormick.

The product addresses the needs of companies with SNA networks, such as business partners engaging in electronic data interchange (EDI), that need to exchange files only intermittently, he added.

IBM's equivalent product, SNA Network Interconnect (SNI), provides both file-transfer

Continued on page 48

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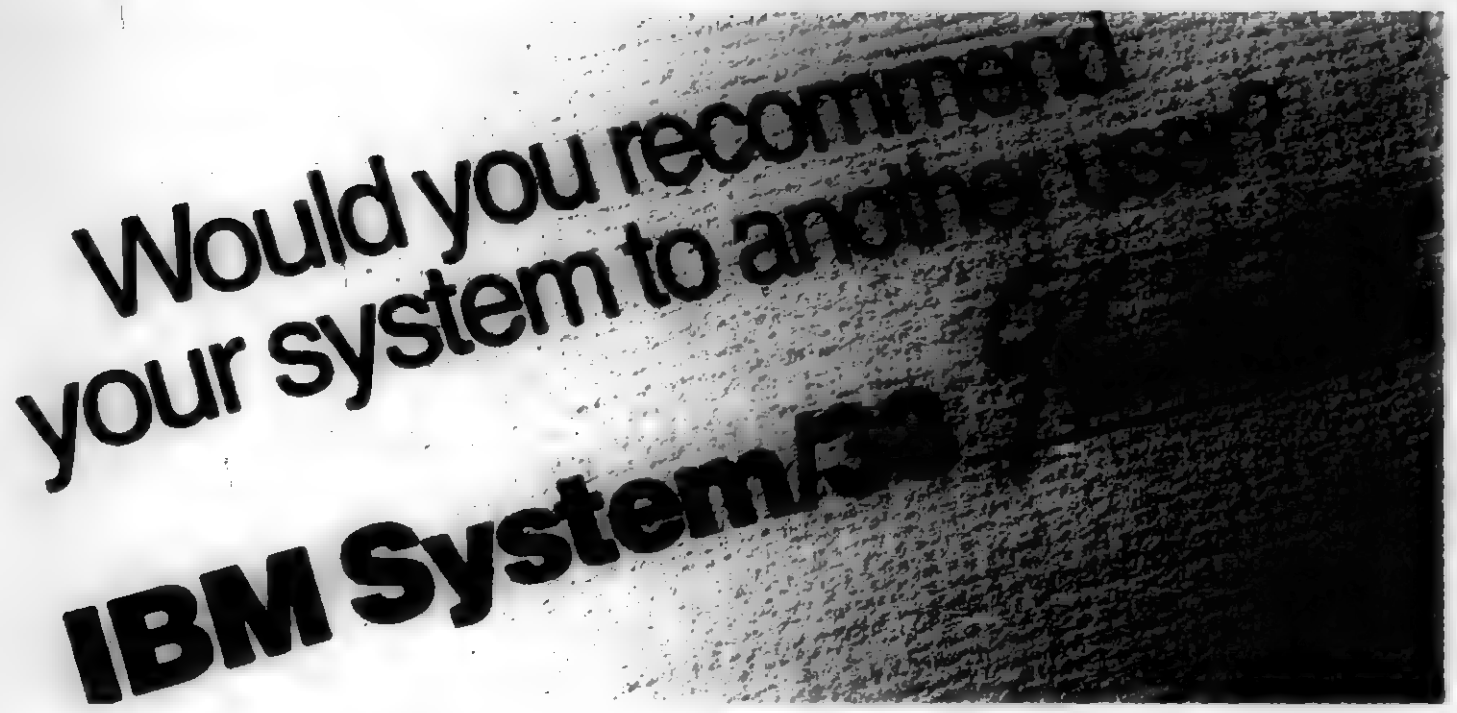
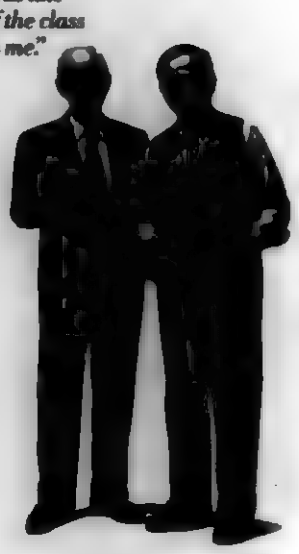


"Sounds like head of the class to me."



Every year, the Datapro Research Corporation puts mid-range computers through a special kind of test.

Instead of checking the "specs" of different systems, they ask if the systems met the "specs" of their owners.

And in 1987, when asked "Would you recommend your system to another user?", over 96% of the people who had IBM systems said "Yes." Which means the IBM System/36 and System/38 were more frequently recommended than any other leading mid-range computers.

For overall customer satisfaction, both IBM systems won special merit, and the System/38 topped the list.

So at IBM, we're satisfied too. Praise is nice no matter where it comes from,

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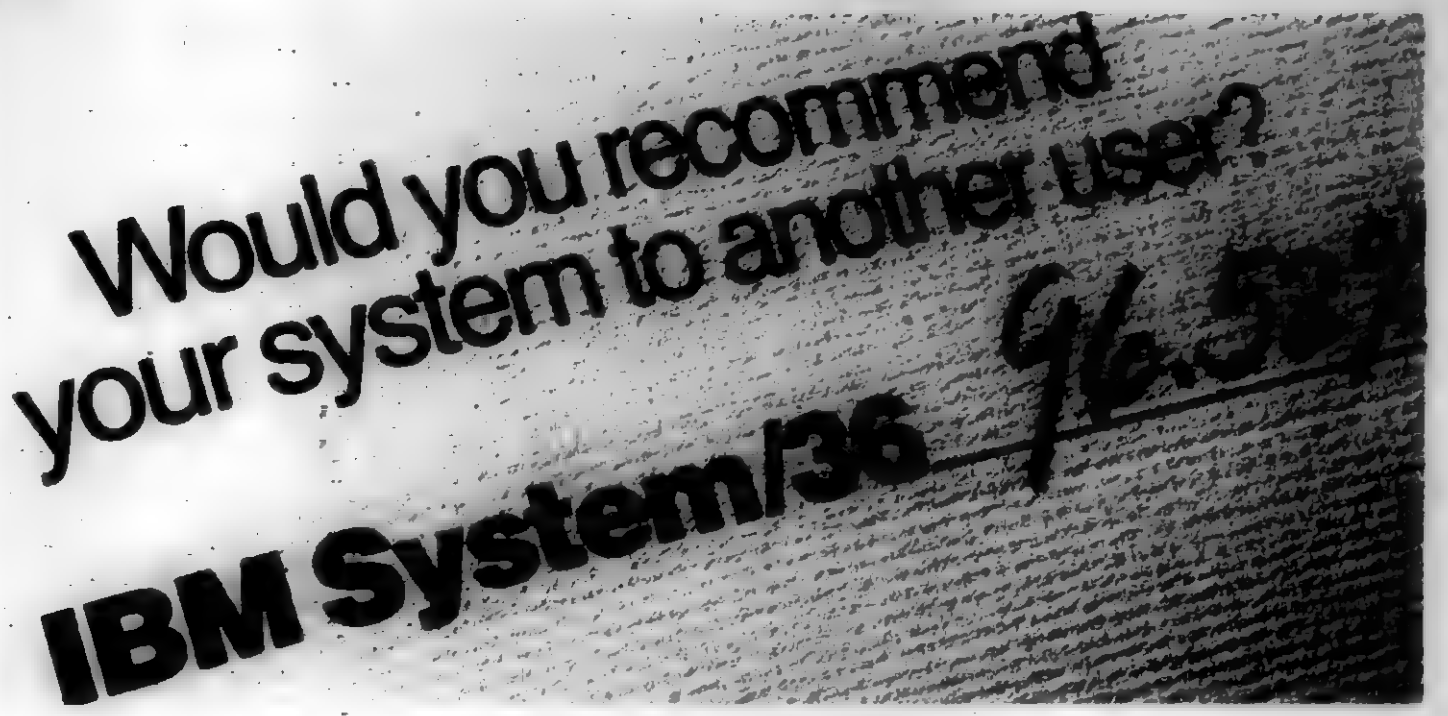
a computer can got straight A's.



but when it's from customers it means the most. If their opinion isn't the acid test, nobody's is.

Right now, over a quarter million IBM mid-range systems are out there proving themselves every day. IBM's mid-range family is more widely accepted by more kinds of businesses than any other. And for lots of good reasons.

The IBM System/36 and System/38 are noted for being easy to install, learn and use. They're also easy to connect—with each other and in larger networks. What's more, over 8,000 programs are available, and the majority is "off-the-shelf" software that you can run right away.

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IBM

Fibercom sets sights on FDDI

Under pressure, firm pledges to add products meeting standard in '89

BY ELISABETH HORWITT
CW STAFF

ROANOKE, Va. — Fibercom, Inc. last week responded to pressure from both customers and competitors, announcing networking products that will conform to the Fiber Distributed Data Interface (FDDI) standard by the summer of 1989.

Users who install Fibercom's existing fiber-based Ethernet product line in the interim will be able to turn in their network boards and receive full credit toward the purchase of FDDI boards from the vendor.

Fibercom said it hopes the offer will keep customers from turning to rivals like Fibronics International, Inc. in Hyannis, Mass., which is already shipping FDDI-compatible networks.

Two Fibercom customers, the New York Stock Exchange and Tektronix, Inc., insisted on an FDDI migration path that did not saddle them with useless non-FDDI boards, according to Fibercom Chairman Albert Bender.

The fiber-based LAN market will increase from $171 million in 1987 to $813 million in 1992, according to Kessler Marketing Intelligence, Inc., which is a Newport, R.I.-based research firm.

FDDI defines two 100M bit/sec. channels on a fiber-based ring with devices accessing the channels through a token-ring protocol that is not compatible with the IEEE 802.5 standard, according to Bender.

The vendor's first FDDI-compliant products will be high-speed backbones interconnecting Ethernet and token-ring LANs based on other network media, Bender said. Prices will fall between $20,000 and $30,000.

Adding fiber power

Fibercom's second phase of product introductions reportedly will provide direct fiber-based connections for computers that require high-speed communications, such as engineering and computer-aided design workstations, Bender said.

The vendor's third round of FDDI introductions will provide direct channel-based host-to-host links, Bender said. "The major computer vendors will bring out their own FDDI interfaces," he added.

Digital Equipment Corp. is working on its own FDDI chip set, according to Bender. IBM reportedly has set up a prototype FDDI network and is likely to announce FDDI support with its 16M bit/sec. Token-Ring LAN introduction later this year, he added.

Third-party vendors such as Fibercom will provide interfaces for computers that still lack FDDI support as well as value-added functions including network management, according to Bender.

Netlink

FROM PAGE 45

and terminal-emulation connections between hosts on disparate SNA networks — while Interhost SNA Hub provides file transfer only, McCormick admitted. However, "Using SNI to marry two SNA networks is like getting married — you have to do a lot of planning and naming conventions, a tremendous amount of coordination," he claimed.

SNI also requires that MIS define address tables between the SNA networks in advance "and that your VTAM and NCP and mine be compatible and stay that way," said Cincom product manager Thomas Vollmar, referring to Network Control Programs.

Just good friends?

But SNA-to-SNA communication through Netlink's Hub "is like dating," without the need to set up cross-addressing between networks, McCormick said.

Netlink's Interhost product is a new version of SNA Hub, an existing communications processor that the Raleigh, N.C., vendor originally designed to provide flexible links between multiple hosts and IBM devices such as 3174 controllers. The Hub allows an IBM host to talk to up to seven other SNA hosts at speeds of up to 64K bit/sec., according to Netlink.

> "USING SNI to marry two SNA networks is like getting married. . . ."
>
> DAVID MCCORMICK
> NETLINK, INC.

Once hosts are connected via the Hub, file transfer is coordinated through Cincom's Netmaster File Transfer Services, an existing product that manages — and to a large extent automates — host-to-host bulk file transfer, Vollmar indicated.

Bypassing operator

The software provides security, data compression and automation of many file-transfer functions, minimizing human operator involvement, Vollmar added.

For example, one system can be programmed to automatically send a file to another as soon as it has finished processing the data. This has the potential to be useful in EDI environments in which a corporation needs to send updated change orders, or perhaps shipping records, at regular intervals.

Netlink chose to support Cincom's bulk file-transfer program initially because the Cincinnati-based software vendor was willing to work with Netlink programmers to ensure compatibility between the two products, McCormick said. The Hub should also work "with a little tweaking" with IBM's Bulk Data Transfer package, System Center's Network Data Mover and other bulk file-transfer software utilizing IBM's LU0 protocol, he said.

The Interhost SNA Hub is priced starting at $17,000 for a V.35 interface. Cincom's Netmaster Network File Transfer Services is priced at between $3,000 and $35,000, depending on the type of host and options selected.

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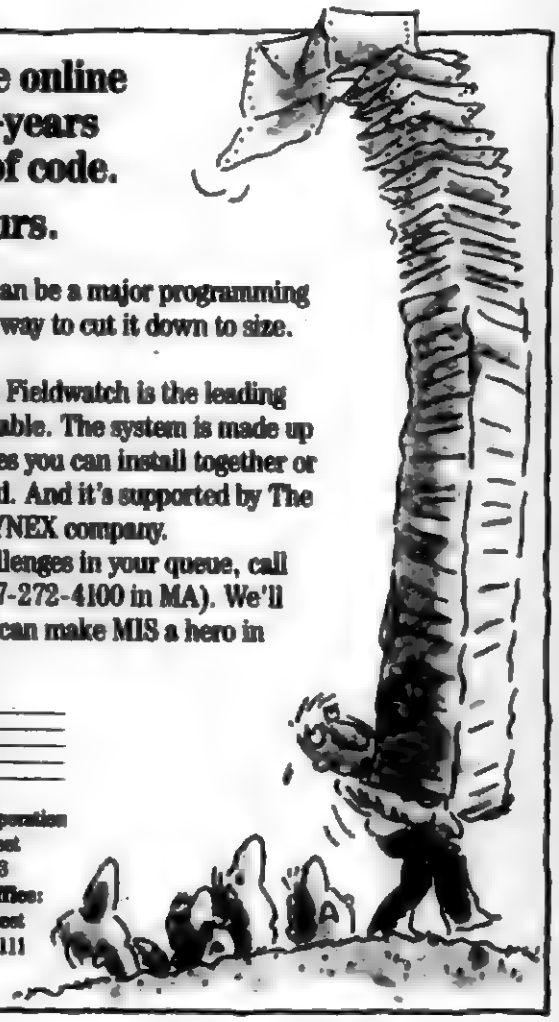

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DEC, 3Com tell twisted tale

BY PATRICIA KEEFE
CW STAFF

SANTA CLARA, Calif. — 3Com Corp. and Digital Equipment Corp. recently presented a revised proposal for 10M bit/sec. Ethernet over unshielded twisted-pair cabling to a subcommittee of a standards group.

This latest proposal, according to 3Com, supports the tenets of a competing draft while offering a more flexible and less costly way for users to take advantage of already installed telephone cable, referred to as 10BaseT.

In a presentation last week to the 10BaseT Working Group, a subcommittee of the Institute of Electrical and Electronics Engineers, Inc. (IEEE), 3Com and DEC also claimed their proposal offers the best means for supporting existing IEEE 802.3 coaxial standards, protecting installations using thin or traditional thick Ethernet cable.

Key to the 3Com and DEC scheme is the use of bidirectional signaling over a single pair of wires. Bidirectional signaling allows multidrop coaxial connections from a single connection to twisted-pair.

A competing standard proposed by Synoptics Communications, Inc. recommends unidirectional signaling, which requires two twisted-pair wires: one for transmitted signals and another for received signals.

By defining two attachment unit interface-compatible architectures, the 3Com-DEC proposal also meets one of the subcommittee's primary objectives.

One architecture requires a 10BaseT medium attachment unit at each end of the twisted-pair segment, providing a link between the workstation and the telephone wiring closet. This connects office workstations to the installed phone cable.

A second architecture allows coaxial multidrop or daisy chaining of additional stations from the workstation attached to twisted-pair, offering the mixed-media flexibility of coaxial and twisted-pair Ethernet in the same work group. Synoptics' proposal requires twisted-pair running to each workstation.

Another difference between the two approaches, according to Robert Metcalfe, 3Com's senior vice-president of technology, is that unlike 3Com, Synoptics requires users to purchase a special repeater.

Leong

CONTINUED FROM PAGE 45

vendor's disturbing that environment."

But wait a minute. A lot can be said for the smaller vendors when it comes to networking products that are designed to run in the IBM and DEC environments. Take Cincom, for example.

Devotees

Before IBM's Netview arrived on the scene, a number of users frustrated by the lack of network management tools IBM had to offer flocked to Cincom's Netmaster package. Today, devoted Netmaster users still say the Cincom tool is a much fuller network management product than Netview.

Another company, Interlink, specializes in linking Decnet to the IBM environment. Although DEC offers a similar gateway, users, including Du Pont, selected Interlink's gateway because of its higher speed — 800K bit/sec. vs. 56K bit/sec. from DEC.

Also, consider this: If your firm is larger than the vendor, chances are that supplier will bend over backwards to give you the support you want.

In Orion's case, it was able to secure data on NBI's financial status (just in case) and to get a close-up view of NBI's product plans over the next year.

So the next time a salesman from Brand X comes knocking, don't slam the door in his face just because he doesn't have a designer logo tatooed on his forehead. He might just have the solution to the network problem you have been agonizing over for months. Lighten up, folks, and take a chance.

Leong is *Computerworld*'s West Coast Bureau Chief.

WHEN DEALING with the big guys . . . you might wind up getting impressed by trendy features you don't even need. Worse, you may change your game plan because you're too emotionally involved with the sales pitch.

Getting approval from top management for an unknown player isn't as difficult as you might think. You might be wondering how Batorski got the NBI contract cleared at Orion. The approach was simple: Instead of saturating the entire company with NBI products in one fell swoop, a $1.2 million pilot was installed. It included 18 micros, one NBI controller and three printers. The installation was followed up with user surveys.

When Orion officials were presented with the positive results, they gave the green light to have NBI network the entire building.

Today, for the first time, more than 250 Orion employees are taking advantage of electronic mail, data base access from a PC and other types of remote communication. Orion is now installing its fourth network from NBI.

Looking back, Batorski says going with the other major systems vendors under consideration would not have satisfied the requirements at hand.

Write this down

So here's another lesson to learn. When dealing with the big guys, don't get sidetracked. You might wind up getting impressed by trendy features that you don't even need. And worse, you may suddenly decide to change your initial game plan because you're now too emotionally involved with the sales pitch.

One user at a television company in New York recently complained that the large vendors spend too much time on their newest capabilities rather than satisfying basic user needs. "I wish I could just buy a stripped-down model, but that just doesn't seem to be available anymore," he lamented.

3Com

CONTINUED FROM PAGE 45

nered 38% and 27% of the votes, respectively.

But 3Com product manager Jim Canaler dismissed the survey as merely representing network configurations, not product satisfaction. "We're primarily designed for systems where you have one larger network that is in a mixed environment in terms of applications," he said.

Loyal 3Com users said the preference for Novell's operating system is akin to judging a book by its cover. "Novell puts a more graphic front end on their system that makes it look a lot better," General Telephone's Heindel said. "But the capability of Novell is reduced when you get into larger network environments. Talk to people who can get into the nuts and bolts of operating systems to appreciate the power and versatility 3Com offers."

Despite the 3Server/400 series' warts — beta-test users admitted superficial software bugs and a clock that lost 50 seconds upon rebooting — early users generally seem satisfied.

"There are six or seven good reasons for getting the server," said Doug Gold, an analyst at International Data Corp. in Framingham, Mass., citing the servers' multitasking, multiuser functionality, increased complexity of application sets and greater security and network management capabilities as well as OS/2 and IBM Personal System/2 capability.

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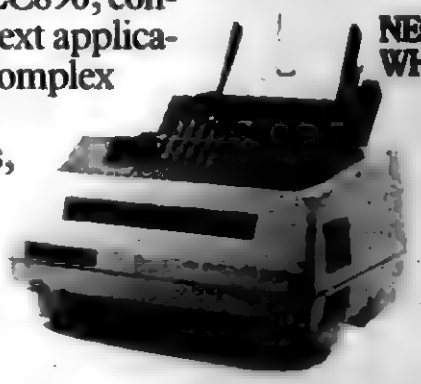

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NEW PRODUCTS

Modems/Multiplexers

Young Design, Inc. has announced the **DR-10**, a combination RS-232C asynchronous data restorer and four-port splitter said to remove jitter from asynchronous RS-232C data.

Data from the master port is reconditioned with all jitter removed and then distributed to four auxiliary ports with a 1-byte time delay, the vendor said.

The single-channel version costs $1,195, the dual-channel version $1,695.

Young Design, 7882 Tyson Oaks Circle, Vienna, Va. 22180. 703-448-8939.

Racal-Milgo has introduced an **Integral Encryptor Option** for its Omnimode family of system modems and its RM-series modems.

The option offers synchronous or asynchronous communications capability at speeds up to 16.8K bit/sec. It operates in point-to-point, multidrop and dial-back-up applications.

The Integral Encryptor option is available in stand-alone or rack-mount versions. Pricing begins at $850 for the factory-installed option and $1,000 for the field upgrade kit.

Racal-Milgo, 1601 N. Harrison Pkwy., Sunrise, Fla. 33323. 305-475-1601.

NEW AT COMNET '88

Many products are set to be rolled out at this week's Communications Networks Conference '88, or Comnet:

An automated test system to measure end-to-end performance of private networks is being announced by **Teradyne, Inc.'s** Telecommunications Division.

Testnet 1000 automatically performs daily network surveillance that measures service quality. Every route between all end points is tested for connection and transmission quality of both voice and voice-band data. Analyzed results are available in report form from the optional Testnet 1000 Controller.

The Measurement Units range in price from $3,500 to $10,000. Teradyne, 1405 Lake Cook Road, Deerfield, Ill. 60015. 312-940-9000.

Chipcom Corp. will introduce the **Ethernodem III/18** family of modular 18-MHz IEEE 802.3 10BROAD36-compliant broadband Ethernet transceivers for single-cable local-area networks.

The products are compatible with existing Ethernodem products. Their chassis/module design allows users to alter frequencies and change bandwidth from 18 to 12 MHz by replacing individual modules rather than purchasing entire units. Users can also upgrade from one port to two ports to eight ports by changing the chassis.

The products operate at 10M bit/sec. A one-port model costs $3,650, a two-port model $3,950 and an eight-port model $5,150. Chipcom, 195 Bear Hill Road, Waltham, Mass. 02154. 617-890-6844.

The **Model 9232 Controller/Terminal Multiplexer**, designed for IBM 3174 and 3274 cluster controller applications, will be announced by **Canoga-Perkins Corp.**

The terminal-end version enables the connections of 32 category A terminals to any IBM 3174 or 3274 controller via a single multiplexed line, coaxial or fiber. The controller-end version multiplexes up to 32 controller ports conforming to the IBM 3299 protocol.

The multiplexer is available with eight, 16, 24 or 32 ports. Prices range from $795 to $3,095. Canoga-Perkins, 21012 Lassen St., Chatsworth, Calif. 91311. 818-718-6300.

A dial-up access security modem said to offer full-duplex operation at 9.6K bit/sec. or 4.8K bit/sec. over two-wire dial-up or two- or four-wire leased lines will be announced by **Cermetek Microelectronics, Inc.**

The **9600S** modem meets CCITT V.32 specifications. It operates synchronously and asynchronously. Password and callback functions prevent unauthorized access. Trellis coding supports forward error correcting and echo cancellation.

The 9600S costs $1,995. Cermetek, 1308 Borregas Ave., Sunnyvale, Calif. 94088. 408-752-5000.

A software-controlled T1 multiplexer called **D/I Mux-II** is slated to be introduced by **Coastcom.**

The multiplexer combines voice, synchronous and asynchronous data and audio/video program information over a standard T1 line. Features include remote diagnostics and control and integrated network management.

The D/I Mux-II costs from $3,000 to $27,000. Coastcom, 2312 Stanwell Drive, Concord, Calif. 94520. 415-825-7500.

Fastcomm Communications Corp. is adding the **FDX 2448** to its Fastcomm FDX series of modems.

The FDX 2448 is a CCITT V.22 bi-synchronous modem that operates at a primary data rate of 2,400 bit/sec. over the Public Switched Network or over leased lines. Features include Microcom Networking Protocol Class 5 adaptive data compression and fallback modes compliant with the Bell 212A and Bell 103 standards.

The FDX 2448 costs $599. Fastcomm, 12347 E. Sunrise Valley Drive, Reston, Va. 22091. 703-620-3900.

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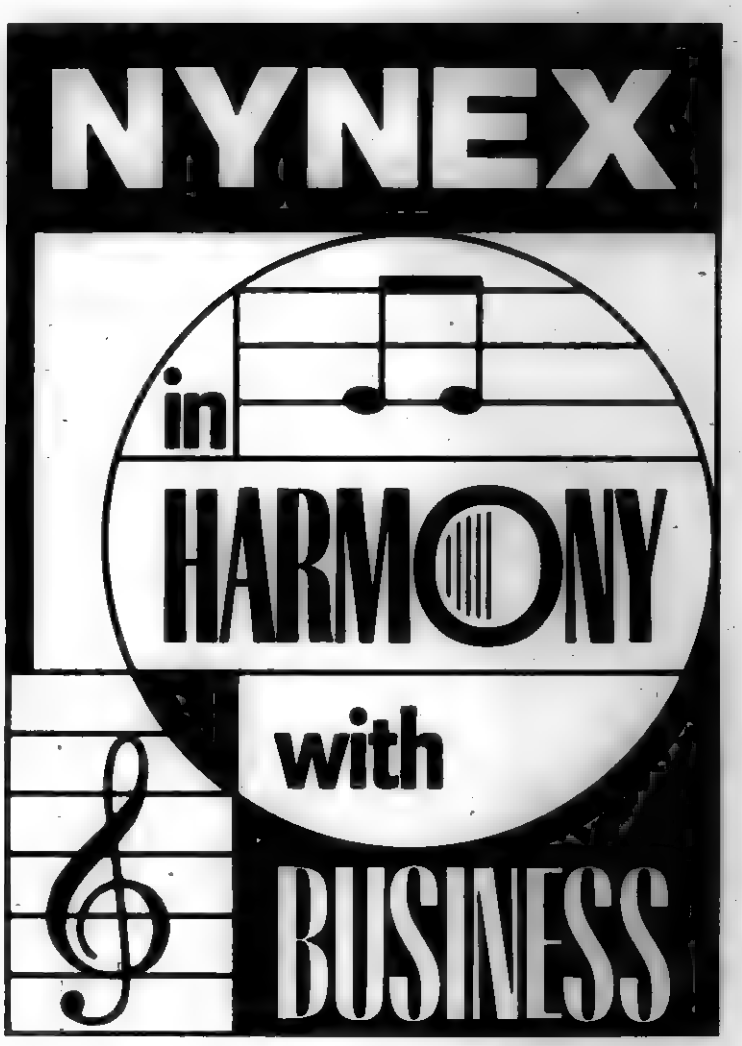

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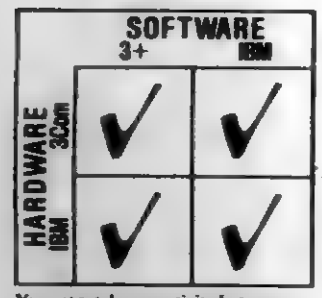

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Constructing a workable LAN is more complex than advertised, especially when the assembly instructions are deficient

REALITY FALLS SHORT OF HOPES

BY AARON BRENNER

WARREN GERETY

It's the typical love 'em and leave 'em story. Seduced by promises of integration and interoperability from network vendors and system integrators, network managers are left to bring up a complete, corporatewide network without support.

While the advent of local-area network hardware standards has accelerated the acceptance of LAN technology, it has also unleashed a host of problems that arise from two sources: exaggerated vendor claims and inflated user expectations.

Continental Grain Co., an international commodity trading and processing company headquartered in New York, operates 24 hours a day. The company has offices in the U.S., Europe, Latin America, Africa and Asia. Larry Stouder, manager of the information center at the company, began to install a network of LANs a few years ago. He says one day the network will connect most of the company's international offices as well as the myriad computer resources within them. In the process of implementing this networking plan, Stouder says he has become more knowledgeable than most professional LAN installers — but this knowledge was hard won.

"When we started, I brought in professed specialists on network wiring," Stouder says. "We hovered over them because we wanted to know more. What we found out, however, was that they didn't know what they were doing. We knew more than they did."

Shaken by the discovery, Stouder dismissed the specialists and began educating himself. "We had to learn enough about wiring so that we could do it ourselves," he says. Stouder does not maintain that his bad experience with a single installation firm is typical of the whole LAN industry. But, he says, it was sufficient to make him wary of depending on outside experts.

Continental Grain's network, which is based on Banyan Systems, Inc.'s server hardware and Virtual Networking Software, or Vines, software and which now spans three continents, is entirely the work of internally developed experts. "By developing expertise, we have created our own specialists," Stouder says. "Most people can't do that because it takes a sizable investment. Most have to seek out some kind of professional help."

Good Samaritan Hospital in San Jose, Calif., managed to find the professional help required to troubleshoot its 3Com Corp. LAN, but it required searching beyond the vendor. When the hospital's system went down the day after Thanksgiving last year, the dealer that sold it was stymied, according to physician services representative Marianne Lucas. "They looked at it for a week and a half and got nowhere," she says. The hospital then decided it was time to look for someone with more experience.

That someone turned out to be a consultant from the Lanquest Group, a consulting firm in Santa Clara, Calif. It took three hours for the specialist to diagnose the problem, according to Lucas, and within six hours, he had the network back in operation. "The lesson," Lucas says, "is to be sure your vendor is experienced in the hardware and software he is selling."

The truth is that demand for easy integration

Brenner, editor-in-chief of *LAN Magazine*, is based in New York.

Reality

FROM PREVIOUS PAGE

of a company's computer and communications resources may far exceed the possibilities, especially given the existing equipment and applications. That is why an honest vendor tells the client, "Your solution depends on what you have and what you want to do."

"The way networks are sold is like selling alcohol to teenagers," says Mark Freund, president of Interconnect Network Consulting Group, Inc. in Pasadena, Calif. "The vendors make [the technology] look so simple, but it isn't."

Steudler

MIS managers might be immune to the intoxicating properties of a smooth sell. But they often have little or no input in the LAN purchase decision. Instead, these critical choices are made by personal computer users, newer to the game and used to a generic product that performs a multitude of tasks easily and quickly.

If it is true, as Freund contends, that vendors are in the wrong for selling LANs as if they were as simple and uncomplicated as PCs and should be accorded as much attention and support as mainframes, it is also true that corporations are guilty of similar transgressions. Most firms, however, have not made the strategic commitment and corresponding investment required to produce sound LAN development.

The corporate world, Freund says, has either chosen to avoid the issue entirely or to confine its experimenting to the departmental level. The result in either case is helter-skelter LAN implementation. MIS departments get squeezed because they are not driving LAN purchase and implementation but are only trying to splice together the mismatched pieces sold to end users and executives.

Some guidelines

Effective implementation cannot be accomplished that way. It takes careful planning and execution. There are five critical elements to a successful network installation, according to Jim Rosen, president of LAN Systems, Inc., a network systems integrator in New York.

One is to stay with standards, he says, noting, "We view Ethernet and token-ring as the viable long-term standards at the link level." The second is to make a complete needs assessment that includes predictions for company growth. The third is to test every piece of equipment as it works in your environment or to use a vendor who will do it for you. The fourth is a complete, coherent system design. And the fifth, which, Rosen says, is probably the most important, is to arrange a support and service program, even if it is done in-house. "Good service," he says, "can make even mediocre hardware perform well."

While this framework fits almost every network installation, it does not provide selection criteria for network hardware and software. That, experts agree, is a highly individualized problem for which only generalized directions can be offered in the abstract.

To understand what is needed beyond the general level, Frank Daubeck, president of Washington, D.C.-based Communications Network Architects, Inc., suggests establishing a "community of interest matrices that are analogous to who is talking to whom." This is done in the design phase. "It boils down to departments or logical groups of PCs," he says. "That's when topology begins to emerge. You can see if there are distance limitations, and you can begin to assign the components of the network: file servers first, then bridges and gateways.

Needs assessment and planning is a critical stage that often takes much longer than the complete installation. Many users regret they did not take more time to assess their needs as well as those of the network.

"We discovered lots of hidden costs in maintenance, operations, dedicating people to network maintenance and ongoing software maintenance, which we didn't expect. And putting it together took more time than we thought," says Wayne Gacnik, manager of systems engineering at Sherwin Williams Co. in Cleveland.

Ray Thomas, manager of office automation at Hadson Gas Systems, Inc. in Irving, Texas, agrees. His office has IBM Personal Computers and Hewlett-Packard Co. HP 3000 minicomputers connected by HP's Starlan network. He also has X.25 links to other offices in Oklahoma City and Houston via Telenet. "The most astounding thing that I found was the complexity of all the network pieces of software," he says. "All the configurations have to match. It is amazing. You have to manage every PC just like you do the mainframe."

> "THE WAY networks are sold is like selling alcohol to teenagers. Vendors make [the technology] look so simple, but it isn't."
>
> MARK FREUND
> INTERCONNECT NETWORK CONSULTING GROUP, INC.

At Hadson Gas, Thomas runs a Starlan network over twisted-pair telephone wire. Starlan is one of the emerging hardware standards to gain widespread vendor acceptance. It is endorsed by AT&T, 10 Net Communications, Western Digital Corp., HP and others. It runs at 1M bit/sec., considered slow in the LAN world, but fast enough as far as Thomas is concerned: "It works for our on-line applications with the HP 3000s and everything we do."

Starlan is a simple network, having taken much from telephone technology. It uses RJ-11 jacks for all its connections, just like most phone systems. It is possible, using four-pair wire, to run the phone system and Starlan over the same cable.

Unfortunately, even Starlan is not as simple as its vendors would like to think. Thomas had no problems with it, but Rick Curl, vice-president of research and development at Postron Corp. in Birmingham, Ala., did when he tried to install the network along with his electronic key telephone system. "We went through lots

Continued on next page

LANs: See how they grow

BY LARRY DEBOEVER

Within three years, local-area networks will grow to a new order of magnitude in Fortune 2,000 companies. In these organizations, LANs will constitute the predominant connectivity architecture, interconnecting hundreds, or thousands, of personal computer and terminal users as well as departmental computers, mainframes and other shared resources.

Little is known today about very large-scale LANs (VLS/LANs), primarily because only a handful currently exist. One thing is clear, however: VLS/LANs are very different from PC work group or departmental LANs.

To say simply that they are more complex is a colossal understatement. Such configurations support 500 nodes at minimum, with the average in the 2,000- to 5,000-node range.

Implementing a VLS/LAN means that no single person in the corporation will fully understand the physical network. This is not necessarily cause for alarm; 2,000-line telephone systems work just fine, and no one knows everything about those systems, either.

There appear to be three distinct models for the creation of a VLS/LAN — the hyperthyroid model, the connect-the-dots model and the big bang model.

The hyperthyroid model. In this model, a company installs a moderate-size LAN after a prototype effort. This LAN is visible in the company and is a success. At some point, a decision is made to extend it to cover an additional set of users, then another set and so on.

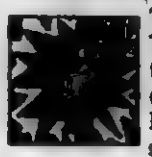
Although most hyperthyroid LANS work well, their success contains a weakness: The purpose of the initial LAN installation is not to create a single, large corporate LAN. It just happens — frequently without design or management. Corporate MIS does, however, usually step in to provide early leadership, treating the LAN as just another part of the terminal network.

The connect-the-dots model. This model is another evolutionary pattern for VLS/LANs. In this model, different divisions, departments within divisions and work groups within departments make relatively independent LAN decisions. One or two of these LANs may have 100 or more users, but most are PC cluster LANs with 10 to 30 users.

Eventually, someone in corporate management decides to interconnect all of these LANs, either by adding a backbone LAN to service most of the new users or extending one of the installed LANs to serve as the backbone.

This strategy usually requires a heavy reliance on gateways to interconnect dissimilar LANs. It may also involve eliminating some of the PC cluster LANs because they cannot be effectively interconnected with the backbone.

Corporate MIS usually takes the lead technical role in selecting the backbone LAN and, in the process, regains control of territorial resources.



The big bang model. This model occurs when there is an enterprisewide decision that embraces LAN technology as the standard for user connectivity, embraces a single LAN vendor and separates the selection of the vendor from installed LAN technology.

This strategy is characteristic of companies that have been slow to adopt LAN technology and have made a corporate decision to adopt LANs as a standard. Clearly, this is the type of sale IBM has targeted for its Token-Ring network.

Problems of VLS/LANs

No matter which model of development a corporation uses, all VLS/LANs share a common set of problems. Network management and support are issues in any LAN, but in LANs of this scale, the difficulties loom much larger, and resolution requires substantial resources.

Successful VLS/LANs use centralized help desks to provide assistance in LAN use, troubleshooting and PC software support.

The performance of VLS/LANs is also an extremely important issue. Two critical factors are the performance of bridges and the design of the network.

In general, bridges have difficulty meeting the throughput demands made on them by large networks. Many older bridges simply cannot support the number of addresses required.

Every LAN is dependent on good design for good performance. In VLS/LANs, however, the issue is critical. Its seriousness is compounded by the fact that the structure tends to evolve rapidly. In the words of one user, "Every day, a [VLS/LAN] segment is being added, modified or screwed up somehow."

Another common problem is data ownership, particularly on departmental machines. When all of the nodes are interconnected, MIS often claims ownership to the departmental data, since the network has made it a corporate resource. Departmental users, on the other hand, still view such data as their property.

This problem is particularly prevalent in VLS/LANs of the connect-the-dots type. In these instances, departmental users typically own their own minicomputers and LANs before interconnection. Consequently, they end up feeling they've lost something in the transition. Occasionally, the frustration threatens to erupt into open conflict. One departmental MIS manager in a major Fortune 1,000 company, for example, recently threatened to cut the newly installed backbone LAN connected to his DEC VAX network because, he says, "Corporate MIS thinks they own the data."

VLS/LANs are an entirely new phenomenon, and we still know very little about them. Understanding will have to come quickly, however, because most medium-scale and large companies count ownership of one among their strategic objectives. If we don't find out how to pursue implementation by design, implementation by evolution will prevail. ●

DeBoever is president of DeBoever & Associates, in Acton, Mass., research and consulting firm that has been studying VLS/LAN implementation.

Reality

FROM PREVIOUS PAGE

of grief putting in Starlan," he says. "It ran fine by itself, but it would not run with the phone system."

After weeks of sending products back and forth, Western Digital (a maker of Starlan), AT&T (the designer) and Curl finally figured out that the phone system and Starlan were attempting to use the same conductors in the four-pair cable.

Starlan is similar to Ethernet, an architecture that, according to Doug Gold, LAN analyst at International Data Corp. (IDC) in Framingham, Mass., accounts for 75% of the installed base of LANs.

Ethernet, unlike Starlan, has a raw data speed of 10M bit/sec., making it the fastest commercially available network running on copper cable. Both, however, use a contention access method, called carrier-sense multiple access with collision detection (CSMA/CD), to regulate use of the network and keep users from bumping into each other. And both are also part of the IEEE 802.3 standard.

Ethernet also exists in another standard form. Ethernet networks were developed long before the 802.3 standard was adopted, and, at one point, Xerox Corp., Digital Equipment Corp. and Intel Corp. joined forces to create a standard for Ethernet, which was widely adopted and still persists despite the renounciation of its creators.

Not the same

There are slight differences between the IEEE's standard and the previous one. These revolve around the use of the IEEE 802.2 protocol. The older Ethernet networks do not use this link-level protocol, while the IEEE Ethernet networks do.

While these differences may make the two standards incompatible, vendors insist and consultants tend to agree that the incompatibility is nothing users need to worry about, since most products support both.

The 802.3 standard, which includes Ethernet on thick coaxial cable at 10M bit/sec., Ethernet on thin coaxial at 10M bit/sec. and Starlan on twisted-pair at 1M bit/sec., is now clearly the predominant Ethernet standard. It is likely, however, that the IEEE 802.3 Ethernet standard will not be the predominant network hardware of the future, even though it has such a large installed base today. More likely, the 802.5 token-ring standard will dominate.

The challenge: Token-ring

IDC's Gold calculates that by 1990, 50% of the installed base of LANs will run on token-ring hardware. By 1993, he says, that figure will be closer to 80%.

The main reason for the predicted success of the token-ring standard is IBM's endorsement of the technology. IBM has stated that it will put its entire product line on token-ring. Indeed, since 1984, the company has introduced token-ring interfaces for almost all of its lines of computers.

"With the institutional type of network, where an IBM mainframe is involved, the hardware choices are narrow," Communications Network Architects' Dzubeck says. "You definitely want token-ring."

Token-ring offers other advantages, including capacity, flexibility, ease of growth and performance. The token-passing access method guarantees each node a response time that is governed in a predictable manner by the size of the network, which means it is possible to build token-ring networks of hundreds of nodes.

Ethernet, on the other hand, is strapped with the CSMA/CD access method. Every time two nodes try to use the network at the same time, their transmissions collide, forcing them to back off, wait and then try again.

Adding more nodes increases the number of collisions, forcing each node to wait longer for network access.

Token-ring handles every type of traffic consistently and predictably, whereas Ethernet is rather sensitive to the type of network traffic it carries.

Bursty traffic, even when generated by a large number of nodes, does well on Ethernet, since the likelihood of collisions is low. Heavy traffic on a small number of nodes may result in performance degradation, since the risk of collision is also higher.

Ethernet makes up for some of its problems with its 10M bit/sec. raw data speed. Indeed, few networks are large enough or have enough traffic to reach the limitations of such bandwidth.

In addition, it is possible, using bridging products, to split up networks to decrease traffic and increase performance. Nevertheless, the real data throughput of Ethernet rarely approaches 10M bit/sec.

Token-ring's raw data speed is only 4M bit/sec.; it has lower overhead, however. In certain situations, its actual throughput may equal that of Ethernet.

The most important factors to consider when deciding between these two standards are type of traffic, number of nodes, cost (Ethernet is slightly less expensive right now) and application.

Wiring

Until 1987, token-ring enjoyed another advantage over Ethernet: Instead of coaxial cable, it uses shielded twisted-pair wiring, which is a less expensive media that is easier to install and maintain.

"The real edge of shielded twisted-pair is that it has the characteristics for the future: the right number of conductors, the right impedance," Freund says. "Being shielded, it eliminates cross talk."

Token-ring also has a star-wired ring layout that makes troubleshooting and node isolation easier, since all nodes are wired directly back to a multistation access unit (MAU).

In networks of more than 50 nodes, the centralized cable control provided by such a layout is a necessity. It can work in much the same way as Starlan, only alongside the phone system rather than with it.

But as Mark Robinson, director of operations for Curtis Manufacturing, Inc. in Peterborough, N.H., points out, this system is not foolproof. "There are distance limitations for the cable run between MAU and the station and for the complete network. We had problems with this. If a computer is off, its cable is still part of the overall length of the network. This led us to exceed the distances, causing the token not to be regenerated," he says.

With Ethernet, because all nodes share the same trunk, fault and node isolation are more difficult. And, what is worse, a faulty node can impinge on other nodes.

With token-ring, the search for a faulty node or cable simply means moving to a MAU and unplugging nodes one by one. With Ethernet, LAN managers must move from node to node, testing the cable as they go. This can double or triple network downtime. Poor diagnostics, more than any other reason, is why users and system integrators moved away from Ethernet.

A new life

A series of product developments seem to have given Ethernet new life, however. These focus on putting Ethernet on unshielded twisted-pair, as Starlan is.

The only difference is that in these configurations, Ethernet still runs at 10M bit/sec. The main vendors offering this approach are DEC, HP, 3Com and Synoptics Communications, Inc. in Mountain View, Calif.

The Synoptics product, called Lattisnet, is especially innovative. It puts Ethernet on essentially the same physical layout as Starlan but adds diagnostic power and flexibility.

Lattisnet, like Ethernet, leans heavily on cabling principles developed in the telephone industry. Increasingly, the data communications industry is adopting these principles.

IBM and AT&T sponsor cabling plans revolving around centralized wiring closets, a star-of-stars layout, twisted-pair copper cable connected to the desk top and fiber-optic cable between wiring closets. Now, all the major LAN hardware standards can take advantage of these cable plans.

As Hadson Gas's Thomas points out, "Having a centralized wiring scheme along the lines of the telephone system makes troubleshooting and adds, moves and changes much easier. Every node can easily be isolated.

"Besides," he adds, "the technology is more developed, and you only have to find someone familiar with telephone cabling to make the changes."

Making it control

Centralized wiring schemes lend modularity, the latest installation buzzword, to the network. Most people think of modularity as the RJ-11 telephone jacks they have at home.

"In a narrow focus, that's true. But modular systems aren't just defined by the use of jacks," says Doug Cabell, senior vice-president at Orion Network Solutions Group in Costa Mesa, Calif. "Any system that uses patch panels and wiring closets to facilitate changes in node use is modular. It eliminates rewiring."

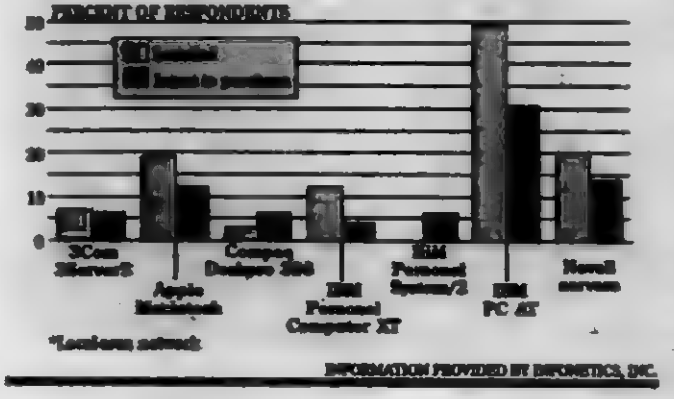
Centralized wiring schemes like those used by Synoptics or IBM provide control in a distributed system.

At first glance, such schemes seem to be more expensive, since more wire is needed than in a bus topology. However, Freund maintains, "Any extra money spent on the cable will be made back in less than a year through savings on maintenance."

Many users are afraid of becoming locked in by wiring

Destined to serve

Purchase intent contrasts strongly with current installation in LAN* server category; both IBM and Apple are expected to lose share



*Local-area network

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Local-area network cabling preferences

Twisted-pair ranks second in popularity, with a combined 39% compared with coaxial's 55%

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schemes. Freund, however, says it is possible to move ahead and still preserve your options. "It is possible to create a generic cabling scheme that does not follow any one company's particular specifications but will work with most vendors' products. I believe this centers around shielded twisted-pair.

"Unshielded twisted-pair is not appropriate in the way it is laid out or in its reliability," Freund continues. "Its loading characteristics are not conducive to corporate environments. It is less stable and has greater degradation than shielded twisted-pair."

Most experts agree with the first part of Freund's statement. Others, like Thomas, say they are quite happy with unshielded twisted-pair.

Thomas

Users need to examine their environments and resources for things like machine noise, distances between nodes, the availability of repeaters, the type and amount of traffic and radio interference. One thing is certain: The days of coaxial cable are numbered.

Twisted-pair wiring is also cutting into the growth curve of fiber-optic cable, says Eric Pearson, president of Pearson Technologies, a Canoga Park, Calif., systems integrator specializing in fiber-optic applications. "There is growth in the fiber-optic LAN market," Pearson says. "But many applications will not use fiber since the introduction of the twisted-pair Ethernet products."

Robinson

The result of this trend, Pearson says, is that "fiber will be used where its intrinsic advantages are greatest — where long distance and high bandwidth are key, as in backbones to connect several LANs, rather than at the desk top."

The distance limitations of fiber-optic cable are measured in miles instead of meters, and bandwidths as great as 200M bit/sec. have been achieved. Other advantages include immunity to electromagnetic and other types of interference.

The complexity of fiber stems from a number of factors. Even though the technology has been in existence for more than 30 years, there are few standards now in place.

Ending the confusion

One standard, the Fiber Distributed Data Interface (FDDI), should help ease some of the confusion as it becomes solidified. Already, most large-network vendors are committed to supporting it.

Although FDDI is currently appropriate only for large LANs, LAN linking or wide-area networks, having a standard for large networks will help, especially as the demand to connect departmental and institutional LANs increases.

Having FDDI as the wide-area solution will influence the local market in another way. FDDI is a token-passing ring that runs at 100M bit/sec. Its acceptance at the wide-area level should speed acceptance of token-ring in the local arena.

A troubling trend in the fiber-optic LAN market is the idea that users can install these networks themselves. Even if such efforts don't result in a faulty network, they almost always waste money.

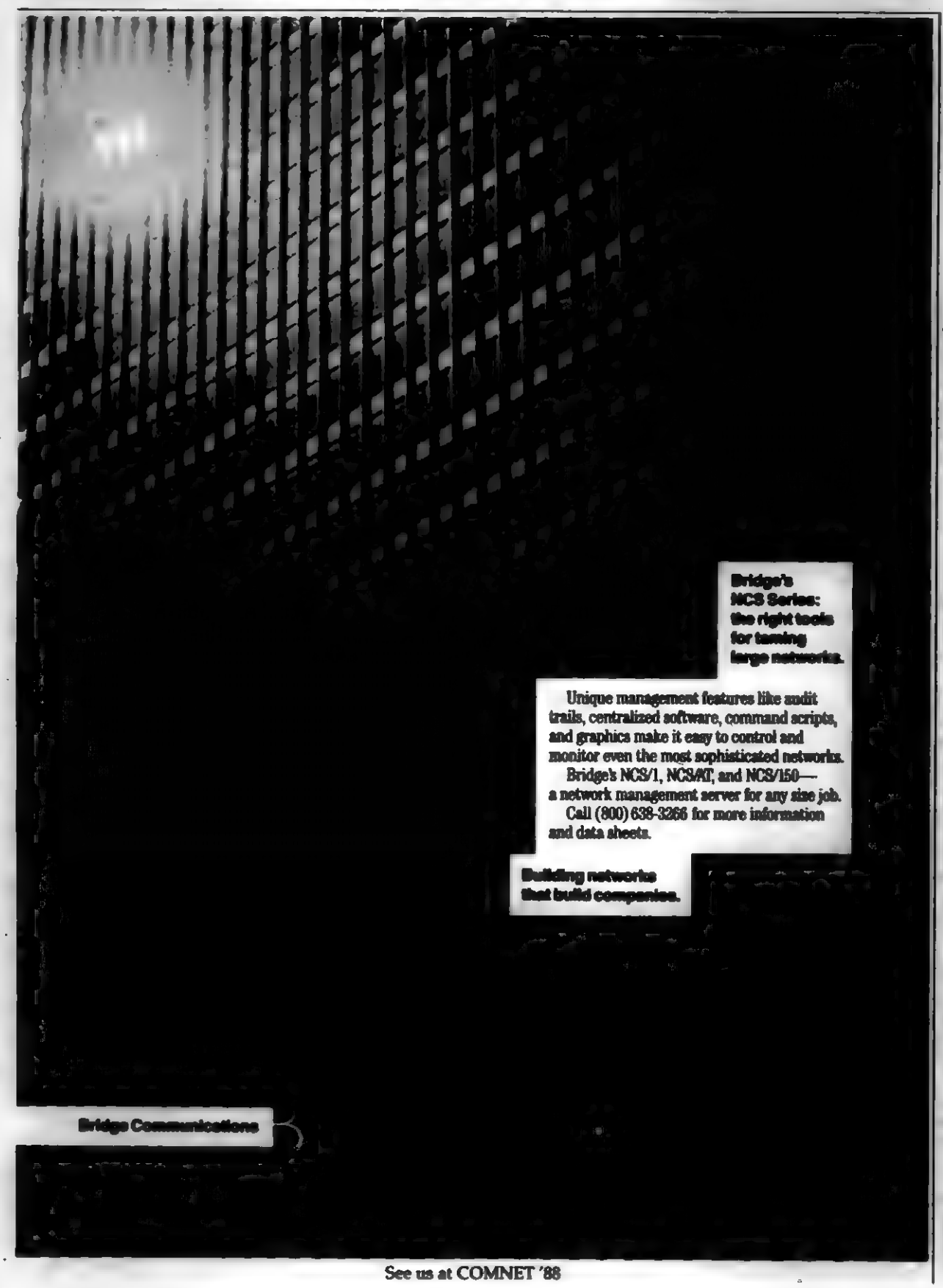
One development that may bring FDDI to smaller networks by making it more affordable is the introduction of an FDDI chip set from Advanced Micro Devices, Inc. in Sunnyvale, Calif. Called Supernet, this set of five chips accomplishes what previously took six expensive and cumbersome add-in boards to do.

Even with the FDDI chip set, however, the price/performance trade-offs of fiber-optic LANs are complicated. An extraordinarily large number of components are involved, most of which have no standards. Connectors, cable and optical components cannot be installed by anyone but an expert. A troubling trend in the fiber-optic LAN market, Pearson says, is the growing idea in some quarters that users can install fiber-optic networks themselves. Even if such do-it-yourself efforts don't result in a faulty network, they almost always waste money.

According to Pearson, "Some users don't spend enough time learning the cost/performance trade-offs. I saw a user spend something close to $150,000 more than he needed to. The LAN performed well, but it should not have cost as much as it did."

In addition, there are numerous configurations for these components. Finding the right one can save money and increase performance.

"One user I know of could have saved tens of thousands of dollars and 50% on duct space by using multiple fibers in each of the tubes pulled," Pearson says. "He just didn't know. LAN design is complicated enough. Fiber almost doubles the complexity." ●



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Reclaiming the LAN: MIS picks up the flag

BY LYLE ANDERSON

As local-area networks multiply and begin to connect, it is increasingly critical for MIS to take an active role at every stage of implementation. LANs must now be considered as front ends to the corporate network, not just as isolated pockets of computing in user departments.

Too often, organizations adopt two or three LAN software standards and implement them on an ad hoc, department-by-department basis. When networks were operating independently, such diversity was not a major problem. Now, however, users in almost every organization demand that their networks be connected with each other, to corporatewide networks and to host computers.

> IT HELPS to involve knowledgeable users when drafting standards and guidelines.

The job of MIS should be to define the appropriate LAN technology for the organization. Many issues cannot be left up to individual departments, including what industry standards the firm will support, if and how connections into the host computer will be provided and what levels of security and audit control are required.

Many users, one standard

The MIS organization should identify a set of LAN hardware, system software and applications that will satisfy most user requirements. Users can implement recommended hardware and software with minimal MIS involvement, but they must justify deviations from recommended standards. This way, MIS can channel users' enthusiasm into workable solutions and minimize potential problems in connecting LANs to other systems.

MIS can take into account emerging standards and vendor directions and, at the same time, enable users to implement workable solutions. The standards should not only identify the approved hardware and software but also define the respective roles of MIS and users and provide guidance in planning and implementing a LAN. A cost model that identifies the total cost of implementation, including training, administration and ongoing support costs, is also helpful.

Publishing a set of standards and guidelines is an effective way to begin to help users select a LAN and transfer the knowledge that different departments have gained in using them.

Creating and promulgating standards requires some diplomacy and consensus building. Users often complain that MIS is unresponsive and lacks the knowledge to guide them. Many users say, with some justification, that they know more about what is needed than MIS personnel because they are the ones who have had hands-on experience with LANs.

For this reason, it helps to involve knowledgeable users when drafting standards and guidelines and when disseminating standards throughout the organization. MIS can use the considerable experience of these users and gain their support in promoting compliance.

Responsibility for administration and day-to-day operation of the network must be defined. In fact, any LAN that links more than 25 to 30 workstations virtually requires a full-time administrator. Depending on the organization, responsibility for selecting an administrator may belong to MIS or to the users.

Many firms develop their own user manuals for LAN operation. A task-oriented manual can greatly simplify training and operation, especially when a number of casual users are on the network.

Consolidating support

Today, available LAN technology forces organizations to provide local support for each LAN installation. Typically, local support is provided by the user department, with assistance from the MIS department on an as-needed basis.

As LANs become more sophisticated and the necessary network management and support tools become available, support can begin to become more centralized, with MIS taking over more of the responsibility for supporting the network environment.

Centralizing backup and administration under MIS is desirable both for cost reduction and improved security.

The role the MIS organization plays in implementation can vary — from serving a source of information to outright ownership of the LAN. In any case, MIS will need to support this utility and provide a reliable and cost-effective infrastructure for end users. ●

Anderson is director of DMR Group, Inc., an information management consulting firm based in White Plains, N.Y.

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LAN wiring with a twist

BY G. BERTON LATAMORE

Local-area networks are gaining muscle and losing bulk. As LAN shipments expand, so does interest in unshielded twisted-pair wiring as a cost-effective alternative to coaxial cabling.

As a telephone technology, unshielded twisted-pair seems to have been around forever. When it comes to digital networking, however, the medium has only really begun to infiltrate LAN sites within the last six months.

While unshielded twisted-pair accounted for only about one-tenth of 1% of 1987 LAN shipments, Doug Gold, senior research analyst for the LAN market at International Data Corp. (IDC) in Framingham, Mass., says user interest has been spurred by a number of recent network releases running on unshielded twisted-pair.

Ahead of the game

BBN, Inc., a diversified high-tech research and development company in Cambridge, Mass., is one step ahead of many users in employing twisted-pair for networking purposes. For the past 10 years, whenever telephone lines were installed in its expanding complex of buildings, BBN made sure that an extra three twisted-pair lines were added for each office to handle data communications. The network vendor uses Phonenet, an unshielded twisted-pair LAN based on Apple Computer, Inc. Appletalk protocols from Farallon Computing, Inc. for tasks both small and large.

"We use Phonenet to carry anything that someone might want to send from a Macintosh to a laser printer," says Ron Watkins, a network engineer at BBN. We also connect the Phonenet network to our corporate Ethernet and through that to a bank of [Digital Equipment Corp.] VAXs that host custom applications. We run those applications through the network so you can use them directly from a Macintosh over Phonenet."

Theoretically, most organizations already possess spare twisted-pair wiring that could be turned to this new use. "For years, AT&T installed extra wire whenever they put a phone in," IDC's Gold says. Unfortunately, existing wiring is not always usable — particularly if it is more than 10 years old.

Money saver

Even when installation of fresh wire is required, twisted-pair can save money. Not only is it less expensive and easier to string, but it is also easier to maintain. Adding a new device to a twisted-pair LAN is as simple as plugging it into a standard telephone jack. "Every desk is served by phone jacks, so we virtually eliminated recabling," says Joe Goodhart, a consultant with Wilmington, Del.-based ICI America, Inc.

ICI, an international chemical firm, chose Lattisnet, a 10M bit/sec. unshielded twisted-pair Ethernet from Synoptics Communications, Inc., when it wanted to unify various office automation functions. "We deliver Wang word processing off a VS100, serve a large DEC community, provide IBM System/36 and 38 and 5520 services and support a large number of 3270 devices and personal computers, all on unshielded twisted-pair," Goodhart says.

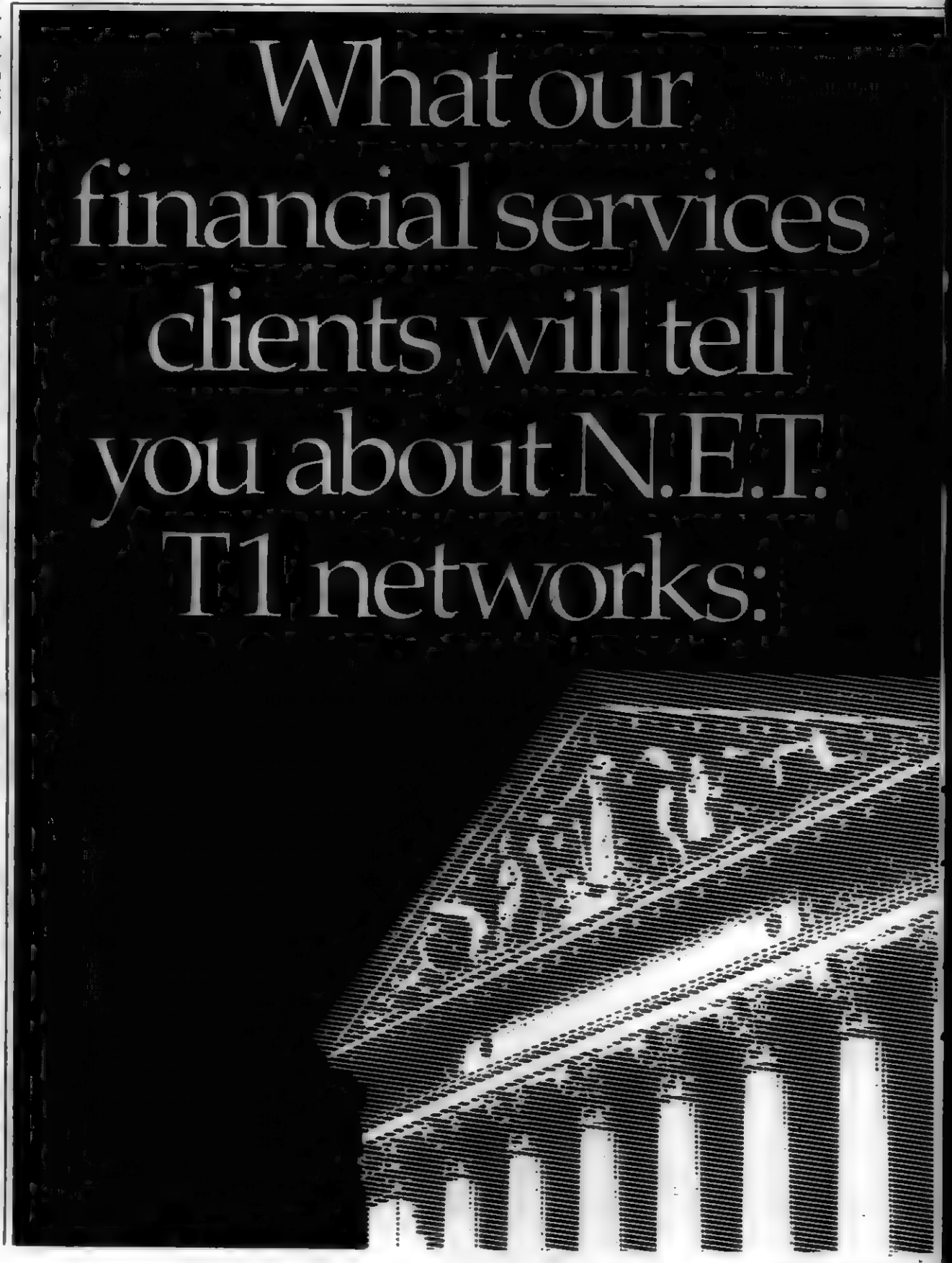
Easy expandability has made twisted-pair an insider favorite at the headquarters of Microage Computer Stores in Tempe, Ariz., according to Bruce Grant, director of technical support. "We also have a Token-Ring, an Arcnet and an Ethernet running on coaxial as test beds for various pieces of equipment that we sell," Grant says. "However, when we want to connect someone to the mainframe, it turns out that our 1M bit/sec. Starlan is one of the easiest networks to expand."

Twisted-pair does experience attenuation problems that limit line length to 330 feet. However, according to Jerry Culbert, president of Needham, Mass.-based Information Transport Systems, Inc., an engineering firm specializing in voice/data cable systems, few sites require longer reach. "We conducted a study of 45 locations showing that 98% of workstations are within about 245 feet of a wiring closet," he says.

Unshielded twisted-pair is also sensitive to fluorescent lights and copying machines. Culbert maintains, however, that these problems can be contained in most environments with proper precautions. Each pair should have its own separate sheath so that signal contamination can be contained, he says. Proximity to light fixtures can be avoided by installing the wiring in a cable rack or in ceiling or floor ducting.

The main barrier to using twisted-pair wiring on LANs is user skepticism, according to ICI's Goodhart. "At first," he says, "it is hard to convince users that a LAN running over telephone wire can deliver the level of service they need. But once users start working with twisted-pair, they fall in love with it — particularly when they see you can provide services anywhere within minutes instead of months." ■

Letourneau is a Burlington, Vt.-based free-lance writer.



Arcnet survives, and battle moves on

BY THOMAS B. CROSS

Arcnet is not antiquated, as many of its critics charge. What it is, committed users say, is irrelevant. But then again, they say, so is Ethernet.

Arcnet was one of the first technologies to link various types of devices. Developed in 1977 at Datapoint Corp., it really took off when its token-bus technology was adapted for the IBM Personal Computer in 1982.

Since then, both the number of Arcnet users and the field of competing technologies have increased dramatically. With an operational speed of 2M bit/sec., the product has been surpassed by many other local-area network technologies operating at 10M bit/sec. and higher. With fiber-optic systems operating at more than 100M bit/sec., some industry observers forecast Arcnet's demise.

Last April, the Arcnet Trade Association (ATA) was formed to serve as a forum for users and to counteract those negative forecasts by promoting Arcnet as a viable technology with a future. However, even users active in ATA and bullish on Arcnet's prospects for survival say they now have more critical issues to worry about.

For a large quasi-federal lending agency, using Arcnet was initially an arrangement of necessity, according to Carrie Herr, strategic planner at the Reston, Va.-based company. Five years ago, when the organization wanted to network its personal computer-based file servers, Arcnet was used because few choices existed, she says. The organization now connects 26 file servers in 15 locations via 40M bit/sec. Etherlink cards.

While Herr uses both Arcnet and Ethernet, she says she likes the former as a "low-end, low-budget, generic system." She says that for small companies or departments, Arcnet vs. Ethernet is not the question; rather, the network operating system is what will make the difference.

The real issue for Herr is in the lines of code written to interface the firm's Novell, Inc. Netware network operating software with Arcnet. "We grew up with Novell and are mired down with such an investment that you can't really move away from that easily," she says.

Always the underdog

Donald Dornbush, director of data processing for the Michigan Education Data Network Association in East Lansing, Mich., an early Arcnet user, says the technology has always been a stepchild to other systems. Nevertheless, he adds,

> "ARCNET is like a Chevrolet, and most people do very well with a Chevrolet."
>
> B. J. HALL
> HALLCOM NETWORK SYSTEMS

Arcnet remains a key technology for a number of reasons:

- It is an easy topology to work with and to install. With a ring topology, the entire network's operation depends on each connection's integrity. With a bus topology, the network can be extended as far as necessary, and one bad connection will not disrupt the entire network.
- It is predictable and reliable.
- The low cost of Arcnet boards makes the technology cost-effective.
- It works with a wide range of software.
- It has a strong potential for faster speeds, a factor on which Datapoint is currently working.

Paul Obradovic, a telecommunications engineer with Southern California Edison, has more than 700 nodes on Arcnet running Netware. The principal reason for his company's choosing Arcnet, he says, was cost.

Obradovic says he likes the speed and performance of Arcnet as well as its reliability. His organization is expanding its network and is looking for gateways to wide-area networks and T1 circuits.

B. J. Hall, founder of Hallcom Network Systems in Denver, a LAN system integrator, says, "Arcnet is like a Chevrolet, and most people do very well with a Chevrolet. However, it's not so much Arcnet nor is it how many nodes: It's what you do with them."

Given its large installed base and popularity among users looking for low-cost, efficient LAN solutions, Arcnet is not likely to either fade away or surrender to Ethernet. In fact, there is room for both in a world in which, with LAN board prices dropping, hardware choices are becoming a side issue. Network operating software is the ground on which future connectivity battles will be fought. •

Cross is vice-president of Cross Information Co. in Boulder, Colo., and the author of several books on communications.

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VENDOR VIEWPOINT
A standard for fast times

BY HOWARD SALWEN

Terminal-to-host connections were sufficient to answer most communications needs during the early 1980s. Today, however, the emphasis has shifted to high-speed, host-to-host and LAN-to-LAN communications. These new requirements have spurred demand for a high-speed, fiber-optic-based communications standard. The Fiber Distributed Data Interface (FDDI) is such a standard.

FDDI is the first standard tailored for complex communications. Its 100M bit/sec. data rate is 25 times faster than IEEE 802.5-based networks and 10 times faster than Ethernet. But it still far from stretches the limits of fiber-optic media.

The standard's token-ring architecture provides predictable network access and features two counter-rotating rings for fault-tolerant bidirectional communications. In contrast to 802.5 token-ring networks, which allow packets from any one node to circulate on the ring at any given time, FDDI networks can carry packets from several nodes simultaneously for greater speed and capacity.

In addition to speed and accuracy, FDDI offers the typical advantages of fiber-optic cabling. Multimode fiber supports node-to-node distances of up to two kilometers and protects data from signal degradation.

More specifically, networks in harsh or noisy environments can benefit from fiber-optic cable's immunity to electrical interference and electromagnetic and radio frequency interference radiation.

The FDDI standard will provide a solid foundation on which to build networks for more complex communications tasks such as transferring graphics images or other large data packets at high speeds. FDDI will also become the standard for backbone networks that support data transfers between different local-area network systems.

While FDDI will have a major impact on the networking industry, definition and ratification of the FDDI standard is less certain. Several companies are currently working on FDDI chip sets. Chip set development is a tremendous challenge, however, and several major pieces of the puzzle are still undefined.

Station management, for example, which addresses such concerns as how a token is put on the ring, has yet to be decided. In addition, configuration parameters, including the size of the fiber and the type of connectors to use, need to be defined. A complete chip set will guarantee FDDI's viability as a standard by ensuring interoperability among products from different vendors.

WHILE FDDI will have a major impact on the networking industry, definition and ratification of the FDDI standard is less certain.

Even after the FDDI standard is fully defined, it will take some time for the standard to become commercially available. In the case of the 802.5 standard for 4M bit/sec. token-ring networks, almost two years passed between the time good chips were first available and when 802.5 interface boards were commercially available. Since the FDDI network is faster and more complex than the 802.5 standard, the wait for FDDI-compatible products could be even longer.

At this point, FDDI networks are at least a year and a half away from commercial availability. It is certain, though, that when interoperable FDDI-standard products become available, they will have a hungry market to satisfy. ●

Salwen is chairman and chief technical officer at Proteon, Inc. in Westboro, Mass.

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Upcoming issues of Spotlight will explore these subjects.

We invite readers to submit vendor-specific questions in these areas so we can obtain the answers for you and for others with similar concerns.

Please address all submissions to Deborah Fickling, Associate Editor, Box 9171, 375 Cochituate Road, Framingham, Mass. 01701-9171.

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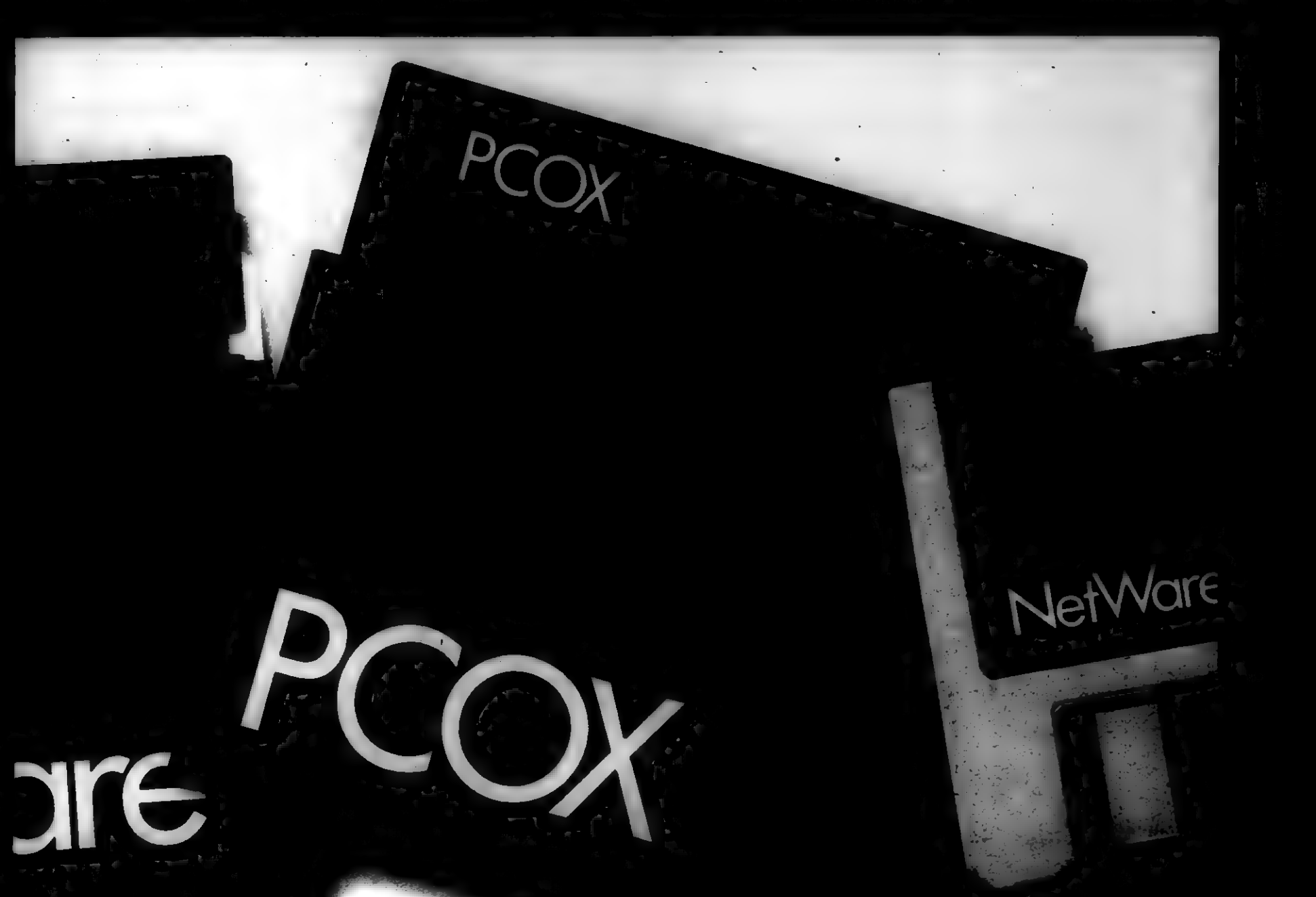

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LAN boards

COMPANY	PRODUCT	NETWORK OPERATING SYSTEMS SUPPORTED	CABLE TYPES SUPPORTED	BASEBAND OR BROADBAND	ON-BOARD COPROCESSOR	ON-BOARD MEMORY	WIRING TOPOLOGY	MAXIMUM NODES PER NETWORK	DATA RATE (BIT/SEC.)	ACCESS OR SIGNALING SCHEME	MAXIMUM LENGTH WITHOUT REPEATERS	MAXIMUM LENGTH WITH REPEATERS	MAXIMUM DISTANCE BETWEEN NODES	PRICE PER CARD
Acer Technologies Corp. (408) 922-0333	Acer 5230 Ethernet Network Interface Card	Netware	Coax, twisted-pair	Baseband	Yes	Yes	Bus	100	10M	CSMA/CD[1]	1,640 ft	8,200 ft	8,200 ft	$329
	Acer 5210-003 Arcnet Network Interface Card	Netware	Coax, twisted-pair	Baseband	NA	Yes	Starburst	255	2.5M	Token passing	100 ft	20,000 ft	2,000 ft	$159
ACS Telecom (213) 325-3955	10 CAD Plus	Proprietary	Twisted-pair	Baseband	Yes	Yes	Bus	32	1M	CSMA/CA/CD[2]	2,000 ft	10,000 ft	10,000 ft	$995
	10 CAD Ethernet	Netware	Twisted-pair, coax, fiber optic	Baseband	Yes	Yes	Bus	100	10M	CSMA/CA/CD	1,000 ft	5,000 ft	5,000 ft	$495
Apollo Systems, Inc. (214) 243-4207	AS200/PC	RS-232 networks	Twisted-pair	Broadband	Yes	Yes	Bus	64	9.6K	CSMA/CD	2,000 ft	4,000 ft	4,000 ft	$695
Alloy Computer Products, Inc. (617) 875-6100	PC-Plus Network	Proprietary	RS-232 data cable	NA	Optional	Yes	Bus	31	700K	Interrupt	1000+ ft	Unltd	2,000 ft	$895-$1,295
Amalgamic Technologies, Inc. (510) 659-0854	Ethernet Card	Amalgo Network File System, Unix	Thick or thin Ethernet	Baseband	Yes	Yes	Bus	1024 (thick)	10M	CSMA	800 m	—	—	2500 (thick), 1024 (thin)
Apollo Computer, Inc. (617) 256-6600	802.3 Network Controller, 802.3 Network Controller VME	Unix System V, Unix 4.2, Aegis, Sun Network File System, DFS	Standard Ethernet, twisted-pair, coax	Either	Yes	Yes	Backbone with drops	Per 802.3 spec	10M	CSMA/CD	Per 802.3 spec	Per 802.3 spec	Per 802.3 spec	$1,350-$4,000
	Apollo Token Ring	AT&T Unix System V, Berkeley Unix 4.2, Aegis, Sun Network File System, DFS	Coax	Baseband	No	—	Token-ring	Unltd	12M	Token passing	NA	Unltd	1,000 m	$1,300 (Series 3000, 4000 Personal Workstations)
Applied Knowledge Systems, Inc. (602) 820-0888	The Knowledge Network	MS-DOS, PC-DOS-compatibles	Twisted-pair	Baseband	No	Yes	Point-to-point	8	9.6K	CSMA/CA/CD	1,000 ft	2,000 ft	500–1,000 ft	$1,000
Applitek Corp. (617) 246-0900	Baseband, broadband, fiber-optic LANs	PSOS	Baseband, broadband, fiber-optic	Either	Yes	Yes	Tree	—	10M	Unltd, IEEE 802.3	—	20 miles	—	$500-$1,000 (per systems)
Ariel Communications Corp. (817) 860-0999	Fiberway	Ethernet, 802.3, fiber-optic	—	Baseband	Yes	Yes	Ring	128	100M	Token passing	NA	NA	10,000 ft	Information not provided
Artisoft, Inc. (602) 293-6363	Lantastic	Nethios compatible, runs on IBM PC LANs, Netware	Twisted-pair	—	Yes	Yes	Bus	500+	2M	CSMA/CA/CD	4,000 ft	5,000 ft	4,000 ft	$100
Aston Technologies, Inc. (800) 854-2003	Quadster	Tapestry	Twisted-pair	Baseband	No	Yes	Star	—	—	—	—	—	—	Information not provided
AST Research, Inc. (714) 863-1333	AST Ethernet Card	Netware	Coax	Baseband	No	Yes	Bus	96	10M	Polling	3,000 ft	—	600 ft	$595
ATAT (800) 247-1212 (201) 522-6000 (NJ)	Starlan Network Access Unit	Unix, MS-DOS, PC-DOS and compatibles	Twisted-pair	Baseband	Yes	No	Hierarchical star, daisy chain	1,000	1M	CSMA/CD	2,000 ft	4,000 ft	4,000 ft	200+
Avatar Technologies, Inc. (617) 438-6872	Alliance	Proprietary, any MS-DOS	Twisted-pair	Baseband	Yes	Yes	Star	100	1.5M	Proprietary	1,000 ft	—	1,000 ft	$100 (per node)
Bell Communications Canada, Ltd. (416) 870-6961	Imagitel	All	Twisted-pair	Baseband	Yes	Yes	Hierarchical star or distributed bus	64 (packets per server)	2M	RBCA	Unltd	Unltd	2,000 ft	$500
Bridge Communications (a division of 3Com Corp.) (415) 969-4400	PCS/1	All	Coax, fiber-optic	Either	Yes	Yes	All	Unltd	10M	CSMA/CD	500 m	2,500 m	500 m	$1,195
	TCP/Term	All	Coax, fiber-optic	Baseband	NA	NA	All	Unltd	10M	CSMA/CD	500 m	2,500 m	500 m	$300
	Telnet/term	All	Coax, fiber-optic	Baseband	NA	NA	All	Unltd	10M	CSMA/CD	500 m	2,500 m	500 m	$300
	Ether/term	All	Coax, fiber-optic	Baseband	NA	NA	All	Unltd	10M	CSMA/CD	500 m	2,500 m	500 m	$300
Bunker Ramo Corp. (714) 773-1000	BFTI Network Card	IBM PC and compatible environments	Twisted-pair, coax	Baseband	Yes	Yes	Star	255	1M, 10M	—	1,000 ft	2,000 ft	200 ft	$500-$600
CMC (800) 262-0023	Ethernet Intelligent Processors	Nethios	Coax, thin Ethernet	Baseband	Yes	Yes	Bus	1,024	10M	CSMA/CD	1,500 ft	2.8 km	2.8 km	From $695
Codenoll Technology Corp. (914) 965-6300	Codenet 3001	Any supporting Ethernet IEEE 802.3	Fiber-optic	NA	Yes	No	Star	1,024	10M	CSMA/CD	3,300 ft	14,850 ft	—	$695
	Codenet 3041	Any supporting Arcnet	Fiber-optic	NA	No	No	Star	—	2.5M	Token passing, bus	3,300 ft	NA	—	$695
	Codenet 3410	Any supporting 802.3 MAP	Fiber-optic	NA	No	No	Star	256	10M	Token passing, bus	3,300 ft	NA	—	$1,700
	Codenet 3061	Nethios	Fiber-optic	NA	No	No	Star	256	10M	CSMA/CD	3,300 ft	NA	—	$1,100
Compupro/Vinsyn Corp. (415) 786-0909	The Net 100A	Concurrent DOS, DR-Net	Coax	Broadband	No	No	Modified star	255	3.2M	—	150 ft	1,000 ft	1,000 ft	$350
	Arcnet PC	Netware, DR-Net	Coax	Broadband	No	No	PC bus	255	3.2M	—	150 ft	1,000 ft	1,000 ft	$350
Computer Network Technology Corp. (800) 628-9284	Lanbod	MVS, COS, Unisys environments	Coax	Baseband	Yes	Yes	Bus	500	20M	CSMA/CA	4,000 ft	Unltd	NA	Information not provided
Computer Pathways, Inc. (206) 487-1600	Grapevine	Proprietary, Nethios, MS-DOS 3.1	Coax, twisted-pair	Broadband	No	Yes	Bus	50	3.6M	CSMA/CA	4,000 ft	4,000 ft	4,000 ft	$595

[1]Carrier-sense multiple access with collision detection [2]CDMA with collision avoidance and CD [3]Transmission Control Protocol/Internet Protocol [4]Synchronous Data Link Control [5]Open Systems Interconnect [6]CDMA with collision elimination

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. Further product information is available from the vendors.

SPOTLIGHT

COMPANY	PRODUCT	NETWORK OPERATING SYSTEMS SUPPORTED	CABLE TYPES SUPPORTED	BASEBAND OR BROADBAND	ON-BOARD COPROCESSOR	ON-BOARD MEMORY	WIRING TOPOLOGY	MAXIMUM NODES PER NETWORK	DATA RATE (BIT/SEC.)	ACCESS OR SIGNALING SCHEME	MAXIMUM LENGTH WITHOUT REPEATERS	MAXIMUM LENGTH WITH REPEATERS	MAXIMUM DISTANCE BETWEEN NODES	PRICE PER CARD
[illegible]	[illegible]	MAP	Coax	Broadband or carrier band	Yes	Yes	Branching tree	Unltd	10M	Token-bus, IEEE, 802.4	25 miles	25 miles	25 miles	[illegible]
Castel Business Networks (404) 395-6705	Castelnet 1000 PC LAN	DOS environment	Coax Ethernet, fiber-optic, twisted-pair	Either	Yes	Yes	Any	8,000	1M - 10M	CSMA/CD, token-ring	250 ft (twisted-pair), 500 m (Ethernet coax), 2,000 ft (fiber-optic)	4½ km	4½ km	$495
	Castel 6000 Token-Ring Backbone LAN	—	Fiber-optic, shielded twisted-pair	Baseband	Yes	Yes	Star, distributed star, ring	240	10M or 80M	Token-ring	2 km	400 km	2 km	$4,000 (port to backbone)
	Castelnet 3000 Terminal-to-Host LAN	TCP/IP, Xerox Network Systems, OSI	Coax Ethernet, fiber-optic, twisted-pair	Either	Yes	Yes	Any	8,000	1M - 10M	CSMA/CD, token-ring	500 m (baseband), 2,000 ft (broadband)	4½ km (baseband), 5 miles (broadband), 20 miles (token-ring)	4½ km (Ethernet), 5 miles (broadband), 20 miles (token-ring)	From $280
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	No	Yes	Bus, star, combination	64	1M	CSMA/CA	1,000 ft	8,000 ft	8,000 ft	$949
	[illegible]	Netware, PC-MOS, Constellation	Twisted-pair, fiber-optic	[illegible]	No	Yes	Bus, star, combination	64	1M	CSMA/CA	1,000 ft	8,000 ft	8,000 ft	$949
Data General Corp. (617) 870-6716	Professional DG Starlan Controller	PC-Net supporting MS-DOS 3.1	Twisted-pair	Baseband	No	Yes	Hierarchical star	1,024	1M	CSMA/CD	8,000 ft	—	1,600 ft	$650
	Professional LAN Controller	(See entry above)	RG-9 thick, RG-58 thin Ethernet	Baseband	—	Yes	Daisy chain, backbone with drops	—	10M	CSMA/CA	600; 1,600 ft	8,000 ft	600, 8,000 ft	$825
[illegible]	[illegible]	[illegible]	Coax, twisted-pair, fiber-optic	[illegible]	Yes	Yes	[illegible]	255	2.5M	Token passing	2,000 ft	22,000 ft	22,000 ft	$395
	[illegible]	[illegible]	Coax, twisted-pair, fiber-optic	[illegible]	Yes	Yes	[illegible]	255	2.5M	Token passing	2,000 ft	22,000 ft	22,000 ft	$395
David Systems, Inc. (408) 720-8000	David Information Manager	IEEE 802.3 compatibles; Vines, Netware, 3Com	Twisted-pair	Baseband	Yes	Yes	Star	3,000	10M	CSMA/CD	2,000 ft	To 2,000 fanouts	2,000 miles	From $695
[illegible]	[illegible]	TCP/IP	Thick, thin Ethernet	Baseband	Yes	Yes	All	512	10M	CSMA/CD	4 km	250 km	4 km	$900
DNA Network, Inc. (315) 296-7420	DNA Network	Proprietary	Twisted-pair	Baseband	Yes	Yes	Multidrop star, daisy chain	64	2.5M	Polling	5,000 ft	NA	5,000 ft	$395
[illegible]	[illegible]	[illegible]	Coax	Baseband	No	Optional	Star	255	2.5M	Token passing	2,000 ft	10,000 ft	2,000 ft	$250
Eagnet Systems, Inc. (416) 273-6410	Eagnet 116	MS-Net	Shielded twisted-pair, coax	Baseband	No	No	Distributed bus	20	1M	CSMA/CA/CD	2,500 ft	Unltd	2,500 ft	$250
[illegible]	[illegible]	[illegible]	Ethernet	Baseband	Yes	Yes	Bus	1,024	10M	CSMA/CD	500 m	2,500 m	2,500 m	From $795
Fibronics International, Inc. (617) 778-0700	System Fiber and FDDI-Based Unit	TCP/IP, ISO	Fiber-optic	Baseband	No	Yes	Star	500	100M	Token-ring	6,600 ft	6,600 ft	6,600 ft	$36,000
[illegible]	[illegible]	[illegible]	Coax	Baseband	—	—	Bus, tree	255	2.5M —	Token passing	—	—	—	Information not provided
Gateway Communications, Inc. (714) 553-1555	G/Token-Ring	Netware, Nethios	Twisted-pair	Baseband	No	Yes	Token-ring	260	4M	Token passing	150 ft	300 ft	150 ft	$650
	G/Ethernet	Netware	Standard, thin Ethernet	Baseband	No	Yes	Backbone, daisy chain	30, 100	10M	CSMA/CD	1,500 ft	4,500 ft	1,500 ft	$395
	G/Net	Netware	RG-58, RG-59, RG-62	Baseband	No	Yes	Daisy chain	255	1.4M	CSMA/CD/CA	4,000 ft	4 miles	4,000 ft	$395
[illegible]	[illegible] Controller	Sun Network File System, Proteonet	Coax, thin wire, fiber-optic	Both	Yes	Yes	Backbone with drops, daisy chain	For Ethernet 1.0, 2.0, 802.3 specs	10M	CSMA/CD	For Ethernet 1.0, 2.0, 802.3 specs	For Ethernet 1.0, 2.0, 802.3 specs	For Ethernet 1.0, 2.0, 802.3 specs	$4,250
	VME Ethernet Controller	(See entry above)	Coax, thin wire, fiber-optic	Either	Yes	Yes	Backbone with drops, daisy chain	For Ethernet 1.0, 2.0, 802.3 specs	10M	CSMA/CD	For Ethernet 1.0, 2.0, 802.3 specs	For Ethernet 1.0, 2.0, 802.3 specs	For Ethernet 1.0, 2.0, 802.3 specs	$7,250
	Proteon 80 P1000 Gould Nelson	—	Shielded twisted-pair, fiber-optic, infrared	—	—	Yes	Star	240	80M	Token passing	3 km (fiber)	—	—	$6,500 (P1400 from Proteon), $5,000 (NSB from Gould)
	A470 SEL 32, A400 General-Purpose Minicomputer, Hypercluster System	Sun Network File System, Proteonet	Coax	Baseband	—	Yes	Backbone with drops	64	80M	CSMA/CA	1,000 ft	—	Unltd	$5,000 (NSB from Gould)
Hewlett-Packard Co. (408) 725-8111	HP Starlan	MS-Net, Nethios	Twisted-pair	Baseband	Yes	Yes	Distributed star with backbone	9,000	1M	CSMA/CD	3,000 ft	52,000 ft	52,000 ft	$300-$8,000

COMPANY	PRODUCT	NETWORK OPERATING SYSTEMS SUPPORTED	CABLE TYPES SUPPORTED	BASEBAND OR BROADBAND	ON-BOARD COPROCESSOR	ON-BOARD MEMORY	WIRING TOPOLOGY	MAXIMUM NODES PER NETWORK	DATA RATE (BIT/SEC.)	ACCESS OR SIGNALING SCHEME	MAXIMUM LENGTH WITHOUT REPEATERS	MAXIMUM LENGTH WITH REPEATERS	MAXIMUM DISTANCE BETWEEN NODES	PRICE PER CARD
Hewlett-Packard Co. (408) 725-8111	HP Starlan 10	(See entry above)	Twisted-pair	Baseband	Yes	Yes	Distributed star with backbone	9,000	10M	CSMA/CD	3,000 ft	52,000 ft	52,000 ft	$500-$3,000
	HP Thinlan	(See entry above)	Thin coax	Baseband	Yes	Yes	Distributed star with backbone	9,000	10M	CSMA/CD	3,000 ft	52,000 ft	52,000 ft	$500-$3,000
	HP Thicklan	(See entry above)	Thick coax	Baseband	Yes	Yes	Distributed star with backbone	9,000	10M	CSMA/CD	3,000 ft	52,000 ft	52,000 ft	$500-$3,000
Honeywell Bull, Inc. (617) 895-6000	LGU 1000	ISO	Thin or thick Ethernet	Baseband	No	Yes	Daisy chain, backbone with drops	30, 100	10M	CSMA/CD, IEEE 802.3	600 or 1,680 ft	2,600; 8,200 ft	2,600; 8,200 ft	$520
	LCN9901, LEM9901	ISO	Thick Ethernet	Baseband	Yes	Yes	Backbone with drops	100	10M	CSMA/CD, IEEE 802.3	1,680 ft	8,200 ft	1,680; 8,200 ft	$1,000-$3,000
IBM (800) IBM-2468	Adapter/A, 8228 Multistation Access Unit	PC-DOS, OS/2 Extended	IBM Types 1-3	Either	No	Yes	Star-wire	260 per token-ring (Types 1, 2); 72 (Type 3)	4M	Token-passing	990; 330 ft	2,500 ft	990; 330 ft	$795 (Adapter/A); $695 (8228)
Intecom, Inc. (800) INTE-800	Lanmark	All	Twisted-pair, coax, Ethernet	Baseband	Yes	Yes	Star	16,384	1M per user	CSMA/CD	Unltd	Unltd	Unltd	Information not provided
Kaypro Corp. (800) 4-KAYPRO	PC Network	Netware	Coax	Broadband	No	No	Token-ring	100	2.5M	—	300 ft	—	300 ft	$399
Kinetron Corp. (408) 436-8550	XL-100-1	K-NOS, Network OS, PC-Net	Double twisted-pair	Baseband	No	No	Daisy chain	125	1.8M, 1.4M, 0.7M	CSMA/CD	2,000 ft	4,000 ft	2,000 ft	$299
	Ethernet	K-NOS, Network OS, Netware	Coax	Baseband	Yes	Yes	Daisy chain	255	10M	CSMA/CD	2,000 ft	10,000 ft	1,000 ft	$399
	Arcnet	K-NOS, Network OS, Netware	Coax	Baseband	Yes	Yes	Daisy chain, distributed star	255	2.5M	Token passing	2,000 ft	4,000 ft	1,000 ft	$299
Lanex Corp. (201) 808-8700	Lanex LAN	TCP/IP, Netbios	Coax	Broadband	No	No	Bus	To 64,000	2M	CSMA/CD	10+ miles	10+ miles	10+ miles	$300-$600 (per connection)
Lanmaster (division of Ventra-Sonics, Inc.) (817) 771-2124	Arcmaster	Netware, Vines, Lifenet	Coax, twisted-pair, fiber-optic	Baseband	Yes	Yes	Star, bus	255	2.5M	Token passing	2,000; 10,000 ft	20,000 ft; unltd	2,000; 10,000 ft	$350
	Arcmaster/2 for IBM PS/2 family	(See entry above)	Coax, twisted-pair, fiber-optic	Baseband	Yes	Yes	Star, bus	255	2.5M	Token passing	2,000; 10,000 ft	20,000 ft; unltd	2,000; 10,000 ft	$795
Lanshare Communications, Inc. (714) 849-7942	D-Link Twisted Pair	IBM PC and compatible operating systems	Twisted-pair	Baseband	Yes	Yes	Bus	255	1M	CSMA/CD	1,000 ft	4,000 ft	4,000 ft	$795
	D-Link Ethernet	Netware, PC LAN	RG-58, thick or thin Ethernet	Baseband	Yes	Yes	Distributed bus	150	10M	CSMA/CD	500; 500 m	1,500; 2,000 m	2,000 m	$899
Magna Computer Corp. (603) 622-3699	Magnet Ethernet	MS-Net, Netware, 3Com	Ethernet coax, Thinnet coax	Baseband	Yes	Yes	Backbone with drops	100	10M	CSMA/CD	1,500; 600 ft	7,500; 500 ft	7,500; 500 ft	Information not provided
	Magnet Starlan	MS-Net, Netware	Twisted-pair	Baseband	Yes	Yes	Star	100	1M	CSMA/CD	500 ft	1,500 ft	1,500 ft	Information not provided
Micom-Interlan, Inc. (617) 263-9929	NI5210 Data Link Controller	PC-Bus	Coax, twisted-pair, unshielded twisted-pair	Baseband	—	Yes	Ethernet backbone, thin Ethernet, Starlan, distributed Starlan, daisy chain	—	10M	CSMA/CD	—	—	—	$395
	NP300 Protocol Processor Board	Multibus, Unix System V.3	Coaxial	Baseband	Yes	Yes	Ethernet backbone	100 without repeater	10M	CSMA/CD	—	—	—	$1,000
	NP200 Protocol-Processor Board	Q-bus Microvax, MicroVMS	Coaxial	Baseband	—	Yes	Ethernet backbone	100 without repeater	10M	CSMA/CD	—	—	—	$2,000
	NP100 Ethernet Protocol Processor Board	VAX/VMS, RSX, Unibus	Coaxial	Baseband	—	Yes	Ethernet backbone	100 without repeater	10M	CSMA/CD	—	—	—	$3,200
	NP900 Protocol Processor Board	Unix V.3, Netware 2.0, MS-DOS 3.0 and higher, Xenix 2.0 and higher, AIX	Coax, unshielded, shielded twisted pair	Baseband	Yes	Yes	Ethernet backbone, thin Ethernet, Starlan, distributed Starlan, daisy chain	—	10M	CSMA/CD	—	—	—	$695
Micro Technology, Inc. (714) 633-7580	MEGNA	Decnet-VAX, Vaxlan, Decnet-RSX, Decnet/E, MicroVMS/ RSX, RSX-11S, LAVC, RSX-11M	Coax and thin Ethernet	Baseband	Yes	Yes	Backbone with drops	1,023	10M	CSMA/CD	1,640 ft	8,202 ft	8,202 ft	$2,250
NMC Inc.-exclusive/ Quinn Corp. (512) 795-1000	Quinn Arcnet LAN products	MS-DOS	Coax, fiber-optic, twisted-pair	Baseband	Yes	Yes	Physical star, logical ring	255	2.5M	Token passing	4,000 ft	20 miles	4,000 ft	$150
Motorola Computer Systems (800) 586-1234 ext. 165	LC2004/MVME 330A	Unix	Coax	Baseband	Yes	Yes	Bus	500	10M	CSMA/CD	1,640 ft	8,200 ft	8,200 ft	$3,045
	LC2001/MVME 330B	Unix	Coax	Baseband	Yes	Yes	Bus	500	10M	CSMA/CD	1,640 ft	8,200 ft	8,200 ft	$1,995
NBI, Inc. (800) 952-6030 ext. 200	NBI Net	Unix, Ethernet, TCP/IP, FTP	Coax	Baseband	Yes	Yes	Bus	255	10M	—	1,000 ft	5,500 ft	5,500 ft	$1,500
	Multinet	MS-Net	Twisted-pair	—	Yes	Yes	Bus	64	1M	—	1,500 ft	4,500 ft	4,500 ft	$995
Network, Inc. (800) 544-6388	VLan+	Advanced Netware	Single twisted-pair, unshielded	Baseband	No	No	Linear bus, star	64	0.8M	CSMA/CD*	1,000 ft	25,000 ft	1,000 ft	$350

COMPANY	PRODUCT	NETWORK OPERATING SYSTEMS SUPPORTED	CABLE TYPES SUPPORTED	BASEBAND OR BROADBAND	ON-BOARD COPROCESSOR	ON-BOARD MEMORY	WIRING TOPOLOGY	MAXIMUM NODES PER NETWORK	DATA RATE (BIT/SEC.)	ACCESS OR SIGNALING SCHEME	MAXIMUM LENGTH WITHOUT REPEATERS	MAXIMUM LENGTH WITH REPEATERS	MAXIMUM DISTANCE BETWEEN NODES	PRICE PER CARD
Network, Inc. (800) 544-8388	VNet	Advanced Netware, except ELS	Single twisted-pair, unshielded	Baseband	No	No	Linear bus, star	128	1.2M	CSMA/CE	1,000 ft	25,000 ft	1,000 ft	$495
The NTI Group (408) 739-2180	Desnet	Netbios, including PC-Net, Vianet, Tapestry	Coax, twisted-pair, fiber-optic	Either	Yes	Yes	Bus, ring	254	2M or 10M	CSMA/CD	5,000 ft (fiber-optic)	15,000 ft	15,000 ft	$350-$600
Novell, Inc. (Hardware Products Division) (408) 720-8700	Novell Ethernet NE1000 (Network Interface Card)	Netware	Coax, thin, thick Ethernet	Baseband	No	Yes	Linear bus, daisy chain, backbone	200	10M	CSMA/CD	984 ft (thin Ethernet), 1,640 ft (thick Ethernet)	2,952 ft	3,280 ft	$395
Orchid Technology, Inc. (415) 683-0300	PCNet	Advanced Netware, proprietary	Coax	Baseband	No	Optional	Distributed bus	255	1M	CSMA/CD	3,000 or 7,000 ft	—	7,000 ft	$495
	PCNet-2	(See entry above)	Coax	Baseband	No	Optional	Distributed bus	255	1M	CSMA/CD	3,000 or 7,000 ft	—	7,000 ft	$495
Pajec Systems, Inc. (617) 863-0613	Supernode	Netware	Twisted-pair, coax (CATV type)	Baseband	No	Yes	Linear bus, star	250 per cluster	16M	Polling token	1,000 ft	10,000 ft	1,000 ft	$395-$495
PC Office, Inc. (619) 268-3235	LAN Adapter	All Netbios including Netware, Tapestry, Network OS	Twisted-pair	Baseband	Yes	Yes	Bus, star, bus from star hub	255	2.5M	CSMA/CD	500 - 1,200 ft	12,000 ft	500 - 1,200 ft	$295
Prime Computer, Inc. (617) 655-8000	LHC300	Primos	IEEE 802.3 AUI	Baseband	Yes	Yes	Bus with drops	1,000	10M	CSMA/CD	1,640 ft	8,202 ft	500 or 2,500 ft	$5,000
Proteon, Inc. (617) 898-2800	P1000/P1200 Unibus/Multibus Interface	TCP/IP	IBM Type 1, Type 6, fiber-optic	Baseband	No	No	Distributed star	255	10M	Token-ring	780 ft	Unltd	—	$2,000-$3,150
	P1100 Q-Bus Interface	TCP/IP	(See entry above)	Baseband	No	No	Distributed star	255	10M	Token-ring	780 ft	Unltd	—	$2,700
	P1500 VME Interface	TCP/IP	(See entry above)	Baseband	No	No	Distributed star	255	10M	Token-ring	780 ft	Unltd	—	$2,700
	Pronet-10 P1300, P1303	Netware, Vines, TCP/IP for MS-DOS	IBM cabling system, fiber-optic, microwave, infrared, broadband	Either	No	Yes	Ring of stars	255	10M	Token passing	1,584 ft	75,000 miles	1,584 ft	$545-$595
	Pronet-4 P1340, P1344	Netware, Vines, IBM PC LAN, TCP/IP for MS-DOS	(See entry above)	Either	No	Yes	Ring of stars	260	4M	Token passing	660 ft	1,235 ft	660 ft	$695
	P1240 Multibus Interface	TCP/IP	IBM Type 1, IBM Type 6, fiber-optic	Baseband	Yes	Yes	Distributed star	260	4M	Token-ring	1,192 ft	Unltd	2,500 ft	$2,800
	P1503 Interface	TCP/IP	—	Baseband	No	No	Distributed star	255	10M	Token-ring	780 ft	Unltd	—	$2,700-$4,250
	P1580, P1380, P1080, P1680, P1180, P1503	TCP/IP, Decnet	Fiber-optic, IBM Type 1	Baseband	No	Yes	Star-shaped ring	240	80M	Token-passing ring	17,080 ft	1,570,000 ft	6,500 ft or 75 ft	$4,900-$8,000
	P1242 Multibus Interface	TCP/IP	IBM Type 1, Type 6, fiber-optic	Baseband	No	No	Distributed star.	260	4M	Token-ring	1,192 ft	Unltd	2,500 ft	$2,000
	P1542 VMEbus Interface	TCP/IP	(See entry above)	Baseband	No	No	Distributed star	260	4M	Token-ring	1,192 ft	Unltd	2,500 ft	$2,500
Pure Data Ltd. (416) 731-6444	PDI500	Netware, Vines, Ethernet	Coax, fiber-optic, twisted-pair	Baseband	No	No	Tree, distributed star	255	2.5M	Token passing	2,000 ft (coax), 3½ km (fiber-optic)	20,000 ft (coax), 35 km (fiber-optic)	20,000 ft (coax), 35 km (fiber-optic)	$395
	PDIUC500	(See entry above)	Coax, fiber-optic, twisted-pair	Baseband	No	No	Tree, distributed star	255	2.5M	Token passing	2,000 ft (coax), 3½ km (fiber-optic)	20,000 ft (coax), 35 km (fiber-optic)	20,000 ft (coax), 35 km (fiber-optic)	$695
Quadram Corp. (404) 564-5637	Quadstar LAN	Netbios, Tapestry	Twisted-pair	Baseband	Yes	Yes	Star	50	1M	IEEE 802.3 CSMA/CD	800 ft	—	800 ft	$375-$795
RAD Data Communications Ltd./ Lannet Data Communications (201) 587-8822	LE-6, LE-9	Ethernet	Two twisted-pair	Baseband	NA	NA	Star	—	16M	CSMA/CD	3,280 ft	3,280 ft	330 ft	$450-$650 (per node)
Server Technology, Inc. (408) 738-8377	Easylan	Netbios-compatible	Twisted-pair	Broadband	No	No	Bus	20	To 56K	—	1,000 ft	—	1,000 ft	$125-$135
Sacor Corp. (704) 327-8800	Fiber-Optic Ethernet Active Star System	Any supporting Ethernet IEEE 802.3	Fiber-optic	Baseband	NA	NA	Star	1,024	10M	CSMA/CD	13,200 ft	13,200 ft	13,200 ft	$1,100 (per node)
	Fiber-Optic Token-Ring Media System	Token-ring, IEEE 802.5	Fiber-optic	Baseband	NA	NA	Star	Unltd	4M or 16M	Token passing	—	NA	NA	$1,295 (per node)
SIIG, Inc. (Sunrock Information Systems, Inc.) (415) 657-0587	Archon 100	MS-DOS, Advanced Netware 286, Vianet, Lanware	Coax	Baseband	No	Yes	Token-bus	255	2.5M	Token passing	2,000 ft	4 miles	4,000 ft	$299
Shoreline Systems, Inc. (714) 559-8000	Starplanet 3.0	Proprietary, Tapestry	Twisted-pair	Baseband	No	No	Distributed bus, peer-to-peer	128	2M	CSMA/CA	2,000 ft	—	2,000 ft	$399.95
Softnet Communication, Inc. (800) 533-1157	KAL 1000, Vianet LAN	Vianet	Coax	Baseband	No	No	Bus	255	2M	CSMA/CA/ CD	1,200 ft	10,000+ ft	10,000+ ft	$295
Standard Microsystems Corp. (516) 273-3100	Arcnet	Vines, Netware, Tapestry, Waterloo	Coax, twisted-pair	Baseband	No	Yes	Distributed star, bus	255	2.5M	Token-ring	2,000 ft	4 miles	2,000 ft	$395
Tandy Corp. (817) 390-3700	Tandylink	Proprietary. Total Operating System	Twisted-pair	Baseband	No	No	Daisy chain	32	0.77M	CSMA/CA	500 or 1,000 ft	NA	1,000 ft	$119.95
Tangent Technologies (404) 963-6300	PC Macbridge AT&T	Appletalk	Twisted-pair	Baseband	Yes	Yes	Bus	1,000+	230.4K	CSMA/CA	1,000 m	—	1,000 m	$299
	PC Macbridge AT&/MCA	Appletalk	Twisted-pair	Baseband	Yes	Yes	Bus	1,000+	230.4K	CSMA/CA	1,000 m	—	1,000 m	$399

COMPANY	PRODUCT	NETWORK OPERATING SYSTEMS SUPPORTED	CABLE TYPES SUPPORTED	BASEBAND OR BROADBAND	ON-BOARD COPROCESSOR	ON-BOARD MEMORY	WIRING TOPOLOGY	MAXIMUM NODES PER NETWORK	DATA RATE (BIT/SEC.)	ACCESS OR SIGNALING SCHEME	MAXIMUM LENGTH WITHOUT REPEATERS	MAXIMUM LENGTH WITH REPEATERS	MAXIMUM DISTANCE BETWEEN NODES	PRICE PER CARD
Telegenesis Corp. (518) 797-3260	3301 PC LAN Card	IBM, Netware, Turm	Twisted-pair	Baseband	Yes	Yes	Star, daisy chain	240	1M	Token passing	1,000 ft	6,000 ft	6,000 ft	$695
10 Net Communications (513) 433-2238	10 Net LAN	DOS environment, proprietary	Twisted-pair, fiber-optic	Baseband	No	No	Star, bus	30,000	1M	CSMA/CD	2,000 ft	10,000 ft	10,000 ft	$695
Texas Instruments, Inc. (800) 527-3500	Ethernet	Unix, DNOS, DOS	Ethernet, coax	Baseband	No	Yes	Bus	—	10M	CSMA/CD	—	—	—	$750-$3,150
Thomas-Conrad Corp. (512) 836-1935	Arc-Card	Arcnet, Netware, Vines, Tapestry, Waterloo Port	Coax	Baseband	No	Yes	Star	255	2.5M	Token passing	2,000 ft	20,000 ft	2,000 ft	$379
Tiara Computer Systems, Inc. (800) NET-IARA	Lancard/A-H	Netware, Vines	Coax	Baseband	No	Yes	Starburst	255	2.5M	Token passing	2,000 ft	20,000 ft	20,000 ft	$695
	Lanard/AHHZ	(See entry above)	Coax	Baseband	No	Yes	Starburst	255	2.5M	Token passing	400 or 1,000 ft	20,000 ft	20,000 ft	$425
	Lanard/AFO	Advanced Netware, proprietary, Arcnet-based environments	Fiber-optic	Baseband	No	Yes	Starburst	255	2.5M	Token passing	4,000 ft	40,000 ft	4,000 ft	$650
	Lanard/E	Any supporting Ethernet IEEE 802.3	Coax	Baseband	No	Yes	Ring	100	10M	CSMA/CD	1,640 ft	8,202 ft	500 m	$395
	Lanard/A	Arcnet-based environments, proprietary	Coax	Baseband	—	Yes	Starburst	255	2.5M	Token passing	2,000 ft	20,000 ft	20,000 ft	$300
TOPS (a Sun Microsystems, Inc. Company) (800) 222-TOPS	Flashcard	TOPS	Appletalk cable, twisted-pair	Baseband	No	No	Bus, star	32 or 254	0.23M or 0.77M	CSMA/CD	1,000 ft	3,000 ft	3,000 ft	$239
Ungermann-Bass, Inc. (408) 496-1611	NICPS/2	Net/One, Netware, PC LAN	Coax, Thinnet, CATV	Both	Yes	Yes	Star, tree, backbone with drops	Unltd	5M or 10M	CSMA/CD	200 m	Unltd	Unltd	From $495
	PC NIU	(See entry above)	Coax, Thinnet, CATV	Both	Yes	Yes	(See entry above)	Unltd	5M or 10M	CSMA/CD	200 m	Unltd	Unltd	$695-$1,395
	3270 NIUPC	(See entry above)	Coax, Thinnet, CATV	Both	Yes	Yes	(See entry above)	Unltd	5M or 10M	CSMA/CD	200 m	Unltd	Unltd	$695-$1,645
	NIUPC	Net/One, PC LAN, Netware, Tapestry	Coax, Thinnet, CATV	Both	Yes	Yes	Star, distributed star, tree, backbone with drops	—	5M or 10M	CSMA/CD	200 m	Unltd	Unltd	$695-$1,645
	PC Network Interface Card	Net/One, Netware, PC LAN	Coax, Thinnet, CATV	Both	Yes	Yes	(See entry above)	Unltd	5M or 10M	CSMA/CD	200 m	Unltd	Unltd	$695-$1,995
	PC NIU Token-Ring	Net/One, Netware, PC LAN	Shielded, unshielded twisted-pair	Token-ring	Yes	Yes	Star, distributed star	Unltd	4M	Token passing	200 m	Unltd	Unltd	$695
	NIU-3MP32	Net/One	Coax, CATV	Both	Yes	Yes	Star, distributed star, tree, backbone with drops	Unltd	5M or 10M	CSMA/CD	200 m	Unltd	Unltd	Information not provided
Unisys Corp. (215) 542-2240	Usernet Spanred	Netware	Twisted-pair	Broadband	No	No	Backbone with drops, distributed star	56; 270 ft	1M, 4M	CSMA/CD	4,000 ft	4,000 ft	2,000 ft	$190,$795
Wang Laboratories, Inc. (617) 459-5000	VS 802.3 LAN Connection	Wang Systems Networking, TCP/IP	Coax	Baseband	Yes	Yes	Bus	1,024	10M	CSMA/CD	1,640 ft	8,200 ft	8,200 ft	$1,650-$2,500
	802.3 Wangnet Service	(See entry above)	Coax	Broadband	Yes	Yes	Branching tree	1,000	10M	CSMA/CD	14,350 ft	14,350 ft	14,350 ft	$2,500-$3,500
Waterloo Microsystems (404) 441-1252	Network Interface Card/A	Waterloo Port, PC LAN Program	Coax, twisted-pair, fiber-optic	Baseband	No	No	Distributed star	255	2.5M	Arcnet	2,000 ft	22,000 ft	2,000 ft	$745
	Network Interface Card	(See entry above)	Coax, twisted-pair, fiber-optic	Baseband	No	No	Distributed star	255	2.5M	Arcnet	2,000 ft	22,000 ft	2,000 ft	$345
Wells American Corp. (800) 755-7580	A Star	Proprietary	Coax	Baseband	No	No	Linear bus	255	1.25M	Polling	1 km	1 km	1 km	$695
Wespac Business Systems Corp. (800) 247-8887	Sytnet	Proprietary	Coax	Broadband	Yes	Yes	Ring	255	10M+	CSMA/CA	10,000 ft	—	1,000 ft	Information not provided
Western Digital Corp. (714) 863-0102	WDLAN-SPE Starnet Plus	Netware, Vinnet, NetBios-compatible, TCP/IP	Twisted-pair	NA	No	Yes	Star, bus	16,000	1M	CSMA/CD	800 ft	1+ miles	800 ft	$395
	WDLAN-SHP-Starlink Plus	(See entry above)	Twisted-pair	NA	No	Yes	Star, bus	16,000	1M	CSMA/CD	800 ft	1+ miles	800 ft	$274
	WD8003E Ethernet Plus	Xenet, Netware, Vinines, PC-LAN, MS-Net, Tapestry, TCP/IP	Thick, thin Ethernet	Baseband	No	Yes	Ethernet backbone with drops	8,000	10M	CSMA/CD	3,500 ft	8,200 ft	3,500 or 8,200 ft	$390
Xerox Corp. (800) TEAM-XRX	XNS on Ethernet	XNS	RG-58, thick Ethernet	Baseband	NA	NA	Backbone with drops	1,024	10M	CSMA/CD	630; 1,640 ft	1,830; 4,921 ft	2,150; 5,251 ft	Information not provided
	XNS on Synoptics Lattisnet	XNS	Fiber-optic Type A, Type B	Baseband	NA	NA	Star	1,024	10M	CSMA/CD	6,000 ft	12,700 ft	13,123 ft	Information not provided
Xyplex, Inc. (617) 371-1400	The Xnet Interface Unit	Ethernet, IEEE 802.3, TCP/IP	Coax, thin, twisted-pair Ethernet; RG-59 coax	Baseband	Yes	Yes	Bus	1,024	1M or 10M	CSMA/CD	1,800 ft	3½ miles	3½ m	$695-$895
Zaki Corp. (617) 489-0281	PC Sharaplan	Proprietary	Transistor-transistor logic	Transistor-transistor logic	No	Yes	Bus, star	9	Transistor-transistor logic	Transistor-transistor logic	250 ft	250 ft	460 ft	$825
Zenith Electronics Corp. (312) 699-2150	Z-LAN100	Netbios, Netware	Coax	Broadband	Yes	Yes	Branch, tree (virtual bus)	5000+	4.5M	CSMA/CD	6,000 ft	18,000 ft	18,000 ft	$995

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HARD TALK

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It's never been easy to be self-sufficient. Just ask any 22-year-old who works at an entry-level job while trying to pay for an apartment, a car and a college education.

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The majority of computer vendors build their products by assembling or modifying components made by other companies; that modification can range from adding significant value to adding a label.

From the price and quality points of view, there is nothing wrong with going to an OEM. Outside sourcing allows the computer maker to concentrate on building CPUs and lets the peripherals makers focus on their own technologies. Few companies emulate IBM by designing most of their own products.

Controlling own fate

But one company that is trying to do that is DEC, which has been bringing its disk drive production in-house throughout the 1980s. It is a move that helps DEC control its own fate and its own profit, which could benefit users through lower prices and better quality control.

Like the college grad trying to pay the rent, DEC has not found the going smooth.

DEC's biggest disk-related headaches to date have stemmed

Continued on page 59

Convex, Alliant prep processors

BY STANLEY GIBSON
CW STAFF

Minisupercomputer rivals Alliant Computer Systems Corp. and Convex Computer Corp. plan to deliver their next-generation processors in late March, the companies said recently.

Convex said it will announce in February or March the C-2, which will triple the power of the vendor's C-1 machine and cost from $500,000 to $750,000.

"We've been expecting that product — in that time frame, in that price range," said Craig Mundie, Littleton, Mass.-based Alliant's vice-president of marketing. He said that in a few weeks, his firm will announce a comparable product. "We think we'll be competitive," Mundie said. Alliant has tentatively scheduled a press conference for Feb. 1, but spokesmen declined further comment.

Tom Lincus, an analyst with L. F. Rothschild & Co. in Boston, predicted Alliant will announce a high-end model comparable to the C-2 in price/performance.

Sanjiv Hingorani, vice-president of Salomon Brothers, Inc. in New York, speculated that the announcement will include compact versions of Alliant's four- and eight-CPU systems that offer more power at less cost than current models. Their power, Hingorani said, may be rated at double that of current Alliant machines, although he cautioned that performance for the Alliant and Convex processors in real applications might be lower than both companies' theoretical performance projections. Alliant's Mundie said version two of his firm's vectorizing, parallelizing C compiler, announced in October, will be out early this year.

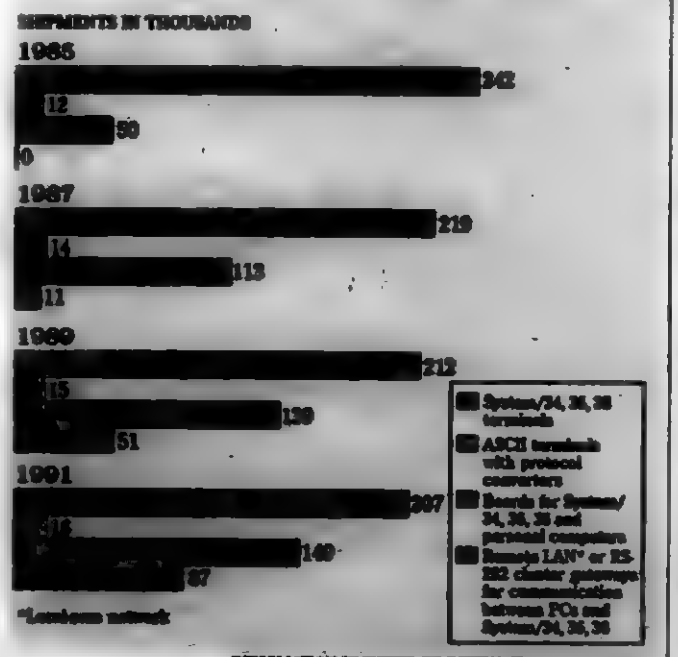
Convex, based in Richardson,

Continued on page 58

Data View

Trends in communications device preferences in IBM System/34, 36, 38 terminal environment

Terminals decline and terminal emulation products gain in actual and projected unit shipments, 1985 to 1991



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

Gesme aims to tie IBM, users

Guide president seeks working relationship

BY STANLEY GIBSON
CW STAFF

Since his first Guide International Corp. meeting in 1970, Gary Gesme has attended 64 of 65 gatherings. Guide recently elected him president, seeing fit to overlook his less-than-perfect attendance record.

Gesme says a decade and a half of close association with the group of large IBM equipment users has given him a clear idea of what Guide can do best.

"We want to continue to work on the goal of Guide-IBM partnership," he says. The benefit of a working relationship with the industry giant is the influence that members can have over IBM's planning — causing IBM to turn out the products that are most useful to Guide members, he says.

Continued on page 58

Apollo hits 20 MIPS, firm says

Apollo Computer, Inc. will soon leapfrog rival Sun Microsystems, Inc. with a high-end system rated at 20 million instructions per second (MIPS), according to an independent research firm.

The firm, D. H. Brown Associates, Inc., recently published a report that outlines the specifications of the expected new high-end workstation from Apollo. The report said the system is based on a vastly different architecture than that of previous Apollo systems.

Apollo confirmed that it will release a so-called "desktop supercomputer" based on a proprietary reduced instruction set computing (RISC)-based CPU. "One of our next steps is to move into that high end to compete with Stellar and Ardent," a spokesman said.

Stellar Computer, Inc. and Ardent Computer Corp. are planning to introduce high-performance workstations in March. Stellar is headed by William Poduska, who launched Apollo [CW, Jan. 11].

The Apollo system will offer nearly five times the floating-point performance of Sun's Sun-4, according to D. H. Brown.

Continued on page 59

Inside

- Compugraphic, Autographix announce line of workstations for presentation graphics design and production. Page 60.
- Visual Technology offers DEC-compatible color terminal. Page 60.

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NETWORKING

Gesme

FROM PAGE 55

In addition, Gesme says he wants to structure Guide conferences to offer the greatest benefits to attendees — to give them an understanding of new technologies and the management skills to put them into practice.

Gesme, manager of systems programming at Deere & Co., Inc. in Moline, Ill., says Guide has helped him explore the leading edge in data processing, largely through presentations by and informal encounters with other members.

He says he is pleased that IBM has been sending progressively more important executives to address the group.

Seeks openness

At each meeting, Guide makes recommendations to IBM that the group calls requirements. One of the most consistently important requirements has been greater openness by IBM in explaining its plans. Gesme has seen progress to the point where IBM can walk the fine line separating preannouncements and statements of direction.

Although it is difficult to determine whether the prodding of Guide is the cause, two recurrent requirements are now being addressed by IBM. In recent years, members cried out for "solutions, not necessarily products," according to Gesme. In July 1987, IBM announced the Applications Systems Division, the goal of which is to provide a wide selection of applications in a timely manner.

Connectivity between IBM architectures has also been at the top of the user wish list. Last spring, IBM announced its intent to create portability of software across IBM hardware families through its Systems Application Architecture product.

Among the technologies generating wide interest is IBM's DB2. "The move to DB2 is like the move from assembler to Cobol much earlier. It costs more, but it's easier to write. It is also easier to support and maintain," Gesme says.

However, the move to DB2 requires adaptations. Greater memory is required to lower response times, which are often still too slow in DB2. "The end user puts in a query and doesn't know when it will come back. We want to see a three-second response time. Thirty seconds is unacceptable," Gesme says. "With IMS, the transaction time is predictable. DB2 may have a very different response time. We have to work with the users so they understand this."

Most Guide members are users of the 3090 series and interest in enhancements to that line is usually high. According to Gesme, members are content with IBM's handling of its flagship computers, which includes a commitment to 15% improvements in price/performance.

Although equipment maintenance has been in the headlines in the past year, spurred by IBM's Corporate Service Amendment discount program, Gesme says interest on the part of Guide members in maintenance has been lukewarm.

"The maintenance topic has become uninteresting over the last five years. This is because equipment has become much more reliable. Now, nobody shows up for the maintenance meeting," he says.

Processors

FROM PAGE 55

Texas, has indicated for some time that a new machine was coming but had previously not released details. Recently, the *Dallas-Fort Worth Business Journal* reported performance, price and delivery specifics.

A Convex spokesman confirmed most of the facts that appeared in the journal article but said the machine will offer three times the power of current machines rather than twice the power, as reported.

Depending on the Fortran version used, Convex's C-1 XP is capable of 8.7 million to 15 million floating-point operations per second (MFLOPS), according to International Data Corp. (IDC) in Framingham, Mass. Alliant's FX/8 can perform 8.5 to 27 MFLOPS, depending on Fortran version and compiler, IDC said.

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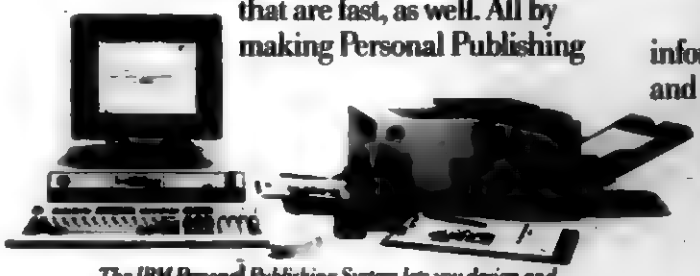

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In every desktop publishing system, information is passed between the CPU and the printer. And for most systems, that's where the publishing process slows down.

But Gesme says he will not lose sight of Guide's responsibility to make members better at their jobs, particularly by developing skills used in senior management. If Guide can make attendees more effective employees when they return to work, it will convince employers of the value of the organization and go far to ensure Guide's future, Gesme maintains.

Apollo

FROM PAGE 55

The Sun-4, introduced in mid-1987, is Sun's RISC-based system and reportedly has a 10-MIPS rating. It was also rated at 1.1 million floating-point operations per second (MFLOPS) in a performance test.

A base configuration of the Apollo workstation will have 8M bytes of memory, 154M bytes of storage, a 19-in. monitor with 1,280- by 1,024-pixel resolution and a 16-bit Z buffer, according to D. H. Brown, which claimed an entry-level system will be priced at less than $40,000.

An Apollo customer who was briefed on the system and requested anonymity called D. H. Brown's specifications realistic.

Apollo would not confirm any of D. H. Brown's specifications, but a spokesman said the workstation will have a new microprocessor as well as a new I/O structure, bus and controllers.

The workstation, expected by industry observers since the Sun-4 announcement, is a major departure for Apollo, which has long depended on Motorola, Inc. 68000 microprocessors.

Connolly

FROM PAGE 55

from various reliability complaints a couple of years ago relating to its RA81 high-end 14-in. drive.

More recently, another disk drive problem appeared when DEC's Microvax 3500 was delayed by the apparent failure of the RA70 disk drive to meet specifications. DEC stated that "quality qualification of the RA70 took longer than expected" but that there were no current problems with the DEC-built drive.

Oops

In the wake of what might be considered an "oops" with the RA70, DEC will have to be extra careful to make sure the drive works as promised at user sites. The company also will have to ensure that if problems do arise, they are handled in an honest and efficient manner — not stonewalled.

Plenty of eyes are now on DEC's storage strategy. The RA81 drew attention, and some users in the transaction-oriented commercial sectors, which DEC is targeting, have questioned whether the company will be able to provide the disk throughput and capacity that they need.

In the coming months — when the RA70 ships, and DEC is rumored to be preparing for a high-end disk drive announcement — users may receive answers to some of the questions about DEC's grow-it-at-home approach.

Connolly is Computerworld's senior editor, systems & peripherals.

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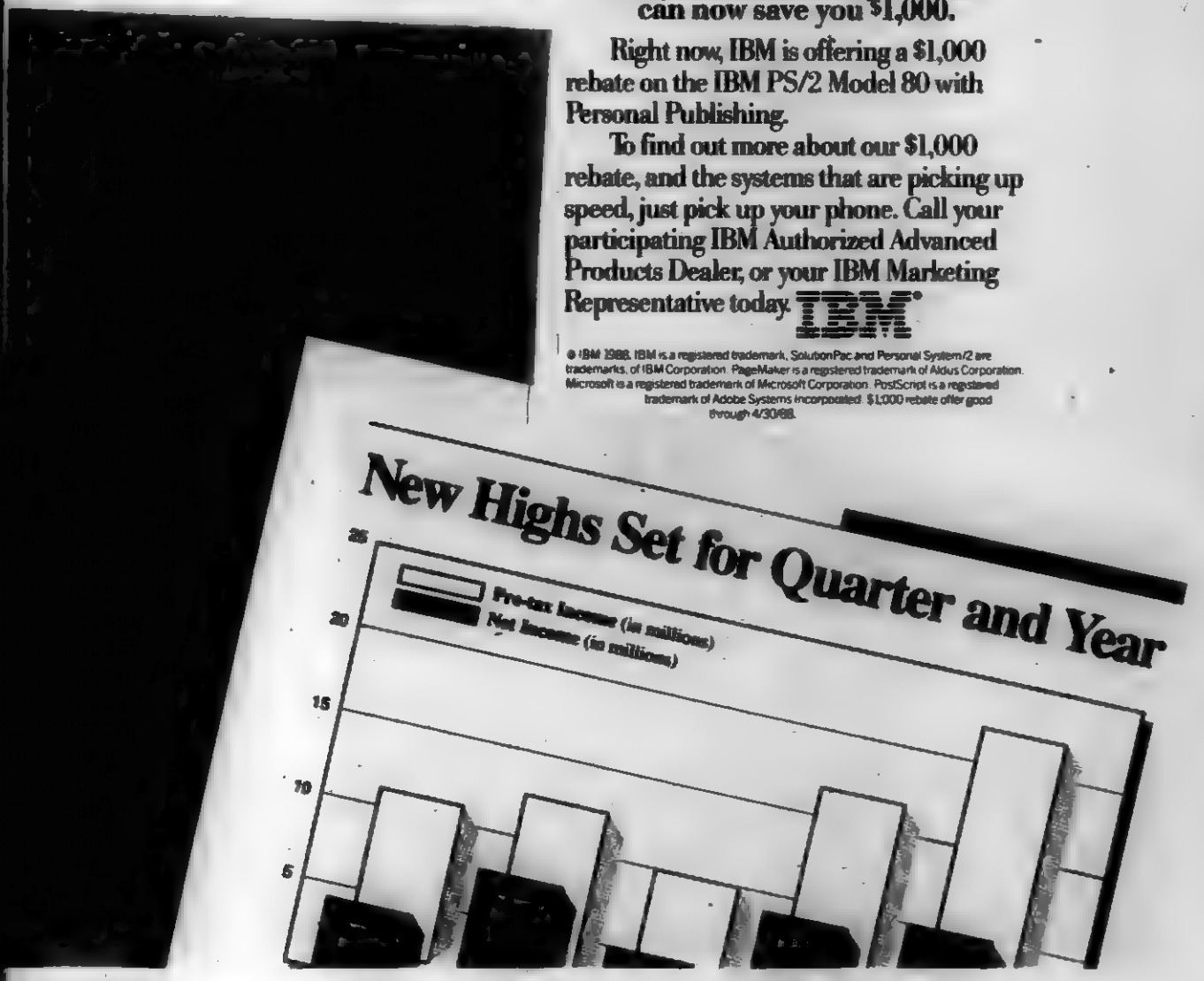

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NEW PRODUCTS

Processors

Nixdorf Computer Corp. has announced the **Targon System 35/50** in both single- and dual-processor versions.

The Unix-based system incorporates reduced instruction set computing. With a single processor, the Targon System 35/50 runs at 6.5 million instructions per second (MIPS); with dual processors, it runs at 11.7 MIPS. A floating-point accelerator is standard. Random-access memory ranges from 4M to 64M bytes.

Nixdorf also announced a line of software tools for the Targon series, including a relational data base, T/Reflex; an expert system environment called Twaice; and an applications generation tool called Targon E.

A basic Targon System 35/50 costs from $125,000.

Nixdorf, 80 Main St., North Reading, Mass. 01864. 617-664-5781.

Graphics systems

A line of three workstations for presentation graphics design and production has been announced by **Compugraphic Corp.** and **Autographix, Inc.**

Called the **Designer Series** by Autographix and offered as part of Compugraphic's **Presentation Series**, the workstations range from the entry-level AGX System 1, priced at $29,850, to the Intel Corp. 80386-based AGX System 3, priced at $47,850. The mid-range AGX System 2, priced at $38,850, offers the same graphics system controller as the System 3.

All three systems include Autographix Release 6.0 software featuring more than 100 Compugraphic fonts, a minimum of 256 colors per image and such charting and graphics features as scatter diagrams, automatic builds for word slides and global editing.

Autographix, P.O. Box 9031, Waltham, Mass. 02154. 617-890-8558.

Data storage

A series of 5¼-in. full-height Winchester disk drives has been announced by **Micropolis Corp.**

The **1560/1580** series is said to offer storage capacities to 765M bytes. Data is transferred at a 15-MHz data rate, and users can choose either the enhanced small disk interface (ESDI) or synchronous small computer systems interface (SCSI). Average seek time is 16 msec.

Micropolis also announced a half-height 5¼-in. Winchester disk drive with capacities from 85M to 182M bytes. The 1650/1670 series offers a 16-msec access time. Both ESDI and SCSI versions are available.

The 1560/1580 series costs $2,295 for ESDI and $2,395 for SCSI in 2,000-lot quantities. The 1650/1670 series costs $1,095 for ESDI and $1,165 for SCSI in 1,000-lot quantities.

Micropolis, 21123 Nordhoff St., Chatsworth, Calif. 91311. 818-709-3305.

Terminals

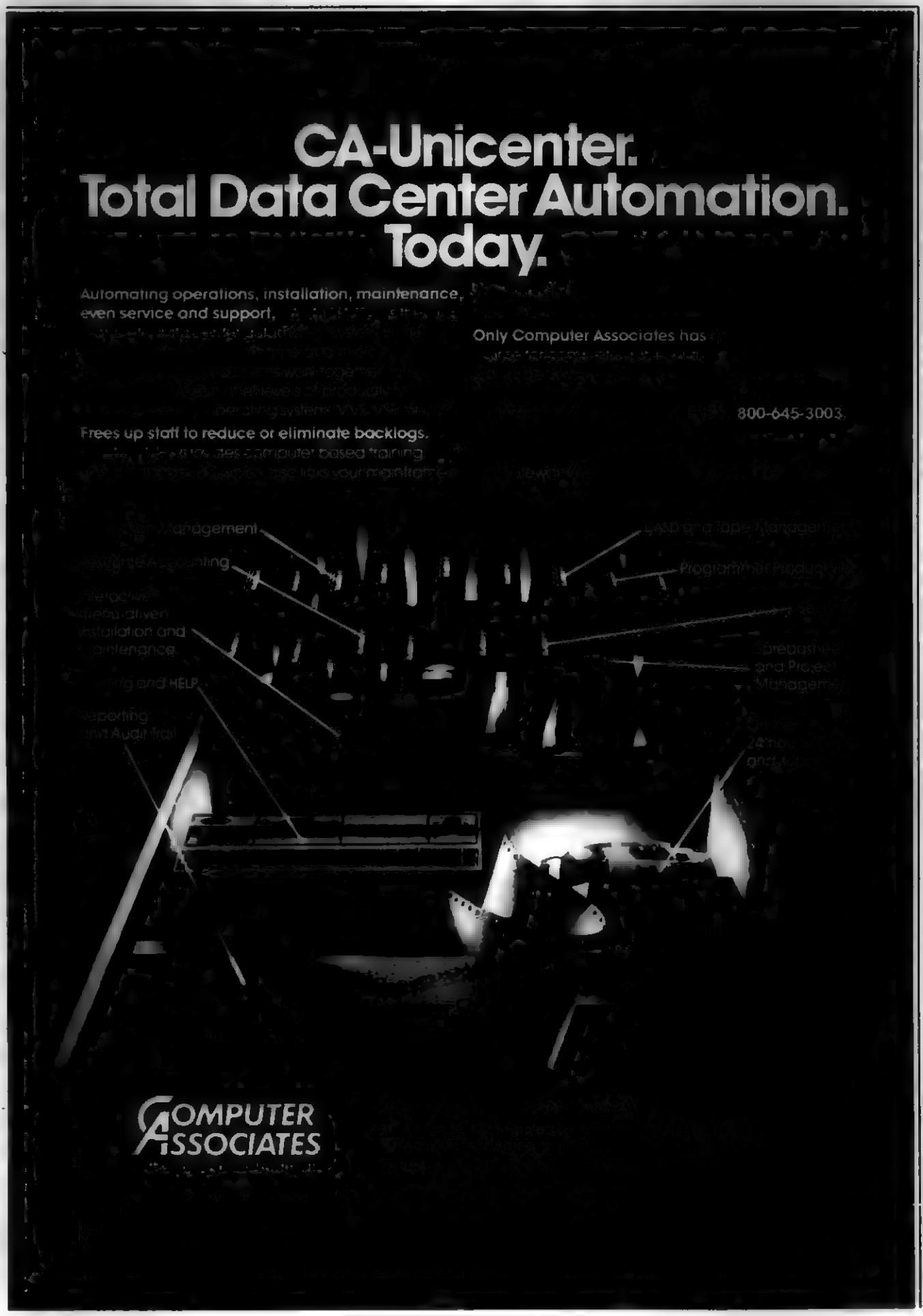
Visual Technology, Inc. has expanded the capabilities of its **Visual 241** color terminal to include full Digital Equipment Corp. VT241 and VT340 compatibility.

The Visual 241 also offers a choice of 16 simultaneous colors from a palette of 64. Other features include integrated bit-mapped color graphics and alphanumeric text, support for the Tektronix, Inc. 4010 and 4014 graphics protocol and DEC Regis emulation.

Visual Technology also expanded its **Visual 600** line with a DEC VT220-compatible video display terminal. The Visual 630's processing capabilities include the execution of down-line-loaded applications at the display terminal level and the ability to locally configure a random-access memory disk for local applications processing.

The Visual 241 costs $1,895. The 600 line costs from $695.

Visual Technology, 1703 Middlesex St., Lowell, Mass. 01851. 617-459-4903.



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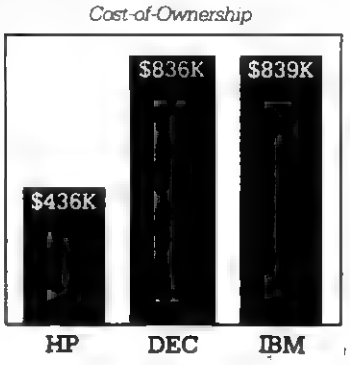

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OMF enables users to combine and manip-

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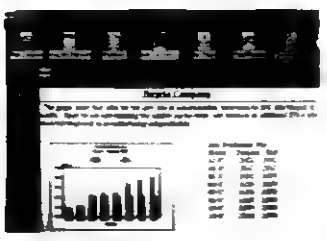

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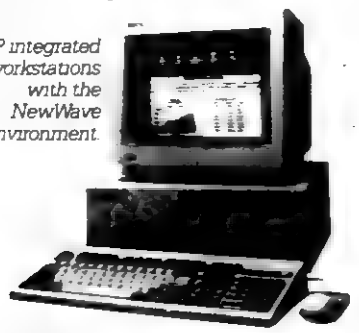

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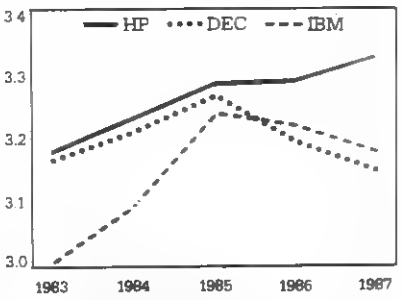

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Why the Mac will win

Could Apple beat IBM in corporate microcomputing or does 'winning' just mean staying in the ring?

PRO

BY CONRAD BLICKENSTORFER

When the cute little Macintosh first knocked on the door more than three years ago, no one took it seriously. Then it reappeared as the Apple Computer, Inc. Macintosh Plus, bringing Adobe Systems, Inc.'s Postscript and the wonderful world of desktop publishing with it. And corporate America began to notice.

Now, in its third incarnation, the Macintosh may actually blow the IBM Personal Computer's house down and, within the next few years, become the U.S.'s business standard of choice.

Look at all the enthusiasm surrounding Macintosh products and compare it with the frustrated waiting in the DOS world. Look at the Mac technology that performs extraordinary tasks — without the fanfare and drama we've learned to tolerate from IBM and its "me-too" vendors.

How did it happen? Can the Macintosh really seize the whole micro pie and replace PCs and PC clones? Its chances are good.

The PC world is in a state of disarray. The introduction of IBM's Personal System/2 has created a lot of confusion. The machines are clearly superior to their predecessors, offering significant innovations such as IBM's impressive Micro Channel architecture and surface-mount technology. Predictably, demand has risen in recent months, and it appears there are now long waiting lists for some models in IBM's lineup.

Nevertheless, with its approach of equipping the machines with the whole range of Intel Corp. chips and other assorted features, IBM has overwhelmed rather than reassured potential buyers.

Those who had hoped for a new generation of PCs based on the 80386 chip were disappointed. The bread-and-butter machines in the PS/2 lineup — Models 50 and 60 — use the older 80286 chip.

And after three years of unfulfilled promises and speedy but unexciting service in the IBM Personal Computer AT, that chip has left some end users disappointed and cynical.

The AT never did live up to its promise and was discontinued by IBM without ever getting a

Continued on next page

Blickenstorfer is director of data processing and analysis for the Dormitory Authority of the State of New York in Delmar, N.Y.

CON

BY JOHN XENAKIS

Can anyone really believe that Apple Computer, Inc. is somehow going to put IBM out of business in the microcomputer department? I just don't think it's going to happen.

But OK, let's suppose it does. So then, is Apple also going to put Compaq Computer Corp. out of business? What about AT&T Information Systems? How about ITT? And Hewlett-Packard Co.? What about Tandy Corp. and the hundreds of other clone makers?

Get real — there are elemental forces of nature going on here. This isn't Apple vs. IBM. This is Apple vs. the rest of the world. Apple isn't going to win that battle no matter how good the Macintosh user interface is. The reason the Mac is not going to become the industry-standard business computer is because Apple doesn't believe it can.

The best way to explain is through an anecdote. In 1985, I received a review copy of Version 1.0 of Digital Research, Inc.'s Graphics Environment Manager (GEM). At that time, GEM was a new graphical interface intended for Microsoft Corp. MS-DOS machines that replaced line-oriented commands with a more intuitive user interface.

When I brought GEM up on my IBM Personal Computer, I couldn't believe my eyes: All of a sudden, my PC looked exactly like a Macintosh. It had the same icons and pull-down menus.

About a month later, I was shocked to hear that Digital Research was coming out with an updated version of GEM that would make it look a little different. The reason for the change? Apple had sued Digital Research for copyright infringement.

I was shocked. I thought this was one of the dumbest things Apple could have done. Let's look at the alternative. Suppose instead of suing Digital Research, Apple had issued a press release saying, "We're delighted that Digital Research has adopted the Apple user interface, and we call on IBM, Microsoft and other industry leaders to form a standards committee so that all users of all microcomputers will

Continued on page 64

Xenakis is an independent consultant in Framingham, Mass., and software editor of *Computer Update* magazine, published by the Boston Computer Society. He is also a commentator on the weekly "World of Computers" radio show on WDLW, a Boston-based station.

WARREN GEBERT

- **PC world in disarray**
- **High-priced PS/2 models**
- **Ongoing battle over user interfaces**

Pro

FROM PREVIOUS PAGE

mainstream operating system to exploit the much-touted potential of its protected mode. Most IBM buyers will end up with 80286-equipped models of the PS/2 series, forced to live with all the limitations of that chip.

With the pricing of the PS/2 Model 80, IBM is clearly indicating that, in its opinion, the 80386 machines represent top-of-the-line professional workstations rather than replacements for the ubiquitous IBM PC. This is a major disappointment. It is very unlikely that the 80286 will ever be able to fulfill the promise and expectation of what a truly useful business workstation should be.

ARE WE REALLY expecting hordes of customers to suddenly pack their PCs with megabytes of memory, buy a high-resolution screen and an entirely new set of programs just so they can use a mouse and have Lotus in the background while they work on their word processors?

To complicate matters further, the PS/2 Model 30 is equipped with an old-fashioned 8086 chip. Buyers did not flock to this model the way IBM had hoped, but enough of those machines will find their way onto enough secretaries' desks to keep the cash registers of software firms ringing for a long time.

To make things even more complicated, manufacturers that have been making a living by producing IBM-compatible computers will not be able to clone IBM's new circuitry for a while. They are now trying to turn their handicap into a virtue by proclaiming the older standard as the real one. Some, most notably Compaq Computer Corp., have been successful. But this internal war in the PC world certainly has made PC buying decisions more awkward.

Hot-rodders

In the short term, the most serious problem in the PC world is plain to see: The operating systems for the 80286 and 80386 chips are too new to be of much use. The machines, though chock-full of MIPS, or million instructions per second, are reduced to being hot-rod PCs.

While it's fun to make Lotus Development Corp.'s 1-2-3 run ever faster, it's not always worth the higher cost of those machines. Also, many customers resent it when every release of the same old software packages grows fatter and more sluggish than the previous one. Users require a more powerful machine just to maintain former levels of performance.

All in all, the current situation is like having a V-8 engine strapped into a motorcycle: plenty of power but rather useless and crash-prone.

Of course, there is Microsoft Windows and the much ballyhooed OS/2 operating system. I have tried Windows, and just as I immediately loved the Macintosh environment with its crisp graphics and effortless, snappy response, I immediately disliked Windows. I felt constrained by its sluggish handling and rigid user interface.

Perhaps I still harbor a grudge from the IBM Topview fiasco, or maybe I'm jaded after years of waiting for Windows, which was going to be available "real soon" every time I inquired. But it just doesn't seem as though the PC can handle a graphics environment very well.

OS/2 may or may not have a lot of potential. But I can't see how everyone will suddenly switch to an expensive new operating environment. The migration from IBM's PC-DOS Version 1.1 to 2.0 was painful enough for many users, but it is nothing like the switch from Version 3 to OS/2 promises to be. Are we really expecting hordes of customers to suddenly pack their PCs with megabytes of memory, buy a high-resolution screen and an entirely new set of programs just so they can use a mouse and have Lotus in the background while they work on their word processors? It's been argued that the switch will be easy once 4M- or 8M-byte configurations are standard. But I'm not sure this will happen overnight.

Software savior

One thing that may rescue the sinking PC ship and convert buyers in droves is the appearance of a truly new and sensational program — something like Lotus's Visicalc or 1-2-3. The PC needs a program that will appear out of nowhere and take the world by storm.

But the 80286 has been around for some time, and that kind of miracle hasn't happened yet. Perhaps it's true that the 286 and 386 chips are too complicated. The good old days when one crackerjack programmer could single-handedly produce a hit program may be gone forever.

Another PC roadblock — the problem with the frustrating 640K-byte barrier inherent to all 8088 machines — seems incredibly hard to overcome. There are, of course, several standards that allow these machines to get past 640K bytes, sort of, with bank-switching techniques. But they are little more than Band-Aids.

These quick fixes remind me of the days when you overheated monster Apple IIs equipped with lots of extra random-access memory, which required preboot

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disks to allow oversized Visicalc spreadsheets. Current bank-switching is essentially the same thing, and it won't last.

Proper access to the protected mode of the 286 and 386 chips requires a new operating system, complete with application software — which brings us back to OS/2 and all its drawbacks.

Out of the race

As if these problems aren't bad enough, the DOS world has another millstone around its neck: The U.S. is already populated with millions of older 8088 and 8086 machines that will never be able to participate in this brave new world of OS/2.

These machines will not just be thrown away because there's a large number of perfectly adequate business software programs that will not lose their basic usefulness for years.

Witness the fact that 1-2-3 has been around in virtually unchanged form for more than five years. The program already offers far more features than 95% of its users will ever need, and it appears highly unlikely that anything will replace it soon.

Since businesses will not just write off millions of machines, the world of IBM PCs will effectively split into old and new. Planned obsolescence and innovation may eventually convert more and more users to the new standard. But IBM's decision to reserve the 80386 for its top-of-the-line machine probably typecast the chip for some time to come as an engine for superusers elite.

Compare this with the Macintosh.

The Mac is not hampered by millions of older machines and programs. It rose almost effortlessly from a diminutive 128K bytes of RAM to 4M bytes and more. There are no insurmountable barriers, no switches, no adjustments.

More memory? Fine. Finder can handle it. Operating system problems? No sweat. Apple will quietly introduce a new version of Finder, and all you'll have to do is go to an Apple dealer and pick it up for free. Then there is the amazingly stubborn personality of Finder. True, Apple's operating system with the funny name was once slow and cumbersome, and many wondered how someone as brilliant as Steve Jobs could be so shortsighted as to limit users to one disk drive, not enough memory, a small screen, no hierarchical file system and so on.

Yet Finder — with its icons and pop-up windows, its trash cans and handlebars — works. It took on a lot of muscle and speed in the past few years, but it never changed its fundamental nature and appearance.

And there is something oddly appealing about a machine that cries uncle, displays a bomb instead of an error message and shuts itself down rather than reveal its innards. Compare that with Unix. You could say Finder is the ideal operating system for the business world: You never have to worry about what goes on inside.

Natural artist

Furthermore, graphics on the Macintosh are simply superior to the PC. The cursor moves more freely and effortlessly, and it provides the end user with the feeling of being directly connected to the Mac.

One gets the clear impression that this machine was engineered for use with a mouse, while the IBM PC still is not. The screen, because it is smaller, is cool, crisp and easy on the eye. The PC world has been playing catch-up for years now. Alas, those efforts have been met with little success, despite an impressive array of add-on boards, high-resolution screens, mice, accelerators and other goodies.

It seems PCs need a lot more hardware and horsepower to even come close to the graphical performance of the Macintosh. Even when they do come close, it always looks as if they're trying to be something they're not. Also, compare the painless installation of just about any Mac program with the cumbersome process of getting PC software loaded and configured. The Macintosh is a natural.

> IT IS NOT hard to see why PC software has a steep learning curve. With the Mac, once you know how to handle one program, you know them all.

Another major reason that the Mac is the encroaching force in corporations is the common user interface of every Macintosh application. It's head and shoulders above the PC world, where virtually every package has a different set of commands and a different mode of operation.

Absurdly, PC software companies even sue each other for using the "look and feel" of a competitor's program instead of working with each other and helping their users.

In such a climate, it is not hard to see why PC software has a steep learning curve. With the Macintosh, once you know how to handle one program, you know them all. This is not to say that Mac programs are user-friendly across the board. Some are not, especially once you get into the more esoteric functions in which a click of the mouse won't do. But the user will always feel at home with functions such as saving, editing, printing and the opening and closing of files.

On top of that, the cut-and-paste functions are identical in all Macintosh programs, and the familiar clipboard is always there. It is a breeze to move almost anything from one Mac program to another. This is invaluable and still cannot be done easily on PCs.

The final tally

The PC world used to be exciting, but look at where the great innovations have been in recent years: While PCs have suffered through a multitude of minor revisions to the same old programs, the Mac world has seen major breakthroughs:

- The Postscript-driven Laserwriter, which changed printing forever and gave it an entirely new meaning.
- Aldus Corp.'s Pagemaker, which created the field of desktop publishing.
- Microsoft Excel, the ultimate spreadsheet.
- The first really useful 19-in. super-high-resolution screens, which can display two full pages of text.
- A new breed of useful, document-oriented word processors and many other dazzling software innovations.

On top of that, Macintoshes are now communicating with Digital Equipment Corp. minicomputers and Sun Microsystems, Inc. supermicros, using connectivity programs such as Pacer, Inc.'s PClink package.

After passing on Apple's Lisa and first being skeptical about "the computer for the rest of us," corporations appear to

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have changed their minds about the Macintosh. Once considered merely cute, the Mac has now firmly established a foothold in most companies. Long lines form for Macintosh workstations as more and more people discover what the machines can do.

The first few Macintoshes were purchased by corporations for experimentation with desktop publishing or Excel. Now, with the advent of the Macintosh SE and Macintosh II, MIS departments are inundated with user requests for more Macintoshes instead of more PCs. The formerly sound strategy of buying PCs as regular workstations and limiting the Mac to special duty is starting to crumble.

A hybrid Mac-and-PC environment may be somewhat difficult to manage now, but this may soon change. There are already reports of programs that let machines based on Motorola, Inc.'s 68020 chip emulate the 80286 instruction set in software and still run faster than a stock PC AT.

Companies with local-area networks or a central minicomputer or mainframe may not even have to go that far. Many popular PC software packages have superior Macintosh equivalents that read PC data files without any conversion. Emerging standards such as Sun's Network File System will make it even easier to communicate among different environments.

WHY NOT switch to the Mac?

In a company in which all workstations are on a LAN or connected to a mini, there is no reason for all micros to be the same. As long as the machines can communicate with each other and data can easily be moved, then why not switch to a superior and more innovative technology? Why not use a technology that has all the answers now, not sometime in the distant future?

In other words, why not switch to the Mac?

PCs would not lose in the sense that they would disappear; rather, they would simply recede and become a more or less stagnating culture with little innovation, a world in which several incompatible levels of performance compete internally and in which fewer and fewer users are willing to keep up with vaporware, multiple standards and planned obsolescence.

Meanwhile, the Macintosh may win the race and become the machine of choice in many of the U.S.'s largest corporations. As director of data processing in a large multivendor environment that includes an increasing number of Macintoshes, I am looking forward to it. ●

Con

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benefit from this interface."

Apple could then have led an industry drive to develop a common user interface that would have been used by both the Macintosh and the MS-DOS worlds. The company's position in the industry would then have been far more prestigious and influential.

Instead, Apple followed a strategy that says this: Think of the Macintosh market as a pie. We're going to keep that pie all to ourselves, even if it means severely restricting its size. This is ours, and you can't have it.

It's hard to believe, but only a little more than a year ago, it was still impossible for any board manufacturer to sell an expansion board for a Mac. Apple simply didn't permit it. We can now see that its new policy of permitting third-party expansion boards to be manufactured has done the Macintosh an enormous amount of good.

Unlearned lessons

It's just a shame that Apple didn't learn more from that lesson. Its vaunted new open architecture policy covers only a small portion of the meaning of that term in the PC world. If Apple really wanted to see the Mac win, it would open the door to clone makers.

If it did, we might see a real chance of the Macintosh architecture taking over the PC architecture.

I've told you an anecdote about Apple. Now let me repeat

It's one thing to fill a document with data, another to fill it with content that makes someone take action. The document that best persuades not only has a typeset appearance, with visual as well as typographic elements, but also has superior content—facts and figures drawn from all possible sources to make a point of view, a point of sale.

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an anecdote about IBM to illustrate the difference between the two companies.

When IBM was designing the Personal System/2 in 1985, it wrote a proposal for the user interface. The company could have developed it internally, copyrighted it and prevented any clone maker from copying it. That's essentially what Apple did on the Mac.

Instead, IBM negotiated with Microsoft for the latter company to modify Microsoft Windows to conform to IBM's Common User Access (CUA) interface for its micros, minis and mainframes. The result is Presentation Manager, which is to be bundled with OS/2 later this year. Every clone maker that uses OS/2, therefore, will be running with IBM's user interface.

How different this is from the Macintosh situation. Instead of keeping its user interface to itself, IBM took a series of business steps that made its user interface available to every vendor in the industry.

This is consistent with what seems to be IBM's policy of being as open as the company considers possible. From Day 1 with the IBM PC, any clone maker could come out with its own computer with the same "look and feel" as the IBM computer.

How different can the marketing philosophies of these two companies be?

IBM's philosophy is that the PC world is a very, very big pie. It is apparently willing to allow as many companies that want to to share in that pie. IBM sees the pie growing larger and larger — so large that even if IBM gets only a small chunk of it, that chunk will be larger than the whole pie in a world where the PC is closed, or partially closed, to other vendors.

What IBM understands, and Apple doesn't, is that clone makers like Compaq help IBM's strategy far more than they hurt it. IBM is looking forward to a time in the 1990s when all of its micro, mini and mainframe computers share common interfaces that have become industry standards and that other companies will be rushing to copy.

WHAT IBM understands, and Apple doesn't, is that clone makers help IBM's strategy far more than they hurt it.

Imagine a world in which a company similar to Compaq made Macintosh clones. What a different world it would be.

The good news

Now let me step back a minute and talk about a couple of things I like about the Mac.

The Macintosh has created enormous excitement in the industry. Its user interface has generated innumerable innovations in software that are going to affect us all for years to come.

One software package after another developed for the Macintosh has been unique — not because of its functions but because of the way the end user invokes those functions. The imagination of Macintosh software developers has been challenged over and over again to make complex software packages easily accessible to the nontechnical end user.

There are many examples of this, but perhaps none is more stunning than the release of Hypercard. Apple bundled Hypercard at no cost with all new Macintoshes and made it available for just $49 to existing Mac owners. Thus, Apple has practically guaranteed that within a year or two almost every Macintosh owner will have Hypercard.

What makes this particularly notable is that Hypercard is a well-structured computer programming language for nontechnical end users. The existing popular end-user programming languages — Basic and spreadsheet macros — are considered unbearably sloppy and unstructured by computer scientists.

Nothing illustrates better how exciting Hypercard is than the number of stackware programs coming into the market; that is, programs developed for the Macintosh using Hypercard as a development language.

This is only one example of

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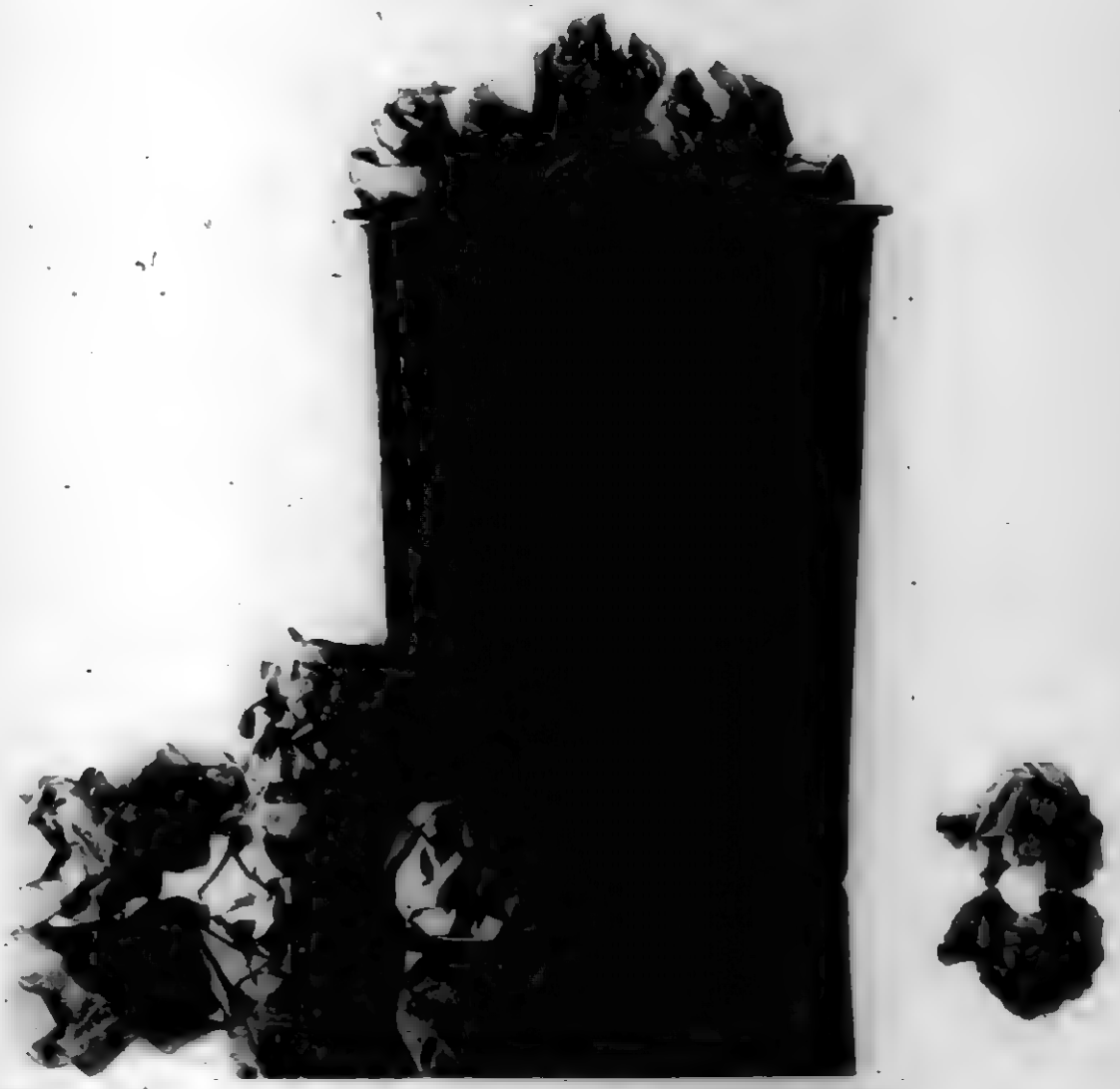

the many favorable things about the Mac. What makes me angry is that Apple has squandered and is continuing to squander all this creativity by keeping the entire Macintosh market to itself, thereby restricting the size of the market and creating less incentive for third-party software developers to invest in the Mac.

Drawbacks

I understand that some MIS directors have installed quite a few Macintoshes in their organizations and are continuing to install more. Presumably, one argument they use with upper management to justify this decision is that they think it unwise to lock themselves into a single vendor — IBM.

Well then, why are they locking themselves into Apple?

The fact is, users could buy a PS/2 today and replace it tomorrow with a machine from any of a hundred other manufacturers. But each time they buy a Macintosh, they lock themselves tighter into Apple. If these managers don't understand this concept, many other MIS managers do, and that's why the Mac will never do more than make a dent in the overall microcomputer marketplace, let alone take it over completely.

For example, Apple is now coming out with a multitasking operating system called Multifinder. According to Apple and Apple watchers, this version of Multifinder is only a first step in the development of a multitasking operating system. For all the complaints we've heard about OS/2's lateness, at least it has all the multitasking power that users of mini and mainframe computers have come to expect. It also has the OS/2 LAN Manager, a very important component sorely lacking from the Macintosh's repertoire.

Apple is reportedly hiring hundreds of programmers to beef up its operating system software. What if Apple missteps and further major enhancements are delayed a year or two, as frequently happens to large companies when they hire lots of programmers too quickly? Then the Macintosh fanatics will be left with lots of nice computers that do lots of nice things but do not take advantage of the latest technology.

During the Vietnam War era, some wag suggested the U.S. declare we had won the war and then go home. Well, Apple could say today that it has won the war, and in that sense, any pronouncements about the demise of MS-DOS are correct.

The fact is, Apple has won the battle of the user interface. The new IBM and Microsoft Presentation Manager will have a user interface that looks very much like the Macintosh interface. Thus we see that the PC architecture has moved strongly in the direction of the Mac architecture.

On the other hand, Apple has also been moving more and more in the direction of the PC architecture, albeit very reluctantly. A major part of the Macintosh's increasing corporate acceptance is that it can coexist a lot better with the PC world. The Mac has better network support for communicating with PCs and even has a "DOS compatibility window," in which you can run PC-compatible programs with the right hardware.

APPLE has squandered [its] creativity by keeping the entire Mac market to itself.

This is particularly ironic, since a Macintosh-compatible window on a PC would violate Apple's copyright and so could not be done.

A merge by popular demand

The fact is, we are seeing a merging of the two architectures, and that's no accident. Eventually, market forces are going to replace the current mishmash of computer architectures with a single standard. In the last two weeks alone, we've seen a major announcement by Apple and Digital Equipment Corp. to develop joint networking products, an announcement by AT&T of its intent to acquire 20% of Sun Microsystems, Inc. and a joint announcement by Microsoft, Ashton-Tate Corp. and Sybase, Inc. to develop an SQL server for sharing data base applications.

In the next five years we may see three major competing end-user architectures: IBM's CUA, a Macintosh/DEC VAX common interface and an AT&T/Sun common interface. By the mid- to late 1990s, the public will demand to be able to get onto a Mac, an IBM PC or a Sun workstation (or their descendants) and, unless they're experts, not even know which one they're using.

This seamlessness will be accomplished largely by more advanced LAN techniques and by further merging of these architectures and interfaces. This merging will also include what are known as high-end workstations and even minicomputers.

There's one final irony to that potential development. With Presentation Manager, IBM and Microsoft have gone 90% of the way toward merging the IBM PC and Macintosh user interfaces.

For the two to merge completely, which is what the public will certainly demand, Apple will have to go the other 10%, and that will mean implementing the Presentation Manager user interface on the Macintosh.

The irony is that if Apple hadn't been so shortsighted by copyrighting its user interface, it could have been the other way around. ●

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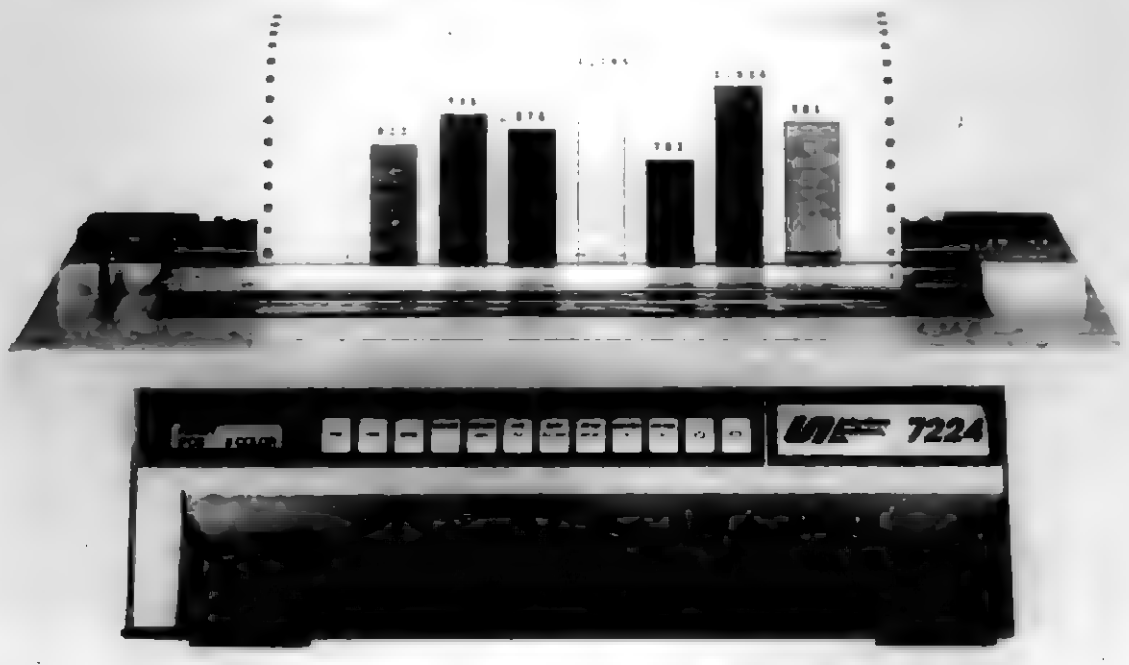

MANAGEMENT

TAKING CHARGE

David A. Ludlum

Breaking all the rules

The other day, I took on the task of serving as the newly appointed manager of end-user computing at my company.

I didn't actually change jobs. I was simulating the position with software for IBM Personal Computer compatibles intended to help computer managers navigate the murky waters of corporate culture and politics.

The software, dubbed Gameplan, from Dean Meyer and Associates, Inc., thrusts the user into the role of a pioneering manager of end-user computing. It offers four choices of corporate culture: traditional, consensus, profit center and futurist. I opted for profit center — characterized by diverse independent profit-and-loss units — and got under way armed with 21 "credibility chips," which I would expend to undertake ventures and, hopefully, get back in greater number as the ventures paid off.

Throughout the exercise, I had 12 projects to choose from: a pilot project, an actual user application, a strategic plan, a briefing paper, a local or long-distance backbone network, a staff steering committee, a user steering committee, a management awareness program, a PC policy statement, an official charter, building an information center and requesting staff.

Wisdom gone awry

Mindful of the conventional wisdom of consultants who urge an understanding of strategic direction before implementing systems, I opted for the formal charter. But I learned that because of my lack of stature and because executives in the company viewed organizational issues as distractions, the move would cost me five chips. The project would occupy half my time for two months.

With half my time still slack, along with that of my two staff members, I put together a strategic plan. It cost me three more chips and consumed the rest of my time for January and a staff member's time for 10 months.

Continued on page 71

Strategist on systems fast track

Liberty Mutual's 31-year-old senior VP started in corporate research

BY ALAN J. RYAN
CW STAFF

There probably isn't a Burke method cited in management texts, but textbook authors might do well to note the name.

The Burke method would read something like this: Take a Dartmouth College graduate, send her through MIT's Sloan School of Management, ship her off to a top insurance company and watch her run — not climb — up the corporate ladder, breaking company records at every level.

Maryann P. Burke's career at Liberty Mutual Insurance Co. in Boston has been a blur. At 31, she is a senior vice-president and manager of corporate research and information systems, one of seven senior vice-presidents in the company, which employs 22,000. Burke became Liberty Mutual's youngest vice-president, its second female officer and, last month, its youngest senior vice-president.

Colleagues say she is ambitious and aggressive as well as professional and friendly. "She'd been working in the company for about a year when I first starting working with her," says Therese Maloney, an executive vice-president in underwriting. "I've seen her develop, make contributions and have the company recognize it.

"She's incisive, a fast learner; she has ideas, and she's able to implement them," she adds.

W. Russell Landberg, an assistant vice-president and manager of Liberty Mutual's data center in Portsmouth, N.H., says Burke is more likely than her predecessors to deal directly with lower level managers, "but not in such a manner as to embarrass her front-line manager."

Burke says she puts in 50 or more hours a week on the job, shuttling frequently between her office in Boston and the data center in New Hampshire and hopping from one Liberty Mutual office to another nationwide.

But she doesn't claim to be all work. A Vermont native, Burke is fond of outdoor activities like running, skiing and tennis. Indoors, she likes to play the piano, which she studied from childhood through high school. Her musical taste runs from classical to pop to jazz. "I don't care whether anybody hears me play," she says. "I just like to play."

PROFILE
Maryann P. Burke

Position: *Senior vice-president and manager of corporate research and information systems, Liberty Mutual Insurance Co.*
Mission: *To shift resources to support insurance professionals with information technology.*

Burke started at Liberty Mutual in the firm's corporate research department after grad-

Continued on page 71

Data View

Opportunity knocks

Four of the five fastest growing occupations* between 1982 and 1995 will involve computers, according to a study

* Includes only detailed occupations with 1982 employment of 25,000 or more

INFORMATION PROVIDED BY *FACTS AND TRENDS: THE CHANGING INFORMATION ENVIRONMENT, AN INFORMATION CHARTBOOK*, BY MAGDA CORDELL MCHALE, STATE UNIVERSITY OF NEW YORK AT BUFFALO
CW CHART: AMY J. SWANSON

Blue chippers join MIT to peer into the 1990s

BY DAVID A. LUDLUM
CW STAFF

At Cigna Corp., researchers are studying the productivity of systems designers and how Cigna agents have profited from the company's on-line insurance agency automation system.

At the U.S. Internal Revenue Service, researchers are examining the impact of major IRS automation projects on the agency's management and personnel and on companies that help prepare tax returns.

At International Computers Ltd., they are looking into electronic mail's impact on the company and into what that firm calls the "fuzzy benefits" of information technology.

These are among the roughly 30 research projects that have been undertaken through MIT's five-year, $5.6 million "Management in the 1990s" program. The program is entering its fourth year — the year in which its dozen blue-chip sponsors hope to begin disseminating

Continued on page 73

MANAGERS ON THE MOVE

MIS goes to the market; Lotus names VP

After a stint as an MIS director, **Scott Miller** has joined **Group 1 Software, Inc.** as director of technical support, taking responsibility for sales support, customer service, training and quality assurance.

Previously, Miller was MIS director with Arbitron Ratings Co., a Control Data Corp. unit, where he held line management positions with CDC's Information Management Consulting and Cybernet Data services.

Miller said MIS work gave him a good set of experiences, providing sound management skills, a broad perspective on computer technology and an understanding of the needs of those who will now be his customers.

But Miller said he is happy to return to direct customer contact. "I'm more of a marketing-oriented guy. I miss the pulse of the marketplace," he said.

F. Robert Kurimsky has been named staff vice-president for information systems and administrative services at **Philip Morris Companies, Inc.**

Kurimsky previously served as staff vice-president for information and communications services. He joined Philip Morris U.S.A. as manager of manufacturing computer systems in 1974 and was named director of process and management information systems in 1975 and vice-president for information services in 1983. Previously, he worked with Sikorsky Aircraft from 1960 to 1974.

Scott Miller

Tod B. Sperling has been named vice-president of MIS at **Lotus Development Corp.**

Sperling is responsible for management and direction of the information systems division as well as the company's new end-user support group, which handles technical services, applications development and technical education.

He joined Lotus in November 1986 as vice-president of human resources, following a 12-year career with Crown Zellerbach Corp., where he was vice-president of human resources and headed the MIS department.

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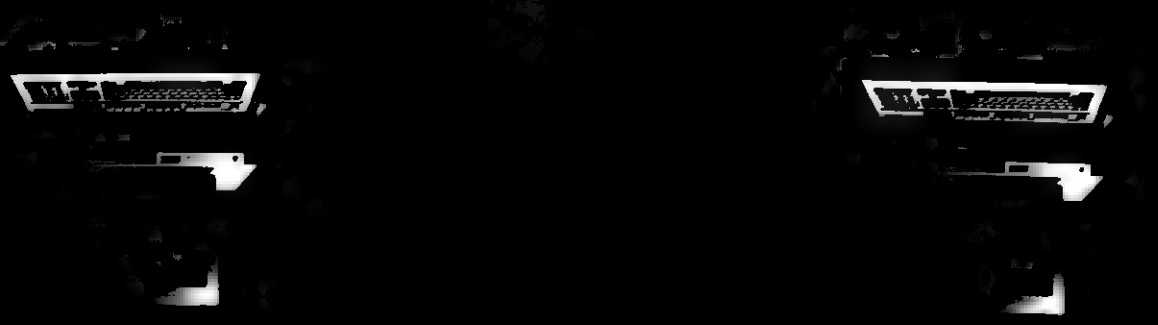

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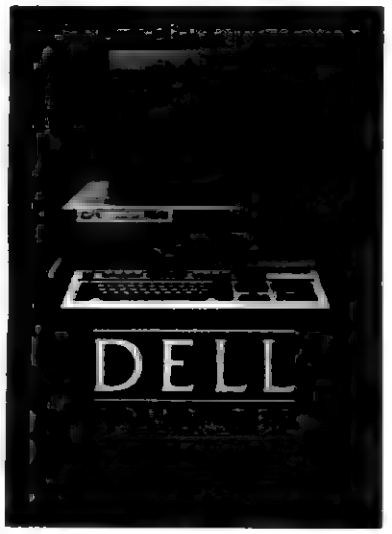

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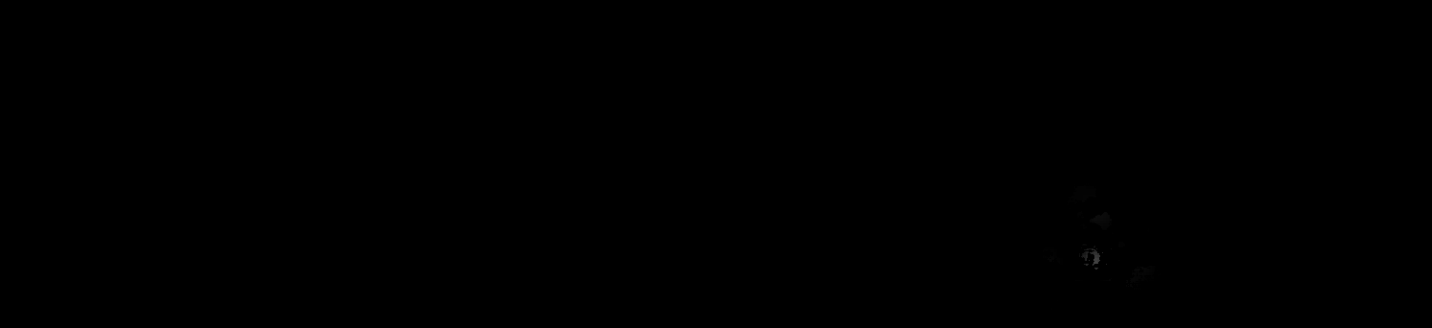

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Strategist

CONTINUED FROM PAGE 67

uating from Sloan in 1980. In 1982, she was named manager of that department. Next, she got involved in strategic planning and concentrated her efforts on the impact of technology; she was named a vice-president during that time.

In 1985, Burke was given responsibility for information systems in addition to corporate research, and last month she was named to her current post.

Burke's co-workers say her strong points are her understanding of the insurance industry and her ability to view technology through its potential impact on Liberty Mutual's business, rather than for its own sake. "She's probably the best top executive we've had in terms of understanding the need for data processing to provide a service," Landberg says.

He adds that Burke is an effective champion for his data center. "She has been very understanding of the need for high-level support, and she's been good at getting the things we need — fronting our requests through the finance department for personnel, hardware upgrades and the like."

Solution seeker

Burke emphasizes that she is driven by a business point of view rather than a love for computers. Educated in mathematics and management science, she says in college she liked the conceptual side of computers but never wanted to spend a great deal of time programming. "I more wanted to focus on the business problems" and how computers solve them, she says.

Burke knows how to program but generally lacks the desire. "I like to use technology to the extent that it helps me achieve my objectives and not a bit over that," she says. However, she says she's technically oriented enough to be demanding in terms of how her people use technology.

The senior vice-president says Liberty Mutual has a large portfolio of transaction-processing and office automation systems but is shifting resources to support professionals such as underwriters and claims supervisors.

"In the past, we've focused on just making sure all of our transactions were fast and efficient," she says. "Now, we're saying we need to orient our information to professionals who need to access that information and work with it."

Burke is pursuing some such projects through joint efforts with vendors that include Digital Equipment Corp., AI Corp. and Teradata Corp.

With these efforts and others, Burke says she will not rest on the laurels of Liberty Mutual's past technological initiatives but will, instead, take a plunge into new ventures. "I continually try to improve and think about what contributions I need to make to the company," she says. "We want our customers to think that we are aggressively seeking the opportunity that technology gives us."

Ludlum

CONTINUED FROM PAGE 67

Along with the monthly overhead of one chip for January and another, in advance, for February, my undertakings left me with 11 chips. It also left me somewhat apprehensive as I entered my second month on the job. Conventional wisdom wasn't exactly making me a hero in this profit center culture. It was time to implement a real user application.

I enlisted a volunteer rather than a user with clout or the one most in need of automation, with my staff facilitating the development of the application the user identified. We chose to use off-the-shelf hardware and software and to involve the DP staff. I was happy to see this would only cost two chips. It would require half my time for a month as well as half of one staff member's time for seven months. I learned that the DP staff's involvement required one of these months but wasn't needed.

At the rate I was going, I figured I could use a management awareness program. That cost me two chips and half a staff member's time for three months and half of my time for two months.

I faced March with seven chips and a demotion to consultant! Then the executive committee denied my request for a formal charter. I didn't have the credibility for that level of approval. No payoff, and five chips down the drain!

I rejected further ventures to learn the outcome of the ones I'd launched. By the end of July, my overhead payments had left me with one chip. But my management awareness program was complete, and it paid four chips for the two it had cost me — one extra for using real company data. At least I had a positive return, and I moved into August with four chips after overhead. Now my user implementation was done. The payoff was nine chips!

My confidence returning, I entered November with 12 chips and my title as manager restored. My strategic plan was done and paid four chips for the three it had cost me. There was a net gain, but the payoff was diminished by the vague nature of the benefits projected and the fact that organizationwide planning was seen as a waste of time. I was getting a reputation as a planner.

I strode into December with 14 chips, feeling I had learned something. The wisdom of those consultants isn't universal.

Ludlum is Computerworld's senior editor, management.

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Blue chippers

CONTINUED FROM PAGE 67

some of the findings.

Launched in January 1985, "Management in the 1990s" is aimed at assessing how changing technologies are affecting organizations' structures, relationships, strategies, personnel and operating procedures.

The research is being conducted by a diverse collection of the faculty of MIT's Sloan School of Management, including experts in applied economics, finance, management and behavioral sciences.

In addition, program sponsors include American Express Co., Arthur Young, Bellsouth Corp., British Petroleum Co., Digital Equipment Corp., General Motors Corp., Eastman Kodak Co., MCI Communications Corp. and the U.S. Army.

Cooperative talk among sponsors

Sponsors, each of which finances the program to the tune of $100,000 per year, said they were attracted not only by the notion of needed academic research that would be directed by practical-minded technology users but also by the interaction among sponsors.

> RATHER THAN focusing on technology, the program is aimed at providing "the big framework" in which to understand developments.

"It wasn't just paying a consultant $100,000 to come in and look at a few projects," said Judith Tomaso, assistant to the deputy IRS commissioner for planning and resources. She said there is growing dialogue among the sponsors.

K. Hugh MacDonald, director of technical projects and strategic programs at International Computers in London, said the sponsors identified joint goals at the outset and have played a greater role in shaping the research than they have in other programs with which he is familiar.

"There is a much closer working relationship between the sponsors and MIT, and we feel we've had some influence on the definition of the program," MacDonald said.

MIT's Roger Samuels, manager of the 1990s program, said the sponsors provide sanity checks as the research progresses.

"We're not interested in blue-sky futurology. We want to look at what is going on today, particularly in leading-edge organizations. We're talking about large-scale corporations changing things," Samuels said.

Rather than focusing on technology, the program is aimed at providing "the big framework" in which to understand developments such as the availability of a new type of microcomputer, he added.

Projects tailored to sponsors

Sponsors play host to several of the research projects. At the IRS, some 1990s program researchers are examining the impact of the introduction of the IRS's automated tax collection technology on the agency's management techniques and employee performance. Researchers are also examining the effects of electronic filing of tax returns on the competitive stance of companies involved with filings, such as accountants, other tax preparers and vendors of tax return software.

At Cigna's Systems Division, researchers are trying to assess how some agents have cut costs or expanded sales by using the company's on-line agency automation system, known as Total Electronic Distribution or TED.

"The purpose of the research is to find out what factors are present — organizationally, marketwise or structurally — that have enabled [the agents] to exploit that technology from a competitive standpoint," explained Lee Morris, the division's senior vice-president of strategic planning.

Cigna is also host to a study of factors that affect systems design productivity, including an effort to measure the value of computer-aided software engineering and to identify the reasons for that effect.

"You can count lines of code, but it tells you nothing about effectiveness and little about efficiency," Morris said. "The basic issue is, are you using the dollars wisely?"

Assessing management, products

International Computers is participating both to improve its own management of technology and to see that its products address emerging needs, according to MacDonald.

International Computers has hosted one project examining the impact of E-mail on organizations and another one looking at what MacDonald calls the fuzzy benefits of information technology.

"These are the benefits that accountants don't like," he says. "They're the ones you can't measure. What is the commercial value of being able to move information from one place to another in five minutes compared with three days?"

The 1990s project got off to a slow start as academics and business-oriented sponsors differed on what was important. Nothing ever got nasty, Cigna's Morris said, and the participants' interests now blend well.

MacDonald also acknowledged the initial difference of views. "Sometimes sponsors talk about research when they really mean development," he said.

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COMPUTER INDUSTRY

INDUSTRY INSIGHT

Patricia Keefe

Vapor need not apply

In its current series of announcements, including one slated for this week, DEC has taken pains to position itself as a leader in the move toward open architectures based on international standards.

While DEC is unlikely to deliver any of this capability before late 1988, the announcements reverse DEC's posture of just one year ago. At that time, DEC was busy blocking access to its VAXBI bus architecture and dodging complaints from users who wanted to link their VAXs and Decnets to incompatible equipment. I'm sure many will remember the Ken Olsen who bad-mouthed standards, especially Manufacturing Automation Protocol.

The new DEC appears to be pulling out all the stops in its efforts to support a whole range of systems, from IBM's VM and MVS operating systems to OS/2 to Microsoft's MS-DOS, to AT&T's Unix System V to Apple's Apple DOS.

No doubt prodding this about-face is increasing pressure from customers who want one-stop shopping from their vendors.

Hurry up and wait

A joint announcement three weeks ago at Macworld Expo highlighted plans by Apple and DEC to integrate their workstation and network environments. But despite a list of specific services the two will provide, users will have to wait until August to get the specifics on how, when and how much. Shades of IBM.

Last week, DEC unveiled what some analysts are calling its answer to IBM's Systems Application Architecture, an umbrella concept designed to tie together all of IBM's disparate systems. In DEC's case, extending its Network Applications Support (NAS) facilities to support users of major operating systems on Decnet/OSI enables DEC to connect its systems with disparate ones from competitors.

Continued on page 76

Walking away from the Crash

Most vendors notch strong quarters, but Tandem, Seagate on skids

BY CLINTON WILDER and JAMES DALY
CW STAFF

Business for most major computer firms escaped October's stock market collapse virtually unscathed, as several vendors last week reported sharp increases in both revenue and earnings for the fourth quarter ended Dec. 31.

Only two major vendors — Tandem Computers, Inc., which had recently indicated expectations would not be met, and Seagate Technology, Inc. — posted a drop in net income. However, a nervous investment community drove most computer stock prices down after IBM's strong quarter failed to meet expectations (see stories pages 6 and 99).

1987 fourth-quarter earnings

Strong international sales, lower tax rates and better cost controls boosted profits for most industry vendors

Apple	$121.4	168	$1B	57
Duquesne Systems	$2.7	41	$12	39
Exabyte	$2.2	522	$30.4	18
IBM	$2.1B	50	$18B	6
Microsoft	$95.3	79	$155.9	92
NCR	$161.3	20	$1.8B	18
Seagate Technology	$22.8	(39)	$322.4	32
Software Publishing	$2.5	105	$14	61
Sun Microsystems	$14	65	$295.1	102
Tandem	$33.7	(12)	$282.3	18
Tandy	$130.7	26	$1.3B	9
Teradata[2]	$1.9	117	$19.4	89
Unisys[3]	$216.9	—	$2.6B	16
Wang[4]	$94.1	—	$784.7	17

[1] Parentheses indicate decrease
[2] Net income excludes $1.1 million in extraordinary tax credits
[3] Reported $168.5 million loss in 1986
[4] Reported $78.6 million loss in 1986

CW CHART

Among the fourth-quarter success stories were Unisys Corp., Apple Computer, Inc., Sun Microsystems, Inc., NCR Corp., Wang Laboratories, Inc., Microsoft Corp., Computer Associates International, Inc. and Software Publishing Corp. Data General Corp. reported its best financial news in some time, earning $12.4 million after several quarters of losses or meager profits.

Although the stock market's drop did not bring the heavy repercussions some had feared, analysts warned that most companies will heed Tandem's example and make cautious optimism the order of the day when predicting results for the first quarter of 1988.

"If there is any downturn, it will most likely occur in the March quarter," said Peter Labe, vice-president of research at investment firm Drexel Burnham Lambert, Inc. "Consequently, most companies are being careful not to over-report their fourth quarter and saving up a little something for January."

Although Tandem's $282.3 million in revenue for the quarter represents an 18% jump over the $240.2 million recorded for the same period last year, the firm's net income fell 12% to $23.7 million, or 24 cents per share.

"Their revenue is not what it was expected to be, but it is clear that they are not in any trouble," said Omri Serlin, editor of the Los Altos, Calif-based "FT Systems" monthly newsletter. "They say that the market crash has lengthened the procurement cycle for some companies and resulted in delays in decision making. But if you look at the other companies, you've got to wonder if this is true."

Other companies that reported quarterly results last week include the following:

Unisys. Completing its first full year as the combined Burroughs Corp. and Sperry Corp., Unisys ended the year with notable strength in sales and new orders both in the U.S. and abroad.

Revenue was $2.8 billion, up 16% from the $2.53 billion reported from continuing operations one year earlier. Net income was $216.9 million, or $1.09 per share, compared with a year-earlier loss — which included restructuring charges — of $188.5 million, or $1.56 per share.

"Unisys was a ray of sunshine in the gloom about IBM," said George Podrasky of Duff & Phelps in Chicago. "The comments on U.S. orders were particularly encouraging. Investors are a little premature in thinking that a gradual industry upturn is over."

For the year, Unisys sales rose 7% to $9.71 billion, but the company attributed much of the gain to a weaker dollar. Profits were $578 million, or $2.93 per share, compared with 1986 losses of $43.4 million, or 54 cents per share.

Wang. The Lowell, Mass.-based vendor showed a strong reversal from year-earlier re-

Continued on page 80

The Sematech showdown

How a Texas town roped that thar consortium

BY JAMES A. MARTIN
CW STAFF

AUSTIN, Texas — Never mind this city's reputable semiconductor manufacturing industry, attractive climate, low housing costs and diverse cultural life. It was good old Texas determination that ultimately brought Sematech, the much sought-after chip consortium, to this state capital [CW, Jan. 11].

"The governor, House Speaker Jim Wright and the congressional delegation, working in concert with the city of Austin, the University of Texas and the Austin Chamber of Commerce, made a strong, collaborative effort," said Rich Thomas, director of state affairs for Texas Gov. William P. Clements Jr.

As a result, Texas beat out other contenders, including California and Massachusetts, for the consortium. Sematech plans to spend $250 million annually to create 800 jobs directly and 2,400 indirectly, with the intention of returning the U.S. to a dominant role in the worldwide semiconductor industry.

Sematech will begin operations during the first quarter of this year in a 300,000-sq-ft former Data General Corp. manufacturing facility and is expected to begin manufacturing by year's end.

The search for a Sematech site began in earnest last spring. Early on, Jake Pickle, a U.S. Congressman from Austin, was instrumental in securing Sema-

Continued on page 76

Migent CEO quits; firm's woes mount

BY STEPHEN JONES
CW STAFF

INCLINE VILLAGE, Nev. — The timing of Carl Gritzmaker's resignation as president and chief executive officer of Migent, Inc. could have been better.

Gritzmaker's departure last week came at a time when the software publisher has scaled back its expectations for quarterly sales and profits because of delivery delays on key products.

The most conspicuous late product is Migent's Emerald Bay multiuser network data base package, which company executives originally said would be available in April 1986. The company had hinted that Emerald Bay would be available earlier this month but said last week that it will ship by the end of March.

Gritzmaker's departure was in part the result of Emerald Bay's upcoming release and Migent's new push into corporate America, according to Charles Hamilton, who moved into Gritzmaker's slot after being vice-president and managing director of Migent's European operations.

As the company moves from the start-up phase into a production period, Hamilton said, a shift was needed in management. Gritzmaker, who had played the role of entrepreneurial leader at Migent since its inception, was less inclined to stick with the day-to-day operations of the company and reportedly left

Continued on page 80

Daisy first workstation vendor to license SunOS

BY JULIE PITTA
CW STAFF

MOUNTAIN VIEW, Calif. — Sun Microsystems, Inc. said earlier this month that it has licensed its SunOS operating system to Daisy Systems Corp. for use in Daisy's Intel Corp. 80386-based workstations.

Daisy is the first workstation company to license the Sun operating system, which is based on Unix. The financial arrangements of the agreement were not disclosed.

Release of SunOS across Daisy's line of 80386-based workstations is scheduled for the second half of this year.

Once the premier player in the computer-aided engineering market, Daisy has struggled recently, reporting a series of escalating losses last year. Daisy has been criticized for using proprietary hardware and software in its product line — a direction that the company has since reversed.

Standard features

Daisy said it intends to adopt the Transmission Control Protocol/Internet Protocol, Sun's Open Network Computing/Network File System and the X11/News graphics interface standards.

"We're pleased to see people developing on a number of different platforms," said Scott McNealy, chairman and chief executive of Sun, which uses systems based on Motorola, Inc. 68000 series microprocessors and Sun's Sparc architecture.

Daisy is currently porting its applications developed on Denix, its own version of Unix, to SunOS. "The most difficult challenge in all of that was in the graphics area, where it always is," Daisy President Norman Friedman said.

Keefe

FROM PAGE 75

At the Communication Networks '87 show in Washington, D.C., today, DEC is expected to announce support for IBM's VM and VSE operating systems along with support for IBM's Professional Office System under DEC's Mailbus.

And at Dexpo East next month, major third-party Apple software developers are scheduled to announce support for DEC systems.

DEC's relationship with Apple forms another continuous thread linking these announcements.

A position of strength

Analysts agree that the announcement strengthens both vendors' positions vis-a-vis IBM. Apple stands to gain the most from a revenue standpoint, according to Bob Randolph, director of the DEC Advisory Service for International Data Corp., a market research firm in Framingham, Mass. "It means they're big-time now," Randolph says.

The pact also gives the minicomputer maker a three-pronged approach to the desk top: the ability to integrate IBM Personal Computers, the Microvax 2000 and the Macintosh. DEC could benefit mightily from the latter and is expected to resell the Mac.

Despite protestations to the contrary from DEC executives, DEC has failed miserably with the low-end desktop. But it seems that DEC is the only one who doesn't get the joke — at least publicly — concerning its low-end strategy.

Shotgun engagement?

While the Apple-DEC relationship is advantageous to both, it appears rushed. Francis Daubeck, president of Communications Network Architects, a consultancy in Washington, D.C., suggests that DEC had to announce its relationship with Apple prior to unveiling its extentions to the NAS facilities.

DEC's reluctance to formalise a relationship with Apple could have stemmed in part from Apple's traditional lack of a strong business system. However, Apple's success last year in breaking down the barrier to corporate sales in general and the rising incidence of Macintoshes installed at VAX sites may have soothed DEC's fears.

But then again, DEC's plunge into the annoying '80s genre of "concept" announcements has probably given it something else to worry about. DEC has essentially promised to tie its users into the major competitive system environments in use today — which is no piece of cake and a potential risk. It's hard to believe any vendor would so willingly hand over access to its customer base.

Yet if DEC fails to live up to its word, these promises will haunt the company to the grave. Any failure to deliver means that DEC, along with IBM, AT&T, Codex and everyone else out there busily unveiling strategic directions and umbrella concepts, will find out pretty quickly that users are in no mood to tolerate any jive.

Keefe is a Computerworld senior editor, networking.

Showdown

FROM PAGE 75

tech's first $100 million in government funds, which helped Texas win friends on the Sematech committee. Clements wasted little time in recognizing the importance of Sematech to the economically battered state and invited site selection members to the governor's mansion for a heart-to-heart talk.

Last summer, Austin city officials formed a nonprofit organization called Sematech-Texas to act as overseer in negotiating efforts. The group saw to it that Austin accommodated Sematech's wish list in every way, especially regarding the consortium's immediate need for a clean room — the sterile environment required for semiconductor manufacturing.

A Sematech-Texas task force put together an ambitious construction project in order to have a simulated clean-room environment ready for the site selection committee's visit.

Aside from political machinations, Austin was chosen for Sematech because of its strong existing base of semiconductor and technology manufacturing and research concerns.

Among the companies with operations in Austin are IBM, which employs 7,000 and manufactures its PC Convertible; Motorola, Inc., with a 5,100-employee manufacturing plant for the 68000 microprocessor series; Texas Instruments, Inc.'s Data Systems Group, which focuses on artificial intelligence systems; and Dell Computer Corp. and PC's Limited, headquartered here.

'Stacks up well'

"Sematech needed a place with a good manufacturing infrastructure, and Austin stacks up well," said Michael Boss, a semiconductor industry analyst for Dataquest, Inc. in San Jose, Calif.

Another factor was the decision of a similar research consortium, Microelectronics and Computer Technology Corp., to choose Austin as its site in 1983. MCC has many of the same corporate members as Sematech and has a research program devoted to semiconductor packaging and integration.

In addition to bids from Massachusetts, California and Arizona, North Carolina's $147 million financial proposal to place the consortium at Research Triangle Park was a leading offer. But one strike against that site was the nearby presence of a Mitsubishi Semiconductor, Inc. plant, sources said.

"A consortium that's trying to build credibility for American semiconductor manufacturing would not be too crazy about locating next door to a Japanese chip plant," said one observer, who asked not to be identified.

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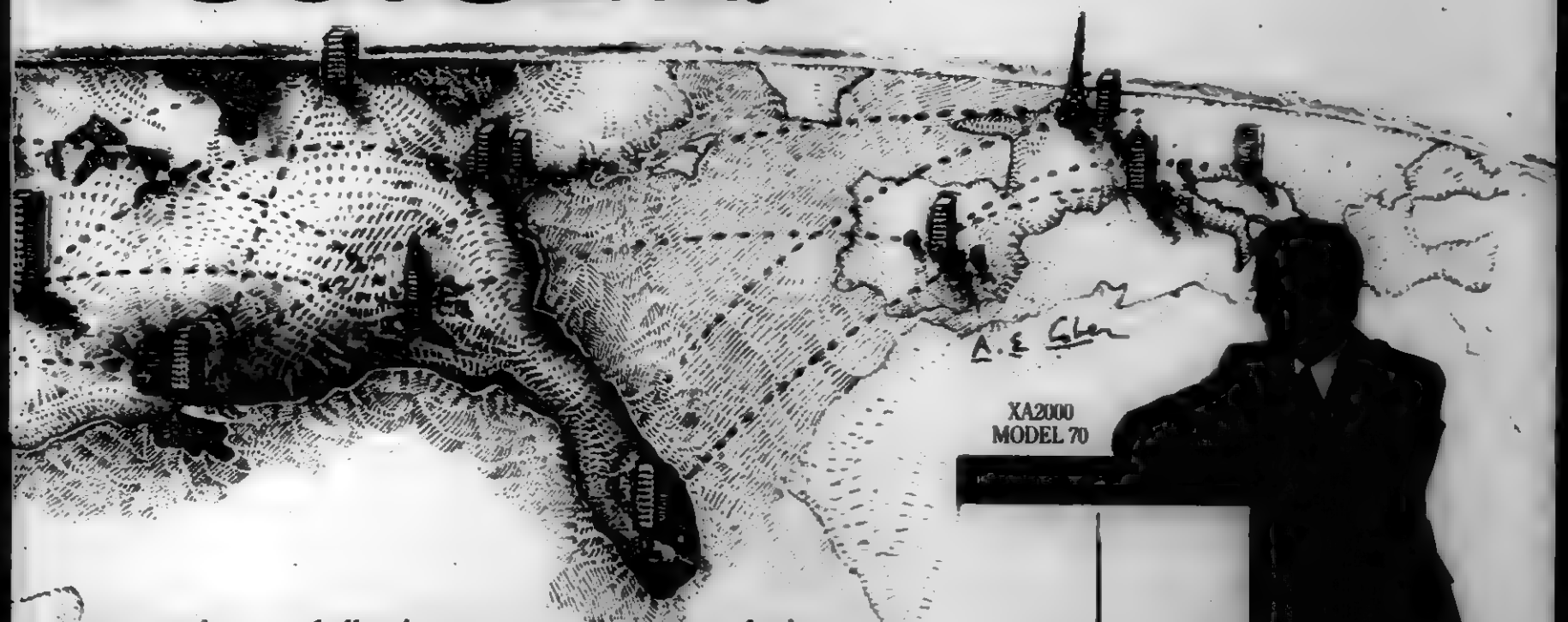

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Walking away

CONTINUED FROM PAGE 75

sults, posting earnings of $34.1 million, or 21 cents per share. For the same period last year, Wang had a loss of $78.6 million, with per-share earnings 49 cents in the red. Revenue clocked in at $784.7 million, up 17%. In the year-earlier quarter, Wang included a $37 million restructuring charge.

NCR. NCR's international business bounced off the dollar's tumble to help the firm post quarterly records for earnings and revenue. NCR's earnings rose 20% to $161.3 million, or $1.79 per share. Revenue increased 16% to $1.82 million, up from $1.57 million a year earlier.

"The collapse of the dollar overseas was a very important part of this," said Don Young, an analyst with Sanford C. Bernstein & Co. "About 54% of NCR's business came from the foreign quarter, and with the dollar taking a tumble, their costs dropped significantly."

NCR also achieved record levels for all of 1987. Net income increased 25% to $419.3 million, and revenue grew to $5.64 billion, up 16%.

Computer Associates. The software giant announced quarterly revenue of $195 million, up 45% from last year's $134.4 million. Net income for the Garden City, N.Y., firm was $42.8 million, or 54 cents per share, up 72% from $24.9 million, or 32 cents per share. The 1987 figures include results from the firm's Ucel Corp. operations.

Prime Computer, Inc. The Natick, Mass.-based vendor's net income for the quarter rose 50% to $21.3 million, or 44 cents per share, up from $14.2 million, or 29 cents per share, for the same quarter in 1986. Revenue rose 16% to $267 million from $230.9 million over the comparable period last year.

For the full year, Prime's net income totaled $64.8 million, or $1.32 per share, a 38% increase over 1986's $46.9 million, or 97 cents per share. But Prime fell short of reporting its first billion-dollar year, as revenue rose 12% to $960.9 million from $860.2 million in 1986.

Data General. President Edson de Castro credited the firm's MV series of minicomputers with its 9% rise in revenue, which reached $342.9 million, compared with the $313.3 million recorded in the same quarter last year.

Net income for the Westboro, Mass.-based firm's first quarter hit $12.4 million, or 43 cents per share, up from $3.3 million, or 12 cents per share, a year earlier.

The recently ended quarter's figure included an extraordinary tax credit of $2.1 million, or 7 cents per share; last year's report included a nonrecurring tax credit of $3 million, or 11 cents per share.

Sun. The Mountain View, Calif.-based vendor's revenue was $235.1 million, compared with $116.5 million a year earlier. Net income was $14 million, or 38 cents per share, up from last year's $8.5 million, or 28 cents per share.

"I expect even larger gains [for Sun] over the next two quarters," said Bob Herwick, senior technology analyst with Hambrecht & Quist.

Apple. Apple continued its recent good fortune in the microcomputer industry's traditionally strong December quarter, reporting its first billion-dollar quarter. The Cupertino, Calif., firm more than doubled its earnings to $121.4 million, or 92 cents per share, and increased sales by 57% to $1.04 billion.

Microsoft. The micro software giant exceeded analysts' expectations, particularly in revenue growth — a pattern that seems increasingly familiar for the Redmond, Wash.-based firm. Sales nearly doubled to $155.9 million, and earnings advanced 79% to $35.3 million, or 63 cents per share.

"Their sales are partially a reflection of PC clone vendors still doing very well against IBM," said Bob Therrien of Paine Webber, Inc.

Seagate. The Scotts Valley, Calif., disk drive manufacturer tempered a 32% increase in revenue with a 39% drop in net income. Revenue was $332.47 million; net income decreased to $22.8 million, or 46 cents per share.

Seagate attributed the drop in net income to costs incurred from an increase in manufacturing capacity and start-up costs associated with several new products.

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Migent CEO quits

CONTINUED FROM PAGE 75

on amicable terms.

"Carl is more of a start-up guy, and when a company gets to a certain size, his kind of skills aren't as applicable," said Wayne Ratliff, president of Ratliff Software Production, Inc. and chief developer of the Emerald Bay data base. Ratliff was a key developer of Ashton-Tate Corp.'s flagship Dbase software.

Under Gritzmaker's guidance, Migent acquired its popular Ability integrated personal computer package from Xanaro Technologies, Inc. and attained, in first-quarter 1987, its first profitable quarter after four straight years of losses. With consumer-oriented products like Ability in place, the company will now try to crack large corporate accounts with a variety of products based on the Emerald Bay technology, Hamilton said.

Migent Vice-President of Marketing David Patrick was named to the firm's board of directors.

Gritzmaker will serve as a consultant to Migent for an indefinite period, Hamilton said. Gritzmaker could not be reached for comment last week.

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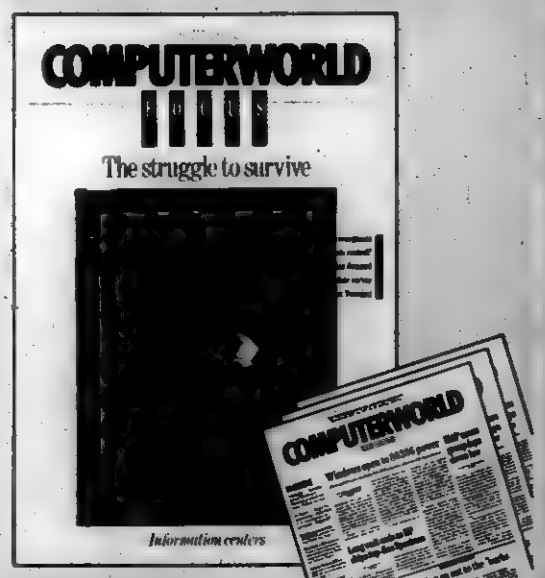

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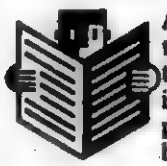
Firms pursue LAN managers

High demand due to increase in PC use, rapid technological evolution

BY SHERYL KAY
SPECIAL TO CW



As companies try to tap into the decentralized computing power provided by installed personal computers, they are looking to MIS for professionals familiar with the management and technical challenges of local-area networks.

The relative newness of the field and the quick changes that occur in technology mean there is not a large supply of professionals with LAN knowledge. Technicians and managers seeking a vital place in a company's implementation of technology can find a niche in the LAN field.

"The technician responsible for the LAN has an enormous impact on the productivity of a business," says Jim Young, managing director of information systems for the Wheeler Group in New Hartford, Conn. "Because it's still an emerging technology, the functionality of LANs is constantly expanding and improving. LAN management also comes with a certain amount of autonomy, unlike traditional communications functions."

Job titles for LAN professionals vary greatly from company to company. In a firm with few LAN nodes in place, most of the responsibilities of LAN management are handled by one person. In an environment with many nodes, a team of professionals handles different aspects of LAN support.

Team leadership

The team is led by a manager responsible for final approval of the appropriate LAN for all projects, planning for future expansion and the direction of the department's activities.

Other team members include network hardware and software specialists who help evaluate and test LAN products, configure and install the LAN, troubleshoot and perform system upgrades.

The LAN administrator maintains the system on a daily basis. He operates a help desk function, acting as the focal point for the LAN users as well as the interface to MIS. Administrators are responsible for loading software, disk management, setting up security procedures and rectifying printer output problems.

Qualifications rigorous

Qualifications for a LAN manager include a minimum of five years of data processing/data communications experience.

"A good project management background, along with strong data communications knowledge and a clear understanding of the user needs are essential for such a manager's position," says Nancy Alter, superintendent of network management for General Accident Insurance Co. in Philadelphia. "A PC background is a plus, but it's really not necessary if you've got all the rest."

Technical specialists should possess more in-depth PC knowledge. A strong background in data communications, particularly in LAN methodology, is also important.

As companies add LAN support positions to the payroll, salaries will become more competitive and more stable. Currently, salaries can range from $18,000 to $50,000 per year for LAN professionals. Low salaries are typically found in companies in which LANs are viewed as PC add-ons, says Richard Lumyou, president of The MIS Group, a Miami-based consulting firm.

LAN managers are hard to find because there is no consistent set of qualifications. Each company defines the job differently. "That niche hasn't matured yet to a position where there is a predetermined set of experiences required to obtain the job," the Wheeler Group's Young says.

> "DON'T GET STUCK drinking from a fire hydrant. There's a lot of information about LANs to get across, and some of these two-day courses jam too much down your throat."
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Technical specialists are the most difficult to find, Lumyou says, primarily because of the depth of specific network knowledge required. "Anyone with a good computer background could learn LAN concepts, but with the hundreds of vendors out there, it is very hard to find someone who will know the exact LAN that a given company has installed," he says.

On-the-job training

As an alternative to finding LAN technicians on the open market, companies are providing on-the-job training. Many LAN vendors also offer courses to train customers in the use of their gear.

Seminars are also offered by independent sources. Ronald Brown, national director for telecommunications consulting for Coopers & Lybrand, warns, "Don't get stuck drinking from a fire hydrant. There's a lot of information about LANs to get across, and some of these two-day courses jam too much down your throat."

Postgrad education

Instead of the one-shot seminars, Brown advises professionals to attend pre- and postgraduate courses that highlight LAN technology. Some of the highly respected schools offering these programs include New York University, Golden Gate University and Temple University.

Professionals who gain experience in LAN positions can look forward to high visibility within most companies.

Such visibility can lead to significant career growth. From the position of LAN manager, a professional may go on to become director of office automation or manager of voice/data telecommunications.

"LAN technology is the future of DP because it is a cost effective way to bring about productivity," General Accident's Alter says. "Those who get involved with it now will really benefit later on, because they will be the ones who worked with LANs from the beginning."

Kay is an MIS human resources consultant based in Tampa, Fla.

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"Simply put, Computerworld delivers just what we're looking for: top-quality job applicants."

Roger Fraumann
Staff Director
Lachman Associates, Inc.
Westmont, IL

Roger Fraumann is Staff Director for Lachman Associates, Inc. (LAI) of Westmont, Illinois. It is one of the largest privately held computer systems software consulting and development firms in the United States. And Roger is pleased to report that plans call for continuing the 50% annual growth every year for the next five years.

Roger is also pleased with Computerworld's contributions to the company's growth. When he needs qualified people to fill positions as the company grows, he turns to Computerworld.

"Computerworld is the only national publication that we routinely advertise in," says Roger. *"Last year we determined that we needed consistent national exposure. We chose Computerworld, which gave us exactly that. Simply put, Computerworld delivers just what we're looking for: top-quality job applicants."*

"We get about 20 responses per ad, and what really counts is that those responses yield at least two quality applicants per ad." Roger explains. *"Overall, a higher percentage of quality people respond to our ads in Computerworld, as opposed to what other publications deliver. Computerworld works for us."*

Plus, Roger has found added incentive to advertise in Computerworld: *"The same ad that runs nationally in Computerworld costs twice as much to run in the Chicago Tribune, a local newspaper,"* he notes.

Since LAI began advertising in Computerworld, the company has gone from 50 to 130 full-time professionals. *"We've been in Computerworld about every other week. And with the company's plans for growth for the next five years, we're going to continue advertising in Computerworld,"* says Roger.

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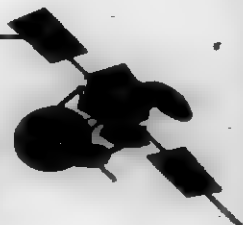

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"We had four specific positions for MIS/DP consultants that we needed to fill in northern New England. We used the local newspaper on a weekly basis, but people who are willing to move usually aren't reading the local Sunday paper. So, I felt this was a perfect opportunity to try Computerworld," says Bjorn.

According to Bjorn, he's quite satisfied with the results. *"From Computerworld, we filled 75% (3 out of 4) of the positions with the responses from the first week, and the remaining position with the response from the following week. These results alone made my ads in Computerworld worthwhile."*

And Bjorn also recognizes a second benefit to advertising in Computerworld. *"The beauty of using Computerworld is that it's read by people in the computer industry who have a need for consultants, as well as being read by consultants who need to keep up to date on the marketplace,"* says Bjorn. *"So we not only reach qualified candidates to fill our current openings, but we are creating awareness of the services that DASI has to offer,"* says Bjorn.

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Prominent high-tech mfr. seeks tech contributors for new RPG-III devel. & implem. Prior large proj. exp. w/online DB desired + min. 3 yrs. business appls. knowl. Desirable SUBURBAN location w/ nat'ly. recog. employer. Salary to $37,000. Call the Data Processing Division (in confidence), **ROBERT HALF OF BOSTON, INC.** 100 Summer Street, Boston, MA 02110. Tel. 617-423-1200. Personnel Consultants. Client company assumes all fees.

SYSTEMS ENGINEER

Design and development of telecommunication software to provide for a communication path for data transmission at the data-link level and perform high level design of telecommunication features for computerized switching systems having distributed flexible architecture. Job involves system verification by algorithm analysis and system simulation. Experience not required but candidate's graduate study must include one course in Telecommunication Systems, one course in Comparative Computer Architecture, one course in Analysis of Algorithms, and a project involving Software for Communication link at the data-link level. Candidate must have a Master's Degree in Computer Science. Salary offered $3,083.33 per month, 40 hours per week, 8 A.M. to 5 P.M., M-F. Send resume to Illinois Department of Employment Security, 401 South State Street - 3 South, Chicago, Illinois 60605. Attn: Mrs. S. Chellini, Ref. #7678-S. An Employer Paid Ad.

PACBASE or IMS DB/DC

Your IMS DB/DC & / or PACBASE experience may be your ticket to an exciting and rewarding career opportunity with our "Build for the Future" company. Immediate & future needs now exist in SE / NE / MW USA for application development professionals. Call or send resume to Don Thompson, CMSI, 7948 Baymeadows Way, Suite 160, Jacksonville, FL 32256, (904) 737-8955. Contractors also needed.

CMSI

TELECOMMUNICATIONS SOFTWARE DESIGNER. Develop and design call processing software for class 5 distributed microprocessor digital switching system from all phases of software development. Investigate existing system and implement new features to meet engineering requirements through detail design, coding and unit and integration testing. Some projects performed on client sites at various geographic locations. Minimum Requirements: M.S. in Computer Science. Two years' experience in the position offered. One course in each of the following: Microcomputer Architecture, Microprocessor Interface, Data Communication and Teleprocessing, Programming Languages (including C), Operating Systems (including UNIX), Must be willing to travel on average of 25% of time, domestically. 40 hrs per/wk. 8:30 a.m. - 5:00 p.m. $34,000 per/yr. Submit resume to: Illinois Dept. of Employment Security, 401 S. State St., 3S, Chicago, IL 60605. Attn: Ms. Marie Kilmartin, Ref: #7778-M, An Employer Paid Ad.

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Immediate opportunities currently exist for Senior Technical Professionals with the following expertise.

SYSTEMS PROGRAMMERS

IBM MVS, VM and Communications Systems Programmers are needed. Must be familiar with O/S internals and related software products and have performed O/S installations, modifications and performance tuning. Salaries $35-$72K

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For more information call Mike Lotito at (301) 770-6560 or send resume to:

DCSI
6269 Montrose Road
Rockville, MD 20852

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Responsible for the development, maintenance and enhancement of code for company's schematic capture design systems for engineering workstations and mainframe computers to design integrated circuits and printed circuit boards. Will also lead other developers in the continued development and maintenance of products. Software will be written in PASCAL language, under both UNIX and VMS. Master of Science degree in computer science and 2 years experience which shall include design and implementation of graphics systems and use of PASCAL, UNIX and VMS software systems. 8 to 5; $36,000/yr. Resume: 7310 Woodward Ave, Room 418, Detroit, MI 48202. Ref: #0888. Employer Paid Ad.

PROGRAMMER/ ANALYST

Rapidly expanding health information company seeks a talented programmer experienced in VMS, BASIC and Powerhouse. Send resume and salary requirements to:

Robert A. Reid M.D.
President
Commonwealth Clinical Systems, Inc.
1100 State Farm Blvd.
Charlottesville, VA 22911

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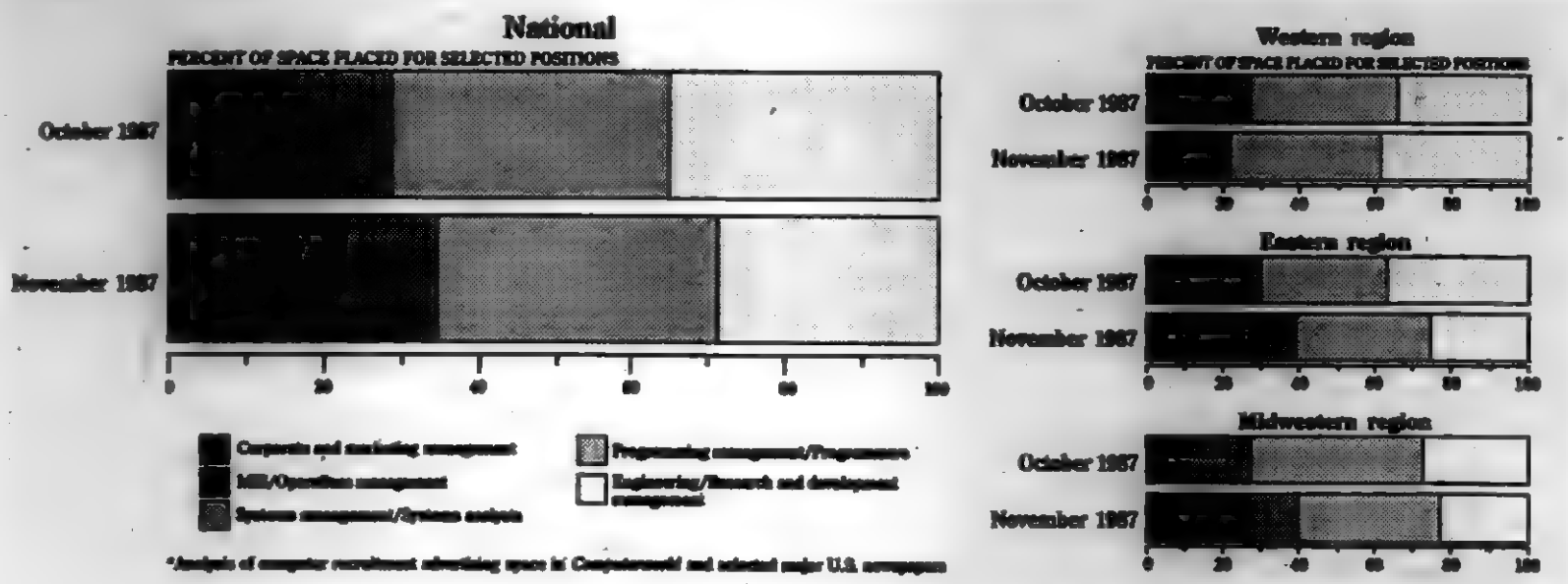
Maintain and develop computer programs for food store of major retail discount chain. Program and maintain system for in-house inventory control and ordering, accounting, pricing and forecasting. Program report formats and screen layouts based on departmental requirements. RPG/COM, CBV, UNIX JIS COBOL and BASIC. $28,000 yr. 3 yrs. exp. req'd. Job site and interview: Simi Valley, California. Send resume to: CW-88007, Computerworld, Box 9171, Framingham, MA 01701-9171.

Scientific Programmer/Analyst

Design, develop programs on CYBER, VAX and IBM Mainframe using Fortran, BASIC, SAS, BMDP, SPSS and graphic packages. Maintain, update statistical packages incl survival, randomization, SIR S/W, ETHERNET, BITNET, ARPNET maintenance exp. necessary. MS Computer Science. 40/hrs week. $30,000/yr. 1 year experience. Resume: NC Geller, Dept. Biostats, Sloan-Kettering Ctr., 1275 York Ave., NY, NY 10021.

CAREER INDEX

Computer recruitment advertising activity*



*Analysis of computer recruitment advertising space in Computerworld and selected major U.S. newspapers

INFORMATION PROVIDED BY CW PUBLISHING, INC.'S RECRUITMENT MARKET RESEARCH DATA BASE
CW CHART

Information Systems Auditors

Levi Strauss & Co., the privately held leader in apparel manufacturing, is currently seeking two key individuals to join our EDP auditing team. Both positions will focus on systems development and acquisitions. You will also be responsible for production applications and computer facilities reviews including audit planning, execution, report preparation and consultation. Travel of up to 20% is required.

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Senior Auditor Requirements include 3+ years' information systems auditing experience and 3+ years' experience as an analyst programmer working with IBM mainframes and HP minicomputers. Familiarity with data bases, data modeling, structured analysis, MVS, VM, CICS, ACF II and TSO is desired.

Our employees enjoy a beautiful, relaxed work environment, an outstanding benefits package including profit sharing, and considerable responsibility and independence. Interested parties should respond expeditiously to Levi Strauss & Co., Employment Dept. JW-02, P.O. Box 7215, San Francisco, CA 94120-6914. We are proud to be an Equal Opportunity Employer.

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ASSISTANT VICE PRESIDENT UNIVERSITY SYSTEMS THE OHIO STATE UNIVERSITY

The Ohio State University Office of Business & Administration is seeking an Assistant Vice President to direct and manage the Office of University Systems. This individual will develop and implement policies regarding administrative and business data processing, voice, data and video networks, and telephony services; plan, organize and direct data processing activities, including systems analysis, programming and computer operations; manage, recruit, and select staff; coordinate computer operations with other computer centers; manage an 18,000 station campus-wide telephone switch including data and video communications networks, and prepare reports on data processing and communications plans, projects, performance and fiscal activities.

Candidates must have a master's degree or an equivalent combination of education and experience. Extensive progressively responsible management experience, preferably in a university environment, and experience with a large and complex MIS/TRA data processing operations with a budget (exceeding $5.0 million and a staff of 100 persons preferred. Telephony experience with premise based switch serving 10,000 stations and communication facilities including microwave and fiber optic circuits is desired.

Salary: Negotiable. To assure consideration, materials must be received by February 19, 1988. Send resume and a cover letter to: Professional Employment Services, The Ohio State University, Lobby, Archer House, 2130 Neil Avenue, Columbus, OH 43210. An Equal Opportunity, Affirmative Action Employer.

HARDWARE/SOFTWARE ENGINEERING OPPORTUNITIES

Allen-Bradley, is the leading developer-manufacturer of total factory automation systems. We are seeking talented engineers for the following positions:

Hardware/Firmware Sr. Design Engineer: Working in our I/O Product Design Group, your responsibilities will include the design and development and/or liaison of Single Point I/O products (including adapter products and analog sensing circuits), coordinating the technical activities of engineers, and interfacing with other departments, outside design houses and vendors. You will design product hardware and firmware at the module and system level and be responsible for appropriate design specifications, and testing and evaluation procedures in its development stages. In addition, you will be responsible for project planning as well as time and cost estimates to meet the development specifications. You should have a BSEE or equivalent, outstanding communication skills and 3+ years hardware/firmware design engineering experience in an industrial setting.

Sr. Software Development Engineer: You will take a leading role in the conceptual design of the complete system, coordinating the technical activities of a small development group, interfacing with other departments and vendors. Develop software for an industrial automation equipment environment. This is a key opportunity to build on your BSCS, BSEE degree or equivalent (MS preferred, PhD considered) and a minimum of 3-5 years of software engineering experience. Knowledge of "C" programming, DEC-VMS, MS-DOS, multitasking relative operating systems, and experience using current software development methodologies would be a plus.

Sr. Software Design Engineer: You will take a leading role in the development of software for realtime control applications using microprocessors. Activities, will include conceptual design/development, complete test/debug, and documentation of the assigned project. In addition, you may also be responsible for coordination of a small development group. You should have a knowledge of the "C" language, experience with realtime operating systems and a minimum of a BSCE, BSCS, BSCIS, or equivalent. Knowledge of DEC-VMS, data communications and 68000 family microprocessors is desirable.

These positions carry a competitive salary and benefits program plus an excellent relocation package. Send your resume and current salary history to:

Mary Messerlie, Human Resources
AB **ALLEN-BRADLEY**
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ComputerPeople Consulting Services is expanding its professional staff in our Columbus, Ohio office. We have immediate needs for experienced specialists in software development, telecommunications technology, telephony, and real-time.

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- **C and UNIX**
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- **Telephony software design**
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- **Terminal emulation software**
- **Bisync protocols**
- **Stored program systems and communications networks**
- **Hardware background with data communications experience**
- **Database**

For immediate consideration please send your resume with information as to GPA, Visa status and/or citizenship to Mr. Jeff Miller, ComputerPeople Consulting Services, 50 Northwoods Blvd., Worthington, Ohio 43085. An equal opportunity employer.

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LAI
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Naperville, IL 60540-1881
Attn: MCW.0128

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LINK COMPUTER CORPORATION

Is a well respected high ranking IBM Value Added Remarketer/Dealer (8/32) located in beautiful Central Pennsylvania.

Our Business Is:

1) Data Processing Development and Management for Pennsylvania area businesses.
2) Marketing the IBM 8/32 product line.
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The following career opportunities are available because of growth:

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Personnel Department
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Altoona, PA 16602

Or call Karen Stone at (814) 696-0755
Brookville/Punxsutawney at (814) 938-6565

GREATER BOSTON AREA
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SUBURBAN based nat'l. firm seeks 3 Sr. P/A's to add to staff for apps. devel. teams. Prefer 3+ yrs. IBM MVS CICS COBOL large-scale proj. exp. Oppty. to join ind. ldr. as it continues record growth into 1988. Salary to $39,000 + reloc. Call the Data Processing Division (in confidence), **ROBERT HALF OF BOSTON, INC.** 100 Summer Street, Boston, MA 02110. Tel. 617-423-1200. Personnel Consultants. Client company assumes all fees.

data processing

SENIOR INFORMATION CENTER ANALYST
4GL in VM Environment

If your specialty is developing Decision Support Systems in a VM environment with an emphasis on fourth generation languages, Miller Brewing Company can bring out the best in you. Our large scale Information Center is a sophisticated, results-oriented environment charged with supporting one of America's largest and most progressive brewers.

You will have project leadership responsibilities in planning and conducting feasibility studies, and in systems analysis, design and development. You will also have key user training and support responsibilities.

A minimum of 2 plus years decision support system development experience in a VM environment is preferred. Knowledge of OMF with SQL/DS, FOCUS, SAS or DB2 desirable, with two or more years MVS/TSO experience. Superior organizational, problem solving, project management and technical training abilities are necessary. BSCS or equivalent preferred.

Miller Brewing Company is a subsidiary of the Fortune 50 Philip Morris Companies Incorporated. We offer competitive salary, complete benefits, and relocation assistance to the attractive, comfortable Milwaukee area. Send resume or letter to: Corporate Recruitment Manager, Dept. #1000-88, MILLER BREWING COMPANY, 3939 W. Highland Blvd., Milwaukee, WI 53201.

Employing and Promoting Equality Today and Tomorrow

MILLER BREWING COMPANY

Data Communications Division

SOFTWARE ENGINEERS AND SALES SUPPORT ANALYST

Apply Yourself To The Advancement Of Communications Technology

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As the project leader for UNIX™, OS/2, and DOS development projects, you will be responsible for definition, design, code and test functions. You'll also coordinate product support, internal training and outside software vendors, and interface with user organizations. Leaders in the areas of software testing and product quality planning are also needed. Individual contributors with broad data communications experience will find challenging assignments related to network connectivity and the rapidly emerging LAN technologies. These positions are located in Dallas, Texas. Excellent communication skills and at least 6+ years' experience are required. A BS/CS degree or equivalent hands-on experience is also required.

SALES SUPPORT ANALYST

You will be working as part of Harris' sales team to supply Harris solutions to customers problems. You will be responsible for making technical presentations on the Harris product line and preparing competitive analysis. Positions are available in New York, Chicago, Dallas, and Los Angeles, as well as other major metropolitan areas. Excellent presentation skills and previous software support experience are required. A BS/CS or equivalent is also required, along with experience in MS-DOS, XENIX and UNIX™. A knowledge of Token Ring, Ethernet and SNA is preferred, as well as a thorough understanding of PC applications development.

If you apply yourself, you'll find we'll give you the responsibility and support you need to develop your ideas and enhance your skills. We also offer a competitive compensation/benefits package. For immediate, confidential consideration, please forward your resume to: Harris Data Communications Division, Personnel Staffing, Dept. CW/0825, P.O. Box 809022, Dallas, TX 75380-9022. Or call 1-800-[illegible] ext. 7853. We are an equal opportunity employer M/F/H/V.

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HARRIS

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● IDMS DBA	Del, Atl	$40K
● IDMS Systems	Dallas	$40K
● IDMS Sr. P/A	Dallas	$40K
● IDMS Analyst	Dallas	$40K
● IDMS Sr. P/A	Phil, Hou	$45K
● CICS Systems (3)	Dallas	$45K
● MVS/XA Systems	DFW	$47K
● IMS Systems	S. Ant	$45K
● DB2 Analysts	Open	Open
● VAX Systems	Dallas	$50K
● VAX IMS Dir.	Dallas	$70K
● IMS Consultant/Memphis		$42K
● Gen/E Utility P/A	Open	$60K

Send resume in confidence to:
Harold M. Harrison
InfoTech Search Consultant
8750 King George Drive, S.166
Dallas, Texas 75235
(214) 630-6668

COMPUTER PROGRAMMER

(Tarrytown, NY) - Under supervision, design, code, test and debug programs written from detailed specifications. Maintain and document programs. Competent to work in most phases of applications programming. Must have working knowledge of CICS, COBOL, OS/MVS and IBM Mainframes. B.S. in computer science + 1 year of experience; or M.S. in computer science. 40 hrs/wk. $30,000/yr. Send resume or letter in duplicate to RWB #116, Rm 331, One Main St., Brooklyn, NY 11201.

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Individuals must have:

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If you fit the above profile and are interested, send resume to:

Vice President - Sales
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Hackensack, New Jersey 07601
(All resumes will be handled confidentially)

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SOFTWARE SPECIALIST - Arlington, TX. Analyze users needs; design and develop computer applications and specifications using HP3000, DEC VAX and DG MV Series, POWERHOUSE. Interface with client users and provide them with technical instruction; enhance existing products. One year experience. 40 hr/wk. $34,000/yr. Apply at Texas Employment Commission, Arlington, TX, JO #4640827, or send resume to: Texas Employment Commission, TEC Building, Austin TX 78778. JO #4640827. Ad paid by equal opportunity employer.

Data Processing

Information Systems Consulting

Peat Marwick Main, an international accounting and consulting firm, is seeking experienced systems professionals to join its Catalyst Consulting Group in Chicago. Catalyst is an information technology firm of Peat Marwick that specializes in state-of-the-art software engineering products and related services.

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ACP/TPF TANDEM

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- Recent systems development experience on minicomputers
- Experience with 4GL's SDLC's, LANS is a plus
- Strong accounting or manufacturing background
- Big eight experience is a plus
- Certification is a plus (CPA, CDP, CMA, etc.)

Send Resume and Salary History in complete confidence to:

PRICE WATERHOUSE
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175 East 400 South, Suite 700
Salt Lake City, Utah 84111

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Providence Gas Company is offering an outstanding opportunity in a progressive and expanding 4381-13 VM/CMS, DOS/VSE environment, for an experienced systems programmer. Must have three plus years experience with one year at the Senior level. Salary level of $36K + depending on experience.

Applicants must be proficient in the following unsupervised procedures.

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- IDMS/R 10.x
- SNA

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Judith A. Garbeil
Providence Gas Co.
100 Weybosset Street
Providence, RI 02903

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Strong BAL and or MVS, IMS, CICS, DB2 or VTAM INTERNALS experience desired.

Paid relocation. Salary based on experience up to Hi 60's.

Send resume to:

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Ventura, CA 93004
Or call Ann at
(805) 647-0226

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Send letter, resume and transcripts to Personnel Office, Anne Arundel Community College, 101 College Parkway, Arnold, MD 21012, by February 29, 1988.

AA/EOE

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Saudi Arabia

The King Faisal Specialist Hospital and Research Centre in Riyadh, Saudi Arabia offers exceptional opportunities for experienced and qualified Data Processing Specialists. The Hospital, a 500-bed specialty referral complex with a large outpatient clinic, is the Kingdom's premier hospital dedicated to providing high quality health care to the citizens of Saudi Arabia.

Positions are available now for:

Data Base Analyst—B.S. degree in Computer Science or equivalent. Five years DP experience with 2 years in data base design, control and management.

Programmer Analyst—3-4 years of college level course work in Computer Science. 12 months experience utilizing CICS & COBOL.

All applicants must be thoroughly familiar with IBM hardware. DL-1 database, CICS & COBOL, & DOS/VS required. Hospital DP experience highly desirable.

Commitments are for 24 months. Salaries are attractive and the exceptional benefits include 30 day annual paid vacation, free transportation, furnished lodging, bonus pay and bonus leave. The selected candidates will be employed by and work directly for the Government of Saudi Arabia.

For further information and/or to apply, please call our toll-free number (800) 251-2961 or send your resume to: HCA International Company, P.O. Box 550, Dept. CW-12588, Nashville, TN 37202. HCA is an Equal Opportunity Employer.

HCA
International Company

SYSTEMS AND TECHNICAL SUPPORT

We are interested in an individual with a very strong technical background with experience in systems design and software programming. The hardware is a Sperry 1100/71 with an attached virtual processor operating in V39, therefore, experience in the V39 operating system on Sperry's 90 series mainframe is absolutely essential. For our unique distribution application, we have developed our own systems and software, therefore, the successful candidate must have proven experience in the design and implementation of large scale business systems preferably in distribution, fulfillment or direct response applications.

We are an industry leader in our field and are presently going through a period of phenomenal growth. We expect this growth to continue on into having to expand or replace our current hardware. As a result, the individual we are seeking must be capable of directing and coordinating a large scale conversion and have proven past experience in doing so.

This year we are planning to set up a remote site in our newest facility in Los Angeles. Previous telecommunications experience would be a definite asset.

With an attractive Midwest location, we offer a competitive compensation package with excellent benefits including a 401K. If you meet our requirements and are looking for a challenging opportunity to work in a fast paced environment, send current resume with salary history and expectations to:

General Manager

DDS
P.O. Box 39993
Strongsville, OH 44136

University of Notre Dame

ASSISTANT PROVOST FOR UNIVERSITY COMPUTING

The University of Notre Dame invites applications and nominations for the position of Assistant Provost for University Computing. The Assistant Provost will report to the Vice President/Associate Provost and function as his/her chief advisor and associate, working cooperatively with the directors of administrative and academic computing services and with various units of the University to assess needs, to prepare reports, and to oversee the implementation and coordination of plans, budgets, policies and operations.

Qualifications include experience in the management of computing services in an academic environment, effective communication skills, and substantial technical expertise in computing systems. Preference will be given to candidates who have a Ph.D. degree and experience as a member of a university teaching-and-research faculty.

The salary is negotiable, based upon experience and qualifications.

Responses, complete with resumes and names of three references, should be sent before February 15, 1988, to: Roger A. Schmitz, Vice President and Associate Provost, 202 Administration Building, University of Notre Dame, Notre Dame, Indiana 46556.

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DATA PROCESSING PROFESSIONALS

Illinois Power Company, a progressive, medium-sized mid-western utility, has the following challenging opportunities. BS or BA in Computer Science, Computational Math, Business or a related field is preferred.

SENIOR DATA BASE ANALYST

Requires 3 or more years experience in data base administration working in an IBM environment. High level data modelling experience desirable. We seek an experienced data base administrator with good communication skills to do corporate data modelling, data base analysis and design, data consulting for project developers, data base product support and new product research.

PROGRAMMERS AND PROGRAMMER ANALYSTS

Requires 3-8 years experience in analysis or programming. COBOL necessary, with experience in CICS, IMS/DB, IBM's Data Dictionary, TSO/SPF, PANVALET, VSAM, IBM-Assembler, and structured design preferred. Identify needs, recommend software/hardware solutions, design programs and systems, oversee all phases of system development and implementation.

PROGRAMMER ANALYST— EDUCATION SPECIALIST

Minimum of 4 years experience in analysis and programming required. Experience in an education function supporting activities related to information systems beneficial. Recommend and implement information system education programs for executive, professional, clerical and data processing staff. Perform cost/benefit analysis, make presentations and evaluate education programs.

COORDINATOR NETWORK OPERATIONS

Requires 2-3 years experience in administration of an IBM 3270 network. Direct the activities of Network Analyst/Operators and clerical personnel in support of users of an approx. 1000 terminal local and remote data network. Administer equipment inventory and leases, assist in planning for the implementation of new requirements to meet anticipated growth.

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Requires 4 years experience in CICS system programming environment, BAL and COBOL, both Macro and Command programming, CICS internals, CICS exits, Debugging and performance tuning. Knowledge in DMB, ACF/VTAM, IMS/DB or TSO/SPF desired.

MVS SYSTEMS PROGRAMMERS

At least 4-6 years experience in an IBM MVS system programming environment and demonstrated experience in Assembler language, VSAM, COBOL, SYSGEN and SMP required. Knowledge in JES 2 and MVS internals, hardware and software problem determination, and MVS performance analysis desired. Knowledge of TMS, CMF, RESOLVE, FDR, SYNCSORT, Look, TSO/SPF, PANVALET helpful.

—ENVIRONMENT—

A challenging roster of systems are supported for business and engineering related activities throughout the company. Some 85 on-line systems as well as nuclear systems are part of the technical challenge present.

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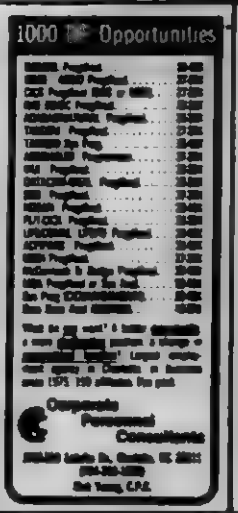

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"The bottom line is results. What I'm seeing, thanks to Computerworld, is beyond our expectations."

— Max Steiner
Director of Marketing
Kenda Systems, Inc.

Max Steiner remembers his days as a salesman, when he would make calls and, invariably, see a copy of *Computerworld* on the desks of his clients. That alone made an impression on Max.

Today, he is Director of Marketing for Kenda Systems, a software services firm with offices in New England, New York and Washington, DC, and specializing in placing contract engineers within the high-tech industry. Having grown by 400 percent annually for the last three years — and having placed several hundred professionals in less than three years, Kenda Systems is an acknowledged leader in the industry.

The impression that *Computerworld* has made on Max early on has been a lasting one. He directs Kenda's advertising. And he directs it to *Computerworld*.

"We are looking for national exposure. First, we want to make people aware of Kenda Systems and then increase the number of resumes sent to us. I believe that greater recognition will lead to greater interest — and understanding of what we can do for people.

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CHICAGO: 10400 West Higgins Road, Suite 300, Rosemont, IL 60018 (312) 827-4433

LOS ANGELES: 18004 Sky Park Circle, Suite 100, Irvine, CA 92714 (714) 250-0164

SAN FRANCISCO: 18004 Sky Park Circle, Suite 100, Irvine, CA 92714 (415) 322-3314

An IDG Communications Publication

PROGRAMMER/ANALYST: Analyze and evaluate existing order processing systems and design, develop, implement and enhance software written in "C" and BASIC for a UNIX based system. Responsible for planning, designing and writing technical documentation for general users and administrators of UNIX System V. Documentation will include both tutorial and reference information. Position also requires using AT&T 3B2 hardware to test the efficiency of a INFORMIX data base system. Responsibilities include providing technical support and direction, reviewing work in progress and evaluating results operating with latitude for unreviewed action or decision. Assume responsibility for training of non data processing users in the facilities of the system. Requires bachelors degree in computer science and 2 years direct experience in the job being offered and described. Salary $27,888, pay/yr. 40 hrs per/week. 8 a.m. to 5 p.m., M-F. Mail resumes to: Colorado Department of Labor and Employment, 600 Grant Street, Suite 900, Denver, CO 80203-2888. Order #3691228.

APPLICATIONS ENGINEER

Develop software and programming for business computer network using knowledge of hardware, software, networking and operations programming in order to control merchandise inventory. We develop systems for companies analysis of product lines and product lines sub groups, and to develop computer image processing systems to demonstrate workflows in sayings and there by assist sales presentations. Bachelors degree + 1 year experience in the job or design engineering involving computer systems; or Masters degree in electrical engineering in lieu of 1 year experience in the job or design engineering. Must have working knowledge or college level class in image processing. Must have working knowledge of FORTRAN computer language. $2,623/mo. 40 hours per week. Job site and interview in Arcadia, CA. Send this ad and your resume to Job # WS13877, P.O. Box 9660, Sacramento, CA 94823-0660. No later than February 9, 1988.

ASSISTANT PROFESSOR OF COMPUTER SCIENCE - LHU is seeking candidates for this position which includes teaching courses in computer and information science as well as working with curriculum development, student advisement, committee assignments and professional and community service. A doctoral degree in computer science or information science preferred. Exceptionally well qualified candidates with a master of science degree in computer science or information science will be considered. Academic or professional experience in the field is required. The University is a primarily undergraduate, state supported, co-educational institution of 2,800 students. The University seeks diverse faculty to develop a multi-cultural and multi-disciplinary curriculum. An equal opportunity/affirmative action employer, the University is actively recruiting women and minorities. Candidates should submit a letter of application, resume, an unofficial academic transcript and at least three letters of recommendation or the names, addresses and telephone numbers of at least 3 references to the following: Robert E. Seyferth, Search Chairperson, LHU, Lock Haven, PA 17745, (717) 893-2011 (Applications will be reviewed beginning 3/1/88, and continue until the position is filled).

ACP/TPF
SR. PROGRAMMER ANALYST

Required, to lead 5 or more ACP/TPF programmer/analysts. Will upgrade and enhance ACP travel reservations/flight policy programs to more efficient TPF software. Will analyze, manipulate, and expand TPF/PUT data base for faster access. All to be conducted in an ACP/TPF programming environment.

Applicants must possess bachelor's degree or equivalent with major field of study in Computer Science, Math, or Engineering, plus 3 years experience in ACP/TPF on-line environment programming.

Education and experience will be found applicable if applicant has a combination of professional development courses and work experience shown to be equivalent to a BS in Computer Science, in addition to 3 years of ACP/TPF online programming as a lead programmer.

Salary to $17/hour for a 40 hour work week. Additional salary may be offered if applicant possesses additional education or experience up to $22/hour.

Apply at the Texas Employment Commission, Ft. Worth, Texas. Job Order #4640934. Ad paid for by an equal opportunity employer.

COMPUTER ANALYST

Professional organization located in NW Indiana is seeking a computer analyst with a minimum 3 years experience in data processing on minicomputers using data-base techniques. The ideal applicant should have knowledge of PRIME computers and programming experience in FORTRAN, and COBOL. Personal computer experience is also desirable.

Excellent salary combined with a comprehensive benefit program. Send letter of interest, resume and salary history to:

Personnel Manager
Canonie Environmental
800 Canonie Drive
Porter, IN 46304

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SYSTEMS 36 PROGRAMMER ANALYST

Mystic Color Lab, a leading mail order photo finisher, located on the shoreline in historic Mystic Conn. is seeking an experienced RPG III Programmer. Experience with systems design and online programming preferred. Job involves new systems development and maintenance of existing system. We offer a competitive salary, benefits package and opportunity for advancement. Send resume and salary history to:

Art Wallace

MYSTIC COLOR LABS

PO Box 146
Masons Island Road
Mystic, CT 06355
(203) 536-4201

SCIENTIFIC PROGRAMMER III

Be part of a team of researchers investigating advanced systems for expert systems. Duties will include: 1) Design and development of software tools to support concurrent problem-solving frameworks that will run on hardware simulators; 2) reformulating and reprogramming existing applications in the frameworks; and 3) conducting measurements and analysis of simulated systems. In addition, the programmer will be required to contribute ideas to other research areas in the project, such as simulator, language, and operating system designs. 3 years experience and B.S. in computer science or equivalent degree and three years experience is required. Familiarity with the LISP programming language and ability to design and build knowledge and engineering software tools, especially in the area of blackboard problem-solving frameworks, are also required. Applicant must also be experienced in building expert systems in information fusion and/or signal understanding. Salary $44,880 minimum. Job site: Stanford CA. Send this ad and a resume to Job #SK13334, P.O. Box 9660, Sacramento, CA 94823-0660 not later than 2/8/88.

Systems Engineer for computer and software consulting firm in Columbus, Ohio, to design, develop and implement systems software in C and the UNIX(R) Shell using the UNIX(R) operating system; write interface mechanisms in real-time between the planning and control function of an overall automated manufacturing environment; design, test, and modify communications between remote sections of manufacturing process; coordinate & integrate software developed by others into coherent working system. No experience required. Must have a MS in Computer Science & and 1 graduate level course each in C programming language, implementing data communications (network) protocols, UNIX(R) operating systems, and Real time programming. Must have written one program in UNIX(R) and C for software development of Multi window craft interface and Curses package tool or Dialogue Management Editor (DME) package tool. 40 hrs/wk, $55,000.00/yr. Qualified applicants reply immediately with resume to R. Lechler, JO#3023364, Ohio Bureau of Employment Services, P.O. Box 1618, Columbus, Ohio 43216.

DATA PROCESSING PROFESSIONALS

HAS, Inc., a rapidly expanding provider of consulting services and proprietary software products, has several immediate career opportunities for individuals experienced in any of the following skill areas:

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PROGRAM SUPPORT SPECIALIST IV
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Monitors the operational integrity and performance of all computer hardware assigned to Computer Operations, the operational integrity and performance of the data communications network, the monitoring of computer hardware and data communication service including in-house device maintenance, adjustments, and the coordinating of all computer hardware and data communications network problems with proper solution and follow-up to problems.

Requires: Bachelor's degree and two years of in-depth experience in data processing, telecommunications and or allowable field substituting.

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Application Instructions: Submit two (2) copies of resume, cover letter and three (3) letters of reference to: Human Resources, 11011 S.W. 104 St., Miami, FL 33176. APPLICATION DEADLINE: Must Be Received By February 19, 1988.

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or
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Your IMS DB/DC & / or PACBASE experience may be your ticket to an exciting and rewarding career opportunity with our "Build for the Future" company. Immediate & future needs now exist in SE / NE / MW USA for application development professionals. Call or send resume to Don Thompson, CMSI, 7948 Baymeadows Way, Suite 160, Jacksonville, FL 32256, (904) 737-8955. Contractors also needed.

CMSI

SYSTEMS ENGINEER

Development of real-time software, namely call processing, distributed OS/MS etc. for a switching network that has reconfigurable switching modules. The software development environment is UNIX/C on mainframe computers and minicomputers. Position involves use of data communications & computer network functions and support tools like real-time UNIX RTX, CDN and SDL on different computer architectures. Experience not required but candidate must have a Master's Degree in Computer Science and graduate study must include a project in the implementation and testing of real-time Communication Protocols on a Reconfigurable Network (Letter of confirmation from School Instructor will be acceptable). Graduate study must include a course in Comparative Computer Architecture and a course in Microcomputers. Salary offered $3,095.33 per/mo., 40 hrs per/wk, 8 AM to 5 PM, M-F. Send resume to Illinois Department of Employment Security, 401 S. State St - 7th, Chicago IL 60605. Attn: Mrs. S. Chetkin, Ref. 97768-S. An Employ Pd Ad.

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1-800-426-9196
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OXFORD Associates, Inc.
Corporate Headquarters
128 Wheeler Road
Burlington, MA 01803

PROGRAMMER/ANALYST: Per state agency develop report layouts, screen layouts & database review. Design & develop logical, usable & workable program spec's. Design, code, test & document complex programs to test development of Syst's Testing, User Training Syst's Acceptance & Handover for Social Service Applications. 1 1/2 yrs exp or 1 1/2 yrs ed programming exp. Must know: COBOL, TP, CPD, MAPPER, ICLT, Sperry 1100 hardware. $33,000/yr, 40 hrs/5 days/wk. Dataskill, Inc., 575 3rd Ave, NYC 10017. Resume: Att: Mr. Gill.

Programmer/Analyst - Analyze, design, develop, implement and debug telecommunications and business applications. Utilize UNIX and C software, CPM, MS DOS, IBM PC hardware. Bachelor's degree in Electrical/Electronic Engineering or Computer Science. 3 years experience performing above. $42,000/yr. 40 hrs/wk. Send resume/letter in duplicate: RVB #113, Room 501, One Main Street, Brooklyn, NY 11201.

SYSTEMS ENGINEER - Assist in the modification of client's financial computer equipment. Require Bachelor's or equivalency in Data Processing or Computer Science and two years experience in DYL 280, DB design, SQL, IDMS with ADSO, DATACOM with IDEAL. Salary $35,000. Job in Woodland Hills, CA. Send resume to: Robert Brown, 6319 DeSoto Avenue, #406, Woodland Hills, CA 91367.

ENGINEER, SOFTWARE. MSCS plus background in UNIX, VMS, MS DOS. Must also know LANS (Ethernet plus IBM token ring), SDO/SI protocols. 8088 assembly and C languages. Duties: Design and implement SDO/SI protocols on VMS and MS DOS operating system, debug and test programs to ensure quality control. $35K per annum. US citizens or permanent residents only. Job site: Santa Valley, CA. Send this ad and resume to: Job #WB 13287, P.O. Box 9660, Sacramento, CA 94823-0660 not later than 2/8/88.

COMPUTER PROGRAMMER/ANALYST: Plan, develop and maintain data processing systems: DB 2/140, DB Eclipse MV/7800; Analyze and configure existing system for future needs; Execute operations and oversee systems development and maintenance; communicate and coordinate DP procedures and technical information with department heads. Requires BS in computer information systems and 1 year in job offered plus 1 year experience computer operator/programmer on above systems; 11:30 a.m. to 8:30 p.m. 40 hours/week. $28,000 per year. Job in Richmond, VA. Send resume to: Employment Security Dept. E.S. Div. Attn: AEO 128911E, Olympia, WA 98504.

SYSTEMS MANAGER

Rapidly expanding health information company seeks a systems manager experienced in VAX/VMS, DECNET, and Intertron Telecommunications Equipment. Send resume and salary requirements to:

Robert A. Reid M.D.
President
Commonwealth Clinical Systems, Inc.
1000 State Farm Blvd.
Charlottesville, VA 22901

PROGRAMMER ANALYSTS

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Qualified candidates include **Programmer Analysts** through **Systems Analysts** with a minimum of 3 years corporate or consulting experience. Background should include IBM or DEC experience, with on-line, database, or 4GL skills preferred. Constell is seeking all skills, but has immediate requirements for the following:

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- IDMS/ADSO
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- ORACLE
- CICS
- COBOL/PL1
- FOCUS/NOMAD
- DEC/VAX
- UNIX/C INFORMIX
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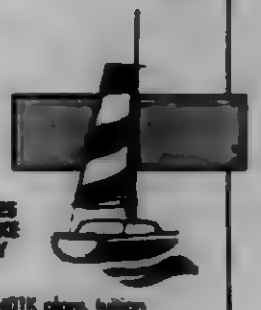
As consultants, we focus on the telecommunications, manufacturing, and financial services industries. Our client roster is proof of our success and includes Fortune 500 as well as other major corporations. We proudly serve the Mid-Atlantic and New England regions and offer a diverse location base.



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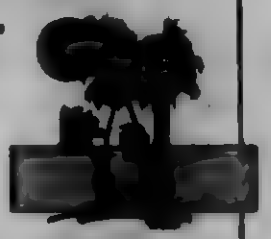

Sound good? You owe it to yourself to explore this unusual, sun filled opportunity. Interested and qualified candidates should forward their resumes complete with salary history and requirements to, or call for personal interview appointment:

CONSTELL

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Flanderway, NJ 08884
201-948-5310

NEW YORK/METRO
139 County Road
Tenafly, NJ 07670
201-569-8666

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PROGRAMMER ANALYSTS WITH RPG III, S/38 TO PLAY A TROUBLESHOOTING ROLE.

At Baxter Healthcare Corporation, a Fortune 75 company, we're applying our strength and leadership position to a variety of services for the health care field. Key among these is our Systems Division, a major provider in the development, installation and support of healthcare information systems.

We now have an opportunity for an individual to join this exciting field, while functioning in a client support position. This responsibility includes responding to client inquiries of a technical or functional nature, writing programs/modifying code, plus diagnosing and creating solutions for customer requirements. Candidates must have at least one year of RPG III experience on IBM System 38, a BSCS or related degree, and top communications and analytical problem solving skills. Limited travel involved, health care related experience a plus.

This is an exceptional position for the individual who thrives on analytical challenges. Baxter provides excellent compensation and benefits including relocation assistance, tuition reimbursement, credit union, retirement plans, and more. We're located in suburban Orlando in desirable Central Florida. For consideration, send resume in confidence to Julie Rae/Dept. CW1-35, Healthcare Systems Division, Baxter Healthcare Corporation, 587 Sandlando Springs Drive, Longwood, FL 32750. Equal Opportunity Employer.

Baxter

MARKETPLACE

Rumors stir market madness

Archaic automation methods end up costing industry time, money

BY ELIZABETH LOZANO
BOSTON COMPUTER EXCHANGE CORP.

Trading volume and profits were down the week ending Jan. 15, as rumors of quantity transactions fueled a general confusion in the marketplace. One issue, however, has become quite clear. The industry that all others depend on for automation has not truly automated itself.

Without a doubt, the National Association of Securities Dealers Automated Quotation System, commonly known as NASDAQ, has its inefficiencies, but the computer industry's methods and protocols for transacting equipment are archaic as well. If you have something to buy or sell, you get on the phone and call everyone you know.

"This 'shout net' method is highly inefficient, and it costs us all a lot of money," one reseller stated. "It's time we set up a live, on-line trading system," he added.

Too many brokers

"The market is like a dog chasing its own tail. We put out feelers for equipment we want, and a few hours later, requests for the same gear come in from brokers who have been called by their broker friends, only the price gets crazy from all the layers of brokers.

"The market has too many brokers trying to make a deal when they are not in direct contact with the buyer or the seller. It's agony trying to sift the real deals from the phony stuff," the reseller lamented.

IBM models closed up across the board after vaporware sales drove some prices through the ceiling.

The IBM PC Model 076 closed up, at $750, with users scrambling for available units and dealers chasing 2,400 off-lease Personal Computers. The PC XT Model 086 closed up $50, at $1,350, with an increase in demand midweek. The Model 089 closed up $25, at $1,875, despite rumors of 100 brand-new units available.

The AT models were the most affected by vaporware conditions. The Model 099 closed up, at $2,300, while the Model 339 jumped to $3,625.

While one successful reseller smiled and said, "Computers were meant to be sold, not used," another dealer complained about market inefficiency and having to chase down a lot of excess-inventory AT Model 339s for about the last three months.

Compaq Computer Corp. trading was flavored more by real transactions than rumors for the week. The Portable I held steady at $700 with few transactions. The Portable II closed up marginally, at $1,725. The Portable III was in high demand, closing at $2,650, with irregular supply spurring dramatic price fluctuations.

Compaq Deskpro trading volume was down for the week ended Jan. 15.

Both the Deskpro 286 and Deskpro 386 held steady, at $2,175 and $4,375, respectively, as users put off purchasing decisions in the face of a shortage in supply of the machines and high asking prices.

Mac business

Apple Computer, Inc. computers seem to be taking the microcomputing world by storm. Soaring demand coupled with heavy street price discounting made for an interesting week for the Macintosh.

The Mac 512 closed even at $850, with its value being supported by excess demand for Mac 512E and Mac Plus units. However, the Mac 512E closed even, at $1,000, with outstanding buy orders for quantities of 25 units or higher dominating across the board.

The used Mac Plus closed even at $1,300, with new discount prices holding that number from climbing any higher.

Used Mac SE and Mac II models were in high demand the week of Jan 11. Tight supply conditions, however, forced most buyers to purchase new equipment instead. The Mac SE closed at $1,925 and the Mac II closed at $4,000.

Used Imagewriter I and IIs experienced high demand the week of Jan. 11 as well.

The Boston Computer Exchange can be reached at 800-BOCOEXX, or 617-542-4414 in Massachusetts.

The BoCoEx Index

Closing prices report for the week ending Jan. 15, 1988

[illegible]	[illegible]	[illegible]	[illegible]
Plus	$1,300	$1,375	[illegible]
SE	$1,925	$2,150	$1,700
II	$4,000	$4,250	$3,500
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INFORMATION PROVIDED BY THE BOSTON COMPUTER EXCHANGE CORP.

Silverlake anticipation slows System/36 activity

BY TONY MEMBRINO
IDC FINANCIAL SERVICES CORP.

According to most dealers, secondary market activity for the IBM System/36 has been somewhat slow, as overall supply is abundant and demand is sluggish. This is in contrast to a fairly active fourth-quarter market.

It appears that some users are waiting to see how much Silverlake, IBM's System/36 and 38 convergence, will affect them before making any decisions.

Silverlake, which is expected to be announced sometime this year, has a performance range that will overlap the IBM 5360 and possibly touch the IBM 5362, making it a machine 50% to 75% more powerful than the System/38 Model 70.

Activity currently taking place in the System/36 used market is focused mainly on the 5360 Models B and D.

Model B values have begun to decline. In November, a 5360 Model B23 Stage 1 could be purchased at retail for 48% of list, or $19,488. Current quotes indicate a drop to 38% of list price, or $15,428. Similarly, the B24 Stage 1 has traded for 55% of retail, or $30,305. It is now trading at 46%, or $25,346.

While the inexpensive upgrades from Model B to Model D have kept B values steady in the past, delays on these upgrades have coerced users to swap out their existing Model Bs and purchase Model Ds outright.

This transition is no doubt warmly welcomed by IBM, which would prefer that users move into the high-end machines. As a result of this swapping, a great supply of Model Bs exists on the used market with little demand, contributing to lower B values.

Model D24 values have held strong. The 5360 Model D24 is currently available new from third-party market dealers as a result of the value-added reseller network, which precipitates equipment appearing earlier than normal and at lower prices. This trend is expected to continue for the near term for the B and D models.

Unexplained delays

As far as the new 5363 model is concerned, delays of four to six weeks have been reported.

Third-party contacts of International Data Corp. (IDC) have been unable to explain these long lead times but have indicated that there is a strong interest in the 5363. These delays have kept 5364 models relatively scarce on the used market.

Analysts at IDC say as soon as the 5363 ships regularly, 5364 values will begin to drop quickly to reflect the performance difference between the 5363 and 5364, the additional cost for a personal computer required with a 5364, the greater disk capacity offered on the 5363 and some new-vs.-used factors.

In direct contrast to the System/36 used market, the System/38 secondary market has been experiencing brisk trading. This activity seems somewhat contradictory, as Silverlake's expected April announcement is supposed to answer System/38 users' dire need for more power and memory. However, IBM has enticed many users to continue buying System/38 models with its October announcement, which reduced prices on many System/38 models.

Overall supply has tightened as a result of increased activities in upgrading. Used dealers have seen new high-end machine purchases and upgrades to the high end. This activity has caused prices to stabilize and, in many cases, increased values for the older System/38 models.

Meanwhile, as sales have increased, the higher end System/38 600 and 700 series have held their values on the retail market. Current trades have them listed at 72% of list. Dealers are expecting stability in used pricing for the short term, mainly with the new line, and an eventual drop-off in the older line as the machines are displaced for Silverlake.

For more information, call IDC's Terri LeBlanc at (617) 872-8200.

IBM mainframes

Current fair retail market value

	Date shipped	MIPS*	List price	Percent of market value
3083 Model J	1Q 1983	7.5	$2,625,731	12
3081 Model K	2Q 1982	12.5	$3,940,731	13
3084 Model Q	4Q 1983	24.3	$6,091,462	18
3090 Model 200	August 1985	27.2	$4,584,000	70

* Millions of instructions per second

INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
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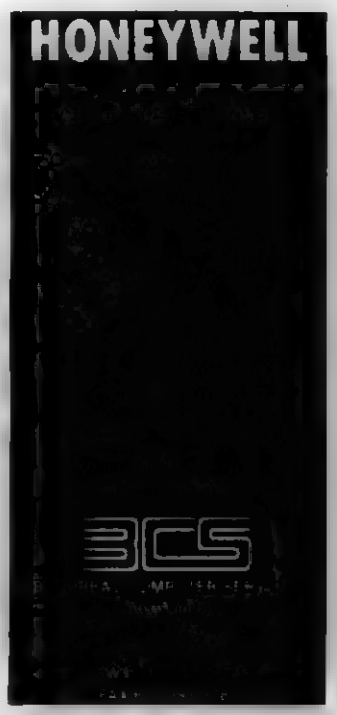

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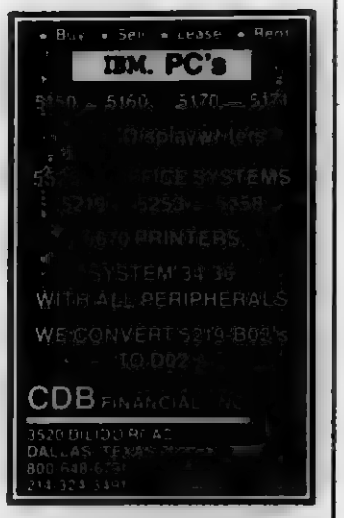

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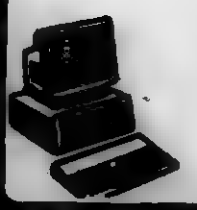

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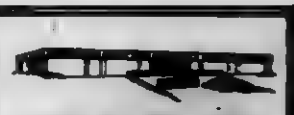

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4361-12	1.85	32 to 64
4381-21	1.9	64 to 128
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4381-2	2.7	64 to 128
4381-12	2.7	64 to 128
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4381-24	6.4	64 to 128
3083-J1	7.1	128 to 256
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Feb. 3	Dec. 31	Software Operating Systems & Languages	Uniforum
Mar. 2*	Jan. 29	Departmental Computing	NCGA/Interface/ WCC
Apr. 6	Mar. 4	Data Security	
May 4	Apr. 1	Communications/ Connectivity	Comdex Spring/ ICA
June 1*	Apr. 29	PC End User Productivity	PC Expo
July 6	June 3	Software	
Aug. 3	July 1	Departmental Computing	
Sept. 7	Aug. 5	Communications	TCA
Oct. 5	Sept. 2	Software Productivity	Unix Expo/Info '88/ Dexpo West
Nov. 2	Sept. 30	PC/Connectivity	Comdex Fall
Dec. 7	Nov. 4	Departmental Computing	

* Search Ad Study Issue

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COMPUTERWORLD

An IDG Communications Publication

COMPUTERWORLD FOCUS

Micro strategies unfold

COMPUTERWORLD

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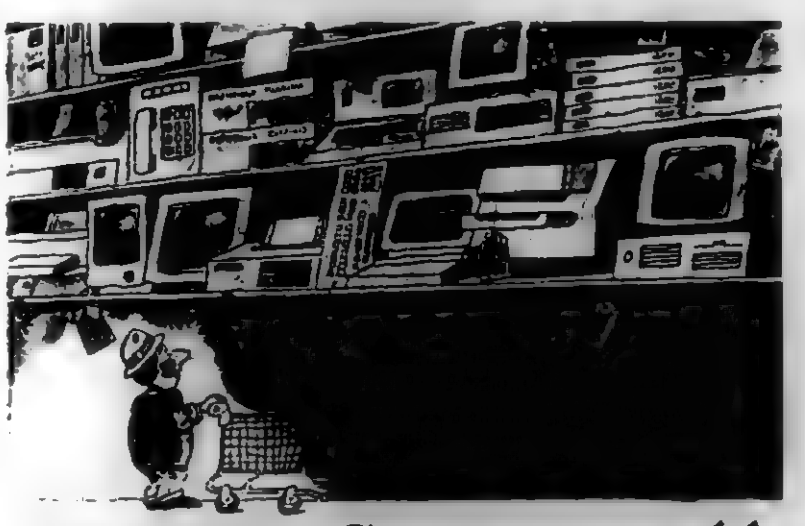

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Feb. 29	Performance Management/ Capacity Planning	Feb. 12
March 14	DBMS	Feb. 26
March 28	Micro-to-Host-Links	March 11
April 11	PCs (IBM-Compatible) Portables/Laptops	March 28
April 25	TBA	April 8
May 9	Printers	April 22
May 23	Data Communications	May 6
June 6	CASE	May 20
June 20	The SNA Market	June 3
July 11	Disaster Prevention & Recovery Products & Services	June 24
July 25	Productivity Software	July 8

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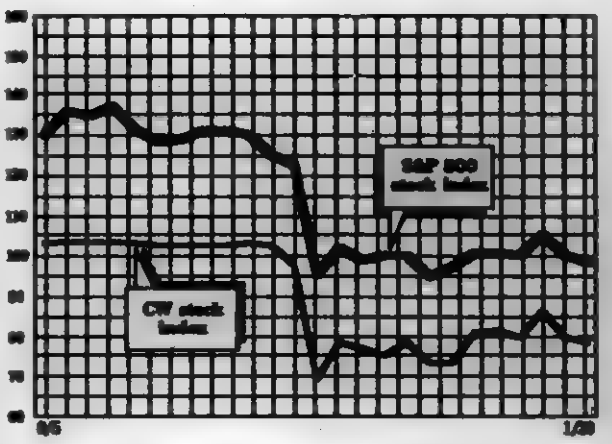
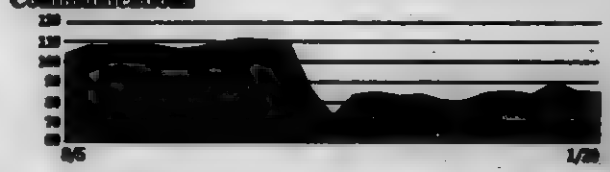


Indexes	Last Week	This Week
Communications	85.0	84.2
Computer Systems	89.1	87.9
Software & DP Services	93.0	91.6
Semiconductors	57.1	54.3
Peripherals & Subsystems	82.2	80.8
Leasing Companies	101.1	100.8
Composite Index	80.2	78.8
S&P 500 Index	100.2	98.9

Communications



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Software and DP Services

Semiconductors

Peripherals and Subsystems

Leasing Companies

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Computerworld Stock Trading Summary

CLOSING PRICES THURSDAY, JANUARY 20, 1988

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JAN. 20 1988	WEEK NET CHANGE	WEEK PCT CHANGE

Communications and Network Services

N	AMERICAN INFO TECHS CORP	100	74	88.3	-1.1	-1.3
O	ANDREW CORP	15	11	13.1	0.1	1.0
O	ARTEL COMM CORP	5	2	1.9	-0.3	-11.8
N	AT&T	36	29	29.9	0.0	0.0
O	AVANT GARDE COMP INC	6	2	2.1	-0.1	-5.0
O	AWA TEX INC	13	7	8.6	-0.5	-7.0
N	AYDIN CORP	26	16	19.3	0.4	2.0
N	BELL ATLANTIC CORP	105	91	95.9	-0.9	-1.3
N	BELLSOUTH CORP	44	29	37.4	0.1	0.3
O	COMPRESSION LABS INC	6	2	3.3	0.1	4.0
O	COMPUTER NETWORK TECH	6	2	2.0	0.0	0.0
O	CONTEL CORP	40	28	31.4	0.8	2.4
O	DATA SWITCH CORP	9	4	6.0	-0.4	-5.9
O	DIGITAL COMM ASSOC	48	28	27.0	-2.0	-6.9
O	DYNATECH CORP	44	14	19.0	-0.5	-2.8
O	FIBRONICS INTERNATIONAL INC	11	2	2.5	-0.1	-4.8
O	GANDALF TECHNOLOGIES	11	5	6.9	-0.1	-2.0
O	GENERAL DATACOMM INDS	14	3	4.1	0.1	2.1
N	GTE CORP	45	29	35.5	0.9	2.5
O	INFOTRON SYS CORP	12	5	6.5	-0.3	-3.7
N	ITT CORP	60	42	46.0	1.9	4.2
O	M A COM INC	16	7	9.8	0.0	0.0
O	MCI COMMUNICATIONS CORP	12	5	10.4	0.0	0.0
O	MICOM SYS INC	12	7	9.6	1.4	16.7
O	NETWORK SYS CORP	15	7	7.4	-1.3	-14.5
N	NORTHERN TELECOM LTD	34	24	17.9	-0.3	-1.4
O	NOVELL INC	30	12	21.3	-0.3	-1.2
N	NYNEX CORP	78	58	65.1	0.9	1.4
N	PACIFIC TELESIS GROUP	34	24	26.5	-0.1	-0.3
O	PARADYNE CORP	9	4	3.9	0.1	2.3
A	PENRIL CORP	6	1	3.5	0.3	7.7
N	PLESSEY PLC	41	29	28.5	0.1	0.4
N	SCIENTIFIC ATLANTA INC	30	9	11.8	0.4	3.3
N	SOUTHWESTERN BELL CORP	48	32	38.1	0.0	0.0
N	3 COM CORP	36	12	18.5	-0.4	-2.0
O	TIMEPLEX INC	41	17	30.8	-1.5	-4.7
O	UNDERMANN BAER INC	16	5	7.1	-0.3	-3.4
N	US WEST INC	60	43	48.0	-0.6	-1.2

Computer Systems

O	ALLIANT COMPUTER SYS	37	5	7.5	0.3	3.4
O	ALPHA MICROSYSTEMS	6	3	4.4	0.0	0.0
O	ALTOS COMPUTER SYS	17	9	10.8	-0.1	-1.1
A	AMDAHL CORP	50	16	28.5	-2.4	-7.8
O	APOLLO COMPUTER INC	25	9	11.4	-0.4	-3.2
O	APPLE COMPUTER INC	60	24	38.8	-2.5	-6.0
N	BOLT BERANEK & NEWMAN	30	12	16.3	-0.8	-4.7
N	BRITTON LEE INC	5	1	1.5	0.1	9.1
N	COMPAQ COMPUTER CORP	70	28	48.4	-7.5	-14.2
O	COMPUTER AUTOMATION INC	17	6	10.4	2.0	23.9
A	COMPUTER CONSOLES INC	12	2	4.9	0.0	0.0
O	CONCURRENT COMP CORP	24	11	16.5	0.0	0.0
N	CONTROL DATA CORP DEL	35	15	20.4	0.5	2.5
O	CONVERGENT TECH	12	3	3.3	-0.6	-16.1
O	CONVEX COMPUTER CORP	22	6	7.8	-0.1	-1.8
N	CRAY RESH INC	135	47	65.8	-0.6	-0.2
O	DAISY SYS CORP	12	5	6.5	0.0	0.0
N	DATA GEN CORP	33	16	22.5	-1.6	-6.5
N	DATAPOINT CORP	9	3	4.3	-0.1	-2.9
N	DIGITAL EQUIP CORP	200	110	116.5	-7.3	-5.9
N	FLOATING POINT SYS INC	17	9	9.9	0.0	0.0
N	GOULD INC	34	8	12.5	-0.4	-2.9
N	HARRIS CORP	40	22	25.8	-0.1	-0.5
N	HEWLETT PACKARD CO	74	38	52.4	-2.1	-3.9
N	HONEYWELL INC	91	48	57.3	0.5	0.9
N	IBM	176	102	110.4	-4.6	-4.0
O	INFORMATION INTL INC	17	9	10.9	0.6	5.2
O	IPL SYS INC	3	2	1.8	-0.1	-7.1
N	MASS COMPUTER CORP	14	9	8.4	-0.3	-4.4
N	MATSUSHITA ELEC INDL LTD	198	69	176.8	1.1	0.6
O	MEGADATA CORP	7	3	3.4	-0.1	-3.6
O	MENTOR GRAPHICS CORP	39	14	19.8	-1.0	-4.8
N	NBI INC	14	4	3.6	-0.1	-3.3
N	NCR CORP	87	60	64.4	-0.8	-0.8
N	PRIME COMPUTER INC	31	12	14.5	-0.5	-3.3
O	PYRAMID TECHNOLOGY	12	5	8.5	0.8	9.7
O	STRATUS COMPUTER	41	15	20.5	-2.3	-9.9
O	SUN MICROSYSTEMS INC	46	14	32.8	-3.6	-10.0
O	SYMBOLICS INC	6	1	1.8	0.4	28.8
N	TANDEM COMPUTERS INC	38	16	19.0	-1.3	-6.2
N	TANDY CORP	57	38	39.6	0.1	0.4
N	ULTIMATE CORP	37	16	18.9	-0.3	-1.6
N	UNISYS CORP	48	34	30.8	-1.8	-5.4
A	WANG LABS INC	19	10	13.6	0.3	2.6

Software & DP Services

O	ADVANCED COMP TECH	6	1	1.5	-0.3	-13.3
N	AGS COMPUTERS INC	25	11	15.4	-0.9	-5.4
O	AMERICAN MGMT SYS INC	28	9	13.1	0.8	6.1
O	AMERICAN SOFTWARE INC	22	9	9.8	0.5	5.4
N	ANACOMP INC	11	4	5.6	-0.4	-6.4
O	ANALYSTS INTL CORP	10	4	7.3	-0.3	-3.9
O	ASHTON TATE	35	13	23.0	-1.8	-7.1
O	ASK COMPUTER SYS INC	17	6	7.5	0.3	3.4
O	AUTODESK INC	34	12	14.6	-2.5	-13.0
N	AUTO DATA PROCESSING	55	16	40.0	1.1	2.9
O	BOOLE & BABBAGE INC	12	5	8.0	0.0	0.0
N	COMPUTER ASSOC INTL INC	37	15	27.3	-1.0	-3.5
O	COMPUTER HORIZONS CORP	15	7	10.0	0.4	3.9
N	COMPUTER SCIENCES CORP	73	42	46.0	-1.5	-3.2
N	COMPUTER TASK GROUP INC	16	9	10.4	-0.4	-3.5
O	COMSHARE INC	28	12	15.5	2.8	21.6
N	CULLINET SOFTWARE INC	14	4	5.9	-0.9	-13.0
O	CYCARE SYS INC	10	6	8.8	0.8	10.2
O	DUQUESNE SYS INC	25	10	19.0	1.0	5.6
A	DATA ARCHITECTS INC	17	7	8.9	-0.1	-1.4
N	GENERAL MTRS (CLS E)	51	28	35.6	1.1	3.3
O	HOGAN SYS INC	17	5	4.9	-0.3	-4.9
O	INFORMIX CORP	31	11	19.5	-1.3	-6.0
O	INTELLICORP INC	11	2	2.9	-0.6	-17.8
O	KEANE INC	19	6	7.0	0.0	0.0
O	LOTUS DEV CORP	60	19	26.8	-1.3	-4.6
O	MANAGEMENT SCI AMER	21	6	8.0	-0.1	-2.0
O	MICRO PRO INTL CORP	8	2	3.5	-0.1	-1.8
O	MICROSOFT CORP	70	36	54.0	-2.0	-4.8
O	MORINO ASSOCIATES INC	24	7	14.0	0.5	3.7
O	NATIONAL DATA CORP	34	19	28.6	-0.6	-2.0
O	ON LINE SOFTWARE INTL INC	22	9	10.6	-0.6	-5.5
O	ORACLE SYS CORP	19	6	11.8	-1.5	-11.3
N	RANSOFTINC SYS INC	28	11	12.1	-0.9	-6.9
O	POLICY MGMT SYS CORP	28	16	16.5	0.3	1.9
O	PROGRAMMING & SYS INC	14	7	9.8	1.1	13.0
O	REYNOLDS & REYNOLDS CO	39	14	17.0	-0.3	-1.4
O	SEI CORP	28	16	16.8	0.0	0.0
O	SHARED MED SYS CORP	53	19	22.3	-0.5	-2.2
O	SOFTWARE AG SYSTEMS INC	28	8	7.9	0.0	0.0
O	SOFTWARE PUBG CORP	17	5	6.6	-0.3	-3.8
A	STERLING SOFTWARE INC	14	6	6.6	0.4	6.0
O	SUNGARD DATA SYS INC	21	10	13.5	0.0	0.0
O	SYSTEMATICS INC	28	10	28.3	0.0	0.0
N	SYS. SOFT INC.	24	7	13.3	0.0	0.0
O	VM SOFTWARE INC	46	7	7.5	-0.5	-6.3

Semiconductors

N	ADV MICRO DEVICES INC	20	8	8.6	-0.6	-6.5
N	ANALOG DEVICES INC	24	8	11.0	0.0	0.0
O	ANALOGIC CORP	13	5	6.6	0.6	10.0
O	INTEL CORP	43	16	22.5	0.1	0.1
O	LSI LOGIC CORP	17	7	8.5	-0.5	-5.6
N	MOTOROLA INC	74	35	48.5	-9.0	-15.5
N	NATL SEMICONDUCTOR	32	16	16.0	-0.5	-3.0
N	TEXAS INSTRS INC	93	38	44.4	-4.4	-9.0
A	WESTERN DIGITAL CORP	23	12	12.0	-1.0	-7.7

Peripherals

O	ALLOY COMP.	13	6	8.1	-0.1	-2.9
N	AMP INTL INC	9	3	8.2	-0.4	-4.7
N	AST RESH INC	26	8	8.5	-0.1	-1.5
O	AUTO TROL TECH CORP	9	3	3.5	-0.0	-0.0
O	BANCTEC INC	15	6	7.1	-0.3	-3.4
O	CIPHER DATA PRODS INC	15	4	6.5	-0.1	-2.0
A	COGNITRONICS CORP	8	2	2.9	-0.4	-11.5
N	COMPUGRAPHIC CORP	23	12	22.3	-0.1	-0.6
N	COMPUTERVISION CORP	23	7	14.8	-0.1	-0.6
A	DATAPRODUCTS CORP	24	7	7.9	-0.1	-1.5
A	DATARAM CORP	9	3	6.0	-0.4	-6.9
N	DECISION INCS CORP	13	4	10.6	-0.1	-1.2
N	EASTMAN KODAK CO	71	42	62.5	-0.5	-1.9
O	E M C CORP MASS	20	10	12.8	-1.8	-12.1
O	EMULEX CORP	9	4	5.9	0.0	0.0
O	EVANS & SUTHERLAND	40	18	18.5	-1.0	-4.9
O	ICOT CORP	13	3	4.5	0.4	9.1
O	INTERLEAF INC	24	9	15.0	-0.6	-3.8
O	IOMEGA CORP	8	1	2.8	-0.1	-4.5
O	LEE DATA CORP	10	3	2.9	-0.1	-4.2
O	MAGNETIC PERIPHERALS INC	9	1	2.8	-0.1	-2.2
O	MAXTOR CORP	24	8	8.9	-0.4	-4.7
O	MICROPOLIS CORP	44	15	18.5	-2.8	-12.9
O	MINISCRIBE CORP	15	5	7.8	-0.6	-7.5
N	MINNESOTA MNG & MFG CO	91	68	87.9	-3.8	-4.2
A	MSI DATA CORP	21	12	20.4	-1.6	-9.4
O	PRIAM CORP	6	1	1.8	-0.1	-7.1
O	PRINTRONIX INC	13	7	7.8	-0.4	-5.1
O	QMS INC	27	10	10.0	-3.3	-24.8
O	QUANTUM CORP	26	8	10.8	-0.8	-6.9
O	RAMTEK CORP	8	2	4.3	-0.6	-12.2
O	RECOGNITION EQUIP INC	27	7	8.8	-0.3	-2.8
O	REXON INC	14	5	5.8	-0.1	-2.1
O	SCAN TRON CORP	17	7	10.5	-0.3	-2.8
O	SEAGATE TECHNOLOGY	46	10	16.1	-0.1	-0.6
O	STORAGE TECH CORP	5	1	1.8	-0.1	-4.7
O	TANDON CORP	7	2	1.8	-0.3	-13.7
A	TEC INC	7	3	5.4	-0.4	-7.5
N	TEKTRONIX INC	43	21	23.3	-1.1	-4.5
O	TELEVIDEO SYS INC	3	1	1.4	-0.1	-4.5
O	TELEX CORP	162	28	28.5	-0.5	-1.6
O	WYSE TECH	40	11	19.9	-2.1	-9.7
N	XEROX CORP	85	50	58.9	-1.5	-2.7
O	XIDEX CORP	15	4	6.8	-0.2	-3.0

Leasing Companies

O	CAPITAL ASSOCIATES INTER-NATIONAL INC	11	4	5.6	-0.2	-4.1
N	COMDISCO INC	37	12	17.8	-0.5	-2.9
O	CONTINENTAL INFO SYS	14	5	6.5	-0.1	-2.0
O	PHOENIX AMERN INC	6	2	2.8	-0.1	-4.3
O	SELECTRON INC	6	3	4.3	-0.1	-2.3

EXCH: N—NEW YORK; A—AMERICAN; O—NATIONAL; O—OVER-THE-COUNTER; S—SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. ON LAST BID
(1) TO NEAREST DOLLAR

Fault line

Crack in IBM revenue growth sends tremors through tech

Aftershocks from the Oct. 19 crash appeared to shake the stock market last week, and computer stocks bore the brunt of the reaction. Despite strong fourth-quarter earnings performances from most major vendors, the market concluded that slow revenue growth by IBM was the sign of an impending computer slump and drove down share prices across the high-tech board.

The massive sell-off moderated late in the week, but few vendors were able to recoup. IBM, which plunged 6 points Tuesday after announcing fourth-quarter results, was trading late Friday at 109¼, down 9¼ points for the week. Digital Equipment Corp. was up ⅛ of a point for the week to 119⅛, Unisys Corp. was off 2¼ points to 32¼, and Hewlett-Packard Co. was down 3⅜ points to 53⅜. Apple Computer, Inc. was down 4⅛ points to 38½; Compaq Computer Corp. lost 6⅛ points to 52⅛. On the American Stock Exchange, Sterling Software, Inc. jumped 2⅛ points Thursday to 8¼ after it revealed a possible leveraged buy-out for $9 to $10 per share, while Computer Consoles, Inc. shot up 1⅛ points to 6 the same day in anticipation of its first profitable year since 1984.

CLINTON WILDER

Speculation puts Comdisco into red ink

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — Leasing giant Comdisco, Inc.'s misadventure in stock speculation caused the $1.2 billion company last week to post a $100 million pretax loss.

At the firm's annual meeting late last week, Comdisco executives said the decision to withdraw from the business of arbitrage — the practice of speculating on stocks of companies believed to be takeover targets — resulted in an after-tax loss of $80 million for the first quarter ended Dec. 31, 1987. That wiped out the company's record profits of $24 million from other operations and resulted in a net loss of $53 million.

The Oct. 19 stock market crash wiped out much of the value of the stocks acquired by Comdisco's arbitrage unit; the company said it has sold 85% of those stocks and expects to sell the remainder by the end of March.

Unanticipated loss

The red ink on the bottom line belied a fundamentally strong core business of computer leasing and disaster recovery services. Total revenue jumped 22% to $327 million for the quarter.

"We did not anticipate such dramatic volatility in the market," Comdisco Chairman and President Ken Pontikes explained in answer to a stockholder's question about the risk arbitrage loss. "It was very traumatic, but we have shown that the company is very sound, the business is very sound, our finances are very sound, and we think the future looks very bright."

Comdisco still holds $45 million in securities, which it is trying to sell at favorable prices, Pontikes said. "We wanted to make an orderly retreat," he said, "and there's a chance we will get some recovery from it."

Shareholders questioned later agreed that Pontikes and other Comdisco executives had made a compelling argument that the firm would quickly recover from the loss — which amounted to $1.34 per share, compared with 57 cents a share derived from the core business.

The company plans to boost earnings by remarketing used computers as they come off lease, generating $580 million in revenue in the next five years.

"We've created a bow wave that pushes a substantial part of our earnings out into the future," said John Vosicky, Comdisco's chief financial officer.

Comdisco also plans to accelerate its leasing of non-IBM equipment. "This year, we are shooting for $1 billion in our non-IBM portfolio," said Bob Bardagy, executive vice-president of marketing. "We haven't left the IBM arena, but its growth will stay relatively constant, and we're looking to new equipment for growth."

The diversification includes the acquisition of computers from Tandem Computers, Inc., Digital Equipment Corp., Data General Corp., AT&T and NCR Corp. Bardagy said the non-IBM business was highly profitable, "since we are doing the financing as soon as we take the computer out of the box." Comdisco moves many IBM mainframes for which it did not provide original financing.

A second growth area is hot-site recovery services provided by the firm's Comdisco Disaster Recovery Services, Inc. subsidiary. The service already has 800 customers, each paying a minimum of $5,000 a month.

Comdisco Disaster Recovery Services maintains 14 hot sites in North America. But this year, operations are expected to go overseas, with the addition of centers in Europe.

Stratus ups entry-level power with pair of systems

BY STANLEY GIBSON
CW STAFF

BOSTON — Adding entry-level models to its year-old XA2000 line, Stratus Computer, Inc. last week announced a pair of systems, each priced near $100,000.

The processors, the Models 50 and 70, offer twice the performance of Stratus's previous entry-level system, the FT-250, at a 35% lower price, the vendor claimed.

The Model 50 can perform 10 transactions per second, according to the ET-1 benchmark, and the Model 70 is capable of up to 12 transactions per second, according to the same yardstick.

The products are compatible with existing XA2000 models and run software written for those systems without changes, the vendor said.

Stratus President William Foster said he expects sales of the systems to be made in large quantities to major corporations rather than in single units to small businesses.

Dave Moschella, an analyst with International Data Corp., a market research firm in Framingham, Mass., concurred with that assessment. "It's a real positive announcement. There will be a lot of orders for five to 50 processors," he said.

Subsystem for adapters

Stratus also announced IOP, an I/O subsystem that can house a variety of communications adapters. The subsystem is included as standard equipment with the new models and is an option for other XA2000 models. Stratus announced an Ethernet communications adapter for use with IOP.

To support IOP, Stratus also announced Version 8.0 of its Virtual Operating System: In addition, the company announced disk drives in 152M- and 320M-byte capacities.

The Model 50, with a price tag of $79,000, comes with a ¼-in. cartridge tape drive, duplexed 8M bytes of memory, the IOP subsystem, duplexed 152M-byte disk drives, an operating system and transaction processing software.

The Model 70 is priced at $110,000 in a similar configuration. A third model, the Model 50T, priced at $84,000, is a version of the Model 50 that is upgradable to the Model 70. All the processors are slated to be available in the second quarter of this year; volume deliveries are slated to begin in the third quarter.

Foster said he does not fear Digital Equipment Corp.'s anticipated foray into on-line transaction processing.

Computervision board's fate up to court

BY ROSEMARY HAMILTON
CW STAFF

Prime Computer, Inc. and Computervision Corp. continued their legal fencing last week in the takeover battle Prime launched late last year.

A hearing was held in the Delaware Court of Chancery in Wilmington, Del., Thursday to resolve the dispute surrounding Prime's attempt to gather voting rights from Computervision stockholders.

> IF PRIME achieves a majority of voting rights, it could remove the board of directors.

A decision was expected either late Friday or today. If Prime is able to achieve a majority of voting rights, it could remove the current Computervision board of directors.

Prime also backed off slightly from its challenge of Computervision's severance agreements. The minicomputer company said it will no longer challenge all severance agreements but only those that apply to the top 17 executives of Computervision.

Meanwhile, Computervision claimed last week that Prime did not disclose information relating to a public offering of debentures to its stockholders.

A Prime spokesman said that challenge was reviewed with others that have been made this month and "nothing they've done has made us change our minds."

Server

FROM PAGE 1

While analysts last week questioned whether the deal threatens Ashton-Tate's market dominance, users praised the technology.

"The sharing of information across the network is important," said Jeff Knepper, director of advanced technology tax at Touche Ross in Washington, D.C. "But the real value is insuring the information," as the SQL Server does.

No names mentioned

It is unclear just what contribution Ashton-Tate made to SQL Server. An Ashton-Tate spokeswoman said the company is providing "the necessary technology and expertise to enable existing Dbase applications and future Dbase applications to transparently use the server." Microsoft's SQL Server product manager Dave Kaplan said, "We're not going into the details of who wrote what lines of code. There is clearly a mutual benefit for both of these companies."

Mutual benefit or not, Ashton-Tate has spent much of the last week defending its decision to join forces with Microsoft, denying that the partnership is a sign of its own weakness or a concession to poor proprietary technology.

Charles Hanes, manager of technical consulting at the Lanquest Group in Santa Clara, said the alliance with Microsoft may signal that Ashton-Tate is working with others to avoid falling further behind technologically.

> "DBASE III has taken it in the chops. . . . But I think [SQL Server] is going to give them a leg up."
>
> ALAN LOEBEL
> HARRIS CORP.

Wayne Ratliff, who was chief developer of the original Dbase, said, "It's evident that Ashton-Tate is having more and more trouble with its in-house technology." Ratliff is now president of Ratliff Software Production, Inc.

"Those kinds of claims are absolute trash," said Roy Folk, Ashton-Tate's vice-president of software development. "Sybase had something we could get our hands on immediately, and with the positioning from Microsoft, it allows us to get to market fast."

Ashton-Tate has sold its own networked DBMS, Dbase III Plus Lan Pack, for 15 months. In light of the announcement two weeks ago, that product's future is uncertain. Folk said SQL Server does not supplant it and that a similar file server product will be offered with later releases of Dbase.

Users said the alliance of Ashton-Tate and Microsoft helps position Ashton-Tate more strongly in the data base market for the long term. "Dbase III has taken it in the chops recently, particularly when compared with products like R:Base, which are more user-friendly in the network environment," said Alan Loebel, a staff consultant with Harris Corp. in Melbourne, Fla. "But I think [SQL Server] is going to give them a leg up."

While the product will cost less than a minicomputer DBMS, it will be more expensive than stand-alone PC software. Users will have to shell out $1,500 to $3,000 for SQL Server but will also face other expenses, such as a network server with sufficient memory to run OS/2, OS/2-based networking software, front-end software, operating systems for all of the nodes on the network, applications for those nodes and an administrator for the data base system.

Robert Therrien, an analyst with Paine Webber, Inc., said he supports the move for an industry standard that allows users to focus on front-end data base applications and pay less attention to the SQL engine.

While many observers have read only negative signs for Ashton-Tate from the three-way deal, Therrien said the arrangement gives an endorsement to Ashton-Tate's technological smarts. "It shows that Microsoft has at least passively seen Ashton-Tate's internal SQL and that they like it," he said.

Rapidfile updated for productivity

BY ALAN J. RYAN
CW STAFF

TORRANCE, Calif. — Ashton-Tate Corp. last week upgraded its Rapidfile personal productivity data base program and cut the price by $100, saying the move will plant the product more firmly in the smaller business marketplace where it has gained acceptance.

Enhancements included in Version 1.2, which is available immediately, include an 80,000-word spelling checker and a Merriam-Webster, Inc. thesaurus, two features users have said they want, according to Michael Arrigo, product manager for Rapidfile.

Arrigo said Version 1.2's lower pricing would help differentiate it from Dbase III Plus. "Our initial intent was to position Rapidfile as a superior product among personal productivity data bases," he said, "but we pushed the envelope on what the break point was between what people want to pay for a relational data base and a file-management data base."

According to Ashton-Tate research, 90% of the Rapidfile sales are to organizations with less than 500 people, Arrigo said.

The product manager declined comment on when an OS/2-specific version of Rapidfile would be available, but said Version 1.2 will run in the compatibility box of OS/2. It does not, however, support the expanded memory features in OS/2 protected mode. OS/2 is the proprietary operating system that was developed by Microsoft Corp. and IBM.

Registered users can upgrade to the $295 Version 1.2 for $35, the company said. The software is available on either 5¼- or 3½-in. media. For those who have purchased the product since Nov. 15, the upgrade is free.

IDMS/R tool hooks into DB2

Well-heeled start-up company devises reverse-engineering system

BY CHARLES BABCOCK
CW STAFF

CAMBRIDGE, Mass. — A well-heeled start-up is offering a development system that can provide expert assistance in putting together IDMS/R applications and also reverse-engineer existing IDMS/R applications into DB2 applications.

If Bachman Information Systems, Inc. is able to fulfill its research and development plans, it will also offer next year a system that takes widely used IMS applications and reengineers them into IDMS/R or DB2 systems.

The latter goal is a more ambitious one, the Gartner Group, Inc., a Stamford, Conn.-based market research firm, has pointed out, because IMS has no underlying data dictionary or catalogue, as IDMS/R and DB2 do. But whatever the obstacles, Bachman has set the goal for itself, in the words of one observer, of not only turning a pig into sausage, but giving sausage new life by reincarnating it as a pig.

A Gartner Group report on the 5-year-old firm described its officers as "a venture capitalist's dream team." It is headed by company President Charles W. Bachman, originator of the Bachman Diagramming Technique, and Arnold A. Kraft, executive vice-president and former project leader of the Digital Equipment Corp.'s order-configuration expert system, Xcon.

The lineup

Additionally, the firm employs Sheldon A. Borkin, former researcher at the IBM Cambridge Scientic Center, as chief scientist, and Steven D. Lipsey, who formed the software products subsidiary at Bolt Beranek and Newman, Inc. as vice-president of sales. The firm has 65 employees and $12 million in venture capital financing, according to the Gartner Group.

The $25,000 Bachman Reengineering Product Set is written in Common LISP and is designed to run on an Intel Corp. 80386-based Compaq Computer Corp. 386, IBM Personal System/2 Model 80 or AT&T 386, under Microsoft Corp. MS-DOS 3.1 or higher with 10M bytes of hard disk storage.

The product set runs above the 640K memory limit of MS-DOS via a Bachman/Workstation Manager operating environment that is included in the set. It uses a mouse and pull-down menus. Complex data base diagrams can be enlarged on the screen for detail work, a demonstration revealed.

The Data Base Administrator component captures data description and data manipulation language in an existing IDMS/R application and stores it in a design data base. The information can be automatically translated into Bachman diagrams.

A data base designer can then modify the design at the logical level of the diagrams, with any additions to the application automatically transferred back into data description language. The design data base also captured the source code of the application. Through rule-based artificial intelligence techniques, the application can be reassembled with procedures, data description and data manipulation language and transferred to a mainframe for recompilation, company officials said.

In reengineering a system, the rules-based assistance highlights inconsistencies and duplicate data structures. "It makes the user into a person dealing with the exceptions, an editor rather than an author," Bachman said.

No established diagraming technique exists for DB2 data bases, so Chris Loosely — a Bachman employee with 16 years' experience at the IBM Santa Teresa laboratory — invented a diagraming method to be used with the product, Bachman said.

Mobility

The IDMS/R and DB2 components are slated for delivery in the second quarter.

"The ability to take an IDMS/R data base, move it to the logical level and then forward into DB2 is quite interesting to us," said J. Michael Barefield, manager of data administration at McDermott, Inc. McDermott is a beta-test site for the set.

As a beta-test user, Barefield found a bug in a sidebar on a screen that would not permit the user to scroll through it. He said the initial version of the software was shipped to him with a free 2M-byte memory board because the system's needs exceeded the projected 10M-byte limitation of his Compaq 386.

Vendors call AT&T on Sun deal

BY ROSEMARY HAMILTON
CW STAFF

MORRISTOWN, N.J. — AT&T last week agreed to meet with a group of computer suppliers that have protested the company's move to acquire 20% of Sun Microsystems, Inc.

The protesters include Digital Equipment Corp., Apollo Computer, Inc., Hewlett-Packard Co. and other vendors that sell Unix systems. Earlier this month, the group claimed that AT&T's alliance with Sun could hurt them competitively if the two companies were to develop a new Unix without including them.

The meeting is scheduled for sometime this week, an AT&T spokeswoman said.

"We have received correspondence from some very important customers, and because they are our customers, of course we will meet with them," said Vittorio Cassoni, president of AT&T's Data Systems Group.

Cassoni was responding to a letter sent by a dozen companies Jan. 15.

"I think they have legitimate concerns," said Kate Comiskey, head of the Unix research group at International Data Corp. in Framingham, Mass.

Sun and AT&T have been working on a Unix implementation that would include the features of both the University of California at Berkeley's Unix 4.2 and AT&T's Unix System V.

Concurrent extends line

BY ALAN ALPER
CW STAFF

TINTON FALLS, N.J. — Concurrent Computer Corp. last week extended its 3280 family of superminicomputers downward with a uniprocessor model offering performance the company rated at approximately 6.4 million instructions per second (MIPS).

Called the 3280SP, the uniprocessor carries an entry-level price of $200,000. It is aimed at users in the financial, government and technical markets who have time-critical applications but cannot afford current high-performance minicomputers, Concurrent said. In addition, the uniprocessor should appeal to customers who have space limitations, since it comes in a single 71-in.-high cabinet.

"We see this system opening new doors for us, particularly with customers who couldn't afford our 3280MPS multiprocessors," noted Rusty DeSantis, Concurrent's product manager of high-performance systems.

"It's also attractive for customers whose buildings were not built for large-scale computers, since it does not need raised floors or continuous air-conditioning," he added.

Concurrent said the 3280SP costs $31,172 per MIPS, compared with competing systems that range from $40,000 to $80,000 per MIPS.

The 3280SP is initially being offered in three basic configurations — 4M-, 8M- and 16M-byte versions — with prices ranging from $199,500 to $234,500. The system supports up to 72 users and is available 90 days after receipt of order, DeSantis said.

Full-featured

The 3280SP features a 32-bit pipelined processor with 16K bytes of cache memory, a 64-bit integrated floating-point processor and 8K- by 80-bit writable control store to accelerate time-critical functions, the company said. It can address up to 32M bytes of memory and features memory interleaving for concurrent access.

All components in the system attach to a 64M byte/sec. memory bus, the firm said. The system offers a 10M byte/sec. direct memory interface expandable to two connections with an aggregate of 20M byte/sec.

The base system comes with a single 368M-byte hard disk, although slots for three additional drives can be filled, providing for an aggregate capacity of 1G byte. Additional cabinets can be added for a maximum of 60G bytes of on-line storage, the company said.

Second-class postage paid at Framingham, Mass., and additional mailing offices.
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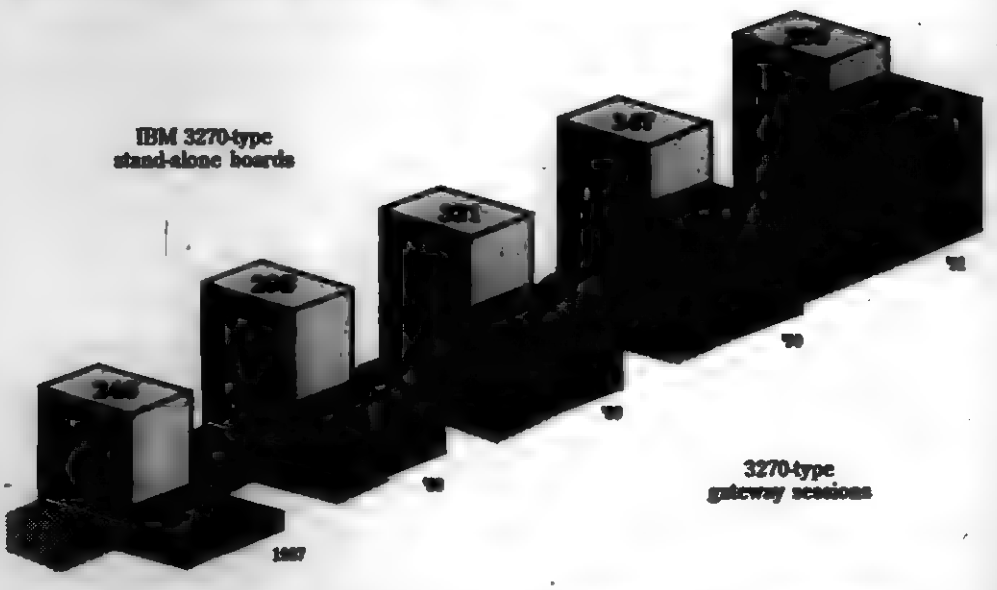
TRENDS

Terminal emulation

More firms look to net gateways for 3270 emulation

U.S. SHIPMENTS FORECAST FOR STAND-ALONE BOARD AND GATEWAY SESSION PRODUCTS (THOUSANDS OF UNITS)



Local-area network gateway unit shipments accounted for only 7% of the 1986 IBM 3270 terminal emulation market, but shipments should grow by 62% each year to account for approximately 45% of the market by 1991, according to a report from Framingham, Mass., research firm International Data Corp. (IDC). Stand-alone 3270 terminal emulation boards should only have a compound annual growth rate of 9%.

After strong stand-alone 3270 board shipments during the last few years, the gateway market is taking off because "people have installed their LANs, and the next thing they want to do is get LAN users access to a mainframe," IDC's Leslie Lord said. Users have also waited for effective tools to monitor, troubleshoot and ease gateway installation, she said.

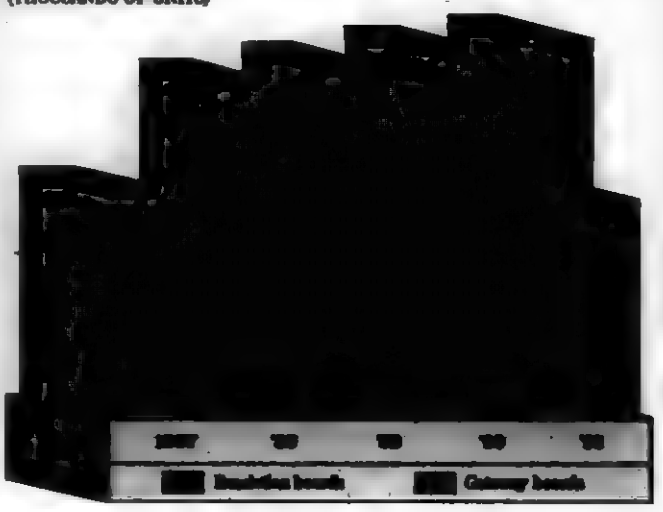
IBM's announcement of OS/2 Extended Edition for its Personal System/2 will pose both a threat and a great opportunity for gateway vendors, Lord said. "People like Digital Communications Associates, Inc. [DCA] and Novell, Inc. could come out with their own value-added version of Communications Manager," an OS/2 Extended component that incorporates both LU6.2 and 3270 connectivity, she said.

DCA held more than 50% of the stand-alone terminal emulation market in 1986, but IBM will chip away at DCA's dominance in the next few years, IDC predicted. The report was based on 1986 figures.

ELISABETH HORWITT

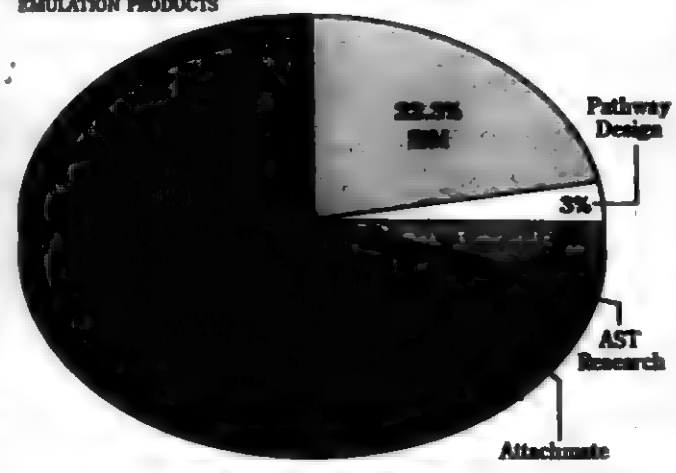
Same trend holds true in IBM minis

U.S. SHIPMENTS FORECAST FOR IBM SYSTEM/34, 36, 38 BOARDS (THOUSANDS OF UNITS)



Dominating 3270 emulation

1986 VENDOR MARKET SHARE OF IBM 3270 STAND-ALONE TERMINAL EMULATION PRODUCTS



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHARTS: AMY J. SWANSON

INSIDE LINES

Heeeerre's Johnny, again. John Cullinane has ended one of the shorter retirements in corporate history. He's back on the board of directors of Cullinet Software. "He only missed one board meeting cycle," a company spokesman said. In October, Cullinane retired and handed over the chairman's title to David L. Chapman. According to sources inside the company, when the founder resurrected himself from consultant standing last month, he was welcomed back with open arms. Outside observers were less kind: "If he had been happy with what he saw at Cullinet from the outside, he wouldn't be back on the inside," one source said.

Break the bank. Systems woes continue to mount at Bankamerica. Last week, the company reported that it has set aside another $35 million for its Masternet trust reporting system. That fourth-quarter reserve is piled on top of $25 million previously held in reserve for a system that was originally projected to cost $20 million to build. A spokesman said the company is reevaluating its interest in the trust reporting business.

Hope you weren't holding your breath. After more than a year of delays and unfulfilled promises, Ashton-Tate will provide a sneak preview of its new Dbase to a select group of users and analysts this week, sources close to the company say.

The demonstrations could signal that Ashton-Tate is close to announcing a release date for the souped-up product, known by many as Dbase IV. That would be in line with Ashton-Tate Chairman Ed Esber's recent hints that an announcement is imminent, but with 350,000 lines of new source code to pull together for Dbase IV, observers are skeptical that the product will ship before summer.

Can the board be bought? Joseph Clark, the embattled Paterson, N.J., high school principal facing dismissal by the local board of education for indefinitely suspending problem students, was recently defended — and even offered a job — by President Reagan. Now Jack Berdy, founder and chairman of On-Line Software in nearby Fort Lee, N.J., wants to reward Clark for his tough stance. Berdy is ready to establish a $100,000 annual college tuition scholarship over the next 10 years for students at Clark's Eastside High School who wish to study computer science. There is one condition: Clark must remain as principal of the school.

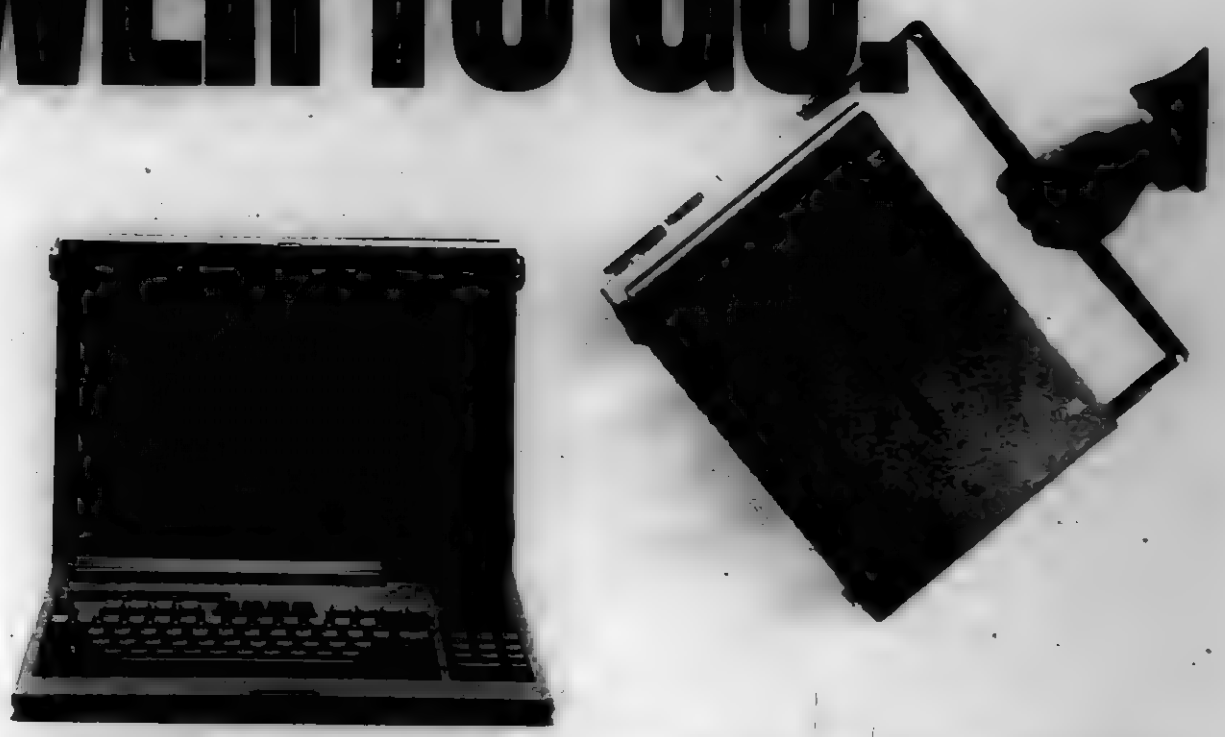
Close-to-Miami vice. Analysts are receiving invitations from IBM to attend a briefing in Boca Raton, Fla., Feb. 11-12. Is this the precursor to another announcement? Some sources expect new IBM products next month covering the low end to the mid-range. Others report possible PS/2 price cuts, especially on the Model 50, which is slated to get a new disk drive.

In their domain. Apollo plans to introduce a new version of its Unix-based operating system Feb. 2. Domain/IX will be the first step in Apollo's rollout of a new generation of workstations. A high-end system based on a reduced instruction set computing processor that includes a new I/O and bus structure is another step that reportedly will be taken shortly.

Over the threshold. Memorex International finalized its acquisition of Telex last week after completing the necessary financing. Telex Chairman George Bragg was named president and chief operating officer of newly formed Memorex Telex North America. Sergio Mazza, who had headed Memorex's U.S. business, will lead a new division, Memorex Computer Supplies, in Milpitas, Calif.

Wait for the next FCC filing. What happened? Northwest Airlines' reservation system took an unscheduled midday rest Jan. 13, requiring passengers on at least one flight — from Orlando, Fla., to Memphis — to board without assigned seats. A Northwest ticket agent in Orlando said the whole system was down. A spokesman at the company's Minneapolis headquarters confirmed the system was down for an hour but would not report reasons or the extent of the outage. Northwest plans to merge the system with TWA's PARS system in March.

NEC INTRODUCES DESKTOP POWER TO GO.



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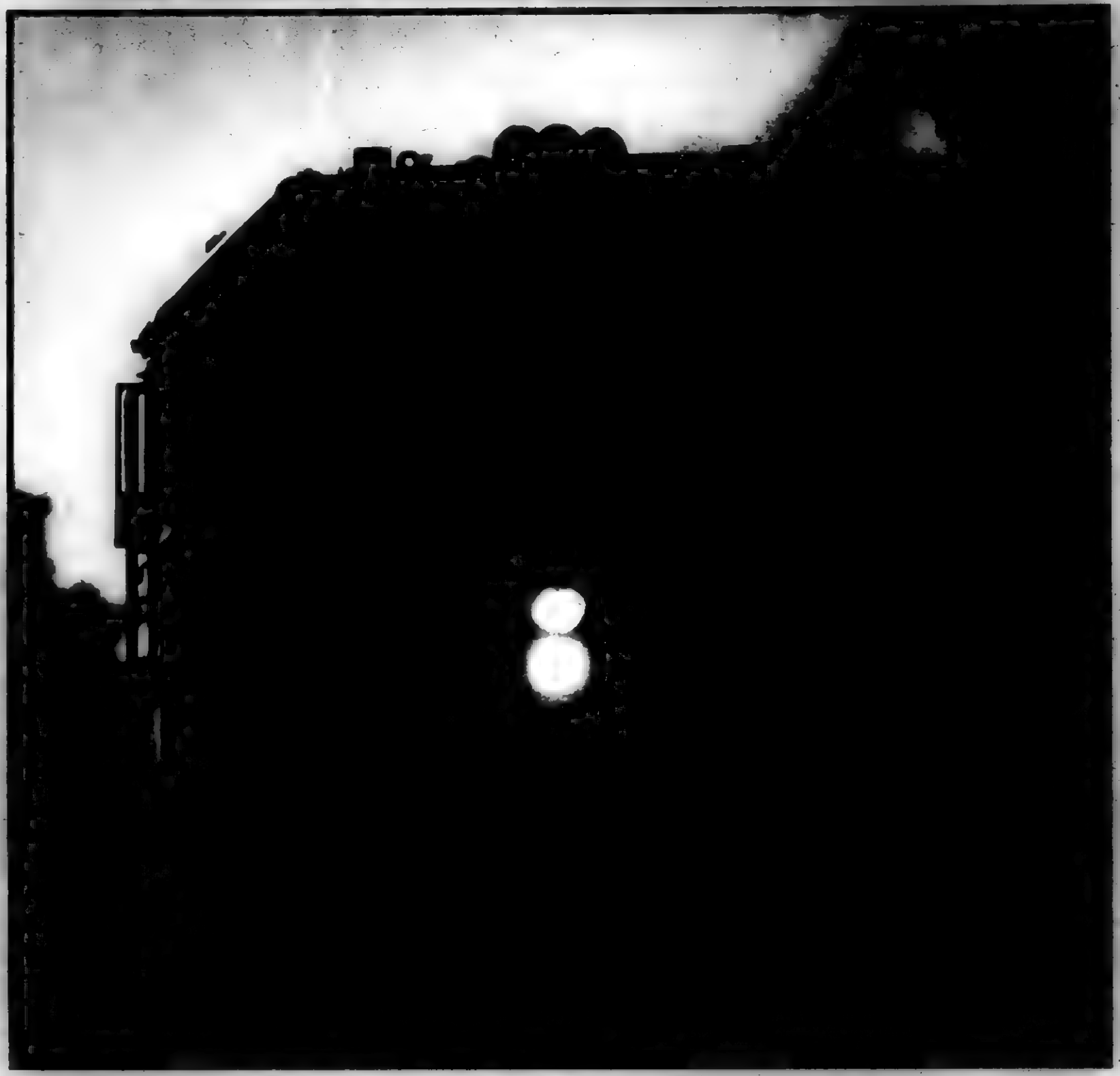
C&C Computers and Communications

THEIR PAYROLL SYSTEM RUNS ON SCHEDULE, TOO.



With 25,000 employees and ten different payrolls, Amtrak had a difficult task making sure everyone's paycheck arrived on time. And since they were required to pay union employees by a specified time every week, Amtrak needed software that would keep their payroll right on schedule. So they chose the Payroll/Personnel System from Management Science America, Inc.

"MSA is the undisputed leader of the software industry in the human resource arena," says Norris Overton, Amtrak's assistant vice president for Resource Management. "It evokes a tremendous confidence factor."

The MSA Payroll/Personnel System enabled Amtrak to eliminate multiple batch systems and replace them with one integrated, online, realtime system. Amtrak can now respond quickly and accurately to the more than 100 requests per week for ad hoc reports. And overtime in the human resource area has decreased considerably. According to Overton, "The accuracy and faster response time have been tremendous for the field, and we're confident that the MSA Payroll/Personnel System will meet our future needs."

For more information, call Robert Carpenter at (404) 239-2000. No matter what kind of industry you're in, we have a payroll system that can keep you rolling along smoothly.

MSA The Software Company

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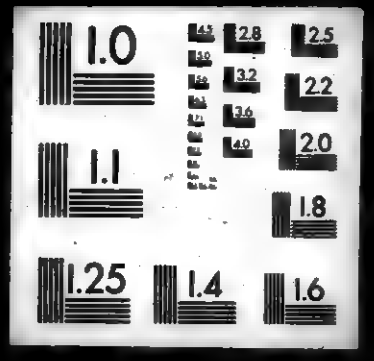
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COMPUTERWORLD

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NEXT WEEK:
IBM answers critics on object code practice.

Shake-up at IBM redraws lines of power

Product groups shuffled; divisions gain day-to-day control

BY ALAN ALPER
CW STAFF

NEW YORK — Seeking to brighten its future after three lackluster years, IBM last week transferred key product design, manufacturing and marketing decisions to five independent business units.

Decentralizing decision-making authority for its domestic manufacturing and development operations from its corporate management committee to the executives heading up the new units will, IBM hopes, enable the $55 billion lumbering giant to expedite product development and react more quickly to customer demands.

The five business units are grouped around key product lines: 370 architecture systems, System/36 and 38 machines,

personal systems, communication systems and technology products (see chart below).

The executive overseeing each unit will be accountable for product line revenue and profitability and will be responsible for worldwide product development as well as domestic manufacturing.

"I've felt for a long time we needed a more responsive, better organization," IBM Chairman John Akers said during a press briefing at IBM regional

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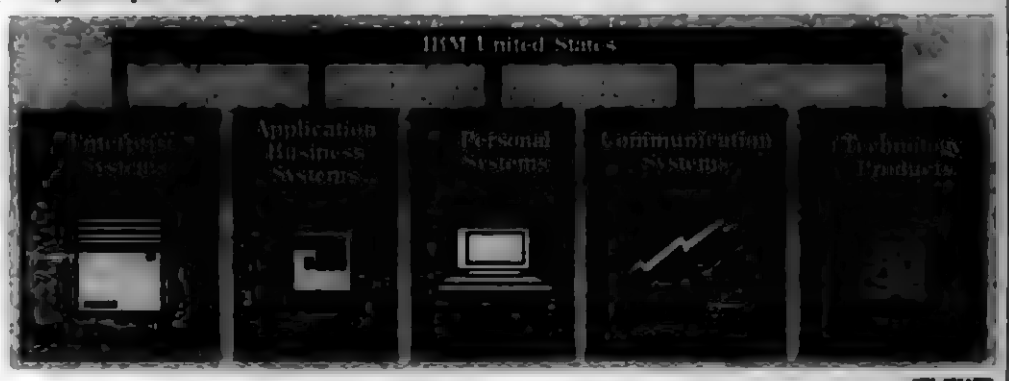
Lined up for business

With reorganization of its U.S. operations, IBM places various product divisions on a par with its mainframe operations



CW CHART

Lautenbach on Blue streak

BY CLINTON WILDER
CW STAFF

Terry R. Lautenbach's elevation to general manager of IBM United States last week surprised many observers, but his IBM career path has been a familiar one for many of Big Blue's highest ranking executives. And he is Blue to the core, logging nearly 30 of his 49 years in an IBM suit.

Like Chairman John Akers and others, the silver-haired Lautenbach rose through the giant company's marketing ranks to several key management posi-

Continued on page 89

$80M MIS disaster

BY DAVID A. LUDLUM
CW STAFF

SAN FRANCISCO — Bankamerica Corp. is scuttling efforts to use its trouble-prone Masternet institutional trust accounting system, which has been five years in the making and cost an estimated $80 million.

The banking company recently disclosed that it will shift the processing for 95% of its institutional trust accounts — believed to represent about 75% of total transactions — to its Seafirst Corp. subsidiary in Seattle. The transfer will take place in mid-April, according to a letter Bankamerica sent to its clients.

The development appears to bring to a climax an ambitious but ultimately disastrous attempt to deploy a leading-edge information system whose cost was initially pegged at $20 million, according to interviews with industry sources and former Bankamerica employees.

On Jan. 21, Bankamerica revealed that, during last year's fourth quarter, it had set aside

Continued on page 10

No-disk Model 50 tested

BY JAMES DALY
CW STAFF

IBM is letting users tinker with a diskless version of its Personal System/2 Model 50 in an apparent effort to fold its proprietary Micro Channel architecture-based machines into a larger networking environment.

The company recently offered the system to customers on a custom-bid basis and may announce it as a full-blown commercial product by next month, according to one early user and an analyst familiar with the machine.

Several users of diskless Model 50 prototypes who were contacted by *Computerworld* said the unit is more reliable, quieter and less expensive than its disk-based counterpart.

MIS gains control

The diskless Model 50 also allows MIS organizations to control the data and applications that end users access from a host computer. The new model uses programmable read-only memory to tap into a local-area network through a file server, which serves as a central repository for software.

"As soon as I can get my

Continued on page 14

Tower line fortified

BY ALAN ALPER
CW STAFF

NEW YORK — NCR Corp. broadened the scope of its Tower family of multiuser Unix-based systems last week by unveiling low- and high-end systems as well as two mid-range members of the series.

At the same time, the company embellished the networking options it offers with the Tower machines. NCR introduced a file server that lets Microsoft Corp. MS-DOS-based microcomputers on a local-area network access Tower applications; a token-ring controller and Netbios; and a Transmission Control Protocol/Internet Protocol interface.

The high-end Tower 32/850, designed around the 32-bit 25-MHz Motorola, Inc. 68020 mi-

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NEW ISSUE
SECOND CLASS

IN THIS ISSUE

Power trip. The focus is on mainframes as IBM unveils the 3745, claiming price and network support advantages over the earlier 3725; Alliant turns up the heat with powerful FX/8 replacements; NAS ups AS/VL storage capacities to IBM 3090 levels; and Unisys cuts 1100/90 prices and announces low-cost enhancements to the mainframe line. Pages 6, 8, 14.

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NEWS

GAO finds NYSE systems guilty in market crash

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C.— Stock exchange computer systems were unable to handle the tremendous volume of transactions attempted during the stock market crash last October, according to a federal agency.

In a preliminary report and testimony to a congressional panel, the U.S. General Accounting Office (GAO) suggested that regulators such as the Securities and Exchange Commission should play a role in encouraging the stock exchanges to upgrade the capacity of the systems.

Problems arose in several markets, the auditors reported, but were typified by the capacity constraints in the card printers on the floor of the New York Stock Exchange (NYSE). "As these printers became overloaded, the delays backed up into other segments of the system and then reverberated through other markets as well," the report said.

On Oct. 19, the day the Dow Jones industrial average plummeted 508 points, orders for 396 million shares were entered into the NYSE's automated transaction system — an unprecedented amount of traffic.

NYSE officials have acknowledged the problems and plan to upgrade the capacity of the systems.

A similar report compiled by the Presidential Task Force on Market Mechanisms, known as the Brady Commission, said the bottleneck resulted from a device controller through which all orders are transmitted to the printers. The controller has a capacity of 68 messages per second, which was exceeded by peak volume of 72 messages per second Oct. 19.

"The floor printers, which have a capacity of 10 to 12 printouts per minute, were overwhelmed at times," the report said. The delays meant that market orders were executed at prices very different from those in effect when the orders were entered, the commission said.

HP rolls out ink-jet printer

Laser-quality unit designed for desktop users

BY JAMES A. MARTIN
CW STAFF

VANCOUVER, Wash. — Hewlett-Packard Co. last week introduced a desktop thermal ink-jet printer said to offer laser-quality text and graphics for less than $1,000.

The Deskjet printer, set for immediate availability, is aimed at capturing a portion of the high-end dot matrix printer market and was not designed to compete with more expensive laser printers such as HP's Laserjet II, according to Thomas R. Braun, manager of HP's research and development section.

The Deskjet reportedly is best suited for individual use, handling sophisticated word processing print jobs that incorporate graphics. The printer was not designed to handle the volumes associated with large desktop publishing or network shared-peripherals requirements, Braun added.

HP's latest printer offering is "a viable alternative to the 24-wire printer technology," said Gary Jensen, a senior industry analyst for Dataquest, Inc. "Customers want laser-quality print, and they are not particularly concerned about the technology used to produce it as long as it's as reliable as dot matrix, quiet, produces true laser-like output and is competitively priced," he added.

The Deskjet is HP's fifth printer introduction in the last 11 months, Jensen said. "They are becoming a significant, if not dominant, player in the market," he added.

Specifications outlined

Deskjet reportedly prints 120 char./sec. in letter-quality mode and 240 char./sec. in draft mode. The output speed is said to be 2 page/min, compared with 8 page/min on the Laserjet II and other laser printers. Text resolution is 300 by 30 dot/in., which is roughly equal to that of the Laserjet II.

The printer includes courier fonts and, with the use of snap-in cartridges, can support up to 32 different fonts. It is compatible with most HP Laserjet printer-supported software packages via the HP Printer Command Language.

The Deskjet works with IBM Personal Computers and compatibles and IBM Personal System/2 models. It also works with HP's Vectra, Touchscreen, Portable Plus and HP 1000, 3000 and 9000 series departmental systems.

Retailing at $995, the Deskjet supports a dual-interface RS-232 and Genicom Corp.'s Centronics parallel interface.

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Prime succeeds in Computervision takeover

Transition task force to address product, personnel redundancy

BY ROSEMARY HAMILTON
CW STAFF

Prime Computer, Inc. and Computervision Corp. put aside their weapons last week and began the arduous task of blending the two companies into a single entity.

The two Massachusetts firms signed a Plan of Merger agreement last Thursday that will make Computervision, a computer-aided design and manufacturing (CAD/CAM) systems supplier, a division of minicomputer maker Prime.

Both users and industry analysts expressed support for the deal, as they had when Prime announced its intentions to acquire Computervision in late December.

"It certainly points out that [Prime is] committed to CAD/CAM," said Steven Felton, director of computer services at The Ryan Group, an architectural firm based in Middletown, N.J., that uses Prime equipment.

Final offer

Prime will purchase Computervision's outstanding stock at $15 per share, which was the second and final offer Prime made in January.

Both companies said that they could not provide details of how Computervision will be brought under the Prime corporate umbrella.

The merger was seen by many as indicative of the inevitable consolidation in the CAD/CAM arena.

"I'm realistic enough now to know that to be a world leader, you have to be much bigger than Computervision is now," said Phillipe Villers, co-founder of Computervision and now president of Cognition, Inc.

CEO Henson plans team

In an interview last week, Prime Chief Executive Officer Joe M. Henson said he intends to set up a transition team that will oversee a number of task forces, which, in turn, will address both staffing and product questions.

"This is a good fit that makes sense," said Robert Herwick, a technology analyst with Hambrecht & Quist, Inc. "I think the deal is a steal. Henson should be congratulated."

Henson said he expects Robert L. Gable, CEO of Computervision, to join him in overseeing the transition team.

Asked if Gable will remain with the new company, Henson said he hoped so. However, he could not say if Gable would be selected to lead the Computervision division.

Industry observers, on the other hand, said they expect Gable to resign.

"I don't think Henson and Gable will work at the same company for a long time," said Craig Symons, an analyst with the Gartner Group, Inc. in Stamford, Conn.

Layoffs possible

Henson also did not rule out the possibility of layoffs.

"We want to treat the employees fairly," he said. "We're hoping that the areas of redundancy are handled by attrition, but that's no guarantee. It's logical that there will be duplication and elimination of job posts. But that doesn't necessarily mean layoffs."

Henson said the task forces will address the product areas in which both companies currently have offerings.

In CAD/CAM software, for instance, both companies sell a version of Medusa, a product that was originally developed by Cambridge Interactive Systems Ltd. (CIS) in Cambridge, England.

In the U.S., Prime was the first to be licensed to market Medusa. Computervision subsequently bought CIS and began marketing Medusa as well. Analysts speculated that the two Medusas will be slowly merged and that customers will eventually have one Medusa available to them.

Workstation overlap

Another product area in which there is potential overlap is CAD/CAM workstations.

Computervision sells its Cadds 4X software on a customized Sun Microsystems, Inc. platform.

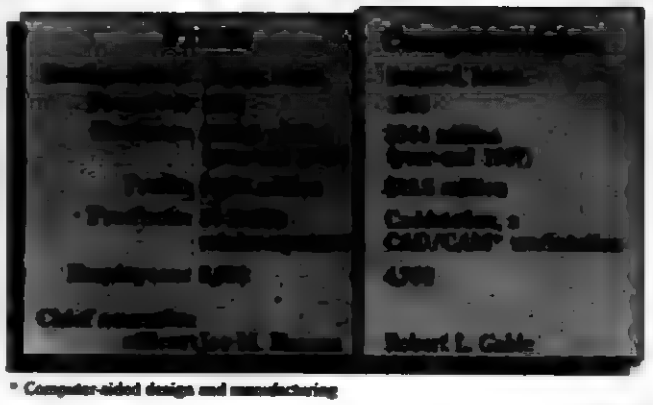
Prime, meanwhile, has deals in the works with both Sun and Silicon Graphics, Inc.

Prime and Computervision began negotiating early last week after nearly a month of hostility.

But while the two companies were involved in various legal maneuvers, industry observers were saying it was just a matter of time.

"It was inevitable," commented Symons of the Gartner Group. "These deals are purely financial, not technical synergy or anything else."

At A Glance



* Computer-aided design and manufacturing

CW CHART

Tower

FROM PAGE 1

croprocessor, supports 512 users, four times as many as the Tower 32/800, NCR said.

With expanded networking support, the high-end Tower should enhance NCR's competitiveness in departmental computing while bolstering its presence in branch processing and small business systems markets, analysts said.

A real performer

"You can't get this much performance from a traditional minicomputer," analyst Louis Giglio of Bear, Stearns & Co. said of the high-end Tower.

"Companies like Wang with their proprietary operating systems have a hard time improving the performance of their software as fast as increasing the performance of their hardware. This shows that NCR's Unix strategy has been a good one," Giglio said.

NCR estimated that the installed base of Tower machines is 50,000.

John Duritsch, assistant vice-president of NCR's computer systems division said the Tower's popularity revolves around the series' modular expansion capabilities and object code compatibility, which allows applications to run on all family members.

Supports more processors

The Tower 32/850 can support six 68020-based application processors, each with 8M to 16M bytes of memory, which is two more than the Tower 32/800 supports.

A new file I/O subsystem with 2M bytes of memory was designed to overcome the small-byte-record problems that plagued early production models of the 32/800 [CW, Aug. 31].

The Tower 32/850 has 40K bytes of cache and a floating-point processor and supports five internal 380M-byte disk drives. Slated for availability in the third quarter, the system lists for $106,175.

The mid-range Tower 32/450 and 32/650 feature 25-MHz 68020s, 32K bytes of cache and 50% more performance than the Tower 32/400 and 32/600, NCR said.

A mass-storage controller supports 179M- and 380M-byte fixed drives and a 150M-byte cartridge tape drive. A 16-channel serial I/O controller enables the Tower 32/450 to support 32 users, twice that of its predecessor, and lets the 32/650 support 64 users, 16 more than the 32/600 supports.

> "YOU can't get this much performance from a traditional minicomputer."
>
> LOUIS GIGLIO
> BEAR, STEARNS & CO.

The Tower 32/450 lists for $15,565, and the 32/650 is priced at $24,915. Both systems will be available in June, NCR said.

The older 32/400 and 32/600 can be upgraded by swapping processors and storage controllers, NCR noted.

The low end

The low-end Tower 32/200 extends 16.67-MHz 68020 technology to a system supporting four users and networked microcomputers.

The single-board system comes with 1M to 8M bytes of memory and supports 25M-, 51M- or 100M-byte 3½-in. disk drives and a 150M-byte cartridge tape drive.

The 32/200 lists for $5,445 and is scheduled for April delivery.

The NCR File Server lists for $1,230 and should be available in the third quarter. The NCR Token-Ring Controller and NCR Token-Ring Netbios, enabling a Tower to connect to a Token-Ring LAN, list for $2,195 and $530, respectively, and are set to be available in the second quarter.

The TCP/IP connection will also be available in the second quarter, according to the firm.

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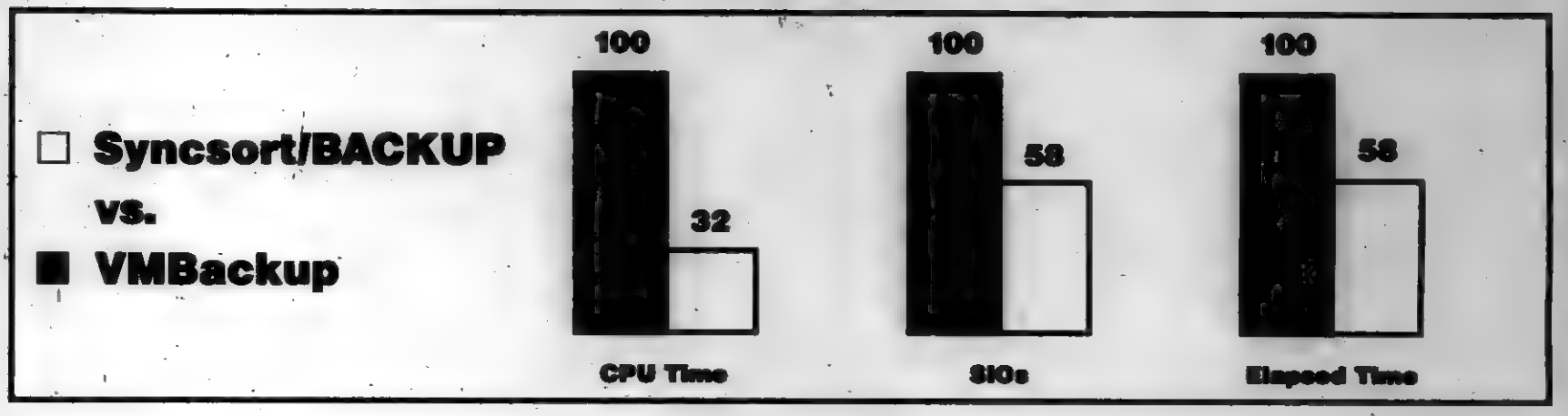

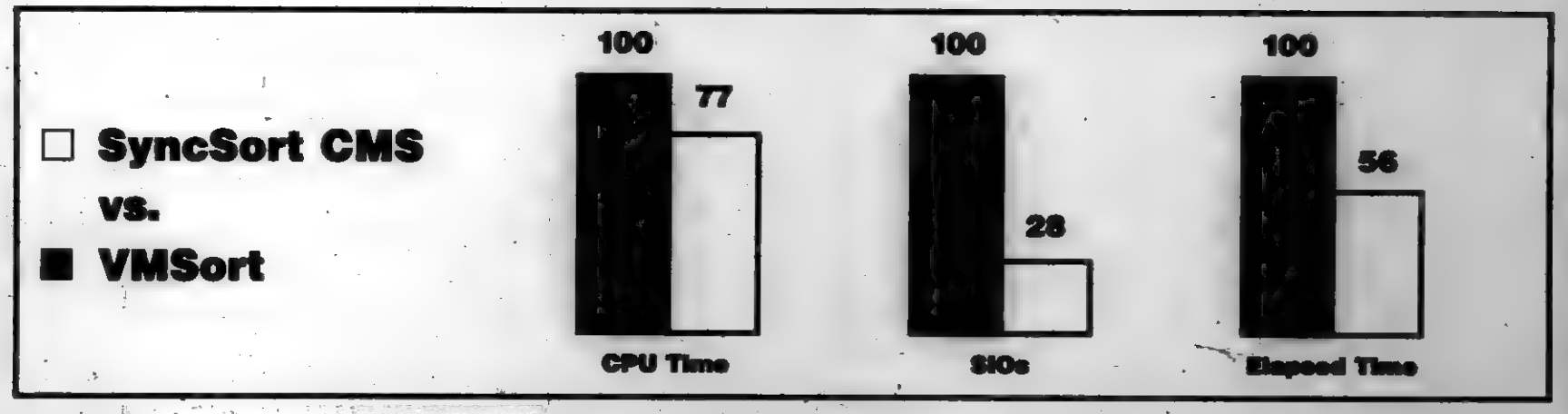

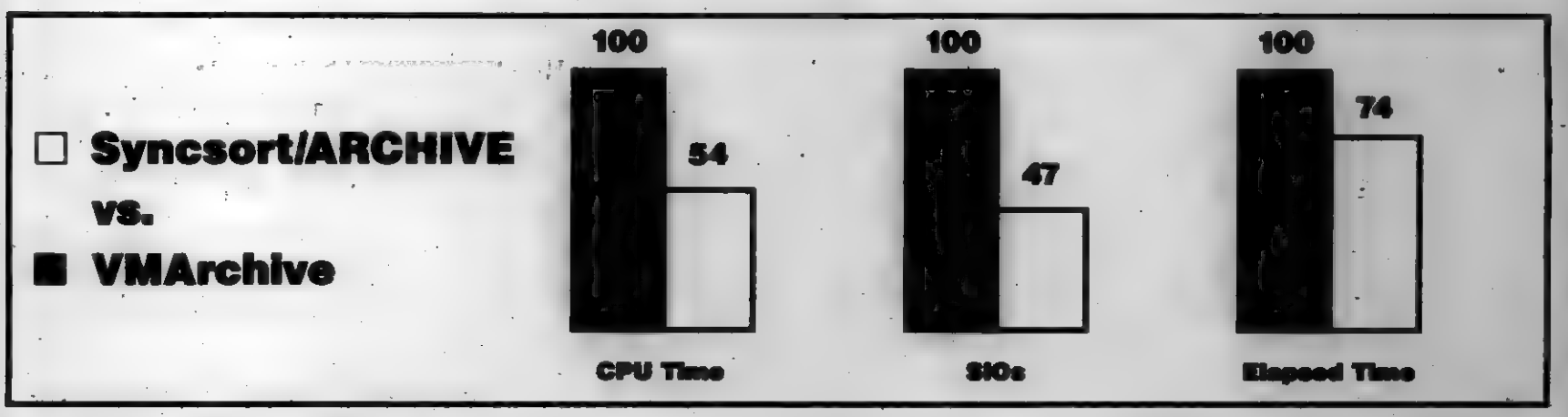

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IBM surpasses 3725 line with 3745

Processor strengthens firm's support for distributed networking scheme

BY ELISABETH HORWITT
CW STAFF

WASHINGTON, D.C. — IBM last week strengthened the ability of its communications processors to support its unfolding distributed networking scheme.

The company announced a long-expected addition to its communications processor family that reportedly packs four times the punch of the existing 3725.

IBM also brought out enhanced versions of the Advanced Communications Function/Network Control Program (ACF/NCP) software that it said adds greater flexibility and peer-to-peer networking to its communications processors. One eagerly awaited feature is dynamic network reconfiguration, which lets users add or delete communications processors, hosts or lines without having to take down the IBM Systems Network Architecture (SNA) network.

The 3745 eliminates several long-standing limitations of the earlier 3725 high-end model and provides far more cost-effective communications processing power, according to IBM.

Among the reported advantages are the following:

• Support of up to 16 host channel connections, compared with six for the 3725.

• Support of up to eight active T1 links, instead of just one. This can eliminate for some companies the need to install an additional box, such as IBM's 3737 or Network System Corp.'s Hyperchannel, to handle high-speed communications between hosts, said Robert Graham, vice-president and manager of the IBM Systems Support group at Bankers Trust Co. in New York.

• Backup capabilities are provided by the second processing unit, which can be automatically activated by a network alert sent to the Netview network management system, according to Donald Casey, vice-president for hardware development at IBM's Communication Products Division.

The 3745's superior processing power also makes it a far more viable gateway between hosts and IBM Token-Ring networks, IBM and industry sources agreed. Users and analysts have complained that the 3725 bogs down as a conduit between a host and a rapidly growing local-area network.

In contrast, the 3745 "can certainly achieve a 1M bit/sec. throughput" either as a gateway between a LAN and a host or between multiple LANs, Casey said, thereby indicating that IBM envisions the device as a high-speed LAN-to-LAN bridge.

IBM's new ACF/NCP releases will allow IBM communications processors to deliver several low-entry networking features that the vendor announced last June, according to Ellen Hancock, vice-president of IBM's Communication Products Division. The new Version 5 supports the 3745 and existing 3720 processors; the enhanced Version 4, Release 3 supports the 3725. Enhancements include the following:

• Support of IBM's SNA 2.1, so devices running the peer-to-peer networking protocol can communicate across an SNA backbone of processors without having to go through the host for each interaction.

• Dynamic network configuration and updates of SNA tables without the need to interrupt network operations.

• Multidrop networking, which allows multiple communications processors to share the same dedicated line.

The one-processor 3745 Model 210 is scheduled to ship in March, with prices beginning at $125,000. The dual-processor Model 410 costs up to $1.3 million for a top-of-the-line model.

Scheduled for shipment beginning in September, ACF/NCP Version 4, Release 3 has an initial license charge of $2,085. One-time charges for ACF/NCP Version 5 range from $14,400 to $72,000, depending on the system. Version 5, Release 1 began shipping last week, with other releases planned for later this year.

Increased availability for the 3745 will be crucial if it becomes a backbone system supporting peer-to-peer connections between IBM and non-IBM devices, rather than just a front end attached to a single host, according to Thomas Nolle, president of Haddonfield, N.J., consulting firm CIMI Corp.

One way that IBM has fitted the 3745 for the role described above is by adding support for the device to its SNA X.25 Interconnection, a program that allows an SNA backbone of communications controllers to support X.25 packet-switching communications between both IBM and non-IBM devices, Casey said.

Of particular interest to Bankers Trust's Graham was IBM's introduction of the Network Asset Management program, which allows IBM cluster controllers to send to a host data base information about serial number, machine type and port number of all attached devices.

The program reportedly will be available without charge as an enhancement to the IBM 3174 Subsystem Control Unit Configuration in the second half of this year.

Front of the line

IBM's 3745 communications processor cuts into some advantages that NCR Comten's 5660 has over the older IBM 3725

	IBM 3745 Model 410	IBM 3725 Model 1	NCR Comten 5660
Maximum number of lines	512	256	1,024
Maximum number of concurrently active T1 lines	8	1	2 to 3
Maximum main storage	8M bytes	3M bytes	16M bytes
Maximum number of internal processors	2	1	1
Maximum number of token-ring connections	8	8	None
ACF/NCP*	Version 5, Releases 1, 2	Version 4, Release 3	Version 4, Release 2
Base price	$180,000	$290,940	$310,000

* IBM Advanced Communications Function/Network Control Program

CW CHART

IBM's System/88 line enhanced by Stratus

BY ALAN ALPER
CW STAFF

NEW YORK — Following its OEM supplier's lead, IBM last week unveiled two entry-level members of its System/88 fault-tolerant systems family and a new I/O subsystem, featuring programmable communications adapters to support specialized protocols.

Supplied by Stratus Computer, Inc., the new System/88s are aimed at customers who need high-availability systems for smaller on-line transaction processing loads, IBM officials said.

Other than IBM packaging and minor specification changes relating to printer support and use of an IBM microcomputer as a console, the new System/88s are essentially identical to the processors unveiled recently by Stratus [CW, Jan. 25], noted William Osborne, fault-tolerant systems manager of IBM's Communication Products Division.

Supports 40 ports

The IBM 4578 comes in 8M- and 16M-byte configurations, with four duplexed Motorola, Inc. 68010 microprocessors, and can support one I/O processor and 40 communications ports.

They reportedly offer comparable performance at lower prices than the existing entry-level 4576 Model 81 and are packaged in smaller 36-in. high cabinets. The two processors are priced at $50,300 and $83,000, respectively, IBM said.

The 4579 is being offered in four models: two 8M-byte and two 16M-byte configurations, with support for up to 96 communications ports. The configurations are differentiated by processor speed; two are powered by four duplexed 68010 microprocessors, the other two by four duplexed 68020s.

Packaged in 54-in. cabinets, all 4579s, save the 68010-based, 8M-byte version, reportedly can support an additional I/O processor. The processors range in price from $83,000 to $109,000, IBM said.

The new processors are scheduled for availability in the fourth quarter and reportedly will be accompanied by Release 5 of the System/88 OS operating system. The 4578 and 4579 can be upgraded within processor class but not to current family members, IBM noted.

The new I/O subsystem, containing 16 slots, attaches to all System/88 family members. It supports RS-232, 422 and 423 communications and can be modified by customers who need to attach devices with unique protocols, IBM said.

Available in fourth quarter

Slated for availability in the fourth quarter, the subsystem lists for $11,000.

IBM also rolled out new 8-in. direct-access storage devices with capacities of 151M, 320M and 781M bytes for the entire System/88 family. Offering 3½ times more capacity than was available previously, the drives are priced at $10,600, $15,200 and $25,200, respectively.

The 151M- and 781M-byte drives will be available in the second quarter, while the 320M-byte drive is set to ship in the third quarter, IBM said.

Phoenix's BIOS to run on Dell PCs

BY ED SCANNELL
CW STAFF

AUSTIN, Texas — Dell Computer Corp. and Phoenix Technologies Ltd. this week will announce that they have agreed to jointly develop a series of BIOS products for Dell's existing line of IBM-compatible systems and for an IBM Personal System/2-compatible system, sources said.

Dell will not retrofit Phoenix's BIOS for people now using Dell's IBM Personal Computer AT- and XT-compatible systems; rather, the company will ship the BIOS with all of its new AT- and XT-compatible systems, starting with the Intel Corp. 80286-based System 200. A Dell spokesman declined to say specifically why the company has decided to switch from its own to Phoenix's BIOS.

> "WE HAVEN'T been getting a lot of demand for Micro Channel systems."
>
> JOHN ELLETT
> DELL COMPUTER CORP.

"We have always strived for highly compatible machines and, for various reasons, have decided to go with Phoenix on the System 200," said John Ellett, a program manager at Dell.

Asked about plans to develop a BIOS for IBM's PS/2 series, Ellett and a Phoenix spokesman declined to comment. "We haven't been getting a lot of demand for Micro Channel systems," Ellett said. "What we have seen is [demand for] the optional 3½-in. drive, IBM Video Graphics Array compatibility and OS/2 compatibility. So that is what we did with the System 200."

Dell will wait until there seems to be sufficient demand from customers before it commits to developing an IBM Micro Channel architecture product, Ellett said.

Dell uses chip sets from Western Digital Corp. in its existing line of systems. Western Digital is one of two chip makers that have announced chip sets that allow systems manufacturers to put together a Micro Channel work-alike.

Dell and Phoenix have been working together for several months, according to one source.

Limits temper corporate OS/2 plans

BY STEPHEN JONES
CW STAFF

IBM's OS/2 Standard Edition Release 1.0 still appears to be more of a technical curiosity than an operating system workhorse and is likely to remain an outsider in MIS circles, according to users contacted by *Computerworld* last week.

Reports of compatibility problems with some existing hardware and software and a lack of OS/2-specific applications have led many MIS shops to buy only one or two copies of the package. Few have plans for widespread implementation.

Among MIS managers, however, interest in OS/2 shows no signs of flagging, and early limitations are not changing corporate purchasing plans for the graphics-based Presentation Manager version of OS/2 expected in the fall.

It's not in there

"Most of the technical people in the company will work with it, but we're in no rush to embrace OS/2," said Phillip Gordon, manager of office systems at Charles Schwab & Co. in San Francisco.

"There is nothing inherent in OS/2 that users can take advantage of," said Amy Wohl, president of Wohl Associates, a Bala Cynwyd, Pa., consulting firm, said it took her staff and a battery of technical engineers from a local dealer four days to install Standard Edition 1.0 on an IBM Personal System/2 Model 60. An incompatible mouse driver was finally identified as the source of the problem.

Wohl said such difficulties will be hard to avoid until additional support staff in the dealer channel becomes more familiar with the operating system.

"It's the usual breaking-in period. But OS/2 is complicated enough that the breaking in will take longer than it should," she said.

Schwab was forced to sit on its copy of OS/2 for a month because the PS/2 Models 50 and 60 did not have the 2M bytes of memory needed to support the system, Gordon said. The company only recently installed an IBM memory card on one of its PCs to handle the OS/2 load.

Lack of communication

The inherent limitations of the product have slowed its acceptance in other MIS shops as well.

The Travelers Corp. in Hartford, Conn., opted to keep Standard Edition 1.0 off of its approved product list because it cannot support communications and network products, such as those that run under IBM's Token-Ring network.

"It can't be a product for us now because of the lack of communications support," said Ron Calabrese, a software manager for The Travelers.

Microsoft and IBM are quick to point out that most of these problems will be resolved in later releases, such as Extended Edition.

Developers admit that OS/2 takes longer to install than DOS because of its increased functionality, but some users said OS/2 is easier to boot than its predecessor. Calabrese said the system almost boots itself through a partially automated loading procedure.

> "WE haven't figured out what we'll do with it yet."
>
> RICK HEIDEN
> GENERAL ELECTRIC CO.

Rick Heiden, a software engineer in General Electric Co.'s Corporate Information Technology Group. "We haven't figured out what we'll do with it yet."

Heiden said his group is more interested in getting its hands on the Presentation Manager. While GE has 40,000 personal computers, Heiden's group has bought only two copies of OS/2.

Even Microsoft Corp., which co-developed OS/2, seems to have trouble mustering much zeal over the system.

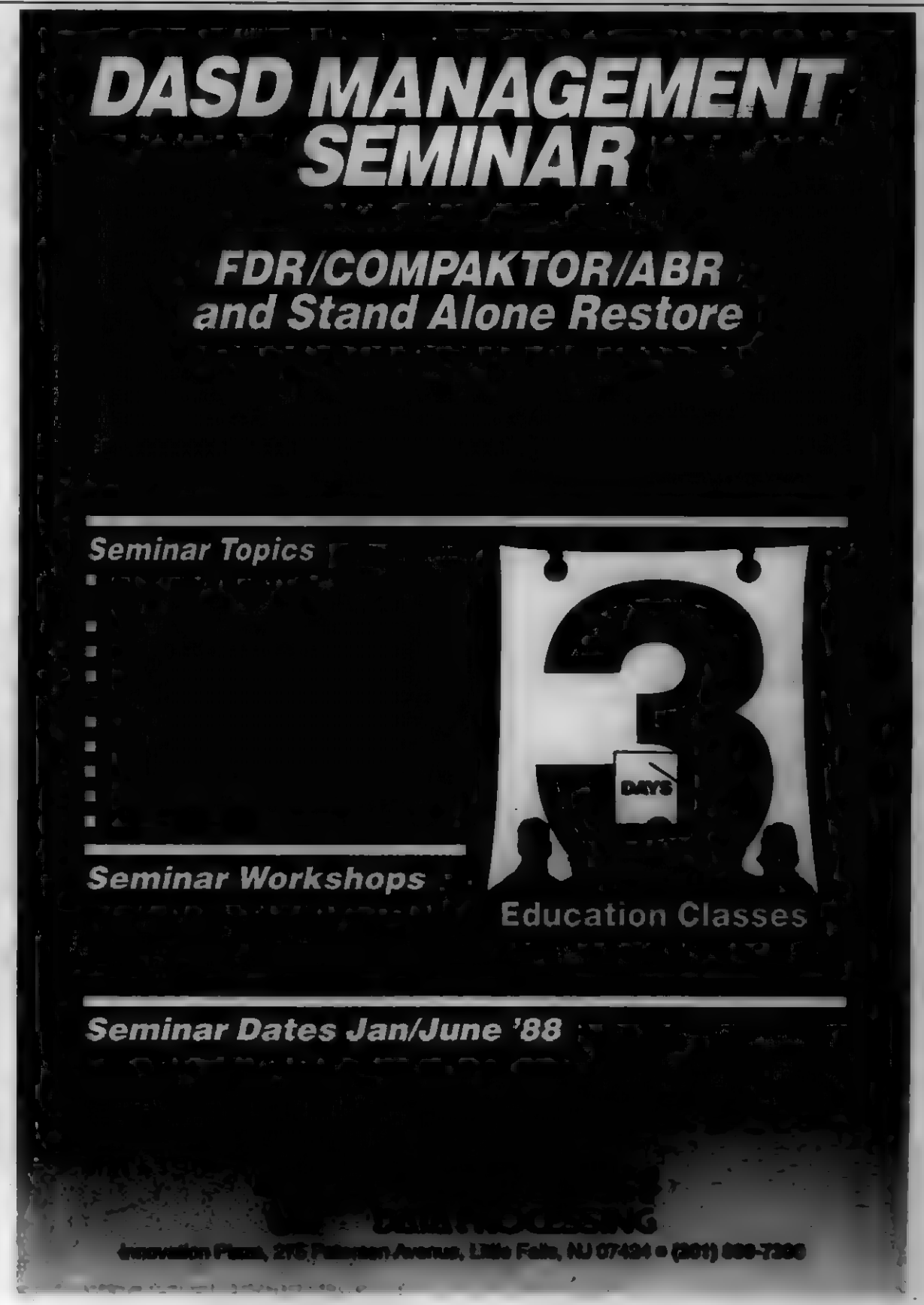
"OS/2 1.0 will be [made] obsolete by 1.1 Presentation Manager — that will be the real base for the next generation of personal computing," said Mark Mackaman, Microsoft's OS/2 product manager.

On the slipcase of OS/2 Standard Edition 1.0, IBM states that it will not support the product after Jan. 15, 1989, apparently turning its attention to Standard Edition 1.1 and Extended Edition 1.0, both of which are slated to ship before that date.

This does not seem to be stopping users from at least trying their hand at the product. John McCarthy, a consultant with Forrester Research, Inc. in Cambridge, Mass., estimated that 235,000 copies of OS/2 will be sold this year. Only 10% of those will include the Presentation Manager.

Some users who have tried OS/2 related a variety of mishaps.

Incompatibility with existing hardware and software is one of the greatest obstacles. Non-IBM add-in boards, incompatible mice and printers and nondocumented software programs have caused some of the biggest problems.



Users ahead of Apple-DEC deal

BY JULIE PITTA
CW STAFF

MIS users already connecting Apple Computer, Inc.'s Macintosh personal computers to Digital Equipment Corp.'s VAX minicomputers appear unimpressed by Apple and DEC's recently announced alliance.

The companies' agreement to jointly develop products allowing Macintoshes to communicate more efficiently with VAXs merely represents the recognition of an existing phenomenon, users said. Further, they added, a few pieces are missing in the Mac-to-VAX puzzle.

"We've been connecting Macintoshes to a lot of things: VAXs, IBM mainframes and Crays," said W. R. Magnor, program analyst for Chevron Corp.'s field research department. "Connecting Macs to VAXs is easy with asynchronous terminal links. I really haven't heard much concrete about the DEC-Apple deal. It needs more meat."

Message to MIS

Apple officials said the companies' new relationship sends an important message to MIS. "It's a reflection that Apple wants to work with MIS people," said George Everhart, Apple's director of corporate marketing. "One of the major catalysts was our customer base. They kept asking us, 'When are you going to do something?' "

As a vehicle into MIS, Apple has been targeting DEC accounts, a realization by the company that many MIS directors have been opting for Macintoshes as terminals to their VAXs. According to the Gartner Group, Inc., between 20% and 30% of all micros installed near VAXs are Macintoshes.

Fueling the Mac-to-VAX debate have been DEC's failure in the personal computer market and the relative ease with which Macintoshes can communicate with VAXs. Third parties have responded with communications products facilitating the link.

A lack of specifics — products have yet to be announced — appears to be troubling some users. Apple and DEC have promised that more details will be offered at a developers' meeting scheduled for August.

"I've yet to have any DEC salesman ever recommend anything but a DEC product to me," said Bo Pitser, MIS director for the Lawrence Livermore National Laboratory. "Apple's Mac and DEC's Vanmate II are competing products. If one of them disappears, you might actually convince me that an alliance exists."

Purchases on hold

One MIS user said he will hold off purchasing any third-party products for Mac-to-VAX connections until DEC and Apple's August announcements. "It could change everything out there," said Mark Goldenberg, Apple support coordinator at Hughes Aircraft Co.'s Buena Park, Calif., facility.

Apple officials have said they have no plans to disrupt the installed base of Macintosh and DEC users.

Goldenberg's group has been connecting Macintoshes to VAXs for about two years using a number of different third-party products. "They're all about the same in terms of functionality," he said.

Even without specific products, the liaison may serve as a political tool for MIS professionals eager to bring Macintoshes into their shops. "The most important thing about this announcement is that it happened," said Daniel Chevitz, president of Odesta Corp., developer of the widely used Helix Mac-to-VAX connection product. "It makes a political difference. It helps the people who have been trying to put together answers to problems and then got hit with political and religious pressures from their bosses. It takes away the lingering fear and doubt."

Mac links steal desktop show

ANAHEIM, Calif. — Communications products for Apple Computer, Inc.'s Macintosh personal computer dominated the exhibitions at last week's Desktop Communications Conference, co-sponsored by Infonetics, Inc. and Andrew Seybold's "Outlook on Professional Computing" newsletter.

Products shown ranged from electronic mail systems for Mac-based local-area networks to connections allowing Macintoshes to communicate with larger systems. Apple and Digital Equipment Corp., fresh from the announcement of their intent to co-develop products allowing more efficient connections of Macintoshes to DEC's VAX minicomputers, had dominant floor space.

Apple Chairman and Chief Executive Officer John Sculley said DEC and Apple's relationship will fuel an important third-party industry. If the Desktop Communications Conference is any indicator, third parties apparently agree. The following are among the announcements made at the show:

- 3Com Corp. introduced an Ethernet adapter for Apple's Motorola, Inc. 68020-based Macintosh II that allows the microcomputer to be used in a 10M bit/sec. Ethernet network. Called the Etherlink/NB and priced at $595, the adapter is designed for use with 3Com's 3+ networking software.
- Infosphere, Inc. introduced Talkteam, a communications software package allowing Mac users in remote locations to access Apple's Appletalk and Ethertalk networks. Once connected, users can share all network services, including E-mail, file servers and printers. Called Liaison and priced at $195, the product allows portions of the network to be kept off-limits to remote users for security purposes.
- Dayna Communications, Inc. in Salt Lake City unveiled Daynamail, an E-mail software program scheduled for availability this spring in both Macintosh and Microsoft Corp. MS-DOS versions. Daynamail is the outcome of an agreement between Dayna and Action Technology, Inc.

JULIE PITTA

Sculley expects 30% increase in '88 earnings

CUPERTINO, Calif. — Apple Computer, Inc. last week predicted a rosy year for the computer industry in general and Apple in particular despite some Wall Street watchers' warnings of a recession.

At the company's annual meeting, Apple Chairman and Chief Executive Officer John Sculley projected that computer industry sales will increase by 30% during 1988, up from a forecast of 25% for last year. Additionally, Sculley said Apple's revenue will grow by between 30% and 40%.

Sculley told a separate gathering of Wall Street analysts a day earlier that 1987 was a year of new systems for Apple but that 1988 will be one of peripherals, especially communications products.

However, he said Apple expects to introduce a mid-range Macintosh, positioned between the $4,000 Macintosh SE and the $10,000 Macintosh II. The new system, which Sculley characterized as a low-end Mac II, is set for a launch during the second half of this year. Pricing will be in the $5,000 to $6,000 range.

Wall Street analysts said they were pleased with Apple's projections. "The company has done extremely well, and it's much more balanced at this point," said Bruce Lupatkin, an analyst for Hambrecht & Quist, Inc. "But there's much more to achieve. They haven't penetrated business to the degree that people seem to think."

Unisys lowers entry-level threshold

BY STANLEY GIBSON
CW STAFF

BLUE BELL, Pa. — Unisys Corp. last week announced two entry-level systems, the 1100/91 and 1100/92 Model II SV processors, which offer the same performance but reduce the cost of the machines they replace by 18% to 26%, according to Unisys.

Unisys also cut prices by 10% on all other processors in the 1100/90 Model II series.

The announcement completes the enhancement of the 1100/90 product line that began last summer when Unisys quietly introduced the 1100/90 Model IIs, which replaced previous 1100/90 processors. In the fall of 1987, Unisys announced the 1100/94 Model II Turbo, a high-end model.

The SV versions of the 1100/91 and 1100/92 were introduced in July 1985 as lower priced, lower performance versions of the 1100/91 and 1100/92 models.

Development on the former Sperry Corp. 1100/90 line had been held up during the last year by uncertainties resulting from the merger of Sperry with Burroughs Corp., according to George Lindamood, a Unisys analyst at the Gartner Group, Inc. in Stamford, Conn.

But with corporate conflicts now resolved, Unisys may be able to catch up to IBM in the next few years with the 1100/90 series, he said. "However, they are not there yet," Lindamood said.

Same for less

The 1100/91 Model II SV is a single-processor system that comes in 8M-byte or 16M-byte memory units. It is priced at $1,429,000, including operator console and operating system software. Unisys said the price is 26% less than the comparable entry-level 1100/91 SV model introduced in 1985.

The dual-processor 1100/92 Model II SV is priced at $2,605,000, an 18% reduction over its earlier SV counterpart. The 1100/92 comes with two 16M-byte memory subsystems, the vendor said.

The new systems are object-code compatible with all current 1100 series and 2200/200 systems and allow users to move to larger systems without converting software, the vendor claimed.

Both systems use 256K-bit random-access memory chips, replacing the 64K-bit chips used in their predecessors.

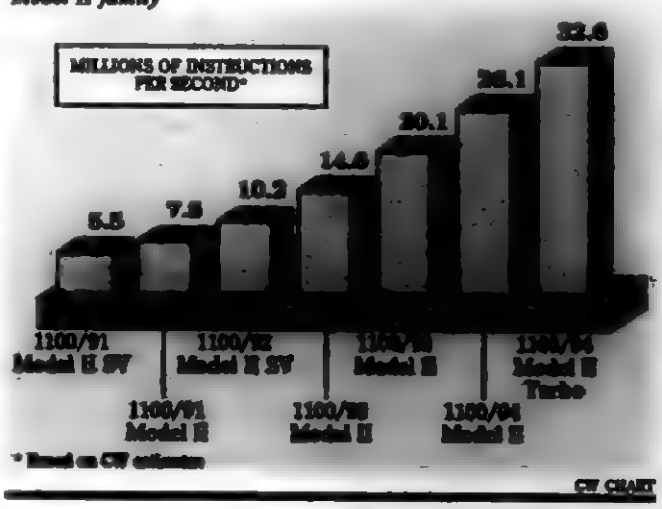
In addition, Unisys announced the Personal Workstation 2 (PW2) operator console, an IBM-compatible personal computer that can replace the Unisys UTS 60 dumb terminal as the operator console for an 1100/90 system.

The PW2 comes with 640K bytes of memory, a 1.2M-byte floppy disk drive, a 20M-byte hard disk, color console and printer. The console assembly with the PW2 is priced at $37,500, the same price as the dumb terminal configuration.

The products are available for immediate delivery, Unisys said.

Plugging the gaps

Introduction of SV models fills out the low end of Unisys's 1100/90 Model II family



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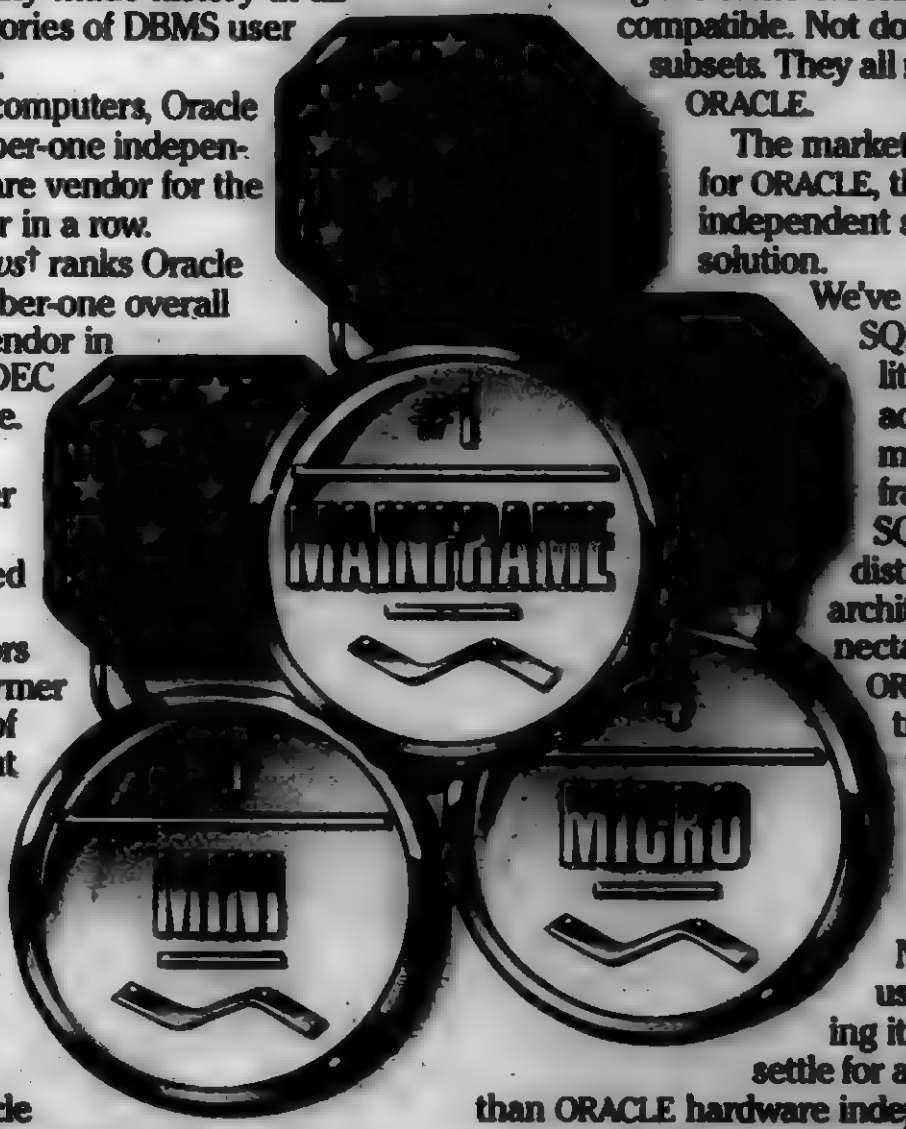

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† *Digital News*, December 7, 1987. ‡ Gartner Group currently unreleased research.
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Banyan lays out a blueprint for OS/2

BY PATRICIA KEEFE
CW STAFF

WESTBORO, Mass. — Banyan Systems, Inc., which prides itself on tying together multivendor environments, is extending its reach by adding OS/2 support.

Last week, Banyan detailed a two-phase plan to integrate OS/2 Standard and Extended Editions support into its AT&T Unix System V-based Virtual Networking Software (Vines) operating system.

None of this support will be delivered until the first half of 1989. The delivery schedule for OS/2 applications stretches from late this year to late 1989.

The first phase of Banyan's OS/2 implementation is slated to be available in early 1989. It will include support for OS/2 print-spooling and file and device sharing; user and system administration features; IBM's Nethios; a distributed applications platform supporting OS/2 as a client and Unix on the server; and basic communications services such as IBM's Systems Network Architecture/3270 and asynchronous terminal emulation.

Banyan said the second phase, slated for mid-1989, will include support for a distributed applications platform for OS/2 clients and servers and additional communications services, such as CCITT X.25 and Transmission Control Protocol/Internet Protocol.

Analysts said that adding support for OS/2, SQL and evolving IBM protocols strengthens Banyan's position as a corporate communications provider.

Vines will be available companywide before IBM's Systems Application Architecture and will tie in many more local-area networks than Digital Equipment Corp.'s Decnet Ethernet, predicted Andrew Seybold's "Outlook on Professional Computing," an industry newsletter.

As outlined last week, Banyan's strategy echoes somewhat that of Novell, Inc., which unveiled its plans in December. Along with 3Com Corp., these vendors' proprietary network operating systems are threatened by OS/2, which supports distributed applications in a multiuser, multitasking mode.

While 3Com will incorporate Microsoft Corp.'s OS/2 LAN Manager into its software, Banyan and Novell will support OS/2 as an application server.

Novell link opens SNA gate

BY PATRICIA KEEFE
CW STAFF

PROVO, Utah — Novell, Inc. supplied a critical component of its plan to support enterprisewide networking with the announcement last week of Netware LU6.2.

The IBM LU6.2 gateway will tie Novell Netware local-area networks to IBM hosts by providing the ability to invoke peer-to-peer networking under IBM's Systems Network Architecture (SNA).

"Every major vendor is implementing a version of LU6.2," said Darrell Miller, Novell's vice-president of corporate marketing. He likened the importance of LU6.2 to that of standards such as Open Systems Interconnect and Transmission Control Protocol/Internet Protocol.

Medium of transportation

A strategic component of IBM's Systems Application Architecture (SAA), the LU6.2 protocol provides peer-to-peer connectivity across IBM systems. LU6.2 functions as the transport mechanism for applications using the as-yet-unreleased Enhanced Connectivity Facility under SAA.

Netware LU6.2 will reportedly provide Netware users with similar support while allowing them to run IBM 3270 and LU6.2 applications over the same gateway. Novell said it will be fully compatible with IBM's Advanced Program-to-Program Communications/PC, known as APPC/PC.

> "EVERY major vendor is implementing a version of LU6.2."
>
> DARRELL MILLER
> NOVELL, INC.

The LU6.2 gateway is media-independent and is supported on LANs based on Novell's Netware and IBM's Nethios. Most of the LU6.2 overhead is located in the gateway server software, making IBM's PC-DOS a more practical platform for LU6.2 applications, Novell said. Support for IBM and Microsoft Corp.'s OS/2 operating system will be added later this year, Miller said.

Netware LU6.2 will be included with each gateway in Novell's Netware SNA Services product family along with two additions: the Token Ring Gateway and Token Ring Multi, a micro-to-mainframe software package said to support multiple host connections to an IBM Token-Ring network.

The Token Ring Gateway is a direct Token-Ring connection via an IBM 3725 front-end processor or 3174 communications controller. Priced at $550, it provides users with access to up to 128 host sessions at 4M bit/sec.

Token Ring Multi provides access to multiple concurrent host sessions through a Token-Ring direct connection to the host. For $395, personal computer users can have as many as five 3270 mainframe display sessions, up to four printer sessions and one PC-DOS session, Novell said.

Netware LU6.2 will be implemented initially on Token-Ring or coaxial gateway connections via the IBM 3174 Distributed Function Terminal Controller. IBM does not offer APPC over coaxial cable, Miller said. Later support will include Synchronous Data Link Control links.

Novell said Netware LU6.2 developer's kits will be available in March and that Netware SNA Services and Netware LU6.2 will be available in the second quarter. LU6.2 upgrades for existing gateways cost $100.

MIS disaster

FROM PAGE 1

$35 million to cover expenses arising from Masternet, following a second-quarter reserve of $25 million. The reserves cover costs such as delayed interest payments, waived fees, additional manpower and hardware.

Last October, Bankamerica's systems chief, Louis Mertes, and its top trust executive, Clyde Claus, resigned in moves attributed to Masternet's failure to generate timely statements and other data. That failure has led some institutional trust clients to take their business elsewhere. Bankamerica reports serving as trustee or agent for assets of $34 billion held by about 700 institutions, down from $38 billion for 800 institutions reported last summer.

Layoffs imminent

A Bankamerica spokesman suggested that layoffs may result from the scuttling of Masternet. "Clearly, there will be reductions over time in our trust operations and systems," he said. "We do expect there will be increased efficiencies."

Bankamerica had hoped Masternet would enable it to offer trust data processing services to small and mid-size banks.

Of the Masternet accounts not going to Seafirst, Bankamerica late Friday said 29 "more complex" accounts will be processed by State Street Bank & Trust Co. in Boston, although actual management will remain with Bankamerica.

Trust accounts

Seafirst processes institutional trust accounts remotely on SEI Corp.'s Trust-Aid 3000 system at SEI's headquarters in Wayne, Pa., according to an SEI spokesman. The system was designed 15 years ago but was upgraded last summer to run on an IBM 3090 Model 400.

For at least five years, Bankamerica has been building its Masternet system around the Trust Plus system developed by Premiere Systems, Inc., also in Wayne, which runs on Prime Computer, Inc. processors.

Premiere was founded in 1979 by former SEI employees with financing from Bankamerica, Seafirst, Philadelphia National Bank and Crestar Bank of Virginia. It was founded in an effort to improve on the institutional trust system that SEI then offered, according to a source familiar with the project. Bankamerica is the only firm that has attempted to go on-line with Trust Plus, the source said.

A spokesman for Philadelphia National Bank said his bank is not using Trust Plus but would not elaborate. Crestar officials could not be reached for comment.

In serving as trustees for institutional trusts such as corporate, union and government pension funds, banks track the performance of the independent money managers that make investments for the trusts, settle their trades, collect income from the investments and make payments to beneficiaries.

Bankamerica brought Masternet on-line March 1, 1987, replacing a 20-year-old proprietary batch processing system. In addition to generating monthly statements, Masternet was supposed to provide on-line updating and querying.

However, Masternet failed to maintain current data and fell months behind in generating statements. These difficulties were caused by slow run and response times, communications problems and leaky disk drives, according to a former Bankamerica employee.

Apathy problem

Masternet also suffered a major blow from poor morale at a securities processing unit in Los Angeles that was involved with its development, the source said. In the midst of the conversion, Bankamerica disclosed that it would move the unit from Los Angeles to San Francisco, leading workers there to slack off. "They did not work hard. They went home early," he said. The bank later decided to keep the unit in Los Angeles.

One Bankamerica trust client looking elsewhere for trustee services is the $370 million Southern California Rapid Transit District, whose pension funds could generate about $300,000 a year for Bankamerica.

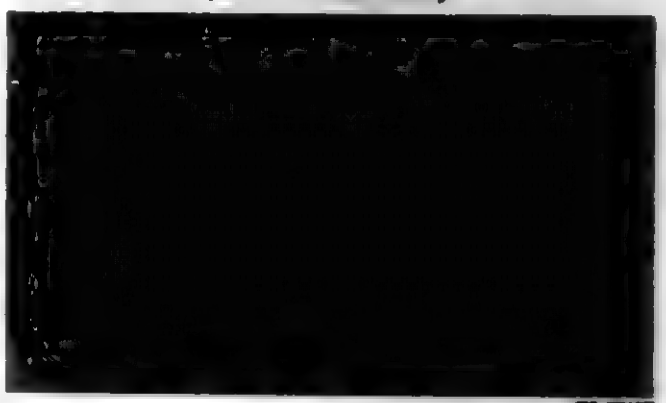
"We have an obligation as fiduciaries to keep everything on an even keel. We haven't lost any money, but it's a great inconvenience not having information," said Edward Paull, pension and benefits manager for the fund.

Bankamerica has appointed Richard V. Fulp, an executive vice-president and head of the trust group at Seafirst, to run its trust department while continuing to head Seafirst's trust unit. Mertes has not been replaced.

A spokesman for the U.S. Comptroller of the Currency declined to comment on a published report that the agency is investigating Bankamerica regarding alleged banking law violations said to be caused by problems with Masternet. In 1984, Bankamerica consented to censure by the agency for its failure to inform customers that it was unable to keep current records of securities transactions as the result of a system conversion.

Masternet's meltdown

Bankamerica's master trust accounting system does not function properly 10 months after the scheduled start-up



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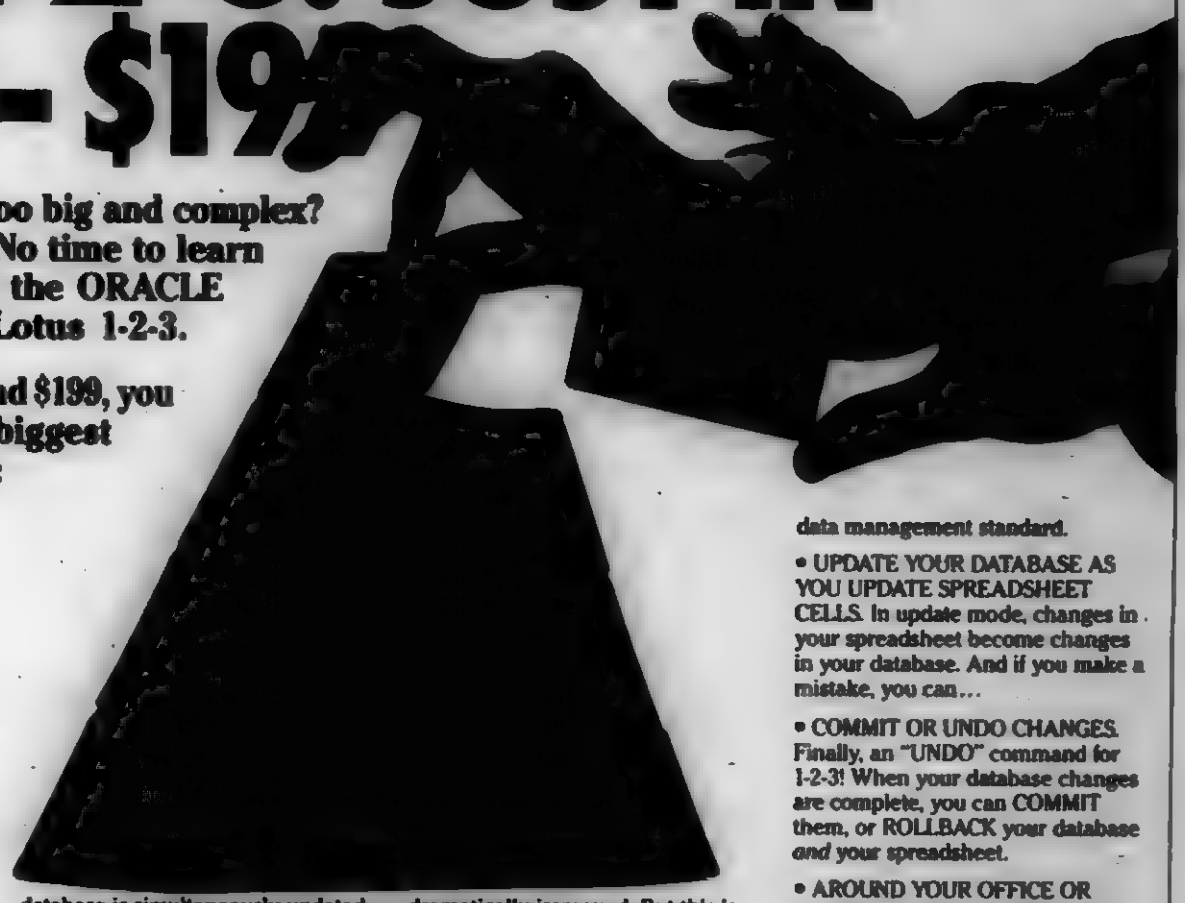

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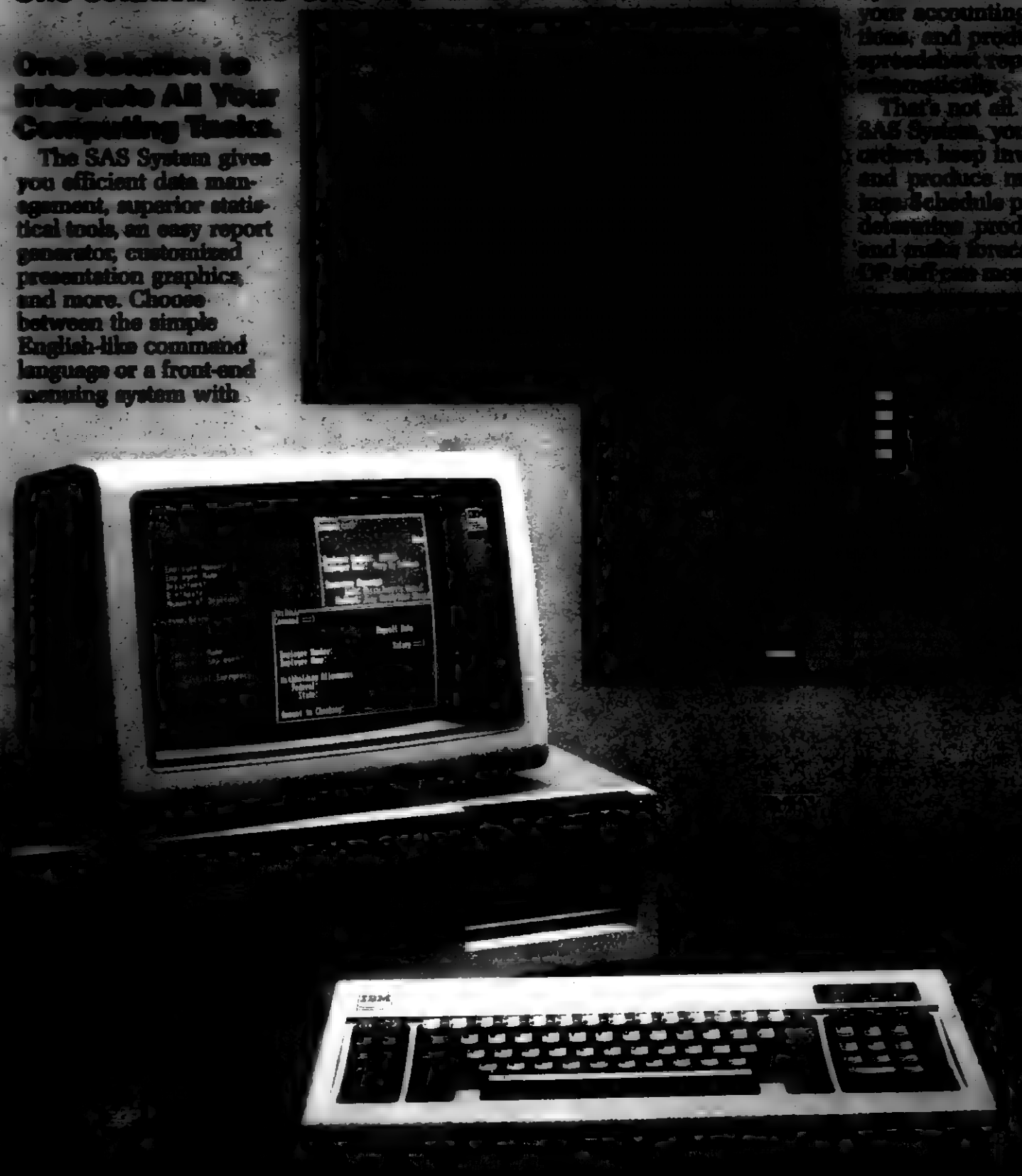

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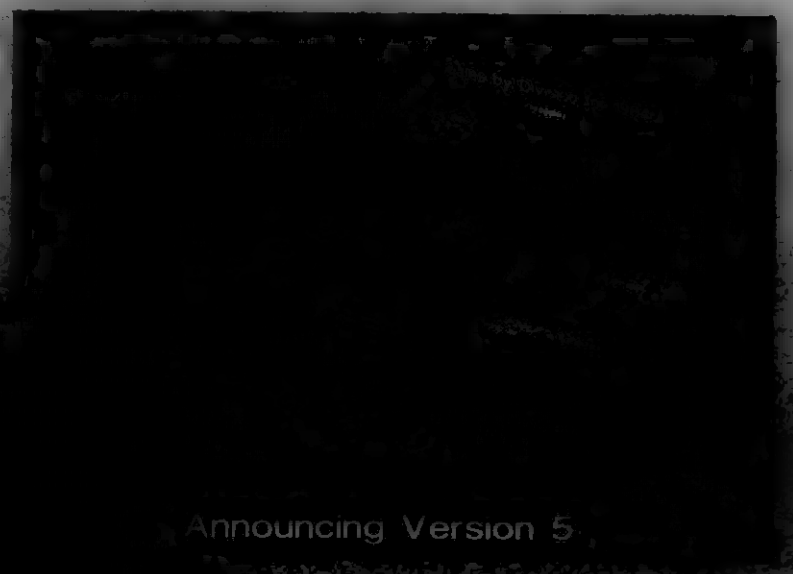

Alliant doubles speed of high end

BY STANLEY GIBSON
CW STAFF

Alliant Computer Systems Corp. is set to replace its original FX/8 parallel processing minisupercomputer today with two higher powered models, the FX/40 and FX/80. The firm said its second-generation systems offer greater than twice the performance of the FX/8 in some applications.

In the announcement, anticipated by industry observers [CW, Jan. 25], Alliant said it will continue to offer and will drop the price of its FX/1 system from $99,900 to $59,900 for a base configuration. The FX/4 system, announced last fall, remains priced at $99,900.

The new models, priced from $150,000 to $500,000, are said to be fully compatible with Alliant's earlier models and able to use some 100 applications available for the earlier systems.

The heat is on

"The new product generation really turns up the heat on the competitors," said Marcia Brooks, a minisupercomputer analyst at International Data Corp. in Framingham, Mass.

Alliant archrival Convex Computer Corp. has confirmed that it will soon announce a new-generation product of its own. Brooks said Convex's system, like its previous systems, will be compatible with Cray Research, Inc.'s supercomputers.

However, Brooks added that the new system will probably incorporate a parallel architecture similar to Alliant's, instead of Convex's earlier uniprocessor vector architecture.

Adding that she expects Digital Equipment Corp. to announce a minisupercomputer late this year or early next year, Brooks noted, "When DEC unveils its response, the minisupercomputer makers — Alliant included — are going to come under extreme pressure."

Alliant rated the performance of a fully configured eight-CPU FX/80 at 65 million floating-point operations per second (MFLOPS), compared with a maximum of 26 MFLOPS for the earlier eight-CPU FX/8 model. The FX/40 is rated at 30 MFLOPS, compared with 14 MFLOPS for Alliant's FX/4 system.

The $149,000 entry-level price for an FX/40 includes one computational element, one VME-based interactive I/O processor, 32M bytes of main memory expandable to 160M bytes, 1.1G bytes of disk storage and a cartridge tape drive.

The entry-level FX/80 system is priced at $299,000 and includes two computational elements, two VME-based interactive processors, I/O processors, 32M bytes of main memory expandable to 256M bytes, a 16-line multiplexer, 1.1G bytes of disk storage and a magnetic tape drive.

Each additional computational element, rated at a peak of 23.6 MFLOPS, is priced at $59,000.

The systems are available for shipment in the first quarter, Alliant said.

NAS extends expanded storage

Memory feature furthers AS/VL systems' IBM compatibility

BY JAMES CONNOLLY
CW STAFF

SANTA CLARA, Calif. — National Advanced Systems (NAS) last week moved to make its AS/VL mid-range systems more compatible with IBM's 3090s by announcing a feature that lets users partition main memory to look like IBM's expanded storage feature.

The subsidiary of National Semiconductor Corp. also increased the memory limit on the three smaller AS/VL models from 128M bytes to the 256M-byte limit of the high-end AS/VL 80 and raised the maximum number of channels for all models from 24 to 32.

The AS/VL series was announced in Europe in March 1987 and in the U.S. in July 1987 as a competitor to the IBM 4381 and the low end of the 3090 line.

An NAS spokesman said NAS still recommends use of main memory rather than expanded storage but noted that some users want NAS to offer an expanded storage look-alike feature to ensure compatibility where NAS machines and 3090s run in a common environment. He cited the example of using an AS/VL to develop applications to run on larger 3090s.

While IBM's expanded storage feature is a set of memory chips connected by a bus to main memory, NAS's look-alike feature allows the partitioning of main memory. NAS already offered the feature on its larger AS/XL series of mainframes.

Ahead of a trend

An analyst who follows IBM and IBM plug-compatible manufacturers, including NAS, noted that offering the expanded storage capability on the AS/VL series helps NAS prepare for the natural shift of expanded storage to smaller systems.

Francis Gens of International Data Corp. said, "It makes sense in that NAS is already positioning the AS/VL against a 4381 follow-on, which certainly will include expanded storage." Gens observed that early users of expanded storage, which was introduced with the 3090s in 1985, were primarily very large MIS shops. He said that with user experience and continued IBM enhancements, the feature is becoming more useful to small shops and less of a luxury.

NAS said microcode updates to support expanded storage are free of charge. Memory upgrades for the AS/VL cost $207,000 for 32M-byte increments, and eight-channel upgrade packages cost $117,000.

Storage Tech counters IBM DASDs

BY STANLEY GIBSON
CW STAFF

LOUISVILLE, Colo. — Storage Technology Corp. last week responded to IBM's new triple-density 3380 Model J and Model K disk drives with its own triple-density model and offered an upgrade path to the subsystem.

Storage Technology's Model 8380R, capable of storing 7.6G bytes per drive, is set for fourth-quarter availability. Packages to upgrade installed single- or double-density drives — a feature not offered by IBM — will be available in the second quarter of 1989, the vendor said.

"The interesting thing about this announcement is that you can upgrade in the field," said David Vellante, a peripherals analyst at International Data Corp. He said the promise of adding power to installed units will prevent some Storage Technology customers from scrapping their units in favor of IBM's triple-density models, which are already shipping.

A four-disk Model 8380R, capable of storing 30.2G bytes, lists at $410,000. A similar configuration of the IBM 3380 Model K drive with the same amount of storage lists at $443,000.

In a move that mirrored IBM's announcement last fall of 4.5M byte/sec. transfer rates, Storage Technology announced that its 8890 Sybercache Disk Control Unit will support a 4.5M byte/sec. transfer rate in the fourth quarter.

Storage Technology also unveiled a scratch loader that can queue as many as 10 tape cartridges. The cartridge stacker was designed for Storage Technology's 4480 cartridge subsystem, which is compatible with IBM's 3480 tape cartridge subsystem. The loader is scheduled to be generally available in the third quarter and priced at $8,455.

Model 50

FROM PAGE 1

hands on more, we'll start populating our office with them," said Travers Waltrip, vice-president of communications at The Travelers Corp. in Hartford, Conn., and an early user of the diskless Model 50. "I think our strategy is going to be that the intelligent workstation at Travelers will be the medialess Model 50."

Users praised the diskless Model 50's capabilities in handling the traditional problems that vex larger networks: cost, security and support.

"We're saving $400 to $500 per PC by making them diskless," said a user of one of the IBM prototypes at a large New York-based financial firm. "If you take $500 a pop — the average cost of a floppy, a hard drive and a controller — and multiply that by several thousand workstations, you're talking about millions of dollars saved."

The diskless personal computer is a recent concept that has emerged with the growth of LANs, host connectivity and increasingly sophisticated PC-based file servers. 3Com Corp., Santa Clara Systems, Inc. and NCR Corp. currently offer diskless PCs.

IBM could extend the diskless option during the next several weeks as part of a larger announcement, according to Clare Fleig, director of research at International Technology Group in Los Altos, Calif.

"Later on this year, they will also be bringing out some networking products that will allow the Micro Channel to be hooked up to new models of IBM's controllers," Fleig said. "Their networking strategy will be much cleaner than it is now, and a diskless Model 50 would fit right into these plans."

In addition to the money saved by eliminating software duplication, the setup prevents the removal of sensitive centralized data. "If our brokers don't have disks on their machines, they can't copy their client base the afternoon before they quit the company and go to the competition," the financial user said.

Not first in the family

The Model 50 would not be the first PS/2 family member to go diskless, but it would be the first to be based on the Micro Channel architecture, a proprietary hardware design that IBM says carries big potential for corporate users.

A diskless version of the Intel Corp. 8086-based PS/2 Model 30 has been distributed to some customers, but it does not contain the Micro Channel bus design [CW, June 15, 1987]. IBM has not formally announced either machine.

"We are absolutely going to need the power of the Micro Channel," said The Travelers' Waltrip, who has hooked the diskless Model 50 to a PS/2 Model 60 server supporting a dozen other nodes. "We don't buy anything that has the old bus in it, such as the Model 30."

The Travelers plans to expand its token-ring network to include approximately 500 personal computers, many of which will be diskless PS/2 Model 50s, according to Joe Brophy, senior vice-president at the company.

"It also gives us the capability of instantly standardizing our software," Waltrip added. "All we have to do is down-line load from a server. And every time one of these intelligent workstations comes up, we know it has the latest version of our software running on it."

The Model 50 also affords the opportunity to run IBM and Microsoft Corp.'s OS/2 operating system, which requires an Intel 80286- or 80386-based machine.

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EDITORIAL

Moneyspeak

THE FOURTH-QUARTER financial reports are in, and information managers are once again sorting through analyses to shape opinions that will affect their confidence in various vendors.

Cost-cutting gave IBM a big earnings boost, but Wall Street was not impressed. Data General's earnings climbed nicely for similar reasons, and Wall Street smiled. Apple, Sun and Microsoft saw profits boom, while Tandem's earnings dipped despite a nice sales gain.

What should MIS make of the quarterly ebb and flow? What do the numbers really say about suppliers and their long-term health?

Often times, very little. To begin with, the requirement that a public company report quarterly financials is a double-edged sword. Its purpose is to provide shareholders with a full and accurate accounting of their investments. But to companies and their customers, quarterly financial results taken at face value can be dangerously misleading, provoking decisions from both parties that are inherently shortsighted.

Three years ago, DEC was struck by a combination of product development delays and product cycle troughs. The result was disastrous quarterly results, a precipitous dive in stock price and then waning customer confidence. Few people, especially within the investment community, took the long view with DEC, and this myopic outlook shook customer confidence.

Clearly, the DEC story is different today. But which is the most accurate over the long haul?

Consider the case of Storage Technology — not the Storage Technology of today, which has emerged from Chapter 11 bankruptcy and has posted several consecutively strong quarters. But consider the Storage Technology of four years ago, the one Jesse Aweida built into the largest peripherals maker in the world, the one that went into Chapter 11.

Close examination, which is easier in hindsight, would have revealed that the old Storage Technology was extremely vulnerable, despite its world-class size. Its rapid growth came as a result of delays in IBM's shipment of key large-scale direct-access storage devices. The overwhelming portion of Storage Technology's sales were from two products — high-end disk drives and tape drives — whose markets were dominated by IBM. Just as companies like Magnuson were destroyed by a single IBM product announcement, Storage Technology fell to the IBM 3380 DASD.

Users have to read beyond the headlines. With the dollar plummeting, how does that impact a vendor doing half its business abroad? And what, therefore, is the impact on its relationship with domestic customers? How are product cycles affecting short-term profits and sales? If profits are largely the result of cost-cutting, how will that affect service and support or long-term investment in key product lines? Perhaps the most critical assessment to make is how responsibly does a vendor react to the normal peaks and valleys of quarterly business results?

LETTERS TO THE EDITOR

Natural evolution

There is a specific reference in "James Martin's show goes on" [CW, Nov. 9, 1987] that I would like to clarify.

The article quoted me as saying that Texas Instruments, Inc.'s computer-aided software engineering (CASE) tool is a closer implementation of my "perfect" model of information engineering than Knowledgeware, Inc.'s IEW CASE tool.

However, TI's product supports *only* that methodology. Although information engineering will gain acceptance as a methodology over time, it is by no means the predominant methodology today. And I believe that to meet today's requirements, a CASE tool must support the methodologies MIS departments are currently using and allow MIS users to evolve at their own pace into more rigorous methodologies such as information engineering.

James Martin

Around for years

I am writing regarding "Folding DOS into Unix" [CW, Dec. 7, 1987]. Finally, it seems that people are making a serious effort to make their DOS applications useful in the era of multitasking.

However, Summa Computer Systems, Inc., the company I work for as a customer support representative, has been doing similar things with a multiuser, multitasking, menu-driven local-area network for years. The product is called SOAS.

SOAS, which stands for Summa Office Automation System, supports IBM's PC-DOS as a task under Summanet, its operating system.

Summanet has proven to be more efficient than Unix. Throughput is better. Up to 10 times as many task switches per second can be performed. Forty tasks can be supported per node. Many real-time applications have been developed using this system.

Since SOAS is completely menu-driven, computer neophytes are able to be productive with the system almost immediately. This makes it not only more functional than both Unix and DOS but much easier to use as well.

Andrew M. Stevens
Syracuse, N.Y.

This week in history

Jan. 30, 1978
Computer equipment from Xerox Corp. and Amdahl Corp., respectively, garner first- and second-place honors in overall user satisfaction in Datapro Research Corp.'s computer users survey.

What makes these results especially noteworthy are that Xerox no longer even makes or supports its systems, and Amdahl is a relative newcomer to the computer business.

Jan. 31, 1983
Houston's inadequate facilities, sultry weather and diesel fumes cause National Computer Conference organizers to ax that city as the site for NCC '84. The decision raises the question of when and where the 1984 conference will be held.

Willing member

I read the article "Restructuring eases maintenance" [CW, Nov. 30, 1987].

The statement attributed to Richard Harrison that no other vendor would agree to a hands-off test is erroneous.

Group Operations, Inc. would have welcomed participation. Unfortunately, we were never notified.

Group Operations' Superstructure has the largest number of users of all the structuring tools combined, with more than 160 sites.

Barry T. Murphy
Vice-President
Proprietary Products Division
Group Operations, Inc.
Washington, D.C.

Unclear logic

I want to provide an opposing view to Efrem Mallach's article "4GLs: Are we talking the same language?" [CW, Dec. 14, 1987].

Mallach painted a myopic and sarcastic picture of the fourth-generation language industry.

He argued that "resource utilization is less of a problem than it once was" and, therefore, fourth-generation language vendors should not improve the efficiency of their products.

While I will not argue with the fact that the cost per million instructions per second is falling, I do believe it is naive to assume

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Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

Can MIS cure health care ills?

Medical facilities finding it hard to swallow high tech's high-priced pill

HARVEY NEWQUIST

Medicine typically operates at the scalpel's edge of technology, from X-rays years ago to computer imaging today. Each successive technology supplants the one preceding it, adding to the cost of patient treatment.

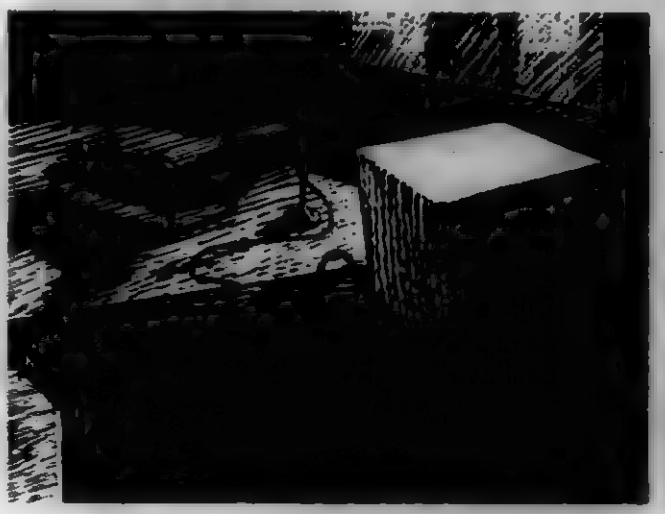
Players in the health care industry — hospitals, health maintenance organizations, clinics — are attempting to use technology to minimize the cost of doing their business, which is delivering medical care. But the technological tools needed to better perform nonadministrative functions — such as doctors' exams, scans, diagnoses and tests — often cost more than they can save in improved efficiency.

There are ethical considerations here as well as financial ones. Not every person can afford a digital subtraction angiogram, which costs three times as much as a standard X-ray. Who should benefit from the most advanced technology — those who need it most or those who can pay for it? And who should decide — the hospital?

MIS's critical condition

MIS and data processing become necessary, even critical, factors in delivering medical services as quickly and inexpensively as possible. Monitoring patients' records, physicians' services, pharmaceutical needs, payments, debits and so on often requires specialized computers and operators.

New hardware and software applications are growing up within medical organizations — applications that will ultimately have to tie in with the existing state of DP.



ROB MANNOX

For instance, Tufts University School of Medicine, along with three other Massachusetts hospitals, has determined that voice-recognition systems can handle 90% of a radiologist's reporting needs without the aid of a typist.

VA system in practice

The Veterans Administration hospital at the University of Pittsburgh is beta-testing an expert system called the Quick Medical Reference, which has captured the expertise of the university's chief internist. Of the 800 maladies currently associated with internal medicine, the university estimates that its system has already been programmed with expertise in 700.

Although such a knowledge base can never be complete because of ongoing medical research, the Quick Medical Reference is already assisting physicians in making patient diagnoses.

A psychiatric clinic in Green Bay, Wis., is developing a diagnostic aid system that will, in response to a clinician's input, allow the tentative diagnoses of psychiatric disorders. The expert system, which is being developed on a personal computer using software from artificial intelligence system vendor Gold

Continued on page 20

Newquist writes and consults on artificial intelligence and other advanced high-technology topics from his office in Scottsdale, Ariz.

Some marriages of convenience

AMY WOHL

Some new partnerships have made headlines recently.

Jan. 13, Ashton-Tate tied the knot with Microsoft, which, in turn, revealed an existing partnership with Sybase. These deals are aimed at creating a multiuser data base environment. Multiple personal computer users (using Dbase III, Ashton-Tate hopes) could share data via enabling software on a network server. The Ashton-Tate/Microsoft/Sybase collective has named that product SQL Server, a bow in the direction of IBM and its widely accepted standard.

The three vendors have agreed to work together, with Ashton-Tate getting exclusive marketing rights to the retail arena and Microsoft retaining exclusive marketing rights to hardware OEMs.

Just a few days later, Apple and DEC announced their decision to jointly develop (and, it seems, separately market) Apple-to-DEC connectivity products. Presumably, Apple is expecting to gain credibility, access to new markets and needed system-level solutions.

DEC, interestingly enough, has kept saying it is providing this Apple connection because its customers asked for it, implying that the company wouldn't have done anything so radical entirely on its own.

DEC and Apple have always seemed like a natural combination — two companies that believe that excellent products create their own marketing energy; two feature- and product-oriented sets of customers who justify less than standard solutions by making them work themselves if necessary.

Midnight snack

Are these partnerships just the normal course of business, or is something new going on in the computer industry?

A little of both. Great product ideas, particularly in software, still turn up in unpredictable places. Also, the ability to recognize, nurture and bring entirely new products to market is hard to find within large companies.

The software business is a good example. Big companies can write a new and improved version that carries an existing product one step — sometimes a big step — further. Big companies can maintain and support existing products as long as necessary. Only rarely do big companies come up with whole new software concepts. The "Aha!" in the night is more likely to wake light (and hungry) sleepers still looking for their first winner.

So, inevitably, big software companies, such as Microsoft and Ashton-Tate, look to smaller, younger companies, such as Sybase, for innovative — or merely available — software technology.

An age-old story

This attention in itself isn't new. Microsoft and Ashton-Tate, as well as other successful software companies, have grown through acquisitions and partnerships. Think of Multimate, Framework and Powerpoint. Think, for that matter, of MS-DOS. What's different now?

There is no big, powerful, product-hungry company here exploiting the financial needs or business naivete of a small company with a neat product. These

> THE "AHA!" in the night is more likely to wake light (and hungry) sleepers still looking for their first winner.

are big, powerful companies joining together into very big, very powerful alliances. We are looking, perhaps, at the emergence of "super" software companies. The recent announcements are simple ad hoc alliances, designed to make something happen sooner or to ensure a larger market share for a collectively developed, collectively marketed product.

The companies are moving in early, locking in their offering as the standard for an important and emerging market, preempting a role that might, in an earlier day, have been played by IBM or an industry consortium.

The next round of joint offerings might feature even larger company mergers, and, indeed, I suspect that such activity could occur this year. But I also expect the emergence of at least a few umbrella relationships, whereby many small developers could bring their wares to market through the talents and resources of a company that would offer funds, packaging, market-

Continued on page 20

Wohl is president of Wohl Associates in Bala Cynwyd, Pa., and editor of "The Wohl Report on End-User Computing" newsletter.

Bringing the kids to interview

AMY SOMMERFELD FIORE

"We understand life's highest priorities," proclaims a national MIS recruiting firm in a recent advertisement. The ad pictures a 35-ish family man beside his smiling wife and daughter. The firm claims it can help him — and you — "achieve both personal and professional satisfaction."

Now isn't this a fresh idea in your search for a new job — admitting up front to a prospective employer that what you really want is a job that will make you *and* your family happy?

Not "I am seeking a new challenge to further my management skills," or "Goals in my five-year career plan include closer analysis of the marketplace and keeping up to date on all technical developments."

Instead, the ad suggests, it might now be valid to say, "The last job I had frustrated me and made my wife crazy," or, "I'm looking for something that doesn't require me to work on Saturday mornings." Or even, "I'd like to relocate to a town with reasonably priced housing and a good school system."

Backward to the future?

If this approach is now valid, it's news to me. Once upon a time, it seemed employers and employees alike understood that the job applicant was looking for personal happiness. We just used the career goals lingo to dress up our desires in more professional garb.

But in recent years, many employers have boldly ignored human needs. When they say they expect dedication to the job, they mean 60-hours-a-week, take-work-home, always-be-on-call dedication. Unfortunately, many ambitious, career-oriented employees buy into this mentality.

The result? It becomes embarrassing to admit you only want to work 40 hours a week.

"What are you," your friends and co-workers wonder, "some kind of closet housewife?"

Last week, an MIS director showed me his company's memo on employee child care. It assured employees that parent support is a concern of the whole company because "child care-related problems have an impact on absenteeism and productivity."

That's certainly true, but why continue to use bottom-line language when the issue is obviously a personal one?

Fiore is a *Computerworld* senior editor.

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Health care ills

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Hill Computers, will generate evaluations that meet the criteria established by the Diagnostic and Statistical Manual of Mental Disorders as outlined by the American Psychiatric Association.

Technologies such as magnetic resonance, ultrasound and imaging for reconstruction are already normal, even if esoteric, components of computerized health facilities. Systems that evaluate a person's potential for heart failure, headsets that allow patients to communicate and software programs that enable paralyzed limbs to be activated via electrodes are the next computer frontiers.

Advances such as voice-recognition input and expert systems must ultimately be integrated into mainframes, minicomputers, networks and data bases. A psychiatric evaluation done by an expert system must be able to draw information from a patient's medical history file, which may be located on a different type of computer in a different state.

Conversely, an administrative system for issuing patients doctors' bills at a clinic may need to consider time spent using an expert system at a hospital.

Health care is the first field that serves millions of consumers daily to face this challenge of using computers to try to cut the costs of other types of computers and, at the same time, to better the services delivered to customers.

Marriages

CONTINUED FROM PAGE 17

ing know-how and ready access to distribution channels.

Apple's recent Claris spin-off might serve as a model, although there might also be less structured relationships in which the software inventors might stay in separate companies while funneling their offerings through their packaging and distribution partner.

In fact, it is getting difficult to start new software companies. Anyone with a personal computer and some spare time can think of an idea and write some code, but bringing a commercial product successfully to the marketplace, particularly in volume, is much more difficult. Small companies find it nearly impossible to make their own way. More new software is being brought to market through the acquisition route — and I expect this trend to continue.

For Ashton-Tate and Microsoft, competing more effectively with IBM may be the main goal. IBM's mysterious and still largely undefined Extended Edition of the OS/2 operating system it developed with Microsoft is touted as offering special advantages to customers.

Software companies, as well as clone manufacturers, fear that IBM's OS/2 Extended might cut them out of a substantial part of the lucrative PC market, and they want to act now — before IBM can show its hand — to lock in some customer interest, if not commitments.

DEC and Apple's new alliance may also be an anti-IBM move. Together, with their innovative hardware capabilities and their appeal to customers seeking early exploitation of technology, they are an appealing team. Everyone agrees that a data base is a primary PC application and that users need hardware and software facilities to permit them to readily share data. More important, they need interfaces and pass-through facilities to larger systems — as sketched out in the Apple-DEC announcement — to ease the chore of bringing sophisticated data from larger systems to largely unsophisticated users.

Ashton-Tate, Microsoft, Apple and DEC all will figure in providing pieces of the puzzle. But the prize of market share will go to the vendor who figures out how to make it work easily, with minimum user training or customer programming, and how to support problem identification and resolution in increasingly complex, multivendor systems.

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Continued from page 16

that MIS executives, technicians and users do not desire optimum efficiency and responsiveness with any system, including fourth-generation languages.

If efficiency is not an issue, then perhaps productivity is. Not so, according to Mallach. He claimed that if a fourth-generation language reduces programming time by 50%, then the average programmer will save only three months' work — a gain easily used up in the fourth-generation language learning curve and, thereby, resulting in a net productivity loss.

That is preposterous. Mallach's logic assumes that programmers only code for six months per year, that programmers will only use fourth-generation language technology for one year vs. being an ongoing skill and that fourth-generation languages only address the development portion of the system development life cycle and not prototyping, maintenance or standardization.

I am glad Henry Ford did not use the same logic as Mallach when designing the Model T. The horse-drawn carriage was efficient, productive and superior technically to other forms of transportation at that time.

However, Ford had a vision. Without a clear vision for the future, based on innovation and technical excellence, how can any fourth-generation language vendor expect to have future success in the commercial data processing marketplace?

Fred Mangiameli
Branch Sales Manager
Must Software International
Los Angeles

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SOFTWARE & SERVICES

SOFT TALK

Charles Babcock

Have a Coke and a contract

The Coca-Cola Co.'s Corporate Information Systems (CIS) has become a leaner operation through the use of outside contract help. While many shops use contract personnel on a spot basis, Coca-Cola uses contractors 12 months a year to round out a highly compact CIS development staff.

At any given time, 15 CIS staffers are working alongside 65 hourly-wage contract workers on Coca-Cola projects. Although the Coca-Cola staffers come out of the ranks of programmers and analysts, they function much more as project leaders.

"I give my people a lot of credit. They didn't all believe in it. Some of them didn't want to do it. But they all rose to the occasion," says William H. Hendry, manager of corporate systems, who supervised the transition (see story page 57).

How did Coca-Cola reach this advanced stage of reliance on contract workers, and how does it work?

When Hendry joined the company in 1983, Coca-Cola had a new chairman who wanted to slim down the company, stop adding employees to its payroll and begin to make things happen with its existing staff.

Hendry remembers saying during his job interview: "If I'm not making very many mistakes, then I'm probably not

Continued on page 24

CASE firms ask what's new

AI, shakeout seen impacting technology's growth in near future

BY NELL MARGOLIS
CW STAFF

NEWTON, Mass. — CASE is hot or CASE is not, depending on who you talk to. Last week, it was two software developers. Both said they are in the CASE market, but they offered starkly contrasting views of where the market is.

"Five years ago, the market didn't exist," Richard A. Carpenter, president of Cambridge, Mass.-based Index Technology Corp., told 150 members of the Massachusetts Software Council. "Now, the CASE market is growing in excess of 35% per year and is estimated to reach $1 billion by the early 1990s."

Richard A. Carpenter

Carpenter, whose company's Excelerator product is one of the most widely used in the so-called upper CASE, or front-end design and analysis, market, predicted the emergence of a new computer-aided software engineering segment. "I call it the templates area," he said. "There's a growing market for prepackaged central data dictionaries that can then be added to by the user to customize them.

"Artificial intelligence techniques, which are just beginning to be used in CASE, will have a significant impact — particularly in providing 'on-board coaching' to software developers," he said.

Carpenter's previews of coming attractions also included emerging standards; a blurring of the line between upper and lower CASE — the areas of back-end code generation, testing and maintenance; increasing integration of CASE with new

Continued on page 27

TEXT MANAGEMENT SYSTEMS

Help for the paper chase

BY JEAN S. BOZMAN
CW STAFF

Like an adolescent, text management is about to come of age.

Born in the 1970s to run on mainframes, these highly specialized software packages were used mostly by large organizations that needed to store and archive extremely large amounts of text. Such users did not mind the high prices — often in excess of $75,000 — or the intensive use of disk-drive resources that these systems required. The ability to accurately locate and revise vital documents, including legislation, insurance policies and technical reports, was worth the trouble.

But the high prices and the tendency of text management systems to use up costly system memory kept the size of the market

Continued on page 25

PETER FIRST

Checking up on SQL/DS

BY CHARLES BABCOCK
CW STAFF

IBM's SQL/DS, just like its big brother, DB2, lacks referential integrity in the operation of its relational data base manager. But a small Wellesley, Mass., company is attempting to at least warn users when their data has lost integrity.

Intex Solutions, Inc. is offering SQL:Verify to provide an audit trail of changes to the data base and an analysis of tables used to see whether changes to data in one location have resulted in appropriate changes to related data in other locations.

SQL:Verify started out as an audit tool to be called SQL:Documentor, but beta-test users of the utility said what they really wanted was a way to check the referential integrity of their data, according to Mark Gelfand, chief of research and development at Intex.

An early user of the product, Michael G. Caplan, vice-president of investment technology at

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Inside

- Information Management software utility aids Wang users in developing custom applications. Page 24.
- Gibson-Graves announces management and QA software for manufacturing environments. Page 28.
- Palladian Software ports its expert system application package to Apollo's Domain Series 4000 Super Workstation. Page 28.

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SQL/DS

CONTINUED FROM PAGE 23

Independence Investment Associates, Inc., a subsidiary of John Hancock Mutual Life Insurance Co. in Boston, said the product "identifies the holes. It gives you a list of 'here's where you don't have a matchup in your tables.' "

Caplan said the burden of supplying referential integrity lies with the user, who must debug the application program so that it does not cause data in one table to be updated while ignoring related data in another table.

Caplan said SQL/DS users could provide the referential integrity check without SQL:Verify, but they would probably do so by creating a brute-force query that would run through existing tables looking for discrepancies in related data.

Caplan said he has used SQL:Verify to check the integrity of entries in a cross-reference dictionary containing 3,000 code numbers of securities. The check took about 30 seconds. "From where I sit, it is blindingly quick," he said.

He estimated it would take SQL/DS running on an IBM 4381 Model 11 about 10 minutes to do the same check through a query that he would write himself.

The referential integrity check is limited to entities and does not cover domains, Gelfand said. SQL:Verify is priced at $2,000 plus a $200 monthly fee at an IBM Group 10 graduated pricing site. It is priced at $5,000 pus a $500 monthly fee for an IBM Group 40 site.

SOFTWARE NOTES

Consortium forms to develop mainframe ART

Inference Corp. in Los Angeles has formed a consortium with three companies, including Ford Motor Co. and Lockheed Corp., to fund and co-develop tools that will allow its Automated Reasoning Tool (ART) to be used to develop expert systems on IBM mainframes. The ART tools will be designed for IBM's IMS/DC, TSO and CICS environments.

Software that will help optimize the execution of programs on parallel processors has been developed at **Indiana University** and is now considered in the public domain. The **Blaze Editor**, or **Bled**, aids users in improving performance of software already ported to the parallel processing environment. Bled allows interactive program editing and will warn a user if changes are being made in violation of the original syntax, according to Dennis Gannon, associate professor of computer science at Indiana University. An addition is under development to allow estimates of program execution behavior, he said.

The New York brokerage house of Donaldson, Lufkin & Jenrette has removed **Oracle Corp.** from the recommended list in its Jan. 11 research bulletin, partly because the firm believes Oracle must have exhausted its short-term upward potential. After giving Oracle's technology, strategy and sales force a favorable review, it concluded that a slowdown in **Tandem Computers, Inc.** business left the brokerage house "uneasy." The firm "does not expect the stock to outperform in the current investment climate."

Computer Corporation of America says it has an interface between Ada and its Model 204 data base management system. The interface allows an Ada application to access the Model 204.

Tool kit to help Wang users customize applications

BY NELL MARGOLIS
CW STAFF

FALLS CHURCH, Va. — Information Management Consultants, Inc. (IMC) last week unveiled a software utility aimed at aiding users of Wang Integrated Image Systems (WIIS) in developing customized applications.

IMC's Transaction Assistant, a programming tool that lets users develop applications for automated document tracking, was specifically designed to supply the missing link for WIIS.

Introduced by Wang Laboratories, Inc. in July 1987, WIIS is an image processing system that scans images of documents and pictures and stores them on optical disks, magnetic disks or microfilm, from which they can be retrieved. WIIS is based on the Wang VS minicomputer and the Wang Professional Application Creation Environment (PACE).

Richard D. Schwarz, who follows image processing for Shearson Lehman Brothers, said that "applications software is crucially important in this industry." The image processing market is expected to triple to $308 million this year, but so far, "the hardware is outpacing the software — you could almost call software the missing link," Schwarz said. "A tool kit could be tremendously important."

Wang is banking on WIIS to push VS sales and to power a company turnaround. However, Charles A. Magliato, northeast regional manger of IMC, a Wang cooperative marketing partner, said prospective customers "had trouble envisioning WIIS in their own settings, particularly in on-line transaction processing applications."

What Transaction Assistant does, said IMC President Sudhakar Shenoy, "is let the user define, by means of tables, every step a document takes, from the moment it enters a company until its final resolution." Both IMC and Wang are targeting large, transaction-intensive, paper-swamped outfits.

With the help of embedded triggers and a key-word system that can be programmed directly into an application, Shenoy said, electronic images captured by WIIS and grouped into "electronic file folders" with assigned data processing transaction codes can be automatically routed to the appropriate stations to be processed by the defined parties.

Available now, the Transaction Assistant costs about $10,000, depending on the extent of support bundled in.

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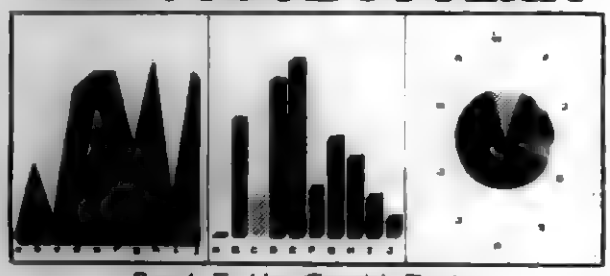

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Babcock

CONTINUED FROM PAGE 23

making enough decisions. You have to try some things," he says. That willingness to make decisions, along with Hendry's previous experience at getting the most out of a small staff, was what Coca-Cola was looking for.

"I was told I couldn't get any additional people. I said, 'Fine. I'll have my people do the things most important to me,' " Hendry recalls.

While serving as MIS director at Federal-Mogul, a national auto parts supplier in Detroit, Hendry had leveraged a small staff by making liberal use of outside contractors.

Bringing in outside contractors has its implicit hazards, however. They are paid a higher wage than regular employees, partly because they are not subject to company benefits. They are frequently newcomers, and the rest of the organization is more suspicious of them than fellow employees. And if contractors represent poor talent, they must be detected and winnowed out quickly.

Hendry made it clear to the custom programming firms in Atlanta that he expected their best people. He screened firms himself to make sure he was acquainted with the talent pool available. And although reasons of space have something to do with it, a contract employee's working conditions never seem quite equal to those of a regular employee. Two or three contract programmers, for example, can fit into one cubicle, while only one Coca-Cola employee would occupy that space.

Given these hazards, Hendry nonetheless believes that contract workers represent an effective way to leverage a small staff. Different projects require different talents, and the metropolitan Atlanta region affords a wide selection. Coca-Cola is a user of Applied Data Research's Datacom/DB and, when needed, trained Datacom/DB programmers are available.

At the same time, it is easier to change programming talent through outside contractors than it is to change employees.

These advantages are somewhat offset by the fact that once a project is completed, the maintenance task is left to Coca-Cola. The contract programmers remain on call, if needed, to work on part of a system, but the primary burden of support falls on the regular in-house staff of 15.

Having played his outside contractors to the hilt, Hendry now says he has a gut feeling that he is overleveraged and it is time to advocate adding more employees to provide greater in-house depth. He is in a well-informed position to make that case.

Babcock is *Computerworld*'s senior editor, software & services.

Paper chase

CONTINUED FROM PAGE 23

small. "Up to now, it has been [only] a stable market," says Jim Russo, vice-president of marketing at Focus Research, Inc. Even today, there are only several thousand users of such systems in the U.S., industry analysts say.

Market getting hot

But implementation of the technology is on the rise, analysts also point out. "The market's beginning to heat up," says Heidi Gabrielson, an analyst with International Data Corp. in Framingham, Mass. And among today's users are some of the largest organizations in the country: B. F. Goodrich Co., Du Pont Co., the National Aeronautics and Space Administration, Cummins Engine Co. and Texaco, Inc.

Text management systems often act as repositories for legislation, insurance guidelines, technical reports and legal documents, including those needed for litigation purposes.

A fairly new user in the insurance industry is Northwestern National Life Insurance Co. David W. Haskin, senior vice-president of corporate resources, says Northwestern National has been using Infodata Systems, Inc.'s Inquire/Text for 18 months.

"We started using Inquire in our legal department, where we manage and create hundreds of legal documents," Haskin says. "But there will be other applications, since underwriting requires the use of huge volumes of text and manuals." Right now, 40 to 50 people are using Inquire on a daily basis. But Haskin says he expects that number to double or triple in the next two years.

One of Northwestern National's biggest advantages in using a text management system is the reduction of paper. "We have been able to cut down tremendously on our paper usage — it's less by a factor of 5-to-1," Haskin says.

In addition, text management makes information more accessible. "Using a product like Inquire allows your agents to have up-to-date information, since the system is on-line and interactive," Haskin points out. "Before we had Inquire, our manuals were only updated as needed and were reprinted at intervals of two or three years."

In addition to insurance companies, newspapers and other publications use text management systems to archive out-of-date stories or as reference libraries. And large firms use the products to store and access corporate policies and procedures.

At the Illinois Bell headquarters in Chicago, Information Dimensions, Inc.'s Basis text management product has been used for three years to capture and recall key corporate documents, such as speeches given by company executives and media clippings pertaining to the company. Now, Illinois Bell is developing a prototype interface between Basis and Digital Equipment Corp.'s All-In-1 integrated office package that Information Dimensions says it plans to sell next year.

"It's just a natural extension of office automation," says Tom Zak, senior systems analyst at Illinois Bell and data base administrator for many of the Basis text libraries. The Bell operating company maintains nine separate data bases built on the Basis product, each handling a separate document category. Now, users are trying to capture electronic messages and memos — and to send them, along with attached text, to co-workers.

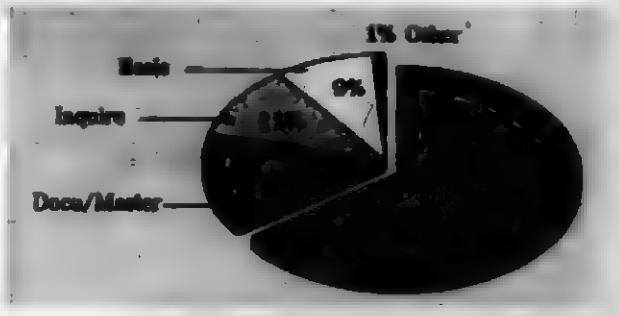
Text management systems vary in their underlying structure, but in general, there are more types of data stored in text management systems than in other office automation products. One of the additional types of data refers to the placement of specific words in the text as well as the frequency of their use.

In addition, data fields are longer in these products. "The text management system doesn't care how long a field is," says Ann Marie Horcher, data base support specialist at Dow Corning Corp. in Midland, Mich. "That's important for maintaining a data base about chemicals and chemical names. Chemical information tends to have names that are longer

Continued on page 27

Installed shares of text management systems

Of 12,000 IBM mainframe sites interviewed, 408, or 3.4%, use the technology



INFORMATION PROVIDED BY FOCUS RESEARCH SYSTEMS, INC.
CW CHART

Users push for text management players

The text management system market has been slow to develop. In fact, "many organizations struggled to find a niche for text data base management systems and couldn't find one," says Jim Russo, vice-president of marketing at Focus Research Systems, Inc. "If text management is to emerge again as a technology, it may be as a delivery vehicle."

Recently, however, users have pushed vendors in their need for text management systems. "Either text [management systems] are coming of age, or the companies are coming of age in how they deal with data processing," says Ann Marie Horcher, data base support specialist at Dow Corning Corp. in Midland, Mich.

Whatever the case, vendors seem to be making strides toward promoting the technology. According to Heidi Gabrielson, an analyst with International Data Corp. in Framingham, Mass., "Even the traditional DBMS companies are thinking about getting into the market, including Oracle Corp. and Relational Technology. Some have researched the possibility of offering a text data base management product and are looking at the text management vendors for products to resell." In addition, Software AG of North America, Inc. recently announced a text retrieval system called TRS.

Still, there are surprisingly few major, active players in the text management software market. There are at least 15 suppliers of text management systems, but just a handful sell most of the installed systems. IBM got into the business in the 1970s with Stairs, a product made by IBM in Germany, which accounted for 65% of the 408 text data base sites cited by a 1987 Focus Research survey (see chart above).

Another 14% in the Focus Research survey said they used Docu/Master, an older product developed by Dun & Bradstreet Corp. subsidiary TSI International. Docu/Master is now sold by Document Systems, Inc. in Norwalk, Conn.

Of the remaining text management users in the Focus survey, 11.2% said they use the Inquire/Text system from Infodata Systems, Inc. in Falls Church, Va., and 8.6% use Basis, a system from Information Dimensions, Inc., a Columbus, Ohio, subsidiary of the Battelle Memorial Institute. The final 1.1% surveyed said they used a variety of systems, notably TextDBMS from Data Retrieval Corporation of America in Milwaukee, a subsidiary of West Publishing Co.

Not included in the Focus Research study were users of packages that run on non-IBM systems, including computers from Digital Equipment Corp., Wang Laboratories, Inc. and Control Data Corp.

Information Dimensions, which claims 1,000 licenses for its Basis product, has versions of Basis that run on all three of the above firms' equipment. Other vendors also serve the DEC marketplace, including DEC itself, which offers the Datatrieve product under its VMS operating system offerings.

Another market study, conducted recently by Computer Intelligence in La Jolla, Calif., found a 46% market share for IBM's Stairs, a 42% share for Inquire, a 7% share for Docu/Master and a 5% share for Basis. To compile its findings, Computer Intelligence surveyed 11,400 IBM mainframe sites and found fewer than 400 text management system users altogether.

Other products, such as BRS/Search from BRS Information Technologies in Latham, N.Y., Text/204 from Computer Corporation of America in Cambridge, Mass., and Info-DB Plus from Henco Software, Inc., did not show up on the surveys because of a relatively low installed base.

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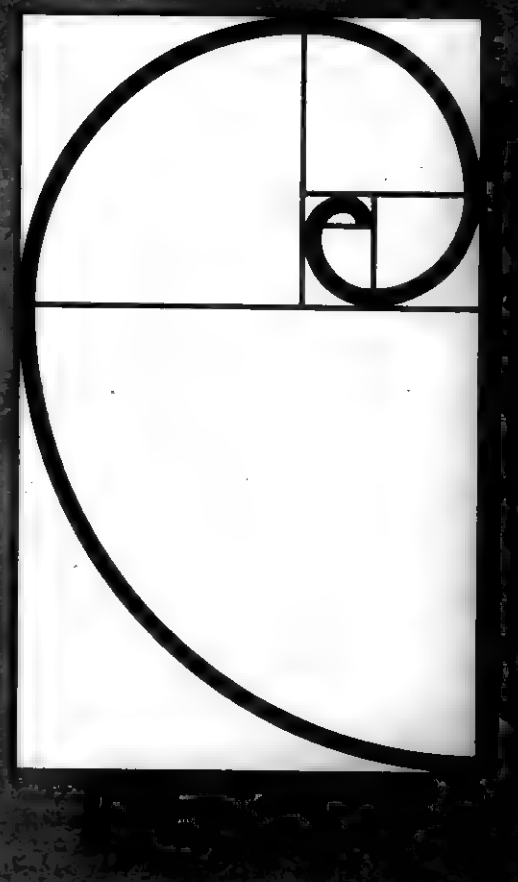
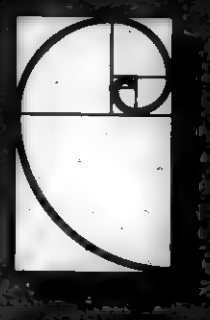




Paper chase

CONTINUED FROM PAGE 23

than standard English names, and 256 characters is usually the choke point of any standard information systems product." Dow Corning uses Basis.

Some text management products are more suited to locating key words and build a very small index, as there are very few text fields. For instance, Docu/Master — an older product developed by Dun & Bradstreet Corp. subsidiary TSI International and now sold by Document Systems, Inc. in Norwalk, Conn. — searches for words sequentially, stopping at each hit in the text.

Other products, such as Infodata Systems' Inquire/Text and TextDBMS from Data Retrieval Corporation of America in Milwaukee, build relatively large indexes as text in their files.

Such systems are based on positional indexing, which means that each new word is cataloged according to its relative position in the document.

As more text is entered, the size of the index grows. Only "noise" words, such as common prepositions and short verbs like "is," would not be cataloged. For this reason, indexes to a text management system can build files that are 10% to 30% as large as the documents being stored. That means that an index to a document 10M bytes long might add an additional storage burden of 3M bytes.

Accordingly, Illinois Bell's Zak predicts that such systems will come to occupy a significant part of the real estate on a company's disk drive peripherals. "The largest text data base we have is 100,000 blocks, which is about 10% of one 896M-byte RA 81 disk drive," he says.

But if storage on disk drives ever becomes a problem, other users say, some documents may be archived to compact disk/read-only memory drives or optical disks. This may be done in-house or farmed out to dial-up services.

"We definitely will do some archiving, either to an optical media or to a solid-state disk," Northwestern National's Haskin says.

For many users, the storage question simply does not come up. The Illinois State Legislature uses more than one IBM 3380 disk drive to hold the state's laws on-line for electronic research, and the California State Legislature is planning to place all the state codes on-line. The California legislature uses Inquire/Text for text retrieval of legislation and recently purchased TextDBMS for creating new text files.

While the storage issue can be resolved, updating is another matter. Most text management systems are not updated on-line. Instead, a data base administrator decides how often to run batch updates. The California legislature runs such updates once every half-hour during the workday. Other users prefer to update overnight. Between updates, alterations to stored text are maintained in interim files.

IBM behind the pack?

Just as the pace of installation of most text management systems is beginning to pick up (see story page 25), many users of the older front-runner product, IBM's Stairs, are abandoning it. IBM added Stairs/PC, a PC interface to Stairs running on the mainframe, in June 1987. But many users resent IBM's lack of support for the Stairs product and fear it is only a matter of time before Stairs is discontinued.

Dow Corning did not wait. The firm used Stairs until Basis was brought on-line four years ago. "We found that Stairs did not allow us sufficient functionality and flexibility to deal with the complex types of text we had," says Horcher, who is also president of the Basis Users Group. "It was a more basic type of system. You had to work by its rules. Sometimes an older design just can't make the journey as a company's needs grow."

Stairs was abandoned by Cummins Engine, too. Three years ago, Columbus, Ind.-based Cummins' corporate library switched to Docu/Master after 10 years with Stairs. "We use it constantly," says Bill Poor, manager of library services. "Docu/Master is a very easy system for the novice user, and the real beauty of it is that you can use it from any IBM terminal or IBM PC in the company."

Ease of use is not the only reason users purchase these products. Jack Plant, a consultant in end-user computing at the Automobile Club of Michigan in Dearborn, evaluated the leading IBM-compatible products and says, "All these products do pretty much the same thing, and they do it in pretty much the same way."

The auto club settled on TextDBMS in June because that product's Textbuilder module allowed the club to easily customize the user menus. The organization, which runs an IBM 3090 Model 400, is developing multiple text data bases that will store travel information and facts on Michigan attractions that will help travel consultants handle phone inquiries.

> "WE HAVE been able to cut down tremendously on our paper usage — it's less by a factor of 5-to-1."
>
> DAVID W. HASKIN
> NORTHWESTERN NATIONAL LIFE INSURANCE CO.

Future applications

As links to electronic mail systems grow, the nature of text management applications will vary. Some emerging uses might include research libraries for corporate memo writers, text data bases for manufacturing procedures and historical files that guide corporate management in making policy decisions.

New uses for text management are surfacing. Several large users are cooperating with the text management systems vendors to produce interfaces with integrated office automation packages such as IBM's Professional Office System and DEC's All-In-1. The trend is unmistakable, as users like Illinois Bell precede vendors in forging transparent links between an end user's word processing package or integrated office package — and the underlying text retrieval engine.

According to Dow Corning's Horcher, "Many people are finding that with electronic mail, they finally have the text in a form that's easily transferable among computers. And since keying in text is harder than keying in data, [text management systems] are being linked to electronic mail as a whole new way of getting at information."

When users are shopping for text management systems, it can be difficult to select the product that best fits their needs. Sometimes, MIS managers are joined by a corporation's librarians or lawyers in making the decision.

Complicating the selection process is the fact that some vendors, such as Infodata Systems, Data Retrieval and Information Dimensions, do not have standard screen menus. Instead, they provide users with a tool kit of statements that allow users to customize the screen interface.

One added attraction, though, is that most vendors offer prospective converts the ability to use the software on a trial basis for 60 to 90 days.

In the end, the satisfaction of the end users will determine the success of a text system. "We were looking for a system that was really easy to use," says Larry Plunkett, senior system programmer at Florida Power & Light Co., which recently installed TextDBMS. "Most of my end users, including many corporate lawyers, could be described as being anti-DP," Plunkett points out. And every little bit — including an easy-to-use text management system — helps.

CASE

CONTINUED FROM PAGE 23

techniques and methodologies; and the inevitable result of a boom: a shakeout, "probably starting next year and continuing on into 1990."

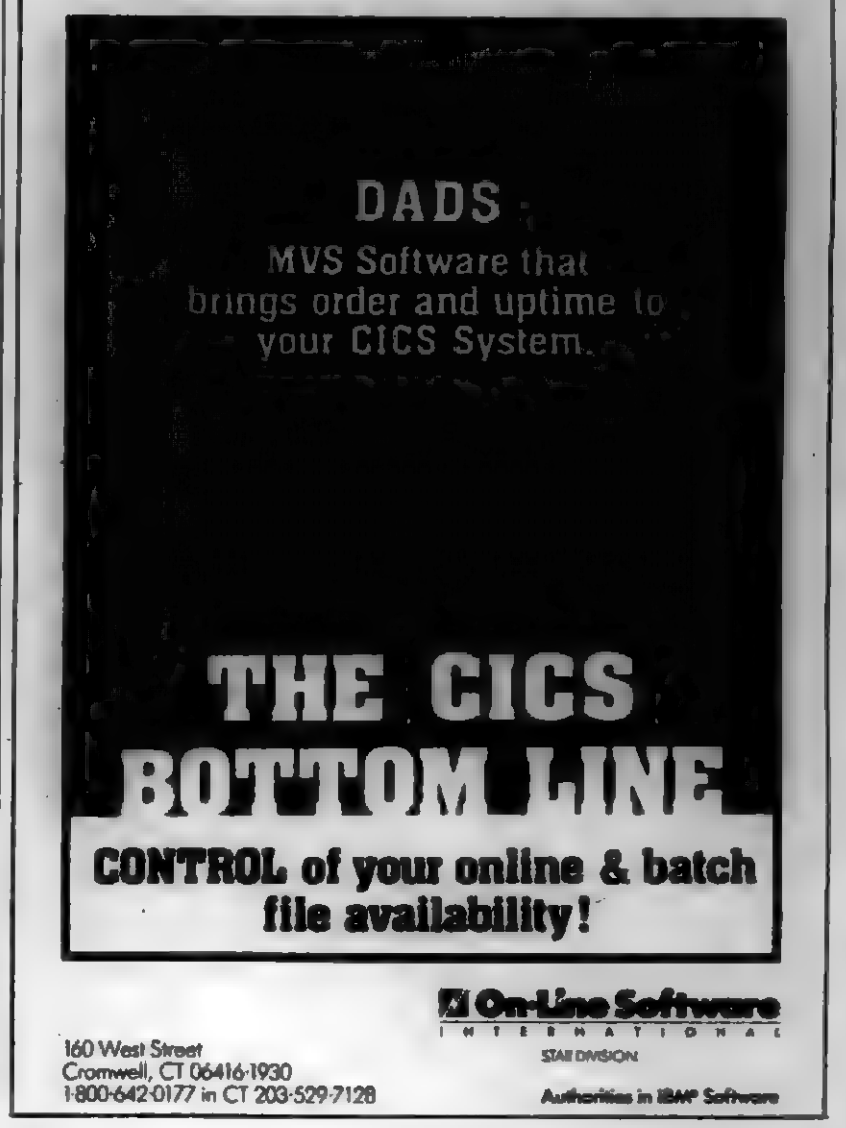
In contrast to the view from upper CASE, Gordon J. VanderBrug, vice-president of development at Salem, Mass.-based Language Technology, Inc. questioned the use of the words new and successful as apt descriptions of CASE.

"What's new is the acronym," said VanderBrug, who described himself as representing neither back-end nor lower CASE, but "existing CASE." Language Technology produces a Cobol analysis and restructuring product called Recoder.

Recent figures show that at the start of 1987, there were some 750,000 software programmers and analysts in the U.S., VanderBrug said. If that is so, he said, "the question becomes, Why hasn't CASE been more successful? Because what most CASE tools automate is not what most software programmers do."

Citing maintenance as accounting for some 80% of the overall effort of providing software, the Language Technology executive called it "grossly overlooked" by automation enthusiasts. "What we desperately need is not more code generators, but a reverse-engineering technology to aid in maintenance."

VanderBrug heralded a coming "redesign era," replete with tools that make reverse-engineering abstractions interactively available to programmers, wed automatic restructuring to graphics workstations and support automatic derivation of data abstractions from Cobol. "We must have CASE for existing systems," he said. "They control almost every aspect of our business lives."



NEW PRODUCTS

Systems software

A software system designed for use in management and quality assurance applications in manufacturing environments has been announced by **The Gibson-Graves Co.**

According to the vendor, **Traq-1** features specific modules for analyzing quality data for raw materials, manufacturing and both batch and lot-oriented finished materials.

The system also provides full data base query and reporting capabilities, the vendor said.

Traq-1 runs on Digital Equipment Corp. VAX systems. A basic Traq-1 license costs $25,000.

Gibson-Graves, P.O. Box 1078, 261 South St., Wrentham, Mass. 02093. 617-384-7164.

Applications packages

Palladian Software, Inc. has ported its **Palladian Operations Advisor** expert system application package to Apollo Computer, Inc.'s Domain Series 4000 Personal Super Workstation.

The Operations Advisor was designed for use in applications involving capacity planning, product mix change, new technology implementation, new methodologies and their effects on lead time, work-in-process inventories and cost reductions.

An initial license for the Operations Advisor costs $90,000.

Palladian, Four Cambridge Center, Cambridge, Mass. 02142. 617-661-7171.

Languages

An enhanced version of the **GT.M** MUMPS compiler for the Digital Equipment Corp. VAX family of computers has been announced by **Greystone Technology Corp.**

GT.M Version 2.0 features incremental backup, a faster version of the data base integrity checker, data base journaling, an on-line Help facility, new language features and a two-volume set of documentation.

GT.M conforms to ANSI-standard X11.1. It is a true optimizing compiler that generates native-mode VAX machine code. An incremental linker and a concurrent data base system are included in Version 2.

GT.M Version 2.0 costs from $1,950 to $35,000.

Greystone Technology, 8 Lakeside Office Park, Wakefield, Mass. 01880. 617-246-0461.

Utilities

A general-purpose systems management facility (SMF) data-movement backup utility has been announced by **Advanced Software Products Group, Inc.**

Developed by Woven Software, Inc. in Houston, SMFutil operates as a replacement for the IBM IFASMFPD system utility.

Functions include the ability to act as an interface between Computer Associates International, Inc.'s CA-Jars accounting package; Marino Associates, Inc.'s MICS billing system; and the SAS system from SAS Institute, Inc.

Data retrieval is based on user-supplied data selection criteria, and error correction and recovery features are included.

SMFutil runs on IBM MVS-based CPUs. It costs $7,500.

Advanced Software Products, Suite 401, 2335 Tamiami Trail N., Naples, Fla. 33940. 813-649-1548.

Data base management systems

3CI, Inc. has released **Infocen Version 7.2**, an enhanced version of its relational data base management system and fourth-generation language application development system.

Version 7.2 includes enhancements that allow the handling of document files, incorporate Wordperfect Corp.'s Wordperfect applications and provide new commands for the Macro module and record subsets.

Infocen is compatible with Digital Equipment Corp., Data General Corp. and Honeywell Bull, Inc. computer systems. It is priced from $30,000 to $50,000 per system.

3CI, Solar Office Plaza, 155 W. Harvard, Fort Collins, Colo. 80525. 303-223-2722.

Development tools

A product that supports IBM VSAM file management operating in native mode under the VM operating system for IBM 370 and compatible computers has been announced by **Unicorn Systems Co.**

Called **VMVSAM**, the software provides multiuser VSAM file support for both development and execution of programs. It provides full VSAM compatibility for Cobol programs ported from the IBM VSE or VMS environment. A call-level interface is provided for assembler and Rexx programs.

A permanent license fee ranges from $5,500 to $14,000.

Unicorn Systems, 3807 Wilshire Blvd., Los Angeles, Calif. 90010. 213-380-6974.

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On your (bench)mark, get set, go. Compaq recently completed a couple of different benchmarks comparing how IBM's OS/2 Standard Edition 1.0 runs on IBM and Compaq systems. The first set of benchmarks pitted IBM's version of OS/2 against Compaq's version, set to be released by the end of March, running on Compaq's machines. "From what we can see from CPU, video and coprocessor benchmarks, both operating systems [running] on our products are basically equal," said Gary Stimac, Compaq's vice-president of systems engineering.

In comparing IBM's OS/2 on IBM systems with Compaq's OS/2 on that firm's systems, Stimac said the only difference in performance is the difference in the megahertz speed of the chip. "If our [megahertz] processor is 20% faster than theirs, then the benchmark comes out exactly 20% faster."

Stimac said he is "very comfortable" in the feeling that Compaq hasn't lost any performance advantages in running OS/2 and that IBM hasn't

Continued on page 34

SCO Xenix, OS/2 score equally

Face-off uses Xenix 286 after previous 386 matchup called unfair

BY ALAN J. RYAN
CW STAFF

CHICAGO — Soon after IBM and Microsoft Corp. questioned the usefulness of benchmark tests comparing their jointly developed OS/2 with SCO Xenix optimized for the Intel Corp. 80386 chip, a benchmark software firm here conducted new tests comparing OS/2 with a comparable version of Xenix.

The results of the latest test conducted by Neal Nelson & Associates, which compares OS/2 with SCO Xenix 286 Release 2.2 in 17 different tests, found SCO Xenix faster in five tests and OS/2 faster in four.

According to spokesmen for IBM and Microsoft [CW, Jan. 11], the original tests unfairly pitted OS/2, an operating system designed to work with Intel's 80286 microprocessor, against a version of Xenix designed to work with the 80386.

Those tests showed the initial release of IBM's OS/2 may run up to seven times slower than The Santa Cruz Operation, Inc.'s Xenix System V when performing the same tasks on the same computer. The computer used in the test was a 2M-byte, 16-MHz IBM Personal System/2 Model 80 with a 70M-byte enhanced small disk interface disk drive.

Originator says tests fair

Neal Nelson, principal of the testing firm, maintained that his original tests, conducted soon after the public release of OS/2 [CW, Dec. 28, 1987/Jan. 4, 1988], were fair.

"The logic of the test was that if a person were to buy OS/2 or Xenix for the PS/2 Model 80 at that time, [OS/2 and Xenix 386] were the choices available, and a performance comparison might be of interest," Nelson said.

The benchmark tests indicate how the operating systems fare in the multitasking environment; they show a computer running first one copy of a task, then increasing one by one until 20 copies are executing simultaneously. The tests also indicate the degradation in seconds as the number of copies increases.

In the latest benchmark tests, OS/2 proved 300% to 600% slower than SCO Xenix 286, introduced in 1985, in a test that included 16- and 62-bit integer math, function calls, loops and sequential and random disk I/O.

According to Nelson, the test might be similar to a normal application mix with office automation and data base activity occurring at the same time. As multitasking activity was increased, OS/2 showed increased degradation.

In a test that compared OS/2 with SCO Xenix 286 in the performance of 100,000 calculations with 64-bit, double-precision floating-point numbers — similar to an engineering or scientific application — OS/2 was faster than Xenix, with differences that ranged from 40% to 50%, the test showed.

In some tests, the operating systems were neck-and-neck in performance. Those included calculation-intensive tasks like word processing, a 250,000-cycle loop with no calculations inside the loop and short- and long-integer math.

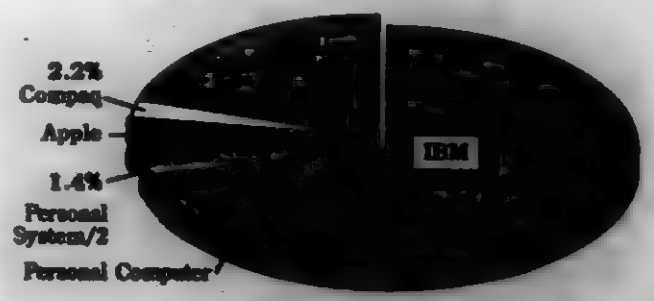
Inside

- AST's Quresbey speaks out. Page 31.
- Quadram board seen by some as poor man's 386. Page 31.
- Wizard claims its Forecaster can spot trends. Page 36.

Data View

IBM's PC of the rock

IBM clearly leads in personal computer market share at Fortune 1,000 sites, as of November 1987



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Floppies stiffened up

Maxell says diskettes' durability doubled

BY ALAN ALPER
CW STAFF

NEW YORK — Maxell Corporation of America recently unveiled a family of floppy diskettes said to offer significantly greater durability and error resistance than its existing product line.

The RD series, which includes 8-, 5¼-, 3½- and 2.8-in. diskettes, employs a new technology said to more securely bond magnetic particles to the floppy diskettes' base film. As a result, single-track durability on 5¼- and 3½-in. diskettes is doubled to 40 million and 25 million passes, respectively, the company said.

The magnetic particles themselves have been improved, resulting in an increase of 10% in signal amplitude, noted Takashi Ozawa, Maxell's vice-president

Continued on page 34

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AST's Qureshey assays the thrill-a-minute PS/2 future

AST Research, Inc. has blossomed from one of the first and biggest IBM Personal Computer enhancement board vendors into a diversified systems manufacturer. After releasing the widely praised Premium/286 microcomputer in the fall of 1986, AST followed up with desktop laser printers and enhanced board offerings for Apple Computer, Inc.'s Macintosh and Digital Equipment Corp.'s VAX markets.

On Black Monday — Oct. 19, 1987 — AST introduced its latest system, the Premium/386, giving users some of the benefits of IBM's Personal System/2 Micro Channel architecture but within the IBM PC AT environment. The company also unveiled the first of a series of intelligent peripheral controller boards, which will take advantage of the Premium/386's Smartslot cooperative processing feature.

AST's diversification has not been without cost, however. Although revenue levels have been encouraging, the firm's net income dropped consistently through fiscal 1987. Only now is it edging back into the black.

Safi Qureshey, president and cofounder of AST, spoke recently with *Computerworld* West Coast correspondent James A. Martin about the company's diversification, future directions and the microcomputer industry outlook for 1988. Qureshey formerly worked at Computer Automation, Inc., an Irvine, Calif., minicomputer manufacturer.

What has been the reaction so far to the Premium/386? How many units have been shipped or sold to date?

We just started shipping in December, so we don't have any numbers yet. If you look at what's been written so far, you'll see it's been received very well. Just as we did with our 286 machine, we didn't just come out with a standard 386 that looks like a fast PC AT. We added some unique capabilities to do more than that. That's been our hallmark in differentiating ourselves — offering unique features within the standard.

Qureshey heads AST diversification, marked by emphasis on the unique

With PS/2 clones expected this year, what will happen to machines like the Premium/386, which only partially mimics the Micro Channel?

We're totally booked with orders and trying to manufacture systems as fast as we can. Introducing a PS/2 product would confuse our dealers and customers. On top of that, significant legal issues remain. If you talk to major chains like Businessland, they'll tell you they are also concerned about the legal issues. We do not believe PS/2-compatible introductions in mid-1988 will, by themselves, create a significant increase in IBM or third-party sales until those lingering legal questions are clarified. IBM hasn't chosen to clarify them, and that has caused a delay in the popularity of those machines. Meanwhile, our customers are not beating down the doors for PS/2 compatibles.

There are reports that the first companies to introduce a Micro Channel compatible might be Taiwan firms hoping to make a splash in the U.S.

Who do you think has bought the PS/2 so far? Traditional IBM corporate customers. Do you think they would run out and buy untested products that have legal issues hanging over them? Those who are buying now are those who were promised seamless integration from PCs to mainframes. They are big corporate customers. A giant company is not going to buy from Multitech, say, just because they are 15% cheaper.

By making it tough, legally, to perpetuate the PS/2 standard, isn't IBM playing it risky? Doesn't the PS/2 need clones to survive?

That seems like the case. For every month IBM delays clarifying its legal policies, it will make the PS/2 less of a standard. This

Continued on page 35

All aboard at Quadram

Quad386XT seen as bargain alternative

BY JAMES A. MARTIN
CW STAFF

When microcomputers based on Intel Corp.'s 80386 chip began appearing in 1986, many users wanted to upgrade but could not justify getting rid of their existing personal computers in favor of more expensive, faster models. At the same time, some users found they were approaching memory and performance limits with their current systems.

To many, the solution arrived in the form of add-in boards like Quadram Corp.'s Quad386XT. Quadram's board, which began shipping last October, promised the power of a 386 machine on an IBM Personal Computer or PC XT compatible via an enhancement card. Best of all, a user could trade in his Intel 8088-based system for a 386 for less than $1,000.

With many 386 systems priced at around $5,000, users were wary of upgrading.

"Price was the main factor in not buying a 386 machine," said Terry Swart, technical service engineer for Cain Chemical, Inc., a chemical manufacturing company in Ponca City, Okla. "With the 386XT, we could buy four boards for $3,600 instead of [spending] $5,000 for one 386 system."

PC priorities

The investments made in existing IBM PCs were another reason for holding onto the PC XTs. "I looked at the prices of 386 systems, and even in discount houses they were well over $2,000. The problem was, I already had a substantial investment in my existing XT," said Robert Tolz, a corporate and tax attorney in New York.

"I had an old PC and didn't know if I should dump it or not, although I was reluctant to let it go because of the peripherals that worked with it. They would be expensive to replace as well," said Rodger Kraus, a partner at Instant Recall, a Bethesda, Md.-based custom software programming firm. "So the accelerator board really filled a need."

The desire to upgrade the PC XT was fueled both by software vendors, whose application programs increasingly required more memory and processing power, and IBM itself, by discontinuing the XT in 1987.

In addition, by 1987 the 8088-based PC was already two generations behind the Intel 80286 and 80386 processors — enough to fuel uncertainties among those companies preferring to live on the leading edge of technology.

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Cain Chemical purchased four Quad386XT boards last year and plans to double that number in 1988 because of the firm's increasing use of more powerful software for computer-aided manufacturing applications.

"We started to bump up against speed problems with Symphony, Dbase III and Framework — just about everything seemed to be slowing down on our XTs," Cain Chemical's Swart said, referring to products from Lotus Development Corp.

Continued on page 35

DBMS advances to key breakthroughs in SQL

BY FABIAN PASCAL
and RICH FINKELSTEIN
SPECIAL TO CW

First in a two-part series.

Performance is a major consideration in data base management system decisions, as evidenced by the number of benchmarking efforts now being undertaken. The performance of data base applications is affected by many factors, including the hardware, the CPU, the memory, the operating system, the data base management software and the nature and mix of applications and their concurrent use.

Within one application environment, on a given hardware-software platform, improvements in response time have traditionally been achieved by system administrators, application developers and even end users. They manipulate storage structures, indexing and procedural code to squeeze desirable performance out of the DBMS.

It is becoming increasingly clear, however, that in most environments this is problematic. Different queries and applications written against data bases require different structures and access strategies. Constant and rapid changes in both data and processing needs strain even the most competent of users and make performance tuning difficult and expensive.

C. J. Date, cofounder of the Codd & Date Consulting Group, cautions that tuning done by users may not ultimately achieve the best performance, because users do not have all the necessary up-to-date information and are not patient with the need to continuously retune. Clearly, machine performance cannot be pursued cost-effectively in the long run without proper consideration of human productivity. Some balance between the two must be struck.

It is for this reason, in part, that relational technology is quickly gaining ground as a data base management foundation. Embedded in E. F. Codd's 12 rules of relational fidelity is the critical concept of "physical data independence," which requires DBMSs to insulate queries and applications from the internal representation of data.

To be productive, users should interact only with the logical level of their data; namely, tables, columns, rows and values, which they can readily understand and manipulate. If properly supported, "physical data independence" shifts some of the burdens of maximizing performance from users over to the DBMS.

Take a look at what a relational DBMS does when a user or an application issues an SQL data request:

- Parsing.
- Syntax checking.
- Name lookup, specifically existence checking, authorization checking, view composition and integrity checking.
- Information gathering.
- Data access decision.
- Execution.

The step that most affects performance is the data access decision; the selection of the best possible path to the data. Relational DBMSs have software modules called optimizers that specialize in this task, insulating users from it. To illus-

Continued on page 35

"It's 6:33 pm. The lines are down. And she's the closest thing I've got to a technician.

Meanwhile, I've got a sales guy here waiting to close a half-million-dollar deal, and he's screaming 'why didn't my order go through.' I have no clue. My technical staff is home watching the game. And all I keep thinking is whatever happened to that word reliability? If I could have anticipated the problem, at least I would have had a chance. As far as I'm concerned, somebody at headquarters better start talking to AT&T about getting a network management system. Or they can find themselves a new whipping boy.

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Floppies

CONTINUED FROM PAGE 29

of sales and marketing for special products. The increase will help eliminate track errors and reduce interchange problems, he added.

Maxell has also reduced signal noise by creating a process to uniformly disperse magnetic particles within the floppy diskette's binder. In addition, an improved diskette liner is said to lift dirt and dust away from the recording surface and reduce errors.

The new series was developed in response to changes in how microcomputers are used, noted David Berry, new products development manager. Since laptop and other portable computers are used in a variety of nonoffice settings, floppy diskettes had to be enhanced so they could perform in a more hazardous environment, he said.

Braving the elements

"We've upgraded our disks in response to the changed environment — where humidity and temperature changes, as well as contaminants, are more prevalent," Berry pointed out.

Maxell's approach differs greatly from that of Verbatim Corp., which recently announced a line of diskettes that use a Teflon topcoat to prevent contaminants from damaging the recording surface.

Berry said a disk drive's read/write head could remove the Teflon coating from Verbatim's floppies, resulting in additional contamination and possible interference with the signal.

Maxell said with the exception of 3½-in. diskettes, all members of the RD family should be available this month for approximately the same price as Maxell's existing line. A box of 10 floppies currently retails for between $9.99 and $12.99, a company spokesman said.

A box of 10 3½-in. floppies will cost 3% to 4% more than the current product line because most are manufactured in Japan and are subject to significant increases in the value of the Japanese yen relative to the dollar, the spokesman noted. The new 3½-in. floppies are expected to retail for between $19.99 and $24.99, he added.

Scannell

CONTINUED FROM PAGE 29

gained any advantages, even though it had a hand in developing the multitasking operating system.

The purpose of the upcoming Compaq OS/2 announcement is threefold, according to Stimac: first, to talk about when it will be delivered; second, to show not only that IBM's OS/2 works well with Compaq's machines but to show off Compaq's built-in performance advantages; and third, to demonstrate how well popular third-party applications will run.

The one thing Stimac said he found surprising is that no one has been beating Compaq's door down to get their hands on OS/2. "We feel it is important to get it out there so developers and users can evaluate it. But is anyone beating down our doors to get it? Clearly not. But that's to be expected, because there aren't any applications out there that require it."

Tooling along with SQL Server. Sybase, the folks that made it possible for Microsoft and Ashton-Tate to make their SQL Server deal last month, announced last week it will port and distribute its Datatoolset to OS/2. SQL Server used in combination with Datatoolset will provide developers with all they need to put together work group applications that can talk with mid-range systems, according to the boys from Berkeley.

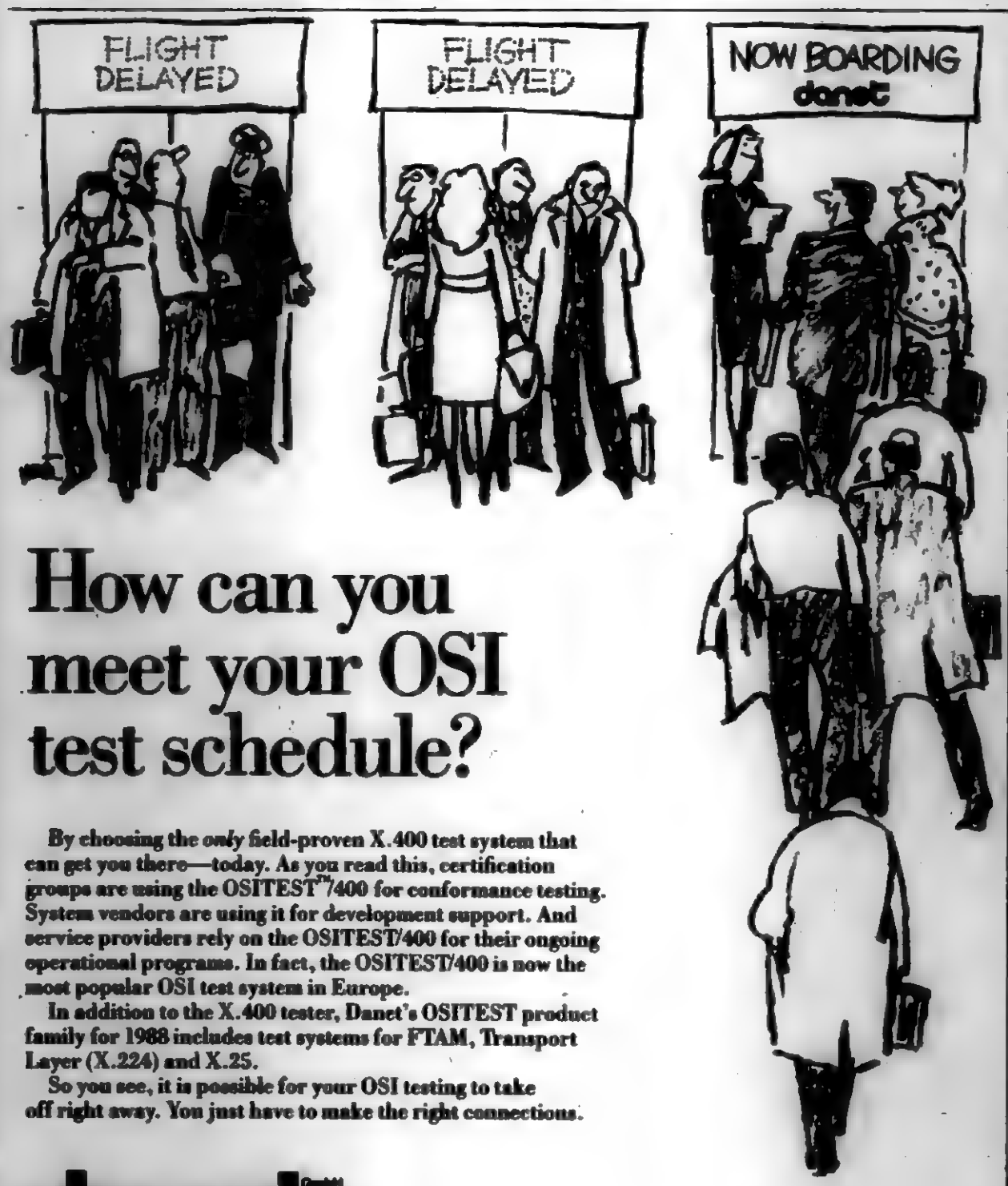
Would Bill Gates Excel-at this? Lotus has created a nice little diversion called the Lotus game. It's a board game (system requirements: two or more people) that challenges the player to ship and sell a Lotus product around the world by gaining approval from the company's manufacturing, finance, research and development and marketing departments. I wonder if Bill Gates could pick up some pointers on how to get OS/2 Extended Edition to market any quicker. Come to think of it, could Lotus pick up something on getting OS/2 products to market quicker?

Could you pass the sweet and sour, Jim? A couple of weeks ago, the Associated Press ran a story on Lotus's opening up a 13-member sales office in Bellevue, Wash., the backyard of archrival Microsoft. The heads of the two firms said there is nothing personal in the move. "There is no personal animosity," Lotus boss Jim Manzi said. "I am coming out [to Seattle] in March. I think I'm having dinner at his [Microsoft's Bill Gates'] house." Gates said he is curious about the new office but doesn't feel threatened.

Maybe after dinner they can sit around and play the Lotus game, with Bill trying to gain approval from Lotus management to market a product called, say, Excel, and Jim doing his best to undermine that effort.

Quote of the week. "Well, I don't feel bad about it," responded Microsoft Chairman Bill Gates when asked if it wasn't a bit awkward for his firm to refer customers to Ashton-Tate to buy the other half of the Microsoft/Ashton-Tate SQL Server.

Scannell is Computerworld's senior editor, microcomputing.



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Qureshey

CONTINUED FROM PAGE 31

doesn't mean IBM will not have its share of the market, of course. But meanwhile, compatible manufacturers will continue to grow beyond the performance of IBM.

Like the Premium/286, have you incorporated any designs into the Premium/386 that will enable you to upgrade that machine as well?

When we came out with the 286, the 386 was already on the horizon, so it was more feasible to take that into account. Expanding the Premium/386 is part of the game plan, of course, but I couldn't say if it would take a 486 card or not. But we do have enhancement features in mind.

What is your reaction to Computer Automation, Inc. hitting up board companies for royalties on its patent?

We don't see that as a major issue, and it's not something we can discuss at this time. We have a good relationship with them and have had correspondence with them on that issue.

How will these royalties affect the cost of add-in boards for the PS/2, for AST and for the end user?

Again, it's too early to say, and we couldn't divulge the discussions we are having.

AST's most recent revenue report looked very positive, but net income had taken a beating. What is the situation now?

The September quarter earnings had reached the bottom, but our net income is also very positive for the quarter that just ended. We expect to earn 10 to 15 cents a share for the December quarter, and that's just a start.

> "BESIDES IBM, most of the major players realize the value of standards and cooperation between software and hardware vendors."
>
> SAFI QURESHEY
> AST RESEARCH, INC.

As our volumes increase, we are able to bring our manufacturing costs down. Also, our new products — like the Premium/386 — will have significantly higher margins than the 286. The board business is rebounding; we've been through the worst of it and probably have more PS/2 add-in products than any other company. As PS/2 shipments increase, our add-in products should relate to those sales, especially when new applications for OS/2, which require more memory, come online.

What do you see as the biggest challenges facing AST, and the micro industry in general, in 1988?

We will see new companies coming out with brand new applications for the faster machines and the PS/2s. In terms of micro applications, we've really only scratched the surface. What we've had so far is really just word processing, spreadsheets and data bases, but there should begin to be applications in [computer-aided design], engineering or small-business multiuser environments.

Besides IBM, most of the major players realize the value of standards and cooperation between software and hardware vendors. The key beneficiary, of course, will be the end users. They can make decisions more intelligently, and we will work to make sure our customers get compatible hardware and software that works together to solve their problems.

Quadram

CONTINUED FROM PAGE 31

and Ashton-Tate Corp.

"The programs had become so large that a simple 8088 machine couldn't handle them. But what was I going to do with all the old XTs? We had to go with a turbo board, and Quadram looked like the best on the market," Swart continued.

As a means of achieving 386 performance at low cost, the Quad386XT was rated as a worthwhile investment by all users queried. However, some discovered hardware compatibility problems while others said the board was more of a temporary solution and not a valid replacement for a 386 system.

Kraus purchased a Wico Distribution Co. Smart Board keyboard for his XT. He said the Quadram board does not recognize input from that keyboard during the read-only memory BIOS initialization process. As a result, Kraus keeps two keyboards by his XT: an IBM keyboard, which is used during booting up, and the Wico keyboard, which replaces the former and is used for inputting data.

Kraus said he was also disappointed when he added the Quad386XT board to a PC with 256K bytes of random-access memory provided mostly by add-on memory cards. He assumed that the Quad386XT, with its 1M byte of extended memory, would assign enough of its memory to the system's RAM to bring it up to 640K bytes. Instead, he found he still had a 256K-byte PC but with 1M byte of extended memory.

"I had to go out and buy another memory board to bring the system up to 640K RAM," Kraus said. The Quad386XT uses the extra memory to design an on-board virtual PC, and the additional memory is not actually used by the board after the boot-up process, he added.

"The 640K RAM that I had to get with another card is never actually used after the boot-up, it's just there so the Quad386XT can design a virtual PC on board. It has to be there so the 386 board can create fast 32-bit memory on the motherboard," he added.

Overall, Kraus said the Quad386XT "fills a definite niche for people who want to speed up an existing machine." He purchased the board as an interim 386 solution while awaiting 386 price drops and performance improvements.

Users said that, in general, obtaining a 386 system for a small price is worth any minor drawback. "It's like buying a 386 machine for $900," Swart said. "Although you still don't have the high-speed machine, this board will keep us from having to upgrade for at least two years. If it can do that for $800, then it's fantastic."

DBMSs

CONTINUED FROM PAGE 31

trate, for a table called Persons with each row representing personal data and both the Deptno and the Salary columns indexed, the SQL query:

```
Select *
From Persons
Where Deptno = 'AI' and Salary > 25000
```

could be executed by accessing the data using the Deptno index, the Salary index or by scanning the whole table. An SQL back end receives and understands requests in terms of sets and set operations rather than row-by-row. Therefore, it can apply intelligent algorithms to information on storage structure, index availability and table statistics dynamically maintained in the system catalog to estimate the response times of available access strategies and select the most efficient one.

Assumptions

It has been assumed that human intervention is necessary for such decisions. Consequently, traditional DBMSs usually collected neither statistical data nor ad hoc repositories (such as catalogs) to store for the optimizer. Moreover, nonrelational data base languages tend to be third generation, processing data one record at a time.

Without the benefit of the high-level table operators of relational languages such as SQL, an optimizer cannot analyze the total data intent of a request and evaluate the efficiency of available paths. The user must select and explicitly specify one up-front, which is not cost-effective in the long run.

This has important implications. For good performance, vendors should concentrate their competitive efforts on providing a broad range of flexible storage structures, good system catalogs and intelligent optimizers to eliminate the lingering myth that relational systems are inherently poor performers.

In addition, users should evaluate performance in terms of the degree of human effort necessary to achieve and maintain it. Proper relational design of data bases is necessary to take full advantage of optimization.

System base optimization is particularly valuable in the microcomputer environment. Personal computer users are even less used to digressing into programming and tuning activities than their minicomputer and mainframe counterparts.

In addition, the distinction that exists between administrators, developers and end users cannot always be relied on or justified.

Well rounded

Ideally, we need products that perform consistently well across the whole range of data base operations. Commercial reality, however, does not offer such luxury at this early stage.

Optimization research is a complicated field: Still in its infancy, resources are not unlimited, and vendors may differ in their priorities, expertise or targets. Consequently, relational DBMSs vary in their performance profiles.

For example, production systems may emphasize fast insert, update and delete operations. On the other hand, retrieval response time may be particularly important in decision support environments. Ad hoc interrogation of data bases by end users cannot afford optimizers that can be easily fooled by how users specify queries. Applications that involve heavy input of external data should be sensitive to the quality of the loading capabilities provided.

In testing PC SQL implementations for performance, we have found that despite the youth of the products and the 640K-byte DOS constraint, relational performance should no longer be questioned. At the same time, products do vary in performance and in the sensitivity of their optimizers to index configurations and operation types.

This reinforces the need to pay particular attention to the requirements of the specific environment for which a relational DBMS is selected.

Next week: Examples from several PC SQL products.

Pascal is an independent analyst based in Washington, D.C., and is affiliated with the Codd & Date Consulting Group, specializing in relational technology and SQL on microcomputers. Finkelstein is a senior consultant with Codd & Date.

The Best Ideas Under the Sun are at SUGI 13

SAS® Users Group International announces its thirteenth annual conference, March 27-30, at Marriott's Orlando World Center, Orlando, Florida. Conference co-chairs: Barry Hobbs and Bob Hamer

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You can also take advantage of PC hands-on workshops, pre-conference training courses, tutorials, roundtable discussions, posters, a problem solving booth, software and hardware demonstrations, and special-interest group meetings.

To register, contact: SUGI 13, SAS Institute Inc., SAS Circle, Box 8000, Cary, NC, 27512-8000; telephone (919) 467-8000.

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NEW PRODUCTS

Systems

Sritek, Inc. has announced an NCR Corp. Tower-compatible multiuser system capable of supporting up to 48 users.

The system, called the Max-20, is object-code and media compatible with NCR Tower systems running Unix or Ryan-McFarland Corp.'s RM/COS operating systems. According to the vendor, it can also run standard DOS applications.

The Max-20, based on the NCR Model 3279 platform, is equipped with an 8-MHz Intel Corp. 80286 processor and a Motorola, Inc. 68020 application processor. A standard system includes a 140M-byte hard disk, a 60M-byte cartridge tape, a 1.2M-byte floppy disk, Unix System V, DOS 3.1, a monitor, a keyboard and a 1,200 bit/sec. modem.

Prices range from $7,995 to $10,995.

Sritek, 6615 Snowville Road, Cleveland, Ohio 44141. 216-526-9433.

Software applications packages

A Lotus Development Corp. 1-2-3 add-on designed for forecasting trends has been announced by Wisard Software Co.

The Wisard Forecaster is said to automatically determine seasonal patterns as well as upper and lower bounds, minimum and maximum values, mean and standard deviation and slopes. Also included is math coprocessor support.

The Wisard Forecaster runs on IBM Personal Computers with 1-2-3 Version 2.0 and higher. It costs $99.

Wisard Software, P.O. Box 19730, Green Bay, Wisc. 54307. 414-436-2341.

Software languages

A portable, object-oriented, high-level assembly language programming tool with C-link syntax has been announced by International Microcomputer Software, Inc.

Risc is said to contain an object-oriented messaging kernel with source code and language extension capabilities.

The initial release runs on Intel Corp. 8086-, 80286- and 80386-based machines. It costs $79.95.

International Microcomputer Software, 1299 Fourth St., San Rafael, Calif. 94901. 415-454-7101.

Software utilities

Nine to Five Software recently announced a report generation system for Apple Computer, Inc.'s Hypercard information management environment.

Reports for Hypercard features row and column reports, free-form reports, multilevel sorts, multiple criteria card selections, column and page breaks, calculated fields, totals, subtotals, averages and math and string functions. Report layout, field selection and calculations are performed with the on-screen report builder.

Reports for Hypercard is priced at $99.

Nine to Five Software, P.O. Box 915, Suite A-D, 231 W. Main St., Greenwood, Ind. 46142. 317-887-2156.

Development tools

A compiler for Ashton-Tate Corp.'s Dbase III Plus has been announced by Dbfast, Inc.

The compiler, called Dbfast, is said to reduce the size of programs and to increase compiling speed. According to the vendor, minimum .EXE file size is 1K byte, with a typical program size of 5K to 10K bytes.

Dbfast uses standard Dbase III Plus commands, functions and data files and comes ready for use on local-area networks. Users can compile a program using Dbfast or can run the program in interpreter mode using Dbase without modification.

Dbfast costs $149.

Dbfast, Suite 2857, 1420 N.W. Gilman Blvd., Issequah, Wash. 98027. 206-392-0368.

XEROX

The new 4075 intelligent printing system. A brief case history of what its capabilities can do for your data center.

Xerox presents an open-and-shut case for the new 4075 intelligent printing system. In brief, it's the electronic printing system that's specifically designed to meet the needs of a medium-size data center.

The 4075, unlike other printers, has built-in intelligence that takes the bulge out of your work load without putting a bulge in your budget. Instead of piles and piles of fanfold paper filling and spilling everywhere, the 4075 prints on standard cut-sheet paper. Its 2-up capability lets you print the information contained on two sheets of fanfold paper onto one 8½" by 11" page. The 4075 not only turns out caseloads of documents at up to 75 pages per minute, it's designed to do it about as reliably and economically as any impact printer. Most important, it can give you quality and flexibility that no impact printer can. For instance, the 4075 can electronically store forms, signatures and logos. That means you can turn blank paper into completed documents in one pass and say good-bye to preprinted forms forever. And with 250 built-in fonts, it gives documents a striking appearance no impact printer can match.

Xerox makes an intelligent printing system for every application, from the data center to remote sites to the desktop. And all Xerox intelligent printers are backed by Team Xerox—one of the largest and most experienced service and support groups in the industry. With the new Xerox 4075, the newest member of a family of intelligent printing systems, your work flow need never overflow again.

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NETWORKING

DATA STREAM

Clare Fleig

Too little, too late?

When IBM unveiled its 4M bit/sec. Token-Ring network in October 1985, it promised to deliver a 16M bit/sec. version. According to IBM's initial statement of direction, the 16M bit/sec. Token-Ring would be used as a backbone for departmentwide or companywide networks with several smaller 4M bit/sec. Token-Rings attached. The smaller versions would be used for small departments and special-purpose applications.

The catch was that while IBM was willing in 1985 to tell users that the faster network was on the way, it wasn't willing to say when. Last November, Ellen Hancock, president of IBM's Communication Products Division, broke IBM's silence on the status of the 16M bit/sec. Token-Ring and committed to deliver the product within two years.

To its credit, IBM did, at the November briefing, try to clear up some of the confusion about where the 16M bit/sec. Token-Ring will fit in the data communications scheme of things. IBM has outlined three strategies for the high-speed version of the Token-Ring: as a backbone network for the attachment of smaller 4M bit/sec. Token-Rings, as a channel-to-channel link between mainframes and for utilization by large corporate departments with high-speed network requirements.

These are by no means the traditional LAN applications now handled by the lower speed

Continued on page 38

Colorizer hopes LAN makes pockets greener

BY KATHY CHIN LEONG
CW STAFF

MARINA DEL REY, Calif. — The people at Color Systems Technology, Inc. have electronically dabbed rosy color on the cheeks of Shirley Temple in 13 of her films and given Santa a scarlet overcoat in *Miracle on 34th Street*. Now, three years and 20 movies later, the company is embarking on a networking project that it hopes will advance its competitiveness in the colorization marketplace.

A Transmission Control Protocol/Internet Protocol (TCP/IP)-based Ethernet local-area network from Communication Machinery Corp. links Digital Equipment Corp. Microvax IIs and Silicon Graphics, Inc. Iris graphics workstations. This configuration should accelerate the firm's colorization output by three to 3½ times, according to Color Systems' Executive Vice-President Joe DeVita.

"Instead of making three or four movies a month, we want to be able to do 10," added Mike DiCarlantonio, manager of engineering at Color Systems and a former MIS manager at Able Computer, Inc. in Irvine, Calif.

In the colorization process, color artists add hues to 1-in. film tapes that are later converted into videocassette film. Currently, this process is performed through the use of separate video networks, computer networks and Color Systems' proprietary color computer and encoder, which combines the video images with the computer data in the final stages.

Not surprisingly, to take a film from inception to completion requires three to four months of work. It takes an exacting four to eight weeks just to do the actual color conversion.

Color me fast

But the new Ethernet network and computer gear, valued at $4.3 million, will make a signifi-

Continued on page 38

VSATs rise again

Spate of rollouts may end technology's nap

BY ELISABETH HORWITT and MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The usually somnolent very small-aperture terminal (VSAT) satellite market bestirred itself in recent weeks as three major vendors made product announcements.

Typically marketed as low-cost, low-capacity alternatives to the older satellite dish technology, VSATs have had disappointing sales in the last few years, according to John McQuillan, president of McQuillan Consulting Co. in Cambridge, Mass.

"VSAT is a promising technology that got oversold by vendors before it matured," McQuillan said. So "there are a lot of gun-shy customers whose VSAT pilots didn't work."

At last week's Communication Networks '88, or Connet, conference here, NEC America, Inc. in Herndon, Va., announced what it claimed is the first VSAT product to support T1 links.

The Nextar CL TSAT is said to support transmission rates of up to 2M bit/sec., or 1M bit/sec. in each direction. TSATs can communicate with one another directly rather than through a central hub, according to Philip Arcoria, NEC's national sales and marketing manager. A 3.6-meter antenna, which NEC recommends as a minimum size, is priced at $30,000, including cable and a modem. A typical VSAT costs $10,000, according to industry sources.

NEC will market the TSAT as an alternative to dedicated terrestrial T1 lines, which cost $15,000 to $20,000 per month, Arcoria said, "so the payback pe-

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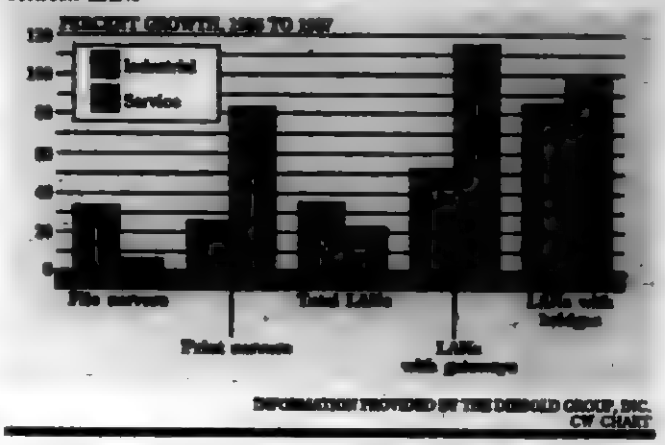
LAN connections on the upswing

Industrial firms installed more LANs; service companies, more links between LANs



INFORMATION PROVIDED BY THE DIEBOLD GROUP, INC.
CW CHART

Service firms take lead in LAN growth

Service companies are seeing a greater growth in local-area networking equipment installations than manufacturing companies, according to a recent study by The Diebold Group, Inc., a New York consulting company.

Industrial firms have approximately 26 networked workstations per 1,000 employees — up 30% from 1986 — compared with service companies, which have 24 networked workstations per 1,000 employees — an increase of 69% from the previous year.

Forty percent of all industrial companies rely on the telecommunications department to manage LANs, while 35% use their data processing departments. At service companies, 29% said their DP department handles LANs, compared with 28% that said it was the telecommunications group's responsibility.

Office automation departments handle LANs at 13% of all industrial firms and 21% of all service companies, the report said.

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The performance of your mainframes and minis is improved by offloading datacomm overhead onto the Forest Computer gateway. Each gateway is powerful enough to support up to 500 virtual terminal sessions. For high speed data transmission, the gateway supports IEEE 802.3 and Ethernet LANs as well as serial transmission speeds up to 56K bps.

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For more information write to Forest Computer Inc., 1749 Hamilton Road, Okemos, MI 48864 or call (517) 349-4700.

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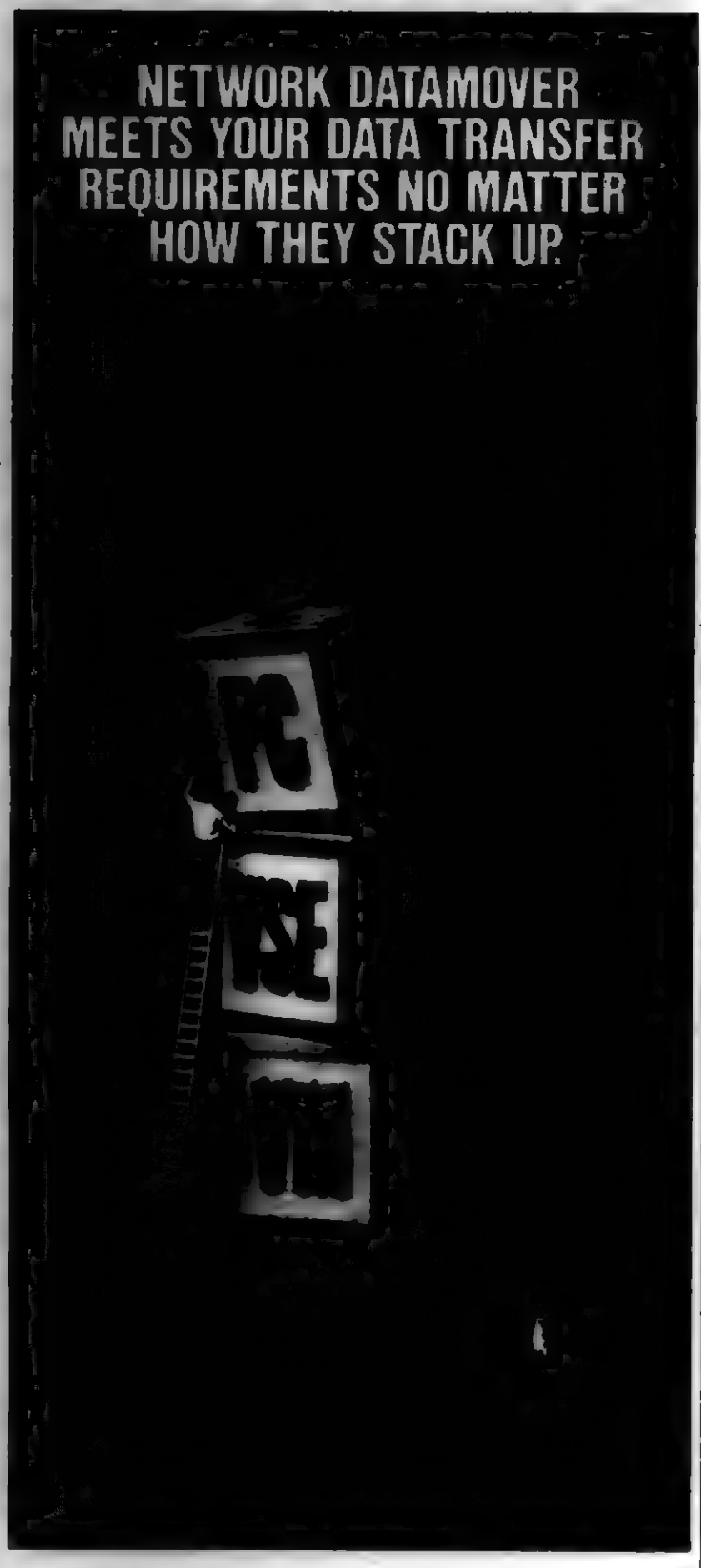

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Fleig

CONTINUED FROM PAGE 37

Token-Ring or, in a pinch, the PC Network. The applications IBM has specified for its higher speed Token-Ring indicate that it is more likely to be marketed by IBM as a wide-area network (WAN) for use with primary applications — for example, the interconnection of buildings in a campus-type setting, such as Project Andrew at Carnegie-Mellon University in Pittsburgh — or the multiring configuration designed by IBM for Agway, Inc. in DeWitt, N.Y.

But even with this WAN positioning, the faster version of the Token-Ring is really too little, too late.

In the early 1980s, the promise of a 16M bit/sec. Token-Ring looked like a strong alternative to other young networking options — notably the 10M bit/sec. Ethernet introduced in 1979. Had IBM been able to capitalize on that promise then, its share of the LAN market segment would undoubtedly be higher that it is today.

Pass the catch-up

Instead, IBM is being forced to play catch-up with the rest of the industry. Other technologies, such as T1 links, are handling applications that IBM had originally earmarked for the Token-Ring. Also, other vendors — notably Proteon — are providing faster and more innovative communications solutions using token-ring technology. These include the use of microwave signals and fiber-optic token rings running at 80M bit/sec. or higher.

Fiber-optic networks from vendors such as Proteon and Fibercom can be configured as high-speed backbones that link multiple lower speed networks located in different parts of a building or campus.

The movement toward the use of fiber optics should be further encouraged by the development of the Fiber Distributed Data Interface (FDDI) fiber-optic networking standard, which should be finalized early this year.

Fiber is already being optimized in many large-scale network projects, and its reach will be extended as the cost of fiber-optic components and connections continues to decline. IBM, of course, has not ignored fiber. The company specifies fiber as Cabling System Type 9 (running at 4M bit/sec.) for the Token-Ring, is active in the FDDI standards-setting process and has committed to supporting the final version of the standard.

Despite this support, IBM views fiber as an alternative to its mainstream networking scheme. The 16M bit/sec. Token-Ring, for example, is expected to run primarily on IBM Cabling System Types 1 and 2 — data-grade shielded twisted-pair wire.

HAD IBM been able to capitalize on its promise of a 16M bit/sec. Token-Ring in the early '80s, its share of the LAN market segment would undoubtedly be higher than it is today.

Old news

But by late 1989, when the 16M bit/sec. Token-Ring is scheduled to appear, fiber-optic-based networks will be a primary option for connecting to and replacing both Ethernet and Token-Ring-based networks.

At the same time, today's Token-Ring users — because of the demands of remote data processing, 32-bit microcomputers and sophisticated application programs written for multiuser, multitasking operating environments like IBM's OS/2 — will require higher speed connection for day-to-day operations.

Instead of a network backbone as IBM originally planned, under that scenario, the 16M bit/sec. Token-Ring may be best suited as a higher speed alternative to the aged 4M bit/sec. Token-Ring.

Fleig is director of systems research specializing in local-area networking and IBM communications for International Technology Group in Los Altos, Calif.

Colorizer

CONTINUED FROM PAGE 37

cant difference in both speed and productivity. While the video networks will be used to view images, the computer networks will be used to select colors and mark the areas for coloring. The colorists must make sure the colors are appropriate and that they do not bleed outside the intended objects.

In each of Color Systems' 18 production rooms, five Apple Computer, Inc. Macintosh 512K micros are linked into a simple serial network attached to the controller, an Intel Corp. 80186-based machine built on-site. The firm has grown impatient with slow response times caused by transmission speeds of only 9.6K bit/sec., DiCarlantonio said. In addition, the Macintoshes do not have the CPU power to process 30 frames per second, a goal that is part of Color Systems' strategy to increase productivity.

"We took the first two years to set up a system and learn what it could do," DiCarlantonio said. "Now we know what we want and how it can be improved."

When all the production rooms are revamped with the new equipment in March, one Macintosh will be used as a front-end operator console with four Iris workstations in the background to store and process the color data. An electronic diffusion system from Datacube, Inc. will be used to diffuse shapes and help artists blend colors.

A Microvax II also will be on the network, functioning as the server and router. The 10M bit/sec. baseband network requires Communication Machinery's ENP/50 boards for the Microvax, which communicate with Ethernet boards already built into the Iris computers.

"We can color in real time and animate in real time," DiCarlantonio said. The improved speed of the network is also a plus for colorists, who can get immediate feedback on their work, he added. "A 10- to 12-second shot could take 15 minutes to color, and you would have to wait until you were done to see it. Now, you can see it right away."

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SNA-PC system cuts out the middleman

BY PATRICIA KEEFE
CW STAFF

LAGUNA HILLS, Calif. — Network Software Associates, Inc. (NSA) has introduced a turnkey system said to link personal computers to IBM Systems Network Architecture (SNA) networks and hosts.

NSA claimed Adaptasync is the first product to enable IBM Personal Computers, compatibles and laptops to talk to the SNA environment without expensive synchronous hardware.

SNA does not support asynchronous, NSA said. Ordinarily, a PC running under SNA must be equipped with a synchronous modem and an IBM Synchronous Data Link Control (SDLC) adapter, the vendor added.

However, the vast majority of IBM PCs and Personal System/2s have serial ports, NSA claimed, adding that asynchronous modems are less expensive and more common.

Adaptasync supports all major SNA communications facilities over asynchronous lines, including: cooperative processing, for IBM's LU6.2/Advanced Program-to-Program Communications; interactive host communications, for IBM's 3270; batch-file transfers, for IBM's 3770/RJE; and specialized program-to-program communications mode, for IBM's LU0.

The Adaptasync line supports four different software products that run on the microcomputer to implement the desired protocol: AdaptSNA LU6.2, AdaptSNA RJE, AdaptSNA 3270 and AdaptSNA LU0.

NSA claimed each package conforms to IBM's Systems Application Architecture (SAA),

BIT BLAST

Net firms ally to diversify

Micom-Interlan, Inc. in Boxboro, Mass., and **Synoptics Communications** in Mountain View, Calif., have agreed to resell each other's networking products and to eventually integrate the two technologies. Micom-Interlan supplies intelligent IEEE 802.3 Ethernet controllers for a variety of systems, and Synoptics sells Lattisnet, a wiring system that reportedly implements 802.3 Ethernet on unshielded twisted-pair wiring.

Meanwhile, **Micom-Interlan's** parent, **Micom, Inc.** in Simi Valley, Calif., has agreed to purchase from **Annet, Inc.** software that is the basis of Annet's Nucleus 7400 line of packet-switching systems. Micom plans to incorporate the software into its Distributed Network Processor line in order to provide a compatible, consistently managed line of packet-switching equipment, according to the company.

Tymnet, a McDonnell Douglas Network Systems Co. subsidiary, announced last week that it will expand its product line with offerings from two other vendors. **Gandalf Data, Inc.'s** Starmaster and PACX 2000 data switches will be marketed under the Tym Switch label as a low-cost way for large numbers of terminals to access Tymnet's wide-area networks, the vendor said.

Digital Communications Associates, Inc.'s System 9000 multiplexer, which will also be resold by Tymnet, will provide cost-effective bandwidth management for customers who want to send a combination of voice, data and image over Tymnet private network links.

Tymnet also announced recently a synchronous 9.6K bit/sec. version of Tymdial X.25, a service that provides dial-up access to the Tymnet public data network. Tymdial X.25 currently offers 9.6K bit/sec. asynchronous and 2.4K bit/sec. access to Tymnet.

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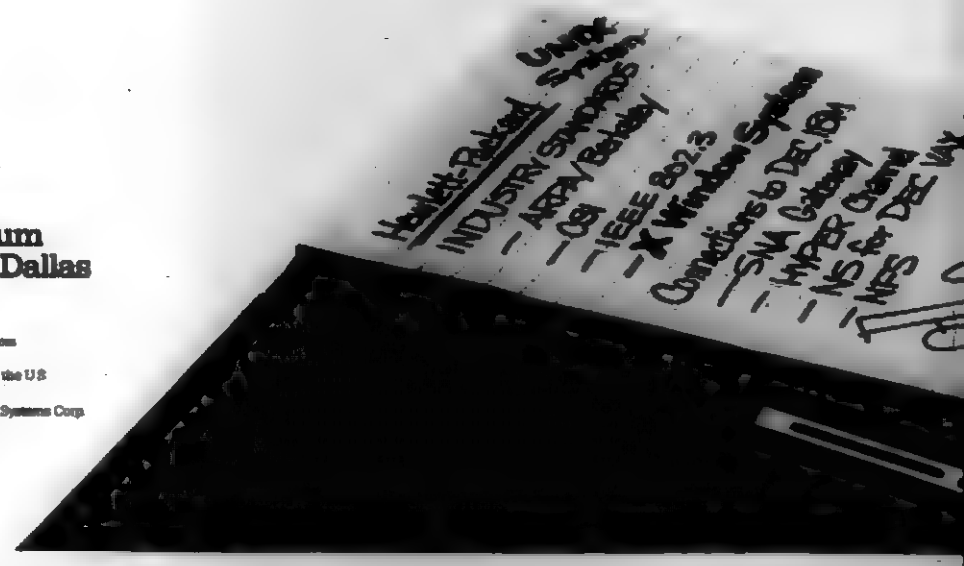

which allows software to be moved from one hardware environment to another without modification.

Pricing for the Adaptasync controller starts at $1,995. The AdaptSNA software packages are priced as follows: LU6.2/APPC costs $285, RJE is priced at $785 and 3270 costs $585. No price was made available for the LU0 package.

VSATs

FROM PAGE 37

riod is less than 18 months." The dishes also provide a quick way to set up a T1 line for users who cannot afford to wait six to 18 months for a terrestrial line, he added. The TSAT's direct dish-to-dish links could be a breakthrough, McQuillan said, since they eliminate the need for a hub, which can cost more than $1 million.

Also at Comsat, Scientific Atlanta, Inc. introduced the Intelligent VSAT network, a satellite-based network system said to incorporate CCITT X.25 packet-switching technology.

By employing X.25 rather than more traditional high-level data link control protocols, Scientific Atlanta's VSATs can support more easily a variety of protocols, such as asynchronous standards and IBM's Systems Network Architecture, said David Fellows, vice-president of strategic operations. In addition, users can back up or extend the VSAT network by connecting it to a public or private X.25 network, Fellows said.

The network hub dynamically allocates 56K bit/sec. channels among VSATs, dividing up a channel among a group of VSATs or dedicating the bandwidth to one terminal on the basis of need, Fellows said.

Scientific Atlanta said it will sell VSAT dishes for approximately $10,000 and the network hub for between $750,000 and $1.5 million, depending on configuration. An IBM Personal Computer-based network management system featuring graphics, network monitoring and statistics collection is included in the hub price, Fellows said. The vendor also said it will offer shared VSAT services from a hub based in Atlanta in about three months.

Battle of the bands

Two weeks ago, officials of Contel ASC, the Rockville, Md.-based satellite communications unit of Contel Corp., set forth plans to develop a VSAT data networking service that merges C- and Ku-band technologies.

The service constitutes the first fruit of Contel's recent acquisition of VSAT equipment vendor Equatorial Communications Co. and the VSAT operations of Comsat Satellite Corp. (Comsat), Contel ASC said. These acquisitions give the firm at least a 60% market share in VSATs, with 40,000 stations installed, officials said.

Contel will be the first vendor to blend the complementary features of Ku- and C-band communications into one hybrid network, according to James J. Sobczak, senior vice-president of the company's newly formed Data Networks Division. The network services, which will be provided through multiple shared hubs, will be priced 15% to 35% lower than those of competitors, Contel claimed.

Contel ASC can provide data customers an upgrade path from a voice-grade network using C-band technology up to a 56K bit/sec. network using Ku-band technology, officials said. While Ku-band stations provide high data rates, the signal may fade during rainstorms, according to the company. In contrast, C-band stations are reportedly vulnerable only to terrestrial microwave signals.

Contel ASC officials said they do not plan to offer a T1 service. "Users are just now getting to the level of needing 56K bit/sec. service," said George P. Roberts, president of Contel ASC. He said the T1 market is too small and has probably already been captured by fiber-optic circuits. However, Contel, a major NEC customer, has been inquiring about the vendor's T1 VSAT system, NEC's Arcoria said.

Contel ASC said the key to the VSAT market, which it expects to grow 20% a year, is to overcome resistance from communications managers and urge them to try pilot programs.

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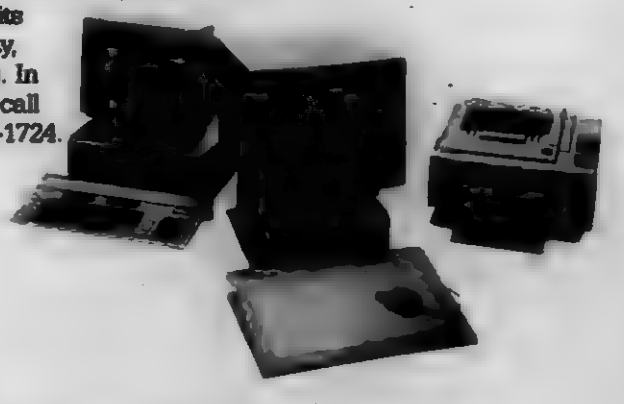

HEWLETT PACKARD

D616722A

NEW PRODUCTS

Local-area network hardware

A token-ring board designed for use with IBM Personal System/2 Models 50, 60 and 80 using the Micro Channel architecture has been announced by **Madge Networks, Inc.**

The **MCA Ring Node** board is said to be compatible with such personal computer network operating systems as Novell, Inc.'s Netware, Microsoft Corp.'s MS-Net, IBM's PC-LAN and Madge Networks' own Netserver.

The MCA Ring Node board carries a price of $795.

Madge Networks, 534 Salem Ave. N.W., Roanoke, Va. 24016. 703-982-0638.

Network services

ITT Corp. has added high-speed digital data capabilities to its private-line service.

ITT Private Line subscribers may now transmit data over digital facilities provided by U.S. Transmission Systems, Inc. between 12 U.S. cities at a speed of 56K bit/sec. The service incorporates local Dataphone Digital Service (DDS) supplied by local Bell operating companies, ITT said.

The 12 cities are Atlanta, Chicago, Dallas, Los Angeles, Miami, New York, Newark, N.J., Orlando and Jacksonville, Fla., Sacramento, Calif., San Francisco and Washington, D.C. More cities are set to be added during the next few months.

Customers pay a flat monthly fee, averaging $2,500, based on mileage between cities and the local DDS facilities.

ITT, 100 Plaza Drive, Secaucus, N.J. 07096. 201-330-5000.

Customer-premise equipment

A rack-mount card that provides desktop access to integrated voice and data communications transport has been announced by **Gandalf Data, Inc.**

The **RM 3640 DOV** provides simultaneous voice and data transmission over existing private branch exchange wiring. The single-channel central rack-mount unit operates full-duplex at data transmission rates from 2.4K to 64K bit/sec. synchronous and up to 19.2K bit/sec. asynchronous. In addition, the card operates at distances up to 2.3 miles at 64K bit/sec. or up to 3.4 miles at 32K bit/sec. in alternate mode.

Up to 14 RM 3640 DOV cards can fit into Gandalf's 3000 chassis without redundancy.

The RM 3640 DOV costs $295.

Gandalf, 1020 S. Noel Ave., Wheeling, Ill. 60090. 312-541-6060.

Links

An enhanced version of **Co/Session**, a remote personal computer-to-personal computer communication software package, has been announced by **Triton Technologies, Inc.**

Version 2.1 uses a data compression algorithm to increase file-transfer speed. It supports data transfer rates to 38.4K bit/sec. Support is also provided for certain 9.6K bit./sec. modems, including models from Hayes Microcomputer Products, Inc. and Racal-Vadic.

Other features include an automatic billing log; session recording; color and graphic support; password protection; and remote printing.

Co/Session runs on IBM Personal Computers. It costs $249 for a two-user version.

Triton Technologies, 146 Maple Ave., Red Bank, N.J. 07701. 201-741-3232.

Modems/Multiplexers

The Hayes Microcomputer Products, Inc.-compatible **Supramodem 2400** has been announced by **Supra Corp.**

Supramodem 2400 has the ability to support asynchronous operation at 300, 1,200 and 2.4K bit/sec., according to the vendor.

Features include compatibility with the AT&T 103/212A and CCITT V.22 and V.22 protocols, automatic answer and dial, two modular phone jacks and a programmable volume speaker.

Supramodem 2400 costs $179.95.

Supra, 1133 Commercial Way, Albany, Ore. 97321. 503-967-9075.

An error correcting modem with an effective throughput of up to 19.2K bit/sec. has been announced by **Microcom, Inc.**

Designed for use with the vendor's High Density Modem System (HDMS), the **HD/9624C** reportedly supports Class 6 of the Microcom Networking Protocol (MNP).

It also supports the AT&T 103 and 212A and CCITT V.22 and V.22S standards, according to the vendor. Other features include the ability to emulate full-duplex transmission, automatic adaptive equalization, automatic fallback, autodial, autoanswer, redial and support for both asynchronous and synchronous data.

The HDMS supports up to 16 HD/9624C modems in a standard 19-in. chassis. HD/2400, HD/2400C and HD/9624C modems may be used in the same chassis.

The modem costs $1,379.

Microcom, 1400 Providence Highway, Norwood, Mass. 02062. 617-762-9310.

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SYSTEMS & PERIPHERALS

HARD TALK

James Connolly

Wanted: A 9370 market

The time has come for IBM to pay the dinner check or risk washing dishes for a long time.

IBM has survived on promises for more than a year as industry analysts and loyal IBM customers have looked at the IBM 9370 as an unfinished product. Observers forgave the 9370's shortcomings and compared it with DEC's Microvax I. The 9370 and the original Microvax both needed a polish through enhancements that would make the 9370 shine as the later Microvax II did.

Despite a few enhancements, the 9370 falls short of user demands. Now, the forgiving has turned into harsh criticism.

IBM admits to missing its target of 5,000 sales in 1987, and analysts are slashing their estimates for this year.

International Data Corp. (IDC) analyst David Moschella estimates 9370 shipments numbered about 3,500 in 1987, rather than the 5,000 that IBM and IDC originally expected. IDC is cutting its 1988 estimate of 10,000 to about 7,000 systems.

Selling 7,000 minicomput-

Continued on page 44

Users take hard look at 4381s

Two-stage shipments, upgrades of third generation on schedule

BY STANLEY GIBSON
CW STAFF

The third-generation IBM 4381 processors announced nine months ago are reaching the first user sites. And despite the fact that the models are widely viewed as the last kicker in the 4381's life, customers who ordered the so-called 20 series models have reported that the small mainframes will meet their processing needs for the foreseeable future.

Users also expressed satisfaction with the two-stage shipment plan IBM announced last year, in which they took delivery of an older 4381 model for later upgrade at a discount. IBM reported that it recently began to ship the more powerful 4381 models and upgrades that were announced last May.

Customers ordering before Nov. 30 received a 4381 Model 11, 12, 13 or 14 that is to be upgraded to a Model 21, 22, 23 or 24 this year. Those users are eligible for discounts of $50,000 to $70,000. IBM's announcement of shipments last month corresponded to the firm's originally stated plan to ship in the first quarter of this year.

Installed base over 5,000

According to statistics compiled by Computer Intelligence, 115 of the the new models or upgrades are on order in the U.S.; 17 were scheduled for delivery last month. According to Computer Intelligence, the U.S. installed base of 4381s in July 1987 was 5,528 systems.

A data center manager at an engineering and manufacturing company in the Midwest who currently uses a Model 14 said he will receive an upgrade to a Model 24 at the end of this month. His upgrade is not part of the two-stage shipment plan but is an enhancement to a Model 14 that was in use prior to the announcement of new models.

"I'm expecting some kind of price action by the end of February," he said, explaining that he might otherwise have taken delivery sooner. He said he is looking for cuts of about 15% in price, based on previous IBM pricing moves. He said he will pay about $340,000 for his upgrade and will gain about 33% improved performance. In addition to the CPU upgrade, he said, he will expand his processor's

Continued on page 45

Data View

Lessors' market

Leasing and renting gain as mainframe acquisition options

INFORMATION PROVIDED BY A DATAPRO RESEARCH CORP. USER SURVEY
CW CHART

Ametek adds processor

ARCADIA, Calif. — The Ametek, Inc. Computer Research Division recently claimed breakthroughs in node-to-node communications technologies with the introduction of its second-generation hypercube-type parallel processor.

The Ametek Series 2010, which succeeds the first-generation Ametek System 14, uses four 20M byte/sec. channels to allow each computational node

Continued on page 44

Encore fills low-end Unix gap

BY JAMES CONNOLLY
CW STAFF

MARLBORO, Mass. — Encore Computer Corp. is scheduled to open a new entry point for its line of Unix-based multiprocessors today by introducing a system with half the performance of the earlier Multimax 320.

The Multimax 310 has a base price of $89,000, compared with $143,000 for the year-old Multimax 320, and is being positioned by Encore for commercial applications such as transaction processing and time-sharing. The Multimax 310 uses the same core technology as the Multimax 320 but is offered in a smaller package with more limited expansion capability.

"It makes new markets available to us, the multiuser commercial marketplace where people want a system for under $100,000," Encore Vice-President for Marketing Frank Pinto said in a recent briefing.

In addition to being aimed at the Unix market, Pinto said the

Continued on page 44

Inside

- Nemonix announces memories for DG Eclipse, MV computers. Page 46.
- Toshiba America rolls out 24-pin dot matrix printer. Page 46.

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Connolly

FROM PAGE 43

ers would have any other company shopping for fleets of Mercedes sports coupes.

Moschella notes that if IBM had promoted the 9370 as a successor to the company's 4361, it would be considered a winner. But IBM positioned the 9370 as more — as the way for big companies to distribute processing — which means now IBM must make the same pitch with what it calls its System/3X follow-on.

Moschella says the 9370 failed to impress large companies — the segment in which IBM wants the system to distribute mainframe applications. He says major sales contracts for hundreds of 9370s are unlikely until IBM cleans up the system's image.

Shortcomings cited

Today, analysts like Moschella find the same failings in the 9370 that they graciously cited a year ago.

Moschella says there is little 9370-specific applications software, particularly under the development-oriented IBM VM. He also notes that IBM boosts the 9370 as a VM machine despite the fact that data centers tend to use IBM MVS in production.

In addition, VM remains complex for unsophisticated users, so a systems programmer is needed for tasks such as software updates.

Moschella also says the 9370's range of performance is too narrow. He cites the case of a potential buyer who was considering the two mid-range models in the 9370 line but realised that his growing needs would force him to make an expensive conversion to the 4381 family next year.

So if the big systems users are avoiding the 9370, who is buying it? The most likely group is the 4361-type of user running IBM DOS/VSE. "It isn't what IBM wanted, but these guys who have been running things like 4361s suddenly have themselves a neat new DOS machine," Moschella notes.

Connolly is Computerworld's senior editor, systems & peripherals.

Encore

FROM PAGE 43

Multimax 310 is intended as a strong offering in the Pick Systems Pick environment.

One analyst noted that the Multimax 310 improves what already appeared to be good price/performance figures for Encore systems but questioned the amount of interest in Unix for commercial computing.

Marty Gruhn, vice-president of The Sierra Group in Tempe, Ariz., said, "If what they say is true, it's hard to believe their systems aren't selling like hotcakes."

Gruhn said her firm's studies show little user interest in commercial Unix because of the lack of Unix-based software solutions on the market today.

Encore claimed the Multimax 310 can handle 4 million instructions per second (MIPS) in a two-processor configuration and 20 MIPS in a 10-CPU system.

Ametek

FROM PAGE 43

to communicate with other nodes. Ametek officials claimed that the 2010, which can be configured with up to 64 nodes, overcomes performance degradation problems associated with routing messages among nodes in other hypercube systems.

Designed in conjunction with scientists at the California Institute of Technology, the 2010 uses Motorola, Inc. 25-MHz 68020 microprocessors and Motorola 6881 floating-point units. Motorola VMEbus interfaces are available.

The 2010 is intended for use in various scientific and engineering applications and features Unix file compatibility. It is scheduled for beta testing during the third quarter and production delivery in October.

Prices for a four-node system start at $45,000; a 64-node system starts at $495,000.

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4381s

FROM PAGE 43

memory from 32M to 48M bytes.

Richard Harkness, data processing director at Hickory Chair Co. in Hickory, N.C., said he ordered a Model 22 under the two-stage shipment plan. He received a Model 12 in July and said he will receive a Model 22 by the end of March.

Harkness decided to purchase a 4381 before the new models were announced, believing that a Model 13 or 14 would provide the amount of power he needs. But when the new models and two-stage shipment option were announced, he opted for a Model 12 with an upgrade to a Model 22. He said he received a discount of the amount announced by IBM, but he declined to name a specific figure.

The new 4381 at Hickory Chair replaced two IBM 4341 processors, both of which ran IBM's DOS/VSE. The 4381 is running IBM's VM with DOS/VSE as a guest. Harkness said the Model 22 will be sufficient for his near-term needs and that he has no plans to upgrade to a Model 24.

An MIS manager for a West Coast insurance company said his firm will not take the upgrade but is instead mulling over a move from its 4381 Model 14 to a used IBM 3081 or a new IBM 3090. Eighteen months ago, his firm upgraded from a 4381 Model 2 to a Model 14, boosting power from 2.9 million to 6 million instructions per second.

William McKinley, director of MIS at Kent State University in Ohio, was running a 3081 and sought to add another. However, when the new 4381s were announced, he said, he was attracted to them — in part because, as an educational institution, he receives a 25% discount from IBM. The two-stage shipment plan and discount were also welcome, McKinley said.

"It was an interesting deal. It fit with our plans," he added. McKinley got a Model 14 in August and said he expects to receive the Model 24 in March or April. "I see three years' daylight with this," he said, indicating that this time span is ample given normal capacity planning requirements.

First in line

IBM said that The MacNeal-Schwendler Corp. in Los Angeles is the first customer to take a model in the new series. MacNeal-Schwendler, a participant in IBM's Industry Marketing Assistance Program, will use the machine to develop software for mechanical computer-aided engineering applications.

According to Mary Caetta, chief of information systems at MacNeal-Schwendler, the processor, which will contain 32M bytes of memory and 7G bytes of disk storage, is not part of the two-stage shipment plan.

The company plans to run IBM's MVS/XA and VM/CMS on the processor. MacNeal-Schwendler considered purchasing an IBM 9370 for use in development but decided against it because the 9370 cannot run MVS/XA, Caetta said. A user of IBM data centers in the past, MacNeal-Schwendler sought the convenience of its own in-house processor, she added.

Jack Tyler, director of data processing at Mississippi Valley Gas Co. in Jackson, said he received the first half of his two-stage shipment, a Model 12, in December. Tyler said he expects an upgrade to a Model 22 to arrive at the end of August. Tyler, who will run DOS/VSE, said he will not expand his Model 12's memory from 16M bytes when he gets the upgrade.

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NEW PRODUCTS

Processors

Nemonix, Inc. has announced its NXMV-Series memory for Data General Corp. Eclipse and MV series computers.

The memories are available in 2M-, 4M- and 8M-byte capacities and are said to be completely hardware- and software-compatible with the DG systems. The NXMV-Series memory has 32-bit words and 7 bits for error-correction control. Pretested 150-nsec, 256K-byte dynamic random-access memories are incorporated in the board design.

Included in the memory is Nemonix's memory diagnostic.

The NXMV-Series is priced from $11,500.

Nemonix, 106 South St., Hopkinton, Mass. 01748. 617-435-9087.

Graphics systems

A high-resolution desktop digital image setter has been announced by Itek Graphix Corp.

The IGX 7000 LED is said to use LED technology to output both text and graphics. It features a modular raster image processor design, output of 1,600 dot/in. and an output speed of up to 500 line/min.

According to the vendor, the image setter is capable of outputting conventional paper and film material as well as press-ready direct-to-plate masters.

The IGX 7000 supports the Itek Graphix Personal Typesetting Workstation personal computer-based composition system. It is compatible with Xerox Corp.'s Ventura Publisher software and supports output to the vendor's IGX 400 laser printer.

The IGX 7000 costs $32,995.

Itek Graphix, 34 Cellu Drive, Nashua, N.H. 03063. 603-889-1400.

Too many people have been led to believe only IBM is experienced enough to service their computers.

CONTROL DATA

Printers/Plotters

Wavetek Corp. has introduced the Model 54 42-col. thermal printer for use with its 50-Series Data Logging Measurement System.

The printer is said to print at 5.8 line/sec. It contains a 7.17K-byte first-in/first-out buffer and can print in text or list mode. Text mode prints each line below the previous one, and list mode prints each line above the previous one.

Other features include graphics capabilities like bar-chart generation, four print fonts and automatic shuttling.

The Model 54 printer costs $1,195.

Wavetek, P.O. Box 85265, San Diego, Calif. 92138. 619-279-2200.

The Information Systems Division of Toshiba America, Inc. has introduced a 24-pin dot matrix printer called the P351SX.

The printer offers a 360 by 360 dot/in. graphics capability and a 360 char./sec. draft print speed. Letter-quality print speed is 120 char./sec.

Paper-handling features include support for up to six-part forms and automatic envelope printing with an optional envelope sheet-feeder. Dual bidirectional tractors are built in, and built-in buffer capacity is 32K bytes.

The P351SX costs $1,499.

Toshiba America, 9740 Irvine Blvd., Irvine, Calif. 92718. 714-380-3000.

Input devices

A document scanner capable of scanning 64-in. by roll-length documents has been announced by Ana Tech Corp.

The Eagle 6050 allows conversion of line art drawings, including large-format lofting drawings, into computer-aided design or industry-standard raster formats. Features include a patented single drive and a continuous-feed roller that accepts paper, mylar, vellum or film. It can scan at a speed of 5.7 in./min at an actual resolution of 500 line/in.

The Eagle 6050's price starts at $90,000.

Ana Tech, 10499 Bradford Road, Littleton, Colo. 80127, 303-973-6722.

Getting to the core of the new Apple

BY GLENN RIFKIN

The new Apple Computer, Inc. ads appeared in *Computerworld* and other trade publications last November. The headline, "MIS manager buys Macintosh, keeps job," bespeaks the corporate vision that is now driving Apple. And it is not simply that Apple is serious about MIS: MIS is now serious about Apple.

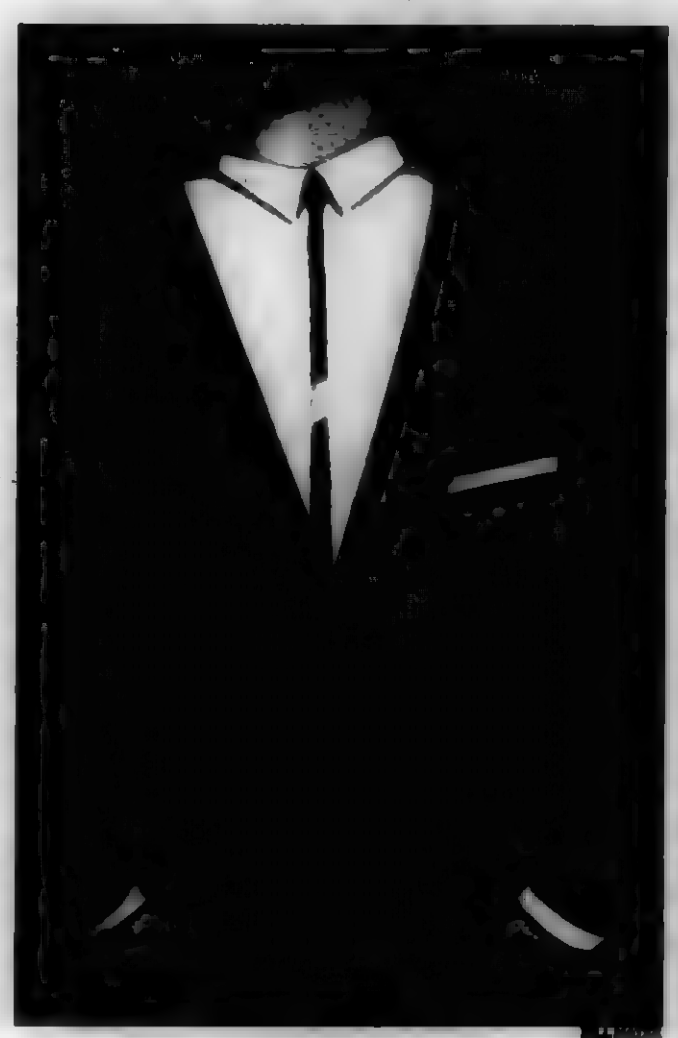
Buoyed at last by the performance respectability of the Macintosh Plus and Macintosh II, increasing functionality in networking and communications and the announcement two weeks ago of a development alliance with Digital Equipment Corp., Apple is finished with sneaking into corporate America through the service and delivery entrance.

Desktop publishing, acting as the Trojan horse, got Apple into hostile territory, and now the company owns 10% of the corporate personal computer market. Apple management says owning 20% by 1990 is a realistic goal.

There is, of course, plenty of room for skepticism. Those with a good long-term memory will remember how the $10,000 Apple Lisa was going to win over big business. And in November 1984, a *Business Week* cover featured a chummy, laughing John Sculley and Steve Jobs clad in flannel shirts and jeans. The dynamic duo were revealing their "bold plan to take on IBM in the office."

Unfortunately for Apple, the plan was premature and based on flimsy business premises. Apple not only did not have the hardware that an MIS manager could take seriously, but it also lacked the internal mind-set to attack that market.

Rick Young, senior industry analyst with Dataquest, Inc. in San Jose, Calif., remembers those days when he worked in systems at The Boeing Co. in Seattle. "Apple would come in with the Macintosh and say, 'Isn't this wonderful? How can anyone not like this?' And when they left, they'd get bashed by the people in MIS," he says.



INSIDE

Biting off sales into MIS
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Apple gets corporate
Page 49

Jobs leaves; tide turns

Jobs' celebrated departure from Apple in 1985 did more than provide good copy for Sculley's tell-all memoirs. It allowed Sculley to get down to the business at hand, which in this case was business. Big business.

According to Apple watchers, Sculley went out on a limb, backing off from the consumer market to continue the quest for corporate business in the face of what seemed like insurmountable odds. The toughest job of all, perhaps, was reshaping the company — changing the perception of Apple as a Land of Techno-Os to that of a serious, big-time computer supplier for business.

Unquestionably, Sculley has steered Apple onto the right track in a remarkably short time. Just last month the company announced record sales and profit for the second quarter in a row — its revenue increased 57% to $1.04 billion, compared with $662.3 million a year ago.

Turning around the fortunes of a corporation the size of Apple in two years is more than just noteworthy; it is the stuff of which business legends are made. And Sculley, who in the past 12 months has been on the cover of virtually every U.S magazine except *Field & Stream*, is more than enjoying his celebrity status.

But Apple must keep things in perspective. "They haven't won anything yet," says Esther Dyson, editor and publisher of the "Release 1.0" newsletter. "They've just managed to stay in the game."

"They've gotten a certain percentage of the way along, but they're still missing a few key elements in selling to MIS," adds Amy Wohl, a consultant in Bala Cynwyd, Pa.

However, Apple recently filled in one of those holes by allying with IBM's strongest competitor, DEC. Driven by user demand for software links, the two companies' recent agreement formalizes what had been an unofficial alliance.

Since then, Sculley and DEC President Ken Olsen — an unlikely pair of chief executive officers — have shared podiums from coast to coast. Olsen attended the announcement of the agreement at Macworld Expo in San Francisco on a Friday. Then Sculley appeared with Olsen at a DEC briefing in Boston the following Tuesday.

Although few details are currently available, the joint development will involve software links between the Macintosh and DEC's VAX — links that users have recently been asking for and forging themselves in some cases.

The two firms also plan to address products for distributed

Rifkin is a senior editor at *Computerworld*.

Core

FROM PREVIOUS PAGE

applications methodology, network management, networking, file sharing, document interchange, data base and terminal emulation.

It is clear that the alliance will benefit Apple much more than DEC. More VAX users are likely to see the reason to now buy Macintoshes than current Apple users will see the benefit of buying the more expensive VAX.

The deal with DEC reflects

Apple's Sculley

something fundamental: Apple is growing up. The company that prided itself on being offbeat is now searching for the best road into the business mainstream without completely losing its penchant for innovation and creativity.

Apple warms up to MIS

For Apple, the warming of relations with MIS marks a significant upturn in its quest. The once oil-and-water relationship is now actually blending a bit. But there's a long way to go before widespread acceptance settles in.

Apple knows that companies with a decidedly Blue cast will probably never consider Apple as an alternative. But some companies that are consistently on the leading edge of technology, such as Boeing and Hughes Aircraft Co., look more favorably upon Apple.

Those companies that are on the fence — firms at which the DECs of the world are welcome — are the ones Apple now has a chance to win over. And even in firms that accept Macintoshes for desktop publishing or other specialized applications, there is still reluctance in MIS to put Apple on its preferred vendor list.

Before Apple can succeed with MIS, it must understand the MIS mind-set. That is not a simple task for a company that has had no historical link to that market. And Sculley has clearly recognized that deficiency. Apple is bringing in scores of strategic hires with backgrounds heretofore foreign to its environs.

The new curricula vitae are dotted with names like IBM, DEC, Data General Corp., Honeywell-Bull, Inc., Wang Laboratories, Inc. and Ungermann-Bass, Inc. (see story page 49).

Folk lure

And the new employees are not being stuffed into sales slots, either, despite the fact that Apple has doubled the size of its field force in the last year. Virtually every part of the company, with the possible exception of research and development, is feeling the influence, from marketing to communications to internal MIS.

Apple vigorously pursued its own new MIS chief, Allan Loren, luring him away from Cigna Corp. in Philadelphia. The intent was not only to solve Apple's own burgeoning MIS needs but to keep the company honest in understanding the MIS discipline, suggests George Everhart, Apple's director of business marketing.

Apple watchers say there are constant wars between the sales, marketing and engineering departments in this new environment and that Sculley has his hands full managing the chaos. "Apple is a normal company with its share of conflicts," Dyson says. Its upper managers "are not all lined up facing in the same direction."

The company also set up a business advisory committee made up of 14 representatives from Apple's largest customers, such as Du Pont Co., Hughes and Control Data Corp. These senior MIS executives advise Apple on business trends.

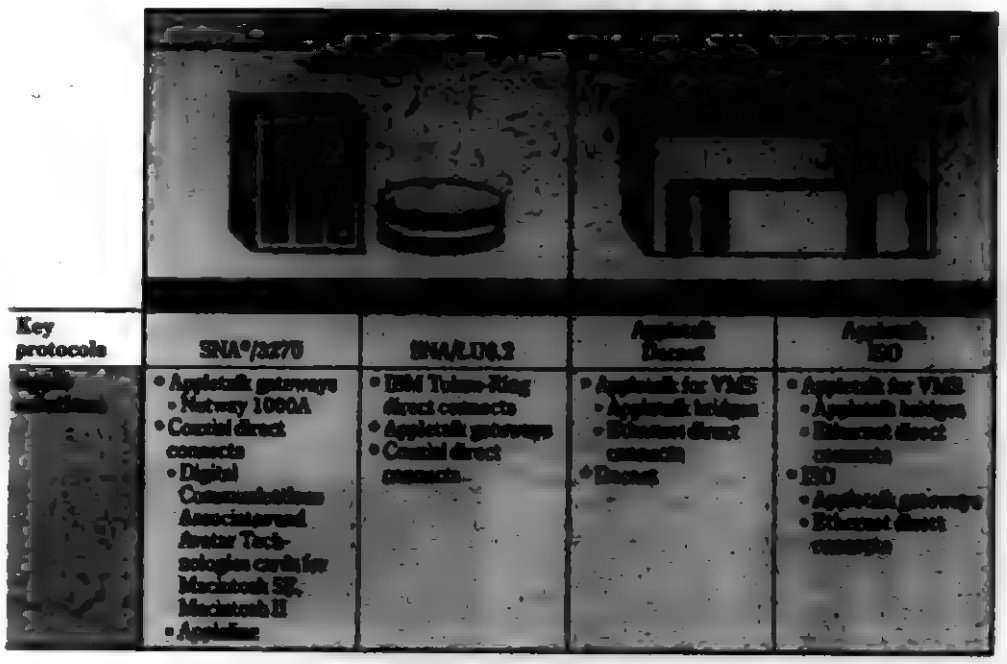
The influx of large-systems executives has apparently not caused the internal disruptions that might be anticipated. There have been no mass defections. Even when Jobs left to form Next, Inc., he took only 10 people with him.

Those who feared that his leaving would rob Apple of its vision have been surprised at Sculley's ability to integrate that vision into his own. And Jobs clearly was an obstacle to the company's getting to where it needed to be.

"He didn't have the discipline it takes to design hard disks and open architectures and, more importantly, the discipline needed to listen to the customer,"

The desktop communications strategy

Apple will integrate Appletalk gateways for both IBM and DEC hosts by 1990



* IBM Systems Network Architecture

INFORMATION PROVIDED BY APPLE COMPUTER, INC.
CW CHART

The challenge: Selling to MIS

In the past, Apple Computer, Inc. simply did not face up to the issue of direct sales and support for MIS. Conversely, IBM flourished by it.

According to Rick Young, senior industry analyst at Dataquest, Inc., IBM sees the importance of the up-front marketing that direct support provides. "They establish the value before the sale. Sales are a follow-on," Young says.

Digital Equipment Corp. followed suit. "For DEC to compete with IBM, it had to field a sales and support organization like IBM's. Apple has never taken on anything like that," consultant Amy Wohl says.

"If you want to be considered a first-class vendor to corporate data processing, you need to be a systems vendor," Wohl continues. "Apple hopes its retail channel will step up to that level, but that is not enough for an MIS department that is used to 20 years of IBM."

For Apple, that challenge is tempered by the reality of its traditional distribution channel: the retail dealers. Apple simply cannot destroy what has been its lifeblood, so it must walk a fine line between creating a direct sales and support force for large MIS accounts and not alienating the reselling folks.

Striking the balance

According to Chuck Berger, Apple's vice-president of market development, the company is hard at work finding that balance.

Berger insists that direct sales, while now being handled by experienced systems sales representatives, remains a small part of the business. Apple says it hopes to get its greatest penetration into MIS through its value-added resellers (VAR) like Nynex Corp., Businessland, Inc. and Microage Computer Stores and regional outlets.

"We've been working with [resellers] for two years now and will continue to upgrade their capabilities to call on these large corporate accounts," Berger says.

To that end, Apple initiated its Account Managers Program. The program puts trained direct sales agents in the field to help dealers create the demand. But those agents do not take direct orders; they funnel everything through a dealer.

The program is not to be confused with Apple's National Account Program, which bypasses the dealer. Companies involved in this program — about 100 large accounts, according to George Everhart, Apple's director of business marketing — simply would not buy Apple if they had to go through a dealer. To accommodate these companies, Apple provides direct service and support for them. This program, in place for three years, is not visibly pushed by Apple.

The umbrella for both programs is the team-selling concept, introduced last October at Apple's annual sales meeting. This approach allows sales representatives to receive credit and compensation for a sale regardless of whether it is direct or through a dealer.

Selling against the VARs?

These moves are part of an attempt to avoid the confusing message customers had been getting from Apple, Berger points out. Often, a sales representative would be in the trenches selling against a reseller, and everybody would end up angry and unsatisfied, particularly the customer.

Apple says the new approach will only help, not hinder, dealers. "The dealers think it's great," Berger says. "We're putting dozens of people out in the field who are going to generate demand that [the dealers] will benefit from."

Whether MIS will benefit is another question. Apple is well aware that large corporations insist on direct contact with the company for more reasons then sales and service. Fortune 500 accounts want to know strategies and product directions and often want hands-on access to prototype machines in order to set their own direction.

In addition, Wohl points out, new programs are fine at the workstation level, but they do not address the complex, large-systems level. "How many Businesslands know how to write or implement code on a mainframe?" she asks.

GLENN RIFKIN

Apple's new faces

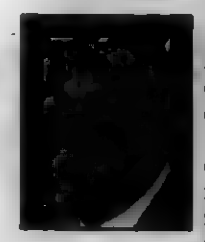
The new faces at Apple Computer, Inc. come not from a hacker's garage or even other personal computer makers but from large corporate environments that heretofore were not feeding grounds for the Cupertino, Calif., company. The following is a sampling of the executives who have recently joined John Sculley's crusade at Apple:

Charles Boesenberg, 38, senior vice-president and group executive for U.S. sales and marketing.

Boesenberg went to Apple after leaving Data General Corp., where he was vice-president and general manager of operations for Europe, the Middle East and Africa.

Prior to working at DG, Boesenberg spent 10 years with IBM in various sales and marketing management positions, including the National Marketing Division.

Boesenberg is responsible for developing and implementing sales and marketing strategies for all Apple products. He joined the company in January 1987.



Harry Copperman, 40, vice-president and general manager of Apple's Eastern Operations Group.

Copperman joined Apple after 20 years of sales and marketing at IBM. He was most recently IBM's director of marketing for higher education.

Copperman currently heads one of Apple's three geographic sales regions. Each group is individually responsible for all aspects of sales, support, training and management in its region. Copperman joined Apple in September 1987.

Allan Loren, 49, vice-president of information systems and technology.

Loren spent 16 years at Cigna Corp., one of the world's largest insurance companies, before joining Apple last September.

He is responsible for all information systems management at Apple and also interacts with the company's sales and marketing staffs for product development.

Joseph Schoendorf, 43, vice-president of marketing. Schoendorf joined Apple in November 1987 after leaving Ungermann-Bass, Inc., a supplier of local-area networks based in Santa Clara, Calif.

Prior to working at Ungermann-Bass, Schoendorf spent 18 years with Hewlett-Packard Co. in various sales and marketing management positions.

Schoendorf is responsible for Apple's strategic marketing group.

Kevin Sullivan, 45, vice-president of human resources.

Sullivan came to Apple after leaving Digital Equipment Corp., where he spent 13 years in a variety of senior personnel management positions.

He joined Apple in April 1987 and is currently responsible for all of Apple's human resources functions worldwide.

GLENN RIFKIN

says Kirk Loevner, Apple's manager of U.S. product marketing. "People here still think we can change the world, but we're more mature about how you do it."

No fooling around

But while Loevner and Apple's marketing staff go after new applications — such as training and scientific/engineering applications — as well as new vertical markets like the financial sector, the key issue may well come back to Apple's culture change. Innovation, after all, has been the company's watchword, and without it, Apple offers less than a clone company does.

And Apple has indeed changed, from counterculture to corporate culture. The T-shirts and beer blasts may continue, but the motivation at the company is now the same as at Ford Motor Co. and IBM: to increase profits and grow.

"There are a lot more MBAs running around Apple," Wohl says. "Of course, I'm not sure how good that is."

Still, people like Everhart and Charles Boesenberg, senior vice-president and group executive for U.S. sales and marketing, point out that they left their large-systems environments not to come in as evangelists but as pilgrims.

"The people who came here with big-business backgrounds didn't come to try to show Apple, 'OK, you dummies, this is how it's done,' " Everhart points out. "I came here because I saw the chance to truly partake in the formation of what Sculley calls a third-wave company — to do things differently than DEC or IBM did them."

And Sculley is intent on not letting up on that. While R&D is funded to the tune of $250 million, freethinkers like Bill Atkinson, developer of Hypercard, and Alan Kay, designer of the Smalltalk programming language, are still encouraged to sit on mountaintops, gaze at the stars and come up with third-wave ideas.

Some longtime employees, like Vice-President of Market Development Chuck Berger, who has been at Apple for six years, admit that the company has changed. The freethinking, he says, is now directed toward what Apple is trying to accomplish as a company rather than being totally random.

"There's definitely not as much time to sit around and brainstorm ideas as there used to be," he says. "But the structure that we've added around here actually frees up a lot more bandwidth to think of creative products and marketing."

Apple's way

Around Silicon Valley, the word is that, though Apple is changing, R&D is still the wild and crazy place it always was, and as long as that stays intact, the ties to the past are secure.

"People have been saying that Apple is changing since Sculley walked in the door 3½ years ago," says Guy Kawasaki, a former Apple software developer and current president of Acius, Inc., a software company in Cupertino, Calif. "I don't think it's changed that much."

Kawasaki reports that Steve Capps, a member of the original Macintosh development team, recently rejoined the R&D group after a two-year absence. "A guy like him would never have gone back there if it was just blue suits. It may not be like it was, but it's still the funnest place in the valley."

Fun notwithstanding, the mixing of two cultures has had an impact. The bureaucracy continues to grow. No matter how open-minded the environment, there is a limit to how many engineers can walk directly into Sculley's office to pitch their ideas.

But as the cultural crossover continues, the new employees — at least the ones hoping to survive and thrive — are acutely aware of the need to preserve the Apple way.

"When I think about reorganizing or restructuring something, I stop and say, 'Will that screw up the Apple way? Will that keep [up] the entrepreneurial way things are going?' " Everhart says.

"You take a 3-year-old running around the room filled with fire and enthusiasm, and he may come up and stick his tongue out at you and it's cute. If a 15-year-old comes up and sticks his tongue out at you, this child may have some problems. You've got to change your behavior patterns.

"But what you would hope you see in the 15-year-old kid is the same fire in his eyes as the 3-year-old has," Everhart continues, "even though he's learned not to stick his tongue out at people."

Apple is clearly not sticking its tongue out at the world of big systems anymore. Words like connectivity, SNA and networking used to be taboo at the company, but no longer. A potential customer now hears language from Apple that is reminiscent of companies like DEC, IBM and Wang.

And somehow, Apple hopes to retain its focus on the individual user while embracing the network. The game plan is to see the world from the PC out rather than from the mainframe in.

Apple says it can accomplish its goal by continuing to improve

Continued on page 51

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Information Systems and Technology

System 38 Applications Programmers

You will design programs, database, and code programs run on the System 38 and written in RPG III. You'll need a BA/BS and 1-3 years of RPG III experience. A background in fourth generation language is a must. Reply to Dept. KA-CW1.

Macintosh™ Programmers

You'll help develop a state-of-the-art network-based information system that will impact the way business does business. You'll need 5-10 years in software engineering with in-depth, recent experience on the Macintosh. Extensive development background in C and exposure to 68000 assembly are also required. Reply to Dept. ET-CW2.

Senior Business Analysts

Working with Project Management, you will perform business analysis; identify business requirements and functional specifications; and prepare documentation, training and rollout implementation. You should have a BA/BS, at least 5 years' experience in system analysis, and excellent communication skills. Reply to Dept. ET-CW3.

Data Modeller

You will develop data models of Apple's business operations, implement corporate data models and provide consultation to our MIS Application Development Teams for local data. You must have 3-5 years' experience in producing data models with automated software tools, as well as in-depth knowledge of finance, manufacturing, sales and distribution. Reply to Dept. KA-CW4.

Network Design Engineers

You'll need a BS in EE or CS with at least 3 years of experience in designing large corporate telecommunications networks. Experience in several of the following is needed: satellite, microwave, T1 fiber optics, X.25, DecNet, SNA, voice and video. A background with PBX systems, LANs, various transmission media and integrated communications is also required. Reply to Dept. KA-CW5.

Peripheral Systems and Products

Senior Design Engineers

Floppy Disk Drive Controller

You will design floppy disk drive interface ICs for vendors making second generation drives, as well as test and evaluate next generation floppy drives. You should have an MSEE (MSCS or BSEE with strong design experience is acceptable) and 2-5 years of disk drive controller design experience. Reply to Dept. CE-CW6.

Hard Disk Drive Controller

You will work with IC designers on a new chip for a very unique and new controller. You should have an MSEE and 5 years' experience designing hard disk drive controllers. Reply to Dept. CE-CW7.

Magnetic Head/Media Specialist

You will characterize vendors' heads and media electrically and mechanically, perform simulation to make recommendations to vendors and qualify floppy disk media. You should have a BS or higher in electrical engineering or physics and 8-10 years' experience in designing magnetic recording heads for hard disk drives. Reply to Dept. CE-CW8.

Floppy Disk/Tape Back-Up Engineer

You will be responsible for project management of tape drive products from product conception through completion. You should have 5-10 years' electronic design experience and a BSEE; MSEE preferred. You must have experience in magnetic recording, digital tape drives or equivalent, plus knowledge of drive I/F (e.g. ST506, SCSI), data encoding and drive controllers. Reply to Dept. CE-CW9.

Peripheral Project Manager

You will take products from the investigation phase through production start-up. You must have a BS in a technical discipline (an MS or MBA is a plus), 2+ years' design experience in peripheral product development, 3-5 years' experience in managing product development across functional areas, and you should understand Apple products and the development process. Reply to Dept. CE-CW10.

Product Design

Product Design Engineers

You'll be involved in product design at every stage of development, from concept to finished assembly. You should have 4 years in mechanical development of electronic products. Consumer products experience is valuable. A BS in Industrial Design is acceptable; a BSME is preferred. Reply to Dept. CE-CW11.

Software Development

Datacom Software Engineers

You'll need experience with one or more of the following: 3x74 emulation, 3270 datastream, VT220/240 emulation, SDLC, DISOSS. Reply to Dept. BH-CW12.

Networking Software Engineers

You must have Macintosh programming experience, low-level system software and networking skills, plus knowledge of drivers and protocol implementations. Reply to Dept. BH-CW13.

UNIX* Software Engineers

You must have experience in UNIX kernel development, device drivers, utilities, NFS, and communications. Reply to Dept. BH-CW14.

Printing Software Engineers

You'll need knowledge of text editors, printer/plotter drivers, page description languages, desktop publishing or business forms software design; Macintosh programming experience very helpful. Reply to Dept. BH-CW15.

Macintosh to Mainframe Software Engineers

You'll need experience with Macintosh programming, 3Z70 communication software links and have knowledge of IBM, SNA, and LAN network protocols. Reply to Dept. BH-CW16.

Operating Systems Software Engineers

You'll do file systems development for Macintosh OS. You must have experience with multi-tasking OS development, device drivers, 68000 assembly, C, or Pascal. Reply to Dept. BH-CW17.

VMS Systems Software Engineers

You'll need a strong background in systems-level design in VMS and its component subsystems (such as memory management, pageswapping, and I/O). Reply to Dept. BH-CW18.

Development Environment Software Engineers

You'll be involved in the design of a multi-language, integrated development environment for the Macintosh. Reply to Dept. BH-CW19.

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Core

FROM PAGE 49

its already superior graphical user interface and tying it into existing and future network standards.

"We've got a two-pronged strategy," says Chris Bryant, marketing manager for work-group systems and desktop communications. "We want to drive the PC market with superior technology and, at the same time, recognize that it is a multivendor world and provide connectivity to all those environments."

Off with the blinders

To that end, Apple has already announced support for the LU6.2 and Advanced Program-to-Program Communications protocol standards.

In January, the company shipped the first of its IBM-host-to-Mac networking products, including an implementation of LU6.2 and PU2.1. In addition, Apple has identified the building blocks of a network management architecture and plans to provide a consistent set of capabilities in that arena.

Apple also established a joint development relationship with Northern Telecom, Inc. to create integrated voice/data products and move toward bringing Integrated Services Digital Network to the workstation level. The coupling has already produced a Lanstar Macintosh product from Northern Telecom and support for Macintosh networking over Northern Telecom private branch exchanges.

"PEOPLE here still think we can change the world, but we're more mature about how you do it."

KIRK LOEVNER
APPLE

But most of Apple's focus is on selling Appletalk. Bryant points out that Appletalk was actually the key to the proliferation of desktop publishing because it made possible the interface between the Macintosh and the Applewriter laser printer.

The protocol, Apple says, is the wave of the future, as it uses software rather than the traditional hardware to connect work groups.

Close to the individual

Bryant admits that the word "individual" is a scary one to MIS. But he says he believes strongly that if the system does not handle the specific concerns of the individual, the individual will simply not get the job done.

Apple set up different internal work groups to create connections to specific environments, such as IBM Systems Network Architecture (SNA), Microsoft Corp. MS-DOS, VAX and the International Standards Organization's Open Systems Interconnect (OSI).

In the future, the company will introduce direct connection to token-ring gateways on an Appletalk network to an SNA environment and a direct coaxial connection to LU6.2 (see chart page 48).

"We're enthusiastic about the Ethernet flavor they are bringing to their networking," says Dave Mueller, manager of network architecture for Boeing Computer Services in Seattle. "But we don't see [Macintoshes] replacing our PCs. They are an adjunct to them. MIS is definitely more willing to listen now."

Apple's Loevner agrees. "We had 4% of the corporate market three years ago, 10% now, and 20% is what we want. But we are realistic enough to know that four out of five desktop machines won't be Macintoshes," he says.

Apple is also getting into the venture capital business in a big way, with investments in Touch Communications, Inc., a Scotts Valley, Calif., start-up doing OSI networking software products; and Sybase, Inc., a high-performance distributed SQL-based relational data base company

Productivity gains with the Mac

Estimated improvements for 42 Apple Macintosh users at Peat, Marwick

INFORMATION PROVIDED BY PEAT, MARWICK, MAIN & CO.
CW CHART

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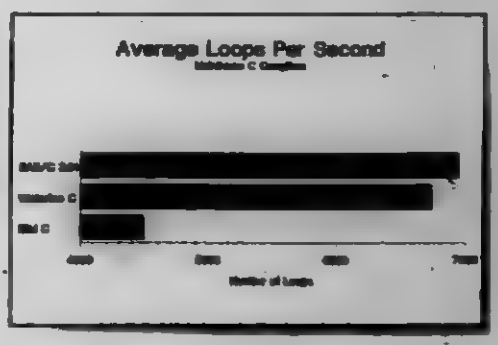

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based in Berkeley, Calif.

Apple spun off its software development group into a separate business unit called Claris Corp., which last month released the first batch of products that fall under its own logo. Consultants like Wohl say Apple will cut the umbilical cord and let Claris strike out on its own in the not-too-distant future in order to ease fears among Apple's third-party development community.

Big enough for both

Apple knows full well that it cannot wipe clean millions of desktops and refill them with Macintoshes. It is intent on hooking into both the MS-DOS and OS/2 worlds with packages such as Apple File Exchange. In fact, with that effort in mind, last month the company began shipping Appleshare PC, a software product that integrates both MS-DOS and Unix into the Mac environment.

Apple is also pointing out to MIS that in OS/2, IBM has done Apple two favors: By emulating its graphical user interface, IBM legitimizes everything Apple has been preaching during the past four years, and by opting to create a standard beyond MS-DOS, IBM has signaled to the world that there will be multiple standards on the desktop. Enter Apple.

"We've proven to MIS that it is going to be a multivendor, multi-operating-system environment. Their best move in that situation is to find the best vendor for each specific area in which they need microcomputer technology. And right now, we have a complete solution," Apple's Berger says.

But while Apple has clearly gotten the MIS religion, it has some gaping holes to fill before the converts will rush to join it. According to Wohl, Apple must decide whether it is a systems vendor.

If so, it needs to find a systems integrator, a la DEC or Wang, to help it meet that end (see story page 48).

For what Apple is seeking in big business, that type of savvy might not be necessary, although it certainly would be helpful. Apple executives say the company can grab its desired portion of the corporate desk top without becoming a mainstream systems vendor.

Michael Homer, director of business development at the company, says Apple's size and flexibility make it able to respond to customers' product needs faster than larger rivals.

"We can tell product development what a customer wants and get projects started within two months. The process is incredibly short," Homer says. And in a world where strategic advantage can disappear quickly, MIS welcomes that agility.

Apple has also benefited greatly from the grass roots movement among corporate users to marry VAXs and Macintoshes. Apple is selling vigorously into DEC accounts, and DEC and Apple sales representatives are reportedly collaborating on many sales, an activity that will likely increase significantly with the new agreement.

No time like the present

Apple knows that it takes a long time to turn perceptions around. Its biggest concern is that MIS understand the added value the Macintosh offers over the IBM Personal Computer and Personal System/2.

The drums have been beating out the message: What IBM only promises — OS/2 Extended Edition and Presentation Manager-type capabilities — Apple already has, and in superior quality. The Macintosh II already offers the processing power of the Intel Corp. 80386 chip, and, overall, the Mac II's Motorola, Inc. platform is far superior to the Intel platform in the wondrous world of graphical interface.

ONCE users try a Mac Plus or Mac II, it is difficult to wrest them away. The machines tend to multiply in an organization like rabbits.

In fact, according to Stewart Alsop, editor and publisher of "PCLetter," an industry newsletter in Redwood City, Calif., the perception is that IBM is now responding to what Apple is doing rather than vice versa.

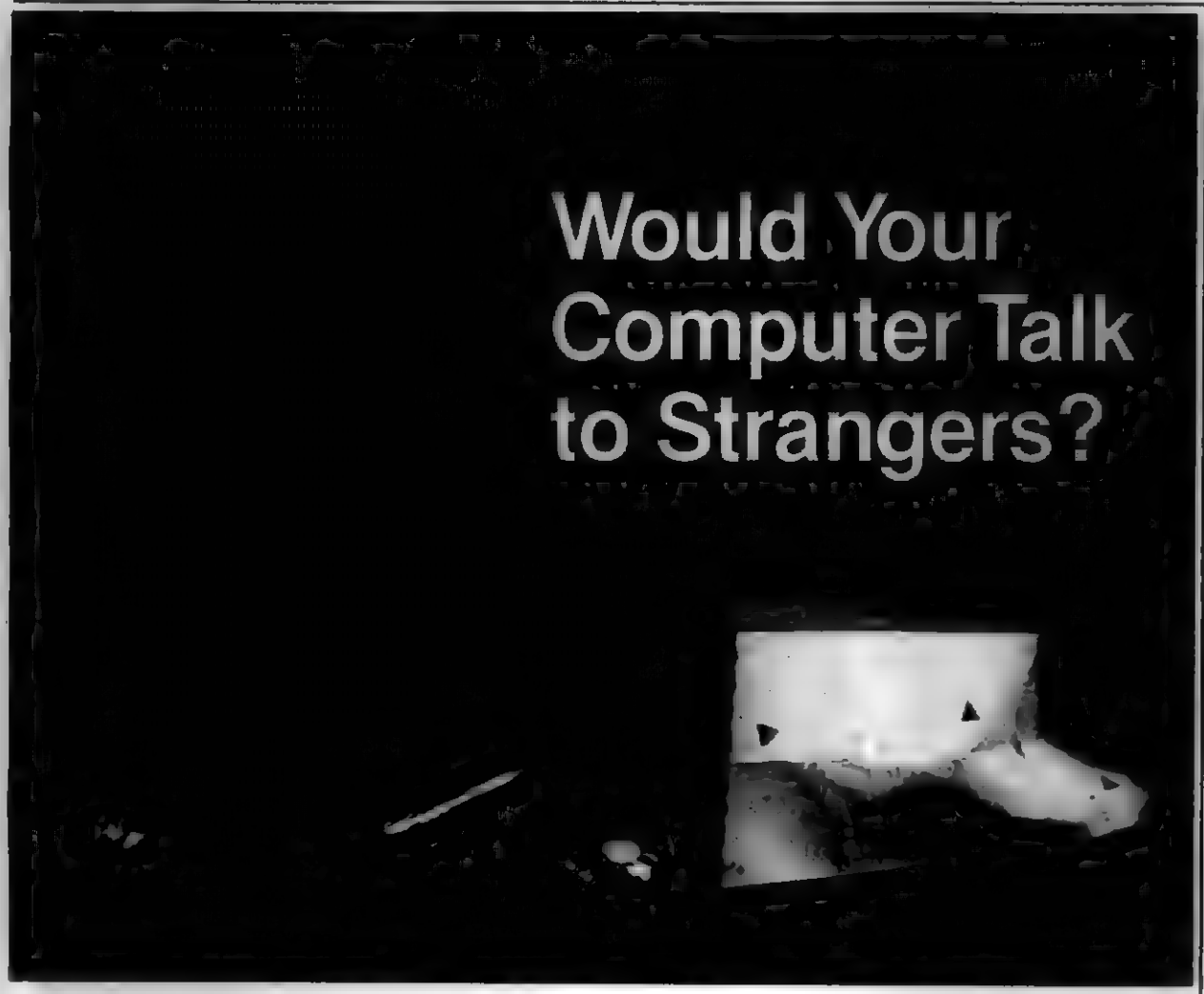
"This gives Apple a legitimacy beyond any fancy technological capabilities," Alsop says. "It gives Apple the legitimacy that Xerox had in the '60s and that DEC still has. Apple is a status symbol in the corporate setting."

But most MIS managers don't contract Mac fever, simply because they do not use the machine. And when they hear IBM is on the way with similar capabilities, regardless of whether those capabilities match up, they are willing to wait it out.

"The more the IBM PC starts to look like a Macintosh, the easier it is for the MIS guy to say, 'We don't need to look that way anymore.'" Wohl says. "The window isn't closing, but it's getting smaller."

Nonetheless, Apple's technology is seductive. Once users try a Mac Plus or Mac II, it is difficult to wrest them away. The machines tend to multiply in an organization like rabbits.

The massive software development going on for the Macintosh, along with such innovations as Hypercard and Multifinder, make Apple well accepted as a second standard. And for now, Apple is content with that. ●

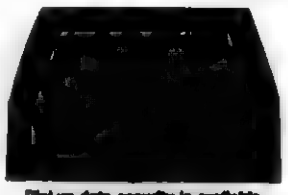


Two new UDS modems, featuring call guard capability, can restrict entry into your data base. Access can be limited to authorized users on dial-up or dedicated lines, whether communications are synchronous or asynchronous. The new modems may be configured for password, password plus callback or automatic pass-through.

201CG adds system security to the long-standing reliability and economy of the 201 modem design. Supporting half-duplex, 2400 bps synchronous dial-up communications, the 201CG can serve as many as 63 users in an access-controlled environment.

224CG adds software-selectable security levels to full compliance with the CCITT V.22 *bis* recommendation. The unit supports up to 16 users and a "super user," who can change access authority or passwords from a remote location. 224CG also supports MNP error control protocol at levels 2, 3, and 4.

With either modem you can make software-controlled security determinations on a user-by-user basis.



Dial-up data security is available with both 201 and 224 modems.

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Productivity tools sit idle

Software turns into expensive 'shelfware' when programmers shun new development packages

BY ROGER PHILIPS

Despite management's best intentions — and more than $300,000 in license fees — a Texas-based aerospace company was unable to convince its programmers to adopt a major new productivity tool. One influential project leader took every opportunity to throw cold water on the product, swaying the entire staff. At the conclusion of the initial project, the product was quietly shelved.

Atlantic Richfield Co. in Los Angeles took a survey and found it had accumulated more than 100 software productivity products and was still paying maintenance fees for all of them. In frustration, management decreed that before any new tool could be brought in, at least two existing products had to be dropped.

How can organizations avoid the "shelfware syndrome?" After automating end-user departments for all these years, MIS's desire to automate itself is strong. But just like their end users, MIS departments need planning and discipline if automation programs are to succeed.

A large part of the job of many development centers revolves around evaluating, selecting, implementing and installing new productivity products. Yet few customers are satisfied.

James F. Sutter, vice-president and general manager of information systems at Rockwell International Corp., voices the typical frustration. "These products all sound good when you're talking to the vendor. But many times, you install them and go back a year later to find they didn't live up to expectations — or worse, they're not being used."

Does Mikey like it?

Just giving the staff more tools does not necessarily make its life easier. A survey of 149 managers of IBM MVS installations conducted by Dialogic Systems Corp. in San Jose, Calif., shows that the four most frequently asked questions when evaluating productivity tools are the following:

- Does the solution specifically address the work load problems I need help with?
- Do the gains in accuracy and speed justify the cost of the purchase?
- Are the reliability, availability and service levels consistent with my expectations?
- Most important, am I convinced my programmers will use the tool after purchase?

Several additional questions, including the following, did not make the Top 10 but should have:

- Is relieving a productivity bottleneck in one phase of the development cycle merely going to move it somewhere else?
- Can the product address more than one phase of the software life cycle? For example, with maintenance absorbing the majority of resources in most organizations, products such as Viasoft, Inc.'s Via/Insight, which supports both maintenance and development, might hold special appeal.

Once these questions have been satisfactorily answered, the usual preacquisition diligence must be observed. When checking references, be aware that products in the computer-aided software engineering (CASE) arena tend to be complex. Only after using a CASE product for six months or more can an organization really begin to know whether the product will work satisfactorily in its environment.

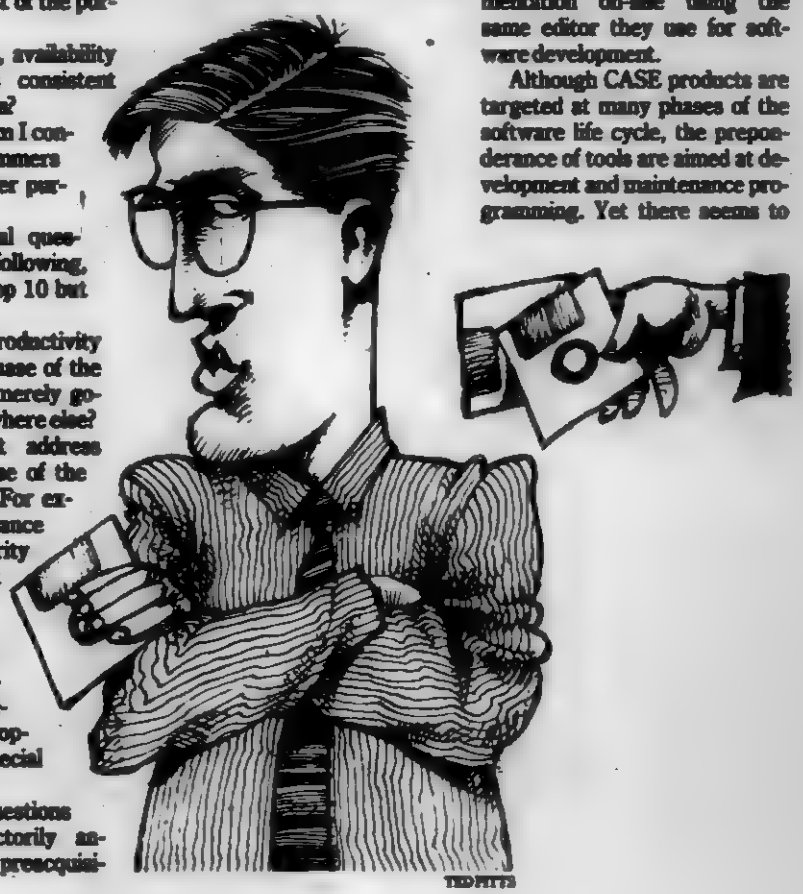
Ask the vendor for contact people from its most- and least-satisfied customers. But don't stop there. Dig out at least two references on your own, without the vendor's help. Do not proceed unless you get glowing reports from at least a majority of experienced users.

Also, consider the fact that you will be married to the vendor for a long time: Investigate accordingly. Review the company's financial history and outlook, but also take time to research its plans for the future of the product line.

You do not need to limit yourself to buying from the financially strongest: In this industry, the best innovations often seem to come from start-ups.

Finally, scrutinize the documentation with an ulterior motive. An organization that strains for perfection in its documentation is likely to do the same in its software. Find out, as an added bonus, if the documentation is available in machine-readable form. Many analysts and programmers like to be able to search and review product documentation on-line using the same editor they use for software development.

Although CASE products are targeted at many phases of the software life cycle, the preponderance of tools are aimed at development and maintenance programming. Yet there seems to



TED PITTS

Philips is the founder of Philips Associates in Scottsdale, Ariz., consulting in developing, managing and marketing computer-related products. He is the former president of Transform Logic Corp., an IBM systems software vendor.

- **Programmers' first impressions last**
- **Beware the moving bottleneck**
- **Five special buying considerations**

be a natural resistance among programmers to learn and use these tools.

In interviewing nearly two dozen large companies and government organizations about programmer productivity tools recently, I discovered one outstanding factor: The success of a tool was tied directly to the programmer's first impression of it. If programmers liked it initially, it got used; if not, it quickly became shelfware. And in most organizations, most tools did not pass the programmer popularity test.

What are the reasons for this unhappy occurrence? Are programmers just perverse individualists who don't want any part of the future? Hardly.

No time for technology

Consider the working environment of the typical programmer. His attitude is natural fallout from the way we define his job. He works under tight deadlines on one or more complex tasks, all of which impact the rest of the organization in some way. Most programmers are acutely aware of two imperatives: If they don't finish their part of the job on time or if the program they are working on blows up in production, bad things will happen. This makes for a conservative, get-out-of-my-way-and-let-me-do-the-job approach.

This same programmer is probably already making good use of important productivity tools: an on-line editor, perhaps a test data generator and maybe a batch simulator for testing on-line systems.

The question is, How many different complex tools can an individual reasonably be expected to master at any given time? While each new tool promises benefits, each has its learning curve and requires continued training time to stay current as it evolves with technology. Clearly, there is a theoretical limit to the number of products one person can know and still get work done.

Those who can, teach

There are two answers to this dilemma. The weaker but more practical one is to develop tool specialists who can tutor, coach and generally hand-hold a programmer or analyst through the occasional use of a particular tool. However, this approach has its limits. Tying up two professionals on a task that requires only one quickly defeats any productivity gains the tool has to offer.

A better answer lies in the software products themselves. We might wish that just one vendor could provide all the best tools. But in many environments, you need to choose tools from different vendors to find the best one in each category. Thus, the programmer or analyst must put up with a variety of nonstandardized interfaces and programming conventions as he moves from tool to tool. Furthermore, when the work produced by one tool could naturally feed the next, programmers still have to do manual input.

The single-vendor solution is not likely to happen soon, although system software companies such as Computer Associates International, Inc., Sage Software, Inc. and Visasoft are beginning to integrate a suite of tools for easier use.

Another approach is a developer's workbench. Using a software shell, all available CASE tools are presented to the analyst or programmer in a uniform and natural way. Designed right, the workbench greatly reduces the learning curve for new tools.

While appealing theoretically, this idea has proven difficult in practice. Rex

THE SUCCESS of a tool is tied directly to the programmer's first impression of it. In the majority of organizations, most tools do not pass this test.

Wickner of TWA, who is also chairman of IBM's Guide Cobol Committee, predicts that no mainframe programmer's workbench will be a commercial success. "The JCL generation feature, which is the heart of these systems, is too unique" to be standardized into a commercial product, he says.

Many programmers have developed their own workbenches, but these homegrown efforts have, for the most part, failed to meet the objectives listed above.

Perhaps the ultimate answer lies in a yet-to-be-developed technology, a "developer's expert." Theoretically, this product would analyze each step of the development or maintenance process as the programmer goes along. The expert would then prompt the programmer or be prepared to respond to inquiries at any point with suggestions on which tool to use next and how to use it.

The technology to develop such a system is just becoming available now, with products such as Aion Corp.'s mainframe expert system shell.

These latter solutions are not available yet, but watch for them. In the meantime, what can you do to garner staff acceptance and successfully install and use productivity products?

When Minneapolis-based IDS Financial Services, Inc. installed CGI Systems, Inc.'s Pacbase application generator, the company found programmer resistance so strong that management brought in a select group of contract employees whose one and only job was to use the product and make it work. This approach proved successful, but IDS later spent considerable time training the regular staff in using Pacbase.

Another organization chartered its

own public relations group to sell a new tool to its programmers. These are extreme tactics, but they contain the seeds of insight.

Choose your psyche

There are other, more practical ways for managers to set staff expectations prior to product introduction. Daniel Couger, consultant and professor at the University of Colorado at Colorado Springs, tells of managers from two different companies who introduced the same code generator product to their staffs. Both organizations had a large application development backlog. The first manager took this tack:

"Each of you should be able to produce more code in less time with this tool. However, I don't expect more lines of code output from you. I expect you'll spend more time in up-front analysis and will produce better quality systems that will require less maintenance. That way, we can catch up on the backlog."

The second manager issued the following edict: "In order to attack the backlog, you are each now expected to develop 10% more code per month using this new tool."

As you might expect, manager No. 1 enjoyed success; No. 2 did not.

Here we see how a productivity product should and should not be introduced. Planning is important, but attitude is key. When a product is introduced, each programmer or analyst naturally asks himself, "How will this product affect my job, and do I want to see it succeed?"

When it came time to introduce Transform Logic Corp.'s Transform application generator to his company, Darryl Waite, vice-president of information systems at Phoenix-based Ramada, Inc., borrowed a page from Mark Twain's *The Adventures of Tom Sawyer*.

He let it be known that only the best programmers would be *allowed* to use the product. Soon, a line formed outside his door of people who hoped to be approved as one of the first users of this exciting new technology. The introduction, as you might expect, was a success.

The payoff

Other planning considerations are needed to avoid unpleasant surprises, set a positive attitude and help ensure a payoff in the software investment:

Budgeting. The initial license price of the software typically represents only one-third to one-half the total cost of implementation. Budget accordingly.

Contract negotiations. Surprisingly, many of the vendors' and customers' expectations — both financial and nonfinancial — never find their way into the contract. Contract negotiation is the best time for your needs to be clearly understood by both parties and committed into writing.

Acceptance. To trial or not to trial? Most productivity software is bought on a trial basis. In many instances, this is a mistake. It sends a message to the staff that management is not really committed to this product, which often dooms it to failure. Most CASE tools will not show their true worth until after many months of use, anyway — longer than most vendors would agree to a trial. If you do your reference checking and preacquisition homework, you can take the attitude, "This is the product we selected. We are committed to it, and we will make it work for us."

Training. Product training grows stale quickly. Only the staff using the product initially should be trained by the vendor at the time of installation. Training at the vendor's location eliminates distractions and helps build enthusiasm for the product. You can lay out a training schedule for the rest of the staff at the appropriate time.

Support. If necessary, establish a special support team or equip the development center to give assistance during the learning curve. Many firms fail to make full use of the vendor, who is often standing in the wings trying to figure out how to turn your organization into a prime reference account. Don't be afraid to call heavily on him as needed.

First use. A controlled first use of the product allows quirks to surface and any adjustments to be made. Ideally, this first use should be in a modestly sized, noncritical application. Don't use the term "pilot project," as this implies that the organization is not yet committed to the product. If that is the message, it is all too easy for a few pessimists to find ways to make the product fail. Furthermore, this is not the time for benchmarks; the learning curve would skew the data.

Evaluation. Do benchmarks under controlled circumstances, when the learning curve is complete — six to 12 months after installation.

Organizations that follow these steps have been consistently able to avoid the shelfware syndrome. Shelfware is not only a waste of money, it is also evidence of a lack of leadership and planning.

With proper evaluation, a sound plan, reasonable expectations and unequivocal management commitment, organizations can count on benefiting from their investments in software development and maintenance productivity through automation. ●

WHEN a product is introduced, each programmer or analyst naturally asks himself, 'How will this product affect my job, and do I want to see it succeed?'

What ISDN is doing for McDonald's data networking capabilities is no small potatoes.

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"In business language, this means we're going to do an even better job for the 30 million customers that we serve every day," said Bonnie Kos, McDonald's Vice President of Facilities and Systems.

"ISDN provides an information outlet to every workstation, thereby eliminating time-consuming and costly wiring, as well as enhancing messaging and network control capability."

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TAKING CHARGE

David A. Ludlum

An obstacle course for MIS

There are no big surprises in the ranking of critical MIS issues by information systems executives surveyed recently by the Index Group, located in Cambridge, Mass. Strategic concerns commonly discussed in the press and professional associations top the list. But responses to some questions about the issues provide some interesting insights into why they dominate the thoughts of senior MIS executives.

Index distributed the survey to readers of its newsletter and, the firm says, received more than 500 responses, slightly more than half of them from the highest ranking information systems manager at the respondent's organization.

The four top-rated issues are common strategic concerns of MIS executives: aligning MIS and corporate goals, MIS strategic planning, educating senior management on the potential of information systems and using systems for competitive advantage.

The next three issues deal with broad technical challenges: developing an information architecture, integrating systems and data utilization. The final three of the Top 10 are general management concerns facing systems executives: human resources, managing organizational changes caused by systems and funding the MIS organization.

Lack understanding

Although aligning MIS and corporate goals seems like a natural choice for MIS managers' No. 1 concern, it might not appear to be a particularly difficult challenge. But just more than one-third of those responding suggested otherwise when they disagreed with the statement that MIS professionals understand the business environment well, and they were accompanied by another third of the respondents who took a noncommittal stand on the question.

MIS strategic planning is similarly obvious as a critical is-

Continued on page 60

Hendry shakes up MIS

Coke exec wants staff to catch the wave of change

BY CHARLES BABCOCK
CW STAFF

ATLANTA — At The Coca-Cola Co., William H. Hendry is described as someone with a laissez-faire management style, someone who does not impose his views on subordinates, someone who is even indifferent in the view of critics with a different set of priorities.

At the same time, he is identified with the wave of change that has swept through the company, a wave that included the introduction of "New Coke" and an attitude that it was time to make things happen.

"If I were running a big company, I'd want him working for me, because he's very results-oriented. He doesn't get bogged down in analysis paralysis," says George R. Martin of George Martin Associates, Inc., a 16-person contract programming firm that works for Coca-Cola.

Hendry, 47, manager of corporate systems at Coca-Cola's headquarters here, attacked the gap between central data processing and users by moving eight members of his corporate information services staff from their department's sixth floor home into offices next to accountants and financial analysts.

No backlog

Under Hendry and a top corporate steering committee, the applications backlog has shrunk to a manageable list that is scheduled for development during a 12-month period. The schedule is adhered to so rigorously that Hendry says, "We don't have an applications backlog."

At the same time, Hendry has overseen a 25% reduction in his staff. Not bad for someone with a reputation of a laissez-faire approach.

"Bill leaves each of his people alone," says Carol C. Austin, who describes herself and Hendry's three other group managers as very different types of people.

"I try to maintain a very enthusiastic, laid-back style," Hendry says with a quick, disarming smile that papers over that paradox. His laid-back side sometimes strikes people as a lack of concern, he acknowledges. But at the same time, his enthusiasm for building ties to users has won him praise.

Continued on page 61

PROFILE
William H. Hendry

ROGER GRIGG

***Position:** Manager of corporate systems, The Coca-Cola Co.*
***Mission:** Leveraging the staff, off-loading staff work to users and assigning staff members to work alongside users.*

SECTION 1706

Independents' backs to the barricades

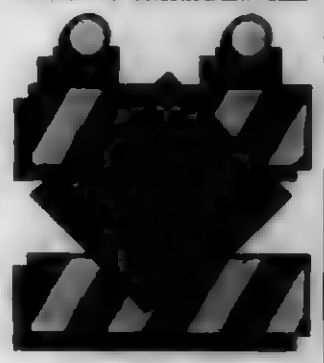
BY DAVID A. LUDLUM
CW STAFF

With members of Congress back in Washington, the curtain has risen on the next act in the struggle by independent computer professionals to alter or overturn Section 1706 of the Tax Reform Act of 1986.

While MIS managers have had little difficulty addressing Section 1706, independent computer programmers, analysts and consultants promise to continue lobbying to amend or overturn the law, which has required many of them to become employees for federal tax purposes, impinging on their mobility.

One effort to ease the blow of 1706 will be led by the law's sponsor, Sen. Daniel P. Moynihan (D-N.Y.), according to Harvey Shulman, general counsel for the National Association of Computer Consultant Brokers and a partner with Washington, D.C., law firm Ginsburg, Feldman and Bress. "He thinks the IRS and the Treasury have done an inadequate job of carrying it out," Shulman says.

Moynihan's tax counsel, Joseph Gale, has confirmed that the senator will propose legislation affecting Section 1706 as early as this week. Moynihan will propose allowing technical services professionals and consultants to apply four or five clear-cut rules to determine, for tax purposes, whether they are employees or independent businessmen, Gale says. The rules would provide an option to the 20 common-law stan-



dards now in place, which many on both sides of the Section 1706 debate maintain are difficult to apply.

Gale says that some individuals who are not sure they can satisfy the test for independent status now would be able to do so under the new guidelines. "People are going to meet it who might have some questions under the last IRS ruling," he says.

Section 1706 denies technical service workers the "safe-harbor" provisions that since 1978 had given independent

Continued on page 61

MANAGERS ON THE MOVE

DHL ships MIS exec to front line

DHL Worldwide Express is moving many corporate information systems activities into its U.S. operating unit, DHL Airways, Inc., and has appointed **William H. Pigott** vice-president of MIS at the Redwood City, Calif., subsidiary.

Pigott is an AT&T veteran and was formerly MIS director of Western Hemisphere field services at DHL Worldwide. In his new position, Pigott will manage systems for billing, tracking and tracing, customs brokerage and office automation.

He will also coordinate programs for MIS research and development and serve on the chairman's committee, the firm's advisory group of senior executives.

"It kind of ties in with a major reorganization and puts MIS in a very positive position, reporting directly to the CEO. It's the backbone of our business," Pigott said.

Among his challenges will be the deployment of a new package tracking and tracing system and a dozen others linked to it. The new system is to run on a Unix-based Pyramid Technology Corp. Model 9840 multiple parallel processing system, replacing a 5-year-old Stratus Computer, Inc. processor that Pigott said is "just fully overloaded."

Martin M. Diesenhof has been named assistant vice-president of Teachers Insurance and Annuity Association — College Retirement Equities Fund in New York.

In his new position, Diesenhof will be responsible for the design, development and implementation of computer systems for the association.

Before joining the firm in 1985 as a systems officer, Diesenhof was affiliated with International Service Systems.

Edward J. Quinn has been named vice-president of information services at Duchossois Industries, Inc., located in Elmhurst, Ill.

Quinn began his career with Duchossois in 1977 as manager of data processing for the firm's Chamberlain Manufacturing unit. Most recently, he served as director of management information services for Duchossois.

Randy Burkhart has been named vice-president of information resources management at Princess House, Inc. in North Dighton, Mass. The firm is a Colgate-Palmolive Co. subsidiary that supplies crystal wares.

Burkhart joined Princess House in 1984 as director of information resources management. Previously, Burkhart was employed by The Kendall Co., Xerox Corp. and Mobile Chemical Co.

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FROM PAGE 57

sue for top information systems executives, and the responses to the survey suggest that the area is similarly fraught with difficulty. Nearly 80% of all managers disagreed with the statement that strategic planning is primarily a question of choosing a methodology.

Index officials comment that many of the firm's clients select aspects of various methodologies or use individual approaches.

Obstacles

Again, few would discount the need to educate top managers regarding the role and potential of information systems, the No. 3 issue. But once more, there are several obstacles blocking the way.

More than half of the respondents agreed that education for senior managers now must be specific to their industry and business. But of much greater concern is the fact that less than one-fourth of those responding to the question agreed that their organization's managers have a strong desire to learn about information systems.

Finally, getting down to the implementation phase, respondents indicated that the wildly popular strategy of using information systems to gain competitive advantage is difficult or even dangerous for them to pursue.

First, strategic systems seem difficult to identify, let alone deploy. More than half the respondents disagreed that identifying them is easy and implementing them is the hard part, and only 14% said their organization has a special program for identifying competitive systems.

Second, two-thirds of the respondents agreed that competitive systems only increase the cost of doing business — not an outcome that many senior executives would relish in this age of rampant restructuring.

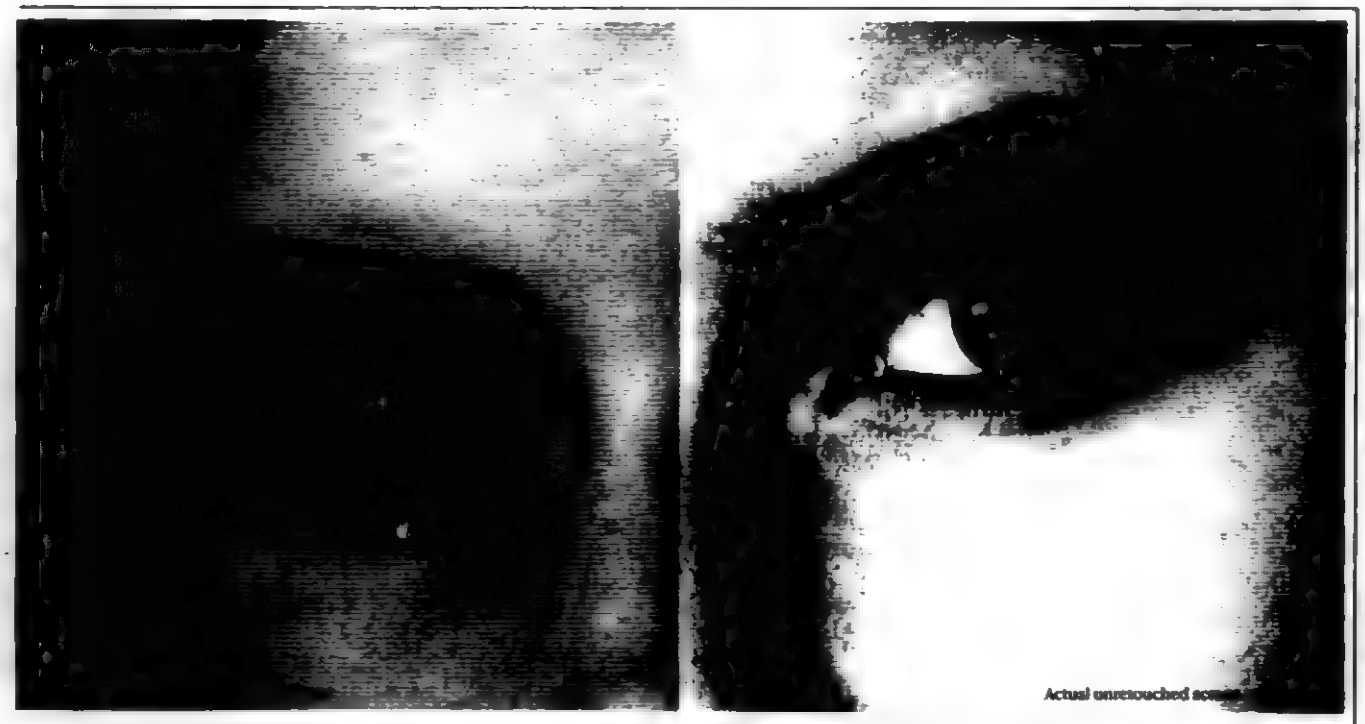
Logjams

While it rounds up the usual suspects in ranking the most critical MIS issues, the survey also identifies some major logjams along the way to addressing them.

It also underlines a consistency among the top concerns of MIS managers in a variety of industries. "Managers who felt that these issues were not important should be aware that they are swimming against a strong current," according to Index.

The firm urges those who acknowledge the issues as critical to work together with colleagues in other firms and industries, in the hope that they will find they have much in common.

Ludlum is Computerworld's senior editor, management.



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1988 Data Security Conference. New Orleans, Feb. 10-12 — Contact: Bank Administration Institute, 60 Gould Center, Rolling Meadows, Ill. 60008.

Interex Computing Management Symposium. Anaheim, Calif., Feb. 10-13 — Contact: Interex Conference Department, 880 Almanor Ave., Sunnyvale, Calif. 94086.

Independents

FROM PAGE 57

contractors in most fields the benefit of the doubt in questions of whether they were employees or legitimate independent businessmen for the purposes of federal income and employment taxes. Under the safe harbor, contractors could justify independent status on the basis of loose requirements, such as adherence to "standard industry practice."

Section 1706 was drafted by congressional staff members who were lobbied by officials of the National Technical Services Association, according to documents that Shulman obtained through the Freedom of Information Act and provided to *Computerworld*. The association's member companies generally employ salaried technical consultants and professionals.

As a result, since Jan. 1, 1987, technical service workers have had to bear the burden of proof that they are independent on the basis of the 20 common-law standards, which address the control a company has over its workers.

Among other effects, conversion from independent to employee status imposes income tax withholding on individuals and denies them income tax deductions for business expenses as well as relatively attractive Keogh retirement plans. Keogh plans are rough equivalents of Individual Retirement Accounts for self-employed people.

The tax withholding and other requirements of Section 1706 impose administrative costs on agencies that place individuals in contract jobs. Independent contractors and their brokers have also savaged the law for inhibiting efficiency and technology transfer and, thus, blunting American competitiveness.

The Senate approved Section 1706 in June 1986, but the action went virtually unnoticed until November of that year. Widespread confusion followed. The law addressed professionals placed in jobs with clients by a third party, such as a broker, but no one was sure whether it also applied to those who contracted directly with clients. The 20 standards seemed open to subjective interpretation.

"Initially, we really weren't cognizant of the potential ramifications of such an arrangement," says Jack Hines, an assistant vice-president in the Information Systems and Services Department at New York Life Insurance Co.

IRS sheds some light

In January 1986, amid an outcry from independent professionals and brokers, the Internal Revenue Service issued guidelines stating that Section 1706 applies to relationships between independent professionals and their brokers but not to direct relationships between professionals and clients. The IRS also waived early payments of employers' taxes due as a result of Section 1706.

Last May, with confusion continuing, the IRS extended and broadened the waivers and issued guidelines that apply Section 1706 to three hypothetical cases. The guidelines have been criticized as unrealistic.

The response among MIS organizations was, and has continued to be, "better safe than sorry." Under the direction of legal or human resources departments, many departments have avoided dealing with independent contractors — particularly those placed by third parties — or have ensured that the independents with whom they contract are someone's employees.

While Section 1706 does not explicitly impose a liability on the client if a worker placed by a broker is found to be improperly classified as an independent contractor, many companies are concerned they could be held liable. "It's my legal opinion that clients really are not at risk, but what the IRS has done is to create such confusion that it is very, very difficult to convince a client that they have no risk," Shulman, the brokers' attorney, says.

Harvey Shulman

New York Life will now hire independent contractors placed by brokers, but the firm puts language in those contractors' agreements requiring the broker to take responsibility for the individuals' taxes, Hines says. The move has not hindered the company's ability to hire the contract workers it needs, he adds.

First Interstate Services Co., a data processing unit of First Interstate Bancorp in Torrance, Calif., is requiring contract workers to have a business tax identification number and be associated with an organization with more than one employee, according to Bill Murin, senior vice-president for human resources.

Independent contractors who worked for First Interstate have become employees of a broker or technical services firm or have set up their own businesses, depending on whether they could meet the common-law standards, Murin says. That has resulted in the company's loss of one or two out of roughly 50 of its former free-lancers, he adds.

Bearing the brunt

It has been independent computer professionals and their brokers who have borne the brunt of Section 1706.

Rusty Romaine of Silver Spring, Md., was an independent consultant from 1978 until last year, typically working on two to six contracts a year, he says. Romaine was halfway through a contract arranged by a broker to work for a telecommunications firm for six months when he got a letter Dec. 27, 1986, from the broker. It said he would have to become the broker's employee or produce payroll receipts from another company to continue working through the broker.

Not wanting to give up his independence — along with business expense deductions and a Keogh plan — and claiming that his broker had breached the terms of his contract, Romaine relinquished the remaining three months of work, which he says was worth $15,000. He did not work steadily again until September 1987, when he negotiated a contract directly with a client through his own corporation. "It's kind of hard to have the rug pulled out from underneath your feet," he says.

David Hicks, owner of Hicks and Associates in Lafayette, Calif., a broker of computer professionals, says he had to convert nearly half of the more than 100 professionals in his stable of contractors to employee status because of Section 1706.

As a result, Hicks says, he had to buy a payroll system and hire someone to manage payroll and contracts. "It's costing tens of thousands of dollars. My guess is my costs have gone up 10%," Hicks says. Over time, he claims, the costs will gradually be passed along to clients and, ultimately, to consumers.

In response to the outcry from brokers and independents, several senators and representatives have sponsored bills to postpone or repeal Section 1706 — including one House bill that attracted more than 100 co-sponsors — but the bills failed to emerge from committee. A late effort by Moynihan to soften Section 1706 died last year when leaders deferred tax revision proposals in order to deal with the budget deficit.

While supporters of Section 1706 contend that opposition is fading, backers say they will continue to push to amend, postpone or overturn the legislature. "It is going to heat up again. It's going to get very, very unpleasant," attorney Shulman says.

MIS managers seem likely to continue to take developments in stride. "I think it is keeping a lot of lawyers in business," New York Life's Hines says.

Coke exec

FROM PAGE 57

"Bill is very outwardly focused toward servicing his user," says Christopher H. Hutchings, manager of corporate accounting. "His door is open. I can get to him pretty quick."

Before Hendry arrived at Coca-Cola, no one in the corporate information services group wanted to be the only person not on the sixth floor, Austin says. Now, the staff members are confident enough to work alongside users and not feel separated from their department, and "users love it," she says.

MIS blues

When he was hired four years ago, Hendry says, he heard his group's staff members say, "We don't have money. We don't have support. Nobody loves us. We can't do it."

He has worked at turning that perception around in two ways. Experience gained in previous jobs convinced Hendry that a small staff can be leveraged in powerful ways, and he proceeded to reduce Coca-Cola's staff while upgrading the level at which it worked.

Tapping his experience as MIS director for auto parts supplier Federal-Mogul in Michigan, he turned things around partly by shifting much of the development burden to outside contractors. At any given time, about 65 contract personnel work alongside 15 Coca-Cola corporate information services employees. Instead of designing systems and writing code, a staff member today is more likely to function as a project manager.

Hendry's other major thrust was in accelerating a process already under way at Coca-Cola: off-loading as much of the corporate information services burden as possible to end users by training half the 1,400-member administrative staff to use Information Builders, Inc.'s fourth-generation language, Focus. With the training, users are expected to provide maintenance for their own analysis and reporting applications.

The latter step has left users both admiring Hendry's prowess and rueful over his sharing the work load. Although willing to listen to users, "he's also ready to suggest the user do something different," Hutchings says.

Hendry recounts how he once agreed to develop a system for a user in the presence of Coca-Cola's chief financial officer, Douglas Ivester, and how Ivester chided him that what his system would accomplish could be done by hand on the back of an envelope. "And he was right," Hendry says cheerfully. "I've been accused of trying to dump the work load on the end user, and I'm guilty."

With a country boy look and a lean, 6-foot-2-inch frame, Hendry seems like he might have stepped out of the Stonewall Brigade, until he reveals that he is a native of Michigan and came south to take a job as development manager for Sangamo-Weston, Inc., a building supply subsidiary of Schlumberger Ltd.

He has managed to adjust to the change in climate. An avid golfer, he appreciates getting on the green for at least a day during January and February.

He also likes watching the Atlanta Hawks play basketball at the Omni arena and getting outdoors with his family on camping trips, although that activity has slackened as his two children have become teenagers.

A manufacturing high

Hendry also maintains an interest in the competitiveness of American manufacturing and recently read *The Reckoning*, a book by David Halberstam about Ford and Nissan. If he were not doing what he is, Hendry says, he would like to be in manufacturing management. "I get a kick out of making something. I can walk through a plant and get a really good feeling," he says. Between his jobs at Sangamo-Weston and Coca-Cola, he was a self-employed consultant in manufacturing software.

But behind Hendry's easygoing exterior lies a native shrewdness that, in some situations, makes him a tough bargainer.

Once, while considering a large software company's $100,000 package, Hendry heard out two salesmen and then had a contract drawn up listing the purchase price at $80,000. The salesmen had been instructed not to discount the deal, but when they appeared with their district vice-president, Hendry pushed the signed contract across the table at him. As the salesmen went into their final pitches, the vice-president picked up the contract and headed for the door. When he reached it, he interrupted the salesmen to ask, "Are you coming, boys?"

"There's no list price in that business," Hendry says, flashing his Cheshire cat grin.

Despite such shrewdness, Hendry shows a simple brand of loyalty. His allegiance to Coca-Cola is so intense that, although he says he misses them, he refuses to buy snacks made by Frito-Lay because the company is owned by archrival Pepsico.

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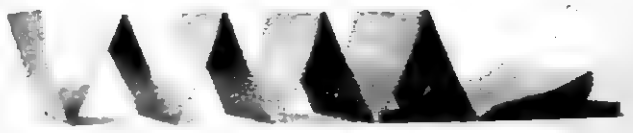
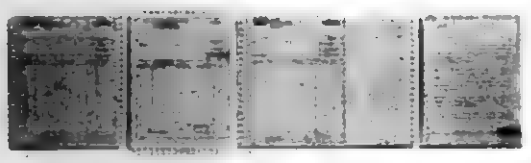
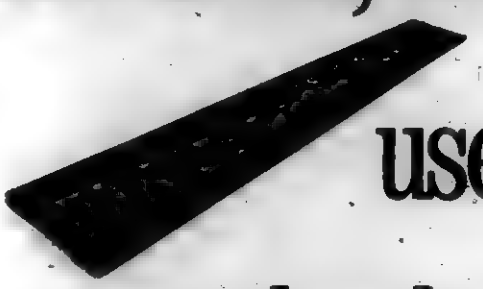
paper,  printed

 electronic forms, didn't

take up much space,  used

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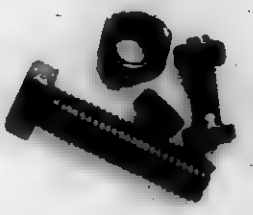
was extremely  reliable,

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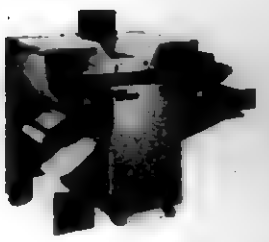
you'd say  Bull.

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INDUSTRY INSIGHT

Clinton Wilder

Wall Street vs. the facts

In this election year, the computer industry's stock market activity is bearing out that time-honored maxim of presidential primaries: perceptions count more than facts.

In the New Hampshire Democratic primaries of both 1968 and 1972, the perceived winner of the primary was not the candidate who tallied the most votes. In those years, Eugene McCarthy and George McGovern, respectively, "won" by finishing second to Lyndon B. Johnson and Edmund Muskie but "exceeding expectations."

Now move the tape ahead to Friday, Jan. 8, 1988. Tandem Computers announced to the press and financial world that its December quarter had a glitch. Wall Street, which dislikes bombshells as much as Gary Hart campaign loyalists do, took this as a red alert that the computer business, which burned investors in 1985, was headed down the tubes again.

The market was so nervous that even what appeared to be positive news about U.S. unemployment took on a negative spin on Wall Street. "We're back to

Continued on page 67

IBM, AT&T chip in

Firms to share techniques with Sematech

BY ALAN ALPER
CW STAFF

NEW YORK — In a rare example of IBM sharing technology, Sematech last week disclosed that advanced memory chip manufacturing processes developed by IBM and AT&T will be the first two technologies studied by the consortium's 13 member companies.

At a press conference here, Austin, Texas-based Sematech said IBM will contribute all manufacturing techniques used in its 4M-bit dynamic random-access memory CMOS device, which is currently under development, and that AT&T will provide processes used to make its 64K-bit static RAM chip.

Both companies, which are also expected to invest approximately $8.5 million apiece in Sematech, will provide all manufacturing and engineering personnel required to expedite the technology transfer.

Picked from members

The two manufacturing processes were chosen from an undisclosed number of technologies offered by the 13 consortium members, according to Charles Sporck, chairman of Sematech and president and chief executive officer of National Semiconductor Corp.

AT&T's process was selected because it can be quickly transferred to the consortium; IBM's process represents next-generation memory technology that will further the research and development efforts of all Sematech members, Sporck noted.

Production processes used to make both memory devices can be easily tested by the consortium, he added, and address the needs of high-, medium- and low-volume semiconductor makers.

Generation of competition

"This is the starting point for the next generation of manufacturing processes," Sporck said.

Providing consortium members with in-depth manufacturing know-how will ensure U.S. semiconductor industry competitiveness, Sporck said. Knowledge gleaned from the R&D work can be used by member companies in manufacturing their own products, provided they receive approval from AT&T and IBM, he added.

AT&T and IBM said they contributed their technology because of benefits they expect to receive from joint R&D efforts.

William J. Warwick, president of AT&T's microelectronics division, said the technology transfer will eventually strengthen the entire semiconductor industry and provide his company with stable sources of supply. "We don't want to make all our own parts," he noted.

IBM executive Jack Kuehler said that despite Sematech's R&D work, his firm will continue to develop its 4M-bit RAM. "Results achieved by the consortium could help speed up our efforts," he said.

Lotus, TI strut past '87; Hogan, AST staggering

BY JAMES DALY
CW STAFF

Lotus Development Corp., Texas Instruments, Inc. and Stratus Computer, Inc. led a parade of vendors that left 1987 in a wake of robust revenue and net income growth, according to quarterly results released last week.

Other companies notching gains in their most recent fiscal quarter included Apollo Computer, Inc., AT&T, Cray Research, Inc., Intergraph Corp. and Computer Sciences Corp. But Hogan Systems, Inc., Harris Corp. and AST Research, Inc. all reported mixed quarters (see chart below).

Lotus. After recently completing its first quarter with revenue in excess of $100 million, Lotus tallied quarterly revenue of $115.6 million, up 41% from the $81.8 million recorded for the same quarter a year earlier.

Net income for the Cambridge, Mass.-based software giant was $22.9 million, or 50 cents per share. This represented a 47% increase over the $15.6 million, or 35 cents per share, recorded for the same quarter in 1986.

For 1987, Lotus had revenue of $395.6 million, a 40% increase over its 1986 sales of $282.9 million. Net income for the year was $72 million, or $1.58 per share, a 49% increase over 1986's net income of $48.3 million, or $1.03 per share.

Much of the company's success can be tied to the sales growth of its bedrock products: 1-2-3, Symphony and Freelance Plus. "Sales of 1-2-3 and Symphony were up over 30%, which is much higher than most people were assuming they'd reach," said Bruce Johnston, an analyst with First Boston Corp. in New York. "This growth trend will continue, particularly this year, because 1-2-3 and Symphony will both receive major upgrades."

TI. The Dallas-based firm credited the recovery of the semiconductor industry — which for years had dogged the company with losses — and a 17% growth in its defense electronics business with spurring a quarterly revenue growth of 15%, to $1.5 billion.

Net income for TI's fourth quarter came in at $94 million, or $1.05 per share, a 248% increase over the $27 million, or 30 cents per share, recorded in the same period in 1986.

The computer maker notched a yearly revenue of $5.59 billion, a 12% jump over 1986's $4.97 billion. Net income for the year grew a whopping 965% and came in at $309 million, or $3.59

Continued on page 65

1987 fourth-quarter earnings

Strong sales ring up revenue growth, rising income for most industry vendors

AST Research	$3	(46)	$92.6	96
Bolt Beranek and Newman	$4.3	39	$78.1	46
Cray Research	$34.1	48	$163.6	18
Computer Sciences	$10.3	36	$287.3	12
Harris	$24.2	20	$493.8	(6)
Hogan Systems[2]	$1.9	(34)	$12.1	11
Intergraph	$34.7	27	$196.3	24
Lotus	$22.9	47	$115.6	41
Master	$5.2	(24)	$74.1	46
Sequent Computer Systems[3]	$1.1	191	$12.1	68
Stratus	$6.6	77	$55.2	58
Texas Instruments	$94	248	$1.5B	15
Western Digital	$8.3	(27)	$160.7	40
Wyse Technology	$7.4	85	$128.1	75

[1] Parentheses indicate decrease
[2] Net income includes extraordinary tax credit of $914,000
[3] Net income includes extraordinary tax credit of $368,000

CW CHART

Regrouped Sytek rolls up LAN sleeves

BY KATHY CHIN LEONG
CW STAFF

MOUNTAIN VIEW, Calif. — After Sytek, Inc. endured a corporate reorganization and the layoff of 14% of its work force last June, the local-area network vendor went into a purposeful hibernation for six months.

Breaking the silence, Sytek President George Klaus told *Computerworld* recently that his company is planning to announce new products early this month that support networking standards and various cabling media.

The LAN vendor, which has traditionally supported only broadband cable, said that part of its goal is to provide hardware and software that will tie its networks into wide-area networks

George Klaus

such as Digital Equipment Corp.'s Decnet and IBM's Systems Network Architecture.

"We have been working on all of this the last 18 months," Klaus said. "We are developing support for multiprotocols, large networking solutions and heterogenous environments. We have to do this so we don't lose momentum with our existing customer base."

More than 10 network wares are set to be part of the February lineup, including an Ethernet Transmission Control Protocol/Internet Protocol adapter card and cabling connection for the Sytek networks over twisted-pair wiring and fiber-optic cable.

"These are all hot areas to get into," observed Bruce Coughran, an industry analyst at Computer Intelligence, a La Jolla, Calif., market research firm. "In 1987, there was an increase in twisted-pair and baseband cabling. The fiber-optic connection has yet to take off."

The Sytek strategy focuses on selling to large-network customers, and Klaus said he be-

Continued on page 67

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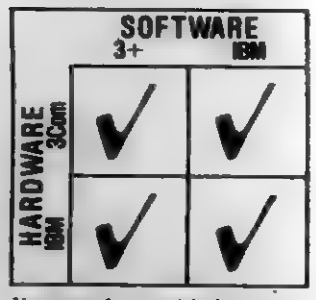

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Lotus, TI

CONTINUED FROM PAGE 63

per share, compared with $29 million, or 24 cents per share, recorded a year earlier.

"The semiconductor industry has experienced an upturn, and they're growing along with it," said Michael Gumport, senior electronics analyst with Drexel Burnham Lambert, Inc.

Stratus. Avoiding the fourth-quarter earnings drop experienced by archrival Tandem Computers, Inc., Stratus reported fourth-quarter revenue of $55.2 million, up 56% from $35.4 million. Net income was $6.6 million, or 33 cents per share, up 77% from 1986's quarterly figure of $3.7 million, or 19 cents per share.

The Marlboro, Mass.-based manufacturer also posted a 48% jump in revenue for the year, rising to $184.2 million from 1986's $124.6 million. Net income increased 43% to $19.4 million, or 97 cents per share, compared with $13.5 million, or 70 cents per share, recorded for 1986.

But analysts cautioned that although Stratus is not in trouble, its growth rate has slowed. "The growth figure is actually a deterioration from the 55% growth they showed a year earlier, 90% the year before that and 105% the year before that. I think that is a source of considerable concern to Stratus," said Omri Serlin, editor of the Los Altos, Calif.-based "FT Systems" newsletter.

"They don't want to be viewed only as a fault-tolerant systems supplier but as a broad-based on-line transaction processing systems supplier," Serlin added. "But the natural hunting ground for OLTP players is in the mainframe category, and that pitches them against IBM, which Stratus doesn't want to do." Stratus is the OEM supplier of IBM's System/88s.

AT&T. The communications giant posted its highest quarterly revenue in two years, rising just less than 1% to $8.60 billion from $8.52 billion recorded for the same quarter a year earlier. Net income was $498 million, or 46 cents per share, compared with a loss of $1.17 billion, or $1.11 per share, in the equivalent period in 1986.

Yearly revenue for the firm was $33.59 billion, a decrease of 1% from the $34.08 billion recorded in 1986. Net income for the year jumped more than 930% to $2.04 billion, or $1.88 per share, compared with $139 million, or 5 cents per share, recorded for 1986.

Results in 1986, however, included charges of $3.2 billion that reduced net income by $1.7 billion, or $1.59 per share. The charges resulted from business restructuring, a change in accounting for depreciation and a writedown of assets and inventory.

The company said sales of computers and business communications products were relatively stable compared with 1986, picking up momentum after a slow start in the first half of the year. Much of the earnings growth stemmed from AT&T's massive cost-cutting efforts.

Apollo. The Chelmsford, Mass., workstation pioneer rang up strong fourth-quarter results, as revenue of $163 million exceeded year-earlier levels by 35% and profits nearly doubled to $10.5 million, or 29 cents per share.

For the year, Apollo posted sales of $553.7 million, up 41% from 1986 sales of $391.7 million. Profits from operations more than tripled to $28.2 million, or 78 cents per share, but net profit was $6.5 million, or 18 cents per share less, because of a third-quarter charge for unauthorized foreign currency transactions.

Cray. The supercomputer maker posted quarterly revenue of $163.6 million, an 18% rise over the $138.2 million recorded for the like period a year earlier. Net income jumped 48% and clocked in at $34.1 million, or $1.08 per share, compared with $23.3 million, or 75 cents per share, recorded a year earlier.

Revenue for the year for the Minneapolis firm came in at $687.3 million, a 15% increase over the $596.7 million recorded for 1986. Net income for the year was $147.1 million, or $4.65 per share, compared with $124.8 million, or $3.99 per share, recorded for 1986.

Chairman and Chief Executive Officer John A. Rollwagen noted that the firm installed 55 computer systems during 1987: 43 new and 12 used systems.

AST Research. The maker of microcomputers and enhancements announced second-quarter revenue of $92.6 million, a 96% jump over the $47.1 million recorded in the same period a year earlier. But net income for the Irvine, Calif., manufacturer dropped 46% to $2 million, or 17 cents per share, compared with $3.7 million, or 32 cents per share, earned during the same period in 1986.

Hogan Systems. The Dallas-based banking application software firm's revenue grew 11% to $12.1 million, up from $10.9 million recorded for the same quarter in 1986. But net income dropped 34% to $1.9 million, or 13 cents per share, down from $2.9 million, or 20 cents per share, continuing Hogan's current slump. The net income included an extraordinary tax credit of $914,000.

Hogan's revenue from sales of its software products took the most significant drop, falling 21% to $3.3 million from $4.2 million recorded for the same quarter in 1986.

Applied Data Research, Inc. The mainframe data base software house said it notched revenue for 1987 of $172.9 million, which was 31% higher than 1986's results. Because the Princeton, N.J.-based firm is no longer a publicly traded company and is now a division of Ameritech, the firm was not obliged to release net income figures.

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Wilder

FROM PAGE 63

the good-news-is-bad-news syndrome," one market analyst says.

But for the computer industry, the worst ironies were yet to come. On Jan. 19, IBM announced that its frustrating two-year streak of declining earnings was over and that fourth-quarter profits were up 50% from 1986 levels.

Influential IBM stock watchers, however, saw things differently. Their revenue expectations were not met, and they saw IBM's real profit growth prospects, minus tax and currency boosts, as thin. Earnings estimates for 1988 were dropped, and IBM stock suffered a six-point price slide from which it has yet to recover.

The IBM effect quickly snowballed into a "get out of high tech" selling spree. While virtually every major computer vendor was reporting solid — in some cases, stellar — fourth-quarter results, their stock prices were taking it on the chin.

What, precisely, is going on here? Several analysts who don't share in the gloom and doom say the market paranoia stems from memories of 1985, when most investors ignored what turned out to be early slump warning signs. Not wanting to be caught again, investors in 1988 are ready to bail out of computer stocks at the first hint that something, somewhere, might be amiss.

But the vendors themselves appear to be drawing battle lines against Wall Street for 1988. The fight is nothing new: many industry chief executives — Control Data's Bill Norris and Cullinet's John Cullinane among them — have long lobbied for freedom from the tyranny of meeting quarterly financial goals.

Microsoft recently took it upon itself to issue a bullish microcomputer *industry* forecast for the first six months of 1988; Apple followed suit last week. Both highly successful vendors want to reassure the investment community not only that each company's fundamentals are sound but that the market that will turn those fundamentals into profits is healthy.

Then there is Sterling Software. Top management of the Dallas-based systems software house has apparently decided it doesn't want to deal with Wall Street at all; it will try to buy the company in a leveraged buy-out.

The investment community is understandably nervous about what computer stocks will do next; the industry's chief executives just want to be left alone to concentrate on profits, market share and long-term strategies. In the wake of the crash, those two interests have never been more in conflict.

One thing is clear. The company that falls short of forecasts is certain to be branded a loser on Wall Street. When that happens, I'm sure Ed Muskie will be able to empathize.

Wilder is Computerworld's senior editor, computer industry.

Sytek

FROM PAGE 63

lieves the new products will give Sytek an entry into companies that would prefer not to use broadband cabling. Many Sytek users, such as Mountain Bell and General Motors Corp., have 500 to 1,000 connections on their Sytek LANs. Since its founding in 1979, the firm has attracted more than 1,000 customers and has attained more than 300,000 installed connections.

Klaus announced that if all goes well, the company will go public this summer. In 1984, Sytek filed a prospectus with the Securities and Exchange Commission but decided not to go public when IBM discontinued an OEM agreement that accounted for half of Sytek's revenue.

Users, in the meantime, say they are pleased that Sytek is finally listening. "Sytek used to be really hot-on supporting only their proprietary network," said one user at Eastman Kodak Co. who is evaluating the feasibility of expanding Kodak's Sytek 2000 network.

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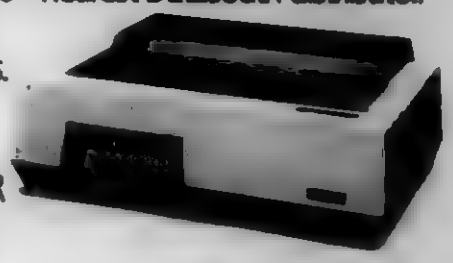

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Apple's Macintosh not just a toy

PCs making comeback as firms discover desktop's creativity, versatility

BY SALLY CUSACK
CW STAFF

Don't disregard everything you learned on your old Macintosh; it could come in handy someday. Especially if you are looking for a career in microcomputer management or support. Or publishing. Or advertising. Or even graphic arts, for that matter. Familiarity with the Apple standard is slowly gaining recognition as a valuable skill.

"People using the Apple Macintosh tend to add a creative aspect to their work," says Rand Miller, programmer and consultant at Citizens National Bank in Henderson, Texas. "The product tends to look a little better and show a little more effort. It would definitely be a big plus for the work we are doing here."

Though interest in Apple Computer, Inc.'s products is growing, positions requiring Apple expertise are usually created after the systems are already installed throughout a company.

Support hard to come by

"Support for the Apple Macintosh is a little outside the trend in corporate organizations," says Bill Storms, microcomputer center manager for the Washington State Department of Transportation in Olympia. "It tends to arrive through the back door."

Generally, there is slow growth in the volume of interest in the Macintosh, and MIS usually doesn't welcome the second standard the Mac may add to the shop, Storms says.

However, 80 Apple Macintosh Pluses are scattered throughout the department's divisions, serving several different functions. Fifty are used in the maintenance section, issuing weight and height permits for hauling on the road.

Running the numbers

When headquarters distributes the district budgets, each district reworks the figures for bottom line coordination using a spreadsheet program on the Macintosh.

The districts also use Macintoshes to directly enter payroll information to the IBM mainframe via 3276 controllers.

Two additional positions have been added to the department since the Macintoshes arrived: computer information consultant and application trainer/data processing liaison.

"The closet Mac user is eventually gaining the passive approval of MIS," Storms says.

At Citizens National Bank, the number of Macintosh computers has grown in recent years from one to eight. Two Macintoshes are used as emulators, connected to an IBM System/38. The rest handle a variety of functions, including spreadsheet applications, forms design and offline audits.

> "MACINTOSH USERS are more adept at a broader range of software than the traditional IBM Personal Computer user. . . . [Mac] users are usually fluent in several software applications."
>
> RAND MILLER
> CITIZENS NATIONAL BANK

The bank also uses Macintoshes in its advertising department, expanding the functions into publishing.

Savings achieved

This additional use was not planned, but Citizens National Bank began to realize a substantial savings from Apple technology.

The company is in the process of installing a signature card system, which will include a Macintosh at the drive-up teller window.

"Macintosh users are more adept at a broader range of software than the traditional IBM Personal Computer user," Miller says. "Because the Apple interface is so similar between packages, users are usually fluent in several software applications, such as data bases, word processing and spreadsheets."

Caterpillar, Inc., headquartered in East Peoria, Ill., brought in the Macintosh for desktop publishing a couple of years ago.

"Initially, we were doing desktop publishing on IBM PCs running DOS," says Jerry Meixsell, publishing systems supervisor at Caterpillar. "But the graphic designers decided the Mac would be better for their work."

As a result of that recommendation, Caterpillar installed five Macintosh Plus computers and several Macintosh SEs.

Desktop publishing functions are shared between the IBMs and Apples. The company expects to connect the Macintoshes to IBM 3270-type controllers in the future.

Currently, there are no Apple experts on the Caterpillar staff. Instead, training is provided by the local Apple representative, and the company contracts with an outside desktop publishing consultant. The goal is to cross-train the staff in both areas.

"We see a fairly sizable impact in the Macintosh world," Meixsell says, "and we are looking at installing Macintoshes in the advertising department. We need to develop skills to lead our corporate users in the right direction."

In the future, Meixsell will be looking to employ someone not only with Apple expertise but with an additional background in all platforms of desktop publishing, including engineering and workstation technology.

Standard acceptance

Despite the growth in Mac use at Caterpillar, corporate policy is to take advantage of the current IBM PC, and there is some reluctance to accept the Apple standard outside of special-purpose applications, Meixsell says.

Not all corporations, however, struggle with second-standard acceptance. For example, Pat Natale, vice-president of auditing at Prudential Insurance Co. in Newark, N.J., says standards were not an issue when the company first installed its Macintoshes.

Natale is responsible for 355 auditors and end users at the company, which uses approximately 175 Macintoshes and 75 IBM PCs tied into an electronic mail system.

Cusack is a researcher for Computerworld.

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Some of our best MIS professionals came to Glaxo to work on our powerful IBM 3090 systems. Some were attracted by our outstanding variety of sophisticated data management and manipulation software, such as CSP, DBII, QMF, File Aid, Excelerator, FOCUS, SAS, and others, more specifically:

- *IBM 3090/4381 OS/MVS XA for Business Applications*
- *Prime 4955/VAX/VMS 8700, 8800 for Scientific Applications*

Others were drawn by the unusual diversity of technical challenges available at the nation's fastest growing research-oriented pharmaceutical firm.

A common denominator? Every one of these people appreciates our commitment to ongoing acquisition of state-of-the-art tools. It's a commitment backed by the resources of a highly profitable company... one that genuinely values its technical professionals, and rewards them accordingly.

If your qualifications meet our requirements, it stands to reason you'll want to join us in one of these key positions.

Systems Analysts II

Two key positions are currently available:

- One position supports scientific end-users using specialized scientific PC software, and
- One position supports commercial end-users using standard business PC software.

The successful candidates will provide prompt microcomputer software assistance and support and problem resolution to over 1,200 end-users in a Help Desk environment. The selected individuals will also work with technical support staffs from all MIS functional areas to coordinate the timely resolution of complex computer problems.

To qualify, candidates must possess a Bachelor's degree in Computer Science or related area and 6-8 years of end-user computing and microcomputer experience, some of which was in a Help Desk role.

For the business end-user support position, advanced knowledge of microcomputer operating systems and application software, such as PC-DOS, DisplayWrite 4, Smart Database, dBase III Plus and Lotus 2A is required.

For the scientific end-user support position, advanced knowledge of microcomputer operating systems and applications software is required and knowledge of Chemtext, PC-SAS, Chembase, PC/Gene, TGraf, Chemtalk, SciMate, RS/1, MASS-11, and MASS-11 DRAW is desirable.

Strong analytical skills, proven ability to solve computer-related problems with an emphasis on software troubleshooting, and excellent verbal and written communication skills are essential for both positions. Prior experience working with a pharmaceutical company or scientific research firm is desirable, as is SAS, CSP, CICS, MVS, QMF and DB2 programming experience; DEC VAX All-In-1, IBM DISOSS and PS/PC experience; and IBM Token-Ring and/or VAX Ethernet network support experience.

Glaxo offers outstanding salaries and benefits, a policy of promotion from within, and much more. Surrounded by three major universities, our Research Triangle Park headquarters are located near beautiful Raleigh, NC, just three hours from the Atlantic Coast to the east and three hours from the Smokey Mountains to the west. For prompt consideration, please send your resume, including salary history, to: Department 3650X822, Glaxo Inc., P.O. Box 13398, Research Triangle Park, NC 27709. An Equal Opportunity Employer M/F/H/V. (No phone calls, please.) No private agency referrals, please.

Glaxo Inc.

DIRECTOR OF MIS

We are conducting a search for one of our clients.

A rapidly growing retailer moving to data base technology and in-store processors, is searching for a dynamic, take-charge MIS director interested in a challenging opportunity. The candidate must have experience managing an MIS department as a business: planning, budgeting and supporting the company's business objectives with technology.

A bachelor's degree is required; retail/distribution experience is a plus.

A competitive salary and an excellent benefits package is offered. All inquiries held in confidence. If you have the qualities we are looking for, please call 214/969-8371 or send a resume to Scott Evans, Arthur Young, 2121 San Jacinto, Ste. 500, Dallas, TX 75201.

Arthur Young

A MEMBER OF ARTHUR YOUNG INTERNATIONAL

An Equal Opportunity Employer M/F

FACULTY POSITION. Purdue University, School of Technology, Computer Technology Program at Columbus. Assistant Professor (tenure track) in 2-year associate degree programs. Primarily evening classes starting in August. Must have business or industrial experience, teaching experience, masters degree, strong background in IBM mainframe systems including business applications in COBOL, JCL and be capable of teaching introductory courses in systems analysis, and BASIC and FORTRAN in a microcomputer environment. 10-month appointment; salary commensurate with qualifications and experience. Send Vita and 3 letters of reference by March 15, 1988 to: Director Philip L. Rice, Purdue University, 4001 Central Avenue, Columbus, IN 47203. PURDUE UNIVERSITY IS AN EQUAL OPPORTUNITY/AFFIRMATIVE ACTION EMPLOYER.

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Sales Offices: **BOSTON:** 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171, (617) 879-0700; **NEW YORK:** Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652, (201) 967-1350; **CHICAGO:** 10400 West Higgins Road, Suite 300, Rosemont, IL 60018, (312) 827-4433; **LOS ANGELES:** 18004 Sky Park Circle, Suite 100, Irvine, CA 92714, (714) 250-0164; **SAN FRANCISCO:** 500 Airport Blvd, Suite 400 Burlingame, CA 94010, (415) 347-0555

SYS/38 PROFESSIONALS

Keane, Inc. is a $50M software services company. We are currently staffing a major project to support IBM System/38 operating software. As a result, we are looking to fill a wide variety of positions. To qualify, you must have a minimum of two years of programming (any language) on a S/38, and expertise in one of the following areas.

OPERATIONS
DATA BASE
COMMUNICATIONS
APPLICATIONS

The successful candidate will have: a demonstrated ability to learn new skills, strong commitment to project goals, and proven interpersonal abilities. These high visibility opportunities offer excellent technical and professional growth, as well as individualized training.

Generous relocation packages are available. We offer competitive salaries and a superb benefits package. Local interviews will be scheduled. For further information, call Barbara Gavin at: (612) 546-3481, or send your resume to her attention at: Keane, Inc., 10201 Wayzata Boulevard, Suite 350, Minnetonka, MN 55343.

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We'd like to talk with you. Please send your resume in confidence to: Director of Recruiting.

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(201) 549-4100

One Galleria Tower, Suite 500
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Dallas, Texas 75240
(214) 960-7015

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INFOMART, 1950 Stemmons Freeway, Dallas, Texas

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CR3

PROGRAMMER/ANALYST

Community Coffee Company, a prominent regional manufacturing company serving a variety of retail food and institutional markets in Louisiana, Mississippi & Texas, is seeking candidates for the position of Programmer/Analyst at our Baton Rouge LA corporate location. Qualifications include:

- Minimum 2-4 years S/38 experience.
- Extensive RPG III, CL, Communications, PC Interface experience
- Systems development and project management track record preferably in manufacturing/ distribution.
- BS in Computer Science or related field.

Send resume with salary history & requirements to: COMMUNITY COFFEE CO., INC., PERSONNEL DEPARTMENT, P.O. BOX 791, BATON ROUGE, LA 70821

PROGRAMMER/ANALYSTS & SYSTEMS PROGRAMMERS

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We have opportunities for on-line and database programmers and systems programmers for both in-house and consulting positions. Fee Paid. Please call or send resume to:

Keith Reichle, CPC
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303 Heritage Park
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803/831-2128

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SYSTEMS APPLICATIONS PROGRAMMERS

Software Alternatives, Inc. is a nationally recognized software development firm with over 200 professionals in 10 cities dedicated to the sales and support of IBM 4300 and S/36/38 computers. Our growth plans for the Chicago, Columbus and Toledo areas in 1988 have created challenging opportunities for individuals with the following experience:

- MVS/VM/VSE
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- MARKETING
- COBOL
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For more information, please write:

IBM

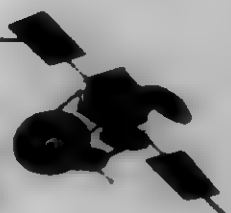
Software Alternatives, Inc.
Mark Crane
4041 Monroe Street
Toledo, OH 43623
SOE-MF

SYSTEMS ANALYST II
Data Communications Specialists
Salary dependent upon qualifications

Oklahoma City is seeking candidates with broad knowledge of data communications hardware and software, including peripheral co-processors, PC LAN's, and computer networks with bridges and gateways to multi-vendor networks and mainframes. MIS is moving toward distributed, multi-vendor data processing with extensive interoperative communication. Successful candidate will assist in the planning, development, and implementation of systems in this environment. Please submit resume by February 29, 1988 to:

The City of Oklahoma City
Personnel Dept.
Civic Center Music Hall
Room B-3
201 Channing Square
Oklahoma City, OK 73102
(405) 231-8809

NASA National Aeronautics and Space Administration



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Join our dynamic development team and participate in a highly visible experimental communications satellite system called ACTS which is the forerunner of the next generation of commercial communication satellites.

You will be responsible for planning and coordinating the voice, data and video application experiments using the ACTS system. Your duties will allow you to interact with a wide variety of government, industry and university experimenters.

Salary range is $36,727 to $50,346 depending on your education and experience.

Qualifications:

- BS or Advanced Degree in Engineering or Physics
- A minimum of 3 years related experience in Telecommunications
- U.S. Citizenship

To pursue this opportunity, send resume and salary history to:

Sandra App, MS 500-301
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Lewis Research Center
Cleveland, OH 44135

Resumes must be received by March 11, 1988.

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ENGINEER

Software Engineers

CLARIS Corporation, Apple's new software subsidiary, is seeking creative, hands-on managers and engineers with text, graphics and/or database software development experience to develop Macintosh™ applications.

All positions require a BS (MS preferred) in Electrical Engineering or Computer Science, or equivalent, and 5+ years' development experience using C, Pascal or 68000 assembly languages on bit-mapped workstation applications like MacWrite™ or MacDraw™ Experience with Macintosh is desirable. In addition, management positions will require 3+ years in a supervisory capacity.

If you are motivated by direct involvement and the opportunity to make a meaningful contribution in a dynamic development environment with a unique start-up, send your resume with SALARY HISTORY AND REQUIREMENTS to CLARIS Corporation, Dept. 1-20, 440 Clyde Avenue, Mountain View, CA 94043. EOE. No phone calls, please.

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Major Washington, D.C. Metropolitan area Financial Corporation seeks ambitious executive who desires a fast track to a senior/officer position. Your track record should reveal a high degree of focus and commitment, visibly demonstrating a pattern of career achievements.

We require excellent management and technical skills, extensive knowledge and experience in an IBM Data Processing (IBM/MVS/XA Systems) environment, production, and related operations support functions. Your charter will include supervising and motivating a highly technical staff, contributing to the development of strategic plans, and ensuring that the DP function meets our user needs, and continues to be regarded as state-of-the-art in the industry.

Communications will be entirely confidential. For prompt consideration, send resume with cover letter to:

Director Search
P.O. Box 1100
Columbia, MD 21044

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Computers

Information Systems Opportunities

Ogiethorpe Power Corporation, one of the nation's leading electric utilities, seeks qualified candidates for the following positions in our information systems department. The positions are based at our corporate headquarters in suburban Atlanta, Ga.

End-User Systems Analyst
Responsibilities include support and training for end-users of information center software and hardware products and participation in the development of end-user systems models. Requirements include bachelor's degree and three years direct experience in system analysis, design and installation.

Systems Programmer
Responsibilities include providing technical support for computer system software. Requirements include a bachelor's degree and two years of systems programming experience in IBM VMS or OS system software.

For confidential and immediate consideration, submit resume to:

Ogiethorpe Power Corporation
Human Resources Department
P.O. Box 1349
Tucker, Georgia 30085-1349

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OVERSEAS ASSIGNMENTS SAUDI ARABIA

MVS/VM System Programmer
Six years direct MVS and VM system support including MVS and VM installation and generation, DASD configuration, TSO and CICS support, JCL support for application development and system maintenance, and system tuning and performance control.

VTAM/NCP Network Manager
Six years direct support of VTAM/NCP in an SNA environment including VTAM/NCP installation and generation, IO devices configuration and definition, network problem definition, and network performance monitoring and control.

IDMS DBA
Minimum of five years direct support of IDMS including all database administration functions-database design requirements definition, design (conceptual and physical), implementation under IDMS/R, IDMS installation and generation, database tuning and performance control, database restructuring.

Production Control Specialist
Six years direct production support of online information systems (Financial, Human Resources Systems, etc.) in an MVS environment. Experience must include production procedures design, JCL support, applications installation and initialization, JOBs scheduling, and backup, recovery, and archive procedures.

C Programmer
At least four years direct C programming experience in DOS 3.x environment including device drivers, graphics, etc. Experience with MS DOS BIOS and internals is a must.

Excellent salaries and benefits. Please send resume to:

ESU Project Manager
AED
1255 23rd Street, N.W. - Suite 400
Washington, D.C. 20037

San Diego, CA

Sharp HealthCare, a community leader in medical services continues its MIS commitment to state-of-art technology. The integration of IBM 4381, and clinical and financial software within our multi-facility network provides a unique challenge for the talented computer professional. All these positions require excellent verbal and written communication skills.

Manager Computer Operations

- 5 years experience in operations supervision including budgeting, planning, data communications and configurations management
- Requires mainframe experience, IBM 4381 & MVS/XA background preferred
- Reports to Director of Information Systems

Clinical User Support

- Strong experience working with Medical "group practice" computer applications including billing, A/R, patient registration/scheduling and 3rd party claims management. CyCare software background preferred
- Demonstrated skills in analysis and planning, interaction with users, programmers and vendors; and user training

Computer Operators

- 2 years operating experience working on one of the following systems: IBM 4381 MVS/XA, System 36 or Data General 10000

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We are developing and modifying major merchandising and warehousing systems on an IBM 4381-MVS/XA using Cincom's SUPRA database. We are looking for a highly motivated individual with database or programming experience in SUPRA/TIS/TOTAL environments to be our Database Administrator. Experience with MANTIS for online program development is also desirable.

Exceptional benefits include medical, dental, profit-sharing, pension and much more. Send resume to: **Somerville Lumber and Supply Co., Inc., P.O. Box 9002, Waltham, MA 02254-9002, Attn: David Rothenberg.**

SOMERVILLE LUMBER

data processing

SENIOR INFORMATION CENTER ANALYST
4GL in VM Environment

If your specialty is developing Decision Support Systems in a VM environment with an emphasis on fourth generation languages, Miller Brewing Company can bring out the best in you. Our large scale Information Center is a sophisticated, results-oriented environment charged with supporting one of America's largest and most progressive brewers.

You will have project leadership responsibilities in planning and conducting feasibility studies, and in systems analysis, design and development. You will also have key user training and support responsibilities.

A minimum of 2 plus years decision support system development experience in a VM environment is preferred. Knowledge of OMF with SQL/DS, FOCUS, SAS or DB2 desirable, with two or more years MVS/TSO experience. Superior organizational, problem solving, project management and technical training abilities are necessary. BSCS or equivalent preferred.

Miller Brewing Company is a subsidiary of the Fortune 50 Philip Morris Companies Incorporated. We offer competitive salary, complete benefits, and relocation assistance to the attractive, comfortable Milwaukee area. Send resume or letter to: Corporate Recruitment Manager, Dept. #1000-88, MILLER BREWING COMPANY, 3939 W. Highland Blvd., Milwaukee, WI 53201.

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Nat'l. retail chain with 250+ stores seeks proj. mgr. to lead apps. devel. team. Must have 5+ yrs. large-scale IBM COBOL DBMS retail sys. exp. Oppty. to join growing co. doing record sales & profits. Loc. in SUBURBS. Salary $50,000. Call the Data Processing Division (in confidence). **ROBERT HALF OF BOSTON, INC.,** 100 Summer Street, Boston, MA 02110. Tel. 617-423-1200. Personnel Consultants. Client company assumes all fees.

SYSTEM PROGRAMMER

Our company is the fastest growing National check printer in the industry. As a result of this growth, the data processing department is seeking an MVS system programmer for our corporate office in San Antonio. This position will be involved in the technical support of data processing for the entire company.

The ideal candidate will have 3-5 years MVS and JES2 experience and be accustomed to a high volume on-line environment. Exposure to the following products preferred: ADR, DATACOM/DB, CICS and UCCEL. System tuning experience a plus.

This position offers a competitive salary as well as a comprehensive benefits package that includes medical/dental/life insurance, vacation, holidays and profit sharing.

If interested in this challenging position, please send resume with salary history to:

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YOU CAN "make" the kernel in 3 minutes! Use your 3+ years' development experience in UNIX* and/or 370 operating systems to join our UTS** development team as a manager or individual contributor in one of the following areas:

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- 4705/X.25 Support
- Performance Measurement Tools
- Online Transaction Processing

Contact Bill McCarthy at (800) 538-8460, extension 6843 or send your resume.

DESIGN AUTOMATION

YOU CAN develop strategic automated tools which take our mainframe designs from concept and verification through to manufacturing. Extensive design automation experience, including C/UNIX based technical skills and/or project management expertise, is essential for the following challenges:

- Manager, Physical Design Automation Development
- Senior Systems Programmers
- Systems Design Engineers
- Manager, Design Automation
- Product Manager, Processor Products Support

Contact Ranell Durgan at (800) 538-8460, extension 6216 or send your resume.

PRODUCT TECHNOLOGY

YOU CAN make significant contributions to the design of our custom test systems by utilizing your 5+ years of system logic design or your 3+ years of software design development experience with high level languages.

- Software Engineer (UNIX & "C" required)
- Hardware Engineer (ECL a plus)

Contact Ranell Durgan at (800) 538-8460, extension 6216 or send your resume.

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YOU CAN use your 3+ years mainframe experience, with emphasis on channel subsystems development, to guide the evolution of future processors. Previous work with 370 compatible channels, channel algorithm design, and/or microcode desirable.

- I/O Design Engineer
- CPU Design Engineer

Contact Judy Goodson at (800) 538-8460, extension 7699 or send your resume.

OPERATING SYSTEMS DEVELOPMENT

YOU CAN play a vital role in creating leading-edge systems software which interacts closely with our hardware at the kernel level. Technical excellence and/or management experience in 370/Assembler systems software development is essential. Use your background in 370/XA architecture and MVS or VM internals to pursue these opportunities:

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- Systems Programmers, Processor Simulation
- Senior Systems Programmer, Macrocode Development
- Manager, Operating System

Contact Susan Raskin at (800) 538-8460, extension 6191 or send your resume.

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YOU CAN enjoy variety, gain technical breadth, and have a direct influence on our products by designing and executing mainframe software test procedures. Your background should include large-scale systems integration and test experience. 370/XA Assembler is also highly desirable for the following:

- Manager, Test Tools Development
- Systems Programmers, Software Validation

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YOU CAN join in the excitement of creating the computer systems of the future, while you enjoy the benefits and competitive salary you would expect from an industry leader.

YOU CAN send your resume to: Amdahl Corporation, Employment Department, Department 2-3, P.O. Box 3470, M/S 300, Sunnyvale, California 94088-3470. Principals only, please.

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INDIANAPOLIS: EDP Career Associates
LOS ANGELES: Supreme Personnel, Inc.
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System Developers
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Job Service of Florida
105 E. Broward Blvd.
Ft. Lauderdale, FL 33301
JO# FL0500

SYSTEM PROGRAMMER SVS, VM-CMS

Qualified candidates will have a degree in computer science or comparable experience, and possess excellent written and oral communication skills. A working knowledge of IBM hardware/software is required for MVS/XA-JES2 running on a large IBM mainframe with DFP, ACF/NCP, NETVIEW, VTAM, CICS, VSAM, TSO and ISPF. Experience using SMP and IBM utilities and service aids to install and maintain operating system components is required. Strong problem determination skills using IBM diagnostic tools and advanced S/370 assembler language programming experience are essential. Candidates with a minimum of two to four years experience installing and maintaining MVS and related products are preferred. Candidates with similar experience in a VM/SP-CMS environment are also invited. Previous experience in a university computer center that provides both academic and/or administrative computing services is also desirable. Qualified candidates should send a letter of application and resume including the name, address and phone number of at least three professional references to: Personnel Services, University of Oklahoma, 905 Asp, Norman, OK 73019. For additional information contact Mr. Carl Bush (phone (405) 325-7234 or write to Merrick Computer Center, 1018 Newton Drive, Norman, OK 73069.

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Computer

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Are you interested in developing innovative systems? Then maybe it's time you looked at the World Wide Information Services Division of Holiday Companies. Our project teams are developing systems to address the future needs of our Wholesale and Retail Divisions and we are looking for people to be part of this integral team.

We currently have openings for a Programmer and Programmer/Analyst with 2 to 3 years of IBM 9100 hardware and DPPX operating systems experience. Our ideal candidate will have several years of COBOL and some experience in retail, wholesale or distribution systems.

Holiday offers a competitive salary and benefits package as well as relocation compensation. Please send your resume in confidence to: Susan Oughton, Personnel Department, HOLIDAY COMPANIES, 4567 West 80th Street, Minneapolis, MN 55437.

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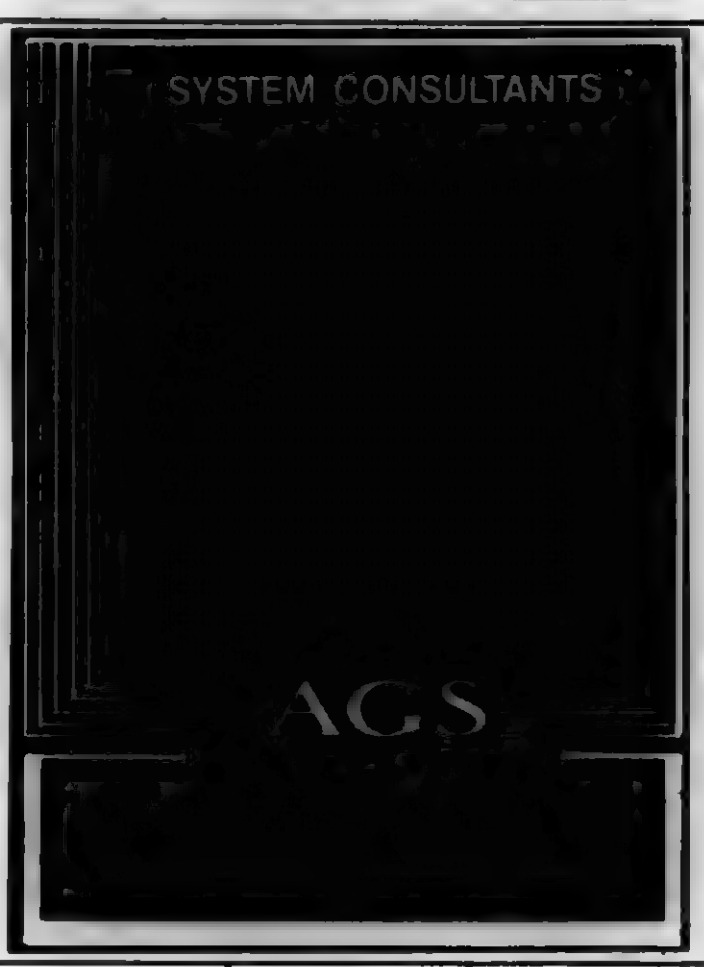
OCS Prog. Analyst (Mfg. Spec./COBOL)	$30K
MIS Prog. Analyst (Fin. Spec./COBOL)	$27K
RMS Sys. Prog. Spec./Tuning	$40K
OCS Sys. Prog. Spec./Admin.	$40K
Sr. Sys. Analyst (CICS/COBOL)	$35K
MIS Prog. Analyst (DB2/JCL/Fin. Spec.)	$27K
DP Prog. Analyst (DB2/JCL/Fin. Spec.)	$27K

It would be in your best interest to exclusively contact an agency that is well established member of a national network, and will give your career interests top priority. Please send resume to Robert Montgomery

The Data Group
P.O. Box 52056
Raleigh, NC 27612



DIRECTOR OF IMPLEMENTATION

Tallahassee Memorial, a 770-bed regional referral center, is seeking a Director of Implementation for Management Information Systems to assist in the development of a detailed work plan to install and implement a hospital information system using IBM 3090-150E hardware and Baxter software.

A 4 year degree in information systems, math, business or other related discipline and 5 years MIS experience in the application software area with demonstrated planning, organizing and management ability is required.

Position offers a competitive salary and a generous benefit package. Apply to:

Personnel Department
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Magnolia Drive
Tallahassee, FL 32308
(904) 681-6280

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Staffware Consulting is the largest data processing professional services firm in Houston, Texas. Houston's economy is revitalizing and because of our extensive and diverse client base, we now have multiple long term contract positions in the following skill sets:

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- System 36
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Send your resume including salary history to:

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One East Wacker Drive
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Chicago, IL 60601
Attention: Dave Gibson

Data Processing

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Excellent opportunity with MIS dept developing and maintaining integrated financial applications on VM/HS V6 Network. SPEED II programming experience and accounting background desirable. Relocation package available. Send resume with salary requirements to:

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Computerworld
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Framingham, MA
01701-9171

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Excellent opportunity in our growing MIS department. The successful candidate will have extensive experience in the following areas: MVS SP or XA, JES2, RACF, ACF2, or TOPSECRET, CICS, VTAM, NCP. Some knowledge of the following areas is helpful: Database concepts, fourth-party software product analysis, data processing concepts, third party DASD management products. Salary commensurate with experience. Excellent benefits including paid health, dental, life and disability insurance. Qualified applicant should send resume to:

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(813) 971-7366

GRAPHIC ARTS SYSTEMS ENGINEER: To plan utilization of computer facilities and personnel to improve the efficiency of operation in graphic arts establishment. Will direct field operations and maintenance activities of computer operations. Will evaluate operational systems and recommend design modifications to increase efficiency and promote flow and eliminate causes of malfunction in computer systems. Ability to supervise engineers and systems operators in production support. Must have 4 years experience B.S. in Electrical Engineering, knowledge of graphic arts imaging systems and applications, and ability to develop computer interfaces or peripheral devices. M-F 4 p.m. to 12 a.m. Salary: $35,000 per year. Send resume only to: Job Service of Florida, 701 SW 27th Ave., Rm. 15, Miami, FL 33135. REF: Job Order #FL3000375.

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CICS Systems Programmer

Retail-Wholesale PA

IDMS PA's/Project Lead

Property/Casualty PA's

If you have experience in one of the above and would like to live in the Rockies please call or send resume immediately to: Stephen J. Kelsey, President, Alliance Consultants, Inc., 1777 South Harrison, Suite 404, Denver, CO 80210. (303) 758-0004.

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(919) 227-6268

A wealth of new positions are available right now on the West Coast.

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To find out more about any position listed below—or others you might like to hear about—call Dave Grinnell toll-free day or night at 1-800-533-4200, extension 103. There's no cost or obligation to you and your inquiry will be held in strict confidence.

If unable to call, write: Dave Grinnell, Source Edp, Department 7571, San Mateo, CA 94402-7571. (When writing, please include your position title).

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Call Dave Grinnell toll-free at 1-800-533-4200, extension 103

Southern California

Edp Auditor (361-01) International distribution company seeks a Senior Edp Auditor experienced in the audit of total system development life cycle in an IBM mainframe environment. CISA highly preferred. Position involves some international travel. To $45,000.

Manufacturing Systems Coordinator (361-02) Excellent opportunity with an Orange County-based manufacturing company. Will be responsible for installing and maintaining manufacturing software. Solid understanding of the total manufacturing process sought. To $42,000.

Sales Representatives (361-03) Orange County branch office of a nationally-recognized consulting firm seeks sales professionals with a proven track record marketing to data processing organizations. A degree and five or more years sales experience desired. Package to $60,000.

Senior Programmer/Analyst—Locate DB2 (361-04) Orange County-based financial organization will be installing DB2. Three or more years of systems development experience in an IBM data base environment sought. To $40,000.

Programmers—*Multiple Openings* (361-05) Consulting firm has multiple openings for Programmers with COBOL, IMS, IDMS or CICS experience. A variety of interesting assignments are available. To $45,000.

Senior Consultants (361-06) Big 8 CPA firm seek degreed professionals with strong systems development experience in state-of-the-art hardware/software environments. To $55,000.

Senior Programmer (361-07) National distribution firm based in Orange County seeks a professional with strong distribution application experience in an IBM MVS COBOL environment. Fast track to management. To $50,000.

Project Leader (361-08) Growing Orange County company seeks a data processing professional with project leadership experience. Will be responsible for all new projects and be trained to become the Systems and Programming Manager. To $43,000.

VSE Systems Programmer (361-09) Three years VSE systems programming experience. Some MVS experience preferred. To $45,000.

Programmer/Analyst (351-01) Growing consulting firm seeks a professional with strong RPG III and System 36 experience to assist in the development of client systems. To $40,000.

Microcomputer Support (351-02) dBase III and clipper experience for systems development sought. To $50,000.

MVS Systems Programmer (351-03) Excellent opportunity for growth in an expanding OS/MVS environment. Lots of technical challenge. To $55,000.

Senior Programmer/Analyst (351-04) Expanding information services group seeks a professional with a strong background in CICS. Five or more years COBOL experience in an OS/MVS environment desired. To $45,000.

MBA Programmer/Analyst (351-05) Experience with several MBA modules desired. Position provides high visibility in an OS/MVS environment. To $45,000.

Business Systems Analyst (351-06) Responsibilities include extensive user interface, systems development and life cycle methodology. Will interface with users and DP to plan and define future needs. To $42,000.

VAX COBOL Programmers—*DBMS Training* (351-07) Join a major development effort in the entertainment industry and enhance your technical skills. To $40,000.

Systems Analyst (351-08) Strong manufacturing systems implementation experience sought (specifically MRP II). To $45,000.

Director of MIS (351-09) Growing IBM 4331 DOS/VSE shop needs a manager to support the upgrade of all applications. To $50,000.

Assembly Language Programmer (351-10) Will develop utility-based systems for an IBM mainframe environment. Creative environment. To $50,000.

CICS Programmer/Analyst (371-01) San Diego financial institution seeks a professional with CICS skills to support a major credit card system. Will work directly with users. Knowledge of Assembler desired. To $40,000.

Communications Software Specialist—*Learn APPC* (371-02) Will develop and support operating systems and communications network software. System developed using UNIX, C and Assembler. To $60,000.

Database Specialist (371-03) Will develop an on-line real-time data base management system. Transaction processing background and a broad range of DBMS experience on mainframe, minis and micro's sought. Strong knowledge of logical/physical design and data dictionaries sought. To $45,000.

Software Engineer—*Software Systems* (371-04) Will develop, test and support real-time embedded software supporting defense and space systems. Programming experience in the DEC VAX or IBM micro environment using Assembler, EXICAL, FORTRAN or ADA sought. U.S. Citizenship required. To $55,000.

MVS Systems Support Programmer (371-05) San Diego firm seeks a professional with MVS systems experience to install products. Must have knowledge of SMP, ISPF, DASD, VSAM or DDF or possess the desire to learn. This is an excellent opportunity to grow into a systems programming position. To $40,000.

IMS Data Base Design Specialist (371-06) In this newly-created position, you will support IMS and be responsible for the testing and installation of recovery and security support packages. Suburban San Diego location. To $50,000.

Senior IBM Software Engineer (371-07) Unique opportunity to develop compilers, optimizers or co-processors for new languages. Knowledge of IBM 370 architecture sought. To $70,000.

PC Programmer/Analyst (371-08) Will be responsible for the interface software between IBM mainframes and PC's. Must have C or Assembler Language along with strong analytical and design skills in the CMS/MVS environment. To $45,000.

DB2 Programmer/Analyst (371-09) Major CMS/MVS shop in San Diego seeks a professional to define the DB2 environment and insure users fully understand and use QMF. Financial or banking industry experience sought. To $45,000.

IMS 4000 Programmer/Analyst—*Opportunity to Learn IMS* (371-10) San Diego company is installing a national network using an IBM 4000 system. Programming knowledge of DPPX using CSP or COBOL sought. To $50,000.

Northern California

Multiple Positions (351-11) Major communications firm seeks 50 computer professionals at all levels to support the conversion of an IBM to a Tandem system. Prior Tandem experience sought. Excellent benefits. Salaries range from $35,000–$45,000.

Programmer/Analysts—*Multiple Positions* (351-12) Several San Francisco Bay Area companies seek professionals with three or more years of System 36 RPG III experience. Excellent opportunities for advancement. Salaries range from $34,000–$70,000.

Programmer/Analyst—*Opportunity to Learn CICS* (351-01) Major financial firm seeks a professional with two to three years PL/I and COBOL experience. Will work on PL/I program conversions to COBOL. To $50,000.

Senior Systems Programmer (351-02) San Francisco office of a major financial institution seeks a professional with MVS/XA experience. Will interact with operations and telecommunications staff and provide MVS/XA support, installs and updates. To $50,000.

Programmer/Analyst (351-03) Two or more years experience in the design and coding of structured COBOL programs in a large-scale IBM environment under MVS/XA sought. Knowledge of VSAM and CICS/ICL desired. Will participate in all phases of systems development cycle. To $37,000.

Senior Programmer/Analyst—*Fast Track to Management* (351-04) Major San Francisco Bay Area retailer seeks a professional with five to six years OS/MVS COBOL experience and two or more years CICS experience. Excellent interpersonal skills sought. To $43,000.

Systems Analyst (351-05) Major San Francisco corporation seeks a Systems Analyst with five to six years experience. Two years Taudem, Pathway, TAL and COBOL experience also desired. Outstanding new facility. To $45,000.

Programmer/Analyst—*IMS DB/DC* (351-07) California department store chain offers highly-visible and challenging opportunities to a professional with four years structured COBOL and some IMS experience in an MVS/XA environment. Beautiful location. To $30,000.

DP Manager (351-08) Highly successful distributor seeks a Supervisor with five or more years System 38 RPG III experience. Must be willing to travel. To $70,000.

Programmer/Analyst (351-09) Major food manufacturer seeks a professional to be responsible for the installation of hardware and IBM software upgrades and evaluation and testing of SNA. Five years System 38 experience desired. To $45,000.

Data Modelling Analyst (351-10) Major San Francisco Bay Area employer seeks a professional with three to six years data modelling experience. Knowledge of DBMS also desired. To $44,000.

Oregon

Programmer/Analysts—*New Development* (351-01) High-growth Portland manufacturing firm is embarking on a large new development effort to install fully integrated manufacturing and financial applications. Professionals with two or more years experience in applications development with solid skills in CICS, ADSO, IDMS structured programming and COBOL sought. Excellent growth potential. To $36,000.

Senior Programmer/Analyst—*CICS* (351-02) Rapidly-expanding, well established firm headquartered in Portland seeks professionals for the design and development of applications to support a variety of applications including distribution, inventory and finance in an on-line, large-scale IBM environment. Two or more years of structured COBOL and one year of CICS experience with a data base would be a real plus. To $36,000.

Applications Engineer—*UNIX OS* (351-03) Well-established company for the OEM market which manufactures a 32-bit model-based computer seeks experienced and innovative individuals to develop operating system drivers, utilities, etc. Campus atmosphere in a high-tech park allows individuals to work in a creative environment. Knowledge of C and UNIX kernals desired. Portland. To $50,000.

Senior Programmer/Analyst—*ALS* (351-04) Newly-created position is expanding firm in Portland to design and develop new business applications in MACRO-II. Opportunity for quick growth to team leader in this active and unstructured environment. Three to five years DEC, PDP and VAX experience programming in MACRO-II and C sought. To $35,000.

Consultants—*Big 8* (351-05) Use your five or more years of large systems experience and project management ability to develop information systems plans. A college degree and strong verbal and written communications skills are sought. A strong profit orientation is also needed. A financial, manufacturing, insurance or banking background and an MBA is highly desirable. To $45,000.

Systems Analyst—*Growth to Management* (351-06) Well-established Portland company seeks a professional with strong verbal and written communication skills as well as structured design techniques to lead special projects in an Analyst role. Initially, you will be involved in the conversion projects and will then move to new development from DEC 20's to IBM 3033 under MVS. Four to six years experience as a Programmer/Analyst and Systems Analyst in COBOL with one year experience in CICS desired. Data base experience helpful. To $36,000.

Programmer/Analyst (351-07) Multiple positions are available in IBM COBOL and CICS or IMS DB/DC. Two or more years experience sought. Excellent opportunity to learn. To $35,000.

Washington

Data Base Analyst (351-01) Seattle office of a well-established manufacturing firm is expanding its staff to aid in the company's data base administration. Successful candidate will possess experience in a major data base management system such as IMS, TOTAL or IDMS. To $45,000.

Tandem Programmer/Analyst (351-02) Major Seattle firm seeks a professional with two or more years experience in TAL, Pathway and COBOL. Banking, financial or data communications experience preferred. Company is situated in a beautiful country setting outside of Seattle. To $45,000.

Sr. Systems Analyst (351-03) Seattle-based organization seeks a proven leader to implement a major on-line (CICS/DL/I) project. Multiple positions offer an opportunity for advancement. Must have major project responsibility experience and excellent interpersonal skills. To $45,000.

Systems Programmer (351-04) Expanding Northwest firm offers state-of-the-art experience to an experienced IBM OS Systems Programmer. The successful candidate will join the state industry leader while enjoying the unique advantages of the Pacific Northwest. CICS, MVS/JES systems internals desirable. To $45,000.

Programmer/Analyst—*On-Line Development* (351-05) Major Seattle firm is offering the opportunity for IBM OS/COBOL Programmers to learn either CICS and IMS/DC. Two or more years experience desired. Relocation assistance. To $35,000.

Systems Development Manager (351-06) Unique opportunity to develop your own system development group in a large service oriented company. Must have proven management skills in the development, design, packages and implementation of new systems. To $60,000.

Software Engineers—*CAD/CAM/CAI* (351-07) Highly successful suburban Seattle-based company which develops manufacturing/engineering software products has multiple openings. Background in CAD/CAM/CAE, CADAM, CATIA or CADDS desired with FORTRAN, C or EXICAL and minicomputers. To $45,000.

Programmer/Analyst (351-08) Wholesale distributor seeks a Senior and Junior Programmer/Analyst using RPG III on IBM System 36. Will develop major new systems in all areas of the company. Excellent opportunity to work in a small environment with room for promotion to the suburbs of Seattle. To $35,000.

COBOL Programmers—*IMS DB/DC Training* (351-09) One of the largest employers of data processing professionals in the Seattle area has multiple openings for DOS or MVS, COBOL Programmers with a minimum of one year experience. This firm offers extensive in-house training in IMS DB/DC skills. Salaries range from $25,000–$30,000.

Senior Big 8 Consulting (351-10) Join a Big 8 firm which is a leading provider of consulting services in all areas of business in the Pacific Northwest. Five or more years experience in an IBM mainframe environment including CICS, DL/I or IMS DB/DC. Fourth generation languages, micro's and structured design techniques are helpful. To $50,000.

Sales Representatives—*Earn $100,000* (351-11) Major software vendor for mainframe and minicomputer sales seeks a professional with a minimum of five or more years of proven sales experience in the hardware and/or software markets. New Pacific Northwest territory. To $75,000 or 100% of quota.

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Data Processing

PROJECT MANAGER

We are seeking an individual to assume a leadership role in the development and support of our VAX based systems. Responsibilities will include the development of short and long range data processing plans, implementation of improved systems, along with staff development and education.

The successful candidate must have a minimum of 7-10 years of experience in data processing to include 2 years' experience managing multiple projects and recent experience in the development of an on-line system. At least 5 years' experience with VAX/VMS and strong COBOL skills required; working knowledge of INFORM and/or Application Factory helpful, but not required. Excellent problem solving and communication skills are essential.

PROGRAMMER/ANALYST VAX/VMS

This challenging position requires an individual with 4-6 years of VAX/VMS experience to develop specifications for programs and system enhancements. In addition, the individual will write, test, implement, and document new programs. This individual will work closely with user departments and should possess good communication skills. Experience in the development of an on-line system preferred. A strong working knowledge of COBOL is required; knowledge of INFORM and/or Application Factory is a plus.

Consolidated Group offers a comprehensive salary and benefits package including profit sharing, tuition reimbursement, medical, dental, and life insurance, liberal vacation policy and more.

If you are interested in the above opportunities, please send resume in confidence to Lisa Trombetta, Employment Representative, Consolidated Group, Inc., P.O. Box 9191, Framingham, MA 01701-9191. An Equal Opportunity Employer M/F. Principals only.

CONSOLIDATED GROUP

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Mass Executive Office of Environmental Affairs seeks Systems Analyst to assist in selection of hardware and software for distributed data processing network delivering RDBMS, GIS, and OA capabilities to 400 end users. Applicants must have experience with Scientific/Engineering Mini and Mainframe systems, relational data base management systems, communication networks and competitive procurements. Technical knowledge of a wide variety of hardware systems and their capacity to run desired application software while meeting performance criteria a must. Compensation $60,000 to $75,000 for 1 year appointment with potential for permanent position. Send resume to:

Rick Trogdon
MASS EOEA
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Boston, MA 02202

Software Design Engineer for development of user-friendly hospital care management systems. Conduct R&D, prototype development, field-tests for networking system for data base sharing. MS-DOS/OS Window software development; replicated file systems for network data protection. Req. Bachelor's Degree in Computer Science plus 2 years exper. R&D computer software OR Master's Degree in Computer Science; thorough knowledge software ("C", INTEL assembly language); exper. or training using operating systems (MS-DOS, Unix). Req. exper. or training in data structuring; training or exper. in use of diagrams, utilities for software devel.; exper. or training use of windowing program environments (MicroSoft Windows); exper. or training use "C" language for access to Unix; req. training or exper. development distributed processing and replicated file systems for data base protection; must have training or exper. software devel. for computer networking; exper. or training technical report writing. Applicants must have completed at least one prototype computer software development project, as student or employee. Job Site/Interviews: Carlsbad, Del Mar/La Jolla. Salary: $31,200 per year. Applicants send this ad and your resume to: Job #ON 14482, P.O. Box 9560, Sacramento, CA 95823-0560 not later than February 15, 1988.

COMPUTER ANIMATION/VIDEO PRODUCTION: College of Design, Architecture, Art and Planning, University of Cincinnati. Tenure track full-time Assistant Professor to provide instruction in Fine Arts applications of computer animation and video production, to advise and provide support for film/video computer animation area, and function as liaison between School of Art faculty and DAAP Computer Graphics Center. Expected to teach approximately 18 contact hours per week of instruction and/or advanced instruction, provide service as necessary to University and community and to continue pursuit of their professional/creative interests. M.F.A. or equivalent in a relevant field of study and demonstration of continuing professional involvement in computer animation and video production as a fine artist required. Experience in 16mm film production desirable. Submit examples of 3/4" and/or 1/2" video cassettes and 16 mm film work if available, resume, three references and a post paid returnable container by February 22, 1988 to: Director, School of Art, DAAP College, University of Cincinnati, Cincinnati, OH 45221-0016. An Equal Opportunity/Affirmative Action Employer.

ULTRADATA Corporation markets and supports advanced computer systems to financial institutions nationally, and recently relocated its Head Office to Pleasanton.

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[illegible] PROGRAMMER

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Experience in pick systems application programming required.

Salary will commensurate with experience. Excellent benefits are offered, and you will be working in beautiful new offices.

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Kevin Pendergraft
Manager, Software Services
Ultradata Corp.
5030 Franklin Dr.
Pleasanton, CA 94566
(415) 463-8361

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CMSI

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Responsible for the design, implementation & testing of electronic CAE software. Design & implement core simulator for logic simulation, real-time simulation & timing verification. Design & implement algorithms for concurrent fault simulation, fault coverage analysis & testability analysis. Implement netlist, base map, table & hardware description language interfaces to simulator. Duties performed on UNIX & VMS operating systems in C, PASCAL & or PL/1 programming languages. Master degree in computer science. At least 1 year experience with CAD/CAE workstations, CAE software development, VLSI logic & circuit simulation & extraction from schematic database & continuity verification. PASCAL, C, VMS/UNIX & graphic programming is required. The 1 yr experience shall include application of software use for design rule checks, electrical rule checks & layout parameters. $ to $[illegible],000/yr. Resume: 7310 Woodward Ave., Rm. 418, Detroit, MI 48202. Ref: #1388. Employer Paid Ad.

MARKET RESEARCH ANALYST
Software Products and Services (NYC)

Responsible for developing, implementing and directing sophisticated market research studies pertaining to sales of company's operational line of software products and services. Duties include: Formulating data gathering methods, collecting, classifying and analyzing technical and statistical financial and marketing data. Utilizing study results for structuring marketing strategies, forecasting marketing trends, determining client preferences and conducting comparative studies regarding marketing, pricing and distribution methodologies. Assisting on promotional and advertising approaches, preparing and presenting reports and responsibility for marketing/sales budgeting and control. Responsible for developing and implementing marketing program for company's expansion into Malaysia, China and South East Asia. A BA in marketing, 2 years experience, 40 hrs/wk, $40,000/yr. Resume/letter in dept. PM178 Room 501, One Main Street, Brooklyn, NY 11201.

SYSTEMS ANALYST

40 Hours per week
8:30 A.M. 5:30 P.M.

$35,000.00 per year

Analyze business problems for application to electronic data processing systems requirements to determine electronic data processing systems abilities for workloads. Clarify existing system, design new application software for EDP systems, create tests to analyze data and monitor all new systems and software. Minimum requirements: B.S. Computer Science, 1 year experience as Systems Analyst, 4 years experience as Programmer Analyst. Experience on IBM Mainframe Computer, Information Management Systems Programming. Occupational experience must include 2 years experience in IBM Mainframe COBOL, batch programming, CICS COBOL programming, and DOS/VSE operating system. Submit resume only to: Job service of Florida, 701 S.W. 27th Avenue, Room 18, Miami, FL 33135 REF: Job Order FL5[illegible].

VAX SYSTEMS PROGRAMMER

$50,000

Major banking firm requires VAX/VMS systems programmer with 2+ yrs in systems support, systems performance/tuning, software installation, DECNET & ETHERNET. Work in super environment.

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Portland, ME 04112
(207)773-4708

1000 DP Opportunities

[illegible]

PROGRAMMER/ ANALYST

Fortune 500 manufacturer has opening for experienced Programmer Analyst. Successful candidate will have 3+ years manufacturing experience including MRP/DRP and bill-of-materials using CICS command level programming in a MVS environment.

Excellent pay and benefits; growth potential; state-of-the-art software/hardware.

For confidential consideration send resume to:

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Attn: Judson Vines

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Customer Support & Systems Assurance Managers

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Must be able to design and develop sophisticated software and systems for telecommunications equipment, especially the design and development of ISDN and/or related Service Digital Network) telecommunications application software. Coordination of testing. Testing on an INTEL 8086 Centrex unit, using IBM 3084-YBZ, SL-TEL 1210E with 8086 ASSEMBLER programming language. Bachelor's Degree is required in Computer Science, Electrical Engineering or related degree. An advanced degree accepted in lieu of experience but must have knowledge of telecommunication software applications. Minimum of 1 year experience in job offered. 40 hours per week; $40,280.12 per annum. Send resume to:

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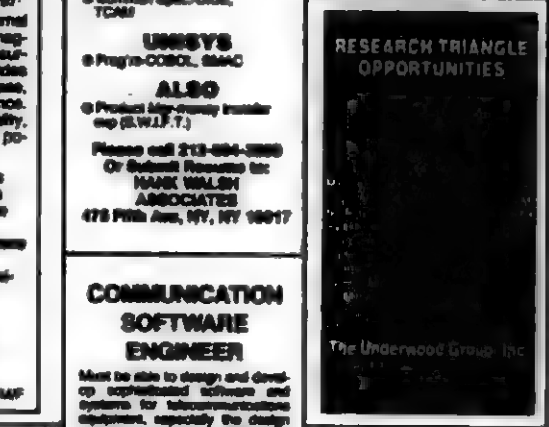

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SYSTEMS ANALYSTS should have a minimum of 7 years experience with large relational database systems for a computer manufacturer. Other mandatory experience includes customer pre-sales work, proposal preparation, and presentation skills. Knowledge of UNIX desirable, large system data capture and database installation and support experience preferred as is "document" processing experience including data capture techniques.

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Attn: Bob Santangelo or Bruce Merry

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Job consists of writing programs to assist and increase productivity of Traffic, Accounting, Operations, Maintenance, and Sales Depts. By analysis of data bank on NCR Tower 32 Unix system. Assist data entry personnel with problems of frozen screens, printers, telephone transmission and other data entry problems. Perform maintenance on NCR Tower 32, PC's, CRT's, Printers, Multiplexers, and Modems. Design systems for maximum utilization of CRT's including installation of equipment for expansion to areas of the office not presently wired for CRT's. Repair cables and system wiring. Coordinate implementation of Vendor maintenance to system. Will be responsible for integrity of hours of service program and compliance with U.S. D.O.T. hours of service rules. Maintain on-line system during peak operating time from 5:00 p.m. to midnight. Applicant must have full knowledge of Tariffs of the National Motor Freight Classification, Central States Motor Freight Bureau, Middlewest Tariff Bureau, Indiana Rate and Tariff Bureau. Must also have full knowledge of the U.S. D.O.T. regulations with special emphasis on hours of service. Applicant's education must include the successful completion of at least 2 years of college with a major field of study in Electrical Engineering, six months of computer programming on NCR Tower 32 Unix system, and various PC's. Experience must include 2 years of work as an Electronic Repair Technician. 45 hours per week from 3:00 p.m. to 1:00 a.m. at $12.85/hr basic and $18.98/hr overtime. An Equal Opportunity Employer, I.D. 3086048. Send Resumes with social security number to Indiana State Employment & Training Services, 10 N. Senate Ave., Indianapolis, Indiana 46204. Attn: W.F. Shepherd, Aids Certification Specialist.

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POSITION:

An opening exists for a manager of a large scale computer animation and visualization film/video-tape facility at a major US university. This facility is in the planning stage currently and will grow to have an annual budget in excess of $3M with an operating staff of 10 to 20 people. The responsibilities of this position include the management of personnel (both artistic, technical and film and video staff), the organization and maintenance of the budget, the scheduling of projects and client contact (both scientific and technical). The annual salary is $58,000.

REQUIREMENTS:

Bachelor's degree in any field.

Experience as a producer which includes:

- Five years of direct management experience of live action and/or computer animation/special effects in television production.
- Two years experience in management, at the producer or executive producer level, of a computer animation facility. Responsibilities should include the direct management of ten or more employees and an operating budget in excess of $2M.
- Experience in project analysis, planning and scheduling of scientific, technical, industrial and theatrical productions, and contract negotiation.

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This is an employer paid ad. Applicants should send a resume to Ms. Wanda Byrd, Illinois Department of Employment Security, 402 N. Randolph, Champaign, IL 61820 Ref No. 1091117005.

SENIOR DSP ARCHITECT - High-Tech company located in the Northeast is looking for Senior DSP Architect. Qualified applicant must possess M.S. in Electrical Engineering and 2 years of experience. The five years of experience in the job utilized can be satisfied through a Ph.D. in Electrical Engineering. Applicant will have primary responsibility in the area of Digital Signal Processing as it relates to the development of Architectures to support Digital Signal Processing, Algorithms and applications of Signal Processing and Communication Systems. The applicant will be responsible for the implementation of pipelined architecture to achieve high performance Digital Signal Processing data paths as evidenced by: 1) Iterative optimization of data-path for pipelined operation, 2) interfaces to micro-code structures, and 4) development of software benchmarking including performance results from the implementation of pipelined architecture. The applicant must perform system and simulation specifications by SCS SDT tools. 40 hours a week, plus overtime as needed. Salary $45,000 to $55,000. Mail resume to: Employment Security Department, U.S. Division, Attn: AEC Shift Supervisor, Olympia, Washington 98504.

SENIOR PROGRAMMER/ ANALYST

Start-up opportunity in new facility! A major Midwest manufacturing facility seeks an experienced mid-systems programmer with 5+ years of COBOL and IMS DB/DC in an MVS environment. Must also have 2+ years of manufacturing applications background. Good relocation package. Excellent benefits! Great Job! Salary to $40,000.

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Paul DiGiorgio
P.O. Box 2965
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SOFTWARE MANAGER (International Technical Manager) - Partake in analysis, design, and development of database products for international markets. Require Bachelor's and three years experience including database product development, porting/conversion, C and IBM PC/DOS. Salary $35,000 per annum. Job location: Torrance, CA. Resume to: CW-89019 Computerworld Box 9171 Framingham, MA 01701-9171.

SOFTWARE OPPORTUNITIES

APPLICATION PROGRAMMER

National wholesale food distribution company in Central Texas seeks an application programmer. Programmer/ Analyst needed to support large development project in this fast growing grocery distribution company. Programming environment is MVS/XA, COBOL, both batch and CICS. Minimum of 1 year experience in this environment is required.

Interested and qualified applicants please send resume to:

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Experience installing, maintaining, and tuning VM operating system required. Primary responsibility is VM, but experience with MVS/XA, VTAM, NCP, CICS, and IDMS beneficial. Very stable company with good benefits. Salary $30K to $41K. EOE. Send resume to:

Employment Supervisor
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SENIOR SYSTEMS ENGINEER/ANALYST. Responsible for developing fault-tolerant mechanisms and real-time distributed systems incorporated into the transaction processing systems. Must have B.S. in engr/computer engr., 3 yrs exp. as Systems Engr/Analyst and background in X Series or S 7000 Architectures. MCP/COMS structures, BNA structures, and NEWP languages. $3,400/mo. 40 hrs per wk. Job site/interview: Irvine, CA. Send this ad and your resume to Job #MLU14040, P.O. Box 9669, Sacramento, CA 95823-9669 not later than 2/14/88.

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Sr. Computer Tool Pgmr (Robotics)--2 yrs college in Eng. or Comp Sci, + 2 yrs exp as Sr. Pgmr of Robotics functions in furniture mfg. 7 a.m. - 4 p.m. M-F; Sat: $21,000/yr. Apply with references to: Job Svc of Fla. 1307 N. Monroe St., Tallahassee, FL 32302. #FL5649710.

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MARKETPLACE

IBM: Smoke and fire

PC XT prices fall as new units enter market; AT demand, prices strong

BY ELIZABETH LOZANO
BOSTON COMPUTER EXCHANGE CORP.

IBM Personal Computer XT models took a dramatic price tumble in the week ended Jan. 22 as the release of more new units into the marketplace pushed prices lower.

The PC XT Model 086 closed down, at $1,325, while the XT Model 089 fell to $1,675. The Model 089 remains a hot commodity, fueling the strength of DOS. DOS is taking on a new meaning — as an acronym for "Dies Only Slowly."

While the Model 089 was on fire, the PC AT Model 339 was smoking. The Model 339 experienced an increase in demand as large volume vaporware supply stimulated resellers and users alike. On Jan. 22, the Model 339 was trading at $3,625.

In other IBM news, the PC Convertible, which has been the focus of laptop rumors for several months, is currently creating an exporters' panic.

The PC Convertible has not been a strong seller in either the primary or the secondary market. Any new Intel Corp. 80286 and 80386-based laptops from IBM are going to have to be more impressive than the "Portable Peanut." In addition, IBM is going to need a foothold in the laptop market, if it is truly going to be in touch with tomorrow.

Compaq smouldering

Compaq Computer Corp. trading was smoldering this week in comparison to IBM's fire. The Portable I closed up marginally, at $725, representing one of the least expensive ways to get a portable. The Portable II, in contrast, closed down, at $1,700, as power portable users upgrade to smaller and faster models. The Portable III closed up, at $2,675, in the face of tight supply conditions and steady demand.

Deskpro 286 sales were strong throughout the week of Jan. 18. The Deskpro 286, which features 640K-byte random-access memory, an amber monitor and a 20M-byte hard drive, closed up $25, at $2,200.

Deskpro 386 demand continues to rule the 386 DOS world. The Deskpro 386 closed even at $4,375, with single-unit transactions favoring trading.

Apple: Alive and well

Apple Computer, Inc. trading was heavy this week, as users and resellers shared their excitement about the long overdue formal alliance between Apple and Digital Equipment Corp.

"The complete acceptance of the Macintosh into the corporate world is just around the corner," one reseller remarked. Another said, "This should make a booming market in both Apple and DEC gear."

Apple's 512E closed down, at $975, experiencing a decrease in single unit demand. The Mac Plus closed even at $1,300, struggling to maintain its value in the face of diminishing demand. The phones continue to ring off the hook for Mac II and Mac SE units. Supply is tight for used models, and new street prices for the Mac II and the Mac SE are competitive.

The Boston Computer Exchange can be reached at 800-BOCOEXX, or 617-542-4414 in Massachusetts.

The BoCoEx Index

Closing prices report for the week ending Jan. 22, 1988

INFORMATION PROVIDED BY THE BOSTON COMPUTER EXCHANGE CORP.

Withdrawal of upgrades spurs 4381 price drops

BY SUSAN GANNON
INTERNATIONAL DATA CORP.

On Dec. 15, IBM withdrew upgrades from the 4381 Models 1, 2 and 3 to the Models 11, 12, 13 and 14. It was these attractively priced upgrades that falsely held up values on the original 4381s.

Used market prices have fallen to reflect the withdrawal of the upgrades of the Model 11, 12, 13 and 14 machines. The 4381 M1 was trading for $163,000 (44% of list price) at the end of October and has fallen to $138,000. Retail values for a 4381 P2 in October were 34% of list price, or $190,000, and are now 28%, or $154,765. A 4381 P3 is currently available for 33% of list price, or $276,616.

Last month, IBM announced that volume shipments of 4381 Model Groups would be available immediately and said 4381 Models 23 and 24 will ship in March.

International Data Corp. has heard that some users participated in an incentive program whereby they took an interim Model 11, 12, 13 or 14 machine with the understanding that they would receive an upgrade to a Model 21, 22, 23 or 24 in the fourth quarter. If this is true, IBM must realize that its customers will be wary of similar programs in the future.

For more information, call IDC's Terri LeBlanc at (617) 872-8200.

IBM mainframes — 4381s

Current fair retail market value

	Date shipped	MIPS*	List price	Percent of market value
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4381 P2	4Q 1983	2.8	$552,731	28
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4381 P13	April 1986	3.7	$447,731	58

* Millions of instructions per second

INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

Many factors lead to fall of 3083

BY SANDRA IAFOLLA
INTERNATIONAL DATA CORP.

The IBM 3081, 3083 and 3084 market is on the decline, with values falling off 20% or more from year-end 1987 prices.

This drop can be attributed to a combination of factors, including an increasing supply of these machines as a result of lease expirations and IBM's 3090 sales push, a diminishing demand as MIS managers stall hardware acquisitions while they wait for the 3090 F series announcement and the increasing supply of used 3090 machines with which lessors must contend.

The value for the 3083 Model E now lies primarily in memory and channels. Used prices for the Model E have dropped to less than $100,000. The larger uniprocessor 3083 Model J continues to hold fairly steady, having dropped approximately $80,000 since last November. Dollar value differences between the 3083 Model JX and 3083 Model J — as well as other 3083 models — are approximately $25,000.

IBM 3081 Model K and 3084 Model Q machines are readily available, with a substantial number of leases set to expire in the second quarter of this year.

These lease expirations, in conjunction with yet another 3090 announcement, will put increasing downward pressure on used 3081, 3083 and 3084 values this year. It is expected that the 3090 hardware and software enhancements will finally offer a meaningful differentiation between the 3090 and the 3081, 3083 and 3084 families.

In the meantime, IBM is doing a tremendous job of controlling the 3090 market. Aggressive on-site test allowances, deferred payments, extended warranties, increased Volume Procurement Amendment credits and reduced software and engineering support have all been reported.

The end result of IBM's sales effort is that a number of 3090 machines are available on the secondary market. It is not uncommon to have some machine availability at this point, but the supply of some machines is greater than normal.

The market value of a Model 200 is determined by the list price of the newer Model 200E, accounting for the basic differentiating features between the two machines. Sales incentives put the retail and wholesale used prices for the Model 200 at approximately 73% and 70%, respectively.

The price of 3090 models other than the E models will once again have to drop to compete against the new F machines, which offer improved price/performance, and the 3090 Model E boxes, which will be more readily available on the secondary market this year.

For more information, call IDC's Terri LeBlanc at (617) 872-8200.

IBM mainframes — 30 series

Current fair retail market value

	Date shipped	MIPS*	List price	Percent of market value
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3081 Model K	2Q 1982	13.5	$3,940,731	13
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3090 Model 200	August 1985	27.2	$4,584,900	73

* Millions of instructions per second

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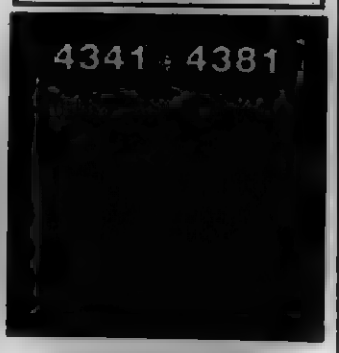

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Training

On-site training touted as cost cutter

BY NANCY BLUMENSTALK MINGUS
SPECIAL TO CW

Although the type of technical training provided by MIS organizations varies depending on the firm's needs, many managers find on-site programs more cost-effective than programs conducted by contractors at outside locations.

"For programmers, we find that the combination of courses from Deltak and a supplemental reading list that we developed is a more economical way to provide training than sending them out to school," says Ed Culliton, manager of information systems at Acme Electric Corp. in Cuba, N.Y.

The cost of a seminar and travel expenses are often too high for managers to justify sending the bulk of their staff members for technical training. For example, mainframe-based training provided by an independent contractor on-site can cost about $4,000 for a class of 10 to 12 people. The same type of course held off-site by a vendor costs about $1,500 per person for one week of training.

Despite the economic issues, some professionals prefer off-site courses. "We have people who think that we are doing them a disservice by not sending them away for training, but there are pros and cons to that," Culliton says.

Electronic training

Many organizations contract with vendors such as ASI/Deltak in Naperville, Ill., and use video and computer-based training (CBT) courses largely as introductory material.

Video and CBT courses are also used to teach operating system concepts, especially in organizations that are going through conversions. Some training vendors offer special one-year IBM MVS conversion video and CBT training packages.

These courses permit companies to provide access to conceptual material without signing a long-term contract with a vendor.

For example, Moog, Inc., an East Aurora, N.Y.-based aerospace company, uses leased CBT courses for end-user conversion training. The company recently implemented a CBT program to train more than 200 IBM VM users on how to use MVS.

"We didn't have anyone available in-house who was qualified to do the training," says Joe Brem, information center supervisor. "Because we had a large number of people to train, classroom training was too burdensome and too expensive. Logistically, it was easier for people to do it on their own," he adds.

Shelfware

Off-the-shelf training packages don't work in all cases. "In the personal computer environment, if people are not partially familiar with computers, they get confused by [video] programs from vendors," Culliton says.

Acme's documentation specialist is currently teaching PC courses on a part-time basis.

Some managers go a step further, designing their own training programs to more closely address their individual needs. However, others are able to implement customized courses with the help of a vendor.

"Ninety percent of our training is done through contract," says Bob Hofstader, manager of education development at Exxon Corp. in New York. "We have a senior computer education administrator who works with external contractors to design a program which is specifically geared towards our learning objectives."

Blumenstalk Mingus is a free-lance writer based in Buffalo, N.Y.

February 15 COMPUTERWORLD Training Section

What percentage of the MIS budget is allocated for training? How do managers justify training expenditures?

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UNIX SYSTEM V • 'C'

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*UNIX System Fundamentals for Non-Programmers	January 6-8 February 17-19 March 16-18 April 20-22 June 1-3 June 29-July 1 August 10-12 September 28-23 October 26-28 December 7-9	January 13-15 March 23-25 June 8-10 August 17-19 September 28-30 December 14-16	January 27-29 April 6-8 June 22-24 August 31-September 2 October 12-14	$985
*UNIX System Fundamentals for Programmers	January 18-20 February 22-24 April 4-6 May 2-4 June 6-8 July 18-20 August 22-24 October 3-5 November 7-9	January 18-20 March 28-30 June 13-15 August 22-24 October 3-5	February 1-3 April 11-13 June 27-29 September 5-7 October 17-19	$985
*Shell as a Command Language	January 21-22 February 25-26 April 7-8 May 5-6 June 9-10 July 21-22 August 25-26 October 6-7 November 10-11	January 21-22 March 31-April 1 June 16-17 August 25-26 October 6-7	February 4-5 April 14-15 June 30-July 1 September 8-9 October 20-21	$380
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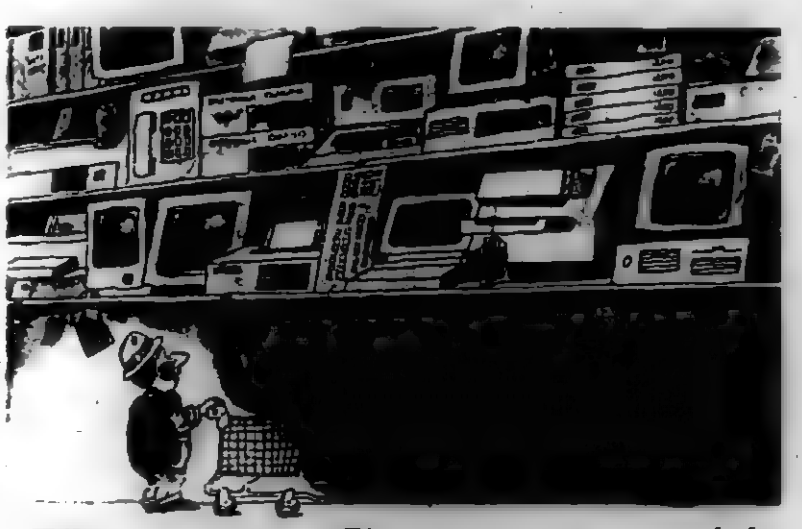

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May 23	Data Communications	May 6
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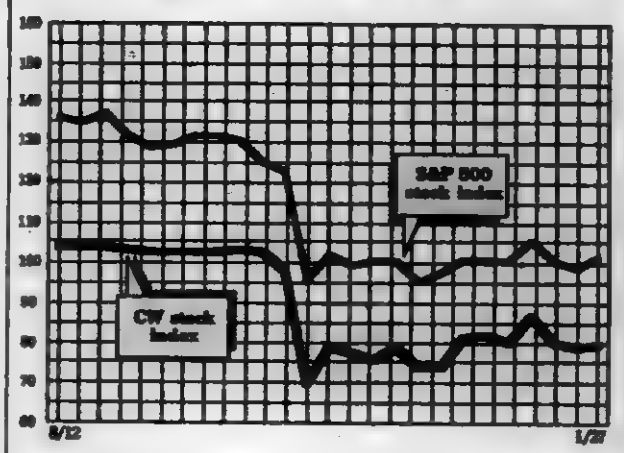

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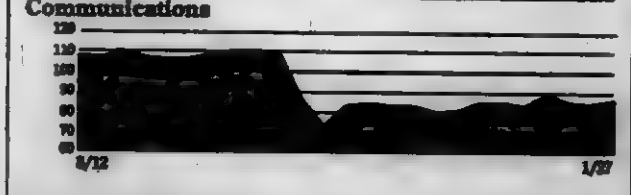

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EXCH		52-WEEK RANGE (1)		PRICE CLOSE JAN. 27 1988	WEEK NET CHANGE	WEEK PCT CHANGE

Communications and Network Services

N	AMERICAN INFO TECHS CORP	103	74	92	6.3	7.3
N	ANDREW CORP	19	11	15	0.1	1.0
O	ARTEL COMM CORP	5	2	2	-0.3	-13.9
N	AT&T	36	25	28	0.8	3.1
O	AVANT GARDE COMP INC	3	2	2	-0.1	-6.9
O	AVANTEK INC	10	6	7	0.1	1.9
N	AYDIN CORP	15	6	13	1.0	8.2
N	BELL ATLANTIC CORP	80	56	76	4.3	6.5
N	BELLSOUTH CORP	44	32	43	2.4	6.4
O	COMPRESSION LABS INC	8	3	4	0.8	22.1
O	COMPUTER NETWORK TECH	6	2	2	-0.1	-3.1
O	CONTEL CORP	45	25	35	1.6	5.2
O	DATA SWITCH CORP	10	4	6	0.3	4.2
O	DIGITAL COMM ASSOC	15	8	10	-1.0	-8.7
O	DYNATECH CORP	44	16	18	-0.8	-3.9
O	FIBRONICS INTERNATIONAL INC	11	2	3	0.0	0.0
O	GANDALF TECHNOLOGIES	11	6	8	-0.1	-2.1
O	GENERAL DATACOMM INDS	14	3	4	-0.2	-6.1
N	GTE CORP	45	28	37	1.3	3.5
O	INFOTRON SYS CORP	12	5	7	0.8	11.5
N	ITT CORP	65	42	48	-0.9	-1.9
O	M A COM INC	16	7	10	0.3	2.6
O	MCI COMMUNICATIONS CORP	12	6	11	0.3	2.4
O	MICOM SYS INC	15	7	11	1.4	14.3
O	NETWORK SYS CORP	15	7	7	0.0	0.0
N	NORTHERN TELECOM LTD	24	14	19	0.1	0.7
O	NOVELL INC	35	12	22	1.5	7.1
N	NYNEX CORP	78	58	68	2.8	4.0
N	PACIFIC TELESIS GROUP	35	25	28	1.8	6.6
O	PARADYNE CORP	9	4	4	0.0	0.0
N	PENRIL CORP	5	1	3	-0.3	-7.1
N	PLESSEY PLC	41	28	28	-2.1	-7.5
N	SCIENTIFIC ATLANTA INC	30	8	15	0.5	4.3
N	SOUTHWESTERN BELL CORP	48	32	37	1.5	4.3
O	3 COM CORP	28	13	19	0.4	2.0
O	TIMEPLEX INC	21	17	19	1.5	4.9
N	UNGERMANN BASS INC	15	7	8	1.0	14.0
N	U S WEST INC	80	62	68	2.1	6.3

Computer Systems

O	ALLIANT COMPUTER SYS	37	5	7	-0.3	-3.3
O	ALPHA MICROSYSTEMS	6	3	4	0.0	0.0
O	ALTOS COMPUTER SYS	17	9	11	-0.1	-1.2
A	AMDAHL CORP	50	19	30	0.8	2.5
O	APOLLO COMPUTER INC	38	9	14	2.1	18.7
O	APPLE COMPUTER INC	60	26	40	0.0	0.0
O	BOLT BERANEK & NEWMAN	30	12	15	-1.3	-7.7
O	BRITTON LEE INC	6	1	2	0.0	0.0
O	COMPAQ COMPUTER CORP	78	28	48	0.9	1.9
O	COMPUTER AUTOMATION INC	17	6	11	0.3	2.4
O	COMPUTER CONSOLES INC	12	2	8	0.3	5.1
O	CONCURRENT COMP CORP	34	11	16	-0.4	-2.3
O	CONTROL DATA CORP DEL	38	16	21	0.8	3.7
O	CONVERGENT TECH	12	3	3	-0.1	-3.8
O	CONVEX COMPUTER CORP	22	6	8	0.1	2.2
O	CRAY RESH INC	135	47	67	1.8	2.7
O	DAISY SYS CORP	13	5	7	0.5	7.4
N	DATA GEN CORP	36	16	26	2.3	8.9
N	DATAPOINT CORP	9	3	5	0.3	5.9
N	DIGITAL EQUIP CORP	200	110	123	7.5	6.5
N	FLOATING POINT SYS INC	17	3	4	0.0	0.0
N	GOULD INC	24	6	11	-1.8	-14.0
N	HARRIS CORP	43	22	27	0.8	2.9
N	HEWLETT PACKARD CO	74	38	58	2.8	5.3
N	HONEYWELL INC	91	49	69	1.8	2.1
N	IBM	176	102	113	2.4	2.2
O	INFORMATION INTL INC	17	6	11	0.0	0.0
O	IPL SYS INC	3	2	2	0.0	0.0
O	MASS COMPUTER CORP	14	5	6	0.0	0.0
N	MATSUSHITA ELEC INDL LTD	196	85	174	-2.1	-1.2
O	MEGADATA CORP	7	3	3	-0.1	-1.2
O	MENTOR GRAPHICS CORP	30	14	20	0.0	0.0
N	NBI INC	14	4	4	0.3	8.0
N	NCR CORP	87	50	68	0.9	1.3
N	PRIME COMPUTER INC	31	12	16	1.4	9.5
O	PYRAMID TECHNOLOGY	12	5	6	-0.3	-2.9
O	STRATUS COMPUTER	41	15	21	0.8	3.7
O	SUN MICROSYSTEMS INC	46	14	32	-1.3	-3.8
O	SYMBOLICS INC	6	1	2	-0.1	-4.8
N	TANDEM COMPUTERS INC	38	17	19	-1.3	-4.8
N	TANDY CORP	57	28	33	-0.3	-0.7
N	ULTIMATE CORP	37	18	18	0.0	0.0
N	UNISYS CORP	48	24	28	2.4	7.7
A	WANG LABS INC	19	10	14	0.1	0.9

Software & DP Services

O	ADVANCED COMP TECH	6	1	2	0.3	15.4
N	AGS COMPUTERS INC	30	11	14	-1.0	-6.5
O	AMERICAN MGMT SYS INC	30	9	15	1.6	12.4
O	AMERICAN SOFTWARE INC	22	6	10	0.3	2.6
N	ANACOMP INC	11	4	7	0.3	3.9
O	ANALYSTS INTL CORP	10	4	6	0.3	3.4
O	ASHTON TATE	33	15	24	0.5	2.2
O	ASK COMPUTER SYS INC	17	6	10	2.3	30.0
O	AUTODESK INC	24	12	15	1.5	9.0
N	AUTO DATA PROCESSING	56	36	42	1.8	4.4
O	BOOLE & BABBAGE INC	12	6	7	-0.8	-9.4
N	COMPUTER ASSOC INTL INC	37	15	28	0.5	1.8
O	COMPUTER HORIZONS CORP	15	7	10	-0.3	-2.8
O	COMPUTER SCIENCES CORP	73	42	48	-0.3	-0.5
N	COMPUTER TASK GROUP INC	15	9	10	-0.3	-2.4
O	COMSHARE INC	28	12	15	-0.3	-1.8
N	CULLINET SOFTWARE INC	14	4	6	-0.1	-2.1
O	CYCARE SYS INC	10	6	7	0.5	7.4
O	DUQUESNE SYS INC	33	10	26	0.8	3.9
A	DATA ARCHITECTS INC.	17	7	9	0.0	0.0
N	GENERAL MTRS (CLS E)	61	36	38	2.3	6.3
O	HOGAN SYS INC	17	5	6	-0.1	-2.6
O	INFORMIX CORP	31	11	21	1.4	7.1
O	INTELLICORP INC	11	2	3	0.0	0.0
O	KEANE INC	10	6	7	0.0	0.0
O	LOTUS DEV CORP	40	19	28	-0.5	-1.8
O	MANAGEMENT SCI AMER	21	9	9	0.0	0.0
O	MICRO PRO INTL CORP	6	3	3	-0.1	-3.6
O	MICROSOFT CORP	79	33	55	1.8	3.2
O	MORINO ASSOCIATES INC	24	7	14	0.3	1.8
O	NATIONAL DATA CORP	34	18	28	0.3	1.0
O	ON LINE SOFTWARE INTL INC	22	9	10	-0.9	-8.1
O	ORACLE SYS CORP	19	8	13	1.5	12.8
N	PANSOPHIC SYS INC	28	11	14	0.9	6.7
O	POLICY MGMT SYS CORP	30	15	19	-0.5	-2.6
O	PROGRAMMING & SYS INC	14	7	10	0.3	2.6
O	REYNOLDS & REYNOLDS CO	30	14	17	0.0	0.0
O	SEI CORP	18	10	15	-0.3	-1.8
O	SHARED MED SYS CORP	28	19	26	2.4	10.7
O	SOFTWARE AG SYSTEMS INC	19	7	8	-0.1	-1.8
O	SOFTWARE PUBG CORP	17	5	8	0.5	7.1
A	STERLING SOFTWARE INC	14	6	8	1.8	24.5
O	SUNGARD DATA SYS INC	21	10	14	0.5	3.8
O	SYSTEMATICS INC	20	10	18	0.5	2.9
N	SYS. SOFT INC.	24	7	12	-0.8	-4.7
O	VM SOFTWARE INC	48	7	8	0.3	3.3

Semiconductors

N	ADV MICRO DEVICES INC	28	8	12	0.8	6.6
N	ANALOG DEVICES INC	28	8	12	0.8	6.6
O	ANALOGIC CORP	13	6	7	0.3	3.7
O	INTEL CORP	23	15	21	0.5	2.7
O	LSI LOGIC CORP	17	7	9	0.3	3.4
N	MOTOROLA INC	74	35	41	2.1	5.3
N	NATL SEMICONDUCTOR	22	10	14	0.3	2.3
N	TEXAS INSTRS INC	98	36	40	2.1	5.5
N	WESTERN DIGITAL CORP	36	12	12	0.3	2.6

Peripherals

O	ALLOY COMP	13	4	4	0.1	2.6
O	AM INTL INC	9	3	4	0.1	2.6
O	AST RESH INC	23	6	9	0.5	5.9
O	AUTO-TROL TECH CORP	9	3	4	0.3	7.5
O	BANCTEC INC	16	5	7	0.3	4.5
O	CIPHER DATA PRODS INC	16	4	7	0.3	4.5
O	COGNITRONICS CORP	5	2	3	0.1	3.4
O	COMPUGRAPHIC CORP	22	9	13	0.5	3.9
O	COMPUTERVISION CORP	23	7	11	0.5	4.8
A	DATAPRODUCTS CORP	24	7	8	0.1	1.5
A	DATARAM CORP	9	5	6	0.1	1.7
N	DECISION INDS CORP	13	4	11	0.1	1.3
N	EASTMAN KODAK CO	71	62	63	0.1	0.1
O	E M C CORP MASS	28	15	23	0.5	2.0
O	EMULEX CORP	9	4	5	0.3	6.5
O	EVANS & SUTHERLAND	9	5	5	0.1	1.3
O	ICOT CORP	13	3	5	0.3	6.0
O	INTERLEAF INC	24	9	15	0.5	3.3
O	KOMEGA CORP	9	1	2	0.1	6.5
O	LEE DATA CORP	10	3	3	0.1	3.7
O	MASSTOR SYS CORP	9	1	2	0.1	3.1
O	MAXTOR CORP	36	9	12	2.1	21.8
O	MICROPOLIS CORP	44	15	20	0.3	2.0
O	MINISCRIBE CORP	15	5	8	0.3	3.9
N	MINNESOTA MNG & MFG CO	94	65	76	1.6	2.1
A	MSI DATA CORP	24	12	16	0.3	1.9
O	PRIAM CORP	6	1	2	0.3	15.4
O	PRINTRONIX INC	13	7	9	0.3	3.2
O	QMS INC	27	10	15	0.6	4.7
O	QUANTUM CORP	28	8	11	0.3	2.8
O	RAMTEK CORP	6	2	4	0.1	2.6
O	RECOGNITION EQUIP INC	27	7	10	0.3	3.1
O	REXON INC	14	5	6	0.1	2.3
O	SCAN TRON CORP	14	7	11	0.3	2.8
O	SEAGATE TECHNOLOGY	46	10	15	0.3	2.3
O	STORAGE TECH CORP	5	1	2	0.1	14.3
O	TANDON CORP	7	2	3	0.1	15.4
O	TEC INC	7	3	3	0.1	2.3
N	TEKTRONIX INC	43	21	24	0.5	2.2
O	TELEVIDEO SYS INC	3	1	1	0.1	4.7
N	TELEX CORP	102	30	47	-1.8	-3.5
N	WYSE TECH	48	11	12	-1.8	-5.0
N	XEROX CORP	85	58	62	1.0	1.6
O	XIDEX CORP	16	6	6	0.3	4.8

Leasing Companies

O	CAPITAL ASSOCIATES INTERNATIONAL INC	11	4	4	0.1	10.0
N	COMDISCO INC	37	12	13	1.0	8.5
N	CONTINENTAL INFO SYS	14	5	6	0.5	7.7
O	PHOENIX AMERN INC	6	2	3	0.1	4.5
O	SELECTERM INC	6	3	4	0.3	8.9

EXCH: N—NEW YORK; A—AMERICAN; O—NATIONAL; O—OVER-THE-COUNTER; S—SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Take five

High-tech stocks catch breath, but Tandem gets gut-punched

A tumultuous Wall Street settled down and computer companies began licking their wounds in action on the New York Stock Exchange last week. Digital Equipment Corp., Apple Computer, Inc., Compaq Computer Corp., Control Data Corp. and Microsoft Corp. all made up some ground lost during recent weeks, as of trading late Friday.

But Tandem Computers, Inc. continued to pay for its announcement early last month that its December quarter's income would not meet expectations. Tandem hit a 52-week low of 17⅜ during trading Tuesday, but rebounded later in the week to reach 19 on Friday afternoon, down ¼ of a point.

Among the week's better performers, DEC was up 2⅝ points to 122¼; Control Data jumped 2¼ points to hit 22⅝; Apple was up 1¼ points to 40½; Microsoft rose 1⅜ points to 55¼; and Compaq went up 1½ points to 47. Among more modest gainers; Apollo Computer, Inc. rose ¾ of a point to 13; IBM went up early in the week then tailed off at the end amid rumors that it will cut PC prices and finished off up ⅛ of a point at 111⅜; and Prime Computer, Inc. rose ⅝ of a point to hit 15½.

JAMES DALY

Ashton-Tate takes graphics gauntlet

Package will joust with Lotus's Freelance Plus on the desk top

BY STEPHEN JONES
CW STAFF

SAN FRANCISCO — Ashton-Tate Corp. last week again challenged rival Lotus Development Corp., introducing a desktop presentation package that will go head-to-head with Lotus's popular Freelance Plus.

The $495 desktop presentation package, called Draw Applause, is the first new graphics product from Ashton-Tate's joint venture with Decision Resources, Inc. It comes more than a year after Ashton-Tate acquired the business graphics software developer.

Draw Applause is positioned as a high-end addition to Ashton-Tate's existing Master Graphics series, which was also developed by Decision Resources. While Master Graphics was designed for Intel Corp. 8086-based personal computers, Draw Applause runs on Intel 80286- and 80386-based systems.

The package requires 640K bytes of random-access memory and an IBM Enhanced Graphics Adapter card. Although Draw Applause can be operated from a keyboard or a mouse, one beta-test user said it was "literally designed with a mouse in mind."

The vendor claimed that Draw Applause can exchange files with other PC and mainframe graphics programs that are written in Computer Graphic Metafile code.

Those programs include Freelance Plus, Software Publishing Corp.'s Harvard Graphics and Computer Associates International, Inc.'s mainframe Tell-a-Graph package.

All the goodies

Draw Applause features text editing, color gradations and a library of 125 color images.

"The product hits state-of-the-art status right out of the blocks, which hasn't always happened with Ashton-Tate," said Brian Mutert, a PC software consultant who attended the announcement here.

Users gave the product high marks for its easy-to-use interface. Philip Abrams, executive vice-president of Princeton Venture Research, Inc. in Princeton, N.J., said he was able to get the product up and running even though the initial beta-test version he received came with no documentation.

But Frank West, the developer who wrote most of the program for Decision Resources and Ashton-Tate, said the product's high-end capabilities could be intimidating for first-time users. West is vice-president of Tigard, Ore.-based Communication Dynamics, Inc., which originally sold the program to Decision Resources.

Ashton-Tate also said it will reduce the price of Presentation Pack, incorporating the Master Graphics series in one package, from $595 to $495.

Facility glitch suspect as CICS/MVS upgrade delayed

BY CHARLES BABCOCK
CW STAFF

RYE BROOK, N.Y. — IBM said last week that delivery of Version 2.1 of CICS/MVS, formerly scheduled for the fourth quarter of 1987, has been deferred indefinitely.

CICS customers will have to wait until the second quarter of this year to learn when it is likely to be shipped.

"IBM needs additional time to complete implementation of the requirements on this product," said a spokesman for the IBM Information Systems Group in Rye Brook, N.Y.

Version 2.1 would provide common storage area relief for MVS/XA users by moving the CICS subsystem above the 16M-byte line that limits MVS/SP users. The common storage area is a region of MVS memory devoted to temporary storage of data and transactions until they can be routed through the CPU for processing or along communications lines to users.

"It's not like IBM to defer a major, strategic product, one that participates in Systems Application Architecture," said Robert P. Tasker, director of computing research at The Yankee Group in Boston.

He speculated that IBM has been forced to delay delivery due to the continuing technical challenge of moving CICS into 31-bit mode operation.

Version 2.1 was also supposed to incorporate Extended Recovery Facility (ERF), which would dynamically switch users on a crashing CICS system to a backup system without loss of transactions or data.

"That's biting off a big chunk. I can easily see that as the hold-up," said Tasker, who used CICS as an MIS director.

Version 2.1, however, was supposed to be available in the fourth quarter without ERF features, according to IBM's Feb. 17, 1987, announcement of the upgrade. Tasker also pointed out that IBM's CICS development resources are limited and that the firm has committed itself to providing CICS under VM for the 9370 mid-range processor.

Tasker said IBM faced a choice between disappointing CICS users with a six-month or longer delay or holding back the sales of its 9370s for lack of CICS under VM.

Barry R. Christian of On-Line Documentation, Inc., a Yorba Linda, Calif., firm that produces a CICS remote-screen access product, said IBM must be having problems getting a 31-bit mode version of CICS to work with existing 24-bit CICS applications, disregarding ERF complexities.

Bells' ONA plans ring false to some

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Several regional Bell holding companies last week announced Open Network Architecture (ONA) plans that could provide corporate managers with new flexibility in designing and managing data networks in the 1990s.

Nynex Corp., for example, said it will provide trunkside access to the local exchange office, a diagnostic channel and reconfigurable private networks as tariffed services.

However, network managers expressed disappointment that the Bell companies have refused to offer transport services independent of switching services, according to Henry D. Levine, an attorney for the Committee of Corporate Telecommunications Users and several financial services companies.

"The failure to unbundle transport imposes enormous direct costs on major data networks," Levine said, because it requires users to buy switching services that they do not need from the Bell companies.

Explain yourself

The Federal Communications Commission required AT&T and the Bell holding companies to file by today ONA plans that explain how they will unbundle their telecommunications services and offer the individual "basic service elements" to enhanced service providers — such as electronic mail and data base services — and to end users.

The FCC will accept public comments on the plans through April 8 and is expected to approve the ONA plans this fall. The services would start rolling out one year later at prices set in state tariffs, according to ONA plans reviewed last week.

In essence, ONA is supposed to allow network managers to pick and choose the basic service elements they want from the Bell operating companies. For instance, several users reportedly plan to purchase the Automatic Number Identification feature, which would improve computer security by immediately identifying anyone who dials into a data base.

In many cases, the Bell holding companies simply unbundled the features of their existing Centrex, packet and private-line services. "No one expected substantial technical realignment of the network in these plans. It's too soon," Levine said, noting that more advanced features are expected in the future.

But Levine said there are a few promising services announced in the initial ONA plans, including the trunkside access service to be offered by Nynex.

Charles P. Wehnes, staff director of ONA marketing for Nynex Service Co. in White Plains, N.Y., said several New York banks have expressed interest in the service.

However, users groups said they are upset that the ONA model developed jointly by the Bell holding companies does not separate the basic service elements from the Bell companies' end-to-end services. Under the model, ONA's basic service elements are only options to be added on top of the underlying service, called a basic service arrangement.

Levine charged that the Bell companies' ONA framework is in direct conflict with the FCC's order to unbundle the basic building blocks of the local network.

"Even under the bad scheme, there are some new services that may be very valuable," Levine said. "The problem is that we'll never see the real potential for an unbundled, open network."

Under the FCC rules that established ONA, the Bell companies must provide enhanced service providers and users with equal access to the local exchange network.

DEC ups support for IBM software

BY PATRICIA KEEFE
CW STAFF

WASHINGTON, D.C. — Further extending its reach into the IBM office, Digital Equipment Corp. last week announced support for IBM's Professional Office System (Profs), CMS Notes mail software and VM and DOS/VSE operating systems.

The announcements at the Communication Networks '88 exposition, or Comnet, here last week underscored DEC's recent statement of direction [CW, Jan. 25] supporting open systems and international standards.

Access to the VM and DOS/VSE operating systems was introduced under Decnet/SNA Gateway V1.4.

The turnkey gateway reportedly allows users to exchange information bidirectionally and share resources between DEC systems in a Decnet environment and MVS, VM and DOS/VSE systems in an IBM Systems Network Architecture (SNA) environment.

Functions supported include terminal emulation, file transfer, mail and document exchange and the ability to create distributed application programs that run between DEC and IBM systems. Other features of the Decnet/SNA Gateway include the following:

- Support for IBM's CICS/VS, IMS/VS, MVS/XA, MVS/SP, ACF/VTAM and ACF/NCP systems.
- The ability to monitor status information relative to the Decnet/SNA Gateway and SNA.

Available now, Decnet/SNA Gateway V1.4 costs $16,500.

The electronic mail gateway is the newest component of DEC's Mailbus product family. DEC already provides gateways to other mail systems, including MCI Communications Corp.'s MCI Mail, CCITT X.400 systems and DEC's VAX Message Router/P Gateway Version 1.0 for IBM's Systems Network Architecture Distribution Services and Personal Services/Distributed Office Support System mail users.

Available in March, VAX Message Router/P Gateway V1.0 is VAX/VMS layered software said to support the exchange of messages and revisable and final form documents between IBM's Profs or CMS Notes mail and DEC mail users.

Prices for the Message Router/P Gateway range from $1,500 for the Vaxstation II to $3,000 for a Microvax 2000 to $36,000 for the VAX 8800.

Shake-up

FROM PAGE 1

headquarters here last week. "This structure will create more entrepreneurship, accountability and independence in our five business units."

Industry analysts said they were intrigued by the separation of the 9370 from IBM's other mid-range machine, the System/36. Some characterized the move as IBM's realization that companies purchasing the 9370 come from a mainframe mind-set and are more interested in distributing applications throughout their organizations than in building a so-called mid-range computer.

The move to disperse various product lines in semiautonomous units surprised some MIS executives, who said they are more concerned that IBM reconcile its incompatible products. "For someone like me, there's just too much need to transcend all those different systems," said Bill Eaton, vice-president of information systems at Levi Strauss & Co. "I want to buy a single solution."

Potential confusion

The MIS manager at a large Dallas site agreed. "There's a potential confusion in the mind of the customer," the manager said. "It looks like we're going back to the old days of GSD and DPD [the General Systems and Data Processing Divisions], and there you had two different product lines competing with each other."

Akers said the company felt that with the forthcoming spate of System/36 and 38 announcements — including Silverlake, the long-rumored successor to the System/36 and 38 — the architecture needed its own business unit.

The firm's evolving Systems Application Architecture (SAA) is expected to provide consistent user interfaces, programs and communications links to IBM's three primary architectures. Yet it will take a long time to develop, analysts said, citing the decade of work IBM invested in making its Systems Network Architecture a standard. Akers called that incompatibility "yesterday's problem."

IBM established a new entity, IBM United States, to oversee the five business units. The group is headed by Senior Vice-President Terry R. Lautenbach (see story page 1). Also reporting to Lautenbach is IBM's U.S. Marketing and Services Group, formerly called the Information Systems Group.

In addition, the company elevated Executive Vice-Presidents Kaspar Cassani and Jack Kuehler to the position of vice-chairman of the board and gave both men broad oversight responsibilities.

Cassani, who continues to oversee IBM's World Trade Asia/Pacific Group and World Trade Americas Group, will serve as review executive for IBM's worldwide marketing and services. Kuehler, who headed the Federal Systems Division and was a member of the management committee, will oversee the Enterprise Systems and Technology Products units and will hold overall review responsibility for IBM United States. However, Allen J. Krowe, who was promoted to executive vice-president, was named review executive for the Personal Systems, Application Business Systems and Communication Systems units.

Akers said the reorganization is a continuation of moves made by IBM to streamline its operations and shift personnel from corporate staff positions to marketing, sales, service and engineering posts. IBM, which adheres to a lifetime employment philosophy, has reduced its worldwide work force by 15,000 during the last two years and redeployed more than 20,000 employees, Akers said.

"This is a major decentralization, a major delegation of authority," Akers stressed. "In some cases, we now have several integrated IBM companies instead of one computer and communications company."

IBM watchers and analysts agreed with the intent of the reorganization but said they are not sure a decentralized structure will enable IBM to cut costs and speed product delivery cycles. Decentralization could create more bureaucracy and even add operational costs, some said.

"When was the last time a company decentralized and cut costs and people?" asked Donald Haback, an analyst at The Nikko Securities Co. in New York. "Centralization allows you to let go of people."

Ulric Weil, a 16-year IBM employee and 12-year Big Blue watcher, said the new structure could be a morale builder for the company but might increase IBM's already bloated bureaucracy. "When you go to decentralization, the review executives will need staffs to interact with the different business units," he said. "Before you know it, you have staff, staff, staffs, and costs escalate."

Akers said that because of IBM's size, the impact of the reorganization might not be felt for years to come. "The decisions we make sometimes do not pay off for four, five or eight years."

Analysts speculated that IBM's overseas operations would be the next area to be realigned, since they have remained relatively unaffected by the recent moves.

While some analysts speculated that the reorganization positions Lautenbach as a possible successor to Akers, others contended that the situation remains hazy.

Some IBM watchers said they had expected Akers to anoint a successor by naming a president or chief operating officer to share the corporate suite. Vice-Chairmen Kuehler and Cassani are not believed to be in the running because they are 55 and 59, respectively.

Midwest correspondent Jean S. Bozman contributed to this report.

Powers that be

IBM charges three of its top executives with review responsibility for key divisions

CW CHART

Lautenbach

FROM PAGE 1

tions, both international and domestic. For the past two years, Lautenbach has devoted his energies to one of IBM's weakest and most critical areas: communications.

"For 15 years, IBM talked about communications, but it wasn't until he took over that they climbed off the IBM soapbox with ISDN, OSI and recognizing that DEC is around," said Bob Djurdjevic, president of Annex Research in Phoenix.

Lautenbach took over the newly formed Communication Products Division (CPD) in November 1985 and one year later became vice-president of the Information Systems and Communications Group, which comprised the CPD and the Entry Systems Division. Perhaps his best credential for executive advancement is the diversity of areas he has managed at the firm.

"When you look at the business lines reporting to him, he has experience across almost all of those product areas," said Frank Dzubeck, president of Communications Network Architects, a consulting firm in Washington, D.C.

A former IBM colleague said Lautenbach has a keen mind for understanding the complexity of IBM's business. "Intellect was one of Terry's greatest assets," said Thomas J. Fraser, a 17-year IBM sales employee who worked for Lautenbach in the Data Processing Division.

Terry R. Lautenbach

Fraser, now president of Computer Equipment Leasing in Port Washington, N.Y., recalled Lautenbach saying intellect was the quality he considered most important for an IBM executive. "And he was one of the better examples of that," Fraser said. "When you think of the number of skills they have to display — understanding the relationship of one technology to another, doing business in 100 different countries — it boggles the mind."

An Ohio native, Lautenbach joined IBM's Cincinnati office in 1959 shortly after graduating with a physics degree from Xavier University in the same city. He climbed the marketing rungs within the Data Processing Division for 17 years and reached the division presidency in 1976.

Two years later, at the age of 40, Lautenbach became president of IBM World Trade Americas/Far East Corp., which earned him a spot on the board of directors. He achieved a vice-president's title in 1980 and became IBM's vice-president of marketing in 1984.

Last week's promotion propelled Lautenbach to the top of the list of potential successors to Akers, according to some analysts. "Lautenbach is now the important line executive, the profit-and-loss guy," said International Data Corp. analyst Jack Hart, a 20-year IBM veteran. "It's that function that has traditionally moved into the president's and then the chief executive's job."

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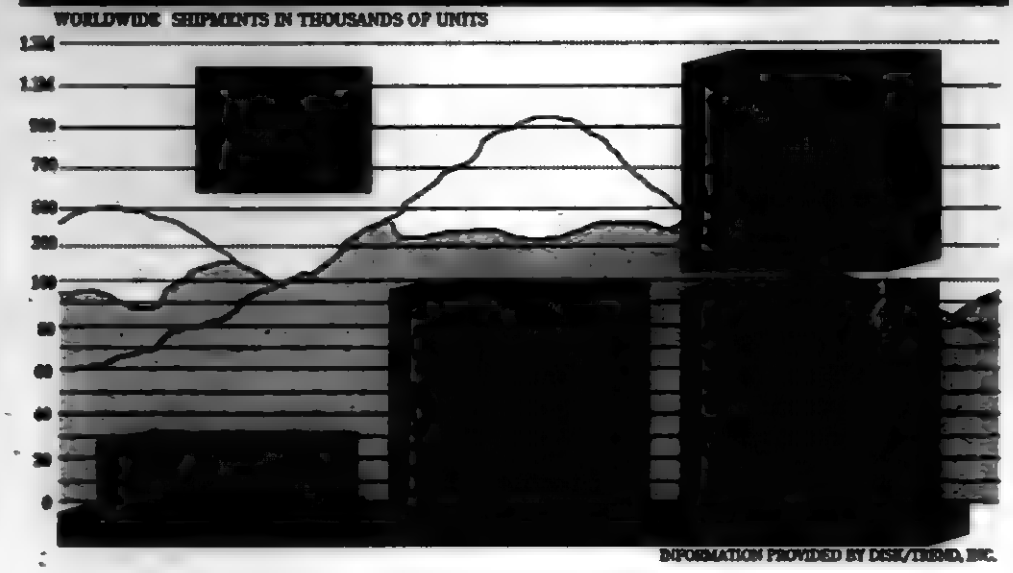
TRENDS

Optical disk drives

The hills are alive with the sound of disk drives



INFORMATION PROVIDED BY DISK/TREND, INC.

The promise of optical disks is set to become a reality by 1990, with sales soaring as users invest in erasable disks and migrate on-line applications.

Work by research firms shows a booming optical market. Disk/Trend, Inc., a Mountain View, Calif.-based research firm, and Peripheral Strategies, Inc. in Santa Barbara, Calif., are tracking the growth and the changing image of optical storage.

Disk/Trend said worldwide shipments of optical disk drives climbed from 31,700 in 1986 to 99,600 in 1987 and that they will reach 1.2 million in 1990.

Disk/Trend also forecast that revenue from those shipments will rise from $203 million to $1.4 billion.

While use of optical disks is increasing, there is a shift in the types of optical units in use. The drives most in demand in 1986 were read/write drives that utilized capacities larger than 1G byte.

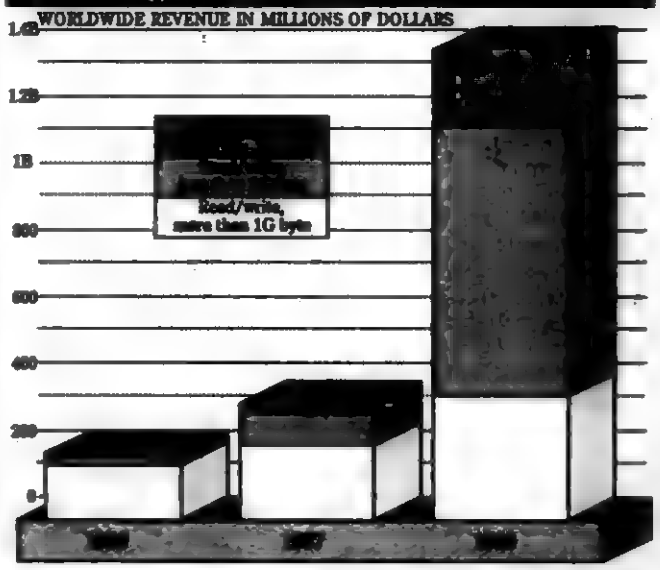
These drives will continue to be popular. But the boom areas will be read/write disks holding less than 1G byte and read-only disks, both of which are expected to attain dominant positions in 1990.

In looking at how erasable disks will be used in 1990, Peripheral Strategies said 55% will be used as fixed magnetic disks are now, for primary mass storage, and that 25% will be used for document storage.

Write-once optical disks are more likely to be used for document and image storage and on-line jukebox-style storage in 1990, Peripheral Strategies added.

JAMES CONNOLLY

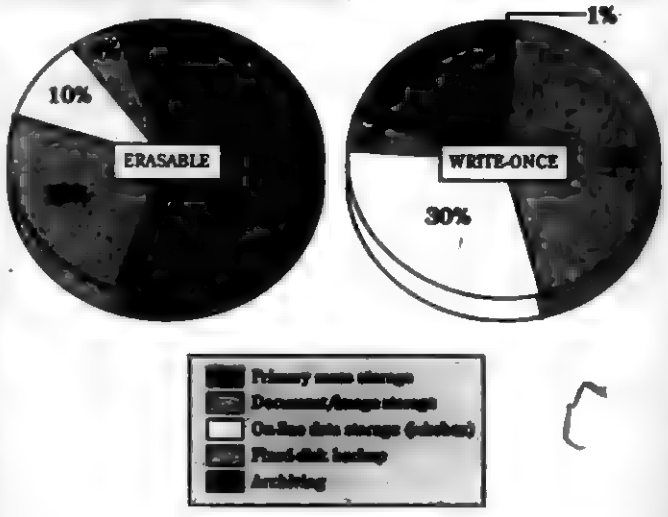
Climbing in 1987



INFORMATION PROVIDED BY DISK/TREND, INC.

Write-once and erasable disk use in 1990

APPLICATION BY PERCENT OF TOTAL USE



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CW CHARTS: AMY J. SWANSON

INSIDE LINES

Branching out. Cullinet plans to release a version of its IDMS data base management system for Unix soon, with initial availability on the Sun Microsystems platform. Cullinet wouldn't specify a delivery date, but a senior official said the DBMS will be "moved to market very quickly."

Reach out and stroke someone. AT&T last week tried to appease a group of Unix vendors that have protested its alliance with Sun Microsystems. "We have met with representatives of companies who requested this meeting, and . . . we reiterated our commitment to maintain Unix System V as an open system," AT&T said. Some of the reps, however, weren't satisfied with AT&T's words. "The meeting was positive in that there was a discussion," said Mark Hatch, marketing manager for software products at Apollo Computer. "But many of us walked away even more concerned." Hatch said competing vendors are upset that "Sun is now claiming it just about owns Unix."

Giving us Dpeak. Viewers of a pre-beta-test version of Ashton-Tate's long-awaited Dbase IV say the product looks like it will be "extremely competitive in the marketplace," with superior implementations of SQL and Query By Example. Those sources expect to get beta-test copies in the next two or three weeks and a formal announcement in the next 60 days. Meanwhile, speculation was hot and heavy last week that Ashton-Tate will announce the acquisition of a high-end three-dimensional spreadsheet for Apple's Macintosh Feb. 10. The company is also reportedly close to wrapping up a deal on a high-end word processor for the Mac.

Texas barbecue flavored. Compaq will announce its version of OS/2 in New York Feb. 17, according to one source. Sources say the company will have several major applications developers present to demonstrate their products under Compaq's version.

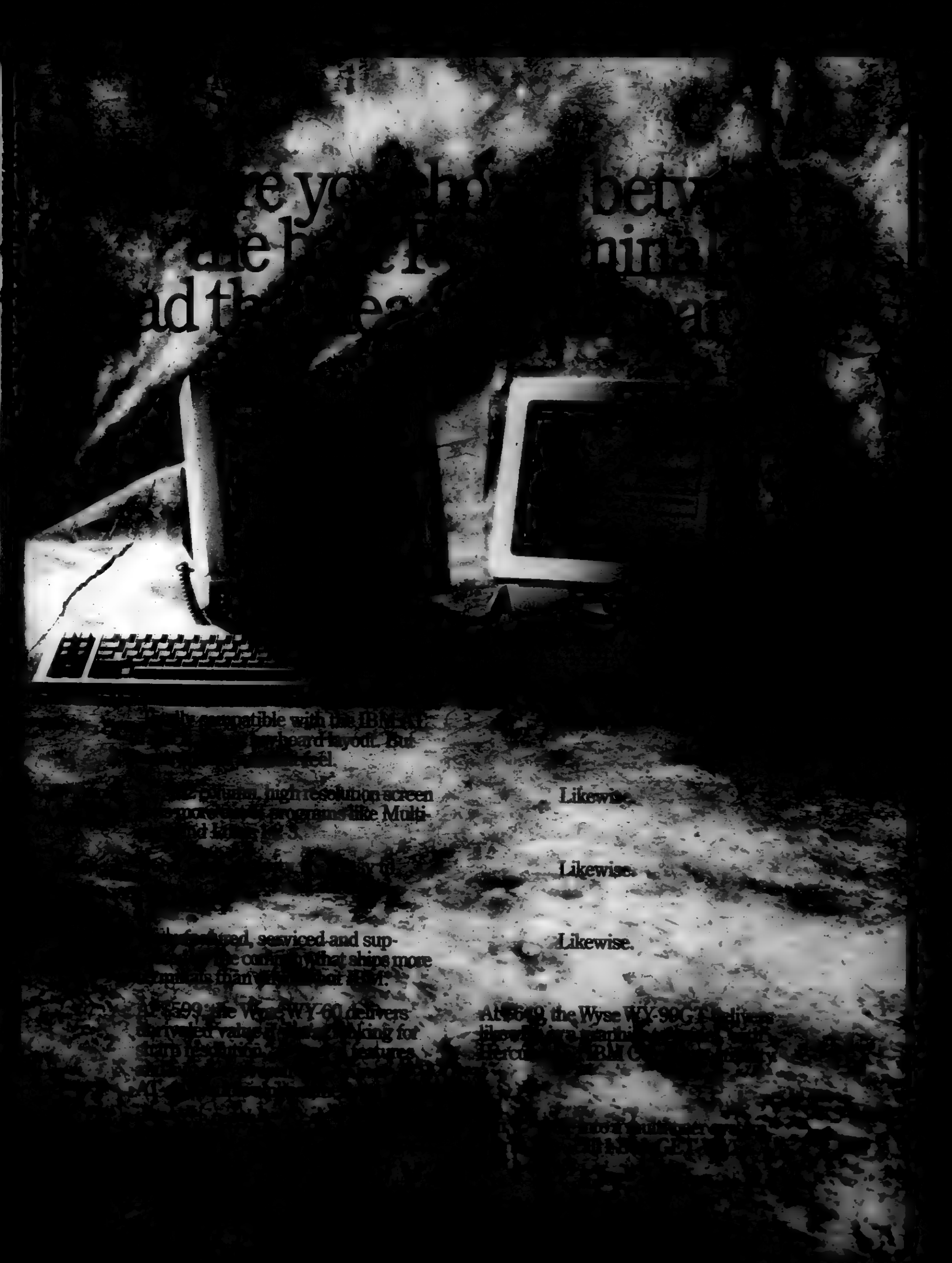
Back in black. CDC, which teetered on the edge of a Chapter 11 filing in 1985, last week reported its first full-year profit since 1984. Although revenue was virtually flat at $3.36 million, CDC earned $19.3 million, or 45 cents per share, compared with a $264.5 million loss in 1986. CDC turned a profit despite one-time charges totaling $44.3 million, about half of which covered the anticipated cost of replacing its faulty FSD-II disk drives.

Seek advice of counsel. A press release recently announced the $4.2 million sale of the high-technology coatings division of Weitech Corp. — the New York firm whose illegally awarded defense contracts resulted in the conviction of former White House aide Michael Deaver and the investigation of Attorney General Edwin Meese. But don't look for the Mount Vernon, N.Y.-based buyer to be diversifying into the computer business — at least not until it changes its name from Vapor Technologies, Inc.

Super status. Wisconsin and Illinois are throwing money and tax incentives at computer designer Steve Chen, each hoping to be the state in which he builds his supercomputer. Both states have reportedly been told that Chen's start-up, Supercomputer Systems, could grow from its current 45 employees to 1,000 or 2,000 in five years. That would rival the size of Chen's former company, Cray Research.

They kept their word. Double sales to reach $100 million by the end of 1987, the Wordperfect team was told by President Alan Ashton and Vice-President Pete Peterson, and we'll send you all to Hawaii for a vacation. The team pulled together and topped the $1 million mark on New Year's eve, just hours before ringing in 1988. Each employee and a spouse or relative can now go to Hawaii gratis for one week.

Hold onto those 3-D glasses. What was cited as a missing link when DEC announced its Vaxstation 3200 and 3500 in September seems ready to appear tomorrow, when DEC and Evans & Sutherland plan to announce a high-end three-dimensional graphics workstation in Boston. Analysts who have said the Vaxstation seems competitive with workstations offered by rivals Sun and Apollo did so with the caveat that DEC lacked high-performance graphics capabilities.



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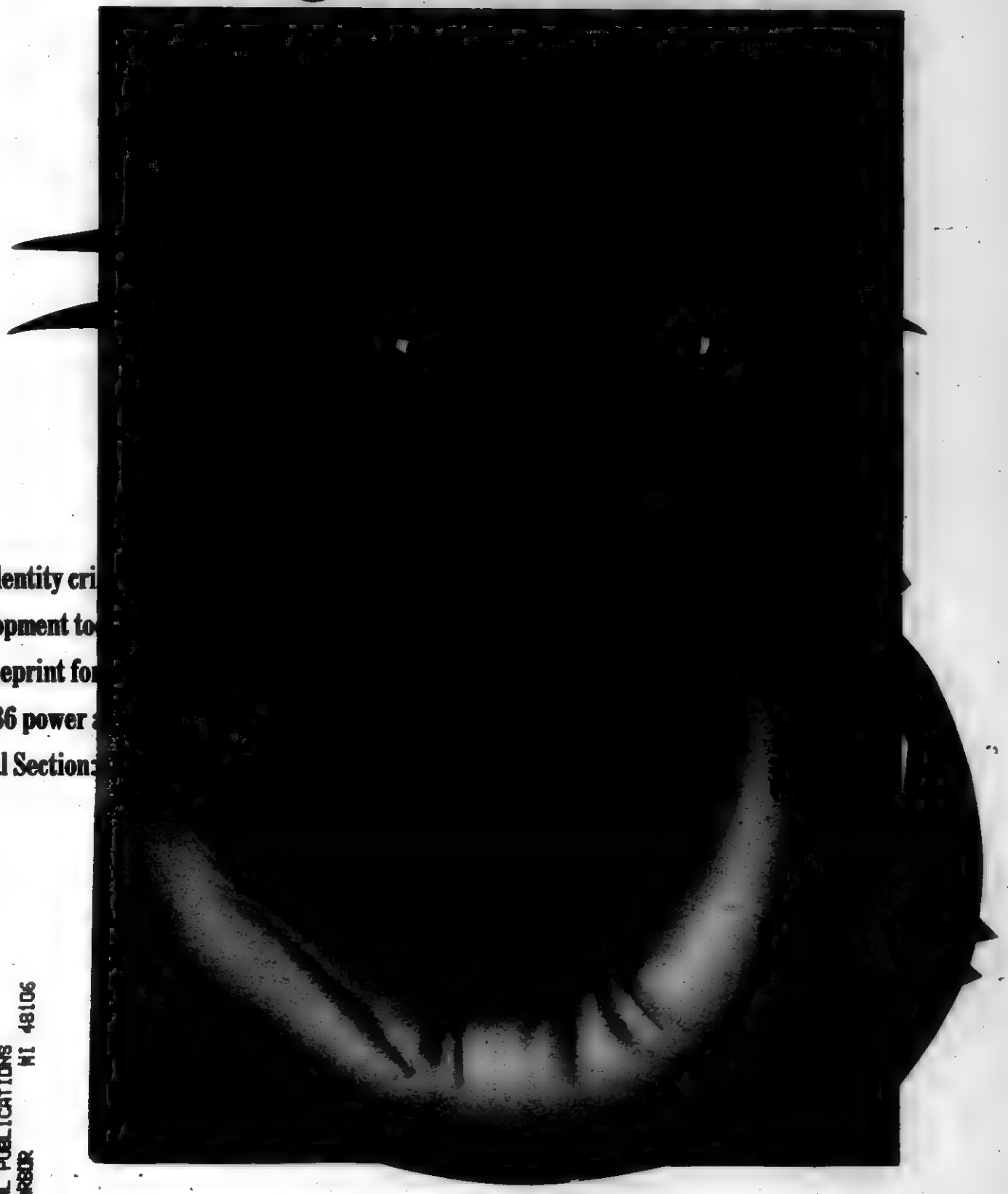
Taming the software beast



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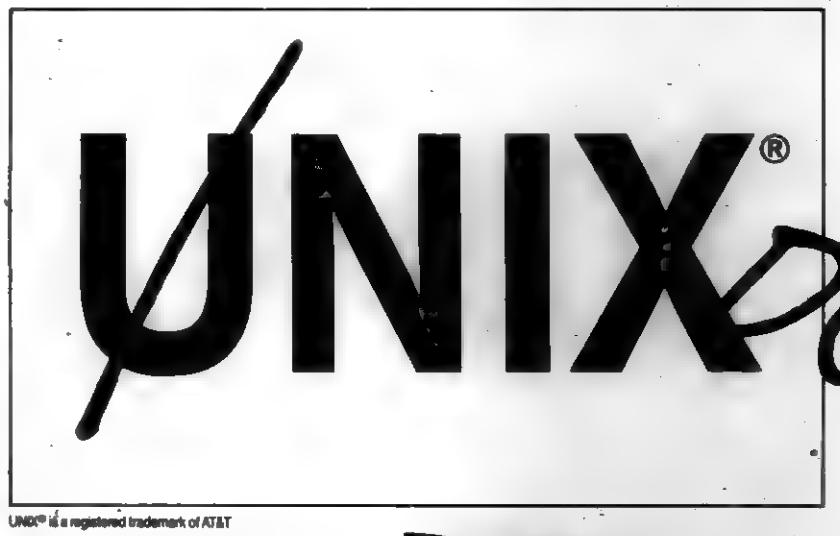

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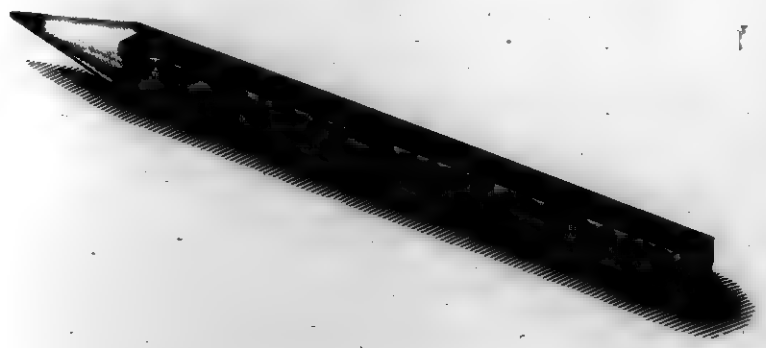

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in focus

CLOSER, AND CLOSER STILL Everyone knows about the Intel 80386 chip and the power it will eventually wield. But while the wait is on for software that will allow the microprocessor to really show its stuff, MIS knows that business demands and competitive decisions can't be put on hold. These professionals are instead opting for solutions that are available now, such as 386-based servers, which make the most of what the chip has to offer. Read about these servers and how they are helping MIS keep corporations moving forward. By Avery Jenkins. *Page 14.*

NO BLUEPRINT FOR SAA IBM's goal for its Systems Application Architecture is certainly a noteworthy one — to provide consistency, portability and interconnection among its systems platforms. However, as the author sees it, SAA is currently only a jumble of products and interfaces without a grand design to pull them all together. It is this "poverty of substance" in SAA that gives IBM users the right to ask some tough questions of their vendor. By Tony Percy. *Page 19.*

The fate of 4GLs

By Stan Kolodziej. Fourth-generation languages are going through a crisis of sorts. Some opponents say that these tools have not fulfilled the promise of end-user computing. Others say they feel these languages have plenty of room to improve on Cobol. Whatever side of the argument you fall on, find out what appears to be in store for the fourth-generation language market. *Page 25.*

Development tools

By George Schussel. Strategic applications development at all levels — from mainframe programmer to end user on a workstation — is only as successful as the tools the developer uses. The author offers a guideline to software selection and some suggestions that can get your staff's creative juices flowing. *Page 32.*

COVER BY BILL MAYER

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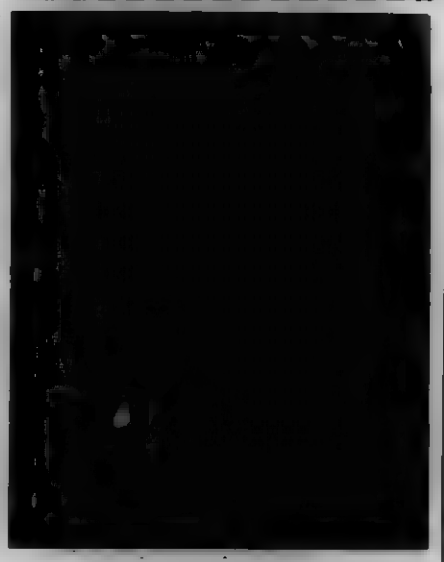

Commercial Unix

It's 1988, and commercial, MIS-oriented Unix actually exists, carried into mainstream business computing on the backs of small systems vendors. Features Editor Michael Tucker takes a hard look at this phenomenon and its repercussions for information systems professionals. Plus: Stories on what IBM's plans are for Unix and the rivals to Unix's position. Section begins on page 29.

From the Editor
Including your letters to us. *Page 5.*

Manager's Corner
Jim Young on putting the fun back into computing. *Page 6.*

Q&A
A data base consultant discusses the data administration function and its ties to business dealings. *Page 6.*

News & Analysis
Duplicating the Micro Channel; ADAPSO decries IBM/Fujitsu code deal; better user interfaces; Amdahl's Aspen axed; Unisoft, Motorola Unix binary standard. *Page 9.*

Blue Beat
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Calendar
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The Insider
Michael Millikin on what happened to end-user programming. *Page 40.*

Log Off
Why your peers use outside consulting services. *Page 40.*

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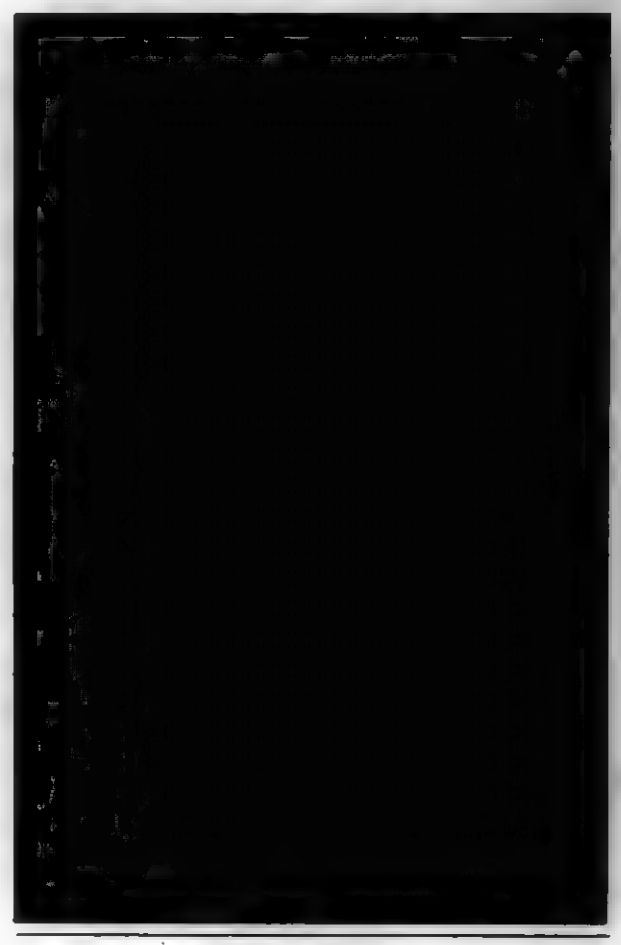

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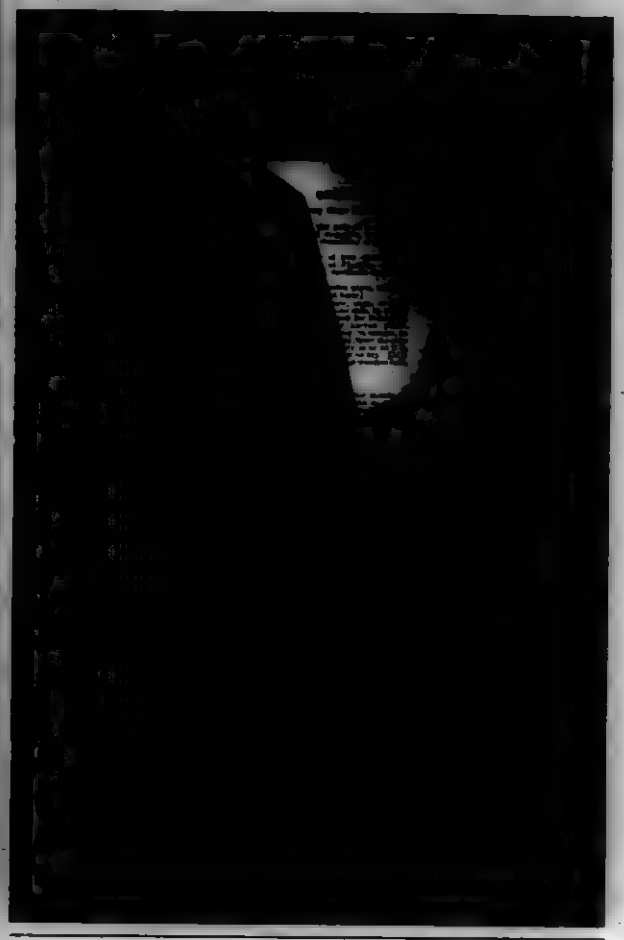

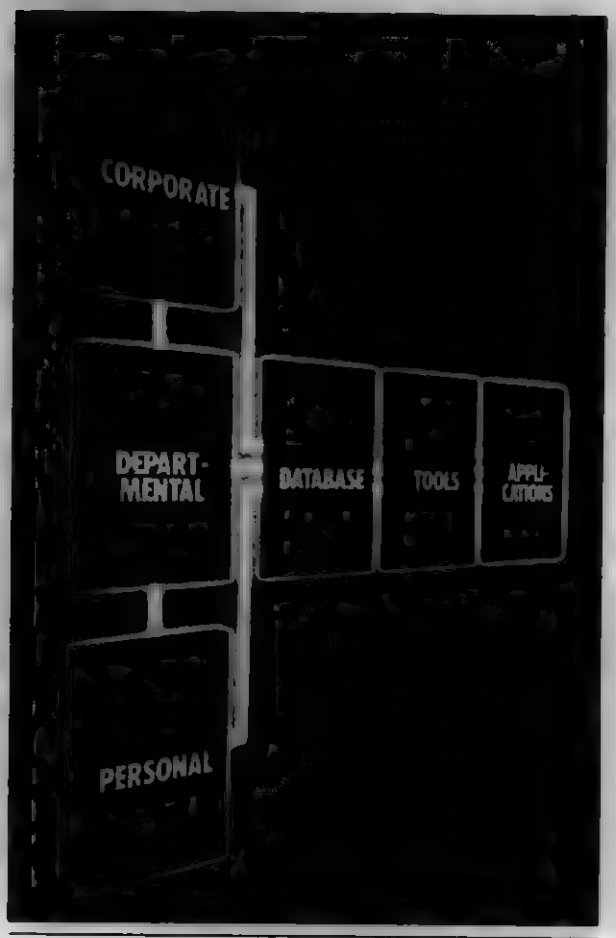

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FROM THE EDITOR

Teach your pupils well

Help Wanted: Computer scientists. According to U.S. colleges, the number of students pursuing a computer science degree is plummeting. Only a few short years ago, there were not enough courses to satisfy student or employer demand; today, students don't seem as interested in pursuing this job market. But employer demand does not seem likely to slacken. While we may still consider the MIS profession a young one, many of its managers are growing older. The largest group of *Focus* readers is in its early to middle forties. What will happen if entry-level computer science graduates are not available? A recent University of California study of college freshmen's plans showed that only 1.9% will major in computer science, down from 4.5% in 1983. Those seeking careers as computer programmers and analysts totaled 3.5%, down from 8.8% in 1983.

Why would today's career-oriented students bypass an assured job after graduation? Look at what's happening in business. As end-user computing spreads throughout organizational structures and departmental computing becomes more common, students may follow a new career path rather than the traditional MIS one. Instead of specializing within MIS — say in network management or systems development — they may choose a career path combining marketing and MIS, for instance.

Certain academic institutions are reflecting this change. There is a university in Boston that no longer teaches Basic and is considering dropping Cobol courses. It is, however, changing its discipline to allow students to specialize in such areas as marketing and DP, for example. Many schools are struggling with the difficulty of providing students with a curriculum that will attract their interest while still providing a complete education that will make them employable. These institutions need to decide if the more traditional course load is as relevant as some of the newer courses that reflect the way the industry is going.

Even if the trend to educate MIS for end-user departments continues, the fact remains that the technical skills and knowledge of a straight computer science degree are still essential. MIS is and always will be called upon for long-term planning, strategic direction, companywide integration, purchasing and maintenance. As an industry, we must continue to find expertise to fill the gap.

Ann Dooley

Every copy you make, every law you break, I'll be watching you

In the Dec. 2, 1987 issue of *Computerworld Focus*, Thomas Roberts in his column, "The absence of ethics," states his alarm that graduate students from the "East Coast's top business schools" are not aware of the criminal (and potentially civil) consequences of making unauthorized copies of software. Please permit me to set Mr. Roberts' mind at ease. Although the graduates of these MBA programs may not be aware of these consequences upon graduation, they may find out the hard way in the real world.

As a professor of computer law at Fordham University School of Law, I can assure you that I am training a new generation of lawyers that not only will be familiar with the consequences of making unauthorized copies of software but will also be prepared to prosecute infringement claims on behalf of their clientele.

Watch out MBAs; computer JDs will be watching you.

Dennis S. Deutsch
Adjunct Associate Professor of Computer Law
Fordham University School of Law
New York

Deja vu: Reader claims WISC technology is nothing new

I just finished reading the news article by Features Editor Michael Tucker entitled "Back to basics: First there was RISC, now there's WISC" [*CW Focus*, Dec. 2, 1987]. It is apparent that you have not done your homework very well, because if you had, you would not be touting this so-called writable instruction set computing (WISC) as something new and wonderful.

WISC is actually a very old concept. In the early '70s, a number of minicomputers, such as the Microdata Corp. 32/S, provided a feature called Writable Control Store, which allowed users to tailor instructions to their needs.

Most notable is the Burroughs Corp. B1000 line. This line of machines featured variable instruction sets tailored to the application language, such as Cobol or Fortran, and allowed full virtual memory and multiprogramming of programs using different instruction sets. This was accomplished by using microcoded interpreters, operating in random-access memory, which were paged in and out dynamically. A high-level microcode language compiler, called Microcode Implementation Language, or MIL, was available for users with special requirements. This machine was highly successful, and many thousands have been sold during the last decade or so.

In closing, I would just like to ask that you do a better job of research and give some deserved credit to the earlier technological pioneers rather than giving exposure to copycat newcomers.

J. Keith Baker
Software Engineer
Unisys Corp.
Paoli, Pa.

Michael Tucker responds:
The final paragraphs did note that there was nothing new about WISC as a technology and that the technology, in fact, reflected a very old tradition of "right-to-the-hardware" programming. The fact that this technology exists and was long the mainstay of minicomputers is well known. The point of the article was simply that this appears to be the first time that WISC has been made available to developers working at the personal computer level.

MANAGER'S CORNER

MIS tries to recapture a feel-good philosophy

Jim Young

Sometimes, when you least expect it, the truth sneaks up and startles you. That was certainly the feeling I got while reading Carol Anderson's editorial in *New England Computing* last October entitled "Are We Having Fun Yet?"

In the article, she asserted that the fun has gone out of computing, and the statement rang true. Not only have we progressed past the fun and pleasure that used to be a major part of MIS work, but the associated enthusiasm of old is also missing.

Some of this attitude may be the dues we pay for lowering the barriers to our skills and mingling with those we support. For reasons of effectiveness, our profession is trying to be more businesslike and approachable. Certainly, some of the fun was found in being a small, elite group.

MIS may have given up some pleasure when the pioneering of early computing gave way to proven concepts and repetitive procedures.

The thrill of technical challenges evaporated, and the straitjacket of standardization took away a lot of our individual creativity. Moreover, technology became so approachable that even nonspecialised users could embrace it, and it ceased to be precious or worthy of a priestly cult any longer.

A sense of independence

There are clearly motivations for past joviality that have irrevocably changed along with our profession; for better or worse, they can never be recaptured. Yet other, more retrievable factors also caused our past high spirits. People say they remember getting more individual satisfaction from their labor. This flowed from a feeling of ownership of technical efforts and a spirit of special identity that is all too often missing today. A sense of independence fueled MIS's self-confidence; bureaucracy and management controls had not yet been spawned by complex megasystems. Pressure was more self-imposed than mandated.

Identifying the valuable causes of enthusiasm is more than just an exercise in nostalgia; it may give MIS the tools to resurrect this era of good feeling. If we could leave out the professional priggishness, perhaps we could regain some of the vitality that used to accompany computer technology. The high spirits and optimism generated energy, motivation and confidence — all the ingredients for creativity and productivity.

For this reason, enthusiasm is highly beneficial to our professional well-being. I suspect it is therapeutic for our personal well-being as well. A positive attitude further breeds success through its influence on others. Peers tend to rally toward demonstrated professional confidence. Users find a positive approach contagious and, through transference, endow related systems with trust and admiration. Enthusiasm even plays a role in generating top management support through the attention it draws and the upbeat outlook it presents. Far from being all dollars and cents, top management is quite familiar with the importance of a champion's personal persuasion.

If enthusiasm is so potent and breeds success, why doesn't every MIS department practice it? The reason is that enthusiasm, like sincerity, is difficult to fabricate. It must be genuine. And because it can easily be dampened, it must also be meticulously cultivated. Several methods can assist in this task.

- **Recognition.** One means of instilling enthusiasm in others is by making a point of recognising their roles and contributions. Not only is this a practice that needs special emphasis at the operator or programmer levels, but it is surprisingly overlooked at the project leader and manager levels as well.

Public accolades are especially appealing to one's self worth. Group acknowledgement can contribute to a person's sense of belonging and adhesion to a work unit. Either way, it is easy to get excited about feeling valuable and effective.

- **Participation.** Another element that reinforces good feelings is a sense of belonging and confidence about the environment. Participation on a broad front gives this perception to people, even if it simply provides vicarious involvement in activities. MIS usually has many projects under way. Just keeping the farthest reaches of the department apprised of these ventures will help to bolster a sense of participation and instill department members with an awareness of broader accomplishments than what they might envision on their own.

Encourage the role each MIS professional plays in a successful achievement to enhance esprit by relating each task back to an individual. Emphasise the recognition that each person receives for playing a part in a noteworthy endeavor.

- **Sense of perspective.** A litany of achievements is all very well for impressing people but hardly enough to build enthusiasm if no one knows the purpose of these accomplishments. Explain how efforts fit a larger organizational context. This big-picture approach might be stressed by showing MIS services from the standpoint of someone who needs them to do his job.

User testimonials, tours and orientations broaden the vision of those confined

Continued on page 8

Young is managing director of MIS for the Wheeler Group, a division of Pitney Bowes, Inc. in Hartford, Conn.

Q AND A

Ronald G. Ross

Nuts-and-bolts data administration functions will be transformed by business slant

Ronald G. Ross is the founder of consulting firm Ronald G. Ross Associates and the editor of the "Data Base Newsletter," both based in Houston. His consulting practice includes work with entity modeling, logical data base design, strategic data planning and data administration.

A frequent speaker at data processing user conferences, Ross is the author of the books *Data Base Systems: Design, Implementation and Management* and, most recently, *Entity Modeling: Techniques and Application*. Ross spoke with *Computerworld Focus* Senior Editor Stan Kolodziej about the changing landscape of corporate data base administration.

In the past, you've mentioned that corporations will have to restructure their DP operations because of the influence of technologies such as expert systems. Could you elaborate?

First of all, I divide the world into two parts: the data-oriented professional staff, such as data and data base administrators, and those, such as business and systems analysts, who are more concerned with programming and computing support. Recently, our newsletter conducted a survey of U.S. corporations of all sizes and in many industries.

Within the 182 firms that responded, we found there was roughly a ratio of eight programming support staff members to each data administration staff member. What concerns me is that as we move toward some of the higher technologies, starting with relational data base systems, then into computer-aided software engineering [CASE] and, ultimately, into expert systems, U.S. companies are not going to be staffed with enough data administration people to provide the necessary coordination of these technologies.

The entire field of data administration is becoming well established in organizations, but the staffing is not keeping pace with the speed in which these new technologies are being delivered. The result will be bottlenecks in trying to deliver more standardised data base solutions and planned data base architectures in corporations. These new technologies are also not going to achieve user expectations.

What exactly is the problem? Is it because MIS has difficulties grasping the implications of new technologies?

Not necessarily. It's a rare company today that hasn't at least thought about relational data bases and CASE engineering and is moving in that direction.

But to reorganise themselves, to restructure themselves, to develop staff expertise and to develop the procedures to involve that staff in the ongoing development of new data base systems is a very difficult step; it involves human factors, it involves changing the political climate, it involves changing procedures and, ultimately, it involves budgets.

We have a well-established mentality in data processing that's focused on application-by-application development within departmental budgets. To make these new technologies ultimately effective, we need to encourage a more corporate point of view, more corporate patterns of funding and a more corporate-oriented information resources management function under which data administration will fall.

You're talking about overcoming an MIS mind-set.

Absolutely, but it's happening. I think we're seeing a long-standing trend that began way back in the early '70s with the advent of data base management systems. I think the end point of this whole trend is to view data as a corporate resource, as something that's shareable across departments, across the organization, and use that philosophy as a stable platform to build corporatewide systems.

There has been so much talk about hardware platforms and concentrating on hardware in terms of systems architecture design and technique. Instead, I like to talk about the data base concept as being the platform for coordinated systems development across a corporation.

Won't you still need the existing systems infrastructure?

Yes, you need data administration working at a nuts-and-bolts level to ensure procedures are followed, standards are achieved and things are documented.

But you also need a blotter function, an information resources function, a large-scale long-term planning function whose job it is to ensure that the information is exploited as a vital corporate resource.

That's all fine and good, but where do you find people to staff these new areas?

Interestingly enough, as people get more involved in building these new data base architectures, they're finding that the expertise they need to draw on is not so much from the data processing department as it is from other areas of the company, other business divisions.

These people have some insight into the idea that information is something that needs to be designed and coordinated, and these are people who have a real sense of mission about what automation can do beyond the basic application levels.

Another talent pool exists in the traditional data administration staff. These areas are producing some business-astute people, people who have dealt with user requirements, who have looked at corporate objectives and tried to translate those into system architectures.

Where does that leave the data processing departments?

There are also staff-level people in data

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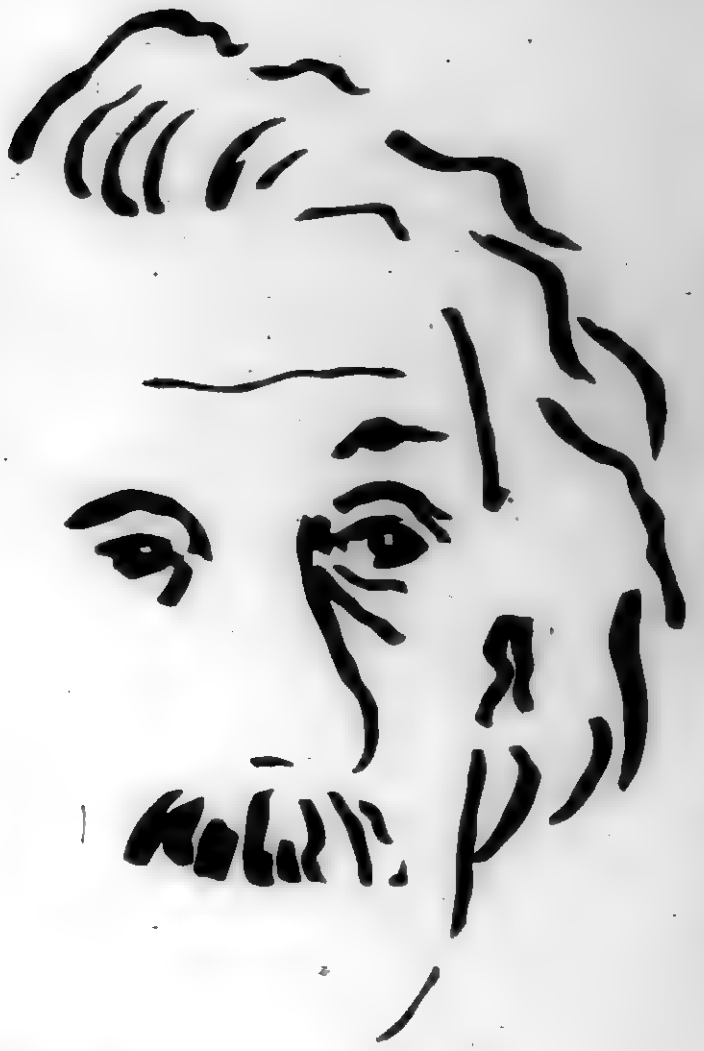

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Manager's corner

Continued from page 6

to the MIS trenches and bring home the real value of MIS's contribution. For the more jaded MIS staff members, demonstrate the hard dollar savings, quantifiable cost avoidance and specific revenue generation that is attributable to MIS's efforts.

• **Sense of opportunity.** A tradition of past contributions can set the stage for positive feelings. On the other hand, there is nothing like future prospects for continued success to whet the appetite for more challenges and to energize continuing activity. Sharing future MIS and organizational plans as well as the opportunities available can serve as real motivators, especially if everyone knows how they can get involved.

Explain how workers can qualify for a desirable project or an up-and-coming area of technology. However, don't forget to define the longer term opportunities available through promotion and how to acquire the necessary skills and experiences.

Finally, to accelerate the growing feeling of self assurance, let everyone know the rules for success. In your organization, what is especially important to do to receive serious rewards — Take risks? Be a maverick? Be a team player? Be an idea person, or, perhaps, an implementor? Make MIS aspirants aware of these unspoken rules. Knowing them can make an enthusiastic professional positively fearless in his efforts to contribute.

These actions, calculated as they are to electrify MIS, all rest on one vital assumption: Enthusiasm and enjoyment come from meaningful professional contributions, and the reverse is also true. If these results fuel one another, then it only remains for MIS management to spur the process by heightening the excitement and fun within a department. Approaching this workplace ideal may be easier than first imagined, because fun for MIS professionals seems to reside in successfully doing their jobs. At least we have not lost *that* attitude.

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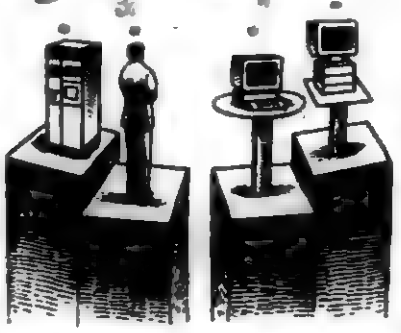

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Q and A

Continued from page 6

processing departments who have always been involved with systems planning, large-scale user requirements and systems integration and who now want to move into something like this information resources management function. So I see a variety of sources from which people can come together and initiate a movement in this direction.

Have you seen companies actually working on such broader data base issues now, or are they still in the concept stage?

Right now, I'd have to say that information resources management is still in its very early stages. There are some similar corporate resource groups being formed, but typically, they are tightly coupled with strategic data and information systems planning.

But I believe this is also the immediate stage before true information resources management is put into place. In our survey, however, we did find that there is a small but growing percentage of data administration people who are reporting outside of data processing altogether. To me, that indicates that their function is being perceived increasingly as a business information systems planning function as opposed to a nuts-and-bolts data processing function.

Do you see a separate organizational unit springing up around information resources management, something like the information centers that followed the appearance of fourth-generation languages?

The company that will prove itself most capable in exploiting this technology will be one that sets up a special organizational unit devoted to ensuring that the data base applications are well chosen, users are well trained, there is coordinated product support and rules and standards are applied. Like information centers, I think we'll see an equivalent body emerging in those companies that prove themselves most capable with expert systems.

Frankly, I don't think that, in the initial stages of expert systems, we are going to see traditional data processing, with its applications-oriented developers, being in the forefront of this movement. I fully anticipate the emergence of something we might call a "knowledge center" that will try and concentrate expert systems skills into a well-coordinated group effort.

Expert systems obviously loom large in your scenario of future corporate processing.

Yes, but there is a caveat. Gerold Cohen, president of Information Builders, Inc., the developers of the Focus fourth-generation language system, recently made the claim that the application backlog will suddenly expand significantly in the next few years as expert systems begin infiltrating the corporate data processing environment. He says this is going to happen because we're suddenly going to realize that there is an immense number of potential applications, or knowledge, being encapsulated and exploited in different ways to make firms more effective. As a result, productivity might actually slow down before it moves ahead again at great speed.

news & analysis

UPDATE

Unix, Xenix wedding bells

It could be a marriage made in heaven or, at least, in California. It's the match of Unix and Microsoft Corp.'s Xenix, with Altos Computer Systems playing the minister. Ever since AT&T attempted to bring all the competing versions of Unix into one standard — Unix System V — developers have tried to merge Unix and Xenix. Neither Microsoft nor AT&T has been overwhelmingly successful in combining the two operating systems, but now small-systems vendor Altos seems to have pulled it off.

A leading Xenix systems vendor, San Jose, Calif.-based Altos has merged the Microsoft operating system with System V. In fact, Altos merged Unix and Xenix so well that Microsoft went to them for advice on how to get the job done. Altos and Microsoft have agreed to share the technology.

This is in keeping with the history of commercial Unix's development. Traditionally, commercial Unix has been the property of small business computer vendors like Altos, and when it has progressed technologically, it has usually done so at the hands of such vendors.

Uniplex's change of fortune tied to Unix's maturity

Isn't it funny how Unix-based office automation software has started slipping into commercial computing? This has happened primarily on the backs of small business and departmental computers.

Texas Instruments, Inc. in Austin, Texas, markets the TI 1000 Microsoft Corp. Xenix- and Unix-based departmental systems. In December, TI announced that it would be remarketing the Uniplex II OA package from Dallas-based Uniplex Integration Systems, Inc. Uniplex II combines word processing, relational data base management, spreadsheets and graphics into a single package.

Actually, what makes Uniplex unique is its age. Uniplex is a child of Redwood International Ltd. in St. Albans, England. Uniplex has been trying, with limited success, to enter the U.S. market since 1985. Now, almost overnight, it is racking up value-added resellers and opening up a U.S. office.

Why the sudden change of fortune now is not clear, but a report from the San Jose, Calif.-based market research firm Dataquest, Inc. suggests that Uniplex's success as a company may be linked directly to Unix's increasing maturity as a market.

Motorola inks OEM deal to aid in departmental push

Marc Software International in Palo Alto, Calif., has announced that it has cut an OEM deal with Motorola, Inc.'s Microcomputer Division in Tempe, Ariz. Under the terms of the agreement, the division will remarket Marc's Wordmarc word processing packages and Linkmarc communications software through its distribution network.

The Motorola division sells mostly to value-added resellers, system integrators and OEMs, and the Marc deal will provide extra impetus to Motorola's efforts to bring its processors to the departmental and small business computer market. However, there is a kicker. Motorola also has a systems division, Motorola Computer Systems, Inc., which is trying to sell into the same market with its own departmental offerings. There could be interesting complications shaping up here.

Netron makes a CASE for IBM mainframe clients

Computer-aided software engineering (CASE) keeps coming to mainframes. Netron, Inc. in Downsview, Ont., has announced an IBM MVS version of its software engineering system, Netron/Cap. Prior to this announcement, Netron/Cap had run on Digital Equipment Corp. VAXs, personal computers and Wang Laboratories, Inc. minis.

With its mainframe debut, Netron/Cap joins a host of CASE and other software engineering tools that have targeted MIS's realm. But the question is whether MIS managers want CASE products per se. It may be that, given the constraints of budgets and time, MIS might prefer to automate code generation completely.

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Units of Unix

Worldwide Unix software unit shipments by environment, 1986-1990

INFORMATION PROVIDED BY DATAQUEST, INC.

GRAPHIC BY BRUCE SANDERS

PS/2 clone makers take the Micro Channel dare

At times, personal computer hardware vendors must feel like the industry is a game of Russian roulette with IBM's finger on the trigger.

For the past several months, IBM has been pointing a gun at the heads of potential cloners of IBM's high-end Personal System/2 microcomputers, which use the firm's patent-pending Micro Channel bus architecture.

William C. Lowe, president of IBM's Entry Systems Division, has successfully stirred up some trouble in the PC market recently. For one thing, Lowe has made it clear that IBM's attorneys will come down hard on vendors that have too liberally duplicated copyrighted Micro Channel architecture technology. Then, playing the devil's advocate, Lowe also has stated that IBM expects a healthy and legal PS/2 clone market in the near future, ruefully adding that any vendor that waits too long with a PS/2 clone will be "left in the dust."

Clone vendors are understandably wary to be the first to test the Micro Channel-compatible waters. Wyse Technology in San Jose, Calif., for instance, says it is holding back the launch of its Micro Channel-compatible personal computer until the legal waters clear a bit. Though Wyse says it has built its own compatible chip sets, other clone vendors say they will look to outside

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IBM hits a source spot

IBM/Fujitsu code deal touches off outcry from ADAPSO

BY RICK DALRYMPLE
SPECIAL TO CW FOCUS

Crying foul, ADAPSO, the software and services trade organization, claims that a foreign vendor has gained a competitive edge over U.S. vendors at a time when U.S. competitiveness is in peril. ADAPSO's outcry follows the much-reported IBM-Fujitsu Ltd. settlement, under which the Japanese firm was granted access to certain IBM source code.

Calling in the referees, ADAPSO informally discussed its case with the Federal Trade Commission (FTC) and the Department of Justice in the U.S. as well as with the Bureau of Competition of the European Economic Community (EEC). The meetings were held in late December.

IBM's policy of not releasing source code and of marketing bundled software products has long been a point of contention with ADAPSO's membership.

ADAPSO sent its delegation to the government organizations following meetings with ADAPSO members whose firms had individually discussed the source code and bundling issues directly with IBM. A review of the progress made with IBM on these issues at ADAPSO's software products section board of directors meeting in December determined that IBM had not become more conciliatory and recommended that meetings with the government organizations begin immediately.

At the heart of the issue are IBM's Object Code Only policy, formally announced on Feb. 8, 1983, and instances of bundling IBM software products, most recently witnessed in the bundling of the Data Base Manager and Communications Manager into IBM's OS/2 Extended Edition. According to ADAPSO's position paper (updated in September of last year), both practices "inhibit the ability of independent software vendors to develop innovative products, resulting in decreased competition, higher prices, less innovation and fewer product choices."

End users are also troubled by IBM's Object Code Only policy. Object code does not allow users to see the original instructions written by the programmer nor does it provide program logic manuals that explain the structure and internal operation of the software. "Without these tools," laments Sandra Hassenplug, a data processing manager at Towers Perrin, a management consulting company in Philadelphia, "end users who wish to take on the management and maintenance responsibility of changing portions of source code to obtain a specific operating benefit must guess at a solution by using IBM's selected user exits. If we had access to the source code, we might choose a point to insert our own code in a spot between the user exits that IBM has provided."

Fair play?

The meetings with the FTC, Justice Department and EEC are seen by computer industry analysts as a defensive border action to remind IBM that some of its announced policies and actions could be construed as unfair business practices.

"ADAPSO's contact with government groups is but one aspect of the fundamental conflict between independent software vendors and IBM," observes Peter Burris, a software research analyst at International Data Corp., a market research firm in Framingham, Mass.

Burris says it is in IBM's financial best interest to increase its software revenue, particularly in the applications area. "Of course," he notes, "ADAPSO's membership would not like to see IBM increase its software revenues by capturing funds that would have gone to independent software vendors.

"By raising the specter of antitrust litigation," Burris adds, "ADAPSO may be able to influence the methods and the rate at which IBM attempts to package its complementary software products to increase software revenues. When threatened, ADAPSO and other organizations representing the interests of third-party vendors can blunt IBM's influence by taking action that slows the pace of change to allow their members to remain vigorous market participants."

Van Weathers, a software analyst at Dataquest, Inc., a San Jose, Calif., market research outfit, agrees that IBM and third-party software vendors must cooperate to succeed.

"The ongoing dilemma is in determining the policies and actions that strike the proper balance of cooperation. IBM needs the products produced by third-party software vendors to sell IBM hardware and software systems to customers that require certain software components only supplied by a third-party vendor. Also, the third-party software vendors need a nonconfrontational relationship with IBM so that they work in conjunction with IBM to fill the software voids IBM chooses not to address," Weathers explains.

Dalrymple is a Boston-based free-lance technology writer.

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Circle Reader Service Number 5

Better user interfaces hone PC vendors' competitive edge

The personal computer software market has never been known for its ingenuity in user interfaces. But times have changed.

Many PC software vendors have been looking to advances in graphical mainframe-based user interface systems for adaption to PC systems. Probably the most notable success to date has been Apple Computer, Inc.'s Macintosh graphics interface, an innovative system that has been turning the PC industry on its ear the past few years. The Macintosh is being chased by IBM, whose Presentation Manager graphical interface system for the OS/2 operating system is scheduled for a mid-1988 appearance.

IBM has been criticized by users and software vendors for waiting so long to bring something like the Presentation Manager to market. Some analysts say the delay of a good user interface from IBM has hurt its PC sales and enabled Apple to increase its business market share.

However, IBM is not making the same mistake with its ambitious Systems Application Architecture (SAA), a plan aimed at providing standard user interfaces across IBM's Personal Computer and mid-range systems lines. To those who have peeked into the SAA development cycle, the SAA user interface apparently resembles the Mac model closely.

Lessons learned

This lesson has not been lost on other vendors. Microsoft Corp.'s Windows user interface has received more user and third-party support than Microsoft expected. Lotus Development Corp., the Cambridge, Mass., maker of the 1-2-3 spreadsheet, has seen its HAL 1-2-3 add-in program become a commercial success. Among other benefits, HAL is above all a translation tool that converts English phrases into a series of 1-2-3 commands.

Lotus will also depart from its nongraphics 1-2-3 design when it comes out later in 1988 with 1-2-3 G, a graphical version of the spreadsheet based on IBM's Presentation Manager.

Others are jumping in. Ashton-Tate Corp. is streamlining the interface to its Dbase PC data base management system, integrating the interface with IBM's Presentation Manager.

According to Borland International, Inc., its purchase of Ansa Software last year will result in better user interfaces with its own products, culling the experience Ansa has gained in using artificial intelligence at the PC level. Part of that collaboration, Borland says, has already been incorporated in its recently introduced Quattro PC spreadsheet package.

Improving PC software user interfaces has not only become an exercise in software engineering progress, it has also virtually become a marketing necessity to spur sales and remain competitive.

"User interfaces will become one of the major issues in software in the 1990s," claims Linda O'Keefe, a vice-president at Dataquest, Inc., a research firm in San Jose, Calif. "Companies that can supply innovative interfaces will be perceived as supplying the means to break user productivity bottlenecks."

One such company is Expert Vision Associates. The Cupertino, Calif., firm has introduced a PC graphical data base system, called EVA, that has its origin in computer-aided design and engineering environments using larger mini and mainframe hardware platforms.

Written in both Microsoft C and SAS Institute, Inc.'s Lattice C, EVA's developers claim that the product will do for user PC data base interfaces what Apple did for user PC interfaces in general.

More advances in graphical PC interfaces are necessary, according to George Morrow, chief scientist at DSC Nestar Systems, Inc. in Mountain View, Calif.

"Programmers are the worst people in the world to work on user interfaces," Morrow says. "They have trouble getting into the rhythm of how average users work with data. I see a good sign in the increasingly greater numbers of nontechies who are working in the user interface area. In my mind, computer literacy is the greatest stumbling block to making computers more relevant to people. Pictures are interfaces to the meaning of words, and graphical interfaces are going to open up computer literacy and, with it, sales."

Not all user interface progress is graphically based. Lotus's Agenda and Dayflo Tracker from Dayflo Software Corp. in Irvine, Calif., are using relational, free-form technology to ease information retrieval for PC data base users.

"I think users have been waiting for something like free-form retrieval for some time," says Robert Gilchrist, Dayflo's chief executive officer. "It fills a gap with the way users relate to data." — SK

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Circle Reader Service Number 6

Amdahl axes Aspen system

Aspen has been axed. Unix may be enriched.

Until 1987, Sunnyvale, Calif.-based Amdahl Corp. was known for three things: It was a relatively successful plug-compatible manufacturer (PCM) at a time when PCMs were not generally noted for success; it was the only U.S. mainframe maker with its own version of Unix, the UTS product; and, until recently, it was working on a mainframe operating system, Aspen, reported to be the first real challenge to IBM's VM and MVS.

Today, Amdahl is less one good reason to be known. The company announced that it has dropped the Aspen effort. Whatever technology in Aspen that had been produced will be grafted onto UTS.

Why Amdahl decided to chop Aspen is not clear. It may be that Aspen simply was not developing quickly enough. Or, perhaps, the company felt that its real market was in Unix-based systems. "The Unix Perspective" newsletter put out by Framingham, Mass.-based market research firm International Data Corp. recently pointed out that Amdahl is now the leading vendor in the low-priced mainframe market in which Unix is frequently the operating system of choice.

It has also been said that Amdahl may have given up on Aspen after the recent pact between Fujitsu Ltd. and IBM, whereby Fujitsu received access to IBM source code. Amdahl may have wanted out of Fujitsu's way should that firm decide to offer a PCM operating system.

Regardless of the motivation, the consequences may be great for Unix. For the first time, it has a serious champion on the mainframe side of the fence. Before, observers speculated that Amdahl might drop UTS for a more proprietary approach. Now, that is not an option. — MT

IBM dare

Continued from page 9

suppliers, such as Western Digital Corp. in Irvine, Calif., and Phoenix Technologies Ltd. in Norwood, Mass., to deliver the necessary components for Micro Channel look-alikes.

It is a waiting game that could go on for some time. "A patent application doesn't preclude you from distributing your product in the market," explains Joseph P. Zammit, a partner in the New York-based law firm of Reavis & McGrath. "IBM could have applied for a Micro Channel patent a few years ago or a few months before the PS/2s were introduced. It's not unusual for a whole patent application process to take years to complete."

Nancy McSharry, a senior analyst of personal computers at market research firm International Data Corp. (IDC) in Framingham, Mass., says that IBM, with the Micro Channel, is redressing the events surrounding the introduction of its original Personal Computer.

"When IBM came out with the PC in 1981, they had little idea it would be as popular as it turned out," McSharry says. "It wasn't prepared legally, and by the time it had successfully sued Eagle Computer, Inc. and others for copyright infringement, it had lost a lot of business. Now it is prepared."

McSharry agrees that clone vendors should be wary of coming out with the first commercial PS/2 Micro Channel clone. For one thing, IBM lawyers are fresh from dealing with a trademark infringement case involving AST Research, Inc. and the use of "/2" in the name of its PS/2 add-in boards, Advantage/2 and Rampage/2. The case was settled out of court with AST removing the "/2."

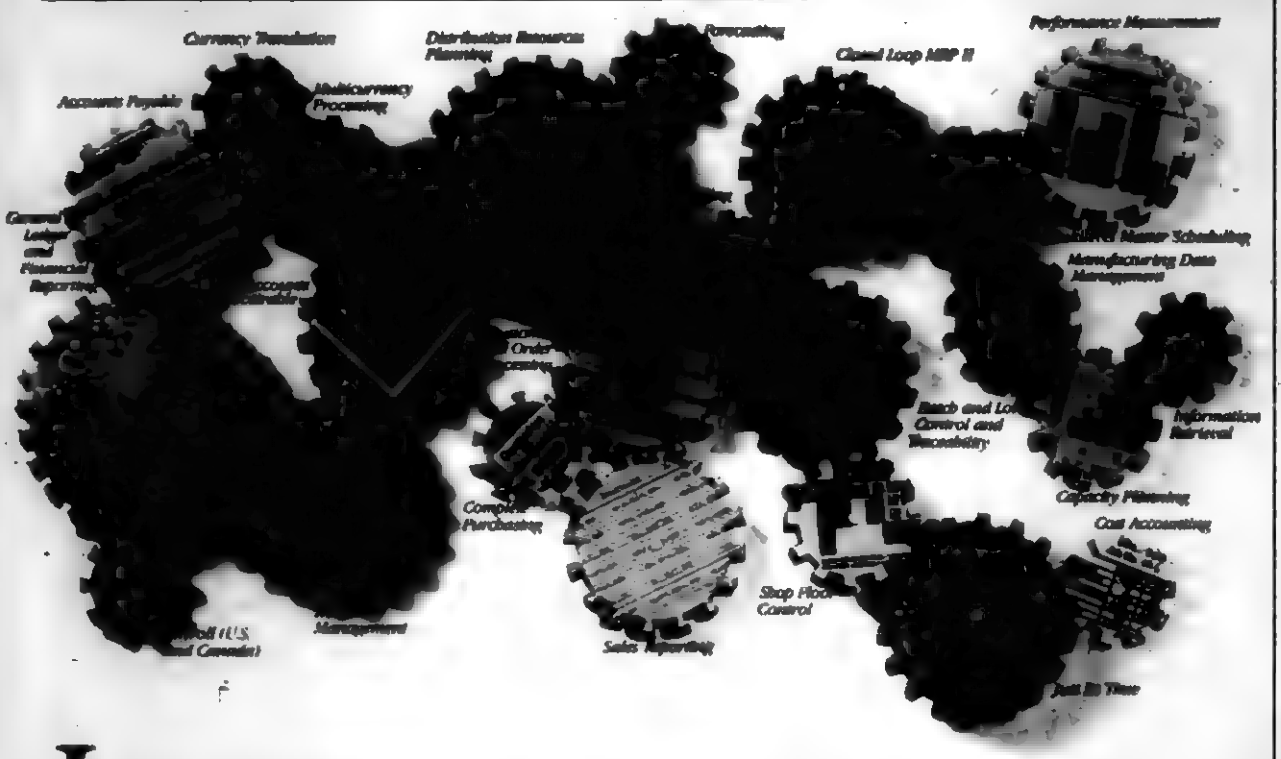
"In a way," McSharry says, "it isn't odd that Lowe seems to be promoting the PS/2 clone business. With all the vendors who are bound to duplicate its machines, it could only bolster the perception that the PS/2 and the Micro Channel are true standards in the PC industry. IBM will lose business to the clones, but it might more than make up for it with the business this standards perception creates."

IBM's Lowe

For now, the legal ramifications of the PS/2 clone market seem to concern vendors and industry analysts a lot more than end users. McSharry says a recent IDC survey of users indicated that most were unconcerned about the PS/2 clone market and many also confessed to being in the dark about the Micro Channel architecture.

For example, although Bob Ebersole, a PC consultant at Westinghouse Electric Corp. in Hunt Valley, Md., says PS/2s will be Westinghouse's primary machine purchase in 1988, he is "unsure that the Micro Channel provides adequate progress over the old PC buses."

In the meantime, clone vendors wait to see who will be daring enough to break out first with a Micro Channel clone and possibly become the first name on the IBM legal counsel's blacklist. "You never really know with IBM," McSharry says. "It's like studying the Kremlin. You know what they say, but you don't know what they mean." — SK



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Circle Reader Service Number 7

Washington, D.C., March 21–23, 1988 **Chicago, May 16–18, 1988**

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A Digital Consulting, Inc. Conference

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See page 7 for details.

Feature Article: Pages 4–5

DAY 1 FORMAT

9:00 a.m. — *Room 1*

INTRODUCTION

George Schussel & James Davey

4th Generation Technologies
The new MIS department • Prototyping • Relational DBMS & 4GLs • SQL

1990—The 5th Generation of Application Development
CASE • Natural language • SAA • Electronic data interchange • Chief Information Officer

Relational DBMS
Structure • Manipulation • Integrity • SELECT, PROJECT, JOIN • Advantages of the Relational approach • Problems with the Relational approach • An analysis of the performance issue

SQL—The New Standard
Examples • Problems with SQL • Portability of SQL

11:00 a.m.

Room 1

MANAGEMENT SESSION

George Schussel

Database & 4GLs

Distributed DBMS
- Selection rules
- Management issues
- Mini vs. micro DBMS

4GLs
- Requirements
- Benefits of 4GLs
- Different types of 4GLs
- Ease vs. performance
- Management issues

Codd's 12 Rules
- Explanation
- Importance

Prototyping
- Life cycle dangers
- How to use
- Advantages of prototyping
- Prototyping requirements
- When to use a prototype

Room 2

TECHNICAL SESSION

James Davey

Post-Relational Data Models

Entity-Relationship
- Classification of entities and relationships
- Attributes and values
- Keys
- Weak entities
- Entity-relationship diagrams

RM/T Model
- Classification of entities
- Subtypes and supertypes
- Surrogate keys
- Integrity rules

Universal Relation Assumption
- Definitions
- Database design
- User Interface

12:00 p.m. — **Lunch**

1:00 p.m.

5th Generation Application Development

CASE
- Objectives
- Integrating technologies
- Diagramming
- Code generation
- Methodology
- Management concerns
- Future directions

Repository
- Active & integrated
- Functions

- User access
- Communications
- Programming interfaces

The Software Market

Selection of DBMS & 4GLs

Logical Database Design

Normalization
- 1st normal form
- 2nd normal form
- 3rd normal form

Canonical Synthesis

Field Level Dependency

Conceptual Data Modeling

Diagramming Types
- Data structure diagrams
- Entity-relationship diagrams
- Entity-relationship diagrams used in information engineering

The Software Market

Selection of DBMS & 4GLs

2:15 p.m.

Mainframe Products

IBM's DBMS & 4GLs
- The installed base
- Intentions to buy
- Strategies for IMS users

SQL/DS & DB2
- How functional?
- How much performance?
- DB2 futures

Design Aids, CASE Tools

CSP, AS, QMF
- CSP experiences
- Management implications

Mainframe DBMS & 4GLs
- ADR, Cullinet, CCA, Software AG, IBI, RTI, Oracle, Teradata & more

Mainframe End User Software
- IBM, Cullinet, IBI, OSI, MUST, more

Minicomputer Products

DEC's DBMS & 4GLs
- COBOL Generator
- RALLY
- Rdb
- DBMS
- RMS

Minicomputer DBMS & 4GLs
- ORACLE, INGRES, IDMS/R & SQL, POWERHOUSE, CORVISION, ULTIMATE, more

3:15 p.m. — *Room 1*

DATA MANAGEMENT FUTURES/HOT TOPICS

Question & Answer Session — George Schussel & James Davey

DBMS • SQL • Distributed DB • Interfaces • CASE • Repository • Expert Systems • Industry

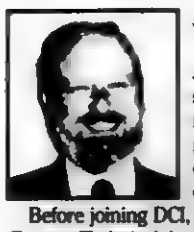
5:00 p.m. — **Hospitality Suites/Product Demos**

Day One Faculty

DR. GEORGE SCHUSSEL
SYMPOSIUM CHAIRMAN

Dr. George Schussel, President of Digital Consulting, Inc., is one of the world's leading lecturers on DBMS/4GLs and 5th generation application development. He is a noted futurist who accurately predicts key software trends years before they occur. His influential role in the industry prompted ICP Interface Magazine to say "... when changes occur (in the software industry), it's a safe bet George Schussel will be there to help the business community adapt."

Dr. Schussel received his doctoral degree from Harvard Business School and is a Fellow of the AAAS.



JAMES H. DAVEY

Jim Davey is Senior Consultant with Digital Consulting, Inc., specializing in database management systems, logical database design, 4th generation language and structured analysis and design. He has over twenty years of experience in design and implementation of database systems.

Before joining DCI, Mr. Davey was Senior Database Consultant with Eastern Technical Associates, Manager of Product Support and Assessment for Prime Computer and Database and Software Support Specialist for Honeywell and General Electric.

The Unique DCI Symposium

The National Database and 4th/5th Generation Language Symposium presents a unique integration of educational seminars and product discussions. The Symposium is NOT a tradeshow. It is 3 days of education and information which will better equip you, the DP professional, to make key decisions about your company's strategic future.

Day One of the Symposium features a full day of Management and Technical education led by Dr. George Schussel and James Davey. The unique format of this education is outlined on page 2. The issues discussed as well as product overviews and critiques will prepare you for Days Two and Three.

The evenings at the Symposium are an important part of the three day conference. They feature Hospitality Suites hosted by participating vendors, many of which offer live product demonstrations.

On Days 2–3 of the Symposium you will have the opportunity to attend presentations covering the key products in the industry. Three sessions run concurrently throughout the two days and are led by representatives from each vendor company. In a classroom style environment, the representatives explain what their product is, what it does and does not do. You are free to move between presentations as you wish; however, many companies send more than one employee to the Symposium in order to get the maximum benefit from the presentations. Guest lecturers will cover added areas of interest and DCI consultants will be available to answer your specific questions. In three days at the DB 4th/5th GL Symposium, you will accomplish product research which could have taken months.

As a unique feature of the DB 4/5GL Symposium you are also encouraged to attend our Free Two-day Relational DBMS Seminar. Led by Jeff Tash, this seminar will focus on practical applications development as well as theory (see page 7).

If you are interested in planning the right direction for your company and need to choose the proper software products, the Symposium is an event you don't want to miss.

Special Presentations

IBM'S Software Products

DB2, SQL/DS, QMF, IMS, CSP, AS

A critique of IBM software products will be part of the first day's presentation. Our consultants are continually surveying users of IBM's software products. Feedback from current users will be provided for attendees.

TEXT INFORMATION MANAGEMENT

An area of importance to many companies is TEXT INFORMATION MANAGEMENT SYSTEMS (TIMS). These systems can provide many services:

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Excellent applications of TIMS include: litigation support; newspaper archives; and financial information.
Sessions at DB + 4/5GL will discuss TIMS. Traditional DBMS such as CODASYL or Relational, don't have the ability to provide these kinds of services. TIMS are especially important in office applications.
Examples of products providing these services include: Computertime Network Corp. — HR pkg., Payroll, Computer Corporation of America — TEXT/204, Information Dimensions — BASIS, Henco — INFO DB+, and G.E. —GESCAN

APPLICATION DEVELOPMENT IN THE

Now that 4th generation application development tools are well accepted, the question arises "Where are we going to and what will be the characteristics of the 5th generation of application development"? Future issues are a major discussion item at the DB + 4/5GL Symposium. A summary of some discussion points from recent symposia are presented below.

RELATIONAL DBMS

Occasionally, one hears comments about "post-relational" DBMS. Adoption of such a technology seems unlikely in the near to midterm future. The advantage of the relational model's mathematical underpinings and the promised wide adoption of the ANSI standard SQL make it highly unlikely that some other logical view of data for commercial processing will be widely adopted in the next ten years.

It is clear, however, that one weakness of relational modeling lies in its modest ability to capture meaning in the same way that network-oriented views of data can. It's most likely that various "semantic modeling" extensions to the relational model will be proposed and one or more may achieve widespread adoption. The ability to capture more meaning in your database structure can mean significant additional savings at the programming level and superior control for data administration.

A number of new relational DBMSs from companies like Sybase, Tandem and Interbase are now targeting the high performance relational DBMS market. These vendors claim distributed capabilities and significantly increased transaction processing potential. Meanwhile, established relational DBMSs such as ORACLE, INGRES, and INFORMIX continue to improve their transaction processing potential by an average of 30%/year. These software improvements combined with rapidly improving MIPS/$ hardware mean that while INGRES 2.0 on a VAX 11/780 was not feasible for your application, INGRES 5.0 on the VAX 8550 will have an 800% cost per transaction improvement and may therefore be very feasible.

Our conclusion is that while network-oriented data views are likely to remain superior for difficult transaction processing applications for the next few years, an ever increasing majority of transaction processing applications will be amenable to solution by relational DBMSs.

If you must bet on the next generation of DBMS, try "Object Oriented DBMS". Research in this area is focusing on how DBMS engines can directly support the object oriented programming paradigms that underlie expert systems technology. Practical products from such research, however, lie several years in the future.

DATABASE MACHINES

One important approach to transaction processing in tough relational processing applications is database machines. Teradata and Britton Lee, offer some significant cost improvements in high volume relational transaction processing. Teradata, for example, has some benchmarks showing a 10–1 price/performance improvement over the use of a straight software only DB2/SQL implementation.

A relational DBMS machine from IBM is not likely. As personal computer workstations continue their takeover of many functions formerly assigned to the mainframe, the host computer's logical future role is as custodian of the corporate database. Architecturally, then, one can look at mainframes as evolving into data base machines and network servers. The concept of a database machine is to offload the database accessing and control from the mainframe to a parallel processing, micro computer architecture. If the job of handling the user interface is offloaded onto personal computers while the job of handling database

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THE FOLLOWING PRO

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Computer Associates International, Inc.	CA-UNIVERSE
Computer Corporation of America	MODEL 204
	IMAGINE
	ACCOLADE
CompuServe Data Technologies	SYSTEM 1032
Computertime Network Corp.	HR pkg
	Payroll
Cullinet Software, Inc.	IDMS/R, ADS/O
Data Access Corp.	DATAFLEX
Digital Equipment Corp.	VIA, Rdb, 4GLs
Execucom Systems Corp.	IFPS
Gateway Systems Corp.	SYNERGIST
G E	GESCAN
Genex	INTELLISYS
IBM Corp.	DB2, CSP, AS
Information Builders, Inc.	FOCUS
Information Dimensions, Inc.	BASIS
ISN Products Corp.	SPIRES
McCormack & Dodge	MILLENNIUM
Micro Data Base Systems, Inc.	MDBS III
Micro DecisionWare Inc.	PC/SQL-link
MultiSoft, Inc.	SUPER-LINK
MUST Software International	NOMAD Family of Products

access is offloaded onto back end machines, the question arises, what is left for the mainframe? The answer of course is nothing, and that is the principal reason why IBM won't do anything to encourage the growth o database machines.

SQL

There has never before been a standard data access language. SQL is going to change that. SQL was developed by IBM in the late 1970s and IBM has based its two strategic DBMS products, DB2 and SQL/DS, on SQL. The most successful independent DBMS software vendor, ORACLE, is based on SQL. The American National Standards Institute and the International Standards Organization have adopted SQL as the standard language for relational DBMS access. The US government will require SQL in future procurements.

With all of these things going for it, it's clear that by the 1990s SQL will be the standard language for data manipulation, definition, and control. This will offer important portability benefits for both human skills and software.

5TH GENERATION by GEORGE SCHUSSEL

NTATIONS — DAYS 2 & 3

DUCTS WILL BE PRESENTED:

Vendor	DB & 4GL Packages
Novell, Inc.	Btrieve, XQL
Officesmiths, Inc.	THE OFFICESMITH
On-Line Software International, Inc.	RAMIS Information System RAMIS/PC Workstation UFO Productivity System
	INTELAGEN
Oracle Corporation	ORACLE
Pansophic Canada	TELON
Phoenix Software	SIGNET
Relational Technology	INGRES
Rhodnius	EMPRESS RDBMS
Seed Software	SEED
Software AG of Canada	ADABAS NATURAL
Software AG of N.A.	ADABAS NATURAL
Tandem Computers	NONSTOP SQL
Technology Information Products Corp.	INFO MODELING DATA MODELING
Teradata Corp.	DBC/1012
The Ultimate Corp.	ULTIMATE
Unilog, Inc.	GEN/1
Unisys Corp.	MAPPER LINC II
XA Systems Corp.	DATA XPERT
Zanthe Information, Inc.	ZIM

SQL is not suitable as an end-user language. For any but trivial uses SQL should be handled by programmers, not end-users. Proficiency with SQL is best achieved when the user has some academic background in set theory and propositional logic.

Therefore, we expect to see SQL "generators" becoming important. When SQL becomes the generated rather than the written language, users can keep the advantage of familiar interfaces such as spreadsheets, yet at the same time, generate applications that are portable from one database engine to another.

Viewed a few years from now, SQL's major importance will be as the standard language for data access communication from one software system to another. SQL ultimately is more important as a software rather than as a human interface.

DISTRIBUTED PROCESSING

In the 1990s leading edge organizations will be using three-tiered computing. The idea behind three-tiered computing is to support personal workstations at the individual or group level, mini-computer data processing at the departmental level, and mainframe hardware to handle common data base applications that run across several departments or companies. There are two software technologies that will allow this. The first is distributed database technology, while the second is cooperative processing.

The idea behind distributed databases is to have a single logical database implemented over diverse machines. Early incarnations of distributed database software are now available from vendors such as Relational Technology, Oracle and ADR.

Cooperative processing systems such as PC/SQL-link from Micro DecisionWare of Boulder, Colorado or SYNERGIST of Gateway Systems of Lansing, Michigan represent an alternative technology approach to building distributed applications. The logic behind these sytems is to offer 4GL application development on a workstation coupled with an active Data Dictionary on a central minicomputer or mainframe. The Dictionary power is such that reusable functions can be built into the system and the logic of its architecture supports both development and execution on a distributed basis.

The 5th generation of application development will be heavily characterized by both a development and execution environment that is largely distributed. Distributed DBMS and cooperative processing systems will lead in providing the support necessary for the building of these applications.

STANDARD ENVIRONMENTS

The early 1990s will give rise to the recognition of six broadly implemented operating system environments, all of which are widely used and considered "standards":

Vendor & Operating System	1986 Market Share	1991 Market Share
DEC's VMS	5%	6%
IBM's MVS and VM/CMS	26%	24%
AT&T's UNIX	6%	22%
Microsoft's MS DOS and OS/2	18%	23%

The vendors of successful productivity tools will provide support in all of these operating environments.

CASE AND 4TH GENERATION TECHNOLOGY

By the mid 1990s the building of applications by business analysts using integrated CASE/DBMS/4GL technology and without programmers will be normal and expected. Successful use of CASE is predicated on the existence of business function and data models. As the power of CASE technology becomes available the demand for people who can implement models will escalate. More than any other single technology the dependency on CASE techniques will define the 5th generation.

THE ADVENT OF EXPERT SYSTEMS

At the current time very little AI technology has permeated the world of commercial systems. Expert systems offer the greatest promise of changing that.

By the 1990s rule based programming will be available to normal commercial programmers. Like DBMS, transaction processing monitors, and report writers then, expert systems will become another tool in the application builder's portfolio.

GUEST SPEAKERS

DR. GEORGE SCHUSSEL

Dr. George Schussel is one of the world's foremost experts in data base management technologies. He is President and founder of Digital Consulting, Inc., a prominent high technology education and management consulting firm. Dr. Schussel is a noted futurist who accurately predicts software trends years before they occur.

Hardware and Software Futures and the 5th Generation of Computer Technology

1. **Computer Architectures: The New Battleground**
   a. Three tiered architecture
   b. IBM vs. DEC vs. UNIX
   c. IBM's role for PS/2
2. **Enhanced PCs for the Future**
   a. The PC in 1991
   b. The PC in 2000
3. **The Importance of Generic Computers Based upon UNIX, MS/DOS and OS/2**
4. **Object Oriented Languages: The New Programming Paradigm**
5. **Expert Systems**
   a. Requirements for Success
   b. Case Histories
6. **Problems with Natural Languages**

LARRY ELLISON

Larry Ellison, President and founder, has been the President and a Director of Oracle Corp., since its organization in 1977. Before founding the company, Ellison held key development posts at Amdahl and Ampex Advanced Research. He holds advanced degrees in physics from the University of Illinois and the University of Chicago.

The Commoditization of Software Technology

1. **Costs of Hardware vs. Software**
2. **Coming Hardware and Software Standards**
3. **The Expansion of Software Lifetimes**
4. **The Importance of Software Portability**
5. **Software Standards—A Must**

NORRIS VAN DEN BERG

Norris van den Berg has had an intensive career with IBM in software development and management, concentrating on both large complex systems and end-user products for business professional users.

He is currently the manager of Data Systems Architecture and Strategy. In this position he carries responsibility across all of IBM's operating units for not only architecture and strategic direction, but market planning and business goals for IBM data base products.

The SAA Environments

1. **IBM's Relational Database Management Systems**
2. **Distributed Database Capabilities**
3. **SAA Environments**
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Relational technology, especially when paired with powerful application development tools such as fourth generation languages, application generators, information center products and artificial intelligence systems can provide dramatic improvements in application development productivity. The key is that it facilitates understanding between producers of information systems and the consumers of information systems. The underlying simplicity of the relational model enables users to develop a consistent, coherent conceptualization, or cognitive model that provides predictive and explanatory power for understanding data. Another related benefit of relational technology is its flexibility and forgivingness in accommodating database design changes. This encourages the use of prototyping, allowing expansion and refinement of system requirements definition.

The universal acceptance of the relational model has led to fundamental changes in the DBMS/4GL marketplace. By the 1990s, the revolutionary changes in networks, hardware and software will dictate the necessity for relational systems. You can't afford to wait until then to acquire an understanding of this most important enabling technology.

JEFF TASH

Jeff Tash is President and Founder of Database Decisions, Inc., an education and consulting company that specializes in database technology and decision support systems. Previously employed by DEC, IBM, CDC, Arthur Young and most recently affiliated with Codd and Date Consulting Group, Jeff has extensive experience in relational database management, fourth generation languages and artificial intelligence. Jeff has assisted a wide range of Fortune 1000 firms understand the impact of relational technology in their organizations and develop ways to evaluate and utilize relational products to gain a competitive advantage. His knowledge of the computer industry coupled with his extensive professioinal experience bridges the gap between theory and practice. He provides practical tips and techniques on how to integrate and deploy the new information technology.

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1. **Enabling Technologies**
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   - –Mainframes vs. Minis vs. Micros (3-tiers)
   - –Batch vs. T/P vs. Timesharing vs. Workstations
   - –Centralized vs. Distributed vs. Cooperative Processing
3. **Application Development Productivity Issues**
   - –Prototyping vs. Traditional Life Cycles
   - –Relational vs. Navigational DBMSs
   - –Single vs. Dual Database Strategy
   - –Development Centers vs. Information Centers vs. Production Centers
4. **Relational Model**
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   - –Integrity Rules
   - –Relational Algebra & Views
   - –Codd's Relational Rules
5. **Database Design**
   - –Entity/Relationship Modeling
   - –Normalization
6. **Data Resource Management**
   - –Data Administration
   - –Database Administration
7. **Technical Issues**
   - –Performance & Physical Design Options
   - –Concurrency / Recovery / Integrity / Security
   - –Connectivity & Distributed DBMS
8. **User Interface**
   - –Relational Languages
   - –Screen & Menu Design
   - –Human Factors Engineering
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Unisoft, Motorola champion proposed Unix binary standard

Unisoft Corp. and Motorola, Inc. are doing the binary Unix standards two-step.

The companies have sponsored several meetings of hardware and software vendors during the last year to propose a Unix binary standard format for computers. The intended standard is based on Motorola processors running Unix System V and Posix, a proposed vendor-independent, multiuser standard interface.

The standard has met with expressions of support from many players in the Unix field. "I've actually been quite surprised by the degree of enthusiasm everyone's displayed," says Robin Schlee, Unisoft's chief operating officer. "Several of Motorola's leading customers stated, in public, that they supported the standard."

Until recently, a binary standard for Unix was almost a contradiction in terms. The traditional bane of Unix's existence has been its own diversity. The operating system has been handicapped by the fact that it is divided not only into different, compatible variants but also into different binary formats in individual formats. The same application might not run on machines from different vendors — even though the machines might use the same version of Unix and might be based on the same processor — because the vendors might have the operating system address each processor in radically different ways.

This situation is, of course, in contrast to an operating system like Microsoft Corp.'s MS-DOS, in which two machines based on the Intel Corp. 80286 microprocessor will likely deal with an application in much the same way. There are several reasons for this unity, not the least of which is that IBM Personal Computer compatibility has long been the driving force of the MS-DOS world. As a result, vendors have a ready-made standard.

Unix, by contrast, was never dominated by any one hardware vendor, even though AT&T did manage to set the system's general direction.

However, there have recently been several suggestions that a Unix binary standard might be possible, at least within products that use the same processor. The first Unix binary standard was, in fact, created the way the MS-DOS standard came into being — via Intel's domination of the PC market.

In late 1985, developers at the desktop level proposed that the Intel 80386 might prove the foundation for a new binary standard. At that time, Charles Hickey, then president of Scotts Valley, Calif.-based software porting house Microport Systems, Inc., argued that 386 machines would lead to a new age in computing in which Unix-based software would be as easily portable as MS-DOS applications. As yet, that prediction doesn't seem to have occurred. But then, the 386 installed base remains small.

Now, Unisoft and Motorola are planning a similar binary standard for machines based on Motorola 32-bit chips. Some analysts say this effort may have an even greater impact than the 386 standard. Motorola processors are in most of the machines currently running Unix — from scientific workstations to the Apple Computer, Inc. Macintosh. — MT

Update

Continued from page 9

Mainframe developers get CASE ability on remote microcomputers

Assuming MIS managers really want to be CASE workers, they can take their pick of computer-aided software engineering (CASE) products. In fact, Cambridge, Mass.-based Index Technology Corp. and Micro Focus, Inc. in Palo Alto, Calif., have just introduced software that links Index's Excelerator CASE product with Micro Focus's Cobol Workbench.

The result is a system that lets you do remote development on a personal computer or other micro for IBM mainframes. The Index/Micro Focus joint venture unites similar efforts to bring remote development capability to MIS. Actually, the problems that face such firms are more social than technological. While the scientific and engineering community has been doing remote development for decades, mainframers have so far resisted the technology.

Government study may liberate neural networks from laboratories

Neural networks are computers that attempt to reproduce in hardware or software some characteristics of the human brain. These networks have a number of interesting properties; they can, for instance, learn and recognize some patterns. They are also very much in the laboratory, and, unless some bugs can get worked out, they may be there forever.

However, Edward Rosenfeld, a New York-based market analyst who produces "Intelligence," a newsletter devoted to neural networks, notes that the federal government may give neurals a big push in the direction of practical applications. He says the U.S. Defense Advanced Research Projects Agency (DARPA) has launched a major study of neural networks and neurocomputing technology.

The DARPA research work is scheduled to be centered at MIT Lincoln Laboratories, located in Lexington, Mass.

There's no place like home for the business computer

Remember the home computer market? That was the one that crashed and burned a few years back because nobody could figure out what to do with home computers. Well, there is now a new twist on that old wrinkle, and this one might actually have money in it.

Market research firm Venture Development Corp. in Natick, Mass., has noted that increasing numbers of professionals are running businesses from their homes. In fact, the company says, 18 million people will be combining their personal and professional addresses by 1992.

That being the case, Venture sees a lot of computers, or rather, business systems, adapted for a home market. Now the question is, can we keep the kids from playing Pac-Man on the multiuser, multitasking, reduced instruction set computing-based home machine?

Consulting firms offer business help to the budding entrepreneur

There is a new beast on the block that high-tech businesses may want to note. Several established consulting firms are now offering special high-tech practices that essentially give the would-be entrepreneur one-stop shopping.

For instance, Big Eight accounting firm Peat, Marwick, Main & Co. has recently announced its High Technology Practice, located in Palo Alto, Calif. Peat-Marwick's practice is meant to be the kind of place where you give them the idea, and they give you a business.

Say you have the plan for an operation. Peat Marwick will help introduce you to venture capitalists, hire a staff, plan a public relations campaign, do a little market research, provide some management consulting and do your taxes.

Of course, they will also charge the appropriate fees. As always, there is no such thing as a free lunch. There are, however, several relatively inexpensive brunches. — MT

Circle Reader Service Number 8

Closer, and closer still

386-based servers aim at full power of Intel's chip

BY AVERY JENKINS

Will full-fledged 386 power never arrive? Hailed as a revolutionary step above its predecessor, the "brain-damaged" 80286 (as one programmer describes it), the Intel Corp. 80386 has nearly a year's wait for the software that will really make it hum. But MIS is not sitting still waiting for a complete 32-bit powerhouse. It is looking for interim solutions in what the industry is currently offering, with an eye to what the future holds.

And vendors have responded. Certain stand-alone 386 machines are increasingly being converted into hosts for multiuser systems supporting as many as 32 terminals. Some organizations are turning to existing operating systems that take advantage of some of the chip's power; however, with the exception of Unix, these systems do not enjoy the widespread support of OS/2, which is backed by industry leaders Microsoft Corp. and IBM.

But perhaps most advantageous for MIS, several local-area network companies have in recent months announced or shipped file servers based on the powerful chip. These firms have also modified their network operating systems to take better advantage of the 386, even though some of these networks are still encumbered by the restrictions of Microsoft's MS-DOS, an operating system designed for stand-alone computing.

All the existing and as-yet-unrealized capabilities of 386-based servers begin with the additional power that the 80386 microprocessor contains over the 80286. The 80286 has been hampered, according to systems developers, by poor memory management, limited direct memory addressing and poor task management.

The most important difference between the 80386 and its 286 predecessor is the 386's capacity for full 32-bit memory addressing, compared with the earlier chip's 16-bit limit. This feature both increases the speed with which data can be transferred within the computer and the amount of memory that the chip can directly address.

While the 80286 had a segmented memory management scheme, the 80386's on-chip memory management can address much larger segments of memory directly.

In addition to permitting faster processing, this facility makes it easier for programmers working directly with the 80386 to develop software for the microprocessor.

In spite of the limitations imposed by existing designs, 80386 file servers also enjoy the advantage of a higher clock speed than was possible with the 80286. The 80386 operates at speeds of up to 20 MHz, and this increase alone can speed up the response time of a network.

The 80386 also has task switching built into the hardware, a function that the 80286 was only capable of if supported by software. Hardware-controlled task switching is much faster, according to John Fitzpatrick, Intel's 80386 product line manager. Fitzpatrick adds that the 386 can switch among 64,000 tasks.

Task switching is especially important in a file server, according to Bruce Lynch, president of The Programmer's Shop in Hingham, Mass., because file servers must field many requests at a time and must control both file management and network management simultaneously. With the 386's task switching, you can do both at once, Lynch explains.

Lynch adds that to take full advantage of the speed of the 80386, hardware designers must incorporate 32-bit buses throughout their architectures. Although using 16-bit buses would make the machine

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Jenkins is a Boston-based free-lance writer.

MARK ULRICH

more compatible with the existing base of add-in cards, this strategy severely limits the overall speed of the machine.

In addition to being faster, the file servers recently announced by the major networking vendors all incorporate 32-bit processing to some extent.

For example, 3Com Corp.'s 3+ server Model 3S/400, released in late October, includes four IBM Personal Computer AT-compatible slots for adding additional communications devices. And while the 3S/400 also includes the ability to add 32-bit memory boards for a total of 14M bytes of system memory, both the Ethernet bus and the small computer systems interface disk I/O remain 16 bit.

Fast memory addressing is not the whole story, according to Jim Cantler, marketing manager of systems marketing at 3Com in Santa Clara, Calif.

"The most constricting part of any type of network server has more to do with disk performance," Cantler says. "Just having a 386 processor doesn't necessarily make a great server."

According to Richard King, president of Provo, Utah-based Novell, Inc.'s Netware Product Division, in a network environment, "one of your main bottlenecks is getting data to and from the network and also to and from disk storage systems." Unfortunately, King adds, the AT 16-bit bus is not very efficient.

Two categories

Cantler says LAN applications involving high I/O fall into two categories: data bases and accounting packages, which use a large number of small files, and applications involving spreadsheets or financial modeling, which would have a small number of very large files.

Ways to improve disk performance include improved disk caching and techniques such as O-Latency. O-Latency permits the computer to read information from the disk out of sequence and, once stored in random-access memory, sort it into the correct sequence.

But both of these methods, in addition to other techniques used to speed disk access, require memory, as does an Ethernet interface. Thus, Cantler explains, "The I/O bus competes with the processor for RAM."

IBM's solution to this problem is the Micro Channel bus, which is implemented on its Personal System/2 computers. The Micro Channel permits the use of arbitration logic, which controls multiple device access to the same bus. With this feature, multiple direct memory access (DMA) devices can use the same bus to access memory.

Micro Channel compatibility is available as an option on the Banyan Systems, Inc. Banyan/CNS file server. This is a 386 file server that can support up to 24M bytes of memory and 32K bytes of memory caching.

At the same time it made its CNS introduction, Westboro, Mass.-based Banyan also made clear its thoughts on where the future of LAN operations resides by announcing a 386 upgrade package for its Motorola, Inc. 68000-based server.

Scott Haugdahl, senior communications engineer for Architecture Technology Corp. in Minneapolis, also predicts that the future of local-area network servers belongs to the 386 — as long as they provide Micro Channel support. Haugdahl says IBM's Micro Channel is the main reason for buying a 386 server rather than going with older 286 technology. Without Micro Channel capability, he claims, all users are doing is running the old software a little bit faster.

Building block

With the 386, "You have a platform you can build on," Haugdahl says. The 286 is not a platform you can build on because its 16-bit technology cannot support the Micro Channel.

But all the news is not good about the Micro Channel. There have been reports that the original design suffered from radio frequency interference problems, which IBM engineers have only recently been addressing.

And not everyone believes that Micro Channel support is a necessity.

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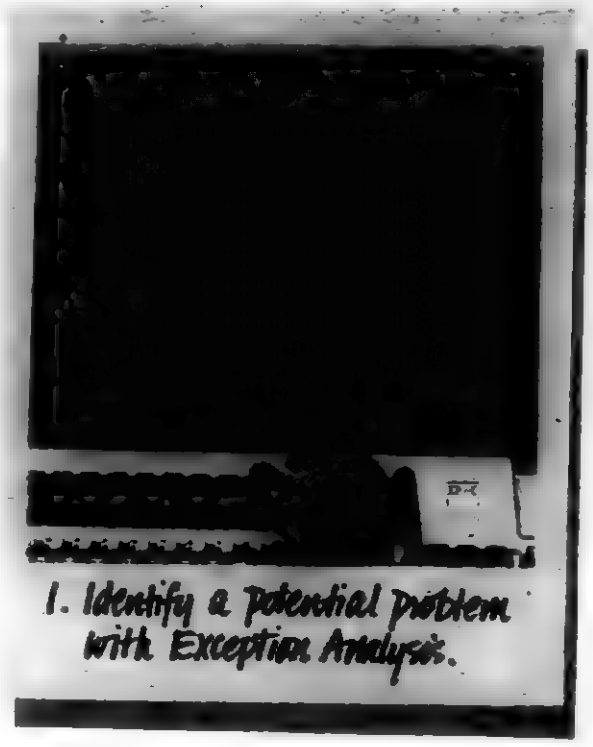

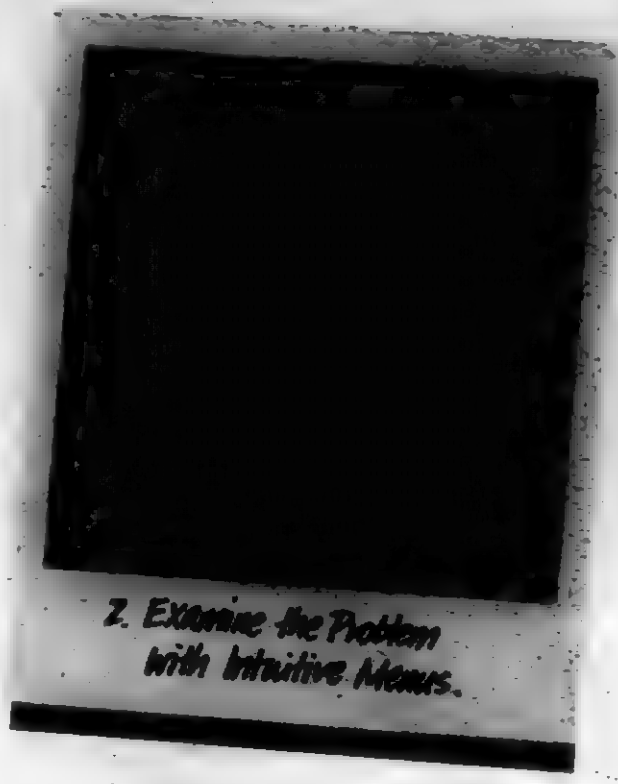

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386 OUTLOOK

While consultant Alex Soya, president of Logan Industries, Inc. in Melbourne, Fla., agrees that one of the major factors in network speed is bus contention among the various server DMA devices, he adds that, "I'm not too convinced that the Micro Channel will be the solution to these problems."

Citing tests that compared the Compaq Computer Corp. Deskpro 386 with the IBM PS/2 Model 80, Soya says the Compaq unit — without the Micro Channel — is the faster machine. Furthermore, these benchmarks did not show much improvement in speed with the use of the Micro Channel, he claims.

Soya suggests that rather than existing to improve performance, the Micro Channel "serves to make IBM's control over the peripheral board manufacturers more complete."

Alternative to IBM

Two of the 386 server manufacturers have designed an alternative to the Micro Channel solution. Both 3Com and Banyan provide a triple-port architecture on their servers to eliminate this contention. With triple-port technology, the CPU as well as the other elements have equal access to memory.

The server and its associated disk are only part of a network, however, and may not be the weakest link in the system's communications chain. Two other elements, the workstation interface cards and the network operating software, must keep up with a 386 server's speed.

"It's the slowest item that controls the speed of the network," Lynch of the Programmer's Shop says. "You have got to get all of the components in a network able to support the speed, otherwise you don't have an advantage."

True 32-bit adapter cards will be necessary for a faster LAN, Novell's King says.

And although 386 computers have been out for about six to eight months, "Most operating systems — even network operating systems — are running in real mode" and not the chip's more advantageous protected mode, King notes. He feels that "some performance improvements are simply because it's a faster machine."

The operating system is another matter, however. King says that Novell has been shipping an 80286 operating system for two years; however, to run the 386 in 286 mode, there is a considerable amount of overhead.

And while 3Com has modified its 3+ operating system for the 386 file server, this software provides little additional capability beyond support for 32-bit memory moves and the use of memory to increase the apparent speed of the disk. 3Com's Canzler says the ability to support 32-bit memory moves only improves network performance between 2% and 5%.

Fine-tuning

Operating system performance is highly dependent on the configuration and typical usage of the LAN on which it is installed, Canzler adds. So, regardless of whether the operating system is specifically designed around the 80386 chip, "Any time you have any operating system, the people doing the installation and management of the network should be knowledgeable about tuning the network."

By adjusting parameters, such as packet size, users can attain higher performance levels, Canzler says.

Banyan is one company that has already developed an 80386 network operating system. Banyan announced its Vines/386 package in the spring of 1986, almost six months before the company's 386 file server debuted.

However, while Vines/386 claims support for the 386 32-bit architecture, it still offers few additional features not found on the standard Vines software.

Chuck Saunders, vice-president of the Riverbend Group, a network value-added reseller in McLean, Va., says it is the lack of software that continues to hold back the power of 386 servers.

He adds that some people are mistakenly waiting for OS/2, which they believe will take

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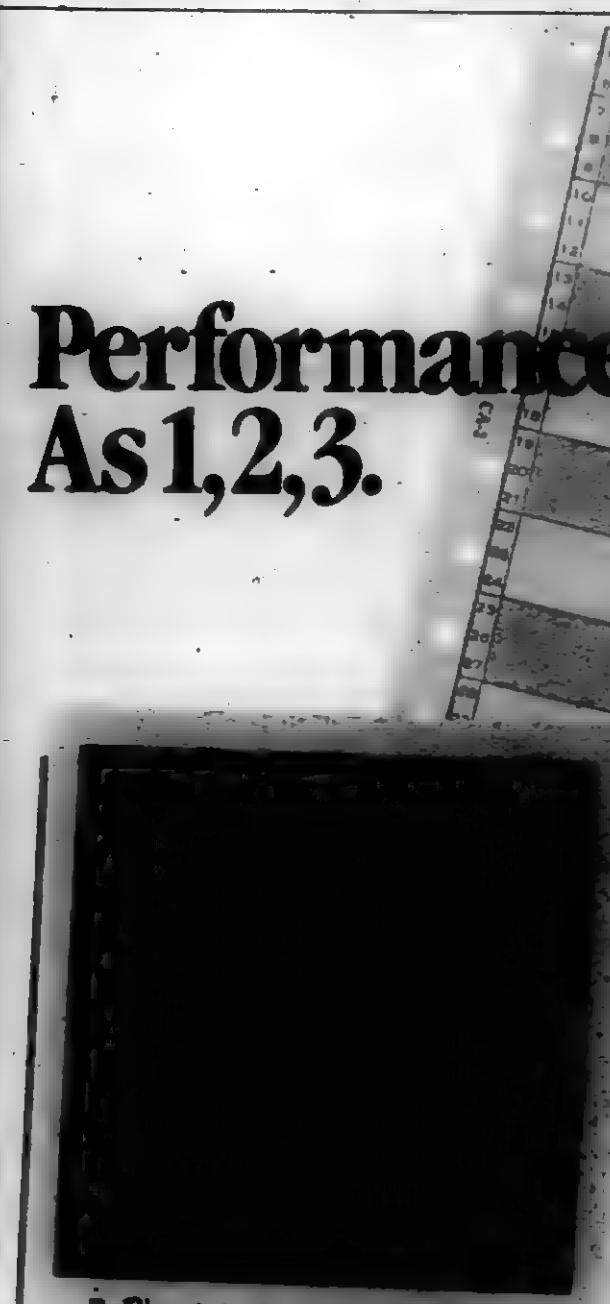

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advantage of the 386's power. Unfortunately, he says, the first version of this operating system does not fulfill this expectation.

The first version of OS/2, which began shipping in December 1987, was written for the 80286 chip.

However, the advantages provided by almost any multithreaded operating system could increase the abilities of an 80386 file server, turning it into more of an applications server.

For example, explains Greg Hansen, senior program manager for Convergent Technologies, Inc., applications programs such as data bases could be split up between both the server and the workstation. Currently, a data base program is run entirely on the workstation CPU, leaving the server's CPU free to handle information requests and manage the network. This setup was a necessity when the limitations of the CPUs left the server with its hands full just controlling network communications. But by using the 386's greater horsepower, data base tasks could be split up between the two CPUs.

Dividing portions

Hansen says that while the workstation portion would focus on the user interface and other high-level tasks, the server portion of the program would perform incoming sort and extraction requests, thus speeding up response time on the network.

Data base developers such as Oracle Corp. and Unify Corp. are working on such projects, and Univation, Inc. in Milpitas, Calif., recently announced its Lifeserver 386 network server. This server was designed to work with the company's Lifenet network operating system, which combines both LAN and data base servers. With the Lifenet system, the data base index is stored at a central location, and the server itself actually processes data requests. This technique also cuts down on the network traffic load because only selected data is passed from the server to the workstation.

Also taking advantage of the 386 are some MS-DOS-like operating systems that have been designed for the 80386, although not necessarily for the LAN environment. These operating systems have both multiuser and multitasking capabilities, allowing a 386-based unit to serve as a host for a small multiuser system.

With systems such as these, it appears that microcomputing is coming full circle. Microcomputers originally moved computing power away from a central processor and onto the desktop. But with the 386, some applications are moving back into a host-based environment — only this time, the host is a 386-based micro.

With support from the right operating system, the 80386 can emulate multiple 8086 machines. This virtual machine capability makes 386 computers a natural for application in multiuser systems, according to Logan Industries' Soya.

These multiuser systems permit several inexpensive terminals (or, in some cases, just a monitor and a keyboard) to be connected, via RS-232 ports, to a single 386 machine. By using software that emulates MS-DOS, these multiuser systems take advantage of the large existing applications software base written for MS-DOS while adding multiuser capability.

These systems are most often used in vertical market and real-time applications, according to vendors. Because of the high speed of such systems and the relative ease of connecting the terminals to the CPU, applications, such as process or manufacturing control, are increasingly being turned over to the 386-based multiuser system.

Multiuser alternatives

Several operating systems currently provide this capacity for 386 computers, and they are not limited to use on machines designed as file servers.

XMM-DOS, developed by Concurrent Controls, Inc. in San Francisco, is an enhanced version of Digital Research, Inc.'s Concurrent DOS.

Concurrent DOS is an outgrowth of Digital Research's CP/M, the first hardware-independent microcomputer operating system. Concurrent DOS, developers claim, has the advantage of using a multiuser, multitasking kernel onto which a DOS emulator has been grafted. This avoids the problems that other systems face in using a DOS look-alike as the kernel and adding multiusage features.

The Software Link, Inc. in Atlanta also recently announced LAN support for its PC-MOS/386 operating system. Unlike most other systems, PC-MOS/386 supports 32-bit protected-mode operations on the 80386, and at the end of November, the company announced that Novell will be supporting this operating system.

Scheduled to ship in the first quarter of this year, the Netware PC-MOS/386 Support Package will permit multiple Novell Netware sessions to run on desktop computers operating under PC-MOS/386.

While this ability does not provide the advantages of a complete LAN operating system, it does allow the interconnection of multiuser systems with some terminals possessing full 80386 capabilities.

However, these systems still lack the critical backing of an IBM or a Microsoft, and, therefore, are unlikely to become 80386 LAN operating system standards.

In fact, without the software and hardware standards and tools and peripherals to drive them, 386 file servers remain more of a promise of things to come rather than an immediate answer to current needs. ✦

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Circle Reader Service Number 10

No blueprint for SAA

IBM's plan lacks grand design

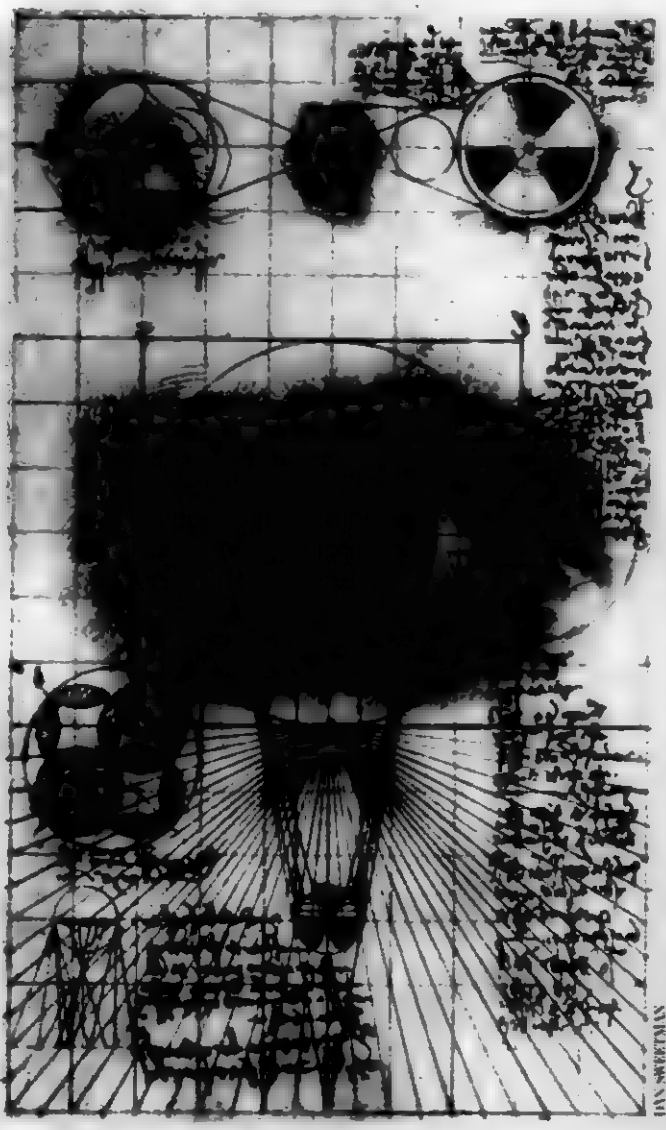
BY TONY PERCY

IBM's Systems Application Architecture (SAA) is currently only a motley collection of products and interfaces that were put together in an attempt to counter Digital Equipment Corp., a competitor that addressed architectural issues more sagely a few years ago, providing consistency, portability and interconnection among its systems platforms. There is no blueprint for SAA. This is not to say that IBM's intent is misguided, only that the evidence of a grand design, which classifies a true "architecture," is simply not visible.

A comparison of SAA with IBM's Systems Network Architecture (SNA) highlights the lack of a master design behind SAA.

Many of SNA's components will also be found in SAA. Even though SNA has changed during the years in response to such factors as distributed processing, intelligent workstations, the need for network management tools and local directories, something permanent has endured. Although their names have changed, there still exist in SNA seven layers that separate the software and hardware boundaries in which decisions should be made about data transformation, routing and so on to gain high-level independence, which is one of the prime goals of a well-designed architecture solution.

As author and lecturer James Martin writes in his book titled *SNA — IBM's Networking Solution*, "Because SNA is an *architecture*, it is independent of any hardware or software product." Certainly, SNA may be associated with certain hardware and software products, and IBM will do its utmost to ensure that SNA users will adopt IBM's implementation of that architecture, but, in principle, users should be able to license or acquire any other vendor's implementation of those protocols or models and not affect the integrity of the total environment.



For instance, a model of LU6.2 functionality, which covers three layers of the SNA architecture, is successfully supplied by several third-party vendors — especially in non-IBM hardware environments. The degree to which an architecture like SNA is open is the extent to which the protocol boundaries in the architecture are unambiguously and completely defined, thus allowing the recognition of other worlds, the provision of logic to support these worlds and a choice of implementations.

(An interesting and timely footnote to this discussion is IBM's recent signal that the protocols for PU4 and PU5 devices are being removed from the public domain, thus indicating that SNA itself is losing some of its openness.)

SAA is not independent of any particular hardware or software product, although it does contain components that are. The emphasis in architecture should be on the protocols and interfaces, not on products. For an architecture to describe how application systems should be built, even on a single hardware architecture, it should reflect the total scope of what is required to do that. It is not enough for IBM just to address application design as if it were merely a question of a Common Programmer Interface, naming certain third-generation languages to be in SAA that are no surprise to anyone. The company should instead think in terms of a software engineering interface, which would take into account

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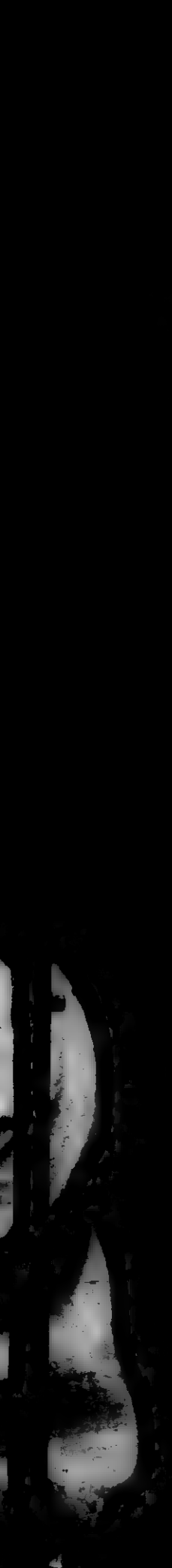
Percy is vice-president of strategy for Applied Data Research, Inc., a Princeton, N.J., developer and marketer of software. This article is based on a presentation he made at a conference on SAA in London organized by Xephon, a consulting company in the UK.



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Nor is it adequate to throw in portions of the interface of a not-very-well-regarded applications development tool — IBM's Cross-System Product — to deflect criticisms that SAA is not addressing the concerns of higher levels of productivity and abstraction and the needs of real-time and transaction processing systems.

The fact is that blatant gaps exist in SAA. For instance, the current definition does not cover the issue of portability of code between different IBM operating systems and teleprocessing monitors, including TSO, VM/CMS, CICS and IMS/DC, let alone between different processors of indeterminate identity, including the System 3X family: (SAA design documentation is vague on some of these issues. For example, "System/3X" is not actually defined, and the suggestion is that it is not in fact a generic name for the System/36 and 38 but a future offering on which components like the Common Programming Interface will be implemented.)

On Oct. 20, 1987, IBM did in fact announce that CICS/MVS and IMS/VS would "participate in the 370 Systems Application Architecture environment." Notice not only the subtle admission that SAA will, in some cases, have to be qualified by "370" (we shall not see IMS/DC under OS/2) but also that IBM announced products, not interfaces.

The remainder of the announcement concentrated on the standardization of interfaces for Advanced Program-to-Program Communications (APPC) for all host SAA environments. While such services will become increasingly important in IBM's scheme of things, they constitute only a small portion of the services that are required of a transaction processing monitor.

IBM may have a tough time convincing users that it has the best vision of what applications should look like and that it understands human factor issues best.

But there are other significant gaps in SAA. More elements are needed to manage the whole cycle of designing, developing, implementing and maintaining applications, especially at a time when IBM is beginning to promote the idea of cooperative processing applications combining logic on a workstation as well as a mainframe.

For example, SAA needs pieces that go toward making a well-engineered application, such as a data dictionary, which keeps track of multiple objects in the organization, especially the meaning of the data in the data base and the way that applications use it.

SAA needs change control and successful methods of tracking change requests and providing audit trails. It needs to address the growing use of higher level graphics techniques to assist in the data and process modeling steps. It must take into account the integration of formal logic rule-based systems, which are beginning to become embedded in certain deliverable applications. IBM must flesh out SAA in a fashion that would achieve credibility and permanence.

Commendable goals

None of these observations are meant to undermine the excellence of IBM's goals. They serve more to point out the severity of the problems facing the company and to highlight the fact that IBM is not performing a service for the software industry by describing SAA, as it is now, as an "architecture." And yet there exist pieces of SAA that reflect tangible technological goals that IBM can achieve.

The difficult part in analyzing IBM's goals for SAA is trying to pin down the reality in the company's announcements and statements of direction.

It is important to keep in mind that IBM devised SAA to address its incompatible hardware and software environments.

IBM appears to have five main objectives in its SAA strategy, as follows:

- To impose greater software engineering discipline in its own development organization to increase productivity.
- To counter the DEC threat by stressing its long-term plans for consistency, portability and interconnectivity in the IBM world and thus regain account control.
- To convince System/36 and 38 users that they have a future with IBM equipment.
- To increase the ability of third-party software vendors (primarily application software vendors) to offer quality products that make IBM hardware and operating system packages more attractive to the industry.
- To develop better human-engineered products that allow and encourage the rapidly increasing end-user community to use a variety of IBM product functions to address business tasks.

The first goal is a straightforward and obvious one. IBM has to reduce the multitude of tools and techniques that have been used in all its development laboratories. Common Programmer Interfaces are a partial means by which to achieve that end.

The second, third and fourth goals are inevitable and uncontroversial because IBM has to move to simplify and reduce variety at a time when the industry is demanding much greater connectivity from its data processing investments.

It is the fifth goal, of improving the human engineering of products, that is in many ways the most subtle objective as well as the one that may spark the most debate.

This goal, which concerns the human engineering aspects of an architecture and is covered in the Common User Access, shows that IBM has finally realised what it will take to derive an increasing proportion of its revenue from software.

Because the company has not provided a statement on the nature of the applications that SAA will support, IBM lays itself open to the charge of dithering.

IBM has to gain a far greater degree of acceptability from the growing end-user community. One of the ways to achieve acceptance is to present a more consistent metaphor for end-user access to a wide range of IBM products.

End users need to acquire an instinctive feel for how a system should behave and learn skills that can be immediately transferred to other products.

Where the user fits in

User needs are the other side of any architecture. Fred Brooks, a leading project manager for the original IBM 360 operating system, claims in his book, entitled *The Mythical Man Month*, that "architecture must include engineering considerations so that the design will be economical, but the emphasis in architecture is on the needs of the user, whereas in engineering the emphasis is on the needs of the fabricator."

On the part of SAA that deals with the Common User Interface, IBM is clearly concerning itself with important human engineering issues.

An interesting development to watch will be the extent to which the market decides that the IBM method of presenting applications, Help facilities and the like, with all the semantic and syntactical consistency it involves, gives users the system quality they need.

Moreover, the flexibility users desire may run counter to the standardization implicit in the SAA user interface. Regardless, IBM's goal of simplification is praiseworthy.

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One last point here is particularly intriguing. IBM has stated the following: "The Common User Access is still evolving. It is being created for intelligent workstations and will grow through the mid-range to the mainframe systems."

Such statements and the lack of coverage of IBM's 3270 software environment in announcements seem to endorse the view that the key to SAA's portability will be through the delivery of systems that have an intelligent workstation, namely the Personal System/2 with OS/2 Extended Edition, as the sole interface.

Noteworthy as IBM's strategy may be, the company will no doubt encounter some problems in executing it. For one, the task of delivering portability and performance is enormous in principle, in practice and in view of IBM's disparate architectures.

As Mike Braude, analyst with the Gartner Group, Inc., a Stamford, Conn.-based research company, points out, "Software portability is a . . . phenomenon like bug-free software that can only be achieved at great expense." It is entirely possible, of course, to deliver identical externals to a product using completely dissimilar and unportable code. That situation might constitute good human engineering but poor software engineering.

Confusion caused by the lack of comprehensiveness of the original definition may cause IBM to stumble. IBM is subject to many internal pressures to include in SAA a number of interfaces (products) that are deemed by their promoters to be strategic. IBM could get caught in a web of its own making if elements not included in SAA are suspected of not being strategic.

SAA's repertoire

Because anything that generates revenue for IBM is considered strategic, the company cannot afford to let the wrong signals go out. For example, VSE is considered by many to be dead because IBM has been dropping hints about its demise for some time. However, not every product that currently fails to appear on the SAA song sheet is necessarily defunct.

Likewise, whenever IBM makes an announcement — most likely accompanied by the press heralding the debut as a further step in the unrolling of IBM's SAA strategy — every interface and feature will be inspected in case IBM is revealing some new offering that will become incorporated in the three target environments of SAA — the 370, the System/3X and the Personal System/2 line. This perception may not always be true, however.

Similarly, IBM has to be careful about stating openly what products (interfaces) have been definitely discarded in SAA planning, such as PL/I, as opposed to those that are still under serious consideration, such as RPG-III.

Problems may also arise from complaints by an existing user base that may resist the incompatibilities that SAA involves or its performance costs. IBM may have a tough time convincing users that it has the best vision of what applications should look like and that it understands human factor issues best.

Dealing with a set of changing technologies, a moving target of sorts, may also cause some problems for IBM. Because the company has not provided a statement on the nature of the applications that SAA will support, IBM lays itself open to the charge of dithering. And dithering it may be, in some cases.

Its shuffle with the much-rumored Repository project and its irregular wooing of the American National Standards Institute IRDS standards committee for data dictionaries are indicative of IBM's uncertainty. The role of graphics techniques in data modeling and high-level code specification is another area in which IBM needs to do a great deal of research before committing to a direction. The strategy for the intelligent workstation push is not yet clearly refined.

The confusion factor

All this does not mean that IBM will be unsuccessful. Confusion in the market often works to IBM's advantage, especially if the independent software suppliers are the target. However, with DEC as a competitor, confusion may be a liability.

So what can we divine from IBM's moves, and how can we expect the company to fill in the gaps in SAA?

First of all, the full implementation of SAA will take years. Further definition will be a slow, staged process, reflecting strenuous debate within IBM. Most experts are predicting it will take until the early 1990s before interfaces will be mature enough to allow the portability that is IBM's goal with SAA. (And by then, of course, the PS/2 with OS/2 Extended Edition will have replaced the 3270 as the primary interface to the system, simple voice recognition systems will be practical, and all the ground rules will have changed.)

Second, there will be simplifications at the higher levels of function invocation that will conceal the lower level divergence. For instance, much has been made of the fact that the Token-Ring network is visible within SAA but that a software interface to exercise it — Netbios being the existing interface — is conspicuously absent. Netbios will nevertheless be around for some time yet, but expect to see an extension of IBM's session management protocol, APPC, to cover a wider variety of functions.

Third, the fate of the System/3X family will be unveiled with the announcement of IBM's Silverlake product. The offering will presumably allow some System/36 and 38 emulation on a 370-based hardware architecture.

Fourth, look for a simplification of the end-user interface and a three-level definition in SAA that will allow menu selection, mnemonic use of the displayed menu and a command language to be simultaneously available at all times. IBM is also expected to make a formal statement to suggest a standard for the meaning of commands across different products or functions.

Fifth, expect a healthy debate on the merits of the the PS/2 as a replacement for the 3270. Look for IBM announcements in 1988 that make substantial additions to the SAA definition and that likely incorporate specialized methods for exploiting the capabilities of intelligent workstations.

Sixth, do not await a reprieve for VSE. IBM has stated, "Our direction with regard to VSE is to make those changes that will facilitate migration to MVS." Do not be surprised by an announcement of MVS/IS on the 9370.

Seventh, do not expect a speedy resolution to the issue of portability across operating systems and telecommunications monitors. It is unlikely that the problem can be successfully attacked by elevating the interface to a higher level, such as CSP; the same problem would remain below. Many experienced software engineers have grappled with the problem of providing a common service interface for applications that would deliver functionality and performance across such systems as CICS, IMS/DC and VM/CMS.

Alternatives will arise

Finally, look out for rival approaches to the idea of an application architecture. Some industry groups may work on an alternate definition or a rival standard to SNA, like the International Standards Organization's Open Systems Interconnect. SAA simply cannot fit the bill in its present shape.

IBM has pulled off a remarkable marketing coup. The company has taken a serious competitive disadvantage — lack of homogeneity — and elevated it to a positive, strategic issue that could delude many into thinking that the company is a safe haven at all times for software as well as hardware.

The worthiness of what IBM is trying to do must not be allowed to distract attention from the poverty of substance in what has been described so far in SAA. The benefits of a well-defined architecture will come to users when they are able to pick and choose components to perform the job.

The opening of the architecture or the proposal of alternative architectures will be threats to IBM. For as long as it owns the architecture, IBM will make every attempt to lock its users into its own components. That is not what makes for a healthy and competitive software industry. ◆

MIS strategies for SAA survival

ALL THE INFORMATION and speculation about IBM's Systems Application Architecture (SAA) can leave many an MIS professional bewildered. The following are some tips that may help you survive IBM's moves.

Each information systems manager must attempt to define the architecture of his information portfolio, keeping in mind what IBM has outlined. He should take inventory of the systems he has developed and acquired, the software packages he licenses, the data bases and files he maintains, the interfaces and security systems he utilizes, the communications links he has adopted and the equipment for which he is responsible.

This task should not be merely a tabulation but an effort to make sense of the choices in order to relate them to what SAA or any other architecture could offer. These actions will help MIS make better decisions in the future.

Information systems professionals should take nothing for granted and demand the most from IBM.

SAA is addressing serious issues, and the IBM user has a right to ask some tough questions and require some sound answers about the substance of SAA.

To plan how components of SAA might be most useful, MIS managers should appoint someone to maintain expertise in the details of SAA as it is unrolled and relate them to the organization's own strategic information plans. There should be no hesitation in attempting to influence IBM about the realities of software architecture.

MIS managers should test their vendors' understanding of SAA's strengths and weaknesses. They should develop ideas of what is immediately useful and why and ensure that vendors are not either following the letter of SAA slavishly or ignoring it completely.

MIS should ask software vendors about their views on architecture and what their stance is on an alternative open systems application architecture.

Above all, information systems people must continue to focus on business needs above technology. They will continue to feel the pressures of squeezed budgets and end-user demands for more.

The success of the strategic systems that MIS delivers will have to address the dual goals of software engineering and human engineering.

MIS will have to stay aware of the acceptability of the human interface and integrated help and training systems and relate the systems it delivers to all the other external services to which the intelligent workstation user will have access.

Professionals will continue to have to make compromises and manage expectations skillfully to maintain productivity at modest expense. Most importantly, MIS managers must realize that when IBM says that a product is "strategic," it means that it is strategic for IBM, not necessarily for its customers. —TONY PERCY

The fate of 4GLs

Hard-to-define, they fight for credibility

BY STAN KOLODZIEJ

The identity crisis for fourth-generation languages (4GL) is going to get worse.

The fact is, 4GLs have never been a particularly easy animal to define. Unlike most computer technologies, which have sought to refine their identities through the work of official standards committees, the 4GL market has been left fairly free to police itself. The result, however, has too often meant a semantic squabbling by 4GL vendors, which has left many users confused and which has put a damper on 4GL sales.

"It's the old story with 4GLs," says Frank Vafier, executive vice-president of Jyacc, Inc., a New York-based developer of user interface systems. "4GL is a generic term that is used by vendors to describe a lot of things that do not conform with American National Standards Institute standards.

"4GLs are a catchall. They are supposed to be nonprocedural and nonsequential, yet many so-called 4GLs are blatantly neither," Vafier claims.

Definitions aside, another problem with 4GLs has been the inability of users and vendors to properly segment the shifting 4GL market into two broad but important categories.

"4GLs can be broken down into those systems that provide tools for some heavy applications building and those that provide what amounts to fancy end-user query and reporting routines," explains Adam Rin, vice-president of product management at Bachman Information Systems, Inc. in Cambridge, Mass., and who was previously involved in developing Applied Data Research, Inc.'s (ADR) Ideal fourth-generation language system.

Peter Levine, vice-president of software engineering strategies at the Gartner Group, Inc., a Stamford, Conn., research firm, agrees. He calls the end-user-type 4GLs "information generators," which are in contrast to the true fourth-generation language applications generators.

In other words, Levine says, such products

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as Telon from Panaophic Systems, Inc. in Oak Brook, Ill., Pacbase from CGI Systems, Inc. in Pearl River, N.Y., and Intelagen from On-Line Software International, Inc. in Fort Lee, N.J., are true applications and third-generation language code generators built for programmers. Other fourth-generation systems, such as Focus from Information Builders, Inc. in New York and Natural from Software AG of North America, Inc. in Reston, Va., are end-user systems that do not generate Cobol code for big programs but rely on 4GLs to provide efficiency gains in the front-end design and prototyping stages of the application life cycle.

Of course, most 4GL vendors are still reluctant to position themselves in either one or the other 4GL camp, a move that could preclude gaining entrance to the lucrative market of the other group. Most 4GL vendors, therefore, claim their systems can accommodate both end-user report generation and heavier systems development. In the past, however, that approach has sometimes led to well-publicized systems development blunders that have fueled user suspicion and the feeling that 4GLs do not belong in the mainframe development arena.

"I think much of what has been said about the failings of 4GLs in heavier systems development is true," Levine claims. "As a result, though MIS has been a big supporter of 4GLs, these languages have mostly been used on a satellite basis. MIS continues to use 4GLs not for the blood-and-guts kind of applications but for lesser concerns."

Vafier says flat out that he doesn't feel it is possible to write complete applications with nonprocedural languages.

"You just can't get the same kind of throughput that you can get with more traditional languages like Cobol," he says. "4GLs are not for big systems."

The larger fourth-generation language development systems have their champions, however. "We're using two 4GL systems to handle

Kolodziej is *Computerworld Focus*'s senior editor.

some heavier, systems-oriented programming," explains David Nickolich, a productivity specialist with a large Midwest communications company. "But we're also using them to give end users access to mainframe data."

Chris Cummer, senior program analyst at Freeport, Maine-based retailer L. L. Bean, Inc., says the company has been using ADR's Ideal for writing nearly all new in-house systems, which include heavy throughput on-line applications like order processing.

The manager of product services at a large southern U.S. soft drink manufacturer says the firm recently shifted from PL/I to Cobol as its primary development language. The manager, who wished to remain anonymous, says his company has since been grinding out large systems development applications using a combination of Ideal and Cobol.

Nod from programmers

Hans Mortner, president of Codd and Date Consulting Group in San Jose, Calif., claims that fourth-generation languages have lately gained in popularity with programmers doing large systems development, especially programmers in big financial companies.

"There is a need to churn these financial programs out quickly, and you can't do that working with Cobol or Fortran," Mortner says.

Nickolich explains that although it is hard for programmers to visualize set processing (a term that he equates with 4GLs and that can be compared with traditional third-generation language sequential processing), it is 4GLs' set processing that can pay major programming benefits later.

E. Reed Doke, an associate professor in the computer information systems department at Springfield-based Southwest Missouri State University, says his field studies of Fortune 1,000 companies revealed a change in the way these companies are designing and developing their software systems.

"There is more end-user input, more end-user software development and more utilization of end users in the development cycle," Doke claims. "We found that, in 1987, between 60% and 77% of the study respondents were using some form of prototyping, and the comments made to us revealed that most of those companies were using 4GLs to do the prototyping."

Doke compares his study with a similar one undertaken at the University of Minnesota in 1981 in which it was revealed that only about 33% of Fortune 1,000 companies were conducting prototyping in 4GLs for new software development.

Doke's findings concerning greater end-user involvement in software development strikes a familiar cord from 4GLs' past.

"These languages have shifted focus into larger, vertical systems development," Codd and Date's Mortner says. "They have never met their stated goal of becoming true end-user programming languages."

However, fourth-generation languages have, in fact, reached this goal for many users. According to Charles Brust, supervisor of computer applications for Montgomery County, Md., "That's what these tools were intended to be used for — producing applications for end users who use mainframe data."

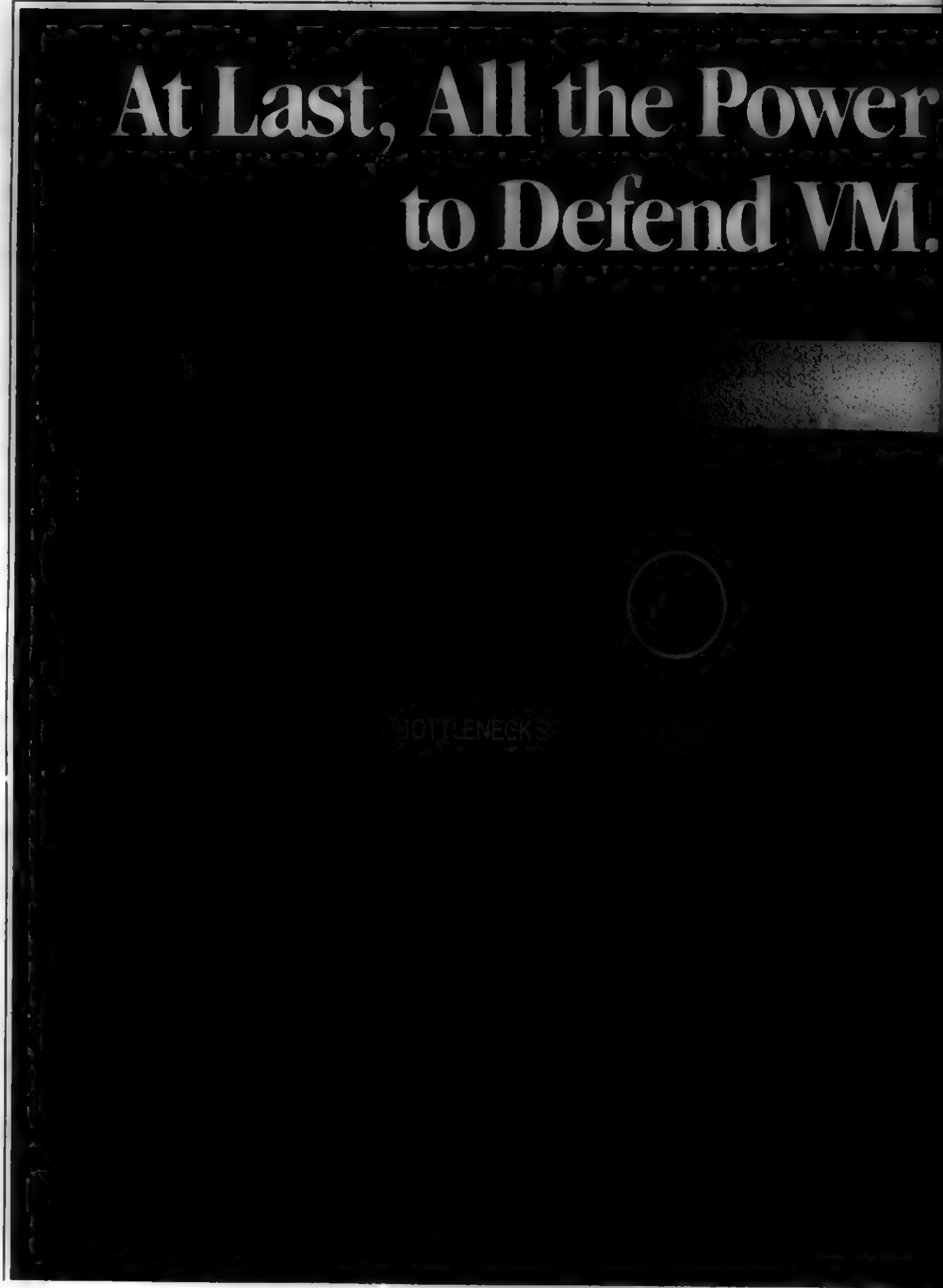
The Gartner Group's Levine says that although he feels 4GLs have not fulfilled all their promises of end-user computing, it is probably because those goals were unrealistic from the start.

Not so shabby

"The major success story of fourth-generation languages on the end-user side has been the creation of facile on-line report generation that has become widespread throughout U.S. corporations," Levine explains. "That's not a shabby record."

Maybe so, but why have 4GLs failed in their mission to bring real programming capabilities to the corporate masses?

Nickolich says the answer to that question is simple. "For all this talk about nonprocedural and English-like statements, end



users still find most 4GL access languages difficult to work with," he says. "You still really need a knowledge of data bases and how they're structured."

For those users who are not capable of or do not wish to get inside a software system and look around, Nickolich explains, 4GLs are an obstacle.

"Yet 4GLs are still the best end-user programming option on the market," says Michael Cohen, a research analyst at Input, a Mountain View, Calif., research firm. "For all the talk about computer-aided software engineering, it leaves the end user out in the cold."

> **"4GLs will be driven by artificial intelligence. We'll see more 4GL vendors integrating extremely user-friendly interfaces."**
>
> HANS MORTNER
> CODD AND DATE CONSULTING GROUP

The mention of computer-aided software engineering (CASE) is significant. Under the current market push of other, better defined software technologies, which include CASE, relational data base management systems, expert systems and some other technologies that claim artificial intelligence as their touchstone, much of what is claimed as 4GL technology is in danger of being broken apart and recast in the image of these other systems.

When speaking with users, analysts and vendors, it quickly becomes clear that most agree that 4GLs will undergo some substantial changes in the near future and that these changes are directly related to the other technologies. Just where the transformations will lead, however, is anybody's guess.

"4GLs will be driven by artificial intelligence," Mortner explains. "We'll see more 4GL vendors integrating extremely user-friendly interfaces, such as Artificial Intelligence Corp.'s Intellect interface."

Nickolich agrees, saying it will be essential for 4GLs to incorporate an easy-to-use interface or to be front ends to relational data bases, which are inherently easily understandable for users.

Levine says that 4GLs have to go beyond the use of the IBM 370 architecture as their main platform, maintaining their front-end software positions and embracing IBM's DB2 relational data base management system or, perhaps, some other relational system like Ingres from Relational Technology, Inc. or Oracle from Oracle Corp.

"These languages also have to incorporate interesting technologies such as natural languages and hooks to expert systems," according to Levine. "Otherwise, they'll be left behind."

Wise choice

According to Chuck Riegel, product manager at Software AG, "At a certain point, we asked whether we should go out and buy other data bases or expand and improve on our existing Adabas data base. We decided to stay with what we had, and it was a wise decision."

Riegel, however, says his company also realizes that there has been a good deal of end-user evaluation of the pairing of 4GLs with DB2.

"We're introducing a DB2 tie-in with our 4GL, but we're going to make sure that we still provide more than what Cobol gives with DB2," Riegel says.

For Carolyn Green, manager of information management at Houston-based Pennzoil Co., fourth-generation languages will become components of fully integrated CASE systems.

"There is so much cross-fertilization in the CASE market now," Green says. "We intend to pilot CASE this year, but we're waiting to see where things settle before making any major commitments."

Hal D'Algee, a consultant based in Davenport, Iowa, says 4GLs are in for a rough time.

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"There has been a lot of AI movement in the last six months," D'Algee says. "A lot of it is within CASE, and that will give 4GLs trouble."

Carnivorous CASE

As an example, D'Algee points to the CASE tools from Bachman Information Systems. And in the estimation of Bachman's Rin, it is just a matter of time before CASE subsumes 4GLs.

"4GLs assume that a data base has already been designed and preexists," Rin explains. "4GLs have basically been positioned as rapid prototyping tools. Where CASE differs is that it is independent of data bases and can convert unstructured Cobol programs. 4GLs are destined to fill part of the CASE environment and eventually fade into CASE."

Input's Cohen disagrees, saying 4GLs are not going away. On the contrary, Cohen claims, it is these languages that will have a major impact on other technologies, such as relational DBMSs.

"All new relational DBMSs have 4GL capabilities, such as screen painting," Cohen says. "4GLs are complementary to data bases, and they are complementary to CASE systems. CASE is not going to eat 4GLs. Both 4GLs and CASE are going in parallel but separate directions and addressing different markets.

"At the end-user level, 4GLs will always offer programming trade-offs in the way of execution time and some loss of efficiency, but that is not why you get 4GLs. If people were always worried about great programming, everybody would be programming in assembler," Cohen says. "The benefits of programming with 4GLs are not always hard and quantifiable."

DB2 ties

But Cohen also says he thinks that 4GLs as an entity will continue to weave their way into other technologies. "One major change is that most 4GLs used to talk only to their own data bases," Cohen says. "Now they are tying into DB2 to remain mainstream."

Andria Rossi, president of Rossi Consultants in Austin, Texas, says that 4GLs are only the beginning of true expert systems. "When you come down to it, all these systems are heading toward the same thing — making it easier to get information out of data bases," Rossi says. "Expert systems are the logical extension of 4GLs."

One area in which 4GLs are making their mark is in the burgeoning market of user interface management systems.

Vafier, whose personal computer-based Jam user interface product is based on 4GL nonprocedural techniques, says that 4GLs are useful as front ends in application development but should back off at a certain point. "Jam programmers build application prototypes, but the applications are actually written in Cobol," he says. "I believe you need to let people keep what they're comfortable with."

Though Vafier says 4GLs are making a significant contribution to user interface front ends, which are necessarily data base independent, his contention that 4GLs lack the abilities for larger systems development makes him pessimistic about 4GLs maintaining their independence. "I see the real definition of 4GLs changing, and I see 4GLs becoming part of other third-generation language-based development systems like CASE," he predicts.

There are other software developments with which fourth-generation languages must contend. As 4GLs edge their way into more advanced software technologies, they may also feel more pressure from some advances made in Cobol, the stodgiest of third-generation tools.

"We avoided 4GLs because we thought they weren't needed," explains David Smith, manager of the productivity aids group at John Deere & Co. in Moline, Ill. "The third-generation application generators or front ends are now giving you the same productivity kicks that 4GLs do."

Drying out

Smith says that his company tried some of the early 4GL report writers on the market and got hung out to dry. "There was no upward mobility with the 4GLs," Smith explains, "and we couldn't target multiple hardware environments like we could with Cobol. There is now a Cobol compiler available for just about every machine on the market."

Doke of Southwest Missouri State also points out that Cobol has had a nonprocedural report writer feature for some time and says some of the nonstandard Cobol compilers on the market, such as Ryan-MacFarland's RM Cobol, are really 4GLs.

But Software AG's Riegel claims there is plenty of room for 4GLs to improve on Cobol, especially at the compiling end.

Riegel explains, for example, that there are still a lot of people using SQL within Cobol to write programs in DB2. "They don't use Cross System Product, IBM's fourth-generation tools, because they're awkward. That leaves few options. What you're going to see is 4GL generators that will generate DB2 programs in IBM DL/1, IMS and VSAM file structures. . . . 4GLs still have enough to stay ahead in the game."

"Given the other advances in the market, however, it looks like the time for 4GLs to really deliver has come," claims David Reuderman, a New York securities analyst at Smith Barney, Harris Upham & Co. "4GLs always seem to be one of those technologies in a perpetual state of showing great promise."

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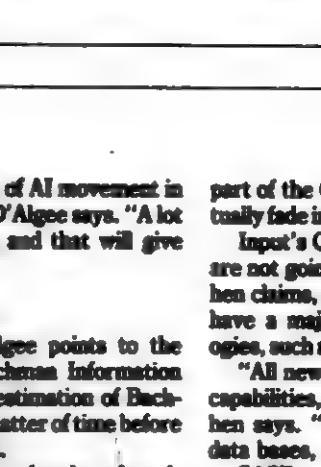

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TERESA C. MORO

Small systems give Unix a break

BY MICHAEL TUCKER
FEATURES EDITOR

Commercial Unix, despite everything, is alive.

Five years ago, even the phrase "commercial Unix" was a contradiction in terms. But as we enter 1988, commercial, MIS-oriented Unix actually exists. There is even a movement afoot to bring on-line transaction processing and CICS applications to Unix.

What happened?

To understand Unix's mysterious success and how it might impact MIS, it is necessary to take a look at the short but colorful history of commercial Unix. It is the curious story of an operating system lost among small-system vendors and ultimately strengthened by them.

The fact that Unix is present at all in commercial computing is nothing short of a minor miracle. The operating system was developed at AT&T Bell Laboratories and later refined at universities and research installations as a scientist's operating system. Where it did turn a profit, it did so as the native operating system in scientifically oriented computings.

Then, during the early 1980s, there were several more or less uncoordinated attempts to bring Unix to the commercial world. AT&T, in particular, rediscovered Unix and attempted to promote it.

However, these efforts to position Unix as a commercial offering met with only limited success. "Unix achieved a certain market position," explains Kenneth G. Bosomworth, president of market research firm International Resource Development, Inc. in New Canaan, Conn. "But it was a much smaller share than AT&T would have liked. I suspect that if they had a chance to do it all again, they wouldn't."

Perhaps not. But by 1987, Unix accounted for some 9% of

Multiuser, multitasking contenders abound. See story page 30.

the systems market, according to International Data Corp. (IDC), a Framingham, Mass.-based research concern.

Unix achieved this success mostly because of its multiuser and multitasking aspects and its relatively inexpensive cost.

The early years

The multiuser and multitasking side of Unix was important during the early years of this decade, especially in its Microsoft Corp. Xenix version and particularly with the makers and remarketers of small business computers.

In the early 1980s, there were very few multiuser and multitasking operating systems for developers working at the low end of the market. The various types of Unix fit the bill, and it quickly became, if not exactly the darling, then at least the steady companion of small business computer dealers working in the two- to 10-user range.

It is, in fact, in that same range that you still find the majority of commercial Unix installations. According to Paul Cubbage, associate director of industry services at San Jose, Calif.-based research firm Dataquest, Inc., more than half the Unix licenses in the world are for Xenix.

However, it is also in this range that Unix is most vulnerable. Between 1980 and 1984, Unix was the only game in town. Today, there are dozens of very good multiuser and multitasking operating systems on the market. More ominous is IBM's OS/2. (See story top right.)

Meanwhile, Unix's relatively low cost made it easily available to scores of young, innovative companies. The most famous of these were the technical workstation vendors, but they included a healthy dose of commercial, multiuser microcomputer makers, such as Altos Computer Systems, Inc. and Arete Systems Corp., both located in San Jose.

"Unix is the default setting of anyone entering the system market today," claims William Zachmann, vice-president of corporate research at IDC. "It's the rallying point of anyone who cannot afford a proprietary operating system. These days, that means just about everybody except Digital Equipment Corp. and IBM."

A VAR, VAR better thing

Thus, from its salad days in the commercial world, Unix was the property of small-systems makers. From its time in the wilderness of value-added reseller and small business computer vendors, Unix has gained two important legacies. The first inheritance was a considerable library of applications (this despite Unix's hard-dying reputation for a lack of software). The second was standards.

Chief among the applications and a major reason why Unix has become interesting to MIS are the several robust data base managers that have been written for Unix machines. "Unix began to take off in 1985," Dataquest's Cubbage says. "That was the year when the DBMS vendors got their products solidified and people could build applications on top of them."

Specifically, developers could build applications that could talk to other applications on IBM mainframes. Early in the game, when Unix-based DBMS vendors were struggling merely to survive, they adopted the most radical technologies they could find. Among other things, they picked relational methods of managing data and IBM's SQL as their method of getting at that data.

And so, when IBM introduced DB2, those vendors were in superb position to exploit it. They could offer their DBMSs as departmental extensions of relational, SQL-based mainframe data.

A Belmont winner

Thus, as early as 1984, Informix Software, Inc. in Menlo Park, Calif., (then called Relational Database Systems, Inc.) was promoting SQL as an industry-standard query language. The big winner, though, was Belmont, Calif.-based Oracle Corp., which was able to ride DB2 compatibility into the major leagues of software companies.

Meanwhile, Unix's second inheritance from its small business computer days was an intense, even fanatical interest in standards on the part of its advocates.

Smaller vendors have greater incentives to maintain and enforce some kind of common view of life. After all, these firms may be simply too small to produce all the peripherals, enhancements, software and so forth that users might want. So they must cooperate on some kind of common interface that will allow every vendor to offer as large a selection of third-party hardware and software as possible.

With Unix, this wasn't easy. For the majority of its history, Unix was divided into competing and incompatible variants.

But multiuser standards groups, such as the P1003 committee of the Institute of Electrical and Electronics Engineers, Inc. and X/Open, have become increasingly effective. These groups, and particularly P1003, which promotes its own standard, Posix, have avoided talking about Unix internals and have dealt instead with interfaces. As a result, they have made progress. For example, Posix is not a specification for

Unix's future in the IBM fold

IBM'S POSITION ON Unix is unclear in light of its Systems Application Architecture (SAA) and OS/2 environments.

Big Blue now can offer versions of Unix on most of its machines. However, while IBM seems happy to offer Unix if its customers want it, the company doesn't seem to care to replace AT&T as the leading Unix patron.

The great impact of IBM on Unix could be in the form of SAA, IBM's scheme to link its otherwise incompatible machines across system platforms. Many analysts have pointed out that with SAA, IBM is trying to do within itself what the Unix vendors are trying to do with Posix; that is, create a standard environment in which operating systems would be largely invisible to applications and users alike.

SAA could be a serious rival to Unix. Paul Cubbage, associate director of industry services for the research firm Dataquest, Inc. in San Jose, Calif., says SAA will begin to reduce Unix's market share by 1991.

On the other hand, William Zachmann, vice-president of corporate research at Framingham, Mass.-based International Data Corp. (IDC), suggests that because Unix so easily models other software, SAA would be a "piece of cake to do on Unix." He sees Unix boxes with SAA emulations cutting into IBM's business in the very near future.

And Unix in the IBM world may be in for more worries when OS/2 becomes widely available. While OS/2 is not multiuser in its current form, it is still an attractive alternative to Unix, and there are those who think Unix won't survive the OS/2 invasion.

"Unix will be overwhelmed by OS/2," says Kenneth G. Bosomworth, president of the market research firm International Resource Development, Inc. in New Canaan, Conn. "The real magnet for software developers will be OS/2. The real question for them is if they dare stay away from it."

Bosomworth thinks that even Unix-based scientific and technical workstations are doomed. "As we see the power of the new 32-bit microprocessor released by inexpensive OS/2 platforms, we'll see scientists and engineers flocking to them," he says.

Unix's defenders are quick to disagree. "To say that Unix is doomed is pretty rabid," IDC's Zachmann claims. "OS/2 will certainly play a role, but you don't build a 100 million instructions per second multiprocessor micro and then try to run it on OS/2. I mean, get serious." — MICHAEL TUCKER

Rivals to the Unix kingdom

UNIX ISN'T ALONE. There are a lot of other multiuser, multitasking operating systems out there. Some of them, like Unix, came out of minicomputers, and, like Unix, earned their stripes among computing's value-added resellers (VAR) and dealers and, like Unix, now have a shot at riding multiuser micros into MIS.

Unix's competitors include the following systems:

- **Pick.** The Pick operating system, brainchild of Richard Pick and now marketed by Pick Systems in Irvine, Calif., remains a viable and important operating system in the commercial world. Whereas Unix came out of the scientific world, Pick has been and always was meant for commercial data processing.

Pick can be found on a number of different systems. In fact, Ultimate Corp. in East Hanover, N.J., currently remarkets the IBM 9370 departmental computer with Pick.

- **Theos.** The Theos operating system is the product of Theos Software Corp. in Lafayette, Calif. Because of its ease of use and other technical merits, Theos has become a great favorite of VARs. "It's great for the vertical marketers," one analyst claims. "You just can't get a better operating system for turnkey systems."

Whether Theos will make a bid for the commercial data processing field remains to be seen. But it is true that most Theos applications are meant for the bookkeeping operations of small- to medium-size businesses and, as such, look a great deal like downsized MIS software.

- **PC-MOS.** Pick and Unix came down to the 32-bit microcomputers from larger systems. PC-MOS, however, was created expressly for them. Introduced in late 1986 by Atlanta-based The Software Link, Inc., PC-MOS was one of the first operating systems meant for machines based on the Intel Corp. 80386 processor.

Multiuser and multitasking, PC-MOS has been quickly picked up by developers in search of something, *anything* that would allow them to work on the Intel 386 while they wait for IBM's long-delayed OS/2 offering. — MICHAEL TUCKER

operating systems but, rather, for operating system interfaces. Thus, individual vendors may market quite different operating systems and still be Posix compatible.

Increasingly, vendors can come to the Unix market and find a near approximation of the connectivity they might get in some single-vendor environments.

Thus, the late 1980s finds commercial Unix without any one, dominant patron. What it has is a foundation of multiuser microcomputer hardware and software vendors that have prospered in vertical and small business computer markets.

Clearly, the future of Unix is tied to that community of microprocessor vendors. And rising on their past successes, that community is aiming high. Just how high can be seen in the fact that Unix's partisans are suddenly interested in on-line transaction processing (OLTP).

The fact that Unix should be considered for a role in OLTP applications is astonishing. Traditionally, the operating system has lacked the most basic elements necessary for commercial OLTP — file and record locking. Such was the fatal inheritance of its youth spent in the scientific and technical markets, in which openness was a prime requirement.

Yet, Cubbage notes, it is "particularly there, in OLTP, that we're seeing Unix make an entry." Technologically, it isn't that improbable. Unix was derived from Honeywell Bull's Multics, which, in turn, was developed for large time-sharing systems that looked a lot like modern OLTP systems. As a result, while Unix has kernel-level problems with on-line processing, those problems can be handled by commercial vendors without immense difficulties.

Agree on OLTP

For example, late last year, Pyramid Technology Corp. in Mountain View, Calif., maker of the Unix-based Pyramid line of multiuser micros, and Sybase, Inc. in Berkeley, Calif., producer of the Sybase relational DBMS, announced an agreement under which the Sybase product would be bundled with a new line of Pyramids, the RTP systems, expressly for OLTP applications.

To make the deal possible, Pyramid had to do a lot of rewriting of the Unix kernel.

"Standard Unix isn't friendly at all toward on-line processing," notes Nancy Colwell, Pyramid's data base program manager. "But Unix is also a standard. You can modify the kernel and still keep to the standard."

But it is in terms of marketing that the Pyramid/Sybase arrangement may be most significant. Both companies have been successful before, but the OLTP arena is new to them. When Sybase first came into the world, it aimed at distributed data base markets. Pyramid, meanwhile, has been, by its own admission, a seller of Unix engines and technology rather than applications for most of its history.

In addition, last year Berkeley, Calif.-based Unisoft Corp. announced Uniteca, which is nothing less than a CICS emulation for Unix-based systems. In other words, IBM's own most widely used transaction processing monitor can now be reproduced under Unix.

Currently, CICS isn't even available under IBM VM and isn't expected until late 1989.

Unix is being carried forward by the force of its multiple vendors. Little companies, young companies, growing companies are trying to do in bits and pieces what giant corporations were unable to manage in a single, great leap — take Unix into MIS.

Unitecs could be used to remotely develop and maintain mainframe CICS applications on Unix-based microcomputers. Or it could be used to run those CICS applications and so bring IBM-style processing to organizations that could otherwise never afford it, such as small businesses or the departments of large ones.

In short, Unix is being carried forward by the force of its multiple vendors. Little companies, young companies, growing companies are trying to do in bits and pieces what giant corporations were unable to manage in a single, great leap — take Unix into MIS.

Whether Unix will be more successful in the MIS shops this time remains to be seen.

But what is clear is that the operating system has entered a new phase of its existence. Now Unix is a movement rather than a product. Armed with 32-bit processors, which make micros look so much like minicomputers that it is difficult to tell them apart, and fortified by past successes, micro vendors are attempting to storm the MIS heights. For them, Unix is the glue in their united front. If they succeed, then so shall Unix.

"If you separate hype from reality," Cubbage says, "then what happened was simple. There's been a long, slow growth for Unix. Now it's matured. It's reached the point where people see it as a way of not getting locked into a single vendor." ◆

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SALLY WIEN COMFORT

Applications development: Tools of the trade

BY GEORGE SCHUSSEL

Applications builders, from the most sophisticated mainframe-oriented programmer to the end user on a workstation, have different levels of expertise but the same goal — to make applications development a quicker, easier and more strategic process. And these forward-thinking craftsmen rely on the MIS professionals in their organizations to provide them with the wares to get their jobs done. Knowing such tools are available is not enough; matching the solution to the need can make all the difference.

Dividing applications development solutions into four major groups with various subdivisions can help simplify the search process.

Group 1 software tools, which include network data base management systems, fourth-generation languages, Cobol, Cobol systems generators and computer-aided software engineering (CASE) tools, were designed to be used by the professional programmer in complex applications in which the transaction level involved is likely to be quite high.

MIS organizations should have at least one tool set from this category for developing tough, or strategic, applications. Because there are few interfaces currently available between network DBMS/fourth-generation languages and Cobol generator/CASE products, you will most likely have to choose between the technologies.

Group 2 products, which include relational DBMSs, data base machines, indexed DBMSs and programmer-oriented fourth-generation languages, are very effective in attacking medium kinds of problems in which "medium" refers to three things: the skill set of the programmer and data base administrator, the complexity of the application and its volume. In moderately sized organizations, it is likely that a tool set from this group will suffice for building strategic applications. Group 2 tools are also appropriate for larger departmental production systems.

Group 3 software tools, which consist of information center fourth-generation languages and text information management systems, were designed to

Schussel is president and founder of Digital Consulting, Inc., located in Andover, Mass. He serves as chairman of the National Database and 4th/5th Generation Language Symposium and is a fellow of the American Association of the Advancement of Science.

be used by people with some computer experience, not by professional programmers. Many Fortune 1,000 firms have chosen mainframe or personal computer-based information center fourth-generation languages for use in building departmental applications or for general use by non-MIS personnel.

The key here is to make sure that the transaction volume does not overwhelm the software's capabilities. Text information systems are useful in organizations of all sizes that wish to manage and retrieve text with data base capabilities.

Group 4 offerings, made up of such end-user tools as menu fourth-generation languages and executive information systems, were designed for use in departments other than MIS, for data base and file structures that represent historical or time-series data and for analyses in which a spreadsheet's capability is inadequate.

In a broad sense, the list runs roughly in order of increasing ease of use and decreasing ability to handle applications in which high volumes of transactions or complex procedural functionality are required. Because fourth-generation language tools are more specialised than third-generation languages, such as Cobol, developers will need to have more fourth-generation language tools available to solve the diverse problems created by today's sophisticated technology.

First in line

The first category of application development tools — network DBMS, fourth-generation languages and Cobol — is not new; the products are based on Codasyl or hierarchical data models, concepts that have been around since 1970. Examples include IBM's IMS and Application Development Facility, Cullinet Software, Inc.'s IDMS/R and ADS/O, Unisys Corp.'s DMS 1100 and Digital Equipment Corp.'s DBMS 32.

Using a product like IDMS/R with ADS/O gives you access to a powerful integrated data dictionary that can help significantly in coordinating functionality across the various programs of an application. Developing applications with a network DBMS requires programming personnel and a data base administration function. The programming is usually procedural.

The data base administrator will be responsible for generating logical and physical data base designs using several different languages, a process much more tedious than generating data base designs for a relational DBMS. Often, in this environment, the data base administration function can become a bottleneck. High-level screen painting, found in tools like ADS/O, removes much of the need for Cobol coding; if the performance of the generated code is not up to the transaction volume, then Cobol is always available as a backup.

Because products like IDMS/R and DBMS 32 have support for data security and integrity as well as transaction integrity, they are often used for building strategic, transaction processing applications. User demands that range from 30 to 300 transactions per second can be handled by applications developed using these technologies.

Complexity, high volumes

For the programming shop that needs to develop complex high-volume applications, Cobol systems generators provide an alternative, or complement, to network DBMSs and fourth-generation languages. Examples of Cobol systems generators are Transform Logic Corp.'s Transform, Pansophic Systems, Inc.'s Telon, CGI Systems, Inc.'s Pacbase and Unisys's Linc II.

These products include screen painters, DBMS data manipulation language generators, active data dictionaries and Cobol code generators. They normally do not have a proprietary DBMS but were designed to generate data manipulation language code for widely used DBMSs, such as IBM's IMS and DB2 or DEC's RMS and RDB.

When the procedural requirements of the application overwhelm the Cobol generator, one can revert to hand coding in straight Cobol for filling in the missing pieces.

Cobol generators are being enhanced with CASE graphical design front ends. Using the resulting software combination, a user may specify a function through graphical process and data design techniques to a system, which ultimately generates the Cobol or Ada application code. CGI's Pacbase and Knowledgeware, Inc.'s Information Engineering Workbench/Gamma are such products. Other Cobol generators are interfacing with Index Technology Corp.'s much-used Accelerator CASE tool.

There is some evidence to support the contention that Cobol systems generators are particularly useful in building complex applications that would overwhelm normal development methods. An experiment for Unisys conducted by Eberhard E. Rudolph of the University of Auckland in New Zealand using Linc II showed that as the complexity of a program increased, as measured by function points, the work per function point accomplished stayed constant.

Whether with hand coding or with certain fourth-generation languages, the work per function point appears to increase as applications become more difficult.

Cobol systems generators, then, are a good choice for consideration for the largest and most difficult applications. This is a reasonable assumption because most Cobol systems generators require a long training period before programming and development staff achieve proficiency in them.

The software products found in Group 2 — relational DBMSs, data base machines, indexed DBMSs and programmer fourth-generation languages — are suitable for solving many of the same kinds of applications that Group 1 tools solve but with the following differences:

- Group 2 tools are usually used when the performance requirements in terms of transactions per second are less rigorous.
- Group 2 tools are used when the nature of the application may require more retrieval and report processing rather than updating.
- Although using Group 2 tools still requires professional programmer expertise, the investment in training and the complexity of these tools is significantly less than for Group 1 tools.

The relational DBMS tools in Group 2 generally come in two versions: software-only products, such as IBM's DB2, Relational Technology, Inc.'s Ingres and Computer Associates International, Inc.'s Universe, and data base machines from such vendors as Teradata Corp. and Britton Lee, Inc.

Although writing SQL data access code for a relational DBMS still requires some significant programming skills, it certainly is far easier than the comparable function for a Codasyl DBMS or IBM's IMS. Differences in ease of use become even more discernible in the writing of data description language for data base creation, something much more easily done with relational DBMSs.

Weak record

However, software relational DBMSs have a weak record in handling high volumes of transactions. It is safest to target such a relational DBMS to applications that have no more than about 20 transactions per second on the largest mainframes.

Many relational DBMSs come with modern and easy-to-use forms-oriented fourth-generation languages for building on-line applications. Active integrated data dictionaries are another advanced capability found in many relational DBMSs. In cases in which the procedural requirements of the application overwhelm the forms fourth-generation language, Cobol is used with embedded SQL.

One particular flavor of relational DBMS is the data base machine. This facility allows you to run embedded or interactive SQL from a mainframe environment. The processing of the code, however, is not done in the mainframe but is shipped off to a dedicated back-end machine, which searches the disks and provides the front end with the necessary data for the application. Teradata's DBC/1012 and Britton Lee's IDM are the two prominent data base machines.

Both products have proven to be appropriate choices when relational DBMS functionality is desired but the performance requirements are too stiff for software-only solutions. The kind of application that could be well solved by relational DBMSs would be one with a large data base, a high retrieval quotient and the need to support browsing and unanticipated queries.

Indexed DBMSs occupy the middle ground between performance and ease-of-use requirements. They are suitable for many of the same kind of applications as relational DBMSs.

The training curve for building your first application with a programmer fourth-generation language is much less than the time and training commitment required to use Cobol systems generator technology.

Designing a data base with an indexed DBMS is certainly much simpler than designing a Codasyl or IMS data base and is also easier than the comparable task for a relational DBMS. While relational DBMSs require data in normalised form, indexed DBMSs only require simple tabular views.

Among the better known indexed DBMSs are Software AG of North America, Inc.'s Adabas, Applied Data Research, Inc.'s (ADR) Datacom/DB, Computer Corporation of America's (CCA) Model 204 and Compuserve, Inc.'s System 1032.

Most vendors selling indexed DBMSs provide a full product set, including report writers, screen painters and data dictionaries. Also, with the increasing popularity of relational DBMSs, most indexed DBMS vendors have announced they intend to deliver SQL capability in the future.

Because the physical implementation technique used by most relational DBMSs is an indexed DBMS, it is likely that during the next few years, indexed and relational DBMSs will evolve to resemble each other.

Another fourth-generation software tool appropriate to applications of moderate complexity and volume are programmer-oriented fourth-generation languages. Examples of these products include Software AG's Natural 2, ADR's Ideal, McCormack & Dodge Corp.'s Millennium:SDT, Cortex Corp.'s Application Factory and Cognos, Inc.'s Powerhouse. You can build applications using these fourth-generation languages, with their screen painters and dictionaries, without making a commitment to a proprietary DBMS. These products run with the hardware vendor's standard file and DBMS software, such as IBM's IMS and DB2 and DEC's RMS and RDB.

The training curve for building your first application with a programmer fourth-generation language is much less than the time and training commitment required to use Cobol systems generator technology. Programmer-oriented fourth-generation languages are suitable for handling the majority of screen-oriented transaction-based applications in medium-size companies. However, as these applications become larger and their procedural complexity increases, programmer fourth-generation languages do not offer as much support (data and transactions integrity, security and recovery) as some of the tools mentioned in the other categories.

So far, the products discussed are aimed toward the professional programmer in an MIS department as the primary user. What is on the market for the business analyst, or possibly even for the end user, who serves as an applications developer? Friendlier user interfaces and more natural languages or facilities make the use of these products directly possible by the consumer of the information.

Some information center fourth-generation languages are Information Builders, Inc.'s Focus, Must Software International's Nomad 2 and On-Line Software International, Inc.'s Ramis. These products offer English language-like fourth-generation languages with optional embedded proprietary DBMSs. However, the fourth-generation languages run against a great number of standard DBMSs and file systems provided by both hardware and software vendors.

Most information center fourth-generation languages originated from report writers and have been enhanced with significantly increased functionality over time. These products are good choices for building simple applications, departmental computing work loads or personal applications systems. The performance characteristics of typical information center fourth-generation languages.

however, limit their usefulness for larger strategic systems. In fact, any application that will require a throughput of greater than 10 transactions per second is probably inappropriate for these tools.

As long as the application is of low transaction volume and simple data base design, its development can be done by end users.

Products like Focus, Nomad 2 and Ramis do have full-blown programming languages that are also well suited for use by programmers in procedural application development. Still, even in this more sophisticated mode, these fourth-generation languages are easier to master than the functionally equivalent third-generation environment of Cobol, CICS and DBMSs.

Used as a complete procedural language, an information center fourth-generation language may require several months of use before a user can develop expertise. As a result, and in order to appeal to direct use by end users without a programming background, all of these products offer menu- or table-driven front ends that allow the generation of simple applications with a minimal initial training period.

Nonprogrammer fluency

In most cases, within a few days, a nonprogrammer can become conversant using Focus's Tabletalk or the Nomad Assistant user interfaces and gain the ability to build simple applications. Someone with a business analyst background but with no programming skills certainly is well within the technological range of this type of product.

Text information management systems were designed to handle bibliographic and library applications. Relational or data-oriented indexed DBMSs are not well suited for handling completely variable-length text or graphics image kinds of data bases. The normal approach used by text information management systems is to do a complete inversion on the data stored so that proximity or exact searches can be carried out on any combination of words.

The data model that best fits text applications is an inversion method, so indexed systems provide the best platform for modifying bibliographic applications. Examples of products providing these kinds of services are Information Dimensions, Inc.'s Basis, Henco Software, Inc.'s Info-DB+ and CCA's Text/204.

The data model used in these applications is usually variable-length text, and, therefore, the data base administrator's job is straightforward. The systems provide query languages and facilities directly and easily usable by non-MIS researchers.

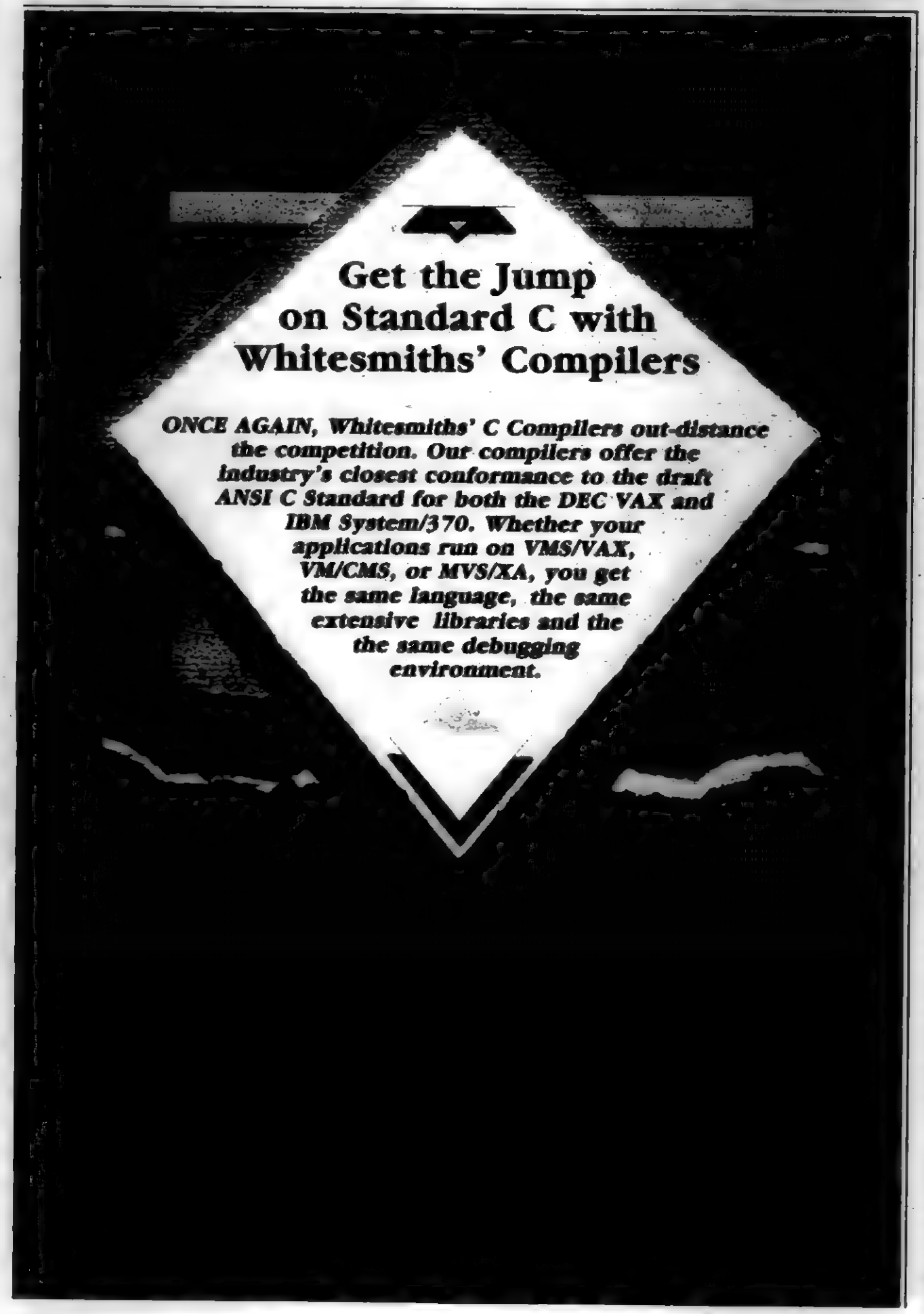
Decision support

Comshare, Inc.'s System W and Information Resources, Inc.'s Express are among the better known examples of decision support systems (DSS). The functions and services provided by these products are similar to those of information center fourth-generation languages.

One way that DSS differ from info center fourth-generation languages is in the way they are marketed. While the buyer of Focus or Nomad is frequently the data processing department of a company, products like System W and Express are usually sold directly to end-user departments, such as manufacturing and finance. The analyses required by these users frequently focus on field, not record, values.

These analyses are also typically performed on existing data bases or historical time series. Accordingly, DSS software is not normally used for interactive, record-oriented transaction capturing. DSS are more useful in multidimensional field-level analyses and reporting in graphic and tabular modes. Because these tools are normally used on static data bases only, updates are typically done in batch mode.

This list of products and suggestions is merely a guideline to help MIS managers provide up-to-date solutions for a range of people. No one tool is right for all occasions and users. As a matter of fact, most firms will probably need several of these offerings to build efficient and productive applications. Good hunting! ‡ ◆



products

TECH TALK

Sun produces Spares that may fuel Unix fire

By Michael Tucker

Just when you think you've got the future of the microprocessor market predicted, someone like Sun Microsystems comes along and messes everything up.

A few months ago, all the answers seemed to be in. The Intel 80386 was going to be the processor that would dominate microcomputing for the foreseeable future — at least, until the 80486, whatever that is, makes its debut. There would be a few alternative processors, such as Motorola chips or the Inmos, Inc. Transputer, but they would mostly be confined to smaller markets.

Which would mean, of course, that Microsoft's MS-DOS and IBM's OS/2 would shape software as thoroughly as the 386 would shape hardware. Alternative operating systems, and particularly Unix, would drift first into niche markets and then into extinction. It wouldn't be a quick death — operating systems fade away very slowly — but it would come eventually.

Because any vendor can license Sparc, shop for the best price and power.

And all this may yet occur. Kenneth Bosomworth, president of market research firm International Resource Development, Inc. in New Canaan, Conn., argues that the 386-based "inexpensive OS/2 platforms" are so much the wave of the future that developers have only two options: learn to surf or drown.

Bosomworth has particularly harsh words about the technical workstation market. It is, he says, "about to get creamed." Companies like Sun and Apollo are in the same sort of position that makers of dedicated word processors were in a few years back. He claims they are going to be crushed by new, general-purpose computers doing what the dedicated machines were supposed to have done but at a much lower cost. He envisions scientists and engineers flocking to the OS/2 machines in much the same way as office workers before them abandoned their Wang machines for IBM Personal Computers.

He could be absolutely right. Machines with IBM's blessing, running industry-standard Microsoft operating systems and unencumbered by heavy price tags, have a lot going for them.

But that doesn't mean that vendors like Sun have to like the situation or sit idly by as this scenario plays itself out. Consider, for instance, Sparc.

In July 1987, Sun announced that it had been quietly working on Sparc, its own proprietary microprocessor, for several years. Apparently, Sun felt that it could not continue to rely on the architecture provided by the Motorola processors, which were the foundation of its original product line.

That Sun had its own processor did raise a few eyebrows. It isn't easy to develop and maintain your own microprocessor. DEC could do it with the "VAX-on-a-chip" and all that, but, then, DEC is DEC, a very big company that can afford to produce its own processors, its own operating systems and the like. The rest of the world is better off going with off-the-shelf industry-standard components.

Ah, but there's the rub. Sun's people had every intention of using industry-standard components. They just meant to set the standard.

Sparc is, to put it bluntly, one hell of a machine. It is a reduced instruction set computing (RISC) device whose design is linked directly with the father of the RISC revolution, David Patterson of the University of California at Berkeley. In current designs, it is a tour de force in elegant minimalism, sporting a mere 50,000 transistors. This means that not only is it blindingly fast — the initial chips are performing at 10 million instructions per second (MIPS) and above — but it is also scalable.

In fact, that's what the name stands for: Scalable Processor Architecture. It is so simple, so classic, that future versions of the chip can be implemented in new technologies, such as gallium arsenide, without a lot of trouble.

Continued on page 37

Tucker is *Computerworld Focus*'s features editor.

PRODUCT CLOSE-UP

Network CASE tool out

Now, it's CASE for networks.

Sun Microsystems, Inc. in Mountain View, Calif., has recently announced the Network Software Environment (NSE), a network computer-aided software engineering (CASE) system meant for the software developer working on a very large scale, as in the millions or billions of lines of code running on networks of heterogeneous machines that may be located miles or even oceans apart.

As such, NSE would appear to be of only passing interest to most MIS officers. It is clearly aimed at people working on the ragged edge of software development, such as defense contractors and aerospace companies. The product has, in fact, some technological inspiration from the Reston, Va.-based Software Productivity Consortium, a collaboration of high-tech firms in search of increased programmer productivity and new methods of managing large-scale programming efforts.

However, NSE could come to the attention of MIS for two reasons. First, workstations are finding a place in applications outside their traditional scientific/technical niche, including some that fall in the traditional province of MIS. Second, and more importantly, MIS professionals are increasingly working on a very large scale. More and more, their development is done for networks of computers rather than stand-alone machines; therefore, they could find themselves turning to things like NSE to make development on

Continued on page 36

Sybase data base gets natural language interface. See story page 37.

BLUE BEAT

Of Ollie and IBM

Deidre Depke

Ollie North, Bud McFarlane, Bill Casey and the rest of those involved in last year's Iran-contra deal were joined by an unlikely partner in their secret activities with foreign governments. History will show that IBM's integrated Professional Office System (Profs) played a pivotal role in the scandal by untangling the web of secret information when the dealings came to light.

Much of the White House staff used Profs to send and receive secret communications and routine information to and from individuals and agencies. Apparently unaware that a computer's memory is much longer than a human's, the players neglected to erase these messages from the White House computer tapes, leaving a long trail of documentation on events that many people thought were long gone. The various lawyers and committees investigating the events found these Profs messages invaluable to their investigations. In fact, as late as Christmastime, revealing Profs messages on the Iran-contra deal were still being uncovered.

As a result, Profs received more than its share of publicity in 1987. One IBM press relations person said recently that he had received more press inquiries on Profs during the latter half of 1987 than he had received during the rest of the system's entire lifetime.

Unwanted or not, the remainder of IBM's software offerings will probably never see the kind of attention that Profs received.

Continued on page 39

Ada precompiler debuts

Embeds SQL statements in Ada programs

Oracle Corp., a Belmont, Calif.-based software developer, has tipped its hat to the Ada programming language by unveiling Pro Ada, a precompiler that embeds IBM SQL relational data base statements within programs written in Ada.

Now edging into the commercial systems areas, Ada originally made its mark with large-systems applications development in the government and military markets. Analysts indicate, in fact, that Ada has been generating more business in all three markets, a fact not lost on Oracle.

"We think that Pro Ada, in conjunction with the nonprocedural query, data manipulation and data definition capabilities of the SQL language, will meet the requirements of complex data base applications, especially those required in the federal government," claimed Dan Klein, product manager for data base management systems languages at Oracle.

Klein said Pro Ada provides full support for the Ada language as presented in the ANSI MIL-STD-1815A standard. He also claimed that the precompiler provides users with integration between SQL and advanced features in Ada. As an example, he explained, Pro Ada supports Ada data-type referencing, including arrays and records within SQL statements.

According to Klein, Pro Ada's support for the array interface enables a single SQL statement to transfer multiple rows of data between the Ada application program and the data base.

The result is a minimizing of overhead for most applications and quick response times for users.

Stellar aspects

The company said that Pro Ada supports its SQL Star distributed DBMS architecture, which enables Ada programs to simultaneously connect with, query and update multiple remote and local data bases.

To run the Pro Ada precompiler, which operates on Digital Equipment Corp. VAX systems running the VMS operating system, users will need Version 5.1 of the Oracle DBMS and the DEC Ada compiler.

Pro Ada's cost ranges from $1,800 for one to nine users; $3,600 for up to 17 users; and $7,200 for an unlimited number of users. — STAN KOLODZIEJ

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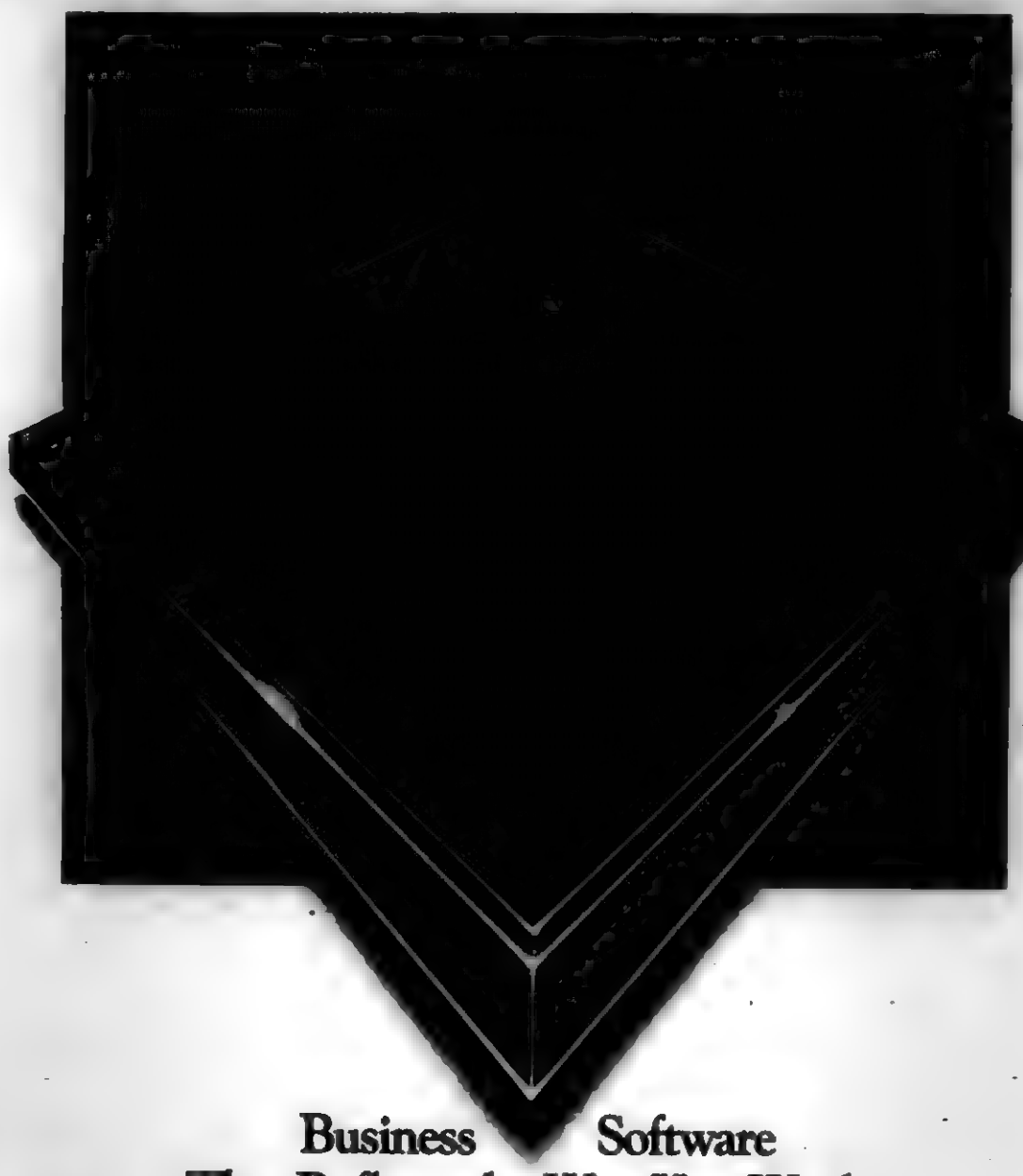

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CASE

Continued from page 35

such a scale less an exercise in agony.

According to Sun, NSE is a "generic platform for the support and integration of the software life cycle." The product is said to provide extensive administration, coordination and project management functions in a network. It can, for instance, keep track of huge numbers of modules of code and make sure that developers have access to the most up-to-date version of that code.

However, NSE's most important function may be that it provides a link between other, third-party CASE products running on individual workstations or systems.

With Sun's typical, almost fanatical adherence to open systems, NSE sports a disarmingly high degree of connectivity. The company has displayed the system linking with the graphically oriented systems analyst tool, Teamwork, from Providence, R.I.-based Cadre Corp.

NSE will be a distributed system, running on multiple nodes of a network. NSE is priced at $2,500 and up and is expected to ship in the first quarter of this year. — MICHAEL TUCKER

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English-using interface out for Sybase data base

Natural Language, Inc. in Berkeley, Calif., has the ear of Sybase, Inc. Specifically, Natural Language has announced a natural language interface for the Sybase relational data base.

Natural Language makes Datatalker natural language query software. The product allows a user to query a data base in English or something very much like it. Rather than writing an application in, say, IBM SQL, you simply type your requirements in brief sentences, and the system will do your work for you.

Datatalker isn't alone in the natural language field. But it may be the most successful such interface in the commercial market. It is relatively undemanding of computer power. That is a key asset because computers don't like English, or any human tongue much, and to make these machines deal with it usually requires a very expensive hardware and software investment.

Datatalker is both less expensive and more effective than most other natural language software because it uses a combination of traditional natural language processes and artificial intelligence techniques. Many natural language systems consist of little more than a sentence parser mechanism, which is a limiting method of dealing with English. Linguists have long recognized that sentence parsers and diagrams do not accurately describe the way that human beings communicate.

Datatalker goes beyond parsing by including a second level of interpretation — an AI-based concept library and deductive system. If a sentence cannot be understood by the parser alone, it is passed on to the AI portion of the system.

Datatalker still provides only a subset of English, and in the hands of a determined mischief maker, it is easy to confuse. But on the other hand, even a restricted subset of a natural language is a great deal more user-friendly than SQL or even most fourth-generation languages.

Challenge to the elite

Sybase, meanwhile, is the up-and-coming challenger on the micro-based relational data base management system block. It has emerged during the last year and a half as a real challenger to the established data base elite, including Oracle Corp. One of Sybase's primary tools in this competition has been strategic alliances and joint ventures — most recently with firms like Pyramid Corp., which wants to use a data base as part of its entry into the on-line transaction processing market.

The new version of Datatalker could give Sybase an additional edge in that competition.

Datatalker for Sybase is currently available for Digital Equipment Corp. VAX systems and Sun Microsystems, Inc. workstations. It is priced at $10,000. — MICHAEL TUCKER

Circle Reader Service Number 188

PRODUCT CHECKLIST

A product that allows the analysis of VM performance problems using a graphical interface has debuted from Candle Corp. Candle, producer of the Omegamon VM performance analyzer, said it grafted a graphical interface onto the product.

Candle said the interface will allow VM installations to analyze in real time why VM applications are running slow or showing poor response time.

The enhanced version of Omegamon costs $30,000.

Candle, 1999 Bundy Drive, Los Angeles, Calif. 90025.

Circle Reader Service Number 189

VM Software, Inc. rolled out **VMCenter II**, a product that allows VM-based systems to be managed more effectively. The product reportedly provides system monitoring, operating assistance, batch operations control and increased security.

VMCenter II is said to allow users to perform routine data center tasks while regularly monitoring, controlling and reporting on the behavior of VM. In effect, problems can be detected and solved as they occur.

VMCenter II is sold under a graduated license fee, with prices ranging from $25,000 to $88,000, depending on the size of the machine.

VM Software, 1800 Alexander Bell Drive, Reston, Va. 22091.

Circle Reader Service Number 190

National Systems, Inc. has unveiled an interactive C compiler that breaks the 640K-byte barrier on Microsoft Corp. MS-DOS-based machines. Instant-C/16M enables programmers to more easily handle large programs on personal computers, the vendor said.

Interactive compilers are programs that combine the speed of traditional compilers with the interactivity of interpreters. Rational Systems is known chiefly for Instant-C, an interactive C compiler for the PC environment.

Last summer, the company announced DOS/16M, a protected-mode, large memory environment that allows programmers working with PCs to exceed the 640K-byte memory limit of MS-DOS. Essentially, DOS/16M does this by letting programmers place applications in memory above the traditional workplace in DOS.

Instant-C/16M costs $795.

Rational Systems, P.O. Box 480, 2nd Floor, 220 N. Main St., Natick, Mass. 01760.

Circle Reader Service Number 191

Wang Laboratories, Inc. has become the latest vendor to display a virtual operating system. Wang announced VS/VM, an environment that allows multiple operating systems to run concurrently as virtual machines on a single Wang VS computer.

VS/VM allows these guest operating systems to share main memory, central processing power and I/O devices. It can support up to 15 VS operating systems and VS IN/IX (Wang's Unix version), the vendor said.

The virtual machines are task independent and can all be controlled from a single workstation. Operators can move between them with single keystrokes.

VM/VS is available for all high-end Wang VS 7000 series processors and earlier VS 85 and VS 100 models. License fees are $9,000 to $18,000, depending on the processor.

Wang, One Industrial Ave., Lowell, Mass. 01851.

Circle Reader Service Number 192

Whitesmiths, Ltd. has ported its host-resident CXDB interactive C source-level cross-debugger to the Motorola, Inc. MC68000 family of processors.

CXDB reportedly allows embedded 68K-byte programs to be debugged in terms of the original C source code on Digital Equipment Corp. VAX and IBM Personal Computers. It does not require user access to the actual target hardware, and users can access programmable read-only memory debugged code without recompiling, the vendor said.

Other features allow the user to execute host-system commands, print the contents of a C-variable function or file with or without assembly language display, single- or multiple-line step, create log output and set and remove breakpoints.

Prices for CXDB range from $1,800 to $7,000.

Whitesmiths, 59 Power Road, Westford, Mass. 01886.

Circle Reader Service Number 193

Tech Talk

Continued from page 35

But interesting as all this is in terms of technology, it's the marketing of the product that gets really fascinating. Sun's proprietary chip ain't all that proprietary. In the words of one analyst, Sun has "tossed it over the wall" like an explosive charge into the industry to do with it what it chooses.

Specifically, Sun has licensed the processor to any semiconductor vendor that cares to make it. Currently, the chip can be had as a gate array from Fujitsu Microelectronics, Inc. in Santa Clara, Calif. Meanwhile, both Cypress Semiconductor in San Jose, Calif., and Bipolar Integrated Technology, Inc. in Beaverton, Ore., have announced plans to produce Sparcs in the near future.

Such is the nature of the chip that enables all three firms to sell Sparcs, but the companies won't merely be competing on price. They'll also each attempt to make Sparc run faster or more effectively while retaining the basic Sparc design. It is as if you could purchase 386 chips from multiple vendors, and you could shop around not only for price but also for the underlying technology.

Thus, the Fujitsu Sparcs available today offer 10 MIPS, but the upcoming Cypress version is said to offer 20 MIPS, and the Bipolar version, which is a year or so off, will reportedly have 40 MIPS. Sun is already talking about 100-MIPS Sparcs.

Meanwhile, system vendors that wish to buy those chips and build products around them are free to do so — even if those products compete with Sun's own workstations. As of late 1987, Sun says, some 40 vendors had signed up to purchase Sparcs for one purpose or another, including such firms as AT&T, Xerox and Arete Systems Corp.

These vendors are free to license software from Sun as well. For example, if you want to take a personal computer, develop an add-in board based on the Sparc and produce a source-code-compatible rival to the Sun workstation, you are welcome to do so as long as you pay Sun for the privilege.

And you can get almost anything you like from Sun: the SunOS Unix-derived operating system; compilers for C, Fortran and the like; and, most important, the Applications Binary Interface, a specification for how applications and the environment below them should intersect. The result is that machines from different vendors based on Sparc shall have binary compatibility of software.

A recent issue of Kate Cosmikey's "The Unix Perspective" newsletter, a publication of Framingham, Mass.-based market research firm International Data Corp., reports that the Applications Binary Interface is particularly important in regard to Sun's alliance with AT&T. Under the terms of that agreement, Sun and AT&T will work together on the Applications Binary Interface as well as on a joint version of Unix. Cosmikey argues that this pact will give Sun the most powerful ally possible in the marketing of its would-be RISC chip standard and give AT&T another shot at being the Unix trendsetter, something that has slipped of late.

Profound repercussions

What all this could mean for Unix as a whole could be profound, indeed. Among other things, Sparc gives Unix vendors a vehicle in which to flee technological obsolescence. By constantly upgrading the chip, yet maintaining binary compatibility between its different generations, developers that use Sparc can stay current without shedding blood in the process. Explains Arete Computer's Chief Executive Officer Gene Manno, "It lets you pursue the cost curve without a lot of hassle."

That being the case, perhaps Sparc will be the method by which Unix can avoid the fate proposed for it by OS/2 partisans. Maybe Sparc will come to define Unix, particularly in commercial computing. Unix vendors have tried lately to bring their wares into on-line transaction processing (OLTP) applications. But OLTP is brutally demanding of compute power. Sparc offers that power, which is the reason why Arete went with it. Doubtlessly, there will be other vendors looking into the possibility of using the chip to produce inexpensive mainframe replacements that would neatly hang on to Sun's already well-developed networking technology.

The important word here is still *perhaps*. Sparc is not the only RISC chip in the universe, nor is the Applications Binary Interface the only Unix standard. Machines running the Intel 386 already have a de facto binary standard for Unix. Meanwhile, Motorola is known to be working on a RISC chip of its own that may be more than the equal of Sparc, and there is an effort to develop a binary standard for Motorola systems.

Yet the Sun chip has some unusual characteristics. Sparc is an open game. Sun makes the rules, but anyone can play. It looks, in short, a bit like the PC in its early days, when third parties created a market that exceeded the original vendor's wildest expectations and fulfilled some of its greatest fears.

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The Insider

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Macintosh, Hypercard does not work.

Users seeking that kind of capability for the Mac may turn instead to Modern Jazz, Lotus's latest incarnation of the integrated application package for the Macintosh world. But once again, you must deal with a script language (albeit an extremely powerful one).

In lieu of a natural language end-user programming facility that empowers even the rawest tyro, end users are still being forced to learn one or more macro languages to do their programming. Result? The 80/20 rule that states that 80% of the users use about 20% of the software's power. Vendors still have a very long way to go.

Millikin is vice-president and senior analyst with Patricia Seybold's Office Computing Group in Boston.

Blue Beat

Continued from page 35

For the most part, software isn't considered sexy by the trade and consumer press, which chooses instead to highlight hardware offerings by IBM and others in its industry coverage. The result is that most software rarely receives the type of coverage it deserves — making it difficult for IBM to promote its software offerings and impossible for MIS departments to keep up with the products available.

Advertising software isn't a good solution to this problem. It's difficult for even the most sophisticated advertising firm to promote the characteristics of systems and operating software; the concepts are often too complex to communicate adequately in the limited time the average reader grants an ad.

Obviously, some of IBM's most famous operating software offerings are very well known. VM, MVS, DOS and OS/2 are familiar to end users — at least, in the abstract. But this familiarity doesn't hold true for the majority of IBM's application offerings. It is this majority that composes the backbone of IBM's array of software and that the firm hopes will generate significant revenue through the 1990s and into the next decade.

Promoting software is a problem for IBM. In 1987, it put into place the necessary corporate structure to develop or acquire operating and application software. But with the notable exception of OS/2 (which got so much attention that its actual attributes were lost in a controversy of compatibility), IBM was unable to effectively communicate the work that it had done on its offerings.

It may be somewhat well known, for instance, that in July of last year IBM finally gave software its due by creating the Applications Systems Division (ASD), which is charged with developing application software and consolidating the company's relationship with third-party developers. Some may also know that on the applications side, IBM began to focus seriously on software for niche markets. Health care, financial services and the travel industry were just three vertical markets for which it announced specialized applications. And independent software vendors certainly are aware that IBM also aggressively stepped up its pursuit of third-party resources to meet its promises to vertical markets.

Wheeling and dealing

In 1987, IBM signed scores of leading software vendors to remarketing agreements for vertical market applications. The firm even chose to work on research and development with third parties and signed up Cambridge-based Lotus to develop 1-2-3 products for IBM's 370 system. More such deals are on the way.

But just what ASD is now marketing or will market in the future is barely known. IBM must now find a way to communicate that work to customers and make them aware of the specific offerings available.

It's unlikely that the company can depend on its marketing force to make customers aware of these products. While many salesmen are willing to sell software as part of an integrated solution to customers buying hardware, they are not as likely to go out and make sales calls that stress software only. This is particularly true for smaller applications; the profit margins aren't sufficient to justify the time spent on the sales call. Unfortunately, that makes the problem particularly tough; it is to the smaller installations that IBM most needs to sell the software. Mainframe buyers already have their needs well covered by attentive IBM sales reps.

IBM may have to put into place a dedicated software sales force. These individuals could spend their time pushing application software to accounts with IBM equipment installed. To be most effective, they would have to be organized by industry market — one group could push software to the health care industry, while another could sell to travel agencies, for instance.

IBM must also target brand new customers with its software. These buyers are key to IBM's efforts to improve its revenue. By selling users on vertical market software, IBM can sell them on its hardware. These are the customers who remain relatively unexploited by IBM competitors, and they are markets that, for the most part, could see real improvements in the way their businesses operate if properly computerized. Those kinds of improvements will sell people on IBM and could, in 1988, finally help IBM reach its goal of generating significant revenue from its software efforts.

Depke is the former editor of "IBM Watch," a biweekly newsletter published by International Data Group, located in Framingham, Mass.

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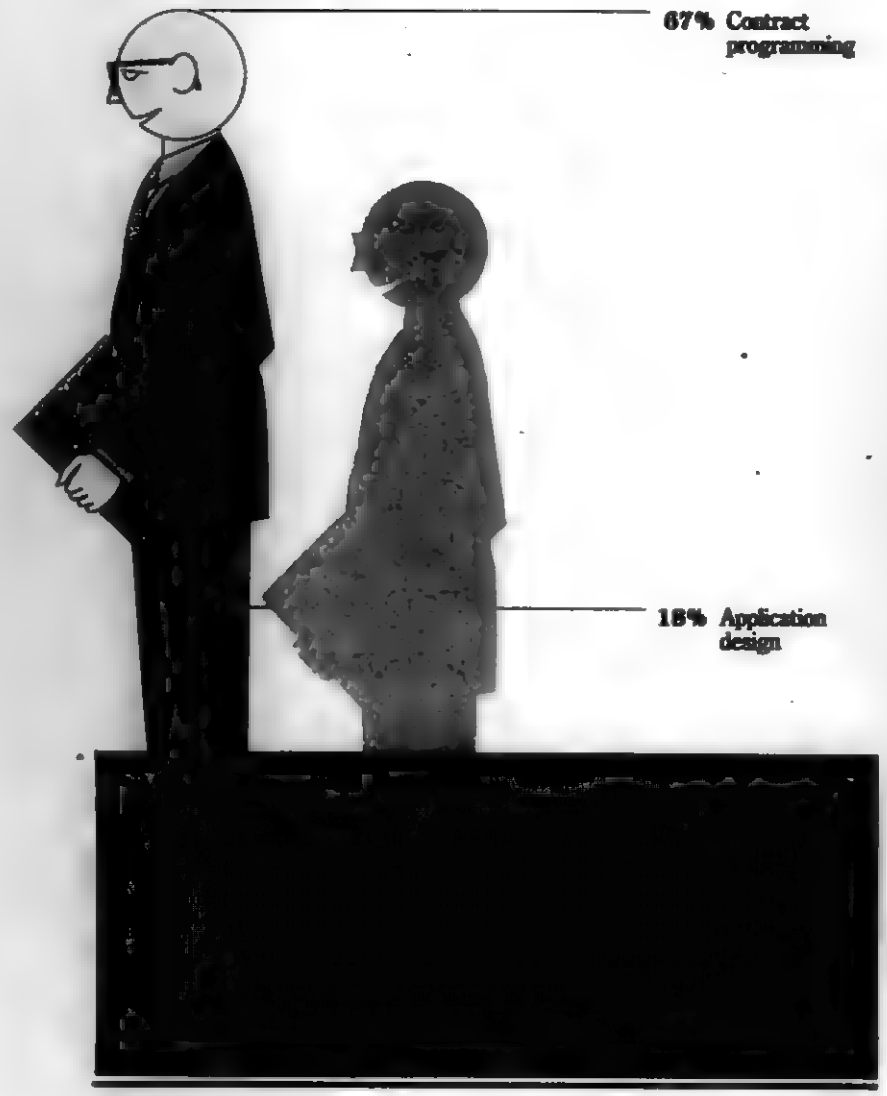

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See story page 11

next issue

Spring into departmental computing with the March issue of *Computerworld Focus*. In it, a top industry analyst provides some opinions on the role of MIS in relation to the rise of autonomous departments. In addition, get the lowdown on PC LANs and work group productivity tools. The Special Section will attempt, through case studies, to dispell the confusion surrounding departmental computing's terms and technologies and take a look at how your peers are handling the decentralization trend.

80/20 rule in practice

Michael D. Millikin

End-user programming has always been a hot button. The rationale behind the concept is to empower the average user with the ability to satisfy the majority of his applications needs without burdening the data processing shop. Everybody theoretically benefits. Users get to do their job speedily, and programmers don't have another year's worth of backlog dumped on top of their shoulders.

But what do end users use to program, and how do they do it? A local university has just stricken Basic from its curriculum as an end-user programming language and is teaching Lotus's 1-2-3 instead. Indeed, for many users, Lotus's macro language is the default end-user programming tool. That situation doesn't do much for non-Lotus users, however.

Several mini-based vendors, notably Wang and Computer Consoles, have produced good end-user programming offerings. Again, that doesn't do much for personal computer users.

Right now, there is no broad-based cross-application end-user programming facility for the PC environment. And because the PC increasingly is becoming the desktop device of choice, that creates a problem.

Solutions will come in one of two forms: applications based or systems based.

An example of the application environment solution is Lotus's LEAF, or Lotus Extended Application Facility. The obvious drawback here is that you need to be a Lotus application or an add-in to play.

The more broad-based and, hence, intriguing solution is the system-based one. Examples here include Hewlett-Packard's New Wave environment, which is built atop Microsoft's Windows; a hypothetical Windows cross-application macro facility; and Apple's Hypercard.

Yet within this type of solution, consistency, transparency and ease of use vary widely. The HP solution offers the broadest range of capabilities and imbues the process with intelligence, even across applications. (Your applications must in some way recognize the New Wave extensions to Microsoft's Windows and soon-to-come OS/2 environments.)

Microsoft currently offers a nice command macro facility within its Excel that lets the user record and play back. To reach into other Windows applications with dynamic data exchange, however, a user needs to use function macros, which entail working in a Basic-like language.

As for Hypercard, Apple excited a lot of people with its release of this hypermedia-like programming environment that supposedly was to provide programming for the rest of us. Hypercard is exciting and terrific and relatively easy to program within. But it is not, at least in its current incarnation, the answer to end users' prayers. Users end up working with yet another script language, Hypertalk, if they want complexity in the applications they create. As a cross-application programming environment for the Apple

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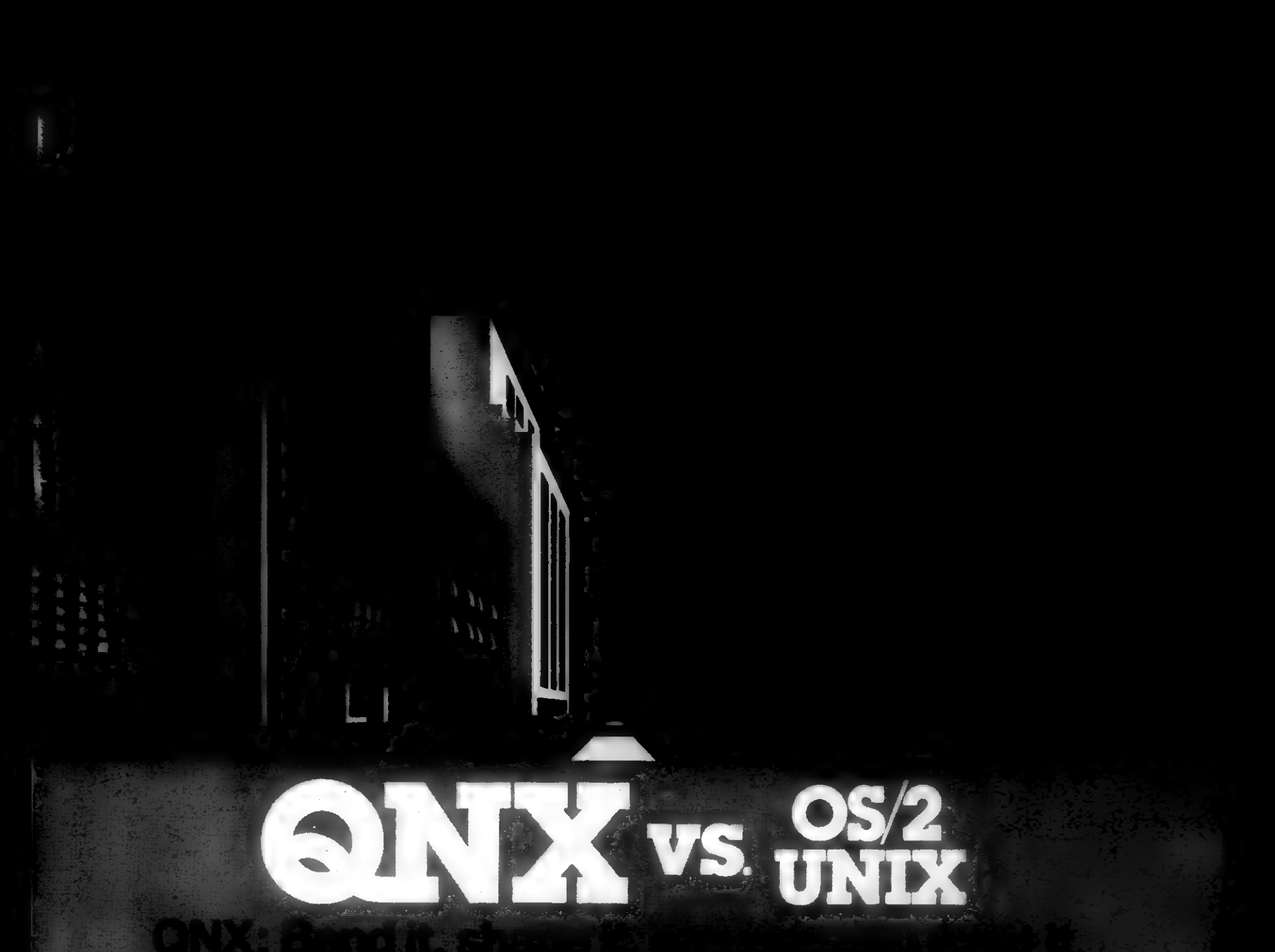

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COMPUTERWORLD

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Billionaires club for Compaq with the firm's growth fueled by sales of 386-based machines. Page 73.

The longest running trade show has been canceled. Page 8.

Dbase IV veil to lift

Patterned after DB2 to meet SQL demand

BY DOUGLAS BARNEY
CW STAFF

The long wait for Dbase IV will end next Wednesday when Ashton-Tate Corp. introduces the product in New York. Dbase IV will use a version of SQL patterned after IBM's DB2 but initially will not provide a communications link to that popular host data base management system.

The product, eagerly awaited by an installed base of more than 1.5 million Dbase users, was originally scheduled for announcement at Comdex/Fall '87 in November, according to a former key member of the development staff and other sources close to Ashton-Tate. Development delays resulted from changes in design goals, technical glitches and turnover in the development staff, those sources said.

Information on product pricing, availability and upgrade policies was not available by press time. Citing a policy of not discussing unannounced products, Ashton-Tate declined to comment.

Change of plans

The company originally planned a partial implementation of SQL aimed at familiarizing Dbase users with a sample of SQL commands, according to the developer and other sources. In response to pressure from users making the transition to SQL-based systems and increasing competition, Ashton-Tate radically shifted that goal in mid-1987 to more fully implement SQL, an analyst briefed by Ashton-Tate said.

Such an implementation of SQL will eventually allow Dbase IV to communicate effectively with the recently announced Ashton-Tate/Microsoft Corp. SQL Server, a data base server

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S/36 sites: Silverlake no threat

BY JEAN S. BOZMAN
CW STAFF

Silverlake is coming. Everybody knows that by now. But at least three customers, each with installed bases of more than 2,000 IBM System/36s, are not worried about the successor to that product line dramatically impacting their operations.

Silverlake is the commonly accepted code name for the IBM system that will reportedly combine System/38 architecture with System/36 software compatibility.

And although the three organizations — a U.S. agency and two insurance companies — have invested hundreds of millions of dollars in the System/36, MIS executives at each said they are confident the system will not be obsolete anytime soon, even though it inevitably will go the way of the System/34.

These executives have re-

Continued on page 4

IBM Cobol 85 compiler passes agency testing

BY CHARLES BABCOCK
CW STAFF

An unannounced IBM product has been approved by the National Bureau of Standards as a high-level Cobol 85 compiler and named in the NBS's January Certified Compiler List.

The chief of software testing at the NBS said Release 2.0 of IBM's VS Cobol II compiler meets most of the conditions for a validated compiler, but it will have to be retested in at least one area before the end of the year in order to maintain that stamp of approval.

While not yet widely used, Release 1.0 of VS Cobol II is IBM's only offering that lets MVS/XA users take advantage of the larger virtual memory available under that operating system. VS Cobol II compiles a Cobol program in 31-bit rather than 24-bit mode. Observers predicted use of VS Cobol II will increase now that Release 2.0 meets the conditions set forth by the American National Standards Institute for Cobol 85.

How soon the compiler will emerge as an announced product in the marketplace was not immediately clear. Industry observers predicted the waiting time will be short, but IBM officials declined to comment as of press time.

As is often the case the first time around, the IBM compiler "did not meet expectations on at least one of the tests," said L. Arnold Johnson, manager of the NBS's Software Standards Validation Group in Washington, D.C.

The validation procedure consists of a battery of tests that uphold ANSI's definition of Cobol 85. A compiler must be in substantial compliance with the standard in its first test but may misfire on one or more tests and still receive approval, Johnson explained.

Time to cram

The VS Cobol II compiler will be tested again in November; at that time, it must pass any failed tests or it will be dropped from the certified list, Johnson said. Government agencies refer to the list when reviewing contracts that include the Cobol language.

The fact that IBM sought validation at the high level is "very welcome news to all VS Cobol II shops. It takes away the apprehension some of them felt about

Continued on page 8

Unisys confronts power of ² masters

BY CLINTON WILDER
and JEAN S. BOZMAN
CW STAFF

Skepticism prevailed in June 1986 when Burroughs Corp. Chairman W. Michael Blumenthal launched a second attempt to acquire Sperry Corp. Analysts viewed the move as a financial gambit by the shrewd former secretary of the U.S. Treasury but found it hard to see exactly how the creation of the industry's second largest company would benefit Burroughs and Sperry customers.

Today, Unisys Corp. and its "Power of 2" corporate mantra have made believers of many skeptics, particularly in the financial community. But the transition period of going from two companies to a $9.7 billion hybrid has been a difficult one, according to many Unisys customers. The same cost cutting and bottom-line orientation that have earned Blumenthal high praise on Wall Street have sometimes resulted in frustration in MIS shops.

W. Michael Blumenthal

Blumenthal "runs a lean and mean organization, and I won't tell him how to run the company," says John DiPalermo, an 1100/90 series user and deputy commissioner of information technology management for the state Department of Social Services in New York. "But he should hire more competent customer service people or pay the people that he has more money. Maybe that would make a difference."

An exclusive *Computerworld* survey last month of 104 Unisys mainframe and mid-range users found that 35% to 50% of the firm's customers believe the vendor has slipped since the merger in several areas, including maintenance, price/performance, technologi-

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In print. IBM expects second-quarter releases for two high-speed nonimpact printers that support AFP software, lauds price savings on two intermediate-speed impact units. Page 10.

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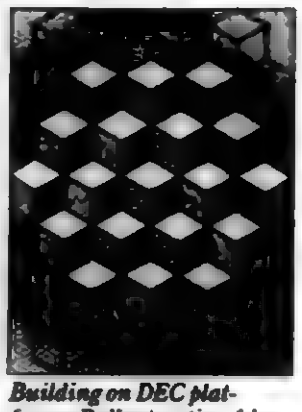

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Quotable

"What IBM is not willing to do is turn over the results of its significant development investment to others to use for whatever purposes they may wish."

PETER SCHNEIDER
IBM

See story page 55.

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Spies like U.S. — credit bureaus target of espionage

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Foreign spies are penetrating the data bases of large U.S. credit bureaus for leads on people who have both access to classified information and financial problems, according to a congressional report.

The brief report, written by a staff investigator at the U.S. House Armed Services Committee and released last month, stated that one method used by hostile intelligence agencies to select targets for espionage is to obtain information from credit reporting systems.

"Financial difficulties have . . . been a primary factor in individuals' decisions to pass classified information to hostile countries," the report said.

U.S. Department of Defense officials are concerned that the credit data bases sometimes indicate whether an individual has U.S. government security clearance. An individual's financial condition can also be screened to find out whether the person is on the verge of bankruptcy or has a gambling habit that could be exploited, the report said.

The report noted that there are five major vendors of credit reports: TRW, Inc., Chilton Corp., The Credit Bureau, Inc., Trans Union Credit Information Co. and Associated Credit Bureaus. It did not provide further details or recommend changes in credit bureau practices.

Delia Fernandez, a spokeswoman for TRW's Information Services Division in Orange, Calif., said TRW's credit reports do not mention security clearances. She added that TRW conducts investigations to ensure that its subscribers are bona fide credit issuers or businesses that need the information for employment or insurance purposes.

Foreign agents could gain illegal access to the files by obtaining a legitimate customer password or through an employee of a legitimate customer, Fernandez said.

The main thrust of the congressional report, released by Rep. John R. Kasich (R-Ohio), was to criticize the Pentagon's procedures for granting security clearances to people born in unfriendly countries. Non-U.S. citizens with security clearances are heavily recruited by spies, the report said.

Markets hit deck after nuclear scare

BY J. A. SAVAGE
CW STAFF

A worldwide communication test by the International Atomic Energy Agency (IAEA) was mistaken for a report of a nuclear accident last week, sending financial markets scurrying for fallout shelters.

Speculation of a nuclear incident in the Soviet Union reportedly sent agricultural commodities trading into a frenzy, fueling a temporary rise in the value of the dollar against currency from countries thought to be closer to the supposed accident.

The test, actually deployed Jan. 27, was the second such test using communications links set up by the World Meteorological Organization (WMO), based in Geneva, according to an IAEA spokeswoman.

The communication, which was sent to 25 of the organization's 160 member countries, asked weather service stations to pass along a partially coded test memo to their nuclear agencies and requested confirmation of receipt. Apparently, someone got hold of a confirmation, which was sent through normal communications channels, near London, according to the spokeswoman.

Transmissions vary

According to Stefan Mildner, director of basic systems for WMO's World Weatherwatch Department in Geneva, major industrialized countries are reached through dedicated lines in a main trunk network. Developing countries are reached by satellite.

"Typically, you can send the information to developed countries at speeds up to 9.6K bit/sec.," said Dick Zitzmann, chief of systems operation at the Washington, D.C.-based National Weather Service. "Data is sent to some links in lesser developed countries at low speed, like that of a teletype."

Zitzmann said that delays in information exchange are not the fault of communications links but of getting data into and picking it out of the system.

"We are providing, as part of our canal equipment, a message queue where we store warning messages of this type, which are then summoned by the Nuclear Regulatory Commission people," Zitzmann said. He estimated that the commission picks up such messages at least once a day. The National Weather Service uses three IBM 4341s.

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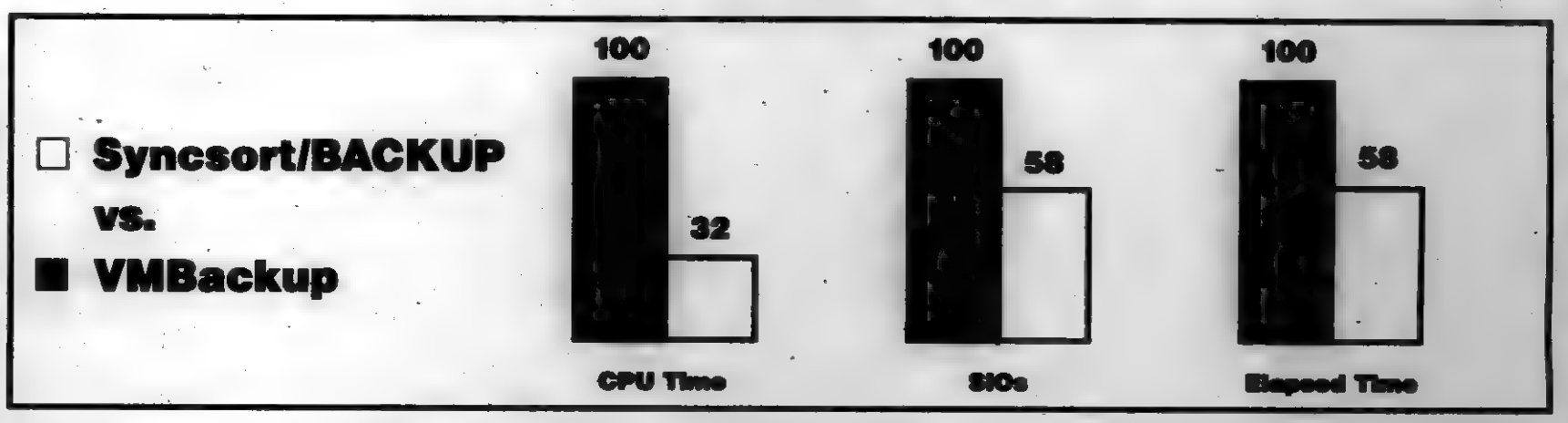

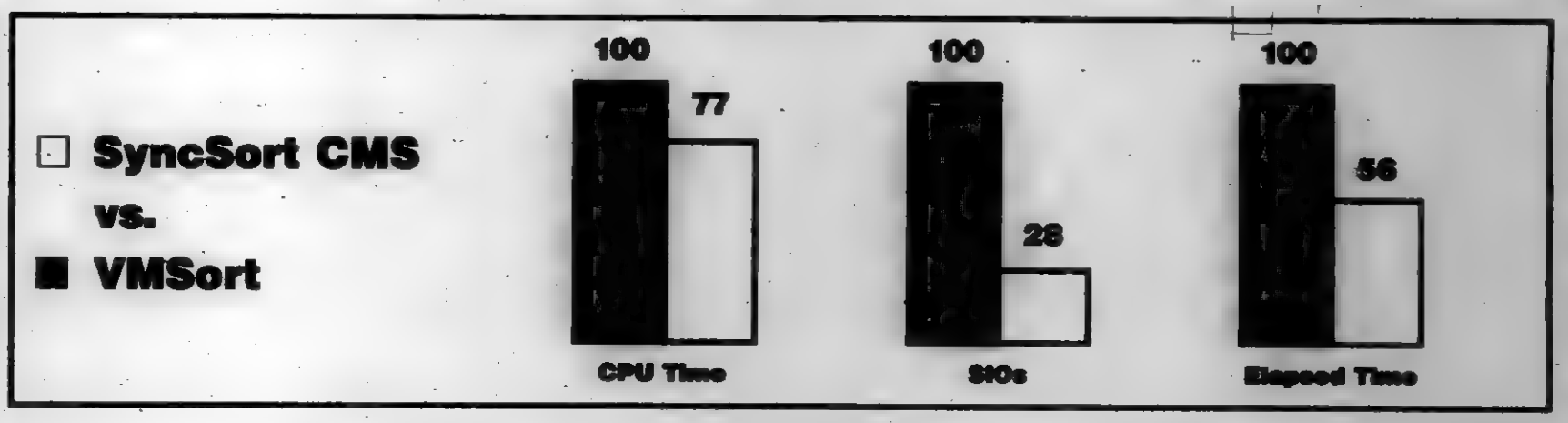

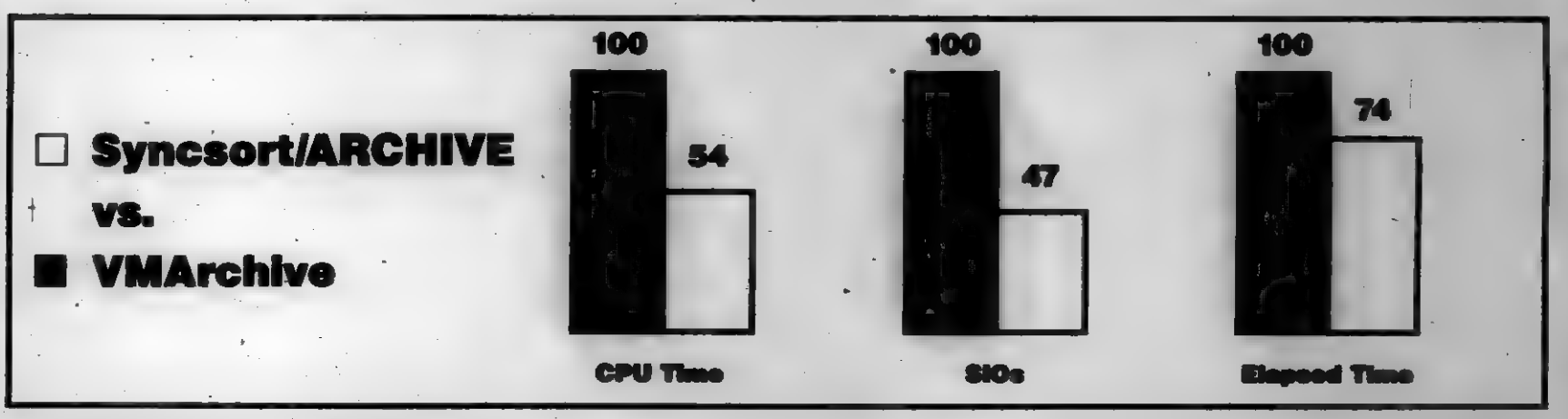

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Charles Schwab cuts staff, CPUs

Trading decline forces brokerage to cut mainframe power, personnel

BY JAMES A. MARTIN
CW STAFF

SAN FRANCISCO — Faced with a continuing postcrash decline in trading volume, Charles Schwab & Co. has cut back on mainframe CPU power, postponed a planned data center move and off-loaded mainframe application development to microcomputers.

The discount brokerage firm's most recent cost-cutting move was last week's layoff of approximately 10 information systems employees in San Francisco and one in its New York data center.

The layoffs were reportedly the first in Schwab's DP history. They represent an abrupt turnaround from the company's goal in mid-1987 to double its data processing staff from 250 to 500.

The layoffs affected a variety of positions, from computer operations staff to senior programmers and analysts, according to Woodson M. Hobbs, executive vice-president of information systems. Ousted employees will receive one month's pay and insurance benefits in addition to job placement assistance from human resources personnel.

In December, Schwab cut its mainframe CPU power from 128 million instructions per second (MIPS) to 83 MIPS, hoping to save about $150,000 in monthly mainframe costs.

Prior to Black Monday, Schwab was running two IBM 3090 Model 400s in San Francisco and a 3083 mainframe in New York. After the Oct. 19 crash, Schwab upgraded to a 3090 Model 150 in New York and shipped a 3083 from that city to San Francisco to replace a Model 400.

The shuffle

The quick CPU shuffle is not uncommon for this fast-paced company. Since the summer of 1986, Schwab's California headquarters ran its brokerage accounting, order entry and corporate processing on two 3090 Model 200s. In October 1986, those mainframes were traded for one 3090 Model 400.

In April 1987, a 3090 Model 180 was brought on-line; it was replaced in July by another 3090 Model 400. This mainframe switching is a way of keeping up with the ebb and flow of Wall Street, Hobbs explained.

To further stretch the budget, Schwab postponed indefinitely a $20 million planned move and expansion of its data production center from the crowded confines of downtown San Francisco to nearby Sacramento. The project would have involved relocating 60 to 80 employees to the California capital.

Instead of moving, Schwab is fast-forwarding plans to bring its New York data center into a fully redundant environment. Schwab hopes to ease any future CPU crunches, such as the one that occurred during and after the October crash, as well as ensure better disaster recovery, Hobbs said.

After the stock market crash, computer systems at all financial houses were overloaded, traders were besieged with orders and many investors found it difficult to contact brokers.

"We're developing order entry and execution systems that run concurrently in New York and San Francisco, so if any software outages or failings occur in San Francisco, New York will take over," Hobbs said. New York's 3090 Model 150 will run the order entry system simultaneously with San Francisco by late this month, he added.

In addition, Schwab said it hopes to cut CPU costs further with a $2 million project that will move applications developers and programmers off mainframes and onto Intel Corp. 80386-based microcomputers.

"When we took some horsepower away, we hurt the developers. So to keep them productive, we're installing a prototype development system on personal computers," Hobbs said.

The company plans to purchase some 130 micros — most likely the IBM Personal System/2 Model 80 — assign one per developer and have them share peripherals.

The developers will share files over a local-area network and will be able to download and upload mainframe files through a gateway.

The project is still in the initial stages, and "there are a lot of issues to be resolved," Hobbs said. "There's more enthusiasm among developers about going to PCs," he added. "It puts them in their own world where they aren't dependent on a mainframe."

System/36

FROM PAGE 1

ceived confidential IBM briefings on the next-generation minicomputer. They said Silverlake machines will probably make their way into their System/36 networks by 1992.

"That is our plan," said Orville Orr, vice-president of computer operations at Farmers Insurance Group of Companies, which operates 2,800 System/36s. "We all know that one day IBM will stop upgrading the System/36 and that we're going to have to move to something else within [that] family."

Even if it is only useful until the early 1990s, the System/36 will have served its purpose for these organizations. When Farmers Group and Continental Insurance Co. in Piscataway, N.J., installed the first System/36s in the mid-1980s, they were replacing 15-year-old order-entry systems.

Updating the heartland

At the U.S. Department of Agriculture, the System/36 brought 2,790 USDA agents' offices scattered across the heartland into the 20th century.

"Before we got the System/36s in, all the reports in our country agricultural offices were done by hand," said James Dinwiddie, director of information resources management at the USDA's Agricultural Stabilization and Conservation Services agency. "The System/36s were replacing paper, pencil and typewriters."

IBM has taken steps to assure System/36 users that it will not discontinue System/36 support anytime soon.

"We'd be crazy not to support such a successful machine as the System/36," IBM marketing vice-president William O. Grabe told the fall meeting of the Common IBM users group in a speech outlining plans for the System/36 family. IBM spokesmen have said there are more than 150,000 System/36s installed worldwide.

Assurances like that aside, the System/36's ability to function as both a stand-alone processor in remote offices and as a node in mainframe-based Systems Network Architecture (SNA) networks are the aspects most crucial to its loyal owners.

"The System/36 already had a lot of the connectivity features that were promised for the IBM 9370," said John B. Vande Creek, vice-president of systems architecture at Continental, which uses more than 2,000 System/36s.

Price is also a factor. "IBM has told its value-added resellers that buying more than 500 machines means you'll get more than 40% off the list price," said Steve Santoro, a former IBM executive who is now administrative manager for Adroit Systems Management, Inc. in Syosset, N.Y. "If you could buy more than that, you would probably get a volume discount approaching 50%."

Industry sources said such massive volume purchases are exceedingly cost-effective.

"Our feeling is that the System/36 is a good performer," said one Continental manager who did not wish to be named.

James Dinwiddie

Significantly, two of the three organizations have bought themselves some protection, a safety net against technological upheaval.

"IBM has a technology exchange program," said Continental's Vande Creek. "This program enables you to buy System/36s on a leased basis for 12 months, so that you have the choice of buying them or upgrading to the next system that comes along."

The USDA has another form of protection. "We have an indefinite quantity requirement clause right in our contract with IBM," Dinwiddie said. "That means I can continue to buy System/36s through the life of that contract, which runs until 1992." That would apply even if the System/36s had to be supplied on special order, Dinwiddie added.

But even that kind of legal protection cannot prevent IBM from eventually discontinuing support of the System/36 operating system and utilities, if it so wishes.

That is exactly what happened in 1985, when IBM wrote a letter to its System/34 customers to tell them it would no longer support the System/34's operating system and key utilities after February 1986. The IBM letter arrived less than three years after the System/36 was announced and two years after the System/36 was first shipped in quantity.

"You might get a letter like that," said Vande Creek, who, until recently, worked for IBM at the Rochester, Minn., System/36 plant.

"But if it did happen, you'd be operating with a very stable system. IBM would stabilise it at a level of function and performance so that it wouldn't have any bugs. Even then, IBM would probably fix a major problem if it affected a large number of users," Vande Creek added.

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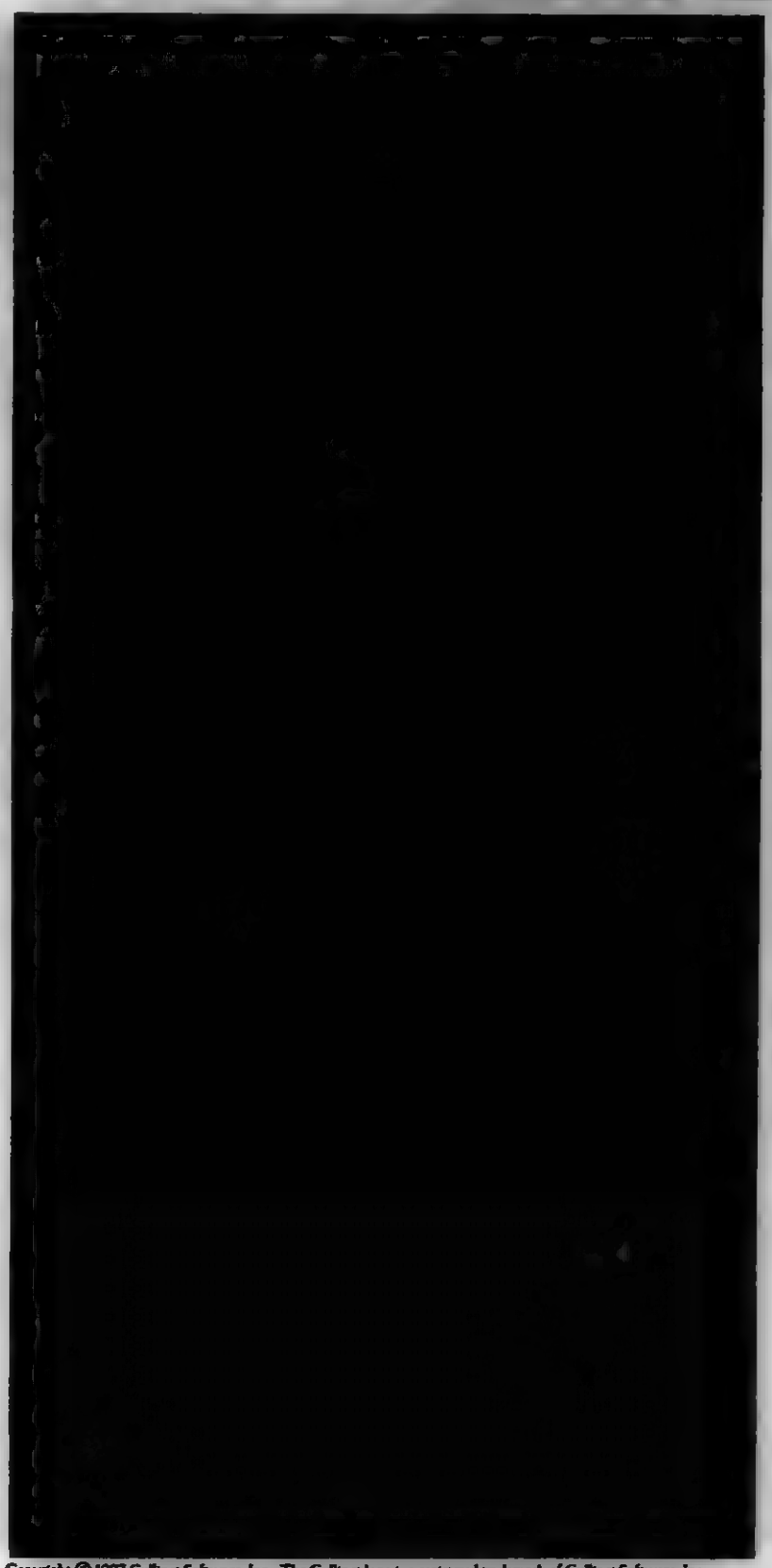

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DEC launches 3-D workstation challenge

BY STANLEY GIBSON
CW STAFF

BOSTON — Digital Equipment Corp. set up a high-end confrontation with key rivals in the engineering workstation market last week by announcing a three-dimensional graphics workstation developed in a two-year collaboration with Evans & Sutherland Computer Corp. in Salt Lake City.

The Vaxstation 8000 is DEC's first 3-D graphics workstation and, as the high end of the Vaxstation family, is pitted against high-performance systems sold by Sun Microsystems, Inc., Silicon Graphics, Inc., Hewlett-Packard Co. and Apollo Computer, Inc.

The workstation, priced at $87,710 for a base configuration including operating system, will be manufactured by DEC but sold by both that company and Evans & Sutherland. It is scheduled to ship next month.

The announcement took place about one month before Stellar Computer, Inc. in Newton, Mass., and Ardent Computer Corp. in Sunnyvale, Calif., said they will launch "desktop supercomputers." With these machines, the vendors promise considerably greater graphics and arithmetic performance than any machine yet announced [CW, Jan. 11].

Meanwhile, established vendors such as Apollo, Silicon Graphics and Sun have all promised more powerful systems within the year.

Acknowledging that products with some higher performance features may exist or be introduced, DEC President Ken Olsen asserted, "We're not joining in the glamour race — the MIPS race. We want to have the machine that people want to use to get work done."

But the Vaxstation 8000 claims a lead over others in the number of antialiased 3-D vector/sec. Antialiasing eliminates jagged edges on rounded contours. DEC said its system performs 500,000 3-D vector/sec., leading Silicon Graphics, which can perform 200,000.

Ultrix support planned

The workstation currently runs only the DEC VMS operating system. Support for Ultrix, DEC's version of AT&T's Unix System V, is scheduled to be available in the future, although DEC did not say when.

Rather than performing complex mathematical operations, the system was designed to connect to other computers for that purpose, DEC officials said. This approach is different from that followed by Stellar and Ardent, whose workstations themselves are intended to be capable of 40 to 60 million instructions per second (MIPS).

The Vaxstation 8000 is built around DEC's VAXBI bus and a proprietary graphics bus. Both buses run in 32-bit mode and support bandwidths of 13.3M byte/sec. Attached to the VAXBI bus are a DEC VAX 8250 processor, system memory consisting of 16M bytes with another 16M bytes optional and three Microvax II processors serving as controllers.

"Five hundred thousand vectors per second is spectacular," said Charles Foundyller, president of Daratech, Inc. in Cambridge, Mass. However, while praising the vector performance, other analysts questioned the ability of the system to compete with others in shaded volume performance.

"Shaded performance is a lot more important than vector processing," said David Burdick, an analyst at Dataquest, Inc. in San Jose, Calif. "It's not going to be too difficult for Apollo and Sun to sell against this."

DEC said the system executes 5,000 Gouraud-shaded, or smooth-shaded, polygons per second. Silicon Graphics' Iris 4D/70 GT workstation is capable of 60,000 Gouraud-shaded polygons per second; the Stellar and Ardent workstations promise some 100,000 Gouraud-shaded polygons per second.

Richard Shaffer, an analyst with Technologic Partners in New York, agreed. "Wire frame [3-D vectors] doesn't count anymore. That's not where the market is," he said, explaining that users are increasingly looking for shaded volumes.

DEC said it expects to sell the Vaxstation 8000 to users performing mechanical computer-aided engineering in the automotive and aerospace industries as well as to users performing molecular modeling.

DEC's vice-president of product marketing, Peter Smith, said DEC is currently second overall in the workstation industry, but it is growing at a rate in excess of 100% annually in that field. That is a rate greater than that of Sun and Apollo, Smith said, although he declined to give a specific figure for DEC's workstation sales.

Big dimensions

DEC's Vaxstation 8000 lines up at the high end of the three-dimensional workstation market

3-D performance	500,000 3-D vectors/sec. antialiased	200,000 3-D vectors/sec.	200,000 3-D vectors/sec.	40,000 3-D vectors/sec.	25,000 3-D vectors/sec.
Shaded performance	5,000 Gouraud-shaded polygons/sec.	5,500 Gouraud-shaded polygons/sec.	20,000 Gouraud-shaded polygons/sec.	60,000 Gouraud-shaded polygons/sec.	5,100 Gouraud-shaded polygons/sec.
Price*	$87,710	$69,000	$57,000	$95,000	$69,500

* Base configuration with operating system

CW CHART

Sun serves up desktop Sparc, hikes 3/60 prices

BY JULIE PITTA
CW STAFF

MOUNTAIN VIEW, Calif. — Reinforcing its commitment to reduced instruction set computing, Sun Microsystems, Inc. last week added a desktop version of its scalable processor architecture computers (Sparc).

At the same time, Sun said it has increased prices for its Motorola, Inc. 68020-based 3/60 line of workstations by up to 10%, a reflection of a jump in the price of 1M-bit dynamic random-access memory. A number of computer vendors have complained of a shortage in 1M-bit dynamic RAM.

Sun officials said the shortage has not impacted product deliveries but that without the price hike, the company faced a significant impact to its gross margins.

Robert Herwick, industry analyst for Hambrecht & Quist, Inc., said Sun "picked on their hottest product" to compensate for an increase in component costs. He estimated that the Sun 3/60 makes up 25% of the company's revenue.

The Sun 3/60 is Sun's 3 million instructions per second (MIPS) system, offering between 4M and 24M bytes of RAM. Before the increase, the base price for a monochrome version was $8,900, and entry-level pricing for a color Sun 3/60 was $10,900.

Despite the timing of a price increase on a Motorola-based system with the introduction of Sun's second Sparc workstation, company officials insisted that they will continue to develop Motorola-based products.

"If Motorola continues to innovate, we will use it," said Edward Zander, vice-president of corporate marketing.

However, they pointed to Sparc as the architecture of the future. "Over time, you will see at the low end what's happening right now in the mid-range," said Sun Executive Vice-President Bernard Lacroute. "The Sparc machine is the better alternative to [Motorola]. Sparc could eventually supplant Motorola even in the low end."

At a base price of $18,900, Sun's new desktop Sparc system, the second in that line, carries a hefty price tag when compared with the desktop Sun 3/60. However, the Sparc machine offers a significant boost in performance compared with its Motorola counterpart.

While the Sun 3/60 offers 3 MIPS of performance, the new Sun 4/110 boasts 7 MIPS. It offers between 8M and 32M bytes of RAM, compared with 4M and 24M bytes of RAM. However, Sun 4/110s with more than 8M bytes of RAM will not be available until this summer, according to the company.

Sun's Sparc workstations are source-code compatible with the firm's Motorola-based line. Disk storage capacity ranges from 141M to 1.3G bytes, depending on the configuration.

The new system was greeted favorably by industry watchers. "It certainly offers the leading price/performance on the desk top," said Michael Orsak, industry analyst for Robertson, Colman and Stephens in San Francisco. "From the customers' perspective, they're getting a choice. They can buy what they want — Motorola or Sparc — and run the same software on it."

Sun officials said the Sun 4 line — launched last July with its Sun 4/200 series, a 10 MIPS deskside system — will account for 15% of the company's revenue in the quarter ending June 30.

ENIAC activist Brainerd dies

Developed first general-purpose computer

BY J. A. SAVAGE
CW STAFF

John Grist Brainerd, who oversaw the development of the first general-purpose electronic computer in the early 1940s, died Monday at age 83 in Kennett Square, Pa.

Until late last year, Brainerd was involved with the Moore School of Engineering at the University of Pennsylvania, holding the title of professor emeritus of engineering.

He received a bachelor's degree from the university in 1925 and a Ph.D. in 1934 and was director of the Moore School from 1954 to 1971.

Brainerd is credited for convincing the U.S. Army to fund ENIAC, or the Electronic Numerical Integrator and Calculator, despite opposition to the idea from his peers. The machine was developed as part of the war effort to help determine trajectories of artillery shells. By the time ENIAC was unveiled on Valentine's Day in 1946, the war had ended. But because it was the first general-purpose computer, it was then used by scientists to resolve calculations for the development of the hydrogen bomb.

ENIAC was the world's largest computing machine, filling a 30- by 50-ft room and containing 18,000 vacuum tubes. Brainerd's peers considered the vacuum tubes to be the weak link in the computer, but the machine operated them at less than capacity to keep them from failing.

The other developers of ENIAC, John Mauchly and J. Presper Eckert, established Eckert-Mauchly Computer Corp. That company was bought by Remington-Rand Corp. in 1950. Brainerd chose to stay in the academic world.

CORRECTIONS

Texaco and Pennzoil co. have not merged [CW, Dec. 28, 1987/Jan.4, 1988]. The possible merger of the companies has not been consummated yet because of unresolved issues.

In the Spotlight chart on Terminals and Terminal Emulation Products [CW, Jan. 11], the phone number for Term-Tronics, Inc. should be 619-565-6330.

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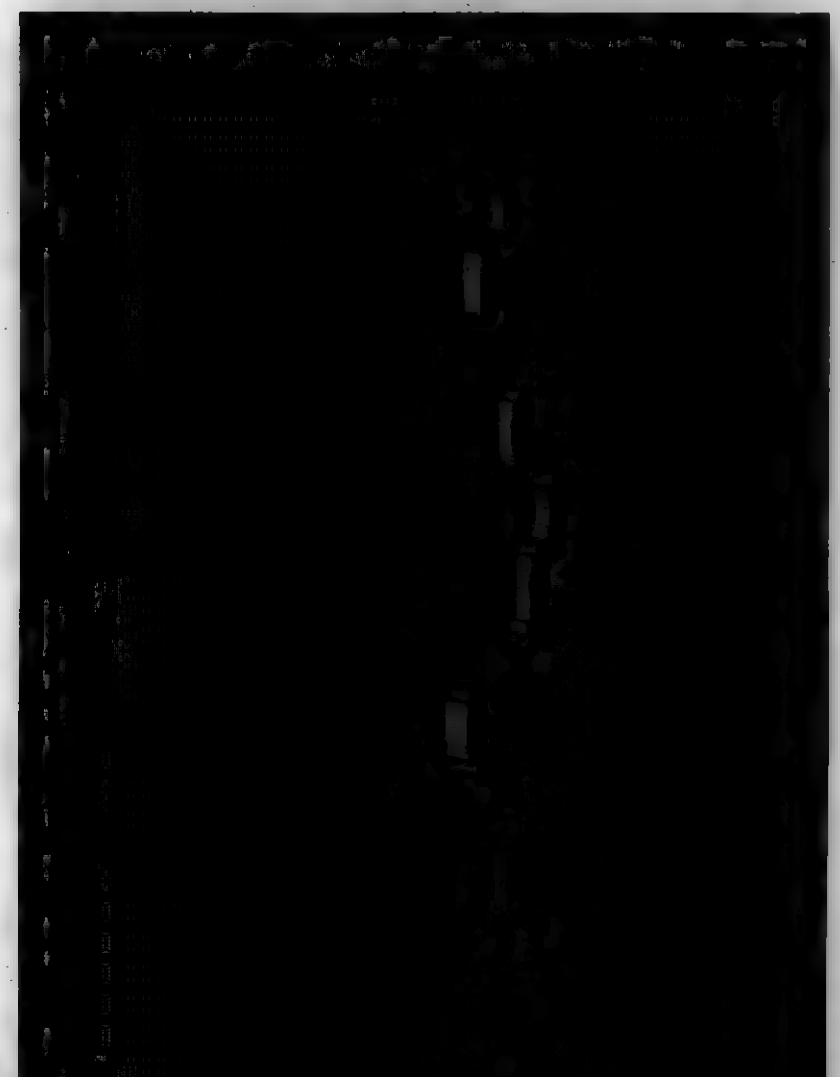

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Once grand NCC nixed this year

BY ALAN J. RYAN
CW STAFF

The National Computer Conference (NCC), once the grandest trade show in the country, is dead — at least for this year.

Last week, the board of NCC canceled plans to stage the show, originally set for May in Los Angeles. The announcement may well be the final chapter in the saga of a conference that was once the jewel of computer exhibitions but fell victim to careless management.

In 1983, NCC boasted nearly 700 exhibitors and 100,000 attendees. Ironically, the sound health of the show — combined with show management's reluctance to limit attendance — may have contributed to its decline and fall.

'Too successful'

"At one point, NCC was too successful," said Holly Bourne, director of marketing services at Fujitsu America, Inc. in San Jose, Calif. "It was hard for any exhibitor to stand out." Corridors overflowing with hordes of attendees in 1983 gave way to more exhibitors but fewer attendees in following years.

By 1987's Chicago exposition last summer, NCC had withered. The show, which had once occupied both floors of Chicago's giant McCormick Place and spilled over to local hotels, filled only half of one floor last year.

Longtime supporters skipped out just weeks prior to the show's opening. Attendance dropped to 16,000, and only 150 vendors exhibited.

Observers said NCC's weakness became readily apparent in 1985 as more vertically oriented and regional shows began to draw attendees away from NCC. "The Interface Group [sponsors of Comdex] has been making a concerted effort to kill NCC," said Lynne Howell, director of corporate exhibits at Northern Telecom, Inc. in Nashville.

Howell said the quality of NCC attendees declined as their numbers dropped. "When you have little kids tromping through the exhibit halls and students passing out resumes, it makes it hard for a company to justify" attending, she said.

Hard to handle

"Unfortunately, NCC didn't seem able to get a handle on its focus," said Eileen Riley, trade show coordinator at Oracle Corp. in Belmont, Calif.

Despite the poor showing at NCC last year, the NCC board made a final attempt to revive the nation's longest running computer show, renaming it the National Computer Exposition/ National Computer Conference and moving it to Los Angeles in May, before canceling last week.

Carroll Lewis, an NCC board member, said no decision has yet been made about future NCC shows.

DP salaries up average of 4.2%

BY DAVID A. LUDLUM
CW STAFF

Companies have boosted pay for data processing hires an average of 4.2% from last year's levels, according to a study released last week.

This year brings relatively large increases in starting pay levels for electronic data processing (EDP) auditors, systems and programming managers, operations clerks and data entry clerks, according to the annual report by recruiting firm Robert Half International, Inc.

The study breaks out findings for DP shops whose professional staffs number more than 50, 15 to 49 or fewer than 15.

For large shops, there are gains of more than 5% for EDP audit staff members (7%), programmer/analysts (6.3%), systems and programming managers (5.4%) and operations I/O clerks (5.3%). Top DP managers and data base managers showed the smallest gains, between 1% and 1.4%.

Less is more

Gains are greater in small and medium-size installations, where pay is lower. At medium-size firms, increases are greater than 6% for data entry clerks (8.8%), telecom specialists (6.3%), senior EDP auditors (6.2%) and data base analysts (6.1%).

At small installations, the big gains are for data entry clerks (9.3%), operations I/O clerks (8.2%) and systems and programming managers (7.6%).

The survey reflects geographic differences in salaries for jobs paying less than $50,000 a year. They include premiums of 5% for Connecticut, Massachusetts and California and discounts of nearly 10% for many Southern states.

THIS YEAR brings relatively large increases in starting pay levels, according to the report.

The big city

Salaries in cities with one million or more people tend to be 5% higher than elsewhere, the study said.

The report, based on job orders to the firm's 130 U.S. offices, reflects more modest pay increases than a recent study by another recruiter, Source Services Corp., which reported a gain of 7.1% [CW, Jan. 11].

The Robert Half survey reflects ranges of starting base pay reported by corporate clients, while Source Services' study includes current salaries reported by prospective new hires, spokesmen for each firm said.

Prevailing wages

Starting salaries for managers this year at large, medium and small MIS installations; figures are based on openings reported to a personnel recruiter

Vice-president of MIS	$71,000 to $101,000	$58,000 to $81,000	NA*
MIS director	$61,000 to $81,000	$47,000 to $59,000	$37,000 to $50,000
Systems and programming manager	$44,000 to $53,000	$38,000 to $48,000	$34,500 to $43,000
Data base manager	$56,000 to $65,000	$37,000 to $45,000	NA
Operations manager	$34,000 to $44,000	$32,000 to $42,000	$26,000 to $35,000

* Not applicable

INFORMATION PROVIDED BY ROBERT HALF INTERNATIONAL, INC.
CW CHART

ANSI to nudge C standard closer to reality

BY CHARLES BABCOCK
CW STAFF

A standard for the C programming language will move closer to reality this week when a technical panel of the American National Standards Institute (ANSI) submits a draft for a second round of public comment.

The first round elicited 32 letters with 500 requests for changes in the proposed standard. These surfaced during a public comment period running from November 1986 through March 1987.

The X3J11 technical review committee of ANSI has been at work on a standard for 4½ years, according to Thomas Plum, committee vice-chairman.

A standard for C is considered crucial, since many software developers are turning to it as the language that promises the greatest portability across hardware platforms.

C emerged from Bell Telephone Laboratories, Inc. in Murray Hill, N.J., in the late 1970s as a language with high-level data structures that, nevertheless, allowed programmers to deal with machine-level entities at a low level.

It thus came to be viewed as modern and flexible and, at the same time, "close to the guts of a machine," in the words of one software developer.

Useful data

Plum said the second draft of the standard incorporates useful data types not previously included in the language, such as long, double floating-point numbers and unsigned long integers. The second draft also includes low-level support for multibyte characters, such as those used to represent Japanese or Chinese characters.

Plum said the C technical review committee consists of 100 members, two-thirds of them C vendors. "So far, all commercial versions of C are converging on the C language standard. Nobody's going off in other directions," he said.

The Unix operating system and most applications for it are written in C. The language gains its portability feature by making use of a function library to provide I/O, mathematics, exception handling, string and character manipulation and dynamic memory management.

Putting such functions in a standard library allows the machine procedures code to be contained in a compact, well-defined division.

Included in SAA

C was included in IBM's Systems Application Architecture, one of three languages so included, and has come to be regarded as a compact language that is more efficient than the fourth-generation languages with which it once competed.

Comments on the current draft of the standard for C will be accepted by the X3J11 committee from Feb. 12 through April 12. Copies of the draft may be obtained from Global Engineering Documents, Inc. by calling 800-854-7179.

The $65 document includes directions for how to inform the ANSI X3 parent committee in Washington, D.C., of any recommendations.

Cobol 85

FROM PAGE 1

migrating their programs to VS Cobol II," said Jerome Garfunkel, a Cobol consultant in Litchfield, Conn.

Until IBM received the validation, VS Cobol II users were left up in the air about how far they should go in converting their Cobol programs to VS Cobol II. If IBM brought forth a product other than VS Cobol II that met the Cobol 85 standard, they would have to undergo a second conversion, commented Garfunkel, a member of the ANSI X3J4 Cobol 85 committee.

Portability

Bruce L. Gaarder, data processing manager at Donohue Enterprises, Inc. in Minneapolis and former chairman of the Twin Cities Digital Equipment Corp. users group, said Cobol 85 will make Cobol programs more portable between DEC VAXs and IBM mainframes.

With its more precisely defined commands and structured programming concepts, an application written in Cobol 85 could run in either environment with fewer changes than earlier versions of the language required, Gaarder said. DEC recently received validation for its VAX Cobol.

Cobol 85 will make programming skills in mixed vendor shops more versatile, he added.

Reason to believe

Garfunkel said IBM's validated Cobol 85 compiler will provide IBM customers with a reason to go ahead and use the advanced version of the language for production systems.

Gaarder disagreed, saying Cobol 85 did not need any additional coronation once the federal government required it for contracts containing Cobol software.

So far, few mainframe Cobol users have begun large-scale conversion of existing programs to VS Cobol II, industry observers said. IBM sought the high-level rating even though a lower, intermediate-level rating was available and required fewer functions.

In addition to IBM and DEC, only Tandem Computers, Inc. and NCR Corp. have Cobol 85 compilers for minicomputers or mainframes.

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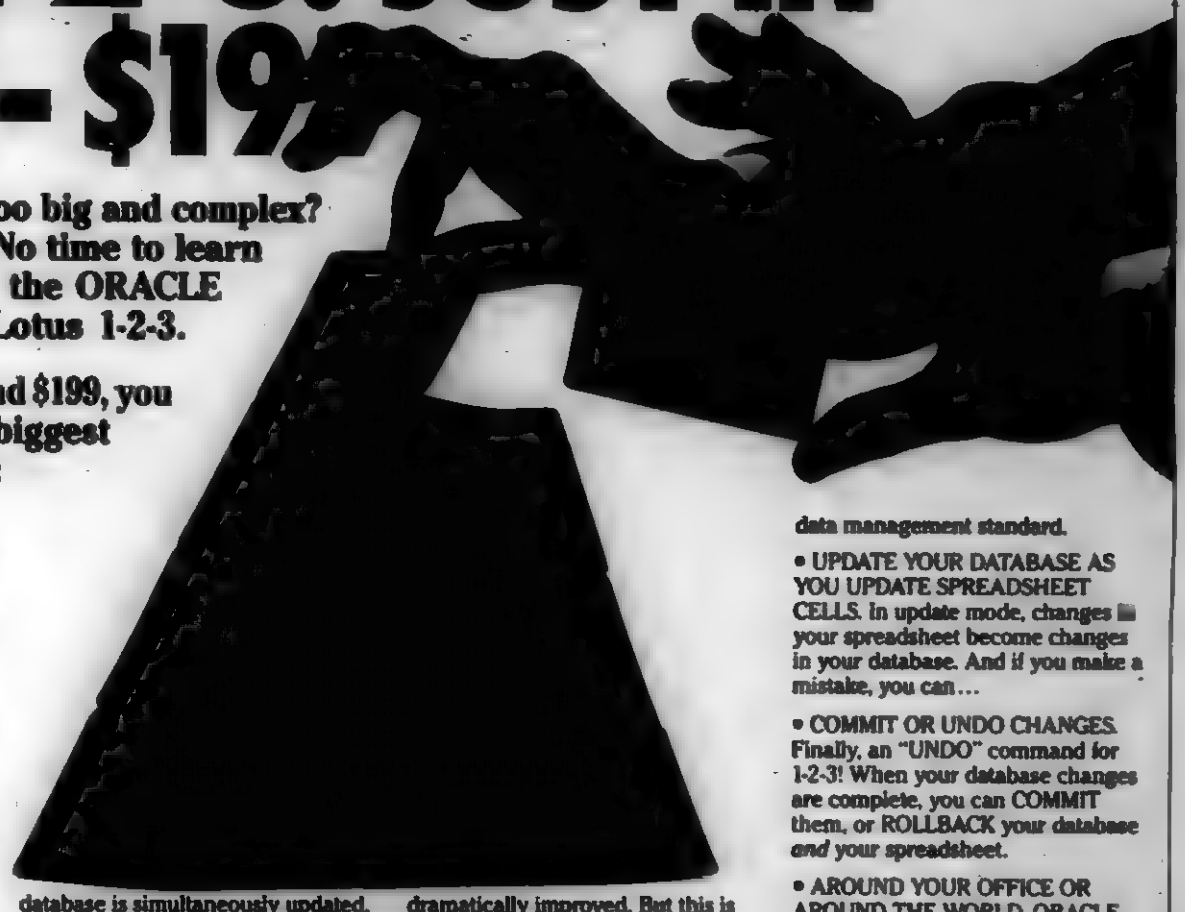

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IBM offers cut-sheet duplex printing

BY ALAN ALPER
CW STAFF

NEW YORK — Expanding its broad array of printers, IBM last week unveiled two high-speed nonimpact units that support its Advanced Function Printing (AFP) software and two intermediate-speed impact devices.

With its new 3827, IBM is offering cut-sheet duplex printing for the first time. The nonimpact printer prints at a speed of 92 page/min and can print two million pages per month, the company said. The device uses an LED print engine from an unspecified vendor.

In a separate announcement, Eastman Kodak Co. said it had signed a contract to supply cut-sheet, electrophotographic printer engines to IBM, but IBM would not say whether the 3827 uses Kodak's engine.

IBM claimed that the 3827 has the shortest duplex paper path in the industry and can automatically switch from single- to double-sided printing.

Priced at $185,000, the 19-sq-ft printer will be available in the second quarter, IBM said.

A month, a million

The other nonimpact unit is an 88 page/min laser printer offering a fanfold paper printing capability. The 3835 accommodates paper up to 15 in. wide and can print up to 1.8 million pages per month, the company claimed.

Priced at $135,000, the 18-sq-ft printer will also be available in the second quarter, IBM said.

Like IBM's earlier models, the new nonimpact printers support AFP software, a set of products that enables users to mix text, data, graphics and images on a single page.

IBM has enhanced AFP to support the printers but has not changed any of its functionality, said William Wilson, group director of large systems management for IBM's U.S. Marketing and Services Group.

AFP has all-points addressability for mixed graphics and text applications and can be used to create electronic forms. Both printers can, therefore, be used in a variety of business or presentation graphics applications or for traditional data processing output.

IBM Models 3800 and 3812 also support AFP, so if users want to change nonimpact printers in a systems configuration, they can do so without having to alter the application, said Lane Jorgensen, manager of printer system marketing at the U.S Marketing and Services Group.

Both printers are direct channel-attach units and work with IBM 4341, 4361, 4381, 3081, 3090 and 9370 systems running MVS or VSE operating systems.

Band technology

The impact printers — including the IBM 6262 — use band printing technology and were designed for use in both direct channel attachment or distributed environments, Jorgensen said. Both can print on multipart forms, card stock, gummed labels and other special forms and feature a swing gate for easier paper loading.

The 6262 comes in two versions: the Model 12 and the Model 14, which are 1,200 and 1,400 line/min units, respectively.

The Model 14 can be directly connected to IBM 4361, 4381, 3090 and 9370 processors.

For distributed environments, both printers can attach to 9370 and 4361 units or any 3274 controller via coaxial cable and to an IBM System/36 or 38 by means of twinaxial cable.

Model 12 lists for $22,600 and is set to be available in March. The Model 14, priced at $26,500, will ship in July, IBM said.

The Model 12's price represents a 30% savings over that of the 4545, IBM's current intermediate-speed impact printer, Jorgensen said.

The 9-sq-ft printers operate at between 55 and 58db and are compact and quiet enough to be installed in an office, IBM's Wilson said. "They're so quiet that we have installed a blinking light so operators know when they are operating," he said.

Run the presses

IBM's latest printers offer different technologies for IBM 370 users

		Print speed	Duty cycle	Price	Availability
3827	LED, cut sheet, duplex	92 page/min	2 million page/ month	$185,000	Second quarter

INFORMATION PROVIDED BY IBM
CW CHART

AT&T option allows routing of digital lines

BY ELISABETH HORWITT
CW STAFF

WASHINGTON, D.C. — AT&T last week announced its long-expected Subrate Data Multiplexing (SDM) option, which is said to handle the firm's individual Dataphone Digital Service (DDS) channels ranging in speed from 2,400 to 9.6K bit/sec., combining them into higher speed T1 circuits and routing them to different customer sites.

The option has long been requested by AT&T customers, "who are always looking to affect their telecommunications bottom line," said AT&T DDS product manager Tom Ball.

The option can save users money by allowing them to route DDS subchannels through an AT&T service node, as opposed to connecting sites directly over individual lines leased from the local carrier, said Thomas Nolle, president of Haddonfield, N.J., consulting company CIMI Corp.

For example, instead of having point-to-point connections between remote sites in New York and Detroit and a data center in Chicago, all transmissions would go directly to an AT&T SDM service node that would then send them on to the appropriate site. This effectively halves the number of local access charges each site pays, since it is sending to one AT&T node instead of to two other sites, and also lowers long-distance charges, since it eliminates the direct Chicago-to-New York connection, Ball said.

SDM can also save users money by combining low-user transmissions into a 56K bit/sec. DDS line or into increments of 1.5M bit/sec. over an Accunet T1.5 or T45 service connection, AT&T said.

An SDM standard?

AT&T's introduction of a long-distance SDM service could also act as an incentive to telecommunications equipment manufacturers to support AT&T's SDM specification as an industry standard, Nolle said.

Avanti Communications Corp., a Newport, R.I., telecommunications equipment vendor, already supports AT&T's SDM protocol in its T1 switches and network concentrators, according to George Kushin, the firm's vice-president of marketing. The debut should put pressure on divested Bell operating companies, some of which offer local routing of SDM subchannels, by giving users a way to bypass their services, Kushin indicated.

SDM5 connects up to five subrate channels, each with a maximum speed of up to 9.6K bit/sec., at $175 per month; the SDM10 connects up to 10 channels, each with a maximum speed of 4.8K bit/sec., at $125 per month. SDM20 connects up to 20 2,400 bit/sec. channels at $75 per month.

The service is slated to be available in 20 cities by March 20, with expansion planned for later this year.

Users seek voice with ISDN forum

Charter aimed at incorporating users' needs into applications

BY ELISABETH HORWITT
CW STAFF

GAITHERSBURG, Md. — Users may finally get a chance to tell vendors what types of Integrated Services Digital Network (ISDN) applications they would like to see, through the newly formed North American ISDN User's Forum.

The forum's charter, signed here by the seven founding members last Wednesday, defines two separate bodies: the ISDN User Workshop, which will identify and prioritize ISDN applications, and the ISDN Implementation Workshop, whose vendor and carrier members will try to reach a consensus on how those applications can be implemented.

By formalizing vendor cooperation and user input, the forum hopes to ensure not only that applications reflect user needs but also that different vendors' implementations can communicate over an ISDN link, according to W. Edward Hodgson, a Westinghouse Electric Corp. communications manager.

Hodgson will chair the User Workshop and act as representative for the Association of Data Communications Users (ADCU).

Hodgson said he has been "pounding on the table" trying to get other Fortune 500 companies and users groups besides ADCU to get involved in the forum. "I keep hearing arguments like, 'My company doesn't want to spend the time or the money.' But in two to five years, standards will save a lot of both."

No pie in the sky

Once users gain a voice through the forum, Hodgson said he expects them to ask vendors not for blue-sky applications but for solutions to existing problems,

> "IN TWO to five years, standards will save a lot of [time and money]."
>
> W. EDWARD HODGSON
> WESTINGHOUSE
> ELECTRIC CORP.

"like an ISDN service to support electronic funds transfer for mom-and-pop grocery stores and gas stations," he said.

While the forum may help to ensure that ISDN applications turn out to be what users want, it will probably take at least two or three years for users to have any real power in the ISDN development process, said Frank Dzubeck, president of Washington, D.C.-based consulting firm Communications Network Architects, Inc.

"No one understands what ISDN applications will be yet. I've talked to corporate users, and so far, ISDN services are just plain vanilla," he said.

The idea of the forum started with the National Bureau of Standards (NBS) soliciting people's views on how ISDN could be brought more quickly to market, according to Ken Goodgold, area manager for advanced technology at regional holding company Southwestern Bell Corp.

The NBS, an organization that helps coordinate and promote the development of standards for government organizations, will act as forum facilitator.

The forum is billed as a joint venture for both government and private industry sectors, Goodgold said.

Intimate partners

The seven founding forum members are the ADCU, Bell Communications Research Corp., European computer vendor International Computers Ltd. and regional holding companies Nynex Corp., Bell Atlantic Corp., Ameritech and Southwestern Bell Corp.

Major vendors such as IBM, AT&T and Digital Equipment Corp. have expressed a strong interest in joining the ISDN forum, Goodgold said, "but we wanted to start with a small group and get the momentum going before we do an open solicitation."

Now that the charter is signed, the forum will actively seek new members from the manufacturer, service and user communities.

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	Columbia	Apr 14
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TN	Knoxville	Feb 03
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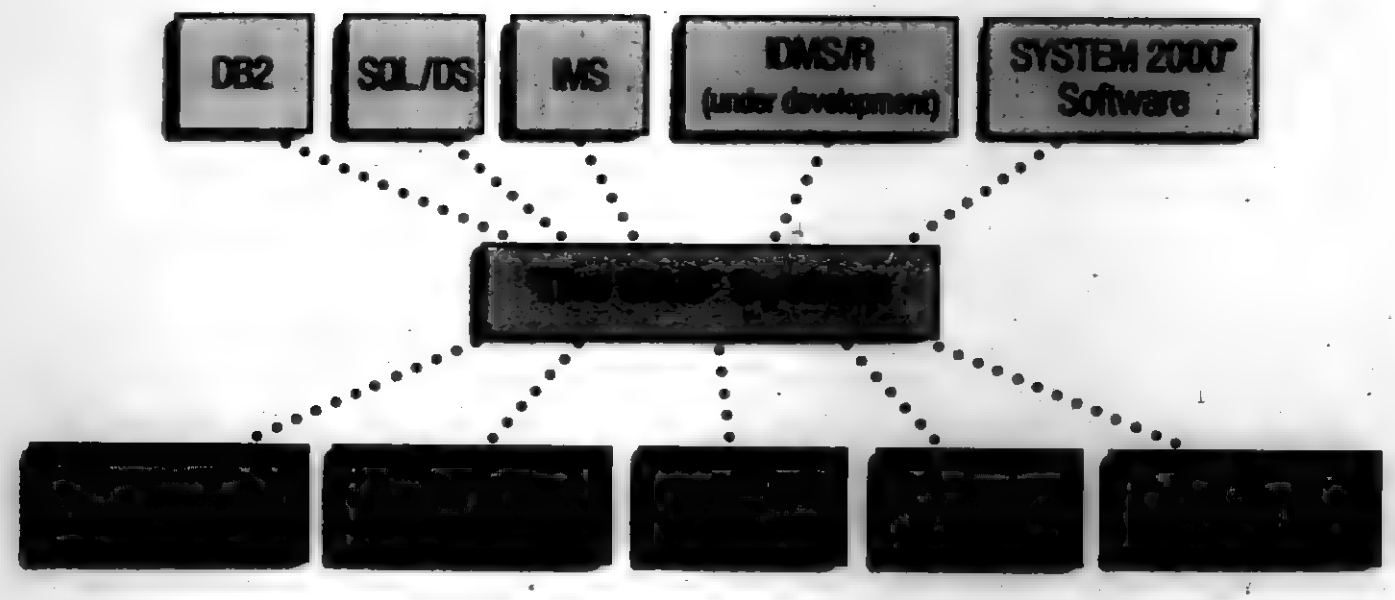

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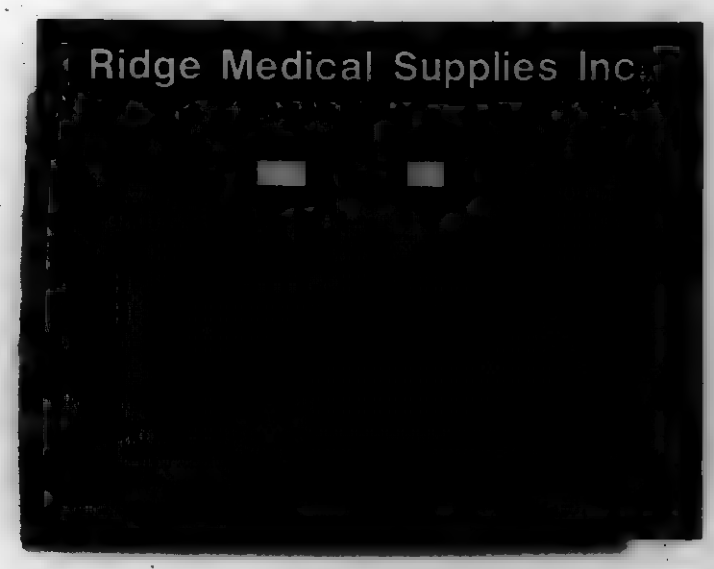
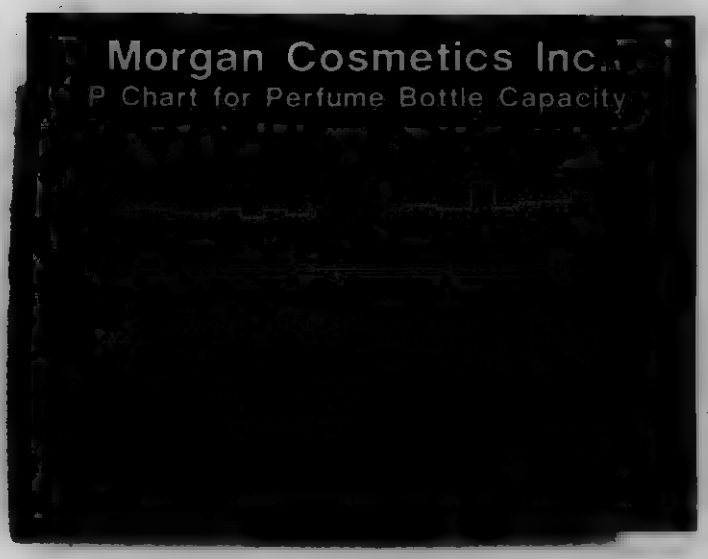
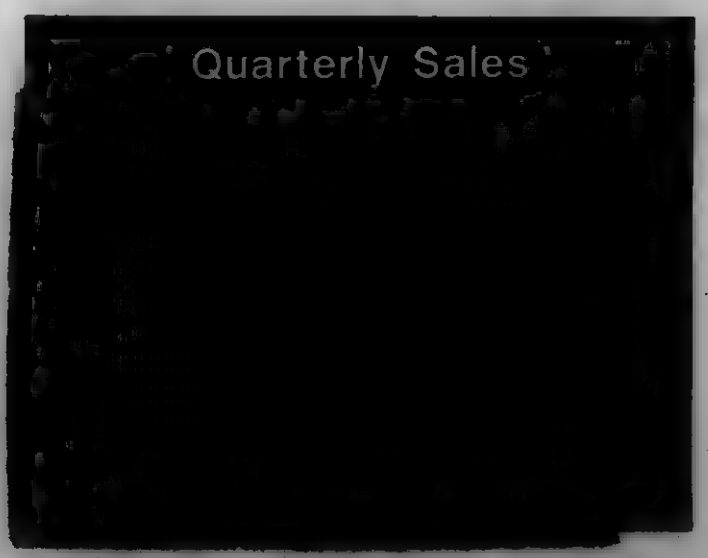
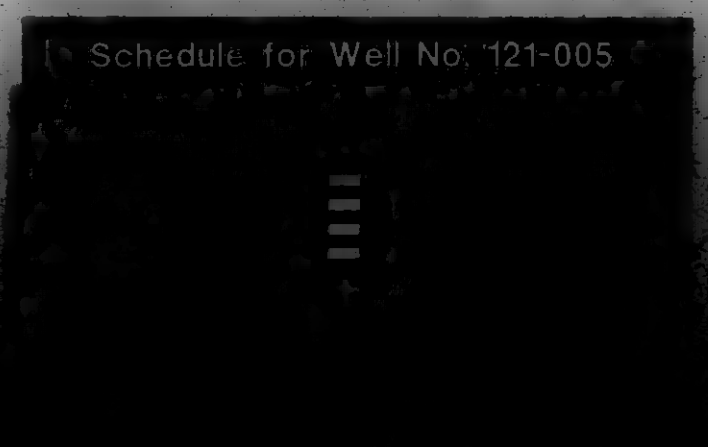








Shopping club finds a bargain

Network's voice response system answers one million calls a month

BY ALAN J. RYAN
CW STAFF

"Hi! This is Tootie. We are now taking orders for the four-piece necklace, earrings and key ring set."

For television junkies and mail-order aficionados, the voice of Tootie might be akin to heaven on earth. Shoppers can order merchandise ranging from personal computers to faux diamonds, 24 hours a day, 364 days a year from home while watching the Home Shopping Club.

Tootie answers each incoming call to the Home Shopping Club — a number that can climb to hundreds or even thousands per minute. She either handles the order herself or passes the call on to another operator. It is no secret that she is considered an extremely efficient worker: She works day and night, takes no coffee breaks or vacations and voices no complaints about being left off the company's payroll. She is not programmed to complain.

The voice response system nicknamed Tootie handles some one million calls monthly for the shopping club, more than one-third of the club's total monthly calls, according to Woody Boyd, president of Precision Software, Inc., the developer of Tootie and similar systems.

The Home Shopping Network *brought in $582.1 million in sales in 1987*

The Home Shopping Club learned of Precision Software's technology through its Unisys Corp. marketing representative, Boyd explains. In November 1986, Precision Software presented an analysis to the club and was quickly awarded a contract for the voice response system. Less than a year later, the mammoth Home Shopping Network, parent of the club, acquired the software firm.

The Home Shopping Network recorded sales of $582.1 million and earnings of $29.5 million in the year ended last August, reflecting increases of 363% in sales and 174% in earnings over the prior year.

The television-based shopping program is available to 43 million homes across the U.S. on cable and broadcast TV stations and through satellite dish broadcasts. During fiscal 1987, the program shipped 17 million packages, compared with 4.9 million in fiscal 1986.

Tootie steals the show

The network employs more than 4,400 people, but its shining star is the voice response system.

For approximately $3,000 per phone line, network users of Precision Software's voice response technology receive one or more IBM Personal Computer ATs or compatibles, depending on the size of the installation. The computer acts as a series of telephones would to a phone system. "You could unplug the phone on your desk and plug in the unit," Boyd says.

The maximum number of phone lines per micro is 64, Boyd says. The system also comes with applications to address user needs like home banking and trucking dispatching.

At the Home Shopping Club, each microcomputer in use has the equivalent of 24 voice positions on it, according to Jerry Troupe, executive assistant to the chairman of the board for special projects.

Troupe explains that in the main location, there is a network of 28 PCs offering the equivalent of 670 agent positions. In a remote facility in Clearwater, Fla., there are two more computers that create another 40 agent positions.

WITH the operators and Tootie combined, 2,000 or more calls can be handled per minute during peak periods.

The club works like this: An item is brought out to the podium and displayed for the home audience; then the order taking begins. Order taking occurs only while the item is on display.

Limited time only

Because the items being sold are all in-stock inventoried items at the Home Shopping Network warehouse, orders are taken until the inventory has been depleted. The show host can view a window indicating the number of calls being taken by Tootie at any time. That information cues the host as to when items should be rotated. A typical item remains on display for approximately six minutes, Troupe says.

With the operators and Tootie combined, 2,000 or more calls can be handled per minute during peak periods with heavy-volume items.

Callers to the voice response system become computer users, and their Touch-Tone telephones act as the computer, Boyd says. "The difference is that the user communicates with the sense of sound rather than the sense of sight," as he would on a computer terminal screen, he adds.

"Every phone call that comes into the building on an 800 line is routed to a voice response line before it has the opportunity to go to a human operator," Troupe explains. The caller can either place an order with the voice system, punching in a membership number from previous orders, or punch in 0 to contact the human operator.

All information about a customer is kept on a data base on the Home Shopping Club's Unisys A 15J mainframe, so repeat callers can make purchases without having to repeat credit card numbers and address information each time.

Operators on duty

During peak periods, the company employs up to 1,200 operators in each of its two locations. The locations are connected via a fiber-optic link.

Advantages the voice response system offers the Home Shopping Club include the ability to move more merchandise in addition to labor, space, time and phone-line savings, Troupe says.

According to Boyd, the voice system is fast. "The average length of call for a human operator is between 50% and 100% longer," he says. "Tootie has reduced significantly the call length," he adds, allowing more products to be sold faster.

Apollo launches Domain/OS

CHELMSFORD, Mass. — Apollo Computer, Inc. last week rolled out a version of its Unix operating system that it said incorporates building blocks for distributed computing.

Domain/OS uses Apollo's Network Computing System (NCS) architecture, which the company introduced a year ago as a method to spread applications across computing systems on a network.

To achieve distributed computing, users need the NCS tool kit in addition to Domain/OS to split up applications and assign them to different resources on the network. Domain/OS is not required to build NCS applications.

The operating system is scheduled for mid-year shipment. Apollo bundles the system with its workstations and does not price it separately. When Apollo users add systems to a Domain network, they are charged a fee for the additional media and documentation required for the operating system, which ranges in price from $200 to $500, a company spokesman said.

Three-faceted base

Domain/OS is based on three operating systems: Apollo's Aegis, a proprietary operating system; AT&T's Unix System V, Release 3; and the University of California at Berkeley's Unix 4.3.

Users of Apollo's current Unix offering, Domain/IX, will receive support for at least another year, the company said. Users will be charged a fee for media and documentation, the price of which has not yet been determined but should be in the $200 to $500 range, the company added.

The new operating system incorporates three NCS facilities: a distributed registry, a network print manager and a remote debugger.

IBM to deliver 9370s to U.S. Postal Service

BY JAMES CONNOLLY
CW STAFF

WASHINGTON, D.C. — IBM's oft-criticized 9370 mid-range system last week won one of the major contracts IBM had anticipated when the U.S. Postal Service awarded the company a pact for at least 306 — and possibly more than 900 — 9370s and larger IBM 4381s.

IBM defeated Digital Equipment Corp. and AT&T in the final bid competition. Under the three- to five-year contract, IBM will supply the Postal Service with 306 VM-based systems to run an integrated logistics support system at regional post offices. IBM bid 9370s and 4381s, although most of the initial 306 sites will get 9370s.

Since the 9370 was introduced in October 1986, IBM has said it expected to win several contracts for hundreds of systems. Recent criticisms of the 9370 have been based on the reluctance of large organizations to buy the system. Analysts estimate that IBM sold 3,000 to 4,000 of the minicomputers in 1987, rather than the 5,000 IBM once projected.

More demand likely

The Postal Service request for proposals stated that the number of systems needed could reach 904 as other applications and locations are supported.

According to Rick Weirich, director of the Postal Service Office for Communication and Technology, the requirements contract is an open-ended agreement that standardizes the service's distributed systems needs as defined by the logistics support system application. That system was designed to integrate tasks now done manually or with a combination of personal computers and mainframes.

Weirich said the application will help regional managers coordinate with each other and with Postal Service headquarters and will save money on volume equipment and materials procurements, shifting inventories to locations in which they are needed and making maintenance efficient.

Judges' decisions final

He said that during a lengthy review process, all three finalists demonstrated systems that met the Postal Service's needs.

Those needs included a single operating system and the ability to support a broad range of terminals. Individual systems may support between two and 512 users.

"Our requirement was for a platform that we could deploy in all our facilities, which come in a wide variety of sizes," Weirich said.

CDC ready to unveil native Unix for Cybers

BY JEAN S. BOZMAN
CW STAFF

MINNEAPOLIS — Control Data Corp. plans to announce a native Unix operating system for its Cyber line of mainframes at this week's Uniforum meeting in Dallas.

The modified version of AT&T's Unix System V, which will have a 64-bit addressing scheme to match the Cyber architecture, will be available for sale sometime next year, CDC executives said last week.

The move to bring standard Unix applications to Cyber systems was requested by CDC users. Normally, Cyber machines are packaged with CDC's proprietary 64-bit NOS/VE operating system. Until now, only a limited form of Unix compatibility had been provided through a shell called VX/VE, according to John Wardell, a manager in CDC's strategic marketing group.

The new Unix system, developed by an unnamed outside company, should be compatible with the government's Posix standard. However, off-the-shelf Unix System V applications will have to be recompiled to run in CDC's native 64-bit environment, Wardell said.

The addition of native Unix should not be interpreted as a divergence from NOS/VE, said Sharon Studer, manager of strategic marketing for CDC's computer systems group. "This is absolutely not a move away from NOS/VE," she said. "In a production environment, NOS/VE gives large, complex computer sites a level of security, fault tolerance and high-performance I/O not provided by Unix."

However, most of the estimated 1,300 Cyber sites run the original NOS operating system instead of the newer NOS/VE, CDC managers said.

Catering to old and new

An internal survey of CDC user sites showed that Unix was a growing requirement for both established CDC users and new prospects. One reason for Unix's appeal is its multitasking capability, Wardell said.

"We see this as an opportunity to gain new-name accounts," Studer said. Packaged with the Cyber 930 departmental system, standard Unix applications will round out CDC's software offerings in the engineering and scientific areas, she said. "To the extent that Unix has become acceptable in other environments, this move would open new application areas to us, such as office applications." The company is moving to strengthen its ties with third-party providers of Unix applications, she added.

The Cyber version of Unix should complement another version being prepared to run on CDC subsidiary ETA Systems, Inc.'s ETA-10 supercomputer. The ETA-10 Unix version is set for release later this year.

Eventually, CDC users should see what the company calls "the transparent environment." That environment would start at a desktop Unix workstation and reach up to the largest Cyber mainframes and ETA-10 supers.

Uniforum focus on 'serious' side

BY ROSEMARY HAMILTON and JULIE PITTA
CW STAFF

DALLAS — There may be few product surprises, but the big guns of the industry will show their commitment to Unix this week at Uniforum, scheduled to open tomorrow.

Apple Computer, Inc., IBM, AT&T and dozens of other vendors plan to make announcements. Noticeably absent from this roster is Digital Equipment Corp., which is scheduled to offer only an exhibit.

"There will be a lot less razzle-dazzle this year," said David Fiedler, editor of "Unique," a Unix newsletter published by Infopro Systems. "People are getting more serious and less innovative about Unix."

High hopes for Apple

This week's biggest splash is expected from Apple, which plans to roll out AUX, its long-awaited version of Unix. AUX is an Apple-ized version of AT&T's Unix System V, Release 2, with extensions from the University of California at Berkeley's Unix 4.2. Sources said 100,000 copies of Apple's long-awaited AUX were recently shipped.

Formally introduced last spring with the debut of the Macintosh SE and Macintosh II microcomputers, AUX was originally scheduled to ship last July. However, problems in tuning the operating system, designed for the Motorola, Inc. 68020-based Mac II, delayed its release. The ship date for AUX was amended several times before this week's expected release.

Pricing will be announced at the Uniforum conference.

AT&T will reportedly announce plans for Release 4 of Unix System V. The company is also set to demonstrate for the first time the operating system that merges Microsoft Corp.'s Xenix and Unix System V.

AT&T also plans a joint announcement with Amdahl Corp. and Sun Microsystems, Inc. Industry observers speculated that the trio may disclose plans for developing a mainframe version of Unix that incorporates some features of the Berkeley version, on which the Sun operating system is based.

One consultant said he expects the group to announce plans to hook Sun workstations into the Amdahl environment.

IBM has scheduled a press conference for Tuesday to reveal enhancements for what the company now calls its AIX workstation family. This line includes both the RT Personal Computer and the Personal System/2 Model 80 running AIX.

A company spokesman said no RT PCs or PS/2s will be introduced. William Lowe, president of IBM's Entry Systems Division, will be on hand to help people understand the relationship between the RT and PS/2, the spokesman said.

The announcement "will likely be a bridge between the RT and PS/2," said Judith Hurwitz, senior editor of "Unix in the Office," a publication of Patricia Seybold's Office Computing Group. "That has been their announced strategy."

Data bases in on the act

The three major data base vendors in the Unix market have also scheduled announcements.

Relational Technology, Inc. hopes to jump on the bandwagon for connectivity between Apple and DEC computers with a port of its Ingres relational data base management system for the Macintosh II.

The DBMS will reportedly run under the Apple's AUX. Claiming to take advantage of increased connectivity between DEC VAXs and Mac workstations, Relational said the product will help provide a link between the Mac II and distributed computing environments.

Oracle Corp. will announce a deal with Intellicorp to remarket the latter company's artificial intelligence tools. Oracle said it also plans to work with Intellicorp to develop an intelligent front end to its DBMS.

Informix Software, Inc. is scheduled to unveil Informix-Turbo, a data base server that it said is fault-tolerant because it ensures that data will not be lost in the event of a system crash.

Unisys Corp. is slated to unveil two Unix-based product lines, the U 5000 series of workstations and the U 7000 series of superminicomputers, which reportedly will support up to 348 users. Both lines will run under a version of AT&T's Unix System V, Release 2.

Hewlett-Packard Co. plans to introduce a CPU upgrade for its HP 9000 Model 825S and 825SRX workstations, which are based on the company's reduced instruction set computing architecture. The company claimed the upgrade, which costs $10,000, will make the workstations 75% faster than the Sun-4/260 and Silicon Graphics, Inc.'s Iris 4D/70.

Wyse Technology is set to announce a marketing agreement with The Santa Cruz Operation, Inc. under which Wyse may resell SCO Xenix 386 for the next three years. Priced at $695, a co-labeled version of SCO Xenix 386 will be sold to Wyse resellers separate from Wyse's Intel Corp. 80386-based micros.

West Coast correspondent Stephen Jones contributed to this report.

EDITORIAL

A bitter pill

FIVE YEARS AGO TODAY, IBM announced its plan to end a 20-year-old practice of distributing source code with its software licenses, thus moving toward an object-code only policy.

The policy change ignited fires all over the map, stoked in great measure by third-party vendors that saw the change as a direct threat to their existence.

Today, this highly complex and emotionally charged issue continues to defy the adage that time heals all wounds. As *Computerworld's* In Depth face-off (see story page 55) between parties on both sides shows, the object-code only policy continues to foster a divisive, bitter struggle between IBM and third-party software providers. Both sides are aggressively trying to win over the group that will ultimately determine what shape the policy will take — the users. From the free enterprise viewpoint, IBM has every right to protect its significant investment in systems software development with weapons like object-code only. Giving the code away clearly gives IBM's competitors an advantage they would not otherwise have. Doing so, therefore, is clearly not in IBM's best interest.

Furthermore, MVS and other users in heavy production-oriented environments have had few complaints and actually some praise about the policy. By effectively controlling the systems environment, IBM can limit modifications to its programs, imposing greater uniformity on the environment and simplifying the support task.

But there is another view. IBM's de facto monopoly in the mainframe operating systems area — while in one sense no different from the position of Unisys, DEC and others vis-a-vis their operating systems — gives it the ability to name the tune for third-party developers to a greater extent than any other company. Seen this way, IBM's present-day position in operating software demands special consideration to promote competition, which is the one area that all parties must agree is in everyone's best interest.

At *Computerworld*, we have always taken the position that what is best for the user is best — period. Some users, particularly those in the more interactive, less production-oriented VM environments, have voiced concern about the object-code only policy, but not vociferously. It appears that IBM has been quick to respond to specific user problems, and that has quelled any potential fury. IBM claims it has responded similarly to third-party vendors, although some vendors tell a different story.

Third-party vendors with product lines closely tied to IBM source code have suffered, and they have also begun making adjustments. Does this mean these companies are slowly vacating markets IBM would like to dominate?

If the policy ultimately serves as a force to reduce competition, it is clearly wrong, if not illegal. But in the absence of either court challenges or a user uprising to the object-code only policy, reality becomes a bitter pill that third parties may have to swallow.

LETTERS TO THE EDITOR

What's in a title?

I enjoyed the article about chief information officers [CW, Dec. 28, 1987/Jan. 4, 1988]. I agree with the analogy that the title is not important as long as the need is recognized.

Ron Breseseneki and I participated in a CIO panel discussion in June 1987 at the National Computer Conference in Chicago. We both agreed that CIO is a bad title and indicates there is not parity with our peers. As long as information systems play a strategic role in the business, titles are irrelevant.

Walter C. Zerrenner
Vice-President
Information Systems
Evangelical Services Corp.
Oak Brook, Ill.

ISDN special

Congratulations to McDonald's Corp. Integrated Services Digital Network (ISDN), the McNugget of technology, marches on [CW, Jan. 18, 1988].

In celebration of the monumental leap forward from 100 to 400 ISDN lines, we suggest McDonald's consider offering an ISDN special, where 2B+D gets you two burgers and a drink. Like ISDN services, pricing has not yet been finalized.

John J. Powers
Geoffrey C. Tritsch
Principals
Powers Tritsch & Associates, Inc.
Wellesley Hills, Mass.

Reminiscing

John Kirkley's request for information on the old Dick Tracy comic strip [CW, Nov. 2, 1987] brought back some interesting memories.

I believe that he may find what he is looking for if the *Chicago Tribune* has kept files of its Sunday comics dating back to the mid-1960s. If my memory serves me right, the series featured the entire Plenty family, which included Sparkle and B. O., and involved lunar landings with extraterrestrial contacts and intermarriage — with offspring. The interplanetary ships were magnetically driven and looked like large cans with gooseneck lamps attached to the ends.

I hope this helps in his search. Thank you for reviving some pleasant memories.

Marcus P. Hagen
DHC Industries, Inc.
Eldora, Ind.

This week in history

Feb. 6, 1978
Honeywell Information Systems, Inc. expands its Level 66 family with the Level 66/Distributed Processing System said to roughly cover the performance of IBM's 3031, 3032 and 3033.

At the same time, Honeywell denies that the system's introduction signals the demise of the troubled Level 66/85.

Feb. 7, 1983
A National Science Foundation panel calls for a federally coordinated national program to stimulate U.S. development and use of supercomputers. The 15-member panel of scientists warns that large-scale computing in the U.S. may be eclipsed by Japanese research and development efforts by the end of the decade.

Out of focus

I resent Harvey Newquist's column about the Strategic Defense Initiative [CW, Nov. 30, 1987], partially because I bought *Computerworld* to read about computers and not about washing machine problems. I also resent the self-proclaimed experts using errored facts and misleading logic to defeat the effort to replace Mutual Assured Destruction with a defense system.

Please keep CW focused on computers. Let Newquist shoot at things he does not really understand elsewhere.

Milo L. Hurley Jr.
Denver

Making it clear

Recent articles in *Computerworld* [CW, Nov. 30, 1987; Dec. 7, 1987] alleged that the National Bureau of Standards (NBS) had provided a special service to IBM by secretly testing a compiler. This was not the case.

Identification of compilers scheduled for testing is offered as a service to vendors. The NBS procedures allow vendors to request that the scheduling of a compiler validation not be published in the Certified Compiler List, as was stated in "NBS ad-

Continued on page 18

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.*

Long arm of the law

Systems pros: be wary of computer crime laws

BUCK BLOOMBECKER

Eleven years ago, Connecticut Sen. Abraham Ribicoff introduced the first computer crime bill in the U.S. Senate. The bill went down in defeat, as did all other attempts at similar federal legislation until 1984. But its effects have since been felt in dozens of states that have copied its language.

Since 1984, Congress has strengthened the federal computer crime law, passed the Electronic Communications Privacy Act and, most recently, passed H.R. 145, the Computer Security Act of 1987. H.R. 145 could ultimately affect computer

UNDER SOME of these laws, if you were involved in the design, implementation or use of a disapproved computer application, you might be liable.

security professionals more than all the earlier laws combined have.

This law makes periodic computer security training mandatory for operators of sensitive federal computer systems. It requires that every operator of a sensitive system establish a plan to ensure the security and privacy of the systems under his control.

If followed, this law will set a precedent that could significantly influence information management in the private, as well as the public, sector and at all levels of government. It is just one sign of the legislative interest in computer crime that Ribicoff initiated more than a decade ago.

Entertaining legislation

At the beginning of 1987, 47 states had passed some kind of computer crime law. A modification of Parkinson's law is required to explain why 15 more computer crime bills were introduced before the year ended: The quantity of new legislation introduced in an area is directly proportional to the amount of old legislation existing in the same area.

This relationship may seem bizarre to the systems professional, who might logically assume that once a state passes a law, it lessens the need to deal with the same problem again. But it will make perfect sense to a television viewer accustomed to seeing "new" programs imitate old ones far more frequently than they strike out for virgin territory.

Like entertainment, legislation is often the result of what people are paying attention to, not what they need.

Currently, people are paying attention to the regular reports of computer crime with which the media entertains us. People who used to gossip about the Asian flu now ask about IBM's viruses.

In the public eye

The democratization of computer crime is gaining speed. Voters are becoming increasingly comfortable forming opinions about computers, and computer crime law seems to be the arena in which many of their negative opinions are being expressed.

The introduction of 15 pieces of legislation last year suggests that many lawmakers see computer crime as an issue of concern to their constituents. The passage of seven bills into law suggests that those lawmakers are right.

Three states — California, Illinois and Missouri — undertook the complete rewriting of their laws. In each case, the laws' proponents argued that the existing laws had been outstripped by the march of technology and criminal inventiveness. (In none of these cases, so far as I can tell, was there much hard evidence to support the argument.)

Three other laws, in New Mexico, North Dakota and Oregon, all reflected growing sophistication regarding the varied nature of computer crime threats.

Each of these latter three states raised the possible maximum penalty for a crime, reflecting the easy legislator's reaction to any problem: tougher laws. (Again, no evidence was brought forth that more toughness was needed, but rhetoric seemed adequate to carry the day.)

Hackers get slap on wrist

At the same time, several of the laws passed last year also reduced the minimum penalties for computer crime offenders. This change, I believe, reflects the continued public interest in hacking.

When there is little or no damage to a computer system, juries are unlikely to allow the perpetrators to be punished severely, particularly if they are

Continued on page 18

Bloombecker is director of the National Center for Computer Crime Data in Los Angeles.

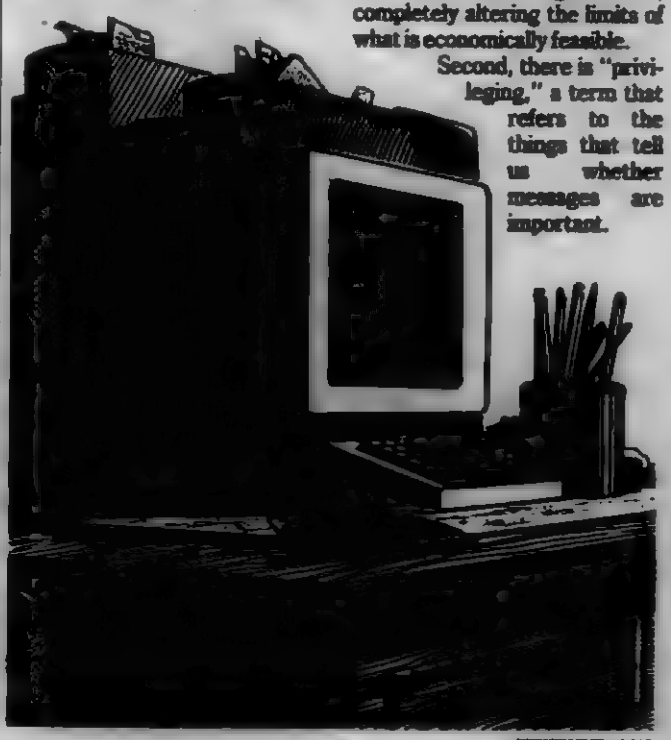
Is it official, or is it junk mail? Desktop publishing won't tell

JOHN BARNES

In predicting the future, it is important to remember that major technological advances are often less important than advances made in the use and application of technologies. It often takes longer to find out what a thing is good for than it originally took to invent the thing itself.

When a technology really shakes things up in a big way, it doesn't change how just one thing is done; it alters a whole set of parameters governing the way the universe works.

For example, the automobile made a bigger impact on our society than the blender did, because the blender simply changed the way we chop up our food, whereas the automobile



completely redefined our social geography.

On the spectrum of change making, desktop publishing is a lot closer to the automobile than it is to the blender.

Changing the universe

Just as the telephone altered the whole way we communicate and as the automobile altered the whole meaning of physical space, desktop publishing is changing basic properties of the social and business universe.

First, there are economies of scale in publishing. Until now, publishing has faced high fixed costs (presses and plates cost a lot) and low marginal costs (once you're set up, making one more copy is cheap).

Thus, the cost difference between putting out a newsletter and not putting one out at all was much bigger than the difference between printing 8,000 copies and printing 8,100 copies of it.

The whole institutional structure of the publishing industry reflects this fact — you buy magazines instead of just the individual articles you want; you buy the whole manual and not just the parts you need.

Desktop publishing drastically shifts the relationship between fixed and marginal costs, completely altering the limits of what is economically feasible.

Second, there is "privileging," a term that refers to the things that tell us whether messages are important.

The way in which we distinguish junk mail from genuine business correspondence is one example. Another is a painting that hangs in a gallery; it conveys more privilege than one sitting on a street artist's easel.

Throughout the last century or more, good quality printing and layout have been the major part of the privileging of the printed word.

We tend to take lower quality printed material, such as Communist Party booklets, less seriously because we can tell at a glance that the people who put the material out can't afford access to good printing.

Once again, desktop publishing will change the scene dramatically.

Many large corporations are already plagued with internal underground newsletters and unauthorized memos.

How much bigger will the problem be when it becomes impossible to tell what is and isn't official?

A look ahead

What will the big shifts brought on by desktop publishing mean? Let me stick my neck out a little here.

Within five years: Crises will occur in corporate discipline as very large quantities of information begin to flow across, instead of through, the lines of authority. Many more employees will know a lot more about the company — and not always what management wants them to know.

There will be thousands of new narrow-interest publications, especially scholarly, literary and trade issues.

Newspapers and other publications will achieve national distribution entirely by modem to local news vendors.

Potentially, there will be hundreds of competitors in a market that today is held by only five or six national newspapers.

Within 10 years: Bookstores and libraries will be able to print any book while you wait for less than half the current cost of a new book. But if you want a hardback, you'll have to take it to a bookbinder yourself.

"Checklist cookbooks" will meet individual interests and dietetic needs: *North Italian Low Sodium Meals with Preparation Times of Less than Thirty Minutes for a Family of Six*, if that's what you want.

The production quality of everything printed will rapidly improve as layout and design skills disperse through the population. Graphics and text design courses will be offered in high schools, much as typing and word processing are now.

Within 15 years: We'll be receiving catalogs from designers, rather than the manufacturers, of furniture, clothing, jewelry, shoes — anything a local craftsman can make from a pattern.

Patterns will be modified to whatever size and fit desired and then either mailed or transmitted via modem to local craftsmen.

Major authors will be self-publishing through the same channels as the modem newspapers, thus bypassing publish-

Continued on page 18

Barnes is the Pacific Northwest area manager for ADG, a high-tech marketing organization based in San Pedro, Calif. His first novel, *The Man Who Pulled Down the Sky*, was published by Congdon & Weed. His second novel, *Sin of Origin*, will be published this spring.

Law

CONTINUED FROM PAGE 17

young, middle-class and bright.

The seventh state, Arkansas, passed its first computer crime law, leaving only two states, West Virginia and Vermont, without any legislation whatsoever on the subject. Massachusetts and Maine, which cover computer crimes only in a limited way in their current statutes, were each asked to reconsider legislation previously introduced but not passed.

Bills become picket signs

Democratization goes beyond the passage of laws. The bills that did not pass suggest that computer crime law may soon be seen as a vehicle for protest against unpopular computer uses.

California and Pennsylvania have followed the lead of proposed federal legislation in attempting to outlaw the use of computers for child pornography activities.

California has also attempted to criminalize the use of computers for advertising, selling or distributing obscene matter.

New Hampshire has attempted to prohibit computerized telephone solicitation, and Connecticut has added computers to its list of items that cannot be brought into jails without permission.

Texas and North Carolina considered bills that would have provided further protections against misuse or theft of computer programs or information.

Although none of the bills above passed, they should make computer professionals pause.

Guilt trickles down

Under some of the laws, if you were involved in the design, implementation or use of a disapproved computer application, you might be liable.

For a system that is insecure, the odds are also increasing that those who set it up or those who maintain it may be found liable.

As more and more legislative attention is directed toward computer use and abuse, those who work in the computer profession should be aware, if not wary, of the law.

Publishing

CONTINUED FROM PAGE 17

ers completely.

The last pornography laws will be repealed because they will be unenforceable.

Within 20 years: Routine facsimile service will be available in the home as well as in the office and will virtually replace mail, except for advertising material and some personal correspondence.

Large ideological hierarchies — churches and political parties, for example — will find themselves facing enormous internal pressure to decentralize. The more economically advanced Communist countries may have to exercise a de facto free press.

Global literacy will be at an all-time high in many more languages than it currently is.

Right now, one of the biggest hurdles Third World literacy programs are facing is the absence of appropriate printed matter to use for practice. Many people have to learn a second language before they can get anything to read. Imagine the difference a few billion cheap primers could make.

Finally, desktop publishing will be more commonly referred to as just "publishing." Fueled by increased literacy worldwide, the industry will still be expanding.

Making it clear

CONTINUED FROM PAGE 16

mits Cobol test rules fuzzy" [CW, Dec. 21, 1987]. However, the procedures are not as clear as they could be.

The NBS plans to clarify both the procedures and the explanation that appears in the Certified Compiler List, which announces the schedule of compiler validations.

We will make it clear that the published schedule may not list all compilers scheduled for testing and that vendors have the option of requesting that their products not appear on the schedule.

I would also like to correct a statement in "Quiet test for IBM Cobol 85" [CW, Nov. 30, 1987] that vendors wishing to bid on government contracts for compilers complying with Federal Information Processing Standard (FIPS) 21-2, Cobol, had to have a validated compiler or be scheduled for testing by Oct. 1, 1987.

There is no deadline by which compilers have to be scheduled for validation. FIPS 21-2 states that any Cobol compilers acquired for federal use after Oct. 1, 1987 must comply with one of the subsets of the standard.

Vendors may request validation of their compilers whenever they decide to sell their compiler to the federal government. All compilers that pass the tests are added to the list as validations are completed. Agencies may acquire compilers on that list as needed.

The procedures for requesting compiler validations and the Certified Compiler List are available from Room B164, Technology Building, NBS, Gaithersburg, Md. 20899. 301-975-3240.

Helen M. Wood
Deputy Director
Institute for Computer Sciences and Technology
Gaithersburg, Md.

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SOFT TALK

Jerrold M. Grochow

Justifying the cost of CASE

Computer-aided software engineering (CASE) technology costs a bundle. While DP management expects wide-ranging benefits from CASE, these are hard to predict and further off than most people realize. With competing budget demands, management is asking — and rightly so — how an investment in CASE can be justified.

Cost-benefit comparisons provide the common denominator, but the problem is how to prepare a case for CASE and win management approval for bringing this technology into your organization.

On the surface, analyzing the costs and benefits of CASE should be similar to studying those of any other investment. You estimate costs and benefits by time period and calculate various functions such as net present value and internal rate of return.

While constructing the cost stream is relatively easy to do, deriving the benefit stream for CASE requires placing a value on things that are hard to define, let alone to quantify. The successful analyst, therefore, will

Continued on page 22

Thumbs-up for DMS

Early users note pros, cons of design system

BY ROSEMARY HAMILTON
CW STAFF

Early users of the Sherpa Corp. Design Management System (DMS) have given this engineering data management system — one of the few available on the market — an overall thumbs-up, although they note it is difficult to use.

The San Jose, Calif., firm's DMS was designed as a management system for the volumes of data produced in a computer-aided design environment. DMS currently runs under Digital Equipment Corp.'s VMS operating system; a Sun Microsystems, Inc. version is expected later this year.

DMS, which was initially released in late 1986, is a "highly modified" version of Relational Technology, Inc.'s Ingres data base management system, the company said. License fees start at $24,500.

"I think Sherpa is trying to make it easier to use now, but it really can be a pain," said Bill Cowhig, manager of very large-scale integration design services at the David Sarnoff Laboratory in Somerville, N.J. "It required a good deal of expertise to embed our files in the Sherpa environment."

Along with another early user, the Radar System Group of the Hughes Aircraft Co. in El Segundo, Calif., Cowhig said that DMS has a long learning curve, but it has provided improvements in data management.

Continued on page 26

Read/write ability in Focus for RMS, RDB

BY NELL MARGOLIS
CW STAFF

NEW YORK — Write? Right. Information Builders, Inc.'s Focus can now write to Digital Equipment Corp.'s RMS files and VAX/VMS RDB relational data bases.

The advance beyond read-only capacity, which will be formally announced here next week at Dexpo East, marks an advance in portability for VAX-based Focus applications and also serves to protect the VAX community's substantial investment in RMS files and RDB, according to Albert D'Andrea, Information Builders' VAX systems marketing manager.

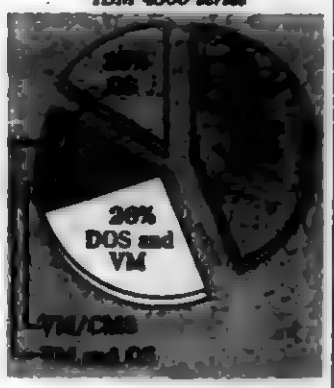
With read/write ability, he said, users can create Focus applications that will run against RMS, RDB or Focus data structures, or any combination of these. "This means that a user with old applications built around RMS files can enhance those files in Focus. They can plug new RDB data bases into old RMS files," D'Andrea said.

The move to read/write is a good one for Information Builders, according to Peter Burris, an analyst at Framingham, Mass.-based market research firm International Data Corp. The 1,000-plus copies of Focus installed on VAX platforms since 1986 account for approximately 25% of the product's installed base and revenue.

Continued on page 26

Data View

VM usage
IBM 4300 series



INFORMATION PROVIDED BY COMPUTER INTELLIGENCE

X Window team drafts major players

BY ROSEMARY HAMILTON
CW STAFF

CAMBRIDGE, Mass. — MIT, along with 13 computer companies, late last month launched a consortium to promote the use of the X Window System.

X Window is an emerging standard developed at MIT that provides a common method of displaying multiple applications on a computer screen.

Last month's announcement was a boost for the X Window movement as IBM, Sun Microsystems, Inc., Apple Computer, Inc. and AT&T made public their support for the standard.

The four companies did not participate in last year's unofficial gathering of X Window supporters, which included Digital Equipment Corp., Apollo Computer, Inc. and Hewlett-Packard Co.

Adoption plans

Each of the new members announced their plans to incorporate X Window into future products.

For instance, IBM, which has already put the X Window System on its RT PC, reiterated its intent to port X Window to the Personal System/2.

The members each paid $150,000 in order to join the consortium.

In addition to these new members, a number of smaller companies, such as Stellar Computer, Inc., joined as affiliate members at a cost of $15,000 each.

Inside

- XA Systems bolsters IMS-Xpert line. Page 27.
- Trax enhances 3-D spreadsheet. Page 27.

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Grochow

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move the discussion from a strict hard numbers approach to one of finding reasonable benefits for reasonable costs.

The best approach is to work backward from projected costs to find the required value of predicted benefits. In other words, if you calculate the cost of a CASE investment, you then know the value of the benefit necessary to make the investment worthwhile.

With a short leap of faith, you can then determine if that is a reasonable value to place on the totality of expected benefits. What you are really doing is getting people to use their experience and judgment to soften what might otherwise be only a quantitative decision.

A simplified cost plan for a medium-size data processing shop looking into CASE can be constructed and studied (see chart at right). Based on the figures in this plan, the organization would have to save approximately $3,250,000 in a five-year period (a horizon long enough for looking at investment returns) just to break even. Most companies have a target rate of return that would be added to that amount.

Looking at this figure strictly in terms of staff costs, what productivity improvement would be needed to save $3,250,000? If the departmentwide average salary and benefits cost was $40,000 per person, an average savings of 11% would do the trick. Since savings would be lower — or nonexistent — in early years, the productivity increase in the fifth year would probably have to approach 25% for these numbers to work out.

Is this improvement reasonable to expect? There are several considerations in answering this question.

Quantifying quality

As an example, a project team using CASE tools for the first time is unlikely to accomplish its task in significantly less time than it would have without CASE. What the team might do, however, is spend more of its time dealing with the substantive issues of the design or implementation rather than with the mundane or clerical aspects. Certainly, there is a value to this, but trying to directly quantify a "more complete design" or a "more elegant implementation" is likely to put you in murky territory.

A trickier question is how do you deal with the benefits of "improved system quality." CASE vendors tell us that using their products will result in better systems, but few try to define or value this benefit.

Hundreds of articles and books have been written on the topic of quality, and many manufacturing organizations have developed quality valuation systems. It is not that the quality of anything can't be valued, it is just that we have not yet agreed on a general definition or value of quality systems.

Nevertheless, while no one will directly put a value on improving system quality, most managers would agree that the combination of productivity improvement and improved system quality would be a powerful combination.

The bottom line is whether management buys your pitch or not. If they are looking for hard numbers all the way, it may be a long while before you can really sell them. If they are willing to accept a combination of hard and soft valuation, then you are well on the way to bringing CASE into your organization.

Grochow is vice-president of American Management Systems, Inc. in Arlington, Va.

Estimating the cost of CASE

Simplified computer-aided software engineering cost plan for an organization with a professional staff of 150

Investment	
Workstations (personal computers) hardware: 75 at $5,000	$375,000
CASE software	
System planning tools (PC): five at $5,000	$25,000
Analysis/design tools (PC): 75 at $5,000	$375,000
Management tools (PC): 15 at $5,000	$75,000
Implementation tools (mainframe)	$250,000
Bridge and interface software development	
Consultants: 50 days at $1,000/day	$50,000
Staff training	
Trainers: 100 days at $1,000/day	$100,000
Staff time: 10 days each at $175/day	$262,500
Total investment cost:	**$1,512,500**
Annual ongoing costs	
Software engineering group	
Three people at $50,000 (salary and benefits)	$150,000
Hardware maintenance: 75 at $500	$37,500
Software upgrading/maintenance	
Estimated at 10% per year for PCs	$47,500
Estimated at 15% per year for workstations	$37,500
Ongoing staff training (done by software engineering group)	
Two days per person for staff of 150 at $175	$52,500
Attendance at user meetings, symposia	
Two people to attend four meetings at $1,500	$12,000
Miscellaneous (such as books, publications)	$10,000
Total annual ongoing cost:	**$347,000**
Five-year cost	
Investment	$1,512,500
Five times annual amount	$1,735,000
Total five-year CASE cost:	**$3,247,500**

CW CHART

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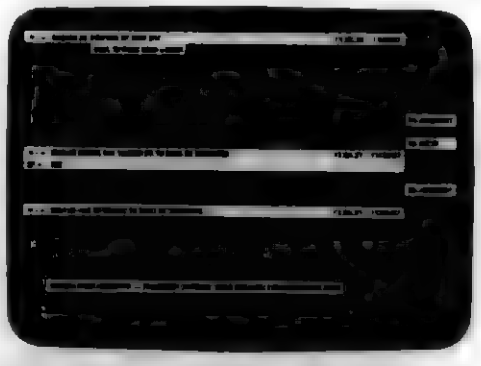

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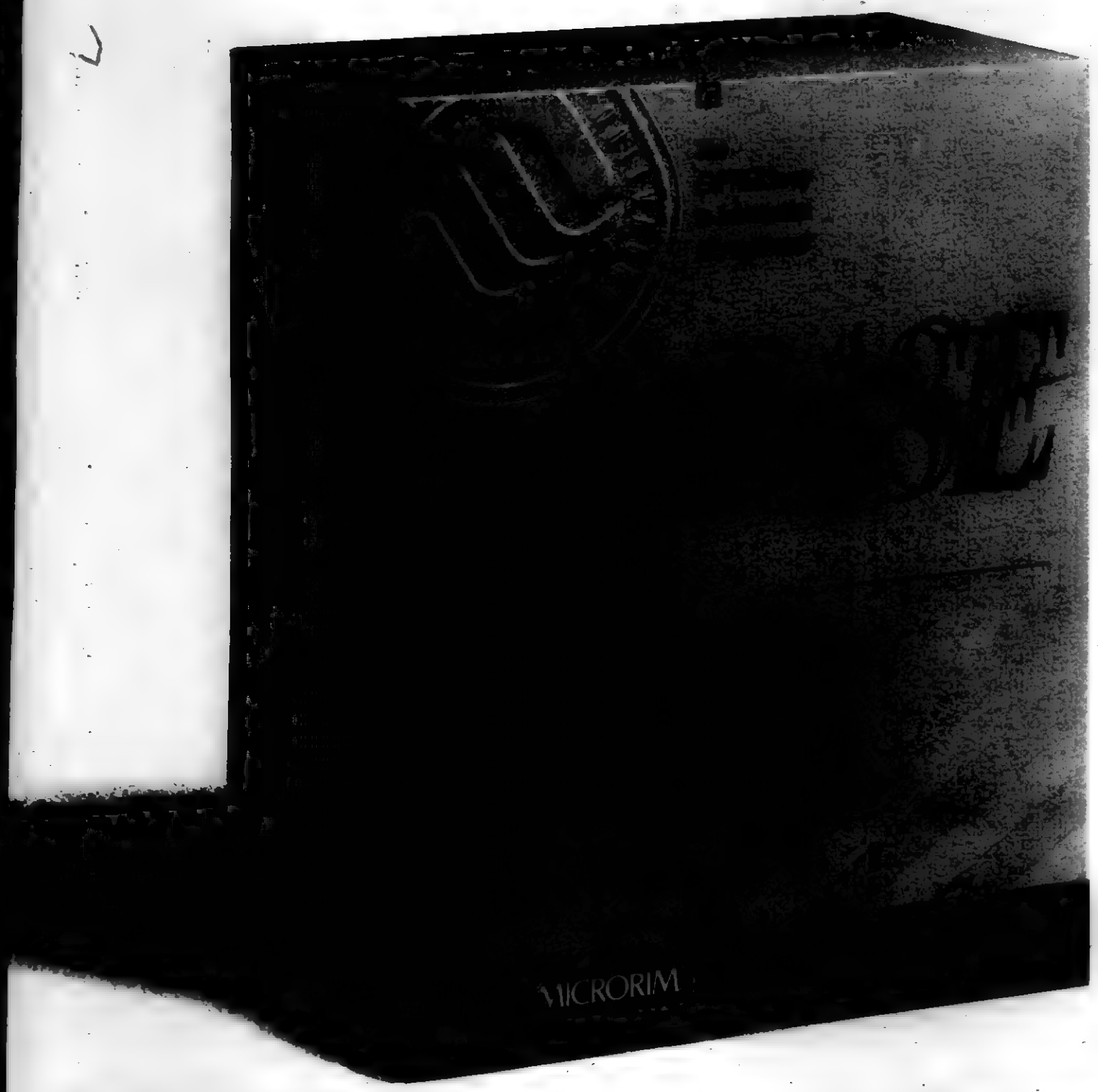

Shown is R:BASE for DOS, which supports up to three simultaneous users on a local area network. Not pictured but also available: R:BASE for DOS Network Six Pack, which supports up to six simultaneous users on a local area network. R:BASE for DOS Network Unlimited, which supports an unlimited number of users networked on a file server. R:BASE for OS/2, the next generation operating system; supports multi-tasking. R:BASE for DOS $725. R:BASE for DOS Six Pack $995. R:BASE for DOS Network Unlimited $2695. R:BASE for OS/2 $895. (Suggested retail pricing).

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DMS

FROM PAGE 19

Hughes also said it has realized a big cost savings since moving DMS into production mode in mid-1987.

Few alternatives

Both users said DMS beat their alternatives, which were either developing an in-house system or selecting one of the few commercially available packages.

Hughes, for instance, considered the Computervision Corp. data management system but rejected it because it was not flexible enough for the Hughes environment, according to James Veronica, manager of integrated computer-aided design and manufacturing systems.

"To develop one on our own would have been too risky and taken more time and effort," Cowhig added. Cowhig's facility, which was the original beta-test site for DMS, was once part of RCA Corp. and is now a subsidiary of SRI International.

The Hughes facility estimated that DMS will bring it an annual savings of $1,000 per design file. Each design has between five and 10 files, or data bases, that belong to it. Each file had an associated manual system of paperwork, mailings and approval that no longer needs to be done. So far, Hughes has moved 500 data bases to DMS, which would represent a savings of $500,000 for that group of files alone.

THE Hughes facility estimated that DMS will bring it an annual savings of $1,000 per design file.

A key feature to the Sherpa system is its ability to set up relationships between files that are associated with a single design. When a change is made to one design file, it will be reflected in the associated file. As a result, engineers receive updated design files throughout the design process, and the likelihood of errors is reduced.

The Sarnoff Laboratory has completed one project and has another under way that would help automate design methodologies. Cowhig said the system gives design work a level of control that could not previously be achieved.

Focus

FROM PAGE 19

In addition to being portable between RDB, RMS and Focus files, applications written in Focus can incorporate data drawn from DEC's hierarchical DBMS data bases and from leading third-party DBMSs, including Oracle Corp.'s Oracle and Sybase, which Focus supports on a read-only basis.

Ingres, from Relational Technology, Inc., is expected to join the list next, sources close to the company said.

The interface's tool kit includes a proprietary data definition language that allows users to create VAX-supported files and data bases without recourse to a third-generation language; utilities that create Focus definitions for existing data; data maintenance facilities that include a nonprocedural language with if-then-else and "perform" constructs; and a report writer for formal and ad hoc queries.

The tool kit also includes screen and window painters and an end-user interface called Talk Technology, which gives occasional users entre into Focus using RMS, RDB or Focus files.

Price ranges

The Focus read/write interface to RDB is set to be available next quarter at prices ranging from $1,695 to $18,825, depending on the CPU.

Current Focus users will receive the interface as a free update.

Read/write capability for RMS files, available now, is bundled into the basic Focus package, available in a price range of $6,800 to $88,500, depending on the CPU.

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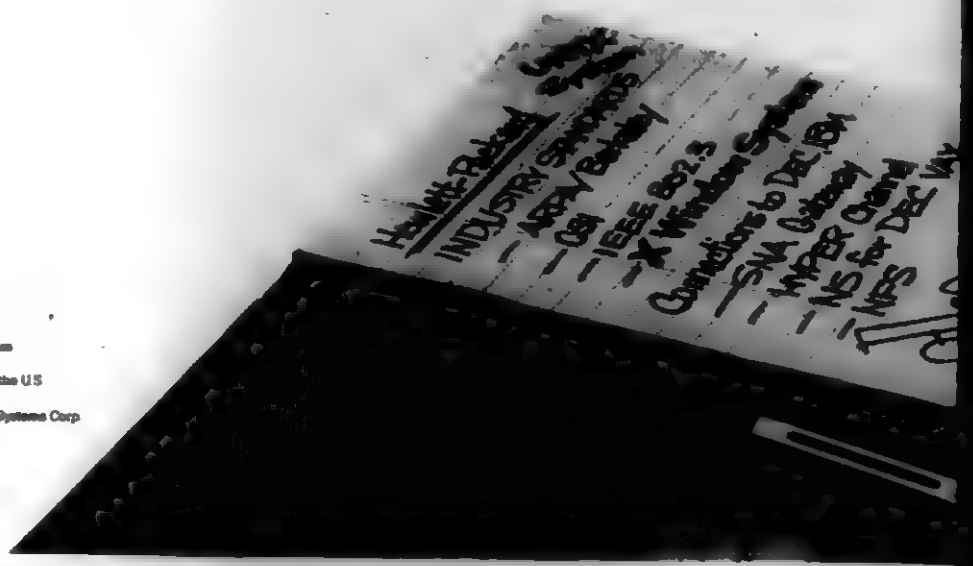

Brake assembly data courtesy of SDRC
Automobile data courtesy of Chrysler Motors

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NFS is a trademark of Sun Microsystems

NEW PRODUCTS

Systems software

XA Systems Corp. has expanded its IMS-Xpert line of software products designed to allow users to edit and browse IMS data bases on-line under IBM's TSO/ISPF or IMS/DC.

Existing Cobol and PL/I record layouts can be used to view and edit the data. Additions to the product line include IMS data base extract and load, which allows a user to select a particular group of segments and load them into an existing data base; the PL/I language option; an audit trail function; and IMS-Xpert/CICS, which provides full-screen browsing and editing for data bases on-line under CICS.

Pricing starts at $40,000.

XA Systems, 987 University Ave., Los Gatos, Calif. 95030. 800-621-0854.

A multiuser statistical quality control package for use on IBM System/36 and 38 minicomputers has been announced by Murphy Software Co.

SQC/3 outputs control charts, histograms, pareto charts, descriptive statistics and regression plots. According to the vendor, multiple control charts or histograms can be superimposed for correlation analysis. The program also supports trend testing and sloped and adjusted control limits.

SQC/3 is priced from $5,790 for the System/36 and from $11,975 for the System/38.

Murphy Software, 15301 Eleven Mile, Roseville, Mich. 48066. 313-445-2840.

Applications packages

An enhanced version of Electronic Spread Sheet (ESS), a three-dimensional mainframe spreadsheet and decision-support system, has been announced by Trax Softworks, Inc.

Version 4.0 of the software includes interfaces to IBM's DB2 and SQL/DS, support for Lotus Development Corp.'s in-worksheet macros, input panels for end users and increased processing efficiency, according to the vendor.

ESS Version 4.0 runs on IBM mainframes and compatibles under IBM's VM/CMS and TSO and Applied Data Resources, Inc.'s ADR/Roscoe. A perpetual license costs $8,000 to $15,000, depending on CPU size.

Trax Softworks, 10801 National Blvd., Los Angeles, Calif. 90064. 213-475-8729.

Utilities

An enhanced version of the direct-access storage device (DASD) tuning utility DASDmon has been announced by Duquesne Systems, Inc.

Release 1.7 expands the data set placement manager component to produce recommendations based on application preferencing. The recommendations identify action items to improve DASD response time and pinpoint physical constraints. Users can also use batch routines in both SAS Institute, Inc.'s SAS and assembler languages.

DASDmon Release 1.7 runs under IBM's MVS/XA 2.2. It costs $15,000.

Duquesne Systems, 2 Allegheny Center, Pittsburgh, Pa. 15212. 412-323-2600.

Software said to be a functional replacement of the DL/1 reorganization unload and reload utilities has been released by BMC Software, Inc.

Called Reorg Plus for DOS/VSE, the software creates data bases identical in structure to those created by the DL/1 utilities. It reportedly contains an unload utility program, a reload utility program and a load program interface. Support is provided for HDAM, HIDAM, HISAM and all current versions of DL/1 and DOS/VSE as well as logical relationships and secondary indexes.

A perpetual license costs from $5,850 to $15,600.

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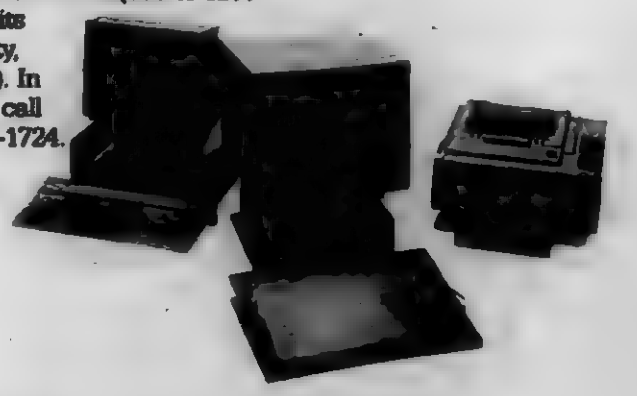

HEWLETT PACKARD

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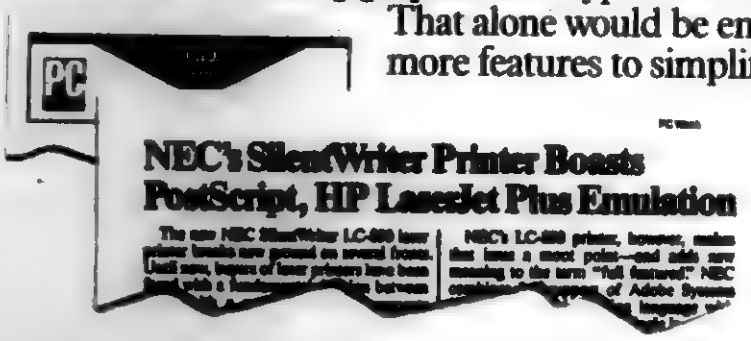
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See us at UniForum '88 Booth #1831

MICRO BITS

Ed Scannell

Canion's song and dance

Will he or won't he? Compaq President Rod Canion told us on a recent visit that the company won't deliver an IBM Micro Channel-compatible system to market this year — maybe.

"I don't think we'll be doing it this year. We don't think we'll need to, but that doesn't say we won't," Canion told us. Hmmm, that seems to cover almost any possibility, although Canion seemed quite sincere about the likelihood of never bringing a Micro Channel architecture-compatible machine to market.

On another topic, Canion said he isn't worried about the IBM workstation that reportedly would combine reduced-instruction set computing (RISC) and Intel 80386 technology. The machine reportedly would run at around 10 RISC million instructions per second and would run many popular DOS-compatible programs.

"The game you are playing in there is one IBM always wins — the theoretical product. It's always going to be better and cheaper than anything else, but it has never worked out that way. So I don't believe it is go-

Continued on page 35

Grid laptop a first

Battery-powered unit runs Xenix, Unix

BY JAMES A. MARTIN
CW STAFF

FREMONT, Calif. — The first battery-powered laptop capable of running Unix and Xenix applications was announced last week by Grid Systems Corp.

The Gridcase 1530 laptop, based on the Intel Corp. 80386 microprocessor, was originally announced before Comdex/Fall '87 as a Microsoft Corp. MS-DOS system.

Since then, Grid said it has ported The Santa Cruz Operation, Inc.'s (SCO) Xenix System V and Interactive Systems Corp.'s 386/IX Unix operating systems to the 1530 laptop.

The Toshiba Corp. T5100 is reportedly the only other portable Unix system, but it is not battery powered.

Toshiba's portable is scheduled to be introduced at Uniforum in Dallas this week.

The 1530 running Unix is "a gorgeous machine," according to Abbi Lawrance, a laptop analyst at Infocorp in Cupertino, Calif. "I'm impressed by the fact that Grid was able to create a true portable based on the 386," she said, adding that both the Toshiba and Grid systems should be successful at fulfilling the need for a portable Unix environment.

Grid is continuing negotiations with SCO and Interactive to bundle their operating systems with its laptop. An announcement regarding those talks should be made by late March.

Until then, users can expect to pay $4,695 for the 1530, $299 for Interactive's Unix and $695 for SCO's Xenix.

Data View

Best intentions

Share of personal computer buying intentions at Fortune 1,000 sites, 1987

INFORMATION PROVIDED BY FOCUS RESEARCH SYSTEMS, INC.
CW CHART

Lap-Link Mac connects to IBM PC systems

BY DOUGLAS BARNEY
CW STAFF

BOTHELL, Wash. — A new way of transferring data files between the Apple Computer, Inc. Macintosh and IBM Personal Computers was recently introduced by Traveling Software, Inc.

The company's $140 product is being released in response to the growing number of shops that are using both Macintosh- and IBM PC-compatible systems. In many cases, MIS organizations are now allowing end users to determine whether they need an IBM PC or a Macintosh and then grappling with the issues of heterogeneous networks.

Lap-Link Mac uses a 6-ft universal cable and serial ports to physically connect the different systems. Data files are transferred at 57.6K bit/sec., a rate significantly faster than file transfer via traditional modems.

Split-screen operation

When using Lap-Link Mac, the screen is split into two windows to display both the PC and the Macintosh file lists.

The order in which files are listed is user selectable, and files can be tagged for erasing or copying. On the IBM PC, file manipulation is accomplished by using menus that are found at the bottom of the screen.

Some vendors provide versions of software that run in both the Macintosh and IBM PC environments, with file structures that are compatible in both. For those applications, transferred files can maintain sophisticated formatting and, in some cases, macro information. Examples of these include Microsoft Corp.'s Excel integrated spreadsheet software and Aldus Corp.'s Pagemaker desktop publishing software.

Lap-Link Mac can take advantage of Apple's Multifinder operating system, which provides a rudimentary form of multitasking and task switching. The product also supports Apple's Appletalk network, the Sun Microsystems, Inc. TOPS network and 3Com Corp. and Novell, Inc. networks.

The linking system supports the full line of IBM personal computers, including the Personal System/2 family, as well as the full line of Macintosh computers, according to Traveling Software. Lap-Link Mac is expected to ship later this month and will be available through computer dealers.

Inside

- Compaq's Deskpro 386/20 gives more power to desktop user. Page 33.
- Finkelstein and Pascal examine the effects an optimizer has on a DBMS benchmark. Page 33.
- Mitsubishi announces family of MS-DOS-compatible PCs. Page 37.

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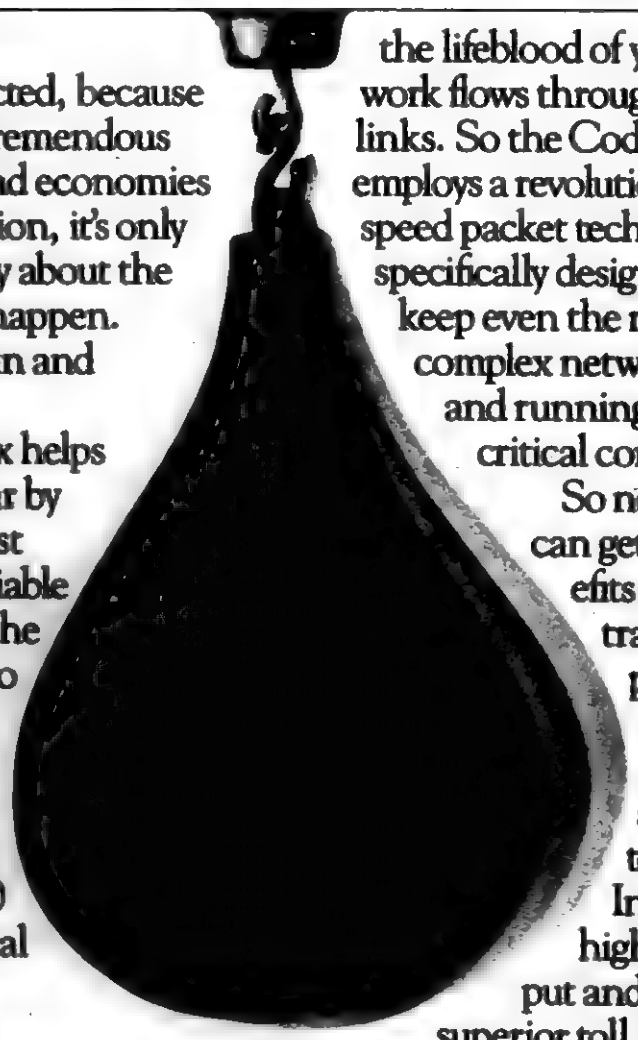

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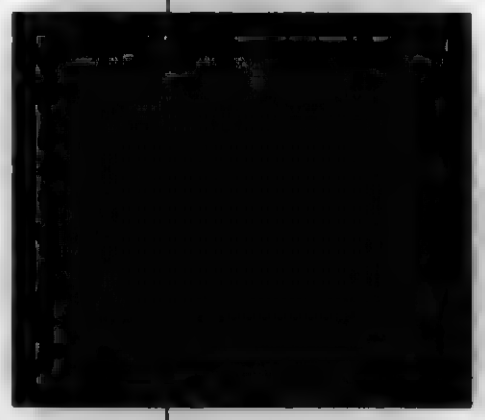

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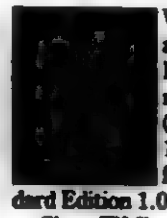
SMALL TALK

William Zachmann

Much ado about OS/2



With considerable fanfare, IBM last fall announced early (December 1987) delivery for OS/2 Standard Edition 1.0.

Since IBM's original announcement of OS/2 and the Personal System/2 line of personal computers last April, many have also believed that OS/2 would offer a compelling reason to buy IBM's newer, more proprietary systems. Many have believed that PS/2 and OS/2 would usher in a dramatic new era of software.

Unfortunately, OS/2 Standard Edition 1.0 offers little to support those beliefs. True, there are more problems getting it to run on compatibles than there have been in the past with IBM versions of Microsoft's MS-DOS. But there are also more problems getting it to run on IBM's own PC AT and 80286-based PCs with third-party boards and peripherals.

Of course, IBM would surely prefer that everyone bought all their personal computer systems from IBM at IBM prices. But buyers concerned about getting the most from their money, which now includes even most of IBM's biggest and most

Continued on page 36

Laptops stand tall

Portables seen infiltrating corporate America

BY JAMES A. MARTIN
CW STAFF

After several years of false starts, 1988 looks like the year the laptop makes some important gains in corporate America.

With a number of major players expected to introduce more powerful systems, analysts say they expect laptops to gain greater acceptance among MIS managers this year.

Users are "demanding higher resolution and true portability, and 1988 is the year in which we'll start to see those gel," says Tim Bajarin, executive vice-president of Creative Strategies Research International, Inc., a consulting firm in Santa Clara, Calif.

Laptop sales increased greatly during 1987, according to industry estimates. Figures released last week from IMS America Ltd., which tracks computer retail sales, indicate that 16,200 laptop systems were sold during the first 11 months of 1986, compared with 79,400 during the same period in 1987.

Market shares fluctuate

The increase in laptop sales has caused vendor market shares to fluctuate, according to IMS. For the three-month period ending in August 1987, NEC Corp. held 36% of the market, compared with 31% for Toshiba Corp. and 27% for Zenith Data Systems, Inc. By November, however, NEC rose to 50%, Zenith dropped to 24%, and Toshiba was down to 18%.

Venture Development Corp. predicts that laptops shipped in the U.S. will increase from 350,000 units in 1987 to 455,000 this year and to 850,000 in 1992.

Major vendors expected to make laptop announcements this year include IBM, with a PC

Continued on page 35

Homegrown PCs make the grade at university

BY ALAN J. RYAN
CW STAFF

KENT, Ohio — Nearly a year after a small computer shop opened its doors on the Kent State University campus here, student and staff workers have built and sold more than 300 personal computers. That surpassed the first-year sales goal of 50 units by more than 600%.

As personal computers became increasingly important on the Midwestern campus, university President Michael Schwartz and director of information services Bill McKinley felt they needed to find a way to bring computers to students and faculty at affordable prices.

Although vendors offered discounts for volume purchases, McKinley knew the IBM Personal Computer-compatible units could be built on-site at even greater savings.

"Through market research, we determined that we could build a computer packaged with dual disk drives, 640K bytes of random-access memory, a Hercules monochrome graphics card, a Zenith monitor, MS-DOS and GW Basic for $850," said Mike Shuman, a computer equipment specialist.

The university arranged to become a licensed Microsoft Corp. OEM. Kent State purchases its motherboards, power supplies, keyboards, boxes, disk drives, controller cards and peripheral cards on the open market, soliciting bids from vendors and suppliers.

The units are assembled and burned in at the on-campus shop of Dave Futey, who employs three to five students — generally from the college's computer science, physics or technology departments — to help. The

Continued on page 36

Deskpro powers up

BY JULIE PITTA
CW STAFF

Corporate users seeking more power on the desk top have found one answer with Compaq Computer Corp.'s 20-MHz Intel Corp. 80386-based Deskpro 386/20.

Many companies are using the higher performance Deskpro 386 in a number of configurations, and users expressed satisfaction with the system's quick processing speed and the fast access time of its disk drives.

"It adds that one extra piece," said Sherrie Burger, manager of office information systems for Blue Cross/Blue Shield of Illinois. "It's fast, friendly, flexible and easily upgraded."

Currently, Blue Cross/Blue Shield's information center in Chicago has four Deskpro 386/20s, with another 25 on order. Burger said the systems will be connected to mainframes or a Digital Equipment Corp. VAX.

Blue Cross personnel will use the Compaq personal computers to access claims histories and financial information stored on the larger systems. The high end of the Compaq line suited the company because of its disk storage capacity, which is up to 300M bytes on a single 5¼-in. hard disk drive, the fast access time of those drives and the PC's processing speed, according to Burger.

"People need reports immediately," Burger explained. "We don't have all day."

Further, Blue Cross/Blue Shield has been pleased with Compaq's customer support.

Continued on page 36

Deskpro 386/20

Prices
Model 60: $7,400
Model 120: $9,400
Model 300: $12,400

- 20-MHz Intel 80386
- Weitek Corp. 80387 coprocessor
- 1M byte of 32-bit RAM

Don't believe all you read about benchmarks

BY FABIAN PASCAL
and RICH FINKELSTEIN
SPECIAL TO CW

Second in a three-part series.

One of the main criteria for selecting a data base management system package is usually performance. While other factors tend to be subjective, performance is quantifiable and has an aura of objectivity to it. In the first installment of this series, we discussed the value of the SQL optimizer and its importance when evaluating performance. Now we will begin to examine the effects an optimizer has on any DBMS benchmark.

Benchmarks should be used to help predict the performance of a DBMS in a specific organization. However, evaluators sometimes turn to benchmarks that are written up in magazines. This may be sufficient in some cases, but benchmarks run by software reviewers are often not applicable to the mix of transactions and queries that will be run in a particular organization.

They do provide some guidance on the relative speed compared with other products, but this has limited merit, since it is not too difficult for a vendor to tune its DBMS to do well in a particular publication's test.

Generalized benchmarks can be used with somewhat greater assurance. Make no mistake: There is much controversy about the accuracy of these benchmarks, and there is a substantial amount of research under way to improve their value.

It is also not always clear what these generalized benchmarks are testing, which makes it difficult for the evaluators to verify that the benchmark is applicable to their environment. This seems to be lost on the benchmark designers, who do not document their benchmarks in terms that can be widely understood. This does not negate the work they are doing; it merely means they have to document benchmarks in more understandable terms.

Make your own

Unless a DBMS evaluator can come up with a benchmark that truly reflects his organization's transaction and query mix, the firm may be forced to develop its own benchmark. This is not a trivial task. The evaluator must have a fairly good idea of the type of update that will be performed and, what is more difficult, a sense of the type of query that will be entered now and in the future.

For larger projects, there may be resources available to do this type of evaluation, but in most cases, this would be too costly, or the skills required would be unavailable. This is why most evaluators try to simplify the task by choosing a simplified model of the update or query transaction load to compare DBMS products.

Evaluators often take current data bases, which are not normalized or reflective of any new system design or system requirements, and use them as their source for information. This again simplifies the benchmark but only serves to show how well a DBMS can perform in the old data base environment. It rarely helps predict how the DBMS will act in a new relationally oriented environment.

It is, therefore, not surprising that a new SQL DBMS often performs worse than the old DBMS or some nonrelational system. This is because the old data base structure was tuned for the old DBMS software, which does not take full advantage of SQL's optimizer and set-processing capabilities.

Evaluators may be able to get around these difficulties by examining the characteristics of a DBMS's SQL optimizer. By evaluating the optimizer's architecture and looking at how the optimizer performs across a broad range of queries, evaluators may be able to judge how the DBMS will perform in different, future environments.

A DBMS may be initially targeted for a specific project, but it will hopefully be used in other systems as well, and it is important to have an SQL DBMS with an optimizer that can react well to an expanding set of requirements.

Next week: Specific areas to consider when developing a benchmark.

Pascal is an independent analyst based in Washington, D.C., and is affiliated with the Codd & Date Consulting Group, specializing in relational technology and SQL on microcomputers. Finkelstein is a senior consultant with Codd & Date.

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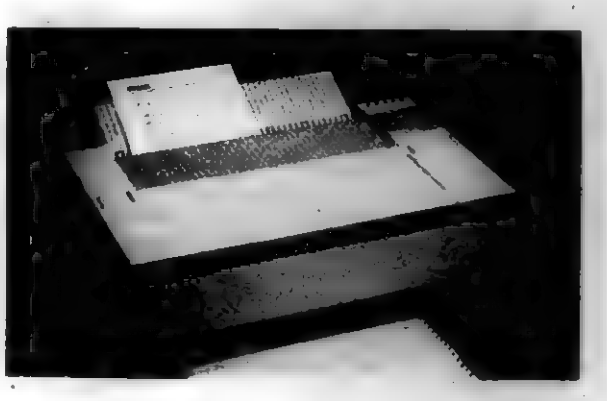

HEWLETT PACKARD

Scannell

CONTINUED FROM PAGE 29

ing to be a threat," Canion said.

Canion pointed out that IBM has tried before to bring DOS compatibility to the RT PC via an Intel 80286 board. He said the board allowed the RT to run many popular DOS programs but at half the speed of an IBM Personal Computer AT.

Neither is Canion worried about the threat Sun poses to Compaq in the workstation market. While he said he respects Sun's products, Canion added that he doesn't believe Sun can build nearly as effective a distribution channel as Compaq.

"Sun has to break into the [retail channel], where we are an established player. [The retail channel] has kept an awful lot of of good companies from having a major success," Canion said.

Rappin' with Rod. A source close to Compaq tells us the company has put together a rap video to promote the company and products to dealers. The folks who produced the video wrote the lyrics, which were rapped out by some high-level Compaq executives. We hear noted rapmaster L. L. Cool J has nothing to worry about.

Out the door. During the last couple of weeks, two interesting products have shipped. The first is Micrografx's Designer, a great full-color graphic arts and technical illustration-drafting program. The second is Lifetree Software's Total Word, a word processing package that allows users to perform many of the functions found in desktop publishers that are more expensive and more difficult to use.

Under protected mode. One of the more unusual requests we've received lately came from an inmate who wanted to know if we could donate an old computer.

It seems our friend in the Big House, who earns $26.40 a month, hasn't been able to save enough money for even a low-cost clone. And his chances of getting out soon to buy one aren't good either (he says he'll be in prison for "at least another decade"). The inmate, David Duhaime, is incarcerated at Washington State Reformatory. He claims it is the only house of correction in the U.S. that allows inmates to have a PC.

Duhaime says he's allowed to have an IBM PC-compatible system (I guess even wardens these days have reservations about the Micro Channel, although I hear he's just wild about OS/2 Extended Edition) with 5¼-in. drives, although the system can't have a modem (you know, contact with the outside world).

So if you feel inclined to help Mr. Duhaime out, you can contact him at the Washington State Reformatory Monroe, P.O. Box 777, Monroe, Wash. 98272.

Scannell is a *Computerworld* senior editor, microcomputing.

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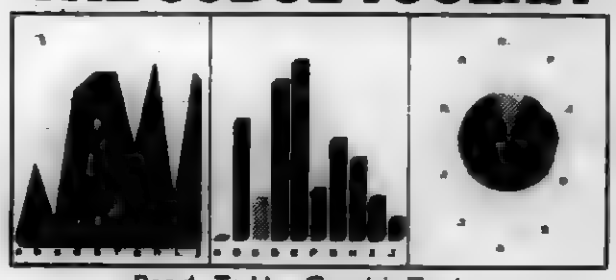

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Laptops

CONTINUED FROM PAGE 33

Convertible centered around the Intel Corp. 80286 chip, and Zenith, which has a technology that reportedly improves the resolution of an LCD without heavily draining the battery supply. Neither company has confirmed or elaborated on these reports.

Compaq Computer Corp. and Apple Computer, Inc. are rumored to be preparing systems for introduction this year if the marketing opportunities are strong enough.

Overseas competitors, among them Samsung Electronics Co. and Mitsubishi Corp., are also expected to increase their presence soon in the growing laptop arena.

Inspires a conference

This year, the laptop will be, for the first time, the sole subject of a trade conference. Executive Computers, Inc., a laptop reseller in New York, says it expects between 3,000 and 5,000 people to attend its Laptop 88 conference in New York this June. The bulk of attendees are expected to be users.

Despite growing acceptance, the laptop is still a long way from mainstream acceptance. Desktop computing power to go — when and where you want it — is a big promise, but the trade-offs to date have often been significant.

"The biggest problem today is true portability," says R. Bruce Johnson, analyst and manager of the PC Resource Center at Deloitte Haskins & Sells in New York, which manages some 2,000 portables and 100 laptops. "When you try to get something that is highly functional and readable, it turns out not to be very portable at all."

Hard-disk capacities remain limited on laptops, although analysts say they expect 20M- and 40M-byte hard disks to become standard this year. In addition, only a few laptops are based on higher speed microprocessors such as the 80286, and users are starting to require much faster speeds.

Service and support

On-site support for laptops is another concern. "It seems to be impossible to get on-site service for laptops, probably because of their small size," says Sherry Ryan, director of end-user computing at Levi Strauss & Co. in San Francisco. Levi Strauss currently has close to 400 Compaq and Grid Systems Corp. systems. "We often have to ship them in for service," she adds.

Laptop power consumption is not a major worry, however. "It's just not as important as some people make it out to be," says Kevin Farrell, manager of microcomputing and management services at Firestone Tire & Rubber Corp. in Chicago. "We're really looking just for convenience. As long as you can plug it in, it's not a concern."

Ultimately, the benefits of laptops will outweigh the shortcomings, some users say.

Having a microcomputer to check out at night like a library book does more than encourage productivity, according to Deloitte Haskins' Johnson. "We have found the people who grow fastest in terms of computer literacy are the ones who take a computer home now and then," Johnson says.

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Zachmann

CONTINUED FROM PAGE 33

loyal customers, are accustomed to greater freedom of choice.

Hopefully, the considerable inconvenience users stand to experience trying to get OS/2 Standard Edition 1.0 to work with third-party display adapters and disk controllers isn't a sign of IBM's "Year of the Customer" campaign coming to an end. The real problem with the system is not its superior ability to refuse to function properly with a greater number of compatible systems and third-party boards than MS-DOS. There are generally ways to work around such problems. The more compelling question is, Why bother to do so?

It doesn't take much experimenting with the $325 OS/2 Standard Edition 1.0 to discover why everybody isn't rushing right out to buy it. These reasons fall into two categories.

First, it requires a lot more resources than most users have, including most of those who bought PS/2s. Second, despite its high cost and enormous resource demands, OS/2 Standard Edition 1.0 provides little practical value. Whatever its attributes, they can be gained in other, more economical ways.

For openers, a 286- or 386-based system with a minimum of 1.5M bytes of memory is required just to get OS/2 Standard Edition 1.0 running. Make that 2M bytes if you want to run MS-DOS applications. You will also need about 5M bytes of hard-disk space for the files. These are minimum requirements.

Disloyal customers who bought compatibles or third-party boards for ATs are not the only ones who have a problem. Owners of older 6-MHz ATs will find that even with sufficient memory, the lethargic pace of the processor will not provide satisfactory performance for any practical use of OS/2.

However, these people at least have the consolation of knowing they've got an old system. Worse yet is the fate of owners of recently purchased PS/2 Model 50s who are looking forward to the supposed benefits of OS/2 Standard Edition 1.0. For them, the bitter truth is that while the new operating system will run on their Model 50s, it will just barely run. Sadly, a PS/2 Model 50 is barely an adequate platform for OS/2 Standard Edition 1.0 — with the emphasis on barely.

The bright spot in all this is that the vast majority of users have little reason to want to run OS/2 Standard Edition 1.0 anyway. Microsoft's Windows/386 is a vastly superior product in terms of practical value delivered today and is ready for anybody fortunate enough to own a 386-based system. Products like Microsoft Windows 2.0 already offer superior functionality on less capable systems.

The promise of OS/2 still looks good for the long term. It is just that OS/2 Standard Edition 1.0 does little to deliver on that promise.

Zachmann is vice-president of research at International Data Corp.

Deskpro

CONTINUED FROM PAGE 33

"We don't have to talk to 14 zillion people to get help," she explained.

Gibralter Savings & Loan in Houston has about a half-dozen Deskpro 386/20s, according to David Swatzell, manager of technical support. He said, however, that the system will make up the majority of the bank's future PC purchases. Of the 160 microcomputers at Gibralter's headquarters, 80% are Compaq systems.

Gibralter is using the higher end Deskpros in a number of configurations, including connecting them to IBM mainframes, as stand-alone systems and as file servers in a local-area network. The bank has developed 26 vertical applications for the Compaq systems for tasks such as investment management, customer service and loan processing.

Swatzell said Gibralter will shy away from IBM's Personal System/2 Model 80, a direct competitor of the Deskpro 386/20, until applications for OS/2 — the operating system designed by Microsoft Corp. and IBM to take full advantage of the Micro Channel — become widely available.

"The Micro Channel [IBM's proprietary bus design] is innovative but not for people who have problems right now with crunching data," Swatzell said. "Without OS/2, there's nothing out there right now to leverage that technology. Our big issue is crunching through hundreds of records now."

Fred Leviton, assistant executive director of the National Foundation of Dentistry for the Handicapped in Denver, has made the transition from a traditional minicomputer to a terminal data processing system to a LAN.

Until recently, Leviton's organization connected Wang Laboratories, Inc. LVT terminals to a Wang 2200 minicomputer. Today, the foundation uses Novell, Inc. networking software and Arcnet communications boards to link AST Research, Inc. 80286-based PCs with a Deskpro 386/20 as a file server.

File information for between 25,000 to 30,000 patients is stored in the Deskpro's 300M-byte hard disk drive.

Look out for PS/2

Despite its success, Compaq's Deskpro 386/20 faces stiff competition from IBM's PS/2 Model 80.

IBM shipped 100,000 PS/2 Model 80s last year, compared with 76,000 Deskpro 386/20s in 1987 for Compaq, according to Dataquest, Inc. IBM got a head start on Compaq: The Model 80 began shipping in July, and delivery of the Deskpro 386/20 commenced in late September, at the time of its debut.

Despite IBM's lead in the high-performance 386 battle, Compaq is firmly entrenched, according to Bill Lempesis of Dataquest.

"They're probably the leader in 386 machines in terms of the diversity of their line and their reputation for being the first out of the block with that technology," he said.

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Homegrown PCs

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technicians also offer applications and built-in menus as options to the $850 price.

As with commercial systems, buyers are offered a standard one-year warranty period and an optional service contract. Servicing on campus can be as quick as a half-hour, depending on the work load of the technicians, Shuman said. The computer shop also offers technical support over the phone.

The PC shop will configure systems to meet the needs of the buyer. "If they need a mouse, we'll give them a mouse. If they need a 3½-in. drive, we'll give them that," Shuman said.

The shop is nonprofit, Shuman said, allowing the Kent PC to be sold for the price of the parts plus assembly. "It's pretty much a break-even deal," he said.

McKinley said the Kent PC is available only to Kent students, faculty and staff. "We have no interest in competing against the manufacturers." He added that other vendors still sell equipment to the university.

An IBM PC XT-compatible model, which is the basic Kent PC with a 20M-byte hard disk substituting for one of the floppies, sells for $1,200.

An AT compatible running at 6, 10 or 12 MHz with 1M byte on the motherboard, a 40M-byte Seagate Technology, Inc. drive, turbo and reset switches on the front, Hercules Computer Technology, Inc. monochrome graphics, a Zenith Data Systems Corp. monitor and Microsoft MS-DOS and GW Basic sells for $2,025.

U.S. BANKRUPTCY CT./S.D.N.Y. - NOTICE OF BAR DATE.
In Re: NEW YORK BUSINESS COMPUTERS, INC. Case No. 87B 11620 (PBA)

Notice: By 1/25/88 Order the U.S. Bkrcy. Ct./S.D.N.Y.-U.S. Customs Bldg., 1 Bowling Green, NY, NY 10004-1408 has fixed 2/16/88 as the last date for filing Proofs of Claims against the Debtor for all pre & post-petition claims arising on/prior to 8/19/87 through 1/15/88 (except for professionals). The Bar Order may be examined at the Bkrcy. Ct.

On/before 2/16/88 all claims including post-filing, secured, priority, wage & tax, & unsecured claims must be filed with the Clerk, Bkrcy. Ct., copies to undersigned, or be forever barred from asserting such claims agnst. the Debtor & from being treated as a creditor for voting on the plan or sharing in any distribution; the holder of non-filed claims shall be bound by the Plan.

Creditors on the Schedules not listed as disputed, contingent, or unliquidated are deemed properly filed.

Creditors need not file claims if: such claims are listed on the Schedules & are not listed as disputed, contingent or unliquidated, so long as, the amount or manner is not disputed.

Creditors who have filed Claims need not file again.

Confirmation will discharge any debt that arose before confirmation whether or not a claim is filed, deemed filed, allowed, or claimant has accepted the plan.

Dated: January 25, 1988 SHEA, LICHTIG, EISENBERG, et al.
1010 Franklin Ave., Garden City, NY 11530

NEW PRODUCTS

Systems

A family of 12-MHz, Microsoft Corp. MS-DOS-compatible personal computers based on the Intel Corp. 80286 microprocessor has been announced by **Mitsubishi Electronics America, Inc.'s** Computer Systems Division.

The family, called the **MP 286 Series 300**, is also Xenix compatible. Configurations include a 1.2M-byte floppy-disk system for $1,995; a 1.2M-byte floppy disk with monochrome monitor for $2,295; a 1.2M-byte disk with an enhanced graphics adapter monitor for $2,995; a 1.2M-byte floppy-disk and a 40M-byte hard-disk subsystem for $3,095; a 1.2M-byte floppy-disk and a 40M-byte hard-disk subsystem with monochrome monitor for $3,395; and a 1.2M-byte floppy-disk, 40M-byte hard-disk subsystem with an enhanced graphics adapter monitor for $4,095.

All systems come with 640K bytes of expandable random-access memory and six full-size expansion slots.

Mitsubishi, 991 Knox St., Torrance, Calif. 90502. 213-515-3993.

The Professional Office Publishing System, a turnkey desktop publishing system for IBM Personal Computers and compatibles, has been announced by **CIE Terminals, Inc.**, a subsidiary of C. Itoh Electronics, Inc.

The system includes CIE Terminals' 10 page/min Lips 10 Plus laser printer and Laser Friendly, Inc.'s The Office Publisher desktop publishing software, developed by Print Three, Inc. Capabilities include document formatting, page composition, text editing and printing.

The Professional Office Publishing System operates under Digital Research, Inc.'s Graphics Environment Manager environment, better known as GEM, and provides a what-you-see-is-what-you-get interface.

The Professional Office Publishing System is priced from $3,995 to $4,995.

CIE Terminals, 2505 McCabe Way, Irvine, Calif. 92714. 714-660-1421.

Software applications packages

The **Ultimate Parcel Shipping System** (UPSS), a software program said to automate the United Parcel Service, Inc. (UPS) shipping process, has been announced by **Aristo Computers, Inc.**

UPSS is said to meet all UPS requirements for a computer-based shipping system. It saves customer lists, automatically calculates UPS zones, shipping charges, insurance fees and call charges. It also prints UPS manifest, c.o.d. labels, standard shipping labels, reports of internal company uses and all required UPS summaries.

According to the vendor, users can modify the built-in data. Data files are compatible with Ashton-Tate Corp.'s Dbase III.

UPSS costs $395. It runs on IBM Personal Computers.

Aristo Computers, Suite 213, 16811 El Camino Real, Houston, Texas. 77058. 713-480-6288.

A scheduling system called **Jobtime Plus**, designed for use on IBM Personal Computers, has been announced by **Wyman Associates, Inc.**

The software features a backward-pass method of scheduling said to recognize a hierarchy of assembly jobs and automatically set release dates. It also provides finite-capacity forward-pass scheduling that calculates start, finish, release, move and queue times to the minute, according to the vendor.

Other features include capacity requirements reporting, on-screen production bar charts, 500 reports, job tracking and status query support for up to 100,000 tasks.

Jobtime Plus costs $8,500.

Wyman Associates, Suite 321, 181 Second Ave., San Mateo, Calif. 94401. 415-343-3900.

Software utilities

A product said to bring what-you-see-is-what-you-get headline fonts to desktop publishing programs has been announced by **Softcraft, Inc.**

The **Display Font Pack** provides a set of Hewlett-Packard Co. soft font format fonts in a variety of typefaces. Matching screen fonts are provided for Xerox Corp.'s Ventura Publisher and Aldus Corp.'s Pagemaker programs.

Fonts provided include sans serif bold, shadow, contour and outline in 24 and 30 points; classic bold, outline and three-dimensional in 24 and 30 points; initial capitals in 24 points; and Old English in 14, 24 and 30 points. The fonts can be used in portrait or landscape orientations.

The Display Font Pack costs $95.

Softcraft, Suite 201, 227 N. El Camino Real, Encinitas, Calif. 92024. 619-944-0151.

A program that runs under Microsoft Corp.'s Windows environment to provide personal computer users with access to data from minicomputers and mainframes has been announced by **DB/Access, Inc.**

Called View/PC, the software is said to allow users to bring files or selected data from host data base systems down to the personal computer for viewing on-screen or for direct access by applications such as Lotus Development Corp.'s 1-2-3, Ashton-Tate Corp.'s Dbase or Microsoft's Excel.

View/PC runs on IBM Personal Computer XTs, PC ATs, Personal System/2s and compatible systems. The package costs $250.

DB/Access, Suite 200, 20111 Stevens Creek Blvd., Cupertino, Calif. 95014. 408-255-2920.

Data storage

A 50M-byte internal hard disk drive for Apple Computer, Inc.'s Macintosh II computers has been introduced by **Jasmine Technologies, Inc.**

The **Innerdrive 50/II** reportedly provides 26-msec access times. The vendor said the drive also comes with 9M bytes of public domain software, shareware and backup software as well as a mounting bracket, cables and all hardware necessary for installation.

The Innerdrive 50/II costs $999. A 90M-byte version, announced in August, costs $1,499.

Jasmine also announced the **Innerdrive 40/SE**, a 40M-byte internal hard disk drive for the Macintosh SE priced at $999.

Jasmine Technologies, 565 De Haro St., San Francisco, Calif. 94107. 415-621-4339.

Printers/Plotters/Peripherals

A 15-in. color monitor featuring automatic frequency scanning from 22 to 50 KHz horizontal and from 50 to 80Hz vertical has been announced by **Idek America, Inc.**

The **Spectrasync 1550+** supports the IBM Personal System/2, IBM Personal Computer AT and the Apple Computer, Inc. Macintosh II.

According to the vendor, the

Idek's *Spectrasync 1537*

monitor also supports IBM Enhanced Graphics Adapter, Video Graphics Array and Multiple Color Graphics Adapter standards as well as noninterlaced versions of the IBM 8514 graphics standard.

Features include graphics resolution to 1,024 pixels by 800 lines and seven switchable colors.

The Spectrasync 1550+ costs $1,299.

Idek also announced the Spectrasync 1537 and the Spectrasync 1437, which are 15- and 14-in. monitors, respectively. According to the vendor, they offer automatic scanning from 15.5 to 37 KHz horizontal and 50 to 90Hz vertical. The 1537 costs $995, and the 1437 costs $849.

Idek America, 204 S. Olive St., Rolla, Mo. 65401. 314-364-7500.

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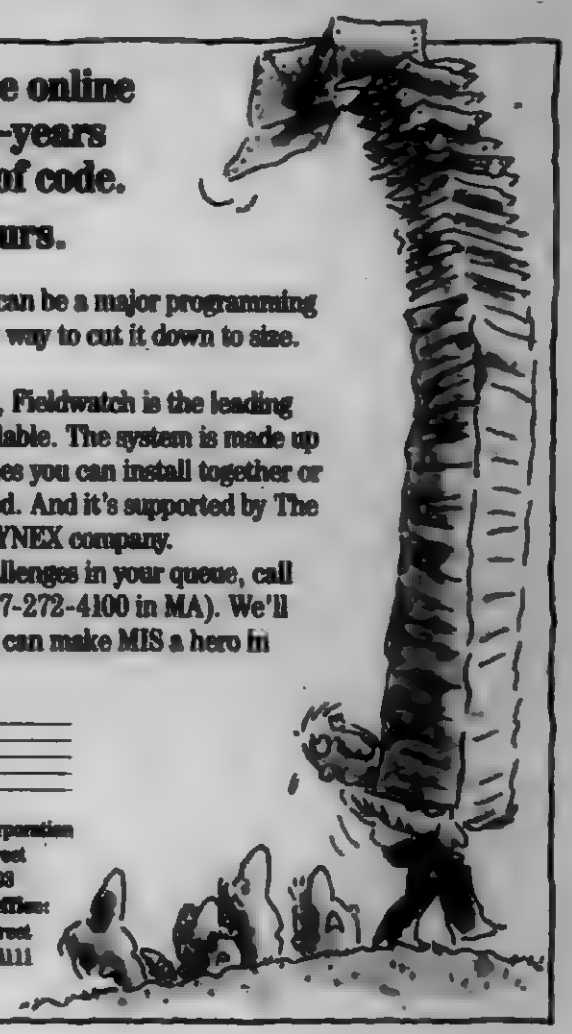

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DATA STREAM

Elisabeth Horwitt

LANs need bridge work

Now that local-area networks have finally won their place in the corporate computing environments — even if most LANs only link five or six micros — many firms are taking the next step of linking multiple LAN sites through network bridges.

A recent study by The Diebold Group in New York showed that from 1986 to 1987, LAN bridge installations grew by 85% in the industrial sector and almost doubled in the service sector. And according to Forrester Research in Cambridge, Mass., all types of network interconnections will see significant growth in the next three years (see chart page 40).

Vendors' latest bridge products and enhancements address this growing need to integrate multiple LANs into a corporatewide networking system. But beware: There are still plenty of older, simpler products left on the market.

Your basic bridge is essentially a transparent device that takes all transmissions on its local network and sends them out over a link to one or more remote LANs. Unlike a router, designed to support just one network protocol, such as DEC's Decnet or Transmission Control Protocol/Internet Protocol, a bridge is protocol-independent — which can be a plus for companies whose networks

Continued on page 40

IBM ups the telecom ante

Plays strong hand with T1, packet-switching additions; eyes PS/2 Netview

BY ELISABETH HORWITT
CW STAFF

Continuing its quest for dominance in the telecommunications arena, IBM recently announced major upgrades and additions to its T1 switch and packet-switching product lines.

The latest versions of IBM's X.25 NCP Packet Switched Interface (NPSI) are said to offer a 40% performance increase over the older version as well as support for IBM's newly announced 3745 communications processor. NPSI provides an interface between IBM Systems Network Architecture (SNA) devices and a CCITT X.25 packet-switching network. One-time charges for the NPSI Versions 2 and 3 start at $12,000; shipment is set to start in December.

IBM also made SNA X.25 Interconnection (XI) a standard product rather than part of its Request for Proposal program. XI is said to support X.25 communications across an SNA backbone of IBM communications controllers, including the 3745. One-time charges start at $15,120; shipping dates range from June to October.

Net alert! Net alert!

Also announced was the X.25 SNA Network Supervisory Function (NSF), which is said to allow an IBM MVS host running Netview to collect network alerts and performance information from X.25 devices attached to an SNA network. One-time charges begin at $12,000; Release 1 is scheduled to ship in June.

Ellen Hancock, general manager of IBM's Communication Systems Division, reaffirmed IBM's intentions to develop a "graphics-based, Personal System/2-based Netview solution."

Among the first products to be supported by the system, IBM said, will be Network Equipment Technologies Corp.'s (NET) Integrated Digital Network Exchange (IDNX) T1 switches, as resold by IBM. The workstation would also allow IDNX network events to be forwarded as SNA alerts to Netview via the Netview/PC in-

Continued on page 44

SEOUL TRAINING

PC net goes for the gold

CHRIS DEMAREST

BY ALAN ALPER
CW STAFF

Behind the scenes of NBC's coverage of the 1988 Summer Olympic Games in Seoul, South Korea, a network of 120 personal computers will be running the show. The complex setup will help producers and support staff track everything from videotapes and NBC personnel to athletes' biographies and Olympic history.

Designed around two Novell, Inc. file servers and a Digital Equipment Corp. Microvax II, the micro network was developed by Nesbit Systems, Inc., a Princeton, N.J., consulting firm. It is currently installed at NBC's Rockefeller Center headquarters in New York so that employees can learn the

Continued on page 41

Touch ports OSI to Mac

ANAHEIM, Calif. — Touch Communications, Inc. recently announced what it claimed is the first Open Systems Interconnect (OSI) product for Apple Computer, Inc.'s Macintosh.

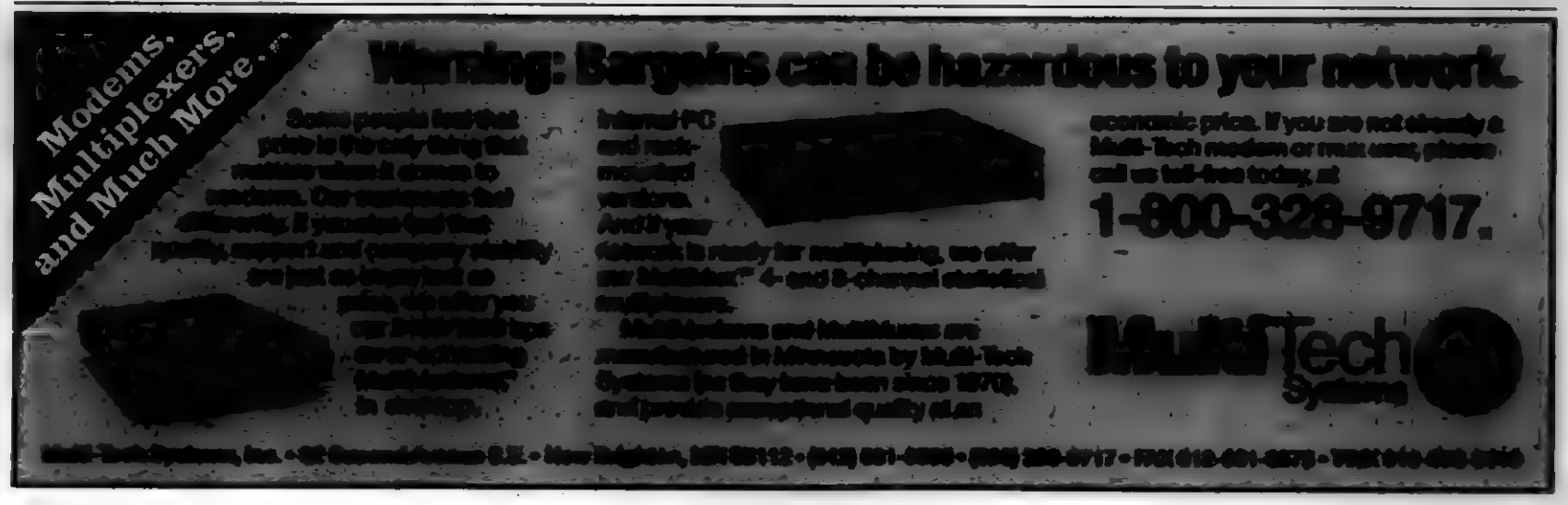
The Touch OSI Macintosh Developers Kit is designed to "get corporate and third-party developers started" integrating new or existing Macintosh software with OSI networks, Touch manager of product marketing Andrew Lauta said. Developers can then link such applications with an OSI network of Digital Equipment Corp. VAXs and IBM Personal Computers, he added. Touch already markets OSI suites for these systems.

The kit includes all seven OSI protocol layers, including the File Transfer and Access Management service, and prewritten user utilities for filing and remote printer access, Lauta said. It costs $545 and is set to ship in May.

The vendor also announced a new version of Touch OSI DOS, which is said to enable users to load OSI software directly onto a 3Com Corp. Etherlink Plus controller board. The board-resident OSI software is said to use 75% less PC main memory than the previous product, leaving the PC freer to run applications.

Priced at $495, Touch OSI DOS is available now.

• Novell adds Ethernet connection board for Unisys emulation. Page 45.
• Next expansion system ups host ratios. Page 45.



Horwitt

CONTINUED FROM PAGE 39

support a variety of protocols. And by ignoring higher level protocols, bridges achieve up to 100 times the throughput of a router, vendors claim.

But a router has one big advantage: It can read headers that a networking system uses to designate to which of several possible LAN addresses it should send a packet. In contrast, the bridge must broadcast a transmission along all available links until it reaches the right LAN. This catch-as-catch-can routing method can be costly in bandwidth to companies that use dedicated lines to link dozens or even hundreds of LAN sites.

Fortunately, these problems are being partially addressed by bridge vendors, such as Vitalink Communications in Mountain View, Calif.; Bridge Communications, also in Mountain View; RAD Network Devices in Rochelle Park, N.J.; and TRW Information Networks in Torrance, Calif. Among the useful features that are increasingly becoming standard for bridge products are the following:

- Filtering allows the bridge to send out over the link only packets that meet certain criteria — for example, only packets addressed to a remote LAN or only Decnet packets.
- Memorizing locations allows the bridge to send a packet directly to the right LAN. Bridge's newer products, for example, only broadcast the first time they send to a given node; once a message is acknowledged, they have a record of that node's address.
- Traffic management includes balancing traffic loads among alternate routes between LANs, diversion of traffic to a backup line when the primary link goes down and the ability to determine the speediest of several alternate routes between LANs.

Making the LAN-to-LAN connection

Users will increasingly need bridges to link separate LANs; gateways will connect different networking environments

Repeaters[1]	$[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Bridges	$1,500	$[illegible]	[illegible]	[illegible]	$[illegible]
Routers	$1,800	$[illegible]	[illegible]	$75,000	$[illegible]
Gateways[2]	$2,000	$[illegible]	[illegible]	$150,000	$[illegible]

[1] Regenerate LAN signals
[2] Link different types of networks

INFORMATION PROVIDED BY FORRESTER RESEARCH, INC.
CW CHART

Wellfleet Communications in Bedford, Mass., and Halley Systems in San Jose, Calif., have recently come up with hybrid products that provide a router's direct addressing capabilities for a limited number of networking protocols and a bridge's protocol transparency for protocols they don't support directly. The devices are also said to allow multiple LANs and digital private branch exchanges to share the same 1.5M bit/sec. T1 link via an interface to a T1 switch.

Pushing the envelope

But while the products described above help users conserve bandwidth through more efficient LAN-to-LAN connections, most fail to extend the LAN's 4M to 10M bit/sec. throughput over long-distance links.

Today, 9.6K or 64K bit/sec. lines are adequate to support limited file-transfer or terminal-to-host sessions. But true LAN speeds will be required as companies start interconnecting cooperative processing networks of engineering and computer-aided design workstations and as IBM brings out more of its distributed networking scheme, based on the LU6.2 and PU2.1 protocols.

IBM deserves credit for taking the lead in high-speed interconnectivity with its Jan. 26 announcements. First, the vendor introduced ACF/NCP programs with PU2.1 support that allow its communications processors to link various IBM and non-IBM networking environments with minimal interference from an IBM host. Second, IBM brought out the 3745 communications controller, which it claims supports up to eight active T1 lines and an effective throughput of 8M bit/sec. [CW, Feb. 1].

With a base price of $125,000 (as compared with a typical bridge price tag of $6,000 to $20,000), the 3745 clearly needs to do more than connect up to eight IBM Token-Ring networks — however speedily — in order to earn its keep. And so it does. Acting as a gateway, the 3745 can connect LANs to up to 16 IBM hosts.

Devices and LANs connected to an IBM Systems Network Architecture backbone of 3745s can also be given access to a CCITT X.25 packet-switching network. The 3745 also offers reliability features such as IBM Netview support and a second processor that can be used as a backup system.

Take all these features together, and the 3745 could prove just the ticket for IBM shops that are in the process of integrating their LANs into a peer-to-peer SNA network.

Horwitt is a *Computerworld* senior editor, networking.

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PC net

FROM PAGE 39

ins and outs of file server and Microvax technology before the equipment is shipped to Seoul in July.

Since beginning the project almost three years ago, Nesbit has worked closely with NBC's MIS department to assure the network that once the Olympics are over, the file servers and the Microvax can be used in other capacities by the cost-conscious General Electric Co. subsidiary (see story below). And cost efficiency is especially important in the case of these Olympics — NBC paid the Olympic committee more than $300 million for the rights to cover the games.

The Ethernet network will eventually reside in the International Broadcast Center in Seoul, which was designed by NBC specifically for the Olympic Games. The network operates under Novell's Netware 2.1 networking software, allowing data to be transmitted at 10M bit/sec. over standard and thin Ethernet cable. The Microvax will attach to the network via a Transmission Control Protocol/Internet Protocol interface. Teleprompters used by on-air personnel will be linked to dedicated micros on the network for script preparation.

Two 9.6K bit/sec. leased lines will enable employees in the field using laptop PCs to call in results from remote venues to the Microvax. Seoul and NBC's New York headquarters will use the CCITT X.25 packet-switching protocol to exchange data — such as altered travel plans — at rates of 64K bit/sec. over two dedicated T1 lines.

Why a PC network?

The micro network approach was taken for a number of reasons, according to Irene Nesbit, president of the consultancy that helped design the network and a developer of the systems requirements for NBC's canceled coverage of the 1980 Moscow Summer Olympics.

File servers, Nesbit stresses, are more compact than minicomputers and are therefore easier to both transport between New York and Seoul and maintain during the 21 days of Olympic events. PC workstations can also be more easily adapted to changing requirements than terminals, she says.

"We're dealing with pretty smart users. They're all computer-literate; they know Lotus and Multimate," Nesbit points out. "We want to allow them to work in a way they are accustomed to."

"This is the most cost-effective solution," adds Michael Zablocki, NBC Sports' Olympics systems manager and the liaison between Nesbit and NBC's MIS organization.

From a mix of IBM Personal System/2 Model 30s and Personal Computer ATs — equipped with 3Com Corp. Ethernet cards — users will be able to access a variety of services, including a videotape library system, a manpower scheduling system, a logistical support system, electronic mail and The Associated Press news wire.

In addition, Lotus Development Corp.'s 1-2-3 spreadsheet and Multimate International Corp.'s Multimate word processing program will be downloaded from the file server or booted locally, Nesbit adds.

All applications on the network will be accessed through a menu system that can be tailored to the needs of each type of user. Multiple security levels are built into the system to allow users access to applications required for their jobs, she says.

The two file servers will be equipped with 109M-byte drives that can be upgraded as required to access a maximum of 8G bytes, Nesbit says. Two dedicated micros will act as a bridge between the file servers, allowing users on one to pass data back and forth depending on the network's load. There will be a fair degree of redundancy on the network with duplicate drives, boards and controllers as well as an uninterruptible power supply.

"The only thing that will stop the network from working is if the cable is cut," Nesbit notes.

The networked systems

The library system, which was written in C, will allow producers to monitor the whereabouts of every videotape needed for the broadcast. A bar code will be affixed to each tape and scanned into the system. Softcraft, Inc.'s Btrieve — a file handler for C — will manage the 25,000 records expected to be part of this application, Nesbit notes.

The logistical support system will be used to keep track of detailed personnel information, including hotel and airline reservations for the 3,500 NBC employees covering the games. The system, developed with Ashton-Tate Corp.'s Dbase III and compiled with Nantucket Corp.'s Clipper, will generate a variety of ad hoc reports based on 25 different parameters, such as names, phone numbers, departure times and so on. Five different types of financial accounting reports can be run to help NBC keep a handle on costs, Nesbit says.

The manpower system was developed to monitor equipment use and personnel schedules. Written with the same tools as the logistics system, it will maintain schedules in quarter-hour increments, tracking each person in NBC's production and engineering groups.

The system will display the location of each individual and piece of equipment during the Olympic Games and will flag the user if any conflicts in scheduling occur. It also contains report capabilities, enabling schedulers to ascertain who or which piece of equipment is available for each job.

A general research system, residing on the Microvax, is already in use at NBC. It is functioning as a repository of athlete biographies, Olympic rules and the histories and results of recent athletic events. A general text-retrieval software package, Statis, written in Fortran by Computer Power, Inc., was used to organize the information.

The research system is being used to provide information for producing biographies of some athletes before the games and will be used during appropriate points in the broadcast to feed announcers insightful tidbits. "The goal is to provide information on who may do well in the Olympics and, therefore, who to cover during the broadcast," Nesbit points out.

Built-in user prompting

Developing a micro network is very different from creating stand-alone applications, notes Ken Michielsen, Nesbit's projects director. "You have to have a finer understanding of what the user needs to do," he says.

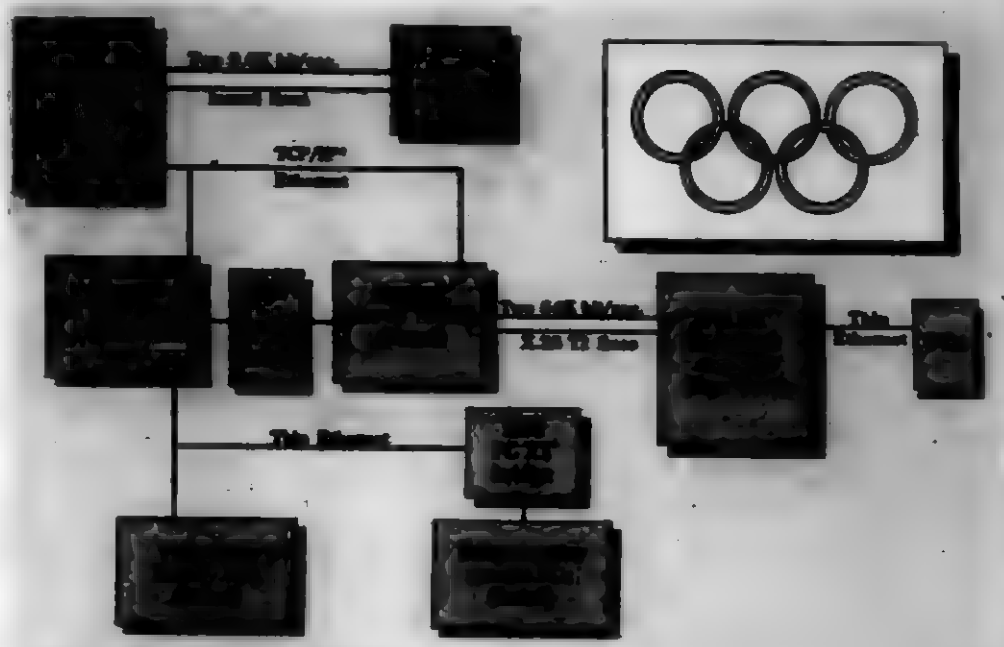
In that regard, Nesbit Systems has built some user prompting into the system. For example, if two users of the logistics application access the same file simultaneously and update information, the system will ask the last user to exit the file if he wants to see the new information before ending the session.

Covering the Olympics is almost a 24-hour-a-day, three-week grind for NBC. That's why Nesbit and company have spent the better part of the last three years working with NBC producers, engineers and users in planning the micro network. During that time, Nesbit and her staff have defined equipment requirements, written code, tested the applications and assembled a pilot network first at the consultancy's Princeton headquarters and late last year at NBC.

"We even worked closely with the building people in Seoul so that we have the cabling and drops where we need them," Michielsen says.

Let the Games begin

A basic schematic of NBC's personal computer network linking New York and Seoul, South Korea for Summer Olympic coverage



*Transmission Control Protocol/Internet Protocol

INFORMATION PROVIDED BY NESBIT SYSTEMS, INC.
CW CHART

NBC's MIS still runs the show

Although NBC has relied on a consultancy to develop a microcomputer network to help manage its coverage of the Summer Olympic Games in Seoul, South Korea, the firm's MIS department has been involved every step of the way.

"We met with [MIS] from the beginning and supply them with status reports on a weekly basis," notes Irene Nesbit, president of Nesbit Systems, Inc., the consulting firm doing the work for NBC. "MIS reviews everything we do; anything that has to do with computers must be approved by them, since all the equipment will come back to the department."

By hiring a consulting firm, NBC's MIS department did not have to add staff and then find work for them after the Olympics project is finished. "Now that we're owned by General Electric, we have to demonstrate incredible efficiencies," says Michael Zablocki, NBC Sports' Olympics systems manager.

Although NBC originally intended to purchase the networked micros, it has now opted to rent them because of logistical problems. "We have the [PC] network installed here [30 Rockefeller Center in New York] for 70 users to train on prior to setting up in Korea," Zablocki explains. "People will need to use some of the same equipment in South Korea during that time, so we need a duplicate setup and felt renting the PCs would be easier than shipping them back and forth."

The file servers will be purchased and will initially return to MIS at the Olympics' conclusion. "It's part of GE's — and other businesses' — philosophies to distribute lists of equipment to divisions that can then bid on it through MIS," Zablocki says. "It's then charged back to the budgets of those divisions which place the winning bids."

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And even [illegible]

Avanti aims cost-effective links at remote sites

BY ELISABETH HORWITT
CW STAFF

WASHINGTON, D.C. — A family of network concentrators and multiplexers announced recently by Avanti Communications Corp. were designed to provide small remote sites with more cost-effective links to a backbone wide-area network of Avanti T1 switches.

The Open Network Concentrator (ONC) family, introduced here at Communication Networks '88, or Comnet, is the first product line of this type that can fully interface with Avanti's Open Network Exchange (ONX) family of T1 switches and network management systems, according to George Kushin, the company's vice-president of marketing.

Avanti was one of many T1 vendors that introduced enhancements and additions to their lines at Comnet [CW, Jan. 18]. The products represent vendors' "desperate attempts to differentiate their products in an overcrowded market" and also to become customers' single point of purchase for networking systems, according to Thomas Nolle, president of Haddonfield, N.J., consulting firm CIMI Corp.

Avanti's products will reportedly provide users with the ability to use one network management system for both the high-end ONX T1 switches and ONC multiplexers.

February releases

Scheduled for shipment this month, Avanti's introductions include the following:

• ONC-100, a T1 multiplexer that supports up to 24 channels between a remote site and an Avanti ONX T1 switch.

A version of the product conforms to the Enhanced Subrate Digital Multiplexing standard, allowing users to route individual lines to carrier-based services that also comply with the standard, according to Kushin. Price ranges from $10,700 to $28,000.

• ONC-50, which is similar to the Series 100 except that it multiplexes a 56K bit/sec. AT&T Dataphone Digital Service channel rather than a 1.5M bit/sec. T1 circuit. It is priced at approximately $4,500.

• ONC-200, an upgraded version of Avanti's Ultramux that was enhanced to be compatible with the ONX network management system. It is priced from $25,000 to $50,000.

• ONC-10, which gives two high-speed devices — for instance, 256K bit/sec. computer-aided design (CAD) workstations — the ability to share a single T1 circuit.

Avanti also introduced four Network Extension Units that act as line drivers to extend line speeds of up to 3M bit/sec. out to CAD workstations and other high-speed applications over a distance of up to several miles, Kushin said.

Without such devices, line speeds of 256K bit/sec. or higher can be extended over a distance of only about 50 feet between the T1 switch and the user device, he noted.

IBM

FROM PAGE 39

terface. IBM also said it is developing an integrated network management data base based on DB2.

IBM's version of the IDNX product line will support 45M bit/sec. T3 networking as soon as NET provides this capability, IBM said. NET recently issued a statement of its intent to incorporate T3 capabilities into its products.

IBM also announced an upgraded version of the 3737 Remote Channel-to-Channel Unit. Model 002, which supports host-to-host links over up to two T1 channels, will replace the older 3737, which supported only a single T1 link. Priced at $76,680, Model 002 is scheduled for June shipment.

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NEW PRODUCTS

Local-area network hardware

An Ethernet controller board for Unibus-based computers has been announced by **Excelan, Inc.**

The board, called **Exos 304**, uses Intel Corp.'s 80286 microprocessor as an on-board CPU. It runs Excelan's Transmission Control Protocol/Internet Protocol software and contains such networking applications as file transfer, terminal emulation and electronic mail. It costs $3,520.

Excelan also announced that it has reduced the price of its Exos 204 Unibus controller board to $2,120.

Excelan, 2180 Fortune Drive, San Jose, Calif. 95131. 408-434-2300.

A multiport repeater for Ethernet networks has been announced by **American Photonics, Inc.**

The **RL7100** consists of the RL7100L local multiport repeater, which interconnects up to eight RG-58 thin coaxial Ethernet segments and allows connection to a standard thick coaxial backbone.

The RL7100R remote multiport repeater provides all of the features of the local version but adds a fiber-optic interface.

The RL7100L costs $2,450; the RL7100R costs $3,150.

American Photonics also introduced the RL7000L Ethernet thin-net repeater. It includes a built-in transceiver and allows for connection of one thin-net branch to a standard Ethernet backbone. It costs $975.

American Photonics, 71 Commerce Drive, Brookfield Center, Conn. 06805. 203-775-8950.

Customer-premise equipment

A personal computer add-in card said to allow remote communication of computer-aided design (CAD) data has been announced by **Gammalink.**

Called **CAD-Fax**, the card allows users to distribute or collect design information via facsimile through a high-speed computer-to-computer file transfer or by means of an integral Hayes Microcomputer Products, Inc.-compatible modem.

CAD-Fax can read Autodesk, Inc.'s Autocad ADI printer/plotter files and Hewlett-Packard Co. GP Graphics Language plot files. CAD-Fax automatically divides each CAD document into 8½-in.-wide stripes of any length and inserts alignment markers so the recipient can reconstruct the original full-size drawing.

CAD-Fax costs $1,995.

Gammalink, 2452 Embarcadero Way, Palo Alto, Calif. 94303. 415-856-7421.

An automatic port contention system designed to expand accessibility to host computer ports has been introduced by **Backus Data Systems, Inc.**

The COP/APC port contention system provides system security by answering off-site calls via modem ports, hanging up and returning the call to the phone number listed in the security directory. When all computer ports are busy, the call can be placed in a call-back queue.

The device provides connections between host computers, local terminal devices, modems and other communication resources. It is expandable from eight to 152 ports and can be used for switching between multiple facilities and resources.

Prices range from $5,200 to $18,500.

Backus Data Systems, Suite 110, 1440 Koll Circle, San Jose, Calif. 95112. 408-279-8711.

XEROX

vary from page to page and must incorporate extensive changes right up to the last minute. (Isn't that just about every job?) Even the most sophisticated PC-based desktop publishing systems lack this critical ability to handle instant change.

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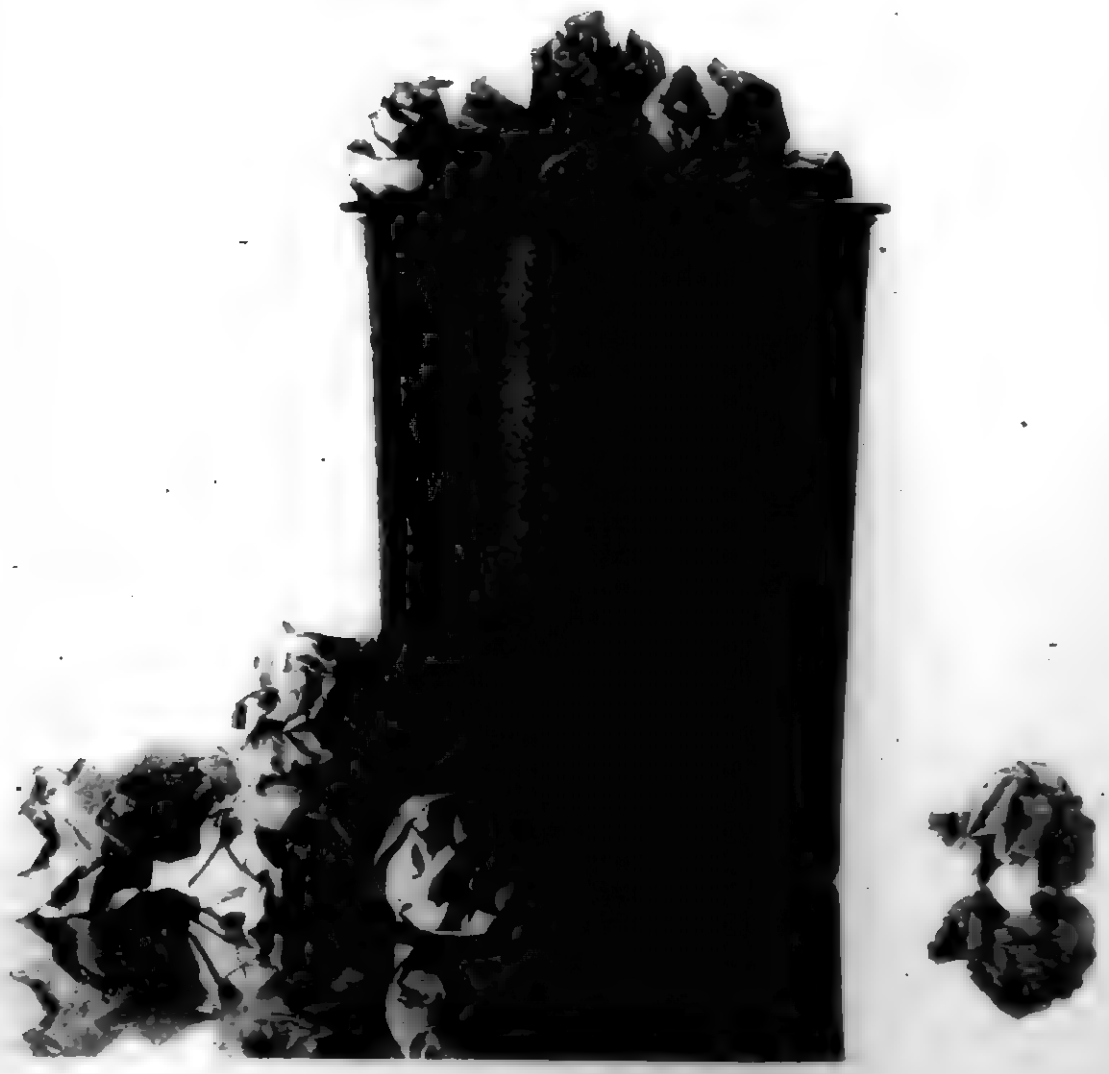

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SYSTEMS & PERIPHERALS

HARD TALK

James Connolly

Apple, DEC tap techies

So much attention has been focused on the implications for the commercial MIS world of DEC's alliance with Apple that people seem to forget that the match could be still more meaningful in the engineering and scientific markets.

It may turn out that the greatest impact of the DEC-Apple agreement to jointly develop connectivity products will be in the technical computing arena in which DEC built its reputation.

This does not mean that the Maynard, Mass., minicomputer pioneer and the Cupertino, Calif., microcomputer innovator cannot achieve their goal of leveraging their agreement to sell general-purpose systems for office automation or traditional MIS applications. MIS and OA in large companies represent growth opportunities for both Apple and DEC.

Looking beyond MIS, one can see that DEC and Apple can help each other solidify their existing positions of strength, which tend to lie in technical computing environments. In addition, reinforcing their scientific and engineering positions can help DEC and Apple in the commercial world, because many of their technical users are in the same Fortune 500-class organizations that are the scenes for DEC's and Apple's MIS battles with IBM.

Continued on page 52

Summit market takes shape

Low-end 3090s will survive as IBM courts large users, analyst says

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — IBM may push large 3090 user sites on a fast track to the 3090 follow-on, known as Summit, while providing four more years of upgrades for current users of low-end and mid-range 3090 machines, according to a leasing firm executive.

"Summit is designed as a high-capacity system that will meet the capacity needs of the top 10% to 15% of the IBM mainframe market today," said William S. Husband, senior consultant to the Meridian Group, a $1 billion Deerfield, Ill., leasing firm, at a recent Chicago seminar.

"It is targeted at high-growth users, not those who are using the IBM 3090 Model 150 or Model 180 machine," Husband said. Summit is directed at high-end users who have already installed one or more 3090 Model 400 or 600 mainframes, he added.

William S. Husband

Summit is expected to appear by late 1990 with more than 200 million instructions per second (MIPS) of power and 2G bytes of main memory in a tightly coupled four-CPU configuration, Husband said. By 1994, it should run at more than 800 MIPS through the use of 16 CPUs on two frames, he added. It is expected to have a 60-MIPS uniprocessor and a top channel speed of 18M byte/sec. Eventually, Summit may address more than 4,000 channels directly — a feature that would allow a large user to centralize several present-day computer rooms at one site.

Meanwhile, the base 3090 will undergo drastic redefinition, Husband said. It will be more powerful and faster and will take up little more space than current models. The 3090 F, G and H models of the late 1980s and early 1990s should also contain features that will boost IBM mainframe reliability to new levels.

"By the mid-1990s, the 3090 mainframe will have taken on the degree of fault tolerance now associated with an [IBM] System/88 or a Tandem Computers, Inc. processor," Husband said.

Basic 3090 specifications will also change dramatically, he said. Beginning in April, when the 3090 F is expected to arrive,

Continued on page 51

Tandem adds IPI subsystem

CUPERTINO, Calif. — Tandem Computers, Inc. recently doubled the data transfer rate and storage density of its mid-range disk subsystem offering with the introduction of the V80 Disk Storage Facility.

The subsystem is intended for use in the same markets served by Tandem's earlier V8 subsystem, which provided an unformatted capacity of 1.3G bytes in combination with Tandem's Nonstop II, VLX, TXP, EXT25 and EXT10 systems.

The subsystem houses up to eight 337M-byte 8-in. disk drives in a single cabinet to provide a formatted storage capacity of 2.1G bytes. The V80 includes Tandem's new 3120 Disk Controller, which features an ANSI-standard Intelligent Peripheral Interface (IPI) for a 2.4M byte/sec. parallel data transfer rate. The company positioned the V80 below the high-end, 4.2G-byte Tandem XL8 subsystem.

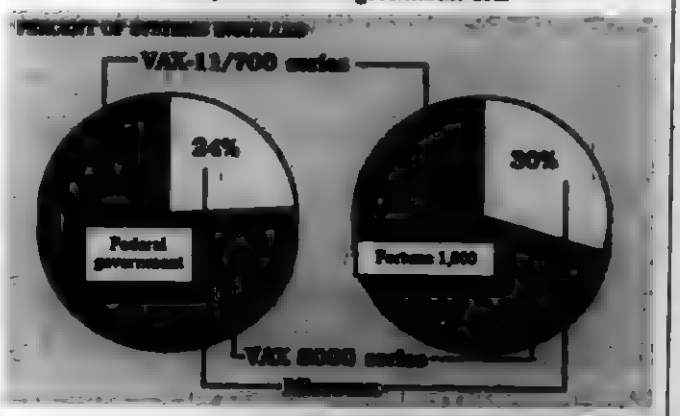
The IPI interface is built into a printed-circuit board that acts as a backplane in the V80. The disk drives are built by Fujitsu Ltd.

Available now, the V80 costs $62,000 with four disk modules and $87,000 with eight. Each 3120 controller costs $20,000.

Data View

Corporations lean toward new VAXs

Large companies commit to DEC VAX 8000 and Microvax series faster than the government does



INFORMATION PROVIDED BY COMPUTER INTELLIGENCE

SCS unwraps near-super

SAN DIEGO — Scientific Computer Systems Corp. (SCS) drove down the entry point for its near-supercomputer product line with the announcement recently of a lower priced system designed to be upgradable to the firm's SCS-40.

The low-end system is the SCS-30/XM, which the company said provides 75% of the SCS-40's performance for 60% of the price.

SCS positioned the new system as an entry-level near-su-

Continued on page 52

Inside

- TI revamps Business Systems. Page 51.
- Xerox offers ion deposition printer. Page 52.
- Unbound rolls out line of Q-bus optical disk systems. Page 53.

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TI gives Business Systems a face-lift

BY SUZANNE WEIXEL
CW STAFF

AUSTIN, Texas — Trying to keep pace with current technology without abandoning users of its older systems, Texas Instruments, Inc. recently revamped its Business System series of multiuser computers.

Five models have been introduced, replacing the mid-range and supplementing the high end of the series.

According to a company spokeswoman, the 17-year-old Business System series was in need of updating, but with an installed base of more than 100,000 systems, TI did not intend to discontinue the line.

Smoothes migration path

In addition to upgrading the Business System line, the changes simplify the migration path to TI's industry-standard System 1000 series, according to the spokeswoman.

The Business System series is based on a proprietary operating system and chip set, while the System 1000 series uses Intel Corp. processors and the Unix operating system. With the changes, both series will support the same peripherals, including hard drives, tape backups and terminals, she said.

Additions to the Business System series include the 677A and 677S mid-range models and the 877A, 877B and 877S high-end models. All the new Business System models feature a 182M-byte, 5¼-in. Winchester disk using small computer systems interface technology as well as a 60M-byte cartridge tape backup.

The 677A and 677S are configured using TI's 990/10A processor. They offer 1.5M bytes of random-access memory, which is expandable to 2M bytes. The 677A, priced at $21,495, comes with a Model 931 terminal. The 677S, which costs $20,995, has a Model 924 terminal.

The Business Systems 877A, 877B and 877S use TI's 990/12 LR processor with a 1M-byte cache memory controller and a 512K-byte memory array. All feature a four-channel communications interface for terminal connection. The 877A, priced at $32,995, comes with two Model 931 terminals; the 877B, which costs $33,595, comes with two Model 931 terminals; and the 877S, priced at $31,995, has two Model 924 terminals.

The systems are available immediately.

Models retained from the current family are receiving price reductions, TI said. They include the low-end System 373A and System 374A, which will sell for $11,495 and $13,495, respectively, and the high-end 891A, 891B and 891S, which have been reduced to $51,995, $52,595 and $50,995, respectively.

According to the spokeswoman, users of older models are being offered incentives to upgrade to the new models.

DG rolls out rack-mounted systems

WESTBORO, Mass. — Adapting its entry-level Eclipse MV/1400 system for use by value-added resellers and system integrators, Data General Corp. recently unveiled a rack-mounted version, the Eclipse MV/1400RM.

The MV/1400, announced last spring, can support eight users with memory that can be expanded from 4M to 8M bytes, the vendor said.

DG also announced an enhanced version of its previously available rack-mounted MV/2000RM in which the base memory has been upped to 4M bytes, expandable to 12M bytes. The MV/2000RM can support 24 users, according to DG.

Each computer occupies seven inches of vertical rack space and is mounted on slides for ease of maintenance, the vendor said. The rack-mounted systems come with an optional streaming-tape subsystem.

List prices for the MV/1400RM begin at $9,995 for a system with 4M bytes of memory, 38M bytes of disk storage, 737K bytes of floppy-disk storage and an operating system license. The MV/1400RMT, which includes a streaming-tape subsystem, is priced at $18,370.

The MV/2000RM lists at $19,150; with a streaming-tape subsystem, the product is priced at $27,525.

Summit

FROM PAGE 49

the 3090 will get channel speeds of 4.5M and 6M byte/sec., a 24-MIPS uniprocessor, serial I/O channels based on fiber-optic technology and large amounts of extended memory. By 1992, a 37-MIPS uniprocessor is expected.

"The major thing that's changing in the 1990s is the channel itself," Husband asserted. "I would not be surprised to see IBM repackage the channel interfaces to the processor now, as a way of providing a platform for a user's final conversion to fiber-optic channel technology." The 3090 F models will initially have 6M byte/sec. channel speeds, he said, while the 3090 G models, expected in late 1989 or early 1990, will have channel speeds of up to 9M byte/sec.

A separate I/O processor — a sort of fifth wheel — will drive the new serial channels through an outboard computer as powerful as a 3090 Model 200. The outboard I/O driver will be capable of multiplexing data that is traveling at different speeds between a user's CPUs and disk drive units. It will need to do that, Husband said, since different computers will send data to disks at different speeds. Distances between CPUs and disk drives will also be changing, with users able to store data as much as one mile away from their IBM mainframe room.

Husband said he expects that a single site might be using a 9M-byte/sec. channel speed for its 3090 G models while the same user's follow-on to the IBM 4381 might send data at 4.5M or 6M byte/sec.

Future 4381 machines may run at speeds of 15 to 21 MIPS, eclipsing today's low-end 3090 Model 120s, 150s and 180s, according to Husband.

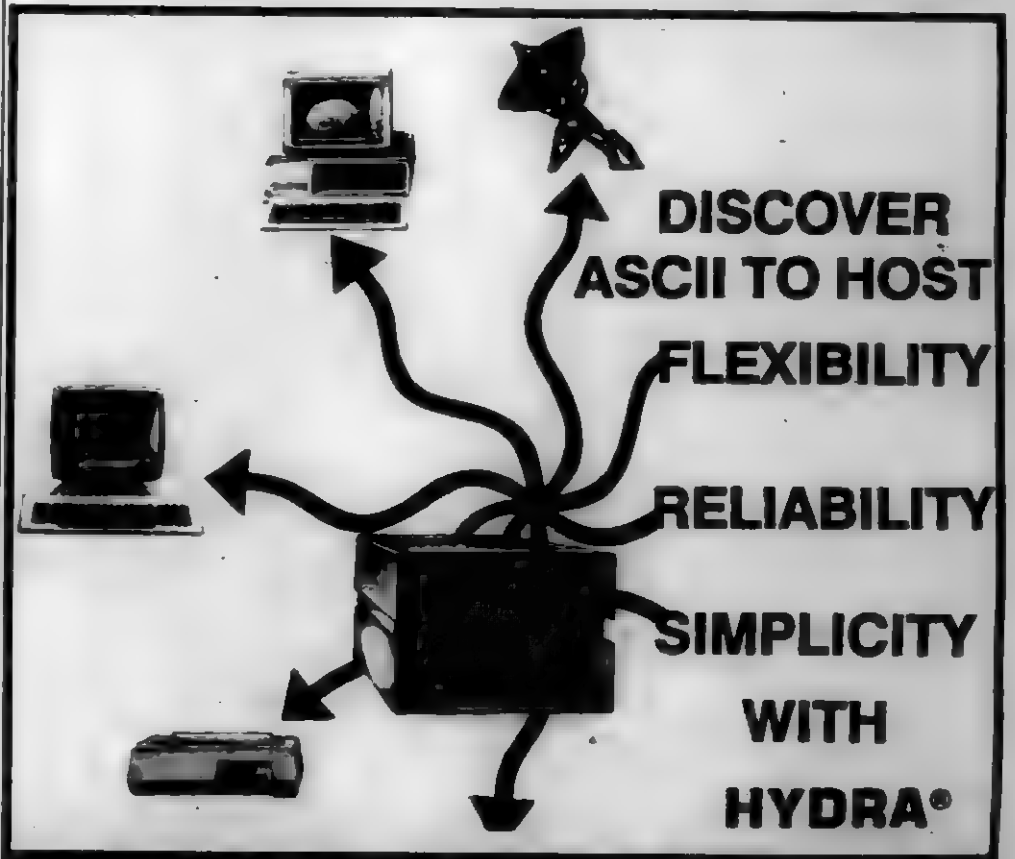
Even the IBM Personal System/2 or its successor could, through future enhancements, send data to disk at 3M byte/sec., Husband said.

Expanded options

Significantly, the 3090's Expanded Storage feature will be enhanced through features embedded in what is commonly called MVS/XB and is the expected successor to IBM's MVS/XA. However, the full functionality of MVS/XB may not be realized until 1989, when IBM ships a version that fully supports Expanded Storage.

"Today, Expanded Storage is a high-speed paging device, which is not the function IBM said it would have when it was introduced in 1985," Husband told his audience of 50 MIS professionals. "Users still do not have the tools to be able to exploit it."

Husband contended that, in general, IBM does not want to make obsolete a profitable computer line by accelerating the addition of features. "IBM may be a leader in the lab, but it is not a leader in providing new products to the market," he said. "Maybe that will change as IBM reacts to their revenue problems of the last three years."



Near-super

CONTINUED FROM PAGE 49

percomputer alternative to the high-end of Digital Equipment Corp.'s VAX line of superminicomputers.

The SCS-30/XM is available with up to 1G byte of SCS's extended memory, which allows memory beyond 128M bytes to be used as a high-performance I/O device emulating a solid-state storage device. SCS claimed the 64-bit system executes up to 33 million floating-point operations per second (MFLOPS), compared with 44 MFLOPS for the SCS-40. SCS rated the SCS-30/XM at 16 million instructions per second in scalar mode.

Like the SCS-40, the new system uses the Cray Research, Inc. Cray X-MP instruction set and supports Cray's CTSS and COS operating systems as well as SCS Scenix, which is the vendor's implementation of AT&T's Unix System V, Release 3.

An upgrade to an SCS-40 involves involves a board swap in the field, according to an SCS spokeswoman. The base price of an SCS-30/XM with 1G byte of memory, a disk drive and a controller is $371,000. Shipments are scheduled to begin during the second quarter.

Connolly

CONTINUED FROM PAGE 49

DEC's history in the scientific and engineering fields is well known. Users in those areas committed early and stayed with minis. They also tended to commit to Apple's Macintosh and its icons earlier than most commercial users, with the most notable exceptions being the large accounting firms that bought Macintoshes for commercial applications.

There was something about the Mac that attracted the technical user; even two or three years ago it was the Mac, not the IBM Personal Computer, that was showing up on the desks of engineers and computer scientists. Today, it isn't unusual to see a technical user running a Mac alongside a Sun or Apollo workstation. Indeed, computer architect Gordon Bell, designer of DEC's VAX, is a dedicated Macintosh user.

Now, if DEC is serious about promoting the Mac for the desk top — or at least welcoming the Mac — DEC will have a more unified offering than it does now, and Apple will have a key to many more doors.

The DEC-Apple venture comes at a time when IBM is working hard to promote its 370 architecture processors in technical computing. That means DEC and Apple will be paired up against combinations of the IBM Personal System/2 — or, less frequently, the IBM RT Personal Computer — and IBM 9370s and 4381s. There are no guarantees that DEC and Apple will win those competitions, even in the technical computing environments. But both DEC and Apple have a chance to make some headway, or at least blunt IBM's own offensive.

So even when MIS remains reluctant to move to DEC or Apple, there is a good chance that the engineering side of the house will be taking a closer look at those vendors.

Connolly is Computerworld's senior editor, systems & peripherals.

Xerox adds ion deposition printer

EL SEGUNDO, Calif. — Xerox Corp. late last month drove its ion deposition printer product line into the range of its high-volume laser printer family with the introduction of a 75 page/min ion deposition printing system.

The 4075 is intended for use as an entry-level electronic printer in medium-size to large data centers.

In ion deposition printing, toner adheres to ion-charged paper to form print patterns.

Analyst Cathy Dingman of the market research firm CAP International, Inc. in Marshfield, Mass., said Xerox's commitment to ion deposition technology as a complementary offering with laser printers is important in view of Xerox's early role in the development of laser technology.

Priced lower than laser printers

In print speed, the 4075 falls between two laser-based Xerox printers, the 70 page/min 8790 and the 120 page/min 9790. However, the new printer features a resolution of only 240 dot/in. compared with 300 dot/in. for the laser systems. The 4075 also costs less, with a base price of $64,495 with an integrated 10M-byte disk drive. The base price for an 8790 is $208,035.

Xerox highlighted the flexibility that the 10M-byte and optional 45M-byte printers provide. The disk can store forms and fonts and merge them with data rather than having the forms and fonts maintained by the host computer, according to Xerox.

The printer can use either cut-sheet or continuous-form paper. It supports Xerox's Host Forms Description Language, which runs on IBM mainframes, and Xerox's Personal Computer Forms Description Language, which runs on IBM Personal Computers and compatibles.

The 45M-byte disk option costs $1,995.

The Xerox 4075 is based on the Delphax Systems, Inc. print engine used in the earlier Xerox 4060 printer.

What our retail clients will tell you about N.E.T. T1 networks:

NEW PRODUCTS

Processors

A 32-bit board-level system compatible with the VMEbus standard has been announced by **National Semiconductor Corp.**

The **VME532** incorporates the vendor's NS32532 microprocessor. It is compatible with Unix and Ready Systems, Inc.'s VRTX and provides a native debug environment, according to the vendor.

It is also compatible with National Semiconductor's software development tools package.

The VME532 features a 64K-byte external cache expandable to .5G bytes and 16M bytes of dynamic random-access memory on-board.

It also has a four-level memory hierarchy consisting of on-chip instruction and data cache, external cache, local memory and global memory.

Other features include two RS-232C serial ports and an internal timer/counter, the vendor said.

A 20-MHz VME532 with 4M bytes of memory costs $9,900.

National Semiconductor, P.O. Box 58090, 2900 Semiconductor Drive, Santa Clara, Calif. 95052. 408-721-6874.

Trilobyte Computer Corp. has introduced its **Model 4200**, a ruggedized Unix-based system incorporating the Sun Microsystems, Inc. Sun-3 workstation and Trilobyte's IV-B chassis.

The Sun-3/E card set is mounted in the chassis' nine-slot VME card cage, with the optional cartridge tape and hard disk located on the shock- and vibration-isolated platform.

Operating parameters are monitored by the Trilobyte Sentry diagnostic monitor and controller.

The Model 4200 is said to meet the environmental requirements of MIL-STD 810D, MIL-STD 167 and MIL-STD 461.

The basic Trilobyte Sun 4200 Ethernet node with the IV-B chassis, a CPU, a video controller, an Ethernet/small computer systems interface and a Sun Unix operating system costs $27,225.

Trilobyte, 14477 Catalina St., San Leandro, Calif. 94577. 415-895-2244.

Data storage

A line of Q-bus optical disk systems has been introduced by **Unbound, Inc.**

The eight optical systems are based on the vendor's Qube desktop Q-bus system package.

They feature 5¼-in. write-once read-many technology and provide users with a choice of MSCP disk or TMSCP tape emulation. Optical disk capacities range from 400M to 800M bytes.

Configuration options include complete Digital Equipment Corp. Microvax II-compatible desktop systems with integral hard disk, TK-50 tape and optical disk or add-on optical subsystem kits with optical controllers.

A typical subsystem configuration includes an 800M-byte 5¼-in. small computer systems interface optical disk in a mini-pedestal or tabletop package with power supply and cooling, according to the vendor.

Prices for the Qube optical systems start at $5,750.

Unbound, 15235 Springdale St., Huntington Beach, Calif. 92649. 714-895-6205.

A universal dual-wide board said to allow Digital Equipment Corp. Microvax computers to operate peripherals as either a DEC TK 50 cartridge or a TU 81E reel-to-reel tape drive has been announced by **Cascade Technology Corp.**

The **Cascade Q/SCSI** host adapter is said to be MU driver-compatible across all DEC operating systems. Firmware permits sequentially organized devices to be attached as TK 50 or TU 81E tape drives and operates transparently with DEC software commands.

It sustains a 2M byte/sec. data transfer rate and provides 18- to 22-bit direct memory addressing, according to the vendor. It also includes a 64K-byte expandable cache buffer.

The Q/SCSI host adapter is priced at $1,695.

Cascade Technology, P.O. Box 1086, Birmingham, Mich. 48012. 313-646-5533.

Printers/Plotters

A plain-paper laser image-setting system has been announced by **Tegra, Inc.**

The **Genesis XP-800** produces both final and proof copy on either letter- or legal-size plain paper. Output resolution is 800 by 400 dot/in. Speed is 8 original page/min.

Typographic features include type sizing from .5 to 1,000 points; electronic slanting, expanding and condensing; and electronic reverse, including kerning in reverse.

Graphics capabilities include rotating images; defining and filling area with tints and patterns; and magnifying and reducing pages.

Graphics can be entered into the Genesis XP-800 on-line or from the Genesis Graphics Subsystem, according to the vendor.

The Genesis XP-800 is priced at $26,950.

Tegra, Middlesex Technology Center, 900 Middlesex Tnpk., Billerica, Mass. 01821. 617-663-7435.

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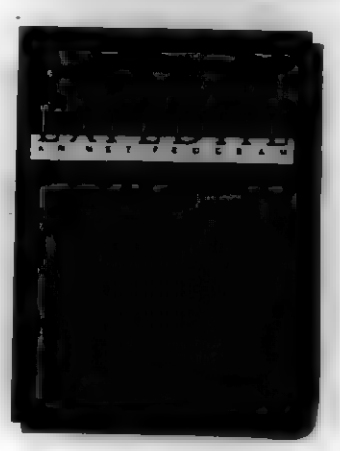

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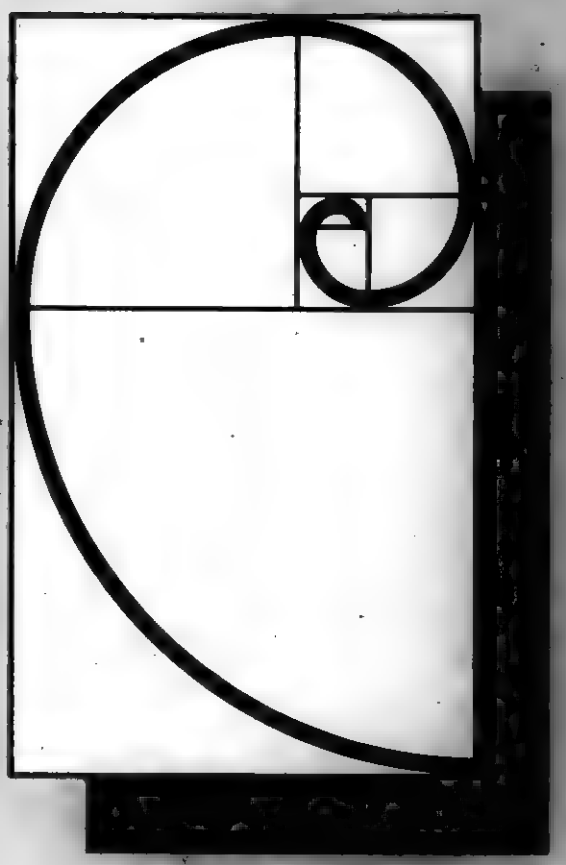
How to recognize all the companies delivering RDBMSs for on-line applications.



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■ [illegible]

SYBASE delivers multi-user performance comparable to transaction-oriented file systems. Its unique *client / server* architecture eliminates operating system overhead. And it handles peak load requirements for fast, predictable response times with a large number of users.

■ [illegible]

SYBASE enforces centrally-stored data integrity rules that apply to all transactions and applications. Comprehensive rules, including rules for *referential integrity*, are enforced with greater control, reliability, and maintainability.

■ [illegible]

SYBASE applications remain up and running during on-line backups, integrity rule changes, database design changes, and performance tuning. Recovery from a power failure or network crash is fully automated with fast, guaranteed recovery time.

■ [illegible]

SYBASE applications and databases can be transparently distributed over multiple heterogeneous machines. SYBASE is first to provide a *two phase commit* protocol for distributed update transactions in a SQL-based RDBMS.

■ [illegible]

SYBASE's pull-down menus, overlapping windows, icons, and point-and-pick interfaces increase both programmer and end-user productivity. SYBASE's integrated visual tools have a consistent look and feel across application development, forms management, data entry, query and reporting, and data administration. SYBASE applications fully exploit character terminals AND bit-mapped workstations without programming changes.

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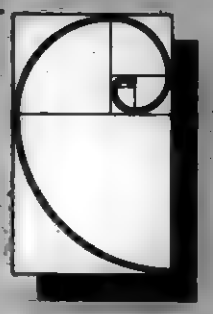

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[illegible]

Object-code only: Is IBM playing fair?

IBM's 5-year-old OCO policy protects its own assets but may threaten customers' investments

No

MARTIN GOETZ is chief executive officer of Sytron Corp., a systems software company in Hackensack, N.J. He was previously senior vice-president of Applied Data Research, Inc. and was one of the company's founders in 1968. He is chairman of ADAPSO's IBM Interface Committee and past president of ADAPSO's Software Industry Association.

By closing its software architecture through an object-code only (OCO) policy, IBM reduces the opportunities for companies developing complementary and competitive products. The source code vs. object code debate is clearly a competitive issue that will affect IBM's user base.

If IBM's OCO policy is not reversed, IBM users will face higher prices, fewer alternative suppliers, fewer complementary offerings and less innovative products.

Independent software companies have provided alternative solutions by building products that interface in unique ways with IBM's. They have offered more efficient code or new functions that replaced or complemented IBM products. To build these tools, developers have often analyzed IBM's source code to gain information necessary to the connecting program.

In some cases, IBM provided tools and information for the interface. But in many cases, depending on the software's function, the actual source code was required.

IBM contends that so-called standard rules and external languages such as SQL, Cobol, JCL are [illegible] for connecting to and enhancing IBM products. This is incorrect. Rules exist only where IBM [illegible], and external languages provide facilities [illegible] during product design and development.

Military [illegible] — if data [illegible] of [illegible] many areas of an IBM [illegible] remain secret for [illegible] reasons. It [illegible] is relatively complete.

Unlike hardware [illegible], which [illegible] and [illegible], programs can [illegible] by [illegible] working with this [illegible].

Yes

PETER SCHNEIDER is assistant general manager of development at IBM's Enterprise Systems in Hopewell, N.Y. Formerly, he was assistant group executive of systems development in IBM's Information Systems and Storage Group. A graduate of the University of Wisconsin with a Ph.D. in electrical engineering, he joined IBM in June 1966.

IBM's software delivery practice has been in place for five years. If you examine what the company has done in regard to its object-code only (OCO) practice, it is merely following what others have done for a longer time and probably for the same reasons.

IBM believes that making licensed programs available in OCO form is a worthwhile practice because it provides customers with high-quality, functionally complete and easy-to-service software. OCO also enables the company to protect the internal design of its programming from unauthorized copying. IBM's customers and users groups have agreed with the company's goals and support IBM's effort to implement OCO.

More than half of all IBM software in the field is object-code only, and the results to date have been excellent. In those few cases in which specific problems occurred for either customers or vendors, IBM promptly resolved them. The company sees no reason to abandon its OCO goal but remains dedicated to responding to specific implementation problems and making adjustments as required.

Step by step

The manner in which IBM provides software to users has evolved over time; distributing software without source code is only one part of that evolution.

More than 25 years ago, when IBM first offered software to work with its machines, the software was provided at no additional charge and without restrictions on its use. The cost of its development and support was recovered in the price of the hardware.

At that time, both source code and object code were routinely made available to customers. The relatively primitive nature of software dictated that source code be provided,

Continued on page 59

- **Half the installed software is OCO**
- **Limited access to DB2, VM/SP and OS/2**
- **IBM 'remains dedicated' to the policy**

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han computers.

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No

FROM PAGE 55

have delivered products that were well received by users.

Some of the conditions under which software vendors and users require source code are the following:

- No interface exists to satisfy the specific need.
- The interface is too limited in scope.
- The interface will not provide an efficient solution.
- The interface documentation is incomplete, ambiguous or silent on points critical to a particular application.
- There are undocumented interfaces that provide potential functional or performance advantages.
- To understand how an interface operates and its impact on other functions in the program.
- To understand the meaning of the data the interface provides.
- To understand the abnormal termination logic of a program.
- To interpret and understand control block information.
- To support new devices and programming environments.
- To simulate or emulate software and hardware environments.
- To incorporate expert system technology.
- To perform problem resolution when it is unclear which product created the bug.
- To debug programming errors and resolve design questions.

IBM customers will be constrained to the interfaces provided by IBM. In the years to come, the IBM user community will be the loser.

Performance measurement products that monitor IBM operating systems, transaction processing monitors and data base management systems require source code to function effectively. Precompilers often require it as well, depending on the functions they perform. Operating system improvements and new functions have been built because of the availability of source code.

Without access to source code, companies cannot build effective software for session control management, debugging, security, tape management, library management and interactive application development.

Vicious cycle

IBM's policy reduces innovation for some important products. For example, independent companies want to build complementary software for DB2. However, the only interface to DB2 is SQL, which is also the external language for communicating with DB2. Therefore, a new system software product that interfaces to DB2 must look like a user application.

These system software products include language processors (fourth-generation languages), performance measurement tools, retrieval packages and data base design tools. Retrieval packages cannot provide optimum retrieval time because the only way to access DB2 is through SQL. Data base design tools will be limited because DB2 data cannot be dynamically accessed directly, and there is no way to determine through SQL where the data physically resides.

Another example is IBM's VS Cobol II compiler, which is delivered in OCO. An independent software company at one time built a precompiler for IBM's older Cobol compiler using knowledge gained by analyzing the source code. The company found a way to compile only changes to a Cobol program, thus speeding up compilation dramatically. However, this product cannot be built for IBM's new VS Cobol II compiler unless the source code is analyzed and understood.

Yet another example is IBM's Professional Office System (Profs). Third-party vendors are precluded from meeting strongly articulated user requirements for improved security and auditability facilities, interoperability with non-IBM electronic mail systems and enhancement or replacement of the Profs document data base service machine.

Withdrawal symptoms

A final example concerns the use of source code to extend operating system capabilities. Hundreds of innovative products were built to extend the capabilities and improve the efficiency of IBM's VM, MVS and VSE operating systems. This will not be the case for IBM's OS/2 operating system, because source code is not available to independent software companies. Nor will it be the case for new versions of MVS, VM and VSE as IBM withdraws source code for them.

Two instances in particular demonstrate how IBM's withdrawal of VM source code will reduce innovation. First, CMS, the interactive component of VM/SP Release 5, offers a new full-screen mode of operation. While well intentioned, it is hard to use and dramatically slower than non-full-screen operation. Some installations have forbidden its use or prevented its invocation. Since it is OCO, IFM customers cannot remedy the performance problems, enhance the end user interface or add to its functions.

Second, VM/SP Release 6 provides a hierarchical, well-designed Shared File System, a facility demanded by users

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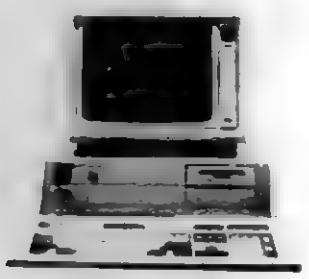

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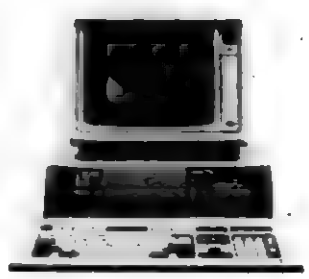

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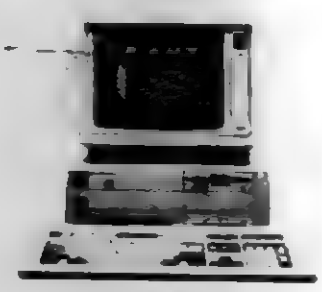

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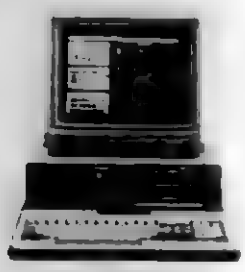

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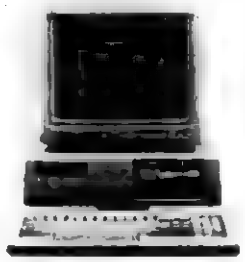

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since 1973. Unfortunately, since it is OCO, it will not support extensions or full utilization. Therefore, vendors as well as IBM customers will be constrained to the interfaces and facilities provided by IBM. In the years to come, the IBM user community will be the loser.

Code retracted

It was in 1983 that IBM reversed its 20-year-old policy of distributing source code with its software product licensees. At that time, the U.S. Department of Justice's antitrust suit was over, and IBM had no government agency looking over its shoulder. True, a case against IBM by the European Economic Community (EEC) was still active, but that was limited to bundling and hardware interface issues.

IBM's source code was fully protected by the copyright laws, so protection was not the real issue. I believe the real issue was access to interface information. IBM has always treated hardware interfaces as proprietary and almost sacred. But access to its hardware interfaces was settled by the 1956 Consent Decree and by the 1984 EEC agreement. Peripheral companies do need hardware interface information to build terminals, disks, tapes, printers, memory and other products that operate with IBM CPUs.

Still, hardware is quite different from software, and the interconnections between two software products are of an almost infinite variety.

Shortly after IBM released its OCO policy, ADAPSO protested in a position paper. Since then, the association has had extensive discussions with IBM, but to no avail. Committees within the Share and Guide users groups have developed similar position papers indicating their need for source code. And when the EEC in 1984 suspended its case against IBM, it specifically stated that IBM's policy on source code was under scrutiny and was not part of the agreement.

Fujitsu Ltd. also recognized the importance of source code for building IBM-compatible systems software and new systems software that is well integrated. Last September, federal arbitrators granted Fujitsu access to IBM source code for more than 750 programs, including the OS, MVS, VSE and VM operating systems [CW, Sept. 21, 1987]. The IBM-Fujitsu arrangement has short- and long-term ramifications for independent software companies and for IBM and Fujitsu users.

Two superpowers?

In the short term, the agreement gives Fujitsu critical information for building systems software compatible with IBM's. And in the long term, it creates a systems software competitor to IBM and to independent software companies. In the future, independents could potentially face Fujitsu, a large and strong competitor. And both IBM and Fujitsu have access to that essential source code.

In the long run, if IBM's OCO policy is not reversed, it could significantly slow the growth of independents. If we look 10 to 20 years ahead, the current international hardware wars between IBM and the Japanese could be replaced by international IBM systems software wars between these two superpowers.

Where will this leave independent software companies if they don't have access to IBM's source code? And where will this leave IBM users if the only vendors for critical software are IBM and Fujitsu? •

Yes

FROM PAGE 55

since the customer bore some of the burden of dealing with any functional or quality deficiencies a given product might have.

As the industry grew, it became more apparent that the development and marketing of software was a desirable business. Software from IBM and other vendors became a separately priced offering. To protect their significant investment in software, firms made it standard practice both to copyright and license software with contracts containing restrictions on its use. Some vendors adopted "trade secret" clauses in their contracts. Many vendors implemented OCO to protect the internal design of their products.

Sapping resources

During this time, source code for IBM-licensed programs was available, and customers and third-party vendors developed modifications and enhancements based on the internal design of IBM programs. By the early 1980s, the modifications required customers to devote significant resources to adapting to new versions of the IBM programs. Customers needed to retrofit and retest their code to ensure that it continued to function properly.

As a result, service in this environment was becoming more costly, since these dependencies were frequently a cause of error. Executives at customer sites were concerned about the high level of programmer resources needed to install, enhance and maintain IBM system products.

In addition, the time required by customers or vendors to adapt their modifications caused prolonged software migrations. This delayed the customers' ability to take advantage of new IBM products. Some customers even decided to forgo the benefits of a new version or product.

Pirating

Also at this time, the unauthorized copying of IBM software — including its internal design — was becoming a major problem. As was already the case elsewhere in

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the industry, IBM concluded it had to augment its software protection by adopting an OCO practice.

IBM viewed OCO as an efficient means of addressing these issues, consistent with the objective of building better products. Before proceeding with OCO, IBM discussed its proposed direction with customers and major users groups. Among these groups, there was general support for the company's objectives.

Some users, however, expressed concern that the transition to OCO for existing products — for which source code had been available — would have to be carefully managed to avoid disruptions to existing customer systems.

Before IBM was to move such products to OCO, customers stressed the need for better functional interfaces, improved serviceability and time for customers and third-party vendors to adapt to the enhanced product.

'Typical and reasonable'

With the above considerations in mind, IBM announced on Feb. 8, 1983, that it was moving toward delivering its software products object-code only.

During the transition, if source code is required for some part of a product, it is available to all customers, subject to the limitations of IBM's Agreement for IBM Licensed Programs (ALP). This agreement authorizes typical and reasonable customer uses for source code.

When the announcement was made, IBM understood that the transition would take at least 10 years, with some products never becoming fully OCO. New products such as DB2 are 100% OCO; they did not have to contend with a history of customer and vendor modifications.

The older system products, such as VM, MVS, CICS and IMS, presented a more formidable challenge. Still in an early stage of evolution, they are shipped with nearly all of the source code available.

Managing OCO

As IBM proceeds with the evolution toward OCO, it intends to take full advantage of its experience and growing expertise to accomplish the harder conversions still ahead. IBM believes that there will not be significant problems.

IBM has taken measures to minimize problems with its OCO direction. Before a product ships OCO, the IBM product development manager must demonstrate that the product is serviceable without source code, that appropriate external interfaces and documentation will be provided and that the product will meet customer requirements without source code being available.

These capabilities are tested before the product is announced through customer advisory councils, user group interactions and internal IBM use.

IBM was aware that its own programmers caused the same problems — developing modifications and enhancements based on the internal design of an IBM program.

Consequently, if a product is to ship OCO, IBM does not permit its employees to use the source code for modifying the product. Thus, a test of OCO readiness is applied by the product manager's peers before the product is announced.

WHEN THE announcement was made, IBM understood that the transition would take at least 10 years, with some products never becoming fully OCO.

When specific customer or vendor problems have occurred, IBM has responded. At times, new or revised external attachment interfaces have been provided and documented. Some customers have engaged in joint development with IBM to produce new functions for the OCO product.

In a few cases, the decision to ship OCO has been at least temporarily reversed, and source code for some or all of the product was made available to any licensed user, subject to the limiting provisions in ALP.

Given the very large number of customer and vendor licensees and given the very large number of active IBM software products, IBM believes it cannot release source code for an OCO program to selected licensees. To do so would be inefficient, difficult to manage and inconsistent with the objectives of OCO.

IBM and ADAPSO

Since OCO was announced, IBM has met frequently with ADAPSO's leaders to discuss the association's concerns about OCO. ADAPSO states several reasons for wanting access to IBM's source code:

- To provide an alternative to inadequate IBM product publications.
- To aid in performing problem identification when both IBM and vendor products are involved.
- To use internal product design information to improve performance.
- To use internal product design information to provide unique vendor functions.
- To exploit internal design information to provide unique business opportunities.

IBM has expressed its willingness to work with ADAPSO or any customer or vendor to correct product or publication deficiencies, including those related to problem identification and performance improvement.

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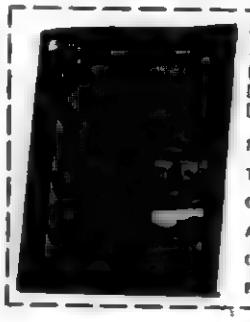

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help software vendors build on IBM's documented attachment interfaces — a highly competitive opportunity.

What IBM is not willing to do is turn over the results of its significant development investment to others to use for whatever purposes they may wish.

Recently, IBM executives met on a regular basis with ADAPSO's leaders to discuss a broad range of topics.

By mutual agreement, the issue of OCO was placed on the back burner to make progress on other issues, such as early access to product external interface information, access to products during Early Support Programs, educational classes on major product changes, hot line support for vendors and so on.

IBM viewed this dialogue as productive and consistent with the firm's recognition that software vendors provide their common customers with valuable products and services. IBM believes it has made, and could continue to make, adjustments in implementing its practices to answer most of ADAPSO's concerns.

The initial press reports of the IBM-Fujitsu Ltd. arbitration — regarding Fujitsu's access to IBM's source code for OCO products — caused ADAPSO's leadership to bring the OCO issue to the forefront again.

ADAPSO's leadership, apparently believing Fujitsu had gained broad, unrestricted access to IBM's source code, could not understand how IBM could continue to deny ADAPSO's members similar "privileges."

Under the terms of the arbitration, IBM is prohibited from discussing the status of any aspect of the arbitration. We are, however, permitted to cite public statements made by the arbitrators: John L. Jones, retired executive vice-president of Norfolk Southern Corp., and Professor Robert Mnookin of Stanford Law School.

Arbitrators speak

Following the initial press reports, both arbitrators amplified on the OCO question. In *The Wall Street Journal* [Oct. 7, 1987], Mnookin said it is "premature for the software makers to fight for similar treatment to that accorded to Fujitsu because the financial terms and many other details of the resolution are still up in the air."

According to *Computerworld* [Nov. 2, 1987], Jones said, "The instructions will carefully spell out what [Fujitsu] can derive from [the source code], and it will be largely interface type of information. It won't be detailed programs or detailed design logic flowing out of the secured facility. . . . They can look to verify what the communications interfaces are between that program and other programs."

Furthermore, in an American Arbitration Association press release [Sept. 15, 1987], Mnookin remarked that access to IBM source code "will occur only in a secured facility whose personnel will have no direct or even indirect contact" with those people who are actually developing software.

Misunderstanding

It appears to IBM that ADAPSO's leadership misread the situation and overreacted. By choosing the path of public confrontation, ADAPSO's leadership is saying it no longer wishes to discuss these issues with IBM or to resolve specific problems that may occur.

Since these issues remain of great interest to IBM, the company will continue to hold discussions with individual software vendors — discussions that will, of necessity, accommodate a smaller audience.

IBM remains committed to its OCO objective, committed to working with those interested in achieving the product improvements necessary for successful OCO implementation and committed to resolving specific problems as they occur. ●

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Using advanced robotics and Artificial Intelligence (AI) technologies, a U.S. Army scout car was computer-driven from a remotely located command post over a mile away. During the first-of-its-kind demonstration, the Advanced Ground Vehicle Technology program, sponsored by the Defense Advanced Research Projects Agency and the U.S. Army's Tank-Automotive Command, utilized three Hughes-built systems. The Autonomous Vision System transmitted video images of the road to computers which sent back steering, brake, and throttle commands. The AI-based Map And Planning System kept track of the vehicle at all times and displayed its location and a map of the local area on a color monitor. The system was operated day and night with Hughes thermal sensors and a complex communication link which coordinated the overall system function.

Airborne radar systems for the 1990s and beyond will benefit from a new, frequency agile microwave reference unit under development at Hughes. The reference unit will enhance the ability of new airborne radar systems to provide ship imaging, long-range high-resolution ground mapping, and reduced mutual interference. The unit will provide the radar receiver and transmit signal generator with 96 channels across a 1 gigahertz bandwidth and will be able to switch channels in 30 microseconds. Older reference units provide 32 channels and require 5000 microseconds to switch channels. The new reference unit has a volume of 120 cubic inches, nearly 50 percent smaller than older devices.

The feasibility and benefits of adapting the Free Electron Laser (FEL) to perform precision radar measurements in space will be examined under a new Hughes program. Scientists will study the potential of the FEL as a compact space-radar transmitter that would be part of a Strategic Defense Initiative (SDI) system for discriminating objects in space. The program will take advantage of the FEL's inherent tunability, high power and efficiency, and its ability to operate in frequency bands of 100 GHz and higher. The program's ultimate goal is a space-based, multiband, adaptive FEL capable of operating efficiently at randomly chosen, stable frequencies.

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MANAGEMENT

TAKING CHARGE

Ron Skelton

Projects take teamwork

At Aerojet Solid Propulsion Co., we successfully implemented a sophisticated automated planning system in about 15 months following three years of floundering efforts and no progress.

The tool, Project/2 from Project Software & Development, handles tasks from shop floor planning to the 10-year strategic plan and has been used for the past three years to forecast sales up to a year in advance. I've been asked how we implemented it, and I'll attempt to answer that question by describing our team approach.

Although it's possible for a team to succeed in spite of its leader, the leader makes or breaks the team in most cases.

The leadership approach we find most successful is often described as "people-oriented." That doesn't mean a friendly, easygoing, softhearted person who sets easy goals. To the contrary, as described by author Tom Peters, the people-oriented leader sets difficult goals and high standards and demands excellence at all times, both in himself and the people who work for him. These leaders see people as the prime medium through which everything is accomplished. They have a tremendous respect for the potential of every individual.

There are several things the leader must do for the team. They include providing and conveying a vision, ensuring that team and individual accomplishments are recognized, clearing

Continued on page 72

Market collapse could restrain MIS spending

BY DAVID A. LUDLUM
CW STAFF

Driven by forces that transcend short-term financial concerns, companies generally planned last year to boost information systems spending this year, and the stock market collapse has not changed their budgets significantly, according to a study.

But companies reported that the market crash could lead to closer scrutiny of systems spending as the year goes on.

Companies in all but one of 15 industry groups surveyed by Mountain View, Calif.-based Input said they plan to boost MIS spending this year, according to the research firm's Annual Information Systems Planning Report, which is based on data collected through 1987 and was released last month.

Continued scrutiny

A follow-up check in November indicated that October's stock market collapse generally did not prompt budget revisions but that it will lead many companies to scrutinize spending more closely as expenses arise, according to Douglas Tayler, manager of Input's information systems program.

Input surveyed about 200 large companies and found that on the average, all industry groups except utilities planned to raise information systems budgets this year. The increases were led by firms in telecommunications, at 12%, transportation, at 10.3%, and insurance, at 9.6%.

Companies in discrete and process manufacturing planned boosts of 7.6% and 7.2%, respectively, and those in financial services, including banks, planned an increase of 2.6%. Retailers projected no change; utilities forecast a drop of 0.2%.

Rather than near-term business concerns, the study found systems spending driven by several trends, Tayler said. They include rising expectations of senior management, new technologies and increasingly complex applications, such as links between corporations.

Two other forces cited, which are more likely to restrain spending, are companies' sensitivity to costs and the instability prompted by mergers and re-

Continued on page 72

Data View

Fostering frustration

Among 609 Computerworld readers surveyed, 81% said they are frustrated with aspects of their jobs

Ineffective or poor management	32.5%
Lack of advancement or career growth	11.4%
Not enough staff or heavy work load	8.7%
Lack of resources or poor or obsolete equipment	6%
Lack of communication with management	5.6%

CW CHART

Driven by enthusiasm

Fidelity systems chief likes an open throttle

BY DAVID A. LUDLUM
CW STAFF

BOSTON — It's not easy to pick out the subject Michael Simmons seems most enthusiastic about, but it just might be the programs his company has put in place to develop its personnel.

Simmons, president of Fidelity Information Services Co., the data processing arm of mutual fund giant Fidelity Investments, Inc., takes obvious pride in displaying awards for Fidelity's recruiting programs and in describing a procedure for confidentially routing complaints directly to him.

In fact, Simmons, whose organization has produced an automated system for customers to get mutual fund prices and portfolio values via Touch-Tone phones, constantly speaks of the importance of people in data processing — and not just through platitudes.

He volunteers an opinionated view of the propensity of DP professionals to hop from job to job for a promotion or, he says, just because the going gets tough. "They're prostitutes," Simmons says of the more flagrant job-hoppers. "They don't have to live with the results that they propagate on someone."

Many interests

But Simmons, talkative and seemingly self-assured, warms to plenty of other subjects, too. While he says he typically puts in 60 hours a week on the job, not all of them have to do with work. There's cooking, for instance, in the 18- by 33-foot kitchen in the California-style contemporary home he has built in the Blue Hills just south of Boston or woodworking with his new lathe.

His interests also include anything on wheels. He owns a 750cc, six-speed Honda V45 Sabre motorcycle and a four-wheel drive Chevrolet pickup truck, and he's replacing his Porsche 944 with a 911 Cabriolet.

He also builds cars that he races on the Sports Car Club of America circuit. He finished fourth in his class in the national championship in 1980, and, with his seventh car under construction, he's still chasing first place. He fields questions on mechanical matters from staff members and occasionally tinkers with their engines. He gets two weekly auto magazines and seven monthly ones. "I'm what is known as a car nut," he says.

Simmons, who is 48 and divorced after an eight-year marriage, acknowledges that he is "not the type that likes to be passively entertained," with the exception of an occasional basketball or football game.

Continued on page 68

PROFILE
Michael Simmons

JOHN GRIMES

Positions: President, Fidelity Information Services Co.
Objectives: Maintaining systems flexibility, attracting self-motivated technical experts, keeping turnover low, developing new technologies.

MANAGERS ON THE MOVE

Former MIS boss crafts new transaction services

David Weber will be aiming to apply banking technology to other services as the recently appointed vice-president of the Information Services Group at **Transfirst Corp.**, a Dallas-based on-line transaction processing company.

Weber, once director of MIS for Giant Stores and a Touche Ross & Co. consultant, is responsible for all data processing at Transfirst, which is exploring the use of credit card verification technology to identify patients for health care providers and the use of automated teller machines to dispense food stamps and other government benefits. It already distributes airline and pro basketball tickets through ATMs.

Weber has studied the development of new services based on information technology, including automated payment of bills, as a vice-president at Payment Systems, Inc., a Tampa, Fla., electronic funds transfer company. "It keeps you thinking. It's an additional challenge that I sort of enjoy," he said. "It's looking at the value of the transaction itself rather than the money you're moving."

William E. Eager has joined **First National Bank of Ohio** in Akron as senior vice-president of operations and information systems. Eager joined the bank from Diversitech General, where he was director of information systems. Previously, he was manager of information systems at Limbach, Inc., a senior consultant with Touche Ross & Co. and a systems supervisor at General Electric Corp.

Neena M. Gupta has joined **Cross & Brown Co.** as director of data processing, with responsibility for the New York real estate firm's computer operations.

Previously, she was systems coordinator at Watt Industries, Inc. She has also been a systems engineer for IBM.

Karin Steinbrenner has been appointed director of computer services at **Framingham State College** in Massachusetts, where she will implement integrated computing facilities for students, faculty and administrators and create an institutionwide data base. Previously, she was manager of information systems at Mid-State Technical Institute in Wisconsin and director of data processing at the National Opinion Research Center.

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Detroit	1/28, 2/25
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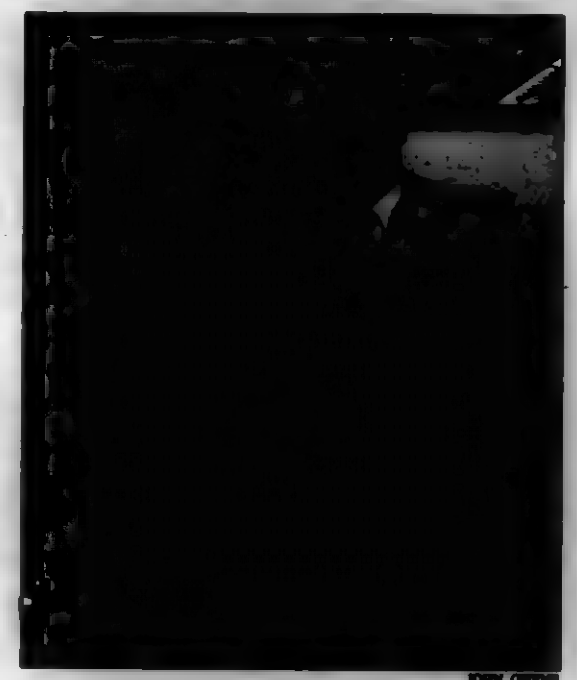
Driven

FROM PAGE 67

His fascination with cars isn't surprising, given his background. Simmons built hot rods as a teenager in southern Indiana and went to work as an auto mechanic right out of high school. He got into DP as a "card walloper" and then as an IBM 650 operator at Cummins Engine Co. Next, he worked as a tab analyst at Arvin Industries, Inc., a muffler maker. After a layoff there prompted by a steel strike, he hitchhiked around the country, working at odd jobs like lumberjacking and, at one point, joined the merchant marine.

He had graduated in the lower 10% of his high school class but enrolled at Indiana State University. There, he excelled academically, served as class president and, he says, matured.

Simmons taught high school biology, "got drafted" into teaching vocational DP and then worked for IBM as a systems engineer, marketing representative and education manager. That experience led him to a job as executive vice-president for operations at American Fletcher National Bank, which is now a unit of Banc One, and then to Fidelity, which he joined in his current post.



JOHN OWENS

Car nut Simmons with a different sort of machine.

Loose technical reins

Despite his early immersion in the nuts and bolts of data processing, Simmons expounds on the view of DP as a business function. "I'm not the lead technician. I don't try to be the most technically competent," he stresses. Instead, he says, he seeks to surround himself with young, aggressive experts.

Richard Johnson, an executive vice-president with Fidelity Information Services, says Simmons brings together technical savvy and business acumen. "He remains astonishingly technically current while doing an amazing job of managing people. Usually [in others], one or the other is present, but not both," Johnson says. Simmons also has a remarkable memory and an "almost visionary" sense of the future, Johnson adds.

Richard Daubenspeck, a Fidelity Information Services senior vice-president, credits Simmons with exceptional skills in building an organization and setting its direction.

Fidelity realigned

Despite his business orientation, Simmons seems somewhat wary of the reorganization of Fidelity's applications development that took effect Jan. 1. It calls for the dispersal of much of the development from Simmons' central organization to about 10 business units or groups. Reflecting the realignment, the name of the central organization has been changed from Fidelity Systems Co. to Fidelity Information Services Co.

The change, which formalizes a process that has been under way for the past year, was prompted by Fidelity Investments Chairman Edward C. Johnson III and is aimed at bringing applications developers and business managers closer together, Simmons says. "We're trying to move the applications developers closer to the business units, so they get more sensitized to the business needs of the various units and [so that] the units get data processing expertise," he adds.

Some 300 to 400 development people will be redeployed to the business units, although not all of them will physically move, Simmons says.

Characterizing the move as experimental, he says Fidelity will know whether it is working by the end of the year. "The important consideration is standardization — getting everybody to play by the same rules, solving corporate needs and unit needs without conflicts," he says.

While Simmons still oversees a budget of more than $100 million, he says he'd rather be accessible than respected for a title. He backs the contention with a self-effacing manner, referring to himself as "a dumb country boy."

If any one thing has driven Simmons from country boy to information systems leader, it appears to be a pervasive enthusiasm. "I get up with the same degree of enthusiasm whether I'm going to work or going to the beach," he says.

CALENDAR

Executive Briefings on Automatic Identification. Cleveland, Feb. 16 — Contact: Automotive Industry Action Group, Suite 830, 17117 W. Nine Mile Road, Southfield, Mich. 48075.

The New IBM. New York, Feb. 16-17 — Contact: The Yankee Group, Seminar Division, 200 Portland St., Boston, Mass. 02114.

Decupe East '88, The 14th DEC-Compatible Exposition & Conference. New York, Feb. 16-18 — Contact: Susan Warbasch, Expocomm International, Inc., 3 Independence Way, Princeton, N.J. 08540.

Showcase '88. Paris, Feb. 16-19 — Contact: IDG Conference Management Group, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

Auto Ideas. Atlanta, Feb. 17-18. Contact: Automotive Industry Action Group, Suite 830, 17117 W. Nine Mile Road, Southfield, Mich. 48075.

Supercomputing Europe '88. Utrecht, The Netherlands, Feb. 21-23 — Contact: Royal Netherlands Industries Fair, Postbus 8660, 3503 RH Utrecht, The Netherlands.

11th Annual Personal Computing Forum. Naples, Fla., Feb. 21-24 — Contact: Sylvia Franklin, Edventure Holdings, 375 Park Ave., New York, N.Y. 10152.

The 10th Annual Electronic Printing Systems Conference. San Jose, Calif., Feb. 21-26 — Contact: S. Thomas Dunn, EPS '88 Conference Chairman, Suite 1, 1055 E. Vista Way, Vista, Calif. 92084.

Effective Methods for Data Processing Quality Assurance. Orlando, Fla., Feb. 23-24 — Contact: Quality Assurance Institute, 5822 Bay Point Drive, Orlando, Fla. 32819.

Fourth Annual Computer Graphics New York. New York, Feb. 23-24 — Contact: David J. Small, Exhibition Marketing & Management Co., Suite 1110, 8300 Greensboro Drive, McLean, Va. 22102.

Vision Guidance for Robotic Systems. Cincinnati, Feb. 23-25 — Contact: Joanne Rogers, Special Programs, Society of Manufacturing Engineers, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

Super Graphic Workstations. Monterey, Calif., Feb. 23-25 — Contact: Institute for Graphic Communication, Inc., 375 Commonwealth Ave., Boston, Mass. 02115.

1988 ACM Computer Science Conference. Atlanta, Feb. 23-25 — Contact: Association for Computing Machinery, Conference Dept., 11 West 42nd St., New York, N.Y. 10036.

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Skelton

CONTINUED FROM PAGE 67

away bureaucratic hurdles and other obstacles, providing the best tools and equipment and establishing well-defined short-term goals.

Although I'm an engineer, it's our experience that the best team members have been political science and business majors with some experience in computer applications. They tend to know how to deal with change and shades of gray.

It takes time to build a strong team. A high turnover rate will kill you. For these reasons, we chose people with roots in the local community — graduates from the local college.

In addition to our ongoing company-wide reorganizations, we have a constantly changing product and customer mix. We therefore wanted an organizational structure that was flexible enough to react quickly to the changing environment but that still preserved the emphasis on teams. For this reason, we chose a matrix organization.

For years, I had sworn I would never use a matrix organization. It's too difficult to manage, with too many chiefs and not enough Indians. But with some modification, it seems ideally suited to the team emphasis. The key to the matrix organization is having functional managers who are not possessive and who understand their roles.

The matrix organization lets us reorganize frequently, within limits. It also allows changing personnel assignments in a very nonthreatening manner. Finally, by participating in several teams, individuals' contributions are emphasized, and their identities are strengthened.

What else made the project work?

One factor was understanding the mission. Like most businesses, our goal is to make money, and we make no money installing computers or implementing software packages. We make money selling rocket motors. To us, time really is money.

The next factor is pure heresy coming from a planning department: Resist developing a detailed long-range implementation plan. Implementation plans are probably the biggest cause of failure in implementing software applications. They don't just set a minimum level of performance, they also tend to set a maximum level. Once presented to upper management, they become cast in stone and, despite promises to the contrary, become very difficult to change.

At completion, an 18-month implementation plan will leave you with a product that has been obsolete for 15 months. I assure you that three years ago, there was absolutely no way to foresee where we wanted to be today.

A much better approach is a broad statement of the direction this implementation is headed in and a clear definition of some short-term products. Nothing generates grass roots and management support like useful products. An evolving implementation that follows a path strewn with them will also show a good return on investment — another point that will sit well with management. In conjunction with this, the team must be prepared to abandon products for which there is no user or whose cost exceeds their usefulness.

Another bit of advice is train, train, train. We train for the development of broad-based skills. We want people to understand not only every aspect of their job but also the jobs of every other member of the team. This increases our flexibility in personnel assignments and has resulted in some surprising innovations.

We encourage innovation at all levels. We have people who come in on their own time to "play" or take terminals home so they are not distracted by the day-to-day demands of the job. People are encouraged to try things, to do something, to "fail forward," to make products and then modify and improve them, rather than to wait until every aspect of a product is perfect.

Finally, the authority for the team to do its job is delegated to it. I do not try to tell the members how to accomplish their tasks — only what the tasks are.

The last thing I would suggest is to avoid the ivory tower approach. By this, I mean putting the implementation in the hands of either the computer center or someone who reports to the president. Both these approaches lead to the implementation plan becoming the mission.

Skelton is manager of master planning and materials management at Aerojet Solid Propulsion Co. in Sacramento, Calif.

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Spending

CONTINUED FROM PAGE 67

structuring, Tayler said.

He also noted that the specifics of budget plans vary greatly among industries. "Each industry and its current state of evolution can vary quite a bit. There is that much uniqueness in today's market."

Hardware accounted for much of the large projected budget increase in telecommunications, while personnel expenses did so in insurance, one of the few industries that reported plans to increase staffing, Tayler said.

In about half of the industries, microcomputer budgets are growing faster than mainframe budgets, although they remain smaller, Tayler reported. Insurance firms planned budget increases of 2% overall for hardware but of 15% for micros, bringing the portion to about one-third that of mainframe budgets.

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COMPUTER INDUSTRY

INDUSTRY INSIGHT

James A. Martin

If at first you don't succeed

1986: The year optical disk technology will be accepted by the MIS masses.

Whoops. Let's try that again. 1987: The year optical disk technology will be accepted by the MIS masses.

Hmmm. Guess not. Well, let's say it once more, this time with feeling. 1988: The year optical disk technology will be accepted by the MIS masses.

The anticipated embrace of optical disk storage systems by corporate America has been as difficult to predict as a Sandinista cease-fire. Yet industry optimists continue to gaze into their crystal balls and come away saying, "Now is the time." But it's anyone's guess when — or if — optical storage will become an MIS mainstay.

CAP International, a research firm in Marshfield, Mass., estimates that the optical disk industry will grow from $282 million in revenue in 1988 to $1.4 billion in 1992. There were roughly 170 optical systems in place with end users in the U.S. at the end of last year, a figure that should jump to 4,630 by 1992, CAP predicts.

At a snail's pace

Belying industry projections, however, the promising technology and the industry spawned to create it have continued to move sluggishly into data processing centers and onto desk tops. The following are a few of the variety of reasons for this:

• The lack of standards in optical disk technology has been a major thorn in the industry's paw. If there are no set standards, how can one ensure that the system purchased in 1988 will be viable in 1990? It's like the old Betamax vs. VHS videocassette recorder argument of the early '80s: Which format do you buy?

An International Standards Organization meeting on the matter is scheduled for October. But most observers say that's only the beginning, and it is not expected to create any immediate solutions.

Continued on page 76

Good year for wheeling, dealing

Index shows mergers and acquisitions totaled $4.9 billion in '87

BY NELL MARGOLIS
CW STAFF

FORT LEE, N.J. — If you don't think the software and services industry is the place to be, just ask the 358 companies that shelled out a cumulative $4.9 billion last year to get into it — or, in some cases, to get further into it.

According to the recently released ADAPSO/Broadview Associates Index — a data base of software and services company mergers and acquisitions compiled for the industry association by investment banker Broadview Associates — 1987 was a record-breaking year for combinations of software and services providers.

Between the Denver Broncos' back-to-back Super Bowl losses, the industry saw an all-time high dollar amount — $4.9 billion, up 29% from the 1986 total — change hands in 358 transactions, up from 305 the previous year.

More than twice the number of "megadeals," or those topping the $100 million mark, were made in 1987 as in 1986, Broadview partner Gilbert Mintz said.

Computer Associates International, Inc., the once and future king of the category, broke its own record for the largest sum ever paid for a software company when it acquired software giant Uccel Corp. for $830 million last summer.

Big players joining teams

"What we're seeing is clearly concentration, not consolidation," Broadview partner Charles Federman said. "Concentration is what you get when the largest players in an industry are growing faster than the industry in general. Consolidation is what you get when an industry is shrinking."

Fallout from Wall Street and Washington, D.C., was minimal, Mintz said. "The crash killed some deals that were going through the hopper in October," he commented, "but not enough to make any real statistical difference."

The Tax Reform Act of 1986 (TRA) was a mixed bag, according to Mintz. Dropping the maximum corporate tax rate from 46% to 34%, he said, "made a number of software and services companies more valuable overnight. There's been a 15% to 20% increase in the value of software and services companies pretty much across the board, courtesy of TRA '86."

This inflation, in turn, drove deal prices up in 1987, killing some transactions and fattening others, Mintz added. Also cutting both ways were tax act provisions that "made it difficult to do asset transactions rather than stock deals," he said.

Overall, however, taxes had relatively little impact on whether and why software and services companies consummated deals last year.

This situation stands in stark contrast with 1986, according to Mintz, when the rush to close corporate buys before the capital gains provisions expired at year's end fueled a late autumn industrywide shopping spree that drove merger and acquisition statistics into the stratosphere.

Better than healthy

"What all this adds up to is a healthy software industry that's getting even healthier," Mintz said.

Figures compiled by Mountain View, Calif.-based market

Continued on page 76

Another bumper crop

Number of software and services industry acquisitions in the past five years

INFORMATION PROVIDED BY BROADVIEW ASSOCIATES

Cullinet wipes the slate clean

BY NELL MARGOLIS
CW STAFF

WESTWOOD, Mass. — Cullinet Software, Inc. announced third-quarter 1988 balance sheet adjustments last week that will result in a before-tax income drop of approximately $13.7 million.

According to Cullinet Chief Financial Officer Donald W. Lobin, the company is writing down the value of project management software acquired last year from Newport Beach, Calif.-based Planning Control International, Inc. (PCI), as well as that of certain notes and receivables.

These receivables include an uncollectible amount owed by a now bankrupt corporate customer and receivables from Cullinet's Latin American operations.

Cullinet's devaluation of the PCI software — a Digital Equipment Corp. VAX-based project management system originally acquired by Cullinet with large defense contractor customers in mind, a company spokesman said — should "in no way signal a departure from any of our stated directions," Lobin added.

Disappointment over the product's performance, he said, left Cullinet with the alternatives of either rewriting or writing off the software; the company chose the latter as the most cost-productive option.

Not just for mainframes

"These write-offs clear the deck for Cullinet," said Charlotte Walker of L. F. Rothschild & Co. With this announcement, she said, "the company is making a clear statement: Out with the old, in with the new. We're not just a mainframe software company anymore."

Walker called both the accounting changes themselves and Cullinet's announcement of them "a courageous move. And well timed. It's no fun that they're having the write-off — it never is — but this points out that the [new executive team as-

Continued on page 74

Midas touch, 386 propel Compaq to $1 billion mark

BY JAMES DALY
CW STAFF

HOUSTON — Compaq Computer Corp. rode its industry domination in the sale of Intel Corp. 80386-based personal computers to become the first U.S. corporation to surpass $1 billion in annual revenue in less than five years, the company reported last week.

The microcomputer manufacturer also reported healthy gains in both revenue and net income for its fourth quarter ended Dec. 31, 1987.

Quarterly revenue came in at $432.1 million, up 131% from $186.9 million recorded for the same period in 1986. Net income grew 202% to $49 million, up from $16.2 million reported a year earlier.

Compaq joined a rarified corps of billion-dollar microcomputer companies like Apple Computer, Inc. and IBM in announcing yearly revenue of $1.22 billion, up 95% from $625.2 million in 1986. Net income grew 218% to $136.3 million, or $3.57 per share, from $42.9 million, or $1.33 per share, the previous year.

Although the results were in line with analysts' expectations, Compaq's financial expansion buttressed the notion that it is beating back the IBM Personal System/2 Model 80 as its main competition in the high-speed 386-based PC field.

"The IBM 386s have been in the channel for six months and they still haven't had much of an impact with users," said Bruce Lupatkin, a senior technology analyst with Hambrecht & Quist, Inc. "In fact, there is a glut of Model 80s out there. But I expect IBM to take additional pricing action to offset this [development]. Compaq may begin to feel some effect, however, when IBM ships the Presentation Manager and OS/2 Extend-

Continued on page 74

WASHINGTON INDUSTRY NOTEBOOK

CBEMA presents '87 public policy awards to legislators

The Computer and Business Equipment Manufacturers Association, or CBEMA, recently presented its 1987 public policy awards to U.S. Sens. Max Baucus (D-Mont.), Dennis DeConcini (D-Ariz.) and Bob Packwood (R-Ore.); U.S. Rep. Robert T. Matsui (D-Calif.); and Michael Keplinger, an attorney with the U.S. Patent and Trademark Office.

The awards were granted for supporting the information technology industry in the policy areas of trade, taxes and intellectual property protection.

Harris Corp. recently formed a subsidiary to focus on software development and support for the federal government and its prime contractors.

Harris Data Services Corp., which is based in Alexandria, Va., reportedly will specialize in Ada software, data base management systems and multilevel security as well as simulation.

Paul R. Patch, vice-president of software operations at Harris's Government Information Systems Division, has been appointed to head the subsidiary.

The U.S. Department of Transportation last month announced a final rule that is expected to make it easier for the telecommunications industry to lay fiber-optic cable in right-of-way sections on interstate highways.

The rule permits states to decide whether cables can be installed along highways.

In the past, the federal government has been reluctant to grant permission; since 1960, it has granted only 250 requests, most of which were for very short segments of highway.

British Telecommunications PLC recently announced it will consolidate its electronic messaging services, including Rockville, Md.-based Dialcom, Inc., into a single Dialcom Group.

The combined group will consist of Dialcom; Telecom Gold, a UK public messaging service; British Telecommunications' value-added business services, including the Prestel videotex service; and the computer network services division in the UK.

John Morris, president of Dialcom in Rockville, has been appointed chairman of the new international business group, which is expected to reap an annual revenue of $100 million.

Cullinet

CONTINUED FROM PAGE 73

sembled by Chairman David L. Chapman] has taken a fine-tooth comb to the company in every respect. Now they're saying, 'Here's a clean balance sheet; there's no funny money in here.' "

Stressing that the write-downs constitute "a nonrecurring charge to operations," Lobin said, "this was the best time to do it. This [third quarter] will be our last quarter of showing a deficit. We don't want to jeopardize fourth-quarter profitability."

In a prepared statement, Chapman said, "Our objective remains to return Cullinet to profitability in the fourth quarter of fiscal 1988."

The third-quarter write-offs, Lobin said, will result in an approximate thousand-dollar dip in the firm's break-even point for the next 13 quarters or so, marginally hedging Cullinet's bet on imminent profitability. But analysts saw the move primarily as housecleaning on the eve of a sizable product rollout. "They're just trying to clean up their balance sheet," said Paine Webber, Inc. analyst Robert Therrien. "I don't think there's anything to read between the lines."

Compaq

CONTINUED FROM PAGE 73

ed. Then customers will be able to benchmark the PS/2 as it was intended to be benchmarked. It's hard to evaluate a product when you don't have software to run it."

Mike Swavely, Compaq's vice-president of sales and marketing, said the 32-bit Compaq Deskpro 386 held an 80% share of 386-based PC sales in dealer channels in 1987. He added that the number of units sold by the firm was trimmed by the shortage of 386 chips that hit the industry last year.

"The shortage certainly affected sales of our 386 models, but by how much is anyone's guess," Swavely said. "But I do know that when the shortage decreased, there was still a shortage of our product, while some of our competitors' models sat on the shelves."

Although it may be difficult for Compaq to notch similar gains for 1988, Swavely predicted a 20% growth in the firm's PC business this year, fueled by the continued success of its recently introduced Portable III and a strong push into the evolving international market.

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Martin

CONTINUED FROM PAGE 73

• Erasable optical technology's crawl toward the marketplace has been slow. The 12-in. write-once read-many optical format is expected to be the dominant system for the next year or two. Not being able to erase what is stored on an expensive optical platter is perfect for applications such as legal and medical archiving, but it is too limiting in others. Some analysts predict erasable optical disks will not be a practical medium until late 1989.

• Optical technology needs to exhibit better price/performance. Optical systems are expensive, and because they don't really replace any existing technology, such as magnetic hard disks and cartridge tape, MIS budgets are forced to stretch even further to accommodate them. Optical disk access times are also significantly slower than magnetic's, and although optical's storage capacity can stretch up into the gigabytes, several manufacturers, including IBM, are working on greatly expanding magnetic disk storage capacities.

• Many MIS shops treat optical storage technology with the same apprehension they initially gave personal computers. Most end users are department managers without extensive technological experience that concerns MIS. Also, as with the early PCs, integration between optical and mainframe systems can be raw and often nonexistent.

INDUSTRY pundits tell us that only 10% of a typical U.S. company is automated; the remaining 90% is still dependent on traditional tools like pen and paper.

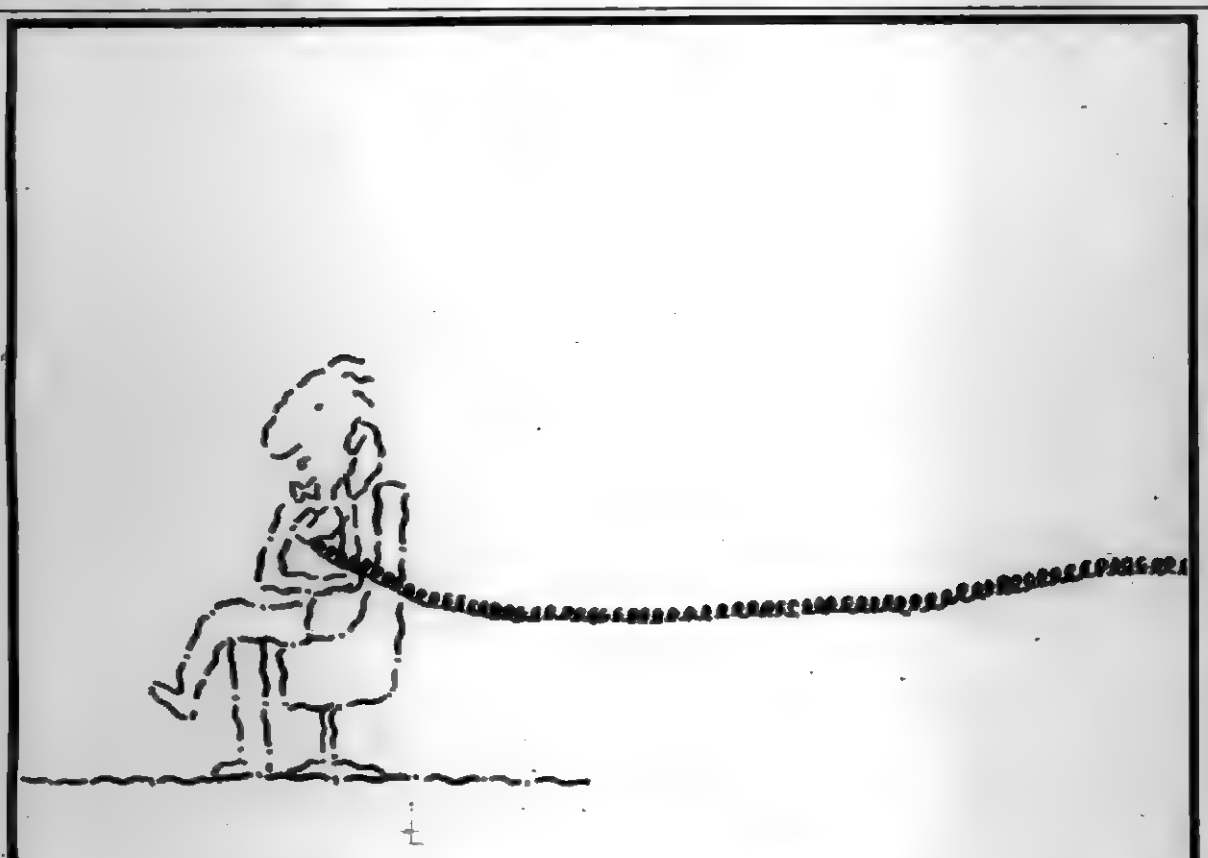
Industry pundits tell us that only 10% of a typical U.S. company is automated; the remaining 90% is still dependent on traditional tools like pen and paper.

Optical companies see this as an unlimited opportunity. They pour money into research and development, release dazzling products and end up scratching their heads because their products aren't selling like miniskirts in a New York department store.

The truth is, corporate America is not as computer-sophisticated as we like to think. Optical vendors may be trying to force a bold new technology on the market at a time when many potential users are still getting used to PCs, facsimile machines and modems. Companies must have great faith to convert all their paper files — essentially histories — to an optical platter for safekeeping.

There is no doubt that optical disk storage and image processing are wonderful, worthwhile, time-saving technologies that could revolutionize the way we do business. But for most companies, after struggling with complex questions about how to connect a micro to a mainframe and when to downsize from a mainframe to a mini, optical technology is still too much, too soon. Maybe next year.

Martin is a Computerworld West Coast correspondent.



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Dealing

CONTINUED FROM PAGE 73

research firm Input show the software and services industry growing at an average annual rate of 17% during the next several years to reach $145 billion by 1991.

Merger trends in 1987 largely continued along previously established lines, according to Broadview Associates.

Choice picks included microcomputer software companies, firms that offer complex systems integration services to both government and commercial organizations and software — as opposed to service — companies, with software products accounting for 55% of total transactions.

Within the services sector, the number of professional services transactions rose 7%, while that of processing services deals took an 8% fall.

Escalating globalization, spurred by the high return-on-equity opportunities offered by U.S. software companies, ranked high on all trends and forecast lists at Broadview. "If this keeps up, we might have to change our name to Abroadview," Mintz quipped.

Up, up and away

And the trend lines are headed nowhere but up, according to Federman, who predicted "400 mergers and acquisitions in 1988."

Contributing to the swelling merger and acquisition ranks, Federman speculated, will be venture-funded companies that would have debuted in the public market this year if there had been one left to enter.

Might 1988 merger and acquisition totals be whittled away as companies opt, instead, for strategic alliances, such as the recent and highly publicized Apple-DEC and Microsoft-Ashton-Tate-Sybase accords? Not likely, Broadview's Mintz said.

"Can you name a couple of successful strategic alliances? As far as I can see," he added, "strategic alliance is an elegant buzzword for joint venture — and joint venture means you do nothing, we do nothing, and nothing gets done."

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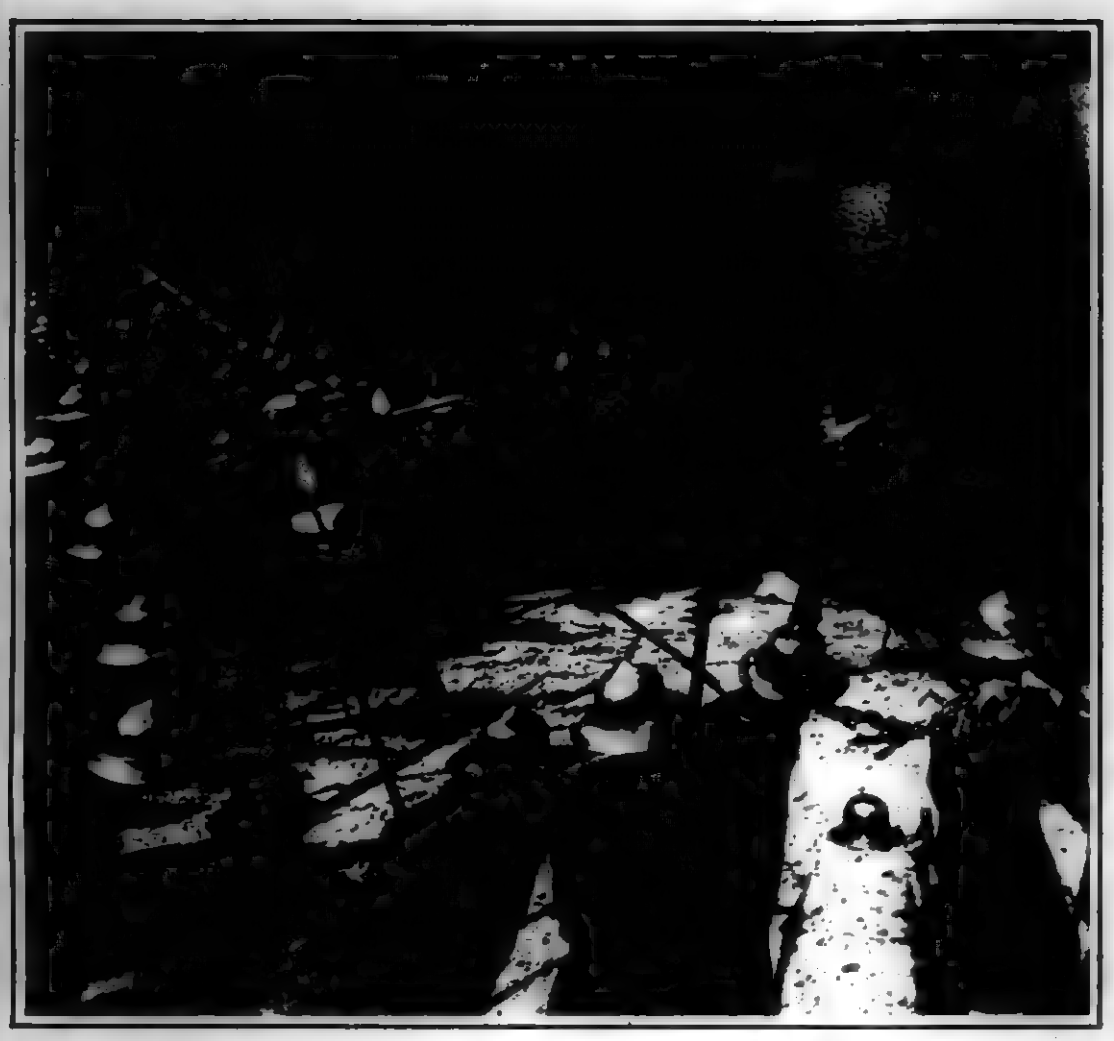

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Unisys

FROM PAGE 1

cal innovation and product-line strength (see chart page 80). In some cases, the former Burroughs sites that were surveyed gave Unisys lower ratings than former Sperry users did.

Dissatisfaction lingers

User interviews independent of the survey found lingering dissatisfaction among many users.

"Most of us were very pleasantly surprised by what happened at the top of the company," said Jim Ault, information systems director at Omaha, Neb.-based Creighton University and president of Use, Inc., the national users group for Sperry customers.

"Now we would like to see that vision and that quality filter down to lower levels," he added.

In an interview at Unisys headquarters in Blue Bell, Pa., Blumenthal confirmed that there have been glitches in his effort to build what he called the critical mass of a $10 billion mainframe giant.

"There were some problems as we moved from two ordering

Continued on page 80

W. Michael Blumenthal

Chairman of the board and chief executive officer
Age: 62
Premerger title: Chairman of the board, Burroughs
Years with company: Eight
Previous employers: U.S. government (Secretary of the Treasury, 1977 to 1979), Bendix (1967 to 1977, elected chairman in 1972)
Education: B.S., University of California at Berkeley; master's of Public Affairs and master's degree and Ph.D. in economics, Princeton University

Quote:
"It's not that two architectures are cheaper than one architecture but that one company can run two of them more cheaply."

James A. Unruh

Executive vice-president and board member
Age: 46
Role: Leads management team in developing and executing the annual financial plan; oversees international operations
Premerger title: Executive vice-president of finance, Burroughs
Years with company: Six
Previous employer: Memorex
Education: B.S., Jamestown (N.D.) College; MBA, University of Denver

Quote:
"Companies are automating in a distributed way much more than they used to. That's where the growth is."

Hollis L. Caswell

Senior vice-president; president of product and technology operations
Age: 56
Role: Oversees development, manufacturing and procurement of commercial product line
Premerger title: Senior vice-president, Burroughs; president, Burroughs System Products Group
Years with company: Four
Previous employer: IBM
Education: B.A., Carleton (Minn.) College; master's degree and Ph.D. in physics, Cornell University; master's degree in management, MIT

Quote:
"We would like to make the corporation less dependent on any specific [hardware] architecture."

Jan Lindelow

Senior vice-president, corporate marketing and services
Age: 42
Role: Coordinates Unisys's commercial business marketing, service and product planning strategies
Premerger title: President of commercial marketing, Sperry
Years with company: 17
Previous employer: Independent consultant to IBM customers in Europe
Education: Master's degree (Swedish equivalent) in electronics, Royal Institute of Technology in Stockholm

Quote:
"Progressive companies have realized that information technology is probably their best vehicle to become more competitive in their own industries."

Blumenthal builds mighty fortress

Unisys Corp. Chairman and Chief Executive Officer W. Michael Blumenthal is by far the most powerful U.S. computer executive who has not devoted his entire career to the industry.

Blumenthal's life story reads like a novel, beginning with his family's escape from Nazi Germany. It continues with a boyhood spent in mainland China, an economics professorship at Princeton University and the chairman's job at manufacturing giant Bendix Corp.

Serving as bookends to the Bendix stint were two government jobs, the second as President Jimmy Carter's secretary of the U.S. Department of the Treasury from 1977 to 1979.

From there, Blumenthal moved to Burroughs Corp. and, seven years later, engineered the computer industry's largest merger in history, the formation of Unisys.

Blumenthal was interviewed in his office in Blue Bell, Pa., by Senior Editor Clinton Wilder and Midwest correspondent Jean S. Bozman.

How does Unisys differentiate itself from the other members of what used to be called the BUNCH, as well as from other competitors?

The BUNCH, I think, is dead. It doesn't exist anymore. Honeywell has pretty well dropped out of it, Control Data is a very much smaller company that really is not in the same range anymore, and NCR is specialized in certain areas, although it's a very good company. Burroughs and Univac have disappeared, and Unisys is there [in their place].

We are very different from IBM and DEC. DEC doesn't go up as high [in processing power] as we do. You can go from the smallest A 1 to the largest A 17 system and throughout the 1100 line without ever reprogramming. And the 1100/90 does very well in number-crunching. The advantages of having that kind of variety far outweigh the cost.

Strictly from a financial standpoint, however, isn't it much more expensive to maintain two architectures?

It's more expensive than having one single architecture, but on the other hand, one single architecture can't meet all these different needs.

That's like saying, "Wouldn't it be nice if General Motors only made a Chevy." Then you'd have huge factories totally focused on just turning out a Chevy. That would be great, except not everyone wants to buy a Chevy.

The market is segmented, so that when we merged these two companies, we got different models that met different market requirements.

At the same time, we could merge those parts of the design and production process that don't affect the final product and the differences in the final product.

What about customer reports of delays in software deliveries and in deliveries of spare parts late last year?

I think a lot of people expected a lot of problems with the merger. We did our very best to minimize that. On balance, I would say the results were stupendous and that very little serious happened.

Are there areas in which there were glitches? Of course there were. I think the single greatest problem we had was in the ordering and delivery system. As we switched over to one [from two], there were some problems.

Since we want to have a uniformly top-notch level of service, delivery and support, it's been painful to us to have even that happen. But compared with what most people expected and with what could have happened, it was relatively minor, even though we don't consider it minor.

Why should someone who has never before purchased Burroughs or Sperry equipment purchase Unisys equipment now?

That kind of potential customer can feel secure now in the knowledge that Unisys is a large, financially strong company, one of the largest in this field.

Permanent backing and support is available.

Another reason is that for the particular need and for the applications that a user has, he will satisfy himself that we have the best solution. We often do, but not in every case. In terms of networking and the A series functions, we are getting a lot of new users.

According to the latest figures, roughly 40% of the entry-level A series machines that have been installed in the last two to three months [of 1987] have been displacing other machines from DEC or IBM.

What's encouraging to us is that the A series so often goes to new users, because people start off with an A 1 or A 4 or A 6, and later on it can grow into an A 15 [account].

> "A POTENTIAL customer can feel secure now in the knowledge that Unisys is a large, financially strong company, one of the largest in this field."
>
> W. MICHAEL BLUMENTHAL
> UNISYS CORP.

When will you retire?

Of course, I might retire from the company. That's not only a possibility, that's a certainty.

My retirement is not imminent.

What will happen to the company when you do?

These things tend to get personalized, but they really shouldn't. It is my responsibility, not only to myself but to the board of directors and to everybody else who works in the company, to make sure that it is run by a group of people, not by one person.

I don't run this company. There are certain decisions that I have to make as CEO, by definition.

I've set up a management board with seven or eight people on it who are the top. I am the cheerleader or the concertmaster from time to time, but essentially they run the company, and if they left, you'd have reason to worry.

If I left today, let me tell you a secret, nothing would happen, not even a hiccup. Companies are companies. There are 100,000 people at this company.

Unisys

FROM PAGE 79

and delivery systems to one," he said. "Orders were delayed or little parts weren't delivered and people had to scramble to get them, but I think that's pretty well worked out by now."

Cultural clash

Several users interviewed agreed that many of their earlier complaints have been addressed, but many, especially former Sperry customers, said they have clashed with the Unisys corporate culture.

"It's now a very procedural organization," said Elaine Maass, manager of user and technical services for Connecticut Natural Gas Corp. in Hartford, an 1100/90 shop. "It's a difference between doing what's right for the customer [before the merger] vs. doing it the right way."

For example, the head of Unisys's systems development at a large engineering firm said he can no longer use an on-line software troubleshooting center within Sperry that he used to access with a password given to him by a local Sperry representative. "Now we have to play by the book and use their 800-number service, which is much slower," says the user, who asked not to be identified. "The rep would probably be fired for giving us the password now."

Many of the transition-related issues are the natural fallout of merging two multibillion dollar organizations, and many users say that service, support and deliveries have vastly improved in the past few months. "But things were in disarray for too long," DiPalermo says. His office runs four 1100 mainframes at sites in Manhattan and Albany, N.Y.

To other customers, however, the merger achieved exactly what Blumenthal intended — critical mass and staying power to compete in the mainframe industry.

"I never saw staying power as a real risk [for Sperry or Burroughs], but I think my boss did," says Eric Thomas, director of information systems and services at Phoenix's John C. Lincoln Hospital, which installed an A 10 system in December. "The fact that I have a boss who's familiar with something other than IBM makes me more comfortable." Thomas's boss is the senior vice-president of finance at the hospital.

The mainframe power

Beyond maintaining customer satisfaction, Unisys must meet the challenge of preserving the future growth path of its mainframe customers. The backbone of Unisys's product line will continue to be mainframes, even as smaller, mid-range systems ship in ever-increasing volumes. Users can also expect Unisys to add more fault tolerance to the A and 1100 series.

Rather than being dinosaurs, mainframes will serve Unisys as a focus for other products and services, Blumenthal says. "The mainframe is a very important centerpiece for what we do," he explains. "That is because those of our customers who have mainframes are, by definition, also those who are the first target for anything else that we can offer."

However, Blumenthal expects the growth in Unisys mainframe sales to remain slow, keeping corporate revenue expansion limited for the near future. Analyst William Easterbrook of Kidder, Peabody & Co. estimates that Unisys revenue will increase only 2% this year, although some analysts' growth estimates are slightly higher.

Opportunity knocks

Far more promising than mainframes are opportunities in networking and fourth-generation languages, Blumenthal says.

> "A KEY TO this whole question of how to communicate with image and data and voice is based on the development of common networks, and we will develop this into a major business. That's our strategy."
>
> W. MICHAEL BLUMENTHAL
> UNISYS CORP.

"We see a real emphasis on ease of programming and ease of communication," he adds. "That's what people are asking for."

To address that need, Unisys has taken two important steps, Blumenthal explains. The company established a development group focused on fourth-generation languages, and it completed the acquisition of T1 communications vendor Timeplex, Inc. in Woodcliff Lake, N.J., for approximately $360 million late last month.

Critical expertise

Timeplex, a firm long rumored for a possible IBM alliance, gives Unisys data communications expertise considered absolutely critical for large systems vendors to meet user needs.

The acquisition continued a trend of systems and networking vendor alliances last year, including IBM's with Network Equipment Technologies Corp. and Data General Corp.'s with Nippon Telephone and Telegraph.

"We think that the T1 backbone networks are, for the large Fortune 1,000 and similar-size government organizations, where the market is developing," Blumenthal says. "A key to this whole question of how to communicate with image and data and voice is based on the development of common networks, and we will develop this into a major business. That's our strategy."

Timeplex forms the nucleus of Unisys Networks, a new corporate unit responsible for enterprisewide networks and network management systems.

To underline the unit's importance, former Timeplex President Edward Botwinick reports directly to Blumenthal as president of the unit and is expected to become a Unisys senior vice-president at the next board meeting.

"The Unisys Networks strategy will be to develop a capability which can advise on, design, implement, install, support and, if necessary, service integrated networks," Blumenthal says. "We have a good part of that ca-

Continued on page 84

Satisfaction not guaranteed

Unisys customers evaluate the vendor in four areas before and after the merger

INFORMATION PROVIDED BY A *COMPUTERWORLD* SURVEY OF 104 UNISYS SITES (53 FORMER BURROUGHS AND 51 FORMER SPERRY)
CW CHART

Slimming down

Unisys's major divestitures and acquisitions since the merger

Memorex	Memorex management group and investor H.F. Lenfest	$510 million	December 1986
Burroughs' international business forms and office supplies division	Clayton & Dubilier	$64 million	December 1986
Sperry Microwave	Hewlett-Packard	$42 million	December 1986
Miscellaneous small business operations, real estate and other assets	Various	$130 million	1986
Timeplex	Unisys	$360 million	November 1987

CW CHART

The art of manufacturing

The Power of 2, as the Unisys Corp. slogan goes, is best seen in the area of manufacturing.

That is where Sperry Corp. and Burroughs Corp. have been able to most visibly merge their operations by pooling their resources and streamlining their overhead.

The proprietary chips that will propel the Sperry 1100 and Burroughs A series architectures into the future will soon be designed, fabricated and tested in just one place — a state-of-the-art semiconductor facility in Rancho Bernardo, Calif.

The former Sperry semiconductor plant in Eagan, Minn., would be closed now, were it not for a heavy demand for 1100/90 chips in the latter part of last year, says Unisys Chairman and Chief Executive Officer W. Michael Blumenthal.

Mass production of the proprietary chips will be carried out by Intel Corp. and Motorola, Inc., Blumenthal says.

At Unisys, mass production should become as modular as IBM's manufacturing of Personal Computers or 9370 mid-range models — that is, with multiple models all based on the same chassis.

"You can look out to a point in time where each box would get its frame, power and cooling system and a bus structure as it came down the assembly line," says Hollis Caswell, president of the Unisys System Products Group. "The only way you could tell which machine it was would be when the CPU got plugged in."

A great deal of modularity is already built into the A series computers, both large and small.

Research and development groups that support the manufacturing effort have also been combined, notably in Unix and fourth-generation languages.

"Unix is a neutral ground for people who came from both the Sperry and the Burroughs side of the company," Caswell says.

JEAN S. BOZMAN

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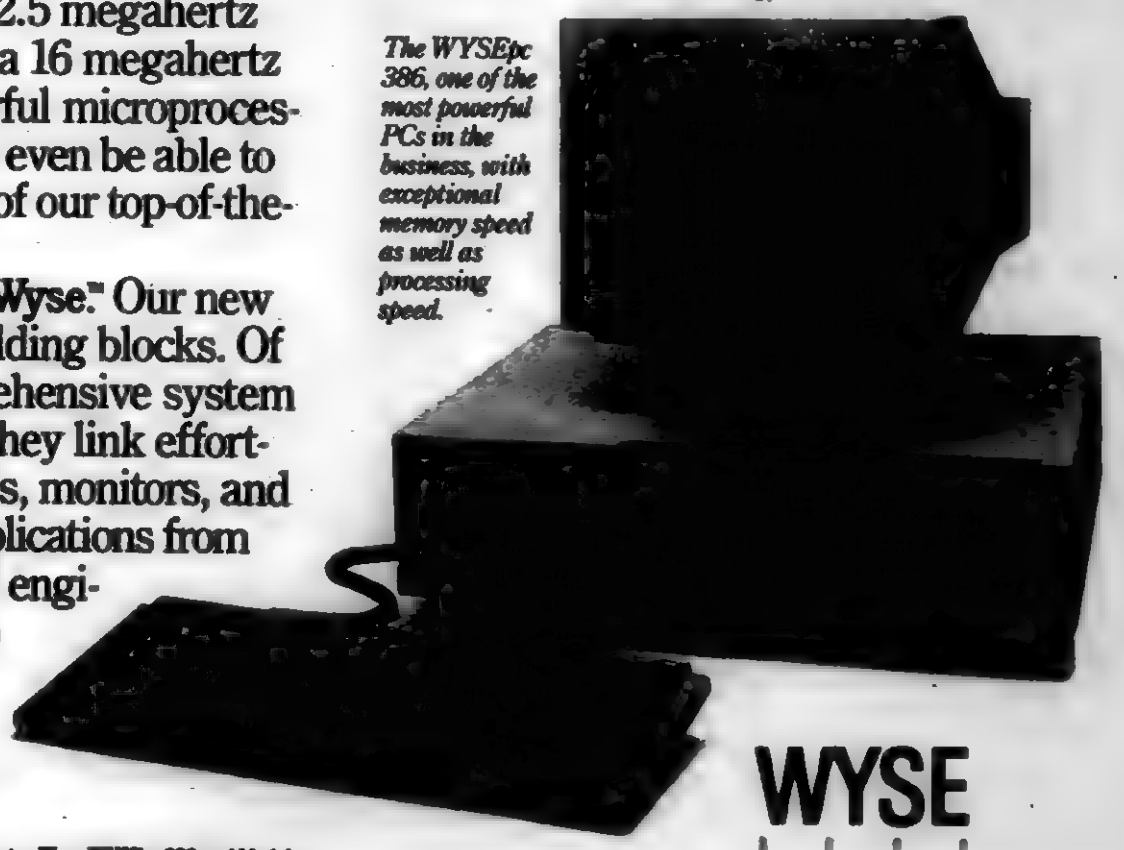

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Dual lines to live forever and a day

BY JAMES CONNOLLY
and JEAN S. BOZMAN
CW STAFF

For Unisys Corp. mainframe users wondering how long the diverse Sperry Corp. and Burroughs Corp. architectures will live, Unisys Chief Executive Officer W. Michael Blumenthal has a brief answer.

"Forever and a day," he promises.

Unisys officials vow that the Sperry 1100 line and the Burroughs A series will be enhanced as important product families under the Unisys umbrella. Any merging of the mainframe lines will be through communications links — primarily for users who have both architectures — and the use of common software, such as fourth-generation languages. The company warns observers to stop watching for common mainframe platforms.

Meanwhile, the company says it will expand its efforts in areas such as fault tolerance, mid-range systems and Unix, where it has already unified the Sperry and Burroughs offerings.

Bridging the gap

The company plans to continue Sperry's development efforts and to extend a string of recent enhancements such as memory boosts and price cuts. One goal is to narrow the gap between the high-end 1100/94 and the A17 models, which are roughly twice as powerful.

Fred R. Meier, Unisys vice-president for corporate program management, says that while the breadth of the gap varies according to which applications are running, 1100/90 follow-on systems now under development will narrow that gap. However, Meier notes that only a "quite vocal" minority of 1100/90 users are at full capacity with the four-CPU 1100/94. He says replacements for the smaller 1100/70 systems will ship by the end of this year.

Meier says one key strategy is to port Sperry's Mapper — a fourth-generation language that he says is user-oriented — to the Burroughs A and V series and to migrate Burroughs' Linc — a fourth-generation language intended for high-performance applications — to the 1100.

"We would hope that Linc will get spread over to the Sperry direction," says Judy Turner, systems and development manager for Pittsburgh grocery retailer Giant Eagle, Inc., an 1100/92 shop. "I think it could do things for our productivity."

Blumenthal says that many of the common applications will be written for Unix environments and that Unisys, which acquires Unix systems from several OEM suppliers, sets itself apart from other Unix vendors by adding value. "We add a lot of features and functions to the basic capability of Unix. We put a Unisys custom element into it," he adds, noting that Unisys hopes to double its Unix-related sales from $300 million in 1987 to $600 million this year.

At the low end, the Unisys strategy combines its proprietary BTOS, Unix and Microsoft Corp.'s MS-DOS and MS OS/2, which Meier says Unisys recognizes as desktop standards. He cites the Unisys B20 multiuser system as a key integration tool for mixed environments.

Unisys

CONTINUED FROM PAGE 80

pability now, but we will extend it and develop it further." Such networks may include IBM and Digital Equipment Corp. machines.

Unix remains a growing product area for Unisys, with sales jumping from $100 million in 1986 to $300 million last year. Unix business in 1988 may double that figure, according to Blumenthal.

Bulwark of the mid-range

As competitors like Sun Microsystems, Inc. and NCR Corp. ride the Unix wave and IBM and DEC also incorporate the Unix standard, the AT&T-developed operating system will prove increasingly critical for Unisys as a bulwark of the mid-range — where Unisys must post double-digit revenue growth to offset the slower mainframe market.

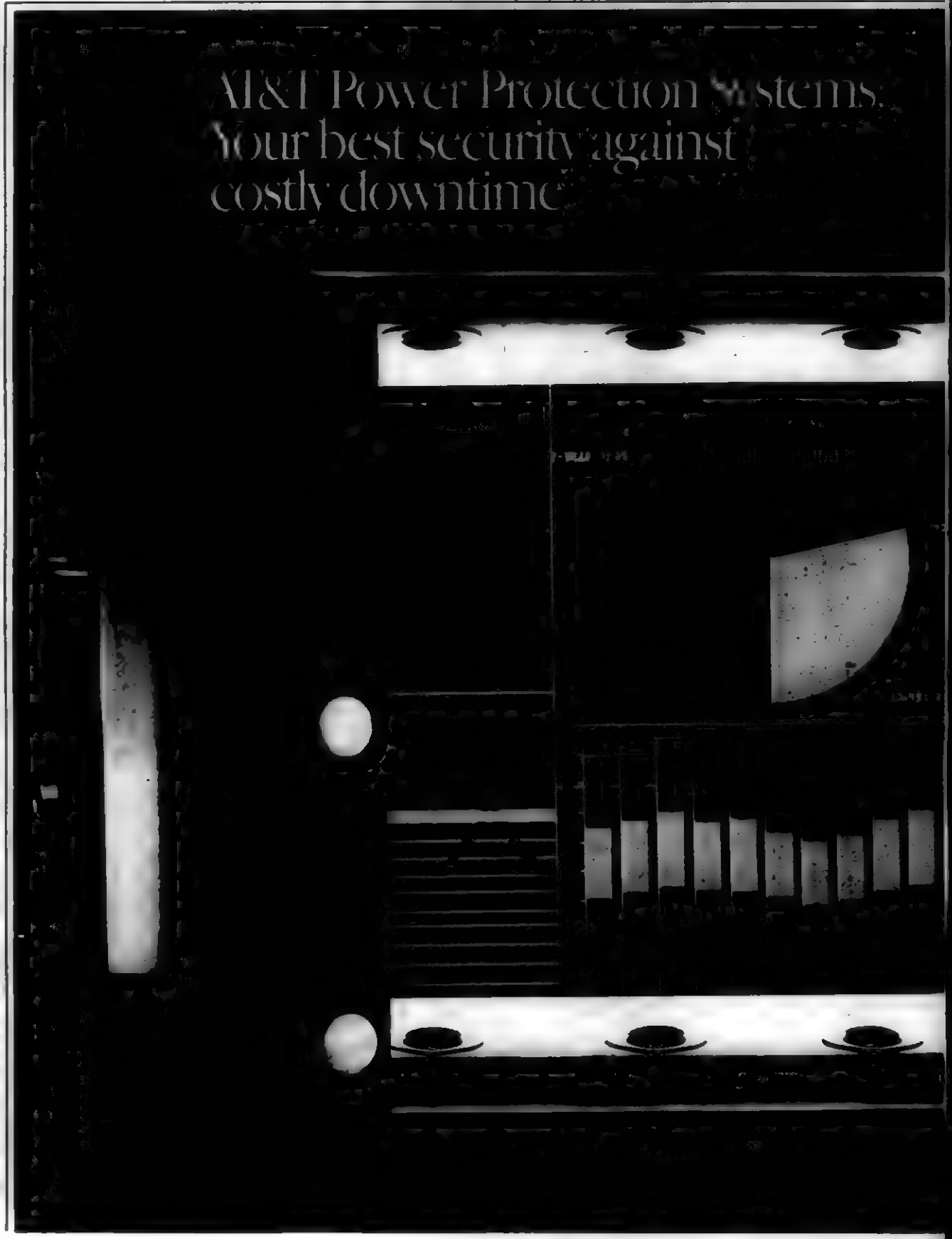
"Profit margins are up now, higher than they were for Burroughs or Sperry," says John Rutledge, computer analyst at Dillon Read & Co. "But to meet the challenge later on, they have to keep the new product flow very strong and do more with Unix." As Unisys heads for the 1990s, it will continue to face, as a combined company, the very danger that prompted the Burroughs-Sperry marriage: the decline of mainframe growth as MIS operations downsize and distribute.

"This has nothing to do with the merger, but we are already de-emphasizing Sperry," says one 1100/92 user. "We're not sure what we're going to do, but the operational costs are much more advantageous with DEC."

Last one to go

The resignation of former Sperry President Joseph J. Kroger at the end of last year was a symbolic milestone for Unisys — removing the only Sperry representative from the office of the chairman and the board of directors.

Blumenthal's divestiture program, which raised more than $2 billion from the sale of various Sperry and Burroughs businesses (see chart page 80), has been completed, restoring faith on Wall Street and the financial freedom to make acquisitions, like that of Timeplex.



Unisys holds its own as financial services market comes under siege

BY ALAN ALPER
CW STAFF

In the financial services market, a key indicator of the firm's performance, Unisys Corp. has not gained very much ground on IBM in the past 18 months but has not lost any, either.

"One and a half years ago, some customers chose not to do business with us because of our size," says O. G. Greene, president of Unisys's Atlanta-based Financial Systems Division. "Those same customers are more receptive to us now because of our size."

As a result of deregulation of the financial services industry, almost every firm in the field is clamoring for the competitive advantage that information technology can provide. But as competition has expanded, so has the number of hardware, software and services suppliers.

Unisys now competes as much with Apollo Computer, Inc. and Sun Microsystems, Inc. in workstations as it does with Digital Equipment Corp. for medium- to large-scale processors. Vendors such as Tandem Computers, Inc. and Stratus Computer, Inc. have made inroads into the transaction processing market segment, where high systems availability is key. Moreover, Unisys is still battling with IBM and NCR Corp. for the hearts, minds and pocketbooks of banks worldwide.

For Unisys, "it's a market that is under siege," says Dave Moschella, an analyst with International Data Corp. in Framingham, Mass. He adds that Unisys has many good products but does not have "a wealth of software people with expertise."

> "ONE AND A HALF years ago, some customers chose not to do business with us because of our size. Those same customers are more receptive to us now because of our size."
>
> O. G. GREENE
> UNISYS'S FINANCIAL SYSTEMS DIVISION

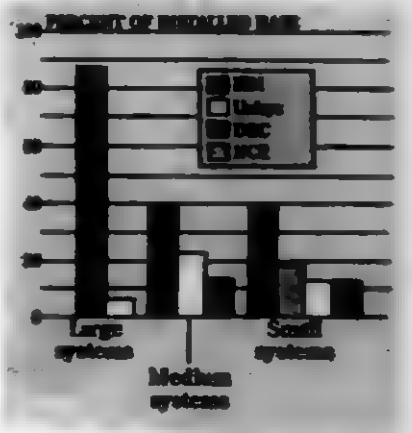
Through Burroughs Corp. systems, Unisys continues to dominate the document processing market. Burroughs had also developed a branch automation system to enable a bank's customer service representative to access all customer information and sell all products and services from a single workstation.

The firm's recent acquisition of wide-area networking from Timeplex, Inc. should enable Unisys to better challenge IBM for contracts with larger banks, Unisys's Greene says. Timeplex's T1 and packet-switching technology will provide those institutions with a way of linking offices that are geographically dispersed, he adds.

The company has made recent inroads in the insurance industry — a segment long-considered an IBM bastion — with its family of Unix-based departmental processors.

In both the large banking and insurance markets, Unisys's strategy is to coexist with IBM by building bridges to that company's Systems Network Architecture, Greene says.

The power of No. 2
Hardware systems in use at U.S. commercial banks, 1987



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

By all accounts, Blumenthal has made the computer industry's largest merger a financial success. But he and the company still face, perhaps, an even greater challenge: restoring the faith of users both stung by inconsistent service levels since the merger and bombarded with new distributed computing options.

"Departmental systems, distributed processing, particular applications, networking, tying things together, being able to talk to each other . . . we're spending a lot of time and money developing those areas," Blumenthal says. "Because if we put our minds to it, we can beat the competition with those products, and that's where the growth is."

Mid-Atlantic correspondent Alan Alper contributed to this story.

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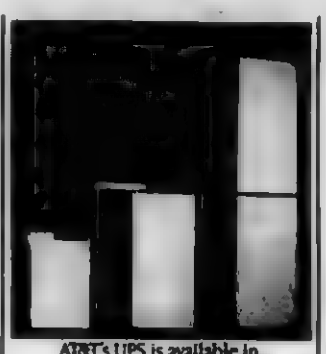

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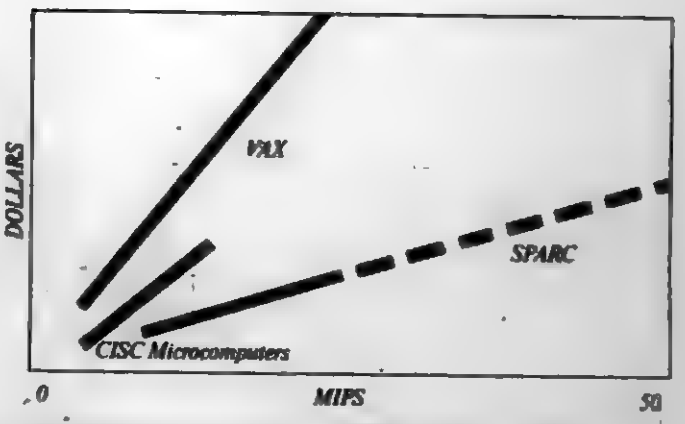

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COMPUTER CAREERS

Brakes on in auto industry hiring

But manufacturing, engineering grads get green light in MIS staffing

BY DENA ALLMAN
SPECIAL TO CW

Although hiring is slowing in the automotive industry overall, MIS managers say opportunities exist for professionals with backgrounds in engineering and manufacturing.

Industry trends driving the demand for MIS personnel include implementing technology to increase production efficiency and looking to information systems to provide an edge over the competition.

College graduates with degrees in electrical or mechanical engineering and a minor in computer science may also find openings in the professional development programs of large auto makers. MIS managers seek professionals educated in engineering because they adapt well to the constantly changing needs of the industry and can pick up the needed applications knowledge on the job.

MAP, OSI literacy useful

"It's helpful if the candidates understand MAP [Manufacturing Automation Protocol] and OSI [Open Systems Interconnect] standards, but it is not required right away," says Ron Keil, manager of automotive support systems at General Motors Corp.

However, those who want to progress in the industry must possess the ability to learn about these areas quickly, Keil adds. Computer-aided design and manufacturing (CAD/CAM) knowledge is also expected to be acquired on the job.

At Ford Motor Co., Hans Kuschnerus, manager of engineering information systems, seeks a higher level of experience.

"Engineering graduates who have practical experience in the field and who understand the applications involved are preferred over those trained in a theoretical approach to the industry," Kuschnerus says.

Workplace creativity

For experienced MIS professionals, the industry is attractive because of fast-changing applications requirements and a less structured atmosphere. Together these factors allow the professionals more creativity than traditional MIS shops.

"After three to five years at Ford, information systems employees are expected to simplify, improve and mechanize their working environment," Kuschnerus says. "Ford's goal is to constantly streamline the process from engineering to manufacturing to sales. To accomplish this process improvement, employees must be willing to generate new ways to improve production."

The highly competitive nature of the industry, especially among the top companies, requires MIS managers to focus on developing strategic manufacturing systems that provide an edge over the competition.

At Chrysler Corp., the factory information systems department carries out all of the manufacturing planning, including coordinating which plant will manufacture certain automotive parts. According to department manager Bob Duran, MIS professionals in his department should possess hands-on experience in CAD/CAM applications and the electronic distribution and generation of operations.

"Information systems professionals actually show the plant employees how to build a car through graphics," Duran says. Information systems is also responsible for detailing how to meet quality requirements and transfer the information to the plant, he adds.

Chrysler's initial MIS hiring is done at the company's Manufacturing and Technical Development Center in Detroit. However, employees can eventually move to other areas of the country where the company operates manufacturing plants, Duran says.

> "ENGINEERING GRADUATES who have practical experience in the field and who understand the applications involved are preferred over those trained in a theoretical approach to the industry."
>
> HANS KUSCHNERUS
> FORD MOTOR CO.

Internal training offered

Ford looks to hire its MIS managers from within the company rather than conduct an outside search. The company also runs a two-year job rotation and training program for computer science graduates. Trainees work in the information systems departments that support engineering, sales, manufacturing or finance. They then decide which area will best meet their career aspirations.

Though the industry's MIS hiring activity is currently being bolstered by the increased use of technology, information systems is not immune from overall streamlining efforts.

"Ford is currently being very selective with its hiring activity," Kuschnerus says. "Work force reductions are being caused by the need to stay competitive within the industry. As Ford's market share goes up, hiring may increase as well."

Little growth in MIS hiring is expected in the future at GM, Keil says, but despite cutbacks elsewhere, the information systems organization is "holding its own."

MIS future healthy

The use of technology, such as electronic data interchange (EDI) systems, will continue to require the industry to maintain healthy information systems staffs, Chrysler's Duran says. In approximately five years, he predicts, the industry will advance to completely designing and manufacturing a car electronically with the help of computer technology.

Ford is currently developing a corporate strategy for EDI, while GM is trying to implement smaller versions of the technology in a few areas of its manufacturing process, according to Jim Moravec, associate director of the Automotive Industry Action Group.

Allman is a free-lance writer based in Chicago.

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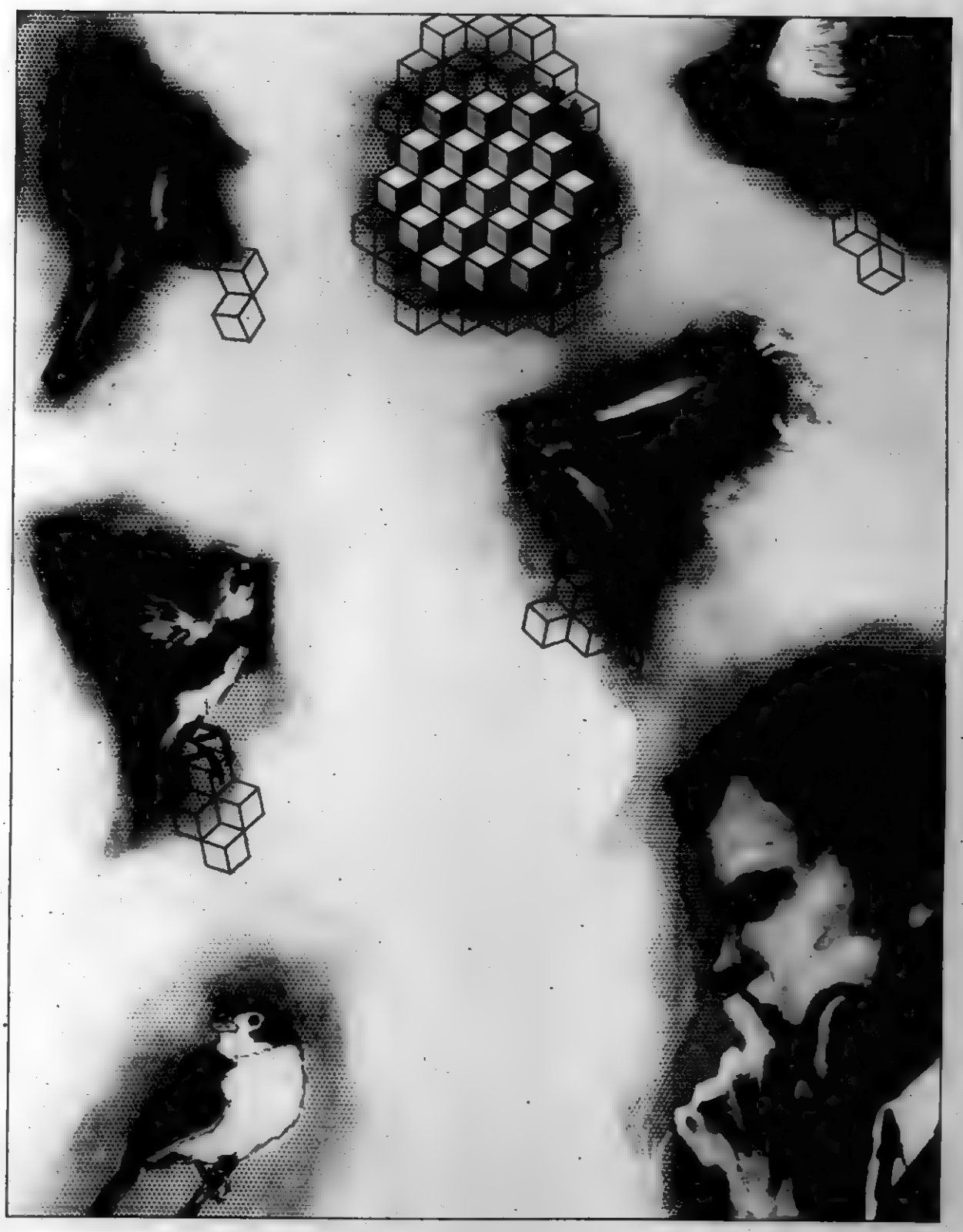

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INSIDE

Common Ground
DEC's Application Centers for Technology are places where the company's interests converge with those of independent software vendors and users looking for teamed assistance. One vendor and one user provide perspective on what these demonstration centers have to offer. Page S4.

Ask the Vendor
Vendors respond to questions about moving files between data bases, code management, electronic publishing and more. Page S6.

From V to X
The ability to run their packages on a full range of hardware is one reason DEC is hot with third-party software vendors. Page S7.

Product Chart
A detailed guide to DEC-compatible data base management systems. Page S8.

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Demand may not be deep enough to support all of the migratory suppliers, especially if DEC decides to join the action

VAX ATTRACTS SOFTWARE FLOCK

BY BARBARA SEHR

BART GOLDMAN

After three decades of drought, the long, dry winter of discontent is over for would-be users of applications software that would run on DEC machines. The official company line says, "Digital has it now," and to a large extent that is true. As Jerry Knaus, a software engineer at Jeppesen Sanderson, an Englewood, Colo.-based maker of navigational aids for U.S. airlines, says, "Now if we need something, we can usually find it someplace."

In the days before the VAX series, finding applications for Digital Equipment Corp. systems was not a pleasant prospect. Ironically, while DEC's was frequently the hardware of choice for software developers, few applications packages were actually developed for DEC systems. For the most part, DEC supplied the iron, and the customer supplied the application expertise.

What made this situation viable for those times was both the quality of the machines and the nature of those who used them.

Equipment design counted for a lot, according to Douglas Loomer, financial data analyst at Teradyne, Inc. in Boston, a company introduced to DEC by the PDP-11/20 minicomputer back in the mid-'70s.

"There weren't a whole lot of applications available [for DEC systems] back then," he says. "But Digital hardware was a lot easier to use than IBM."

Then too, DEC hardware usually rested in the hands of users more inclined toward developing their own applications rather than accepting some broadly based off-the-shelf package.

The times are changing, however, both at user sites and at the old mill in Maynard, Mass., that serves as DEC headquarters.

While some users still prefer to "roll their own" software, many former do-it-yourselfers have decided they would rather purchase ready-made programs. CH2M-Hill, a Corvallis, Ore.-based engineering consulting firm with 26 U.S. offices, has written some 500 of its own engineering analysis programs for its cluster of 13 DEC VAX CPUs.

Still, Wayne Yarnall, CH2M-Hill's product manager for print services, says he would rather buy an off-the-shelf program than take up staff time to support the software. "I'd rather buy it from somewhere else and call their people to come in and support us," he says. "Our people are occupied enough with everyday systems administration."

At the same time, a number of factors at DEC, including changes in attitude and product line, have produced a substantial crop of applications from third-party software suppliers. International Data Corp. (IDC), a market research firm based in Framingham, Mass., estimates that about $550 million worth of third-party applications software was sold in the DEC market in 1987 in addition to $175 million or so sold by DEC itself.

"There's a ton of software available for the VAX," Loomer says, noting that the introduction of the VAX made it easier for third-party software houses to convert their packages for DEC users. Rising VAX sales and encouragement from DEC also boosted the availability of applications

Salur is a free-lance writer based in Seattle.

VAX attracts

FROM PRECEDING PAGE

packages, he says.

In addition to developing horizontal spreadsheets and office automation products to go along with its increasing emphasis on connectivity, DEC is actively encouraging the development of third-party vertical applications software for its VAXseries.

Just through its Cooperative Marketing Program (CMP), DEC has assembled between 100 and 120 selected software houses and OEMs, which together produce about 300 different packages targeting such vertical markets as accounting, health care and scientific development.

The company maintains individual industry groups to keep tabs on developments in a particular vertical market and to react accordingly. "The key to penetrating a market is to have the right portfolio," says Jim Willis, group manager of distribution, marketing and sales for DEC's business systems.

There are a couple of very sound reasons that DEC would choose to stimulate third-party software development.

One is a practical recognition of its own limitations. "I think the company recognizes that others do a better job developing software than DEC can," says Wayne Smart, systems development engineer for Fleetwood Enterprises, Inc. in Riverside, Calif., a manufacturer of mobile homes and recreational vehicles.

Smart adds that DEC has always been recognized for its strength in hardware, not software.

"With the huge base and fast growth of the market, it is impossible for Digital to satisfy the demand by itself," says Marty Gruhn, executive vice-president of The Sierra Group, a market research firm in Tempe, Ariz.

Selling point

Another reason is the fact that plentiful software helps to sell hardware.

"Experience shows that users often choose their software first, then buy the hardware that will run it," says Dennis Freeman, a spokesman for MCBA, a developer of accounting programs for the VAX. Even current DEC users are likely to expand their use of the company's hardware if they see a need that is being filled by a new application.

Burt Pickard-Richardson, second vice-president at Northern Trust Co. in Chicago, says that although DEC systems already constitute a significant portion of the financial institution's on-line capacity, there is room for more, should the right applications software come along. "If a Digital salesman asked me what would motivate me to buy another $2 million in hardware, I would say, simply, a superior application," he says.

"We're still looking for a trust package that is large enough to meet our needs."

"DEC recognizes that others do a better job developing software than it can."

WAYNE SMART
FLEETWOOD ENTERPRISES, INC.

In fact, despite a major increase in the software crop, growth remains somewhat uneven. For one thing, not all fields have produced equally. While some applications have proliferated, other vertical markets remain sparse.

"The environment of most off-the-shelf packages is not what we are accustomed to," CH2M-Hill's Yarnall says. "There's not a whole lot of selection in the DEC world for our particular needs."

Doubts also prevail among some users about the prudence of using multiple third-party software without having some kind of interface that ties it together.

"There is a definite lack of a consistent interface within third-party software products," says Mark Schnegg, systems manager at *The Boston Globe*, where multiple VAX systems support between 500 and 600 users in applications ranging from factory automation to graphics.

"It is difficult for someone to have to learn several different function keys for several different programs," he says. "There must be a way to bring these applications together."

Since that way has not yet appeared, the *Globe* turned some of its office automation duties over to a network of Apple Computer, Inc. Macintosh personal computers. The Mac feeds into the newspaper's Ethernet local-area network and thus interfaces with the DEC Vaxcluster.

Anxiety lurks

Finally, DEC users are still apprehensive about the dependability of third-party software and software providers.

Schnegg, for example, complains that on several occasions he has dealt with third-party suppliers that either did not have the facilities to provide the level of support the newspaper required or, worse, went out of business.

"We try to stick with Digital's own applications because we've been burned so many times by third-party sellers," he says.

In recognition of such concerns, DEC maintains admission standards for its CMP that are stricter than some exclusive men's clubs'.

"We look for experts in their field," says Richard Corley, industry marketing manager for health care and pharmaceutical applications at DEC. "We also take great care to develop strong relationships."

DEC requires that its CMP applicants already show an existing base of satisfied customers, maintain an existing sales and support force and prove recognized leadership within a particular market.

The company examines and reviews each product with existing customers of the software house and then performs a technical review of the product within its own facility. CMP applicants must also endure vigorous examination of their financial stability by DEC.

Although this elaborate screening may be reassuring, users can wind up excluding some excellent programs if they confine themselves to software produced only by CMP companies. The long and painful application process may discourage some well-established software houses from joining the program, says Bob Randolph, an analyst with IDC.

Pressure's on

Randolph performed a study of the CMP last year and found general satisfaction among its participants. That satisfaction, however, seemed to decline in direct relation to the size of the member company.

There may be other reasons that some software houses choose not to go along with the CMP, Randolph says, especially those that can adequately sustain themselves against DEC within their own market. Some companies may not want to share their customer list or may not want to lose their independence, he says.

Competition within the applications market is becoming increasingly heated, whether or not the developer is a CMP member. Vendors whose businesses were once restricted to the realm of IBM mainframes are even joining the fray.

"IF A DIGITAL salesman asked me what would motivate me to buy another $2 million in hardware, I would say, a superior application."

BURT PICKARD-RICHARDSON
NORTHERN TRUST CO.

Crowding on the field

At Teradyne — a manufacturer of automatic test equipment — all the company's general ledger, accounts receivable and payable and payroll processing is handled by a software accounting system called AP Plus from McCormack & Dodge Corp. in Natick, Mass. Loomer says he is impressed by the way the software adapts to the DEC environment.

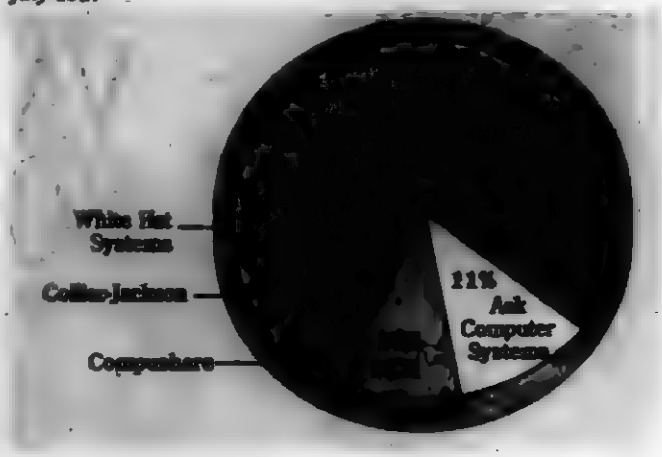
Pleased as he is with the M&D crossover, Loomer points to Cullinet Software, Inc.'s 1986 announcement that it would begin targeting VAX applications as the real watershed for that market. Cullinet, the largest independent supplier of mainframe software, had always pledged allegiance to IBM, he says. When the Westwood, Mass.-based company — now in DEC's CMP — broke through the IBM curtain, it was a signal for other traditional Big Blue houses to follow.

Whether Cullinet's decision to test the VAX waters will prove to be as beneficial for the company as for its users is uncertain, however, according to IDC's Randolph. The problem, he says, is that other makers of relational data bases for mainframes have entered the VAX arena at the same time. Cullinet "is going to find itself in the same condition as it was in the IBM market."

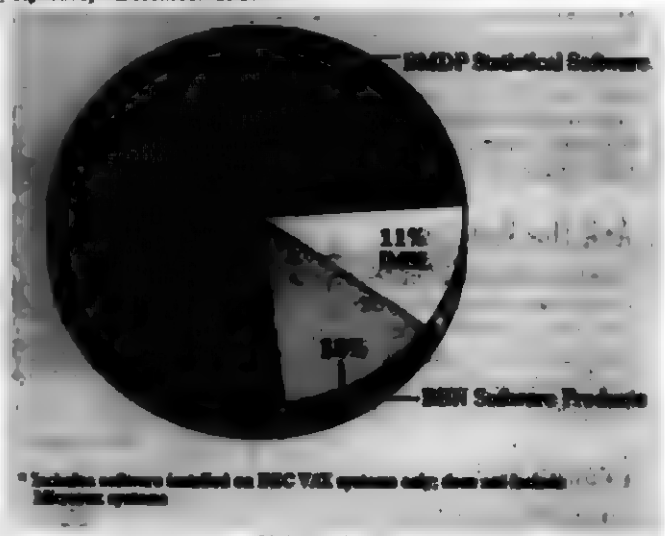
The Sierra Group's Gruhn says this competition is also putting pressure on DEC to improve its own applications products. She says new competition from third-party data base developers has forced DEC to look at its own in-house data base product. Not

High scores in VAX software

Market share division among suppliers of VAX accounting software, July 1987



Market share division among suppliers of VAX data analysis software, December 1987*



* Includes software installed on DEC VAX systems only; does not include Microvax systems

INFORMATION PROVIDED BY COMPUTER INTELLIGENCE
CW CHART

all emigration or competition is coming from the mainframe direction, she adds.

PC software houses like Ashton-Tate Corp., Oracle Corp. and Wordperfect Corp. are also clambering onto the VAX platform.

Adjusting support

One factor in the DEC market that may take migrant software companies by surprise is the extent of support VAX users require.

Generally speaking, the amount of support is more than PC software vendors are used to providing and possibly more than mainframe software vendors from the IBM environment are ready to provide for the prices they can charge.

VAX shops in particular seem to thrive on tinkering with established packages until they achieve an exact fit with their needs.

A VAX user with packaged software is much like a child with mechanical aptitude who is given an erector set. The possibilities are endless. There are no sacred cows, no matter how well respected or how much of an expert the original product developer is.

Even a respected accounting program such as M&D's AP Plus is not immune to experimentation. Loomer says Teradyne programmers work closely with support people at M&D to customize its package to meet company requirements.

Sometimes, he says, in-house programmers find more capabilities than even the developers had expected. "You have to understand the software," he says. "If you learn its capabilities, you get more out of it."

Fleetwood Enterprises' Smart says his company has tinkered with its MCBA accounting program to adapt it to the needs of its 47 manufacturing plants in the U.S. and Canada.

Another user who believes in exhaustive tinkering and testing is Robert Lovestedt, a systems manager at Weyerhaeuser Co., a giant lumber and paper products company in Tacoma, Wash. Lovestedt oversees facilities that serve a group of scientists and engineers in the company's research buildings in nearby Federal Way.

Weyerhaeuser has been using VAX systems since 1979 and now has a Vaxcluster of six CPUs within Lovestedt's operation. "We've gone from 120M bytes of disk storage to 15G bytes and from eight users to about 150," he says.

Still, Lovestedt's search for comprehensive applications software continues. Because of the nature of scientific and engineering applications, he says, his operation is not tied to one particular package. "We tend to run some experiments with a package and then move on to the next one," he says.

Profit squeeze

The price of a particular package can determine the degree of user experimentation. "If a package costs only a few thousand dollars, it is probably cheaper to just buy a number of packages and evaluate them all," Lovestedt says. "Once a package goes through the $20,000 threshold, our testing procedures change."

That change could mean trying out a package at the vendor's expense. While PC users may have to go to a computer store, independent software vendors in the VAX market make it a point to make sure their products work on a customer's own hardware configuration.

"We don't trust anything until we get it hooked up and try it," CH2M-Hill's Yarnall says. "If it works, most likely we'll buy it."

Because of the need for this level of demonstration support, even the most basic packages for the VAX series are priced much higher than what a similar package might list for on a PC.

Wordperfect, a popular word processing package from Orem, Utah-based Wordperfect, is available in both markets, but the VAX version sells for more than 10 times the cost of the PC list price.

The Boston Globe's Schnegg

For many VAX users, such as Jeppesen Sanderson's Knaus, price is at the bottom of the list of considerations. "Need is far more important," he says. "[We ask], 'Does the product do what we need?' "

Still, because DEC built its company as a provider of low-priced alternatives to mainframes, there is still some price consciousness in the VAX market.

Traditional IBM software houses will have some difficulty in the VAX market for that reason, IDC's Randolph says.

"The DEC world will not pay $100,000 for a software package," he says. "It may mean that traditional IBM houses will have to cut their prices by about 25%."

Because some of the niches sought by these vendors are limited, conventional economics should require doubling prices rather than reducing them, Randolph adds.

Third parties — especially those that are not part of the CMP — may also have to contend with intense competition from DEC itself, which has stated its commitment to increased software development. DEC's Willis says the company will continue to offer horizontal packages in the future. DEC is no longer just a hardware company, he says. "Our emphasis here changed years ago," he says. "With our networking tools and development tools, we will establish ourselves in the software arena."

Stretching out

Unlike IBM, which has long developed many of its own horizontal applications packages, DEC has not extended itself much beyond its operating systems and network software packages until recently.

In the past few years, however, the company has joined IBM in offering some horizontal packages for the office automation market that can be customized by users. A recent IDC survey shows that 49% of VAX

Continued on page S5

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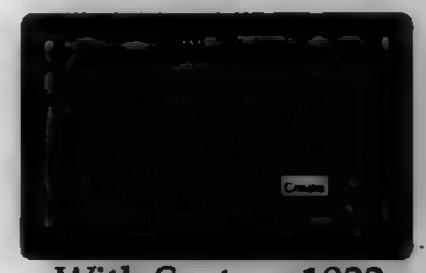

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DEC ACTs display obvious premeditation

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Successful tryout no guarantee of hit

BY ALAN RADDING

Persistance of vision helped Computer Aided Decisions, Inc., a Boston-based financial software firm, win a place in Digital Equipment Corp.'s network of Application Centers for Technology (ACT).

ACTs are fully equipped DEC demonstration rooms, each located in proximity to 17 major computer markets throughout the country. Each concentrates primarily on the vertical industry most heavily represented in its location. That specialization is, in turn, reflected in the stock of software available for demonstration on various DEC hardware configurations and in the qualifications of the company's sales and consulting staff.

A team of full-time DEC employees is assigned to each ACT. These employees are knowledgeable about specific industries and capable of demonstrating DEC hardware and selected third-party application software.

Turn on the heat

That Computer Aided Decisions, which began marketing an investment management system to run on DEC's VAX line in 1981, is one of those selected vendors must be attributed, at least in part, to a long campaign of persuasion. According to marketing director Tom Roginski, that campaign was instrumental in steering DEC into the financial services area. At the beginning, Roginski recalls, DEC's interest was lukewarm at best.

Three years ago, however, Computer Aided Decisions' system became the first financial package to receive DEC's stamp of approval. The package's designation as DEC-certified software was a start, Roginski says, but it really meant only that the software was supportable by DEC.

In 1985, DEC began its Cooperative Marketing Program (CMP) for selected third-party vendors. Computer Aided Decisions' portfolio management and trading software — the Expanded Portfolio Valuation System (EPVS) — was the first financial system to be teamed with DEC, Roginski says.

The CMP led Computer Aided Decisions directly into the ACT program, which was launched in August 1986. The company now takes advantage of ACTs throughout the country, although 85% of its market is in New York.

Even in the Boston area, where Computer Aided Decisions maintains a fully configured system at its own offices, the company often uses the local ACT for special presentations. "We have our own facility, but if we are doing a major show, we'll do it at the ACT," Roginski says.

There are several steps involved in selling through an ACT, Roginski explains. First, initial contact with a prospect is made. Usually, a DEC sales agent in the field makes the identification and then contacts Computer Aided Decisions to qualify the prospect.

The second step involves Computer Aided Decisions' speaking directly with the prospect. The software company determines whether the client can use the EPVS product, while the customer decides whether the software is a possible fit. The client goes to the ACT to meet DEC's sales agent and employees from Computer Aided Decisions. The two companies present themselves to the prospect as a team. "The client deals with us as a single entity," Roginski says. At the ACT, the client sees the software operating on appropriately configured equipment and participates in a hands-on demonstration.

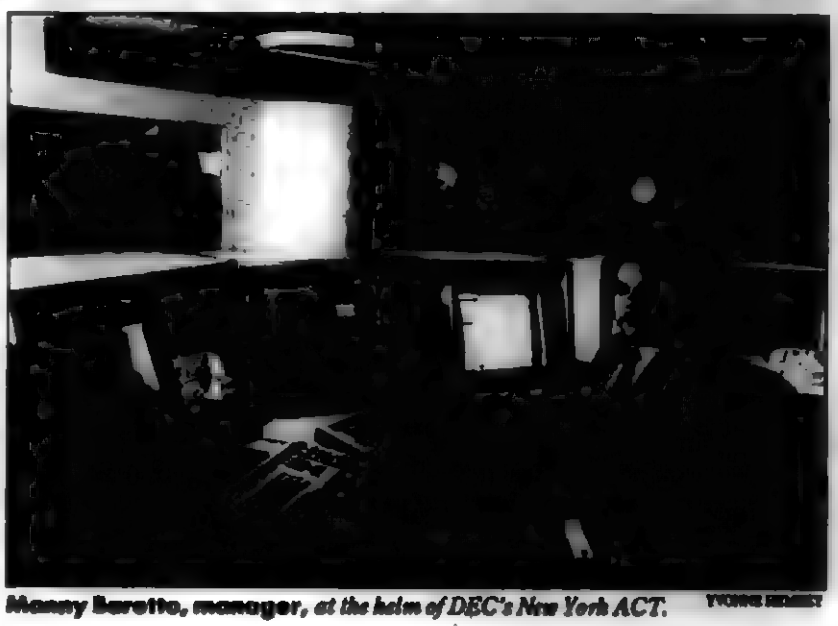
The final step is a trial run at the ACT for actual users from the prospective purchaser. By this time, any refinements suggested by the team have usually been incorporated into the system.

Everybody benefits

The ACT is very effective for Computer Aided Decisions; as much as 90% of its business comes through this program, Roginski estimates.

The ACT's value goes beyond convenient space for demonstration. Well-equipped, privately owned and operated demonstration rooms are cropping up in major technology market centers. But, Roginski says, that sort of arrangement does not compare to the ACT, which is "upscale in terms of equipment and designed to make a client feel at home."

Both Computer Aided Decisions and DEC benefit from the ACT. While the former receives sales and hardware support that it would not otherwise have, DEC can walk customers past its full line of CPUs and peripherals. Manny Barreto, DEC's New York ACT manager, says, "Customers often come in looking for something specific, and they see other new things that they'd also like." ●



Manny Barreto, manager, at the helm of DEC's New York ACT. YVONNE HEMSEY

If Ira Powell doesn't end up buying Computer Aided Decisions, Inc.'s investment management software package and accompanying Digital Equipment Corp. hardware, it won't be because of any problem with the Application Centers for Technology (ACT) program.

When Powell, operations manager of the Pension Fund Investment Department at Du Pont Co., describes his experience at the ACT, he interrupts himself repeatedly to apologise for sounding like a DEC commercial and to remind the listener that he has not actually bought anything through the ACT yet.

"Maybe it's just a honeymoon phase. Or perhaps we were just lucky," he says.

Early last year, Powell began searching for an investment portfolio management system for his department. The Pension Fund Investment Department is a fully staffed, in-house investment management operation that manages Du Pont's $10.5 billion pension fund.

The department wanted an existing program that would be broad enough and flexible enough to handle its large investment operation, including overseas investments, foreign currency transactions and a host of domestic and international financial activities.

The company did not want either custom-written software or a commercial package that would require extensive retooling to fit the particular needs of an in-house investment operation.

Since the activities of his department are far afield from Du Pont's usual areas of business, Powell requested hardware and software recommendations from a number of major computer manufacturers. Only DEC responded with comprehensive recommendations, complete with a demonstration. The quality of the company's response was due to the ACT program, which was created to answer this type of request.

> "WE ASKED them to show us how we would do this or do that, and they did it."
>
> IRA POWELL
> DU PONT CO.

Powell says he had expected to travel throughout the country to see the recommended products. As it turned out, however, his DEC sales representative invited him to suburban Philadelphia, about an hour from Du Pont's Wilmington, Del., headquarters, to meet Computer Aided Decisions' employees and have a full, working demonstration of that company's program.

At the ACT, both Powell and systems supervisor Sam Park were given a full hands-on demonstration by DEC and Computer Aided Decisions personnel. "We asked them to show us how we would do this or do that, and they did it," Powell says.

A good team

What would ultimately be the strongest impression the ACT made on Powell was the seamlessness with which DEC was able to incorporate third-party vendors into the ACT presentation. Powell says he is confident he was presented with a unified hardware and software solution, which is what the ACT was ideally intended to achieve. The DEC ACT team, as a single entity, assumed responsibility for the complete solution. "Everyone was involved. It's like they went that extra step to be involved," he says.

Powell was also impressed with the attentive treatment he and Park received. "They were acting like we were buying the entire product line," he says.

Powell has not yet signed a purchase agreement, but his project leader is booked for a trip to Computer Aided Decisions' headquarters in Boston for training and a chance to meet the staff.

While Powell is clearly impressed with the DEC ACT and the enthusiasm, knowledge and service he encountered there, his decision will ultimately depend on the quality of the products he is offered.

"There are lots of people who have very good packages, but they are too focused," he says. These packages fulfill only some of his needs. The Computer Aided Decisions program, although it does much more of what he wants and does it well, still does not do everything.

There is no doubt that seeing a software product in the context of an ACT operation adds to its appeal, Powell says, but even an impressive demonstration of teamwork in action is not, by itself, necessarily enough to clinch the sale. ●

Radding is a Boston-based author specializing in business and technology.

VAX attracts

FROM PAGE S3

users purchased their word processing software from DEC.

There is some question of whether that measure of success will continue as the market for DEC equipment expands into new user territory and PC software companies begin to bring their products into the VAX environment.

The Sierra Group's Gruhn says PC software firms could act as spoilers for DEC's in-house development efforts.

"The first choice for word processing tends to be the PC," she says, "which means that users are more likely to use a word processing program that is moved up to the VAX from the PC."

The upper hand

At the same time, if DEC does beef up its own library of applications, as it has indicated it will, the company is likely to claim an advantage that third-party software houses are lacking. All of the DEC applications built so far were designed to run in tandem with each other.

Whitey Stange, VAX technical manager at Pioneer Data Systems, a division of Pioneer Hi-Bred International, Inc. in Johnston, Iowa, also wants third-party packages to work together in some way.

Pioneer Data's Stange

"Every vendor seems to think it is in the center of the universe," he says. "These programs just don't seem to know each other."

However, according to Stange, there is another side to the dilemma. With DEC's All-In-1 program, users sacrifice individual expertise, evident in third-party offerings, for the ability to have an integrated team in which no component stands out, he says.

"Precision Visuals, for instance, does an outstanding job with graphics, and other third-party-house packages provide the best in their field," Stange says, referring to the Boulder, Colo.-based developer of graphics software and provider of consulting services. "DEC's All-In-1 is not the best in any of its individual parts."

> "WE TEND to run some experiments with a package and then move on to the next one."
>
> ROBERT LOVESTEDT
> WEYERHAEUSER CO.

In a recent Sierra Group study, a common interchange for multiple-vendor software was chosen as one of the top five demands of users.

Forecasters say the pressure will be sufficient to force DEC to develop what has been called X-Windows, much like the Windows program developed by Microsoft Corp.

In Microsoft's Windows, multiple applications from multiple vendors can be run at the same time.

However, Weyerhaeuser's Lovestedt says that, like with everything else, need determines whether or not his company buys applications from DEC or a third party. "We're totally neutral," he says. "We have a data base from DEC and other packages from third parties."

Jeppesen Sanderson's Knaus says DEC has the upper hand in any head-to-head competition between itself and its third-party software house. "Presumably, DEC would be able to keep up with VMS revisions," he says. "Hopefully, they would know VMS better than anyone."

Even DEC itself, especially with its CMP, looks to third parties for many of its in-house applications, according to DEC's Corley. But that does not prevent the company from building its own beachheads within the applications market.

A precedent on the hardware side strikes fear in the hearts of some third-party software developers. Many years ago, when DEC concentrated on making CPUs, it purchased most of its peripherals from third parties. Outside manufacturers flourished for a long time by providing disk drives, tape drives and printers to DEC. During the past decade, however, DEC has learned that there is gold in the peripherals business.

"It is an interesting game," The Sierra Group's Gruhn says. "It is not just limited to DEC. It begins when a manufacturer is dependent on third parties to supply a need. Once the market becomes large and thriving, the manufacturer goes from a supporting role to a predatory one. The long-term reality is that once a market grows to about $10 billion, or large enough to be considered relevant by the manufacturer, natural instincts take over."

The question then is not whether but when DEC will take on the application software market, Gruhn says.

No worries

DEC officials say the third-party market will remain a healthy competitor and will continue to complement its own efforts. Third-party software houses do not openly express any major concerns.

"All we do is software," says Peter Hallett, a product manager at Precision Visuals, Inc. "For DEC, software plays only a small part in its overall operations."

MCBA's Freeman agrees. "Independents can react so much quicker to the marketplace than a giant corporation like DEC," he says.

Users naturally want to see a continuation of healthy competition between DEC and third-party houses and will probably use their influence to keep the third-party channels open.

Teradyne's Loomer notes that DEC's closed architecture on the VAXBI bus has not exactly shut down third-party peripheral houses. "They've just gotten very creative," he says.

Furthermore, while, DEC's in-house word processing application may have won acceptance by many VAX users, some see this horizontal effort as too little, too late.

Several years ago, Stange says, his division, which does genetic research to develop corn hybrids for the international seed company, asked DEC if it planned to develop its own word processor. He was assured that the company would not.

A year later, Stange says, DEC developed its All-In-1 word processing package. "We had already put a package in place," he says, "and there was no chance of our converting to something else then." •

Software preferences

*Breakdown of applications in use on DEC systems**

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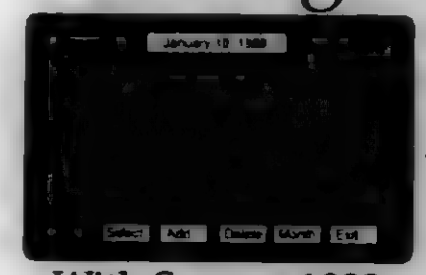

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ASK THE VENDOR

The following questions were solicited from users and conveyed to the vendors for responses.

What will M&D's Millennium do for me on the VAX that the company's G/L Plus series does not?

Stanley Ciepcielinski
Alcatel NA, Inc.
Hickory, N.C.

MCCORMACK & DODGE CORP.: Millennium is a set of programs that provide shared features between applications such as general ledger, accounts payable and fixed assets. Examples include Borderless Query, which gives users on-line access to data stored in any M&D application, and Screen Designer, which allows users to display screen data any way they choose.

We want to move DEC RDB files on a VAX to a VAX 8600 running Focus. Is there any simple way to do this without having to break the files down to flat files and then reload them again to Focus?

Terry Bazylewicz
Director of MIS
Jersey City State College
Jersey City, N.J.

INFORMATION BUILDERS, INC.: Focus can interface directly to RDB data bases, allowing users to easily read RDB data directly into a Focus data base with no intermediate step. Focus supports the same interface functionality with most VAX-based data, such as RMS, Relational Technology, Inc.'s Ingres, Oracle Corp.'s Oracle and Sybase, Inc.'s Sybase.

It would be nice to be able to use DEC's CMS with Ingres. However, ABF, Ingres's fourth-generation language, is not compatible with CMS. What is Relational Technology doing to provide a code management facility that would allow this?

Tom Blythe
American Mathematical Society
Providence, R.I.

RELATIONAL TECHNOLOGY, INC.: Relational Technology does not now provide a direct interface between CMS and Ingres. However, the data dictionary available in the current version of Ingres contains catalogs that allow users to write utilities for a CMS/Ingres interface.

We have files created with DEC's Datatrieve that use a PIC definition of S9(4). Trying to read that format using SAS is very difficult, and we have to go through a character conversion routine in order to get the SAS program to read the format. Is there an easier way to read a Datatrieve format using SAS?

Peter Byron
Process automation staff
Great Northern Paper Co.
Millinocket, Maine

SAS INSTITUTE, INC.: Generating a standard ASCII file using PIC S9(4), the data file should contain a standard ASCII string with a leading-sign five numeric values to the left of the decimal and four to the right. If this is the case, using the w.d informat will allow SAS to read the data.

Why did Cincom decide to implement Vaxcluster support within Ultra by using an I/O server rather than a homogeneous use of the distributed lock manager?

Dave Sinclair
Business manager
Nucleus Data Systems
Calgary, Alta., Canada

CINCOM SYSTEMS, INC.: Both approaches have their advantages and disadvantages.

The disadvantages of homogeneous support show up most clearly when used in a data base management environment. In a high-volume transaction-based system, the sheer number of locks required to ensure data integrity can be enormous; consequently, the management of these locks becomes a prime.

Continued on next page

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Developers rate compatibility as DEC's greatest virtue

BY KATY GURLEY

Digital Equipment Corp. is hot, and its uncompromising micro-to-mainframe compatibility is why, third-party software developers agree.

"Our software runs on everything from the Microvax 2000 all the way up to the clustered 8800s," says David Solum, vice-president of marketing and new business development at Ask Computer Systems, Inc. in Los Altos, Calif., which produces Manman and Maxcim, integrated management information systems for manufacturing.

Solum says IBM cannot provide such widespread compatibility. "If you try to take the same range of computing power from IBM, you would have to start with the System/36 or 38 range and move all the way up to the 3090. There is not a single operating system that runs on all those systems," he says.

Running the gamut

R. Patrick Johnson, vice-president of new product development as well as the System 1022 data base management system at Compuserve Data Technologies, Inc. in Cambridge, Mass., says his company's System 1032 DBMS is successful because it is linked to DEC's VMS architecture.

David Solum

"The VAX is really the only architecture that can run the exact same software on a range of machines covering a thousandfold price range," he says.

This high degree of compatibility fits the business climate of the 1980s, which is another reason DEC is riding high, according to Howard Anderson, managing director of The Yankee Group, a Boston-based research firm. That climate, he says, is characterized by departmental computing, decentralized operations, profit centers and less reliance on or need for a major data processing department.

Dennis Martineau

"What they've done in the last two years is either outrageous genius or good luck," Anderson says. "DEC began to fit best into those companies with decentralized management and profit centers — a company in which you have a vision that, from the smallest device on the software, could grow with you. Plus, they offer great connectivity. DEC is an awfully attractive company to write for right now."

The attraction was strong enough to pull Project Software & Development, Inc., a project management software firm also located in Cambridge, out of an exclusively IBM orbit. "Three out of every four licenses we sell are for the VAX," says Dennis Martineau, vice-president of marketing. "In 1978, we were selling 100% IBM. But now we are moving strongly into the DEC environment."

Developers have watched DEC bulldoze its way into the heart of the minicomputer market during the past two years. It accomplished this not only by offering across-the-board compatibility but also through what developers say is a good-faith effort to provide them with technical information about a product in advance of its release.

Solum says access to upcoming technology is a key support issue. "We need continuing access to their software development plans, particularly in the tools area. We're writing software today that is going to be delivered a year or two from now. If we are writing that software with today's tools, it won't have all the features it should have."

In addition, DEC is minimizing head-on competition between its own sales force and those of developers.

This way to support

A key element in improving support, developers say, has been DEC's Cooperative Marketing Program (CMP) and System Cooperative Marketing Program (SCMP), under which DEC's outside sales force and its third-party developers team up to sell new accounts for vertical applications. The 110 CMP members sell only software; the more than 40 SCMP members are former DEC OEMs that sell hardware as well.

"Support has been improving by leaps and bounds in the last two years," says Solum, who attributes the improvement to the CMP project and whose own company is an SCMP.

Participants, nonparticipants and DEC itself all agree that a company receives more attention and better software support from DEC if it is a member of CMP or SCMP.

"DEC has told its third-party suppliers in the CMP and SCMP groups where it is going. It wants to keep them happy," says The Yankee Group's Anderson. "It's in their best interest to see that those guys survive."

The software companies most attractive to DEC are those producing vertical-market packages in the scientific/engineering, manufacturing, financial services, government, health care and other large service industries.

Software developers who do not fit the CMP or SCMP profiles sometimes feel shortchanged. "When you're not a CMP, it's more difficult to get answers," Johnson says. Access Technology, Inc. in Needham, Mass., recently integrated its principal product, 20/20, with DEC's All-In-1. Now the company needs extra support from DEC, but it does not receive it because it is not a CMP member.

Jay Yesselman

"From a marketing standpoint, we've been somewhat frustrated that DEC's marketing emphasis has been in the way of vertical solutions," says Jay Yesselman, product manager for 20/20, a spreadsheet with graphics, data base management and project modeling. But he says the firm works in cooperation with DEC's direct sales force and that the association alone has boosted the product's credibility.

George Luntz, vice-president of sales and marketing for MCBA, a producer of accounting, distribution and manufacturing software, says he would like a CMP agreement with DEC but has not yet been approved for one.

"The key component of such an agreement would be the stamp of approval of DEC," he says. "We have everything but a written agreement in place." The Glendale, Calif., company participates in DEC's Small Business Direct Program, but the CMP membership would provide it with more advance information on upcoming DEC products.

And justice for all

A DEC spokesman acknowledges that CMP and SCMP participants get more attention from DEC but that the company actively supports all third-party developers.

In fact, DEC has maintained a data base of software products called The Softbase System since 1986. This data base is available on DEC's worldwide network to employees in sales marketing and purchasing. More than 1,500 third-party developers currently have software products listed among the 6,500 entries, and DEC actively encourages participation. A toll-free number is available for anyone interested in making submissions. Products can be listed for any type of DEC hardware and need not be based on DEC's operating system. •

Gurley is a free-lance writer based in Wellesley, Mass.

Ask vendor

FROM PRECEDING PAGE

cause of system overhead.

With a server method of Vaxcluster data base support, Ultra can be fully supportive of a Vaxcluster environment; that is, it can provide a high degree of load balancing and fail-over support while not incurring the overhead of VMS lock management.

Does Microsystems Engineering plan to upgrade the VAX version of Mass-11 to give it "what-you-see-is what-you-get" [WYSIWYG] qualities, both batch and interactively, and typesetting capabilities, like kerning and graphics cropping? When do you see it happening?

Cecilia Fernandez
Technical documentation system manager
Racal-Milgo, Inc.
Sunrise, Fla.

MICROSYSTEMS ENGINEERING CORP.: Release 8A of Mass-11 for the VAX and micros will be available this spring. The VAX version will be as WYSIWYG as the hardware will allow.

It will also include some sort of graphics designation in review mode — either an actual graph or a representative box. Which designation is used depends on whether our users indicate they are willing to put up with the slow performance time created when drawing a graph to terminal on the VAX.

In addition, Mass-11 will print to an Adobe Systems, Inc. Postscript file, which will put in printer codes, allowing the file to go out to a Linotype typesetter. •

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Microvax DBMSs

COMPANY	PRODUCT	STRUCTURAL APPROACH	MINIMUM MEMORY REQUIRED (IN BYTES)	MULTIUSER CAPABILITIES	MENU-DRIVEN	INCLUDES QUERY LANGUAGE	PROGRAMMING LANGUAGE SUPPORTED	FULL DATA TRANSFER TO OTHER SOFTWARE	MAXIMUM FIELD SIZE (IN CHARACTERS)	MAXIMUM FIELDS PER RECORD	MAXIMUM RECORDS PER FILE	SECURITY PROVISIONS	PRICE
Advanced Data Management, Inc. (609) 799-4999	DMS	Hypernet	500K	Yes	Yes	Yes	C, Fortran, Basic, Pascal, proprietary	No	4,000	255	16M	At data base, record, field, command levels	$7,200-$60,000
Ashton-Tate Corp. (213) 329-8000	Dbase III Plus/Lanpac	Relational	640K	Optional	Yes	Yes	Dbase	WKS, DIF, ASCII files	1,024	128	1G	Eight levels of passwords; data encryption, form-access controls	$695-$995
Automated Systems, Inc. (800) 328-2626	Easy Base II	Relational, hierarchical	64K	Yes	Yes	Yes	No	Any package	30	100	Limited by disk space	Password protection through file level	$2,995
Boeing Computer Services (206) 865-3460	Boeing Rim	Relational	500K	Yes	No	Yes	Cobol, Fortran, Pascal, Basic, PL/I	No	4,096	1,021	Limited by disk space	Relation level	$6,000 and up
Compass America, Inc. (818) 992-6066	Paine DBS-Plus	Relational	2M	Yes	Yes	Yes	Basic	ASCII files	255	512	16.7M	Passwords at menu, screen, field levels	$10,500
Comshare, a division of Associated Grocers Ltd. (403) 236-6100	Lazer	Network	1M	Yes	Yes	Yes	Cobol, Basic, C	Proprietary	Limited by disk space	Limited by disk space	1G	Record locking, secondary and primary password protection	$3,480
Cincom Systems, Inc. (800) 543-3010	Ultra	Relational	1M	Yes	Yes	Yes	Cobol, Basic, Fortran, proprietary	No	4,000	512	Limited by disk space	Passwords	$20,000
Cognos Corp. (613) 738-1440	Powerhouse PC	Indexed	640K	No	No	Yes	Proprietary	1-2-3, Dbase, DIF, ASCII files	2,047	1,024	Limited by disk space	None	NP
Computerview Data Technologies, Inc. (617) 661-6440	System 1032 4GL/DBMS	Relational	3,500	Yes	Yes	Yes	C, Cobol, Fortran, Basic	SAS, SPSS, Datagraph, Context-32	32,767	3,000+	Limited by disk space	Password user ID code, user name, any combination field-, record-level restrictions	$3,000-$19,500
Computer Representatives, Inc. (408) 980-0886	Relate/DB	Relational	Varies	Yes	No	Yes	Proprietary, Cobol, Pascal, Fortran, Ada	Any ASCII files or native DBMSs	NP	128	Limited by disk space	Password protection at the file, field, record levels	$15,000
DB/Access, Inc. (800) 288-3620	Bobcaye	Relational	1M	Yes	Yes	Yes	Cobol, Pascal, PL/I, assembler	Access/Star	120	300	Limited by disk space	None	$10,000
Dialogue, Inc. (212) 425-2665	Analect/Rim	Relational	1M	Yes	No	Yes	Fortran, C	Oracle, R:Base 5000 formatted files	4,096	1,000	Limited by disk space	Relation level	Starts at $4,000
Digital Equipment Corp. (800) DIGITAL	VAX RDB/VMS	Relational	4M	Yes	Yes	Yes	NP	Culinet IDMS/R, VSAM	16,382	2,000	NP	Access control lists, VMS security	$1,900-$80,000
	VAX DBMS	Network (Codasyl-compliant)	4M (4M per processor for 8974/8978)	Yes NP	No	Yes		No	65,000	Varies by processor	NP	VMS security	$2,900-$60,000
Empress Software, Inc. (416) 922-1743	Empress	Relational	2M	Yes	Yes	Yes	C, Fortran, Cobol	ASCII files	Limited by disk space	Limited by disk space	Limited by disk space	At table level	$9,000
IBI Corp. (612) 890-1840	CYX	Network	1M	Yes	No	No	All standard Unix	No	8,192 bytes	NP	16M +	None	$15,000
Hence Software, Inc. (617) 890-8670	Info-DB+	Relational	1M	Yes	Yes	Yes	Any supported by VAX	Works with host file formats	4,096	9,999+	Limited by disk space	Through data item level	$4,500-$15,000
Information Builders, Inc. (212) 736-4433	Focus for VAX	Relational	512K	Yes	Yes	Yes	Cobol, Fortran, Pascal, C, SQL	PC Focus, IBM mainframe Focus	256	Limited by disk space	Limited by disk space	Access, resource security; program accounting; password assignment; display control; encryption	$6,000
Information Dimensions, Inc. (800) DATA MGT	Basis	Flat	512K	Yes	No	Yes	C, Pascal, Fortran, Cobol, PL/I, Basic, Ada	All-in-1	1M	2,000	More than 1G	For data base, index postings, files, data elements	NP
	DM	Relational	1M	Yes NP	No	Yes		No	15,000	500	2G	Privacy codes, access codes	NP
Informix Software, Inc. (415) 322-4100	Informix-4GL, SQL, ESQL/C, C-Isam	Relational	1M	Yes	Yes	Yes	C	1-2-3	32,000	32,000	Limited by disk space	Full SQL GRANT, REVOKE facilities	$995-$20,000
Intersolv, Inc. (617) 661-6124	Intersolv	Flat/ inverted	NA	Yes	Yes	Yes	Fortran	ASCII files	Limited by disk space	75 (unlimited repeating fields)	Limited by disk space	Passwords by field, function levels	$3,850

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COMPANY	PRODUCT	STRUCTURAL APPROACH	MINIMUM MEMORY REQUIRED (IN BYTES)	MULTIUSER CAPABILITIES	MENU-DRIVEN	INCLUDES QUERY LANGUAGE	PROGRAMMING LANGUAGE SUPPORTED	FULL DATA TRANSFER TO OTHER SOFTWARE	MAXIMUM FIELD SIZE (IN CHARACTERS)	MAXIMUM FIELDS PER RECORD	MAXIMUM RECORDS PER FILE	SECURITY PROVISIONS	PRICE
Intellicorp Information Systems, Inc. (312) 969-6444	Multiview	Relational, hierarchical, network	4M	Yes	Yes	Yes	Proprietary	RMS files	64,000	Limited by disk space	Limited by disk space	Data base, file, record locking	$8,000 first user, $2,000 each additional user, up to $40,000 for 5+ users
Interactive Systems, Inc. (800) 962-UDMS	User Defined Management System	Relational, hierarchical	1M	Yes	Yes	Yes	C, Cobol, Fortran, Basic, Pascal	DIF, ASCII files	Limited by disk space	User-definable	Limited by disk space	Through field level	$2,950-$6,500
Interactive Technology, Inc. (800) 368-6868	IMC	Relational	512K	Yes	Yes	Yes	Fortran, C, Macro	Any RMS or ASCII file	255	255	16M +	Password protection from access through individual field levels	$6,500
Interbase Software Corp. (617) 649-3077	Interbase	Relational	1M	Yes	Yes	Yes	Ada, Basic, Cobol, C, Fortran, Pascal, PL/I	RMS, RDB files	32,000 bytes	16,000	Limited by disk space	Data base, relation, field levels	$5,000-$15,000
Landmark Software Systems, Inc. (301) 720-8100	Xanadu	Relational	256K	Yes	Yes	Yes	Cobol	RMS files	132	Limited by disk space	Limited by disk space	Per fields, entities, data base	$30,000-$80,000
MDBS, Inc. (800) 344-5832	MDBS III	Network	64K	Yes	No	Optional	Cobol, C, Fortran, Pascal, Basic, proprietary	NP	65,535	65,535	Limited by disk space	Password protection at record, transaction, data item levels	Starts at $7,000
	Knowledgeman/2	Relational	512K	Yes NP	Yes	Yes		NP	65,535	255	2G +	Data encryption, write/read access codes	$3,995
National Information Systems, Inc. (800) 859-7180	Answer	Hierarchical, network, relational	1M	Yes	No	Yes	Any VAX structured language	RMS, ASCII files	30,000	12,000	Limited by disk space	None	NP
Oracle Corp. (312) 498-8615	Helix VMX	Relational	NP	Yes	Yes	Yes	NP	NP	NP	Limited by disk space	Limited by disk space	Password protection	$4,500 and up
Oracle Corp. (800) 345-Oracle	Oracle	Relational	1M	Yes	Yes	Yes	NP	RMS, RMS2, SQL/DS	65,000 bytes	254	Limited by disk space	NP	$3,000 and up
Park Software, Inc. (206) 343-0447	Xenix	RMS files	NP	Yes	Yes	No	No	1-2-3, Multiplan, Excel, Nyphin, Finar, Digicalc	128	250	Limited by disk space	Up to nine levels	$1,000-$4,500
Progress Software Corp. (617) 270-6500	Progress	Relational	2M	Yes	Yes	Yes	Proprietary	Dbase	2,000	2,000	Limited by disk space	User ID, password at field, file levels	$8,000-$12,000
P-Stat, Inc. (609) 924-0160	P-Stat	Relational	400K	Yes	Yes	Yes	Proprietary	ASCII files	999	3,000	Limited by disk space	None	Approx. $2,000
Public Utility Corp. (208) 522-3580	Socrates	Three-dimensional	2M	Yes	Yes	No	No	ASCII files	100 per level	127	2M +	Access per user, account, data base, program, record, data item, field	$12,000
Quadrex Corp. (303) 728-6777	QDMS-R	Relational	5M	Yes	Yes	Yes	All VAX programming languages	Proprietary	512	32,000	32G	Read/write protection at field level, security at individual terminals	$16,000-$25,000
Revelation Technology, Inc. (800) 4-INFORM	Inquire	Relational	1M	Yes	Yes	Yes	C, Cobol, Fortran, Basic, Pascal, Ada, PL/I	SYLK, DIF, ASCII files	2,000	127	Limited by disk space	Field, time, date, user levels	$6,000
Rim Technology, Inc. (303) 451-8144	Rimin	Relational	500K	Yes	No	Yes	Fortran, Pascal, C	ASCII files	4,000	100	Limited by disk space	Record locking, passwords	$4,000
Rod Corp. (612) 788-0641	Inquire	Relational	1M	Yes	Yes	Yes	RMS files, Basic, Fortran	ASCII, RMS files	4,000 bytes	100	Limited by disk space	Passwords, encryption at programming level	$10,000
Saturn Systems, Inc. (612) 944-2452	Saturn-base	Proprietary	NA	Yes	Yes	Yes	Proprietary	ASCII files	132	10,000	999,999	Passwords at field, record levels	$3,500
Seed Software Corp. (703) 960-0660	Seed (Shell, Protocol	Network	1M	Yes	No	Yes	Cobol, Fortran, C	1-2-3, ASCII, DIF files	30,767	3,000 per schema	Limited by disk space	Passwords	$3,500-$11,000
Signal Technology, Inc. (800) 235-8787	Smartstar	Relational	NA	Yes	Yes	Yes	NP	RMS, RDB files, Britton Lee IDM	132	NP	Limited by disk space	None	$5,000-$65,000
Smith, Alford and Co. (601) 969-6411	Anagen	Relational	NA	Yes	Yes	Yes	Any that works with RMS files	RMS files	80	999	Limited by disk space	At menu, system, field levels	$3,750-$8,000
SCI, Inc. (800) 535-3001	Inforer	Relational	1M	Yes	Yes	Yes	NP	RMS files	70	Limited by disk space	Limited by disk space	Data base, data set, data item levels	$4,900-$20,000
Timeline, Inc. (800) 255-3160	Digitrax	Three-dimensional	512K	Yes	Yes	No	Basic	RMS files	32,767	512	4G +	Passwords	$4,000
Wisconsin Products, Inc. (519) 886-3700	Wetfile/Flex	Flat, relational	50-60K	No	No	Yes	Any that can access RMS sequential text files	RMS files	79	Limited by disk space	2G	None	$900-$1,800 per year annual license

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George J. Weiss
Program Director
November 20, 1987

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VAX and PDP DBMSs

COMPANY	PRODUCT	DEC HARDWARE SUPPORTED	STRUCTURAL APPROACH	QUERY LANGUAGES USED	SUPPORTS CONCURRENT PROCESSING	ACCESS CONTROL TO WHAT LEVEL	INCLUDES DATA DICTIONARY	DATA BASE ADMINISTRATOR UTILITIES PROVIDED	INCLUDES FACILITY FOR DOWNLOADING TO PCs	PERFORMS DATA TRANSFERS WITH WHICH DBMSs	PRICE
Advanced Data Management, Inc. (609) 799-4600	DMS	VAX/VMS	Hypertext	QML	Yes	Field	Yes	Monitor performance, analyze structure, rebuild, recovery	No	NP	Up to $72,000
Automated Systems, Inc. (608) 335-3636	Easy Base II	All VAX, PDP-11	Relational, hierarchical	Proprietary	Yes	NP	Yes	Report writer, library, backup, recovery, reorganization utilities	Yes	Any	$1,995-$4,995
Boeing Computer Services (206) 865-3600	Boeing files	VAX/VMS	Relational	Proprietary	Yes	Relation	Yes	Report writer, forms screen generator, program interface language	Yes	NA	Up to $35,000
Campus America, Inc. (615) 523-9306	Prism DMS-Plus	All	Relational	Proprietary	Yes	Limited field level	Yes	Screen, report, forms generator; data manipulation; tape, interfacing utilities; menu processor	Yes	ASCII files	$22,000-$35,000
Cincom, a division of Associated Cincom Ltd. (402) 296-6100	Lanar	All VAX	Network	Proprietary	Yes	Secondary through keyword	Yes	Define schemas, add/delete records, password verification	No	Total	$8,000-$10,000
Cincom Systems, Inc. (800) 543-3010	Ultra	All VAX	Relational	Spectra	Yes	Record	Yes	Complete DBMS maintenance and tuning utilities	No	RMS files	$30,000-$120,000
Comparex Data Technologies, Inc. (617) 661-9440	System 1032 DBMS	Any running TOPS 10, 20	Inverted	Proprietary	Yes	Record, field	No	Installation manual, system administrator program with DBA, DEFO, BANNER, PATCH, FIX, CHECK, DEFAULT commands	Yes	NP	$20,000-$72,000
	System 1032 4GL/DBMS	All VAX	Relational	Proprietary Yes	Yes	Field		NA	Yes	NP	$12,000-$100,000
Computer Representatives, Inc. (408) 998-9898	Relate/DB	All VAX	Relational	Proprietary	Yes	File, field, record	No	Has command necessary to observe or alter structure of any given table	Yes	Any ASCII files or native DBMSs	$15,000-$110,000
Cullinet, Inc. (617) 329-7700	Totem/db	All VAX	Relational, hierarchical	Proprietary	Yes	Item	Yes	File maintenance	No	IDMS/VAX, RMS files	$6,000-$35,000
Cosmic/The University of Georgia (404) 542-3265	Rim5	All VAX	Relational	Proprietary	No	NA	Yes	None	No	R:Base, Mirvasin	$3,000 for program
DBMS/Rmx, Inc. (408) 559-9000	Rdb/eng	All VAX	Relational	Proprietary	No	NA	Yes	File description, program/storage descriptor	Yes	System 1032, SQL/DS, Focus, Datatrieve, RMS	$60,000-$80,000
Dialogue, Inc. (212) 425-2600	Analect/Rim	VAX/VMS	Relational	Proprietary	No	Relation	Yes	Report writer/generator, data loader, 4GL support language, color graphics, statistical modeling, data manipulation	Yes	Oracle, R:Base 5000 formatted files	Up to $80,000
Dynamic Software, Inc. (415) 969-7702	Dataset	All VAX	Relational	File	No	Value	Yes	Report writer, field validity, distribution control	Yes	ASCII files	Up to $20,000
HN Corp. (612) 869-1848	CYX	PDP-11, all VAX	Network	None	Yes	None	No	Recovery, dumping/loading, expansion utilities; file maintenance; transaction roll-back	No	None	$10,000-$30,000
Honeywell, Inc. (617) 689-6000	Info/DMS	All Honeywell under VMS	Relational	Proprietary	Yes	Data base	Yes	Installs on data baseload	No	ASCII files	$20,000-$100,000
Information Builders, Inc. (212) 736-4433	Focus for VAX	VAX/VMS	Relational	SQL, Focus, EQL, proprietary	Yes	Value within field	Optional	Access command control, encryption, password assignment, display control, program accounting, resource limitation	Yes	Oracle, Ingres, Sybase, DBMS, RMS, RDB, Focus	$6,500-$80,500
Informatics (Australasia) Inc. (408) 296-8000	Mark	VAX/VMS	Flat	Proprietary	Yes	Field	No	Maintenance	No	Sequential files	NP
	3GL	VAX/VMS	Relational	Proprietary Yes	Yes	Relation		Maintenance	No	ASCII files	NP
Information Structures, Inc. (303) 293-3911	Base/OE	PDP-11, all VAX	Relational, hierarchical	Proprietary	Yes	File	Yes	File update processor; query, application languages	Yes	None	$13,500-$36,000
Informix Software, Inc. (415) 322-4200	Informix-4GL, C-Isam	Most	Relational	SQL	Yes	Relation, field	Yes	Shared, locked, synced, subschemas, database	No	NP	Sold with unix
Innergic, Inc. (617) 661-8124	Innergic	All VAX	Flat	Proprietary	No	Field, function	No	Help facilities, security, editors, report writer	Yes	ASCII files	$13,500
Intel Micro Information Systems, Inc. (503) 696-8080	iRMX/Rdm	iRMX/VMS	Relational, hierarchical	Proprietary	Yes	File, record, data base	Yes	Facility many, variable length fields, on-line recovery, symbolic debugger, file transfer from RMS files, automatic translation, add views	No	RMS files	$4,500 (base system), up to $40,000 (50+ users)
Interactive Systems, Inc. (800) 982-UDMS	User Defined Management System	All VAX running VMS	Relational, hierarchical	Proprietary	Yes	Field	Yes	Dump, dictionary extract, dictionary interface programs	Yes	System 1032, Ingres, RMS files	$2,950-$15,300

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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Field	Yes	[illegible]	Yes	Any RMS or ASCII files	[illegible]
Interbase Software Corp. (617) 648-3977	Interbase	All VAX up to Venchester	Relational	SQL, proprietary	Yes	Data base, relation, field	Yes	Backup, restore, maintenance utilities	Yes	RDB, proprietary	$35,000-$75,000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
MDBS, Inc. (800) 344-6832	Knowledgeman/2	VAX-11, 8000 series	Network	Proprietary	Yes	Field	Yes	NP	Yes	NP	$15,900 and up
	Knowledgeman/2	VAX-11, 8000 series	Relational	Proprietary	No	Field	Yes	NP	Yes	NP	$11,906 and up
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Odesta Corp. (312) 498-8016	Helix VMS	Any VAX	Relational	Proprietary	NP	NP	NP	NP	Yes	NP	$4,500-$75,000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Park Software, Inc. (206) 343-0447	Xenix	VAX/VMS	RMS	None	NP	Nine levels	Yes	Creates data files, audit trail management, loading/dumping file description, copy file description, mass change/delete	Yes	RMS files	$2,000-$13,000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Progress Software Corp. (617) 275-4500	Progress	VAX running VMS, Ultrix	Relational	Proprietary	Yes	Record	Yes	Backup/restore analysis	Yes	Dbase	$20,000-$60,000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Quodata Corp. (303) 728-6777	QDMS-R	All VAX/VMS	Relational	Proprietary	Yes	Bit	Yes	Screen, report, letter, menu generation	Yes	ASCII, EBCDIC files	$16,000-$25,000
	QDMS	PDP-11, RSTS/E family	Relational	None	Yes	Bit	Partial	NP	Yes	ASCII, EBCDIC files	$12,000-$19,500
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Rim Technology, Inc. (206) 451-8144	Rimin	VAX running VMS, Unix	Relational	Proprietary	Yes	Record	Yes	Report writer, full-screen interface	Yes	ASCII files	$8,000
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Saturn Systems, Inc. (612) 944-3483	Saturn-base	All PDP, VAX	Proprietary	Proprietary	Yes	Field, record	No	Report writer, report generator, load/unload, data base extension, screen parameter files, interactive query	Yes	ASCII files	$3,500-$14,000
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Signal Technology, Inc. (800) 235-6787	Smartstar	All VAX	Relational	SQL	Yes	NA	Yes	NP	No	RMS, RDB files, Britton Lee IDM	$5,000-$55,000
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Software AG of North America, Inc. (703) 860-5050	Adabas	All VAX	Relational	Proprietary	Yes	Field	Yes	Initial design and loading, restart/recovery, data base modification, multi/control/tuning, security	No	Proprietary	$10,000-$80,000
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SCI, Inc. (800) 336-3891	Infocon	All VAX	Relational	Proprietary	Yes	Data item	Yes	Performance monitor, import, load/off-load, build, change, security	Yes	RMS files	$4,900-$60,000
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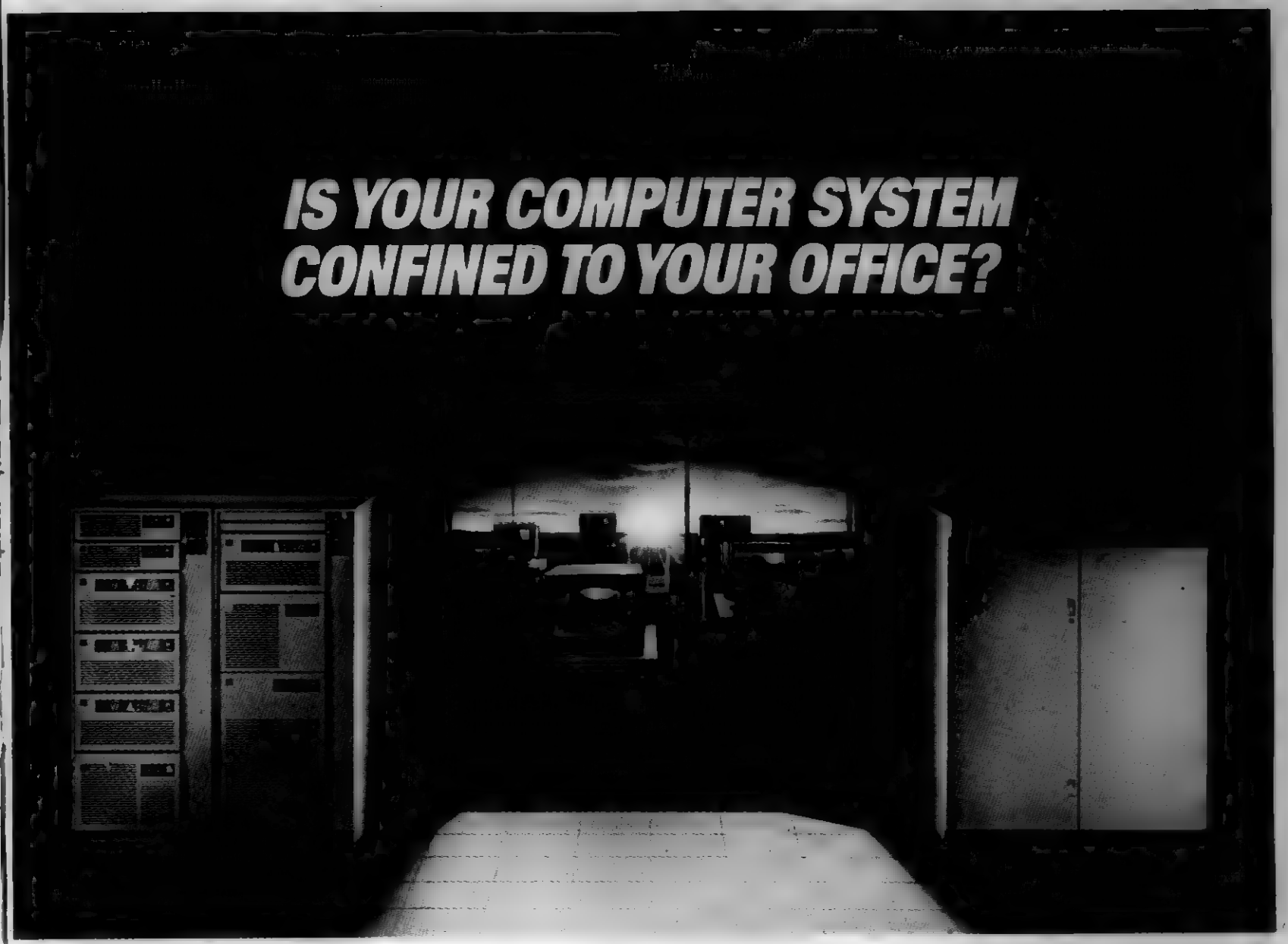
Wescom Products, Inc. (319) 886-3700	Watfile/Plus	VAX/VMS	Flat, relational	Proprietary	No	NP	No	NP	No	None	$900-$1,800



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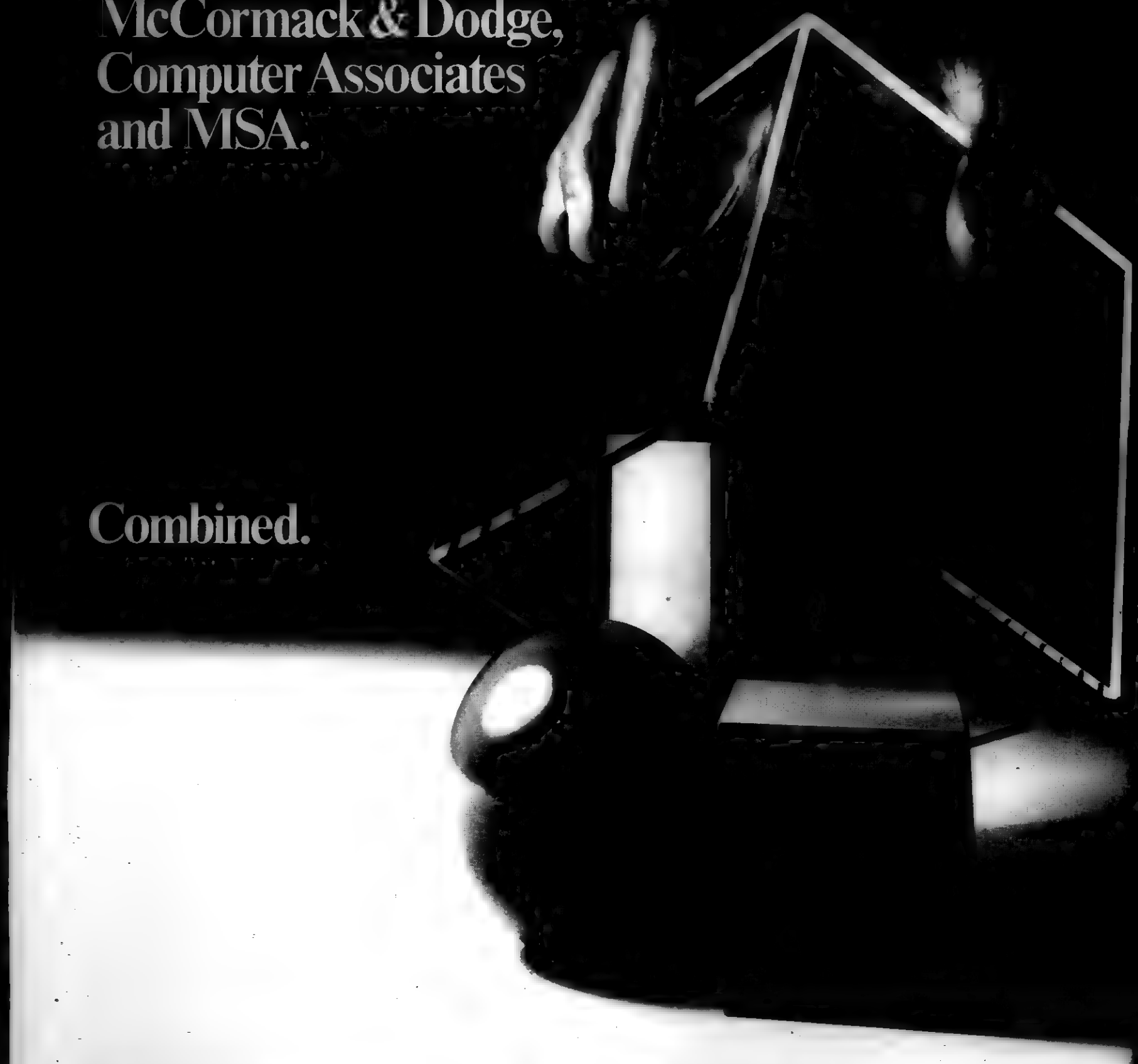

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Company needs applicant with Master's Degree in Computer Resources Management or Computer Science and must have experience or training courses in NCR/VRX Systems and VRX Cobol Systems; in Basic-3 on-line environment; and in UNIX Systems. Will analyze, design, develop and implement computer programs and provide any and all necessary documentation as deemed necessary for these computer programs and user, operate and command NCR/VRX, VRX Cobol, UNIX and Basic-3 on-line computer systems. Salary $50,200/yr. 40 hrs/wk. Office in Decatur, IL. area. Please send resume to Illinois Dept. of Employment Security, 347-357 N. Main, PO Box 1600, Decatur, IL 62525-1. Attn: S. Ann Irwin, Plz Job #012167068. An employer paid ad.

Mathematical Systems Analyst wanted to analyze complex mathematical, logic and coding requirements; analyze production programs to identify problems and make modifications; design, develop and implement computer software for manufacturing and engineering applications; design program logic to produce required processing; code new programs and modifications; prepare complete program, system, user and operation documentation and create test data and test all new and modified programs; Requires M.S. degree in Mathematics or Computer Science and one year experience in the job offered or one year related experience as a Computer Systems Analyst; $44,580.00 per year; 1.5x/hr overtime; 40 hours per week. Send resume to 7310 Woodward Ave., Room 415, Detroit, MI 48202. Ref. #3888 "Employer Paid Ad".

SENIOR ENGINEER: Project scope: design, implementation & maintenance of a medical library system, & integration with an automated medical office system. Duties: analysis, design program specs & task assignment; supervise other Syst Analyst & Programmers on project tasks. Extensive knowledge in free text database design, decision support systems, natural language processing, and basic knowledge of medicine. Proficiency with both high & low level programming languages, computer networking & communications. Proven experience in conducting research & supervising project. At least 2 yrs of formal training in a medical science discipline, and MS Electrical Engineering or Computer Science. Salary $40,000/yr 40 hrs/wk. 8am-5pm. Send resume to Job Service of Florida, 3421 Lawton Road, Orlando, FL 32803-2699. Ref: JO #FL0867111.

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SYSTEMS ANALYST: Design, code maint software package which obtains digital data from Remote Terminal Unit (RTU) for use in Mainland China. Maint, enhance & test "Chinese Processing Systems" software (an in-house version of the VMS operating syst.) integrate Chinese characters into screen. Interface w/Chinese users. Install system in China, test installation & train users. 1 yr or 1 yr rel programming exp. Must know C, XENIX or UNIX, MS-DOS, IBM PC/AT, VAX hardware, VAX/VMS op syst. Must be fluent in Mandarin & English, & read & write Chinese. $50,000/yr, 40 hrs/wk. Computer Systems & Technology, 226 Sherwood Ave., Farmingdale, NY 11735. Send resume: Attn: Mr. Ming

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Analyst/Programmer - NYC locations - Analyze users needs; Design, develop and implement financial, accounting, commercial and manufacturing applications; write program specifications; use Burroughs B1000, A Series, BSD, DMSII, Unc II, SAMCS, JSMCOS, SMCS, COMS, ALGOL 68 in Computer Science or Electronics Engineering, 2 years experience doing above 35 hour week (9 a.m. to 4:30 p.m.) $37,000 per year. Send resume in duplicate to: RVB #130, Room 501, 1 Main St., Brooklyn, NY 11201.

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The Christian Broadcasting Network (CBN) has an immediate opening for a Senior Systems Analyst Programmer. The candidate will design and implement computer systems to solve business problems, perform analysis, design, programming, project management and support functions. Must be familiar with IBM OS-MVS, IDMS data base management and MSA human resource systems. Bachelor's degree is required in Computer Science, Mathematics, Business Administration or Engineering. If you agree with the mission of CBN, send letter and resume to:

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COMPUTER ENGINEER

Spring Valley New York, design and development of local area network for IBM XT system for use with educational projects using ASSEMBLER, FORTRAN & BASIC. Must have MS in Comp. Science or Electrical Engineering. Must have 6 months experience. 40 hours per week, 9 to 5. $35,771 per year. Send resume or letter in duplicate to: RVB #130, Room 501, One Main Street, Brooklyn, NY 11201.

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The Institute of Public Administration has the following immediate vacancies in its Computer Center:

LECTURERS IN COMPUTER SCIENCE. Must hold at least a Master's degree in Computer Science with a minimum of two years of teaching experience in programming languages (COBOL, FORTRAN, and PASCAL) and in analysis and design of applications systems.

ANALYSTS/PROGRAMMERS. Must hold at least a Master's degree in Computer Science with a minimum of two years experience in the area of applications development; or a Bachelor's degree in Computer Science with five years experience. This experience should be on a large IBM 300X computers operating in MVS-CICS-VSAM environments.

SENIOR SYSTEMS ANALYST. Must hold at least a Master's degree in Computer Science with five years of experience; or a Bachelor's degree with five years of experience as a Senior Systems Analyst.

EXPERTS IN STANDARD AND PROCEDURES. Must hold at least a Master's degree in Computer Science with a minimum of three years experience; or a Bachelor's degree in Computer Science with three years of experience in the design, implementation, and evaluation of procedures.

COMMUNICATIONS SYSTEMS PROGRAMMERS. Must hold at least a Bachelor's degree in Communications Engineering or Computer Science with a minimum of two years experience in SNA, NCP, VTAM on MVS operating systems.

SYSTEMS PROGRAMMERS. Must hold at least a Bachelor's degree in Computer Science with a minimum of four years of experience in systems programming on MVS/JES2 operating systems.

Knowledge of Arabic language is essential for lecturers and analysts/programmers; for others it is preferable.

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Interested persons should submit complete resume detailing their academic achievements and related experiences along with references. Copies of diplomas, transcripts, experience certificates, etc., should be attached.

Applications should be addressed to:

The Director General (Administration & Finance)
Institute of Public Administration
Riyadh 11141 (Saudi Arabia).

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Systems Programmers

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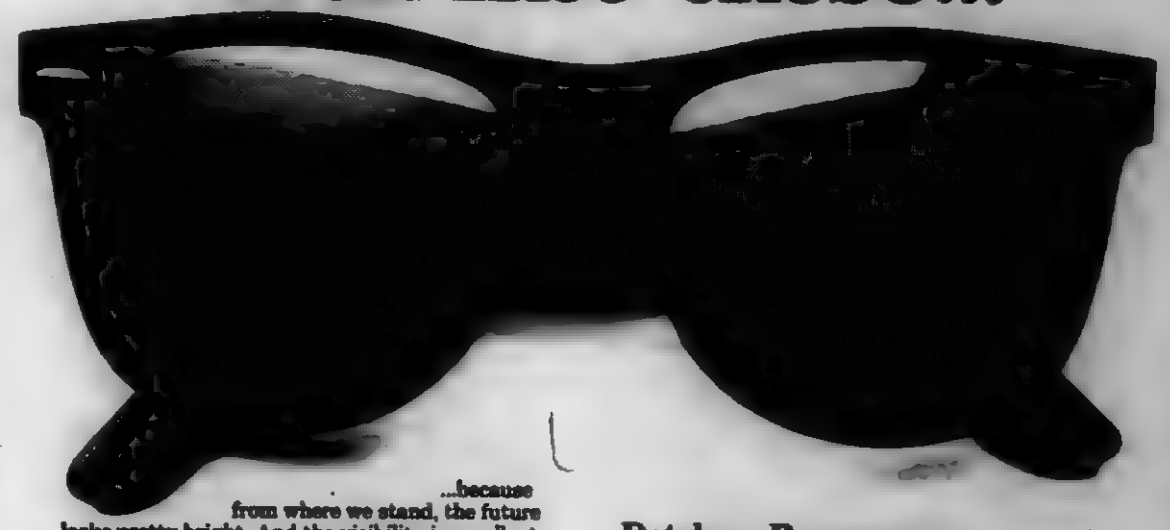

...because from where we stand, the future looks pretty bright. And the visibility is excellent. Unisys is stretching hardware and software technologies to their highest level of design and application sophistication. That means unlimited career opportunities for Systems Programmers who share our strong desire to build the computer technology of tomorrow.

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Help us upgrade existing computer technology to take full advantage of the latest UNIX* capabilities. Your project team will have total systems involvement from "C" and shell programming to kernal and device drivers. Your team will depend on your extensive internals knowledge of UNIX* based software to produce a new generation of 1100 systems technology.

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Systems Programmers will develop compiler and runtime systems for "C", Fortran or Ada. Seasoned programmers are needed for large system software projects. UNIX* internals or 1100 assembly language is highly desirable.

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Systems Programmers will be involved in the design and implementation of advanced database software. Software craftmasters with development experience in Relational and CODASYL databases, Data Dictionary, Distributed Databases, Recovery, and Advanced data models are needed. Unisys database software comprises an integrated, universal approach to data access, ability to handle very large databases and hundreds of concurrent users.

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We offer a competitive compensation and benefit package. For prompt consideration, please send your resume to: Professional Staffing, Department CW-28, Unisys Corporation, P.O. Box 64942, M.S. 4973, St. Paul, MN 55164 or call the Unisys Recruitment Line collect, (612) 636-5507 to discuss these opportunities. An affirmative action employer.

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UNISYS

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Requirements: Bachelor's degree in an appropriate field from an accredited college or university (or equivalent combination of education and experience) and five years of progressively responsible experience in computer operations using large-scale IBM or IBM-compatible computers with remote on-line terminals. At least three years of experience shall have been at the supervisory level. Demonstrated interpersonal skills and written/oral communications skills are a must.

Application Instructions: Please submit two (2) copies of resume, academic credentials, and names and phone numbers of three references to:

Human Resources Department
Miami-Dade Community College
11011 S.W. 104 Street
Miami, Florida 33176

Application Deadline: Must be received by March 11, 1988.
1987-88 Salary Range: $35,000-$47,835. Liberal benefits.
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JOHNS HOPKINS HEALTH SYSTEM

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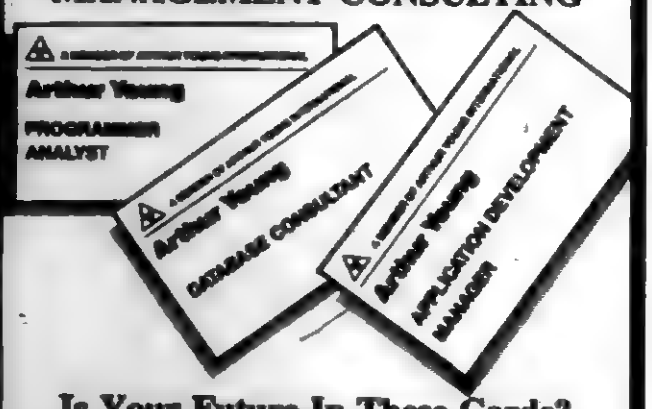

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MIDWEST - Chicago, Minneapolis, Detroit, Columbus and other MW locations: Jim McCormick, One IBM Plaza, Chicago, IL 60611 (312)645-3035.

NORTHEAST - Boston, Washington, D.C., Richmond, Philadelphia and other NE locations: Larry Glassman, 3000 K Street NW, Washington, D.C. 20007 (202)956-6063.

SOUTHEAST - Tampa, Charlotte, Birmingham, Atlanta and other SE locations: Dana Milner, 235 Peachtree Street NE, 2100 Gas Light Tower, Atlanta, GA 30042 (404)581-1300.

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- FOCUS
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data processing

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Manager of Human Resources
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Reqs. B.S. and min. 4 yrs. related exp. (or equiv.) with thorough knowledge of UNIX. Must be skilled in the use of good judgment and taking responsibility, as position involves substantial autonomy in decision-making.

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Please send resume to:
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Scottsdale Industrial Airpark
7650 E. Evans Rd., Scottsdale, AZ 85260

SENIOR SYSTEMS PROGRAMMER

Highly skilled and experienced individual with 3 to 5 years of system level experience in the following areas:

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- VM/SP-VM/HPO
- DOS/VSE-VSE/SP
- CICS 1.5-1.7
- BTAM-VTAM

Qualified individual will require skills in the areas of data communications, system monitoring and tuning, hardware and software evaluation and installation.

Please send resume to:

TOKHEIM CORP.
Attn: Human Resources
P.O. Box 360
Ft. Wayne, IN 46801

Equal Opportunity Employer M/F/H/V

Programmer/Analyst

Silicon Valley financial services group has opportunity for a Programmer/Analyst with coding knowledge of COBOL and Assembler. Must have experience in batch and online CICS processing in a MVS environment. Needs strong interpersonal, analytical and problem-solving skills with a knowledge of insurance terminology, products and processing. Working knowledge of Life/70 a plus. This position designs, codes, tests and documents application programs and works with users in identifying problems and modifications.

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Data Processing

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Minimum five years experience with involvement in planning, designing and implementation of large scale systems. Knowledge of TSO/ISPF, PANVALET, STRUCTURED COBOL, OS/JCL, IBM utilities, CICS and DATA BASE required. Degree preferred.

Programmer/Analyst

Approximately 75% programming and design, 25% analysis with substantial user interface. Requires at least three years experience with thorough knowledge of TSO/ISPF, PANVALET, STRUCTURED COBOL and OS/JCL. Excellent communication skills and problem solving ability required. CICS and [illegible] preferred.

Associate Voice Communications Analyst

As Assistant to the Senior Voice Communications Analyst responsibilities include operating various telephone recording equipment, performing software changes on Rolm equipment, maintaining monthly telephone bills, creating and maintaining various types of documentation. College degree preferred. Good verbal and public communication skills required.

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Experience applying statistical methodology to health insurance and financial data. Requires a knowledge of SAS, QUICKJOB, and other user-oriented mainframe programming tools, including TSO/ISPF. Must also have familiarity with IBM PC including software such as SYMPHONY, DBase III, PC FOCUS. Degree in mathematics, economics or statistics preferred.

We offer a competitive salary and an excellent benefits package. If you feel you would be interested in a career with Central States, please mail your resume and salary history to: Central States Southeast and Southwest Areas Health, Welfare and Pension Funds, Attention: Human Resources Department 2202, Sandy Marries, 8550 West Bryn Mawr, Chicago, IL 60631.

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- Data Processing
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- Advanced Manufacturing Systems

If unable to attend any of the Career Fairs, please send your resume to: Mr. Scott Evans, 2121 San Jacinto, Suite 700, Dallas, TX 75201. All responses held in confidence. PRINCIPALS ONLY.

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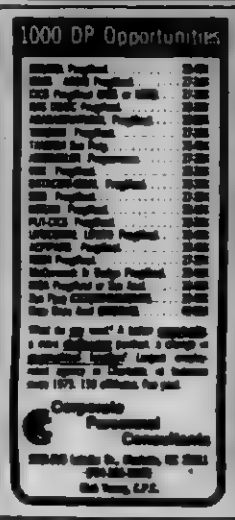

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MARKETPLACE

IBM plagued by short supply

Prices, demand on their way up as used market can't find enough PCs

BY ELIZABETH LOZANO
BOSTON COMPUTER EXCHANGE CORP.

The used microcomputer market was active the week of Jan. 25, as all the IBM Personal Computer, PC XT and PC AT models were in short supply and hot demand.

The once plentiful PC Model 076 experienced a dramatic increase in demand. At week's end, the 256K-byte standard model closed up, at $775. The PC XT Models 086 and 089 were available in single units, but quantity buyers were left out in the cold with cash in hand. The Models 086 and 089 closed up, at $1,350 and $1,700, respectively.

The big news on IBM's Intel Corp. 80286-based equipment came straight from the horse's mouth this week, as a reliable source at IBM said there are no excess-inventory AT Model 339 units in the marketplace. He added, "I could have sold a ton of them [339s]. We are still manufacturing those units, and they are available through dealers."

Despite that comment, resellers continue to search, sell and resell quantities of 339s. Like the Holy Grail, these knights of the marketplace are searching the vapor in hopes of finding a lot of machines.

Compaq market alive

Compaq Computer Corp. trading experienced an increase in activity.

The classic Portable I closed even at $725 as single-unit transactions between end users dominated the board. The Portable II closed up marginally, at $1,725, experiencing similar conditions. In contrast, the Portable III climbed up to $2,725 as the market saw high demand and tight supply.

Compaq's Deskpro 286 performed well, as single-unit activity led the 20M-byte model to close up, at $2,250. The Deskpro 386 held even at $4,375, representing the only Compaq model that experienced a decrease in trading volume. Supply conditions for this powerful machine continue to be tight.

Slow week for Apple

Apple Computer, Inc. Macintosh trading was relatively quiet for the week ended Jan. 29. The Macintosh 512 traded even at $850. The Mac 512E closed even as well, at $975 in single units. The Mac Plus stumbled and closed down, at $1,275, as supply conditions improved for buyers. The Mac SE closed down slightly, at $1,900, as discount steet prices continued to push down this machine's used value. Mac II models continue to be in high demand on the used market, with few sellers. This week, the Mac II closed at $4,025, with buyers outnumbering sellers by at least 9-to-1.

The Boston Computer Exchange can be reached at 800-BOCOEXX or 617-542-4414 in Massachusetts.

The BoCoEx Index

Closing prices report for the week ending Jan. 29, 1988

	Closing price	Week high	Week low
IBM PC Model 076	$775	$900	$350
XT Model 086	$1,350	$1,425	$800
XT Model 089	$1,700	$1,900	$1,000
AT Model 099	$2,900	$2,900	$1,950
AT Model 339	$3,375	$3,500	$2,400
Compaq Portable I	$725	$975	$600
Portable II	$1,725	$1,900	$1,475
Portable III	$2,725	$3,000	$2,175
Plus	$1,300	$1,300	$975
Deskpro 286	$2,250	$2,500	$2,050
Deskpro 386	$4,375	$4,600	$4,000
Macintosh 512	$850	$875	$650
512E	$975	$1,100	$800
Plus	$1,275	$1,375	$950
SE	$1,900	$2,150	$1,700
II	$4,025	$4,200	$3,500

INFORMATION PROVIDED BY THE BOSTON COMPUTER EXCHANGE CORP.

European market experiences a flurry of activity in January

Selected European IBM equipment

Current fair retail market value in Europe

3370 A2/A12	2Q 1984	$54,757	15
3370 B2/B12	2Q 1984	$36,569	17
3375 A1	3Q 1981	$57,651	4
3375 B1	3Q 1981	$40,694	7
3380 AA4	4Q 1981	$142,444	18
3380 B4	4Q 1981	$103,432	25
3380 AD4	1Q 1985	$121,947	51
3380 BD4	1Q 1985	$88,558	54
3380 AE4	3Q 1985	$164,793	95
3380 BE4	3Q 1985	$135,059	99
4381 P1	4Q 1983	$839,497	16
4381 P2	2Q 1986	$557,062	49
4381 P13	2Q 1986	$421,201	69
4381 P14	2Q 1986	$545,041	53
System/38 Model 4	3Q 1980	$55,879	25
System/38 Model 6	1Q 1984	$93,118	41
System/38 Model 20	4Q 1984	$193,396	45
System/38 Model 600	3Q 1986	$271,546	65
System/38 Model 700	3Q 1986	$392,935	75

* Based on Feb. 2, 1988, exchange rate

INFORMATION PROVIDED BY IDC FINANCIAL SERVICES CORP.

BY ALYSON PRIOR
and JOHN DESOUZA
IDC FINANCIAL SERVICES CORP.

Secondary market activity throughout Europe was fairly brisk on a wide range of IBM equipment during the traditionally slow month of January.

A number of factors contributed to this activity, with the most prevalent being users' anticipation of upcoming IBM announcements and the announcements' effect on MIS acquisitions.

The European fair retail market values (see chart, left) were established early this month.

Disk drives

In general, there are plenty of IBM 3370 and 3375 disk drives available on the used market, even though activity is more indicative of a spot market. Demand for this equipment fluctuates, causing a periodic drying up of supply when prices have shown marked, but short-lived, increases.

As expected, users have shown more interest in the B drives of all IBM disk drive models lately.

The market for 3380 standards and 3380 AD4s and BD4s is steady; values for the AE4s and BE4s have been falling, however. The market for standards is fluid, and values are stable at this time.

The market for 3380 D models has been showing some degree of short supply, which is helping to keep values at current levels up.

Currently, indications from the market are that 3380 AE4 and BE4 values will continue to drift downward in the immediate future.

After the initial excitement of IBM's new 3380 AJ4, BJ4, AK4 and BK4 drives, it appears that displacement of the older drives is not as rapid as some had expected.

For the most part, large users seem to have moved to the new drives. Medium-size shops, however, appear to be hanging onto their standard and D drives for now.

4381 processors

The withdrawal of the upgrades to the 4381 Models 1, 2 and 3 late last year and the arrival of the upgrades to 4381 Models 21, 22, 23 and 24 in January appears to have been well-assimilated by the market from the first.

The steadfastness that had been seen in values for the Model 14 has disappeared, and prices are falling. In addition, Model 1s are declining in value, particularly since the withdrawal of the early-model upgrades.

There are very few Model 1, 2 and 3s around and, coupled with little demand, the upgrade capability becomes somewhat less attractive cost-wise for these machines than for certain other models.

In contrast, 4381 Model 2s, 12s and 13s are garnering a healthy demand because of the attractiveness of the upgrade to the Models 21, 22, 23 and 24. In addition, values are firm for these models. These boxes are somewhat scarce and typically are snapped up very quickly.

System/38

The System/38 market has maintained a good level of activity during recent weeks despite the approach of IBM's Silverlake, which appears to be having more of an effect on the System/36 market right now. Silverlake is slated to be IBM's System/36 and 38 follow-on machine.

Demand for the smaller, older boxes — in particular, the System/38 Models 4, 6 and 8 — continues, with supply tightening and values remaining the same.

Obtaining upgrades to the System/38 Model 100 series is relatively problem-free, whether one goes to IBM or a third-party source. The resulting high-end boxes, System/38 Models 600 or 700, are appearing on the market at attractive price levels.

For more information, contact IDC Financial Services Corp.'s Terri LeBlanc at 617-872-8200.

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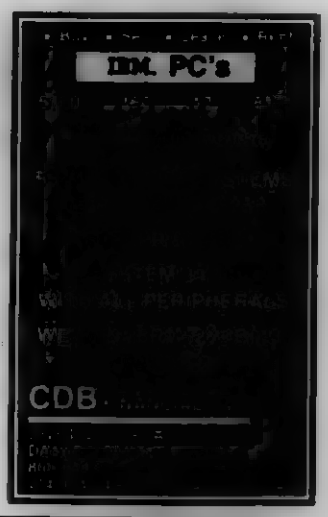

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May 4	Apr. 1	Communications/ Connectivity	Comdex Spring/ ICA
June 1*	Apr. 29	PC End User Productivity	PC Expo
July 6	June 3	Software	
Aug. 3	July 1	Departmental Computing	
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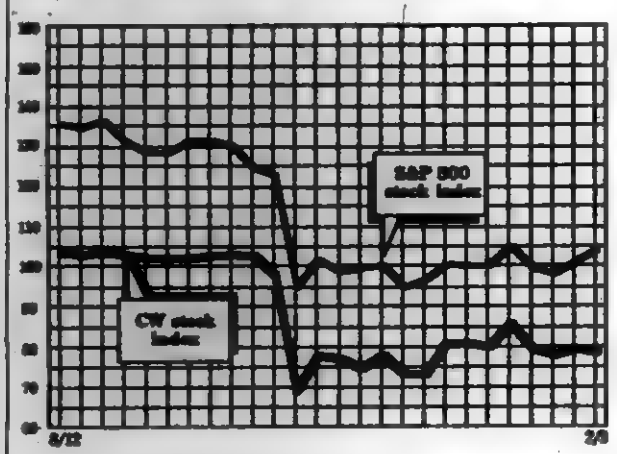

Indexes	Last Week	This Week
Communications	86.4	85.6
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Leasing Companies	102.1	101.6
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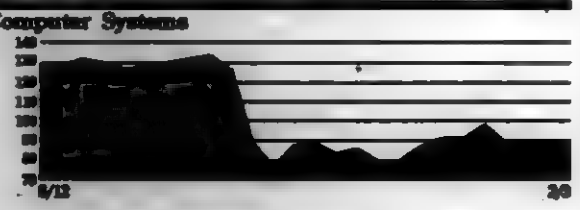
Communications

Computer Systems



Software and DP Services

Semiconductors

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Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, FEBRUARY 3, 1988

EXCH		52-WEEK RANGE (1)		PRICE CLOSE FEB. 3 1988	WEEK NET CHANGE	WEEK PCT CHANGE

Communications and Network Services

N	AMERICAN INFO TECHS CORP	108	74	92.8	+1.1	1.2
O	ANDREW CORP	19	11	13.5	+0.3	1.9
O	ARTEL COMM CORP	8	2	1.5	-0.1	-7.7
N	AT&T	35	30	28.5	+0.6	2.2
O	AVANT GARDE COMP INC	6	2	1.9	-0.1	-5.3
O	AWATEX INC	19	6	7.0	+0.2	2.7
N	AYDIN CORP	38	18	20.5	+0.3	1.2
N	BELL ATLANTIC CORP	80	61	71.9	+1.8	2.5
N	BELLSOUTH CORP	44	30	40.9	+1.1	2.8
O	COMPRESSION LABS INC	6	2	4.0	+0.0	0.0
O	COMPUTER NETWORK TECH	6	2	1.8	-0.2	-9.7
O	CONTEL CORP	40	25	34.0	+1.0	3.0
O	DATA SWITCH CORP	9	4	5.8	-0.5	-8.0
O	DIGITAL COMM ASSOC	49	20	28.1	+0.1	0.5
O	DYNATECH CORP	44	14	19.0	+0.8	4.1
O	FIBRONICS INTERNATIONAL INC	11	2	2.4	-0.1	-8.0
O	GANDALF TECHNOLOGIES	11	5	5.8	-0.1	-2.1
O	GENERAL DATACOMM INDS	14	3	3.6	-0.3	-8.5
N	GTE CORP	45	29	38.0	+1.9	5.1
O	INFOTRON SYS CORP	12	5	6.8	-0.5	-6.9
N	ITT CORP	68	42	44.0	+0.9	1.9
N	M A COM INC	16	7	8.6	-0.4	-8.8
O	MCI COMMUNICATIONS CORP	12	5	11.0	+0.4	3.5
O	MICOM SYS INC	18	7	10.0	-1.0	-9.1
O	NETWORK SYS CORP	19	7	7.5	+0.1	1.7
N	NORTHERN TELECOM LTD	24	14	17.8	-0.3	-1.4
O	NOVELL INC	30	12	17.8	-5.0	-22.0
N	NYNEX CORP	78	58	69.8	+2.0	3.0
N	PACIFIC TELESIS GROUP	34	9	28.1	+0.9	3.1
O	PARADYNE CORP	9	4	4.3	+0.4	9.7
A	PENRIL CORP	6	1	3.4	+0.1	3.0
N	PLESSEY PLC	41	23	27.6	+1.3	4.7
N	SCIENTIFIC ATLANTA INC	20	8	12.4	+0.3	2.1
N	SOUTHWESTERN BELL CORP	46	22	37.4	+0.8	2.0
O	3 COM CORP	26	12	17.3	-1.6	-8.8
O	TRIPLEX INC	41	17	32.3	+0.0	0.0
N	UNGERMANN BASS INC	16	5	7.4	-0.6	-8.2
N	U S WEST INC	60	43	54.1	+1.3	2.4

Computer Systems

O	ALLIANT COMPUTER SYS	37	5	7.8	+0.5	6.9
O	ALPHA MICROSYSTEMS	8	3	4.1	-0.3	-5.7
O	ALTOS COMPUTER SYS	17	9	11.0	+0.4	3.5
A	AMDAHL CORP	30	19	20.0	-0.3	-0.8
O	APOLLO COMPUTER INC	25	9	12.3	-1.3	-9.3
O	APPLE COMPUTER INC	60	28	38.5	-0.3	-0.8
N	BOLT BERANEK & NEWMAN	30	12	14.5	-0.5	-3.3
O	BRITTON LEE INC	5	1	1.5	+0.0	0.0
O	COMPAQ COMPUTER CORP	70	28	43.6	-2.6	-5.7
O	COMPUTER AUTOMATION INC	17	5	10.3	-0.4	-3.5
O	COMPUTER CONSOLES INC	12	2	4.9	-0.3	-4.9
O	CONCURRENT COMP CORP	24	11	16.8	+0.8	3.9
O	CONTROL DATA CORP DEL	28	18	21.8	+0.6	3.0
O	CONVERGENT TECH	12	3	3.1	+0.0	0.0
O	CONVEX COMPUTER CORP	22	6	7.5	-0.4	-4.7
N	CRAY RESH INC	138	47	69.8	+1.3	1.9
O	DAISY SYS CORP	13	5	7.0	-0.3	-3.4
N	DATA GEN CORP	38	18	25.9	+0.1	0.5
N	DATAPOINT CORP	9	3	4.4	-0.1	-2.8
N	DIGITAL EQUIP CORP	200	110	116.0	-7.0	-5.7
O	FLOATING POINT SYS INC	17	3	4.0	+0.1	2.2
N	GOULD INC	20	8	10.9	+0.1	1.2
N	HARRIS CORP	43	22	28.9	+0.4	1.4
N	HEWLETT PACKARD CO	74	38	53.1	-2.0	-3.6
N	HONEYWELL INC	91	48	61.0	+2.0	3.4
N	IBM	178	102	109.0	-3.8	-3.3
O	INFORMATION SYTL INC	17	9	11.9	+1.1	10.2
O	IPL SYS INC	3	1	1.5	-0.1	-7.7
O	MASS COMPUTER CORP	14	5	6.4	+0.0	0.0
N	MATSUSHITA ELEC INDL LTD	198	98	172.0	-1.5	-0.9
O	MEGADATA CORP	7	3	3.1	-0.2	-6.7
O	MENTOR GRAPHICS CORP	38	14	20.0	+0.3	1.5
N	NBI INC	14	4	4.0	+0.1	2.2
N	NCR CORP	67	39	58.5	+1.3	2.3
N	PRIME COMPUTER INC	31	12	15.9	+0.0	0.0
O	PYRAMID TECHNOLOGY	12	5	8.3	+0.0	0.0
O	STRATUS COMPUTER	41	15	21.8	+0.5	2.4
O	SUN MICROSYSTEM INC	46	14	28.8	-1.8	-5.9
O	SYMBOLICS INC	6	1	1.8	+0.1	4.0
N	TANDEM COMPUTERS INC	28	17	18.8	+1.0	5.6
N	TANDY CORP	57	28	35.5	+2.1	6.4
N	ULTIMATE CORP	27	16	18.0	+0.1	0.8
N	UNISYS CORP	48	24	31.4	-1.8	-5.3
A	WANG LABS INC	19	10	13.9	+0.0	0.0

Software & DP Services

O	ADVANCED COMP TECH	6	1	1.9	+0.0	0.0
N	AGS COMPUTERS INC	20	11	13.8	-0.8	-5.2
O	AMERICAN MGMT SYS INC	20	9	13.5	-1.3	-8.8
O	AMERICAN SOFTWARE INC	22	6	10.1	+0.1	1.3
N	ASK COMP INC	11	4	7.0	+0.1	1.8
O	ANALYSTS INTL CORP	10	4	7.4	-0.1	-1.7
O	ASHTON TATE	33	13	23.0	-0.5	-2.1
O	ASK COMPUTER SYS INC	17	6	10.1	+0.4	3.8
O	AUTODESK INC	34	12	17.0	-1.3	-6.8
N	AUTO DATA PROCESSING	55	19	41.8	-0.8	-1.8
O	BOOLE & BABBAGE INC	12	5	9.3	+1.0	11.8
N	COMPUTER ASSOC INTL INC	37	15	28.0	+0.3	0.9
O	COMPUTER HORIZONS CORP	15	7	9.4	-0.3	-3.2
N	COMPUTER SCIENCES CORP	73	42	47.0	+1.3	2.7
N	COMPUTER TASK GROUP INC	18	9	9.9	-0.3	-2.9
O	COMSHARE INC	26	12	14.8	-0.8	-4.9
N	CULLINET SOFTWARE INC	14	4	8.3	+0.5	6.7
O	CYCARE SYS INC	10	5	7.9	+0.6	8.6
O	DUQUESNE SYS INC	28	10	18.1	-1.8	-9.2
A	DATA ARCHITECTS INC	17	7	9.4	+0.5	5.6
N	GENERAL MTRS (CLS E)	51	30	38.8	-1.1	-3.0
O	HOGAN SYS INC	17	5	4.8	-0.1	-2.6
O	INFORMIX CORP	31	11	20.0	-0.9	-4.3
O	INTELLICORP INC	11	2	2.9	+0.0	0.0
O	KEANE INC	10	5	7.0	+0.0	0.0
O	LOTUS DEV CORP	45	18	26.3	+0.0	0.0
O	MANAGEMENT SCI AMER	21	6	8.8	-0.3	-4.3
O	MICRO PRO INTL CORP	8	3	3.4	+0.1	1.9
O	MICROSOFT CORP	70	33	52.8	-3.0	-5.4
O	MORENO ASSOCIATES INC	24	7	14.4	+0.1	0.8
O	NATIONAL DATA CORP	34	19	28.0	+0.3	1.8
O	ON LINE SOFTWARE INTL INC	22	8	8.8	-0.1	-1.3
O	ORACLE SYS CORP	18	7	12.3	-1.0	-7.5
N	PANSOPHIC SYS INC	20	11	14.8	+0.8	5.4
O	POLICY MGMT SYS CORP	30	15	20.8	+1.8	9.2
O	PROGRAMMING & SYS INC	14	7	10.1	+0.1	1.3
O	REYNOLDS & REYNOLDS CO	30	14	18.0	+1.0	5.8
O	SEI CORP	18	10	13.0	-0.2	-1.8
O	SHARED MED SYS CORP	38	18	28.4	+0.8	3.0
O	SOFTWARE AG SYSTEMS INC	10	7	7.8	+0.0	0.0
O	SOFTWARE PUBG CORP	17	6	8.8	-0.8	-8.3
O	STERLING SOFTWARE INC	14	6	8.3	+0.0	0.0
O	SUNGARD DATA SYS INC	31	16	18.3	+1.0	7.0
N	SYSTEMATICS INC	30	19	27.0	+1.0	3.8
N	SYS. SOFT INC.	XX	7	12.3	-0.4	-3.0
O	VMX SOFTWARE INC	45	7	8.3	+0.5	6.5

Semiconductors

N	ADV MICRO DEVICES INC	25	8	8.5	+0.1	1.2
N	ANALOG DEVICES INC	24	8	10.8	-0.9	-7.6
O	ANALOGIC CORP	13	6	7.3	+0.0	0.0
O	INTEL CORP	42	18	22.6	-0.5	-2.1
O	LSI LOGIC CORP	17	7	7.8	-1.0	-11.4
N	MOTOROLA INC	74	38	40.1	-0.6	-1.5
N	NATL SEMICONDUCTOR	22	10	10.0	-0.1	-1.2
N	TEXAS INSTRS INC	60	28	43.0	-1.1	-2.5
A	WESTERN DIGITAL CORP	20	11	11.3	-0.6	-5.3

Peripherals

O	ALLOY COMP.	13	4	4.1	-0.125	-2.9
N	AM INTL INC	6	3	4.1	-1.4	-25.0
O	AST RESH INC	23	6	8.8	-0.2	-2.8
O	AUTO TROL TECH CORP	9	3	4.0	+0.4	10.3
O	BANCTEC INC	16	5	6.5	-0.3	-3.7
O	CIPHER DATA PRODS INC	15	4	7.1	+0.4	5.6
O	COGNITRONICS CORP	5	2	2.9	+0.0	0.0
N	COMPUGRAPHIC CORP	28	19	22.4	-0.6	-2.7
O	COMPUTERVISION CORP	23	7	14.9	+0.9	0.0
A	DATAPRODUCTS CORP	21	7	7.5	-0.4	-4.7
A	DATARAM CORP	9	5	8.0	-0.3	-4.0
N	DECISION INDS CORP	13	4	10.6	+0.1	1.2
N	EASTMAN KODAK CO	71	49	60.9	-1.9	-4.4
O	E M C CORP MASS	29	10	12.5	-0.5	-3.8
O	EMULEX CORP	9	4	5.3	-0.1	-2.3
O	EVANS & SUTHERLAND	40	16	30.0	+0.8	3.9
O	ICOT CORP	13	3	4.3	-0.3	-5.8
O	INTERLEAF INC	24	9	15.9	+0.8	8.0
O	IOMEGA CORP	8	1	2.9	+0.5	21.1
O	LEE DATA CORP	10	3	3.1	+0.0	0.0
O	MAGNETIC SYS CORP	6	1	2.0	+0.1	3.2
O	MAXTOR CORP	34	6	11.0	-0.9	-7.4
O	MICROPOLIS CORP	44	13	18.5	+0.0	0.0
O	MINISCRIBE CORP	18	5	7.4	-0.5	-6.3
N	MINNESOTA MNG & MFG CO	91	46	67.3	-0.8	-1.3
A	MSI DATA CORP	24	12	22.0	+0.8	3.8
O	PRIAM CORP	6	1	1.5	-0.4	-20.0
O	PRINTRONIX INC	13	7	8.8	+0.6	7.3
N	QMS INC	27	9	8.8	-1.4	-13.6
O	QUANTUM CORP	25	8	10.5	-0.8	-4.7
O	SMARTEK CORP	6	2	4.9	+0.1	2.2
N	RECOGNITION EQUIP INC	27	7	8.1	-0.6	-7.6
N	XEROX INC	14	5	8.0	+0.1	2.1
O	SCAN TRON CORP	14	7	10.3	-0.3	-2.4
O	SEAGATE TECHNOLOGY	48	10	15.1	-0.6	-4.0
O	STORAGE TECH CORP	5	1	2.0	+0.0	0.0
O	TANDON CORP	7	2	1.8	-0.3	-12.5
A	TEC INC	7	3	5.7	-0.1	-2.4
N	TEKTRONIX INC	43	21	22.3	-0.5	-2.1
O	TELEVIDEO SYS INC	3	1	1.3	+0.0	0.0
N	TELEX CORP	102	20	48.1	+1.8	3.5
O	WYSE TECH	40	11	17.0	-1.9	-8.5
N	XEROX CORP	85	60	62.9	-3.0	-4.5
O	ZIDEX CORP	16	6	8.9	+0.5	7.5

Leasing Companies

O	CAPITAL ASSOCIATES INTER-NATIONAL INC	11	4	4.1	+0.0	0.0
N	COMDISCO INC	37	12	18.3	-0.5	-2.7
N	CONTINENTAL INFO SYS	14	6	6.0	+0.0	0.0
O	PHOENIX AMERN INC	8	3	2.9	+0.0	0.0
O	SELECTERM INC	6	3	4.0	+0.0	0.0

EXCH: N—NEW YORK; A—AMERICAN; O—NATIONAL; O—OVER-THE-COUNTER; S—SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Quicksand

Novell sinks fast as week proves sticky for most stocks

Major vendors in the mainframe, software and networking businesses took it on the chin, and high-tech stocks sagged in general, in trading last week. Leading the tumble as of Thursday's close was Novell, Inc., which lost more than 25% of its value to close at 17⅞, down 5⅛ points from a week earlier.

Other companies taking a bruising included Digital Equipment Corp., which dropped 4 points on Wednesday and finished at 117¼, down 6⅛ points from a week earlier, and Microsoft Corp., which fell 4¼ points to finish at 51.

Among the week's other losers, IBM fell 3¼ points to 108⅝ despite plans for a high-level restructuring; Sun Microsystems, Inc. sank 3⅛ points to 30; Lotus Development Corp. fell 2¼ points to 25⅛; Compaq Computer Corp., whose announcement of its first billion-dollar sales year yielded no favorable result, dropped 4 points to hit 43⅜; 3Com Corp. fell 1⅝ points to 17⅜; and Ashton-Tate Corp. headed at 21 after losing 3 points.

The few bright spots in the week included Prime Computer, Inc., which rose ⅛ of a point to finish at 16⅛; and Stratus Computer, Inc., which rose ⅜ of a point to 22.

JAMES DALY

Dbase IV

FROM PAGE 1

product scheduled to ship late this year.

The effort to provide a full implementation of SQL should sit well with the MIS community, which looks to SQL to provide applications portability and cross-systems connectability in the long run, said the analyst, who follows the SQL data base market.

Although the product's SQL is compatible with the syntax of DB2, there will be no communications links that would allow Dbase IV to query a DB2 data base. And while Ashton-Tate has adhered faithfully to the DB2 model, there is one minor area of incompatibility, according to a third-party developer briefed on the product. "It doesn't have the so-called dynamic SQL," the source said. Dynamic SQL is a feature available on DB2 but not applicable to personal computer use, the source said.

Compatibility

A key Ashton-Tate goal was to provide full compatibility between the current Dbase III Plus and Dbase IV. The products have the same file structure, and Dbase IV is upwardly compatible with Dbase III Plus. In addition, any applications written in Dbase IV that do not take advantage of added features will run unchanged under Dbase III Plus.

The SQL Server announced by Ashton-Tate and Microsoft will run existing Dbase applications.

However, because Dbase IV was developed before the specifications of SQL Server were finalized, users will have to upgrade to a later version of Dbase IV that meets those specifications in order to run the Dbase III Plus applications and connect to the server product.

The initial implementation of Dbase IV will not include communications facilities to other DBMSs, but these will be released over time, one source noted.

Despite the lack of communications facilities, SQL is an important element of the firm's future connectivity strategy. "It opens up the architecture to communicate with DB2 in the future, as well as other DBMSs such as IBM's OS/2 Extended Edition Data Manager and Lotus/DBMS," an analyst briefed by Ashton-Tate said.

Double offering

There are two modes under which SQL can be used. With the interactive or command mode, users can type SQL commands directly at the Dbase dot prompt. In the embedded mode, users or developers can write SQL procedures that are callable by a Dbase program, the former Ashton-Tate developer said.

In cases in which Dbase commands are duplicated by SQL, the commands are dropped in favor of SQL.

Unlike some data bases such as Oracle Corp.'s Oracle, which uses an SQL engine, Dbase IV maintains its Dbase engine. As a result, SQL commands are translated in the Dbase language when querying or manipulating data. "It is extremely transparent," the developer said.

Limitations

In addition, the product cannot translate Dbase into SQL, or use IBM's Query-by-Example or a forms system to generate SQL code. "In order to use SQL, you have to know it. But in the server version, Query-by-Example and the forms system will generate SQL," the developer said, referring to the Ashton-Tate/Microsoft SQL Server.

For ease of use, the Assistant, a menu-driven front end currently found in Dbase III Plus, has been replaced with the Control Center. The Control Center is a nonprocedural window-oriented interface that leads a user from one function to another. "It seems architected to take advantage of the OS/2 Presentation Manager," the source said.

For network uses, the initial version of Dbase IV will include automatic record and file locking. In addition, existing Dbase applications can be recompiled under Dbase IV and will take advantage of the automatic record and file-locking features, the developer said.

Besides adding SQL support, Ashton-Tate has added Dbase language extensions, many of which have been popularized by Dbase clone vendors, the developer said.

Math coprocessor solution no go for PS/2 Model 80

BY ALAN J. RYAN
CW STAFF

IBM's Personal System/2 Model 80 is unable to properly use Intel Corp.'s 80387 math coprocessor with a protected-mode demand-paged operating system. The hardware problem could potentially affect IBM's AIX operating system, a derivitive of AT&T's Unix System V.

To work around a known error in Intel's 80386 microprocessor that affects the interface to the math coprocessor under operating systems like Xenix and Microsoft Corp.'s Windows 386, several vendors have created fixes.

IBM, however, has made no hardware fix available to allow the use of the coprocessor under demand-paged operating systems on the Model 80.

An IBM spokesman said last week that because AIX will not be available until September, the company is still testing many of the inner workings of the Model 80. "It's premature to make a statement on what will or won't work. [AIX] is not due for another six months, so there's still a lot of testing going on at this point," the spokesman said.

The glitch reportedly can cause a 386-based computer to respond with an incorrect return value while performing a math function and can cause the machine to lock up.

Fixes currently on the market will not work properly on the Model 80, explained Bill Brothers, Xenix product manager at The Santa Cruz Operation, Inc., because they involve manipulating address lines. "The Model 80 decodes all address lines, so therefore, you can't play addressing games," he added.

Merger finalized

NATICK, Mass. — Prime Computer, Inc. announced the completion of its $400 million acquisition of Computervision Corp. last week and told Computervision users it would continue to support all current products from that company.

"I want to reassure Computervision's customers ... that they will not be forced to migrate from their current product investments," Prime President and Chief Executive Officer Joe M. Henson said in a statement.

Prime also announced that Computervision's marketing will be folded into Prime's so that the merged organization will sell both Prime and Computervision products.

Marketing will be bisected along vertical market lines, with one division selling to manufacturing customers and the other to commercial and technical users.

Each division is expected to account for 50% of total sales, according to Prime.

In his statement, Henson also said the company has no plans for layoffs as a result of the merger, but he did not rule them out.

Prime will attempt to find jobs within the company for employees in positions made redundant by the merger, he said.

Banyan adds LU6.2, PU2.1

BY PATRICIA KEEFE
CW STAFF

WESTBORO, Mass. — Network integrator Banyan Systems, Inc. last week announced that it will incorporate LU6.2 and PU2.1 software licensed from Orion Network Systems, Inc. into its Virtual Networking Software (Vines).

The announcement marks the second critical element in Banyan's strategy to maintain IBM compatibility.

Last week, Banyan detailed plans to provide support for OS/2, which was developed by Microsoft Corp. and IBM and represents the first product release under IBM's Systems Application Architecture umbrella [CW, Feb 1].

At that time, the company also promised to support IBM's Netbios under OS/2, Advanced Program-to-Program Communications under OS/2 Extended Edition and the LAN Server Program.

Banyan initially announced plans to support LU6.2 in last summer's introduction of Vines Version 3.0. At that time, the vendor said it would first release an LU6.2 tool kit to developers and corporate programmers.

Support for LU6.2 not only enhances Banyan's ability to communicate with a range of IBM processors and systems but also extends the company's reach into the many non-IBM environments that will also support LU6.2.

Slated for release later this year, Banyan's LU6.2 offering will reportedly support the advanced communications protocols in IBM's Systems Network Architecture.

Trouble hits AI companies

BY STANLEY GIBSON
CW STAFF

CAMBRIDGE, Mass. — Seeking to stem the tide of continuing financial losses, troubled Symbolics, Inc. announced the resignation of its two top officers last week.

Meanwhile, Teknowledge, Inc., a Palo Alto, Calif.-based maker of expert systems software, said it will lay off approximately 60 of its 100 workers as the company ceases direct-marketing efforts. In the future, Teknowledge will only license its products, the company said.

At Symbolics, Brian Sear stepped down from his post as president, chief operating officer and member of the board, and Russell Noftsker resigned as chief executive officer. Noftsker will continue as chairman.

The company's board of directors said it will begin an immediate search to fill the single position of president and CEO.

Analysts said slow demand for artificial intelligence computer systems such as the ones Symbolics markets, compared with brisk demand for general-purpose systems that can run AI applications, could be the source of the trouble.

In its second-quarter results, posted in January, Symbolics lost $15.4 million on revenue of $23.8 million. The loss included an $11.2 million charge for restructuring costs.

Teknowledge reported second-quarter revenue of $3.8 million and a loss of $6.7 million, including a $5.8 million restructuring charge.

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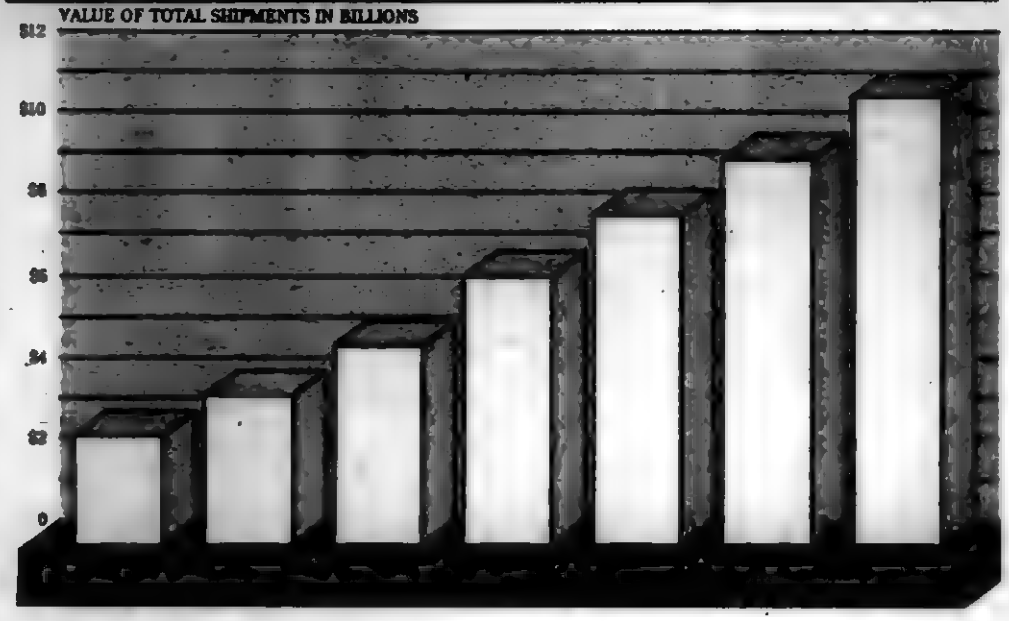
TRENDS

The Unix market

Growing steadily, Unix shows it's here to stay



Once considered just a techie's toy, the Unix operating system will continue on an already steady growth path to reach more than $11 billion in revenue by 1991, according to International Data Corp. (IDC) in Framingham, Mass.

The operating system will likely be taken more seriously as it chips away at the commercial market, primarily because it is nonproprietary and "frees users from the bonds of any one vendor," IDC reported.

Of all the Unix markets, the single-user is the most volatile; the mid-range and large-scale systems markets have stabilized with a set group of players.

The single-user market "is the area where we expect the most growth," said Kate Cominkey, a Unix analyst at IDC. "Unix will be showing up on more desk tops, and we expect lots of shifting around until this market becomes more defined."

Cominkey said the mid-range systems market appears to be the most stable of all segments. Although AT&T remains at the top of this market, it is also losing market share.

In 1985, AT&T held a 43.2% market share, while Digital Equipment Corp. accounted for 24.6%. A year later, AT&T's share had slipped to 34%, while DEC's moved up to 29.3%.

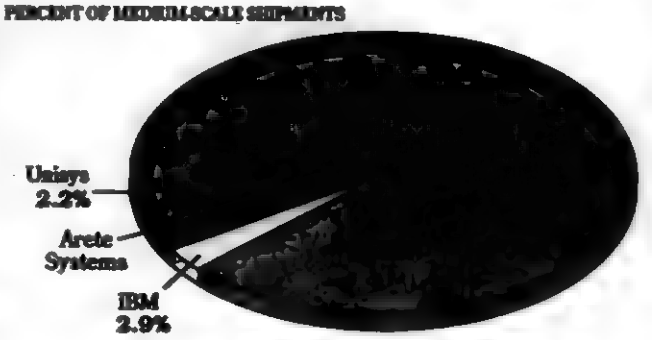
In the large-scale systems segment, IBM has captured nearly half of the market. Cominkey said IBM's 43.7% share represents all Unix versions running on IBM mainframes, including Amdahl Corp.'s UTS.

ROSEMARY HAMILTON

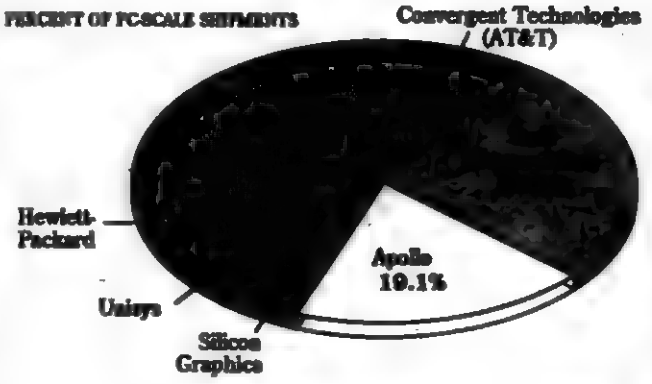
PC market volatile; higher end mature

PERCENT OF LARGE-SCALE SHIPMENTS

PERCENT OF MEDIUM-SCALE SHIPMENTS



PERCENT OF PC-SCALE SHIPMENTS



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHARTS

INSIDE LINES

Out of the wild blue vapor. Cullinet last week began shipping its IDMS/R release that includes the ability to process SQL queries — four months behind the schedule Cullinet officials announced at a September 1986 press conference that heralded the company's "blueprint" for the future. In addition to read-only SQL capabilities, Release 10.2 of Cullinet's hierarchical DBMS incorporates an average 11% performance improvement.

No-fault data base. A 14-month-old joint development project between Stratus and Sybase may finally bear fruit. Stratus expects to make available in April the capability for Unix workstations to extract and manipulate data from Sybase SQL-based data bases residing on its fault-tolerant systems. Stratus has offered the Oracle data base with its machines for a number of years but reportedly opted for a higher performance data base engine from Sybase, the company that developed the technology for the recently announced SQL Server.

Primary soundings. For IBM watchers still trying to assess the presidential chances of new U.S. General Manager Terry Lautenbach, a bit of history may prove enlightening. When Lautenbach was named president of IBM's old Data Processing Division in 1976, the man he succeeded in that post was current IBM Chairman and CEO John F. Akers.

Jumping the gun. AST Research will announce this week the details of its version of Microsoft and IBM's OS/2, the company says. AST's OS/2 precedes the expected Feb. 17 announcement of Compaq's OS/2 version and will presumably take advantage of the AST Premium/386's multiprocessor capabilities that mimic IBM's Micro Channel.

An obvious scoop. The scandal over a $55 million federal contract for 12 network switches took a new twist last week. For weeks, AT&T has complained that a General Services Administration (GSA) official leaked AT&T's bid price to competitors. Then came a newspaper report that AT&T also got a "confidential" tip from the GSA. It's true that AT&T was told that a $40-per-connection bid for the Washington, D.C., switch would be too high, but that was an obvious point, since the request for proposals for that switch required a bid of less than $37.

The beat counters always ring twice. Management Science America (MSA) has frozen employee salaries for six months and cut executive salaries by 3% to 10% in an attempt to make the company profitable this year. Fiscal 1987 results won't be announced until March 1, but in September, MSA reported a loss of $68.4 million for the first three quarters. MSA is one of the first major software vendors to adopt rules requiring revenue to be counted when a product is shipped rather than when a contract is signed, as recommended by the American Institute of Certified Public Accountants, and $68 million of MSA's loss was attributed to the rule change. At times, there was a four- to five-month lag in shipments, according to Chris Mortensen of Alex Brown & Sons in Baltimore.

Plug this into your Walkman. Emerald Systems plans to introduce this week a version of its tape backup system that allows Xenix-based systems to store up to 2.2G bytes on a calculator-size cassette. The Vast Device for Xenix, which measures 12 by 9½ by 6 in. and uses Emerald's 8mm cassettes, reportedly allows much larger hard disks to be attached to Xenix-based systems. Vast Device holds the equivalent of 6,200 floppies, or one million sheets of paper, and is priced at $6,995.

Extended invitations. IBM has approached several software developers in recent weeks, particularly data base developers, about writing front ends for its OS/2 Extended Edition. "If you look at the specs of OS/2 Extended, it is a pretty plain-Jane kind of system that's missing some of the nice front-end tools. They are working with key developers to help them put together some popular front ends," one source says. None of the major DBMS developers contacted last week, however, would admit to having a copy of the operating system.

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Spalding employees have also found AMAPS to be fast, flexible and easy to use. According to Walt Szemela, Project Manager for Manufacturing and Distribution Systems, "All the information is there whenever you need it. You can't ask for anything more than that."

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COMPUTERWORLD

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In Depth — Neural nets take aim at the data base analysis market. **Page 89.**

Will they or won't they? F model 3090s from IBM are coming, but analysts disagree on how soon; most concur in predicting that some type of MVS/XA follow-on will debut today. Page 6.

Apple delivers Unix version as Uniforum once again hosts debate about the operating system's commercial status. Pages 132,133.

It's not lights-out time yet in data centers, but operations managers are planning ahead for fully automated facilities. Page 17.

Ashton-Tate throws glove down in market for Macintosh spreadsheet and word processing applications. Page 4.

Cray offers growth path for X-MP users — a Unix-oriented Y-MP system. Page 8.

Oh where, oh where is my 9370? California distributor ships system to Florida apartment and gets stuck footing the bill. Page 2.

Get your personal VMS here. DEC seen readying yet another desktop strategy. Page 39.

Uh, well . . . OS/2 ports still empty

BY DOUGLAS BARNEY
CW STAFF

If you are one of the 20,000 or so buyers of IBM's OS/2, you are probably still staring at an operating system prompt instead of an application. Or maybe you are running several copies of a single application, but not one you really care about.

One thing is for sure: You are not running any of the applications that a group of overly ambitious vendors promised they would deliver by now.

Vendors contacted by *Computerworld* last week groped for excuses as to why promised applications have yet to ship for the operating system that is now 2½

Continued on page 8

IBM drops guard, anoints Unix

Wider RT PC role, AIX standard get wary reception at Uniforum

BY ROSEMARY HAMILTON
CW STAFF

DALLAS — IBM last week abruptly reversed its long-standing resistance to the Unix operating system, anointing Unix as a key strategic element of its product line.

In an elaborate show of support at the Uniforum 1988 conference here, IBM unveiled enhancements for its line of AIX-based workstations and announced plans to participate actively in Unix standard-setting activities. Separately, IBM designated its oft-criticised RT Personal Computer as a strategic, general-purpose mid-range system.

However, the moves quickly drew skepticism from Unix industry watchers, who said IBM had little choice but to embrace the thriving operating system standard.

Nothing but homewrecks

"It's been the old not-invented-here syndrome," said David Fiedler, editor of "Unique," a Unix newsletter published by Infopro Systems in Reacne, Calif. "Unix is an AT&T product. That sort of thing is important to IBM."

One analyst said IBM was left with no choice but to ramp up its Unix efforts in response to the U.S. government's commitment to Unix as well as that of other major customers, such as General Motors Corp.

"The Unix market is becoming critical for them," said Judith Hurwitz, an editor of "Unix in the Office," a publication of Patricia Seybold's Office Computing Group. "About 70% of the federal government's requests for proposals now require Unix."

IBM put forth the following intentions for Unix:

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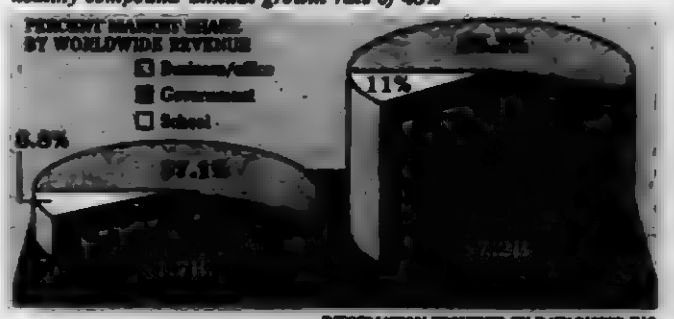
Too large to ignore

A projected $7 billion market for Unix software represents a healthy compound annual growth rate of 48%



INFORMATION PROVIDED BY DATAQUEST, INC.
CW CHART

PS/2s make killing in Wall Street stock firms

BY JAMES DALY
CW STAFF

Although still maligned by many observers, IBM's Personal System/2 is poised to dramatically impact end-user computing on Wall Street, where two brokerage firms plan to install tens of thousands of the machines to replace real-time stock quote systems.

Automatic Data Processing, Inc. will serve as middleman for one of the largest PS/2 sales to date when it begins delivering the first of more than 40,000 systems to Shearson Lehman Hutton, Inc. and Merrill Lynch & Co in the next few months. The systems will be bundled with ADP's Financial System Partner stock quote service.

The deal marks a major victory for IBM in getting its Micro Channel bus architecture onto Wall Street at a time when vendors like Sun Microsystems, Inc. and Apollo Computer, Inc. are ardently courting the financial community with their high-powered workstations.

"Sun and Apollo may offer similar services, but we don't need their power, their speed or their expense," said Bill O'Neil, vice-president of strategic technology planning at Shearson Lehman. "The Sun and Apollo machines are tremendously fast,

Continued on page 6

AI superstar plunges to earth

Knowledge-based expert systems delivered on symbolic processing machines are "a trend that I'd say is unstoppable at this point."

Russell Noftsker
Chairman, Symbolics, Inc.
February 1986

"I don't want to see the company fail. I don't want to see any more employees lose their jobs."

Noftsker
February 1988

BY CLINTON WILDER and STANLEY GIBSON
CW STAFF

CAMBRIDGE, Mass. — Like Icarus, Symbolics, Inc. thought there was no limit to how high it could soar.

Its technology was the envy of that sexy new industry, artificial intelligence, and its rapid climb to the $100 million revenue level in 1986 earned it acclaim as "a stock market superstar."

Symbolics' Noftsker

Now mired in red ink and leaderless — its founders having been eased out of control — the firm stands as a classic case of missed opportunities, overreaching ambition and market insensitivity.

"Success can be seductive," said Barbara Isgur, a technology analyst with D. H. Brown Associates in Tarrytown, N.Y.

"It's hard to know when to turn the corner or change direction. I can't think of a company that's been able to do that without a lot of pain," Isgur said.

Symbolics — which sprang up at the forefront of an indus-

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NEWSPAPER
SECOND CLASS

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Uniforum. Commitments to Unix run rampant as Apple starts shipping its own Unix version and AT&T details plans for Unix System V, Release 4 with real-time capabilities. Pages 132, 133.

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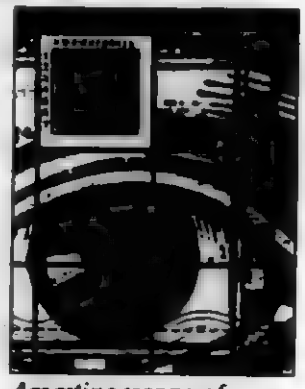

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Quotable

"Two or three years ago, this was a small show of ponytails and blue jeans. This year's Uniforum is a very corporate show."

JUDITH HURWITZ
PATRICIA SEYBOLD'S OFFICE COMPUTING GROUP

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Return to sender

Distributor, FBI baffled over missing IBM 9375

BY KATHY CHIN LEONG
CW STAFF

Lost: *One IBM 9375 Model 60 mid-range computer, related storage devices and printer. Weighs about 1,000 pounds. Sentimental value. Owner concerned.*

SANTA CLARA, Calif. — It seemed like a normal business day for distributor Marketex Computer Corp., when a Jim Peters of Tampa, Fla., ordered a used IBM 9375 over the telephone. But events quickly took a strange turn.

Marketex arranged for a shipping company to deliver the system to a residential address given to it by the caller, who said he worked for a company called Systems and Simulation, Inc., an actual engineering firm in Tampa. The computer has not been seen since.

Now, three weeks later, the Federal Bureau of Investigation and county police are on the lookout for the IBM 9375 Model 60, serial number 00248, four IBM 9335 disk drives, a tape drive and a printer. The market value is estimated at $191,000.

Marketex found that Systems and Simulation never had an employee named Jim Peters and that the apartment to which the computer was delivered was under the alias of a Michael Ray Shaeffer.

"The guy on the phone played us like a piano," Marketex President Russell Schneider said. "He negotiated. He asked for that model specifically. He knew the equipment and was extremely conversant in technology."

Marketex had run a credit check on Systems and Simulation but never on Peters. Schneider said it is standard business practice to perform a check on the potential buyer.

To add to the confusion, the FBI told Schneider that the apartment tenant used a fraudulent name and showed false identification papers. Investigators did tell Marketex that witnesses saw the tenant transferring equipment into a moving van.

If only we sent a 4381

"This would have never happened if we had shipped a 4381," Schneider lamented. He pointed out that while other IBM hosts must be installed by an expert, the IBM 9375 can be installed and serviced by users.

When third-party vendors install and maintain IBM products, they follow a strict accounting procedure of reporting the serial number after each check is stored in an IBM-operated data base. Now, Schneider says he has no idea where the IBM 9375 will show up next.

"People suggested that the person could have shipped it over to Cuba," Schneider said. "After all, it's only a four-hour boat ride."

Bob Golko, chairman of the Computer Dealers and Lessors Association, called the case bizarre.

"It is unusual for a distributor to ship a system off to a customer who it does not already know. . . . If there is ever a service call made on it, we will be able to track it down," Golko said.

NECIS withdraws U.S. plans

BY ALAN J. RYAN
CW STAFF

BOXBORO, Mass. — NEC Information Systems, Inc. (NECIS) has withdrawn plans to distribute low-end and mid-range workstations to the growing North American market this spring.

Frank Girard, NECIS vice-president of systems marketing, said the firm is currently reevaluating the positioning and pricing of the workstations but is not permanently abandoning the market.

"We're looking at some of the price points and also maybe looking at addressing a higher end marketplace," Girard said.

In the interim, NECIS will continue porting applications software to work with the workstations, Girard said.

Girard denied speculation that NEC Tokyo, which produces the workstations, was displeased with the marketing strategy NECIS planned for the systems. "Our strategy was fairly clear . . . basically going after the OEM and value-added reseller marketplace and, of course, using the advantages that our dealer distribution channel provided," he said.

According to one workstation market analyst, the vendor that can successfully sell workstations through dealer channels remains to be named. "We know that neither Sun nor Apollo have made outstanding headway thus far in setting up dealer networks," the analyst said.

Girard said that while OEMs had expressed interest in the workstations, no contracts had been signed.

Ashton-Tate feeds Mac demand

Broadens presence in market by adding spreadsheet, word processor

BY STEPHEN JONES
CW STAFF

PALO ALTO, Calif. — Ashton-Tate Corp. last week filled out its line of applications for Apple Computer, Inc.'s Macintosh with a multifunction spreadsheet aimed at presentation-hungry users and a word processor that features advanced desktop publishing capabilities.

Ashton-Tate's push into the Mac market, along with recent similar efforts by such companies as Lotus Development Corp. and Symantec Corp., promises to extend the list of applications choices for corporate Macintosh users. Most of today's best-selling programs, such as Word and Excel, belong to Microsoft Corp.

"This strengthens Ashton-Tate's presence substantially in the Mac world, and they have the resources needed to get some [dealer] shelf space for these products," said Bill Higgs, director of software research at Infocorp in Cupertino, Calif.

Outside help

The Full Impact spreadsheet and the Fullwrite Professional word processor from Ashton-Tate are based on technology from outside firms.

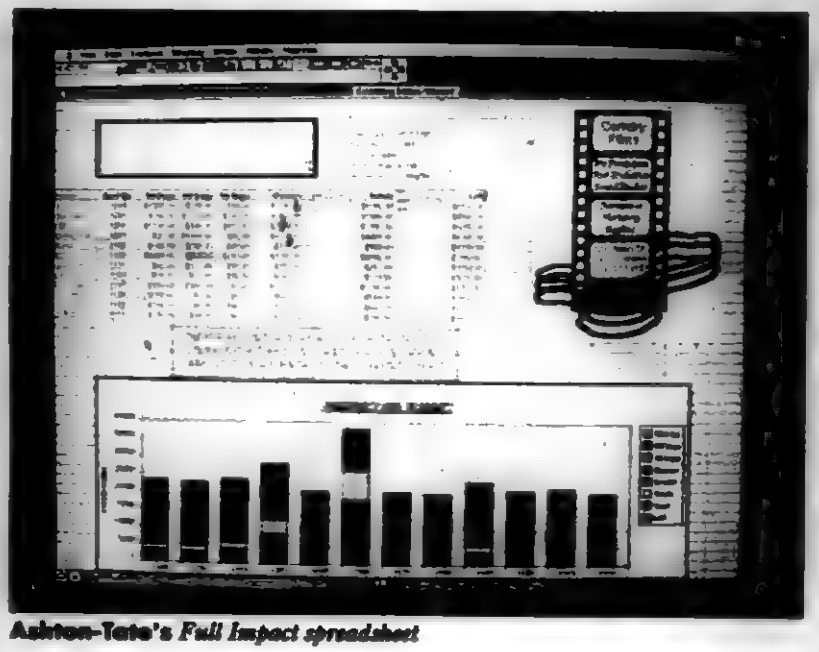
The company will position Full Impact, which costs $395, as a presentation-oriented package that enables users to combine text, data and graphics on a single page for business-related presentations. Apple has identified such desktop presentation capabilities as a key to future Macintosh programs.

Full Impact uses the standard Mac interface, offers full color support and multiple fonts and can open eight spreadsheets at once. Import and export functions support applications from DOS and Mac environments, including Ashton-Tate's Dbase III Plus, Lotus's 1-2-3, Microsoft's Sylk and IBM's Data Interchange Format file formats.

The package, based on technology from Encore Software and scheduled to ship by July 31, also features a variety of macro capabilities and customized icon bars that allow users to create a library of functions.

It runs on the Macintosh SE or Macintosh II and requires one 800K-byte disk drive and a hard disk drive or two 800K-byte disk drives with 1M byte of random-access memory. The program disk requires 800K bytes of memory.

While analysts praised the graphics features of Full Impact,



Ashton-Tate's *Full Impact spreadsheet*

Ed Esber, Ashton-Tate's chairman and chief executive officer, downplayed the package's chances of knocking Excel off as the No. 1 Macintosh spreadsheet.

"We're not saying that this product will immediately take over the leader in the spreadsheet market, but it will be a strong second," Esber said.

Ashton-Tate will take a more competitive stance against Microsoft Word by publishing Fullwrite Professional, which Ashton-Tate acquired with its recent purchase of Ann Arbor Softworks, Inc. in Newbury Park, Calif. Ashton-Tate will also sell Ann Arbor's Fullpaint, a $99.95 graphics generator for the Mac.

That's a wrap

Fullwrite Professional, which sells for $395 and is set to ship by April 30, features a what-you-see-is-what-you-get display of text and graphics. Analysts said they were impressed with its built-in drawing environment for page layout, which enables text to automatically wrap around a graphic design.

The word processing side of the program includes a procedure that automatically updates the outline of a document while it is being created, a 100,000-word spelling checker and a 220,000-word thesaurus. It works with all Apple-supported and Adobe Systems, Inc. Postscript-compatible printers, and it requires two floppy disk drives or one hard disk drive.

Ashton-Tate also announced Dbase Mac Runtime, a $795 execute-only package that lets developers distribute custom applications developed with the firm's Dbase Mac data base.

Esber said the company will consolidate its Macintosh operations near Sunnyvale, Calif. — and Cupertino-based Apple — by the end of August. The division will be home to about 50 development and sales and marketing employees who are currently working at three locations in Southern California.

Dbase group passes IEEE the baton

BY DOUGLAS BARNEY
CW STAFF

A committee that attempted to standardize the Dbase language without the consent of Dbase developer Ashton-Tate Corp. has disbanded and turned its work over to a study group formed by the Institute of Electrical and Electronics Engineers, Inc. (IEEE).

The Dbase Standards Working Committee was formed last year by a group of Dbase clone and tool vendors. The goal was to develop a standard language so that applications would be portable across the range of Dbase-like products.

Ashton-Tate objected to the efforts, largely on the grounds that the group infringed on the Dbase trademark. The firm sent letters to committee members, demanding that the committee cease and desist from trademark infringement.

Legalese?

In previous conflicts, Ashton-Tate's counsel has also implied that the language itself was proprietary and, thus, protected by law.

The study group formed by the IEEE is only the first step in the long road toward possible standardization of the Dbase language. But as long as the group does not use the name "Dbase," Ashton-Tate will not interfere with its efforts, said Roy Folk, executive vice-president of Ashton-Tate.

Ashton-Tate, however, said it has not given up on protecting Dbase, even if it means suing vendors that clone it.

Cloners get some slack

BY STEPHEN JONES
CW STAFF

TORRANCE, Calif. — Ashton-Tate Corp. scaled back its tough-guy approach toward Dbase clone makers last week, announcing a marketing deal with a potential foe and offering an olive branch to other developers.

The company said it acquired publishing rights to Frontrunner, a language development tool for Dbase III Plus developed by Pittsburgh-based Apex Software Corp. Frontrunner recently was added to a list of several Dbase clone programs that irked the copy-sensitive Ashton-Tate during the last year.

But instead of dragging Apex into court to contest possible Dbase copyright infringement, Ashton-Tate said it will sell the program as a "popular" $195 add-on to Dbase III Plus.

That may shock some clone makers, who late last year were challenged by Ed Esber, Ashton-Tate's chairman and chief executive officer, to "make my day" by copying Dbase proprietary technology.

By last week, however, Esber had toned down his words.

"We want to work with third-party add-on people and make them a better part of the family than we have in the past. I'm not doing my Clint Eastwood [imitation] anymore," Esber said.

Observers said Ashton-Tate will expand the market for Dbase III Plus by working with add-on makers while turning the firm's focus to future releases of Dbase for DOS and IBM OS/2 environments.

Esber, however, maintained that Ashton-Tate will continue to keep the Dbase III Plus technology under tight wraps.

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IBM expected to reveal 128G-byte MVS/XB

BY JAMES CONNOLLY
CW STAFF

IBM is ready to announce the follow-on to its premier operating system, MVS/XA, this week with extended addressing that could support main memories of up to 128G bytes in the near term and 15T bytes in the long term, according to a variety of industry observers.

The extended addressing would allow memory increases by orders of magnitude above the current 31-bit addressing's 2G-byte architectural limit and pave the way for new IBM mainframe architectures. The company scheduled a press conference for Monday morning; analysts alerted to the briefing voiced various predictions on the new addressing limit. Those ranged from a 37-bit scheme that would allow 128G bytes of memory to a 47-bit architecture.

While most analysts dismissed reports that the announcement will include a third-generation 3090 mainframe family commonly called the "F models," one consultant said those models, the new MVS version and a new I/O architecture that will support high-speed, 6M byte/sec. fiber-optic channels are likely to debut.

Bob Djurdjevic, president of Annex Research in Phoenix, said sources within IBM indicated the F models will be announced and that their performance will be 20% to 25% higher than the existing 3090E models because of hardware enhancements and the new operating system.

Djurdjevic said IBM may have finalized the decision to announce the F models within the past two weeks. He said IBM's goal is to spur demand for 3090s in expectation that demand otherwise may fall off this year.

F models in springtime?

Consultant Bill Husband of the Meridian Group, a leasing company in Deerfield, Ill., said what he called MVS/XB will be announced this week, followed by the F models in April.

He also said IBM may provide insight into where it is going with the F models and subsequent mainframes known by the code name "Summit."

"I think what we might get is an IBM statement of direction on things like Summit. They might take the opportunity to confirm a lot of what they have been telling customers privately for a while," Husband said. He said one future benefit of extended addressing could be to support a massive shared memory that can be accessed by multiple 3090 and Summit-class machines.

However, Per Flaaten, manager of information technology research at Arthur Andersen & Co. in Chicago, noted that one drawback to the extended addressing is the possibility that it will be accomplished in a retrofit manner by stringing together multiple address spaces for a program rather than through a true architectural change.

PS/2s

FROM PAGE 1

but the PS/2s are no slouch, either. We figured out what resources we needed and came up with a logical decision to take the less expensive alternative."

Both firms plan to begin phasing out their network of Quotron Systems, Inc. terminals in the next few months as ADP starts delivering its service prepackaged on a configuration of high-end PS/2s.

Quotron on the outs

O'Neil said Shearson Lehman is planning a rollout in a flagship office for the fourth quarter and will take the next few years to replace its stable of nearly 20,000 Quotron workstations with an arrangement that leans heavily on the PS/2 Model 50.

"Quotron is a dumb terminal with old technology," O'Neil added. "This system gives us live market quotes, which satisfies the Quotron function, plus a PC-DOS partition in which you can write industry-specific applications, and it offers spreadsheet, data base, word processor and graphics capabilities."

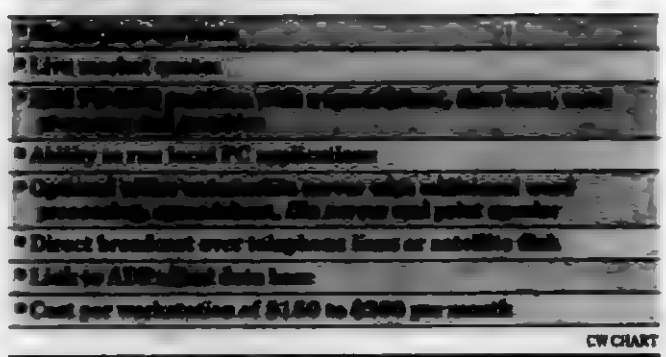
Merrill Lynch executives said their company's 23,000 Quotron systems will also eventually go. "The deliveries are going to be spread out over the next two or three years," said Rich Gaiti, vice-president of the advanced office systems group at Merrill Lynch. "We'll mostly be looking at [PS/2] Model 50s, but we'll include some Model 60s, which we'll be using as a network server, and some Model 80s."

Sources at Merrill Lynch also said ADP will include an unspecified number of diskless PS/2 Model 50s, which IBM has yet to announce but which the firm has reportedly been using on a custom-bid basis for the past several months [CW, Feb. 1].

Financial System Partner is an ambitious consultant system that uses windows to allow a broker to look at a wide variety of services, including the client's portfolio, stock prices and spreadsheets with live quotes.

Market maker

Features of ADP's Financial System Partner



CW CHART

The system runs under IBM's PC-DOS, but "migration to OS/2 will be mandatory in the future as far as we're concerned," said Larry Jones, senior vice-president of product management and systems development at ADP.

The system is a direct offshoot of International Marketnet (Imnet), a joint venture Merrill Lynch and IBM formed in 1983 to develop a financial information system both for internal use and to market to other brokerage houses. When the Imnet deal crumbled early last year, ADP stepped in and announced that it would work on a similar system with Merrill Lynch.

The deal could be a major blow for the functional, but some say outdated, Quotron system. Shearson Lehman and Merrill Lynch are two of Quotron's oldest and largest customers; both have used the system since the mid-1970s.

Additionally, when Los Angeles-based Quotron was acquired by Citicorp in 1986, Merrill Lynch was forced into the distasteful situation of fattening a competitor's wallet with each monthly service payment. "I know that Quotron also bid on this contract, but I don't think the fact that Quotron is owned by a company many consider to be our archenemy helped the matter any," one Merrill Lynch employee said.

Quotron, however, is not taking the switch lying down. "We've got a contract with Merrill Lynch for this service into the early 1990s, and I know we'll continue to prosecute that contract," said George Levine, Quotron's vice-president of sales and marketing. "We'll continue to develop applications and provide services to Merrill Lynch that ADP will need to meet to provide a comparable service."

AI superstar

FROM PAGE 1

try subculture nurtured by MIT-trained developers in a revitalized section of Cambridge known as AI Alley — built its success on dedicated LISP workstations for AI software development. Known as the Porsches of AI workstations, Symbolics systems in the $100,000 price range were the platform of choice in AI development labs.

"They went to places that could afford to give their high-priced scientists a seat and an expensive machine," said Terry Shannon, editor of a newsletter for the Digital Equipment Computer Users Society, the AI special interest group of Digital Equipment Corp. users. "That's a bounded market that has been pretty well saturated."

While Symbolics' rate of new installations stalled, an increasing amount of AI and expert systems development was emerging on industry-standard hardware platforms running Unix, DEC VMS and Microsoft Corp. MS-DOS operating systems. That trend has continued, leaving Symbolics behind.

According to company cofounder Noftsker, who resigned as chief executive officer earlier this month but remains as chairman, Symbolics made a key strategic blunder in 1983. At Noftsker's urging, the company considered development of the so-called Ivory chip, a microprocessor containing all of the Common LISP language. In theory, such a chip could be incorporated into industry-standard hardware platforms as an AI development coprocessor.

But, Noftsker said, Symbolics' board rejected the project at the urging of the research and development vice-president. Noftsker was able to restart the effort in 1985, but the delayed three-year development cycle cost the firm a critical window of opportunity. Symbolics announced the chip last spring [CW, May 18, 1987] but said it would not ship until later this year.

Plunge to earth

Symbolics' financial performance has fallen far and fast since the glory days of 1986

INFORMATION PROVIDED BY SYMBOLICS, INC.
CW CHART

Noftsker was removed from day-to-day operations 10 days ago in a management shake-up that also included the departure of Brian E. Sear, president and chief operating officer. Sear was brought in to spark a turnaround when Symbolics began skidding. He orchestrated several cost cuts, including the reduction of the work force from almost 1,000 to 650 and the abortion of the company's move to more spacious quarters.

"There was a difference of opinion as to what could be cut and what could not," Thomas Farb, Symbolics' treasurer and acting chief financial officer, said of Sear's resignation.

"Sear was perceived as cutting the future," said Esther Dyson, editor of the "Release 1.0" newsletter.

What the future holds for Symbolics is now a major question mark. Most observers said they feel Symbolics must find its niche with AI development software for others' hardware platforms, and there is potential for OEM sales of the Ivory chip.

But at this point in the firm's volatile history, observers are at a loss as to how to chart a Symbolics recovery strategy. With Symbolics stock trading at less than $2 per share, an acquisition or purchase of assets may be the company's fate, as it was for Lisp Machine, Inc. last year.

Ironically, the LISP machine market leader's chance for survival may depend on its ability to catch up in the non-LISP hardware world.

"Having a superior product that's not where the parade is going," Dyson said, "leaves you out of the parade."

All aboard Apple-DEC bandwagon at Dexpo

TOPS, Novell lead slew of vendors eager to hitch a ride with new duo

BY ALAN J. RYAN
and NELL MARGOLIS
CW STAFF

NEW YORK — And now, your local weather report for Dexpo East '88: This week, the Big Apple will be hit by a blizzard of buzzwords as companies eager to attach themselves to the recent strategic alliance of Digital Equipment Corp. and Apple Computer, Inc. blanket the area with "connectivity," "interface" and "seamless access" announcements.

In an effort to network Apple Macintoshes, IBM Personal Computers and DEC VAXs, Berkeley, Calif.-based TOPS said it will unwrap TOPS/VMS this week.

Slated for third-quarter availability, the networking software package reportedly will let a VAX act as a TOPS Network file server, giving Macintosh and PC users access to large-capacity disk storage, high-volume backup functions and improved data security.

Users will also be able to draw files from the VAX, share them and then return them to the VAX for storage and backup in VAX format, the company said. Additionally, the VAX can act as a network file server, letting users launch Macintosh applications or PC programs on microcomputers from the VAX.

Provo, Utah-based Novell, Inc., the personal computer local-area network giant, is expected to make its VAX environment debut with a VMS version of its Netware operating system.

With more than 160,000 operating system installations worldwide, Netware is regarded as a LAN standard. However, some have already questioned whether Netware/VMS will give users something new or merely widen their choices.

"Excelan has a product out that already achieves integration between the DOS world and the VMS world," said Paul Sherer, an analyst with Robertson, Colman & Stephens in San Francisco. He called the Excelan, Inc. connection "a robust product that does the job well."

The Netware/VMS announcement will be "Novell positioning itself as a multivendor player," Sherer added.

Whether Netware/VMS turns out to be something new or not, companies are already lining up to support it. Sources close to Relational Technology, Inc. reported that the Alameda, Calif., relational data base management system maker will announce Ingres support for the Novell DOS/VAX LAN at Dexpo.

Oracle Corp. will also reportedly announce an agreement with Novell to develop a file server product for Netware/VMS and an agreement with Interlink Systems, Inc. to get SQL Net to run on Interlink's Datacomm Gateway.

Another product expected to debut at Dexpo is Odesta Corp.'s Helix VMX DBMS with access to RMS files, which reportedly will ship later this year. Helix VMX already uses the Macintosh as a front end, with a VAX as a back end. One drawback to the system, however, is its inability to easily work with VAX/VMS RMS files.

"The piece of the puzzle that has been left out was that most data on VAXs is sitting in RMS files," said Daniel Cheifitz, president of Odesta.

IBM jacks up service prices

BY STANLEY GIBSON
CW STAFF

RYE BROOK, N.Y. — Following a year of maintenance price cuts, IBM last week boosted charges for some hardware maintenance, equipment rental and use of its Information Network, a remote computing service.

IBM announced that monthly rental and leasing fees for IBM computers will jump 7%, effective June 1.

IBM's National Service Division raised its hourly service rates 15%, effective last Friday. In addition, IBM Maintenance Agreement charges are being increased 7% for some mainframe products, 10% for some IBM copiers and 15% for many machines not covered by IBM's Corporate Service Amendment (CSA), effective June 1.

Throughout 1987, IBM progressively cut its maintenance prices and enticed customers to apply for its CSA by implementing steep discounts and free after-hours maintenance. In November, all IBM Maintenance Agreement customers were handed 24-hour, seven-day-a-week service at no extra charge.

"IBM had cut its maintenance prices to the bone. Perhaps they cut them too much," said Richard Forsythe, president of Forsythe McArthur Associates, Inc., a Skokie, Ill.-based computer leasing firm.

IBM said it will raise fees for the use of the Information Network by 7%, effective April 1. IBM also said connectivity service, storage, network traffic and 800-number dial-access charges will remain the same.

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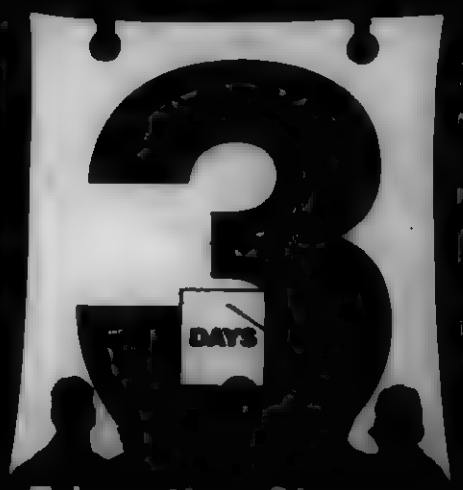

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Cray blazes path for X-MP users

BY JAMES CONNOLLY
CW STAFF

MINNEAPOLIS — Cray Research, Inc. redirected the mainstream of its supercomputer line last week when it announced the Y-MP/832 as an extension to the 6-year-old X-MP family.

The $20-million Y-MP is more than twice as powerful as the X-MP/416 and is rated faster than the Cray-2.

In addition to offering a growth path for the 114 X-MP users — the majority of Cray's 173 users — the Y-MP announcement was a major step in Cray's shift from its COS operating system to Unix.

Cray's brand of Unix, called Unicos, is standard on the Y-MP, as it has been for the Cray-2. Noting that COS supports only four processors and 16M words of memory, Cray said COS is available as an option.

Down to X-MP level

While declining to discuss future Y-MP models, Cray promised to migrate Y-MP technology down from the eight-processor Y-MP/832 into the X-MP line.

The Y-MP features 32-bit addressing and circuits that are 1,000 times denser than those used in the X-MP. As a result, Cray claimed that its first eight-CPU system is smaller and easier to maintain than the X-MP and uses 30% faster processors.

With a theoretical performance level of 3 billion floating-point operations per second (GFLOPS), the Y-MP ranks well below the claims by crosstown rival ETA Systems, Inc., which rates its ETA-10 at 10 GFLOPS.

Actual supercomputer performance tends to be a fraction of such ratings. The ETA-10 performs 52 million floating-point operations per second (MFLOPS); a single-processor X-MP, 39 MFLOPS in the Linpack benchmark.

The Y-MP/832 features twice the memory — 32M words — of any of the 11 X-MP models. The X-MP, introduced in 1982, complements the Cray-2, Cray-3 and Cray-4 systems being developed by Cray.

A Cray spokesman said a successor to the Y-MP remains in development, despite last year's resignation of designer Steven Chen. The Y-MP follow-on is targeted for the early 1990s.

Cray Chairman John A. Rollwagen said the successor to the Y-MP, known as the "Y," is the subject of a development project launched a year ago alongside Chen's massively parallel processor "MP" project. He said the Y will be an evolutionary extension of the Y-MP with faster processors, more CPUs and additional memory.

Two major Cray customers, each with at least eight Cray supercomputers, were happy to see the Y-MP's compatibility with the X-MP and the increased number of CPUs.

"We have already signed a contract to buy two. The major thing to me is that we can almost consider it an X-MP/832 rather than a Y-MP," said Norman Morse, division leader for the computing and communications division at Los Alamos National Laboratory in Los Alamos, N.M. That laboratory was the first Cray customer in 1976.

'Standard setter'

John E. Ranelletti, head of the computation department at Lawrence Livermore National Laboratory in Livermore, Calif., noted, "Cray machines continually set the standard for supercomputing." He said eight processors make time-sharing easier. However, he said, users and vendors still must meet the challenge of designing software that will automatically run in parallel on such multiprocessors.

Hal Feeney, director of technical computing services at market research firm Dataquest, Inc. in San Jose, Calif., observed that the Y-MP is evolutionary, not revolutionary.

"It's very impressive," Feeney said. "It looks like Cray is doing what Cray does best, which is press the technology and press the performance." He said the shift to Unix is a natural move in technical computing, in which the operating system standards are Unix, IBM's MVS and Digital Equipment Corp.'s VMS.

The Y-MP/832 was designed to run X-MP applications in a 24-bit mode or new applications in a 32-bit mode. The Y-MP processors are built with 2.5K-macrocell gate arrays.

The denser circuits allow Cray to package each CPU in a two-board module, compared with 144 modules per CPU with the X-MP. The shorter circuit paths mean a reduction in the cycle time from the X-MP's 8.5 nsec to 6 nsec.

The Cray-2, with eight times the memory of a Y-MP, tends to be used more for research in fluid dynamics and image processing, while the X-MP and Y-MP are more suited in time-shared engineering environments.

Rollwagen said Cray expects to ship three or four Y-MPs this year, starting in the third quarter, and about 12 in 1989.

Heavy hitters

Introduction of Cray's Y-MP system broadens the supercomputer company's lineup of multimillion-dollar machines

Cray Y-MP/832	8	32	3	$20
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Cray X-MP/416	4	16	1.2	$16

* Billions of floating-point operations per second, based on *Computerworld* estimates

CW CHART

Layoffs, low funds ail Celerity

BY STANLEY GIBSON
CW STAFF

SAN DIEGO — A shift to selling in the crowded minisupercomputer market has apparently backfired on start-up superminicomputer maker Celerity Computing, which recently laid off a number of workers and now seeks more funding in order to survive.

In a filing last month with the U.S. Securities and Exchange Commission (SEC), Celerity said a "substantial work force reduction" would take place Jan. 29. *The San Diego Union* reported that 50 workers were let go at that time. In the SEC filing, the company blamed the problem on delays in receiving parts from a single-source supplier.

The company also announced that it would have to receive $2 million in the very near future to continue operations. The firm said it has not received any firm commitments yet.

Technology for sale

According to a former employee, Celerity stopped selling computers in late January when the firm laid off all employees except those in research and development. Efforts are now being made to sell the firm's technology, the former employee said.

Founded in May 1983, with Hambrecht & Quist Venture Partners as the lead investor, Celerity offered its stock for public sale last summer. Total funding, including the public offering, came to $31.5 million, according to information released by Celerity.

Celerity officials did not return *Computerworld's* calls concerning the company's recent troubles. Hambrecht & Quist partner Robert Morrill, who is on Celerity's board of directors, declined to comment.

Last summer, another Hambrecht & Quist-funded start-up, Canaan Computer Corp., ceased operations without giving notice to its customers or dealers [CW, Aug. 10, 1987]. Celerity customers and dealers could not be contacted at press time.

Celerity's 6000 product, a 64-bit reduced instruction set computer-based near-supercomputer, announced in September 1987, was expected to be delivered that November.

According to sources, however, it could not be shipped because of the parts delay, which involved semiconductors. The Unix-based parallel and vector processing system was expected to have a starting price of $250,000.

OS/2

FROM PAGE 1

months old. One developer said there are not enough users for a decent beta test. Another blamed a combination of an unavailable C compiler and post office delays. Ironically, none cited the process of actually porting the applications to OS/2, which they all said is easy.

Say it in bold

Oracle Corp. made perhaps the boldest prediction in a series of advertisements last year that promised to ship an OS/2 version of its Oracle data base management system the first day the new operating system shipped. That day was Dec. 4. Oracle for OS/2 is still not available.

According to Oracle, the key holdup is in testing, not porting, the product. "There aren't many copies of OS/2 out there. It is hard to get software tested under OS/2 in real-world conditions," said Gene Shklar, director of marketing for Oracle's PC product line.

Oracle said, however, that it will show off its OS/2 product next week and that it now plans to ship by the end of March — nearly four months later than originally planned. Prerelease versions of the product have shipped since January, Shklar pointed out.

Users looking forward to the first-quarter delivery promised for Borland International's Paradox DBMS software should put their wallets back in their pockets. Paradox will ship in the second quarter, according to Borland President Philippe Kahn.

Kahn, who was one of the first to promise a first-quarter delivery of OS/2 applications, said the delay stems from the need to avoid "fast and sloppy ports."

At an IBM seminar last week, Kahn outlined plans for future ports of Borland's Quattro spreadsheet, upcoming Sprint word processor, Sidekick Plus and language tools. This time, Kahn did not provide specific delivery dates, except to say that the products will ship this year. He did say that versions of Paradox for the OS/2 Presentation Manager and IBM's OS/2 Extended Edition will ship by the end of this year.

USERS looking forward to the delivery promised for Paradox DBMS software should put their wallets back in their pockets.

Informix Software, Inc. originally planned to ship OS/2 versions of its relational data base software nearly as soon as OS/2 shipped, acknowledged Stephen E. Hill, the firm's director of product marketing. That project was delayed because of IBM shipping delays, he said.

"To IBM, shipping means it just gets off their docks" but not necessarily into users' hands, Hill said. As a result, Informix did not receive a copy of OS/2 until Christmas — just in time for the project to be further delayed by the holiday break. Informix wrapped up its port last month and is scheduled to ship the final version this week. Beta-test versions have shipped since last month, Hill noted.

Although no major applications are currently shipping, there is a slight sample of smaller programs currently available to pioneer OS/2 users.

These include Thinktank from Symantec Corp.'s Living Videotext division, a pop-up programming Help system from Peter Norton Computing, Inc., programming tools and diagnostics from California Software, Inc., the GSS Graphics Development Toolkit from Graphics Software Systems, Inc. and the Btrieve development tools from Novell, Inc.

Computerworld West Coast correspondent Stephen Jones contributed to this report.

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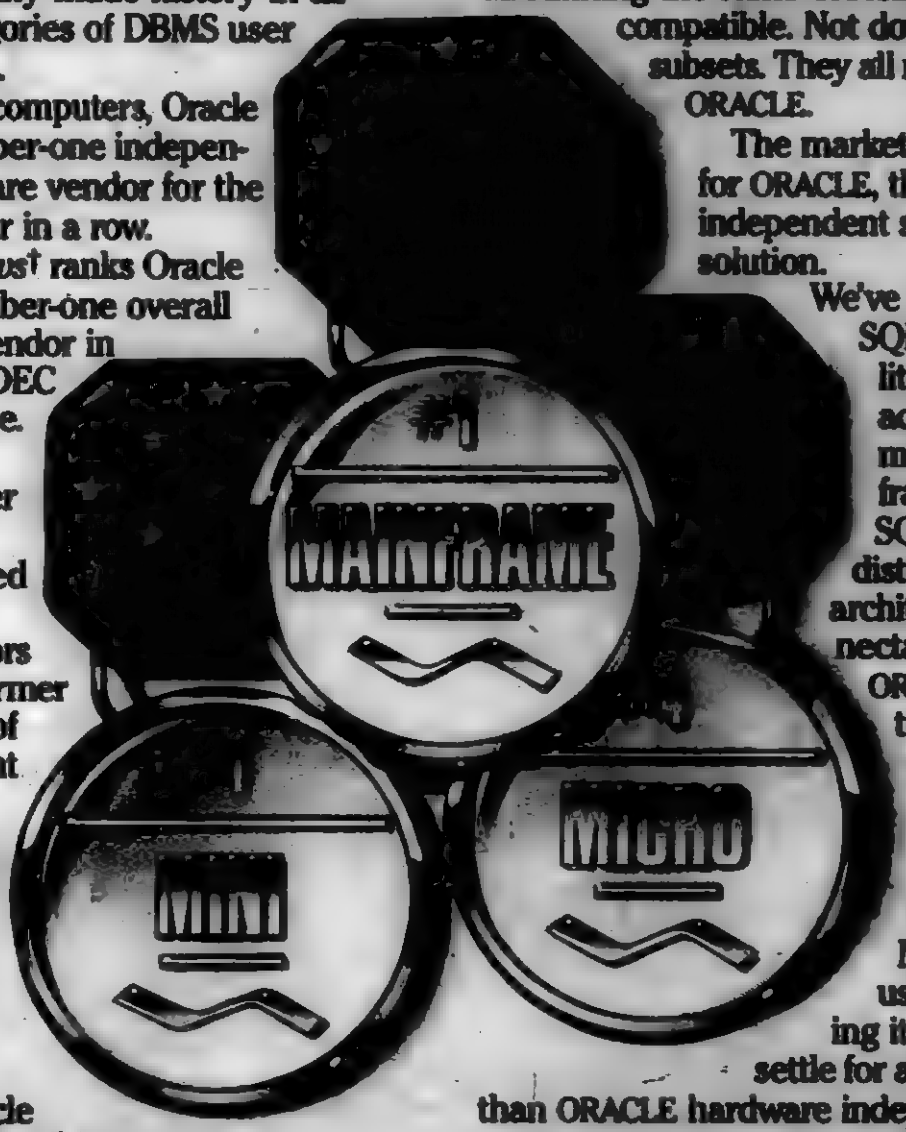

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Microsoft ports for OS/2

Multiplan, Word updates ports of current MS-DOS versions

BY STEPHEN JONES
CW STAFF

REDMOND, Wash. — Seeking to fill a void in initial OS/2 applications, Microsoft Corp. is scheduled to announce this week its plans to ship upgraded versions of Multiplan and Word that will run under IBM's OS/2 Standard Edition 1.0.

But users seeking a panacea for the current absence of OS/2 programs should not look to Microsoft for immediate answers. Multiplan is not slated to ship until sometime in May, and although early portions of Word will be demonstrated this week, the word processor will not be available until the third quarter.

Both OS/2 programs will be ports of the new upgrades of the Microsoft MS-DOS versions of Multiplan and Word and will not be written especially for OS/2 Standard Edition 1.0. Each package will come with both MS-DOS and OS/2 disk versions of the new program, Microsoft officials said.

Unlike quick-and-dirty ports to OS/2 promised by other vendors, Microsoft claimed that the Multiplan 4.0 upgrade was redesigned to take advantage of the operating system's multitasking and extended memory capabilities.

Lotus Development Corp. is following a similar plan for a dual MS-DOS and OS/2 release of 1-2-3 Version 3.0 this spring.

The current $195 price tag for Multiplan will not change for the OS/2 version, a strategy that one Microsoft developer said will also be used for other upcoming ports of MS-DOS applications. No price was given for Word.

The source said Multiplan for OS/2 Standard Edition 1.0 will have increased data base functionality, more character formatting, such as boldface and italic, and more math functions and formulas embedded in the program. It also features complete file compatibility with Microsoft's Excel and Lotus's 1-2-3.

The new version of Word will capitalize on OS/2 Standard Edition 1.0's increased memory ceiling, featuring a lengthy document and retrieval facility, extensive indexing and programmable macros, according to Charles Stevens, group product manager for word processing.

A concession of sorts

Microsoft's push for OS/2 Standard Edition 1.0 ports represents a departure from the company's earlier attitude of shying away from such simple programs. But Microsoft Chairman Bill Gates and others remain adament that OS/2 Standard Edition 1.0 and related applications will ultimately provide little more than a transition to the OS/2 Presentation Manager, expected to ship in October.

And with fewer than 30,000 copies of OS/2 Standard Edition 1.0 actually sold, some analysts said they feel Microsoft might be one of only a handful of developers that will announce imminent release dates for similar ported applications.

"When developers see a number of OEM hardware vendors shipping OS/2, then you'll see them jumping in to test the water," said Bill Higgs, director of software research at Cupertino, Calif.-based Infocorp. "For the moment, they can sit back and watch what happens."

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DEC, Emulex bury hatchet

MAYNARD, Mass. — Just in time for Valentine's Day, Digital Equipment Corp. and Costa Mesa, Calif.-based Emulex Corp. ended three years of legal combat.

"This settlement puts an end to a chapter," a DEC spokesman said of the settlement Wednesday of all outstanding litigation between the two companies. Although the companies agreed not to disclose details of their agreement, the joint settlement announcement revealed that Emulex will be allowed to license the technology that DEC once accused it of stealing.

The DEC-Emulex legal skirmishing began in 1985, when DEC charged Emulex with stealing trade secrets and infringing on certain patents on DEC's SBI, CMI, Unibus and Q-bus technologies.

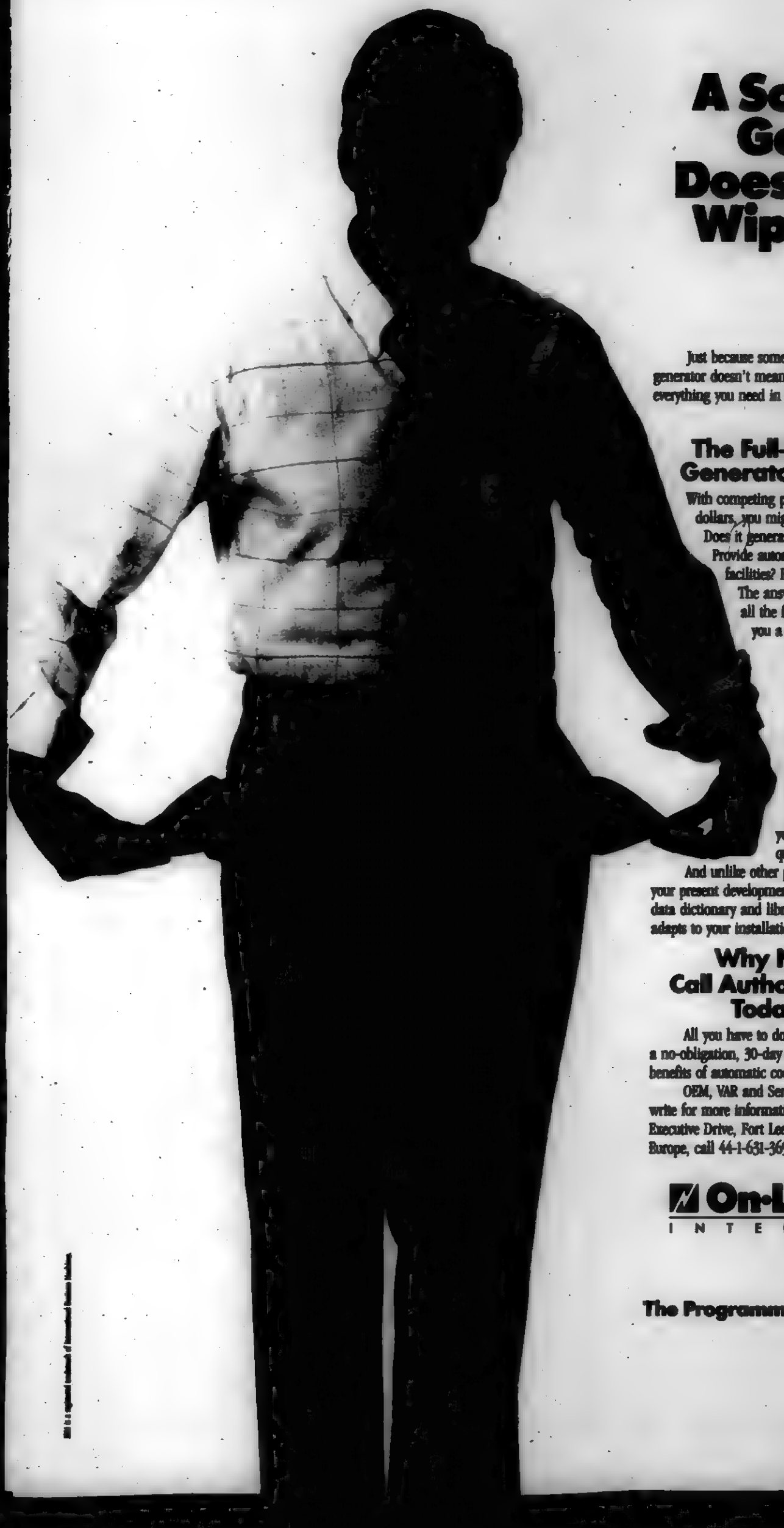
Emulex counterclaimed in antitrust and later brought its own suit, in which it alleged that DEC was refusing to supply it with products and services and inducing other companies to do the same.

Coast-to-coast court-by-court volleying continued through 1987. In the end, however, the companies, not the courts, decided the cases, with each side declaring victory.

"We're very pleased with the settlement," an Emulex spokesman said.

Declining to specify a dollar figure, the Emulex spokesman said that "the impact of the settlement will not be financially material to the company." The license price, he said, will have "no effect at all on our product direction or the prices at which we sell our products."

"It made sense to settle," a DEC spokesman said. "Emulex is paying for the license; the fact that they are validates our patents."



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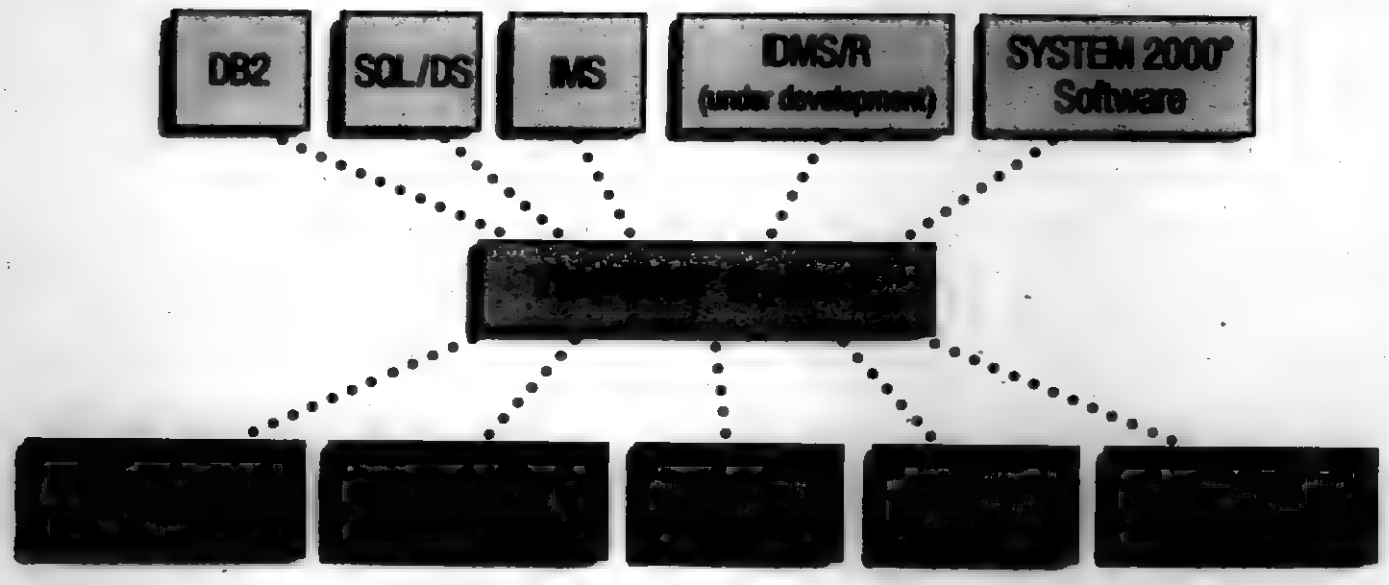

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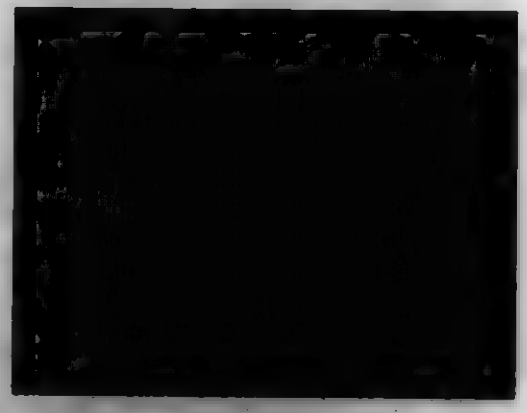

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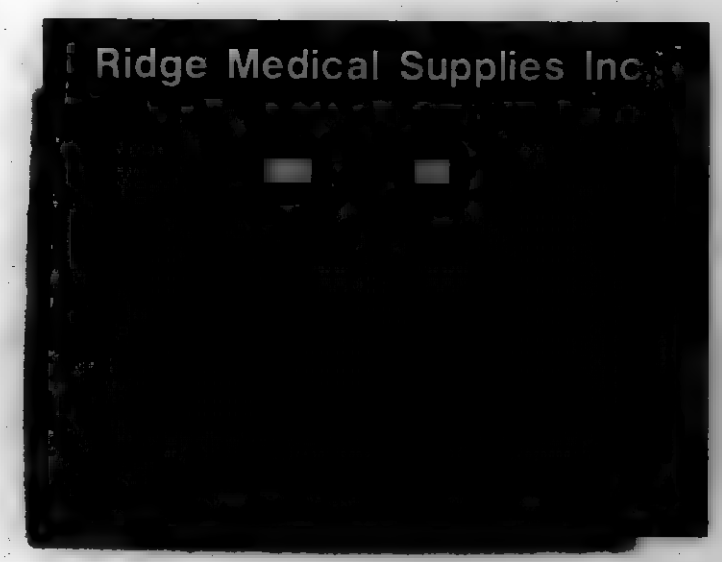

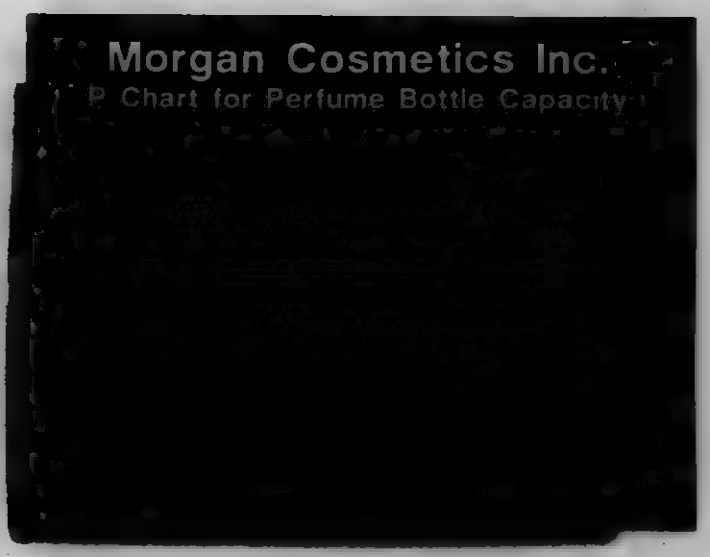

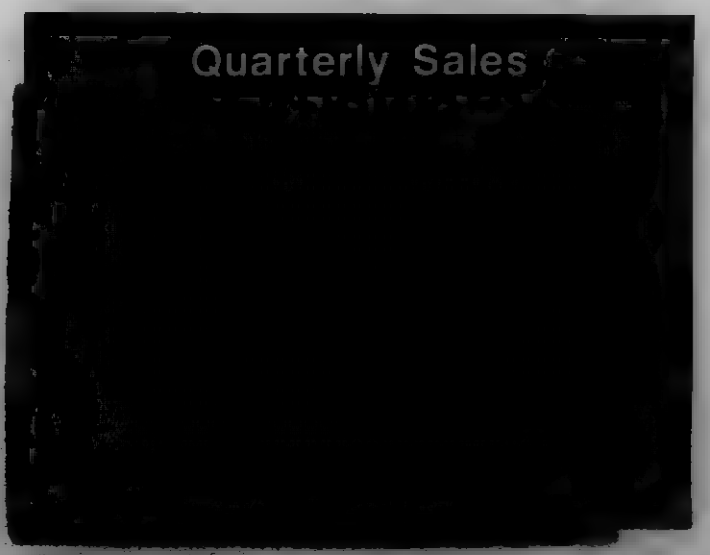

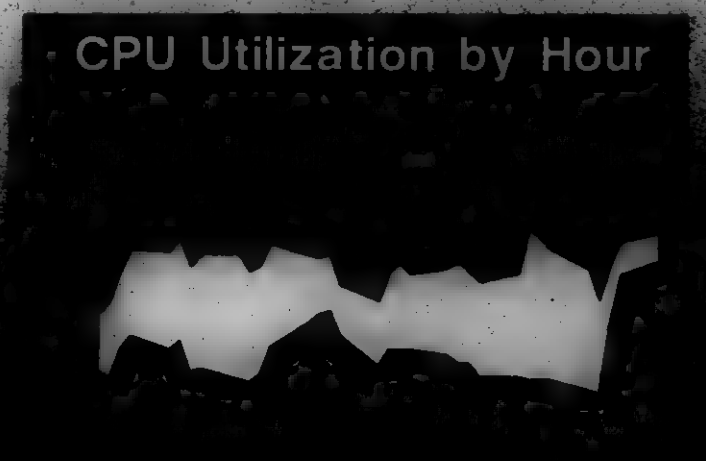

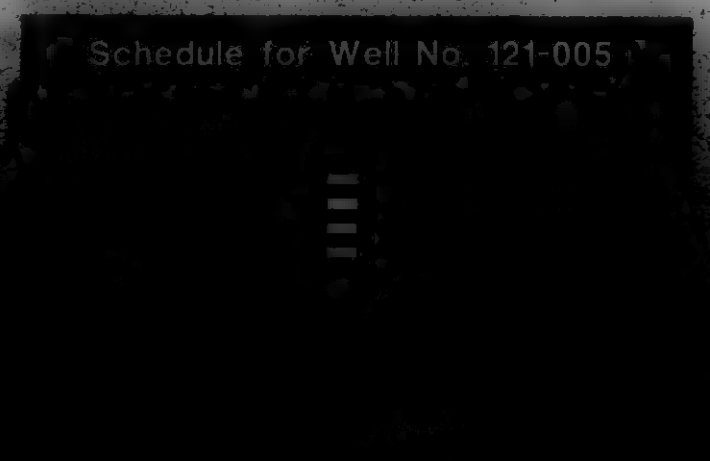

Computers should not be market crash scapegoats

BY MITCH BETTS
CW STAFF

ANALYSIS

Three exhaustive investigations into the October stock market crash have been wrapped up, and what is interesting is the amount of attention each devoted to computers: Did computerized program trading cause the crash? Did the computers at the stock exchange hold up under pressure?

From the postmortem reports, it appears computers were a small part of the problem and could be a small part of the solution. Several observations can be made in the wake of "Black Monday":

• **The knee-jerk reaction was to blame the computer.** One U.S. senator, for example, quickly called for the suspension of program trading to "unwind the death spiral into which mindless, computer-driven algorithms have driven the market." Cooler heads noted that the trades were programmed by people and permitted by regulators.

Program trading refers to the use of computers to make automatic trades in stocks and futures when prices change a few percentage points. The sophisticated investors use algorithms developed by mathematicians known as "rocket scientists."

• **Program trading made the plunge worse.** No one claims program trading caused the crash, which was triggered mostly by jitters about the economy. But just when it seemed the market might bounce back on Black Monday morning, huge sales by just a few program traders nipped the rally in the bud.

The chain reaction of two types of program trading, index arbitrage and portfolio insurance, accelerated the crash, according to reports by the president's Brady Commission and the staff of the Securities and Exchange Commission (SEC).

At critical points, program trading accounted for 30% to 68% of the New York Stock Exchange (NYSE) volume, the report said.

• **Computers at the stock exchanges worked remarkably well under the intense pressure and record volume but not well enough.** Problems arose in several markets and were typified by the overloaded device controller and card printers on the NYSE floor, according to a report by the U.S. General Accounting Office.

Delays from the overloaded printers meant that orders were not executed at the same price they were entered, which had ripple effects throughout the market, the report said.

• **Computers should be used to monitor trading activity.** Information systems at the stock, futures and options markets should be upgraded to make it easier for regulators to monitor trading problems, the Brady Commission said. The systems should provide more details about each trade and the ultimate customers.

"This information can be used to diagnose developing problems as well as to uncover potentially damaging abuses," the commission said. In other words, it might help to avert another market meltdown — or at least make it easier to write postmortem reports.

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Securities firms sustain investment

Study reveals trading system purchases will increase — within limits

BY ALAN ALPER
CW STAFF

NEW YORK — Despite fiscal constraints resulting from volatility in the world's financial markets, securities firms expect to continue investing heavily in information technology this year to reduce operating costs and enhance productivity, according to a recent study.

The study, conducted last month by Audits & Surveys, Inc. and sponsored by Digital Equipment Corp., found that the 202 securities firms polled said they will increase their investments in information technology by an average of 18% this year.

That figure is far lower than the 30% to 40% annual increases in information technology expenditures that became standard practice for securities firms during the bull market of 1982 to 1987, industry analysts emphasized.

Better data management

The findings, disclosed during a panel discussion at the Securities Industry Association's Information Management Conference here last week, suggest that securities companies will continue investing in trading systems that provide more efficient management of market data and back-office automation.

"Companies will focus their spending on areas that reduce costs in data processing and hone in on projects that can reduce operating costs," said Hal Rich, a panel member and chief information officer at Citicorp's Investment Bank unit.

"We're going through a stage where we need to block and tackle better," added panel member Gerald Ely, director of capital markets information systems at Merrill Lynch & Co. "But while we pull in our horns, we can't forget about the innovative things we need to do to be more efficient."

Beefing up back office

Securities companies will have to beef up their back-office operations to deal with ever-increasing trading volumes, panel members said.

"Companies are going to have to rewrite their core systems at a cost of about $100 million over the next four to five years to keep up," said panel member Sameer Patel, information technology specialist at McKinsey & Co.

The study found that smaller securities companies are interested in increasing the speed of their trading systems, while larger houses are investing more heavily in efficient management of market data.

On the average, 24% of the companies polled said they expect to increase expenditures in expert systems technology. As expected, 40% of the larger firms said they will increase their use of artificial intelligence, compared with 19% and 20% of small and medium-size firms, respectively.

"Artificial intelligence, by and large, is oversold," stressed panel member Bill Kelvie, managing principal at consulting firm Nolan, Norton & Co. "Really, the issue is to get better use of the technology that is already there."

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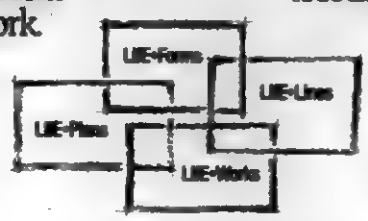

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HP users don't mind wait for Spectrum

Most say they'd rather have the RISC-based machine right than right now

BY JAMES A. MARTIN
CW STAFF

ANAHEIM, Calif. — For most, the long and often frustrating wait for Hewlett-Packard Co.'s Spectrum series of supermicrocomputers is still not over.

Nonetheless, attendees interviewed last week at an HP Interex User Group conference here said they remain committed to HP and "don't mind sitting tight."

"HP could have turned Spectrum out sooner, but I'd prefer they wait until it's ready," said Isaac Blake, technical support analyst for the city of Tempe, Ariz., information systems division.

Rollouts rolled back

Spectrum is the project name for HP's reduced instruction set computing (RISC)-based, 32-bit precision architecture systems, which reportedly offer significant price/performance upgrades to the HP 3000 line. The five-year, $250 million development project first promised to produce Series 930 and 950 systems by late 1986 and first-quarter 1987, respectively. The projected rollouts were snagged in mid-1986 on glitches such as an I/O software bug, pushing back shipment dates about a year.

At present, most HP customers who have recieved a Series 930 or 950 have not yet progressed beyond the testing and preliminary implementation stages, users said.

An HP spokesman said the company does not divulge shipment levels on individual systems, but he did say the orders for the Series 930 and 950 "exceeded our expectations."

"I feel like a 6-year-old at Christmas," said Arnold R. Dixon, a systems and procedures director at Celanese Fibers Operations in Salisbury, N.C., referring to the imminent arrival at his company of a Series 950.

Waiting around

Celanese is scheduled to receive its 950 in June, followed by two more before year's end. The long wait has not interfered with Celanese's data processing projects and plans, because the Series 950s will be used for implementing a new multiple-user inventory control and purchasing application as well as redundancy systems that "are not under any time crunch," Dixon said.

> "HEWLETT-PACKARD users are the most loyal in the world. A lot of users don't mind sitting tight."
>
> DONALD A. WRIGHT
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Some said the Spectrum delays might actually prove beneficial. Pacific Telesis Group, a San Francisco-based regional holding company, ordered a Series 930 more than a year ago but may no longer need it.

"We had a lot of growth for the first few years after we broke off from AT&T," said Reggie Mills, installation manager for the company's data systems. "Since we placed our order, things have stabilized to the point where it's no longer needed, and we will probably cancel our order."

Some customers said they are tempted to switch to another vendor because of the delays and their own resulting CPU crunches.

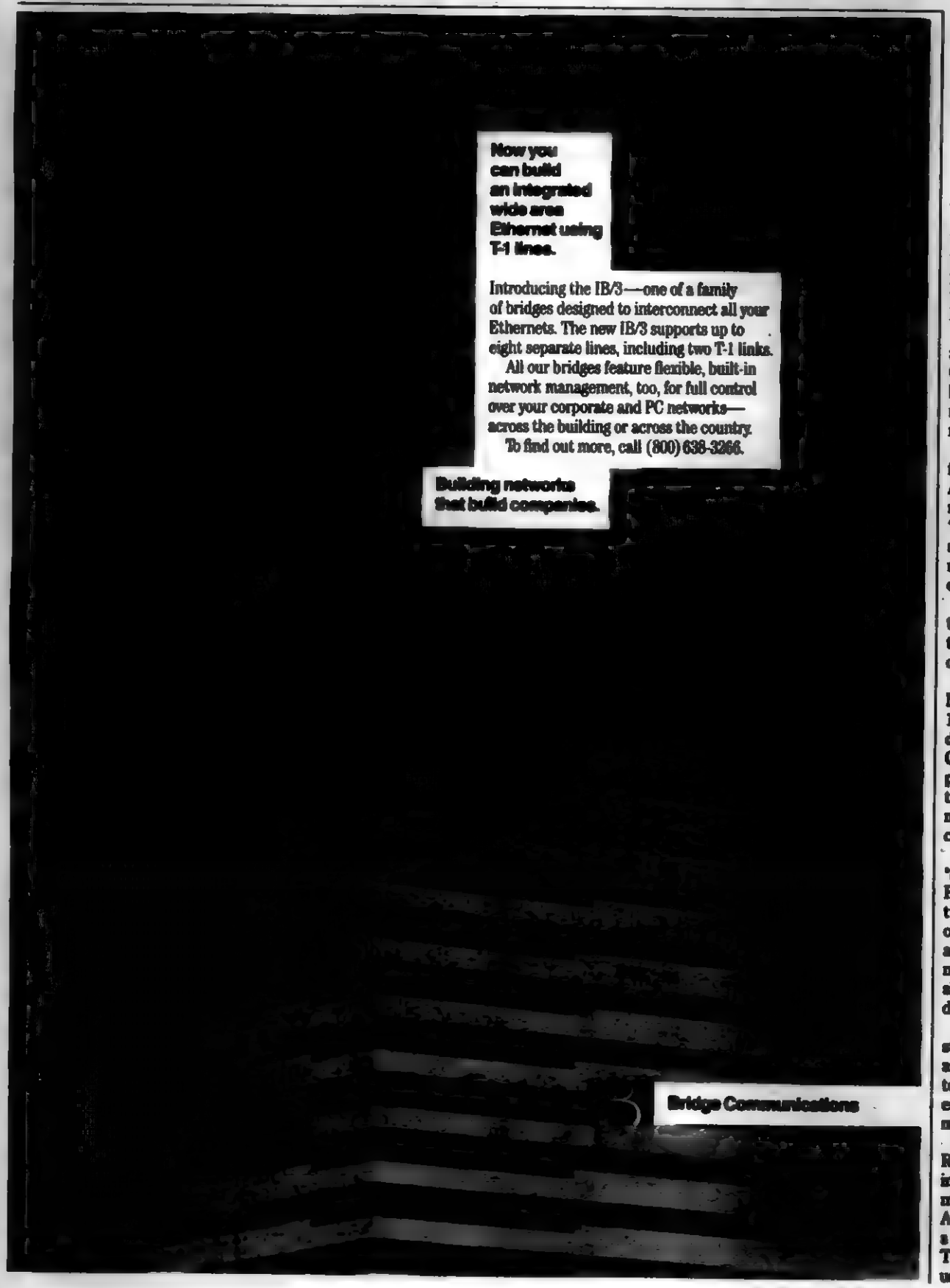
Pacific Mutual Life Insurance Co. in Newport Beach, Calif., launched in April 1987 a full-scale study on the effects of dropping HP in favor of Digital Equipment Corp. or IBM and seriously considered proposals from those vendors, according to David L. Hicks, the insurance company's senior systems consultant for applications systems.

'Maxed out'

Pacific Mutual's HP 3000 Series 70 and two Series 48 systems were "maxed out," Hicks said, and for a time it looked as if the company would have to postpone new projects and applications. The study showed Pacific Mutual could not afford to drop HP, however.

One of the most persuasive factors in sticking with HP, Hicks said, was the 80% and greater trade-in allowance HP offered to customers who bought a Series 70 to ease computing crunches until Spectrum models arrived.

In general, users said they believe the RISC-based systems will be worth waiting for. "Hewlett-Packard users are the most loyal in the world," boasted Donald A. Wright, an Interex board member and a consultant with Interactive Computer Technology in Lake Elmo, Minn. "A lot of users don't mind sitting tight."



'Lights-out' goal no nap for MIS

BY JAMES A. MARTIN
CW STAFF

LAS VEGAS — Full-scale implementation of the "lights-out" concept may still be years away, but it was the talk of the day at the eighth annual Association for Computer Operations Management (AFCOM) show here last week.

With the level of automation in a corporate data operations center expected to increase significantly in the next few years, the role of the computer operator will become like that of an airline pilot, attendees said. Repetitive tasks will be taken care of by unattended operations technologies, but the presence of a sharp mind on-site will be even more important than before, to avert potential disasters.

Lights-out environments — fully automated operations centers — are not expected to be in place to any large degree before the early 1990s. But meanwhile, computer center operations managers and staff members are facing mounting pressures to make good today on what lights-out promises tomorrow: higher productivity at lower costs, with a better allocation of resources, human and otherwise.

Future employees

Computer center operators are also expected to be better educated than their high school graduate predecessors, possess a variety of technology support skills, understand fully the nature of the companies they work for and be ready to accept other responsibilities if their jobs are eliminated or reduced in scope.

In fact, some say the computer operations staff is the most important element in a company's success or failure. Corporate America's increasing dependence on data as a means of cutting costs and keeping up with the competition brings unprecedented responsibilities to computer operations workers.

"As professionals, our responsibilities extend all the way to the corporate shareholders," said Leonard Eckhaus, president of AFCOM. "What the DP operation does heavily impacts many of the company's basic business and financial operations, which translates into profit and loss to the shareholders."

Due to a variety of factors — including fears of a recession following the stock market crash and tough competition from Japan — lights-out is increasingly being regarded as one way of keeping a line on operating costs. "This means operators will need higher skills, since more and more of their job is becoming automated," said Ray M. Ybaben, editor of AFCOM's monthly magazine.

Although most attendees interviewed said they were several years away from any full-scale lights-out implementation, the concept is causing some concern already in computer operations centers.

At Ranger Insurance Co. in Houston, the operations staff has been reduced from 22 to eight, thanks mainly to increased automation, according to James Savage, data center manager. In the past, five operators were on duty per shift; today, only two are needed.

Although several operators were laid off, Savage said, others were reassigned to different support tasks and new projects.

"Lights-out is frightening to operators because they think it's eliminating jobs, but progress usually creates new jobs," said Jerry M. Turner, chief of the Center for Disease Control's operations branch in Atlanta.

The increasing reliance by corporations on departmental computing is another opportunity for current operations staff members to find new responsibilities, attendees said.

"Often, department management in a corporation doesn't have the skills needed to care for a computing system and doesn't really want to acquire those skills for themselves," Ybaben said. "They're not interested in the computer, just the results, and this gives the operations person a new opportunity."

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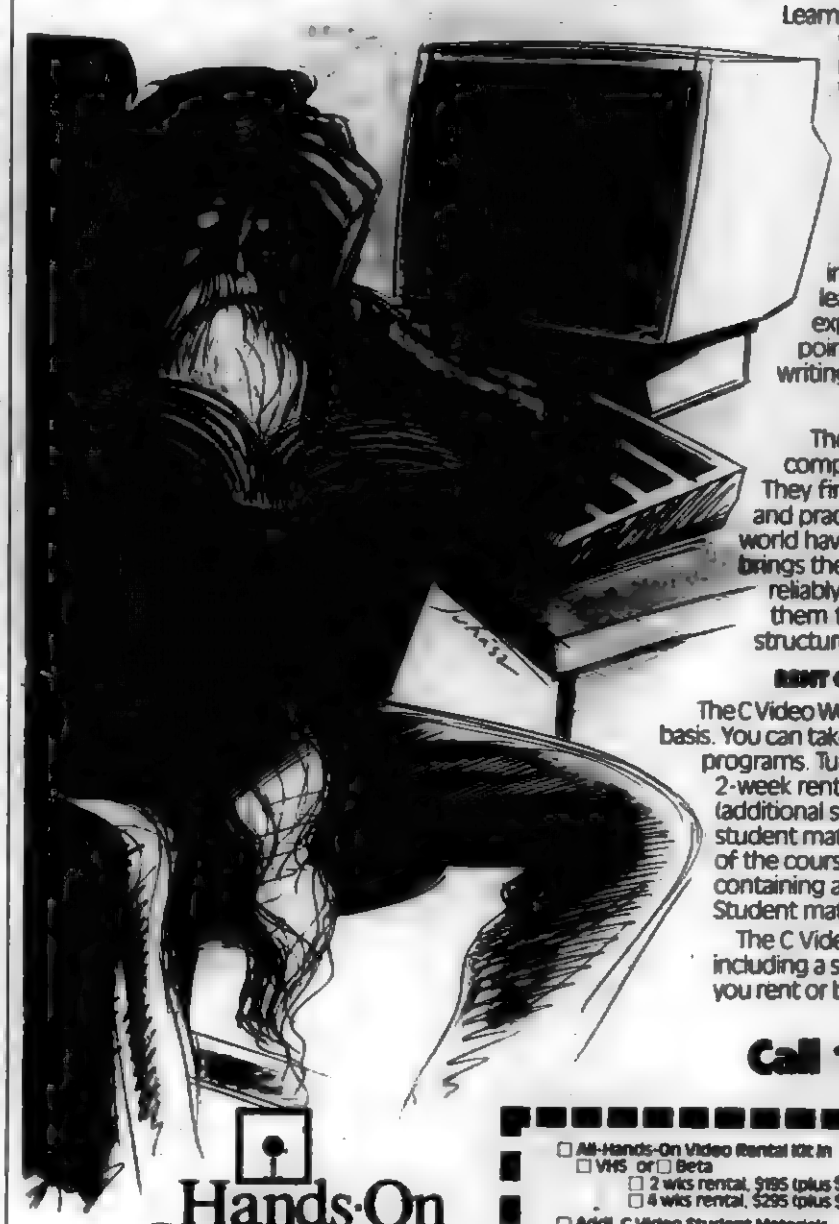

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EDITORIAL

Unisys — Take 2

WHEN YOU LOOK at the results after more than a year and a half of the biggest computer industry merger ever, it's tempting to pin the success label on Unisys. It's similarly tempting to pin a genius label on W. Michael Blumenthal, who masterminded and then oversaw the marriage of Sperry and Burroughs — as outlined in last week's special Unisys report [CW, Feb. 8].

For one thing, the sum of the two parts has not only remained financially viable but is considerably more sound than Burroughs and Sperry were individually. Credit Blumenthal with doing a masterful job in this regard. At a time when mainframes were getting a bad name on Wall Street, Blumenthal convinced the investment community that a new firm composed of two architecturally different mainframe companies could grow and possibly thrive.

Second, the widespread belief when the merger was announced that there would be mass defections of Burroughs and Sperry users to IBM, DEC and other camps has not come to pass. According to Unisys, the merger yielded what it terms critical mass, or the sheer bigness that gives comfort to mainframe buyers. In Blumenthal's own words, compared with what most people expected and with what could have happened, Unisys has done well.

Moreover, the company has maintained strength in one very key, bitterly contested market — commercial banking — in which Burroughs had been strong, despite concerted efforts by IBM and DEC to capitalize on merger-related uncertainty.

But hold off on canonizing Blumenthal or elevating the Unisys story to miracle status. The greatest tests are still to come.

A part — perhaps a large part — of the financial success of Unisys has resulted from a carefully hatched, $2 billion divestiture of some business units of Sperry and Burroughs. Actual revenue growth for this year has been pegged by some analysts at well under 5%.

Real growth in the medium and long term will have to come from mid-range systems, networking products and other areas in which the company has not traditionally been a major power.

Most critically, Unisys needs to quickly and effectively address a sense from too many users that support has fallen victim to the merger. As other companies have learned — often too late — nothing will turn users off more quickly than feeling anything short of completely coddled when it comes to support and maintenance.

Unisys must also recognize that being big should not mean being bureaucratic. There are certain aspects of smallness that users like. IBM's recent corporate reorganization was intended to eliminate bureaucracy between the company and its dealings with customers.

The company seems keenly aware of these long-term success factors. With more creative genius and a lot of careful listening to its customers, the "Power of 2" can become more than just a slogan.

LETTERS TO THE EDITOR

Word twist

To be quoted in an important publication like *Computerworld* is a special honor. Even to be misquoted in CW is an honor, albeit a lesser one. In the article "Let's see, word publishing, desktop processing — no . . ." [CW, Dec. 14, 1987], the author quoted me as saying, "Interoperability is a strategic, corporate imperative." What I said was, "Interoperability is a corporate strategic imperative."

The difference between these two statements may be egregiously subtle, yet the precision of my meaning was blunted and deformed in the misquoted version.

Thanks for producing well-written, authoritative, timely and potent information in issue after issue. The professional information services that your publication gives me are invaluable in my work.

David J. Becker
Manager of
Automation Resources
Boeing Support Division
Boeing Co.
Seattle

The how and why

John Barnes' article, "How to spot the true colors of a rare breed — the expert" [CW, Jan. 18], left me wondering if I'm doing it all wrong.

Barnes said, "Something is wrong if the expert you hired is spending most of his time explaining what he does." Later in the article, he said, "Something is right if he starts making plans for turnover to your personnel early." Can I really handle turnover to my clients without explaining what I have done?

I have always believed that my clients should wind up knowing not only what I have done but also how and why I did it. Typically, it takes longer to communicate this knowledge than it did to solve the immediate problem. Unless my clients understand the how and why, my contribution is just a quick fix. I do not believe I can build a healthy long-term client relationship by basing it on a series of quick fixes.

Perhaps Barnes could be persuaded to write another article along the lines of "How to know if your expert did the job you needed done."

John Boddie
Unusual Software
Newark, Del.

Out of bounds

I protest the inclusion of such callow and sophomoric sympathies as those expressed by Buck BloomBecker in his article "On trial for willful computer sabotage" [CW, Dec. 7, 1987].

To characterize the U.S. government as in any way resembling the Third Reich is a preposterous proposition. To insult the intelligence of our federal judiciary with such drivel is a crime against reason.

BloomBecker described his fear that an elitist group of techies will become conscienceless wielders of power to the detriment of the common man and world peace. The truth as determined through experience and modern history is somewhat the opposite.

It is probably impossible to form such conspiratorial groups as would be necessary to threaten our institutions of freedom in this country. To succeed at such an enterprise, one would have to cut off the free flow of information. That is unachievable at this late date.

It is all too prevalent that an Amy Carter, Brian Wilson or Katya Komisaruk will arrogantly patronize and underestimate the common sense of the average American. With the aid of a cooperative and uncritical press, it is easy to make a flash in our media for a few moments of glory.

Bill Copenhaven
Richmond, Calif.

This week in history

Feb. 13, 1978
Scientists at Pennsylvania State University use a Digital Equipment Corp. PDP-11/34 to study the motion of the human body in an effort to improve athletic performance and reduce the risk of sports-related injuries.

Feb. 14, 1983
IBM opens up to its Personal Computer users the huge installed base of Binary Synchronous Communications (BSC) protocol networks by introducing a combination hardware and software product that emulates 3270 devices running under BSC.

BSC is the most commonly used protocol on IBM mainframe-based communications networks.

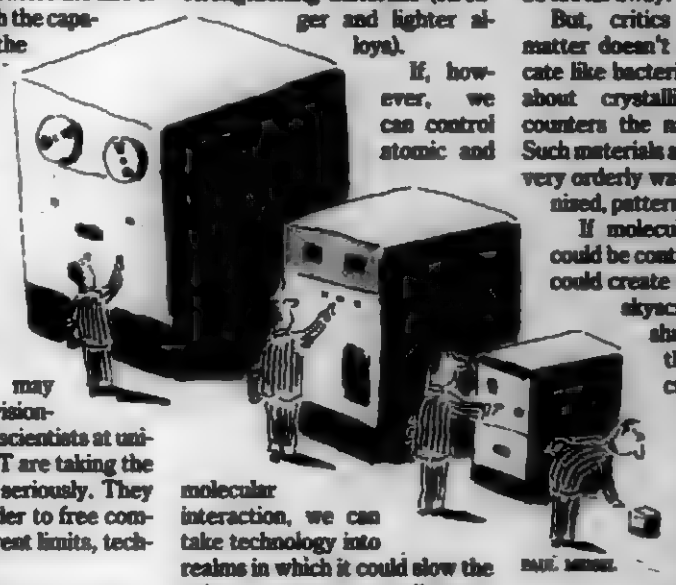
Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor, Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.*

Computers smaller than a fly

HARVEY NEWQUIST

What's the smallest computer you can think of? Certainly not a personal computer, because you can buy laptops that are smaller. And not the typical hand-held computers, because now you can get them as small as a credit card. Credit cards are small, but a mosquito is much smaller. Bacteria are 1/10,000 the size of mosquitoes. Atoms are 1/10,000 the size of bacteria.

Imagine computers the size of a few atoms, with the capability of storing the code for constructing a skyscaper, including plumbing, electricity and air channels. That's a supercomputer thousands of times smaller than basic bacteria.



While you may have trouble envisioning such a thing, scientists at universities like MIT are taking the possibility quite seriously. They argue that in order to free computers from current limits, technology must be downsized past microns to atomic and molecular levels. That's 1/10,000 of a micron — nanotechnology.

The issues are explored by K. Eric Drexler in his book, *Engines of Creation, The Coming Era of Nanotechnology.*

Drexler and his supporters claim that technology is still the modern equivalent of primitive man chipping stones and bending heated metal. The most impressive advances are still related to the ways of old — using temperature (superconductors), chipping away at raw materials (smaller silicon processors) and strengthening materials (stronger and lighter alloys).

If, however, we can control atomic and molecular interaction, we can take technology into realms in which it could slow the aging process, cure diseases, help replenish the air supply and produce one of the most important instruments that man will ever use — the nanocomputer.

The underlying concepts of nanotechnology are analogous to what is going on in biotechnology. Bioscientists commonly effect changes in bacteria by injecting them with viruses to produce specific kinds of results, from growth hormones to enzymes.

The DNA structure of an organism is altered in a methodical, even predictable way. Since DNA molecules are already being manipulated within organisms, it seems to the nanotechnologist that molecular control over inorganic matter shouldn't be too far away.

But, critics say, inorganic matter doesn't grow and replicate like bacteria or cells. What about crystalline structures? counters the nanotechnologist. Such materials seem to grow in a very orderly way, forming organized, patterned structures.

If molecules of all types could be controlled, then they could create everything from skyscrapers to space shuttles as long as the types of molecules needed for bonding and building were available. How would they know the difference between them?

Precedents are already available in even the simplest biotechnology. Penicillin

Continued on page 23

Newquist writes and consults on artificial intelligence and other advanced high-technology topics from his office in Scottsdale, Ariz.

Putting information back in the center

NAOMI KARTEN

When I was an information center manager, my department was situated near the elevator so that users could find it easily without traipsing through other departments. We were the first room a visitor to the floor encountered, so people asked us for directions — to the rest rooms, to another department, to the conference room, even back to the elevator.

In the noncomputing world, an information center brings to mind just this kind of service.

The booth in the department store, the window at the train station, the little building at the rest area on the highway — all offer information to guide you on your way. If you need help in getting from Point A to Point B, the attendants don't hand you a compass or enroll you in Intro to Navigating Operating Systems. They simply tell you the best way to get from A to B.

By many other names

In the corporate world, however, information center is a strange name for what in reality acts as a service center. There are plenty of alternative labels in use: micro support center, user services center, decision support center, productivity center. Most of these names emphasize services, not information.

Some organizations deliberately depart from the information center designation because the name was introduced by IBM. If IBM says do it *this* way, they would rather do it *that* way.

Many organizations simply prefer a name that more accurately reflects their actual services, which generally include creating specialized data bases, evaluating hardware and software, establishing policies and guidelines and providing training and product support. Right from the start, they viewed themselves as something other than a center for information. One center, for example, is called hot line and training.

But users are becoming proficient in product mechanics, and the need for basic services will not last forever. To be of value to the organization for the long term, information centers need to become true information centers — one-stop shopping for expertise in the retrieval and use of computerized information to support business needs.

Requirements for guides

To provide this level of expertise, staff members need to understand and be able to communicate with others about the following:

- Corporate data, including sources, format, meaning and usage. Besides knowing the who, what and where of corporate data, the staff must understand the differences and inconsistencies among various sources of data. Seeing the big picture enables information centers to collect data from multiple sources and supply it to users in the most effective form for supporting desktop decision making.
- Sources and uses of external data bases that can be purchased or accessed to support business needs. Whereas corporate data is largely oriented toward transaction-based operational needs, external data can be valuable in providing quick access to information that can affect the direction of a company's future.
- Emerging computer technologies that may support or advance users' business needs. Staying on top of the technology is too important to be merely an afterthought, but it frequently falls off the to-do list in the scurry to fulfill other obligations.
- The range of user-developed applications. Users are spending enormous amounts of time reinventing the wheel. By tracking and cataloging selected applications from key areas, information centers can develop an application menu from which users can draw when starting a new project.
- The range of computer technology available in the company and how it is being used.
- The company's major production systems, where they get their data from and what they do with it. Knowing these systems requires a familiarity with how key data elements change as they meander through the company's key systems.
- Corporate goals and objectives and the flow of information through the company to support these goals. Information centers must aim in this direction to survive. Some forge strong links to the data administration group and are becoming knowledgeable about corporate data.

Some information centers assign staff members exclusively to technology evaluation; they concentrate on meeting with

Continued on page 23

Karten, president of Karten Associates in Randolph, Mass., is a consultant, trainer and lecturer in the management of end-user computing. She is editor of the monthly publication "Managing End-User Computing," published by Auerbach Publishers, Inc.

FDR, JFA: Picking up the pieces

GLENN RIFKIN

That January morning in 1933: Herb Hoover tapped his derby on top of his head and flipped a quick wave to Frank D. Roosevelt. "Hey, Frankie," he said. "Good luck. It's all yours now." And with that, he popped out the side door of the White House and hopped on a train to Iowa, whistling, "Happy Days are Here Again."

In 1985, down in Armonk, N.Y., it was, as Yogi Berra would say, deja vu all over again. John Opel threw on his overcoat and patted John Akers on the back. "Good luck, Jackie. It's all yours now," he said. With that, Opel grabbed a company jet to Palm Springs, whistling, "Do You Know the Way to San Jose?" John looked around his spacious new office and noticed small cracks in the ceiling and paint peeling near the window.

Now everyone knows that Frank landed right in the middle of a big mess. Too many good times had made the old country fat and lazy, ripe for a big fall. When he took over in 1933, the downward slide was just picking up steam. Things would get a lot worse before they got better.

Jack inherited his own little country ready for a fall. Depression set in almost immediately. Too many years of good times had made Blueland fat and lazy, and, although no one believed it was possible, the fall came fast.

Suddenly, everyone was pointing at Jack. "Hey," they cried, "Blueland is the biggest and the best. It's the last great hope for freedom and high margins. What are you going to do about it, Jack? Huh? What?"

Things got worse before they could get better. Blueland's GNP — gross national prominence — dropped precipitously as the economy battered the heart and soul of its business. Wars broke out. First, armed legions from the Far East and the American Southwest attacked the flank. Then, a skilled army led by Capt. Ken Olsen struck the midsection.

No more war

Now everyone knows that Frank turned out to be a big hero. He led the forces that beat back the Depression. Of course, it took a skirmish called World War II to help old Frank work his magic.

Jack doesn't want another war in Blueland. He's already losing the few battles he's got.

So he just decided to take his little place apart and then snap it all back together. In the process, he did a bit of jiffying up, tucking in the corners and cleaning up the mess. He wants everyone to remember him as they remember Frank. He wants to be a hero.

"The only thing we have to fear," Jack says, "is fear itself . . . and delayed buying decisions and tighter margins and more clones and VAX clusters and integration and recessions and. . . ."

Rifkin is a *Computerworld* senior editor.

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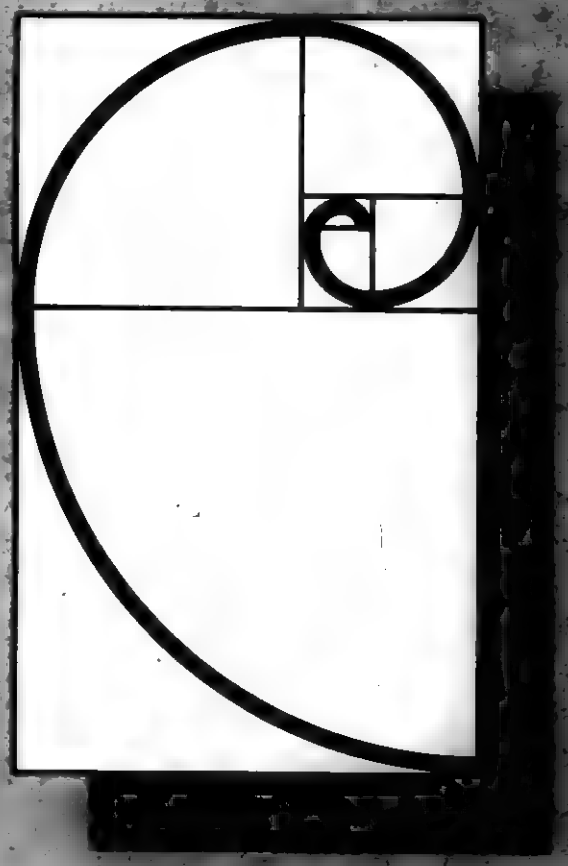

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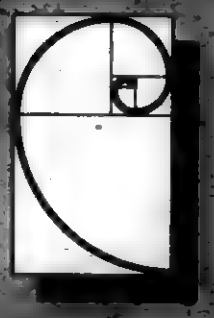

SYBASE

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[redacted]

Computers

FROM PAGE 19

affects certain bacteria but not living cells. Such selectivity should also be possible in building molecular machines.

Now consider assemblers, which are the "how" in using molecules to build things. Assemblers are molecules formed together as miniature machines to achieve a certain function, whether it be linking other molecules to form smooth-as-silk steel or forming an assembly line to create unbreakable plastic only millimeters thick. Machines so small that they are invisible could be created by linking molecules in precise formations.

More than sci-fi

Does the potential of nanotechnology begin to sound like science fiction? You can almost picture the lab scene: "Hey Bill, over here, under the electron microscope, you've got to see this — it's a fully automated GM plant, and it's turning out cars just a few molecules wide."

Nanotechnology proponents claim that there is nothing wrong with a little wild speculation. Look at how eerily accurate Jules Verne and H. G. Wells were in writing about societies decades beyond their own.

But it really shouldn't sound that far off the mark. After all, today's microprocessors contain thousands and thousands of microscopic components that form chips smaller than M&Ms. The room-size ENIAC of 1946 is already the fingernail-size Intel 80386 of the 1980s.

And that brings us to the prospect of actually creating nanocomputers. Present-day computers, built with micron technology, can't avoid molecular flaws. They also contain processors built in a two-dimensional, or flat, configuration.

In much the same way that biotechnologists create predetermined bacterial functions, the nanotechnologist could create interconnecting circuits. Arranging the molecular level of a semiconductor design would allow for more precise, three-dimensional circuitry.

Mechanical or chemical reactions could cause molecular-size computers to operate with incredible efficiencies, even though these methods are about 100,000 times slower than electric signals. However, since the traveling distance is one millionth less than that crossed by electric signals, there will be a considerable processing time improvement.

Nanocomputers would control assemblers, but what would control the nanocomputers? The answer lies in artificial intelligence. Just as computer-aided design and manufacturing takes some of the human intervention out of various design and production phases, so will the next generation of AI help to create nanocomputers and nanomachines.

Though nanotechnology is many years away from reality, its proponents tend to be some of the best and brightest in the world of computer research. They could make it happen, some think, as soon as the turn of the century.

Advances in computing power, memory and speed during the past few years have really just been alternate ways of cutting the same computer pie. You can serialize it, parallelize it, hypercube it or neurally network it. But changing its inherent molecular format — now that's radical.

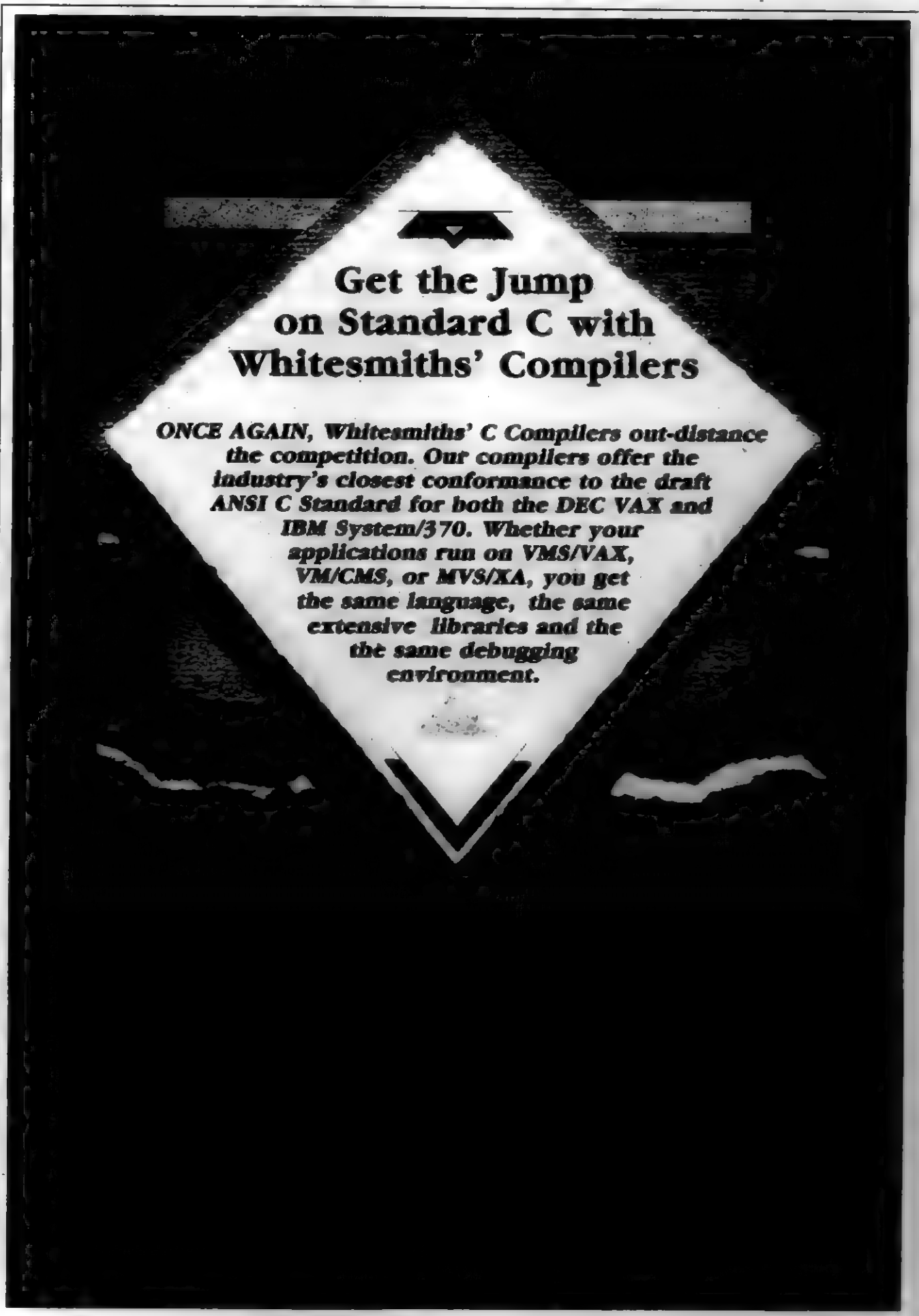
Information

FROM PAGE 19

vendors, viewing new products and assessing the benefits to be derived from these products.

Some information centers create libraries of user-developed applications, and through on-line bulletin boards and other forms of communication, they help their users avoid redoing what has already been done.

The service component of the information center that has been dominant during the last several years has been essential to support the early stages of end-user computing. But as users develop proficiency and as the current emphasis on the basics diminishes, there must be an evolution from service centers to true information centers.



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   70. Mining/Construction/Petroleum/Refining/Agric.
   80. Manufacturer of Computers, Computer-Related Systems or Peripherals
   85. Computer & DP Services, including Software/Service Bureau/Time Sharing/Consulting
   90. Computer/Peripheral Dealer/Distributor/Reseller
   75. User: Other _____
   95. Vendor: Other _____ (Please specify)
2. TITLE/FUNCTION (Circle one)
   IS/MIS/DP MANAGEMENT
   10. Vice President, Asst. VP
   21. Dir., Mgr., Supvr., IS/MIS/DP Services
   22. Dir., Mgr., Supvr., of Operations, Planning, Adm. Services
   23. Dir., Mgr., Supvr., Analyst, of Systems
   31. Dir., Mgr., Supvr., of Programming
   32. Programmer, Methods Analyst
   35. Dir., Mgr., Supvr., OA/WP
   36. Data Comm. Network/Systems Mgt.
   OTHER COMPANY MANAGEMENT
   11. President, Owner/Partner, General Mgr.
   12. Vice President/Asst. VP
   13. Treasurer, Controller, Financial Officer
   41. Engineering, Scientific, R&D, Tech. Mgt.
   51. Sales/Mktg. Mgt.
   OTHER PROFESSIONALS
   60. Consulting Mgt.
   70. Medical, Legal, Accounting Mgt.
   80. Educators, Journalists, Librarians, Students
   99. Others _____ (Please specify)
3. COMPUTER INVOLVEMENT (Circle all that apply) Types of equipment with which you are personally involved either as a user, vendor, or consultant.
   A. Mainframes/Supermnis
   B. Minicomputers/Small Business Computers
   C. Microcomputers/Desktops
   D. Communications Systems
   E. Office Automation Systems
   F. No Computer Involvement

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SOFTWARE & SERVICES

SOFT TALK

F. Barclay Jordan

You better shop around

Many quality software applications are available as packaged software today, but selecting the right package remains a demanding task.

This burden can be eased by following these guidelines:

• Identify the individuals who will use the software and appoint them to a section team.

In addition to users, this team should include representatives from MIS, internal auditors and other departments that might be affected by the new or enhanced application. Ultimately, this team should monitor and support the implementation.

• Document required features and functions in detail.

Traditionally, this documentation effort is completed as the result of interviews. An alternative approach that is gaining favor consists of conducting a few software selection team meetings that might last for four to eight hours, the objective of which is to reach a consensus on what business functions are required in the new system.

Regardless of the approach, the first task of the selection pro-

Continued on page 27

Consortium states its CASE

Plans to integrate disconnected steps of software development cycle

BY NELL MARGOLIS
CW STAFF

RESTON, Va. — A limited partnership formed by 14 leading aerospace and defense firms in search of better software is expected to yield interfacing modules this spring that work with a variety of established computer-aided software engineering (CASE) tools.

The Software Productivity Consortium was formed in 1985 by 14 companies, including Boeing Co., Grumman Corp., United Technologies Corp. and TRW, Inc. They established an independent headquarters for the group in Reston, which

Dennis Gaughan

served as the site of a recent gathering of executives from the 25 CASE tool vendors that the consortium selected as its Guest Systems Council.

Dennis Gaughan, a consortium manager, said the meeting allowed the consortium to give the CASE companies their first detailed briefing on the consortium's forthcoming developments. The CASE companies "are not part of the problem, but part of the solution," in the consortium's view, Gaughan said.

The consortium plans to use prototyping, reusable code, knowledge-based systems and software system engineering to integrate previously disconnected tools used in the software development cycle.

According to consortium

Continued on page 28

Data View

DEC VAX sites

Data base management system market share and percent of package sites

INFORMATION PROVIDED BY COMPUTER INTELLIGENCE
CW CHART

SOFTWARE NOTES

IBM expands expert shell

IBM's Expert System Environment (ESE) is under continued development and will be available for use under IBM's CICS and IMS/DC before the end of this year, according to Herbert Schorr of IBM's Information Systems Group in Rye Brook, N.Y. The end-user-oriented expert system shell was introduced under IBM's VM in 1985 and made available for IBM TSO users under MVS in April 1986.

Schorr said IBM is jointly building the CICS and IMS/DC

Continued on page 28

Answer adds DB2 support

CANOGA PARK, Calif. — The Answer Systems Division of Sterling Software, Inc. has added IBM DB2 support to its Mark V on-line fourth-generation development system.

The DB2 support, announced last month, comes with a $15,000 upgrade fee. The base price of Mark V is $100,000 for the IBM MVS operating system.

Mark V users should now be able to work with both the IBM IMS hierarchical data base management system and the DB2 relational DBMS. According to the vendor, Mark V users can join relational data with hierarchical data.

With Mark V, users can develop applications that are independent of a particular DBMS, an Answer Systems spokesman said. As a result, users can move applications back and forth between data bases. This concept, called the Logical Data View, provides a layer of definition that remains separate from the actual application. The definition can be changed to assign the application to a data base.

Inside

- IBM offers Fortran conversion tool. Page 26.
- Cullinet preps DBMS that runs under Unix. Page 27.
- ADR revamps ADR/The Librarian. Page 28.

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* Emc² supports its own super-economical, multi-user environments to vastly enlarge the population that can use it. VAP is a special VTAM application for MVS and VSE. FIVS is the multi-user Fischer International Virtual System for VM.

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IBM takes up application translation

Conversion program turns CDC, DEC Fortran into IBM VS Fortran

RYE BROOK, N.Y. — IBM last week made a program available that it said converts Fortran applications written for Control Data Corp. and Digital Equipment Corp. processors into IBM VS Fortran.

The IBM Fortran Translation Tool translates source code statement-by-statement into IBM Fortran while running as a batch job under IBM's MVS or VM.

The original statements are preserved as comments in the new program. If a statement cannot be translated, the program labels it with the code "CX" for manual translation. A system editor assists in finding the output statements that need manual conversion, IBM spokesmen said.

The tool translates PDP-11, TOPS and Plus dialects of Fortran from DEC as well as VAX Fortran.

The conversion program consists of two parts: a source translator and a run-time routine, which supports date and time facility, sense switch, light simulation and CDC masking instructions in the translated program.

The tool became available on a limited basis Friday and should be generally available by July 1. It is priced from $2,400 for an IBM Group 10 processor to $9,600 for a Group 40 processor, spokesmen said.

Profs gets calendar access

IBM also announced Version 2, Release 2, Modification Level 2 of its Professional Office System (Profs) to provide calendar access across VM systems using VM/SP Release 5 TSAF.

The cross-system calendar access should make it easier to plan group meetings for users of different systems, IBM spokesmen said. Profs calendar access can work with up to eight systems.

Profs Version 2.2 can run in the IBM VM/XA SP environment as well as the standard IBM 370 VM mode, but it continues to run in 24-bit mode under XA, according to the IBM announcement.

The updated Profs also provides support for Displaywrite/370 Release 2 and Displaywrite/370 Image and Graphics Feature printing.

Profs Version 2.2 is priced from $12,800 in Group 10 processor sizes to $32,000 in Group 40 sizes.

Unretouched Photo.

Buy The One On The Left And You'll Have To Put It Where The Sun Don't Shine.

The monitor on the right, however, can be placed anywhere you like. Even in direct sunlight. It's the new *Flat Technology Monitor* from Zenith Data Systems—winner of *PC Magazine's* coveted "Technical Excellence Award" in the hardware category for 1987.

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Our Flat Technology Monitor has an impressive 14-inch display. And even though it's bigger, it's 50% brighter than conventional CRT's and it has 70% greater contrast. So you get colors with greater depth and definition that make your reports, charts and graphs come alive like never before.

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Flagship CASE package gets real-time ability

BY NELL MARGOLIS
CW STAFF

SANTA CLARA, Calif. — Visual Software, Inc. has added real-time support to its PC-based computer-aided software engineering (CASE) tool, VSdesigner.

The firm's marketing vice-president, Casey Roche, said the enhancement was made available in response to requests from the VSdesigner user base, many of whom are engineers working in control-factor-intensive industries such as aerospace and communications. Users sought automated specification and documentation of time relationships.

The VSdesigner, which runs on the IBM Personal Computer AT, Personal System/2 and compatibles, is a CASE front-end drawing and documentation package. It includes a multiuser data base that handles both hierarchical and relational structures and supports an unlimited number of decompositions, connections to objects and objects within a node, Roche said.

Offers design flexibility

The design front end is not tied to a particular methodology, input method or screen and menu format. Rather, it works with the user's choice of each.

Similarly, Roche added, VSdesigner emulates several popular word processors.

The real-time enhancement, according to Roche, supports Ward-Mellor and Boeing-Hatley methodologies. Moreover, he said, standard design methodologies, such as the Yourdon structured design method, can be combined with real-time methods in a single design.

VSdesigner's real-time extensions include symbols, such as tasks, semaphores, mailboxes and queues, as well as critical path analysis that lets users check a design path to make sure a program operates within designated necessary time constraints.

VSdesigner can work with any IBM Netbios-compatible local-area network that fits within 640K bytes, the vendor said.

It is available immediately for $7,500. Current customers may upgrade to the real-time version free of charge.

Jordan

CONTINUED FROM PAGE 25

cess is to document the required business features and functions. A weight should be assigned to each: for example, a score of 5 equals "absolutely required at implementation;" 3 equals "desirable at implementation;" and 1 equals "desirable at some time after implementation." Completion of this task will result in a written user-requirements definition.

• Conduct a comprehensive search for appropriate packages.

Contact software vendors, other businesses in your industry, trade associations that might provide lists of potential packages and your hardware vendor.

• Investigate the history of a vendor.

Have updates been delivered in a timely manner? Is the size of the vendor's staff sufficient to support your organization? Does the vendor have the financial resources to remain viable?

• Consider the simplest package that will satisfy your needs.

Will it satisfy your needs without modification? Will it interface to existing systems? What are the estimated execution runtimes? What are the estimated file sizes? How much disk space will be required? Does the package include a report writer, or does it interface to your existing one?

• Consider only software that can be supported by your installed hardware and your existing staff.

Never make two changes at once. Select software that fits into your overall computing and communications architecture.

• Develop a short list of two or three of the most promising vendors.

Some vendors can be eliminated based on their performance record, support capabilities or business orientation. Some potential packages can be eliminated based on missing features or functions. Other packages may not operate in the data base environment of your choice. Select two or three vendors that come closest to meeting your requirements at competitive prices.

• Ask selected vendors to demonstrate their software packages.

Some vendors offer 30-day trial periods. Others will conduct personalized demonstrations if a significant sale appears possible. If you use a trial period, develop a test plan and schedule against which you can measure results. Compare the package's capabilities with your user-requirements definition.

• Call or visit current users of the package.

Reference checking is essential. Look for firms in a similar situation in your industry. How well does the software work? Ask current users about the vendor's assistance during implementation and the effectiveness of service provided after implementation.

• Negotiate a favorable contract with the vendor.

Most vendors provide standard contracts that contain significant protection for them. Spend time to obtain special consideration for user and technical training, needed documentation, technical support during implementation and, later, ongoing maintenance. Price is important, but value is more important. Never buy or negotiate on price alone.

The risk of failure can be reduced by following a rigorous selection approach. Obtain active support from those who will use the software. Document your requirements in writing. Investigate vendors' capabilities. Select basic software that fulfills your needs without requiring modification. Confirm your selection by visiting or talking with current users.

Discipline is required to select the software that best meets your objectives rather than the software sold by the best salesman. Careful planning and thoughtful analysis will help differentiate one product from another. Software selection is a painstaking process, but it is essential for getting the right package at the right price to support a company during the software's life.

Jordan is a manager specializing in software evaluation with Coopers & Lybrand in Houston.

IDMS/SQL for Unix prepped

WESTWOOD, Mass. — Cullinet Software, Inc. recently said it plans to release a version of its Digital Equipment Corp. VAX-oriented data base management system for the Sun Microsystems, Inc. platform under the Unix operating system.

The software will be a version of IDMS/SQL, which is currently at beta-test sites. IDMS/SQL supports the IBM SQL standard.

IDMS/SQL was written in C, so moving it to Unix has not been a difficult project, a Cullinet official said. Cullinet has reportedly had a version of the DBMS running under DEC's Ultrix for a year.

In addition, Cullinet announced it will be adopting the software portability guidelines of X/Open, a group of vendors that has been promoting a standard environment for software to enable users to move applications across platforms.

Cullinet intends to implement X/Open's Common Applications Environment, which is based on existing standards such as AT&T's Unix System V Interface Definition.

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Expert shell

CONTINUED FROM PAGE 25

versions with some customers. IBM will continue to develop and market both ESE and a programmer-oriented shell system called Knowledgetool, even though the company is encouraging third-party shell vendors to move their systems to IBM environments, Schorr said.

Speaking of artificial intelligence, Dennis Yablonsky, president of **Carnegie Group, Inc.** in Pittsburgh, said IBM wants third-party vendors to think in terms of developing applications in Knowledgetool as well as move their systems into mainframe environments.

The Knowledgetool inference engine can be called by Cobol, Fortran or PL/I programs, making expert systems written in it easily accessible from mainframe applications.

"IBM would love to see expert systems in Knowledgetool that would work with a Hogan banking system, COPICS or the IBM health care system," Yablonsky noted. COPICS is IBM's Communications-Oriented Production Information and Control System.

Information Builders, Inc., seeking to spread the gospel of its Focus fourth-generation language and data base management system, has established a publishing subsidiary to produce, among other things, the "Focus Systems Journal." The journal will reportedly air articles on coding techniques and internal operations of Focus.

Users of the **Ingres** relational DBMS from **Relational Technology, Inc.** can now access their data through Information Builders, Inc.'s Focus via an interface developed by the two companies.

Arthur Andersen & Co. has included **Cullinet Software, Inc.'s** applications in its software demonstration and training program. Cullinet's application development products, ADS/Online and Application Expert, will be installed at the accounting firm's Advanced Systems Development Center in Chicago.

Candle Corp. has acquired Intercept, an IBM MVS automated operations product from **Compucept, Inc.** Candle is starting to market the product as AF/Operator. Candle currently distributes the Omegamon family of performance monitors.

Unisys Corp. has added **Knowledge Systems'** KEE PC-Host to its Knowledge Systems family to allow users to develop expert systems under Unix on a personal computer.

Relational Technology, Inc. and **DB/Access, Inc.** will jointly market DB/Access' Access/Star line. Relational's customers can use the product to employ SQL commands for loading data into the Ingres DBMS from remote systems. The data can be located on IBM mainframes, Digital Equipment Corp. VAXs or Hewlett-Packard Co. HP 3000s, Relational said.

Oracle Corp. will jointly develop a relational data base management system and related products for use with **Convergent Technologies, Inc.'s** CTOS operating system.

Consortium

CONTINUED FROM PAGE 25

President Howard Yudkin, the consortium exists to identify the elements of an optimum CASE environment, outfit it with the best existing tools and build the rest.

Harnessing technology

Toward that goal, the first consortium product is slated for spring delivery. Called Build 1, the package will introduce the data harness, a data exchange facility that reduces the need for conversion between various tool formats, increasing efficiency and cutting down on redundancy and error, according to vice-president of product development Jonathan Addleson.

The data harness will work with a variety of existing CASE products, the group said. Four "Build" tools are planned during the coming year to make up what the consortium calls Product Set 1.

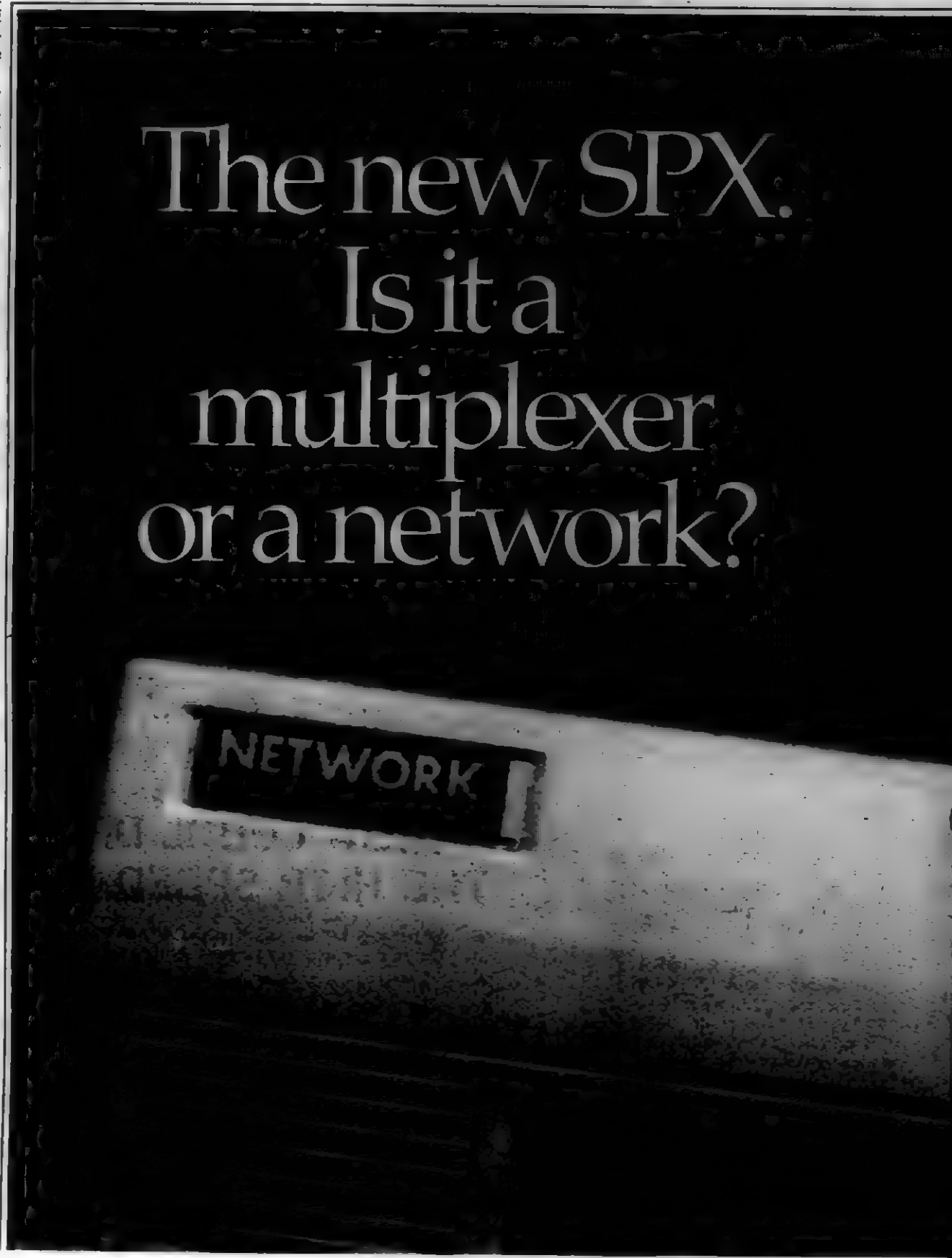
The group plans to offer all its products commercially. According to Gaughan, "an open system like this won't inhibit competition — to the contrary, it will stimulate it."

No one company can produce a full CASE environment, Gaughan noted. "If companies continue to pull separately and talk to no one else, then the user is going to be faced with making a major investment in a system that he has to try to force-fit to his needs."

In contrast, he said, the consortium approach "could reduce the price of software, reach more users through economies of scale, stimulate rather than inhibit competition and put an end to the Tower of Babel that's now going on."

Louis Mazzuchelli, president of Cadre Technologies, Inc. and a guest at the recent gathering, said the CASE companies were intrigued if not 100% convinced of the consortium's plan. Many worthy goals were stated, Mazzuchelli said, "but I don't think anything was abundantly clear."

The 25 participants in the consortium's Guest Systems Council include Sun Microsystems, Inc., Apollo Computer, Inc., Digital Equipment Corp., Index Technology Corp. and Cadre Technologies.



NEW PRODUCTS

Systems Software

An enhanced version of **ADR/The Librarian**, which extends change control to the IBM VM/CMS-ISPF environment and provides native VM/CMS support, has been announced by **Applied Data Research, Inc.**

Release 3.7 enables The Librarian to manage the update cycle of production source code to ensure source-to-executable synchronization in VM/CMS environments. The facility can be activated without a guest MVS or VSE operating system or shared direct-access storage devices. Also included in Release 3.7 is a file-comparison program for MVS environments.

ADR/The Librarian Release 3.7 is priced at $25,000 for VSE or VMS and $59,900 for MVS environments.

Applied Data Research, CN-8, Route 206 and Orchard Road, Princeton, N.J. 08543. 201-874-9000.

National Business Systems, Inc. has enhanced its **Toss Office Support System** office automation product.

Version 2.0 includes enhanced outside system interfaces that allow users to connect the communication environment with outside sources, system interfaces including a bulletin board feature and document archiving and recalling and added security features. Performance enhancements include immediate notification of messages. Other enhancements include IBM MVS/XA support, CICS command-level support, master index cleanup and disk utilization statistics.

A DOS/CICS version costs from $15,000 to $30,000. An MVS/CICS version costs from $18,000 to $72,000.

National Business Systems, Avon Park S., 30 Tower Lane, Avon, Conn. 06001. 203-677-8396.

Duquesne Systems, Inc. has enhanced its SAS Institute, Inc. SAS System-based **Billing Data Base Facility (BDBF)** billing and charge-back system.

Release 2.4 includes an interface to load data sources from Merrill Consultants' Expanded Guide to Performance Evaluation, a system tuning and capacity planning tool that writes information to SAS data sets.

Enhancements to the SMF component of BDBF include step accounting, device connect times and improvements to software charging, print processing and suspense processing.

Other features include job accounting from multiple sources, accumulation of resource use measurements, calculation of charges, detailed invoices and generation of invoices and account summaries.

BDBF Release 2.4 costs $22,500.

Duquesne, 2 Allegheny Center, Pittsburgh, Pa. 15212. 412-323-2600.

Hewlett-Packard Co. has introduced **HP Business System Plus**, software designed to integrate personal computers and HP 3000 business computers into a centrally managed system.

The software incorporates utilities said to enable HP's PC and Workgroup software applications to be centrally downloaded and managed from the HP 3000. Workgroup software reportedly provides services such as electronic mail and access to minicomputer data bases to all users on a network.

The software comes on a single HP 3000 tape. It includes host-based communications; data retrieval; resource sharing utilities; and the HP Vectra Office Professional Pack, featuring spreadsheets, word processing, graphics and PC-based communications applications. Prices range from $29,220 to $65,570.

Hewlett-Packard, 1820 Embarcadero Road, Palo Alto, Calif. 94303. 800-367-4772.

Dynasoft Corp. has announced an option that reportedly allows its mainframe-based **Dynasoft Integrated Software System** to access IBM's DB2 for MVS/TSO environments and SQL/DS for VM/CMS environments.

Dynasoft users can display the names of fields on record from DB2 and SQL/DS data bases and create selection criteria for access to specific information contained in data base files. The data can then be organized into spreadsheet format with the Dynaplan mainframe spreadsheet or generated in text format with the Dynaword word processing component.

The option ranges in price from $2,000 to $9,000

Dynasoft, 6300 River Road, Rosemont, Ill. 60018. 312-696-4440.

Software Products & Services, Inc. has ported its **EPOS** computer-aided software engineering environment to the Motorola, Inc. 68000/68020 processor family under the Unix operating system.

EPOS is an integrated project support environment with development and project management support capabilities. In addition to the assistance provided in all phases from requirements to maintenance, including code generation and code feedback features, it provides general import and export capabilities to incorporate other tools or to operate in a corporate support environment.

EPOS is priced from $10,500 to $42,500 depending on host system.

Software Products & Services, 14th Floor, 14 E. 38th St., New York, N.Y. 10016. 212-686-3790.

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AT&T Systems, Inc. has released **Benchmaster Version 1.2**, an upgrade to its work load emulator for Unix systems.

In external mode, it can turn a Unix machine into a Remote Terminal Emulator or Remote Workstation Emulator. In local mode, it functions as a response time monitor on a Unix system.

Enhancements include an Automatic Script Generator said to cut benchmark script writing time and new script generation commands.

AT&T also announced **GSA Standard Libraries Option Version 1.0**, designed to help with General Services Administration-compliant benchmarking in live test demonstations.

Benchmaster Version 1.2 costs from $2,500 to $8,000 depending on the system configuration. The optional libraries cost $2,500 for each copy of Benchmaster.

AT&T Systems, 12904 Olivine Way, Silver Spring, Md. 20904. 301-384-1425.

Applications packages

Document library management and review software called **Docuforum** has been announced by **Network Technologies International, Inc.**

Docuforum is a document development and management software product said to allow users to collaborate, create, review, transfer and manage documents electronically. Docuforum maintains a systematic archive of every draft.

Docuforum consists of Microsoft Corp. MS-DOS Forumlink workstation software and a document server based on either a host computer running AT&T's Unix System V or a personal computer running The Santa Cruz Operation, Inc.'s SCO Xenix. Prices range from $1,500 to $12,000.

Network Technologies, 315 W. Huron, Ann Arbor, Mich. 48103. 313-994-4030.

A computerised maintenance management software system for use in physical plants has been announced by **Logic Sciences, Inc.**

The software, called **Technical Equipment Analysis Manager**, or **TEAM**, monitors equipment within a physical plant and alerts operators or maintenance staff members when a problem occurs. It also generates work orders and advises technicians on repair strategies.

TEAM is written in C and runs on most systems, ranging from IBM Personal Computer ATs to mainframes running Unix, IBM's MVS and DOS and Digital Equipment Corp.'s VMS. It interfaces with the physical plant's distributed control system to monitor plant equipment in real-time. TEAM is composed of seven basic modules that can be purchased individually or as a complete series.

Turnkey packages range in price from $10,000 to $38,000.

Logic Sciences, 11000 Wilcrest, Houston, Texas 77099. 713-879-0536.

Precision Visuals, Inc. has ported its **DI-3000 XPM** graphics software package to Unix-based systems.

DI-3000 XPM is said to enable application developers to build and manipulate objects using a world coordinate graphics data manager based on the output model of the most recent version of the Programmer's Hierarchical Interactive Graphics System, or PHIGS, draft standard. The package provides simulation, modeling and design functionality in a device-independent environment and includes the complete DI-3000 graphics subroutine library.

The Unix version is available for systems based on the University of California at Berkeley Unix 4.2 and AT&T Unix System V, including Sun Microsystems, Inc. workstations, Digital Equipment Corp. VAX Ultrix time-sharing systems and the Tektronix, Inc. 4132. Prices start at $5,520.

Precision Visuals, 6260 Lookout Road, Boulder, Colo. 80301. 303-530-9000.

A version of the **Snow Report Writer** for the Unix, Xenix and Ultrix operating systems has been announced by **Snow Software, Inc.**

The report writer allows users to create customized reports, forms and business graphics. According to the vendor, data from 100 application packages can be read and written to with the Snow Report Writer. File data from Lotus Development Corp.'s 1-2-3, Ashton-Tate Corp.'s Dbase packages, Micropro International, Inc.'s Wordstar, ASCII, some Basic and some Cobol can be used.

Reports available include columnar reports, invoices, statements, vouchers, mailing lists and labels and form letters. Instant access to file data is in the form of quick queries and reports.

The Xenix version costs $995; the Unix version costs $1,195; and the Ultrix version costs $1,295.

Snow Software, 2360 Congress Ave., Clearwater, Fla. 34621. 813-784-8899.

Languages

A group of programming languages for users of Unix-based software on the NCR Tower family of supermicrocomputers has been announced by **NCR Corp.**

The languages offered include Language Processors, Inc.'s LPI Cobol, LPI Basic, LPI Fortran, LPI PL/1 and LPI Pascal. The languages are priced from $2,000 to $6,000.

NCR, 1700 S. Patterson Blvd., Dayton, Ohio 45479. 513-445-5000.

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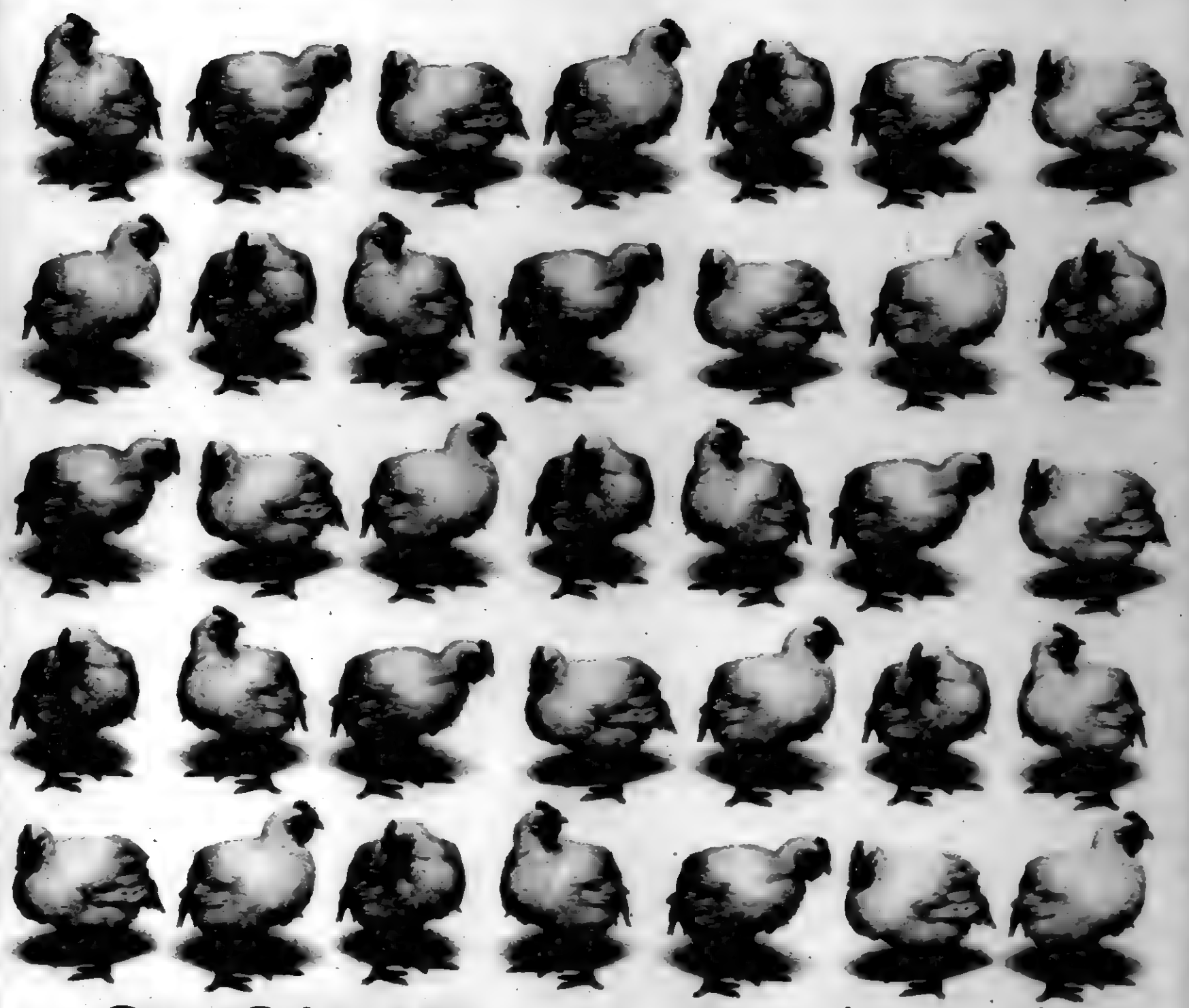

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***CINCOM SOLVED IT:** With MANTIS Application Development System*

Mr. Bill Clontz
Director of Computer Services
Holly Farms Foods

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"MANTIS was ideal for us because you don't need 2-3 years of experience to use it," explained Bill Clontz, Director of Computer Services at Holly Farms. "It lets us take new graduates, quickly train them and, in a matter of weeks, turn them into valuable programmers."

As a result, programmer productivity at Holly Farms has reached an all-time high. "We've seen substantial improvement ratios," Clontz said. "In the time a programmer might turn out one CICS command-level program, he can turn out from six to eight programs on MANTIS."

Most of the 500-plus MANTIS applications now in production at Holly Farms are aimed at streamlining costs. For example, Data Processing used MANTIS to develop a model of how chickens consume feed over the course of their lives, allowing Holly Farms to cut production at one of its feed mills by 1½ days a week.

"We've got key users who are picking up on the term 'MANTIS,'" Clontz noted. "Around here, MANTIS has become a synonym for 'get it done quickly.'"

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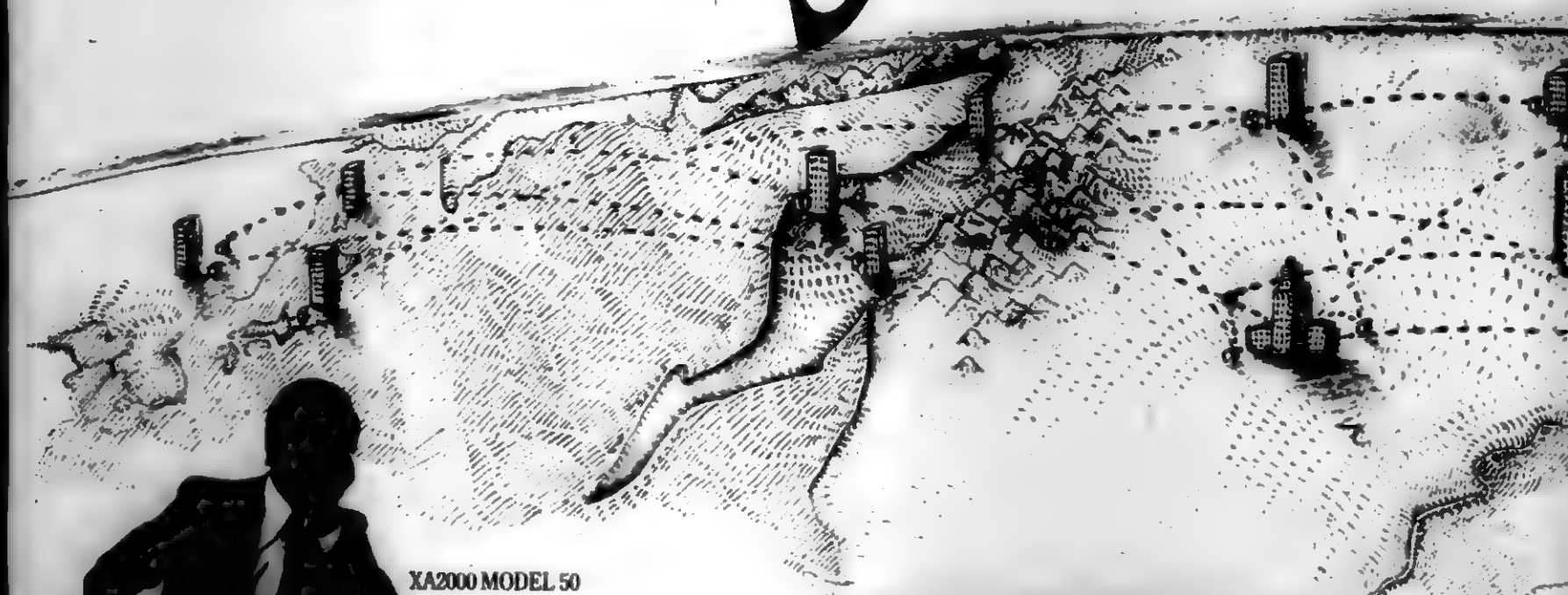

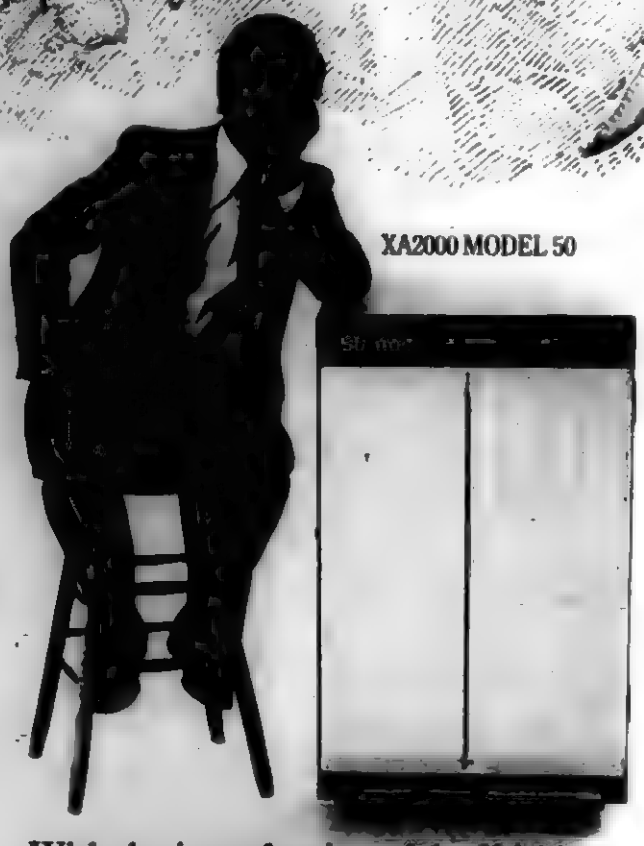

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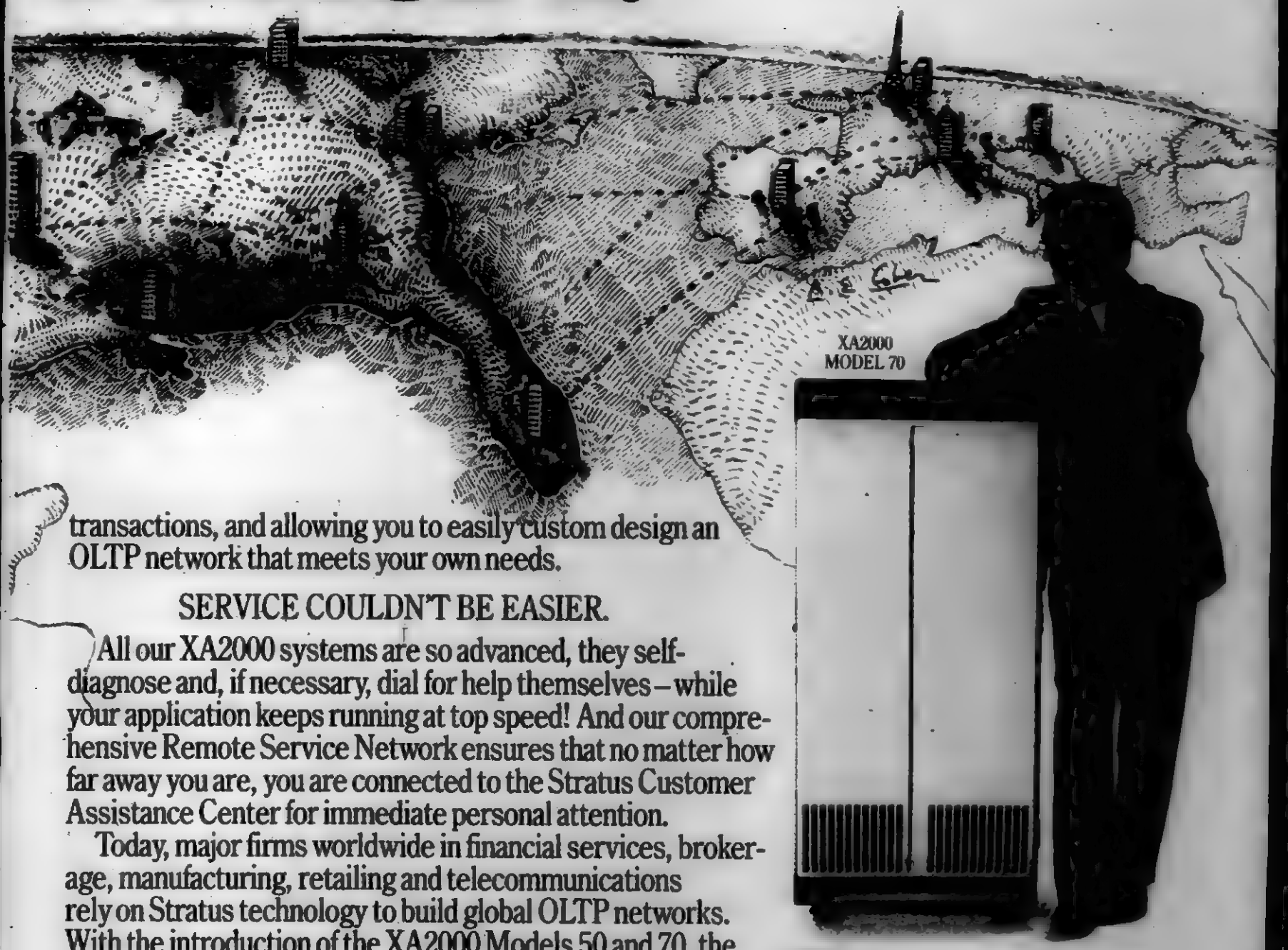

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Utilities

BBN Software Products Corp. has introduced four software options for its **RS/1** data analysis package to run on Hewlett-Packard Co.'s HP 9000 Series 300.

The options include QCA, a quality control package; the RPL Toolkit, a programming aid for RS/1 application development; Graphic Writer, a document development system; and CLI, a host language interface said to allow direct access to RS/1 files from applications written in C.

RS/1 software reportedly provides statistical analysis, data management, modeling and graphics capabilities. It also includes RPL, an integrated programming language for custom application development.

Pricing for the four options ranges from $1,000 to $6,000.

BBN Software Products, 10 Fawcett St., Cambridge, Mass. 02238. 617-873-5000.

The **Da Vinci Group** of VM/Ease, Inc. has introduced two products for use in the development of relational data base applications.

SQL/DS Space/Management Utilities is a set of programs said to enhance IBM's SQL/DS. It allows estimation of the number of pages and data base space required for proposed tables and indexes as well as estimation of direct-access storage device space required for tables, indexes and defined free space. It also allows users to sample, collect and report internal performance of SQL/DS.

Dbedit Plus is said to expand the functions of IBM's Dbedit software. Users can add, delete and update multiple records in a relational data base, generate reports and tailor screens to specific applications.

SQL/DS Space/Management Utilities costs from $1,500 to $4,250. Dbedit Plus costs from $2,500 to $5,800. Both are available for monthly lease.

Da Vinci, Suite 1700, 2101 Webster St., Oakland, Calif. 94612. 415-645-1513.

An enhanced version of **Dump**, a CICS transaction to view and modify virtual storage, has been released by **International Business Information Systems.**

Dump 2.0 includes support for IBM MVS environments under CICS/VS. It is reportedly capable of searching for literal values, providing decimal virtual addresses and displacements and is said to place makers.

Other features include security facilities for restricting use to specific terminals and users. Both hexadecimal and character display of the selected area is provided.

Support is also provided for IBM DOS/VSE environments. A perpetual license for Dump 2.0 costs $400. Current users may upgrade for $100.

International Business Information Systems, P.O. Box 15780, New Orleans, La. 70175. 504-897-3367.

Two software utilities for IBM mainframe programmers and systems analysts have been announced by **Blueline Software, Inc.**

Online Erep/VM was designed for use in error management. **VIP/VM** provides program processing information to streamline source code.

Online Erep/VM provides summaries of the data stored in the error recording area of the system. Errors are displayed on the terminal in graphic format.

VIP/VM points the source code that requires the greatest amount of processing time.

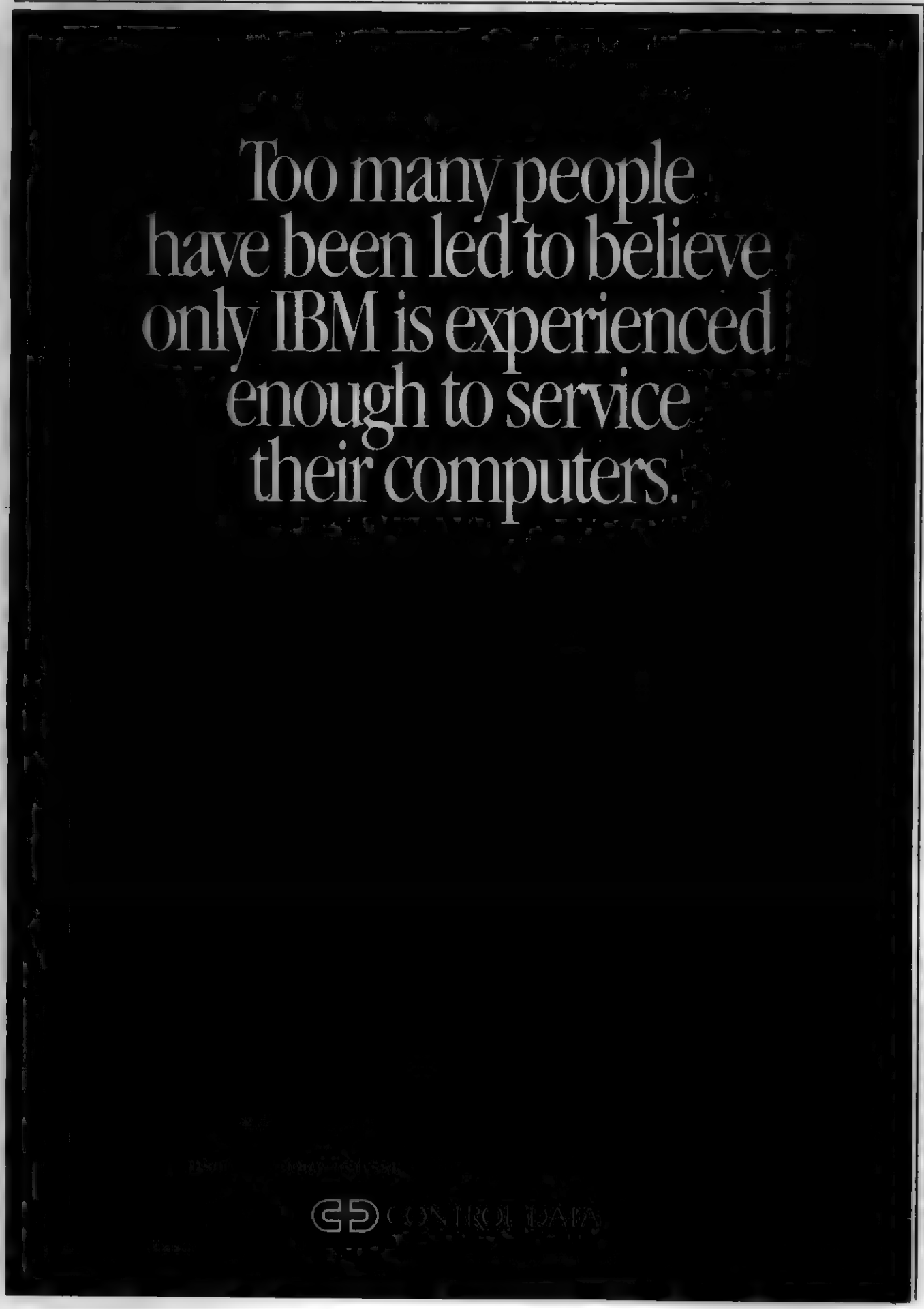
Online Erep/VM and VIP/VM cost $3,500 each.

Blueline Software, Suite 340, 1500 S. Lilca Drive, Minneapolis, Minn. 55416. 612-542-1072.

A security utility for use on IBM System/38 minicomputers has been announced by **GT 38 Software.**

Called **Security Signoff**, the program monitors and analyzes active jobs and initiates a cancel after a specified period of inactivity. The amount of time between checks and the subsystems monitored are user-defined. The program costs $150.

GT 38 Software, P.O. Box 10054, Atlanta, Ga. 30319. 404-436-9535.



MICRO BITS

Douglas Barney

SQL Server secrets unshed

What we still don't know about SQL Server. Microsoft, which kept its relationship with Sybase a semisecret for more than a year, still holds some SQL Server cards up its sleeve. Although we do know that the SQL Server uses a full implementation of SQL, runs under OS/2 and will use Ashton-Tate's Dbase as one front end, there is still much we don't know.

Here's a sample of questions recently posed to Microsoft, along with the firm's responses:

- Will Microsoft develop an interface to Lotus's 1-2-3 for the millions of users who feel most comfortable with rows and columns? Microsoft won't say.
- Which Microsoft languages will be supported by SQL Server? Again, Microsoft won't say.
- Will there be IBM Advanced Program-to-Program Communications links to other host data bases? It's possible, Microsoft says.
- Will Microsoft support IBM's OS/2 Extended Edition Data Manager with development tools and front ends? Microsoft won't say.

Continued on page 43

Palantir shoots for firsts

BY DOUGLAS BARNEY
CW STAFF

HOUSTON — In what may be two firsts, Palantir Software next week is set to announce word processing programs for Microsoft Corp.'s version of OS/2 and Windows.

The products, which reportedly will sell for $495 each, are set to be announced Wednesday, when Compaq Computer Corp. announces its version of OS/2.

Microsoft plans to announce a version of its Word for OS/2, but that product should not ship until the third quarter. No firm other than Palantir has announced a high-end word processor for Windows.

Dubbed Powerwriter, Palantir's OS/2-based word processor takes advantage of the large memory capabilities provided by OS/2, allowing users to place large text files in active memory. As a result, the performance of such functions as repaginating, searching and reformatting should be improved, the firm said.

Palantir originally did a simple port from its Microsoft MS-DOS word processor to OS/2 but soon realized that OS/2 provided little extra value. The firm took the opportunity to optimize the product for OS/2.

"We realized that you can do things in OS/2 that you can't do in MS-DOS," said Charles W. Mitchell, director of publishing operations for Palantir. "For instance, you can use the same code to do two different tasks at the same time, such as printing while editing."

Powerwriter will ship by the end of March, a company spokeswoman said.

Beat Microsoft to punch

Palantir is billing the Windows product, set to ship later this month, as the first full-featured word processor for Windows. Windows itself includes a sparsely featured word processor called Windows Write. Microsoft is rumored to be developing a high-end Windows-based word processor, but that product would not ship anytime in the near future.

Palantir's Wintext includes advanced automatic indexing and alphabetical sorting features and what-you-see-is-what-you-get capabilities. Also, users can merge text with graphics and have the ability to view an entire page in a compressed mode.

Users can edit up to four documents at once in four different windows. In addition, the package includes multiple Undo capabilities to correct mistakes and a reverse Undo feature to counteract an Undo.

Data View

Room to grow

Percent of sites installing or planning graphics software

INFORMATION PROVIDED BY COMPUTER INTELLIGENCE
CW CHART: FRANK C. O'CONNELL

Norton ships data base for OS/2 development

BY ED SCANNELL
CW STAFF

SANTA MONICA, Calif. — Peter Norton Computing, Inc. recently began shipping its On-line Programmer's Guide to OS/2 Kernel API, claiming the product is just the second package available that works under the protected mode of IBM and Microsoft Corp.'s OS/2 operating system.

The program, an OS/2 data base that can be called up as a movable Help window, was designed to provide developers with programming tips and information.

The company claimed the software contains many of the tools that programmers commonly reference in the 10 volumes of OS/2 manuals.

"So instead of rummaging through pages of books for information, it is now available with just a few keystrokes," said John

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Inside

- DEC won't give up on the low end. Page 39.
- How much do you know about benchmarks? Page 38.
- Forecast calls for Snow Report Writer network version. Page 46.

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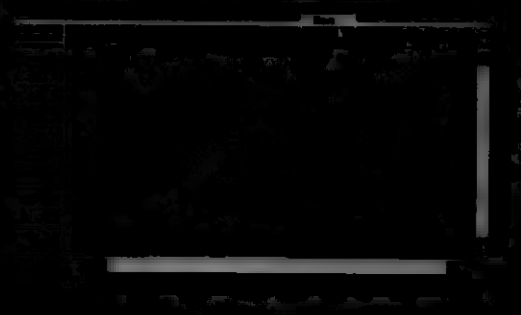

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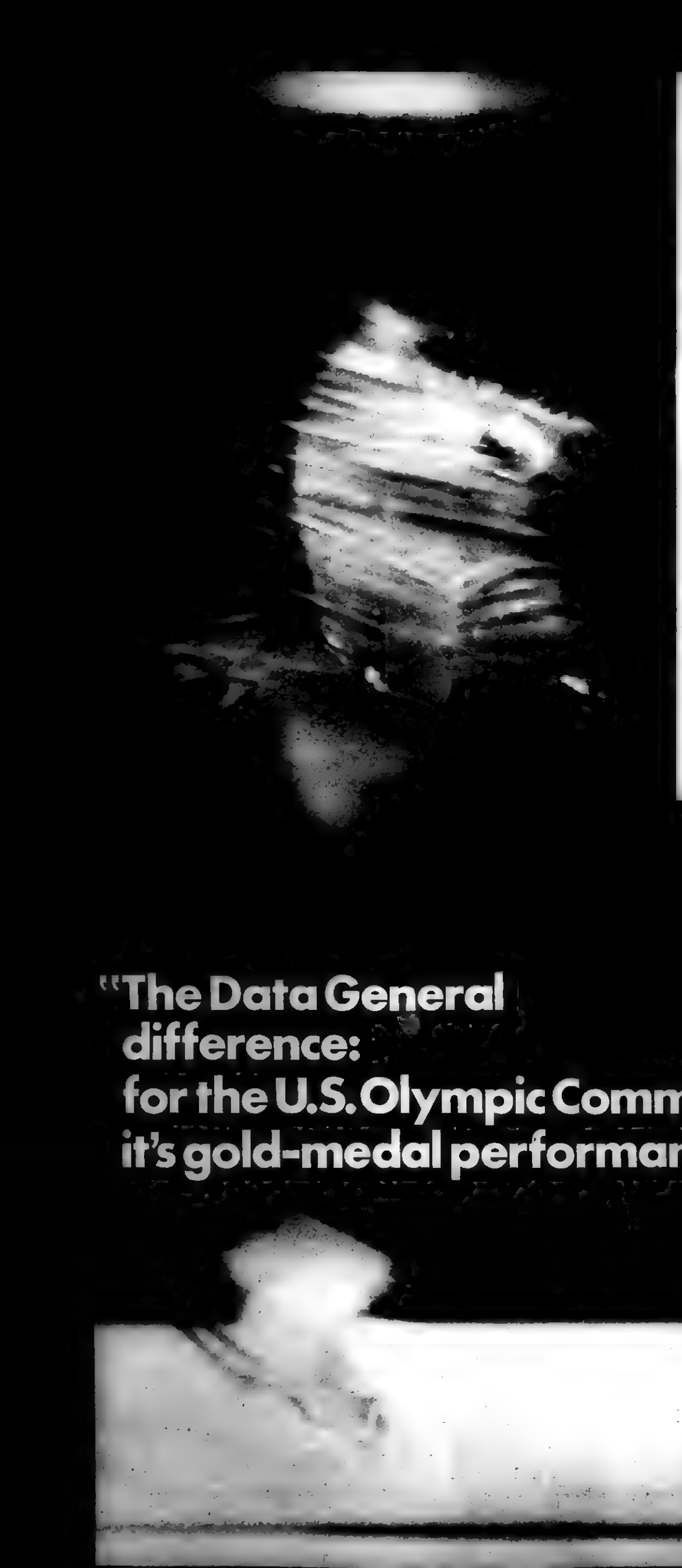

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SMALL TALK

William Zachmann

OS/2: The plot weakens

Last week, I discussed the problems users may face in getting OS/2 to run on anything other than state-of-the-art hardware. Now I question whether OS/2 is even worth the transition.

As I pointed out last week, IBM's OS/2 Standard Edition 1.0 costs a lot, requires more resources than most systems have, is complex and more difficult to use than IBM's PC-DOS and only runs in character mode.

The benefits that would justify the additional resources to run OS/2 aren't likely to appear for some time. The longer this takes, the greater the chance that newer alternatives will have appeared that will better fulfill the charter of OS/2.

The three main features of OS/2 are the graphical user interface of its Presentation Manager, which is expected later this year; access to the 16M-byte address space of the Intel 80286 chip; and multitasking.

But there are many other ways to get these features. Microsoft's Windows 2.0 and Windows/386 already offer a graphical user interface identical to that promised late this year with the Presentation Manager. And the Apple Macintosh has long offered an effective graphical user interface.

Access to larger memory — beyond the 640K-byte DOS limit — is already available from many sources. As many of these products can make full use of the addressing and memory management capabilities of the Intel 80386 processor, they can go well beyond OS/2's capabili-

Continued on page 42

Developers hope for slow, steady acceptance of multiuser SQL Server

When Microsoft Corp., Ashton-Tate Corp. and Sybase, Inc. announced their alliance on a new product called SQL Server several weeks ago, the industry collectively sat up and took notice.

SQL Server is, after all, a potentially standard-setting data base engine for local-area networks, especially if the two-million-strong installed base of Ashton-Tate Dbase users decide to buy into it. The product is slated for release in the second half of this year.

David Kaplan, Microsoft's SQL Server product manager, recently spoke with *Computerworld* senior writer Alan J. Ryan about what SQL Server means for corporations, product acceptance timetables and the prod-

DOUG WILSON

Microsoft's David Kaplan explains SQL Server

uct's capabilities.

What does SQL Server mean in the long term for tying firms together?

Local-area networks mean that work group computing will be supported in the future in the way that multiuser time-sharing has been supported in the past. Within the work group environment, you still get the kind of powerful, shared multiuser services, but with an intelligence and richness in user interface that you haven't been able to get in the traditional character- or terminal-based environment talking to a centralized host.

Does the emergence of this product mean that there could be a time when corporations will need fewer mainframes?

That's largely something that is going to be determined by the marketplace. The cost comparisons right now between [millions of instructions per second] in the area of large-scale computing or even on proprietary minicomputer architectures seem to be dramatically different from the cost performance comparisons on 80386 boxes.

The 386 by itself obviously can't do it alone; it needs the kind of high-performance I/O that you'd typically have to turn to large-scale systems for.

Who will be able to develop products to work with SQL Server?

Anyone who is in the business of software development. We really anticipate two primary constituencies, the first of which is the independent software ven-

Continued on page 42

Prime supermicro finds home in varied firms

BY ALAN J. RYAN
CW STAFF

NATICK, Mass. — The ability to run both Unix and Microsoft Corp. MS-DOS programs, along with its file server capabilities, has prompted some users to purchase Prime Computer, Inc.'s EXL 316 supermicrocomputer.

At Amdahl Corp., the mechanical engineering depart-

EXL 316

Price: Starts at $15,900

- Intel 80386, 16 MHz
- 8MB and 32MB byte formatted 5¼-in. Winchester disk subsystem
- SVID-compliant implementation of AT&T's Unix System V, Release 3
- Can run MS-DOS programs simultaneously via Merge 386

ment is using the EXL as a file and peripheral server. Garment manufacturer Byer California in San Francisco is using one EXL to run corporate applications to manage real estate and another as a front-end server to its superminicomputers.

Reseller Tridata Corp. in Allentown, Pa., is using the EXL in-house for accounting and distribution tracking. It is also packaging the hardware with its own software and marketing the product to government and commercial accounts.

Prime began shipping the Intel Corp. 80386-based supermicrocomputer, which runs both AT&T's Unix System V, Release 3 and MS-DOS programs, last June. It communicates with the Prime 50 Series and other vendors' host systems via IEEE 802.3-standard Ethernet run-

Continued on page 43

Can DEC gain success in low end?

BY GLENN RIFKIN
CW STAFF

ANALYSIS

Unstated but central to Digital Equipment Corp.'s recent agreement with Apple Computer, Inc. is the fact that DEC has failed to produce a successful desktop machine of its own.

Despite the official recognition of Apple's Macintosh, Ken Olsen and DEC are still not giving up on the low end. Sometime before September, DEC is slated to unveil the Personal VAX, a VMS-based desktop machine that will once again put the firm into the personal computer fray. Already, industry analysts are scratching their heads as to what DEC could possibly be thinking about now.

The Personal VAX was conceived by DEC's Low-End Systems Group in February 1987. The idea then was to get a machine out — the first choice being a scaled-down version of the Vaxstation 2000 — by November 1987. By slimming down VMS and using a subset of it, as was done with the Microvax, DEC could conceivably put VMS on the desk top at prices competitive with IBM's Personal System/2 series.

Internally during that time period, DEC was forecasting that the PS/2 and its OS/2 operating system delivery dates were going to slip badly. "We thought they might spend years trying to get it to really work right," a former DEC engineer close to the project says.

The marketing angle was to suggest that VAX on the desk top was the best solution for DEC shops. If these corporate offices were already "stuck" with IBM Personal Computers, DEC would support them as well by offering the PC-compatible Vaxmate.

Continued on page 44

Test your benchmark knowledge

BY FABIAN PASCAL
and RICH FINKELSTEIN
SPECIAL TO CW

This is the conclusion of a three-part series.

In the first two parts of this series, we discussed various issues concerning the benchmarking of SQL data base management systems. Now we will delve into specific areas concerning when to consider developing a custom benchmark and how to make more effective use of generalized benchmarks.

First, a benchmark should include a test for loading a table. Although an optimizer does not affect this particular test, there are other factors to consider.

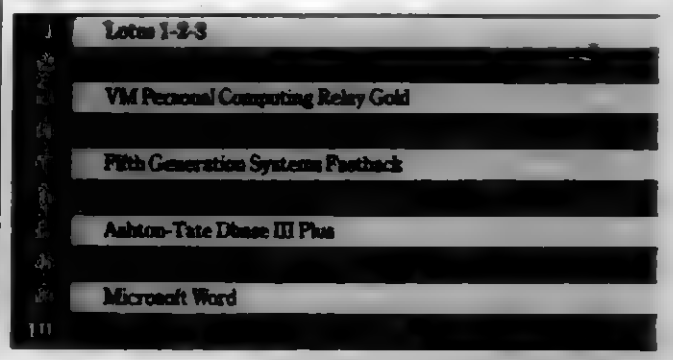
Some SQL DBMSs create a transaction log that contains an image of all rows that are inserted during a load. This adds some performance overhead, which may be worthwhile if the DBMS allows you to restart a load at some arbitrary point, such as if the load process is interrupted by a system or program failure. If this facility is not available and the load must always be restarted from the beginning, then the logging process should be turned off during load test.

The amount of time required to load a table may not be important if you only intend to load a table once. On the other hand, if the table will be reloaded periodically, loading time becomes more important. There may be

Continued on page 45

Top sellers

Software: Feb. 1-5



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CW CHART

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FROM PAGE 39

ties. In addition, some of these already offer multitasking.

Sure, I've got OS/2 up and running on a test machine, but I'm not sure I will ever make it a part of my normal use of personal computers. It is at least possible that alternative means will continue to meet my needs.

Should my case be the norm, then it is not likely that OS/2 will ultimately replace MS-DOS. On the contrary, it is quite possible that MS-DOS-based alternatives could be the dominant desktop operating environment for the indefinite future.

Does this mean that I think OS/2 will prove to be another product like IBM's Topview?

No. It means that it may not be until a successor to OS/2, built for the 386, is in place, that OS/2 will finally amount to much. The 386 version would avoid the problems of the "brain-damaged" 286 chip and would offer even more memory and full multitasking of existing MS-DOS applications through the 386's virtual mode.

If this scenario proves correct, the strategy for large users would be to bypass OS/2 on the desktop almost entirely. Instead, one could use Windows 2.0 and Windows 386 where appropriate, and make full use of OS/2, or its successor, in the early 1990s when a full-function 386 (or 486) version is available.

Zachmann is vice-president of research at International Data Corp.

SQL Server

FROM PAGE 39

dors. We are also going to find that the corporate community is a constituency for that tool kit.

What are the limits of SQL Server in terms of degradation?

We envision that a data base in the range of 300M bytes and a user community of maybe 35 users accessing an SQL Server will typically get subsecond response time across that entire group of users over a LAN.

Why does the performance degrade more slowly with SQL Server than with other implementations?

When standard DBMS architectures and SQL implementations schedule tasks, they defer that process to the operating system. The operating systems on any multiuser systems all have task schedulers. But the task schedulers are not optimized for a particular slot of tasks; they have to handle anything that any application program can fire at them.

Data base management systems typically fire only a very specific piece of that task spectrum out, and those are the things that have to do I/O to disk, fast reads to the disk, fast writes to the disk and things like that, as well as responding back to users. What we have done in SQL Server is take that task scheduling right into the SQL kernel itself — that part of the DBMS that partially interprets the SQL, sends it out and turns it into something that can be accessed against the data base.

How similar will SQL Server be to IBM's server product?

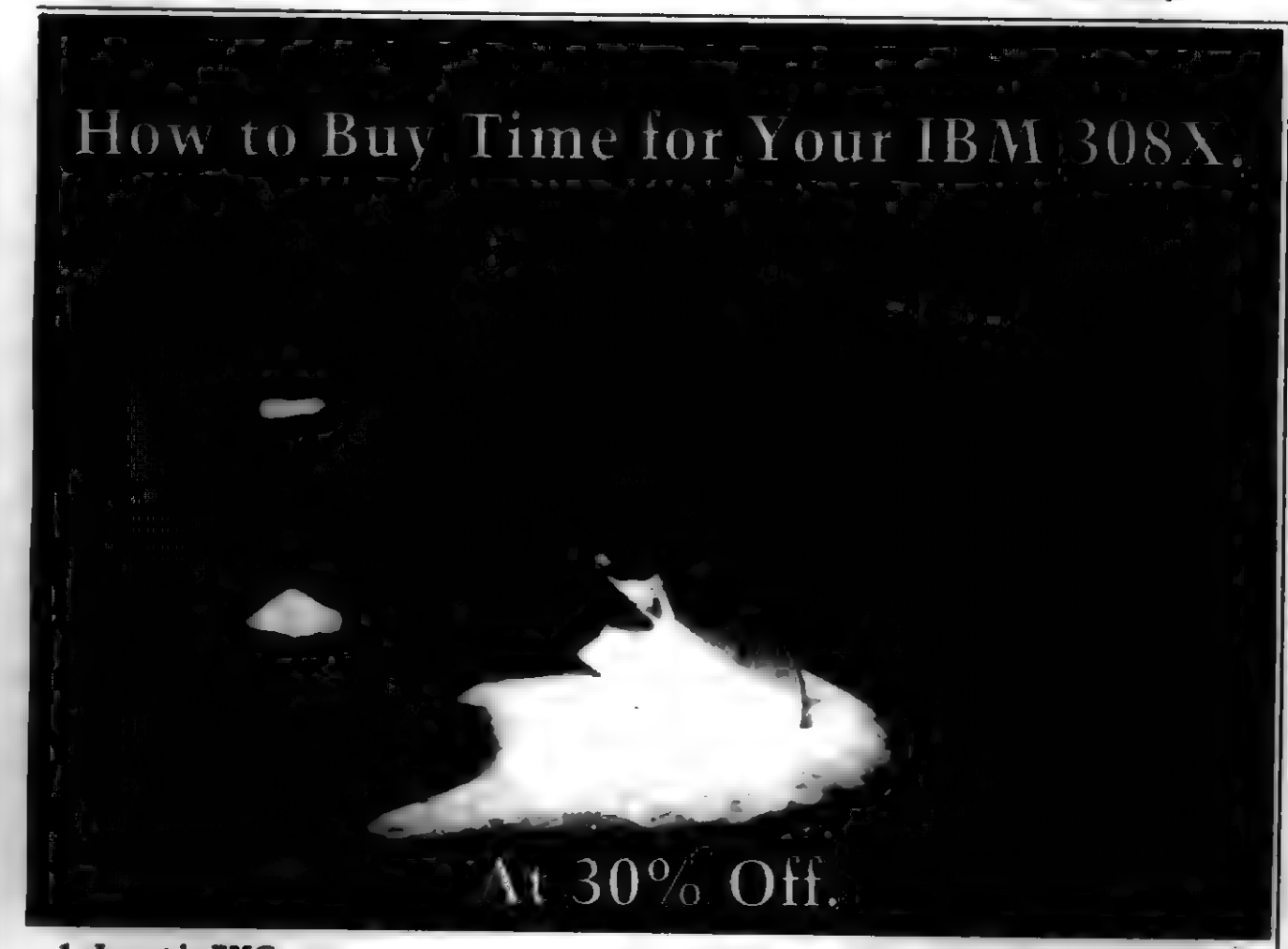
We differ from them in LAN orientation, which IBM has certainly committed to over time but will not be in anything we see in 1988 from them, and in our multiuser orientation and in the whole area of server intelligence.

Is SQL Server a direct competitor with OS/2 Extended Edition?

Certainly, anybody can read indirect competition in this in the sense that both of them are SQL products that run on PCs, but that's an oversimplified view. In a lot of ways, we think we're going to complementary.

How long will it be before this product is in widespread use in corporations?

Neither we nor Ashton-Tate are betting the ranch on getting rich overnight. We expect to deliver to the marketplace by the end of 1988, and we expect a slow but steadily building ramp of acceptance.



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With the uncertainty surrounding IBM's next move in the mainframe area, adding a few more years to your system's productive life will pay dividends for you down the road. So why buy a new system, when EMC's main storage upgrade gives you the performance you need to make your current system your future workhorse. With EMC you save 30% over comparable IBM upgrades, which means buying time now for your 308X has never been a better decision. The simple "plug and play" design of EMC's upgrade makes improving the performance of your system as easy as adding sand to an hourglass.

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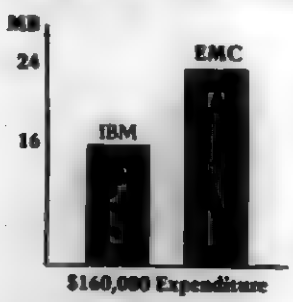
EMC uses state-of-the-art technology and production methods to offer our 308X upgrade at 30% lower cost than IBM. A 16MB upgrade from IBM is priced at $160,000. For that same price you could buy 24MB of EMC main storage. That's an additional 8MB of main storage or a savings of $50,000. Either way you save with EMC. EMC also features coterminous leases and trade-up credits so the return on your investment continues after your purchase.



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EMC is the leading independent manufacturer of main storage upgrades and other system enhancement products for mainframe and mid-range computers. All EMC products are supported by our worldwide network of sales and service offices.

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If you're interested in buying time for your 308X system, call EMC today at **800-222-EMC2** for your free information kit. Our 308X upgrade is the "midlife kicker" that saves you money and improves your 308X's performance.

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Barney

CONTINUED FROM PAGE 35

However, Microsoft will admit to planning support for IBM's OS/2 LAN Server. The firm is also adamant that a local-area network-based data base server approach is superior to a Unix-based pure-multiuser approach. We suspect some of the unknowns will provide fuel for future announcements.

The systems software conundrum. Both IBM and Microsoft seem to be redefining data base software as systems, rather than applications, software. IBM took the first step by making the OS/2 Extended Edition Data Manager part of an expensive version of the operating system.

Now, Microsoft is actively marketing SQL Server using the same rules that apply to any piece of systems software. The firm is seeking commercial developers to write applications and is going after hardware OEMs that may bundle the stuff with micros.

The goal is to have SQL Server available on as many pieces of hardware as possible, with a broad array of front-end applications. For MIS, this presents a radically different approach to evaluating software.

Until now, MIS benchmarked various data base management systems for performance, then threw development tools and existing front-end applications into the evaluation brew. If Microsoft has its way, the benchmarking may fall in importance, and the front end may become the key determinant. Meanwhile, we will just wait and see whether MIS views DBMSs as systems or applications software.

Betaware; Vaporware you can touch? A new trend among software firms is to proudly sell unfinished, or beta-test versions, of software. Under this scheme, users get to pay for debugging a vendor's software. The latest entrant to this market is Walleoft Systems, which is shipping a beta-test version of its UI2 code generator that works with Ashton-Tate's Dbase. Of course, as with any beta-test agreement, interested users get an early peek at the software and can sometimes shape what the final version will be.

Windows all over. If our source is correct, Microsoft is up to its old tricks again. The firm that pushed vaporware to its limits with the original Windows may be pulling a repeat performance with the Presentation Manager. A version of the Presentation Manager was supposed to ship as part of an OS/2 software developers tool kit by the end of 1987 and again last month. Now we hear Microsoft is shooting for next month. The deadline is October of *this year*, guys.

No Gupta just yet. Lotus is almost, but not quite, ready to formally disclose that Lotus/DBMS is based on technology licensed from Gupta Technologies. The announcement, originally set for several weeks ago — and again for last week — has been pushed back once more. As soon as they tell us, we'll tell you.

Barney is a Computerworld senior editor, microcomputing.

Prime supermicro

CONTINUED FROM PAGE 39

ning Transmission Control Protocol/Internet Protocol software. Prime is also reportedly developing IBM Systems Network Architecture connectivity between the EXL 316 and IBM systems.

"We will be using [Prime EXLs] to replace all of our personal computers," said Michael Higgins, manager of technical support at Byer. He said the company is using the EXL as a front-end server to its Prime 9955 Model 2 and its Prime 2655 computers.

By running Unix with a software package called Merge 386 from Locus Computing Corp., EXL users can run character-mode MS-DOS and Unix applications simultaneously, according to Higgins. "For instance, a file on a [Lotus Development Corp.] Symphony spreadsheet can be directly taken to a Unix application or spreadsheet," he explained.

Higgins said he is using an Oracle data base management system designed for Unix from Oracle Corp. to develop many of the company's main corporate applications systems. "I anticipated at the beginning that we could run two or three Oracle DBMSs simultaneously, but I underestimated. I believe we can run six or even 10 on it."

Tim O'Rourke, CAD systems support manager at Amdahl, said he is running PC Interface, a communications software package from Locus, on his EXL. The software reportedly provides users with a transparent extension of the PC environment and acts as a file server, providing centralized storage and backup. It can also share files among multiple IBM Personal Computers or compatibles.

Amdahl currently owns one EXL and has ordered a second, O'Rourke said. Both will be used to store a data base generated by 20 Compaq Computer Corp. Deskpro 386s and four 20-MHz Deskpro 386s.

For Byer, the EXL fit a niche, Higgins said. "A similar strategy with a lot of the 50 series machines would have been substantially more expensive, although they would have been different MIPS," he said. "Now we're forced to go out and use Unix."

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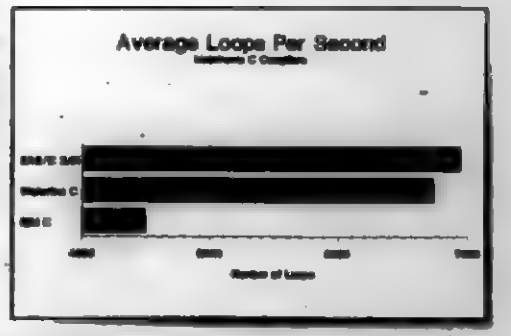

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DEC success

FROM PAGE 39

The philosophy behind the plan was that the gap between VAX applications and applications capable of running on such platforms as Intel Corp.'s 80386 or the Mac II was getting increasingly narrow. It would not matter to users whether the operating system was VMS or DOS or OS/2.

"VMS really isn't going to be visible," the former DEC engineer says, "any more than DOS is visible to most customers. The real question is, Are you going to have applications and is it a common, easily understood user interface? The days when you are going to sell the operating system per se are over."

But did DEC have the mindset to go out and get the software applications and the right windowing system in place? Would the company aggressively go after productivity tools such as Lotus Development Corp. 1-2-3-type applications for the Personal VAX?

The answer to these questions initially seemed to be no. There was constant foot-dragging on the part of the software people. "DEC has the same kind of problems relative to personal computing that IBM had relative to minicomputers," a former DEC insider says.

DEC also suffered from the "once burned, twice shy" syndrome. No one in marketing or sales wanted to get on the bandwagon for yet another attempt at a PC when the company's track record had been so poor.

Olsen had a history of getting personally involved at the low end, endlessly pushing for packaging redesigns that caused long and costly delays. Then he would reportedly come down hard on the development staff for failing.

Software from heaven

"Ken's strategy was always 'Get the box built, and the software will come from heaven,'" the former DEC engineer says.

The Personal VAX got hung up for several months on the software issue. Yet somehow, the idea survived. The hardware questions remain unanswered. The machine is reportedly diskless, but DEC is still answering the box questions. The Vaxmate, sans fan, became a nightmare for DEC developers because it simply ran too hot. Will DEC go a similar route with the Personal VAX? That is currently unknown.

When it is announced, the machine will be priced competitively, reportedly under $5,000. Though they've missed the window of opportunity created by OS/2 delays, DEC insiders say IBM and Microsoft still have plenty of obstacles to overcome with OS/2 implementation.

An industry analyst who wants to remain anonymous says he has been told that DEC expects the Personal VAX "to be a slow grow" for the firm.

John Rose, group manager for personal computing systems at DEC, would not comment on the product but said, "If you look at the history of the VAX for the past couple of years, it is logical to expect that we will continue to enhance that platform in both directions."

All for one and one for all?

No one is quite sure what the Personal VAX means to DEC's agreement with Apple. It's one thing to push Macintoshes instead of PS/2s. It's another to put the stamp of approval on someone else's desktop offering when you are about to announce a brand new solution yourself.

According to Rose, both DEC and Apple have agreed to be "friendly competitors" on the desk top. "We want to win the desk top with a DEC-logo device," Rose says.

It is unlikely, however, that the deal with Apple will affect the Personal VAX. Olsen is not known for killing products, particularly at the low end.

At issue right now, apparently, is whether to incorporate OS/2 and DOS slots on the Personal VAX. This issue has polarized the development group inside DEC, which is no surprise, considering Olsen's long-term resistance to expansion slots on his PCs.

"No decision has yet been made," one analyst reports. "When we see the blood trickle out from under the door, you'll know someone has won."

Without referring specifically to the Personal VAX, Rose says, "We will be integrating OS/2 and, if appropriate, providing OS/2 on DEC-based hardware."

In the long run, it appears that the Personal VAX will become DEC's desktop machine of choice. The Vaxmate, which has fallen far short of expectations, is still considered a strategic product, according to Rose.

But if the Personal VAX incorporates DOS and OS/2, the Vaxmate will slowly disappear. The more important question remains: Are there any desktops left out there that would provide a significant market for a VMS PC, and how and will DEC market this machine?

Norton

FROM PAGE 35

Socha, director of research and development at Norton.

The Norton Computing data base is also said to provide software developers with access to specifications and programming examples for the four OS/2 function groups, which include system and file services, keyboard services, mouse services and video screen services.

Easy access

When the Norton guide is activated, categories of information can be accessed through pull-down menus.

When a category is selected, the program presents a list of one-sentence deacriptions, each of which can be expanded for more detailed information.

An interesting feature of the program is the DOS-to-OS/2 equivalency table. Norton Computing used the table to convert its own programs from DOS to OS/2, according to Socha. "It made the job a lot faster and less painful," he said.

A companion Norton Guide for the Presentation Manager, the graphical interface for OS/2, is currently being developed, according to the company.

Theirs takes hours.

Installing and configuring a 3270 or RJE remote host connection for BSC or SNA NETBIOS LANs? With the competition, it'll seem to take forever. While RabbitGATE™ takes just a few minutes. It's so easy that most people don't ever open the user guide.

But RabbitGATE saves more than set-up time. It also saves time in operation. At 56Kbs, it's the fastest LAN-gateway around. But more important—at any line speed—it performs file transfer up to twice as fast as the competition. Using only a host session, to keep your DOS sessions concurrently available to local DOS applications.

That's because RabbitGATE has its own 80186 processor and 512k of RAM. So when compared to other gateways, which downgrade your workstation, RabbitGATE saves up to 50% of your workstation's processor and RAM.

As if saving time and memory wasn't enough, RabbitGATE also saves you money. It's priced competitively, yet offers built-in windowing, 8 host sessions per workstation, and access to different hosts with different

Benchmark

FROM PAGE 39

only a limited window for when a table can be loaded or, from a usability point of view, it may important to complete the loads as quickly as possible.

For example, it may be critical that the table be loaded every morning in 15 minutes so the user is up and running by 9:00 a.m. Otherwise, the user may be frustrated and reject the system.

Retrieval tests

In a heavy retrieval environment, the tests of SQL joins are very important. It is rare that a system consists of only one table. A two-table join should always be tested, as should a three-table join.

Three-table joins are very common; a typical example is the join between a customer, an invoice and an invoice detail line table. Four-table joins are a bit rarer but should be considered.

One problem with testing joins is that it is difficult to get data that accurately reflects the real-life situation. It is also difficult to find the time required to perform all the necessary tests. Some four-way joins can take hours if the tables are very large.

You can restrict the joins to just a few rows in the tables; with the help of indexes, this would reduce time dramatically. In all cases, the benchmark should test the ability of the optimizer to use indexes. It is rare that joins are done on unindexed columns. The benchmark should also test the optimizer's sensitivity to the join condition in the WHERE clause of the SQL command.

In the following statement, we will join an employee table with a department table using the employee numbers in both tables.

```
SELECT PERSON
FROM EMPLOYEE
WHERE
EMPLOYEE.EMP_NO =
DEPT.EMP_NO
```

If indexes exist in the employee table, then the optimizer must choose which one or ones it will use. Many times, an optimizer will be tricked into using the wrong index or indexes. You may get quite different results by flipping the WHERE condition and putting DEPT.-EMP_NO on the left-hand side of the equal sign.

Better optimizers will use statistical data and histograms that are stored in the system catalog in order to determine the best index to use. In some cases, an optimizer may even decide to build a temporary index if the optimizer determines that it will increase performance.

Ordering, or sorting, is also very important in retrieval environments. It is crucial to use indexes correctly when they are available, and benchmarks should test queries that cannot use indexes for ordering. Some optimizers will build a temporary index, while others will use a vendor-developed sort program. The quality of this type of programs varies substantially from vendor to vendor.

Compound conditions

Queries with AND or OR Boolean conditions are quite common but difficult to optimize. Of the two, the OR operation is considered the one that is more difficult to optimize correctly. Good optimizers can use indexes to greatly reduce I/O.

Subqueries, or nested queries, and correleated subqueries are rarely tested in benchmarks. Many evaluators underestimate the importance of these queries and tend to ignore them.

Certain types of subqueries are equivalent to joins. An optimizer should be indifferent to the fact that a query is a join or a subquery and should be able to execute equivalent joins and subqueries in the same amount of time. However, this is rarely the case. Since end users are as likely to write subqueries as they are to write joins, the optimizer should be tested to see how well it can handle both cases.

Aggregate functions

The LIKE command is used for pattern matching and can sometimes be optimzied by using index searches or scans of the leaf, or bottom, level of a Btree index. Similarly, aggregate functions such as COUNT, TOTAL or AVG can often be calculated directly from an index.

Testing updates is relatively straightforward in a single-user environment, but with the advent of local-area networks, things can get much more complicated.

In a multiuser environment, close scrutiny should be paid to the transaction manager, the type of logging and recovery options that are available, the number of users that can be handled concurrently, the granularity of locking and the degree to which the transaction manager provides consistency of data at the expense of concurrency.

A good transaction manager will allow a developer to choose the level of consistency that is desirable in order to achieve a certain level concurrency. To this end, the new SQL PC products, running in a requestor/server mode, provide a level of data integrity previously unattainable in LAN environments. Performance of any DBMS should take into account the overhead required to provide data integrity. A DBMS that does not ensure data integrity, even if it is very fast, is not very useful to an organization.

In these articles, we have attempted to point out some considerations when benchmarking DBMS systems. Ideally, all these issues should be transparent to the system developer and end user. As optimizers and transaction managers become more sophisticated, many of these issues will doubtlessly disappear. At the same time, we are confident that new issues will surface to take their place. In the meantime, the quality of the optimizer remains the single most important component of an SQL DBMS and should be well tested before any selection is made.

Pascal is an independent analyst based in Washington, D.C., and is affiliated with the Codd & Date Consulting Group, specializing in relational technology and SQL on microcomputers. Finkelstein is a senior consultant with Codd & Date.

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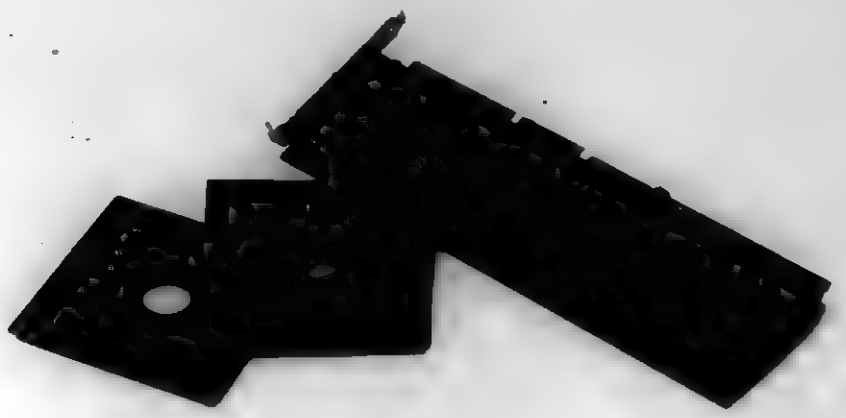

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NEW PRODUCTS

Development tools

Micromain Prototyper, software allowing users to design, revise and demonstrate mainframe applications on personal computers, has been announced by **Micromain Software, Inc.**

Micromain Prototyper consists of an integrated data dictionary, screen painting, report painting, scenario building, simulation and documentation subsystems.

Micromain Prototyper costs $395.

Micromain Software, 5 Aldrin Road, Plymouth, Mass. 02360. 617-747-5933.

A table-driven assembler for microprocessors designed to work on Unix-based systems has been added by **Specialized System Consultants, Inc.**

Called **Framework Assembler**, the software allows programmers to program 8-bit microprocessors without a cross-compiler for each new chip. The product is a family of two pass-absolute assemblers that includes Intel Corp. Hex format output records.

In source form, the base program and the adaptation files for one target processor cost $175. Specialized System Consultants, P.O. Box 55549, Seattle, Wash. 98155. 206-367-8649.

Software enhancements

A networking version of the **Snow Report Writer** has been announced by Snow Software.

The multiuser version is said to allow shared data files to be merged to generate custom reports. Features include record locking, file protection, windowing and on-line Help, the vendor said.

The Snow Report Writer networking version runs on IBM Personal Computers on Novell, Inc., Orchid Technology, Inc., 3Com Corp. and IBM networks. It costs $995 for eight workstations.

Snow Software, 2360 Congress Ave., Clearwater, Fla. 34621. 813-784-8899.

An enhanced version of **Dbx**, the translator that allows users to transport Ashton-Tate Corp.'s Dbase programs into the C language and to other machines, has been announced by **Desktop AI.**

Dbx Version 3.0 features Dbx/Express, a programming language derived from Dbase and Nantucket Corp.'s Clipper; a system analysis program that automates the translation and compilation process; and an intelligent language translator for converting Dbase programs into C source code.

Translated programs can be directly moved to Unix, Xenix, Digital Equipment Corp. VAX and Apple Computer, Inc. Macintosh systems without Microsoft Corp. MS-DOS emulation.

Dbx costs $350.

Desktop AI, 1720 Post Road E., Westport, Conn. 06880. 203-255-3400.

Release 5.0 of the **Total Recovery Planning System** (TRPS) disaster recovery planning tool kit has been announced by **Chi/Cor Information Management, Inc.**

TRPS is said to provide the tools necessary for creating, managing and maintaining a disaster recovery plan. Release 5.0 includes a relational data base design, a section for documenting voice and data communications networks, a methodology for developing a recovery plan and a user-defined reporting facility.

TRPS costs $9,500 including the software, the methodology, some sample data and documentation. It runs on IBM Personal Computers and compatibles.

Chi/Cor, 10 S. Riverside Plaza, Chicago, Ill. 60606. 312-454-9670.

Printers/Plotters Peripherals

A full-page display system for desktop publishing has been announced by **NEC Home Electronics, Inc.**

NEC's *Monograph System*

Called the **Monograph System**, it features a 16-in. square screen; a 1,024-by 1,024-pixel monitor; a controller board; driver, font and diagnostics software; a signal cable; and a user's manual.

Other features include a built-in IBM Color Graphics Adapter (CGA) emulator that displays CGA software in double-scan mode with 640- by 400-pixel resolution. The video controller board fits in any IBM Personal Computer XT, PC AT or compatible in an 8- or 16-bit slot.

The Monograph System is priced at $1,999.

NEC also announced the **Multisync GS** monochrome monitor, which displays in up to 64 shades of gray. It costs $279.

NEC Home Electronics, 1255 Michael Drive, Wood Dale, Ill. 60191. 312-860-9500.

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DATA STREAM

Anthony J. Friscia

Pinpointing MAP's future

With the Enterprise Networking Event (ENE) approaching, the question arises: How are Manufacturing Automation Protocol's (MAP) prospects as a future factory LAN standard?

The past year has been generally quiet for MAP, which experienced sluggish sales and limited press. While this will not be a better year in terms of sales, the general MAP atmosphere is more positive than it has been for some time. There are three reasons for this more upbeat attitude.

First, the MAP/TOP Users Group has announced a six-year freeze on the MAP 3.0 specification. This will allow users to work with a stable product and will let vendors approach the market without fear of losing their return on investment.

Second, ENE is reinvigorating user interest in the standard. Although there will not be the same blind excitement that surrounded earlier events, ENE will undoubtedly open the door to MAP market opportunities.

Finally, the market has become more realistic with three years of experience under its belt. There will not be the same kind of overzealous forecasting and expectations that basically sealed MAP's fate in 1986.

ENE will be a major turning point — for better or worse — for the MAP market. A suc-

Continued on page 54

IBM exec speaks out on LAN Server's potential

Today, months after the waterfall of IBM OS/2 announcements, corporate users are still trying to figure out how to gracefully fit these products into their networking environments without serious disruption. *Computerworld* West Coast Bureau Chief Kathy Chin Leong interviewed Leland Reiswig Jr., director of IBM's Entry Services Division Austin Laboratory and head of the OS/2 Extended Edition project, to discuss the merits of IBM's new LAN Server.

Leland Reiswig Jr.

Why did IBM decide not to license the entire LAN Manager program from Microsoft Corp., instead developing the LAN Server on its own?

We wanted to optimize the local-area network support in our LAN Server product and in the Extended Edition, and we wanted to optimize it to support the standards we are setting for Extended Edition, which are [IBM Systems Application Architecture]-compliant to the Common User Access interface, or CUA.

We wanted to provide a different view of network and resource management than the LAN Manager provides. And we were looking to the future in terms of SAA support that could ensure that LAN Server would be complementary to our connectivity facilities and our host LAN support.

So the LAN Manager was going in a direction IBM was not heading?

Microsoft's requirements for LAN Manager do not necessarily prioritize the support and

Continued on page 58

Investment in factory LANs

Actual and projected dollar value of local-area network shipments

INFORMATION PROVIDED BY VENTURE DEVELOPMENT CORP.
CW CHART: AMY J. SWANSON

NET prods skeptics

Firm aims to prove it's not an IBM puppet

BY ELISABETH HORWITT
CW STAFF

REDWOOD CITY, Calif. — Nearly a year after signing a resale and technology transfer agreement with IBM, Network Equipment Technologies Corp. (NET) is still struggling to convince a skeptical industry that its product development plans are not dominated by its giant partner.

IBM "does have the rights to our proprietary protocols, so they can use them in IBM products, which they can announce apart from us," Kurt Jaggers, NET's marketing manager of network systems products, told *Computerworld* in a recent interview. NET will also continue to develop products of its own to add value in the IBM Systems Network Architecture (SNA) market, "where there is a huge overlap between our customers and IBM's," Jaggers said.

Nevertheless, recent product announcements and statements of direction from both vendors point to a strong bond in their respective telecommunications product strategies — particularly in the network management area.

For example, on Jan. 26, IBM announced that it is working on a Personal System/2-based network management workstation that would provide "real-time information and control for a [NET] Integrated Digital Network Exchange [IDNX] network" in both graphic and text for-

Continued on page 51

Video rental king loads in automation

BY PATRICIA KEEFE
CW STAFF

SPRINGFIELD, Va. — Video rental king Erol's, Inc. is a classic all-American success story. So it's not surprising that savvy owner Erol Onaran, who immigrated here from Turkey 25 years ago with $16, also leads the video market in automation.

Onaran, who started out in television repair, took a chance in 1980 and jumped full force into the then-fledgling video rental market. Seven years later, Erol's is ranked No. 1 in *Video Store* magazine's annual top 100, with $154,676,000 in revenue from 147 stores.

Service and speed are the chain's hallmarks, and it relies heavily on a vast point-of-sale (POS) terminal network and bar-code readers to achieve those goals. Servicing more customers in a shorter time means more revenue, satisfied customers and repeat business.

While it might seem a cheaper route to some, Erol's nixed a local-area network in favor of POS terminals attached to in-store IBM System/36s. These are primarily Model 5362s, but Erol's is switching over to Model

Continued on page 55

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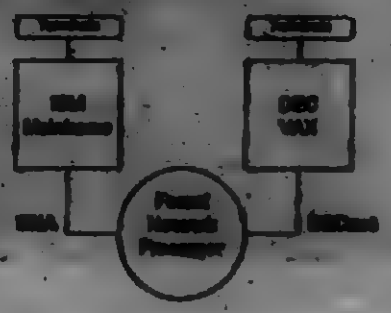

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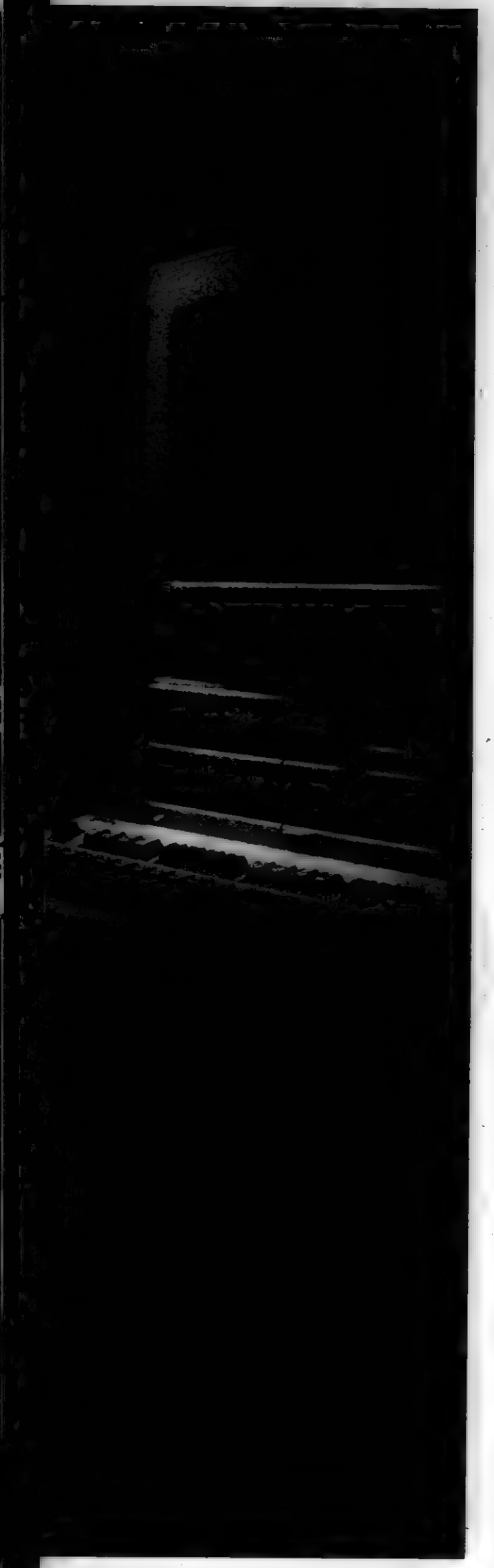

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Study shows EDI is on the fly

BY PATRICIA KEEFE
CW STAFF

The electronic data interchange (EDI) market appears to be growing at a fast clip despite somewhat lukewarm reports from users who either feel they were strong-armed into buying EDI or are unsure about its benefits.

Link Resources Corp., a research firm based in New York, estimates that there are about 3,600 active EDI user companies and predicts this figure will rise to 10,500 by the end of 1991.

While Input, a Mountain View, Calif.-based research firm, estimates EDI growth at a whopping 147% per year, Link takes a much more conservative approach. Link has adjusted its 1986 revenue for EDI from $30 million to $27 million but nonetheless projects steady upward growth — 45% to 60% annually — through 1991.

In a recent report, Link surveyed EDI users from 20 U.S. companies in the manufacturing, transportation and retail industries that had annual sales of at least $100 million.

Despite expectations of healthy EDI growth, Link's survey did not uncover wild enthusiasm for EDI among users. Although 75% of the respondents cited internal interest in EDI, a significant 40% said the impetus came from customers.

In a similar vein, 15% said they installed EDI only because they had to. Even so, 45% were very positive about EDI, and 35% said they believed EDI was where the industry was going.

Also, a recent report from the Automotive Industry Action Group based on interviews with 250 firms found that many had installed EDI only to accommodate major customers.

As for benefits, 35% of those surveyed by Link said they did not know or it was too early to tell; 15% said they expected to reap future savings; and 15% said it is strictly a customer service.

In the Link survey, users complained that the third-party provider segment of the EDI market is very fragmented. This makes one-stop shopping difficult, leading to little, if any, vendor loyalty.

Although 65% of the users said they are using publicly approved or industry-standard EDI formats, they most often support proprietary formats from trading partners. Therefore, industrywide cooperative efforts are essential, Link said.

The global view

Internationally, the picture appears much rosier, according to Input. A recent report estimates the 1987 market at between $75 million and $90 million for network/processing services, software and professional services.

Some domestic EDI vendors, such as GE Information Services and IBM's Information Network, are developing strategies for international capabilities for two basic business reasons: their largest clients will require international support, and such services will be necessary to qualify as full-service positions.

Input attributed rising interest in international EDI to increasing domestic recognition of the benefits associated with EDI: reduced inventory, improved customer service, faster turnaround and lower costs. Thus, U.S. user expenditures for international EDI network and processing services are expected to rise from $2.5 million this year to $220 million by 1992.

Despite Input's rosy expectations for growth in international EDI use, it does cite some impediments. A number of international trade participants are developing information systems incompatible with EDI's dominant trends, which could slow the adoption of international EDI.

Another troublesome issue is transborder data flow, which inhibits the transfer of business data. Also, some foreign carriers have placed restrictions on leased lines through pricing designed to encourage public network use, which Input says may not be the best solution in certain data applications.

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BIT BLAST

AT&T links SDN, Accunet service

AT&T recently announced a link between its Software Defined Network (SDN) and the Accunet Switched 56 Service. Combining the two services provides end-to-end, 56K bit/sec. data transmission for users who cannot justify dedicated links for applications such as bulk data transfer and graphics transmission, AT&T said. The "static" version of the combined service requires a dedicated data channel between user and AT&T premises; the dynamic version allows users to allocate the same 56K bit/sec. line for digital voice or data transmissions on a dynamic basis. AT&T hopes to offer the new capability as a tariff by mid-year.

Fibronics International, Inc. and **Control Data Corp.** have signed a joint development agreement to link CDC's Cyber line of computers with Fibronics' System Finex network, a 100M bit/sec. fiber-optic network that conforms to the Fiber Distributed Data Interface standard. The resulting network products will attach high-speed peripherals such as

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NET

CONTINUED FROM PAGE 47

mats." The workstation will forward IDNX network events, as SNA alerts, to IBM's Netview network management system.

NET has since told *Computerworld* that it plans to upgrade Enhanced Operator Console (EOC), its existing IBM Personal Computer AT- and PS/2-based network management workstation, from IBM's PC-DOS to OS/2. NET also plans to provide on EOC the same level of functionality that is now available on its proprietary, Unix-based Integrated Network Command System, Jaggers said. And though "EOC is definitely not Netview," the system does send network alerts to Netview via the Netview/PC interface. NET also plans to support IBM's expected release of generic Netview commands, which will allow NET's IDNX line to be configured from a Netview host.

Independence stays

On the other hand, NET is remaining independent as to the data base management system it uses for centralized collection of network management statistics, Jaggers said. The T1 switch vendor will continue to use Oracle Corp.'s Oracle as its data base despite the fact that IBM recently announced it will base its own system on its DB2.

And NET is exploring on its own potential uses of expert systems and artificial intelligence technology in its products, according to Jaggers. One possibility is an expert system component to advise users on how to diagnose problems on IDNX networks. A second possibility is an AI-based graphics system that will present network topologies not only of NET switches but of other vendors' products as well. AI-based tools may also help NET connect its data bases with IBM's, Jaggers said.

When NET recently announced its intent to support 45M bit/sec. T3 links, IBM quickly followed with its own statement of direction to support T3. Although IBM indicated that its initial support will be through the NET product line, its introduction of the high-end 3745 communications processor, which can support up to eight active T1 links, indicates another focus for the vendor's thrust into high-speed interconnectivity. NET, for its part, plans to market its T3 capabilities as a way to link powerful host processors, local-area networks and video applications, Jaggers said.

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Friscia

FROM PAGE 47

ceasful event will restore user confidence, but if users hear once again that they must wait for solid MAP products, they may abandon the standard for good. A review of where the market has come from makes clear the current pitfalls to its potential.

Advanced Manufacturing Research (AMR) conducted a number of user surveys during 1987 to determine the status and potential for MAP sales. It was clear that two factors contributed to the slowdown.

Plans on hold

First, companies that expected to enter the pilot phase (limited in-plant installations) in 1987 put MAP implementation plans on hold. Second, expected "rapid followers" did not jump into the market due to the lack of early success stories. This absence of new users left virtually all MAP activity to essentially 30 pioneer user companies, putting limits on the immediate growth potential of the overall market.

Contrary to commonly reported opinion, the majority of users interviewed did not blame "waiting for MAP 3.0" as the reason for a slowdown in activity. Most of these users understood at the beginning that their MAP efforts would require a phased migration process. Users, in fact, said they planned to install hybrid versions of MAP that would require modifications over time.

Among users who slowed down or ceased MAP activity, 50% of the respondents said the primary reason was vendor performance and product quality and availability. The gripe here was that vendors were late delivering products, and once products were delivered, they were of beta-test quality at best, which significantly increased implementation time.

MAP 3.0 has thus only become a factor because product delays added so much time to users' implementation cycles that MAP 2.1 installations were finally scheduled for completion at the same time that MAP 3.0 products were to be available. It thus became perceived as foolish not to wait for the next generation of products. Had MAP 2.1 products been available when advertised, users would be more aggressively involved with MAP today.

As a result of the above factors, 1987 MAP connection sales stayed even with those of 1986 — approximately $17 million. Industrial Networking, Inc., a joint venture between General Electric and Ungermann-Bass, was last year folded into Ungermann-Bass and ended the year with approximately $12 million in sales, down from $16 million in 1986. Concord Communications did less than $4 million, slightly lower than its 1986 tally, in MAP product sales.

Sales this year should be flat overall — even with a successful ENE. A strong finish for the market this year will lead to solid fourth-quarter bookings but not to actual revenues realized. AMR thus forecasts 1988 sales at $20 million.

Sales aside, users still support MAP's development and say they would like to standardize on MAP/Open Systems Interconnect-based networks. In one survey, the vast majority of user respondents, 80%, stated that they want to support a communications standard within their factories.

Given the market's history, however, several factors are crucial to an upswing in the MAP market based on the success of ENE. First, the event has to be more than hoopla and must feature working 3.0 products. Second, vendors must be prepared to deliver working MAP 3.0 products to users following the event.

Users clearly will not tolerate any more delays. The option to use viable proprietary networks like DEC's Decnet is strong within many companies. If users are let down at the early 3.0 stage, the MAP product market will be in trouble.

Friscia is president of Advanced Manufacturing Research, a Salem, Mass.-based research and consulting firm.

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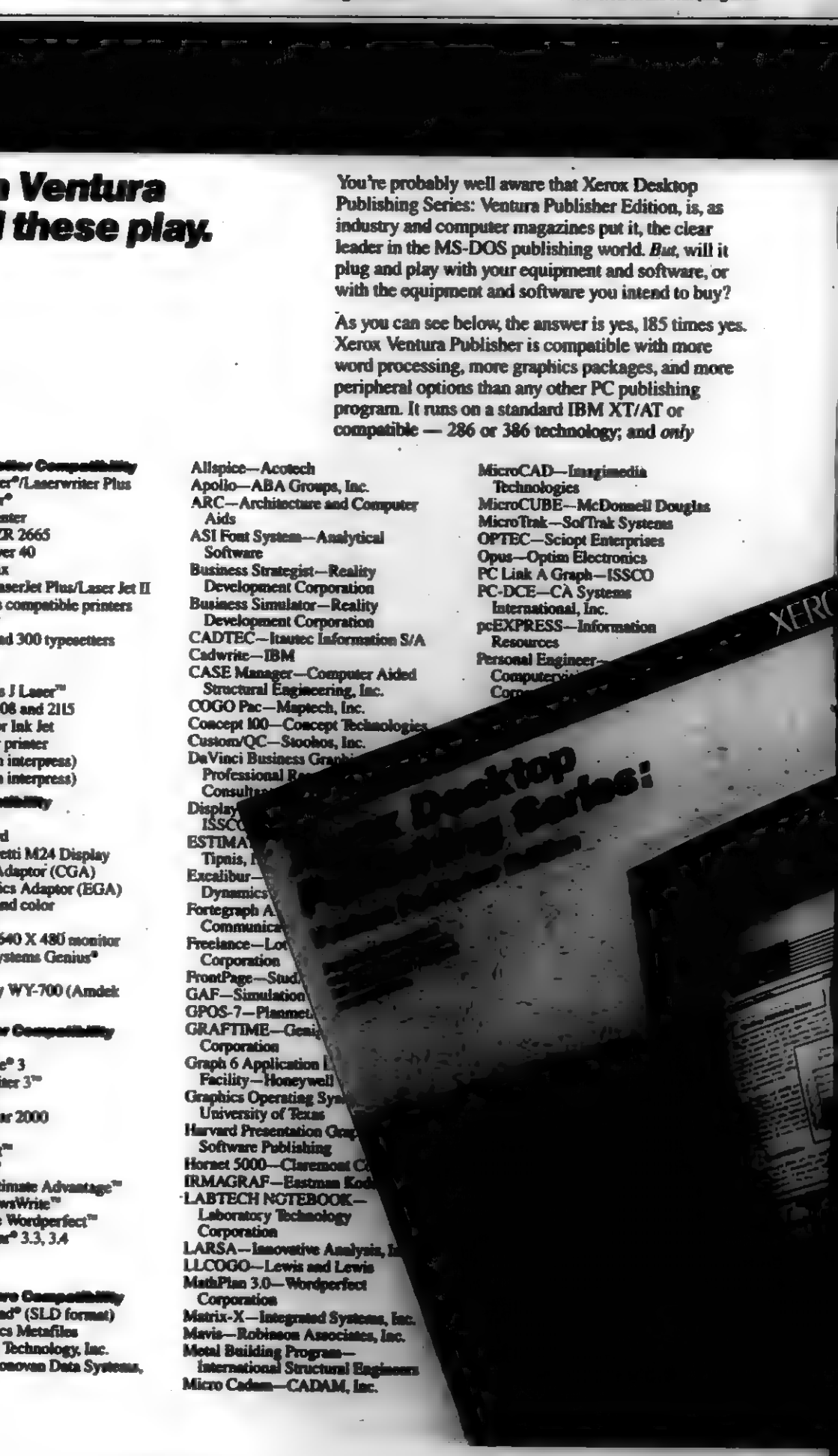

Video king

FROM PAGE 47

5363s and Model 5364s. Each store has six to 10 microcomputers, matching printers and one System/36.

Customers present a computer-coded club membership card along with their selections, whose labels are scanned and recorded by a bar-code reader. Printers at each sales counter immediately output an invoice. The whole process takes seconds, rather than minutes.

The day's transactions are sent into the store's System/36, which is also used to verify membership and track inventory. Nightly, these processors download data into an IBM System/38 in Springfield over leased lines using modems and IBM's LU6.2 technology. On-line 24 hours a day, the System/38 prints out nightly reports, controls a membership data base and updates inventory.

About a year and a half ago, Erol's decided to revamp its computer network to achieve greater efficiency and cost reductions. The previous setup used a mix of IBM 5251 and 5291 CRTs and Centronics Data Computer Corp. 150 printers, which required protocol converters, slowing down the system. Customer service was further hampered by having the terminals share one printer.

In April 1987, Erol's began implementing a new system. The older IBM CRTs are being replaced by homegrown PCs that feature one floppy drive, Ideacomm 5291 emulation boards from Ideassocintes, Inc. and internal bar-code readers.

"We save 50% of the cost by building them ourselves," said A. J. Whitfield, manager of Erol's retail system. A number of emulation boards were tested, but Ideassocintes' was the most compatible with Erol's system. The Ideacomm 5291 links the PCs to the System/36 and also supports the printers.

Upgrades

Today, each PC has its own 40-col printer, reducing invoice processing time by 50%. The added cost is outweighed by a net savings achieved by using cheaper printers and eliminating the 5291s and protocol converters.

Revamping the old system included a hard look at Erol's high-end processors. Whitfield admitted to some concerns about the future of the System/36 and 38. "We understand the operating systems are coming closer together [via Silverlake], but it has not arrived in time to do us any good," he said.

Erol's installed an IBM 3090 in December to handle the load from another 50 stores the company plans to open this year. "It's some evidence of our concern over where the System/38 is going," he conceded.

Continued from page 50

graphics workstations to Cyber host channels, the firms said.

Cylix Communications Corp. said recently it will provide an interface between its network management system and the IBM Netview network management system. Memphis-based Cylix provides data communications systems.

Sun Microsystems, Inc. has made more strides toward having its Network File System (NFS) accepted as an open industry standard. Some 150 vendors already support the protocol, and a Sun spokesman said recently that AT&T's 20% investment in Sun means that all future versions of AT&T's Unix System V will be shipped with NFS.

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Since then, over half a million IBM® PC,™ XT,™ AT™ and compatible users have made our IRMA family the industry standard in 3270 micro-to-mainframe communications.

But now, IRMA 2 provides connectivity between mainframes, PCs and the new IBM Personal System/2™ models. While MacIRMA™ connects mainframes with Macintosh IIs and SEs. All with the same 3270 emulation features your users have been familiar with for, well, five years now.

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products can support the DCA and IBM mainframe file transfer software you probably already have installed in TSO, CMS and CICS environments.

What's more, DCA has products for every connectivity option. Including coax, SDLC, LAN gateways, LAN workstation software, twinax and asynchronous communications.

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LAN Server

CONTINUED FROM PAGE 55

consistency with IBM's architecture. They [Microsoft] tend to look at LAN systems in terms of supporting all vendors' products, which is a priority for them. I think we have more of a host systems affinity.

The LAN Server announcement we made conforms to CUA standards and to how the Extended Edition will implement the SAA protocols for communications, user interface and data management.

What exactly is CUA?
That is the standard by which we are going to implement all of our user interface components into the Extended Edition and IBM's applications on OS/2. It is a standard for how we use color, how we use select items on a menu, terminology, function keys. It provides consistency to applications that are independently developed. From a user's perspective, as you switch from one to another, you don't have to relearn how to use the functions of an application. The standard has been published — the specifications for how we will write our applications and how our services will be implemented in Presentation Manager OS/2.

Will LAN Server support Microsoft MS-DOS machines?
Let me be specific. It will support PC-DOS, not MS-DOS.

Will OS/2 applications run on LAN Manager and LAN Server?
Some will. Those that conform to the OS/2 Application Program Interface will run transparently. Those that use the unique programming interfaces provided by LAN Manager will not run with the OS/2 LAN Server.

Since LAN Server requires OS/2 Extended Edition 1.1, what real gains will users obtain compared with what they are using today?
They will see the value of OS/2. They will be able to break the 640K memory barrier, run multiple applications and quickly switch between them. They will have concurrent processing going on in the background. In addition, because of those characteristics of OS/2 and Extended Edition, they can now have shared gateways and servers. They can get more effective utilization from existing hardware. The LAN Server program has functional enhancements beyond that of the PC LAN program, such as enhanced security, data base management and network management.

How will users tap the resources of systems outside the network?
There are no facilities that are directly a function of the LAN Server. But by using the LAN Server resource management in conjunction with our existing products that provide access to host data, this can be done more readily in an OS/2 environment than in a PC-DOS environment. Users won't manually have to go through separate operations to bring data down, store it and then put it within the context of a program. It will be much simpler.

Are all the pieces of LAN Server completed yet?
The testing is not yet completed. Most of the code is written. As far as what the product is, more details on it will come out as we get closer to shipping.

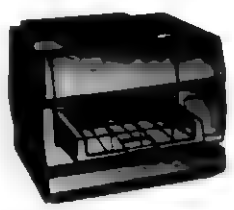
> WITH LAN Server, users "will be able to break the 640K memory barrier, run multiple applications and quickly switch between them."
>
> LELAND REISWIG JR.
> IBM

Will the LAN Server, priced at $995, require users to buy the IBM PC LAN Program Version 1.3?
No. It will support LAN Program 1.2. But when you use 1.2, you will not get access to all the functions provided by 1.3, such as network and resource administration, the user interface shell and security functions.

Do you need to have an OS/2 version of Netview in order to have Netview work in this environment?
No. You don't have to because Netview is monitoring traffic running on the LAN. Whether it runs on OS/2 or PC-DOS is not a significant distinction. OS/2 Netview is planned for future releases. It will do fine with PC-DOS.

Is there anything else we should know about Extended Edition or LAN Server?
It is important to focus on the fact that the Requester function of the Extended Edition is integral. That has a significant difference for users because of how easy it will be to access these functions . . . instead of having to deal with separate products. I am hopeful that Extended and LAN Server will be a much more cohesive user tool than all of the different products that users have to deal with now.

Inside thes
a revolution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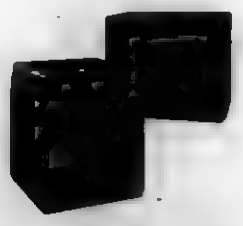
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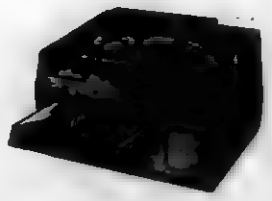
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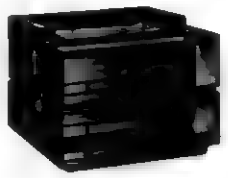
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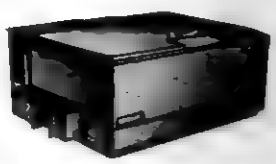
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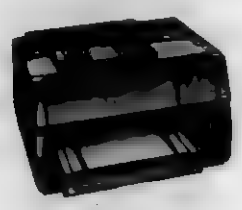
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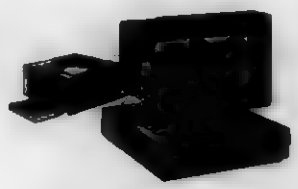
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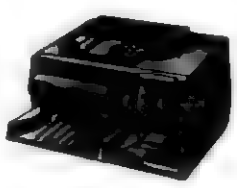
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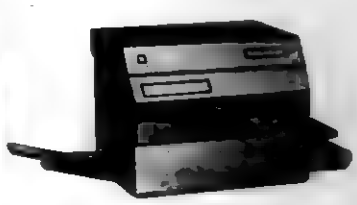
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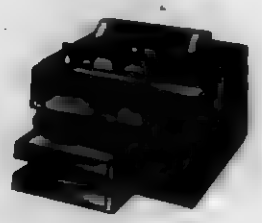
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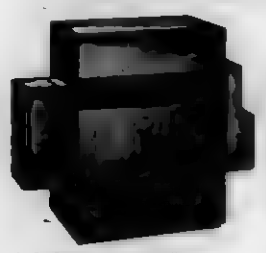
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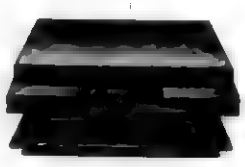
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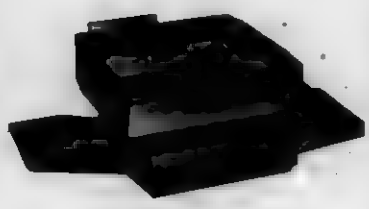
NEC Information Systems
SilentWriter™ LC-890

QMS-PS® 2400


Apollo Computer Inc.
Domain/Laser 26™

NEW PRODUCTS

Local-area network hardware

Racore Computer Products, Inc. has introduced an eight-port **Multistation Access Unit** for use with IBM Token-Ring networks.

The access unit serves as the central junction box to connect all of the personal computers on the network. Each device can accommodate up to eight PCs and can be daisy-chained to configure a network with up to 260 workstations. According to the vendor, workstations can be connected up to 100 meters from the access unit. Daisy-chained units can be located up to 45 meters from one another.

The Racore Multistation Access Unit costs $395.

Racore, 170 Knowles Drive, Los Gatos, Calif. 95030. 408-374-8290.

A serial communications expansion card said to provide simultaneous support for multiple wide-area networking protocols has been announced by **Banyan Systems, Inc.**

The **Intelligent Communications Adapter** supports asynchronous, block asynchronous, IBM Synchronous Data Link Control and CCITT X.25 protocols. It is controlled by an Intel Corp. 80286 processor with 512K bytes of dedicated memory.

Included are two direct-memory access channel-controlled lines that transmit and receive data at rates of up to 64K bit/sec. and four interrupt-driven lines that operate at 19.2K bit/sec.

The 16-bit IBM Personal Computer AT bus card is compatible with servers running Banyan's Vines/286 or Vines/386 virtual network operating system software. It costs $1,495.

Banyan Systems, 115 Flanders Road, Westboro, Mass. 01581. 617-898-1000.

SDLC LAN Gateways for the IBM Personal System/2 Micro Channel bus have been introduced by **ICOT Network Systems, Inc.**

The IBM 3270 interfaces connect networked PS/2s and Personal Computers through a PS/2 Model 50, 60 or 80 to the IBM Systems Network Architecture host environment.

Each gateway supports up to 32 LU sessions on an IBM Netbios-compliant LAN. Up to 10 gateways of each type may be installed on a single LAN, the vendor said.

The SDLC LAN Gateway appears to the host as a 3274-51C cluster controller. Line speeds up to 19.2K bit/sec. over leased, switched or multidrop lines are supported. The X.25 LAN Gateway adheres to CCITT 1976, 1980 and 1984 recommendations.

Pricing ranges from $1,995 to $3,995.

ICOT, P.O. Box 91395, Mobile, Ala. 36691. 205-633-3270.

A Motorola, Inc. VMEbus-compatible local-area network interface board, the **V-Arc02**, has been announced by **Comendec Ltd.**

The product provides connection to Arcnet LANs. It is constructed around a very large-scale integration controller and functions as an intelligent slave in the system.

Interrupt level, interrupt vector, base address and addressing range are jumper-selectable. The board base address is selectable to a 4K-byte boundary, according to the vendor.

Other features include 2K bytes of dual-ported random-access memory, which provides four 512K-byte packet buffers.

The V-Arc02 connects to the Arcnet network cable via a coaxial lead to a connector.

The V-Arc02 LAN interface board costs $1,590.

Comendec, P.O. Box 280, 708 Mandrake Drive, Batavia, Ill. 60510. 312-879-7003.

Tops, a Sun Microsystems, Inc. company, has announced a hardware device that attaches desktop computers and peripherals to Apple Computer, Inc. Appletalk networks using Tops' Flashtalk.

Called **Tops Teleconnector**, the product is compatible with Appletalk networks. Flashtalk simultaneously supports personal computer-to-Macintosh communications at the standard Appletalk rate of 236K bit/sec.

Network cables attach to the Tops Teleconnector via a standard RJ11 modular phone plug.

Tops Teleconnectors cost $59, including one cable and one RJ11 jack.

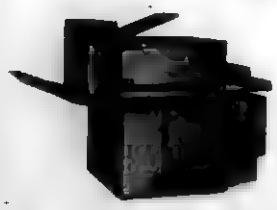
Tops, Suite 220, 2560 Ninth St., Berkeley, Calif. 94710. 415-549-5900.

Micom-Interlan has announced a protocol processor embedded with Transmission Control Protocol/Internet Protocol (TCP/IP) software for AT&T Unix System V, Release 3-based, Motorola, Inc. VMEbus-compatible systems.

Called the **NP722**, the card provides a set of hardware and software tools for TCP/IP processing. It consists of an Intel Corp. 80186 processor, 82586 local-area network coprocessor and 512K bytes of random-access memory. It processes direct memory addressing data and command transfers between the host's main memory and the network, the vendor said.

Micom, 155 Swanson Road, Boxboro, Mass. 01719. 617-263-9929.

se printers
is going on.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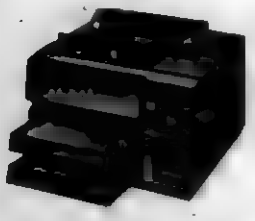
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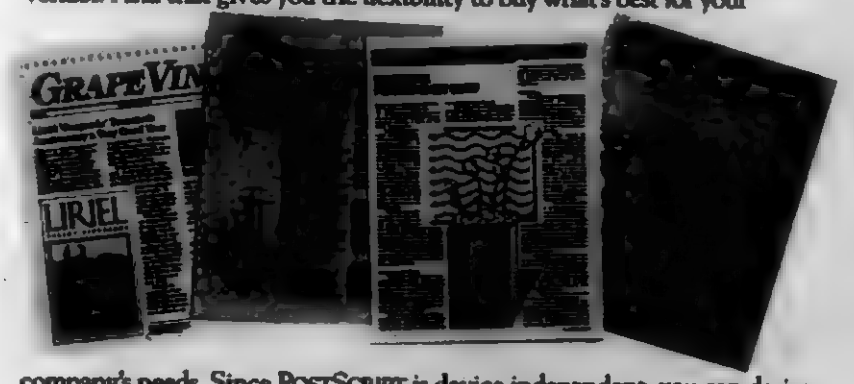
Apple Computer Inc. LaserWriter® Plus

PostScript® from Adobe Systems started a revolution in business communications. That's why you'll find PostScript in virtually every popular laser printer sold today.

PostScript, the page description language, is the unanimous choice for some very good reasons. PostScript gives you the option of printing from an IBM® PC, Macintosh™, or mini/mainframe.

With so many printers to choose from, you won't be tied to a single vendor. And that gives you the flexibility to buy what's best for your



company's needs. Since PostScript is device independent, you can design a document, then professionally print it later at a higher resolution.

You can also choose from hundreds of software programs supporting PostScript. And PostScript lets you combine text, line art, and even digitized photographs on the same page.

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Ask for a demonstration on the PostScript printer of your choice. With so many to choose from, the hardest decision you may face is which PostScript printer to buy.

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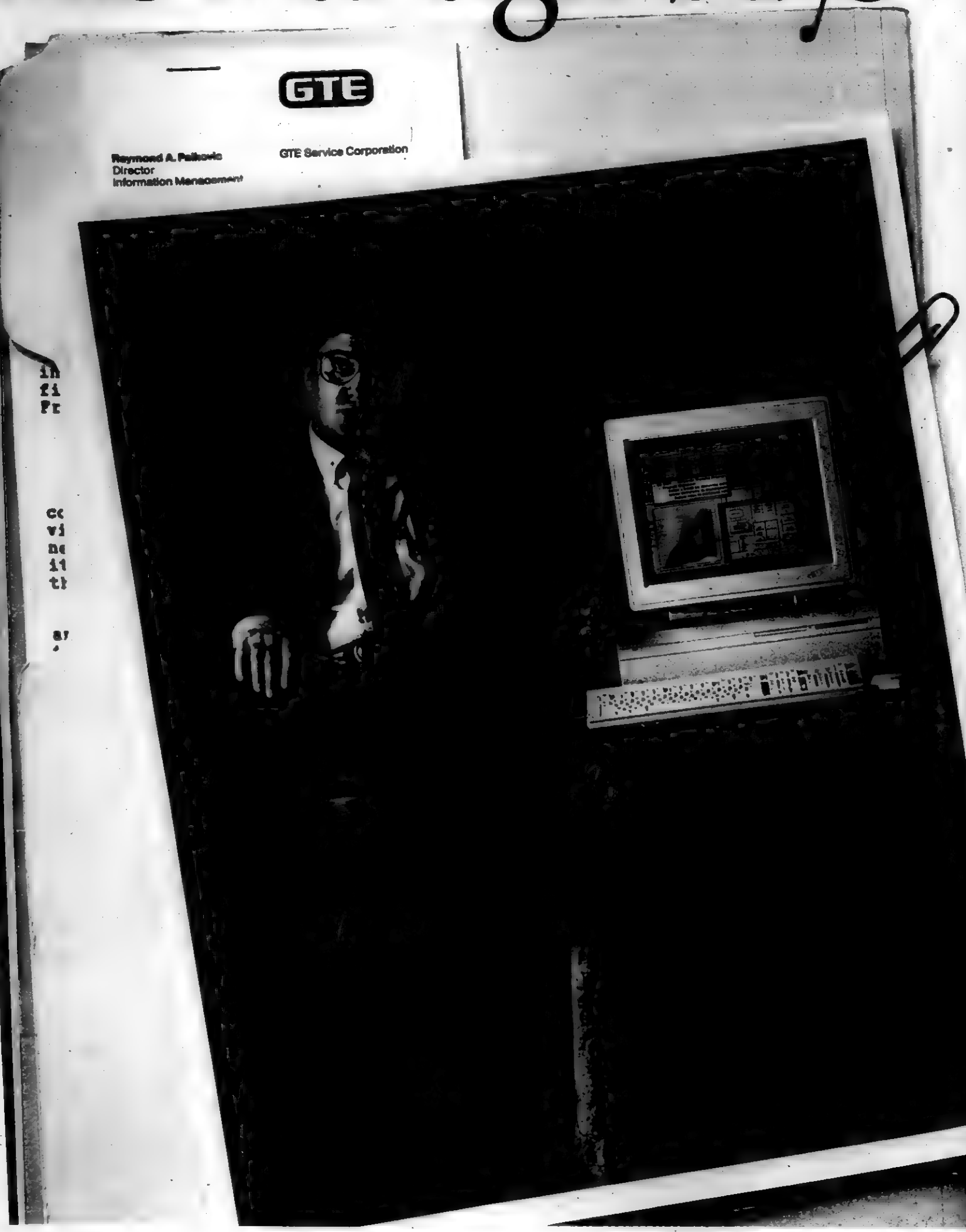

Macintosh, keeps job.

Until very recently, the above headline was the MIS equivalent of "Man Bites Dog."

Because specifying Macintosh® personal computers for the corporate desktop was an act of sheer daring. Like hang gliding, or wearing a Mohawk.

But now, if the behavior of data processing executives is any indication, we've engineered the thrills out of handing us a purchase order.

Since the introduction of the Macintosh Plus with its 1 to 4 megabytes, and most recently the faster, expandable and MS-DOS compatible SE, hundreds of the *Fortune 500* have put Macintosh to work.

At first we were hired for specific jobs that no one else can do as well. Like low cost CAD/CAM and Desktop Publishing.

But then, our other merits revealed themselves.

Such as the open architecture of the SE and the new Macintosh II.

Which lets you connect seamlessly to DEC's VAX, IBM mainframes, and other popular systems. And by putting Macintosh at the front end, you give people a more civilized way to deal with mainframes.

Another revelation is the wide array of innovative Macintosh business applications–financial analysis, word processing, databases, and, of course, graphics. Which are not only easier to learn than what's running elsewhere, but more advanced.

The point-and-click simplicity of the Macintosh graphic interface is a well known boon for the user.

But it also turns out to be a major time and money saver for you who have to train all those users. Because Macintosh has a lower training cost per desktop than any MS-DOS computer on the market.

Macintosh's simple, straightforward operating style also pays off impressively after the training is over.

In an in-depth analysis of 7 Macintosh installations in business, users consistently reported productivity gains of 15 to 25% and more.

And on top of all this, Macintosh has excellent connections.

While others are pushing the "network of the Near Future," the Macintosh network is here and now. It's called AppleTalk®.

AppleTalk is a networking protocol that is at the same time sophisticated, infinitely flexible, easy to set up. And meets ISO standards.

You can link the system together just about any way you want to–over phone lines, twisted pair, fiber optics or Ethernet.

Plug in a card and you can run AT&T UNIX™ as well as MS-DOS applications. And in fact, there are a variety of other ways to integrate Macintosh into the MS-DOS world.

Including the AppleShare™ file server which lets Macintosh and PC's link and share data.

All of which makes it a simple matter to incorporate Macintosh into any existing network.

Or, to build new ones.

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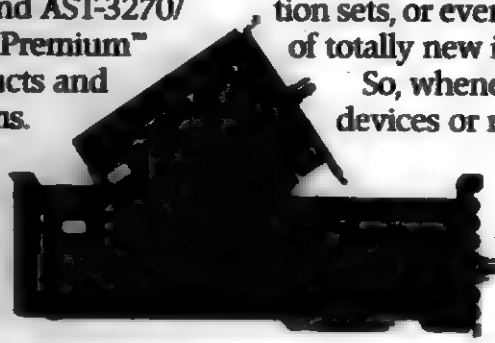
We've Decided To Call Off The Competition Between IBM® and IRMA®.

It no longer matters which 3270 emulation will become the reigning standard.

Because now you can have compatibility with both IBM and IRMA using AST's two new micro-to-mainframe communications solutions: AST-3270/CoaxIIA™ for IBM Personal System/2™ Models 50, 60 and 80; and AST-3270/CoaxII™ for AST Premium™ Computer products and PC-based systems.



Which means you can run all existing application software designed to run on either IBM or IRMA hardware today. Or take advantage of our new family of high-function, 3270 emulation software for CUT, DFT and graphics modes.

Whichever software you choose, your organization's investment will be protected from obsolescence caused by the introduction of new 3270 devices or protocols.

Because built into the AST-3270/CoaxII family are custom processors enabling future modification of existing soft-loadable instruction sets, or even the development of totally new instruction sets.

So, whenever new terminal devices or new protocols come on the market, AST will offer diskette-based microcode upgrades.

It's that simple. And a lot less trouble.

Next time you need to make a micro-to-mainframe communication choice, go for a knockout and choose to have it all from AST.

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AST Research, Inc., 2121 Alton Ave., Irvine, CA 92714-4992. Attn: M.C. COMPUTERWORLD 2/15/88

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Local-area network software

An eight-user version of the **Tapestry** network system has been announced by **Torus Systems Ltd.**

According to the vendor, Tapestry/8 offers all the functionality of regular Tapestry, including electronic mail, file sharing, printer sharing, network management and asynchronous communications. It operates with Torus's local-area network hardware, the Torus Ethernet Plus adapter or any IBM Netbios-compatible LAN hardware.

Because it uses distributed architecture, Tapestry/8 allows any or all of the personal computers to be undedicated servers. However, network configuration is centralized.

Tapestry/8 costs $795.

Torus, 240 B Twin Dolphin Drive, Redwood City, Calif. 94065. 415-594-9336.

Network management

A dial backup system designed to protect data networks from leased-line failures has been announced by **Control Resources Corp.**

Called the **Intelligent Dial Backup System**, the modular system features microprocessor-controlled common logic and an internal electronic cross-connect that automatically switches the local end of a failed leased line to any available dial facility.

Other features include bridging for backing up multipoint circuits and centralized control of multiple local or remote systems with an IBM Personal Computer.

Prices start at $11,900 for a minimum configuration of 12 local leased lines and four four-wire dial line pairs. Maximum configuration is 192 leased lines and 48 line pairs.

Control Resources, E64 Midland Ave., Paramus, N.J. 07652. 201-265-2700.

A network management system that runs on an IBM Personal System/2 with a Video Graphics Array color monitor has been introduced by **Newbridge Networks, Inc.**

4601 Mainstreet includes software that centralizes all alarm reports from Newbridge's networking products. The 4601 Mainstreet workstation extends single-site control from the digital T1 backbone network down to the individual data ports on the end user's desk top.

4601 Mainstreet connects to the private T1 network through a cable between a serial port on the PC and a port on a network node. Each node responds only to the commands addressed to it specifically.

4601 Mainstreet costs $3,895.

Newbridge Networks, 13873 Park Center, Herndon, Va. 22071. 703-834-3600.

Customer-premise equipment

A voice processing system for IBM Personal Computers has been announced by **American Telesystems Corp.**

Voicemate is said to provide integrated voice and data processing. The system consists of a voice processor on a plug-in board, the operating system, application software and documentation. The system provides voice-mail capabilities for up to 50 users and can be expanded for up to 2,000 users. Users can access the system through a Touch-Tone telephone.

Features include name addressing; user/controller password; guest access; annotate and redirect; prompting; distribution lists; and Help.

A 25-user system costs $3,995; a 50-user system costs $5,995.

American Telesystems, 7 Piedmont Center, Atlanta, Ga. 30305. 404-266-2500.

A system said to convert a desktop personal computer into an answering machine, an electronic bulletin board or a message clearing house has been announced by **NCR Corp.**

The **NCR Voice Management System** combines voice-mail capabilities with a speech processor, a personal calendar, a modem and communications management software.

The voice management system provides computerized dialing, answering and message delivery, data communications and a phone number data base for single or multiple users.

The system can be operated from a desk or remotely by a Touch-Tone phone, according to NCR.

The NCR Voice Management System operates on the vendor's PC710 and PC810 workstation family. It is priced at $695.

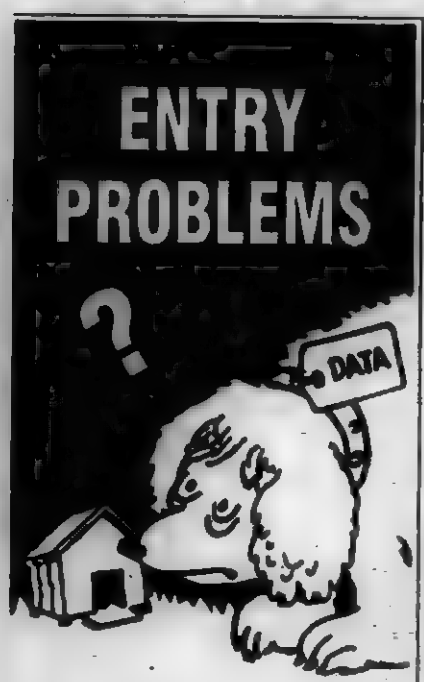
NCR, 1700 S. Patterson Blvd., Dayton, Ohio 45479. 513-445-5000.

A line of manual peripheral-sharing switches with built-in surge protection devices has been announced by **Bravo Communications, Inc.**

The **Sure/Fire** line of bidirectional switches allows configuration of two to four peripherals to be connected to one CPU or two to four CPUs to be connected to one peripheral device. The switches are available in both serial and parallel versions. According to the vendor, they protect against all forms of in-line cable power surges and spikes.

The bidirectional switches are priced at $189 each.

Bravo Communications, 4460 Partridge Court, San Jose, Calif. 95121. 408-270-4500.



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Software Services

On January 26, 1987
IBM announced the IBM 3090 Model 600E.

It uses the fastest one-million-bit memory chips in a commercially available computer and it computes up to fourteen times faster than the earlier IBM 3084.

And it's the largest general-purpose computing system installed anywhere in the world.

IBM

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On February 25, 1987
IBM announced that an experimental 4-million-bit chip had been fabricated on the same manufacturing line responsible for the world's first mass-produced one-million-bit chip.

Which makes it another great memory of the future.

IBM

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Links

Bridge Communications, a division of 3Com Corp., has announced internetwork bridges and IBM Personal Computer network servers offering such security features as network access control by port, use of the Data Encryption Standard and audit-trail information.

The **Secure Personal Communications Server/1** family provides secure network connections for IBM PCs and Personal System/2 Model 30s using Transmission Control Protocol/Internet Protocol. The IEEE 802.3 Ethernet and the Bridge Broadband Ethernet servers cost $1,795 each.

The **Secure IB** bridge products cost from $12,000 each. The Secure IB/1 links 802.3 Ethernet local-area networks with 5M bit/sec. Bridge broadband LANs. The **Secure IB/2** interconnects two Ethernets via transceiver cables or fiber-optic media.

Bridge Communications, 1345 Shorebird Way, Mountain View, Calif. 94043. 415-969-4400.

An upgraded version of **Intalk**, desktop telecommunications software for the Apple Computer, Inc. Macintosh, has been released by **Palantir**.

Version 3.0 adds a user interface that allows the windows to be resized and relocated; use of the text editor or the communications command language editor script language and the terminal at the same time; faster screen drawing; on-screen function keys; Connect protocol for Control Data Corp. mainframes; and a feature that allows the user to paste graphics and data to the clipboard of a remote Macintosh running Intalk.

Other features of Intalk include text file transfer with handshaking and filter options and terminal emulations.

Intalk 3.0 costs $195. Registered users can upgrade for $50.

Palantir, Suite 100, 12777 Jones Road, Houston, Texas 77070. 713-955-8880.

Control Data Business Centers has announced a software program said to link microcomputers to Orchestrator, its mainframe payroll, human resources and accounting services.

Called **Orchestrator Premier**, the software is a data entry and communications program that includes reporting, linking and file-translation modules. It accesses data files downloaded by the vendor's applications made available through Control Data Business Centers' data service network.

The report writer features the ability to sort, select, total and calculate. Other features include password and functional security and special edit routines.

Orchestrator Premier runs on IBM Personal Computer XTs, ATs and Personal System/2s. It costs $3,000.

Control Data Business Centers, 8100 34th Ave. S., Minneapolis, Minn. 55440. 612-853-8100.

Protocol converters

Black Box Corp. has announced the **Black Box Multiport Protocol Converter**, which is said to support up to seven parallel and serial devices simultaneously.

The base unit comes with four RS-232 serial ports that can be configured for data rates from 110 to 19.2K bit/sec., for one or two stop bits and seven or eight data bits with odd or even parity.

According to the vendor, the protocol converter allows most ASCII printers to emulate IBM 5256 printers. It also lets ASCII terminals or personal computers with terminal-emulation software emulate IBM 5291 and 5251 printers.

The base unit costs $2,749. Additional ports can be added for $335 each.

Black Box, P.O. Box 12800, Pittsburgh, Pa. 15241. 412-746-5530.

A 32-port protocol converter has been announced by **Local Data, Inc.**

The **Datalynx/3174** is said to emulate an IBM 3174 Systems Network Architecture controller. It supports up to 32 ASCII terminals.

Software that provides asynchronous pass-through capabilities is available. Asynchronous terminal users can access IBM mainframes through protocol conversion or ASCII minicomputers through a straight ASCII pass-through mode. Computer-to-computer applications are also supported.

The Datalynx/3174 protocol converter is available in four- to 32-port models. It is priced from $3,000 to $10,500.

Local Data, 2771 Plaza Del Amo, Torrance, Calif. 90503. 213-320-7126.

A multiprotocol communications adapter board for IBM Personal Computers, PC XTs, ATs and compatibles attached via coaxial cable to an IBM 3274 or 3174 cluster controller has been announced by **Network Software Associates, Inc.**

Called **Adaptcoax**, the board supports PC-to-host communications through a 3274 or 3174 using any one of three IBM Systems Network Architecture protocols: 3270, LU6.2 Advanced Program-to-Program Communications or 3770 RJE, the vendor said.

Adaptcoax plugs into a single expansion slot. The associated software runs under IBM's PC-DOS 2.0 or higher.

The Adaptcoax board costs $595.

Network Software Associates, 22982 Mill Creek, Laguna Hills, Calif. 92653. 714-768-4013.

On April 2, 1987
The IBM Personal System/2®
family of computers was announced.

So whether you do stand-alone processing, large network telecommunications, or anything in between, you felt especially good on April 3, 1987.

IBM

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On April 12, 1987
IBM made no new product announcement.

Never on Sunday.

IBM

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File servers

An upgraded version of the **386Ware** Microsoft Corp. MS-DOS server has been announced by **Logicraft, Inc.**

386Ware is said to enable up to eight concurrent users on a Digital Equipment Corp. VAX system to access personal computer software. The upgraded version includes a 1.2M-byte floppy disk drive, load balancing between servers and enhanced resolution for Lotus Development Corp.'s 1-2-3 enhanced graphics adapter drivers. In addition, the vendor said, communication speed between 386Ware and the VAX host has been doubled.

386Ware for four concurrent users costs $10,995; for eight concurrent users, it costs $15,995. A diagnostic package that provides the ability to analyze 386Ware performance costs $795.

Logicraft, 22 Cotton Road, Nashua, N.H. 03063. 603-880-0300.

Software that creates an optical disk-based file server for local-area networks has been announced by **Optical Storage Solutions, Inc.**

Called **OS-DOS 4.0**, the Microsoft Corp. MS-DOS-compatible software was designed to connect IBM Personal Computer systems with any of 11 different 5¼-, 8- or 12-in. optical drives. The connection allows the optical disk to operate as if it were a Winchester disk. Users can address the drives transparently as part of a Novell, Inc. network, the vendor said.

The software supports a 20-char. file name, 65,000 subdirectories and an unlimited number of files, the vendor said. File size may run up to 2G bytes.

OS-DOS 4.0 is priced from $1,250.

Optical Storage Solutions, 1130 D Burnett Ave., Concord, Calif. 94520. 415-825-3441.

Electronic mail

Tel-E-Mail, a Lotus Development Corp. 1-2-3 add-in said to provide unattended

***Tel-E-Mail** imports on-line data into Lotus's 1-2-3*

background communication, text editing and electronic mail capabilities, has been announced by **3X USA.**

According to the vendor, Tel-E-Mail can automatically capture and reformat or edit data from on-line information services and other remote computers without leaving 1-2-3. Users can also use Tel-E-Mail's built-in editor to create messages or modify text files without leaving 1-2-3.

Tel-E-Mail supports general-purpose data communication in stand-alone or memory-resident mode. It requires a Hayes Microcomputer Products, Inc.-compatible modem and 1-2-3 Release 2.0 or higher. Each $99 package includes two copies of Tel-E-Mail.

3X USA, 393 Park Ave., Leonia, N.J. 07605. 201-592-6874.

An enhanced version of the **PC-Tpost Electronic Mailbox** for IBM Personal Computers and Personal System/2s has been announced by **Coker Electronics.**

Version 3.0 of the software is said to feature an electronic mail bulletin board with remote mail deposit and collection capabilities; batch mail sending and receiving; electronic mail for portable PCs; a local-area network E-mail bridge; and direct mail deposit.

The PC-Tpost Electronic Mailbox is priced at $129.

Coker Electronics, 1430 Lexington Ave., San Mateo, Calif. 94402. 415-573-5515.

An enhanced version of **Chairman**, a multiuser bulletin board software package for IBM Personal Computer XTs, PC ATs and compatibles, has been announced by **Dynamic Microprocessor Associates, Inc.**

The new release is said to support data transfer rates of up to 19.2K bit/sec. and adds support for many protocols. According to the vendor, Chairman allows use of the full IBM graphic character set.

A full Chairman multiuser system costs $995. A two-line version costs $495; a single-user version costs $295.

Dynamic Microprocessor Associates, 545 Fifth Ave., New York, N.Y. 10017. 212-687-7115.

Security

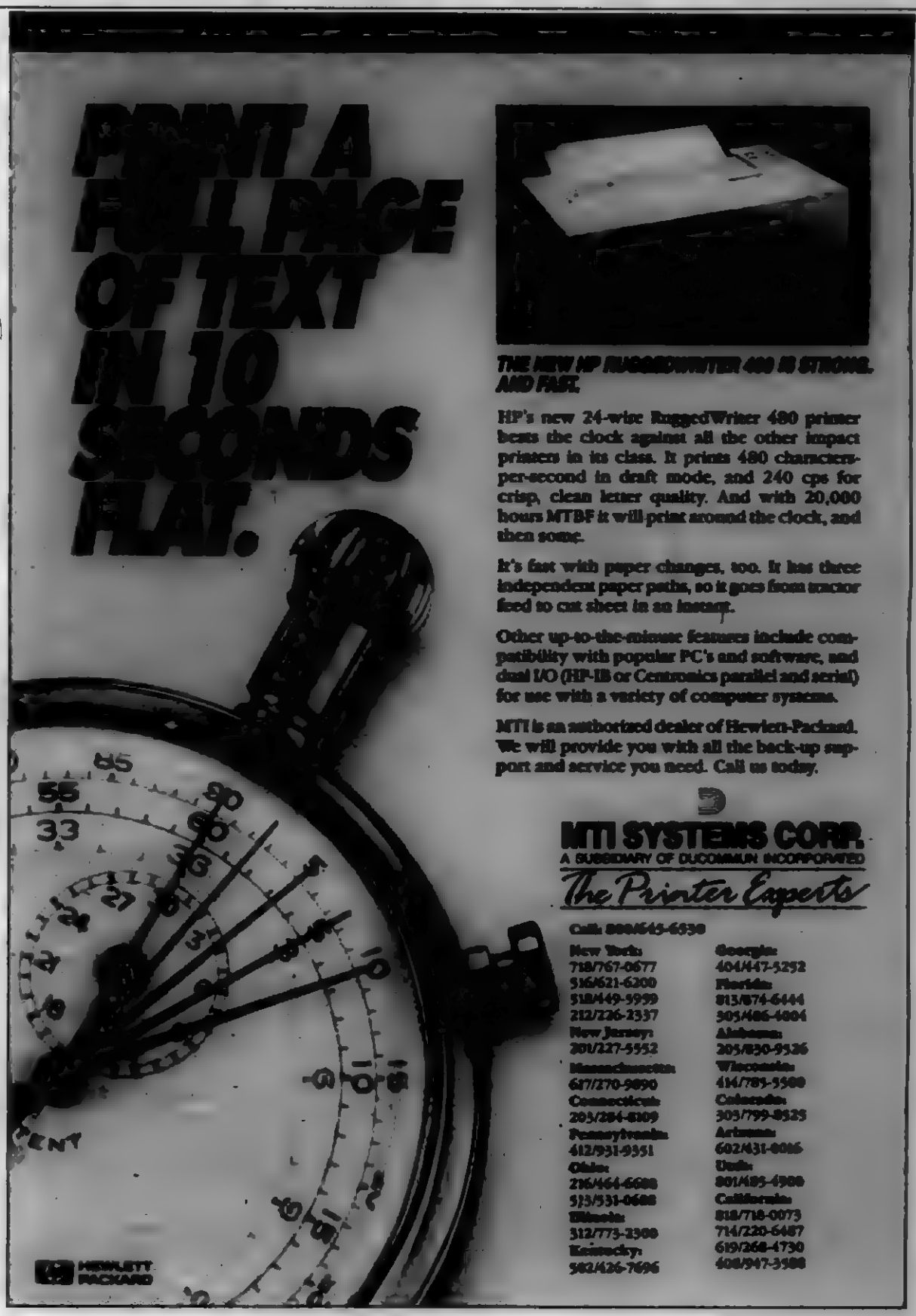
The **Onguard PC System 2400**, an uninterruptible power system said to provide 12 to 24 minutes of on-line backup for multiple local-area network file servers, has been announced by **Clary Corp.**

The Onguard PC System 2400 provides 2,800W of peak repetitive power for primary loads as well as 480VA of isolated, conditioned power for secondary loads, such as printers, modems and remote terminals. Two sets of AC power receptacles are provided for a total of five loads.

Features include true sine wave output, sealed batteries, pulse width modulation technology and a status display panel.

The Onguard PC System 2400 costs $1,490.

Clary, 320 W. Clary Ave., San Gabriel, Calif. 91776. 818-287-6111.



Modems/Multiplexers

Codex Corp. has introduced the **Codex 6228** digital transmission multiplexer, designed to operate at aggregate rates from 48K to 256K bit/sec.

According to the vendor, the Codex 6228 can support up to 56 channels in a single enclosure. It uses plug-in modules to provide loop-backs, alarms and planned integration with Codex network management systems. The multiplexer can also support multiple link control, modem tail circuits and drop-and-insert applications, the vendor said.

The Codex 6228 is priced at $4,975.

Codex also introduced the **Codex 2362** point-to-point leased-line data modem. It is compliant with CCITT V.33 and V.29 standards, operates at speeds from 4.8K to 14.4K bit/sec. and costs $3,195.

Codex, Maresfield Farm, 7 Blue Hill River Road, Canton, Mass. 02021. 617-364-2000.

An RS-232 multiplexer has been announced by **Western Telematic, Inc.**

The **DM-41** features four asynchronous channels that simultaneously communicate at speeds to 9.6K bit/sec. It is said to be capable of transmitting up to 5,000 ft over twisted-pair telephone wire. The multiplexer is 1 in. thick and was designed to mount on walls or behind workstations.

The DM-41 multiplexer costs $295.

Western Telematic, 5 Sterling, Irvine, Calif. 92718. 714-586-9950.

A data communications exchange unit designed to allow peripheral sharing, computer-to-computer communication and buffering of print data has been announced by **Bay Technical Associates, Inc.**

The device, called the **Data Communications Exchange System24**, features a 16-bit CPU. It is customized by combinations of serial and parallel ports installed in four-port I/O modules to a maximum of 24 ports. The standard 512K-byte buffer is expandable to 4.5M bytes. It operates in full-duplex mode.

The device costs from $895 to $1,895.

Bay Technical Associates, 200 N. Second St., Bay St. Louis, Mo. 39520. 601-467-8231.

A device said to link asynchronous data terminals to host computers up to 10,000 cable feet away has been introduced by **Teltone Corp.**

The **T-Line-3** transmits full-duplex data at 19.2K bit/sec. on spare telephone wire pairs, the vendor said.

The T-Line-3 units cost about $275 per channel.

Teltone, 10801-120th Ave. N.E., Kirkland, Wash. 98033. 206-827-9626.

A facsimile modem card that allows IBM Personal Computers and compatibles to communicate with Group 2 and 3 facsimile machines has been announced by **Ricoh Corp.**

The **Imagecard** is said to allow facsimiles to be sent or received as a background task so the PC can be used for other applications. Incoming messages are automatically saved to disk.

Other features include automatic dialing, automatic error checking and generation of reports for traffic control and management. Software to drive the Imagecard is included with the board.

The Imagecard costs $1,175.

Ricoh, 5 Dedrick Place, West Caldwell, N.J. 07006. 201-882-2000.

A modem simulator for short-distance local applications has been announced by **Teleprocessing Products, Inc.**

The **TP-235** features a V.35 interface and can support data rates up to 1.54M bit/sec. with its optional T1 feature, the vendor said. It can be used either in continuous or controlled carrier systems.

Other features include front panel indicators and a digital data loop-back capability.

The TP-235 modem simulator with T1 option costs $595.

Teleprocessing Products, Building 7K, 4565 E. Industrial St., Simi Valley, Calif. 93063. 805-522-8147.

A V.32 9.6K bit/sec. modem has been announced by **Cermetek Microelectronics, Inc.**

The **9600FR** is capable of operating at 9.6K and 4.8K bit/sec. using V.32 technology, as well as 2,400, 1,200 and 300 bit/sec. using V.22 bis, Bell 212A and 103. It also includes options for X.25 and Microcom Networking Protocol.

The 9600FR costs $1,995.

Cermetek Microelectronics, 1308 Borregas Ave., Sunnyvale, Calif. 95088. 408-752-5000.

Cabling

A card-slot unit that supports unshielded twisted-pair, fiber-optic and RG-58 coaxial cable as well as standard AUI transceiver connections in Ethernet networks has been introduced by **Cabletron Systems, Inc.**

Called the **Multimedia Access Center**, the unit is available with either two- or eight-digit card slots. Interface cards can be mixed within the access center or the unit can make up all of a single media interface.

In addition to supporting twisted-pair phone wire and providing the ability to mix media interfaces, the unit offers such software capabilities as remote network management, redundancy and self-diagnostics. The Multimedia Access Center repeats and self-configures each port regardless of the media interface. The repeater portion conforms to IEEE 802.3 specifications. Each port supports a 10M bit/sec. data rate, the vendor said.

Pricing depends on configuration. In general, the cost per connection is $495 for twisted-pair and $890 for fiber-optic cabling.

Cabletron, P.O. Box 6257, Rochester, N.H. 03867. 603-332-9400.

On April 16, 1987
IBM announced the world's
first thin-film superconducting device
that works at practical temperatures.

This advance followed
the breakthrough by two IBM scientists
whose discovery the previous year
sparked a new era
in superconductor research
throughout the world.

IBM

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On May 11, 1987
IBM announced the
newest release of Database 2,
the leading relational database program.

It allows people who are
not sophisticated in the ways of computers
to get sophisticated answers
out of their computers.

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SYSTEMS & PERIPHERALS

HARD TALK

James Connolly

The impact of nonimpact

The computer industry, like the automobile business, is a field in which selected technologies acquire the label of "hot product."

Those are the features and products that make a splash when first introduced — or at least redirected for a particular market segment — even though comparable technologies have been making low-key but steady gains elsewhere in the industry.

Such is the case with nonimpact printing. The splash for laser and other nonimpact printers came a couple of years ago when manufacturers such as Canon drove down the price of copier-based laser technology to a point that systems vendors such as Hewlett-Packard could offer lasers as relatively affordable peripherals for personal computers.

Since that time, much of the attention devoted to lasers has focused on how they work with PCs.

However, lasers actually predate PCs and have been making an impact on even the largest computing environments since companies such as IBM

Continued on page 73

IBM 3090 user spiced with TLC

Extra care taken for university's Model 120E vectorization test site

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — Many times, those who are first in line to install a new computer get a little more attention. That appears to have been the case at the University of Illinois at Chicago (UIC), which installed the first IBM 3090 Model 120E last September.

The system, which is packaged with an IBM Vector Facility, is to be a testing ground for the vectorization of scientific problems that were previously solved through linear equations.

The first sign that IBM would give the site extra attention was when the company sent an IBM fellow to the public university in August 1987. The fellow, whose salary will be paid by IBM for one year, is helping scientists on the campus make the transition from scalar to vectorized code, said Thomas H. Brown, UIC's computer center director.

Such special arrangements between IBM and the academic community are not unusual. A Model 120E now being installed at North Dakota State University in Fargo includes a vector facility that IBM provided in exchange for the future development of vectorized chemical applications. IBM plans to remarket those vector applications to other users, which will not be done with the results of UIC's work.

Another sign of IBM's attention to detail in the UIC installation was the way IBM resolved a shipping error. Installation at UIC's computing center, located just west of downtown Chicago, came to a grinding halt the morning of Sept. 19, when a critical 400-lb. piece of cable was discovered missing. Even though it was a Saturday, IBM chartered a small plane to fly a duplicate cable from its Poughkeepsie, N.Y., mainframe facility to the computing center.

The need was critical, Brown said, since the university's 3081 Model K had to be unplugged to make way for the Model 120E. "Running in parallel is a luxury we've rarely been able to afford," he said.

Previously, the IBM 3081 Model K ran all on-line VM/CMS applications in one of its CPUs while running all MVS batch applications in its second CPU. After the Model 120E's installation, the 3081 was devoted to on-line applications only, boosting the number of users on-line from 450 to 900. The IBM team picked up the installation in mid-afternoon, and the rest went

Continued on page 73

Vaxstation foretells future?

BY STANLEY GIBSON
CW STAFF

The multiprocessing that was introduced with the Digital Equipment Corp. Vaxstation 8000 recently will likely lead the way as the first of several multiprocessor VAXs to be introduced by DEC this year, according to analysts.

"Multiprocessing is the jewel in the crown of Digital," said Marty Gruhn, president of Tempe, Ariz.-based research firm The Sierra Group. After the late spring announcement of Polar Star, a widely discussed peer multiprocessing mainframe-class VAX, DEC will introduce multiprocessing as a layer over all its product lines, Gruhn said.

VMS 5.0, which DEC reportedly will announce with Polar Star, is necessary to implement peer multiprocessing, but application software must be optimized in order for the benefits of

Continued on page 72

Data View

Big boxes, big disks

Large IBM mainframes support an average of up to 65.5G bytes of disk storage

INFORMATION PROVIDED BY COMPUTER INTELLIGENCE
CW CHART

Elxsi hybrid system debuts

BY J. A. SAVAGE
CW STAFF

SAN FRANCISCO — In a move to woo the commercial marketplace, Elxsi Corp. last week introduced a minisupercomputer called the Pegasus Superframe.

The system, set to be available late this year, is based on CPUs that process 25 million in-

Continued on page 70

Inside

- Charles River Data adds multiprocessing version of supermicro, claims throughput tripled. Page 72.
- Accus releases 30 page/min. laser printer for shared-resource and word processing environments. Page 80.

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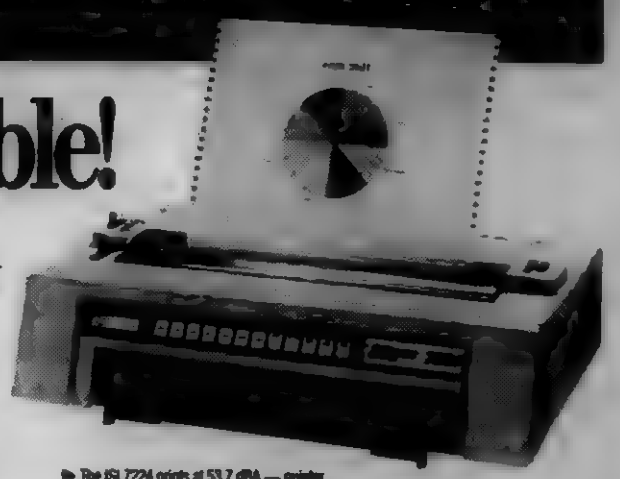

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7224

Speeds reach 400 cps draft. You can also print graphics, bar codes, and oversize characters without GDDM, BGU, or other special software. Output can be in black or up to eight colors.

Fully integrated (no box!), the ISI 7224 connects directly to IBM 3174/3274/3276 controllers or S/3X twinaxial cable.

Forms-handling advantages include automatic paper parking, no-waste demand-document tear-off, and a straight path for stiff forms. No extra-cost gadgets are required.

Extra features and all, the ISI 7224 costs much less than its IBM counterpart.

For more information, call 1-800-544-4672 (in Michigan, 313/769-5900). Or write.

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A concept unlike anything you've ever seen before. And a concept you've needed for quite some time.

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In today's multi-technology environments, even the best of today's traditional schemes can't keep pace with user demands for comprehensive network reliability, serviceability, and growth. That's because no single system has ever been able to address universal network management requirements.

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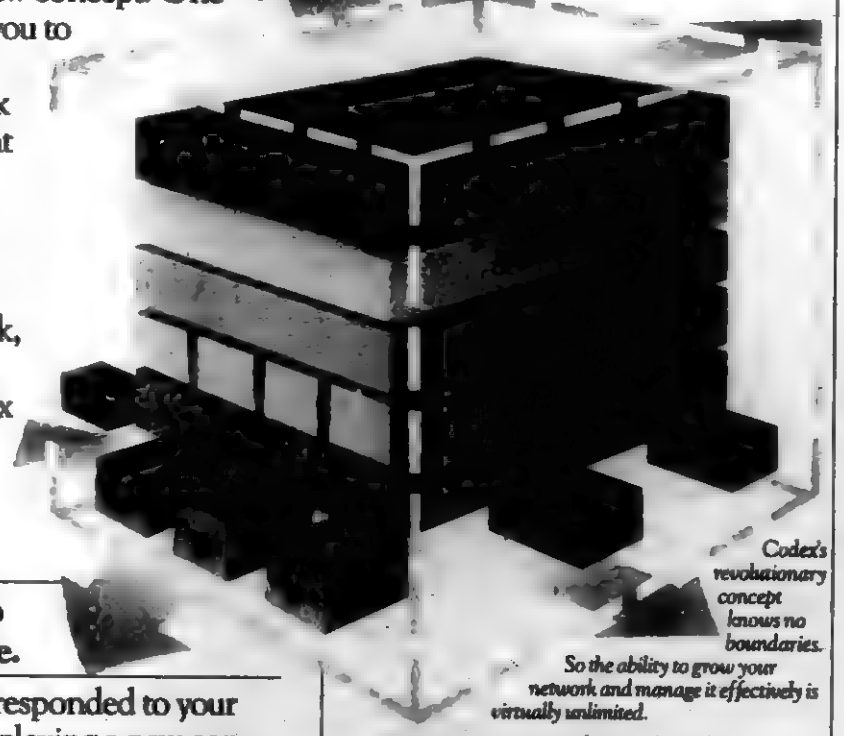
To get maximum network performance in these complex environments, a new level of integration is required. Which requires a new concept. One that allows you to address current network management needs, yet ensures you of optimum control over your network, no matter how complex it may be, or may become in the future.

Codex to the Rescue.

We've responded to your needs by employing a new concept to optimize your overall network's performance.

The result is a revolutionary system that's modular, incredibly easy to use, and offers an extraordinary user interface that provides an integrated systems view of your entire network.

To accomplish this, we've moved from today's proprietary era to our new direction for the entire network management industry. By creating a system based on user demands for open architecture in a standardized environment.



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A System Architected for Growth.

Our new system is designed to incorporate the future, accommodating new networking applications as they are developed. That's because it's based on open architecture technology, consistent with emerging OSI standards. Which provides unmatched user flexibility, and unmatched potential for growth.

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Sales offices in more than 40 countries worldwide. In Europe call 32-2-4608980, in Canada 416-797-5700, in the Far East 852-5-666706 (in Japan 81-3-5848300), in the Americas 617-364-2000.

introducing innovative roducts. Now it's time for k management concept.

management concept, all network devices are treated consistently. In fact, it defines a relationship between all network devices and the management system – a relationship never before established. So one system will handle all architected devices, as well as give you the structure to manage unarchitected devices.

Standards Are the Roadmap.

As protocols and applications proliferate, the demand for standardization is greater than ever before. Everyone is talking about standards – they're critical to the future because they facilitate integration, choice and flexibility.

As the leading proponent of vendor-independent networking, Codex has always been an active

No matter what your networking needs, Codex has the solutions.

contributor to the evolution of network management standards. So naturally, we designed our integrated network management system to be fully consistent with emerging OSI standards.

True Integration Is Here.

With our new concept, you'll be able to get one consistent view of the entire network topology. With a single management system you'll have the potential to manage and control your entire network – statistical and time division multiplexers, T1 muxes, modems, X.25 concentrators – and other network devices. And that includes access to your computing equipment.

Our new network management concept allows you to control your network no matter how far it reaches.

And we've engineered a non-proprietary technology that can work with other systems – in conjunction with IBM's NetView, for example – to give users truly integrated control of their network.

This level of control allows you to *take decisive corrective action* to optimize network performance. Because the information and the management commands for your entire network are integrated and provide a unified database, one system provides full problem, fault, event and performance management – with extensive diagnostic, restoral, reconfiguration and reporting capabilities to maximize overall network availability.

Call For More Information.

Obviously, there's lots more to tell than this space allows. To obtain a free brochure outlining our revolutionary approach to network management, call **1-800-426-1212, Ext. 246.** In Europe, call 32-2-6608980. Or write to Codex Corporation Dept. 707-46, Maresfield Farm, 7 Blue Hill River Road, Canton, MA 02021-1097. We promise it will change the way you look at network management forever.

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The Networking Experts

Visit Codex at Interface, March 28-31, Booth #1584.

Multiflow extends minisuper line with high-, low-end units

DALLAS — Multiflow Computer, Inc. built on the base it established last year in the minisupercomputer market with last week's introduction of high- and low-end systems.

The Trace 7/100 and Trace 14/200, which were announced here at the Uniforum show, bracket the performance of Multiflow's existing Trace 7/200 system. Like the Trace 7/200, the new systems are based on Multiflow's Trace Scheduling compacting compiler technology, which combines up to seven or 14 32-bit operations into a very long-instruction word for processing in a single clock cycle.

Multiflow said 19 Trace 7/200 systems were installed by the end of 1987, with most of the computers being used in applications such as electrical and mechanical design analysis, fluid dynamics and computational chemistry.

The high-end Trace 14/200 provides twice the performance of the Trace 7/200 and can initiate up to 14 operations with a 512-bit instruction word, according to Multiflow Vice-President of Marketing and Sales Robert Smith.

Peak performance of 30 MFLOPS

Smith claimed the Trace 14/200 has a peak performance rating of 30 million floating-point operations per second (MFLOPS) and 10 MFLOPS when running the Linpack benchmark. It costs $399,500 with 32M bytes of memory, 1.1G bytes of disk storage, Unix and other peripherals.

Smith, who pitted the Multiflow product line against that of Convex Computer Corp., said applications that lend themselves to parallelism benefit the most from Trace Scheduling but that some benefits are available for scalar processing.

In comparing Multiflow systems to the Cydrome, Inc. Cydra 5 data-flow computer, which was recently announced by Cydrome and Prime Computer, Inc., Smith claimed price advantages for the Multiflow computers even in areas in which the Cydra 5 and Trace systems' performance match.

The Trace 7/100 is the entry-level Multiflow system and has a base price of $197,500. It was designed to provide two-thirds the peak performance of the Trace 7/200.

Elxsi

CONTINUED FROM PAGE 67

structions per second (MIPS) and 10 million floating-point operations per second (MFLOPS), according to the vendor. The company said its performance claims are based on the the so-called Digital Equipment Corp. VAX MIPS measurement, in which a DEC VAX-11/780 is rated at 1 MIPS, and the Linpack 64-bit 10-by-10 matrix for MFLOPS. Elxsi's earlier System 6400 CPUs were rated at 7 MIPS.

A basic Pegasus system with a Model 6160 CPU, 32M bytes of memory, 823M bytes of storage, tape and operating system software is priced at $695,000. Fully configured, with 10 CPUs, a 250-MIPS, 100-MFLOPS Pegasus costs $4 million.

According to Elxsi, when fully configured, Pegasus has a greater transaction speed than IBM 3090 mainframes or DEC VAX 8800s for one-fifth the price.

The Model 6160 is intended to expand sales in commercial, industrial and defense applications, according to Elxsi. Elxsi's installed base is in the "low 80s," said David Dunlap, vice-president of finance and administration. "It's not as much as expected."

John Miles, director of computing and communication services at California State University in Sacramento, said he is "definitely interested in upgrading" his two Model 6410s. "Elxsi's support, both software and hardware, has exceeded our idea of the norm," Miles added.

On May 19, 1987
IBM announced
four new IBM 4381 processors.

They offer a
30% performance improvement
over previous models
and include a one-megabit chip
that can "read" a 2,200-page
document in one second.

Yes, 2,200 pages.

IBM

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On June 16, 1987
IBM made the largest telecommunications
software announcement in its history.

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program-to-program communications
over IBM Systems Network Architecture (SNA)
between IBM System/370 operating systems,
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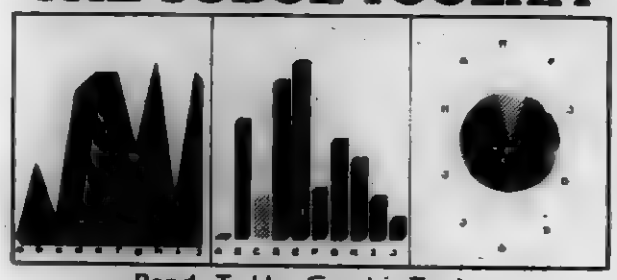

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Sony readies News for U.S. channels

BY NELL MARGOLIS
CW STAFF

NEW YORK — Undaunted by earlier failed attempts, Sony Corp. is again bidding to enter the U.S. computer market — this time with a recently unveiled Unix-based 32-bit engineering workstation.

Called Net Work Station, or News, the latest Sony is hard to distinguish from the offerings of Sun Microsystems, Inc., Apollo Computer, Inc. and Hewlett-Packard Co., which together command some 70% of the $2 billion U.S. workstation market. Sony is neither denying nor bemoaning this sameness; to the contrary, the company is capitalizing on it.

"The boxes themselves are very general-purpose. That's one of their biggest advantages — they can do whatever you want them to," said Richard Shah, western regional manager of Sony Microsystems Co., the Palo Alto, Calif.-based Sony subsidiary formed to market the News line.

News "is the closest thing yet to a generic workstation," said Anthony I. Wasserman, president of Interactive Development Environments, a San Francisco-based computer-aided software engineering (CASE) manufacturer and one of six software companies that have signed on as strategic allies of the fledgling Sony Microsystems.

Standards of living

From the Motorola, Inc. microprocessor to the University of California at Berkeley Unix 4.2 operating system to the Transmission Control Protocol/Internet Protocol to the windows, Wasserman said, what you see is the product of "a company that said, 'Let's build a machine that lives on standards.' "

Sony is initially targeting its workstations at the CASE and desktop publishing industries — niches in which, according to Shah, standardization has particular end-user appeal.

Slated for April shipment, the first editions of News are the NWS-711, priced at $3,995, and the NWS-841, which costs $19,900. The two work in tandem, with the NWS-841 acting as a file server to the diskless NWS-711s. The NWS-841, Shah said, features a dual-processor architecture that substantially speeds I/O. Sony Microsystems, which will manufacture its workstations in California and sell them through OEMs and value-added resellers, is also banking on its household name to boost it into the U.S. computer market.

Even with standardization and software partners thrown in, that may not be enough, according to Robert Herwick, an analyst at Hambrecht & Quist, Inc. in San Francisco.

"They failed in the PC business, which is a little more forgiving than the workstation market," Herwick pointed out. What's more, he said, "The $500 to $1,000 you save by choosing Sony over Sun just isn't a big enough price break, especially when you add in that Sun offers a wide range of systems and connectivity."

Qantel adds high-end minis

HAYWARD, Calif. — Qantel Business Systems, Inc. recently continued the replacement of its line of small business systems with the introduction of three minicomputers.

The high-end announcements followed the company's 1987 introduction of the System 43 desktop multiuser system and the low-end System 15, which the company billed as an IBM Personal Computer AT-compatible model designed to migrate users from single-user PC environments to multiuser systems based on Qantel's Best/AOS operating system.

The new models — the System 65, 68 and 88 — were designed to support between 20 and 50 terminals in typical environments, according to Qantel.

The System 65 is 1.4 times faster than the earlier System 55 and has twice the basic memory, with a memory range of 4M to 16M bytes, according to the vendor. The System 65 is based on Qantel's single-board Q32 processor and supports up to three disk drives with capacities up to 160M bytes each as well as a quarter-inch tape drive.

Added features

The System 68 also is based on the Q32 but features 8M to 16M bytes of memory, optional half-inch reel and cartridge tape drives and an optional peripheral expansion cabinet for mounting disk drives of up to 430M bytes of memory.

The System 88 is based on Qantel's multiboard Q299 processor and is available with 8M to 16M bytes of memory. The System 68 supports 25 to 30 users in a typical environment, and the System 88 supports 50, according to Qantel.

The systems are available now at prices ranging from $50,000 to $200,000.

Qantel, which sells its systems through a direct sales force and value-added dealers, is targeting vertical markets with the systems and its proprietary software, which includes manufacturing resource planning, retail and hospitality and leisure software.

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Supermicro throughput tripled

Charles River adds multiprocessing versions to Universe line

BY STANLEY GIBSON
CW STAFF

FRAMINGHAM, Mass. — Tripling the throughput of its systems, Charles River Data Systems, Inc. recently introduced multiprocessing for its Universe family of supermicrocomputers.

The multiprocessing is offered in two modes: peer multiprocessing, in which up to seven processors execute a program together; and auxiliary multiprocessing, in which one processor can be dedicated to a single task separate from the other processors.

Both are supported under Release 8 of Charles River's Unos operating system, which was also announced recently.

Richard Swee, Charles River's vice-president of engineering, said no applications or operating system changes are required for multiprocessing.

The multiprocessors are available in two configurations: one with the Motorola, Inc. 68020 microprocessor and another with the Motorola 68030.

MIPS rating

A four-processor 68020-based CPU was rated by Charles River at 12 million instructions per second (MIPS), although larger systems have yet to be benchmarked, Swee said. Each 68020-based CPU is rated at 3.5 MIPS, he added. A 68030-based system is rated at 5 MIPS per processor, but 68030-based systems have not been tested completely, according to Swee.

The systems, which will be sold through OEMs and value-added resellers, are intended primarily for factory process control, transaction processing, data entry and teleprocessing applications.

A four-processor version has a suggested price of about $50,000 and includes 140M bytes of disk storage, 2M bytes of memory, an operating system license and a tape drive, according to the vendor.

Solid-state system aimed at Unisys

MILPITAS, Calif. — Zitel Corp. recently targeted Unisys Corp. mainframe users with a semiconductor-based storage subsystem designed to provide faster I/O than an electromechanical disk subsystem can.

Zitel claimed its Ramdisk/ALX holds a fourfold throughput advantage in comparisons with Unisys thin-film disk drives while providing up to 1G byte of on-line solid-state storage.

The Ramdisk/ALX is intended for use with Unisys A, B and V series mainframes and medium-scale systems in on-line and batch applications in industries such as banking, insurance, health care and manufacturing as well as in government agencies. The subsystem is based on 1M-bit dynamic random-access memory chips and connects to standard sequential Unisys Data Link Processors.

Zitel said the Ramdisk/ALX appears to the host as a disk drive and can process more than 1,200 I/Os per second.

The subsystem features up to eight ports, battery backup, single- and double-bit error detection and automatic error correction, according to Zitel.

The company also claimed that the Ramdisk/ALX can extend the life of installed magnetic disks by reducing actuator activity. Prices start at $159,000 for the Ramdisk/ALX with 128M bytes of storage. A 1G-byte system starts at $610,000.

Vaxstation

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multiprocessing to be realized, she said.

The Vaxstation 8000 is built around two buses — the VAXBI bus and another proprietary graphics bus — both of which operate at the same speed. A series of graphics processors are attached to the graphics bus, and a VAX 8250 and three DEC Microvax II processors are attached to the VAXBI bus. One Microvax II serves as a tape and Ethernet controller, another acts as a disk controller, and the third controls the graphics bus interface.

"It keeps traffic off the 8250 CPU and spreads the power around," said Ron Ginger, product manager for the Vaxstation 8000. Ginger pointed out that this is not the first use of the Microvax II chip as a controller; it is also used in the Ethernet controller in 8000 series VAXa.

Maintains speed

Although the division of labor among several different processors means that the figures for millions of instructions per second will never be as high as single-processor machines from competitors, the Vaxstation 8000 has the benefit of not losing any performance when more than one task needs to be done, Ginger explained.

Although Ginger declined to elaborate on future versions of the high-end Vaxstation, some analysts said that adding more powerful processors to the system's VAXBI bus could be readily done.

The VAX 8250 could be replaced with a more powerful VAX processor. In addition, the CMOS-based Microvax 3000-type processors could take the place of Microvax IIs, according to Craig Symonds, an analyst with the Gartner Group, Inc. in Stamford, Conn.

"This product was way out of sync. The 8250 was too small, but they needed something to attach to the BI bus," said John Logan of The Yankee Group in Boston. He suggested that the VAX 8250 will be replaced with another processor as soon as it is appropriate.

Logan said DEC has indicated to him that a future implementation of the Vaxstation 8000 could be as a server on a network. "Who else on the market has something like this? It's not an impractical solution," he added.

"Digital loves to use a Cray on a network. They are intrigued by the server concept," Logan continued, citing the use of DEC's gateway to Cray Research, Inc. supercomputers. DEC "is not the leader in single-user systems, and they won't be the leader," he added.

Ginger said the system can be used as a two-dimensional graphics server now, thanks to its implementation of the X Window standard. An X Window specification for three-dimensional work has not been made yet, but when it is, the workstation will implement it, Ginger said.

Further describing the Vaxstation 8000's architecture, Ginger said the VAXBI bus was necessary because a speed of 13.3M byte/sec., as well as the larger address space of the bus, was needed.

Microvax IIs were selected as controllers because of their ready availability at DEC and because of the manufacturer's familiarity in using them for various tasks. In addition, the VAXBI protocols assume that intelligent, autonomous devices are attached, Ginger said.

A similar bus and processor arrangement can be made wherever better performance can be achieved by separating work into several kinds of tasks, Ginger said. As to whether or not users can expect to see such implementations in the future, he said, "Stay tuned."

On June 16, 1987
IBM also announced enhancements
to the IBM Token-Ring local area network
designed to help computer users
exchange information.

Which is just one reason
why our local area network
has become one of the most popular local
networks available today.

And, of course, it's managed with
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On July 20, 1987
IBM began volume shipments of the
mid-range IBM 9370 Information System
two months ahead of schedule.

So now a broad set of users can
enjoy the power of the popular
IBM System/370 architecture
even sooner than expected.

IBM

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Connolly

FROM PAGE 67

and Xerox announced mainframe-class lasers more than a decade ago.

What's happening today is that nonimpact printers are having a major impact on all segments of the corporate computing operation and are steadily replacing line printers.

Perhaps the most significant developments outside of the PC environment have been in the mid-range of the printer market, in which the appearance of nonimpact printers — whether based on laser, ion deposition or other technology — is the norm rather than the exception.

Impact needed

Numerous MIS managers report that they are currently producing the majority of their reports on nonimpact printers. Those managers acknowledge, however, that they likely will always need impact printers — spewing out noise along with their green-and-white fanfold paper — particularly for multipart forms.

But those managers are relying more and more on the nonimpact printers that are producing 30 to 100 pages per minute with increased flexibility in areas such as paper handling and graphics, and with rapidly improving price/performance levels.

The question is, Will anybody miss that green-and-white paper and the chug-chug of a line printer?

Connolly is *Computerworld*'s senior editor, systems & peripherals.

Pixar adds simplified imaging computer

SAN RAFAEL, Calif. — Pixar recently introduced a reengineered version of its Pixar Image Computer with limited expansion capability in an attempt to expand its market niche.

According to Pixar, the Pixar II is a high-resolution imaging computer designed for use in medical, remote sensing and mapping and animation applications.

The Pixar II, priced at $29,500, includes 12M bytes of memory and software. The original Pixar, introduced in 1986, costs $49,000.

The Pixar II has two slots for memory expansion. A 12M-byte board costs $17,500, and a 48M-byte board is available for $35,000.

The original Pixar can be expanded to contain 192M bytes. Both computers run at 40 million instructions per second, and both computers' pixels are 48 bits deep, Pixar claimed.

Multiple Chaps

The Pixar II is available with one or two channel processors; the original Pixar can be expanded to three channel processors. The channel processors, called Chaps, are composed of four parallel processors.

Pixar also announced that a video merge capability option to align or compare two images will be available this summer for $28,000.

It includes 12M bytes of memory. The merge option is designed to superimpose images without altering the data.

Both the Pixar and the Pixar II must be attached to a host made by Sun Microsystems, Inc., Symbolics, Inc., Digital Equipment Corp., Silicon Graphics, Inc. or Apollo Computer, Inc.

3090

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flawlessly, Brown said.

The Model 120E's three primary jobs are to run vector equations; to support all university MVS batch applications, primarily those for scientific research; and to support the university library's electronic card catalog application. To do those jobs, UIC installed a Model 120E with 32M bytes of memory and 16 channels. The vector facility is mounted in a cabinet that forms a T figure against the main processor cabinets.

The 8 million instructions per second (MIPS) Model 120E serves as an in-house vector processing resource for the university's faculty and its 25,000 students.

Until now, vector equations written in Fortran had been run at the University of Illinois at Champaign-Urbana and a supercomputing center at Cornell University sponsored by IBM, where UIC has visiting rights. Using the national Bitnet network, UIC faculty have been able to run their programs at the supercomputer facilities by dialing in code from their Chicago offices.

Price a priority

Pricing was a consideration in obtaining the Model 120E for the UIC campus. It is the entry-level machine in the 3090 family, but since it is water-cooled, users can build up to a Model 150E, 180E or 200E through field upgrades.

"We've decided to buy capacity in the smallest increments possible," Brown explained. "In two to three years, we may need a Model 150. But if I can postpone that buying decision, it will be cheaper at that time." The university computing center currently has a staff of 55 and a $3 million budget, much of which is used for personnel costs.

Although UIC did not receive any special discount in exchange for development work, the Model 120E was bought at the university rate of 20% less than IBM list price, Brown said. UIC was also pleased when IBM moved up the installation date from December 1987.

UIC Chancellor *Donald Langenberg, Brown with Model 120E*

In the planning stage, UIC had considered the purchase of a used IBM 3081 before deciding to buy the Model 120E. A second 3081 would have matched UIC's existing 64M-byte 3081 Model K. Eventually, Brown chose the purchase of the Model 120E because it offered more flexibility and better price/performance.

"Getting another 3081 wouldn't have given us the vector capability," Brown concluded. "It was 50% bigger in size than the 120E, and there was no upgrade path to other 3090 machines." The Model 120E is linked to the older IBM 3081 via one channel-to-channel connector.

Brown said the Model 120E installation was not the first instance in which UIC played a role in the early installation of IBM products. The university was a beta-test site for early releases of MVS, he said.

UIC maintains a relationship with Cornell's IBM 3090 supercomputer project and with a National Supercomputing Center at the University of Illinois at Champaign-Urbana.

On August 4, 1987
IBM announced a computer
that's twice as fast as the original
IBM Personal Computer
and 40% smaller.

A fact that makes
the IBM Personal System/2® Model 25
an intelligent choice
for businesspeople on the rise
or students on a budget.

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On September 1, 1987
IBM announced the IBM 3380 Model K
disk storage unit, the most
advanced in the industry.

It can store 7.5 billion characters
of information—a capacity 1,500 times
that of the original IBM 305 RAMAC
system of the 1950s.

And it can do it at less cost—
about 700 times less.

IBM

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NEW PRODUCTS

Turnkey systems

Masscomp recently introduced three industrial measurement system packages that integrate data acquisition hardware and software under its Laboratory Workbench user interface.

The systems include a 32-bit Motorola, Inc. MC68020 CPU with floating-point accelerator, an 8M-byte parity memory module and a 318M-byte 5¼-in. Winchester disk drive. Software includes an imaging graphics subsystem and a Unix-compatible operating system.

The single-processor **IMS 5550-01**, priced at $95,475, includes a 16-channel, 12-bit analog-to-digital converter, expandable to 256 channels.

The dual-processor **IMS 5700-01**, priced at $158,792, includes a synchronous memory interconnect running at 26M byte/sec. that links up to four processors, system memory and two optional vector accelerators.

Masscomp also announced two Signal Analysis System packages priced from $133,300.

Masscomp, One Technology Park, Westford, Mass. 01886. 617-692-6200.

Processors

Scientific Computer Systems Corp. has announced an **Extended Memory** feature that offers 1G byte of memory for enhanced high-performance computing on the vendor's supercomputer systems.

Included in the option is an upgrade from the Cray Research, Inc. X-MP/24 instruction set to the functionality of the Cray X-MP/416. The option also implements gather/scatter and compress index instructions on the vendor's SCS-40, which consists of advanced vector instructions providing support for high-speed indirect addressing of array elements.

The Extended Memory option is priced at $16,000 per megaword.

Scientific Computer Systems, 10180 Barnes Canyon Road, San Diego, Calif. 92121. 619-546-1212.

A multiple microprocessor-based system called **Hyperflo** has been announced by **Pacific Cyber/Metrix, Inc.**

According to the vendor, the Hyperflo system is currently implemented on the Motorola, Inc. VMEbus and employs Motorola's 68020 microprocessor. Processor boards carrying four 68020 processors and two floating-point processors are standard.

Also included are a system resource board, a memory control board and one or more global memory boards. A read-only memory board can be added for storing application software modules. Up to 18 processor boards can be added, as can more memory control boards.

Other features include a built-in runtime operating system, support for Unix and software development tools.

A basic system is priced at $20,300.

Pacific Cyber/Metrix, 6805 Sierra Court, Dublin, Calif. 94568. 415-829-8700.

An attached processor for use with Digital Equipment Corp. VAX computers has been announced by **Computer Maximizers, Inc.**

Called **V/Max**, the processor is available in C, Fortran and Pascal compilers. It runs at 3½ to 4 million instructions per second (MIPS). The floating-point multiply time is 437 nsec. Specific CPU-bound programs are run on the V/Max-attached processor instead of on the CPU, relieving the VAX of extensive processing loads.

According to the vendor, one or more V/Max attached processor boards may be added to any VAX system.

V/Max is available on a monthly rental basis for $9.83 per day per MIPS.

Computer Maximizers, 15187 Springdale St., Huntington Beach, Calif. 92649. 714-897-5096.

A Q-bus-based system said to be compatible with Digital Equipment Corp.'s LSI-11 computer has been announced by **Scientific Micro Systems, Inc.**

The **SMS 1000 Model 38** includes a Winchester hard disk drive, an LSI-11/23 or LSI-11/73 CPU, four or eight serial ports, a selection of removable media and a five-slot quad-height Q-bus backplane. It supports real-time and time-sharing operating systems. Storage devices range from enhanced small device interface to quarter-inch cartridge tape or 5¼-in. floppy disk load and backup devices.

Pricing ranges from $3,000 to $17,000.

Scientific Micro Systems, 339 N. Bernardo Ave., Mountain View, Calif. 94043. 415-962-5459.

A 16-channel I/O subsystem for reducing processor and bus load in VMEbus applications has been introduced by **Plessey Microsystems, Inc.**

The **PME SIO-4** is an intelligent serial communications controller with an on-board Motorola, Inc. 68020 processor optimized for use in both Unix-based and real-time applications.

Features include a minimum of 1M byte of random-access memory dual ported to the 68020 processor and the VMEbus. Also included are 16 RS-232-compatible asynchronous channels running at speeds up to 38.4K bit/sec. and two channels that support synchronous or asynchronous operation and 128K bytes of read-only memory.

The PME SIO-4 costs $2,695.

Plessey Microsystems, One Blue Hill Plaza, Pearl River, N.Y. 10965. 914-735-4661.

A 32-bit array processor featuring up to four computational processors and a peak speed of 72 million floating-point operations per second (MFLOPS) has been announced by **Floating Point Systems, Inc.**

The **MP32 SSP** offers directly addressable memory and can be configured with from 1 to 16 megawords of memory. It is available with Digital Equipment Corp. interfaces including Q-bus, Unibus and VAXBI.

Mpfortran, a Fortran language environment, is available for the MP32 SSP. Designed for use with the system's parallel processing architecture, it supports the use of data flow analysis to reduce the parallel programming effort. Also included are more than 250 math routines and parallel processing constructs.

The MP32 SSP costs $57,500.

Floating Point Systems, 3601 S.W. Murray Blvd., Beaverton, Ore. 97005. 503-641-3151.

Compupro, a division of Viasyn Corp., has added four low-end models to its **MP Series** of mid-range multiuser systems.

The MP100 series supports two to six users, provides application transfer across the entire multiuser system and offers a range of industry-standard application software and data communications options. All models feature modular architecture to allow for expansion of memory and data storage.

Features include a 12-MHz Intel Corp. 80286 host CPU, a 12-slot enclosure, 10 serial ports with DB-9 connectors, a parallel printer port, 1M byte of random-access memory, a 51M-byte hard disk and a 5¼-in. floppy disk drive.

Prices range from $7,995 to $10,495.

Compupro, 26538 Danti Court, Hayward, Calif. 94545. 415-786-0909.

Graphics systems

Imaging Technology, Inc. has added four products to its image processing product line.

The **DP-200** and **HRDP-200** display processors integrate with the vendor's Series 200 product family. The DP-200 provides 1,280- by 1,024-pixel resolution, a 60Hz noninterlaced scan rate and a display of up to 4,096 simultaneous colors. The HRDP-200 features 2,048- by 1,536-pixel resolution, on-board

Continued on page 76

On September 7, 1987
most everyone at IBM stayed home.

It was Labor Day.

IBM

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On October 6, 1987
IBM announced a worldwide family of innovative computerized telephone branch exchange (CBX) systems.

In fact, the IBM 9751 CBX,™
developed by ROLM,® requires 70% less space and can handle 70% more voice and data than our previous CBX systems.

So whether your business uses
100 phone lines, or 20,000, give us a call.

IBM

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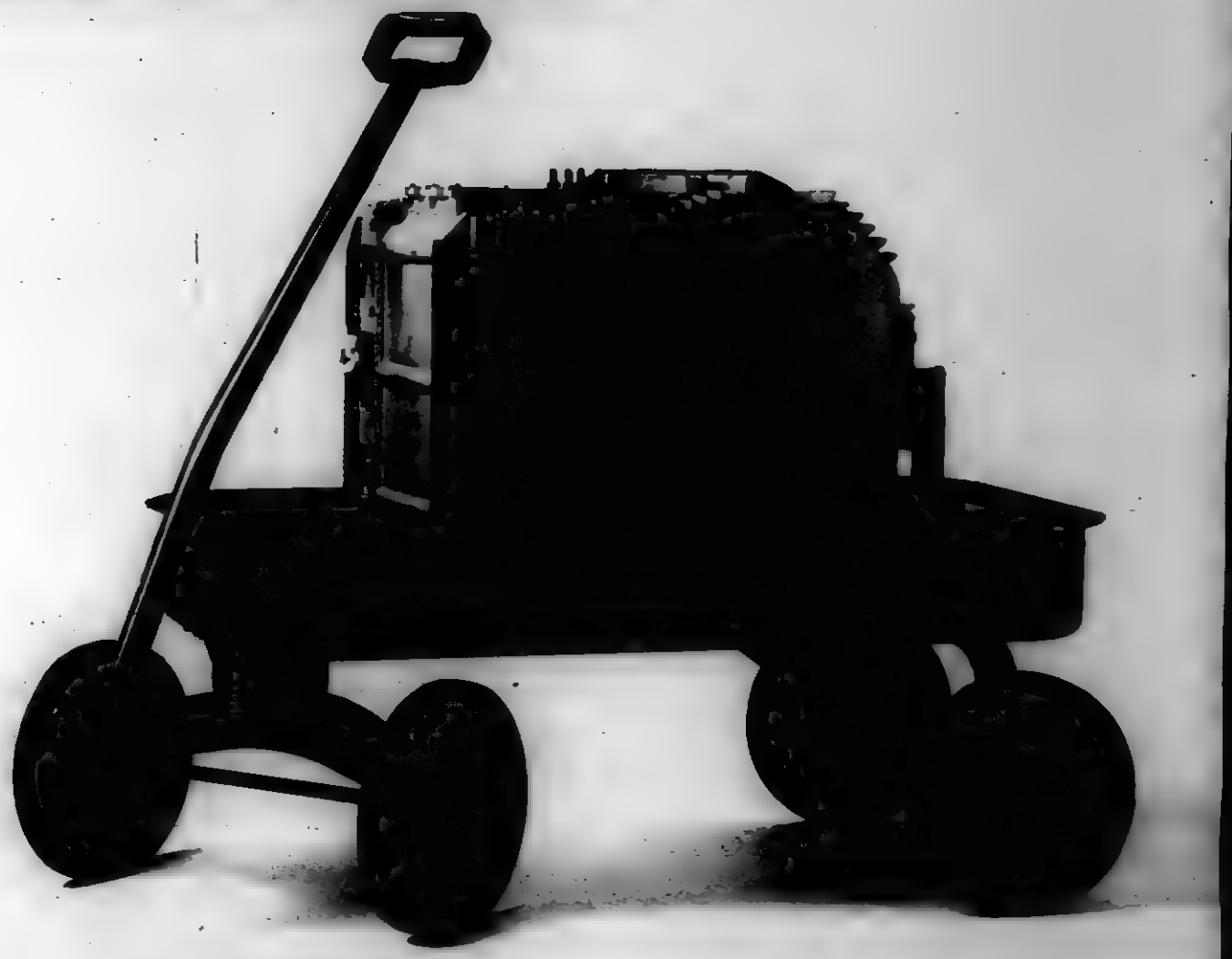
How our storage products' technology can boost your systems' productivity. No. 2 in a series.

Fully sealed. Runs cool. Fits under an airplane seat. And comes 4 to a box.



Do you know what it is?

It's one of our direct access storage device's (DASD) disk enclosures, and it delivers improved reliability, improved availability and greater compactness.

Here's why:

It's small—60 lbs. vs. 140 for the industry standard's—because its disks are small—10.5" in diameter vs. 14" for the industry standard's.

This is why these disks can be sealed inside their enclosures... which makes them less susceptible to environmental contamination.

It's also why we're able to service our DASDs fast...which reduces downtime, increases availability.

It all adds up to greater productivity.

That's our DASD technology's ultimate value to you. And you can't get it anywhere else.

For specs on our full line, call your local Amdahl representative.

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Amdahl Corporation
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Sunnyvale, CA 94088-3470

Continued from page 74

graphics and output lookup tables for gray scale image manipulations. The display processors cost from $53,995 to $58,995, respectively.

Imageaction 200 is an interactive menu-driven software package featuring a hierarchical structure, Help facilities and support for user-defined functions. It costs $2,995.

The single-board floating-point **IPA-150 Image Processing Accelerator** was designed specifically for image processing applications. It costs $7,995.

Imaging Technology, 600 W. Cummings Park, Woburn, Mass. 01801. 617-938-8444.

A high-speed programmable processor for bit-mapped graphics systems has been introduced by **National Semiconductor Corp.**

Called the **DP8500 Raster Graphics Processor**, the chip features a 100-nsec bus cycle time on back-to-back vector and block operations. It works with all types of memory, according to the vendor, and can access frame buffers in both planar and pixel fashion.

Scheduled to be available in the third quarter, an evaluation board is available now for $1,495. Production pricing will be $95 for quantities of 10,000 or more.

National Semiconductor, P.O. Box 58090, 2900 Semiconductor Drive, Santa Clara, Calif. 95052. 408-721-6528.

Data storage

Tab Products Co. has added the **Series 2000 LD** and the **Series 2000 SD** to its line of laser-optic filing systems.

The Series 2000 LD includes a 2.2 page/sec. scanner with multiple scan resolutions, combined flatbed and automatic sheet feeder capability, a 19-in. landscape display, a laser printer, a 12-in. optical disk drive and an IBM Personal Computer AT.

The Series 2000 SD offers the same features and capabilities as the 2000 LD using a 5¼-

Tab's *Series 2000 LD*

in. optical disk drive.

Both systems use a small computer systems interface that allows connection of up to seven devices.

The Series 2000 LD costs $69,995. The Series 2000 SD costs $49,995.

Tab Products, 1400 Page Mill Road, Palo Alto, Calif. 94304. 415-852-2400.

A dual-emulation tape coupler said to interface industry-standard half-inch tape transports to Digital Equipment Corp. Q-bus computers has been introduced by **Emulex Corp.**

The **QT13** tape coupler offers DEC TMSCP and TSV05 compatibility as a switch-selectable option, the vendor said, providing the ability to interface with both the complete Q-bus family and Microvax systems.

Features include a set of self-diagnostics and adaptive direct memory addressing and 22-bit addressing switch-selectable options. The QT13 handles tape interface data rates to 1M byte/sec.

The QT13 costs $1,095.

Emulex, 3545 Harbor Blvd., Costa Mesa, Calif. 92626. 714-662-5600.

A tape duplication system that supports Digital Equipment Corp.'s TK50 half-inch cartridge tape drive has been announced by **Applied Data Communications, Inc.**

The **CD-2500** supports industry-standard half-inch tape formats used on DEC VAX and PDP-11 systems. It also supports most quarter-inch compatible (QIC) formats for quarter-inch cartridges in capacities ranging from 20M bytes per 4 tracks to 125M bytes per 15 tracks. According to the vendor, up to 16 individual tape drives in any combination of formats can be interfaced to each CD-2500.

The CD-2500 costs $39,950, including a monitor and four QIC-11 or QIC-24 drives.

Applied Data Communications, 14272 Chambers Road, Tustin, Calif. 92680. 714-731-9000.

A high-speed storage-module drive disk controller for use with Sun Microsystems, Inc. workstations and file servers has been announced by **Interphase Corp.**

The **V/SMD 4400 Phoenix** is said to be capable of interfacing up to four storage-module drive disk drives to a Sun workstation or file server.

It features the vendor's Buspacket Interface and Virtual Buffer Architecture, which preformats packets of data in memory first-in, first-out fashion before acquiring control of the host system's Motorola, Inc. VMEbus.

Other features include installation software, boot read-only memories, a full-function queueing driver, a runtime formatter and other utilities.

The V/SMD 4400 Phoenix is priced at $3,350.

Interphase, 2925 Merrell Road, Dallas, Texas 75229. 214-350-9000.

Terminals

IBM's Information Systems Group has announced display stations for its mainframe and minicomputer systems.

The **IBM 3206** display station Models 100 and 110 are 1,920-char., 15-in. green monochrome CRTs with smudge-resistant screens for use with the IBM 3090 Processor Complex. The display stations replace the IBM 3180 Models 140 and 145. Functions include increased record/play/pause capability, rule and lighter weight. They cost $2,695 each.

The **IBM 3192 W** models are part of the 3270 Information Display System. With up to 3,564 characters, the 15-in. black-on-white CRT offers a smudge-resistant screen and the functions of the IBM 3180 Model 1. Features include printer port, record/play/pause capability and rule and set-up mode. Prices range from $1,995 to $2,145.

The **IBM 3197 W** models are enhanced follow-ons to the IBM 3180 Model 2. The IBM 3197 W models' 15-in. black-on-white CRTs display up to 3,564 characters. Support for ASCII printers, two display sessions or one display and one printer session concurrently is included. Pricing ranges from $1,995 to $2,145.

IBM, 900 King St., Rye Brook, N.Y. 10573. 914-765-3064.

A time and attendance terminal featuring a message system and bulletin board has been announced by **NCR Corp.**

The **NCR 2845 Time and Attendance terminal** collects and stores up to 1,500 transactions of attendance information in its own 16K-byte random-access memory. It transmits its information to a host computer for payroll calculations.

Features include an employee status file, a 20-key keyboard, an internal clock and a 72-hour battery. The NCR 2845 is supported on the NCR Tower and personal computer lines by the NCR Labor Management System software package.

The terminal is priced at $1,100.

NCR, 1700 S. Patterson Blvd., Dayton, Ohio, 45479. 513-445-4169.

Decision Data Computer Corp. has announced its **Personal Workstation Model 5052**, said to be compatible with IBM System/34, 36 and 38.

The system is said to be capable of emulating seven System/34, 36 or 38 devices simultaneously, including one defined as a printer. It uses an Intel Corp. 80286 processor and features a built-in 20M-byte hard disk drive.

Other features include a windowing/status display system, a

Continued on page 80

On October 13, 1987
The American Society for Quality Control
announced that, for the second year
in a row, its poll of over 600 senior executives
associated IBM with high quality
more than twice as often as any other
company named in the survey.

And during National Quality Month,
that's an association that would make
any company proud.

IBM

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On October 20, 1987
IBM announced its newest addition
to the System/3X family of computers.

System/36 Model 5363, the smallest
System/36, can be installed in as little as one
hour by customers with no knowledge
of data processing.

This helps explain why this family,
with more than 250,000 installed, is the most
popular mid-range system in business.

IBM

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"What if...

What if the cost of owning your next computer was cut almost in half?

What if you could truly network your multi-vendor environment?

What if you could easily access all the information in your system?

What if your computer company gave you the best service and support in the industry?

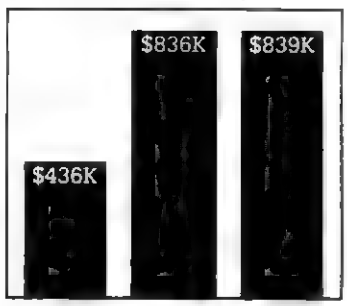
What if you made He your computing

You'd have your computing power for a lower cost-of-ownership.

Up to $400,000 lower, in fact.

Based on original purchase price and support costs over five years.*

Cost-of-Ownership



Because the HP 3000 Series 950 costs about half of IBM's 4381-23 or DEC's VAX 8700.

For a comparable class of computer.

Remarkable savings, you'll agree. Savings made possible by HP's remarkable new RISC-based Precision Architecture computers.

RISC—Reduced Instruction Set Computing—is a new concept in designing computers which, through simplification, can speed up computer processing.

Instructions are executed in hardware.

And advanced hardware technologies like VLSI are utilized, so that an entire CPU is on a single chip.

It all means fewer components.

And it all results in significant advantages in terms of reliability, as well as cost-of-ownership and performance.

Advantages which the HP 3000 line will maintain in future models.

To keep on giving you a lot more for a lot less.

The powerful HP 3000 Series 950: one of a full line of compatible mid-range computers.

*Based on US list prices available as of December 1, 1987.

You'd have true multi-vendor connectivity.

We know you want more networking options, not less.

Hence the HP commitment to a networking strategy that gives you the true multi-vendor connectivity that proprietary networks simply can't deliver.

HP AdvanceNet.

A strategy which adheres to industry standards.

And which supports de facto standards such as SNA.

For example, HP AdvanceNet is based on the OSI seven-layer model. Our HP StarLAN office networking is based on IEEE 802.3. And our X.25 Private Wide Area Network is based on CCITT standards.

It's this commitment to true multi-vendor networking that will allow you to keep your networking options open in the future, and will protect your existing systems investment.

It's a long-standing commitment.

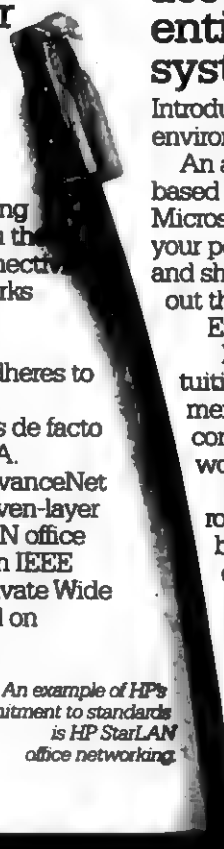
Supported by a broad range of networking products.

And by years of experience (over 60,000 nodes installed since 1971).

It's a commitment that extends to service and support.

From planning through maintenance. With proven services designed expressly for your multi-vendor network.

Because that's the real world.



An example of HP's commitment to standards is HP StarLAN office networking.

You'd have easy access to your entire information system.

Introducing the HP NewWave environment.

An application environment based on MS™-DOS and Microsoft® Windows 2.0 that lets your people access, manipulate and share information throughout the system.

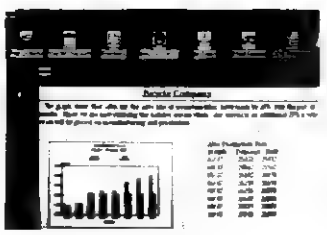
Effortlessly.

By means of simple, intuitive icons. Pull-down menus. A "mouse." And a common interface across workstation applications.

The NewWave environment incorporates two breakthrough technologies, the HP Object-Management Facility (OMF), and "agents," which together allow users to focus on their business tasks, not their computing tools.

OMF enables users to combine and manip-

wlett-Packard partner?



A window to your world.

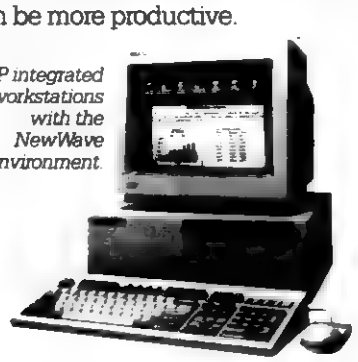
ulate different data forms— text, spreadsheets, graphics, images, even voice—from disparate sources throughout the system.

All as easily as if working in a single application.

Then, just as easily, the results can be mailed to anyone on the system.

And in the NewWave environment even the novice user can be more productive.

HP integrated workstations with the NewWave environment.



What's more,"agents," which are practical implementations of artificial intelligence principles, can learn and perform repetitive tasks for your users. For example, "agents" can automatically update and distribute a sales report. On a prescribed day, at a certain time.

Furthermore, the environment will run under OS/2, and support Microsoft's Presentation Manager, once they're available.

NewWave.

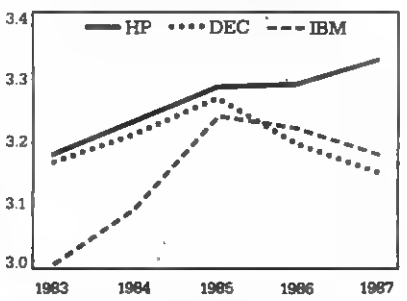
It will lead the way to a new and more productive era in computing.

You'd have the company with top ratings in customer support satisfaction

No two customers are the same.

This is a guiding principle of the HP way of doing business.

Customer Support Satisfaction.



It means asking a lot of "What if..." questions so that solutions can be tailored to your specific needs.

Instead of off-the-shelf solutions routinely handed out.

And it means following up with service and support.

Consider this record: #1 for five straight years in the widely-respected Datapro customer surveys.

It's a record based on an average across six key service and support categories: maintenance effectiveness, maintenance responsiveness, troubleshooting, documentation, education and software support.

And it's a record that should come as no surprise.

Because when you make your customers number one, they do the same for you.

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Or Call 1 800 752-0900, Dept. 286A

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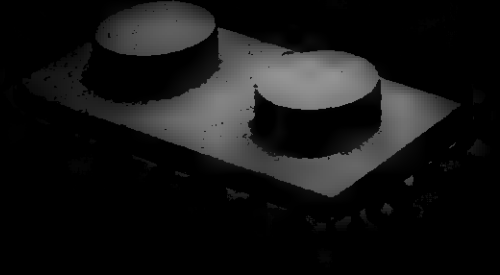

nd the PC system outgrow.

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Continued from page 76
data/software security system and a 64-color screen.

The Personal Workstation Model 5052 is priced at $4,360.

Decision Data Computer, 100 Witmer Road, Horsham, Pa. 19044. 215-674-3300.

Printers/Plotters

A 1,000 line/min **band printer** said to be plug-compatible with the Hewlett-Packard Co. HP 3000 computer has been announced by **Interscience Computer Services, Inc.**

The printer features a built-in diagnostic display; floor-length acoustical cable and a combination of the friction-free hammerbank and a laterally moving full-font steel band.

The printer is priced at $12,165.

Interscience also announced a 600 line/min band printer called the **LB662**, designed for use with IBM System/34, 36 and 38. It costs $9,950.

Interscience, 5171 Clareton Drive, Agoura Hills, Calif. 91301. 818-707-2000.

A printer controller said to permit IBM System/34, 36 and 38 users to generate precision-tabbed labels, forms, graphics, logos and bar codes has been announced by **Decision Data Computer Corp.**

The **DDCC Magnum Controller** was designed for use with the company's 6700 series matrix printers. It allows the printers to generate optical-character recognition text and to print up, down and sideways in addition to top to bottom. Standard matrix characters, solids, halftones, reversed, shaded, striped, half-dot bar codes and standard bar code characters are available.

The controller supports all IBM System/34, 36 and 38 Advanced Printer Functions and emulates IBM 5224 and 5225 printers.

The DDCC Magnum Controller costs $995.

Decision Data, 400 Witmer Road, Horsham, Pa. 19044. 215-674-3300.

A laser printer for shared-resource and word processing environments has been announced by **Acom Computer, Inc.**

The 20 page/min printer, called the **Office Manager LX3820**, emulates either an IBM 5219 to an IBM System/36 or 38 or a Hewlett-Packard Co. Laserjet Plus to an IBM Personal Computer.

Duplex printing allows four-up image printing on 8½- by 11-in paper. Up to 2,500 sheets of paper can be accommodated. Other features include 34 resident fonts with three font cartridge slots; bold, underline, subscript and superscript support; and proportional spacing with right margin justification.

The Office Manager costs $24,995 without duplex capabilities or $28,495 with them.

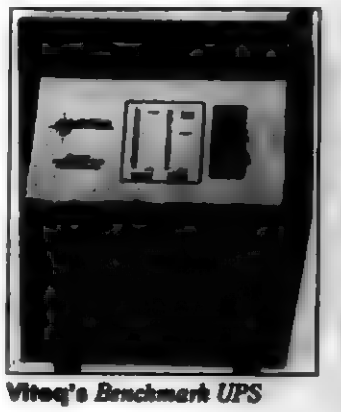
Acom, 3534 Atlantic Ave., Long Beach, Calif. 90807. 213-424-2986.

Power supplies

The **Benchmark UPS** series of 750VA to 1.5-kVA on-line uninterruptible power supplies has been introduced by **Viteq Corp.**

The Benchmark UPS units are said to protect data processing and industrial equipment from line disturbances and to provide output power in the form of a true sinusoidal waveform voltage.

The series includes three models: the UPS 386 for general use; the UPS 386 LAN, which includes a Novell, Inc. network interface for network power fault diagnosis and orderly system shutdown and is for Intel Corp. 80286- or 80386-based file servers; and the UPS 1.5 kVA, which was designed for minicomputer equipment.



Viteq's *Benchmark UPS*

Prices range from $1,795 to $2,795.

Viteq, 10000 Aerospace Road, Lanham, Md. 20706. 301-731-0400.

Deltron, Inc. has announced the **Standby Systems Series FL04** and **Series FL06** to **FL15** as battery backup for minicomputers and microcomputers.

The Series FL04 provides 400VA output power, 10 minutes runtime at full load and 25 minutes runtime at half load. Transfer time is 4 msec, the vendor said.

Series FL06, FL08, FL12 and FL15 models provide 600, 800, 1,200 and 1,500VA output power, respectively, and up to 80 minutes runtime at half load. Transfer time is also 4 msec.

Standby Systems models feature common mode/transverse mode noise reduction and sine wave output. Prices range from $645 to $1,545.

Deltron, P.O. Box 1369, Wissahickon Ave., North Wales, Pa. 19454. 215-699-9261.

Input devices

Wedge reader support for Digital Equipment Corp. VT320 terminals and IBM Personal System/2s has been announced by **Intermec Corp.**

Intermec has enhanced its **Model 9570** to provide support to the PS/2. The **Model 9570AB Wedge** supports the VT320. The wedge readers transmit data entered through the wedge as if it were entered through a keyboard, the vendor said. Both readers work with either a laser scanner, a digital wand or a slot scanner. Data may also be uploaded through the readers' auxiliary RS-232 input port.

Other features include 16-bit microprocessors, decoding algorithms and the ability to read and automatically discriminate major bar code symbols.

The Models 9570 and 9570AB cost $495 and $595, respectively.

Intermec, P.O. Box 360602, 4405 Russell Road, Lynnwood, Wash. 98046. 206-348-2600.

The **Eagle 1650** and **Eagle 1680** — large-format document scanners for use with Apollo Computer, Inc.'s Domain, Digital Equipment Corp. workstations or IBM Personal Computer ATs — have been announced by **Ana Tech Corp.**

The scanners, designed to convert line-art drawings into raster formats, feature a continuous-feed roller that can scan documents from 1- to 17-in. wide by roll length. The scanner accepts paper, mylar, vellum or film up to 0.01-in. thick.

The Eagle 1650 provides a scan speed of 8.6 in./min at a resolution of 500 line/in.; 21.6 in./min at 200 line/in.; or 4.3 in./min at 1,000 line/in. The Eagle 1680 provides a scan speed of 3.1 in./min at a resolution of 800 line/in.; 10.3 in./min at 200 line/in.; or 1.6 in./min at 1,600 line/in.

The Eagle 1650 is priced at $45,000. The Eagle 1680 costs $50,000.

Ana Tech, 10499 Bradford Road, Littleton, Colo. 80127. 303-973-6722.

A color scanner and separating system for producing color separated film negatives and positives to expose lithographic and letterpress printing plates has been announced by **Howtek, Inc.**

The **Coloracan system** incorporates the vendor's Scanmaster digital color flatbed scanner; Scanmaster 35 digital color 35mm film scanner; Pixelmaster solid ink jet color printer; color processing computer and software and color algorithm. Photographs and line art are converted into 256 levels of gray data for each color. A high-resolution monitor allows the user to preview a scanned image.

Coloracan an be interfaced to a variety of 1,000 dot/in. film recorder and phototypesetters. It costs $96,000 including a film recorder; $85,000 without.

Howtek, 21 Park Ave., Hudson, N.H. 03051. 603-882-5200.

On October 23, 1987
IBM announced the new IBM
Personal Publishing System.

So you can create anything from
newsletters to presentation booklets with
the IBM Personal System/2®
right at your desktop.

Now your business can
really make headlines.

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On October 31, 1987
it was announced that an IBM Fellow
had received the prestigious Turing Award
for fundamental contributions to the
development of RISC technology.

Four months earlier, The Institute of
Electronics and Electrical Engineers (IEEE)
honored IBM for its innovation in both
inventing and developing the concept of
magnetic disk storage for computers.

All of which made 1987 a very rewarding year.

IBM

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Voice, finger and retina scans: Can biometrics secure your shop?

BY JANET FIDERIO

The systems programmer enters the small vestibule of the research lab. The door locks behind her, and the door in front of her will not open until an automated security system verifies her identity. She places her right index finger on the shining platen of a 10- by 12-in. box.

The scanner compares the ridges and bifurcations of her print with those on the employee's identification template stored in a host CPU. The chances are one in a million that another person's print will share the same characteristics. Confirmation is made, and the door swings open.

The employee goes to her desk and once again places her finger in a small portable scanner attached to her personal computer. Upon authorization, an audit trail is begun, and she can proceed with her work.

.....

Biometric security devices are the Rolls-Royces of the security industry. These products authenticate a person's identity by digitally measuring a physical or behavioral characteristic, such as a fingerprint, voice inflection or the pattern of blood vessels that snake across the retina.

They are heavy artillery in a data security arsenal, often welcomed by security professionals behind the scenes but frequently rejected by MIS managers on the front line.

"In effect, MIS managers work like hell to keep the systems user-friendly," says Jack Bologna, president of Computer Protection Systems, Inc. in Plymouth, Mich. "And when someone from security comes along saying, 'We're going to add this new access method,' everything MIS has worked for in the past two years is up in the air again."

But biometric systems are now being developed that are transparent to the user. Even those that add a step to the authentication process should not be discounted, especially by organizations that place a premium on corporate information.

What a properly installed and maintained biometric device promises MIS is an almost failsafe method of verifying the identity of the person accessing the corporate facility or data. "Once this is done, we are in the position of having real accountability in our records," says Charles Creseon Wood, president of Information Integrity, a San Francisco-based security consulting firm.

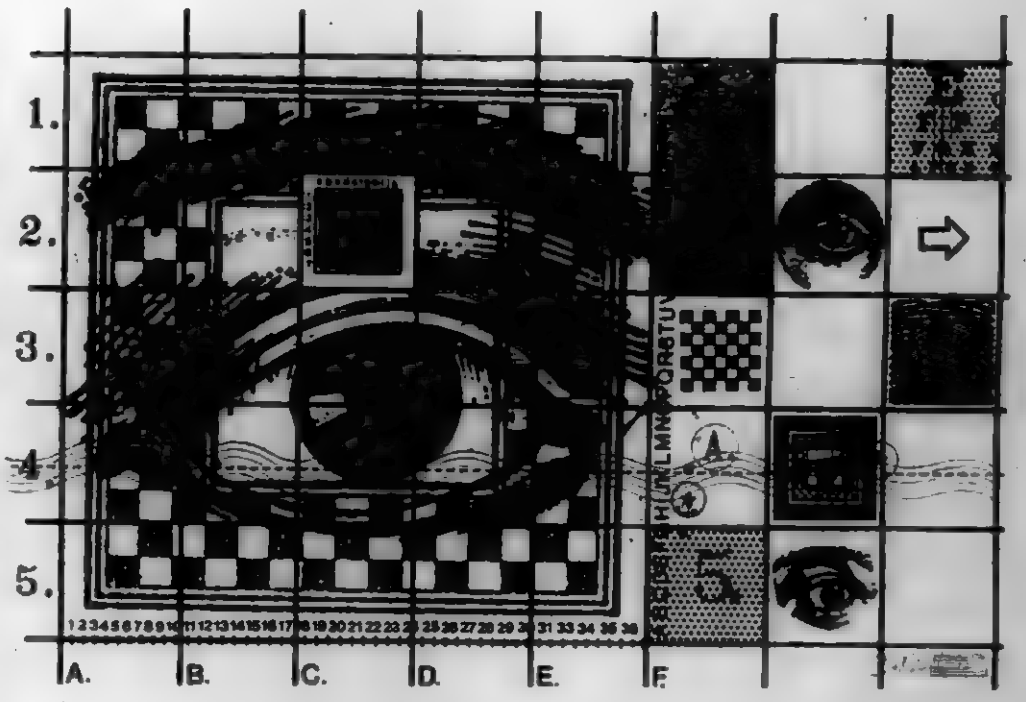
While biometric devices cannot ensure that an authorized person entering the building or sitting at the terminal is not about to commit a crime, the products promise thorough audit trails based on a rigorous authentication scheme.

A person's identity can be verified according to one of three parameters: what he knows (passwords), what he has (smart cards or tokens) or what he is (biometrics). Of the three, biometrics is the most exact: It is easier to tell a friend your password or to lose your token passcode generator than to duplicate your fingerprint.

Biometric products come in a variety of shapes, sizes and prices. At the high end, off-the-shelf devices like a retina scan can cost as much as $7,000 for the hardware alone. The least expensive signature and keystroke dynamic systems cost between $400 and $700.

Six biometric technologies are currently available. Retina scans use a low-intensity light source to scan a circular section of the retina. The eye signature created is stored in a microprocessor. Traditionally used for physical entry systems, retina scanning systems are also available for data access applications.

Thumbprint or fingerprint identification systems create



DAN COLLINS

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Fiderio is a *Computerworld* senior editor, features.

Biometrics

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templates of a fingerprint by measuring and digitizing the ridges, loops and bifurcations unique to an individual's print. These are typically found in either physical or data access control systems.

Hand geometry systems measure, record and compare finger length, skin translucency, hand thickness or palm shape. Typically, they are used for physical access systems.

Voice verification devices make use of voice patterns and inflections to make a unique template. Most of these systems can accommodate minor voice deviations. They are typically used for physical security.

Signature verification devices commonly use sensitive pens or pads to trace either the static or dynamic characteristics of a person's signature. They have been designed for both physical and data access tools.

Keystroke dynamics identify individuals by their typing patterns and rhythms. These products commonly monitor various repetitive character groups such as "i-n-g," "t-i-o-n" and "t-h-e." Log-on-only and continuous verification systems are being developed. Keystroke dynamics are typically used for terminal or PC data access control.

All of these biometric products compare the stored templates with fresh patterns or scans to allow or deny access to the mechanism being secured, whether it is a building or a terminal. They are tools used only in large security control systems. Many of the data access products can interface with products such as IBM's RACF.

Biometric products are most often found in the U.S. Department of Defense and other government facilities, European and Middle Eastern defense organizations, research labs and even computer tape storage centers. Most of these applications are for physical access security systems, but custom data access systems have been in use for years.

Industry sales of biometric devices almost doubled last year (see story page 84), and more than 17 vendors currently market products. An additional 15 companies are beta-testing biometric devices.

Are they for you?

But can commercial companies — and your MIS group — use biometrics now? It depends on your environment and what you are trying to protect. Even though these devices are expensive, cost may be insignificant when corporate data is extremely sensitive or valuable (see story at right).

> KEYSTROKE dynamics "has value, and we've used it. But you must make sure you employ the technology in the right applications."
>
> JOAN MURRAY REYNOLDS
> CHEMICAL BANK

According to one user in the financial services field who has tested several biometric devices, 3% to 5% of all corporate data requires top-level security.

"And this percentage may change depending on the environment you're in," he says. "In a firm that does genetic engineering, for instance, maybe 95% of its information is in that [top-secret] category; but at General Motors, maybe only 3% of all that company's information is in the category."

There is data in commercial environments that is worth securing at any cost — for instance, seismic research in a major oil company, product development in any competitive corporation, sensitive or dangerous research applications or funds transfer systems. Loss, theft or compromised data in any of these situations could be considered a crushing blow.

Not surprisingly, custom biometric data access systems are already in use at top high-security environments in both commercial and government facilities. And an increasing number of Fortune 500 companies — such as General Electric Co., Merrill Lynch & Co. and Manufacturers Hanover Trust Co. — are testing them.

Vendors of biometrics, however, no longer target just the high-end security market. While these companies still court national security and government sites, they now see MIS departments of large corporations as potential clients. Not only do vendors think many corporations could benefit from their physical access systems — where the majority of biometric systems are currently found — but they see untapped potential in the MIS and data access control market.

Prices coming down

To meet the needs of this sizable market, vendors are developing less expensive, more portable offerings that have drastically reduced average prices of low-end products. For example, a number of products last year broke the $1,000-per-unit barrier. The first commercial biometric device to do so was a signature verification unit called Sign-On, developed by Signify, Inc. in Columbia, Md.

According to Signify President Peter Kelly, Sign-On is in production. One way it can be used is as a system or network access control device designed to protect companies from unauthorized penetration from remote sites over dial-ups or leased lines. The hardware costs less than $700.

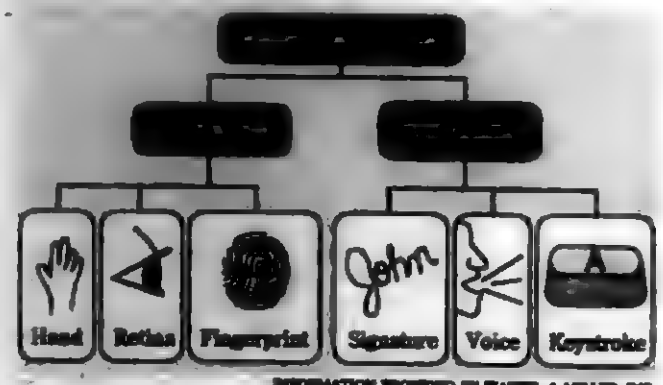
Another firm about to break the $1,000 mark is Thumbscan, Inc. in Oak Park Terrace, Ill. Its basic fingerprint verification product, due out this month, will cost $995. According to company President Peter Dignan, the product is targeted "almost exclusively to Fortune 1,000, highly integrated, multiple-CPU environments."

Perhaps the least expensive of the biometric devices soon to be available are typing or keystroke dynamic systems. International Bioaccess Systems Corp., based in New York, is beta-testing a product called Biopassword. It consists of host software and a printed-circuit

Continued on page 86

High-tech security

Automated biometric devices use either physiological or behavioral characteristics to identify an individual



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CW CHART: ANDY J. SWANSON

Planning, consulting boost biometric bill

BY BARBARA SEHR

Putting a price tag on security, whether it's a smoke alarm in a child's bedroom or a biometric device to protect valuable company data, is a difficult challenge for most people.

But imagine, if you will, an MIS department at a huge cosmetics corporation. Beyond the walls of its computer room stands a cluster of mainframes and minicomputers.

Within the huge data base is an exclusive formula that will reshape the faces of American women. The details of the mixture are known only to the chief executive officer and a small, highly valued group of researchers.

Every competitor in the cosmetics business would like to get its hands on this formula. How do you ensure that the few employees authorized to work on the formula are the only ones that can access it? And how much will a security system cost you?

Administrative details

If you intend to use biometric devices as your primary means of security, you can count on some hefty start-up costs. According to Charles Cresson Wood, who operates Information Integrity, a security consulting firm in San Francisco, the main expenditure for a system done right usually comes from administrative costs.

During consultations with clients, Wood stresses the importance of answering such administrative questions as: "Who should have access?" "What is the purpose and level of each person's access?" And, "How do you manage changes within a job?"

A typical biometric security installation at a large corporation can amount to about $100,000 in in-house costs, Wood says. These costs include planning for the system, using in-house people as trainers for other employees and administering security controls such as keeping up with the employment and security status of all those who enter or exit a protected site.

This price does not include consulting fees, which could run as high as $50,000, and still excludes any equipment that is purchased or installed.

Also note that equipment costs would not be limited to specific biometric devices. Use of a biometric product is likely to require a dedicated personal computer. This is the case unless the device can be integrated into a company's mainframe network, which might also handle building maintenance functions such as climate control. For some facilities, however, a dedicated PC is recommended.

Pricey hardware

From this point, hardware choices begin to get expensive. Don Grant, vice-president of Entrance Controls, Inc. in Seattle, says the average biometric device can cost about $8,000 per door, including normal installation.

Grant, who has installed security systems at installations as varied as software developer Microsoft Corp. and the Strategic Defense Initiative research project at Seattle-based Boeing Aerospace Co., says the cost for a biometric installation is about four times that of a typical card-key entry system.

> IF YOU intend to use biometric devices as your primary means of security, you can count on some hefty start-up costs.

According to Ben Miller, a security consultant and publisher of "Personal Identification News," a newsletter based in Washington, D.C., the cost depends on what kind of input device is used in the installation. The most common device is a hand geometry unit, which measures the shape of a user's hand against a data base of various imprints.

Miller says hand geometry units — which tend to be the most reliable — cost less than $3,500 uninstalled. This compares with about $6,500 without installation for a retina scan unit from Eyedentify, Inc. in Beaverton, Ore., which represents a more recent technology.

Also commonly used, Miller says, is a thumbprint reader, which can cost $5,000 per unit uninstalled.

To secure a simple computer room with a single access door, one of these devices is likely to be sufficient. However, some users combine devices such as card keys and biometric units for maximum peace of mind.

The ultimate trap

Miller notes that one of the most elaborate security systems is something appropriately called a

Sehr is a free-lance writer based in Seattle.

mantrap. In the mantrap, users must first enter one door of a specially built room using a card key, then provide a thumbprint and finally enter a password to gain access to a second door that provides entry to the secured area. In the case of unauthorized entry, the intruder is held within the room until security personnel arrive.

Depending on the extent of construction required, installation alone for such a device could cost a company several hundreds of thousands of dollars, according to Miller.

> "COMPANIES suffer a greater loss through errors of omission than commission. Things like human error have caused more damage than fraud."
>
> CHARLES CRESSON WOOD
> INFORMATION INTEGRITY

In most biometric device setups, cost of installation is usually included in the purchase price, according to Entrance Controls' Grant.

However, if installations require extensive, atypical wiring, price is likely to go up accordingly. "If an engineer gets involved, it can run an additional $50 an hour," Grant says.

Password problems

Even though you may have controlled access to the computer room, security measures are not yet complete. The terminal itself needs protection from unauthorized use, and that may require additional biometric devices. Password protection is simply not enough for a top-secret scenario.

The problem with passwords, consultant Wood says, lies not in the elaborate systems themselves but in the user. "The real potential of password systems has not been recognized," he says. "Errors arise in the manner in which the passwords are determined and in the failure to maintain constant revisions."

As a result, real security will demand additional protection. That protection may amount to yet another hand geometry unit that requires a user to identify himself each time he begins work at a terminal.

It's all in the stroke

A less expensive biometric alternative that also restricts access to a terminal is a keystroke dynamics system from International Bioaccess Systems Corp. in New York.

According to Frederick L. Saxe, International Bioaccess's CEO, keystroke dynamics measures the way a user types on the terminal keyboard in 110 different tests.

Individual patterns are stored by the system, and access can be gained only by repeating the stored pattern. The entire system is contained within a single printed-circuit board that can sell for about $500 in low volumes.

Personnel requirements

Once biometric equipment is installed, it requires some user training. There are two types of users: the security administrator and the authorized user.

Security administrators are usually assigned the task of establishing enrollment in the system.

They are also responsible for maintaining security provisions — making sure, for instance, that privileges are granted and revoked in keeping with employee turnover.

These administrators obviously require more training and, therefore, must spend more of their time in the training process.

On the other hand, depending on the complexity of the device chosen, authorized users may require only a couple of hours' or days' training.

The cost of this training, like installation, is usually included in the price of the overall project. Employee man-hours spent in training are figured into Wood's $100,000 in-house costs estimate.

Given the huge costs, Wood says, elaborate security systems may not always be worth their upkeep to every company.

"Companies suffer a greater loss through errors of omission than commission," he says. "Things like human error have caused more damage than fraud." •

The world according to biometrics

A glossary of security terms.

Accuracy
A general term describing a physical trait determined at which that person selected unchanged during each life enhancement by major cosmetic surgery or injury; examples include fingerprints, profile and retinal scans

Enrollment
Enrollment of enough biometric data as a reference pattern for future verification attempts; often, many samples are taken and an average retained

Enrollment time
The time period required for an identifyee to record the data that will be used as the identity reference

False accept
An error, as a result of malfunction of the verification method, whereby an identifyee is determined to be someone who he is not; also known as a Type II error

False reject
An error in verification whereby a genuine identifyee is designated as an imposter and not permitted access; also known as a Type I error

False accept/false reject ratio
A method of rating an automated verification system; for maximum security, the rating should be very high, which means an experienced imposter will be allowed access and that authorized users will rarely

Fingerprint pattern
Any of a number of fingerprint characteristics, such as ridge endings and bifurcations (divided branches of ridges), are analyzed, quantified and used to create a unique personal identifier

Hand geometry
Any of a number of hand characteristics, such as the silhouette of the closed hand, finger length and hand proportions, are analyzed, quantified and used to create a unique personal identifier

Identification
Determining who a person is without prior indication by that person; this is most often done in law enforcement when the identifyee is either incapacitated or intentionally uncooperative

PIN
A unique personal identification number, often required by systems for further verification activity

Profile
A term frequently applied to the file data taken from enrollment; some systems update the profile each time it is used

Quasi-biometric
A shortened term (from quasi-biometric personal characteristic) for a trait that is in part biometric but in part cultivated and habitual in nature; for example, a golf stroke, a signature or a mode of walking

Retina scan
A method of collecting data describing the vascular pattern on the back of the retina that is analyzed, quantified and used to create a unique personal identifier

Session
A general term referring to the time during which the identifyee and the system are involved; usually, it is preceded by the terms "enrollment" or "ID," whichever is appropriate

Signature dynamics
A set of pen movement characteristics, discovered when a signature or other writing is performed, that are analyzed, quantified and used to create a unique personal identifier

Verification
The process of determining who a person is by first requiring a declaration as to who he or she claims to be, then proving the claim true or false; this is typical of a commercial situation in which the identifyee presents nonsecret information (a card or the keying in of an employee number) that is then verified by something such as a fingerprint or by visual recognition; the identifyee is almost always willing and cooperative

Voice patterns
Human voice features, such as sound resonance, pitch and volume, that are analyzed, quantified and used to create a unique personal identifier

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Lower prices add to market rise

BY BEN MILLER

Commercial demand for biometric security devices has grown slowly since these products became widely available in 1985. But the market is definitely on the upswing.

Slightly more than 1,000 biometric verification devices were sold in 1987, nearly double the number from the year before. Dollar sales, however, dropped as a result of rapidly decreasing prices on the units.

The lower prices and broader range of products available this year should result in substantial growth in both unit and dollar sales. The majority of units placed will be integrated into applications such as access control for offices and military installations, information system security, criminal investigation systems, inmate and prisoner control and perhaps some civilian government programs.

The average cost of biometric verifiers sold in 1987 was less than $3,000, compared with nearly $7,000 in 1986. Prior to 1986, there were no devices that cost less than $7,500.

Two major factors contributing to these lower than average prices are the entry of products in the $495 to $3,500 price range and price cuts of up to 30% on the more expensive high-security devices.

Most of the less expensive devices are intended for integration into application systems developed by others; they do not include support electronics or hardened casings, both of which are required for biometrics' largest market to date — industrial security access control. In the future, end-user prices of biometric devices will become increasingly hard to track as the level of integration accelerates.

A new generation

A new generation of lower priced voice, signature and hand geometry devices began to emerge last year, accounting for more than 60% of the biometric units sold, or about 25% of the industry dollar sales. This year, the unit market for devices priced at less than $3,500 should rise to nearly 80%, and their dollar share of the market could approach 50%.

Biometric vendors also brought in approximately $7 million in development money from corporate partners and government funding. Another $22 million to $25 million was raised in public and private markets to support further development.

FALLING prices are the result of new designs introduced by companies just entering the market.

The level of research and development expenditure for biometric projects in very large organizations such as IBM, NCR Corp., Siemens AG, NEC Corp. and AT&T is difficult to estimate, but many of these companies hold patent positions on devices not yet released.

The lower price trend will continue this year for both the new generation of devices and the high-security access control systems. By mid-year, as many as six reliable devices selling in the $400 to $1,500 range will be available.

Manufacturers are hopeful that the low prices of these devices, intended for integration into other systems or as OEM equipment, will stimulate industry sales. If such sales do not materialize, it is certain that several vendors will not be around in their present form by year's end.

Price wars

Falling prices are the result of new designs introduced by companies just entering the market. Established developers respond by offering lower cost models on their own products and by lowering prices on existing models.

Vendors with lengthy industry experience, such as Identix, Inc., Eyedentify, Inc. and Fingermatrix, Inc., have announced lower cost and streamlined product versions. Most of these companies are taking extra time to make sure everything works right before they release new versions commercially.

Ecco Industries, Inc. is the only firm to date that has shipped products at both the high and low end.

In the upper end of the market, highly accurate, tough-to-spoof machines for industrial and military security will cost less than $5,000 on the average this year, compared with more than $7,000 in 1986 and about $6,000 last year. Already, Recognition Systems, Inc., whose ID-3D product gives false accept and reject rates of less than 1%, has begun to win support from distributors and the military. It is priced at around $3,500 per access point.

Fingerprint readers could get a boost if law enforcement agencies decide to equip their new automated fingerprint identification systems with live-print direct readers.

It is difficult to estimate what the biometric sales picture will look like later this year. Restricted federal budgets will not help the situation for high-end products, but the track record they have established for reliability and lowered prices may open the way for some sizable sales.

Sales of products in the less than $1,500 segment could grow exponentially if the initial units perform well in beta-test sites. To date, few of the units in this price range have been in service long enough to establish a reputation. If reports from initial users are good, some amount of pent-up demand could be released. ●

Miller is publisher of "Personal Identification News," a Washington, D.C., newsletter that tracks advanced security technologies and policy.

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IBM The Bigger Picture

Biometrics

CONTINUED FROM PAGE 82

board that is inserted in a workstation.

Biopassword verifies an individual during the logon process by measuring 110 different variables — such as key pressure, typing rhythms, speed and trends in common letter groupings — as he keys in his ID and password.

The system, which is transparent to the PC or terminal user and provides programmable time-outs, is being beta-tested by Hughes Aircraft Co., Wells Fargo & Co. and Merrill Lynch. The hardware's total cost is $495.

According to Ben Miller, publisher of Washington, D.C.-based "Personal Identification News" ("PIN") newsletter, the average cost of a biometric device in 1986 was $6,900. Last year, the average cost was a little less than $3,000. Miller says prices should drop even further this year.

But even if the interest is there, prices are still too high to allow MIS environments to readily adopt biometric products, once they consider the large number they need for data access applications.

"We certainly have the need [for biometrics] today and have had for some time," says William Olischar, vice-president of information systems at Prudential Insurance Co. of America in Roseland,

MIS Training Institute's Weiland

N.J. "The generic requirement is there [for biometrics] — and in quantity."

However, even though some products cost less than $1,000, shops like Olischar's need thousands of the devices, an expense that adds up. "We are watching [the technology], and there is going to be a point where it crosses that line. But we are not there yet, and we are probably a couple of years away," he adds.

According to Cheryl Helsing, president of Cheryl Helsing, Inc., a security consultancy in San Francisco, one of the problems with biometric devices is that they are difficult to cost-justify.

"If you eliminate a human guard," Helsing says, "you can figure on saving $50,000 on around-the-clock guard service. But data security applications become difficult to justify when you have a large number of terminals or PCs that need to have these devices added." It is at that point, Helsing says, that cost per device becomes a big issue.

Olischar adds that adopting biometrics is closely tied to economics and risk vs. cost. Steve Weiland, director of information security at The MIS Training Institute in Framingham, Mass., agrees. "The idea is not to spend more on the control than on the risk," Weiland says. "If you have the possibility of losing $1,000 a year, it doesn't make sense to spend $5,000 a year trying to prevent the $1,000 loss."

Other than cost, a major problem stifling commercial sales of biometric devices is that products are still evolving, and results of beta testing are, in some instances, still being incorporated into designs. This is especially true with biometric data access products.

"We are at the introduction stage of the life cycle," "PIN" 's Miller says. "Users need to understand what their requirements are and also what the frustrations of a new technology will be."

User annoyance

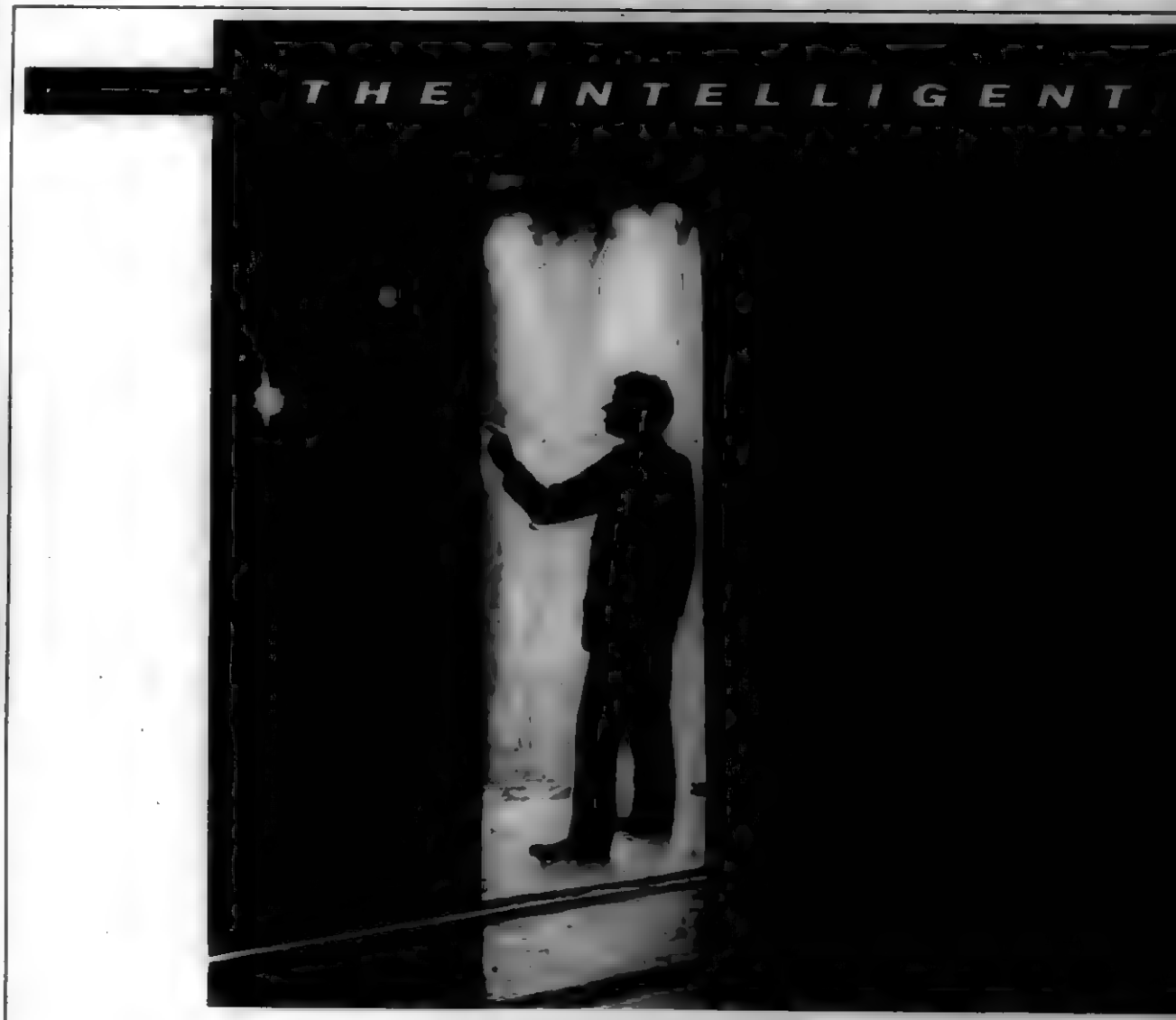
One of these frustrations is the user annoyance factor of these products. According to Computer Protection Systems' Bologna, the products can turn off users because they tend to err on the side of conservatism — that is, they can prevent an authorized person from accessing the system.

When an authorized person is denied access, it is called a Type I false negative error. A more serious problem, a Type II error, is a false positive, when an unauthorized person is allowed access. In facilities that need extremely high security, a higher than average Type I error rate may be condoned to ensure that the Type II error rate is top-notch.

The Type II error rate in Eyedentify's retina scan product, for example, is estimated to be one in one million. User companies can adjust the Type I and Type II values of the products to tighten or loosen security controls. But that process could annoy early users.

According to John Murray Reynolds, vice-president and corporate data security officer at Chemical Bank, false rejects were a problem when Chemical Bank, based in New York, tested a yet-to-be-released keystroke dynamics product.

The product, Reynolds says, constantly monitored the way a person at a terminal typed. If an authorized person did not type the same way all the time, he would get kicked off the system and be forced to log on again. Keystroke dynamics "has value," Reynolds says, "and we've used it. But you must make sure you employ the technology in the right applications." Reynolds recommends keystroke dynamics for organizations that do a great deal of data entry, in which computer operators



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do the same thing repeatedly.

Another issue that must be addressed is public acceptance. A certain percent of the population may inherently distrust some types of biometric identification. As a result, not all types of that technology are suitable for all applications.

At a major national laboratory that has been using retina scanning devices for physical access authorization, user acceptance was a minor problem. According to one of the site's security specialists, who requested anonymity, a small group of users resisted the system initially because they did not understand the technology and feared that the scan would damage their eyes.

Likewise, some people associate fingerprinting with law enforcement. According to George Warfel, security consultant and "PIN" coeditor, about 4% to 5% of the population last year still resisted having their fingerprints taken.

Public acceptance can especially become a problem if a biometric device is to be used in a public service, such as automated teller machines. In these situations, signature dynamics or voice products would be best, since they request the card user to do something he is accustomed to doing. That is why, Information Integrity's Wood says, quasibiometric technologies such as keystroke dynamics have a lot of potential. These products are passive in nature and do not require user involvement and cooperation.

One last snag in the biometrics picture is the possibility that MIS will resist additional security. According to Bologna, some MIS professionals argue that biometric devices complicate the logon process further.

Even if you feel your facility needs high-tech security, be sure to set up a test environment and work with the products thoroughly before you sign on the dotted line. "Gain experience with the technology," Helsing says. "Do evaluations and pilot tests and get to know which application is best suited to your shop."

Wood recommends interested users to enter a 30-day, no-commitment trial before going ahead with a wider implementation. "To unilaterally decide that this technology should be applied across the board," Wood says, "is a great recipe for failure." •

A card holds the future

The first place MIS will most likely see biometric technology is embedded in token- or smart-card devices. According to Joan Murray Reynolds, vice-president and corporate data security officer at New York's Chemical Bank, the combination of smart or token cards and biometrics makes sense because it would cut down on certification and authentication costs.

"There are points that must be worked out so the systems can't be spoofed," Reynolds says. "But it appears now that this is the way [biometrics] would be most useful and least expensive to implement."

If biometric data were stored on a smart card, the information could be validated by a local reader instead of having to be transmitted to a CPU.

Verifying signatures

One example of a possible smart card and biometric scenario involves automated teller machines. In the near future, when you open a bank account and apply for an ATM card, the bank officer may not only ask you for your account number but also request that you enroll for a signature verification template. The biometric information would be digitally stored on the token or card.

When doing your banking at an ATM, you would at some point be asked to sign your deposit or withdrawal slip using a specially equipped pen and pad. In the time it took you to sign your name, the ATM's biometric reader would compare it with the information stored on the card.

Providing you had the necessary funds in your account and your signature was verified, your transaction would be processed. Similar systems could be used to verify credit card purchases.

Four choices

Four vendors that currently provide such products are Micro Card Technologies, Inc. in Dallas, Fingermatrix, Inc. in White Plains, N.Y., Identix, Inc. in Palo Alto, Calif., and Security Dynamics, Inc. in Cambridge, Mass.

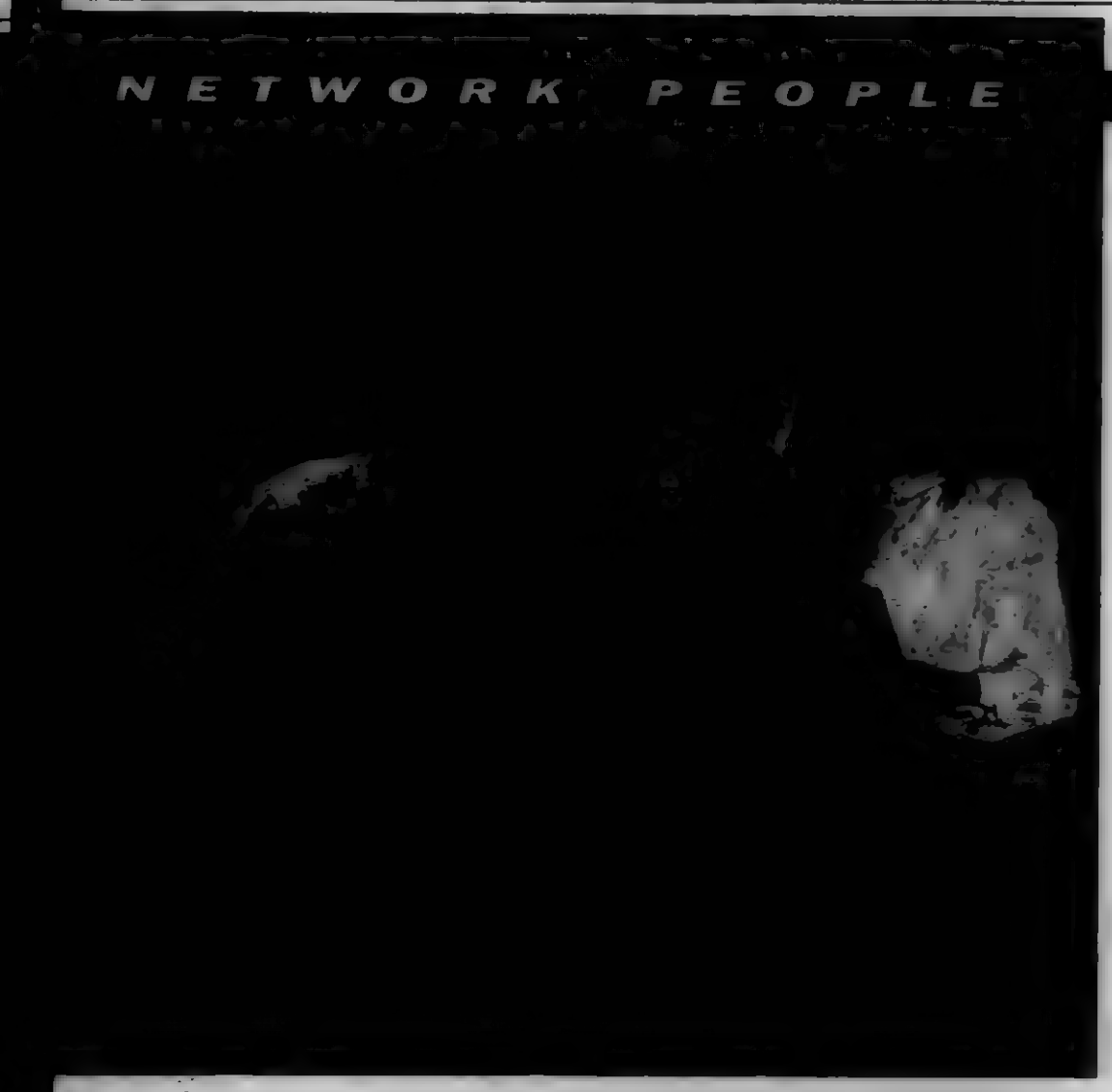
Micro Card Technologies' product, called Smartcard, is the size of a credit card and stores an employee's personal identification number (PIN) along with a biometric template if requested. All information is embedded in read-only memory and erasable programmable ROM.

The Fingermatrix Ridge Reader Mint smart card terminal provides users with a smart card that stores a fingerprint minutiae file. The product is scheduled for release in the spring.

Identix provides smart cards to be used with its IDX-50 and IDX-50W Smartcard Access Control terminals. The smart cards combine fingerprint templates, a PIN and an optional magnetic strip.

Security Dynamics' product, SecureID, is a random pass-code generator that contains a small micro system that stores all information in random-access memory. When the card is tampered with, connection between the battery and memory is broken. This destroys all information and makes the card tamper-resistant.

JANET FIDERIO



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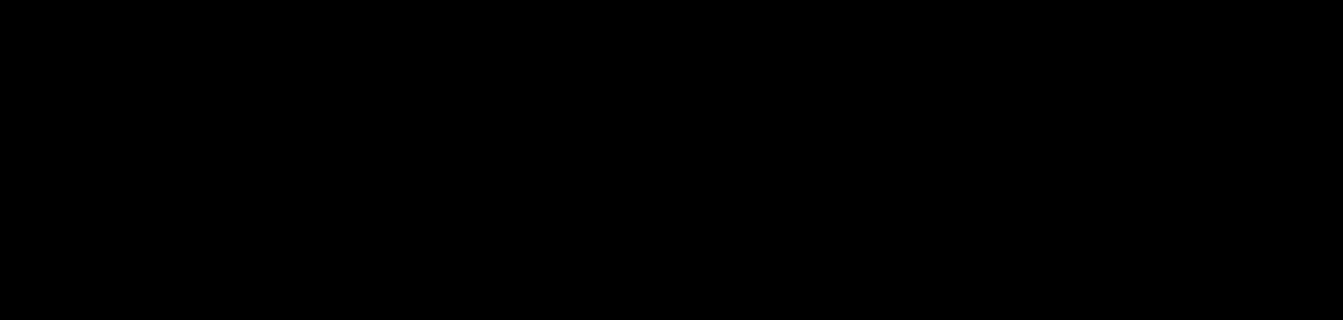

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Neural networks: Glamour and glitches

Neurocomputers shine in demonstrations but still make some decisions for the wrong reasons

BY MICKEY WILLIAMSON

While university scientists still try to figure out how the nervous system works, engineers and mathematicians in the private industry are building neural networks to solve problems that defy the capabilities of traditional serial machines.

So far, the only large-volume application for neural networks is in high-speed modems. But before long — maybe in less than two years — neural networks will be the tool of choice for analyzing the contents of large data bases.

Neural networks are already being tried out in a variety of applications:

- Modems that transfer data at 9.6K bit/sec. use a neural network that learns to distinguish between noise and data.
- Nestor, Inc. markets a system that reads handwriting and converts it into ASCII characters as though the information had been entered through a keyboard instead of a digitizing pad.
- Hecht-Nielsen Neurocomputer Corp. has a product that can recognize and classify complex visual images, a feature useful in applications such as industrial parts inspection and autonomous robotics.
- Both Neuralware, Inc. in Sewickley, Pa., and Neuronics, Inc. in Cambridge, Mass., offer low-cost software that lets developers experiment with neural network architectures. The former runs on Intel Corp. 80286 machines, the latter on the Apple Computer, Inc. Macintosh SE or Macintosh II.

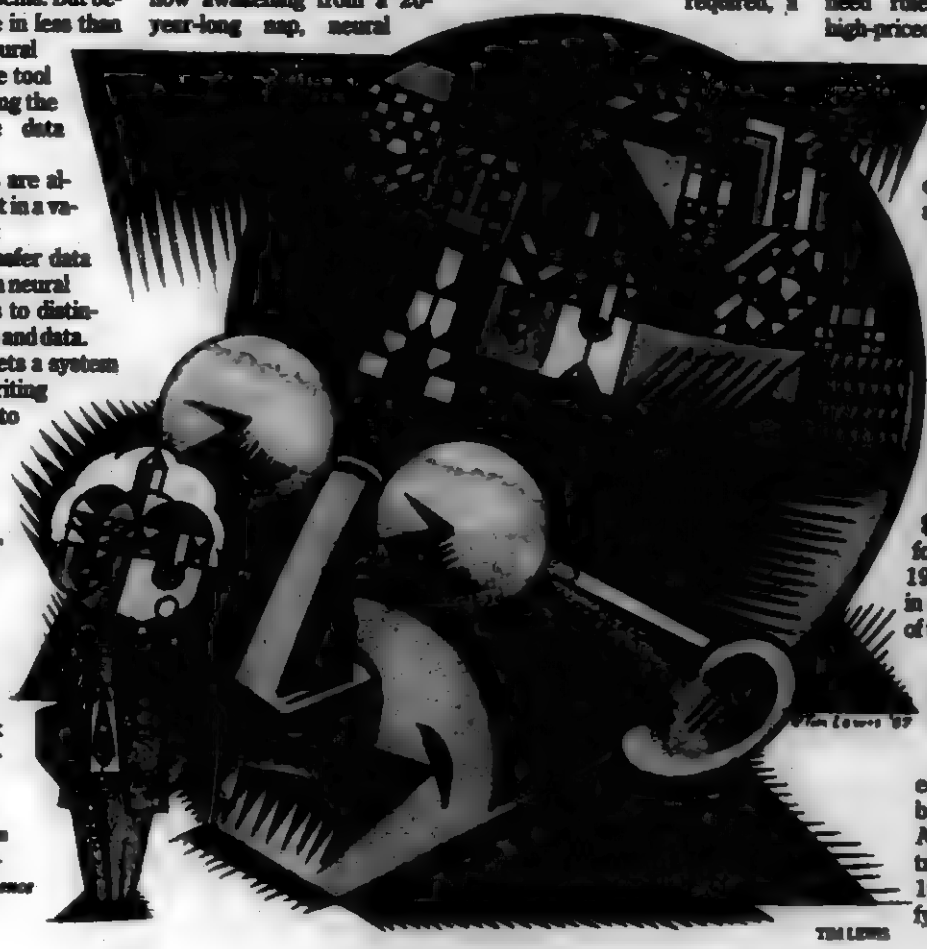
A 30-year-old technology just now awakening from a 20-year-long nap, neural networking offers an information processing approach entirely different from the conventional algorithmic programming model. Instead of following a painstakingly enumerated list of steps to achieve a program goal, neural networks — also called neurocomputers — are trained for a specific task in much the same way a human would be. That is, given a set of examples of the kinds of inputs it will receive and the sort of output required, a neurocomputer will develop its own problem-solving algorithm.

Since neurocomputers function essentially by recognizing patterns, they are well suited for tasks that conventional computers cannot do — for example, looking at masses of marketing and sales data to discern buying patterns for a product line.

This is the stuff expert systems are made of, but a neural network-based expert system goes one step further: It does not need rules, programming or high-priced knowledge-engineering services.

According to Barrett Moore, Eastern regional operations manager at Nestor in Providence, R.I., an application-level programmer can learn to build an adaptive expert system — a system that learns from the data it has been shown — with two weeks' training and an investment of about $25,000. Nestor, founded in the mid-1970s and incorporated in 1983, is the patriarch of the neural industry.

The rate of development in neurocomputing is impressive. When Edward Rosenfeld, editor of New York-based *Intelligence Newsletter*, started tracking the field in 1984, he could identify barely two dozen



TIM LEWIS

Williamson is a technical journalist and consultant in Warwick, Mass. She is author of *Artificial Intelligence for Microcomputers.*

- **Future application: Giant data bases**
- **Well suited to unconventional tasks**
- **One step beyond expert systems**

companies worldwide involved in neurocomputer work. He now lists more than 175, at least 125 of which are devoting "very major efforts" to neural networking development research.

"I count 29 or 30 start-ups in the field in the last two years," Rosenfeld says.

The pace has probably not yet reached its peak. Some 1,500 people attended the first International Neural Network Society conference in San Diego last June. More than 200 papers were presented, and a straw poll found that two-thirds of attendees were involved in product development.

One of the more spectacular demonstrations at the San Diego conference was Netalk, built by Terrence Sejnowski at Johns Hopkins University in Baltimore. Netalk was able to learn to translate ASCII text into understandable English speech.

At first, Sejnowski reported, the neurocomputer babbled like an infant. Gradually, it learned to distinguish between words. After about 16 hours of practice in matching text and phonemes (corresponding speech sounds), it was talking at the level of a 6-year-old child.

Caveat emptor

Today's buyers are investing in research and development, experts warn, not in a mature technology. Several years will have to pass before neurocomputers join mainstream computing.

According to Robert Hecht-Nielsen, founder and chairman of Hecht-Nielsen Neurocomputer in San Diego, designers still have much to learn about configuring and training neurocomputers.

But, Hecht-Nielsen says, designers do not face technical barriers comparable to those vexing researchers in superconductivity, for example.

Before he left TRW, Inc. in San Diego to start his own company, Hecht-Nielsen built what is probably the largest neurocomputer in existence today, the Mark IV, for the U.S. Department of Defense.

Neurocomputer architecture is modeled on current understanding of the way the human brain encodes and processes information. Nodes in a neural network — called processing elements — model individual nerve cells, or neurons, in the human nervous system.

In the brain, each neuron receives electrochemical impulses from thousands of other neurons. If the sum of the signals received is strong enough, the neuron sends it on to another nerve cell or to a muscle or organ.

Laboratory scientists are now trying to determine how the organic network of nerve cells is arranged and what happens within a neuron when learning takes place.

Just like a brain

Neural network simulation software lets developers work with some of the dozen or so best-known theories of brain organization and learning. They can experiment with processing elements and the strengths of signals between the elements.

Just as the field of expert systems has given rise to a variety of development tools and theories about which tools best match which kinds of problems, we can expect to see neural network development systems that employ one or another organizing principle for internode connection and learning.

The brain is a massively parallel processor, working on many inputs at once; neurocomputers are also inherently parallel. But most currently available products are software packages or add-in boards that simulate neural networks on conventional serial computers.

There is no guarantee that a good piece of neural software would run better on a parallel computer, Rosenfeld says.

The processors in a neural network, whether implemented in hardware or software, are relatively simple. Unlike traditional von Neumann computers, which rely on a central processor and do one thing at a time in serial fashion, neurocomputers work in parallel, with several processing elements at once handling a single data item.

The fact that processing, and hence learning, is distributed among processing elements leads to unusual robustness in neural networks. Neurocomputers are inherently fault tolerant; individual processing elements can malfunction without compromising the entire system, just as individual cells in the brain can die with no appreciable change in a person's behavior.

Typically, processing elements are arranged in layers, or slabs (see chart at left). The lowest layers look at general features of a pattern — curved or straight, thick or thin, high or low — and succeeding layers are increasingly specific until at last there is a slab whose output is sufficiently refined to be useful.

The lower levels may recognise, for example, that a character contains a couple of curves. Intermediate levels may refine their understanding of the shape, but only at the top layer is the input recognised for what it is, the letter S.

Neurocomputing finds its roots in technologies such as signal processing and pattern recognition. Its history dates back to the 1940s and a paper written by neurophysiologist Warren McCulloch and mathematician

How a neural net works

The processing elements are organized in layers in which each element has weighted connections to elements in other layers; the input layer receives many stimuli, while the output layer produces only one response

INFORMATION PROVIDED BY NEURALWARE, INC.

I don't do numbers

According to one theory, logical and rational operations are performed by the brain's left hemisphere, integrative and intuitive functions on the right. Following this, neurocomputers are right-brained: no good at all for keeping the company books but very well suited for discerning the financial indicators in a year's worth of stock market data.

MICKEY WILLIAMSON

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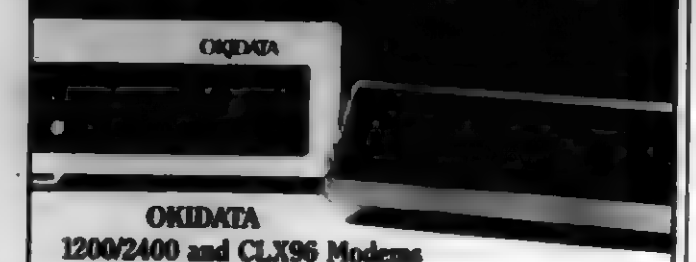

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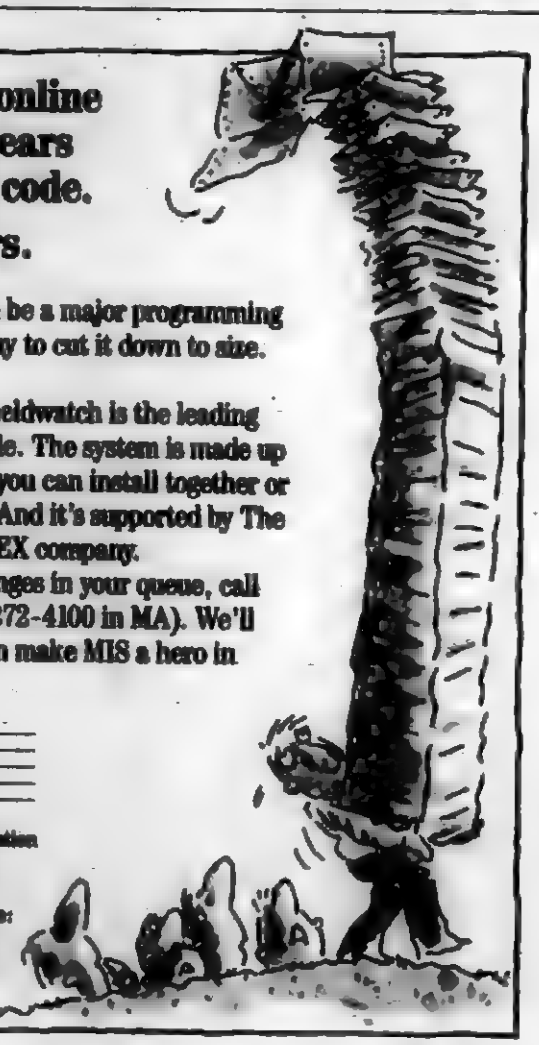

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Walter Pitts. The paper described an abstract model of neurons and showed how they might be connected to carry out mental processes such as learning.

Death, rebirth

This work caught the imagination of Harvard University undergraduate Marvin Minsky, who in 1951 built a learning machine out of vacuum tubes and motors based on the McCulloch-Pitts neuron model — a model that to this day forms the basis of most work in neural networking.

Minsky, now a professor at MIT, went on to become one of the founding fathers of artificial intelligence. Though much of his early work provided a foundation for present-day neurocomputer research and development, Minsky's 1969 book *Perceptrons* presented a scathing critique of neural networking.

The book is widely held to be the reason that funding for neural network research dried up in 1970, sending the technology into dormancy for nearly 20 years.

Today, interest and activity has reawakened, due in part to two trends in the chip making industry: low prices and high density. The price of memory and processors has decreased to the point that vendors can invent their own technology rather than wait for it to come from university research laboratories.

Howard Bogert, vice-president at Dataquest, Inc., a San Jose, Calif., market research company launching a multiclient study of opportunities in neurocomputing, sees the technology as a way to make use of advances in semiconductor technology.

EVENTUALLY, we will see neural networks on a chip.

With chips becoming ever more complex, Bogert predicts, by the year 2000, "it will be possible rather routinely to build a chip equivalent to 1,000 VAXs."

Given the current lack of knowledge about which network configurations best suit which kinds of tasks, simulating neural networks in software is the logical choice. But eventually, we will see neural networks on a chip.

The implications of neurocomputing in fields such as manufacturing and process control are many and varied. For example, AIware, Inc. in Cleveland demonstrated a neural simulation of paper-tension control in a paper mill at the San Diego conference. The system performs a quality-control function, determining how strong and thick the paper will be.

Dataquest's Bogert says he sees neural networks as potentially good quality assurance inspectors in combination with a vision system. They should, he says, spot both "gross defects and generalities such as 'Is the label on straight?' "

Neural networks could also handle data base management tasks such as eliminating duplications from a mailing list. A neural network "should be able to recognize that H. Jones is the same person as Howard Jones if the address is the same," Bogert says.

Teaching an expert system to do that would require a series of rules in which the system first distinguished between first and last names and then matched the last name and address in Record A with those in Record B. It should then discard one of the two records if the last name and address are identical in both. A neural network would simply match patterns contained in the two records and discard one if the match exceeded a given threshold — for example, if there was an 85% correspondence.

Calling on the expert

One of the most interesting product categories is adaptive expert systems. Nestor has one such system installed for beta-testing in a financial services firm, where it makes recommendations concerning mortgage applications.

According to Nestor spokesman Barry Hoglund, the system receives application information from the company's historical data base and is told by keyboard entry whether each application was accepted or rejected and, when possible, whether the accepted applicant later defaulted on the loan.

"After a significant number of applications have been presented to the system, it will develop its own internal understanding of what constitutes an acceptable application or one that should be rejected," Hoglund says. "At that point, if you submit a new application, it will make a decision whether to approve or deny [the loan]." The number of training cases varies with the application, but "it is numbered in the thousands, rather than the hundreds of thousands," Nestor's Moore says.

This system is different from a conventional expert system of the inductive variety — in which rules are developed from a set of examples — Hoglund says, because "we don't predetermine what the relationships are between the variables. We submit the variables to the system and let it recognize a pattern."

The potential problem is that the neural system may pick out bogus variables on which to base its conclusion.

Suppose, for example, an insurance underwriter bases decisions on factors that do not appear on the application. Perhaps the company has a temporary policy in effect to restrict loans. Maybe the applicant has an unusual history with the company.

In those cases, the neurocomputer would probably find some variable on which to differentiate, but its decisions would bear no resemblance to the human underwriter's performance.

Or, consider an inspection system that is shown a set of good ballpoint pens and a set of rejects. It happens that what is wrong with the rejects is that the ink outlet is clogged. But the

Make it look familiar

As with all new technologies, marketplace acceptance is apt to be slow in coming, with most potential customers taking a wait-and-see attitude. That stance is forcing vendors to be more creative in their marketing strategies.

"One of the approaches we're taking," says Casey Klimasauskas, founder and president of Neuralware, Inc., "is not to go too far out in terms of applications and to package those applications in a way that looks familiar and feels familiar but adds capabilities that aren't available otherwise."

Embedding neural networks within familiar products is a strategy already in use, according to several industry observers. Edward Rosenfeld, editor of New York-based *Intelligence Newsletter*, says he knows of "some very prominent neural networking scientists" who developed a neural network algorithm under subcontract with a chip making company. The chip maker now uses the network in a semiconductor inspection system it sells to a third company.

"No one would ever know that neural networks were in any way involved in this situation," Rosenfeld says.

Robert Hecht-Nielsen, founder and chairman of Hecht-Nielsen Neurocomputer Corp., says he sees neural networks and conventional computers as complementing, rather than competing with, each other. His company foresees a growing use of the neurocomputer as a coprocessor controlled by a host digital computer.

"That will become more and more common," he says, predicting that 10 years from now, practically every computer will be partly a programmed computer and partly a neural computer.

MICKEY WILLIAMSON

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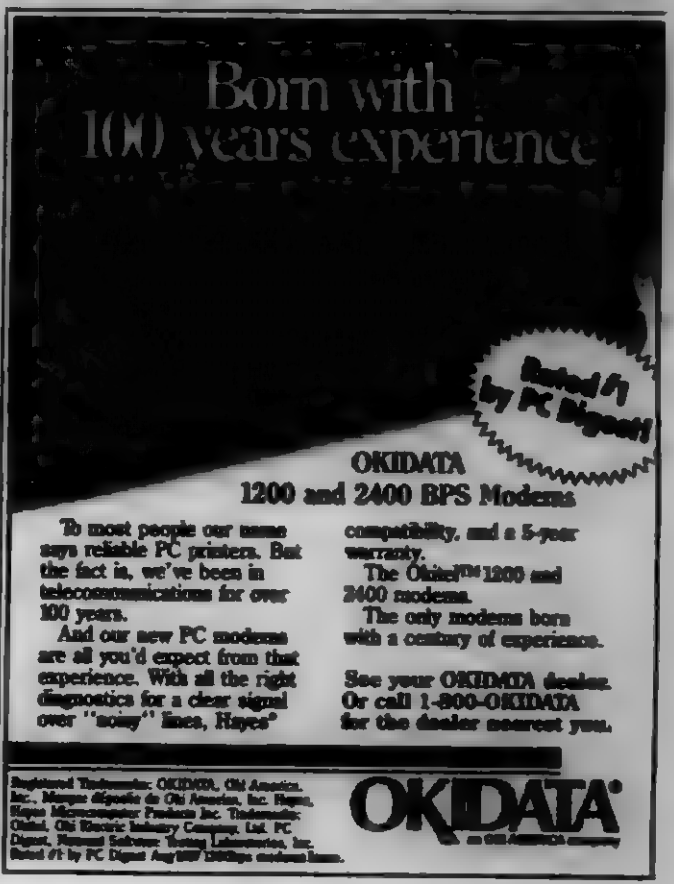


vision component of the neural network cannot see that, and there is no telling what it will base its opinion of quality on. How to account for these so-called exogenous variables is one of the conundrums facing researchers today.

Nor can neural expert systems explain their decisions the way more conventional rule-based systems can. A rule-based system could display the rules and variables that it used to reach its conclusion and even write a report that could be used in a letter to a rejected applicant. Neural systems cannot yet do that.

Sitting on the bottom line

However, the potential of neural expert systems is still impressive. One financial services organization's neural loan analysis system is said to outperform the company's human experts by 27% in terms of profitability.

Hecht-Nielsen says, "If you translate that into the scale of a business that is lending hundreds of millions of dollars a year, that can be an astounding difference at the bottom line. It can make a good company great."

The kind of neurocomputer-based systems that science fiction movies show — the ones that recognise people's voices or faces or palm prints before they unlock a door — are becoming possible, according to Casey Klimasauskas, founder and president of NeuralWare, Inc. And neural-equipped watchman robots should be able to differentiate between animals and human intruders in a factory, to see fire or flood and to decide on appropriate actions to take.

In the office, continuous speech-recognition systems — speaker-independent and able to adjust for variations in accent — will make possible voice typewriters that take vocal dictation and turn out printed memos.

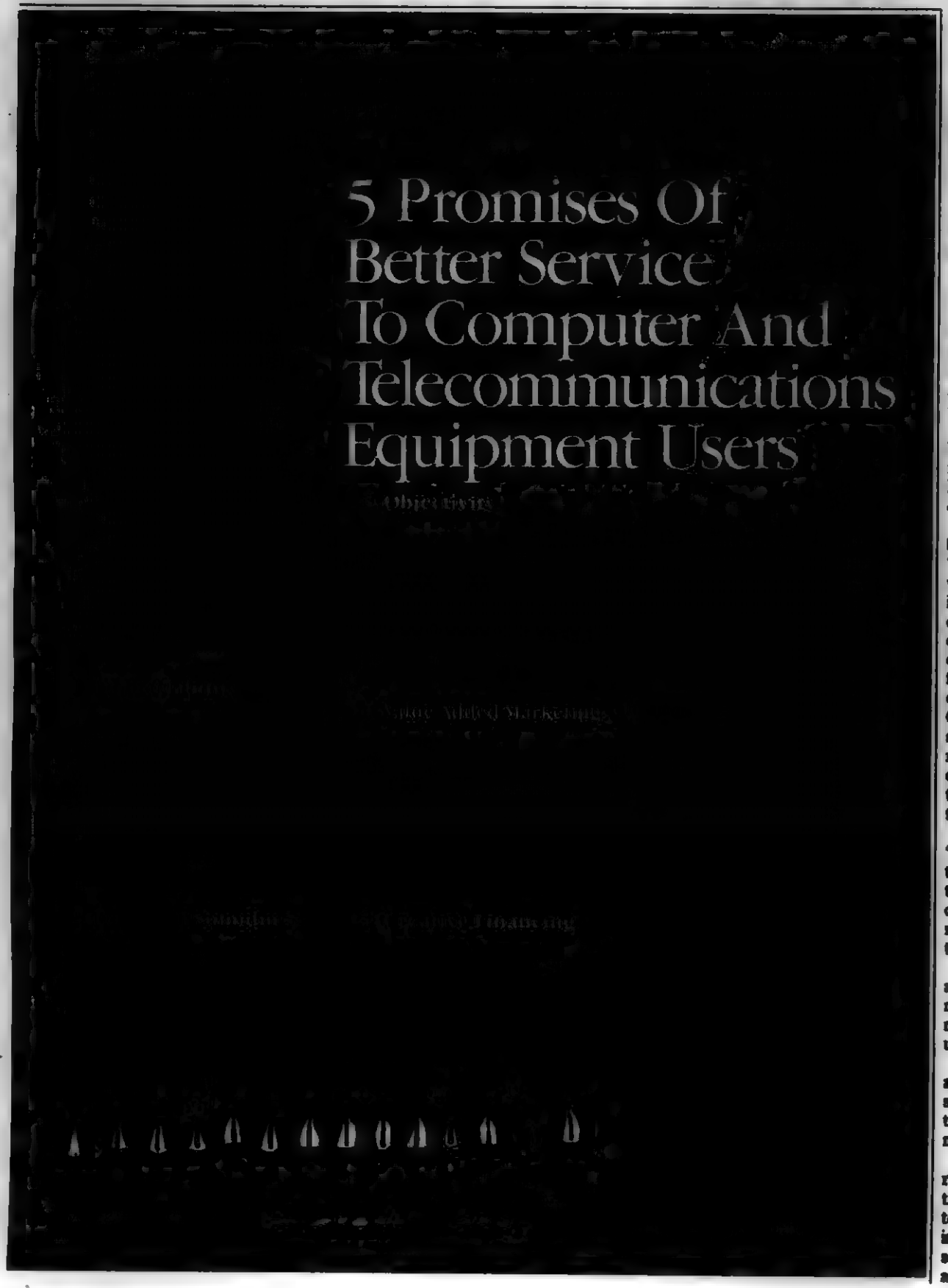
But not quite yet. First, a few barriers must fall, Klimasauskas says. Small problems can be solved on machines in the Intel Corp. 80286 and 80386 classes, but some problems involve such extensive amounts of data, or the patterns to be matched are so complex, that special-purpose hardware will have to be developed.

In addition, the equations that determine the strength of connections between processing elements are both "very tricky to select and very critical," Klimasauskas says. "That does not make for a sufficiently robust system that you'd want to deploy it in the field for inexperienced users who don't know what the results should be."

Developers must also choose appropriate learning paradigms from among the 13 that are currently known. Hecht-Nielsen's software offers a choice of five. Different paradigms will doubtless be best suited for different tasks, but much work remains to be done before the best matches are found.

And a slew of unanswered questions remains: How should the weights of various inputs be summed in a given neural element? How often, and by how much, should they be adjusted? How many layers are sufficient, and how many processing nodes?

How enterprising should the system be; in other words, how many times should it guess before it gives up? If it finds one good answer, should it continue to search for another? Once it has reached a conclusion, what should it do about contradictory evidence?



ONE FINANCIAL services organization's neural loan analysis system is said to outperform the company's human experts by 27% in terms of profitability.

Down the road, users may be able to buy neural network shells that incorporate answers to many of these questions. But at the moment, each system is proprietary and custom-written.

Better or just newer?

"A lot of research needs to be done on whether you can really get more processing power out of a neural system than you can out of a traditional system," says Robert Kuczewski, TRW staff engineer. According to Kuczewski, many people in the field still do not understand the full implications of using the neuron, rather than a CPU and memory, as the basic processing structure. Furthermore, he says, "There really haven't been any applications demonstrated to date that are clearly better than any other way of doing the same thing."

"That's wrong," Hecht-Nielsen says. "Our customers are people who know their business; they've been in it a long time, and they've tried everything they can get their hands on. Now they've tried neurocomputing, and it works a lot better."

User companies with neurocomputer applications under development are not making announcements, and the neural network vendors working with them are usually sworn to secrecy.

But the names whispered in confidence are the big ones in finance, banking and insurance, as well as auto making, entertainment, transportation and telecommunications.

And while it is too early to define a neural network industry, or even to measure the installed base of neurocomputing systems, it is not too soon to think about the implications of a computer that can do something much more like thinking than anything we have seen before. •

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MANAGEMENT

TAKING CHARGE

Anita A. Bradley

Tending the DP forest

Do you rely on the phone to ring with complaints of poor response time or poor turnaround on batch work? Do your systems operators, network operators, systems programmers or application programmers have to worry about keeping your system running efficiently? Or do you have someone to monitor the performance of your shop and make corrections before small problems mushroom into large, unmanageable ones?

Data processing shops that don't have a group dedicated to this end aren't running as efficiently as they could. On one hand, if you have an abundance of cycles and storage available to do the job, your system will run smoothly, with little tuning required. However, your costs are likely to be higher than they need to be.

If, on the other hand, you maximize use of your current resources before acquiring more, you will need to pay more than a little attention to planning and performance management.

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Two of the employees in

Continued on page 104

Shaping up Goldman

Systems exec sees opportunity in market collapse

BY ALAN ALPER
CW STAFF

NEW YORK — It was the week of Black Monday when Rick Adam decided he would join Goldman, Sachs & Co. as a partner and the firm's top systems executive.

As the world's financial markets gyrated uncontrollably after almost five years of unbridled growth, it could easily be argued that this was not the most propitious time to come to Wall Street. Adam, moreover, already had a secure job: He was corporate vice-president of the information systems division at Baxter Healthcare Corp., a $5 billion Deerfield, Ill., health care firm.

But to Adam, joining one of Wall Street's most prestigious firms — even as industrywide contraction began — was like playing in the big leagues. "I didn't find it troublesome at all," Adam says. "In hard times, strong firms get stronger. I look at this as an opportunity."

Challenge is not new to Adam, a 41-year-old West Point graduate and father of four. His pastimes include skiing, marathon running and an occasional triathlon, and he is given to spicing his language with military and sports analogies.

Earned his wings

Adam served in the U.S. Air Force from 1968 to 1973, working as a computer officer and data center manager on the Apollo space program.

He later joined IBM as a sales representative based in Los Angeles, then ran Litton Industries, Inc.'s corporate data center, FMC Corp.'s data processing operations and Baxter's Information Systems Division.

PROFILE
Rick Adam

***Position:** Partner, Goldman, Sachs & Co.*

***Mission:** To hasten transition to IBM mainframes, seek technological edge over competitors.*

Upon his arrival at Baxter in 1980, Adam says, he found an MIS department wracked with problems. He conducted exit interviews with departing staffers to help formulate a remedy and found that much of the MIS staff had become stale.

Turnover down

To fix the systems shortcomings, Adam had to install personnel and human resource programs. He established Baxter's first college recruitment and entry-level training programs. Turnover fell from 25% to 3%, and the department's staff grew from 150 to 400.

Adam says his management style is rooted in military training and an acknowledgement that the Information Systems Division exists for one reason — to serve its clients. "I'm enormously mission-oriented," he says. "It's important for any [information systems] department

Continued on page 96

RECRUITING 1988

Cost control dominates in new MIS hiring season

BY LAWRENCE STEVENS
SPECIAL TO CW

At Sun Company, Inc., a Radnor, Pa.-based oil company, information systems units will do slightly less hiring this year than they did in 1987, delaying the replacement of employees and using more outside contractors.

"The price of oil has dropped in the past year, and that has pulled our profits down. And the further south our profits fall, the tighter we have to pull in our belt," says Dudley Cooke, general manager of information systems at Sun.

The oil company's situation is typical of MIS organizations in many industries at the onset of the recruiting season.

Most hiring needs for this year will remain steady or drop slightly from 1987, according to MIS recruitment specialists. They say this will prompt some managers to rely on more efficient recruiting techniques.

Win a few, lose a few

A few MIS departments will expand this year due to the addition of services or increased business volume, the experts add. But on the other hand, cutbacks will be evident in financial services firms overwhelmed by the Oct. 19 stock market collapse.

"The situation on Wall Street has definitely impacted the brokerage community and a limited number of investment banks in terms of the hiring of DP professionals," says Roger O'Connor, staff consultant at Edward Perlin Associates, Inc., a New York-based compensation management firm.

"There will be reductions of staff as well as bonuses, and there will also be salary adjustments," O'Connor adds.

RAL MAYFORTH

In general, however, most MIS hiring will be limited to the replacement of departing employees, and according to a telephone survey by Perlin Associates, turnover will remain steady or decline from the 18% to 21% rates of the last five years.

Despite anticipation of this belt tightening, there is no crisis atmosphere. For most departments, services will not be cut, expansion plans made last year will not be significantly altered, and outside of financial services, there will be few layoffs.

"It's just a question of be-

Continued on page 100

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THE FIRST CHOICE

Shaping up

CONTINUED FROM PAGE 95

to get its mission well defined so folks know what it is and are focused on it."

As a Wall Street outsider, Adam's current challenge is to learn the vagaries and vernacular of investment banking. Planning systems and communications strategies while managing a large MIS staff and budget is not much different in investment banking than in other businesses, Adam suggests. Once the terms are translated, that is.

"I often have to take an interpreter along to catch some of the nuances of financial terms," Adam admits, referring to some of his meetings with Goldman's other partners and end users.

Intimate industry knowledge is only one element of being an effective investment banking chief information officer, Adam contends. Equally important, he declares, is broad technical knowledge, deft planning and organizational ability and good people skills. "You have to be like a good quarterback reading the defense," he says. "A CIO has to have good sensitivity to his clients."

Gene Bedell, director of information services at First Boston Corp. — to whom Adam reported while data center operations manager at FMC — believes the affable but stern executive will be able to adapt to the peculiarities of Wall Street.

"He's effective; he's got a good sense of people and a lot of common sense," Bedell says. "He's got a reasonably good technological background, but he's not a techie."

> "YOU HAVE to be like a good quarterback reading the defense."
>
> RICK ADAM
> GOLDMAN, SACHS & CO.

Adam is joining Goldman at a crucial time: A project to convert its corporate information system from old Burroughs Corp. to IBM mainframes is at least two years behind schedule and substantially over budget.

Wall Street sources say the protracted project contributed in part to the dismissal of Goldman's former top MIS executive, Abe Weiss. Regulatory changes and phenomenal growth at the firm helped bog down the project.

Bedell says Adam has not underestimated the challenge. "If anyone can do it, Rick can do it," he declares.

Seconding that opinion is Steven Lazarus, Adam's former boss at Baxter and now associate dean of the University of Chicago School of Business and president and chief executive officer of the Arch Development Corp, associated with the University of Chicago and the Argonne National Laboratories. "Rick's a learning system," Lazarus says. "He absorbs each experience and uses it."

Lazarus recalls a payroll system under development at Baxter that Adam was told to implement within a year of his arrival. Four months later, Adam told Lazarus the system would have to be junked.

"He said that if I let him start all over that in six months he could get a working system," Lazarus remarks. "It took a lot of courage, but that's what he did. And he did accomplish it."

High-octane exec

Goldman is hoping Adam can pull similar feats amid its pressure-cooker atmosphere. David George, the Goldman partner responsible for Adam's hiring, acknowledges the firm needed a high-caliber information systems executive to ensure that its technological infrastructure is as solid or better than those of its Wall Street brethren. Hiring Adam as a partner — something rarely offered to an outsider — reflects Goldman's serious commitment to achieving this.

"We found what we thought was the right person, and we offered what we felt was appropriate to Rick's accomplishments and what was required to entice him to the firm," George explains.

Soon after joining Goldman, Adam fired a recently appointed head of telecommunications, citing organizational overlap. Colleagues say Adam is good at sizing up talent and is not afraid to make changes if required. "Once he has the team he wants he'll fight like hell for it," Lazarus states.

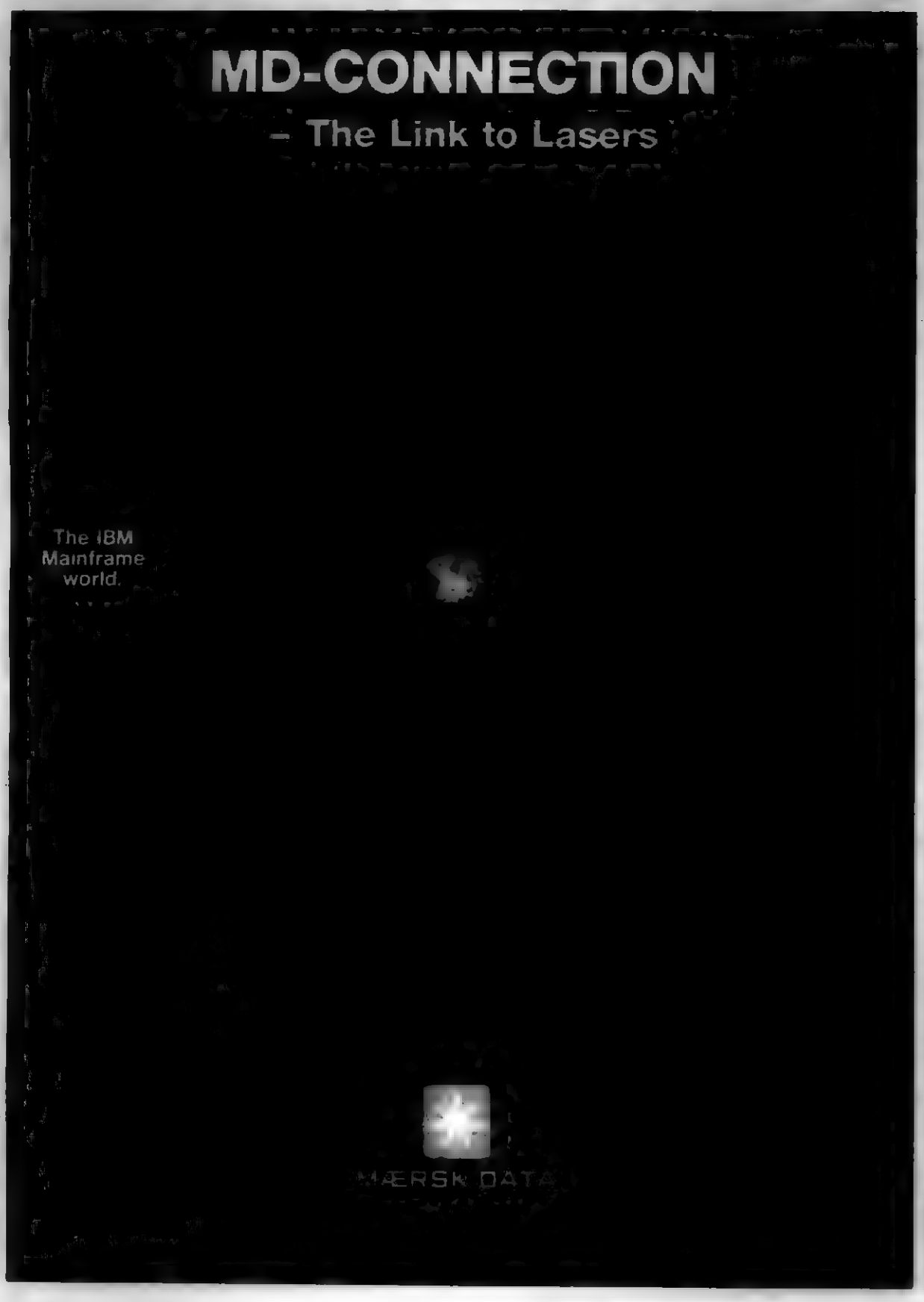
Adam realizes that having better technology than other investment bankers will enable Goldman to earn more money for clients and, ultimately, for the firm. That's why he hired management consultants to assess Goldman's level of automation through technology benchmarks designed to rate competitive advantage in the financial services industry.

"David [George] and I were looking for different ways to establish a starting point" for rating Goldman's technological infrastructure, Adam explains.

Starting points are something MIS projects and triathlons have in common. End points, however, are given greater weight in both pursuits. As a short-course triathlete, Adam knows that stamina is crucial to completing MIS projects and athletic competitions.

So far, Adam says his wind has been better in MIS-related tasks than in the almost 35 miles of swimming, bicycling and running that is required to finish a short-course triathlon. Adam believes he will improve in both areas with age.

"I plan on being the [triathlon] age-group winner when I get to 70," he says emphatically.



CALENDAR

FEB. 21-27

Supercomputing Europe '88. Utrecht, the Netherlands, Feb. 21-23 — Contact: Royal Netherlands Industries Fair, Postbus 8500-3503 RM Utrecht, the Netherlands.

11th Annual Personal Computing Forum. Naples, Fla., Feb. 21-24 — Contact: Sylvia Franklin, Edventure Holdings, 375 Park Ave., New York, N.Y. 10152.

The 19th Annual Electronic Printing Systems Conference. San Jose, Calif., Feb. 21-25 — Contact: S. Thomas Dunn, EPS '88 Conference Chairman, Suite 1, 1855 E. Vista Way, Vista, Calif. 92084.

Effective Methods for Data Processing Quality Assurance. Orlando, Fla., Feb. 22-24 — Contact: Quality Assurance Institute, 9222 Bay Point Drive, Orlando, Fla. 32819.

Fourth Annual Computer Graphics Show New York. New York, Feb. 22-24 — Contact: David J. Small, Exhibition Marketing & Management Co., Suite 1110, 8300 Greensboro Drive, McLean, Va. 22102.

Vision Guidance for Robotic Systems. Cincinnati, Feb. 23-25 — Contact: Joanne Rogers, Special Programs, Society of Manufacturing Engineers, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121

Super Graphic Workstations. Monterey, Calif., Feb. 23-25 — Contact: Institute for Graphic Communication, Inc., 375 Commonwealth Ave., Boston, Mass. 02115.

1988 ACM Computer Science Conference. Atlanta, Feb. 23-26 — Contact: Association for Computing Machinery, Conference Dept., 11 W. 42nd St., New York, N.Y. 10036.

Interactive Instruction Delivery/Learning Technology in the Health Care Sciences. Kissimmee, Fla., Feb. 24-26 — Contact: Society for Applied Learning Technology, 50 Culpeper St., Warrenton, Va. 22186.

FEB. 28-MARCH 5

Telecom '88 Bank Telecommunications Conference. Bal Harbour, Fla., Feb. 28-March 2 — Contact Ed Alwood, American Bankers Association, 1120 Connecticut Ave. N.W., Washington, D.C. 20036

Third International Conference on CD ROM. Seattle, March 1-3 — Contact: Sherrie Eastman, Microsoft Corp., Box 97017, 16011 N.E. 36th Way, Redmond, Wash. 98073.

MARCH 6-12

National Conference of the North American Honeywell Users. Norfolk, Va., March 6-10 — Contact: Lee Pecce, NAHU, P.O. 2037, Willingboro, N.J.

Integrated Database Management System User Association Annual Conference (IDMS 88). Orlando, Fla., March 6-10 — Contact: Kathleen Nilles, IDMS User Association, Suite 600, 111 E. Wacker Drive, Chicago, Ill. 60601.

2nd IEEE Conference on Computer Workstations. Santa Clara, Calif., March 7-10 — Contact: Computer Society of the IEEE, 1730 Massachusetts Ave. N.W., Washington, D.C. 20036.

Federal Office Systems Expo (FOSE) '88. Washington, D.C., March 7-10 — Contact: Debbie Murray, National Trade Productions, Inc., Suite 400, 2111 Eisenhower Ave., Alexandria, Va. 22314.

1988 Spring National Design Engineering Show and Conference. Chicago, March 7-10 — Contact: SNDES, 999 Summer St., Stamford, Conn. 06905.

Ninth Annual Conference on IBP Performance/Capacity Management. Scottsdale, Ariz., Mar. 7-11 — Contact: Applied Computer Research, Inc., P.O. Box 9280, Phoenix, Ariz. 85068.

Seybold Seminars '88. San Francisco, March 7-11 — Contact: Seybold Seminars, 6922 Hollis Road, Malibu, Calif. 90265.

IBM Here and Now. Atlanta, March 8-9 — Contact: Automotive Industry Action Group, Suite 830, 17117 W. Nine Mile Road, Southfield, Mich. 48075.

CAP '88 West. Los Angeles, March 8-10 — Contact: Computer Aided Publishing, Inc., Suite 280, 80 W. Montgomery Avenue, Rockville, Md.

Connect '88. New York, March 8-10 — Contact: Meg Maurer Young, Cahners Exposition Group, 999 Summer St., Stamford, Conn. 06905.

Society for Information Management Institutional Member Conference — Information Systems: The New Business Partner. Tarpon Springs, Fla., March 9-11 — Contact: Kathleen Nilles, Suite 600, 111 E. Wacker Drive, Chicago, Ill. 60601

MARCH 13-19

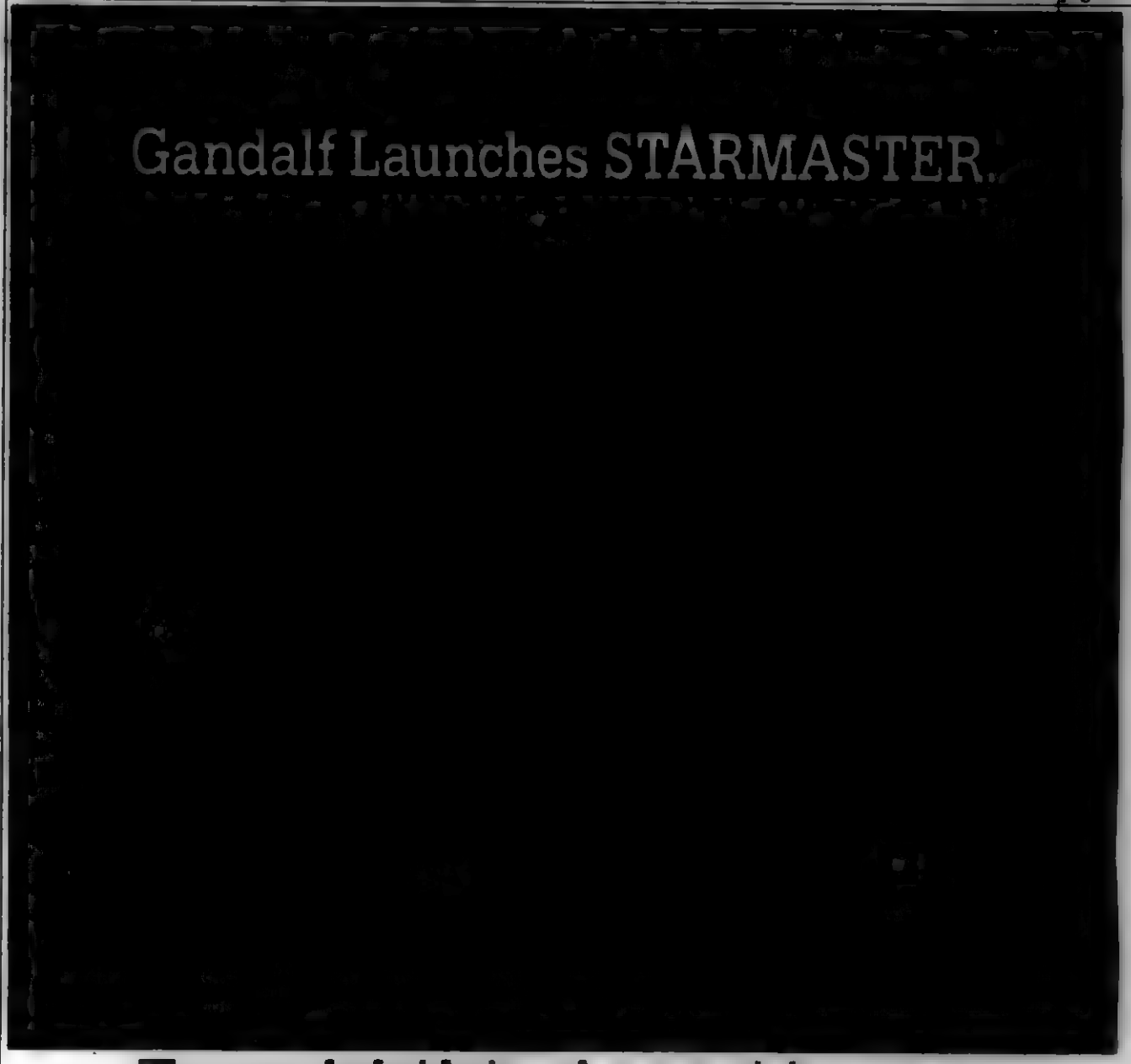
1988 International Development Center Institute Conference. Orlando, Fla., March 13-16 — Contact: Development Center Institute, P.O. Box 44087, Indianapolis, Ind. 46244.

6th Annual National Conference on Ada Technology. Washington, D.C., March 14-17 — Contact: U.S. Army Communications-Electronics Command, ATTN: AMSEL-RD-LC-ASST-1A (Al Rodrigues), Fort Monmouth, N.J. 07703.

Securicom 88 — The 6th Worldwide Congress on Computer and Communications Security and Protection. Paris, March 15-17 — Contact: Securicom, 8 Rue de la Michodiere, 75002 Paris, France.

Desktop Presentations: Computers Reach for New Media. San Jose, Calif., March 16-18 — Contact: Jean O'Toole, CAP International, Inc., One Snow Road, Marshfield, Mass. 02050.

Continued on page 104



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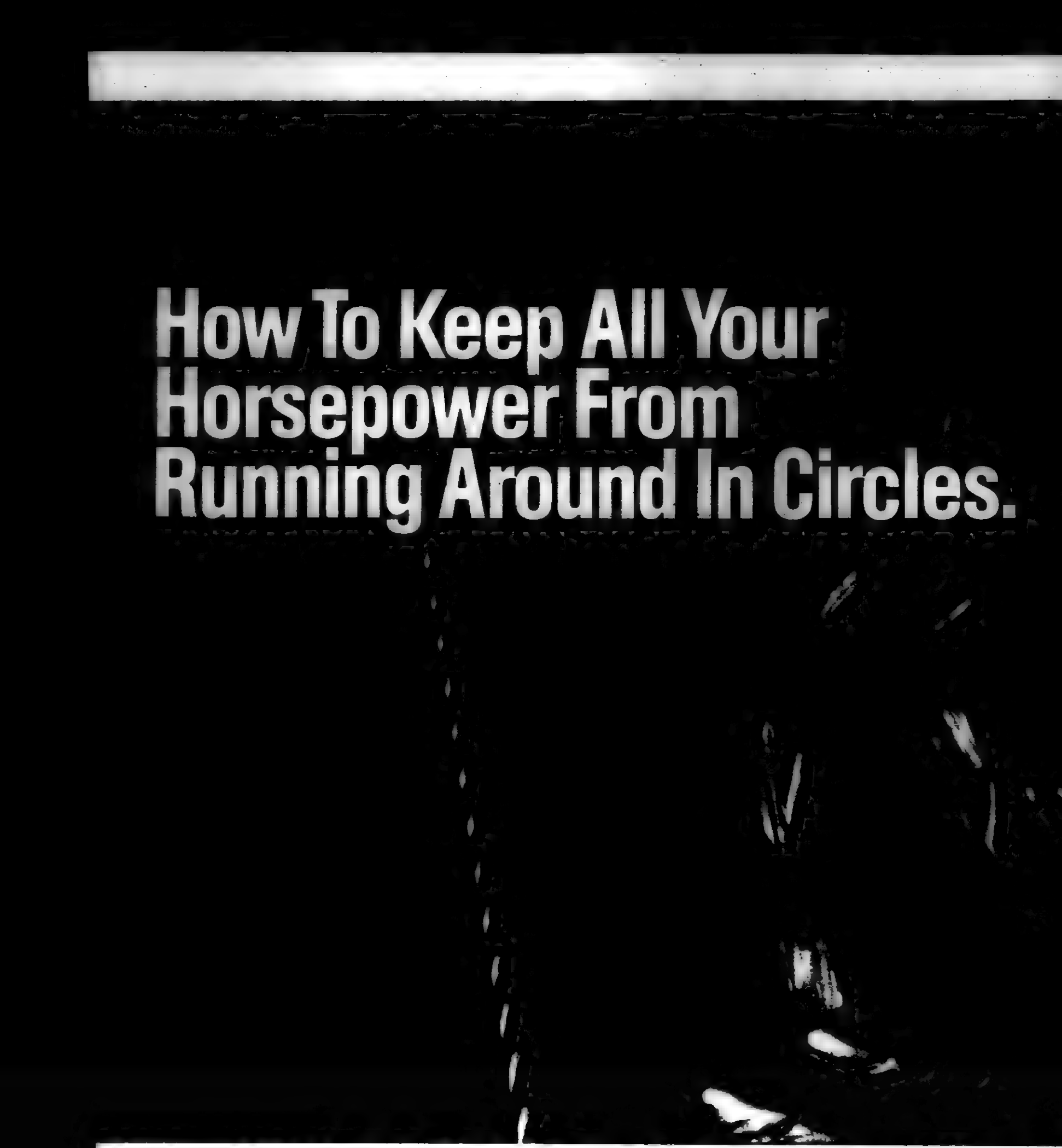

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Hiring

FROM PAGE 95

ing a little smarter and more efficient in our hiring and personnel practices," Cooke says.

Turning to contractors

One such practice is the use of contract workers. "MIS departments work on long-term plans," Cooke points out. "You can't drastically change the number of employees as business cycles ebb and flow. When we have to cut back, it shows itself in subtle ways. We hire at lower levels, we delay replacing people, and we use more outside contractors and temporary help."

Indeed, while staff hiring is expected to remain brisk in telecommunications, data base software and technical support specialties — jobs that are difficult to fill at any time — many companies are turning to contractors to fulfill these specialty needs.

Tom Ferruggia, manager of MIS at Aerospatiale Helicopter Corp. in Grand Prairie, Texas, is struggling to maintain services at a high level and convert from a home-grown DL/1 environment to a Cullinet Software, Inc. IDMS/R integrated data base environment while keeping the number of employees level.

He, too, will depend some on outside contractors. "Independent contractors cost more, but they give us the flexibility we

Sun Company's Cooke

need," Ferruggia says. He points out that using temporary expertise gives Aerospatiale the skills it needs at the time and in the areas that it needs them. "For the right situation, it's very efficient," he says.

Innovative hiring tactics

Another way MIS can maintain services without increasing the personnel budget is to make use of more efficient recruitment techniques. Most managers cite this order of preference for hiring tactics: referrals from present employees; college recruitment (for entry-level positions); newspaper ads — first local, then national; and finally, professional recruiting firms.

Employee referrals. Fidelity Information Services Co., the data processing arm of Fidelity Investments, Inc. in Boston, has institutionalized the process of encouraging employees to refer prospective recruits.

Michael Simmons, the company's president, says offering employees $1,000 for successful referrals brings considerable savings compared with other recruitment methods (see story above).

College recruitment, lower level hiring. Many companies will also try to cut costs by hiring at lower levels. They will be looking at college placement offices for inexperienced recruits, who will need training. This method gets mixed reviews from MIS managers; the advantages include getting an employee relatively cheaply who can be trained in desired fields. A disadvantage is the high turnover as these recruits take their training and experience to another company.

Michael Heschel, vice-president of information resources at Baxter Healthcare Corp. in Deerfield, Ill., believes wholeheartedly in this method.

"We plan to do heavy campus recruiting, and we will hold at least two training classes this year," he says.

"We do expect to lose about 50% of the people we get that way within three or four years. But many of the people in our core of committed employees came from these training programs. These are the people who have grown up with us and are likely to stay with us."

Baxter's Heschel

Newspaper ads. Most MIS managers advertise in newspapers for their positions. Typically, they run half the ads in local papers and half in national papers. It is clearly an economical choice.

Aerospatiale's Ferruggia says he will try to hire through newspaper ads before going to a recruiting firm. "It's a lot more cost-effective," he says, "and we can usually find as good a candidate as those brought in by the recruiters."

Professional recruiters. Last on the list of methods for hiring come professional recruiters. This is partly because of the expense, which in a sense is like keeping one nonproductive person on the payroll for a year for every four or five people hired. A second problem is the question of the honesty and integrity of the recruiter, Fidelity's Simmons says.

He says that when he uses professional recruiters — normally as a last resort — he only uses the best. "The shadier headhunters will put people into your company and then ask them for names of other employees, whom they then try to move out of the company," Simmons says. "They take out from the top and bring in through the bottom." Whenever possible, he insists on a contract stating that the firm will not recruit out of his company.

Stevens is a free-lance writer based in Springfield, Mass.

Going the extra mile for a Mercedes

One innovative method some MIS departments use to recruit employees is letting current staff members refer potential job candidates to the company.

Four years ago, Fidelity Information Services Co. in Boston began a program dubbed Employee Pursuit that awards prizes to workers who recommend someone who is eventually hired by the company.

"Recruiting through newspaper ads or professional recruiters is expensive. We'd rather give part of the money we would have spent on those methods to our employees," says Michael Simmons, the company's president.

Simmons adds that the prospective recruits obtained through internal referrals are more likely to be hired; also, once hired, they tend to be more loyal to the company than employees obtained using other methods. Last year the firm totaled 780 referrals resulting in 180 hires, which represent about 35% of all recruits.

Despite the expensive prizes offered, including the chance to win a Mercedes-Benz, Fidelity Information Services normally has a substantial net savings when an employee is hired through a referral rather than other methods. Simmons points out that recruiting firms charge 20% or more of annual salary. At a $30,000 salary, the recruiter gets at least $6,000, while a typcial prize is worth about $1,000.

The number of companies that use this method of recruiting is still small, but the idea is slowly catching on. A similar plan at seven TRW, Inc. companies in California allows employees to earn $500 plus the chance to win a car for each recruit they bring to the company. The participating firms are fulfilling from 25% to 30% of hiring needs in this way.

McDonnell Douglas Corp. in Long Beach, Calif., also initiated a program in which employees earn $750 and the chance to win a vacation for each recruit they bring to the firm who stays for more than 90 days.

The company considers the program a success, but according to Doug Tillotson, a human resource director at Douglas, the firm is only going to implement the program every few years to prevent employees from spending more time recruiting than working.

LARRY STEVENS

What's hot?

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* Data base management system
† Computer-aided software engineering

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LOCAL HAPPENINGS

SOUTHEAST

Baltimore, Feb. 23. Association for Systems Management (ASM), Baltimore Chapter. Critical Long-Term DP Issues, with Darius C. Andrews of Performance Resources, Inc. Marriott Host Valley Inn. Contact: Eileen Sosen, 1904 Brightwood Court, Eldersburg, Md. 21784.

New York, March 9. Association for Women in Computing, New York Chapter. Health in the Office, with Milan Sulove of The Sulove Technique. Manufacturers Hanover Trust Co., 270 Park Ave. 5:30 p.m. Contact: AWC, P.O. Box 2283, Grand Central Station, New York, N.Y. 10163.

East Hanover, N.J., March 9. ASM, Western New Jersey Chapter. Designing, Implementing and Managing Information Centers, with Joan Penwick of AT&T. Hanover Manor, 16 Eagle Rock Ave. 5:30 p.m. Contact: Lee Cahill, Cahill Associates, Inc., 305 Boulevard, Pompton Plains, N.J. 07444.

Philadelphia, March 9. ASM, Philadelphia/Keystone Chapter. Local-Area Networks: Future Direction, with Maura Brockwood of D.H. Brown Associates. Engineers' Club, 1317 Spruce St. 5:30 p.m. Contact: Jack Cavanaugh, Computer Task Group, Suite 1300, 8 Penn Center, Philadelphia, Pa. 19103.

SOUTHEAST

Charlotte, N.C., Feb. 25. Data Processing Management Association (DPMA), Charlotte Chapter. Monthly meeting. Royce Hotel, Interstate 77 and Tyvola. 6 p.m. Contact: David Hollifield, Piedmont Natural Gas, P.O. Box 33068, Charlotte, N.C. 28233.

Chamblee, Ga., March 8. ASM, Atlanta Chapter. Quality Assurance, with Pam Cooper of National Data Corp. The Holiday Inn Chamblee-Dunwoody, 4386 Chamblee-Dunwoody Road. 5:30 p.m. Contact: Jane Roberts, BBO & Co., Suite 1000, 1 Ravinia Drive, Atlanta, Ga. 30346.

MIDWEST

Cleveland, Feb. 24. DPMA, Greater Cleveland Chapter. Aspects of Communication Skills, with Paul Martino of Keller, Martino and Associates. Hilton South Hotel, Rockside Road and Interstate 77. 6:30 p.m. Contact: DPMA, P.O. Box 6772, Cleveland, Ohio 44101.

Kansas City, Mo., March 8. ASM, Greater Kansas City Chapter. Telecommunications: Signaling System Seven. Hilton Plaza Inn, 45th & Main. 5:30 p.m. Contact: Bill Newton, Computer Task Group, Suite 370, 11000 King St., Overland Park, Kan. 66210.

WEST

San Francisco, March 2. Association for Women in Computing, Bay Area Chapter. Data Driven Design, with Mike Smith of Quality Systems. Stagecoach Restaurant, 44 Montgomery St. 5:30 p.m. Contact: AWC, Suite 1044, 41 Sutter St., San Francisco, Calif. 94104.

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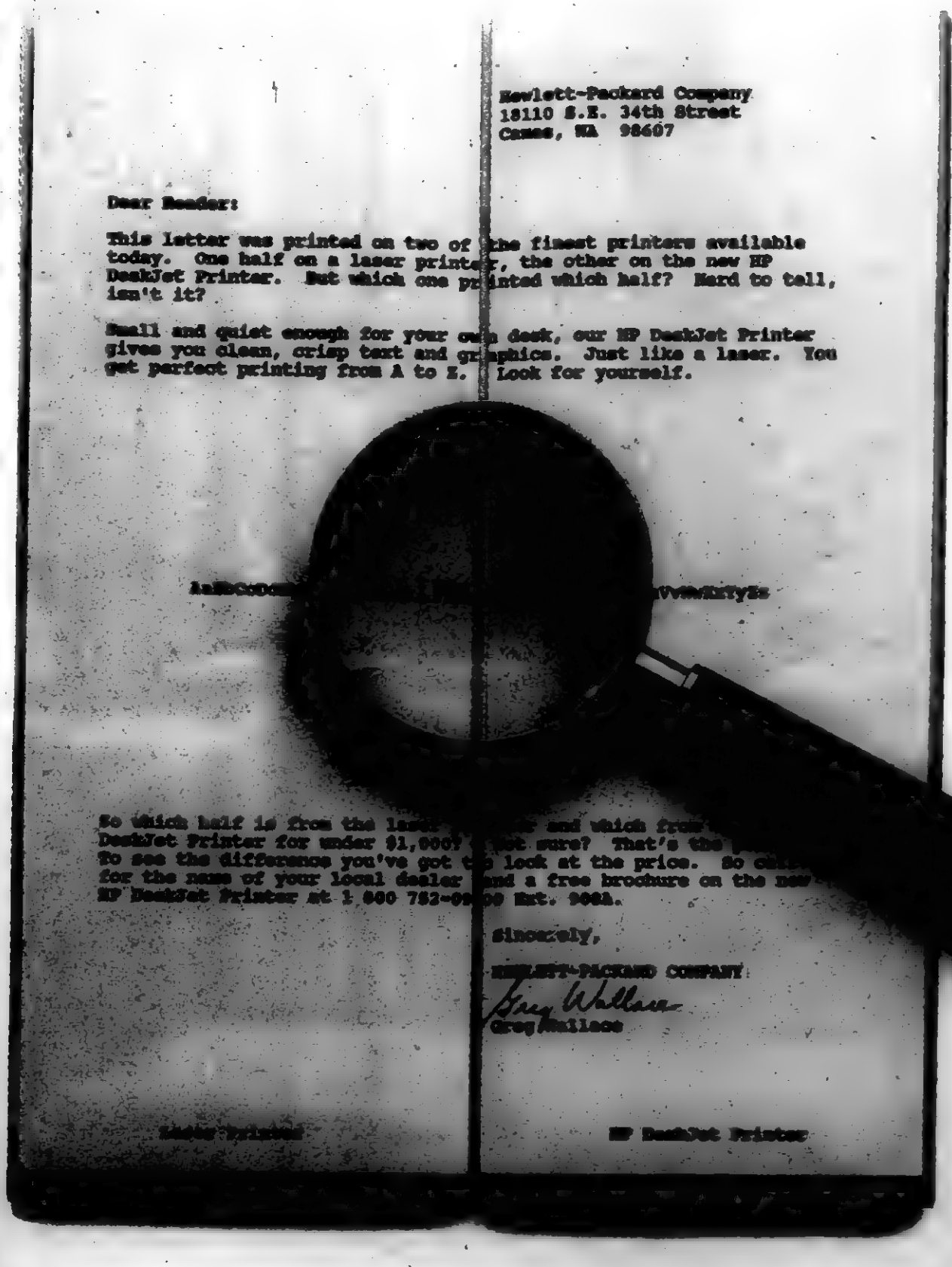

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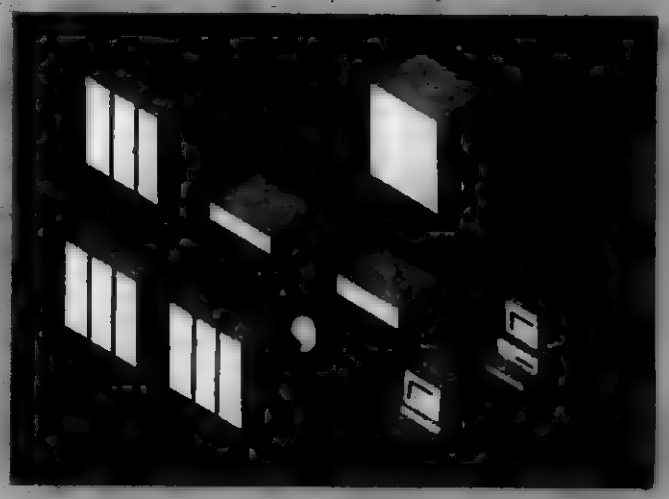

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Bradley

CONTINUED FROM PAGE 95

technical services are responsible for the performance and planning of the operating system, two for the network and distributed hardware, two for CICS and application design, one for direct-access storage devices (DASD) and tape and one for the procurement and disposition of hardware.

One big happy family

The group is a tightly knit, expert unit whose diversity and global perspective of the information systems world make it unique in our organization. Technical services is also the heart of the DP department's strategic and tactical planning effort.

Technical expertise teamed with a comprehensive understanding of the information systems function — that's what technical services is all about.

As a catalyst, technical services is responsible for working with all areas of MIS to solve problems. This arrangement works and works well. As troubleshooters, technical services staffers don't have daily responsibility for any one portion of the system. On the contrary, they have the freedom to inspect any and all parts of the system as needed. The group's activities include the following:

- Monitoring and tracking the system to predict when and where problems will occur and recommending corrective action to head off expected problems. This is achieved through both formal, quarterly performance and availability reports and informally through daily monitoring and tuning recommendations.
- Disseminating those findings to relevant sections of MIS through presentations, training, reports and newsletters.
- Conducting strategic and tactical planning for the computer system. This includes writing the DP five-year plan and other planning reports, such as the justification for a CPU upgrade or installation of a new software package.

All of these activities help the other sections of MIS perform more effectively.

In addition, technical services acts as a clearinghouse for information about application changes being installed on the computer system. This is helpful to system programmers and others who, because of the nature of their work, aren't always aware of the big picture.

By scanning the MIS environment and reviewing users' future resource needs, technical services can advise management on ways of "solving tomorrow's problems today," a slogan the group has adopted.

A couple of examples will illustrate my point.

Operations personnel once reported the runtime for a key batch job had increased by two hours. Both operations and applications personnel tried to solve the problem by changing the elements of the job they each understood.

Technical services took a different approach. The group analyzed the historical system records and pinpointed contention for DASD from a job in a different application. This job was scheduled to execute in the same time frame as the job in question. By scheduling these two jobs to run separately, both could execute in the same amount of time it used to take the longer job.

Cutting costs

The technical services group has also helped cut the company's overall computer costs. In 1985, the group spearheaded a computer load management program that encouraged overnight use of the computer. This helped balance the work load and lower peak daytime utilization. As a result, prime time use dropped from 60% to 34% of the total. Computing costs declined from 44 cents per CPU second in 1985 to 22 cents in 1987. At the same time, computer utilization has continued to climb — more than doubling in the last three years.

In addition, on-line response time has consistently remained at less than two seconds for the remote end user, and the portion of batch jobs turned around in one hour or less has risen from 82% to 95%, while DASD utilization has risen from 50% to 67%.

The evidence is clear. Virginia Power's technical services group has boosted productivity and helped MIS maximize its resources.

In today's rapidly changing world, it helps to have someone grappling with tomorrow's problems — and presenting solutions today. What better way to stay one step ahead of the future?

Bradley is a systems information resources specialist in the Technical Services Section of Virginia Power's Data Processing Department.

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INDUSTRY INSIGHT

Clinton Wilder

Big doings at Compaq corral

So far, it's been a big year for high tech in Texas. First there was Austin's winning of the Sematech chip manufacturing consortium, and then, two weeks ago, the announcement that native Compaq's 1987 sales surpassed the $1 billion barrier in record time.

At first blush, it's a staggering thought that an IBM Personal Computer clone maker reached that milestone even before successful minicomputer builder Prime Computer. Prime came up just short, at $960 million for 1987, but, of course, it chewed through the billion-dollar barrier by gobbling up Computervision.

During its brief career, Compaq has vaulted into a very elite group. The 1987 Fortune 500 lists only nine U.S. billion-dollar commercial computer vendors, based on 1986 revenue.

That excludes billion-dollar firms that sell computers as part of their business, such as Tandy, Honeywell, Motorola, Zenith, Gould, Texas Instru-

Continued on page 110

Du Pont CASE unit hits the road

Chemicals giant melds technology, psychology to create custom software

BY NELL MARGOLIS
CW STAFF

WILMINGTON, Del. — Du Pont Information Engineering Associates (IEA) — the CASE consulting business unit launched by chemicals titan Du Pont Co. — is taking its show on the road.

A seemingly unlikely software player, Du Pont IEA is hitting the open market with a double shot of software creation aid. Du Pont IEA uses Application Factory, a powerful back-end computer-aided software engineering (CASE) tool developed by Waltham, Mass.-based Cortex Corp., and has an equally powerful conviction that MIS professionals and end users must be included in the software creation process from inception to completion.

In an industry niche ripe with products and overripe with hype — and in which would-be users are already complaining of too much choice and too little guidance — Du Pont is betting that the IEA approach will be not only believed but bought.

"We're projecting first-year revenues in the $10 million range," said general manager Scott Shultz, "but our infrastructure is set up for $20 million."

Still formally a Du Pont department, IEA last July received final clearance to operate autonomously within the company, complete with its own manage-

Du Pont's Shultz

ment and sales force as well as a staff of some 40 trained software developers.

Will IEA's mixture of team psychology and hard-core CASE play outside Du Pont, where the CASE consultants will not have the benefit of ongoing immersion in the customers' business? Early indications are that it will.

O. H. Materials Corp. in Findlay, Ohio, is among the first outside companies to build a system with the aid of IEA. Last spring, the 900-member hazardous and toxic waste cleanup company was in need of a work-in-progress tracking system.

The 15-person MIS department chose Application Factory as the tool most likely to build the system — only to realize that time spent learning how best to use Application Factory could substantially shave the efficiencies gained by using the tool in the first place. An Application Factory user at another company recommended a call to Du Pont IEA.

"It was kind of strange, calling Du Pont, of all people, for something like this," said MIS director Michael L. Turnow, who admitted doing a double-take when he first heard the name. The initial meeting with the team from IEA, however, convinced him that he had dialed the right number.

"There's no way we would have tackled a project this size, with a new tool like Factory, without IEA," said Dave Anderson, systems development supervisor at O. H. Materials.

The finished work-in-progress system, which went into production last month, "is by far the largest cost accounting system O. H. Materials has," Anderson said. It includes some 20 files, 30 screens and 50 different reports. "It took about three months to create, then six more to define and redefine what upper management really wanted to see."

Anderson said the project would have taken seven people a year to create without IEA, "instead of me and one person from DP working with IEA for nine months. We were working hard, sure, but I'm talking about two people instead of seven."

Continued on page 110

Hogan exec resigns; firm faces struggle

BY CLINTON WILDER
CW STAFF

DALLAS — Plagued by sluggish sales and declining profits, banking software house Hogan Systems, Inc. last week announced the departure of its No. 2 executive and the reorganization of its marketing and sales functions.

The company said President and Chief Operating Officer Richard B. Aldridge resigned to pursue other interests, but observers said his departure stemmed from disagreements with Chairman and Chief Executive Officer Gary W. Fiedler and Hogan's board of directors.

Fiedler took over the chairman's post last summer from George L. McTavish, who also resigned.

"Rick was very close to McTavish, so maybe McTavish's resignation was the writing on the wall," said Jim Poyner, a technology analyst at investment firm Rauscher Pierce Refsnes, Inc. "Hogan's not in fi-

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Inside

- Minisupercomputer vendors post mixed fourth-quarter results. Page 107.
- Unisys breaks into stock quotation business with Sasquet system. Page 108.

Data View

The best in software

Information systems executives at Fortune 500 companies pick top two vendors for software operations and products

INFORMATION PROVIDED BY DONOHUE ASSOCIATES
CW CHART

New horizons for Northern Telecom

BY ELISABETH HORWITT
CW STAFF

MISSISSAUGA, Ontario — A recent management upheaval at Northern Telecom Ltd. heralds the telecom equipment vendor's accelerated drive into the overseas and end-user telecommunications equipment markets.

Earlier this month, the Canadian firm combined its overseas subsidiaries into one organization headed by Desmond Hudson, former president of domestic operations.

Hudson's successor, Roy Merrills, will be directing a reorganized Northern Telecom, Inc. toward a more dominant share of the U.S. customer-premise equipment (CPE) market, he said.

"I obviously have a mandate to grow our [CPE] business to match our success in switches," Merrills said.

His 1988 strategy for accomplishing this involves "very actively and intensively building customer relations" using the same basic open-door approach that the company brings to the central office switch market, he said.

Prior to his recent appointment, Merrills was group vice-president of Integrated Network Systems, Inc., Northern Telecom's central office switch group.

Full plate

"Roy has a lot on his plate now; the central office switch side is where the money has been for Northern Telecom," said Bart Stuck, vice-president of Probe Research, Inc. in Morristown, N.J.

The reorganization calls for Merrills to oversee all product groups, including the CPE areas such as data communications and private branch exchanges. In these areas, Northern Telecom's future success is based on "a wish, a hope and a prayer," Stuck said.

Merrills said one tactic that Northern Telecom plans to use is to have customers sit on advisory boards that will provide input into the company's planning for new products and services.

"I don't think it will be so different working with the Bell operating companies or with the Fortune 500," he said.

Uphill battle

Stuck disagreed. The CPE side of the market is "an uphill battle not suited to the technical sell," which Northern Telecom has used successfully to sell central office switches to the divest-

Continued on page 108

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Minisuper makers curb great expectations

BY JAMES DALY
CW STAFF

The soaring growth expectations of the minisupercomputer industry fell a little closer to earth recently when two leading players in the market tempered their healthy yearly financial gains with mixed fourth-quarter results.

Analysts noted that although the figures for Alliant Computer Systems Corp. and Convex Computer Corp. were good, future expectations have been trimmed because earlier forecasts were overly ambitious.

"Wall Street expectations for these companies a year ago had been off the wall," said Joseph Payne, an analyst with Baltimore-based Alex Brown & Sons, Inc.

"But we're still dealing with a very complex and new industry system," Payne added. "Both companies have super products whose features could become extremely important, especially in the scientific and engineering quarters. I'm looking for growth, but our expectations are coming down."

Alliant's restructuring fee

In the quarter ended Dec. 31, Alliant reported revenue of $14.2 million, a 15% increase from the $12.3 million recorded for the same period in 1986. Income, however, before extraordinary tax credits, was slammed by a one-time restructuring cost of $275,000 and dropped to $315,000, or 3 cents per share, from $1.1 million, or 13 cents per share, recorded a year earlier.

Yearly revenue for the Littleton, Mass., manufacturer jumped 75% to $53.8 million, compared with $30.8 million in 1986. Income from operations grew 51% to $3.6 million, or 34 cents per share, compared with $2.4 million, or 28 cents per share, for 1986.

Convex announced fourth-quarter revenue of $20.2 million, up 55% from the $13 million recorded in the year-earlier period. Net income before extraordinary credits for the Richardson, Texas-based firm grew 42% to $1.4 million, or 8 cents per share.

The company reported annual revenue of $69.6 million, a 73% increase over 1986 revenue of $40.2 million. Income from operations came in at $5.5 million, or 31 cents a share, compared with $2.2 million, or 15 cents per share, recorded for 1986.

Other vendors reporting financial results recently include the following:

VM Software, Inc. This system software developer concluded a difficult year in which profits dropped 32% from year-earlier levels while sales grew only 13%.

Fourth-quarter revenue of $11.5 million was up just 11% from $10.4 million a year earlier. Quarterly profits for the Reston, Va.-based firm were $2.3 million, or 37 cents per share, down 8% from the $2.5 million, or 39 cents per share, that was recorded for the same quarter in 1986.

Revenue for the year increased to $30.6 million from $27 million reported for 1986. Income dropped to $3.4 million, or 53 cents per share, compared with $5 million, or 77 cents per share, recorded a year earlier.

Electronic Data Systems Corp. For the quarter and the year, EDS posted solid profit gains on only nominal revenue growth.

Fourth-quarter revenue for the Dallas-based computer and communications services giant increased only 3% to $1.18 billion. But net income for the quarter rose to $104.2 million, or 85 cents per share, a 46% increase from the $71.5 million, or 58 cents per share, reported in the same period in 1986.

Annual revenue rose to $4.43 billion, up just more than 1% from the $4.37 billion recorded in 1986.

Net income rose 24% to $323.1 million, or $2.65 per share, from $260.9 million, or $2.13 per share, recorded a year earlier.

Hogan

CONTINUED FROM PAGE 105

nancial trouble, but its problem is marketing. They have to come to grips with how to sell their packages."

Hogan, closely watched by the mainframe software industry since its landmark 1986 OEM agreement with IBM, has seen its business marked by fits and starts since the initial boost from IBM. The 20-year agreement for IBM to become Hogan's exclusive U.S. sales channel for Hogan software restored the vendor to profitability and credibility, but Hogan has failed to sustain the momentum.

In Hogan's most recent quarter ended Dec. 31, income from operations fell to $1 million from $2.9 million a year earlier. More significantly, the slowed part of the business has been sales of new software products, while fees from maintaining current installations have contributed the only revenue growth.

"They're just coasting along at a stable level," Rauscher Pierce's Poyner said. "The IBM deal is proceeding much slower than they had hoped. And IBM is bending over backward to push applications software, which is all the more reason to wonder what's going on."

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Unisys enters retail brokerage stock quote market

BY ALAN ALPER
CW STAFF

NEW YORK — Unisys Corp. last week entered the increasingly competitive stock quote information service business, unveiling a hardware and software system aimed at small to medium-size retail brokerage houses.

The system, called Snapnet, provides stock quote information, account management data and local applications processing on a Unisys desktop micro.

Unveiled at the Securities Industry Association's Information Management Conference here, Snapnet was developed during the last three years in conjunction with Intelligent Quotation Systems, Inc., a small New York software developer. Snapnet will be marketed through Unisys's Financial Systems division.

The stock quote information business has become increasingly congested during the last few years as new vendors attempt to wrest market share from industry leader Quotron Systems, Inc. Quotron is facing reticence from brokerage houses that perceive its parent, Citicorp, as a competitor. Citicorp acquired Quotron in 1986.

Automatic Data Processing, Inc. has emerged as the primary competitor to Quotron, but its joint development contracts with leading brokerages Merrill Lynch & Co. and Shearson Lehman Hutton, Inc. have made other brokerage houses wary.

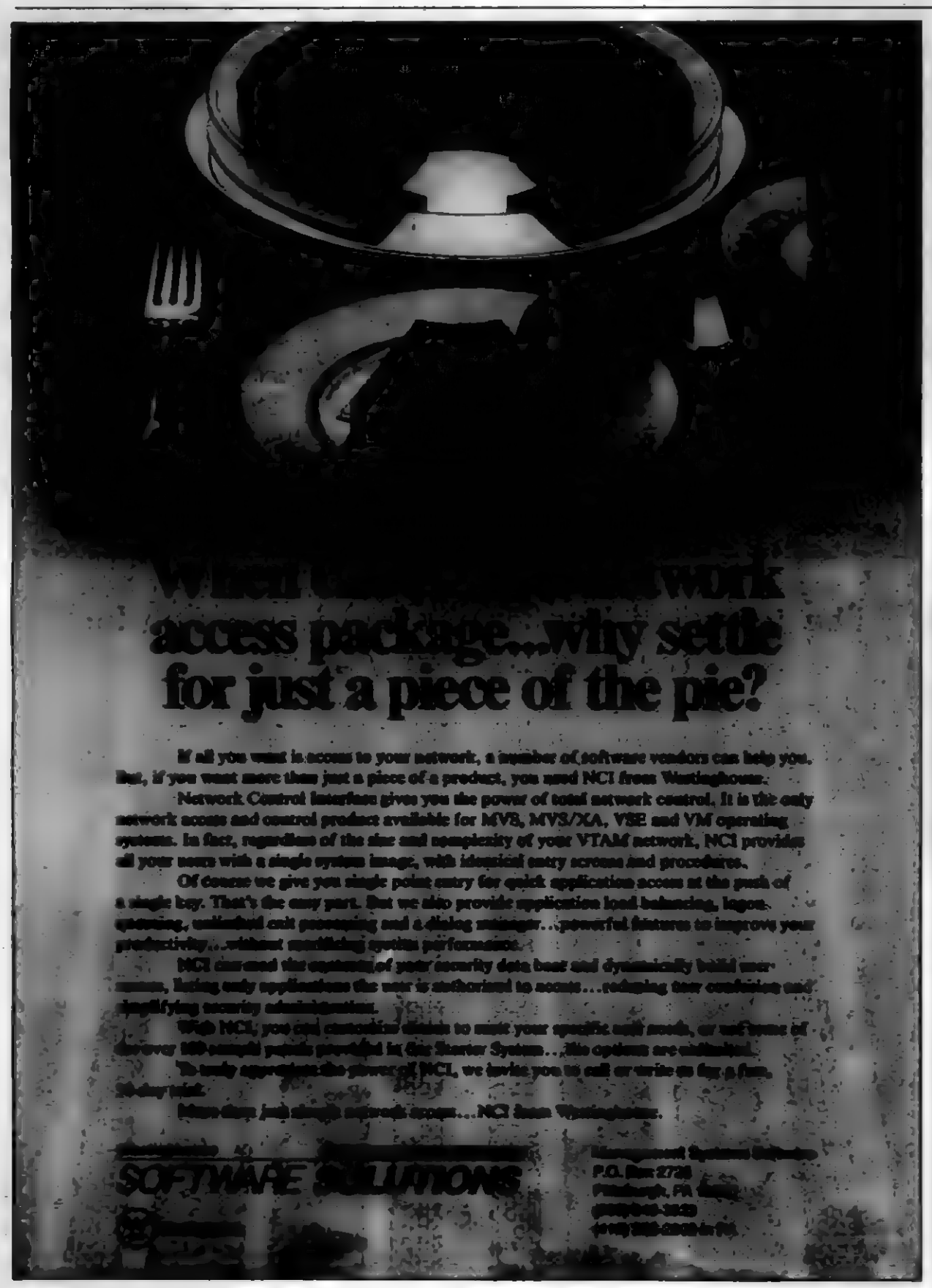
Ro Pavlick, Snapnet marketing manager, said despite market congestion, brokerage houses are looking for ways to customize their systems to provide competitive advantage. "Systems marketed by other vendors have provided limited interaction between customer account and market quote information," she said.

Unisys says that despite its late start, it can capture significant market share by starting with small brokerage firms and working its way up. "We're finding that because most of the hardware has been leased, brokers are not locked into any one vendor," noted Fred Pennino, eastern regional sales manager within Unisys's Financial Systems division.

Snapnet consists of a Unix-based computer that acts as a branch controller, enabling micros based on Microsoft Corp.'s MS-DOS to access a variety of stock quote data bases and other market information services.

The controller supports up to 20 workstations and facilitates access to account information on an IBM mainframe via a Systems Network Architecture bridge. Branch controllers can also be networked via the CCITT X.25 protocol.

Snapnet's controller is priced at $100,000, while the micros list for about $4,500 apiece, Pennino said. Cost of the market feed, software and services depend on the requirement of each installation, he added. Snapnet will be generally available in April.



New horizons

CONTINUED FROM PAGE 105

ed Bell operating companies, he said.

"CPE is much more complicated — for one thing, there's IBM. And it takes a more application- and marketing-oriented sell," he said.

CPE experience

Merrills does claim experience on the CPE side. Before his five years with Northern Telecom's central office switch group, he ran Northern Telecom Canada's international voice/data PBX terminal operations.

"I also helped develop the business during its formative years, so product-

Northern Telecom's Merrills

wise, I am fairly educated," Merrills said.

In the next two years, Northern Telecom plans to introduce connectivity products that will build on its Supernode central office system, Merrills said. "We are very interested in providing connectivity between multiple local-area networks," he noted.

Michel Guite, vice-president and analyst at Salomon Brothers, Inc., said Northern Telecom needs to strengthen its presence in the voice/data — as opposed to just voice — arena, and in the T1 switch market.

Guite predicted that Northern Telecom will bring out its own T1 switch line, and "do more with voice/data integration and network management — but slowly."

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Du Pont

CONTINUED FROM PAGE 105

Du Pont's proprietary project management methodology, Rapid Iterative Production Prototyping (RIPP), provides the customer with a tangible prototype early in the game before moving on to serial refinements.

"What users tell you they want isn't always what they really want," Shultz said, "and there's no way for either you or them to know that until you've got something tangible up and running."

"RIPP makes sense to me because it works," said Thomas O'Sullivan, systems section project manager for Du Pont's chemicals and pigments department, which has worked with IEA on several CASE projects.

"You've got to define the rules of the game before you play the game. If you don't, you're in trouble," O'Sullivan commented.

RIPP enthusiasm

Both the RIPP methodology and the user-involved philosophy drew enthusiastic comment from Turnow and Anderson.

"RIPP was a definite plus," according to Turnow. "It let us see what we were going to get. Even more important is that IEA gets the user involved. The result is more excitement on the front end and no surprises on the back. Problems get worked out mid-cycle instead of hitting you in the face later when you're not expecting them."

The human side of CASE, O'Sullivan said, is equally critical to an end product that works. "Building a system isn't like selling a calculator," he said. "It's more like a marriage. And if it goes wrong, it's more like a divorce.

In fact, Turnow said, problems arose during the IEA project. "The whole system got a lot bigger than we thought it was going to." IEA, he said, "bit the bullet and did the extra work that was required."

"The worst part of working with IEA was that we found discrepancies between what we thought we were getting and what it turned out we were getting," Anderson added. "The best part was that they fixed it."

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Wilder

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ments and National Semiconductor.

No matter how you slice it, it's an exclusive club compared with other U.S. industries. In the 1987 Fortune 500, there were 28 oil companies, 14 pharmaceutical makers, 13 steel makers, 16 industrial and farm equipment vendors, 19 forest products concerns, 28 chemical companies, 14 aerospace firms and no less than 35 food industry representatives posting annual revenue of 10 or more figures.

In service industries, the contrast is even more striking. In 1986, Electronic Data Systems and Automatic Data Processing were the computer industry's only representatives among 69 billion-dollar diversified service firms.

Select few

It's clear that the moniker "big business" applies to only a handful of players in the computer field. There are two main reasons for this.

The first is the industry's relative youth, particularly with regard to the number of players. Industry granddaddies like NCR and Burroughs date back to the Henry Ford era, but the vast majority of vendors are less than 20 years old, and a huge number, including Compaq, were born in this decade. The industry's dizzying growth rates since the 1960s have propelled its leading players into America's corporate elite so fast that observers often forget how young the industry really is.

To put this in perspective, try this trivia question: What is the largest U.S. company still run by its founder? Answer: DEC, with Ken Olsen at the helm.

The second reason for the small size of the billion-dollar computer club is the industry's unique configuration, with its market leader seven times the size of its nearest competitor. Until the last couple of years, IBM's profits alone were often larger than the No. 2 vendors' revenues.

In no other U.S. industry segment is there a gap that comes anywhere close to IBM's dwarfing of the other guys. On Fortune's 1986 lists, Goodyear, at about 2½ times the size of Firestone, was the only industry leader that even doubled the size of its next largest competitor.

So Compaq, a company without a traditional sales organization that relies almost exclusively on dealer distribution, is up there with the big boys — roughly in the same size league as Tandem, Amdahl and Data General.

Meanwhile, Compaq should not gloat too much about its making the billion-dollar mark faster than any other company. Sun Microsystems, with its most recent quarter ringing in at $235 million in revenue, may beat Compaq's record in the very near future.

But for now, down in the heart of oil country, Rod Canion and his charges are mighty proud. If Phil Estridge and IBM created the business microcomputer industry, Canion and Compaq redefined it. They extended the IBM standard and laid the track for the roller coaster IBM-compatible micro business.

Now that the industry pits a billion-dollar PC-compatible company against a $50 billion Personal System/2 company, the results will be interesting to watch.

Wilder is *Computerworld*'s senior editor, computer industry.

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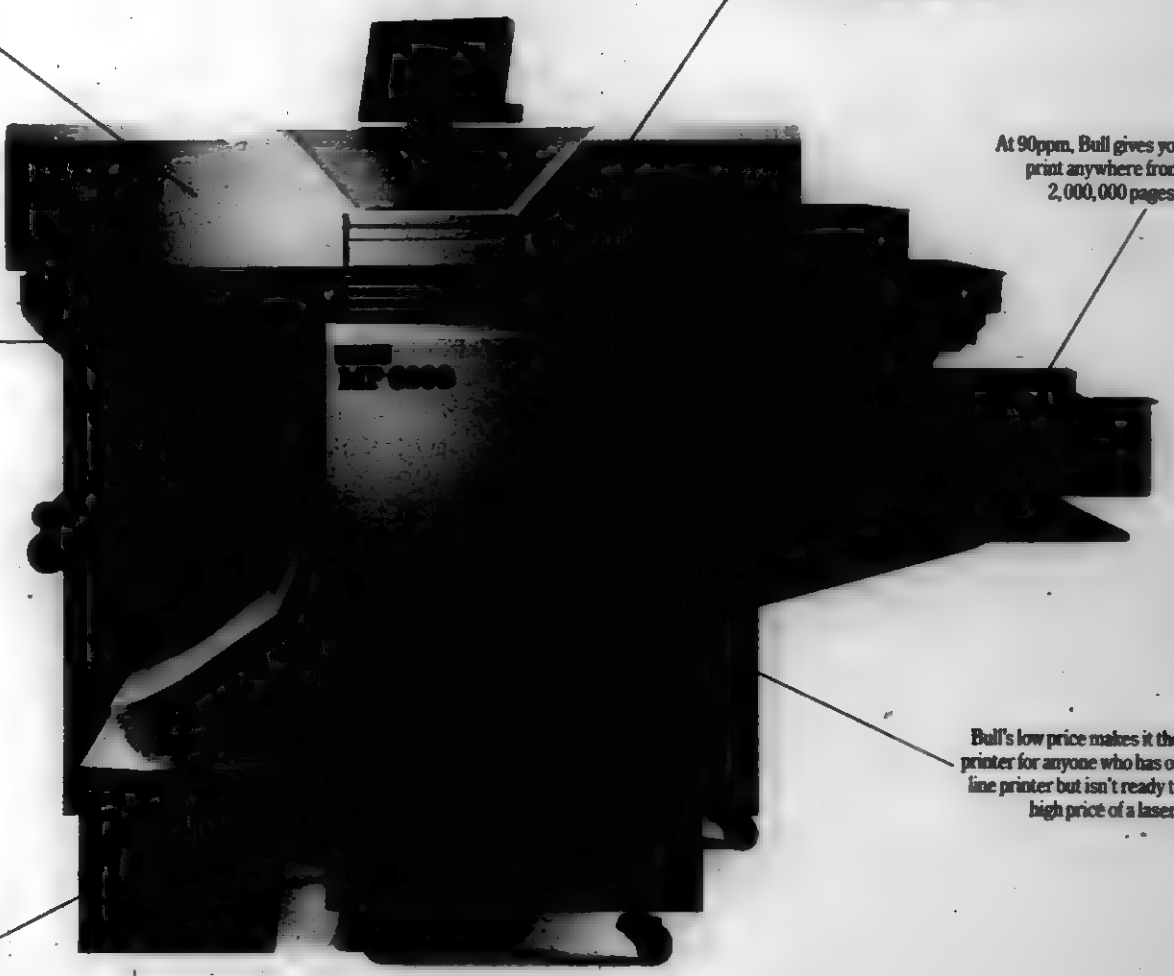

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COMPUTER CAREERS

Calamities spark growing field

Threat of fraud, natural disasters create openings for security analysts

BY JANET MASON
SPECIAL TO CW

Once limited to government and financial institutions and largely overlooked by top management elsewhere, the need for data security is gaining recognition in many industries.

The prevalence of personal computers and a government requirement that banks establish disaster recovery plans are just two factors in the increasing corporate awareness of the importance of security professionals.

Data center calamities coupled with top managers' being held personally liable for fraud perpetrated in their companies are also heightening management's awareness of both disaster recovery and information security. At least 10 computer room disasters in the past year — including fires, floods and an earthquake — brought home the message that a disaster can happen to any company, says Jack Bannan, information security manager for corporate MIS at General Electric Co.

Expert system security

Another growth area is in securing expert systems; without security, a company could lose information and actual expert logic processes to a competitor.

Data security professionals are responsible for thwarting threats to corporate information from outside hackers or internal employees. Often, the role is coupled with responsibility for disaster recovery and contingency planning. "The two go hand in hand," Bannan says. "They both deal with preventing threats to the computer — physical and data threats."

While many data security professionals divide their time between data security and disaster recovery, others attend solely to the security side.

Some companies, however, relegate data security as just one of the many responsibilities of a top MIS person. "This distribution or responsibility may make management feel better," says Sanford Sherizen, a Natick, Mass.-based information security consultant, "but it really doesn't help that much. Companies need at least one full-time information security employee."

The lowest level security professional is generally someone at the analyst level, paid a salary in the $30,000 range. The next highest level, the senior analyst position, is typically paid about $38,000. Beyond that rank is the first-level manager earning in the low forties. At the highest level is the data security officer, with an income in the mid-fifties.

Major metropolitan areas on the East and West Coasts are the best areas of the country for information security positions. Jobs are also plentiful in the Washington, D.C., area, with a concentration in the Department of Defense and related private sector companies.

MAJOR METROPOLITAN areas on the East and West Coasts are the best areas of the country for information security positions. Jobs are also plentiful in the Washington, D.C., area, with a concentration in the Department of Defense and related private sector companies.

Finance, government hot

Finance and government still top the list of institutions employing data security professionals. The prime employers are large banks, brokerage centers and savings and loans organizations.

Telecommunications firms, threatened by hackers stealing "free" telephone time and browsing through data bases, are also becoming major markets for data security positions. Other industries with a growing interest in security professionals are large manufacturing firms, retail holding companies and oil companies.

Although information security education programs do exist, most companies prefer professionals who possess considerable MIS experience, rather than someone straight out of school. In general, information security professionals are usually plucked from the ranks of data processing with a background spanning programming and management.

For example, Art Grande, assistant vice-president of MIS in charge of data security at the First Pennsylvania Bank NA in Philadelphia, counts 21 years at the bank, seven of which he spent in data security. Grande attended professional seminars on data security and joined the Computer Security Institute in Northboro, Mass. His responsibilities are to establish yearly goals and objectives and to administer the data security unit.

Dennis Boecker, data security officer with Uniroyal Goodrich Tire Co. in Akron, Ohio, divides his time between disaster recovery and the physical security of the data center. The company assigns another MIS employee part-time to handle data security. Boecker started in MIS working with systems and then moved into management. Boecker says the skill most valuable to his present position is the ability to work and communicate with all types of people.

Testing carried out daily

Boecker's daily responsibilities include testing systems at the company's outside hot site to make sure they will run in the event of a disaster. On the physical side, he watches for security breaches that "may not be anything or may result in equipment being destroyed" and passes the information on to upper management. He also follows technological developments in detectors, cameras, badge readers and so forth and makes sure only authorized people enter the data center.

The information security position, according to GE's Bannan, is ideal for a bright person with an MIS background "who is quick to pick things up and good with the internal workings of the computer."

Ironically, these are the same characteristics of successful hackers. Do former hackers make good information security people? "It has been done," Bannan says, "but it's a little like having an ex-bank robber guard the bank."

Moore is a Philadelphia-based freelance journalist.

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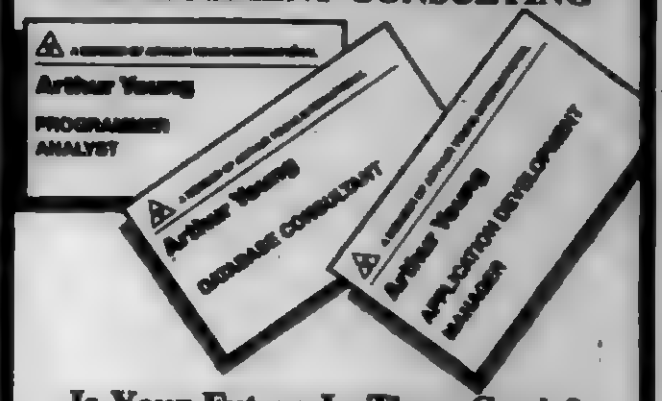

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Senior Programmer Analyst: To research, design and implement the following: Policy and security system for commercial buildings using Expert Database system; artificial intelligence techniques for building heating, ventilating, air condition system and lighting control utilizing OPS-83 artificial intelligence language, logic programming, PROLOG and conflict resolution strategy. Requires Master of Science in Computer Science including 5 years of college education. Other requirements include two major projects in either post employment or in post graduate work in the following areas: PASCAL, PROLOG, and OPS-83 programming language, computer network and algorithms. This requirement shall be concurrent with 1 year experience as a computer aided software engineer/programmer. Hours: 8:00am - 4:30pm, 40 hours per week at $37,200 per year salary.

Please send resume to: Illinois Department of Employment Security, 401 South State Street-3 South, Chicago, IL 60605. Attn: Robert S. Felton, Reference #V-S. 6734 F. AN EMPLOYER PAID AD

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The Los Angeles Times, one of the world's leaders in newspaper publishing, is developing a major on-line Circulation Information System to support a 500+ terminal network. This landmark venture has created an excellent opportunity for a skilled problem-solver who is thoroughly familiar with Software AG products.

You will be challenged technically by a broad spectrum of current Software AG products in an IBM 3090 MVS/XA hardware environment and by a multi-million record, multi-file database.

The successful candidate will have in-depth experience with Software AG products, specifically **ADABAS, NATURAL** and **PREDICT**. A minimum of 5 years' experience in Database Administration, including 2 years in supervision, is required.

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In MA 617-270-9191

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AA/EOE

SYSTEMS ANALYST EDP - Develop technical specifications and feasibility studies. Require Bachelor's or equivalent in a numeric discipline and one year experience with IDMS, structured design methodologies and marketing and sales support systems. Job location: Los Angeles, CA. Salary $36,000 per annum. Resume to: Pat Eakin, 3136 Pacific Coast Highway, Torrence, CA 90505.

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Create and manage an organization to support the business requirements of the Marketing and Sales functions; develop functional specifications, design systems, databases, files and procedures.

Position requires BA/BS in Business/Computer Science and 10 or more years experience supporting sales and marketing requirements in a consumer-oriented/direct sales business. Candidate must have orientation to application of leading edge data processing tools including relational data-bases, 4GL's, networks and statistical tools; familiarity with computer modeling techniques and excellent presentations skills.

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Sr. Sys. Analyst (CICS/CMS) [illegible]
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DBP Prog. Analyst [illegible]
(CICS/Fin. Apps.)

It would be in your best interest to exclusively contact an agency that is well established, member of a national network, and will give your career interests top priority. Send resume or call R. Montgomery at 919-787-4205

The Data Group
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Maybe you thought the days of rapid growth at Apple were over!

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With the recent announcement of our first billion-dollar sales quarter, Apple Computer continues to gain momentum in a wide array of business environments.

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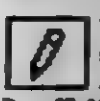
As a technical consultant, you'll use your expertise in mini/mainframes and networking solutions to support our sales reps and advise customers on the value and integration of Apple products into their current MIS and other business environments. As an integral part of the sales team, you will be responsible for formal presentations to customers, network design and integration, as well as applications development.

These positions require at least 3 years of computer related experience in a mini/mainframe or high-end workstation environment, coupled with excellent communication and presentation skills.

Experience in a pre-sales technical support position utilizing your knowledge of data communications, UNIX*, VM, MVS, DECNET and SNA/SDLC is a definite plus, as is Macintosh experience.

We have opportunities in the San Francisco Bay Area, Sacramento, Los Angeles, Orange County, Denver, and Anchorage.



To apply for these positions, send your resume, indicating location preference, to APPLE COMPUTER, INC., Human Resources, Dept. SE, 333 W. San Carlos Street, Suite 1025, San Jose, CA 95110. An equal opportunity employer.

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Usability Specialist Software Documentation

Microsoft is currently seeking a Usability Specialist to design and administer usability testing and documentation evaluation for the User Education Group of the Applications Division.

Responsibilities for this position include:

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- Evaluating results of usability tests, producing reports and presenting recommendations for user education materials.

The qualified individual must have prior experience designing and implementing usability testing and evaluation programs in a corporate environment. Knowledge of research methodology and protocol analysis procedures required. Experience in the software industry and familiarity with Human Factors research and user interface issues preferred.

Microsoft offers an excellent compensation and benefits package, including relocation assistance. For consideration, please send resume with salary history, to: MICROSOFT CORPORATION, Human Resources, Dept. JRUS-0215CW, 16011 N.E. 36th Way, P.O. Box 97017, Redmond, WA 98073-9717. We are an equal opportunity employer.

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The preferred candidate will be degreed with an emphasis in MIS or Marketing and have 5 or more years experience in Unisys large systems environments with at least 2 years in systems analysis/design, especially in marketing/sales applications.

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The preferred candidate will be degreed with emphasis in computer science or Information Systems and have at least 2 years experience in IBM VM/CMS applications as a Systems Programmer. Previous experience with EXEC, EXEC 2 or REXX job control languages, programming experience in BAL and COBOL or FORTRAN and an advanced level of interpersonal skills is desired. CADAM experience is a plus.

PROGRAMMER ANALYST

The preferred candidate will be degreed in computer programming or MIS or have applicable programming experience. Experience in a Unisys/Burroughs environment a significant plus.

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Miller Brewing Company is a subsidiary of the Fortune 50 Philip Morris Companies Incorporated. We offer competitive salary, complete benefits, and relocation assistance to the attractive, comfortable Milwaukee area. Send resume or letter to: Corporate Recruitment Manager, Dept. #1000-88, MILLER BREWING COMPANY, 3939 W. Highland Blvd., Milwaukee, WI 53201.

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SYSTEM: RPG III
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(213) 216-9000

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SYSTEMS ANALYST: Util knowledge of database analysis, database mgmt. & relational databases, design, develop, implement code & main database appl for sub-modules of Marksman (MS package) for Sm- & mdy-related programs. Major emphasis to be placed on troubleshooting, maintaining efficiency & improving performance of syst, as well as user liason. Must know X/L language, C, Assembly, COBOL, PC-DOS, TSO, DB2, DBASE III PLUS & LOTUS 1-2-3, & communication concepts for linking PC to Mainframes. Master's - Computer Science; 18 mos exp. or 19 mos. related programming w/database analysis exp. $30,000/yr, 40 hrs/wk. Resume to: Attn: CL-877, Professional Technical Resources, Inc., 159 5th Ave., Suite 505, New York, NY 10010.

Sales Manager: Responsible for sales of CRT display monitor or computers and medical imaging. Responsible for electronic shows and conferences setting direction for engineering department and develop future products. Train and supervise nationwide local sales representatives. Report directly to the president of the company and to headquarters in Tokyo. $4,000 per month, 4 years experience. Place of employment Broomfield, CO. Send this ad and your resume to: Colorado department of Labor and Employment, 600 Grant Street, Suite 900, Denver, CO 80203-3528, Job Order #CO2861231 No later than 2/1/88.

PROGRAMMER/ANALYST - Support development of CASE software. Require 3 years experience including ASSEMBLER, COBOL, CICS, OS/MVS, IMS, DB2 in both mainframe and micro environments. Salary $36,000 per annum. Job location: Los Angeles, CA. Resume to: CW-88017, Computerworld, Box 9171, Framingham, MA 01701-9171

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$60,000 - $80,000 per year, 5 day/40 hour week. Design, develop and implement computer systems for manufacturing operations. Responsible for specific system projects. Requires: Bachelor of Science degree or equivalent in Mechanical Engineering or Industrial Engineering; 1 year experience as Systems Analyst or 2 years experience as Programmer/Analyst; working experience with IBM mainframe systems; and working knowledge of COBOL, TSO/SPF and IMS. Mail resume to:

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Software Engineer - Design, develop, implement and enhance an authoring system and other tools which enable educational/training software to be produced cost effectively. Utilize MS/DOS, PC/DOS, C, Intel 8088/86, Assembly, VAX 11/780 and REX 11M. BS/Computer Science. 6 months experience doing above or Master's degree in Computer Science including completion of research project in design and development of small scale authoring system including extensive use of IBM PC 360 and Pascal. 35 hour week, $31,468 per year. Job location: Brewster, New York. Send resume/letter in duplicate to: RVB #188, Room 501, One Main St., Brooklyn, New York 11201.

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CHICAGO: 10400 West Higgins Road, Suite 300, Rosemont, IL 60018, (312) 827-4433

LOS ANGELES: 18004 Sky Park Circle, Suite 100, Irvine, CA 92714, (714) 250-0184

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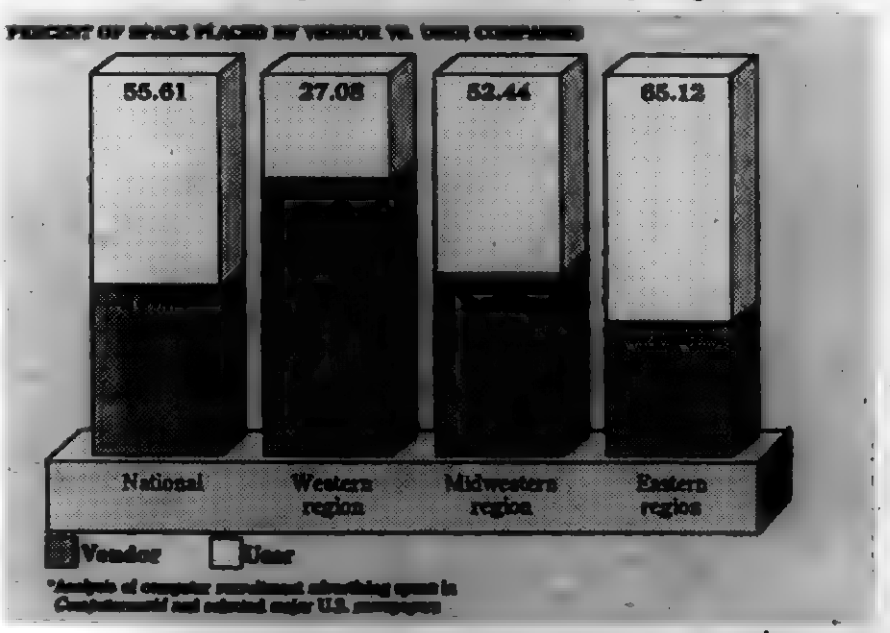
CAREER INDEX

December 1987 computer recruitment advertising activity*



*Analysis of computer recruitment advertising space in Computerworld and selected major U.S. newspapers

INFORMATION PROVIDED BY CW PUBLISHING, INC.'S RECRUITMENT MARKET RESEARCH DATA BASE

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The RAND Corporation, located in Santa Monica, California, is a private, non-profit institution engaged in research and analysis of matters affecting national security and the public welfare and in the operation of doctoral degree programs. Our expanding research efforts in these areas offer qualified software professionals the opportunity to work as part of multi-disciplinary teams solving some of this country's toughest problems.

At RAND, the computing environment consists of a mix of centralized and decentralized computing resources that include IBM mainframes, DEC VAX minicomputers, SUN workstations, and a variety of microcomputers. We use UNIX* as our standard operating system.

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To develop advanced simulation and modeling systems support tools, including interactive data management and graphics, that facilitate broad-based policy analysis and exceed the current state-of-the-art. You will need at least 1 year of simulation and modeling experience and 2-5 years experience with FORTRAN and/or C. Knowledge of graphics, window based interfaces and relational databases a plus.

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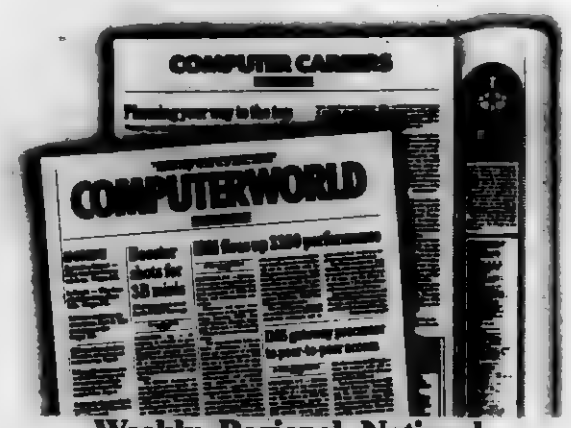

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MARKETPLACE

PC blizzard or snow job?

IBM turns attention to PS/2, abandons resellers, users and older line

BY ELIZABETH LOZANO
BOSTON COMPUTER EXCHANGE CORP.

As the snow blew across New England early this month, the used microcomputer market experienced its own blizzard. Buyers and sellers alike scrambled for equipment throughout the early part of February.

IBM trading activity was clouded by the increase in Personal System/2 new equipment sales quotas. An increase in gray market activity is going to be the end result of this IBM blunder.

When asked for their reaction, many C-level resellers expressed anger, and a few said they were surprised. IBM abandoned both its Personal Computer lines and the average user months ago when it introduced what should have been called CS/2 — the Corporate System/2. Now IBM is abandoning the average dealer.

As one reseller stated, "Consistency builds trust, and IBM has been everything except consistent." Another trader added, "They're feeding their own gray market, then they'll beef that we sell at discount."

In spite of IBM's PS/2 push, its PC models remain the favorite among average users. The dual-floppy drive classic, the PC Model 076, closed up, at $800, in the week ended Feb. 5, experiencing a resurgence in demand.

The PC XT Model 086 held even at $1,350, with few quantity transactions. The XT Model 069 closed down $25, at $1,650, experiencing the full effect of vaporware sales — a change in market price expectations.

IBM's PC AT lines performed well. The AT Model 099 closed even at $2,300 despite a decrease in trading volume. The "queen," the PC AT Model 339, continued its reign closing at $3,350 despite the bantering of its name by vaporware vendors.

Compaq fares well

Compaq Computer Corp. trading experienced an increase in activity across the board. The luggable Portable I closed up $50, at $750, as single-unit transactions dominated. The Portable II closed down, at $1,675, as user demand for power portables seems to be shifting to truly portable machines like the Toshiba Corp. T1200.

The Portable III traded at $2,700 with few units available on the used market. The 20M-byte Deskpro 286 was bringing in a price of $2,275 at the close of trading Feb. 5.

Compaq used equipment trading continues to flourish, and the final evidence of the company's success may be seen in recent advertisements for its Intel Corp. 80386-based clone. Many of these "Brand X" machines claim they are "IBM and Compaq compatible," and traders state, "It's a Compaq clone."

Apple buyers puzzled

Buyers of Apple Computer, Inc.'s Macintosh are in a quandry comparable to that of IBM buyers. Just what is the Mac II? And where is Steve Jobs when you need him? Where is the *real* systems integrator?

The Mac II dropped in value the first week of this month to close at $4,000. Instead, users sought Mac Plus and Mac SE models. The Mac Plus traded down at $1,250, experiencing an increase in supply, while the SE held even at $1,900. The Mac 512 and Mac 512E traded at $825 and $975, respectively, with a steady base of demand by first-time users.

Questionable trade practices by the Intel Systems Group in Hillsboro, Ore., have raised concerns that the firm does not know the rules of fair trade for excess inventory transactions. Trading rules apply to all players, even novices.

The Boston Computer Exchange can be reached at 800-BOCOEXX, or 617-542-4414 in Massachusetts.

The BoCoEx Index

Closing prices report for the week ending Feb. 5, 1988

	Closing price	Recent high	Recent low
IBM PC Model 076	$800	$900	$350
XT Model 086	$1,350	$1,425	$800
XT Model 069	$1,650	$1,900	$1,000
AT Model 099	$2,300	$2,900	$1,950
AT Model 339	$3,350	$3,500	$2,400
Compaq Portable I	$750	$975	$600
Portable II	$1,675	$1,900	$1,475
Portable III	$2,700	$3,000	$2,175
Plus	$1,325	$1,400	$975
Deskpro 286	$2,275	$2,500	$2,050
Deskpro 386	$4,325	$4,600	$4,000
Macintosh 512	$825	$900	$650
512E	$975	$1,075	$800
Plus	$1,250	$1,350	$950
SE	$1,900	$2,150	$1,700
II	$4,000	$4,200	$3,500

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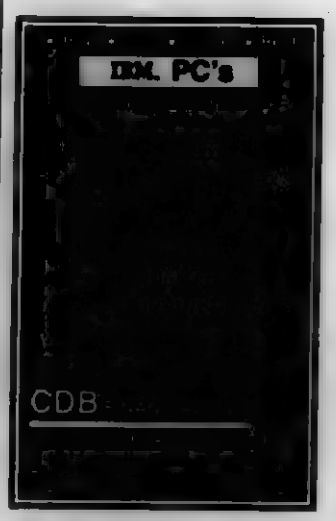

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The pros and costs of data processing training: necessity or luxury?

BY MICHAEL BALL
SPECIAL TO CW

MIS management typically views training either as a necessity whose cost cannot be measured in dollars and cents or as an expendable item too expensive to justify in the budget.

At American Family Mutual Group in Madison, Wis., training is not governed by cost justification. "We learned a long time ago you can't be short on training," says Don Breitenbach, vice-president of MIS. "We don't find it has to be justified. If you do things right the first time, it saves a lot of money."

At Southland Corp. in Dallas, "We made a decision a long time ago to hire only people with two to three years experience for our entry-level [positions]," says Dave Karney, vice-president of MIS.

Because of the size of the company's MIS operation, "We decided not to set up an entire training organization. From a cost standpoint, we couldn't justify a permanent training group," Karney adds.

Managers report that they spend between 1% and 4% of their total MIS budgets on training. Comparisons are difficult because not all companies measure training expenditures in the same manner.

American Family Mutual managers look at how much of an employee's work year goes to training. "We devote about 8% of a particular person's time to it and have [done so] for about 10 years," Breitenbach says.

> "WE LEARNED a long time ago you can't be short on training. We don't find it has to be justified. If you do things right the first time, it saves a lot of money."
>
> DON BREITENBACH
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Out of American Family Mutual's $27 million MIS budget, only about $100,000 can be directly charged to training. "Even if you add the eight or nine people [involved full time], it wouldn't exceed $300,000 or $400,000," Breitenbach says.

Similarly, at Champion International Corp. in Courtland, Ala., "We don't think of it as dollars, but training is a large part of our time budget," says Hank Livingston, operations chief. "Even if you add travel for training, it might be 3% to 4% of our budget, perhaps $70,000 to $100,000 a year," he adds.

"I put training costs in my budget," Livingston says, "I am ready for any questions, because I have the answers. So far, there has never been a question." Champion International's attitude is, "If we don't provide training and use the staff and systems we have, the whole investment is wasted," Livingston adds.

An even more discrete system of training justification is in place at Ohio Bell in Cleveland. Operations district manager Greg Flick oversees a separate training program geared toward the needs of the operations staff. "About a year and half ago, we justified separating our training," Flick says.

The change was made because the operations training provided in the central MIS program was not keeping up with the rapid equipment and software changes in the operations area.

Ball is a free-lance writer based in Boston.

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February 15

COMPUTERWORLD

Training Section

Utilizing in-house volunteers to reduce training expenses? For what situations is this effective?

Turn to the Training section of COMPUTERWORLD's February 29th issue for an interesting editorial feature addressing these and other questions.

Call for more information.

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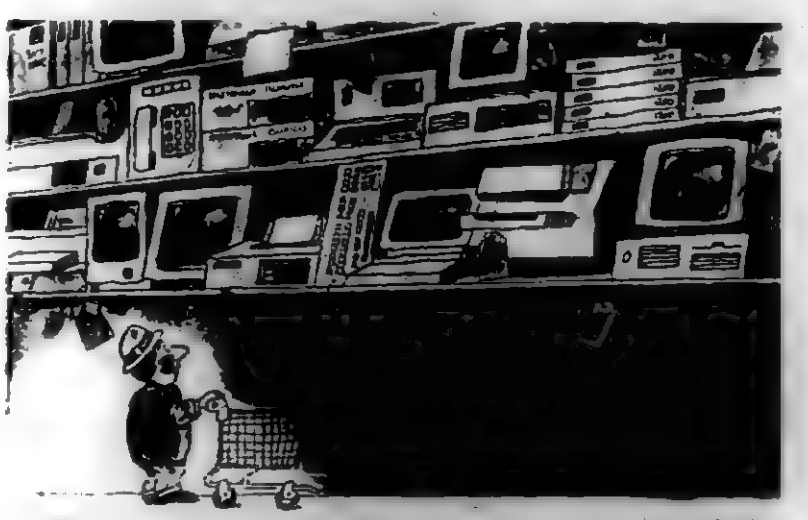

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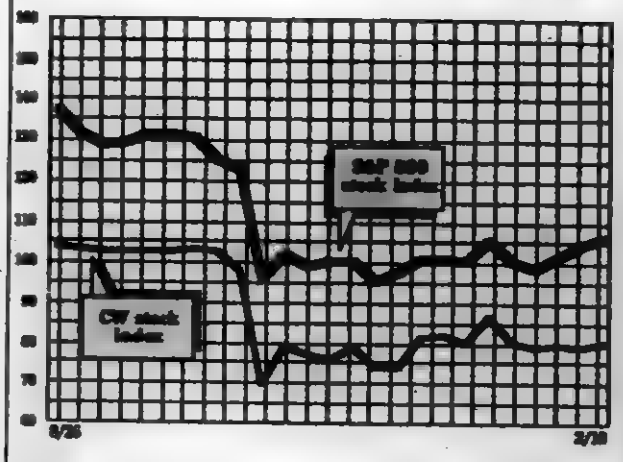

Indexes	Last Week	This Week
Communications	85.6	86.6
Computer Systems	88.7	91.1
Software & DP Services	92.5	92.3
Semiconductors	53.1	55.9
Peripherals & Subsystems	80.0	80.3
Leasing Companies	101.6	102.6
Composite Index	78.9	80.3
S&P 500 Index	104.3	106.1

Communications

Computer Systems

Software and DP Services

Semiconductors

Peripherals and Subsystems

Leasing Companies

CW CHARTS: AMY J. SWANSON

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, FEBRUARY 10, 1988

EXCH		PRICE 52-WEEK RANGE (1)		CLOSE FEB. 10 1988	WEEK NET CHANGE	WEEK PCT CHANGE

Communications and Network Services

N	AMERICAN INFO TECHN CORP	100	74	94.63	2.8	2.2
N	ANDREW CORP	19	11	13.75	0.3	1.9
N	ARTEL COMM CORP	3	2	1.50	0.0	0.0
N	AT&T	35	26	29.75	0.3	0.8
N	AVANT GARDE COMP INC	3	2	2.50	0.1	4.7
N	AWATEX INC	6	3	5.88	-0.1	-1.5
N	AYDIN CORP	14	8	20.38	-0.3	-1.3
N	BELL ATLANTIC CORP	82	61	73.38	1.5	2.1
N	BELLSOUTH CORP	44	29	41.75	0.9	2.1
N	COMPRESSION LABS INC	6	2	3.50	-0.5	-12.5
N	COMPUTER NETWORK TECH	6	2	1.88	-0.1	-5.5
N	CONTEL CORP	40	26	34.38	0.4	1.1
N	DATA SWITCH CORP	9	4	5.88	0.1	2.3
N	DIGITAL COMM ASSOC	49	20	28.50	2.0	2.1
N	DYNATECH CORP	48	14	19.00	0.5	0.0
N	FIBRONICS INTERNATIONAL INC	11	3	3.38	0.0	0.0
O	GANDALF TECHNOLOGIES	11	3	5.50	-0.3	-4.3
N	GENERAL DATACOMM INDS	14	5	3.50	-0.1	-3.4
N	GTE CORP	45	32	38.25	-0.4	-1.0
N	INFOTRON SYS CORP	12	5	6.75	0.0	0.0
N	ITT CORP	68	42	48.00	0.0	0.0
N	M/A COM INC	16	7	10.38	0.8	7.8
N	MCI COMMUNICATIONS CORP	12	5	10.75	-0.5	-2.3
N	MICOM SYS INC	17	7	10.50	0.5	5.0
N	NETWORK SYS CORP	10	7	7.25	-0.5	-3.3
N	NORTHERN TELECOM LTD	24	14	16.38	0.8	3.5
N	NOVELL INC	20	12	15.25	1.5	8.5
N	NYNEX CORP	78	58	70.13	0.4	0.5
N	PACIFIC TELESIS GROUP	34	24	28.88	0.6	2.0
N	PARADYNE CORP	6	4	4.38	0.1	2.9
A	PENRIL CORP	6	1	3.25	0.1	3.7
N	PLESSEY PLC	41	28	28.75	-1.0	-3.4
N	SCIENTIFIC ATLANTA INC	30	8	12.88	0.5	4.0
N	SOUTHWESTERN BELL CORP	48	32	36.63	1.3	3.7
N	3 COM CORP	26	12	18.63	1.4	8.0
N	TIMEPLEX INC	41	17	32.25	0.0	0.0
N	UNGERMANN BASS INC	11	5	8.50	1.1	15.3
N	U S WEST INC	66	43	54.75	0.5	1.2

Computer Systems

O	ALLIANT COMPUTER SYS	27	6	6.88	-0.9	-11.5
O	ALPHA MICROSYSTEMS	6	3	4.13	0.0	0.0
O	ALTOS COMPUTER SYS	17	9	10.50	-0.5	-4.5
O	AMDAHL CORP	30	19	33.13	3.1	10.4
O	APOLLO COMPUTER INC	23	9	13.13	0.9	7.1
O	APPLE COMPUTER INC	68	36	41.00	1.5	3.8
O	BOLT BERANEK & NEWMAN	31	12	13.88	-0.6	-4.3
O	BRITTON LEE INC	5	1	1.38	-0.1	-6.3
O	COMPAQ COMPUTER CORP	73	36	48.25	2.5	5.5
O	COMPUTER AUTOMATION INC	17	5	13.50	2.5	22.8
O	COMPUTER CONSOLES INC	12	2	4.88	0.0	0.0
O	CONCURRENT COMP CORP	24	11	16.75	0.0	0.0
O	CONTROL DATA CORP DEL	38	18	22.25	0.5	2.3
O	CONVERGENT TECH	12	3	3.13	0.0	0.0
O	CONVEX COMPUTER CORP	22	6	7.13	-0.5	-6.6
O	CRAY RESH INC	138	47	75.88	7.3	10.6
O	DAISY SYS CORP	13	5	7.00	0.0	0.0
O	DATA GEN CORP	38	16	27.38	1.5	5.8
O	DATAPOINT CORP	9	3	3.88	-0.5	-11.4
N	DIGITAL EQUIP CORP	200	110	120.50	4.5	3.9
O	FLOATING POINT SYS INC	17	3	4.00	0.0	0.0
N	GOULD INC	24	9	10.88	0.0	0.0
N	HARRIS CORP	48	32	37.75	0.5	3.3
N	HEWLETT PACKARD CO	74	36	57.25	4.1	7.8
N	HONEYWELL INC	91	69	81.50	0.0	0.0
N	IBM	178	102	111.63	2.8	2.4
O	INFORMATION INT'L INC	17	9	11.50	4.4	3.2
O	IPL SYS INC	3	1	1.75	0.3	16.7
N	MASS COMPUTER CORP	14	6	6.63	0.3	4.7
N	MATSUSHITA ELEC INDL LTD	198	98	173.88	1.9	1.1
O	MEGADATA CORP	7	3	3.13	0.0	0.0
O	MENTOR GRAPHICS CORP	30	14	22.00	2.0	10.0
N	NBI INC	14	4	4.00	0.0	0.0
N	NCR CORP	67	50	59.88	2.4	4.2
N	PRIME COMPUTER INC	31	12	17.88	2.8	12.8
O	PYRAMID TECHNOLOGY	12	6	8.13	-0.1	-1.5
O	STRATUS COMPUTER	41	25	28.75	2.6	9.2
N	SUN MICROSYSTEMS INC	48	14	32.88	3.1	10.5
O	SYMBOLICS INC	6	1	1.56	-0.1	-3.8
N	TANDON COMPUTERS INC	28	17	19.00	0.3	1.3
N	TANDY CORP	37	28	35.50	0.0	0.0
O	ULTIMATE CORP	37	15	19.75	-0.3	-1.6
N	UNISYS CORP	48	24	34.50	2.1	10.0
A	WANG LABS INC	19	10	14.38	0.5	3.6

Software & DP Services

O	ADVANCED COMP TECH	6	1	1.88	-0.3	-13.3
N	AGS COMPUTERS INC	20	11	15.00	1.4	10.1
O	AMERICAN MGMT SYS INC	20	9	15.00	1.5	11.1
O	AMERICAN SOFTWARE INC	22	8	9.63	-0.5	-4.9
N	AMACOMP INC	11	4	7.75	0.8	10.7
O	ANALYSTS INTL CORP	10	4	7.00	-0.4	-4.1
N	ASHTON TATE	33	15	25.00	2.0	8.7
O	ASK COMPUTER SYS INC	17	8	10.63	0.5	4.9
O	AUTODESK INC	24	12	17.75	0.8	4.4
N	AUTO DATA PROCESSING	35	16	42.00	1.0	2.4
O	BOOLE & BABBAGE INC	12	5	8.00	-0.3	-3.0
O	COMPUTER ASSOC INTL INC	37	18	29.00	1.0	3.6
O	COMPUTER HORIZONS CORP	10	7	8.00	-0.4	-4.8
O	COMPUTER SCIENCES CORP	73	42	48.75	1.2	2.7
N	COMPUTER TASK GROUP INC	10	9	9.63	-0.3	-2.5
O	COMSHARE INC	20	12	13.50	-1.0	-6.9
O	CULLINET SOFTWARE INC	14	4	5.88	-0.4	-6.0
O	CYCARE SYS INC	10	6	7.88	0.0	0.1
O	DUQUESNE SYS INC	25	16	18.50	0.4	2.1
A	DATA ARCHITECTS INC	17	7	9.38	0.0	0.0
N	GENERAL MTRS (CLS E)	51	30	37.50	0.8	2.9
O	HOGAN SYS INC	17	6	4.50	-0.1	-2.7
O	INFORMIX CORP	21	12	20.25	0.3	1.3
O	INTELLICORP INC	11	3	2.75	-0.1	-4.3
O	KEANE INC	13	6	7.50	0.5	7.1
O	LOTUS DEV CORP	46	15	27.00	0.8	2.9
O	MANAGEMENT SCI AMER	21	6	6.13	0.4	8.5
O	MICRO PRO INTL CORP	6	2	2.50	0.1	1.8
O	MICROSOFT CORP	70	28	53.75	1.0	1.9
O	MORINO ASSOCIATES INC	24	7	15	0.1	0.9
O	NATIONAL DATA CORP	34	19	28.50	0.5	1.8
O	ON LINE SOFTWARE INTL INC	22	9	9.63	-0.1	-1.3
O	ORACLE SYS CORP	19	7	13.63	1.4	11.2
O	PANSOPHIC SYS INC	28	11	16.00	1.3	8.8
O	POLICY MGMT SYS CORP	28	15	21.50	0.8	3.8
O	PROGRAMMING & SYS INC	14	7	10.25	0.1	1.2
O	REYNOLDS & REYNOLDS CO	28	14	17.25	-0.8	-4.2
O	SEI CORP	25	10	14.25	-0.8	-5.0
O	SHARED MED SYS CORP	33	19	26.00	-0.4	-1.5
O	SOFTWARE AG SYSTEMS INC	10	7	7.63	-0.1	-1.6
O	SOFTWARE PUBG CORP	17	6	8.13	0.5	5.8
O	STERLING SOFTWARE INC	14	8	8.13	-0.1	-1.5
O	SUNGARD DATA SYS INC	21	10	15.75	0.5	3.3
O	SYSTEMATICS INC	30	15	20.75	1.0	5.1
N	SYS. SOFT INC.	28	7	14	1.5	12.2
O	VMI SOFTWARE INC	45	7	9.75	1.3	15.2

Semiconductors

N	ADV MICRO DEVICES INC	22	8	9.88	0.5	5.3
N	ANALOG DEVICES INC	23	8	11.13	0.3	2.8
O	ANALOGIC CORP	12	5	7.88	0.0	0.0
O	INTEL CORP	42	18	26.00	0.5	1.9
O	LSI LOGIC CORP	17	7	9.50	0.0	0.0
N	MOTOROLA INC	74	36	62.50	0.5	0.8
O	NATL SEMICONDUCTOR	22	10	10.50	0.0	0.0
N	TEXAS INSTRS INC	69	36	48.75	0.5	1.0
A	WESTERN DIGITAL CORP	23	11	11.88	0.5	4.4

Peripherals

O	ALLOY COMP.	13	4	3.88	-0.5	-12.1
O	AM INTL INC	6	3	3.50	0.0	0.0
O	AST RESH INC	23	8	9.38	0.6	7.1
O	AUTO TROL TECH CORP	9	3	3.94	-0.1	-1.5
O	BANCTEC INC	9	3	3.50	0.0	0.0
O	CIPHER DATA PRODS INC	15	4	6.50	0.0	0.0
O	COGNITRONICS CORP	3	2	2.88	0.0	0.0
O	COMPUGRAPHIC CORP	25	7	23.00	0.0	0.0
O	COMPUTERVISION CORP	25	7	9.00	-1.0	-10.0
O	DATAPRODUCTS CORP	12	7	7.50	0.0	0.0
O	DIGIRAM CORP	2	1	0.88	0.0	1.1
O	DECISION INDS CORP	13	4	10.75	0.1	1.2
O	EASTMAN KODAK CO	71	49	61.50	0.0	0.0
O	E M C CORP MASS	20	10	14.00	1.5	12.0
O	EMULEX CORP	9	4	7.00	0.5	7.7
O	EVANS & SUTHERLAND	12	5	11.50	1.5	15.0
O	IDOT CORP	3	2	2.50	0.0	0.0
O	INTERLEAF INC	21	9	17.50	1.5	11.0
O	IOMEGA CORP	5	2	2.75	-0.1	-4.3
O	LEE DATA CORP	5	1	1.75	0.0	0.0
O	MASSTOR SYS CORP	3	1	1.50	0.0	0.0
O	MAXTOR CORP	14	6	10.88	0.1	1.1
O	MICROPOLIS CORP	33	13	21.25	0.5	2.4
O	MINISCRIBE CORP	18	8	9.13	0.0	0.0
N	MINNESOTA MNG & MFG CO	93	65	97.50	0.5	0.5
O	MSI DATA CORP	24	12	21.75	0.5	2.4
O	PRIAM CORP	3	1	1.63	0.1	3.1
O	PRINTRONIX INC	12	7	8.88	0.0	0.0
O	QMS INC	17	8	8.88	0.0	0.0
O	QUANTUM CORP	27	8	9.38	0.5	5.6
O	SMARTER CORP	6	2	4.13	0.0	0.0
O	RECOGNITION EQUIP INC	14	7	9.13	0.0	0.0
N	REXON INC	14	7	8.88	0.0	0.0
O	SCAN TRON CORP	13	7	10.38	0.0	0.0
O	SEAGATE TECHNOLOGY	42	16	16.63	1.5	9.9
O	STORAGE TECH CORP	5	1	1.88	0.1	4.1
O	TANDON CORP	7	1	1.50	0.1	7.7
O	TEC INC	7	3	5.38	0.0	0.0
N	TEKTRONIX INC	43	21	24.88	0.5	2.0
O	TELEVIDEO SYS INC	3	1	1.31	0.0	0.0
N	TELEX CORP	32	10	11.50	0.5	4.5
O	WYSE TECH	9	3	10.25	0.0	0.0
N	XEROX CORP	69	31	48.75	0.5	1.0
N	ZIDEX CORP	10	6	7.00	0.0	0.0

Leasing Companies

O	CAPITAL ASSOCIATES INTERN.					
N	NATIONAL INC	11	4	4.88	0.1	4.6
O	COMDISCO INC	37	12	18.00	0.5	2.8
O	CONTINENTAL INFO SYS	14	5	8.50	0.0	0.0
O	PHOENIX AMERN INC	6	2	2.75	-0.1	-4.3
O	SELECTERM INC	6	3	4.00	0.0	0.0

EXCH: N—NEW YORK; A—AMERICAN; O—NATIONAL; O—OVER-THE-COUNTER; S—SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. EST LAST BID
(1) TO NEAREST DOLLAR

Round 2

Cray leads comeback as most tech stocks get off the ropes

The Department of Commerce's announcement that the U.S. trade deficit had narrowed to $12.2 billion in December helped put computer stocks back in fighting trim last week after sagging almost across the board in action a week earlier. Leading the rebound as of Thursday's market close was Cray Research, Inc., whose introduction of the $20 million Y-MP/832 supercomputer (see story page 8) spurred its stock up 6 points to finish at 76.

Other leading issues that came in winners included Hewlett-Packard Co., which jumped 4⅛ points for the week to 57¼; Digital Equipment Corp., up 4⅛ points to 120; IBM, which dropped to as low as 107¼ on Tuesday but rallied to finish up 3¼ points at 111¼; NCR Corp., which jumped 3⅛ points to 59⅛; Sun Microsystems, Inc., up 3½ points to 33⅛; and Microsoft Corp., up 3¼ points to 54⅛.

More modest gainers included Ashton-Tate Corp., which rose 2⅛ points for the week to 24⅛; Unisys Corp., up 2½ points to 34⅛. Novell, Inc., which gained some of the ground it lost a week earlier when shipment delays were revealed, rose 2 points to 20.

JAMES DALY

Unix makes headway in commercial market

BY ROSEMARY HAMILTON
CW STAFF

DALLAS — The Uniforum 1988 trade show and conference held here last week gave evidence that Unix is slowly but surely making its way into the commercial market.

The biggest boost of all came from IBM and Apple Computer, Inc. Both companies worked hard to convey a Unix commitment. While Apple Chief Executive Officer John Sculley gave the Uniforum keynote address on the main floor of the Infomart, William C. Lowe, president of IBM's Entry Systems Division, was two floors above him at the IBM Infomart showroom presenting his ideas on Unix to the press.

"Now that those two [companies] are really involved, there is no question that Unix has made it," said Omri Serlin, president of Itom International, Inc., a consulting firm in Los Altos, Calif. "You'd be hard-pressed today to find many serious commercial applications, but you can't overlook Unix's momentum."

AT&T detailed plans for its Unix System V, Release 4, which includes a number of features intended for more commercial applications.

Release 4, expected to go to beta-test sites next year, will include real-time capabilities — the lack of which has been a big drawback for Unix — better systems operation, maintenance, maintenance facilities and back-up and restore features, according to AT&T.

"Unix is moving into the mainstream, but that doesn't mean people are going to throw their current operating systems out," said Robert Ackerman, chief marketing officer at X/Open Ltd. "It's a step-by-step progression of open systems coexisting with proprietary systems."

Into the mainstream

Technical product demonstrations outweighed commercial applications at the 237 vendor exhibits, but mainstream applications made a strong showing.

In addition, there were other operating system releases geared toward the commercial environment. Texas Instruments, Inc. introduced Release 2.2 of the TI System V operating environment for its System 1500. It includes Extended Symmetric Processing, a feature that allows processors in a multiprocessor configuration to share jobs equally.

A number of hardware suppliers announced plans to offer data base management systems and office automation applications on their platforms.

Tandem Computers, Inc. announced the availability of Informix, Inc.'s Informix-Turbo data base server on its Unix-based system, and Harris Corp. said it will offer Unify Corp.'s Accell fourth-generation language development environment for its CX line of superminicomputers.

Highlights of AIX software

IBM introduced last week more than two dozen pieces of software intended to help put together the AIX family of workstations.

The company also announced its plans to work with the National Bureau of Standards (NBS) to develop conformance tests for Unix software. AT&T, X/Open and other organizations have been involved with the NBS on conformance tests for more than a year.

Among the highlights of the new AIX workstation software are the following:

- Version 2.2 of the AIX operating system for IBM's RT Personal Computer, which includes more device and communications protocols support. An initial shipment is scheduled for June, and Transmission Control Protocol/Internet Protocol and IBM Systems Network Architecture enhancements are slated to be out in September. A 16-user license is $2,295; a 17- to 32-user license is an additional $1,700. The upgrade charge from Version 2.1 is $395.
- The Distributed Services package for both the RT PC and IBM's Personal System/2 running the AIX operating system. A copy of the operating system and Distributed Services must be installed on each system participating in this environment. It is intended to allow users to access local and remote resources, such as printers, without knowledge of the resources' actual location. The RT PC version has a license fee of $600; the PS/2 license is $400. Both are scheduled for delivery in March 1989.
- The AIX/RT DOS Server, which provides the ability to set up an RT PC as a file or print server for the DOS Version 3.0 system. It provides automatic conversion of data and files between AIX and DOS formats. Slated to be available in March 1989, the product carries a license fee of $225.

The AIX PS/2 DOS Server provides the same functions on a PS/2 running AIX. IBM said it will also be available in March 1989 and can be licensed for $225.

- Both RT PC and PS/2 users will have Sun Microsystems, Inc.'s Network File System (NFS) available to them. Data can be accessed via NFS on any system that also supports NFS. The RT PC version will be licensed at $995 and available in September; the PS/2 license is $400 and will be available in March 1989.
- X Window System support is scheduled to be offered for the PS/2 in September at a cost of $195. IBM had previously announced X Window System support for the RT PC.

ROSEMARY HAMILTON

IBM

FROM PAGE 1

- Elevating the RT PC from a specialized mid-range offering to a general-purpose mid-range system with a strategic status comparable to IBM's 9370 and System/36 and 38.
- Phasing out its multiple Unix versions in favor of AIX, which will eventually span its entire 370 product line.
- Expanding the AIX workstation family, a blend of the RT PC and IBM Personal System/2 platforms running AIX.

At a conference for software developers that IBM hosted in Dallas last week, Larry Ford, the firm's assistant group executive for mid-range systems, told attendees there are three major areas of opportunity for independent development: the 9370 platform, the System/36 and 38 and so-called Silverlake follow-on platform and the RT PC. Previously, IBM had identified only the 9370 and System/36 and 38 platforms for general-purpose mid-range computing.

Beyond the mid-range

AIX, however, will play a role beyond the mid-range market, executives said. The goal is to run AIX from the PS/2s to IBM's 3090s. AIX will become the only Unix offering from IBM as the multiple Unix versions it currently provides are phased out.

But this plan has a kink in it. Unix is not a part of IBM's Systems Application Architecture (SAA), the portability standard that IBM's Ford said "will go down in history as IBM's most important announcement."

"SYSTEMS Application Architecture "will go down in history as IBM's most important announcement."

LARRY FORD
IBM

According to William C. Lowe, president of IBM's Entry Systems Division, AIX will be made consistent with the strategic SAA where possible. In areas of incompatibility, such as the user interface, IBM will provide bridges to link the two worlds.

"We plan to provide products as leaders in the Unix market," Lowe said.

But some industry observers said otherwise. Omri Serlin, president of consulting firm Itom International, Inc., said IBM is still not fully committed to Unix. "All this brave talk about AIX is probably only true for the Entry Systems Division," which has control over the RT. The division "is very defensive about the RT. I think to the rest of the corporation, Unix still holds very little interest."

Other observers said that IBM intends well but that it will have trouble reaching this goal. "The Unix market may be just too open," Infopro's Fiedler said. "People in the Unix market aren't going to say we have to have IBM."

Along with statements of direction, IBM introduced products for the AIX workstation family. The enhancements, many of which will not be available until 1989, are intended to help blend the RT PC and PS/2 environments (see story above). The concept of the AIX workstation family was first presented last year. The workstations will be offered as general-purpose systems that range from low-end single-user models to a mid-range machine, IBM executives said. Last week's announcement included a facility that would allow an RT PC to support up to 32 users in native mode.

Under umbrella

The RT PC and PS/2 Model 80 will serve as the two hardware platforms under the AIX umbrella. According to Lowe, IBM is now pouring an equal amount of money and resources into RT PC and PS/2 efforts.

The RT PC was not included in the ranks of the 9370 and System/36 and 38 when IBM executives discussed the mid-range in the past. Ford said it has been presented as a two-pronged strategy "when we discuss where we've been the longest."

"In terms of opportunity, it's Unix and the RT PC," he added.

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AT&T, Sun: Unix to remain open

BY JULIE PITTA
CW STAFF

DALLAS — AT&T and Sun Microsystems, Inc. spent much of their time at last week's Uniforum 1988 trying to allay fears that their partnership will result in an unfair advantage for workstation vendor Sun.

At the same time, the two companies picked up an ally in Amdahl Corp., which said it will use the combined Sun and AT&T operating system as the base operating environment for its future Unix offerings.

The evening before the show opened, AT&T hosted a gathering of 100 of its licensees, intending to assure them that despite the company's agreement to develop Unix System V, Release 4 cooperatively with Sun, Unix will remain an open system.

"AT&T went to lengths to assure people that Sun wouldn't have an advantage," said Charles Smith, product marketing manager for Tektronix, Inc.'s workstation division. "But there's still some apprehension out there."

AT&T was among the first computer vendors to license Sun's Scalable Processor Architecture (Sparc) for use in its own systems.

Both alliances have fueled speculation that Release 4 will be optimized for the proprietary Sparc. Additionally, critics have said that Sun, which will be part of Release 4's development team, can bring products running the new release of Unix to market more quickly because it will know the specifications first.

Critics gather forces

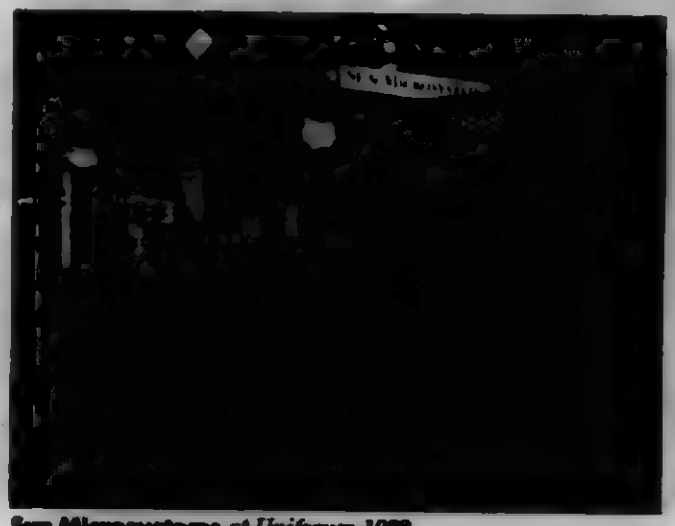
Critics of the partnership have joined forces in what has been called the Hamilton Group, so named because their first meeting was held on Hamilton Avenue in San Jose, Calif. Members of the group, including Digital Equipment Corp., Apollo Computer, Inc. and Hewlett-Packard Co., have hinted that they may turn to litigation.

AT&T told licensees that it will deliver information regarding its new release of Unix in a timely fashion. Beginning in the middle of this year, AT&T will hold briefing seminars for systems vendors and software developers.

In 1989, AT&T plans to revise drafts of the next version of its System V Interface Definition (SVID) with the industry. Also next year, AT&T will offer the System V Verification Suite, software that enables vendors to test their systems for conformance with SVID. Beta-test versions are scheduled to be available this year.

"The idea that AT&T would abandon its policy of Unix openness is pure folly," said Jack Scanlon, vice-president of product development for AT&T's Data Systems Group. "The only way AT&T can succeed in this marketplace is by continuing its policy of openness."

Sun argued that Unix's growth will be impeded by fragmentation if other vendors fail to support Release 4. "If we can get this industry behind a single binary standard, Unix will present a major alternative as a development platform," said Edward Zander, Sun's corporate marketing vice-president.



Sun Microsystems at Uniforum 1988

Other Uniforum announcements included the following:

- HP said it will offer a CPU upgrade for its HP 9000 Model 825S and 825SRX workstations, based on the firm's Precision Architecture using reduced instruction set computing. The systems have been upgraded to a performance level of 2.02 million floating-point operations per second, a threefold improvement from earlier models. The upgrade is priced at $10,000. Model 825S is priced at $42,500, and Model 825SRX costs $69,500.
- Sun took time out from the Unix controversy to announce yet another alliance — this time with Amdahl. Under the agreement, Amdahl and Sun will jointly develop and market products linking Amdahl's mainframes and Sun's workstations.

Amdahl has licensed Sun's Network File System, which it plans to port to its UTS operating system based on Unix. Sun and Amdahl said they will make joint sales calls to selected customer accounts.

A/UX ships following lengthy delay

BY JULIE PITTA
CW STAFF

DALLAS — Apple Computer, Inc. used its first appearance at the Uniforum 1988 conference last week to announce that it is shipping A/UX, an "Apple-ized" version of Unix, some seven months late.

Apple's version of AT&T's Unix System V, Release 2.2, with the University of California at Berkeley's Unix 4.2 and 4.3 extensions, runs on the Macintosh II. It features the Macintosh Toolbox, which can be used to create the Macintosh user interface in A/UX applications.

An upgrade bundle for current Mac II owners consists of an internal or external 80M-byte hard disk drive with A/UX, the Motorola, Inc. Physical Memory Management Unit (PMMU) and 4M bytes of random-access memory. It is priced at $4,879 for the internal drive version and $4,979 for the external drive version.

Entry-level loaded

An entry-level configuration of a Macintosh II with A/UX costs $8,597. That system includes a Mac II with 2M bytes of RAM, a 12-in. monochrome monitor, a 4-bit video card and an 80M-byte hard disk drive loaded with A/UX and PMMU. Additionally, Apple said it will distribute a set of reference manuals for $649.

Apple offered no projections of how many A/UX systems it expects to ship but said it has 100,000 copies of A/UX ready for shipment. The operating system was originally planned for release in July 1987.

A number of third parties jumped on the A/UX bandwagon. A total of 50 third-party products for A/UX were introduced at Uniforum.

Among those offerings for more mainstream applications were a port of Relational Technology, Inc.'s Ingres relational data base management system to A/UX, allowing Mac II users with A/UX to integrate data in Ingres files stored on other microcomputers, minicomputers and mainframes.

Also, Informix Software, Inc. in Menlo Park, Calif., introduced Wingz for A/UX, an integrated spreadsheet it acquired when it merged with Pittsburgh-based Innovative Systems, Inc.

Set for availability in the second quarter and priced under $500, Wingz was designed to operate under both the Macintosh operating system and A/UX.

PC-to-Unix standard offered

BY PATRICIA KEEFE
CW STAFF

DALLAS — If Hewlett-Packard Co. and Microsoft Corp. have their way, the standard for personal computer-to-Unix integration will be Microsoft's OS/2 LAN Manager running under AT&T's Unix System V.

The jointly developed proposed platform, as announced last week at Uniforum 1988, will be called Microsoft LAN Manager/X (LM/X). According to the plans, HP will provide the Unix port using LAN Manager source code, but Microsoft will retain OEM licensing rights.

LM/X would reportedly allow users to mix Microsoft MS-DOS, Xenix and OS/2 applications and systems on a network, accessing Unix System V-based servers without additional workstation software.

Also, LM/X would support advanced networking services such as shared data bases, directory services, mail services and distributed applications.

Based on the Server Message Block protocol standard, LM/X allows a Unix System V-based server running LM/X to handle requests from workstations running software based on Microsoft's MS-Net, MS-Net for Xenix and OS/2 LAN Manager.

In addition, Microsoft promised LM/X server support for IBM's PC LAN Program and OS/2 Extended Edition. LM/X would support the LAN Manager's controversial interprocess communications mechanisms — redirected, or named, pipes and mail slots.

IBM has said it will not support these facilities. HP said it will talk to its OEMs before deciding on support.

LM/X due in 1989

The initial release of LM/X, slated for early 1989, will reportedly run on Intel Corp. 80386-based systems under Microsoft's Unix System V/386 Release 3.2, a merger of Xenix and Unix System V scheduled for release in the third quarter. LM/X will require 2M bytes of random-access memory, a hard disk and a monochrome IBM Color Graphics Adapter, Enhanced Graphics Adapter or compatible monitor.

HP said it will first support LM/X on its HP 9000 computers running the HP-UX operating system. There are no plans to port LM/X to the HP 3000 series, an HP spokesman said.

LM/X would be capable of running on a variety of networking hardware, including IBM's Token-Ring network, the IEEE's 802.3 Ethernet and Starlan, and can coexist on the same server with AT&T's Remote File Sharing and Sun Microsystems, Inc.'s Network File System.

In addition, OEMs can port LM/X to transport protocols such as the Transmission Control Protocol/Internet Protocol and Open Systems Interconnect.

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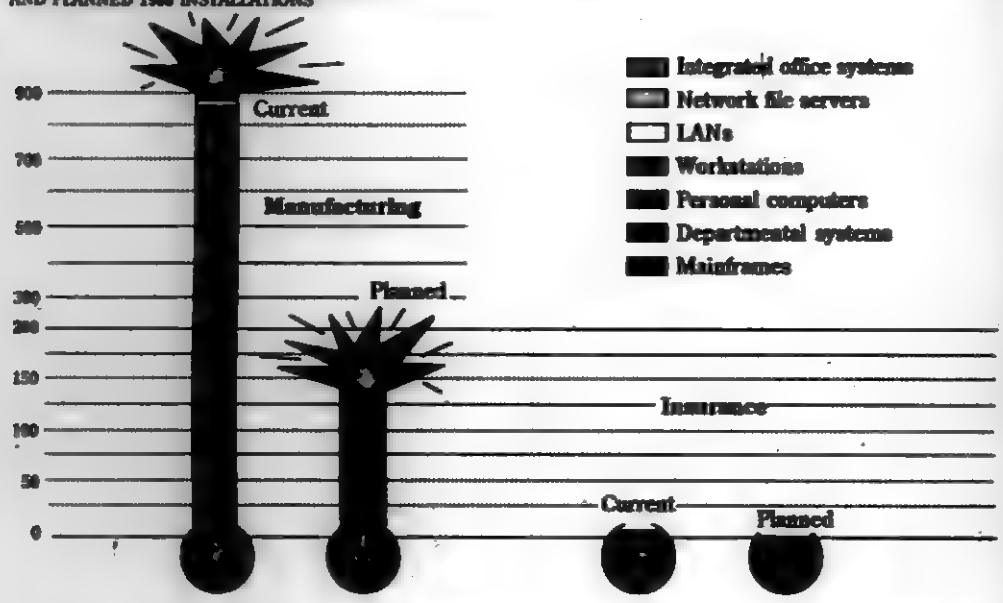
TRENDS

DEC hardware

Hot and cold in vertical markets



Despite the company's efforts to expand into new markets, more immediate growth opportunities for Digital Equipment Corp. may lie in its proven markets.

A recent study of DEC's opportunities in vertical markets shows manufacturers are planning to acquire the broadest range of DEC systems and that the vendor has made a minimal impact on the insurance industry. The study was conducted by Tempe, Ariz.-based market research firm The Sierra Group.

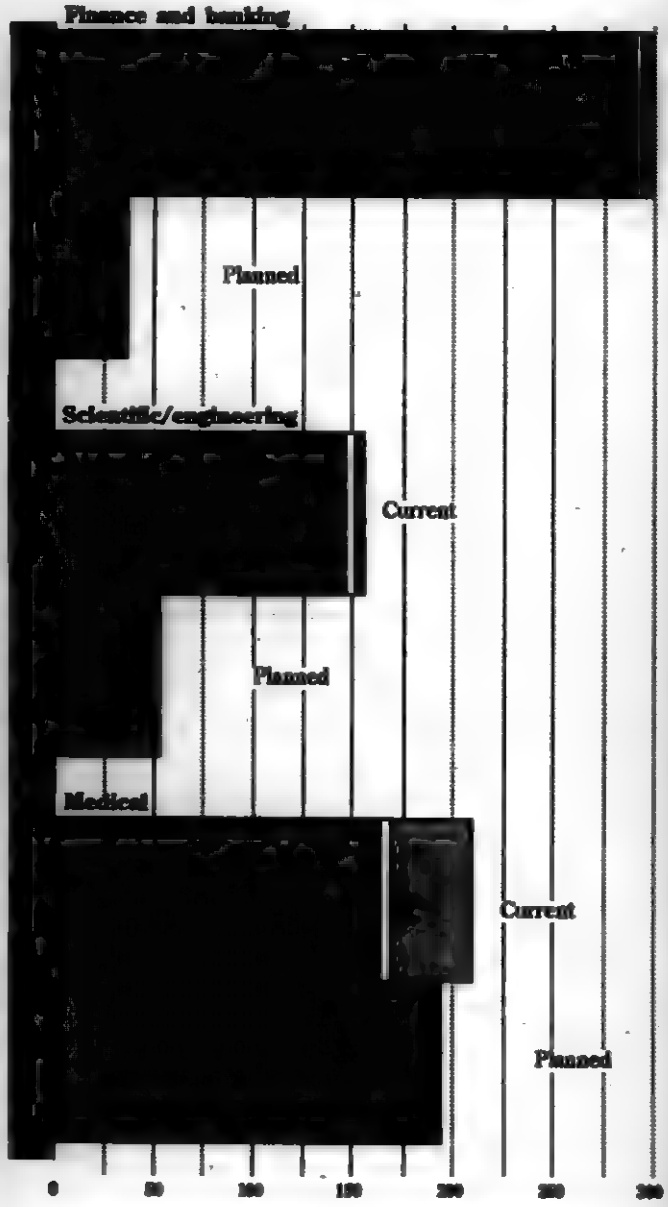
The group reported DEC's installed base numbers and 1988 DEC acquisition plans for 870 user companies, 367 of which counted fewer than 500 employees and 108 of which reported more than 10,000 workers.

The 240 firms in the medical category plan to install the most DEC systems in 1988. But 160 of the 191 systems that those firms plan are workstations; only two are large VAX systems or clusters of VAXs.

The 154 manufacturing companies that responded to the survey intend to install only 136 DEC systems. But 26 of those are large systems, and 55 are departmental systems.

Scientific and engineering users plan to acquire 52 systems, including 46 mainframes or departmental computers. DEC has targeted industries such as the insurance field in recent years, but 171 insurance firms reported an installed base of 10 DEC systems, with plans to acquire only two in 1988.

JAMES CONNOLLY



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CW CHARTS: AMY J. SWANSON

INSIDE LINES

Certified treaty. After three months of negotiation, IBM and the Computer Dealers and Lessors Association are set to announce an agreement that will resolve their differences concerning IBM's policy on deinstallation and reinstallation of equipment that was announced last fall. The solution reportedly relaxes IBM's policy, which stipulated that equipment moved by anyone other than IBM would be subject to charges to be recertified under IBM's Maintenance Agreement, and should make it easier for users to deal with both leasing companies and IBM, sources say.

Pit Bull processors. One wave in the flood of announcements due this week is a move by Honeywell Bull to pit three multiprocessor versions of its DPS 7000 supermini against the IBM 4381 and DEC VAX 8700. The DPS 7000 was the first major introduction for young Honeywell Bull last April and is a focal point of the company's strategy.

From the Oracle. Oracle this week will lay out its plans for supporting the increasingly popular Apple Macintosh. High on the agenda is the announcement of a distribution agreement concerning an interface between Oracle's DBMS and Apple's Hypercard hypertext system. Oracle will also announce plans to connect the Mac to various hosts running Oracle and the possible announcement of an A/UX version of Oracle.

Racing for share of mind. There is some fascinating pre-ship jockeying between Microsoft — with the Sybase/Microsoft/Ashton-Tate SQL Server — and Lotus for a share of the future data base market. Both firms are seeking MIS mind share in the hopes of lucrative sales of server-based SQL DBMSs later this year and into next. Until now, however, Lotus has told the world little about its plans, and the firm has yet to formally acknowledge that its DBMS is based on an engine from Gupta Technologies. That should change this week when key Lotus execs begin to specify how Lotus/DBMS will work and who should use it.

Calling Dick Tracy . . . A tiny Pittsburgh software house dragged out words like "racketeering" last week when it took on Tandem Computers and Mack Trucks, Inc. in federal court. Performance Associates Corp., which says its work force has been slashed from 22 to four because of its foes' actions, accused Tandem and Mack of racketeering and misappropriating trade secrets. Performance Associates also said the latter company conspired with Tandem to take over a branch automation package that it was developing for Mack. Tandem and Mack spokesmen declined comment.

The Lowe highlights. IBM's Entry Systems Division President Bill Lowe gave analysts a hint of things to come at an IBM seminar last week. Slides of IBM's future included lots of empty boxes meant to represent unannounced PS/2 models. Lowe indicated that by the end of the year, the low end of IBM's PS/2 line will be Intel 80286-based machines; by 1989, it will be 80386-based machines. Lowe also implied that the PS/2s, including the Model 50 with its lowly 20M-byte drive, will be field-upgradable.

Window watching. Two corporate users said last week that they have seen early versions of the Presentation Manager Version 4.11 and were a bit underwhelmed by what they saw. They said the program still looks very much like Windows 2.0 and were disappointed that its icons didn't look very "Mac-like." IBM told them, however, all that will change with the next few versions. Version 4.13 of the program, slated to be released in the next couple of weeks, will be the basis for the developer's version, expected by the end of March.

The Toshiba sanction. The Pentagon is getting ready to comply with a 1987 congressional mandate to stop buying products from Toshiba due to the scandal involving Toshiba's sale of military gear to the Soviet Union. For the next six months, the proposed regulation says, the Defense Department cannot buy any Toshiba product or any system with more than 50% Toshiba components. However, this action is likely to be replaced by less severe sanctions in the forthcoming omnibus trade bill.

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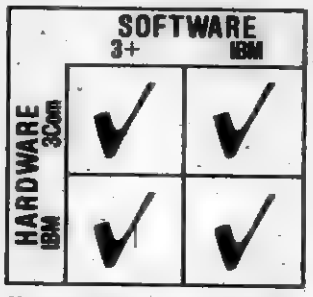

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COMPUTERWORLD

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Eastman Kodak bets that OSI will enable it to compress a multitude of SNA networks into a manageable few. Page 51.

DEC readies Vaxmate price cuts in effort to buck up lagging sales. Page 5.

IBM opens data trove to E-model users

BY CHARLES BABCOCK
CW STAFF

NEW YORK — IBM is launching a new mainframe operating system that builds on its MVS/SP and MVS/XA lines and offers users an 8,000-fold increase in the virtual memory available for data.

Enterprise Systems Architecture/370, announced here last week, offers a number of innovations that IBM said can be used only by its top-of-the-line, 3090E mainframe buyers. Users of 3090Es as well as Amdahl Corp. and National Advanced Systems Corp. mainframes predicted that the plug-compatible manufacturers will find it difficult to quickly duplicate the architecture.

The new features include use of expanded storage as a dedicated direct-access storage device inside the CPU, an expansion of virtual memory through a hardware and software innovation called data spaces and data windowing services that allow application users to scroll through large virtual data sets.

Although large IBM customer sites predicted an eventual need for these features, many managers last week said they are in no hurry to experiment with the operating system until IBM lays out future hardware plans (see story page 112).

Staged delivery of the operating system reportedly will begin in August, with added functions shipped as upgrades before the end of the year.

Existing applications, particularly large IMS applications, are supposed to run 10% to 12% more efficiently under ESA/370, said Carl J. Conti, vice-president of IBM's Enterprise Systems unit. Some batch processing could even show a performance decrease of 3%, the customer

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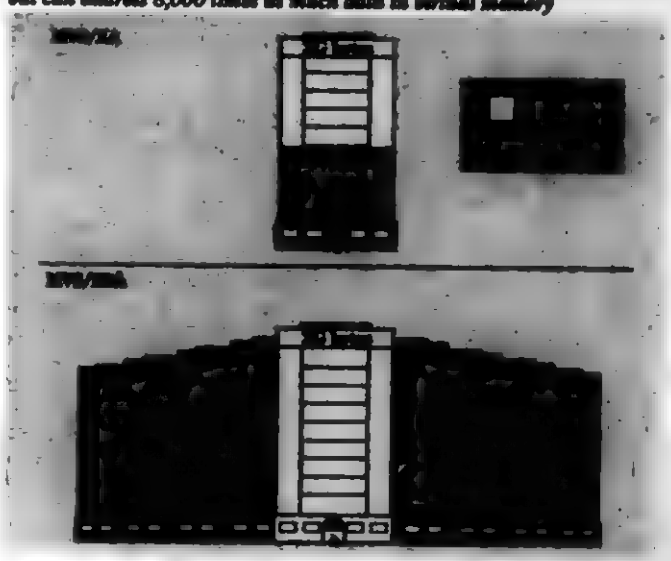
Change of address

MVS/ESA duplicates the 2G bytes of memory addressable under MVS/XA but can address 8,000 times as much data in virtual memory



CW GRAFX

Mainframe shifts gears

BY JAMES CONNOLLY
CW STAFF

ANALYSIS

The mainframe — whose critics portray it as a dinosaur helplessly watching the skies for a cataclysmic meteor shower — is being adapted for a new role by its biggest advocate, IBM.

With an eye on the proliferation of powerful workstations and distributed processors that can run user applications, IBM reinforced its effort to redirect the mainframe as a corporate data base machine and network manager rather than an applications processor.

IBM's introduction of MVS/ESA and system-managed storage software were seen as major steps in positioning its 3090 and future mainframes.

The word "enterprise" and the concept of sharing information throughout a corporation were focal points for executives in IBM's Enterprise Systems unit at last week's announcement. The minimal applications orientation focused on how the 3090 and the system software will support distributed user applications that require massive amounts of storage and, for technical computing, the 3090's vector processor.

MVS/ESA was designed to support 16 terabytes of memory while making it easier to manage data in memory or in on-line storage. If that capacity were translated into typewritten pages — at an average of 4,000 bytes per page — 16 terabytes

Continued on page 112

Pay issue: Women pull a bit closer

BY DAVID A. LUDLUM
CW STAFF

First the good news: Women in computer professions are narrowing the gap between their pay and that of their male counterparts.

Now the bad news: If you are a woman in data processing, you still earn only about three-fourths as much as a man in a comparable position.

Recent figures from the U.S. Bureau of Labor Statistics show that women in three computer professions surveyed do better than women in other industries in approaching the pay level of their male colleagues, earning 79% as much as men in comparable positions. That compares with a figure of 70% for working women in general (see chart page 4).

However, the numbers also indicate that women in computing face the same problems as

Continued on page 4

Ashton-Tate stages Dbase revival

Looks to stave off challengers with better interface, SQL support

BY STEPHEN JONES
CW STAFF

NEW YORK — Aiming to stop the defection of a dissatisfied customer base and to revive its waning control over the data base market, Ashton-Tate Corp. announced its long-awaited Dbase upgrade last week.

Dbase IV, which is scheduled for shipment by July 31, will be the first major Dbase enhancement to come out of Ashton-Tate in more than two years. Dbase IV will sell for $795 — a $100 increase over Dbase III Plus — while a developer's edition will be priced at $1,295.

Rewritten almost from top to bottom, Dbase IV was designed for Microsoft Corp. MS-DOS-based personal computers. However, the developer will also offer a character-based version of the program to run under OS/2 Standard Edition 1.0. A version for IBM's Presentation Manager is being developed, but Ashton-Tate would not forecast a shipment date.

Ashton-Tate claimed Dbase IV addresses most of the limitations associated with the now dog-eared technology of Dbase III Plus. Features include a full implementation of IBM Systems Application Architecture-compatible SQL, a built-in program compiler that runs 10 times faster than Dbase III Plus and a revamped user interface called the Control Center that includes a new applications generator.

Continued on page 6

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Speaking in tools. Microsoft unveils five enhanced languages and aims tools for writing MS-DOS real-mode and OS/2 protected-mode applications at users who previously had limited access to expensive OS/2 development equipment. Page 8.

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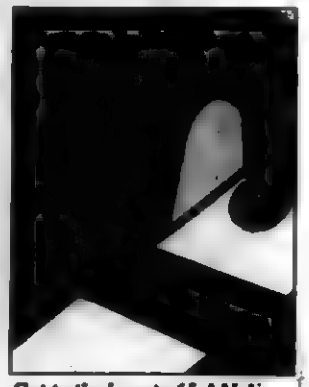

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"When it comes to collecting massive amounts of information, organizing it and, most importantly, sharing it across an enterprise, there is no solution that can do it as well."

CARL CONTI
IBM'S ENTRY SYSTEMS DIVISION

Describing the IBM 3090. See story page 1.

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Motorola enters hotly contested RISC business

BY JAMES A. MARTIN
CW STAFF

AUSTIN, Texas — In an announcement expected to bring added momentum to the growing reduced instruction set computing (RISC) market, Motorola, Inc. said last week it will announce a line of RISC microprocessors this spring.

Motorola's 88000 series, as the RISC line will be called, will contain a primary processor and two cache memory management unit chips, offering 17 million instructions per second (MIPS) performance that will later be boosted to 50 MIPS in parallel processing applications, the company said.

Motorola's RISC entry is expected to give the architecture additional momentum and heat up the competition, analysts said. Currently, only a small number of semiconductor vendors offer RISC chips.

A lot of RISC

But a variety of proprietary RISC environments exist today in the engineering and technical workstation market, including IBM's RT Personal Computer, Hewlett-Packard Co.'s Precision Architecture HP 3000 series and Sun Microsystems, Inc.'s Scalable Processor Architecture computers.

"Every Tom, Dick and Harry is going to want to do a RISC solution soon," said Michael Kubiak, a semiconductor analyst with Kidder, Peabody & Co. in San Francisco.

Intel Corp., for example, reportedly will announce its first RISC-based series, the 8900, consisting of three integrated chips, sometime this spring or early summer, observers said. The anticipated Intel 80486 is not expected to be based on RISC technology. An Intel spokeswoman would not confirm the reports.

"Motorola's announcement is certain to make some of the proprietary RISC companies stop and think if they want to compete in the commercial market," said Alice Leeper, an industry analyst with Dataquest, Inc.

RISC environments from IBM and other vendors are incompatible, and Motorola's announcements bring a new equation into the picture, analysts said. However, users should not be worried about compatibility between systems yet.

"We do have multiple RISC architectures now, but it's still the very early stages of this market, and at some time in the future, we will have one or two dominant architectures that would then have the support of the others," Leeper added.

Sterling bags buy-out, plans buy-back

BY CLINTON WILDER
CW STAFF

DALLAS — Sterling Software, Inc. abandoned its proposed leveraged buy-out by management late last week but said it will attempt to buy back 50% of its publicly traded stock.

If successful, the $27 million to $30 million stock buy-back will accomplish part of what the leveraged buy-out intended — reducing Sterling's exposure to the volatility of the public markets.

Leveraged buy-outs are exceedingly rare in the software industry, but Sterling has pioneered new financial tactics in the past.

Under the shrewd fiscal leadership of Chairman Sam Wyly, the IBM mainframe systems software vendor completed an unprecedented hostile takeover of much larger Informatics General Corp. in 1985.

Sterling spokesman Ray Hannon said management ended the buy-out negotiations last week because of stockholder opposition. "Many stockholders preferred that the company remain publicly owned, but a number of them would like to sell their shares," he said. "That was the mixed input that we had."

Share offer proposed

Under the plan announced Friday, the company offered to buy back three million of its six million shares outstanding for a price of between $9 and $10 per share. The terminated leveraged buy-out had proposed the same price per share.

Before last week's announcement, Sterling's shares were trading at $8.25 on the American Stock Exchange.

Management insiders currently own about one million shares of Sterling stock. If the stock buy-back plan is successful, less than 45% of Sterling's stock will remain on public markets.

Earlier last week, Sterling reported profits from operations fell 29% to $1.4 million in the quarter ended Dec. 31. Revenue rose 15% to $52.1 million in that period.

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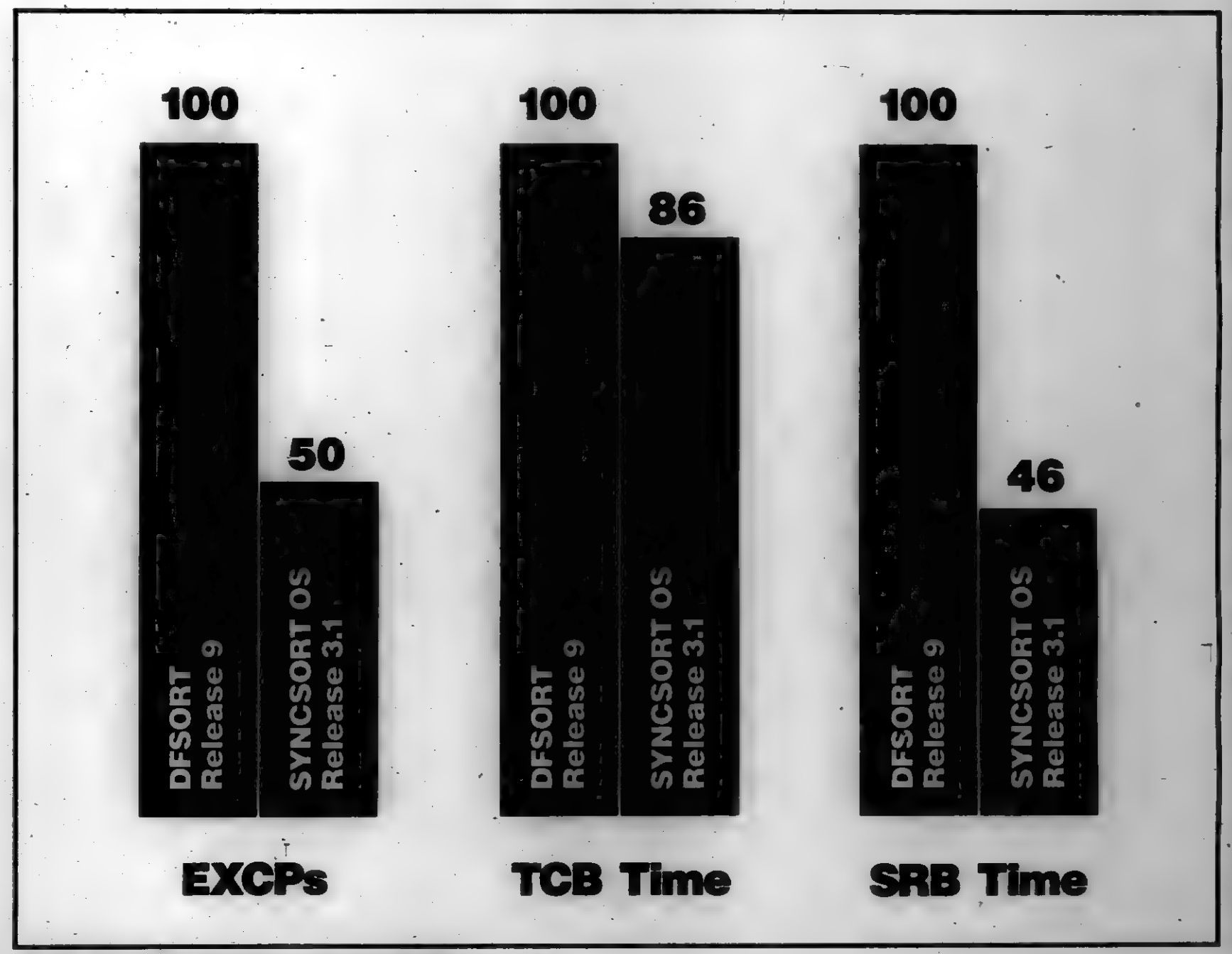

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Netware links VAX, PC LANS

BY NELL MARGOLIS
CW STAFF

NEW YORK — Novell, Inc. last week made its Digital Equipment Corp. market debut with Netware VMS, a software program it claims can connect DEC VAX users with personal computer local-area networks.

Based on the Provo, Utah, company's Netware operating system for PC LANs, Netware VMS turns any DEC VAX/VMS into a file and print server for IBM Personal Computers and compatibles, according to Novell. The software uses standard VAX Ethernet controllers to link the minicomputers to PC networks, said David Clare, Novell's Netware VMS product manager.

Netware VMS interfaces between Microsoft Corp. MS-DOS and VMS file and naming conventions, Clare said, so PC users see files on the VAX server in standard DOS while the files remain standard VMS to VAX users.

In addition, Netware VMS lets users running PC-based terminal-emulation software talk to VMS just as they could if their computers were physically hooked into a VAX terminal port, Clare said.

Support forthcoming

Both Oracle Corp. and Relational Technology, Inc. have announced support for Netware VMS; Oracle and Ingres data bases will be available to Netware VMS users with the second release of the Novell package, scheduled for shipment in early autumn.

The new software combines Netware and VAX security systems and stores all Netware VMS files as standard VMS files. The combination gives users the advantage of DEC's backup and archive procedures, Novell explained.

Slated for July shipment, Netware VMS server-based prices will range from $5,500 to $26,500.

Also attracting attention at Dexpo East 88 last week was Emulex Corp.'s newly announced Performance 4000 Ethernet terminal server.

The latest Emulex entry, according to the company, is wholly compatible with DEC's Local Area Transport (LAT) protocol. LAT lets a user plug the Performance 4000 directly into an Ethernet network and allows Emulex to position the product squarely against DEC's Decserver 200.

Apple serves third parties large slice of Mac-VAX pie

BY JULIE PITTA
CW STAFF

NEW YORK — Apple Computer, Inc. directed the spotlight on its third-party developers during last week's Dexpo East 88 show, fueling speculation that its relationship with Digital Equipment Corp. may not result in tangible products.

Apple chose to lavish attention on third-party Macintosh-to-DEC VAX connectivity products rather than raise expectations surrounding its own plans with DEC. Some industry observers said Apple's focus on third parties is an indication that its relationship with DEC will result merely in guidelines and standards for independent developers rather than competing products.

"They'll try to endorse standards rather then develop products," said Al Cini, president of Computer Methods Corp., an end-user consulting firm.

Even independent developers admit that the proliferation of Mac-to-VAX connectivity products has resulted in confusion among users.

"The MIS director is telling us that he'd rather see [connectivity] products from either Apple or DEC," Cini said. "They're afraid of committing to small companies that could be insolvent."

Product parade

The domination of Dexpo by Apple and its third parties is a reflection of the glut of Mac-to-VAX connectivity products on the market today. Among the product announcements last week were the following:

- Touch Communications, Inc., a Scotts Valley, Calif.-based developer partially funded by Apple, showed Touchterminal, a software product it claimed allows Macintoshes or Microsoft Corp. MS-DOS-based microcomputers to act as terminals to a VAX across a Touch Open Systems Interconnect network.
- Alisa Systems, Inc. in Walnut Creek, Calif., introduced Make Easy, a software product for Mac-to-VAX connectivity it said allows the Mac to retain its user interface. Make Easy consists of a server on the VAX and "client software" on each Mac connected to it.
- Blyth Software, Inc. in Foster City, Calif., unveiled Omnis SQL Connectivity Pack, a relational data base product for Mac-to-minicomputer connectivity co-developed with Innovative Solutions, Inc. It includes a server for the minicomputer and data base software for the Mac. Pricing ranges from $3,500 for DEC's Microvax II to $23,750 for a Vaxcluster 8978 and an additional $295 per Mac. Availability is scheduled for mid-year.
- Synoptics Communications, Inc. in Mountain View, Calif., and Kinetics, Inc. in Walnut Creek, unveiled a plan to provide 10M bit/sec. Ethernet capability over telephone wire to users of Apple's Macintosh SE.

At a press conference and during his keynote speech, Apple Chairman and Chief Executive Officer John Sculley concentrated on third-party efforts, noting that independent developers have been instrumental in promoting the connection of Macintoshes to VAXs. Apple and DEC's central role will be to establish standards for Mac-to-VAX connectivity, he said.

Third-party developers appeared comforted by Apple's stance. "Apple is giving a clear signal that they're not going to stab their developers in the back," said Ed Forman, marketing director at Network Innovations Corp., a Cupertino, Calif.-based Apple developer. "I believe Apple and DEC will provide enabling technologies for third parties."

Apple and DEC have declined to offer specifics on their joint development agreement, announced last month, except to say that more details will be available in August.

Pay issue

FROM PAGE 1

working women in general, including limited advancement opportunities and greater pay discrepancies in the top jobs of their profession.

Analysts offer varying reactions to the findings, which are based on BLS figures for 1987 wages and salaries of full-time employees released this month.

No visible gap

Joseph Berman, chief of DP placement for recruiting firm Robert Half International, Inc., said that though he does not disagree with the government figures, a pay gap has not been evident from his placement work.

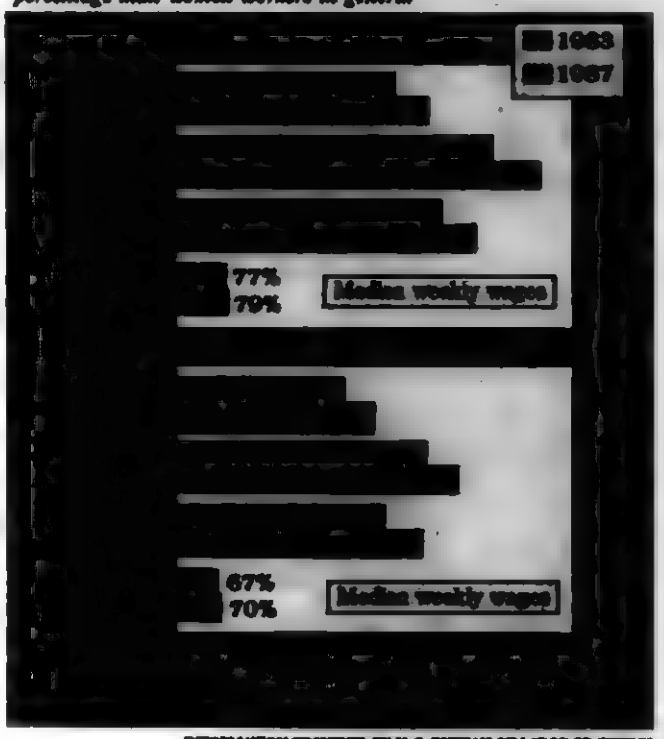
Steve Joffe, a vice-president at recruiting firm Source EDP, said the gap stems largely from different levels of experience among male and female computer professionals. Men and women with the same experience and skills tend to earn similar salaries, he said. But Joffe also noted that the gap tends to be wider at more senior levels.

Betty M. Vetters, director of the Washington, D.C.-based Commission on Professionals in the Sciences and Technology, agreed that the pay gap for computer professionals increases with seniority and contended that the gap occurs only partly on account of men's greater experience.

Studies show that men earn higher starting salaries than women with a comparable education and that they continue to outearn similarly skilled women, Vetters said.

Incremental progress

Women in computer professions continue to earn little more than three-fourths the pay of their male colleagues, which is still a higher percentage than women workers in general



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DEXPO NOTEBOOK

Top billing for DEC, but Apple steals the show

BY NELL MARGOLIS
CW STAFF

The lingering impression of last week's Dexpo East 88 — the first Digital Equipment Corp. trade show since Apple Computer, Inc. and DEC announced their alliance — was that of two shows: an exciting, SRO display of Apple-to-VAX connections (see story page 4) and one for everybody else.

While crowds thronged Pier 90 of New York's Passenger Ship Terminal to ogle the Apple corps, everybody else played out a pale imitation of Dexpos past at neighboring Pier 92. "If the Apple stuff wasn't here," said one longtime Dexpo attendee, "this show would be an absolute disaster."

The show began on an inauspicious note when, ironically, the computer show experienced problems with its computers. "When we and many other exhibitors arrived to set up, we found that the Expoconsul computer was down," said Harry Martenas, marketing events manager at Cambridge, Mass.-based Compuserve Data Technologies, Inc.

"That caused a big problem for us, because security rules said that we couldn't get into our booths without our official badges; the badges couldn't be made without the computer," Martenas added.

When the locked-out companies finally got their badges and entered their booths, already running a deficit in setup time, they discovered a problem with Alexander Graham Bell's connectivity product.

"There were no phone lines," said James Douglas, national sales and marketing manager for Tampa, Fla.-based Collier-Jackson, Inc. By the time the show officially opened Tuesday morning, Douglas reported, phone lines had been put in, but they were not working. "We plugged in two modems — nothing."

Complaints to Expoconsul International, Inc., which organizes the show, brought quick reassurances that "someone would get right on it," Douglas said. But as of midday Thursday — only hours from the show's close — some of the booths that lacked phones from the beginning, including Collier-Jackson's, were still without working lines.

Two companies, which asked to remain anonymous, held a joint press conference and were dismayed to find a lone reporter in attendance. "This is an exciting announcement. Where did we go wrong?" one spokesman wondered aloud. "I know, I know," he answered himself. "We didn't use the words Apple-to-VAX in our announcement."

Vaxmate prices cut to boost sales

BY GLENN RIFKIN
CW STAFF

In an attempt to stimulate lagging sales of its Vaxmate personal computer, Digital Equipment Corp. is set to lower prices of the machine by up to 37% this week.

DEC will also announce further moves to make PC integration easier for its customers with the bundling of a joint license for Vaxmate Client software, now included with every purchase of a Vaxmate. The Decnet/PCSA license was previously priced at $500.

The client license is needed to take advantage of VAX/VMS Services for MS-DOS, DEC's VMS-layered integrated personal computing software that allows PCs to share files, data and resources with any other user on a Decnet network.

The price for a Vaxmate base system is now $3,495 — a 26% drop from the original price of $4,750. When purchased with a VAX or Microvax as the server for a new or expanded local-area network, the Vaxmate price drops to $3,195, a 33% reduction. In quantities greater than 25, the price drops 37% to $2,995.

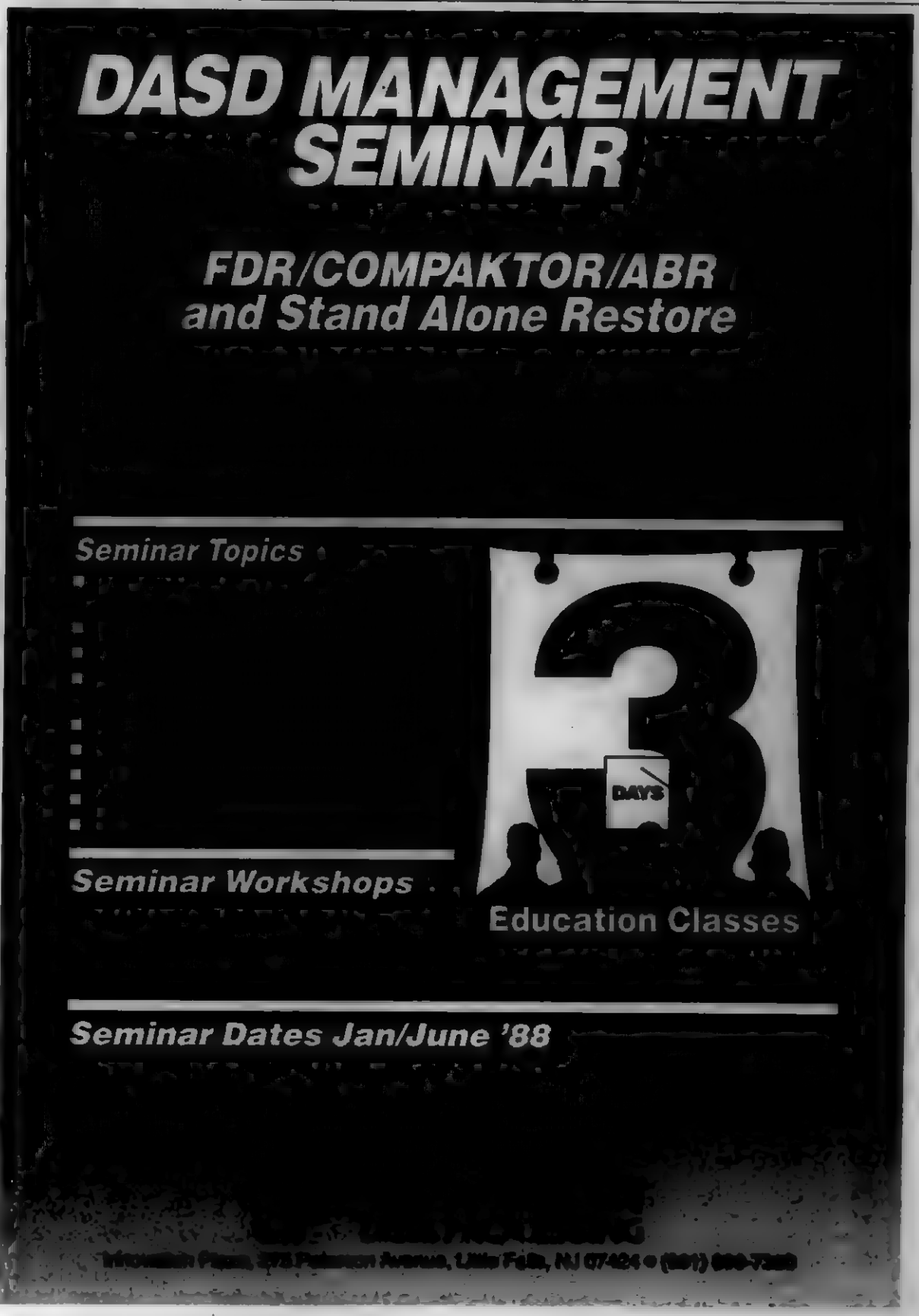
Volume purchases of the IBM PC Network Integration Package will drop from 5% to 37% as well, depending on packages purchased. The full package remains priced at $1,195 for a single unit but drops to $753 per unit when 100 units or more are purchased.

Umbrella marketing

According to John Rose, group manager of DEC's Personal Computing Systems, these moves are part of a series of activities that come under the Network Applications Support umbrella. "The price reductions reflect two things: the competitiveness of the PC marketplace in general and our continuing focus to put our PCs on our VAX ports," Rose said.

DEC will not divulge sales figures on the Vaxmate, but according to industry watchers, the machine has been a major disappointment within the company.

"DEC is just mirroring the downward pricing trend in the personal computer industry," said Michael Millikin, senior editor at Patricia Seybold's Office Computing Group in Boston. "It was foolish to have a 286-based box priced so high in the first place," he added, referring to the Vaxmate, which is based on Intel Corp.'s 80286 microprocessor.



Here come the OS/2 applications

BY DOUGLAS BARNEY
CW STAFF

With IBM and Compaq Computer Corp. playing drum major, a parade of software vendors trumpeted their intentions last week to move applications to IBM and Microsoft Corp.'s OS/2 operating system. But only Informix Software, Inc. and IBM can deliver on their promises immediately, and most applications are still months away.

A "who's who" of micro software vendors who had previously discussed OS/2 support gave shape to these plans, with specifics on products and delivery schedules, at separate Compaq and IBM events.

Informix beat data base rival Oracle Corp. to market as it began shipping a full line of relational data base products for OS/2 last week. Oracle had boldly promised to be the first out of the gate by shipping a product on the first day of OS/2 availability; it now plans an April delivery.

Informix is shipping its Informix fourth-generation language development package, the Informix-SQL data base management system, Informix-ESQL, which allows the embedding of SQL statements into C programs, and its C-Isam indexed sequential access method tool.

Joining Informix in shipping products is OS/2 co-developer IBM, which has begun shipping an OS/2 version of its Displaywrite 4 word processor, the company said last week.

Ashton-Tate Corp. announced Dbase IV, but said it would not be available under OS/2 until later this year (see story page 1).

Microsoft was also active, announcing ports of Multiplan and Word to OS/2 Standard Edition 1.0 and a series of language products that support OS/2 applications development (see story page 8).

Other announcements included the following:

- Software Publishing Corp. said its first OS/2 application will be available in the third quarter of this year.
- Borland International, Inc. announced plans to move its major applications, including its Paradox DBMS, the Quattro spreadsheet, the Sprint word processor, Sidekick Plus, Turbo C and Turbo Pascal, to OS/2 by the end of this year.
- Oracle announced that its OS/2 version of the Oracle DBMS will act as a data base server. The Oracle product, which can also be used on a single workstation, is expected to sell for $1,295.

Compaq trumpets MS OS/2 ship

BY ALAN J. RYAN
CW STAFF

NEW YORK — Compaq Computer Corp. began shipping MS OS/2 Version 1.0 optimized for its personal computers last week and disputed claims from IBM that its Micro Channel-based Personal System/2 line is better suited to run the next-generation operating system.

During a two-hour press conference saturated with support from independent software vendors here, Compaq Chief Executive Officer Rod Canion said a Compaq Deskpro 286 running MS OS/2 in protected mode performs common functions such as calculations, memory access, screen scrolling and random disk access between 17% and 52% faster than IBM's PS/2 Model 60.

Canion added that the Deskpro 386 Model 20 performed each task faster than the IBM PS/2 Model 80-111. Running the same test, a suite of standard benchmark comparisons Compaq has reportedly used for several years, the performance advantage for the Deskpro ranged from 20% to 62%.

In a standard graphics application, Canion said Compaq's Intel Corp. 80286- and 80386-based systems demonstrated performance advantages of 18% over the PS/2 Model 60 and 31% over the Model 80-111.

On the bench

An IBM spokesman said the benchmark claims appear to be exaggerated. "There are many ways to do benchmarks," the spokesman said, "and you can easily set them up to produce the type of results you want." He added that IBM uses the independent National Software Testing Laboratory "to produce fair, unbiased results."

A Compaq spokesman said that although OS/2 and MS OS/2 are very similar, the Compaq hardware makes the software run faster on Compaq machines.

JOHN CHAMBERS
Compaq's Canion

Analyst Peter Labe, a vice-president at Drexel Burnham Lambert, Inc., said Compaq's benchmarks are not very relevant to its MS OS/2 announcement. "The 386 is so fast that I'm not sure anyone could tell the difference [between one machine and another] anyway," Labe said.

He said a more important issue is IBM's attitude that vendors that do not have the Micro Channel architecture will not find a market for their products in corporate America within two years. "It may be that we'll have a two-standard market," with both Micro Channel and industry-standard architectures, Labe said.

Melinda Reach, a vice-president at Merrill Lynch & Co., predicted that most users will wait until the graphical user interface is available before purchasing OS/2.

Compaq is the third company to ship the operating system. IBM released OS/2 Standard Edition 1.0 Dec. 4, and Zenith Data Systems started shipping MS OS/2 Dec. 18.

Following the briefing, 21 independent software vendors assembled to display products running under MS OS/2. The products tested included data base, communications and applications programs.

The operating system is available from Compaq dealers and is priced at $325, the same price point as IBM's OS/2. Buyers receive both 5¼- and 3½-in. disk versions in the package, Compaq said.

Dbase

FROM PAGE 1

Although a demonstration of the program here was temporarily stalled because of a bug in the software, analysts who saw Dbase IV gave it an initial round of high marks.

"They paid a lot of attention to meeting the concerns of the development community; it's clearly faster, and the interface eases the work of the end user," said Bill Higgs, director of software research for Cupertino, Calif.-based Infocorp.

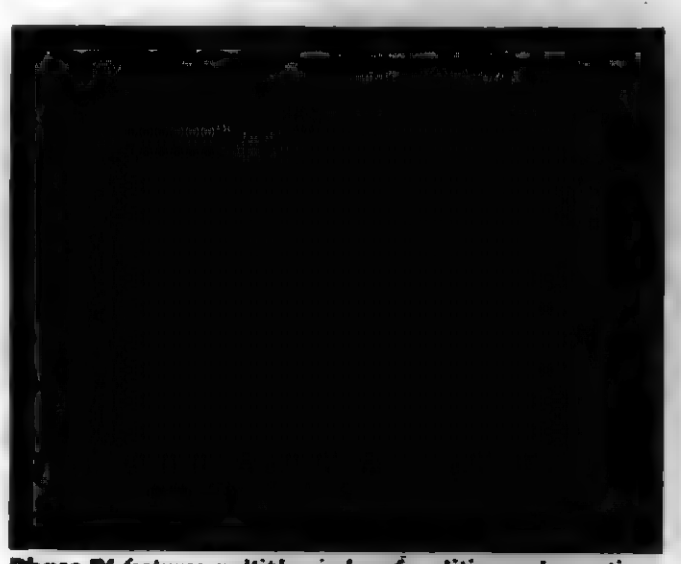
The Control Center interface was designed for nonprogrammers and provides pull-down menus with cursor-selectable command options as well as a what-you-see-is-what-you-get screen display. It also lets users perform data entry, query and report generation without writing programs.

Ties that bind

An analyst who is familiar with the product reported that the SQL implementation gives Dbase IV the connectivity needed to tie into multiuser operations running on a data base server. Such a software server, called the SQL Server, was recently announced by Ashton-Tate and Microsoft.

If linked to an SQL-based data base server, Dbase IV would allow PC users to access relational data on the server, while providing transaction management, record and field-locking capabilities and data rollback and recovery.

The question now is whether Ashton-Tate has kept its customers waiting too long for this fresh Dbase technology. Botched development plans, reports of dissension among programmers at the firm and a daunting 350,000 lines of new source code have delayed the release of the product since last summer.



Dbase IV *features multiple windows for editing and execution*

The lack of upgrades and a code of silence from Ashton-Tate executives on new product specifications led many frustrated users to move to alternative software from such Dbase clone-makers as Nantucket Corp. and Fox Software, Inc.

Although Ashton-Tate claimed Dbase IV will win back many of those unhappy customers, users said they have found the Dbase name is not necessarily analogous to leading-edge technology.

"If Ashton-Tate comes out with a faster version of Dbase, it warrants a look, but we won't move over until we test it and see how it matches up to what we have," said Kuen Ling, a Metropolitan Life Insurance Co. project manager whose staff has switched to Nantucket's Clipper to compile Dbase code.

Ashton-Tate hopes to hold onto its installed base of nearly two million Dbase users by helping them move into the multiuser data base environments of the future.

Dbase IV allows existing Dbase code to access the SQL Server developed jointly by Microsoft, Sybase, Inc. and Ashton-Tate [CW, Jan. 18] as well as some modified Sybase data base management system products, according to Roy Folk, Ashton-Tate's vice-president of software products. Applications written exclusively in Dbase IV can be compiled and extract data from any DBMS using ANSI-standard SQL, including IBM's DB2 and Oracle Corp.'s Oracle.

Folk admitted that the translation process does result in a noticeable decrease in the program's performance. But Richard Finkelstein, senior consultant with Codd and Date Consulting Group in Chicago, said upward compatibility is worth the trade-off in performance. "Dbase IV provides a migration path for users who want to get to SQL but don't want to throw out the applications they already have," he said.

Dbase IV can send complete SQL calls to the server if a new application is developed in the Dbase/SQL language or if existing Dbase code is recompiled.

Take that

Ashton-Tate took a swipe at the competition during last week's announcement, saying Dbase IV would be able to compete across three major areas of data base technology. Software developers that have taken market share away from Ashton-Tate in those segments include the following:

- Borland and Microrim, Inc., which market relational data base products with easy-to-use interfaces.
- Nantucket and Fox, which specialize in Dbase compilers.
- Oracle Corp. and Informix Software, Inc., which have pioneered SQL technology on minicomputers and sell similar programs for PCs.

Analysts warned that Ashton-Tate might have trouble taking on anyone if it does not adhere to its already late release schedule.

Users who buy Dbase III Plus between now and July 31 can upgrade to Dbase IV for $30, while all other Dbase owners can buy the product for a $175 upgrade fee.

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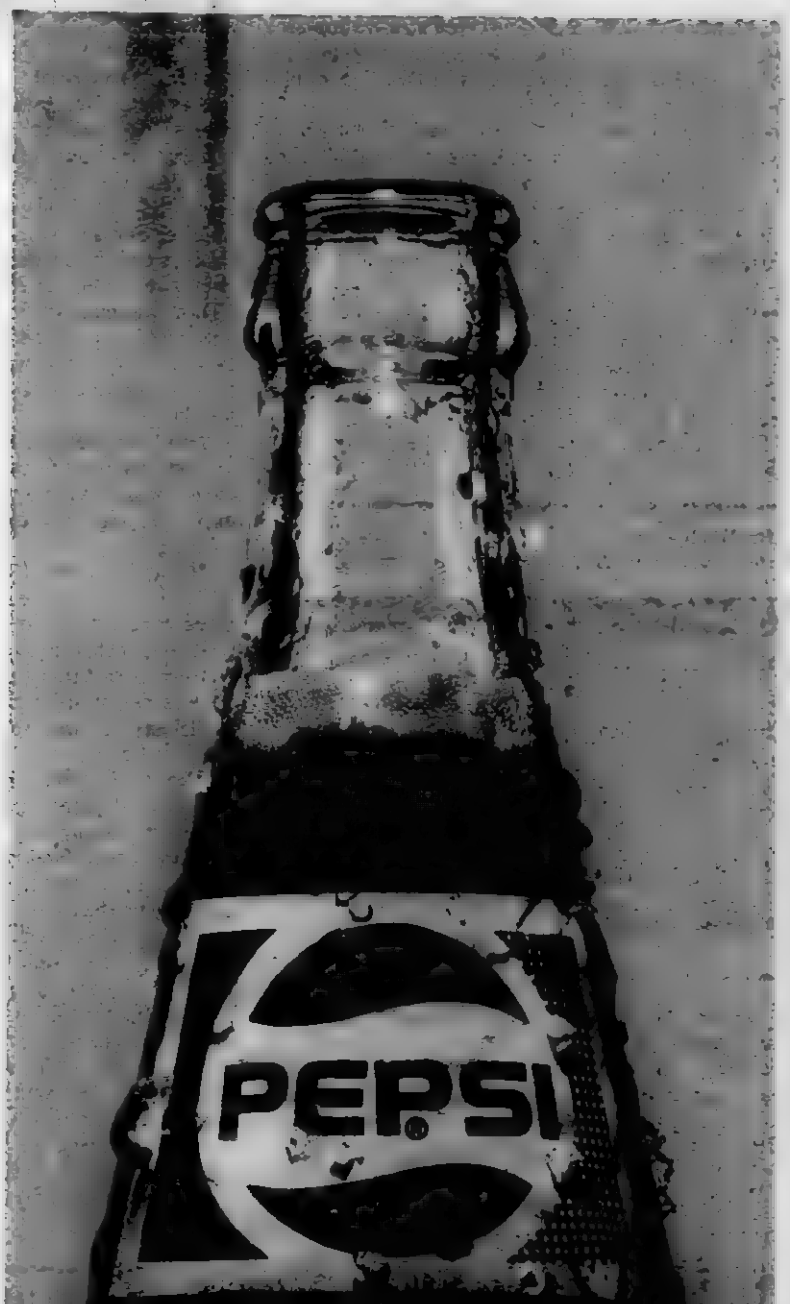

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Honeywell Bull revamps 7000s

Three air-cooled multiprocessors protect data during power outage

BY JEAN S. BOZMAN
CW STAFF

MINNEAPOLIS — Honeywell Bull, Inc. last week announced three high-end models for its 10-month-old DPS 7000 family, each of which is roughly equivalent in power to an IBM 4381 processor.

Designed as upgrades for the 3,500 Honeywell Bull GCOS 7 systems worldwide, the three air-cooled models are multiprocessors with redundancy features to protect data in the event of a power outage or component failure.

Models 72, 82 and 92 will be available Feb. 22, 23 and 24, Honeywell Bull spokesmen said.

The top-of-the-line Model 92 delivers double the power of the $1 million Model 50, the former high-end machine, and can support 121,000 transaction/sec. for more than 2,000 users. The Model 72 can be field-upgraded to the other two models.

4381 competitor

Honeywell Bull managers said the company can compete against the 4381 by stressing the GCOS 7's ease of use vs. that of IBM's MVS/SP operating system and the DPS 7000's multiprocessor architecture vs. uniprocessor versions of the 4381.

However, industry analysts said the machine is more likely to be purchased by existing DPS 7 users than by IBM sites.

The first DPS 7000 Model 72 shipped in the U.S. is currently being installed at a Boston-area supermarket that owns an older Level 64 and a DPS 7, the company said.

"These new DPS 7000 models will help several DPS 7 users I know who are topping out on their systems," said Shirley Eick, president of the North American Honeywell Users Group, Inc. "This will give them a growth path that is completely compatible with their GCOS 7 systems."

Eick noted, however, that U.S. customers "aren't necessarily driving the changes coming along in the DPS 7 line; European users are doing that."

"It seems that Honeywell Bull is buried in the French company that owns part of it," said Mike Geran, an industry analyst with The Nikko Securities Company International, Inc. in New York, referring to Paris-based Compagnie des Machines Bull.

Among the systems' features are multiple CPUs, an enhanced version of the GCOS 7 operating system with improved recovery features and redundant disk drives.

Not fault tolerant

However, Honeywell Bull spokesmen stopped short of terming the features fault tolerant. "All the subsystems are completely redundant," said Maurice Gervais, director of medium systems marketing for Honeywell Bull in the U.S. "They have dual power supplies, dual consoles and a reconfiguration capacity that allows the system to operate if any component should fail."

However, Gervais cautioned against running the systems in mirror image, saying that is an expensive way to achieve fault tolerance.

Nikko Securities' Geran noted that "the redundancy features appear to address IBM's fault-tolerant features."

Gervais said that the company was delivering high system availability at the request of many GCOS 7 users.

The DPS 7000's improved personal computer support was provided through a license agreement with Montreal-based Micro Tempus, Inc. for its Tempus-Link product.

"Tempus-Link will support any MS-DOS-based personal computer," Gervais said, referring to Microsoft Corp.'s PC operating system.

Honeywell Bull also announced the Distributed Office Automation Services system, a downsized version of the DPS 7000 Mistral text retrieval system already used in France.

Filling out the middle

Three new models extend Honeywell Bull's DPS 7000 mid-range line

[1] Millions of instructions per second; CW estimates based on vendor-supplied information
[2] Sample configuration including storage, printers and front-end processors

INFORMATION PROVIDED BY HONEYWELL BULL, INC.
CW CHART

The DPS 7000 Models 72, 82 and 92 push DPS 7000 performance past that of the series' first five models, announced in April 1987. The new models range in price from $731,000 to $1.94 million for power levels spanning the IBM 4381 Models

HP reports 54% rise in profits

BY CLINTON WILDER
CW STAFF

PALO ALTO, Calif. — In another sign of the computer industry's relative strength in an uncertain economy, Hewlett-Packard Co. reported impressive financial results last week for its first quarter ended Jan. 31.

The minicomputer and scientific instruments vendor posted a 54% rise in profits on a 26% increase in sales, compared with year-earlier levels. But most encouraging was HP's rate of new orders, which were the highest of any quarter in the firm's history, President and Chief Executive Officer John A. Young said in a statement. New orders totaled $2.44 billion, a 26% growth rate over orders in the comparable quarter a year earlier.

HP's announcement followed solid results for most minicomputer makers, including Digital Equipment Corp., Wang Laboratories, Inc., Prime Computer, Inc. and Data General Corp. in the quarter ended Dec. 31. The trend indicates industry strength in the period immediately following the Oct. 19 stock market crash.

HP reported revenue of $2.19 billion, up from $1.74 billion a year earlier. Profits grew from $116 million, or 45 cents per share, to $179 million, or 71 cents per share.

Microsoft unwraps OS/2 languages

BY STEPHEN JONES
CW STAFF

SAN FRANCISCO — Microsoft Corp. continued to stoke the OS/2 fires last week, announcing a family of development tools that it said can be used to write both MS-DOS real-mode and OS/2 protected-mode applications.

At a developer's conference here, Microsoft unveiled five enhanced languages, a reconfigurable multifile editor, an enhanced Codeview debugger and a handful of other utilities. The only language missing from the announcement was Cobol, but the developer said an enhanced OS/2 version would be released soon.

The tools are aimed at appealing to a broad base of corporate developers who, up until now, have had only limited access to expensive OS/2 development tools. Microsoft has sold early releases of an OS/2 developer's tool kit that include a C compiler for OS/2, but the package costs $3,000. The OS/2 languages announced last week will cost the same as current MS-DOS releases, the company said.

"It doesn't do much good to have an operating system if you have no tools to write applications for it," said Bob Bierman, a senior programmer with the Living Videotext, Inc. division of Symantec Corp., which has beta-tested most of the Microsoft languages.

But Bierman downplayed the announcement, noting that most of the new compilers show little improvement except that they can work under both the MS-DOS and OS/2 operating systems.

No breakthrough

Bill Higgs, director of software research at Infocorp, agreed. "It's another step in giving developers another piece of what they need, but it doesn't represent a tremendous breakthrough," he said.

Microsoft C Optimizing Compiler 5.1 and Fortran Optimizing Compiler 4.1 cost $450 each. Pascal Compiler 4.0 costs $300, Basic Compiler 6.0 costs $295, and Macro Assembler 5.1 costs $150. The Basic, Fortran, Macro assembler and Pascal compilers will ship by March 31, and the C compiler will ship by the end of April, the company said.

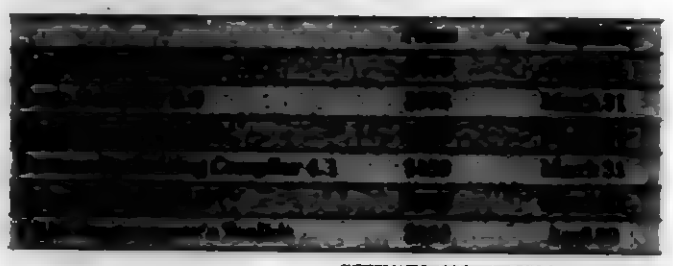
The new tools allow development for three environments: OS/2- and MS-DOS-specific and family applications.

Applications written in the latter dual mode can run under either OS/2 or MS-DOS but offer inferior performance and functionality because they were not written specifically for OS/2. Such applications would typically be limited to basic setup and utility-type programs, said Steve Ballmer, vice-president of software systems at Microsoft.

As a software developer, Bierman said he has little use for such dual-mode applications. "With most applications, end-user performance is too critical to sacrifice by using the family mode," he said.

Speaking in tongues

Microsoft will roll out a line of MS-DOS- and OS/2-compatible languages during the next three months



INFORMATION PROVIDED BY MICROSOFT CORP.
CW CHART

Eight windows open

Each language is bundled with a number of utilities, including Microsoft Editor, which allows up to eight windows and multiple files to be open at one time running multiple languages. An enhanced Codeview debugger allows users to view data structures and follow linked lists and nested structures.

Microsoft also announced the OS/2 Programmer's Toolkit, which provides more than 900 pages of OS/2 documentation.

The tool kit reportedly will be available April 30 for $350. While the OS/2 languages will be enhanced to work with subsequent versions of the operating system, Ballmer predicted that the bulk of applications for OS/2 Standard Edition 1.1, the so-called Presentation Manager, will be written with tools announced last week.

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E. F. Hutton files move uptown

Shearson Lehman packs Hutton account info into central complex

BY ALAN ALPER
CW STAFF

NEW YORK — Shearson Lehman Brothers, Inc. last week completed the first phase of a six-month project to automatically transfer data from E. F. Hutton & Co.'s two data centers in downtown Manhattan to its Information Services Center one mile uptown. The data transfer is occurring as Shearson navigates the final steps of its $1 billion acquisition of Hutton that is expected to close later in the quarter.

During the recent President's Day weekend, Shearson transferred about 45% of Hutton's customer account information into its own mainframe complex, according to Gary Hegedus, vice-president of systems programming at Shearson. Although unable to quantify the data, he said the customer information originated from 125 of Hutton's 400 worldwide offices.

"There are thousands of customers and many positions within each portfolio," Hegedus explained. "A customer file could contain 15 different stocks with 15 positions within each."

Out with the old

As customer information is moved to Shearson's systems, Hutton's offices are switching from age-old Bunker Ramo Information Systems terminals to a mix of IBM 3270 workstations and Personal System/2s that can communicate on Shearson's network via remote controllers and modems.

The objective is to integrate Hutton into Shearson's centralized information network and make effective use of the massive processing capacity of Shearson's IBM mainframe complex (CW, Dec. 14, 1987).

As the data transfer process continues, Shearson is still wrestling with the question of whether to move Hutton's two IBM 3090 Model 400s to its complex once the data transfer project is completed, since Shearson recently upgraded its own IBM mainframe configurations.

Shearson certainly has the room in its nine-story 732,000-sq-ft facility to accommodate the Hutton hardware. The firm is also building a 14-story addition next door in which it will consolidate all operations personnel.

"We have to see what is salvageable, and that relates to Hutton's [computer] leases," Hegedus said.

Hutton brokers at the initial 125 offices that were converted to the Shearson network were able to access customer information the morning after the three-day holiday weekend, Hegedus claimed.

The balance of Hutton customer data will be moved to Shearson's IBM mainframe complex in either one or two stages, Hegedus said. The entire project is scheduled to be completed by the end of June.

Within weeks of making its acquisition offer, Shearson began moving Hutton's branch data, including brokers' commissions, to its IBM mainframes over T1 lines at 1M byte/sec. (see chart above). Much of the work was done in the window between its daily on-line and batch processing cycles, Hegedus said. Transmission was eased using a communications software subsystem from The Systems Center, Inc. called Network Data Mover (NDM), which transfers data directly from source to destination files without intermediate staging or spooling.

The firm has been sending more than 125 files a night from the Hutton systems to Shearson. Some of the files contain one million to two million records, Hegedus said. To accommodate the additional data, Shearson added 14 strings of IBM 3380 direct-access storage devices, bringing total on-line storage capacity to more than 1 terabyte, Hegedus said.

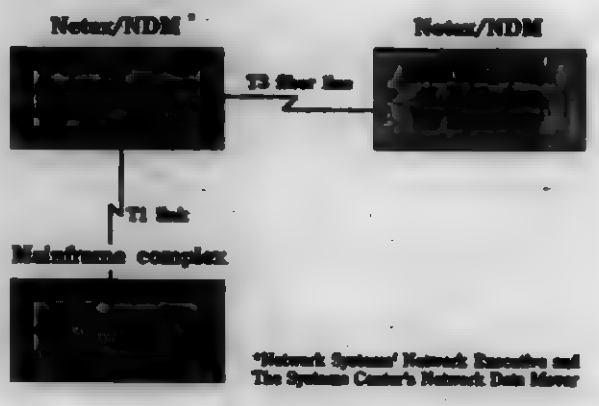
Shearson is using Network Systems Corp.'s Hyperchannel and Network Executive, more commonly known as Netex, to achieve the 1M byte/sec. data transfer speed. "It's not channel speed, but it's up there," Hegedus said, noting that the Hyperchannel adapter is the limiting factor.

As 24-hour global trading makes increased demands on the company's systems capacity, Shearson's MIS department has had to make sure its on-line system comes up earlier than it did before. To fit the daily data transfer work into a tight processing schedule, MIS has to look carefully at job scheduling.

Hutton has been using NDM to transmit data between its primary and backup data centers for the last few years, Hegedus said. The firm has a T3 fiber line running 1,200 ft between its two data centers to facilitate high-speed data transfer and stricter controls. Shearson had been using a competing product marketed by IBM, called Bulk Data Transfer, to move large amounts of data.

Merged identity

The acquisition of E. F. Hutton by Shearson Lehman Brothers requires a variety of communications links to tie the new company's information systems



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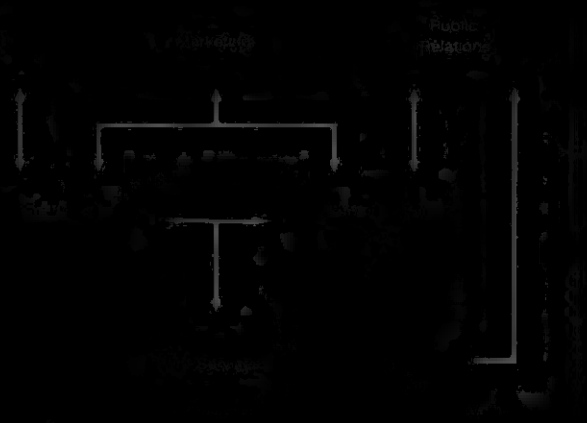

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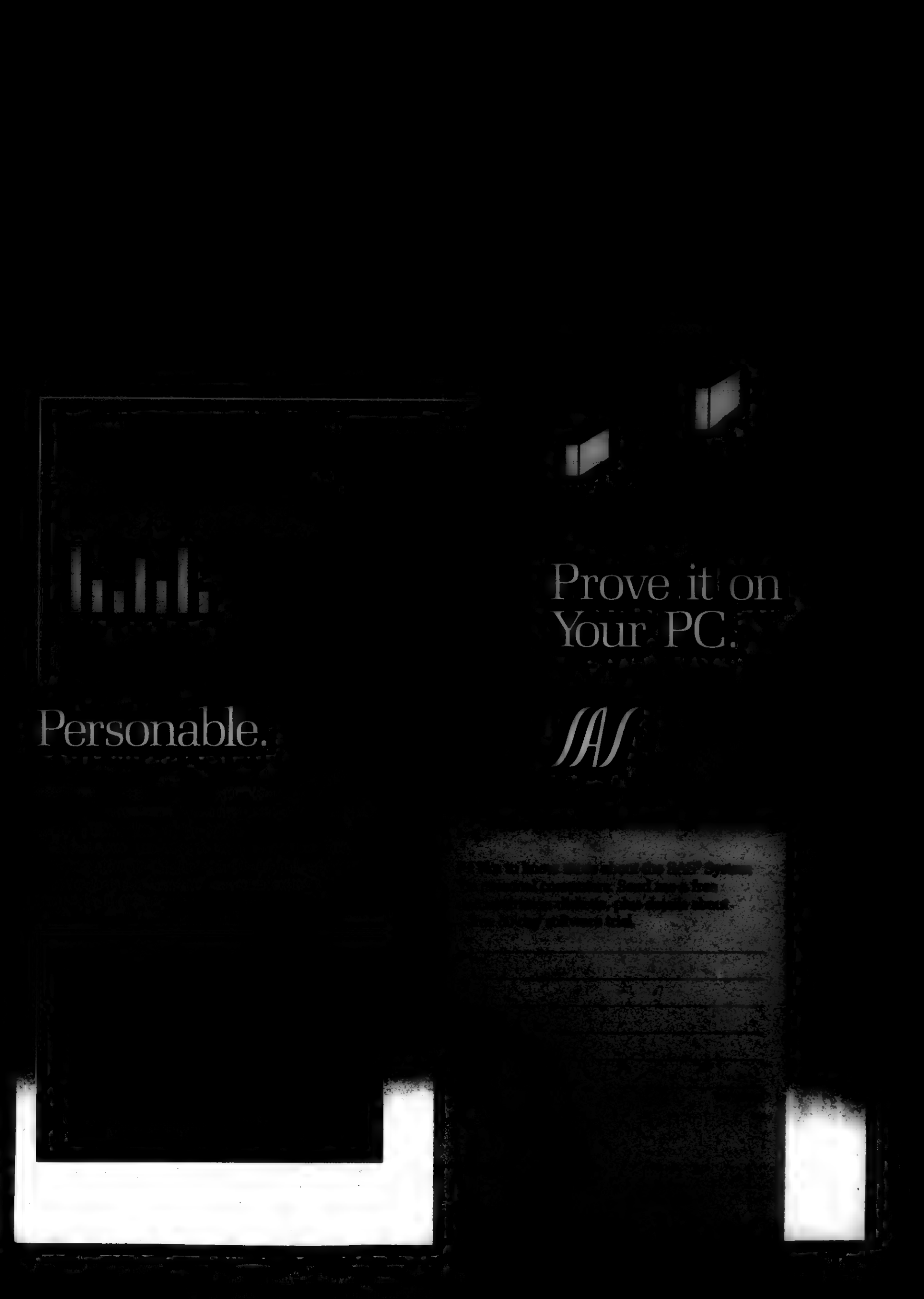
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Sytek bolsters Ethernet, backbone capabilities

BY PATRICIA KEEFE
CW STAFF

MOUNTAIN VIEW, Calif. — In an effort to catch up with its rivals, Sytek, Inc. last week launched 24 mixed-media multiprotocol products and two product families said to provide Ethernet and backbone internetwork capabilities.

While the announcement does not put Sytek in front of the pack, it does provide the firm with the tools to enter the race, agreed Joseph Seidler, a vice-president at Santa Clara, Calif.-based research firm Infonetics, Inc. and formerly Sytek's vice-president of marketing.

Sytek claimed that these product introductions will enable its users to mix numerous technology standards and media on large networks.

"These new products put Sytek in the mainstream of what large organizations desire, if not demand, from networking," Seidler said.

Growing family

Additions to Sytek's personal computer networking family include an Intel Corp. 80386-based file server, an Ethernet adapter and personal computer-based Transmission Control Protocol/Internet Protocol (TCP/IP) software.

Sytek also expanded its Localnet 2000 terminal-to-host line, which now offers twisted-pair support in addition to two routers.

The newly introduced Localnet Ethernet family features a variety of baseband and broadband devices supporting IEEE 802.3 and TCP/IP.

In addition, Sytek unveiled several Localnet Internetworking products.

These include a broadband IEEE 802.4 token-bus backbone connection, remote network management and three bridges. The bridges provide Ethernet-to-Ethernet, broadband PC-to-Ethernet and Ethernet-to-token bus links.

Siemens supports ISDN

BY ELISABETH HORWITT
CW STAFF

BOCA RATON, Fla. — Siemens Information Systems, Inc. is expected to announce today an Integrated Services Digital Network (ISDN) Primary Rate Interface for its Saturn line of private branch exchange (PBX) systems.

Support for the Primary Rate Interface, which defines a high-speed, 1.5M bit/sec. connection between customer-premise equipment and carrier services, has previously been announced by Siemens competitors AT&T, Northern Telecom, Inc. and Wang Laboratories, Inc. subsidiary Intecom, Inc.

A Siemens spokeswoman confirmed that the company would announce Primary Rate Interface support for Saturn.

Siemens will not yet introduce support for the ISDN Basic Rate Interface, which defines standard connections between a PBX and the voice and data equipment on users' desks, she said.

Early introduction of a Basic Rate Interface could be a strategic coup for Siemens, according to Thomas Nolle, president of Haddonfield, N.J., consulting firm CIMI Corp.

The other leading PBX makers have "no vested interest" in providing a generic interface that allows other vendors' equipment to be attached to their PBXs, Nolle said.

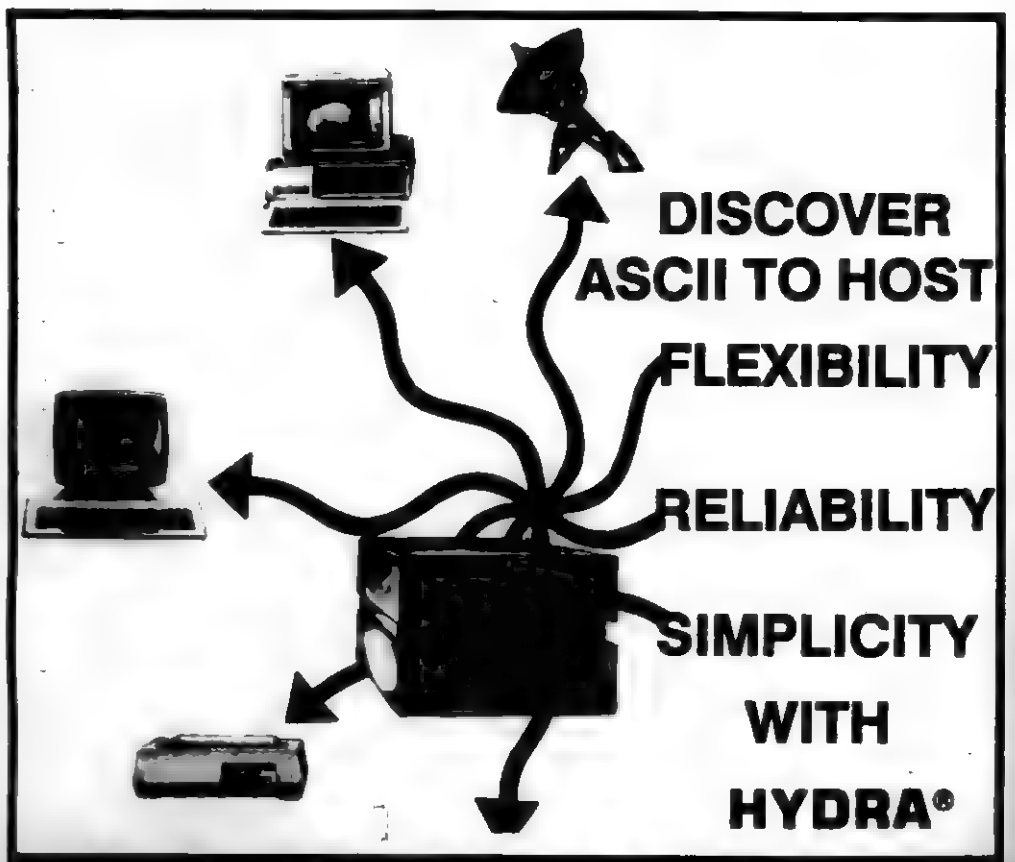
Alliant to acquire Raster

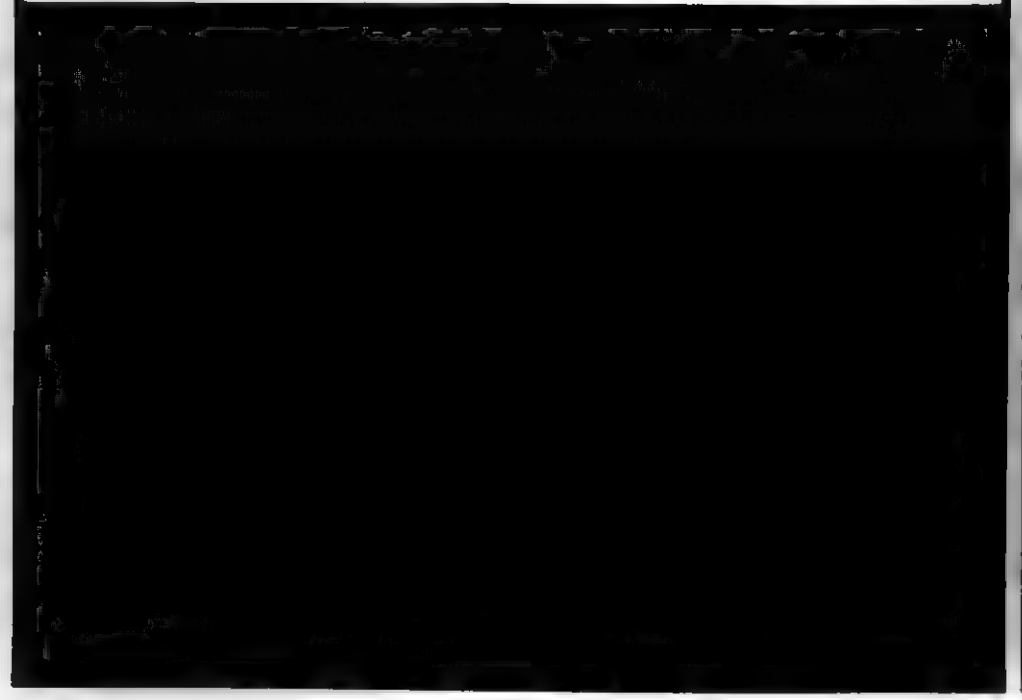
LITTLETON, Mass. — In a move to broaden its product line, Alliant Computer Systems Corp. announced Friday it has signed a letter of intent to acquire Raster Technologies, Inc. for 2.2 million shares of Alliant's stock.

Although Westford, Mass.-based Raster will continue to sell and support its Model One family of graphics terminals as well as its GX4000 graphics accelerators, Alliant plans to eventually integrate Alliant and Raster products, according to Craig Mundie, Alliant's vice-president of marketing.

"Raster and Alliant have a number of common customers," Mundie said, indicating some of them have been using Raster products with Alliant's Motorola, Inc. VMEbus.

Mundie claimed the acquisition will have "no real substantive effect" on Alliant's deal with Apollo Computer, Inc., in which Apollo resells Alliant systems as computational processors for its workstations.





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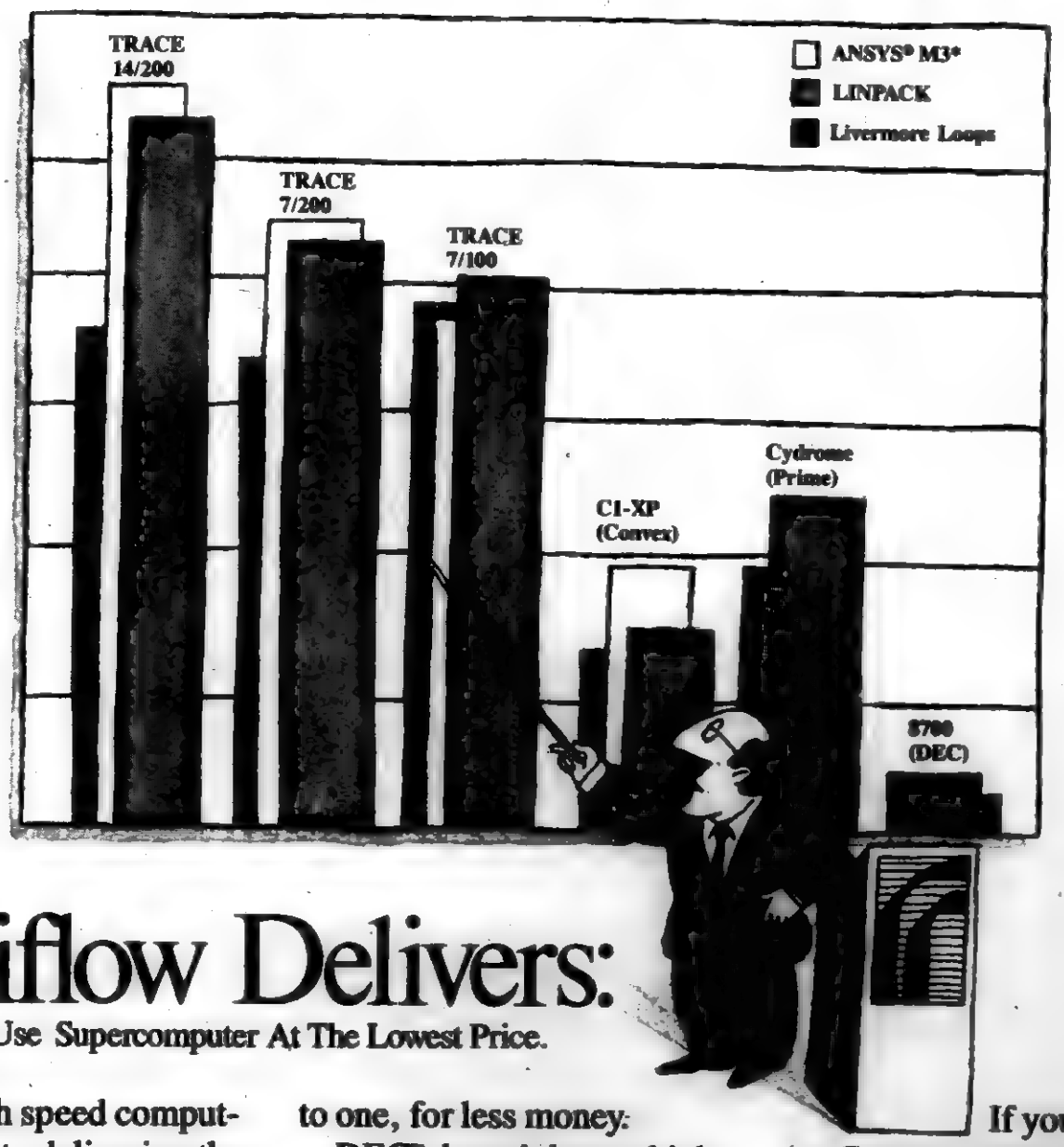

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AT&T reveals multivendor net specification

Network Management Protocol defines common set of standards for vendors' systems

BY ELISABETH HORWITT
CW STAFF

BASKING RIDGE, N.J. — AT&T's still-embryonic multivendor network management system moved one step toward maturity last week with the release of specifications that reportedly allow it to communicate with other vendors' network management products.

However, industry perception of AT&T's Unified Network Management Architecture (UNMA) as mostly vaporware continues to cloud its hopes of challenging IBM's Netview as a de facto industry standard.

AT&T's newly released Network Management Protocol, or NMP, defines a common set of protocols through which different vendors' network management systems can communicate with a single UNMA-compatible network management workstation, according to AT&T spokeswoman Ruthlyn Newell.

The protocol will allow the telecommunications vendor's network management system to monitor and configure multiple multivendor networks from a centralized location, Newell added.

AT&T is currently "having a lot of discussions with vendors about their supporting NMP," Newell said. However, no vendors have announced support of the protocol to date.

They needed it yesterday

AT&T needs to solidify UNMA specifications and sign up vendors to support the architecture as soon as possible in order to counteract IBM's drive to make Netview an industry standard, according to Jeremy Frank, a program director for enterprise network strategies at the Gartner Group, Inc. in Stamford, Conn. "AT&T really had to do it yesterday," given IBM's rapid extension of the Netview umbrella, Frank said.

AT&T is one of several vendors that Eastman Kodak Co. is considering in its quest for better ways to manage its extensive multivendor network installation, according to Alan Chase, manager of research and technical planning for Kodak's computing and telecommunications group. "But UNMA seems more visionary than real, and we have to provide an acceptable level of service now," Chase said.

NMP conforms to the four upper layers of the Open Systems Interconnect communications standard, AT&T said.

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4.8 Kbps	2048A SA/MM 2048C SA/MM 2048T SA/MM	2248A SA & MM	
2.4 Kbps	2024A SA/MM 2024T SA/MM	4024 SA 2224A[2] MM 2224B SA 2224E MM 2224CEO SA 2224G MM	
Dial Backup	48E SA 48F SA 839A MM 839B SA 2296A[3] SA/MM	N/A*	N/A*

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(2) 2224 series asynchronous transmission at 0-300 bps, 1200 and 2400 bps, and synchronous transmission at 1200 and 2400 bps.
(3) 2296A has ability to automatically back up 4-wire private line with a single switched network connection.
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Sprint drops EDS as partner in FTS-2000 bid

BY ELISABETH HORWITT
CW STAFF

U.S. Sprint Communications Co. jilted Electronic Data Systems Corp. (EDS) last week as its partner in a joint bid for FTS-2000, a multibillion-dollar contract to build a telecommunications network for the federal government.

"Sprint contacted us, saying that they have decided to go it alone," EDS spokesman Mark Fox said. "My impression is that they may pick up another partner." EDS, for its part, will not bid on its own for the contract, according to Fox.

The split resulted from "some differences in the business relationship" between the General Motors Corp. subsidiary and the long-distance carrier, Fox indicated.

Sprint would not comment on the situation beyond saying that it is still evaluating the FTS-2000 request for proposal (RFP).

Not a money maker?

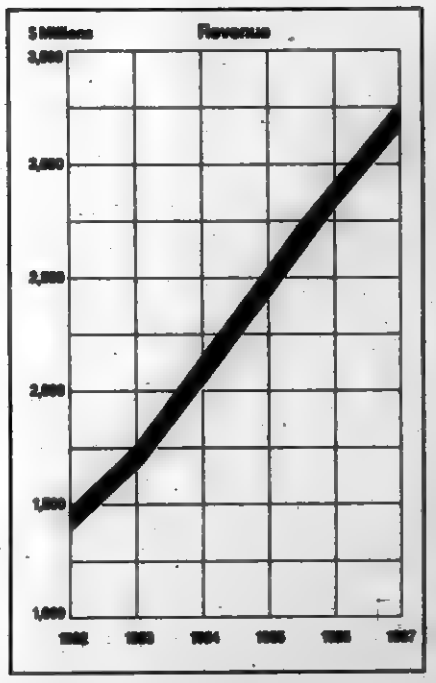
"When a deal of this magnitude falls apart, someone has decided they won't be making money on it," said Thomas Nolle, president of Haddonfield, N.J., consulting firm CIMI Corp.

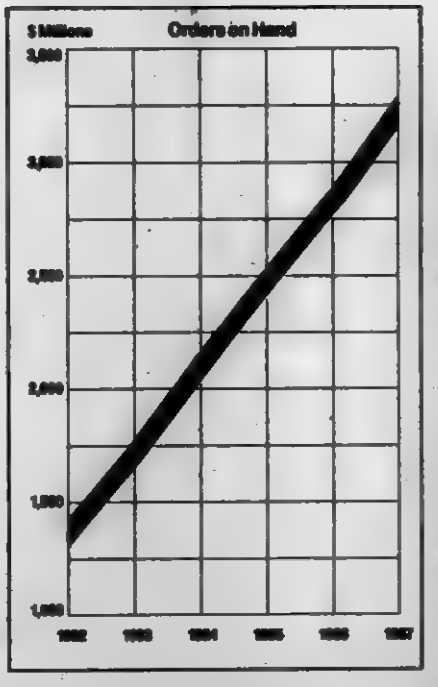
The most likely bone of contention, Nolle said, is the allocation of responsibility for "ongoing support, making changes — the costs that make a proposal dangerous because they are hard to estimate up front." Negotiating such arrangements becomes "tougher when you have two organizations with a lot of power and ego," he added.

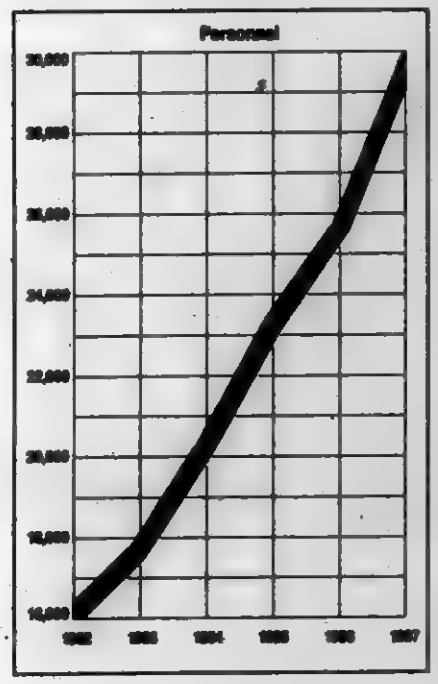
The EDS-Sprint partnership announced its intent to re-enter the FTS-2000 bidding earlier this month, following the U.S. General Services Administration's (GSA) agreement to its request to divide the contract between two bidders. According to the GSA's final RFP, released late in January, one bidding team will provide telecommunications networking for 60% of government agencies, the other for 40%.

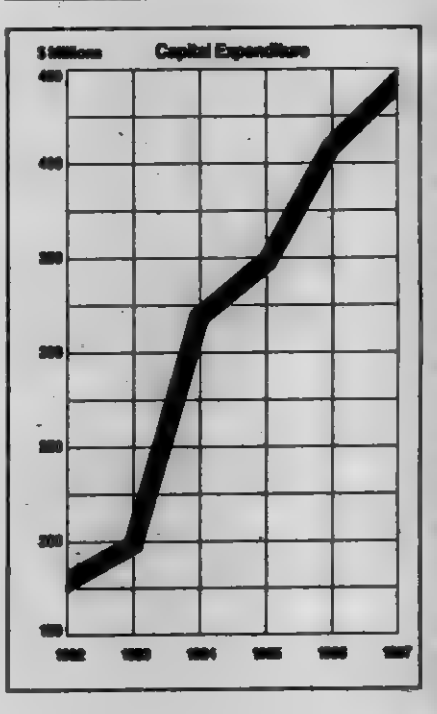
The other major bidders on the contract are Boeing Computer Services Co. partnered with AT&T and the team of Martin Marietta Corp. and MCI Communications Corp.

Once again, our lines align









The lines demonstrate a consistent record of stable, long-term investment and growth that could serve as a model for any corporation, anywhere in the world.

But one doesn't necessarily have to be a financial wizard to see the reason behind it.

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EDITORIAL

Hitting a nerve

CARE TO VENTURE a guess as to which subject engenders more controversy among *Computerworld* readers than any other?

Integrating computers of different vendors into one shop?

Finding good help?

Sex?

Religion?

Politics?

How about Section 1706 of the Tax Reform Act of 1986.

CW has been flooded with mail responding to a recent article [CW, Feb. 1] on 1706, similar to the response we received last May about a previous piece written on the same subject.

Section 1706 is a portion of the revised tax code, slipped into the Tax Reform Act under very dubious circumstances, that threatens the independent status of contract data processing workers. In other words, the section sought to make certain that independents comply with the same federal income and employment tax rules that full-time employees or programmers must adhere to.

As of this writing, legislators who helped ramrod the bill through are seeking to more neatly define the criteria for determining who is an independent and who is not. But the cloud of uncertainty that has hung over this issue for more than a year is already taking its toll, both on independents and on the shops that employ them.

Specifically, many shops that we spoke with have altered contract-employment contracts to ensure that either the independents hired have proper tax credentials or that the agency assigning them to work has assumed full liability for taxes due to the government by the worker. This is interesting, because the law does not expressly go after DP shops if contract workers are found to violate the tax code. Nonetheless, this shows one of the ripple effects of poorly conceived and shoddily executed tax reforms.

But there is one aspect of 1706 that is reasonable, sound and proper — its basic intent and spirit.

There is no arguing with tax laws whose aim is to expose any individual or group that has used old laws to shield themselves from paying a fair share of taxes. There are contractors and agencies who have provided de facto permanent employment for free-lancers. Why shouldn't they be treated like any other permanent, full-time or part-time worker vis-a-vis the tax system?

On the other hand, there are hundreds of one- and two-person independent agencies that clearly deserve to be treated as businesses for tax purposes. Hopefully, the reforms to 1706 that will be proposed will apply more specifically to the different cases that exist and not assume the blanket-coverage approach of the current law.

Clearly, it is past time to stop looking at the situation as all black or all white. There is a vast gray area that needs be addressed by a fine-tuned 1706 — and done so in a truly equitable manner.

LETTERS TO THE EDITOR

Healthy future

Harvey Newquist raised an important issue in his column "Can MIS cure health care ills?" [CW, Feb. 1].

Health care in the U.S. is a $525 billion industry that represents almost 11% of the gross national product.

With health care costs continuing to increase at a faster rate than inflation — and demographic trends leading to a population that is, on average, older — we can expect government, consumers and the overall industry to put greater pressure on health care executives to deliver quality health care more cost efficiently.

This pressure will significantly increase MIS budgets in health care, change the role of MIS executives in the health care field and increase the overall visibility of health care issues throughout the computer industry.

But computers will have the greatest impact on health care costs when the technology matures in two areas.

The first area is in developing integrated data base technology, which will give doctors and other health care personnel, hospitals and other health care delivery organizations, insurers, health maintenance organizations and others in the health care field appropriate access to patients' medical records.

The second is in advancing the technology for image display and networking. This advancement will make possible the integration of diagnostic images into the data base for various patient records.

Forward-thinking health care executives are already developing strategies and procedures that will accommodate this future technology.

Many are restructuring their operations — and information management styles — in response to changes in the regulatory and competitive environment.

Richard P. Corley
Health Care Industry
Group Manager
Digital Equipment Corp.
Marlboro, Mass.

No winner

In "See to shining C" [CW, Dec. 28, 1987/Jan. 4, 1988], William Zachmann implied that C is the best programming language. Events in the America's Cup yacht challenge provide an interesting analogy.

Two comments in the article deserve a rebuttal. First, Zachmann stated, "An inherently structured language, C makes languages like Cobol and Fortran look as obsolete as the Model T Ford." C and Cobol are both procedural block-structured third-generation languages. C also contains the epitome of unstructured code, a GOTO verb.

Second, he implied that C is one of the "much better languages that provides substantial productivity improvements." Productivity gains come from using structured design, coding, testing and maintenance techniques, not a specific language.

Unfortunately, it is common to see elegant C code, which is as easy to debug as IBM assembler code in register notation.

Just as there is no best boat, there is no best language. Each language has strengths and weaknesses. A language should be chosen based on factors that are required for a specific task, not on the dictates of one who imagines himself as "responsible for information systems in a business organization."

Charles F. Rinster
Tucson, Ariz.

This week in history

Feb. 20, 1978
Radiation emitted from CRTs is not responsible for the cataracts developed by two *New York Times* copy editors after that newspaper switched to an electronic editing system, an investigation concludes. The study was conducted by the National Institute for Occupational Safety and Health at the request of the Newspaper Guild.

Feb. 21, 1983
Recently published Internal Revenue Service proposals severely limit the types of in-house and outside software development that qualify for research tax credits.

Stating that "the costs of developing computer software are not research or experimental expenditures," the proposed rules jeopardize a provision of the Economic Recovery Act of 1981 that was expected to give vendors a 25% research tax credit for software development.

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

Vendors learn to respect referential integrity

EFREM MALLACH

Take a survey of data base administrators. Ask what pains them. Along with dentists, the Internal Revenue Service and arthritis, referential integrity will come up often. It's a real problem. But fortunately, data base management software suppliers are finally beginning to do something about it.

A data base has referential integrity if it "hangs together." Every invoice, for example, refers to a customer in the customer file. Every part number refers to a real part record. Every employee is in a real department, and so on.

Referential integrity is lost when a parent record is deleted but all of its children are not. For example, a customer's record might be deleted while there are still outstanding invoices for that customer. This situation can occur by accident or sometimes result from collusion between the customer and the supplier's data processing staff.

REGARDLESS of how it might happen, the data base administrator is supposed to make sure it does not happen. His neck is on the line if it does.

Regardless of how it might happen, the data base administrator is supposed to make sure it does not happen. His neck is on the line if it does.

Prime suspects

Referential integrity is primarily a problem with relational data bases. A network data base uses pointers that make it easy to determine if a customer has outstanding invoices and to prevent deleting the customer's record if he has bills to pay.

A relational data base lacks these pointers. One cannot find out, just by looking at the customer's record, that invoices for the customer exist. To do so, one must check all invoice records to see if there are any with the customer number in question.

Checking isn't very time consuming if the data base is properly organized with invoices indexed by customer number, but it's an additional step that's easy to omit.

The lack of pointers contributes greatly to the flexibility of a relational data base. Flexibility, unfortunately, is also the flexibility to do things wrong and to get into trouble.

Referential integrity is just one manifestation of this problem. The others are aspects of the central issue: the ability of a data base management system (in the most general sense of the term "system"; in this case, including the data base administrator) to enforce business rules in the data base.

The alternative to central enforcement is to require every transaction to check for violations of every possible business rule that might affect it. Even when transactions are developed by professionals, this requirement is difficult to enforce and creates a massive maintenance problem when business rules change.

Help's on the way

Vendors are beginning to help. Products exist today that enforce business rules in two ways. One approach used by some suppliers — most prominently, Sybase, Inc. in Berkeley, Calif. — is to add business rules to data definitions.

Sybase uses "triggers" attached to data element definitions. A trigger is a small program activated when a data element is accessed, deleted or modified. A trigger activated by an attempt to delete a customer record can scan the invoices and prevent deletion if an open invoice exists.

Triggers can also enforce any other business role; for instance, one that states no employee may be hired at higher than the midpoint of the applicable salary range.

A second approach checks the data base periodically to ensure that business rules are not violated. SQL:Verify from Intex Solutions, Inc. in Wellesley, Mass., works on IBM SQL/DS data bases. If there are any customer numbers in the invoice file that do not appear in the customer file, the program can produce a list of them.

In the process, it can also produce a list of duplicate customer numbers in the customer file and of several other things that might go wrong with a data base. By selecting a suitable set of

Continued on page 24

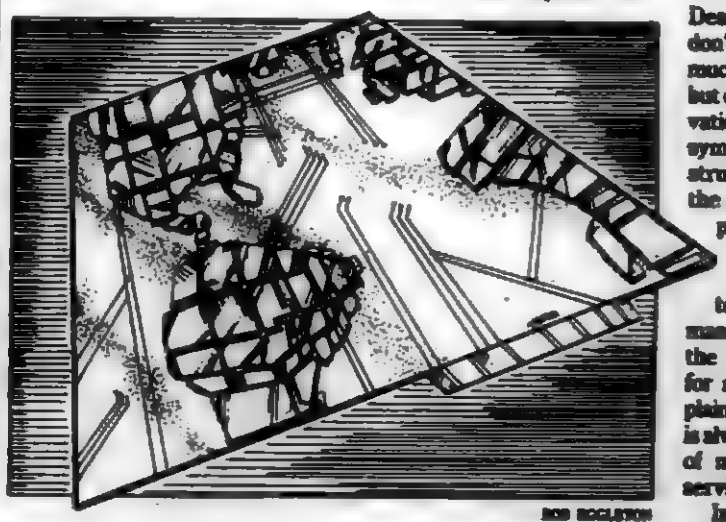
Mallach is a faculty member of the Boston College School of Management and a consultant to user and vendor executives. Based in Needham, Mass., he recently published Win Them Over: A Survival Guide for Corporate Consultant Relations Programs.

Friends and foes join to build PCs

Lift the veil and find a map of the world, from Singapore to El Salvador

CHARLES P. LECHT

While replacing a board in one of my personal computers, my attention was drawn to a chip that bore the words "El Salvador" and the logo of Texas Instruments, revealing the country and company of origin. This bit of information led me to wonder how many other countries and companies had contributed to this PC's manufacture.



BOB BOCLETON

Without checking every component, but having removed just a few boards, I managed to come up with at least 11 countries and 16 companies. The countries included Japan, Singapore, Malaysia, Taiwan, South Korea, Indonesia, Australia, the Philippines, El Salvador and the U.S.

The company symbols were not easy to decipher, but I recognized those of Motorola, Intel, IBM, Fairchild, Hewlett-Packard, Nippon Electric, TI, National Semiconductor, Advanced Micro Devices, Beckman Instruments, Yokugawa Electric, Hitachi, Siemens, Fujitsu, Electronic Associates and AST Technologies.

Some of the companies were operating in several of the countries, the notable example being TI, whose logo I found on components from at least five countries.

Included in the overall country list are nations harboring clone manufacturers as well as legendary computer industry foes such as IBM, Fujitsu, Hitachi, NEC and Intel — competing and cooperating at the same time. Omoshiroi (Japanese for "interesting"), I thought.

Exploring the component origins of the first machine led me to lift the bonnets off several other systems, each produced by a different manufacturer, either Japanese or American. They all sported a similar country and company mix.

Don't let them fool you

Desktop computer vendors don't seem to be manufacturing much of what they sell anymore, but don't be misled by this observation. Just as the conductor of a symphony doesn't make the instruments used to play a work, the results always differ, depending on who's conducting.

What differences can we expect between systems offered by differing manufacturers using basically the same components? Except for manufacturers that are just plain copying, the system design is always unique. So is the quality of manufacture, reliability and serviceability of the end product.

In addition, factors like the availability of a large software library, training materials, documentation and applications know-how differ within each manufacturer's environment. Often, vendors cut costs in these areas and offer fallacious savings

Continued on page 24

Lecht is an IDG News Service foreign correspondent based in Tokyo.

Productivity finds another miracle cure

MICHAEL SULLIVAN-TRAINOR

One morning, an MIS manager awoke to find that researchers had discovered the cure to all of his productivity headaches.

A radio announcer said, "Scientists reported today that a select group of Cobol programmers who had inserted a GOTO statement for every other line of code increased the chances of achieving optimal productivity by 99.6%."

Switching off his clock radio, the manager picked up the telephone to call his development chief. He knew his staff had been using GOTOs every once in a while when they needed them, but they certainly weren't using them as every other line of code. The possibilities were mind-boggling.

"Hello, Dick. Did you hear the news? I want everyone putting GOTOs in their programs, starting today," the manager told him.

"But that's totally against the philosophy of structured programming," Dick complained. "Besides, we don't know whether that research involved novices, hackers or what. The results might be different, depending on what group is exposed to the GOTOs."

"I know," the MIS manager said, "but let's try it with that new personnel application anyway."

"You mean the one we used a code generator and CASE system on? The one we're thinking of switching from Cobol to Natural? The one that's a prototype for our new methodology?" Dick asked.

"That's right. If this works, we can toss out all those tools I never understood anyway and save ourselves some real money," the manager said, then hung up.

A week later, selective use of GOTOs had brought about significant productivity improvements at the shop but only with certain parts of the application written by highly experienced programmers using a more efficient compiler.

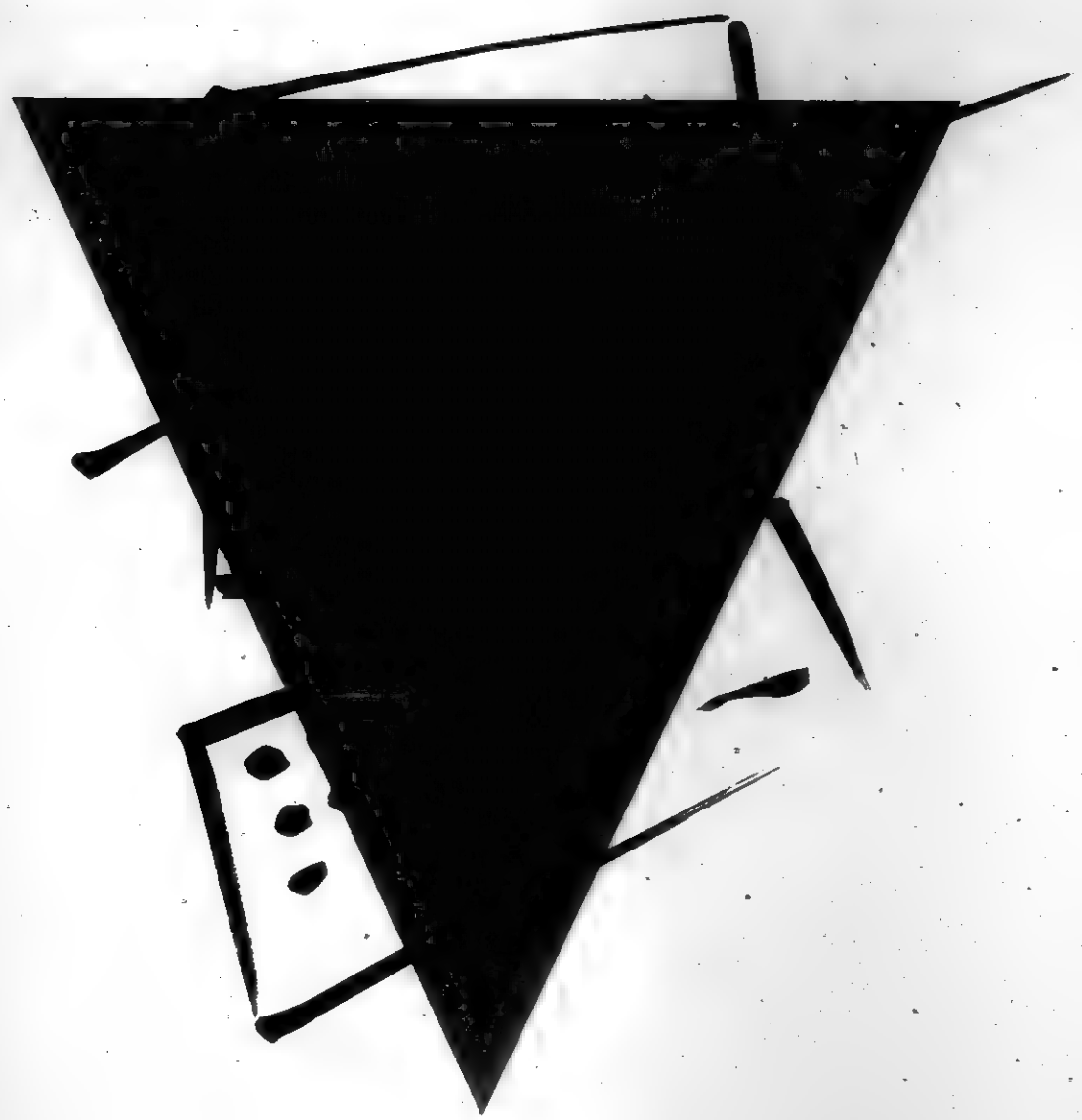
Fanfare falls flat

After studying front-page stories in all the trade papers and even the leading business publications, the MIS manager realized that this alleged cure-all was just another partial productivity aid receiving its usual introduction into the world.

"Looks like it's back to the drawing board," the disappointed manager said to his development man.

"Maybe not," Dick said. "I just heard that Bell Labs researchers are achieving amazing results with Basic for production applications."

Sullivan-Trainor is a Computerworld senior writer.



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With a record of excellence spanning five decades, Alcatel PABX Systems offers premium quality products such as the System 3100 PABX. With the ability to handle voice and data simultaneously, the System 3100 allows you to realize significant gains in operations efficiency by using your existing office telephone lines to communicate data from one workstation to another, and to computers, word processors, printers and electronic mail systems.

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Integrity

CONTINUED FROM PAGE 21

rows to check, a data base administrator can enforce other rules; for example, one that forbids quoting items that are neither in stock nor expected within 30 days.

Pros and cons

There are several issues to consider in choosing between these two approaches.

One pragmatic issue is the environment. Sybase's DBMS runs on minicomputers and microcomputers, not on mainframes. Conversely, you can't buy SQL:Verify for anything but an IBM mainframe: SQL/DS under VM today, DB2 under MVS soon.

But these limitations are temporary. The range of products that address data base integrity needs is growing. Research projects, such as Postgres at the University of California at Berkeley (a follow-on to the work that produced Ingres), are pursuing this area vigorously. Most major DBMSs will soon support either static or dynamic checks, directly or via third-party add-ons.

A second consideration is ease of recovery from a problem if it is detected after the fact. Many product systems do not actually delete records but, instead, flag them as inactive so that their information is retained and can be used for reporting.

When this approach is used, a deleted customer record can often be restored the next day with no real loss. Periodic checks will do quite nicely in these situations. When deletion or other errors can have instantaneous, permanent and unrecoverable effects, dynamic checking is more suitable.

A related factor is the frequency with which one expects problems to occur. If users are untrained, potentially malicious (as the general public) or otherwise untrustworthy, dynamic checking of every transaction may be worth the effort.

The same is true if the data base can be modified via transactions developed by end users, since forcing them to code business rules into every transaction is not practical. If users are more controlled, periodic checks are more likely to suffice.

There is also a hardware capacity and response time trade-off. Checking each transaction requires resources, slows responsiveness or both. Periodic checks that are run during slack times do neither. Using periodic checks can postpone an expensive upgrade or permit use of a system smaller than what might be called for otherwise.

With mainframe performance, measured in millions of intructions per second (MIPS), being comparatively costly and minicomputer and microcomputer MIPS less so, both Sybase and Intex Solutions may well have chosen the optimal approach for the environments they support.

What should users do about referential integrity? Recognize the problem, of course. Decide between the varying conceptual approaches and buy or write software that supports the chosen approach. Then, at last, data base administrators can relax.

Friends and foes

CONTINUED FROM PAGE 21

to users. The proclamations of product marketeers from companies no longer with us echo from the past to the present to find new life in the next generation of gullible users. You hear, "Technically, we're far superior," "Nowhere is throughput better," "It will run the same software without change," and, "We'll be around when you need us," to name just a few.

The fact that desktop computer makers may all be using the same sources for components such as chips, boards and subassemblies does not, in itself, mean we should be concerned about standardization of the end product. Different suppliers do not make identical products. Standardized parts may actually be beneficial; cost savings through economies of scale are certain to accrue to users.

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SOFT TALK

Rosemary Hamilton

Can IBM be a Unix player?

While IBM's commitment to Unix is to be commended, the company also shows signs that it has a way to go before it really plays the open systems game.

First, the positive side. IBM helped both its users and the Unix market by finally presenting a lucid Unix picture. Prior to the Uniforum 1988 trade show, held earlier this month in Dallas, IBM's position on Unix was about as clear as pea soup.

IBM was offering a variety of Unix versions, and there was no real indication as to which one was more strategic than the others. What's more, none of those versions were included in IBM's master plan of Systems Application Architecture (SAA). So did that mean none of the Unix versions were destined for a great future?

Then there was the newly created AIX workstation family, featuring the RT Personal Computer, which has had a dark cloud hanging over it since its introduction two years ago. Was IBM going to make this product strategic? Or was the company merely re-labeling a troubled product line?

Robert Ackerman, who represents X/Open in the U.S., says that IBM's position on Unix has been intentionally vague. "If they wanted to be articulate about it, they would be," Ackerman says.

Continued on page 29

Object-oriented systems emerge

Early versions considered predecessors of '90s mainframe systems

BY CHARLES BABCOCK
CW STAFF

BEAVERTON, Ore. — Two small companies are in the final stages of bringing out general-purpose, object-oriented information management systems, a technology that deals with data in more complex forms than traditional data base management systems.

Initially written for workstations and the Digital Equipment Corp. VAX, the products are seen as the forerunners to the mainframe systems of the 1990s. Cullinet Software, Inc., producer of IDMS/R, and several other major software houses are believed to have development projects under way to add object-oriented features to their mainframe products.

The computer-aided design (CAD) community has experimented with object-oriented information systems for three years, but a more commonly recognized example of object-oriented programming is the user interface on the Apple Computer, Inc. Macintosh, on which the click of an icon opens a file.

"A file in an object-oriented environment does not need to receive a script from a user to activate a file. The same way that a stage director cues an actor, a user can invoke an object that knows what it is supposed to do," said Randall P. Sutherland, a research analyst at Dataquest, Inc.

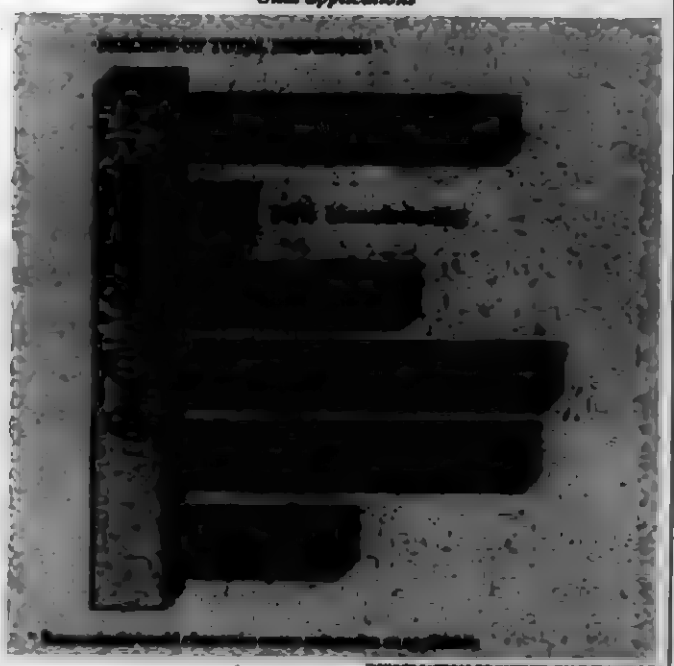
Servio Logic Corp., a 25-employee firm in Beaverton, and Ontologic, Inc. in Billerica, Mass., a 45-employee outfit, are the youthful pioneers. Servio Logic said its system, Gemstone, is available immediately on the VAX with a system scheduled to follow in the second quarter for Sun Microsystems, Inc. workstations. Ontologic said its system, Vbase 1.0, has been in use

Continued on page 30

Data View

Unix in the workplace

135 Uniforum 1988 attendees say they run the following Unix applications



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CW CHART

X/Open support up

DALLAS — The X/Open Consortium gathered more support from both users and vendors recently at the Uniforum 1988 trade show held here.

Microsoft Corp. signed on as a member of the consortium's Independent Software Vendors Advisory Council, and Salomon Brothers, Inc. joined the Users Advisory Council.

In addition, both Microsoft and AT&T committed to the X/Open Common Applications Environment for future operating system products.

X/Open's charter is to promote the use of existing and emerging industry standards. Its goal is to achieve an open system environment based on its Common Applications Environment to enable users to move applications across hardware platforms.

Continued on page 27

IDMS/R ships out with SQL

BY CHARLES BABCOCK
CW STAFF

WESTWOOD, Mass. — Cullinet Software, Inc. recently began shipping IDMS/R Release 10.2, its mainframe data base management system with limited SQL support.

Meanwhile, the company said it will begin beta shipments of the next release of IDMS/R, which will have additional SQL support, in the first quarter of 1989.

Release 10.2 of IDMS/R has the ability to process SQL queries. Another feature of the mainframe hierarchical DBMS is the ability to take advantage of multiprocessor CPUs, according to the company.

Cullinet Executive Vice-President David A. Litwack said about one-third of Cullinet's customers make use of large IBM machines such as the 3090 group.

Release 10.2 faster

Cullinet ran a benchmark of Release 10.2 to test it in comparison with its predecessor, Release 10.0, and found the revised DBMS could execute 104 transaction/sec., compared with the earlier version's 94 transaction/

Continued on page 30

Inside

- IBM APL ported to VMS. Page 27.
- Deloitte moves project management packages up and out. Page 29.
- Britx offers accounting tool for System/36. Page 32.

Spotlight

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IBM programming language ported to VMS

BY NELL MARGOLIS
CW STAFF

ROCKVILLE, Md. — In a move bound to delight those who prefer letters to words, STSC, Inc. has taken IBM's APL from Ph.D. to VMS.

According to an early user, STSC's Digital Equipment Corp. VMS implementation of APL Plus, the company's enhanced version of the APL programming language, is also likely to receive a warm welcome from DEC VAX-based professionals whose daily work involves massive amounts of complex computation and analysis.

Born in the early 1960s of a mathematician's doctoral thesis and originally commercialized by IBM, APL is a parallel programming language that can process an array of numbers in a single operation, according to James Wheeler, director of APL technology at STSC.

"STSC's [APL Plus for VMS] is good; it's very good," said Stephen Jaffe, research consultant at Paulsboro, N.J.-based Mobil Research & Development Corp., a subsidiary of Mobil Corp. and an APL Plus for VMS beta-test site. The research and development needs of Mobil center on the analysis of vast amounts of data, Jaffe said.

The early implementation "isn't perfect," Jaffe said. "There are things it can't do." However, he added, "STSC has been exceptionally responsive"; some of the earlier deficits have already been corrected. Moreover, "some of the features are extremely powerful," Jaffe added.

Jaffe said the programming language is suited to his users. "We hire mathematicians and engineers, not computer programmers."

In the early 1970s, "somebody here discovered APL; we found that it was the key to getting a lot of people competent in analyzing their own data," Jaffe said. Armed with APL, "we automated all of our pilot plants — roughly 100 of them, all doing simulation experiments."

With some 800 scientists running experiments in APL, and with the VAX taking over as hardware platform of choice, Mobil research and development was eager to try the new STSC entry, Jaffe said.

> "WE FOUND [APL] was the key to getting a lot of people competent in analyzing their own data."
>
> STEPHEN JAFFE
> MOBIL RESEARCH & DEVELOPMENT CORP.

Spicing it up

STSC's flavor of the generic APL language, called APL Plus, includes such enhancements as a multiuser, component-based file system, built-in error handling, a report formatter and a software utility library, STSC's Wheeler said.

Available across a wide range of mainframe, minicomputer and microcomputer platforms, APL Plus has run on the VAX under Ultrix for several years. Several months ago, the company introduced APL Plus for VMS.

In addition to standard APL features, such as nested arrays for handling advanced data structures and a full-screen editor and session manager, the VMS version includes two new commands that let the user execute VMS document-control language commands from within an APL environment and an interface between APL and other programming languages that has been enhanced for use with VMS. A maintenance update, due to ship this quarter, will add full VMS file-handling facilities, according to Wheeler.

APL Plus for VMS costs between $6,000 and $33,000, depending on CPU.

X/Open

CONTINUED FROM PAGE 25

Its efforts have been focused on the establishment of Posix, an emerging Unix standard, and, more recently, The MIT X Window System.

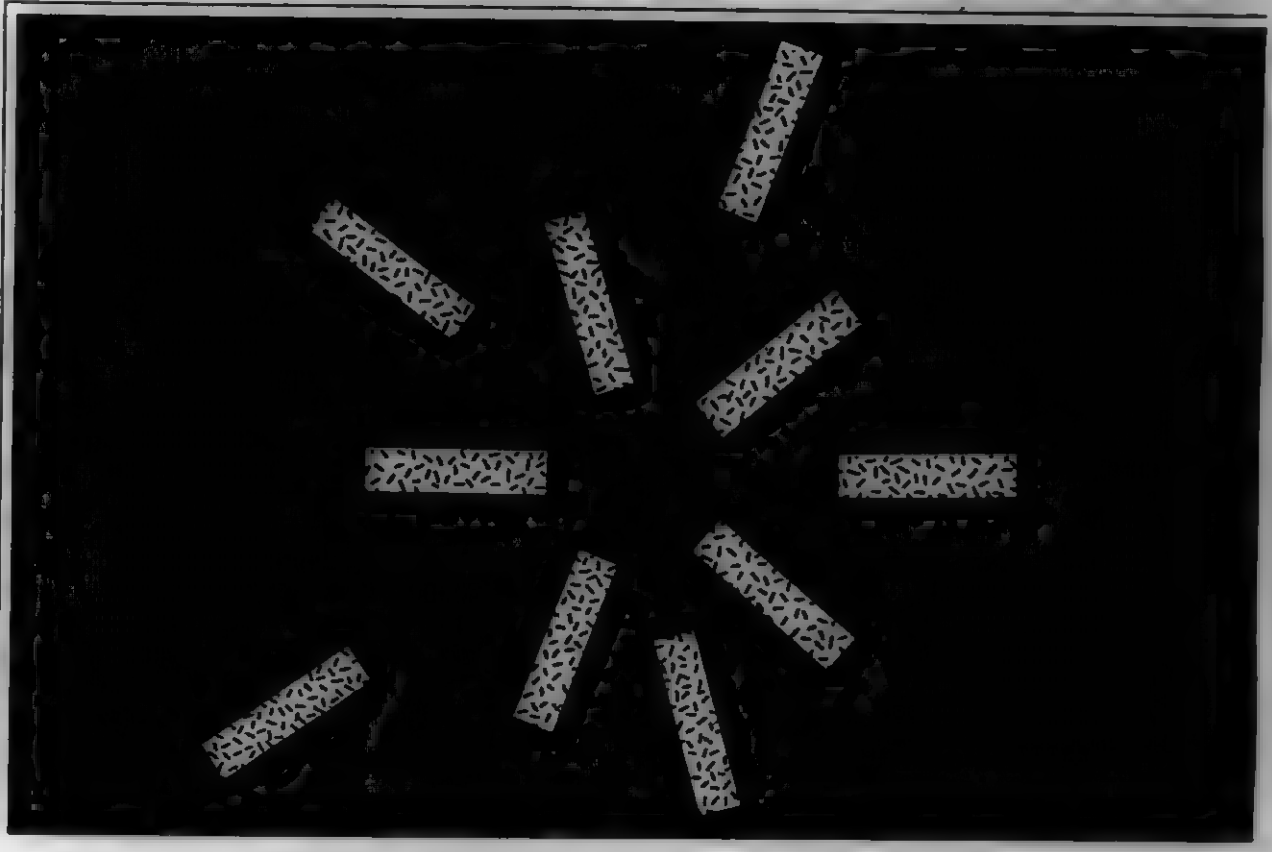
Until recently, X/Open, founded in 1984, has had a low profile in the U.S. Its headquarters are in London, and many of its members are European companies. Over the past several months, however, several U.S. vendors and users have hopped on the X/Open bandwagon.

The goals

At Uniforum, X/Open also outlined its specific goals for this year. The group is preparing a revised version of its System Calls & Libraries definition so that it remains consistent with the Posix standard.

It intends to address networking issues for the first time. The initial step will be to define an X/Open Transport Interface, a programming interface to the Level 4 Services of the International Standards Organization's Open Systems Interconnect model.

The group also plans to address the security of the Unix operating system by publishing a handbook on the security features of Unix.



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Dekker ports software to VAX world

BY NELL MARGOLIS
CW STAFF

REDLANDS, Calif. — Dekker Ltd. is sending its project management software packages up and out; up from personal computer platforms to VAX/VMS and out of exclusively military contracting into the commercial world.

Dekker Trakker and Dekker Trakker Plus, introduced two years ago to run on IBM Personal Computers and compatibles, were originally targeted at large-project U.S. Department of Defense contractors that needed to comply with rigorous DOD requirements, according to company founder and President Simon Dekker.

The Digital Equipment Corp. VAX versions of both Dekker packages are expected to ship this quarter. Dekker Trakker lets the user plot all of a project's activities in order of performance, assigning the resources required and costs incurred at each step, Dekker said. Dekker Trakker supports the Critical Path Method (CPM) of scheduling, including both the arrow and the precedence diagramming methods. Users can also create a schedule without using CPM, relying instead on a series of Gantt charts, according to Dekker.

With Dekker Trakker, a user can define an unlimited number of activities and resources and then apply an unlimited number of cost and burden rates against them on a budget, actual cost or estimate-to-complete basis, the company said. The package provides detailed scheduler and resource/cost reports and graphics.

Plans include analysis, reporting

Dekker Trakker Plus includes additional analysis and reporting features, according to Dekker. It allows users to perform time-phased calculations, including budgeted cost for work scheduled, budgeted and actual cost for work performed, cost and schedule variance and performance, various performance indexes and independent estimate at completion.

Dekker Trakker Plus will produce all documents and graphics associated with performance analysis, prominently including cost performance reports and cost/schedule status reports.

Dekker Trakker VAX license prices range from $20,000 to $40,000; Dekker Trakker Plus VAX license prices range from $35,0000 to $65,000, depending on the number of users. Base prices for both packages include one year of software enhancement service and customer support for one key contact.

Hamilton

CONTINUED FROM PAGE 25

At Uniforum, IBM went to great lengths to articulate its ideas on Unix. AIX got the nod as the strategic Unix, which means the other IBM Unix versions will be phased out over time. AIX's importance stretched out to the AIX workstation family, now considered very strategic to the efforts of IBM's Entry Systems Division. Finally, although Unix is not part of SAA, it will be consistent with SAA where it can. Bridges will be provided to SAA in areas in which Unix cannot conform.

IBM is to be commended for its efforts at Uniforum, because embracing Unix couldn't have been easy. After all, IBM has long kept its distance from the Unix market.

IBM has in the past indirectly conveyed the message: We know what's best, and Unix isn't it. IBM had to eat that message at Uniforum.

Despite the great strides IBM made at Uniforum, there were indications that it will only go so far in committing to the open systems market that Unix supporters hope to create. And that, ultimately, is not the best way to serve its users.

Unix: A three-letter word

For instance, William Lowe, president of IBM's Entry Systems Division, took the podium at a press conference and announced that "from our perspective, Unix is a three-letter word: A-I-X."

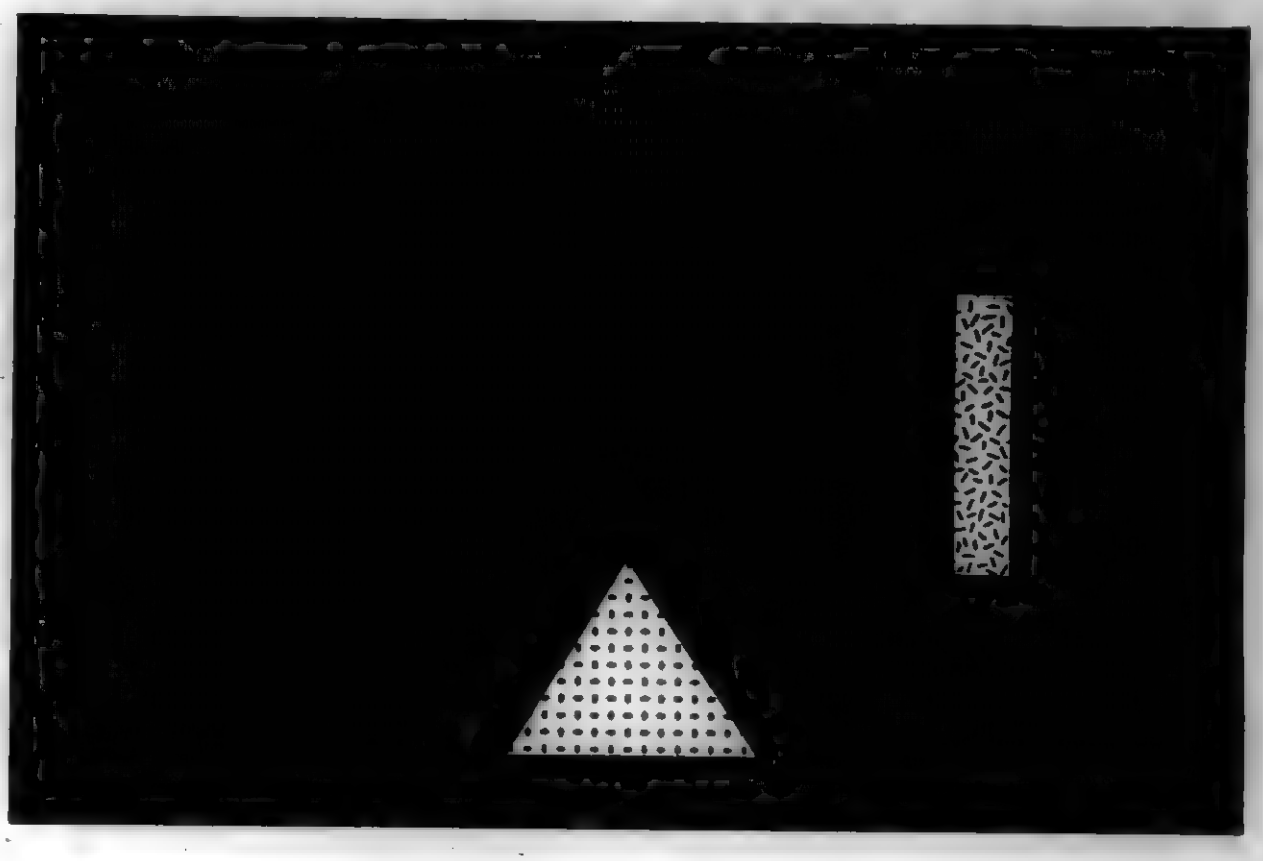
Maybe that was intended to be just a catchy phrase to show support of Unix. But it also can be interpreted with a proprietary ring to it, which is exactly what Unix is not about.

Also, IBM has said no thanks to the X/Open effort. X/Open is a group of vendors working toward creating an open systems environment based on existing and evolving industry standards.

Company executives said it wasn't necessary to belong to the group. When asked about IBM's plans for X/Open, Andrew Heller, a vice-president at the Entry Systems Division and general manager of advanced engineering systems said, "We continue to evaluate it, but as long as they stay on-course, we would rather work directly with the standards groups."

IBM's decision not to become an X/Open team player has an air of snobbishness about it, which goes against the open systems philosophy.

Hamilton is a *Computerworld* senior writer.



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IDMS/R

CONTINUED FROM PAGE 25

sec. rate.

The transactions consisted of 60% simple retrievals, 20% updates and 20% complex retrievals. Release 10.2 could process 225 I/Os per second, and Release 10.0 could handle 200 I/Os per second, according to Litwack.

Improved performance

Both benchmarks were performed on an IBM 3090 Model 200 under MVS/XA. The improvements ranged from 10% to 12.5%.

Release 10.2 also has an improved user interface that produces a less cluttered screen with clearer terminology and more user prompts, according to Litwack.

The release allows IDMS/R data base administrators to create a backup copy of the data base without interrupting updates or other transactions. In addition, data base administrators will be able to implement maintenance tape fixes while the system is running.

Round-the-clock functions

In both instances, the previous release of IDMS/R would have required a shutdown for the procedures. Release 11.0 will add additional 24-hour operational characteristics to the product, Litwack said.

Most of Release 10.2 runs above the 16M-byte, virtual-memory line under MVS/XA. Only a few parts of the DBMS ran above the line in Release 10.0, Litwack said.

In addition, related tools and subsystems, such as IDMS Architect, Cullinet's computer-aided software engineering tool kit, and ADS/Online, the firm's fourth-generation applications development system, also run above the line when used with Release 10.2, Litwack explained.

The latest release of IDMS/R is priced between $104,000 and $390,000, depending on system configuration, Cullinet officials said. The existing base of 2,400 IDMS/R customers will receive Release 10.2 as an upgrade without charge, the vendor said.

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Object-oriented

CONTINUED FROM PAGE 25

at 50 beta-test sites since mid-1986 and is slated to be generally available in April.

One of Servio Logic's beta-test sites is the National Oceanic and Atmospheric Administration (NOAA), which is using Gemstone to store navigational information of the coastal waterways. Objects can be extended more easily than data types; for example, if the NOAA wants to add a list of lighthouses to the class of objects known as "navigation aids," they will fit in that class alongside buoys, radar sounding points and U.S. Coast Guard stations, said J. Michael Connell, senior product manager at Servio Logic.

"Most of our beta sites are national laboratories or universities. Object-oriented is the successor technology to relational data bases, and it's still quite new," Connell said.

Relational data bases can be used as the underlying system for an object-oriented system, according to Ontologic's Robert R. Martin, vice-president of marketing. But a relational data base is not a prerequisite to object-oriented systems and can limit their performance, he said.

CAD market targeted

Object-oriented systems are expected to account for only $10.5 million of the $1.5 billion DBMS market in 1988, Dataquest's Sutherland said. The primary market for object-oriented systems are users of CAD systems, who try to track numerous versions of text and images and develop new products.

"Without an object-oriented approach, they are in danger of losing control of their ability to manage their files. Their work is much more detailed than the data in business data base files," Sutherland said.

Ontologic's Vbase 1.0 will be able to handle related text, geometry and graphics as objects, Martin said. It is written in C and will support C and SQL. It was designed to run on Sun workstations and VAXs under DEC's VMS. No pricing is available yet on the product.

Servio Logic said Gemstone, announced last week, can manage three elements of data — structure, behavior and value — at the same time. It is available immediately under VMS at a price of $9,975 for a DEC Microvax II and $119,700 for a VAX 8800. Licensed for a VAX 8800, the software can handle up to 64 users. Gemstone will be available in the second quarter for Sun-3 and Sun-4 workstations, Connell said.

An object-oriented programming language, Opal, for data definition and manipulation can be purchased as an option with Gemstone. Applications may also be written in C or Smalltalk, an object-oriented language originated 10 years ago at Xerox Corp.'s Palo Alto Research Center.

Gemstone also supports Ethernet and RS-232 networks, Connell said.

Servio Logic, a subsidiary of the San Pao Group in San Francisco, was founded in 1982. Gemstone is its first product.

Ontologic was founded in 1983 as Mosaic Technologies, Inc. and produced graphic workstations. It changed its name and focus in 1985 to develop an object-oriented system.

Although there are several vendors of object-oriented programming languages, only a handful of object-oriented system producers exist today.

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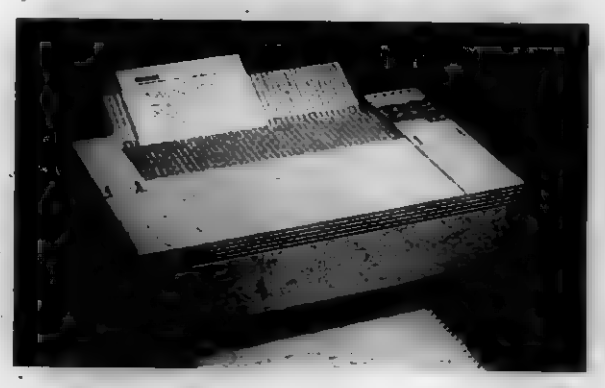

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NEW PRODUCTS

Systems software

A logical data modeling software package for use on IBM mainframes under the TSO of IBM's MVS operating system has been announced by **Holland Systems Corp.**

Called **Design4data**, the package is used to design stable, sharable data models that serve as templates for data bases. Features include multilevel project control, cross-referencing capabilities, password protection and a directory that provides a control mechanism for naming, storing, editing and reporting on data elements, user views and logical data modeling.

Other features include multiuser, on-line and batch operations, graphic model representation, full menu support, on-line Help and data-use requirements collection.

The Design4data package is priced at $45,000.

Holland Systems, Suite 303, 3131 S. State St., Ann Arbor, Mich. 48108. 313-995-9595.

An accounting system designed for use on the IBM System/36 has been announced by **Britz Publishing, Inc.**

Called the **Britz General Ledger**, the software includes such features as multicompany processing, recurring journal entries and financial statements. It can also interface with the vendor's Bpay accounts payable system.

Britz General Ledger is priced at $199, including RPG-II source code.

Britz Publishing also announced Release 5.1 of its **Indoc** documentation system for indicator use on the System/36. Enhancements include a feature allowing the user to document indicators that are used in screen formats and improved print format. Indoc costs $99. Current users can upgrade for $49.50.

Britz Publishing, 1814 Capital Towers, Jackson, Miss. 39201. 601-354-8882.

An enhanced version of the **VMSQL/Edit** full-function table editor for IBM's SQL/DS has been announced by **Applied Relational Technology**, a division of VM Software, Inc.

Release 1.1 offers data validation capabilities allowing individual fields on the screen to be validated according to a range or list of values or minimum, maximum and default values as well as passing the field to a REXX user exit for further validation or reformatting.

Also included are screen painting enhancements that allow users to create and customize screens using the cursor instead of commands; fill-in-the-blank full screens for performing selective queries; and the ability to edit specific views.

VMSQL/Edit costs $13,500 for a permanent license and $9,500 for a three-year license.

Applied Relational Technology, 1800 Alexander Bell Drive, Reston, Va. 22091. 703-264-8000.

Applications packages

J. D. Edwards & Co. has released its **Subcontract system** for the IBM System/38.

The Subcontract system provides for management of contract commitments associated with construction, maintenance and professional service contracts, according to the vendor.

It features tracking of submittal requirements, transmittal information, purchase orders, progress payments and contract status.

The software is integrated with the vendor's General Accounting and Accounts Payable systems and is part of the Construction Management line.

The system costs $11,000.

J. D. Edwards, 4949 S. Syracuse St., Denver, Colo. 80237. 303-773-3732.

A 32-bit version of the **Excalibur Plus** business system has been announced by **Armor Systems, Inc.** for use on The Santa Cruz Operation, Inc.'s SCO Xenix 386 operating system.

Excalibur Plus is an integrated, multiuser accounting system with applications for accounts receivable, accounts payable, inventory control, point of sale, payroll, order entry, billing, general ledger and customer information.

Each Excalibur Plus applications module for the SCO 32-bit Xenix system is priced at $1,059, except the Customer Information/Data Base Management system, which costs $600.

Armor Systems, 342 N. Orlando Ave., Maitland, Fla. 32751. 305-629-0753.

Boston Business Computing, Inc. has upgraded two of its Digital Equipment Corp. emulation products for Microsoft Corp. MS-DOS and Unix systems.

Version 3.0 of the VCL DEC VMS emulator adds 30 commands, lexical functions, flow control of command files, an updated manual and a customizable Help facility. It implements DEC's DCL command language.

EDT+ is an enhanced version of the PC/EDT emulation of DEC's text editor, VAX EDT. It features increased speed, an updated manual and file-transfer capabilities.

Licenses for VCL 3.0 start at $195. Licenses for EDT+ start at $295.

Boston Business Computing, Riverwalk Center, 360 Merrimack St., Lawrence, Mass. 01843. 617-683-7920.

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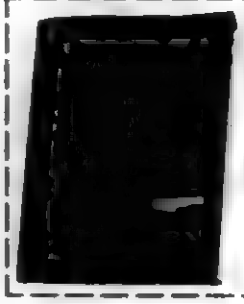

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MICRO BITS

Douglas Barney

Informix wins OS/2 derby

The very foist. Informix Software has beaten rivals Oracle and Relational Technology in the race to ship OS/2 versions of relational data base management system software and tools. The Informix products would have hit the market even sooner if IBM had been a bit more efficient in shipping its final version of the operating system.

It's a natural. When Microsoft announced an equity position in Natural Language, Inc., provider of a natural language interface for SQL-based data base management systems, Microsoft's SQL data base was just a juicy rumor. Now that Microsoft has an SQL back end, it makes sense to use the Natural Language product as a front end. So while Ashton-Tate sells the Dbase language as a front end, Microsoft sells English.

At the time of the investment, Microsoft President Jon Shirley said Natural Language products would not be incorporated into Microsoft products for some three years. But since the only barriers to moving the Unix-based Natural Language

Continued on page 42

OS/2 seen as boon for Paradox

Author claims 20% to 200% performance leap in mid-'88 version

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — One of the authors of the Paradox microcomputer-based data base management system said he believes his software will run 20% to 200% faster in the OS/2 versions that Borland International plans to ship during the second quarter.

But performance is not the whole story. "The real benefit of running Paradox under OS/2 is that it will have the ability to do context switching and real multitasking," Richard Schwartz, vice-president of software development at Borland, recently told the Chicago Association of Microcomputer Professionals.

For now, Borland is demonstrating a version of Paradox that runs under character-based OS/2, the operating system jointly developed by IBM and Microsoft Corp. In that version, Paradox's 384K-byte program runs under the 640K-byte limit of DOS 3.0.

Until IBM ships its OS/2 Presentation Manager in late 1988, Borland will continue to sell the same user interface available on the current version of Paradox.

Programs run side-by-side

"We've chosen to be fairly limited in how we present multitasking to the user," Schwartz told the Chicago users group. "Paradox is running as a single application, not as a multithreaded application. OS/2's multitasking capabilities are then used to allow multiple Paradox applications to run side-by-side."

When IBM releases the Presentation Manager, set for late this year, Borland will develop a new user interface for Paradox, making full use of multiple windows, pull-down screens and selection through mouse clicking.

"You can then present the user with a more intuitive interface," Schwartz said. "The Presentation Manager will allow users to point to something and to use it by double-clicking on a mouse."

A planned user-transparent link to SQL will allow Paradox queries to be directed toward mainframe IBM DB2 DBMSs, Schwartz said. This SQL interface could, he said, then be used to link Paradox to other popular DBMSs, including Oracle Corp.'s Oracle running on Unix machines.

Borland is also evaluating whether it will support Unix and Apple Computer, Inc. Macintosh versions of Paradox, Schwartz said. Former Ansa Software President Ron Posner had earlier promised a Unix version of Paradox.

Inside

- VP Ingari talks about the Lotus challenge. Page 41.
- Odesta data base to handle RMS files. Page 42.
- Caliper Maintenance Software designs hospital system. Page 50.

Data View

Inside track

IBM System/34, 36 and 38 users buy 80% of their micros from IBM

INFORMATION PROVIDED BY COMPUTER INTELLIGENCE

PS/2, RISC melded for academic workstation

BY ED SCANNELL
CW STAFF

RYE BROOK, N.Y. — Marking the first marriage of its Personal System/2 and reduced instruction set computing technologies, IBM recently introduced a workstation for the academic market. Rumors of such a system have been circulating in recent months.

Called the 6152 Academic System, the product uses the PS/2 Model 60's box in combination with a new chip similar to the one used in IBM's RT Personal Computer.

IBM also unveiled a software system it co-developed with Carnegie-Mellon University to manage a university's distributed computing environment using a 6152. The Andrew System consists of the Andrew Tool Kit and the Andrew File System.

The 6152 is available in several configurations, ranging from a low-end system that can handle between 2M and 20M bytes of disk storage up to a ver-

Continued on page 46

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William Zachmann

NEC rewrites the script

A couple of weeks ago, I spent several days in bed with bronchitis and a fairly high fever. With my temperature running over 103 degrees, I had lots of strange dreams, and quite a number of them had to do with fractals, Mandelbrodt sets and Postscript.

What got my overheated brain going on the first two subjects was an exciting book titled *Chaos: Making of a New Science*, by James Gleick. It is a survey of some of the most exciting new research and theoretical thinking in the physical sciences.

But what put Postscript into my neural circuits was an equally exciting personal computer printer: the NEC LC-890 Silentwriter. It has made me, overnight, a born-again convert to Postscript, despite its hefty $4,795 list price and equally hefty 68-lb bulk.

Postscript, the page description language developed by Adobe Systems, Inc., is a means for describing the marks that you want to make on paper, which can include complex graphics and elaborate text fonts.

A Postscript printer is really a printing computer. The LC-890, for example, contains a Motorola 68000 and 3M bytes of memory. It is, in effect, a powerful print server that accepts the Postscript input stream from the host and turns it into impressive marks on paper.

The LC-890, however, can attach to any IBM Personal Computer or compatible by means of either a standard Centronix printer cable or an RS-

Continued on page 43

Lotus marketeer talks of 1-2-3, standards and sharing the world with Microsoft

As vice-president of corporate marketing and business development for Lotus Development Corp., Frank Ingari has a simple job: make more money from existing products and make new products such as Lotus/DBMS successful. Difficult as it sounds, the hardworking creative writing buff and sometime-musician seems up to the task.

Ingari spoke with *Computerworld* Senior Editor Douglas Barney about the challenges ahead and some of the ways in which Lotus will approach its changing market.

How will Lotus's 1-2-3/M for IBM 370 hosts work?
We have been able to use the core code on the PC and the mainframe, which allows for 100% compatibility. And 1-2-3 on the PC can engage with the mainframe in a couple of different ways. You can run your spreadsheet on the PC as a stand-alone application and have file exchange with the mainframe. Or you can go into terminal-emulation mode and run the spreadsheet on the mainframe.

Will one approach be used by organizations more than the other?
It is not an either/or proposition. You will see a lot of both.

How do you view Microsoft Corp. as a competitor? Is the relationship made more difficult because that firm controls the operating system and also acts as a competitor?
It is a very interesting relationship, which kind of characterizes this industry. It is a fiercely competitive business, and yet it is a lot of people having a good time. It is very interesting to have the role that they have in the systems business and the applications business, and they are quite cleverly going to try to parlay that.

Ingari poised *to meet the challenge of changing market*

Is that fair?
By the rules of today's game, that is fair competition.

But how can you maintain a good relationship when Microsoft is coming after you in every market you target?
They play pretty straight. I could not run Microsoft down on this subject. We do think we hold the trump card in the applications market.

What is your approach to the data base manage-

Continued on page 43

Dell finds favor as the 386-based machine of the cost-conscious set

BY JULIE PITTA
CW STAFF

AUSTIN, Texas — Although it lacks the glamour of 80386 machines from Compaq Computer Corp. or IBM, Dell Computer Corp's. 386-based personal computer is gaining influence with business users.

The Dell 386/16, a 16-MHz machine based on Intel Corp.'s 80386 chip, is especially popular with users with small budgets.

"Why didn't we go with a Compaq? We're talking about saving money," said Bill Pierce, director of end-user computing for Gold Kist, Inc., an agricultural cooperative that ranks among the Fortune 500. "The price is right."

Introduced last June, the system offers 1M byte of random-access memory, 128K bytes of

Price: $4,299 for 40M-byte configuration

read-only memory and a 1.2M-byte flexible disk drive. A configuration with an additional 40M-byte hard drive and a 12-in. monochrome monitor is priced at $4,299.

Last week, Dell upgraded its 386 machine, renaming it PC's Limited System 300. The new version adds IBM Video Graphics Array support and the option of a 3½-in. flexible disk drive.

A configuration of the PC's Limited System 300 with a 40M-byte hard disk drive and a 12-in. monochrome monitor is priced at $4,599.

Price is not the only reason for the machine's appeal, said Bill Lempesis, a PC industry analyst at Dataquest, Inc. Dell augments its mail-order approach with a direct sales force targeted at corporate accounts.

The Dell 386/16 also offers corporate customers 12 months of on-site service through third-party Honeywell Bull, Inc.

"Its performance is up there with most everyone else's," Lempesis said. "I don't know if there's really any downside to buying it, except that Dell is not as big as a Compaq. But they are more aggressive in terms of price."

Lempesis said Dell sells a large chunk of its PCs to corporations. According to sources, sales to business customers accounted for about 30% of Dell's revenue last year. In 1987, Dell had earnings of $6 million on revenue of $110 million, making it the seventh largest U.S. microcomputer manufacturer.

Gold Kist has purchased seven Dell 386/16s for use as stand-alone systems to perform tasks such as inventory management of the co-op's poultry feed mills and general accounting.

Pierce said he expects to acquire more Dell 386/16s throughout the year. Some will be used as file servers in local-area networks.

So far, Pierce said, he is pleased with the Dell system's performance. "All the boards that we typically like to use with our PCs are working fine," he said, adding that Dell has been able to deliver the machines to Gold Kist within a week.

The Dell 386/16 represents the first significant clone purchase for what until now has been a solidly IBM shop. Gold Kist has 400 IBM Personal Computer ATs and PC XTs. Pierce said Gold Kist has standardized

Continued on page 43

Mac earns its stripes at Chevron

Open architecture greases skids for former parriah at oil giant

BY JULIE PITTA
CW STAFF

It was once an unwelcome sight. But now, Apple Computer, Inc.'s Macintosh plays an integral role in helping Chevron U.S.A., Inc. handle data on the more than 2,000 barrels of oil processed each day at its Richmond, Calif., refinery.

Until recently, according to W. J. Silva, lead analyst for the refinery's computer operations, Macintoshes were sneaked into Chevron departments under the guise of special-purpose requirements.

"People were bringing them in, telling corporate [management] they had special needs for graphics or for desktop publishing and using them for everything," Silva said.

At Chevron last fall, however, the Macintosh was promoted to Level 1, a designation that indicates the system is fully supported by Chevron's corporate guidelines.

"It's being used by everyone — a real cross section of the refinery," Silva said, noting that 500 users have access to the approximately 90 Macintoshes. "It's now the machine of choice."

Silva said Chevron's switch

Continued on page 46

Top sellers

Software: Feb. 8-13

INFORMATION PROVIDED BY CORPORATE SOFTWARE, INC.
CW CHART

Barney

CONTINUED FROM PAGE 37

product to OS/2 are the porting of code and finding a machine powerful enough to run it, will it really take three years?

The new Ashton-Tate? Ashton-Tate has taken a lot of heat for technological lethargy and an overemphasis on marketing. Now, Tate insiders are beginning to speak of an Ashton-Tate renaissance spearheaded by Dbase IV, which was written entirely by company developers (most of the firm's products were acquired or licensed from others).

And they just might be right. Ashton-Tate went out of its way to pick up some data base hotshots to pull Dbase IV together, and early reports indicate that Dbase IV is as innovative as it gets. But the important thing is that the company has a new attitude.

The firm is highly confident in its technology but is taking great pains not to appear arrogant. If the company truly has the technical momentum that some describe, the real winners are the more than 1.5 million Dbase users.

Microsoft does it backwards. Microsoft officials once held that writing applications for the OS/2 kernel was "doing it backwards." Instead, they said, the way to go was to write for their own Windows, then port those babies up to the Presentation Manager. Microsoft still plans to support Windows and the Presentation Manager but will try it backwards first — with OS/2 kernel versions of Word and Multiplan.

OS/3, where are thee? Microsoft Chairman Bill Gates once estimated that an Intel 80386 version of OS/2 would ship about 12 months after the original and that applications should move smoothly from one OS/2 to another. That would have meant that OS/3, let's call it, would ship before the end of this year. Given that the Presentation Manager won't ship until late this year, users could have waited just a couple of months and jumped to the 386.

Now we hear that OS/2 for the 386 won't ship until, maybe, mid-1989, which means you might have to give the Intel 286 version a try anyway.

Windows dressing. In its rush to publicize Windows, Microsoft has also pulled in a couple of unreleased applications. A two-page advertisement shows off Windows applications and includes an unfinished Windows version of Paradox, which Borland International seems to have stopped talking about, and Beacon, a language product that is being developed by Micro Database Systems. Too bad Microsoft didn't toss in some screen shots of some of its unannounced Windows products.

All downhill, Ray? If you don't catch Raymond L. Ocampo Jr. when he isn't representing Oracle, you may miss him completely. Outside the courtroom, he is often just a blur. Ocampo, who is in charge of litigation for the distributed data base dynamo, was the only representative of the Philippines at the Calgary Winter Olympics in the luge event. While Ocampo didn't win the gold, he did win the award for highest placed Filipino software lawyer.

Our memory works. Reports that some third-party memory boards do not support OS/2 have made some buyers wary. Ideassociates sees this as a major opportunity and is claiming that its Ideamax/MC and Idea Supermax/MC, which both work with the IBM Personal System/2 line, support OS/2. Will we now get releases from firms whose boards crash under OS/2?

Barney is a Computerworld senior editor, microcomputing.

Odesta piece fits data base puzzle

An already innovative data base product that uses an Apple Computer, Inc. Macintosh as a front end and a Digital Equipment Corp. VAX as a back end will be enhanced later this year to access VAX RMS files.

Odesta Corp.'s Helix-VMX uses the Macintosh's graphical interface for querying and applications development. However, some 80% of the files found on VAXs are currently excluded from this scheme.

"The piece of the puzzle that has been left out was that most data on VAXs is sitting in RMS files. It is murder to get that information out of there," said Daniel Cheifetz, president of Odesta.

RMS files will also be accessible via terminal emulation while maintaining some of the icon-driven Mac interface.

With Helix-VMX, users can develop applications using a visual, object-oriented approach, the vendor said. The system provides on-line transaction processing capabilities, record locking and customizable menus.

The product is, in part, an outgrowth of a cooperative development partnership reached last year between Odesta and DEC. Under the agreement, DEC provides Odesta with machines for development and testing as well as technical guidance.

The new version of Helix-VMX was announced last week and should be available later this year.

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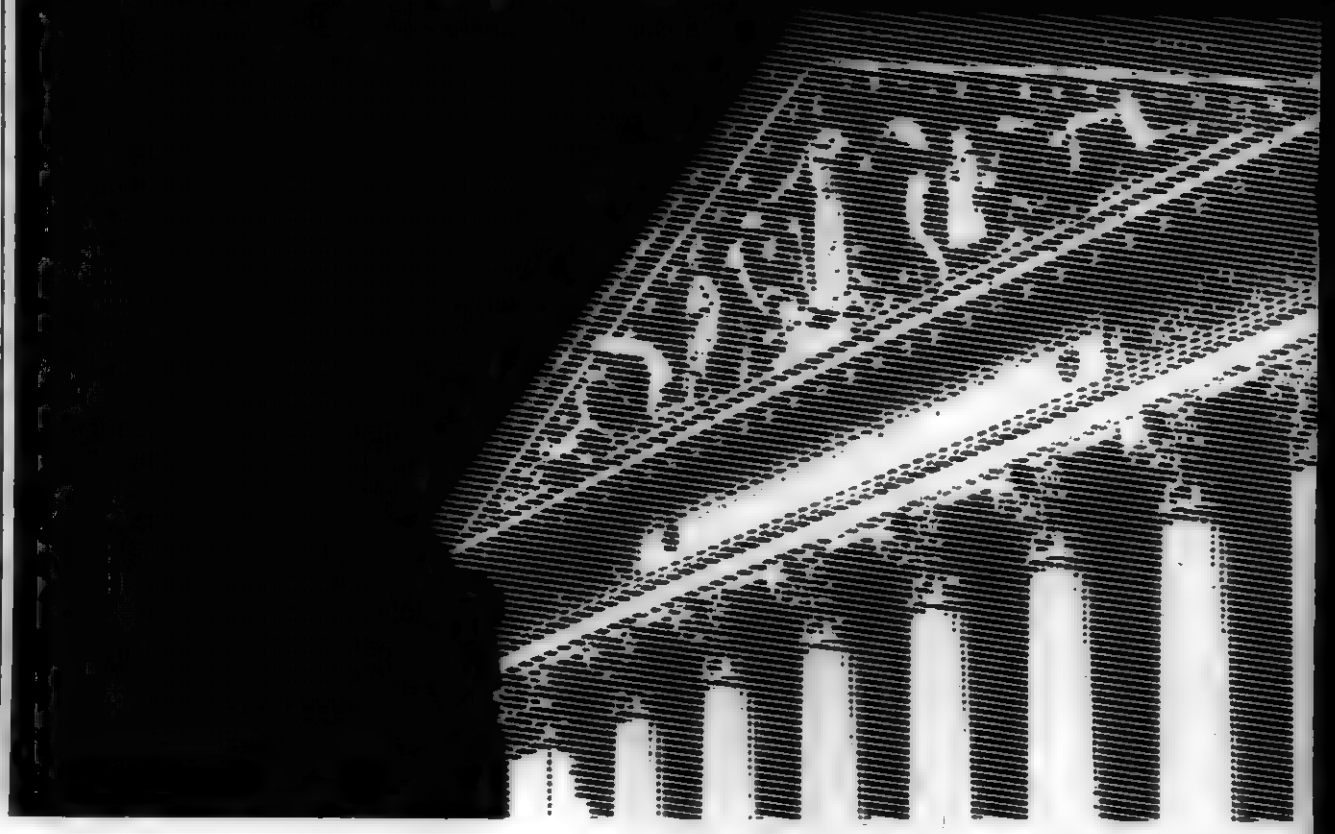

Zachmann

CONTINUED FROM PAGE 41

232 (25-pin) or RS-422 (nine-pin) serial connector.

The LC-890 can also attach to an Apple Appletalk connector as the Apple Laserwriter does.

Using a full-function word processing program like Microsoft Word with the LC-890 opens a whole new world of output possibilities. With a full-blown desktop publishing package like Aldus' Pagemaker, the LC-890 makes any IBM PC or compatible as capable of sophisticated desktop publishing as any Apple Macintosh.

The LC-890 provides 35 built-in and scalable font sets for operation in both interactive and batch Postscript modes. It also offers 13 fonts in Diablo 630 and Hewlett-Packard Laserjet emulation modes. Fonts, emulation modes, a choice of two separate high-capacity feed trays and other options are set with front-panel controls.

I suppose that Macintosh and Laserwriter users, long accustomed to the benefits a Postscript printer brings, will smile tolerantly at the excitement fuddy-duddy IBM users like me feel as we finally see the light. No matter. The LC-890 has made a Postscript believer out of me, probably for life.

Zachmann is vice-president of research at International Data Corp.

Lotus marketeer

CONTINUED FROM PAGE 41

most system market?
We have strength that comes from the sheer knowledge of how people interact with PCs, especially doing numerically related analyses and decision support. We also bring the spreadsheet and the graphics to this market. We see a very tightly clustered set of fundamental productivity tools — the spreadsheet, the data base and the graphics [Freelance] — that is used to pull information out. We have been working on this DBMS for several years and have a great set of tools. It will be very easy for people sitting at PCs to work with SQL engines.

Will your tools be available for other SQL engines?
Absolutely. We said we would eventually support IBM's DB2 with the tools. We will be as aggressive as we can for all the major engines. We will also be willing to link up to what might appear to be competitive engines.

Lotus's 1-2-3 has sold well, in large part, because of its familiar interface. Wouldn't a Presentation Manager version with a new interface put you back at square one?
No. We believe our Presentation Manager product will really be a killer. It will build on the installed base and also exploit the new technology.

How will you handle the upgrade to 1-2-3 Release 3, which may well be the largest upgrade in microcomputer software history?
We have a lot of people testing 1-2-3 Release 3 to make sure it is completely compatible. We are also engaging the channel in the upgrade. Last time, most upgrades were direct.

Dell finds favor

CONTINUED FROM PAGE 41

on the AT bus and that for now, he does not expect to migrate to the Micro Channel-based Personal System/2s.

"We feel we made a fairly conservative decision to go with Dell," Pierce said. "I am a little nervous about it; we've been going with Big Blue for a long time."

Dick Cooper, the engineering design coordinator for 3M Co.'s Dynatel Systems Division, is looking to Dell as a cost saver. "We're looking for performance for the dollar," Cooper explained. "If the PC's Limited machine can deliver the same performance as a Compaq, we'll buy them because they are cheaper."

So far, the Dell 386/16 is meeting expectations, Cooper said. 3M is using the Dell 386/16 as a server in a LAN in which users are performing computer-aided design applications.

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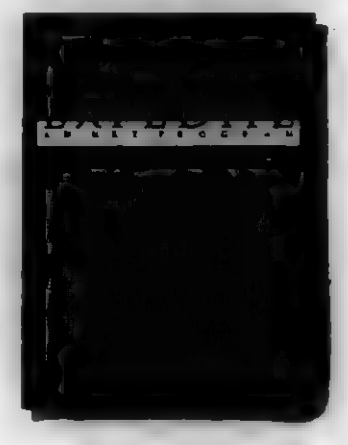

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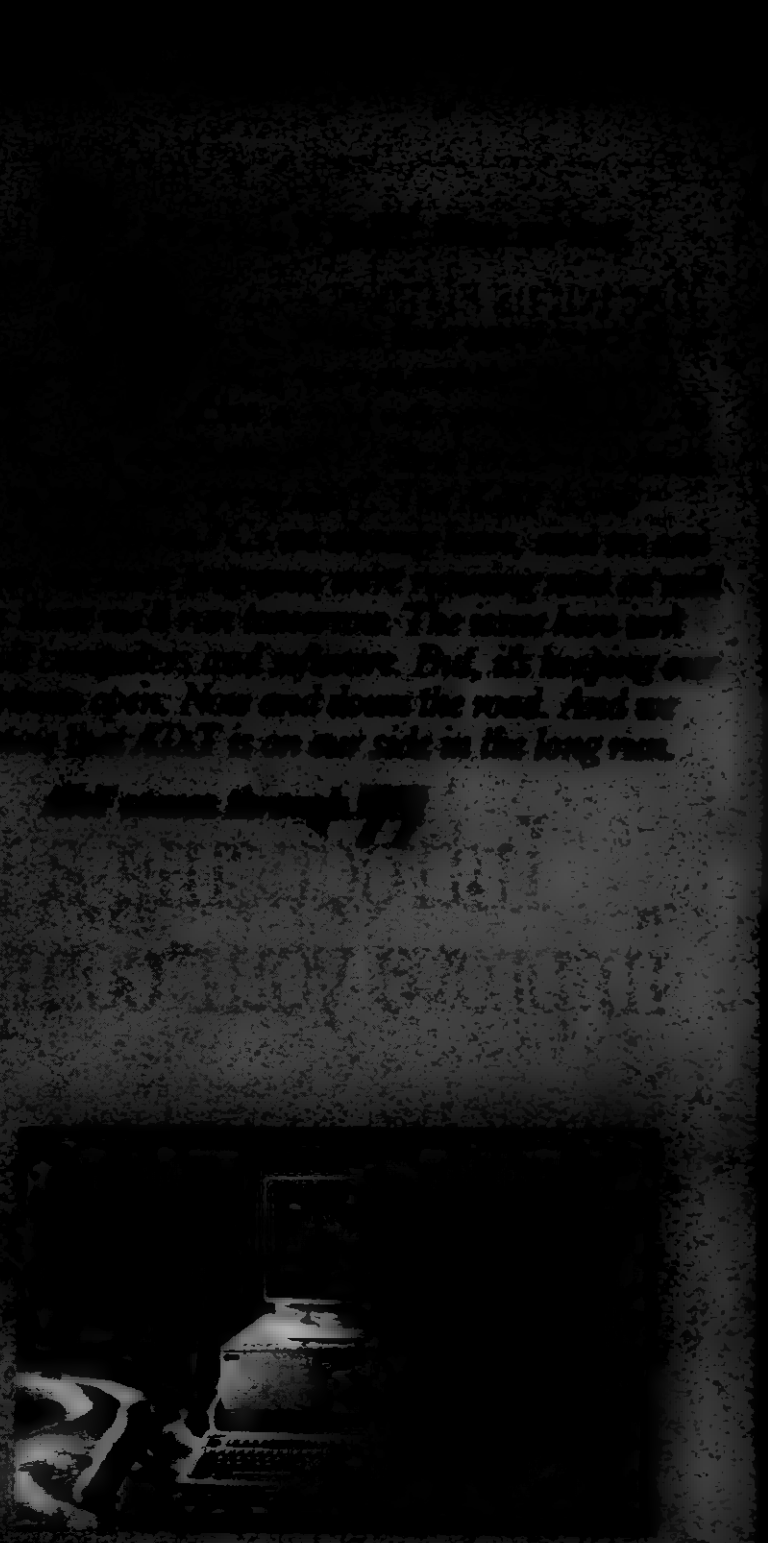

Mac earns stripes

CONTINUED FROM PAGE 41

from the once preferred DOS world to the Mac resulted from Apple's elimination of some elements on the machine to which Chevron had objected. For one thing, with the introduction of its open-architecture Macintosh SE and the Macintosh II last spring, Apple systems can now be upgraded. In addition, connecting Macintoshes to minicomputers and mainframes, as well as to other Macintoshes, is simpler because of new communications products from Apple and third-party vendors.

Chevron's blessing of the Mac generated a flood of purchases. At the end of last year, the refinery counted about 40 Macintoshes. Today, that number has more than doubled, and Chevron is buying the micros at a rate of six to eight per month. Silva says he expects Macintosh installations to top off at about 150.

The Motorola, Inc. 68000-based Macintosh SEs make up the majority of the new PCs the refinery buys. Chevron orders the more powerful Motorola 68020-based Mac IIs for special purposes, especially for use as word processors to replace obsolete Xerox Corp. 860s. The Mac II's larger screen makes it ideal for word processing, Silva said. Additionally, the refinery purchases Mac IIs for compute-intensive applications. "As some of the engineering groups start crunching more data, they will need the more powerful CPU," he explained.

As a result of the increased interest in the Macintosh, Chevron picks up only one or two Microsoft Corp. MS-DOS-based PCs a month, Silva said. Currently, the split between Macintoshes and MS-DOS-based PCs is about even, but the number of Mac installations will likely overtake that of DOS-based PCs in the next month.

Still, Chevron has not completely given up DOS-based machines for Macintoshes. "There's always a die-hard user who has spent months learning Lotus's 1-2-3 and won't switch over to [Microsoft's] Excel," Silva said.

But "a lot of people with DOS-based machines are replacing them with Macintoshes," he continued. "The Mac is user-friendly: It's easily learned by the novice and easily remembered by the casual user. Once you've learned one Mac program, you know all the Mac programs."

Chevron is sending replaced DOS-based PCs to its maintenance department for use in a maintenance shutdown tracking system, a software program written exclusively for a DOS-based system.

Mac of all trades

The refinery uses Macintoshes for a variety of tasks — from simple word processing by clerical personnel to data analysis by refinery engineers. In fact, Chevron organized the Macintoshes into small work groups all connected via Apple's Appletalk network.

Macintoshes can access data stored in the refinery's Digital Equipment Corp. PDP-11/84 minicomputers through modems hard-wired to access ports in the DEC mini. Macterminal, a communications program resident in the Macintosh, dumps data onto the Mac's screen.

Connection to the DEC mini allows the Mac user to access data relating to the refinery process. Oil products created at the refinery vary from aviation fuel, gasoline, diesel fuel, waxes, asphalt and lubricants, Silva said. Crude oil is brought to the refinery, where it is heated, broken down into its different components and then refined. "The finished process for one product is the feed for another," Silva said.

The minis store operating histories — records of temperature, flow rates and pressure in the storage vessels. "We're constantly monitoring," Silva said. "Engineers use the data to analyze the parts of the process that they are responsible for. They look for problems and how to correct them."

All the data sent to the Macintosh can be organized into graphs through the use of packages like Cricket Software's Cricket Graph. "By graphing the data, you can see problems that you couldn't by just looking at raw numbers," he said.

Desktop publishing tools allow refinery engineers to create reports using the graphed data. In addition, Chevron uses Mac-based desktop publishing systems to create operator manuals as well as the refinery's in-house newsletter.

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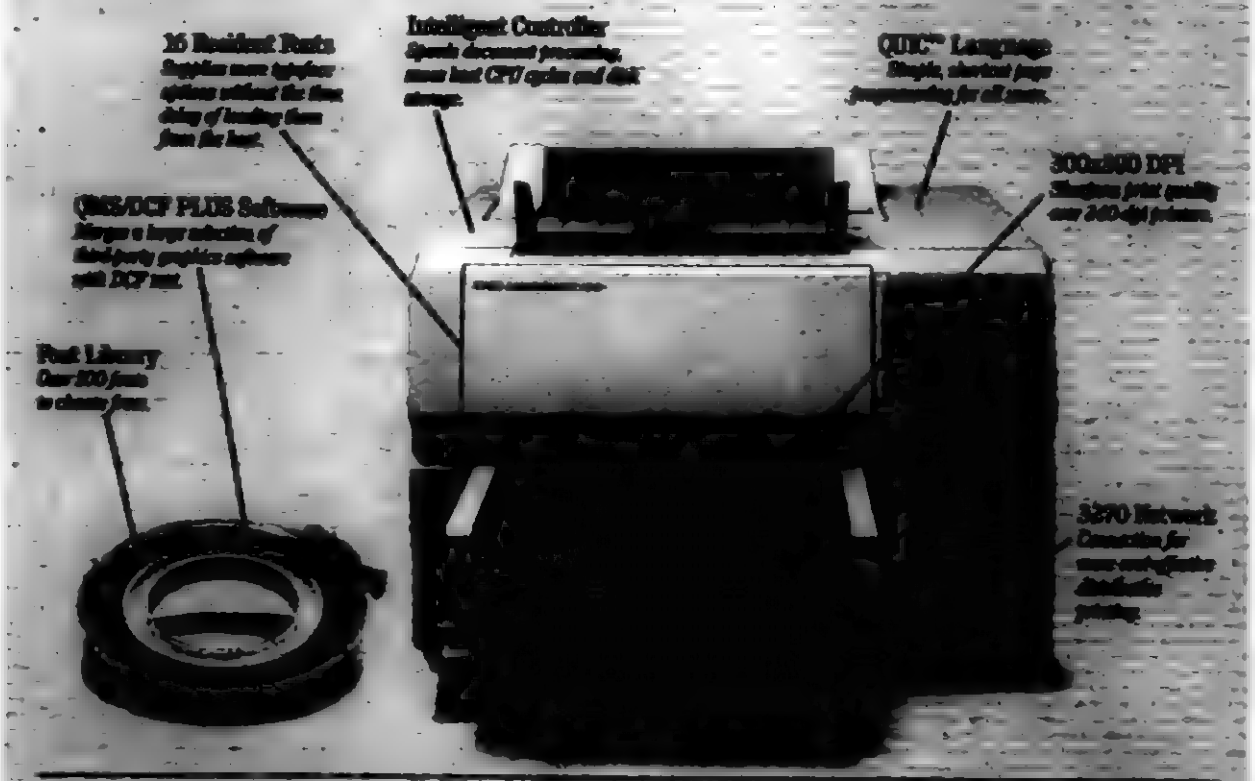

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PS/2, RISC

CONTINUED FROM PAGE 37

sion that can store between 8M and 140M bytes. Depending on the configuration, prices range from $7,000 to $11,000, including monitors.

Users can run IBM's PC-DOS and OS/2 Standard Edition 1.0. The system also runs the Academic Operating System 4.3, a Unix-based, multiuser, multitasking system that will be available only to universities, on the 6152.

The Andrew Tool Kit contains several programs that can be used for software development and graphics display. The Andrew File System supports file sharing and decreases network tie-ups by directing user access to programs and data on local disk storage instead of over a network, a spokesman explained.

The system will be sold in the U.S. to colleges and universities only. IBM declined to say whether it would make such a machine available commercially.

The 6152 is expected to be generally available by July. The Academic Operating System 4.3 for the RT PC should be available this month for $1,715 and a version for the 6152 next month for $300.

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NEW PRODUCTS

Systems

Two Intel Corp. 80386-based microcomputers have been announced by **Advanced Logic Research, Inc.**

Called the **Flexcache 16386** and the **Flexcache 20386**, both systems are based on the Intel 82386 coprocessor. The 16386 operates at 16 MHz with no wait states, and the 20386 operates at 20 MHz with no wait states. Both feature a flexible bus design and cache memory.

Other features include 1M byte of 32-bit dynamic random-access memory expandable to 2M bytes on the main system board and a hard-disk controller.

The Flexcache 16386 costs from $4,690. The Flexcache 20386 costs from $7,490.

Advanced Logic, 10 Chrysler Ave., Irvine, Calif. 92718. 714-581-6770.

Software applications packages

Expert system development software said to generate C source code from decision trees has been announced by **Programs in Motion, Inc.**

The package, called **1st Class Fusion Expert System**, also offers code generators for Pascal and production rules. Features are said to include the ability to see the current knowledge base in context with others in an expert system and to move from one knowledge base to another with just a keystroke.

The expert system software can capture and display text or graphic screens from other applications for display and can link directly to Ashton-Tate Corp.'s Dbase III.

1st Class Fusion Expert System costs $1,295.

Programs in Motion, 10 Sycamore Road, Wayland, Mass. 01778. 617-653-5093.

Info-XL, an information management program for IBM Personal Computers and compatibles, has been announced by **Valor Software Corp.**

According to the vendor, Info-XL allows users to view a single large information base through various on-screen windows, each of which tracks different types of data. Users can set up permanent or temporary links between information categories by using a built-in outliner or an ad hoc approach using the search capabilities.

Features include a window for building structured data files; a window for entering and maintaining free-form text; a daily schedule window; a monthly calendar window; a report generator; and the ability to resize and change color configurations of the windows. Info-XL costs $150.

Valor Software, 1700 Don Ave., San Jose, Calif. 95124. 408-978-3044.

A software package designed to help hospitals track and manage equipment and facilities has been announced by **Caliper Maintenance Software Systems**, a division of Diagonal Data Corp.

Medmaint automatically schedules maintenance tasks, prints work orders, controls maintenance work load and man-hour requirements, identifies problem equipment, recommends corrective action and details maintenance costs for each piece of equipment, including labor and material.

Intended for hospitals and health care facilities with more than 100 beds, Medmaint runs on IBM Personal Computers and compatibles. Prices start at $3,495.

Caliper Maintenance Software, P.O. Box 2278, Lakeland, Fla. 33806. 813-666-2330.

American Medical Software has announced its **Medical Office Billing System** and has enhanced its **Medical Office Management System.**

The Medical Office Billing System is said to process accounts receivable, billing, insurance, claims generation and tracking, patient and medical record inquiries, referral analyses, statements and superbills.

The Medical Office Management System includes the features of the billing system and adds the ability to process appointments, practice analysis reports and recall notices.

The systems run on IBM Personal Computers and compatibles. The Medical Office Billing System costs $1,995. The Medical Office Management System costs $3,495.

American Medical Software, P.O. Box 236, Edwardsville, Ill. 62025. 618-692-1300.

Project Software & Development, Inc. has launched an add-on graphics product for its Qwiknet Professional project management software for IBM Personal Computers and Personal System/2s.

The **Qwiknet Graphics** add-on is said to allow users to produce histograms, network diagrams and bar charts. The graphs can be customized through scaling, coloring and zoning options and can be exported to free-form graphics software programs.

Qwiknet Graphics supports up to 256 colors and sizes up to 27 sq ft.

Qwiknet Graphics costs $645. Qwiknet Professional costs $1,495.

Project Software & Development, 20 University Road, Cambridge, Mass. 02138. 617-661-1444.

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DEC counters IBM's SAA

DEC's Network Applications Support (NAS), a strategy for linking non-DEC desktop devices to Decnet, has befuddled and frustrated many observers. The last thing the industry needs is another acronym (particularly since National Advanced Systems already lays claim to NAS) or another communications "solution" that includes no products.

The only thing new in DEC's January announcement was its proposed plan to develop OS/2 interfaces to Decnet at a later date. The scarcity of the tangible prompted one wag to remark that the Maynard minicomputer marvel might be changing its slogan from "Digital has it now" to "Digital will have it soon."

But in spite of its stumbling debut, NAS, when implemented, promises to be a powerful networking plan and an attractive alternative to IBM's Systems Application Architecture (SAA).

Peering through the clouds of smoke, there can be little doubt that NAS is a response to SAA. DEC didn't want to put it just that way, though. In fact, DEC Chief Executive Officer Ken Olsen specifically denied that NAS was conceived as an SAA alternative.

However, a prepared statement given to consultants —

Continued on page 60

Kodak picks network standards

OSI cornerstone of firm's plan to cut communications costs by 50%

BY KATHY CHIN LEONG
CW STAFF

ROCHESTER, N.Y. — Tired of managing its computer operations and communications networks without a long-term strategy, Eastman Kodak Co. has embarked on an ambitious global networking plan based on support for the International Standards Organization's Open Systems Interconnect (OSI) architecture.

The project seeks to stabilize the communications platform within Kodak by 1995 in order to drive communications costs down to less than 1% of the sales revenue, compared with the 1.5% currently being spent, stressed Henry Pfendt, director of the Computer and Telecom Services division. That amount is substantial, since Kodak has reported sales of $13.3 billion.

Beyond cost savings, both Pfendt and Alan Chase, group manager of research and network engineering, said the move to follow international standards will place Kodak in an enviable competitive position by 1995. Users won't have to worry about what kind of network they are using, Chase said.

Opening up

Kodak represents a growing number of vendors making commitments to open architectures in place of proprietary methods, according to consultant David Ferris, president of Ferris Network Integration. Using standards provides the freedom to plug in new technologies without hurting existing investments, he said.

The goal is to have Kodak networks integrated so smoothly that users anywhere in the world will be able to communicate with each other. Today, it is common to find several terminals and personal computers on a user's desk, each dedicated to a single host. Chase said he expects that these technologies will be merged to provide easier access.

The grand networking strategy was crafted last November with the help of Electronic Data Systems Corp. (EDS) after Ko-

Continued on page 61

LAN DIAGNOSTICS

Pinpointing trouble spots

BY RICK DALRYMPLE
SPECIAL TO CW

Local-area networks have become a vital part of corporate computing. According to one recent Forrester Research, Inc. study of 40 Fortune 1,000 firms, network management is the top concern among MIS directors surveyed.

Not surprisingly, managing a LAN can be daunting: Topologies are complex, a wide variety of protocols are used, and LANs are connected to wide-area networks and corporate hosts via bridges and gateways.

What LAN managers need, then, are diagnostic tools. A variety of such hardware and software products have entered the market during the last 18 months (see story page 56).

Continued on page 56

JULIA TALCOTT

PS/2 with AIX goes on-LAN

BY ELISABETH HORWITT
CW STAFF

DALLAS — IBM has significantly enhanced the communications capabilities of its AIX workstation platform, providing its Personal System/2s with many of the features already offered on its RT Personal Computer.

Several products that were announced by IBM at the Uniforum 1988 conference held here recently are part of the vendor's strategy to provide the PS/2 Model 80 as an entry-level system for AIX applications from which users can migrate up to the RT PC, analysts said. An IBM 370 version of the Unix-based operating system is expected eventually.

IBM's Uniforum introductions included the following:

- IBM AIX PS/2 Transmission Control Protocol/Internet Protocol (TCP/IP), which allows AIX PS/2 systems to communicate with other computers that support the communications protocol. The price is $300. The IBM RT PC already supports TCP/IP.
- The IBM AIX PS/2 Workstation Host Interface Program (WHIP) Version 1.0, which allows a PS/2 Model 80 running AIX to exchange files with a 370 or access the host as a Dis-

Continued on page 55

Inside

- Net managers form independent T1 group. Page 55.
- White Pine enhances Mac-to-VAX communications software. Page 62.

The Jury-Rigged Network.

Up until it broke down, it wasn't a bad network. However, the jury is still out on who's responsible for fixing it.

This isn't a fairy tale, but it could easily start off "Once Upon A Time . . ."

The main characters are professionals like yourself, faced with the complex task of evaluating and implementing network strategies in the face of constantly shifting carrier regulations and options, rapidly changing technology, and a rising chorus of vendor claims and promises that hold more smoke than substance. Just like a fairy tale, you have to travel through this fantasy-filled world in order to safely arrive at a happy ending. The danger is, you could very well end up with something we call the "Jury-Rigged Network".

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The Jury-Rigged Network And How To Avoid It.

In simple terms, a Jury-Rigged Network is one that was never designed or implemented within a *total* systems perspective. The individual components, too often a mix-and-match assortment, are forced to perform at degraded levels to achieve *ad hoc* compatibility. In effect, the whole network becomes less than the sum of its parts, with the end user left to discover—as he certainly will—the weak links built into his network by a vendor who never really held more than a few pieces to the puzzle. A vendor who may not be around when the puzzle comes apart.

Therefore, the key to managing risk in the development of your network lies with selecting the right vendor. A vendor more interested in developing a long-term strategy for your success than selling his off-the-shelf products. Choose wisely and you're no longer talking about a vendor.

Instead, you've got a partner.

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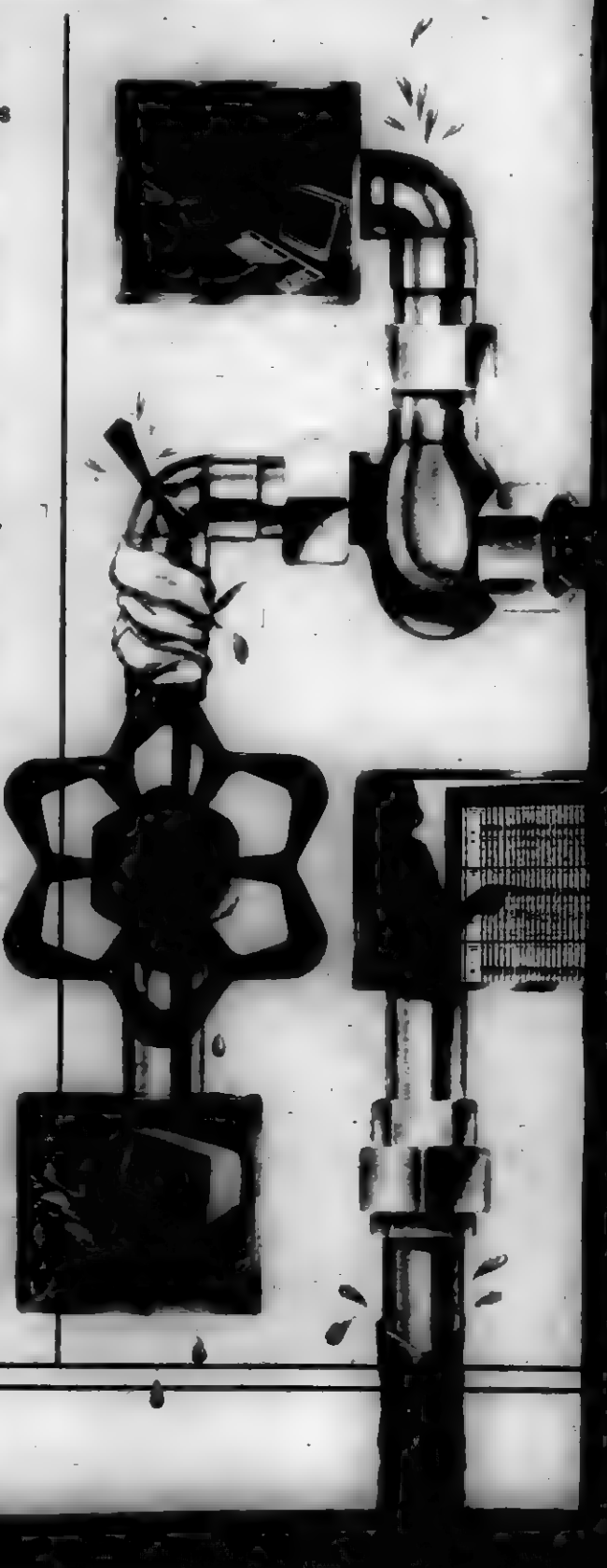

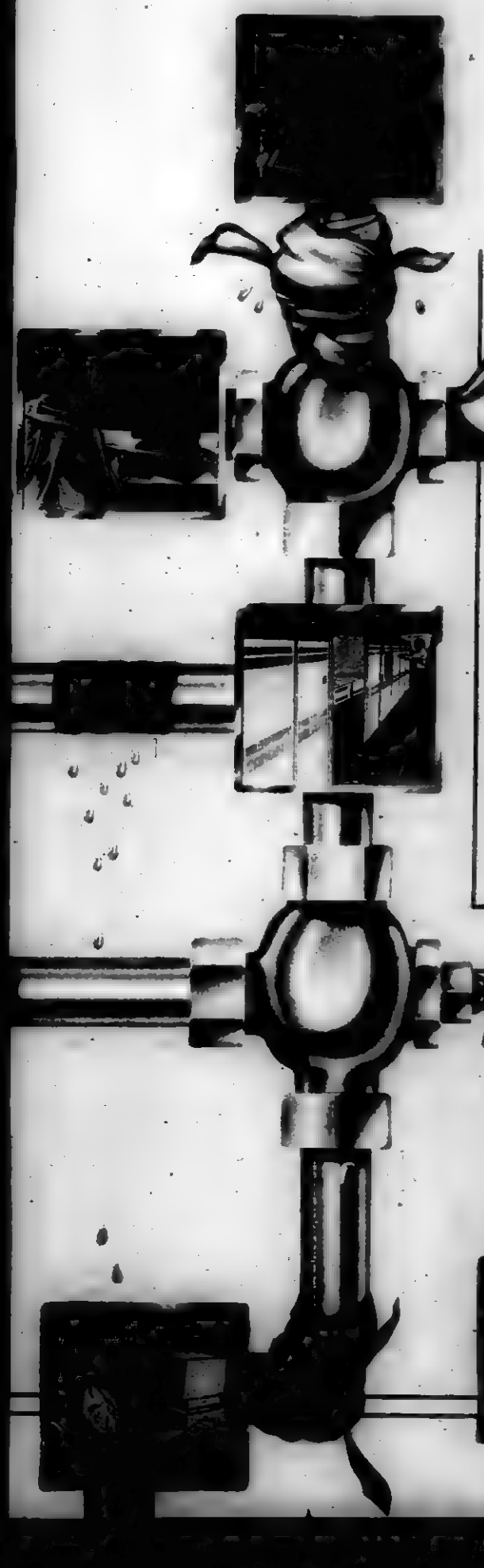

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"With the General's comprehensive technological capabilities... we've been able to build in network integrity from the smallest system to the largest."

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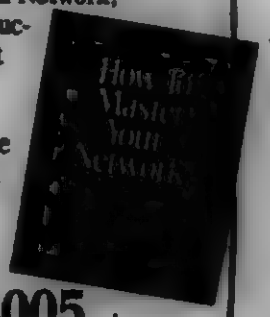

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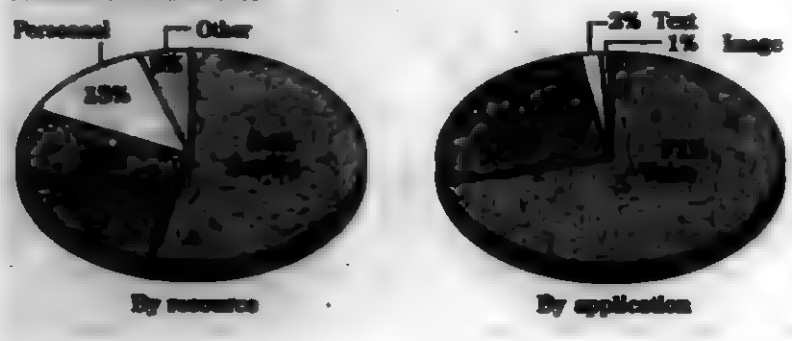

INFORMATION PROVIDED BY THE DIEBOLD GROUP, INC.
CW CHART

Service firms' telecom spending up slightly; MIS control loosens

BY ALAN ALPER
CW STAFF

NEW YORK — Telecommunications expenses are estimated to have increased slightly at large North American service companies and decreased marginally at industrial firms last year, according to a recent study conducted by The Diebold Group, Inc.

The survey also revealed that the trend toward MIS control of telecommunications has leveled off. Approximately 69% of telecommunications chiefs at industrial companies report to MIS, compared with 61% of their service company brethren.

"Many MIS people see telecommunications as an expense area, not as a strategic area, but more of a grungy day-to-day thing," said Chester Frankfeldt, a senior associate within Diebold's Research Program. "They see it as a utility; no matter what, they can't control people's urge to pick up the phone."

In its annual survey of information technology budgets, The Diebold Group polled 1,800 major corporations on their telecommunications expenditures and usage patterns. The study reflects responses from 149 firms, or 8.2% of the companies polled, and compares 1987 expectations with 1986 actuals.

As a percentage of revenue, telecommunications expenses at service companies rose 8%, to represent 0.88% of revenue, but decreased slightly to 0.54% of revenue at industrial firms. Service companies are more information-dependent and spend 63% more on telecommunications than industrial companies, Frankfeldt explained.

> "MANY MIS people see telecommunications as an expense area, not as a strategic area, but more of a grungy day-to-day thing."
>
> CHESTER FRANKFELDT
> THE DIEBOLD GROUP, INC.

This gap, however, has narrowed during the last few years, despite the marginal spending decrease at industrial firms. "Service companies spent a lot of money in the early days after divestiture and got ahead of company needs," he said.

Both service and industrial firms spent almost twice as much on service as they did on equipment. The ratios have remained almost constant during the last few years, The Diebold Group said.

Not surprisingly, all companies spent more than twice the amount on voice than they did on data communications. Most are still spending very little on text and image transmission, the survey revealed.

Service companies spent almost three times more on data processing than on telecommunications. Industrial firms spent more than twice as much on data processing than on telecommunications. "This reflects the attitude that the computer is the factor and telecommunications is the means to get the information out," Frankfeldt said.

Service companies also employ more people to oversee telecommunications than their industrial counterparts, the survey pointed out. Service companies have two telecommunications employees per million dollars spent to industrial companies' 1.49 employees.

"The number for service companies means either most of them have very sophisticated organizations or they're top-heavy," Frankfeldt said.

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Net managers form independent T1 group

BY MITCH BETTS
CW STAFF

ARLINGTON, Va. — A group of T1 network managers have formed the Independent T1 Users Association to give users more clout when dealing with carriers, equipment vendors, standards groups and regulatory agencies.

The association, expected to be fully functional by September, will fill a gap between the general-interest International Communications Association and vendor-specific users groups, according to Raymond A. Beavan. Beavan is manager of network services at LTV Steel Co., located in Cleveland.

"We'll be presenting a national united front to the T1 industry," said Beavan, one of six members of the steering committee.

Connections not made

A major concern of the founding managers is that local exchange carriers, which have 65% of the T1 circuit market, have not established standard connections between the public network and T1 networks.

"Each Bell operating company goes in its own direction by requiring different connectors . . . but users want national uniformity," said Jerome G. Lucas, president of Telestrategies, Inc., a McLean, Va.-based consulting firm that is working with the association. T1 users are hoping that, collectively, they can prod the industry into solving such problems at a faster pace, he said.

Among the association's goals are to share ideas on acquiring, implementing and managing T1 networks among members; to work with vendors to solve problems; to send representatives to standards groups; and to hire an attorney for representation at the Federal Communications Commission and state commissions, the organizers said.

Full voting membership will be limited to T1 users, but vendors and consultants may be invited to certain meetings as associate members.

At the wheel

The association's steering committee includes representatives from American Airlines, American Savings & Loan Association and Conoco, Inc.

Telestrategies is providing administrative support for the fledgling association.

Other members of the steering committee are Richard Knapp, product engineer at American Airlines; Thomas Mokate, director of telecommunications at American Savings & Loan; and Richard Tuss, assistant director of telecommunications at Conoco.

PS/2 with AIX

CONTINUED FROM PAGE 51

tributed Functional Terminal (DFT) supporting up to five concurrent sessions, IBM said.

A PS/2 equipped with WHIP can also act as a gateway, setting up 370 sessions for attached asynchronous terminals or for other systems over an Ethernet or IBM Token-Ring local-area network using the TCP/IP Telnet protocol.

Set to be available in September, the program is priced at $400. IBM also announced the latest version of AIX/RT WHIP with DFT support.

- IBM AIX/RT Distributed Services and AIX PS/2 Distributed Services, which reportedly will allow the respective workstations to share data, printers and other resources over a LAN using IBM Systems Network Architecture LU6.2, peer-to-peer protocols, Synchronous Data Link Control or TCP/IP.
- The AIX PS/2 DOS Server Program allows PS/2 Model 80s running AIX to act as file or print servers for DOS Version 3.0-based systems running AIX. The server program converts data, files and commands between AIX and DOS formats, IBM said. The AIX/RT DOS Server was also announced.
- IBM AIX Access for DOS users allows an RT PC or PS/2 Model 80 to provide file- or printer-sharing services to an IBM PC or PS/2 running DOS Version 3.3. It also allows DOS systems to appear as asynchronous terminals to an AIX system.

Priced at $150, the program reportedly will be shipped in March 1989.

- The IBM AIX PS/2 DOS Merge Program provides multiuser, multitasking execution of both DOS and AIX programs and sharing of files and resources between them. Priced at $250, the program is set to ship in September.

Linking AIX with TCP/IP, Ethernet and DOS is part of "IBM's strategy to accommodate RFP checklists" of manufacturing, government and European firms that use such protocols with Unix, noted Marty Gruhn, executive vice-president of the Sierra Group in Tempe, Ariz. But AIX is still not part of IBM's main systems strategy, Gruhn added.

IBM also plans to have AIX participate in Systems Application Architecture (SAA), according to Jerry Latta, the company's group director of technical computing systems. SAA defines IBM's mainline system environments as well as common interfaces for communications and software development.

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Pinpointing

FROM PAGE 51

These products help LAN network managers in three critical ways. They improve the manager's ability to quickly and accurately diagnose net problems, suggest network performance improvement strategies and aid in maintenance and charge-back administration.

But when do you need to invest in LAN diagnostic tools? According to Harvey Freeman, president of Lanworks, Inc., a LAN system integration and support consultancy based in Minnetonka, Minn., it depends on the level of LAN complexity.

"TO SAVE a long argument, I put the users in front of the network analyzer and show them exactly what their actions do to the network."

JOE HOLTZSCHER
MCDONNELL DOUGLAS
AEROSPACE INFORMATION
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Added complexity, he notes, can quickly lead to dramatic growth in network service problems.

"The introduction of multiple vendors and/or the introduction of a bridge to another network leads to multiple protocols," Freeman says, "which complicates the task of isolating the source of network problems."

Learning the hard way

When one of these complex LANs goes down, the resulting productivity loss may turn out to be more costly than the purchase of the diagnostic tool would have been. But managers often learn that lesson the hard way.

Ken Bosomworth, president of International Resource Development, Inc. (IRD), a market research firm based in New Canaan, Conn., points out that "it often takes a major outage to convince an otherwise prudent manager that dollars spent on outage prevention are better investments than those same dollars spent on emergency recovery."

Network diagnostic tools can be purchased separately as LAN analyzers or as part of a vendor-specific LAN. However, the products mostly provide the same basic functions.

The LAN detectives

Network analyzers are typically used to monitor network performance. They cannot monitor packets beyond bridges or gateways, because these LAN products filter out traffic directed to local addresses.

However, some LAN analyzers can decode higher layer protocols and analyze traffic passing through a bridge.

For example, an analyzer that can decode Transmission Control Protocol/Internet Protocol addresses can identify the source network of troublesome packets that have entered the LAN via the bridge.

LAN analyzers provide a statistical and sometimes graphic view of network performance. On a monitor, the tool can display every byte in the packets whizzing, or crawling, through the network. The manager can also set parameters to capture and display specific types of packets or different packet segments.

Some products also analyze the statistics and display the results of the analysis — for example, the number of bad packets sent by a given node over a given time span — as charts, graphs or diagrams.

Lanworks' Freeman

"LAN analyzers are both troubleshooting and operational analysis tools," Lanworks' Freeman points out. "In skilled hands, an analyzer can be used to determine if problems stem from either hardware or software."

According to Cecil Thornhill, president of Mathematica, Inc., an imaging software development firm based in Lakeland, Fla., a LAN analyzer helps clear up protocol-handling misconceptions for his staff. They can then more accurately determine whether hardware or software — or neither — is responsible for specific LAN problems.

In one recent case, Mathematica used Lanwatch, a LAN analyzer from FTP Software, Inc., when it was called in to integrate a multivendor hospital radiology diagnostic system.

The system ran over a LAN with more than 100 nodes, which allowed the diagnostic radiology units to be wheeled into the rooms where they were needed and plugged into the LAN.

The diagnostic systems' computers used a different vendor's network interface boards. To complicate matters further, the computer systems on the LAN employed several custom versions of Unix with slightly different routines for handling network communications.

Mathematica used Lanwatch to pinpoint the hospital's LAN malfunctions.

"Without a network analyzer, it would have been very difficult to identify and unscramble the missed cues and timing problems in the communications dialog," Thornhill says.

Network analyzers can depict the work load of a LAN server, workstation or group of network stations to determine who is loading the net down or to measure the performance of a workstation or server under a variety of load conditions.

This capability is particularly useful when planning network capacity.

Policing the network

A side benefit of net diagnostic tools is that they can help net managers police and communicate with LAN users.

LAN manager Joe Holtzscher, specialist in system programming at McDonnell Douglas Aerospace Information Services Co. in St. Louis, says that most of his users will obey network rules if the consequences of their rule violations can be graphically illustrated.

In managing a McDonnell Douglas LAN that has more than 200 nodes, Holtzscher uses a network analyzer to show users the problem. "Often, the user violating network rules thinks he is using the network correctly," Holtzscher explains. "To save a long argument, I put the users in front of the network analyzer and show them exactly what their actions do to the network."

Holtzscher adds, however, that when a LAN is connected to a bridge, it is impractical to educate every occasional user who enters the LAN from another network. To prevent these outside users from disrupting the LAN, he has used his analyzer to learn the characteristics of some of the most destructive network rule violations.

This information led to the building of a data filter located on the LAN bridge that traps packets that can cause problems and prevents them from entering the network.

"I prefer to use a combination of a TDR [time-domain reflectometer], two or three LAN analyzers and the network management tools provided by the LAN vendor," Holtzscher says of his diagnostic setup.

He uses a Tektronix, Inc. TDR and LAN analyzers from Execelan, Inc., Hewlett-Packard Co. and Network General Corp., as well as management tools from Ungerman-Bass, Inc.

Going haywire

Outside users are just one source of problems beyond the direct control of the network manager. Sometimes, the installation and maintenance of the network wiring itself creates problems. In the city of New York, for example, LAN cable is installed and maintained by union electricians. Frequently, these electricians are not skilled in LAN installation techniques.

Because of this, a LAN manager at a Wall Street brokerage firm says he has justified his TDR many times over by using it to accurately locate cable faults and loose connectors.

IRD's Bosomworth

The manager, who asked not to be identified, first uses the cable testing function on his LAN analyzer, the Sniffer from Network General, to get a rough idea of where a cable fault lies. However, he says, to quickly isolate the exact location of the fault, the TDR is the right tool to use. His TDR is also from Tektronix.

Portable TDRs, or cable testers — such as the Model 1503B from Tektronix, E10N from Experdata, Inc. or cable testers from Cabletron Systems, Inc. — allow network managers to pinpoint cable and connector fault locations at the physical layer of the LAN. TDRs can be purchased for between $995 and $4,200.

Whether or not your LAN installation is complex enough to warrant buying a diagnostic tool, communications consultants say that in the future, LAN suppliers will provide more diagnostic capability bundled into the network itself.

In addition, artificial intelligence may get into the act. According to IRD's Bosomworth, "We expect LAN vendors to provide expert system tools to aid the LAN manager in diagnosing problems and recommending specific actions."

Bosomworth adds that network manager tools will continue to function in the dual role of network policeman and detective until more sophisticated and automated diagnostic tools are in place.

Sorting it all out

LAN network analyzers fall into two categories — software-only tools and combinations of hardware and software.

Software-only analyzers usually cost less than $1,500. They include Maynard, Mass.-based Digital Equipment Corp.'s LAN Traffic Monitor; Bloomington, Minn.-based Experdata, Inc.'s Vigilan; Boston-based FTP Software, Inc.'s Lanwatch; and Santa Clara, Calif., 3Com Corp.'s Etherprobe Network Utility. All run on IBM or compatible PCs.

LAN analyzer hardware/software products are priced between $17,000 and $25,000. They include the DRN-1700 Lanscan Ethernet monitor from Communication Machinery Corp. in Santa Barbara, Calif.; Montgomery, Pa.-based Digilog, Inc.'s family of Protocol and Protocol/Performance Analyzers; the Lananalyzer from Excelan, Inc. in San Jose, Calif.; HP4971S from Hewlett-Packard Co. in Colorado Springs; The Sniffer, from Network General Corp. in Sunnyvale, Calif.; and Torrance-Calif.-based TRW, Inc.'s NM2000.

AM Communications, Inc. in Quakertown, Pa., offers a broadband net analyzer called the Languard Technical Monitor and Control System. Token/Scope Network Analyzer from Concord Data Systems, Inc. in Marlboro, Mass., monitors token bus nets.

Some diagnostic tools were developed by LAN vendors to be used only with their products. Examples include Mountain View, Calif.-based Bridge Communications, Inc.'s Network Control Server/AT; System 5101 Network Control Center from Sytek, Inc., also in Mountain View; and Santa Clara-based Ungerman-Bass, Inc.'s Network Control Console.

Also in this category are centralized host-based net management products like IBM's Netview and DEC's Network Management Control Center/VAX Ethernim.

RICK DALRYMPLE

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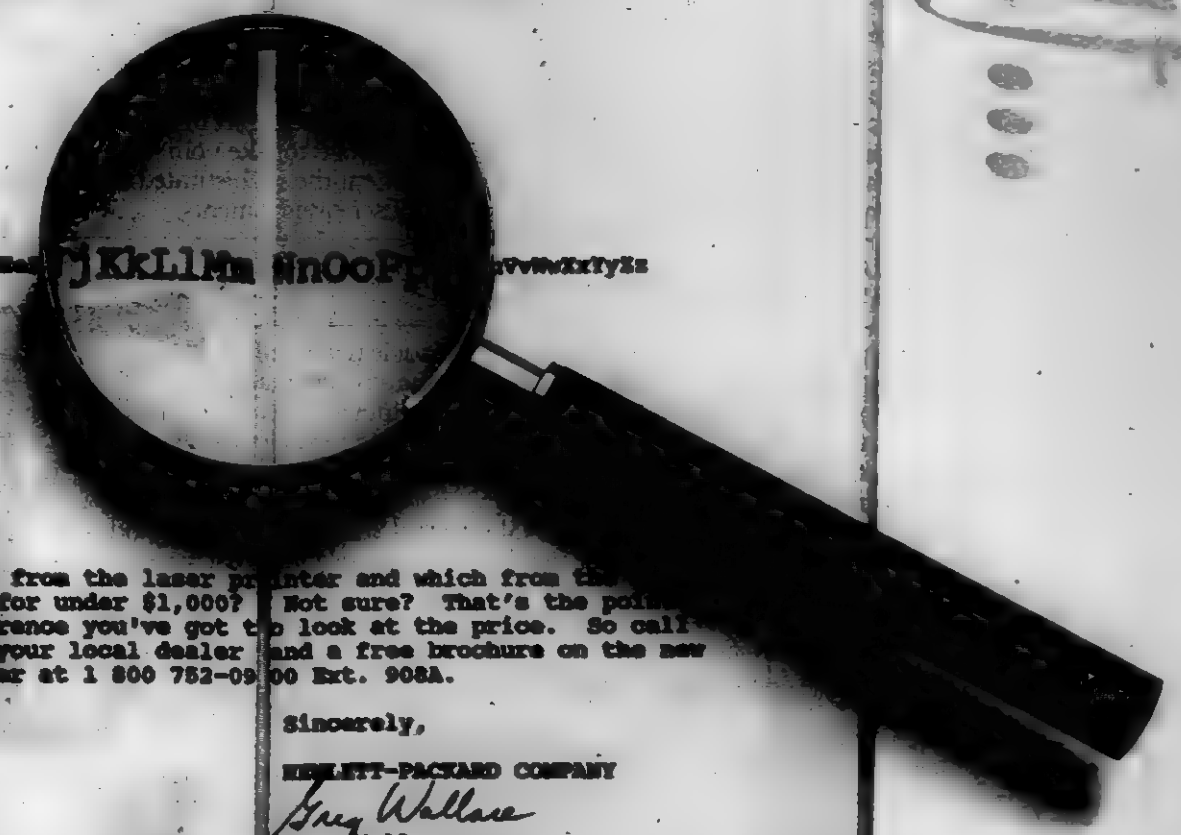

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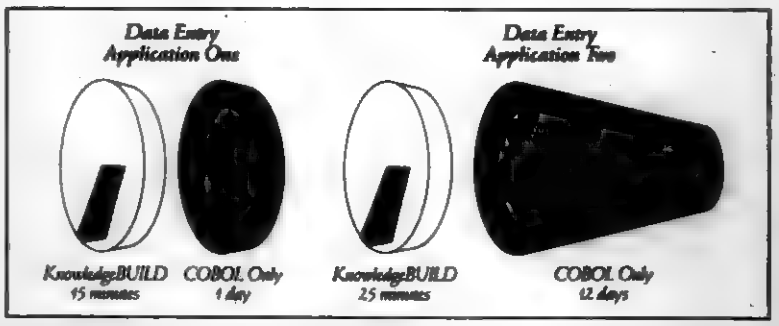

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Connectivity tools in limelight at Unix show

BY PATRICIA KEEFE
CW STAFF

DALLAS — The recent Uniforum 1988 trade conference showcased more than the commercial viability of AT&T's Unix System V; it also featured a slew of related connectivity products.

Kicking off the parade of announcements was AT&T, which unveiled a software device driver said to support the "Berkeley" (Unix) Transmission Control Protocol/Internet Protocol (TCP/IP) utilities over Ethernet.

The TCP/IP Device Driver is compatible with systems using Unix System V/VME Release 3.1 and AT&T's WE 321SB VMEbus Single Board Computer.

This reportedly enables AT&T-based VMEbus systems to exchange files with, log on to and gain access to a wider range of computer systems.

The package runs with Communication Machinery Corp.'s ENP-10 or ENP-10 Plus VMEbus Ethernet board. Communication Machinery assisted AT&T in developing the device driver software and plans to take an active role in supporting AT&T customers.

Amdahl Corp. introduced the 4635 Communications Interface Unit and supporting software. It is said to enable users of AT&T's Datakit virtual circuit switch to significantly expand network size and throughput with links to UTS, Amdahl's Unix System V-based mainframe operating system.

The 4635 serves as a direct multiplexed interface between the mainframe and the Datakit switch, allowing asynchronous terminals and hosts attached to the switch to communicate directly with UTS via high-speed links.

DEC world

Unix in the DEC world also got some attention. In a separate release, Communication Machinery announced support for AT&T's Streams I/O system and Remote File System protocol.

This support will be offered in three configurations. For Unix System V Release 3 VMEbus or Multibus system users, Communication Machinery will either complete the port or provide a Streams porting kit. Pricing will depend on the configuration.

Network Research Corp. announced a Network File System implementation said to give users the ability to boot remote diskless Sun Microsystems, Inc. workstations from Digital Equipment Corp.'s VAX/VMS systems. Set to be available in the second quarter, pricing will range from $250 for single-user DEC Vaxstations to $4,500 for large VAXBI bus systems.

Network Research also unveiled Fusion Version 3.3 for VAX/VMS, which provides CCITT X.25 support over TCP/IP networks. This gives users of Unix, Xenix and Microsoft Corp.'s MS-DOS the ability to tie into the Defense Department Network through connections to VMS systems. Set to ship at the end of the first quarter, Version 3.3 is priced from $750 to $4,500.

Gibson

CONTINUED FROM PAGE 57

but not to the press (we got our mitts on one anyway) — contained point-by-point comparisons between DEC's and IBM's networking strategies, always casting DEC in a more favorable light.

One page of the handout, entitled, "IBM and Digital comparison," boasts a chart reminiscent of an old Anacin commercial. In this example, the illustration depicting IBM connectivity looks like a headache diagram, complete with jagged electrical lines, while the DEC side looks smooth and orderly, with an S-curve signifying NAS — the headache cured, if you will.

SAA was created to offer application portability across nearly all of IBM's disparate architectures. DEC has no need of this, because it has only one architecture, so all its VAX/VMS applications can run on all systems.

Big problem, big solution

IBM's problem is greater than DEC's, but its solution may be larger, going beyond DEC's internal compatibility. SAA will make it possible for the applications to be portable across non-IBM equipment as well as IBM systems.

And IBM is actually freeing third parties and users from its hosts through peer-to-peer SNA and SAA. In other words, you could set up a true peer-to-peer network using someone else's hosts as long as you (and they) support LU6.2 and PU2.1. Several non-IBM vendors have announced support for both.

In the meantime, DEC's claims to openness and multivendor connectivity largely depend on the company's promised migration to the International Standards Organization's Open Systems Interconnect (OSI) communications standard, which will not be viable for another year or two, most industry experts agree.

And while DEC supports LU6.2 as a way to link its own systems with IBM's, it resists supporting PU2.1 as a way to link them with other non-IBM computers.

SAA requires that applications be rewritten to its interfaces, however, which

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will take time and effort. But those who pay the price will receive a reward — whether it's worth the price is another question.

DEC's NAS, in contrast, reaches out to non-DEC systems, but in a more limited way. DEC is not talking about running VAX applications on an Apple Macintosh and vice versa. It merely wants non-DEC equipment, particularly IBM and Apple micros, to be full participants in Decnet.

DEC's networking strategy, at least until OSI arrives, is dependent on the VAX as a server for Decnet, which is similar to IBM's old hierarchical SNA.

NAS is DEC's way of providing an effective VAX-to-workstation connection using a wide variety of other vendors' products — a shrewd move, given that its own entries in the desktop market have consistently fallen flat.

NAS promises to protect and expand DEC's installed VAX and Decnet base. By integrating OS/2 into its own network, DEC blunts IBM's ability to use the IBM Personal System/2's expected domination of the workstation market to dominate the corporate network.

Some industry observers even believe DEC should support SAA, to foster the conversion of IBM users to DEC's hardware through application portability.

Which approach is better, NAS or SAA? Both will have their appeal, and both are likely to accomplish their goals: to keep DEC and IBM users from leaving their respective folds for better networking found elsewhere.

Apparently, DEC feels that if IBM can lock in its customers with long-range strategic statements such as SAA, then DEC is not only entitled to do the same, but must in order to survive.

And why shouldn't it? Let's face it, it was DEC's influence that caused IBM to come out with SAA in the first place.

If DEC could only have been more frank in telling the world that it was introducing a new desktop strategy in response to SAA, there would have been less confusion about what NAS is.

DEC also could have chosen an original, and catchier, acronym.

Gibson is a Computerworld senior writer.

Kodak

CONTINUED FROM PAGE 51

dak realized it would benefit from an outside viewpoint. In an 18-week joint study, Kodak and EDS interviewed company users worldwide to assess needs and current network benefits.

For too long, independent business units have relied on a variety of proprietary networking schemes. For instance, at last count, there were 13 different IBM Systems Network Architecture (SNA) networks and "every local-area network known to man," Chase said.

"Computers and telecommunications are converging at a rapid pace," Pfendt said. "We needed to get going on a long-term plan. We could not continue to have engineering groups going in different directions."

Doing it right

Streamlining and standardization are the hallmarks of this project. Kodak will limit its purchases to fewer suppliers and narrow down the list of voice and data services it offers internally. "We would rather do a few things very well than do too many things in a mediocre fashion," Chase said.

For example, by 1995, Kodak will have whittled the number of SNA nets from 13 to less than six. And if that move proves to be successful, the company will follow up by moving SNA traffic over CCITT X.25 lines.

Although Kodak operates mainframes and minicomputers from IBM, Digital Equipment Corp., Hewlett-Packard Co. and a variety of turnkey systems vendors, Pfendt said he expects that the company will protect its hardware investments by making standard communications interfaces available.

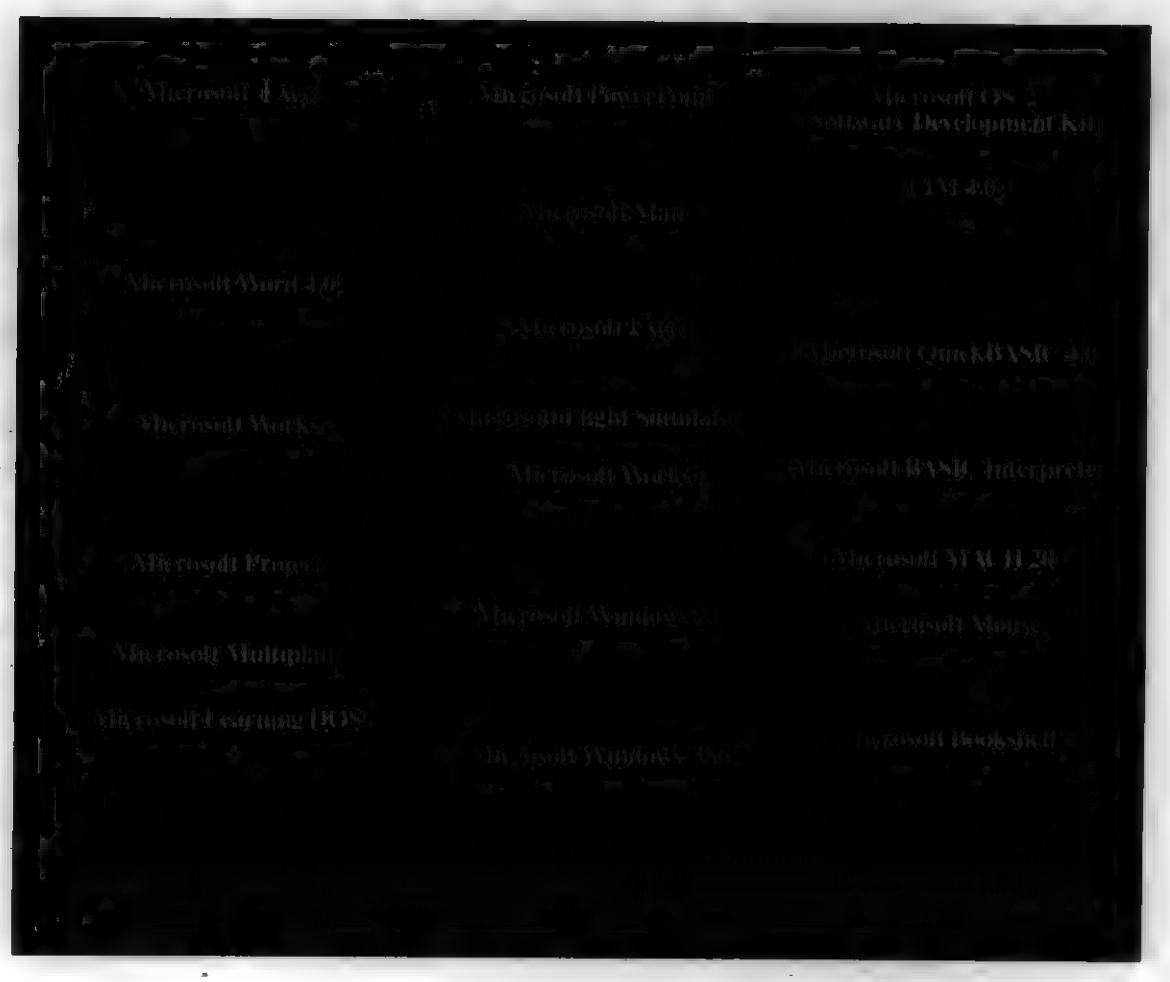
"We want to have a network plan that is both adaptable and reliable," Pfendt added. Pfendt, who would not disclose the costs involved in migrating to OSI, said he expects to execute the project in three phases.

The first will involve providing backbone facilities such as T1 links to make existing networks more economical.

During the next two phases, the push will be on to migrate networks to emerging standards such as Integrated Services Digital Network and Manufacturing Automation Protocol/Technical and Office Protocol.

Chase outlined "the road map to Kodak's future," which includes these standards: CCITT X.400, IEEE 802.3, 802.4 and 802.5 networks and Fiber Distributed Data Interface. Kodak will also readily embrace electronic data interchange, network management and voice messaging standards. "The users we've talked to are relieved that we finally have something in place," Chase said.

The rewards are many.



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NEW PRODUCTS

Local-area network hardware

The **Accudacs Series II** nodal processor, said to permit nonblocked digital cross-connecting of 64K bit/sec. channels for up to 43 T1 or CCITT channels, has been announced by **Integrated Telecom Corp.**

Features available include voice compression, data multiplexing, an integrated channel bank and CCITT X.25 networking. Nodal configuration, channel routing and system performance monitoring can take place from any point in the network, the vendor said. The system can be equipped with automatic redundancy.

The Accudacs Series II is priced from $10,000 to $60,000, depending on the configuration.

Integrated Telecom, 630 International Pkwy., Richardson, Texas 75081. 214-234-3340.

Customer-premise equipment

Codex Corp. has announced its **6502 Packet Assembler/Disassembler**, or PAD, and **Netminder Configuration Manager**.

The Codex 6502 asynchronous PAD provides access to a public data network or acts as a feeder for the Codex 6510 IXP in a pure CCITT X.25 network. It supports speeds to 9.6K bit/sec. Prices range from $1,800 to $4,400.

The Codex Netminder IBM Personal Computer AT-based software allows users to create, store and download configurations of Codex 6510 IXP X.25 processors and certain Codex multiplexers acting as feeder nodes to 6510 IXP X/25 networks. It costs $2,000.

Codex also enhanced its **Codex 6510 IXP Intelligent Network Processor** to include an X.21 interface card; the ability for V.24 and V.35 interface cards to accept and provide clocks; a watchdog timer on the CPU card; and the ability to broadcast message packets over multiple channels. It costs $6,070.

Codex, Mansfield Farm, 7 Blue Hill River Road, Canton, Mass. 02021. 617-364-2000.

Links

White Pine Software, Inc. has enhanced its Apple Computer, Inc. Macintosh-to-Digital Equipment Corp. VAX communications software, called **Mac240.**

Mac240 Version 2.0 features user-installable network communications drivers, large-screen support and support for the new Macintosh keyboards. Other enhancements include the abilities to send multiple files with a single selection and to transfer only files modified since a specified date as well as the addition of national replacement character sets.

Mac240 provides DEC VT240 emulation, DEC VT220 text emulation, Tektronix, Inc. 4010 and 4014 graphics, printer support and autodialing.

Mac240 costs $199. Registered users can upgrade to Version 2.0 for $25.

White Pine Software, Box 1108, 94 Rt. 101A, Amherst, N.H. 03031. 603-886-9050.

A family of hardware and software devices designed to link computer-integrated manufacturing (CIM) resources has been announced by **VG Systems, Inc.**

Called the **VGCIM network**, the products are said to integrate personal computers, satellite cluster computers, graphics stations, independent data bases, printers, plotters, local-area networks and IBM host computers.

The primary system units are the VG 9500 channel control unit, priced from $12,000, and the VG 9750 Communications Connector, priced from $21,995. They are used with the VG 9250 graphics display station, which costs $20,300, the VG 9625 Personal Design Station, priced at $9,975, and VG Systems software modules.

A VGCIM system configuration can range from a connection of two similar devices to a complex system connecting many dissimilar devices.

VG Systems, 21300 Oxnard St., Woodland Hills, Calif. 91367. 818-346-3410.

Electronic mail

Personal computer-based software that allows users to set up and run computer conferences, electronic-mail systems and information libraries has been introduced by **United Software Industries, Inc.**

Called **People-Net**, the software runs under the Unix and Xenix operating systems.

Users have the ability to create identical, parallel conversations that reside simultaneously at one or more other People-Net-equipped sites.

Users may establish information data bases, retrieve and exchange information, send and receive E-mail, participate in conferences and transfer data files, the vendor said.

Licenses cost $550 for noncommercial small-system object code, $2,250 for commercial small-system object code and $4,500 for large systems, including source code.

United Software Industries, 8399 Topanga Canyon Blvd., #200, Canoga Park, Calif. 91304. 818-887-5800.

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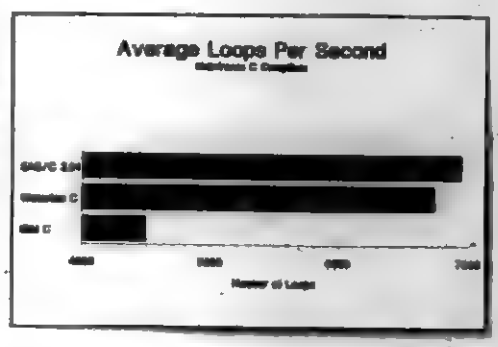

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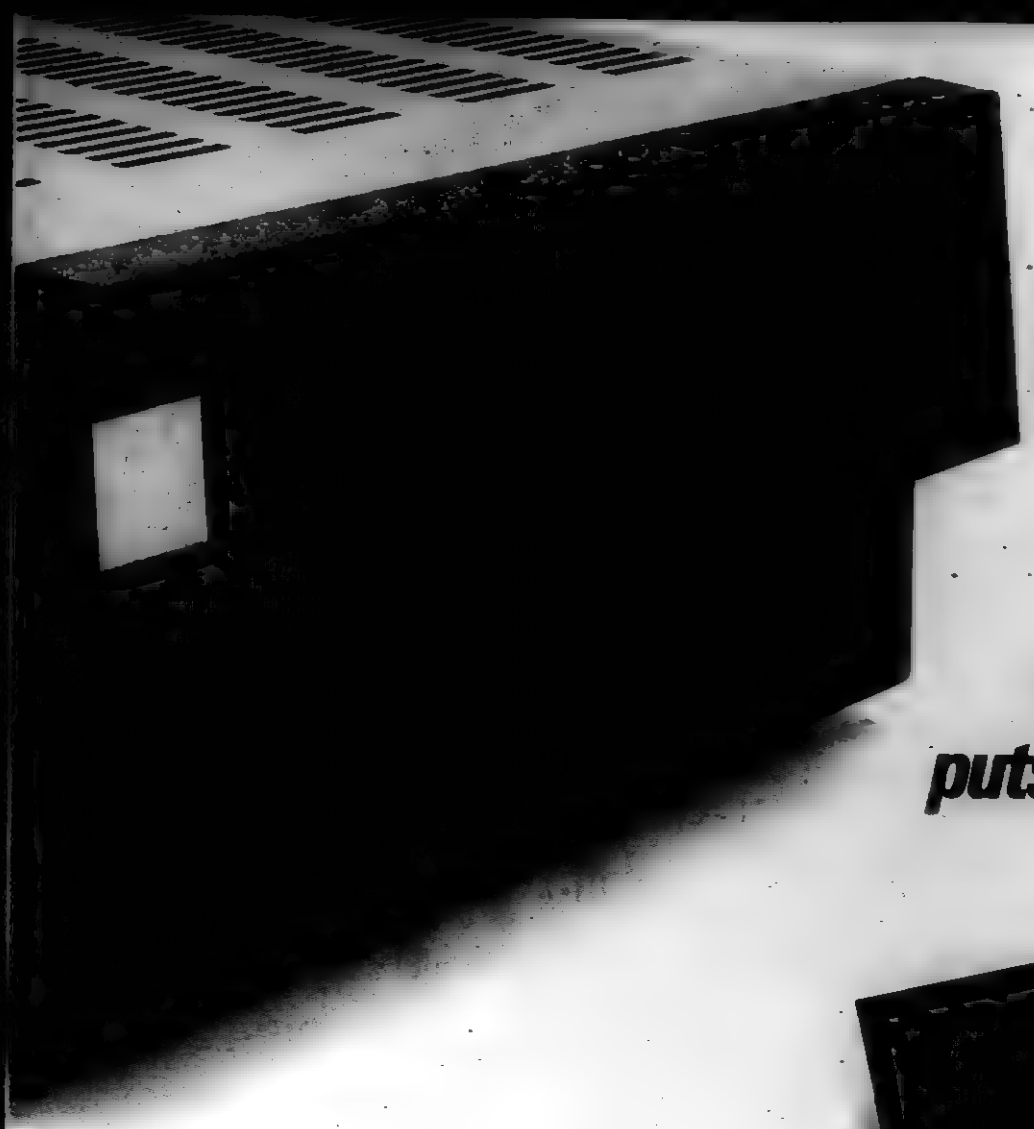

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HARD TALK

Jean S. Bozman

System/36 to live on

IBM's widely discussed Silverlake — the machine that will reportedly combine IBM's System/36 with its System/38 — appears certain, to many observers, to seal the doom of the System/36. But early reports of the extremely popular System/36's death are probably, like those of Mark Twain's passing, greatly exaggerated.

IBM will probably hedge its bets on the newest mid-range technology, industry analysts say. That's because the 250,000-plus users of the System/36 and 38 and, yes, the elderly System/34 keep producing golden eggs of revenue — and stable profits — for IBM.

So when Silverlake hits the street, it will probably stress System/38 features more than System/36 features. That would leave room for continued marketing of the IBM 5363, the youngest of the System/34, 36 and 38 brood, which was just hatched last fall.

Don't worry yet

"On Day One, Silverlake will not extend to the bottom of the System/36 line," says David Andrews, president of ADM in Cheshire, Conn. Andrews says low-end users will be offered the 5363, which will be enhanced as time goes on with more disk space and memory.

The anticipated marketing

Continued on page 67

IBM broadens service horizons

Policy aimed at multivendor shops with relocation, installation needs

BY STANLEY GIBSON
CW STAFF

Continuing its drive to be a one-stop supplier of all that a data center requires, IBM announced last month that it will, for the first time, perform site planning for computing centers that include non-IBM equipment. The offering also marks the first time IBM has offered mid-range and Personal Computer customers facility planning for installation and relocation.

"The point is, we are one point of contact," said Ed Carriero, manager of contract services at IBM's National Service Division, summing up a main goal of the new offering, which is dubbed Site Management Services.

The services are the first of several portfolios to be included in IBM's Customized Operational Services, the goal of which is to provide the physical environment for data processing products, according to IBM.

The current offering expands on the assistance and counsel that IBM has offered for years in designing all-IBM data centers, Carriero said. Previously, IBM would recommend what design measures to take, but the charges for its recommendations were not formally structured. Site Management Services calls for more specific recommendations and has fees for every design service, or module, Carriero explained.

The module for site planning replaces the Site Planning Services Solutionpac, which IBM withdrew. However, site planning is essentially the same as the Solutionpac, except that IBM will procure materials and select subcontractors. Site planning covers floor plan layout and the coordination of multiple sites. In addition, the module takes care of installation and customer setup of IBM and some non-IBM products.

Relocation services consist of three separately priced service modules: project planning and management, mover services and hardware services. Project planning and management provides a project manager to coordinate relocation tasks and also to deal with various vendors. Under mover services, IBM will

Continued on page 66

Cubix designs multiuser 386 system

BY STANLEY GIBSON
CW STAFF

CARSON CITY, Nev. — Tossing its hat into the ring with the increasing number of vendors of multiuser systems based on the Intel Corp. 80386 microprocessor, Cubix Corp. recently introduced the Cubix3/386.

Based on AT&T's Unix System V, the system can support 32 directly attached users, although more may be added through Cubixnet, the vendor's local-area network.

Cubix3/386 has an integrated Winchester disk, tape and floppy drive controller, memory and multiuser system intelligence on one board. To relieve overhead on the central processor, I/O peripheral devices are managed by separate processors, the vendor said. The system's random-access memory can be extended from 4M to 16M bytes in 4M-byte increments.

Concurrent operations

Cubixnet is Ethernet-based and allows IBM Personal Computers and compatible workstations to become nodes on the Cubix3/386 file server. The LAN allows concurrent operation of DOS and Unix programs, the vendor claimed.

Cubixnet requires a board in the Cubix host and in attached personal computers. The base price for Cubixnet with the networking software, documentation and file server is $1,595. Extra nodes cost an additional $995 each.

Cubix3/386 comes with a built-in battery backup power supply. In addition, a software feature shuts down the system in the event of a power disturbance, which prevents system crashes, the vendor said.

The multiuser system will be sold to value-added resellers and OEMs that sell systems for applications such as accounting, inventory and departmental processing, according to Cubix.

A base configuration with 4M bytes of memory, 170M bytes of disk storage, 60M bytes of tape storage and a Unix license carries a suggested retail price of $13,995.

The Cubix3/386 system will be available at the end of the month, according to the vendor.

Data View

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Inside

- Data Voice Solutions adds multiuser MS-DOS system. Page 66.
- DG blends disk, tape storage systems in single package. Page 67.
- Sun announces 892M-byte storage module device disk drive. Page 70.

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Firm adds MS-DOS 386 system

NEWPORT BEACH, Calif. — Data Voice Solutions Corp. recently filled in the middle of its multiuser Microsoft Corp. MS-DOS systems line by adding a Centaur II capable of supporting up to 56 terminals.

The new system fits between the firm's 14-user Centaur II and 100-user Centaur II departmental systems. The Centaur II systems allow ASCII terminals to run popular MS-DOS programs by providing an application processor for each user. The systems also provide workstation users with Novell, Inc.'s Netware local-area network software.

Targeted at the large departmental processing market, the family of systems is upgradable in its 19-in. rack from the low-end 14-user work group to the 100-user model.

Centaur IIs are typically used with a voice/data private branch exchange, providing switched access to MS-DOS and Netware applications via standard terminals, according to the vendor. Using a switch, a set of application processors can support up to five times the number of terminals on a dynamic port contention basis, the vendor claimed.

Prices range from $45,000 to $120,000, depending on options selected. The systems are available for immediate delivery.

IBM

CONTINUED FROM PAGE 65

select and retain a common carrier to relocate the contents of the customer's data center.

Carriero stressed that IBM does not intend to go into the site planning business per se. Site Management Services are only offered in conjunction with the sale of new IBM equipment, he said.

IBM could subcontract the equipment move to someone else, such as the vendor of the non-IBM equipment, who is knowledgeable about the hardware and can assure that precautions will be taken so all warranty guidelines are met, Carriero explained.

"It's hard to say whether or not they're trying to get additional revenue or just be the point of contact," a West Coast data center manager said. "I imagine there are some users who want to stay away from nuts and bolts," he added, explaining that those firms would generally be smaller ones. His own organization, a large oil and gas firm, feels better with its own staff doing the work rather than someone else, he said.

Another operations manager, who asked to remain anonymous, said the multivendor aspect of IBM's announcement is particularly timely, given the corporate trend toward acquisitions. She said her firm's data center was once entirely IBM but has since acquired other businesses and, with them, computer gear.

"We are now faced with merging data centers — with moving and maintaining disparate equipment," she said. "We occasionally hire consultants to do this. If IBM could really do this, it would be great."

A. S. "Migs" Damiani, president of Comsite International, Inc., a data center design and construction firm in Beltsville, Md., said IBM will not be likely to compete directly with his company but will probably use his firm or another like it as subcontractors.

"We don't look at them as a competitor, because IBM won't staff and do these things. Their main purpose in doing this is to increase their market share in hardware," he said.

Comsite has noticed that IBM sales agents have been offering Site Management Services in the Philadelphia area, Damiani said. "Customers are not taking them seriously. They know IBM will try to sell them equipment."

Low-pressure approach

To put customers at ease about being subjected to sales efforts as part of the design process, Carriero said the sales staff will not take part in the design effort once the contract for Site Management Services is signed.

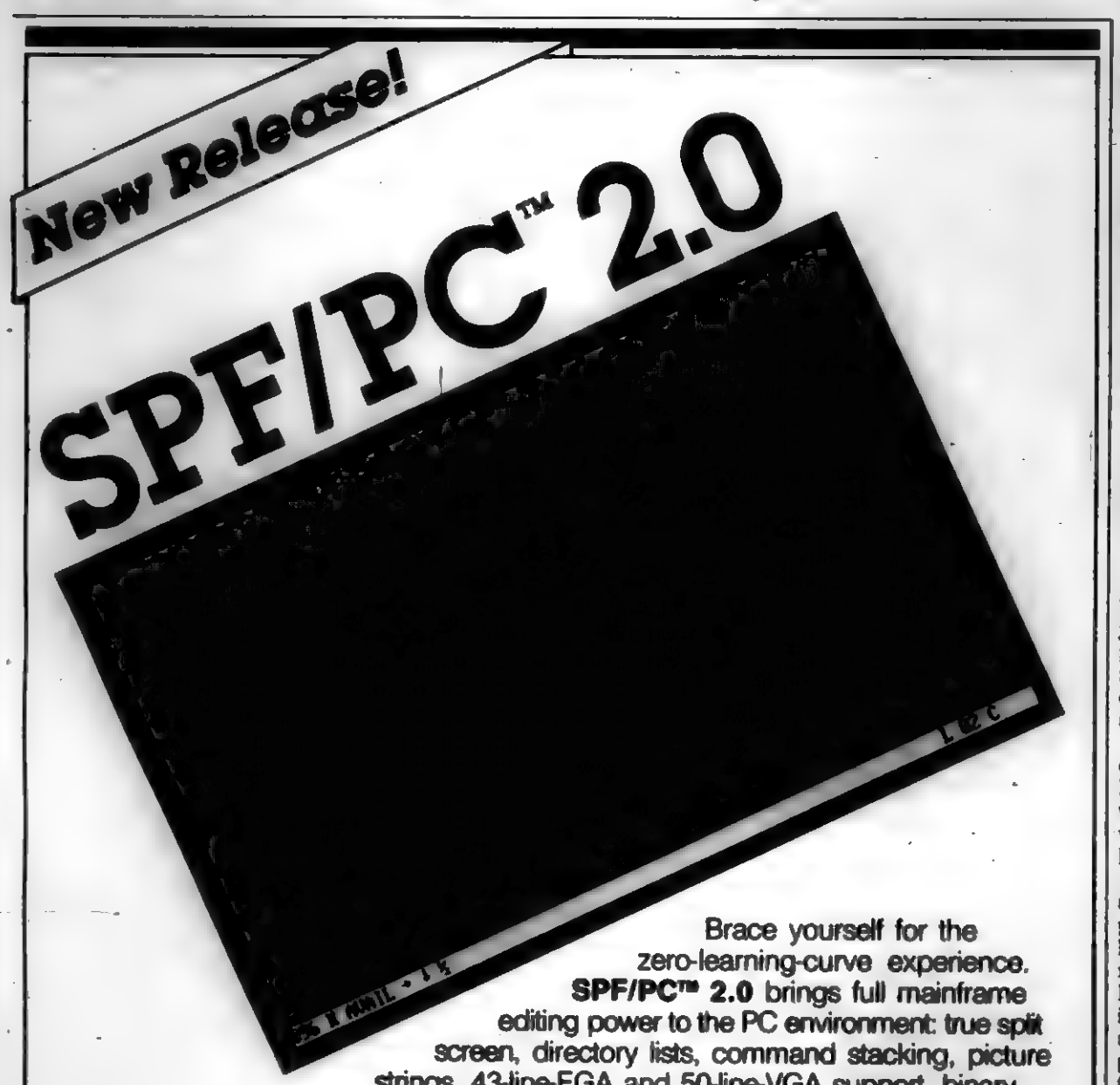
Despite his skepticism about IBM's chances for success in its new endeavor, Damiani said he will be happy to work with IBM if it is successful. "In a way, it would be easier dealing with one client, IBM, instead of with hundreds," he said.

Richard Forsythe, president of Forsythe McArthur Associates, Inc., a computer leasing company in Skokie, Ill., said his firm performs data center design and relocation along the lines announced by IBM. "It's a very profitable activity, and it's an activity that customers need. But it sounds easier to do than it is," he said, explaining that his company had to learn from experience how to carry off data center projects successfully.

"It requires a great deal of fancy footwork. Something always doesn't work out as planned. You have to do Sunday afternoon scrambling," Forsythe said.

Bob Guiko, president of Unicom, a computer leasing company in Sausalito, Calif., said his firm also offers data center planning and moving services. "The only place it has value is in the smaller account. The larger account has created a competitive atmosphere," he said.

The move by IBM represents an effort to return to being a full-service vendor, a profile Guiko said IBM has lost in recent years. "When you walk into a data center today, you're amazed when you see a data center that is all IBM. Five years ago, it was the opposite," Guiko said.



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Bozman

CONTINUED FROM PAGE 65

of both the System/36 and Silverlake machines could be IBM's way to gear down for the System/36's eventual demise, according to Frank Gens, vice-president of technology assessment at International Data Corp.'s Financial Services Corp. in Framingham, Mass.

Gens says IBM may very well do what Hewlett-Packard did when it introduced the Spectrum series while continuing to market the older HP 3000 computers. IBM, Gens speculates, may want to see how well the System/36 community accepts Silverlake before the company decides to withdraw the System/36 from the market altogether.

Right now, it looks like IBM will signal users that Silverlake is for those who want advanced features — not inexpensive Systems Network Architecture (SNA) servers.

Sex appeal?

"The people that want the sexy stuff will go for Silverlake," Andrews says, pointing to the enticements of unlimited upper growth, Systems Application Architecture and an IBM MVS-class operating system that come with the System/38's relational data base management system.

Andrews says Silverlake's prices will be tiered according to CPU power, which should help convince low-end System/36 users to stay with the System/36 — at least for now. Another factor some will have to consider is the difficulty of conversion to the new machine for low-end System/36 users.

Silverlake will be "a fairly new animal" for these users, explains Steve Santoro, administrative manager of Adroit Systems Management, a System/36 value-added reseller located in Syosset, N.Y.

Santoro says System/36 users are going to have a significant learning curve with the new processor. "They should be asking themselves whether they want to be the first ones on their block to own a Silverlake," he says.

Practical answer

For those who find the extras of Silverlake unnecessary, the System/36 is still the practical answer, according to Dale Kutnick, an executive vice-president at Gartner Securities, a subsidiary of the Gartner Group. "If you need a System/36 for a dedicated application, something to get the job done today, then you can be confident buying a System/36 now," he says.

That is the path taken by Continental Insurance in Piscataway, N.J., and the Farmers Insurance Group of Companies in Los Angeles, both of which maintain more than 2,000 System/36s as remote processors in a distributed SNA network [CW, Feb. 8]. Their faith in the System/36's staying power is backed up by analysts.

"Anyone who thinks the System/36 is going away the instant that Silverlake arrives is wrong," Andrews says. "Does Silverlake signal the eventual demise of the 36?" he asks rhetorically. "The answer is yes, but it will take years before the System/36 goes away for good."

Bozman is *Computerworld*'s Chicago-based Midwest correspondent.

DG packages disk, tape drives in single unit for MV family

WESTBORO, Mass. — Data General Corp. recently moved to integrate disk and tape storage systems in a single package with the introduction of the Combined Storage Subsystem (CSS) for the DG MV family of minicomputers.

DG also introduced two disk drives, a 14-in. 862M-byte drive designed for large, interactive environments and a 234M-byte 5¼-in. disk drive designed to reduce the cost of storage by as much as 32% for mid-range and high-end systems. The smaller disk drive and a 0.15-in. streaming cartridge tape drive were designed for packaging in the CSS.

The CSS is said to support up to seven storage devices in a rack-mount chassis and allow a user to package disk, tape backup and interchange media in a single unit. The CSS is intended to provide flexibility and reduce the acquisition price for DG MV/7800 XP, MV/15000 and MV/20000 systems, according to Joe Clayton, marketing product manager for mass storage peripherals at DG. He claimed that use of the CSS with a 40-user MV/7800 XP reduces the total system price by 11% and the five-year cost of ownership by 9%.

CSS configurations are priced from $10,200. The stand-alone 21M-byte tape drive costs $8,500. The 14-in. disk drive and controller cost $34,700.

The 14-in. disk drive was designed to increase storage capacities on high-end systems by up to 37% while reducing the cost per megabyte by as much as 44%.

DG said the 0.15-in. 21M-byte streaming cartridge tape drive provides interchange compatibility with the low-end DG systems.

The 130M-byte half-inch read-after-write cartridge tape drive was designed for system backup at a sustained data transfer rate of 135K bit/sec.

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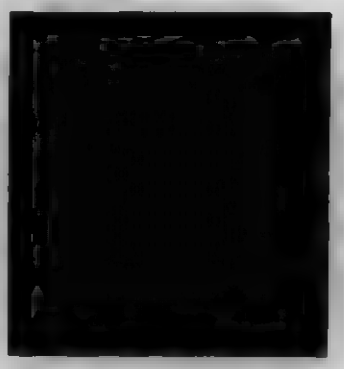

If you're interested in making your remote branch offices act like they're home, the Harris 9300 is the best solution when you require any combination of the following:

- 3270 host application or data-base access;
- Remote printing (RJE);
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For more information write Harris Corporation, Data Communications Division, 16001 Dallas Parkway, P.O. Box 809022, MS # 5, Dallas, Texas 75380-9022. Or call toll-free:

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NEW PRODUCTS

Turnkey systems

A bar code data-entry module that enables the collection of attendance- and labor-related activities has been announced by **Profitkey International, Inc.**

According to the vendor, the **Attendance and Labor Collection** module captures and enters data directly from the shop floor. Features include planned and unplanned setup and run-rate, indirect and move times, deviation quantities and codes, work center changes and attendance transactions.

The data-entry terminal is available as a desk-, bench- or wall-mounted unit. A bar-coding wand is required for each terminal. Up to 32 data-entry terminals can be connected to the Profitkey system.

The module costs from $12,000. Complete hardware and software systems cost from $20,000 to $100,000.

Profitkey International, 283 Main St., Salem, N.H. 03079. 603-898-9800.

Processors

MDB Systems, Inc. has introduced the **Transverter-73 System**, a product said to allow users of Digital Equipment Corp.'s PDP-11/34 computers to use DEC PDP-11/73 CPUs and memory.

The system consists of a rear-loading 5¼-in. rack-mountable chassis, an 11/73 CPU and 1M byte of block-mode memory. It also includes MDB's bus interpreter transverter, consisting of one quad-size and one dual-size module. The board can be installed in Unibus and Q-bus backplanes.

Support is provided for direct-memory addressing transfers in both directions. Delay lines used in the transverter provide precise timing for signal and data transfers between the two buses and compensate for any de-skewing that might occur.

The Transverter-73 System costs $6,590.

MDB Systems, Box 5508, 1995 N. Batavia St., Orange, Calif. 92613. 714-998-6900.

Data storage

Sun Microsystems, Inc. has introduced an **892M-byte storage module device** (SMD) disk drive.

The 9-in. disk drive is compatible with Sun's current subsystem controller. In addition, each 892M-byte subsystem can support one expansion drive. Users can link up to four disks per system for a total of 3.6G bytes of data storage. Average access time is 15 msec, and the transfer rate is 2.4M byte/sec.

The subsystem costs $22,900. Expansion disk drives cost $19,900.

Sun, 2550 Garcia Ave., Mountain View, Calif. 415-960-1300.

A quad-height disk controller that interfaces up to four storage module device (SMD) and enhanced SMD disk drives to Digital Equipment Corp. VAX and PDP-11 Unibus systems has been announced by **Distributed Logic Corp.**

Called the **DU256**, the module interfaces drives with data-transfer rates up to 3M byte/sec. to the VAX and PDP-11 systems. It contains a command-queue buffer that can store up to 21 commands from all drives, then queue them for the proper order of execution on each drive.

Other features include use of an elevator seek-ordering algorithm to determine the execution order and an automatic self-test function.

The DU256 is priced at $2,950.

Distributed Logic, 1555 S. Sinclair St., Anaheim, Calif. 92806. 714-937-5700.

Printers/Plotters

Intermec Corp. has announced a twin-axial adapter to connect Intermec bar code printers to IBM System/34s, 36s and 38s.

The **Model 9176 Twinax Adapter** connects the bar code printers directly to the IBM minicomputers or to IBM's 5251 Model 12 and 5294 controllers, allowing the bar code printer to emulate the IBM 5256.

The adapter converts IBM EBCDIC/Twinax protocol to ASCII/Intermec standard printer protocol.

The Model 9176 Twinax Adapter costs $1,095.

Intermec, P.O. Box 360602, 4405 Russell Road, Lynnwood, Wash. 98047. 206-348-2600.

Honeywell Bull, Inc. has introduced the **Model 4/20** and **4/21** dot matrix printers and has enhanced its **Model 4/66** color dot matrix printer.

The 80-col. Model 4/20 and the 136-col. Model 4/21 feature draft-quality printing at 200 char./sec. and letter-quality printing at 40 char./sec.; 20 fonts; single-bin automatic sheet feeders; and serial or parallel interfaces. They are compatible with graphics packages for the IBM Graphics Printer.

Enhancements to the Model 4/66 seven-color, three-print mode device include a bar code printing facility. One model has been configured to emulate the Hewlett-Packard Co. 7475A printer.

The Models 4/20 and 4/21 cost $645 and $899, respectively. The Model 4/66 costs from $2,795.

Honeywell Bull, 300 Concord Road, Billerica, Mass. 01821. 617-671-2517.

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MIS slowly warms up to object-oriented programming

The biggest payoffs of this new way of coding emerge in the second generation of applications

BY PHILIP GILL

Relational data base technology was around for almost 20 years before it gained wide acceptance. Object-oriented programming languages may face a similarly slow route to MIS approval.

These languages may hold enormous potential to improve programmer productivity and cut application development time, but one vendor of an object-oriented programming language reports that the vast majority of its more than 2,000 licensees to date are not in the MIS realm.

One reason is that "MIS wants the same things they have always had," says Walter Zintz, a Concord, Calif., independent consultant who specializes in Unix and programming languages.

"MIS has a strong locked-in mentality," explains Tom Love, chairman of Productivity Products International, Inc. (PPI), the Sandy Hook, Conn., vendor of Objective-C, an object-oriented variant of the C language. The typical environment does not provide software code that is easy to maintain or reuse for new application development. That lock-in, Love says, "has caused many of the [application backlog] problems."

Unlike conventional programming languages, object-oriented ones are based on the concept of grouping similar and related commands together in what are commonly referred to as "objects" or "classes." In such an environment, a programmer deals only with objects rather than lines of code. Objects can include lines of code or whole programs and can be reused or easily modified.

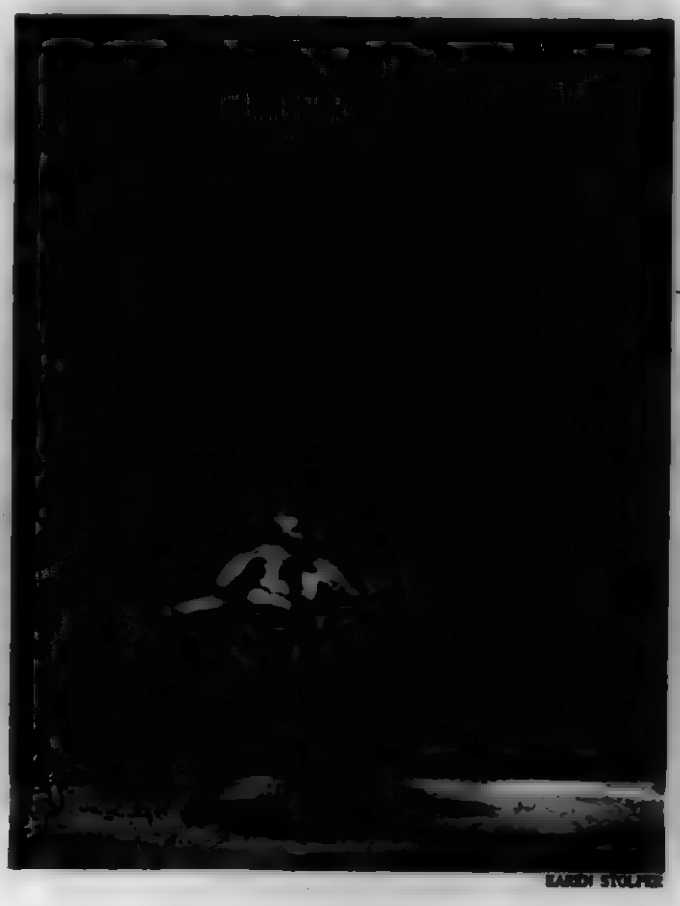
Despite MIS departments' reluctance to change, object-oriented programming language vendors are optimistic about the future of the technology with MIS management. Love claims his firm is experiencing a surge in interest among third-party developers of business applications for users in the financial services and investment communities.

Object-oriented programming languages and techniques have been kicking around for two decades at institutes and engineering labs like Xerox Corp.'s Palo Alto Research Center (PARC) in California, but commercial products have been available for only the last five or six years.

"This industry is in its infancy," says Adele Goldberg, president and chief executive officer of Parcplace Systems, Inc. Also based in Palo Alto, Parcplace was spun out of PARC's research and development labs almost two years ago. Its charter is to commercialize Xerox's Smalltalk-80, the first object-oriented programming language.

As with all new technologies, it takes time for the market to adapt and for the product to be fine-tuned, particularly in the area of performance. Many object-oriented language vendors liken their products' status in the MIS environment today to that of relational data base management systems in 1975.

At that time, the first commercial implementations of relational DBMSs were receiving a skeptical reception from MIS departments, which found them too new and unproven. Nevertheless, the technology has gradually won over MIS to such a point that no one seriously disputes its merit. In fact, the relational DBMS model sets the standard for DBMS implementations today.



KAREN STOLPER

Not a match

Object-oriented programming languages face another problem that all new technologies must confront: Until the technology matures, performance does not match up to expectations. Response time is still slow compared with command-oriented languages, according to Ron Fisher, LISP project leader for Xerox AI Systems in Palo Alto. This Xerox operating group develops and markets LISP-based artificial intelligence systems to commercial and scientific users.

Object-oriented language vendors, like relational DBMS vendors before them, note that they must make the necessary improvements in reliability, response time and implementation. The vendors must also

Gill is a San Mateo, Calif.-based freelance writer and editor who specializes in Unix and other computer-related topics. He is the former editor of *Unixworld* magazine.

- **Steep learning curve, rich payoff**
- **Pure vs. hybrid languages**
- **One goal: object-oriented data bases**

provide a growing body of tools to aid application development.

Despite proponents' efforts, object-oriented languages remain, in large part, the tools of technologists and tinkerers in scientific, research and engineering environments. Most applications developed using these languages tend to be in the more esoteric disciplines of AI and expert systems, Goldberg and Fisher agree.

Yet vendors cite some convincing reasons for this technology's eventual acceptance by MIS and a broad range of users:

The rise of Macintosh-like user interfaces. Apple Computer, Inc.'s Macintosh has popularized the icon user interface to such an extent that it is rapidly becoming the expected norm in user interface design and implementation.

> "MANY OF THE first uses of object-oriented programming languages in MIS environments may be in rapid prototyping of user interfaces to new applications."
>
> RON FISHER
> XEROX AI SYSTEMS

"The technology to do those kinds of user interfaces comes from object-oriented languages," PPI's Love says. Object-oriented programming is well suited to building icon user interfaces, which are more complex than command-oriented interfaces. Encapsulation and the ability to reuse code helps provide control in the development process.

There is also a conceptual link between icons and objects. Icons represent whole categories of functions, such as word processing functions, grouped together under one heading or class. A user moves into more specific functions by working his way through a hierarchy of related functions or classes.

A second icon might represent an electronic mailbox. A third might represent a communications program or electronic calendar.

Users' demands for better interfaces will highly motivate MIS to adopt object-oriented languages. "In some cases today, the user interface has become more important than the underlying capabilities of the product," Xerox's Fisher claims.

Fisher contends that many of the first uses of object-oriented programming languages in MIS environments will be in rapid prototyping of user interfaces to new applications.

Reusable software. The ability to get the most out of software provides the

Continued on next page

Class act

The concept of a class or object is central to all object-oriented languages. A class defines the data storage and data operations that may be performed on a particular data item or type. An object is a specific instance of a class and consists of a pointer to the class definition and some data storage.

A class has both a public part — available to any function inside or outside that class — and a private part — available only to other internal members of that class. This structure is key to reusing software developed using object-oriented languages. An application can be modified by changing the functions that act on the public part of a class, rather than by rewriting it.

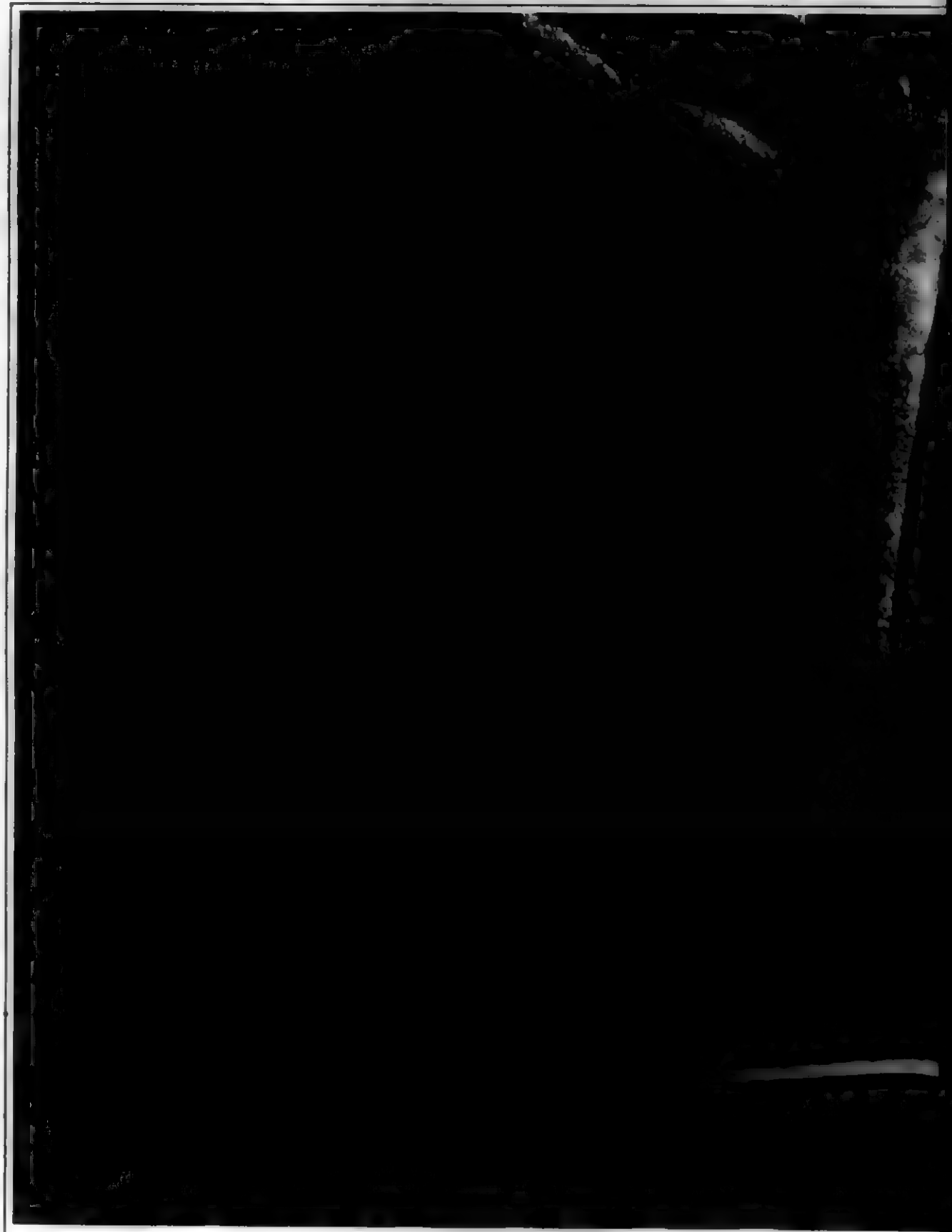
Classes and objects have three main features: encapsulation, inheritance and dynamic binding.

- Encapsulation, used to organize a program into modules, allows data and procedures that can act on them to be coupled in a class. Encapsulation can take many forms, but it often means keeping a number of procedures in the same file.
- Only when encapsulation is coupled with a second characteristic, inheritance, can object-oriented languages provide their real payoff. Inheritance allows new classes to be developed using older classes with new variables.

For example, all graphics functions could be grouped into classes in a hierarchy. At the head would be a general program that incorporates graphics procedures. Additional data structures for graphics, such as a line, circle or square, could be linked. Thus, all functions could be applied to the line, circle or whatever shape you choose.

- Dynamic binding is key to reusable software. Its premise is that the functions contained in the module or class will always respond in the same way, regardless of the instructions that act on it. At runtime, a set of instructions different from those originally used may be applied to a module or class.

PHILIP GILL



Hypercard: A good beginning despite missing features

What Apple Computer, Inc. did for mice, windows and icons, it may do for object-oriented programming languages. Apple's Hypercard, introduced last summer, is a new kind of programming environment that organizes all forms of information into what appears as stacks of index cards. Users then manipulate those stacks to create applications.

On a more technical level, Hypercard consists of a limited number of instructions, plus objects and messages. Hypercard instructions are attached to objects. When Hypercard sends a message to a particular object, the object carries out its function.

How close is this environment to object-oriented programming? Apple Fellow Bill Atkinson has acknowledged that an affinity exists between Hypercard and Parcplace Systems, Inc.'s Smalltalk-80, said to be the first pure object-oriented programming language.

Ron Fisher, LISP project leader at Xerox AI Systems, says that while Hypercard offers some features of an object-oriented language, it lacks some important characteristics.

Foremost among the missing elements is inheritance. Inheritance means that an object can retain the functions of related objects in much the same way that a wire fox terrier, for example, inherits its capabilities and properties from being a wire fox terrier but also from being a dog and a mammal as well.

Adele Goldberg, president and chief executive officer of Parcplace, agrees that Hypercard lacks much of the functionality of a true object-oriented language. However, in the long run, she says, that may not be so bad. Hypercard has the potential to introduce a large number of users to the concepts of object-oriented languages.

PHILIP GILL

What ISDN is doing for McDonald's data networking capabilities is no small potatoes.

When McDonald's Corporation took a hard look at its telecommunications needs a few years ago, it saw 9400 restaurants in 46 countries, served by more than 20 networks. And a new restaurant opening every 17 hours.

McDonald's needed a telecommunications system that could grow with it, but one simple enough that the company could concentrate less on telecommunications and more on talking to customers.

The solution: the nation's first customer application of ISDN, the Integrated Services Digital Network, made possible by the cooperation of Ameritech's Illinois Bell and AT&T Network Systems.

McDonald's will use ISDN to send voice, data and video over ordinary telephone lines simultaneously. An AT&T 5ESS™ switch at Illinois Bell will support digital phones, integrated voice/data terminals, facsimile, voice mail, host access and modem pooling, giving McDonald's a real competitive advantage in its data networking capabilities.

"In business language, this means we're going to do an even better job for the 30 million customers that we serve every day," said Bonnie Kos, McDonald's Vice President of Facilities and Systems.

"ISDN provides an information outlet to every workstation, thereby eliminating time-consuming and costly wiring, as well as enhancing messaging and network control capability."

Thanks to ISDN, McDonald's will enjoy better customer service, more current market information, better tracking of product promotions, more efficient inventory control, and reduced administrative workloads.

Ultimately, higher level applications of ISDN on the public switched network will replace most of the company's myriad networks, linking all its offices and restaurants around the world.

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Object-oriented

FROM PRECEDING PAGE

biggest payoff for MIS by far. Object-oriented programming languages could relieve the applications backlog that plagues many MIS installations. The key is that these languages, in contrast to procedural languages, enable users to develop reusable software.

Programmers can develop modules, or classes, of functions that can be separated into their individual components. These classes can be reassembled in different ways to develop new applications.

Object-oriented data bases. A form of DBMS technology just now coming to market — object-oriented data bases — allows data to be grouped in ways that are impossible under the constraints of current DBMSs, according to Michael J. Caruso, director of research and development at Innovative Software Engineering, Inc.

The Cambridge, Mass.-based company markets Vision, a commercial object-oriented data base intended for investment banking and portfolio analysis applications. Caruso says the firm plans to expand its efforts to other applications areas.

While relational DBMSs restrict data to either text or integers that are linked through tables, files and relations, object-oriented data bases permit data to be linked through other means as well, Caruso says. For instance, an historical data base can be linked through a time series.

Pure or hybrid

Object-oriented programming languages fall into one of two general categories — pure and hybrid. In a pure object-oriented language, programmers work in a computing environment that contains only objects. Smalltalk-80 is perhaps the best-known pure object-oriented language.

The second category, hybrid languages, adds object-oriented concepts, such as encapsulation, classes and objects, on top of conventional programming languages. "They provide the look and feel of a pure object-oriented language" but retain the characteristics of the command languages on which they were based, PPI's Love says. For instance, PPI describes Objective-C as "a commercial precompiler that adds Smalltalk-80 encapsulation, inheritance, classes, messages and objects to the C language."

Some of the more widely used languages that provide object-oriented capabilities are the following:

- C++, from AT&T, provides object-oriented programming capabilities to C

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programmers in the Unix environment.

• Objective-C, from PPI, is available for a variety of environments, including IBM Personal Computers.

• Object Pascal, from Apple, is the language in which much of the Macintosh user interface has been written.

• Hypercard, also from Apple, is a programming environment that presents all data as stacks of index cards. There is some debate as to whether Hypercard can rightly be called an object-oriented programming language, however (see story page 73).

• The Common LISP object-oriented programming environment is a language available from many vendors, including Xerox AI Systems. Its product, dubbed LOOPS, for LISP Object-Oriented Programming System, is used mainly in AI applications.

• Smalltalk-80, the first object-oriented programming language, is available from Parcplace. All commercial versions of Smalltalk-80 are licensed from Parcplace.

Advantages not obvious

PPI's Love warns that the benefits of object-oriented programming languages will not be immediately apparent to users in the first generation of a program's development.

> "OBJECT-oriented programming will require an entirely different mind-set for programmers and systems analysts."
>
> ADELE GOLDBERG
> PARCPLACE SYSTEMS, INC.

Parcplace's Goldberg agrees, noting that little if any independent analysis has been done of programmer productivity gains through this technology.

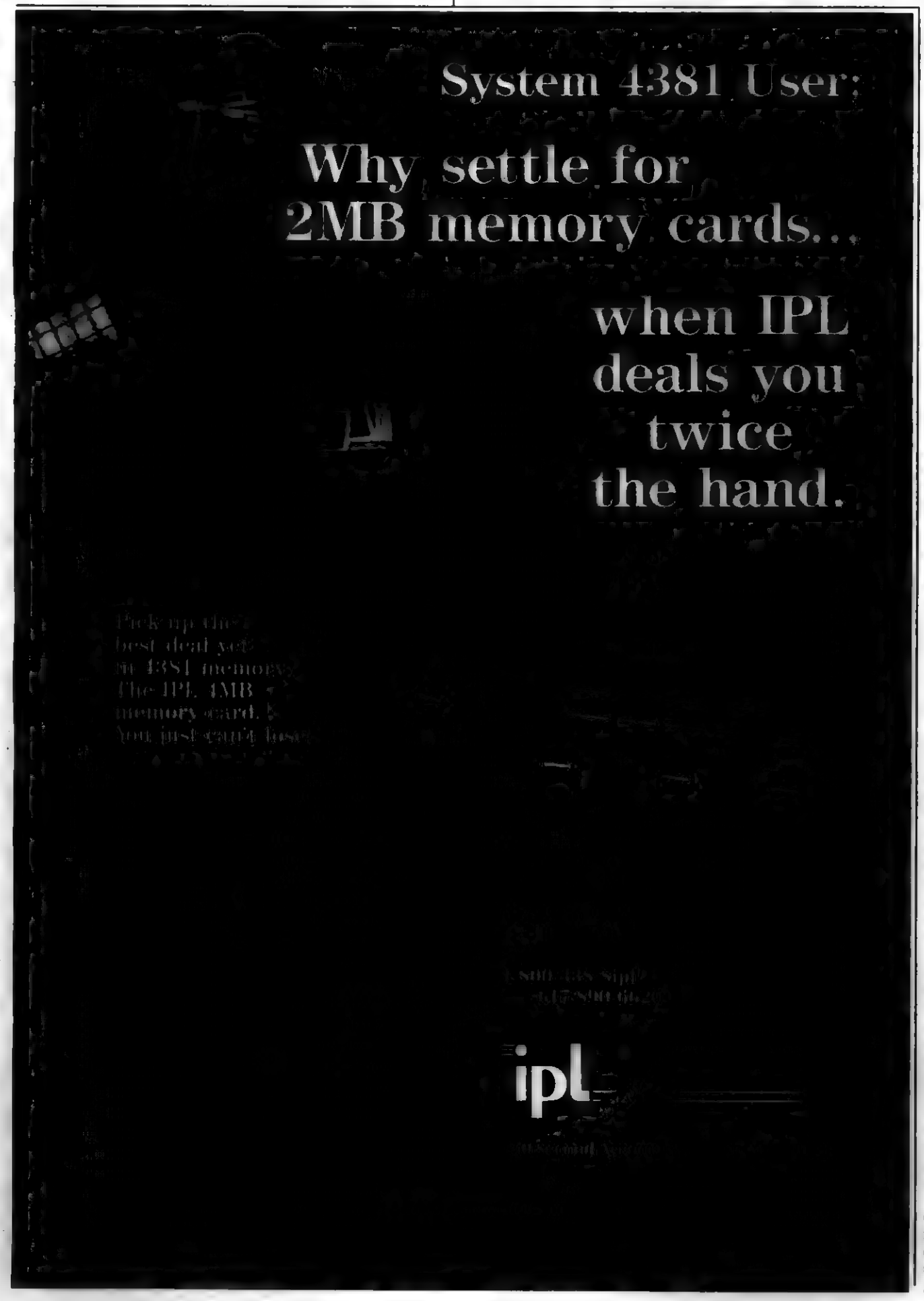
However, Love claims his company has seen substantial benefits during the second generation. Up to 60% of the program code is reusable, he says.

The major cost of this technology is in training programmers, Love says. Hardware is inexpensive because many of these programs are available for low-cost mass-produced personal computers and Unix systems. The software is also relatively inexpensive; prices range from $500 to $2,000.

The eventual success of these languages will depend more on design than cost. Goldberg says object-oriented programming will require an entirely different mind-set for programmers and systems analysts. She points out that programmers will need more extensive training in what constitutes good and effective design of user interfaces and the visual presentations object-oriented languages make possible.

Ultimately, Goldberg predicts, vendors will develop user interface objects that incorporate known rules and elements of good graphics design and visual presentation. These prepackaged objects will be portable from machine to machine and application to application. They will eliminate the need to train programmers in the principles of good graphics design as well as the intricacies of object-oriented programming technology.

In the end, Goldberg indicates, good taste may be just as important as good technology in determining the success or failure of these languages in the MIS community. •



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TAKING CHARGE

Eric K. Clemons

Strategic necessities

There continues to be much interest in the strategic and competitive uses of information system applications, as evidenced by articles, conferences and executive education enrollments. Much of the hype — the excessive claims and unrealistic expectations — that characterized work in 1985 and '86 seems to be fading. Most firms have more reasonable expectations for their information systems ventures. In addition, more is now known by academic investigators and corporate decision makers.

Our research during the past four years has led us to formulate the strategic necessity hypothesis, which says that many, if not most, strategic applications of information systems have proven to be strategic necessities. That is, regardless of the system developers' original intent, most strategic information systems have not been a source of lasting competitive advantage. Rather, they have become new essential aspects of doing business. Getting them right merely yields parity; getting them wrong may force you out of the game.

This hypothesis, if true, has policy implications both when evaluating a potentially competitive application and when developing an MIS strategy.

Much support is available for the strategic necessity hypothesis. Some support comes from our prior expectations, based on traditional economics of competition, which state that when a firm earns supernormal profits, additional competitors will enter and these profits will be competed away.

More recent work by professor David Teece of the University of California at Berkeley addresses the "appropriability" of benefits from innovation. Teece has found that in some instances, the first developer earns greater profits, perhaps for an extended period of time, but does not always win as a result of innovation. He developed a simple

Continued on page 80

The Feds' dynamo

Exec is salesman, motivator and life of the party

BY MITCH BETTS
CW STAFF

ALEXANDRIA, Va. — Joseph J. Leo, a senior manager at the U.S. Food and Nutrition Service, is trying to modernize the information systems that support $20 billion of the nation's most critical services, including the food stamp, welfare and school lunch programs. He doesn't have much time for vendor hype.

At a symposium on federal systems in December, Leo listened to some lofty sales pitches and then took the podium to deliver a withering critique. "Give me a migration path," he told the vendors, with characteristic bluntness. "I have to manage in three different worlds: the past, the present and the future."

Later, in an interview, Leo smiled and said, "The vendors will tell you that everything is possible when, in reality, it's not."

Tough stance works

Although Leo is tough on vendors, he is also known as a tough manager at the Food and Nutrition Service, part of the U.S. Department of Agriculture. As deputy administrator for management, Leo is in charge of an odd assortment of offices: information systems, personnel, civil rights and administrative services. In addition, he serves as chairman of a special committee that provides guidance to all 50 states on the use of computer systems for public welfare programs.

"He's definitely a tough manager," says his boss, Anna Kondratas, administrator of the agency. "But that's positive from my point of view, because he runs a very tight shop," she says, noting that the agency's systems modernization program is well coordinated and running smoothly.

Leo likes to keep his workday down to 10 or 12 hours — "one step short of being a workaholic," he says — and spends his free time with friends, his sports car and planning an upcoming trip to Europe. "My generation grew up with the adage: Work hard, play hard," he comments.

Along with an occasional outburst of temper, Leo is known for having a high energy level and extraordinary enthusiasm for his work, according to Kondratas. In fact, for years he has

Continued on page 81

PROFILE

Joseph J. Leo

BRUCE HOERTEL

Position: *Deputy administrator for management, U.S. Food and Nutrition Service.*

Mission: *Running a tight shop, selling programs, motivating by communicating excitement, charting the future.*

BOEING COMPUTER SERVICES

Channeling the information stream

BY DAVID A. LUDLUM
CW STAFF

With 45,000 workstations or terminals, 450 minicomputers, 54 mainframes, supercomputers and its development of communications standards, Bellevue, Wash.-based Boeing Computer Services Co. (BCS) is conspicuous among large and innovative users of information technology.

And with more than 1,500 customers in government and industry, many desiring systems integration, the computer services division of The Boeing Co. is also a prominent example of the potential for such users to sell products and services to other companies.

But BCS, which centralizes most major systems activities at Boeing, has also been making strides in other realms of the management of information technology, such as controlling costs, supporting corporate strategy, educating personnel and keeping abreast of new technology.

Like the commercial MIS arms of most aerospace firms, BCS, whose earnings are not made public, makes a negligible contribution to its parent company's bottom line, according to Paul Nisbit, an aerospace analyst with Prudential-Bache Securities, Inc.

However, BCS's commercial activities seem to offset the costs and expand the capabilities of its internal services, Nisbit says. "Undoubtedly, they've streamlined their engineering and manufacturing processes due to the very sophisticated systems in place internally," he says.

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Such accomplishments come in response to major upheavals in Boeing's business environment. Airline deregulation and new competition from the European consortium Airbus Industrie have put downward pressure on the prices Boeing can charge for its commercial aircraft.

Among Boeing's responses has been the firm's adoption of Japanese-style "design/build teams" — an effort to boost efficiency and cut costs by coordinating designs more closely with manufacturing requirements and budget constraints.

Continued on page 84

MANAGERS ON THE MOVE

Tending to the client's technical needs

Richard Leegant has been named senior vice-president of Information Services at **CUC International, Inc.** in Stamford, Conn. The company provides credit card enhancement services such as shopping, travel, insurance, extended warranties, prepaid legal plans and credit card registration.

Along with software development, data processing and data entry, in his new position, Leegant is responsible for serving as a liaison to CUC's marketing department for service and support of the banks and retailers that are CUC's clients.

The responsibility reflects a

CUC's Leegant

"technical relationship" between CUC and the clients that parallels their marketing relationship, Leegant explained. "We want to be smooth and operationally effective. If [clients] are making money but things aren't running smoothly, they're not going to be happy," he said.

Leegant was previously senior vice-president of Mortgage Administration at the Federal National Mortgage Association, where he directed a 500-employee operations group. Prior to that, he was director of Information Services at the Student Loan Marketing Association.

Steve Hicks has been promoted from director to vice-president of Management Information Services at **Whittle Communications L.P.** in Knoxville, Tenn., a publisher of magazines, newsletters and videos.

Thomas F. Berns has been named director of business systems development for Firestone Tire & Rubber Co.'s retail operations in Chicago. Berns joined Firestone after serving as vice-president of information services at Baxter Healthcare Corp., located in Deerfield, Ill.

Kimberly L. Clawson has been promoted to operations manager in the Management Information Services department at **Keller-Crescent Co.**, an Evansville, Ind., advertising agency.

Clemons

CONTINUED FROM PAGE 79

model to predict who will retain the benefits from a new product or service — the innovator, one or more imitators, suppliers or customers.

When there is a tight appropriability regime — patents or trade secrets or an innovation that is difficult to codify or is embedded in such a way as to discourage reverse engineering — the innovator is likely to retain benefits. Conversely, with a weak appropriability regime, benefits will be competed away.

When there is a competitive factors market — many suppliers exist for the necessary factors of production, and competing suppliers can exert little pressure on the developer of the innovation — the innovator will retain benefits. However, when the supplier of key resources has significant bargaining power, the innovator will find many of the economic benefits of his development accrue to the supplier.

Unfortunately, MIS applications rarely have the characteristics that allow an innovator to retain economic benefits. Patents are rarely available, trade secrets are of limited effectiveness and the functionality of applications like customer order-entry systems are visible to all competitors.

Since the key resources — data processing equipment, telecommunications capacity or automated teller machines (ATM), for example — are commodities available to all competitors, Teece would predict that under these circumstances, all competitors with similar strategies would develop similar systems and benefits such as reduced costs or improved service would be retained by customers.

Evidence in pharmaceuticals

Industry case studies during the past several years have yielded some evidence that supports this prediction. Perhaps the most striking example is in the distribution of pharmaceuticals and health and beauty aids to pharmacies.

A previous column described McKesson's Economost electronic order-entry system. Currently, more than 99% of McKesson's customers order electronically. Use of this system, and integration to exploit the data it captures, has enabled McKesson to make significant productivity gains: warehouse worker productivity is up tremendously, and in a period in which sales increased sixfold, McKesson's sales force has been reduced by 50% and telephone order-entry clerks reduced from 700 to 15.

Significant competitive impact on McKesson is more difficult to demonstrate. Most major competitors developed similar systems with similar capabilities at approximately the same time. In the decade following the system's introduction, McKesson's national market share remained essentially unchanged at 20%.

It appears indisputable, however, that customer order-entry was strategic in this industry. Smaller competitors, unable to develop competing systems, left drug distribution; from 1975 to 1985, the number of drug distributors was reduced by almost 50%. We believe that these distribution systems rapidly became strategic necessities.

Benefits from these systems — reduced operating costs and reduced prices — were largely passed through to pharmacies and independent drugstores, enabling them to compete more effectively against supermarkets and chain stores. Even the smaller distributors that were acquired appear to have benefited: as the holder of a key factor — the market share needed to make these strategic order-entry systems cost-effective — most were acquired by major firms at a significant premium above book value. Thus, these systems appear to be beneficial strategic necessities, benefiting all aspects of the industry.

The strategic necessity hypothesis has clear policy implications for corporate decision makers. When it appears that competitive advantage may be possible, the decision maker must assess the opportunity critically and skeptically. What will make it competitive? How will benefits be kept, and how will competitive advantage be defended? If it is truly a competitive opportunity, determine the importance of speed, which is tied to first-mover effects.

When assessing applications, a reasonable expectation for strategic systems appears to be strategic necessity. For strategic necessities, decision makers must ask themselves the following question: Can your firm do it all? If the answer is no, the firm has four principal options: exit the industry, merge with additional players, form a joint venture, or join a consortium to develop the innovation. If the answer is yes, the firm's principal decision is between independent or cooperative development.

Finally, if the firm has some special advantage in development, it should consider developing and selling the innovation to any or all industry participants. An industry's strategic necessity may provide competitive advantage for a supplier.

Provident National Bank has a profitable business processing asset-management accounts for many brokerage houses competing with Merrill Lynch's Cash Management Account. And Philadelphia National Bank has developed a profitable business as the switch for a regional ATM consortium.

Clemons is associate professor of Decision Sciences at the University of Pennsylvania's Wharton School.

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"Evaluating every graphics package available would have taken time and information center resources we couldn't spare. But we needed to know which package was right for us. And we needed to know fast."

Kevin Maloney, Senior Systems Analyst of Office Automation, Pepsi-Cola International (a division of PepsiCo, Inc.).

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Feds' dynamo

CONTINUED FROM PAGE 79

been known as "Dynamo Joe."

"Most staff meetings are ho-hum affairs, but Joe manages to stay enthusiastic. I heard he once gave a six-hour briefing without losing any energy, although I'm not sure everyone else managed to keep up with him," Kondratas says.

"He's knowledgeable, people trust him, and he believes in what he's doing. The result is that he manages to convince everyone to go along with his plans," Kondratas adds.

Leo calls himself a new breed of government executive — one who can point to a combination of management and technology experience.

That combination is rare among government information systems executives, says Robert V. Head, a technology consultant and former Agriculture Department official.

Right mix of skills

One advantage that mix of skills provides is that Leo is an excellent manager of major systems procurements, Head says. His agency recently awarded a $12 million contract for a distributed information system based on IBM 9370s — without any of the protests and controversies common to government procurements.

"Maybe [other federal managers] should take a seminar from Joe Leo on how you do these things," Head says.

Leo points out that computer experience has been an important skill in his management "tool bag" and helped him to win his current job.

He began his government career in 1971 as a management analyst at the U.S. Department of Transportation, and as he moved up the ladder, was frequently put in charge of various office automation projects.

That experience paid off in 1984, when he was thrust into a four-month competition with 80 applicants for the management job at the Food and Nutrition Service.

The agency wanted to move the control of information systems from the comptroller's office to the management office, so the winning applicant had to have computer experience. Leo clinched the job when he recommended that the agency stop buying 8-bit personal computers and switch to the 16-bit systems that were about to hit the market.

Keeping pace

Leo says he continues to invest in his technical skills by reading computer trade journals, mostly so he can maintain a vigorous, professional dialogue with the technical staff.

The executive sees his role as that of a leader who can motivate his staff by communicating "excitement about the future and an understanding of the pressures on the day-to-day managers in the present." He maintains that a staff must feel a sense of commitment from the top.

Actually, Leo's information systems staff might wish he were a little less involved in technical programs, he says with a chuckle.

"But if I make the investment in staying on top of automation, I'm not going to ignore that investment. When I sit at a conference and hear something that conflicts with my view of the future, I'm going to say so," he says.

Love or respect?

"I know members of his staff who say they respect him and like to work with him," Head says. "But I don't think they would describe him as lovable."

What drives him to be a tough manager? "Maybe it's because I never really had any breaks. I've had to work very hard [to advance in the government], one step at a time," Leo says. And he expects the same hard work from his staff.

While Leo may not be lovable, he's a lot of fun at a party. "He's a terrific dancer," Kondratas reports. "He loves ballroom dancing, and he's the life of the party at any of our agency functions."

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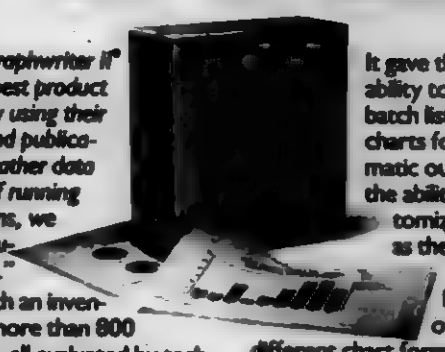

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2nd IEEE Conference on Computer Workstations. Santa Clara, Calif., March 7-10 — Contact: Computer Society of the IEEE, 1730 Massachusetts Ave. N.W., Washington, D.C. 20036.

Federal Office Systems Expo (FOSE) '88. Washington, D.C., March 7-10 — Contact: Debbie Murray, National Trade Productions, Inc., Suite 400, 2111 Eisenhower Ave., Alexandria, Va. 22314.

Ninth Annual Conference on IBP Performance/Capacity Management. Scottsdale, Ariz., Mar. 7-11 — Contact: Applied Computer Research, Inc., P.O. Box 9280, Phoenix, Ariz. 85068.

Seybold Seminars '88. San Francisco, March 7-11 — Contact: Seybold Seminars, 6922 Wildlife Road, Malibu, Calif. 90265.

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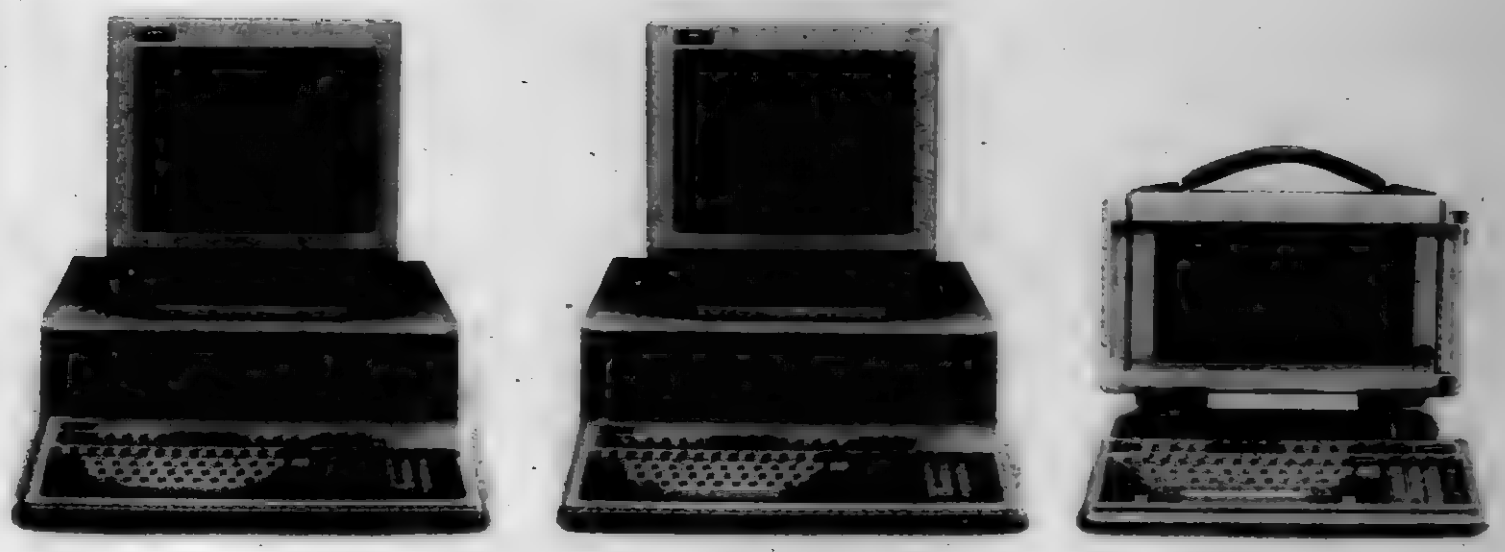

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COMPAQ

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Channeling

FROM PAGE 79

The teams include design engineers, material specialists, manufacturing engineers and BCS information systems professionals.

"Coordination of that kind is best handled by an information system," says Del Rowan, assistant to the president at BCS. "To do that, obviously you need the information systems people." Rowan emphasizes that Boeing is revamping production processes before automating them. "It does little good to take a manual system that has been in place and simply automate it," he says.

All for one

In a speech last fall, Robert Dryden, then president of BCS, described the team approach as part of a breaking down of organizational barriers that is accompanying an effort by Boeing to streamline processes around a flow of digital information.

In other efforts to boost efficiency, BCS has implemented advanced systems for design, engineering and manufacturing as well as for cost analysis of design options.

Airline deregulation, along with volatile prices for jet fuel, has also placed a premium on flexibility in Boeing's production. BCS has helped address that need with design and manufacturing data bases that accommodate production of various models of a basic aircraft design and with systems for scheduling and manufacturing resource planning.

In his speech, Dryden, who was succeeded by longtime IBM marketing executive Michael Hallman after being appointed president of Boeing Military Airplane Co. last fall, stressed that much of Boeing's production is essentially information processing.

"Our vision of what we want this process to become is that of an enhanced information stream," Dryden said. "What we are doing to implement that vision is rebuilding the company around the concept of that enhanced information stream."

Sharing information has enhanced Boeing's customer service by allowing documentation to be based on original design and manufacturing data, according to Dryden. BCS has also supported customer service with systems for worldwide tracking of spare parts inventories and for troubleshooting with artificial intelligence.

Enhancing skills

The development of AI technology has been a major thrust at Boeing since the early 1980s, when the U.S. Air Force advised contractors to pursue it and a company task force concluded it was crucial to Boeing's competitiveness.

But the company found itself with a demand for AI experts at the master's degree level that far outstripped the available supply, according to Bruce Wilson, BCS's chief scientist for computing technology. The company estimated it needed "about 150 trained folk" but could only bring about one on board every two years, Wilson says.

That led BCS to launch its Associates Program in 1984 — recently renamed the Skill Enhancement Program — which is run out of its Advanced Technology Center for Computer Sciences, a 5-year-old facility aimed at acquiring and developing technology and disseminating it to Boeing operating companies.

The Skill Enhancement Program is aimed at cultivating AI know-how within Boeing and fostering the application of AI to procedures and products. It provides graduate-level training to experienced software engineers from the Boeing companies.

"It's a transfer mechanism for allowing us to move the technology evolving inside the center out to the operating companies," says David Fennell, manager of the program.

The Skill Enhancement Program, which takes students in groups of about 10, involves six months of prototype development and an optional, introductory half-year of training. The first class graduated in February 1985; since then, the program has produced 68 alumni. "The labor costs are on the students' own organizations, so they tend to pick good people," Wilson notes.

One fruit of the program is Boeing Electronics Co.'s Connector Assembly Specification Expert, an expert system for helping workers assemble electrical connectors. It provides a printout of assembly instructions, avoiding the need for workers to search hundreds of pages of documentation. The firm says the system, which runs on a Digital Equipment Corp. Microvax, should save Boeing $10 million per year when it is fully deployed.

Through its Education and Training Division, BCS has extended its AI instruction to others, including employees of a group of Japanese companies, through a joint effort with the Tokyo trading company Nisaho Iwai. The Skill Enhancement Program will be extended to include training in high-speed computing and perhaps other areas, Fennell says.

The Advanced Technology Center also strives to keep BCS abreast of the latest technologies. It oversees Boeing's relationship with the Carnegie Group, Inc., a Pittsburgh firm specializing in the application of AI to manufacturing and engineering in which Boeing has purchased an equity stake.

The center also runs programs that bring scientists and researchers to Boeing for one- or two-day colloquiums or visits that last several weeks, during which they consult and lead seminars, an undertaking Wilson calls the "rent-a-professor" program.

At A Glance

CW CHART

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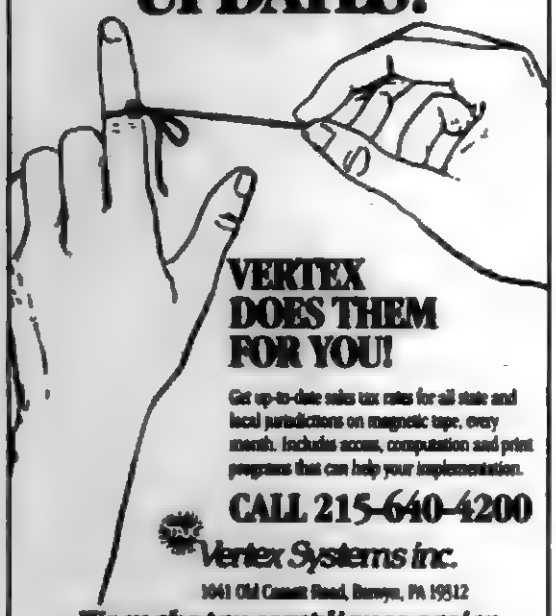

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COMPUTER INDUSTRY

INDUSTRY INSIGHT

Clinton Wilder

Combine and conquer

The season of the deal. Less than eight weeks into 1988, the industry has already seen three acquisitions valued at more than $200 million. If that pace continues, maybe the industry's consolidation really will go the way of the auto industry, as some sages have surmised for years.

Computervision finally gave in to Prime, creating a potent new force in computer-aided design and manufacturing. Then, last week, Tandem, whose name you see more and more in sentences that also contain the word "networking," moved to annex a big chunk of communications expertise with its proposed buy-out of Ungermann-Bass.

The third prominent nine-figure deal was struck 10 days ago with the $235 million sale of Mtech, the Dallas-based service bureau for banks and financial firms. Mtech is a classic case of a large corporation — Dallas banking giant Mcorp — making a lot of money by getting into the computer services industry and spinning off the operation as a separate business.

In this case, Mtech became a corporate cash cow when its parent skidded on the oil industry slump. After milking the profits, Mcorp sold the whole cow — its 80% equity stake — to help its bottom line. The bank has lost $340 million in the last two years.

Hooked a Bass

The Mtech sale brings an interesting new player (players, actually) into the industry: the Bass brothers, the noted wheeler-dealers from Fort Worth, Texas, who graced the cover of *Newsweek* a couple of years back.

The Robert M. Bass Group will share Mtech ownership with Welsh, Carson, Anderson & Stowe, New York venture capitalists that are no strangers to high tech.

The idea might be far-fetched, but the thought of the Bass boys making their Texas-

Continued on page 90

Tandem to buy Ungermann-Bass

$260M deal will stave off further DCA takeover advances

BY JAMES DALY
CW STAFF

SANTA CLARA, Calif. — Ungermann-Bass, Inc. buried any chance that Digital Communications Associates, Inc. (DCA) might attempt another hostile takeover by announcing last week that it will be acquired by Tandem Computers, Inc. for approximately $260 million.

In the latest of a 12-month flurry of mergers involving networking companies, local-area network vendor Ungermann-Bass agreed to become a wholly owned subsidiary of Tandem, the Cupertino, Calif.-based supplier of computer systems and networks for on-line transaction processing.

The emergence of Tandem as a white knight draws the curtain on a drama that began shortly after last October's stock market crash, when DCA made a $175 million offer to acquire Ungermann-Bass at a time when the latter firm's stock was down.

The bid was seen by some analysts as an opportunistic move on DCA's part and was unanimously rejected by the Ungermann-Bass board of directors shortly thereafter. But Alpharetta, Ga.-based DCA made no secret that it was still interested in the company and retained one million shares of Ungermann-Bass stock, or nearly 6% of the firm.

"Clearly, the DCA takeover bid caused Ungermann-Bass to look over its shoulder," said Bob Kimball, a senior research analyst at Montgomery Securities. "I suspect [discussions with Tandem] started out as OEM talks to solidify their relationship, then progressed to a minority interest investment and, finally, an out-and-out buy."

Following the merger, Ungermann-Bass will operate as an independent division of parent firm Tandem.

Ungermann-Bass cofounder and Chief Executive Officer Ralph Ungermann will become a vice-president of Tandem and will be nominated for election to Tandem's board of directors.

Talking for months

Mike Gardner, Ungermann-Bass's vice-president of marketing, confirmed that buyer-seller talks had been going on with Tandem for the past four months but denied that the merger was spurred by the takeover bid.

"We have worked with each other on projects in the past and found it to be a natural fit," Gardner said. "The market is moving to distributed intelligence in computing, distributed data bases, high-availability systems and transaction processing. Local-area networks are the glue that combines these converging technologies together."

Both companies also share a common user base in the financial services, manufacturing and telecommunications fields and are committed to open networks

Continued on page 90

At A Glance

CW CHART

Cray opens software war chest

BY ALAN ALPER
CW STAFF

NEW YORK — Responding to the needs of its expanding base of commercial customers, Cray Research, Inc. is increasing expenditures on operating software development, according to John Rollwagen, chairman and chief executive officer.

The Minneapolis supercomputer company spent about $109 million on R&D last year, 40% of which was devoted to software development, Rollwagen told securities analysts at a recent meeting here. By next year, Cray will spend as much on software as it does on hardware development, he added.

Cray is allocating additional resources to ensure that Unicos, its AT&T Unix System V-derived operating system, contains functionality that is equivalent to its COS proprietary operating system. Unix has taken on increased importance within the Cray product line and is offered as the standard operating sys-

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Inside

- Cullinet posts $3.9 million loss, looks toward blacker pastures. Page 87.
- Arthur Andersen opens CIM demo center. Page 87.

Software firm tackles Olympian project management task

BY NELL MARGOLIS
CW STAFF

CAMBRIDGE, Mass. — Project Software and Development, Inc. (PSDI) is staging the biggest product demonstration in its 20-year history this month, and the whole world is watching.

Olympic sponsor and supplier PSDI's project management software is at work in Calgary, Alberta, planning, scheduling and managing more than 30,000 activities relating to the 1988 Winter Olympic Games.

For PSDI, Olympic supplier status is more than just an advertisement worth its weight in gold, silver and bronze. It is the software maker's chance to prove that project management is not just for aerospace and construction companies.

PSDI founder Daniels

The message is critical if privately held PSDI is to keep up or exceed the average 25% annual growth it has enjoyed since it was started, according to Robert L. Daniels, the firm's founder and chief executive officer.

"People tend to get very emotional about project management," he said. "It's not just a technology, it's a discipline, a way of thinking — and it's highly particularized to each separate project."

At the Winter Olympics, the sports events and related activities — including food service, security, medical backup, transportation and training of volunteers — have been broken down into 15-minute or shorter time periods to be tracked, monitored and modeled. This is handled by PSDI's Digital Equipment Corp. VAX-based Project/2 software and its newer Microsoft Corp. MS-DOS-based Qwiknet Professional for microcomputers.

The effectiveness of PSDI's attempt to alter the image of project management through what amounts to a televised reference sell will take months, if not years, to fully evaluate. However, even before the final medals are handed out in Calgary, PSDI appears to be scoring.

In the two years since the company started promoting its Olympic connection, its products have gained a foothold in industries such as broadcasting, finance and entertainment, according to Vice-President of Marketing Dennis Martineau.

On the rise

The $30 million company recently closed a record $10.3 million quarter — up 47% over last year's comparable period — and is looking to increase its 300-member work force by 15%.

Daniels started PSDI in his

Continued on page 88

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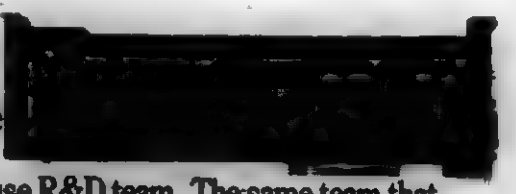

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Cullinet loses $3.9M in quarter

WESTWOOD, Mass. — Cullinet Software, Inc. last week reported what it has targeted as the last of its current series of losing quarters. The data base management software firm said its net loss, excluding a one-time charge, narrowed to $3.9 million, or 12 cents per share, compared with $5.4 million, or 17 cents per share, a year earlier.

Revenue in the third fiscal quarter ended Jan. 31 grew 21% to $54.2 million from $44.7 million in the year-earlier period. The company said international business was particularly strong and now accounts for 32% of Cullinet's revenue, up from 23% one year ago.

Revenue from the sales of new products, however, was down slightly, from $22.6 million a year earlier to $21.9 million. License renewal fees and service revenue grew 46% to $32.3 million.

Cullinet's actual net loss was $12.7 million, or 39 cents per share, reflecting a pretax charge of $13.7 million. That charge was attributed to the write-down of project management software product assets that Cullinet acquired when it bought Planning Control International, Inc. in 1987 [CW, Feb. 8]. Analysts called the write-off an attempt by Cullinet to "clear the decks" for a return to profitability.

Last week, however, the company said its return to the black in the current quarter ending April 30 will depend on customer acceptance of new products, especially the new version of its flagship program IDMS/R supporting SQL-based on-line query and data retrieval.

Toxics ruling hits chip makers

BY J. A. SAVAGE
CW STAFF

California semiconductor and computer manufacturers using toxic chemicals, such as the arsine gas and heavy metals used in chip making, will be required this week to begin warning their employees and surrounding communities that those chemicals may cause cancer and birth defects.

The warning requirements are a result of a 1986 California ballot measure aimed at providing safe drinking water and implementing toxics enforcement. Despite heavy industry opposition, the measure passed overwhelmingly.

Although the enactment was drafted by environmentalists, many say this initial phase will do little good. "It will only remind people who are otherwise unaware that they are dealing with dangerous chemicals," said Dennis Hayes, author of *Running Amok in Silicon Valley*, a forthcoming book about environmental hazards in the high-tech region of California.

Companies reported that they will probably fulfill the requirement for notification of the community by running monthly advertisements in local newspaper classified sections.

Arthur Andersen opens CIM center

BY JEAN S. BOZMAN
CW STAFF

EVANSTON, Ill. — Seeking to showcase and market its computer-integrated manufacturing (CIM) expertise to the MIS community, Arthur Andersen & Co. earlier this month opened a CIM demonstration center, sponsored by Northwestern University, in a 24-acre research park.

"We needed to create an environment, and a place, where people could come to examine CIM technology for two to three days," said James K. Burns, managing partner in charge of systems integration for Arthur Andersen's international organization.

The CIM center, called the Systems Integration Center, includes a demonstration area for factory-floor technology and a conference center for MIS and senior management teams from current or prospective Arthur Andersen clients.

International site

Burns said the center will serve as Andersen's international site for systems integration research, CIM briefings for clients, multivendor CIM seminars sponsored by Arthur Andersen and training in CIM techniques.

No money need change hands at the Systems Integration Center. It will serve as a backdrop for Arthur Andersen's continuing activities in computer systems research, Burns said. For its part, Northwestern University plans to contribute its professors and resources to Arthur Andersen's CIM seminars at no cost.

"This research park is an opportunity for us to take good science and to make it go — through applications to business needs," Northwestern University President Arnold Weber said.

The center's exhibits will, however, underline Arthur Andersen's ability to mix and match offerings from various vendors. The four-story center houses a demonstration factory stocked with donated equipment from 35 hardware vendors, including IBM, Digital Equipment Corp. and Hewlett-Packard Co.

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Olympian

CONTINUED FROM PAGE 85

mid-20s out of a passion for order and an interest in the construction industry that he developed as a student at MIT. Between the early 1970s and the early '80s, he said, annual growth always topped 20%, usually running between 30% and 100%. PSDI rarely ran an ad, Daniels said.

The software virtually sold itself — first to the construction industry, then to large utility companies.

Even customers' woes turned into profits for PSDI. When the 1982-'83 energy crisis "stopped construction cold, we went into outage maintenance, using Project/2 to manage plants during their down cycles," Daniels said. When the government cracked down on utilities, PSDI segued into prudency audits.

In 1980, the aerospace and defense sector discovered Project/2, and PSDI became project manager for the space shuttle program. Daniels assumed that his start-up days were behind him.

'Brick wall'

"Then, suddenly, we hit a brick wall," Daniels said. "Suddenly, it was 'Here come the micros!' and everything changed. This company was built on renting our software — all of a sudden, nobody wanted to rent software anymore. Project/2 started looking too hard to use and too expensive. We had to get into gear and enter the low-end market — very quickly, and with a rather important product." Enter Qwiknet Professional.

Daniels started the microcomputer group that developed that product, hiring new developers and a new sales staff. But today, the two-culture concept is just a memory at PSDI. "We've discovered that we're dealing with complementary markets, not separate ones," Daniels said. "In fact, about 60% of our PC sales come from our mainframe customers."

DEC recently announced a System Cooperative Marketing Program agreement with PSDI, making the Cambridge company the first DEC partner able to sell hardware as well as software in the project management market.

On the same day, Oracle Corp. announced a renewed and intensified relationship with PSDI that will let the latter offer its users full-function Oracle relational data bases.

Even as the Olympics are helping PSDI expand the public image of its market, the company is expanding its marketing operations increasingly into Europe and Asia. "We're introducing project management to people who can't even say it," said Daniels, who projects that 30% to 35% of PSDI's revenue will come from overseas markets by the early 1990s.

"It's totally different — more like a real business," Daniels said of life at the helm of the "new" PSDI. "From around 1974 to 1984 — that was more like a dream world. Now, we work for a living every day."

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Cray

CONTINUED FROM PAGE 85

tem on its latest machine, the Y/MP/832 [CW, Feb. 15].

Cray, which has installed approximately 189 systems in its 16-year history, intends to support both operating environments on its Y/MP, X/MP, Cray-1 and Cray-2 systems. The firm does not expect to change its strategy when it unveils the Cray-3 and Y series, which it is expected to do within the next two years.

Some of the software-related funds will also be spent on computer-aided design packages for internal hardware development, Rollwagen noted. But Cray applications software development is expected to remain the province of third-party developers, a Cray spokesman said.

The increased emphasis on software R&D comes as Cray expands its traditional customer base from government and educational institutions to commercial users in the financial, telecommunications and manufacturing industries. Commercial users expect complete systems, unlike technical organizations, which often write custom software, Rollwagen said.

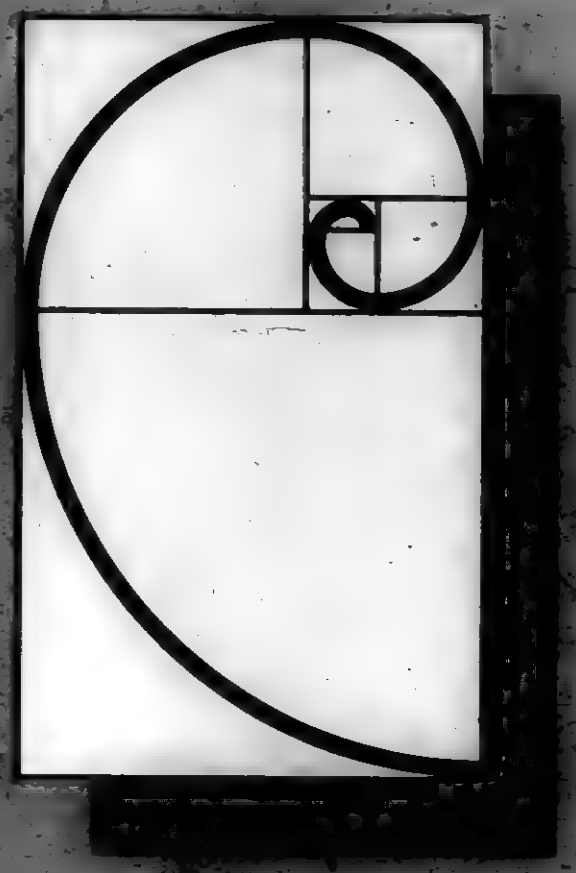
Gary Smaby, an analyst at Piper, Jaffray & Hopwood in Minneapolis, said Cray has no choice but to spend more on software if it is to diversify its customer base. "Future market opportunities will come from customers who typically do not do development in-house," he said.

In the firm's formative days in the mid-1970s, early customers such as the Los Alamos National Laboratory would devise their own operating system for Cray hardware. "When we started, we were a hardware company; our customers were able to take care of their own [operating] software needs. That's no longer true," Rollwagen said.

Last September, the company reorganized its software group under former Vice-President of Marketing Bob Ewald, who was named vice-president of software development. The changes occurred after the much-publicized departure of hardware designer Steve Chen to start his own company, Supercomputer Systems, Inc.

Increased emphasis on software development, in conjunction with its entrenched market position, should allow Cray to retain its advantage over Japanese rivals and near-supercomputer start-ups, Piper Jaffray's Smaby said. "There's a growing portfolio of applications that run on their machines that will help them maintain their high-performance lead," he said.

[illegible] the [illegible] RDBMSs for on-line applications.



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Wilder

CONTINUED FROM PAGE 85

size deals at ADAPSO conferences is certain to raise a few eyebrows.

And the season to find partners. As lively as things have been on the acquisition front, this year's joint development partnerships have really been hopping. If politics make strange bedfellows — which we will certainly see as the presidential primary season unfolds — the computer industry is fashioning entire new beds.

Since the curtain went up on 1988, we have seen DEC with Apple, AT&T with Sun (much to the chagrin of several key Unix vendors) and Microsoft with Ashton-Tate and Sybase. And let's not forget IBM with Steve Chen's supercomputer lab, even though that was struck last December.

Of course, technology partnerships are nothing new to the industry, but the rate at which major vendors are pairing up is notable. When rivals like Microsoft's Bill Gates and Ashton-Tate's Ed Esber share a press conference to praise each other, that's an eye-opener.

But each obviously perceives an even fiercer rivalry with Lotus. It's a lot like DEC and Apple sharing a big common enemy in IBM.

Why all the joining of hands? Look at the technologies involved. On several fronts, the industry is at the edge of defining new standards.

The implementations of Unix, SQL and OS/2 in the next 24 months, for example, may very well define the shape of the industry for the next five years. Needless to say, no major vendor wants to be left on the sidelines.

That is the fear driving DEC, Apollo, Hewlett-Packard and others to ensure that AT&T and Sun don't walk away with a proprietary Unix that locks them out. Don't be surprised to see two or more of those companies strike Unix development deals together. In 1988, technological necessity is the mother of partnerships.

And also starring . . . IBM last week filled in a hole left by its big executive shake-up and reorganization late last month. C. Michael Armstrong was named chairman of IBM World Trade Europe/Middle East/Africa, the post vacated by Kaspar V. Cassani when he was named one of IBM's two vice-chairmen. Armstrong will remain president of the World Trade Group as well as president directeur general of IBM Europe.

It's a very logical promotion and needn't be scrutinized for implications like the last announcement of Big Blue executive changes. But if you're wondering, yes, 49-year-old Armstrong has moved up fast through the ranks and is a man to watch.

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Ungermann-Bass

CONTINUED FROM PAGE 85

based on industry standards, according to a statement by Tandem President and CEO James Treybig.

"Tandem believes it will be a survivor as a full-line product supplier," said Susie Peterson, minicomputer analyst for First Boston Corp. "To become that, Tandem must connect to IBM and DEC, and that's what Ungermann-Bass gives them."

Gerald Held, Tandem's vice-president of new ventures, said Tandem considered becoming an OEM outlet for a LAN vendor but saw a fuller strategic fit with Ungermann-Bass. "We find large corporations are shifting from small LANs to large networks of LANs," he said. "As people move to on-line systems, you need to tie them together."

Merging networking firms

The merger is just one in an increasingly regular series of strategic partnerships between networking companies and larger computer companies, such as Unisys Corp.'s acquisition of Timeplex, Inc.

"It's eminently clear that networking has become a central part of data processing," said Glenn Pafumi, a technology analyst at Eberstadt Fleming, Inc. "But networking is still very difficult for an end user, so they're looking to their principal DP vendor to supply all things."

The merger fits neatly into the plans of Tandem's New Ventures Group, which was charged in 1985 with forging strategic business ties through joint ventures and acquisitions. The Ungermann-Bass deal is the second such alignment in the U.S. and the third overall.

"I think Tandem sees itself as a white knight protector of technology jewels," First Boston's Peterson said. "It's saying it will coddle the companies that it acquires; it won't rape and pillage the company on the first day."

The acquisition "preserves the integrity of both companies and gives Ralph Ungermann and his management a place to wander," added Harry Rosenthal, a communications analyst with Prudential-Bache Securities, Inc. "Plus, it enables Tandem to connect their computers to all kinds of different terminals."

The transaction has been approved by each firm's board of directors. Under the arrangement, Ungermann-Bass agreed to recommend its stockholders accept a cash tender offer by a newly formed Tandem subsidiary to acquire all 12.5 million outstanding shares of Ungermann-Bass's common stock at $12.50 per share.

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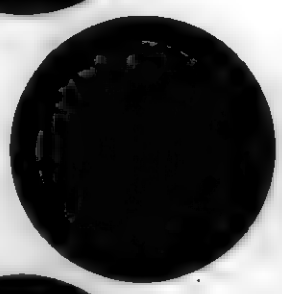
We're looking for a few good slogans — witty, relevant, SHORT (these are small buttons), and at least moderately clean. You may send in your entries on the form below or a copy.

But you may NOT send us everything that comes into your head. Our offices aren't big enough to handle all that paper! Please take the time to narrow down your ideas to the two best you can come up with (test them on your friends).

All entries will be shown to our panel of judges, who will be tied to their chairs until selections are complete. Six winning slogans will be picked, and everyone who sent in one of those slogans will be eligible for a prize. If you are the only one submitting a particular slogan that wins, you, of course, get the prize. However, if more than one person had the same intelligent idea, we'll pick the prize winner out of a hat. Prize winners will receive a $100 certificate good towards the purchase of software from a friendly neighborhood computer store.

All decisions of the judges will be final, and no representations as to their competence, skill, or sense of humor are being made. All entries will become the property of *Computerworld*. Deadline for entries is **March 18, 1988** at our offices in Framingham, MA.



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Take a look at what *Focus* has planned for 1988.

Computerworld Focus 1988 Schedule

Issue Date	Closing Date	Topic	Show Distribution
Jan. 6*	Dec. 4	Communications/ Connectivity	Communication Networks
Feb. 3	Dec. 31	Software Operating Systems & Languages	Uniforum
Mar. 2*	Jan. 29	Departmental Computing	Interface/ WCC
Apr. 6	Mar. 4	Data Security	
May 4	Apr. 1	Communications/ Connectivity	Comdex Spring/ ICA
June 1*	Apr. 29	PC End User Productivity	PC Expo
July 6	June 3	Software	
Aug. 3	July 1	Departmental Computing	
Sept. 7	Aug. 5	Communications	TCA
Oct. 5	Sept. 2	Software Productivity	Info '88/ Dexpo West
Nov. 2	Sept. 30	PC/Connectivity	Comdex Fall
Dec. 7	Nov. 4	Departmental Computing	

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COMPUTERWORLD FOCUS

Micro strategies unfold

COMPUTER CAREERS

Analysts' role definition murky

Opportunities abound for those who possess business, analytical expertise

BY ALAN RADDING
SPECIAL TO CW

The role of the systems analyst may be the least well-defined job in the computer industry. Programmers write code, MIS managers manage, but what exactly do systems analysts do?

While there may be disagreement over the particulars of the position, there is unanimity about opportunity.

"Demand is rising dramatically because of the missing ingredient — strong business analytical skills," says Martin Joyce, a partner in software development and networking services at Coopers & Lybrand's Boston office. Because of the expansion of computer technology, "There aren't enough mid-level people to go around," he reports.

"The problem is finding people who understand both business and computers," says David Block, MIS director at American Bakeries Co. in New York.

Demand high

Joyce agrees that the person who is "steeped in technology and can become an expert in the particular business" will find a great demand for his services.

The exact nature of the systems analyst's job varies according to the size of the organization, its computer sophistication, the style and approach of the company in general and the particular industry in which the company operates. Systems analysts might specify the system, write code and operate as business consultants.

"The systems analyst is someone who is well versed in a specialty from an applications standpoint and can work with users to define and develop system specifications for programmers and programmer/analysts," says Jim Combs, manager of Source EDP in Burlington, Mass.

At Coopers & Lybrand, a systems analyst understands financial services and possesses technical sophistication.

American Bakeries' Block prefers systems analysts who were programmers or, at least, are familiar with programming. The systems analyst must thoroughly comprehend the actual business, Block says, but "programming knowledge gives him scope and understanding."

In a small shop, the systems analysts are also the programmers. At William H. Sadler, Inc., a New York book publisher, systems analysts each work with their own group of departments to develop specifications and they then write the code, says MIS director Robert Kinney.

Because the job description for a systems analyst is so broad and varied, so too is the educational background required.

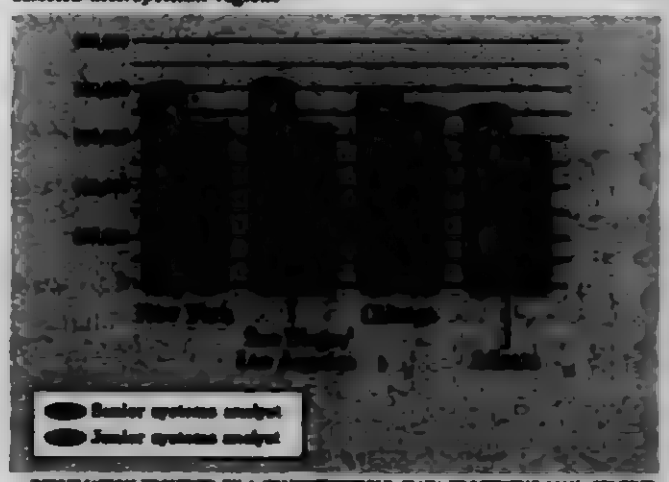
"Most companies want people with some kind of business background and computer science education," says Brian Leary, industrial relations management consultant at Robert Kleven and Co., a recruiting firm in Lexington, Mass.

Generally, systems analysts possess bachelor's degrees in computer science, although many may also possess a business degree and take computer courses along the way. Leary says that the MBA usually is not required by a hiring company.

Entry-level salaries start in the $20,000 to $25,000 range; those with an advanced degree and some business experience can start at more than $29,000.

How much you can make

1,500 MIS professionals rate systems analysts' annual salaries for selected metropolitan regions



INFORMATION PROVIDED BY A COMPUTERWORLD /DATA PROCESSING MANAGEMENT ASSOCIATION 1987 SALARY SURVEY
CW CHART

Salaries for senior people can reach above $40,000, but systems analysts generally do not make $50,000 unless they reach a supervisory level. The career path for a systems analyst may well lead to supervision, as a project leader, for example.

Because systems analysts are expected to possess a strong general business orientation and must acquire detailed knowledge of business operations, some recruiters say analysts are well positioned to move into general management.

Management path

"It's definitely a path to management. You get a good, broad understanding of the organization," Leary says. A systems analyst can "make a good impression on management."

At American Bakeries, Block sees good systems analysts moving toward computer systems management. "They'll go to higher levels of DP management and not necessarily move into general management," he says.

The experience of a computer-driven marketing firm in suburban Boston has led management to conclude that "typically, good programmers make terrible system analysts," says a senior account manager who supervises systems analysts for his clients' projects. The main problem with programmers who become systems analysts, he says, is that "they lack the user point of view."

Some companies, like Sadler, prefer to train their systems analysts in-house, while others, like American Bakeries, expect that all but entry-level candidates will be able to quickly get up to speed without much hand-holding.

Radding is a Boston-based author specializing in business and technology.

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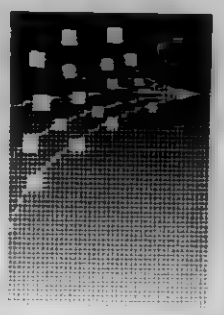

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Our environment includes an IBM 4381-P14, VM, DOS/VSE, DL1 and ADR's DATACOM/DB. We are installing an IBM 3090-J1 this year.

The successful candidate will be a self-starter, will enjoy keeping several tasks going at one time, and is able to support daily requirements while promoting steady improvements in database administration. Please send resumes to:

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You will interface with Users to compile system/program specifications, design/code/test/implement various Travel Systems, and maintain/enhance existing systems on an IBM system 370 architecture mainframe computer. At least 7 years experience with program development and analysis skills using COBOL, JCL, CICS, IBM Utilities, VSAM, TSO/SPF, LIBRARIAN and SDF/BMS is required. B.S. degree and experience with FOCUS, BAL and IMS is preferred.

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Will provide support for both on-line and batch business applications in a 24-hour-a-day, high volume, multi-CPU environment. Additionally, will troubleshoot applications and provide prompt on-site problem solving. Four years experience in a large scale MVS data processing facility and in-depth knowledge of JCL, TSO, CLISTS, and data center scheduling packages is required. Familiarity with DCMS, RACF and programming fundamentals is preferred.

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Interested applicants apply at the Texas Employment Commission, Dallas, TX. Or send resume to TEC, TEC Bldg., Austin, TX 78778. JO #5158120. Ad paid by an equal employment opportunity employer.

Computer Architect. Resp. for defining and developing implementation of performance estimation and measurement for data communications development; duties incl. definition and analysis of product requirements; development of performance evaluation models for communication architecture analysis; provide education and training in communication systems performance evaluation methodology; develop modeling project plans and tools for performance measurements; interface with software evaluation groups to define performance testing. Reqs. a M.S. in C.S. or E.E. and 4 yrs. exp. in O.S. Design/Analysis. Also req. knowledge of 370/XA architecture; familiarity with application of statistic processes/queuing theory in communication systems modeling and analysis; familiarity with simulation tools and techniques; knowledge of operating systems architectures and UNIX; knowledge of local area networks architectures; experience in data communication performance measurement and tuning. Salary: $1,000/wk. Contact: Jolanda Peterson, Immigration Administrator, 1290 East Argues Avenue, Sunnyvale, CA 94088 not later than March 8, 1988. Must have legal right to work.

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- Distribution industry applications
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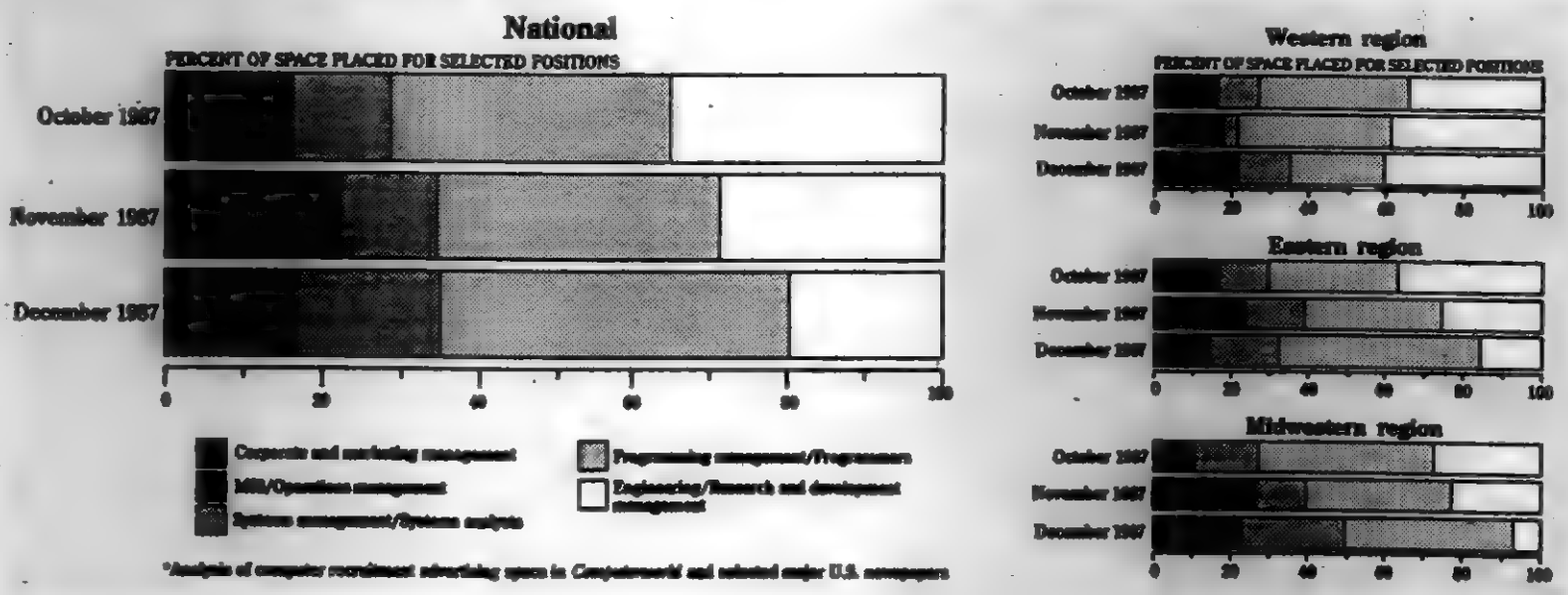
CAREER INDEX

Computer recruitment advertising activity*



*Analysis of computer recruitment advertising space in Computerworld and selected major U.S. newspapers

INFORMATION PROVIDED BY CW PUBLISHING, INC.'S RECRUITMENT MARKET RESEARCH DATA BASE
CW CHART

DATA BASE ADMINISTRATOR

ORACLE RDBMS

Adolph Coors Company-Shenandoah Brewery has an immediate opening for an innovative and ambitious individual with experience in relational database analysis, design, and programming. Will play key role in a team effort of developing new application systems using data driven approach. This is a state-of-the-art environment utilizing ORACLE RDBMS distributed across multiple DEC VAX computers.

Position requires a B.S. in Information Systems, Computer Science, or related degree with 2-5 years recent experience as a Data Base Analyst or Administrator in a relational environment, preferably ORACLE. Working knowledge of VAX/VMS and Fortran is also required. Background including Manufacturing and/or Engineering applications and project management experience preferred. Good communication and interpersonal skills are a must.

Our quality of worklife reflects Coors' innovative philosophy. If you would like a challenging career in addition to excellent salary and company paid benefits, send resume and salary history noting Department code on envelope, to:

ADOLPH COORS COMPANY
Shenandoah Brewery
Dept. DW
P.O. Box 25
Elkton, Virginia 22827

DATA BASE ANALYST

Do you prefer a rural lifestyle, but don't want to sacrifice a state-of-the-art work environment? At Brockway Inc., a Fortune 500 packaging leader, you can have your cake and eat it too!

We are seeking an experienced Data Base Analyst at our data center located in Northwestern, PA. Primary responsibilities include design and implementation of IDMS data bases, assisting with performance/tuning and installation/upgrades of IDMS software. As a member of the data management team, you will also provide guidance to other MIS groups on the use of ADSI/O and multiple data dictionaries.

This position requires strong background in IDMS data base design/implementation, ADSO, IDD and the use of IDMS compilers and utilities.

Together with ample opportunities to develop your professional skills, we offer competitive salaries and excellent benefit programs including relocation assistance. For confidential consideration, please send your resume to:

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Computer Professionals: Some people, in time and with help, manage to conquer their shortcomings.

If you happen to be a little short...in experience and know-how, that is no reason why you cannot begin now to achieve your long-range ambitions.

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The biggest tactical error you can make is to attempt career advancement on your own...leading, perhaps, to your own Waterloo.

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- UNIX INTERNALS
- ADA SOFTWARE
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- VAX/DECNET/Ethernet
- INTEL 310/30/C/COMM
- RMX 286/ PL/M /ASM
- HONEYWELL DPS/COBOL

Forward resume to D. Sierra.

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If you qualify, call Howard Levin or Maureen McCue at 800-222-0153 or (in NJ) 609-667-4488, or send your resume to either address listed below. Our client companies pay all costs.

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Member Firm
computer/net

COMPUTER SPECIALIST--IDMS SAUDI ARABIA

U.S.- Saudi Arabia Joint Commission on Economic Cooperation seeks a U.S. citizen for a two year (with possible renewal) position with USDOT's TRANSPORT Project in Riyadh. Apply only if you have the required background. Benefits: salary + differentials up to 25%; base salaries in GS-14 range: $46,000-$80,000.

Individual will be responsible for the day-to-day activities, support and technical implementation of the IDMS database environment, utilizing an IBM 3081 system. Working with the Ministry of Communications, the specialist will develop systems design and standard procedures, prepare documentation and train users.

Qualifications: B.S. degree in computer science, math, business, accounting or related fields; min. 10 yrs experience in a mainframe environment, with 5 yrs in an IDMS environment. Good communications skills and ability to train others are also required.

To apply: Send five copies of resume and five copies of typed SF-171 form available from any federal government, except post offices, as well as a letter of intent to P.A. Hemington, Suite 910, 1730 Rhode Island Ave. NW, Washington, DC 20036 no later than April 15, 1988.

EOE

SACRAMENTO
& the Sierra Foothills

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- Systems Programmer UVS, CICS, VM/CMS
- Software Engineers 68000, C, Pascal
- Software Engineers Point of Sale, UNIX, C

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A Bottling System

SENIOR SYSTEMS ANALYST

Coca-Cola Enterprises, Inc., the world's largest bottler of soft drink products, has created a new position in the systems area. The primary duties are as follows:

- Lead analyst in development of new financial systems
- Design and enhancement of current financial consolidation systems
- Develop internal and external financial reports for senior management
- Primary interface with Vice President-Controller

This new, exceptional opportunity requires an individual with the following credentials:

- Minimum 8 years experience in financial systems with emphasis on financial consolidation and reporting
- 4 year degree/MBA Finance preferred
- Familiar with IBM/MVS environment
- Excellent communication skills
- Advancement potential

Compensation and benefits are excellent. If interested, please send your resume and salary history to:

Coca-Cola Enterprises
A Bottling System

Department SM7-36
CCE-TSD
P.O. Box 1778
Atlanta, GA 30301
An Equal Opportunity Employer

"The bottom line is results. What I'm seeing, thanks to Computerworld, is beyond our expectations."

— Max Steiner
Director of Marketing
Kenda Systems, Inc.

Max Steiner remembers his days as a salesman, when he would make calls and, invariably, see a copy of *Computerworld* on the desks of his clients. That alone made an impression on Max.

Today, he is Director of Marketing for Kenda Systems, a software services firm with offices in New England, New York and Washington, DC, and specializing in placing contract engineers within the high-tech industry. Having grown by 400 percent annually for the last three years — and having placed several hundred professionals in less than three years, Kenda Systems is an acknowledged leader in the industry.

The impression that *Computerworld* has made on Max early on has been a lasting one. He directs Kenda's advertising. And he directs it to *Computerworld*.

"We are looking for national exposure. First, we want to make people aware of Kenda Systems and then increase the number of resumes sent to us. I believe that greater recognition will lead to greater interest — and understanding of what we can do for people.

"It only follows that we can best accomplish our goals by advertising with the industry leader — it answers all our needs. Computerworld reaches the qualified software professionals we're looking for.

"And we have the proof. We've seen as much as a 30 percent increase in resumes coming into our offices. Plus we're getting everything we hoped for: national recognition and responses from top people from all over the country. Clearly, we're quite pleased with the results.

"We're hearing from software engineers who are impressed with the fact that Kenda's in Computerworld. *The bottom line is results. What I'm seeing, thanks to* Computerworld, *is beyond our expectations."*

Computerworld. We're helping serious employers and qualified information systems, communications and PC professionals get together in the computer community. Every week. Just ask Max Steiner. For all the facts on how Computerworld can put you in touch with qualified personnel, call your local Computerworld Recruitment Advertising Sales representative today.

Weekly. Regional. National. And it works.

BOSTON: 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (617) 879-0700

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WASHINGTON D.C.: 3022 Javier Road, Suite 210, Fairfax, VA 22031 (703) 573-4115

CHICAGO: 10400 West Higgins Road, Suite 300, Rosemont, IL 60018 (312) 827-4433

LOS ANGELES: 18004 Sky Park Circle, Suite 100, Irvine, CA 92714 (714) 250-0164

SAN FRANCISCO: 18004 Sky Park Circle, Suite 100, Irvine, CA 92714 (415) 322-3314

An IDG Communications Publication

"For Source Edp, Computerworld is a people-and profit-puller."

Dave Grinnell
Vice President & Ad Director
Source Services Corporation
Mountain View, CA

Dave Grinnell is Vice President and Advertising Director of Source Services Corporation, the parent company of Source Edp, the world's largest recruiting firm that specializes in the computer profession. Source Edp has been an advertiser in Computerworld — almost from inception of the publication. Here's why:

"With its fantastic pass-along circulation, Computerworld not only reaches executives in computer management, but programmers, systems analysts and other individual contributors that are in particular demand by our client firms. It helps us reach the heart of our candidate base efficiently."

"Not only does Computerworld reach our market, but it reaches a market that's actively interested in computing and fostering their career growth. Conservatively, over the years, we have helped many thousands of Computerworld readers find new positions within the computer profession; many times more than those readers of other technology or trade publications. How do we know? We have an elaborate tracking system that helps us verify from which media respondents see our ads. Typically, Computerworld generates over four times more respondents who eventually are placed in new positions by Source than the next nearest computer industry publication."

"Because we're national in scope, we need the coast-to-coast coverage and support that Computerworld offers our 75 office network. We've helped Computerworld readers find candidates or move from Houston to Rochester, NY. . . . from Seattle to Miami . . . you name it. That's something that local newspapers, local radio and other media we also use can't accomplish for us with as much direct success."

"In short, why do we depend on Computerworld? First, it's profitable reading for employers. Second, it's profitable reading for those seeking new employment. And third, through our services, it's also profitable reading for us. It's a 'win-win-win' situation for all."

Computerworld. We're helping employers, top professionals and people who help them get ahead get together. Every week. Just ask Dave.

For all the facts on how Computerworld can put you in touch with qualified personnel, call your local Computerworld Recruitment Advertising sales representative.

COMPUTERWORLD

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Irvine, CA 92714. (714) 261-1230

SAN FRANCISCO: 18004 Sky Park Circle, Suite 100,
Irvine, CA 92714. (415) 322-33314

An IDG Communications Publication

"We filled 75% of the positions with responses from our first ad in Computerworld."

Bjorn Nordemo
Vice President
Data Arts & Sciences, Inc.
Weston, MA

Bjorn Nordemo is Vice President of Data Arts & Sciences, Inc. (DASI), a contract software agency based in Weston, MA. Although they place people in permanent positions, DASI most often places 'contract programming personnel' — consultants who fit special niches for short or long term commitments in corporations in the New England area.

"Our agency specializes in finding computer consultants — designers of systems, evaluators of hardware and software requirements, and computer programmers to mention a few. We recently were introduced to Computerworld as a potential source for finding these consultants," states Bjorn. *"I liked the idea because I know Computerworld has a broad reach — from MIS/DP directors to computer programmers, in multiple industries and multiple markets — and that's what DASI needs."*

"We had four specific positions for MIS/DP consultants that we needed to fill in northern New England. We used the local newspaper on a weekly basis, but people who are willing to move usually aren't reading the local Sunday paper. So, I felt this was a perfect opportunity to try Computerworld," says Bjorn.

According to Bjorn, he's quite satisfied with the results. *"From Computerworld, we filled 75% (3 out of 4) of the positions with the responses from the first week, and the remaining position with the response from the following week. These results alone made my ads in Computerworld worthwhile."*

And Bjorn also recognizes a second benefit to advertising in Computerworld. *"The beauty of using Computerworld is that it's read by people in the computer industry who have a need for consultants, as well as being read by consultants who need to keep up to date on the marketplace,"* says Bjorn. *"So we not only reach qualified candidates to fill our current openings, but we are creating awareness of the services that DASI has to offer,"* says Bjorn.

"We have some great plans for expansion and as we do, Computerworld is going to play a strong hand in helping us accomplish our goals," concludes Bjorn.

Computerworld. We're helping employers and top professionals get together in the computer community. Every week. Just ask Bjorn.

For all the facts, call your local Computerworld Recruitment Advertising Sales representative.

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Sales Offices

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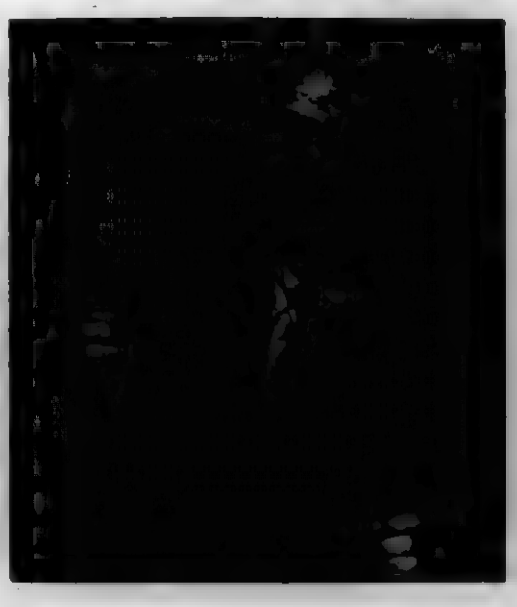
"...Computerworld has proved to be one of the most effective media for reaching our high-tech target groups."



— Michael Gill
Senior Vice President/
Creative Director
Thompson Recruitment Advertising

Michael Gill is Senior Vice President and Creative Director of Thompson Recruitment Advertising, based in Los Angeles, California. In 1986, Thompson won more EMA awards than its three largest national competitors— combined. The company's advertising goal is a simple but demanding one: To create the most effective recruitment advertising in the marketplace.

Thompson can point to many reasons for its success. And one of the first that comes to mind, Michael says, is Computerworld and its Employment Today section.

"Today's job market continues to change rapidly. It's no longer enough to merely post a job and hope that people will come running. This new competitive marketplace demands that we use many new approaches and do a lot more research. Simple demographics just aren't enough any more. Fortunately, Computerworld understands this need for research that goes beyond numbers alone.

"For us, Computerworld has proved to be one of the most effective media for reaching our high-tech target groups. We've discovered that it is must-reading for many of the high achievers that our clients want to attract.

"In fact, we recommend Computerworld to our clients because we know that it will reach prospects most effectively. Among other benefits is the quality of the publication itself, which reinforces the quality of our campaigns.

"The successful recruiter knows that today's marketplace is highly competitive, and that tomorrow's marketplace will be even more so. At Thompson, we expect that tomorrow, as today, Computerworld will be an invaluable ally in helping us to achieve our mission of creating the most effective recruitment advertising in the marketplace."

Computerworld. We're helping employers and top professionals get together in the computer community. Every week. Just ask Michael.

For all the facts on how Computerworld can put you in touch with qualified personnel, call your local Computerworld Recruitment Advertising sales representative.

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An IDG Communications Publication

MARKETPLACE

No supply woes for PC, Mac

IBM, Apple, Compaq micros lead the way to new trading record

BY ELIZABETH LOZANO
BOSTON COMPUTER EXCHANGE CORP.

The used microcomputer market experienced heavy trading in the week ended Feb. 12, as supply conditions improved for IBM Personal Computer and Apple Computer, Inc. Macintosh Plus buyers.

IBM's PC XT Model 089 and PC AT Model 339, Compaq Computer Corp.'s Deskpro 386 and Apple's Mac Plus led the way in sales as the market set a new high in trading volume for the year.

The AT Model 339 remained a hot commodity on the Big Board. This model, complete with a monochrome monitor and adapter, closed even at $3,350, trading under more favorable supply conditions than it has previously.

The less powerful AT Model 099 closed up $50, at $2,350, with machines appearing in only small quantities. The XT lines performed well throughout the week, closing up an average of $50. The XT Model 089 brought a price of $1,750, and the Model 086 traded at $1,350.

PC buyers expressed pleasure with the increase in availability during the week. The two-floppy drive IBM PC Model 076 closed even at $800, with demand evenly matching supply.

ALL THE Mac wizards will probably not be able to perform their magic with this machine, and sales will continue to be low until there is more software available for the Mac SE.

In the Compaq arena, the Deskpro 386 and the Portable III were in extreme demand during the second week of the month. The Deskpro 386 "wonder box" closed even at $4,325, as new equipment vendors' discount prices held this model's used value from rising.

The Portable III traded up at $2,725, experiencing a supply shortage. In contrast, Portable II supply conditions improved during mid-week, leading this machine to trade at a marginally lower price of $1,650.

Compaq's first claim to fame, the Portable I, brought a price of $750 during the week. Overall, the unit experienced steady market conditions. Market players predict continued success for the Houston-based manufacturer, as used market demand is currently growing exponentially with Compaq's new equipment sales.

Macs stay even

The Mac Plus traded actively early in the week. However, this popular model ended up closing even, at $1,250. Volatile supply conditions forced trading volume down toward the end of the week.

The Mac 512 and 512E closed even as well, at $825 and $975, respectively, with a steady supply to meet demand.

The BoCoEx Index

Closing prices report for the week ending Feb. 12, 1988

	Closing price	Recent High	Recent low
IBM PC Model 076	$800	$875	$675
XT Model 086	$1,350	$1,550	$750
XT Model 089	$1,750	$1,875	$1,000
AT Model 099	$2,350	$2,400	$1,950
AT Model 339	$3,350	$3,600	$2,400
Compaq Portable I	$750	$875	$600
Portable II	$1,650	$1,950	$1,475
Portable III	$2,725	$3,000	$2,175
Plus	$1,250	$1,400	$975
Deskpro 286	$2,375	$2,500	$2,050
Deskpro 386	$4,325	$4,600	$4,000
Macintosh 512	$825	$900	$675
512E	$975	$1,075	$800
Plus	$1,250	$1,350	$950
SE	$1,875	$2,150	$1,700
II	$4,000	$4,200	$3,500

INFORMATION PROVIDED BY THE BOSTON COMPUTER EXCHANGE CORP.

The newer Mac models, the SE and the Mac II, experienced opposite conditions. The SE closed at $1,875 with an increase in demand, and the MacII closed at $4,000 with a decrease in demand.

All the Mac wizards will probably not be able to perform their magic with this machine, and sales will continue to be lower than anticipated until there is more software available for the Mac SE.

The Boston Computer Exchange can be reached at 800-BOCOEXX or 617-542-4414 in Massachusetts.

Availability of IBM storage devices varies according to who is buying

BY ROBERT CALLERY
IDC FINANCIAL SERVICES CORP.

Activity on the secondary market for IBM 3380 storage devices has been lively. Many users are taking advantage of falling used prices by adding disk drives to their shops. However, many large users are opting to increase capacity and save floor space by going directly to IBM for the newly announced high-capacity 3380 Ks.

Since mid-November, the 3380 AE has declined in value by 19%, and the 3380 BE4 has dropped 13%. This can be directly attributed to the availability and shipment of IBM's new high-capacity 3380 K model. Announced in September, the 3380 K offers 50% more capacity, requires an equivalent amount of floor space and promises increased performance when compared with the 3380 E.

With shipments of the 3380 K commencing, many users have replaced their 3380 E disk drives with this product. One way users seem to be making room for the direct-access storage device (DASD) is by disposing of their older equipment in the secondary market.

IBM 3380 disk drives

Current fair retail market value

BE4	4Q 1988	$[illegible]	5Mb	2.5
AE4	2Q 1988	$[illegible]	5Mb	2.5
BE4	1Q 1988	$[illegible]	4Mb	2.5
AE4	4Q 1987	$[illegible]	4Mb	2
BE4	3Q 1988	$[illegible]	7Mb	3
AE4	4Q 1987	$[illegible]	7Mb	2.5
BE4	4Q 1987	$[illegible]	7Mb	2.5
AE4	4Q 1987	$[illegible]	10Mb	7.5
BE4	4Q 1987	$[illegible]	10Mb	7.5

INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

Ripple effect

As more and more users abandon their equipment on the secondary market, the supply of 3380 E models will likely increase, and prices will fall. This is sure to have a ripple effect on the rest of the high-capacity DASDs on the market.

Much like the effect a pebble has on a calm pond, falling prices at the high end of a product line ripple through to products of less capacity, speed or performance. This is the case with the 3380 D.

As 3380 E drives become more readily available in significant quantities, and prices continue to fall, the 3380 D models look less and less attractive. Prices of the 3380 AD have fallen 33% since mid-November. The add-on 3380 BD has fared slightly better, losing only 22% of its value during the same time period.

This trend is expected to continue as 3380 Es values decline and IBM pushes sales of its new 3380 J models.

MUCH LIKE the effect a pebble has on a calm pond, falling prices at the high end of a product line ripple through to products of less capacity, speed or performance. This is the case with the 3380 D.

The 3380 J, announced in September, offers 2.5G bytes of storage, the same as the 3380 D, with faster access times, upgradability to the 3380 K and quadpathing.

Contributing to the demise of the 3380 D are falling prices of the original members of the 3380 family of disk drives, the 3380 AA4 and the B4.

Throughout the first half of 1987 and into the fourth quarter, the 3380 standard drives, the 3380 AA4 and B4, remained very stable. Prices actually rose throughout the third quarter as users took advantage of the inexpensive cost per megabyte and caused the supply of machines to dry up.

During the fourth quarter of 1987, the standard 3380s experienced their first decline of the year, with the 3380 AA4 falling 22% and the B4 falling almost 35%.

The supply of these models is increasing daily as users opt for newer products in the 3380 family. Market research firm International Data Corp. expects prices of standard drives to continue falling throughout the rest of the year as prices of the Model E and D also decline.

With IBM aggressively marketing its new storage products, there will be many opportunities for users to save money by taking advantage of low prices on used equipment.

For more information, contact IDC Financial Services Corp.'s Terri LeBlanc at 617-872-8200.

Used Equipment

RA81 HDA

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• FULL SYSTEM TESTING	• BUILT TO NEW OEM SPECIFICATIONS
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• OPTIONAL EXTENDED WARRANTY	
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DATASAT

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Digital

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- **A Performance Pledge**—Our guarantee that your equipment is certified eligible for DEC maintenance at the site and time of installation or we'll bring it up to eligible status by repair or replacement at our cost.

If you prefer, you may select **MERIDA'S FULL 90 DAY PARTS AND LABOR GUARANTEE.** Merida will, at our expense, repair, replace or refund the purchase price of any equipment found defective within 90 days of delivery.

We can't guarantee that you'll never have a problem. But we can guarantee that if you do, we'll make sure you're protected. It's our commitment to you.

FOR MORE INFORMATION ON MERIDA'S EXTRA MARGINS OF PROTECTION, CALL US TODAY!

*Please note that certain restrictions may apply depending upon your particular requirements and equipment.

dda
DIGITAL DEALERS ASSOCIATION

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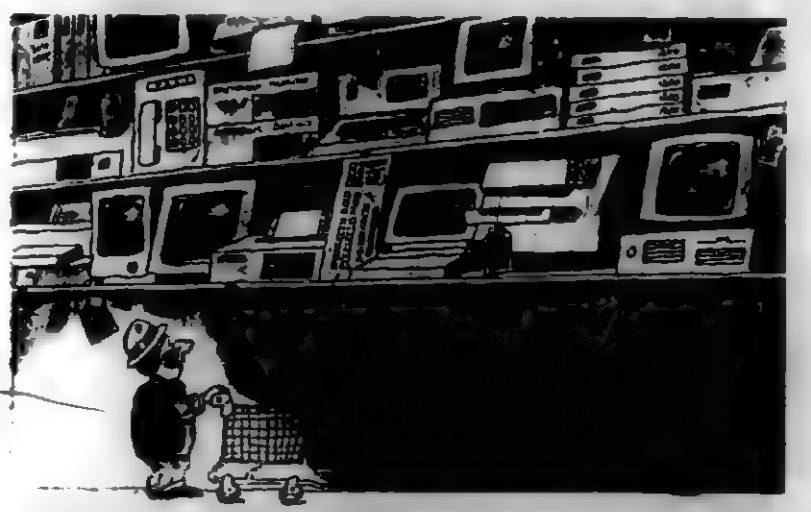

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Issue Date	Topic	Ad Closing Date
March 14	DBMS	Feb. 26
March 28	Micro-to-Host-Links	March 11
April 11	PCs (IBM-Compatible) Portables/Laptops	March 28
April 25	TBA	April 8
May 9	Printers	April 22
May 23	Data Communications	May 6
June 6	CASE	May 20
June 20	The SNA Market	June 3
July 11	Disaster Prevention & Recovery Products & Services	June 24
July 25	Productivity Software	July 8

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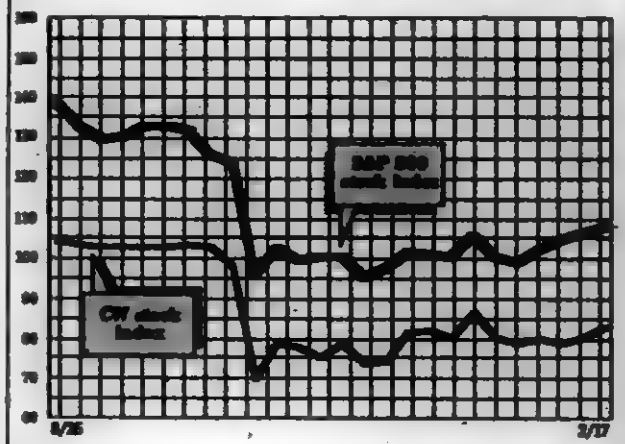

Indexes	Last Week	This Week
Communications	86.6	89.3
Computer Systems	91.1	92.1
Software & DP Services	92.3	95.7
Semiconductors	55.9	56.8
Peripherals & Subsystems	80.3	81.0
Leasing Companies	102.6	110.3
Composite Index	80.3	82.7
S&P 500 Index	106.1	107.1

Communications

Computer Systems

Software and DP Services

Semiconductors

Peripherals and Subsystems

Leasing Companies

CW CHARTS

Computerworld Stock Trading Summary

CLOSING PRICES THURSDAY, FEBRUARY 17, 1988

EXCH		PRICE 52-WEEK RANGE (1)		CLOSE FEB. 17 1988	WEEK NET CHANGE	WEEK PCT CHANGE
Communications and Network Services						
N	AMERICAN INFO TECHS CORP	100	74	98.25	-1.4	-1.5
O	ANDREW CORP	19	11	15.00	1.3	9.1
O	ARTEL COMM CORP	5	2	1.50	0.0	0.0
N	AT&T	38	29	29.25	-0.5	-1.7
O	AVANT GARDE COMP INC	6	2	1.88	-0.1	-4.3
O	AVANTEK INC	10	6	6.88	0.0	0.0
N	AYDIN CORP	28	16	20.38	0.1	0.5
N	BELL ATLANTIC CORP	83	61	70.50	-2.5	-3.5
N	BELLSOUTH CORP	44	32	40.00	-1.5	-3.7
O	COMPRESSION LABS INC	6	2	3.50	0.0	0.0
O	COMPUTER NETWORK TECH	6	2	1.81	0.1	7.4
O	CONTEL CORP	40	26	32.75	-1.5	-4.7
O	DATA SWITCH CORP	8	4	6.38	0.5	8.5
O	DIGITAL COMM ASSOC	48	22	28.50	0.0	0.0
O	DYNATECH CORP	45	14	20.00	1.0	5.3
O	FIBRONICS INTERNATIONAL INC	11	3	2.50	0.1	5.2
O	GANDALF TECHNOLOGIES	11	3	5.88	0.4	8.6
O	GENERAL DATACOMM INDS	14	3	3.63	0.1	2.8
O	GTE CORP	45	35	37.88	-0.4	-1.0
O	INFOTRON SYS CORP	12	6	7.25	0.5	7.4
N	ITT CORP	68	49	49.88	0.5	1.0
N	M A COM INC	18	7	10.13	-0.3	-2.4
O	MCI COMMUNICATIONS CORP	12	5	10.88	0.1	1.2
O	MICOM SYS INC	17	7	10.88	0.4	3.8
O	NETWORK SYS CORP	19	7	7.75	0.5	6.9
N	NORTHERN TELECOM LTD	34	14	19.00	0.8	2.4
O	NOVELL INC	32	12	22.00	2.8	14.3
N	NYNEX CORP	72	58	68.38	-1.6	-2.5
N	PACIFIC TELESIS GROUP	34	9	28.75	-1.1	-3.8
N	PARADYNE CORP	9	4	4.88	0.5	11.4
A	PENRIL CORP	6	1	3.38	0.1	3.8
N	PLESSEY PLC	41	28	28.25	0.5	1.9
N	SCIENTIFIC ATLANTA INC	20	9	12.50	-0.4	-2.9
N	SOUTHWESTERN BELL CORP	48	22	37.13	-1.5	-3.9
O	3 COM CORP	28	12	20.63	2.8	16.7
N	TIMEPLEX INC	41	17	32.25	0.0	0.0
N	UNGERMANN BASS INC	15	6	12.25	3.5	44.1
N	U S WEST INC	80	63	88.63	-1.1	-2.1
Computer Systems						
O	ALLIANT COMPUTER SYS	37	5	7.00	0.1	1.8
O	ALPHA MICROSYSTEMS	6	3	4.00	-0.1	-3.0
O	ALTOS COMPUTER SYS	17	9	10.63	0.1	1.2
A	AMDAHL CORP	50	19	35.38	2.3	6.9
O	APOLLO COMPUTER INC	35	9	12.88	-0.3	-1.9
O	APPLE COMPUTER INC	60	28	41.88	0.8	2.1
O	BOLT BERANEK & NEWMAN	30	12	13.38	-0.5	-3.6
N	BRITTON LEE INC	6	1	1.38	0.0	0.0
O	COMPAQ COMPUTER CORP	70	28	47.50	1.3	2.7
O	COMPUTER AUTOMATION INC	17	5	11.88	-1.1	-8.7
O	COMPUTER CONSOLES INC	11	2	4.75	-0.1	-2.6
O	CONCURRENT COMP CORP	34	11	17.25	0.5	3.0
O	CONTROL DATA CORP DEL	36	15	24.25	2.0	9.0
O	CONVERGENT TECH	12	3	3.38	0.3	8.0
O	CONVEX COMPUTER CORP	22	6	6.88	-0.3	-4.5
O	CRAY RESH INC	135	47	78.13	2.3	4.3
O	DAISY SYS CORP	13	6	7.00	0.0	0.0
N	DATA GEN CORP	39	16	27.13	-0.3	-0.9
N	DATAPOINT CORP	9	3	4.13	0.3	6.5
N	DIGITAL EQUIP CORP	200	110	120.88	0.4	0.3
N	FLOATING POINT SYS INC	17	3	3.88	-0.1	-3.1
N	GOULD INC	24	8	10.50	-0.4	-3.6
N	HARRIS CORP	43	22	28.88	1.1	4.1
N	HEWLETT PACKARD CO	74	38	57.50	0.3	0.4
N	HONEYWELL INC	91	48	84.75	2.8	3.1
N	IBM	176	102	112.75	1.1	1.0
O	INFORMATION INTL INC	17	9	11.25	-0.3	-2.2
O	IPL SYS INC	3	1	2.13	0.4	21.4
O	MASS COMPUTER CORP	14	8	8.00	0.4	5.7
N	MATSUSHITA ELEC INDL LTD	196	93	177.50	3.5	2.1
O	MEGADATA CORP	7	3	2.88	-0.3	-9.0
O	MENTOR GRAPHICS CORP	39	14	23.88	1.9	8.5
N	MSI INC	14	4	4.13	0.1	2.1
N	NCR CORP	87	60	62.25	3.4	5.7
N	PRIME COMPUTER INC	31	12	17.75	-0.1	-0.7
O	PYRAMID TECHNOLOGY	12	5	7.75	-0.4	-4.8
O	STRATUS COMPUTER	41	18	24.00	0.3	1.1
O	SUN MICROSYSTEM INC	48	19	33.00	0.1	0.4
O	SYMBOLICS INC	6	1	1.44	-0.1	-8.0
N	TANDEM COMPUTERS INC	28	17	18.50	-0.5	-2.8
N	TANDY CORP	57	28	38.00	2.5	7.0
N	ULTIMATE CORP	37	15	15.75	0.0	0.0
O	UNISYS CORP	48	34	34.50	0.0	0.0
A	WANG LABS INC	19	10	14.38	0.0	0.0
Software & DP Services						
O	ADVANCED COMP TECH	6	1	1.50	-0.1	-7.7
N	ADS COMPUTERS INC	20	11	15.00	0.0	0.0
O	AMERICAN MGMT SYS INC	20	9	16.75	1.8	11.7
O	AMERICAN SOFTWARE INC	22	6	9.88	0.3	2.6
N	ANACOMP INC	11	4	7.63	-0.1	-1.8
O	ANALYSTS INTL CORP	10	4	6.75	-0.3	-3.6
O	ASHTON TATE	33	13	24.75	-0.3	-1.0
O	ASK COMPUTER SYS INC	17	6	11.50	0.9	8.2
O	AUTODESK INC	34	12	19.25	1.5	8.5
N	AUTO DATA PROCESSING	66	16	43.75	1.8	4.2
O	BOOLE & BABBAGE INC	12	5	7.75	-0.3	-3.7
N	COMPUTER ASSOC INTL INC	37	15	28.88	-0.1	-0.4
O	COMPUTER HORIZONS CORP	15	7	9.25	0.3	2.8
N	COMPUTER SCIENCES CORP	73	42	50.50	1.8	3.6
R	COMPUTER TASK GROUP INC	17	9	9.50	-0.1	-1.3
O	COMSHARE INC	28	12	14.00	0.5	3.7
N	CULLINET SOFTWARE INC	14	4	6.13	0.3	4.3
O	CYCARE SYS INC	10	6	7.88	0.0	0.0
O	DUQUESNE SYS INC	33	10	19.75	1.3	6.8
A	DATA ARCHITECTS INC	17	7	9.50	0.1	1.3
N	GENERAL MTRS (CLS E)	51	30	36.88	-0.6	-1.7
O	HOGAN SYS INC	17	5	4.50	0.0	0.0
O	INFORMIX CORP	31	12	23.00	2.8	13.8
O	INTELLICORP INC	11	3	2.75	0.0	0.0
O	KEANE INC	16	6	7.50	0.0	0.0
O	LOTUS DEV CORP	40	19	38.25	2.3	6.3
O	MANAGEMENT SCI AMER	28	8	8.13	0.0	0.0
O	MICRO FRD INTL CORP	8	3	3.50	0.0	0.0
O	MICROSOFT CORP	70	35	57.50	2.8	7.0
O	MORINO ASSOCIATES INC	24	7	16	1.8	12.1
O	NATIONAL DATA CORP	36	19	36.50	0.0	0.0
O	ON LINE SOFTWARE INTL INC	22	9	9.75	0.1	1.3
O	ORACLE SYS CORP	19	8	14.75	1.1	8.3
N	PANSOPHIC SYS INC	28	11	15.88	-0.1	-0.8
O	POLICY MGMT SYS CORP	30	15	22.75	1.3	6.0
O	PROGRAMMING & SYS INC	14	7	10.63	0.4	3.7
O	REYNOLDS & REYNOLDS CO	36	14	17.75	0.5	2.9
O	SEI CORP	16	10	14.50	0.3	1.8
O	SHARED MED SYS CORP	68	19	26.38	1.4	5.5
O	SOFTWARE AG SYSTEMS INC	19	7	8.75	1.1	14.8
O	SOFTWARE PUBG CORP	17	5	10.13	1.0	11.0
A	STERLING SOFTWARE INC	14	6	8.25	0.1	1.5
O	SUNGARD DATA SYS INC	21	10	15.75	0.0	0.0
O	SYSTEMATICS INC	28	10	33.00	1.3	4.1
N	SYS. SOFT INC.	24	7	10	1.3	9.1
O	VM SOFTWARE INC	48	7	12.38	2.5	38.4

Semiconductors

EXCH		PRICE 52-WEEK RANGE (1)		CLOSE FEB. 17 1988	WEEK NET CHANGE	WEEK PCT CHANGE
N	ADV MICRO DEVICES INC	28	8	10.88	0.5	7.4
N	ANALOG DEVICES INC	24	8	11.38	0.5	2.2
O	ANALOGIC CORP	15	5	6.88	0.1	1.5
O	INTEL CORP	42	16	26.75	0.5	1.9
O	LSI LOGIC CORP	17	7	8.50	0.1	1.5
N	MOTOROLA INC	74	38	44.63	1.1	2.5
N	NATL SEMICONDUCTOR	23	10	10.50	0.1	1.3
N	TEXAS INSTRS INC	63	35	47.88	1.1	2.4
A	WESTERN DIGITAL CORP	25	11	12.38	0.5	4.2

Peripherals

EXCH		PRICE 52-WEEK RANGE (1)		CLOSE FEB. 17 1988	WEEK NET CHANGE	WEEK PCT CHANGE
O	ALLOY COMP.	15	3	3.50	0.1	4.4
O	AM INTL INC	9	3	3.75	0.1	4.2
O	AST RESH INC	28	8	9.13	0.2	2.7
O	AUTO TROL TECH CORP	9	3	3.94	0.0	0.0
O	BANCTEC INC	15	4	6.69	0.0	0.0
O	CIPHER DATA PRODS INC	15	4	7.00	0.1	1.5
O	COGNITRONICS CORP	8	2	2.88	0.0	0.0
O	COMPUGRAPHIC CORP	28	10	22.50	0.0	0.0
O	COMPUTERVISION CORP	23	7	7.00	0.0	0.0
O	DATAPRODUCTS CORP	12	4	6.38	0.0	0.0
O	DATARAM CORP	8	1	6.00	0.1	1.5
N	DECISION INDS CORP	15	4	10.63	0.1	1.2
N	EASTMAN KODAK CO	71	49	62.50	1.5	2.5
O	E M C CORP MASS	28	10	15.00	1.0	7.1
O	EMULEX CORP	9	4	8.63	0.4	4.4
O	EVANS & SUTHERLAND	40	16	21.00	0.5	2.3
O	ICOT CORP	15	5	3.75	0.1	2.7
O	INTERLEAF INC	24	9	17.63	0.0	0.0
O	IOMEGA CORP	8	1	2.75	0.0	0.0
O	LEE DATA CORP	6	1	3.50	0.2	4.7
O	MASSTOR SYS CORP	6	1	1.75	0.1	4.6
O	MAXTOR CORP	16	6	11.38	0.4	3.4
O	MICROPOLIS CORP	16	5	22.25	1.0	4.7
O	MINISCRIBE CORP	11	5	8.69	0.0	0.0
N	MINNESOTA MING & MFG CO	74	46	68.63	0.1	0.1
A	MSI DATA CORP	16	12	12.00	0.3	1.1
O	PRIAM CORP	3	1	1.69	0.0	0.0
O	PRINTRONIX INC	15	7	8.75	0.1	1.4
O	QMS INC	27	8	8.25	0.0	0.0
O	QUANTUM CORP	21	8	10.75	0.0	0.0
O	RAMTEK CORP	8	2	4.00	0.1	3.0
O	RECOGNITION EQUIP INC	21	7	9.25	0.1	1.4
O	REXON INC	14	5	6.75	0.0	0.0
O	SCAN TRON CORP	14	7	10.25	0.0	0.0
O	SEAGATE TECHNOLOGY	48	10	15.75	0.1	0.6
O	STORAGE TECH CORP	8	1	1.88	0.0	0.0
O	TANDON CORP	7	1	1.88	0.1	4.2
O	TEC INC	7	2	3.13	0.2	4.7
N	TEKTRONIX INC	48	21	24.88	0.5	2.1
O	TELEVIDEO SYS INC	3	1	1.31	0.0	0.0
N	TELEX CORP	102	30	40.38	-1.1	-2.3
O	WYSE TECH	25	11	18.00	-0.3	-1.4
N	XEROX CORP	88	50	65.88	-1.1	-2.0
O	XIDEX CORP	16	6	6.88	-0.1	-1.9

Leasing Companies

EXCH		PRICE 52-WEEK RANGE (1)		CLOSE FEB. 17 1988	WEEK NET CHANGE	WEEK PCT CHANGE
O	CAPITAL ASSOCIATES INTERNATIONAL INC	11	4	4.38	0.8	21.9
N	COMDISCO INC	37	12	19.63	0.5	2.1
N	CONTINENTAL INFO SYS	14	6	7.00	0.5	7.7
O	PHOENIX AMERN INC	7	2	2.88	0.1	4.5
O	SELECTERM INC	6	3	4.00	0.0	0.0

EXCH: N—NEW YORK; A—AMERICAN; O—NATIONAL; O—OVER-THE-COUNTER; S—SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Thanks, Abe

Ungermann-Bass has a happy holiday; most stocks rise

Modest gains were the order of the day on the New York Stock Exchange last week in trading shortened by the President's Day holiday on Monday. The big winner as of Thursday's market close was Ungermann-Bass, Inc., whose stock value increased more than 40% when it surged 3½ points on Tuesday following its announced merger with Tandem Computers, Inc. The local-area network vendor finished at 12¼, up 3½ points from the week before.

Other weekly gainers in top computer issues included Microsoft Corp., up 2½ points to 58; Hewlett-Packard Co., up 2½ points to 59½; and Amdahl Corp., up 1¾ points to 35⅛. More modest advances reached 3Com Corp., up 1⅛ points to 20½; NCR Corp., up 1 point to 61⅛; Lotus Development Corp., up ⅜ of a point to 28⅛; Apple Computer, Inc., up ¾ of a point to 41¾; Tandem, up ⅝ of a point to 19¼; and IBM, up ⅛ a point to 112½.

Slight losses tagged Sun Microsystems, Inc., down ⅛ of a point to 33½; Stratus Computer, Inc., down ¼ of a point to 24¼; and Digital Equipment Corp., down ⅛ of a point to 119½.

JAMES DALY

IBM

FROM PAGE 1

announcement letters indicated.

Although the IBM announcement Monday adopted a conservative tone and called ESA/370 "an evolutionary step," Conti told a Yankee Group audience in New York the next day that ESA/370 was "a much larger step" than the one from MVS/SP to MVS/XA seven years ago. That move lifted the virtual memory ceiling from 16M to 2G bytes.

Higher ceiling

ESA/370 will provide 16 terabytes of virtual memory for data storage, although program logic will still have to reside in the lower 2G-byte address space — as opposed to both data and program logic storage in MVS/XA virtual memory address spaces.

That ceiling will satisfy customers' needs "for more than seven years," Conti predicted.

The jump to terabytes of virtual memory puts the IBM operating system far ahead of users, a situation that was not the case seven years ago with the announcement of MVS/XA. The largest data centers store a maximum of 1 terabyte on their DASD, Conti acknowledged. Few companies have produced applications that brush up against the 2G-byte limit of MVS/XA.

"We don't think we need more than 2G bytes yet," said an MIS director at a New York firm listed near the top of the Fortune 500. Nevertheless, his technical staff was eagerly studying the IBM announcement.

"Obviously, what you need vs. what you could do if you had ESA/370 are two different things. This could open up our thinking as systems implementors," the MIS director said.

What you don't know ...

Among other things, large users and mainframe software developers pointed out that the provisions of ESA/370 will allow them to be unconcerned about whether an application requires huge amounts of data or where that data resides as the application runs.

"The application programmer can load huge data bases rather than having to go to I/O to bring in the data," said Russell Artzt, who is senior vice-president at Computer Associates International, Inc. in Garden City, N.Y.

ESA/370's added virtual memory is limited to storing data in what IBM calls data spaces, unlike its predecessors, MVS/XA and MVS/SP. Under those two operating systems, virtual memory typically is divided into address spaces that can store anything from systems programming to application logic and data.

Joseph Farrelly, vice-president of Applied Data Research, Inc. (ADR) in Princeton, N.J., said IBM has moved in the right direction.

"Users don't need more room for data base managers or application logic. They need room for more data," he said.

IBM officials said ESA/370 still uses a 31-bit address word, using pointers in additional hardware registers to clone 2G-byte data spaces.

IBM's Carl J. Conti

"Through the use of some registers in silicon, we actually stack data spaces inside the machine horizontally, so we can deal with them in the machine," said Andrew J. Hurter, director of product support at IBM's Information Systems and Storage Group.

But the applications programmer deals with the data spaces as if they were in the form of logical virtual memory, with addresses increasing to larger and larger raw numbers, he said.

The creation of data spaces captures virtual memory inside the CPU, eliminating time-consuming I/O and improving performance, Hurter said.

"IBM has extended the capability of data fetching to include expanded addressing without having to drastically change the instruction processing portion of their 370 architecture," ADR's Farrelly noted.

Close to others

Another indication of how close ESA/370 is to its MVS predecessors is the fact that it is composed of the combined enhancements in MVS/SP Version 3.0 and Data Facility Product, the MVS disk management subsystem, Version 3.0, according to the IBM customer announcement letters.

While DOS/VSE and MVS/SP shops have taken months to convert to MVS/XA, the conversion to ESA/370 could be accomplished in weeks, according to Conti.

Other features of the operating system include the following:

- Hiperspaces, a special, high-performance form of memory making use of expanded storage, the internal CPU memory reservoir controlled by the operating system's paging supervisor.

One kind of hiperspace reserves a piece of expanded storage as an internal DASD to speed performance for authorized programs. Data stored in this form of hiperspace will not be subject to paging activity contention.

Another type uses expanded storage where available, backed by auxiliary storage, for storing data. Hiperspaces are different from data spaces in that data spaces can reside anywhere in processor storage or auxiliary storage.

- Data windowing services, from Fortran, PL/I, Cobol, C, assembler or Pascal applications, can access and scroll through data in virtual memory or large temporary data objects.

The window is defined by the user in a certain portion of the application that maps portions of the data object. Data can be manipulated in the window by statements of the named languages.

August ship

The MVS/SP Version 3.0 component of ESA/370 with IBM's JES2 is scheduled to be available in August at a one-time charge of $163,200 for an IBM Group 30 processor and $259,200 for a Group 40 processor.

MVS/SP 3.0 with JES3 reportedly will be available for the same processor groups at the same time for $183,600 and $291,600, respectively.

Data Facility Product Version 3.0 is scheduled to be available in December at a cost of $54,000 for a Group 30 processor and $86,400 for a Group 40 processor.

IBM also announced that VM/XA, previously announced for availability during the first quarter of 1989, will now be available in December.

Mainframe

FROM PAGE 1

could hold 2.6 million 1,500-page books.

Analysts cautioned that while there may seem little need for 16 terabytes of memory, some users are now approaching the 2G-byte limit that seemed absurd when MVS/XA was announced. To take advantage of that capacity, IBM unveiled features to isolate data from application code within the CPU, thus making it practical to use expanded storage for data. The system-managed storage software is intended to hide from the user any need to know where data resides.

Describing the 3090, Carl Conti, vice-president of the Enterprise Systems unit, said, "When it comes to collecting massive amounts of information, organizing it and, most importantly, sharing it across an enterprise, there is no solution that can do it as well."

The emphasis on the mainframe as a server for workstations is one result of IBM's renewed focus on communicating with its customers, said Michael Geran, an analyst with The Nikko Securities Company International, Inc. in New York.

"The tripod [IBM] used in its original presentation of the 9370, with the mainframe, the 9370 and the workstation each being a leg, has been partially undercut by the rate of change in microprocessors and the slow development of the 9370," Geran said.

Conti said PCs will drive user demand for mainframe storage and that technologies such as artificial intelligence, image processing and relational data bases require the storage capacities that new IBM mainframes will support. While the largest data centers today have 1 terabyte of data, he said they will have 500 terabytes in a few years.

Conti was the principal IBM spokesman during the announcement and a day later at a New York seminar on IBM directions, sponsored by The Yankee Group, a Boston-based market research firm.

Analyst Robert P. Tasker of The Yankee Group saw the IBM move as a step toward a two-tier environment in which there are corporate mainframes and application activity occurs on workstations at the expense of minicomputers, like the IBM 9370 and local-area networks.

"This is a continuation of the shifting of the mainframe that has been going on for a few years," said analyst Francis Gens of market research firm International Data Corp. in Framingham, Mass. "They have been talking for a while about the mainframe as a big repository for data. Clearly, they have to look at the strength of PCs and the like and figure out what the mainframe niche is going to be."

Asked about the demand for more than the 2G bytes of memory offered under MVS/XA, Gens noted that when the earlier operating system was announced in 1981, 2G bytes seemed like more than anyone could ever need. Now, large-systems customers are nearing that limit and may pass it when they restructure systems to take advantage of MVS/ESA, he said.

The next steps for IBM, according to analysts, are continuations of its recent ones. They expect faster processors, enhanced subsystems, such as an IBM DB2 to take advantage of MVS/ESA, and up to quadrupled CPU storage with the introduction later this year of 4M-bit memory chips.

Meanwhile, IBM plug-compatible vendors National Advanced Systems and Amdahl Corp. already promise support for ESA by saying they will unveil product timetables after IBM releases MVS/ESA specifications in four months.

No rush to registers

BY JEAN S. BOZMAN
CW STAFF

Several large IBM user sites are apparently in no hurry to embrace IBM's new Enterprise Systems Architecture/370 (ESA/370). Following last week's announcement, several MIS managers said they are inclined to wait for the next generation of IBM 3090 hardware that might take full advantage of the MVS/ESA operating system.

"We're not chomping at the bit for ESA/370," said Nick Simonds, executive director of information systems at Chrysler Corp. in Detroit. "I'm never a pioneer in early software of that kind, anyway."

Most of those surveyed said they see themselves moving toward ESA — in time. "It's an enhanced MVS/XA that we will inevitably have to go to," said an information manager at a Bell operating company. "We don't know what the system overhead will be, and neither . . . did our team of IBM representatives."

Users appeared excited by the prospects of virtually unlimited address space but said they are unsure of which 3090 configuration will allow them to implement it.

"ESA/370 fixes some problems that we have now," said Pete Miller, senior vice-president of data processing at First National Bank of Chicago, where four 3090s are in operation. "We don't need trillions of bytes of extra address space, but we'd surely like more than the current 16M-byte limit."

"It's like the tip of the iceberg," said Steve Matheys, who is in charge of data management for Nielsen Marketing Research, Inc.'s two 3090 sites in Green Bay, Wis.

Users at mixed sites said they will wait to see what plug-compatible manufacturers Amdahl Corp. and National Advanced Systems (NAS) announce in response to MVS/ESA.

"We were contemplating a conversion from MVS/SP to MVS/XA, " said Dave Jacobs, manager of data processing operations at Ingersoll Milling Machine Co. in Rockford, Ill., which replaced a 3090 Model 200 with a NAS XL/70 in 1986. "This Enterprise operating system is just throwing another element into that decision."

IBM outlines PS/2 pricing strategy

BY ED SCANNELL
CW STAFF

BOCA RATON, Fla. — IBM laid out an ambitious plan last week to aggressively drive up price/performance marks on its Personal System/2 line, saying it will introduce more powerful versions of every member of the PS/2 family during the coming year.

At a lavish seminar staged to pump up enthusiasm for its Micro Channel architecture and OS/2 operating system, IBM said it will deliver the following products:

- Intel Corp. 80286-based systems priced at the current level of the PS/2 Model 30, or about $1,500.
- An Intel 80386-based system priced between $3,595 and $6295, which is the current range for an 80286-based model.
- Systems based on the 386 costing approximately $1,500 and scheduled for delivery sometime in 1989.

IBM will also deliver at least two intelligent subsystems with coprocessors that exploit the advantages of its Micro Channel architecture by Comdex/Fall '88. The company is working on a file management subsystem based on the small computer systems interface, a graphics subsystem, a numeric coprocessor and various communications products.

IBM's Lowe

First things first

"The things we'll focus on first are communications cards, because they have a high level of interrupts that can be best serviced not by the main engine but by an intelligent subsystem," said Frank King, vice-president of IBM's Entry Systems Division.

IBM, which is trying to shake its image as a pricey personal computer supplier, will maintain the current price points of its PS/2 line, which range from $1,350 to $13,000, but will add faster processors and more functions at each price point, according to Bill Lowe, president of the Entry Systems Division.

"Our objective is not to get the product line down to $600. I expect our entry points to remain where they are but with improved function," Lowe said. "The high end may continue to go up [in price] as we add more function."

IBM has also accelerated its development schedules and will introduce as many new systems this year as it did in 1987, when it announced 11 processors. The firm will have two major announcements a year during the next two or three years, Lowe said. He added that IBM's development team is on a six- to 12-month development schedule.

IBM has been offering a diskless version of its PS/2 Model 50 to key customers during the last few months, Lowe admitted. The company has not announced the system formally because it cannot manufacture enough system parts to meet demand. He said the firm's plants will meet current demand by the end of the first quarter.

By mid-year, IBM will have a 3½-in. hard disk drive that can handle 100M bytes of storage and a 5¼-in. drive that handles up to 600M bytes. This will allow the PS/2 Model 80 to serve as a more effective departmental OS/2 file server, Lowe said.

Delivery of a series of more powerful systems is not IBM's top priority for this year, however. Both Lowe and King said acceptance of OS/2 is the key factor in helping both IBM and the microcomputer industry grow during the next three to five years. Central to OS/2's acceptance are applications from major vendors, of which there have been precious few so far. IBM and Microsoft Corp., however, believe that 1,000 applications will be available for OS/2 by early next year, Lowe said.

IBM has apparently softened its longtime ambitions to be a major force in the microcomputer software applications market. Although King said IBM's Advanced Application Division is working on a range of "software that integrates the office function," Lowe said the company will largely depend on third-party developers to deliver key OS/2-compatible software.

As important as the delivery of OS/2 is AIX, the company's Unix operating system for its 80386-based systems, and developing a platform for running IBM System/36 applications under OS/2 [CW, Dec. 14, 1987]. Both will be done before the end of this year, Lowe said.

In the works

In other hardware-related projects, IBM said it is also working on the following:

- A removable read-write optical disk drive, to be delivered in early 1989, that will help the company gain a foothold in markets such as image processing.
- A 12 million instruction per second graphics processor aiding the performance of IBM's Presentation Manager.

In discussing the reasons for and the potential of the Micro Channel, King said the architecture was created to allow a PC to connect to a variety of hardware devices and local-area networks, not to run multiple on-screen software applications.

"What we are finding is that users who stress communications and new applications like image processing increase dramatically the number of things they want to do concurrently," King said. "We are seeing more configurations where they want to attach to several LANs or hosts."

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Gaps in 3090 line filled up

BY STANLEY GIBSON
CW STAFF

IBM filled cracks in its flagship 3090 line last week, adding a dual-processor version of its Model 180E, the 280E, and a five-processor system, the Model 500E.

IBM also announced two 4381 models that will take advantage of the MVS/ESA operating system the company announced last week. Those models, the 4381 Models 91E and 92E, are based on the 4381 Models 23 and 24 and offer comparable power.

The models and enhancements came at a time when many industry observers expected IBM to boost the power of the 3090 line by about 20% with the so-called F models, a second kicker in the 3090 line's life span following last year's E models.

The announcement stopped short of such an overhaul, however. IBM officials said further 3090 enhancements are in the offing but will not be forthcoming in the first half of this year.

"We are just seeing IBM take some of the steps to build on the new architecture, MVS/ESA. The other steps are going to be seen along the way and will grow into the 'Summit' series," said Steven Josselyn, a large-systems analyst at International Data Corp. in Framingham, Mass.

The 3090 Model 500E is configured with three processors on one side and two on the other. It can operate as a single-image or physically partitioned configuration.

Priced at $4.9 million for an average configuration, the Model 280E will be available in the second quarter. The Model 500E, priced at $9.7 million for an average configuration, will ship in the third quarter, IBM said. The 4381 91E is priced at $550,000. The 4381 Model 92E is priced at $920,000. Both models will ship in November.

Tale of the tape

New IBM E models fill holes in mainframe product line

[illegible]	Five	70.4	$9.7 million	3Q 1988
3090 280E	Two	28	$4.9 million	2Q 1988
[illegible]	Two	8.1	$920,000	November 1988
4381 91E	One	4.8	$550,000	November 1988

* Millions of instructions per second; CW estimates based on vendor-supplied information

INFORMATION PROVIDED BY IBM
CW CHART

IBM adds high-end facilities

IBM's announcement last week included two major facilities for its mainframes: automatic storage management and the capability to partition IBM 3090 mainframes into as many as eight logical processors.

The firm also trimmed prices on expanded memory 8% to $370,000 for the first 64M bytes; additional 64M-byte increments were reduced 22% to $225,000.

Data Facility Storage Management Subsystem (DFSMS) can improve programmer and user productivity, IBM claimed, by automatically determining what data is to be stored on which storage devices in a DP shop. DFSMS is composed of a new MVS/Data Facility Product (DFP) Version 3 and other products of the Data Facility family, together with the firm's Resource Access Control Facility data security product, IBM said.

IBM said MVS/DFP Version 3 will make it easy to migrate to new direct-access storage devices (DASD). Although IBM did not elaborate on specifics, the product should make it easier to move to the next generation of IBM DASDs than it was to move from IBM 3350 disk drives to 3380 models, said David Vellante, a storage systems analyst with International Data Corp. (IDC) in Framingham, Mass.

DFSMS will be available in December, IBM said.

IBM also announced Processor Resource/Systems Manager (PR/SM), a facility that partitions a single 3090 central processing unit into as many as four separate processors. The 3090 line's multiprocessing Models 280E, 400E, 500E and 600E can have each of their two sides partitioned into four processors, yielding a total of eight processors.

PR/SM is available on all 3090E model processors at prices ranging from $60,000, on the Models 120E, 150E and 180E, to $200,000, on the Model 600E. The feature is set to be generally available in August.

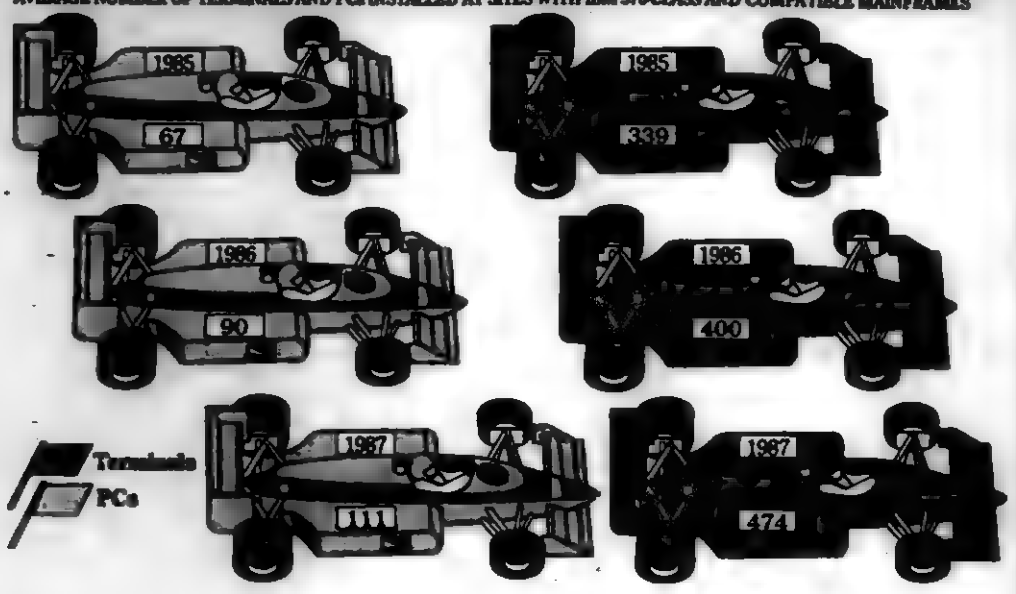
STANLEY GIBSON

TRENDS

Terminals vs. PCs

Micros making a move at mainframe sites

AVERAGE NUMBER OF TERMINALS AND PCs INSTALLED AT SITES WITH IBM 370-CLASS AND COMPATIBLE MAINFRAMES



Terminals in major data processing sites are slowly losing desktop share to personal computers, according to a study by Focus Research Systems, Inc. in West Hartford, Conn. Focus gathered statistics from 7,150 locations that have IBM 370-class or compatible mainframes.

The figures show that during the last several years, corporate purchasers have been planning to buy an increasing number of terminals relative to PCs. But when the final purchase figures were tallied, those corporations had instead bought an increasing number of PCs relative to terminals. The result is that the ratio of terminals to PCs has been narrowing since 1985, as corporations put more and more intelligent workstations in the hands of end users.

In 1985, the average number of terminals at the sites surveyed was 339, while the average number of PCs stood at 67 — a ratio of about 5-to-1.

In 1987, the average number of terminals had increased to 474, but the average number of PCs had climbed to 111 — a ratio of a little more than 4-to-1.

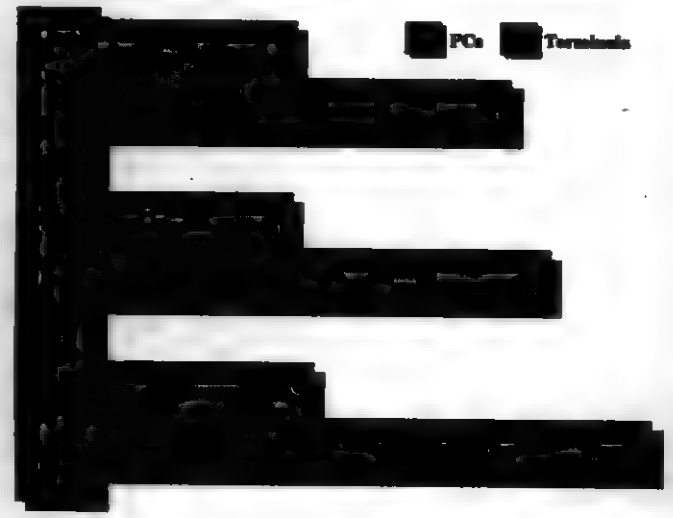
Firms in 1985 planned to purchase two terminals for every one PC and, in 1987, increased that ratio to about 2½-to-1.

The movement to PCs is not sudden or radical. Terminals are still multiplying at a healthy rate, according to the Focus study. But the trend to put more intelligence on the user's desk top continues, despite the apparent ambivalence of large corporations.

STANLEY GIBSON

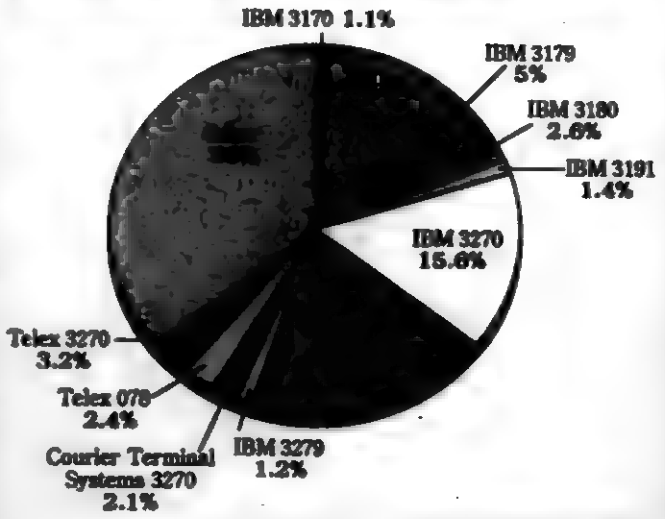
Terminals figure in future

AVERAGE NUMBER OF TERMINALS AND PCs PLANNED FOR ADDITIONAL IBM AND COMPATIBLE MAINFRAME SITES



Terminal market wide open

TERMINAL MARKET SHARE



INFORMATION PROVIDED BY FOCUS RESEARCH SYSTEMS, INC.
CW CHARTS: FRANK C. O'CONNELL

INSIDE LINES

Early warning system. Was it insight or incompetence? Only Apple knows for sure. Macintosh systems set up at Dexpo East 88 last week to guide attendees through the Apple-DEC connection exhibits listed Network Innovations as an Apple subsidiary. A Cupertino, Calif., neighbor of Apple's, Network Innovations recently introduced CL/1, a connectivity language for Mac-to-VAX applications, and was featured prominently at Apple's press conference and in Apple Chairman and CEO John Sculley's keynote speech. Ed Forman, marketing director for Network Innovations, declined to comment on any possible investment by Apple, and the computerized listing was later edited.

Hawkeye enlists. Will the *M*A*S*H* crew be reunited now that Alan Alda has signed on with the IBM marketing campaign? In television ads scheduled to run during the Calgary Olympic Games this past weekend, Alda was to become the point man for the electronic version of "The Bigger Picture" campaign, which has recently hatched major newspapers with a wash of gray ink. No word on whether he'll join his former cohorts, who already swapped their sweat- and blood-stained fatigues for the white-collar-and-tie environment of the modern business office.

Micro retail-channel architecture. According to our source, Tandy is preparing 100 hand-tooled clones of IBM's PS/2s to distribute to computer centers for demonstration purposes only. Apparently, the angle is to show customers that Tandy can do the job and, given enough interest, offer the clone for sale.

Serving many masters. Lotus's approach to the data base market is to both develop front-end tools and polish up and market an SQL engine licensed from Gupta Technologies. Now, Lotus officials are saying that the front-end tools, which include 1-2-3/G and Freelance, will be available for other popular SQL engines. Key candidates would include Oracle, IBM's OS/2 Extended Edition and maybe even the SQL Server from archrival Microsoft.

You can't keep a good geek down. It was revenge of the nerds time at the recent Uniforum 1988 show in Dallas. It seems that mischievous Unix junkies had it in for the Kapinsky Hotel. The children of the Kora synchronized their watches and put their room key cards in the solenoid-operated locks at the same time, causing a breakdown in that system. Some hacker also broke into the hotel's computer system, our source reports.

Crayette2. Convex Computer, the Richardson, Texas, maker of Cray-compatible minisupercomputers, is set to announce its next-generation processor, the C-2, on March 1 in New York. The product follows by a month archrival Alliant's replacement of its product line. Convex, which now uses a vector processing architecture, is expected to use a parallel architecture for the first time. Convex has acknowledged that the new computer will be three times as powerful as its current product and will be priced between $500,000 and $750,000.

How high is up? With 40M-, 100M- and even 200M-byte storage drives becoming the rule, DEC is reportedly burning the midnight oil working in-house on a 500M-byte half-height storage device that it will show to key accounts. If the work pans out, it will nearly double the capacity of its current internally developed high-end 5¼-in. drive, the 280M-byte RA70 that will be used in its new Microvax 3000 series.

New kid on the block. One more challenger is training to step into the ring for the heavyweight free-for-all with supercomputer powerhouses Cray, Control Data and Japan, Inc. Concurrent Computer said it has completed its five-month evaluation and is moving ahead with technology based on Princeton University's Navier-Stokes Computer. The project is aimed at fluid dynamics modeling and combines parallel processing and pipelined computing.

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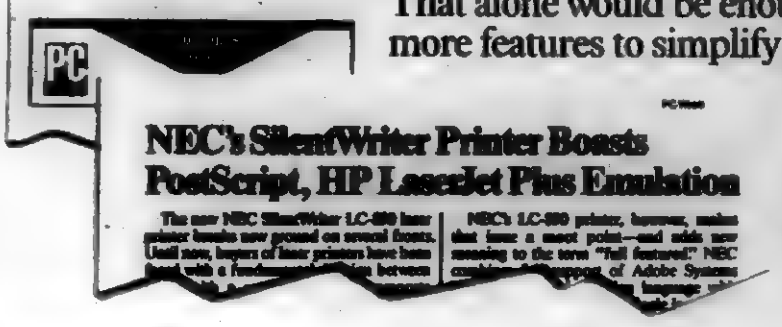
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THEY PAY A CAST OF THOUSANDS WITH MSA PRODUCTION.

Home Box Office, Inc., prints thousands of payroll checks every month. Some of the checks are run weekly, others bi-weekly, and many of them must be mailed out to employees located throughout the United States. So it's critical that Home Box Office have a payroll system that's accurate, dependable, and flexible.

To achieve this, Home Box Office selected the Payroll System from Management Science America, Inc. Specifically, they wanted an online payroll system that could accommodate overtime, hours register and payroll register reports, as well as take care of special union calculations and an overtime shift. They also wanted a system that could do an accurate job of balancing taxes.

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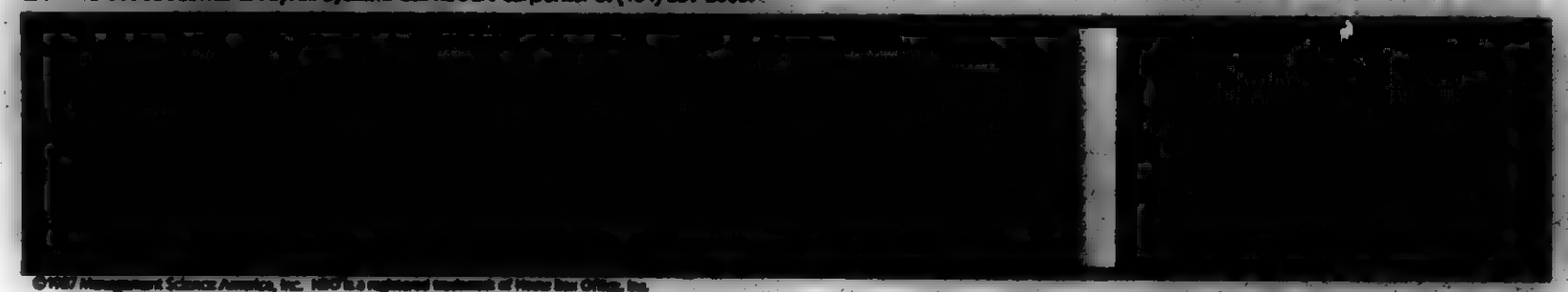
MSA The Software Company



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COMPUTERWORLD

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DBMS: It's Lotus's turn at bat

Broad-based server strategy, Gupta alliance to counter Microsoft lineup

BY DOUGLAS BARNEY
CW STAFF

CAMBRIDGE, Mass. — Lotus Development Corp. is preparing to go toe-to-toe with rival Microsoft Corp. by hatching an ambitious data base plan emphasizing front-end tools that are portable to an array of data base management systems.

After months of not commenting, Lotus is set today to acknowledge a 2-year-old co-development agreement with Gupta Technologies, Inc., Lotus sources said.

Lotus is also scheduled to provide more details on its plans for Lotus/DBMS, a line of server-oriented products intended to provide networked data base functions and access to a broad range of minicomputer- and mainframe-based DBMSs, the sources said.

Divide and conquer

Lotus and Gupta Technologies will split up responsibilities for selling Lotus/DBMS

CW CHART: FRANK C. O'CONNELL

So close and yet so far

Today's announcement by Lotus comes just six weeks after Microsoft, Ashton-Tate Corp. and Sybase, Inc. announced SQL Server, another server-based DBMS. Despite remarkable similarities in core engine technology, the Microsoft and Lotus strategies could not be farther apart in other respects.

Microsoft aims to establish a single standard for an SQL serv-

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Sun's 386 peeks over PC horizon

BY JULIE PITTA
CW STAFF

MOUNTAIN VIEW, Calif. — Sun Microsystems, Inc. will reveal in early April its long-awaited 80386-based microcomputer, able to run both Microsoft Corp.'s MS-DOS and Sun's Unix-based SunOS operating system, according to sources at Sun.

The system, code-named Roadrunner, will be available in two versions, offering 20- and 25-MHz clock speeds, those sources said. A basic configuration will offer 8M bytes of random-access memory, expandable to 32M bytes.

Entry-level pricing for the Sun 386 will be set at about $8,000, sources said.

Sun Chairman and Chief Executive Officer Scott McNealy declined to comment on the system.

Phoenix Technologies Ltd., sources said, provided Sun with a software coprocessor, allowing DOS sessions to be run under Unix through a combination of board-level hardware as well as software. It enables workstations with incompatible operating systems like Unix to

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Amdahl, NAS expect to unravel new MVS

BY JAMES CONNOLLY
and J. A. SAVAGE
CW STAFF

Officials of Amdahl Corp. and National Advanced Systems last week said they will deliver whatever hardware enhancements are necessary to support IBM's new MVS/ESA operating system within a year of the first deliveries of the software. IBM has said it will begin MVS/ESA deliveries to its own customers — which include Amdahl and NAS — in August.

IBM has placed a burden on the shoulders of its plug-compatible manufacturer competition with the announcement of MVS/ESA [CW, Feb. 22]. But PCMs said that supporting IBM's newest operating system will be a relatively minor challenge.

Furthermore, the Amdahl and NAS officials and other observers emphasized that many of the hardware and software modifications for MVS/ESA and products like it can be made using publicly available IBM documents. Little reverse-engineering is required, they said.

NAS's director of market planning, Carl V. Claunch, said NAS and its hardware supplier, Hitachi Ltd., expect to have to

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EDS outgrows Mr. Goodwrench role

BY ELISABETH HORWITT
CW STAFF

After three years of heavy labor trying to get General Motors Corp.'s information processing house in order, Electronic Data Systems Corp. is refocusing its sights on commercial systems integration — just when that market may be set to explode.

The company has a good chance of making a killing, industry analysts claim. But first, it needs to prove it has outgrown its dependence on GM business as well as its older role as a traditional, all-or-nothing systems integrator.

A realistic goal for EDS is to have 50% or more of its business coming from outside GM by 1990, according to Donald Atwood, GM's vice-chairman, who is responsible for all of

GM's Donald Atwood

GM's technical staffs and subsidiaries, including EDS and GM-Hughes Electronics.

That is a significant turnaround, considering that in 1986, 73% of EDS's revenue came from GM and the company's identity as an independent systems integrator seemed to be in danger of getting swallowed up in its role as GM's MIS department.

Just prior to the 1984 takeover, EDS was a 15,000-employee, $1 billion company with strong user bases in the government, retail, banking and insurance sectors. By 1986, the company had 40,000 employees — about 10,000 of them former GM MIS people — and

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NEWSPAPER
SECOND CLASS

IN THIS ISSUE

Face-lift. CDC revamps its aging Cyber 990 line with the Cyber 992 and 994, which boast memory of 256M bytes and twice the I/O capacity of the 990, and an improved Fortan compiler. The units are pitted against IBM's 3090 Models 180E and 200E. Page 10.
Pipeline. Siemens trumpets the arrival of Cornet, an ISDN Primary Rate Interface for its Saturn PBX line that includes D channel messaging formats. Page 14.

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ED THOMPSON
AMDAHL CORP.

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Clone of contention?

Kaypro first to promise Micro Channel system

BY DOUGLAS BARNEY
CW STAFF

SOLANA BEACH, Calif. — Braving legions of lawyers and IBM threats to protect its proprietary technology, Kaypro Corp. has become the first microcomputer vendor to reveal definite plans to clone the IBM Personal System/2 Micro Channel architecture.

Kaypro, once a leader in the CP/M market, has been only moderately successful in the IBM-compatible world. It hopes a successful PS/2-compatible product will help it regain some of its former luster in the corporate marketplace.

Kaypro plans to ship the system by the end of May, according to David Kay, the company's president. Kay declined to provide the source of chip sets and BIOS technology or give product configuration information.

Although the technical hurdles in cloning the PS/2 have been nearly overcome by firms such as Phoenix Technologies Ltd., Chips and Technologies, Inc. and Western Digital Corp., clone manufacturers have been so fearful of lawsuits that few have publicly discussed plans.

Legal action taken

IBM has trumpeted its intention to aggressively protect its proprietary technology and has even filed suit against AST Research, Inc. and Orchid Technology, Inc. for using the PS/2 name in advertisements. Both suits have been settled.

Kay is apparently not worried about a lawsuit. "We are confident . . . in regard to licensing the intellectual property of the players involved in the Micro Channel technology," he said.

A full PS/2 compatible may be necessary to effectively run such strategic IBM software as OS/2 Extended Edition, which includes proprietary data base and communications facilities.

DEC readies Polar Star for Super Tuesday debut

BY STANLEY GIBSON
CW STAFF

Digital Equipment Corp. has chosen Super Tuesday to announce its long-awaited mainframe-class multiprocessor, code-named Polar Star, according to a consensus of analysts and industry observers.

A DEC spokesman confirmed that an announcement is scheduled to take place at DEC's Marlboro, Mass., facility March 8 but declined to elaborate.

Polar Star, which will consist of four tightly coupled VAX 8700 systems, will be capable of up to 22 million instructions per second [CW, Dec. 14, 1987], according to previous statements by a company executive.

The system will offer symmetrical, or peer, multiprocessing, compared with the master-slave multiprocessing relationship used in Vaxclusters, DEC said. A new version of the VMS operating system, Version 5, will reportedly be required for the multiprocessing capability.

Running mate

Stephen Widen, a DEC analyst at International Data Corp. (IDC) in Framingham, Mass., said that despite earlier predictions, DEC may not announce Version 5 of VMS when Polar Star is announced.

The operating system features necessary to do multiprocessing would have to be included in the Polar Star announcement, he said, but a full-fledged Version 5 might not be ready at that time.

Analysts said that in addition to Polar Star, DEC might unveil the following:

- A smaller multiprocessing system, code-named Calypso. While it could be announced as soon as March 8, it more likely will be announced in the following two months, according to one source. The system reportedly will contain up to four CMOS-based Microvax III processors.
- An RA 90 disk drive, a 9-in. storage device with a 1.2G-byte capacity. This product could be announced as soon as March 8 but more probably within the next two months.
- As part of a major move into transaction processing, a cooperative agreement with at least one firm specializing in vertical-market transaction processing software.

Polar Star and Calypso will perform multiprocessing, as opposed to parallel processing, IDC's Widen said. The multiprocessors will not be able to divide a program into several parts for simultaneous execution, as is the case with parallel processing.

However, a Polar Star or Calypso multiprocessor could be partitioned into up to four CPUs running different operating systems, Widen said.

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Sidekick upgrade finally ready

BY STEPHEN JONES
CW STAFF

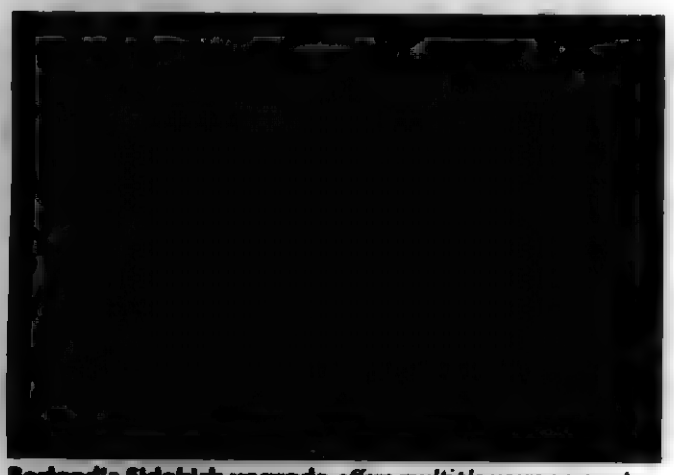
SCOTTS VALLEY, Calif. — The long-awaited upgrade to Borland International's Sidekick desktop management program should materialise from the vapor haze this week after nearly three years of development.

Sidekick Plus is a souped up version of the widely used random-access-memory-resident desktop organiser that Borland first shipped in 1984. The utility program is set to sell for $199.95, compared with the $84.95 cost of the original Sidekick.

Borland claimed that the utility can be squeezed into as few as 70K bytes of random-access memory, but the firm said that can only be accomplished by swapping pieces of the RAM-resident program back and forth to a hard disk.

One beta-test user contacted last week said that the swapping procedure drains the product's performance.

Sidekick Plus, scheduled to ship in the first half of March, features nine file-editor notepads that can hold up to 11,000 words each and can be viewed on the screen at one time, a data communications package, four improved calculators and a multiwindowed outliner.



Borland's Sidekick upgrade *offers multiple users on a network a common calendar*

Among other things . . .
An updated calendaring system provides common calendars that can be accessed and modified by a number of users whenever it is running on a local-area network.

It can also be programmed to automatically place a telephone call at a given date and time, with an alarm to signal the user.

The program runs on Microsoft Corp. MS-DOS-based personal computers and under IBM's OS/2 Standard Edition 1.0 in compatibility mode.

Not really late
Borland has been telling users for the last two years that a Sidekick upgrade was on the way, but nothing had emerged until last week.

Philippe Kahn, president of Borland, maintained that the product is not late but that rather "it had been talked about for a long time."

Kahn is looking to leverage an installed base of about two million Sidekick users for upgrade sales while pitching the revamp to corporate America as a companion utility to such Borland products as Quattro and Sprint.

However, the developer might have trouble winning over any user running OS/2, because that operating system all but eliminates the use of RAM-resident programs — including Sidekick Plus.

Paper saver
Still, the program's ability to organize schedules, directories and myriad pieces of loose paper appeals to many users.

"I don't even use a paper pad anymore because of it; I don't know what I'd do without it," said a project manager with a Fortune 500 electronics company who has beta-tested the program for the last three months.

Borland will continue to market Sidekick as a beginner's alternative to the advanced Sidekick Plus upgrade.

AT&T answers SNA's call with console, Tandem deal

BY JEAN S. BOZMAN
CW STAFF

LISLE, Ill. — AT&T Network Systems moved on two fronts last week to counter the pull of IBM's closed Systems Network Architecture at large corporate sites. AT&T announced a console that gives large corporate customers control of their Centrex and Integrated Services Digital Network (ISDN) lines as well as a look into IBM's Netview running on their IBM mainframes.

In a surprise move, AT&T executives also announced an agreement to jointly develop transaction processing applications with Tandem Computers, Inc. in Cupertino, Calif.

The nonexclusive agreement between AT&T and Tandem would make the Tandem-run software available to ISDN users through AT&T's 5 ESS, or Electronic Switching System, and the public packet-switched network. As the first outside vendor to design applications for the 5 ESS-switched ISDN service, Tandem reportedly will develop industry-specific software.

The vertical markets have yet to be defined, said Gerald Peterson, vice-president of marketing for Tandem. He did not set a firm time for product availability but said AT&T agreed to aid in market research, to certify the Tandem software's 5 ESS interface and to make sure it conforms to ISDN standards.

Threat to IBM
Dale Kutnick, executive vice-president of Gartner Securities, Inc., said he believes the alliance could represent a threat to IBM because "it could end up that Tandem's processors will handle some of the applications that traditionally have been run on an IBM mainframe."

Tandem's Peterson

Industry analyst Fred Chanowski, president of Chanowski Telecommunications Management Corp. in Needham, Mass., said the AT&T moves provide users with greater network control.

"The customer now literally owns an element in the network," he said. He also said the inclusion of an interface to Netview indicates that AT&T recognizes "that IBM is the dominant player in data communications and that they have to work with them."

IBM backs off fee for moved gear

BY STANLEY GIBSON
CW STAFF

In response to objections from computer dealers and lessors, IBM announced Friday that it is changing its Maintenance Agreement Acceptability Letter (MAAL) policy, which was announced last fall.

The policy required that a fee be paid in order to recertify equipment for IBM maintenance after it had been moved by someone other than IBM. The company last week said it will not charge that fee as long as certain provisions are met.

The MAAL requirement had the potential of raising customer prices and reducing a user's equipment moving and reconfiguration options, according to leasing companies.

The measure was scheduled to become effective Dec. 1 of last year, but was postponed pending the results of negotiations between IBM and the Computer Dealers and Lessors Association (CDLA). The change announced last week is the result of those talks. Ambrose Carr, director of industry relations at IBM, said the policy will not be enforced by IBM as long as proper packing equipment and an audit trail of equipment changes are in place.

'Out out of line'
Every IBM machine is supplied with special covers and brackets for moving, and IBM will insist that such equipment be used, Carr said. The MAAL policy was established because the cost of replacing parts to recertify a piece of equipment under IBM's maintenance agreement "really got out of line," Carr said.

The CDLA announced recently that members of its organization found to be swapping older parts for newer ones in equipment being moved will be recommended for expulsion from the group.

"The industry recognized the problem, and the CDLA felt the MAAL was an administrative and cost burden," Carr said.

Although the MAAL policy is still on the books, it will not be implemented pending the success of preventive measures, Carr said.

After May 1 — the effective date of the new policy — if there is no audit trail, if the correct packing materials are not being used and if IBM has to replace parts to put the equipment back under its maintenance agreement, then IBM will charge for the parts replacement, Carr said.

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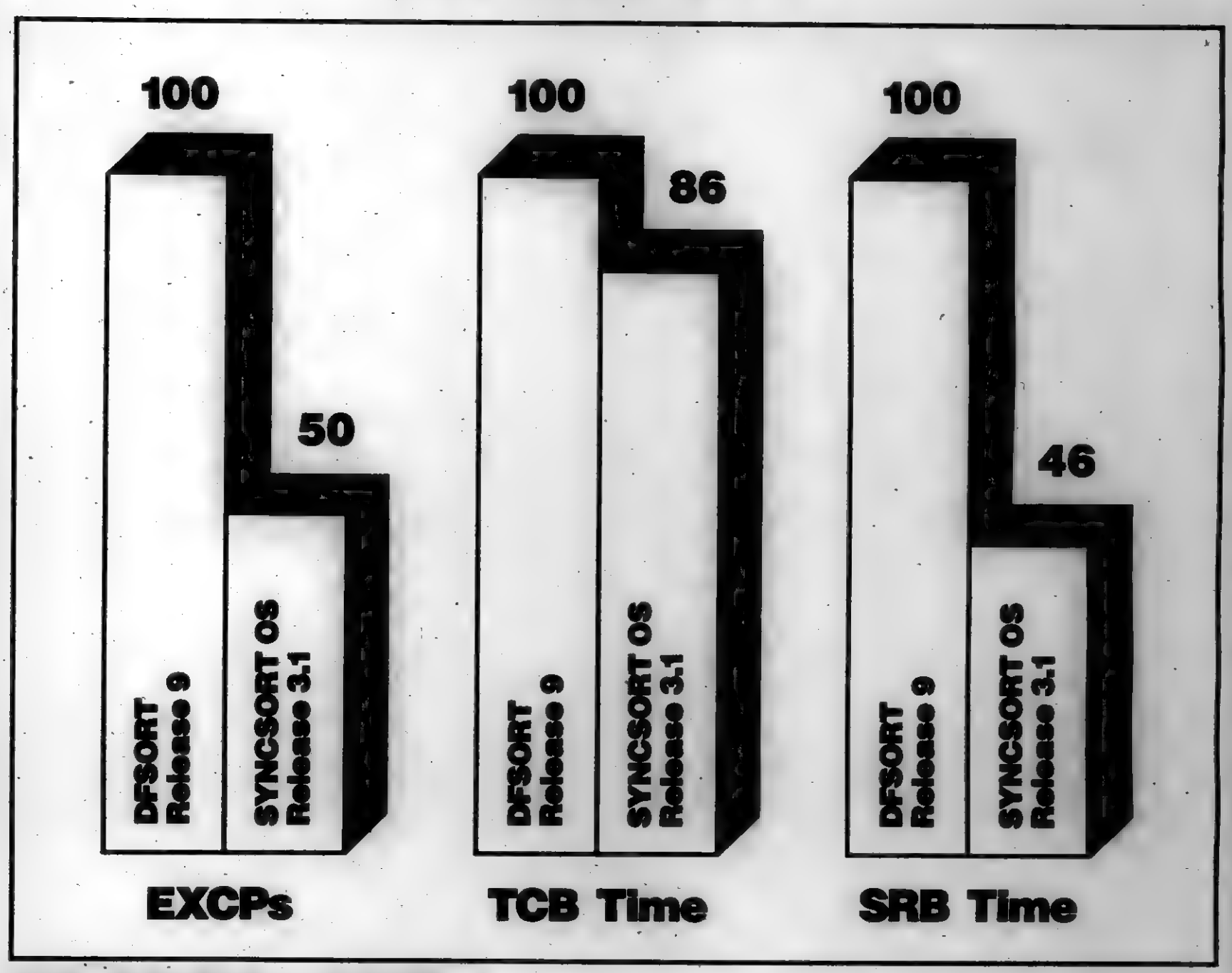

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Demand high to extend SAA umbrella further

BY CHARLES BABCOCK
CW STAFF

ANALYSIS

At the Common users group conference in Chicago last October, IBM System/34, 36 and 38 customers wore buttons with the letters SAA crossed out in red.

The mid-range users were upset that IBM's Systems Application Architecture made no mention of RPG, the programming language in which System/34, 36 and 38 applications are written. IBM officials responded quickly to the demonstrators.

"Clearly their intent is to support RPG III under SAA. That was publicly stated a number of times," said Charles Massoglia, an East Lansing, Mich., System/36 and 38 consultant who attended the conference.

John T. Friedline, IBM's Atlanta-based marketing manager for SAA, said, "We would like to add more languages to SAA. RPG is one of them."

Party preparations

The outspokeness of the IBM mid-range system users and IBM's accommodating stance illustrate one of the dilemmas that is shaping up for SAA as it nears its first birthday.

With customers beginning to take SAA seriously, they want to see the IBM products on which they depend included under its umbrella. When SAA extends its reach, however, the task of achieving application portability grows larger.

"The more IBM adds to SAA, the more difficult it becomes to accomplish its original goals," said Dennis J. Yablonsky, chief executive officer of the Carnegie Group, Inc. in Pittsburgh.

"If IBM were to willy-nilly include everything that people ask for in SAA, then the object of portability would never be achieved," agreed Paul Hessinger, chief technical officer of Computer Task Group, Inc. in Buffalo, N.Y. But Hessinger said he is convinced additions will be made on a controlled basis.

So far, the only additions to SAA have been CICS/MVS and IMS/VS. IBM added the two mainframe teleprocessing monitors last October, in part to assuage the concerns of the 25,000 CICS user sites and 3,200 IMS/DC sites.

The mainframe language PL/I is a likely addition, Friedline said in an interview with *Computerworld*. Many large shops have developed applications in that language, and IBM's expert system shell Knowledgetool is written in it.

Friedline said IBM has a strict review process that determines what is added to SAA:

- First, diverse elements of IBM must agree that a need exists for the component to be added.
- The reviewers must agree on a standard architecture to govern the form in which the component will be added.
- IBM must fund development of the component for each of the four operating systems covered by SAA — that is, MVS in its latest version; ESA/370 and VM on mainframes; an unnamed mid-range operating system, possibly that found on the still unannounced Silverlake; and OS/2 Extended Edition for the Personal System/2.
- Finally, a product must exist under one of the operating systems before its inclusion under SAA so that IBM has something real to point to with the announcement, Friedline said.

Not reassured

These standards do not necessarily reassure mid-range users. One of them, Dan Cense, a listener in Friedline's The Yankee Group audience and manager of international marketing systems at Polaroid Corp. in Cambridge, Mass., said what he saw in SAA was a plan to tie IBM mainframe and personal computer environments closer together.

Cense said he saw little reference to mid-range machines, although he is willing to wait and see what Silverlake looks like. Silverlake is the unannounced but widely anticipated IBM follow-on to the System/36 and 38. Cense's firm is unusual in that it uses both mainframes and System/36s. Although IBM is committed to providing SAA software on a future mid-range platform, Cense said, he does not know what that platform will be nor how soon it will arrive. His main question is whether his existing RPG II applications will run on it.

The programming languages chosen so far for SAA have little relevance to his 14 System/36 shops, Cense noted. Cobol is barely used in them, and C and Fortran are nonexistent. At the same time, Cense said adding RPG to PCs and mainframes is a low priority for IBM because it is almost nonexistent on those machines today.

"There is an enormous cost to support different operating systems in the mid-range," Cense noted.

"What they were basically telling us was the mainframe user won't need a departmental machine. He can tie his mainframe as a server to PCs or PC local-area networks," he said.

Deal fulfills Ungermann dream

BY KATHY CHIN LEONG
CW STAFF

SANTA CLARA, Calif. — Like many Silicon Valley entrepreneurs, Ralph Ungermann often dreamed that his networking company would one day become a billion-dollar business. Now, after a $260 million buy-out by Tandem Computers, Inc., it looks like Ungermann-Bass, Inc. will get there faster than expected, Ungermann said last week.

In an interview with *Computerworld*, Ungermann painted a picture of the opportunities the company will gain as a result of the acquisition, particularly in on-line transaction processing.

He also said the deal lifts the cloud of uncertainty that has hung over operations since the company snubbed a $175 million acquisition bid by Digital Communications Associates, Inc. (DCA) in November 1987. "In the past six months . . . I spent more time selling our viability than selling our product," Ungerman said.

I got a name

Ungermann-Bass will become a wholly owned subsidiary of Tandem and will retain its name, with Ungermann remaining president of the subsidiary.

Although he is a vice-president and board member of Tandem, Ungermann said the best contribution he can make to that

Ralph Ungermann

firm is to successfully lead his company. "I don't even think I will have an office at Tandem," he noted.

Seizing a larger market share in Tandem's popular industry segments is a natural outcome of the deal, Ungermann said.

Tandem's customers fall into three key areas: telecommunications, financial and manufacturing. More than 50% of Ungermann-Bass customers are in the manufacturing market, with less than 20% in telecommunications and still less in the financial community. "All of Tandem's users are going to need networks, and now we can be there to catch them," Ungermann said. No reorganization plan is on the drawing board at Ungermann-Bass.

Some analysts tracking the market gave the move a firm thumbs-up. "There is a continuing need to be big enough to sling it out with IBM and DEC," said Tom White, president of Infonetics, Inc. "This is exactly what they have done."

Ungermann-Bass will inevitably lose its identity, White said. "IBM said Rolm would maintain its independence, and now we see IBM's label on their equipment," he said. "In two years, the Ungermann-Bass label will be gone."

Immediate chemistry

In late December, when Ungermann met with Tandem founder and President Jim Treybig to see if Tandem would resell Ungermann-Bass gear, the talks grew serious: Both wound up exploring the possibility of a merger. Tandem had no low-end networking strategy at the time, and potential customers would then look to IBM or Digital Equipment Corp. Ungermann-Bass was limited in its service and support resources.

Although Tandem has had no formal ties with Ungermann-Bass in the past, the two firms found themselves jointly selling products in overlapping markets, particularly the manufacturing arena. Last year, they won a Hughes Aircraft Co. bid together.

"It would take us five years on our own" to build a bigger support organization, Ungermann said. "Now it will take a few months."

MIS warm on mainframes, Unix, study says

BY NELL MARGOLIS
CW STAFF

BOSTON — Rekindled interest in mainframes and an unexpected enthusiasm for Unix were among the surprising themes sounded by MIS directors considering mid-range purchase decisions, according to a recent report by The Yankee Group.

The market research firm surveyed more than 300 large-company MIS chiefs to gauge their perceptions of and opinions on major mid-range computer manufacturers and wares and found that mainframes are high on MIS acquisition lists.

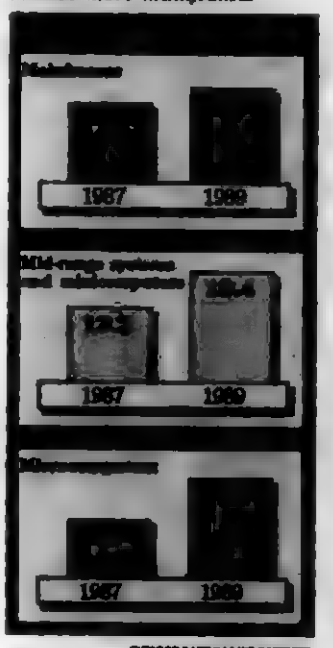
John Logan, The Yankee Group's director of mid-range systems, said his firm now estimates the mainframe market will grow by more than 10% in the next two years, up from a 4% projection reported by a similar survey group last year.

The startling resurgence of interest in the mainframe market, Logan said, foreshadows "the starting of the squeeze of the mid-range market."

Anticipating the shipment of IBM products, MIS managers who are running out of computer capacity are finding "a reason to wait for the mainframe," Logan said.

Shopping list

MIS directors' buying plans include more mainframes



INFORMATION PROVIDED BY THE YANKEE GROUP
CW CHART

Even more startling than the vote of confidence for mainframes was an enthusiastic response to Unix-based mid-range systems.

Only 36% of survey respondents said they will not evaluate any of the many offerings in the low-priced, apparently powerful Unix-based machine category; 64% said they would.

Revs reviews for DEC

In less surprising news, Digital Equipment Corp. emerged as the leader of the pack, substantially outscoring all other vendors in the product line category, narrowly squeezing out IBM in the applications leadership category and also copping the gold medal as "most favored vendor to work with."

IBM made an overall strong second-place showing in the survey, with its 4300 line outdistancing its System/38, 9370 and System/36, in that order, in popularity.

In an upset victory in the product line category, IBM's 4300 line was bumped down to third place by Tandem Computers, Inc.'s Nonstop, lauded for its on-line transaction processing capability.

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† *Digital News*, December 7, 1987. ‡ Gartner Group recently published research.
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Lotus takes Notes to PC forum

BY ED SCANNELL
CW STAFF

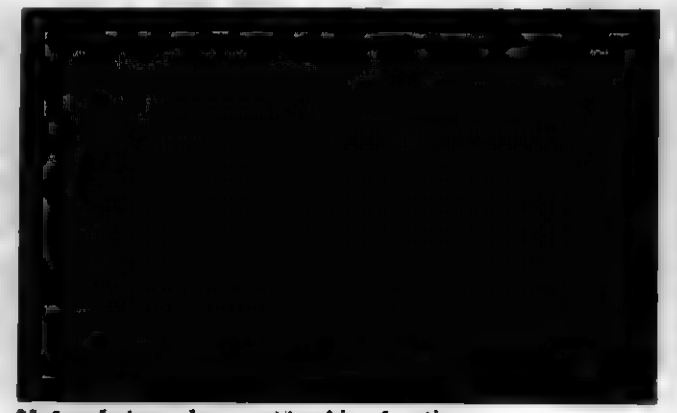
NAPLES, Fla. — Lotus Development Corp. last week previewed its first work group package that allows users to send textual and graphics information across networks to plan meetings and track projects.

Code-named Notes, the program allows users to call up a document from a central data base, add comments to it and track it from user to user. The program's security features permit only selected people to see it.

Lotus has not determined a price for the product, which will be available in about a year, according to Jim Manzi, Lotus's president and chief executive officer, who previewed the product here at the Personal Computing Forum.

Lotus claims the product will make workers more productive once they do meet or may eliminate lower level meetings altogether.

"The bottom line is that a whole layer of intermediaries and information filters and routers disappear from the process, and decision makers are connected more directly to key pieces of information," Manzi said. Users can view the information in several ways: by chronology, name, category or the person performing the evaluation, Manzi said. The program borrows some concepts from Agenda, Lotus's yet-to-be-released personal information manager, but has some important differences, according to Manzi.



Notes features document tracking functions

"Some might think Notes is Agenda for group work. That's not correct, but it's not totally wrong, either," Manzi said.

Both Notes and Agenda were developed as part of the chairman's research and development team, a group of in-house Lotus developers and alumni put together by company founder Mitch Kapor. Notes is the first product released by that group.

"You can still assume we need two separate products. Given the state of technology at the time, we assumed DOS was what we had," said Kapor, who also attended the forum last week.

Notes was designed to work with IBM's OS/2 Standard Edition 1.0, OS/2 Extended Edition and Presentation Manager.

Notes is now being beta-tested by several large accounts as well as by almost 200 users within Lotus, Manzi said.

DBMS

FROM PAGE 1

er product and is actively inviting third parties to provide front ends and OEMs to bundle the system with hardware, analysts said.

So far, Lotus is going it alone. Unlike Microsoft, which has announced its intent to run under OS/2 only, Lotus/DBMS and its related tools will run on a variety of hardware and software platforms. Lotus/DBMS will run on a single workstation that will be available under OS/2 only, according to an analyst recently briefed by Lotus, but the firm is also expected to offer a server product that will run on either Microsoft MS-DOS or OS/2-based servers.

Lotus, which announced its planned entry into the data base market nearly a year ago, declined to comment.

Lotus and Gupta will split marketing responsibilities, with Lotus focusing on end-user tools and Gupta providing programmers with development tools. Gupta is providing Lotus with an SQL-based DBMS engine that will run under both MS-DOS and OS/2 and offering router technology for workstation access to a server data base, another source briefed by Lotus said.

The Gupta product already runs under MS-DOS but can address up to 16M bytes of memory by using a special C compiler. Microsoft, which licensed similar technology from Sybase, is only going after the OS/2 market, although MS-DOS machines can communicate with the server. Despite these differences, the two combatants will overlap at the center. "They are going head-to-head with Microsoft, with architecture that is strikingly similar," the analyst said.

Interface dependent

The delivery of the SQL-based Lotus/DBMS product line is highly dependent on Microsoft's shipping the OS/2 Presentation Manager interface, currently slated for October. Lotus 1-2-3/G, a graphical version of 1-2-3, will require the Presentation Manager and is expected to be the single most important front-end tool for Lotus/DBMS.

While Microsoft is working on an unspecified set of front-end tools, the firm's main focus is on popularizing the engine and establishing it as a component of systems software, the analyst said.

Lotus, on the other hand, is focusing more of its attention on end-user oriented front-end tools than on the data base itself and will make those tools available for non-Lotus data base products. Regardless, Lotus is expected to push the Gupta DBMS as the primary engine.

"Lotus's emphasis is as an applications house. Microsoft is a systems house and turned over most of the end-user stuff to others," the analyst said.

Lotus also has a heavy focus on connections to host systems. "They are doing drivers to different data bases, such as DB2," said the other source briefed by Lotus. Unlike the Gupta support of peer-to-peer communications, Lotus's plans concentrate on uploading and downloading data rather than updating host data bases in real time. Gupta will be responsible for providing LU6.2 for cooperative processing and production-oriented data base applications. The current product can work with active IBM DB2 files and is being enhanced to tie into other data bases.

Although Lotus is focusing almost exclusively on end-user tools, systems programmers will be able to write directly to Lotus/DBMS on the server using tools from Gupta.

The Lotus tools will provide ad hoc queries and forms generation. "The goal is to have where the data resides be invisible to the users, allowing them to do ad hoc queries into other data bases," the analyst said.

These tools will be linked together with a new programming language called Lotus Extended Application Facility (LEAF), which the firm is developing specifically for Lotus applications. "LEAF is the glue that holds the Lotus tools together," said another source briefed by Lotus.

LAN Manager APIs get Novell OK; IBM treads water

BY PATRICIA KEEFE
CW STAFF

PROVO, Utah — Novell, Inc. last week announced support for a critical piece of Microsoft Corp.'s approach to OS/2 networking — key LAN Manager application programming interfaces (API).

Novell, which initially spurned the Microsoft approach, sees the APIs as akin to IBM's Netbios and a separate issue from the LAN Manager. This support means users of Novell's network operating system, Netware, can be assured of running most, if not all, OS/2 applications.

There is speculation, which Novell denies, that customer pressure forced the firm to knuckle under to Microsoft. "Interesting, the way they've turned around," said Rob Glaser, Microsoft's manager of networking products.

Banyan Systems, Inc., another network software competitor, and IBM, in a reversal of its previously stated position, have also indicated they may soon follow suit.

The APIs in question are Named Pipes and Mail Slots, which are interprocess communications. "Named Pipes is being considered in light of the need to provide a base for all industry applications," IBM spokesman Scott Brooks said last week. "IBM has not announced support for Named Pipes."

Increasing support for Named Pipes and Mail Slots is not necessarily to Microsoft's advantage, according to competitors.

Dulling the edge?

Microsoft, trying to make a name for itself in communications with LAN Manager, welcomes such support. But Novell and Banyan claim that support for these APIs eliminates Microsoft's edge. "We will not let Named Pipes be the differentiators between us and someone else," said Anand Jagannathan, vice-president of business development at Banyan.

Despite IBM's hedging, Novell last week took the initiative and announced two products: Netware support for Named Pipes and Mail Slots and Nondedicated Netware for OS/2, a Netware alternative for OS/2 server-based applications. Both products are slated to ship during the fourth quarter.

Nondedicated Netware for OS/2 allows OS/2 and Netware to coexist on the same server with some performance degradation. The product is positioned as a entry-level option for OS/2 server-based applications.

Lotus does one better on 1-2-3

BY DOUGLAS BARNEY
CW STAFF

CAMBRIDGE, Mass. — Users can expect dramatically faster recalculations, improved local-area network support, multidimensional spreadsheets and a better data base in the forthcoming Release 3 of Lotus Development Corp.'s 1-2-3, company officials said last week.

To prepare users for the release, the firm said, it will begin shipping preview kits in April that include technical information and software for compatibility testing. Release 3 is slated to ship in the second quarter.

In addition to rewriting 1-2-3 entirely in C for the sake of portability, Lotus has put much work into boosting the product's performance. The package includes the minimal recalc approach featured in the Lotus Speed-Up utility as well as background recalculation. Users reportedly can also change data while a recalculation is taking place, a feature Lotus called a first. Lotus did not provide specific benchmark figures to support its performance claims.

While declining to give details, Lotus officials argued that the networking capabilities of Release 3 will be superior to those of Lotus Networker, the LAN-based version of 1-2-3 many users consider overpriced.

The system uses a technique adopted from host applications called optimistic concurrency control. "It is only when two users collide that they realise they are sharing a file," said David Reed, vice-president of research and development for Lotus's PC spreadsheet operation. This will operate in multiple instances when the product is running under IBM's OS/2, Reed said. The oft-maligned data base capabilities of the product will be substantially improved and reportedly will include multiple table joins and a query optimiser.

Another new and previously unannounced feature is asynchronous redisplay, a feature that lets macros execute without continuously updating the screen. Unlike the current version, Release 3 will require a hard disk.

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IBM struggles with Token-Ring board supply

BY PATRICIA KEEFE
CW STAFF

IBM acknowledged last week that it will not be able to rectify its ongoing shortage of Token-Ring boards by the end of this quarter as planned but expects to resolve the problem by midyear.

A spokesman confirmed that Ned Lautenbach, president of IBM's National Distribution Division, told analysts earlier this month that he was more optimistic about the situation being brought under control by the second quarter. According to IBM, Lautenbach told analysts, "We have underestimated demand for over a year now, and we continue to ramp up."

However, even a second-quarter solution may be unlikely, according to an analyst who spoke with another IBM executive. Frank King, a vice-president of development at IBM's Entry Systems Division, said he was not sure when IBM would be able to meet demand, according to Thomas White, president of Infonetics, Inc. in Santa Clara, Calif.

At a November analysts' briefing, Ellen Hancock, president of IBM's Communication Products Division, announced that IBM would be able to ship boards in volume by the end of the first quarter.

IBM has been plagued by its inability to ship Token-Ring boards in volume since the boards first began shipping in March 1986. IBM has consistently cited voracious demand as the reason behind the boards' lack of availability.

Popularity on the upswing

Last fall, IBM executives said 85% to 90% of their top 250 customers had accepted the Token-Ring as a major architecture. Further, IBM has said its Token-Ring shipments increased five times from 1986 to 1987 and predicted volume would double again this year. In November, Lautenbach said IBM had installed more than 12,000 Token-Ring networks supporting more than 200,000 users. Last week, an IBM spokesman would only say that Token-Ring sales quadrupled through its reseller channels last year.

"It's getting beyond the point where you can accept what they say about underestimating demand," said Cecilia Brancato, an analyst with Oppenheimer & Co. in New York. "It appears there must be some other problem."

Surprisingly, IBM's woes have not necessarily resulted in gains for competitive token-ring board suppliers.

Many MIS shops have chosen Token-Ring for their architecture and want to go "true Blue" with their networks, according to Mike Baron, an engineering and sales representative at Valinor, Inc., a network reseller based in Lowell, Mass.

Baron, who resells 3Com Corp.'s token-ring boards for personal computers, said that although users have no qualms about buying 3Com's network software, they are hesitant to substitute non-IBM hardware when dealing with orders of 100 to 500 adapter cards.

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- Hackers broke into government-funded university computers, changed system clocks, modified financial data and then returned clocks to entry time. Result: An obliterated audit trail gave corrupt data to the university and free computer time to the hackers.
- Payroll and production re-runs plagued a manufacturing plant. Wrong system clocks caused posting of incorrect job times. Result: Manufacturing lines ran below efficiency, with a high cost in lost man hours and wasted capacity.

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High-end Cybers to combat 3090s

BY JEAN S. BOZMAN
CW STAFF

MINNEAPOLIS — Control Data Corp. last week enhanced its 5-year-old line of Cyber 990 computers with two high-end machines, the Cyber 992 and 994.

The two systems, along with an improved Fortran compiler, are intended to compete with IBM 3090 Model 180E and Model 200E machines, which are being bid to CDC's traditional base of university and scientific accounts.

Existing Cyber 990 users will be able to upgrade to the new models by adding a second I/O unit and additional memory, according to Michael Dech, director of tactical marketing for CDC's Computer Systems and Services Group. The systems are scheduled for delivery in August.

The 992 and 994, CDC's largest general-purpose mainframes, have a main memory of 256M bytes — twice that of previous models — and twice the I/O capacity with the introduction of a second I/O unit. The Cyber 994's primary I/O unit can support 24 channels at 3M-byte/sec., while the second I/O unit can support 28 more channels at 15M byte/sec.

The Fortran compiler enhancements improve performance by 20%, the firm said. The tool has a loop unrolling feature that uses artificial intelligence software to realign Fortran loops for faster processing. Additional Fortran releases, scheduled to be shipped in six months, would boost system performance another 15%.

Dech said CDC's models, which have 64-bit architecture, compare favorably with IBM's 3090s, which recently acquired 43-bit addressing.

The Cyber 992 is priced at $1.9 million for a single-processor machine with 64M bytes of memory, 10 direct-memory access processors and eight direct-memory access channels.

The Cyber 994 is priced at $2.1 million for a single-processor machine with 64M bytes of memory, 20 peripheral processors and 24 standard channels. Additional memory can be added in 64M-byte increments at a price of $7,500 per megabyte.

Flaw in IBM Cobol 85 compiler seen as minor; options revealed

BY CHARLES BABCOCK
CW STAFF

IBM's mainframe Cobol 85 compiler failed only one portion of the National Bureau of Standards (NBS) test suite, and that failure occurred in an area likely to affect few users, according to two Cobol experts.

But IBM may still need months of development effort to convert the compiler into a commercial product, the experts said last week.

The Validation Summary Report issued by the Software Standards Validation Group of the NBS said IBM's VS Cobol II compiler returned the wrong record size when the Cobol phrase RECORD IS VARYING DEPENDING ON was used under a specific condition. The wrong value was returned when the operating system was asked to read variable-length records in conjunction with relative I/O.

"Variable-length records would be very uncommon in an MVS production environment," said William M. Klein, product planner at Application Development Systems, Inc., a San Jose, Calif., producer of a Cobol debugger.

"Less than 1% [of users] use relative record I/O. Of those, only 1% use relative I/O. I suspect this is something IBM overlooked," noted Roger Knights of SPC Systems USA in Seattle, producer of a Cobol report writer marketed by IBM.

Both Knights and Klein said IBM will be able to correct the error before Jan. 1, 1989, when its compiler is scheduled to be tested a second time.

Flaw linked to record length

The compiler returns the correct record length when asked to read fixed-length records because the length "corresponds with the maximum record size declared in the Cobol program," an appendix in the NBS report stated. When a record smaller than the maximum is written, "the I/O control system pads it with blanks," returning an inaccurate value.

The validation test was conducted under Version 1 of IBM's MVS/XA on an IBM 3081 mainframe. The current version of MVS/XA is 2.2.

The mainframe Cobol 85 compiler could pass the tests and still not be ready as a commercial product because it might lack well-phrased error messages or other user-oriented features, Knights said.

The validation report revealed that IBM added two optional modules to its compiler that were not necessary to pass the test. IBM requested that the modules be checked anyway, and both passed without discrepancies. One is a debugging module, and the other was a segmentation module.

Sun's 386

CONTINUED FROM PAGE 1

simulate a complete IBM Personal Computer environment so that they can run PC-based applications.

The system is currently being beta-tested by Sun end users and OEMs.

Sun's Intel Corp. 80386-based system, the company's first Intel-based machine, was developed at its Billerica, Mass., division. The system has been ready for several months but was delayed while company officials wrestled with positioning issues, sources said.

Choice is yours

With the introduction of an 80386-based system, Sun will be providing its customers with a choice of three different architectures: its traditional systems, based on the Motorola, Inc. 68000 series microprocessor, the newer scalable processor architecture systems, based on Sun's own proprietary reduced instruction set microprocessor, and systems using the Intel chip.

The addition of an Intel line allows Sun to further extend its philosophy of one operating system for multiple architectures, industry observers said.

"They want to offer the customer a choice," said Michael Orsak, industry analyst for Robertson, Colman & Stephens. "All systems are Unix-compatible so that the architecture becomes less of an issue."

It also allows Sun to get a foothold in corporate accounts committed to either Intel-based systems or MS-DOS.

Initially, Sun will market the system primarily through value-added resellers (VAR), thereby avoiding direct competition with IBM PC-compatible makers, like Compaq Computer Corp., that sell strictly through retail channels. Last November, Sun launched its VAR program. The number of VARs currently qualified under that program remains undisclosed.

Sun, however, is investigating the possibility of entering the dealer channel, sources added, a decision that is not expected to be made soon. "I don't see them being a direct threat to Compaq," Orsak said. "It takes an awful lot of effort to set up retail distribution. That's been Compaq's strength."

Senior Editor Ed Scannell contributed to this report.

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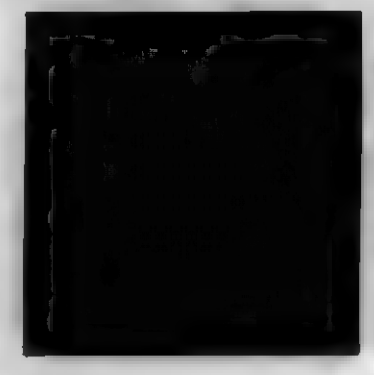

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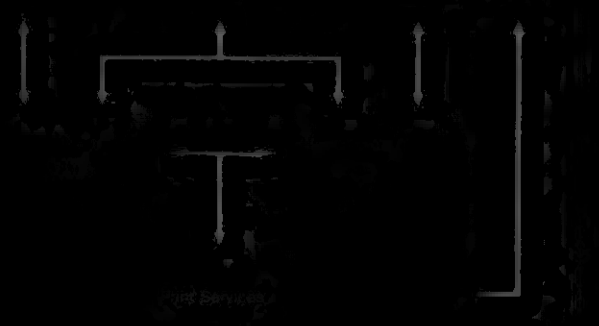

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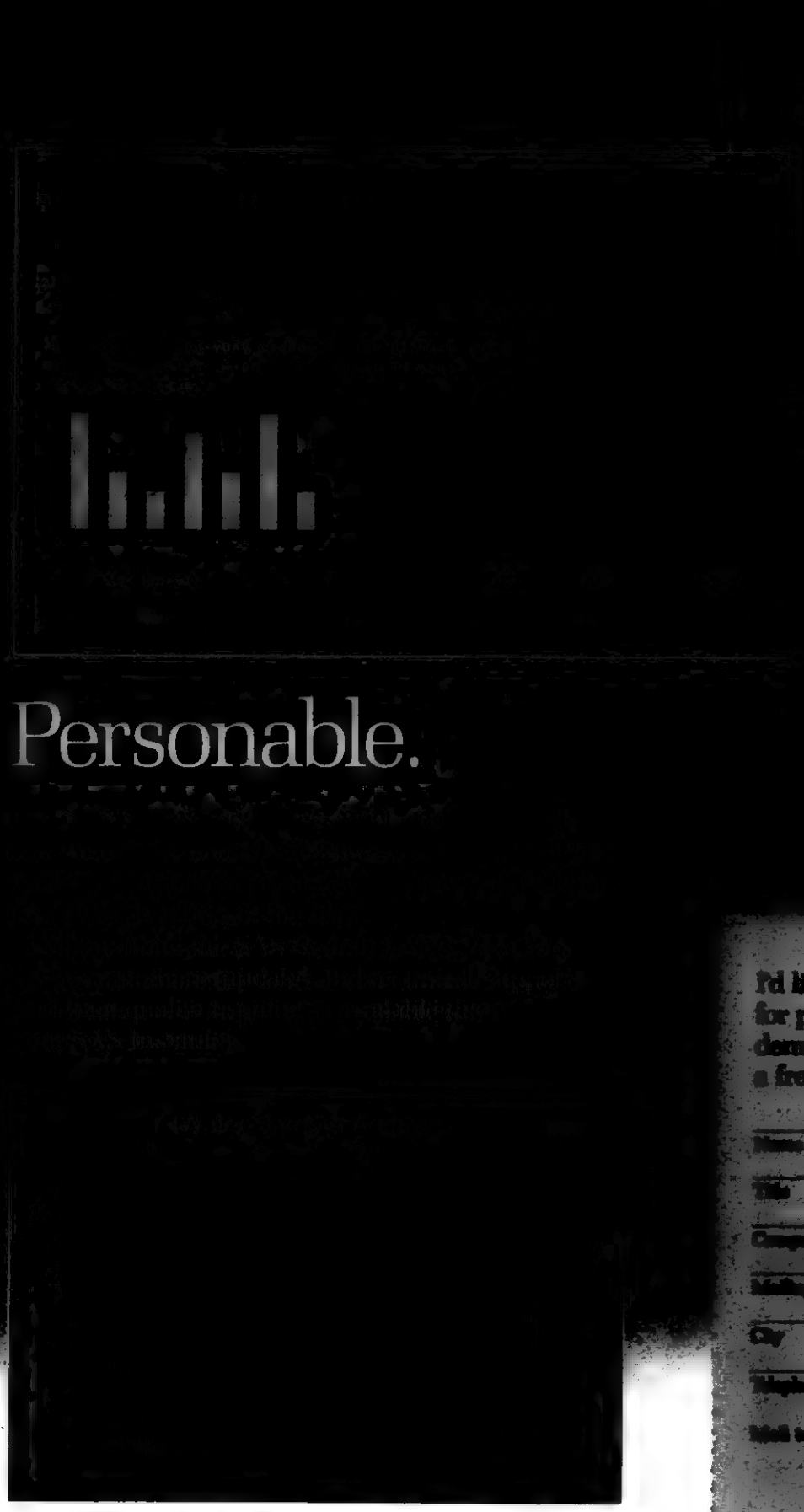

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Firms fuse LU6.2 into offerings

Spectrum, Communications Solutions answer peer-to-peer demand

BY KATHY CHIN LEONG and ELISABETH HORWITT
CW STAFF

Pointing to a growing interest among large companies in IBM's LU6.2 peer-to-peer protocol, two firms introduced products last week that incorporate basic LU6.2 functions.

Communications Solutions, Inc. in San Jose, Calif., announced a local-area network gateway that supports both IBM 3270 and LU6.2 applications. And today, Spectrum Concepts, Inc. is scheduled to introduce Xque, an enhancement to its Xcom 6.2 software that allows files to be automatically extracted from an IBM System/38 printer spool and routed to another System/38 or 370 host running MVS.

Spectrum's Xcom 6.2 is a line of software that uses LU6.2 protocols to provide peer-to-peer batch file transfer to IBM and non-IBM systems. Xque was requested by users who wanted to print System/38 documents on an MVS high-speed 3800 laser printer, according to Mark Favelson, the company's XCom marketing manager.

Without Xque, users can manually intervene to route files from a System/38 to a 370 but cannot set up unattended printing functions, Favelson said.

Is Silverlake's future?

Xque is currently being shipped as a standard feature of all Xcom 6.2 products, the vendor said. While the enhancement currently supports the System/38, it was developed with the idea of eventually supporting Silverlake, IBM's expected integration of its System/38 and 36 computer lines, Favelson said.

Spectrum is in the process of certifying Xque's compatibility with LU6.2 gateways that have been announced by Communications Solutions, Eicon Research, Inc. and Novell, Inc.

Communications Solutions' Maxess Systems Network Architecture gateway, announced last week, concurrently supports LU6.2, IBM 3270 and Synchronous Data Link Control connections between networked IBM Personal Computers and hosts.

Maxess takes the place of an IBM cluster controller, but unlike the controller, which can recognize only 32 physical devices, the $4,995 Maxess can allow 32 concurrent host sessions to be shared among an unlimited number of networked PCs, Communications Solutions claimed.

The workstation software supports IBM's Advanced Program-to-Program Communications/PC protocol but takes up approximately 120K bytes less main memory than IBM's product, Communications Solutions claimed.

Maxess addresses a perceived user demand for network management in two ways. Emulating an IBM cluster controller, it can send basic alerts to IBM's Netview system. Maxess also allows users to gather information from a LAN and display it on a LAN workstation.

Set to ship in April, the product supports any IBM NetBios LAN and has been successfully tested with Novell, 3Com Corp. and IBM Token-Ring network products; Communications Solutions said. Maxess represents the first in a line of gateway products that will eventually support IBM Personal System/2 machines, IBM and Microsoft Corp.'s OS/2 operating system and CCITT X.25 protocols.

Siemens puts Saturn on ISDN orbit

BY JAMES DALY
CW STAFF

BOCA RATON, Fla. — Siemens Information Systems, Inc. mapped out the next leg of its journey to the Integrated Services Digital Network (ISDN) telecommunications standard last week with the introduction of Cornet, an ISDN Primary Rate Interface for its Saturn private branch exchange (PBX) line.

Cornet also includes Siemens' version of D channel messaging formats that can support a variety of services over an ISDN connection. Both products are scheduled for mid-1989 availability and will sport $15,000 price tags.

The Primary Rate Interface defines a high-speed 1.5M bit/sec. connection consisting of 23 64K bit/sec. B channels and a separate D channel to carry signals. The interface is commonly used as a high-speed pipeline between customers' switching equipment with hosts and carrier central office switches.

Islands of their own

"With Cornet, users can establish private islands of ISDN PBX networks in their own time frame and access the public network when it becomes available in their area," said Scott Angerson, group product manager for systems and networks at Siemens.

The vendor is encouraging information service companies and other equipment vendors to incorporate its D channel messaging formats into their own products, Angerson said. The D channel message set standardizes how various ISDN-compatible devices communicate. Although Angerson noted that a final ISDN standard for the format is at least four years away, Cornet's design allows incremental modification of its messages to maintain adherence to the standards.

But some analysts chafed when confronted with the protocol Siemens claimed is the "least proprietary" of existing PBX protocols. "That's like saying, 'I have the least case of leprosy,'" said Thomas Nolle, president of CIMI Corp., a Haddonfield, N.J., consulting firm. "The benefits of ISDN are related to standardization, and we're not going to have that if we upgrade existing proprietary interfaces with ISDN features. Siemens had the first commercially available ISDN chip set, so why, at this stage, come up with a quasi-proprietary standard even if you make it available?"

It was a dark and rainy night . . .

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — The morning after a violent rainstorm here last August, water began to trickle under the 18-in. raised floor at Household Financial Services' (HFS) suburban computing facility. It soon flowed in a torrent that would submerge the company's computer room under two feet of standing water for more than 24 hours.

In that time, minnows and carp swam freely in HFS's computer room, lodging in its computer cabinets. Several IBM 3090 mainframes were ruined.

"You could clearly hear the water flowing," recalled Gregory Hedges, HFS's data security manager, who told the chilling tale to 500 fellow customers of Comdisco Disaster Recovery Services, Inc. at a Florida meeting earlier this month.

"People who came to work wearing very nice shoes and suits had those clothes ruined as they tried to save tapes, paper forms and supplies that would be needed in the backup site," he said.

Ready for anything

But HFS was prepared to replace any ruined clothes, as well as to tend to hundreds of other details, because it had a thorough disaster recovery plan that was revised in 1987. Hedges and a team of MIS managers had been updating the plan as officers of a financial organization that authorizes credit card purchases, processes personal loans from 850 Household Finance Corp. (HFC) loan offices and supports transactions at 70 locations nationwide. They had no way of knowing that nine inches of rain would fall in 12 hours, ending on Aug. 14, 1987, causing nine Chicago-area businesses to declare flooding disasters.

Rains turned computer room into a high-tech fishin' hole

Hedges, who had arrived to work at 7:30 a.m. that day, said an emergency meeting of MIS and corporate officers was called by 9:30. By 10 a.m., a disaster had been declared. This made two of Comdisco's three Chicago-area hot sites available for HFS operations. Power was out in the area, as was most phone service, and most roads were blocked by the floodwater for most of the day.

The disaster recovery plan spelled out tasks so that substitutes could replace tired or incapacitated workers, if necessary. It even took into consideration the possibility of loss of life, Hedges said. The plan resulted in the restoration of minimal system operations by 11 p.m. the first day of the flood.

"You didn't have to tell people what to do," recounted Sandra Akemann, assistant vice-president at HFS, who helped write the plan. "We had been through three dry runs before this."

Within 13 hours of the declaration of a disaster, HFS and Comdisco had restored the key operating systems on hot-site machines. The disruption did not paralyze HFC's business, Hedges said, since the plan called for collecting local data and posting it within 24 hours. Four days into the disaster recovery effort, normal operations were restored.

Within 10 days, HFS's computer room had been decontaminated, refurbished and outfitted with new mainframes and disk drives. Fifteen days after the disaster hit, HFS operations returned, in a caravan of 17 cars full of data tape, to the firm's Prospect Heights, Ill., headquarters.

Data comes first

The first task of the disaster recovery plan, which identified key functions and established priorities, was to rush vital financial data, which had been updated late on Aug. 13, to the hot sites, located in nearby Wood Dale. The software team then brought up IBM's Transaction Processing Facility/Airline Control Program transaction operating system on the hot site's IBM 4341 mainframe and brought up MVS/XA on Comdisco's IBM 3084 Q.

At the same time, HFS asked IBM and National Advanced Systems to replace the ruined equipment, which included two IBM 3090 mainframes, two 4381s and a 3033, along with IBM 3380-type disk drives; however, HFS declined to specify what it now has in operation.

An IBM field engineer removed one head disk assembly from a vital disk drive for use at the Comdisco hot site. The move allowed HFS to restore all Aug. 13 transactions. About half of the 400 people on HFS's data processing staff were assigned official roles in the disaster recovery plan. The remainder formed a resource pool, Akemann said, that filled the gaps in manpower.

HFS's plan worked because it addressed details, such as the replacement of ruined clothes, as personal issues. It did not, however, anticipate that a flood would be caused by local municipal variances, which allowed two neighboring corporate campuses to drain rainwater over HFS's grounds.

"HFS's drainage could have handled the runoff from one corporate campus," Akemann noted, "but not from three."

Landscaping changes made since the flood are designed to prevent a repeat of the disaster, Akemann added.

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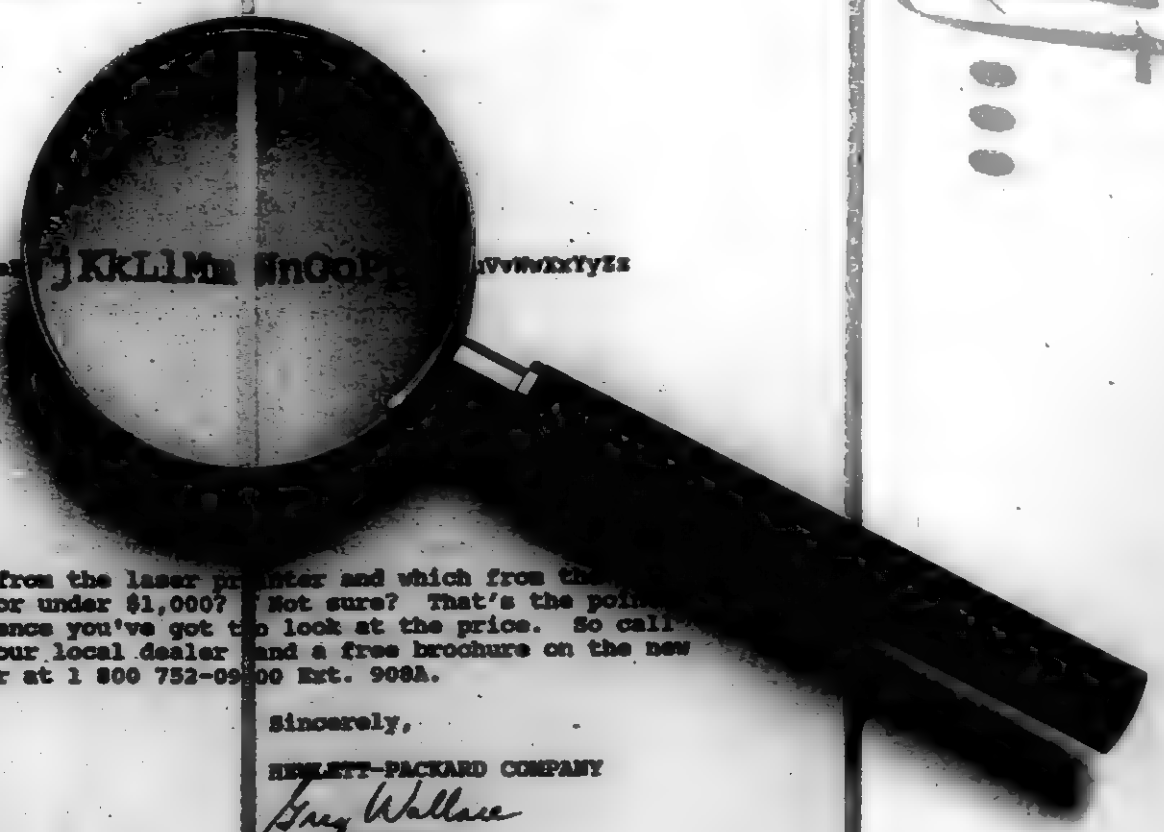

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EDITORIAL

Nothing like it

TO PREDICT THE impending death of mainframe computing has been one of the industry's great fads of late. But IBM's announcement of a new version of MVS shows that the country's largest companies just aren't buying that line.

When it releases MVS/ESA later this year, IBM will give users of its largest mainframes an 8,000-fold boost in addressable memory space, although it will limit most of that additional capacity to data. It is significant that MVS/ESA was announced so soon after a period IBM had declared "The Year of the Customer." The company spent a lot of its time in 1987 in earnest discussions with its largest customers. Those users have been hearing a confusing array of messages. They've heard departmental computer makers tell them that networked minis are the best way to handle data. They've heard Microsoft say that Intel 80386-based network servers are the way of the future. And data base vendors have held forth the Holy Grail of distributed data base management systems.

But after hearing all the pitches, those customers apparently came back to IBM with a simple message: Move the applications out to the field, but give us central control over data.

That message makes a lot of sense. Data is increasingly becoming the lifeline of large organizations. The thought of breaking up and distributing that data without adequate controls on concurrency, security and integrity is enough to set an MIS director's teeth on edge.

But at the same time, users are pushing to distribute applications to the lowest possible level. PCs have taught us that data should be separate from the mechanisms that use it. Given the proper set of tools, end users are capable of thinking up remarkably creative ways to solve their problems. And those approaches have created an insatiable appetite for more data to manage.

When IBM introduced MVS/XA seven years ago, its 2G-byte address space seemed like an ocean. But applications like automated teller machines, credit card authorization systems and integrated manufacturing systems have quickly gobbled up that space. At the same time, PC power users and departmental computers have been hitting on the data center for higher quality information — and more of it.

IBM has put three critical strategies in place to address this trend. Its cooperative processing thrust and Systems Application Architecture acknowledge that users should process data as they please, regardless of the hardware it runs on. MVS/ESA, on the other hand, gives MIS the tools it needs to deliver data quickly and in large volumes. The strategy will take years to evolve, but it represents some sound thinking.

IBM has recognised that each component of an information system has its place. PCs are a terrific window on the world — friendly, responsive and fast. Minis and local-area network servers do a good job of sharing information locally. But when it comes to crunching raw numbers, IBM believes you still can't beat a mainframe.

LETTERS TO THE EDITOR

Section 1706: Up in arms over a taxing situation

The story "Independents' backs to the barricades" [CW, Feb. 1] appeared to be written by a lawyer from the brokers trade association.

I am very disappointed in the manner in which *Computerworld* handled this important issue. I suggest you give equal opportunity to the other side of the story. I am sure I can be instrumental in making appropriate information available.

John R. Rapasky Jr.
Chairman, Chief Executive Officer
Zink & Katich, Inc.
Lansing, Ill.

As president of a professional services company, I found your recent story on independent contractors misleading and inaccurate. Congress passed Section 1706 as part of the tax reform act to eliminate tax loopholes and abuses permitted by the safe harbor clause. To reverse this to benefit an elitist group of workers would make a mockery of tax reform. It is time to report the whole story.

Robert A. Jones
President
Computer Dynamics, Inc.
Southfield, Mich.

The article on Section 1706 disappointed me. The headline, "Independents' backs to the barricades" and the construction barricade design promised a balanced report. Instead, I felt I was reading a partisan press release. If your construction barricade means the author is still writing, please run the next installment.

I would like to read more news directly from the Internal Revenue Service, other responsible organizations like ADAPSO and some congressmen who voted for Section 1706.

Tell me why the independents are up against the barricades. I still don't know. The author made it sound like they are far from the barricades, grouping beneath a wing of a Washington lobbyist's special interest group and shouting jingoistic slogans. Maybe the story should have been titled "Independents promise to make matters worse for management."

Except for the U.S. Department of the Treasury, Section 1706 was far from a pleasant experience for anyone, including Mincron SBC Corp. By the way, how much more revenue has been collected with the imposition of Section 1706?

Regardless, the last thing any of us needs is more change in the tax code.

Frank Prescott
Director of Recruiting
Mincron SBC Corp.
New York

The article "Independents' backs to the barricades" is an inaccurate assessment of Section 1706's effect on independent contractors in MIS industries. The section does not impinge on the mobility of independent contractors. It simply clarifies and corrects a situation in which, prior to 1706, individuals were allowed to represent themselves as independents and to receive tax benefits they were not entitled to.

The author's reference to amend or overturn the law would allow tax benefits to a small group of individuals that are not available to everyone else. Section 1706 is a fairness issue. Why not report the facts as they really are and present those sides of the issue?

Robert S. Forman
President
IMI Systems, Inc.
New York

The story "Independents' backs to the barricades" only presented the position of independent contractors opposed to Section 1706.

In the spirit of fairness and good reporting, *Computerworld* should inform its readers that the article only represented those independents seeking to alter Section 1706. It is time for proponents of 1706 to voice their views.

Robert J. Symolski
Chairman, Chief Executive Officer
Cap Gemini America, Inc.
New York

The independent contractors do not have their backs against the barricades, the brokers do. Frankly, it is the confusion that is continually fostered by comparing apples with oranges that angers me. I am an independent contractor and have been one for quite a few years. The new law has not affected me or the customers I meet in any way. But then again, I operate a business, not a loophole.

Bill Eh
Independent Contractor
Los Angeles

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

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Computer ethics for cynics

Students need to learn that people matter and can be trusted

BUCK BLOOMBECKER

"Being ethical only allows other people to take advantage of you."

This bit of cynicism came from a college student after listening to a recent speech of mine, "Why I'm not a computer criminal." Clearly, my effectiveness at communicating the importance of ethics in a computer security strategy was less than 100% that night.

I shouldn't have been surprised. The student who spoke was enrolled in a computer science program that offered no ethics courses. As such, he was like virtually every other computer student in the U.S. A mere handful of schools offer computer ethics courses.

Faculty members praise me for coming to town to speak about about computer ethics. They explain that with all the important changes in technology, they just don't have the time to teach that subject.

Double-edged teaching

In teaching students to value technology so highly, we often imply that they need not value people.

This approach is likely to turn out employees who come to work in data processing departments needing remedial ethics education. For starters, we will have to teach them that people matter and can be trusted. It is an uphill battle, but fortunately, there are signs of hope.

The blindness to the importance of human values among college faculties is very often matched by a similar attitude in the computer security professionals and MIS managers entrusted with safeguarding computer-related assets.

'Integrity' a dirty word

One industry reporter wrote recently, "Interviews with several companies . . . reveal that rather than using sophisticated electronic security systems, the most common method of security is reliance on employee integrity."

Never before had I seen "integrity" used as a dirty word. The implication seemed to be only a step in cynicism away from that of my collegiate listener. Rely on integrity? That would be the last thing a high-tech company would ever do if it were serious about security.

According to Hewlett Packard's computer security manager, Hans von Braun, "Most companies base their security standards on 'low trust' and countermeasures." In contrast, the HP way is "high trust" — focusing on rewards for doing things right. In practice, this means that von Braun restricts his programmers far less than many of his colleagues in the security field do.

"Bank security people are appalled at our lack of limitations," von Braun says. Administration of HP's ACF2 access control system is decentralized. Occasionally, von Braun will check, but he leaves most of the administration of security to systems programmers.

TOM LULEVITCH

"Trusting employees is central to our way of doing business," he adds. "It leads to a lot of innovation when they have freedom."

Convincing co-workers and others you rely on to follow your company's ethical standards goes with the management territory. In fact, as computer crime becomes recognized as a more serious threat, the necessity of ethics will become more evident, and the pressure on managers to motivate their staffs to ethical action will increase.

If the pressure does not come from within, it will come from professional organizations attempting to justify the claim that their members are professionals. If the organizations don't apply pressure on their own, eventually, the law will require ethical standards in response to public demand after some major calamity.

W. Michael Hoffman, director of the Bentley College Center for Business Ethics, reports that the implementation of ethics programs is on the rise throughout the business community.

Hoffman points out that most companies have established ethics codes and that an increasing number are establishing committees to enforce them — ombudsmen to counsel employees about ethical dilemmas and, occasionally, even judicial boards to handle ethics violations.

Ignorance not bliss

Pierre Chenebert of Hydro-Quebec reports that computer ethics awareness has made a significant difference at his company. After the internal auditors reported that a password system was needed to protect the company's on-line processing system, he called on the Canadian consultancy DMR Group to develop a companywide ethics awareness program.

"Our corporate culture was exactly the opposite of that in banking," Chenebert explains. "Employees saw no reason to protect data." In the course of the awareness training, he found that people were selling data maintained by the company because they were not aware of its confidential nature.

"Once they understood the nature of the material and the morality involved," he says, "they agreed they should not do it." Software piracy stopped, and a password system was established without resistance from the employees or their unions.

Many consultants agree with a people-centered approach to computer security. Crimes occur not only because there are people who want to commit them, but also because those people think they will not get caught.

This judgment often depends

Continued on page 18

Bloombecker is director of the National Center for Computer Crime Data in Los Angeles.

Welcome to the complex and messy world of integration

JOHN KIRKLEY

At a Chips and Technologies press conference last month, there were the media and the message. The media included a new-age video with sea gulls and sunsets, a somewhat balky slide show and sincere executives speaking earnestly to a roomful of business and trade journalists.

The main message was the introduction of the company's new high-end IBM Personal System/2-compatible chip sets. But as the morning progressed and reporters began asking questions, a sense of reliving history began to creep over the more gray-haired members of the press corps.

It started when someone asked about IBM's marketing strategies for the PS/2 line.

Same game, new name

"It's a mainframe game," said one of the Chips and Technologies luminaries. "IBM is selling the PS/2s just like they sold mainframes. It's going to be more difficult for companies — the clone makers, for example — to compete. It will take more money and more resources. But Amdahl and other IBM-compatible mainframe companies proved it can be done successfully."

After all the PC hoopla, once again, it's a mainframe game. The new Intel 80386-based machines give you the power of a mainframe on a desktop.

Blinding speed, multitasking, cache memories, interleaving and, of course, the ability to tap into the resources of the corporate computer all make the PS/2 Models 50, 60 and 80 a formidable family. The clones that will appear later this year will be even faster and more powerful than the IBM machines they emulate, according to Chips and Technologies.

End users still hungry

Even without these new powerhouses, today's minimum technological starter set for many organizations is an Intel 80286-based machine with graphics capability and 20M bytes of storage. The more voracious, MIPS-eating end users are calling for, and receiving, 386-based PCs or Apple Macintosh SEs or Macintosh IIs.

The rise of networks — in particular, PC local-area networks — is likely to accelerate during the next five years. Concurrently, there will be a decrease in time-sharing systems and the continuing decentralization of computing resources that has been going on for more than a decade now.

There is much talk about two- and three-tier architectures; that is, terminals, PCs and workstations tied directly to the mainframe vs. an architecture in which mid-range departmental systems sit between the mainframe and the end-user desktop

DATA, applications and users will interact by intricate and organic means to form a much more complex and egalitarian system.

machines. There's a certain neatness to each of those scenarios.

Real life is messy

But in real life, the connections between users at all levels of the organization — between hierarchies of equipment, between LANs, larger corporatewide networks and global wide-area networks — will evolve in a much more functional and messy way.

In all likelihood, data, applications and users will interact by intricate and organic means to form a much more complex and egalitarian system than that implied by the two- and three-tier models.

The massive move to connections at all organizational levels creates additional challenges and opportunities for MIS.

IBM, traditionally the purveyor of the two-tier model, is evidently going to provide MIS with a tool to regain at least a modicum of control. The firm is allowing some users to play with a diskless version of the PS/2 Model 50 equipped with the Micro Channel architecture. One of the motivations for building the system is to let MIS organizations control the data and applications that end users can access from the mainframe.

Continued on page 18

Kirkley is a computer industry writer, editor and consultant based in Warwick, New York.

Integration

CONTINUED FROM PAGE 17

But despite the obvious appeal to MIS managers who prefer centralized control, this move is hardly the harbinger of a return to the good old days when the data processing center held the keys to the kingdom.

End users have tasted freedom, they have become much more sophisticated technologically, and they intend to control their own data.

Managerial misconceptions

One information systems professional, who is now working outside his company's MIS department, says, "The managers in the MIS shop are still doing the same old thing. It takes months — in some cases, years — to get an application to run. Mostly, they're maintaining tons of old code. They think they are controlling the data base, but the fact is that the users are building their own data bases on the hard disks of their 286- and 386-based PCs."

Another manager within MIS presents a different view. "We say, 'To hell with technology.' " He and his MIS colleagues are configuring their organization's systems based on the way the corporation's structure is evolving, instead of reacting to the latest releases of hardware and software.

With the mainframes on the desk top tied to the mainframes in the data center, with the corporation awash in millions of instructions per second, with end-user computing growing and with networking changing the face of organizational information resources, MIS departments are going to be hard pressed to develop unique strategies that meet the constantly changing needs of their organizations and end users.

MIS omnipotence obsolete

There is no one way to meet the demand. In the light of current developments, the entire relationship between MIS and the end-user community has to be rethought.

The old formulas won't work. Neither the old role as the high priest of DP wielding ultimate control nor the opposite persona of the laissez-faire consultant fits today's environment.

Instead, 1988 marks the beginning of a new era characterized by closer interaction among management, MIS, end users and vendors. The demarcations among these elements are blurring and shifting.

Management is becoming more oriented toward the strategic deployment of information resources. MIS is becoming more involved in business strategies and long-range corporate planning. Users are growing in technological sophistication and taking responsibility for their data and applications development. And vendors are beginning to offer consulting services to address the managerial and strategic planning concerns of their customers, in addition to providing the latest hardware, software and networking systems.

Having lost the power of its autonomy, MIS must search out ways it can fit in with the variables of this new, complex equation.

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Computer ethics

CONTINUED FROM PAGE 17

on the ethics of those around the would-be criminal. If no one questions the sudden appearance of a luxury car parked in the employees' parking lot, its owner feels safe as he continues to steal from the data center that he's supposed to be running. If no one asks why one woman on welfare has 36 children, she will continue to submit claims and cash her benefit checks.

Crime detection is only the most obvious benefit of ethics education for those who work in data processing. Consultant Danielle Pouliot from DMR Group lists a number of results: better understanding of the validity of security; clarification of the organization's expectations; clarification of each employee's responsibilities; acceptance of new responsibilities in computer security; development of more employer-employee cooperation; and the development of a feeling of belonging.

The benefits of teaching — and learning — ethics are too important to let them get drowned in cynicism.

This week in history

Feb. 27, 1978

Overall U.S. data processing spending will rise 13.1% during 1978, fueled by increased demand for hardware to improve throughput and computing productivity, International Data Corp.'s annual computer industry market forecast predicts.

Feb. 28, 1983

The data processing industry, the scientific community and segments of Congress are up in arms over a Reagan administration decision to crimp funding of the federal government's computer standards program from $10 million to $3 million. Such a cut would virtually eliminate the Institute for Computer Sciences and Technology of the National Bureau of Standards — a program whose charter is to develop federal computer standards and aid government agencies in their DP use.

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SOFT TALK

Les Gilliam

Measuring development

Is there a practical way to measure the result of the applications development process? "Function points" appear to offer an approach that could work.

The function point concept was publicly discussed by Allan Albrecht of IBM in 1983 at Guide 57 and has been in use within IBM since 1978.

To measure function points, a procedure has been developed for analyzing an application and assigning numerical values to the input, output, internal file, interface (external) file and inquiry activities within that application.

The choice of hardware or software to be used does not matter. Further, it makes no difference which programming language is used. The measure can take place before a line of code is written, if the design is complete.

These values are then adjusted according to other application attributes, such as computation complexity, to yield a single application measure called function points.

If the cost of designing, developing and implementing that application is known, a productivity value can be calculated by dividing the number of function points by the cost.

But using only personnel costs in the productivity formula

Continued on page 23

SAA goals broaden

Cooperative, distributed processing targeted

BY CHARLES BABCOCK
CW STAFF

NEW YORK — IBM's Systems Application Architecture (SAA) has a broader underlying goal than simply providing common user interfaces and applications that are portable across hardware platforms, according to its chief IBM spokesman, John T. Friedline, manager of SAA marketing.

Speaking here at a conference sponsored by The Yankee Group on "The New IBM," Friedline stated that one of the goals of SAA is to "isolate changes of underlying hardware from application programmers."

He indicated that such a goal would not only provide application portability but would allow IBM to alter and upgrade its processors without worrying that the machine changes made a programmer's development skills or a firm's existing programs obsolete.

IBM is also banking on being able to provide, through SAA, a capacity for distributed applications across multiple hardware platforms, particularly between mainframes and personal computers.

Friedline referred to both cooperative processing and distributed processing — he did not attempt to distinguish between the two — as major goals of SAA and the reason behind the addition of CICS/MVS and IMS/VS to the SAA line-up last October.

IBM needs to provide distributed services under SAA, utility programs that provide printouts or move files across multiple systems. This effort "needs a lot of work," Friedline acknowledged.

One key to IBM's distributed approach already figures prominently in SAA — relational data base and the relational data access and manipulation language, SQL, he said.

IBM believes it must continue to offer multiple operating systems and hardware platforms because its customers require systems optimized for different tasks, the IBM official said.

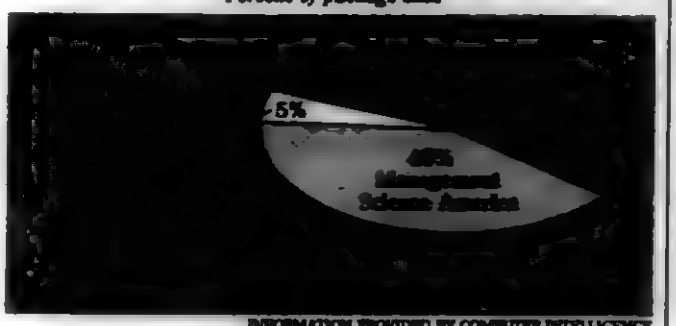
MVS/XA, for example, is

Continued on page 23

Data View

Fixed-asset software

Percent of package sites



INFORMATION PROVIDED BY COMPUTER INTELLIGENCE
CW CHART

PC users can tap SNA via emulation software

DANBURY, Conn. — VM Personal Computing, Inc. recently released a version of its IBM 3270 emulation software with VTAM support.

The new version is available for IBM VM/VTAM and MVS/VTAM and gives microcomputer users direct access to an IBM Systems Network Architecture (SNA) environment, the firm said. Users can dial into an IBM mainframe running VM Personal Computing's Relay/3270 and let their personal computer function as a 3270 terminal in an SNA environment. The connection is made over a telephone line. Relay/3270 runs on an IBM mainframe. PCs must run VM Personal Computing's Relay Gold to access Relay/3270. The two programs combined provide a software-only method of 3270 emulation for a microcomputer.

Because no hardware add-ons are required for 3270 emulation, a PC can function as a 3270 terminal in most remote locations, the company said. Laptop computers can participate in an SNA environment as well.

The MVS/VTAM version is available now. The VM/VTAM version is scheduled for shipment in April. Relay/3270 for MVS/VTAM can be licensed for $14,500. The VM/VTAM version will be offered for $12,500.

Current Relay/3270 users who request the VTAM support will be charged an upgrade fee that has not yet been determined, the company said.

Monitor lets users access remote screen

YORBA LINDA, Calif. — On-Line Documentation, Inc. has a new look. Release 2.1 of the Look on-line CICS terminal monitor software system lets users view remote terminal screens instantly.

The degree of remoteness affects neither the screen contents nor their immediate appearance on the user's screen, according to the company. Release 2.1 target terminals need not be predefined; definition to CICS is all that is required to bring a terminal within Look's sights.

A Look 2.1 user can set up joint viewings by calling a remote terminal operator and selecting the remote CICS terminal screen contents to be viewed from a current list of CICS sessions. An unlimited number of terminals can be monitored, and Release 2.1 includes a security interface that keeps remote screen data out of view of unauthorized parties as well as an on-line security definition process.

Look 2.1, which supports CICS Releases 1.6 and 1.7 under IBM's OS or DOS, is available now. A single-CPU permanent license costs $2,955 for DOS and $3,995 for OS.

Inside

- Computer Associates smoothes VSE-to-MVS conversion. Page 22.
- Unisys enters Executive Link into corporate America. Page 26.

Compuserve grafts on application generator

BY NELL MARGOLIS
CW STAFF

NEW YORK — A menu-driven, screen-based application generator that lets users both develop and maintain applications in a highly visual manner has been added to Compuserve Data Technologies' System 1032 product line.

System 1032, which now includes System 1032 Application Facility, or System 1032/AF, is Compuserve's fourth-generation language and data base management system for Digital Equipment Corp.'s VAX. System 1032/AF was designed as an add-on module and will be available next month, according to Laurie Conrad, senior product specialist.

The application generator's menu-based editors allow a user to specify data, menus, screens, application logic, Help messages and end-user actions — most of the application components, according to Compuserv.

At the same time, System 1032's fourth-generation language enables a user to add a custom operation or procedure. The language resembles Pascal, Conrad said.

For Lois Riskin, data base administrator at American Cyanamid Co.'s Agricultural Research Division in Princeton, N.J., a longtime System 1032 user site, an application generator that would let her build System 1032 applications with multiple data sets was something "that came not a moment too soon."

For years, Riskin reported, "we had been meaning to catalog all of our government submissions. And all of a sudden, my boss needed a full report 'a week from Friday.' "

Using an alpha-test version of System 1032/AF, Riskin produced a prototype catalog application — "my first ever with AF" — and, within a day and a half, finished the production application less than two hours after leaving the meeting at which she presented the prototype.

Timesaving time

Within three days, she said, she wrote the report code that she incorporated into the application. Without AF, Riskin said, the job "would have taken two weeks instead of 1½ days, and I couldn't have included error checks and exits."

Some users like to begin development by designing data structures; others prefer to start off building menus and screens. System 1032/AF, Conrad said, accommodates both, keeping final applications consistent regardless of the order in which they were designed. In addition, Conrad added, System 1032/AF applications can integrate most VAX software and facilities.

License fees for System 1032/AF will range from $600 to $24,000, depending on CPU. Basic System 1032 prices range from $3,000 to $120,000.

SOFTWARE NOTES

'DB2-SQL Tips' hits presses

New York-based consultant George Coronado is now offering **"DB2-SQL Tips,"** a newsletter that supplements his "DB2-SQL/DS Users Bulletin." The first set of tips includes information on using naming convention standards, avoiding referential integrity problems and managing IBM's DB2 Union statement. "DB2-SQL Tips" is available for a fee of $10 to $15. Write to Box 560, Wall Street, New York, N.Y. 10005.

Systems Educational Associates, Inc. in Oak Brook, Ill., is planning to publish a $250-per-year newsletter on IBM's Systems Application Architecture (SAA), called **"SAA Age."** The monthly publication will be edited by Chuck Balsly, an IBM mid-range system consultant, and Mark Webb, former managing editor of *Scope.36*.

Sherpa Corp. in San Jose, Calif., maker of an engineering data management system [CW, Feb.8], recently acknowledged that its product can be difficult to implement and has begun offering Quickstart. The $50,000 product, a combination of services and software, gives users the base data management system, on-site training and an application template — a software layer that addresses the particular application a user wants to perform.

Morino Associates, Inc. recently reported it has acquired a minority equity interest in Elan Software Products, Inc. in San Jose, Calif., a maker of operator productivity software. The deal calls for the two companies to cooperate on product development. Elan's IMS/VS Operator Workstation product is currently available. A version for IBM's MVS and MVS/XA operating systems is scheduled for release late this year.

Quant Systems in Charleston, S.C., has collected public-domain C programs and is offering them compiled for The Santa Cruz Operation, Inc.'s SCO Xenix 286 and SCO Xenix 386, Microport Systems, Inc.'s Unix and Tandy Corp.'s Tandy 6000-compatible Xenix Development System. The programs cost $12.95 per disk and reflect the work of university professors, students and C programmers.

Apollo Computer, Inc. has reached agreements with **Software Research, Inc.** and **Time Arts, Inc.** Software Research's software analysis and testing tools now operate on Apollo workstations for work on Cobol, C, Pascal and Basic programs. Apollo will also comarket Time Arts' Lumena/32 graphics package for producing digitized color images.

Management Science America, Inc. has installed its General Ledger System for IBM's DB2 at Ohio State University Hospital in Columbus for beta testing.

Digital Equipment Corp. has enhanced its OPS5 expert system building language to offer interfaces to artificial intelligence routines written in other languages and to eliminate runtime size limits. OPS5 can now call routines written in DEC's VAX C and VAX Ada, and OPS5 programs can be integrated with programs written in VAX Basic and VAX Bliss-32.

Amperif Corp. in Chatsworth, Calif., has acquired **HDR Systems, Inc.** in Omaha, producer of a Unix-compatible SQL-based relational data base management system called Noah. Amperif offers the RDM/2 data base machine that interfaces to Unisys Corp. mainframes, minicomputers and personal computers.

Execucom Systems Corp.'s IFPS/Plus financial planning and modeling package is available on the **Apollo Computer, Inc.** family of Domain 3000 and 4000 workstations, spokesmen for the company said.

CA-Duo eases conversion to MVS

GARDEN CITY, N.J. — Computer Associates International, Inc. recently released an upgraded version of its VSE-to-MVS conversion package that is intended to help users make a smoother transition to IBM's premier operating system.

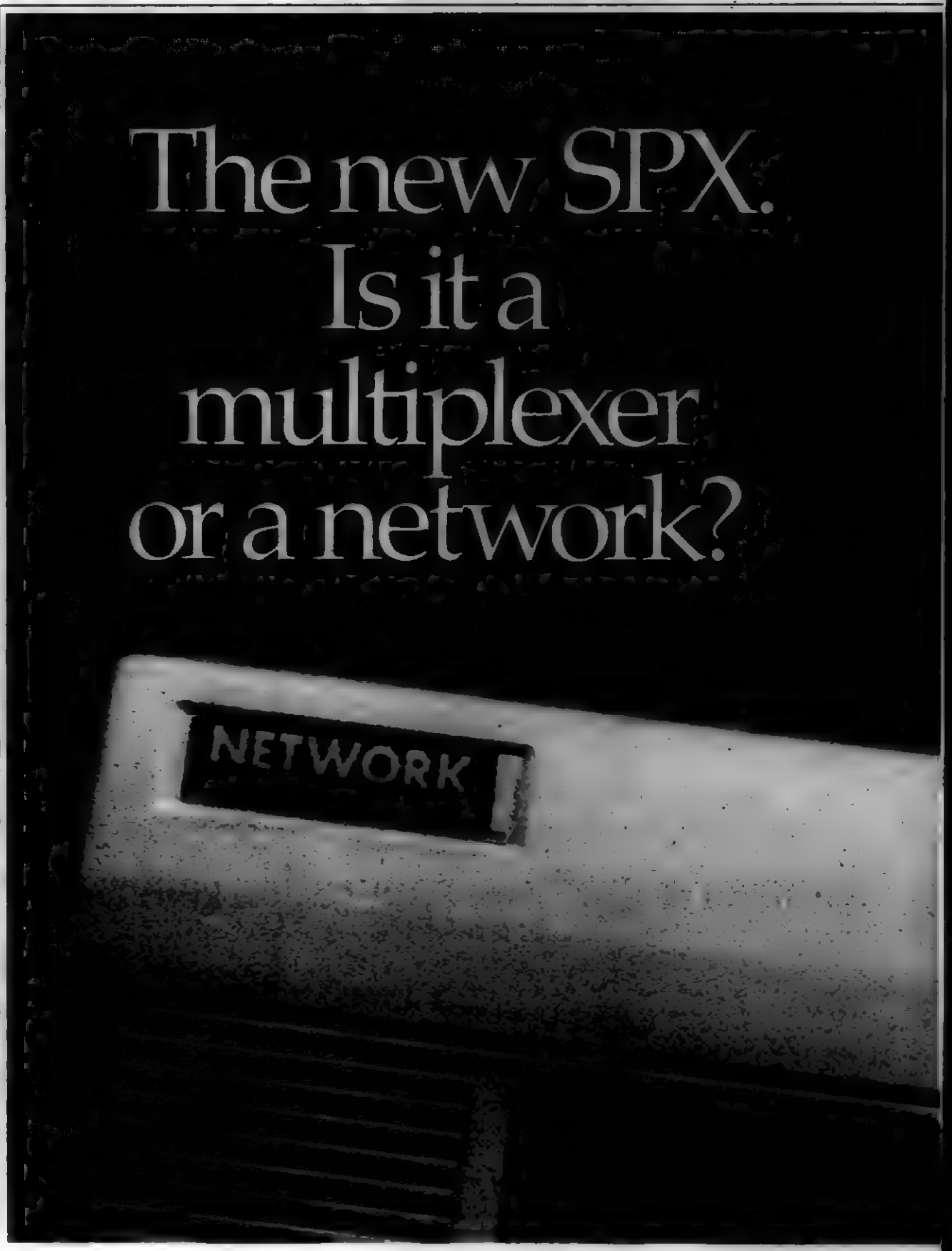
CA-Duo has been aimed at IBM DOS/VSE users moving to MVS. With Release 4.7, users of IBM's VSE/SP, the newer VSE operating system, will also be supported.

The software package is said to allow users to gradually move to the MVS environment. With Release 4.7, for example, users can execute a VSE program in an MVS environment.

The software package allows users to run a sort under MVS with VSE sort exit routines instead of rewriting those exit routines as MVS exit routines, the company said.

In addition, Computer Associates said, CA-Duo includes facilities that upgrade the performance of VSE programs as well as providing direct access to MVS facilities from within a VSE program.

CA-Duo Release 4.7 is available now. It carries a two-year license fee of $40,000. Current users of Release 4.6 who have maintenance contracts can upgrade free of charge, Computer Associates said.



SAA goals

CONTINUED FROM PAGE 21

much better at driving 1,000 users than five, Friedline said.

But MVS and other mainframe operating systems are no longer the only choices, he added, as witnessed by the "placement of 15 million personal computers over the past five years."

The mask

The purpose of the common programming interface of SAA is "to mask the differences of those operating systems" and still allow a developer to build applications.

Another part of SAA is a common user interface, so the user sees the same thing whether the application is on an IBM Personal Computer or "System/3X" — the follow-on to the System/36 and 38 code-named Silverlake.

"What is key over the next five years is to get access to end users, to drive production with application tools that should look the same and feel the same if they access different systems," Friedline said. "You want that done at the highest level possible, because life is too short for all of us to become application programmers."

No cure-all

SAA, however, is not a panacea for application developers. "What's critical is it still requires structured programming techniques. You must design applications for portability," the Atlanta-based marketing manager said.

One example is CICS Cobol applications. IBM has no plans to move its CICS teleprocessing monitor to smaller hardware platforms, such as PCs, because it does not make sense on single-user machines. That means a CICS Cobol program must be structured in such a way that the CICS Command Level statements are easily separated from the Cobol statements for it to be portable, Friedline noted.

He added that IBM is committed to moving its application development system, Cross System Product (CSP), into the IMS environment. CSP was previously limited to CICS and TSO under MVS and to CMS under VM.

Gilliam

CONTINUED FROM PAGE 21

leaves out a very vital part of the productivity effort — the tools used in the work process. Therefore, the costs should include computer costs as well as any other funds expended to support the design and creation of the application.

The developers and users of the function point approach contend that the technique is just not precise enough right now to measure a single program or the person who produced it. They do believe, however, that the idea is appropriate for measuring total applications. And by combining such data, the relative productivity of a development team or group could be measured.

Measuring MIS

Perhaps the productivity of a support group could also be measured. This might be done by first knowing the sum of function points for all applications being supported. Then the productivity of the support group is determined by dividing the function point total by manpower time and/or total costs. These figures could then be used for comparing and charting the trend of time and costs per, say, 1,000 function points supported. Other broad measures of all MIS activities are being developed in conjunction with the function point development work.

Having some type of uniform measurement of applications, along with the costs of producing those applications, provides valuable information to the MIS manager. For example, applications could be compared to point out the "above average" or "below average" systems. Then those factors that contributed to the productivity — or lack thereof — could be found and evaluated. Trends in productivity could be charted and used in measuring benefits of new tools like fourth-generation products.

Could function points someday become a universal standard in the measurement of a computer application system or its creators? Perhaps, if the method's evolution is supported and allowed to move toward greater usefulness and acceptability.

If the technique were to become an industry standard, could the MIS department be compared with other similar units within or outside the corporation?

What should an MIS organization do to take advantage of these ideas? Someone in the organization should be assigned the responsibility of tracking the progress made in the application of function points and other "software metric" concepts. Next, there must be a resource cost allocation system in use that captures and allocates man-hours, machine time and all costs down to the project, or applications, level. Service agreements should also be implemented.

Then, begin measuring the function points in all new applications in order to establish a routine for measuring and to begin creating the historical data base.

The most important step is to start. Then a learning and adjustment process on which to build can be set in motion. Those who make such a commitment early will likely be the first to reap the benefits of measuring and improving the productivity of the MIS unit.

Gilliam is president of Gilliam Associates, a management consulting firm in Ponca City, Okla.

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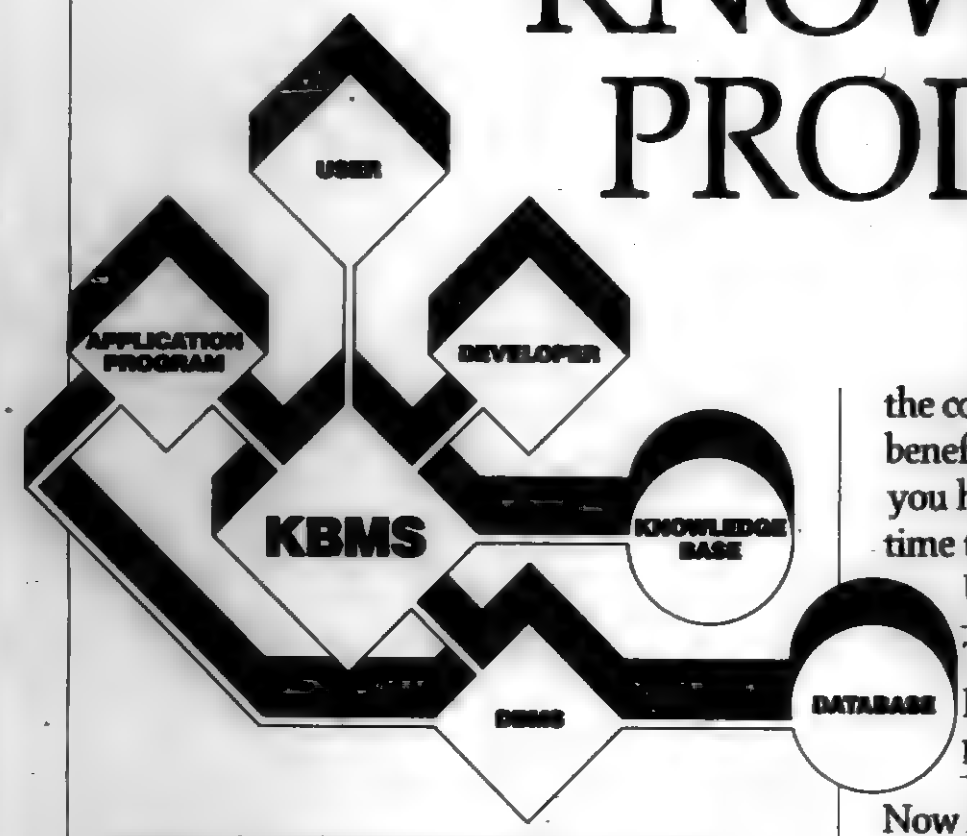

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NEW PRODUCTS

Systems software

An on-line, real-time system providing immediate transaction processing and full security for multilocation, multifacility health care institutions has been announced by **Global Software, Inc.**

Called **Hospital Material Management System**, or HMMS, the program was designed for use in the purchasing, disbursement and replenishment of stock and nonstock items. Features include automatic requisition consolidation, usage analysis capabilities, vendor performance reporting and real-time stock status checking.

HMMS runs on IBM 4300, 3000 and 9370 series computers and IBM System/38s and compatibles. It is priced from $90,000.

Global, 1009 Spring Forest Road, Raleigh, N.C. 27615. 800-334-7192.

Unisys Corp. has announced an integrated on-line, real-time financial management and accounting system based on its Linc fourth-generation language.

Executive Linc runs on Unisys A and V series mainframes. The modules include General Ledger, Accounts Payable, Accounts Receivable, Fixed Assets, Purchasing Order Processing, Inventory Control, Order Entry and Payroll.

Prices range from $10,000 to $36,000 per module, depending on the CPU.

Unisys also announced **DMS.View** and **Linc.View**, products for use with its Infoexec series of data management facilities and Linc II on the A series systems.

DMS.View allows A series users to access Infoexec's Interactive Query Facility and Workstation Query Facility without migrating their data bases. Linc.View offers the same capabilities for Linc II data bases.

DMS.View is included in the Infoexec series. A five-year license for Linc.View ranges in price from $4,000 to $119,000.

Unisys, P.O. Box 500, Blue Bell, Pa. 19424. 313-972-9515.

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PACKET/3270 is a trademark of PACKET/PC, Inc.

Utilities

A product said to allow users of IBM's Interactive Computing Control Facility (ICCF) to execute most user transactions directly from an ICCF command mode or full-screen edit-mode command line has been announced by **Dynamic Products, Inc.**

Called **DPIICCF**, the utility allows users to define transactions to be made available from ICCF in a table used by DPIICCF. Then users enter the tranid on the command line of a command mode of full-screen edit-mode screen. When the transaction is terminated, control returns to ICCF at the exact point where it was before exiting to the user transaction, the vendor said.

DPIICCF costs $80 per month, $800 per year or $2,400 for a permanent license.

Dynamic Products, 1782 Richard Circle, St. Paul, Minn. 55118. 612-451-3051.

Software designed to provide data compression under IBM's MVS and MVS/XA operating systems has been introduced by **Sterling Software, Inc.'s** Systems Software Marketing Division.

Shrink/IMS Express is transparent to application programs, the vendor said, and uses no tables. It also includes an IBM ISPF interface and requires a minimum of system overhead, so other jobs can be run simultaneously.

Shrink/IMS Express costs $19,000 for a site license.

Sterling Software, #100, 11050 White Rock Road, Rancho Cordova, Calif. 95670. 916-635-5535.

A spool-file management system for Hewlett-Packard Co. business computers running its MPE XL operating system has been introduced by **Unison Software.**

Spoolmate features preprint analysis, distribution control and multilevel priority queuing.

Also included are an on-line printing history for any printer and spool file, spool-file archiving in either the MPE spooler or a permanent disk and an audit trail to determine the status of a single spool file or a group of spool files.

Spoolmate is priced between $1,500 and $4,000.

Unison Software, 415 Clyde Ave., Mountain View, Calif. 94043. 415-968-7511.

Development tools

Software designed to extend full embedded SQL support to the IBM interpretive TSO Clist language has been released by **Relational Architects, Inc.**

RLX/DS allows development of Clist combining ISPF dialogue services with embedded SQL. RLX Clist dialogues can be edited and tested within ISPF/PDF Edit. According to the vendor, no compile and link edit steps are required.

RLX/DS adheres to standard syntax, enabling RLX SQL statements to be copied directly into Cobol or PL/I. Support is provided for nulls and host indicator variables, and SQL query results can be stored directly in ISPF tables.

RLX/DS costs $12,000. Annual rental is $4,000.

Relational Architects, Suite 2341, 175 Fifth Ave., New York, N.Y. 10010. 212-966-0010.

MICRO BITS

Douglas Barney

Criticism overblown?

Still arrogant after all these years? Several years ago, it was popular to characterize Lotus as arrogant.

The firm was the clear spreadsheet chieftain, had grown far more quickly than its support and sales staff could handle, clung tightly to copy protection and was bashed consistently by customers, competitors and the press.

Recently, Forrester Research reopened the topic by publishing a report that says Lotus customers love the products but hate the company. The report, based on interviews with a scant 34 customers, indicates that 56% of Lotus's customers find the firm "responsive to their service and support needs," but apparently 44% didn't.

But while a *Computerworld* survey of users failed to give Lotus an unqualified pat on the back [Nov. 2, 1987], the firm did get a healthy B for customer support. As for customer relations, Lotus got a C+ and praise for its efforts to improve.

Where does that leave Multimate, Framework and

Continued on page 31

Shift in Oracle OS/2

Rewriting pushes ship date back to April

BY NELL MARGOLIS
CW STAFF

BELMONT, Calif. — It seems rarely a week goes by that Oracle Corp. fails to make some sort of announcement. Last week was no exception.

In some ways, it was a reannouncement of the firm's Microsoft Corp. MS OS/2-based version of Oracle. Originally, the firm planned to do a simple port of Oracle to the OS/2 environment and ship it concurrently with the operating system.

Instead, Oracle chose to rewrite the product to take advantage of OS/2 features not attainable in a simple port, pushing back the delivery schedule.

Now slated for shipment in April, Oracle for OS/2 takes advantage of OS/2's multitasking and shared-memory features. The product gives users a server-based architecture geared to "the maximum overlap of computation and I/O," a company spokesman said.

The OS/2 product may be a critical weapon in Oracle's battle with the recently announced but still unshipped Ashton-Tate Corp./Microsoft/Sybase, Inc. SQL Server. "Oracle for OS/2 should give Oracle a competitive position against SQL Server," argued Michael Cohn, an analyst with Input, a market research firm based in Mountain View, Calif.

The latest Oracle — which can be used simultaneously as a stand-alone single-user system and a data base server to a multiuser network — is powered by

Continued on page 35

Data View

Off and running

Percent of micros using OS/2 expected to skyrocket by 1991

INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

Visicorp founder rejoins the spreadsheet fray

BY DOUGLAS BARNEY
CW STAFF

SAN FRANCISCO — The founder of ex-spreadsheet king Visicorp has reentered the rows and columns market with a line of add-in products for Lotus Development Corp.'s 1-2-3.

Dan Fylstra, who served as chairman of Visicorp until November 1984, last week announced three 1-2-3 add-ins aimed at boosting the speed of calculations and providing project management and decision support.

As the marketing agent for Visicalc, Visicorp once ruled the spreadsheet roost. However, a protracted legal struggle with Visicalc supplier Software Arts, Inc. concerning product enhancement issues gave Lotus an easy entre into the market. Visicorp was then sold to Paladin Software Corp., which itself folded.

In addition to supporting the product that helped destroy Visicorp, Fylstra's new firm, Frontline Systems, Inc., also plans to support other major applications, such as Borland International's Quattro.

Continued on page 30

DOS 32-bit package an OS/2 bridge

BY ALAN J. RYAN
CW STAFF

CUPERTINO, Calif. — Opus Systems is now shipping a coprocessor board and software package for personal computer users wanting to run 32-bit Unix-based applications from the Microsoft Corp. MS-DOS environment.

Typical applications for the Wizard of OS include computer-aided engineering, computer-aided design and manufacturing, and computer-aided software engineering. The product is viewed by some as an interim solution to problems that IBM and Microsoft's OS/2 ultimately are meant to solve.

"While users in the past have been able to take advantage of 32-bit multitasking applications on their PCs, they have never been able to do so while remaining in the pure DOS environment until now," said Robert DeHaven, Opus's vice-president of sales and marketing.

Continued on page 33

Insight

- Gupta's SQL server mainframe upside out. Page 29.
- Tool aims to put mainframes out of business. Page 29.
- Program diagnoses optical drives as hard disks. Page 30.

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C&C Computers and Communications

SMALL TALK

Julie Pitta

Dulcet tones or tin ear?

With the debut of Modern Jazz, Lotus has attempted to bring some harmony to what has been a dissonant relationship with Apple.

Lotus's original Jazz, an integrated business package for Apple's Macintosh, was introduced more than three years ago amid much fanfare. Even then, Apple had its eye on the elusive business user it hoped to reach with applications like Jazz.

Apple was in for a disappointment, as Jazz became one of Lotus's more prominent flops. The package was bug-ridden, lacked a macro programming language and, at $595, was considered overpriced. Although about 50,000 copies of Jazz were delivered during its first year on the market, according to Dataquest, shipments plunged to 10,000 in 1986.

In comparison, Microsoft delivered 15,000 copies of its Mac spreadsheet, Excel, which shipped later that year. Shipments of Excel jumped to 160,000 copies in 1986, according to Dataquest.

Lotus's failure with Jazz caused the software giant to reconsider its Mac development efforts. Why then, did Lotus choose to reenter the Mac market with a name that is less than music to the ears of Mac users?

"It's one of those questions that you can argue on its behalf or against it and still be right," says Kathy Lane, an industry analyst at Dataquest.

There were many such arguments at Lotus headquarters before the firm's marketing

Continued on page 33

The ace behind Gupta's PC servers sees lots of topspin coming in SQL market

While many software developers scramble to get a relational microcomputer data base server on the market, Gupta Technologies, Inc. has been selling an IBM PC-DOS version of such a product since October 1986. The technology used in SQLbase was advanced enough to attract the attention of Lotus Development Corp., which will announce this week that it has been developing a similar server with Gupta for nearly the past two years. That server is expected to tie into an upcoming front-end data base application from Lotus.

Umang Gupta strives to gain edge in PC server market

The mastermind of the company's SQL server technology is Umang Gupta, an Indian immigrant who founded the Menlo Park, Calif.-based developer three years ago. Unlike other data base servers that are being ported from minicomputer and mainframe environments today, Gupta built his technology from the ground up for personal computers. That PC-based technology may well give Gupta an edge in the emerging PC server market as competition starts to heat up.

Although Gupta could not talk about the pending Lotus announcement during a recent interview with West Coast correspondent Stephen Jones, he did discuss the explosion of interest in data base servers and some of the nuances of the expanding market.

Why has there been such increased interest in SQL for personal computers?

There was a need for some protocol or language to separate front-end applications from back-end servers. SQL happened to be there, and it made possible concepts like data base server technology and cooperative processing technology. SQL originally proved to be a relational data base management system language for programming and ad hoc query and analysis, but it was inevitable that SQL was going to become a standard. IBM's announcement of OS/2 Extended Edition was the last thing needed to get it there.

How will the move to PCs affect the market for host data bases?

I don't think it will reduce the market; there will continue to be a market for data bases to exist on host mainframes and minis. It's possible that the emergence of local-area network data bases will reduce the growth in the mini area for data bases, but overall, there should be growth in all three areas.

What do you think about the SQL Server announcement by Ashton-Tate Corp. and Microsoft Corp.?

The relationship between the companies is a good one. They all

Continued on page 35

Theos 386 version eagerly awaited

BY ALAN J. RYAN
CW STAFF

Although Theos 286 sites are already taking advantage of multitasking and multiuser capabilities not found in Microsoft Corp.'s MS-DOS, users are eagerly awaiting its 32-bit Theos 386 counterpart, which will be faster and use the additional functionality of Intel Corp.'s 80386 processor. They will not have to wait long.

Last week, an international developers' conference was held in Lafayette, Calif., to unveil Theos Software Corp.'s Theos 386 and its companion Theos C language. Some 60 developers in attendance received beta development kits and training on the operating system. The new version should be out in the second quarter, a company spokesman said.

Theos 286-V

Price: Price: $695 for runtime version for one to 32 users

- Requires 640K bytes of memory; supports up to 16M bytes
- Supports: Theos Basic, Theos C, Exec Job Control Language, Ryan/McFarland Cobol

Theos 386

Price: Unannounced

- Supports one to 128 users
- Requires 1M byte of memory; supports up to 4G bytes
- Supports: Theos Basic, Theos C, Exec Job Control Language

Theos 386 will support up to 128 users, each with 4G bytes of addressable memory, the company claimed. The large memory address breaks the 640K-byte program segmentation barrier for C programs.

For current users of the Theos 286 operating system, the migration will be a natural one, they said.

Speed needs

Eloo Bateman, president of Shoreman Food Technologies, Inc. in Federalsburg, Md., said it all comes down to speed. "I never thought systems were fast enough, but we're at the point now where they are becoming fast enough for our needs," he said.

Bateman is currently running Theos 286 on a Third Coast Technologies, Inc. 386-based computer with 10 terminals, six printers and a modem hitched up to it. He said he plans to purchase Theos 386 when it is available.

Shoreman, which manufactures dehydrated bread for stuffings and coatings, is using Theos to handle its accounting, sales, inventory, payables, receivables and quality control testing, Bateman said.

John Hobach, an applications programmer at the J. C. Penney Co. catalog division in Milwaukee, said his future plans include Theos 386. "The biggest advan-

Continued on page 30

Don't tell Willard Scott about this one

BY DOUGLAS BARNEY
CW STAFF

HARTFORD, Conn. — If you want to know what the weather will be in Yuma, Arizona, tomorrow or how cold it was yesterday in Fairbanks, Alaska, just ask your computer. At least, that's what Metacomet Software, Inc. hopes users will do.

Metacomet recently completed Accu-Weather Forecaster, a software package that can import and analyze live weather data from the Accu-Weather, Inc. weather service. The data includes air pressure, fog, rain, wind direction and speed and steering winds — which exist at some 18,000 feet and help determine the direction weather systems take.

While aimed in part at the hobbyist market, the package is also applicable to any business that depends on the weather. These businesses include agriculture, amusement parks, transportation firms and ski areas, all of which make business decisions based on often out-of-date weather forecasts.

Metacomet is also pitching the product to on-the-go executives to assist in travel planning. The package is not intended for businesses such as large airports, which already have trained meteorologists on staff.

Small insurance firms hoping to predict potential damages from storms are also a target of the product. But like major airports, most large insurance firms employ meteorologists and can predict storm damages before a storm even occurs.

When using Accu-Weather Forecaster, users log on to the

Continued on page 30

Top sellers

Software: Feb. 15-19

INFORMATION PROVIDED BY CORPORATE SOFTWARE, INC.
CW CHART

Theos 386

CONTINUED FROM PAGE 29

tage of Theos 386 over the 286 is unlimited memory usage for developing," he said. Hobach writes nearly all of the software used to automate the catalog division.

Archive headache

One drawback in the system, according to Shoreman's Bateman, is its inability to do live archiving. "My plant runs 24 hours a day," Bateman said. "When I shut the system off to do an archive, somebody takes a hit."

Bateman also said the operating system cannot boast a wide breadth of add-on third-party software.

The users said there are no licensing problems using the multiuser capabilities on the Theos system. "You just buy a version of the application software for the correct number of users," said Michael Ackerman, manager of support services at the San Francisco Chamber of Commerce.

Ackerman said the Chamber recently purchased a Third Coast Technologies 386-based computer to run Theos 286. The unit was configured with 25 serial ports.

"We plan on putting 13 users on it off the bat, and we'll increase that to 19 in April," Ackerman said. He added that he will upgrade to the Theos 386 as soon as he can.

The users agreed that Theos 286 is cost-effective for their needs.

"I could get another user up and running for maybe another $600 — the cost of a terminal and a cable," Shoreman's Bateman said. "If I put another IBM PC on the line, by the time I get the network cards and software in place, I'm going to spend some serious money."

Visicorp founder

CONTINUED FROM PAGE 27

The $125 3-2-1 Blastoff is a spreadsheet formula compiler that speeds the recalculation of Lotus work sheets by five to 10 times.

Unlike other spreadsheet compilers, which allow work sheets to be distributed and read without 1-2-3, the Frontline Systems product is aimed solely at performance.

Faster than Speed-Up

The system includes the minimal recalc feature found in the Lotus Speed-Up utility. With minimal recalc, only the cells that have been changed are recalculated.

However, 3-2-1 Blastoff goes further to speed the calculations by compiling 1-2-3 formulas into machine instructions for Intel Corp.'s 8087, 80287 and 80387 math coprocessors. As a result, 3-2-1 Blastoff requries a math coprocessor, the developer said. "Blastoff speeds up recalcs. Speed-Up avoids recalcs," Fylstra added.

For the distribution of "secure" work sheets, 3-2-1 Blastoff allows the user to delete the formulas used to build a work sheet. As a result, the recipient can load the work sheet but cannot modify the formulas. The project is set to ship next month.

Project packages

Frontline Systems also introduced the $145 Project Calc, which is aimed at managers of moderate-size projects. With Project Calc, Frontline Systems said specific budgets and schedules can be created with the same spreadsheet used for overall budgeting.

A project schedule can also be linked to a spreadsheet so that any change to the spreadsheet will trigger a change in the schedule. The package is said to be able to generate Pert and Gantt charts and perform critical path analysis. It is scheduled to ship in April.

The third product provides decision trees that are linked to 1-2-3 work sheets. The $100 Decision Analyst, also slated to ship in April, was written by Fylstra and tests many "what-if" alternatives.

Willard Scott

CONTINUED FROM PAGE 29

Accu-Weather service at 1,200 bit/sec. and download specifically requested information.

User controls weather

The software can map the data, allowing the user to make the forecast. Accu-Weather also provides premade Accu-Weather forecasts, but these are not as up to date as forecasts made with the live data. Although the package does not automate the weather forecasting, it does include a primer on forecasting based on weather data and mapping.

Now a commercial product, the software was orginally written to assist gifted students in the Hartford school system do weather forecasting, according to the students' teacher, Daniel Barstow, who is also the program's author and president of Metacomet.

The $90 package currently runs on IBM Personal Computers and compatibles and requires a modem. A version for Apple Computer, Inc.'s Macintosh is slated to be available next month. In addition, a version for the Apple II is in the works and will reportedly be available in six months.

There is no subscription fee for Accu-Weather data. Users pay an hourly charge for connecting to Accu-Weather, and a typical fee for downloading would be $2, Barstow said.

In 1987 Microsoft put over
2,100,000 hours into research
and development
to introduce 21 new products
and product updates.

The work is hard.

Barney

CONTINUED FROM PAGE 27

Dbase IV? When Ashton-Tate chairman Ed Esber told the media that his firm's Presentation Manager products will be based on its line of Apple Macintosh software, an interesting question emerged: Does this mean the firm's current core offerings in Microsoft MS-DOS word processing, integrated spreadsheet and data base are now little more than chopped liver?

Betaware umbrage. Marty Rinehart of Wallsoft Systems recently called to point out a grievous error in a recent column that dubbed his firm the latest entrant into the betaware market. (Betaware is unfinished software that is sold to customers.)

Rinehart is seeking honors for being the true pioneer of betaware. As a matter of fact, Wallsoft's UI2 code generator for Dbase was the first betaware ever, Rinehart says. That is, unless you count extremely buggy shrink-wrapped software that is sometimes passed off as finished product.

Rinehart also quarreled with our definition of betaware as users getting to pay for debugging a vendor's software. Rinehart says customers (especially programmers) are happy to get cracking on a key program early. And whereas most beta-test software goes out to key customers, betaware is available to anyone as a kind of egalitarian beta test.

HEADHUNTERS at Uniforum 1988 set up tables filled with such programming tools as Jolt Cola, Oreo cookies and Twinkies.

But do you need a multitasking lap? By this summer, users will be able to take OS/2 on the road when they use a Toshiba America high-end laptop. Later, Toshiba will provide the Presentation Manager graphical user interface. Now if they could just find a place to hang the mouse.

I cannot tell a lie. Most vendors displaying OS/2 applications at Compaq's MS OS/2 announcement recently said their products took months to develop because they weren't just ports of existing products. But Spencer Leyton, vice-president of Symantec, claimed his company's Living Videotext Division needed just 48 hours to come up with its OS/2 version of Thinktank 2.41., an outline processor with desktop productivity features. "And I think that's because we let the programmer go home in between," he quipped.

An offer you can't refuse. Knowing what kind of people program in Unix, headhunters at the recent Uniforum 1988 show came prepared. They set up tables filled with such programming tools as Jolt Cola, Oreo cookies and Twinkies. Stamped onto the Twinkies wrapper was the headhunters' phone number.

Nobody can have just one 386 computer chip. Speed-demons may want to look out for samples of 25-MHz Intel 80386s, set to ship sometime in the second quarter, with production level quantities appearing in the fourth quarter. But don't hold your breath for the 32-MHz model, which probably won't be announced this year. As for the 80486, sorry to say you're looking at late 1989.

It is still a young industry. David S (no punctuation) Schulhof may be destined to follow in the footsteps of such innocents as Microsoft founder Bill Gates and Dell Computer founder Michael Dell, who each made a fortune in the computer business before they were 30. Schulhof, age 22, is the founder of Complete Computer Services, Inc., which recently sold its 25,000th copy of CCS Designer computer-aided design software.

Of course, Schulhof depends on the wise advice of older executives, such as Vice-President of Marketing Suzanne K. Arlie, who is 24, and Vice-President of Operations Cheryl Meder, who at 29 must be nearing early retirement.

Care to buy an old fogy a beer, Dave?

Don't forget to bring a camera: To show its appreciation for the gobs of money it has made in that country, Lotus will, for the first time, hold its board meeting in Japan in a few weeks.

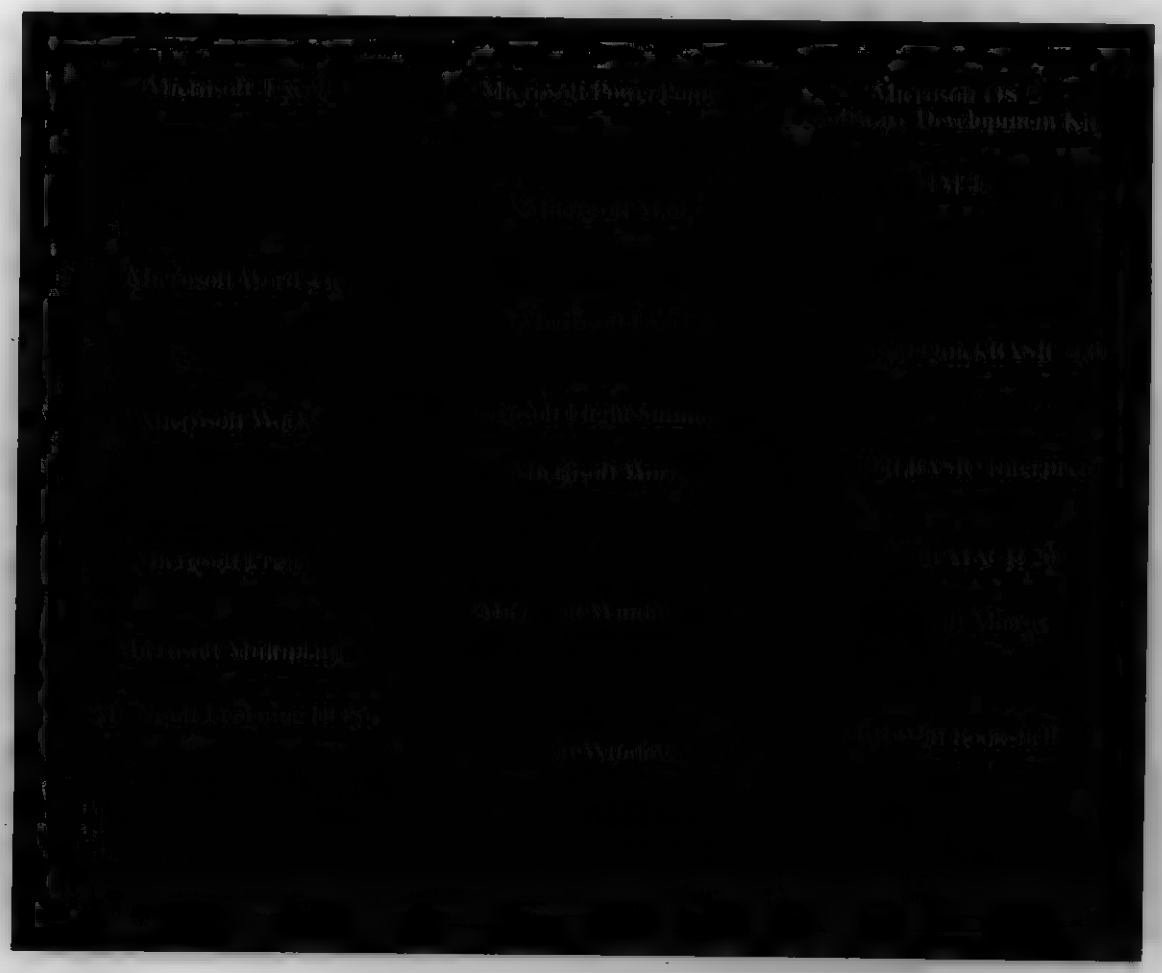
Computerland branches out into market forecasting. I guess if you sell millions of dollars worth of computer products from 550 stores every year, you should be in a position to know what areas of the market are going to heat up. Well, Computerland agrees and recently released a paper on three hot areas for this year.

Topping the list are personal computer networks and the advent of "networkable software." So, 1988 is finally the year of the LAN?

Also on the list are desktop presentation systems that allow a PC to create slides and overhead transparencies. These systems will use laser printers, photo scanners and photo digitisers to allow photographs to be combined with text.

Barney is a Computerworld senior editor, microcomputing.

The rewards are many.



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PS/2 adapter leaps 7M bytes

BIRMINGHAM, Mich. — Hoping to be the first to exploit IBM OS/2's thirst for memory, Profit Systems, Inc. has announced a product that it said breaks the 7M-byte random-access memory barrier on the IBM Personal System/2 Model 50.

The Elite 16/2, a 16M-byte universal RAM adapter, works with PS/2 Models 50 and 60 and the 16-bit slots in Model 80s. It breaks the 2M byte/slot barrier with its proprietary Unirom, the company said. OS/2 reportedly boots up and recognizes all Elite 16/2 usable memory without the use of device drivers.

The product supports IBM's PC-DOS and Microsoft Corp.'s MS-DOS, multiuser operating systems like Unix and Xenix, local-area network operating systems and Quarterdeck Office Systems' Desqview. Shipments will begin within the next few weeks, according to a company spokeswoman.

The product ships with 512K bytes of memory for $595. Additional memory upgrade kits cost $200 for 512K bytes and $1,000 for 2M bytes.

OS/2 bridge

CONTINUED FROM PAGE 27

For the Futurenet Corp. division of Redmond, Wash.-based Data I/O Corp., the Opus product is necessary to allow the company's Future Designer software to run under MS-DOS. Futurenet is also an OEM for some of the Opus products.

Michael McClure, marketing product line manager at Futurenet, said that while the Wizard of OS board will be transparent to users, many are leery of adding boards to their PCs. "Some think it is a boat anchor, because many applications don't need it," he said. "It won't speed up your word processor or your Lotus [programs]. It will only speed up those applications that the vendor has ported to it. We use it because we cannot make our product run under standard DOS under 640K bytes of RAM."

When OS/2 becomes readily available, the need for the Wizard of OS board will be even more limited, McClure predicted. "There are advantages to Unix that some people want," he said. "I will probably end up offering both OS/2 and Unix versions and let the customer decide."

The Wizard of OS consists of a coprocessor board offering performance of 1 to 5 million instructions per second, 2M to 16M bytes of random-access memory and a single floppy disk.

The disk contains software that includes a Wizard of OS kernel, which runs on the Wizard of OS coprocessor board and is similar in function to the Unix kernel, and the Wizard of OS agent, which runs in DOS or OS/2 and translates Unix calls to MS-DOS or OS/2 calls. Wizard of OS also uses a DOS file system and DOS or OS/2 devices.

The Wizard of OS runs on IBM Personal Computers, PC ATs, XTs and compatibles. An OS/2 version will be available in April, the company said. It also supports AT&T Unix System V, Release 3 system calls, the company claimed. Prices range from $1,995 to $7,640.

Pitta

CONTINUED FROM PAGE 29

group settled on a name for the upgraded version of Jazz. Lotus began previewing the product under the name Galaxy nearly one year ago, a name that was selected because a member of the product team is an amateur astronomer.

Galaxy might have remained the product's official name had it not already been taken, according to Kim Shah, Lotus business development manager. "Everyone wanted to keep it," Shah says. "But it would have been difficult to use it here and impossible to use it abroad."

Back to the drawing board. During a one-year period, Lotus held four brainstorming sessions that generated 600 potential product names. Brainstorming groups consisted of Lotus employees both involved and not involved with the Jazz project.

Stuck on Jazz

Pam Campagna, Modern Jazz product manager, says names tended to revolve around interwoven and multifaceted themes reflecting the product's integrated nature. "Coming up with a name is the easy part," Campagna explains. "The hard part is being able to use it."

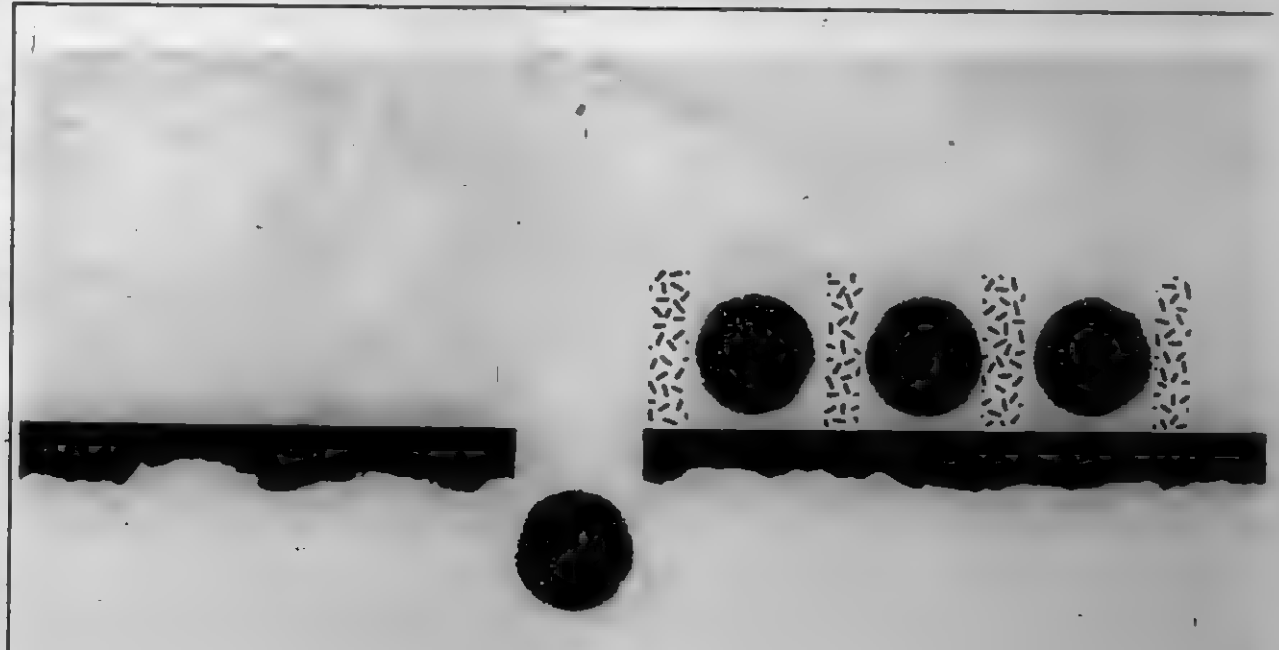
Despite Lotus's efforts to rename the product, Jazz stuck.

"We talked with a lot of end users and retailers about the name, and the one thing that came out loud and clear was that no matter what we named it, people would associate the product with Jazz," Campagna maintains. "We decided that we could spend time explaining to people why we renamed the product or be able to get beyond that and tell people what it does.

"Besides, it's descriptive of the product, and it's got a nice ring to it," she adds.

Modern Jazz isn't the first time that a naming project hasn't borne fruit. Before the original Jazz was launched, Lotus launched an in-house contest to come up with a name. No prize was awarded, since Lotus President Jim Manzi opted to name the product himself.

Pitta is *Computerworld*'s West Coast senior correspondent.



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CONTINUED FROM PAGE 29

needed each other to some point. But I believe it's too much to expect that one server will become the dominant standard. There are too many competing forces out there to allow one company to deliver a knockout blow to all the other vendors in the business. SQL Server will be one of four or five products that will be competing in the market.

Remember that squeezing a mini [server] system down to PCs is not just a matter of porting it over. There are many things they have to solve to meet performance and portability considerations, and certain utilities on the mini version may be quite different than the ones you have in a PC environment.

Do you think Ashton-Tate is giving up on the back end of the data base market?
No, if it was a choice of having the Microsoft back end or no back end at all, then it was a good move for the short term. But in the long term, a back-end engine is too important a component for a major data base company to give up the control of such important technology to somebody else. I believe Ashton-Tate will eventually come out with a server system of its own that will give it more control over the technology.

Do you see Ashton-Tate's Dbase as an important front end to a server?
I think it's hard to graft something like Dbase onto SQL; I'm skeptical about somebody's ability to build a product that truly supports SQL and can also support programs from earlier [Dbase] versions.

Does Gupta have a head start in the the SQL server market because you already have a Microsoft Corp. MS-DOS version of the product?
We have a head start to the extent that we have a product out there, but the eventual success of our company will be how we market not just SQL Base/16M, a server product that uses expanded memory, but how we market all products in terms of things like connectivity. We're staking our future on the success of cooperative processing, not just SQL back-end engines.

Microsoft is positioning SQL Server as systems software, but should a DBMS be labeled as systems software?
It would be nice if that were so. IBM is also labeling its OS/2 Extended Edition as systems software. But until we achieve a standard programmatic interface for back-end engines, it will be hard to think of them as just another component of systems software. I believe that should happen, but it won't happen overnight.

Other than a data base, what are the most appropriate application front ends for a back-end server?
In addition to traditional front-end data base tools, a spreadsheet is a natural to be put in front of a data base engine. Also, there are applications such as document processing, page composition and word processing and even expert systems.

Oracle shift

CONTINUED FROM PAGE 27

an SQL-based data base kernel composed of four concurrent OS/2 processes, the spokesman said.

These four processes include one that writes to the data base file and the after-image journal file; one that manages all before-image I/O, providing data integrity to users doing simultaneous updates and deletes; one that increases throughput by anticipating the need for data blocks; and one that provides a significant measure of data integrity and safety by rolling back partially completed or prematurely terminated transactions.

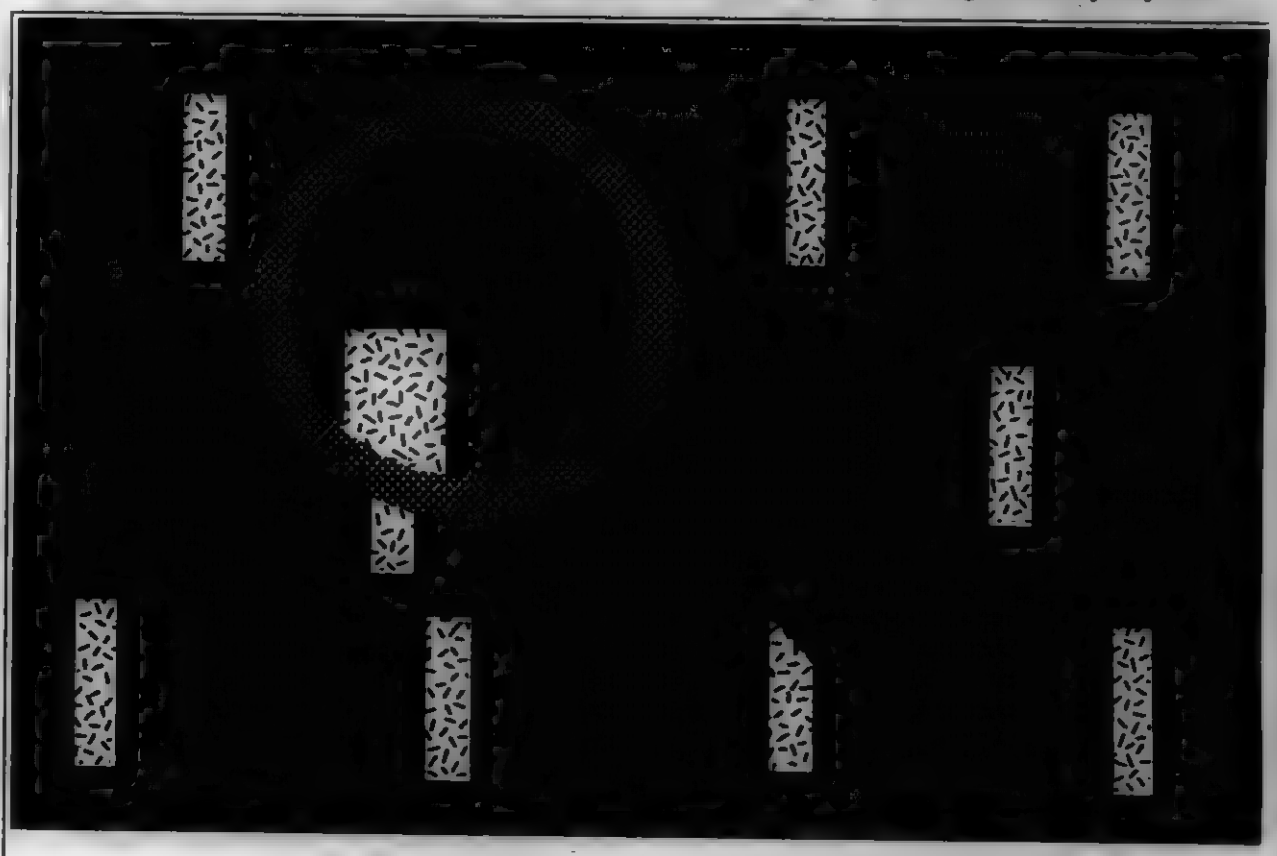
In addition, a shadow process spawned by the kernel prevents users from corrupting a shared data base by inadvertently writing to shared memory. When applications are executed across a network, the application communicates with its shadow on the remote Oracle OS/2 server by means of major industry protocols.

The Oracle OS/2 package comes with a network management tool for data base administrators. Dubbed Oracle Display System, the software lets the administrator monitor data base use in real-time on an OS/2 server.

Nothing new
The product's architecture, according to an Oracle spokeswoman, "is not completely new under the sun. This is substantially the same architecture we introduced back in April, when we announced Professional Oracle and the Oracle Lanserver, and that underlies all of Oracle."

The difference between Oracle for OS/2 and the substantially similar Lanserver is a critical one, overlooked in much of the publicity attending last spring's Lanserver announcement, the spokeswoman said. Lanserver runs only under Xenix. The Oracle Lanserver went to beta-test sites in November. The virtually identical underlying architecture, the spokeswoman said, will make porting from Microsoft MS-DOS-based Professional Oracle to Oracle for OS/2 considerably easier to accomplish.

While final prices have yet to be set, Oracle said it anticipates marketing Oracle for OS/2 at Professional Oracle's $1,295 price.



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NEW PRODUCTS

Data storage

A software program that links write-once optical storage drives manufactured by ATG Corp. or Optimen Corp. with IBM Personal Computers and compatibles has been announced by **Optical Storage Solutions, Inc.**

Called **Perma File**, the program makes an optical disk drive appear as if it were a hard disk. It can address storage capacities of up to two billion bytes while managing 95,000 files. Five files may be open simultaneously for reading and one file at a time for writing.

Perma File costs $895.

Optical Storage Solutions, 1130 D Burnett Ave., Concord, Calif. 94520. 415-825-3441.

A 5¼-in. external floppy disk drive for the IBM Personal System/2 series has been announced by **Delkin Devices U.S.A.**

The **525 Extra** plugs into an existing connector inside the PS/2. It acts as a B drive, allowing the systems to read, write and format standard 360K-byte disks. The drive does not contain a power supply. It uses power from the computer's own internal supply.

The 525 Extra is priced at $325.

Delkin Devices, Suite 306, 4655 Cass St., San Diego, Calif. 92109. 619-273-8086.

Emerald Systems Corp. has combined its 150M-byte enhanced small device interface hard disk and its 150M-byte quarter-inch cartridge tape into a tape backup subsystem called the **DOS 150-4000.**

The unit operates under the DOS operating system and most DOS-based local-area networks. It offers disk access times up to 16.5 msec with backup speeds to 5M byte/min on the tape drive.

According to the vendor, if used with an existing hard drive, the DOS 150-4000 uses Emerald Systems' optional Diskmeld feature, allowing it to meld the two hard drives into one logical volume.

The DOS 150-4000 is priced at $5,995.

Emerald Systems, 4757 Morena Blvd., San Diego, Calif. 92117. 619-270-1994.

A 5¼-in. optical disk drive said to be compatible with magnetic drives has been introduced by **Laserdrive Ltd.**

The **Laserbank 800** is said to be capable of running application software and operating systems developed for Winchester drives without modification. According to the vendor, it can also be used like a magnetic storage device. It features 810M bytes of storage capacity, an access time of 175 msec and data transfer rates to 2.78M bit/sec.

In addition to Winchester mode, in which the Laserbank 800 reads, writes and appears erasable to the user, the drive also supports write-once read-many mode.

A single-drive Laserbank 800 subsystem costs $4,995. A double-sided optical cartridge that is compatible with the IBM Personal Computer AT costs $189.

Laserdrive, 1101 Space Park Drive, Santa Clara, Calif. 95054. 408-970-3600.

Board-level devices

A small computer systems interface adapter for the IBM Personal System/2 series has been announced by **Future Domain Corp.**

The **MCS-350 Host Adapter** interfaces with the PS/2 Models 50, 60 and 80. It offers a transfer rate of 1.67M byte/sec. as well as full Micro Channel compatibility with IBM-assigned identification numbers, the vendor said. It can run such operating systems as 's Xenix and IBM and Microsoft Corp.'s OS/2.

The MCS-350 Host Adapter is priced at $390.

Future Domain, Suite A, 1582 Parkway Loop, Tustin, Calif. 92680. 714-259-0400.

PC Technologies, Inc. has introduced two half-slot accelerator cards for the IBM Personal Computer.

The **286 Express-12** and the **286 Express-16** have 12- and 16-MHz Intel Corp. 80286 microprocessors, respectively. They each have 16K bytes of cache memory to speed up Intel 8088-based personal computers that operate at clock speeds of 4.77 to 8 MHz.

The 286 Express-12 costs $645, and the 286 Express-16 costs $795.

PC Technologies, Box 2090, 704 Airport Blvd., Ann Arbor, Mich. 48106. 313-996-9690.

The **Cadcontroller**, a multifunction graphics card, has been introduced by **GTCO Corp.**

The IBM Personal Computer AT-size card is said to be capable of displaying 1,024- by 768-pixel color graphics. It can also be configured to work with lower bandwidth monitors, such as NEC Corp.'s Multisync, at either 1,024- by 768-pixel interlaced or 800- by 600-pixel noninterlaced resolution.

The Cadcontroller has a serial port for connecting a digitizer or a plotter. GTCO's Micro Digi-Pad digitizer can draw power directly from the board's serial port, the vendor said.

Cadcontroller costs $777; a random-access memory option costs $495.

GTCO, 7125 Riverwood Drive, Columbia, Md. 21046. 301-381-6688.

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DATA STREAM

Walter Ulrich

Who'll man the LAN?

An increasingly hot issue for MIS managers to puzzle over, as local-area networks continue to proliferate, involves whether individual departments should have control over their own LANs or whether there should be some kind of centralized oversight of such installations.

In the past, LAN installations tended to be autonomous: bought, installed and managed by local staffs. LANs are now becoming centralized, or wide-area, LANs, and the overseeing of these installations is gaining ground as corporations seek to integrate LANs into company-wide information networks and MIS seeks to gain better control of user computing resources. This can be useful, as long as it does not force groups of users to conform their LANs to a rigid corporate standard that does not address their individual needs.

Companies, when deciding how to oversee their LANs, should take care to balance the opposing imperatives of consoli-

Continued on page 41

Rolm seen scaling PBX heights

Study predicts IBM's might will help propel subsidiary to top by '92

BY ALAN ALPER
CW STAFF

PARSIPPANY, N.J. — IBM subsidiary Rolm Corp., currently languishing in third place in the private branch exchange (PBX) market, will become the top supplier by 1992 by virtue of IBM's prowess in data processing, data communications and network management, according to a recent report by Probe Research, Inc.

If successful, IBM would also reverse years of heavy losses at its Rolm Systems division and transform the unit into a profitable entity within two years, the report said. IBM has invested in computer-aided design and manufacturing and has shared its low-cost manufacturing processes with Rolm, according to Bart Stuck, coauthor of the report and Probe executive vice-president.

IBM plans to conquer the PBX market by leveraging in-house manufacturing and design smarts, large account control and accumulated sales and marketing acumen, according to the New Jersey-based consulting firm. Spearheading IBM's effort will be the 8750/9750 PBX line, which is the first Rolm switch to be introduced and sold directly by IBM.

"Since more of the purchasing decisions are being made by the MIS executive the telecom manager now reports to, IBM will be dealing with customers it knows quite well," Stuck said.

Among the PBX's strengths, Probe said, are breadth of voice and data applications, Integrated Services Data Network (ISDN) support, future support of IBM's Systems Application Architecture and integration of voice capability into Netview, IBM's network management architecture.

Based on an anticipated 7% annual growth rate in overall PBX line shipments and anticipated higher prices of switches with integrated data communications capabilities, Probe estimated that IBM will grow from $1 billion in PBX revenue this year to $2.5 billion in 1992.

Feedback

While it is still early to assess the products' market acceptance, since they only began shipping a few months ago, initial customer feedback is positive, Stuck said.

IBM chose to "get this product ramped up quickly and then go back and fix it" and is committed to adding additional capabilities, such as remote diagnostics, that customers are clamoring for, Stuck stressed.

If IBM vaults over AT&T and Northern Telecom, Inc. to become the leading worldwide PBX supplier (see chart at left), the market share gains will come primarily at the expense of second-tier suppliers, Stuck said. All totaled, the Big Three are expected to increase their world-

Continued on page 41

IBM's Rolm to conquer the PBX field

Over the next four years, private branch exchange installed base should almost double

INFORMATION PROVIDED BY PROBE RESEARCH, INC.
CW CHART

Micros can access VAX via OSI net

NEW YORK — Touch Communications, Inc. in Scotts Valley, Calif., chose the recent Dexpo East 88 show to launch the latest of its Open Systems Interconnect (OSI) networking software packages.

Touch Terminal is said to allow an Apple Computer, Inc. Macintosh or an IBM Personal minal emulation software to establish sessions with a Digital Equipment Corp. VAX/VMS host over an OSI local-area network.

Despite its name, Touch Terminal is not a terminal emulation package but "allows users to take advantage of OSI networking capabilities while retaining the familiar commands of most existing [terminal emulation] applications," Touch President Bill Fello said.

Providing terminal emulation across an OSI network eliminates the need for dedicated serial or modem lines, according to Fello.

Touch Terminal also permits the user to establish several sessions with one or more hosts over the network, as long as the microcomputer's operating system or terminal emulation package supports concurrent sessions, Fello said.

Additional software

Touch Communications also provides a software package that is said to allow VAX/VMS hosts to communicate over an OSI network using existing VAX software.

The OSI standard is a government systems procurement requirement as of 1990.

Touch Terminal is slated to be available in June. Pricing is not yet available.

As a promotional offer, Touch Terminal will be provided as a free addition to any other Touch OSI software product that is ordered through the end of September, according to Touch Communications.

Insides

- MAP/TOP broadband specification is ready and waiting. Page 40.
- Simpact adds Ultrix-supported interfaces for VAXBI-based machines. Page 41.
- Kinetics rolls out Ethernet card for the Mac II. Page 42.

Roger, Lockheed, that's a qualified go for ISDN test

BY KATHY CHIN LEONG
CW STAFF

SUNNYVALE, Calif. — Nearing the end of a so-far successful Integrated Services Digital Network (ISDN) trial, Lockheed Missiles & Space Co. seems optimistic about the technology but is not quite ready to commit itself to the emerging telecommunications standard.

Although Jim Mathieu, Lockheed's supervisor for telecommunications planning, conceded that ISDN seems to meet Lockheed's needs, he stressed the importance of accessing the real costs of ISDN before embracing the technology. Overall, however, Mathieu gave a thumbs-up to his ISDN pilot because it not only did what the vendors told him it would, but it also barely altered the way users conducted their day-to-day computing activities.

Lockheed is the first of three companies that Pacific Bell plans to use for ISDN trials. The others include an undisclosed business in San Francisco and Chevron Corp., located in nearby San Ramon, Calif. In the Lockheed pilot, 20 to 25 users were selected from different departments, including security, general procurement and missile systems.

Mathieu was more than willing to have Lockheed used as a test site when Pacific Bell first approached him. "I was screaming about this three years ago, because I knew this was down the road." ISDN is no longer a theory, he said. "Users who

Continued on page 41

Modem pooling cuts costs

BY PATRICIA KEEFE
CW STAFF

FREMONT, Calif. — Omnitel, Inc. will soon begin shipping a family of what it claims are the first firmware-based modems, which turn a personal computer into a multiuser modem server.

The Netcomm product family reportedly creates a full asynchronous communications server on a network, providing cost-effective modem pooling for a large number of users. Up to four modem cards, each providing four modems in one, can be loaded into a PC server, supporting a total of 16 ports.

At the heart of what is described as a "modem in a processor," digital signal processing is used for typical analog modem functions. The product also takes up less PC resources than outboard modem cards because it is firmware-based.

The internal modem has already been adopted by MCI Communications Corp. for use with its Comm Desk Manager software in two scenarios: in a stand-alone workstation that replaces telex for accessing long-distance lines and for using electronic mail; and as a message server capable of determining message priority and best times to transmit, such as when the rates are lower, Omnitel said.

Netcomm product specifics include the following:

- The Q2400 and Q1200 modem cards. The cards fit IBM's Personal Computer and compatibles, are used for local-area network and multiuser applications

Continued on page 40

MAP broadband specifications ready

BY KATHY CHIN LEONG
CW STAFF

WARREN, Mich. — As promised by the MAP/TOP Media Committee, the Manufacturing Automation Protocol/Technical and Office Protocol broadband specification is finished and available to those interested in setting up factory networks.

According to Ali Bahrololoomi, who is chairman of both the Media Committee and the MAP Task Force, the specification is a strategic document for users, because it details how to allocate broadband channels to accommodate applications other than MAP. It also features broadband maintenance, testing and physical installation rules.

"What instructions users rely on are from the supplier, and that differs from vendor to vendor," Bahrololoomi said. Many MAP users may have broadband networks that handle only MAP, not other potential applications such as voice or video.

Up until now, there has not been any consensus on how to install a broadband cable system for MAP.

In addition, the Institute of Electrical and Electronics Engineers, Inc.'s standards committee has endorsed the broadband technology, but none of the standards groups have addressed the MAP specifications.

"Broadband is more than a cable," Bahrololoomi said. "It is a system that involves many complex issues. You can't simply lay down a cable and expect that it will automatically transmit the right signals from the head-end modulator."

The $24 broadband document represents 2½ years of input from more than 200 users, vendors and broadband equipment designers. Bahrololoomi expects that the strategic document will be the basis for broadband MAP implementation for years to come.

The MAP/TOP Media Committee is also working on a similar carrier-band specification slated for June availability. Activity on a fiber-optic media specification will probably follow, according to Bahrololoomi.

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EMC² The System Enhancement Company.

Modem

FROM PAGE 39

and feature PC AT command set compatibility. The Q2400 has four 2,400/1,200/300 bit/sec. modems on a full card and costs $1,799. The Q1200 has four 1,200/300 bit/sec. modems on a full card and costs $895.

• Asynchronous Communications Server (ACS) software. Priced at $995, ACS provides modem server capabilities for IBM Netbios LANs, autodialing, direct connection to hosts and security features.

• Virtual Communications Adapter (V-Com). Priced at $179, V-Com replaces individual modems in workstations and directs communications traffic to the ACS server. Popular PC communications software, such as Crosstalk Communications' Crosstalk and Data Storm Technologies, Inc.'s Procomm, can be used simultaneously, and serial devices can be shared.

The Netcomm series can support up to 16 users and nodes, providing modem access to all network users at a significantly reduced cost, Omnitel claimed.

To achieve the above configuration, a traditional approach calls for installing 16 phone lines and purchasing 16 internal modems, Omnitel said. Using 2,400 bit/sec. modems and factoring in a cost of $40 per month per phone line, Omnitel estimated the total system cost for one year to be $18,064; for three years, it is $33,424.

The Omnitel Modem Server enables users to share four modems, configured as follows: four phone lines, one IBM PC XT clone, 16 V-Com cards, a network interface card, software and one 4-Modem Netcomm board. Factoring in the same $40 per month per line cost, Omnitel's approach is estimated to cost $10,173 for one year and $14,013 for three years.

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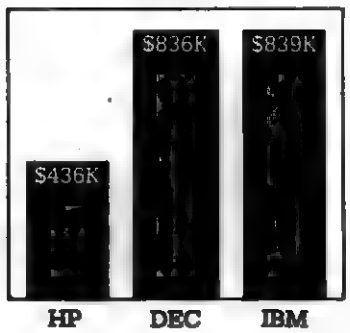

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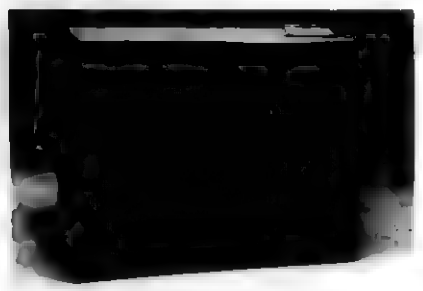

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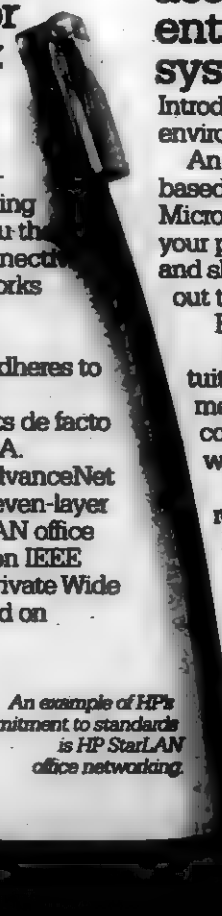

An example of HP's commitment to standards is HP StarLAN office networking.

You'd have easy access to your entire information system.

Introducing the HP NewWave environment.

An application environment based on MS™-DOS and Microsoft® Windows 2.0 that lets your people access, manipulate and share information throughout the system.

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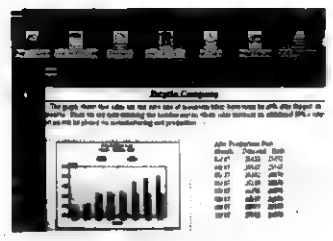
By means of simple, intuitive icons. Pull-down menus. A "mouse." And a common interface across workstation applications.

The NewWave environment incorporates two breakthrough technologies, the HP Object-Management Facility (OMF), and "agents," which together allow users to focus on their business tasks, not their computing tools.

OMF enables users to combine and manip-

*Based on US list prices available as of December 1, 1987.

Hewlett-Packard
ing partner?



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ulate different data forms— text, spreadsheets, graphics, images, even voice—from disparate sources throughout the system.

All as easily as if working in a single application.

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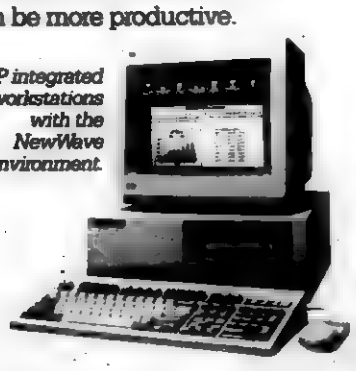

HP integrated workstations with the NewWave environment.

What's more, "agents," which are practical implementations of artificial intelligence principles, can learn and perform repetitive tasks for your users. For example, "agents" can automatically update and distribute a sales report. On a prescribed day, at a certain time.

Furthermore, the NewWave environment will run under OS/2, when available, and provide future support for MIT's X-Window System™ and Microsoft's Presentation Manager.

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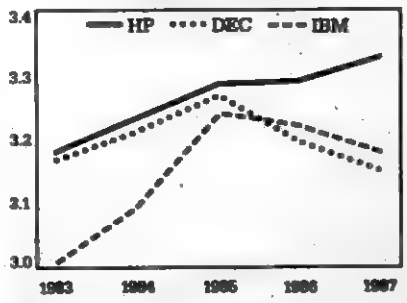

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Ulrich

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dation and customization. Customization is the tailoring of facilities and services to meet the unique requirements of the local user; this philosophy tends to support local oversight. Consolidation merges the requirements of a large population of users to achieve economies and efficiencies — a philosophy that tends to support centralized oversight instead.

The arguments in favor of customization are many. The unique needs of the local situation are best understood by the local team, and local control means local support.

On the other hand, some degree of centralized oversight can make sense. Many successful companies have established exacting standards and demand uniformity across their facilities nationwide. Corporate oversight consolidates technical expertise: Many companies' network support staffs are spread thin enough without having to do needs analysis, installation, implementation and support for one LAN installation at a time.

It don't come easy

The technology is now available to tie different LANs together. However, inefficiencies occur at each intersection between LANs. Additional hardware, software and communications facilities are required. A coherent and consolidated LAN strategy can sharply reduce the number of network intersections, improving performance and ease of use while allowing better sharing of resources.

In this environment, there are fewer distinct network products to manage or be considered. Network control and management activities can be more sharply focused. Also, future network integration problems can be better anticipated or eliminated, and installation and operational costs can be decreased.

For most companies, the arguments in favor of centralized LAN oversight outweigh arguments in favor of localized control. But it is still possible to implement aspects of local LAN oversight within a primarily centralized strategy.

Generally, a balanced plan between centralized and decentralized oversight would work as follows:

Corporate communications and information systems management should have primary responsibility for evaluating LAN alternatives. The best technical staff from the organization should be brought together as a team for this evaluation.

Several LAN alternatives should be approved, since one type of network is rarely ideal for all of a company's applications, user populations and computer installations.

Next, each division and decentralized location could select from a menu of approved LAN standards. This approach — mixed oversight — will ensure that the LANs on the approved list fit the overall corporate approach. However, the local organization should have the final say in selecting a LAN.

Consolidated and coordinated efforts are required to evaluate the complex alternatives and to narrow the range of possibilities. Local control is mandatory to garner local support and ensure unique local requirements are met. Multilevel and multigeographical cooperation is essential. Mixed oversight for LANs makes the most sense.

Ulrich is a Partner with Coopers & Lybrand in Houston and consults with leading companies on a wide variety of communication and computer issues.

Rolm

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wide PBX market share from 70% to 80% during the next four years, the report noted.

Stuck said he envisions little chance for AT&T and Northern Telecom to thwart IBM's momentum. "IBM has designed its new product with integrated voice and data from the ground up," he said. "The other two companies have not and will have to reassess what to do with their products."

AT&T, Stuck pointed out, has the resources to alter its product line and could play its Unix and ISDN cards to its advantage. Northern Telecom, which is smaller, has fewer alternatives, he said.

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BIT BLAST

Simpact develops DEC interfaces

Simpact Associates, Inc. in San Diego has introduced a family of **Digital Equipment Corp.** Ultrix-supported of communications interfaces for DEC VAXBI-based computers. The protocol interfaces include CCITT X.25, X.25 DDN, IBM's High-Level Data Link Control, Advanced Data Communications Control Procedure, Synchronous Data Link Control, Bisynchronous Communications, Digital Data Communications Message Protocol and Manufacturing Automation Protocol. The interfaces are based on Simpact's multiport, single-slot ICP1632 front-end processor, said to be the first DEC-licensed product for the VAXBI. Using native-mode ICP1632 can result in throughput improvements of up to 6-to-1, Simpact claimed.

Apollo Computer, Inc. has signed a pact with **Ki Research** to supply Apollo with software linking Apollo workstations to Digital Equipment Corp.'s Decnet. The software is said to provide Apollo users with access to files and programs on DEC equipment tied to Decnet using existing Apollo communications utilities. This would allow bidirectional communications between Apollo and DEC systems. The software is also said to allow the workstations to function as DEC terminals and communicate over Decnet Phase IV Ethernet networks. Volume shipment of the Apollo product is slated for the second half of this year, Apollo said.

Attachmate Corp. recently claimed to be the first third-party vendor to support IBM's Enhanced Connectivity Facilities/Server Requester Programming Interface (ECF/SRPI) on its 3270 micro-to-mainframe software. Now a standard feature of Attachmate's Extra Connectivity Software, the interface allows IBM Personal Computer or Personal System/2 users to use ECF Virtual Print, Virtual Disk and Virtual File programs, the vendor said, so users no longer need to purchase IBM's 3270 emulation programs in order to provide ECF connectivity on a PC or a PS/2.

IBM has made **Soft-Switch, Inc.** in Wayne, Pa., a member of its Industry Marketing Assistance Program, thereby agreeing to cooperatively market the vendor's electronic mail connectivity software. Soft-Switch's software gateways provide electronic messaging interconnectivity between IBM, Wang Laboratories, Inc., Digital Equipment Corp., Novell, Inc., 3Com Corp. and other vendors' systems, allowing users to exchange E-mail, editable documents and binary files across the various systems.

Datapoint Corp. in San Antonio has announced its intent to support the the CCITT X.400 Message Handling System, an electronic messaging standard.

Lockheed

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think that ISDN isn't going to come better get up and get moving."

Implementing ISDN has enabled Lockheed to realize some significant cost savings in network configuration and software updates, Mathieu said. Like many other businesses, Lockheed was using separate wiring schemes for voice and data as well as a myriad of hardware and software products that must coexist in the same office environment.

In addition, some 70% of the company's employees move to other locations every year, resulting in the expensive and cumbersome rerouting of cables as well as software changes for workstations and telephone sets, Mathieu said.

Configuration simplified

In contrast, at departments using the ISDN network, voice and data transmissions travel over a common twisted-pair wiring scheme that connects various user areas via an AT&T 5ESS switch at the local Pacific Bell central office. Connections are handled by 55 Basic Rate ISDN lines, each of which supports two 64K bit/sec. digital channels and a separate channel for signaling.

Standardized ISDN connections greatly simplified network reconfiguration at Lockheed and made relocation of user terminals a matter of unplugging the equipment from one wall outlet and moving it to another.

Another reason for the trial's success is that users were able to run their existing workstation and host applications unaltered, Mathieu said. The only noticeable changes to the network were a new type of telephone on the desk and users' ability to transmit data at 19.2K bit/sec. instead of 1,200 bit/sec.

Applications featured in the trial included terminal emulation, video monitoring and other basic file-transfer applications from PC-to-PC and PC-to-host IBM mainframes.

AT&T was the trial's supplier of phone sets and terminating units, which provided the appropriate wire interfaces between the telephone wire and the voice/data phones. An ISDN PC Card from Atlanta-based Hayes Microcomputer Products, Inc. was used for file transfer. Lockheed used off-the-shelf communications PC software in conjunction with Hayes' ISDN PC Card.

Some glitches occurred during the early part of the trial, according to Rod Rucker, a systems specialist with Pacific Bell who has been on the Lockheed premises daily. These included some initial problems with the network termination units, some minor central office switch failures and an instance in which one of the ISDN lines was not operating because of an old bridge tap on the phone line. But many of the problems were resolved through software changes and changes in DIP switch settings, Rucker said, adding that none of these glitches caused users to lose data.

"I expected there to be more failures, but there weren't," Mathieu said, noting the real surprise of the test was that the 30-year-old wiring in the buildings really worked.

With the six-month trial officially ending next month, the next logical step, according to Mathieu, will be for Pacific Bell to perform a cost analysis on the entire project.

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NEW PRODUCTS

Links

Etherport II, an Ethernet interface card for the Apple Computer, Inc. Macintosh II, has been announced by **Kinetics, Inc.**

Etherport II is said to allow users to connect Macintosh IIs directly to an Ethernet network providing communication with Digital Equipment Corp. VAX/VMS systems, computers running the Unix operating system and IBM Personal Computers.

Etherport II costs $795.

Kinetics also reduced the price of its Etherport SE, an internal option card that provides a direct connection to Ethernet for the Macintosh SE, to $795.

Kinetics, 2500 Camino Diablo, Walnut Creek, Calif. 94596. 415-947-0998.

Advanced Computer Communications has enhanced its **ACS 4030** remote Ethernet bridge, which links two separate Ethernet local-area networks.

The upgraded version offers the choice of a point-to-point or CCITT X.25 packet network link between the Ethernet LANs. It also allows the network manager to set network configuration tables from a remote network site.

Features of the ACS 4030 include a choice between adaptive and static routing, protocol independence and compatibility with IEEE 802.3 and thin-wire Ethernets. Modem rates from 1,200 to 64K bit/sec. are supported.

The ACS 4030 is priced at $4,975.

Advanced Computer Communications, 720 Santa Barbara St., Santa Barbara, Calif. 93101. 805-963-9431.

A 23- and 15-GHz microwave radio link for extension of the IBM 3274 cluster controller and up to 32 connections to terminal devices when a direct connection is not possible has been announced by **Microwave Networks, Inc.**

The **Micronet 3X74 Extender** acts as a direct replacement of coaxial cables and provides up to 32 Category A device or terminal connections over one microwave link at distances up to three miles. Features include speeds to 2.36M bit/sec.; protocols that are half-duplex, serial and IBM-transparent; compliance with Part 94 of FCC rules; individual channel diagnostics; and fault-status indicators.

Available in eight-, 16-, 24- and 32-port rack-mountable configurations, the Micronet 3X74 Extender costs up to $15,000.

Microwave Networks, 10795 Rockley Road, Houston, Texas 77099. 713-495-7123.

Modems/Multiplexers

Fibermux Corp. has announced the **FX7440W**, a four-channel twinaxial multiplexer that supports IBM System/36 and 38 applications.

According to the vendor, the FX7440W carries the outputs of up to four of the IBM minicomputers over a single pair of optical fibers to as many as 28 daisy-chained peripherals, including IBM 3180 terminals.

A stand-alone version is priced from $2,500 to $4,500, depending on the configuration.

Fibermux, 9428 Eton Ave., Chatsworth, Calif. 91311. 818-709-6000.

Method Systems, Inc. has introduced the **Mini Mux** and the **Mighty Mux** eight-channel multiplexers.

The multiplexers offer transmission distance flexibility via standard internal jumpering, offering one-, two- or three-mile options. The Mini Mux operates at data rates up to 9.6K bit/sec., and the Mighty Mux operates at independent data rates up to 19.2K bit/sec.

The Mini Mux costs $395, and the Mighty Mux costs $495.

Method Systems, 3511 Lost Nation Road, Willoughby, Ohio 44094. 216-942-2100.

Multiplexers designed to connect asynchronous terminals to computers at distances to one mile over a single four-wire circuit have been announced by **Patton Electronics Co.**

Four- and eight-channel versions with RS-232 or RS-422 interfaces support speeds up to 9.6K bit/sec. with simultaneous full-duplex operation of all channels. Full diagnostics include loop-back and line tests.

Prices start at $295.

Patton Electronics, 7958 Cessna Ave., Gaithersburg, Md. 20879. 301-975-1000.

An IEEE 488 bus extender with a built-in 2,400 bit/sec. modem has been announced by **ICS Electronics Corp.**

The **ICS Model 4888** allows interconnection of IEEE 488 bus controllers and their instruments over the direct-dial telephone network. The user's computer can place calls to each remote site as required, and each remote site can call in whenever necessary. The local 4888 can store the telephone numbers for its remote site, and each remotely located 4888 serves as a controller for the remote instruments.

Features include automatic error detection and correction, data compression and software transparency.

The ICS Model 4888 costs $1,895.

ICS Electronics, 2185 Old Oakland Road, San Jose, Calif. 95131. 408-432-9009.

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SYSTEMS & PERIPHERALS

HARD TALK

James Connolly

Is MVS/ESA enough?

They said they wanted differentiation. They finally got differentiation.

Since early 1985, when IBM introduced the 3090 family of mainframes, the system's critics have complained that there was too little to distinguish the machines from the older IBM 3080 family. As a result, many potential 3090 customers found used 3080s to be a more economical purchase than new 3090s.

Now, IBM has come forward with a new operating system — one that not only cannot be used on a 3080 but cannot even run on the original 3090s. IBM's release of MVS/ESA is a clear statement that this will be the basic operating system for the successor to the 3090 — commonly called Summit. It represents a major step toward full utilization of the 3090's key features, particularly with the ability to hold data, rather than just instructions, in expanded storage.

But two questions remain: Is the differentiation too late to help the 3090 white out its brand as a failure, whether that mark was deserved or not? And

Continued on page 48

3480 makers catch up at last

PCMs finally breaking IBM's stranglehold on cartridge market

BY JEAN S. BOZMAN
CW STAFF

For the past three years, IBM has had the entire tape cartridge field to itself, as competitors struggled to fashion devices compatible with its 3480.

From the March 1984 announcement of IBM's replacement for its 3420 tape drive until now, IBM has shipped, by most estimates, 30,000 to 40,000 of the 3480 drives in the U.S. as well as another 10,000 worldwide.

The devices were added to IBM shops that were converting tape libraries to the 220M-byte tape cartridge format. But there were other applications, including using the cartridges for software distribution by mail — and the transfer of data between separate IBM systems.

In the face of shipments totaling 10,000 to 12,000 per year, none of the major plug-compatible manufacturers (PCM) was able to deliver equivalent technology. Now those companies — National Advanced Systems (NAS), Memorex Telex N.V., Storage Technology Corp. and Aspen Peripherals Corp. — appear to have drawn abreast of 3480 technology.

Shipments of the NAS 7480 drive and the Memorex 5480 began last fall, and volume shipments are now under way. Stor-

Continued on page 47

IBM maintenance price boost a trend?

BY STANLEY GIBSON
CW STAFF

User reaction to IBM's recent maintenance price increases has been mild, but industry observers are watching IBM's moves warily to see whether the giant of Armonk continues to boost prices after slashing them throughout 1987.

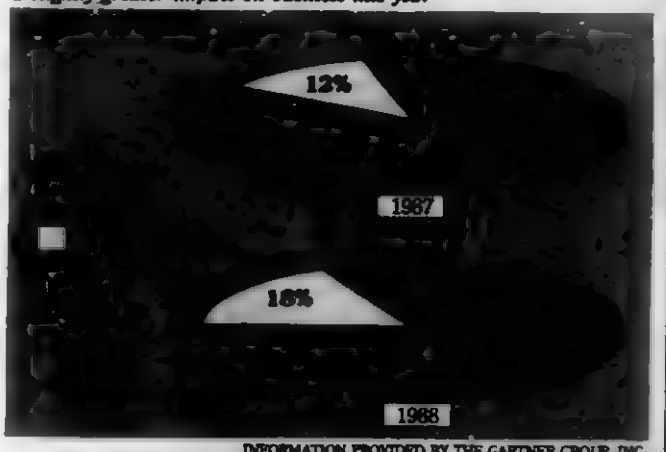
IBM raised Maintenance Agreement charges 7% on its 3080 series of mainframes, effective June 1 [CW, Feb. 15]. The price hike also applies to customers who have the Corporate Service Amendment (CSA) to the Maintenance Agreement, a long-term discount plan for customers who take care of some maintenance themselves. In addition, IBM raised hourly service rates across the board by 15%.

One 3081 user in the Southeast who just signed a CSA agreement said he is satisfied with his savings despite the price hike and has no plans to withdraw from IBM maintenance. He had been under a regular Maintenance Agreement but said he was attracted to CSA when a

Continued on page 48

Eye on CSA

Leasing companies see IBM's Corporate Service Amendment having a slightly greater impact on business this year



INFORMATION PROVIDED BY THE GARTNER GROUP, INC. AND THE COMPUTER DEALERS AND LESSORS ASSOCIATION
CW CHART

Multiuser Unix line extended

BY J. A. SAVAGE
CW STAFF

SAN JOSE, Calif. — With influence from its new parent company, Taiwan-based Multitech Industrial Corp., Counterpoint Computers, Inc. is bridging its product line of Unix-based multiuser computers to the small computing market with the introduction of the single-processor System 15 for up to 26 users.

Counterpoint is also expanding upward with the multiprocessor System 22, which is intended to host from 17 to 192 users.

Until now, Counterpoint had one product, the System 19, which could be expanded by plugging in up to 10 processors.

Counterpoint merged with Multitech in November 1987. Multitech's primary business is personal computers, noted Counterpoint President Pauline Alker. It markets PCs that can be connected to Counterpoint's systems as networked stations.

On the high end, the System 22 can be configured with up to

Continued on page 47

Inside

- NAS enhances solid-state storage devices. Page 50.
- Burr-Brown announces bar-code terminal for keyless data entry. Page 50.

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Vitale continues: "Digital helped us plan, design, build and implement a network in just a year's time. Now our transaction processing capabilities let us fill orders faster than any competitor. What's more, Digital's operating system makes writing customized software so much easier that our data center staff is about half that required by our previous mainframe systems."

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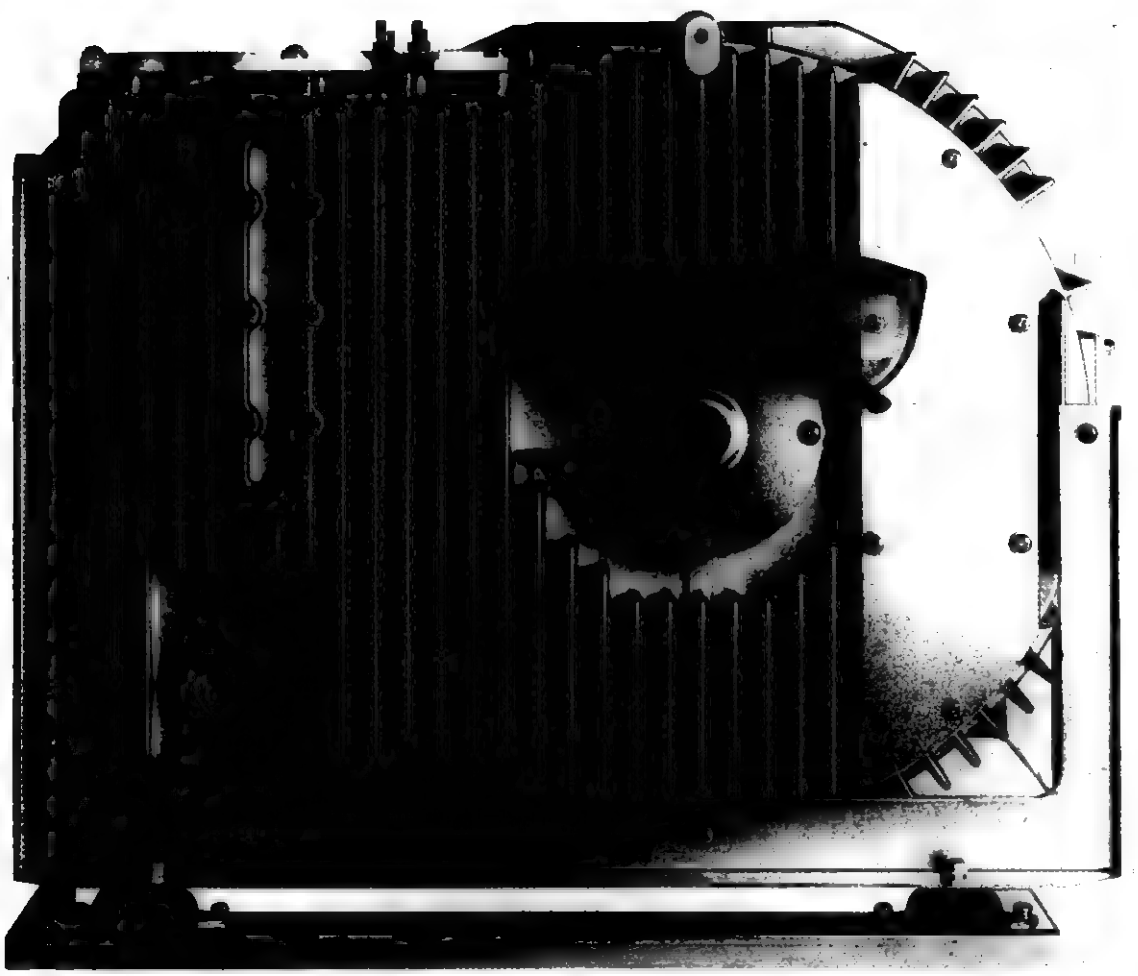

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3480 makers

CONTINUED FROM PAGE 43

age Technology's 4480, announced last year as part of the larger Storage Technology automated library system, has been shipping since December. And Aspen Peripherals has shipped hundreds of its 3480-type drives to the OEM marketplace since April 1987.

In addition, another competitive system based on Hitachi Ltd. drives may soon be available from Comparex, a joint venture in Europe between BASF AG and Siemens AG, according to Louise Biggs, a senior industry analyst at market research firm Dataquest, Inc.

These competitors will take at least a 22% share of the 3480 market, which is expected to grow by 15% or more each year, according to Dataquest. Currently, about 39,000 3480-type drives are installed in the U.S., with about 50,000 worldwide. Dataquest said that by 1991, some 112,000 units will be installed in the U.S., with overseas presence growing at a comparable rate.

Worldwide growth predicted

By 1991, the worldwide OEM marketplace should grow to 30,000 units shipped per year, said Dave Guy, vice-president of field operations at Aspen Peripherals. His company ships 3480 compatibles for attachment to IBM mainframes, Digital Equipment Corp. VAXs and other mid-range systems through the small computer systems interface. End users record data with the devices from non-IBM systems for later use on 3480s attached to IBM hosts.

If the future is so bright, what took these vendors — all of them familiar with IBM plug-compatible manufacturing techniques — so long?

"It was an exotic piece of technology, especially in the area of the thin-film heads," answered Bob Katzeff, vice-president of Disk/Trend, Inc. in Mountain View, Calif., and a consultant on IBM peripherals. Biggs added, "It was all new technology. The 3480 went from nine tracks to 18 parallel tracks, and it introduced a new chromium dioxide media."

Analysts concurred that the PCMs had to reinvent the wheel, fashioning their own very large-scale integration components to duplicate the 3480's functions.

At the same time, they added enhanced functions — partly to offset the fact that the PCM prices were so close to IBM's list price. Traditionally, PCMs have tried to price IBM-compatible CPUs and peripherals at levels 15% to 20% below IBM's list price. In this case, however, most PCM 3480-compatible prices are within 5% of IBM's list price of $65,430 for the IBM 3480 string controller and about $43,120 for each additional IBM 3480 drive.

"The pricing reflects the fact that there was a high research and development cost associated with this product," Biggs said.

NAS and Hitachi, its Japanese supplier, devised a data-compression algorithm that allows users to fit 400M to 600M bytes of data onto a single NAS 7480 cartridge.

Memorex, which is shipping a Fujitsu Ltd. drive, also offers a twofold data compression feature, according to Bob Bodnar, director of storage marketing at Memorex.

The Memorex 5480 also offers a standard buffer of 2M bytes — nearly four times greater than the IBM 3480's original 512K buffer and twice the standard 1M-byte buffer for the 3480. NAS offers a tape-position display and an eight-cartridge automatic loader. The NAS and Memorex models have displays that swivel, allowing operators to monitor tape activity from across the room.

As with other IBM plug-compatible equipment, just as the gap between IBM and its market followers closes, IBM is ready to set the wheels of progress in motion again with a new round of technological advances, according to one industry analyst.

William S. Husband, a senior consultant at the Meridian Leasing Corp., a Deerfield, Ill., leasing firm, said the 3480's specifications could change as soon as this summer. The enhanced 3480 cartridges would have 500M bytes, Husband said, and each string of 3480 drives would be able to handle two concurrent I/O operations. Support for channel speeds of 6M bytes or more is also planned, he added.

Unix line

CONTINUED FROM PAGE 43

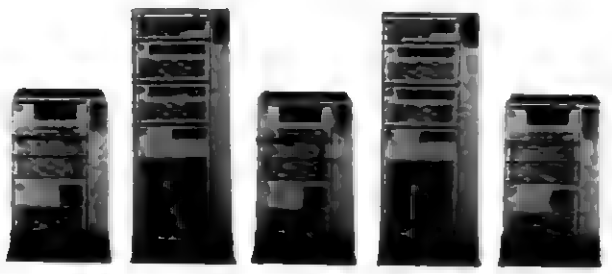
10 Motorola, Inc. 68020, 25-MHz processors. It runs at 4 to 32 million instructions per second (MIPS), according to Counterpoint, and has a standard 4M bytes of memory. It is priced at $19,000.

Another version of the System 22, the 22E, has ECC memory instead of parity memory. Its basic configuration, with 16M bytes of memory and 70 users, starts at $56,000.

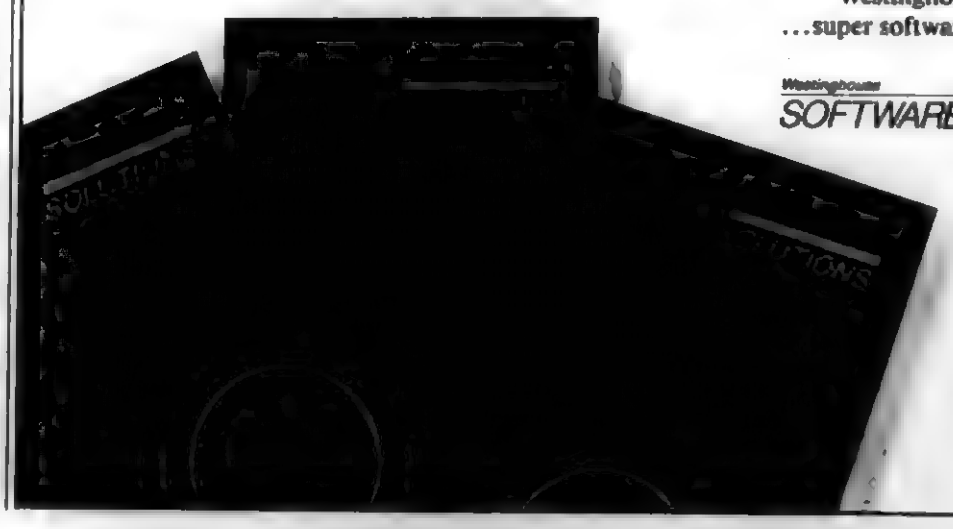
The smaller System 15 runs on a single Intel Corp. 80386 processor at 20 MHz. It runs at 3.5 MIPS and has 4M bytes of memory. The System 15 is priced at $5,500.

Alker said Counterpoint will continue to support both types of microprocessors.

The System 22 operates on Counterpoint's C-XIX 3.0, the company's version of Unix. The System 15 carries Microsoft Corp. MS-DOS and Unixmerge capabilities. The System 22 is available this month. The System 15 is expected to be available in April.



One good decision leads to another.



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Connolly

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what comes next?

Despite carrying the blame for IBM's financial weakness during the past few years, the 3090 has been fairly successful. Users have aired a minimum number of performance complaints. In analyses of revenue production, the systems have sold relatively well.

There is a real possibility, however, that MVS/ESA shipments in August may prove too late be a major factor in 3090 sales, since observers expect IBM to announce Summit only a year or so later.

The availability of MVS/ESA on a 3090 may be most useful as a development environment allowing leading-edge users to have MVS/ESA applications ready when Summit arrives. It is also likely to help 3090s coexist with Summit processors if IBM introduces a clustering concept with Summit.

What's next?

Regarding what comes next, Vice-President and General Manager of IBM's Enterprise Systems unit Carl J. Conti took time during the MVS/ESA announcement to rule out any more major enhancements for the 3090E series during the first or second quarter of this year.

That means the processors that observers have nicknamed the F series will not be introduced until at least midyear, six months or more after most analysts predicted.

Some analysts interpreted other IBM comments and literature as saying that whatever new functions are delivered with the F models can be accessed only through MVS/ESA.

Conti provided a brief look at one of the features of future mainframes the day after the announcement while speaking at a seminar sponsored by Boston market research firm The Yankee Group. He said there have to be major changes in the I/O structure of mainframes not only with support for faster channels but also with better access to on-line storage devices. He noted that the current I/O architecture lets mainframes share disk drive strings only when each string is connected to each mainframe.

Conti said that the "all-to-all" approach has to be changed to an "any-to-any" architecture with dynamic communications between mainframes and disk drives being handled by a powerful switch.

That lends credence to the scenario being sketched by a growing number of IBM watchers, who say that Summit is more than a new processor. It is an environment in which 370-type mainframes can be clustered through high-speed bus connections, fields of disk drives hang off another bus that allows access from any of those mainframes, data bases are managed by special-purpose processors and end-user applications are off-loaded to other processors.

The concept is becoming clearer. But can IBM implement the strategy fast enough and well enough to fight off what are likely to be continued advances by minicomputers, super personal computers and distributed data bases?

Connolly is Computerworld's senior editor, systems & peripherals.

IBM

FROM PAGE 43

five-year option and round-the-clock service were added to the discount plan last year.

He said he entertained bids from third-party maintenance firms but in some cases was deterred because of IBM's parts availability policy changes of last year, which make it more difficult for some maintenance providers to stay stocked with parts. "The 7% is part of the agreement. And I would have to pay that anyway under the straight Maintenance Agreement," the user said.

The manager of a West Coast data center running a 3084 said the 7% price hike is of little concern to his firm and will not cause it to move to a newer machine. "But it probably will sway someone who might be thinking of leasing a 3090 or a 3080 from a third party. They might lean toward the 3090," he said.

Others reacted more sharply to the price change. "Now that they've squeezed the competition, they've raised the price," said Tom Martin, president of Computer Financial, Inc., a leasing company in Hackensack, N.J. "IBM has a coordinated, or master, strategy to get maintenance contracts in-house."

Donald Goodspeed, president of Computer Maintenance Consultant, Ltd. in White Plains, N.Y., offered, "The strategy is to encourage the customer to move on to the 3090. People have not been moving off of 3080s, because they work well."

Goodspeed also said he does not think the cost of maintaining 3080s has gone up as much as the price hike would indicate. "Prices are what the market will bear. They have nothing to do with delivery cost," he said.

The consultant said the 7% raise is equal to the CSA upper limit for a piece of equipment under the plan. An increase greater than that amount on a single item would entitle a customer to withdraw from the plan without giving several months notice, as is otherwise required.

"I predicted six months ago this would happen," the 23-year IBM veteran said. "Price reductions have stopped. You will now see a strategy of price increases," he said.

Jim Paster, marketing manager of the IBM business segment of Control Data Corp.'s Engineering Services Division, agreed that the move is calculated to steer customers away from 3080s. "This intertwines maintenance pricing with hardware strategy and makes it clear what they want the customer to do."

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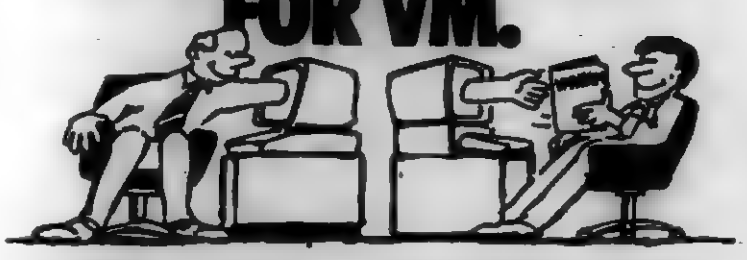

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SPOTLIGHT

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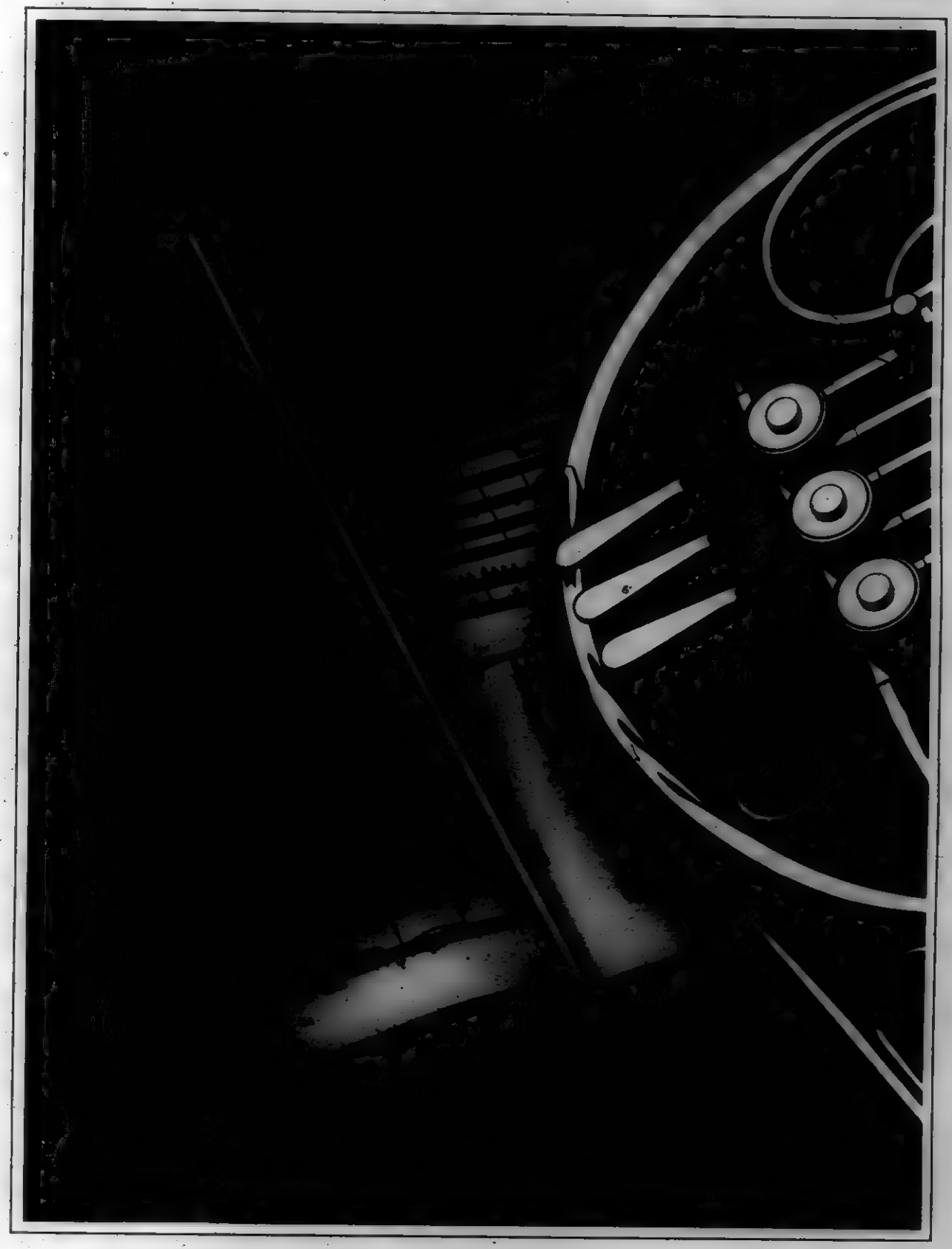

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Communications managers need more hands as they try to manage growing networks with inadequate resources

DISCORD IMPEDES NETWORK CONTROL

BY MICHAEL LEIBOWITZ

P. CHARLES LADOUCEUR

Mike Allen knows how important data is, particularly the data that describes how efficiently his networks are running. Before taking charge of Premier Bancorp, Inc.'s telecommunications operations, Allen presided over a much smaller network but spent far more time in management meetings, listening to complaints.

"They would tell me, 'Your response times are atrocious, really bad,' " he recalls. "Sometimes that was in fact true, and I knew it was true." But more often than not, Allen says, the problems were perception rather than fact. "Yet, I could not refute what they were saying," he adds.

So when Premier Bancorp, located in Baton Rouge, La., began merging its individual computer operations into a statewide network a year and a half ago, Allen fought for, and won, the right to set up and staff facilities to measure vital statistics on the network's performance.

The new performance management system will give frequent reports on the network's operation, allowing Allen to take corrective action long before a user sees a problem. Once a month, he will send those reports to users.

"I just felt it was essential in order for us to do our job correctly," Allen says. "If I'm not performing — if my networks aren't doing what they're supposed to be doing — [this system] is going to tell me about it. And we'll let the world know it."

Measuring, reporting and analyzing network performance numbers — key elements in the discipline called performance management — are gaining popularity as networks spread out beyond simple, back-office hookups to become the business backbone of many corporations.

With networks tying together terminals and computers of far-flung departments across cities and oceans, an increasing number of MIS executives are calculating the extent to which their organizations have staked portions of their businesses on network performance and are investing in tools to help manage that performance.

According to Thomas W. McDonald, a consultant with Management Technology Group in Natick, Mass., as corporations began to use networks as a strategic weapon for competitive advantage, they began saying "the network is not a utility anymore — it's a corporate asset, and its got to be managed like a corporate asset."

Communications managers are quick to agree on that point, noting that when the performance of the network degrades, so can a company's strategic edge and overall efficiency.

If a firm's customer service representative cannot respond quickly to a billing dispute or if a brokerage house wastes time in processing a transaction, the business will lose valued customers.

If response is chronically slow on a bank's automated teller machines or if an airline cannot complete a reservation quickly, customers will go elsewhere. And with more back-office personnel tied into networks, the consequences of lagging efficiency can mean higher overtime and labor costs.

Rose Mary Gabler, a product marketing manager with BGS Systems, Inc., a Waltham, Mass.,

Leibowitz is a free-lance writer based in Brookline, Mass.

Network

FROM PRECEDING PAGE

vendor of performance management tools, says recognizing the need for performance management is a relatively recent phenomenon among communications executives.

Gabler says the 1986 introduction of Netview, IBM's centralized network management system, drove the message home. "It raised the level of consciousness among the network people who have been historically more concerned with availability — keeping the system up and running — as opposed to how it's performing," she says.

Easier said than done

But appreciation of a concept and actual implementation are two different things. A number of problems have acted as a brake on the growth of network performance management.

> "YOU NEED a way of tying the data together through some kind of network control functions. Those products don't exist."
>
> ALAN LEVY
> INTERNATIONAL SYSTEMS SERVICES CO.

First and foremost, there is the sheer complexity of data gathering in networks that typically consist of a far-flung assortment of products from a variety of vendors.

Managing the performance of any system is a multistep process that begins with the measurement of vital statistics such as response time, utilization, uptime and error rate.

On a weekly basis, the performance numbers are collected and compiled into a report. Performance management personnel analyze this data to ensure that pre-established performance objectives are being met. If the response times are encroaching dangerously on objectives, MIS personnel may opt to do some tuning to alleviate bottlenecks.

On a monthly basis, a report showing actual performance and comparing it with objectives is usually sent to management outside MIS and to vendors.

What sounds like a time-consuming task is even more difficult and time-consuming in the case of networks, says Tom Ross, a partner with St. John's Consulting Group in Westfield, N.J.

Instead of measuring performance statistics of one item, such as the mainframe, personnel engaged in network management must gather data on a host of components, such as controllers, modems, communications lines, multiplexers and front-end processors, most of which originate from different sources.

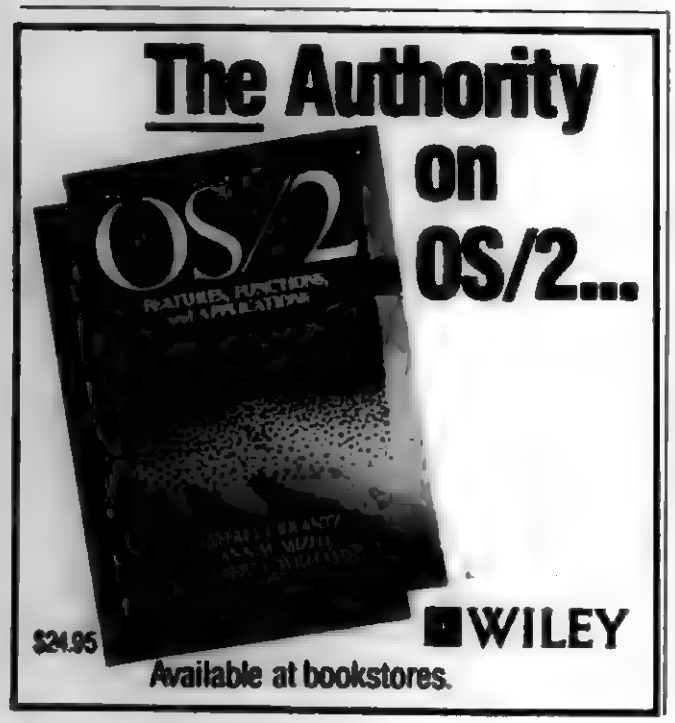
Few of the tools that currently exist for network management are designed to cope with that sort of heterogeneous environment.

Plenty of tools are available for monitoring the separate components of a network, Ross says, but a small number can pull such diverse data together and provide analysis of it in a common report.

The data from one component, such as a modem, is of little use to performance managers alone. It is only valuable when integrated with other pieces of data, thus reflecting the performance of the whole network.

Alan Levy, a senior manager

Continued on next page



Managing complex challenges of work load growth

BY ROSEANNA TORRETTO

Work load growth presents the biggest performance management challenge at the Health and Welfare Agency Data Center (HWDC) of the State of California.

The mission of HWDC, a 200-employee data center located in Sacramento, Calif., is to provide cost-effective data processing capability in the form of computer and communications equipment, software and expertise to the 12 departments of California's Health and Welfare Agency.

Computer processing is provided on three nearly independent systems. An IBM 3033 Model U is used as a facilities management system for one department. Five percent to 10% of an Amdahl Corp. 5890 Model 300 uses MDF to carve out a niche for IBM VM services within the agency.

The primary system, which is shared by every user department, processes production, test and development work loads consisting of IBM CICS transaction processing, TSO and both prime- and off-shift batch jobs.

Since January 1984, the data center's IBM MVS/XA system with JES2 has grown from a single IBM 3084 Model Q processor to one IBM 3090 Model 400 and approximately 90% of the Amdahl 5890.

HWDC performance management is based on service-level objectives, which are determined by customer need. These objectives concern response time, turnaround time and availability.

Response-time levels establish, for example, a parameter that says 90% of on-line transactions will be completed within a minimum amount of time — usually less than four seconds — and are gauged according to customer transaction submission. Availability and turnaround goals are set to fall at 95% of possible performance.

The previous day's system and network availability, work load volumes and response time for each CICS application and TSO are reported every weekday morning at a systems problem status meeting attended by HWDC management and staff.

Service-level objectives that have not yet been met are identified as problems and assigned to a member of the performance measurement and capacity planning staff.

This group of five programmer analysts is responsible for performance measurement, work load forecasting, capacity planning and so on. Staff members report on the status of the unmet service-level objectives at the daily meeting.

Although service-level objectives for on-line systems are not explicitly translated into I/O performance objectives, the performance of data storage subsystems is monitored closely.

This is because I/O time is a major contributor to on-line response time. Direct-access storage device (DASD) I/O response time components are reported daily by volume, as is cache control unit performance.

> THE DATA CENTER'S biggest and most interesting challenge has been to manage one critical CICS application with more than 550,000 transactions per day.

Responsibility for data storage management is split by the HWDC's technology and operations divisions, with the technology group responsible for the lion's share of performance issues. The data management section of the operations division is responsible for the management of DASD space and its availability.

For the shared system, DASD storage includes 200 volumes of single-capacity IBM 3380-type DASDs and 100 volumes of double-capacity DASDs. One-third of the volumes are attached to IBM 3880 storage control units with cache.

Improvement alternatives

Sometimes performance improvement requires more powerful resources to be installed. In 1985, a CICS region shared by several applications experienced unacceptably high response times and failed to meet service-level objectives because of I/O delays for Software AG of North America, Inc.'s Adabas volumes.

At the same time, TSO experienced high response times for transactions that required access to catalogs, RACF, load libraries and other system data sets. Cache analysis tools from hardware vendors were used to show that service-level objectives could be met and consistent response time could be provided to Adabas and TSO users through the use of caching.

System data sets, TSO data sets and on-line production data bases such as Adabas and Cullinet Software, Inc.'s IDMS/R were then cached. The cache analysis tools were used in problem analysis to reevaluate cache size requirements and data set placement and to select additional data sets to be cached.

Another time, HWDC took advantage of efficiencies built into a new software release, which improved application performance by minimizing I/O activity to the RACF data set. An RACF 1.7 option to use extended storage dramatically reduced the number of prime-shift I/Os to the RACF control data set from 3.6 million per day to less than 100,000.

For batch systems, turnaround time for unscheduled batch jobs is reported weekly to make sure the system is meeting service objectives. Goals for scheduled batch jobs, based on input queue wait time, are also reported at this time.

When turnaround time is unacceptable, the data center tries to identify bottlenecks, which are often found in storage media. In 1985, HWDC improved service by providing dramatically

Watching the system grow

Increased demands on California's Health and Welfare Agency data center have required the agency to more closely monitor all aspects of system performance

	[illegible]	[illegible]
Number of CICS transactions per week	2 million	6 million
[illegible]	[illegible]	[illegible]
Number of batch jobs per week	20,000	30,000
[illegible]	[illegible]	[illegible]
Number of gigabytes of direct-access storage	100	250

CW CHART

Torretto is a senior programmer analyst at the Health and Welfare Agency Data Center of the State of California in Sacramento.

fewer tape errors and faster throughput by migrating to cartridge media.

The schedule simulation facility of Computer Associates International, Inc.'s Data Center Management System is used to simulate peak work loads. This helps to estimate the number of tape drives needed to meet production job schedules. A tape library of 80,000 cartridges and 32 IBM 3480 magnetic tape subsystem drives currently serves the system.

Innovative Data Processing's Fast Dump Restore, which takes weekly full-volume backups, was selected for its speed, since it requires only 20 minutes to back up a double-capacity volume.

That company's Automatic Backup and Restore, chosen for its versatility, is used to take daily incremental backups, securing only changed data sets. Sterling Software, Inc.'s DMS/OS is used to migrate and move data sets and to create customized reports. Computer Associates' FastDASD is used to evaluate data set placement based on activity and seek delays.

The challenge of size

HWDC's biggest and most interesting challenge has been to manage one critical CICS application with more than 550,000 transactions per day. This application will grow to one million per day by the fourth quarter of this year.

The application's response time has improved significantly through the years as HWDC acquired faster processors and faster data storage subsystems. Improved data transfer times and DASD seek times have reduced DASD I/O response time from 35 msec to 5 to 10 msec.

The future performance characteristics of this application are uncertain; attempts to model it have been disappointing. Analytic modeling tools break down when CICS, which runs in a single address space using more than 50% of a single processor, is modeled running on a multiprocessor. Attempts are currently under way to modify the application.

As current on-line applications grow and new applications are added, HWDC needs to process increasing amounts of data and I/O activity rates. Faster access to data is a must, but simplified data storage management is also required. For the data center, device addition, migration and allocation need to be simplified. Data set performance requirements need to be managed by the system.

Through the years, HWDC has been able to take advantage of hardware and system software developments to improve performance specifications. What is needed now are the staff and systems resources to explore the expanded storage opportunities now being offered. ●

Network

FROM PRECEDING PAGE

with Boston-based consulting firm International Systems Services Co., explains that performance management is especially difficult when dealing with distributed networks having heterogeneous nodes and when trying to manage data flowing from one network to the next across different topologies.

Nonexistent tools

Again, the problem is a lack of integration. "You need some way of tying the data together through some kind of network control functions," Levy says. "Those products don't exist."

"The data we get is rich. We probably get all the data we need," says Jim Cox, manager of technical resources at Texas Utilities Services Co. in Dallas, about the tools that monitor performance on the company's 5,000-device IBM Systems Network Architecture (SNA) network that serves its customer service agents.

But the big problem has been tying all this data together. In some cases, Cox's people have had to write their own analysis programs, which can be a time-consuming task. In other cases, "you have to make your own analysis of the different layers separately," he says. "It takes manpower."

Just about everyone points to the lack of trained manpower as an impediment to performance management of networks. Although tools provide summary data automatically, getting to the root of a response time problem when one arises is more difficult.

"It is one thing to produce numbers and information; it's something else to know what to do with them," says Mario Morino, president of Vienna, Va.-based network analysis tool vendor Morino Associates, Inc.

"The guy doing network performance work is facing multiple disciplines — he may be facing an IBM SNA network, tied to a X.25, tied to a Decnet," he adds, referring to Digital Equipment Corp.'s network.

Bring in specialists

Because the issues involved are so complex, network management is really a job for network specialists as opposed to performance management generalists, according to Management Technology's McDonald.

Unfortunately, however, good network people are hard to find, and the ones a communications department does employ are usually kept too busy with maintenance issues to worry much about analysis and optimization.

Performance management ends up taking a backseat. The state of networks today still involves so much fire fighting that performance management has to take a back seat, according to BGS Systems' Gabler.

Performance management could prevent many network fires through detection of potential bottlenecks, according to McDonald, but the problem is in breaking the problem-response cycle.

"If we took the time to do performance management properly, we would be less in reactive mode," he says. "But we're in reactive mode, so we can't take the time to manage the network properly. So we stay in reactive mode."

Catapulting into a proactive stance requires solid management backing because of the investments of staff and money required by performance management of networks.

Take advantage of change

Sometimes, the opportunity for presenting a case for the commitment arises when major changes are made in the organization of the company's corporate network.

Texas Utilities Services, for example, first began doing performance management of its network after the organization merged the operations of three individual Texas-based power companies.

And at Premier Bancorp, Allen obtained the resources to do performance management after the organization merged the bank operations of its eight member banks.

Reorientation toward performance management can, however, also be accomplished through bottom-line reasoning.

At Eli Lilly & Co., a pharmaceutical firm in Indianapolis, end-user complaints about long response times were sufficient enough to convince communications personnel that they needed a performance management system.

The asset approach

Rather than just present the case for such a commitment to management in the form of negatives, however, the company's telecommunications group armed itself with financial models that compared the cost of doing performance management with the manpower savings from increased end-user productivity, calculating return on investment figures for the performance management system.

"We used an approach [where we said] you have to treat end-user productivity as a corporate asset," explains Dan Franz, a senior systems analyst in the group. "Then you can start building a lot of financial models out of that."

The costs that were sold to management included the cost of dedicating approximately 120 man-hours per month, along with equipment maintenance fees and purchase and setup charges.

The company installed an Avante-Garde Computing, Inc. Net/Alert Plus performance monitoring system that captures data on its 180 IBM 3270-type communications lines spanning a worldwide network.

The monitoring system as installed at Eli Lilly consists of a stand-alone minicomputer connected to 3270-type lines coming into its Indianapolis headquarters, as well as remote monitors at two other data centers in San Diego and Bathingstoke, UK.

The system collects data on such things as line utilization, response times and transaction volume and has been used extensively to reconfigure lines, line speeds and satellite configurations, according to Franz.

Network personnel are now able to head off complaints by using the performance management system to perform tuning before end users ever see a problem, Franz says.

But what may have been even more important in reducing negative feedback is the system's ability to document good service.

Reports on response time performance are now sent out on a monthly basis to managers of end-user departments as well as the vice-president of MIS. Those reports have had a marked impact on user satisfaction, Franz says.

"We have really cut down the number of complaints based upon distributing the information to the user," he says. "People remember just the bad times. But now, they can see that

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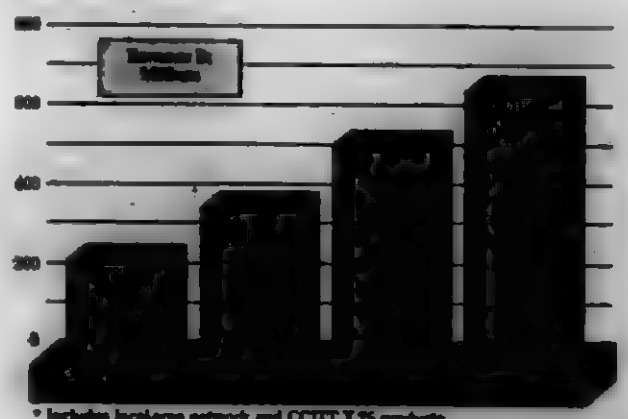

* Includes hosted network and CCITT X.25 products

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> "IT IS ONE thing to produce numbers and information; it's something else to know what to do with them."
>
> MARIO MORINO
> MORINO ASSOCIATES, INC.

although response time may have degraded during a peak time, that is not the norm."

Management is also happy with the system. In fact, Robert Groves, Eli Lilly's telecommunications manager, says the company would allocate the resources to do more performance management if it were feasible. Unfortunately, he says, the tools are weak even if the spirit is willing. The next major challenge is to push performance management outward from the 3270 network to Eli Lilly's worldwide Decnet, which supports a vast population of ASCII devices. For now, however, Groves says this task can only be approached in piecemeal fashion.

Eli Lilly has purchased several performance management tools, but Groves says they need to be integrated into an overall performance management system. "We need tools," he says. "We need integrated tools. We're trying to take a view on Ethernet as a corporate distribution facility — host to host. So we're looking at those tools, and we've got some of them. But we're trying to figure out how to organize them in a way that you can do overall network management."

Groves says the big issue in doing such an integration is not so much the labor involved but in doing it "in such a way that it can grow as additional capabilities come on board."

"I think the challenge," he says, "is what are you going to do when the distributed processing eats you alive? It's not that you don't want to manage the network — it's that you can't."

Texas Utilities Services has also had to settle for partial management of its data communications network.

UNTIL RECENTLY, local networks have not had major performance demands placed on them, making the task of LAN management relatively simple.

Although this electric utility's DP subsidiary installed a performance management system on an IBM CICS-based SNA network that serves its customer service agents, it runs two other networks without monitoring them. The SNA network, consisting of 12 front-end processors located throughout Texas, is connected by primary and backup routes to three IBM 3090s and one IBM 4381 mainframe at the hubs.

In managing this network, the company makes use of several tools — IBM's Netview and its Service Level Reporter data base and BGS Systems' Best/1-SNA network modeling package and Capture/SNA network snapshot facility.

Cluster controllers with hardware response-time monitors have been installed in all the critical areas — particularly customer-service centers. "We

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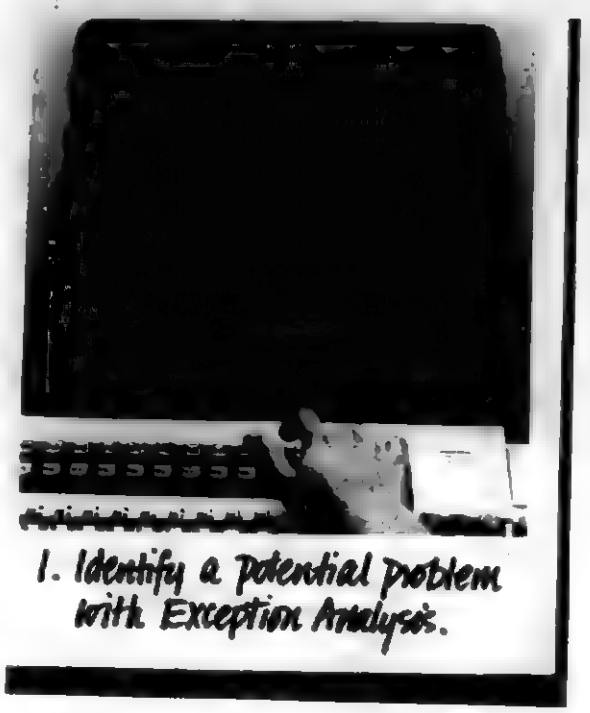

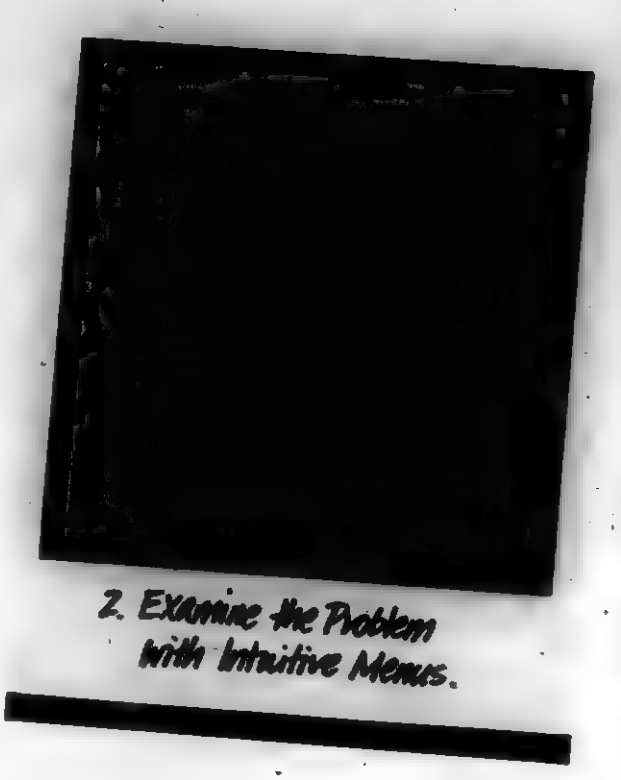

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know exactly what they're getting," says Texas Utilities Services's Cox.

Each month, MIS sends reports graphing the past month's response times to the power utility's customer service groups. MIS has a goal of providing two-second or less response times 90% of the time, a goal the company has consistently met through its performance management efforts. While no service-level agreement exists, the response time objective is published in the company's corporate objectives.

According to H. B. Keating, Texas Utilities Services' director of information services, his organization would like to manage performance of the company's 1,000-device Hewlett-Packard Co. network and its 300-device Intergraph Corp. network, but the tools to do so do not exist. "In those areas, we go more by the noise level. . . . 'Are we getting complaints or not?' " he says.

LAN lag

For Dana Gargano, director of corporate support services at Primerica Corp. in Greenwich, Conn., the noise level is beginning to exceed tolerance limits in the company's local-area network sector.

Network management products for LANs have been particularly slow to emerge. According to Mark Leary, program manager for the Communications Technologies Service at Framingham, Mass.-based International Data Corp., this lag can be attributed to the somewhat embryonic nature of LANs.

Until recently, local networks have not had major performance demands placed on them, making the task of LAN management relatively simple and of little interest to either vendors or users.

Mounting complaints

But Gargano is currently faced with mounting user complaints about the peak-period performance of the company's 200-workstation Novell, Inc. LAN and management requests for performance information similar to that provided for Primerica's IBM 3083-based system.

Currently, Gargano's group is evaluating Network General Corp.'s Sniffer LAN Protocol Analyzer, which provides information such as number and type of packets flowing across the network.

> "I THINK as LANs evolve more, there will be other vendors out there that will fill this particular void."
>
> DANA GARGANO
> PRIMERICA CORP.

Sniffer, costing approximately $20,000, is expensive and does not provide such information as server utilization, average response time and number of cache hits, Gargano says.

As for other products, there are packages to monitor direct-access storage device utilization on the system's 20 Compaq Computer Corp. 386 servers, "but they're primitive at best," he says.

Gargano says he is waiting for Novell to introduce a performance management tool that would help fill in the gaps and anticipates additional products will become available from other vendors.

"I think as LANs evolve more, there will be other vendors out there that will fill this particular void," he says.

Too many cooks

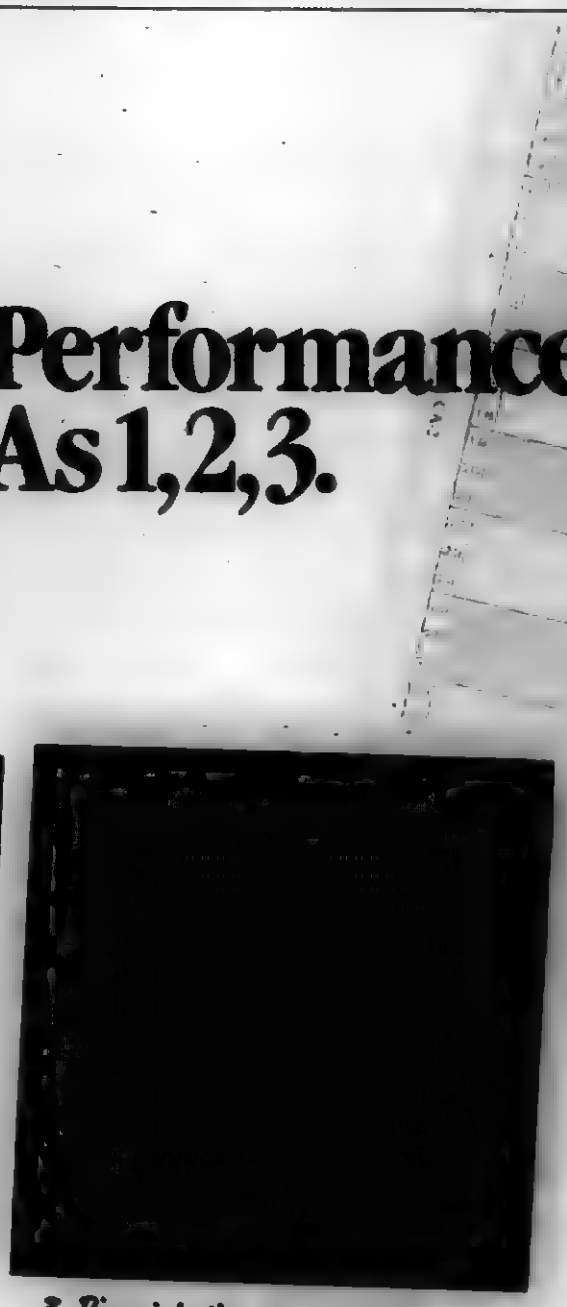
While there are undeniable deficiencies and gaps in the tool supply at all levels, there are also organizational barriers to effective performance management of networks.

In some companies, Gebler says, network personnel do not have any access to performance data for the company's host system.

Although most companies have folded their communications department into the MIS structure, performance management in many shops is still done independently by each department.

And, according to Morino of

Performance Problems As 1,2,3.



interface lets you press a key and look directly into your CICS system so you can immediately answer questions about transaction response time, exceptional conditions, and resource utilization.

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Morino Associates, the boundaries are often too rigid to permit effective sharing of performance data. "This guy's responsible for the network, this guy's responsible for the data base and this guy's responsible for operating systems. You have to get three departments to work together to troubleshoot a problem. That's very difficult when you don't have a point of integration," he says.

A better organizational tack, Morino suggests, would be to create a higher level group that could look at performance across the board. "There is no line between the host and network anymore," Morino says, "but I don't think we've yet come to grips with that fact."

Dust gathering

Lack of follow-through with use of purchased tools is also a common failing, according to Management Technology's McDonald. Many companies install performance management tools to deal with a specific problem and then neglect to use those tools or update them on a regular basis.

"They use these tools to find out where the bottleneck is and to make sure they get good service," McDonald says. "And then the thing is put on the shelf. Or, they buy it and set it up for a system and get some regular reports. And in six months, those reports are meaningless, because the system has changed and no one has put in the time to adjust it."

And, according to BGS Systems' Gabler, after purchasing performance management tools, 98% of major network customers end up doing performance management on a "catch-as-catch-can" basis.

> THERE IS no line between the host and network anymore, but I don't think we've yet come to grips with that fact."
>
> MARIO MORINO
> MORINO ASSOCIATES, INC.

The payoff

Companies that are doing performance management regularly are finding that it pays off. Northwestern National Life Insurance Co., headquartered in Minneapolis, is a medium-size shop that has been doing network performance management for about three years, according to Tom Fischer, manager of network systems.

Northwestern National's commitment to performance management involves dedicating half of one MIS staff person's time on an ongoing basis to monitoring, analyzing and tuning its network, which consists of two IBM 3090s connected to 3,000 terminals and then sharing the data with 20 IBM System/36s in the field. In addition, the company spent about a year during the last few years developing an internal package for integrating its tools, including BGS Systems' Best/1-SNA and Capture/SNA, IBM's Netview and Network Performance Monitor and Morino Associates' MVS Integrated Control System.

While having to expend that much effort to create an integrated system was far from ideal, Fischer says, the results have been worthwhile. Since installing the system, MIS has consistently met its commitment — spelled out in service-level agreements signed with users — of providing 3½-sec. response time to users 90% of the time.

Fischer also points out that the performance management data is also used in capacity planning, which is where the cost savings can be particularly obvious.

By using the tools, for example, Fischer's group was able to prove that the addition of extra system facilities recommended by a vendor would be unnecessary. That single finding saved the company $750,000 a year.

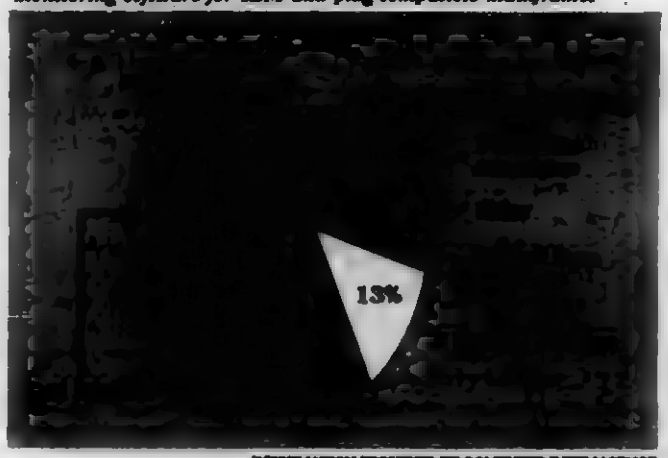
Northwestern National's programmer Robert Choban adds that performance management has become particularly important since the company began to off-load applications from the 3090s to the System/36s last year.

"Off-loading means you can keep your host under control, but your network becomes more important. If there's going to be a bottleneck, that's where its going to be," he says.

"These tools can easily justify themselves if you just do the business analysis and see what it buys you," Fischer says. "The payoff is in allowing the network to run at peak efficiency "without having to go out and acquire more facility than you need." •

Measuring up

Market share, January 1988, for performance measurement and monitoring software for IBM and plug-compatible mainframes



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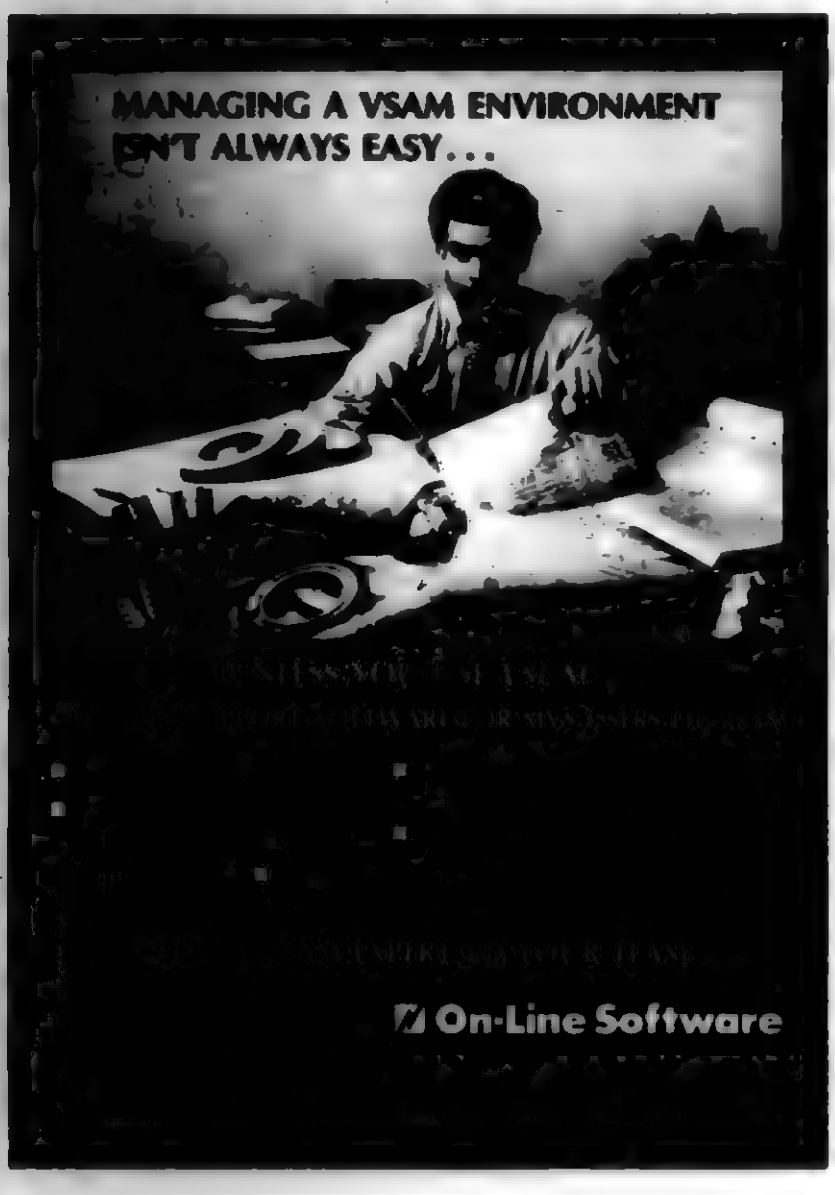

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Network management systems

COMPANY	PRODUCT	HARDWARE, SOFTWARE OR COMBINATION	STAND-ALONE OR INTEGRATED	HARDWARE PLATFORM	NETWORK ENVIRONMENTS MANAGED	ON-LINE NETWORK STATUS MONITORING	REMOTE FACILITY TESTING	LINK-LEVEL DIAGNOSTICS	THROUGHPUT ANALYSIS	CONFIGURATION MANAGEMENT	SECURITY AND ACCESS CONTROL	JOB ACCOUNTING AND CHARGEBACK	MODELING AND SIMULATION	ON-LINE GRAPHICS REPORTING	AD HOC REPORT GENERATION	HISTORICAL DATA BASE REPORTING	PRICE
Alta Computer Communications (714) 979-7030	Mux	Hardware	Stand-alone	NA	Proprietary	Yes	Yes	Yes	No	Yes	Yes	Yes	No	No	Yes	Yes	$5,000
	Attach Resource Manager	Combination	Integrated	NA	Proprietary	Yes	Yes	Yes	No	Yes	Yes	Yes	No	No	Yes	Yes	$8,500
Allen Systems Group, Inc. (813) 448-1300	Shopmon	Software	Stand-alone	All IBM and compatibles, except systems running DOS	IDMS	Yes	No	No	Yes	Yes	Yes	No	No	Some	No	No	18,250-$24,500
[illegible], Inc. (617) 879-[illegible]	Netmon 7000	Combination	Stand-alone	[illegible]	SNA; X.25	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	$35,000
Applied Computing Devices, Inc. (812) 232-6051	Network Knowledge Systems	Combination	Integrated	Mini	SNA; T1; X.25; synch; asynch; voice/data, fiber networks	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	NP
[illegible] Digital Data Systems, Inc. (subsidiary of NCR Corp.) ([illegible]) 281-[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Multivendor/multiprotocol, with X.25 option	Yes	Yes	No	No	Yes	Yes	No	No	No	Yes	No	$750
Atlantic Research Corp. (703) 644-9000	NTS 4000 Distributed Network Restoration, Test and Management System	Combination	Integrated	Micro	WAN	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	NP
AT&T (201) [illegible]	Accunet T1.5	Offers network service	NA	NA	T1	No	No	No	No	No	No	No	No	No	No	No	$600 per port per month
	Datapheone II Level IV System Controller 300/400	Combination	Either	Mini	T1, private-line analog, switch-net and high-speed modems, DSU/CSU[1], T1 and slot multiplexers, DDS[2], LADS[3]	Yes	Yes	Yes	No	Yes	Yes	No	No	Yes	Yes	Yes	$70,000-$130,000
	Datapheone II Accuflex Network Manager	Combination	Either	Mini	T1, modems, multiplexers	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	$60,000-$130,000
	Datapheone Digital Service with Customer Test Service	Software	Integrated	Micro	DDS	No	Yes	Yes	No	No	Yes	No	No	No	No	No	$6.50 per month per circuit
	Software-Defined Network Service with Service Management System and MIS Reports	NP	Integrated	Mini	SDTN[4]	No	No	No	No	Yes	Yes	Yes	No	No	No	Yes	NP
	Controlled System Management	Combination	Integrated	Micro, mini	PBX	No	No	No	Yes	Yes	Yes	Yes	Yes	No	No	Yes	NP
	Visual Maintenance & Administration Panel	Combination	Stand-alone	Micro	PBX	Yes	Yes	Yes	No	Yes	NP	No	No	Yes	No	No	$4,000 (software only)
	Accumaster Trouble Tracker	Combination	Integrated	Micro	PBX	Yes	Yes	Yes	Yes	No	Yes	No	No	Yes	Yes	No	$60,000
	Accumaster Centralized Workstation	Combination	Stand-alone	Micro	Starlan, T1	Yes	Yes	Yes	Yes	Yes	Yes	NP	No	Yes	NP	NP	$7,000-$15,000 per user
	Starkeeper	Combination	Either	Mini	AT&T ISDN or Datakit VCS	Yes	Yes	Yes	NP	Yes	NP	Yes	Yes	Yes	Yes	Yes	From $35,000
Avant-Garde Computing, Inc. (800) 778-7000	Net/Command	Combination	Stand-alone	Mini, micro	IBM, SNA[5], Decnet, Unisys, X.25, HDLC[6], LAN, WAN, T1	Yes	Yes	Yes	Yes	No	Yes	No	No	Yes	Yes	No	NP
	Net/Guard	Combination	Stand-alone	Mini, micro	Asynch dial-up	Yes	Yes	Yes	Yes	No	Yes	No	No	Yes	Yes	Yes	NP
	Net/Alert Plus	Combination	Stand-alone	Mini, micro	IBM, SNA, Decnet, WAN, HDLC, Unisys, BSC[7]	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes	NP
Avanti Communications Corp. (602) 968-[illegible]	Open Network Management System	Combination	Integrated	Supermicro	T1 backbone	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	$80,000-$90,000
BGS Systems, Inc. (617) 891-0000	Bestnet Boundary	Software	Either	MVS systems	SNA	No	Yes	Yes	Yes	No	Yes	No	Yes	Yes	No	No	$49,050
	Bestnet MSNF	Software	Either	MVS systems	SNA	No	Yes	Yes	Yes	No	Yes	No	Yes	Yes	No	No	$67,575
Codenoll Systems, Inc. ([illegible]) 332-[illegible]	Multi Media Access Center	Combination	Integrated	Micro	Ethernet	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No	No	$2,500-$16,000
	LAN Specialist	Combination	Stand-alone	Micro	Ethernet	Yes	No	Yes	Yes	Yes	Yes	No	Yes	No	No	Yes	$5,795

[1]Wide-area network [2]Data service unit/channel service unit [3]AT&T's Datapheone Digital Service [4]Local-area data net [5]Synchronous digital transmission network [6]IBM Systems Network Architecture [7]High-level data link control [8]Binary Synchronous Communications [9]Computer-aided scientific/engineering [10]Time-division multiplexers [11]Transmission Control Protocol/Internet Protocol [12]Synchronous data link control [13]Packet assembly/disassembly [14]Fiber distributed data interface [15]Synchronous time-division multiplexer [16]Advanced Program-to-Program Communications

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. When a vendor is unable to provide specific information about its product, this is designated NP (not provided). When a question does not apply to a vendor's product, this is designated NA (not applicable). Further product information is available from the vendors.

COMPANY	PRODUCT	HARDWARE, SOFTWARE OR COMBINATION	STAND-ALONE OR INTEGRATED	HARDWARE PLATFORM	NETWORK ENVIRONMENTS MANAGED	ON-LINE NETWORK STATUS MONITORING	REMOTE FACILITY TESTING	LINK-LEVEL DIAGNOSTICS	THROUGHPUT ANALYSIS	CONFIGURATION MANAGEMENT	SECURITY AND ACCESS CONTROL	JOB ACCOUNTING AND CHARGEBACK	MODELING AND SIMULATION	ON-LINE GRAPHICS REPORTING	AD HOC REPORT GENERATION	HISTORICAL DATA BASE REPORTING	PRICE
Case Communications, Inc. (301) 258-7710	5000 series	Combination	Integrated	Mini	CASE modems, multiplexers	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	$16,000-$70,000
Cincom Systems, Inc. (800) 543-3010	Net/Master	Software	Integrated	Mainframe	SNA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	$65,000
Codex Corp. (617) 364-2000	Codex 3000	Combination	Integrated	Micro	Modems, stat multiplexers, digital TDM[10], communications networks	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	From $30,000
	Codex 9000	Combination	Integrated	32-bit workstation	Communications networks	Yes	NP	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	$60,000
Communications Machinery Corp. (800) 262-8023	DRN-1700/Lanscan	Combination	Stand-alone	Independent	Ethernet, TCP/IP[11], ISO	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	$8,500
Computer Associates International, Inc. (800) 645-3003	CA-Vmon	Software	Stand-alone	Mainframe	SNA, SNA/VTAM	Yes	No	No	No	Yes	Yes	No	No	No	No	Yes	$7,500-$15,100
	CA-Mindmon	Software	Stand-alone	Mainframe	SNA, VTAM protocols	Yes	No	No	Yes	No	Yes	No	No	Yes	Yes	Yes	$26,000-$48,300
	CA-Netman	Software	Stand-alone	Mainframe	All	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	$14,000-$54,000
Computer Software Management & Information Center (COSMIC) (404) 542-3265	NQS-ARC11750	Software	Stand-alone	Mainframe, mini	Any network of Unix-based machines	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	$6,000
Comsystems Telecommunications (617) 894-8888	Distributed Network Design System	Software	Stand-alone	Micro	X.25, distributed	No	No	No	No	Yes	No	No	Yes	Yes	No	No	$15,000
	Capacity/Q	Software	Stand-alone	Micro	NP	No	No	No	No	Yes	No	No	Yes	No	No	No	$15,000
	Multipoint Network Design System	Software	Stand-alone	Micro	T1, SNA, multipoint, point-to-point	No	No	No	No	Yes	No	No	Yes	Yes	No	No	$17,000
Contel (301) 230-6400	Manager Plus	Software only, combination	Either	Mini	PBX, voice/data networks	Yes	Yes	No	No	Yes	Yes	Yes	No	No	Yes	Yes	NP
Control Resources Corp. (201) 265-3700	IDM	Combination	Stand-alone	Micro	Last mile, local loop	Yes	Yes	No	Yes	Yes	Yes	No	No	No	Yes	Yes	From $12,000
Datacomm Management Sciences, Inc. (203) 838-7182	MTRX-8000, 4000, 1000	Combination	Stand-alone	Micro	WAN	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	$300-$400 per port
	NSM-64	Combination	Either	Micro	SNA	Yes	Yes	Yes	Yes	No	No	Yes	No	Yes	Yes	Yes	$5,000-$75,000
	Asmacs	Combination	Stand-alone	Micro	WAN	Yes	Yes	Yes	No	Yes	No	No	No	Yes	No	Yes	$700 per circuit
Datapoint, Inc. (301) 540-6464	Auto-Net Network Restoral System	Combination	Stand-alone	Micro	Four-wire voice frequency, all protocols	Yes	Yes	No	No	Yes	Yes	No	No	No	No	No	$1,400 per circuit
Data Switch Corp. (203) 926-1801	Intellinet Network Performance Management System	Combination	Either	Micro	SNA, BSC, SDLC[12], IPARS, X.25, RJE, Unicorn, VIP	Yes	No	No	Yes	Yes	No	Yes	No	Yes	Yes	Yes	From $45,000
Develcon, Inc. (306) 434-4481	DCF 2000	Combination	Stand-alone	Micro	DDS	Yes	Yes	Yes	No	Yes	Yes	No	No	Yes	Yes	Yes	From $6,000
Digilog, Inc. (215) 628-4630	MDTS	Combination	Stand-alone	Micro	WAN	Yes	Yes	Yes	No	No	Yes	No	No	No	Yes	Yes	$700-$900 per line
	NDTS	Combination	Stand-alone	Micro	WAN	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Some	Yes	Yes	$700-$900 per line
	NAMS	Combination	Stand-alone	Mini, micro	WAN	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	$800-$1,200 per line
Digital Communications Associates, Inc. (404) 442-4000	System 3000	Combination	Integrated	Micro	T1	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	NP
	NMS Version 3.0 and User Services Facility	Combination	Stand-alone	Micro	PADS[13], Series 300	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	$10,000-$40,000
Digital Equipment Corp. (Contact local DEC sales office)	Network Management Products & Services	Combination	Integrated	Micro, mini, mainframe	X.25, SNA, DDS, Decnet	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NP
DSC Communications Corp. (817) 491-2000	Teleprl	Software	Either	Micro	PBX	Yes	No	NA	NA	Yes	Yes	Yes	No	Yes	Yes	Yes	$6,000-$25,000
	Telebus	Hardware	Stand-alone	Micro	PBX	Yes	No	NA	NA	Yes	Yes	Yes	No	Yes	Yes	Yes	$3,000-$6,000
Duelz Networks, Inc. (714) 770-1221	Engards	Combination	Stand-alone	Workstation	WAN	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	$80,000-$120,000
Duquesne Systems, Inc. (800) 222-2000	Netspy	Software	Stand-alone	Mainframe; MVS, MVS/XA only	VTAM	Yes	No	No	Yes	No	Yes	No	No	Yes	Yes	Yes	$12,000-$20,000
Emcom Corp. (214) 423-7183	Network Control System Series/70	Combination	Either	Micro	Standard communications protocols, including IBM, SDLC, IPARS, Unisys	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	NP
Exodus, Inc. (408) 434-2300	Loadpac 8100	Combination	Either	Micro	Ethernet, Decnet, Appletalk	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	No	Yes	$4,900
Fiberaxx Corp. (818) 709-6000	Lightwatch	Combination	Stand-alone	Micro	Magnum fiber-optic backbone	Yes	Yes	Yes	No	Yes, some	No	No	No	No	Yes	Yes	From $1,000
Fibronics International, Inc. (617) 770-0700	Fibronics Network Management System	Combination	Stand-alone	Micro	FDDI-based[14], proprietary cabling system	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	NP

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Amdahl Corp., Inc. (800) GAL-DALF	Starpoint	Combination	Integrated	Micro	Starnaker	Yes	No	Yes	Yes	No	No	No	No	No	Yes	Yes	NP
Gejac, Inc. (301) 725-2560	Arsap	Software	Stand-alone	Mini, mainframe	Decnet, VMS Cluster, VMS	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	$5,000-$18,000
General Datacomm, Inc. (203) 574-1118	Netcom NMC 70	Combination	Stand-alone	Micro	Analog and digital datacom, multiplexers, STDM[9]	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	$10,700-$68,700
Halley Systems, Inc. (408) 434-3535	Connect LAN/View	Combination	Integrated	Micro	Broadband backbone networks	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	NP
Hekimian Laboratories, Inc. (301) 840-1217	Reset	Combination	Integrated	Mini	T1	Yes	Yes	No	No	No	Yes	No	No	No	No	Yes	NP
Hewlett-Packard Co. Information Networks Division (Contact local HP sales office)	HP Network Services	Combination	Stand-alone	Mini	802.3, SNA, Ethernet	No	Yes	Yes	Yes	No	No	No	No	No	Yes	No	NP
	Application Software Products	Software	Stand-alone	Mini	802.3, Ethernet, X.25, point-to-point	No	Yes	No	No	No	Yes	No	No	Yes	Yes	Yes	NP
	WAN Protocol Analyzer/LAN Protocol Analyzer	Combination	Stand-alone	Independent	802.3, X.25, T1, SNA/SDLC, BSC, Ethernet, analog voice networks	Yes	No	Yes	Yes	No	No	No	Yes	Yes	Yes	No	$12,250-$20,100
	HP Network Support Services	Off-site service	NA	NA	X.25, 802.3, Ethernet, SNA, PBX, T1	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	NP
Honeywell Bull, Inc. (617) 862-6000	DSA-Network Control Facility	Combination	Integrated	Mini	Proprietary mainframes, minis, micros in DSA environment	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	NP	$1,570-$3,600 software only
IBM (800) IBM-2468	Netview	Hardware	Stand-alone	Mainframe	SNA, can interface to APPC[6]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	$7,800-$60,240
Infinet, Inc. (617) 681-0600	NIS Series 900 Manager I	Combination	Integrated	Mini	T1, modems, DDS, X.25	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	From $80,995
	NIS Series 900 Manager II	Combination	Integrated	Mini	T1, modems, DDS, X.25	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	From $40,995
	NIS Series 90 Integrator	Combination	Integrated	Mini	T1, modems, DDS, X.25	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	From $89,995
Infotron Systems Corp. (800) 345-4636	ANM/INX	Combination	Stand-alone	Micro	Stand-alone matrix, data management PBX system	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	$10,000
	ANM 1500	Combination	Stand-alone	Micro	T1	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	$7,500
	ANM/NX	Combination	Stand-alone	Micro	T1	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	$15,000
	ANM 800	Combination	Stand-alone	Micro	56K backbone, access networks	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	$10,000
	INM1000 with foreign vendor interface	Combination	Stand-alone	Supermicro	T1, 2M-bit stat multiplexer-based, WANs	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	$59,500-$77,550
	INM400 with foreign vendor interface	Combination	Stand-alone	Supermicro	T1, 2M-bit stat multiplexer-based, WANs	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	$42,900-$56,050
	INM200 with foreign vendor interface	Combination	Stand-alone	Supermicro	T1, 2M-bit stat multiplexer-based, WANs	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	$29,500-$40,050
Innovative Software, Inc. (800) GET-SMART	Smart LAN Performance Test	Software	Integrated	Micro	Netbios, DOS 3.1 and compatible LANs	No	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	$40,95
Integrated Telecom Corp. (214) 234-3340	Integrated Digital Management System	Combination	Integrated	Mini	T1	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	$15,900
Interactive Systems, Inc. (314) 432-0900	Telephone Facility Management System	Combination	Integrated	Mini	Wide	No	No	No	No	Yes	No	Yes	Yes	No	No	Yes	From $120,000
Kentrox Industries, Inc. (800) 824-4510 (503) 643-1681 (in Ore.)	T-Smart CSU	Combination	Either	4,800V interface	T1	Yes	Yes	Yes	No	Yes	No	No	No	Yes	Yes	Yes	$2,000-$2,800
Kinetics Associates, Inc. (908) 724-0404	MICS/Net	Software	Stand-alone	Mainframe, MVS only	SNA	No	No	No	Yes	No	No	Yes	No	Yes	Yes	Yes	$18,500-$30,000
NCR Comten (Contact local NCR sales office)	CAF1 R1 Communication Alerting Facility	Combination	Integrated	Communications processor and display terminal	SNA, BSC, OSI, X.25	Yes	No	No	No	No	No	No	No	Yes	No	No	From $185 per month
	Overview R1	Combination	Stand-alone	Micro	SNA, PBX-SNA	Yes	No	No	No	No	No	No	No	Yes	No	Yes	From $200 per month
Netlink Communications Corp. (415) 573-1500	NET	Combination	Integrated	Micro, mini	T1, PBX, modems	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NP
Network Equipment Technologies, Inc. (415) 366-4400	IDNX	Combination	Stand-alone	Proprietary	T1	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No	No	Yes	From $25,000
	INCS	Combination	Integrated	Sun workstation	T1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	$87,500-$130,000
	Enhanced Operators Console	Software	Integrated	Micro	T1	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	$5,000
	INCS Alert Monitor	Software	Integrated	Micro	T1	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No	No	Yes	$2,000
Network General Corp. (415) 968-1900	Sniffer	Combination	Stand-alone	Micro	Ethernet, token-ring, Arcnet, Starlan	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	$20,000-$30,000
Paradyne Corp. (800) 482-3333	Analynx System	Combination	Stand-alone	Mini	Declink, T1, SNA BSC	Yes	Yes	Yes	No	Yes	NP	No	Yes	No	Yes	Yes	$1,800

COMPANY	PRODUCT	HARDWARE, SOFTWARE OR COMBINATION	STAND-ALONE OR INTEGRATED	HARDWARE PLATFORM	NETWORK ENVIRONMENTS MANAGED	ON-LINE NETWORK STATUS MONITORING	REMOTE FACILITY TESTING	LINK-LEVEL DIAGNOSTICS	THROUGHPUT ANALYSIS	CONFIGURATION MANAGEMENT	SECURITY AND ACCESS CONTROL	JOB ACCOUNTING AND CHARGEBACK	MODELING AND SIMULATION	ON-LINE GRAPHICS REPORTING	AD HOC REPORT GENERATION	HISTORICAL DATA BASE REPORTING	PRICE
Paragon Systems (714) 888-3022	PIOMS III	Software	Stand-alone	Mainframe	MVS/VTAM	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	From $50,000
Quantronics, Inc. (801) 262-9923	Analycon	Combination	Stand-alone	Micro	SNA BSC, Unisys, IPARS	Yes	Yes	No	Yes	Yes	No	No	No	Yes	Yes	Yes	From $7,785
Racal-Milgo (800) 237-0440	CMS 3000 Communications Management System	Combination	Either	Mini	T1, SNA, DDS/SC, asc multiplexers, analog	No	No	Yes	Yes	Yes	No	No	No	No	Yes	Yes	From $50,000
Racal-Vadic, Inc. (408) 432-8008	MDS II VA 9000 System Controller	Combination	Integrated	Micro	Asynch, synch dial-up modems	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	$3,500
Racotek, Inc. (800) 227-0021 (U.S.) (800) 267-7688 (Canada)	MAP/Center	Software	Stand-alone	Other	SNA, Ethernet, DNA	No	No	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	$7,500-$25,000
Southwestern Bell Telephone Co. (314) 235-8374	Product Administration and Data Analysis System	Combination	Integrated	Multiuser micro, mini	Packet network	Yes	Yes	No	Yes	Yes	Yes	No	No	No	Yes	Yes	$30,000
Retrotest, Inc. (408) 370-0288	Integrated Packet Exchange	Combination	Either	Micro	T1	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	$50,000-$75,000
Symplex Communications Corp. (313) 995-1555	Maestro	Combination	Stand-alone	Micro	Proprietary	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	$8,900
Tandem Computers, Inc. (408) 725-6000	Distributed Systems Management	Software	Integrated	Minicomp	Tandem Expand Network	Yes	Yes	No	Yes	No	Yes	No	No	No	Yes	Yes	NP
Technitronics, Inc. (800) 267-3550	Explicit	Software	Integrated	Mainframe	SNA	No	No	No	Yes	No	No	No	Yes	Yes	Yes	Yes	$55,000-$75,000
Telco Research Corp., a wholly owned subsidiary of Fiserv Corp. (815) 220-6168	Network Publisher	Software	Either	Mini, minicomp	Voice, data, SNA, multidrops, polonic packet, multiplexers, T1	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	$150,000-$600,000
Telematics International, Inc. (818) 880-4900	Smartview	Software	Stand-alone	Micro	Smartnet-X.25 Network	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	$3,000
Telenet Communications Corp. 800-TELE-NET	TPSH	Combination	Integrated	Micro, mini	Packet-switched	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	NP
Teleprocessing Products, Inc. (800) 532-8147	Multidrop Network Management	Combination	Integrated	Micro	DDS, digital networks	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NP	Yes	Yes	Yes	From $12,000
Telesis, Inc. (312) 980-8000	Telesoft	Combination	Stand-alone	Mini	T1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NP
Telwatch, Inc. (800) 422-1266	Netsmc 2000	Software	Integrated	Mini	Multivendor physical layer	Yes	Yes	Yes	No	Yes	Yes	Yes	No	No	Yes	Yes	From $25,000
	Netwatch	Combination	Stand-alone	Micro	T1, analog, digital	Yes	Yes, some	No	Yes, voice only	No	Yes	No	No	No	No	Yes	From $3,000
Timeplex, Inc. (201) 391-1111	Link Network Management System	Combination	Stand-alone	Micro	T1	Yes	Yes	Yes	Yes	Yes	Yes	NP	NP	Yes	Yes	Yes	NP
	Link/View Network Management Interface	Software	Integrated	Micro	T1, SNA interface	Yes	No	No	No	No	No	No	No	No	No	Yes	NP
	Time/View Unified Network Management System	Combination	Integrated	Workstation	T1, OSI Navigo interface	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NP
3Com Corp. (800) NET-3COM	Network Control Server	Combination	Stand-alone	Workstation	TCP/IP, Xerox Network System protocols running on Ethernet	NP	NP	Yes	Yes	Yes	Yes	NP	NP	Yes	Yes	NP	NP
TRW, Inc. Information Networks Division (213) 373-0161	9662600	Combination	Integrated	Mini	TCP/IP	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	$18,000
Tymnet, McDonnell Douglas Network Systems Co. (800) 872-7654	Tymnet	Combination	Integrated	Micro, mini, mainframe	All	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	NP
U.S. West Network Systems (800) NET-CENTER	Net Center Graphic Network Monitor	Software	Integrated	Micro, minicomp	SNA	Yes	Yes	No	No	No	Yes, some	No	No	Yes	No	Yes	NP
Veralink Corp. (408) 945-1199	Veranet 2	Software	Stand-alone	Micro	T1	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	Yes	NP
Vitalink Communications Corp. (415) 794-1100	Vitalink Management Services	Software	Integrated	Supermicro	WAN, SNA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	NP
Wang Laboratories, Inc. (617) 459-5000	Distributed Management Facility	Software	Integrated	Mini	SNA, Wang systems and networks	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	$300-$5,000
Westinghouse Electric Corp. (800) 340-3838	Network Control Interface	Software	Either	Mainframe, IBM and compatibles	VTAM	Yes	No	Yes	Yes	No	Yes	No	No	No	No	No	$8,750-$11,500
Xyplex, Inc. (800) 338-5316	Advanced Network Management Software	Combination	Integrated	Mini	Proprietary	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	No	$1,500-$3,000
Zenith Electronics (312) 699-2199	Z-LAN 800	Combination	Stand-alone	Micro	Proprietary	Yes	Yes	No	No	Yes	Yes	No	No	No	Yes	Yes	$8,000-$12,000

Disciplines unite to fill resource needs

BY THOMAS BELL

As the organizational need for data processing grows, application requirements often overrun the capacity of existing equipment.

Large IBM IMS and CICS applications now consume the entire capacity of even the largest IBM 3090, and many mid-range systems, such as IBM 9370s and the Digital Equipment Corp. 8000 series, currently support only a single interactive application.

With this kind of resource stress developing, software performance engineers can no longer assume that capacity planners will be able to provide whatever equipment is needed: The need may turn out to be larger than even the most powerful machine available.

Similarly, capacity planners can no longer assume that demands from a variety of applications will smooth out demand peaks.

In recognition of this reality, a merger is being forged between software performance engineers and capacity planners.

The resulting discipline, called system performance engineering, integrates the conventional issues that surround capacity planning — such as load growth, actual processing capacity and hardware loading — with software engineering considerations, such as performance requirement determination, performance prediction and system design improvement.

An unlikely pair

This blending presents an unexpected challenge because it requires technical knowledge from both areas to be applied and historical organizational conflicts to be recognized.

Long-standing and dramatic differences, both in viewpoint and organizational desires, exist between application designers and equipment planners. The former want immediate changes in the technical environment so they can implement applications more quickly; the latter urge caution so that resource requirements can be assessed.

When these differences are overcome, the payoff from combining the two approaches can be substantial, as the following examples demonstrate.

At a major financial institution, a system performance engineering analysis staved off the possibility of a major performance shortfall just prior to an equipment installation.

In this case, a pair of mid-range processors was slated to assume the growing load of a major transaction-based application from an old system. Initial capacity projections, based on an earlier system's requirements, showed that the two machines could handle the new system far into the future.

Measurements taken just before installation, however, indicated that the system would, from the beginning, consume more capacity than the two machines could offer.

Subsequent examination from both the capacity planning and software performance engineers' points of view showed that relatively minor changes — primarily in software — could produce a system with adequate performance. When the system went live, these projections proved to be correct.

Overly optimistic

In another organization, early tests performed on two applications scheduled to run on networks of superminicomputers showed that, in this company as well, capacity projections were wildly optimistic.

New systems were being developed to replace existing applications that were partially automated.

However, in one instance, capacity projections were based on an unrealistic understanding of the actual application design; in another example, developers assumed far greater processing power than was available as well as lower load growth than what actually occurred.

Reexamination of the first application led to some hardware alterations and extensive software changes. Costs were considerably higher than expected, but the required performance was attained.

System performance engineering was undertaken later than the ideal time, but it avoided a system failure.

Reconciling the second application with capacity availability involved both software changes and reallocation of work load between processors. Throughput, although still less than desired, is adequate.

If either of these two companies had brought together software performance engineering and capacity planning earlier in the process, their systems could have been modified at an earlier stage in the development cycle and could have more closely met functional requirements.

Regular-mode, as opposed to crisis-mode application of such a joint effort, is becoming more commonplace, but unfortunately, the impetus for this frequently comes from outside of either discipline.

At one nationwide company, for example, a major new accounting application was scheduled to run under a popular data base management system on several divisional mainframes, based on a capacity plan that considered only throughput and cost.

The only reason this project did not fail was that top management was concerned about whether adequate response time could be maintained with the new application design.

Top management ordered a study that considered the trade-offs of throughput, response time, application design and load growth. The study showed that management's concerns were justified: Even batch processing could not meet the timeliness requirements on the departmental machines.

Going the distance

As this incident demonstrates, technicians can no longer pass off the idea of cross-disciplinary planning. Top managers are recognizing the need for thorough analysis and are beginning to question decisions that appear to be based on incomplete information.

System performance engineering is not necessary for every situation. In most cases, the conventional separation of approaches is far more manageable, yielding results more quickly and at lower cost.

With system performance engineering, analysts must cope with a geometric increase in ambiguity. In this kind of study, nearly all options are open for consideration, and the richness and diversity of alternatives can easily lead to an overload of required analysis.

So when is it really necessary to undertake a more extensive study?

In general, a system performance engineering analysis should be done for any system that is projected to do the following:

- Consume 30% or more of the capacity of hardware controlled by a single copy of the operating system.
- Consume 30% or more of a single processor when the application runs as a single task.
- Use more than 30% of the expected capacity of a data base system.

Such an analysis is also appropriate when large applications necessitate investment in a new mainframe or when any major new system is considered for addition to a mid-range host computer.

Out on the floor

Performance issues are no less critical in departmental computing than for corporate mainframe systems. In fact, departmental systems, and mid-range systems in general, probably represent the most important area for applying system performance engineering during the next few years.

When a system is to be distributed to a variety of these computers, performance problems are magnified by the number of such machines.

System performance engineering is a way to avoid the nearly impossible task of fixing the problems at each location individually.

The analyst, or system performance engineer, projects resource consumption based on existing systems, controlled benchmarks, initial prototypes and experimental data from internal as well as external sources.

The projection should be based on total resources required during heavy-load situations and should factor in all processing demands, including communications software, operating system overhead, data base accesses and so on.

It should also include an engineering reserve that can adequately reflect the uncertainty in loading characteristics, software implementation inefficiencies and any additional requirements that may arise when the system goes into operation.

When that projection is complete, the system performance engineer compares the processing requirement with hardware availability, both for the present time and for the next three to five years.

Typically, the result of the analysis to this point is disconcerting to users and DP managers as well. The processing requirement — in terms of CPU time, disk I/Os, data base access or communication line capability — is far greater than originally anticipated.

Frequently, users' and DP managers' first reaction to the bad news is to ask about the probable response time under the projected load. Response-time projections for lower priority work can be calculated very easily.

Elementary queuing theory shows that the length of the line, along with response time, becomes infinite when the arrival rate (load) exceeds the service rate (processing capacity). First, we must ensure that "rho" (arrival rate divided by processing rate) is less than one, meaning throughput is adequate. Then we examine probable response time.

Bringing down rho

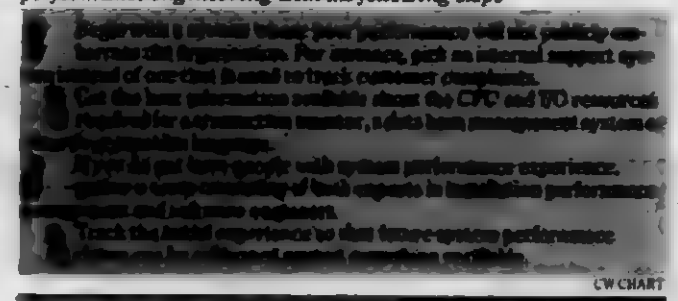
A number of techniques can be used to bring rho down. The system performance engineer must choose a combination of techniques that will bring it to less than one and keep costs under control. Some of the strategies include the following:

- Decrease the load by redefining the business processes, reversing commitments on less important resource-intensive parts of the system or finding another way to use the system that will shift load to the most efficient parts (for example, batch instead of on-line).
- Increase the processing capability by augmenting hardware or reducing other applications running on the same hardware. In general, large hardware augmentation is unpopular because it creates explicit performance problems. Marginal changes are usually acceptable, so careful analysis is needed to ensure that the recommended change is the correct one.
- Reduce the resource requirement by revising the application's use of system support services, including data base

Continued on page S14

Starting out

If you are proceeding with a corporate thrust toward some really large systems or departmental computing, prepare for system performance engineering with the following steps



CW CHART

REGULAR-MODE, as opposed to crisis-mode application of a joint effort, is becoming more commonplace. Unfortunately, the impetus for this frequently comes from outside of either discipline.

Bell is president of Rivendell Consultants, Inc. in Palos Verdes Estates, Calif.

Performance analysis, logically

A different kind of hardware monitor has become important to performance analysts as they pursue an enlarged role in their installations.

For standard computer performance evaluation studies on mainframes, hardware monitors have given way to powerful and flexible software monitors, which can provide the same data and more in either raw or formatted report form.

The analyst can still use a hardware monitor to determine CPU usage, I/O rates and transaction counts on an IBM mainframe, but connecting the hardware monitor to appropriate probe points borders on the impossible.

THE performance analyst needs a broader view to see why a system is underperforming even though each component meets specifications.

For most mainframe performance analysis, a software monitor, provided as an integrated part of the operating system, is a better choice.

The options got better

The responsibilities of performance analysts have, however, expanded outside the mainframe environment and into areas such as communications systems, new types of peripherals, powerful microcomputers and advanced superminicomputers — areas in which software monitors are frequently inadequate or nonexistent.

In these new territories, analysts are finding that a new type of measurement hardware — something called a logic analyzer — is what is really needed to monitor critical interactions.

Originally developed for hardware designers, these tools have proven critical in solving performance problems in environments with advanced hardware.

The performance analyst is frequently confronted with the need to find out why new equipment performs absurdly — why, for instance, a new tape drive on a powerful workstation transfers data at an average rate of only 15% of its advertised speed.

The analyst needs to find out whether the slowdown is attributed to a greater-than-anticipated data load, lengthy handshaking, repeated drive repositioning or something else entirely.

Similarly, if a 9.6K bit/sec. communications line seems to take five seconds instead of two to transfer a full screen of data, the performance analyst must be able to pinpoint where the delay is occurring and whether it is caused by retransmissions, pretransmission waits, processing blockages, operation of the equipment at half the rated speed or something else.

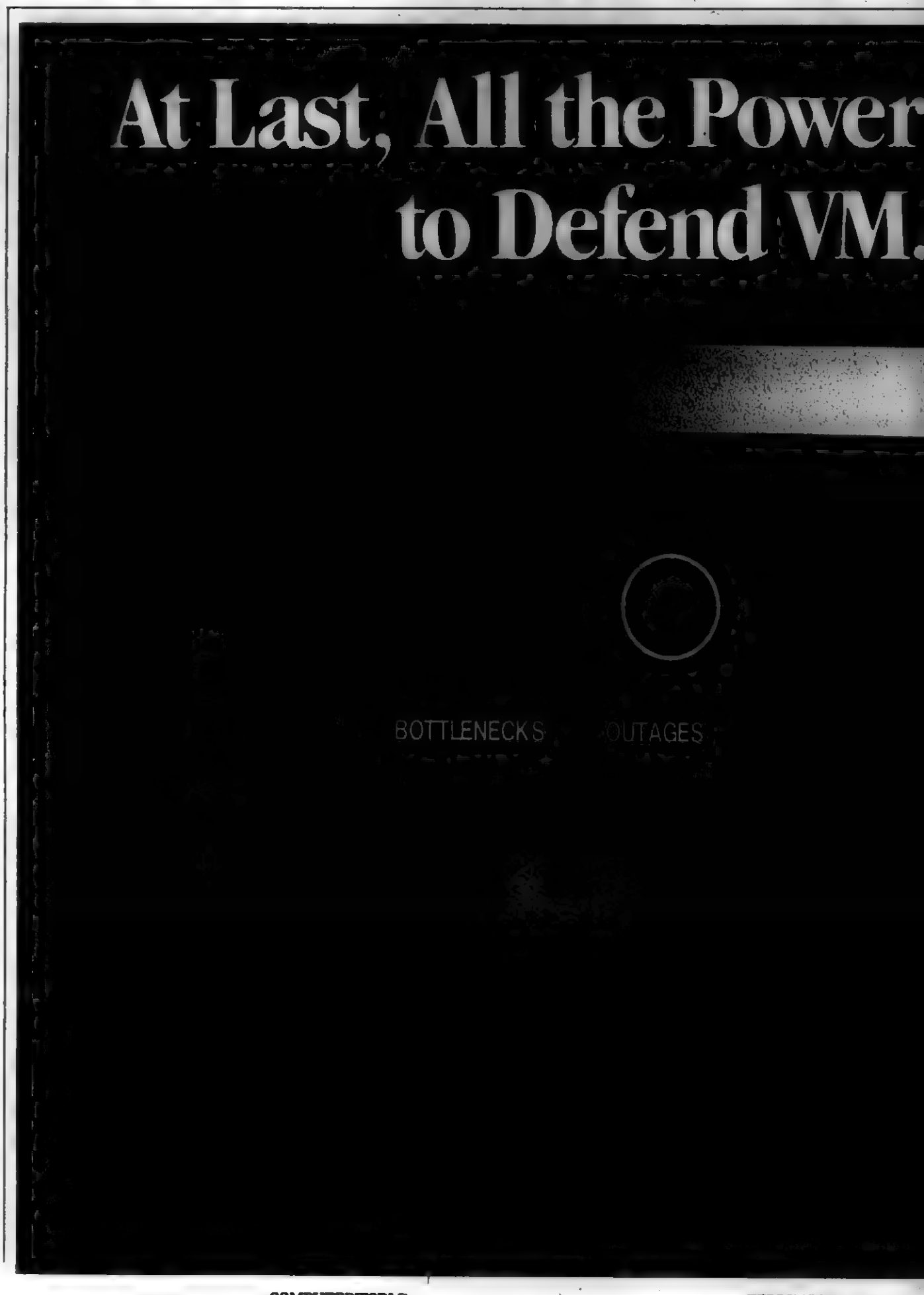
The specialized devices vendors use may be useful, but these typically measure only interactions appropriate for debugging a single piece of equipment.

The performance analyst needs a broader view to determine why an entire system may be underperforming even though each component meets specifications.

Open a new window

In real-life instances of the two problems mentioned above, logic analyzers were able to pinpoint the trouble areas, precisely because they permitted the simultaneous examination of multiple interfaces.

In the first case, the logic analyzer showed that a processor correctly issued a BACKSPACE command to its tape controller, that the controller converted the command into a READ REVERSE and, furthermore, that the tape drive flushed its cache



and repositioned the tape, delaying the processing by about 250 msec for each operation.

A specialized hardware device examining only one interface would not have revealed why a simple BACKSPACE took so long, particularly when the tape drive performed backspace commands rapidly.

In the case of the communications line, the logic analyzer traced the problem to a bug in the communication concentrator. Although a communication line monitor was attached, it only showed that transmission halted and then subsequently restarted after a request for retransmission.

On the other hand, the logic analyzer, because it permitted examination of both input and output from the concentrator, showed that a bit was occasionally dropped from a message that was correctly received.

The major advantage a logic analyzer has over a conventional hardware monitor is its ability to record and report detailed interactions. Conventional hardware monitors do not possess the high-speed memory components necessary to record the raw details. Logic analyzers, can, however, obtain the level of detail required and display it immediately for on-screen analysis.

Like a conventional hardware monitor, a logic analyzer has probes that attach to circuitry so signals can be monitored with minimal interference to the monitored equipment. The old hardware monitors simply set timers and counters to summarize activity on the system.

New logic analyzers, in contrast, have extensive high-speed memory so they can record the sequence of signal changes. This provides the details of interactions so the performance analyst can determine why things got delayed instead of just finding out the extent of the delay.

One thousand to one

A modern logic analyzer can record several thousand changes for each of its probes. Up to 100 probes are typically available. For most practical applications, analysts say 20 to 32 probe lines are adequate, but a larger number may occasionally be required to examine 32-bit address or data lines at several different places.

The depth or number of states that can be stored by a logic analyzer usually ranges from 2,000 to 10,000. Even this number may be inadequate if the states of the probes are recorded frequently — each 10 nsec, for example — but most logic analyzers have an option to store states only when the analyzer is clocked with a signal indicating valid data.

> THE MAJOR advantage of a logic analyzer is its ability to record and report detailed interactions.

This may be critically important to the performance analyst when he needs to record situations that occur infrequently over an extended period.

Data trap

Even when states are recorded at fixed intervals, the performance analyst can set up the logic analyzer to capture important information. The states of the signal lines are fed into the memory of the logic analyzer, and each new set of states shifts the previously recorded sets down one place in memory. The analyst sets the analyzer to stop when some critical condition occurs. In this way, the sequence of states leading up to the critical situation can be captured.

The data stored by a logic analyzer can be displayed on a CRT or printed out in several formats. The two most helpful formats, which are actually best used in conjunction, are time line displays and hex character displays. Time line displays permit analysis of the relationships among signal lines over time. Interpreting the signal lines as individual bits in hex characters, on the other hand, facilitates examination of data or address lines.

The cost of a logic analyzer appropriate for computer performance evaluation may be as

Continued on next page

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Unite

FROM PAGE S11

services. A wide variety of opportunities exists to reduce resource consumption in modern systems.

Changing the various techniques for journaling, temporary data storage, coordination between machines and memory management can frequently help to greatly decrease resource use.

- Reduce the resources consumed by the application software itself. Particularly when the application code replicates system services, significant savings can be obtained by modifying application code.
- Modify the options in the support software to reduce the overhead from autonomous services like paging, backups and communication monitoring.

Unsophisticated analyses assume that no such overhead will occur; opportunities in this area are usually exploitable only after initial system integration is complete.

- Reallocate work load to a different processor. When powerful workstations or personal computers are included in the system, they can frequently be assigned more work.

Since the power of these machines is growing rapidly, they may offer many opportunities to correct problems.

More conventionally, functions can frequently be split off in order for them to be processed on another machine or onto another processor in a multiprocessing computer.

Of course, identifying alternatives that may achieve the desired performance is only part of the job. An absolutely convincing case must also be created to explain both the situation and the potential solution. Any change will upset someone's plans, and some may cause acute budgetary problems.

Human issues

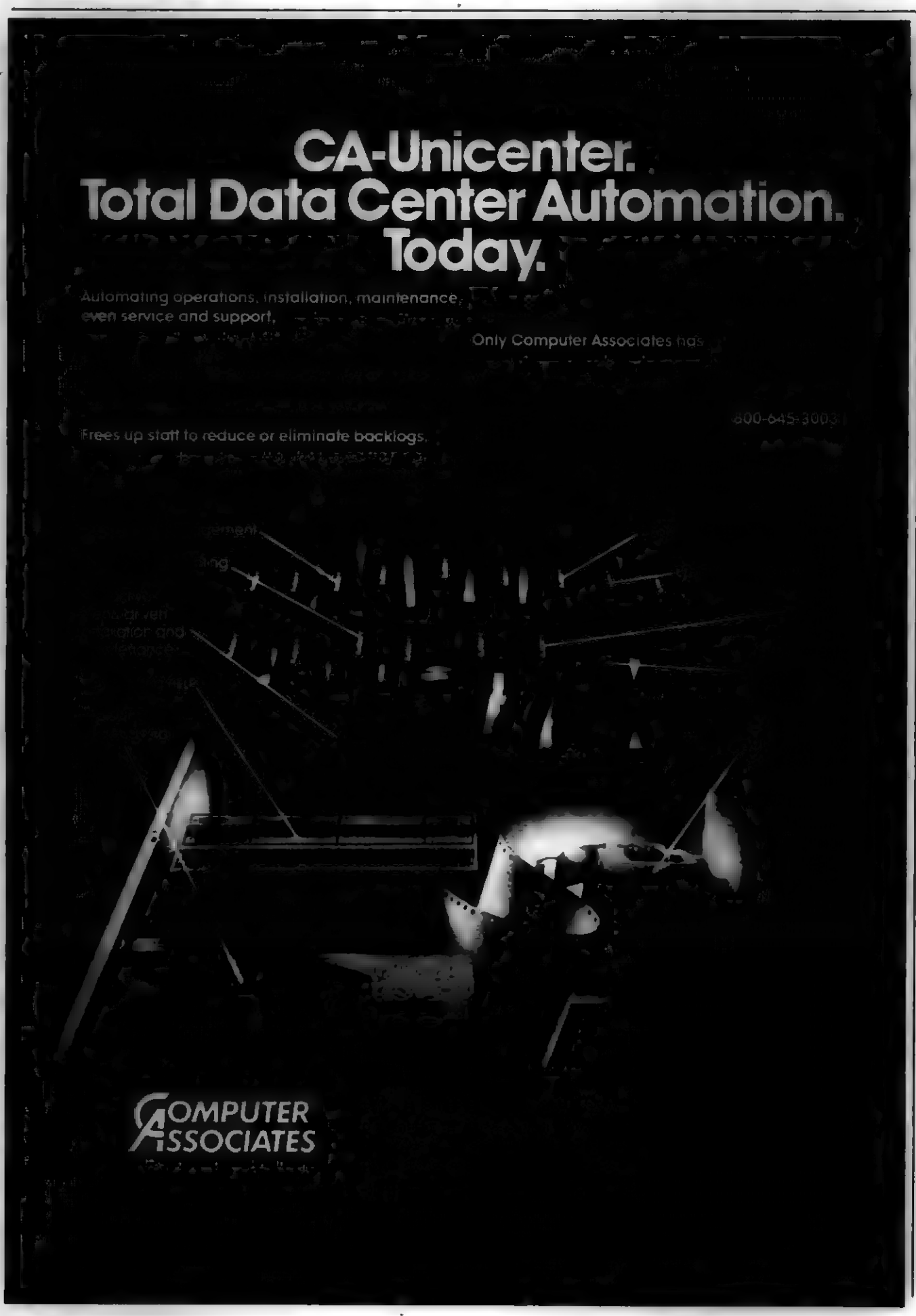
Furthermore, it might be necessary to defuse the emotionally loaded issue of whether an alteration to planned computer hardware and software configurations or application designs implies criticism.

WITH system performance engineering, analysts must cope with a geometric increase in ambiguity.

Even if he has been associated with the organization prior to the start of the development project, the system performance engineer will likely be viewed as an annoyance by some developers.

These developers will almost certainly be under schedule pressure and will resent what they see as an unwarranted intrusion.

The system performance engineer must parachute onto the scene equipped for rescue but prepared to do battle. ●



Logically

FROM PRECEDING PAGE

low as $5,000 or as high as $50,000, depending on the number and speed of probes, the depth of the memory, the output devices and the maximum rate that data can be stored. Usually, a unit priced between $10,000 and $15,000 is appropriate for performance analysis studies.

Capabilities in addition to the basic ones are available in many analyzers, usually for an incremental cost. These may include a means to put counts in buckets, usually to show address ranges of code being executed on microcomputers. They might also include additional and higher speed probes, improved user interfaces and portability.

Time synchronization across all probes is desirable for high-speed work — even across the pods used to concentrate the signals before running them into the analyzer. If the analyzer distinguishes between probes that collect state information and timing information, both are desirable. Portability is very desirable but not a necessity.

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Smartstart
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Job scheduling package for Wang Laboratories, Inc. VS operating system. Schedules and runs background jobs, automatically schedules for single or multiple runs, allows for unattended operation, schedules for specific dates.
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A batch job scheduler for Hewlett-Packard Co.'s HP 3000 and Spectrum series. Automates production, job stream preparation, user job request integration, job status documentation and operator activities.
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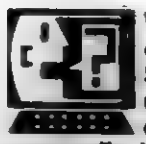
ASK THE VENDOR

The following questions were solicited from users and conveyed to the vendors for responses.



Will Anmacs, Datacomm Management Sciences' automated network mangement and control system, eventually include T1 access capability?

George Thompson
Information System Specialist
Southern New England Telephone, Inc.
New Haven, Conn.

DATACOMM MANAGEMENT SCIENCES, INC.: T1 access for test, monitor and limited reconfiguration has recently been accomplished using Anmacs four-wire access system. Anmacs' overlay architecture is currently in use on T1 circuits.

When will OCS have versions of Scheduler, Tape, Chargeback and Private available for Hewlett-Packard Co.'s Spectrum systems?

Kevin Kobaisi
Manager of Technical Services
Cenex/Land O' Lakes AG Services
St. Paul, Minn.

OPERATIONS CONTROL SYSTEMS: Scheduler, Tape and Chargeback have been operational on the Spectrum for some time now and are in use at several customer sites. Private is currently being tested and should be available for release in the near future. Customers planning to upgrade to Spectrum should contact Operations Control Systems for more information.

Does Altai Software's Zeke support multiple systems?

Anna Zinkhon
Scripps Howard Information Systems
Cincinnati

ALTAI SOFTWARE: Yes. Zeke works with the IBM MVS, VSE and VM operating systems. Because a single Zeke catalog is shared across all three, jobs and other events may be scheduled across multiple CPUs running various operating systems. Any event on System A can trigger another event on System B and vice versa.

Does Vital Signs support all current releases of IBM VM/SP and HPO?

Ned Hedrick
Manager, Technical Services
Valmont Industries
Valley, Neb.

BLUE LINE SOFTWARE: The earlier releases of Vital Signs, which was introduced last summer, supported VM/SP, VM/IS and VM/HPO, although some commonly used VM/HPO performance factors were not reported. Vital Signs currently offers full support for HPO and enhanced direct-access storage device management features, including real-time seek analysis and modeling of double- and triple-density IBM 3380-type devices.

What kind of impact does Rabbit-2 Capacity Planner and Resource Analyzer have on the existing system? How much of the system's current resources does the product require? How easily can Rabbit-2 interface with existing accounting and monitoring files on an IBM VMS system?

Jeff Wood
Systems Manager
New York Casualty
Watertown, N.Y.

RAXCO RABBIT SOFTWARE: Rabbit-2 has virtually no impact on existing resources, as it builds an array in memory and extracts data from the array at memory speeds with no overhead. The product uses the VMS accounting file with process or image data as its primary input. The monitor can also be a Rabbit-2 input with no modification required. ●

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VENDOR VIEWPOINT
Network demand strains service delivery

BY JEFF MARINSTEIN

As the explosive growth of computer networks continues, a "good news/bad news" story unfolds.

The good news is that network growth is delivering more computing power and application availability to end users. The bad news is that this growth will lead to performance and service problems that may land MIS in the middle of a real quandary.

The dilemma is how to consistently deliver automated, state-of-the-art solutions to business problems without adversely affecting response time. What users once knew as the computer network has become a highly complex, critical service organization.

The dynamic nature of the present-day corporation, which requires timely access to information to maintain its own competitive edge, has produced an enormous upswing in the number of remotely connected end users. These end users, reared for the most part in the personal computer environment, are more self-sufficient and demanding in terms of response time than any of their predecessors.

As the pattern of network use changes, more corporations are coming to view users as paying customers of MIS. Some companies have already created formal service-level agreements between MIS and end users, wherein a stated measurement has been developed to ensure that the MIS organization is providing adequate service.

While service demands increase, other factors combine to make delivery of consistent service through network performance management more difficult.

The evolving network is becoming more heterogeneous, and combining multiple hardware and software vendors on it requires significant new knowledge on the part of the performance analyst as well as programmers.

In addition, applications have grown more complex. With distributed data base management systems on the horizon, along with applications that may approach the range of 1,000 transaction/sec., networks are now being stressed as never before.

While IBM's Systems Application Architecture may offer much hope for transportable and hardware-independent applications, the additional layer of software will, no doubt, challenge the performance analyst.

Many network performance tools are available from a variety of vendors, but these products all concentrate on analysis rather than action.

Knowledge-based systems will eventually solve this problem. Currently, however, a performance analyst needs to deduce reasons for poor performance, and a network technician is needed to implement the relevant changes.

Taking steps

Although the prospects for solving the performance puzzle may seem gloomy for the average MIS organization, steps can be taken that will help firms meet the dual requirements of network growth and performance maintenance.

One of these measures is to clearly define computing standards, both hardware and software, and enforce strict adherence to them. Companies must devise standards with the knowledge that micros and mid-range systems will become an integral part of tomorrow's network.

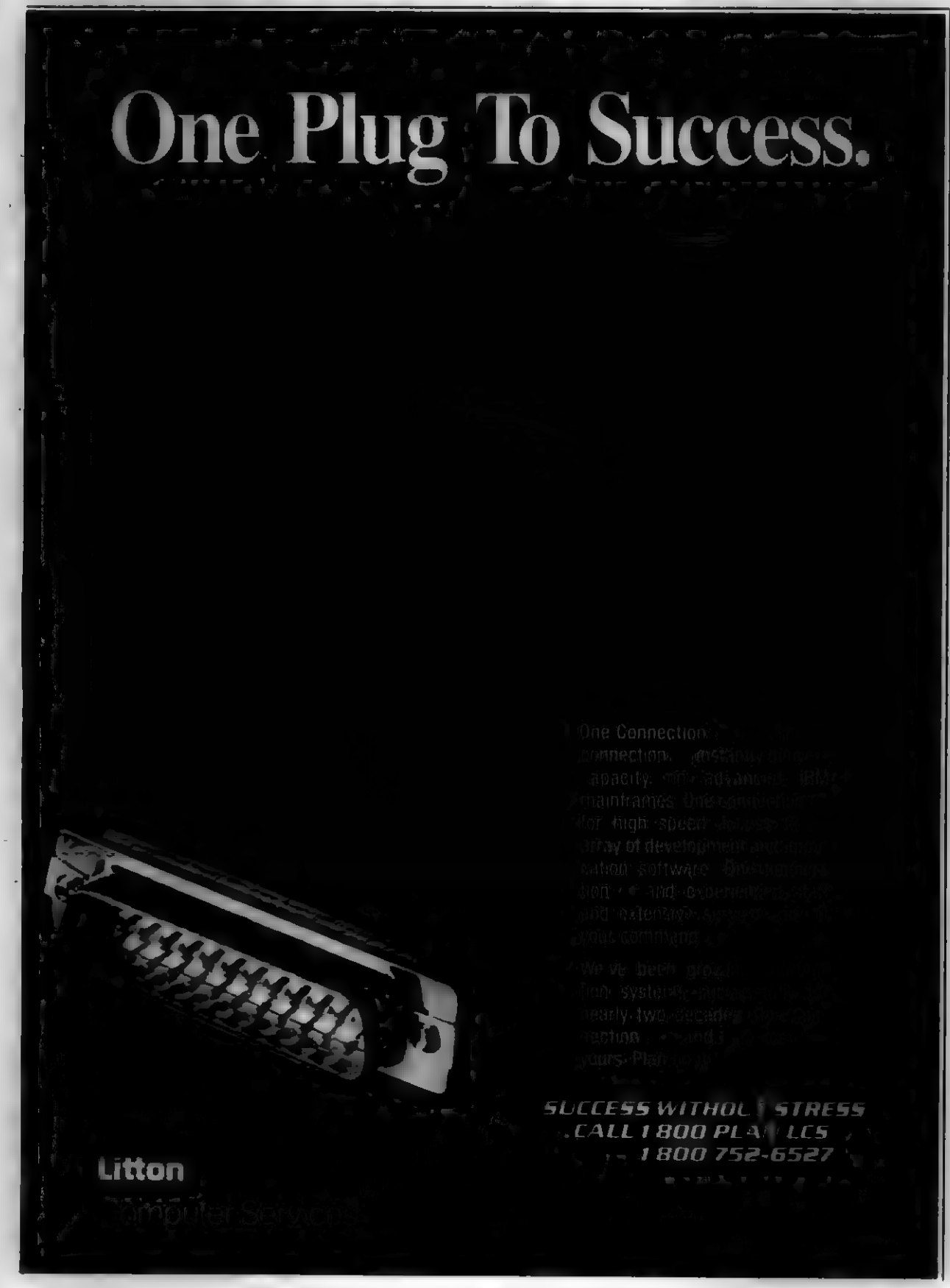
It may also be advisable, at least for now, to stick to the straight and narrow pathways. IBM and Digital Equipment Corp., along with other vendors, have been fairly open in their strategic plans for network offerings. Blazing trails by installing proprietary network solutions is an ill-advised strategy.

Software performance engineering, the study of the design effects of new applications and their performance, is a promising route.

Performing a formal capacity planning study on the network will help companies better prepare for new work loads and increased end-user demands. One technology that offers much hope is the expert system.

The real goal is to have a system that not only monitors network performance but generates findings in the form of dynamic network performance improvements. This would greatly reduce the skill level needed by the performance analyst and would result in improved network performance. ●

Marinstein is marketing manager for the Performance Group at Computer Associates International, Inc. in Garden City, N.Y.



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NEW PRODUCTS

Data storage

National Advanced Systems (NAS), a subsidiary of National Semiconductor Corp., has announced enhanced versions of its **7900 Semiconductor Disk Storage Subsystems.**

The product is a solid-state storage device that emulates rotating disks. New models include the 7900-4, with a 7970-4 control unit and 7990-4M storage unit. The 7990-4M comes in configurations of 32M, 64M, 128M and 256M bytes per device. Maximum capacity per string is 1G byte.

The 7900-4 supports up to eight logical volumes per storage unit. A variable volume feature allows the customer to designate logical volume size in 1M-byte increments. The device also offers single, dual or quad porting.

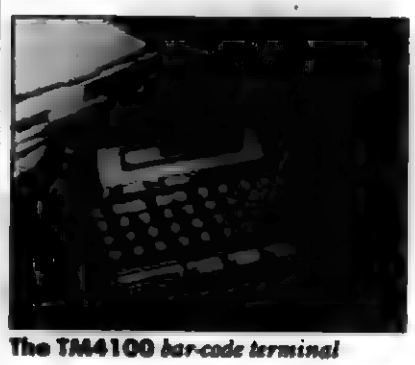
The 7900-4 costs $456,500 for a 256M-byte configuration.

NAS, P.O. Box 54996, 750 Central Expwy., Santa Clara, Calif. 95054. 408-970-1000.

Terminals

A bar-code terminal designed for use in keyless data entry applications has been announced by **Burr-Brown Corp.**

The **TM4100** features a scannable



The TM4100 *bar-code terminal*

keyboard, a 16-char. LCD and a 200-char. buffer. Inputs from laser scanners, slot readers and bar-code wands are accepted. Also featured are a built-in wand holder and an audible tone that acknowledges input. The terminal includes an RS-232 auxiliary serial port and a choice of RS-232 or RS-422 for the host communications port.

The TM4100 is priced at $695.

Burr-Brown, P.O. Box 11400, Tucson, Ariz. 85734. 602-746-1111.

Printers/Plotters

Two electrostatic monochrome plotting systems, designated the **8500 Series**, have been announced by **Versatec**, a Xerox Corp. company.

The products accept 906 and 907 as well as Hewlett Packard Co.'s HP Graphics Language (HPGL) data format. The 8524 model plots on 24-in.-wide media, and the 8536 model plots on 36-in.-wide media. Both plot with 200 point/in. resolution at 1 in./sec.

The plotters feature integrated rasterizers that accept an unlimited number of vectors, the vendor said. Other features include plot scaling, 90-degree plot rotation, mirror imaging and variable line widths. The RS-232C serial interface accepts vector data at rates up to 38.4K bit/sec. A Genicom Corp. Centronics-type parallel interface can be used as well.

The 8524 costs $19,900; the 8536 costs $24,900.

Versatec, 2710 Walsh Ave., Santa Clara, Calif. 95051. 408-988-2800.

An ion page printer for use with IBM mainframes has been announced by **General Business Technology, Inc.**

Called the **GBT 6640**, the nonimpact printer emulates the IBM 3211 or 3205

The GBT 6640 *ion page printer*

Model 5. In addition, it provides direct channel attach to the IBM 9370 and 4300 series.

The printer offers a print speed of 30 page/min and a resolution of 300 by 300 dot/in.

The GBT 6640 uses standard letter 8½- by 11-in. or legal 8½- by 14-in. cut-sheet paper. According to the vendor, output can be in either portrait or landscape format.

Other features include eight fonts — each with 96 characters — and 32 graphic char., 500 dual-sheet input feeders and program- and operator-selectable page orientation, fonts, line/in., char./line, number of copies and I/O feeder, the vendor said.

The GBT 6640 costs $23,995.

General Business Technology, 1891 McGaw Ave., Irvine, Calif. 92714. 714-261-1891.

Xerox Corp. has enhanced its 10 page/min **4045 Laser CP** Model 100 series printers.

According to the vendor, enhancements include expanded paper handling capabilities, such as an optional two-tray 500 sheet feeder/stacker accessory; 1M byte of standard memory, expandable to 2M bytes; and an increased print volume to a design centerline of 15,000 page/month.

Prices for the Model 100 series start at $4,995.

The feeder/stacker accessory costs $1,295 when ordered with a 100 series printer.

However, the feeder/stacker costs $1,495 when ordered for a previously installed model.

Xerox, 101 Continental Blvd., El Segundo, Calif. 90245. 213-333-7000.

A Tempest-compatible color dot matrix printer has been introduced by **North Atlantic Industries, Inc.**

The **Tempest P5-T** printer provides letter-quality printing at 100 char./sec. and draft-quality printing at 290 char./sec.

It features 16 resident fonts and seven-color capability.

The North Atlantic Tempest P5-T printer is priced at $3,625.

North Atlantic Industries, 60 Plant Ave., Hauppauge, N.Y. 11788. 212-242-0000.

A nonimpact printer that emulates IBM's 3203 Model 5 printer has been announced by **Memorex Corp.**

The **4780** uses the ion-deposition process. It prints at 80 page/min and provides 240 by 240 dot/in. resolution. In addition, a built-in two-up option allows printing of two page images on a single sheet in a condensed font. Users may select from a library of more than 100 fonts, and up to eight fonts can be mixed per line or page.

The 4780 operates on-line to an IBM or compatible mainframe via either an external or built-in controller. A dual-input feeder holds up to 2,000 sheets; the output stacker, with job separation, holds 1,500 sheets.

The 4780 costs $65,000.

Memorex, 611 S. Milpitas Blvd., Milpitas, Calif. 95035. 408-957-1000.

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Executive information systems make life easy for the lucky few

Is your top management data-rich, information-poor and starving for knowledge?

BY MARY LOU JORDAN

State-of-the-art executive information systems (EIS) accommodate the most critical need of any executive: timely information that does not take long to collect or understand. A well-designed EIS can give executives the power to excel in a competitive world.

To a novice end user — which includes many senior executives — having a personal computer is not always an opportunity to explore avenues of computing. Instead, it can be the beginning of a short exercise that ends with the user having the PC removed in order to "get back to real business." Instead of user-friendly interfaces, EIS must have user-seductive interfaces.

An EIS is not merely a decision support system with a different name; rather, it is defined by user interface issues — how far the vendor has gone to see that the interface can be easily used by a nontechnical user.

According to consultant James Martin, "An EIS must package information elegantly and make it easily explorable." Martin says touch screens are one approach with obvious appeal.

What's happening?

Furthermore, an EIS is distinguished from a decision support system in its "what-is" characteristic. An EIS answers questions such as, "What is happening now to my company?" or "What is happening in the marketplace now?" Decision support systems, designed largely for projections and modeling, have a "what-if" nature.

EIS help the executive evaluate what is happening at present by using time-series data to show trends and put figures in context. The systems also integrate external information into an executive's workday. Because of their democratic approach to data, EIS are particularly suited to incorporating information such as government statistics, stock market data and marketing issues from various sources.

To succeed in its information goal, an up-to-date EIS requires a fully loaded PC or workstation, using a mouse or touch screen and enhanced graphics. And the more hard-disk storage the system has, the better.

Beyond hardware, the most successful EIS employ state-of-the-art software that allows executives to use pop-up or pull-down menus rather than type at the keyboard to interact with the system. Integrated text and graphics as well as charts and spreadsheet-style reports should appear together on the screen. Signing on and off and printing graphs, charts and reports should be fast and easy.

EIS software must be able to display a variety of preset reports and allow the user to create personalized reports quickly.

Peter Radford, vice-president of planning for National Westminster Bank USA in Manhattan, says, "It's a hazardous exercise. You really have to give [users] a tremendous amount of flexibility while at the same time providing them with access to a tremendous amount of information." National Westminster uses Execucom Systems Corp.'s IFPS software.

LEE COREY

Quick response

State-of-the-art EIS software can, on short notice, get a summary of any data the company has in its corporate data base to replace stacks of printed reports. But it is not enough to merely replace paper reports with electronic copies. An executive must be able to reconfigure reports as well as create new ones as conditions change. An EIS's ability to accomplish this task quickly and intuitively is crucial to its success.

Making computers palatable to top officials is one goal of all EIS, and ease of use plays a key role in their acceptance. Retrieving useful information is positive feedback for even the most technophobic executive.

"The executive user interface is extremely easy," says Bradford Ross, project manager of CIS/Boss business operations at Grumman Data Systems Division in Woodbury, N.Y. His company uses Comshare, Inc.'s Commander EIS.

"I spend 10 minutes showing an executive the mechanics of using a mouse or using a touch screen, and that's the training," Ross says. "Training for executives is more involved with familiarizing them with what's available than the actual mechanics of using the system."

Proficiency for executives depends on the proficiency of the system to bring up reports, graph data into reports, zoom in on key figures for more elaborate detail and move through a feast of already prepared reports and graphics at the touch

Continued on page 55

Jordan is a free-lance writer and editor based in Arlington, Mass.

- **Strategic *and* tactical systems**
- **'User-seductive' interfaces needed**
- **More than decision support**

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Pick and choose

Following is a sampling of executive information systems (EIS) products. They meet the criteria of user-friendliness and efficiency demanded by executives and are able to answer the "what-is" questions executives are likely to pose.

• **Comshare, Inc.** This Ann Arbor, Mich., company sells Commander EIS, which runs on heavily loaded personal computers and connects with IBM and Digital Equipment Corp. mainframes.

This system has four modules. The main EIS module provides the types of reports and charts that executives use regularly. In addition, there is an exception reporting module, one to provide access to the Dow Jones News/Retrieval service and a module called Execu-View for querying against mainframe data bases.

Commander EIS's user interface is graphical, with pop-up menus in a windowing system. Color is used extensively, both in charts and to highlight reports or text. The system also uses zooming, allowing users to select an item from a report, then bring up the detailed information behind it by clicking on that item.

IBM mainframe prices for Commander EIS range from $89,500 to $152,000. With Execu-View, the cost is $135,000 to $245,000.

• **Corporate Class Software, Inc.** This New York-based company markets Fastar EIS, which allows executives to access internal corporate information and external data in the form of customized reports.

Fastar EIS pulls data from the company's existing financial data base and automatically updates reports based on changes made in Fastar data. Executives can access the supporting data behind any set of numbers in a report.

Interfaces and reports are built from a tool kit, which includes an icon builder, a background maker that attaches icons to a function and an application builder that links all the windows to create custom applications.

The price of $90,000 includes a $40,000 license for Fastar, support for 15 users, documentation, installation, training and consulting.

• **Metaphor Computer Systems, Inc.** Based in Mountain View, Calif., Metaphor sells a system aimed specifically at marketing managers but which may be generalized for use as an EIS. The Metaphor Computer System runs on proprietary hardware, including a workstation with an oversized high-resolution screen, a file server, a data base server and a communications server, all on a local-area network.

Metaphor's user interface is icon-based throughout, accessed by a mouse. Data is loaded into the 3.4G-byte data base server, and the system is set up to access A. C. Nielsen Co. marketing data. In addition, users can run queries directly against an IBM SQL/DS data base on an IBM mainframe using the icon interface.

A typical entry-level configuration for hardware, software, 12 workstations and all servers is $300,000. Additional workstations cost $8,000.

• **Pilot Executive Software.** This Boston-based firm sells Pilot EIS, a system that includes a development environment called Command Center and two applications, Advantage and Dimension.

Command Center data is kept on an IBM or DEC mainframe and is updated through periodic transfers of flat files from the company's transactions data base and from outside sources. The PC module sends the queries to the mainframe data base, then displays the text, graphics and reports requested.

The system offers hierarchical screen displays as well as an exception-reporting module. The user interface is menu driven, with colors to highlight text elements and figures. Pilot also offers a library of time-series charts and reports to track historical data.

Site licenses, including PC software, range from $95,000 to $155,000.

.....

The following vendors sell software products that are not strictly EIS systems but which many firms use to create their own EIS:

• **Execucom Systems Corp.** This Austin, Texas, firm sells a supplies tool kit for building EIS, with four components:

First, IFPS/Plus is an analytical engine with data management capability that accesses information from corporate data bases and loads it into its own. Its natural-language facility allows executives to ask questions such as, "Why did income go down in Quarter 3?" and get responses such as "Because sales in Region 4 decreased."

Second, the Impressionist business graphics system delivers color displays of executive-quality reports and charts. Third, Vantagepoint allows users to download and integrate data from the mainframe, review it in graphic format from the top down and then focus on any level of detail. Finally, the executive can ask questions of source data in an English-like natural query language.

The price, including IFPS/Plus, Impressionist and Vantagepoint, ranges from $40,000 to $150,000.

• **Information Resources, Inc.** Based in Chicago, this company sells PC Express. It is a fourth-generation language with an embedded EIS application that takes advantage of Mainframe Express, the company's high-end relational DBMS.

PC Express includes exception reporting, access to external data and ad hoc query modules, plus custom applications. The EIS application within PC Express contains a forms-driven interface with pop-up menus for querying mainframe data.

Mainframe Express is priced from $65,000 to $85,000. PC Express costs $1,500 per copy. The EIS application package alone, including the reports, costs from $30,000 to $40,000.

MARY LOU JORDAN

Lucky few

FROM PAGE 51

of a button or screen.

EIS can benefit MIS as well. According to Donald Zinn, a principal with consulting group Management Dynamics in Yonkers, N.Y., it is difficult to overestimate the importance of EIS in corporate information services.

MIS challenge

Zinn says EIS are "the next real challenge, the main mission for the MIS manager." He maintains that "MIS has never really been the management of information systems, it's been data

EIS HAS "had a tremendous impact. Just in raw productivity, you can get a lot more work from the same number of people."

PETER RADFORD
NATIONAL WESTMINSTER BANK USA

processing. This is an opportunity for MIS to give manageable, actionable information to the managers and executives who need it."

Some MIS managers are reluctant to explore the possibilities of EIS, concerned that it is merely another new system that will not really benefit users and will just cause more headaches for the DP department. Yet in case after case, when MIS has held back on implementing an EIS, it has been the nontechnical managers and even executives who have gone after the systems.

In fact, National Westminster's Radford is one executive who says MIS should not be in charge of EIS at all. "You've got to own it yourself to make it work," he says. "That's not a criticism of DP shops. It's just that it's a completely different activity in terms of the goal and the focus."

Reluctant MIS professionals may be in danger of being left by the wayside, only to have to catch up after the important technology and business decisions have already been made.

Increased visibility, greater management satisfaction with MIS, exposure to leading-edge technologies — these are some of the benefits that implementing an EIS brings to an MIS professional. As Grumman's Ross puts it, "I think our organization has been looked upon as a technological leader, not only within our own company with the other divisions, but also around the country. We're being approached by other companies for advice."

The ultimate question

To put the system together successfully requires listening to users about what their needs are.

"The No. 1 thing an MIS manager should look at is what the executives need to know," says Michael Packer, president of The Mac Group, Inc., a Cambridge, Mass.-based consulting firm. "What's critical? What decisions are being made?"

It is also important to keep in mind that the needs of an executive user are going to differ from those of other users. This requirements analysis process may be the most difficult part of implementing an EIS. According to consultant Martin, "Simply asking is not good enough. You have to probe." Martin recommends methodologies such as joint planning workshops and critical success factors.

When compared with the prospect of sheaves of printed reports, EIS benefits far

XEROX

The new 4075 intelligent printing system. A brief case history of what its capabilities can do for your data center.

Xerox presents an open-and-shut case for the new 4075 intelligent printing system. In brief, it's the electronic printing system that's specifically designed to meet the needs of a medium-size data center.

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outweigh the initial investment in EIS research and data development for both the corporation and the MIS manager.

From the top

David Schmitt, EIS administrator for the Arizona Department of Transportation in Phoenix, explains: "We had a previous system, a decision support-type system, and it was not successful. One of the reasons was that instead of working directly with the executives, the planners were working with people one or several layers below them, and asking those people to speculate on what the execs wanted to see. That just doesn't work."

The department now uses Pilot Executive Software's EIS software running on a dedicated Digital Equipment Corp. Microvax host with IBM Personal Computer workstations. In preparation for this system, Schmitt says, "we had some good, close working sessions with the executives to find out exactly what they needed, the kind of information they themselves would use."

Executives can use EIS for a variety of functions, such as internal financial reports, marketing-management and integration of external sources of information into a company's overall business plan. Gathering external data from sources such as the A. C. Nielsen Co. and Dow Jones News/Retrieval service and placing it in an EIS data base helps companies combine internal and external information to measure how well their firm is doing on a larger scale.

This type of information is especially important to Gary Rinehart, manager of information technologies at San Diego Gas and Electric Co. "We first implemented world news, industry news, financial news, responsibility reporting, organizational charts — things that didn't require the attention of the executives. We're now developing more personalized applications," Rinehart says. The firm uses Pilot Executive Software's Command Center.

Of course, most organizations constantly gather this kind of information, appending it to reports or typing it into computer systems by hand. However, the backlog in MIS, combined with the difficulty of interpreting and quantifying such data without the aid of an EIS, works against this data gathering technique.

> "WE HAD close working sessions with executives to find out exactly what they needed."
>
> DAVID SCHMITT
> ARIZONA DEPARTMENT OF TRANSPORTATION

By relieving some of the applications backlog in MIS and by giving an executive information he can use quickly — and thereby avoid spending hours poring over reports — EIS give both types of managers the time to think about new approaches to problems and to use their peripheral business vision.

This wider vision can create a crucial competitive advantage. If strategic computing is defined as the type that produces a sustainable shift in market share or supernormal profitability, there are many strategic applications for EIS in marketing, financial management and investment.

In fact, an EIS, along with distributed computing, personal computing, local-area networks, decision support systems and a host of other technologies that get information to the right people at a moment's notice, can be a strategic business weapon if used aggressively to gain market share or improve profitability.

"If I were a corporate executive," Martin says, "I would absolutely want to have certain types of information at my fingertips, possibly with a PC at home, too. There would be some kinds of critical information about the company that I would want to monitor continuously.

EIS are also tactical systems because they use computing resources well and can be implemented without making major changes. Fast access to information on a firm's mainframes means connectivity not only with one or two kinds of computers but also with operating systems, data bases and file data.

Today's EIS do not demand that a company change how or where its data is stored; rather, these systems require that people feeding data into the EIS get the information fast enough for timely delivery into the system.

Beneficial presence

A company can implement an EIS and almost immediately see an improvement in the performance of senior managers and executives. Companies do not need to put a PC on everyone's desk or link all computers together in a network or even put data into data bases to realize the advantages of EIS.

The results that National Westminster's Radford sees are convincing: "It's had a tremendous impact, both qualitatively and quantitatively. Just in raw productivity, you can get a lot more work from the same number of people."

In addition, Radford says, "The kind of analysis that's done is a lot more sophisticated. [The executives] can do kinds of analysis now that were a luxury when they were just crunching through it themselves."

And these systems do not handicap a firm's ability to

Theirs takes hours.

Installing and configuring a 3270 or RJE remote host connection for BSC or SNA NETBIOS LANs? With the competition, it'll seem to take forever. While RabbitGATE™ takes just a few minutes. It's so easy that most people don't ever open the user guide.

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As if saving time and memory wasn't enough, RabbitGATE also saves you money. It's priced competitively, yet offers built-in windowing, 8 host sessions per workstation, and access to different hosts with different

implement other technologies and strategies later. Connectivity problems will not multiply, because EIS only extract information — they don't create it. That is a plus when it comes to keeping corporate data safe.

Healthy toddler

The market for EIS is only about 3 years old. The handful of companies currently marketing EIS now target Fortune 500 companies.

International Data Corp. (IDC) in Framingham, Mass., puts EIS sales at approximately $15 million in 1986 and nearly double that in 1987. Sales are expected to reach more than $100 million by 1991, showing slow but steady growth during the next four years, according to IDC.

Newer EIS should not only be easier to use but also easier to implement. Getting a prototype of the system up and running will take less time, thereby making advocates' claims about the systems' potential more credible and reducing the work MIS has to put in.

Ted Jastrzembski, former director of the Software and Services Industry program at IDC, says Execucom is part of the new wave of EIS vendors. That firm's recent entry into the EIS field is an offering that makes use of a "black box" technology: The keyboard for the system is flat and black, with a reduced set of highly functional keys. "It looks like something that came out of the Sharper Image catalog," Jastrzembski says, "and [perception] is important in this market."

EIS allows executives to receive the information they need faster, giving them time left over to think big.

In the short term, EIS will be able to access more of a corporation's data bases without slowing the system or disturbing transaction data. The beginnings of this trend are becoming evident in systems such as Mountain View, Calif.-based Metaphor Computer Systems, Inc.'s Metaphor, which connects transparently to mainframe data bases. More vendors are expected to follow suit.

In addition, more tools will become available within EIS to enable firms to mix data transparently from a variety of sources for better integration of outside information into corporate data bases.

After all, executive users are the ones who need to look beyond the confines of the business and into general business conditions and factors.

From the corner office

In the long term, EIS should be able to access data through the transactions data base as a proliferation of different mainframe, operating environment and data base problems are solved.

"You've got to understand that executives are not going to want to see the transactions data base directly. They'll want to see some aggregation, a roll-up of it. But you still don't want to have to move it out of the environment it's in — you'll want to aggregate it in place," The Mac Group's Packer says.

Management Dynamics' Zinn says EIS will become integrated with expert systems to create a natural language interface and, possibly, inference engine-aided information systems. Opinion is still divided over the user interface that will eventually dominate, whether it will be natural language or graphics. But as time goes on, both will become faster and easier to use and implement.

Sample executive information system

Rather than a static printed report, this system provides windows into detail analysis or trend analysis

INFORMATION PROVIDED BY PILOT EXECUTIVE SOFTWARE, INC.
CW CHART

For now, though, as one of Zinn's clients puts it, executives and managers are "data-rich, information-poor and starving for knowledge." EIS allows executives to receive the information they need faster, giving them time left over to think big. They are a tactical solution that brings strategic computing power to the executive suite and corner office.

"I think it's going to really take off," consultant Martin predicts. "Every executive has information that he has to be tracking daily. When I talk to CEOs, they tell me there is certain information they've been asking [MIS] for for years and have not gotten. I think most CEOs would say that."

"When this settles down and the technology matures," he says, "This is the way everyone will do business." ●

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ESS shakes up the system

BY JOHN ROCKART and DAVID DE LONG

A number of executives are using computers, with some impact on their daily operating methods. But what is the impact of these systems on their organizations?

We are quite uncertain about either the short-range or ultimate impacts because the initiation of executive support systems (ESS) in most of the sites we visited was only one of several significant changes taking place. In addition, most of the systems had been in place for a short period of time.

It was clear, however, that major changes were taking place in the organizations we saw. And in many cases, executives highlighted the role of the ESS in their progress toward managerial objectives of decreased staff levels, increased spans of control, role change or organizational change.

The presence of one or more of these managerial objectives in each case is instructive. Although a few of the impacts described to us appear to have "just happened" as a result of the ESS, most of them are the result of conscious managerial efforts along several fronts. The ESS is merely a facilitator.

Flattening the pyramid

Two related managerial objectives came up in company after company: reductions in staff and middle management and increases in span of control. Both of these impacts ultimately point toward a flattening of the organizational pyramid.

Several firms we studied implemented an ESS to help reduce staff or at least anticipated this as an impact of the system. Xerox Corp. has 600 staff and management in its corporate headquarters in Stamford, Conn. President Paul Allaire says, "We wanted to invest in technology rather than people, and as we took down the head count we had to make them more effective. In the last three years, we've achieved a 5% reduction per year in total headquarters costs."

Gillette North America's controller, Don Palmer, says he anticipated a reduction in the number of "data acquirers" — those in staff positions whose job is primarily to collect information. This function could now be done more efficiently by the ESS.

A telecommunications company executive, however, focused on the information middlemen. "There are people in this organization whose only job is to answer questions about the budget. This technology squeezes them."

Extend managerial arm

The other organizational impact facilitated by ESS is an increased span of control for managers. Due mostly to the electronic communication capabilities of ESS, examples of increased span of control are easier to find than those of reductions in staff head count, and the effect on organizational structure is more immediate.

Chief Executive Officer Ian Rolland at Lincoln National Corp. has 14 direct reports and no executive assistant. He attributes his ability to maintain such a large span of control to the ESS, particularly its electronic mail capabilities, which allow him to keep in close touch with his subordinates.

Jim Tunis, who managed ESS implementation at Lincoln National, sums up the impact of the companywide system this way: "High-level management can assimilate more information from more subordinates electronically, so the span of control of these managers is increasing."

At Xerox, Allaire also says he sees ESS changing the organization: "In lots of companies, middle management acts as a filter for information, and this causes delays. Our system allows executives to work directly with professionals and analysts without the filters."

A more definitive and consistent impact of ESS deals with the work responsibilities of staff analysts and executive secretaries. In companies like Xerox, ESS are driving the automation of performance reporting systems and speeding up the collection and processing of data.

The controller of Diversified Electronics Corp. (not the company's real name) explains the impact of ESS on his staff: "One of the objectives of the system was to make sure our staff was doing more professional work, such as analysis, and less clerical consolidation." Under the old system, financial analysts spent about 80% of their time doing clerical work and 20% analysis. "Today, those figures are about 40% clerical and 60% analysis," he says.

Ken Soha, director of the ESS project at Xerox, offers a related view: "In the future, the role of the staff will change from presenting information to adding value. Currently, at the management committee meeting, the staff provides information. But in the future, executives will be getting this same information from the system before each meeting."

Another role sometimes changed by ESS is that of the controller. Gillette's Palmer explains the change: "Because of the ESS, the controller starts to get involved in the market size, market share and productivity statistics — all sorts of things that have not been in his domain previously. You don't want to set up separate reporting arms, and the logical reporting focus is the group that's already doing reporting in the financial area."

As a result, the controller becomes much more broadly involved in the business. "He understands the interrelationships of different factors, and he really becomes the reporter, the measurer, the monitor of the business. With this much-improved information base, it's easy to become more actively involved with strategic planning issues," Palmer says.

ESS has also changed the roles of executive secretaries, turning them more into executive assistants. At one manufacturing company, the chairman's secretary is trained on Lotus Development Corp.'s 1-2-3 and Information Builders, Inc.'s Focus to retrieve data for her boss. One vice-president at Lincoln National sees his secretary now as an administrative assistant, helping him more with budgets and maintaining data bases and doing less traditional clerical work.

FINANCE departments seem to be the biggest winners and losers in the poker game of power redistribution.

Companywide change

There is an underlying sense among many executives who install ESS that these systems can be a powerful force for two types of organizational change:

- A change in business focus, sometimes affecting the whole company.
- Power shifts, altering the relative influence of functions, departments or individuals. These are often unforeseen and difficult to identify.

Companywide or departmental changes in business or strategic focus are by far the most significant type of change created by ESS. When Mike Jensen became president of Banco Internacional de Colombia, a Citicorp subsidiary, he says he found that a lot of lower level managers worked with inadequate data.

Account officers, for example, often did not know about an overdraft or major deposit, nor did they have timely knowledge of account status or profits. Through his ESS, Jensen encouraged his subordinates to become more attentive to business details.

Another example occurred in a marketing support unit at International Computers, Ltd. (ICL).

The group's director wanted to establish a quality improvement program in his organization. He had his quality manager prepare a small data base that produced 50 graphic charts each month showing the different levels of incidents (from major to minor) by product line and the time it took to resolve each incident for the customer.

The director says, "I used this in reviewing my line managers each month. This not only showed my managers that it was costing them money to carry out this level of maintenance, but they also saw the value of taking preventive steps to avoid these problems in the first place." In its first year, the average number of incidents reported by customers declined 25%.

Power redistribution

Power shifts among functional groups, departments and individuals are another type of change supported by ESS.

One vice-president of personnel contends that his ESS strengthened the perceived importance of the personnel function: "The personnel function has become recognized as one that actually does control, does know the underlying trends in and does understand the manpower position in the organization. Three years ago that would have been regarded — wrongly — as the domain of the finance function."

In general, finance departments seem to be the biggest winners and losers in the poker game of power redistribution, created by changing information flows. They either lose power — often subtly — where another department gains independence through access to its own sources of functionally critical data, or they gain strength by centralizing control over financial and performance information.

One of the best examples of a finance group gaining power through an ESS is at Diversified Electronics. There, the controller acknowledges that enhancing the reporting system created a data base that came to be regarded as the corporation's only source of performance data. The finance department's power was greatly increased vis-a-vis the divisions, since it controlled access to this data base.

Yet another kind of power shift created by ESS is the enhanced influence executives gain by monitoring individual and organizational performance through the computer.

The controller at Diversified Electronics characterizes the phenomenon this way: "The system acts as sort of a 'hidden hand,' tightening up the control process by its very presence. The fact that we ask the divisions to explain variances through the ESS each month does more to control our business than anything."

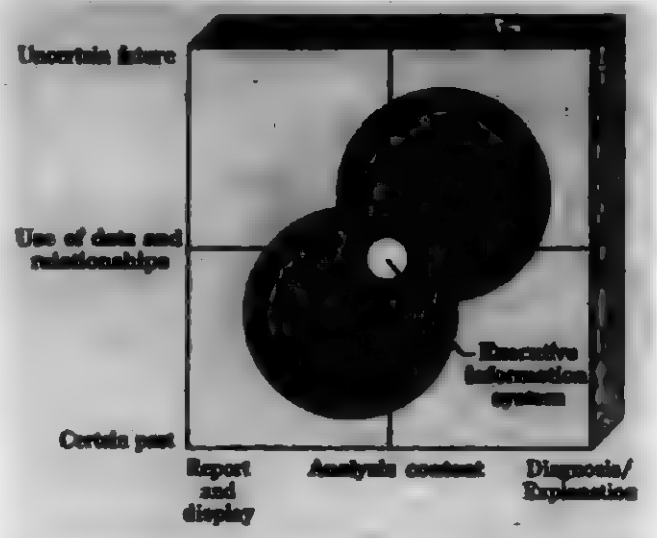
Similarly, the director of ICL at one time accessed a data base of customer breakdowns to monitor the status of equipment reliability and customer attitudes.

"The chief value I got was the organization knew I was doing it," he says. "If the people below know you are taking an interest, it affects their attitude." •

Rockart is director of the Center for Information Systems Research (CISR) at MIT's Sloan School of Management in Cambridge, Mass. De Long is a research associate at CISR. This article is excerpted from a new book, *Executive Support Systems* (Dow-Jones Irwin, Homewood, Ill.). Copyright ©1988 Dow-Jones Irwin. Reprinted by permission.

Comfortable niche

Executive information systems fill the gap between future-oriented decision support systems and fourth-generation languages, which merely report the past



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TAKING CHARGE

Anthony Reed

A Welcome mat for DP

Most companies take a very passive attitude toward welcoming new employees.

First, a new hire spends an hour in the personnel department filling out insurance forms and getting an earful about other benefits. Next, he's taken to the medical department for a quick physical; then he's hustled to his new desk and given a terminal, a logon ID and a stack of manuals. Then he's on his own. He begins to question his decision to join this impersonal firm.

Companies can prevent this problem by establishing a formal orientation program for data processing hires.

The orientation might begin with a series of meetings with various managers, users and other staff members. A meeting with the vice-president of MIS can go a long way toward making a new employee feel welcome. Meeting people in the user, production control, operations and systems areas helps the hire associate a face with a voice on the telephone.

The nickel tour

Too often, a new employee is shown only how to get to two places — his office and the restroom. He's expected to learn his way around the facilities. A simple tour lasting no more than an hour or so can help make him feel more comfortable. Tours of the operations area, documentation library, technical library and other points of interest will help him get his bearings.

Provide the hire with descriptions of the hardware and software configuration, productivity tools and utilities. There's nothing more frustrating than not knowing what tools you have to work with. If the new employee sees you take pride in your facilities, he'll feel equally proud to work there.

A program that formally introduces an employee to a department's procedures, policies and standards can help make him more productive. Often, he's given a stack of sedative manuals on the first day and left alone to read (or sleep) through them.

Prepare a list of reading ma-

Continued on page 66

Top insurers still use systems to cut costs

BY DAVID A. LUDLUM
CW STAFF

A recent study of major insurance companies suggests a continuing need to use information technology to control expenses.

Compared with less robust rivals, major insurance companies with strong profit growth in recent years boosted spending on information technology while controlling other expenses, according to the study.

The more profitable companies concentrated more information technology spending on personnel, particularly for the development of proprietary systems, while the others spent relatively more on hardware.

The study was conducted by two professors at Georgia State University's Decision Sciences Laboratory with data gathered from 40 companies from 1983 to 1986 by the Life Office Management Association in Atlanta.

The researchers assessed the intensity of investment in information technology by measuring it as a portion of all non-interest operating expenses. They measured profitability as total non-interest operating expenses as a portion of premium income.

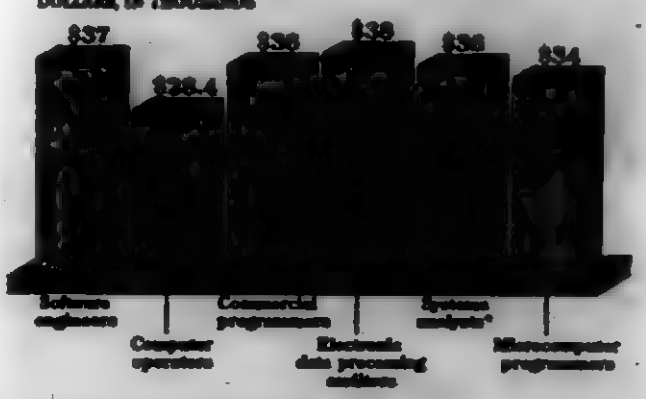
The study does not find a cause-and-effect relationship between the two but reports that a significant relationship does exist.

Continued on page 66

Data View

Professionals' pay

Median compensation of U.S. computer professionals by job function, based on 2,000 responses in a nationwide survey of professionals



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CW CHART

Facing challenge

Directness, delegation mark Blue Cross exec

BY PATRICIA KEEFE
CW STAFF

NEW YORK — Some people just love a challenge. In Geri Riegger's case, the drive is so strong that it carries over to her vacations, which have included a recent trek down the Amazon in Peru and four trips to Africa.

While not all Riegger's pastimes are quite so exotic — she also relaxes with tennis, cooking, baroque music and gardening — she is clearly not one to shy away from the unknown. Some 25 years ago, she left the relative safety of a teaching post to pioneer in what was then the almost exclusively male bastion of data processing.

Running the show

Today, after joining Empire Blue Cross/Blue Shield in 1982, Riegger controls a budget of $40 million to $50 million and oversees computing and networking departments that have a combined staff of about 300 who serve roughly 10,000 users.

Her shop boasts many large computers of the IBM 3090 variety, numerous non-IBM midrange processors and a network of 10,000 voice and data terminals as well as personal computers.

In the wilds of Manhattan, Riegger's current challenges include integrating the voice and data communications of what were once two separate insurance providers into a single, cohesive network and generally "making order out of chaos."

Joking that she likes to speak in English rather than in acronyms, Riegger says her approach to technology lies primarily in how it can be applied to the health care business. "I can be instrumental in reducing costs and making the corporation more efficient, or, in a period of expansion, I can increase revenues by using technology as the basis of new products," she says.

Riegger certainly shines in cost management, colleagues say. Her biggest achievement while at Empire, she agrees, has been improving the level of service to customers. "It almost took the [whole] five years, and we did it while reducing the cost per transaction," she says, noting that service improvements

Continued on page 64

PROFILE
Geri Riegger

Position: Vice-president of Information Services Division, Empire Blue Cross/Blue Shield
Mission: Meeting business needs by defining clear goals, setting strategies and directing her organization toward them

Weyerhaeuser spins off another DP business unit

BY KATHY CHIN LEONG
CW STAFF

TACOMA, Wash. — Ten years ago, Weyerhaeuser Co. developed a software product that allowed workers to cut more lumber from the company's forests without cutting down more trees.

Now the nation's second largest seller of wood and paper products has decided to share its money-saving software secrets by launching Innovis Interactive Technologies.

According to President Mark Lembersky, the goal of the start-up firm is to provide interactive decision-making tools to help nontechnical employees contribute to a company's bottom line. "We have been besieged by other institutions to provide similar kinds of products for them. The best way to do it was to set up a company," he said.

Innovis is the company's second technology-based subsidiary. In 1986, it launched Weyerhaeuser Information Services, a unit that provides data processing and disaster recovery services for both Weyerhaeuser companies and outside businesses. Innovis will follow suit in offering software to sister companies and non-Weyerhaeuser customers.

Weyerhaeuser is one of a growing number of users of information technology that have branched out to provide data processing products and services to others. Companies such as Eastman Kodak Co., Bankamerica Corp. and Bechtel Group, Inc. have been in the computer and software services market for a number of years.

Double vision?

Innovis now offers two software products: Vision, the program for cutting trees more efficiently, and Desktop Building, a product intended to offer commercial property owners structural overviews of buildings. While Desktop Building does not provide the engineering detail of computer-aided design packages, it helps users decide what architectural features would be most cost-effective to build.

Vision is sold directly to the general market in a personal computer version for $350. More sophisticated modules that operate on Silicon Graphics, Inc. computers for three-dimensional capabilities reportedly will cost from $2,000 to $150,000.

Desktop Building will be offered exclusively to the Weyerhaeuser Building Systems unit, according to Lembersky. "That company will be offering [Desktop Building] as part of their service to customers," he said. "This is how we will typically offer our products."

Lembersky acknowledged

Continued on page 66

Challenge

CONTINUED FROM PAGE 63

typically do not come cheap.

With her bent toward the logical and her zeal for cost control, it is not surprising that Riegger showed an early attraction to math and science. She began her career as a high school teacher; that lasted just one year. Unable to find a position teaching the disciplines she had studied, she switched to teaching computers, a jump she describes as a major but unplanned turning point in her career.

Riegger says she recognized the opportunities that computing, as a new industry, afforded women with the proper skills. She was right. The move led to 12 years with IBM, during which she moved from teaching to selling to product development, as well as a White House fellowship and selection as Manufacturers Hanover Trust Co.'s first female vice-president, heading up computing operations.

Getting established

Riegger says that in general, women have had a harder time at high levels, but that they often do better in computing because of the need for technical skills.

The impact of those views at Empire is subtle, however, according to Arlette Klein, a vice-president of systems and Riegger's peer. "She does not campaign from a feminist perspective, but she may have somewhat raised the consciousness of people around us in terms of what is appropriate [behavior]."

A no-nonsense, results-oriented approach on the job has helped Riegger get where she is today. While somewhat reserved — she is not a "buddy person" at work, a colleague says — Riegger is known for being direct and assertive. "She does not gild the lily or beat around the bush," a co-worker acknowledges.

"I am definitely not laid back," Riegger says with a laugh. "I clearly believe in setting very high standards for my organization." She adds that a staff of "leaders in their own right" makes those goals achievable.

Her job, as she sees it, is to define clear goals, set strategies and direct the attention of her organization toward the goals. "I do get involved, but how someone implements those goals is not a concern of mine," she says.

Klein concurs. She notes that Riegger is not one to drown in detail but is persistent in tracking those aspects of a project she cares about, such as costs.

Doing homework

Riegger's mix of technology and business knowledge allows her to "hold her own" in any planning or implementation environment — and a penchant for doing her homework doesn't hurt either, according to Dick DiFalco, a division vice-president and Riegger's boss.

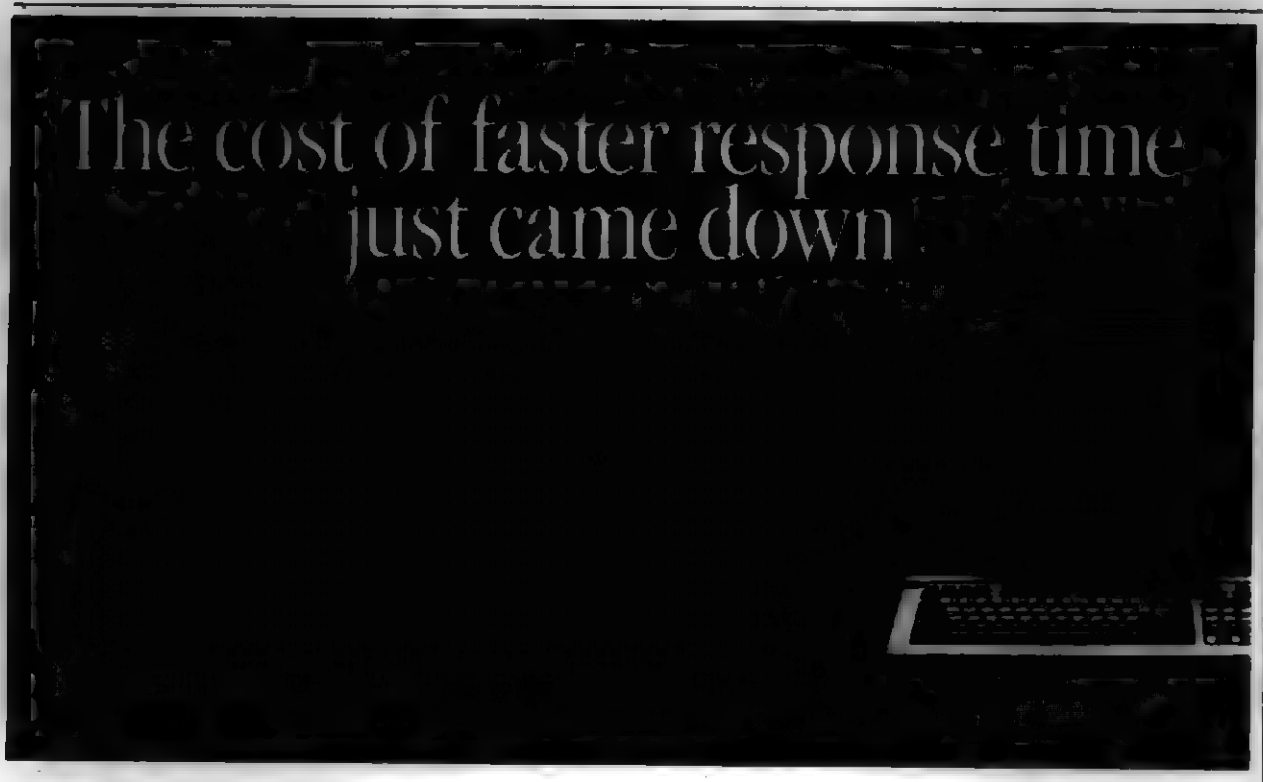
Besides evolving from a "back room operation" in the five years since Riegger joined Empire, MIS was recently anointed a corporate function rather than a divisional one. That makes it even more important for someone in Riegger's position to be able to relate to business needs, DiFalco adds.

"Her attitude on the job is always one of: 'How does what we are doing help or hinder the business we are supposed to support?' " he says.

Riegger credits that attitude to her IBM training in marketing. "It's not enough to know technology; you have to be able sell and explain it to your customers and executive management," she says.

Adds Donald Morchower, Empire's chief information officer: "IBM does prepare people in a certain way and image. She brings that level of professionalism and organization with her."

DiFalco sums up this experience by describing Riegger as a "situation manager" — someone who can be counted on to take a project from start to finish and bring it in on time, within budget and achieve the prescribed goals.



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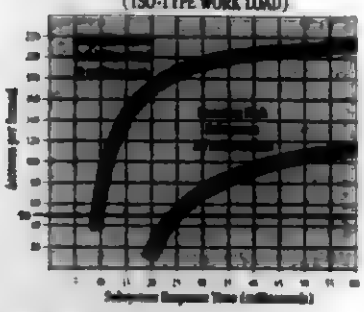

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CALENDAR

MARCH

National Conference of the North American Honeywell Users. Norfolk, Va., March 6-10 — Contact: Lee Pecor, NANU, P.O. 3027, Willingboro, N.J.

Integrated Database Management System User Association Annual Conference (IDMS 88). Orlando, Fla., March 6-10 — Contact: Kathleen Miles, IDMS User Association, Suite 600, 111 E. Wacker Drive, Chicago, Ill. 60601.

2nd IEEE Conference on Computer Workstations. Santa Clara, Calif., March 7-10 — Contact: Computer Society of the IEEE, 1730 Massachusetts Ave. N.W., Washington, D.C. 20036.

Federal Office Systems Expo (FOSE) '88. Washington, D.C., March 7-10 — Contact: Debbie Murray, National Trade Productions, Inc., Suite 400, 2111 Eisenhower Ave., Alexandria, Va. 22314.

Ninth Annual Conference on IBM Performance/Capacity Management. Scottsdale, Ariz., Mar. 7-11 — Contact: Applied Computer Research, Inc., P.O. Box 8990, Phoenix, Ariz. 85066.

IBM Mavs and Mavs. Atlanta, March 8-9 — Contact: Automotive Industry Action Group, Suite 830, 17117 W. Nine Mile Road, Southfield, Mich. 48075.

CAP '88 West. Los Angeles, March 8-10 — Contact: Computer Aided Publishing, Inc., Suite 300, 90 W. Montgomery Ave., Rockville, Md.

Connect '88. New York, March 8-10 — Contact: Meg Mercer Young, Cahners Exposition Group, 999 Summer St., Stamford, Conn. 06905.

Society for Information Management Institutional Member Conference — Information Systems: The New Business Partner. Tarpon Springs, Fla., March 9-11 — Contact: Kathleen Miles, Suite 600, 111 E. Wacker Drive, Chicago, Ill. 60601

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But you may NOT send us everything that comes into your head. Our offices aren't big enough to handle all that paper! Please take the time to narrow down your ideas to the two best you can come up with (test them on your friends).

All entries will be shown to our panel of judges, who will be tied to their chairs until selections are complete. Six winning slogans will be picked, and everyone who sent in one of those slogans will be eligible for a prize. If you are the only one submitting a particular slogan that wins, you, of course, get the prize. However, if more than one person had the same intelligent idea, we'll pick the prize winner out of a hat. Prize winners will receive a $100 certificate good towards the purchase of software from a friendly neighborhood computer store.

All decisions of the judges will be final, and no representations as to their competence, skill, or sense of humor are being made. All entries will become the property of *Computerworld*. Deadline for entries is **March 18, 1988** at our offices in Framingham, MA.

YES, I'd like to enter *Computerworld's* ridiculous button contest. My two slogans are written below. I understand the rules above, and realize that these entries will become the property of *Computerworld*. I hope your judges can read!

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DP unit

FROM PAGE 63

the two products are aimed at very focused markets.

While Lembersky would not elaborate on future products from the new business, other sources within the corporation said it is working on a software package designed for retail home improvement centers. The interactive graphically based software would help customers working on projects such as a backyard deck to determine what materials to buy and in what quantities.

Lembersky stressed that the company is not attempting to sell computer technology but is, rather, using computer software as the best media to sell its decision-making concepts. In the future, he suggested, the company may use optical disk technology to achieve the same results.

Lembersky related a philosophy he hopes to see carried through the product line. "I don't want to give people the sense that the computer has all the answers," he said. "The computer is a tool to help them make better decisions."

Insurers

FROM PAGE 63

That underscores the importance of using information technology to control other expenses, according to Sidney E. Harris, an author of the study now at Claremont Graduate School in California. "Don't just look at the amount you spend in relation to income, look at the amount you spend in relation to expenses," he said.

Companies should decide whether it is more critical for them to use information technology to cut costs or boost revenue, he added.

The study suggests a growing need for insurers to use technology to increase revenue. "The ability to deliver flexible investment-based products at the lowest cost has become a critical success factor for the industry," it says. "Product innovation is heavily dependent on information technology for production efficiency and for distribution and service effectiveness."

Harris said the findings should be relevant to other industries in which companies have a similar degree of reliance on information technology, including financial services, wholesale trade, health care and business services.

Reed

FROM PAGE 63

terial for the hire. If you have several volumes of standards and procedures, identify specific sections that may be relevant to his immediate needs.

Provide him with copies of the security manual and explain any penalties for violations. Show him where the technical and system utility manuals are located and identify the procedures for checking them out.

Simple steps such as these can go a long way toward making an employee feel more comfortable in his new environment and toward making make him more productive faster.

Reed is an independent quality assurance consultant in the Dallas area.

SCIENCE/SCOPE®

A newly developed system significantly speeds up the measurement of digital data generated by modern radars. The Automated Radar Monitor (ARM) system uses a computer and special interface hardware. It replaces expensive, time-consuming manual special test equipment (STE) hardware panels currently used. ARM can collect high-speed digital radar data, analyze it, and display it on several computer terminals simultaneously. The cost of the ARM system, developed by Hughes Aircraft Company, is approximately one-third that of the STE it replaces.

Advanced V-band circuitry will play a key role in satellite-to-satellite communications and in the operation of spaceborne imaging array systems. Hughes is developing for the U.S. Air Force compact, reproducible, reliable transmit/receive switches and analog and digital phase shifters. The components will operate at approximately 60 GHz, the preferred range for phased array equipment in future space systems. The V-band includes frequencies from 50 to 70 GHz, and is considered the optimum frequency range for orbiting secure communications systems.

Carried aboard a new satellite, positioned to detect storms threatening the East Coast, are two experiments. The Geostationary Operational Environmental Satellite (GOES) H, designed and built by Hughes for the National Oceanic and Atmospheric Administration, includes a space environment monitor (SEM) and an experimental receiver. The SEM assesses magnetic field strength and direction, solar x-ray fluctuations, and particles in its vicinity that make up solar wind and radiation belts around the Earth. The receiver will be used to aid in international search and rescue missions by monitoring radio distress signals from troubled ships or aircraft throughout most of North and South America. GOES H is in geosynchronous orbit above the Atlantic seaboard.

A new circuit design complex will help Hughes microchip designers develop advanced radar and communications systems for military applications. The Microwave Monolithic Integrated Circuit (MMIC) Design Center will include cell libraries and computer-aided design workstations and will be located in the new gallium arsenide (GaAs) microchip production facility. Location of MMIC design and GaAs production in the same facility will benefit the design activities, as MMIC chip development requires repetitive design-processing cycles with quick turnaround. The MMIC program is designed to support all microwave and millimeter wave systems with the latest state-of-the-art technology.

Hughes Missile Systems Group is advancing every phase of research and development, as it applies to tactical guided missile systems and strategic defense. Opportunities for engineers and scientists are in analog/digital circuit design; high-voltage power supply design; transmitter and radome design; electro-optical design; IR imaging sensors; focal plane arrays; mechanical engineering; and systems engineering. Send resume to Hughes Engineering Employment, Dept. S3, 8433 Fallbrook Ave., Canoga Park, CA 91304. Equal opportunity employer. U.S. citizenship required.

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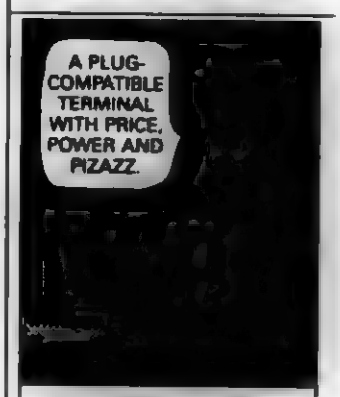

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INDUSTRY INSIGHT

Stephen Jones

Hashing out legal rights

It might not be the hottest topic on this week's episode of television's *L.A. Law*, but the intellectual property and copyright protection of software remains an important, and as yet unresolved, issue for users and vendors in the computer industry.

Software source code, those innocuous lines of commands that make up an application, attained celebrity status during the last few years, thanks to a series of sexy lawsuits and drawn-out court battles.

At issue was how far one developer could go in copying another's software program. Any hacker is free to come up with a spreadsheet, but what if it clones the "look and feel" of

Continued on page 71

Preletz leads recovery cavalry

Hambrecht & Quist's results man turns troubled firms upside down

BY J. A. SAVAGE
CW STAFF

MILPITAS, Calif. — Hambrecht & Quist, Inc. partner and turnaround specialist Mike Preletz says that his education at the U.S. Military Academy at West Point may have something to do with his drive to excel at the helm of no less than six high-tech companies at once.

"They have a simple method there," he said. "Learn, or they take you out and shoot you."

Superminicomputer start-up Ridge Computers, based here, is the eighth high-tech company to learn about Preletz's turnaround techniques. San Francisco-based Hambrecht & Quist, one of the computer industry's premier venture capital firms, replaced Ridge's chief executive officer with Preletz earlier this month in an effort to stanch further losses at the company. Preletz immediately axed one-half of the company's work force.

While imposing unemployment on many, Preletz has been successful in making his companies profitable.

Mike Preletz

Culver City, Calif.-based tape drive maker Rexon, Inc., for example, lost $6 million on $33.5 million in sales in fiscal 1985. In its two full fiscal years since Preletz took the helm, Rexon earned $3 million on $9.3 million. Revenue in fiscal 1987 passed the $100 million mark.

Preletz also holds the CEO position at disk drive film head maker Read-Rite Corp. in Milpitas; scientific computer vendor Adac Laboratories, also in Milpitas; Visual Technology, Inc. in Lowell, Mass.; and Zymed, Inc. in Camarillo, Calif.

Ridge customers and analysts who follow the company say the venture-funded, private company has been marred by inconsistent direction, such as starting with a proprietary Unix-like operating system and later supporting AT&T's Unix System V as well.

In various announcements in the last few years, Ridge has said it was aiming at the engineering and scientific marketplace, education, high-performance graphics and computer-aided design and manufacturing.

"We felt Ridge was directed at different markets," said Ridge customer Richard Huang, vice-president of Pacific Data Images, Inc., a firm that provides animated graphics to clients like the Super Bowl producers. "At the beginning, they didn't have Unix, and when they did, they went after the business market."

Ridge's latest product, a Unix-based 5100 superminicomputer, will be at least two months late, missing its projected February ship date, Prelets said, while the firm consults with its largest

Continued on page 70

BGS impedes Morino's buying binge

BY NELL MARGOLIS
CW STAFF

VIENNA, Va. — Between last July and last month, Morino Associates, Inc. went on the first corporate shopping spree in its 15-year history. Morino dipped into its cash kitty five times for a total of $3.4 million to acquire product lines or companies that complement its own successful information systems management support software.

But two weeks ago, Waltham, Mass.-based BGS Systems, Inc. brought the long good-buy to a halt when it rejected a friendly $27 million tender offer from Morino.

In the aftermath of the failed takeover, market observers for the most part extended condolences not to the spurned suitor but to the company that, in their view, would have done well to be bought.

"Morino's offer made a great deal of sense," said Mark Finley,

Continued on page 72

NEC seeks forfeiture of Intel's copyrights

BY JAMES A. MARTIN
CW STAFF

MOUNTAIN VIEW, Calif. — In an aggressive move to turn its luck around, NEC Electronics, Inc. last week filed a motion in U.S. District Court seeking to overthrow Intel Corp.'s copyright claims on its 8088 and 8086 microprocessors.

NEC asked U.S. District Court Judge William Gray to issue a ruling that any 8088 and 8086 copyrights claimed by Intel in four years of litigation against NEC be forfeited because of Intel's "consistent failure to take the minimum steps required by law to protect them."

"If we win this motion, the case is over," said Linnet C. Harlan, NEC counsel. "Even if microcode is deemed copyrightable, Intel still doesn't have any copyrights, because they didn't do what they were supposed to do to protect them."

NEC further claimed that Intel has allowed at least 10% of its 8088 and 8086 microprocessors to be distributed without bearing the proper copyright notices. In addition, Intel knowingly permitted its licensees to distribute "millions of parts without the required copyright notice," NEC charged.

"NEC is trying to change the focus of the case from the real issue of copyrighting microcode," said Paul Johnson, a semiconductor analyst with Shearson Lehman Hutton, Inc. in New York. "The real significance here is that NEC has become very aggressive in its defense."

The NEC-Intel legal disputes date back to 1984 and center on the issue of copyrighting microprocessor codes. Intel claims NEC's V series of microprocessors unfairly infringed Intel copyrights on the 8088 and 8086 chips.

A landmark decision in Intel's favor handed down last year was thrown out in December when U.S. District Court Judge William Ingram resigned from the case after NEC filed a motion to disqualify him because he indirectly owned a small portion of Intel stock.

Amdahl faces ESA challenge after '87 boom

BY J. A. SAVAGE
CW STAFF

SUNNYVALE, Calif. — Citing a substantial influx of traditional IBM customers and an employee training program that reduced expenses by $250 million, Amdahl Corp. announced that 1987 was "by far" its best year in business.

The company, which produces IBM-compatible mainframes and peripherals, broke the billion dollar mark in revenue last year, rising from 56% in a disappointing 1986 to $1.51 billion. Profits more than tripled from $41.8 million in 1986 to $146 million.

The revenue peak, however, was quickly overshadowed by IBM's announcement this month of a new operating system for its top-of-the-line 3090E mainframe. Such announcements often signal a dearth in mainframe sales for IBM competitors such as Amdahl that rush to simulate the product.

Not major problem

John C. Lewis, Amdahl chief executive officer, said last week that IBM ESA/370 will not cause major problems in the revenue and shipment stream because the announcement was anticipated.

Lewis added that the hardware adaptations for Amdahl's 5890 family "will not be a major technical challenge" (see story page 1).

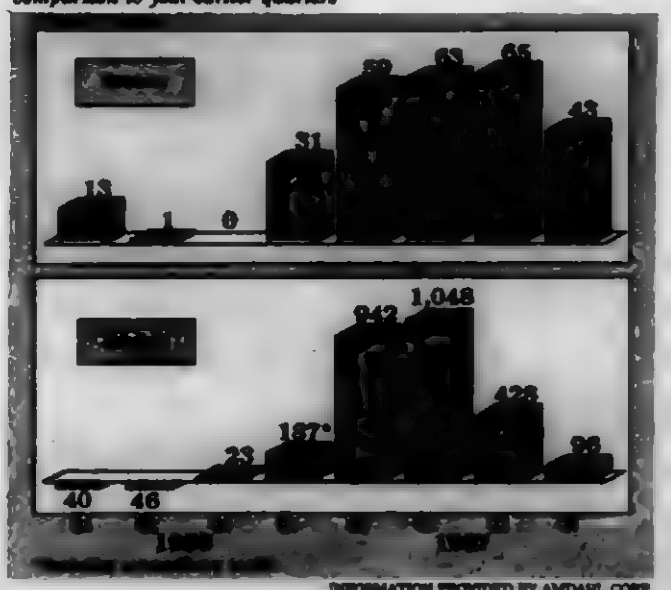
Sales of the 5890 accounts for two-thirds of the firm's total revenue, according to Amdahl.

Amdahl Chief Financial Officer Ed Thompson said Amdahl is winning market share in part because of a 400-person increase in

Continued on page 72

Soaring over Sunnyvale

Amdahl's percentage gain and decline in revenue and earnings in comparison to year-earlier quarters



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CW CHART

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FOUNDATION

INDUSTRY WEEK IN BRIEF

Symbolics, Inc. announced the departure of cofounder and Chairman Russell Noftsker less than one month after he resigned as chief executive officer and was removed from day-to-day operations [CW, Feb. 15] of the troubled Cambridge, Mass., artificial intelligence workstation maker. Vice-President of Operations Ronald Darcy was appointed to the position of president and CEO.

Software AG Systems, Inc. received an acquisition bid from its West German equity partner, Software AG. The unsolicited tender offer amounts to approximately $50 million for 78% of the Reston, Va.-based firm, as Software AG already owns 22%.

"I can't see any other buyers emerging in the U.S.," said analyst Scott Smith of Donaldson, Lufkin & Jenrette, Inc. "Software AG is one of the stocks that just hasn't come back since the Oct. 19 crash. At this point, it's worth a lot more to the West German company than it is to U.S. investors."

Although Burland International basked in the glory of a 167% quarterly revenue jump, costs related to the introduction of new products and the start-up of a company magazine caused a 46% drop in profits before taxes.

For the quarter ended Dec. 31, the Scotts Valley, Calif.-based software vendor posted revenues of $21.7 million. Profits before taxes, however, sagged to $250,000.

Dial-up modem maker Racal-Vadic, Inc. in Milpitas, Calif., has chopped 118 administrative and manufacturing staffers, or roughly 20% of its work force, as the result of a slowdown in its business and the opening of an automated manufacturing facility. This latest cutback comes on the heels of last year's withdrawal from the personal computer retail sales business when sales did not meet expectations.

JAMES DALY
AND CLINTON WILDER

Preletz

FROM PAGE 67

buyer and European OEM channel, Groupe Bull in France.

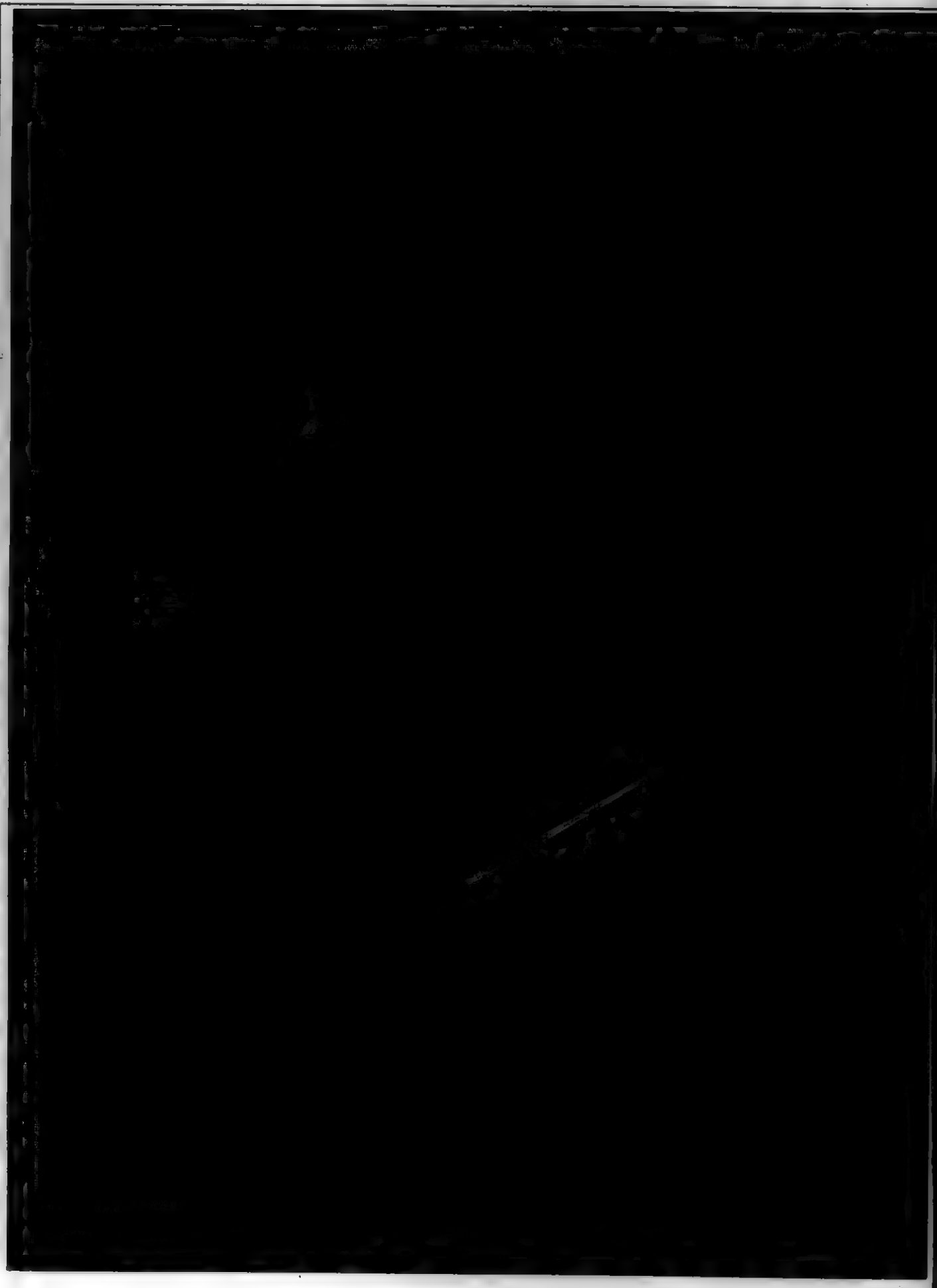
Ridge was counting on the 5100, which holds 144M bytes of main memory, runs at 14 million instructions per second and supports up to 128 users, to bring it into the black. Hambrecht & Quist apparently could not wait any longer for the promised profitability.

The venture capital firm does not necessarily need an investment in a company, however, before it will take over management and attempt to make it profitable. Investors in Rexon went to Hambrecht & Quist looking for an infusion of capital last year, according to Preletz.

"If the company qualifies as good technology and it has a good marketplace, it's a potential big hit" for Hambrecht & Quist, he said. "You want to come out with a company that's worth $100 million in three or four years."

Preletz was adamant that his techniques of turnaround do not cause low morale at his companies. He said employees know when a company is doing poorly and that low morale precedes, not follows, big layoffs.

However, several employees at Ridge who were interviewed since Preletz's arrival appeared to be in low spirits. "We're trying to keep our chins up," one technical support person said. She said her department was pretty much spared of cuts because of its customer commitment.



Jones

FROM PAGE 67

the industry leader?

Although interest in these intellectual property debates is waning among some MIS managers, it seems to be gaining momentum with an expanding group of lawyers, developers and users based in Southern California. Attracting attendees from around the world, the International Conference on Computers and Law was held earlier this month in Santa Monica, Calif., to address a number of legal issues relating to the computer industry.

Topping the list was the difficult balancing act of protecting a developer's software technology from infringement and promoting standardization and free competition in the marketplace.

Asking the courts to deliver a verdict on that issue, though, invites a number of problems. For one, the bulk of today's court systems and lawyers do not have the technical savvy to decide whether the structure, organization and sequence of source code is able to be copyrighted, said Richard Bernacchi, an attorney with Irell & Manella in Los Angeles, a member of the organizing committee for the conference.

Add to that a confusing set of precedents and several pending cases, such as Lotus's suits against Paperback Software and Mosaic Software, and you have all the makings of a major headache for the computer industry.

These problems have resulted in many intellectual property cases being decided more on the basis of legal technicalities than on an assessment of the technologies in question. In fact, most of today's copyright protection guidelines for the computer industry are modified versions of copyright principles written at a time when computers were akin to science fiction.

Heart of the matter

Bernacchi and David Nimmer, a lawyer specializing in copyright protection, have developed criteria that could go a long way toward getting at the heart of proprietary technology. The lawyers' criteria, as proposed to conference attendees, include the following:

- How much of a program's code was dictated by the type of hardware on which it runs?
- How much of the code was dictated by the hardware's operating system?
- How much of the code is needed to operate any program used in a particular application?

The idea behind these questions is to strip away generic source code and give judges and juries the bare bones of an application to which one developer claims sole possession.

Such criteria would not be needed if more companies followed Microsoft's lead in making code for products such as SQL Server and LAN Manager completely open to outside developers. But while Microsoft pursues its open architecture approach, companies like Lotus, Ashton-Tate and IBM continue to be wary of clone makers.

IBM could touch off a whole new series of legal battles on the hardware side with its proprietary Micro Channel bus architecture for the Personal System/2 line.

Developers, lawyers and users alike would do well to band together at such meetings as the computer law conference in California to hammer out the details for some clear copyright guidelines before the next explosion of litigation.

Jones is a *Computerworld* West Coast correspondent.

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Amdahl's boom

CONTINUED FROM PAGE 67

its marketing department during the last two years.

And while the bulk of new shipments are going to customers who have already bought Amdahl products, there is a significant number who have been "almost totally" IBM in the past, he said.

"Now people feel a lot safer buying Amdahl. The new saying is, 'You'll never get fired for having two suppliers,'" Thompson said, alluding to the MIS maxim, "No one ever got fired for buying IBM."

Cutting losses by increasing productivity in general administration contributed substantially to Amdahl's bottom line, according to Thompson.

"Two years ago, 35% of sales were eaten up by the cost of doing something wrong — the cost of doing something twice," Thompson said.

Training makes perfect

All employees, Thompson said, went through a training program to improve quality and eliminate duplication.

"They now speak a common language internal to the company," he said.

Amdahl's selling, general and administrative expenses dropped to 16.5% of sales last year from more than 20% in 1986, according to Joseph Payne, hardware analyst for Alex Brown & Sons, Inc. in Baltimore.

Buying binge

CONTINUED FROM PAGE 67

an analyst with the Gartner Group, Inc. in Stamford, Conn. BGS stock was selling at $6 per share when Morino made a $9-a-share cash offer for the company. The price was "what many would call generous," Finley said, "and the companies' product lines are a natural fit."

Morino offers software products and services that help companies manage IBM mainframe-based data processing, networking and application resources. BGS makes and markets modeling software used to predict the performance of medium-size to large IBM computer systems and communication networks.

Moreover, with $33.2 million in fiscal 1987 revenue, more than $6 million in profits and 300% growth during the last four years, Morino could have appealed to minority owners of BGS, which, Finley pointed out, "hasn't made operating income for one heck of a long time."

So why no deal? Although BGS Chairman, President and cofounder Harold Schwenk Jr. emphasized that "the board did carefully deliberate the Morino offer," he implied that the price was not right. "The cash behind BGS shares is in the $5-per-share range," Schwenk said. "At $9 a share, Morino was offering about $3 a share for the business — the rest amounts to cash for cash."

Speculation among market analysts centered on reluctance of the three BGS founders, who together still hold 60% of the company's stock, to give up their entrepreneurial positions.

"This is an example of the golden rule: He who has the gold makes the rules," Finley said. "The company belongs to B, G and S [the initials of the cofounders' surnames]; if they don't want to sell, they don't have to."

Morino's decision to grow through acquisition, according to founder and President Mario Morino, inevitably grew out of the company's "mission to become known as the company that can put in and support your whole information systems management support system. No single vendor can do it."

Put money where mouth is

Within weeks after announcing the intent to embark on a five-point acquisition and alliance strategy to complement continued internal development, Morino began putting its money where its mouth was. In quick succession, the company made the following purchases:

- A $1.5 million equity investment in Westboro, Mass.-based change management software vendor Business Software Technology.
- The Resource Inventory Manager line of inventory and asset management software from Unisoftware, Inc. for $600,000.
- The $450,000 acquisition of an inventory and asset management software product from Dallas-based Bendata Management Systems.
- The intended $800,000 acquisition of Lexington, Mass.-based American Management Co. This pending deal, if consummated, will give Morino its first presence in the Digitial Equipment Corp. VAX systems management market for a relatively small entry price.
- An $85,000 equity investment in Elsa Software Products, Inc. in San Jose, Calif., whose products improve operator productivity and automate operations in IBM mainframe environments.

"What Morino is doing is very smart," said Ken Kolence, an independent industry consultant based in Palo Alto, Calif. Unlike competitors, who see information systems management software as unrelated utility packages, "Mario views this as an overall application," he said.

Where will the firm's strategy go without BGS? Onward, according to Morino.

While declaring that his company was disappointed by BGS's decision, Morino said that "modeling is important in what we're trying to do, but not critical." Moreover, "we already have a cooperative support agreement in place with BGS" — an agreement that Schwenk said BGS definitely will support.

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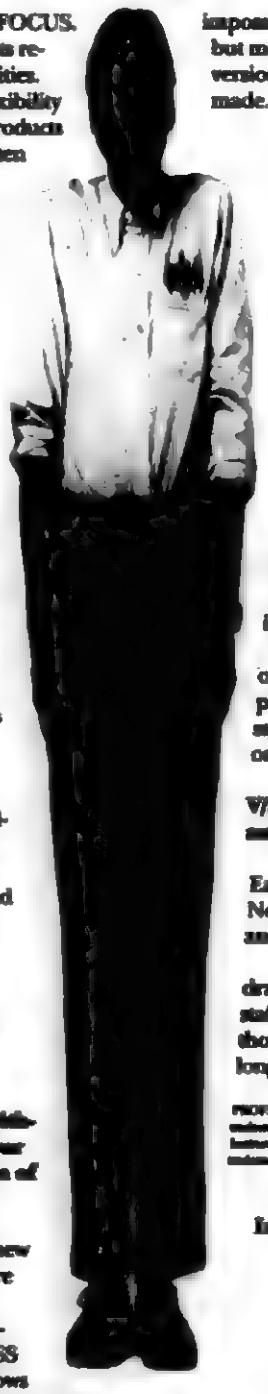

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Planners move out of back room

Communications, business skills the keys to capacity planning

BY MICHAEL BALL
SPECIAL TO CW

At Security Pacific Automation Co. in Glendale, Calif., capacity planning is more than just a stepping stone on the way to the top of MIS.

Gerald Hodge, manager of computer performance evaluation, oversees a staff of 24 operations and applications professionals involved in planning and performance functions.

"It is no exaggeration to say capacity planning is a career here," he says.

Spotlight on planning

Traditionally viewed as a low-profile technical arena, capacity planning is receiving more attention from management because of the increased complexity and cost of computer systems.

This attention is allowing professionals in the field to make a career out of a back-room function. Experienced planners are finding they must improve their business knowledge and communications skills.

At the same time, the increased sophistication of capacity planning technology may reduce the total number of planners a company requires and allow experienced professionals to concentrate on higher level tasks.

"Products today don't just give you data; they tell you what to do," says capacity planning consultant Ken Kolence of Kolence Associates in Palo Alto, Calif.

In the future, these products will encompass both artificial intelligence and modeling techniques as well as a blend of computer-aided software development and capacity planning.

Ultimately, companies will no longer need to teach new MIS professionals all the rudiments of the field.

"We're going to be less demanding on our people as a result," Kolence says.

Career glamour

At Coldwell Banker Residential Group in Laguna Hills, Calif., a higher profile for the capacity planning staff makes positions within the section more attractive to MIS professionals, says Jason Shane, manager of national capacity planning.

The key to management's recognition of capacity planning, Shane says, is staffing the section with competent professionals who possess an extra set of communications skills.

"I am a technician and I will die one, but if our systems planners cannot deal with executives, the message is lost," Shane says.

Shane looks to hire professionals with computer expertise and oral and written communications skills.

> "I VIEW THE capacity planner as a liaison between MIS and business planning. The technical skills are secondary. I would take business analysts and train them in systems."
>
> JASON SHANE
> COLDWELL BANKER
> RESIDENTIAL GROUP

"I view the capacity planner as a liaison between MIS and business planning," Shane says. "The technical skills are secondary. If I had the money to do so, I would take business analysts and train them in systems."

Security Pacific's Hodge also wants to make capacity planning a career varied enough to keep people developing professionally.

To achieve this goal, Security Pacific funds internal and external education, and Hodge's managers are always exchanging duties.

"We make sure that skills cross-training is part of the job," Hodge adds.

Professionals enter Security Pacific's capacity planning and performance functions from the applications and operations areas of MIS. "It takes about a year or longer for them to teach each other the other side," Hodge says.

After this period, a person is ready for something else, Hodge says. Depending on the employee's interests and abilities, that something is likely to be a stint with a measurement team of four, perhaps monitoring and helping manage operating system performance. Finally, when those skills are mastered, and the MIS professional is ready for a new challenge, "then we go into actual capacity planning," Hodge says.

Rather than purchase technology as it becomes available, Hodge relies more heavily on the staff already in place.

"The tools are definitely becoming enriched," he says, "but we are not necessarily buying a shiny new tool unless it definitely does something we're not already doing."

In terms of recruiting, Hodge looks for a strong systems programmer, one who knows the systems internals specific to the firm's operation. But this person must also possess a real interest in performance or capacity.

"We want someone who will do more than take the data off the screen and look at the book to see what it means," Hodge says. "The person we hire will be the one who says, 'The interesting thing about this number is that it is only collected at this time, so it's skewed.' "

Hodge may hire someone without a performance track record and pay them in the low- to mid-$40,000 range.

"But we can go substantially higher for a truly established professional," he says.

Experienced planners rare

However, Hodge says he rarely finds a highly experienced capacity planner and does not always hire the ones he does meet. "We have to be careful, because some experienced people are not able to look at the job with fresh eyes," he says.

According to Hodge, his staff seems to thrive on the demands and the constantly varying duties.

"If a person has a job and doesn't think every once in a while, 'Why don't I just go and dig ditches?' — then the job probably isn't challenging enough," Hodge says. "This one is."

Ball is a free-lance writer based in Boston.

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As a key member of our MIS Team, you will be responsible for performing systems analysis for the selection and implementation of office automation products in the business environment, and providing user support and technical consultation for OA hardware and software on IBM PC's and mainframes.

Background must include a Bachelor's Degree in Computer Science or related area with 6-8 years office automation experience. Experience in Displaywrite 4 and DISOSS and IBM PC communications is required. Knowledge of DEC environment and interfaces with IBM is desirable.

At Glaxo Inc., growth opportunities and up-to-date facilities are complemented by a location (near Raleigh/Durham) that has excellent resources in close proximity. Prestigious universities, scenic vistas, lively recreational areas, and exciting cultural opportunities are all a part of the daily life of the Glaxo professional. Further, we reward talent and creativity with an excellent salary and benefits package (including a completely equipped, on-site athletic facility). Candidates interested in this position, please send your resume, including salary history, to:

Human Resources Department
Job #3650BEM

Glaxo Inc.
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(No Phone Calls, Please)
No Private Agency Referrals, Please

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MIS MANAGER

Fasson Roll Division

Avery, a world leader in the manufacture of pressure sensitive materials, has an outstanding opportunity available for an MIS Manager for their Fasson Roll Division's headquarters, located just east of Cleveland, Ohio.

The qualified candidate will:

- Manage resources to design, develop, and enhance systems to support a multi-location manufacturing environment
- Develop and implement the Strategic MIS Plan for the division
- Define and prioritize hardware and software needs for the finance, marketing, and manufacturing areas
- Manage programming and operation in an IBM 36/38 and DEC environment

To qualify for this opportunity to join a Fortune 300 leader, you must possess a B.S. degree; advanced degree and/or training a plus. In addition, you should have 10 years of professional business experience with at least 3 years of supervising MIS professionals; the ability to lead and develop your staff; strong project management skills; broad-based business knowledge (manufacturing background preferred); good communication and presentation skills; and experience with IBM equipment.

Avery offers a highly competitive compensation and benefit package with excellent advancement potential. For confidential consideration, send your resume to: **Michelle Burley Keys, Human Resources, Job E-031.**

AVERY

Fasson Roll Division
250 Chester Street
Painesville, OH 44077

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Affirmative Action Employer.
M/F/H/V
No third party inquiries

Office Automation Analyst

The Information Sciences Department of Smith Kline & French Laboratories is seeking an individual experienced in Office Automation Analysis. The successful candidate will analyze office automation requirements and develop tactical and strategic plans for both functional groups as well as SKF-R&D as a whole; manage the implementation of office automation plans; act as a consultant in providing state-of-the-art expertise; interface with vendors to assess their product applicability relative to R&D's needs; and participate in and lead EDP project teams.

The successful candidate must have:

- BS/BA in computer science, business, or a scientific discipline (MS/MA preferred).
- A minimum of 6 years computer applications experience required with at least 2 years in Office Automation Analysis together with a demonstrated record of developing and implementing strategic office automation plans.
- In-depth knowledge of the Office Automation market place especially related to word processing and electronic mail required.
- Demonstrated ability to understand and analyze office automation requirements in scientific, administrative, and secretarial functions required.
- Good communication and interpersonal skills required.
- VAX/VMS experience highly desirable.

SK&F Laboratories, a world leader in pharmaceutical research and development, is located in a new, state-of-the-art research complex near Valley Forge, PA. We offer an excellent compensation and benefits package as well as opportunities for personal and professional growth. Interested candidates should forward their resume to George P. Kissell, Jr., Manager, Personnel Relations, G0145, SK&F Laboratories, P.O. Box 1539, King of Prussia, PA 19406-0939.

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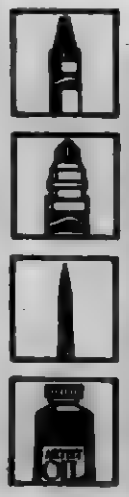
SK&F

MVS MIGRATION

A Major Conversion for Binney & Smith



Discover the professional and personal advantages you want at Binney & Smith, multi-million dollar manufacturer of CRAYOLA and LIQUITEX branded products. Our corporate headquarters information services environment consists of an IBM 4381 running VM/VSE, CICS/VTAM, VOLLIE and IDMS.

Continuous company growth has caused the need to migrate from DOS/VSE to MVS/XA. In the next few months, major hardware changes will be made. The talented Technical Support Specialist we seek should have at least 8 years of experience in VS, CICS, VTAM, JCL, JES2, ISPF, TSO, and VSAM. Proven ability to implement systems software for an MVS environment. A past background in DOS/VSE to MVS migration and database is considered a plus.

At our Corporate Headquarters in Easton, Pennsylvania, you'll enjoy the advantages of a very pleasant lifestyle. Housing is affordable and there is easy access to varied cultural, recreational and educational centers. Both Philadelphia and New York are within easy driving distance. Commutable from North/Central New Jersey.

At Binney & Smith, you will find a strong corporate commitment to excellence and competence which means an usual degree of employee satisfaction. We recognize and reward talent, offer highly competitive salaries and pride ourselves on a liberal progressive benefit program including relocation assistance. Please send resume and salary requirements in confidence to: Human Resources Dept. DVR, Binney & Smith, Inc., 1100 Church Lane, Easton, PA 18044-0431.

BINNEY & SMITH

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MVS PROGRAMMERS

A unique opportunity exists to join the world's largest winery in responsible career growth positions offering an excellent compensation/benefit package and ideal living conditions in a nonmetropolitan area 90 miles from San Francisco.

We are seeking experienced MVS programmers for design and development. These are premiere opportunities to be involved in redesign/rewrite of major systems such as Order Entry, Sales, Pricing, Transportation and Inventory in the following environment: MVS/XA, CICS, DB2, TSO/E, RACF. Development software: QMF, CSP, COBOL and Structured Design Tools. Experience with McCormack and Dodge's millennium software a plus.

Please send resume and salary history in confidence to:
Professional Staffing Department,
E. & J. Gallo Winery,
P.O. Box 1130,
Modesto, CA 95353.

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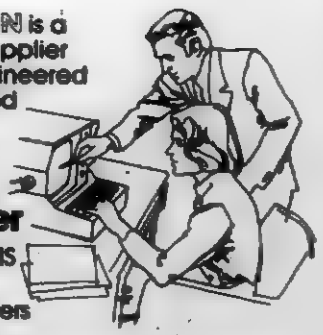
BRUSHWELLMAN is a leading worldwide supplier of high reliability engineered materials. Due to rapid growth, we currently seek experienced **Programmers** and **Programmer /Analysts** in our MIS Department at Corporate Headquarters in Cleveland, Ohio.



☐ P/A for New Systems Development on IBM 4381 using IDMS, DOS/VSE, CICS. Experience needed:
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- Command-Level CICS
- IDMS & related products

☐ Programmers for System 3X environments. Experience to include:
- 2-3 years' RPG programming
- MAPICS highly desirable
- PC exposure helpful

Brush Wellman offers a competitive salary, Company-paid benefit programs, and comprehensive relocation assistance. Send your resume in complete confidence to: Sarah N. Steiner, Corporate Manager, Employment; Brush Wellman Inc.; 1200 Hanna Bldg.; Cleveland, OH 44115.

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If you missed the opportunity to dial us directly on January 24th, then here's another chance to take advantage of our DP Opportunities Hotline. Excellent positions are still available in a variety of areas. By dialing our number you'll gain access to a very exclusive multiple IBM 3090 environment. But only if you're as committed to progress as we are at Fireman's Fund.

Exactly how advanced are we? Well, the fact that IBM currently features us in their own product advertising speaks strongly for our ability to select and cultivate technology, and where we're going is even further ahead. We have made a 48 million dollar project commitment for 1988 to continue the development of our nationwide business information processing network. You'll find a range of challenges here involving IMS DB/DC, DB2 and CICS in an MVS/XA, VM/SP, VM/HPO and VTAM environment. But above all you'll find commitment and a team dedicated to building value for the future. Ours. And yours.

DP Opportunities Hotline:
Call COLLECT 415/492-6439
Sunday, March 6
10 a.m. to 4 p.m. (Pac. Std. Time)

DESIGN/SR. PROGRAMMERS
Five or more years programming experience, 2 of which include experience with IMS DB/DC. A thorough understanding of COBOL, structured design and programming essential. For design positions, project leadership and planning experience required. Familiarity with DB2, JCL, Yourdan or Gane/Sarson structured methodologies preferred.

SYSTEMS ANALYST SPECIALISTS
12+ years of data processing experience in large scale IMS analysis, design and development with expertise in IMS DB/DC, structured methodologies and design, structured tools/techniques, data base considerations, data modeling, data dictionary and project management and planning. DB2 and/or SAS highly desirable.

LEAD/SR. SYSTEMS ANALYSTS
At least 5 years analysis/programming experience with on-line applications; an in-depth understanding of structured design/analysis techniques, a background in IMS development systems are essential for these assignments. Advanced level positions also require previous project leadership experience. DB2 would be a plus.

LEAD/SR. EQUIPMENT PLANNERS
Assume responsibility for capacity planning, cost value analysis, configuration analysis and design. Five or more years equipment planning experience and a thorough understanding of IBM Sys 370 architecture are required.

TELECOMMUNICATIONS MANAGER & SR. ANALYSTS
A thorough understanding of IBM SNA environment to design and implement large-scale, nationwide data communications networks is required. Will also evaluate and plan the implementation of voice/data products and services which requires excellent analytical, project management, and communication skills. 3-5 years directly related experience with vendors such as AT&T, IBM/ROLM, Northern Telecom, MCI are essential. Additional experience should include ACD's and voice messaging systems plus a strong understanding of the current regulatory environment. Management position requires an additional 2-3 years experience in a supervisory capacity with a strong emphasis on strategic planning.

Our systems operations are ideally located in Northern California's Marin County. In fact San Rafael and Novato, our major sites, recently topped The San Francisco Chronicle's list of "best places to live" in the Bay Area.

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If you miss the March 6 Call-in, please forward your resume indicating position of interest to: Fireman's Fund Insurance Companies, Systems Division, Central Employment Services, Job #SYS7, 4040 Civic Center Dr., San Rafael, CA 94912. An equal opportunity employer. Principals only, please.

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The biggest tactical error you can make is to attempt career advancement on your own...leading, perhaps, to your own Waterloo.

Come in. Call. Or mail your resume to the NCA firm nearest to you. No charge for our services. Confidentiality is assured. Now is the time to advance!

National Computer Associates

University of South Carolina
System Vice President for Computer Services

The University of South Carolina invites applications and nominations for the position of System Vice President for Computer Services. The University is a nine-campus System with a total enrollment of over 37,000 including 15,000 undergraduate and 6,900 graduate students on the USC-Columbia campus. Columbia is the state capital and the geographic, economic, and cultural center of the state with a metropolitan population of over 463,000.

The System Vice President for Computer Services reports to the President and has responsibility for providing technological resources to the nine campuses of the University System and to over 75 governmental agencies. He or she will establish the technical direction essential to supporting research, instructional, and administrative needs of all end users and for developing the University's new parallel supercomputing system.

The Computer Services Division consists of over 300 employees responsible for several mainframe systems supporting a data network of over 1,000 terminals plus a voice network of over 10,000 stations. In addition, distributed minicomputers and numerous microcomputer systems require substantial effort.

To provide effective leadership, the candidate should have a college degree with formal training in technology, an appropriate combination of academic and administrative computing and technological experience and a record of accomplishment in leading and managing in a complex and decentralized environment of both internal and external user expectations.

Applications and nominations will be accepted until April 15, 1988 or until the position is filled. The position will be filled on or about July 1, 1988. Applicants should submit a resume with a brief letter of application to:

Dr. James R. Duris, Chairman
System Vice President for Computer Services
Search Committee
College of Science and Mathematics
University of South Carolina
Columbia, SC 29208

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OHIO UNIVERSITY STAFF POSITIONS

The University Computing and Learning Services has the following two vacancies:

COMPUTER SOFTWARE SPECIALIST

Minimum Qualifications: Bachelor's degree in Computer Science/Business Administration related field or equivalent experience; 5 - 7 years overall DP/Computer related experience; rel db, 4GL and COBOL Programming Languages, systems development, analysis and design, project control, knowledge of SAS, SPSS; or DYL280; human relations.

Responsibilities: System design and development support, leadership capability, and purchased software selection and implementation for administrative application. Supervises Programmer/Analyst(s). Salary: $25,000 - $31,000.

MANAGER, INFORMATION CENTER

Minimum Qualifications: Bachelor's degree required. Prefer degree in computer related area, however, could substitute a combination of degree in a less technical area and relevant experience. Three years experience in a university computing environment. Several years experience in Human Resources Management required; supervisory experience and ability to manage/direct professional staff.

Responsibilities: Coordinate Information Center activities necessary to increase computer self-sufficiency of University personnel. Counsel/advise all University departments, including faculty and administrative staff. Salary: $28,000 - $32,000.

Availability of Both Positions:
As soon as practical following search processes.

Send letter of application and resume to Joan Harris, UCLS, Harding Hall, Ohio University, Athens, Ohio 45701 by March 25, 1988.

APPLICATIONS FROM WOMEN AND MINORITIES ARE STRONGLY ENCOURAGED.

DIRECTOR OF SYSTEMS AND PROGRAMMING

Heritage Computer Corporation is seeking a Director for programming staff. We are a state-of-the-art developer and marketer of IBM mainframe hardware for the property/casualty insurance industry. This Sheboygan based position will be responsible for R&D, product construction, client support activities, hiring and training of staff.

The ideal candidate will have 10 years management in IBM property/casualty insurance environment. Bachelor's degree and continued education in insurance preferred. This is a highly visible position with excellent promotional opportunities.

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Please call 212-654-3660
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HUMAN NUTRITION RESEARCH CENTER
UNIVERSITY OF NORTH DAKOTA

PROGRAMMER/ANALYST II
#3-048

Requires Bachelor's degree in computer science with coursework in mathematics and statistics and three years of increasingly responsible experience in the development of data processing systems and programming. Must have working knowledge of the VM/CMS operating system and PLI, Fortran, SAS, REXX, IFS, and DMS, as used under the VM/CMS operating system. Knowledge of the VSAM file access method and Lotus 1-2-3 and dBase III essential. Prefer strong mathematics and statistical background, data processing experience in a scientific setting. Prefer experience in data processing and statistical consulting with good oral and written communication skills. SALARY: $1,881 - $2,622. DEADLINE: March 24, 1988. Send letter of application and resume to: Job Service North Dakota, Attn: Craig Knudsvig, PO Box 1537, Grand Forks, ND 58206.

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Prominent sw vendor seeks tech well-founded pro to direct staff of 20+ in VAX based product line. Dist/field svc. appe. & multi-vendor mini bkgrd. desirable. This hi-vis. role has adv. to VP lvl. + significant perf. income pot! Base salary to $55,000. Call the Data Processing Division (in confidence), ROBERT HALF OF BOSTON, INC, 100 Summer Street, Boston, MA 02110. Tel. 617-423-1200. Personnel Consultants. Client company assumes all fees.

Knowledge Engineer - Assess feasibility of artificial intelligence (AI) systems for client companies. Design, program & organize services relating to AI projects. Requires PhD. in Computer Science. Grad level program must have included courses or research: 1. in CAD-CAM technology, CAD/Solids Modelling, computer aided analysis, NC programming, process planning & control, robotic systems & PMS. 2. in utilizing Lisp programming & at least one major knowledge engineering tool (ART, KEE, KNOWLEDGE CRAFT) in developing AI solutions within manufacturing industry & in the development of AI systems to support the mfg planning activity; & 3. in the application of AI to process planning. Job site & interview: Dearborn, MI. 40 hrs/wk. Non-Profit salary: $1037.53/wk. Send resume to 7310 Woodward Ave, Rm 415, Detroit, MI 48202. Ref. #3888. "Employer Paid Ad"

SYSTEMS ANALYSTS/ APPLICATIONS PROGRAMMERS

(2 positions)
Columbia University Libraries

Two positions available to install, maintain and enhance library/bibliographic applications software (NOTIS) operating on major university network. One position acts as project leader and performs training.

Bachelor's degree required, advanced degree preferred. Minimum of 2-3 years progressive programming and analysis experience (or equivalent in education and experience) essential. Also required are experience in an IBM environment; experience with PL/1, IBM assembler and JCL; and excellent communication and documentation skills. Knowledge of MVS, VSAM, CICS, VM/CMS, IBM 3270 terminal communication, ADABAS, COM-PLETE or library bibliographic applications desirable. The senior Analyst/Programmer must have ability to work independently and to take primary responsibility for production applications.

Salary commensurate with experience and qualifications. Excellent benefits include assistance with University housing and tuition exemption for self and family.

Send resume, listing 3 references, to: Kathleen Williams, Director of Personnel, Box 30, Butler Library, Columbia University, 535 West 114th Street, New York, NY 10027. Deadline for applications is March 10, 1988.

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Five years experience with VAX equipment, and associated higher order language operating systems; three years experience with a major relational database such as INGRES or ORACLE; and two years experience as a Project Manager of a major ADP support programs. BS in Computer Science or related field required.

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Five years ADP experience including three with VAX equipment and four with a major relational database such as INGRES or ORACLE.

Work site in Yorktown, VA.
U.S. Citizenship required.

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MVS/XA, SMPE, CICS, TSO, Token Ring Networks, PC Software, ADABAS/Natural, VTAM, ACF/NCP, NCCF/NPDA, TOP SECRET, Stds. Dev., Proj. Mgmt., & Proposing, & Publishing.

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Systems Programming, Special Projects, Standards Development, Systems Security, and Applications Development.

Positions require 4 year college grad with Maj. course work in CS or MIS & 2 yrs exp. Exp. may be sub for ed. Sal. Benefits. Resume to:

J. Richard Langley, Director
Room 54, Holland Building
Tallahassee, FL 32399-1300

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COMPUTER SYSTEMS ENGINEER

Achieving and maintaining the HAWORTH reputation for Excellence is a reflection of the dedication to innovation and uncompromising quality of professionals like yourself in every facet of our company. And, not surprisingly, that dedication to Excellence has also made HAWORTH the fastest growing company in the Office Furnishings Industry. We currently have an opening available for a Computer Systems Engineer.

This individual will provide technical support and has responsibilities for the continuous operation of Haworth's CICS systems including IMS/DB support. Support duties include planning, designing, installing, performance tuning and maintaining systems software. This individual will also provide consultation, technical problem-solving, and debugging services for persons in other areas of MIS.

Haworth's computing environment consists of an IBM 3090-200E running MVS/XA, JES2, VTAM, TSO/E, ISPF, CICS, IMS/DB, DB2, DISOSS, PS/CICS as well as many other state-of-the-art software systems.

The ideal candidate will possess a Bachelor's degree in computer science or related technical field or equivalent with 4 to 6 years experience in systems software. A demonstrated competence in one computer language and an in-depth understanding of CICS are also required.

We urge you to investigate this opportunity. The addition of your individual talent, skills, education and goals will help assure our mutual success. For immediate consideration, please send your resume including salary history in confidence to:

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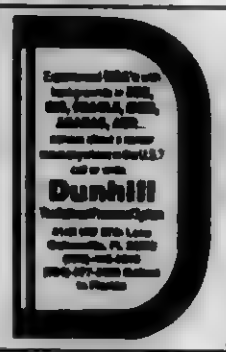

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23. Dir., Mgr., Supv., Analyst, of Systems
31. Dir., Mgr., Supv., of Programming
32. Programmer, Methods Analyst
35. Dir., Mgr., Supv., OA/WP
36. Data Comm. Network/Systems Mgt.
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12. Vice President/Asst. VP
13. Treasurer, Controller, Financial Officer
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70. Medical, Legal, Accounting Mgt.
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99. Others _____ (Please specify)

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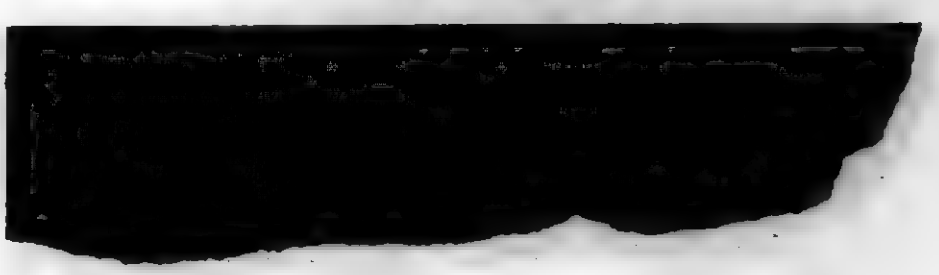

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85. Computer & DP Services, including Software/Service Bureau/Time Sharing/Consulting
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21. Dir., Mgr., Supv., IS/MIS/DP Services
22. Dir., Mgr., Supv., of Operations, Planning, Adm. Services
23. Dir., Mgr., Supv., Analyst, of Systems
31. Dir., Mgr., Supv., of Programming
32. Programmer, Methods Analyst
35. Dir., Mgr., Supv., OA/WP
36. Data Comm. Network/Systems Mgt.
OTHER COMPANY MANAGEMENT
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12. Vice President/Asst. VP
13. Treasurer, Controller, Financial Officer
41. Engineering, Scientific, R&D, Tech. Mgt.
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MARKETPLACE

Used market lost in the vapor

Trading slows as resellers, end users driven away by vaporware sales

BY ELIZABETH LOZANO
BOSTON COMPUTER EXCHANGE CORP.

The market experienced a trading lull in the week ended Feb. 19, as volume sales of vaporware — used equipment offered for sale before it is truly on the block — discouraged resellers and end users alike. Despite this lack of confidence in reliable supply, however, major manufacturers' microcomputers experienced only slight decreases in value.

The IBM Personal Computer XT Model 089 closed down $25, trading at $1,725 in single-unit transactions. The PC XT Model 086 recovered after falling in value midweek to close at $1,350. The PC AT Model 099, affected by vaporware sales, brought a price of $2,325.

Both the AT Model 339 and the PC Model 076 closed up marginally. The AT Model 339 closed at $3,375, escalating in value as the official end of its production nears. The two-drive classic PC Model 076 was exchanged at $825, with an increase in demand fueling its $25 increase in value.

The big IBM news of the week was the newspaper ads for the company's new DOS machines. Major retail chains were advertising new ATs, and dealers were on the phones buying and reselling these machines for quick cash as well.

Missing: Model 339s

Are these models being phased out by retailers to make room for inventory that meets sales quota requirements? Although sources at IBM insist that the AT Model 339 is still in production, current market conditions indicate otherwise.

One major retailer stated, "I sure can't get any 339s out of IBM. I sure wish I could."

Another dealer, commenting on the events of the week, exclaimed, "I don't want what's behind door No. 1, or what's behind the curtain. I want those 339s."

In contrast to the rumors that fueled the lull of IBM transactions, used Compaq Computer Corp. equipment traded steadily, experiencing solid pricing throughout the week of Feb. 15.

The Compaq Plus was the most readily available of the Compaq line. It closed even, at $1,350, as many buyers and sellers expressed confidence in the basic hard drive portable.

The Compaq Portables II and III closed even at $1,650 and $2,725, respectively, under comparable conditions. The Portable I traded up, at $775, experiencing an increase in trading volume and demand.

The most popular of the Compaq models, the Deskpro 386, continued to be in short supply. The Deskpro 386 40M-byte model closed at $4,300, representing the most available version of these underproduced boxes.

One particular line of machines was the stabilizing factor across the Big Board, preventing the IBM rumor mill from spoiling the market. An increase in trading of Apple Computer, Inc. Macintoshes on Feb. 18 and 19 led to an increase in favorable expectations for the coming week.

The Mac Plus was bought and sold at $1,250 throughout the week, experiencing a major increase in volume during the second half of the week.

The most powerful of the Mac models, the Mac SE and II, held steady at $1,875 and $4,000, respectively, despite a decrease in asking prices. These two models continue to experience an increase in sales volume.

The Boston Computer Exchange can be reached at 800-BOCOEXX or 617-542-4414 in Massachusetts.

The BoCoEx Index

Closing prices report for the week ending Feb. 19, 1988

IBM PC Model 076	$825	$875	$475
XT Model 086	$1,350	$1,500	$750
XT Model 089	$1,725	$1,875	$1,000
AT Model 099	$2,325	$2,400	$1,950
AT Model 339	$3,375	$3,600	$2,400
Macintosh 512	$800	$900	$675
512E	$950	$1,075	$800
Plus	$1,250	$1,350	$950
SE	$1,875	$2,150	$1,700
II	$4,000	$4,200	$3,500
NEC Multisynch	$500	$525	$375

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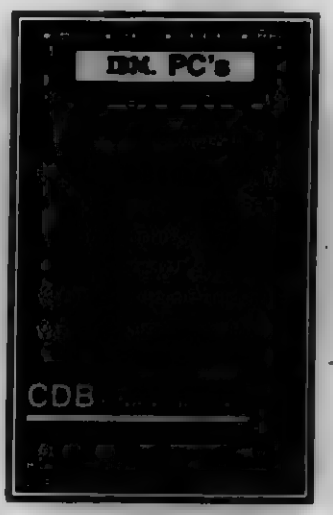

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3/14 Key aspects of the information center's role in end user training.

3/28 How effective is computer-based training? What are the trade-offs between CBT and instructor-led?

Turn to the Training section of COMPUTERWORLD's March issues for an interesting editorial feature addressing these and other questions.

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'Key users' reduce expenses

BY NAOMI KARTEN
SPECIAL TO CW

Few end users are born trainers. Most possess no instructional experience. Nevertheless, it is possible to harness the enthusiasm of end users who enjoy teaching to reduce user training expenses, supplement understaffed information centers and provide an additional source of support to novices.

One way to leverage end-user enthusiasm is for organizations to designate an individual in each user department as a key end user.

Key users receive intensive training from the information center and then serve as the first source of support for departmental trouble-shooting or problem solving. Problems that stump the key user or that exceed departmental boundaries are passed to the information center for resolution.

While the information center continues to provide training on the products it supports, the key user can hold classes that are smaller, less formal and targeted at the unique needs of the department.

Program's benefits

Three of the most compelling program benefits are the following:

- Departmental end users can get more immediate support than if the information center is their closest source of assistance. End-user computing cannot contribute to productivity gains if users must wait days to get help with problems or weeks to get into a class. Local gurus can reduce this wait.
- With key users providing departmental support, the information center no longer must assist each individual user and can provide a more comprehensive service to a larger segment of the organization.
- Because they are members of user departments, key users are familiar with their departments' business functions. They can, therefore, tailor diagnostic guidelines, tips, techniques, learning aids and so on to the specific activities of their department. To be effective, a key-user program requires the right individuals, adequate information center support and management recognition of its value.

As with the information center itself, the people who can best support end users' needs in a key-user capacity are people who possess a mix of technical, training and business skills. They must be skilled at communicating technical concepts to novice users and able to get along well with people.

The information center must work with key users to ensure they understand both the functions of information center-supported products and their application to support business needs.

Key users must become familiar with policies, standards and guidelines that ensure a common approach to departmental support and training and avoid a "do it my way" orientation.

Most important, information center staff members must be readily available to help resolve problems that key users will inevitably encounter.

Many end users enjoy showing off their knowledge and will gladly give a class or demonstrate techniques to their peers. These individuals are often easy to identify. They are the ones who love to dig up solutions and are quick to help out when others get stuck.

The expertise of these individuals can be channeled in a direction that supplements formal training efforts at minimal cost.

Karten is president of Karten Associates in Randolph, Mass., and editor of "Managing End-User Computing."

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April 11	PCs (IBM-Compatible) Portables/Laptops	March 28
April 25	TBA	April 8
May 9	Printers	April 22
May 23	Data Communications	May 6
June 6	CASE	May 20
June 20	The SNA Market	June 3
July 11	Disaster Prevention & Recovery Products & Services	June 24
July 25	Productivity Software	July 8
Aug. 8	TBA	July 22
Aug. 29	DB2 Market	Aug. 12

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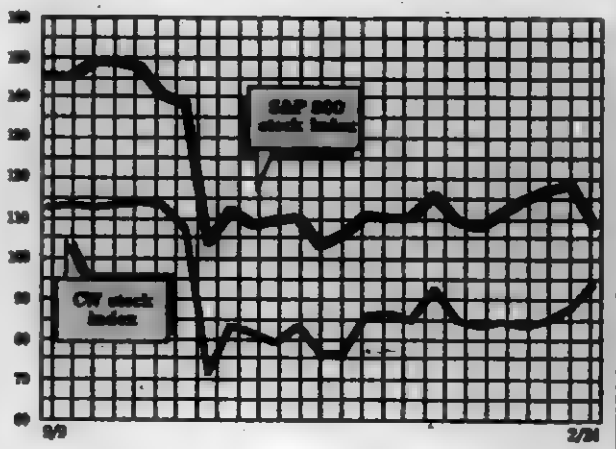
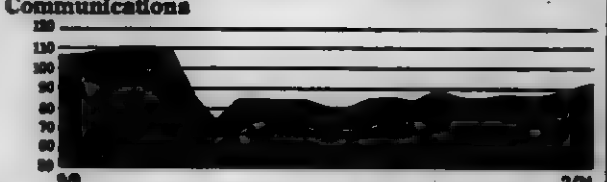
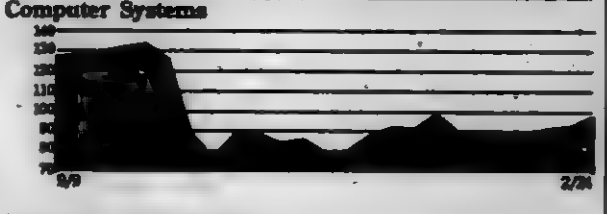


Indexes	Last Week	This Week
Communications	89.3	92.4
Computer Systems	92.1	97.0
Software & DP Services	95.7	99.3
Semiconductors	56.8	62.2
Peripherals & Subsystems	81.0	85.1
Leasing Companies	110.3	113.3
Composite Index	82.7	87.1
S&P 500 Index	107.1	109.3

Communications

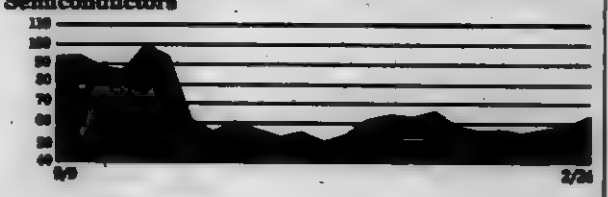


Computer Systems



Software and DP Services

Semiconductors



Peripherals and Subsystems

Leasing Companies

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, FEBRUARY 24, 1988

EXCH		52-WEEK RANGE (1)		PRICE CLOSE FEB. 24 1988	WEEK NET CHANGE	WEEK PCT CHANGE

Communications and Network Services

N	AMERICAN INFO TECHS CORP	100	74	92.88	-0.6	-0.7
O	ANDREW CORP	19	11	14.75	-0.3	-1.7
O	ARTEL COMM CORP	4	2	1.75	0.3	16.7
N	AT&T	36	29	29.38	0.1	0.4
O	AVANT GARDE COMP INC	6	2	1.88	0.0	0.0
O	AWANTEK INC	19	6	7.25	0.4	5.5
N	AYDIN CORP	36	16	23.00	2.6	12.9
N	BELL ATLANTIC CORP	80	61	70.88	0.4	0.5
N	BELLSOUTH CORP	44	29	41.13	1.1	2.8
O	COMPRESSION LABS INC	7	2	3.50	0.0	0.0
O	COMPUTER NETWORK TECH	6	2	1.69	-0.1	-5.9
O	CONTEL CORP	40	25	29.75	1.0	3.1
O	DATA SWITCH CORP	9	4	7.13	0.8	11.8
O	DIGITAL COMM ASSOC	40	20	30.00	1.5	5.3
O	DYNATECH CORP	42	14	20.25	0.3	1.5
O	FIBRONICS INTERNATIONAL INC	11	2	2.75	0.3	10.0
O	GANDALF TECHNOLOGIES	11	5	6.00	0.1	2.1
O	GENERAL DATACOMM INDS	14	3	3.63	0.0	0.0
N	GTE CORP	40	36	38.50	0.6	1.7
O	INFOTRON SYS CORP	12	6	7.25	0.6	9.0
N	ITT CORP	66	42	47.00	0.1	0.3
N	M A COM INC	16	7	10.38	0.3	2.5
O	MCI COMMUNICATIONS CORP	12	5	11.25	0.4	3.4
O	MICOM SYS INC	17	7	10.88	0.0	0.0
O	NETWORK SYS CORP	18	7	8.38	0.6	8.1
N	NORTHERN TELECOM LTD	24	14	19.13	0.1	0.7
O	NOVELL INC	30	12	22.25	0.3	1.1
N	NYNEX CORP	78	58	69.63	1.3	1.8
O	PACIFIC TELESIS GROUP	34	9	28.88	-0.1	-0.4
O	PARADYNE CORP	9	4	5.38	0.4	7.7
N	PENRIL CORP	6	1	3.75	0.4	11.1
N	PLESSEY PLC	41	28	29.75	2.5	12.3
O	SCIENTIFIC ATLANTA INC	20	8	13.88	1.4	11.0
N	SOUTHWESTERN BELL CORP	48	32	37.38	0.2	0.7
O	3 COM CORP	28	12	21.88	1.3	6.1
O	TIME FLEX INC	41	17	32.25	0.0	0.0
N	UNGERMANN BASS INC	18	5	12.38	0.1	1.0
N	U S WEST INC	60	48	55.00	1.4	2.6

Computer Systems

O	ALLIANT COMPUTER SYS	37	5	7.25	0.3	3.6
O	ALPHA MICROSYSTEMS	6	3	4.00	0.0	0.0
O	ALTOS COMPUTER SYS	17	9	11.00	0.4	3.5
A	AMDAHL CORP	80	58	38.50	0.1	0.4
O	APOLLO COMPUTER INC	25	9	15.50	2.6	20.4
O	APPLE COMPUTER INC	60	28	42.25	0.4	0.9
N	BOLT BERANEK & NEWMAN	28	12	13.88	0.5	3.7
O	BRITTON LEE INC	6	1	1.63	0.3	18.2
O	COMPAQ COMPUTER CORP	70	36	47.13	-0.4	-0.8
O	COMPUTER AUTOMATION INC	17	5	13.00	1.1	9.5
O	COMPUTER CONSOLES INC	11	2	5.13	0.4	7.9
O	CONCURRENT COMP CORP	34	11	14.00	-1.3	-7.2
O	CONTROL DATA CORP DEL	38	16	25.50	1.3	5.2
O	CONVERGENT TECH	11	3	3.50	0.1	3.7
O	CONVEX COMPUTER CORP	22	6	6.63	1.8	36.5
N	CRAY RESH INC	135	47	80.88	1.8	2.2
O	DAISY SYS CORP	15	6	7.25	0.3	3.6
N	DATA GEN CORP	37	16	27.75	0.6	2.3
N	DATAPOINT CORP	9	3	4.13	0.0	0.0
N	DIGITAL EQUIP CORP	200	110	136.50	4.8	3.6
N	FLOATING POINT SYS INC	16	5	4.00	0.1	3.7
N	GOULD INC	24	8	12.38	1.8	16.7
N	HARRIS CORP	43	22	28.75	-0.1	-0.4
N	HEWLETT PACKARD CO	74	38	60.50	3.0	5.2
N	HONEYWELL INC	91	48	64.25	-0.5	-0.8
N	IBM	170	102	114.13	2.4	2.0
O	INFORMATION INTL INC	17	9	11.25	0.0	0.0
O	IPL SYS INC	3	1	2.00	-0.1	-5.9
O	MASS COMPUTER CORP	14	5	6.88	0.9	14.8
N	MATSUSHITA ELEC INDL LTD	180	83	179.63	2.1	1.2
O	MEGADATA CORP	6	3	2.88	0.0	0.0
O	MENTOR GRAPHICS CORP	30	14	27.38	3.4	14.1
N	NBI INC	14	4	9.25	1.1	27.3
N	NCR CORP	87	60	64.38	2.1	3.4
N	PRIME COMPUTER INC	31	12	17.88	0.1	0.7
O	PYRAMID TECHNOLOGY	12	5	7.75	0.0	0.0
O	STRATUS COMPUTER	41	16	27.00	3.5	12.5
O	SUN MICROSYSTEMS INC	48	14	35.00	2.6	8.1
O	SYMBOLICS INC	6	1	1.50	0.1	4.3
N	TANDEM COMPUTERS INC	38	17	21.63	3.1	16.9
N	TANDY CORP	57	28	38.38	0.4	1.0
N	ULTIMATE CORP	37	18	19.13	-0.8	-4.0
N	UNISYS CORP	48	34	38.00	1.5	4.1
A	WANG LABS INC	19	10	14.13	-0.3	-1.7

Software & DP Services

O	ADVANCED COMP TECH	6	1	1.63	0.1	8.3
N	AGS COMPUTERS INC	30	11	15.25	0.3	1.7
O	AMERICAN MGMT SYS INC	20	9	16.00	1.3	7.6
O	AMERICAN SOFTWARE INC	22	6	11.63	1.8	17.7
N	ANACOMP INC	11	4	7.88	0.3	3.3
O	ANALYSTS INTL CORP	10	4	7.00	0.2	2.7
O	ASHTON TATE	30	13	27.38	2.6	10.6
O	ASK COMPUTER SYS INC	17	6	12.13	0.6	5.4
O	AUTODESK INC	34	12	22.25	2.0	9.8
N	AUTO DATA PROCESSING	65	16	43.00	-0.6	-1.7
O	BOOLE & BABBAGE INC	12	5	7.75	0.0	0.0
O	COMPUTER ASSOC INTL INC	37	15	28.63	-0.3	-0.9
O	COMPUTER HORIZONS CORP	15	7	9.63	0.4	4.1
N	COMPUTER SCIENCES CORP	73	42	82.00	1.5	3.0
N	COMPUTER TASK GROUP INC	17	9	9.88	0.4	3.9
O	COMSHARE INC	28	12	13.75	-0.3	-1.8
O	CULLINET SOFTWARE INC	14	4	8.38	0.3	4.1
O	CYCARE SYS INC	10	6	7.88	0.0	0.0
O	DUQUESNE SYS INC	28	19	20.50	0.5	2.8
A	DATA ARCHITECTS INC	17	7	13.50	4.0	42.1
N	GENERAL MTRS (CLS E)	51	30	38.75	2.9	7.8
O	HOGAN SYS INC	17	5	5.13	0.6	12.9
O	INFORMIX CORP	31	12	23.50	0.5	2.2
O	INTELLICORP INC	11	2	3.00	0.3	9.1
O	KEANE INC	10	6	7.00	-0.5	-6.7
O	LOTUS DEV CORP	40	19	20.25	1.0	5.4
O	MANAGEMENT SCI AMER	20	9	9.38	0.3	4.1
O	MICRO PRO INTL CORP	6	3	3.50	0.0	0.0
O	MICROSOFT CORP	79	37	58.88	2.4	4.1
O	MORINO ASSOCIATES INC	24	7	17	0.3	1.5
O	NATIONAL DATA CORP	39	19	28.50	0.0	0.0
O	ON LINE SOFTWARE INTL INC	22	9	11.38	1.8	18.7
O	ORACLE SYS CORP	28	8	18.50	0.8	6.1
O	PANSOPHIC SYS INC	28	11	18.63	-0.3	-1.8
O	POLICY MGMT SYS CORP	39	25	22.25	-0.5	-2.2
O	PROGRAMMING & SYS INC	14	7	11.50	0.8	8.2
O	REYNOLDS & REYNOLDS CO	39	14	20.50	2.8	15.8
O	SEI CORP	18	10	18.00	0.5	3.4
O	SHARED MED SYS CORP	36	19	28.63	0.3	0.9
O	SOFTWARE AG SYSTEMS INC	18	7	11.50	2.0	21.4
O	SOFTWARE PUBS CORP	17	8	12.50	2.4	23.8
A	STERLING SOFTWARE INC	14	6	8.38	0.1	1.8
O	SUNGARD DATA SYS INC	21	10	16.25	0.5	3.2
O	SYSTEMATICS INC	20	10	18.00	-0.8	-4.7
N	SY SOFT INC	24	7	10	1.0	6.7
O	VMI SOFTWARE INC	46	7	12.38	0.0	0.0

Semiconductors

N	ADV MICRO DEVICES INC	25	8	12.25	1.6	15.1
N	ANALOG DEVICES INC	24	8	13.13	1.8	15.4
O	ANALOGIC CORP	13	5	6.88	0.0	0.0
O	INTEL CORP	42	18	26.50	2.5	10.7
O	LSI LOGIC CORP	17	7	9.25	0.8	9.5
N	MOTOROLA INC	74	36	47.13	2.5	5.6
N	NATL SEMICONDUCTOR	32	10	11.38	0.9	8.6
N	TEXAS INSTRS INC	80	36	51.25	2.4	7.5
A	WESTERN DIGITAL CORP	33	11	14.88	-2.5	-20.2

Peripherals

O	ALLOY COMP.	13	3	3.38	-0.1	-4.6
O	AM INTL INC	9	3	4.00	0.3	8.7
O	AST RESH INC	25	8	9.13	0.0	0.0
O	AUTO TROL TECH CORP	9	3	3.94	0.0	0.0
O	BARCTEC INC	16	5	6.75	0.1	1.5
O	CIPHER DATA PRODS INC	18	4	7.25	0.3	4.3
O	COGNITRONICS CORP	6	2	3.00	0.1	3.4
O	COMPUGRAPHIC CORP	36	19	22.38	-1.1	-4.8
O	COMPUTERVISION CORP	22	7	7.00	0.0	0.0
A	DATAPRODUCTS CORP	24	7	8.38	0.0	0.0
A	DATARAM CORP	9	3	8.00	0.0	0.0
N	DECISION INDS CORP	13	4	10.63	0.0	0.0
N	EASTMAN KODAK CO	71	40	41.38	-1.1	-2.6
O	E M C CORP MASS	20	10	15.00	0.0	0.0
O	EMULEX CORP	9	4	7.63	1.9	13.1
O	EVANS & SUTHERLAND	40	16	20.25	-0.5	-2.6
O	ICOT CORP	12	3	4.75	1.9	28.7
O	INTERLEAF INC	24	9	16.63	1.9	8.7
O	IOMEGA CORP	6	1	3.00	0.3	9.1
O	LEE DATA CORP	6	3	3.75	0.3	7.1
O	MASSTOR SYS CORP	8	3	1.88	0.1	7.1
O	MAXTOR CORP	28	6	13.00	1.8	13.5
O	MICROPOLIS CORP	41	15	24.00	1.8	7.9
O	MINISCRIBE CORP	13	5	9.00	0.4	4.3
N	MINNESOTA MNG & MFG CO	91	62	90.00	-0.6	-1.9
A	MSI DATA CORP	24	12	24.38	2.4	10.9
O	PRIAM CORP	6	1	2.13	0.5	30.8
O	PRINTRONIX INC	15	7	8.63	-0.1	-1.4
O	QMS INC	27	8	9.50	0.3	3.7
O	QUANTUM CORP	26	8	10.75	0.0	0.0
O	RAINTER CORP	6	2	3.88	-0.1	-2.1
N	RECOGNITION EQUIP INC	28	7	9.13	-0.1	-1.4
O	REXON INC	14	5	7.00	0.3	3.7
O	SCAN TRON CORP	14	7	10.25	0.0	0.0
O	SEAGATE TECHNOLOGY	46	10	18.00	2.3	13.4
N	STORAGE TECH CORP	5	1	2.00	0.1	5.7
O	TANDON CORP	7	1	1.75	0.2	12.9
A	TEC INC	7	3	4.81	-0.3	-6.1
N	TEKTRONIX INC	41	21	25.25	0.8	3.1
O	TELEVIDEO SYS INC	3	1	1.31	0.0	0.0
N	TELEX CORP	102	30	50.00	1.5	3.0
O	WYSE TECH	40	11	20.38	2.4	13.2
N	XEROX CORP	85	50	66.63	-0.3	-0.4
O	XIDEX CORP	16	6	6.75	-0.1	-1.5

Leasing Companies

O	CAPITAL ASSOCIATES INTERNATIONAL INC	11	4	5.00	0.1	2.6
N	COMDISCO INC	37	13	20.50	0.5	4.5
N	CONTINENTAL INFO SYS	14	5	7.50	0.5	7.1
O	PHOENIX AMERN INC	7	3	2.75	-0.1	-4.3
O	SELECTERM INC	8	3	4.13	0.1	2.1

EXCH: N—NEW YORK; A—AMERICAN; O—NATIONAL; O—OVER-THE-COUNTER; S—SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Springboard

Gainers prevail as mini-bull market launches most stocks

Computer issues took their cue last week from a market in which the Dow Jones Industrial Average reached its highest level in more than six weeks to register generally steady advances in trading.

Top gainers as of Thursday's close included Digital Equipment Corp., whose strong gains on Monday helped maintain its steady climb to 123¾, up 3 points from the week earlier; Stratus Computer Corp., up 3 points to 27¼; and Ashton-Tate Corp., where positive reaction to its Dbase upgrade helped the stock rise 2¾ points to 27½.

More modest gainers included Seagate Technology, up 1½ points to 18¼; Compaq Computer Corp., which rose 1⅝ points to 48¼ after being added to Standard & Poor's 500 stock index; Tandem Computers, Inc., up 1⅜ points to 20¾; Apollo Computer, Inc., which rose 1⅛ points to 15⅜; Advanced Micro Devices, Inc., up 1⅜ to 12; and IBM, up 1⅛ points to 114½.

Slight losses, however, reached Control Data Corp., down ⅝ of a point to 24⅜; Hewlett-Packard Co., which slid ¾ of a point to 60; and Microsoft Corp., down ⅝ of a point to 58⅛.

JAMES DALY

AI tools cast in production role

IBM mainframe tool merges knowledge base processing, data base access

BY NELL MARGOLIS
CW STAFF

WALTHAM, Mass. — Alcorp, Inc. last week announced an IBM mainframe-based expert systems builder that it said integrates knowledge base processing with existing corporate data bases for use in large-scale production applications.

Knowledge Base Management System (KBMS) can be accessed by modifying existing mainframe applications to supply a user with embedded rules-based expertise, said Alcorp President Robert N. Goldman. An expert system built with the product reportedly can also function as a stand-alone application capable of accessing IBM's DB2 and SQL/DS relational data bases. In addition, a user may define paths to other mainframe data base management systems through a customizable exit facility.

KBMS is the only mainframe-based expert systems tool to incorporate all four of the reasoning methods currently at work in expert systems technology, according to Alcorp founder and Chairman Larry Harris. Alcorp was formerly known as Artificial Intelligence Corp.

Drawing on these methodologies, Harris said, KBMS can interpolate information from the corporate data base with rules and facts stored in KBMS-created knowledge bases to address what one early KBMS user called "the ambiguous kind of problems that make up most of the action out here in the real business world."

In fact, the product originated in that "real business world." It was co-developed with and tested by several Alcorp customers, each of which has already put the system to work in production applications. Liberty Mutual Insurance Co. and Transamerica Insurance Group, for example, are both using KBMS in underwriting. Southern California Edison Co. developed a KBMS-based application for weather and temperature forecasting.

Needs space

Written in the C language, KBMS occupies its own IBM MVS address space in a manner similar to a data base manager, Goldman said. It is not tied to a particular teleprocessing monitor.

KBMS can be accessed by a terminal called from within an application program. AI/SQL, a proprietary Alcorp SQL-like language, can be used to manipulate data and rules in order to come up with an answer needed by the application.

The system, Harris said, gains production application power from an internal network that does for rules what an index does for data base files. When any change occurs, the network allows only those rules that are affected to be triggered. That limits the resource-intensive process of scanning rules serially looking for a hit.

KBMS's application interface was designed by Tom Nelson, formerly with Cullinet Software, Inc., who designed the central architecture of Cullinet's IDMS DBMS.

Southern California Edison, one of the country's largest electric utility companies, is among the four companies constituting Alcorp's KBMS consortium of early users and development consultants.

The system was applied to a load-forecasting application that predicts electricity demand, according to Michael Musbet, manager of technology research for the information services department at Southern California Edison.

"If our estimates are off on the low side, we're failing our customers; if they're too high, we're left with an extremely expensive inventory," Musbet said.

The company's KBMS model for predicting weather temperatures, Musbet said, is bettering the National Weather Service's predictions and coming within half a degree of the human weather expert it emulates.

Slated for commercial availability in June, KBMS supports IBM mainframe environments, including MVS/XA, MVS and VM operating systems; CICS, TSO, IMS/DC and CMS teleprocessing monitors; and DB2, SQL/DS and other DBMSs.

Prices will range from $90,000 to $200,000, depending on options selected and data bases interfaced, the vendor said.

VM/IS users: Installing is easy, nothing else is

BY ROSEMARY HAMILTON
CW STAFF

VM/IS, the mainframe operating system positioned by IBM as being easy to use, does meet its claims of easy installation; but living with it is another story entirely, several early users said last week.

VM/IS, users claimed, requires a fundamental knowledge of the mainframe operating system on which it is based and senior-level programming skills to maintain it.

The users, all of whom have technical backgrounds, said they are generally satisfied with the operating system but raised doubts as to whether a nontechnical user could manage it. "You don't need an MIS staff, but you do need a pretty sharp technical mind," said Ronald Koontz, director of MIS at JLG Industries, Inc.

Users noted that the real challenge to VM/IS comes when users move beyond simple operations or when they go out of the VM/IS environment by installing a third-party software product. "When you get into packages like [Must Software International's] Nomad2, you cross the threshold and need a real systems programmer to help," said Joe D'Amico, director of applications development at the Federal Asset Disposition Association in San Francisco.

IBM has positioned VM/IS as an operating system for departmental end users that can be managed by a systems administrator with a lower skill level than an experienced MIS staffer.

It has been tailored to provide easier installation and maintenance. In addition, there are nearly 30 program products, such as IBM's SQL/DS and Professional Office System, that users can select to be rolled into the VM/IS environment. In effect, customers can order a ready-made data center.

Usage on light side

Forrester Research, Inc. in Cambridge, Mass., estimated that 20% to 30% of IBM 9370s shipped are running VM/IS. Estimates of 9370 shipments vary from 3,000 to 4,000.

"IBM has been trying to position it as a departmental system, but they just aren't there yet," said Robert Kusche, president of VM/Assist, a consulting firm in San Francisco that recently completed four VM/IS installations for clients. "VM/IS is a real pretty shell around existing products. The problem is, IBM didn't make the existing products easier."

Mark Douglas, a software engineer who works on a consulting basis for Phoenix Reinsurance Co. in New York, said he defines VM/IS as the same as VM but with a very good installation guide. "VM/IS is what should be shipped with VM anyway," Douglas said.

An IBM spokeswoman said she could not respond to users' claims on VM/IS without more knowledge of each user's specific environment. She said IBM does not use a strict definition for the term "systems administrator" but said IBM's reference to a systems administrator in the VM/IS announcement letter of October 1986 was a person who "did not require the skills of a programmer or DP expert."

However, it would not be possible to run a VM/IS environment without programming skills, especially if you "move beyond the prepackaged realm," said Tony Rodgers, operations manager at the Federal Asset Disposition Association.

"We did considerable tailoring to our [VM/IS] environment that would have posed problems to a systems administrator without much DP experience," added James Binger, a systems programmer for the Milwaukee County government.

One site recently installed Oracle Corp.'s data base management system, and another site has been running Must Software's Nomad2 on a 9370 under VM/IS. In both cases, users reported that the installation and maintenance of the software is the same as in a typical VM mainframe environment.

According to Allan Christenson, manager of technical support services for the Milwaukee County government, "If you advance to things like VTAM that are complex, you need a systems programmer with communication experience."

Users contacted last week said they provide their own support, although IBM does provide a remote support facility for VM/IS and has placed emphasis on remote service from a host environment. The company has been announcing products that would allow users at a central site to support a 9370 remote installation.

New MVS

FROM PAGE 1

replace four to seven logic boards in the NAS AS/XL and AS/VL processors to run MVS/ESA.

An Amdahl spokesman said the only delays he anticipates in supporting MVS/ESA involve customers who want to compare the existing Amdahl Multiple Domain Facility (MDF) with IBM's new Processor Resource/Systems Manager for IBM 3090E models.

The spokesman said MDF and other features comparable to those in MVS/ESA are already offered or can be easily added to Amdahl's 580 series mainframes. In comparing the transition to MVS/ESA with the migration to IBM's MVS/XA in 1981, he said the MVS/ESA transition should be about half as difficult.

PCMs denied that IBM's introduction will stall user purchases of mainframes. However, analyst Robert Tasker of Boston-based market research firm The Yankee Group said he has already advised one client, an insurance company ready to write a check for an Amdahl mainframe, to wait.

"If you are in that high-end game, you can't afford not to at least pay attention to an operating system from IBM," Tasker said.

PCMs and industry watchers last week provided an unusual look at how hardware manufacturers construct compatible systems, based largely on public documents.

"What we do is read the book, the customer operations manual," said one industry executive who asked to remain anonymous. "Between 95% and 99% of what you need to know is in it. Anybody can buy the book for $14."

Dennis Stein, manager of processor systems marketing at Amdahl, said PCMs and other companies learn about product plans by monitoring each other's patent filings.

NAS's Glanuch noted that IBM patents for the multiple data spaces featured in MVS/ESA were first patented around 1980. But, he added, IBM did not have a method to allow user applications to take advantage of them. Glanuch said subsequent patents provided more of an indication of direction for features, such as IBM's expanded storage.

Observers said that PCMs next examine product specifications, which are published within 120 days of an announcement in the IBM Principles and Operations Manual. Then they buy the IBM product and study the software documentation.

The software license specifically permits use of software to design compatible hardware, observers said. Final compatibility tests are accomplished by running particular instructions and monitoring the machine parts, such as registers, to see how they react.

One executive noted that the original PCM machines introduced in the mid-1970s were designed by technicians who took machines apart and analyzed the components with oscilloscopes. He said large-scale integration produces components that are too small to attach to instrument contacts.

Amdahl's Stein said, "In 15 years, we've gone through this so many times that it's second nature."

EDS

FROM PAGE 1

$4.38 billion in revenue.

But behind those impressive growth figures, EDS's relationship with the auto giant was hitting some serious potholes. Analysts were questioning whether GM would truly become leaner and meaner after spending billions of dollars on factory automation and systems integration. Several individual projects fell behind schedule. And there were complaints and unrest among the 7,500 former GM MIS managers who had become part of EDS.

"I think the working relationship between EDS people and

EDS's Hank Johnston

GM is outstanding now, knowing that as recently as a year to 18 months ago, it was a pretty traumatic experience," Atwood says.

Former GM employees have reportedly adapted to EDS's management style and working environment. And perhaps most important, EDS has completed the two projects that attracted GM to acquire the company in the first place: the consolidation of the auto company's 110 disparate networks into a single, worldwide telecommunications system; and the amalgamation of 50-odd GM data centers into 19 information processing centers.

Now that EDS has passed the initial crunch period of GM projects, GM is encouraging the company to "take the capabilities they've learned [at GM] and move out into the world to enhance their own sales," Atwood says. But before it can compete effectively, EDS must do some groundwork to match its own capabilities and market image to customers' integration needs.

"I think it's a matter of education," says Hank Johnston, vice-president of sales and marketing for EDS's North American Commercial Group. "Most people in the marketplace look at us as a total computing and automation provider and think this is the only way we will solve their problems." EDS is trying to back off from its former "all-or-nothing" image in systems integration, he adds.

Changing the angle

"EDS still wants to become pervasive in a company, but now it is [moving toward that goal] from different angles," says William Shattuck, a software and services analyst for Montgomery Securities. "They'll try to get their foot in the door with bite-size projects to show what they can do; then, once they get to know the customer, they'll come up with broader projects."

EDS is now trying to demonstrate its willingness to "participate in all or part [of a systems integration project] as long as we get a chance to work with the customer over that time period," Johnston says.

One such customer is Eastman Kodak Co., which recently hired EDS to help it determine a cost-effective strategy for networking its multivendor systems worldwide (CW, Feb. 22). A survey of corporate users, jointly performed with EDS, helped Kodak decide to migrate to the ISO's Open Systems Interconnect standard.

Alan Chase, Kodak's group manager of research and network engineering, says he was impressed with EDS's ability to "mobilize and, boom, do a project. A lot of the company's success is due to its energy, enthusiasm and its ability to seize the moment and strike fast." EDS's GM background was another major reason why Kodak hired the company, Chase says.

Nevertheless, Kodak plans to keep an open mind when it selects vendors to help it choose and implement the components of its new telecommunications network. The initial spadework that EDS performed "was very much a distinct project that could lead to other projects — for EDS or for other vendors," Chase says noncommittally. But that is the type of attitude EDS would like to change.

"We're trying to get people to focus on the larger picture, how concepts like just-in-time delivery and electronic data interchange can make them more effective competitively in the marketplace," Johnston says.

Spearheading EDS's efforts in that direction is the North American Commercial Group, formed in mid-1986. Johnston says the mandate of this smallest but fastest growing EDS division is to provide integration services in the manufacturing, retailing and distribution, utilities, travel and transportation sectors.

Networking integration is another focus for EDS's drive for new business. Late in 1986, EDS formed EDS Communications Corp., a subsidiary that offers to help organizations identify and solve their networking needs.

Bullish

Many analysts are bullish about EDS's prospects of dominating the commercial systems integration field — a market that will grow from $1 billion in 1987 to $5 billion in 1992, according to Input, a Mountain View, Calif., consulting firm. Those figures do not include ongoing facilities management services or products provided for systems integration projects by a vendor not directly involved as a contractor, Input says.

"The whole systems integration business is changing in character, offering more market opportunities as corporations need more help in tackling new, more complex strategic applications and integrating corporatewide networks," Shattuck says.

Of course, that expertise is also being developed by EDS's leading competitors, including Boeing Computer Services, Martin Marietta Corp. and IBM's Federal Systems Division. IBM reportedly pulled in $1.5 billion in commercial systems integration revenue last year. EDS's systems integration revenue totaled $1.4 billion, excluding its GM business; it was $4.3 billion with GM-related revenue included (see chart above).

Company representatives are vague about the number and nature of signed or pending commercial systems integration contracts. However, Johnston mentions "a number of things pending . . . sizable things we're looking at, including some major computer-integrated manufacturing opportunities." EDS performed "eight or 10 consulting projects or major studies, some of which will lead to something in 1988," he adds.

Changing lanes

GM's contribution to EDS's revenue stream is shrinking

INFORMATION PROVIDED BY ELECTRONIC DATA SYSTEMS CORP.
CW CHART

No firm is an island

Even a $4.6 billion-a-year company like Electronic Data Systems Corp. (EDS) knows it cannot do everything by itself. The company is increasingly striking deals, with varying degrees of success, with other contractors.

This is standard procedure in the government systems integration market, in which a typical contract involves one or more prime contractors and some 60 or 70 subcontractors. However, EDS's relationships in this area have gone through some rough times of late. Last month, the company split up with U.S. Sprint Communications Co., its bidding partner in a multibillion-dollar telecommunications contract for the U.S. General Services Administration.

Friction is common in the federal systems integration arena, particularly when two dominant, strong-willed partners are involved in a contract, says Thomas Nolle, president of Haddonfield, N.J., consulting firm CIMI Corp. "And yet, with the scope of what the government is trying to do, it's hard to find just one company for the job," he adds.

EDS may have better luck in the manufacturing market, in which it has formed two major alliances: one with Tandem Computers, Inc. and one with a fellow General Motors Corp. subsidiary, GM Hughes Electronics. In November 1987, EDS and Tandem entered an agreement in principle to jointly develop and market products and services to help manufacturers connect and functionally integrate multivendor business, engineering and factory control systems.

The two partners are going after Digital Equipment Corp. in the manufacturing network integration field, with Tandem providing the shop floor hardware and host networking products, and EDS tying it all together, according to Anthony Friscia, president of Advanced Manufacturing Research, Inc. in Salem, Mass. EDS is currently seeking other alliances of this type, he adds.

Hughes and EDS have worked together on several GM projects, including the design and implementation of computer-integrated manufacturing systems at several GM plants, according to GM Vice-Chairman Donald Atwood. Recently, the two subsidiaries began offering their joint services to outside businesses; they reportedly are in the talking stage with several companies. In addition to its shop floor expertise, Hughes brings to the table an extensive line of satellite-based products and services.

ELISABETH HORWITT

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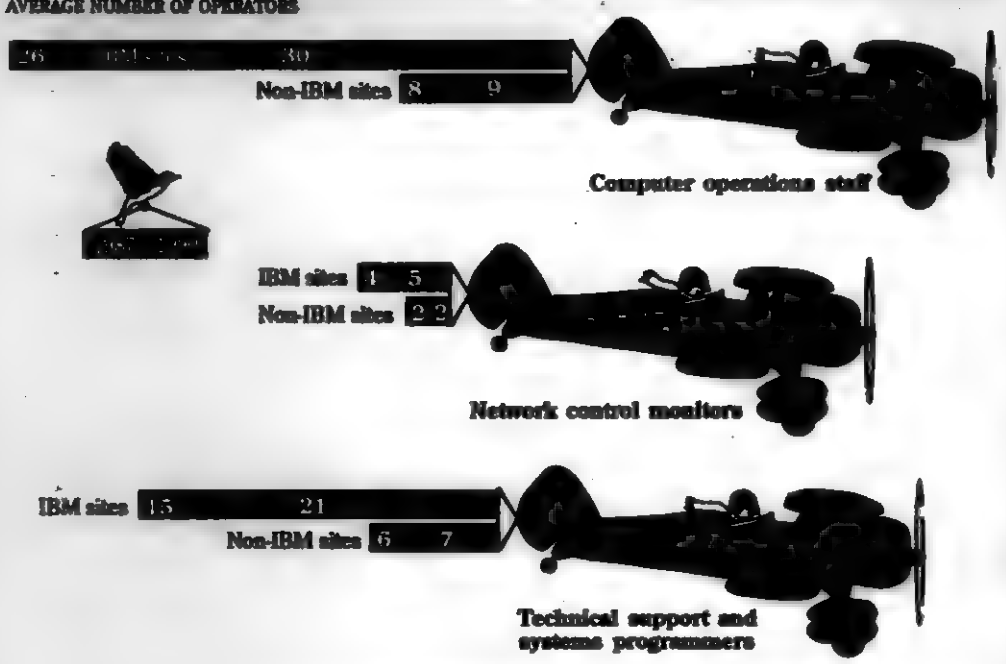
TRENDS

Data center staffing

Tools put drag on data center staff growth

AVERAGE NUMBER OF OPERATORS



Along with moderate growth in numbers, data center staffing will be marked by the redeployment of some personnel in the next three years, a recent study said.

There will be relatively strong growth in the numbers of technical support and systems programming personnel through 1990, and some data center workers will be shifted to network management, according to a survey of 101 major computer installations by International Data Corp.

A key factor in overall data center staffing will be automated tools. Consistently, the companies that projected no change in their use of automated tools anticipated relatively large increases in staffing.

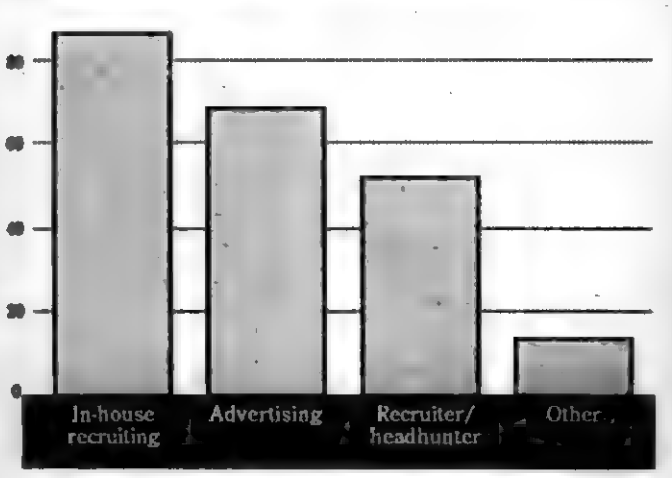
Companies projecting increased use of tools project more moderate growth in staff, and some firms anticipating much greater use of the tools project decreases in staffing.

With the growing complexity of networks, firms expect to employ more network monitors. While network management is becoming a data center function at some companies, many are still grappling with how to handle the growing field, the study found.

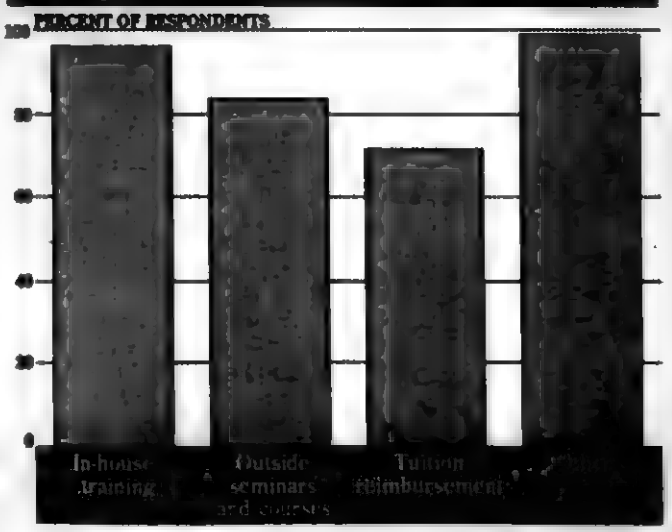
When it comes to recruiting, the surveyed companies expressed a preference for in-house job posting, an inexpensive approach often required by corporate policy.

DAVID A. LUDLUM

Job posting tops hiring techniques



Companies are flexible with training



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHARTS: AMY J. SWANSON

INSIDE LINES

Don't fly with us. At last week's Personal Computing Forum in Naples, Fla., Esther Dyson's annual superstars' romp in the sun, Mark Teffian had some strong words for IBM. Teffian, vice-president of technology planning for Covia, United Airlines' information services subsidiary, said he wouldn't be much inclined to buy many more IBM PS/2s unless the company granted licenses for its Micro Channel architecture. Teffian's firm has some 69,000 workstations, many of which are PS/2s.

Moving on down. IBM will announce a Micro Channel-based version of its low-end PS/2 Model 30 as well as speedier disk drives for its Model 50 in early April, sources said last week; however, it isn't clear whether the Model 30 will contain Intel's 8086 or 80286 processor. IBM is also planning a splashy promotion for its dealers in the next few weeks involving OS/2 and the PS/2 Model 80; according to one source, the company has met only 50% of its internal sales goal for the Model 80.

One who fell off the Apple tree. Next, Inc., Steve Jobs' start-up, plans to unveil its long-awaited workstation next month, and the word is it's a screamer. Sources say the Motorola 68030-based system is faster than a speeding bullet and that its on-screen resolution equals that of its output — something not yet achieved. The company won't restrict sales to the academic market, as it initially said, and will push it hard in the commercial market, sources said.

Super achievers? Apollo plans to announce tomorrow a workstation in the class of the personal supercomputers expected from Ardent and Stellar. The workstation reportedly will run Domain, Apollo's version of Unix that supports both the University of California at Berkeley's Unix 4.3 and AT&T's System V. Scheduled to be offered at a price of less than $100,000, the system will be software code-compatible with current Apollo products, with some compiling necessary, according to a source close to the company. In addition, Ardent is expected to announce its workstation tomorrow. Stellar is slated to make its announcement March 14.

A shot across the bow. A small third-party maintenance firm has won the first battle of its legal war charging Hewlett-Packard with unfair business practices. Cleveland-based Hypoint Technology won a preliminary injunction last week requiring HP to reinstate the availability of four-hour service response time to HP customers who also use Hypoint's maintenance services; HP rescinded the service policy last August. Hypoint's attorney called the ruling the first victory by an independent service firm against a major vendor.

View inside DEC. Word is that DEC will soon, at long last, release Decview. This is consultants' latest nickname for the integrated, "open," centralized network management architecture that will be DEC's answer to IBM's Netview. The latest rumor is that DEC is basing the product on Cincom Systems' Netmaster, which has already gained a substantial user following as a more flexible, functional alternative to Netview.

No, yes and yes. Apple officials spent much time last week denying published reports that the company will introduce a laptop version of the Macintosh later this year. Sources close to the company said the Mac laptop has been hampered by Apple's inability to produce one cheaply enough to compete in that price-sensitive market. Meanwhile, sources close to the company said Apple will announce this week a compact disk/read-only memory disk drive designed to plug into its Macintosh and Apple II computers. Priced at $1,200, the CD SC product reportedly will be bundled with a compact disk featuring reference sources. Finally, Apple and Texas Instruments are said to be ready to announce Thursday a joint project to build an artificial intelligence workstation.

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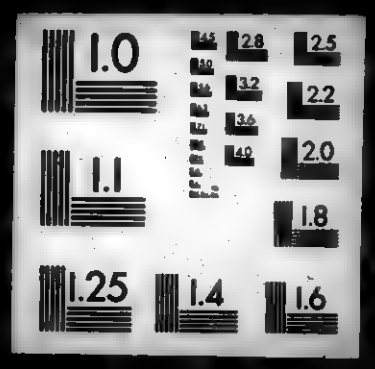
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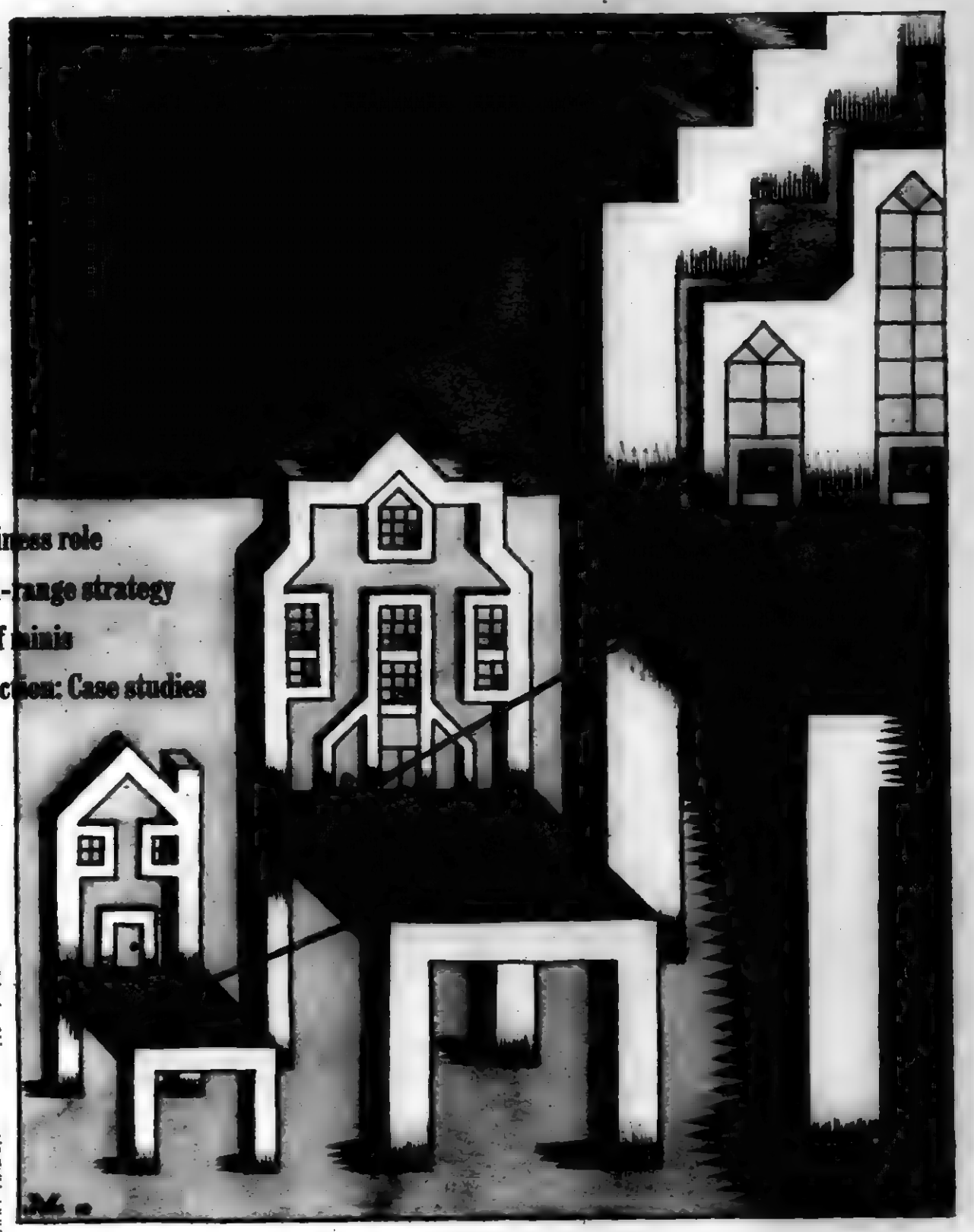

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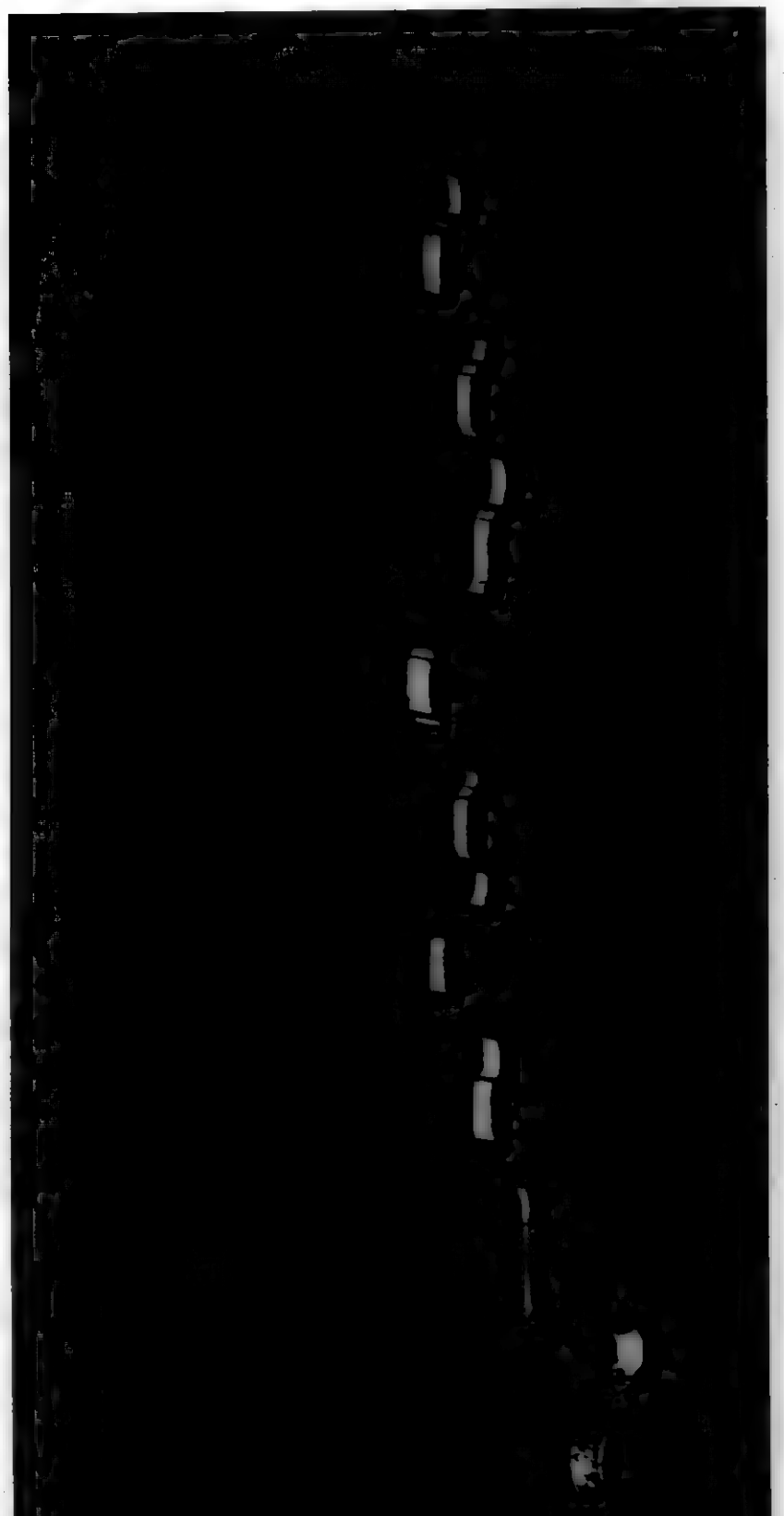

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in focus

TIME FOR A CHANGE Work groups are forging departmental computing in their own image, promoting a versatile computing structure to mirror the flexibility that is so crucial to their dealings with each other. To stay abreast of this evolving definition of departmental computing, information systems professionals are altering their attitudes, roles and responsibilities. MIS is becoming a facilitator, creating an environment for senior management and work groups to achieve departmental computing's benefits. By Halsey Frost. *Page 18.*

IBM'S DEPARTMENTAL PREDICAMENT IBM is in the process of bringing together a departmental architectural complex that is far superior to anything the company has done before. There is a problem, however; this new mid-range scenario is significantly different from what IBM's installed base has been using and requires massive migrations that its users may not want to undertake. This analyst scrutinizes IBM's departmental strategy and the reality beyond the company's marketing hype. By Brian Jeffery. *Page 23.*

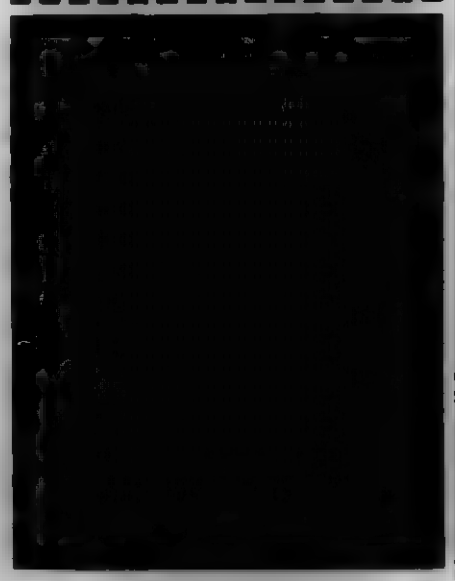
Up for grabs

By Stan Kolodziej. Getting a hold of the mid-range marketplace can give a vendor control over the critical function of conducting data between micros and mainframes. No one vendor has overwhelmingly staked its claim in this area, although the likes of IBM, DEC and companies with Unix-based systems are still trying. Read about how these vendors hope to become departmental winners. *Page 27.*

Are minis' days numbered?

By Marty Gruhn. To the detriment of minicomputers, LANs and network file servers have increased in popularity as a means of supporting work groups and their departmental computing tasks. In fact, survey responses from MIS executives and departmental managers indicate that the mini may be fading as the key mid-range solution. *Page 29.*

COVER BY TIM LEWIS



Case studies

The confusion surrounding the definition of departmental computing may stem from the fact that companies have tailored the concept to their needs. Features Editor Michael Tucker talks to three organizations to find out what departmental computing means to each of them. Plus: A look at the aspirants to the departmental computing throne. Section begins on page 31.

From the Editor
Including your letters to us. *Page 5.*

Manager's Corner
Jim Young on the fine art of project validation. *Page 6.*

Q&A
IBM consultant puts IBM's Silverlake departmental offering in perspective. *Page 6.*

News & Analysis
Apple targets Fortune 500; Nixdorf revamps U.S. subsidiary; 9370 software remains a mystery; Prime, DEC go after mainframes; Unix standard pushed. *Page 13.*

Blue Beat
Brian Jeffery on IBM's slighted System/38. *Page 34.*

Products
Tech Talk on defining departmental computing; Prime superminis; Stratus fault-tolerant offering; Computone add-in board. *Page 34.*

Calendar
Industry events. *Page 38.*

The Insider
Michael Millikin on Macintoshes as OS/2 alternatives. *Page 40.*

Log Off
IBM's lead in installed departmental systems in info centers. *Page 40.*

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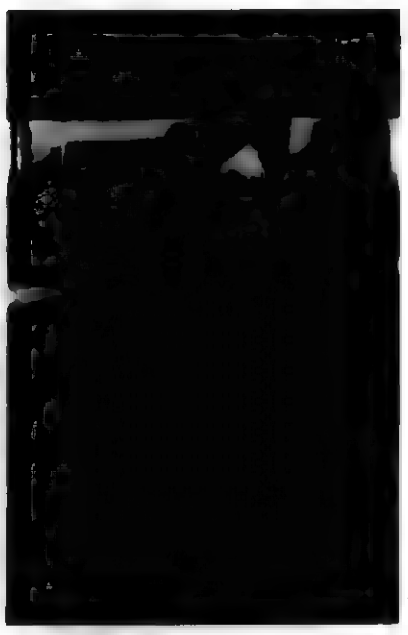

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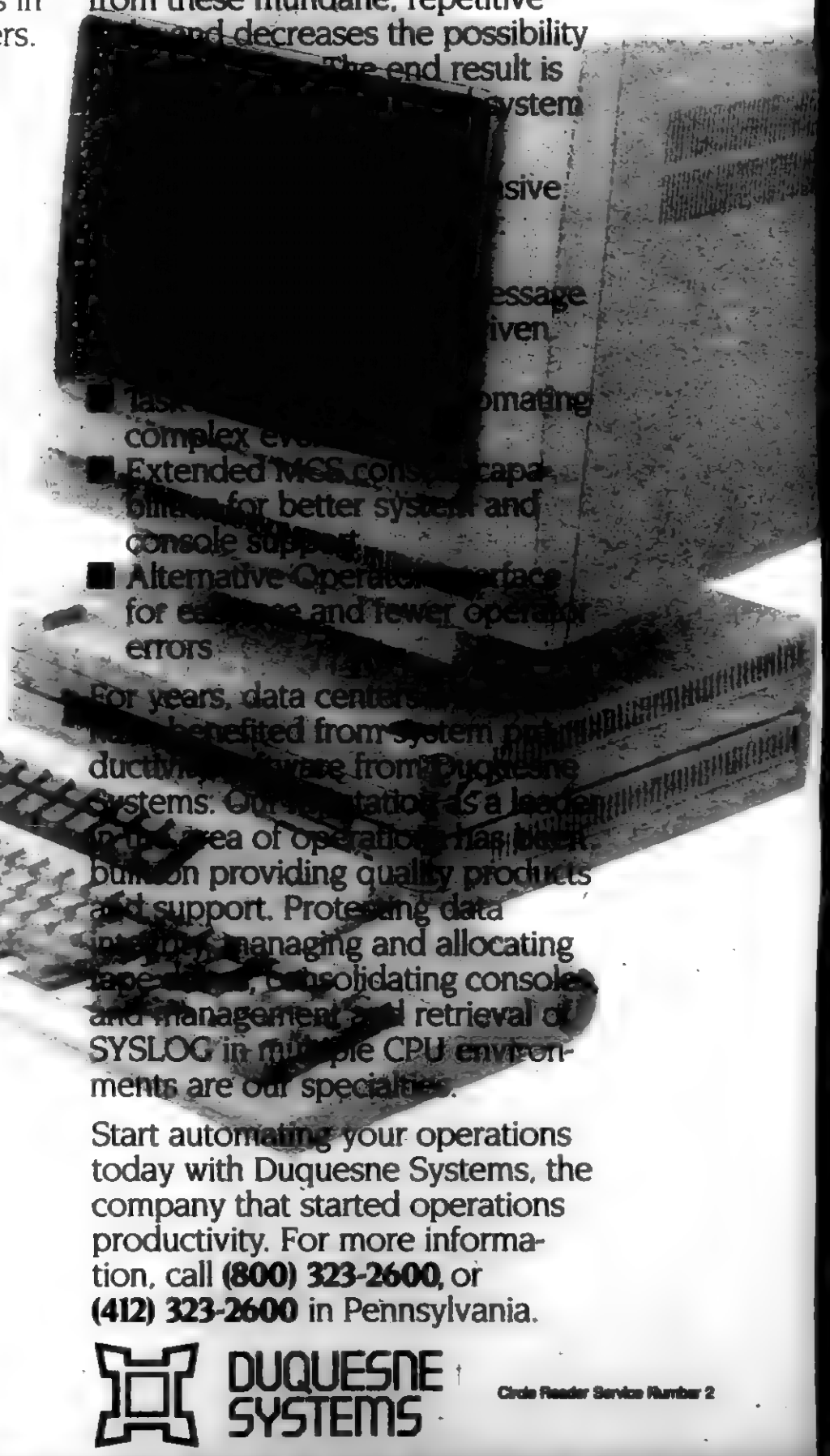

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FROM THE EDITOR

Emotional feedback

It's hard to believe that departmental systems can *still* raise passions — and rather intense ones at that. We went into this departmental computing issue of *Computerworld Focus* with the assumption that our topic's finer points had been argued out long ago. Surely, the theory and practice of middle-tier systems would have been perfected years ago, back in the days of the first office automation-oriented minicomputers.

We were wrong. One analyst we contacted was flatly insulted that we bothered him about departmental systems. To him, departmental systems were, effectively, just another way of saying OA. Yet, the very next day, one of our reporters attended a press conference cosponsored by Prime Computer and Cydrome, Inc. at which these companies, too, were using the term "departmental computer." But they were using it to describe their newly minted departmental supercomputer. The reporter interviewed an information systems officer at a large brokerage firm who was truly delighted with the product. "A Crayette," she said, "that I can put right in with the users."

The day after, I spoke to an MIS officer, who refused to let me quote or even cite him, who felt that departmental systems were a deadly threat to his profession. His argument was that, by making multiuser systems as accessible as personal computers, the departmental computer could put MIS out of work.

Rage, joy and fear. Curious passions for such systems to inspire. Part of the problem is that departmental computing is so ill-defined that it can mean many things to many people. But still, our writers were left wondering if, perhaps, there is more here than meets the eye. Doesn't this debate sound curiously familiar — like the arguments about PCs a few years ago? Could it be that departmental computers, like PCs, are only part of the larger trend that could either greatly enrich or greatly reduce MIS's power by bringing data processing closer and closer to the end user?

If this is the situation in departmental computing, then there are some concealed issues in this month's *Focus*. What seems to be a placid subject is actually filled with sharks and reefs and island paradises, too. It all depends on your perspective.

Michael Tucker

FEATURES EDITOR

Judgment day: Reader gives Greene a no-confidence vote

I would like to congratulate you for your editorial "Greene in judgment" in the Jan. 13 issue of *Computerworld Focus*. The idea of a jurist, however competent, trying to fully grasp, make sense of and channel the development of such a complex industry has been bothering me for some time. Your editorial points out beautifully how crazy such a proposition really is. That commentary should be sent to every member of Congress.

David E. Miller
Joiner Associates, Inc.
Madison, Wis.

Fourth-generation languages' success hinges on planning

The article entitled "The fate of 4GLs" in the Feb. 3 issue does not address one important point relevant to the success, or lack thereof, of fourth-generation languages — the management and/or mismanagement of 4GL-based projects.

Some of the negative comments 4GLs have had to endure are really the result of poorly developed applications, not necessarily anything inherent in the 4GL itself. In fact, the problem is that fourth-generation languages are quite tolerable and allow for a myriad of avenues one can follow to develop an application. The trick is to know the right avenue to take to get the most effective and efficient results. We have been very successful in making new believers out of 4GL users by dramatically increasing the throughput and functionality of an existing application by implementing proper techniques and using current facilities. Too often organizations have not upgraded their 4GLs to the current release level and have not re-educated their staffs in their proper use.

I agree that to continue to be successful 4GLs must become more powerful and have interfaces to relational data base systems. Part of this power will come from compiled code.

The use of a 4GL does not make or break an application. It is still the rolled-up-sleeves systems analysis, design and other preliminary work that contributes the most to the application's success. Why 4GL users lose sight of this preliminary work escapes me. By themselves, 4GLs won't weave any magic. The key is prior planning accompanied by effective use of the 4GL.

Loren D. Hurwitz, CDP
Relational Software Solutions, Inc.
Princeton, N.J.

Philosophy, not technology confines information's power

Your interview with Ronald G. Ross in the Feb. 3 issue brought back memories. In the mid-1970s at Summa Corp., our brilliant but not-well-understood director of research had a personal commitment to information as a powerful corporate asset. The greatest challenge we faced was philosophical, not technical. Very few top managers were able to step aside from day-to-day matters and even begin to grasp the revolution we were suggesting. We renamed our MIS function the Corporate Data Bank, but most still saw information only as a recording of history. I believe top management must make a philosophical conversion before it is convinced that knowledge (and the information it is built on) can be power.

Lynn Milton Anderson
Los Angeles

VIEWPOINT

MANAGER'S CORNER

The fine art of project validation

Jim Young

It is a little surprising, not to mention embarrassing, for MIS to be accused of hotdogging. No sooner does MIS begin practicing sophisticated, progressive techniques then it may tend to forget the fundamental tasks of its profession.

Top management is finally recognizing the benefits that MIS provides to an organization, measuring them in strategic and competitive terms. But it is because of these halcyon circumstances, perhaps, that MIS thinks it has graduated beyond having to validate the returns on a finished project.

The big picture is important. And focusing on the strategic scope of MIS's impact is an essential, executive-oriented process. Yet we must not forget that total organizationwide benefits are made up of a series of investments, each with its own returns. Someone must ensure that, long after the attention-getting turmoil of systems construction and well after the celebration of implementation has been forgotten, the expected returns are realized. This assurance is key for numerous reasons — not only to ensure that technology is being used effectively but also to build credibility in the composite paybacks by demonstrating the accuracy and validity of each element.

As important as this step is, or more precisely, because of it, suddenly running out with a financial yardstick is not sufficient. Evaluating implemented projects requires an approach that respects the contribution made by properly conducted postevaluations. The following rules may help make postevaluations meaningful and useful.

• **Make sure evaluation is part of your charter.** Checking up on the success of a project is not the kind of task that can be carried out without at least tacit approval of the organization. To avoid being seen as a pretentious usurper or an exacting dilettante, MIS should make sure that management sanctions such an effort and that users appreciate the intent. Some environments feel that MIS's reviewing of the results of its own handiwork is a conflict of interest. If so, another group should perform the analysis, internal audit, finance, quality assurance and so on. In cases in which MIS performs the analysis, it is wise to have different individuals, even another MIS-related function, do the work. Either way, the important thing is MIS's close involvement and support of such an effort.

• **Set up the rules before the game begins.** At the time of project approval, make sure that the users whose project it is understand that their results will be examined. The objectives of the project should be spelled out in a measurable way. Most projects' benefits can be quantified in dollars — reduced expenses, minimized use of assets, increased revenue and so forth; others require less direct arithmetic — reduced order fulfillment time and reduced error rate, among other things.

The occasional project whose goals are intangible or subjective should attempt to itemize a target, such as customer satisfaction measures, value of information and supported decisions. The measures should have a base of comparison. For example, nothing can be more frustrating when assessing staff growth then finding out that personnel growth is ostensibly tied to business growth. If a goal has been set based on a certain revenue, the postevaluation team can adjust accordingly.

Together with setting measurable goals, MIS should identify the person responsible for ensuring that benefits are achieved. An appropriate choice would be a user manager close enough to the system to appreciate what it offers and with enough power to authorize savings and improvements. This person should have some responsibility for the success of the new systems. MIS should also establish a time frame in which it can achieve benefits and at the end of which it could conduct a postevaluation.

• **Perform a business assessment, not a DP assessment.** Just as system goals will measure benefits to the company, so, too, will an overall assessment evaluate the system through the eyes of the business. It may be nice to identify project problems, conformance to specifications and so on, but these elements are not as important as determining how the system contributes to an organization's goals and objectives. It is this bottom-line view that will pave the way for other MIS investment decisions or, conversely, to adjust the MIS investment strategy to improve benefits.

• **Say it politely.** The postevaluation is not so much a report card on how the system was designed as it is an analysis of how the system is being used and whether or not it is an effective solution. Because the report is destined for top management, it is a small wonder that the process can be intimidating to users who might feel they are under the microscope. Therefore, in a report, it is essential to be constructive, to be positive where appropriate, to present a balanced picture and, above all, to adopt a tone of "us" rather than one of MIS vs. users. If the postevaluation is to serve as a vehicle to prompt improvement, the system's users must understand and accept the recommendations in a positive way.

• **Say it in executive terms.** It is not sufficient to point out how much users like the new system, how much they use it or even how much easier it has made the work process. The salient observations should revolve around cost-benefit analyses, measures of effectiveness and even strategic impact. Summary analysis of high-level issues for important projects should be prepared for top management. While measurement against initial goals is a prerequisite, a good assessment will go further and identify unexpected improvements and side benefits as well. Often, in areas such as office automation, these advantages can outweigh the planned benefits. Point out the implications of new work methods, both the problems and the opportunities. These observations may improve benefit projections for new projects.

• **Be proactive.** From an executive standpoint, an essential part of the review is the recommendations from the evaluation team. After going through a major project and a period of use, MIS should have gained knowledge about how it should conduct projects, how the new system could be modified, how other systems could be adjusted and so on.

The nature of the recommendations will largely be determined by the results of the project. If the results are disappointing, remedial action is warranted. If the system is a roaring success, suggestions for follow-up projects to exploit other opportunities are appropriate. Even unmitigated failures should

Continued on page 11

Young is managing director of MIS for the Wheeler Group, a division of Peavey Bowen, Inc. in Hartford, Conn.

Q AND A

David H. Andrews

On Silverlake: Analyst puts IBM's departmental offering in perspective

For 20 years, David H. Andrews has worked his way through the mainframe user's environment. But by his own admission, nothing excited him as much as IBM's System/38 introduction did; and Andrews, then an MIS manager, discovered a new calling. In 1984, he went into the consulting business, launching ADM, Inc. in Cheshire, Conn., with the purpose of helping MIS managers with IBM 370 technology discover the high-program productivity and cost-effectiveness of the System/38's architecture.

Today, ADM President Andrews has 12 consultants on staff monitoring IBM's latest activities. IBM is in the midst of its ambitious Silverlake project: to integrate the System/36 and 38 and to enhance the 38's relational data base capabilities with SQL. Andrews recently spoke with *Computerworld Focus* Senior Writer Helen Pike about Silverlake.

What is Silverlake?
Physically, it's going to be a family of compatible computers, maybe six models.

The range is going to extend from the middle of the current 36 line up to at least twice the power of the top end of the 38 line, ... somewhere between two and three times the power of the the System/38 Model 700.

We believe you're going to see an announcement during the second quarter of 1988 and delivery sometime during the third quarter. Speculation that the announcement is due any day now is incorrect. IBM will bring it to market as soon as it possibly can, but it won't rush it if it is not ready. There's still a lot of work to do; this is a complex project.

Why is it complex? What is there left to do?
Well, just the final stages of shaking down and debugging. The creation of all new microcode has been a sort of a gating item on putting it together.

The underlying architecture is going to be a superset of the System/38 from a computer architecture standpoint, and parts of the 38's CPF operating system will be reused. Below that level, all the microcode has to be rewritten. Each different model has its own microcode.

Do you think it will usher in a new generation of computing?
Senior management at IBM views this as sort of a revolutionary step forward, not just another niche product. The last time the company did anything this significant in terms of a turn in direction was introducing the IBM Personal Computer.

The 38 has been a niche product since its inception. The concept is to move it out of the niche status and give it a heavy push.

What is Silverlake's relationship to IBM's 9370?
They're both going to be made on the same production line, and, physically, they're going to have a great deal of resemblance. The racks are the same, the peripherals are the same, the I/O controllers are the same and the power supplies are the same.

However, don't confuse that to the point where you think its either a hybrid computer or that one computer runs both codes or anything else. The interface is going to make them completely different machines.

Was the 9370 intended as a bridge product to the Silverlake models?
Absolutely, [although] I wouldn't use the phrase "bridge product." I would say the 9370 was designed to serve a particular need. Folks with a heavy investment in 370 software needed small 370s on which to be able to distribute existing 370 applications, and IBM needed a small platform to run programs like Cadamore, [an IBM computer-aided design and manufacturing offering].

The 9370 was never intended to be IBM's only offering in the mid-range, and the firm never realistically believed this thing was going to be a VAX killer or take over the marketplace.

Is Silverlake the Digital Equipment Corp. VAX killer?
I don't use that phrase, and I know everyone is going to be asking, "Is it the VAX killer?" IBM is realistic enough to realize that DEC and VAX are firmly enough established that nothing is going to kill them right now. I would say it is IBM's hope that the Silverlake system will reverse the trend the VAX line has started to make into the commercial mid-range marketplace.

Up for grabs are office automation and communications, and IBM would like to regain some

Continued on page 11

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Q and A

Continued from page 6

market share there at DEC's expense.

Looking out two or three years — not all of this is going to happen in one day — I think the most common use for Silverlake systems will be to act as control points for clusters of intelligent workstations. The workstations will be physically attached to the Silverlake through some kind of local-area network.

Some people say, "Oh, you mean [Silverlake] is going to be a file server?" Well, that's correct, but the term "file server" sort of implies a lesser role. I prefer to refer to it as a control point for a network of intelligent workstations. I think that's the role IBM would like to see it in.

And what role will telecommunications have in the Silverlake models?

The decision was intentionally made to put a communications-oriented person in charge of the Silverlake project. It is going to have a very strong communications flavor.

It'll have a very strong connection with the intelligent workstations for which the blueprint has just been published as part of the IBM Systems Application Architecture [SAA] specifications.

The SAA specifications describe how intelligent workstations are going to work with host systems. That interface will be implemented on the Silverlake series.

In terms of networking, Silverlake will have all of IBM's Systems Network Architecture capabilities the current System/36s and System/38s have. In addition, but not likely in Release 1, the networking model will be the Advanced Peer-to-Peer Networking capability that was announced for the 36s a year and a half ago.

I also believe the technology in IBM's 3720 and 3745 will be incorporated into a mid-range rack-mounted version and will become the communications controller for Silverlake over time.

What will this mean to IBM's mid-range competitors?

The greatest strength Silverlake is going to have in the marketplace is the fact that the machine itself was designed around an integrated relational data base capability.

The mid-range marketplace in a few years could have a lot of Silverlakes and a lot of VAXs. The strategy of many of the remaining vendors could be to consolidate around Unix.

What does all of this mean to the MIS manager?

If you're coming from the 370 environment, this [new] environment is a lot easier to deal with.

There was a rapidly growing trend even before Silverlake for large 370 organizations to switch to 38s. Even firms with IBM 3080s and 3090s are moving towards doing a much higher percentage of their work on 38 technology.

We strongly believe Silverlake is going to accentuate that trend. People aren't going to throw out all their 3080s and 3090s; instead, what you're going to see is a different mix.

The typical mid-range 370 user is using the IBM DOS/VSE operating system and is facing a conversion to both IBM's MVS and DB2.

During the next five years, half or more of the current DOS/VSE users are going to choose the Silverlake path rather than the MVS/DB2 path. That direction is going to be a lot less costly and take a lot less time and effort.

What will be the next step after Silverlake?

Sometime in 1989, or certainly by '90, we're going to see the Summit series of mainframes. Those are the machines beyond the 3090.

The Summit series will be a step toward bringing the 370 and the Silverlake architectures together. The Summit is likely to have one of the important characteristics of the 38 or Silverlake — it's likely to be a single-level storage machine. The next generation after Summit, we think you're going to see another generation of mainframes that will, in effect, merge the two technologies.

Manager's Corner

Continued from page 6

not be allowed to slink off into obscurity unexamined. Honest confrontation of such an unpleasant experience can prevent it from recurring, especially if MIS makes recommendations based on lessons learned.

The proactive nature of the evaluation document should be a natural extension of the initiative necessary to implement a postevaluation process. Ensuring that an organization is enjoying the full advantages of its investments in automation is a responsibility that calls upon MIS to demonstrate leadership and business values.

Hopefully, part of the reason for rising to this challenge is to show top management that MIS is a responsible steward of organizational resources. Who knows? Perhaps with top management's confidence, the basis for a new system's reputation might revert to the intuition and fundamental trust generally granted to MIS in the old days. Then we can spend more energy delivering benefits to our organizations and less energy proving their worth.

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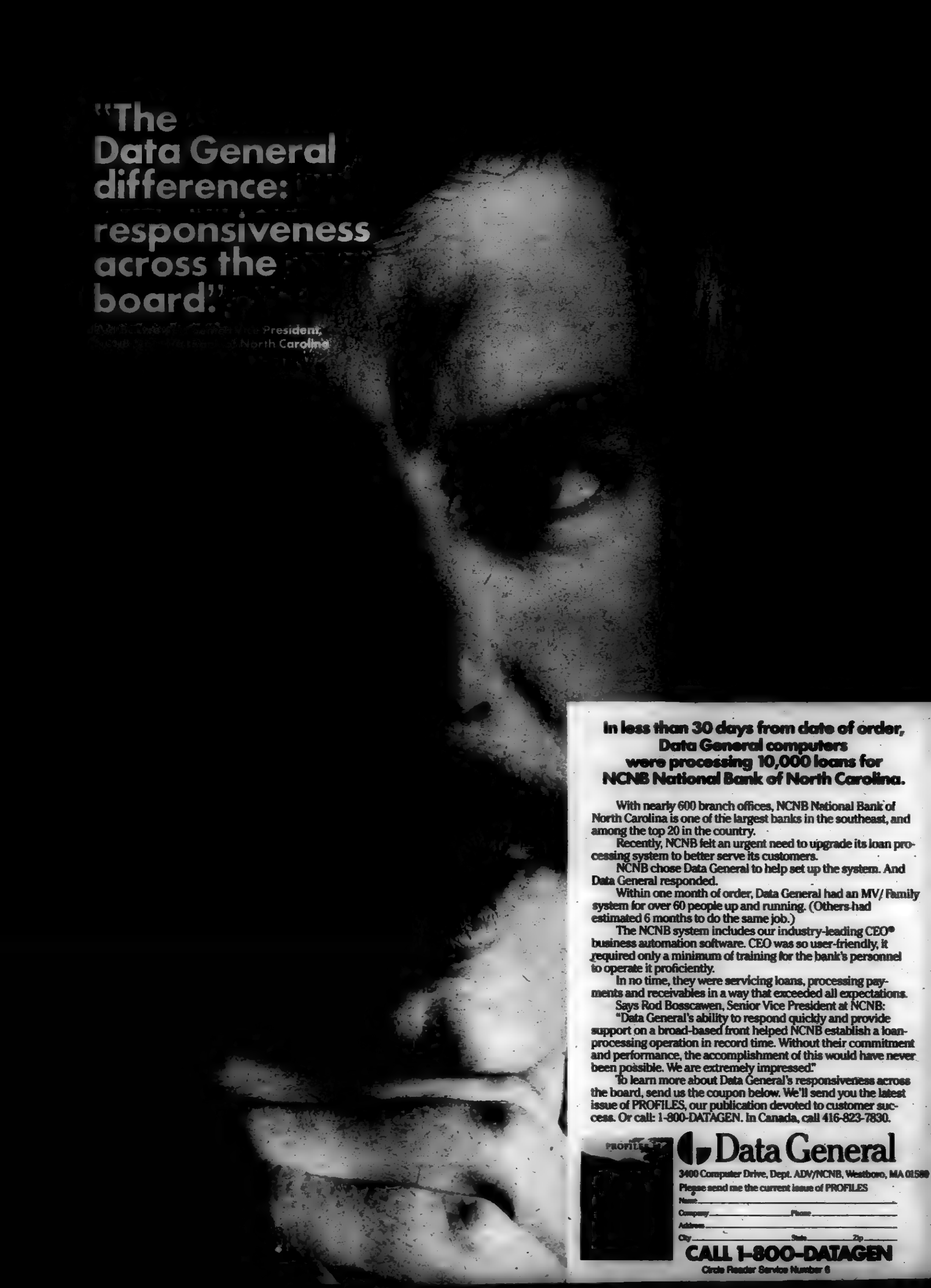

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news & analysis

UPDATE

Apple, DG publishing tools

If desktop publishing is destined to fade, it won't be soon. The market is still cooking, made hotter by some recent product introductions, most notably from Apple Computer, Inc. and Data General Corp.

Apple upgraded its printer technology with three laser printers aimed at the desktop market, and DG inked a three-year OEM contract enabling DG to incorporate Xerox Corp.'s Ventura Publisher software into DG's CEO Desktop Composer package.

The Apple announcement is significant because it continues the company's full backing of a business that some analysts have been contending could peak any time. The three Apple laser printers use Canon U.S., Inc.'s LBP-SX engine and offer 300 dot/in. resolution, and Apple claims that the printers offer up to four times the speed of existing Apple Laserwriter printers.

As for Data General, the company says it will configure CEO Desktop Composer with its Dasher/286 PC and word processing and communications software to create what it terms "turnkey publishing systems."

The DG announcement is important because it attempts to merge desktop publishing directly into a large, integrated departmental processing system, such as DG's Comprehensive Electronic Office, thereby centralizing something that, to date, has been the epitome of decentralized, personal computer-based computing. Could be a sign of things to come.

9370 sales cannibalizing System/36, 38 market share

IBM's appearing a little sheepish lately after admitting that the sales of its 9370 line of departmental computers have lagged behind its optimistic projections. The machines have yet to take the edge off the expanding sales of Digital Equipment Corp. VAXs into U.S. corporate departments, a casus belli for IBM and the reason for the appearance of the 9370s.

To make matters worse, the 9370 could be less of a "VAX killer" and more of an IBM "System/38 killer," according to Scott Brown, marketing manager at Focus Research Systems, a West Hartford, Conn., research firm.

"We've found that almost all of the 9370's relative market share in this study is cannibalized from System/36 and System/38 machines, and the hardest hit is the System/38," Brown says.

Brown adds that the big winner in all of this could be DEC. He argues that DEC's departmental market share relative to IBM's is virtually unchanged but that the overall departmental computing market has grown by 50%.

"In other words," Brown says, "DEC is enjoying the same percentage of a larger pie."

Oracle, Lotus join crowded micro-level SQL arena

The IBM SQL market continues to get more confusing at the microcomputer level. Oracle Corp. recently introduced Oracle for 1-2-3, a software package that enables users to type SQL commands or choose menu options from within Lotus Development Corp.'s 1-2-3 spreadsheet. Users can then retrieve data from Oracle data bases residing in IBM Personal Computers or from other host computers.

The product competes directly with an upcoming Lotus SQL-based local-area network data base management system that reportedly will be equipped with a 1-2-3 interface. Ironically, though Oracle's SQL product will compete directly with Lotus's scheduled SQL product, it was developed by Oracle using Lotus's own Developers Toolkit.

The SQL market got really crowded, however, at the recent revelation that Microsoft Corp., Ashton-Tate Corp. and relational data base developer Sybase, Inc. are working together to develop an SQL data base engine for network servers. (See story page 15.)

IBM reorganization affects departmental strategy

The background to IBM's departmental computing has suddenly changed. IBM recently

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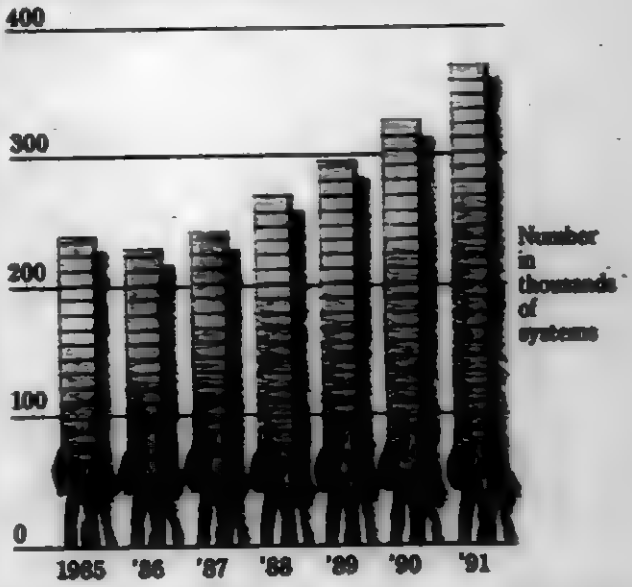
Multiuser mania

U.S. shipments of multiuser systems



INFORMATION PROVIDED BY AN INTERNATIONAL DATA CORP. REPORT BASED ON 125 U.S. MULTIUSER SYSTEM VENDORS.

GRAPHIC BY BRUCE SANDERS

Apple renews MIS effort

Gets blessing from DEC, woos IBM users

Apple Computer, Inc. in Cupertino, Calif., has received a much-needed blessing in its bid to woo Fortune 500 MIS managers thanks to Maynard, Mass.-based Digital Equipment Corp.

The two firms went public in January with a joint development announcement that formalized connectivity efforts under way since late 1986 to integrate Apple Macintoshes and Appletalk 2.0 into DEC's VAX/VMS 2.0 architecture and Decnet/OSI network, respectively.

"You could say this is the Good Housekeeping seal of approval," comments Chuck Boesenberg, Apple's senior vice-president and group executive for U.S. sales and marketing. "We are definitely serious about selling into the Fortune 500 marketplace."

From DEC's perspective, the integration of Apple at the low-end reverses "the utter failure" Digital experienced in trying to sell expensive and sophisticated personal computers to a market that wanted cheap machines, explains DEC President Ken Olsen.

"Personal computers did great for work alone," Olsen observes. "But in organizations, you need to work together. . . . Apple has a great network [easily plugged in], but they have to have a plug into an international network."

The Apple connection adds yet another low-end capability to Digital's Network Applications Support (NAS), a strategy that emphasizes networking over systems configurations. Digital executives also indicate the company is planning to extend NAS to include machines from clone makers Compaq Computer Corp., Olivetti Corp. and Zenith Data Systems Corp.

Nixdorf seeks higher profile for its U.S. subsidiary. See story page 14.

A developers' conference for Macintosh independent software vendors is scheduled for August to introduce them to NAS's capabilities.

Says William Strecker, DEC's product strategy and architecture vice-president, "It's too bad it's a cliche, but we really were responding to customer demands to integrate the two."

Wooing IBM's MIS users

The dust had barely settled on the DEC-Apple alliance when

Continued on page 17

NEWS & ANALYSIS

Revamped Nixdorf unit to blitz U.S. market

The company has been here for several years, keeping the lowest of profiles, quietly gaining market share in U.S. businesses like retailing and banking. It has been the quietest of residents; industrious but low key.

It is curious, considering this vendor's parent organization is big time in Europe, thought to be one of the most dynamic and diversified computer companies on that continent. Now the company figures it is high time to make some noise in the U.S.

The U.S. company in question is Nixdorf Computer Corp., the North Reading, Mass.-based subsidiary of Nixdorf Computer AG of Paderborn, West Germany. For the past two years, the parent corporation has undertaken a major push to beef up its U.S. subsidiary into a formidable systems marketing force in departmental computing.

For Nixdorf AG, that plan will not happen soon enough. According to one source, Nixdorf's U.S. subsidiary lost about $100 million in 1985 and a further $50 million in 1986. That's a lot of financial hemorrhaging. To turn those figures around, Nixdorf says it is planning a three-stage strategic revamping of its U.S. subsidiary, which could have consequences for the hotly contested U.S. departmental computing market in the 1990s. Nixdorf is also hoping it will change its subsidiary's status from poor cousin to star performer.

According to Charles P. White, program director of industry service at the Gartner Group, Inc., a Stamford, Conn.-based research firm, Nixdorf's first move is a necessary shift from a dying data entry business to what the firm sees as some of the hot markets of the next decade: vertical, high-transaction-volume industries, such as banking, insurance and retailing, and more general, departmental computing applications.

"To help with that," White explains, "Nixdorf's U.S. sales and service organizations have been expanded considerably in the past two years. Just as importantly, the various U.S. Nixdorf branches have been given much more operating autonomy and have separate reporting lines from Nixdorf AG's development organization." Such an arrangement, White explains, places the U.S. company in a unique and privileged position among Nixdorf AG's various international subsidiaries. The extra autonomy, the parent firm explains, could provide the U.S. operating units with the capability to act more quickly on business opportunities.

At the same time, Nixdorf took a long look at its tried-and-true 8870 departmental systems platforms and decided a change was needed. The 8870 family is based on 16-bit processor technology, which, in the past few years, has quickly been overturned and replaced by faster 32-bit machines introduced by Digital Equipment Corp., IBM and others. The 32-bit machines are increasingly in demand from large corporate customers.

To plug the gap, Nixdorf recently unveiled its Targon line of 32-bit machines based on the Motorola, Inc. 68020 processor.

Along with the upgrade to the 32-bit machines, Nixdorf also decided it needed a new operating system for the 32-bit architecture and chose Unix.

Departure from the norm

Opting for a standardized operating system like Unix is quite a departure for Nixdorf, which, like DEC and, until recently, IBM, built its reputation on providing turnkey systems using proprietary systems architecture. In Europe, Nixdorf has been known for its turnkey proprietary systems solutions, and it tried to carry such strengths over to the U.S. market. However, except for a few showcase accounts, sales have been flat.

Microsoft Corp. was one of these accounts and is, in fact, a good illustration of a classic Nixdorf sell. Three years ago, the Redmond, Wash., software developer chose a Nixdorf turnkey system to handle manufacturing resource planning activities at its U.S. and European subsidiaries. The system chosen was a popular one for Nixdorf customers: Nixdorf 8870-based minis and terminals running its Comet vertical systems software.

"What we were looking for was an international vendor with good systems, good international applications and a system that could deal with local currencies and customize for each country," says Neil Evans, MIS director at Microsoft. "Nixdorf was solid in all those areas."

Gerry Ordelheide, vice-president of sales and marketing at Nixdorf's U.S. subsidiary, says that he looked at the U.S. departmental market and saw vendors such as DEC and IBM fighting it out with proprietary systems.

Ordelheide

"We saw that these vendors didn't have enough applications for users, because they never emphasized software development like Nixdorf did," Ordelheide claims. "We had more than 4,000 applications that we had developed over the years. We knew nonproprietary systems and software would be the way to go in this market."

Even so, Ordelheide acknowledges that he and colleagues at Nixdorf will have a big selling job convincing corporate America of the commercial viability of Unix, an operating system that is much more synonymous with European commercial computing.

"I believe MIS in the U.S. is still technology driven and looking for anything that will put them ahead, including Unix," Ordelheide says. "There are more than 100 Unix software houses in the U.S. You can build turnkey systems with Unix, but it does not lock customers in. If they wish to go to another [Unix] vendor, they can. Nixdorf wants to become the main driver for Unix in this country."

To that end, Ordelheide points to the nationwide service and software network the vendor has put in place during the past few years to back its U.S. marketing push. "Service and software will be big factors in the 1990s in computing," he says.

It might be bumpy along the way, however. Despite Nixdorf's progress, for example, White of the Gartner Group gives the vendor a mixed scorecard for the near future.

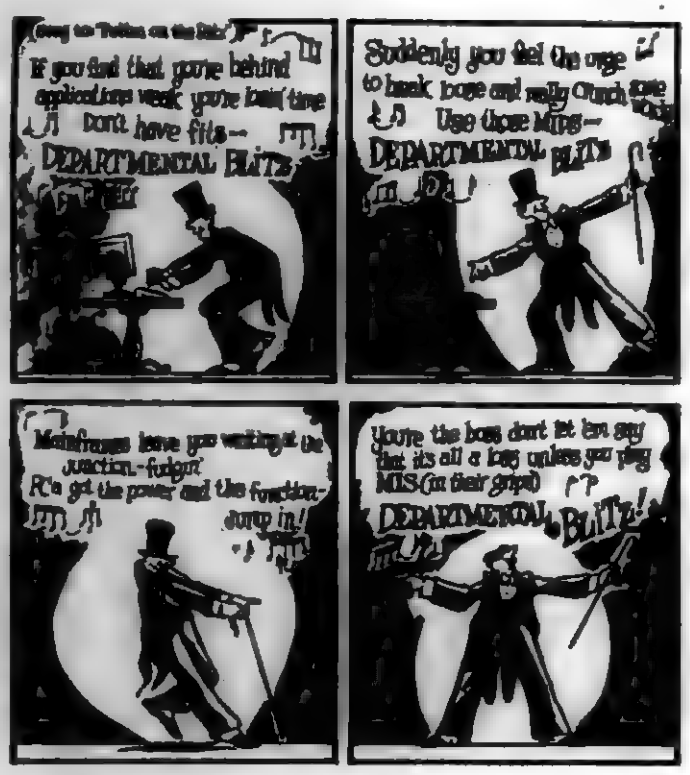
"There's a German term, "jein," that is used to describe something that has both good and bad points," White explains. "Nixdorf's shift to Unix will be a mixed blessing."

Microsoft's Evans has his own recommendation for Nixdorf. "I think Nixdorf still has something to learn about the independence and savviness of U.S. customers," he says. "U.S. customers like to get into the hardware and software and take a look. Being a turnkey systems vendor, the Nixdorf people have been uncomfortable with that.

"However, I think they're a little less stodgy and formal than they were," Evans adds. — SK

dB

By Rich Tennant



Update

Continued from page 13

reorganized into five business units grouped along key product lines, including 370 architecture systems, which include the 9370 line, and System/36 and 38 computers.

The decentralization move was explained as a necessary one by IBM Chairman John Akers to make IBM more flexible and responsive to market trends. By making the System/36 and 38 a separate business unit, the company underscored its commitment to continue to market these machines, along with Silverlake, IBM's rumored System/36 and 38 follow-on, as key parts of its departmental strategy.

Novell unveils OS/2 network plan to get market jump on IBM

The IBM OS/2 local-area network race is getting a boost at the network level from Novell, Inc.

The fast-charging Provo, Utah-based LAN vendor has announced it will support IBM's OS/2 Standard Edition through its Network Requestor, a software package enabling an OS/2 workstation to talk to a Novell Netware server.

Novell also announced its Netware Application Processor, which won't be released, however, until IBM starts shipping its own networked OS/2 Extended Edition later this year. The processor is aimed at providing support for OS/2 server-based applications.

Arch Novell competitor 3Com Corp. had, a short time before, unveiled its 3+Open OS/2 LAN strategy. By basing its OS/2 networking plans on the already-available OS/2 Standard Edition, both Novell and 3Com are hoping to get a market jump on IBM, whose own OS/2 network strategy is squarely centered on the Extended Edition, an offering that is scheduled for release in the latter part of 1988.

Visicalc guru ships enhanced Demo program prototype software

From the almost-fell-through-the-cracks column: Dan Bricklin, of distant Visicalc fame, is now shipping Demo II, the enhanced version of his firm's product, Demo, which enables both experienced and novice programmers to create program prototypes.

Bricklin, president of Software Garden, Inc., a two-person operation based in Newton, Mass., says that the company has sold up to 20,000 copies of the original Demo directly from his home and that some heavy hitters, such as Microsoft Corp., have used Demo to create their own software products.

Maybe good things *can* come in small packages. — SK

NEWS & ANALYSIS

Whereabouts of 9370 software still a mystery

More than a year after its introduction, the IBM 9370 remains something of a mystery. Initially viewed as a departmental system, the smallest member of the 370 clan so far has not fully taken on that role. As of yet, there is little prepackaged applications software for the machine.

So far, the 9370 has been sold in the same manner as its larger siblings, with the majority of its sales to MIS departments in large corporations. Whatever software that exists usually has been written in-house by these MIS departments.

"Partly, it's a matter of installed base," notes one software vendor, who asked not to be named. "At the moment, there aren't that many 9370s out there, and those that are are at the sort of Fortune 1,000-type firms where most of the software development is going to be internal anyway. That's just not going be a market for us. At least, not yet."

The vendor did note, however, that the situation could change as more of the machines enter the business world.

Those that write

Meanwhile, the software vendors that are writing for the machines are mostly producing system-level software or application development tools. Also, some developers say they are looking to apply the 9370 to vertical market applications. This tactic, however, has raised its own set of problems, because IBM does not have a good track record at the care and feeding of vertical marketers. IBM's inability to deal effectively with smaller companies going after small markets may be one of the leading causes for the 9370's relative unpopularity to date.

Another reason that the 9370 may not be attracting a lot of software developers is the impending debut of IBM's much-rumored Silverlake machine, the successor to IBM's System/36 and 38 lines. One of numerous unconfirmed stories about Silverlake is that it is easy to use. If that is the case, then Silverlake — not the 9370 — could be IBM's real departmental offering. By basic definition, a departmental machine is one that may be set in a corner and run either unattended or attended by computer novices with minimal assistance from MIS.

It may be that developers of departmental software see Silverlake as their real market and are waiting accordingly. In any case, some observers suggest that the 9370 is not a departmental system at all but, rather, a kind of downsized mainframe meant for the aid and comfort of MIS shops.

One way or the other, the mystery could be solved as early as this winter. By the fourth quarter, Silverlake probably will be available for public inspection. Moreover, by that time, the population of 9370s will have significantly increased. Software developers will then have a clear choice of which, or neither, of the machines is their best bet. — MT

Sybase SQL Server gets nod from Ashton-Tate, Microsoft

Sybase, Inc. thinks it may have the silver lining for MIS directors in the cloudy issue over who has control of the corporate data base. Sybase, along with Ashton-Tate Corp. and Microsoft Corp., announced in January a local-area network server for IBM's OS/2 environment.

Sybase, the Berkeley, Calif., developer of the first SQL-based relational data base, is licensing its technology to Microsoft in Redmond, Wash. In turn, Microsoft and Torrance, Calif.-based Ashton-Tate, under a separate license from Microsoft, will ship enhanced versions of the product, SQL Server, in the second half of this year. Microsoft will add the MS OS/2 LAN Manager interface, while Ashton-Tate is embedding the SQL sublanguage in Ashton-Tate's Dbase IV, which came out last month. Although prices have not been fixed, they are expected to be between $1,500 and $3,000.

"Now is the time to deal with connectivity to corporate mainframe computing," comments Ashton-Tate Chairman Edward Esber about his goal to establish work group data base technology as "a responsible member of corporate computing." He adds that "servers are the solution to MIS managers' problems."

Microsoft Chairman Bill Gates agrees. "Data base servers will bring work group computing to life," he says. "They hold the key to true multiuser connectivity. Individual productivity tools have run out of gas, so work group productivity is the next step.

"The client-server architecture will be the cornerstone of new computing," claims Gates, who emphasizes OS/2 as playing a critical role on the network.

OS/2 meetings

Late this month in San Francisco and again in April in New York, Microsoft will hold developers' conferences on OS/2 as a network operating system. The conferences will focus on Microsoft's work group technology, the SQL Server and Microsoft's MS OS/2 LAN Manager.

As of January's announcement, the SQL Server had attracted the attention of Information Builders, Inc., Symantec, Blyth Software, Inc. and Borland International, Inc., which reportedly will write programs for the server.

For its part, Sybase claims it will port

Continued on page 16

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NEWS & ANALYSIS

AT&T, Sun ink Unix deal

Amdahl joins in to push Unix as a standard platform

AT&T's MIS effort has been a pale one at best. But after the December holidays, company officials came back East tanned from a financial arrangement with Mountain View, Calif.-based Sun Microsystems, Inc. that is intended to ensure the development and promotion of Unix as a standard platform for the full range of heterogeneous computing.

Based in Morristown, N.J., AT&T's Data Systems Group (DSG) inked a deal that calls for up to a 20% investment by AT&T in 5-year-old upstart Sun — a stock investment that could total more than $300 million over three years.

The deal is all part of a plan aimed at making the MIS director's job easier, both companies maintain.

According to Bill Stockman, DSG's software product manager, the arrangement "gives the MIS director the option to choose, in the competitive marketplace, any hardware he wants and to preserve his application base."

"The customers understand that [Unix] gives them the freedom of choice," adds Bill Woo, Sun's senior product manager for Unix/ADI, an application binary interface that interchangeably runs Unix software.

AT&T and Sun's Unix push was further strengthened at Uniforum in February when Amdahl Corp. announced it will base its next UTS mainframe release on the companies' new Unix iteration. As an interim step, Amdahl has come out with a 4635 communications interface unit that will link AT&T's virtual circuit switch to UTS.

The Unix campaign, however, was not without a backlash from competitors. Companies led by Hewlett-Packard Co. and Digital Equipment Corp. publicly voiced fears that a vendor-led effort to standardize Unix might force the operating environment into a proprietary status.

AT&T and Sun's competitors demanded, and got, an audience with DSG's president, Vittorio Cassoni, on Jan. 28. According to an AT&T spokeswoman, Cassoni maintained AT&T will keep Unix as an open system and that the company will improve its performance.

Specifics of the deal

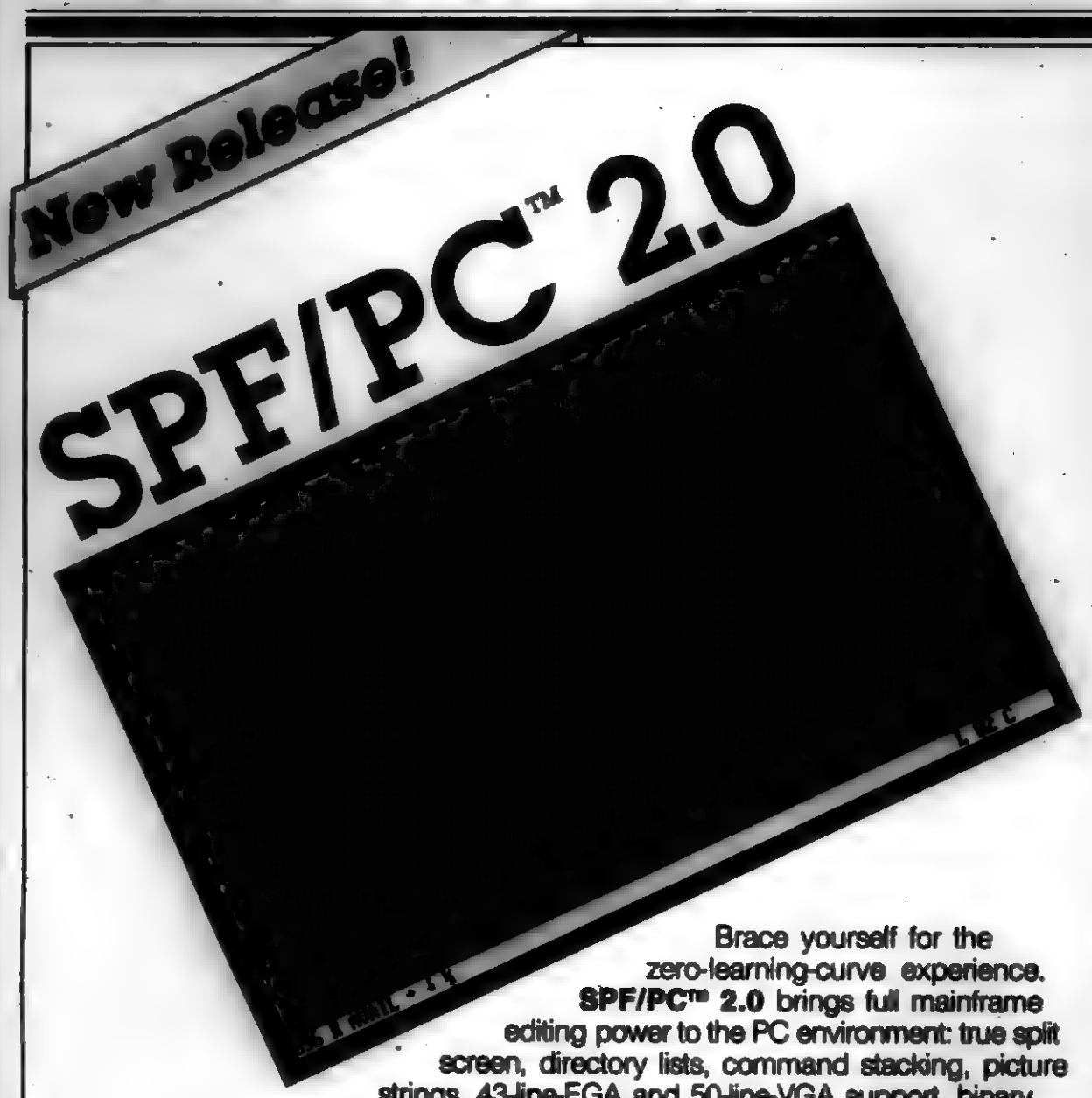
The Sun and AT&T collaboration calls for merging elements of AT&T's Unix System V with those parts of the University of California at Berkeley Unix 4.2 favored by the scientific and engineering community. It also will meld networking and graphics features of Version 4.2 already used by Sun in its Unix derivative, SunOS. The latter two features chiefly refer to Sun's Network File System and its X.11/Network Extensible Window System, a graphic user interface.

The arrangement enlarges a prior deal set last fall in which Sun agreed to help AT&T develop a mid-range family based on Sun's revolutionary Sparc, or scalable processor architecture chip, which uses reduced instruction set computing technology.

AT&T's Unix bid is further strengthened by a pact signed earlier in 1987 with Redmond, Wash.-based Microsoft Corp. to incorporate the features of Xenix, Microsoft's Unix version that runs on Intel Corp.'s 80386 microprocessor, into System V.

By mid-1988, Sun is expected to have a version of SunOS available that will conform to AT&T's System V interface definition. In 1989, AT&T hopes to offer Unix System V with key Unix 4.2 and SunOS features.

All of which is observed by John McCarthy, an analyst with Forrester Research, Inc. in Cambridge, Mass., who claims that "Unix is at a disadvantage right now. But it lies there. Unix, instead of a time-sharing pig, will be the client-server computer architecture of choice. For now, MIS managers should sit back and wait. How well Sun makes its run at departmental computing remains to be seen." — HP



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Sybase server

Continued from page 15

its Data Toolset to OS/2 in time for the mid-year shipments of its relational data base server from Microsoft and Ashton-Tate.

But in the second quarter of this year, Sybase says it expects to have available a systems developers kit for its data base library code and documentation.

According to Robert S. Epstein, co-founder and executive vice-president of Sybase, by giving the company's relational data base an OS/2 LAN connection, MIS managers will regain some of the control they lost to the personal computer-oriented trend in distributed computing.

"All the power will be in the mainframe without damaging the data base," Epstein reports. "I think this will eliminate the struggle between PC users and MIS departments." — HP

NEWS & ANALYSIS

Prime, DEC ready mid-range wares to rival mainframes

While departmental computing remains a hot topic in the industry, departmental computer vendors seem to be trying to turn attention elsewhere. Leading departmental and minicomputer vendors Digital Equipment Corp. and Prime Computer, Inc. have introduced versions of their products that act like mainframe systems.

This trend reflects advances in technology that make smaller multiuser systems worthy rivals for even very large systems. However, the movement is also

North American Mortgage's *Trice, left, and Robert Withoff, data center operations manager.*

a product of revamped marketing strategies on the part of mini vendors.

Natick, Mass.-based Prime's mainframe-like departmental offering is the 6550 system, a dual-processor computer first shipped in January. The first 6550 customer was North American Mortgage Co. in Houston.

At North American Mortgage, the 6550 will fit into a nationwide network of Prime and non-Prime systems. "It's going to handle our entire corporate data base and some of our telemarketing," explains Susan E. Trice, the company's first vice-president of information services. "It will deal with general ledger, our mortgage service operation, a new on-line marketing service. . . . Basically, we haven't found anything we couldn't do with it."

Trice claims the firm has no interest in going with a similar IBM system.

Meanwhile, Maynard, Mass.-based DEC had been looking at the mainframe market for some time. It initially promoted clusters of its VAX minis to do mainframe-like operations. More recently, however, the company was widely reported to be working on a four-processor version of the VAX that is clearly targeted at the mid-range of IBM's mainframe line.

DEC is also believed to be working on a version of its VMS operating system that would better support large on-line transaction processing applications.

'Eaten alive'

Technologically, analysts suggest the mainframe trend is fairly easy to implement. William Zachmann, vice-president of corporate research at International Data Corp., a research firm in Framingham, Mass., recently distributed a white paper titled "The Mainframe Meets the Micro — And Gets Eaten Alive." In the paper, Zachmann argues that systems based on multiple, inexpensive microprocessors are now so powerful that they can easily overwhelm mainframe processing power.

However, industry observers are less certain about the wisdom of microcomputer- and mini-based vendors going head-to-head with IBM. Market analyst Shaku Atre, president of Atre International Consultants, Inc. in Rye, N.Y., points out that one departmental system vendor — Lowell, Mass.-based Wang Laboratories, Inc. — already attempted to get into mainframes and was badly mauled for its efforts.

"People shouldn't be trying to get into the mainframe market right now," Atre claims. "What DEC should be doing is looking to its micros. So far, there hasn't been anything, if you will, over the Rainbow." — MT

Apple renews

Continued from page 13

the California firm turned around and announced a series of offerings for IBM mainframe users and keepers at the Infonetics Desktop Communications Conference held in Anaheim, Calif., at the end of January.

The first of these offerings was MacAPPC, a software implementation of IBM's LU6.2 and PU 2.1 protocols. MacAPPC paves the way for developing Mac applications on IBM's Systems Network Architecture.

Included in MacAPPC is Apple's Hypercard, a stack development tool that lets programmers create applications that can include graphics and sound.

A site license for the product is priced at $2,500.

Then there was the announcement of the Macworkstation, a software tool kit that lets developers, resellers, systems integrators and MIS departments create a Macintosh interface for programs operating on a host.

An internal license for the Macworkstation costs $2,500; a commercial license costs $5,000.

Lastly, Apple announced a Macintosh coprocessor platform for IBM Nubus coprocessor add-in cards for the Apple Macintosh II.

The platform includes a Motorola, Inc. 68000 processor operating at 10 MHz with 512K bytes of random-access memory and a bus master interface to the Nubus.

In addition, the product incorporates a real-time, multitasking operating system, which supports a set of services for software executing on a card, and a defined interface to the Mac II. — HP

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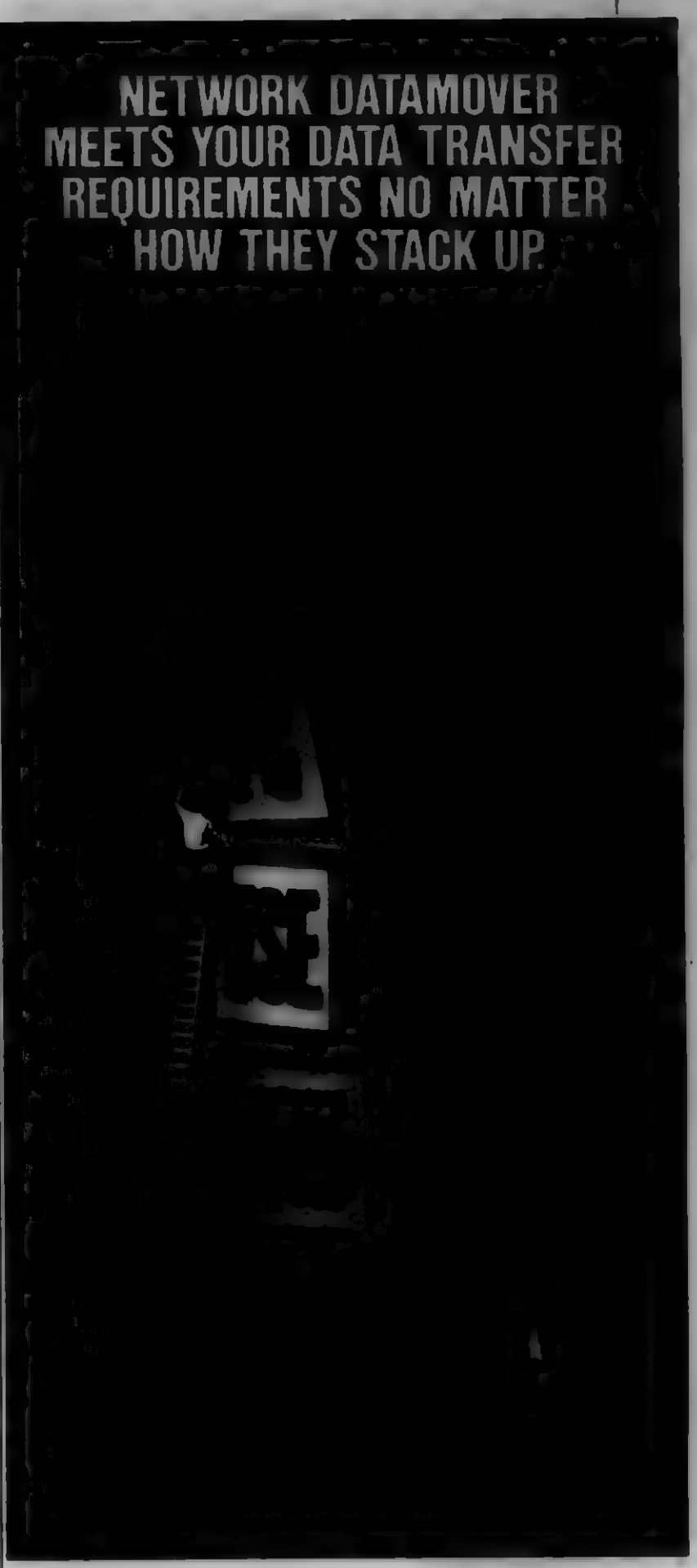

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Time for a change

MIS expands its business role

BY HALSEY FROST

The new face of departmental computing has prompted changes in the attitudes, roles and responsibilities of information systems professionals. Through its involvement at the department level, highly disciplined and structured MIS has begun to promote a work environment that thrives on being flexible.

And top management has begun to notice the changes. Many MIS managers are shaping isolated technology goals into corporate ones, taking advantage of leadership opportunities that exploit not only their high-tech knowledge but also their management skills. As they come to terms with the shifting climate of the mid-range, MIS professionals continue to boost their business acumen.

Even though departmental computing is evolving and its place in organizations is emerging more clearly, its definition remains fuzzy, probably because many can exploit this imprecision. Vendors, for example, have seized upon the term to promote sales and profits, identifying it by class of hardware: primarily minicomputers, supermicrocomputers and microcomputers connected via local-area networks.

Corporate personnel, on the other hand, have exploited the term by using it to bypass the bureaucracy — real or perceived — in MIS. Corporate staff seems to justify this bypass by normally associating the term with end-user or client computing.

Another reason for the term's vagueness may be that it reflects the confusion among MIS as well as among other managers in an enterprise about departmental computing's place in the overall organization.

Since departmental computing's inception, its meaning has changed, and it may continue to evolve. Two years ago at the National Office Automation Conference in Washington, D.C., I defined departmental computing as "departments having their own computer larger than a personal computer processing multiple applications to satisfy staff and mission requirements." Today, however, to clarify the term and make it reflect what is being implemented, we should think of it as work group, rather than departmental, computing to discard the connotation of a definite organizational structure.

Departmental computing, as it is being implemented in most organizations, does not necessarily respect department boundaries or include all functions of a department. However, it usually does include processing the functions of a work group, regardless of its size, location or formal status in an organization. Thinking in terms of work group computing removes the need to revise major departmental systems with every reorganization, acquisition or divestiture. Often, whole departments may be eliminated or reduced, but the functions they perform do not necessarily go away.

The very imprecisiveness of the departmental computing notion may be appropriate, because it reflects what is happening in the information systems industry today. As end users or clients assume greater responsibility for information systems, computers are being used in an increasingly unstructured manner (spreadsheets and office automation applications, for example). This makes computer processing easier for most businesspeople to understand, because many of them function and operate in an unstructured manner in a flexible business environment.

This versatile structure, however, may be threatening to some MIS managers. For one thing, it may cause some confusion. Historically, the MIS function has been highly structured, following well-defined

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Frost is a senior associate at New York-based management consulting firm John Diebold & Associates, a division of The Diebold Group, Inc.

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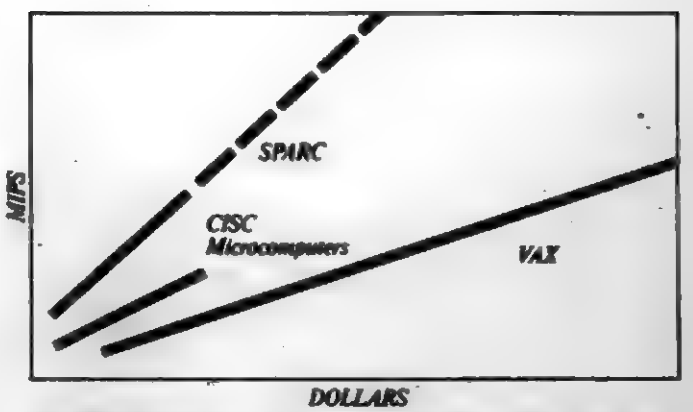

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procedures to respond to clearly defined users' needs. Now, however, users seem to understand — and like — departmental computing's ability to allow them to develop timely responses to changing situations without needing to meet many of MIS's highly structured requirements.

This apparent dichotomy in providing information support may also help explain senior management's lack of understanding and acceptance of MIS professionals' role as business managers who contribute to corporate objectives. They are no longer merely technical administrators.

The breakdown of the highly structured MIS environment has been accelerated by the effective use of PCs, and now other distributed information processing environments are similarly shaking off the shackles of restraint. Managing information systems effectively in this increasingly unstructured environment requires an understanding of the attitudes, roles and responsibilities of those involved. Successful departmental computing capitalises on these changes, and progressive MIS managers promote them for their companies' as well as their own advantage.

The information processing environment has undergone, and continues to face, rapid transformation. Amazingly, however, these changes have frequently gone unnoticed by MIS personnel, who should be the primary agents of change. In many cases, this lack of awareness resulted from failing to see the larger trends that prompt change; in other cases, it resulted from a heavy work load and the pressures of business. Rarely has this oversight extended to technological change, although missing the PC's impact on corporations was a significant exception. Instead, MIS's unawareness usually involved the attitudes and expectations of clients and business management.

A very significant change has taken place — information processing is no longer a mystery to most businesspeople. In many cases, businesspeople developed their own applications when they needed them. Although the application may have only been a simple spreadsheet, this accomplishment beneficially altered their attitudes.

Unfortunately, MIS personnel's underestimation of the impact of PCs made top management and users doubt the value of MIS support. They saw MIS as an inhibitor, rather than a facilitator, of PC use. At about the same time, corporate management became aware of the potential of information processing as a competitive tool. This long-awaited recognition of the value of information improved business management's attitude toward MIS and raised its expectations of information technology.

During this time, the business climate was optimistic and expansive. PCs proliferated, and departmental computing expanded. Savvy MIS managers took this opportunity to lead their firms in finding information support applications that contributed to the business.

In the last few years, computing in companies has been altered drastically, becoming increasingly complex and integrated. Integration has become a technology industry problem, not merely an MIS concern.

Demands escalating

Because of these changes, MIS is being attacked from all sides. Time has quickly become a problem as the euphoria of work groups that generated their own information via PCs and departmental computing has subsided. Work groups are realizing that the data they need resides in existing applications managed by MIS. Consequently, as requests for access to corporate data have escalated, MIS faces more demands for integration and expanded communications capabilities.

Business management has also increased its demands on MIS. Sensing the competitive value of information systems, corporate management now expects MIS management to participate actively in business evaluations and make a significant contribution through information technology. In addition, the corporate brass expects MIS to manage and control the apparent runaway expenses of keeping up with technology.

While MIS wrestles with this dilemma, work groups and clients bristle with frustration. Changes affect their functions as well. When they adopted PCs and departmental computing, users added information processing to their daily business activities, partly because it allowed them to seize the opportunity to generate their own information as they wanted it.

Users also embraced computing in response to the general downsizing that was taking place in most organizations. Business personnel developed a strong belief that wider technological application was the best way to cope with reduced staff and increased information demands. Work groups were enthusiastic about doing more with information systems but became frustrated when they realised they couldn't do it alone.

Fortunately, an important attitude change had taken place. While historically, work groups would have viewed MIS as unresponsive to their needs, this time these groups have begun to understand the complexities of information processing and to recognise the need for access to corporate data. As a result, work groups acknowledge that MIS can help them improve their use of departmental computing and PC processing.

Technological developments continue to encourage and support work group attitudes and capabilities. Departmental computing's effectiveness capitalises on the interaction of two major technological trends. The first is the "diseconomy of scale" in processors: the concept that computer performance does not necessarily increase in proportion to costs (see chart). PC vs. mainframe processor price/performance is the most dramatic example of the diseconomy of scale, but the concept also applies, to a lesser degree, to communications and software. Lower prices have brought technology to the desktop and have also created a highly complex technical environment. The need for common access to data from the desktop creates this complexity. Integration and interoperability remain to be achieved.

Ease of use is the second major trend promoting departmental computing today. It enables personnel without technical backgrounds to use MIS technology effectively in business. Ease of use is the result of software professionals taking advantage of the trend of increased hardware capacity and lower unit costs. This trend enables work groups to become more responsible for application development, freeing MIS to address highly technical areas such as integration, communications and data administration.

The transfer of application development responsibility to work groups will make strides in resolving programmer shortages and the applications backlog. Hopefully, both MIS and work groups now recognise that they need each other.

Departmental computing appears to be a promising solution, but it certainly has not yet lived up to its touted potential. Senior management and work groups are looking to MIS management for leadership and for MIS to fulfill its primary role in departmental computing — that of facilitator. It should play this role by creating an environment that makes it easy for senior management and work groups to achieve departmental computing's benefits, capitalising on the changes in attitude discussed above.

MIS management can become this facilitator if it changes its approach by letting go; MIS needs to stop thinking in terms of having to do everything. MIS can establish a partnership with a work group in which each partner's role and responsibility is recognised and understood. This relationship should satisfy senior management's expectations, once it understands what each partner must accomplish. Work groups are in a better position than MIS to develop competitive business applications and are more likely to achieve the benefits top management expects. As a partner, MIS will share the rewards by enhancing work group capability to identify and implement the right applications.

Roles and responsibilities in departmental computing are not absolute; they vary according to three basic organizational philosophies: centralized, decentralized and distributed. In departmental computing, a centralized philosophy gives MIS the major responsibility of planning to perform almost all support functions. A distributed philosophy is a shared approach, with responsibilities spread among MIS and work groups. A decentralised approach provides work groups with the primary responsibility for departmental applications development and support. In a decentralised environment, MIS focuses on activities that affect organizations other than just individual work groups and provides the necessary governance and infrastructure for corporate MIS activities.

In most businesses today, the trend is toward the decentralized approach: Decision making is moving down the organization to small business units. However, the trend in departmental computing is to move from its historical centralized position toward a distributed approach. This variance reflects the better understanding of information processing outside the MIS organization and allows MIS to focus its efforts on achieving systems integration and interoperability.

MIS's side of the bargain

MIS should have primary responsibility for providing corporate MIS policies, standards and guidelines to ensure compatibility and effective resource use. Likewise, data administration and telecommunications cross organizational boundaries, requiring MIS to watch over these functions for maximum interoperability.

Other services, such as technology research, training, education and, to a lesser degree, office systems support, can be provided more efficiently by a central resource like MIS than by each work group. However, this factor does not preclude MIS from delegating portions of an activity to work groups.

The work group's responsibility expands from funding and waiting for delivery of information applications to taking responsibility for business application management, implementation and support for its unique information needs.

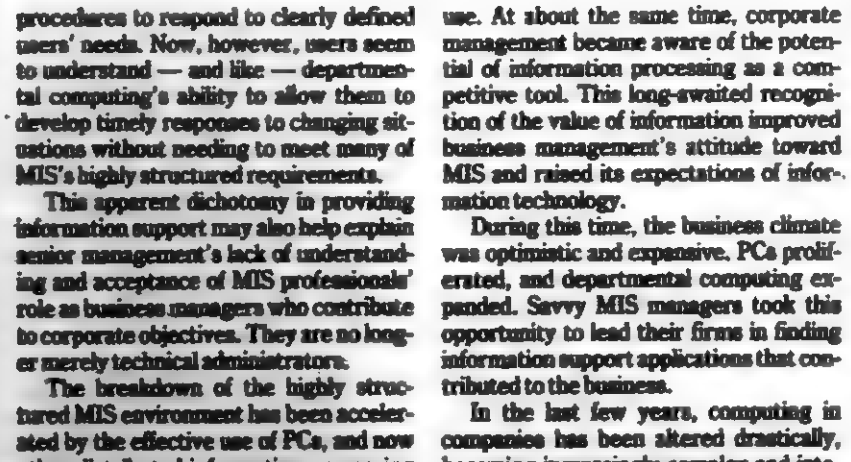
A work group that cannot provide appropriate resources can ask MIS to help provide resources to perform these activities or obtain the services from qualified outside sources. In any case, responsibility for applications remains with the work group. It must manage the information support most critical to its performance.

Although this discussion has focused on departmental computing, it certainly applies to the broader realm of all corporate information processing. MIS's role is changing to that of the facilitator of technology application required by work groups. To do so requires that MIS implement the necessary infrastructure: a widespread telecommunications network and a well-defined and accessible corporate data base.

Administratively, this setup involves providing standards and guidelines, training and education programs and overall planning. This infrastructure will allow work groups to effectively provide business management with systems that can make a difference in the competitive position of their organizations. ✦

The diseconomy of scale in processors

Performance doesn't necessarily increase in proportion to cost



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IBM's departmental predicament

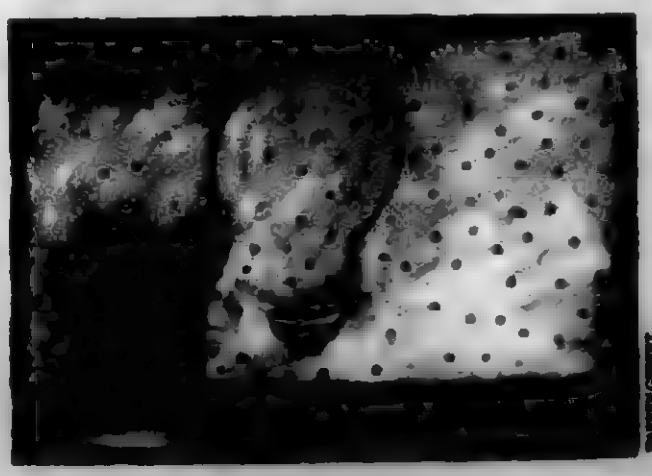
Early misjudgments hamper strategy

BY BRIAN JEFFERY

Talk about departmental computing, and it is hard to leave out IBM. IBM may not have invented the concept, but the company has certainly been one of its most enthusiastic converts.

IBM claims to have one of the best sets of offerings for departmental computing. It offers the 9370, a mid-range system that implements the tried-and-true 370 architecture and that has an entry-level price at the new low of $31,000. IBM also offers the Personal System/2, an advanced personal computer, and the Token-Ring, a PC local-area network. The principle, as IBM puts it, is simple enough: You have 370 mainframes, Systems Network Architecture (SNA) and IBM Personal Computers. You build on that investment by adding compatible components and creating what IBM describes as a "370 affinity" throughout your organization. Easy enough, right?

Wrong. There is much about IBM's departmental computing scenario that doesn't quite fit the picture. For example, there is the matter of the 9370 delays, which have amounted to close to a year from the machine's announcement to general availability. SNA communications software, which was announced eight months after the 9370 debut, did not become available until a year after that.



Obviously, there is something odd here. Surely IBM shouldn't have trouble providing VTAM support for a 370 machine. Didn't the company figure that capability out years ago? And why so long a wait for its OS/2 Extended Edition operating environment? By IBM's own admission, development on the PS/2 began back in 1983. Does it take five years, with Microsoft Corp.'s help, to develop a PC-DOS-based operating system?

It is easy to sniff at this situation, ascribe it to IBM ineptitude and console yourself with the thought that it doesn't matter anyway, because Digital Equipment Corp. is winning the VAX wars, mainframes are going away and the IBM Micro Channel can be cloned. But the reality is more complex. With IBM, the reality is always more complex.

Let us start with the 9370. It is first and foremost a VM system. VSE is supported quietly, and IX/370 is minimally supported, but the 9370's main emphasis is on VM/SP. MVS does not work on most of the 9370 I/O, and MVS support, as IBM cryptically observed in its initial 9370 announcement, is intended to support development of "applications under MVS/SP on the host and transport, without changes to distributed work group locations." In other words, the 9370 in its present form cannot be used as an MVS production system.

Then there is the matter of TSAF, which was implemented for the first time under VM/SP Release 5. TSAF is an interesting phenomenon, a global resource manager that IBM claims provides transparent user access to server resources within a VM processor or across VM processors. The first TSAF support is for the SQL/DS relational data base management system, here making its debut for VM. The next product to look at is the Professional Office System (Profs), IBM's main office system offering for VM environments. This environment is progressively shaping up.

The 9370 has a Graphical Data Display Manager (GDDM) for image and graphics, QMF for data base query, Profs Application Support for PCs, ACF/VTAM 3 for LU6.2 support and Netview. But this is a Netview that is evolving toward something considerably more than just a network management package. It is Netview, with Netview Distribution Manager supported by VM/Distributed Systems Node Executive (VM/DSNX), which creates an on-line software distribution mechanism.

Amid all the detail, it is easy to miss what is happening here. This is not the MVS-based 370 architecture as we have historically known it. It

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Jeffery is managing director of the International Technology Group, a management consulting and market research firm in Los Altos, Calif. He is also project director for the firm's *The IBM Directions Report*.

is a VM and relational data base scheme, and it comes out of a number of systems and architectures that IBM has been using internally since the 1970s. There is Vnet, for example, IBM's internal VM-based peer-to-peer network system. Vnet is a non-SNA system in its origins that the company has never offered publicly. Vnet runs Profs, and, within IBM, there are more than 300,000 Profs users out of a work force of around 400,000. Interestingly, as far as office automation goes, IBM has been a VM shop for close to a decade.

Then there are the relational data base products. SQL/DS, DB2 and the rest of this group originated in the early 1970s with System/R, developed into a distributed relational architecture, R Star. Although IBM marketing focused on IMS and DL/1 in the 1970s, IBM's own laboratories worked with the relational DBMS applications, under VM, with Vnet. The distributed relational DBMS scenario that is shaping up now with DB2, SQL/DS and OS/2 Database Manager is R Star reincarnate.

Also, one should take into account Low Entry Networking (LEN), the dynamic network reconfiguration facility that is IBM's key vehicle for peer to peer. Oddly, IBM stated in June 1986 that LEN would be available first for the System/36 and 38 line. LEN was developed at IBM's Yorktown Heights, N.Y., facility, which is a VM shop, and it was developed for VM.

And on and on and on

And on it goes. The PS/2 with its Micro Channel implements a subset of VM; the Token-Ring network provides coprocessing for multiple PC and PS/2 clusters; the OS/2 Database Manager evolves into a LAN-based distributed relational DBMS environment; and the OS/2 Presentation Manager interfaces with GDDM. All of this is an implementation of exactly the same architecture that IBM built into the 9370 and optimized in hardware while waiting for the microcode to activate it.

The important idea here is that the IBM departmental computing scenario, with its 9370s, PS/2s and Token-Rings, represents not merely a different set of products but also a different architecture. The mysterious 9370 delays, the odd bugs and the long lead times to software availability reflect what IBM is trying to do. It is seeking to effect an evolutionary and highly complex transition across its entire product line to an architectural complex that is significantly different from and none too compatible with the installed base of its large end users.

IBM's maneuvers make more sense if looked at in historical perspective. For most of the 1970s, IBM's mainstream computing scenario revolved around MVS, IMS and CICS and SNA. The concept of distributed processing, born in the early 1970s, involved using distributed 3790s and later 8100 Information Systems with SNA. Then, in 1983, IBM began promoting the System/36 as its key departmental system and, thereafter, became an enthusiastic proponent of departmental computing (which, coincidentally, started to become popular about that time).

The System/36, tied to PCs tied to IBM's Distributed Office Support System (Disoss), acquired Personal Services to talk to PCs and Disoss. The Token-Ring, which appeared in 1985 as IBM's key LAN, ran some ASCII and Netbios for a while. But strangely enough, the network could not talk to the System/36, IBM's key departmental system, without a dedicated Personal Computer AT gateway. (The obvious conclusion? They came from completely different design streams.) Nor for that matter, could the System/36 talk to Profs, IBM's key VM office system, a situation that persisted after Profs became a central component of the 9370, IBM's new key departmental system. Curiouser and curiouser.

It probably would not come as a shock to most end users to hear that the System/36 offering was a stopgap departmental solution. What is a little more disturbing is that the whole complex of the System/36, Disoss, Personal

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Services, PCs and, by implication, much of the MVS software environment that went with these components was a massive stopgap architecture.

While IBM was promoting this stopgap measure, it was also quietly bringing in the components of a whole different scenario: Profs as a host VM office system, SQL/DS for VM in 1983 and the Token-Ring in 1985. Then, in 1986 and 1987, came enlightenment — these offerings were meant to work with 9370s and PS/2s. And while this point sinks in, we note that VM is suddenly blossoming into a full-blown large systems operating environment. After years of piecemeal and measy support for SNA and for 370 extended addressing, VM is now the way to go for data center systems.

And speaking of SNA, what of LU6.2? Officially introduced in 1982 to provide peer-to-peer networking capability, it was not fully integrated until June 1987, when the whole 9370 VM complex was also brought into the fold. Why did it take so long to provide even the most basic dynamic reconfiguration facilities for SNA, or a global data dictionary for DB2 or OS/2 Extended Edition? The delays have been remarkable. Unless, that is, the whole process was interdependent and the tasks were time-consuming because they were effecting a major architectural transition.

Which is exactly what has been happening. And, as so often with IBM, there is good news and bad news.

The good news is the architecture itself. It is good — very good. Vnet is potentially a far more machine-efficient networking method than classical SNA. VM/CMS is one of IBM's most user-friendly environments. VM's hypervisor facilities, the use of real and virtual machines, is a potentially useful solution for the user that needs to migrate applications. For example, even VSE under VM often runs more efficiently on 370 machines than in native mode. Profs, as IBM's internal network demonstrates, is highly effective for document communications within large organizations.

Rather quietly, too, VM has picked up the ability to handle voice communications, text, image, high-resolution color graphics generation and output and electronic publishing.

In addition, there are some

IBM must have believed its customers would drag themselves through the largest architectural transition in MIS history.

noteworthy features in the VM network environment. VM/DSNX, with the Netview Distribution Manager, allows applications software to be customized at a single location and distributed throughout a network.

VM/DSNX and the dynamic reconfiguration facilities of LEN add up to an interesting scenario. The 9370 was designed, IBM tells us, as a Fortune 500 system. Fortune 500 corporations typically never have been and probably never will be genuinely decentralised organizations.

Distributed processing has its limits, particularly in these times when corporate management is beginning to think of MIS functions as a competitive tool. To compete effectively requires coordinating the organization's resources as a whole while preserving a degree of flexibility at the company's lower levels. The IBM architecture arguably offers the necessary mix: local departmental processing with centralized top-down control as well as the ability to reconfigure centrally or to distribute new software applications overnight.

IBM's relational data base component is not negligible, either. The global resource manager facilities of TSAF with the compatible distributed DBMS architecture of SQL and QMF and, due to be integrated next, LEN, add up to a very powerful

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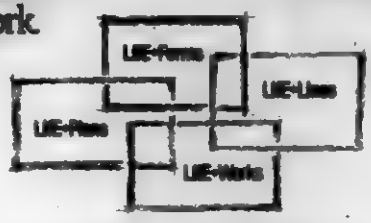

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data management complex — one that is already on the way to organizationwide single-level storage.

As for PS/2s, Token-Ring nets and the like, the fit should be very close. The reality is that the 9370, the PS/2 and the latest version of the Token-Ring are part of the same product line.

The high end of the PS/2 is, for all intents and purposes, the low end of the 9370, with the same latent functions. The Token-Ring, as a central component of coprocessing, can provide a local 4M bit/sec. communications infrastructure in the same way for PS/2s, Token-Rings, controllers and other IBM systems. The Micro Channel, with its facilities for multiple systems networking, is merely a local version of the broader VM I/O technology already implemented on the 9370.

Impressive impression

IBM's departmental lineup is very impressive, and if it were possible to implement it from the ground up, competitors the likes of DEC would have a rough time.

This fact, in turn, brings us to the bad news. It is not possible to implement this scenario from the ground up. Most of the components of the new IBM architectural complex date from the early 1970s, when they were sidelined after Thomas J. Watson Jr. expressed his opinion that the 370 architecture would last until the 21st century. Fifteen years later, the sins of the fathers are being visited on IBM and on its MIS users.

More than a decade's worth of MVS, IMS, CICS and SNA communications software has been laid down. What was IBM thinking about when it deliberately promoted a whole departmental systems architecture during the 1980s that was disastrously incompatible with what is now being introduced? System/36s collapsed under the weight of Displaywrite, Discos was temporarily fixed with software Band-Aids, and a mass of software had to be overlaid on a structure already burdened by its own weight.

It was not just a mistake. The whole process was too well planned for that. More likely, it was a misjudgment.

IBM management must have believed that its customers would toe the line and drag themselves through the largest architectural transition in the history of MIS. But when the degree of resistance to this migration became apparent, IBM resorted to marketing hype for the 9370 and the company's Systems Application Architecture. Just more banging the drum for departmental computing.

The irony of it all

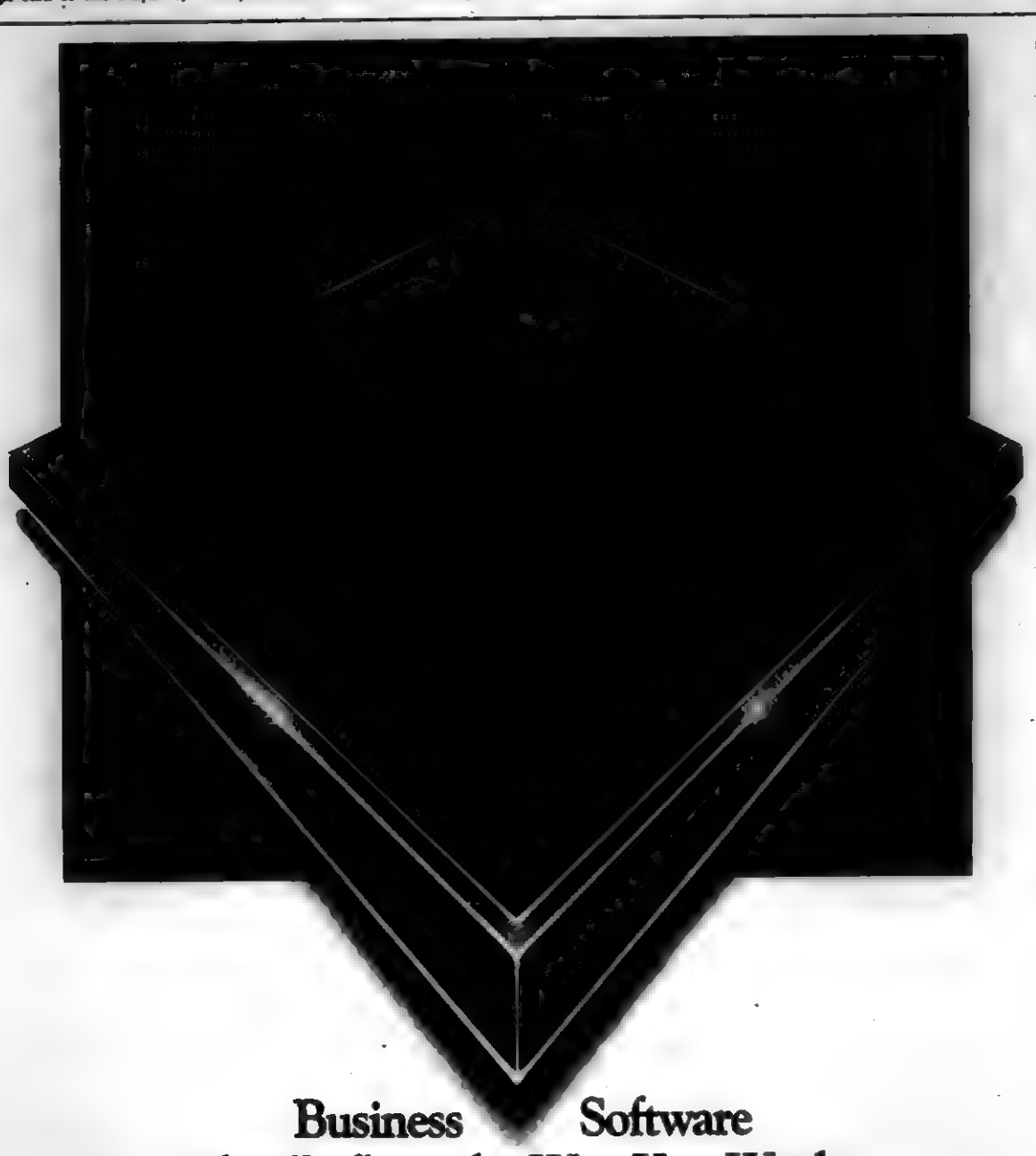
There is a certain tragic irony to the situation. IBM is in the process of bringing in an architectural complex that is far superior to anything it has had before, but it cannot be optimised without massive migrations. The company dare not reveal to its customer base the full extent of the architecture because to do so would also be to reveal just how different it is from what IBM has been marketing for decades.

This leads to one other, final irony. IBM cannot bring in customers to show them its own departmental network to help sell them on the concept for the simple reason that IBM doesn't have a departmental network. It never installed System/36s en masse because its own internal VM network made them unnecessary, and that network ran and continues to run quite efficiently on host mainframes.

Don't take my word for it; ask IBM to tell you about how the company uses departmental systems in-house. Ask how many System/36s IBM uses for departmental systems applications and how many 9370s it plans to install for departmental computing.

The reality is that the IBM internal network and the architectural complex to which IBM is moving are fundamentally two-level, not three-level, in their original forms.

From IBM's point of view, the mid-range component, the 9370 and, indeed, the whole concept of departmental computing are for public consumption. ◆



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Up for grabs

Vendors vie for mid-range

BY STAN KOLODZIEJ

Departmental computing has been a wide open market for years, a potentially enormous and lucrative area resting strategically between the twin processing towers of mainframes and microcomputers. The stakes are high with departmental computing, and vendors are all too aware of the future marketing importance of capturing high, visible ground in this arena. They are also aware of the repercussions of failing to gain a foothold.

A hold on computing's middle tier can give a company control of the critical function of conducting data to and from micros and mainframes, a need that likely will continue well into corporate computing's future. This role of departmental data gatekeeper could have gone to IBM, but IBM failed to win a clear departmental decision years ago when its System/34, 36 and 38 and 4300 lines of mid-range systems bowed.

In light of IBM's continuing inability to dominate the departmental computing market, however, minicomputer vendors, personal computer software firms and communications companies are making headway. These other vendors are presenting their own departmental computing approaches and philosophies, ideas that are adapting to changes under way in personal computing and local-area networks.

For example, Digital Equipment Corp.'s All-In-1 departmental system began as a philosophy to deliver an umbrella of integrated hardware and horizontal software and has since undergone change.

"I think the whole emphasis now in departmental computing is on how well vendors can adapt to changing computing environments," says Dick Loveland, DEC's manager of system engineering for business and office information systems. "When you look back to 1982, the year we introduced the All-In-1 departmental system, the big aim was to provide a consistent processing shell or environment that could give users easier interfaces than existed at the time. On top of that, we built what we considered to be the primary office functions of electronic mail, word processing and access to corporate data."

Next, Loveland says, came the need for more vertical, department-specific applications. "Now we have to go ahead and accommodate Microsoft Corp. MS-DOS-based PCs and LANs. What we've seen in the '80s is the ability to provide cost-effective desktop solutions with terminals and PCs," he says.

"People are now demanding types of services that go beyond what they originally intended with a desktop device," Loveland says. "They want more sophisticated and integrated capabilities." Keeping up with the explosive growth of PC applications and communications will set departmental communications' course for the next few years, he claims.

But DEC is not alone in its emphasis on approaching departmental computing as a grid of communications from which horizontal and vertical software can be delivered. Minicomputer vendors such as Data General Corp., Hewlett-Packard Co., Unisys Corp., NCR Corp. and Honeywell Bull, Inc. all emphasize the minicomputer-cum-server as the centralized machine that delivers third-party packaged software to departmental users.

The many Unix-based departmental systems

Kolodziej is Computerworld Focus's senior editor.

vendors currently in the market are no exception. Systems from Quadratron Systems, Inc., Uniplex Integration Systems, Inc., Altos Computer Systems and Computer Consoles, Inc. take advantage of the Unix operating system's multiuser capabilities to drive software applications from powerful minicomputers to departmental users.

"We deliver word processing, data bases, spreadsheets and electronic mail," explains David Leonnig, marketing manager at Uniplex. "These are the major business applications."

Centralized to the extreme

The extreme extension of centralized, departmental control can be seen in executive information systems, which aim to deliver very specific, vertical software to upper level management.

"We've found users are craving more specialized office software functions," says David Friend, president of Pilot Executive Software, an executive information system software vendor in Cambridge, Mass. "We're seeing more need for horizontal communications among our users, and we've felt a need to bring a lot of the Pilot software applications down into the middle-management level. We're a communications vehicle, and I think that's a perception that has changed recently with departmental systems. The emphasis is on communications now, not just software."

For Chris Stone, manager of office systems software at DG in Westboro, Mass., departmental computing has been a continual evolution toward the easier integration of separate software applications through advances in communications.

"Providing vertical applications is important, but communications is going to be the driving factor behind departmental computing," Stone asserts. "If your communications are good, the vehicle for enhancing software applications is there."

Stone's contention is that facile communications are essential for ushering in the future of departmental computing, which will emphasize nonprocedural data access and exchange and the distribution of relational data bases.

"You have to be able to get in and out of data bases quickly, through LANs, through wide-area networks and through other networks," Stone claims. "You have to be able to do that effortlessly and completely, and that will give you distributed data access and processing. That's true departmental computing, and that's way ahead of what separate LANs and smaller work group computing can now deliver."

Not enough oomph

Although departmental systems vendors may incorporate LANs into their product offerings, most, like DG's Stone, maintain that LANs simply cannot deliver the power and software needed to drive departmental systems.

"We know there are vendors trying to promote LANs as departmental systems, but having five people on a LAN is not going to give you distributed data processing," Stone says.

Others would temper that statement, however. Suzanne Purnell, an analyst at Dataquest, Inc., a San Jose, Calif., research group, says she has seen good LAN market growth in departmental computing, specifically at the small work group level, the organizational building blocks that make up departments.

"I really think LANs are still for the smaller departmental player," Purnell says. "But perceptions are changing. Until recently, LANs were considered too slow, devoid of good work group software and too expensive to be taken seriously in departmental installations. That's turning around."

For at least one corporate user, departmental systems might be considered overkill — too expensive and offering more power than users need. "If I had to go through it again today, I would go with LANs instead," explains Ken Grisinger, assistant vice-president of operations at Beneficial Standard Life Insurance Co. in Los Angeles. Grisinger says his department has 55 users running departmental applications over a Unix-based departmental system from NBI, Inc. in Boulder, Colo.

Originally installed in mid-1986 to handle word processing and copy writing, NBI's system won Beneficial over because of its good interface to the organization's Compugraphic Corp. publishing system, an important requisite in the insurance business.

However, Grisinger contends that the departmental system, which runs over two NBI minicomputers and a file server, just has too much power for what his department needs.

First of all, the system is based on University of California at Berkeley Unix 4.2 instead of AT&T's Unix System V, which, Grisinger says, limits the amount of third-party software available to the department.

"Another problem is that we have never required the mainframe interface that NBI provides with the system. That would have given us more justification for the system's power. If I had my druthers, I would go with a [Banyan Systems, Inc.] Virtual Networking System network or something like it. I think LANs are flexible and powerful enough for departmental use now," Grisinger says.

User demand has prompted almost every departmental system vendor to enter into agreements with LAN vendors to integrate LANs into backbone departmental networks. And it is not just LANs that are being integrated; most popular PC software application packages are licensed by departmental vendors in an effort to stay ahead in the escalating game of providing one-stop departmental shopping.

As a result, some see departmental computing in danger of becoming an industry catchall, overburdened with too many services, a situation that may further blur the distinction between vendors' products.

"I think departmental computing, to some extent, has become a dumping ground for services without enough regard as to whom the vendors are servicing," says Wayne Sennett, vice-president and general manager at Cupertino, Calif.-based Motorola Computer Systems, Inc., a relative newcomer to departmental computing with its Linked Information Environment series of integrated departmental software offerings.

For Sennett, concentrating on servicing work groups entails processing differences that most departmental system vendors have not yet addressed.

"Departmental computing is today a broad brush stroke, an attempt to place all users on basically the same applications level," Sennett says. "Departmental computing brings in canned applications and tries to merge the user with the system, not the other way around."

Sennett claims that Motorola's research indicates that a majority of time is spent by work groups keying in one sort of data or another. Much of the remainder of the time is spent analyzing and reporting on the data.

"What users want are canned software tools, not canned word processors," Sennett says. "They want tools that are made so that work groups can design and handle many of their applications themselves, without bringing in programmers. It gives work groups the ability to become masters of their own fate.

"In a sense, the software has to be generic, because you don't really know in advance what the intended work groups are about," Sennett explains. "But you won't be able to deliver this software to the work group level unless you can create and distribute data bases across a variety of system platforms. With work group departmental computing, you have to capture data, work on the data within the work group and then share it with the rest of the corporation."

Sennett says that work group computing is accomplished by treating software with an open systems approach, similar to what has been occurring in the hardware microprocessor industry.

"Today, we talk a lot about open hardware and architecture in which we can get a processor board and plug it in, and things run and drivers are kind of generic and so on," Sennett explains. "You can't do that very well with integrated software packages, however."

IBM needs heavy hitting

As for IBM, the company has not been silent amid the activity. In response to mid-range market gains by DEC and other minicomputer vendors, IBM has recently wrapped its 370-based hardware into its 9370 departmental machines. Yet an apparent stall in 9370 sales and software development has again blunted IBM's departmental push, and now some are saying IBM will have to wait for its Systems Application Architecture to provide the firm with the heavy hitting it is looking for in the departmental market.

Despite these problems, IBM will continue to be important in departmental computing because of its several mainframe-based de facto software standards, most notably the VM operating system and the DB/2 relational data base system, which the company is pushing into the mid-range. Both products continue to gather huge third-party software support.

In the meantime, IBM has declared it will not abandon its beleaguered System/36 and 38 line of minicomputers and continues to announce enhancement products to emphasize that point.

Besides, IBM controls the surrounding micro and mainframe markets. And it is those same markets that are now changing the face of departmental computing. ◆

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CORPORATE SURVEY

Are the mini's days numbered?

Rise seen in LAN, file server use

BY MARTY GRUHN

Early returns from surveys of MIS executives and departmental managers indicate that the days of the minicomputer as the premier mid-range solution may be numbered. In the past year, local-area networks and network file servers have made dramatic gains, and future trends suggest that their hold on corporate America is likely to tighten. Because these systems represent an alternative way of supporting work group and departmental computing, they pose a significant threat to the niche mid-size minis now enjoy.

There is growing evidence that users are beginning to expand their options in supporting work group and departmental computing requirements. This finding is based on a survey conducted by The Sierra Group in Tempe, Ariz. The marketing research firm sent comprehensive surveys out between November 1987 and January 1988 and received responses from 870 companies in various vertical markets, such as finance/banking, insurance, manufacturing, medical and scientific/engineering.

The responses paint the profile of a marketplace in transition, one in which local-area networks and network file servers form the future. The study indicated that in organizations in which departmental minicomputers and LAN or file server technologies are already installed, companies plan to increase budgets to extend LAN and network file server environments.

Of the firms surveyed, 21.5% said they plan to increase spending for departmental minicomputers, compared with 44.5% and 43.2% that said they plan to increase budgets for LANs and network file servers, respectively.

This trend is further underscored when the number of units to be installed this year is compared with the existing installed base. Within the survey sample, 516 companies reported plans to install 836 departmental minicomputers (an average of 1.6 minicomputers per company, or a 16.3% growth).

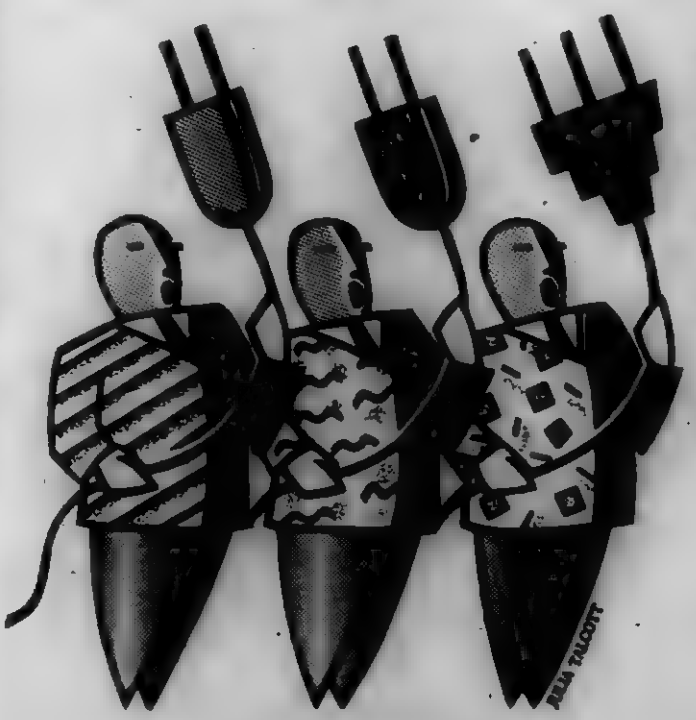
In contrast, 274 companies said they intend to install 617 LANs (an average of 2.25 networks, or a 65.9% unit growth), and 117 companies said they plan to install 335 network file servers (an average of 2.86 servers per company, or a 60.4% unit growth). Thus, while the number of departmental minicomputers installed by the end of this year will still be greater than the number of networks and file servers in use, the most dramatic growth will take place in networked support systems.

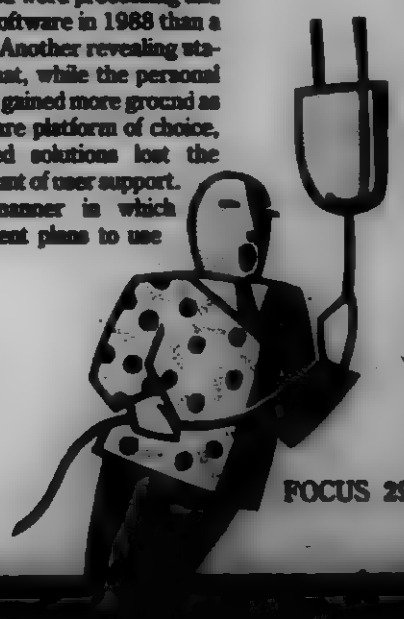
The survey also indicated that overall user satisfaction with departmental minicomputers declined between 1987 and 1988, while satisfaction with network file servers remained relatively stable. These dynamics combined to make user satisfaction with network servers higher than that of departmental minicomputers.

Although the satisfaction with the overall performance of LANs also declined between 1987 and 1988, it remained on par with the ratings of departmental minicomputers. Taken in the aggregate, it is clear that users perceived that early LAN/file server installations provide at least equal performance and, based on strong purchasing momentum, offer higher value for the dollar.

Compared with a 1987 Sierra Group survey, which had the same baseline questions, the number of users planning to purchase software is slightly lower this year, with the most notable decline in planned purchases for departmental minicomputers. Alternatively, software to be installed on LAN servers is higher in several areas for 1988. More managers reported plans to buy LAN-based word processing and imaging software in 1988 than a year ago. Another revealing statistic is that, while the personal computer gained more ground as *the* software platform of choice, LAN-based solutions lost the least amount of user support.

The manner in which management plans to use





Gruhn is a vice-president of The Sierra Group, a marketing research and consulting firm in Tempe, Ariz. She serves as manager of the company's industry services, end-user studies and strategic consulting group.

CORPORATE SURVEY

LANs also emphasizes departmental minicomputers' tenuous position as the preferred mid-range solution for the future.

Of those respondents with LANs installed, the vast majority said they will use their LANs to facilitate PC-to-PC communications, with the goal of PC-to-mainframe connectivity ranked as a distant second priority. Establishing PC-to-minicomputer links and using the mini as an intermediary between the PC and mainframe (PC-to-mini-to-mainframe links) ranked third and fourth, respectively.

The study also looked at the viability of using a departmental minicomputer as a network file server. A review of the technologies in use by the survey base indicated that, contrary to the marketing strategies of the major minicomputer suppliers, most users are installing PC technologies as network file servers.

PC-based servers prevail

The vast majority of those surveyed reported using Compaq Computer Corp.'s Intel Corp. 80386-based PC models, IBM's Personal System/2 Model 60 and 80 and a variety of IBM- and third-party-provided Personal Computer ATs as their network file servers of choice. Only in Digital Equipment Corp. accounts did minicomputers emerge as platforms for file servers. In IBM accounts, PC-based servers prevailed, with 71% of IBM users with LANs installed reporting the use of PC-based servers on their networks.

So what do these statistics mean and what future effect will they likely have on the minicomputer and LAN or file servers as complementary — but competing — departmental alternatives?

First and foremost, these findings illustrate that, despite the industry's rocky start, LANs and file server technologies are working well within many companies and, once through the shakedown period, are enjoying a solid and growing demand. The survey results also illustrate that the integration of PCs is, and will remain, the foremost agenda of departmental users this year, and technologies that support this requirement will be embraced.

As important, the strong demand for network and server solutions, in contrast to the lesser demand for minicomputers, also suggests that many of the promises vendors made to users in the past few years have yet to be realized.

Despite a flurry of announcements, strategic intents and promises, minicomputers are not yet perceived as being able to deliver the levels of cost-effective and painless PC integration that users seek. Networks and PC-based servers have come into that void. This trend is one that minicomputer suppliers can ignore only at their own risk.

There are other more subtle but equally enlightening implications of the study. As networks emerge as a prevalent technology to connect multivendor environments, the need for industry standards has now reached critical proportion. Industry suppliers must begin to deliver these solutions in 1988, rather than use the words "industry standards" as a marketing theme or a catchphrase to buy time for future development.

> **The fate of the departmental mini lies in the hands of suppliers whose charter is clear: Provide real PC integration or end users will do it themselves.**

It is also clear that manufacturers of larger systems will have to deliver more cost-effective departmental alternatives faster to stay ahead of the revolution in PC technologies. PCs are no longer merely single-user desktop systems but rather are becoming multiuser servers. The continued acceptance of PC-oriented solutions will have a ripple effect upward through organizations and will change how and when users utilize larger computing resources.

The number of 80386 PCs and high-end PS/2 models in use as file servers also suggests that subtle shifts are at work in the PC marketplace. These systems may have missed many desk tops, but they have found a logical niche as centralized support systems in PC-oriented networks. The implications for PC and third-party networking vendors are obvious, as is the specter of OS/2 as a significant network server operating system in the future.

In the final analysis, however, the most significant question remains. Do these trends spell the demise of departmental minicomputers or just a bump in the road to fully distributed computing? The pragmatic view is that these changes represent a significant shift in the potential scenarios for the future. What they will mean to last year's darling, the departmental minicomputer, remains to be seen.

The fate of the departmental mini lies in the hands of suppliers whose charter is clear: Provide real PC integration or end users will do it themselves.

Vendors that have based their 1988 strategies on the solid foundation of networking and can deliver tangible PC integration will find a receptive audience. On the other hand, minicomputer vendors that have not done their homework and continue to ignore the PC integration issue will find a limited set of opportunities this year. ◆

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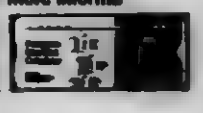

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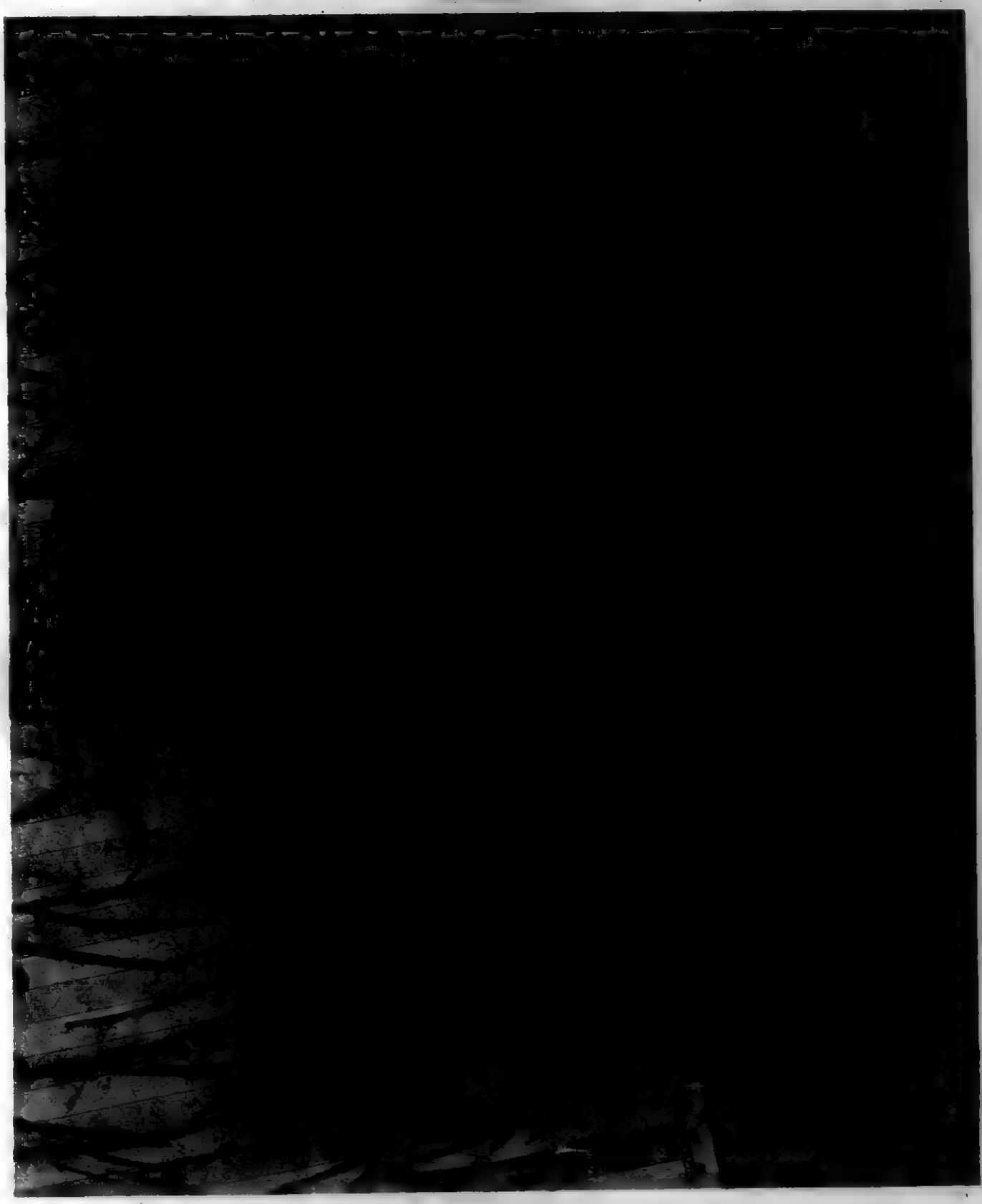

GEOFF O'CONNELL PHOTO, TOM MONAHAN ILLUSTRATION

To each according to his need

BY MICHAEL TUCKER
FEATURES EDITOR

Pity poor departmental computing.

It has been around ever since the invention of the minicomputer. But after all these years, you can still get yourself into a good knock-down-drag-out fist-fight trying to define the term.

Part of this confusion stems from the fact that companies have tailored the concept to their needs; in fact, the three organizations that *Computerworld Focus* spoke with have created departmental computing in their own image.

During its salad days, departmental computing and departmental computers were easy to explain. As far as MIS was concerned, departmental systems were minicomputers that were situated in small organizations and supported two to 20 terminals. Frequently, they were not connected to any other processor. Departmental computing was simply another way of saying word processing.

That all began to change in the 1970s. Minicomputers became so powerful that, increasingly, they challenged mainframes at some data processing tasks. Minis, or rather the people that managed them, became the first rivals to MIS officers for sole control of the computer power in major corporations.

In the 1980s, the situation shifted again. Microcomputers, particularly personal computers, emerged to challenge minis. Departmental systems went briefly into eclipse, only to reappear as part of a new philosophy of computing. Such systems were now proposed as the middle section of a three-tiered computing network, with PCs at the bottom doing personalized computing, corporate mainframes at the top managing company data resources and minis, or mini-like multiuser micros,

An analyst handicaps the top eight departmental frontrunners. Page 33.

Turn your desktop system into a multiterminal monster

WHILE MULTIUSER microcomputers or minis get star billing in departmental computing, there are other candidates for the role.

For instance, MIS professionals who must be their own systems integrators and who must deal with budget constraints may wish to consider the humble personal computer or IBM's Personal System/2 to do the job.

There are now a host of companies that provide the technology necessary to turn single-user systems into multiuser ones. For a small investment, you can turn a desktop system into a multiterminal monster. This alternative is particularly attractive given the new generation of 32-bit personal computers.

As an example, Star Gate Technologies, Inc., headquartered in Eastlake, Ohio, markets a number of cluster controllers for PCs and their kin. The recently introduced CC-9000 reportedly can give a PC based on the Intel Corp. 80386 processor 80 serial and 20 parallel ports. It can also function as the hub of a 10-port star configuration network.

For systems integrators working with the PS/2, meanwhile, St. Louis Park, Minn.-based Digiboard, Inc. offers the Digiboard Openender. A multichannel communications board, the product gives the PS/2 either four or eight asynchronous serial communications ports as well as an optional serial port. Up to four Openenders can be used at once for a total of 32 ports.

Even the vendors of this kind of technology will admit that turning PCs into multiuser systems is an unusual business. In a sense, it is the ultimate violation of a personal computer — depersonalizing it.

But for MIS in an age of costly stock market crashes and reduced capital spending, the multiuser PC can be an effective way of getting departmental computing without the price of departmental computers. — MICHAEL TUCKER

acting as oracles in the center.

Today, even this classic, three-part definition has begun to fail. New functions, such as data network management, have been forced onto the departmental processor. Some observers are beginning to talk about departmental systems providing a fourth tier — connections to the world outside local networks.

Thus, as an industry and a technology, departmental computing may be undergoing a severe identity crisis.

A connectivity passion

Fortunately, a new consensus of what departmental computing is and does seems to be taking shape. In it, departmental computing is a combination of old and new functions. The new departmental computer may gracefully concede most office automation functions to PCs, but it claims connectivity as its own with a passion.

A certain number of the oldest departmental computing definitions are still current. Many MIS installations continue to use minis and multiuser microcomputers to provide the OA applications and small group processing for which minicomputers were first designed. In some ways, for this definition of departmental computing, minis seem almost immune to obsolescence; they continue to be used despite the fact that 32-bit personal computers now actively rival older minis for processing power.

Kenneth Bosomworth, president of market research firm International Resource Development, Inc. in New Canaan, Conn., explains the situation by noting that sheer processing power is not what is really wanted in departmental computing. "The principal focus [for such systems] has been word processing and data access," he notes. "You're not concerned with power here, not in the sense of number crunching, anyway. You're not computing numbers. Rather, these machines are information sifters."

Replacing mainframes?

Thus, even in this day of personal computers, you can still find a lot of dedicated minis providing communications, file server functions, electronic mail and even word processing for departmental organizations. When the management of local data is added to that mix, then we up the ante to the point at which departmental computing can truly augment mainframe processing — or, in some cases, even replace it.

One of the purest examples of that kind of departmental computing is at the Port of Seattle in Washington. Once a big iron shop supporting two Burroughs Corp. mainframes, the Port is now a strong minicomputer advocate.

The Port provides administration and services to the seaport and airport of Seattle as well as to scattered administrative installations around the city. In 1979, according to systems manager Tim Hutton, the Port decided to "try distributed processing, mostly to cut down on communications costs. We had mainframes communicating over telephone lines to our offices. That was expensive."

The Port bought three Wang Laboratories, Inc. Wang VS systems. One was placed at the main computing site, where it off-loaded work from the two mainframes, another went to the airport and still another was installed at the Port's waterfront facility on the docks. Rapidly, the Port grew to depend on the minis far more than on its mainframes — so much so that by 1988, it could dispense with one of its two mainframes and increase its population of Wang units to five.

As to the effectiveness of departmental computing in his organization, Hutton cites some interesting numbers. "In 1979, we had a staff of 55 people. Today, we have a staff of 56, an increase of only one in nine years. In '79, our budget was $2.1 million; today, it's $2.4 million, and that's mostly just increases in salary due to inflation. In '79, we supported 800 programs; today, 6,000. In '79, we had 125 users; now, we've got 660, and of that number, only 50 are not on the Wangs."

He says that the only applications remaining on the mainframe are those that simply aren't worth the effort to convert to minicomputers, such as listings of aging equipment. And even those will go in the next year or so when the last mainframe is booted out the door.

However, Hutton does feel that mainframes have a place in the world. "It just so happens," he says, "that we were in a position to do without them."

He also notes that departmental systems have their drawbacks. "It was a bit of a hassle coming up with a place to put them," he says. "Wang advertises the machines as being able to run in a normal air-conditioned and heated office, and that's

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true. But they are also noisy. Their disk drives put out a lot of sound. That can get on people's nerves. We ended up building small computer rooms for them. But of course, we then outgrew those rooms pretty quickly."

Other problems included backup and support. Seattle's airport, which has two Wangs and more than 130 workstations, is 30 miles away from the Port's main computing site. "When you've got that many people working on a system, you've got to have an on-site programmer/analyst — not to support the system but to support the people on it. Users are users, whether of PCs or mainframes or minis, and eventually, they're going to need help," he says. Port MIS staff members now take turns providing on-site support.

Backup has not been as easy. The Port employs two computer operators to drive from installation to installation to perform evening tape backups of data.

Ironically, the one thing that the departmental systems did not do was cut down the need for communications. But, Hatton says, that had more to do with the changing nature of communications than it did with the minis. Increasingly, data links are simply part of computing. "We've got 150 connections to the outside world," Hatton says. "They range from links to the steamship lines to connections with the U.S. customs office."

Few MIS officers would probably go so far with their departmental systems as has the Port of Seattle. For most DPers, the idea of departmental computers is that they assist, rather than challenge, centralized systems. Indeed, the most widely held theory of departmental computers is the famed three-tiered model of computing.

Three-tier classic

Grumman Data Systems in Bethpage, N.Y., provides a host of computing services to its parent, engineering firm Grumman Corp. Grumman Data's approach provides a classic example of the three-tiered model, most likely because the firm's assistant director of automated data processing, Jerry Michael, says he is a believer in this kind of computing setup. "When you have an efficient computer, like a mini, that lets you put applications and development close to the user, you can be very, very effective."

At the bottom tier, Grumman Data supports a host of desktop systems — both terminals and PCs. At the top level are a cluster of IBM mainframes. And in the middle are a selection of Hewlett-Packard Co. HP 3000s, Digital Equipment Corp. VAXs and Wang VS systems.

"In our definition," Michael explains, "a departmental system is any that handles data or applications that are unique to a single department, rather than a generic application useful to the whole corporation."

As an example, Michael points to a division of Grumman that "does nothing but keep track of government-furnished equipment, that is, material that is loaned to us by the federal government. That's pretty unique."

Departmental computers also keep track of the firm's hazardous waste, fixed assets and business-related traffic. Depending on the size and function of the department they serve, the departmental systems will support between six and 250 users.

However, Michael cautions that each tier provides a unique service. He argues that attempting to replace any one type of machine with another — say, to attempt to do all the mainframe tasks with a mini — is to risk becoming inefficient. "No one tier replaces another," he says. "Give the user a PC so he can keep track of his own data, give the department a mini so it can perform local processing, and then provide links to the corporate mainframe."

He has only one serious beef with the standard three-tier definition of computing. "There's really a fourth tier," he says. "And that's communications with the outside world."

It is at this fourth tier, and possibly beyond it, that departmental computing is experiencing its crisis. In an age when distributed processing is increasingly a computing given, connectivity of hardware and software is MIS's holy grail. And, increasingly, departmental-level systems are being called on to provide that connectivity — even in settings in which these systems have traditionally never been used before.

For example, departmental systems have traditionally not been used in situations in which different departments had to be tightly integrated into a single effort. The assumption has always been that departmental systems, despite their upward links to mainframes, are still somewhat separate from the organization; if they haven't exactly been islands of computing, then they at least have been peninsulas.

Yet, notes Michael Pacher, a senior associate with consultancy The Mac Group, Inc. in Cambridge, Mass., "you can still have integrated computing and not have monolithic systems if you keep control of the standards for interfaces and data within your organization." The devices that MIS officers are using more and more to keep that control are departmental-style processors.

Baltimore-based Johns Hopkins Hospital is a case in point. The organization supports a vast network that Raymond Lenhard, the hospital's vice-president of information systems, describes as "a very heterogeneous set of hardware and operating systems. We've got IBM mainframes, some DEC PDPs, a few Sun Microsystems, Inc. workstations and on and on."

Within this network, departmental computing is done in the usual fashion. "If the central hospital is the utility," Lenhard says, "then the various departments link to the central system as users."

Rx: Data integrity

But, Lenhard explains, a hospital has some unique requirements for any system of departmental computing. It must maintain levels of connectivity and data integrity far in excess of anything demanded of other data networks.

Patient identification is a good example. In a hospital, keeping records and files current, even if they are located in multiple and dissimilar data bases, can be a matter of life or death. It is critical to know that patient John Doe in Room 16, who checked in for a tonsillectomy, is not the John Doe in Room 37 who requires a heart transplant.

To provide that kind of safety, Johns Hopkins maintains a cluster of several (the number is growing) Pyramid systems from Pyramid Technology Corp. in Mountain View, Calif. These machines effectively ride herd on the rest of the network. According to Lenhard, "Lots of standards setting, lots of data management, lots of data security and lots of glue that holds it all together — that's what we've got on the Pyramids."

Lenhard says the result is a bit chaotic, but it is chaos that works. "It's not a design I'd advocate that people build from scratch," he says. "But what we've done here is face up to existing architectures. We've spent a lot more time networking systems and applications than throwing them out."

For MIS officers facing similar tasks, Lenhard has a single piece of advice — keep it simple. But, he cautions, it is not always easy to recognize simplicity when you see it. "It may not seem very simple to network two dissimilar data bases rather than just have someone type in the same piece of data twice, but really, it is. With dual data entry, you double your chances of an error." And, in the hospital setting, errors can be more than just costly in dollar terms. Thus, Lenhard's cardinal rule is, "You want to eliminate data entry as much as possible."

Departmental systems are one of those technologies that has long been slotted for an early death.

Personal computers and PC LANs have cut deep into the mid-range's traditional markets, and many analysts have suggested that, eventually, those markets will go with desktop machines and networks entirely.

However, Johns Hopkins' Pyramids show that departmental systems may yet have a place as connectivity and communications machines that support the fourth tier.

If that is the case, then departmental systems and MIS officers could become very close. Where, traditionally, information systems professionals have viewed departmental computers as alternate centers of computing power to MIS and, therefore, as a threat, such systems could now become MIS officers' single most important tool to manage the complexities of widely distributed processing.

Perhaps, rather than creeping slowly to an ungraceful end, departmental systems will experience a golden age. ◆

Snow White & the seven dwarfs

WHAT ARE DEPARTMENTAL computers, who sells them, and who uses them?

Market analyst Shaku Atre, president of Atre International Consultants, Inc. in Rye, N.Y., recently completed a study in which she attempted to answer those questions and others.

As for the market itself, "a departmental computer installation is a division, an organization or a department of a larger organization that has annual revenues of $10 million to $3 billion," she notes.

Atre finds it a little more difficult to say exactly who sells these machines most successfully, but she can narrow it down to one major vendor and a number of aspirants. She says the market consists of eight major vendors — IBM, Digital Equipment Corp., Hewlett-Packard Co., Wang Laboratories, Inc., Data General Corp., Prime Computer, Inc., Unisys Corp. and Nixdorf Computer Corp. — plus, of course, many, many smaller players. She says she feels that the eight companies will dominate departmental systems, at least in the short run. "The game now," she notes, "is figuring out which of them is Snow White and which are the seven dwarfs."

To this end she cites some recently released U.S. Department of Commerce figures that suggest most buyers of mini and multiuser microcomputers are not first-time users. Instead, they are organizations that already own at least one departmental-type machine and are now purchasing another, usually from the same vendor with which they've dealt before. "Mini or departmental computer sales will grow only by about 5% during the next few years," Atre says. "Which means, I think, that DEC will outpace IBM in this area, because DEC already has the largest installed base of such machines."

Atre says that DEC will, therefore, be the Snow White of departmental systems but, possibly, only in the near term. She cautions that some of DEC's competitors are looking stronger. IBM's push into departmental systems, with machines like the 9370, is the most obvious threat, but, she adds, "HP shouldn't be forgotten, and Data General shouldn't be forgotten."

Beyond DEC and the seven dwarfs, Atre explains, are what could be the most important rivals of all — the makers of personal workstations. "Perhaps in 1991 to '92," she notes, "Sun Microsystems, Inc. and Apollo Computer, Inc. will do to DEC what DEC did to IBM." — Michael Tucker

products

TECH TALK

Departmental computing: Chameleon of the industry

By Michael Tucker

What *is* departmental computing, anyway? Or, rather, why is it so hard to define?

Oh, these questions aren't to say that you can't get good, firm explanations of the term. It is just that for every six people you ask, you get six definitions. For some, it means minicomputers. For others, it is another way of saying gateway machines. For still others, it is an expensive marketing program for computer vendors that have exhausted the personal computer market but lack the resources to sell mainframes.

It shouldn't be this hard. After all, the idea of a mid-range system between PCs and mainframes is intuitively attractive. Moreover, there are well-developed models and theories of how departmental computing should be done — the famed three-tiered architecture of corporate computing is a classic example.

Yet, hard it remains. Could it be that departmental computing cannot be defined because it is simply too broad a concept to fit into one category?

> Everyone has a unique definition for departmental computing.

To help explain, take today, for example. In the past six hours I have met with three vendors. Each was introducing or discussing a radically different product. At first glance, it would be hard to say that they were anywhere near the same topic. Yet, I submit that each was selling into the departmental computing market.

9:30 a.m. — Ungermann-Bass, Inc. arrives to discuss Access/One, which the Santa Clara, Calif., company describes as "a standard platform for the delivery of network services to diverse network users." That means that if I am an MIS officer, and my company has a bunch of different networks and networking media and I'm slowly going insane trying to run multiple networks on multiple media in one company, Ungermann-Bass can help me.

The firm claims it can provide a system that fits into standard wiring closets and allows me to run multiple networks over standard twisted pair.

I may still have to handle protocol conversion and the like myself (although Ungermann-Bass hints that it will be looking at products to do that for me), but at least I don't have to worry about multiple media. I can keep a few rolls of common twisted-pair telephone-style wire in the basement and spool out a few yards when I want to add another PC, workstation or terminal to the network. I don't have to worry about expensive cabling. I may save millions of dollars in add-and-move charges — the expenses I normally incur in moving terminals or adding new ones.

A single Access/One system costs about $10,000.

Ungermann-Bass talks about Access/One as being the foundation for enterprisewide communications. That is to say the product is meant to provide a standard platform for communications throughout the corporation. This function would seem to be the complete antithesis of departmental computing in which, in theory, communications happens solely between coworkers with related functions or through a departmental system acting as a go-between.

Yet being an antithesis is a bit like being an imitation, the sincerest form of flattery. To become the total opposite of something means that one recognizes the power of the enemy. So isn't a drive toward enterprisewide communications a tacit admission that communications is, today, a departmental affair and that the most one can hope to do, at the moment, is to link the departmental local-area networks?

12:30 p.m. — I arrive at a nearby hotel. I am having lunch with representatives from San Jose, Calif.-based Chips and Technologies, Inc. They spend the greater part of an hour and a half explaining to me how their company, in association with Adaptech, Inc. in Milpitas, Calif., and Phoenix Technologies Ltd. in Scotts Valley, Calif., and the Santa Cruz Operation, Inc.

Continued on page 36

Tucker is *Computerworld Focus*'s features editor.

PRODUCT CLOSE-UP

Prime superminis bow

Prime Computer, Inc. in Natick, Mass., has unveiled two superminicomputers for departmental settings. The 4050 and the 4150 join the growing list of small, multiuser systems that are so powerful they challenge mainframes in some applications.

The 4150 is the larger system, supporting up to 254 terminals. It boasts performance of up to 4.1 million instructions per second (MIPS), up to 32M bytes of main memory and up to 3G bytes of on-line storage. The 4150's price tag begins at $191,600.

The smaller 4050 supports up to 128 users, and its starting price is $88,000.

Both systems are software compatible with Prime's other 50 series machines. The 4050 and 4150 are true departmental systems in that they are meant to operate outside of MIS's glass house and in the unforgiving modern office environment. The systems reportedly can withstand the wide swings of cold and heat that air-conditioning and wintertime heating cause, as well as the dust, clutter and random shocks that arise from day-to-day usage.

Stratus assaults DEC, Tandem with entry-level OLTP offering. Page 36.

The machines are also said to be easy to operate by end users and non-MIS officers.

The systems use the firm's Primos information system. This combined software environment and data base is related to Pick Systems' Pick operating system, which is, in some ways, one of the premier operating systems for departmental offerings.

What may be most significant

Continued on page 36

BLUE BEAT

The slighted 38

Brian Jeffery

Dateline: Rochester, Minn. Here, in the supersecret heart of IBM's development laboratory, a team of top IBM engineers is putting the finishing touches on the long-awaited Silverlake machine, which is known as the Olympic within IBM.

Sources close to the company say that the unit is composed of two lines, a System/38 follow-on and a System/36 follow-on, with a total of nine models, six of which will be introduced in 1988.

Users who have seen the system say that it comes with a new suite of Systems Application Architecture applications, comparable with those of the 9370 VM, a new version of RPG that is a superset of RPG-II and RPG-III, a Rexx-based control language and that it was designed by Howard Hughes after he had received inspiration from Darth Vader, who had landed in a flying saucer after finding a cure for cancer at the top of the Great Pyramid of Cheops, where it had been hidden by the CIA, which didn't want him to cure Emilia Earhart from the effects of a foolproof diet plan left to her by aliens, who had visited the earth 10 billion years before and built the Great Wall of China.

Don't you just love those Silverlake rumors?

Now that we have Silverlake out of the way, let's look at something more serious — the System/38. It is based on the most advanced computer architecture ever developed by IBM or, for that matter, anyone else. It has an integrated relational data base management system

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Tech Talk

Continued from page 34

in Santa Cruz, Calif., have worked together to produce a Personal System/2 clone kit. If you want to build a working PS/2 compatible, they will sell you pretty much everything you need, except for the casing.

I ask: Won't IBM take a dim view of their actions? They respond by saying that, in their understanding, semiconductor vendors (like Chips and Technologies) will not be troubled by licensing problems. But systems vendors that use IBM's Micro Channel architecture (like Chips's customers) will probably have to obtain IBM's permission.

We debate whether IBM wants the PS/2 to be an open or closed system. For the sake of argument, I suggest Big Blue will keep the PS/2 all for itself. For the sake of their customers, the people from Chips and Technologies say IBM will not. We agree to disagree.

Interesting, but not a departmental computing visit, right? A PS/2 is a *personal* system by definition, right?

Well, yes and no. It is now generally believed that, eventually, "departmental" will mean networks of some kind. Minis and multiuser systems will still exist, but, increasingly, they'll be big compute servers within intelligent LANs. The future may well be best revealed in technologies like those being promoted by the Network Computing Forum, a research and development association of systems vendors, in which the departmental system is considered a departmentwide network acting as though it were a single multiuser system. Some of the forum's members, particularly Apollo and Sun, are already performing batch processing with networks of workstations.

And the PS/2 shows strong signs of going in that direction as well. I questioned Sikander Naqvi, the Chips and Technologies representative, on that issue. He noted that, to the contrary, the IBM PS/2s his company has seen do not seem to contain any secret IBM connectivity hardware. What the machines do sport is the Micro Channel bus, which, because of its increased speed, could allow the machines to support front-end communications coprocessors of vastly greater power than any personal computer has managed before.

With that communications power, it would be possible to do with personal computer LANs the kind of departmental computing that has so far been done only with multiuser systems.

So, is the Chips and Technologies' introduction a PC story or a departmental story? You tell me.

2:00 p.m. — Waltham, Mass.-based Binary Engineering Software's President, Kevin Shea, arrives in the office. Binary Engineering has a new software product, Tech Graph Pad. The offering is a PC program for engineers that attempts to do for them what, say, Lotus's 1-2-3 did for businesspeople. Just as 1-2-3 is an improved and computerized version of paper spreadsheets, so, too, is Tech Graph Pad a computerized version of an engineer's graph paper.

The product costs $275 and requires an IBM Personal Computer XT- or AT-class machine running Microsoft's MS-DOS 2.0 or higher.

I liked the product and said so, but wondered why Shea was talking to me. After all, I write for MIS officers, not engineers. "Yes," he says, "but who supplies the software to the engineers?"

MIS holds the purse strings

Shea's point is simple: In most large firms, MIS buys the PC software. MIS managers are becoming ever more responsible for the software in departments other than their own. As a result, Shea explains, the MIS officer has to act more and more like some kind of vertical market application manager. Today, the department MIS supplies may be accounting; tomorrow, engineering.

So, even Binary Engineering is a departmental story.

I wonder. Could it be that departmental computing is hard to define because it is so immense? Could the departmental computing tale be similar to that of the story about the blind men who set out to define an elephant? Each of them reached out and touched a different part of the beast and found they each had a radically different idea of "elephantness," even though each had met the same creature.

Prime

Continued from page 34

about the Prime machines is their sheer power. When supporting 254 terminals, the 4150 boasts a user population that exceeds that of many mainframes.

As such, the question is whether the 4050 and 4150 can really be classified as departmental in nature or, rather, low-level, low-maintenance corporate DP devices.

Thus, the 4050 and 4150 join the ranks of machines that could almost completely remove end users from MIS's list of concerns. Whether that would be a blessing or a curse would depend on whether it meant MIS would be needed more, as central managers of distributed computing operations, or less, if end users discover little need for centralized systems. — MICHAEL TUCHEN

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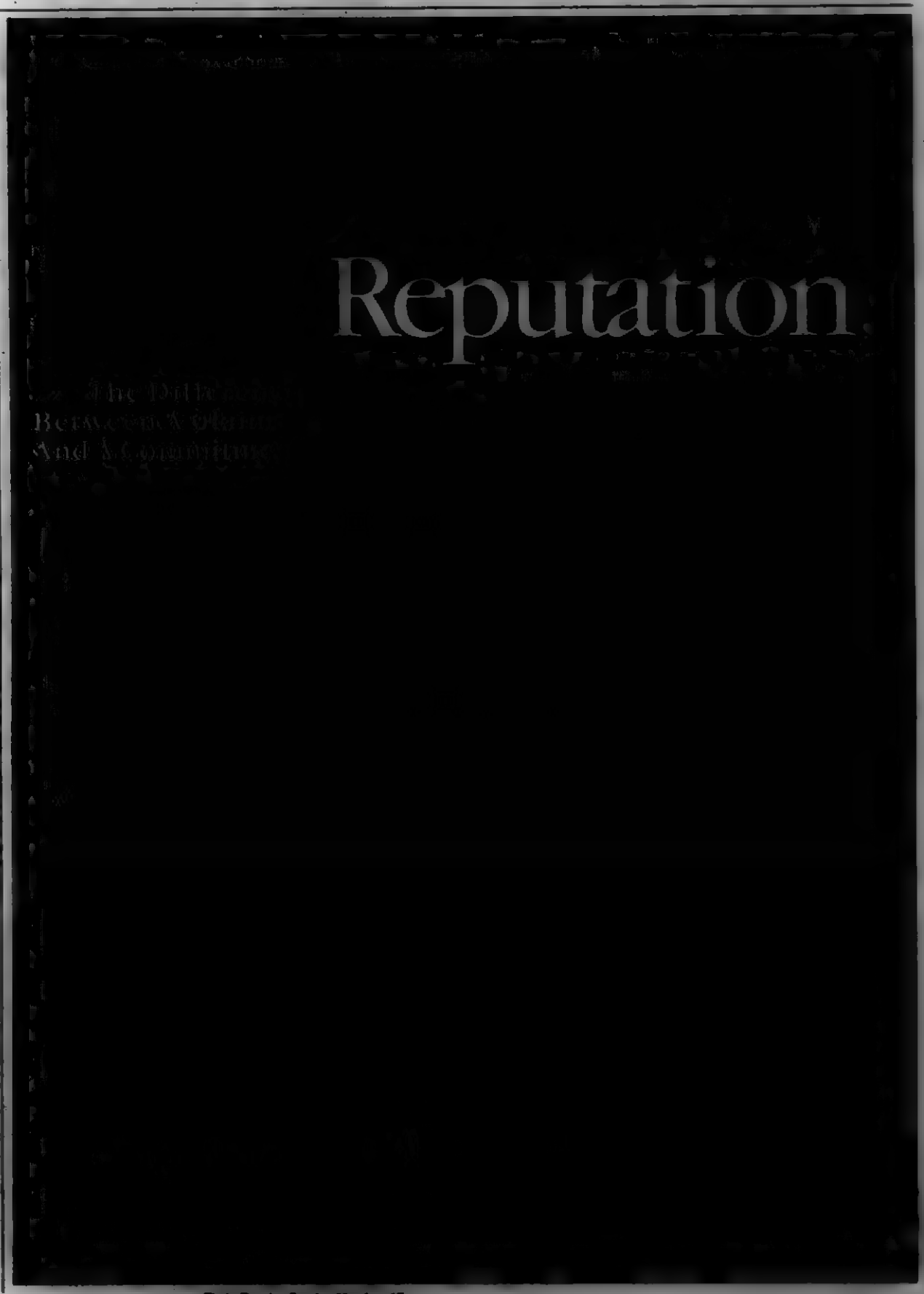

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Stratus guns for DEC, Tandem

Stratus Computer, Inc. launched the New Year's first salvo in the fault-tolerant online transaction processing (OLTP) turf war, taking aim at Digital Equipment Corp. and Tandem Computers, Inc. with an entry-level computer priced at $79,000.

In Stratus' XA2000 line of continuous processing systems, the Model 50 boasts a price/performance ratio of $8,000 per ET-1 transaction/sec. and reportedly delivers performance as high 10 ET-1 transaction/sec.

"We expect this to be a volume product," said William E. Foster, president and chief executive officer of the Marlboro, Mass.-based company.

Foster, who denied seeing sales cycles stretch out, says Stratus is investing heavily in a strategy to sell to new domestic markets, such as retail, travel, government and telecommunications.

Stratus also has two key OEM relationships, with IBM and Olivetti Corp., which account for 30% of its annual revenue. "Our objective is to make IBM and Olivetti as successful as they can be," Foster said about the added significance of the entry-level announcement.

At the January product debut, Stratus also introduced communications hardware and software for the XA2000 family that paves the way for integration into a heterogeneous computing environment.

The products include an intelligent I/O subsystem that accommodates more interfaces and runs on its own dedicated processor; a universal communications adapter for specialized or proprietary communications protocols; an Ethernet communications adapter compliant with the IEEE 802.3 standard interface that comes with an optional Transmission Control Protocol/Internet Protocol (TCP/IP) interface; a low-end and a high-end disk subsystem ranging in capacity from 152M bytes to 781M bytes; and a ¼-in. cartridge tape subsystem, the Model T301.

The company also upgraded the operating system for the XA2000 line, VOS, to Version 8.0 to accommodate the I/O subsystem.

An entry-level configuration for the Model 50 includes duplexed processor boards with four duplexed CPUs per board, 8M bytes of duplexed memory and a 152M-byte duplexed disk drive. Software is composed of VOS, a transaction processing facility and a forms management system.

The Model 50 comes with a 34-in. cabinet and costs $79,000.

A Model 50-T comes with a 54-in. cabinet that allows for upgrading to the Model 70. It sells for $84,000.

Next in line

The Model 70, also part of Stratus's entry-level attack, boasts price/performance characteristics similar to those of the Model 50. However, the unit is capable of up to 12 ET-1 transaction/sec., according to the vendor. The Model 70 is priced at $110,000.

All three models begin shipping in the second quarter.

The Ethernet communications adapter and the user-programmable communications adapter cost $4,000 and $2,500, respectively. The TCP/IP software is priced from $3,000 on the Models 50 and 70 to $6,200 on existing Models 150 and 160. Shipments also begin in the second quarter.

Both the intelligent I/O subsystem and the D117-based disk subsystem are priced at $13,000 for 152M bytes, $17,500 for 320M bytes and $28,000 for 781M bytes. Shipments reportedly will take place in the first six months of this year.

The ¼-in. cartridge tape subsystem costs $5,000.

In addition, Stratus has reduced the price of its existing 448M-byte disk drive to $22,000. — HELEN PIKE

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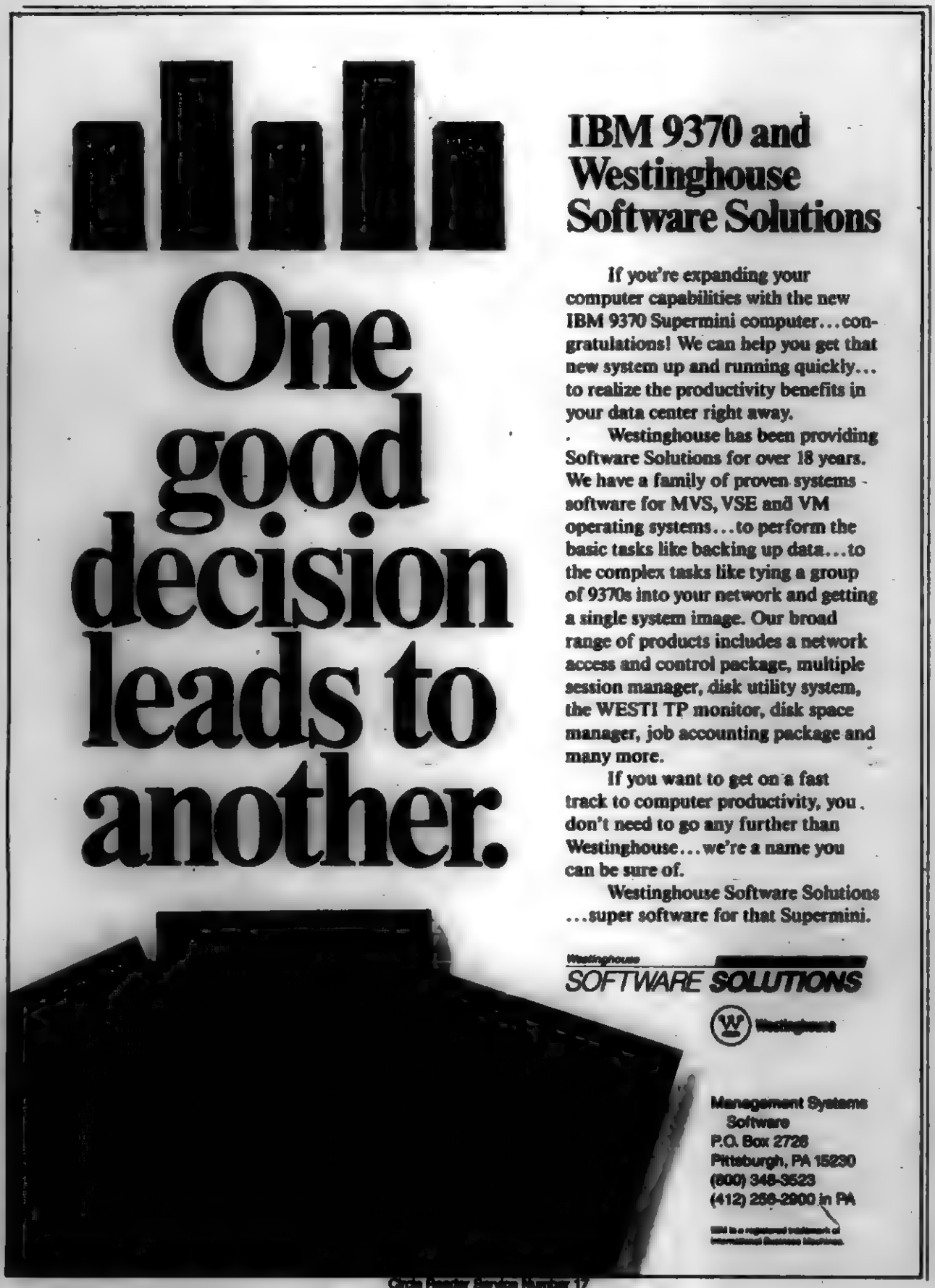

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The Insider

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when the time comes for a hardware upgrade, a Mac may displace a PC.

There are many good reasons to go with a Macintosh solution at the desk — ease of training being a major one.

Making allies

Apple has a good opportunity to strike up strategic relationships with a number of systems vendors.

DEC was an obvious candidate, but others are enticing as well. Those vendors that either begrudged the entire PC movement and accommodated the machines only in deference to the clamor of their customers or that just happened to be late with a PC solution may be able to create a potent departmental solution by featuring Macintoshes as front ends.

Those seeking an alternative to OS/2 now have it.

Moskin is vice-president and senior analyst with Patricia Seybold's Office Computing Group in Boston.

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Blue Beat

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more powerful and functional than any of the SQL systems, it employs 48-bit addressing (23 bit is standard for the IBM 370, 31 bit with MVS/XA), single-level storage, a language interface more sophisticated than even fourth-generation languages, the highest level of customer satisfaction of any IBM system and programmer productivity that averages seven to eight times higher than that of an equivalent 370 system. If IBM were about to introduce the 38, it would be the hottest story ever in the computer industry.

The surprising characteristics of the System/38 come from its origins. In the early 1970s, IBM worked on a project named Future Systems, whose goal was to develop a radical mainframe architecture to follow the 370. The development team was one of the most talented ever assembled, and the results of the group's research, seen in muted form in the System/38, are extremely impressive.

Yet it was left to IBM's General Systems Division to use the architecture, and the division was obliged by its charter to implement the architecture as, of all things, a small business system. This implementation is somewhat miscast in that the System/38 architecture is expandable far beyond the limits of the 370. IBM's own engineers say they believe that the 38 could be made to support 64-bit and even 96-bit addressing relatively easily.

The 38's history has been one of survival against odds. In 1974, then-Chairman Frank Cary canceled the Future Systems project, allegedly because of hardware problems but, in reality, because of opposition from the company's 370 lobby, which pointed out (rightly) that to introduce such a system would raise hell with the IBM customer base. After getting end users to convert to the 360, IBM wasn't about to try the same thing again. The 370 would stay, as far as anyone could tell, forever.

Then, in 1983, the System/38 was almost terminated in the same way as the 8100 series and for the same reasons: so as not to detract from the IBM commitment to the upcoming 9370. The 38 survived because a handful of IBMers and customers fought for it.

The 38 has proved particularly popular with low-end 370 users faced with a VSE-to-MVS conversion. In practice, even the most elementary calculations show that the additional performance requirements can be met more cost-effectively with a 38 than with an MVS conversion. The difference in System/38 overhead and in programming costs is that great.

European defense

Yet the System/38 has proved almost invisible to the MIS community in the U.S. In Europe, the contrast is striking. The issue of 370 vs. System/38 is widely debated in the press, there are numerous consulting firms to assist end users in handling migrations to a System/38, and no IBM seminar would be complete without a discussion of the System/38. IBM, while not liking the whole thing very much, has nevertheless gone along with what is a powerful and well-organized lobby.

In the U.S., the problem appears to be one of ignorance and prejudice. Most of the MIS community has not been exposed to the System/38. Ditto for IBM personnel: IBM management is staffed by veterans who won their spurs selling 360s and 370s, IBM marketing representatives are often poorly informed about the line and most MIS consultants apparently share IBM's prejudices.

Because of these factors, we may well be missing the real significance of Silverlake. IBM itself has said that the Silverlake line will eventually reach the $2 million range in 1991. That situation would put Silverlake well up into the 3090's price bracket. And having put Silverlake at that level, IBM would have to offer some kind of upward migration into the large mainframe area, which, in turn, would mean that Silverlake applications running something akin to a System/38 Control Program Facility would have to be supported on large mainframes.

And, IBM tells us, it is large mainframes that in the 1990s will have single-level storage, powerful relational data bases, advanced languages and a 47-bit operating system named "Planet." For the 370 architecture, then, you'd have to add one bit, the same way in which MVS/XA is equivalent to 32-bit. And that means Planet would really be 48-bit.

Hey, wait a minute!

Jeffery is managing director of the International Technology Group, a management consulting and market research firm in Los Altos, Calif.

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C2	VM Software,Inc. *800-562-7100;703-264-8000 in VA*
36	Westinghouse *800-348-3523;412-256-2800 in PA*

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PRODUCTS

Add-in board rolled out

Computone tool boosts PS/2 multiuser platform

Computone Systems, Inc. has introduced Intelliport PS8, an intelligent eight-port multiuser board designed for IBM's Micro Channel bus architecture, which is used in IBM's Personal System/2 Model 50, 60 and 80 microcomputers.

The Atlanta-based company said that Intelliport supports up to 32 users or devices on the IBM PS/2 machines and will maximize multiuser use under Unix, Microsoft Corp.'s Xenix and other operating systems that run on the PS/2 systems.

Intelligent add-in boards, such as Intelliport PS8, will convert the PS/2 line into a fast multiuser platform, a setup for which there is already a strong market demand, according to Terrell Redd, Computone's vice-president of sales and marketing. "Much of the demand for intelligent boards is created by the confusion arising from compatibility problems in the [Intel Corp.] 80386 processor-based microcomputer market," Redd said.

"The standard IBM Personal Computer AT bus of the [Intel] 80286 processor market is history. The 80386 micro manufacturers are creating some compatibility problems with cache memory and other technology inside the 386 platform. I believe 386 AT bus standards will emerge, but today, the IBM PS/2 Micro Channel bus platform looks pretty strong," he added.

Redd said that the Intelliport PS8 board is powered by a 10-MHz Intel 80186 processor, which also off-loads most of the I/O processing from the host.

The board's features include Intelliview, enabling multiple sessions on each terminal; Intelliprint, enabling independent use of printers attached to terminals; and Intellikey, allowing up to 16 user-defined function keys.

Intelliport PS8 has a suggested retail price of $1,295 and is available now. — STAN KOLODZIEJ

Circle Reader Service Number 196

LARGE SCREEN DISPLAY SOLUTIONS

Whenever two or more people get together to examine computer data/graphics, a real-time, large screen projection system is an invaluable tool.

Electrohome pioneered the concept of computer projection and, today, offers the most complete line of advanced systems. In the forefront are the new ECP® GRAPHICS single lens and ECP 3000 three lens systems. Both feature an advanced microprocessor that simplifies operation, and widens the capabilities gap between Electrohome and other projection systems.

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The ECP Graphics

This new single lens system can project images generated by high resolution (1024 × 1280 pixels, non-interlaced) CAD/CAM terminals, as well as video. Because it automatically locks on scan rates from 15-80 KHz, it's perfect for use with VCRs, PCs, terminals or high res CAD/CAM work stations. The ECP GRAPHICS is extremely portable and has VARI-FOCUS for screens 5' to 14' diagonal (front, rear or curved).

The ECP 3000

This new 3-lens system offers a bright, crisp image for screen sizes from 5' to 25' diagonal (front, rear or curved) and VARI-SCAN from 15-50 KHz. Like the ECP GRAPHICS this unit has a multi-function infrared remote control that includes digital convergence and all projector functions.

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Circle Reader Service Number 18

CALENDAR

March 13-19

1988 International Development Center Conference. Orlando, Fla., March 13-16 — Contact: Development Center Institute, P.O. Box 44087, Indianapolis, Ind. 46244.

14th Annual Computer Fair. Seattle, March 16-17 — Contact: Thomas Bennett, University of Washington Academic Computing Services, 3737 Brooklyn Ave. N.E., Seattle, Wash. 98105.

March 20-26

NCGA '88 Ninth Annual Conference and Exposition. Anaheim, Calif., March 20-24 — Contact: National Computer Graphics Association, Suite 200, 2722 Merrilee Drive, Fairfax, Va. 22031.

March 27-April 2

Thirteenth Annual SAS Users Group International (SUGI). Orlando, Fla., March 27-30 — Contact: Sally Roberson, SUGI 13 Registration, SAS Institute, Inc., P.O. Box 8000, SAS Circle, Cary, N.C. 27512.

World Congress on Computing. Chicago, March 28-31 — Contact: Cheryl Delgreco, The Interface Group, 300 First Ave., Needham, Mass. 02194.

The 16th Annual Interface '88 Conference and Exposition. Chicago, March 28-31 — Contact: Cheryl Delgreco, The Interface Group, 300 First Ave., Needham, Mass. 02194.

PRODUCT CHECKLIST

Yet another group of small business or departmental multiuser computers has come to market. These are the **Astra 400** and **Astra XL** machines from **NEC Information Systems**, a wholly owned subsidiary of the Japanese electronics giant NEC Corp.

The Astra 400 group is based on the NEC proprietary ITOS operating system. The group consists of the Astra 430, 450 and 470. Depending on the configuration, they will support up to 64 users and cost $13,945, $17,550 and $24,525, respectively.

According to the vendor, the Astra XLs are similar to the 400s, except that they are based on University of California at Berkeley Unix 4.2 rather than than on NEC's ITOS. Prices for XL machines range from $8,500 to $22,000.

NEC Information Systems, 1414 Massachusetts Ave., Boxboro, Mass. 01719.

Circle Reader Service Number 197

Jazz is back as **Modern Jazz**. Whether this revised **Lotus Development Corp.** integrated software will provide music to the ears of Macintosh users remains to be heard, however. Modern Jazz combines a worksheet, graphics, data base, forms, word processing and communications in a single package.

It runs on the Apple Computer, Inc. Macintosh Plus, Macintosh SE and Macintosh II machines as long as they support either two 800K-byte disk drives or one 800K-byte drive and one hard disk. Modern Jazz is priced at $395. Jazz 1.0 and Jazz 1A owners can upgrade to the product for $95.

Lotus, 55 Cambridge Pkwy., Cambridge, Mass. 02142.

Circle Reader Service Number 198

Data General Corp. has gotten into the personal computer-based desktop publishing business with a little help from its friends at Xerox Corp. DG has introduced the **CEO Desktop Composer**, a version of Xerox's Ventura Publisher 1.1. The product will allow desktop publishers working on Microsoft Corp. MS-DOS machines to link up with DG's departmental systems running DG's Comprehensive Electronic Office (CEO) office automation and networking software.

Thus, a CEO Desktop Composer user could extract corporate data from a departmental system and insert it directly into a document, the vendor said.

CEO Desktop Composer comes in several sizes and packages. The MS-DOS version costs $6,460. Prices for the CEO package range from $5,360 for the entry-level version running on the DG Eclipse MV/1400 to $50,015 for larger systems.

Data General, 4400 Computer Drive, Westboro, Mass. 01580.

Circle Reader Service Number 199

Wang Laboratories, Inc. has introduced a gateway between its office automation package, Wang Office, and Digital Equipment Corp.'s OA package, All-In-1. The gateway, known as Interoffice, was developed for Wang by The Boston Software Works, Inc. in Boston and promises to greatly increase connectivity in shops that combine or wish to combine Wang and DEC equipment.

Among other things, Interoffice allows the transparent exchange of electronic mail and documents between the two OA packages. In addition, Wang can provide similar transparent access to IBM's Professional Office System via Wang Profs, a gateway that Wang displayed at Telecom '87 last October.

Prices for Interoffice depend on the size of the processors involved. They range from $2,400 for smaller Wang VS machines to $9,500 for larger systems.

Wang, One Industrial Way, Lowell, Mass. 01851.

Circle Reader Service Number 101

A software development tool for creating cooperative processing applications has been unveiled by **Hewlett-Packard Co.**

The **HP Cooperative Services** development tool enables personal computers and HP 3000 business computers to process information jointly across a network.

According to the vendor, cooperative processing allows software developers to use the power of PCs in data processing applications. DP applications can take advantage of such PC features as Microsoft Corp.'s Microsoft Windows user interface and HP's Newwave applications environment.

The HP Cooperative Services development tool is priced from $2,700 to $8,700.

Hewlett-Packard, 3000 Hanover St., Palo Alto, Calif. 94304.

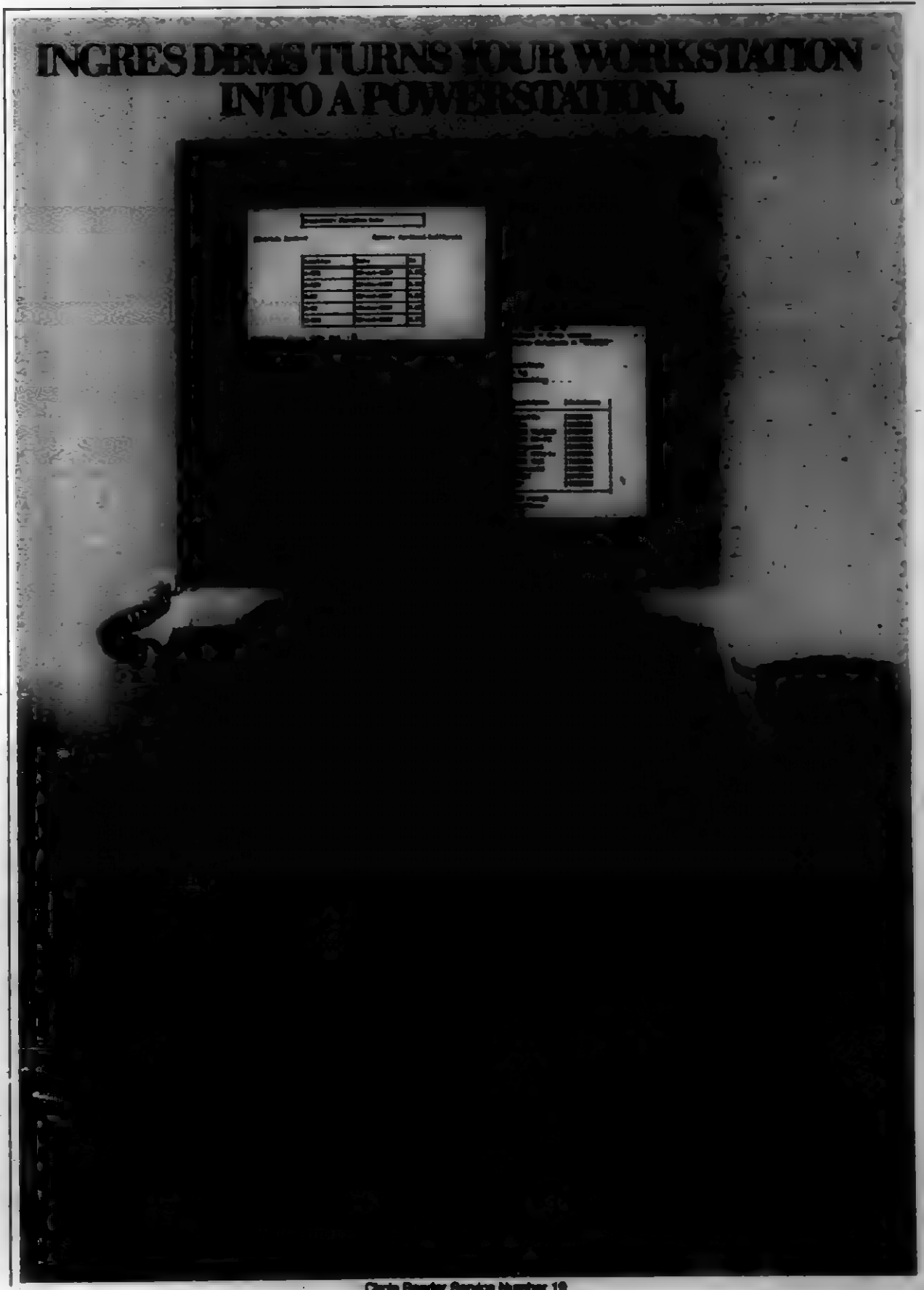
Circle Reader Service Number 102

Oracle Corp. is back in the news. The relational data base management system vendor has announced **Oracle for 1-2-3**, an add-in product for the Lotus Development Corp. spreadsheet. The product allows personal computer users to access data in the Oracle data base via the 1-2-3 spreadsheet. In effect, the spreadsheet becomes a user-friendly interface and query device for the data bases.

Oracle for 1-2-3 costs $199.

Oracle, 20 Davis Drive, Belmont, Calif. 94002.

Circle Reader Service Number 103

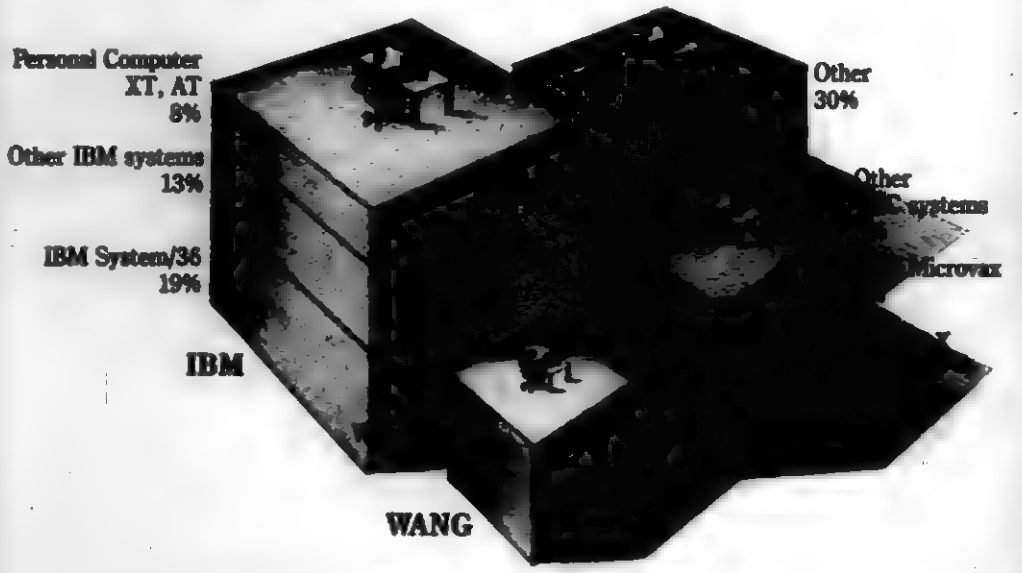


Circle Reader Service Number 19

log off

Departmental lion's share

In information centers, IBM holds the lead in installed departmental systems



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GRAPHIC BY BRUCE SANDERS

OF INTEREST

"Most of the components of the new IBM architectural complex date from the early 1970s, and they were sidelined after Thomas J. Watson Jr. expressed his opinion that the 370 architecture would last until the 21st century. Fifteen years later, the sins of the fathers are being visited on IBM and on its MIS users."

BRIAN JEFFERY
INTERNATIONAL TECHNOLOGY GROUP

See story page 23.

next issue

Data security is increasingly in the news — and for good reason. Spy sagas, expensive data losses and natural disasters are the bane of top management and can leave MIS shouldering the blame for insufficient prevention. April's *Computerworld Focus* will help show you ways to safeguard your systems. Learn how performance monitors and uninterruptible power supplies can maximize uptime and how hot and cold sites can come to the rescue if the worst happens. Security-minded MIS can also discover how to protect the growing ranks of personal computer networks.

Our Special Section salutes survivors. In it, we'll spotlight some infamous computer disasters and the tough lessons they taught. Check out April's *Focus* so you don't get caught playing the fool.

Apples shine as front ends

Michael D. Millikin

A growing synergy between DEC and Apple recently evolved into a formal joint development agreement between the two companies. This pact, coupled with DEC's latest refinement of its desktop strategy, opens up a new possibility for departmental computing: Apple Macintoshes used as the front end on a distributed departmentwide or enterprisewide network.

"Aaagh!" MIS and DP managers may choke. "Macintoshes!"

You bet. The squat little box that inspired some of the best and the worst advertising in the industry has grown up considerably and is easily the peer of personal computers when it comes to applications capability and connectivity. What has been missing for the Mac has been integration into network services and transparent access to either host-based or distributed applications.

DEC is supplying some of that network integration with its Network Application Support (NAS) program. In short, Digital has opened up its customers' choice of desktop devices. A DEC account can go with DEC's VMS or Ultrix, Microsoft Corp.'s MS-DOS, IBM's OS/2 or now the Mac operating system as the desktop environment. DEC still expects to sell its terminal-based strategies into many accounts. But both firms say they expect that the Macintosh increasingly will become a popular choice for DEC customers.

DEC says it plans to push out code onto the various desktop platforms for more distributed access to the network. For example, some or all of future DEC All-In-1 versions will be resident on the Macintosh.

Under NAS, the Mac will have access to the full suite of distributed network services announced as part of the growth of Decnet Phase V. It will also have access to the underpinnings for distributed network applications — the Remote Procedure Call, which is part of Decnet System Services.

But DEC's is by no means the definitive solution. Apple's Unix variant, A/UX, will provide access to both Macintosh productivity applications as well as to an industry-standard environment. With A/UX, Apple will have a workstation engine as functional, in many ways, as OS/2.

The battle for the future is OS/2 vs. the Mac operating system. There's not much Apple can do about the installed base of however many millions of MS-DOS and IBM PC-DOS machines that exist. From 1984 to 1987, Apple managed to sell one million Macintoshes. In contrast, last year IBM sold one million Personal System/2s from April to November.

OS/2 will exploit a hefty number of those machines (based on Intel's 80286 chip and higher), precluding a swap, en masse, for a different workstation platform. However, by cooperating with the MS- and PC-DOS and OS/2 environments and by offering its own comparable functionality, Apple should be able to win a lot of new seats. Then

Continued on page 36

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COMPUTERWORLD

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Hidden costs mine OS/2 field

Pricey surprise may await users planning upgrade — even on PS/2s

BY STEPHEN JONES and ALAN J. RYAN
CW STAFF

If you are expecting to run fancy next-generation applications under OS/2 on that PC AT you bought two years ago, get ready for a surprise: You may face nearly $5,000 in additional expenses to do so.

Even if you just bought an IBM Personal System/2 Model 50 last week, you are probably looking at extensive upgrade costs, not to mention what users say will be substantially higher long-term expenses for support and software.

IBM and Microsoft Corp.'s OS/2 is emerging as an expensive proposition for large corporations, some of which may find themselves saddled with millions of dollars in additional costs if they want to provide their base of IBM Personal Computer AT users with the latest and greatest operating system.

Better buy bigger

Although the official word from Microsoft is that OS/2 Standard Edition Version 1.0 requires 2M bytes of memory and an Intel Corp. 80286-based processor running at 6 MHz, "the best long-term decision is to purchase a 386 [machine]," said Mark Mackman, OS/2 product manager at Microsoft.

Users and software developers familiar with OS/2 said last week that a basic 80286-based micro can run one OS/2 application, but at least 3M bytes of memory are recommended if a user wants to run two or more applications at once.

"You can run OS/2 on a [standard] AT if you want to, but you probably won't be able to run anything else," said Bill Higgs, director of software research at Infocorp in Cupertino, Calif.

High price to pay

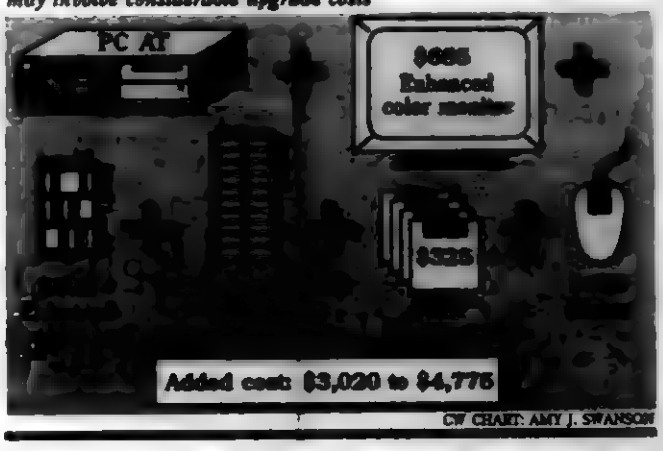
Infocorp has estimated that the cost of implementing OS/2 on a basic AT — including memory add-ins, operating system, applications software and user training — could range from $2,000 to $8,000.

For example, the cost of adding the 3M bytes of memory needed to effectively run OS/2 on a PS/2 Model 50 could run as high as $1,750 at retail list prices. The machine comes standard with 1M byte of memory.

Continued on page 6

It won't come easy

Although OS/2 will run on an IBM PC AT, the future Version 1.1 may involve considerable upgrade costs



CW CHART: AMY J. SWANSON

60 MIPS go under a desk

BY NELL MARGOLIS
CW STAFF

BOSTON — Apollo Computer, Inc. planted the first flag — if only by hours — in the suddenly hot supercomputing workstation territory last week with a 64-bit RISC-based parallel processing machine the firm claimed can deliver 60 to 100 MIPS.

With the Domain Series 10000 Personal Supercomputer, Apollo blasted past high-end workstation competitors into the realm of minisupercomputer manufacturers, according to market analysts.

Considering it did not exist a week ago, the supercomputing workstation niche is quickly getting crowded. Ardent Computer Corp.'s Titan debuted on the West Coast (see story page 8) as Apollo was rising in the East — and that was just for starters. Within the month, Newton, Mass.-based Stellar Computer,

Continued on page 8

NCR to show next mini line

BY JEAN S. BOZMAN
CW STAFF

NCR Corp. is poised to announce a processor family that will allow the firm's ITX operating system to operate at near-mainframe levels, according to NCR customers and industry analysts. The systems, reportedly named the NCR 10000 series, are set to be announced in New York early next week.

Several NCR customers contacted last week said NCR product managers had told them there will be four models, spanning an approximate price range from $50,000 to $200,000 or more. NCR declined comment.

Continued on page 116

HELP WANTED

MIS stares at skills crunch

BY MICHAEL SULLIVAN-TRAINOR
CW STAFF

Unable to find an MIS professional with the communications programming background he needs, Bob Maiers, manager of information processing at Morton Thiokol, Inc. in Chicago, is training one of his current employees to do the job instead. The lack of an experienced professional is slowing the company's installation of a mainframe communications network.

"There are not a lot of people available with a high level of skill," Maiers says.

His predicament is not unusual. Shortages in key skill areas are making it hard for MIS managers to find experienced professionals in communications, data base management, systems programming and top management. As a result, managers must work their experienced people harder, rely more on inexperienced trainees and delay implementing new technologies.

A recent *Computerworld* survey of 100 MIS managers revealed the following:

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Shortages shrink talent pool

In a CW survey, 100 MIS managers rate the difficulty of filling the following positions

CW CHART

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Beefed up. Convex unveils the C series of Unix-based single- and multiprocessing systems that appear to be pitted not against Cray but archrival Alliant. Page 4.

Scaled down. Ardent aims Titan, a "shrunken-down Cray," at bridging gap between high-end workstations and minisupers. The graphics supercomputer's debut coincides with the announcement of similar systems from Apollo and Stellar. Page 8.

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Quotable

"We are willing to pay any license fees to anyone we infringe upon. We've told IBM to just send us the bill."

RAJ JASWA
CHIPS AND TECHNOLOGIES, INC.

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LANs bridge to ISDN

Microcom to link local nets over long distance

BY JAMES DALY
CW STAFF

NORWOOD, Mass. — Microcom, Inc. became the first company to plug Integrated Services Digital Network (ISDN) telecommunications standards into a LAN-to-LAN connectivity product when it unveiled the MLB/1500 local-area network bridge last week.

The bridge marks an important milestone for the evolving ISDN to develop a toehold in the rapidly expanding LAN market, according to Larry DeBoever, a networking consultant in Acton, Mass.

"This is absolutely the right kind of application for ISDN. Many people use T1 bridges to connect LANs, and, basically, they're substituting ISDN for T1. In a year, everyone will be making them," DeBoever said.

Calling all LANs

The bridge supports link speeds of up to 64K bit/sec. over a dial-up long-distance connection between LANs, Microcom said. It also passes LAN packets regardless of what type of higher level networking protocol was used to generate them, according to the vendor.

The MLB/1500 is made up of three parts: a wide-area network module that controls the ISDN line link between the bridges; a LAN interface module that handles the packet traffic on the LAN; and a bridge management module that receives the packets from the LAN interface module, establishes communications links, keeps track of LAN and wide-area networking statistics and controls the general operation of the system.

The bridge also employs learning and filtering algorithms to increase network efficiency and ensure that only data packets used for remote LANs are passed over the bridge.

Microcom said networks that use Novell, Inc.'s Netware, 3Com Corp.'s 3+, Digital Equipment Corp.'s Decnet or Transmission Control Protocol/Internet Protocol can take advantage of the bridge, which is priced at $12,500 and available 90 days after receipt of order.

Five Bells peal together as Ameritech unites MIS

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — Ameritech recently said it is consolidating the MIS staffs of its five Midwestern telephone companies into a single organization called Ameritech Applied Technologies, Inc.

Glen Arnold, president of Ameritech Applied Technologies, said Ameritech created the subsidiary to help standardize a variety of internal computer systems it inherited from Illinois Bell, Wisconsin Bell, Michigan Bell, Indiana Bell and Ohio Bell.

"Some of our software systems are getting rather old," Arnold said last week. "We feel that if you're going to update these systems, it would be more efficient to update them once than to do it five times in five states."

Now, the development of common systems will be stressed — each software system and data base will be designed for use throughout Ameritech.

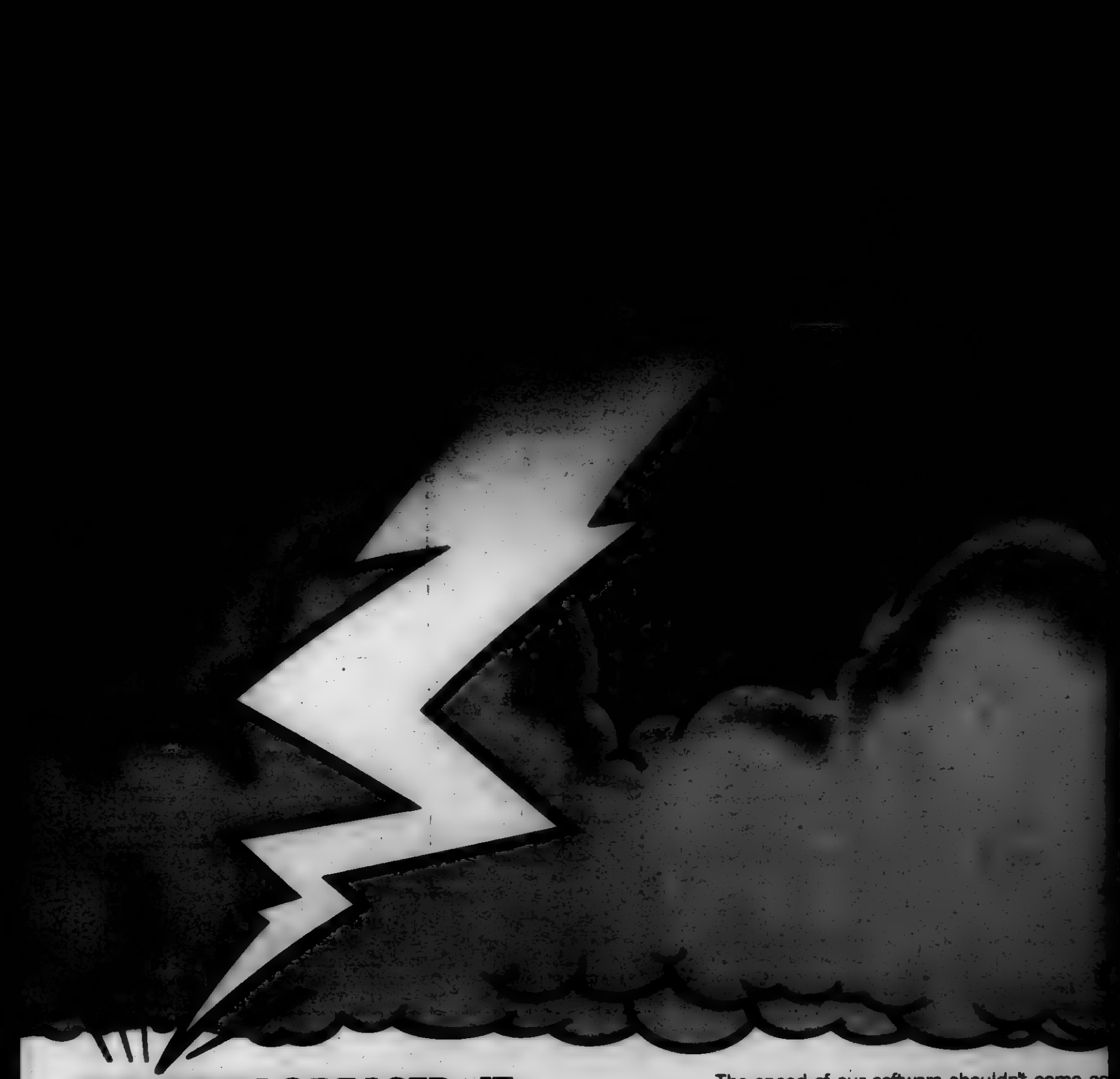
The new company, now being incorporated, is a wholly owned subsidiary of Ameritech with a total staff of 3,000 and a headquarters staff of 100 in Chicago. The realignment process began last week, as some managers in Ameritech Services and the Ameritech Bell companies were assigned new positions. Despite the changes, more Ameritech employees have moved to new jobs on paper than in moving vans.

No major moves

"We're going to have a small headquarters staff that will focus on strategic architectures," Arnold said. "But the software development people will stay close to our end users. Most of them are not going to have to move at all." No layoffs are expected, Arnold said, adding that there will be new hires at the firm's headquarters.

Until now, each MIS shop within Ameritech had its own set of hardware and software. Wisconsin Bell and Indiana Bell were largely IBM shops, while Illinois Bell had former Sperry Corp. computers and Michigan Bell had a combination of IBM, Sperry and former Burroughs Corp. equipment. For this reason, the strategic software systems for billing, administration and services also varied throughout the company.

The subsidiary's incorporation is expected to become final sometime next month, when regulatory agencies in the five Midwestern states give their official approval.



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Convex raises minisuper stakes

High end of series claims to rival Cray performance for fraction of cost

BY ALAN ALPER
CW STAFF

NEW YORK — Convex Computer Corp. last week unveiled a long-anticipated family of single- and multiprocessing systems, the high end of which is said to slightly exceed the performance of a Cray Research, Inc. X-MP/14 at one-quarter the price.

The C series includes two repackaged versions of Convex's existing C1 uniprocessor — both with reduced prices — and a processor that forms the basis of a multiprocessing architecture. The new architecture supports multiprocessing configurations of up to four tightly coupled 64-bit processors and can perform parallel operations, the company said.

All of the C series systems are Unix-based and feature integrated scalar/vector processors. The C1s — renamed C120 and C130 — and the C210, the base processor for multiprocessing configurations, are currently available. The C220, a two-processor version, is set to ship next quarter, while tri- and quad-processor configurations — known as the C230 and C240 — will be available in the fourth quarter, the firm said. Prices of the C series machines range from $275,000 to $1.4 million, Convex said.

The C series offers vector performance of between 20 and 200 64-bit million floating-point operations per second and scalar performance of between 11 and 124 Whetstone millions of instructions per second, Convex said.

A computational chemistry application called Amber is said to run 2.5 times faster on a C120 than on a Digital Equipment Corp. VAX 8800 that is 66% more expensive. The same application ran at the same speed on the C240 as on the Cray X-MP/14, Convex claimed.

Trying to break mold

Industry analysts and observers said the new product family represents an attempt by the Dallas firm to distinguish itself from a growing number of competitors at a time when growth has slowed in the so-called minisupercomputer arena and aggressive pricing has become the name of the game.

"This family is important to Convex because they need to have a faster follow-on system with more features to stay in the game," noted Gary Smaby, an analyst at Piper, Jaffrey & Hopwood in Minneapolis.

International Data Corp. (IDC), a Framingham, Mass.-based research firm, is revising downward its earlier estimate that the minisupercomputer market would reach $250 million last year. "We initially expected the compound annual growth rate for 1986 through 1991 to reach almost 40%, but that will come down," IDC analyst Marcia Brooks noted. Growth in the minisuper market will probably still exceed the 30.4% growth rate IDC projected for the high-performance system market overall, she said.

While Convex has continually compared the products with supercomputer leader Cray's, the C series seems directly aimed at archrival Alliant Computer Systems Corp. Alliant recently unveiled a processor family and has touted the alleged advantages of parallel processing since its formation. Alliant has also staked out the lower end of the market with systems priced lower than $100,000, in contrast to Convex's performance-oriented strategy, analysts noted.

Leader of the pack

First out of the gate five years ago, Convex is the acknowledged leader in the minisuper class, having shipped approximately 260 systems to some 150 international customers.

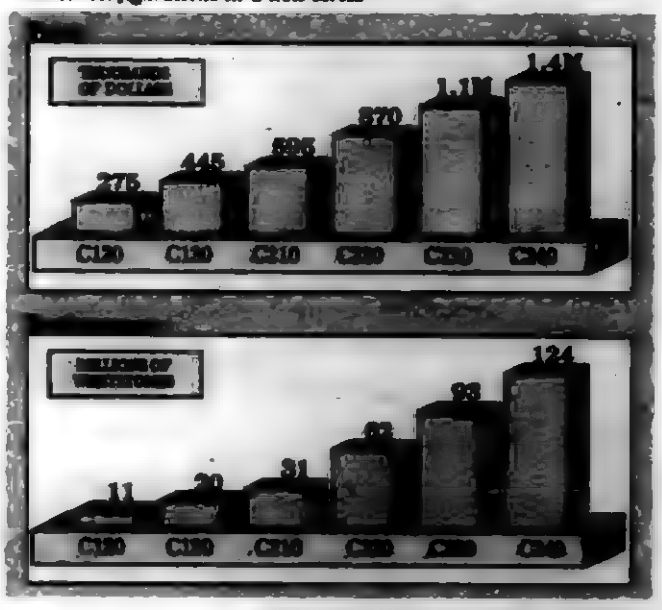
The entry-level C120 continues to use the TTY logic chips of the earlier C1 series, but Convex increased by up to one gigabyte the amount of physical memory the machine can support and reduced its price by roughly 20%; the C130 and more powerful systems use gate emitter-coupled logic chips.

The C200 processors can support up to 2G bytes of memory and share an intelligent I/O subsystem said to move data at 200M byte/sec. Both Multibus and VMEbus interfaces are standard with the systems.

Because the machines are air-cooled, they require less floor space and are less expensive to operate than large-scale IBM or Cray systems, claimed Steven Wallach, Convex vice-president of technology.

Second series

Convex expands power range by replacing its existing C1 processor with six configurations in a new series



INFORMATION PROVIDED BY CONVEX COMPUTER CORP.
CW CHART

MIS gets share of Fidelity layoffs

BY DAVID A. LUDLUM
CW STAFF

The layoffs of information systems professionals prompted by last October's stock market crash spread to Boston's sizable money management community last week as Fidelity Investments dismissed about 10% of its systems work force.

The dismissal of about 100 systems workers was in line with layoffs among most of the support and customer service departments at Fidelity, which let go approximately 800 employees, or about 10% of its work force.

The move came as Fidelity reorganizes its systems workers, moving the roughly two-thirds who develop applications from the central data processing organization, Fidelity Information Services Co. It is assigning about half those workers to individual business units and the other half to a new central organization, Fidelity Systems Development Co. [CW, Feb. 8]

Across the board

Michael Simmons, president of Fidelity Information Services, said he thinks systems layoffs are spread evenly among the two central groups and the business unit application developers.

"The idea is to try and become more productive. We didn't suspend anything. We didn't stop anything. We've reduced the number of people, and now we'll see how we can do the work," Simmons said. Across-the-board systems layoffs would hit about 70% in Boston and the rest in Dallas, he said.

Fidelity, the nation's biggest independent mutual fund firm, has expanded much more aggressively than its rivals, in part through encouraging frequent buying and selling of funds and touting both automated and personal customer service via 24-hour-a-day telephone lines.

Both moves led to rapid expansion of the systems work force. Last year, there were about 300 hires, and as in past years, systems workers who recruited new employees stood to win a Mercedes.

Fidelity, the first mutual fund company to retrench so sharply, has thus cut its systems work force only to the level of mid-1987, Simmons said.

He declined to describe how layoffs were targeted, but a spokesman said those whose jobs were considered expendable were let go. "I would not say it was a performance-based thing at all. It was based on position," the spokesman said.

The reorganization — launched informally prior to the stock market crash at the behest of Fidelity Chairman Edward C. Johnson III — is also aimed in part at controlling costs, said Richard Johnson, a Fidelity Information Services executive vice-president.

Time-out to regroup

"It will allow us to back up and put some necessary controls in place and assign specific accountabilities for each group to get things done in the time we want to get them done. It's an opportunity to regroup and get some controls in place," Johnson said.

The spokesman said affected employees will be eligible for severance pay ranging from six weeks' pay to "substantially more," depending on length of service, as well as help in job hunting.

Since the beginning of the year, Fidelity has laid off about 100 contract systems workers and about 300 other employees, most of them temporary customer service workers.

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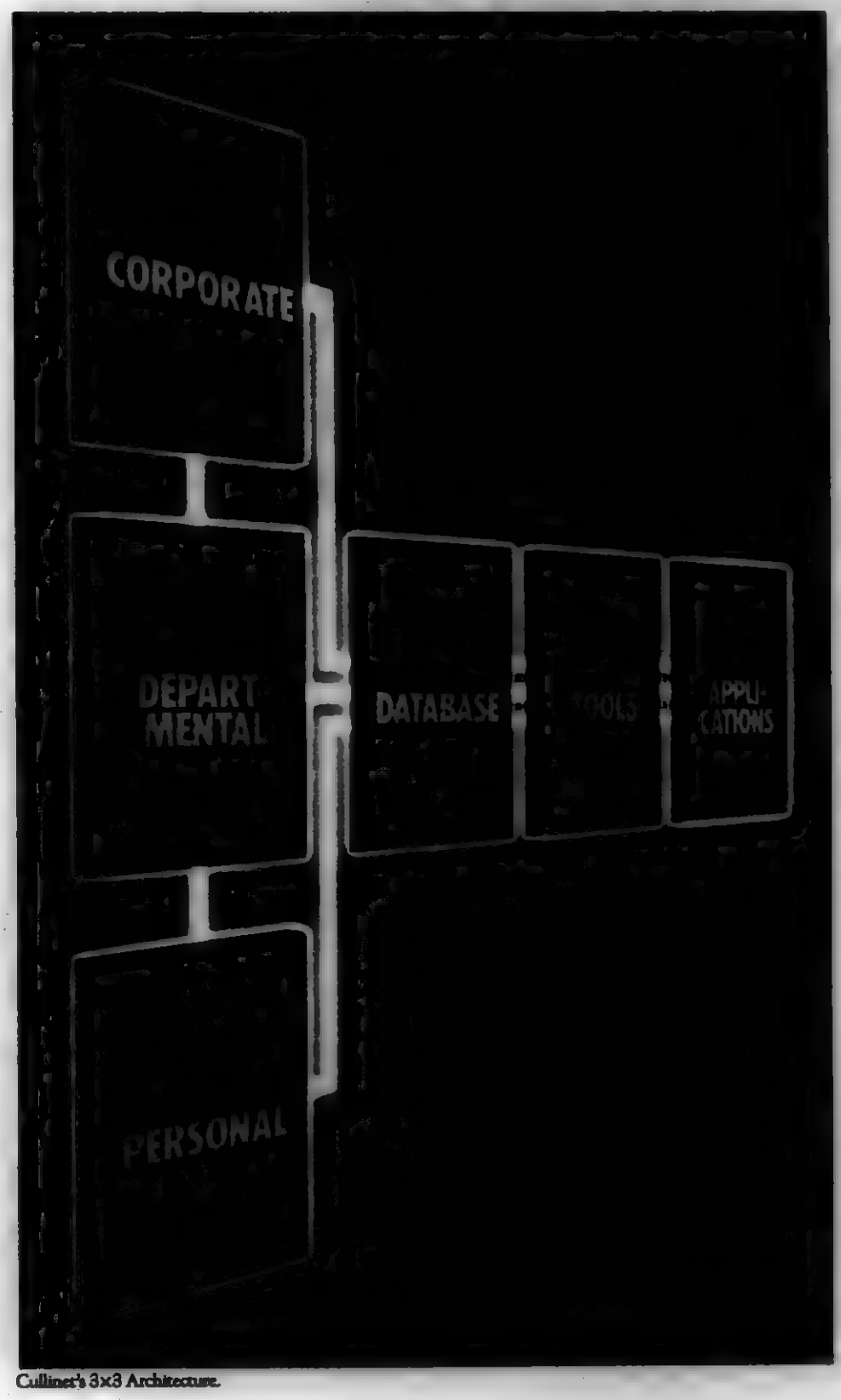

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HP, AST tout customized OS/2 versions

BY JAMES A. MARTIN
CW STAFF

Two more microcomputer vendors, Hewlett-Packard Co. and AST Research, Inc., joined the OS/2 software bandwagon last week, announcing their own versions of the Microsoft Corp. operating system.

HP said it will offer three versions of OS/2 for its Vectra series of personal computers. The first, OS/2 1.0 Version A, will run on Intel Corp. 80286-based Vectra ES and ES/12 micros and 80386-based RS/16 and RS/20 micros. It is set to be available in April for $325.

Version A will reportedly offer all basic OS/2 features as well as a dual-boot mode that enables users to choose between OS/2 and Microsoft's MS-DOS when booting up the system, and support for the HP proprietary mouse interface.

OS/2 1.0 Version B is said to add to those capabilities support for the original HP Vectra PC and its proprietary features, such as keyboard and disk interface cards. This version will be available during the second half of this year, at a price that has not yet been determined, according to Bill Johnson, marketing manager for the HP PC Group.

The third version, OS/2 1.1, includes the Microsoft Presentation Manager graphical interface and will be shipped in early 1989 at an as yet undetermined price, according to the company.

No rival to IBM's tool

The initial HP OS/2 release does not offer any of the capabilities that IBM is planning with its proprietary OS/2 Extended Edition, which includes enhanced micro-to-host communications, Johnson said.

"But we are very interested and involved in PC connectivity with our minicomputers, and it fits into our overall connectivity strategy," he added.

AST's OS/2 is also priced at $325, in line with IBM and Compaq Computer Corp. versions of the operating system.

The AST OS/2 version is scheduled to ship this week, and the Presentation Manager will follow when available later this year.

AST's OS/2 includes the dual-boot option between MS-DOS and OS/2 and was designed to work with AST Premium/286, Premium/386, the Premium Workstation and the Xformer/286 motherboard.

A spokesman said the AST OS/2 version is able to run on all of the firm's CPUs.

Buyers take chip shortage in stride

BY ED SCANNELL
CW STAFF

The growing shortage of memory chips finally took its toll last week as two major suppliers of memory enhancement products were forced to raise their prices.

However, most systems manufacturers said they did not expect the increases to drive up prices on their products during the next few months.

AST Research, Inc. said shortages of both 256K-bit and 1M-bit memory chips forced it to raise prices by 10% to 15% on all desktop systems delivered after June 1, with larger increases to be applied to its memory boards. Quadram Corp. also told key accounts last week it would be raising prices on its series of memory boards, although it declined to say by how much as of press time.

Most corporate MIS managers who were contacted also said they did not expect the shortages to adversely affect system prices and had no plans to change their purchasing decisions during the course of this year.

The chip shortage may "slow down the decline in prices" of microcomputers this year, but it will not raise prices, predicted Kavin Moody, Gillette Co.'s MIS director. Moody said he did not plan to make any major adjustments in his budget for microcomputer purchases this year.

Officials at both Quadram and AST indirectly blamed the 2-year-old U.S. trade agreement with Japan, which caused a dramatic reduction in shipments of dynamic random-access memory chips to the U.S. and prompted sharp increases in chip prices.

Japan currently makes the vast majority of memory chips for the U.S. market. Volume prices of 256K-bit dynamic RAMs have risen from $1.70 each last summer to its current price of $3.25, according to analysts.

"If all trade restrictions were removed by a wave of the magic wand, the situation would improve dramatically," said Venkat Mohan, a vice-president at Quadram.

The lack of 1M-bit chips has resulted in a significant backlog of Quadram's add-in products for IBM's Personal System/2 line, Mohan said. Most board and systems vendors expect shortages to persist throughout the rest of the year.

Last week, however, the American Electronics Association and the Semiconductor Association issued a joint statement urging the U.S. government to gain access to the Japanese market for American companies and encourage U.S. semiconductor firms to re-enter the dynamic RAM market.

"I think you'll see a variety of U.S. [chip] manufacturers who previously dropped out of the dynamic RAM market bringing their lines back up," said Mike Swavely, Compaq Computer Corp.'s vice-president of marketing. Currently, only Texas Instruments, Inc. and Micron Technology, Inc. have any significant share of the memory chip market.

Swavely and officials from other IBM-compatible product vendors said they do not expect to increase prices this year but admitted they probably will not be able to drop prices as sharply as expected either.

"Some people were predicting that prices would go down in the second quarter, but I don't think that is going to happen," said John Patterson, Tandy Corp.'s vice-president in charge of product development.

Zenith Data Systems does not expect any systems pricing changes over the short term because it has signed long-term agreements with chip manufacturers to meet its sizable government contracts.

Some observers said IBM will be hurt less than its competitors because it has its own chip foundry. An IBM spokesman said his company produces most of the 1M-bit chips it uses in its systems and relies to a lesser degree on second sources.

OS/2 field

FROM PAGE 1

Users who want to take advantage of all of the communications benefits of OS/2 Extended Edition 1.1 will need more than 4M bytes of memory; Extended Edition itself will sell for $795.

Those users who consider IBM's forthcoming Presentation Manager graphical user interface the key to OS/2 should tack on $900 for a color monitor and mouse, both of which are recommended. Older PCs that do not have an IBM Video Graphics Array card will have to add one for $500 to $600.

It is also expected that applications written to take advantage of the Presentation Manager will be more costly than their DOS counterparts.

Then there are the hidden expenses. One user noted that because OS/2 comes in 5¼-in. 1.2M-byte, or 3½-in. 1.44M-byte, formats, he would have to purchase a new disk drive to install the operating system on some of his older ATs.

Don't forget support

The estimated costs to get OS/2 up and running do not include the less tangible but equally costly long-term support issues, which could add thousands of dollars to the cost of upgrading each PC in an organization.

"Machine by machine, it will take at least one man-day to get information off the old machine and get the new system up and running by the time we go through all the backups and data conversion," said Jim Danielson, supervisor of information systems at Bendix Corp. in Elyria, Ohio, which has 500 PCs running DOS.

Because MIS staffs will be supporting two or more operating systems, more resources will be required, said Michael Reilly, assistant vice-president of office systems at Metropolitan Life Insurance Co. in New York, which has 3,000 DOS users.

Bogged down

The requirements for the Presentation Manager alone could create more serious problems. Analysts and software developers said that 80286-based machines running at 10 MHz or less will plod along at prohibitively slow speeds when running the graphics-based user interface and OS/2 Extended Edition.

"In terms of performance, the 386-based machine makes all the difference in the world; the graphical interface demands that kind of performance," said Roy Folk, vice-president of software products at Ashton-Tate Corp.

If the 80286 does not deliver the punch needed for advanced versions of OS/2, observers said, IBM could have some angry PS/2 users on its hands.

IBM has been selling its PS/2 Models 50 and 60 as the machines that will run the operating system of the future. Analysts, however, said they are skeptical about whether that will include the Presentation Manager and Extended Edition.

The Model 80 is the only member of the PS/2 line outfitted with an 80386. But only about 10% of the PS/2s sold to date have been Model 80s, according to research firm International Data Corp. (IDC). "Anybody who bought lower than a Model 80 is almost certainly in for a disappointment," said William Zachmann, senior vice-president of research at IDC.

Despite the financial penalties, some users said the trade-off is worth it.

"There is some risk in all of this, but we have confidence it will give us added productivity and better decision making," said Joseph Brophy, senior vice-president at The Travelers Corp. Brophy said he expects 10% of the 20,000 DOS users at Travelers to migrate to OS/2 within a year of the anticipated introduction of Extended Edition 1.1 in November.

Bendix's Danielson predicted that about 70% of his PC users will be running OS/2 by 1990.

The bottom line

System expansion required to run OS/2 is expected to dramatically boost single-user costs

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U.S. delays sanctions; Brazil revising policies

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The Reagan administration postponed trade sanctions against Brazil last week amid signs that Brazil is revising some of the computer and software policies that triggered the threat of U.S. retaliation.

It appears that U.S. negotiations with Brazil are going favorably, and the U.S. does not want to disrupt that progress, according to Charlotte LeGates, a spokeswoman for the Computer and Business Equipment Manufacturers Association.

U.S. Trade Representative Clayton Yeutter said the sanctions will be postponed at least until April 19, when Brazil is expected to issue regulations covering software imports and copyright protection. If the regulations satisfy U.S. concerns, sanctions may not be necessary, a spokesman said.

The U.S. wants to ensure that the regulations do not impose unfair tariffs or software import restrictions, sources said. Last November, President Reagan proposed $105 million in tariffs against Brazilian products, charging that Brazil was discriminating against U.S. computer and software products and failing to protect software copyrights [CW, Nov. 30, 1987].

Mending fences

Since then, Brazil has passed a software copyright law and relaxed its 1987 decision blocking the sale of Microsoft Corp.'s MS-DOS. In a major concession, Brazil said it will permit the sale of MS-DOS 3.3 because there is no Brazilian equivalent. It will not, however, permit sales of the earlier MS-DOS 3.2, because an equivalent product is sold by Brazil's Scopus Tecnologia SA.

There are also reports that Brazil has rejected a plan by Unitron SA to make a clone of Apple Computer, Inc.'s Macintosh, according to LeGates.

"There was a lot of dismay and disgust in December about the lack of progress in this situation, but that mood has really changed" after the recent developments, LeGates said.

Ardent joins downsized supercomputer fray

BY JULIE PITTA
CW STAFF

SAN FRANCISCO — Ardent Computer Corp. last week launched its "graphics supercomputer," a system positioned to bridge the gap between high-end workstations and minisupercomputers.

Introduction of the system coincides with the debut of a similar system from Apollo Computer, Inc. In addition, Newton, Mass.-based start-up Stellar Computer, Inc. is scheduled to formally introduce a third system in this class early next week.

Despite claims made by Ardent, Apollo and Stellar, it appears that the distinctions among the three products remain cloudy.

"They're all aimed at the same market," said Omri Serlin, president of Itom International, Inc., a Los Altos, Calif., market research firm. "The way the companies have arrived at the design is somewhat different. But who cares? The proof will be the performance on user applications."

Ardent's Titan uses 64-bit parallel vector architecture, like that found in supercomputers like Cray Research, Inc.'s X-MP.

Peak processing rate on the machine has been tested at 64 million floating-point operations per second. In addition, graphics processing performance has been measured at 200,000 full-color three-dimensional polygons per second.

'Shrunken-down Cray'

Gordon Bell, Ardent's vice-president of engineering, research and development and one-time developer of Digital Equipment Corp.'s VAX architecture, called the Titan "a shrunken-down Cray."

The Titan is said to be targeted at single users requiring high-speed number-crunching and high-performance graphics capabilities as well as visualization.

Ardent says it expects the system to be used by research scientists in the computational physics, chemistry fluid dynamics and mechanical computer-aided engineering areas, along with other scientific fields.

Ardent has signed a number of customers for its system, including Westinghouse Electric Corp., General Motors Co., Eastman Kodak Co. and MIT.

A limited number of single- and dual-processor versions have been shipped to selected customers. Three- and four-processor versions are scheduled for shipment in the fourth quarter of this year.

Cheap seats

Of the three systems, Apollo's appears to be the more general-purpose one. Both Ardent and Stellar's systems offer higher performance graphics capabilities. Ardent's Titan is built around off-the-shelf components, while Stellar's is more proprietary in nature.

Jeffrey Canin, industry analyst at Hambrecht & Quist, said the Ardent system will appeal to users who cannot afford the price of a minisupercomputer but require that level of performance.

Pricing for the Titan begins at $79,000 for a single-processor version and peaks at $150,000 for a full-function, four-processor version.

Performance of the system, as stated by Ardent, is "impressive when compared with both lower priced workstations and minisupercomputers."

"It's a new class of system. The controversial issue is how large a class it will be," Canin maintained.

60 MIPS

FROM PAGE 1

Inc. is scheduled to bring out its supercomputing workstation, and industry sources predict an imminent entry from Silicon Graphics, Inc.

Apollo's reduced instruction set computing-based Series 10000 "has definitely raised the bar for the competition and set the groundwork for a new class of computers," said David Burdick, an analyst at San Jose, Calif.-based Dataquest, Inc.

This new class, deskside models able to perform calculations at speeds formerly reserved for supercomputers, is targeted at exceptionally compute-intensive applications that require supercomputer clout.

Tuning trouble

In computational fluid dynamics, for example, users trying to simulate air flow "have to send their computations off to a Cray or a superminicomputer and then postprocess them on the workstation to manipulate the results," said Apollo high-end senior product marketing manager Paul Bemis. "The two-step process usually takes overnight, not to mention the loss in interactivity. Imagine trying to tune your radio if you couldn't hear the sound until later."

The Series 10000 is the first implementation of Apollo's Parallel Reduced Instruction Set Multiprocessing, or Prism, architecture. Able to be deployed as either a computational workstation or a network server, it wraps up to four processors, 8M to 128M bytes of main memory and up to 3G bytes of local storage into a box the size of a file cabinet.

The combination, according to Apollo, yields a workstation that can deliver 15 to 30 million instructions per second (MIPS) with one processor and 60 to 100 MIPS in a four-processor configuration.

> APOLLO is "playing at a distinct advantage: They have a large established customer base and a third-party software base. Ardent and Stellar have neither."
>
> DONALD BELLOMY
> INTERNATIONAL DATA CORP.

In a series of performance benchmarks run on similarly configured machines, the Apollo machine delivered more than 10 times the total throughput of Hewlett-Packard Co. and Sun Microsystems, Inc. high-end workstations, Apollo said. Prices for the package range from just under $70,000 to $139,900.

Despite what some see as a black hole in Apollo's offering — a three-dimensional graphics component will not be announced until the third or fourth quarter — the Prism and Series 10000 introduction should boost Apollo well into the front ranks of competitors in the new market niche, said Donald Bellomy, an analyst at International Data Corp. in Framingham, Mass.

"Once they've got the graphics component, they're playing in a whole new ballpark," Bellomy noted. "And they're playing at a distinct advantage: They have a large established customer base and a third-party, software base. Ardent and Stellar have neither."

As of year-end 1987, Apollo's 54,000 installations accounted for 25% of the workstation market, according to Bellomy.

The Personal Supercomputer series is source code- and binary data-compatible with all Apollo products, giving users access to some 1,800 applications, the firm said. It runs on Apollo's Domain/OS, which offers the choice of the University of California at Berkeley's Unix 4.3; AT&T's Unix System V, Release 3; or both simultaneously.

How the supercomputing workstation market will be carved, analysts noted, is not as big a question as how much of a market there is to carve.

"There's a market for these boxes, but it's limited in size," said Russell Crabe, an analyst at Stamford, Conn.-based Gartner Securities Corp.

Dataquest's Burdick said he views it as "not yet a market, but a major new market niche. We're starting to see evidence that people want supercomputer speed and graphics at workstation prices."

The Prism announcement could increase Apollo's standing in the traditional workstation market, Burdick added. "Sun was there first with the Unix standard with open architecture," he said. "This time, Apollo is first."

Workabolics' dream machines

Apollo and Ardent claim minisupercomputer performance for latest workstation products

[1] Millions of instructions per second
[2] Millions of floating-point operations per second

INFORMATION PROVIDED BY APOLLO COMPUTER, INC. AND ARDENT COMPUTER CORP.
CW CHART

CORRECTIONS

The Software Productivity Consortium plans to offer its products [CW, Feb. 15] only to consortium members.

Microway, Inc.'s NDP Fortran-386 compiler is for use with Intel Corp. 80386-based systems [CW, Dec. 14, 1987].

Fastcomm Communications Corp.'s FDX 2448 is a V.22 bis modem capable of communicating synchronously or asynchronously [CW, Jan. 25].

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Mac II to speak with LISP in TI pact

BY JULIE PITTA
CW STAFF

CUPERTINO, Calif. — Apple Computer, Inc. announced last week that its Macintosh II will be packaged with a LISP microprocessor and sold by Texas Instruments, Inc. as an artificial intelligence system.

In other news last week, Apple announced it had bought Network Innovations Corp., a communications software developer, and also opened up its Appletalk network to the Apple IIE and Apple IIGS systems.

TI's Data Systems Group will resell the Macintosh II, to which it will add its internally developed coprocessor board based on its LISP microprocessor and Explorer software environment for artificial intelligence development to the Mac II.

The Macintosh II, to be called the Micro-Explorer, will share the Apple and TI logos, marking the first time both companies have participated in a joint development agreement. The system will allow for the development of symbolic processing applications such as expert systems and will also run traditional Macintosh applications.

Pricing for the system is set to begin at $14,995, which includes a Mac II with 2M bytes of random-access memory, a 40M-byte hard disk drive, the Micro-Explorer coprocessor board and a runtime version of the Explorer software environment. Deliveries are scheduled for the second quarter of this year.

No big deal?

Industry watchers said the agreement represents a minor opportunity for Apple. "It won't represent that great a market for Apple," said Michael Orsak, an industry analyst at Robertson, Colman & Stephens. "Not that many people need a LISP processor."

Network Innovations, a Cupertino, Calif.-based developer of communications software products, was purchased by Apple for an undisclosed price.

> "NOT THAT many people need a LISP processor."
>
> MICHAEL ORSAK
> ROBERTSON, COLMAN & STEPHENS

At last month's Dexpo East '88 show, Network Innovations and its product CL/1, a connectivity language that allows the development of applications for connecting Macintoshes to Digital Equipment Corp. VAXs, received praise from Apple Chairman and Chief Executive Officer John Sculley. Earlier this year, Apple and DEC said they will work together to ease the connection of Macintoshes to VAXs.

Apple said Network Innovations will initially concentrate on the Mac-to-VAX products, later moving to products that connect Macintoshes to IBM mainframe data bases.

According to officials at both companies, Network Innovations will remain independent of Apple, retaining its own management team and headquarters. Apple representatives will sit on the Network Innovations board.

In a move to bring the Apple IIE and IIGS product families in line with the needs of corporate America, Apple said it has decided to offer networking links from these lower priced machines into the Appletalk network. This is expected to benefit mainly Apple IIE and IIGS users in the education and small business markets.

The links include an enhanced Appleshare file server at $799 and Appleshare print server at $299; a $249 Apple II Workstation Card; and two versions of the $99 Apple IIGS Workstation Software package, one for the file server and one for the Apple IIGS.

Users can hook into the Appletalk network thorugh Localtalk serial cable for access to the Appleshare server and Laserwriter printers, Apple said.

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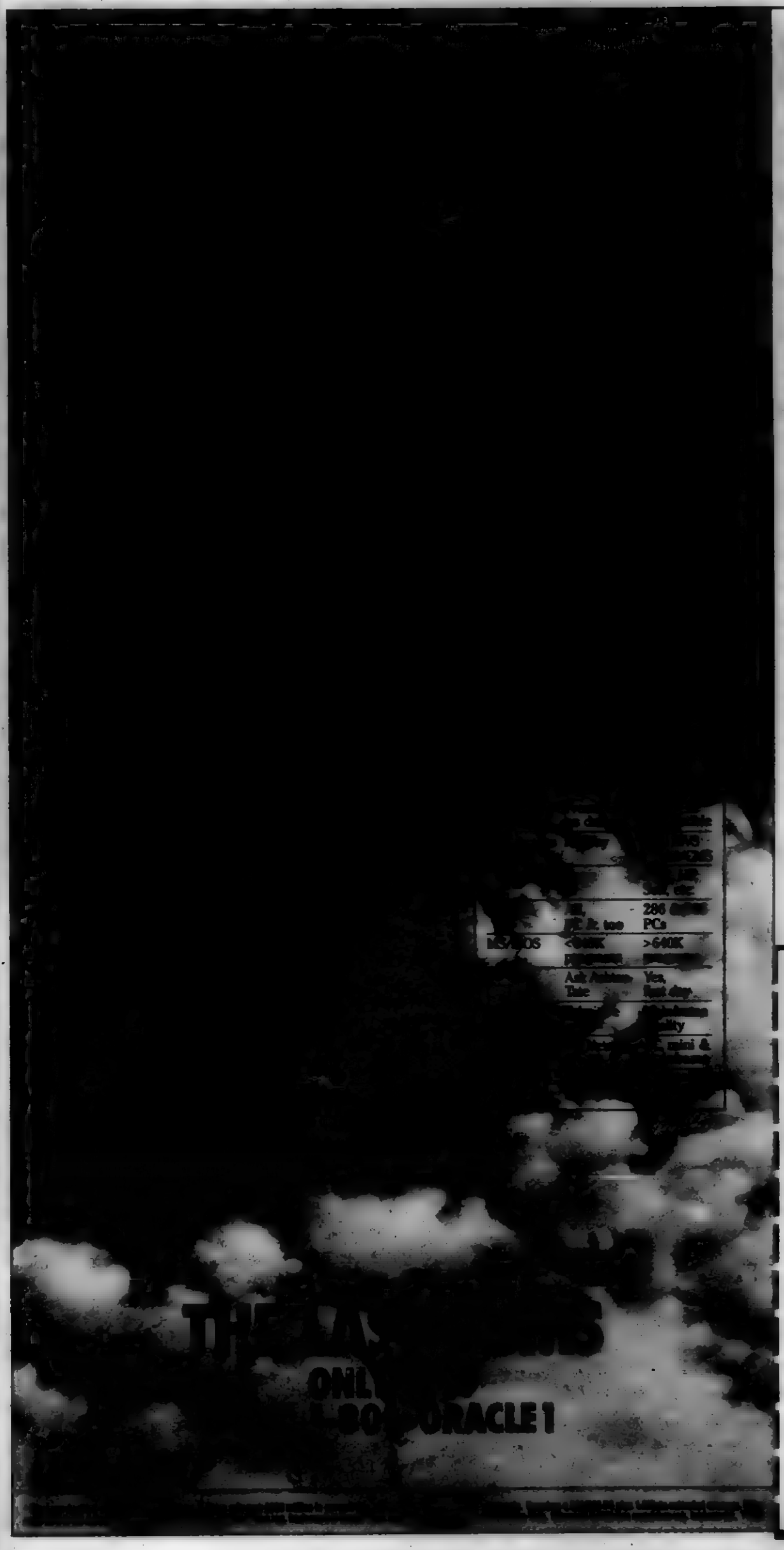

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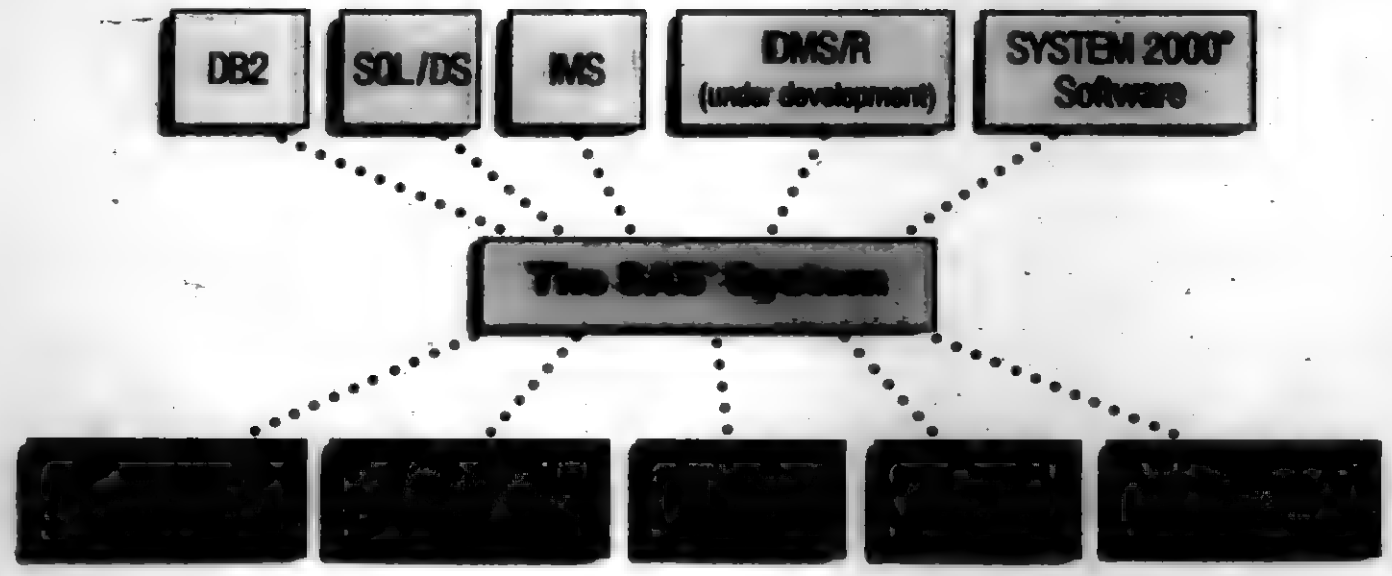

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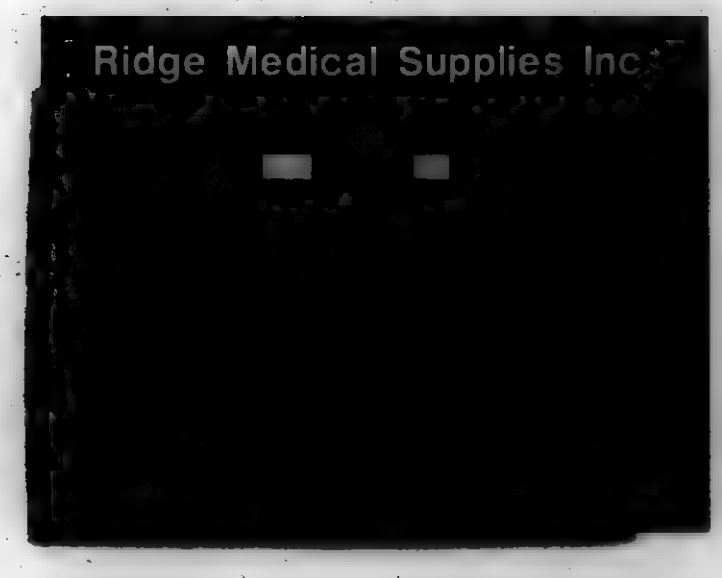
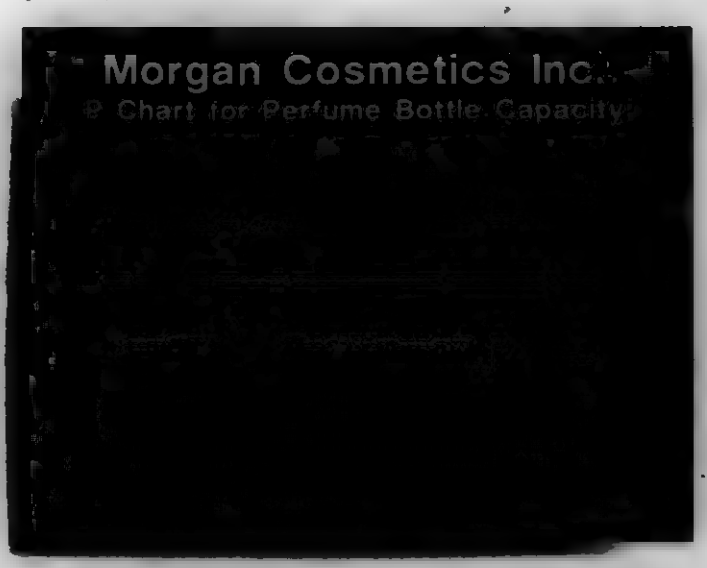
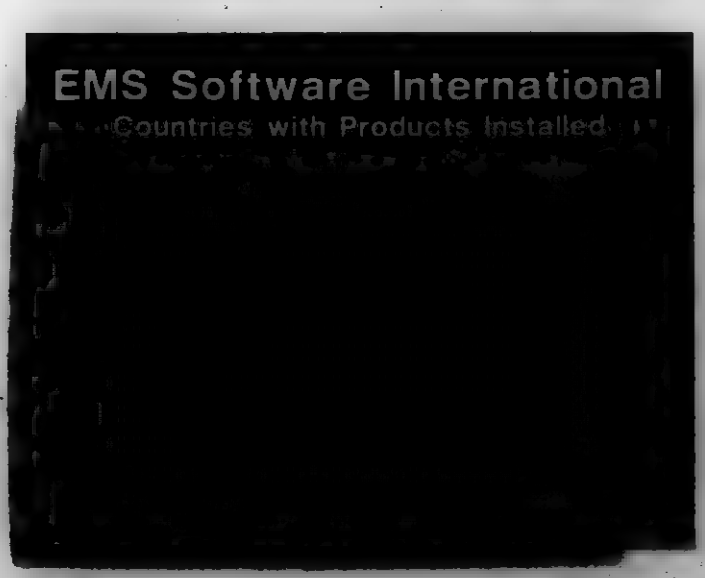
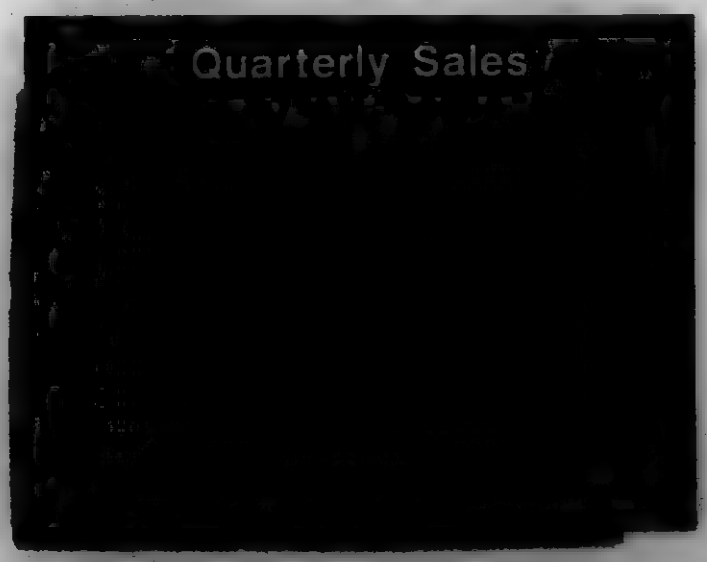
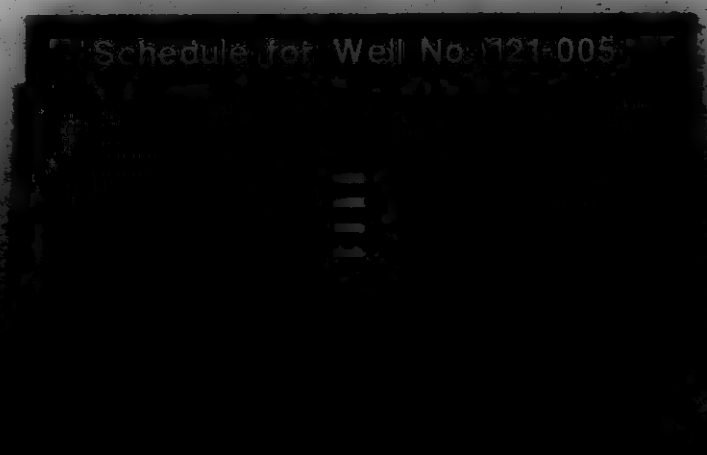










Sneak peek for PS/2 clone

BY JULIE PITTA
CW STAFF

SAN JOSE, Calif. — Chips and Technologies, Inc. last week previewed the first running prototype of a system the firm claimed is compatible with the Micro Channel architecture of IBM's Personal System/2.

Chips and Technologies has developed a chip set said to be compatible with the Micro Channel and has offered it to systems vendors as the basis of cloning the PS/2.

However, company officials said last week it is still unclear what the legal implications will be for cloning IBM's proprietary technology.

The first samples of the seven-chip set are scheduled to be shipped to between 50 and 100 OEM customers this month, according to Raj Jaswa, product marketing manager for Chips/250, believed to be the first available Micro Channel-compatible chip set. Volume production of Chips/250 is scheduled for late June, Jaswa said.

He predicted that systems compatible with the PS/2 Models 50 and 60 — both Intel Corp. 80286-based systems — will hit the market as soon as the second quarter.

And Tandy, too

According to some sources, Tandy Corp. has designed a board layout for a Micro Channel-compatible machine and is expecting the Chips/250 chip set by late this month. Tandy will ship prototypes of a PS/2 compatible to select dealers by mid-April, the sources said.

Chips and Technologies has been negotiating a licensing agreement with IBM for the last six months, Jaswa said. However, the firms have failed to reach an agreement.

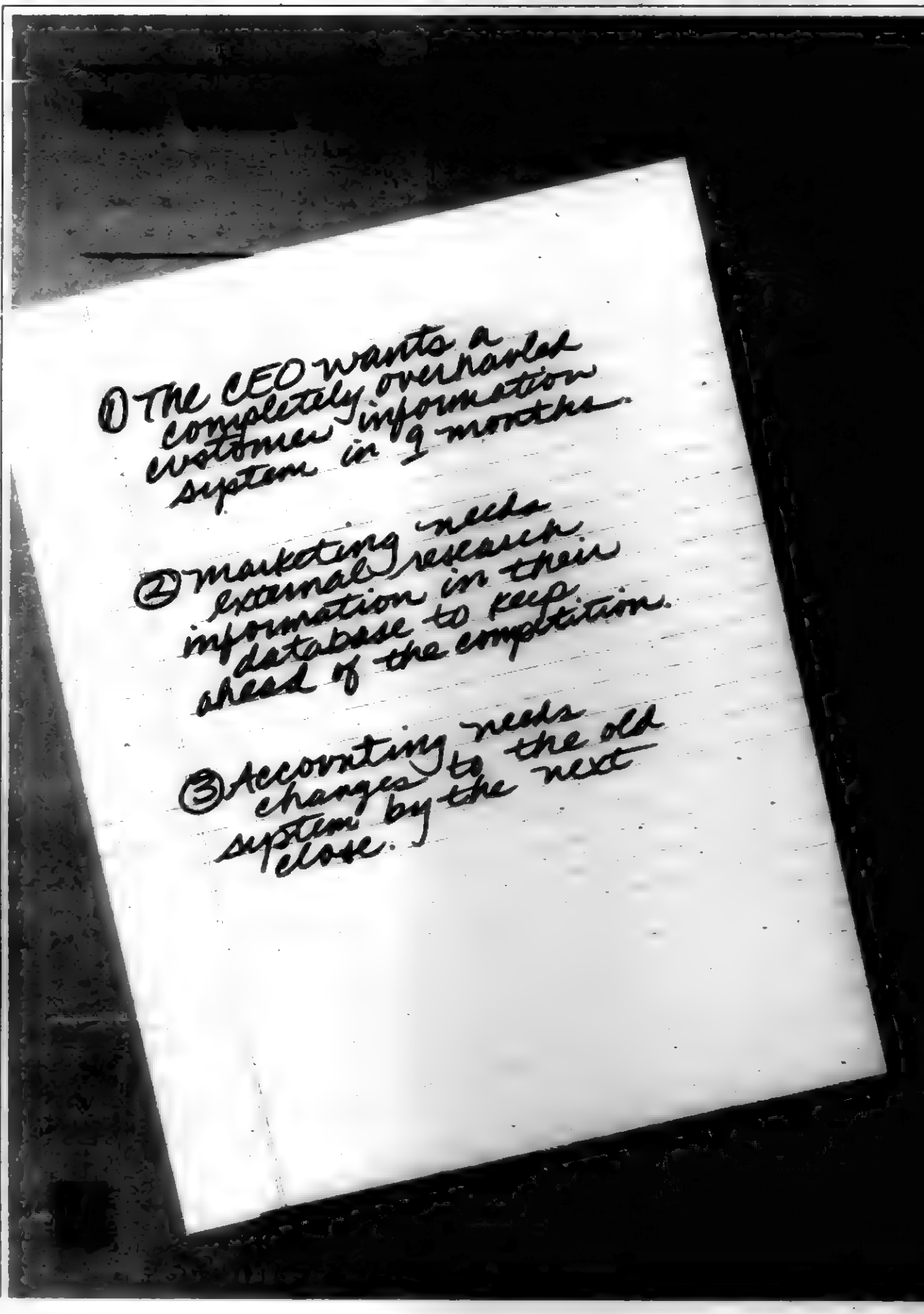
"We are willing to pay any license fees to anyone we infringe upon," Jaswa said. "We've told IBM to just send us the bill."

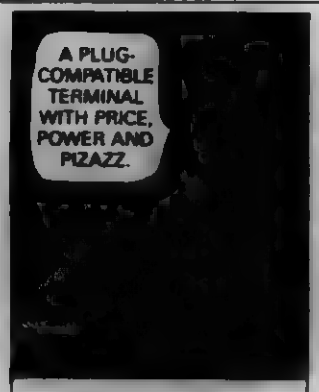
Chips and Technologies said its chip set will allow system vendors to improve on the performance of the PS/2 Models 50 and 60. In Microsoft Corp. MS-DOS-based applications, the Chips and Technologies prototype is running 50% faster than the 10-MHz Models 50 and 60, Jaswa said. Chips and Technologies expects to double that to 20 MHz before a final version of the chip set is released.

While IBM's wait-state memory cycle is measured at one, Chips and Technologies has tested its prototype at 0.5 to 0.7, Jaswa maintained.

Testing remains preliminary. So far, Chips and Technologies has tested 10 MS-DOS-based software programs, including widely used packages such as Lotus Development Corp.'s 1-2-3. Additionally, it has tested three add-in boards — Intel's Above Board and IBM's ST506 hard-disk controller and dual asynchronous card.

Chips and Technologies said it will begin testing IBM's OS/2 on the prototype shortly.





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Migent tool clears legal hurdles

BY DOUGLAS BARNEY
CW STAFF

INCLINE VILLAGE, Nev. — It's a year late and a bit scaled down, but later this month, Migent, Inc. should finally ship Emerald Bay, a data base product written by Ashton-Tate Corp. Dbase author Wayne C. Ratliff.

The product was originally scheduled to ship in the first quarter of last year and was set to include a Dbase-compatible front end. But an Ashton-Tate lawsuit alleging trade secret violations disrupted the development effort, according to Ratliff, who formerly served as Ashton-Tate's chief scientist. "It has been a sad story, complicated by the lawsuit," said Ratliff, who has been developing the product under contract for Migent.

In compliance with a settlement agreement between Migent and Ashton-Tate, the resulting product will not be entirely compatible with Dbase. Instead, there will be a front end, called Eagle, designed to be similar to, but different from, Dbase.

"It is not a clone, but if you know Dbase, you can learn Eagle in literally a few minutes. You can also convert programs quickly, but this is done manually," Ratliff explained.

The product is said to include an import and export feature called Roetta that allows Dbase and other types of data to be used with the system.

Migent also planned to include SQL as a key part of the product, but that did not happen. A key SQL programmer working for Ratliff defected to Borland International, pushing the SQL implementation back. SQL may be part of an update this summer, according to Ratliff.

Migent had also planned to ship a multiuser network version of the product. That did not happen; local-area network support is slated to be part of a follow-on update.

Migent had originally intended to promote its Ability integrated spreadsheet as another front end. But as with LAN support and SQL, users will have to wait for a product update that supports Ability.

The product reportedly will run under Microsoft Corp.'s MS-DOS. Prices were not available at press time.

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Motorola to nab Unix V

SCHAUMBURG, Ill. — Motorola, Inc. last week said it is about to sign a deal with AT&T that will ensure the company early access to upcoming releases of Unix System V.

However, an AT&T spokesman said its relationship with Motorola is no different from the verbal agreements it has with other hardware suppliers.

"We have made agreements with other vendors, not just Motorola, to make sure they get beta copies as early as possible," the AT&T spokesman said.

Motorola's announcement is the latest move in its push for the Unix market. The company also signed an agreement last week with the Unisoft Group, the parent company of Unisoft Corp.

Under terms of the agreement, Unisoft will provide the Unix ports for Motorola's 68000 and 88000 platforms.

At the Uniforum 1988 trade show last month, Motorola and Unisoft launched the latest standards effort in the Unix market by announcing the Unix Binary Compatibility Standard for Motorola microprocessors.

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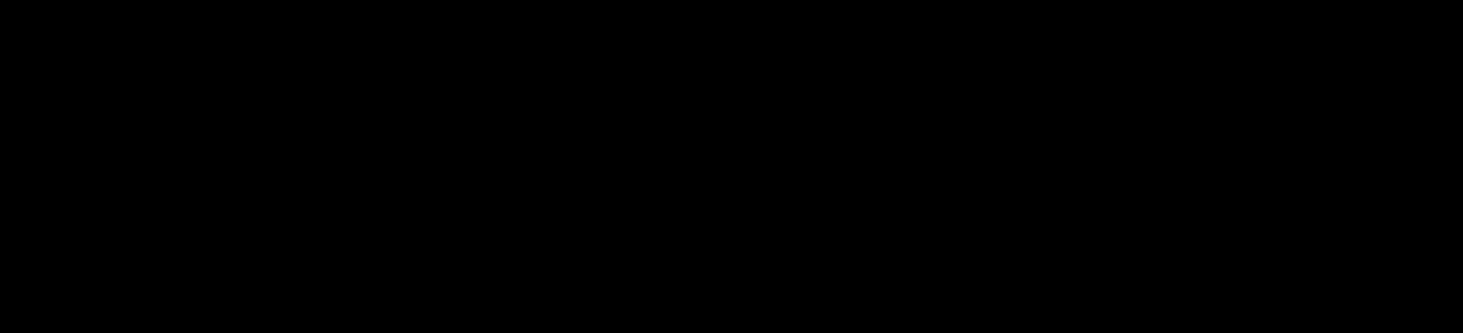

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System challenges 3088

Data Switch says channel-based 9088 supports 4.5M byte/sec.

BY ELISABETH HORWITT
CW STAFF

SHELTON, Conn. — Data Switch Corp. last week took aim at IBM's Model 3088 with a competing channel-based host networking system that is said to support data transfer rates of up to 4.5M byte/sec. for up to 16 mainframes.

The Model 9088 Multisystem Interconnect Unit targets corporate sites in which multiple hosts must regularly exchange large amounts of data, according to Data Switch product manager of Hostnet systems Neil J. Unger. For example, it could be used in a distributed processing environment in which multiple hosts cooperatively perform subtasks within one large job or where they trade off different jobs to balance the work load, he said.

The 9088 also can provide information sharing among logical processors created by IBM's MVS/ESA operating system within a 3090 mainframe, he added.

Avoiding bottlenecks

Consultant David Passmore said he could not think of many instances in which companies had enough hosts in one place to justify the 9088. "Or if they do," he added, "they use front-end processors because most of the communications is terminal-to-host." Passmore, a principal at Fairvax, Va., consulting company Network Strategies, Inc., said many of his customers want to directly channel-attach their mainframes, "but this is primarily as a way to avoid the front-end processor bottleneck when connecting multiple host sites over distance."

An entry-level 9088 with two internal data paths can be upgraded in two-channel increments to six data paths that can support communications among up to 16 IBM hosts, according to Data Switch. In contrast, up to eight hosts share only two data channels on an IBM 3088, "which can slow real throughput down to 1.2M byte/sec. when there is a lot of contention and handshaking between hosts," Data Switch's Unger said.

IBM was unavailable for comment.

Data Switch further boosted the 9088's throughput by assigning a dedicated microprocessor to handle I/O for each host channel adapter. In applications, such as bulk file transfer, in which handshaking is minimal, a 9088 network "approaches the 4.5M byte/sec. host channel speed" between two hosts, Unger said.

The 9088 is said to handle up to 512 addresses per data channel and to support all access methods for channel-to-channel communications without the need to modify mainframe operating system or application software. Transaction programs supported include LU6.2, JES2/NJE, Bulk Data Transfer and IBM's Intersystem Communication and Multiple System Coupling. Both data streaming and D.C.-Interlock modes are supported.

The product supports 3M-byte and, optionally, 4.5M-byte channels for IBM's 4300- and 3080-class computers. It is set to ship in April, with prices starting at $65,000 for a two-channel unit.

Users blast FCC access charge proposal for private networks

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Network users groups last week told the Federal Communications Commission that its proposal to impose switched access charges on certain private networks is unworkable and simply not necessary.

Furthermore, they denied accusations that there is widespread cheating by users to avoid the current $25 monthly surcharge on private lines.

"There is no problem which requires fixing," said the filing by the Ad Hoc Telecommunications Users Committee, which includes firms such as American Airlines, American Express Co., Ford Motor Co., General Electric Co. and Sears Roebuck & Co.

Similar comments were filed by the International Communications Association (ICA) and the Committee of Corporate Telecommunications Users in the proceeding, which is intended to determine whether private-line users pay their fair share of the costs of using the local telephone exchange [CW, Nov. 30, 1987].

The FCC last November revisited its policy toward private interstate networks that "leak" traffic from private branch exchanges (PBX) into the local telephone network. The commission now levies a flat $25 surcharge to roughly cover the costs of these off-network calls, but it is searching for a more accurate way to apply switched access charges.

The FCC said recent advances in digital PBX and Centrex switches suggest that off-network calls could be identified and measured for applying access charges. But the users groups said that neither the local exchange carriers nor the users have switches capable of accurately measuring leaked traffic and that adding the capability would be too costly.

Although the users supported the surcharge method, they said the $25 figure is too high and should be reduced to reflect the 60% drop in carrier access charges — or that it should perhaps be eliminated. The ad hoc committee recommended that the surcharge be cut to $10.

Users can obtain an exemption from the $25 surcharge by self-certifying that they do not leak traffic into the local exchange. But the FCC said it suspects the exemption "has been and continues to be abused by some and may contribute to the low level of actual revenues collected by the surcharge."

Revenue from the surcharge has dwindled from $147 million in 1986 to $114 million in 1987 and an estimated $88 million this year, far less than the FCC anticipated.

Allegation denied

Taking umbrage at the allegation that widespread cheating accounts for the revenue drop, the ad hoc committee and other users attributed the decline to FCC policies that have encouraged the direct use of the switched network and the fact that newly installed data links are likely to be exempt from the surcharge.

The so-called "leaky PBX phenomenon" is rapidly disappearing, the users groups said, for two main reasons:

- Rates for switched services used by large businesses have declined, due to lower access charges and the introduction of low-priced carrier services. This reduces the incentive to leak off-network traffic through a PBX because it encourages the direct use of switched networks.
- Data communications is now growing faster than voice communications, and most data traffic uses private-line rather than dial-up connections.

"It would be grossly inefficient to require existing switching devices to be upgraded for the sole purpose of measuring leakage, because both leakage and the need for the surcharge are declining," the ICA's filing said.

MSA rocked by resignations of top-level execs

A top-level shake-up is under way at Management Science America, Inc. (MSA) as two of that firm's top technology executives and a senior vice-president for sales resigned recently.

Dennis Vohs, former director of development at MSA and most recently president of its Advanced Manufacturing, Inc. subsidiary, resigned after 17 years with the company.

Vohs told *Computerworld* that MSA was consolidating the sales and development efforts of his unit back into the corporate fold and that he opposed the move. After talks with top management, Vohs said he decided "it would be best if I left."

Vohs called the parting "very amicable" and said he is looking for an equity position with a venture capital-backed firm. The new director of development at the manufacturing unit is Michael O. Hunt, who will also continue as president of MSA International, Inc.

Also departing is Larry Smart, senior vice-president of technology.

MSA's director of public relations, Denise Fields-O'Connor, also recently resigned, as did Jeff Fisher, former senior vice-president of sales.

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EDITORIAL

Clear but cloudy

DOESN'T IT SEEM like just yesterday that the clouds of impending recession, maybe even depression, were gathering? Wasn't it earlier this winter that many of the finest minds in the economic prognostication business insisted that a radical change for the worse was a *fait accompli*, following the tornado that devastated the stock market last October?

And along with these gloomy predictions came all sorts of advice about battening down the hatches. But after reading last week's reports on the present state of economic soothsaying, the question arises, Does anyone have a barometer that works?

First came the results of a survey conducted by the University of Michigan, which concluded that Americans see a strong economy ahead, thus providing "further evidence that a recession isn't likely this year," according to one newspaper report.

Then the U.S. Department of Commerce revised its Leading Economic Indicators for December. (We're not sure why, but in doing so, the indicators broke a string of two consecutive months of decline; three in a row signals *recession* in economists' parlors.)

In addition, the Dow was climbing toward the 2,100 mark. So everything's fine with the world, and we can pretty much forget about deficits and crashes and the fact that the White House guard will change in 10 months, right?

Hold on a minute. The Michigan study also showed that the number of U.S. households that fear a worsening long-term economic picture is increasing — fairly rapidly.

The U.S. Department of Labor recently released figures that signal a worsening inflationary outlook. And one of the most respected stock-fund managers in the country has begun to aggressively move away from the equity markets and into bonds and cash.

Through all this seemingly contradictory data, the one fact that stands clear is that Wall Street, the business media and the American public is inexorably fixated on the short term. The problem with this myopia is that well-hatched business plans, especially information systems strategies in today's environment, must focus on the medium and long term.

Therefore, it is worthwhile to repeat a message to information professionals that ran in this space shortly after Black Monday.

First, assume modest economic growth for this year — it's an election year, so nothing drastic will happen — and develop contingencies to long-term plans should the economy really sour next year.

Stick to pre-established long-term systems plans, but be wary of commitments to projects that assume or require a favorable business climate extending into the early 1990s.

Assume that, in this day of mass media, the greatest determinant of economic ebbs and flows may be human emotion, and that is imminently unpredictable.

LETTERS TO THE EDITOR

More sound and fury over Section 1706

As a certified public accountant and senior partner of my firm, I found the story "Independents' backs to the barricades" to be inaccurate [CW, Feb. 1].

I would caution your readers to properly classify their workers and not count on any agreement with a third-party vendor to limit their liability from an Internal Revenue Service assessment of withholding taxes. I also suggest that readers audit their vendors for compliance, because the IRS will not do it for them.

John J. Cameron
Zusman, Cameron & Allmon
Certified Public Accountants, Inc.
Palos Verdes, Calif.

Regarding the new rules and tests that are set to be introduced in the federal legislature, they should also include a Pinocchio test to be given to the independents. The questions could simply be: "Do you have a unique skill?" and "Are tax deductions the most important considerations for being an independent contractor?"

The Internal Revenue Service could then make a field trip to MIS shops and rank people by the size of their noses. You could bet they would be busy. Let's give a similar test of honesty to their vendors for co-liability, and the U.S. deficit could be reduced.

George H. Moilanen

I was disappointed to read the one-sided view regarding the position of independent contractors in the article "Independents' backs to the barricades." I would have expected a publication of your caliber to provide a more balanced viewpoint to its readers on an issue of such importance to the software services industry.

Accordingly, I hope you will see fit to print the other side of the argument together with the relevant facts.

Roy Kienke
President
CP Information Systems, Inc.
New York

The story "Independents' backs to the barricades" did not provide any substance or really reflect any current events. If you are going to spotlight a story from a lawyer and the brokers, you should also provide one from a lawyer and the professional services companies.

Jack Hines from New York Life Insurance Co. is probably right when he said this issue is good for the lawyers. I might just be right when I say *Computerworld* has encouraged a fox to write a story about how to guard the chicken coop.

John Mazza
Area Vice-President
Technical Aid Corp.
Oakland, Calif.

It appears as though a small special interest group is taking advantage of tax loopholes prior to the enactment of the 1986 Tax Reform Act, and they have convinced the author of "Independents' backs to the barricades" to champion their cause and stir up support for altering Section 1706. That article was totally misleading. The tax reform act did its job by closing many unfair loopholes. Let's not try to reopen them for the esoteric.

John F. Kasse
President
Kasse, Inc.
Boston

As a former aerospace administrator, I was responsible for coordinating activities by company programmers and programmers provided by technical service companies. It would be unjust if outside programmers performing the same function as in-house programmers were allowed to classify themselves as independent contractors and claim deductions not allowed to the rest of us. It appears *Computerworld* encourages special rules to classify some programmers as independents while asking others to pick up the tax tab. How unfair for a respected publication to print stories advocating special tax treatment for a select group.

Herbert G. Gale
Retired
Hughes Aircraft Co.
Oceanside, Calif.

How can independents have their backs to the barricade? When is the last time you saw MIS personnel not have systems to design or programs to write? Oh, you mean some personnel lost their employment-related tax write-offs. Well, I suppose they can get a job in fast food or pumping gas. Of course, if they are on the fringe, they can always continue their current job.

Joseph A. Post
Director of Project Management
Zink & Katich, Inc.
Lansing, Ill.

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.*

Technosynthesis: Life after disks

CHARLES LECHT

The time between discovery of a new publications medium and its maturation to maximum utility can be great. The ancient Egyptians used papyrus, but it took several thousand years before paper reached the level of usefulness inspired by the invention of the printing press.

This pattern has been manifest since time immemorial: The ultimate usefulness of one invention awaits the discovery of another. Film had to await the movie camera; sound recording, tape; broadcast, video.

These days, the maturation time of newly discovered media in the publishing world is ever shortening. For example, computer disks — floppy, hard, optical and laser — are reaching ever increasing utility over shorter increments of time. Innovations in computer hardware and software are flowing into the marketplace at a rapid pace.

Innovations in optical-disk read/write technologies are creating soaring sales. Shipment figures are astonishing, from 31,700 units in 1986 to 99,600 in 1987. In 1990, the number may reach 1.2 million.

Disk technologies should reach peak utility in the next five years. After that, their desirability as an I/O medium will begin to be eclipsed by that of massive direct-access, nonmoving, plug-in computer memories. Information now available for purchase on disk will be housed in these memories; the blank disk media will be replaced by blank, nonmoving memory modules.

When the sun sets on disks

When the day of the disk is done at the turn of the century, computer technology will have shed the last of its moving parts to become ever more reliable and useful to us. The day that there are no longer moving parts in a computer system will herald the arrival of another — the day that the product of electronic publishing can itself be electronic.

Limitations in power availability, practical portability and so on in computers with moving parts have caused the role of computers in electronic publishing to thus far be essentially consigned to helping create old publishing media forms in new ways.

When the computer and its source of electrical power become truly portable, it will find a new role as the medium itself. For example, there are a host of companies that are "publishing" — there may be no better word for it — computers containing language translation information that was heretofore only found in a classic text or possibly on a phonographic disk.

Examples of other uses of computers as media abound. While these are primarily in the nature of small, hand-held devices of limited power, we can anticipate that they will soon begin to increase their capabilities in an essentially limitless way.

The use of a computer system to create new media publications and to aid us in obtaining the benefits that these bring will doubtless offer people an exciting new experience. As the printing press was used to create books, the computer may create that which books promise to offer: experience.

SUE DARBY

Words dance off the page

I offer the book in its current form as a plateau from which we can proceed to gain a glimpse of how this could come about. Suppose that the pictures in books were capable of moving. If the pages were available on the display of a computer, getting them to move would be no big feat.

And suppose that we could somehow enter the moving picture scene to experience its content, leaving the world of words outside. It would be possible if the book were capable of producing three-dimensional holographic scenes and projecting them around us. The book would then offer us an experience as large as life itself — albeit an artificial experience.

The impact of artificial experience is staggering in its potential for improving the quality of our lives. It could so reduce our dependency on the written and spoken word that we might one day be free of the necessity to communicate using them.

A technosynthesis is at hand. We may forever be caused to wonder, as did the ancient Middle East scribe of *The Rubaiyat of Omar Khayyam*, "Who is the potter, pray, and who the pot?"

Lecht is an IDG News Service foreign correspondent based in Tokyo.

What's a mainframe, after all?

AMY WOHL

Users don't really care what you call a system. They care about what it does, what it costs, how easy it is to use and how well it integrates with information-providing devices already in use.

Historically, a mainframe was big physically, big in acquisition and operation costs and big in processing power. Today, we can find mainframes that are quite small, sometimes not so expensive and even less powerful than certain personal computers and minicomputers.

We need to stop measuring the physical size or raw performance of a computer and start looking more at the environment it requires, the support it demands and the functionality it provides. We need to look at the real cost of doing things — including items that appear on the organizational rather than the data processing department's bill, such as time lost working in an unfriendly environment.

We also need to understand the difference between continuing what we're doing because it makes ongoing economic sense and continuing what we're doing because familiar things seem less scary, particularly in complex and critical environments.

Learning to share

Early mainframe computers weren't designed around particular applications. We figured out for ourselves how to perform an increasing variety of tasks on whatever hardware platforms the computer industry supplied.

Today, that is less true: Mainframe applications increasingly tend to share certain characteristics, such as solving corporate-level problems.

Except for certain kinds of giant number-crunching applications, which might focus all of a mainframe's power on a single problem, most mainframe environments have been designed to permit multiple users to share the computer's considerable processing power. Applications that are processor hogs, such as what-you-see-is-what-you-get interfaces, graphics and so on, don't easily share multiuser mainframe environments. They don't share single-processor environments of any size well, micro or mini or mainframe.

Mainframes generally use custom or highly customized software, most often created and maintained by the user organization's own expensive programming staff. In contrast, minicomputers and PCs depend, for a substantial part of their charm, on the abundant availability of turnkey, off-the-shelf software.

To make efficient use of their power and provide rich, flexible tools, mainframes often use complex, layered software that requires professional — DP professional, that is — administration and support. Minis and PCs often rely entirely on non-DP professionals for their care and usually do best with more straightforward approaches.

The mainframe design and programming philosophy has traditionally emphasized writing programs to make efficient use of a scarce resource. This tendency can lead to programs that run well but are difficult for end users to learn or use — and certainly not designed for users to modify. Minis may be similar but continue to try to move in a friendlier direction; PCs are specifically designed, particularly in their modern dress, to offer friendly interfaces and some user-accessible customization.

Note that size and speed don't seem to be the relevant measures here. We can get computing environments of equivalent sizes in single, large computers or by yoking multiple smaller machines together, provided we don't need to apply all of their combined power simultaneously to the same part of a problem.

> IN 10 or 15 years, we will be writing once again about the dangers of too much decentralization.

Instead, the relevant measures that differentiate systems today include the following:

- The complexity of the required supporting infrastructure and its cost.
- The amount of software available for different applications.
- The user's perception of the level of complexity a system represents and the level of complexity he's willing to handle.

A mainframe has not yet been reduced to being a giant MIPS-pusher. Contrary to industry rumor, I have not yet suggested that the proper role of a mainframe is as a file server to a PC. But that day could come, as the power and the operating system of the mainframe is shrunk to fit within a very little box.

Be a conservationist

In the meantime, we need to look toward making good use of all of our resources, assigning the right applications to the right level of processor power, applications software availability and appropriate interface support.

Increasingly, doing so will mean interactive interfaces and personal productivity tools at the desk on micros; higher level tools under local control on bigger and bigger, but not necessarily more complex, minis; and organization-level tools on mainframes unless and until we find a better environment.

As more multiuser, multitasking environments — such as local-area networks, their operating systems, servers and LAN applications software — become available, it is inevitable that applications that today are done exclusively on mainframes will move to increasingly decentralized locations. In 10 or 15 years, we will be writing once again about the dangers of too much decentralization and the advantages of putting more of our eggs in bigger baskets.

Wohl is president of Wohl Associates in Bala Cynwyd, Pa., and editor of "The Wohl Report on End-User Computing" newsletter.

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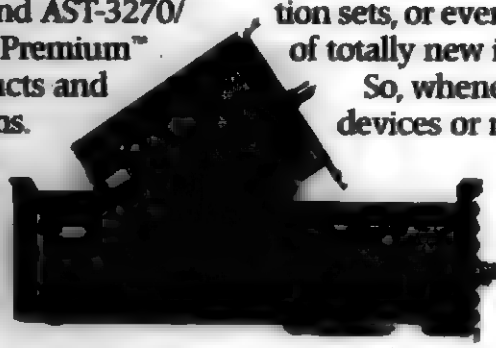

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A defense of people in project productivity

Peopleware
By Tom DeMarco and Timothy Lister
How can a project be judged successful if it meets back-breaking deadlines but half the staff quits after its completion?

This question sums up the authors' main line of reasoning: Don't rely on apparent results in assessing the productivity of a project team; measure the full impact on the company and the people.

DeMarco and Lister skewer conventional wisdom. They point out that Parkinson's Law — which says that work expands to fill the time allotted it — is not a law like Newton's. Parkinson's Law, they say, "didn't catch on because it was so true. It caught on because it was funny." The authors suggest a revision: "Organizational busywork tends to expand to fill the working day."

The book is an unremitting defense of the people part of the productivity equation, backed by statistics and anecdotes.

One example: a study of the productivity of programmers measured according to different estimates of how much they should produce. The programmers were least productive when trying to meet a schedule set by their supervisors and more productive when they set their own schedules — but they were even more productive when no estimate was made at all.

The authors also report the results of their Coding War Games, which tested 600 developers from 92 companies between 1984 and 1986. Each employee was measured on designing, coding and testing a medium-size program.

The pleasantness of office work environment correlated to performance: Those developers scoring in the top quarter were 30% to 50% more likely to say their work spaces were acceptably quiet, private and spacious, compared with those in the bottom quarter.

One study does not prove that working conditions create better performers. An alternative explanation might be that top performers choose to work in better conditions. Either way, the authors point out, an employer gets better performers by providing better work conditions.

Who are the better performers in your organization? You do not have the foggiest idea, DeMarco and Lister maintain. This entertaining book shows how to advance beyond a gut-feeling approach to productivity.

Softcover, $24.50, 188 pages, ISBN 0-932633-05-6, by Dorset House Publishing Co., New York, N.Y.

GEORGE HARRAR

BOOKS IN BRIEF

VM and Departmental Computing
By Gary McClain
How to install, maintain and use IBM's VM, a topic even more important to IBM shops since the introduction of the company's 9370 mid-range computers.

Softcover, $24.95, 258 pages, ISBN 0-07-044939-2, by McGraw-Hill Book Co., New York, N.Y.

Hypercard Power
By Carol Kaehler
A member of the Apple Computer, Inc. Hypercard development team leads novice users into the world of this free-form data base organizer.

Softcover, $17.95, 435 pages, ISBN 0-201-06701-3, by Addison-Wesley Publishing Co., Reading, Mass.

OS/2
By Jeffrey Krantz, Ann Mizell and Robert Williams
Three IBM software engineers closely involved with OS/2's development preacht the operating system's features, functions and applications.

Softcover, $24.95, 282 pages, ISBN 0-471-60709-6, by John Wiley & Sons, Inc., New York, N.Y.

The Expert Executive
By David Hertz
This jargon-free text could spur lagging interest in artificial intelligence tools by directing advice to nontechnical executives — the ones who could be using AI to make planning, production, marketing and distribution decisions.

Hardcover, $19.95, 238 pages, ISBN 0-471-89677-2, by John Wiley & Sons, Inc., New York, N.Y.

Standards for Open Systems Interconnection
By Keith Knightson, Terry Knowles and John Larmouth
Open Systems Interconnect is explained for those who may want to use or implement this model from the International Standards Organization.

Hardcover, $39.95, 388 pages, ISBN 0-07-035119-8, by McGraw-Hill Book Co., New York.

Publishers wishing to have their books considered for review can direct books, prepublication galleys, press releases, catalogs or other information to George Harrar, Features Editor, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

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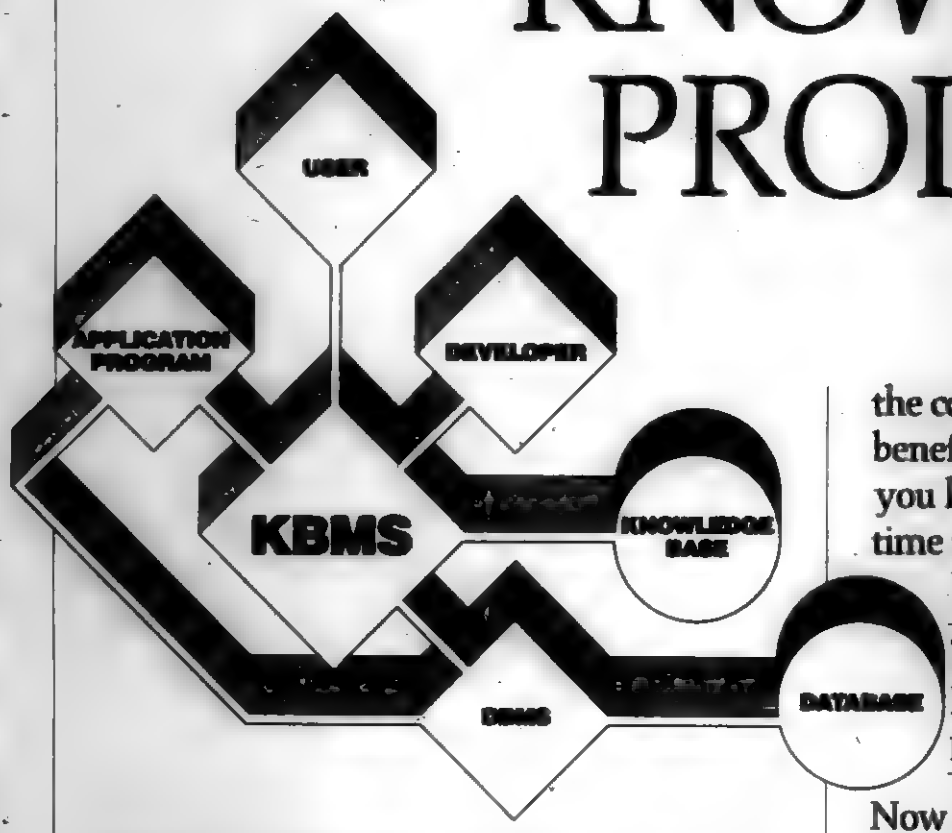

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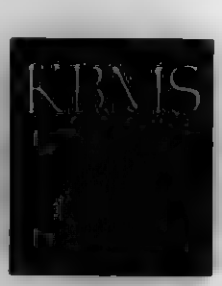

A major computer company is saving over $25 million a year on product ordering and configuration, thanks to expert systems they developed in-house.

A leading financial services company has substantially reduced bad credit losses with a computerized system they developed based on artificial intelligence.

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SOFT TALK

Charles Babcock

Catching up to IBM's ESA

IBM's announcement of the ESA/370 operating system aroused fear in some quarters that it was a door slamming shut on IBM plug-compatible manufacturers (PCM).

That is always a possibility, and there is little doubt IBM will exploit features of the operating system more quickly than other manufacturers, such as NAS or Amdahl. But the MIS director of a mixed-vendor shop says this is merely the latest event in an old game of leapfrog.

As the head of computing at a large federal agency, he decided to keep his comments off the record. But he expressed keen interest in the ESA/370 announcement because he is one of the few users who has implemented an application that consumes 2G bytes of virtual memory, the limit under MVS/XA.

With the new operating system, IBM is making an additional 16 terabytes of virtual memory available for data. To a federal agency that uses data and moves materials throughout a large percentage of the U.S. population, the expansion of vir-

Continued on page 32

9370s play mainframe, not departmental, role

BY ROSEMARY HAMILTON
CW STAFF

Contrary to expectations, the typical IBM 9370 is running host applications that have long been the mainstay of its bigger brothers in the IBM 370 family instead of distributed or departmental applications, according to a recent survey by Focus Research Systems, Inc.

The survey of 109 user sites that either have a 9370 or plan to buy one indicates that users are assigning traditional mainframe applications, such as general-ledger packages, to this low-end mainframe instead of office support systems or other departmental applications. Of the group surveyed, 85% said their 9370 is located in the MIS department and will continue to function in a centrally supervised MIS role.

The findings come from a preliminary release of the Focus Research report on the 9370. A complete report will be presented later this month at the ADAPSO Management Conference in Palm Desert, Calif.

Nearly half of the user sites surveyed reported that their 9370 is either running or will be running accounting or financial applications. These applications include general-ledger, accounts receivable, accounts payable and fixed assets, which are traditional 370 applications.

"Financial applications are the oldest MIS applications. It looks like people are off-loading those to the 9370," said James Russo, vice-president of market-

Continued on page 31

Applications used on the 9370

IBM's low-end mainframe is being used primarily for host-type applications under MIS rather than distributed applications

INFORMATION PROVIDED BY FOCUS RESEARCH SYSTEMS, INC.

Analysis fray widens

MIT forecasting program goes commercial

BY ALAN ALPER
CW STAFF

WELLESLEY, Mass. — If Intex Solutions, Inc. is right, a 20-year-old economic forecasting, modeling and data analysis program that is used primarily in academic and government institutions could become a bread-and-butter statistical tool in the commercial world.

Intex, a 3-year-old firm best known for developing add-on products for Lotus Development Corp.'s 1-2-3, recently acquired exclusive marketing rights to the program — which is called Troll, for Time-Shared Reactive Library. It enables users to model, extrapolate, store data and generate reports within a single mainframe environment. Developed at MIT to facilitate economic research, Troll runs on IBM 370s and compatible mainframes and is aimed at users who need to create econometric models and execute simultaneous equations using vast amounts of data.

Over its 20-year lifetime, Troll has been continually updated, according to Libby Flanagan, product marketing manager. In response to commercial needs, the company recently released

Continued on page 31

HP launches IBM 5080 emulator

BY NELL MARGOLIS
CW STAFF

PALO ALTO, Calif. — Hewlett-Packard Co. recently announced the 5080 Emulator, which it said will let users of HP 9000 workstation graphics access designs and data from mainframe-based applications such as Lockheed Corp.'s Cadam, IBM's Caeds and French manufacturer Dassault Systems' Catia.

All three are popular applications within the aerospace and automotive industries, according to Richard Maroncelli, 5080 Emulator product manager at HP.

"We really feel that computer graphics makes more sense on a workstation than on a time-shared mainframe," said a design engineer at a large West Coast aerospace company that is beta-testing the 5080 Emulator. The user requested anonymity.

"The new graphics engines [in workstations] give you the ability to display a vast amount of vectors and pixels locally, which

Continued on page 32

Inside

- Data Processing Services revamps fixed-asset package for System/36. Page 30.
- Tektronix adds plotting tools for VAX. Page 36.

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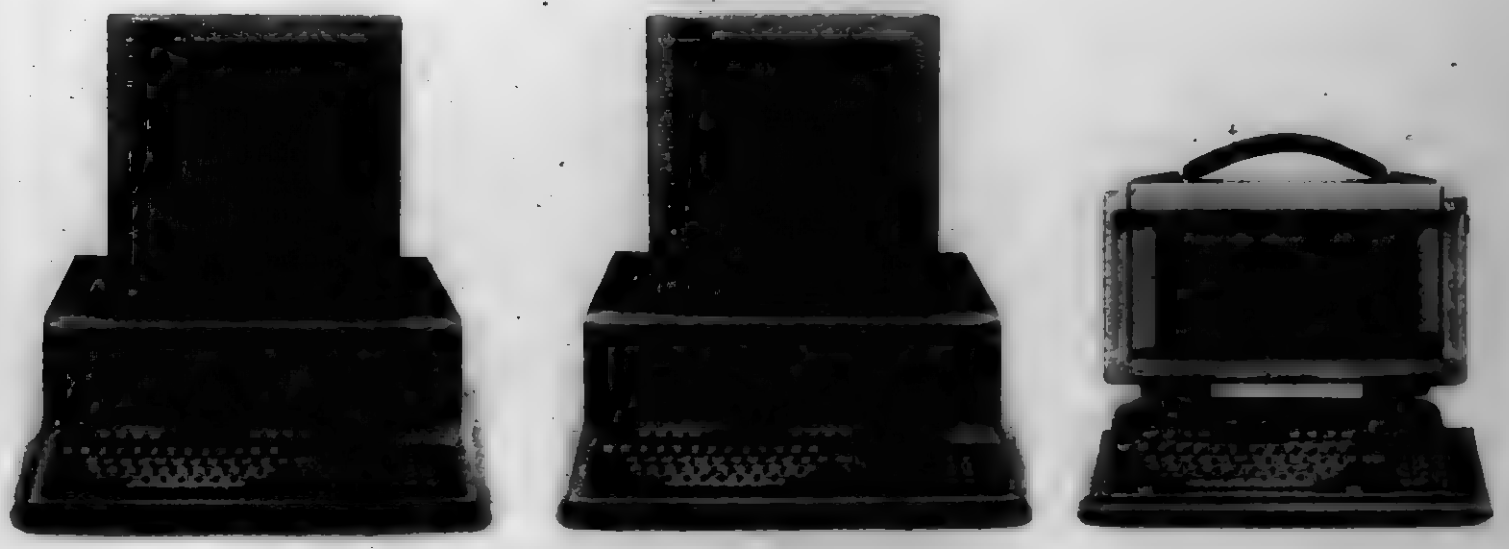

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Cobol monitor eases code maintenance

BY ALAN ALPER
CW STAFF

NEW YORK — Two data processing shops using a Cobol performance monitor developed by a small company here are finding that tested programs are meeting established standards, enabling programmers to more easily maintain code.

Developed by Clarity Concept Systems, Enforcer I automates the process of evaluating adherence to predefined Cobol programming standards. The monitor rates a program's source code understandability and functional complexity, according to Jerry Sitner, Clarity's president.

"It will point out things such as 'move record' vs. 'move employee record,' making sure there are two words in the data name. Or look for uncalled for abbreviations," Sitner explained.

Modifications

Enforcer I is executed alongside the source code of the program being evaluated. A report is then generated indicating the nature and location of each line of code that deviates from predetermined standards. Users can modify Enforcer I to add to or delete standards offered with the monitor. "If they adhere to Cobol 85, for example, you can tell Enforcer I to not allow GOTO statements," Sitner said.

Enforcer I requires 300K bytes of main memory, runs under IBM's OS or DOS systems and resides in the system's load library. It carries a permanent license fee of $9,500, Sitner said.

Maintenance can account for anywhere between 50% and 80% of a DP shop's development budget, according to International Data Corp., a Framingham, Mass., research firm.

Southern Connecticut Gas Co. has used Enforcer I since last fall on Cobol programs written for its IBM-compatible mainframe from NEC Corp., which runs DOS/VSE. The company has modified the monitor with a number of user exits to meet in-house Cobol programming standards, according to Jim Ballas, manager of software and programming.

Although unable to quantify time or cost savings, Enforcer I has replaced the salary of one full-time librarian, Ballas said. "Without it, I would have to manually check every line of code," he noted. "I don't have time to do that."

The staff of eight programmers at the Bridgeport, Conn., gas firm was initially unenthusiastic but has been won over, Ballas said.

"Now, we have truly structured programs," he said. "They're a hell of a lot easier to maintain."

Because of resource constraints, the firm is not testing programs written previous to Enforcer I's installation. "If it's working, I don't touch it," Ballas noted.

Polychrome Corp., a Yonkers, N.Y., graphics plate manufacturer, has made extensive use of Enforcer I for the last two years, according to Jarl Ingers, financial and sales systems manager. "I've looked at other products that are out there, and none handle data dictionary activities like Enforcer," he said.

Enforcer I has helped the firm, which has converted from a Unisys Corp. to an IBM mainframe, develop Cobol programming standards. "Not only has the product enabled us to enforce standards, but we have used it as an educational tool. Programmers write better programs," Ingers said.

Because the code is clearer, it is easier to maintain, he noted. Polychrome asked Clarity to develop a hierarchy chart for Enforcer I so programmers can more easily follow the changes that need to be made. "I would say the product has enabled us to cut by 50% the amount of maintenance, as long as there is a different programmer making the changes," Ingers said.

Package for IBM minis tweaked

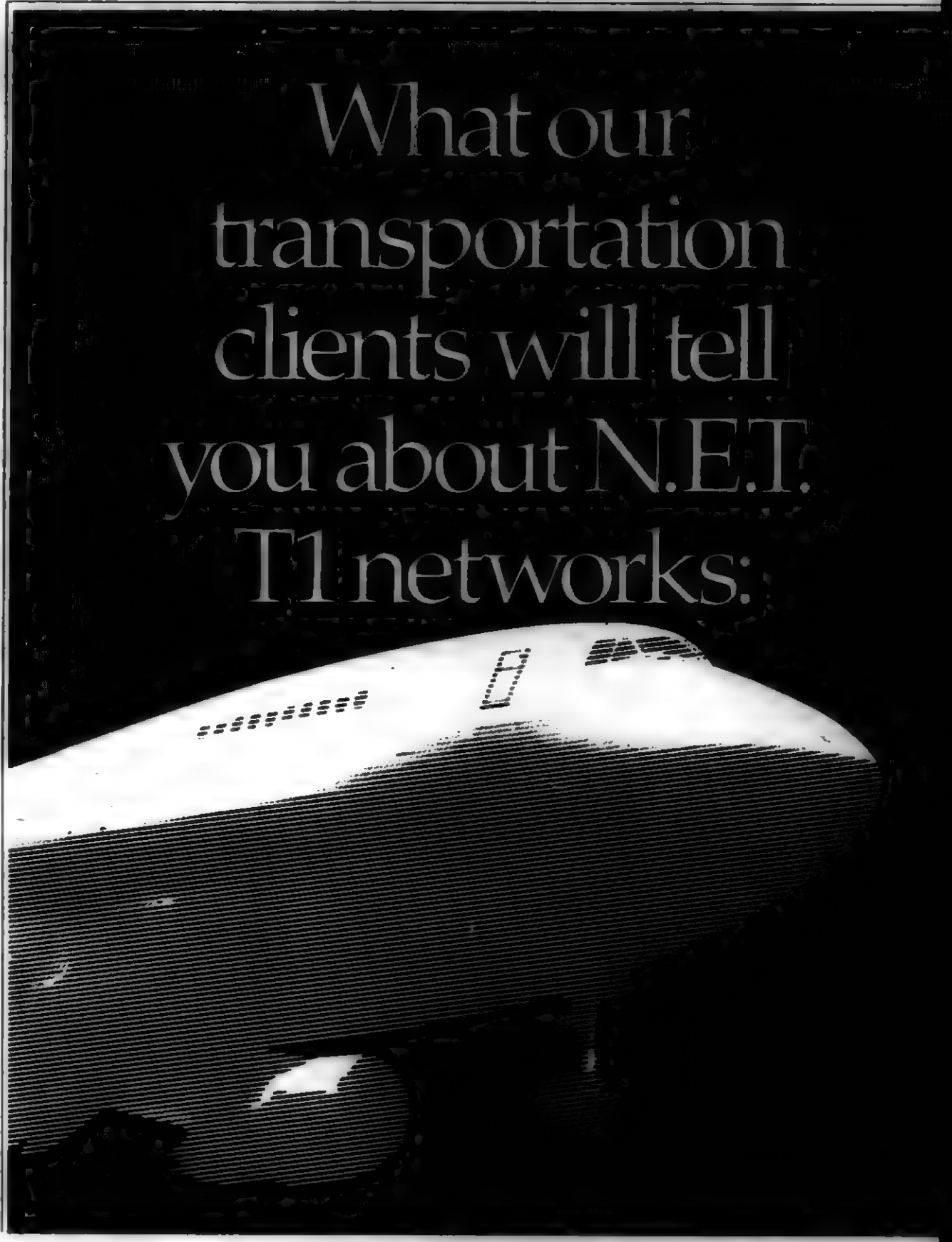
INDIANAPOLIS — Data Processing Services, Inc. recently released an upgraded version of its fixed-asset package for the IBM System/38 that it said includes improved interactive and on-line capabilities.

Release 4.0 of the Fin/38 Fixed Asset Management System has also been revised to comply with the latest U.S. tax regulations, including the 1986 Tax Reform Act, the company said.

The software's query capabilities were changed to allow users to directly query certain files or Fin/38 programs, such as the asset-class file and fixed-asset-methods file.

On-line features were added that enable users to perform queries while within certain Fin/38 programs, such as projected depreciation and the asset master file. Previously, a user had to exit a program, go back to the main menu and then perform a query, the company said.

Release 4.0, which is available now, carries a $6,000 license fee. Users of Release 3.0 can upgrade free of charge , the company said.



Analysis

CONTINUED FROM PAGE 27

an interface to import data from IBM SQL/DS relational data bases into Troll and a facility to enable Troll-generated graphs to be printed out using some 1-2-3-compatible files.

Troll faces an uphill battle in the commercial world. Entrenched companies such as SAS Institute, Inc. and SSPS, Inc. already offer a variety of economic analysis and modeling packages for micros and mainframes. Flanagan said her product offers a set of forecasting tools within a single mainframe environment.

"With micro-based products, you can download your life away," Flanagan said.

Troll also has a low initial cost with a high monthly subscription fee. An initial license is priced at $2,000, followed by a $500 per month fee, Intex spokesmen said.

On a roll with Troll

Stephen Symansky, an economist at the International Monetary Fund (IMF), is an enthusiastic Troll user. He has converted both the IMF, which is constructing an econometric model of the world's economy, and the World Bank to Troll usage. "I've looked at 15 mainframe and PC packages, and Troll is light-years ahead of them," he noted. "It's the only product out there that does rational expectation models."

Rational expectation models are a new feature added to Troll through a joint project funded by the Federal Reserve Board. Called the Forward Looking Simulator, the module estimates future solutions from a model based on what economic decision makers are likely to do, rather than being limited to historical data, spokesmen said.

The IMF uses an IBM 3081 attached to a 9370 running under the VM operating system. The institution has written some VM programs that enable economists to move data from its homegrown data base on the mainframe into Troll on the 9370 for analysis and modeling.

David Williams, a senior economist in the governor's office in Florida, is using Troll for a variety of forecasts, including state revenues, economic growth, population trends, criminal justice requirements and social service needs. Troll is running on an IBM 3084 under MVS.

"There isn't a routine invented over the last 10 years in statistical and econometric techniques that it can't do," he said.

Both Williams and Symansky cited Troll's ease of use for nonprogrammers as a major plus and its lack of quality graphics — despite the bridge to the micro-based packages — as a weakness. "We reenter our data into a Macintosh when we want quality graphics," Williams said.

Graphics weaknesses aside, Intex's ambition to take Troll mainstream could also suffer from its current lack of portability. A long-rumored version for Digital Equipment Corp.'s VAX could go a long way toward expanding Troll's potential user base, observers said.

Intex has hired some of the MIT academics who worked on Troll to help with marketing and development, Flanagan said. Intex hopes to expand its base of 90 sites in 17 countries beyond academic and government users to include financial services and industrial concerns.

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9370s

CONTINUED FROM PAGE 27

ing at Focus.

Another 26% of those surveyed said their system is being used for testing and development of both commercial and in-house-developed software.

"The primary applications usage shows that it is definitely being used as a host," Russo added. "It's an MIS machine, in many cases a stand-alone host doing typical host applications."

Educational users

The survey also found that 6% of the user sites are using 9370s to run manufacturing software. A 9% showing went to the educational market, but Russo cautioned that this group represents educational institutions running a variety of applications on the 9370, rather than commercial users running educational software applications.

Almost half of the group is either running or intends to run commercial applications.

Russo said no single package emerged as a strong leader in the 9370 market. "It's all over the place."

Focus said another indication of the 9370's host role is the operating systems selected for it. Of the 100-plus respondents, 49% said they are running or will be using the IBM VSE operating system.

Meanwhile, 38% have chosen the VM/IS operating system, which is IBM's user-friendly version of VM. Another 13% of the group use a hodge-podge of operating systems, including IBM's MVS and the Pick Systems Pick operating system, Russo added.

The survey respondents represent a wide variety of businesses. One-quarter are manufacturing companies, and 22% are educational institutions. Software vendors make up 11% of the survey, while government sites account for 7%. Russo said the remaining 35% of the group spans "'everything from general business to agricultural to transportation." None in the final group had a large enough showing to be separated from this category, he said.

HP

CONTINUED FROM PAGE 27

is something you really want and need," the user said. "We're talking about millions of bits on the mainframe. You just can't do it in real-time."

Automotive design

With the 5080 Emulator, HP's Maroncelli said, an automotive engineer has the ability to move a familiar application from the mainframe, change a car's design and then ship it back to the mainframe, which is the platform of choice for interfacing with the robotics installation on the factory floor.

Co-developed by HP and San Diego-based Spectragraphics Corp., the 5080 Emulator includes a design-set channel controller that supports up to 64 simultaneous users and eight local-area network gateways.

The emulator runs on HP 350RX or 350CH workstations, opening up mainframe access to both single and multiple users. In the case of multiple users, Maroncelli said, the software supports up to 16 simultaneous 5080 emulations.

More features coming

Moreover, he added, two enhancements for the new emulator — an IBM 3278 emulation package and a high-speed file-transfer product — will be available when the product ships next quarter. The 3278 emulator lets HP 9000 workstation users perform data-entry inquiry applications as though on a 3278 terminal. The file-transfer software lets them download mainframe data to the HP 9000 at 50K byte/sec.

The 5080 Emulator, the user said, "lets you use the workstation as a dumb terminal. It gives you a bridge so that you can transition your existing applications from the mainframe to the workstation and off-load the design function, but at the same time, it gives you a safety net that protects your investment in mainframe software. That's why this is a strategic product."

HP said 5080 Emulator prices will range from $9,629 for a single-user license to $32,858 for a 16-simultaneous user license.

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AICORP
Bringing AI Software to Business

Babcock

CONTINUED FROM PAGE 27

tual memory into data spaces is a welcome move.

At the same time, the MIS director is rooting for the opposition. In his mixed-vendor shop, a 10,000-terminal network is supported by several IBM 3090s and Amdahl 5880 mainframes.

When IBM offered MVS/XA, or when it makes sudden advances in its hardware, the agency has little choice but to buy from the market leader. "We swing to IBM for two or three years, then back again to the plug-compatible manufacturers" as they catch up, he says.

Will the PCMs be able to catch up to the 3090E running ESA/370?

"They'll be hurt for a little while. Then watch American ingenuity pop to the fore again. They've been doing it since 1975, when Gene Amdahl put out the first Amdahl machine," the MIS director says. "I'll still play both sides."

IBM IS putting its development efforts into the ESA basket.

The ESA/370 initiative opens several doors to large mainframe-oriented shops, the MIS director says. With its greater use of expanded storage, the new operating system will probably offer huge buffers or "a bigger bucket" for operations within the CPU.

"The intelligence community has been using image processing for years," and that form of data manipulation could find increasing commercial use, given the ability to store and move millions of bytes at a time.

The ability to process images would also open the door to handling objects, or packages of instructions and related data that have to move as a unit in and out of the CPU, he says.

And once handling images or larger units of data becomes commonplace, mainframe shops are likely to go to optical storage to archive documents and other large units of data in their original form, he adds.

A point that has not been widely discussed before is that in its ESA/370 announcement, IBM also stated that "MVS/ESA will be the primary base for future SAA enhancements in MVS."

ESA/370 is also "the primary delivery vehicle for future MVS and Data Facility Product functional enhancements and constraint relief."

Thus there should be little doubt IBM is putting its development efforts into the ESA basket. At the moment, that container looks a great deal like MVS/XA with data-space virtual memory added. Both are still working with the 31-bit address word. Migration from one to the other is the equivalent of moving from "dot to dot," according to Carl J. Conti, vice-president of IBM's Enterprise Systems Unit, as users upgrade from one MVS/XA release to another.

But that could change with the next hardware and software announcement. PCMs had best stay light on their feet and ready to run.

Babcock is *Computerworld*'s senior editor, software & services.

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NEW PRODUCTS

Systems software

A real-time operating system designed for use on 16- and 32-bit microprocessors from Intel Corp., Motorola, Inc. and National Semiconductor Corp. has been announced by **Boston Systems Office**.

Called **BSO/Realtime Craft**, the system is made up of three software modules said to provide the processors with real-time multitasking management capabilities. The modules include XEC the executive, IOS the I/O supervisor and FMS the file management system. Also included are a debugger and a spying function, which enables the user to examine task states and other objects managed by XEC.

BSO/Realtime Craft costs from $6,300.

Boston Systems Office, 128 Technology Center, Waltham, Mass. 02254. 617-894-7800.

Release 2.2 of the **TI System V** operating environment for the TI System 1500 has been announced by **Texas Instruments, Inc.**

Release 2.2 features Extended Symmetric Processing (ESP), which lets all processors share equally in scheduling applications, performing I/O and providing system service functions. It also offers mass storage and terminal interface controllers that run asynchronously to service the application processors.

A Release 2.2 license for up to 32 users costs $2,995; for more than 32 users, it costs $4,995. System 1500 users participating in TI's Subscription Update service may obtain the upgrade free of charge.

TI, P.O. Box 181153, DSG-178, Austin, Texas 78718. 800-527-3500.

Applications packages

A series of program modules that provide sales performance statistics and analysis has been introduced by **Stansbury Ltd.**

The Sales Calculator allows users to conform, edit, analyze and report sales performance statistics of new account representatives and calling officers. Statistics reported include penetration, cross-sell ratio, deposits and commissions earned. Reports are on a month- and year-to-date basis by all customers, existing and new. Performance ranking and payroll reports are also produced.

The product runs on both microcomputer and mainframe hardware. Microcomputer versions cost $10,000; mainframe versions cost $40,000.

Stansbury, Suite D, 7341 Jefferson Highway, Baton Rouge, La. 70806. 504-924-1407.

Languages

Ibuki has announced that its **Ibuki Common LISP** is now available for the Sun Microsystems, Inc. Sun-4/110 and Sun-4/260 workstations.

Ibuki Common LISP is a complete implementation of Common LISP together with a development environment that includes an error handling system, a debugger for symbolic debugging of interpreted and compiled code, an interface to Emacs, a Common LISP interface to X Window systems and a foreign function interface for calling programs written in C and Fortran.

Ibuki Common LISP for any Sun workstation costs $700.

Ibuki, 1447 Stierlin Road, Mountain View, Calif. 94043. 415-961-4996.

Utilities

An IBM MVS utility called **VSAM Data Compressor** has been introduced by **Softworks, Inc.**

The program is said to cut disk space up to 50%. It has an automatic space release feature that adjusts space if files are inefficiently allocated. It uses no external tables and is fully automatic, according to the vendor. Once installed, it is transparent to the user.

Softworks offers a free direct-access storage device analysis tape that simulates a compression and calculates each data set's percentage of savings from compressions and space release.

VSAM Data Compressor is priced from $20,000 to $30,000, depending on CPU.

Softworks, 7700 Old Branch Ave., Clinton, Md. 20735. 301-856-1892.

Tektronix, Inc.'s Computer-Aided Engineering Systems Division has announced three plotting products for Digital Equipment Corp. VAX environments.

The products were designed for Tektronix's Designer's Database Schematic Capture (DDSC) tool.

The **Gmodel Plotter Toolkit** is said to allow users to create a specific plot driver to plot DDSC data base files. Users can then interface most plotters to DDSC.

The **Gmodel Sixel Plotter Interface** lets users to plot DDSC data base files to DEC Sixel Printers.

The **Gmodel Postscript Plotter Interface** allows users to plot DDSC data base files to Adobe Systems, Inc. Postscript devices.

The Sixel and Postscript interfaces cost from $3,500. The Gmodel Plotter Toolkit costs $7,500.

Tektronix, P.O. Box 4600, Beaverton, Ore. 97075. 503-629-1152.

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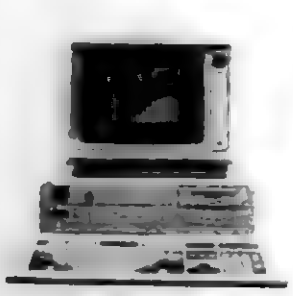
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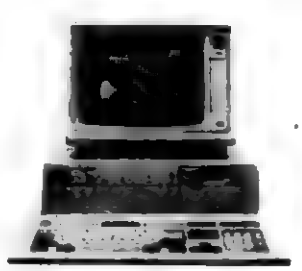
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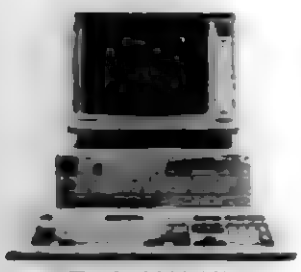
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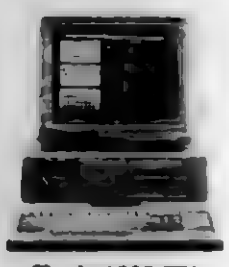
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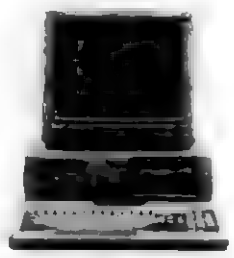
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MICRO BITS

Ed Scannell

Not everyone likes a clone

To clone or not to clone. At Esther Dyson's recent Personal Computing Forum, Apple's Jean-Louis Gassee was rather adamant in his position of not licensing Macintosh technology to clone makers. He said encouraging potential cloners would only mean slimmer margins for Apple, thereby cutting down his company's ability to do creative research and development. "What if DEC licensed the VAX? Would they have as much money to put into R&D?" he asked. "We could be giving people the keys to the chicken coop."

At least one major buyer of Macintoshes doesn't think it's necessary to have a Mac clone market. Jeff Ehrlich, General Electric's manager of product technology, buys a couple hundred Macintoshes a month and is a major fan of the system's capabilities and technological elegance. However, for GE to buy a Mac clone, it would have to be priced about 30% below the Mac, something cloners couldn't afford to do given the high up-front development costs, Ehrlich notes.

"Apple's prices are competi-

Continued on page 43

Symantec offers a Grandview

Information outliner said to organize, relate data from varied sources

BY ED SCANNELL
CW STAFF

CUPERTINO, Calif. — Symantec Corp. has jumped into the personal information management market with a product that allows users to organize and track information from various sources.

Grandview, which took two years to develop, has a fully featured outliner and word processor. With its ability to organize and relate any mix of data, the program is intended to complement users' existing spreadsheets and data bases.

Grandview's two main functions are outlining and word processing, for productive work, and category viewing, for finding relationships in data and tracking work in progress. The program's "viewing" capability lets users look at data in any fashion, Symantec said.

The program's Outline View provides a seamless interface between documents and headlines by letting users open up to nine windows simultaneously and look at a number of headline labels on screen, according to Symantec.

Grandview's Document View offers style sheets, paragraph formatting and custom headline labeling. The program also gives users control over the look of the outline, including headers, footers and table of contents.

Category View allows users to assign outline and word processing data to various categories to be tracked throughout a project. The information can then be viewed by project, person, date or several other categories. Symantec claimed no other currently available product has this capability.

Grandview is scheduled to be shipped at the end of this month at a suggested retail price of $295.

Answers Q&A demand

Symantec also released Version 3.0 of its popular Q&A product last week that integrates word processing and data base functions. The company said it has incorporated more than 100 new features into Version 3.0.

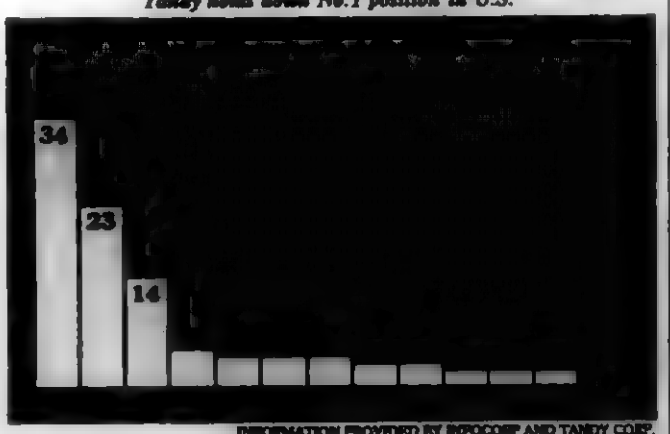
Chief among the new capabilities are record locking, multiuser local-area network support, multiple file support and several major enhancements to the program's word processing and mail merge abilities. The program's multiple file lookup allows it to pull information from multiple Q&A data bases, increasing the number of applications for which the program can be used, a spokesman said.

Version 3.0's record-locking support allows multiple users to simultaneously access the same data base. The program fully supports network access, allowing password protection to be incorporated, which precludes unauthorized entry into data bases, a spokesman said. Q&A Version 3.0 is available immediately and costs $349. Users of Version 2.0 can upgrade for no extra charge.

Data View

PCs' retail market shares

Tandy holds down No.1 position in U.S.



INFORMATION PROVIDED BY INFOCORP AND TANDY CORP.
CW CHART

Televideo withdraws market bid

BY JULIE PITTA
CW STAFF

SUNNYVALE, Calif. — Televideo Systems, Inc. recently backed out of the engineering workstation market less than one year after entering it.

The company's engineering workstation efforts are "on hold" indefinitely, according to William Crouch, Televideo's senior marketing vice-president. In July, Televideo introduced a line of Intel Corp. 80386-based engineering workstations running the Unix operating system.

Crouch said Televideo entered the market "a little too soon." The workstations supported X Window Version 10.4, and Televideo said it intended to support Window X.11.

Few scientific applications exist for X.11, Crouch maintained. "There are a lot of people shipping Unix systems into multiuser environments," he explained. "But that's different

Continued on page 42

Inside

- Baker explains Direct IV, Ashton-Tate's new aggressiveness. Page 41.
- Gupta makes friends with SQLbase. Page 41.
- Datacopy releases Mac OCR for text scanning, graphics capture. Page 50.

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SMALL TALK

Jeffrey Tarter

Info tools show promise

At Comdex/Fall, a group of relatively obscure "information manager" programs suddenly become one of the hottest stories in town. Industry analysts and conference panelists were almost unanimous in predicting steep growth rates for the new category, and the crowds of curiosity-seekers at the Lotus booth — at which Lotus's Agenda information manager was unveiled — seemed to suggest that the bandwagon was beginning to roll.

Since then, the ballyhoo has died down considerably. Most of the new information managers, including Agenda, are still in the vaporware stage, and the few titles that have actually shipped are generating only a trickle of sales. A fair number of people are beginning to wonder if this new category will ever amount to much. "Why do I need to computerize my Rolodex?" a senior analyst at The Yankee Group asked a large users group meeting recently. Nobody had an answer.

Of course, most genuine software innovations have gotten off to a similarly rocky start. When Bob Frankston, co-developer of Visicalc, offered a public showing of his "electronic spreadsheet" at NCC in 1980, less than two dozen people showed up. When Visicalc appeared, I was working as an editor at a national business magazine. I turned down a Visicalc exclusive because I was convinced that the program had no relevance to managers.

Continued on page 42

No more Mister Nice Guy; Esber says gloves are off as Ashton-Tate regains fighting trim

In the last six weeks, Ashton-Tate Corp. has grabbed the personal computer industry by the collar, forcing skeptics to take a second look at the Torrance, Calif.-based software firm. With the announcement of some potentially hot applications for Apple Computer, Inc.'s Macintosh and the long-awaited unveiling of Dbase IV, Ashton-Tate is ready to live down two years of criticism.

But a Rocky-like comeback for the one-time king of the data base market will not be easy. An absence of product upgrades has eroded Ashton-Tate's share of the PC data base market, and the firm faces a crushing wave of new competitors in the emerging PC relational data base business. Ed Esber, chairman and chief executive at Ashton-Tate, spoke with *Computerworld* West Coast correspondent Stephen Jones about the company's new aggressiveness, its controversial deal with Microsoft Corp. and its plans for the future.

Ashton-Tate's *Esber ready for Rocky-like comeback*

Ashton-Tate made an uncharacteristically early announcement with Dbase IV. Have your competitors forced you into the vapor wars?

There are three reasons Dbase IV was announced early: one, major corporate buying cycles are longer, and as advance information began to get out, it was important for Ashton-Tate to show its product to developers, customers and third-party add-in developers; two, with advanced news out, it was possible that the customers would pause in their purchase of products unless we let them know what to expect; and three, IBM was beginning a 13-city tour during which several software firms were given access to IBM's customers, and one of the prices of admission was a product running OS/2.

I still prefer to announce and ship at the same time, and we will do that whenever possible.

At the Dbase IV announcement, Ashton-Tate took a few swipes at its competition. Will you be taking a bolder stance with competitors?

Ashton-Tate clearly tried to be a gentleman competitor in the past, maintaining a strong sense of professionalism.

Today, we're down to fighting weight, we're bringing out leadership products, and we won't allow ourselves to do less than the best.

What effect will Dbase IV have on the Dbase clones?

If we continue to move technology, we will be able to maintain a strong share of the market. We do intend to be very protective of the technology in Dbase IV, more so than we have been of earlier versions of Dbase.

We're going to take a more vigilant approach, but instead of doing a Clint Eastwood, we're saying, "Let the cloner beware."

Continued on page 46

Gupta's SQLbase makes friends, influences users

BY JULIE PITTA
CW STAFF

Gupta Technologies, Inc.'s SQLbase is winning friends among once-skeptical corporate users these days with its ability to deliver features currently unavailable in other relational data bases.

Many users were skeptical about the product because its technology was new and they were not familiar with the company. But after seeing it in action, most have been fairly pleased.

"It's fast, it's available and it fits into the kind of environment we want," said Tony Pizi, Merrill Lynch & Co.'s assistant vice-president of personal computer software development. Like others, Pizi said there was some reluctance at Merrill Lynch to go with an unknown.

"We were a little apprehensive; there were only 10 employees when we first started using it a year and a half ago," he explained. "But they were the only game in town. They're more of a name player now than when we started with them, especially since the Lotus agreement."

The product's technology recently received a boost in credibility with an endorsement by and licensing agreement with Lotus Development Corp.

Richard Finkelstein, senior consultant with Chicago-based Codd and Date Consulting Group, said, "People who need to network data bases and have any concerns about data base integrity must use this product," adding that it is the only SQL-based product of its kind available.

SQLbase allows the server to act as a traffic cop, directing only requested data toward different microcomputers within the network and cutting down on local-area network traffic, Finkelstein said.

Stephen Morse, technical designer for Manufacturers Hannover Corp.'s data base project, said he is mostly satisfied with SQLbase but has encountered some technical difficulties.

Morse said he discovered a conflict between Microsoft Corp.'s Windows 386 and Proteon, Inc.'s Pronet 1344 card, causing garbage to be written on his network's file server. Although the problem was not traced to SQLbase directly, it arose because SQLbase requires IBM's Netbios to function.

Another user, who wished to remain anonymous, said he also experienced some corruption of his data base. However, he appeared patient with the difficulties. "We've had a few problems, nothing that we wouldn't expect with any new product. After all, this is a new technology."

Micro data base servers are here to stay

First in a two-part series.

BY RICHARD FINKELSTEIN
SPECIAL TO CW

ANALYSIS

The concept of data base servers on micros has arrived and may permanently shift the center of gravity in data processing from mainframes to micros.

The timing could not be better. As users store information on micros, they encounter the same data integrity, security and performance problems associated with mainframes. These problems become especially apparent on local-area networks.

Historically, data base management system vendors have provided automated solutions to these problems, but personal computer vendors have largely ignored them. This is in part due to the perception that PCs are stand-alone systems that are not susceptible to the same problems as mainframes. Nothing could be further from the truth.

LAN file servers were originally introduced as an answer to the problems associated with data sharing. Architectural constraints prevented DBMS vendors and application programmers from developing stable automatic facilities that would ensure data base integrity and adequate performance. Because of this, networked data bases were — and still are — susceptible to data loss and erratic performance and were therefore unsuitable for implementing mission-critical systems.

Data base server development began about two years ago, when several vendors recog-

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Top sellers

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Tarter

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Noise level, in short, is never a reliable indicator of the potential importance of a new software concept. The real test is whether the products themselves actually solve important problems for users.

To get a good sense of why these programs matter, it helps to look at how many different kinds of information exist in a typical office.

If the office is automated, a good deal of information will probably exist in computerized data bases and spreadsheets. But even then, creating cross-linkages among various information bases remains difficult.

Information manager programs deal with this problem by creating a common file format that can store and cross-reference many different kinds of text, loosely structured records and, sometimes, graphics. Unlike conventional data bases, these programs don't require users to set up rigidly hierarchical structures for data; instead, they let users "view" the contents of an information base in a variety of ways.

One obvious question about the information manager category is, "Who's got the best product?" It is unlikely that any one product will ever achieve the same kind of market leadership that Lotus's 1-2-3 or Ashton-Tate's Dbase have. Instead, I expect we'll see at least a half-dozen major products, each offering special capabilities optimized for specific applications.

It may take a while for the skeptics to kick the tires and look under the hood, but I suspect information management programs will become a major part of the office automation picture.

Tarter is editor and publisher of "Softletter," a Cambridge, Mass.-based newsletter for software developers and publishers.

Televideo

FROM PAGE 37

from the [computer-aided design] market. The CAD market is waiting for X.11. It really wasn't a viable product for us."

Televideo's Telestar workstations were scheduled for shipment last October. However, the line was never shipped in volume. Complicating the company's efforts was a shortage of monitors resulting from a labor strike in South Korea, where Televideo owns a production plant.

Sources close to the company said Televideo, struggling through slumping sales and, at best, marginal profitability, "rushed into [the Unix-based engineering workstation market] and tripped. It turned into a much smaller market than they thought it would be."

Last year, Televideo Chairman and Chief Executive K. Philip Hwang said Unix-based engineering workstations would be an important strategy for troubled Televideo, which in the past has suffered from an unsuccessful foray into the retail and OEM personal computer markets.

Crouch said Televideo remains committed to Microport Systems, Inc., a Unix developer.

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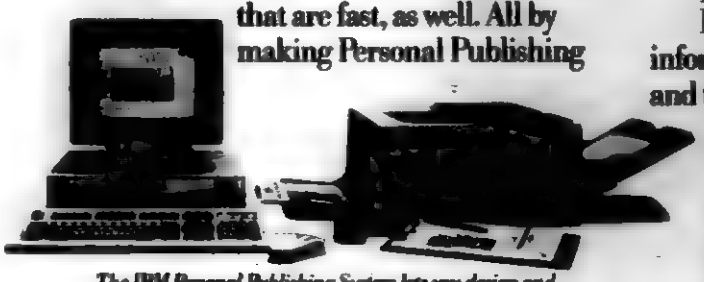

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Scannell

FROM PAGE 37

tive. I'm not going to buy from anyone else for 10% less. The margins aren't there anymore," Ehrlich says.

No more slack. Word has it that IBM and Microsoft have lost most of the slack time built into the development schedule for the Presentation Manager. This is particularly disturbing for those vendors and users who say a graphical user interface represents the true realization of OS/2.

The problems appear to be primarily bureaucratic and not technical in nature. It seems to be taking longer than expected for one company to sign off on a particular segment of the program and turn it over to the other.

Actually, IBM's Hursley Group, which is working on the File Manager, is a third party that further slows things down. While it's early yet, it looks like IBM and Microsoft will have to struggle a bit to make the Presentation Manager's October deadline.

Thanks for the loan. An Intel executive told us last week that the stake IBM had in his company was much like "an insurance policy" to ensure Intel could meet demand for IBM's systems.

Once Intel started churning out enough chips to satisfy demand, Big Blue took back its dough. IBM, which once owned 20% of the company, sold its remaining 3.1 million shares of Intel in December.

"We never took the money out of the bank. [IBM's stake] was like an insurance policy," the Intel official said.

However, what goes around comes around, and now Intel is reportedly working on a PS/2 chip set.

The company also said that demand for its 80386 boards are high among its corporate accounts for both office and home use. Apparently, some customers who use 386s in the office aren't accustomed to foot shuffling when they work at home on their personal computers and have become, well, addicted to speed.

Today — 0%. Tomorrow — 1%! Stand back, Jack. Mitac, a Taiwan-based PC manufacturer, just wrapped up its yearly meeting and has resolved to "secure" 1% of the worldwide PC market by the end of this year. To get a 1% share, the company figures it has to sell about 200,000 personal computers. Mitac said it plans to have an IBM Personal System/2 Model 30 compatible out during the second half of this year.

From Russia with love. Apple's Gassee, again speaking on a panel at Esther Dyson's recent forum, came up with a nice little phrase for unfriendly interfaces — KGB interfaces. Such interfaces are those that impede users from accessing information. Gee, I wonder whose interface he's talking about.

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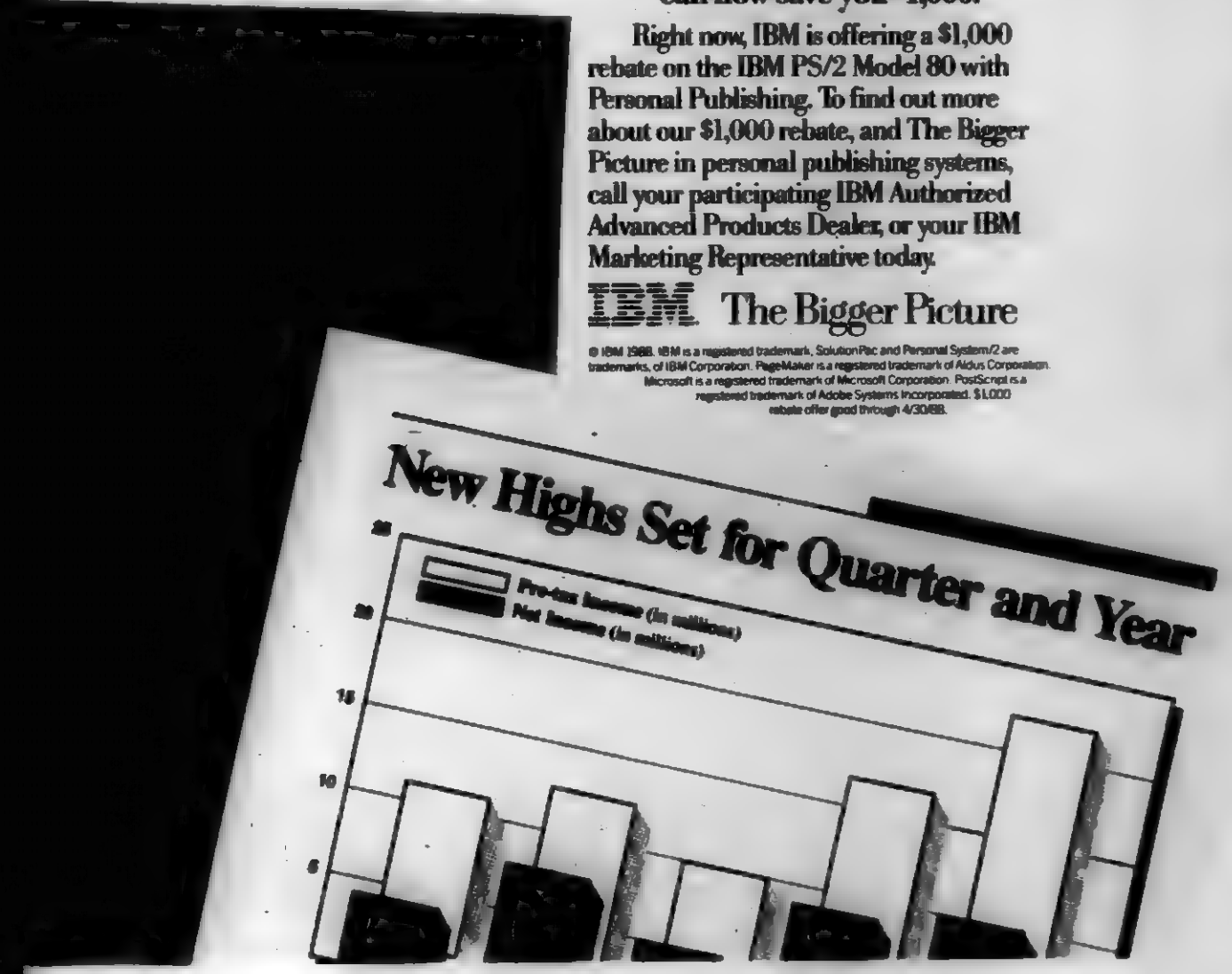

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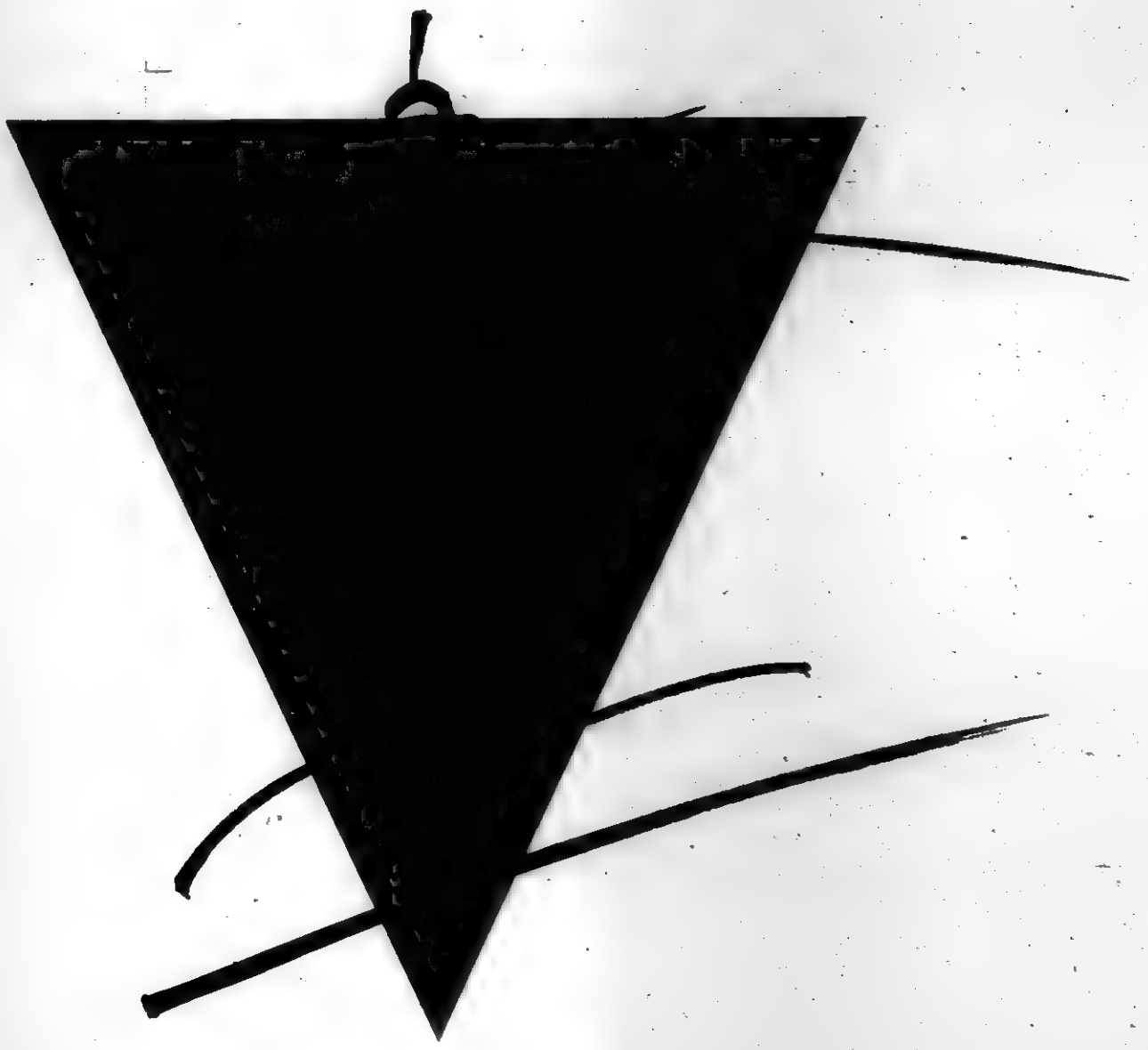

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FROM PAGE 41

Did you give up competing for a share of the back-end data base market when you opted for SQL Server?
That is a misconception. Dbase-IV ships with a back-end engine that is roughly 30% of the code, and other versions will have back ends that are world-class. For the OS/2 server market, we joined forces with Microsoft to promote the Sybase technology. Nobody has given up anything; what's happened is that three companies have said, Let's confuse people less and support one OS/2 server product.

Do you have a role in how SQL Server is enhanced?
Both Microsoft and Ashton-Tate had lots to say about what SQL Server will do and how, but clearly, Sybase had the most to say. Both Microsoft and Ashton-Tate will play a substantive role in SQL Server's evolution.

Could Ashton-Tate's Framework or Multimate be positioned as a front end to SQL Server?
Expect that any release of an Ashton-Tate product that could benefit from the SQL Server technology will be designed to capture that benefit.

Are you concerned that Microsoft might take you on in the data base market?
I am restricted in certain ways in competing with Microsoft on a server in the OS/2-Intel world. Microsoft has some restrictions on it in competing in the data base workstation market, and those deal with SQL and the Dbase language, among other restrictions. To make this relationship work, it was necessary that we agreed to certain restrictions related to servers and data bases.

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Micro servers

FROM PAGE 41

nized the need to bring mainframe stability down to PC LANs. Client/server systems, as they are called, transfer all DBMS functions to a centralized DBMS, or server. Data base servers differ from traditional mainframe DBMSs in that the server is distinctly separated from the front-end (client or requestor) applications.

Users can still run applications such as Lotus Development Corp.'s 1-2-3 at the client workstation but store all information at the server. Multiple users can now access the same spreadsheet information without fear of corrupting or losing data.

Reduce traffic
Data base servers have better performance than traditional file server systems. Data base servers select and transmit only the specific information that is requested. Data base servers also support advanced locking strategies that permit greater concurrency on multiuser LANs.

The recent announcement of the Microsoft Corp./Ashton-Tate Corp./Sybase, Inc. OS/2 SQL Server partnership firmly cements SQL client/server technology into mainstream data base application development. Microsoft's server requires OS/2 but supports both DOS- and OS/2-based workstations. Lotus has announced a competitive product that uses Gupta Technologies, Inc.'s SQLbase technology and has the advantage of being able to run on both DOS and OS/2 platforms.

IBM has also announced a planned enhancement to OS/2 Extended Edition that will include data base server capabilities. IBM's product will require OS/2 on both its server and workstations, but users will benefit from a highly integrated data base architecture. With many other major relational data base vendors developing server products, users can pick and choose the system that best meets performance and application needs.

Next week we will conclude with a discussion of data base server applications.

Finkelstein is a senior consultant for the Codd and Date Consulting Group in Chicago and publishes "SQL Review" newsletter.

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NEW PRODUCTS

Software applications packages

Mac OCR, an Apple Computer, Inc. Macintosh-compatible program for text scanning with graphics capture functions, has been announced by **Datacopy Corp.**

Intended for use with Datacopy's Model 730 and Jetreader scanners, Mac OCR formats text for Apple's Macwrite and Microsoft Corp.'s Word. It stores graphics in more than 10 formats for compatibility with a range of illustration and page-layout software.

Typically, the vendor said, Mac OCR can read a 2,000-char. text page in less than a minute.

Mac OCR costs $695.

Datacopy also announced **OCR 4mat**, software that automatically converts scanned data into files that can be read by Lotus Development Corp.'s 1-2-3 on an IBM Personal Computer. It costs $195.

Datacopy, 1215 Terra Bella Ave., Mountain View, Calif. 94043. 415-965-7900.

An enhanced Unix spreadsheet package featuring a Lotus Development Corp. 1-2-3 work-alike interface has been announced by **Unipress Software, Inc.**

The package, called **Q-Calc Standard**, also features 1-2-3 file compatibility and 94 financial, statistical and mathematical functions. Users can interactively process spreadsheet data through their own custom extensions or Unix utilities.

An optional graphics support package allows users to produce business graphics.

Q-Calc Standard costs from $450 on personal computers to $4,000 for superminicomputers.

Unipress Software, 2025 Lincoln Highway, Edison, N.J. 08817. 201-985-8000.

Dmaintenance, a stand-alone equipment maintenance tracking program that runs on IBM Personal Computers and compatibles, has been announced by **SBT Corp.**

Dmaintenance schedules maintenance, tracks labor and materials, records service contract activity and tracks purchasing and leasing from different vendors. Written in Ashton-Tate Corp.'s Dbase III Plus, Dmaintenance keeps records for up to 99 providers of equipment maintenance. Other features include multilevel security and the ability to enter new records without exiting the current on-screen procedure.

Dmaintenance costs $395; a multiuser version costs $595.

SBT, One Harbor Drive, Sausalito, Calif. 94965. 415-331-9900.

A utility for finding, collecting and examining text material in word processing, ASCII and data base files has been introduced by **O'Neill Software.**

The Text Collector is said to be capable of searching an entire disk or specific groups of files for a combination of terms. It automatically saves all context blocks meeting the search criteria. Users can also collect material interactively as they browse through files.

The program permits searches using Boolean operators, nested parenthesis and 14 wild cards.

The Text Collector runs on IBM Personal Computers with IBM PC- or Microsoft Corp. MS-DOS 2.0 or above. It costs $69, plus $3 for shipping and handling.

O'Neill Software, Box 26111, San Francisco, Calif. 94126. 415-398-2255.

Software utilities

Fill & File, software said to allow users to fill business forms using personal computers and to store information from those forms in data files for later use, has been announced by **Formworx Corp.**

According to the vendor, the user can create an on-screen likeness of the actual form and then fill in the blanks either by using the keyboard or by calling up information from the data files.

The user interface features pull-down menus that allow users to draw solid, bold or dotted lines and to create boxes and blanks to be filled in. Color is supported. The data files are compatible with ASCII and Ashton-Tate Corp.'s Dbase III Plus file formats, the vendor said.

Fill & File costs $149.

Formworx, Reservoir Place, 1601 Trapelo Road, Waltham, Mass. 02154. 617-890-4499.

A software package that is said to be capable of converting Autodesk, Inc.'s Autocad drawing files into ASCII format files without using Autocad has been announced by **The Great Softwestern Co.**

The software, called **D2D**, runs independently of Autocad. It allows users of third-party applications that read .DXF format files to access Autocad data.

According to the vendor, the product can effectively take a 300K-byte Autocad drawing file in .DWG format and convert it into a .DXF format in less than 30 seconds.

D2D automatically places the correct file extensions and, during the conversion process, can even recover some drawings containing errors.

D2D is priced at $99.

Great Softwestern, Suite 202, 207 W. Hickory St., Denton, Texas 76201 817-383-4434.

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DATA STREAM

L. David Passmore

Appletalk: A real LAN?

Although Apple's Macintosh has found increasing acceptance in the business world, there are many who regard Apple's network, Appletalk, to be a joke, something less than a real local-area network.

With Ethernets and IBM Token-Ring LANs running the gamut from 4M, 10M and 80M bit/sec. and with 16M and 100M bit/sec. versions on the way, the 230K bit/sec. Appletalk speed seems slow by comparison. Many user surveys published in the trade press don't even bother to include Appletalk. The network appears to have been developed only as a convenient way to connect Macintoshes to Laserwriters, not as a general-purpose LAN for users to perform real work.

Appearances can be deceiving, however. In a number of ways, Appletalk is more sophisticated than any LAN available for the IBM Personal Computer world, as it supports several advanced features.

For example, an internetworking capability permits the routing of transmissions among multiple local or modem-linked remote Appletalks. A name-binding protocol automatically and dynamically assigns new network names and addresses to new nodes as soon as they come up on the network. This eliminates the need for any manual network configuration process, contributing substantially to Appletalk's ease of installation.

Continued on page 58

Ma Bell faces rival in Boston

Fidelity, Merrill Lynch propose fiber-optic net to link business hub

BY ELISABETH HORWITT
CW STAFF

BOSTON — Fidelity Communications, Inc. and Merrill Lynch Teleport Technologies, Inc. have announced the formation of Teleport Communications-Boston, a joint venture to build and operate a fiber-optic network in downtown Boston's financial and business districts.

The partners will initially market the network to their respective parent companies, Boston-based Fidelity Investments and Merrill Lynch & Co. But Teleport Communications also plans to offer its fiber facilities as an alternative to New England Telephone Co.'s local telecommunications services.

The service will target regional financial institutions and other companies "that rely heavily on telecommunications and don't want to put all of their eggs in one basket," said Paul Chisholm, the venture's newly appointed general manager.

The fiber-optic network will be competitively priced and offer "greater security as well as faster, more reliable transmission" compared with traditional copper-based telephone wiring, Chisholm said. He said the venture will be able to draw on technology and expertise of New York Teleport, a similar network in the New York/New Jersey area that Merrill Lynch Teleport Technologies operates.

'Built-in customers'

The venture is likely to succeed because, like New York Teleport, its parent companies are "built-in customers," said Frank Daubeck, president of Washington, D.C.-based Communications Network Architects, Inc. Other potential clients include high-technology firms in and around Boston and AT&T, which currently buys fiber-optic capacity from New York Teleport, Daubeck said.

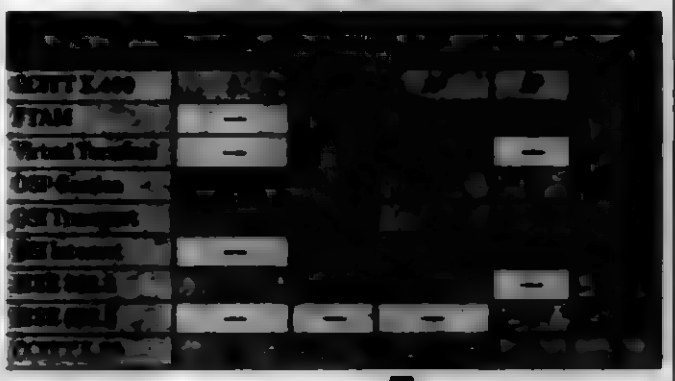
New England Telephone intends to "compete vigorously" with the new venture, according to a company spokesman. By the end of this year, the local carrier will have 5,300 miles of fiber-optic wiring miles in Massachusetts, with the greater portion concentrated in the Boston area, New England Telephone spokesman Mark Marchand said.

Currently under construction, the Teleport Communications network is scheduled to begin operating by midyear. Tentative future plans include extending the network to Route 128, where a number of high-tech companies reside.

DataView

Vendor backing for OSI

IBM stands alone with 802.5 token-ring support; others stick with 802.3 Ethernet



[1] The ISO's Open Systems Interconnect
[2] Delivery in Europe only

Key: — Shipping — Announced — Statement of intention issued

INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

Fiber LANs seek market

BY JAMES DALY
CW STAFF

Fiber-optic networks, which have been used primarily as a backbone connecting multiple local-area networks based on other cabling media, may be on the verge of taking the next giant step in their evolution: directly connecting user workstations.

What is the potential catalyst for this development? A growing demand for enough local bandwidth to support application-to-application communications and distributed data processing among powerful workstations

Continued on page 57

3+Open to hit shelves in June

BY PATRICIA KEEFE
CW STAFF

SANTA CLARA, Calif. — 3+Open, the latest release of 3Com Corp.'s network operating system, is said to be on schedule and ready to ship in June.

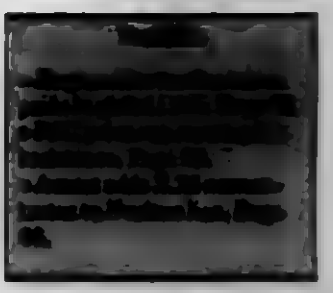
Microsoft Corp. and 3Com took to the road recently to demonstrate the jointly developed Microsoft OS/2 LAN Manager, which is four months away from shipping to OEMs.

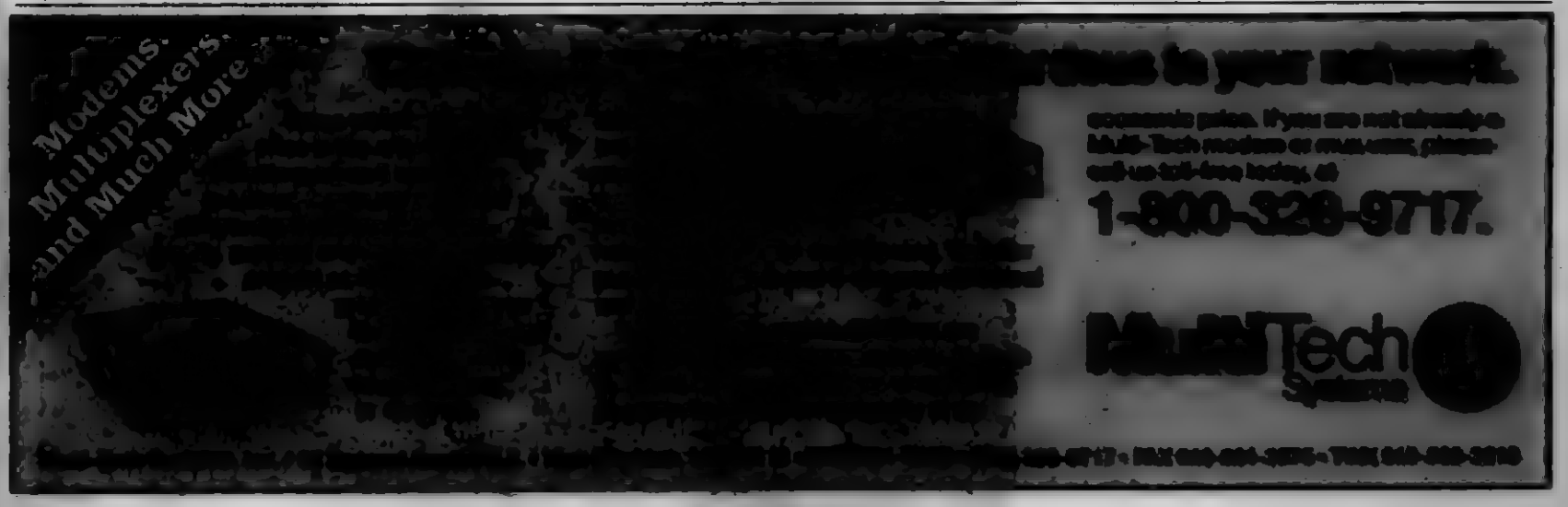
3+Open is said to provide many of the services now available to users of 3Com's current generation of software, 3+. Specifically, it will provide 3+Share; Name; 3+Mail; remote server; remote PC; Netconnect; Start; IBM Systems Network Architecture/3270; 3+Reach, a programming interface for mail gateways; and Net-DOS.

3+Open will add a LAN Manager core, protocol independence, performance and security improvements and network management, according to the vendor.

Current 3+ users will be able to upgrade to 3+Open. 3Com also stressed that it will continue to support 3+ and plans to pro-

Continued on page 58





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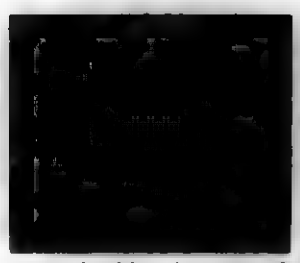

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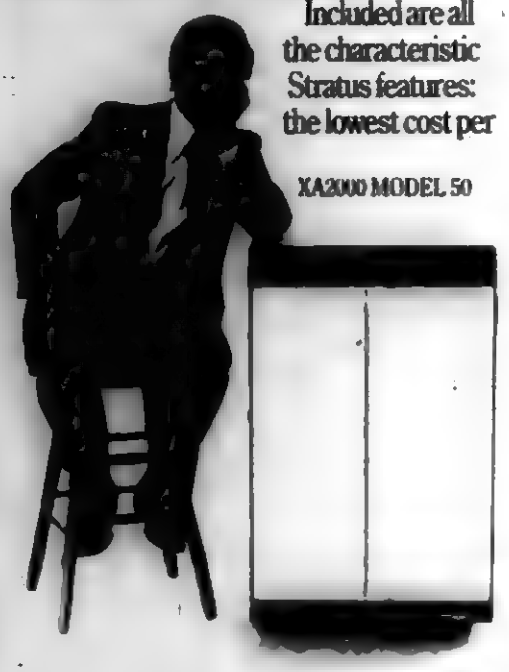

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Hughes bandwidth scheme knows no bounds

BY ELISABETH HORWITT
CW STAFF

LONG BEACH, Calif. — General Motors Corp. subsidiary Hughes Electronics Corp. has taken a lot of trouble — and spent a lot of money on long-distance bandwidth — to ensure that users at various corporate local-area network sites have quick access to resources on other LANs.

Hughes has interconnected individual LAN sites throughout the country over high-speed dedicated lines into what is "probably the largest [multivendor] Ethernet in the world," said Jack Covert, head of the company's technical support services. The network is connected by Digital Equipment Corp. and Vitalink Communications Corp. bridges — devices that take transmissions on one LAN and route them out over a remote connection to resources and workstations on other LANs. Both satellite and terrestrial connections are used to connect sites throughout Southern California and as far away as Tucson, Ariz.

"WE'VE GOT a philosophy on how to set up our Ethernet, which is to get as much bandwidth as cheaply as we can to provide for peak periods."

JACK COVERT
HUGHES ELECTRONICS CORP.

All major Hughes sites are linked via 1.5M bit/sec. T1 lines; smaller sites are served by 56K bit/sec. links, Covert said. A new multiplexing system, which the company plans to install shortly, will increase that 56K minimum to 224K bit/sec. "We've got a philosophy on how to set up our Ethernet, which is to get as much bandwidth as cheaply as we can to provide for peak periods," Covert said. "We don't care if the bandwidth gets used completely or not."

Response time guaranteed

The payoff from this generous use of bandwidth is that it guarantees users acceptable response time at all times — even when they are accessing a DEC VAX on a remote LAN at peak business hours. "The worst times we've seen of Ethernet users, only 12% to 14% of our total bandwidth is being used, even at the main backbone," which supports incoming traffic from multiple nodes, Covert said. Usually, only 3% of available bandwidth is used, he added.

While Ethernet is the standard network protocol used by all Hughes sites, a variety of Ethernet types — 64, to be exact — are used by individual locations. Approximately 1,000 nodes communicate via DEC's Decnet communications protocols, while more than 2,000 use Transmission Control Protocol/Internet Protocol. This is the main reason the company chose to use bridges, which make no distinction between different types of upper-level networking protocols, rather than routers, which only recognize one type of protocol, according to Covert.

While routers can make intelligent decisions about how to route a packet directly over multiple network links to the right destination, bridges must often broadcast a packet over all adjoining links until it reaches the right node. Bridges thus tend to use up more long-distance bandwidth, but Hughes was willing to pay for high-speed lines in order to have a "plain vanilla Ethernet," Covert said. "We don't want to deal with individual subnetworks, [each using a different protocol]. It gets too messy."

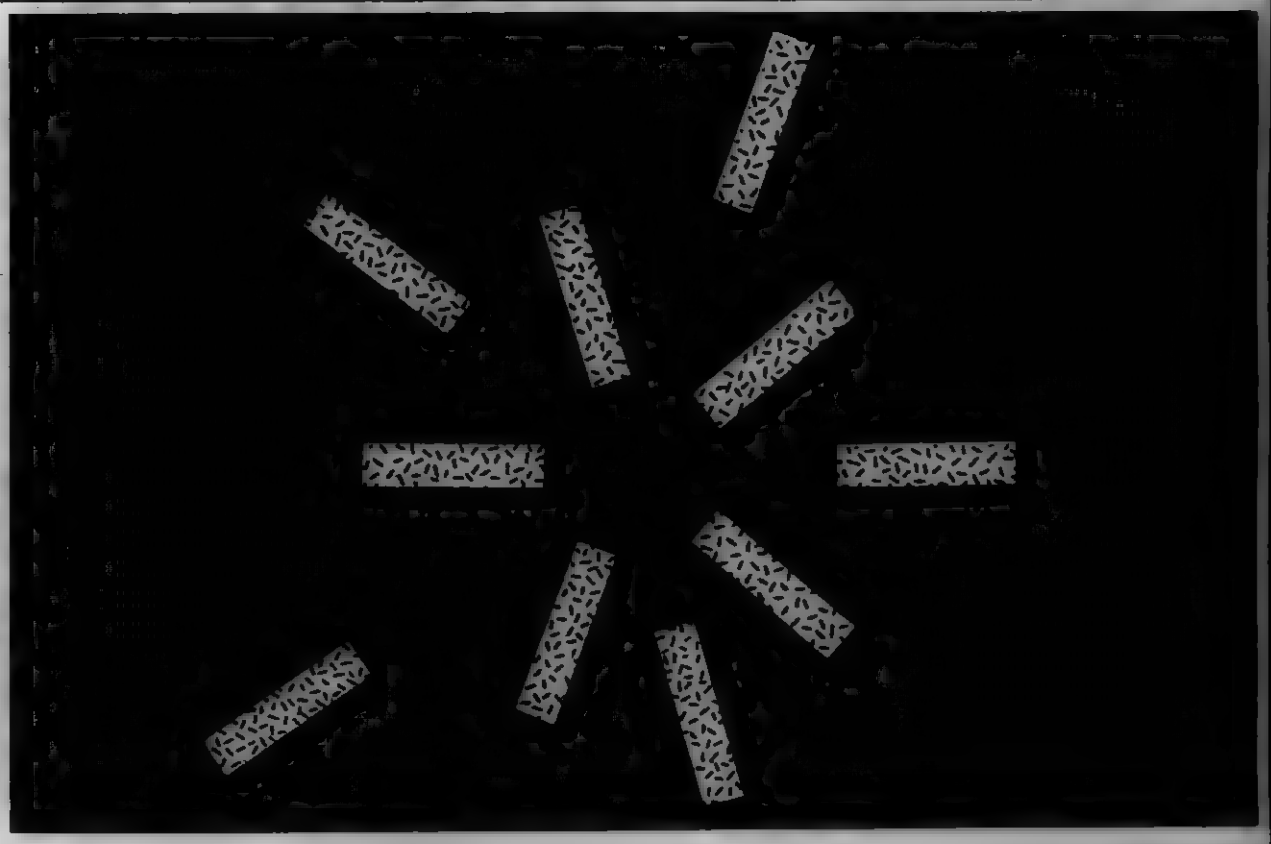
A few groups of users on 3Com Corp. 3+ networks and Apple Computer, Inc. Appletalk LANs are loosely connected to the corporate communications system. Covert's people treat these installations as true subnetworks, not as part of the corporate Ethernet system.

Sour on net management systems

While Covert said he is generally happy with his Ethernet bridges, he is less happy about the network management systems that bridge vendors currently offer. One of his major complaints is that he must buy a separate network management system for each new brand of bridge he installs. This is the main reason Hughes' bridge installations are for the most part limited to Vitalink and DEC products — although one or two groups of users have installed a few Bridge Communications boxes on their own.

Covert said he would like to see network management software monitor error rates and volume of packets sent, "just like what you can do now on an SNA network." He also requested a bridge alarm system "that tells you about systems going down right now" and management reporting software that would allow him to project usage growth and anticipate problems.

"I've had to write my own code to poll Vitalink and DEC machines to figure out what's wrong. What vendors have given us so far is pure garbage — you can't manage an Ethernet now with what they give you," Covert said.



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Fiber LANs

CONTINUED FROM PAGE 51

and computers.

"Fiber is coming on strong in graphics-oriented applications, where pictures are truly worth a thousand words," says Richard Cerny, president of Trellis Communication Corp., a networking design and management firm in Salem, N.H. "There is also the need for high-speed transfer in the scientific world, where you have a tremendous amount of compute-intensive information that has to be sent at super-duper speeds. That takes fiber."

Overkill?

Some industry sources still doubt whether there is significant need in the LAN market for fiber's whopping 100M bit/sec. bandwidth. "It's like trying to crack a walnut with a sledgehammer," says Larry R. DeBoever of DeBoever & Associates. "I'm bullish on fiber as a backbone [to connect multiple LANs], but if we can get 10M bit/sec. on dedicated twisted-pair, why do we need fiber? Even with 1M bit/sec., we're still rich in bandwidth."

But what may now seem like overkill may soon be essential. Fiber proponents say that as high-speed workstations filter down from the high-tech departments to the desk top, many will have a fiber-optic cable trailing behind them. Leading the way is a new generation of 15M to 25M bit/sec. workstations that Sun, Apollo, Tektronix and Hewlett-Packard are expected to announce this year.

Several vendors have already incorporated fiber's high bandwidth capacity into host-to-host networks. In January, Fibronics International, Inc. and Control Data Corp. signed a joint development agreement to link CDC's Cyber line of computers with Fibronics' Finex, a 100M bit/sec. fiber-optic network.

"Whereas the networks of the past few years have been a couple of hundred units, we now see 2,000 to 3,000 workstations on a network," says Bob Chiras, group marketing manager for workstation manufacturer Apollo Computer, Inc. "We're beginning to see a lot of demand for very high-speed corporatewide networking, and we're convinced fiber is going to be a part of that."

Another factor in fiber's spread to the user's desk top is its resistance to electronic interference and tapping by unauthorized users. Security considerations were the primary reason Mitre Corp. chose fiber for its IBM Personal Computer network, according to Mitre systems engineer Delores Derrington.

"We're working with some sensitive data and know if we've just laid the cable that no one has messed with it," Derrington says. Although the network's bandwidth capacity is greater than Mitre's current needs, the firm plans to add high-power workstations and video to the LAN.

For some, however, performance gains are offset by current cost issues. Even though fiber cable is less expensive than most wire media, the price tag on fiber-optic transistors and transceivers — which is often two to five times higher than similar units in a twisted-pair setup — stifles many potential users' interest.

"We did some quick adding and figured that if we wired 30 rooms with fiber, we're talking at least $21,000. We did our whole twisted-pair wiring job for $3,000," says Bob Johnson, telecommunications manager at the University of Washington in Seattle. "I can't imagine why anyone would want to use fiber to link individual machines unless they had money to burn."

"The cost is coming down, but the price per connection is still about twice that of twisted-pair or coaxial. And that's a significant difference for the small user," says Matthew West, president of Network Architects, Inc., a networking design firm in Marietta, Ga. "It still needs to come down considerably before it will make any great impact in the LAN area."

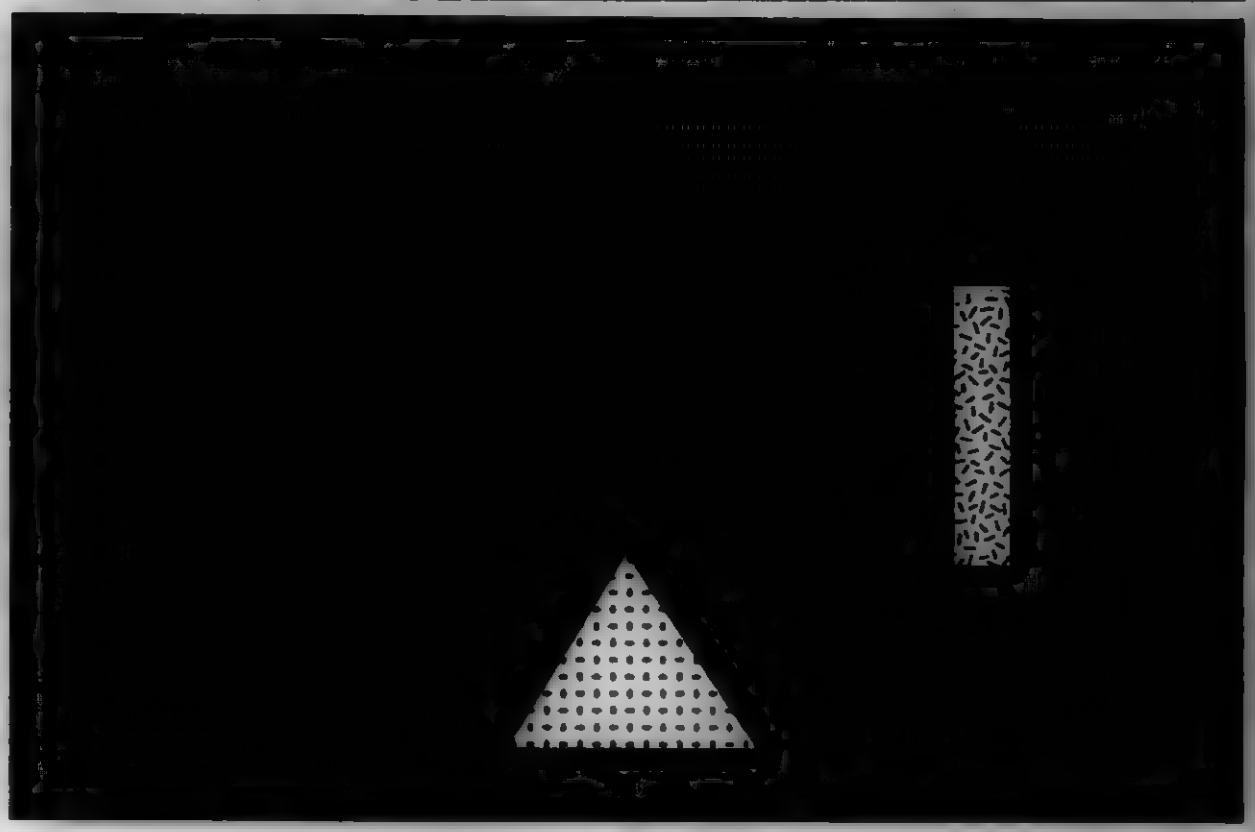
BIT BLAST

Wang joins GTE trial

Wang Laboratories, Inc. announced its participation in **GTE Florida's** Integrated Services Digital Network (ISDN) trials in Tampa, Fla. Wang is supplying PC 280s to demonstrate simultaneous data and voice transmission. The personal computers, equipped with ISDN cards, are linked via a modular telephone jack to a 64K bit/sec. ISDN Basic Rate Interface channel running over twisted-pair wiring. The connection links workstations to either a Wang host or an AT&T 5ESS switch at GTE Florida's central office.

The federal government spent $2.7 billion on telecommunications products and services in fiscal 1987 and will spend $3.8 billion in fiscal 1992, according to a report by Mountain View, Calif.-based research firm Input. The figures represent an average annual growth rate of 7% in government telecommunications expenditures during that five-year period.

NCR Corp. has announced plans to license Santa Monica, Calif., software company Retix's Open Systems Interconnect (OSI) networking software for use on all NCR computer systems. NCR plans to implement Retix's protocol software from the data link layer up through the application layer of the OSI networking standard, the company said.



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3+Open

FROM PAGE 51

vide at least two more releases — one this spring and another this fall. There are no plans to provide a Unix version of 3+.

Currently, 3+ supports DOS and Apple Computer, Inc. Macintosh workstations. Support for an OS/2 client will be added this month, followed by 3+Mail for an OS/2 client in June, 3Com said.

3+Open is slated to ship in three phases. The initial phase will be introduced in June with general availability during the summer. It is said to include the LAN Manager and support for Microsoft MS-DOS and OS/2 clients, as well as 3+Share, 3Com's XNS protocols (to ensure support for 3+) and 3+Start, a two-server system for DOS and OS/2 workstations.

In the fall, 3Com said it will port its basic services to OS/2 as outlined above and provide dedicated server support for DOS and OS/2 clients as well as support for subsidiary Bridge Communications' protocols and services — including NCS, GS and PCS/1 — and Motorola, Inc. 68000-based Transmission Control Protocol/Internet Protocol.

In 1989, 3Com said it will top off 3+Open with Macintosh support, fault avoidance (disk and file mirroring), IBM 3270 and LU6.2 gateway services, IBM Netview integration and Net Manager.

AT&T gives users telephone tap

BY JEAN S. BOZMAN
CW STAFF

LISLE, Ill. — AT&T Network Systems offered its largest end-user customers potential control of their portion of the AT&T network late last month when it announced a new customer-site product called Net Partner.

The product allows end users to monitor and diagnose faults on Centrex and Integrated Services Digital Network (ISDN) lines that are switched through an AT&T 5ESS switch at the local telephone company. It also provides a way for the user to send network statistics to IBM's Netview network management system running on an in-house mainframe, AT&T said.

Net Partner combines a Sun Microsystems, Inc. Sun-3/60 workstation at the customer site with AT&T software running on an AT&T 3B2 600 at the telephone company offices. What the customer sees is a series of green icons, which represent all his phone and data lines, as well as a listing of network alarms that should be tested and checked.

For the first time, the customer will be able to monitor and test his own lines before the Bell operating company does and to alert the local telephone company if the problem is not repaired quickly, AT&T said. Flashing orange or red icons signal trouble to the network manager sitting at the customer site's Net Partner console.

Fred Chanowski, president of Chanowski Telecommunications Management Corp. in Needham, Mass., said that such end-user control is critical to the success of ISDN and other AT&T network services at large user sites. "Before this, the customer was two or three steps removed from the applications processor that was managing his Centrex lines," Chanowski said. "Often, he had to call the regional telephone company to get repairs done."

Test takers

The Net Partner system was tested at McDonald's Corp. during that company's one-year trial of ISDN, according to Don Render, vice-president of product management for AT&T's Operations Systems group. Now, more than a dozen corporate customers are asking to test the system.

AT&T hopes to package Net Partner with new ISDN installations at Bell operating companies and at corporate sites, Render said.

Some Bell operating companies have expressed reservations about giving corporate customers the ability to peer into their central office operations and track how quickly repairs are carried out, said William Marx Jr., executive vice-president of marketing and customer operations at AT&T Network Systems.

"You're opening the window to what's going on inside their house," he admitted, "and it will be a new way of doing business." However, "most telephone companies tell us that they see the opportunity to grow their revenues this way," Render said.

The product will be available to end users by fall through the Bell operating companies and independent telephone companies, which will set the price and provide some custom features, according to AT&T.

Passmore

FROM PAGE 51

Unlike PC network operating system protocols, Appletalk protocols were designed from scratch to support peer-to-peer resource sharing across network workstations, in contrast to Novell and 3Com's server-based approach.

Appletalk was originally designed to support direct communications between any pair of network nodes, including communications with intelligent printers like the Laserwriter. This capability has been exploited by one product, the TOPS network operating system from Sun Microsystems, which allows Macintoshes to directly share each other's files, eliminating the need to dedicate one or more workstations to the job of making shared files available to network nodes.

For those who do not want a dedicated server configuration, the Appletalk Filing Protocol is supported by products like Appleshare. Users don't need to purchase network operating system software, either: Appletalk protocols are supplied with standard Mac system software.

Hardware advantage

It's in the area of LAN hardware that Appletalk is radically different from IBM PC products: Instead of requiring a LAN interface card, every Macintosh and Laserwriter has a hardware interface to Appletalk built-in.

The same Mac communications chip and port that supports serial communications to an attached modem is reprogrammed for Appletalk to support balanced transmission at 230K bit/sec. over twisted-pair cable. Consequently, the only Appletalk hardware connection cost is approximately $50, which is for the interface cable.

Appletalk's relatively low speed would seem to limit its utility, yet such is not necessarily the case. While Ethernet and Token-Ring networks operate in the multiple megabit-per-second range, the actual speed of data transfer between PCs is usually limited by LAN protocols and most PC hardware to no more than about 200K bit/sec.

A real limitation of Appletalk's relatively low speeds is the maximum number of nodes supported on a single LAN. Even this obstacle can be overcome by segmenting larger Appletalk nets into multiple networks, each with fewer Macintoshes.

Nonetheless, for users with higher speed networking requirements, the Appletalk protocols are now supported over 10M bit/sec. Ethernet. This configuration, called Ethertalk, is supported by Apple hardware for the Mac II and by multiple third-party vendors for the Mac SE and the DEC VAX. To distinguish the Appletalk protocols, which can, in theory, run over any type of LAN, from the Appletalk 230K bit/sec. hardware, Apple now refers to the protocols as Appletalk and has renamed its hardware Localtalk.

Apple-DEC support

Appletalk protocols running over Ethernet are expected to assume a major role in the recently announced Apple-DEC alliance. Because Ethernet is transparent to higher layer protocols, customers can simultaneously use the same Ethernet LAN to support Digital Network Architecture/Decnet protocols between VAXs and Appletalk protocols between Macintoshes and VAXs. These Apple-to-DEC links for the VAX already exist in products from Alisa, Pacer and Odesta.

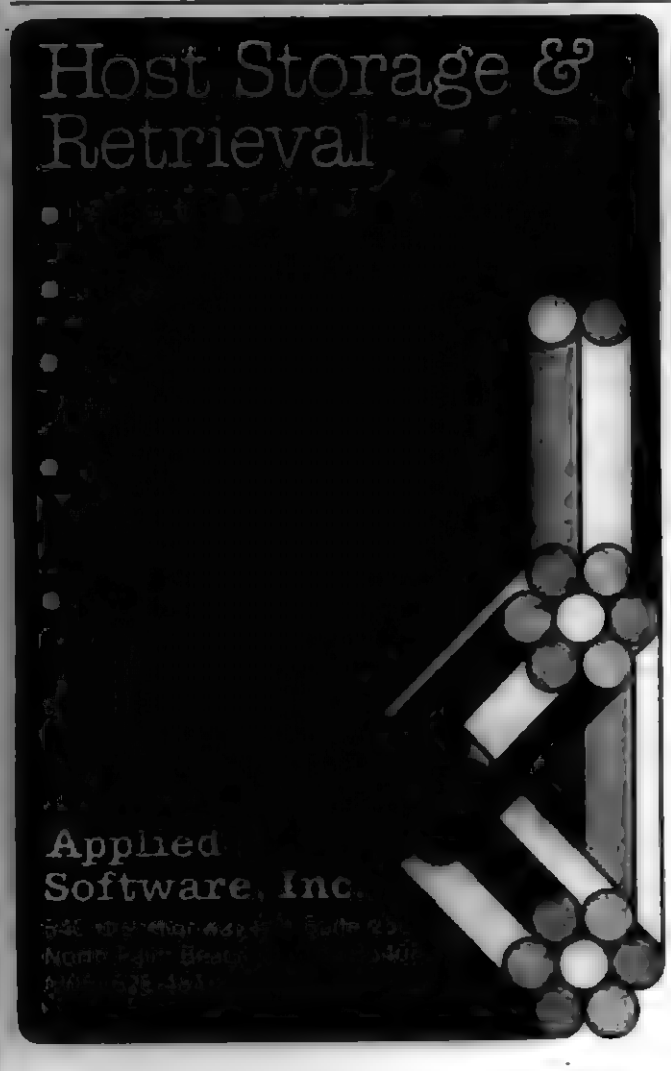
Appletalk's low cost and ease of use could help it gain acceptance as a network for microcomputers other than the Mac. For example, an Appletalk network of IBM PCs, Unix workstations and intelligent laser printers might be created to support file sharing and Adobe Postscript printing, using TOPS products. There have been rumors that Tandy is considering the use of Appletalk with its next generation of PCs.

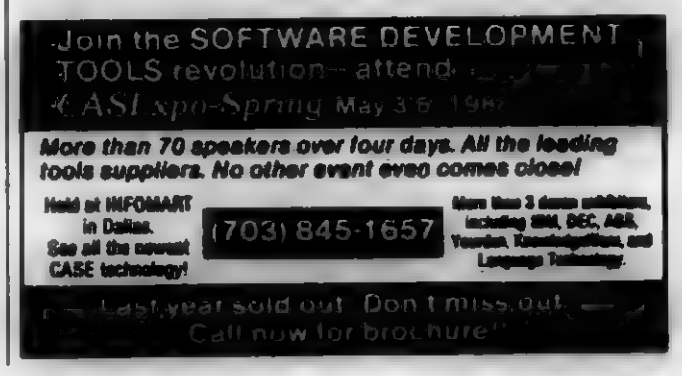
So is Appletalk a real LAN? In a recent article by Bob Metcalfe, the inventor of Ethernet and founder of 3Com, Metcalfe predicts which LANs are likely to survive and prosper through the year 2000. The four winners are Ethernet, Token-Ring, Fiber Distributed Data Interface and Appletalk.

Metcalfe states that today, Appletalk is second only to Ethernet.

What he did not say is that with the recent success of the Macintosh and the high percentage of Appletalk LAN installation by Mac users, there may soon be more Appletalk nodes installed than either Token-Ring or Ethernet. So while Appletalk may be the Rodney Dangerfield of LANs, it's more than worthy of respect.

Passmore is a principal with Network Strategies, Inc. in Fairfax, Va.





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Honeywell Bull

FCC's price cap scheme for AT&T put on hold

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The Federal Communications Commission's plan to dramatically reform the way it regulates the price of AT&T long-haul services is bogged down in political problems.

And managers of business networks think that's just fine, because they believe the proposal needs a lot more scrutiny, according to Kenneth L. Phillips, vice-president of telecommunications policy at Citibank NA and chairman of the Committee of Corporate Telecommunications Users (CCTU).

The FCC's proposal to replace traditional rate-of-return regulation with a price cap scheme was announced with great fanfare last August by Dennis R. Patrick, the Republican chairman of the FCC.

The proposal would put an end to regulating the rate of return of dominant carriers — which could mean a big boost for AT&T's profits — and instead would place an annual ceiling on prices [CW, Aug. 10, 1987]. Patrick argued that his plan would give AT&T a profit incentive to cut costs and operate more efficiently, while protecting consumers from excessive prices.

However, the plan has been greeted with skepticism in many quarters, including the U.S. Congress, AT&T's competitors and users groups, such as the CCTU and the International Communications Association (ICA).

One concern of the users groups is that the initial level of price caps may be set too high or that the annual adjustments may allow the price caps to rise too fast.

In Congress, Democrats are trying to delay the action until after the November presidential elections, several observers said, in hopes that the next president will name a new FCC chairman.

"There's going to be a radical change in the cast of characters at the commission, regardless of who wins the election," Phillips said.

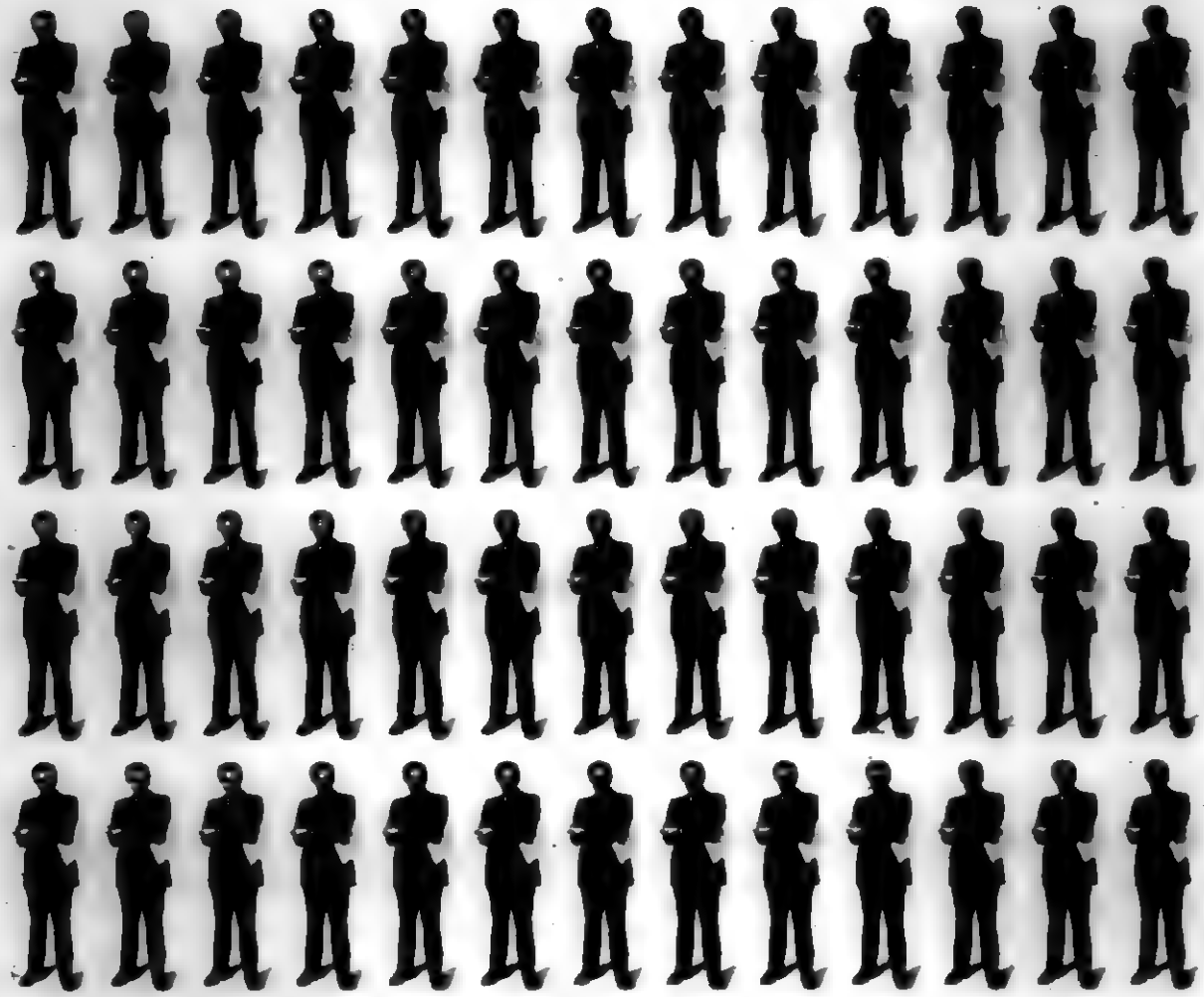
The ICA and the CCTU are supporting bills that would delay Patrick's price cap scheme until after a new presidential administration is in place in January 1989.

"Congress doesn't trust the FCC, which may produce some automatic resistance to FCC proposals," said Rep. Al Swift (D-Wash.) at a recent trade show.

"In general, there is some congressional concern that the FCC will ram through some controversial rule changes without setting aside adequate time to discuss their merits," said George R. Dellinger, a telecommunications analyst at Washington Analysis Corp.

Patrick can mollify Congress by issuing a more detailed proposal at a forthcoming FCC meeting, to be held either March 24 or April 21, Dellinger said.

The ICA said it may support the price caps, but only if there is evidence that the new system will protect rate-payer interests better than the current regulatory system. In its official filings, the ICA complained that the FCC has spent more time developing broad new policies than it has on enforcing the current regulations and addressing such issues as strategic pricing of special access services.



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Driven by a powerful Network Control Language, NETMASTER not only helps decrease downtime, it helps cut costs at Northwestern Mutual. As VTAM Specialist George MacDonald points out, the system's multiple sessions capabilities have allowed his company to delay hardware purchases and, in many cases, hardware upgrades as well as improve productivity. "I wouldn't want to have to manage a network like ours without something as high quality as NETMASTER," said MacDonald, whose company also utilizes SUPRA™ and MANTIS® from Cincom. "There's just no way in the world to do it."

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Fiber-based net adds miles to host channel

MINNEAPOLIS — Two fiber-optic channel extenders recently introduced by Network Systems Corp. are said to support IBM host-to-host and host-to-peripheral connections of up to 1.5M bit/sec. over distances of several miles.

The Fiber Link 2000 (FL2000) and Fiber Link 5000 (FL5000) are said to provide users with the same level of performance within a radius of a few miles as is provided over local, channel-based connections. The link can be used to extend channel speeds from the host out to channel-attached peripherals and data entry terminals or as a link between one or more mainframes.

The products will fill a gap in the vendor's Remote Device Systems networking products, which currently support channel-based connections over either local links or long-distance T1 connections, Network Systems said.

Above-average medium

The fiber medium was chosen because of its high bandwidth, lack of vulnerability to electrical disturbance and other outside interference and its ability to support signals over distances of several miles, the company said.

The FL2000 handles network distances of 2 km; the FL5000 handles up to 5 km. Each product can be configured as either a standard-performance or high-performance model.

Standard performance supports approximately 43K byte/sec. over distances of 2 km, and 60K byte/sec. over 1 km. A high-performance model can handle speeds of up to 1.4M byte/sec.

Prices range from an FL2000 standard-performance model at $17,500 to a high-performance FL5000 for $44,500.

Make these "people" laugh, and you could win $100 worth of software.

Announcing the 1988 Computerworld button contest!

Every year, as all you button freaks know, *Computerworld* distributes tens of thousands of buttons at trade shows around the country. For several years now, against our better judgement, we have been letting you, our readers, write the slogans for these buttons. To our surprise, you have written some good ones (like those shown here). So we're doing it again.

We're looking for a few good slogans — witty, relevant, SHORT (these are small buttons), and at least moderately clean. You may send in your entries on the form below or a copy.

But you may NOT send us everything that comes into your head. Our offices aren't big enough to handle all that paper! Please take the time to narrow down your ideas to the two best you can come up with (test them on your friends).

All entries will be shown to our panel of judges, who will be tied to their chairs until selections are complete. Six winning slogans will be picked, and everyone who sent in one of those slogans will be eligible for a prize. If you are the only one submitting a particular slogan that wins, you, of course, get the prize. However, if more than one person had the same intelligent idea, we'll pick the prize winner out of a hat. Prize winners will receive a $100 certificate good towards the purchase of software from a friendly neighborhood computer store.

All decisions of the judges will be final, and no representations as to their competence, skill, or sense of humor are being made. All entries will become the property of *Computerworld*. Deadline for entries is **March 18, 1988** at our offices in Framingham, MA.

YES, I'd like to enter *Computerworld's* ridiculous button contest. My two slogans are written below. I understand the rules above, and realize that these entries will become the property of *Computerworld*. I hope your judges can read!

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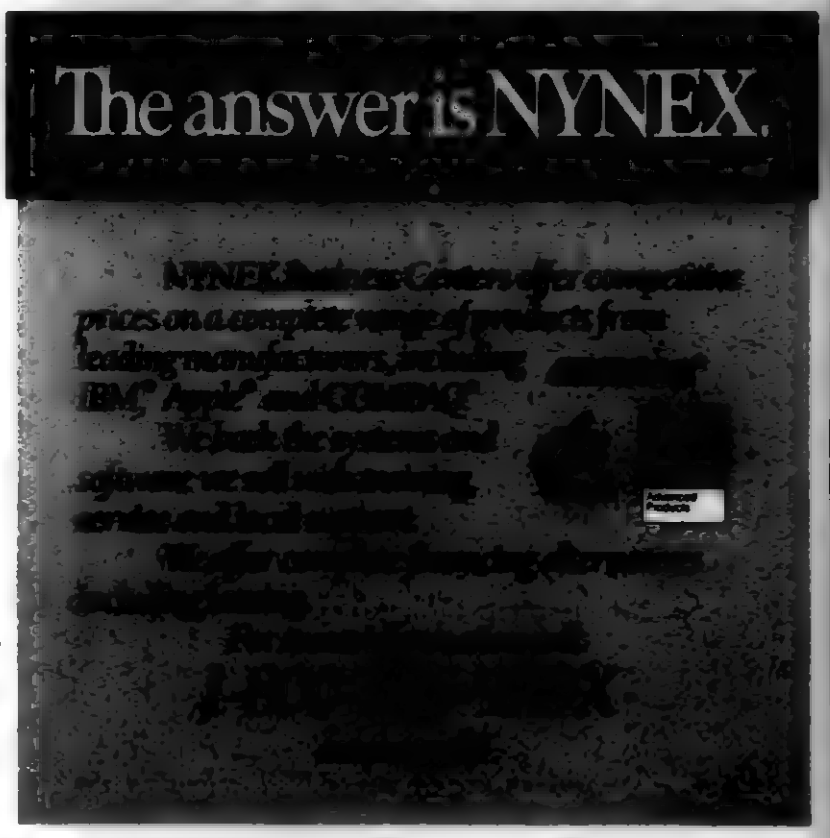

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NEW PRODUCTS

Local-area network hardware

Amnet, Inc. has added the **Nucleus 7200 X.25 Concentrator** to its family of Nucleus 7000 wide-area network products.

The Nucleus 7200 X.25 Concentrator is said to optimize communication line costs for connection to public and private wide-area networks including packet-switching networks. It is reportedly capable of supporting up to 20 ports that implement the CCITT X.25 interface at speeds up to 256K bit/sec. The concentrator can also handle 2,000 simultaneous user circuits with a throughput capacity of 750 data packet/sec.

A four-port configuration of the Nucleus 7200 costs from $5,695.

Amnet, 1881 Worcester Road, Framingham, Mass. 01701. 617-879-6306.

Local-area network software

The Software Link, Inc. recently upgraded **Lanlink**, its software-based local-area network.

Lanlink 5X allows a data transmission rate of a 0.5M bit/sec. or higher, depending on hardware, the vendor said. It uses a standard parallel port and customized cabling to communicate with the file server and other computers in a work group.

Features include multitasking, remote modem access, print spooling, local printing and a nondedicated server.

It requires 32K bytes of random-access memory on the server for each satellite workstation on the network.

Lanlink 5X costs $125 for each satellite. The network multitasking option costs $195.

The Software Link, 3577 Parkway Lane, Norcross, Ga. 30092. 404-448-5465.

Network management

A management control facility has been introduced by **Case Communications, Inc.** for use with its Case Data Concentrating Exchange (DCX) Series communications processors.

The **Case NCAM2** option board replaces the NCAM1 module. It plugs into an existing expansion slot in the DCX multiplexer and acts as an interface to the Case 5000 Series Network Management System. Users can monitor, diagnose, control and configure DCX networks through centrally located network management software.

Up to 14 intermediate NCAM2 boards can be used to link DCX multiplexers to the head NCAM2 board.

Head NCAM2 boards cost $2,500. Intermediate and slave boards cost $2,300.

Case Communications, 7200 Riverwood Drive, Columbia, Md. 21046. 301-290-7710.

Links

A remote controller for IBM 3270 communications that provides multiple concurrent host communications and IBM Token-Ring local-area network support for both Type A and ASCII devices has been announced by **Harris Corp.**'s Data Communications Division.

Called the **H174-32R**, the controller is capable of supporting up to 32 standard Type A devices with connections for an additional 24 asynchronous devices or hosts. The unit also supports standard synchronous line speeds of 64K bit/sec. using IBM Systems Network Architecture protocols.

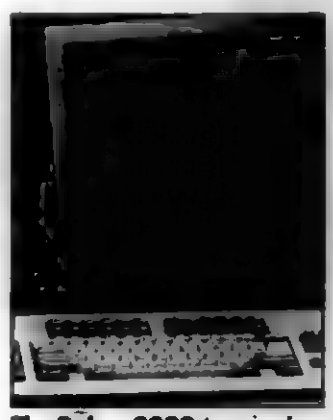
The H174-32R is priced at $9,950.

Harris, 16001 Dallas Pkwy., Dallas, Texas 75248. 214-386-2000.

Protocol converters

A twinaxial/coaxial compatible protocol converter terminal has been announced by **Rebus Corp.** and **JDS Microprocessing.**

Called the **Rebus 3000**, the



The Rebus 3000 *terminal*

display terminal is said to be IBM compatible when used in conjunction with JDS Microprocessing's Hydra protocol converter. Features include support of communications processing up to 38.4K bit/sec., a concurrent operations printer port and a private command interface.

The terminal offers a standard IBM-labeled 121-key 3180 Model 1-style keyboard with 24 function keys.

The Rebus 3000 costs $595.

Rebus, P.O. Box 36502, San Jose, Calif. 95158. 800-426-7090.

Digital Link Corp. has announced its Extended Super Frame (ESF) channel service unit, the Model **DL551E**, designed to permit direct connection of D1 through D4 framed data terminal equipment (DTE) to ESF-formatted T1 networks.

The unit converts D1- or D4-framed DTE signals to ESF signals. For transmission over 1.54M bit/sec. T1 networks, ESF allows on-line error monitoring. Local and remote error status conditions are reported via front-panel LEDs on the local channel service unit.

Other features include fault isolation on an end-to-end T1 network, DTE loop back and network loop back code detection and generation capabilities.

The DL551E ESF is priced at $1,795.

Digital Link, 133 Caspian Court, Sunnyvale, Calif. 94089. 408-745-6200.

File servers

A combined remote bridge and router for Ethernet-based wide-area networks has been announced by **RAD Network Devices**, a subsidiary of RAD Data Communications.

Called the **Remote Ethernet Bridge**, the device includes active loops, alternate routing and node address-level security. It operates on such data link levels as single, dual, quad, T1 and M1-Cept. Forwarding data rates range from 4.8K to 2.05M bit/sec.

Made up of two cards and software, the bridge installs on an IBM Personal Computer AT. Prices start at $6,590.

RAD Network Devices, 151 W. Passaic St., Rochelle Park, N.J. 07662. 201-587-8822.

Electronic mail

Inbox/PC, software said to provide electronic mail and file transfer capabilities for IBM Personal Computers and compatibles, has been announced by **Think Technologies**, a division of Symantec Corp.

Inbox/PC supports up to 100 users on a personal computer local-area network with a file server supporting Microsoft Corp. MS-DOS 3.1 or higher. It supports protocols such as Etherlink, Etherlink Plus and IBM Token-Ring and Netbios as well as RS-232 LAN products implementing the redirector model of file sharing.

Inbox/PC costs $599.

Think Technologies, 135 South Road, Bedford, Mass. 01730. 617-275-4800.

Security

The **Smart-line** dial-up control and report system for monitoring dial telephone lines has been announced by **Dataprobe, Inc.**

Smart-line allows a user with a dial telephone to access, interrogate and control remote equipment. Smart-line provides voice response to keypad inputs, indicating current status and available control and reporting options.

Smart-line is available as a stand-alone dial line interface to be integrated into existing systems or bundled with standard switching modules.

Pricing starts at $450.

Dataprobe, 170 Coolidge Ave., Englewood, N.J. 07631. 201-569-6464.

Modems/ Multiplexers

The **EM-1000** and **EM-2400**, integrated 1,200 and 2,400 bit/sec. modem and CCITT X.25 packet assembler/disassembler (PAD) products, have been announced by **Emucom, Inc.**

The products feature Hayes Microcomputer Products, Inc. Smartmodem capability and provide call and error correction over leased and dial-up lines.

The EM-1000 is a stand-alone unit that converts a 1,200 or 2,400 bit/sec. Hayes AT-compatible synchronous modem to an X.25/X.32 PAD. The EM-2400 provides full-duplex synchronous or asynchronous transmission.

The EM-1000 and EM-2400 cost $325 and $795, respectively.

Emucom, 25 Industrial Ave., Chelmsford, Mass. 01824. 617-256-9871.

Anderson Jacobson, Inc. has announced a series of 2,400 bit/sec. dial-up modems for use with its AJ Modular Modem System.

The **AJ 2441-2** modems are compatible with the Hayes Microcomputer Products, Inc. AT command set and feature nonvolatile memory and answerback security.

The AJ-2441-2M features MNP Level 4; the AJ-2441-2C1 provides MNP Level 5.

Prices range from $495 to $995.

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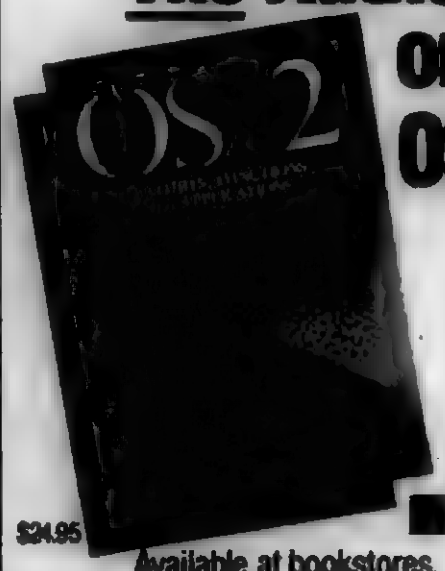

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HARD TALK

Stanley Gibson

DEC readies '88 artillery

In November, we will have elected a new president, there will be a new world champion of baseball, and DEC will have entirely replaced its VAX line.

DEC Vice-President Bill Demmer reportedly has been traveling the country telling consultants just that. Actually, the Microvax 3000 series would be the only currently offered processor family not to be replaced. But those machines were new in September 1987, and not all have shipped yet.

So, while some are looking at DEC's surge during the past couple of years as an aberration that will soon end, it is more likely that 1988 will see a continuation of DEC's momentum. The "Marvel of Maynard" will thus cement its claim to the No. 2 position among computer vendors and keep growing.

What are the new machines, and what will they mean?

First, there is a multiprocessing system, code-named Polar Star, expected this week. This VAX, reportedly capable of performing 22 million instructions per second (MIPS), will be the cornerstone of DEC's attempt to offer a mainframe alternative to IBM.

Then there is Calypso, reportedly a Microvax 3000-based symmetrical multiprocessor that could find a niche among smaller accounts that wish to

Continued on page 71

Used CPUs hit bottom

ESA expectations seen fueling price plunge

BY STANLEY GIBSON
CW STAFF

In the months preceding IBM's announcement of MVS/ESA, the values of used IBM 3080 mainframes fell through the floor, according to leasing industry officials. But prices should not fall any farther, the officials said, even though 3080s cannot run the new operating system.

Prices for 3080s dropped so far that those machines became hard to find on the used market, as owners reportedly declined to sell them at such deflated prices.

Meanwhile, users are waiting to see whether 3090 base models will be fully upgradable to the expected enhanced 3090s, commonly known as the F models; 3090 values reflect this uncertainty, leasing companies said.

The price decline for a typical 3081, from $800,000 in October 1987 to $350,000 in mid-February, shows that users probably had an idea of what the ESA announcement was to be, according to Svend Hartmann, president of Computer Merchants, Inc., a major leasing firm.

Flooded the market

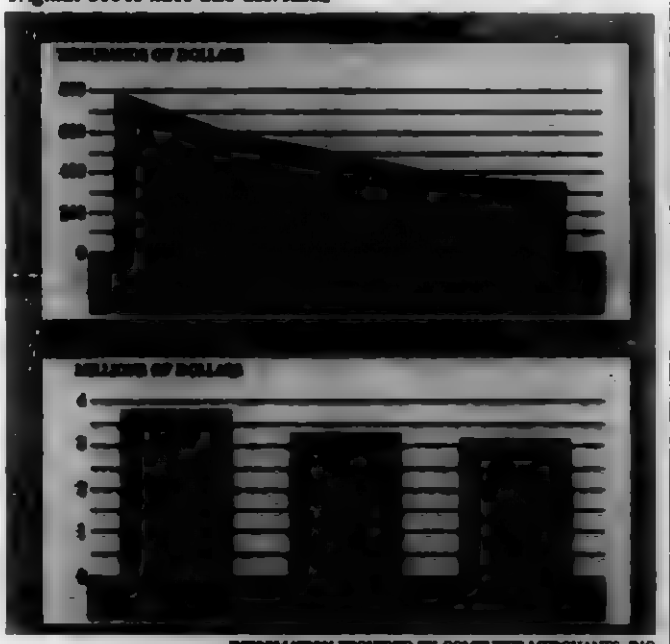
However, Hartmann also said IBM's eagerness to sell 3090s late last year [CW, Nov. 23, 1987] caused a large number of 3080s to be displaced, resulting in too many machines on the market at once and a consequent erosion in their value.

Marty Walsh, senior vice-president at Comdisco, Inc. in

Continued on page 70

Going down

In the last six months, IBM 3080 values have nose-dived; values of original 3090s have also decreased



INFORMATION PROVIDED BY COMPUTER MERCHANTS, INC.
CW CHART

Intel plugs Fastpath into multiple networks

BY JAMES CONNOLLY
CW STAFF

PHOENIX — Intel Corp. recently enhanced its Fastpath line of channel-attached control units for IBM mainframes to allow a single Fastpath unit to support multiple environments.

In the past, different Fastpath models were needed for each link to Digital Equipment Corp. VAXs, Transmission Control Protocol/Internet Protocol (TCP/IP) networks, Manufacturing Automation Protocol networks, Open Systems Interconnect (OSI) networks and ASCII devices. Intel said each Fastpath unit now can connect an IBM 370-type mainframe to a TCP/IP network as well as a VAX, MAP, OSI or Ethernet network and ASCII devices.

Roger Thomas, general manager of Intel's Systems Interconnect Operation, said the feature provides users with cost advantages by making Fastpath more flexible. He also said further enhancements are planned to allow each Fastpath unit to support three or four different connections, besides the TCP/IP link.

Fastpath is available with Advanced Computer Communications Corp. Acces/MVS software for TCP/IP connections to hosts running IBM MVS and MVS/XA. TCP/IP software for IBM's VM is available for Fastpath through third parties, according to Intel.

The feature should be available as a field upgrade in April. Base prices for Fastpath units range from $35,000 to $75,000, and the new feature and upgrades range from $5,500 to $15,000, depending on the model and configuration involved. Acces/MVS costs $22,000.

Imagen lengthens laser line

BY SUZANNE WEIKEL
CW STAFF

SANTA CLARA, Calif. — Imagen Corp. has expanded its Imageserver XP line of laser printer systems to include an 8 page/min model based on the Canon, Inc. LPB-TX laser printer marking engine.

The 3308/S Laser Printer System features the same raster image processor used in the rest of the Imageserver XP line.

According to a company spokesman, use of Imagen's Real-Time Rasterization process provides full-page text and graphics document printing at resolutions of 90,000 dot/sq in. at a true-rated output speed of 8 page/min for letter-size paper stock.

Page management features include dual-input paper trays,

Continued on page 71

Inside

• Intergraph announces development system for Clipper 32-bit microprocessors. Page 72.
• AK Systems introduces IBM format tape system for CAD/CAM applications. Page 72.

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Aviv shifts 3480 focus to minis

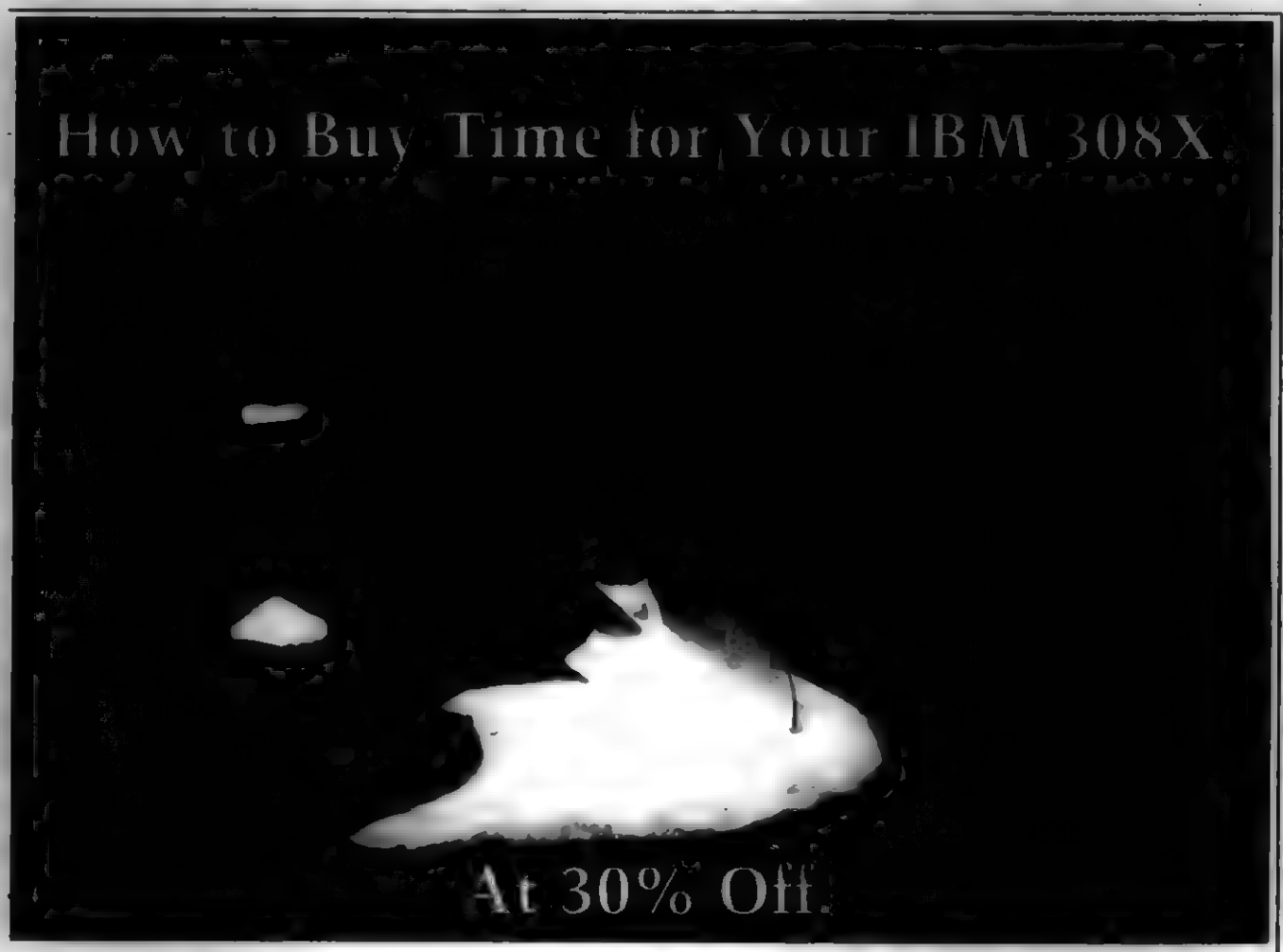
WOBURN, Mass. — Aviv Corp. has migrated IBM 3480 cartridge tape technology downward from mainframes to the minicomputer level with the introduction of 3480 media-compatible tape systems for Digital Equipment Corp. VAX and Microvax, Sun Microsystems, Inc. and Data General Corp. computers.

The TFS 3480 is aimed at organizations in which IBM mainframes and those smaller systems share environments and users need to exchange data among departments.

The tape subsystem uses 220M-byte cartridges and was designed to be compatible with Aviv's Multiport static-switching system, which the company said allows up to six non-IBM hosts to share a single TFS 3480 system.

The TFS 3480 is available in single- or dual-drive configurations. The dual-drive system features dynamic dual-porting, which allows simultaneous access by two hosts at a transfer speed of 1.5M byte/sec. per host.

A single-drive system costs $63,400, and a dual-drive system costs $80,650.



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EMC uses state-of-the-art technology and production methods to offer our 308X upgrade at 30% lower cost than IBM. A 16MB upgrade from IBM is priced at $160,000. For that same price you could buy 24MB of EMC main storage. That's an additional 8MB of main storage or a savings of $50,000. Either way you save with EMC. EMC also features coterminous leases and trade-up credits so the return on your investment continues after your purchase.

3. Improve Performance.

By increasing your 308X's main storage capacity, you will improve system response time and increase your users' productivity.

EMC's 308X upgrades are 100% hardware and software compatible with IBM 3081, 3083, and 3084 CPU's. Upgrades are provided in 16MB increments and run all IBM diagnostics. Use of EMC upgrades will have no effect on your IBM maintenance.

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Used CPUs

FROM PAGE 69

Rosemont, Ill., the nation's largest computer leasing firm, agreed that IBM's aggressive 3090 sales efforts targeted at its large accounts contributed to the 3080 price drop.

Hartmann said that prior to the ESA announcement, 3080 values had become so low that many users were declining to sell those mainframes at such depressed prices.

"We reached a point where supply began to dry up. There are indications that prices have bottomed out. I believe they have. At these low rates, people will not sell," Hartmann said.

Walsh said prices are up slightly from three weeks ago. A 3081's value has increased about $20,000 from its level in the $300,000 to $400,000 price range.

In the 3090 market, Hartmann said that doubt as to whether the 3090 base models will be fully functional under the ESA operating system has prompted softness in the values of those machines.

E models only

"Most buyers do not want the original models, only E models. They are afraid IBM will make a distinction between plain and E models — in software, in the ability to run ESA and so on," Hartmann said.

"The original models were already very soft. The effect of ESA may have been anticipated," he added. Nonetheless, the current ability of 3090s to upgrade to E models has "put a floor" under that soft demand, Hartmann said.

Per Flatten, an IBM analyst at Arthur Andersen & Co. in Chicago, said there is little likelihood that IBM will not allow upgrades to F machines.

"I don't see how they could refuse to upgrade. It would severely damage IBM's credibility," Flatten said. He suggested that upgrade prices could be raised if customers opted to buy used 3090 base models and have IBM upgrade them, rather than buying new E models. He added that the 3090 base models would be upgradable until the Summit line, IBM's mainframe successor series, is announced.

International Data Corp. analyst Francie Gens said there is little chance that 3090 base models would ever be unable to upgrade to ESA-capable machines.

Comdisco's Walsh agreed. "All indications are that you will be able to upgrade to the F models," he said. Users of XA operating systems may see fit to wait until the F models and upgrade options are announced, Walsh said, pointing out that currently, XA systems offer nearly as much functionality as ESA.

Gibson

CONTINUED FROM PAGE 69

run more than one operating system.

Key to both of these computers will be the expected Version 5 of DEC's VMS operating system, which will, analysts say, permit peer multiprocessing. Version 5 reportedly will also allow up to 32 VAXs in a cluster. Multiplying 32 times the 22 MIPS expected with Polar Star yields 704 MIPS. Whether that number is realistic in practice and exactly how the system can be used are other questions, but such a cluster could be yet another customer option.

Just the thought of such massive clusters connected to each other reinforces DEC's pet slogan, "The network is the computer."

Hints of things to come

In the meantime, there are reports of a desktop VAX and a large, uniprocessor VAX that will be water-cooled. And the Vaxstation 8000 three-dimensional graphics workstation introduced just a few weeks ago must not be overlooked.

Indeed, by this time next year, DEC will be offering a larger number of VAXs than ever before for an extremely broad range of uses. All these products will be integral Decnet nodes.

By next year, DEC's multivendor networking strategy, recently announced as Network Applications Support, will be more fully developed. Building on an anticipated set of tools, the Apple Macintosh will be a fully functioning Decnet node by the fall.

DEC's new products will have to be well done, of course. There will have to be appropriate applications. And marketing efforts will have to be successful. But there are signs that DEC is fully capable of these things.

There is talk that DEC will offer transaction processing software and vertical market applications for banking and insurance developed by key large accounts. DEC's sales and support have been receiving higher and higher marks.

What could trip DEC up?

In the past, DEC failed with personal computers when it didn't have a clear strategy. In the PC market, there just wasn't room for an uncertain commitment.

But there is no evidence that DEC doesn't know what it's doing this time around. The methodical way in which the VAX line has been expanded and the schedule of upcoming announcements show that DEC has developed, and is following, a clear blueprint.

With its broad line of products, DEC should be highly attractive to new accounts, from mechanical engineering customers who need 3-D workstations to banking and insurance firms that require transaction processing.

But these new products will also be offered to existing DEC customers, giving them little reason to look elsewhere for their computing needs. A DEC customer will have to be very imaginative to find a need that DEC will be unable to fill.

So, even if DEC does not poach in IBM territory, it will be able to grow in a very healthy way by selling products to new and existing accounts.

By early 1989, it is probable that DEC will have gone way beyond the point of being a transitory supernova illuminating the sky only to fade, as others have in the past.

Indeed, if the DEC of the past few years — a company with a few good minicomputers and solid networking — threw a fright into IBM, what will the DEC of 1989 do?

JUST THE THOUGHT of such massive clusters connected to each other reinforces DEC's pet slogan, "The network is the computer."

Gibson is a Computerworld senior writer.

Imagen

CONTINUED FROM PAGE 69

each of which holds 200 pages; a 100-page output tray; faceup- or facedown-selectable output; and the ability to accommodate different sizes and types of paper. Automatic duplex printing is also standard.

The printer offers a 300,000-page five-year rated lifetime, the spokesman said, as well as a duty cycle of 6,000 page/min. It allows direct connection to Ethernet networks, making the printer suitable for work group environments, he added.

The 3308/S reportedly uses Imagen's multiple language support software, enabling it to accept output written in Imagen's Impress page-description language as well as in Ultrascript, its Adobe Systems, Inc. Postscript-compatible emulator.

Other standard emulations include Tektronix, Inc.'s 4010/4014 graphics terminal, Epson America, Inc.'s FX+ and IBM's 5152 dot matrix printer.

The Imagen 3308/S Laser Printer System is upwardly compatible with other Imageserver XP printers.

Priced at $10,950, it will be available this month, the vendor said.

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NEW PRODUCTS

Processors

The Intergraph Advanced Processor Division has announced a software development system for its **Clipper** series of 32-bit microprocessors.

Housed in a 12- by 12- by 15-in. desktop unit, the system comes with a Clipper C100 computer engine and separate I/O processor. Also included are 8M bytes of random-access memory, a floppy disk and a 156M-byte hard disk.

Standard software includes the Clix operating system, a C compiler, a downloader and debugger, network core software and screen copy and ASCII print resources.

The Clipper Development System is priced at $11,950.

Intergraph, 2400 Geng Road, Palo Alto, Calif. 94303. 415-852-2365.

—

A data acquisition peripheral that works with Digital Equipment Corp. VAX computers over standard RS-232 ports at speeds of up to 19.2K bit/sec. has been announced by **International Data Acquisition & Control, Inc.**

Called the **IDAC/1000**, the stand-alone peripheral has a 32K-byte firmware operating system. It reportedly can capture eight channels of single-ended or four channels of differential analog output. Up to 16 channels of digital I/O are jumper-selectable for input or output in groups of eight.

The IDAC/1000 costs $995.

International Data Acquisition & Control, P.O. Box 397, Four Limbo Lane, Amherst, N.H. 03031. 603-673-0765.

Data storage

A tridensity, ½-in. nine-track **IBM format tape system** for computer-aided design and manufacturing applications has been introduced by **AK Systems.**

The system offers 800, 1,600 and 3,200 character/in. density capabilities. It is compatible with computer systems that use VME, S-100, RS-232 or IEEE 488 buses; it is software compatible with IBM PC-DOS, Microsoft Corp. MS-DOS and Xenix operating systems.

Prices start at $3,295.

AK Systems, 20741 Marilla St., Chatsworth, Calif. 91311. 818-709-8100.

Terminals

Moniterm has introduced 19- and 24-in. monitors for use with Sun Microsystems, Inc. workstations.

Model VY1962, a 19-in. monitor, and **VL2462**, a 24-in. monitor, offer 1,152- by 900-pixel displays. They are plug-compatible with the Sun-3/50, Sun-3/60 and Sun-3/100 workstation monitors.

The **Model VY1989** is a 19-in., 1,600- by 1,280-pixel display that is plug-compatible with the Sun-3/200 and Sun-4/200 workstation monitors.

The Model VY1962 costs $1,525, the VL2462 costs $2,495, and the VY1989 costs $1,795.

Moniterm, 5740 Green Circle Drive, Minnetonka, Minn. 55343. 612-935-4151.

Printers/Plotters

An 8 page/min laser printer with a resident Adobe Systems, Inc. Postscript controller has been announced by **AST Camintonn Digital Division**, an AST Research, Inc. company.

Called the **AST Turbolaser/PS**, the printer also features an optional board for Digital Equipment Corp. LN03, Diablo 630 ECS and Hewlett-Packard Co. HP Laserjet Plus emulation.

The printer is based on the Ricoh Corp. 4081 engine. It offers 3M bytes of random-access memory and 1M byte of read-only memory. Full-page graphics are printed at a resolution of 300 dot/in., and 250-sheet I/O trays are standard.

The AST Turbolaser/PS costs $4,595; the emulation upgrade is priced at $595.

AST Camintonn, 2121 Alton Ave., Irvine, Calif. 92714. 714-553-0247.

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Lotus Symphony 2.0

Carriers land profits by empowering DP units

BY ELISABETH HORWITT

Airline carriers are squeezing their information systems for all they're worth.

Industry leaders have discovered they can leverage their systems to raise the bottom line in two important ways. They can turn a profit from reselling internally developed software and services, which eventually evens out the cyclical earnings of air transportation.

They can also improve the effectiveness of internal operations and support value-added services that generate more business.

As a result, airlines are counting on their computer systems more than ever to help them stay aloft in today's turbulent, deregulated market.

"The purchase of Eastern Airlines and its information services subsidiary System One was a crucial part of [Chairman and Chief Executive Officer] Frank Lorenzo's strategy" for growth and for developing products that differentiate Texas Air from its competitors, says David Hultsman, staff vice-president of technology planning for System One Corp., now Texas Air's information processing subsidiary.

Texas Air effectively tripled the MIPS power of its major data processing facility and turned itself into a third-party networking provider in order to ensure virtually unlimited bandwidth for networking applications in the past year, Hultsman says.

That airline company is not the only carrier with large MIS and communications expenditures.

Airlines increased their communications budgets an average of 26.2% from 1986 to 1987 — the largest jump by any industry, according to a recent survey by the International Communications Association.

"Carriers are right up there with insurance companies as far as MIS outlay goes," says William Maybaum, a vice-president at DMW Group, Inc., an Ann Arbor, Mich., consulting firm. "All the major airlines are building systems to meet upcoming requirements and to supply services, and it's all roll-your-own code."

Airlines have moved in three directions to accommodate today's market pressures:

• **Travel reservation systems.** Ever since United Airlines and American Airlines developed their reservation systems in the late 1970s, carriers have been using computer systems to lure customers away from the competition.

• **Independent MIS subsidiaries.** Major airlines have broken their DP departments into separate subsidiaries that are expected to be profitable in their own right.

• **Competitive in-house operations for customer service.** Even the traditional DP role of supporting in-house operations has taken on a competitive edge, with carriers racing with each other to recover from bad press on their customer service and safety records.

But is the expense of these new systems and networks worth the price?

In a competitive market such as this one — yes. That is, if the development of a new product allows a carrier to recoup development or installation costs through resale, like the Texas Air network, or bring in additional business and profits, like many of the airline reservation systems currently in use.

And the profits can be significant. According to an American Airlines spokesman, operating earnings for its Sabre reservation system were $107 million in 1987. Operating earnings for AMR Corp., American's parent company, according to a preliminary unaudited report, were $198.4 million. That means Sabre's revenue was 54% of total company revenue.

The key to service

Computer systems have spearheaded campaigns by Texas Air and its rivals to restore customer confidence in airline safety and service levels.

"We want people to see Continental and Eastern as the most reliable systems going in terms of having baggage go to the right place and finding your seat assigned when you get on a flight," System One's Hultsman says.

"It would be a real competitive advantage to provide this in a shorter time frame than

TERRY ALLEN

Horwitt is a *Computerworld* senior editor, networking.

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FAA updates traffic control network
Page 76

Carriers

FROM PRECEDING PAGE

anyone else," he adds.

Airline spokesmen admit that deregulation and the spate of mergers that followed have made it increasingly difficult for computer systems to track and coordinate various key operational areas.

American, for instance, has had to steadily upgrade its IBM mainframe capacity, beginning in the late 1970s, "to get us over the deregulation hump," says Joseph Selman, a senior representative for corporate communications at AMR.

"I AGREE with people who have been saying that deregulation would have been impossible without the technology to support it."

DAVID HULTSMAN
SYSTEM ONE CORP.

"The big impact [to American's systems] came a couple of years back, when you had volatile fares and a vast number of airlines flying to places they never had before," Selman says.

Today, American's Sabre system handles as many as 1.5 million fare changes overnight "when a price war kicks off," Selman adds.

Recently formed conglomerates, like Texas Air, Northwest Airlines-Piedmont Aviation and Delta-Western, are all still in the process of merging their MIS operations.

For example, Texas Air has had to set up high-speed communications links between Continental Airlines and Eastern data centers to keep track of "flights in the air, on the ground, preparation for new flights — it's a very complex situation," Hultsman says.

"We've had to link Data General, Unisys and IBM computers and integrate [acquired subsidiaries'] old applications into the system, since we don't have the time to develop new ones," he adds.

Airport of the future?

Both Texas Air and United hope to bring about quick, visible improvements to customer services by revamping airport terminal systems that customers deal with directly.

United, for example, has spent 680,000 man-hours converting its new terminal at Chicago's O'Hare Airport into "a just-in-time facility," interconnecting various departments and hosts "so that a lot of things happen automatically now," says Richard Pemberton, senior technical support design analyst for United's data processing subsidiary, Covia Corp. [CW, Jan. 18].

Formerly, one set of terminals accessed Apollo, United's IBM-based reservation system; a second set provided links to the airline's Univac-based flight operations and crew management system.

Today, United's terminal and public information operations at O'Hare are handled on IBM Personal System/2 Model 50s linked over an IBM Token-Ring network.

A remote gateway ties the PS/2s to United's reservation and operations systems. Users can hot-key between the two systems, or they can call both up at once via a Microsoft Corp. Windows interface.

The ability to interact in real time with different operational areas has significantly increased operators' ability to juggle airport resources effectively and, in turn, has increased the number of flights the terminal can safely and efficiently take on, Pemberton notes.

A year and a half ago, the terminal handled 330 to 350 flights a day; today, it manages more than 400 flights.

Texas Air is prototyping an airport terminal system in Houston that would distribute as much functionality as possible, steering it away from the carrier's centralized computing facility, Hultsman says.

For example, customer services such as baggage handling, boarding pass distribution, charge account handling and some gate assignment operations at Texas Air would be handled on Tandem Computers, Inc. systems at individual airport terminals.

The Tandem computers would use IBM's Systems Network Architecture protocols in order to communicate back to the data center's IBM host machines for basic operations, such as flight coordination.

The fault-tolerant computers are one component of System One's drive for more reliable customer service, Hultsman says.

The company also plans to set up a fault-tolerant packet-switched network with redundant high-speed lines, which would ensure reliable communications among the firm's various carriers and data processing facilities.

Straying off reservation

The travel reservation service market is another focal point for carriers' strategic deployment of computer systems.

American and United, which pioneered such systems in the late 1970s, faced no serious challenge to their dominance until the last year or so.

What changed the market from a two-horse race into a free-for-all was the realization by all major carriers of how large a return reservation services offer, says Peter Zegan, a professor of MIS at Miami's Florida International University and a consultant for several airlines.

American, for example, reportedly receives $1.70 for every transaction on its reservation system and gets about 20% more business from agencies that use Sabre than from those that do not, Zegan says.

Given that travel agencies generate approximately 70% of all airline ticket sales, according to Zegan, it is not surprising that American and United's market share is being threatened by Texas Air, Delta and a partnership consisting of Transworld Airlines and Northwest (see chart above).

The combatants seek to gain and keep customers by enhancing their reservation systems to be more reliable and easy to use and by introducing turnkey systems that are designed to make travel agents' jobs easier.

A large portion of carriers' telecommunications outlays have gone into faster, more reliable pipelines to deliver their services to the various travel agencies.

System One recently installed a high-speed pipeline between Continental and Eastern data centers, enabling agents to make and confirm reservations without having to log off one system and on to another.

Most of the major competitors now offer to replace an agent's IBM 3270 terminal with a PS/2 workstation, which, in

Continued on page 80

Airlines soar for reservation systems market

American leads with 36%

INFORMATION PROVIDED BY DMW GROUP, INC.
CW CHART: FRANK C. O'CONNELL

Get them to the gates on time

BY HARVEY NEWQUIST

At United Airlines' terminals at Stapleton Airport in Denver and O'Hare Airport in Chicago, an expert system keeps hourly gate assignment chores in check.

According to Mark Teflian, vice-president of technical planning at United, "the GADS [Gate Assignment Decision System] provided immediate payback in efficiency of gate assignment and aircraft zone control."

Currently, gate controllers at United's new O'Hare terminal assign more than 400 flights daily to one of 50 gates.

The assignments must take into consideration that planes like DC-10s and 747s do not maneuver easily into all available gates and that runway backups and weather affect how quickly individual flights can get in and out. Since United's reputation relies on servicing customers efficiently regardless of weather conditions and flight delays, timely gate management is a necessity.

GADS consists of Texas Instruments, Inc.'s Explorer LISP machine workstations and a knowledge base supplied by half a dozen experts from United's gate operations team. According to United and TI officials, the system took 10 months to develop and, after two test phases, was installed in both airport terminals last July.

Before implementing GADS, airline employees relied on a huge magnetic board to keep track of gate positions and moved the airplane magnets according to flight plans, much like a war game table. The new expert system provides controllers with a graphic depiction of current gate status. Possible assignment scenarios can be manipulated on command.

More important, the system makes routine assignments so that true experts can focus on more critical assignments. GADS is linked into United's proprietary flight information system, Unimatic. Unimatic now feeds flight information directly into GADS, which can then update its decision-making process based on the status of incoming and outgoing planes.

Because of the expert system's success, United is now planning on installing GADS in several other key airports.

"But equally important," Teflian says, "we're gaining firsthand experience with a technology that has the potential to improve numerous other hub management operations." ●

Newquist writes and consults on artificial intelligence and other advanced high-technology topics from his office in Scottsdale, Ariz.

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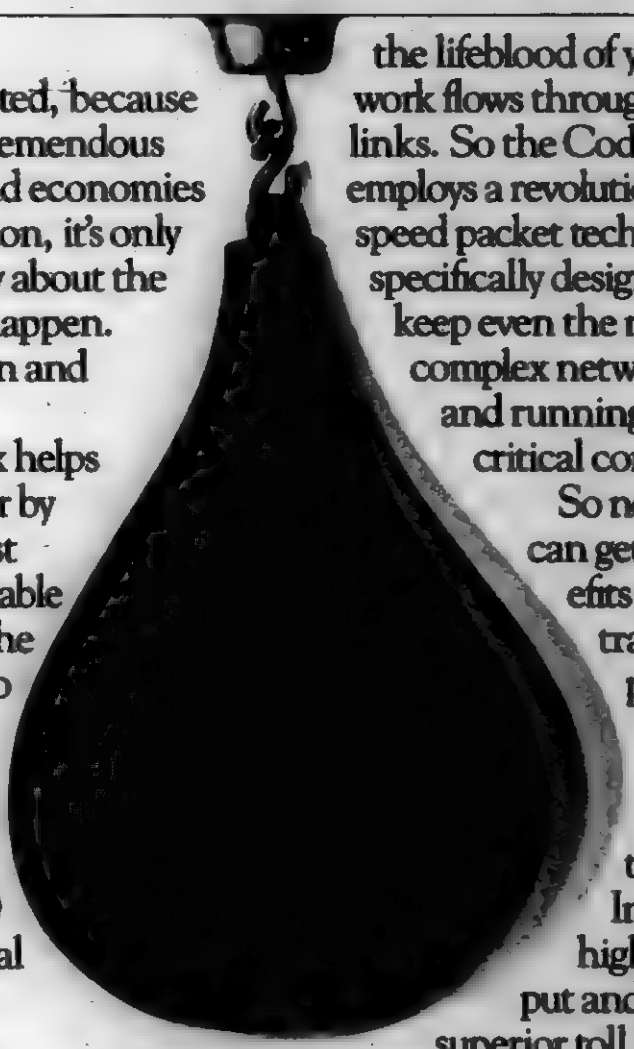

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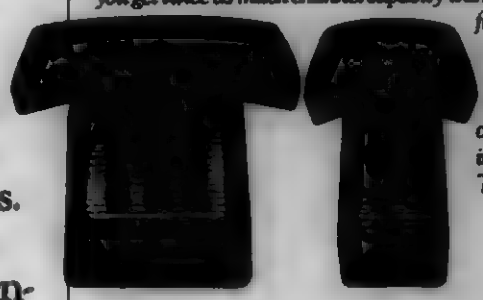

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Delayed traffic control system may (finally) get off the ground

BY BECKY BATCHA

After more than five years of confrontation between the Federal Aviation Administration and Congress, a computer system that will help control U.S. air traffic in the 21st century has finally been approved for production — almost.

Last December, the U.S. Congress granted sufficient funding to get the ball rolling on production of the FAA's $5 billion Advanced Automation System (AAS). On July 29, if all goes as scheduled, either IBM's Federal Systems Division or Hughes Aircraft Co. will win the contract for the gigantic project and will begin building it.

The FAA still needs to convince Congress that its cost justifications for the AAS hold water and that the system's hardware and software components will work as planned. But disputes about the need for preproduction testing, which held up the project for months, seem to be settled for good.

HARDWARE is critical, as the system cannot accumulate more than three seconds of downtime per year.

The FAA has agreed to production models, and Congress is pleased with the outcome. "We are basically satisfied," says a spokesman from the House Appropriations Committee. "We are comfortable with the program schedule."

The AAS consists of four main components, slated to go into operation incrementally during the next decade:

• **New color workstations for air traffic controllers.** Workstations, the first component, are scheduled for implementation in 1993 or 1994, according to Michael Perie, manager of the FAA's AAS effort.

The workstations' primary advantage, Perie says, will be to combine radar tracking and flight plan monitoring.

• **A local-area networking scheme that links controller workstations to host mainframes.** Perie says the networks will be put in place at the same time as the workstations. IBM and Hughes suggest proprietary networking schemes based on the IEEE 802 protocol, the ANSI Fiber Distributed Data Interface and the ISO Open Systems Interconnect model.

• **A new complement of computing power.** The FAA will install a network of mainframes in its 20 regional air traffic control centers in 1995 or 1996, if production goes as planned. The specific system architecture will depend on which contractor gets the bid, but the FAA considers modularity, reliability, ease of maintenance and ease of installation to be its general priorities.

Hardware reliability is especially critical, as the system cannot accumulate more than three seconds of downtime per year. A viable plan for crossing over from the current air traffic control network of IBM 3083 hosts also ranks high on the list of requirements, Perie says. "You can't shut off the air traffic control system for a few months to cut the systems over."

• **Software for tracking and analyzing flight plan information and radar data on flight status.** The suite of real-time software that will monitor air traffic is known as Aera, for Automated En Route Air Traffic

Batcha is a free-lance writer based in Boston.

Three out of four programming hours are wasted.

UN

Control. It will be written in the Ada language, which the FAA chose primarily for its high reliability in real-time applications and its ease of maintenance, Perie says.

Aera will come up in stages, starting with relatively straightforward flight monitoring and control functions set to go on-line with the new host mainframes in the mid-1990s.

Later phases of software development, planned to continue beyond the year 2000, will include programs that spot potentially dangerous situations and suggest preventive action and ones that approve or deny airlines' requests for preferred flight routes. Still other programs are designed to reduce the amount of work that air traffic controllers must handle.

Because the AAS contract is one of the government's largest civilian computer projects to date, because it is designed to use unproven hardware and software and because the current air traffic control system leaves so much to be desired, the FAA has been subject to intense scrutiny since it proposed the plan in 1981.

Congress's watchdog organization, the General Accounting Office's Information Management and Technology Division, or GAO/Imtec, put up a strong fight to have a prototype testing phase inserted between AAS design and AAS production phases. And it won.

But the division has not let the FAA off the hook yet. "The changes the FAA made are positive," GAO/Imtec evaluator Ted Alves says. "There's an increased likelihood of success, but there are still major risks."

Good faith

Congress's move to grant money for the acquisition signals that the FAA has acted in good conscience to correct perceived deficiencies, the House committee spokesman says. Legislators are concerned, however, that cost increases and technical delays could hurt the project. The AAS is already 50% over its design budget and close to two years behind schedule, and that's for the planning stage alone.

Given the size and complexity of the effort, however, no one expects development to proceed without a few hitches. "I think it's inevitable that there are going to be problems with it before it goes operational," the House committee spokesman points out. "That is a long way off."

> **"THERE are only so many airplanes that can go up and down off that concrete at any point in time."**
>
> **MICHAEL PERIE**
> **FEDERAL AVIATION ADMINISTRATION**

Until the AAS goes into production, the nation's air traffic control system will depend on 1960s-era workstations and software powered by the network of 3083 hosts that came on-line in the past year.

With the ability to handle 4.3 million instructions per second (MIPS), each 3083 mainframe has about twice the power it should need to monitor traffic volume projected for the mid-1990s, the FAA's Perie says. Should the AAS fall further behind schedule and traffic volume expand more than expected, a 24-hour field upgrade could increase performance to 6 MIPS.

Don't count your chickens

Still, neither the interim 3083 network nor the AAS itself can translate into guaranteed on-time flights for road-weary commuters.

Increased computer capacity and functionality can do little to counteract bad weather or relieve overcrowding at airports, the two main causes of delays and cancellations. "There are only so many airplanes that can go up and down off that concrete at any point in time," Perie says, no matter how good the computer system gets.

"If you want to think of the whole air traffic system as a series of bottlenecks, we've removed one bottleneck," he continues. "But there are more bottlenecks to go." ●

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A Different Kind of Computer Company

Carriers

CONTINUED FROM PAGE 74

addition to calling up reservation data on the airline's host, can practically perform travel agents' jobs for them.

American's Sabreworks, for example, provides word processing, data base and spreadsheet capabilities as well as a fill-in-the-blanks menu to guide inexperienced agents through the reservation making process.

Covia's *Pemberton*

United's Focal point is said to provide both menus and an English-like command structure for agents intimidated by the complex code typically used to input reservations.

The up-front development and installation costs of such systems can be high. When American sued Delta and Texas Air recently for allegedly persuading agencies to break their five-year contracts with Sabre, one of its principal complaints was of having to write off the installation, training and amortized development costs of turncost agencies' PS/2-based systems, AMR's Selman says.

Carriers harbor few doubts that the potential paybacks are well worth the up-front costs and risks, however. Delta's quick pickup of 91 agencies in less than six months after introducing Deltastar exemplifies the return of such systems.

The PS/2-based systems offer another potential return, according to United's Pemberton. By providing agents with local intelligence, the systems cut back on the amount of computing power and communications bandwidth that the carrier must allocate to agency services.

Under "the old dumb-terminal mode," he says, the carrier's mainframes kept overloading as use of its reservation service grew.

Travel reservation systems are only one of a growing number of products and facilities that carriers are reselling to other companies — both for profit and as a way of boosting market share.

Taking systems to market

Major carriers are starting to look at their DP centers as profitable in their own right, according to DMW Group's Maybaum. AMR, for example, includes a travel services group that sells, among other things, a turnkey reservation system to hotels.

Former United/Allegis Corp. Chairman Richard Ferris set up Covia approximately a year ago to support both in-house operations and planned expansion into the travel services business, Selman says.

For several years now, major carriers have resold internally developed software and excess computing resources.

"Just about everything developed for Continental or Eastern is being resold to other airlines; the Continental reservation system does reservations for 35 to 40 other airlines," System One's Hultsman says.

> "IT'S A small incremental cost to add another airline to your system."
>
> PETER ZEGAN
> FLORIDA INTERNATIONAL UNIVERSITY

"It's a small incremental cost to add another airline to your system," Florida International's Zegan says.

Demand for predeveloped maintenance, flight tracking, reservation and crew management computer systems is high among small airlines that cannot afford in-house software development costs — which are about the same for a small or large carrier, he adds.

The ability to recoup development or installation costs through resale has allowed some carriers' DP subsidiaries to undertake ambitious projects that ultimately win the carrier a bigger piece of the market pie.

In January, for example, System One purchased 10,000 route miles of fiber-optic cable, which supports 45M-bit/sec. voice/data transmission, from Lightnet and Williams Telecommunications Group.

The network will serve at least three purposes. First, it will support faster and more reliable communications between various Texas Air subsidiaries and internal operations, according to Hultsman.

Second, it will bring in profit: System One has become a telecommunications carrier with the right to sell voice/data transmission services to other businesses. And third, the network's "virtually unlimited bandwidth," coupled with major upgrades in distributed computing power, will give System One the leverage to quickly develop new applications and products that will "differentiate us from other carriers in a marketplace that is changing at the speed of light," Hultsman says.

He adds, "I agree with people who have been saying that deregulation would have been impossible without the technology to support it." ■

MIS takes off

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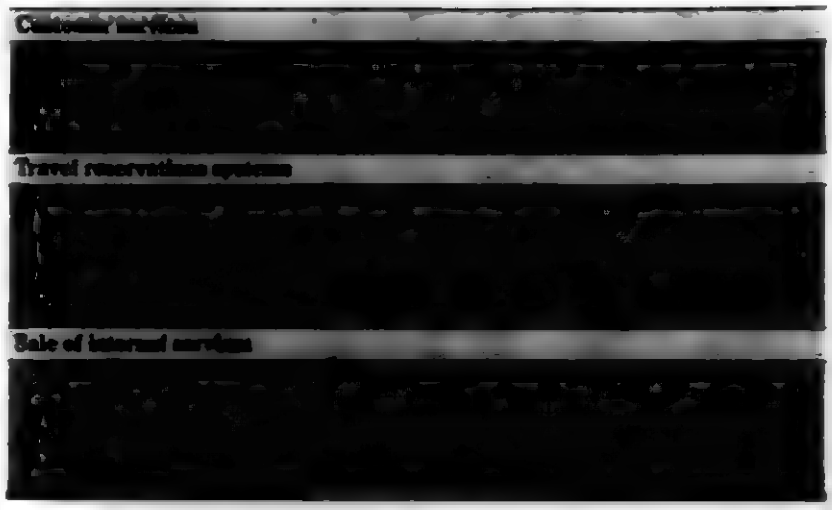

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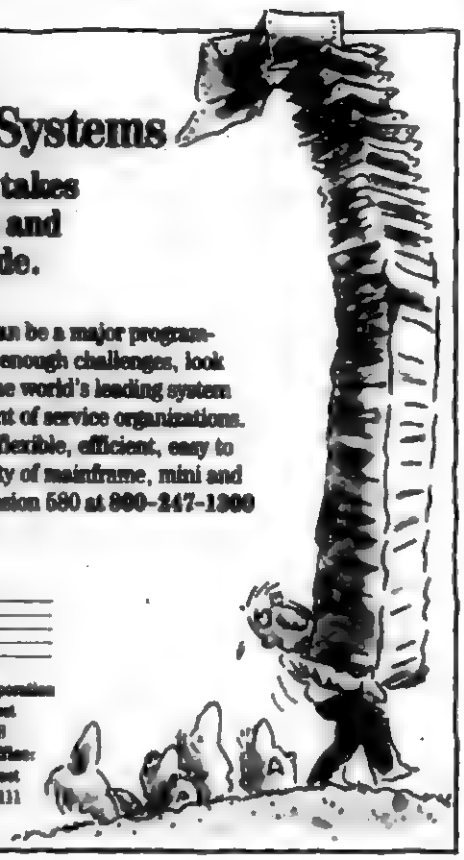

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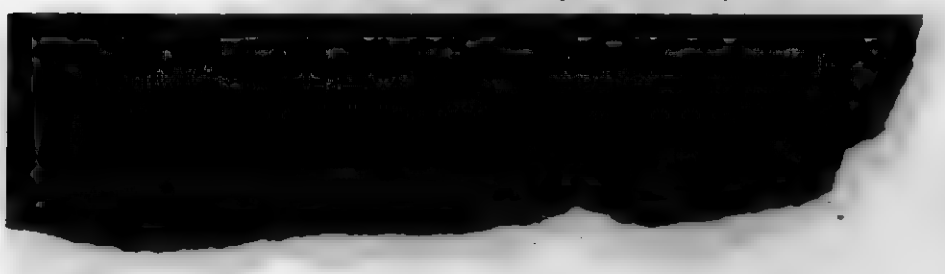

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IBM PC orphans hang on to a good thing

If you resist switching to the PS/2 — for whatever reason — here are your alternatives

BY ALAN RADDING

It's not that there are straggling columns of IBM PC refugees searching for a safe haven now that IBM has abandoned the DOS standard for the Personal System/2. But large corporate users — even those who have announced their intentions to shift to the new standard — are not junking their IBM Personal Computer investment, either.

When the last PC AT shipped in December, it marked the end of a lively five-year era for IBM, in which the firm rose to the forefront of new markets. But that era is apparently not yet over for most users, large or small.

Instead, according to a fourth-quarter 1987 survey conducted by International Data Corp. (IDC) in Framingham, Mass., more than 60% of large organizations are buying personal computers based primarily on the requirements of their end users — not on the latest technology available.

And most ranked OS/2, the operating system IBM and Microsoft Corp. are developing for the PS/2, near the bottom of their list of desired upgrades.

Someday a PS/2

Of the 200 companies surveyed, 73% indicated they planned to purchase some PS/2s this year, but only 12% said they will buy PS/2s exclusively.

And the secondhand market is flourishing. Alex Randall, president of the Boston-based Boston Computer Exchange Corp., which brokers used computers worldwide, reports that the IBM PC XT has actually increased in price since the announcement of the new IBM line. In January 1987, a used XT in good condition sold for $1,750. A year later, a similar machine sells for $1,825.

PS/2 technology presents a dilemma for many companies, like Chicago-based Heller Financial, Inc. Charles Mallet, senior vice-president of information management services, says his shop will eventually make a complete conversion to the new technology — "at some point."

Heller already has an OS/2 pilot program under way and a task force studying the issue. But Mallet's operation relies on an installed base of more than 500 IBM PCs. His problem lies in when to make the jump and, more immediately, what to do now, since the organization needs new machines.

"How do you service your clients when there are two different operating systems?" he asks. If nothing else, he says, dealing

BART GOLDMAN

Radding is a Boston-based author specializing in business and technology.

- **Installed base of DOS PCs still growing**
- **Some prefer old standard, even for LANs**
- **Stand-alone applications? Sit tight**

with two storage media of different sizes — 5¼-in. floppies and 3½-in. diskettes — creates an awkward situation.

In the meantime, along with the pilot OS/2 program, Heller just bought more than $300,000 worth of Compaq Computer Corp. machines that adhere to the old PC standard.

Heller's Mallet

Waiting for Godot

Lee Doyle, manager of PC services at IDC, published a series of reports on customer reactions to the PS/2, beginning last summer. He suggests that Mallet's experience is typical of what has been going on throughout corporate America.

Initial reports of customers' anger at IBM for abandoning the PC standard in favor of the PS/2 have given way lately to not anger or resentment but confusion, Doyle says — or resignation. Thus Mallet's dual strategy is not uncommon.

Plenty of customers realize the limitations of DOS and are in full agreement with the IBM strategy, he adds. But most of them are taking a wait-and-see attitude.

In general, professionals who consult corporate users are suggesting that companies not upgrade until applications and capabilities exist that the organization wants and that also require the new hardware and operating system.

Since most PCs today are used for stand-alone, character-based applications such as word processing, spreadsheets and simple data bases, consultants are almost unanimous in their recommendation to sit tight with the DOS machine.

IDC's Doyle

"There is so little written for OS/2. . . . Those who are buying it are buying to experiment," says Stephen DelVecchio, manager of the microcomputer advisory group at Coopers & Lybrand in Boston. "For most people, the PC standard is just fine."

From a financial standpoint, waiting makes the most sense, as long as productivity is not suffering. "Why buy now if you don't really need it? In this industry, prices always come down," says Marc Sokol, executive vice-president of Realia, Inc. in Chicago.

What will change is the nature of the end user. "You won't see computer people using the [old] machines. These will be people who aren't worried about state-of-the-art," says Steve Veto, publisher of *PC Resources*, a Peterborough, N.H.-based magazine devoted to supporting IBM PCs and compatibles.

"Old PCs don't die," adds Tom Davenport, director of research at the Index Group, Inc. in Cambridge, Mass. Instead, they are passed down the corporate ladder and put to use for clerical tasks, he says. Even an old PC with two floppies still makes a terrific word processor.

SINCE most PCs today are used for stand-alone, character-based applications, consultants are almost unanimous in their recommendations to sit tight with the DOS machine.

Comfort in numbers

What gives IBM PC users confidence to continue with the old standard despite IBM's departure from it? The huge installed base of PCs and compatibles. According to figures compiled by IDC, there are approximately 18 million IBM PCs and compatibles worldwide.

Ironically, the number of DOS PCs and compatibles in the field will actually increase despite the departure of IBM. According to some predictions, PC prices — already less than $1,000 for basic models — will continue to drop.

Existing machines will keep circulating, and more DOS machines based on Intel Corp. 80286- and 80386-based technology will be put into circulation. The net result will be a larger installed base than currently exists.

Furthermore, the DOS faithful have not been left at a dead end; in fact, this may be the best thing going for them. There is a clear upgrade path for PC users who may someday want to take advantage of OS/2. The new operating system will be able to run on many 286- and 386-based machines.

"If you are buying a 286 machine today," Realia's Sokol says, "you really are facing a binary test: Does it boot OS/2?" The answer will be a clear yes or no, giving buyers a simple criterion if they are planning to upgrade their existing machines.

Not high and dry

Users have some attractive options to choose from. One is to trade up gradually to 286- and 386-based DOS machines that can accept OS/2 when there is a reason to make the leap but that, in the meantime, are able to run DOS applications better than ever before.

Another option is expansion through

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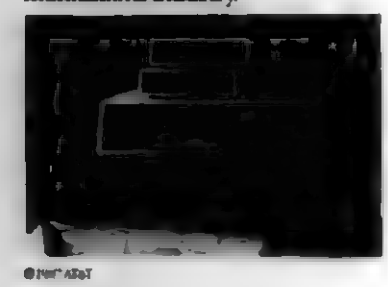

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IBM's PC of the rock

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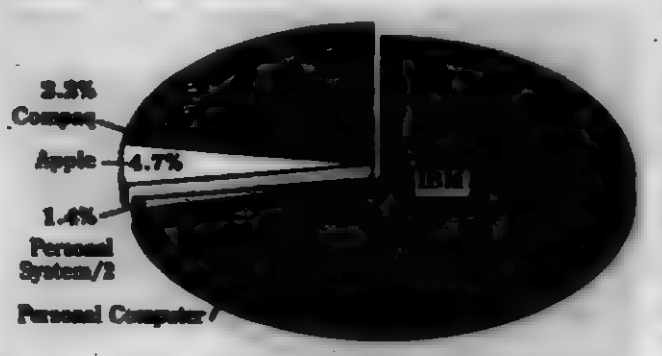

INFORMATION PROVIDED BY FOCUS RESEARCH SYSTEMS, INC.

networks. Since DOS workstations can connect very easily to an OS/2 server in a network, there is no reason to be concerned about being left high and dry, says Howard Elias, senior director of computer merchandising at the Radio Shack division of Tandy Corp. in Fort Worth, Texas.

Another strategy is to put 286- and 386-based accelerator boards into older PCs. This option supplies speed and extra memory for larger DOS applications that you may want to run now and which the smaller machine cannot handle.

Exception to the rule

IDC, which as a general policy cautions against the use of accelerator cards, makes an exception in this case.

"The specter of OS/2 and the large [cost] overhead it will bring to the market may open up the need for accelerator cards and boards," Doyle says.

IDC's usual reservations have to do with reliability and cost effectiveness of accelerator boards. But Doyle says he is favorably impressed with the Intel products in this area. And while he says add-in cards are still not an inexpensive solution, certainly adding one costs less than buying a PS/2.

The boards represent roughly a $2,000 investment, plus the cost of added memory, vs. a $5,000 to $7,000 investment for a new machine.

One micro manager in Virginia says he is very excited about the Intel 386 board and swears that if he "could get 100 of them tomorrow," he'd grab them.

The ultimate strategy, of course, is to do nothing for now, as long as you are not already bumping into the limitations of your current machines.

Index Group's Davenport

The real limitation, it turns out, may not be the older machines but rather the applications themselves and users' abilities to conceptualize beyond the software they already use.

"Most companies lack a model for personal computing other than spreadsheets and word processing. For that, they don't need PS/2," the Index Group's Davenport says.

Eventually, he says, "we'll figure out the 1990s' equivalent to the spreadsheet," and then you'll know it is time to make the change.

The power users in your company may push for the new technology right away. Users who run applications that require advanced graphics or those who are lured by the promise of connectivity and multitasking will be the most eager to make the transition, says David Browning, a partner at WBS & Associates, an Annandale, Va., microcomputer consulting firm.

Steered to PCs

But even when connectivity is the issue, some consultants still prefer PCs over the new technology. For many networking applications, the PC is perfectly adequate.

Speed is not really a function of the CPU when you are talking about networks, Browning says. The file server and network design influence the speed of the network more than the CPU, he points out.

As a result, Browning says, he recently installed a network of 100 PC clones, Intel 8088 machines with a turbo board. Not only did he advise against going to the PS/2 line, but he steered his client away from the substantially more expensive 286- and 386-based machines.

The result is an effective local-area network priced at a fraction of what the new technology would have cost.

Of course, there are strong financial incentives to stick with what you have. Even though many corporate machines have fully depreciated, chief financial officers may not readily allow their companies to walk away from their PC investment.

"It will take persuasive arguments to convince [CFOs] to throw away the PCs for new machines," the Index Group's Davenport says.

In 1984, the Index Group began researching the idea of disposing of PCs as part of the product life cycle, but the research did not yield much data. "Nobody believed it would happen," Davenport says.

Playing it safe

What if your PCs are not actually assets? Does that make the transition any easier?

Well, leasing firms are not seeing a major migration to the new technology either, even though it could be expected that firms that lease their machines would be the first to trade up.

"Customers aren't upgrading to the new machines," says Paul Ranelli, vice-president of finance

Continued on next page

Why not?

Once customers begin to ponder alternatives to the original IBM Personal Computer and seriously consider making changes, there is no telling where it will lead them.

A corporate customer service manager for a utilities system for Ashton-Tate Corp.'s Dbase has noticed a sudden interest in the Apple Computer, Inc. Macintosh in shops that had been staunchly IBM.

The sentiment the manager is picking up on is that if the companies are going to change, then why not experiment a little bit.

Tom Davenport, director of research at the Index Group, Inc. in Cambridge, Mass., says he has also noticed a few companies suddenly looking at the Macintosh, a machine they wouldn't have even considered a few months ago.

Macintosh supporters in the corporate world, who have been battling the entrenched single-standard mentality, have a new argument, he explains.

Their position is, Now that the single standard has been breached, if you can accept two standards, why not three?

ALAN RADDING

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The party's not over — yet

IBM has left its own party, but the DOS merrymaking will continue — at least for a while longer, depending on who you talk to.

Industry observers say OS/2 and the Personal System/2 will come into their own within the next three years in large corporate environments, in which connectivity and multitasking are paramount. But stand-alone PC users can be confident that their machines will maintain a high level of support for at least another five years.

Compaq Computer Corp. has already picked up IBM's banner, providing the leading Microsoft Corp. MS-DOS machine in the corporate environment. The company says it is committed to straddling the same two technologies users are trying to straddle, although it still produces only one Intel Corp. 8086-based machine. "All our [Intel] 286 and 386 machines will run OS/2," says Lynn Parsons, a Compaq spokesman.

At the same time, he says, "we will continue to support our products with DOS enhancements." Naturally, customers must judge for themselves how long this support will last.

Tandy Corp. is benefiting from IBM's sudden departure from the DOS world as well. "For the first time, we have large accounts calling us," says Howard Elias, senior director of computer merchandising for the Radio Shack division of Tandy in Fort Worth, Texas. But, Elias says, "the business world is moving to new platforms, OS/2 and beyond." Tandy's strategy is to "sell platforms that will migrate," he continues. Radio Shack will concentrate on 286- and 386-based machines that, Elias says, will be able to run OS/2.

"We don't see an end to DOS," Elias says. His reasoning is the huge installed base. "DOS has the momentum. You can't turn it off if you wanted to."

ALAN RADDING

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Orphans

FROM PRECEDING PAGE

at Selecterm, a computer leasing firm in Danvers, Mass. Instead, they are playing it safe and staying with the technology they know, Ranelli says.

He also reports a strong secondary market for PC XTs, clearly obsolete machines that should be plunging in value but are holding their own.

When IBM announced it was dropping the PC in favor of the PS/2, knowledgeable people advised Mike Rohrbach to dump his large inventory of rental IBM

NEW technologies may force corporations to redefine their notions of personal computing.

PCs. Rohrbach is vice-president of Boston-based International Market Resources, a computer rental firm.

But he didn't follow that advice. Instead, the company decided to bring in more PC compatibles because it believes the PC market will be around for a long time. Rohrbach says the PS/2 and OS/2 platforms are clearly directed toward the largest corporate users. "We looked at small to medium-size companies, and they were going to stay with PCs," he says. Eventually his company will buy PS/2 machines, he realizes, but "we haven't had very many calls for them," he says.

A changing world

By 1990, however, the PC era may really begin to taper off. Most major manufacturers are expected to stop making the oldest 8086- and 8088-based machines by then, even in the laptop segment, in which 8088 technology is still prevalent, Davenport predicts.

For now, the choices customers face are both awkward and far-reaching. More than just presenting a costly purchasing decision, the technologies that are emerging may force corporations to redefine their notions of personal computing. In particular, mainframe models will increasingly penetrate the personal computing environment.

For the next few years at least, corporations are going to suffer through multiple technology standards and different visions of what computing is all about. Without the dominant DOS standard, Realia's Sokol says, "the world has suddenly gotten more complicated." •

MANAGEMENT

TAKING CHARGE

William R. Duncan

Projects from the ground up

An architect would not attempt to prepare a financial statement, and few accountants would attempt to design a building. Although both are professionals, the skills and experience necessary to practice in each field are quite different. Fortunately, both the consumers and the providers of these services recognize the differences.

Software development and project management are also professions. The skills and experiences necessary to practice in each field are quite different. The software professional must have a detailed understanding of the technology involved in creating the end product: how the hardware, software and end user will interact.

The project management professional must have a detailed understanding of the process involved: how to estimate, schedule and measure progress. In addition, both must be equally capable of dealing with people to help manage and motivate the project team.

Professional differences

Unfortunately, neither the users nor the providers of software have yet recognized the differences between the professions. Software projects continue to be managed by software professionals who emphasize technology and people to the detriment of process. But a successful

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Travelers' Brophy on developing vision

BY STANLEY GIBSON
CW STAFF

Leaving work late one Friday a couple of years ago, Paul Barrett, vice-president of employee benefits systems at The Travelers Corp. in Hartford, Conn., went out to the company garage and found he had locked himself out of his car. He needed to get to a locksmith, so he sought help from someone still at work. At 7 p.m., the only one left was his boss, Joseph Brophy, who came out to help him.

As they drove to the locksmith in Brophy's car, Barrett heard a strange sound coming from the cassette player. Brophy was listening to a tape of conversational Chinese, although he admitted he could not understand a word.

Brophy's idea was, in preparation for an upcoming trip to China, to begin studying the Chinese language by immersing himself in its sounds.

Listening is important to Brophy, the senior vice-president and chief of Information Systems at The Travelers. Listening, he says, has been a key to planning for the firm's mushrooming capacity needs and developing its corporatewide transaction processing and communications network.

Through the years, Brophy has listened carefully to those who report to him and has paid close attention to demographic and technological trends in his drive to put The Travelers at the leading edge of computer technology.

Travers Waltrip, telecommunications manager and one of six people who report directly to Brophy, puts it this way: "We operate as a team. There is a lot of discussion among ourselves. Very seldom does he make an edict. But he listens carefully so that he can make one if it is required."

Brophy also likes to be heard. He is the No. 1 user of voice mail at The Travelers and is wont to leave messages on it at all hours, according to Barrett. He is also a serious bagpipe player.

Brophy's wide-ranging interests take him out of the realm of the techie — even out of the realm of the mainstream manag-

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PROFILE

Joseph Brophy

Position: *Senior vice-president, The Travelers Corp.*

Mission: *Promoting a vision of how information technology can be used to make money and improve the organization.*

MANAGEMENT TOOLS

MIS managers catch up with technology

BY ROSE MULA
SPECIAL TO CW

Like cobblers with holes in their shoes, MIS managers have long provided sophisticated data processing services to others but have often undertaken their own management tasks with antiquated manual systems.

That anomaly is fast being corrected, however, as a new breed of management software enters the scene. And early reviews show systems managers giving these automated administration tools a cautious thumbs-up.

MIS can't count on software to solve all its management problems, warns Arnie Roberts, a consultant with ADC Associates, Inc. in Palo Alto, Calif. But he says there are a number of excellent programs that can help. That's the good news.

The bad news, Roberts says, is that some MIS professionals think if they buy a good project management system, it will automatically make them good managers. "Not true," he stresses. "You must understand the elements of project management before any program can help you."

Assets management

One of the biggest projects MIS faces is coordinating its assets. MIS pros at Equitable Bank NA in Baltimore have turned to The Equipment and Software System (TESS) for help. TESS is a mainframe-based tool for managing DP assets and procedures that was developed and is currently sold by Bendata Management Systems, Inc. in Dallas. However, Morino Associates, Inc. in Vienna, Va., reportedly will

ANNE CUSHMAN

acquire full rights to TESS by June.

Phillip Miller, a systems programmer at Equitable, says the bank has been using TESS for about 2½ years to control its hardware and software inventory not only at its headquarters location but also at approximately 125 branches in Maryland, Delaware and Washington, D.C.

An authorized user can access TESS at any time to de-

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Decentralized DP sites seen lacking in recovery planning

BY DAVID A. LUDLUM
CW STAFF

Contingency planning has often failed to keep up with the decentralization of data processing, according to a recent report.

The lack of planning jeopardizes decentralized functions such as order entry, accounts receivable, inventory tracking and office automation, according to the report by the The Diebold Research Program, an arm of The Diebold Group, Inc. consulting firm supported by 200 sponsors.

Perhaps one or two of the Fortune 100 companies have contingency plans for decentralized systems, although the number is growing as the systems handle more important functions, said Raymond Epich, a Diebold vice-president and manager of the firm's Chicago office.

"Even among very large, sophisticated companies, it's a process they're just starting to get involved with," Epich said. According to Epich, when floods hit Chicago last fall, at least four companies' office systems were damaged.

Diebold cites several reasons for the lack of planning at decentralized sites, including small staffs lacking DP operations expertise and facing a pressing backlog of applications to develop, the reluctance of corporate managers to impose requirements, limited budgets and the belief that plans will be as expensive as those for central sites.

Unconventional threats

Jerry Isaacson, a Northboro, Mass., computer security consultant, agreed with the report and added that decentralized sites face some unconventional threats, such as theft of the processor. "It's not to hard to walk off with a Microvax with all the corporate data on it," he said.

When organizations decentralize, users sometimes neglect contingency planning because it had been transparent to them, Isaacson said.

Jack Bannan, president of the Delaware Valley Disaster Recovery Information Exchange Group, said decentralized sites are not likely to need contingency planning if data is exchanged with a central mainframe.

"It depends on whether critical applications are run solely on the minis. If the data is downloaded and uploaded, the destruction of a mini isn't going to put anyone out of business. You have to look at each thing on its own merit," Bannan said.

Appropriate planning for a distributed processor depends on the applications it runs, according to James Levinger, a spokesman for Wang Laboratories, Inc.'s Wang VS Backup and Recovery Services. "It's what you've got to do with it in a contingency situation," he said. "What's right for a mainframe might be drastic overkill at this level."

Managers of decentralized sites need guidance from upper management in developing plans, Epich said. "Unless someone's putting it together for them in the larger context, they don't understand the significance. There's got to be someone whose calling the tune from a central location."

The Jury-Rigged Network.

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Therefore, the key to managing risk in the development of your network lies with selecting the right vendor. A vendor more interested in developing a long-term strategy for your success than selling his off-the-shelf products. Choose wisely and you're no longer talking about a vendor.

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How To Choose The Right Partner.

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you to take full advantage of AT&T's current and future service offerings without sacrificing many of the benefits associated with private networking—all under the control of a single network management system.

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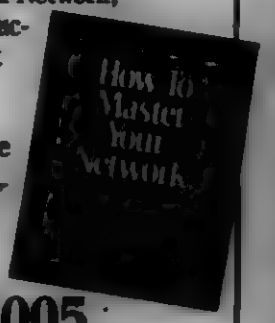

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Catching up

FROM PAGE 85

termine the location and status of any hardware or software item at the company, such as when and from whom the item was purchased or leased, how many months it has depreciated, when invoice payments are due, when a piece of equipment is scheduled for maintenance and if that maintenance is covered by agreement.

Miller says TESS has saved the bank thousands of dollars by flagging maintenance agreement payments being made on items the company no longer had. And because TESS is SAS-based, it also lends itself well to ad hoc reporting, Miller says.

Campbell Soup Co. in Camden, N.J., "you can have only one person updating on-line at a time."

Campbell used TESS to track its corporate equipment worldwide. However, the company had no direct links to allow remote facilities with no mainframes to input data. Fortunately, Bendata Management developed Computer Assets Tracking System (CATS), a personal computer-based system that enables all of Campbell's 25 remote facilities to link into the network.

CATS "will help us make decisions about future acquisitions and replacements and possibly swapping assets from one location to another," MacKenzie says. He says the information may also affect the company's volume purchase agreements.

Dataproducts' William Strowbridge

"If we see lots of old equipment out there, we might find that a volume discount might make it feasible to replace a lot of it at once, instead of making sporadic replacements here and there."

One flaw with CATS, MacKenzie says, is its lack of ad hoc reporting capabilities — a correction that Bendata plans to make. After that, "our remote locations can create reports, put them on a disk and send them to us. That will be a big plus." A single-user version of CATS costs $995; the local-area network version costs $2,900.

Another automated management product — Sofstore from Hanover, N.H.-based DTSS, Inc. — focuses on the electronic distribution and administration of PC software in firms at which the distributed computing asset base has become large but has gone unmanaged.

As its name implies, Sofstore functions as a software store. Employees can shop for, order and take delivery of software electronically from their IBM Personal Computer or compatible. And because the Sofstore data base resides on the host mainframe, it enables managers to exert more effective purchasing control and to generate a variety of reports by accessing the stored data.

Dan Cavanagh, senior vice-president of information technology for Metropolitan Life Insurance Co. in New York, is an early Sofstore beta tester. "It really simplifies our distribution of new versions of PC software," Cavanagh says. "We merely install it in our mainframe, and all authorized employees can dial in and get their copies . . . it's very cost-effective."

In addition, Sofstore helps keep Metropolitan honest, Cavanagh says, by automatically restricting distribution of new releases to those employees who are licensed to receive them.

Scheduled to be available late this month, Sofstore will range in price from $37,000 to $116,000, depending on the host mainframe and the number of PCs connected. It runs under IBM's VM/CMS operating system using IBM's SQL/DS data base.

Report preparation

Microman II is an MIS automation tool developed by Poc-It Management Services, Inc. in Santa Monica, Calif. The product schedules and tracks projects for project managers and aids MIS directors in preparing management reports.

William Strowbridge, vice-president of management information resources at Dataproducts Corp. in Woodland Hills, Calif., says he uses PC-based Microman II for two reasons: one, because of its simplicity of operation compared with project management systems that are more network-oriented; and two, because it's the only program he has used that provides management reports in a format similar to what users are used to seeing.

"The reporting packages are not specifically in data processing terms," Strowbridge explains. "Microman II does an outstanding job reporting in terms of resource utilization, resource planning requirements and backlog of requests."

Strowbridge says his company, a manufacturer of computer printers, has used Microman II to develop and implement an accounts receivable system and an order-entry system as well as for every-day problem resolution. Microman II runs on IBM PCs or compatibles and costs $2,895.

Automated planning

For long-range planning automation, Lawrence Wergin used a product called Winplan during an 18-month stint as senior vice-president of the Data Center Division of Farm Credit Services in Wichita, Kan. He says Farm Credit's board of directors wanted to consolidate three separate DP departments and standardize all processing on a single computer family. Outside consultants estimated it would take more than $26 million and five years to accomplish the goal. "With the help of Winplan," Wergin says, "we did it in less than two years and for less than $11 million."

Metropolitan Life's Dan Cavanagh

"The primary value of the package was to work as a communications vehicle between MIS management and senior management," Wergin explains.

Although long-term strategic planning was the original thrust of Winplan, enhancements in progress are aimed at adding short-term project planning to its capabilities. Winplan is available for $495 from Windleaf, Inc. in Colorado Springs. It runs on IBM PCs and Digital Equipment Corp.'s Rainbow.

Mula is a Waltham, Mass.-based freelance writer.

More shoes for the cobbler

Other products that help MIS automate its management tasks include the following:

• Training Management, Administration, Planning and Scheduling Software (T-MAPSS) from Applied Learning International, Inc. in Naperville, Ill., is a data base training management system designed to deal with frequent changes in personnel, requirements and equipment. T-MAPSS is an integrated program that provides a foundation for the management of training and a way to correlate plans, accountabilities and costs into the overall business strategy. It runs on IBM Personal Computers and compatibles and costs $4,950.

• PC Tracker from RG Software Systems, Inc. in Willow Grove, Pa., is a personal computer-based inventory management system for tracking PCs, software, peripherals and accessories. PC Tracker systems can track up to 32,000 items, depending on the size of disk storage space available. The base price is $495.

• The Micro Resource Manager from Atrium Information Group, Inc. in Fairfield, Iowa, is micro management software that compiles basic data on inventory, cost, training and support. The PC-based product builds a data base from which reports and chargeback analyses can be extracted. The basic cost ranges from $995 to $4,995. The local-area network version starts at $5,695, and a Digital Equipment Corp. VAX version, due out in June, reportedly will cost from $5,000 to $20,000.

ROSE MULA

CALENDAR

1988 International Development Center Institute Conference. Orlando, Fla., March 13-16 — Contact: Development Center Institute, P.O. Box 44087, Indianapolis, Ind. 46244.

6th Annual National Conference on Ada Technology. Washington, D.C., March 14-17 — Contact: U.S. Army Communications-Electronics Command ATTN: AMSEL-RD-LC-ASST-1A (Al Rodriguez), Fort Monmouth, N.J. 07703.

Securicom 88 — The 6th Worldwide Congress on Computer and Communications Security and Protection. Paris, March 15-17 — Contact: Securicom, 8 Rue de la Michodiere, 75002 Paris, France.

Desktop Presentations Computers Reach for New Media. San Jose, Calif., March 16-18 — Contact: Jean O'Toole, CAP International, Inc., One Snow Road, Marshfield, Mass. 02050.

National Computer Graphics Association Ninth Annual Conference and Exposition (NCGA '88). Anaheim, Calif., March 20-24 — Contact: Sharon Sutton, Suite 300, 2722 Merrilee Drive, Fairfax, Va. 22031.

1988 Annual Conference of the National Automated Clearing House Association Conference (NACHA '88). Dallas, March 20-23 — Contact: Barb Hill, Suite 640, 1901 L St. NW, Washington, D.C. 20036.

Computer '88 Computer Standards Conference. Washington, D.C., March 21-23 — Contact: Computer Standards Conference, c/o Computer Society of the IEEE, 1730 Massachusetts Ave. NW, Washington, D.C. 20036.

19th Conference on Computers and Industrial Engineering. Dallas, March 23-25. Contact — Institute of Industrial Engineers, 25 Technology Park/Atlanta, Norcross, Ga. 30092.

International Congress on CIM Databases '88. Cambridge, Mass., March 27-29 — Contact: Kim Takita, CAD/CIM Alert, 656 Boylston St., Chestnut Hill, Mass. 02167.

ISSA '88. San Francisco, March 27-30 — Contact: Information Systems Security Association, P.O. Box 10346, Newport Beach, Calif. 92658.

The Candle Performance Conference. San Francisco, March 27-April 1 — Contact: Candle Education Registration Office, 1999 Bundy Drive, Los Angeles, Calif. 90025.

Interface '88. Chicago, March 28-31 — Contact: The Interface Group, Inc., 300 First Ave., Needham, Mass. 02194.

1st Annual World Congress on Computing (WCC). Chicago, March 28-31 — Contact: The Interface Group, Inc., Registration Dept., 300 First Ave., Needham, Mass. 02194.

AIIM, Inc. (Anyole years) Spring Conference. San Diego, April 5-6 — Contact: Randal L. Lecount, Gay & Taylor, Inc., P.O. Box 1410, Winston-Salem, N.C. 27102.

PIMA Management Information Systems Conference. Savannah, Ga., April 6-8 — Contact: Scott Baumruck, Paper Industry Management Association, 2400 East Oakton St., Arlington Heights, Ill. 60005.

1988 EFTA Expo. Washington, D.C., April 10-13 — Contact: Jim Cullen, Electronic Funds Transfer Association, Suite 1000, 1726 M St. NW, Washington, D.C. 20036.

22nd Annual ATA National Workshop and Computer Systems Demonstrations. Baltimore, April 10-13 — Contact: American Trucking Association Management Systems Department, 2200 Mill Road, Alexandria, Va. 22314.

10th Conference on Computer Audit, Control and Security. Atlanta, April 10-15 — Contact: EDP Auditors Foundation, P.O. Box 88180, Carol Stream, Ill. 60188.

Brophy

CONTINUED FROM PAGE 85

er — and put him into the sphere of the humanist and philosopher.

In addition to mathematics, he studied philosophy in college and pursues his interest in the subject by reading the contemporary French philosopher Teilhard de Chardin.

"You have to have a vision. It requires a lot of work, a lot of reading, a lot of listening," Brophy says.

Community service

The philosophical leanings of 54-year-old Brophy do not confine his love for his fellow man to the abstract. He and his wife Carole Anne, parents of five children, are active in community groups such as the West Hartford Street Ministry, an ecumenical youth counseling organization.

"He is a blend of someone who can think systematically and someone who is compassionate," says Rick Lanz, director of the Street Ministry.

> "YOU HAVE to have a vision. It requires a lot of work, a lot of reading, a lot of listening."
>
> JOSEPH BROPHY
> THE TRAVELERS CORP.

For the past two years, Brophy has organized an annual concert of Celtic music for the benefit of the ministry. The bagpipe group in which he plays, St. Patrick's Pipe Band, has been featured along with other performers. "The Celtic music concert was his idea. He organized it. He also did publicity for it. We just stood by and watched," Lanz says.

Lanz reports that Brophy has helped him and the ministry in other ways, such as helping to design a pension plan for its employees. Lanz recounts that Brohpy helped a young man who had dropped out of high school but was skilled in the use of computers to get a job at The Travelers.

DP just part of the big picture

In one sense, Brophy's broad interests are an end in themselves, helping to take his mind away from the mundane. But those interests also allow him to view the wide scope of life, of which data processing is just one part.

Once his vision of the future of DP is clear, it must be communicated. "A very significant part of my job is selling. What I have to sell is a vision of how technology can be used to improve the organization and contribute to the bottom line," Brophy says.

In 1976, when he was an IBM account executive dealing with The Travelers, Barrett recalls listening to a Brophy presentation on corporate networking and computing goals for 1981. It was extremely ambitious, Barrett thought, as he noted each goal for future reference. But five years later, the subject of Brophy's talk, a nationwide claims system called The Travelers' On-Line Processing System, was a reality.

Brophy's accomplishments have been widely recognized by colleagues. In 1986, he received the Data Processing Management Association's Distinguished Information Sciences Award. Several years earlier, he received a citation from the state of Connecticut for his work in DP.

A New York native, Brophy went to parochial school there and graduated from Fordham University. He later pursued graduate studies at New York University.

His musical training began early, with five years of violin lessons. Later, with earnings from a part-time job, he bought a set of bagpipes and took lessons from an accomplished Scottish piper.

During the Korean War, Brophy took his bagpipes with him to Hokkaido, Japan, where he served in a skiing unit. He still enjoys cross-country skiing.

Brophy also studied French for many years and continues to read in the language. He revives his conversational skills when European travels take him through France, he says.

After university studies, Brophy joined The Prudential Insurance Company of America in its actuarial training program, where he learned to program an IBM 650 computer. Later, he went into underwriting, billing and, finally, because of his interest and experience in data processing, MIS.

Travelling up the ladder

After a stint at an actuarial and consulting firm, he went to Bankers National Life Insurance Co., where he worked as chief actuary and later chief of data processing. In 1971, he moved to The Travelers.

Offering advice to young people launching a career in MIS, Brophy stresses the importance of education.

"Go for an advanced degree, preferably in a different discipline" from MIS, he recommends. "In the insurance industry, try for a CPA, CLU or actuarial degree."

Then try to get some business experience, possibly in marketing. Next, come back at a higher level in MIS, he says.

"Get a look at the big picture. Be a double or triple threat," Brophy urges. "That is kind of what I did." And keep honing your skills through education, he adds.

Taking his own advice to heart, Brophy recently completed a nine-week senior executives' program at MIT. He recounts that half the participants were from overseas and several were from Japan.

Brophy is now learning Japanese.

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Duncan

FROM PAGE 85

project must meet minimum standards of performance in all three areas. With the process aspect shortchanged, the software will be late and over budget.

Can the specialized skills of a project management professional really help that much? To answer that question, let's look at the project management practices of a profession with similar problems — construction engineering.

The design of petrochemical processing facilities, hydroelectric power plants and major high-rise buildings share certain key characteristics with software development. The projects are technically complex, often have never been done before and are constrained by costs and schedules.

The most notable difference in the project management practices of the two professions is the degree of specialization in planning and control — in the process aspects. A construction project manager will have a specialist develop the estimates, schedules and progress reports. Software project managers will typically perform these planning and control tasks themselves.

Responsibilities overlap

The overlap between technical and process responsibilities creates a serious problem for software development: It inhibits the feedback cycle that is critical to improving performance. For example, what happens if the estimator's task estimate is too low? On a construction project, the task manager tells the project manager. The project manager decides whose estimate is better and adjusts the plan accordingly.

THE OVERLAP between technical and process responsibilities creates a serious problem for software development: It inhibits the feedback cycle that is critical to improving performance.

On a software project, the project manager is the estimator: There is no independent third party to resolve the difference of opinion (and an estimate is just that, an opinion). Rather than blame his boss for a poor estimate, the task manager looks for some other excuse. The estimator does not get accurate feedback on the reason for overruns and thus continues to estimate inaccurately.

Is the construction engineering model really applicable to software development? Some industry authorities think so. In the 1960s, IBM proposed that software should be developed by a team of specialists headed by a chief programmer. The chief programmer would be responsible solely for the technical performance of the project team. The process responsibilities would be handled by other individuals.

More recently, structured analysis guru Tom DeMarco suggested that an independent estimating function is a prerequisite for successful software development. He proposed the creation of an independent estimating group whose members would be compensated according to the accuracy of their estimates.

Both proposals were based on the construction engineering model that recognizes the special skills of the project management professional.

The project management profession has other lessons to teach. Work breakdown structures, standard in the other engineering professions, can help make sure that necessary tasks are not inadvertently omitted.

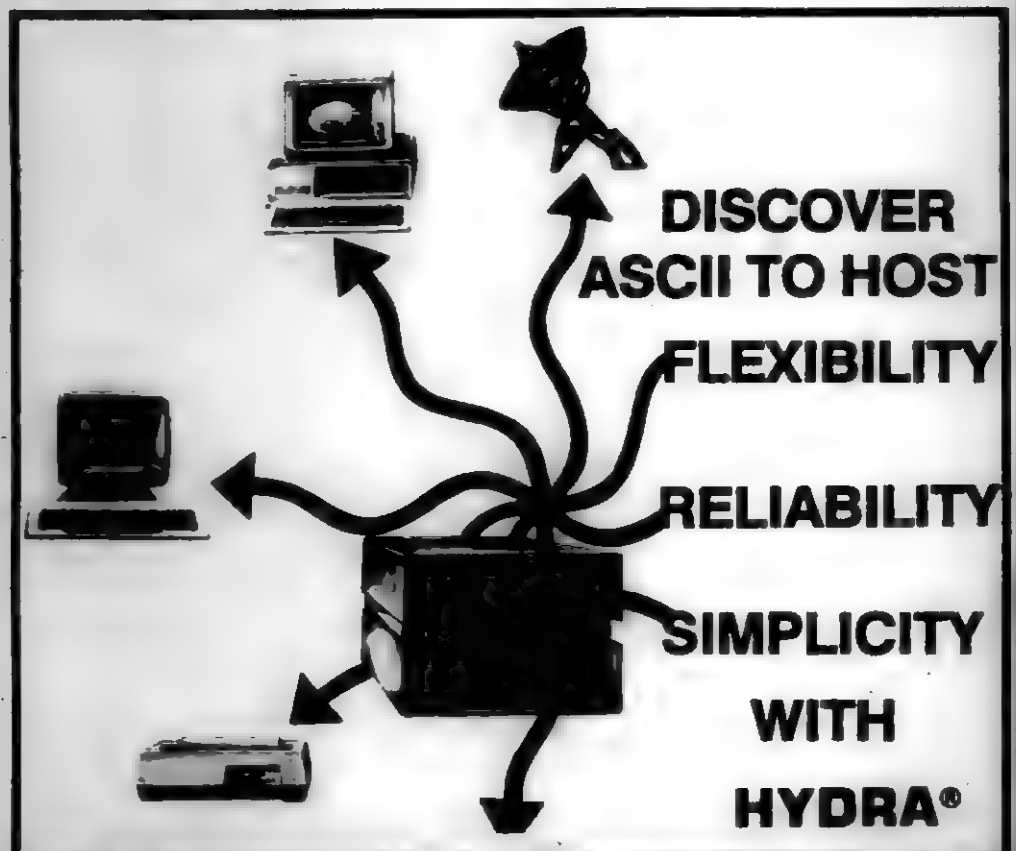
Resource scheduling

Resource-based scheduling, rather than task-based scheduling, reveals that many software projects have nearly 100% of the work effort on the critical path. Thus slippage on almost any task will cause slippage on the entire project, and schedule delays not only become understandable, they become unavoidable.

Properly implemented, earned value reporting, which withholds credit for a task until it is actually completed, can give management a true picture of project status and eliminate the "It's 90% done" syndrome.

Despite these lessons, most software will continue to be developed the old-fashioned way — with the senior technical person responsible for process management as well. Most software will still be completed over budget and behind schedule. Most software will still be full of bugs long after it has been released to the user. Isn't it time we at least tried something new?

Duncan is president of Duncan Associates, a Lexington, Mass., project management consulting firm, and president of the Mass Bay Chapter of the Project Management Institute.



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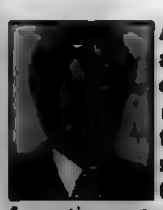

About a month ago, this section of *Computerworld* reported the results of a recent survey that asked information systems executives of Fortune 500 companies to pick the top software companies in a variety of categories. Earning the "best" rating in six of 15 categories, covering mainframe, minicomputer and micro software, was the world's largest software company — even though the company gets only one-eighth of its revenue from software.

That, of course, is IBM. The survey, conducted by Wayne, Pa.-based research firm Donohue Associates, dovetailed appropriately with Big Blue's detailed 1987 financial results from its upcoming annual report.

IBM licensed $6.83 billion worth of software — or "program products," in IBM lingo — worldwide in 1987, making the independent software industry's reigning giant, acquisition-gorged Computer Associates International, look like a relative midget.

That figure accounted for 12.6% of total IBM revenue — a small number, perhaps, but one that has grown at a very rapid clip over the past few years. In 1986, the bottom of the hardware slump for IBM, the company's software revenue percentage was 10.8%.

Comes through in pinch

The growth rates of IBM's software sales are staggering, especially in the context of overall revenue that grew just 2.4% in 1986 and 5.8% last year. Worldwide software revenue jumped 24% in 1987 — not bad for a business that's bigger than the entire corporate revenue of all but a handful of IBM's competitors. In the slump year of 1986, Big Blue's software sales soared 32%.

In the U.S. alone, IBM's software machine pulled in $2.82 billion last year, up 19% from 1986. The growth rate in 1986 was only 8.8% but, excluding maintenance revenue, software was the only segment

Continued on page 97

Prime's Fischer pushes ahead

New CAD/CAM unit president reveals plans for a single Medusa version

Last week, Prime Computer, Inc.'s Robert A. Fischer was chosen to lead the world's second largest computer-aided design and manufacturing (CAD/CAM) vendor behind IBM.

After much speculation in the wake of Prime's successful hostile takeover of Computervision Corp., Fischer was appointed president of Prime's Computervision Division. Former Computervision President and Chief Executive Officer Robert L. Gable resigned to pursue personal interests.

Fischer will be responsible for the sales and marketing of all Prime and Computervision products to the manufacturing industry worldwide, while W. L. "Roy" Brubaker, Prime's vice-

Robert A. Fischer

president of worldwide sales, will head up sales and marketing to commercial and technical markets.

In an interview at Prime's Natick, Mass., headquarters prior to the reorganization with Laura DiDio, a free-lance writer for *Computerworld*, Fischer spoke about his vision for the merged firms and disclosed for the first time that Prime will work toward a single version of Medusa, Computervision's drafting, design and documentation software that is licensed to Prime.

It's a well-known fact that Prime and Computervision have product line overlap, particularly with regard to Medusa. How will you resolve that?

We intend to eliminate any customer confusion by having a single version of Medusa. We're convinced that it's in everybody's best interests to end up with a single version of Medusa that will be offered on a variety of platforms and that will incorporate the best application functionality of both products.

We plan to continue and enhance the two personal computer-based offerings [of Medusa], and give [Autodesk, Inc.'s] Autocad a run for their money.

All products will continue to be supported as though the [two] companies had remained independent. When, in the future, it is determined that there can be significant customer benefits and cost savings in merging

Continued on page 96

Data View

Ten years of chipping away

DEC's worldwide market share has doubled since 1977, while IBM's has dropped 12 points*

INFORMATION PROVIDED BY SHEARSON LEHMAN HUTTON, INC.
CW CHART

DCA still playing the field, searching for LAN mate

BY JAMES DALY
CW STAFF

ANALYSIS

ALPHARETTA, Ga. — Four months after unsuccessfully stalking general-purpose network vendor Ungermann-Bass, Inc., Digital Communications Associates, Inc. (DCA) insists that the prey may have escaped, but hunting season is far from over.

Ever since Ungermann-Bass rejected DCA's $175 million marriage proposal last November, DCA has made it no secret that it is still shopping for a partner that offers a comparable inroad into the local-area network market. Ungermann-Bass eventually agreed to a friendlier and more lucrative $260 million offer from Tandem Computers, Inc. last month.

"We'll continue to look around the marketplace," admitted Craig Huffaker, DCA's executive vice-president. "Right now, we'd very much like to be in the LAN business."

DCA spokesman Bill Marx said his firm slices the LAN market into three segments: personal computer LANs, bridges and gateways and large terminal-to-

Continued on page 96

Intel CEO: 386 shortage to end soon

BY ALAN ALPER
CW STAFF

NEW YORK — Intel Corp. Chief Executive Officer Andrew Grove recently said the firm's 80386 production rate should balance with demand by mid-year, thanks to additional manufacturing capacity being brought on-line during the year.

As demand heated up for the 80386, the Santa Clara, Calif.-based chip maker was forced to put the high-performance 80386 microprocessor on allocation, or customer rationing, late last year.

Addressing a recent meeting of security analysts here, Grove said Intel spent $302 million last year upgrading both the capacity and capabilities of its manufacturing plants. This year, the firm plans to spend a record $400 million.

'Never have enough'

"In our business, you never have enough capacity at the leading edge of technology," Grove said. "You always need to invest in both additional capacity and capability."

Grove said the impact of allocation on Intel's customers has been minimal. "Maybe not everybody got what they wanted, but they knew what they would get and got what they knew," Grove said.

Analysts said that although Intel would like to be able to ship more 386s, allocation has enabled the firm to maintain higher prices, which has helped profitability. It has also curtailed double ordering, which in the past has caused chaos when parts are in short supply.

Increases expected

Grove said that Intel expects to achieve "high single-digit" increases in sales and earnings in the first quarter.

He said that earnings growth in the quarter would have approached the 25% gain achieved in the preceding period if changes in the firm's tax rate had not been factored in. Intel benefited from tax loss carryforwards in the fourth quarter last year.

Industry analysts were generally pleased with Grove's projections. Many had expected lower earnings growth because of increased research and development and sales expenses combined with less favorable tax treatment.

Constrained supply of the 80386 was also expected to have a more damaging effect on sales growth, they added.

"Business is clearly better than expected," noted John Geraghty, an analyst with First Boston Corp. "I had projected a 5% sales increase and envisioned cost pressure on the bottom line."

Soderblom renegotiates license with IBM

BY STANLEY GIBSON
CW STAFF

ROTTERDAM, Netherlands — Olof Soderblom, the inventor of the token-ring networking technology used in IBM's Token-Ring network, announced that he has reached a new licensing agreement with IBM, enabling IBM to sell its Token-Ring boards for use in non-IBM equipment.

The agreement will relieve dealers and users of the concern that an IBM Token-Ring board might not be covered under a patent license if it is used in a non-IBM computer, Soderblom said.

The previous agreement, reached in 1980, allowed IBM to implement the token-ring system in its own products only.

The patents on the technology invented by Soderblom are held by Willemijn Holding BV, located here, which carries on licensing activities on behalf of Soderblom.

Averting loss of business

According to Soderblom, some retailers had reportedly been selling IBM Token-Ring boards with IBM-compatible personal computers made by companies other than IBM.

IBM reportedly has agreed to pay the royalties on these boards so that users will not feel it necessary to buy non-IBM token-ring boards for use in non-IBM equipment. Without the royalty agreement, users might have moved to token-ring boards made by an IBM competitor, Soderblom said.

IBM's previous payment was reportedly a lump sum of $5 million. However, the new agreement calls for a royalty payment on each token-ring product shipped, Soderblom said, although he did not specify the amount.

The new agreement also includes a payment for boards that have already gone into non-IBM computers, Soderblom said.

INDUSTRY WEEK IN BRIEF

Ashton-Tate Corp. reported solid gains in yearly and quarterly revenue and net income in results released last week. The microcomputer software developer reported yearly revenue of $267.3 million, a 27% increase over 1986, while net income hit $43.1 million, a 43% increase over the $30.1 million reported a year earlier. Revenue for the fourth quarter, ended Jan. 31, was $75.5 million, up 20% from the year-earlier level. Net income was $12.6 million, a 21% increase.

Computervision Corp.'s top financial executive, Donick F. Mauro, resigned from Prime Computer, Inc., along with Chief Executive Officer Robert Gable (see story page 91). Prime Chief Financial Officer David J. Collard was named chief financial officer of Prime's new Computervision Division. One top Computervision executive will remain; Vice-President and Treasurer Richard L. Buckingham was named to the same posts at Prime.

Honeywell Bull, Inc., the global information systems company formed last March by Compagnie des Machines Bull in France, Honeywell, Inc. in the U.S. and NEC Corp. in Japan, announced healthy revenue but slim profit margins during its first full year of operations. Revenue for 1987 clocked in at $2.06 billion, compared with revenue of $1.9 billion achieved by Honeywell's computer operations in 1986. Net income for the year, however, was only $17.4 million.

Data Architects, Inc. announced that it will merge with Logica PLC, a British software development and consulting company, in a $37.8 million deal. Logica, with annual revenue of about $126 million, will merge its North American operations with the Waltham, Mass.-based company to form a wholly owned subsidiary of Logica. Data Architects is a 21-year-old vendor of electronic funds software, network services and other products.

Prime Computer Corp. Chairman Robert Wiggins has been named chairman and chief executive officer of Technology Research Corp. in Clearwater, Fla. In his 16 years at Prime, Wiggins led the firm from a $3.5 million to a $850 million a year company. He resigned last year after the Largo, Fla., communications products maker pleaded guilty to charges of defrauding the Social Security Administration.

Software AG Systems, Inc. agreed to be acquired in full by its West German equity partner, Software AG, for approximately $60 million. The Darmstadt, West Germany-based developer of Adabas currently owns 25% of Reston, Va.-based Software AG Systems.

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DCA playing field

CONTINUED FROM PAGE 91

host general-purpose LANs.

Marx said DCA addresses PC LANs with products from its 10Net Communications subsidiary and connectivity with its Irmalan family, but DCA's terminal-to-host segment affords room to grow.

While the firm may develop such a product line in-house, it has a history of talking with its wallet. Last year, DCA bought low-end LAN gear maker Fox Research, Inc., which was renamed 10Net. In 1986, DCA purchased Microstuf, Inc., Cohesive Network Corp. and Irma board maker Forte Communications Co.

But last year's flurry of networking mergers means pickings are getting mighty slim. "Unfortunately, nobody offers the breadth of what Ungermann-Bass did," said Richard Kimball, senior research analyst at Montgomery Securities in San Francisco. "Ungermann-Bass had a large base with a strong sales and customer support organization. Right now, there isn't any one company that can give [DCA] that."

While DCA does not need to acquire anything — last year's revenue topped $181 million, and the firm boasts a $102 million cash reserve war chest — "they really need to round out their product line," said Mary McCaffrey, vice-president of Cyrus J. Lawrence, Inc. in New York. "They're hitting communications managers on the wide-area side and PC distribution channels, but they don't have the core LAN products that would be sold directly to MIS directors."

Likely matches

Following this scenario, the leading prospects on DCA's shopping list of independent LAN vendors include the following:

- **Sytek, Inc.** Parent company General Instrument Corp. has been trying to sell its majority share for more than a year, but the price is reportedly too high. Mountain View, Calif.-based Sytek recently launched more than two dozen new products to propel its broadband terminal-to-host network focus into the general-purpose LAN mainstream. But the company is extremely late to market, having suffered market and personnel setbacks. However, Sytek claims seven straight quarters of profitability and would probably be the easiest to buy.
- **Proteon, Inc.** Also rumored to be searching for a buyer, the token-ring maker should be benefiting greatly from the shortage of IBM Token-Ring adapters, as well as IBM's speed limitation of 4M bits. But Proteon has been dogged by distribution problems. Company officials maintain that once the Fiber Distributed Data Interface, a proposed LAN standard for fiber optics, is approved, the Natick, Mass.-based company will take off. That remains to be seen.
- **Banyan Systems, Inc.** The Marlboro, Mass., vendor boasts highly sophisticated network software backed by a small but fanatically loyal user base. Its Achilles heel until now has been weak marketing and distribution. Rumored to be grooming itself for an initial public offering, Banyan could use a cash infusion to really get going.
- **Excelan, Inc.** Known for its commitment to the Transmission Control Protocol/Internet Protocol, Excelan last year purchased Kinetic Systems Corp., a maker of Apple Computer, Inc. connectivity products. The Kinetic line is a nice fit with DCA's Macirma board connecting the Apple Macintosh to IBM mainframes. San Jose, Calif.-based Excelan is probably the least likely candidate to be for sale, but it offers departmental network focus, which is what DCA needs.

DCA may also try an end run with a smaller, lesser known and, consequently, less expensive firm.

"If the key to their growth is simply technology acquisition, then the opportunities become a lot broader," says Alice Bradie, an analyst with Hambrecht & Quist, Inc. "They may look for a small firm with a technology that they can grow."

Senior Editor Patricia Keefe contributed to this report.

Prime's Fischer

CONTINUED FROM PAGE 81

products, migration assistance or bridges will be made available to help customers take advantage of the new offerings.

However, no customer will be coerced or forced to convert. I also want to assure customers that their accounts will be the total responsibility of one and only one sales and support organization.

When will you drop the second Modcomp line?

There's been no date set.

Are there plans to meld or drop any other products at this point?

We really mean it when we say we presently have no firm decisions in this area ... and we won't until we've had the benefits of teams from both companies working together to do the evaluation and make recommendations. And again, there's no time frame set for its completion.

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Continued on page 97

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Jan. 25	LANs	Jan. 8	Communication Networks
Feb. 8	DEC-compatible Software	Jan. 21	Uniforum
Feb. 29	Performance Management/ Capacity Planning	Feb. 12	
Mar. 14	DBMS	Feb. 26	
Mar. 28	Micro-to-Host Links	Mar. 11	WCC/Interface
Apr. 11	PCs (IBM-compatible)/ Portables/Laptops	Mar. 25	
Apr. 25	Electronic Publishing	Apr. 8	
May 9	Printers	Apr. 22	Comdex Spring
May 23	Data Communications	May 6	
June 6	CASE	May 20	
June 20	The SNA Market	June 3	PC Expo
July 11	Disaster Prevention & Recovery Products & Services	June 24	
July 25	Productivity Software	July 8	
Aug. 8	TBA	July 22	
Aug. 29	DB2 Market	Aug. 12	
Sept. 19	Hardware Roundup: Large, Medium Scale & Special Purpose Systems	Sept. 2	
Sept. 26	Hardware Roundup: Small Scale Systems	Sept. 9	TCA
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Oct. 17	AI/Expert Systems	Sept. 30	Demo West
Oct. 31	Unix	Oct. 14	
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Spotlight is a series of pullout sections within *Computerworld*, each focusing on one product category. With 24 Spotlight sections in 1988, you'll get the purchasing specifics you need for PCs, LANs, printers and productivity software — to name just a few. Each Spotlight contains quick reference specification charts that compare products on a feature-for-feature and dollar-for-dollar basis. Plus related editorial on real-life applications, interviews, vendor viewpoints and market trends. And since it's a pullout section, you'll be able to save and refer to this information as you need it.

If you're involved in buying products, *Computerworld* Spotlight is the section you'll be turning to throughout 1988. And if you're marketing computer products in any of the Spotlight categories covered, you should be putting your message where your market is. Our schedule of 1988 Spotlight topics is listed at the left for your reference.

COMPUTERWORLD

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Prime's Fischer

CONTINUED FROM PAGE 91

and commercial sales. So Computervision has become 50% of our activity.

We now also have $100 million in operating revenues since the merger. And we've moved up about a hundred places in the Fortune 500. Prime and Computervision combined are the 242nd-ranked Fortune 500 company, as per the last available 1986 figures.

Our combined R&D investment for 1988 will reach in excess of $150 million, far more than either company could have made alone.

Now that the Computervision acquisition has been finalized, what else can we expect to see from Prime this year?

First is to buy a company like Computervision. "Strategic alliances" is a euphemism for our buying technology in the manufacturing and engineering area. There are companies that are starting to develop programs that do materials selection and process planning and cost estimating and fixturing and add intelligence to processes that have been done manually for years.

So Prime is looking to buy some software products and combine them with our product line. We'll also be developing interfaces to some of the commonly accepted MRP II systems — that's internal development.

We need to find a strong partner — and I think I can mention who the players are — like an Allen-Bradley, Gould or Siemens, who are strong in the shop floor area.

The last thing we'll do in '88 is to buy some custom systems integration capability. We'd like to have $20 million to $50 million in revenues coming out of selling services to companies where they want to take some of our products that they have installed and some of somebody else's and get them all together.

What do you see as being your hot products, and what forthcoming products can we expect Prime to introduce?

Prime has a current technology interactive design modeler, which will be introduced in April, called the Project Control System. It's in beta test now. It's written on top of [Oracle Corp.'s data base] Oracle and resides in one of the Prime 50 series computers. It does configuration management.

The Project Control System doesn't care whether you're dealing with geometry or coded data image graphics, and it provides the upstream link to the IBM and DEC environment which you find in so many companies these days.

Additionally we see Computervision's CADDS4X as being at the core of any product line hoping to maximize 3-D penetration of major accounts — in particular, it is strong in aerospace and automotive accounts.

Wilder

CONTINUED FROM PAGE 91

of IBM's U.S. business to grow at all.

Looking at these results — and heeding the opinions of corporate information systems executives in the Donohue survey — perhaps it's time to rethink the conventional wisdom of IBM's viewing software primarily as a means to push more boxes — 3090s, no doubt — out the door.

With the 3090 now on the downside of its product life cycle, Silverlake still in the speculation stage and the 9370 still trying to shake the ubiquitous prefix "disappointing," most of the excitement coming out of IBM for the past several months has been software related. It has become clear that IBM's Systems Application Architecture (SAA) and Application Systems Division, even though their details and missions might be fuzzy, are the wave of the future as far as IBM top management is concerned.

In his annual letter to IBM stockholders, IBM Chairman John F. Akers reveals that Big Blue, at a time of celebrated corporate retrenchment, belt-tightening and even facilities closing, has increased its U.S. programming ranks in the past three years by approximately 6,000.

During a period when U.S. sales of its lifeblood processors and peripherals have declined for two straight years — and its deeply discounted maintenance services dropped 8.2% in U.S. revenue last year — software is currently the major growth industry within IBM domestically. IBM knows this and will continue to treat it that way. Because of the IBM operating system stranglehold, it's the only part of the business that is strongly protected from recession and slow capital spending.

As a result, we will see, at the very least, several things from Big Blue:

- A continued hard line on IBM's object-code-only access policy to independent developers, much to the consternation of ADAPSO.
- Continued operating system upgrades and improvements — for the right price.
- Lots more SAA missionary work at customer and industry gatherings.

One year from now, when IBM reveals the breakdown of its 1988 revenue sources, you can bet that software will have registered another healthy increase in both sales growth and its percentage of the total IBM dollar mix. That's a sure thing — a rarity in this business.

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COMPUTER CAREERS

Trains, planes and automobiles: Automation boom drives need for MIS

BY ROSE MULA
SPECIAL TO CW

The need to ship tons of freight and move millions of people more quickly and efficiently than ever before is causing a frenzy of automation in the transportation industry and an increasing demand for MIS professionals.

As with most things in transportation, location is everything. MIS professionals willing to relocate to a company's strategic areas will find numerous opportunities.

"We're always looking for good people for our Dallas/Fort Worth and Tulsa headquarters," says Joseph Selman, corporate communications senior representative for American Airlines.

Feds out of driver's seat

Deregulation is also driving demand for computer professionals in the airlines. Prior to deregulation, life was a lot simpler, according to Selman. "We flew straight lines and had only one or two fares per route. Today, the routes and fare structures for all airlines are extremely complex. Computerization arrived in the nick of time," he says.

For example, American Airlines needs a large staff of programmers and planners to run systems that help plan how many seats to sell, what fares to charge and which routes the airline should fly. The company also requires data base managers to administer Sabre, American's massive computerized reservations system that it also licenses to other airlines.

On a smaller scale, in the less complex field of the trucking industry, requirements for MIS professionals are also great.

"Communication is crucial to our business. We must have an integrated system that ties all our offices together," says Robert Dirks, executive vice-president of Minneapolis-based Berger Transfer and Storage, a $30 million company.

Berger recently became an agent for Allied Van Lines, Inc. and is doing business with various freight brokers around the country. "We have to communicate with all of them as well," Dirks says. "Frankly, we haven't been able to hire enough people with the expertise to pull it all together.

"We want people experienced in data processing, but we're not looking for any specific educational or training background. Mainly, we need people with common sense," he adds.

Openings in trucking do not necessarily require a background in the industry. In fact, Dirks says, it is advantageous for his company to bring in people from other industries who can provide a fresh viewpoint.

> "IT'S GOOD to have outsiders come in who are willing to challenge us and point us in other directions."
>
> ROBERT DIRKS
> BERGER TRANSFER AND STORAGE

"Because of government regulation, we have done things the same way for so many years that many of us fall into the trap of thinking there is no other way to do them. I think it's good to have outsiders come in who are willing to challenge us and point us in other directions," Dirks says.

On another track

Opportunities for MIS professionals also abound in the railroad industry, says John Tierney, senior vice-president for materials and systems at Burlington Northern Railroad Co. As with the airlines, deregulation is creating a more competitive environment.

"The good news for MIS people, at least in our company, is that we're looking forward to pushing technology out into the operations of the railroad to a much greater extent than ever before," Tierney says.

Currently, Burlington Northern is moving technology out into the field by supplying its workers with hand-held data collection devices. Workers in remote locations gather data and transmit it by telephone to either personal computer or mainframe receivers where the data can be manipulated as needed.

Last year, Burlington Northern increased its staff significantly, "but we still need very, very good people at all levels for our headquarters operations in St. Paul, near Kansas City and in Fort Worth," Tierney says.

The company also recently completed a comprehensive compensation study to ensure that its salaries are competitive. "As a result, we plan to raise salaries of many of our present MIS employees to bring them in line with what we offer to attract new people."

The picture is also bright on the automotive front, at least according to Mike Kaminski, manager of the Manufacturing Automation Protocol program at General Motors Corp.

Stuff dreams are made of

"The automobile industry is right on the threshold of the future," Kaminski says. "All those things we used to read about in comic books — automobiles guided electronically and traveling at great speeds with no risk of accidents — it's all going to happen soon."

Such futuristic goals are a dream scenario for MIS professionals, he adds. "We need professionals to direct us toward these new, innovative areas. MIS people in the automotive industry in general, and General Motors in particular, are on the brink of a very challenging future," Kaminski says.

Qualified MIS professionals who want to jump on the GM bandwagon may find a location near them. "We have plants all over the country. I see tremendous opportunities everywhere for the right people," he adds.

The right people, as far as GM is concerned, are aggressive professionals who possess technical backgrounds and are well educated. "We want more master's degrees, more comprehensive computer knowledge; people with energy, drive and flexibility; people who want to participate in and contribute to our future," Kaminski says.

Mula is a Waltham, Mass.-based freelance writer.

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Director of Marketing
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Max Steiner remembers his days as a salesman, when he would make calls and, invariably, see a copy of *Computerworld* on the desks of his clients. That alone made an impression on Max.

Today, he is Director of Marketing for Kenda Systems, a software services firm with offices in New England, New York and Washington, DC, and specializing in placing contract engineers within the high-tech industry. Having grown by 400 percent annually for the last three years — and having placed several hundred professionals in less than three years, Kenda Systems is an acknowledged leader in the industry.

The impression that *Computerworld* has made on Max early on has been a lasting one. He directs Kenda's advertising. And he directs it to *Computerworld*.

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John Corrigan, Recruitment Advertising Sales Director, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171; 617-879-0700

BOSTON: 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171. Al DeBello, Regional Manager, Nancy Perchet, Account Executive; 800-343-6474. (In Massachusetts, 617-879-0700).

NEW YORK: Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652. Warren Kolber, Regional Manager, 201-967-1360. Jay Horwack, Account Executive 800-343-6474.

WASHINGTON, D.C.: 3110 Fairview Park Drive, Ste 1040, Falls Church, VA 22042. Katie Kress, Regional Manager, 703-876-5100; Pattie Smith, Account Executive 800-343-6474.

CHICAGO: 2600 South River Road, Ste. 304, DesPlaines, IL 60018. Pamela Powers, Regional Manager, 312-827-4433; Ellen Cross, Account Executive 800-343-6474.

LOS ANGELES: 18004 Sky Park Circle, Ste 100, Irvine, CA 92714; Barbara Murphy, Regional Manager, 714-827-0184; Ellen Casey, Account Executive, 800-343-6474.

SAN FRANCISCO: 18004 Sky Park Circle, Ste 100, Irvine, CA 92714; Barbara Murphy, Regional Manager, 714-827-0184; Chris Glenn, Account Executive, 800-343-6474.

SYS/38 PROFESSIONALS

Keane, Inc. is a $50M software services company. We are currently staffing a major project to support IBM System/38 operating software. As a result, we are looking to fill a wide variety of positions. To qualify, you must have a minimum of two years of programming (any language) on a S/38, and expertise in one of the following areas.

OPERATIONS COMMUNICATIONS
DATA BASE APPLICATIONS

The successful candidate will have: a demonstrated ability to learn new skills, strong commitment to project goals, and proven interpersonal abilities. These high visibility opportunities offer excellent technical and professional growth, as well as individualized training.

Generous relocation packages are available. We offer competitive salaries and a superb benefits package. Local interviews will be scheduled. **For further information, call Barbara Gavin, collect, at: (507) 285-1552, or send your resume to her attention at: Keane, Inc., 15 South West Third Street, Rochester, MN 55902.**

KEANE

THE ESSENTIAL PROFESSIONALS

An equal opportunity employer

IMS & TPF Applications Programmer Analysts

Opportunities in Phoenix, Arizona

American Express, an international leader in the financial services industry, is expanding the Business Systems Development and Transaction Services groups in Phoenix. Openings are available for individuals in various Programmer/Analyst positions.

Requirements are:

- Minimum of 2 years OS COBOL applications programming experience in an IBM compatible environment utilizing JCL, MVS, TSO, and IMS batch and/or on-line applications
- Senior positions require 4-6 years experience with systems analysis and design in an IMS/project environment
- At least 1 year experience coding BAL in an ACP or TPF environment and technical leadership with large systems in an on-line environment. Knowledge of IBM Assembly language, CMS and COBOL is desired.

Join a team of professionals in a state-of-the-art facility (we process with the 3090 series CPU's). Salaries are competitive based on experience; an excellent benefits package is available.

If you qualify and are interested in a challenging future, send your resume and salary history in confidence to: **J. Benjamin, AMERICAN EXPRESS, Dept. UW, P.O. Box 53781, Phoenix, AZ 85072-3781.**

An Equal Opportunity Employer

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Join one of the fastest growing consulting firms in the Southeast! Overwhelming demand has created new openings in the areas serviced by our NASHVILLE, TN; CHARLOTTE, NC; and COLUMBIA, SC offices in the following areas:

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- IDMS/ADSO
- NATURAL/ADABAS
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- DB2 (DBA or PA)
- IMS DB/DC
- VAX, UNIX, C
- PC, Macro CICS, Ins.
- PC FOCUS

We offer excellent benefits and competitive salaries. Call or send resume to our Corporate Office today:

AMERICAN COMPUTER PROFESSIONALS
P.O. Box 8128
Columbia, SC 29250
(803) 256-8855
equal opportunity employer m/f

LAN ENGINEER

General Dynamics Fort Worth Division has installed an advanced fiber optic-based LAN, and is seeking an individual to develop and integrate network hardware/software systems, conduct technical analysis of transmission facilities, as well as provide LAN design and support.

Desire BS in a technical discipline plus 3-5 years' experience in the telecommunications industry. LAN experience required; familiarity with token ring network technology desirable. General Dynamics offers competitive salaries, comprehensive benefits and advancement opportunities to match your performance and motivation.

For immediate consideration, send your resume to: **Supervisor of Professional Staffing, P.O. Box 748-61-CW, Mail Zone 1662, Fort Worth, TX 76101. Principals only.**

GENERAL DYNAMICS
Fort Worth Division

Equal Opportunity Employer
U.S. Citizenship Required

The Dayton Board of Education is seeking a highly qualified individual for the following position:

Manager of Technology
Salary Range: $44,365 - $61,248

Responsible for planning, supervising, organizing, directing, providing an integrated information system for total evaluation of all data, and evaluating process of Information Systems Services and Instructional Technology. Coordinates utilization of staff and resources to accomplish district goals. Facilitates implementation of districtwide technology programs as well as communication of needs to Superintendent and appropriate personnel.

Qualifications: Master's Degree (Doctorate preferred) in Education, Computer Science or related field. Two (2) years supervisory or administrative experience in an educational environment (preferred). Two (2) years supervisory or administrative experience in a technological environment. Outstanding verbal and written communication skills.

Apply in confidence by submitted a complete typed resume including three business references & indicating position for which application is being made to:

Mr. Ruben Nazario
Executive Director
Dayton Public Schools
348 West First Street
Dayton, Ohio 45402

Deadline for receipt of letters is 4:00 P.M., Thursday, March 24, 1988.

An Equal Opportunity Employer - M/F/H

Data Processing

APPLICATION PROGRAMMER & PROGRAMMER/ANALYST

Midway Airlines, a rapidly expanding $300 Million Chicago-based national airline, has a unique opportunity to be involved in our new IBM 4381 MVS shop.

The successful candidates will have:

- 3-5 years of major application design/development experience in an MVS environment
- Proficiency in structured methods, COBOL, CICS, MVS, TSO, access methods, package software, system life cycle concepts
- Strong verbal & written communication, organization & planning, and analytical skills
- Broad technical background helpful (PL/I, CSP or DMS, RPG, DB/DC, ISPF, BAL, 3/38, PC)
- Bachelors degree or equivalent work experience
- Airline application experience helpful

We offer excellent compensation and an outstanding benefits program. Forward detailed resume including salary history (only resumes which include salary history will be considered) to: Manager of Employment, Dept. DP, MIDWAY AIRLINES, 5959 S. Cicero Ave., Chicago, IL 60638. Fee-Employer preferred. We are an equal opportunity employer m/f/h.

Midway

D.P. Consultants

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The Registry
40 Washington Street
Wellesley, MA 02181
(617) 237-0110

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- SCOBOL
- PATHWAY
- GUARDIAN
- INSPECT
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Relocation and Fee Paid
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Rock Hill, SC 29731
(803) 366-8000, EXT. 6

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S/E Unix, C, Kernel	To $60K
MVS PL1, IMS	To $40K
MVS Cobol, CICS	To $40K
Healthcare Consult.	To $50K
S-38 RPG3	To $45K
VAX Fortran RT	To $40K
Sys Pro DOS/VSE	To $38K
HP3000 Cobol	To $30K
VSE, CICS, DL1	To $34K
Sys Pro CICS	To $40K
UNIX, C, RDBMS	To $45K
Burr Cobol DMS	To $60K

Call Russ Bray, C.P.C.

AVAILABILITY, INC.
813/289-8883
Dept. C, P.O. Box 28434
Tampa, Florida 33622

PROGRAMMER/ANALYST IBM SYSTEM/38

The Orleans Parish Criminal Sheriff's Office in New Orleans, LA is seeking programmer/analysts to add to their present staff. The successful candidate will have a minimum of one year experience in a structured RPG III environment with emphasis in systems design and on-line programming. A bachelor degree in a related field as well as experience with J.D. Edwards integrated financial software a plus.

OPCSO is an equal opportunity employer and offers a competitive salary/benefit package. Send resume with salary history and requirements to:

Personnel Director
Orleans Parish Criminal Sheriff's Office
3800 Gravier St.
New Orleans, LA 70119

PROGRAMMER/ANALYSTS & SYSTEMS PROGRAMMERS

FOR CAROLINAS AND SOUTHEAST

We have opportunities for on-line and database programmers and systems programmers for both in-house and consulting positions. Fee Paid. Please call or send resume to:

Keith Reichle, CPC
Systems Search, Inc.
203 Heritage Park
Lake Wylie, S.C. 29710
803/831-2128

(local to Charlotte, NC)

DATA PROCESSING PROFESSIONALS

You Can Afford To Be Choosy... So Choose The Best

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It stands to reason that a company that's one of the largest software consulting firms in the South, and is rated as one of the 53 fastest growing companies in America, would have a lot to offer in terms of challenging assignments and career-growth opportunities. BROADWAY & SEYMOUR does — and how!

Due to our continued growth, we have some exceptional opportunities in several Southeastern cities:

Raleigh, NC
PROGRAMMER ANALYSTS & SYSTEMS ANALYSTS

Requires 2+ years experience in IBM mainframe and any of the following: COBOL, MVS, VM/CMS, NOMAD, DB2/SQL, CSP, OMF, CICS, CLIST, MSA, DL/1, System 36 or 38.

PROGRAMMER ANALYST

Requires IBM mainframe and HP 3000 experience.

TECHNICAL WRITERS

Requires 1+ years experience in UNIX operating environment and/or telecommunications software.

Charlotte, NC
PROGRAMMER ANALYSTS, SYSTEMS ANALYSTS & TECHNICAL SPECIALISTS

Requires 2+ years experience in any of the following: CICS, IMS, COBOL, PC, "C" language, FOCUS, IBM Token-ring applications development, OS/2, IBM 370 Assembler, CPCS, HOGAN, MSA or UCCEL.

Norfolk, VA.
PROGRAMMER ANALYSTS & SYSTEMS ANALYSTS

Requires 2+ years experience in any of the following: IMS DB/DC Fast Path Applications Development, IDMS, ADS/O, CULPRIT, System 36, RPG III, ATM applications development with IBM and/or Diebold equipment, JCL, CICS and MSA.

Winston-Salem, NC
PROGRAMMER ANALYSTS & SYSTEMS ANALYSTS

Requires 2+ years experience in any of the following: IBM System 36, RPG II, CICS, DL/1, IMS DB/DC, GENER/OL, DB2, ADABAS/NATURAL and IBM-PC NETWORKING (NOVELLE, IBM Token-ring).

We offer an excellent salary and comprehensive benefits including medical, dental, long term disability, life insurance and a 401(k) savings plan and wellness program. For confidential consideration, please send your resume and salary history, **INDICATING THE LOCATION AND POSITION OF INTEREST**, to: Director of Human Resources, BROADWAY & SEYMOUR, INC., 302 S. Tryon Street, Charlotte, N.C. 28202.

An Equal Opportunity Employer M/F/H/V

The City of College Station is currently recruiting for the position of
DIRECTOR OF MANAGEMENT INFORMATION SYSTEMS

This position is responsible for the development, implementation, and coordination of the City's data processing functions. A 4 year degree or 10+ years of Data Processing Management experience plus 3 years systems analysis, 2-4 years programming experience, and excellent interpersonal/communications skills required. Experience in a municipal DP environment, knowledge of microcomputers, installation experience, or experience working with first time DP users helpful. Excellent benefit package. Salary D.O.Q. Submit resumes with complete employment, educational, and compensation history by March 30, 1988 to:

City of College Station
Personnel Department
P.O. Box 9960
College Station, TX 77840
EOE

MANAGEMENT INFORMATION SYSTEMS ADMINISTRATOR. Install new software applications and train users. Develop multi-user database applications for system users. Assist users with new applications as well as trouble shooting hardware and software. Ensure system integrity through data back-up files. Serving a resource for hardware/software maintenance, and constant system monitoring. Ensure company's needs are met in an up-to-date, cost efficient manner. Plan systems for future growth. Must have a B.S. degree in computer science, and at least 2 year's experience as a management information systems administrator or a computer programmer analyst. Must have working experience with: C-program with data base interface; network topology and design; relational data base; accounting and production data base; and multi-user programming. 40 hrs/wk at $615.00/wk. Send resumes to Jeanne N Vencill, Director Human Resources, 2905 Xenium Lane, Plymouth, Minnesota 55441.

DEVELOPMENT MANAGER
LIBRARY INFORMATION SERVICES

Applications Development Project Manager needed with solid technical skills in the areas of systems analysis and design in a large database online environment. University environment utilizing TSO/ISPF, CICS and SOFTWARE AG's ADABAS and COMPLETE under MVS/XA. In-depth knowledge of PLI and ASSEMBLER languages in an online database environment required. Candidate must also have supervisory and project management skills and ability to develop and maintain liaison with other academic institutions using similar software. Familiarity with library cataloging procedures desirable but not necessary.

Submit resume to:

Rose Hollbrook
Personnel Office
Brown University
Box 1879/BM3721
Providence, RI 02912
An EEO/AA Employer

SEISMIC, PROGRAMMING SUPERVISOR

Design, develop and maintain software for 3D Seismic processing for land, marine and transition zone surveys. Maintain and coordinate navigation and positioning software for on-board and in-house use. Develop expert system and graphics tools to assist in seismic processing. Supervise a group of Senior and Junior Programmers in the above. Conduct training for both company personnel, national and foreign clients in these areas. Need Bachelor of Science degree or Equiv. in Applied Mathematics. Need one year exp. as Seismic Programming Supervisor, or two yrs. as Senior Programmer, Research Geophysicist. 40 hrs/wk. $42,000 per year. Apply at Texas Employment Commission, Houston, Texas, or send resume to the Texas Employment Commission, TEC Building, Austin, Texas 78778. J.O. #47-888-54. Ad paid by an Equal Employment Opportunity Employer.

SENIOR PROGRAMMER - PROJECT LEADER
SUNBELT - HEAVY INDUSTRY

Minimum 3 years experience with Unix 1100. DMS/OPS/SDF/COBOL required. Experience with MAPPER a Plus. Degree preferred. Excellent career opportunity with an aggressive, growth oriented company. Salary commensurate with experience.

Reply to CW-88662
Computerworld
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Framingham, MA 01701-9171
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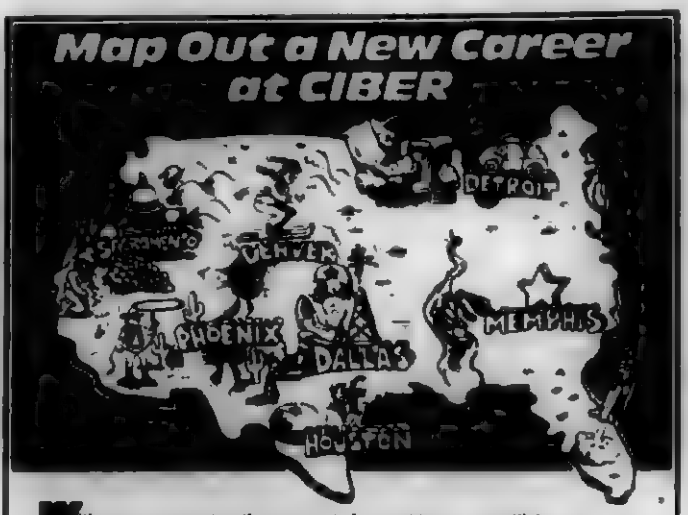

With many companies, the prospect of an exciting career with long-range opportunities is limited by one element—location. CIBER knows that the environment in which you work and live affects your personal satisfaction. A career with our rapidly expanding consulting firm will allow your future to take shape in a choice of data processing markets.

Our employees are salaried and receive generous benefits including relocation assistance. If you have a minimum of 3 years experience, we can offer you a wide range of technical opportunities in diverse industries using the latest systems and computer technology.

Openings are currently available in the following locations for data processing professionals who are experienced in these preferred fields:

PHOENIX
TELON
DB2
IDMS ADS/O
IMS DB/DC
CICS/DL-1
FOCUS
GFIS
TRANSFORM (HOLD)
ACP/TPF
UNIX*: C
EASYTRIEVE PLUS

Dan Pellman
3003 N. Central Ave.
Suite 2512
Phoenix, AZ 85012
(602) 234-0411

NORTHERN CALIFORNIA
IDMS, ADS/O
IMS DB/DC
DB2/SQL
CICS, COBOL
PICK/BASIC
ADABAS, NATURAL

Gary Preston
1010 Hurley Way
Suite 300
Sacramento, CA 95825
(916) 929-2729
or
2478 Business Ave.
Suite 1045
Pleasant Hill, CA 94523
(415) 930-3494

DENVER
IMS DB/DC

MEMPHIS
IMS DB/DC
DB2/SQL
TELON
ORACLE
FOCUS
SAS
CICS
FORTH
PROLOG

For Memphis or Denver, please contact: Beth Kern
1776 S. Jackson St.
Suite 804
Denver, CO 80210
(303) 691-2273

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Higher Aspirations? Join the StorageTek Team in Colorado.

Storage Technology Corporation is The Information Storage and Retrieval Company. Exciting new products mean a solid commitment to software development as a major initiative in our dynamic growth plans. It's a fast-paced scene for the following professionals:

- MVS Software Engineer
- MVS Systems Programmer
- Software Test Engineer
- Diagnostic Developer
- Tools Developer
- Technical Writer

Ideal candidates will have a BS or MS in CS or equivalent, plus experience with IBM 370 operating systems. Openings exist at all levels.

At StorageTek you'll enjoy the stimulation of working with the top-flight technical talent in the business. If you thrive in a systems software development environment, you'll warm to our climate, culture and unlimited recreational activities. That's the beauty of StorageTek in Colorado.

For immediate consideration, please send your resume to David Armstead, Department CW 48, Storage Technology Corporation, 2270 South 88th St., Louisville, Colorado 80028-3159. We are an equal opportunity employer.

The Information Storage and Retrieval Company

SYSTEMS/PROGRAMMING OPPORTUNITIES

Due to continued growth in the international marketplace, the time is right for hard-working DP Professionals to showcase their expertise with Sea-Land Corporation currently staffing a development center which is instrumental in achieving strategic corporate goals.

[redacted]

This highly capable person will possess 5+ years total development applications experience including life cycles, process modelling and project scheduling methods. Some exposure to Yourdon, D/B design and CASE tools would be helpful. Strong communication and interpersonal skills required. Primary responsibilities involve defining, establishing and supporting an environment of methods procedures and tools for analysis, design, planning and development.

[redacted]

The successful candidate will be a strong communicator with broad mainframe experience who can interact efficiently with Information Services. Background should include 3+ years COBOL, ADABAS, JCL, TSO, SPF and 2 or more years of CICS, BMS and ADAPREP. Major duties involve acting as advocate for applications developers to Information Services concerning changes in software.

[redacted]

This diversified position requires a problem-solver who can provide guidance and direction to application analysts. Strong working background in CICS, ADABAS, NATURAL, COBOL, VSAM, JCL and TSO required. 3/38 and PC a plus.

[redacted]

Qualifications include 2+ years successful experience in ADABAS/NATURAL, CICS and COBOL. Position entails supporting the MIS Applications Dept. PC background would be a plus.

Applicants with the ABOVE EXPERTISE, who feel they can make a valuable contribution in our highly technical marketplace, are urged to apply. If a truly competitive salary and comprehensive benefits package interest you, send resume (DETAILING SPECIFIC POSITION OF INTEREST) with salary history and requirements to:

Sea-Land Corporation
Betty Corpening, Recruitment Specialist
Sea-Land Corporation
P.O. Box 1050, Elizabeth, N.J. 07207
EO/AA EMPLOYER F/H/V/H

ALASKA

University of Alaska Computer Network

Interested in a challenging position in a unique and exciting environment? The University of Alaska Computer Network is a 5,000 mile communications network linking 13 campuses statewide with 3 computer systems. We have an opening for an experienced systems programmer in an IBM 3090 MVS/XA, JES2, and Cullinet IDMS environment. Your experience and creativity will help us continue to extend the frontiers of computer applications and technology.

Systems Programmer II
(annual $40,435 to $67,262)

As a minimum, the successful applicant must possess knowledge of IBM systems software, skills in assembly level programming, and the ability to maintain, develop, and install computer operating systems.

Please send a letter of application, your resume, and three professional references to:

University of Alaska Computer Network
303 Tanana Drive
Room 3 Bunnell Bldg.
Fairbanks, AK 99775-5180

Closing Date: March 31, 1988

The University of Alaska is an AA/EO employer and education institution. Applications are especially sought for this position from women and minorities. Your application for employment with the University of Alaska may be subject to public disclosure if you are selected as a finalist.

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Over 500 Openings

IMS/DB2	all levels
IDMS/ADSO	all levels
ADABAS/NATURAL	all levels
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CICS	all levels
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NuTech Computer Careers
4667 Hardwick St.
Suite 142
Lakewood, CA 90712
(213) 694-8278

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Robert Half, staffed by EDP professionals for EDP professionals with 100 offices throughout the U.S., Canada & Great Britain, is the largest network of personnel consultants in the Data Processing field. And its establishment in 1948 also makes Robert Half the oldest. One call and you can search the local, national and international markets. All fees are paid by client companies, of course. The following is a partial listing of opportunities and locations:

BOSTON

PROJ MGR - INVEST SYS
Well regarded BOSTON invest co seekz proj mgr to lead apps devel teams doing major sys expan. Must have 5+ yrs IBM MVS COBOL large invest proj mgmt exp. Opply to be key part of hi-vis dept. Doing state-of-the-art projs.
Salary to $60,000 + relac

IBM P/A'S
SUBURBAN fin'l svc corp seeks tech talented pros for diverse online DBMS projs. Bkgrd skills desired include IBM OS/MVS w/COBOL, PL-1 or FOCUS + any knowl of IMS, DATACOM/DB or CICS helpful. Excepl oppty w/tech & prof growth! Salaries to $40,000

ROBERT HALF
of Boston
100 Summer Street
Boston, MA 02110
(617) 423-1200

CHARLOTTE

SYSTEMS ANALYST
Put your managerial, technical, and design skills to work with prestigious local company! Will supervise three. 6+ years System 38 exp required.
Salary $35,000

TANDEM COBOL
Fortune 1000 company with reputation for treating employees very well seeks Tandem COBOL programmer/analysts. Excellent benefits. Relocation pkg second to none. Salary $36,000

ROBERT HALF
of Charlotte
1395 Charlotte Plaza
Charlotte, NC 28244
(704) 339-0550

WISCONSIN

PROGRAMMER/ANALYST
A major financial services leader headquartered in Milwaukee is beginning a new phase of teller equipment utilizations. Need solid 2+ years experience with "C" language and data base with NCR teller hardware knowledge. D1008 $25-33,000

TELECOMMUNICATIONS ANALYST
Telecommunications has become a major element in the D P world. Our client requires 3-5 years experience in Voice systems and/or Data networking in a SNA/SALC environment. A solid opportunity for growth to management. D1009 $30-36,000

ROBERT HALF
of Wisconsin
777 E. Wisconsin Ave.
Milwaukee, WI 53202
(414) 271-HALF (271-4253)

DALLAS

OUR OFFICE IS PROUD TO ANNOUNCE AN ADDITION TO OUR SERVICES
We have developed an electronic bulletin board that allows you to review a sample of opportunities available in Dallas and other areas. From the convenience of your home or office, simply dial 214/987-1957 to link up with our modem, view the ROBERT HALF EMPLOYMENT LOCATOR PROGRAM (RHELP), and just follow the instructions.

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ROBERT HALF
of Dallas
Two Northpark East, Suite 110
Dallas, TX 75231
(214) 363-3300

FREE Ask for our latest Salary Survey.

ST. LOUIS

PROGRAMMER/ANALYST CONSULTANT
Major contract programming firm has a long-term project and needs several COBOL IMS DB/DC professionals with 3+ years experience. Company offers excellent benefits and relocation package. Project is for 2 or 3 years. Will be employee - no subcontractors.
Salary to $38,000

SYSTEMS PROGRAMMER
Prestigious St. Louis corporation seeks DEC VAX/VMS and IBM MVS Systems Programmers. All positions offer opportunity to work with the latest hardware and software. Must have BS degree and 2+ years of VMS support, MVS support or Assembler programming.
Salary to $40,000

FORTRAN-UNIX PROGRAMMER/ANALYST
Manufacturing firm in start-up mode seeks an experienced CAD/CAM professional who has 3+ years of Fortran and at least one year of Unix knowledge. Will be part of large IBM staff but will work independently. Excellent benefits, high visibility position.
Salary to $35,000

ROBERT HALF
of St. Louis
7733 Forsyth Blvd.
St. Louis, MO 63105
(314) 727-1535

RALEIGH

SYSTEMS ANALYST
Prestigious not-for-profit organization in the beautiful Research Triangle area of North Carolina, is looking for a Systems Analyst with 3+ yrs PC Networking and/or S/36 experience. Position requires a Masters Degree in Computer Science and strong leadership ability. Reports to the Director of the organization. This is an excellent opportunity for a creative and rewarding career in a highly desirable location. If qualified, please submit resume in complete confidence.
To $40,000

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of Raleigh
3760 National Drive, Suite 208
Raleigh, NC 27612
(919) 787-8226

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Heavily capitalized entrepreneurial telecomm/online services firm seeks systems Designer/Programmer w/signif telecomm & online database exp to develop software applications using VAX/VMS or UNIX/"C". POWERHOUSE or DEC PSI +. Good relo. $32-52,000

Bob Carson
ROBERT HALF
of Cincinnati
201 E. Fifth St. #1580
Cincinnati, OH 45202
(513) 621-7711

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Multiple openings for P/A with growing South Bay Co 5+ yrs CICS, COBOL, 43XX, VM, MVS, DBMS, VSAM, VTAM.
Salary to $42,000

43XX PROG/ANALYSTS
Jr & Sr with banking, brokerage or insurance exp in desirable Orange Cty, Calif. CICS, MVS, VM, DSAM, ISPF
Salary to $40,000

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Major Orange Cty Company BS bus. payroll/personnel/benefit sys IMS DB/DC, TSO, ISPF
Salary to $50,000

Randall Vaughan
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of Southern California
3600 Wilshire Blvd., #2008
Los Angeles, CA 90010
(213) 386-6805

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CONSULTANTS
National financial corp located in S FL seeks two sr consultants with McCormack & Dodge software experience. Will interact with users within state of FL. 4 yr degree is a must. Relocation fees paid. Salary $60,000

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of Miami
2655 Le Jeune Road #814
Coral Gables, FL 33134
(305) 447-1757

NATIONAL BUREAU OF STANDARDS
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AUTOMATED PROTOCOL METHODS PROGRAM
COMPUTER SCIENTIST
NEEDED TO WORK IN MARYLAND

RESEARCH AND DEVELOPMENT (R&D) POSITION: Specification, Validation, Implementation and Testing of OSI Protocols and Distributed Systems.

- Conduct R&D leading to the specification, validation, implementation, and testing of OSI computer communications protocols and distributed systems by automated methods.
- Design, develop and implement software tools and systems to model, analyze and predict the behavior of complex distributed systems which are specified using formal description techniques.

QUALIFICATIONS: B.S. degree plus three to five years experience or equivalent in R&D in the fields of protocol specification, validation, implementation and testing. Experience in application of automata theory, language theory and graph theory to the construction of analytic models, software tools and test systems for the analysis of distributed systems and computer communications protocols (preferably ISO/OSI protocols). Experience in the application of formal description techniques to the specification of data communications protocols (preferably Estelle and ASN.1). In-depth knowledge of UNIX, Pascal and C. U.S. citizenship required.

SALARY: Ranging from $39,501 to $60,883, depending upon qualifications and experience. Position offers excellent career benefits and professional growth opportunities. The National Bureau of Standards is an Equal Employment/Affirmative Action Employer. Please send your Personal Qualifications Statement (SF-171) to:

U.S. Department of Commerce
National Bureau of Standards
ATTN: Jeannie Chones
Administrative Building, Room A123
Gaithersburg, MD 20899

LAFAYETTE COLLEGE

DIRECTOR OF ACADEMIC COMPUTING SERVICES

The Director shall be responsible for the planning, development and operation of academic computing as well as the planning, development, and implementation of a campus-wide network. The Director also will have overall responsibility in the areas of personnel, operations, planning, budget and records in computing services. The Director will report to the Provost/Dean of the Faculty and will be expected to work closely with appropriate committees, departments and individual users.

The Director should have experience in computer operations, administrative functions, and be highly knowledgeable of computer hardware, software, and technical approaches to network and computer operations in general. Knowledge of telecommunications systems and experience in an academic institution are desirable. A doctorate is desirable but not required.

Founded in 1826, Layfayette College is a highly selective, independent, undergraduate, coeducational, residential institution of about 2,000 students. The College offers the AB in 22 fields and the BS in six fields of science and five fields of engineering.

Academic computer facilities consist of VAX 11/750 and AT&T 3815 mini's, and 100 microcomputers - IBM PC/ATs with EGA, PS2 Model 50's, and compatibles. Administrative computer facilities consist of a VAX 11/785 network with 20 microcomputers.

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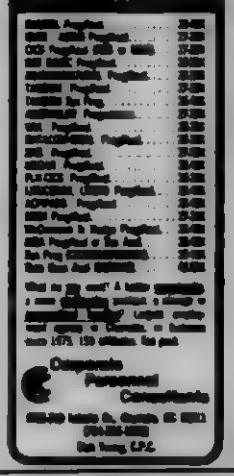

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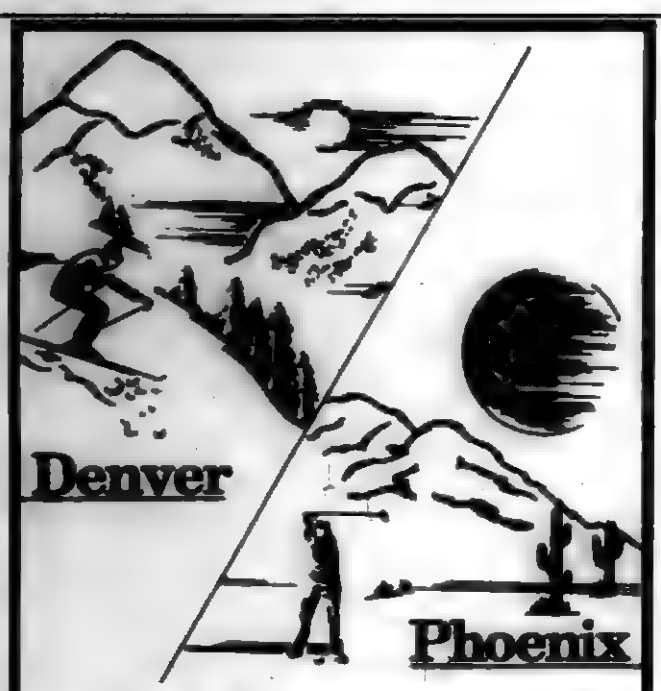

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MARKETPLACE

EGA market image sharpens

Run on boards, monitors result of vendors' neglect, lack of full systems

BY ELIZABETH LOZANO
BOSTON COMPUTER EXCHANGE CORP.

The used microcomputer market pace picked up during the week ending Feb. 26, as the continuing shortages of standard full systems fueled component trading.

The Big Board showed heavy trading of 20M-byte hard drives, IBM Enhanced Graphics Adapter (EGA) monitors and laser printers. The decision made by IBM and Compaq Computer Corp. to drop the EGA monitor standard and focus their attention on the newer monitor standards has set the stage for a run on EGA boards and monitors.

State-of-the-art equipment users report their willingness to dump the EGA, though other savvy buyers see an opportunity to upgrade more of their units to the EGA.

End users, leasing companies and resellers are in hot pursuit of any IBM Personal Computer, PC XT and PC AT standard models that are available. The average user is still reluctant to buy into the Personal System/2 lines, given software issues.

As a result, the PC XT Model 089 and AT Model 339 are that user's default solutions. As one user commented, "Buying new technology is not the answer for me. I want to buy a machine that's like the rest of the ones in my office."

The AT Model 339 closed up, at $3,400, under supply shortage conditions. The 6-MHz, 20M-byte AT Model 099 also closed up, at a price of $2,350.

Dealers, in a state of panic, sought reliable supply of the XT Model 089, but to no avail. The machine traded up, at $1,750, in single-unit transactions. The XT Model 086 was the only IBM PC-DOS machine that dropped in value during the last week of February. The basic dual-floppy-drive monochrome PC Model 076 closed even, at $825, with few quantity lots available.

Compaq trading was flavored by erratic supply conditions throughout the week. The Portable I traded up, at $800, as a result of supply shortage conditions early in the week. The Portable II closed down, at $1,625, with an increase in supply at the end of the week. The Portable III closed up, at $2,775, as demand for this model continued to grow.

The older portable Compaq Plus was the only Compaq model that experienced steady conditions. It traded at $1,350. The Deskpro lines performed well throughout the week, with the Deskpro 286 experiencing an increase in volume, trading at $2,300. The Deskpro 386 was exchanged at $4,275, representing the clear choice of power users.

Macintoshes silent

Nothing was new in the Apple Computer, Inc. Mac world the week ending Feb. 26. The Macintosh SE with two floppy drives traded even at $1,875; the 20M-byte hard-drive version struggled to maintain its value and closed at $2,600. The Macintosh Plus held steady at $1,250, experiencing a marginal decrease in demand.

The lower end of the Macintosh line increased in value, illustrating the market's strong demand for proven technology.

The Mac 512E closed up, at $975, while the original "Fat Mac," the Mac 512, brought a price of $825.

The scramble for used Imagewriter I and II units raged on. Like the bank at lunchtime on a Friday, users stood in line waiting for available Imagewriters. The Imagewriter I closed at $300; the Imagewriter II closed at $350. Laserwriter trading was virtually nonexistent during the week, as the long-awaited arrival of the Laserwriter II encouraged users to evaluate their options before purchasing equipment.

The Boston Computer Exchange can be reached at 800-BOCOEXX or 617-542-4414 in Massachusetts.

The BoCoEx Index

Closing prices report for the week ending Feb. 26, 1988

	Closing price	Recent high	Recent low
IBM PC Model 076	$825	$900	$600
XT Model 086	$1,325	$1,425	$800
XT Model 089	$1,750	$1,875	$1,000
AT Model 099	$2,350	$2,425	$1,950
AT Model 339	$3,400	$3,600	$2,400
Compaq Portable I	$800	$925	$650
Portable II	$1,625	$1,900	$1,475
Portable III	$2,775	$3,000	$2,175
Plus	$1,350	$1,400	$975
Deskpro 286	$2,300	$2,475	$2,050
Deskpro 386	$4,275	$4,575	$3,600
Apple Macintosh 512	$825	$900	$650
512E	$975	$1,075	$800
Plus	$1,250	$1,350	$950
SE	$1,875	$2,100	$1,600
II	$4,000	$4,200	$3,500
Hewlett-Packard Laserjet	$875	$975	$550
NEC 7730	$450	$550	$300
DEC LQP02	$700	$975	$250

INFORMATION PROVIDED BY THE BOSTON COMPUTER EXCHANGE CORP.

IBM cartridge tape market records success

BY ROBERT CALLERY
IDC FINANCIAL SERVICES CORP.

During the past 12 months, prices for used IBM 3480 cartridge tape units have been very stable.

This stability is a result of two factors: a fairly limited supply of machines on the secondary market, caused by the slow migration of users in the tape market, and the lack of an alternative high-end tape product available from IBM, to which users would be able to migrate.

By year-end 1985, the 3480 made up only 9% of the total installed base. Two years later, that percentage rose to 27%. By year-end 1988, International Data Corp. (IDC) estimates the installed base of cartridge tape will be almost 40%.

Even though this was IBM's first major tape announcement since the 3420 Model 8 was introduced in 1973, it took almost four years for the 3480 to capture 40% of the market.

The latest IDC projections for the first half of this year call for approximately 2,800 units to ship domestically. However, when looking at the entire installed base of tape drives, the older 3420 reel-to-reel still outweighs the newer 3480. Yet each year, the gap is narrowing.

Slow development

These figures clearly illustrate a slower migration in the tape market compared with other IBM peripherals. Since this migration has been slow, the development of the secondary market has also been slow.

As recently as March 1987, two years after the 3480 first shipped, there were very few used machines available. Since there were no other high-end tape products available from IBM, this was not surprising.

Typically, when machines appear on the secondary market, users are displacing older equipment and moving to a replacement product. In this instance, since there are no other products users can move to, the main sources of used boxes are consolidation of data centers, bankruptcy cases or overpurchasing.

This pricing trend is likely to continue until IBM announces an alternative product to the 3480, which IDC says will happen this year.

The older 3420 reel-to-reel models have been in a steady state of decline for some time now, with the 3420 Model 8 the only tape with much value left. The demise of this tape drive is due to the fact that most users migrate from the 3420 to the newer 3480 cartridge tape drive. This has caused large quantities of 3420s to appear on the secondary market.

Retail prices on the secondary market for 3420 Model 8s are approximately 11% of the list price, or $2,500, and the supply is practically endless.

Most third-party dealers are selling machines from inventory, which leaves end-user take-out offers very low. If dealers have inventoried stock to sell, they are unlikely to pay very much for an end user's machine, unless forced into it by the structure of a deal.

With the 3480s trading at 90% or so and the 3420s at 11% or less, the used tape market is in a state of contrast. Great bargains can be found at the low end, while the newest technology is still quite expensive.

For more information, contact IDC Financial Services Corp.'s Terri LeBlanc at 617-872-8200.

THE OLDER 3420 reel-to-reel models have been in a steady state of decline for some time now, with the 3420 Model 8 the only tape with much value left.

IBM tape products

Current retail fair market value

	Date shipped	List price	Percent of list price
3420 Model 4	4Q 1973	$16,870	3%
6	4Q 1973	$19,710	5%
8	4Q 1973	$21,860	11%
3480 A22	1Q 1985	$65,430	90%
B22	1Q 1985	$43,120	90%
A11	1Q 1987	$49,080	New
B11	1Q 1987	$38,810	New
3422 A1	1Q 1986	$40,480	New
B1	1Q 1986	$19,680	New

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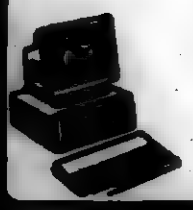

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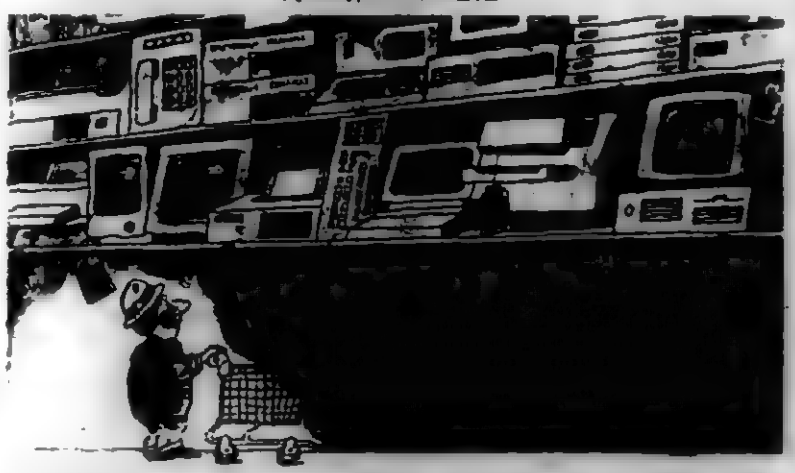
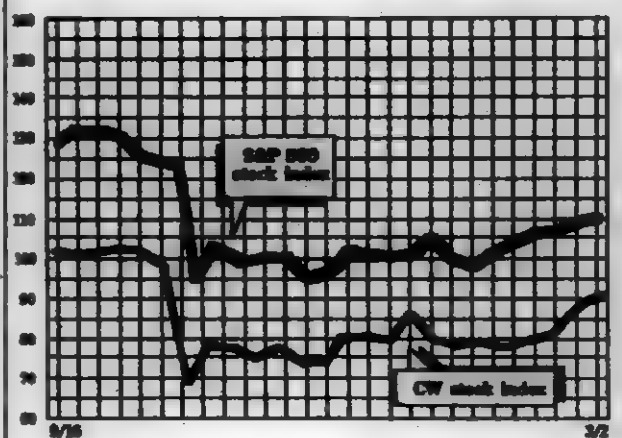


Upcoming Computerworld Spotlight Sections

Issue Date	Topic	Ad Closing Date
March 28	Micro-to-Host-Links	March 11
April 11	PCs (IBM-Compatible) Portables/Laptops	March 28
April 25	Electronic Publishing	April 8
May 9	Printers	April 22
May 23	Data Communications	May 6
June 6	CASE	May 20
June 20	The SNA Market	June 3
July 11	Disaster Prevention & Recovery Products & Services	June 24
July 25	Productivity Software	July 8
Aug. 8	TBA	July 22
Aug. 29	DB2 Market	Aug. 12
Sept. 19	Hardware Roundup: Large, Medium Scale and Special Purpose Systems	Sept. 2
Sept. 26	Hardware Roundup: Small Scale Systems	Sept. 9

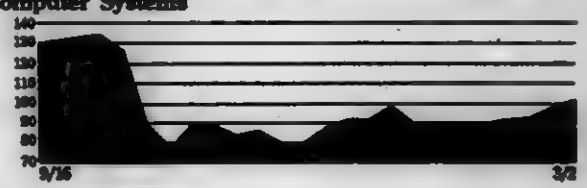
STOCK TRADING INDEX



Indexes	Last Week	This Week
Communications	92.4	95.8
Computer Systems	97.0	101.4
Software & DP Services	99.3	101.6
Semiconductors	62.2	64.0
Peripherals & Subsystems	85.1	87.3
Leasing Companies	113.3	121.9
Composite Index	87.1	90.2
S&P 500 Index	109.3	110.8

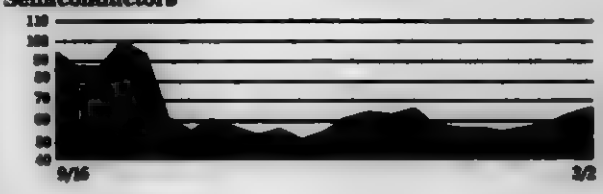
Communications

Computer Systems



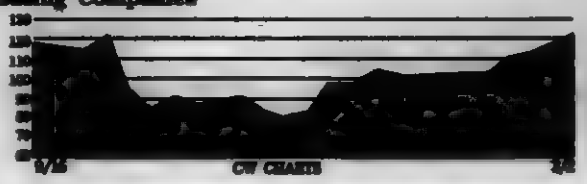
Software and DP Services

Semiconductors



Peripherals and Subsystems

Leasing Companies



Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, MARCH 2, 1988

EXCH		52-WEEK RANGE (1)		PRICE CLOSE MARCH 2 1988	WEEK NET CHANGE	WEEK PCT CHANGE

Communications and Network Services

N	AMERICAN INFO TECHS CORP	100	74	94.63	2.0	2.2
O	ANDREW CORP	19	11	15.25	0.5	3.4
O	ARTEL COMM CORP	4	2	1.81	0.1	3.6
N	AT&T	36	29	29.38	0.0	0.0
O	AVANT GARDE COMP INC	3	2	1.94	0.1	3.4
O	AVANTEK INC	10	6	7.25	0.0	0.0
N	AYDIN CORP	28	16	22.63	-0.4	-1.8
N	BELL ATLANTIC CORP	80	61	72.00	1.1	1.6
N	BELLSOUTH CORP	44	29	40.75	-0.4	-0.9
O	COMPRESSION LABS INC	7	2	3.13	-0.4	-10.7
O	COMPUTER NETWORK TECH	3	2	1.69	0.0	0.0
O	CONTEL CORP	40	25	24.13	0.4	1.1
O	DATA SWITCH CORP	9	4	7.75	0.6	8.8
O	DIGITAL COMM ASSOC	48	20	32.13	2.1	7.1
O	DYNATECH CORP	43	14	21.50	1.3	6.2
O	FIBRONICS INTERNATIONAL INC	11	2	4.00	1.3	48.5
O	GANDALF TECHNOLOGIES	11	6	6.50	0.5	8.3
O	GENERAL DATACOMM INDS	14	9	3.88	0.3	8.9
N	GTE CORP	48	29	38.88	0.4	1.0
O	INFOTRON SYS CORP	12	5	8.25	1.0	13.8
N	ITT CORP	66	49	48.38	1.4	2.9
N	M A COM INC	16	7	10.50	0.1	1.2
O	MCI COMMUNICATIONS CORP	12	8	11.38	0.1	1.1
O	MICOM SYS INC	17	7	11.38	0.5	4.6
O	NETWORK SYS CORP	15	7	9.13	0.8	9.0
N	NORTHERN TELECOM LTD	34	14	19.13	0.0	0.0
O	NOVELL INC	30	12	19.88	-2.4	-10.7
N	NYNEX CORP	78	58	70.38	0.8	1.1
N	PACIFIC TELESIS GROUP	34	9	28.75	0.1	0.4
O	PARADYNE CORP	9	4	5.88	0.8	11.9
A	PENRIL CORP	6	1	4.25	0.5	12.3
N	PLESSEY PLC	41	23	31.00	1.3	4.2
N	SCIENTIFIC ATLANTA INC	20	8	14.00	0.1	0.9
N	SOUTHWESTERN BELL CORP	48	22	38.00	0.6	1.7
O	3 COM CORP	28	12	21.00	-0.9	-4.0
O	TIMEPLEX INC	41	17	32.25	0.0	0.0
O	UNGERMANN BASS INC	16	5	12.25	-0.1	-1.0
N	U S WEST INC	60	45	55.13	0.1	0.2

Computer Systems

O	ALLIANT COMPUTER SYS	37	5	7.00	-0.3	-3.4
O	ALPHA MICROSYSTEMS	9	3	4.13	0.1	3.1
O	ALTOS COMPUTER SYS	16	9	11.50	0.5	4.5
A	AMDAHL CORP	55	19	34.38	-1.1	-3.2
O	APOLLO COMPUTER INC	26	8	18.25	0.8	4.8
O	APPLE COMPUTER INC	60	28	44.75	2.5	5.9
N	BOLT BERANEK & NEWMAN	28	12	15.25	1.4	9.9
O	BRITTON LEE INC	5	1	1.56	-0.1	-3.8
N	COMPAQ COMPUTER CORP	79	28	50.38	3.3	6.9
O	COMPUTER AUTOMATION INC	17	5	12.88	-0.1	-1.0
O	COMPUTER CONSOLES INC	11	2	5.13	0.0	0.0
O	CONCURRENT COMP CORP	24	11	18.00	2.0	12.5
O	CONTROL DATA CORP DEL	38	18	28.13	0.6	2.5
O	CONVERGENT TECH	11	3	3.63	0.1	3.6
O	CONVEX COMPUTER CORP	22	6	6.63	0.0	0.0
N	CRAY RESH INC	138	47	84.88	4.0	4.9
O	DAISY SYS CORP	13	6	7.50	0.3	3.4
O	DATA GEN CORP	37	16	27.25	-0.5	-1.8
N	DATAPOINT CORP	9	3	4.13	0.0	0.0
N	DIGITAL EQUIP CORP	200	110	120.25	-5.3	-4.2
N	FLOATING POINT SYS INC	10	3	4.25	0.3	6.3
N	GOULD INC	24	8	12.13	-0.1	-1.0
N	HARRIS CORP	43	22	29.75	1.0	3.5
N	HEWLETT PACKARD CO	74	38	64.63	4.1	6.8
N	HONEYWELL INC	91	49	65.00	0.8	1.2
N	IBM	178	102	117.25	1.1	1.0
O	INFORMATION INTL INC	17	9	13.00	1.8	16.8
O	IPL SYS INC	3	1	2.50	0.5	25.0
O	MASS COMPUTER CORP	14	5	6.75	-0.1	-1.8
N	MATSUSHITA ELEC INDL LTD	196	98	187.13	7.5	4.2
O	MEGADATA CORP	6	3	3.63	0.8	28.1
O	MENTOR GRAPHICS CORP	39	14	27.75	0.5	1.8
N	NBI INC	14	4	6.38	1.1	21.4
N	NCR CORP	67	50	64.00	-0.4	-0.6
N	PRIME COMPUTER INC	31	12	18.63	0.8	4.2
O	PYRAMID TECHNOLOGY	12	5	10.50	2.8	36.5
O	STRATUS COMPUTER	41	15	27.00	0.0	0.0
O	SUN MICROSYSTEMS INC	48	14	33.75	-1.3	-3.8
O	SYMBOLICS INC	6	1	1.53	0.0	2.1
N	TANDEM COMPUTERS INC	36	17	20.75	-0.9	-4.0
N	TANDY CORP	57	28	40.63	2.3	5.9
N	ULTIMATE CORP	37	15	14.75	-0.4	-2.5
N	UNISYS CORP	48	24	36.88	0.9	2.4
A	WANG LABS INC	19	10	14.88	0.8	5.3

Software & DP Services

O	ADVANCED COMP TECH	6	1	2.13	0.5	30.8
N	AGS COMPUTERS INC	20	11	17.25	2.0	13.1
O	AMERICAN MGMT SYS INC	20	9	16.88	-1.1	-6.9
O	AMERICAN SOFTWARE INC	22	6	12.00	0.4	3.2
N	ANACOMP INC	11	4	7.75	-0.1	-1.6
O	ANALYSTS INTL CORP	10	4	7.25	0.3	3.6
O	ASHTON TATE	33	13	28.50	1.1	4.1
O	ASK COMPUTER SYS INC	17	6	12.25	0.1	1.0
O	AUTODESK INC	34	12	23.00	0.8	3.4
N	AUTO DATA PROCESSING	68	18	46.00	3.0	7.0
O	BOOLE & BABBAGE INC	12	5	8.25	0.5	6.5
N	COMPUTER ASSOC INTL INC	37	15	29.13	0.5	1.7
O	COMPUTER HORIZONS CORP	15	7	9.50	-0.1	-1.3
N	COMPUTER SCIENCES CORP	53	42	51.13	-0.9	-1.7
N	COMPUTER TASK GROUP INC	17	9	10.00	0.1	1.3
O	COMSHARE INC	28	12	14.50	0.8	5.5
N	CULLINET SOFTWARE INC	14	4	6.00	-0.4	-5.9
O	CYCARE SYS INC	10	6	7.88	0.0	0.0
O	DUQUE SNE SYS INC	33	10	19.75	-0.8	-3.7
A	DATA ARCHITECTS INC	17	7	13.63	0.1	0.9
N	GENERAL MTRS (CLS E)	51	30	41.75	2.0	5.0
O	HOGAN SYS INC	17	9	9.00	-0.1	-2.4
O	INFORMIX CORP	31	12	20.00	-3.5	-14.9
O	INTELLICORP INC	11	3	2.88	-0.1	-4.2
O	KEANE INC	10	6	7.50	0.5	7.1
O	LOTUS DEV CORP	46	19	30.50	0.3	0.8
O	MANAGEMENT SCI AMER	20	6	7.50	1.1	17.6
O	MICRO PRO INTL CORP	6	3	3.75	0.3	7.1
O	MICROSOFT CORP	79	37	60.50	-0.4	-0.6
O	MORINO ASSOCIATES INC	24	7	16	-1.0	-6.1
O	NATIONAL DATA CORP	34	19	28.50	0.0	0.0
O	ON LINE SOFTWARE INTL INC	22	9	11.25	-0.1	-1.1
O	ORACLE SYS CORP	19	8	16.00	-0.5	-3.2
N	PANSOPHIC SYS INC	28	11	15.75	0.1	0.8
O	POLICY MGMT SYS CORP	30	16	23.50	1.3	5.8
O	PROGRAMMING & SYS INC	14	7	12.75	1.3	10.9
O	REYNOLDS & REYNOLDS CO	30	14	21.25	0.8	3.7
O	SEI CORP	18	10	16.50	1.5	10.0
O	SHARED MED SYS CORP	38	19	26.63	-1.0	-3.8
O	SOFTWARE AG SYSTEMS INC	17	7	12.75	1.3	10.9
O	SOFTWARE PUBG CORP	17	6	13.50	1.0	8.0
A	STERLING SOFTWARE INC	14	6	8.38	0.5	6.0
O	SUNGARD DATA SYS INC	31	10	17.00	0.8	4.8
O	SYSTEMATICS INC	30	19	27.50	-0.5	-1.8
N	SYS. SOFT INC.	24	7	16	-0.5	-3.1
O	VMI SOFTWARE INC	46	7	12.00	-0.3	-2.0

Semiconductors

N	ADV MICRO DEVICES INC	25	8	12.38	0.1	1.0
N	ANALOG DEVICES INC	24	8	13.38	0.3	1.9
O	ANALOGIC CORP	13	5	7.00	0.1	1.8
O	INTEL CORP	42	18	29.00	0.5	1.8
O	LSI LOGIC CORP	17	7	9.75	0.5	5.4
N	MOTOROLA INC	74	35	49.50	1.4	2.9
N	NATL SEMICONDUCTOR	22	10	12.13	0.8	6.6
N	TEXAS INSTRS INC	60	38	54.13	2.9	5.6
A	WESTERN DIGITAL CORP	23	11	14.88	0.0	0.0

Peripherals

O	ALLOY COMP	13	3	3.63	0.3	7.4
N	AMI INTL INC	9	3	4.13	0.1	3.1
O	AST RESH INC	25	6	9.75	0.8	8.9
O	AUTO TROL TECH CORP	9	3	8.25	1.3	33.5
O	BANCTEC INC	16	5	7.88	1.1	16.7
O	CIPHER DATA PRODS INC	16	4	6.38	1.0	15.8
A	COGNITRONICS CORP	5	2	2.88	-0.1	-4.2
N	COMPUGRAPHIC CORP	28	19	22.25	-0.1	-0.6
N	COMPUTERVISION CORP	22	7	7.00	0.0	0.0
A	DATAPRODUCTS CORP	24	7	8.88	0.5	6.0
A	DATARAM CORP	8	5	6.25	0.3	4.2
N	DECISION INDS CORP	13	4	10.63	0.0	0.0
N	EASTMAN KODAK CO	71	40	44.00	2.8	6.3
O	E M C CORP MASS	29	10	14.75	-0.3	-1.7
O	EMULEX CORP	9	4	7.75	0.1	1.6
O	EVANS & SUTHERLAND	40	18	20.00	-0.3	-1.2
O	IDOT CORP	13	3	5.00	0.3	6.3
O	INTERLEAF INC	24	9	17.63	-1.0	-5.4
O	IOMEGA CORP	6	1	2.94	-0.1	-2.1
O	LEE DATA CORP	9	3	3.88	0.1	3.3
O	MASSTOR SYS CORP	6	1	2.06	0.2	10.0
O	MAXTOR CORP	23	6	13.38	0.4	2.9
O	MICROPOLIS CORP	44	13	27.75	3.6	15.6
O	MINISCRIBE CORP	18	5	10.00	1.0	11.1
N	MINNESOTA MNG & MFG CO	84	45	58.25	0.3	0.4
A	MSI DATA CORP	27	12	24.75	0.4	1.5
O	PRAM CORP	6	1	2.31	0.2	8.8
O	PRINTRONIX INC	13	7	8.75	0.1	1.4
O	QMS INC	27	8	9.38	-0.1	-1.3
O	QUANTUM CORP	25	6	11.00	0.3	2.3
O	RAMTEK CORP	6	2	4.13	0.3	6.5
O	RECOGNITION EQUIP INC	24	7	9.50	0.4	4.1
O	REXON INC	14	5	7.00	0.0	0.0
O	SCAN TRON CORP	14	7	10.25	0.0	0.0
O	SEAGATE TECHNOLOGY	46	10	19.63	0.6	3.3
O	STORAGE TECH CORP	5	1	1.75	-0.3	-12.5
O	TANDON CORP	7	1	1.56	-0.2	-10.7
A	TEC INC	7	3	4.63	0.2	3.9
N	TEKTRONIX INC	41	21	26.50	0.3	1.0
O	TELEVIDEO SYS INC	3	1	1.31	0.0	0.0
O	TELEX CORP	59	30	51.00	1.0	2.0
O	WYSE TECH	43	11	20.50	0.1	0.6
N	XEROX CORP	85	50	61.75	5.1	9.1
O	XIDEX CORP	18	6	6.88	0.1	1.9

Leasing Companies

O	CAPITAL ASSOCIATES INTERNATIONAL	11	4	5.75	0.8	15.0
N	COMDISCO INC	37	12	22.75	2.3	11.0
O	CONTINENTAL INFO SYS	14	5	8.13	0.8	8.3
O	PHOENIX AMERN INC	7	2	2.88	0.1	4.5
O	SELECTRON INC	8	3	4.13	0.0	0.0

EXCH: N—NEW YORK; A—AMERICAN; O—NATIONAL; O—OVER-THE-COUNTER; S—SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Ole!

Wall Street seems more like Pamplona as bulls run wild

The winter blues were nowhere to be found in the canyons of Wall Street last week as the Dow Jones industrial average jumped to a postcrash high of 2071.62 and leading computer stocks soared.

The biggest gainer as of Thursday's close was Apple Computer, Inc., which announced a pact with Texas Instruments, Inc. to introduce next month a personal computer system using artificial intelligence. This sent the company's stock up 4¼ points over the week earlier to close at 46½.

Other matadors in the bull market included Cray Research, Inc., up 3¾ points for the week to 86¼; Compaq Computer Corp., up 3 points to 51¼; Computer Associates International, Inc., up 3 points to 31¼; Hewlett-Packard Co., up 2⅛ points to 63⅜; Ashton-Tate Corp., up 2⅛ points to 29⅝; Lotus Development Corp., up 2¼ points to 31½; and Microsoft Corp., up 1⅝ points to 61.

The only clunker on the Street was Digital Equipment Corp.'s 5-point tumble to 119½, which some speculated was caused by low-end pressure from Apollo Computer, Inc.'s introduction of a workstation it claims will be the fastest on the market.

JAMES DALY

Postal Service ousts mainframe application for CD-ROM scheme

BY JAMES A. MARTIN
CW STAFF

WASHINGTON, D.C. — In what is said to be the largest nationwide installation of compact disk/read-only memory technology in a production environment, the U.S. Postal Service has unhooked its mainframe-based ZIP code retrieval system and replaced it with more than 400 CD-ROM drives. Officials said the project is saving as much as 50% in on-line transaction costs.

In December 1987, the Postal Service initiated its CD-ROM program, deploying a total of 438 systems to postal facilities across the nation for use by mail forwarding sites and ZIP code information clerks handling telephone inquiries. The CD-ROM project was designed, in part, to wean the Postal Service away from the monthly costs of contracting its mainframe data base processing and on-line terminals from a service company.

"I expect we will see a 50% reduction in cost per ZIP code retrieval, based on the same volume year to year between on-line and CD-ROM access," said Michael Selnick, program manager for the ZIP code retrieval system at the Postal Service's headquarters here.

Struggling for acceptance

The Postal Service's use of CD-ROM comes at a time when the acceptance level of the technology by users is embryonic at best. Despite backing from such players as Microsoft Corp., whose annual CD-ROM conference unfolded in Seattle last week, analysts predicted that by the early 1990s, only 5% to 8% of the world's PC users will access a CD-ROM system.

"Although there are specific applications for CD-ROM today — with attorneys, hospitals, pharmaceutical companies and the like — no one I know has been able to imagine an application that will stimulate PC users to go out en masse and buy expensive CD-ROM hardware and software," said Jim Porter, president of Disk/Trend, Inc.

The Postal Service's Michael Selnick

As a result, the Postal Service is to be commended for taking the bold step toward embracing the fledgling optical-disk technology, said Linda W. Helgerson, editor and publisher of the "CD Data Report."

The Postal Service CD-ROM program was developed to more economically and reliably automate its ZIP+4 system, in which customers are assigned a nine-digit ZIP code in exchange for a discount on bulk mailing charges.

The CD-ROM systems installed at Postal Service locations consist of Hitachi Ltd. 1503S drives attached to Telex 1280s, which are IBM Personal Computer AT compatibles made by Telex Computer Products, Inc. Each of the 438 Telex PCs has a dedicated CD-ROM player that replaces the on-line ITT Corp. 110382 IBM 3270-type terminals in accessing current ZIP+4 address data.

Those terminals were linked via leased lines to the IBM 3090 Models 200 and 300E housed at the First Data Resource, Inc. data center in Omaha. First Data is a government service contractor that has maintained the National Directory File data base for more than four years and has provided the Postal Service with its CD-ROM system through a competitively bid contract.

The ZIP+4 retrieval system started out as 44,000 pages of printed data in the form of a 47-volume directory, two copies of which were distributed to each of the 39,400 postal units nationwide and updated annually, Selnick said. Although the directory is still published, the Postal Service signed a contract with First Data four years ago to maintain the National Directory File and provide access via on-line terminals. The national address data base is a 3.2G-byte file that First Data compresses onto a single 660M-byte CD-ROM disk. Each month, 438 copies are distributed to postal facilities with CD-ROM systems. First Data updates its data base from magnetic tapes of data downloaded from the Postal Service's ZIP+4 on-line data base.

Speed trade-offs

Despite the savings in transaction costs, Selnick admitted there is some trade-off for CD-ROM in terms of access speeds. Initially, accessing information in the National Directory File on First Data's 3090 took seven to eight seconds, Selnick estimated.

"Over time, that was improved to about two seconds. Right now, with the CD-ROM system, we're experiencing a response time of about three seconds, but we expect that will be brought down as technology improves."

In addition, the CD-ROM disks must be updated monthly, which means the information retrieved from an optical disk might not be as current as that found in an on-line mainframe data base. As more postal sites go on-line with CD-ROM, the costs of monthly updates will decrease, Selnick added.

CD-ROM moves past 'gee whiz'

BY JAMES A. MARTIN
CW STAFF

SEATTLE — Although no one expects 1988 to be the year compact disk/read-only memory takes off, the fledgling technology took a few significant steps toward maturation at the third annual Microsoft Corp.-sponsored CD-ROM conference here last week.

With the long-awaited market entry announcement of Apple Computer, Inc. and new local-area networking features and technology improvements from other vendors — as well as growing interest from MIS — CD-ROM appears finally to be becoming a viable, though limited, technology.

"Last year, the show was focused mostly on ideas about the 'gee-whiz' potential of CD-ROM," said Pamela B. Roberts, a storage analyst with market research firm Infocorp. "This year, what impresses me is that there are now commercial services and products available that are pragmatic."

Apple steals the show

Apple dominated the conference with a glitzy introduction of its $1,199 CD-ROM drive. The firm chained CD SC will work with a version of its Hypercard, enabling users to interface with the large files contained on CD-ROM platters.

Apple said its CD-ROM will plug directly into the Macintosh Plus, Mac SE and Mac II small computer systems interface ports. CD SC will reportedly be supported on the Appleshare network and by the new Appleshare Version 2.0 file server operating system, which was announced separately last week.

To date, CD-ROM has been widely criticized as being too limited for serious MIS application. Spectrum Interactive, a Bedford, Mass.-based training and systems contractor, also announced last week it has a tentative agreement with American Airlines to develop a nationwide CD-ROM project for the airline's Sabre reservation system.

In living color

In what is said will be one of the first large-scale CD-ROM applications in the private sector, the system will consist of a Sony Corp. CDU-100 drive attached to an IBM Personal System/2 Model 30 running on an IBM Token-Ring network. Spectrum's digital audio/video encoding reportedly enables travel agents using the Sabre system with CD-ROM to show customers high-resolution color images of vacation spots and hotel rooms.

"The ability to merge pictures with the huge data base of information in Sabre offers American a strong competitive advantage," said Max Hopper, executive vice-president of the airline, in a prepared statement. The Sabre travel information network is used in some 14,000 locations on about 60,000 terminals. The project is scheduled to go on-line late this year.

Other announcements at the show included the following:

- Microsoft announced Version 2.0 of its MS-DOS CD-ROM Extension, which reportedly includes the ability to read disks in both the "High Sierra" file format and the slightly different ISO 9660 version of that format, according to Tom Lopez, vice-president of Microsoft's CD-ROM division.
- Hitachi Corp. said it has developed a portable CD-ROM drive for the Compaq Computer Corp. Portable III. Hitachi said it will be available in limited quantities in June and cost $1,500.
- Meridian Data, Inc. in Capitola, Calif., unveiled what it called the "first network CD-ROM drives," which reportedly enable multiple CD-ROM drives and data bases to be integrated into an IBM Token-Ring, Ethernet or Arcnet LAN.

CD Net is set to be available in April for $2,995.

Meridian's CD Server is slated to be available in April for $5,995.

NCR minis

FROM PAGE 1

A low-end 32M-byte model, with support for 20 terminals, will be used at remote locations. Two mid-range models will support about 200 or 750 terminals, respectively, while a 128M-byte high-end dyadic processor will support 1,000 terminals.

The high-end model will reportedly include an icon-based software-generator that will allow nonprogrammers to write applications, user sources said. NCR will also package the high-end model with Oracle Corp.'s relational data base and a new release of ITX called Release 6.0, users said.

The move is the first major hardware announcement for ITX users since the NCR 9500 debuted in early 1986.

The system architecture will allow users to address the full limit of 999 attached terminals that can theoretically be supported under ITX. By contrast, many NCR 9300 and 9400 users claim their current practical limitation is fewer than 50 terminals.

Very large-scale integration chips and surface-mount technology enabled NCR to develop compact units with low power consumption.

'All the advantages'

"This new machine will be smaller than the original NCR 9800 box," said Mark Steidinger, data processing director of First Bank and Trust Co. in Menomonie, Wis. "But it has all the advantages of ITX software."

ITX is optimized for on-line transaction processing, which allows banks, retail businesses and manufacturing firms to add terminals without disrupting operations. Older ITX applications are expected to run on the new systems.

Code-named Top Gun, the architecture has the potential to replace the NCR 9300, 9400 and 9500 with an expandable system that offers greater speed and capacity. But NCR users and analysts said NCR would not immediately withdraw the older systems. "Users of older ITX systems will probably be able to chain these systems together in the same network," said one Midwestern user who asked not to be named.

NCR appears to have a corporate plan for updating each of its primary hardware platforms, said Mike Geran, vice-president of research at The Nikko Securities Company International, Inc. in New York. The ITX introduction echoes that of the NCR 9800 debut, in which a modified version of the mainframe VRX system was adapted for use on another building-block architecture, Geran noted.

The 9800 family was announced as a successor to the NCR 8000 series and was designed to support incremental growth with the addition of multiple processors.

Skills crunch

FROM PAGE 1

• Managers are having trouble finding qualified data base administrators and data base analysts.
• Finding communications managers and communications specialists is a difficult chore.
• Qualified systems programmers are in short supply.

And the difficulties are expected to continue. Increased specialization and the proliferation of technology will combine with what some experts call "the baby bust" — a sharp decrease in the number of people entering

Rockwell's Sutter

the work force during the next 10 years.

Fifty-five percent of the managers interviewed in the *Computerworld* survey say they foresee shortages of MIS employees for the next five years. To maintain staff and find the experts their companies need, managers say they are developing new hiring strategies and finding ways to do without certain personnel.

The shallow end

Emerging technologies for which no pool of talent has yet developed are focal points for many of the shortages. But certain mature technologies that are less popular with the current crop of computer professionals are also showing signs of a shrinking supply of workers.

Among the emerging technologies currently experiencing shortages are these:
• Relational data base management systems, particularly IBM's DB2. Some firms report paying 10% to 15% more for experienced DB2 professionals than for pros equivalently skilled in nonrelational DBMSs.
• Application development tools, such as code generators and computer-aided software engineering systems. Because no standards are in place, there is no one set of tools familiar to most professionals, and many programmers have had no exposure to the products.
• Networking, particularly workstation-level connections and software. Companies are redeploying many data center professionals to network management functions because of internal demand.

Skills at a premium

Shortages of experts in certain technologies that have been around for some time are aggravated by increased interest in the technologies from MIS organizations and vendors. These areas include the following:
• Standard IBM large-scale operating system internals. A historic drought of internals programmers is worsening as software companies hire experts to build systems that work with IBM's VM and MVS.
• Unix and Ada internals. As Unix and Ada become more popular in military and multivendor applications, the relatively small supply of programmers in these areas is quickly being depleted.
• Artificial intelligence applications. There is no shortage of computer scientists interested in AI, but professionals who are experienced in the practical implementation of AI in expert systems to serve business applications are rare.

"In the last five years, there has been an explosion in skill requirements," says Richard Harrison, director of the Federal Software Management Support Division of the General Services Administration.

In the past, programmers could qualify for positions with general knowledge, Harrison adds. Now, a programmer working with an IBM 3090, for instance, is required to know all the utilities and support features of the software on the mainframe before he even gets to the applications. Harrison says that "85% of the machine is eaten up by its own facilities."

The results of shortages in technical areas, while not disastrous, are often costly to MIS organizations. "We run at risk" from developing projects using inexperienced staff members, says a data administrator for a large insurance company.

When the professionals simply cannot be found, managers must place less experienced employees in charge of important projects. Rather than do that, many companies step up their recruitment efforts, looking to other companies to find the people they need.

For example, as a result of the shortage of relational data base

The GSA's Harrison

experts, Conoco, Inc., a Ponca City, Okla., oil company, has had to step up its college recruitment program to replace DB2-trained employees who have been recruited away, says John Happ, employee relations manager.

"A number of our people have left for what they saw as better opportunities," Happ says.

Happ says he is also concerned about a lack of available telecommunications talent. "I don't know where to get the candidates. Every company is into telecommunications these days, and there is no source of talent."

Some companies are staffing up too quickly to meet their needs by hiring trainees. The Hamilton Standard Electric Division of United Technologies Corp. in Windsor Locks, Conn., is able to fill only about 50% of its vacancies each month, says data manager Raymond Levesque. "We're having a tough time getting people across the board."

In addition to skill shortages, the company cannot compete with the high salaries and more varied opportunities offered by neighboring insurance companies in the Hartford, Conn., area. The firm's location in the Northeast, where unemployment is low and the cost of living high, also does not help matters.

One result of these problems is that the company is promoting its experienced staff, in some cases, moving managers to a higher level of responsibility than they may be ready to attain, Levesque says.

Going national

Other companies, such as Inland Container Corp. in Indianapolis, are changing their practice of regional recruiting in favor of national advertising. "We're looking at people from other markets on the West Coast and in the South and Midwest," says Ken Thomas, Inland's MIS manager.

It took Thomas more than six months to fill three operating systems programmer positions. The sticking point was that candidates had to be knowledgeable in EDL, the operating system for IBM Series/1 computers. "We were doing without the staff we needed," Thomas says. "Our projects were not completed on time." Inland also found it hard to recruit programmers familiar with Natural, Software AG of North America, Inc.'s fourth-generation language, and DOS/VSE systems programmers for a new IBM 9370.

"We hired services from IBM's Professional Services Group to keep the project going," Thomas says. "When something is a requirement, you do whatever you have to do to get the job done." IBM charged Inland more than $10,000 to have a professional install VSE on the 9370 and accomplish some preliminary software work, Thomas says.

Many companies are also finding it hard to locate MIS professionals with specialization in specific industries.

"Companies are becoming more specific about the business experience they want," says Richard W. Bell, staffing manager for Arthur Young in Dallas. "They are pigeonholing positions based on industry backgrounds in manufacturing or retail or health care."

Bell chairs the Southwest High Technology Cooperative in Dallas, a consortium of companies that holds its own annual computer career fair. Thirty-eight firms are expected to participate in the fair this year, the largest number in the event's five-year history.

The shortage of specific industry knowledge and business skills is also being felt at the executive levels of many companies. Seventy-seven percent of the MIS managers interviewed reported difficulty in finding qualified MIS professionals for management positions.

> "COMPANIES are becoming more specific about the business experience they want."
>
> RICHARD W. BELL
> ARTHUR YOUNG

The new requirements of companies seeking MIS executives may be the source of the difficulty. Most of these companies are requiring their top MIS executives to possess a strong combination of industry and business knowledge as well as technical expertise.

Shortages of such professionals are pushing compensation packages into the $250,000 range. In rare cases, firms are offering more than $500,000 annually to capture a top executive.

"There is tremendous pressure for increased compensation," says James Sutter, Rockwell International, Inc.'s vice-president of information systems. "We don't go off the deep end like some of the financial services firms, but it's an expensive proposition."

Causes of MIS employee shortages

100 MIS managers list leading factors causing shortages

	Percent of respondents
Changes in technology	35%
Lack of education and training	23%
Lack of senior professionals	14%
Unique applications or equipment	11%
Location outside of a major metropolitan area	8%
Other	9%

INFORMATION PROVIDED BY A 1988 COMPUTERWORLD SURVEY
CW CHART

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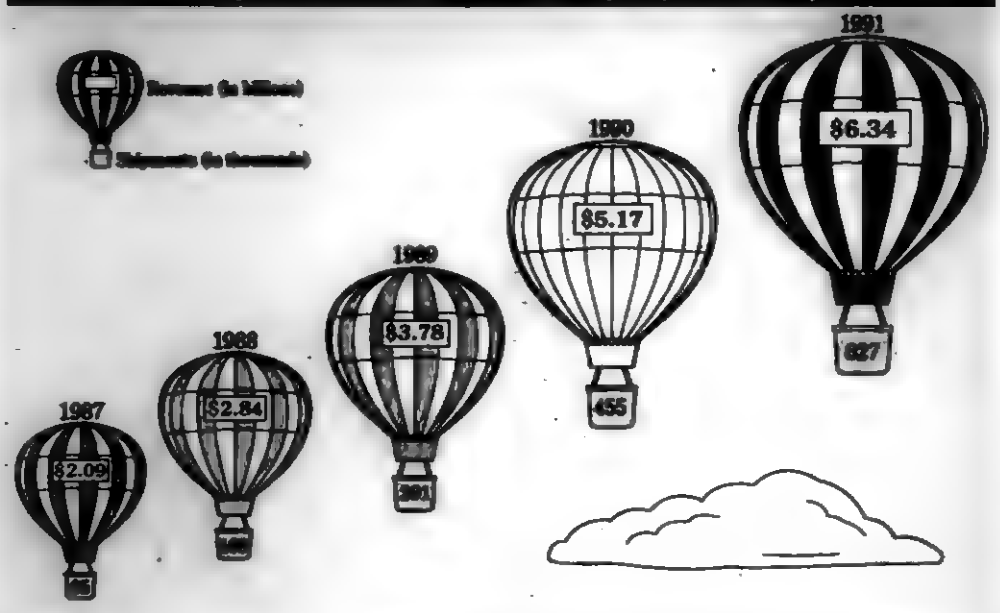
TRENDS

Graphics workstations

Shipments expand, sending revenue up, up and away



A hot commodity since their debut in 1980, technical workstations will be a $6 billion market by 1991, according to Dataquest, Inc. in San Jose, Calif.

Graphics and networking capabilities account for the rapid market growth, Dataquest says. "Networking on a workstation is easier than networking on a PC, since workstations do not get into the network code," said Brad Smith, Dataquest's director of research. "This combination is ideal for projects involving more than one engineer."

Declining average selling prices correspond to lower prices of component parts, coupled with companies manufacturing in higher volumes. This should not present a problem for technical workstation vendors. "Typically, you get three times the volume when you cut the price in half," Smith said.

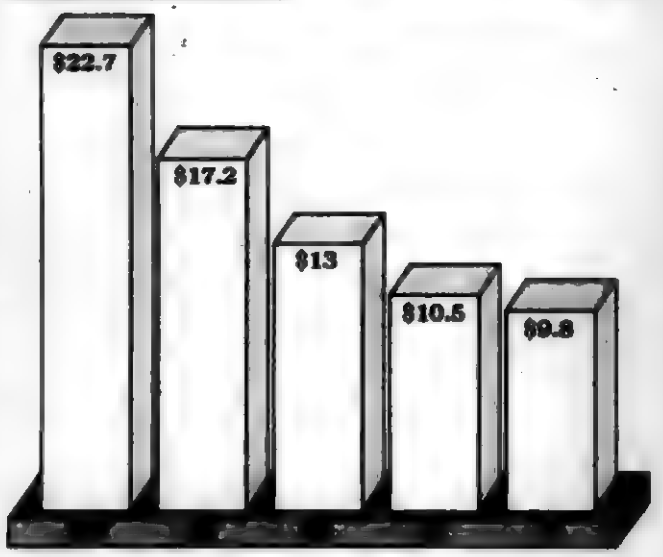
While both Sun Microsystems, Inc. and Apollo Computer, Inc. have strong market shares, Smith predicted Sun will hold the lead. "They're aggressive players and quick to lower their prices. Sun is also playing the Unix trend," he added. Digital Equipment Corp. holds the No. 3 spot. "DEC owns much of the software for engineering's superminis. They network everything from the workstations to the two million systems," Smith said.

Currently, more than 200,000 technical workstations are installed. There are 8½ million engineers, scientists and technicians worldwide.

SALLY CUSACK

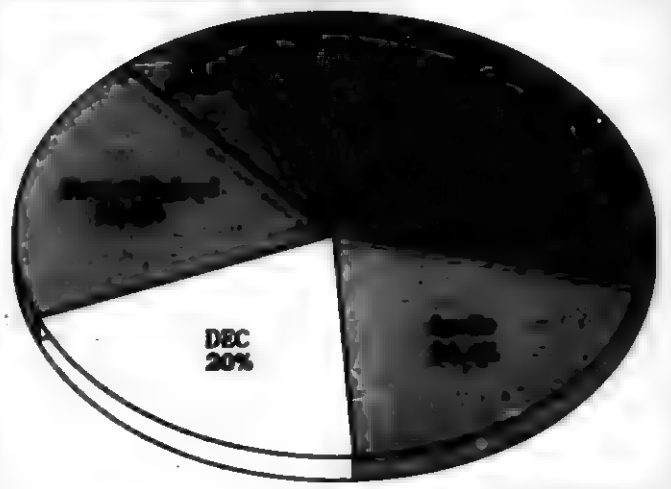
Average workstation price will tumble

AVERAGE PRICE (IN THOUSANDS)



Sun steals the lead

MARKET SHARE (BASED ON UNIT SHIPMENT)



INFORMATION PROVIDED BY DATAQUEST, INC.
CW CHARTS: FRANK C. O'CONNELL

INSIDE LINES

TAC one on. Late this month, Lotus will announce a new version of The Application Connection (TAC), Version 5.0, and a common way for Lotus applications to share data. TAC, which shifts data between micros and IBM hosts, will embrace hosts other than IBM 370s and is expected to work with Lotus's mainframe 1-2-3/M. Lotus will also describe a new interface for 1-2-3 that facilitates data transfer without file conversion.

Testing the line. Tandy has put together the board layouts for an IBM Micro Channel-compatible system and is only waiting for delivery of Chips and Technologies' chip set and Phoenix Technologies' ROM BIOS, both of which it should have in the next week or so, according to sources. Tandy reportedly will ship 100 systems to selected dealers for demo purposes around the middle of April. This is Tandy's way of gathering customer reaction and testing the legal waters without making an official announcement. The system encompasses a 20-MHz Intel 80386, 2M bytes of RAM, caching chips from Intel, a 16-bit Video Graphics Array on the motherboard and an IBM Personal System/2-compatible mouse port, according to sources. No word yet on what its price will be.

Slimming down. Computer Corporation of America, which was put up for sale last year by parent company Crowntek, quietly trimmed 40 people from its field sales force last month. A spokeswoman said the layoffs are not related to the current search for a buyer but are rather a strategic move to refocus the firm's resources. Computer Corporation is exploring the possibility of a leveraged buy-out by management and is also seeking outside buyers. The Cambridge, Mass., developer of mainframe data base management systems employs about 400 people worldwide.

You've got to serve somebody. Rumblings have it that Microrim is seriously contemplating offering its R:Base DBMS as a front end to the Ashton-Tate/Microsoft/Sybase SQL Server. The only difficulty lies in getting R:Base's subset of SQL to talk effectively to SQL Server, a source said.

They threw money at him like there was no tomorrow, but even a package of $50 million in tax incentives couldn't sway Steve Chen to move his Supercomputer Systems, Inc. start-up from Wisconsin to Illinois. For several weeks, Illinois officials hoped that Chen's personal ties to the University of Illinois at Urbana, where he earned his Ph.D. in 1975, would bring his company across the border — along with 2,000 potential jobs. But Chen turned Illinois down, saying that a move would disrupt the initial planning work being conducted by 40 staff scientists.

Send the letters to Washington. The IRS has its eye on companies that improperly classify their employees — such as data entry clerks or programmers — as "independent contractors" in order to evade employment taxes [CW, Aug. 25, 1986]. A major IRS crackdown using 400 revenue agents has netted 9,000 culprits so far. Tax assessments have been issued to 92% of those employers selected for audits. More information on the employee classification rules can be found in the IRS's Publication 539, "Employment Taxes."

The ax comes down. Less than two months after installing a new top management team, Tektronix announced it will lay off 1,000 employees by the end of May. The first cuts will affect 300 workers in the Beaverton, Ore.-based firm's information display group. Those employees were notified last Friday. Most layoffs will occur in the Portland, Ore., metropolitan area, where 11,000 of Tektronix's 16,900 employees work, and will affect mainly managerial and professional positions. New Tektronix CEO David Friedley said the firm has been "operating at less than maximum efficiency."

"More tips!" the news editor demands. So I say, "You want more people calling in? Fine, I'll give them your name!" So call the Computerworld *hot line at 1-800-343-6474 and ask — no, demand — to speak with Pete Bartolik. Let's see how long he can hold up.*

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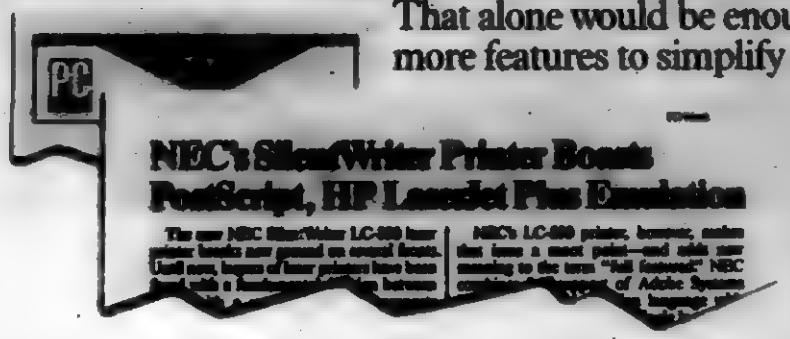
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WE HELPED REFINE McDERMOTT'S PAYROLL.

McDermott International, Inc., makes the world's largest offshore oil-producing platforms. It also makes jobs for thousands of people all over the world, which makes for a fairly complex and dynamic payroll. A payroll that had become even more complex because of the acquisition of the Babcock & Wilcox Company. That's why McDermott went to Management Science America, Inc., where they found some excellent payroll solutions with the MSA Human Resource System.

Babcock & Wilcox had a payroll system that was incompatible with McDermott's. So McDermott's first step was to draft a list of their new software needs. "We had a 50-item, 10-page document that listed the specifications we needed for our software," notes Jim Maumus, Payroll Specialist at McDermott. "We listed some pretty stringent requirements, but MSA had a system that was what we needed for payroll purposes. Now our payroll department responds more accurately and rapidly to corporate needs. We're saving time with our new Human Resources System, which means we're saving money."

Maumus is a good authority on the subject of payroll administration—in 1986, the American Payroll Association honored him with the national Payroll Man of the Year award. His summation assessment of MSA?

"We've been able to accomplish what we expected to do in a reasonable time frame and at a reasonable cost. My experience with the MSA package has been very, very positive." If your company is dynamic and growing, chances are that you, too, could profit from one of our refined systems. We're the acknowledged leader in Human Resources and many other applications. And if you'd like more information, please contact Robert Carpenter in Atlanta at (404) 239-2800.

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COMPUTERWORLD

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Many hold off planning for impact of Open Network Architecture on voice and data networks. Page 16.

VAXs tuned for mainframe challenge

BY STANLEY GIBSON
CW STAFF

MARLBORO, Mass. — Casting aside pretenses of noncompetition with IBM, Digital Equipment Corp. announced a line of multiprocessing VAXs last week that challenge the lower end of IBM's 3090 mainframe line.

The systems, called the 8800 series, consist of one to four VAX 8700 CPUs offering one to 3.7 times the processing power of an 8700. The high-end four-processor VAX 8840 is capable of processing about 22 million instructions per second, according to estimates by market research firm International Data Corp. Enhancements to the VAX VMS operating system let the units act as peer multiprocessors, DEC said.

DEC Vice-President William Demmer publicly said last year that the company would announce such a mainframe-class VAX in 1988. The system carried the internal DEC code name of "Polar Star."

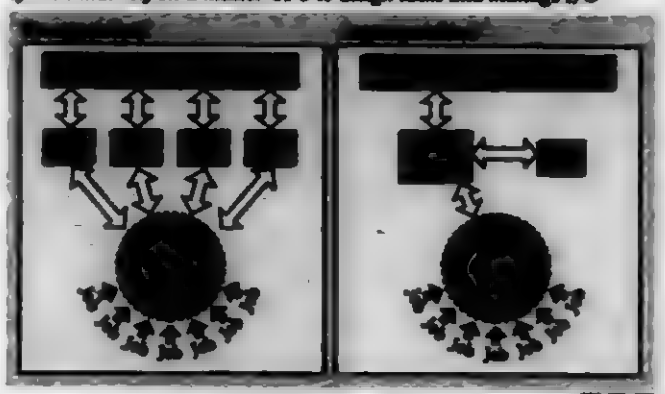
"Our goal is to match the best in the mainframe business," DEC President and Chief Executive Officer Ken Olsen declared. He said the new processors are the cornerstone of DEC's effort to sell to customers who have trusted only IBM in the past.

DEC claimed the systems require one-third the data processing staff required for IBM mainframes.

The systems, available immediately, will be shipped initially with a prerelease version of DEC's VMS Version 5.0, the full version of which will be announced in coming weeks, according to Demmer.

Users who purchase the system and the prerelease VMS Version 5.0 right away will get a free upgrade to the complete Version 5.0 when it becomes available, DEC officials said.

Peer relationships
Symmetrical multiprocessing eliminates the limitations of asymmetrical systems that rely on a master CPU to assign tasks and manage I/O



CW CHART

OLTP features coming

The complete version of the VMS upgrade has been expected to offer transaction processing features [CW, Oct. 12, 1987]. Referring to reports of an on-line transaction processing system that would run on the 8800 series, a DEC spokesman said such a system will be announced in the months ahead. DEC also promised a multiprocessing release of Ultrix, DEC's version of the AT&T Unix System V operating system, in the near future.

"Symmetrical multiprocesse-

Continued on page 6

Lotus to unwrap integration scheme

BY DOUGLAS BARNEY
CW STAFF

CAMBRIDGE, Mass. — An ambitious communications blueprint that ties together Lotus Development Corp.'s personal computer, data base server and mainframe products via a common data access interface is scheduled to be unveiled late this month.

According to informed sources, the interface will debut with the shipment of Lotus's previously announced 1-2-3 Release 3 early this summer. However, the product will also be an integral part of Lotus's future line of spreadsheet, data base and communications applications, the sources said.

The interface will reportedly allow spreadsheets and data bases to directly query a variety of host and PC applications while users remain within the familiar confines of the spreadsheet environment.

Sources said Lotus will use these planned communications capabilities as a lure for users considering other applications vendors. Lotus declined to comment on the upcoming announcement.

Lotus has announced a horde of still unavailable applications but has given only sparse details on how they will work together. Clearly, the company

Continued on page 103

Strategic systems plans gone awry

When the information blueprint is a lemon, costs can be staggering

BY GLENN RIFKIN and MITCH BETTS
CW STAFF

By 1985, there was chaos in New Jersey. The state's Division of Motor Vehicles had awarded a contract to Price Waterhouse to modernize its management and computer operations, but the plan was ill-defined and overly ambitious, a sure recipe for disaster. When the wrong programming language was used to implement a new driver registration system, more than a million New Jersey drivers were unable to register their cars or registered them incorrectly because of computer errors. A major investigation into the mess revealed that Price Waterhouse had "professionally misjudged" the implementation. The snafu cost the state $6.5 million.

LEE KAUFFMAN

When something goes wrong in information systems, it's hard to hide. A few highly publicized fiascoes have sent shivers down many an MIS manager's back as he whispers to himself, "I'm glad that wasn't me." The following are some examples of such cases:

- After nearly $5 billion spent, seven years invested and several major MIS casualties, Bankamerica Corp.'s foray into high technology has been nothing short of a disaster. The bank has lost tens of millions of dollars in various technological calamities, such as the failure of its Masternet, an $80 million program designed to automate the employee benefits and trust services department. The bank recently scuttled the entire system [CW, Feb. 1].

According to the *San Francisco Examiner*, the failed attempt cost the bank $45 million as well as some important customers. It also reportedly cost Bankamerica's latest MIS chief, Louis Mertes, his job. All told, strategic MIS failures in the 1980s have helped Bankamerica slide from first place to 29th in assets of banks worldwide.

- The Internal Revenue Service's 1985 tax processing season was a data processing nightmare.

Continued on page 104

NEWSPAPER
SECOND CLASS

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Anticipation. Users anxiously await power, expansion options available with Apollo's yet-to-ship super workstation, the 62-bit Domain Series 10000. Page 103.

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Quotable

"What you can do with these VAX systems continues to improve . . . but for the moment, we will continue to view the VAX as a mid-range machine."

DONALD BROUT
NABISCO BRANDS, INC.

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SPOTLIGHT

There are still many rough spots on the road to distributed DBMS.
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Career fears mount

Dispersed MIS operations are source of tension

BY JAMES CONNOLLY
CW STAFF

TARPON SPRINGS, Fla. — Fear of failure and fear of blocked career paths are key concerns in the minds of information systems professionals as their companies disperse MIS operations, according to a study commissioned by the Society for Information Management (SIM) Institutional Member Program.

The study, which examined human resources issues, also revealed that even within companies maintaining a centralized MIS approach, some of the most important human resources issues relate to creating a business orientation for MIS.

MIS executives said their concerns focus on having their workers acquire business orientations, encouraging managers to be businessmen rather than technologists and emphasizing creativity and innovation.

Results of the study were presented to the SIM Institutional Member Conference here last week by Easton, Conn., research group Cognitech Services Corp. Researchers surveyed 20 SIM member companies and 48 business units within those companies.

Cognitech researchers said that after identifying the top issues, they concentrated on those that relate to dispersed MIS operations. The motivation behind this was that they expect the dispersed strategy to become more common during the 1990s, particularly with more companies implementing strategic applications at the business unit level. Seven of the 20 firms said they had highly dispersed operations.

Learning to cope

Cognitech President Kay Lewis Redditt said some of the proactive firms participating in the study have found successful methods for dealing with the human resources problems relating to dispersion, while reactive companies have failed to do so. Redditt said that the challenge of managing a dispersion effort in itself creates problems. "One of the managers we talked to said he wakes up at night with knots in his stomach. He said he knows how to go about it but that he is worried it won't work," Redditt said.

MIS professionals in dispersed units find themselves needing new personal and business skills because they have to deal more closely with their users. This may leave them feeling frustrated in their career growth because they are removed from the central MIS operation.

Estridge spurned Sun, Apple

BY ALAN ALPER
CW STAFF

NEW YORK — The late Phillip "Don" Estridge, the IBM executive credited with turning the company's Personal Computer operations into a $5 billion business, spurned offers to take over the top jobs at Apple Computer, Inc. and Sun Microsystems, Inc., according to testimony and documents being considered in a wrongful death suit in federal court here.

Testimony began in court last week to determine monies to be awarded to the survivors of Estridge and his wife Mary Ann.

Estridge, the prime mover behind IBM's meteoric rise in the microcomputer business, and his wife were killed in an August 1985 crash of a Delta Air Lines jet landing at Dallas-Fort Worth Airport.

Estridge held the position of corporate vice-president of worldwide manufacturing at the time of his death.

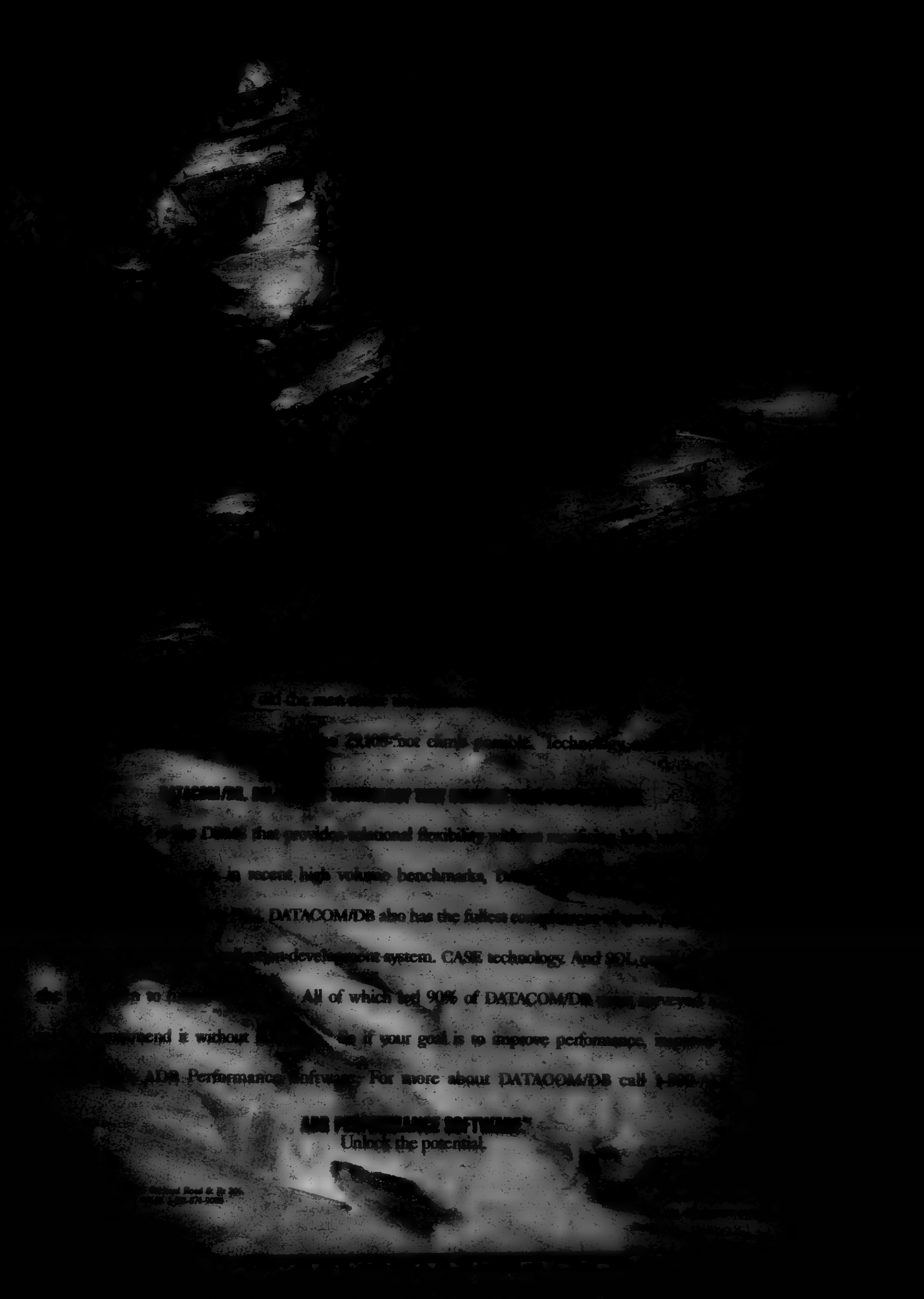
IBM Chairman John Akers, who testified last week, suggested that had Estridge remained with IBM, he had the potential to enter top management and perhaps even head the company, according to a published report.

Akers also said Estridge had rejected an offer to become chief executive of Apple five or six years earlier, the report noted. Estridge also spurned a $16 million offer to join Sun, according to a brief filed by the plaintiffs. Sun declined to comment but is expected to give a videotaped deposition this week.

Estridge's survivors — three daughters and his mother-in-law — are seeking $25 million for his death and $5 million for the death of his wife, according to documents filed in the U.S. Court for the Southern District of New York. Testimony in the civil suit is expected to conclude this week.

Delta, which has acknowledged responsibility for the deaths, is disputing the amount it should pay but has not offered its own figure.

Depositions from Akers and IBM Vice-Chairman Paul Rizzo indicated Estridge could have accumulated $25 million in IBM earnings and benefits had he lived.


Unlock the potential.

Irish division tames MSA's annual gains

BY JAMES DALY
CW STAFF

ATLANTA — Losses from an Irish subsidiary continued to dog software vendor Management Science America, Inc. (MSA), which offset a jump in yearly revenue with a dramatic drop in net income and sagging fourth-quarter revenue, according to 1987 results released last week.

"We're attributing a lot of the drop to RTS," said William J. Laney, chief financial officer at MSA. "But they're getting back on track and . . . should break even by next year." MSA acquired Dublin-based minicomputer software vendor RTS Ltd. in April 1986.

While MSA's 1987 revenue leapt to $258.5 million, a 43% increase over 1986's $180.8 million, net income registered a loss of $221,000, or 1 cent per share, down from a profit of $13.2 million, or 73 cents a share, reported a year earlier.

Revenue for the fourth quarter ended Dec. 31 came in at $65.7 million, an 11% gain over the $58.7 million recorded in the same quarter a year earlier. However, the company posted a loss of $303,000, or 2 cents a share, down from a profit of $4.8 million, or 26 cents a share, for the same quarter in 1986.

DCA poised for OS/2 revelation

Development tie expected to provide Microsoft with 3270 link for OS/2

BY PATRICIA KEEFE
CW STAFF

NEW YORK — Digital Communications Associates, Inc. (DCA) is expected to reveal its MS OS/2 connectivity strategy, along with a development alliance with Microsoft Corp., at a press conference here today.

The partnership will reportedly fill in the missing pieces of Microsoft's MS OS/2 strategy — IBM 3270 connectivity — while providing DCA with OS/2 support, according to analysts and sources close to DCA, who said that firm has been working with Microsoft for months.

Some analysts said they expect the announcement to provide the first alternative to the Communications Manager portion of IBM's OS/2 Extended Edition.

"I think that's stretching it a bit," responded Paul Maritz, general manager of Microsoft's Networking and Xenix Business Unit, who would only confirm that Microsoft President Jon Shirley will attend the press conference.

But at a July 1987 press conference, DCA joined Compaq Computer Corp., Ashton-Tate Corp. and others in saying that there would be alternatives to OS/2 Extended Edition. DCA also said it would provide an alternative in its niche market — 3270 emulation.

If the analysts are correct, the bottom-line importance for users is a future ability to piece together presumably less expensive and possibly enhanced Extended Edition capabilities, including Communications Manager features, from third parties, as opposed to purchasing proprietary software from IBM.

> "MICROSOFT is working diligently to point out that there is nothing proprietary or magical about OS/2 Extended."
>
> DAVID TERRIE
> NEWPORT CONSULTING

"That could be very attractive to users who don't want Presentation Manager and the data base part of Communications Manager," said Merv Adrian, managing editor of the *Focus Systems Journal* for Information Builders Publishing in New York.

"Microsoft is working diligently to point out that there is nothing proprietary or magical about OS/2 Extended," noted David Terrie, president of Newport Consulting.

DCA, based in Alpharetta, Ga., confirmed it will outline its OS/2 networking strategy but declined to comment further.

Analysts said announcement specifics will include support for Microsoft's MS OS/2 LAN Manager as well as software said to support both DCA's Irma 3270 emulation boards and IBM's Micro Channel architecture-compatible Token-Ring family, enabling users to choose their host-access path.

An IBM Advanced Program-to-Program Communications, or APPC, server capable of bridging OS/2-based work groups to IBM LU6.2-based environments is expected to come at a later date. DCA licensed LU6.2/PU2.1 technology from Communications Solutions, Inc. in August 1986.

An analyst who spoke recently with Steve Ballmer, vice-president of Microsoft's systems software group, said Ballmer agreed it would be "reasonable" to expect Microsoft to provide APPC support in the not-too-distant future.

DCA, which has close ties with 3Com Corp., has long been rumored to be working with Microsoft on 3270 connectivity.

Michael Murphy, editor of the "California Technology Stock Letter," reported that he sees the DCA-Microsoft alliance as an extension of the Microsoft-3Com strategy into the 3270 world.

Federal workers trade paper for desktop publishing tools

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Desktop publishing and high-volume electronic publishing are becoming the hot technologies in the federal government, the world's largest paper-generating enterprise.

Preliminary results of a survey by the U.S. General Accounting Office show that 34% of the civilian agencies have desktop publishing systems in operation and another 15% have them in prototype or pilot tests.

Furthermore, 32% of the civilian agencies have some form of high-volume electronic publishing system, and the U.S. Department of Defense has major electronic publishing initiatives under way, officials reported.

There was ample evidence of this trend at last week's Federal Office Systems Expo '88, or FOSE, from the well-attended educational sessions on desktop publishing to the keynote speech by John Sculley, chairman of Apple Computer, Inc.

In addition, Xerox Corp., based in Stamford, Conn., announced it has enhanced its Documenter office publishing system by providing it with multilanguage capabilities. Xerox hopes to capture more contracts with foreign service agencies, officials said, with this system that lets users process text in more than 40 languages and combine it with graphics for output on laser printers or electronic transmission.

The product, slated for availability in the second quarter of this year, is priced from $10,000 to $20,000, depending on the number of languages and storage capacity.

No stranger

Xerox has already made inroads into the potentially lucrative DOD market for large-scale publishing systems.

In January, Xerox announced contracts with the U.S. Navy's Printing and Publishing Service and the U.S. Air Force for the production of documents such as regulations, manuals, pamphlets and forms.

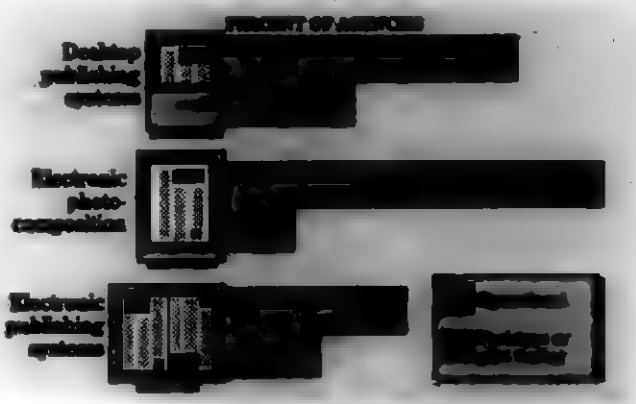
"More and more government RFPs [requests for proposals] are calling for publishing capabilities," said Clinton T. Newby, director of federal operations at Interleaf, Inc., a Cambridge, Mass.-based vendor of electronic publishing systems.

Interleaf's federal business has grown 75% a year for the last three years, Newby said.

In his speech at FOSE, Sculley acknowledged that Apple is best known in the federal government for desktop publishing. But he suggested that future opportunities in the federal market will come from desktop presentations, digitized mapping and the use of the Macintosh as a front-end "dashboard," or user interface, to existing mainframe systems.

Uncle Sam's print shop

A survey of 114 civilian federal agencies indicates a booming investment in electronic publishing technologies



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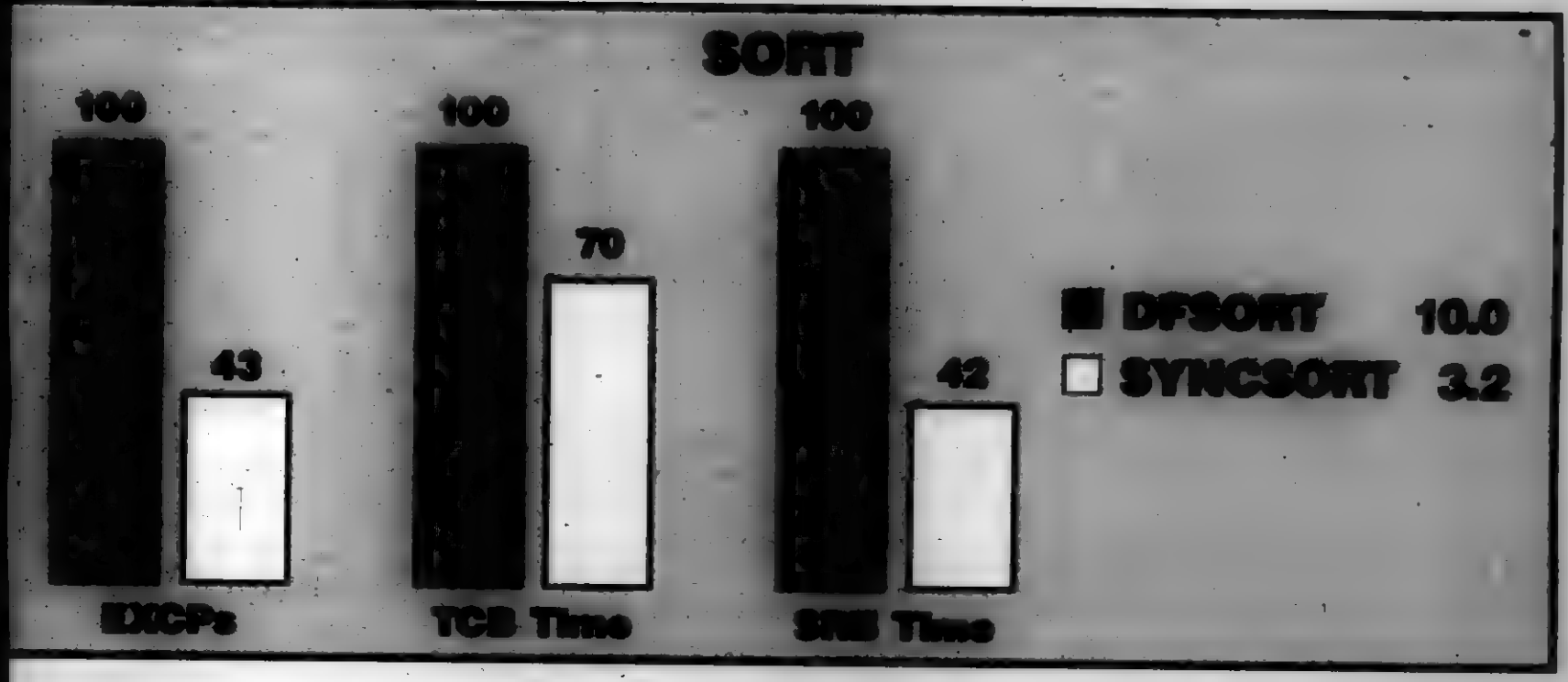

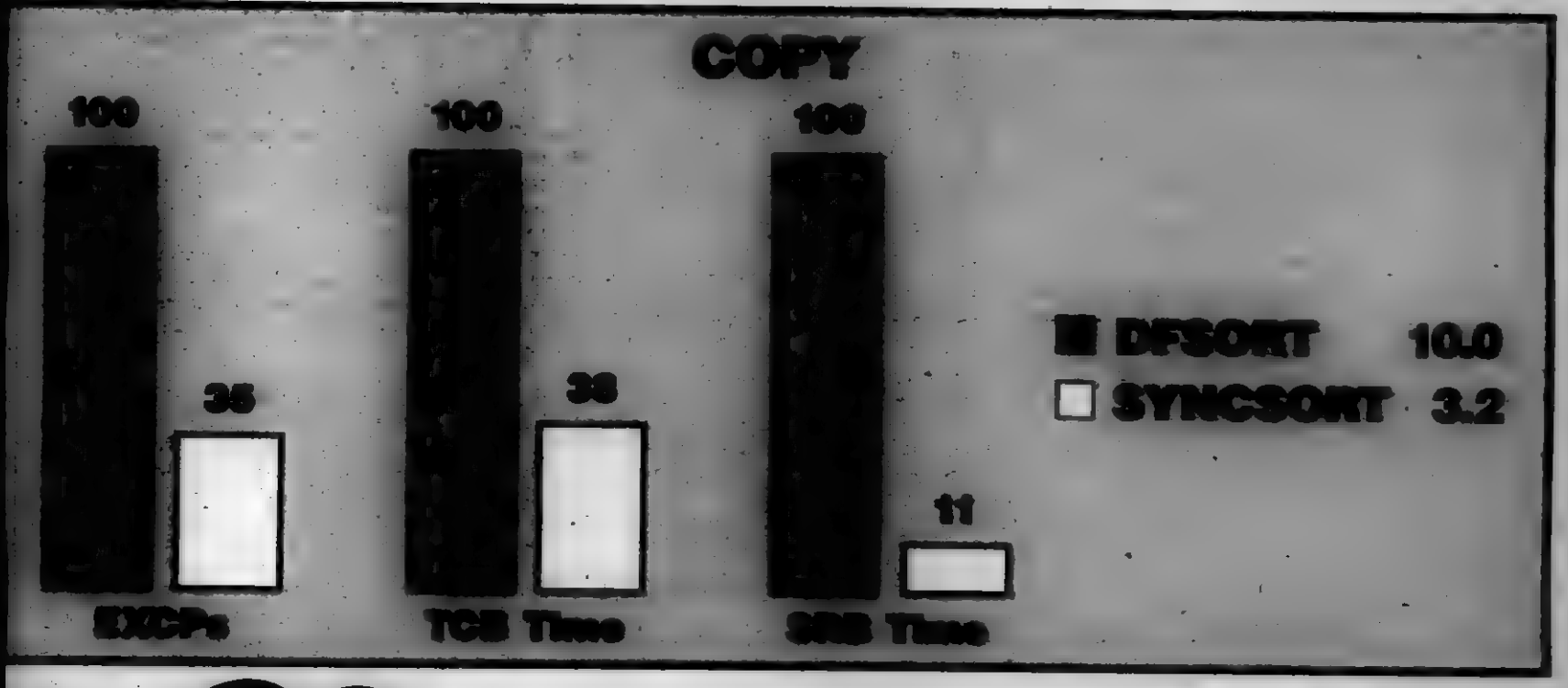

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Judge opens lines for Bell firms

Granting of regional value-added service rights could spark industry

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — A federal court authorized the seven regional Bell holding companies last week to provide regional value-added network services, including electronic mail, data transmission, protocol processing, voice mail and videotex gateways.

The ruling set forth by U.S. District Judge Harold H. Greene could dramatically transform the shape of the information services industry, prompting some new competition as well as joint ventures with existing firms, analysts said.

Each of the holding companies posted a 1987 net income of roughly $1 billion. Alliances between the Bell companies and voice mail and videotex organizations will provide a much-needed financial and marketing boost to those fledgling industries, several industry experts said [CW, Sept. 21, 1987].

Open the gates

The most immediate effect of the ruling will be to allow several of the Bell companies to unleash the voice mail services they eagerly developed in anticipation of Greene's decision.

Pacific Telesis Group and Bell Atlantic Corp. have already been able to obtain Federal Communications Commission approval for voice storage and retrieval services.

Until now, the Bell companies were prohibited from entering the information services business by the Modified Final Judgment of the AT&T divestiture on the grounds that Bell offspring hold monopoly control over the local exchange.

But last September, Greene loosened that restriction somewhat, ruling that the Bell companies may transmit information but not originate or manipulate the information content [CW, Sept. 14, 1987].

In the supplemental order issued last week, Greene said the Bell operating companies may provide gateways for videotex and other information services as long as they are limited to six features: data transmission, address translation, protocol conversion, billing management, introductory displays and Help screens.

Because of the addition of electronic and voice mail to the package, Greene's ruling was more favorable than the holding companies had expected. They issued statements applauding the freedoms granted by the federal judge but said Greene should have gone further and removed all restrictions on information services.

Pleasant surprise

The freedom to offer E-mail was a surprise, sources said. Greene "just threw in electronic mail and didn't give any reasons for doing it," said Warner R. Sinback, manager of telecommunications affairs for GE Information Services, a Rockville, Md.-based unit of General Electric Co.

But Sinback and several analysts said they do not expect any dramatic changes in the E-mail industry, mainly because the Bell companies are still prohibited from offering any long-distance services.

The divestiture accord limits the Bell operating companies to services within their local-access and transport areas.

"The majority of electronic mail is long distance. Who knows what the market for local electronic mail is? If it's difficult to sell in the long-distance, corporate environment, you'll have a lot more difficulty selling it locally to small users," explained Mark Winther, a market analyst at Link Resources Corp. in New York.

However, the Bell companies may take the option of handing off their local traffic to long-distance carriers such as Telenet Communications Corp., just as they do with their local packet services, according to Gary Arlen, president of Arlen Communications, Inc., a Bethesda, Md., research firm.

John Morris, chairman of Dialcom Group, the Rockville-based electronic messaging unit of British Telecommunications PLC, said his firm is actively exploring alliances with the Bell operating companies.

VAXs

FROM PAGE 1

ing is only one component of Version 5.0, which will also include on-line transaction processing and additional communications features," said Stephen Widen, a DEC analyst at IDC. "They really aren't ready with all the features."

According to Demmer, the multiprocessing that is offered by the systems makes them well suited to most mainframe sites, where users have typically dedicated each of a mainframe's several processors to a separate task.

Existing VAX customers welcomed the added capabilities of the 8800 family and indicated that the features will be more useful to extend the range of their current VAX configurations than to oust any IBM mainframes.

In the name of science

At United Technologies Corp.'s Chemical Systems Division in San Jose, Calif., users have been waiting for the higher powered VAX 8800 systems to handle scientific applications, according to Phil Henderson, the firm's chief of engineering computing. The new release should allow the division to boost performance, he said.

With asymmetrical processing, "sometimes when you load up the system with interactive processes, you find you have less computing resources than you thought you did," Henderson said. But DEC's latest release is not likely to affect the corporate IBM shop at parent company United Technologies, he added.

Similarly, Donald Brout, staff vice-president of information technology at Nabisco Brands, Inc., said he does not expect the VAXs to push away any IBM mainframes — at least not immediately. "What you can do with these VAX systems continues to improve," he said, "and that means you will be able to do a much larger application on VAXs than you could before.

"DEC has very realistically made the point that you can grow by adding to your Vaxclusters, but for the moment, we will continue to view the VAX as a mid-range machine," Brout added. Nabisco, a division of RJR Nabisco, Inc., maintains 12 IBM 3090s in three locations.

An I/O of one's own

With symmetrical multiprocessing, each processor can initiate its own I/O, thus speeding throughput, DEC's Demmer said. With previous asymmetrical processing, such as that in the dual-processor 8350 model, one processor had to initiate all I/O.

In addition, the multiprocessing feature included in VMS Version 5.0 is said to dynamically balance the computing work load for the various processors. To further boost throughput, additional VAXBI buses are offered on each 8800 family member; up to four are available for the 8810, and up to six are available on all other models.

Also, the 8640 can contain up to 512M bytes of memory. "IBM only offers one-half that on its largest mainframes," Demmer said.

To achieve parallel processing and gain greatly increased throughput on a single application, programs will have to be "decomposed" to run on the different processors in parallel, Demmer said.

The processors, numbered 8810, 8820, 8830 and 8840, are upgradable to more powerful members of the same family. DEC announced a preconfigured cluster, consisting of two dual-processor 8820s, called the VAX 8842. The systems are priced from $543,900 to more than $1.7 million; all upgrades cost $280,000.

Midwest correspondent Jean S. Bozman contributed to this report.

Mainframe challenge

With the release of the multiprocessing VAX 8800 series, DEC powers up to challenge the lower end of IBM's 3090 mainframe line

	Number of VAX 8700 processors	VAXBI buses	Memory range (in bytes)	MIPS*	Base price
VAX 8810	One	One to four	48M to 512M	6	$543,900
VAX 8820	Two	Two to six	128M to 512M	11.4	$833,700
VAX 8830	Three	Two to six	128M to 512M	16.8	$1.1M
VAX 8840	Four	Two to six	128M to 512M	22.2	$1.6M
VAX 8842 cluster	Four	Four to 12	256M to 1G	22.2	$1.6M

* Millions of instructions per second, estimated by International Data Corp.

CW CHART

VMS 5 on launch pad

According to Digital Equipment Corp., symmetrical multiprocessing on its VAX systems would be impossible without enhancements to VMS. Those enhancements are included in the prerelease version of VMS Version 5 that is being sold with the new 8800 series of multiprocessors, DEC said last week.

A DEC spokesman said the reason for the incomplete release of VMS 5 is that it has been tested thoroughly only on the 8800 series and not yet on all other VAXs. When it is ready to run on other processors, it will be formally announced and made generally available, he said.

Users of the previously offered dual-processor VAX 8350 and VAX 8800 systems will gain the peer multiprocessing capability by running VMS 5 when it becomes available for them, according to DEC. One beta-test user said he has been operating an 8350 as a symmetrical multiprocessor under a test version of VMS 5.

High performance, low overhead

DEC said an 8800 system running VMS 5 will gain 25% to 30% better performance for the firm's All-In-1 office automation package. The company also said the 8800, which consists of two 8700 CPUs, offers the same performance as a VAX 8820, which also contains two VAX 8700 CPUs.

Bob Meilhofer, director of operations at Grumman Corp.'s Data Systems Division in Calverton, N.Y., has been evaluating a four-processor VAX 8840 system for several months. He said performance gains from the system tend to depend on whether the application run is "I/O intensive."

However, Meilhofer observed that operating system support of symmetrical multiprocessing does not take up a large amount of overhead. "It's less than 10%. They [DEC] did a good job of keeping it low," he said.

The 8840 consistently offered 3.6 times the performance of a single 8700, a result Meilhofer said is not far out of line with DEC's claim of 3.7 times the performance.

He said the 8840 offered 15.4 times the throughput of a VAX 8200; one of his jobs that took 77 minutes on a VAX 8200 took only five minutes on the 8840. The 8200 reportedly offers approximately 1 million instructions per second (MIPS) performance; therefore, the 8840 performed the work at a rate of 15.4 MIPS.

Meilhofer also said programmers in his shop have been adapting, or "decomposing," some computation-intensive jobs to be processed on the 8840 in parallel, a task he said did not appear to be inordinately difficult.

STANLEY GIBSON

Big Eight firm shines to Windows, wards off OS/2

BY STEPHEN JONES
CW STAFF

CHICAGO — A major division of Arthur Andersen & Co. last week committed itself to a wholesale switch over to Microsoft Corp.'s Windows operating environment, passing up for now the promises of Microsoft's Presentation Manager component of OS/2.

The plan requires scuttling 4,000 copies of Lotus Development Corp.'s 1-2-3 spreadsheet in favor of Microsoft's graphics-based Excel program.

While the accounting firm did not rule out the chance of eventually migrating to OS/2 Standard Edition 1.1 with the Presentation Manager, Andersen officials said they expect to run Microsoft MS-DOS applications in the Windows environment for the next two to three years.

Instant gratification

Andersen's audit division, which owns about 4,000 personal computers, opted for Windows because it wants to take advantage of the software's graphical user interface. Although the Presentation Manager will offer a nearly identical interface when it ships this fall, Andersen planners said it could take two years before enough applications are available to run the operating system effectively.

"If we're convinced we're going to a new user interface, why should we wait another two years for Presentation Manager to come around?" asked Jack Dreiss, director of development for the advanced computer audit techniques group.

Dreiss said the audit division decided to support Windows to save money on training costs and give users true multitasking capabilities. He estimated that the graphical interface can reduce user training time by 40% when compared with the C-prompt interface of character-based machines. He said the Windows interface should save the division about $2 million per year in PC training costs.

With many Fortune 1,000 companies casting a skeptical eye toward OS/2, the announcement by a leading member of the Big Eight accounting group could inhibit acceptance of the operating system. But some industry observers said the benefits of the Presentation Manager will eventually outweigh any short-term gains associated with Windows.

"If they're trying to solve business problems today, then going to Windows makes sense; but Presentation Manager is really the wave of the future," said John McCarthy, an analyst with Forrester Research, Inc. in Cambridge, Mass.

New on the block

In addition to Excel, Andersen's audit division will adopt a new line of Windows-based applications, including a data base program, a word processor and such internal programs as financial statement, planning and budgeting systems.

Dreiss said the migration will take a total of 18 months to complete.

The greatest challenge facing Andersen with the Windows swap could be weaning its installed base off 1-2-3. Andersen, a longtime 1-2-3 user, started looking for alternatives when Lotus said it would not support the Windows environment. Andersen's MIS staff polled about 50 top users on the move to Excel and, according to Dreiss, received mostly favorable responses. Beginning June 1, current 1-2-3 users will participate in a four-hour transition course for Excel.

Dreiss said he expects to win over old-time 1-2-3 users by letting Excel sell itself. "To say the migration is not a challenge would be naive, but we have an excellent product to work with, and it's clear we're headed in the right direction."

Sparc to fire up Unisys Unix line?

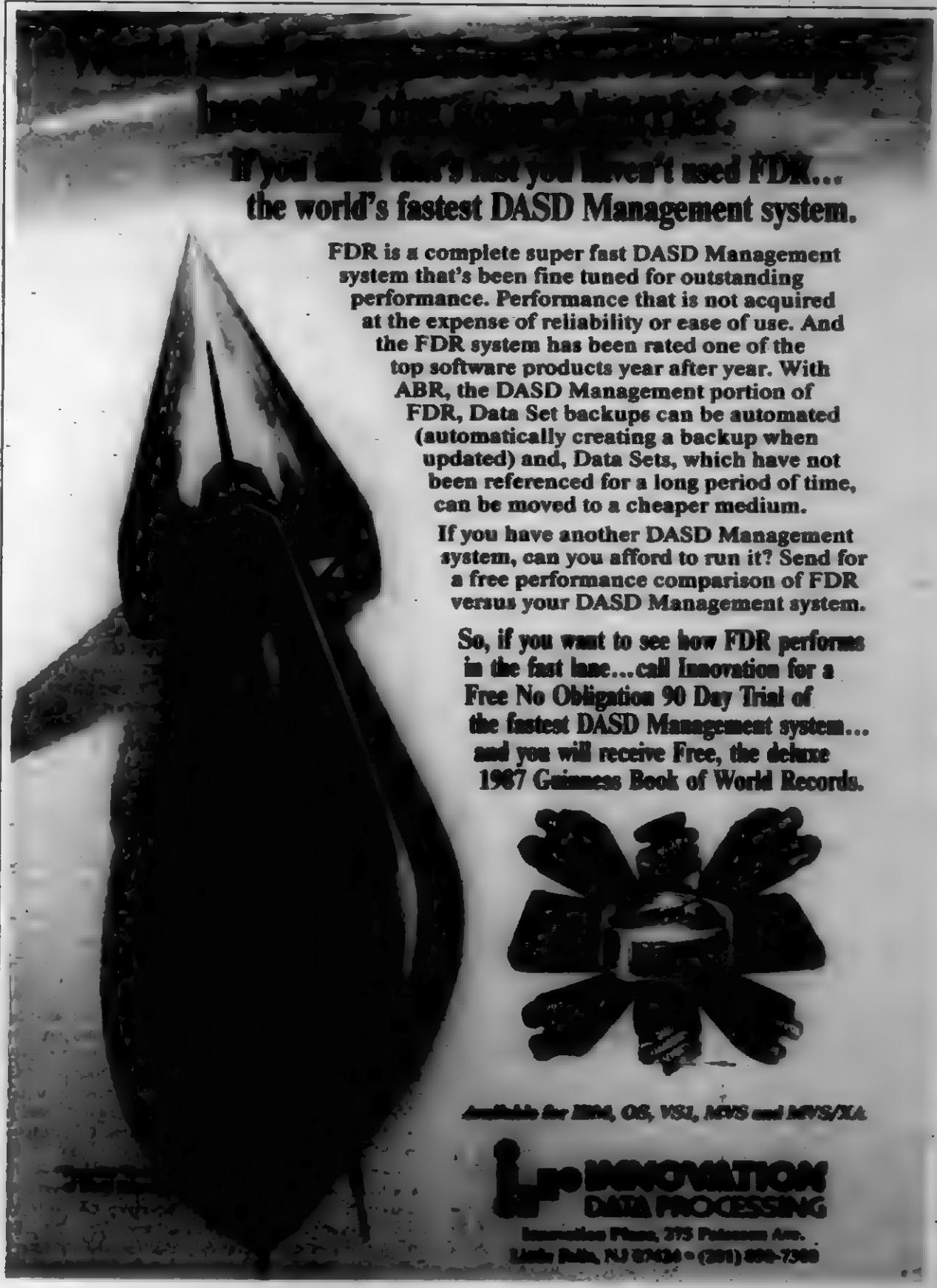
BLUE BELL, Pa. — Joining a growing nucleus of computer vendors, Unisys Corp. announced last week that it has signed an agreement with Sun Microsystems, Inc. to license Sun's Scalable Processor Architecture (Sparc) microprocessor design.

AT&T announced last fall that it had licensed the Sparc design from Sun. Xerox Corp. has signed a similar agreement. Sun has licensed Sparc to three semiconductor manufacturers — Fujitsu Microelectronics, Inc., Cypress Semiconductor Corp. and Bipolar Integrated Technology — for sale on the open market.

"We have just signed a license agreement, but we haven't made a determination as to what specifically to do. We are looking at a high-performance workstation and a large Unix system," said Fred Meier, vice-president of corporate program management at Unisys.

Unisys examined other reduced instruction set computing (RISC) architectures and may yet commit to other RISC designs as well, Meier added.

Unisys also said it is working with AT&T to enhance the commercial functionality of the open Applications Operating Environment for AT&T's Unix System V. Meier said discussions with AT&T have concerned incorporating other flavors of Unix in the Posix standard and in Unix System V, Release 4.



Phaser opens host services to Netware

BY ELISABETH HORWITT
CW STAFF

SAN FRANCISCO — More than a year of joint development work by Novell, Inc. and Phaser Systems, Inc. bore fruit last week when Phaser announced software said to provide Novell Netware users with access to a variety of IBM mainframe environments.

Phaser announced two software offerings. Phaser Systems Application Manager/Net (PSAM/Net) connects IBM Personal Computers and Personal System/2s to a wide variety of IBM host resources and services through the IBM Systems Network Architecture (SNA)/VTAM environment. PSAM/LAN allows users to access PSAM/Net functions through Novell's Netware local-area network server.

Software components running on workstation, server and mainframe allow users to accomplish the following:

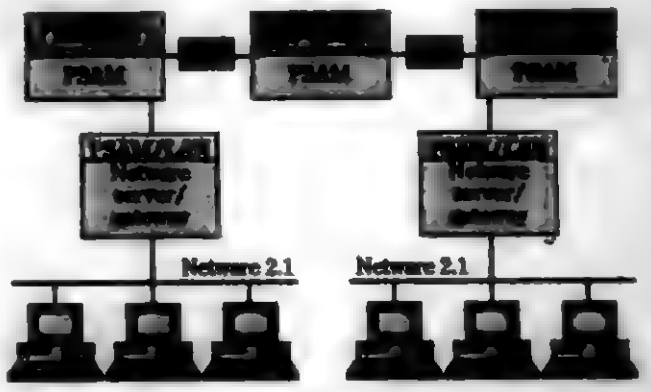
- Initiate, control and retrieve batch jobs through IBM's JES2 or JES3.
- Run application sessions in IBM's CICS, IMS or VM/CMS.
- Access data across several different mainframes via IBM's Intersystem Communication program.
- Set up virtual floppy disk files on the host of up to 250M bytes.
- Access resources on multiple hosts and Netware servers across an SNA network.
- Access virtual printer services and floppy disks via IBM's Extended Communications Facility/Server-Requester Programming Interface.

Novell presented PSAM/LAN to its customers at a series of seminars that emphasized Netware's growing attachments to hosts and other types of networking environments.

"This is the first Novell seminar I've seen where they're emphasizing mainframe connectivity rather than just LANs," said Joyce Kellogg, a Netware user from Gould, Inc.'s Quality Control department. "They must have realized that sooner or later, you run out of room on a server."

Reaching up

The Phaser Systems Application Manager/LAN allows Novell Netware users to store and access files on IBM mainframes and provides routing services to other mainframes and servers across an SNA network



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Products such as PSAM/LAN will help Novell in its campaign to establish Netware 2.1 as a dominant mainframe connectivity solution before IBM has a chance to dig in with its OS/2-based connectivity strategy, said Eric Killorin, president of Hyatt Research Corp. in Andover, Mass. Archrival 3Com Corp. has forged "much closer ties to OS/2" through its alliance with Microsoft Corp., Killorin said.

Part of the plan

Netware will run OS/2 as a guest operating system on a coprocessor board and support software written for IBM's application programming interfaces to OS/2; however, the need to go through Netware to get at OS/2 may prove costly in terms of memory and processing overhead, Killorin said.

PSAM/LAN's mainframe-based virtual disk services could be extremely useful to Novell customers, according to Gould technical services manager Michael Kobos. By having users store files on the mainframe, MIS can enforce backup and security standards that "users who store data on PCs don't adhere to," he said.

Phaser recently emerged from Chapter 11 proceedings by becoming 100% privately owned by Novell Chief Executive Officer Raymond Noorda.

However, the company will remain completely independent and is already approaching other LAN vendors about migrating Phaser to their systems, according to Phaser President John Mullen.

A likely next version of PSAM/LAN will support DOS 3.1 networks such as 3Com's, a Phaser spokesman said.

Products the vendor plans to introduce later this year will add support of IBM LU6.2 peer-to-peer networking and transaction processing across IMS, CICS and SQL systems.

PSAM/LAN is scheduled for release in May. A 10-user version of the Netware portion of the software is set to cost $2,500.

IBM mainframe software for unlimited users will cost from $3,000 to $15,000. PSAM/Net is priced between $7,000 and $40,000 and is scheduled to be available in early June.

DB2 booster shot nears

BY ALAN ALPER
CW STAFF

NEW YORK — IBM is expected to deliver a limited implementation of referential integrity in its upcoming release of DB2 but will not be able to provide an active data dictionary before next fall, according to industry observers.

In its next iteration, expected between early May and late June, DB2 is expected to be capable of detecting changes made to interrelated data in multiple tables. DB2's current lack of referential integrity — changing one field and having it correlate with the same data in another — has kept it from being used in mission-critical applications at many IBM shops, observers have said.

Under the current DB2 release, for example, the system would allow the deletion of a customer from a table without referencing an outstanding account, noted Shaku Atre, president of Atre International Consultants, Inc. in Rye, N.Y.

"There will be some content integrity," Atre said of the impending DB2 release, "but no foreign key support." A foreign key is a field in a record that can be used to locate another record where it serves as the primary key or unique identifier.

No domain support

While it is unclear whether IBM will call the next iteration Release 3.2 or Release 4, it is fairly clear that DB2 will still not support domains. A domain is a set of related data that cuts across multiple tables.

The new release, Atre said, will also stress reliability, availability and serviceability. "IBM wants to make [DB2] so robust that customers will feel comfortable putting production systems on it," Atre asserted.

IBM is not expected to provide a long-anticipated and much-needed active data dictionary until next fall at the earliest, analysts agreed. "You won't see a sweeping repository," said Michael Braude — vice-president of software management strategies at Stamford, Conn.-based Gartner Group, Inc. — concerning the upcoming release. "IBM still will not yet have a world-class development environment, such as what we see in other data base management systems."

'Cumbersome tool'

In Release 3, which debuted in May 1987, IBM offered a directory, or extension to the DB2 catalog, that it called DB RAD, which details data relationships but does not function as a full data repository.

Users contend DB RAD is at best a stopgap measure. "They tried to stick their fingers in the dike with DB RAD, but it is a cumbersome tool," noted Andrew Galat, a consultant with Computer Partners, Inc.

In a presentation at the Connect '88 conference here last week, the Gartner Group's Braude sketched out his interpretation of IBM's distributed data base directions for DB2. Braude said the process began with IBM's release late last year of TSAF, a mechanism that provides access to data across IBM VM-based machines, and will continue later this year with the release of IBM's OS/2 Extended Edition. IBM will elevate DB2's distributed capabilities when it unveils its R-Star technology, which is said to provide access to data bases distributed on machines with the same architecture. R-Star, however, is not expected to make its appearance until 1990, Braude said.

IBM is also developing technology under the project name of Starburst that is said to provide access to data residing in data bases across a variety of IBM and non-IBM computing architectures. So-called vertical, heterogeneous distributed DBMS technology will be made available under DB2 sometime in the 1993 time frame, Braude said.

He cautioned users not to cast these dates in stone. "I think the schedule is subject to slippage, based on developments in the past. DB2 has not moved ahead as fast as I thought it would," Braude said.

CSP upgrade fails to resolve nagging issues

BY CHARLES BABCOCK
CW STAFF

An unheralded IBM announcement last month upgraded the firm's "strategic" fourth-generation language and application generator to make the product a more effective tool in mainframe environments.

The recent additions, however, still leave Cross System Product (CSP) with no visible way of addressing IBM's mid-range systems, even though it is a product in IBM's Systems Application Architecture (SAA).

At the same time, IBM appears serious about establishing CSP as a major product in its limited application-building tool set. In a move reminiscent of its special offer on DB2, IBM has lowered CSP's price — it is sold as two products, CSP/Application Development and CSP/Application Execution — from the $42,000 to $60,000 range for the two products to a range of $12,000 to $30,000 for both.

CSP Release 3.2 expands its linkages to existing mainframe applications and data. It also provides enhancements that allow applications written in CSP to execute more efficiently from IBM VM/CMS files, according to product sheets sent to IBM customers. But observers familiar with application development tools have raised the following questions about CSP:

- The announcement did not address CSP users' desire to store CSP applications in MVS-partitioned data sets, where they frequently exercise change control constraints over source code programs. Instead, CSP applications must be stored in the CSP library. "It is not possible to use the partitioned data sets. That is a Guide/Share requirement and will be a direction of the product in the future," said an IBM spokesman in Rye Brook, N.Y.
- Although CSP is frequently cited as an application developer for DB2, critics point out that its dictionary still has highly limited compatibility with DB2's catalog. The CSP dictionary can use data from DB2 for data definitions, but changes to definitions in one cannot be automatically imposed on the other.

A common repository for CSP and DB2 "is a customer requirement. It is a future objective," the IBM spokesman said.

- There has been no indication from IBM on how CSP can be used on its mid-range systems — the System/36, 38 and the yet-to-be-announced Silverlake — as required in order to be in compliance with SAA. "CSP's direction is to become a product for all three hardware environments," the IBM spokesman said.

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- Write in votes only for products that were first shipped or significantly enhanced in 1987.
- Only original ballots will be counted. Photocopies are not acceptable.
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- Entries must be received by April 4.

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Best Microcomputer

5 1☐ Macintosh II, *Apple Computer, Inc.*
2☐ Compaq 386/20, *Compaq Computer Corp.*
3☐ PS/2 Model 50, *IBM*
4☐ PS/2 Model 80, *IBM*
5☐ PC's Limited 386/16, *PC's Limited*
6☐ Premium 386, *AST Research, Inc.*
7☐ Tandy 4000, *Tandy Corp.*
8☐ Leading Edge Model D2, *Leading Edge Hardware Products, Inc.*
9☐ Pac 286, *Tandon Corp.*
0☐ Powermate 386, *NEC Information Systems, Inc.*
x☐ 6386 Workgroup System, *AT&T*
y☐ Vectra RS/20, *Hewlett-Packard Co.*
6 1☐ Other _____

Best Laptop/Portable

7 1☐ 1400 LT, *Tandy Corp.*
2☐ Wang Laptop Computer, *Wang Laboratories, Inc.*
3☐ Gridcase EXP, *Grid Systems Corp.*
4☐ PC-7221, *Sharp Electronics Corp.*
5☐ Portable III, *Compaq Computer Corp.*
6☐ Multispeed HD, *NEC Information Systems, Inc.*
7☐ Portable Powermate, *NEC Information Systems, Inc.*
8☐ PC Convertible Model 3, *IBM*
9☐ Toshiba T5100, *Toshiba America, Inc.*
0☐ Other _____

Best Local-Area Network Product

6 1☐ 1-2-3 Networker, *Lotus Development Corp.*
2☐ 3+ Version 1.2, *3Com Corp.*
3☐ Appleshare PC Software, *Apple Computer, Inc.*
4☐ Vines 386, *Banyan Systems, Inc.*
5☐ Vines 3.0, *Banyan Systems, Inc.*
6☐ Appleshare 1.1, *Apple Computer, Inc.*
7☐ Inbox, *Think Technologies*
8☐ Quadstar, *Quadram Corp.*
9☐ 386A File Server, *Novell, Inc.*
0☐ Alliance ZSL, *Avatar Technologies, Inc.*
x☐ Proteon-4, *Proteon, Inc.*
y☐ Carbon Copy Plus, *Meridian Technology, Inc.*
9 1☐ 3Station, *3Com Corp.*
2☐ PC Network Program Version 1.2, *IBM*
3☐ Etherlink/MC, *3Com Corp.*
4☐ Network Card Plus, *Hercules Computer Technology, Inc.*
5☐ The LAN Workplace, *Tecmar, Inc.*
6☐ Other _____

Most Useful Micro-Mainframe Link Product

10 1☐ TAC Release 2, *Lotus Development Corp.*
2☐ Helix VMX, *Odesta Corp.*
3☐ Irma 2, *Digital Communications Associates, Inc.*
4☐ Irmalan 3725 Gateway, *Digital Communications Associates, Inc.*
5☐ Adapt3274, *Network Software Associates, Inc.*
6☐ IBM PC Network Integration Package, *Digital Equipment Corp.*
7☐ Multi-PC/3270, *Anex Technology, Inc.*
8☐ Clusternet II, *Intelligent Technologies International Corp.*
9☐ Multiplex/XL, *Network Innovations Corp.*
0☐ Ideacomm 5250/Remote Gateway, *Ideassociates, Inc.*
x☐ Dbase Direct/36, *Ashton-Tate Corp.*
y☐ Tempus-Share, *Micro Tempus, Inc.*
11 1☐ Attachmate Extra, *Attachmate Corp.*
2☐ Maxess SNA Gateway, *Communications Solutions, Inc.*
3☐ Access/QLLC, *Eicon Technology Corp.*
4☐ Touch Terminal, *Touch Communications, Inc.*
5☐ Other _____

Best PC Expansion Board

12 1☐ Abqveboard 286, *Intel Corp.*
2☐ Inboard 386, *Intel Corp.*
3☐ Mac 286, *AST Research, Inc.*
4☐ Curam, *Cumulus Corp.*
5☐ Hard Card 40MB, *Plus Development Corp.*
6☐ Cardrive, *Innovative Devices, Inc.*
7☐ Paradise Autoswitch EGA-480, *Paradise Systems, Inc.*
8☐ Gammafax Plus, *Gammalink*
9☐ Advantage/2 I/O Board, *AST Research, Inc.*
0☐ Orchid Ramquest 50/60, *Orchid Technology, Inc.*
x☐ R-Card 45, *Rodime, Inc.*
y☐ Vega VGA, *Video Seven, Inc.*
13 1☐ Quad386XT, *Quadram Corp.*
2☐ Other _____

Most Innovative New Software Product

14 1☐ OS/2, *IBM and Microsoft Corp.*
2☐ Professional Oracle, *Oracle Corp.*
3☐ PC Excel, *Microsoft Corp.*
4☐ R:Base for DOS, *Microrim, Inc.*
5☐ Word 4.0, *Microsoft Corp.*
6☐ Works, *Microsoft Corp.*
7☐ Quattro, *Borland International*
8☐ Designer, *Micrografx, Inc.*
9☐ Byline, *Ashton-Tate Corp.*
0☐ SAS System for Personal Computers, *SAS Institute, Inc.*
x☐ Demo 2, *Software Garden, Inc.*
y☐ Autocad AEC Mechanical, *Autodesk, Inc.*
15 1☐ Cricket Graph, *Cricket Software*
2☐ Hypercard, *Apple Computer, Inc.*
3☐ Surpass, *Surpass Software*
4☐ Quickbasic 4.0, *Microsoft Corp.*
5☐ @Liberty, *Softlogic Solutions, Inc.*
6☐ Wordperfect 5.0, *Wordperfect Corp.*
7☐ Graphwriter 2; *Lotus Development Corp.*
8☐ Windows 2.0, *Microsoft Corp.*
9☐ PC-MOS, *Software Link, Inc.*
0☐ Multimate Advantage II, *Ashton-Tate Corp.*
x☐ Windows/386, *Microsoft Corp.*
y☐ Reflex Plus, *Borland International*
16 1☐ Concurrent DOS 386, *Digital Research, Inc.*
2☐ Other _____

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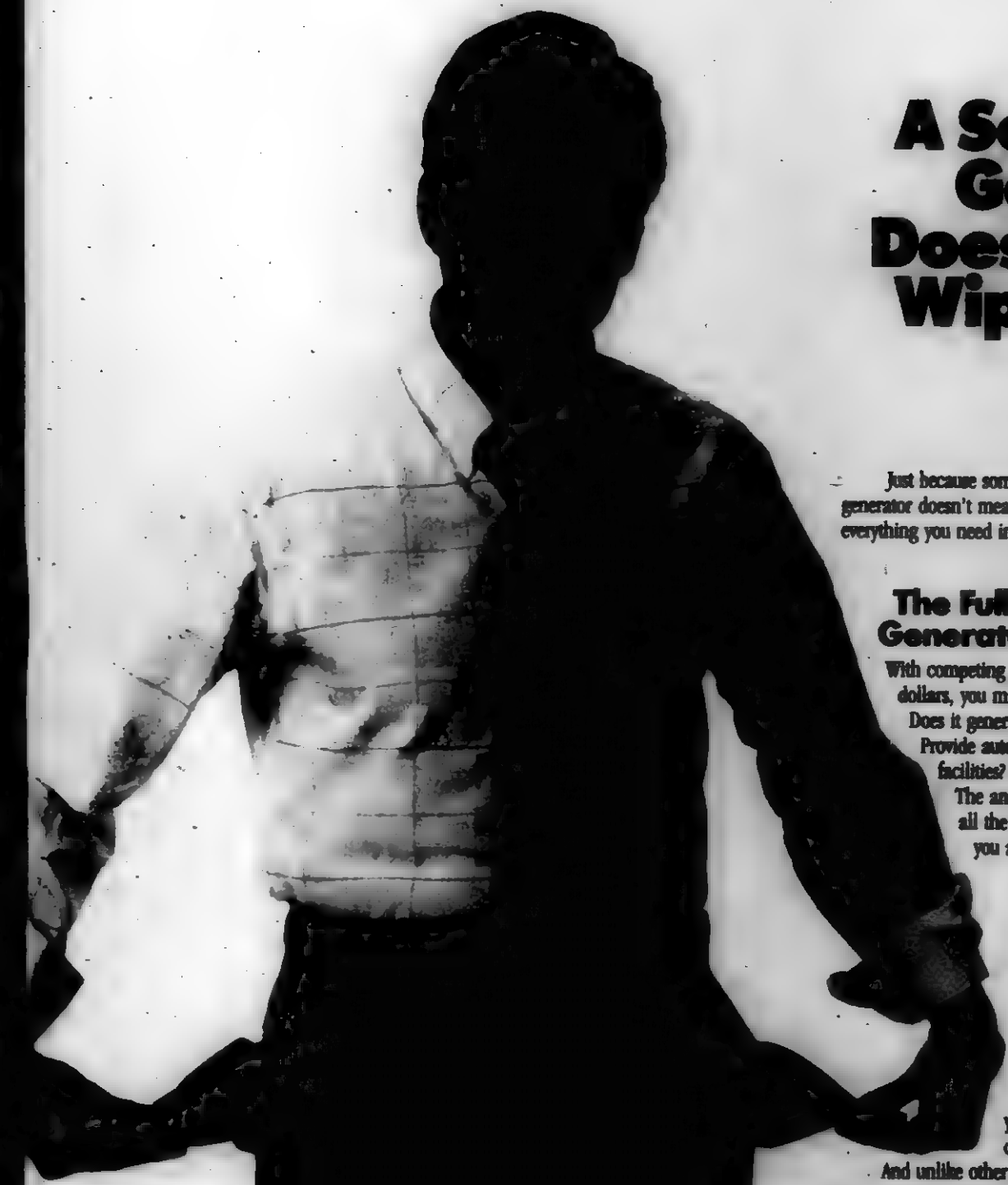

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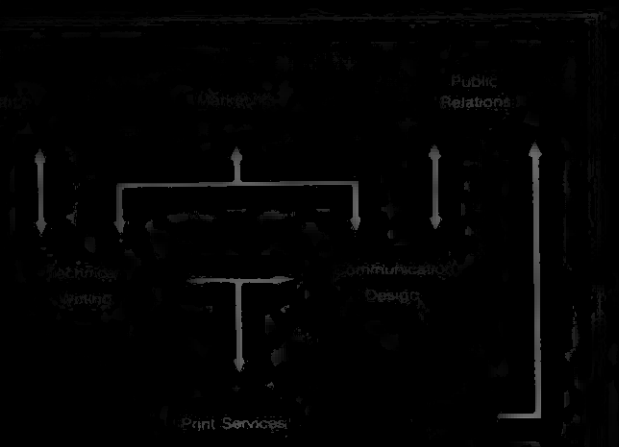

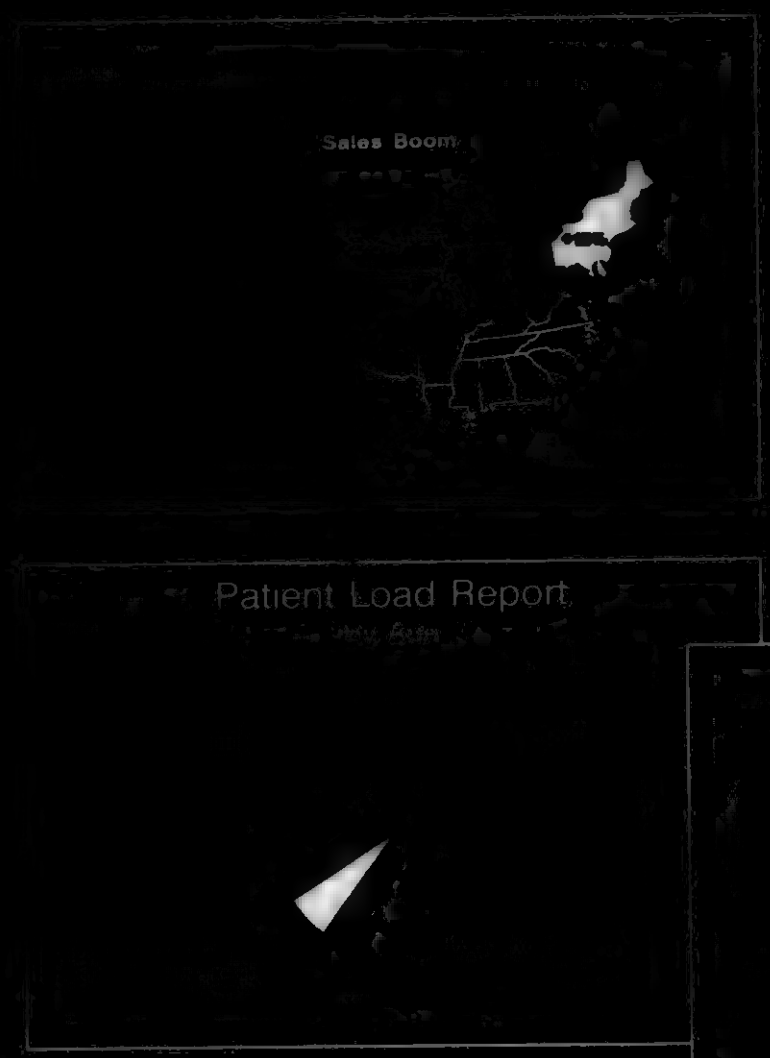

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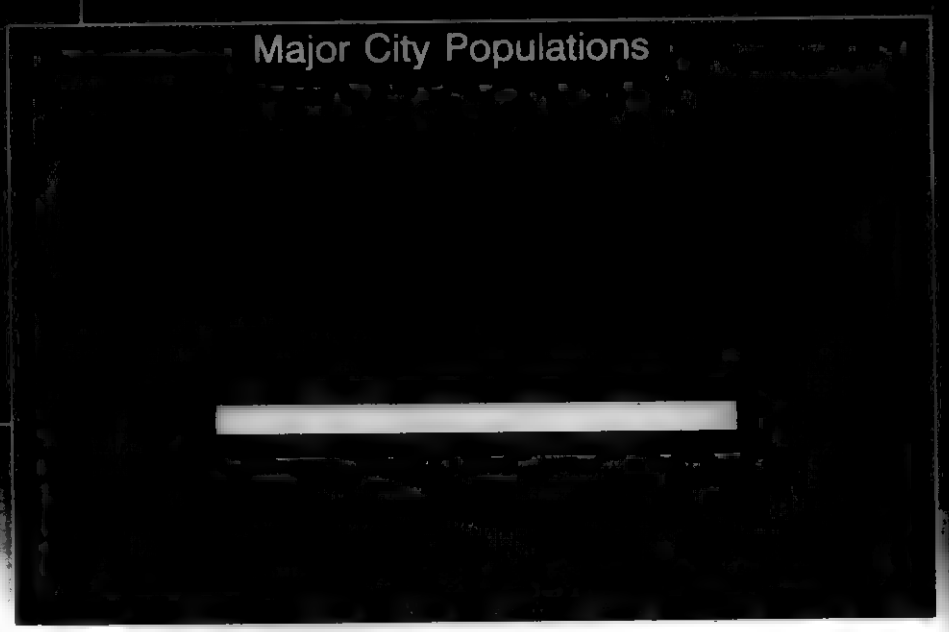

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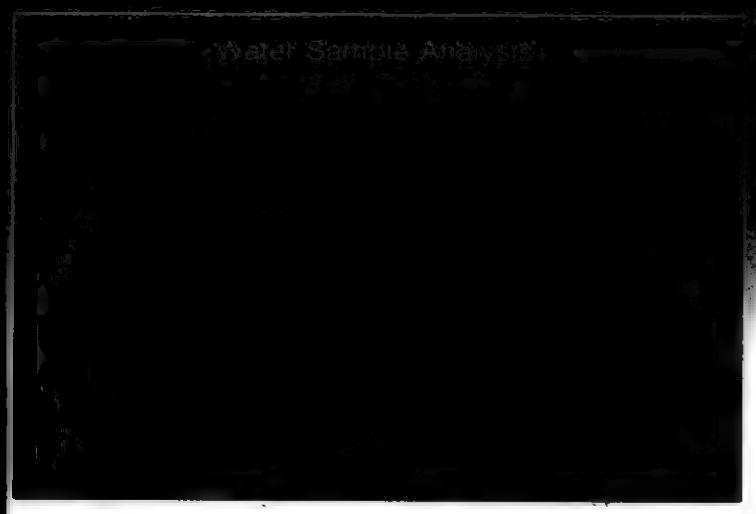

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Users want clones to keep IBM hungry

BY ALAN J. RYAN
CW STAFF

The dust has settled, been swept up and returned to form a new layer since IBM introduced its Micro Channel architecture and Personal System/2 to the world last spring. But users are apparently eager to see the dust stirred up again in the form of clones.

Users contacted in an informal survey last week said that if anything, the competition will help keep IBM's pricing reasonable. Yet the presence of compatibles in the marketplace does not guarantee sales.

Steve Wainwright, a project leader in charge of evaluating new equipment at Empire Blue Cross/Blue Shield in New York, said that although his company is basically an IBM shop, he will look at Micro Channel clones when they become available. Currently, he said his buying plans include PS/2 Model 60s and 80s, both Micro Channel products.

Build a better mousetrap

To attract a second glance from most shops, a clone must provide more than a comparable IBM machine, the users agreed.

The technology manager at a large chemical company said he would snub a Micro Channel-compatible machine offering strictly what IBM's computers offer, even though his company currently boasts a healthy mix of IBM and compatible personal computers. "A clone has to have something going for it other than that it copied IBM. All things being equal, why not buy IBM?" he asked.

Smaller shops, and those that have not traditionally been IBM in the past, routinely compare compatibles with IBM's offerings.

A data center worker at a Midwest insurance company said computers compatible with the Micro Channel-based PS/2 line will be looked at seriously, especially if end users express an interest in them. "Later this year, we'll be looking for a standard clone in this shop," she said. That clone will be either IBM Personal Computer AT or PS/2 compatible, she added.

Foremost for any clone to succeed would be its ability to properly run OS/2, the users agreed. All said their future plans include running OS/2 and applications written for it.

"We're heavily into mainframe communications, so we need the ability to run the Communications Manager" capabilities of OS/2 Extended Edition, Wainwright said.

A manager in charge of PCs for a Midwest manufacturing plant said the maker of the system is unimportant. "We're waiting for boards to make it a good system. If you don't have the function for it, it doesn't matter who made it," he said.

Meanwhile, the time frame for the first PS/2 clone sighting is narrowing. Rumors have surfaced that Tandy Corp. may show its own PS/2 Micro Channel-compatible computer sometime next month, and Kaypro Corp. has said it will be one of the first to have a compatible computer ready. But no one is talking about release dates.

"The first [PS/2 clone] has to appear, and everyone else will wait to see how IBM handles that," said Clare Fleig, director of research at International Technology Group in Los Altos, Calif. "It's a big risk for the first cloner."

Sun wraps X400 into E-mail plan

MOUNTAIN VIEW, Calif. — Sun Microsystems, Inc. last week joined a small but growing band of major computer vendors that support the CCITT X.400 electronic messaging standard.

The workstation company introduced Sunlink Message Handling System (MHS), said to allow users on Sun's messaging systems to communicate with other X.400 standard systems.

Sunlink MHS runs on top of Sun's Sunlink OSI, so that it can be used for message exchange across a local-area network of Sun workstations, the vendor said. The product can also run on top of Sunlink X.25, for the transmission of messages over a long-distance packet-switching network.

A directory service is said to allow systems administrators to provide customized message routing over a complex system of networks that support both X.400 and Sun's proprietary messaging system, which adheres to U.S. Department of Defense protocols. The same set of addressing formats can be used to send messages to either type of system, according to Sun. The workstation vendor said it plans to enhance its X.400 product to support transmission of graphics, facsimiles and other types of information.

Sunlink MHS is scheduled for shipment in May at a list price of $6,000. Other computer vendors that offer X.400 products in the U.S. include Digital Equipment Corp., Hewlett-Packard Co. and Data General Corp.

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Kevin Maloney, Senior Systems Analyst of Office Automation, Pepsi-Cola International (a division of PepsiCo, Inc.).

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Publishing load shifts to PCs

BY STEPHEN JONES
CW STAFF

SAN FRANCISCO — General-purpose computers grabbed some of the limelight usually reserved for traditional high-end publishing systems at last week's Seybold Seminars '88 on electronic publishing.

The annual show, held here, has generally featured proprietary, single-user publishing systems from companies such as Atex, Inc. Last week's conference, however, saw the high-end publishing industry begin to shift its focus to powerful 16- and 32-bit workstations that carry out advanced publishing tasks and give users more computing flexibility.

"We're going to see an industry built around proprietary technology rapidly moving en masse to PCs, Macintoshes and Unix workstations," said Jonathan Seybold, president of Seybold Seminars and Publications.

Users could reap the benefits

End users could have the most to gain from the industry changes. While a terminal that is tied into a proprietary publishing system restricts users to a limited number of tasks, intelligent personal computers can run anything from word processing programs to spreadsheet and data base applications.

"It's inevitable that users will prefer a general workstation that can do everything over a single-purpose computing system," said Bill Higgs, director of software research at Infocorp in Cupertino, Calif.

Apple Computer, Inc. was the most visible PC vendor trying to drum up support for its systems last week. Apple rounded up a gaggle of third-party developers to promote its Macintosh II as the hub of a multipurpose high-end publishing system that can be assembled with off-the-shelf commercial software. Third-party developers showing their wares on the Mac included Microsoft Corp., Aldus Corp., Cricket Software and Interleaf, Inc.

Sun Microsystems, Inc. attempted to firm up its position in the electronic publishing industry, promoting an open-system strategy based on its low-end Sun-3/350 and 3/360 workstations and a standard Unix operating system that can run across multiple platforms. A Sun official said workstation sales into the electronic publishing market already contribute as much as 10% to the company's total revenue.

Aldus and Digital Equipment Corp. built on their year-old marketing partnership, announcing plans for tighter integration between Aldus's PC Pagemaker and DEC's VAX servers and Decnet/OSI networks. DEC's VAX Integrated Publishing strategy calls for networked publishing systems that start on the desk top.

ATE SOFTWARE
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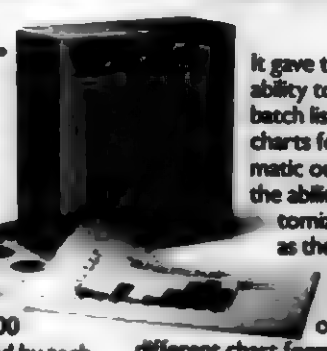

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Unix windows do MS-DOS

MOUNTAIN VIEW, Calif. — Users of high-end engineering workstations and Unix-based multiuser systems need Lotus Development Corp. spreadsheets, too. At least that is the belief of Hunter Systems, which today plans to announce the availability of software said to allow Unix-based Motorola, Inc. 68020 machines to run unmodified Microsoft Corp. MS-DOS software.

The package, called XDOS, works with systems such as the NCR Corp. Tower and Sun Microsystems, Inc. Sun-3/160. Hunter officials claimed the software also allows the Unix-based machines to run multiple MS-DOS programs simultaneously in Unix windows. Personal computer programs reportedly can address volumes on a hard disk that exceed the 32M-byte limit of MS-DOS.

Hunter claimed that XDOS technology will ultimately allow any non-MS-DOS computer to run MS-DOS. The software is currently being enhanced to work with reduced instruction set computers.

Hunter said XDOS uses binary compiler technology, which provides higher software performance than other simulators. Instead of using the C, assembler or Pascal source code of MS-DOS, the code is converted into an executable binary file. When the binary file is combined with XDOS emulation of MS-DOS, MS-DOS can run on a variety of architectures.

XDOS is available for low-end systems for $425, mid-range systems for $1,000 and high-end systems for $2,000.

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Users put ONA plans on back burner

Wary firms ponder standard's puzzle and promise, await FCC ruling on Bells' tolls

BY KATHY CHIN LEONG
CW STAFF

Now that all seven regional Bell holding companies have filed their Open Network Architecture (ONA) plans, users groups and industry experts are urging businesses to start figuring out — and planning for — ONA's future impact on their voice and data networks.

But while effects of ONA will impact both voice and data networks in terms of billing, services and sheer number of vendors, many companies are putting the topic on the back burner until the Federal Communications Commission formally approves the plans of the seven Bell holding companies sometime this fall.

ONA represents an FCC edict that the divested Bell operating companies provide their customers with consistent, fairly priced access to the Basic Service Elements (BSE) that provide access to, and transportation across, the local carrier's network.

Customers in this context are both business users and enhanced service providers, such as value-added network or electronic-mail vendors. The idea is to ensure that if the operating companies start offering enhanced services such as voice-mail or electronic data interchange, they do not use their control of local access lines to shut out their competitors.

Some companies are relying on the representation of users groups such as the Ad Hoc Telecommunications Committee, the International Communications Association and the Committee of Corporate Telecommunications Users to see to their ONA interests in Washington, D.C.

However, corporations such as The Travelers Corp., Atlantic Richfield Co. (Arco) and Visa International, Inc. have dedicated staff monitoring the issue.

Seeking continuity

For Arco, a major objective with ONA is "continuity between the Bell companies in their services," stressed Don Walton, manager of operatoins and support at Arco in Los Angeles. Large national companies like Arco hope that ONA will make possible the same basic features at more-or-less consistent prices from all of the divested Bell operating companies.

Walton's second big concern is that the quality of service improves rather than degenerates under ONA. "ONA can be good for users, since it will offer options never given to us before, but I want to be sure that Arco is going to be much better off."

Other users said they are concerned about who is going to foot the bill for the carriers' early, and possibly unprofitable, attempts at ONA-based services.

> "IN A FEW years, you won't have any choice but to select ONA services if you want to be competitive. . . . That is just how things are headed."
>
> KENNETH PHILLIPS
> COMMITTEE OF CORPORATE TELECOMMUNICATIONS USERS

Companies that have a major stake in data networks are impatient to get some solid, stable specifications so that they can make sure their equipment is compatible with ONA services.

'Big burden'

"This is going to be a big burden for us," said Leland Fong, senior network planner at Visa. "For a company such as ourselves, it is hard to understand and determine what the engineering or design of our networks must be."

That concern is understandable, ONA trackers sympathise. The complexities of ONA baffle even the sharpest of telecommunications analysts; there are reams of documents on the issue.

And the BSEs range from basic packet-switching offerings to call-detail recording. While regional Bell holding company Ameritech filed for 21 BSEs, counterpart Nynex Corp. filed for as many as 91.

Some users have been frustrated in their attempts to understand ONA's technical — and possibly political — ramifications for their companies. "They feel as though they have been left out of the planning process," said Kenneth Phillips, vice-president of telecom policy for the Committee of Corporate Telecommunications Users. The Bell companies have hosted individual sessions to outline their ONA strategies. "They were good attempts, but instead of having users participate, they were sessions that mainly told users what to expect," Phillips charged.

"If users were confused about ISDN, they are certainly unclear about ONA," said Tom Nolle, president of Cimi Corp., a

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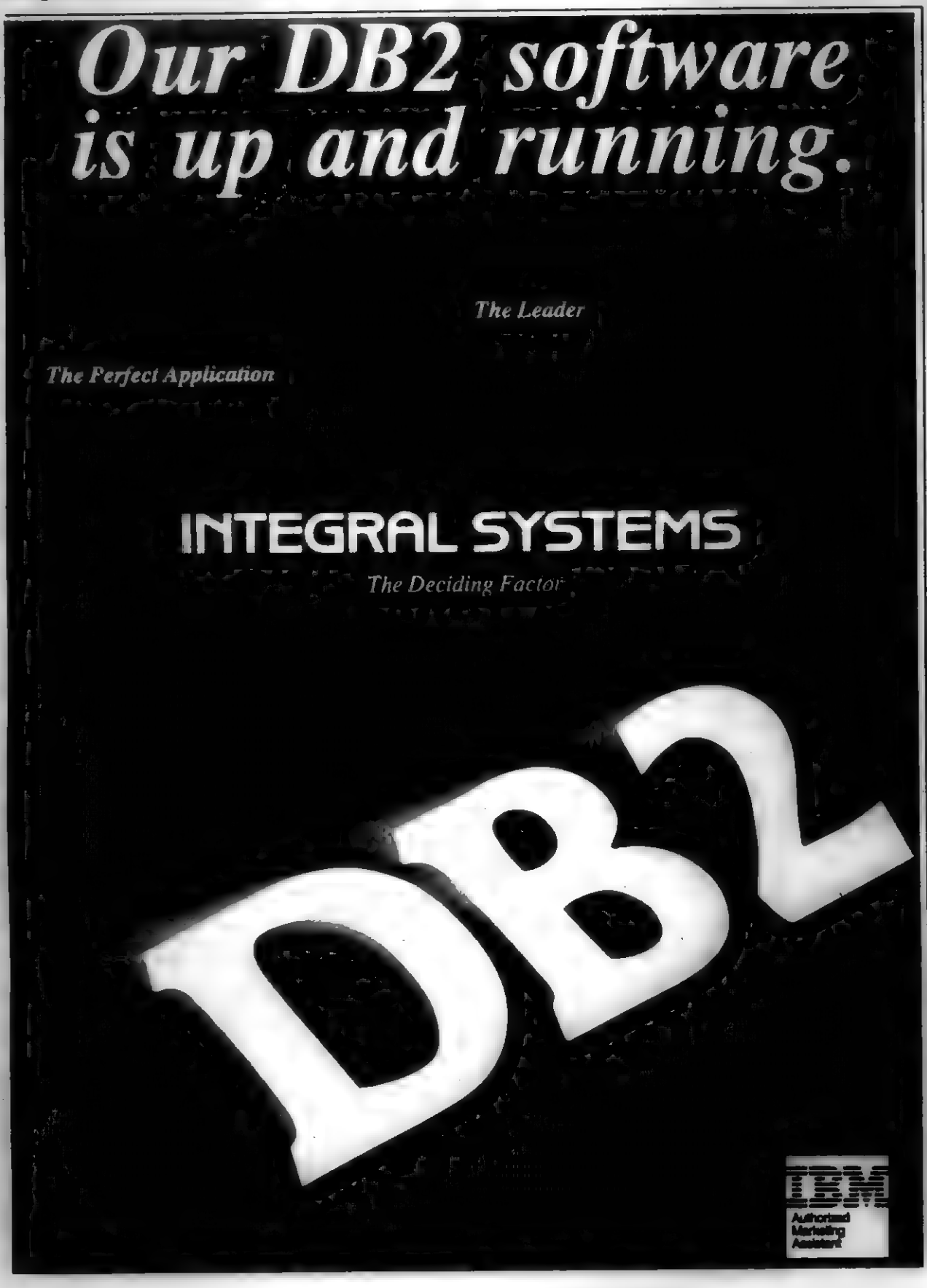


Lotus's Metro squeezed for expanded PCs

CAMBRIDGE, Mass. — A new version of Metro, a desktop management package, began to ship last week from Lotus Development Corp.

The package, which butts heads in the market with Borland International's immensely popular Sidekick, now supports the IBM Video Graphics Array standard and uses less random-access memory. The original version of Metro squeezed users' work space by chewing up 120K to 140K bytes of RAM. The newest version uses only 64K bytes by "swapping out" unused modules, according to the vendor.

However, in order to use the memory-swapping features, customers must have a hard disk or Intel Corp.'s Above Board. Without these, Metro still requires 125K bytes of RAM.

Metro 1.1. also supports IBM's Personal System/2 line of computers and other 3½-in. floppy disk drive-based machines.

Metro still costs $85, and registered owners can upgrade for $35. In addition, users of Lotus Express, a communications package that works with MCI Telecommunications Corp.'s MCI Mail, can also upgrade for $35.

ONA

FROM PRECEDING PAGE

Haddonfield, N.J.-based consultancy. According to Nolle, ONA remains a set of established policies that affect users indirectly. The third-party network vendors, known as enhanced service providers or ESPs, are involved in future product planning. But until something actually materializes on the market, most users said they prefer to wait.

Watch, look and listen

"I'm not involved in any committees or anything; I prefer to wait and see how it will all come together," said Gary Ho, manager of data communications at Transamerica Corp. in Los Angeles.

But ONA pundits are anxious for users to take a more active role. In five years, the voice and data networks will be radically changed, Phillips stressed. He noted that the telephone companies are backing ONA as a precursor to Integrated Services Digital Network. "In a few years, you won't have any choice but to select ONA services if you want to be competitive in the marketplace. That is just how things are headed."

Consultants, including Nolle, have urged users to stay on top, as much as possible, of ONA proceedings. Next month, users and vendors will have an opportunity to issue their comments to the FCC on the Bell company filings. "Users must demand that their phone companies tell them what this all means," Nolle said. "In the 1990s, the telecom world will be vastly different. Users will be able to tap into the central office switch data base and obtain their own voice services. But this all leads into the issue of what to do and when to do it."

Metaphor hopes Nielsen data deal boosts ratings

BY J. A. SAVAGE
CW STAFF

Users of Metaphor Computer Systems, Inc. minicomputer-based management information retrieval systems will not have to wait for the mail to bring them data from Nielsen Marketing Research, a division of A. C. Nielsen Co.

An alliance announced last week between the two companies to design and market proprietary information delivery promised that users will be able to tie directly into Nielsen's data base server by early next year.

The bulk of Metaphor users are in the packaged goods area — those who manufacture what is available on supermarket shelves.

Data's in the mail

And according to Nielsen, most packaged goods manufacturers subscribe to its research services. Currently, data tapes from Northbrook, Ill.-based Nielsen are available by mail.

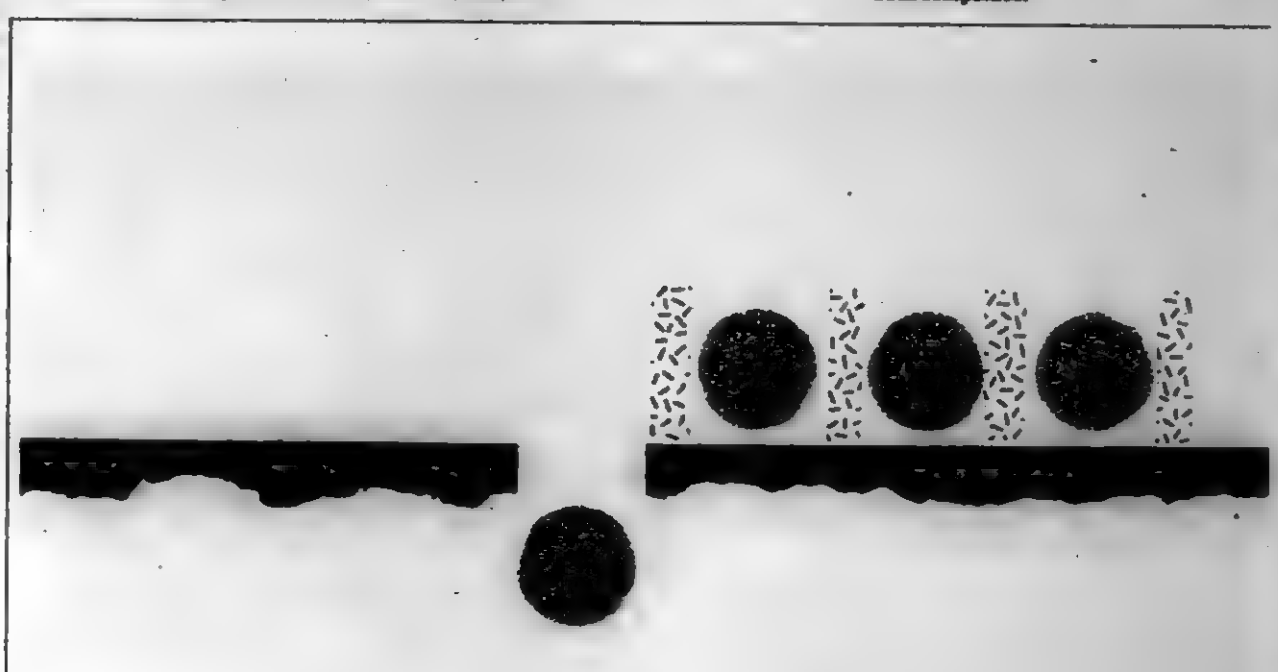
According to the company, a basic configuration of DBS-250 — a relational data base server, a data base gateway, a file server, a communications server, workstations and software tools — costs about $300,000.

A Nielsen spokesman commented that for many users, it would not be unusual to spend that much again on marketing information services.

Proctor and Gamble Co., for instance — the consumer goods firm that is currently Metaphor's biggest customer — "spends $2 million to $3 million on Nielsen's [data]," according to Metaphor President Don Massaro.

No price has yet been set for direct access to Nielsen's data.

Nielsen marketing information will also be available to IBM Personal Computer-compatible systems, according to both companies.



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DG to resell Bridge LAN-based links

BY ELISABETH HORWITT
CW STAFF

WESTBORO, Mass. — Continuing down the migration path to a standardized local-area networking architecture, Data General Corp. last week revealed plans to resell two Bridge Communications, Inc. products that provide LAN-based links between its terminals and hosts.

The announcement reflects a closer working relationship between DG and Bridge, noted DG product manager Todd Kurland. The original marketing agreement, announced last summer, called for DG to bring Bridge sales agents in on any pending deal in which Bridge's 802.3 networking products seemed appropriate, Kurland said.

DG decided, however, to sell certain Bridge products as integral parts of its own networking line. This will boost DG's strategy of migrating its networking line to the International Standards Organization's Open Systems Interconnect (OSI) networking standard, since Bridge is also headed that way, Kurland said. "We will implement any OSI enhancements they introduce."

Talking it up

A similar agreement between DG and 3Com Corp. is "in the talking stages," Kurland said. By linking its own systems to 3Com's products, DG would provide its customers with enhanced connections to IBM Personal Computers, he added.

DG will initially resell Bridge's Communications Server/200 (CS/200) and Network Control Server/AT (NCS/AT) "because they address about 90% of our users' networking requirements," Kurland said. "Customers aren't asking to migrate [to a Bridge LAN] from an existing direct terminal-to-host connection, but we've had a lot of requests from companies that are moving into new buildings." While LAN-based links cost more than a direct connection, they ease communications between large numbers of terminals and multiple hosts, Kurland said.

The two companies also will work together to develop new products and enhance existing ones specifically for DG systems, Kurland said. And DG would like to develop with Bridge a direct Ethernet host link that would be more economical than the current CS/200 connection.

DG's relationship with Bridge enables the minicomputer vendor to catch up with Digital Equipment Corp., which has been offering LAN-based terminal-to-host connections for years, according to David Passmore, a principal at Fairfax, Va., research company Network Strategies, Inc. Such links "are a useful alternative to running gobs of twisted-pair wire to connect terminals to hosts," he added.

Integrating 3Com's line of PC LAN hardware and software could prove more difficult for DG, however, Passmore said. "3Com and Bridge haven't integrated their own products yet, but maybe Bridge could eventually provide bridges between 3Com servers and DG hosts."

The CS/200 provides concurrent access to an Ethernet LAN for up to 10 asynchronous hosts and workstations at speeds of 19.2K bit/sec. per port. The DG version, Termserver, is priced at $3,650. The NCS/AT, to be sold by DG as Termmanager, is an IBM PC-based system that monitors and controls network traffic on up to 128 Termservers. It can reconfigure Termserver ports, maintain audit trails of network errors and monitor and control user access to the network.

DG said it will sell a Termmanager system, running on a DG Dasher/286 PC, at a base price of $12,160.

Teradata adds Sun, IBM tools

LOS ANGELES — Teradata Corp. last week reached out to other computing environments by extending its IBM SQL support and announcing an interface to the Sun Microsystems, Inc. platform.

The company said its Transparency series will provide users of its data base machine, the DBC/1012, with the ability to process SQL requests from applications that have be written to work with IBM's SQL/DS or DB2.

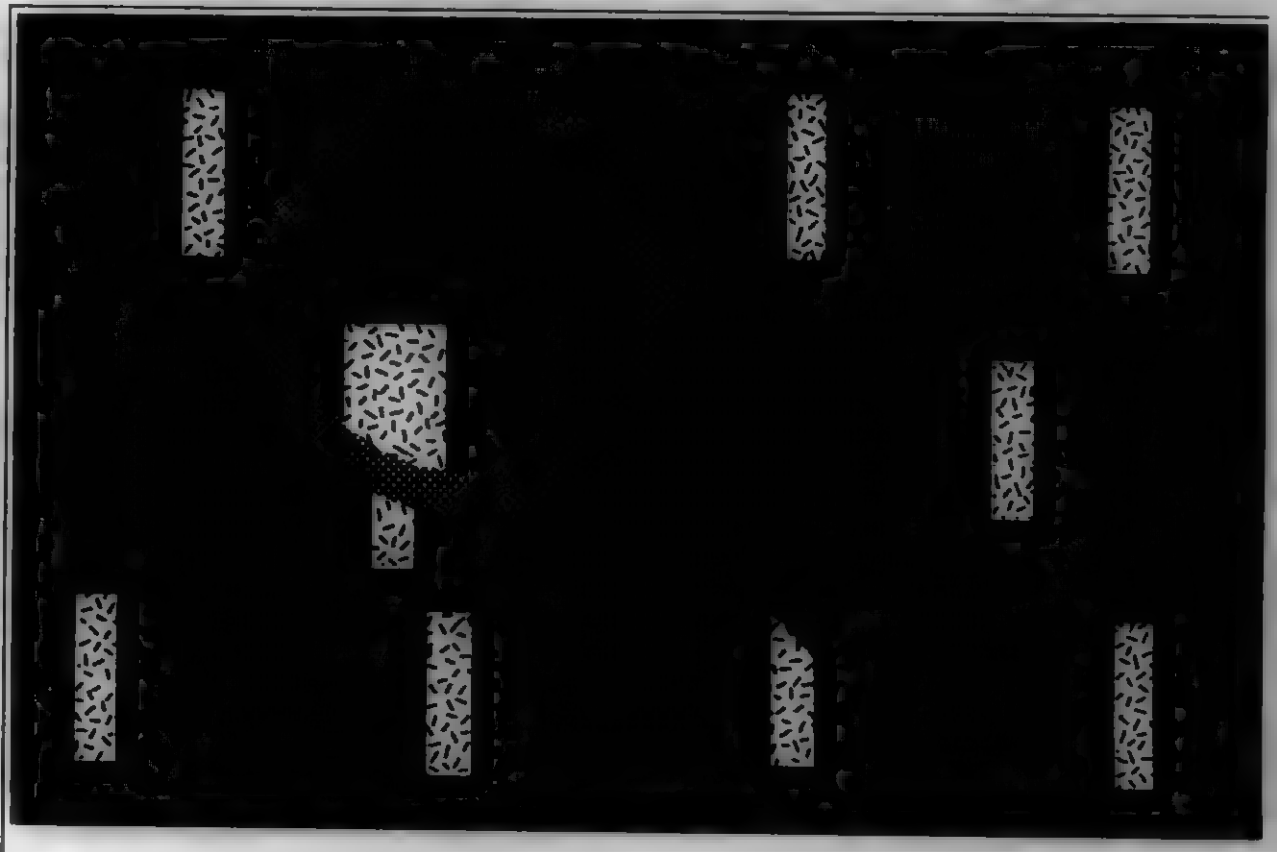
The software will be introduced in phases, the company said. An initial release supporting SQL/DS will be available next month and offer support for three applications, including IBM's QMF and SAS Institute, Inc's. SAS system.

DB2 support for the Transparency series is slated for introduction in June, the company said.

The Transparency series will carry a license charge of $25,000, Teradata said.

The Sun interface is said to provide direct access across an Ethernet network so that a Sun workstation can communicate with a DBC/1012 as a peer. Previously, DBC/1012 users were able to connect various workstations that would function as a terminal in a slave mode to the host data base machine.

The software is scheduled for release in July and will be licensed for $4,000, the company added.



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EDITORIAL

Get real

If you think it's odd that U.S. semiconductor makers are now pressing the U.S. government to ensure Japanese manufacturers supply high-capacity memory chips to our markets, you're right.

This is the same group that pressed for, and won, sanctions against Japanese producers. Now, there are mounting shortages of 1M-bit dynamic random-access memory chips, shortages that are causing delays in some computer products getting to market. Are the Japanese playing hardball by holding shipments down, or were the sanctions just a stupid idea?

The idea behind them was to encourage greater investment by U.S. firms. Instead, the price for dynamic RAMs eventually skyrocketed. If this sounds similar to the situation in the auto industry a few years ago, where profits of U.S. auto makers soared following the Japanese acceptance of voluntary quotas, you're right again.

No one argues that some Japanese companies were dumping memory chips into slack markets. Whether that was a clearance sale because of market conditions or a concerted effort to monopolize the chip market has never been shown.

Whatever the case, U.S. chip makers had better learn to play ball in an international league. This cry-baby bellyaching is not going to win a lot of support, especially when the end result is artificially strengthening the hand of IBM, which is big enough to sculpt its own dynamic RAMs.

James F. Benton

There were sheriffs and frontier judges in some towns of the Old West who relied not on might but on craftiness to keep the peace. There were so many bad guys, so many internecine feuds, that the best weapon these men had against the general rancor of the times was not a gun but guile.

Similarly was Jim Benton a modern-day peacemaker. He fought to solidify the delicate union he helped create — a union that at times threatened to fly apart under the force of internal turmoil — while using the strength of that union to fight bigger battles. Benton, the leader of the Computer Dealers and Lessors Association, died last week at the age of 57 (see story page 79).

Under his leadership, the CDLA weathered tremendous storms. Twice, the reputation of the lessors was rocked to the core, first by the Itel disaster, then by the OPM scandal. The dealers and lessors themselves competed ferociously with one another. At times, the competition turned cutthroat, aggravated by, among other things, IBM's bold push onto the leasing scene four years ago with IBM Credit Corp.

Through all this, Benton wined and dined and wheeled and dealed his way through Washington, D.C., lobbying — usually successfully — on behalf of his group.

Like the CDLA, Benton was one of a kind.

LETTERS TO THE EDITOR

Behind the scenes

As one of the officers in charge of the investigation in the Detroit income tax case, I was disappointed in the information provided regarding our investigation, reported in "To catch a thief: Lessons in systems security" [CW, Dec. 14, 1987].

I am particularly sensitive to media coverage of Detroit police investigations that give the impression, direct or implied, that any one investigator solved a case. Those of us in law enforcement know that very few fall within that category.

The income tax case was a difficult, complex and lengthy investigation. It required many days of document review and meetings with Detroit income tax management personnel and systems analysts. It required instruction on the use of slave terminals until we understood how Ronald Cojoe manipulated the data to accomplish his criminal act and required the review of thousands of canceled checks to locate the evidence needed for prosecution. It required the design of forms that matched hard copies of data base information with canceled checks and other evidence documents in order to track the fraudulently produced refund checks from alteration of data bases through the actual cashings of checks.

All of this had to be accomplished while working undercover to avoid revealing our efforts to Cojoe, who was still functioning in a position of authority.

Through the combined efforts of Sgt. James Arthurs, Investigator Marvin Winkler, Lt. Fred Campbell, Assistant Prosecutor Nancy Alberts and myself, all four defendants pleaded guilty rather than stand trial. It should also be noted that they were not prosecuted under racketeering statutes, as your story indicated. They were, however, charged under Michigan statutes covering embezzlement and obtaining money under false pretenses. Since this conviction, the City of Detroit has filed suit in federal court in an attempt to recover the stolen funds.

Charles S. McEwen
Sergeant
Criminal Investigation
Bureau Staff
Department of Police
Detroit

This week in history

March 13, 1978
The appearance of a series of IBM demonstration centers for the firm's new 5110 system sparks speculation that the company is testing the feasibility of opening a retail chain to distribute its small business systems. IBM denies it is considering such a change, stressing that it has operated demonstration centers for other systems.

March 14, 1983
The Federal Communications Commission releases an access charge reimbursement plan that will force telecommunications users to pay their local telephone companies more to handle message toll service and WATS calls, beginning Jan. 1, 1984.

Under this new scheme, local phone companies will bill users directly for access charges.

Still struggling

In the article "MIS dream jobs still elude blacks" [CW, Jan. 18], you pointed out the underrepresentation of blacks and Hispanics in MIS management jobs. But according to your pie chart, only 1.5% of MIS managers are Asian.

Asian Americans are 2% of the population and 4% of all professionals. Yet they have failed to make a proportional impact on MIS management. This pattern is repeated in many other professional fields in which Asians do fairly well as individual contributors but are often not promoted into management. Please remember that Asians are also a minority. Though Asian Americans have scored many successes in the computer field, they remain far from even so far as management is concerned.

Arthur Hu
Lead Engineer
Mosaic Software, Inc.
Stoneham, Mass.

Prolific Ethernet

In "Reality falls short of hopes" [CW, Jan. 25], I was quoted as estimating that the installed number of token-ring local-area networks in 1990 will be 50% of the total LANs worldwide.

What I gave were estimates for worldwide shipments of token-ring networks by U.S. vendors by 1990, not the installed

Continued on page 23

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

AI stars falling, but sky still bright

Although big names are taking over the territory, pioneering spirit isn't dead

HARVEY NEWQUIST

The way you can tell the pioneers from the followers in any business, the saying goes, is that the pioneers always have the arrows in their backs. Sometimes they're even unlucky enough to be lying face down in the mud.

As certain artificial intelligence companies report losses and slowing sales, people are saying, "AI must be dead." The truth is that commercial users have never shown as much interest in the whole field of AI as they do today.

Granted, some of the pioneers, such as Symbolics, Intellicorp and Teknowledge, are taking heavy beatings in sales and profits. But at the same time, Sun Microsystems, Apple and even IBM are focusing on AI, especially expert systems, as an area that's financially worth exploring.

History repeats itself

Remember when intrepid PC start-ups like Osborne, Corona and Eagle started backsliding after Compaq, IBM and the imported clones swept up the market? The PC industry did not go down with those failing companies. In fact, it consolidated. The new companies validated the business of manufacturing and selling PCs.

Symbolics invented the market for hardware that ran expert system software back in 1980. After about six years, the bigger kids on the technology block saw what a nice little business this was and got into the act.

First, DEC positioned its VAX workstations as worthwhile for performing AI tasks. Then, upstarts Apollo and Sun started offering low-cost alternatives to LISP machines. In the last six months, IBM has been touting everything from its joint marketing agreements with Intellicorp to its own Knowledge-tool package to a new architecture that will allow for expert system porting to IBM environments.

The price is right

On the other hand, the new darling of corporate microcomputing, Apple, has teamed up with the U.S. darling of semiconductor manufacturing, Texas Instruments, to bring a whole new piece of AI architecture into play.

TI is going to be putting its Lisp Megachip into Apple's Macintosh IIs to create a machine to perform AI tasks for just under $20,000.

The typical Symbolics machine costs four to five times that much, banking that you will pay for the increased power and efficiency. Apple and TI are making AI accessible to the less power-hungry mass market with their $20,000 machine.

In AI, the mass market is where the action — and the money — is.

Off to a great start

Most of the AI companies formed in the early '80s based their products on such radical technologies that they touted being on the leadingest and bleedingest edge of computing. They sat back and just waited for customers to beat a path to their doors.

BILL MAYWORTH

At first, this strategy worked. All the branches of the military — prompted by the Defense Advanced Research Projects Agency and various research labs like Lawrence Livermore, Sandia, SRI International and Los Alamos — lined up to buy the products as soon as they came off the vendors' docks. Price was no obstacle.

Corporate America was a little bit slower to catch on. Companies like General Motors, Boeing and Westinghouse jumped at the chance to get into AI technology and, in some cases, even bought equity stakes in the fledgling pioneers.

But they were the exceptions; most companies started finding out about expert systems through magazine articles and an occasional seminar at a computer conference, not through product purchases.

Despite the fact that most AI products couldn't be integrated with existing installed hardware and software, the AI pioneers still grew at incredible rates through the mid-1980s, many increasing sales by more than 50% per year.

After the flood

Then the well began to run dry. Almost all of the research groups that either needed or wanted high-powered and high-priced AI products had them by the end of 1986. The rest of the potential customers were still in learning, not spending, stages. Those that were ready to spend weren't ready to spend thousands of dollars on stand-alone and nonintegratable technologies.

The AI vendors had already anticipated a massive influx of cash from the mass market and bought bigger headquarters buildings and added staff. Some of the pure AI companies became too bloated to tread water in 1987 and began to sink.

Conversely, corporate America was finding that AI really did provide solutions to problems that could not be solved via regular software. Companies like Fireman's Fund, American Express, Chemical Bank, Coopers & Lybrand and Du Pont started publicizing their success using and jointly developing AI applications.

Other, smaller, companies, hearing of these endeavors, started picking up AI products — especially those designed for PCs — in droves, while the large-system AI vendors watched their own sales suffer. So as user interest was on the incline, some AI vendors were already on the decline.

Savvy marketing on the part of mainstream computer companies helped push the AI vendors further off kilter. IBM and Cullinet both offered AI products as adjuncts to their existing product lines, selling AI not as a special tool but as a peripheral that could be added to existing systems.

That was just what the cus-

Continued on page 23

Newquist writes and consults on artificial intelligence and other advanced high-technology topics from his office in Scottsdale, Ariz.

Start planning now for multiprocessors

EFREM MALLACH

Fad followers who chase each passing bandwagon land by the wayside. Those who understand the underlying technological and economic factors behind trends wait for the right bandwagon to come along and are firmly seated as it moves forward.

In terms of processor architecture, which path should you follow? You must make these choices:

- Microprocessors or minicomputer/mainframe processors constructed out of many components?
- Special-purpose or general-purpose designs?
- One processor or many?

The fundamental technological and economic forces tell us that microprocessors are inherently more cost-effective than any other approach. That is because they utilize the potential of any technology to its fullest. Every gate on an Intel 80386 helps make it the best possible 386 microprocessor.

By contrast, a more widely useful component, such as a bit slice, cannot be fully utilized in a specific application. The need to interconnect such chips, and the components that make these connections possible, further handicap a system not based on microprocessor technology.

Will only get better

Not only are microprocessors the most cost-effective approach today, their edge must inherently grow with time. Chip complexity increases each year as designers learn how to make components smaller and the chips themselves larger. In a microprocessor, each added gate does its share. Were this not so, a different gate would have been put there in its stead.

Conversely, designers of generalized components put the most-used features in first. Capabilities added later — such as the seventh and eighth inputs to a NOT-OR, or NOR, gate — are of lower value and will tend to contribute less to the eventual system.

For these reasons, microprocessor performance is rising faster than that of minis or mainframes. From 1982 to early 1988, the speed of the fastest widely used microprocessor increased by a factor of six, from 0.5 million instructions per second (MIPS) on the Motorola 68000 to 3 MIPS on the Intel 386. Mini performance rose from 3 MIPS on the Data General MV/10000 to 12 MIPS on the Prime 6530, a fourfold increase. Mainframes climbed from 8 MIPS on an IBM 3081 with a single CPU to 20 MIPS on an Amdahl 5890, a factor of 2½. MIPS are a poor measure, but the trends are clear.

The second factor to consider is that general-purpose processors are more cost-effective than those optimized for a particular application. It is easy to design a special-purpose architecture that looks better on paper. Start with a general-purpose design and take out any instructions, registers or other parts the application doesn't use.

USERS and vendors who prepare for using multiprocessor architectures based on general-purpose microprocessors will have the most cost-effective systems in five years.

But the specialized design will cost more because of lower production volume. Most experts figure a 20% drop in unit cost each time volume doubles. The economic logic in favor of general-purpose processors eventually overwhelms the engineering logic that favors a specialized design.

The general-purpose architecture edge will increase with time. Here, the gap is widening because research and development accounts for a growing fraction of chip cost.

When volume doubles, the R&D allocated to each chip produced drops by 50%. Simple special-purpose devices may hold out against a 20% production learning curve for a while, but complex ones can't fight a figure that approaches 50% when R&D becomes a major factor in the computation.

To draw conclusions from these two trends, we must take a third fact into account: A single micro can't do it all. Early this year, there was still roughly a fourfold gap between the speeds of the fastest micro and the fast-

Continued on page 23

Mallach is a faculty member of the Boston College School of Management and a consultant to user and vendor executives. Based in Needham, Mass., he recently published *Win Them Over: A Survival Guide for Corporate Consultant Relations Programs.*

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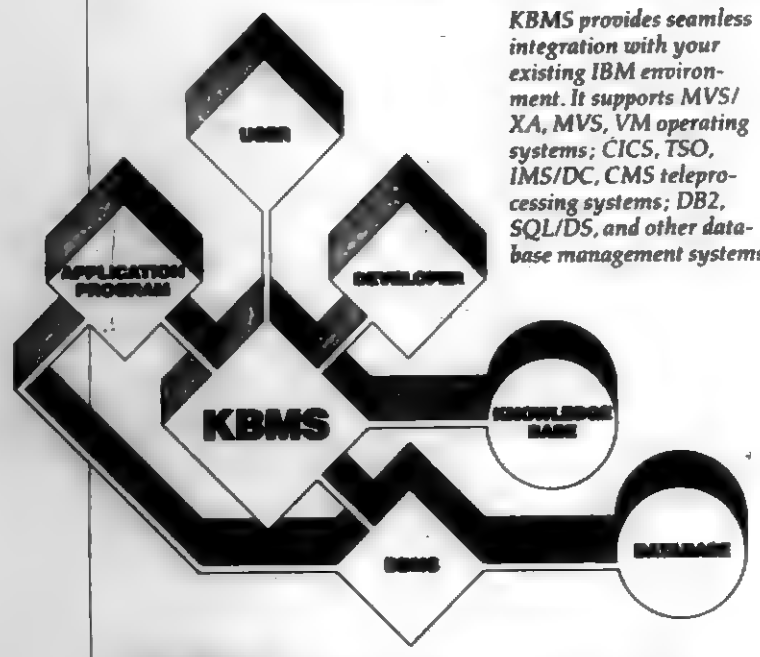

KBMS provides seamless integration with your existing IBM environment. It supports MVS/XA, MVS, VM operating systems; CICS, TSO, IMS/DC, CMS teleprocessing systems; DB2, SQL/DS, and other database management systems.

A major computer company is saving over $25 million a year on product ordering and configuration, thanks to expert systems they developed in-house.

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These are true stories. Yet expert systems still have not taken a serious place in the business world.

Why? Because they've been available only on specialized systems using esoteric languages like LISP and PROLOG. So, like the companies described above, you could only benefit from knowledge-based systems if you had a great deal of money, people and time to make them work.

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Multiprocessors

CONTINUED FROM PAGE 21

est mini and a sevenfold gap between the fastest micro and the fastest mainframe.

It takes 27 Intel 386s to match the raw power of an Amdahl four-processor complex. The conclusion is inescapable: The most cost-effective way to obtain substantial processing power is turning out to be a multiprocessor architecture utilizing general-purpose microprocessors.

Cost-effective does not mean suitable for all applications. There are some application areas in which massive power is applied to a single task. Apollo's recently announced Domain Series 10000 Personal Supercomputer, and similar ones from Stellar, Ardent and others, bring mini-super price/performance standards to the desk top.

This aggressive pricing reflects competition in the workstation market as much as inherent cost factors. Their price per MIPS is impressive, largely because workstations tend to have less I/O bandwidth and tend to be configured with less memory, fewer peripherals and fewer ports than commercial systems offer.

Yet in aggregate throughput per dollar and correcting for configuration differences, these systems barely approach the multimicroprocessors from Sequent, Encore and their cousins. And the Sequent- and Encore-type machines have been here for two years. In the high-tech computer business, that's a full generation of technology. Next year's multi-68030 products, and the 1990s' multi-80486 systems, should be even better.

If you don't need it, don't get it

The bottom line: If an application doesn't require the absolute maximum single-task performance, systems designed with that factor uppermost in mind are poor choices.

What about reduced instruction set computing? RISC is a fine way to design instruction sets. Its advantages apply to general-purpose micros as much as to anything else. There are several commercial microprocessor RISC projects under way. If the world converts to RISC, the fundamental forces and trends will still apply. The long-run relationships among micros, minis and mainframes will not change. All three will stabilize at a new level on account of the benefits of RISC but in the same relative positions.

People who fear their skills losing value in a new environment will fight changes tooth and nail. The costs of peripherals, memory, software and support, all of them unaffected by processor technology, blunt the system price impact of pure CPU cost-effectiveness. Also, new products do not yet have the system and application software depth that mainframe and mini families have amassed.

The long-range trend is clear: Users and vendors who prepare for using multiprocessor architectures based on general-purpose microprocessors will have the most cost-effective systems in five years.

AI stars

CONTINUED FROM PAGE 21

tomer wanted to hear: He didn't have to start over if he wanted to get into AI, and these products would work with the millions of dollars worth of hardware and software already installed in his computing center.

Fight for survival

Now the AI pioneers are playing catch-up. Some, such as Lisp Machines and Silogic, have already fallen by the wayside, while some are headed in that direction.

Many of these firms are rushing to get their products into the mainstream. Inference Corp. is putting its expert system product on IBM mainframes, while Intellicorp is readying an Intel 80386-based version of its expert system for market. Aion and Neuron Data already offer their products in environments ranging from the VAX to the Mac.

But don't rule the pioneers out yet. They invented artificial intelligence products in the first place and took them to the point where the IBMs, DECs and Suns of the world saw a reason to jump into the action.

A few AI shooting stars doesn't mean the whole sky is falling.

Prolific Ethernet

CONTINUED FROM PAGE 20

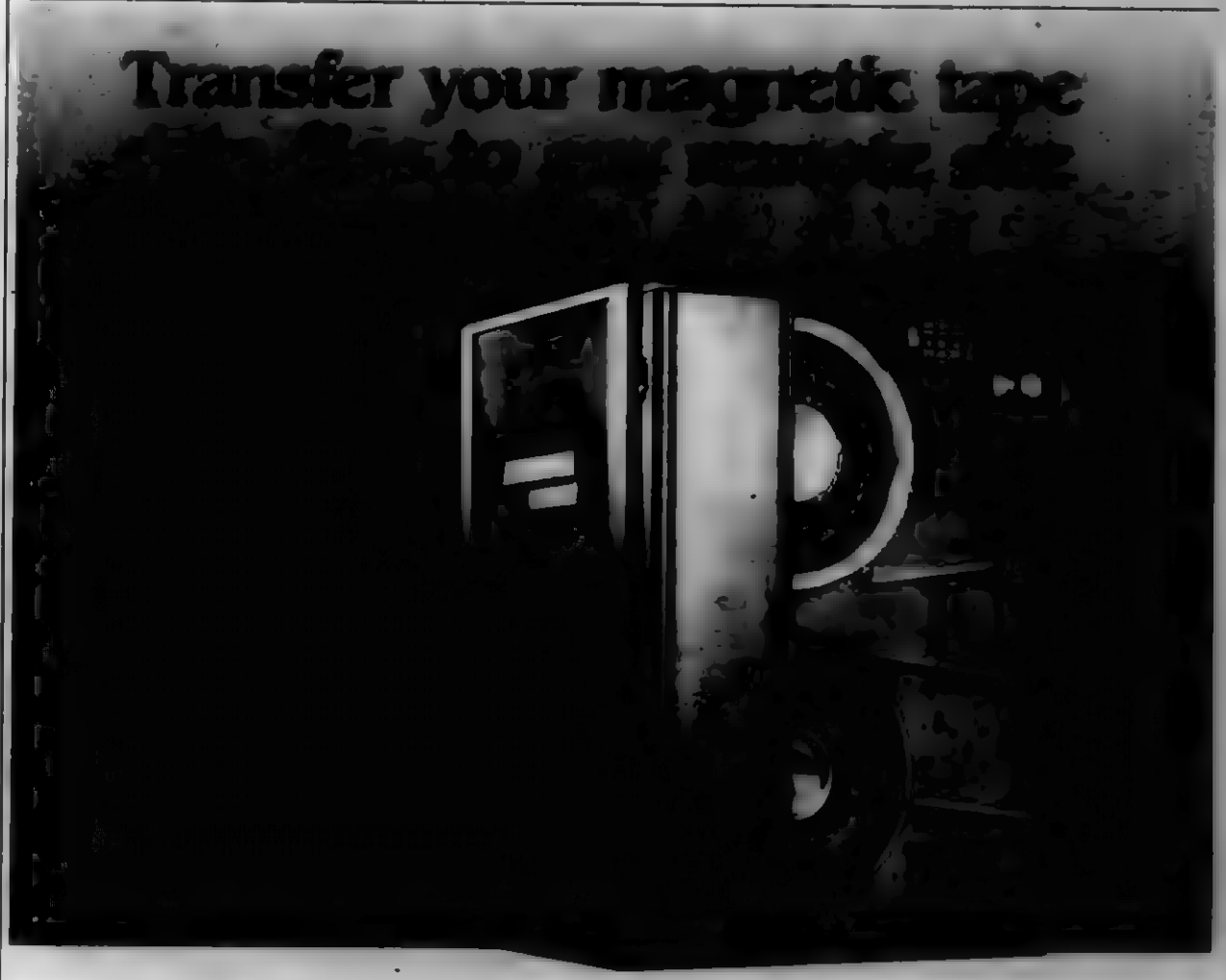
base number.

The IEEE 802.3 Ethernet technology has been and continues to be quite prolific. It is a technology that is not only well understood by the user and vendor communities but also continues to remain the primary LAN technology of several prominent communications and systems providers throughout the world.

In certain environments, 802.5 token-ring has made significant inroads into this established marketplace, and the inherent advantages of that architecture will continue to supplant Ethernet in years to come.

Today, the European community is already witnessing an increase in the sales of token-ring vs. Ethernet, but we are a good decade away from token-ring's installed base surpassing that of Ethernet's, if, in fact, that ever happens.

Douglas Gold
Senior Research Analyst
Local-Area Network Market
International Data Corp.
Framingham, Mass.



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SOFTWARE & SERVICES

SOFT TALK

Jerrold M. Grochow

A CASE for integration

Let's face it: We live in a multivendor world for software design and development tools, and we have to figure out how to survive in that world.

Since vendors don't provide generalized interfaces to other vendors' tools, the burden falls in our laps, the users of these tools, to create our own integrated computer-aided software engineering (CASE) environments.

While some vendors claim to provide integrated CASE environments, they typically only deal with a portion of the life cycle or with a specific development methodology. This means that users still need to combine several vendors' tools to create the desired CASE environment.

Since the benefits of using a CASE environment often come from the ability to automatically pass information from tool to tool and, therefore, from one life cycle phase to another, the need for integration is clear. The issue is how to do it best without spending a fortune and with some hope of a lasting solution.

Continued on page 26

MVS/ESA widens OS options

But IBM's PR/SM partitioning scheme unlikely to sway VM users

BY ROSEMARY HAMILTON
CW STAFF

RYE BROOK, N.Y. — With the recent announcement of MVS/ESA, IBM has made available for the first time the ability to run multiple operating systems without VM.

It seems unlikely, however, that large numbers of VM operating system users will abandon VM for the IBM 3090E Processor Resource/Systems Manager (PR/SM) feature. PR/SM is the hardware option that creates a multiple operating system environment for MVS/ESA.

The ability to manage multiple operating systems has long been a job exclusive to VM in large MIS shops. Prior to PR/SM, the only other way to support multiple operating systems was the physical partitioning of IBM's multiprocessor systems such as the 3090 Model 400.

Limited application

According to Bill Wilson, IBM's group director for large systems, PR/SM is intended only for those shops that have no other VM requirements, such as the use of the CMS teleprocessing monitor. In addition, Wilson said, VM has built-in tools that assist a user in a migration or testing environment that would not be provided with PR/SM.

"PR/SM makes a whole lot of sense if you strictly want to carve up your CPU," said Tom Foth, a senior software developer at VM Personal Computer, Inc. in Danbury, Conn.

Wilson said IBM is trying to provide more options for large shops rather than discourage the use of VM.

Currently, approximately 50% of all MVS shops also run VM, according to Wilson. Of that 50%, Wilson estimated that several hundred use VM strictly to guest other operating systems or to run a test version of a new operating system release.

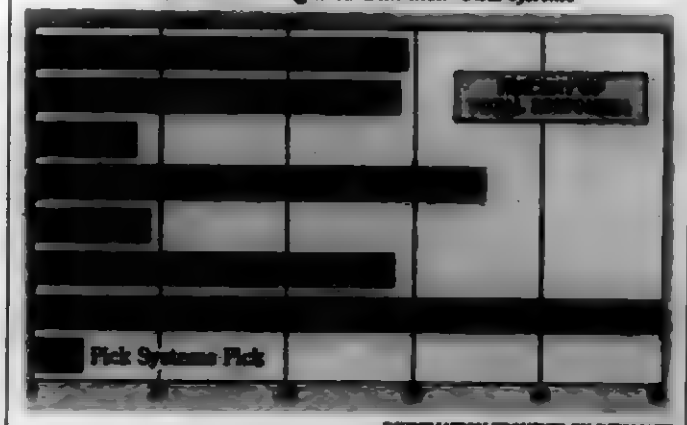
"There should be a number of people who will justify PR/SM — those who don't want to

Continued on page 29

Data View

Used alongside Unix

Other operating systems cited by 135 Uniforum 1988 attendees in Dallas as being used with their Unix systems



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Cameo offers data capture

BY NELL MARGOLIS
CW STAFF

SANTA CLARA, Calif.— Managers charged with quality control responsibilities in manufacturing plants are the main target users for Cameo Systems, Inc.'s new data analysis software for three major lines of minicomputers and the IBM Personal Computer AT.

Dubbed Camstat, the software consists of an integrated set of statistical functions said to allow technicians to capture

Continued on page 26

Accounting series for VAX aired

BY ALAN ALPER
CW STAFF

GARDEN CITY, N.Y. — Computer Associates International, Inc. last week unveiled an integrated accounting package aimed primarily at medium- to large-scale Digital Equipment Corp. VAX users who do not need the full functionality or have the data center resources required of its original Masterpiece family.

Called Masterpiece/ABS, the product line is a VAX/VMS port of Computer Associates' Advanced Business Systems (ABS) line of financial and distribution management software. ABS, which originally was designed to run on Data General Corp. hardware and was later ported to the IBM mainframe environment, was acquired from Stuart P. Orr & Associates in 1983.

While there is some function-

Continued on page 28

Inside

- On-Line Software enhances its Verify CICS QA tool. Page 27.
- Sytec offers accounting package for Wang VS mini series. Page 28.
- Utility to compress data for archival backup added by Information Management Software. Page 32.

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Grochow

CONTINUED FROM PAGE 25

Almost all of the work in tool integration depends on the cooperation of tool vendors. Several provide extract files of your data in an easy-to-use form. Some vendors provide "programmer interfaces," libraries of routines that directly access their dictionary or internal files.

An example of this would be the Excelerator Programmer's Interface from Index Technology, which provides both read and write functions.

Others use industry-standard file-access methods to allow programmers to write their own access routines.

The most notable example of this is the burgeoning use of DB2 as a mainframe data base by vendors of dictionary systems and application generators.

In any event, you will probably need one of your better programmers to design interface programs and make them work, particularly if micro-to-mainframe communication is involved.

Consulting firms are also starting to develop expertise in this area, often as part of their general CASE consulting work.

Specific methods

The most straightforward way of tying two or more CASE tools together is by "exporting" data from one and "importing" it to another.

For example, in some designer workbench products, you can create an ASCII file with some or all of the contents of the design dictionary by issuing a few simple commands.

The file can then be read by programs to extract information or transform it into a format required by another tool — for instance, an application generator or mainframe dictionary system. The chart at left shows a schematic of this process.

A more direct form of integration involves accessing a tool's internal files directly. Unless you are into reverse-engineering commercial software tools, this method requires a vendor-supplied programmer's library.

While few vendors provide these today, there is a clear trend in this direction as vendors realize that this is one way of satisfying their users' unmet needs as well as "locking in" customers to that particular vendor's tools.

Once you have created a number of custom interface programs, you are likely to try to protect your investment by staying with that vendor. The chart above shows an example of how this might work.

Of course, in both of these methods, you have to be aware of any changes in file formats or routine calling sequences from one release to the next. This is particularly painful when vendors introduce import/export capabilities or programmers' libraries without determining the full range of what their users want or need.

Dream fix

The most desirable kind of integration is one that unfortunately isn't commercially available, namely a CASE environment in which tools of different kinds from different vendors all share the same central data base or repository.

When the designer workbench puts design information in a repository, which is also accessed by the application generator, our problems will be solved.

Recent rumblings from IBM indicate that it may be moving in the direction of providing such a repository, but it will still require a major cooperative effort on the part of CASE tool vendors to bring this common repository CASE environment to fruition.

The Information Resource Dictionary System ANSI standard, developed by the National Bureau of Standards, is one attempt to define what such a repository should look like. The chart below shows what a CASE environment might look like under a common repository standard.

Wrapping up

The issue of tying many vendors' tools together has not escaped the attention of the industry establishment. Currently, it is almost impossible to go to a CASE research gathering without seeing at least one session on standardization of tool interfaces.

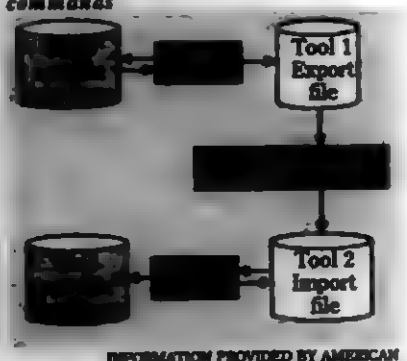
Among other groups, the IEEE Standards Committee on Professional Tools is attempting to develop a framework for tool integration that could be provided by all vendors.

The future will no doubt bring many new ideas for CASE tool environment integration, but until then, "us CASE users" will have to keep rolling our own.

Grochow is vice-president of the Corporate Technology Group of American Management Systems, Inc. in Arlington, Va.

Import-export communication

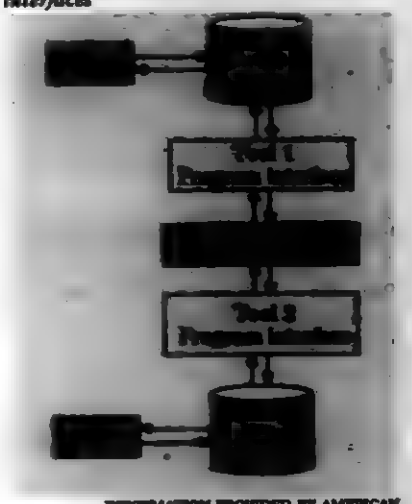
Both CASE tools provide import-export commands



INFORMATION PROVIDED BY AMERICAN MANAGEMENT SYSTEMS

Direct data base communication

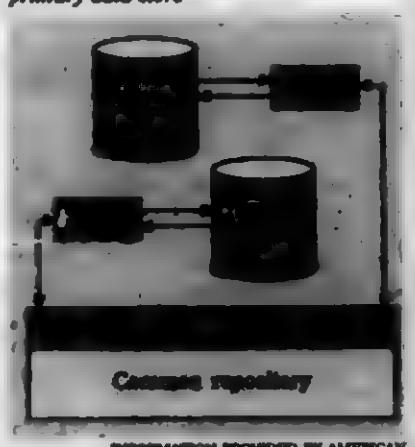
Tool provides direct program-to-program interfaces



INFORMATION PROVIDED BY AMERICAN MANAGEMENT SYSTEMS

CASE tools using a common repository

All tools use a common repository as their primary data store



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Cameo

CONTINUED FROM PAGE 25

data directly from the manufacturing floor. Through a broad range of data manipulation features, it allows engineers to analyze the information collected.

Although Camstat was primarily designed as a statistical process control tool, it also functions as a general statistics package, said Dave Budenaers, director of development at Cameo. Offering a complete set of common statistical functions as well as extensive documentation and reporting features, Camstat offers "about 80% of what the high-end statistical software packages [offer]," Budenaers claimed. The absent 20%, he explained, included "basically, the whole business of experimental design," which is scheduled to be among the enhancements featured in the second Camstat release, due early this summer.

Every manufacturing company has to work within a given set of engineering tolerances, Budenaers said. "What you've got to do is make sure that the variables stay within the tolerances," he said.

The software simultaneously supports parametric, attribute, character and date variables. Data manipulation features let the user create data subsets, change and transform values, filter out subsets of information and restore or switch between subsets with a single keystroke, Budenaers said.

In addition, he said, Camstat's menu-driven structure and full-screen data entry and editing facilities make the software relatively easy to learn and to use, while full-color or shaded-pattern presentation graphics and detailed documentation ability enable users to display results in a variety of charts and graphs and preserve them as reports.

Available this month at prices ranging from $649 to approximately $1,100, Camstat runs on the IBM PC AT, Digital Equipment Corp.'s VAX, Data General Corp.'s MV series and Hewlett-Packard Co.'s 9000 Series 800.

SOFT NOTES

M&D moving, consolidating operations

McCormack & Dodge Corp., currently operating out of two locations in Natick, Mass., said it will relocate its corporate offices to a new $60 million headquarters building in neighboring Framingham, Mass. According to M&D, construction of the 450,000-sq-ft facility should begin in mid-1988, with occupancy slated for mid-1990. The 900-employee firm is making the move in anticipation of continued employee growth.

Micro Data Base Systems, Inc. in Lafayette, Ind., supplier of the MDBS III personal computer-based data base management system, is moving up. The company plans to provide a version for mainframes running IBM's VM later this year through an agreement with **Interactive Data Corp.** in Lexington, Mass.

Amperif Corp. in Chatsworth, Calif., has acquired **HDR Systems, Inc.** in Omaha, producer of a Unix-compatible SQL-based relational data base management system called Noah. Amperif offers the RDM/2 data base machine that interfaces to Unisys Corp. mainframes, minicomputers and PCs.

Prime Computer, Inc. has produced a version of its Information EXL data base management system that runs on the firm's Unix-based supermicro, the EXL 316. The EXL 316 runs AT&T's Unix System V, Release 3 and can run Unix and Microsoft Corp.'s MS-DOS simultaneously.

Execucom Systems Corp.'s IFPS/Plus financial planning and modeling package is available on the **Apollo Computer, Inc.** family of Domain 3000 and 4000 workstations, spokesmen for Execucom said.

Teseract Corp., the human resource software supplier that is a subsidiary of The Prudential Insurance Company of America, has announced that its product line will support operations with IBM's DB2 by June.

Cybermation, Inc. is offering its Execution Scheduling Processor in five subsets priced from $3,000 to $7,000. The job scheduling package is being offered in pieces for the smaller, budget-conscious user, according to Tina Rogers, manager of marketing and sales at the Markham, Ont., firm.

Natural Language, Inc. has ported its NLI Datatalker to the Sun Microsystems, Inc. Sun-4/110 workstation. Datatalker is used for natural language queries to data base management systems.

MAI Basic Four, Inc. in Tustin, Calif., has acquired the credit union applications of **The Computer Group Ltd.** in Anchorage, Alaska. According to the company, the applications are licensed to 100 credit unions in the U.S. to run on MAI Basic Four computers.

On-Line Software boosts CICS tool

BY SUZANNE WEIKEL
CW STAFF

FORT LEE, N.J. — On-Line Software International, Inc. recently added features to Verify, its CICS quality assurance tool, designed to support more output devices, strengthen large-volume testing capabilities and simplify use.

According to a company spokesman, Verify helps ensure proper functioning of new or modified CICS applications. Designed for interactive operation, the tool enables a programmer to react immediately to differences in test results rather than browse through the differences after they occur, the spokesman said. Programmers can choose to use on-line or batch-mode testing.

Release 3.0 of the software provides support for additional terminal types used in rerunning test cases. In addition to the IBM 3270 terminals supported by earlier versions, Verify now supports IBM 3600, 4700 and TWX sequential devices that are used as banking terminals, automated teller machines and teletypewriters.

Applications testing made easy

A utility intended to simplify testing for applications that generate numbers has been added. Called Store and Forward, the utility allows the user to take work-in-progress fields from an output screen during a Run function and place them in subsequent input screens. A Run Screen Exit feature for further customization was added.

Other features include the ability to run test streams using real terminals as well as virtual terminals and the ability to capture production transactions for reexecution and forward recovery in addition to a selection screen said to allow a user to choose screens for either browsing or editing.

Verify was originally released in 1985. A permanent license for the DOS environment costs $25,000; for the OS environment, it costs $37,500. Release 3.0 is available immediately.

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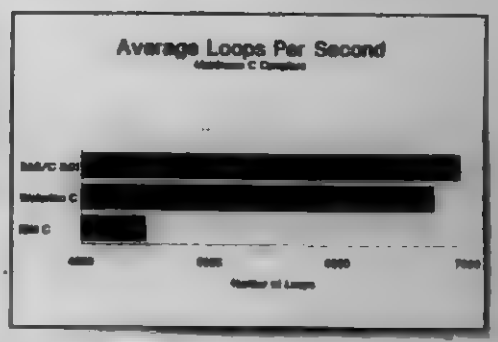

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CAD/CAM bundled for desks

BY NELL MARGOLIS
CW STAFF

BEDFORD, Mass. — Computervision Corp. is repackaging the most often used portions of its Computer Aided Design and Drafting System, or CADDS, software and bundling it with the recently introduced Sun Microsystems, Inc. Sun-3/60-based Model 33 workstation to offer individual computer-aided design and manufacturing (CAD/CAM) users a niche-specific, desktop CAD/CAM package.

Aimed at the mechanical, electronics, architectural, engineering and construction markets, the Professional Series Caddstation systems are available now at prices ranging from $29,900 to $45,000 with a monochrome monitor and $31,900 to $45,000 with a color monitor.

The series comes in three flavors. Professional Designer gives the user a two- and three-dimensional design and drafting system with multiple views and a second, more sophisticated level that further allows the user to use common surfaces with fillets and blends.

Professional Mechanical Engineer packages physical properties calculation, finite-element modeling and analysis and documentation features with an engineering calculator that can perform symbolic computing.

Professional Machinist, targeted at 2- and 2½-axis milling and turning applications, lets manufacturing engineers create tool paths for parts designed with the aid of CADDS software.

Interface adds windows

All Professional Series software includes the menu-oriented mouse-driven Computervision user interface, which features icons and windows, a company spokesman said.

Moreover, Professional Series applications all generate complete CADDS data bases. As users contribute information, the Professional CADDS Interface reconciles and updates the central data base.

Built on industry standards, the system runs on Unix, across Transmission Control Protocol/Internet Protocol and Ethernet and complies with the Network File System standard.

Order tracking tool runs on Wang VS

HAVERHILL, Mass. — The latest offering from Wang Laboratories, Inc. VS-based software manufacturer Sotas, Inc. is a purchase order and receiving package that is integrated with Sotas's Accounts Payable software and can be integrated with the Sotas General Ledger financial system, according to the vendor.

Sotas P/O is aimed at allowing users to keep timely, accurate records of purchase orders of any size and type by verifying information and updating the system as data is being input, according to Sotas President Chester J. Domoracki.

The product is based on the purchase order module developed by California-based MCBA, Inc. Already popular on the Digital Equipment Corp. VAX platform, the MCBA module lent itself readily to adaptation to the Wang VS environment, Domoracki said. The software lets the user enter and edit normal and blanket purchase orders as well as receipts, rejections and the reasons for rejections on-line. It reports scheduled receipts, notifying the user when shipments arrive early or contain either more or less product than expected.

Geared toward multiuser and multicompany use, the purchase order package can run reports as a background task, freeing the workstation for other work.

Prices range from $7,000 to $15,000, depending on system configuration.

Accounting

FROM PAGE 25

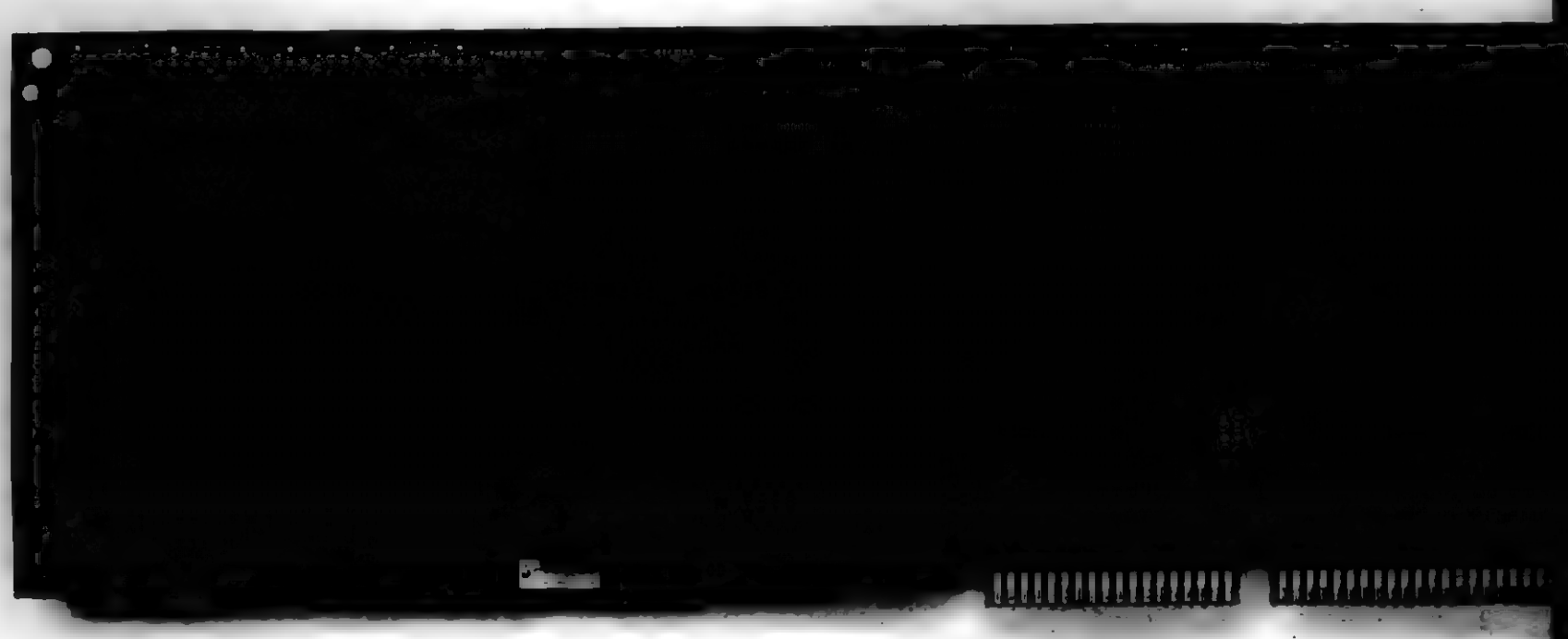
al overlap between Masterpiece and Masterpiece/ABS, the two products complement each other, said Mark Wasilko, senior vice-president of marketing.

The new product line is targeted at smaller, centralized companies with limited data processing personnel because it is easier to install and maintain. Masterpiece is aimed at larger, decentralized corporations, he added.

The package is offered in a modular form, enabling users to purchase only those applications they need. Modules include general ledger, accounts payable and receivable, order processing, inventory control, purchasing, fixed assets and payroll. Each module within Masterpiece/ABS is individually priced based on the size of the VAX used. Module prices range from $8,500 to $30,000, noted Gary Layton, Application Products division marketing manager. Users who upgrade to Masterpiece within three years can apply 75% of their purchase price to the higher end product, Layton added.

Masterpiece/ABS requires VMS 4.2 or higher, RMS file management system, an ANSI Cobol compiler and compatibility with DEC VAX tape and disk drives, Computer Associates said.

As with its Masterpiece line, Computer Associates will offer an interface between Masterpiece/ABS and its Business Decision Software (BDS) line. BDS consists of Ad-Lib, a menu-driven, dictionary-oriented reporting tool; CA-Strategem, a decision support and analysis tool; and CA-Telegraf, a business graphics package. The interface will be available in June and is free to customers, Layton said.



If you're trying to make your LANs run real-time communications to your mainframe, the solution is RabbitGATE.™ Because the brains behind RabbitGATE—an on-board intelligent processor—does all of the communications processing. This means it runs the gateway software without dedicating the PC as a gateway server.

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3090Es in parallel

BY CHARLES BABCOCK
CW STAFF

IBM is offering a compiler that it said enables the company to characterize its 3090E series as parallel processors for general-purpose computing.

IBM has named the compiler and its associated support library Parallel Fortran.

An extension of IBM VS Fortran II, Parallel Fortran analyzes a program and automatically allocates pieces it to multiple processors, according to the company.

In tests using a dedicated 3090 600E, Parallel Fortran was able to speed up a numerically intensive organic chemistry program that had been 97% converted to run in parallel mode.

The program ran nearly twice as fast in parallel — by a factor of 1.9 — using two processors and 5.3 times as fast using six processors, according to spokesmen for IBM's Engineering Scientific Systems Development and Technology Division.

For a high-energy physics program that had been 92% effectively converted to parallel processing, the speed was up by a factor of 1.8 and 4.3, respectively, on the two machines.

A thin-layer fluid dynamics program that had been 89% effectively converted to parallel processing enjoyed throughput improved by factors of 1.8 and 3.9, respectively, the IBM spokesmen said.

IBM's PR/SM

FROM PAGE 25

maintain VM expertise in-house to run multiple systems," said Romney White, president of VM/CMS Unlimited, Inc., a VM software supplier in Boston.

White suggested that PR/SM is a shot at Amdahl Corp., which has been providing a similar capability in its Multiple Domain Facility since 1984.

PR/SM reportedly allows users to split a 3090E model into four logical partitions. Multiprocessor 3090s could run up to four operating environments on each side of the system for a maximum of eight.

For those 3090E shops interested in the PR/SM feature as a substitute for VM, the monthly savings will be $4,500, which is the monthly fee for VM/XA. There is also a savings from eliminating the need for VM expertise in the MIS department.

The PR/SM hardware option costs between $60,000 and $200,000, depending on the CPU.

"We're not lessening their dependency on VM," Wilson said. "We're giving them more options beyond VM. If users need other VM capabilities, we're telling them to continue with VM."

PR/SM is a renamed and enhanced version of the Multiple High Performance Guests Support (MHPGS) feature that IBM announced with VM/XA last year.

In both cases, up to four operating systems can function as preferred guests, achieving "near native" performance, according to Wilson. Previously, only one guest operating system was designated as "preferred," while other operating systems would run at approximately half the performance they could achieve in native mode.

MHPGS will be available to VM users as PR/SM, Wilson added.

BMC offers IBM alternative

BY NELL MARGOLIS
CW STAFF

SUGAR LAND, Texas — BMC Software, Inc. says it created Reorg Plus for DOS/VSE to give DL/1 data base users a faster, more efficient alternative to IBM unload and reload utilities. According to early users, the company has succeeded:

"We had a file with two to three million records. Every time we reorganized it, it took us seven or eight hours," said Gene Sobota, senior systems program manager at Murrysville, Pa.-based Beckwith Machinery Co.

"Our only alternative was IBM's utilities, so that's what we used," he said.

The reorganization task was so time-consuming and unwieldy, Sobota said, that he was willing to try BMC's product as soon as he heard of it, on the off chance that it might actually meet its claim to beat IBM's time. Soon after he bit, Sobota bought.

"With Reorg Plus, we've got the job down to about three hours and 15 minutes. On a small, 51-file data base, we did the whole reorganization process in five minutes. Before Reorg Plus, it would have taken us at least two hours," he said.

The substantial speed increase, according to a BMC spokeswoman, lets users reorganize files more often. Frequent reorganizations, in turn, lead to improved data base performance, not to mention less off-line time.

The Reorg Plus package, which supports all current versions of DL/1 and DOS/VSE, includes separate unload and reload utility programs and a load program interface. Search algorithms let the user control the placement of segments in the data base, reducing total I/O necessary for data retrieval, a company spokeswoman said.

"Before we had Reorg Plus, it took us 20 to 25 minutes to run a program just to find out if we had a problem," Sobota said. "That was just to get a print. We'd still have to go in there and flag the error for deletion." The BMC software "gives us a printout that tells us whether or not there's an error and, if so, exactly where it is."

Reorg Plus for DOS/VSE is available immediately at prices ranging from $5,850 to $15,600, depending on CPU.

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NEW PRODUCTS

Systems software

A Unix version of the **Stata** statistical, data management and graphics software program has been introduced by **Computing Resource Center.**

According to the vendor, Stata is capable of performing analyses on data sets of up to 32,000 observations.

Stata will be available for Sun Microsystems, Inc. workstations and the Digital Equipment Corp. VAX, according to Computing Resource Center. Prices range from $2,500 for a five-user license to $8,500 for a 100-user license.

Computing Resource Center, 10801 National Blvd., Los Angeles, Calif. 90064. 213-470-4341.

Version 5 of the **Integrated Manufacturing System** for custom-build manufacturers has been introduced by **Computer Covenant Corp.**

In Version 5, application programs have been bound into one executable image, and virtual memory is used to speed processing.

Included in the system are hardware-independent ANSI terminal support, a menu switching procedure and an application-driven security system. The system includes Quotation Tracking, Order Processing/Inventory/Invoicing, Bills of Material/Routing, Materials Inventory/Purchasing, Tool Inventory, Job Cost/Tracking, Production Planning/Control and Financials.

Prices range from $1,000 to $3,500 per module.

Computer Covenant, 4 Forest Park Drive, Farmington, Conn. 06032. 203-677-6563.

Utilities

A mainframe computer software utility that compresses data for archival backup has been announced by **Information Management Software, Inc.**

Dascomp runs as a batch program under the IBM MVS/XA operating system. According to the vendor, it compresses either fixed- or variable-length records within sequential or partitioned data sets to an 8-1 ratio. It will compress either ASCII or EBCDIC text files and operates on a file by file basis.

Dascomp is priced at $18,000.

Information Management Software, Suite 223, 2899 Agoura Road, Westlake Village, Calif. 91361. 818-991-4246.

A performance and maintenance tool for the IBM IMS DL/1 Database Administrator has been introduced by **The Schumann Consulting Group.**

DBC runs as a batch program in an IBM MVS or MVS/XA environment. It provides data base and volume free-space analysis, record length distribution and root and segment pointer validation. It also provides a detail and summary tracing with response times for DL/1 calls at the segment level, the vendor said. DBC is viewed online through a series of IBM ISPF panels. Help screens are included.

The fully configured version of DBC costs $30,000.

The Schumann Consulting Group, 333 Sylvan Ave., Englewood Cliffs, N.J. 07632. 201-569-7335.

SCIENCE/SCOPE®

NASA's Magellan Mission will carry only one scientific instrument during its detailed mapping exploration of the planet Venus. The Hughes Aircraft Company-built synthetic aperture radar (SAR) will gather data in greater detail than any of the previous 20 U.S. and Soviet Venus probes. It will transmit images 30 times sharper than those gathered by the Hughes-built Pioneer Venus, which provided the first extensive scientific study of the planet. In a fixed polar orbit, Magellan will take 243 days to map nearly all of the planetary surface, taking pictures for 37 minutes during each of its three-hour orbits. The remaining time in orbit will be spent transmitting the data back to scientists on Earth.

Revolutionary "smart skins" will integrate avionics and sensors directly into the skin and structure of future aircraft and space vehicles. As part of the U.S. Air Force's Project Forecast II, Hughes is working with the USAF Avionics Laboratory to develop concepts and applications for a new generation of avionics. Systems using these technologies will provide levels of performance, reliability, and fault tolerance not possible in current conventional avionics systems.

A focal plane module for a long-wavelength infrared sensor designed for space surveillance is capable of withstanding high radiation levels. Developed for the Strategic Defense Initiative Organization, the Hughes-built module is the heart of the sensor, and can detect and survive radiation resulting from a nuclear detonation or radiation that is naturally present in space. The key to its survivability is a new radiation-hard, silicon material prepared with gallium or arsenic. These detectors are thinner than conventional ones, allowing most high-energy radiation to pass through them without creating false signals.

A speech-recognition system developed at Hughes is capable of saving approximately $1.5 million per year in data entry and handling costs alone. After successful prototyping, the system was put on line in radar assembly areas. The voice input system allows inspectors to describe problems in plain language to personal computers, which have vocabularies of up to 1,000 words each. The computers give verbal instructions, repeat the inspector's words for verification, and then record the information. This lets operators keep their eyes and hands on the products they are inspecting. It is estimated that paperwork will be reduced 80 to 90 percent, and human errors caused by manually typing information into the computers will be eliminated.

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MICRO BITS

Douglas Barney

Letting the users decide

What if users called the shots? Every time a product is late because of overambition or wreaks havoc because of major incompatibilities, close your eyes and imagine what the world would be like if users called all the shots.

First of all, vendors would be either shot or penalized $500 per package (even on a $150 package) for every instance of copy protection. They would also be penalized — say, for the cost of a free upgrade — if they charged for support or used new file formats incompatible with the rest of your applications.

Bugs due to poor quality assurance testing would merit a coupon giving you half off the vendor's competitor's product, and late products would come bundled with 10 shares of the company's preferred stock.

If users had their way, every program would share an interface that wouldn't be bit-mapped, documentation would make sense, and support lines would be open.

Put a user in charge of a major software vendor and preannouncements would cease. Instead, the company would

Continued on page 36

Microsoft ships PC booster

Mach 20 ups desktop units' memory, provides hardware for OS/2, Excel

BY STEPHEN JONES
CW STAFF

REDMOND, Wash. — Microsoft Corp. gave low-end personal computer users a high-performance boost last week by releasing its Mach 20 Performance Enhancement System accelerator board.

The add-in card is aimed at upgrade-hungry users of Intel Corp. 8088-based IBM Personal Computers or fully compatible machines who want more memory and horsepower on their desktops. The Mach 20 gives users the hardware needed to run next-generation programs that would otherwise be out of reach, including Microsoft's Excel and the MS OS/2 operating system.

The board should help Microsoft gain acceptance for its advanced software programs in the low-end 8088-based market, which makes up the bulk of today's installed base of PCs.

The Mach 20 consists of an Intel 80286 microprocessor, 16K bytes of cache memory, a 16-bit data bus and Microsoft's Inport Mouse interface. The base unit costs $495 and is available now.

But end users who want to run Excel and OS/2 will have to buy an expanded memory board, priced at $395, to handle the extra load of those programs, according to Microsoft. The Memory Plus board is compatible with the Lotus/Intel/Microsoft Expanded Memory Specification 4.0 and can support up to 3.5M bytes of memory, according to Microsoft.

Although the Mach 20 can run on IBM PC XTs and such compatible machines as the Tandy Corp. Tandy 1200, Microsoft is not making any promises of widespread compatibility with clones. "We're entering the market with caution," said Rich Abel, senior product manager

Continued on page 38

Data View

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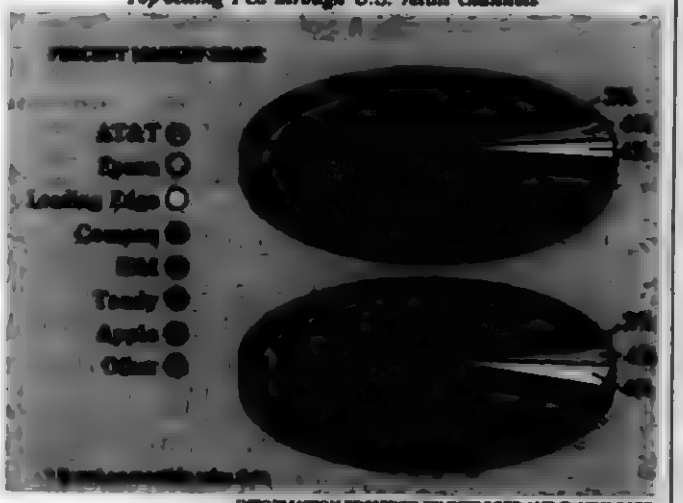

INFORMATION PROVIDED BY INFOCORP AND TANDY CORP.
CW CHART

Powerhouse goes to PCs

BY NELL MARGOLIS
CW STAFF

OTTAWA — Cognos, Inc. recently said it will go after workstation users and independent software developers with a microcomputer version of its Powerhouse fourth-generation and application development language that runs under both Microsoft Corp.'s MS-DOS and IBM's OS/2.

According to Cognos, nothing was lost in the translation of the popular mid-range-based software package to the personal

Continued on page 38

User gives Graph Plus thumbs-up

BY ALAN J. RYAN
CW STAFF

RICHARDSON, Texas — Micrografx, Inc. is shipping beta-test versions of Graph Plus, an enhanced version of its Windows Graph product that incorporates full support for Microsoft Corp.'s Windows 2.0 user interface.

The general release version of the product will be available in April, according to George Grayson, president of the company.

Graph Plus's Windows support includes the Windows 2.0 Multiple Document Interface and Dynamic Data Exchange, Micrografx said.

One user at a large West Coast company uses the Graph product for business sales projections charts and engineering scatter plots. He said a particularly useful feature of the product is its ability to import data from his IBM mainframes. For the company's business require-

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Inside...

- Faraday president reviews pros, cons of Micro Channel-compatible chips. Page 35.
- HP makes impression with low-priced laser-quality printer. Page 35.
- NEC enhances APC IV Powermate 1 PC. Page 40.

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MICRO BITS

Alan J. Ryan

Marriage of inconvenience

OS/2 is like a second marriage for MIS, but as in the days of bigamy, the first spouse is still lurking around, continuing to make particular demands.

But instead of supporting two wives, MIS departments face the equally arduous task of implementing and supporting the next-generation operating system while also supporting various versions of DOS.

Jim Danielson, supervisor of information systems at Bendix in Elyria, Ohio, says the entire OS/2 migration is a nightmare. However, he adds, waiting will only make matters worse. The longer he waits, the more Microsoft MS-DOS data he'll have when he decides to convert to OS/2. Other managers concur.

Although there are many who will not implement OS/2 until Extended Edition 1.1, incorporating the Presentation Manager, is available in November, some MIS managers have already started planning for OS/2. Careful consideration is being given to bringing the operating system in smoothly while phasing out the comfortable but somewhat backward world of MS-DOS.

Weaning users from MS-DOS could prove to be the most difficult and time-consuming challenge of all. Danielson says that even though his company's 500 MS-DOS users generally have few problems because of a

Continued on page 38

Legal hassles don't deter Faraday from chipping away at PS/2 clones

The race for dominance in the IBM Personal System/2 Micro Channel clone market is already on, months before any vendor has dared to release such a potential hot potato.

Silicon suppliers such as Western Digital Corp., through its Faraday Electronics division, and Chips and Technologies, Inc. are on the verge of delivering their Micro Channel-compatible chip sets. In addition, virtually every major microcomputer vendor is reported to have a PS/2 Micro Channel look-alike in the works. However, one big question remains: What are IBM's lawyers going to do when a PS/2 clone hits the stands?

West Coast correspondent James A. Martin recently talked with Faraday's vice-president and general manager, Collier Buffington, on the legal, technical and manufacturing aspects of developing a PS/2 Micro Channel-compatible chip set and selling it to vendors.

Faraday's Buffington *says there's no mystery behind the Micro Channel*

Back in October, Western Digital announced it would release its PS/2 Micro Channel chip sets early this year. What is the status of the chip set now?

The first chips are in, and we're analysing them now for compatibility. By industry experience, compatibility testing really never stops, but we expect to be shipping commercial chip sets in late April or early May.

How many OEM vendors have your chip set in hand now? How long have they had it?

We have released early silicon to a small number of OEMs that have major commitments and the engineering resources to help us with the compatibility issues. What we have out now are prototypes. There have been a few minor compatibility problems so far, but nothing major.

Can you say when we can realistically expect PS/2 Micro Channel compatibles to be announced by vendors using your chip set?

Probably in the May-June time frame. There will be a few manufacturers that will move aggressively; others will not feel an absolute pressing need. The rollout of Micro Channel products is going to start in May and most manufacturers will have something out by February 1989.

Continued on page 38

Deskjet makes impression in small-scale printer market

BY JAMES A. MARTIN
CW STAFF

By essentially offering laser-quality text and graphics in a printer priced at less than $1,000, Hewlett-Packard Co. seems to have a hot new product on its hands. The printer's prospects should also improve with the addition of much-needed drivers to many software packages currently not supported by the Deskjet.

The HP Deskjet, announced last month, is already causing talk in the personal computer world. Priced at $995 and below, the thermal ink-jet printer boasts the ability to print text and graphics with resolution close to that of HP's Laserjet printers — but at half the cost.

Printing 2 page/min, as opposed to the Laserjet's 8 page/min, Deskjet is aimed at individual publishing needs and is not suitable for networking environments. Its goal is to offer a quicker, higher quality alternative to dot matrix and letter-quality printers for light word processing, spreadsheet and graphics applications; on several counts, users said it exceeds admirably.

"I needed a printer that

would handle complicated graphics that were scanned in from my HP Scanjet, one that would handle Chinese as well as English text. People are coming from all around the office to use my printer," said Michael Sano, professor of Asian religions at the University of Hawaii in Honolulu.

Most Deskjet users did not want to invest in a laser printer but were dissatisfied with slower dot matrix and letter-quality machines. "I didn't want to go the extra money for a laser printer in upkeep and in initial price," explained R. W. Kuhnemund, owner of Pro-Optics, an optical supplier in Ormond Beach, Fla. "The number of pages I needed to print was relatively small, so this printer was recommended to me, and the resolution is excellent." Although Kuhnemund admitted Deskjet's output is not as good as a laser printer's, he said it is "as good as any letter-quality printer I've ever seen."

But the printer is not problem-free. Because Deskjet is

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OS/2 pours foundation for data base servers

Last of a two-part series.

BY RICHARD FINKELSTEIN
SPECIAL TO CW

ANALYSIS

Last week, we discussed the importance of a new breed of products, called data base servers, that run on microcomputers and exploit SQL's capabilities for data integrity and the efficient manipulation of data. We also touched on the approaching standardization of SQL, which will provide advanced communications and applications portability. This week, we will discuss the specific applications this technology makes possible.

A big boost for users and application developers will come from the open nature of the newest SQL products. Microsoft Corp., Lotus Development Corp. and IBM all support open architectures with SQL interfaces, allowing vendors to build standardized SQL interfaces that can access any or all of these servers. This allows vendors to leverage their development costs against a larger user base.

They are also freed from the costly task of building and maintaining their own data base managers and can concentrate their resources on building advanced end-user tools. This will ultimately translate into low-cost end-user products that can be brought to market much quicker and at very reasonable costs.

Data base servers will also accelerate the trend toward integrated application software. Users will be able to choose from any number of tools from different vendors, all of which will be able to access and share information from the same server. We will see traditional applications such as spreadsheet, data base and word processing merging with image and audio processing — all combined with object-oriented front ends.

Vendors that have many years of experience developing graphical interfaces on Apple Computer, Inc. Macintosh computers will be able to transfer their technological know-how to Microsoft's OS/2 Presentation Manager. Packages such as Odesta Corp.'s Helix data base management system or Geoquery software, which creates a map metaphor for data based on ZIP codes, can be ported to the Presentation Manager and then linked to the data base server using SQL.

Vendor support

Major software vendors such as Microsoft, Lotus, Borland International and Ashton-Tate Corp. will be introducing suites of integrated software that will access the common data base server information. Users will be able to mix and match as desired. In fact, Oracle Corp. is already delivering an add-in product that links Lotus's 1-2-3 to an Oracle data base.

Hardware advances will also make new applications possible. For example, IBM Personal System/2 Micro Channel hardware, which can accommodate multiple processors, will make possible specialized boards for the server that will support artificial intelligence applications, high-transaction fault-tolerant systems or automated data backup requirements. The Micro Channel can also support high-density storage media, such as optical disks, that can be used to store graphic, image and audio data.

Application developers can look forward to new, highly portable fourth-generation tools that

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Barney

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answer inquiries about product plans honestly and directly.

If users ran IBM, the Micro Channel would work with existing boards, and IBM would help others clone its machines. If users ran Apple, Macintosh clones would be in abundance and would actually offer color at a low cost.

Most of all, OS/2 would have been here two years ago, perhaps without a compatibility box, and would run quickly on the orginal 6-MHz IBM Personal Computer AT. "Look-and-feel" litigation would come to a swift end.

And everything would be cheaper and work.

The clones are coming! When IBM announced its Personal System/2 line last year, analysts and cloners predicted that PS/2 clones would arrive in about nine months. Well, nine months are almost up, and guess what? The clones are almost here.

According to a key source in the clone community, nearly a dozen silicon manufacturers — including the usual suspects, such as Intel, Western Digital and Chips and Technologies — are working on chip sets. Several firms are working on the BIOS, and some hardware manufacturers such as Compaq are doing all their own work.

This groundswell of development may well propel the Micro Channel into standardom by the 1990s, but like the older PC XT and AT, it won't be just IBM's standard.

If cloners do the job right and manufacture with surface-mount technology, the clones could be more advanced than present-day systems and could cost less. Also, the selection of PS/2 clones could put the customers back where they belong: In the driver's seat, pressuring IBM to drop its prices and advance its technology further.

But like the early days of IBM PC clones, there is a very real possibility that these machines will be less than compatible, and that users will be less than happy with them. The key test will be whether these machines can run IBM's unshipped, but nonetheless strategic, OS/2 Extended Edition or whether IBM will use some fancy footwork to prevent that.

Adolescent upgrade. A recent *Businessweek* article on Lotus President Jim Manzi's toughness (could have called him Macho Manzi) elicited a letter from a Lotus customer complaining about the firm's messy upgrade from 1-2-3 Release 1A to Release 2. Well, Jim called this customer to learn more about the problem and found out that the author was not a leading MIS professional but rather a 17-year-old who works at a drugstore. I guess this guy is not a hot prospect for 1-2-3/M.

By the time it gets here, we'll know how to use it. Noted Dbase aficionado Adam Green makes a good living teaching users the ins and outs of the current version of the popular data base management package. Knowing a good thing when he sees a pre-alpha-test version, Green has announced a course on Dbase IV, using an advanced version of the product provided by Ashton-Tate. The final version isn't set to ship until July.

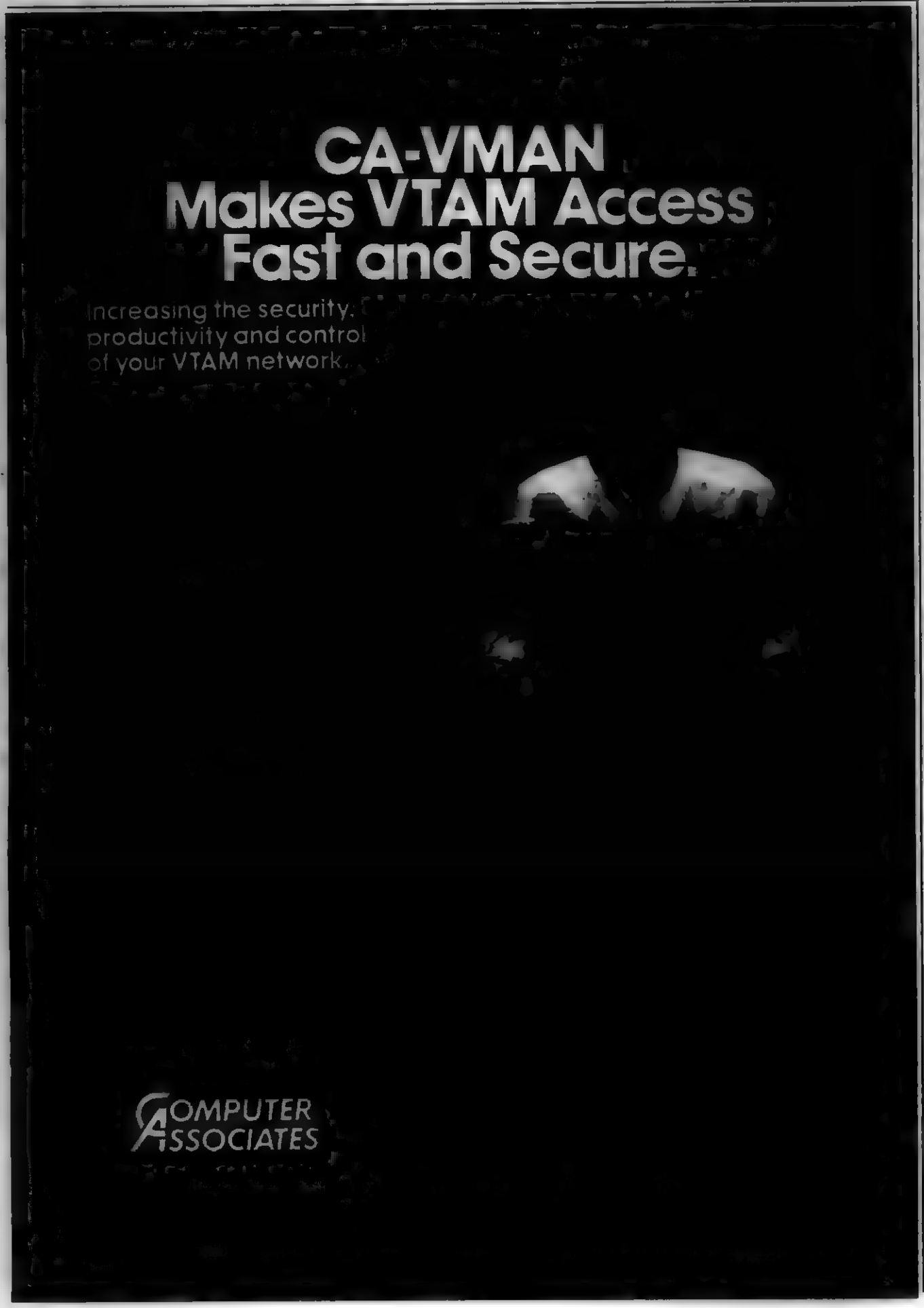
Green will cover the product's unique features, including SQL, applications generation and better networking. Say, how does that bug work again?

You gotta love this guy. Nobody can speak quite so eloquently as a true Texan, and Tandy Chairman John Roach is no exception. While software vendors and users have railed somewhat awkwardly against lawsuits that seek to prevent copying of software users' interfaces, Roach reduced the issue to two simple sentences.

"Lotus took 'look-and-feel,' a romantic term, and turned it into fighting words. Such terms ought to be left to male-female relationships."

You can write this column any time, John.

Barney is a *Computerworld* senior editor, microcomputing.



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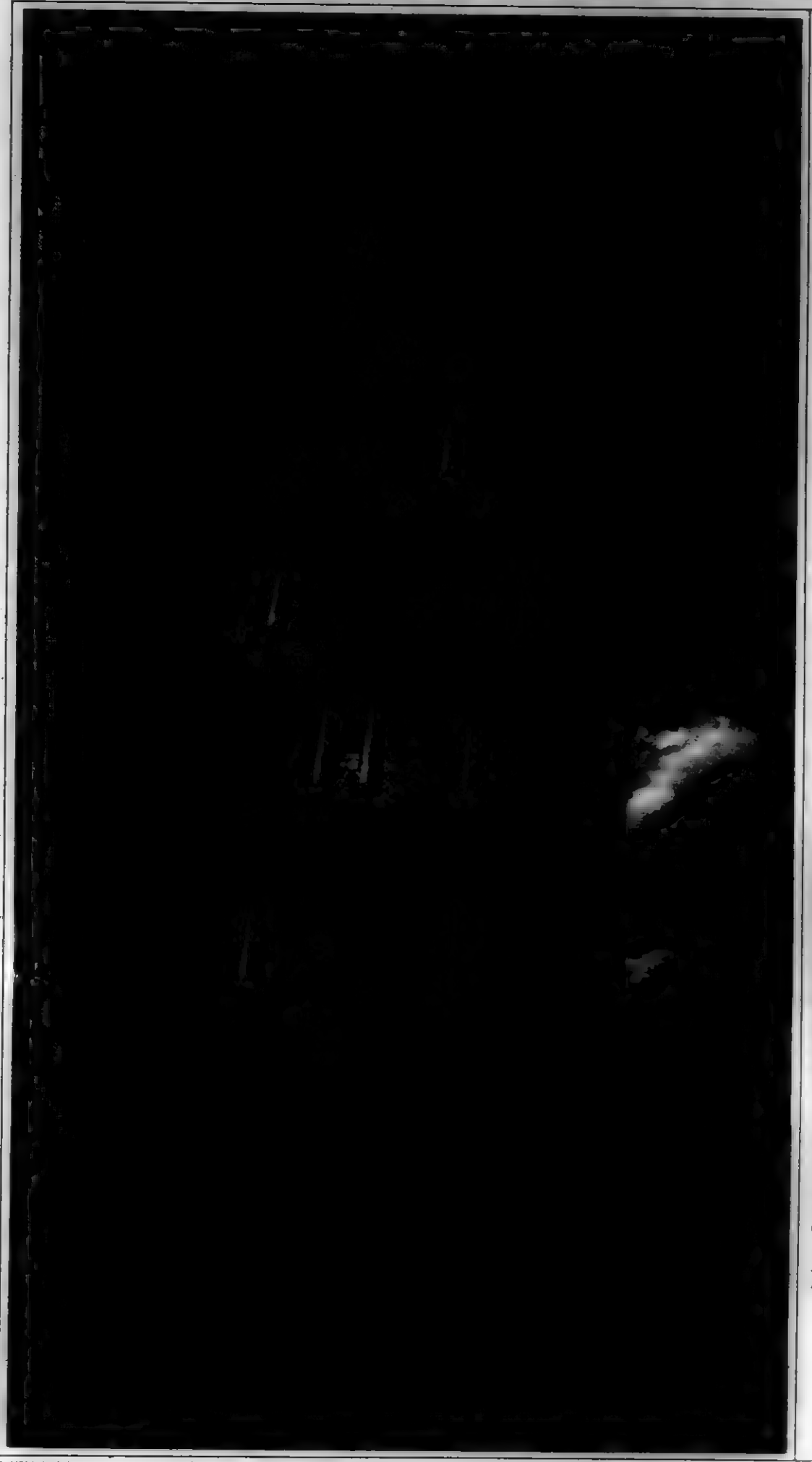

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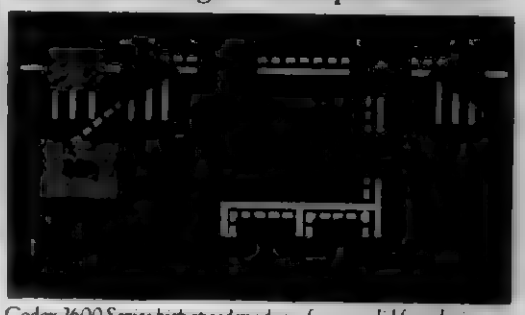

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OS/2

FROM PAGE 35

are explicitly designed to take advantage of the set-processing capabilities of relational data base servers.

Contenders

Ashton-Tate has already indicated that it will enter this arena with a portable Dbase IV. The firm will be competing against products such as Gupta Technologies, Inc.'s SQLwindows or similar development tools that are likely to be announced by Lotus, Borland and Microsoft.

Data base servers encourage both software and data integration. Again, SQL is fundamental to this link. SQL provides a common inter-data base language. Different dialects of SQL will complicate communications somewhat, yet by consolidating around IBM's DB2 SQL syntax, vendors can build the necessary links. Users who purchase DBMSs that only support subsets of SQL may find themselves locked out from the technology.

For IBM host-oriented applications, IBM's OS/2 Extended Edition lays a solid foundation for seamless access to distributed data between IBM's DB2, SQL/DS and OS/2 Extended Edition relational data bases. In this environment, OS/2 data base servers will be able to support moderate-volume departmental computing and be linked to mainframe hosts for high-transaction systems at the same time.

Answers for today

For those who need remote data access today, Gupta's SQLnet allows SQLbase application developers to transparently access other SQLbase servers as well as DB2. Both Relational Technology, Inc. and Oracle offer distributed data base technology that can link their data base servers and provide gateways to other relational data bases.

Network Innovations, which was recently acquired by Apple, is also promoting its SQL-based CL/1 language as a standard interserver communications language. Several firms already offer CL/1 links: Apple has Hypercard, Blyth Omnis 3.

Macintosh users will also benefit from server technology. They will have the ability to access SQL data base servers on shared networks such as Appletalk and 3Com Corp.'s 3Com+. Organizations should consider planning for this new environment now. Proper planning can help preserve hardware, software, installation and training costs. Migration can be accomplished either gradually or rapidly, as needs require.

Software vendors including Microsoft and Ashton-Tate have already announced moderate upgrade policies. Plans should be made to turn MS-DOS machines into workstations and introduce OS/2 computers as potential high-end workstations or servers.

Micro Channel hardware, OS/2 multitasking and SQL data base servers form the foundation of this new era in information processing. Although the equation is not complete until the new application products become available, the future for information processing shines bright and points in the direction of data base server processing.

Finkelstein is vice-president of Midwest operations in Chicago for the Codd and Date Consulting Group.

Faraday

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Have legal issues kept any big orders from coming in?

All that uncertainty does affect us, because some vendors are concerned, some are not. Some feel they have reasonably strong patent licensing agreements with IBM and can proceed with no problem. I know of no company that is not working on a Micro Channel product. Whether they actually bring one to market, I don't know.

Have you in fact received any big orders, something that would indicate that a PS/2 compatible using your chip set is definitely in the works?

We have design commitments from several major manufacturers — a mixture of American, Asian and European firms.

What, if any, are the differences between the PS/2 Micro Channel-compatible chip sets offered by Western Digital and those by Chips and Technologies or others?

Ours offers a higher level of integration and requires fewer external parts to develop PS/2 products than other chip sets do. Therefore, the cost to build a system is lower. Our technology is 1¼ CMOS gate-array semiconductors, which means it's easy to build a laptop or any other low-power system.

In your efforts to reverse engineer the Micro Channel, have you made any interesting discoveries or gained any special insight into the inner workings of that architecture?

The technology is really not that mysterious. What separates the Micro Channel from the [IBM Personal Computer] AT bus are three big areas: the direct memory access controller, the programmable option select that lets you install add-in cards without setting DIP switches or jumpers and the central arbitration control point, which is the logic that allows you to have multiple masters. None of this is new or revolutionary; the Micro Channel is an evolutionary product.

What kinds of end users will buy a PS/2 Micro Channel compatible? Why should they take all the risks with lawsuits, incompatibilities with OS/2 Extended Edition and so on just to save a few bucks?

I think they will be skeptical initially, but once sound products are out there, they will come around. The big users — banks, airlines and so on — are buying tens of thousands of machines per year, so it's not merely a cost savings to them but also a means of control over IBM. These big companies using IBM's architecture have always gone out and bought massive amounts of products from compatible vendors; it's their way of keeping IBM honest, forcing them to provide good, quality service and be competitive.

Powerhouse

FROM PAGE 33

computer environment. "All of the modules, all of the features, are there," said Christopher Fedorko, product marketing business manager at Cognos. Powerhouse currently has 9,000 installations.

According to an early user, Cognos is not kidding. "It's Powerhouse — the same features, the same syntax," said Suzanne Harman, vice-president of AH Computer Services, Inc., a Powerhouse PC beta-test site.

Powerhouse PC includes a data dictionary, a dictionary reporter, a screen design and data input module and a volume transaction processor and report writer. In addition, Fedorko said, Cognos reengineered the product for the microcomputer environment, adding a terminal emulator, a source-code transfer facility and a data, file and application transfer facility.

In the first PC implementation, Powerhouse offers Hewlett-Packard Co. terminal emulation; subsequent versions will bring on emulation of Digital Equipment Corp.'s VT220 and VT100 and Data General Corp.'s Dasher D 400.

Harman encountered some problems during the beta test that she said Cognos has worked aggressively to solve, and did.

Available immediately at $1,295 for a single copy and with multiple-copy discounts, Powerhouse PC runs on IBM Personal Computer ATs or compatible Intel Corp. 80286- and 80386-based machines.

Deskjet

FROM PAGE 35

new, only a handful of software drivers exist to interface the printer with software applications, forcing those who use the less popular programs to depend on the Laserjet driver or an Epson America, Inc. FX80 emulation cartridge offered by HP. The latter methods do not always take advantage of the Deskjet's specific capabilities, causing some minor problems with, among other things, font selection.

"HP tells me it won't be a problem much longer, as they are working on writing software drivers for most applications," Kuhnemund said.

"It seems to be a case of the hardware coming first and the software maybe will follow," he added. "If a complete beginner bought this printer, I don't think he would be very satisfied at the fact he simply bought a $1,000 letter-quality printer that makes very little noise."

Another user expressed dissatisfaction at the printer's handling of envelopes. "For some reason, when you feed in the envelope and send the signal to the printer, the envelope comes out once with nothing on it, and you have to feed it back in a second time before it is printed," said Charles Raub, sales and marketing manager at Air Conveying Corp. in Memphis. "But," Raub said, "that is my only complaint about the printer. I'm happy enough with the Deskjet not to scream about the envelopes."

Graph Plus

FROM PAGE 33

ments, he said, Graph seems to be the best product on the market. But in the engineering side of the business, "We're looking for more applications than Graph offers," he added.

Enhancements the user said would be useful in future versions include batch processing similar to that offered in Microsoft's Excel, macro capabilities and improved text processing.

According to Micrografx, Graph Plus's features include an integrated drawing editor, the ability to add or replace data in existing charts and bit-map support. Graph Plus also offers desktop presentation capabilities through its device driver support for the Videoshow Presentation System from General Parametrics Corp.

Suggested hardware requirements for Graph Plus are an IBM Personal Computer AT or compatible with a mouse, an IBM Enhanced Graphics Adapter or Video Graphics Array card for color, a graphics monitor and a printer.

Graph Plus reportedly supports all I/O devices that are compatible with Windows, including graphics cards, graphics displays, mice, light pens, digitizing tablets, plotters, color printers, laser printers and dot matrix printers. At $395, Graph Plus is a little pricey, the user said, but he added that Micrografx offers discounts. The Videoshow driver retails for $99.

Microsoft

FROM PAGE 33

for Microsoft's hardware group, who added that other machines are being tested for compatibility.

Microsoft will release a $325 port of its OS/2 Standard Edition 1.0 in the second quarter of this year that is tailored to run with the accelerator board, he said.

Conceding that most users of old 8088-based PCs probably do not want to spend more than $1,000 on upgrades, Abel said Microsoft is bundling the Mach 20, Memory Plus board and Excel for $995.

But Microsoft might have a hard sell when users tally up the total cost of the upgrade. Including the operating system and add-ons, the package costs more than $1,300. And that does not include the cost for such programs as Excel and other hardware upgrades needed to handle the memory-consuming graphics of the OS/2 Presentation Manager.

Ryan

FROM PAGE 36

menu-driven interface his department has set up for them, they may still feel the pinch when the serious OS/2 implementation hits the fan. They'll have fewer people to answer DOS users' questions, he says.

In some shops, support costs alone with OS/2 could rise as high as 50% to 60% of the overall implementation price for the first year, predicts Michael Reilly, assistant vice-president of office systems at Metropolitan Life in New York. At first, the operating system will be a challenge for Met Life's applications programmers, who will need additional support.

But even as more and more applications become available (IBM is hoping for 1,000 by year's end), it won't be an easy time to work in MIS. Workers will have to keep a watchful eye on existing MS-DOS applications, noting those programs that work with the new operating system and those that do not.

Ryan is a Computerworld senior writer.

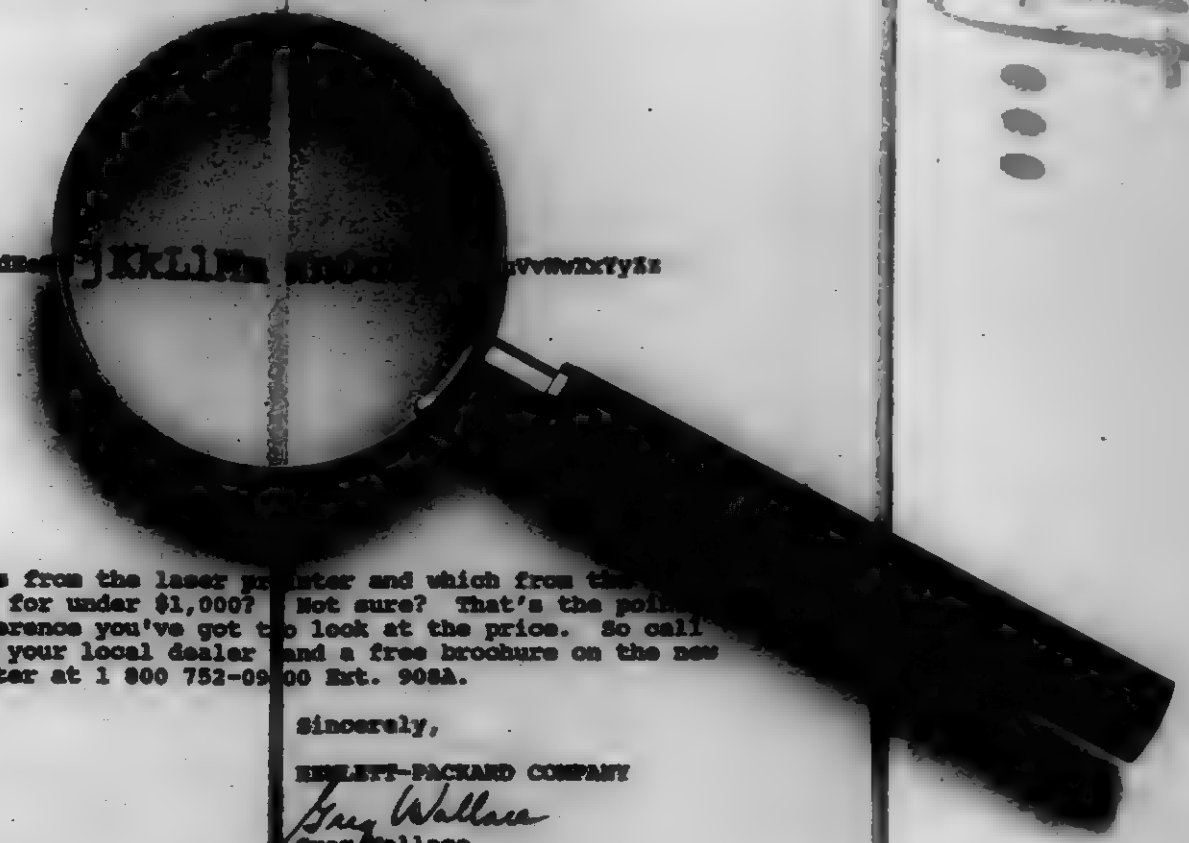
If you can see the difference, you must be looking at the price.

Hewlett-Packard Company
18110 S.E. 34th Street
Camas, WA 98607

Dear Reader:

This letter was printed on two of the finest printers available today. One half on a laser printer, the other on the new HP DeskJet Printer. But which one printed which half? Hard to tell, isn't it?

Small and quiet enough for your own desk, our HP DeskJet Printer gives you clean, crisp text and graphics. Just like a laser. You get perfect printing from A to Z. Look for yourself.



So which half is from the laser printer and which from the DeskJet Printer for under $1,000? Not sure? That's the point. To see the difference you've got to look at the price. So call for the name of your local dealer and a free brochure on the new HP DeskJet Printer at 1 800 752-0900 Ext. 908A.

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Greg Wallace

Laser Printer

HP DeskJet Printer

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NEW PRODUCTS

Systems

NEC Information Systems, Inc. has enhanced its **APC IV Powermate 1** personal computer.

Enhancements include software-selectable operating speeds of 8 or 10 MHz, maximum random-access memory capacity of 10.6M bytes and seven expansion slots.

NEC also announced additional data storage options for the Powermate 1, including a 720K-byte 3½-in. floppy disk drive with a 5¼-in. form factor and an 80M-byte 5¼-in. hard drive.

The base Powermate 1 unit, including 640K bytes of RAM, a 1.2M- or 360K-byte floppy diskette drive and a hard-disk controller, costs $1,845.

NEC, 1414 Massachusetts Ave., Boxboro, Mass. 01719. 617-264-8000.

The Color Layout System, a design system based on the Apple Computer, Inc. Macintosh II, has been announced by **Lightspeed, Inc.**

Artwork is input using a 300 dot/in. color flatbed scanner. It is then manipulated to fit the designer's layout. Images are combined with Bitstream, Inc.'s Bit-

The *Color Layout System*

stream outline fonts for headline and text, using typographic specifications, adjustable grids and on-screen rulers. Text from other Macintosh word processing packages can be imported in ASCII format.

The base system costs $17,000, including a Macintosh II, a 19-in. color monitor and software. As a software-only package, the system costs $6,000.

Lightspeed, 47 Farnsworth St., Boston, Mass. 02210. 617-338-2173.

Two fault-tolerant, multiuser multitasking microcomputers have been announced by **Lemmo Data Products, Inc.**

The first incorporates dual 10-MHz microprocessors. It features 2M bytes of main memory and supports up to 16 users. The second adds dual 51M-byte hard disk drives. According to the vendor, both personal computers allow access by any terminal user to either CPU, memory or disk drives.

Prices range from $7,394 to $8,550.

Lemmo Data Products, 182 Cedar Hill St., Marlboro, Mass. 01752. 617-460-0333.

Sharp Electronics Corp. has reduced the price of its **PC-4501** laptop computer.

The IBM Personal Computer-compatible laptop features a supertwist LCD screen, a 3½-in. disk drive, Genicom Corp.'s Centronics parallel printer port and 256K bytes of memory, expandable to 640K bytes. Options allow users to add a second disk drive, a 300/1,200 bit/sec. modem, a CRT adapter, an erasable programmable read-only memory card, an extended memory card and an external 5¼-in. disk drive.

The PC-4501 now costs $995.

Sharp Electronics, Sharp Plaza, Mahwah, N.J. 07430. 201-529-8970.

Software applications packages

Instant Pages, a desktop publishing program for use with IBM Personal Computers and compatibles and Epson America, Inc. or Hewlett-Packard Co. Laserjet printers, has been announced by **Electronic Arts.**

The menu-based Instant Pages offers what-you-see-is-what-you-get capability as well as such features as bold, underline, double wide, double high and normal text styles; full character set; word wrap; text editor with cut, copy, paste and undo; automatic reformatting; justification; and the ability to read ASCII files from other third-party application programs.

Instant Pages costs $49.95, including a template library.

Electronic Arts, 1820 Gateway Drive, San Mateo, Calif. 94404. 415-571-7171.

3BT Corp. has ported its **Database Accounting Library** to the Apple Computer, Inc. Macintosh Plus, Macintosh SE and Macintosh II.

According to the vendor, the library is the first Macintosh-integrated accounting software to include source code. All programs in the series now run on MicMax, data base software from Nantucket Corp.

The Database Accounting Library programs operate independently or as an integrated system. Source code versions available for $395 include Dledger, Dinvoice/Dstatements, Dpayables, Dpayroll, Dassets, Dproject, Dmaterials, Dprofessional, Dproperty and Dmaintenance. Each program costs $295 and includes Dpurchase and Dordera. A main menu and file-backup utility cost $65.

SBT, One Harbor Drive, Sausalito, Calif. 94965. 415-331-9900.

A time and information management software program for use on Microsoft Corp. MS-DOS-based computers has been announced by **Chronos Software Corp.**

Who/What/When cross-references all entries into reports by person, project and date. It can handle an unlimited

Chronos's *Who/What/When*

number of people, resources, projects, subprojects and tasks, according to the vendor. Memos, notes and reports can be attached to records and priorities can be assigned.

Who/What/When is priced at $169.

Chronos Software, 1500 16th St., San Francisco, Calif. 94103. 415-626-4244.

Software languages

A natural language-based personal computer software query product has been announced by Panaophic Systems, Inc.

Designed to allow users to ask questions in English to retrieve information, **Easytrieve Plus NL** also generates Easytrieve Plus and Easytrieve Plus PC code in response to natural-language questions. It includes an expandable 350-word vocabulary and recognizes synonyms for actual field names. In addition, once the user has requested information, the original question can be adjusted without starting over.

Easytrieve Plus costs $499.

Panaophic Systems, 709 Enterprise Drive, Oak Brook, Ill. 60521. 312-572-6000.

An upgraded version of the Arity/Prolog programming language featuring an embedded C compiler has been announced by **Arity Corp.**

Version 5 allows users to place C and Pascal language code and declarations directly within an Arity/Prolog program. In addition to the language facilities, other features include a set of screen design predicates for creating windows, pull-down menus and dialogue boxes and built-in data base management.

Arity/Prolog runs on IBM Personal Computers and compatibles. The compiler and interpreter cost $650; the interpreter alone costs $295.

Arity, 30 Domino Drive, Concord, Mass. 01742. 617-371-1243.

Software utilities

A Lotus Development Corp. 1-2-3 add-in that provides the capability to find strings of characters within cells has been announced by SMI Corp.

Search-Replace allows users to replace the strings with other strings. The cell can contain labels, formulas or numbers. The search can be done in columns or rows. Cell protection is maintained during a replace, the vendor said.

Search-Replace is priced at $39.95.

SMI, P.O. Box 582221, Tulsa, Okla. 74158. 918-560-9536.

A data entry system for Ashton-Tate Corp.'s Dbase has been announced by Fox & Geller, Inc.

Quickentry is a stand-alone product that uses Lotus Development Corp. 1-2-3-style menus to help the user create data entry forms and enter data. It does not require Dbase to run or any knowledge of Dbase to use, the vendor said. Data entry features include carryover fields and a ditto key, password security, 10 types of data fields, browsing, searching and editing of records.

Quickentry costs $99.

Fox & Geller, 604 Market St., Elmwood Park, N.J. 07407. 201-794-8883.

Quires Corp. has announced **Workspaces**, an add-in said to provide Lotus Development Corp.'s Manuscript with multiuser and multitasking capabilities.

Manuscript is a document processor that integrates word processing with symbols, graphics, formatting, printing and data base capabilities. Workspaces organizes information according to tasks for shared or individual use. Features include the ability to create templates, manage directories and files and check the personal computer for memory and storage information. On-line Help is also provided.

Workspaces costs $85. Bundled with Manuscript, it costs $495.

Quires, P.O. Box 940, Niwot, Colo. 80544. 303-530-2744.

Kinetic Corp. has added to its **Kinetic Access** line of security and management systems for IBM Personal Computers.

Kinetic Access II and Kinetic Access II Plus use a menu system to restrict access to the computer, the operating system, individual operating commands and the execution of programs. Kinetic Access II is a software-only product, and Kinetic Access II Plus uses a half card or erasable programmable read-only memory (EPROM) with software to control booting.

Kinetic Microlok is a machine-access-only security system. Kinetic Access Jr. is a menu-only product that lets applications be chosen from a main menu.

Kinetic Access II costs $165; Kinetic Access II Plus costs $175 with EPROM or $195 with the half card. Kinetic Microlok costs $79.95 with EPROM or $99.95 with a half card. Kinetic Access Jr. costs $39.95.

Kinetic, Distillery Commons 240, Louisville, Ky. 40206. 502-583-1679.

Development tools

S & S Systems has released an enhanced version of **Quik/BMS**, its IBM CICS screen-development software.

Quik/BMS runs on a personal computer and automatically generates BMS macro source code for use on a mainframe. The full-screen editor allows users to paint and modify CICS screens, and a review screen provides a view of the CICS screen in IBM 3270 format.

The new release supports CICS 1.7 key words for the map-set definition, map definition and field definition macros. Other features include the ability to generate copybook source code from a painted screen and the ability to create a table from multiple lines of identical fields.

Quik/BMS costs $395.

S & S Systems, P.O. Box 1725, Claremore, Okla. 74018. 918-342-0633.

A Fortran compiler for Intel Corp. 80386-based personal computers has been announced by Science Applications International Corp.

SVS Fortran-386 allows users to develop Fortran programs up to 16M bytes in size and run them in the protected mode of the 386 under control of an existing Microsoft Corp. MS-DOS operating system.

SVS Fortran-386 includes a native code compiler, a complete runtime I/O system, a source-level debugger and VM/Run, a 386 runtime monitor. The compiler supports ANSI-standard Fortran 77 as well as some extensions, the vendor said.

SVS Fortran-386 costs $895.

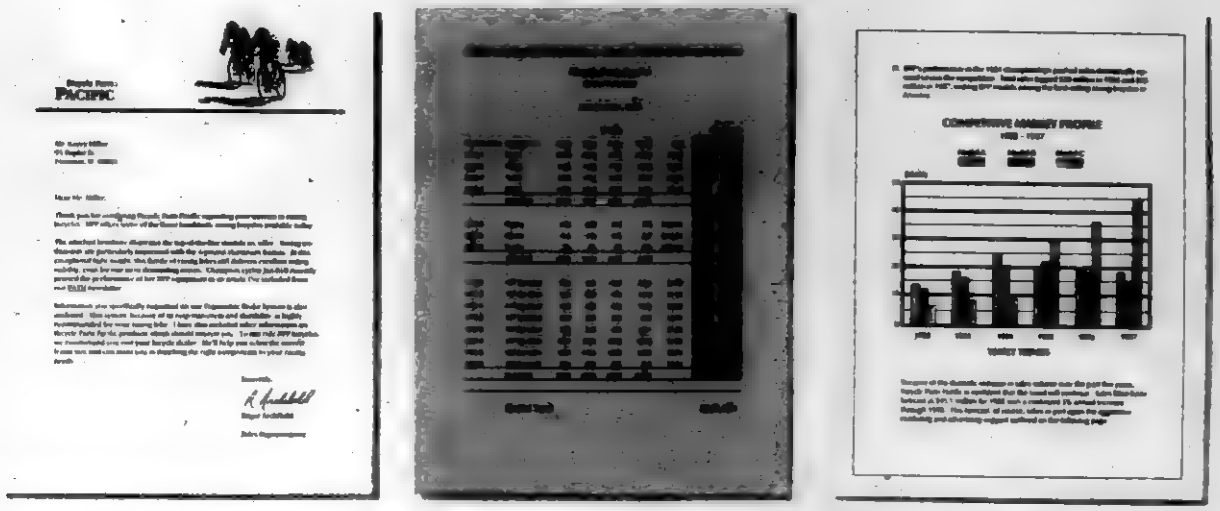
Science Applications International, Suite C-31, 5150 El Camino Real, Los Altos, Calif. 94022. 415-960-3322.

A software development tool for creating cooperative-processing applications has been announced by Hewlett-Packard Co.

The HP Cooperative Services development tool enables personal computers and

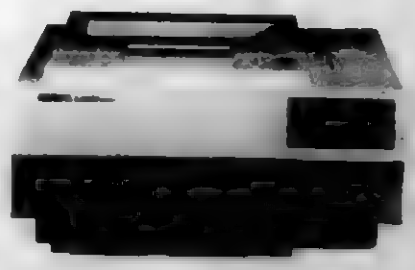
Continued on page 42

How to look good from start...



to finish.

The HP LaserJet Series II Printer.



Nothing brings your ideas to life like the HP LaserJet Series II Printer—from office memos to forms to newsletters. As the leading laser printer, it works with all popular PCs and PC software packages. And, with a wide range of fonts, you get more options to create superior looking documents.

With additional memory you can even print sophisticated 300 DPI full-page graphics. And with HP's ScanJet scanner, you can also easily add photographs, illustrations and text.

No wonder more people choose the original over all other laser printers combined.

So call 1 800 752-0900, Ext. 900D for your nearest HP dealer.

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Print samples were created using Microsoft Word, Microsoft Excel, and Aldus PageMaker.

Continued from page 40

HP3000 business computers to process information jointly across a network. According to the vendor, cooperative processing allows software developers to use the power of personal computers in DP applications. The applications can take advantage of such PC features as Microsoft Corp.'s Windows user interface and HP's Newwave applications environment.

The HP Cooperative Services development tool is priced from $2,700 to $8,700.

HP, 1820 Embarcadero Road, Palo Alto, Calif. 94303. 800-367-4772.

Software enhancements

Buttonware, Inc. has introduced **PC-Calc Plus**, an enhanced version of its spreadsheet program for IBM Personal Computers and compatibles.

PC-Calc Plus includes graphing, split screens, DOS access, support for Intel Corp.'s 8087 and 80287 processors, named ranges, sideways printing and a Move command. It also features enhanced printing and formatting capabilities; business, financial, trigonometric, date and time functions; context-sensitive Help screens; and menus.

PC-Calc Plus costs $69.95. Registered users of PC-Calc can upgrade for $25.

Buttonware, Box 5786, Bellevue, Wash. 98006. 206-454-0479.

Rational Systems, Inc. has enhanced its C language incremental compiler, **Instant-C**.

Version 3.0 features medium- and large-model support for C source and object code. According to a spokesman, it provides visual debugging displays throughout the programming cycle as well as advanced syntax checking.

Instant-C Version 3.0 supports common ANSI-standard extensions as well as compilers from Microsoft Corp., Lattice, Inc. and Borland International.

Instant-C Version 3.0 runs on IBM Personal Computers and compatibles. It costs $495.

Rational Systems, P.O. Box 480, Natick, Mass. 01760. 617-653-6194.

An enhanced version of **Viewpoint**, a personal computer project management and graphics system, has been announced by **Computer Aided Management, Inc.**

According to the vendor, Viewpoint 3.0 supports enhanced graphics adapter graphics in 43-line mode, can be configured for international use and performs up to 10 times faster than the earlier version.

Other enhancements include support for DOS-based local-area networks, support for Adobe Systems, Inc. Postscript devices and Hewlett-Packard Co. HPGL plotters and support for remote plotters on networks.

Viewpoint 3.0 costs $1,995. The graphics system costs $995.

Computer Aided Management, 24 Professional Center Pkwy., San Rafael, Calif. 94903. 415-472-5120.

Data storage

A series of tape backup subsystems designed for the IBM Personal System/2 Models 50, 60 and 80 Micro Channel-based personal computers has been announced by **Emerald Systems Corp.**

The quarter-inch PS/2 tape backup products range in capacity from 60M to 150M bytes and can be used in either the DOS environment or with Novell, Inc.'s Advanced Netware 2.0. They feature Emerald Systems' ASP backup software utility.

Emerald *tape subsystems*

The **DOS 60-9107** 60M-byte external model and the **DOS 150-9107** 150M-byte external modem cost $1,995 and $3,295, respectively.

The **DOS 300-11000** features a single chassis containing two 150M-byte tape units. It costs $5,995.

Emerald Systems, 4757 Morena Blvd., San Diego, Calif. 92117. 619-270-1994.

Several mass-storage systems for the IBM Personal System/2 Models 50, 60 and 80 were recently announced by **Priam Corp.**

The **Priam Storagespace** external drives are available for the PS/2 Model 50 in capacities of 45M, 62M and 133M bytes.

The **Priam Innerspace** internal drive is available for the PS/2 Models 60 and 80 in 330M-byte capacity.

Prices for the 45M-, 62M- and 133M-byte systems for the Model 50 are $1,750, $1,950 and $3,920, respectively. The 330M-byte Innerspace drive for the Models 60 and 80 costs $4,540.

Priam also announced a 337M-byte internal mass-storage system for the IBM Personal Computer AT and compatibles. The system costs from $4,890.

Priam, 20 W. Montague Expwy., San Jose, Calif. 95134. 408-434-9300.

Printers/Plotters Peripherals

Hewlett-Packard Co. has announced the **HP Color Publisher**, a merged-text and color graphics system for use with HP Vectra personal computers or IBM Personal Computer compatibles.

The package consists of the HP Paintjet color graphics printer, the HP Graphics Gallery collection of presentation graphics software and HP Executive Memomaker word processing software.

The HP Color Publisher costs $2,190.

HP, 1820 Embarcadero Road, Palo Alto, Calif. 94303. 800-367-4772.

An optical mouse designed for use with IBM's Personal System/2 computers has been announced by **MSC Technologies, Inc.**

The **PC Mouse** includes mouse systems drivers that support video graphics array modes and make the mouse compatible with software designed to be IBM mouse-compatible.

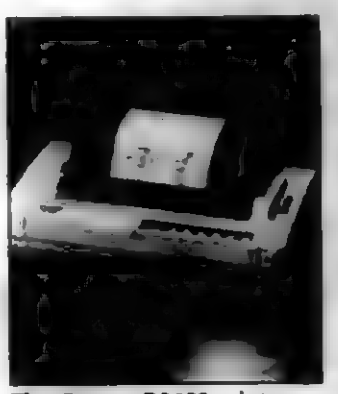
The package also includes MSC's Designer Pop-Up Menus software, featuring a library of menus for third-party business applications and a compiler for creating customized menus.

The PC Mouse for the PS/2 costs $159.

MSC Technologies, 2600 San Thomas Expwy., Santa Clara, Calif. 95051. 408-988-0211.

The **Canon BJ-130**, a plain paper, nonimpact bubble jet printer, has been announced by **Canon U.S.A., Inc.**

The printer features a 48-nozzle print head offering print resolution of up to 360 dot/in. at speeds up to 220 char./sec. It also has a built-in automatic sheet feeder that can handle standard cut-sheet paper or envelopes and an optional tractor assembly that permits the unit to handle sprocket paper up to 15 in. wide. A parallel interface is standard; a serial interface is optional.



The Canon *BJ-130 printer*

The Canon BJ-130 costs $995.

Canon Printer Division, One Canon Plaza, Lake Success, N.Y. 11042. 516-488-6700.

A 5¼-in. floppy disk drive for the IBM Personal System/2 has been announced by **Systems Manufacturing Technology, Inc.**

The **XD-360** is said to be compatible with the same double-sided, 360K-byte diskettes as those used on the IBM Personal Computer family. It installs via a printed-circuit board cable that is routed internally through the drive B connector to the rear panel and into any available slot.

The *XD-360 disk drive*

The XD-360 supports IBM PC-DOS 3.3. It costs $325.

Systems Manufacturing Technology, 1145 Linda Vista Drive, San Marcos, Calif. 92069. 619-744-3590.

Board-level devices

An IBM Video Graphics Array-compatible graphics controller for IBM Personal System/2 Models 50, 60 and 80 has been announced by **Galagraphics Ltd.**

The **Galaxy Mercury/2** two-card controller uses the IBM Micro Channel 16-bit parallel bus. Features include instant zoom, software selectable resolution of 1,024 by 768 or 800 by 600 lines and up to 256 simultaneous colors from a palette of 256,000.

The product costs $2,495.

Galagraphics also announced the **GS-1280** and **GS-800**, IBM Personal Computer AT-compatible graphics boards with dual Intel Corp. 82786 graphics processors, zoom windows and high-resolution color support. The boards cost $3,195 and $2,495, respectively.

Galagraphics, 1568 Ocean Ave., Bohemia, N.Y. 11716. 516-563-1320.

A unit designed to allow any single expansion card to be mounted on the bottom of Toshiba America, Inc.'s T1100 Plus and T1200 portable computers has been announced by **Connect Computer Co.**

The **Wonunder** is a metal card carrier that mounts on the bottom of the computer and an interface card that plugs into the computer's expansion port. Most standard 8-bit personal computer expansion cards of two-thirds length or less can be used, the vendor said. Cards supported include network interface cards such as Ethernet, Arcnet, Proteon, Inc. and Starlan cards, modem cards and mainframe terminal-emulation cards.

A basic Wonunder package costs $349. With an Arcnet expansion card, it costs $629. With an Ethernet expansion card, it costs $779, and with a CXI, Inc. IBM 3270 terminal emulation board, Wonunder costs $1,195.

Connect Computer, 9855 W. 78th St., Eden Prairie, Minn. 55344. 612-944-0181.

Auxiliary equipment

Automated diskette duplicators for use with the IBM Personal Computer, PC XT, AT or compatibles have been announced by **Autofax Corp.**

The **AFX5251** is a 5¼-in. version and the **AFX5253** is a 3½-in version. Both are capable of duplicating 60 diskettes per hour. They feature 30-diskette I/O hoppers; optional 100-diskette hoppers are available. Software that allows duplication of 120 diskettes per hour is also available.

The systems cost $2,745 each.

Autofax, 4113-A Scotts Valley Drive, Scotts Valley, Calif. 95066. 408-438-6861.

Thumbscan, Inc. has announced the **Boot** family of security access products for personal computers.

PCboot and Lanboot restrict access to individual PCs or local-area networks. Dealerboot adds a timing capability that allows dealers to enforce trial periods for hardware and software.

PCboot and Lanboot prevent unauthorized users from initializing or booting the PC; using software application programs such as Lotus Development Corp.'s 1-2-3; accessing data, files and template programs; and gaining access to system resources such as disk drives and serial ports.

PCboot costs $179.95; Lanboot costs $379.95.

Thumbscan, Suite 800, Two Mid-America Plaza, Oakbrook Terrace, Ill. 60181. 312-954-2336.

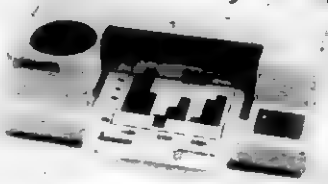
International Battery Corp. has introduced lithium computer replacement batteries for Intel Corp. 80286-based IBM Personal Computer XTs and Personal System/2s.

The **Model BR-P2** battery is a six-volt unit that measures 19½ by 33.9 by 36mm. It is made from nontoxic material and is user replaceable. It has a shelf life of 10 years when stored at room temperature, the vendor said, and is guaranteed to last two years during normal computer use conditions.

The Model BR-P2 costs $26.

International Battery, #113, 6860 Canby Ave., Reseda, Calif. 91335. 818-609-0516.

Every presenter wants to make a compelling, persuasive case. And color, you'll agree, makes all the difference. It's more eye-catching. More readily understood. More memorable. In short, color makes any desktop presentation more effective. And research proves it.



All you need is a Hewlett-Packard ColorPro Plotter like we used here, or the HP PaintJet Color Graphics Printer. Together with a PC—IBM compatible or Apple Macintosh—you can use all the popular graphics software like Lotus Freelance Plus, Cricket Presents, HP's Graphics Gallery (used below), Microsoft Chart and Harvard Graphics.

At under $1,300, the HP ColorPro Plotter may be just where you want to start. It will turn your ideas into colorful, easy-to-grasp visuals. Or, if you need to combine near-letter quality text with color graphics, you can rely on the HP PaintJet Color Graphics Printer for under $1,400. Whichever you choose, you'll create desktop presentations with startling color and greater impact.

For a colorful sample overhead and the name of your nearest dealer, call 1 800 752-0900, Ext. 903A.

Freelance Plus® and Lotus® are U.S. registered trademarks of Lotus Development Corporation. Microsoft® is a U.S. registered trademark of Microsoft Corporation.

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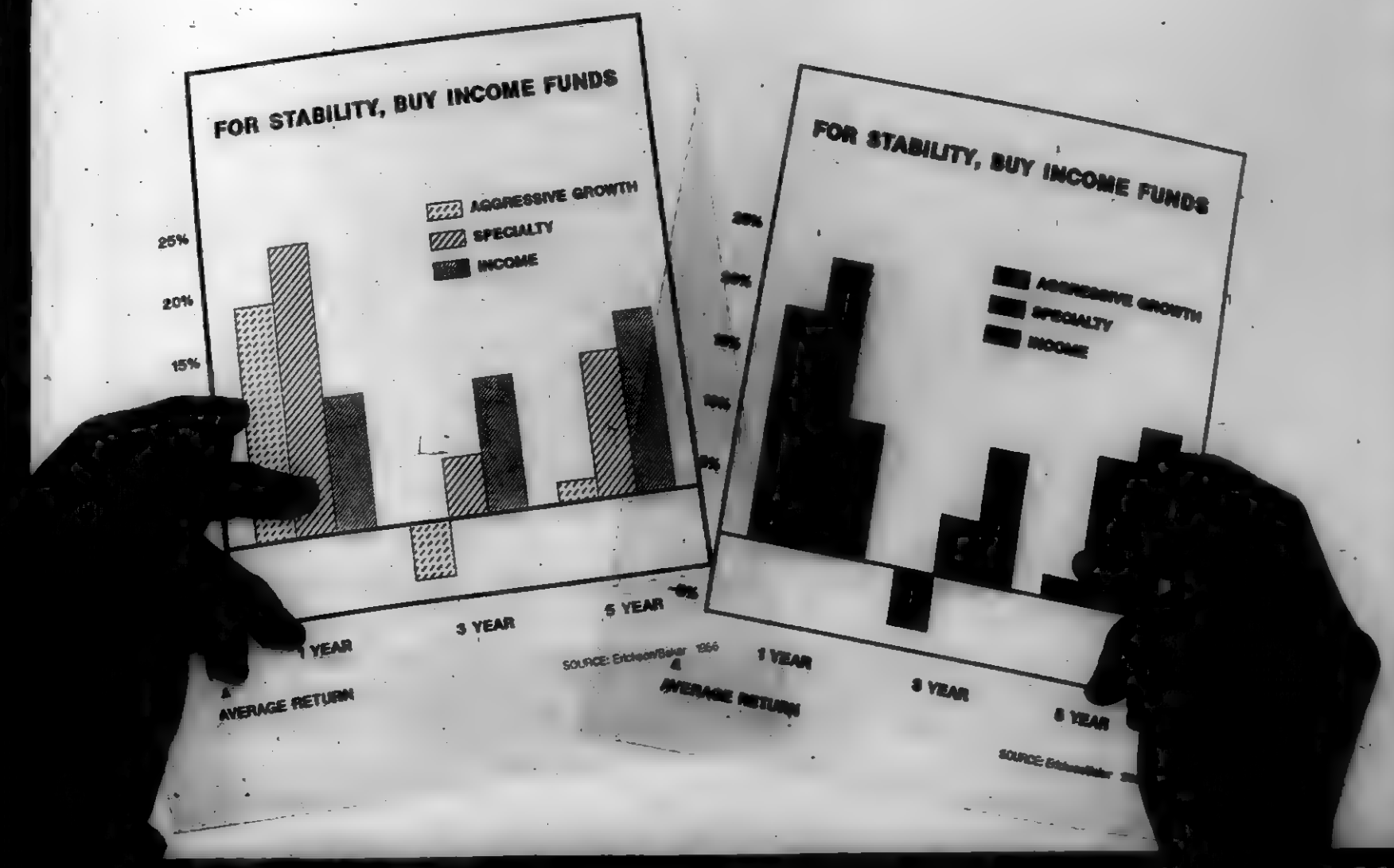
Guess which presentation made the sale.



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DATA STREAM

Patricia Keefe

MIS tangled up in nets

There's nothing like a little communication to keep data processing flowing smoothly. And I don't mean bandwidth and modems. The stress here is strictly on the interpersonal link, whether face to face or via direct dial-up.

Unfortunately, MIS can get so consumed with building good rapport with management and user departments that conversation between the various DP, applications development and communications units falls by the wayside. This does not bode well for system health.

It used to be that MIS managers worried about users' surreptitiously installing small work group networks or buying into different personal computer standards. Most of these squabbles have been laid to rest with the help of corporate edicts on approved standards, buying policies and formalized support organizations.

But as necessary as these tactics are, they are not enough to prevent serious system degradation and related crises in companies that have embraced corporatewide networking.

Political battles about whether communications managers should report to MIS directors are not the issue. The fact is, these managers need to work together today more than ever.

Continued on page 54

Net management help wanted

Firms waiting for standards seek aid for multivendor systems

BY ELISABETH HORWITT
CW STAFF

The past few months have seen a spate of activity from vendors that target two types of network management customers: companies that want better tools to help them manage their own multivendor networks and firms that want someone else to manage their networks for them.

There is a much clearer demand in the first area than in the second, according to Jeremy Frank, program director of enterprise network strategies at the Gartner Group, Inc. "Companies want someone to give them tools, help them set up the system and get it running — then back out and provide maintenance if necessary."

As a former employee at AT&T regional holding company Pacific Telesis Group, Frank worked on several joint bids with Pactel Spectrum Services, a subsidiary offering network monitoring, restoral and inventory maintenance services on its own system. Spectrum's refusal to sell the system commercially lost it some customers, Frank said. "Fewer and fewer companies want to give up control of a network they perceive as a strategic edge."

Proceed with caution

Pactel Spectrum's experiences are "certainly a warning to us," admitted Philip F. Otto, president and chief executive officer of network management services vendor Netline Communications Corp. in San Mateo, Calif. "But we think [Spectrum's troubles are] more a managerial than strategy issue, and they have regulatory constraints that don't apply to us."

Spectrum, for example, cannot offer to manage networks that stretch across different divested Bell operating companies' local access and transport areas, Otto pointed out. Founded in January, San Mateo-based Netline plans to offer network management services similar to Spectrum's later this year.

Another recent entry in the network management services arena is EDS Communications Corp., a division of Electronic Data Systems Corp. established in 1986. The company will develop a network, then turn it over to the customer or manage it from EDS facilities, noted the company's vice-president, Peter Fitzgerald.

Fitzgerald predicted strong demand for his firm's services among Fortune 1,000 companies bewildered by the technological complexity of the postdivestiture networking market. However, he was only able to

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Data View

LAN buying trends, 1988 to 1992

Dollar value of connections going down; servers and software on the rise

INFORMATION PROVIDED BY FORRESTER RESEARCH, INC.
CW CHART

Overseas fiber link cuts costs

BY KATHY CHIN LEONG
CW STAFF

MENLO PARK, Calif. — Raychem Corp., a $944 million producer of industrial alloys, plastics and polymers, is anxious to see its communications costs drop once it gains access to the new AT&T TAT-8 transatlantic fiber-optic cable in December.

Raychem and other companies, such as Eastman Kodak Co. and Visa International, Inc., are queueing up for the right to use the additional bandwidth and

Continued on page 54

Financiers look at OSI standards

BY ALAN ALPER
CW STAFF

NEW YORK — A group of financial services companies have formed an organization to define data processing and communications standards for their industry, using the seven layers of the Open Systems Interconnect (OSI) model as a starting point to describe industrywide requirements.

Called FISO, Inc., the group's intent is to bring a modicum of consistency to the way financial services companies process data and communicate, not only within their own businesses but also in their dealings with external information suppliers. "The only standard in the business now is that everyone does everything differently," said David Isherwood, a cofounder and assistant vice-president at Shearson Lehman Hutton, Inc.

Industrywide standards would enable MIS departments to accelerate applications development because programmers will be able to focus their efforts on code, not technology, accord-

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- 1000ist [illegible] OS/2 with embedded LAN software for IBM users. Page 48.
- Interlink, Canada join to provide distributed DBMS links between DEC, IBM systems. Page 52.
- Announcing Network Connections unveils direct connection device. Page 56.

Siemens, DEC to enhance Bell nets

BY ELISABETH HORWITT
CW STAFF

Continuing its efforts to invade the telecommunications marketplace on several fronts, Digital Equipment Corp. recently announced an agreement with Siemens USA subsidiary Siemens Communications Systems to cooperatively develop systems that will implement enhanced services on local telephone companies' networks.

The companies will work on a nonexclusive basis to integrate Siemens' central office switches with DEC's computer equipment.

The resulting systems will allow a divested Bell operating company's network to provide the same capabilities as are available on a local- or wide-area network, said Richard Blake, vice-president of strategic planning at Siemens.

The partners will also work to develop new protocols and services that operating companies can provide through Integrated Services Digital Network standard interfaces and under Open Network Architecture regulations laid down by the Federal Communications Commission, he added.

The integration of voice and data applications "has been slow to take place but has been identified as the fastest growing area in the computer field," said Bart Stuck, vice-president of Probe Research in Morristown, N.J.

Widespread use

The linking of computer applications with private branch exchanges and central office switches serves telemarketing groups, insurance and financial service representatives — any job that requires calling up information while talking to someone on the telephone, he added.

DEC already has agreements with all seven regional Bell holding companies to implement VAXs as data base servers at regional telephone company sites, Stuck said. Such systems are currently used to keep track of routes and destinations for an 800 number service, but "will grow to pick up a lot of other applications," Stuck said.

For example, a VAX at the central office could be programmed to configure a customer's network to support terminal-to-host links during business hours and batch-file transfer at night.

DEC also has signed up Siemens, Northern Telecom, Inc. and L. M. Ericsson, Inc. to integrate their PBXs with the VAX under DEC's Computer Integrated Telephony program.

DEC's rivals are also working hard to integrate their systems with those of telecommunications vendors, however. IBM has announced statements of direction to integrate its computers with Siemens and Ericsson's central office switches, according to Stuck. And Data General Corp. is jointly developing intelligent switches with Japanese carrier NTT.

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A Different Kind of Computer Company

Survey says net managers will see more complete nets in '88

NEW CANAAN, Conn. — Frustrated MIS managers who have vainly petitioned their vendors for more integrated, comprehensive and open network management will get their wish with the next generation of products, according to a recent report by International Research Development, Inc. (IRD).

According to the report, many corporations have held off from implementing companywide network management systems because currently available products lack key functionality. Users are increasingly pressuring vendors to provide the following:

- Monitoring and active control of all network elements.
- The ability to heal, bypass or circumvent failed network elements as automatically as possible.
- Improved user interface features, such as nonduplicative reporting of fault conditions.
- Statistics and historical operating data automatically saved in a standard data base format, such as SQL, with vendor-provided tools for users to develop their own analysis formats and other output.
- The capability to monitor and diagnose unsatisfactory conditions in systems and application software, rather than just in hardware.

Shocked into action

Although current products do not meet the above needs satisfactorily, vendors have been galvanized to provide those functions in future products, IRD said.

IBM, for example, reportedly has more than 200 people — as opposed to 44 people five years ago — working on upgrades to its Netview host-based network management system and the Netview/PC interface. Netview upgrades within the next three years should provide several features, including the following:

- Two-way message and command formats for reconfiguring non-IBM network elements through Netview/PC.
- Standardized fall-back or circumvention techniques for networking equipment.
- Designation of separate paths for network management system communication, in case of a network failure.
- Rewriting of Netview software components to improve formats for statistics collection and reporting.
- Greater functionality in Netview.

Network management system revenue should jump from $600 million last year to at least $700 million this year, the report stated.

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10Net cozies up to IBM net users

BY JAMES DALY
CW STAFF

DAYTON, Ohio — 10Net Communications took a step closer to OS/2 integration with the recent announcement of a Netbios-compatible unbundled version of its 10Net local-area network software for use on the IBM Token-Ring and PC networks.

Parent company Digital Communications Associates, Inc. is expected to release a statement of direction on OS/2 later this month, which should also address 10Net's plans.

"Because we're Netbios-compatible and support the Server Message Block protocols that IBM says can operate with the OS/2 server code, you can have the IBM PC LAN program running on the workstation or the 10Net software running on the workstation in the DOS environment interoperating with the OS/2 server," 10Net President Greg Goodall said.

A real cream puff

Goodall added that the unbundled software provides another alternative to the PC LAN program. "If the IBM PC LAN program is the Chevrolet of the Token-Ring PC network software, 10Net is the Cadillac software module," he said.

However, users already have several other "Cadillac" models to choose from, most notably Novell, Inc.'s Advanced Netware, 3Com Corp.'s 3+, Banyan Systems, Inc.'s Virtual Networking Software, or Vines, and other network operating systems. Novell has the strongest grip on the departmental network market, but Goodall claimed the only entrenched vendor is IBM.

The unbundled version will contain an enhanced version of the 10Net operating system software, electronic mail and caching modules as well as the multiuser calendaring, print spooling, user-to-user communications, broadcast communications and remote job submission software used in the bundled product, according to the vendor.

The unbundled version will cost $395 per node and is slated for delivery next month, 10Net said. Current 10Net users will be able to upgrade for $195 per node, and the bundled product will continue to sell for $695 per node, according to the vendor.

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3Com file server roars past Compaq model in benchmark

3Com Corp.'s Intel Corp. 80386-based dedicated file server, the 3+ 3Server3 Model 3S/400, outshone a similarly configured server from Compaq Computer Corp. in recent benchmark testing conducted by The Lanquest Group. 3Com's Model 3S/400 ran word processing, spreadsheet and data base applications an average of 25% faster than a Compaq Deskpro 386/20, test results showed. The suite of applications used included Microsoft Corp.'s Word, Lotus Development Corp.'s 1-2-3, Ashton-Tate Corp.'s Dbase III Plus and Innovative Software, Inc.'s Smart LAN Performance Test.

The Massachusetts Corp. (Masscomp) has agreed to become an OEM of Community, **Technology Concepts, Inc.'s** implementation of Digital Equipment Corp.'s Decnet for Unix computers. Community for Masscomp's 4,000-plus systems is scheduled for summer availability.

Micom Systems, Inc. is manufacturing an asynchronous emulation adapter for IBM's 3174 control unit. The adapter is the result of hardware and software development efforts by Micom and IBM's Communication Products Division under a prior agreement. Product shipments began last December.

Rumors of the private packet-switching market's demise are premature, according to a recent report by **The Yankee Group.** The Boston-based research firm predicted that sales of packet-switching equipment conforming to the CCITT X.25 protocol will grow 25% domestically and 30% internationally from 1988 to 1992, reaching $1.4 billion in total revenue during that time frame.

Competitive T1 and Integrated Services Digital Network technologies will support and augment, rather than reduce, the implementation of private packet-switching networks, according to the report.

Communications Solutions, Inc., a San Jose, Calif., vendor of IBM-compatible communications software, has published the first issue of a network management newsletter. The February issue of "Network Management Perspective" includes articles on voice/data integration, the International Standards Organization's Open Systems Interconnect protocols, product evaluations, AT&T's Unified Network Management Architecture and IBM's Systems Network Architecture Management Services. Subscription rates are $350 for one year and $520 for two years.

Apollo Computer, Inc. has signed an agreement to purchase **Ki Research** products that it claims will allow Apollo workstations to transparently access files and programs on Digital Equipment Corp. VAX/VMS hosts via Decnet communications protocols. Apollo already offers links between its computers and DEC VAX/VMS hosts.

Atlantic Microsystems, Inc. in Salem, N.H., has signed an OEM agreement to provide **3Com Corp.** in Santa Clara, Calif., with products designed to provide fault-tolerant qualities for 3Com file servers.

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VISIT US AT INTERFACE, BOOTH 1906

Firms join to link IBM, DEC

Interlink Computer Sciences, Inc. in Fremont, Calif., and Oracle Corp. in Belmont, Calif., have entered into a joint marketing and cross-certification program under which the firms will cooperate in providing distributed data base management system links between Digital Equipment Corp. and IBM systems.

The joint effort was designed to make it easy and efficient to marry data bases and applications between DEC and IBM computers, according to an Interlink spokesman.

Under the agreement, Oracle and Interlink are certifying interfaces to one another's products; for example, allowing Oracle SQLstar users access to DEC equipment and IBM mainframes. They will also reportedly cross-certify each other's products for interoperability, exchanging information to assure continued upward compatibility.

A version of Oracle's SQLstar that runs between DEC VAXs and IBM mainframes running VM using Interlink's Advanced Gateway for the VM environment is currently in limited release and will be generally available in April. An IBM MVS-compatible version will be released during the summer, the vendors said.

Interlink's Advanced Gateway products and Oracle's Oracle DBMS connectivity products will be cross-promoted, and each vendor's sales staff will be cross-trained, the companies said.

Net management

CONTINUED FROM PAGE 45

cite two current EDS Communications customers: General Motors Corp. and Unilever N.V.

Demand for network management development tools has been showing signs of life only recently. One of the market's earlier players, Avant-Garde Computing, Inc., went through nine consecutive quarters in the red and then witnessed a major retrenchment that included taking its two flagship products off the market. "We bit off a lot, trying to do everything people wanted on a case-by-case basis," Avant-Garde director of communications Roger Green said.

The company has since reintroduced its network management system in a more standardized form and has begun focusing on automating network management operations for companies with limited technical staff. Its last two quarters were profitable.

Help wanted

"We are absolutely looking at third parties to help us develop our network management system," said Alan Chase, manager for research and technical planning at Eastman Kodak Co. "We have found a whole kludge of pieces out there but few acceptable products, and none of it fits together." The firm is considering companies like EDS, Boeing Computer Services Co. and AT&T to help it design various pieces and make them work together.

Telwatch, Inc. in Boulder, Colo., has spent almost three years helping American Express Travel Related Services Co. develop a communications control center that does trouble ticketing, inventory, real-time monitoring and data base searches for performance analysis. "Three years ago, no one product was covering all the bases," even for one vendor's product line, and the subsidiary needed to manage a broad range of networking equipment, communications operations manager Glenn Caldwell said. "Now network management is hot, but I still haven't seen a commercial product comparable to ours, and a lot of other businesses are scrambling to catch up with us."

Mitre Corp. in Bedford, Mass., is evaluating Command Technologies, Inc.'s VXM Network Shell as a way to generate a common set of applications for managing and monitoring multivendor networks. One VXM feature that caught Mitre's interest was the "Softrobot" concept: intelligent command scripts that can be sent out over a network to initiate jobs on a variety of systems, according to Mitre technical staff member Vivian Sovinsky. A prototype program that Command Technologies reportedly developed for Mitre in two hours collects network statistics from Bstat, a program that generates network performance statistics on Excelan, Inc. LANs.

"I told Command that we couldn't buy VXM unless it could run on a [Transmission Control Protocol/Internet Protocol] network, and it only took them a couple of weeks to do it," Sovinsky said.

Mitre is also heavily involved in the TCP/IP network management standards effort, but this will only define formats for exchanging network data — "which doesn't rule out VXM" as a viable system, Sovinsky said.

Indeed, third-party vendors seem determined to have their products complement solidifying standards. Telwatch, for example, plans to provide links to IBM's Netview and possibly AT&T's Unified Network Management Architecture for equipment that does not yet support the de facto standards, according to the firm's CEO, James Edwards. "We also think there is a large window before ISO and ISDN standards are fully functional. And we will continue to provide what the big players don't have," Edwards said.

Financiers

CONTINUED FROM PAGE 45

ing to Isherwood.

Information suppliers and vendors would also benefit by not having to customize solutions for financial services companies, a common and costly occurrence, he added. The organization hopes to have a set of standards agreed upon by year's end, Isherwood said. "There may be two or three acceptable solutions, and there may be no reason not to bless all three."

An industry first

FISO will first define the unique requirements of the financial services marketplace in terms of the OSI model and then scrutinize the work of other cross-industry standards bodies, he said.

Although it is open to adopting preexisting standards that are germane, the group expects to adopt many of its own standards. "In the financial industry, there are some nuances," Isherwood said. "We have a lot of broadcast-type data, and I'm not aware of anyone doing work on broadcast standards."

So far, FISO consists of 17 member companies, although 130 organizations have expressed interest in joining the group. Members and interested parties include hardware vendors AT&T, Digital Equipment Corp., IBM, Stratus Computer, Inc. and Sun Microsystems, Inc.; information services suppliers, including Quotron Systems, Inc. and Automatic Data Processing, Inc.; the stock exchanges; the Securities Exchange Commission; and the Commodities Futures Trading Commission.

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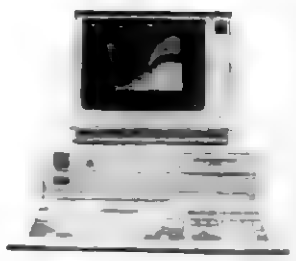
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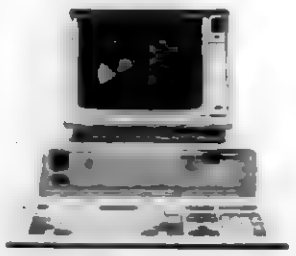
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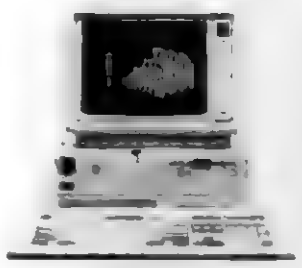
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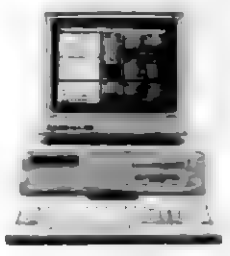
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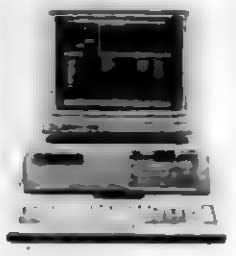
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Keefe

CONTINUED FROM PAGE 45

Computers and communications are being so tightly coupled that you can't just look at half of the equation anymore. Nowhere is this more obvious than in corporate networks and network management systems.

The current crop of network management systems pretty much sticks to the fundamentals, answering questions such as "What's my error rate?" and "Is my modem working?" This is all fine and well — network managers need to know these things. But increasingly, users need to know more. They need to know, for example, how changing applications on a computer system will impact services on a corporatewide network.

As an example of how an innocent change on one side of the house can trigger systemwide ripples, consider the following situations:

- An applications programmer made a slight change to improve the look of the screen. Unbeknownst to him, that change required an extra packet every time a message was sent, hence doubling the volume of message-related packets on the network. "The poor guy had no idea; he just saw the costs go crazy," says John McConnell, an analyst with Infonetics.
- A file server supported 15 users comfortably until a power user decided to upload a sophisticated, resource-hungry application. The server struggled to handle the load, and suddenly, the network slowed to a crawl.
- A decision is made to bridge two local-area networks to provide electronic mail capability to one of the LANs. An undesirable by-product of this bridge, however, turns out to be indirect host access for those same users, creating a potentially serious data security problem.

These situations came about because the people involved failed to consider that their systems are highly interdependent in terms of performance. It helps to look at networks as a system, just like mainframes, rather than as PCs with peripheral cards, observes Mark Freund of network consulting firm Interconnect.

"A lot of people are asking, 'How can I manage all of this?' " says McConnell. He says decision makers need network management systems that do two things: build tools for decision support and provide environmental management or, more specifically, include the computer system as part of the structure to be managed. Theoretically, this environmental approach would enable a network manager to isolate a problem as a function, perhaps, of the application mix on the network, as opposed to a communications failure of some sort.

With the advent of networks as a desirable, if not expected, component of corporate systems, users and systems personnel alike will have to face up to the need to take better notice of the effects of their actions on the overall system.

Keefe is a Computerworld senior editor, networking.

Overseas fiber

CONTINUED FROM PAGE 45

services that will be provided on the TAT-8 fiber link, which will directly connect the East Coast and Great Britain, providing linkages to Canada and France.

The cable link will be constructed and maintained by AT&T, British Telecommunications Inc., the French Telecommunications Administration and Teleglobe Canada.

Attractive economy of scale

Howard Westbrook, Raychem's U.S. international corporate manager of computers and communications, would not estimate how much the company stands to save, since he is still negotiating other contracts with network vendors that will affect overall costs. However, he did say that TAT-8 provides "an economy of scale that is very attractive."

Westbrook said Raychem has signed a three-year agreement with France Telecom for one 56K bit/sec. leased line. Westbrook said the company is considering MCI Telecommunications Corp. to handle the U.S. portion of the fiber connection. "We need to be as flexible with our vendors as possible. Customers want quality service. It can be two cans on a string as long as they get that quality," he said.

Meanwhile, Raychem is working closely with France Telecom to make sure the portion of its fiber line that goes to France and England will work smoothly.

The fiber-optic link will provide an alternative for global network users whose choices are now limited to terrestrial analog lines or satellite. The fiber link will support digital communications, reportedly providing clearer signaling than analog links. But unlike satellite connections, the undersea medium does not generate transmission delays, which are said to make it hard to use some protocols, such as IBM's Systems Network Architecture.

A typical three-year fiber contract for one 56K bit/sec. line with France Telecom is estimated to cost about $4,100 a month, according to Nicole Toomey, assistant manager of international services. In many cases, one leased 56K bit/sec. fiber line provides significant cost savings over three separate 19.2K bit/sec. analog lines to an overseas destination, she noted.

As an international company with data centers in California, England, France and Germany, Raychem expects to lease one 64K bit/sec. fiber channel from California going to England, which will replace two 9.6K bit/sec. lines, Westwood said. Another 64K bit/sec. channel will go to France from California.

The greater bandwidth gives Raychem the potential of doubling its data traffic, according to Westbrook. Future plans include transmitting both facsimile and voice across the fiber link, he added.

Speedy delivery

The cornerstone of data delivery at Raychem is the Transaction Delivery System (TDS), an internally written application that supports four different operating systems and allows Burroughs Corp. and IBM hosts and Personal Computers talk as though they were peers on the network.

A year in development, Raychem said TDS lets users write files into a mainframe data base and send files to other users on the network.

When the fiber network connection is activated at Raychem, the TDS application will be able to run uninterrupted and will enable Raychem to bring more users onto its customized electronic mail network. Running on the fiber network, the application is expected to save on the costs of telexes and overnight mail packages.

"The fiber plans are coming along slowly," Toomey said. "We are taking our time, and there's still much to do."

After the fiber network is laid down and ready for testing in September, Raychem said, it will have its network traffic deployed over the fiber line by December.

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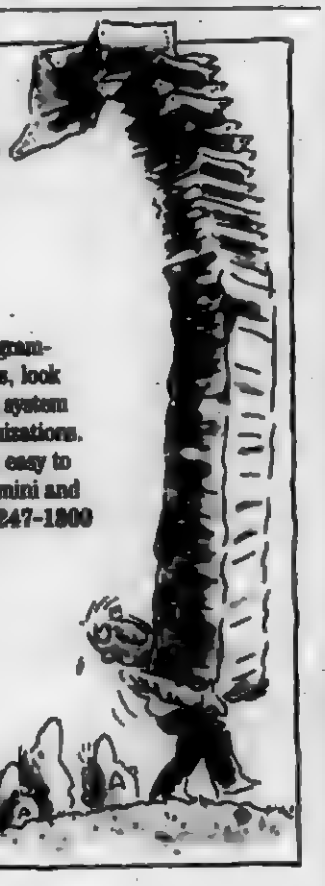

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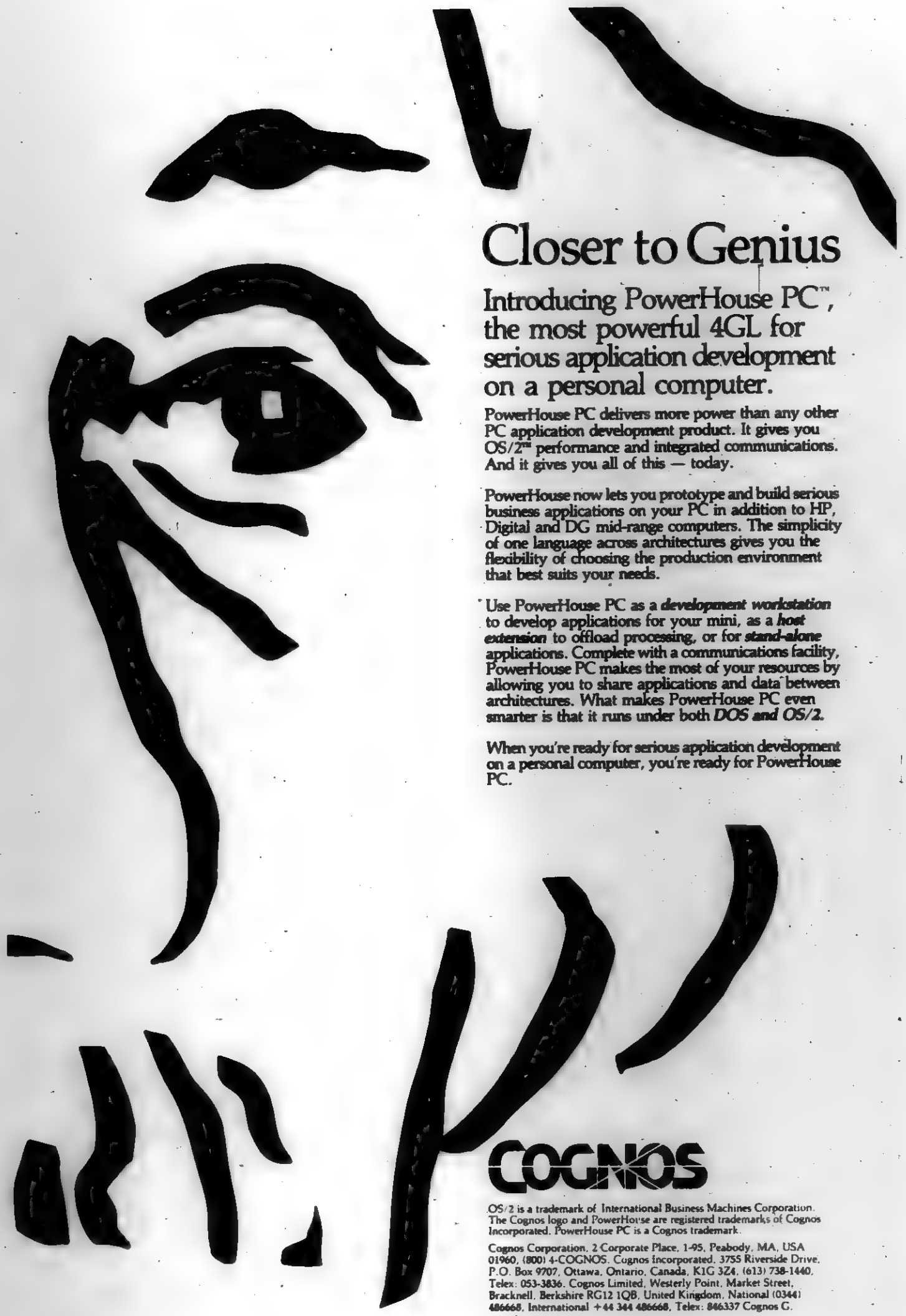

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Distributed DBMS holds promise for decentralized firms, but this budding technology has yet to reach its potential

DATA DISPERSAL STARTS AS TRICKLE

BY CHRIS YALONIS

CHRISTOPHER BING

Distributed data base management systems are still more talk than reality. But out of the debate provoked by this software technology and out of the confusing clamor of definitions and claims made by various vendors, the outlines of something real are beginning to emerge. "There really is no such thing as a true distributed data base management system available on the market today," says Ron Ross, editor of the "Data Base Newsletter" in Boston. "Some vendors are making progress, though, and we are beginning to see forerunners of powerful distributed systems that will come to be an integral part of data processing environments in many sophisticated organizations."

Several companies — such as Applied Data Research, Inc., Oracle Corp., Relational Technology, Inc., Software AG of North America, Inc. and Sybase, Inc. — have announced distributed DBMS products. Other vendors, such as Cincom Systems, Inc., Computer Corporation of America and Cullinet Software, Inc., have announced their strategic directions in distributed products. Meanwhile, a few intrepid user organizations are testing the waters with systems that incorporate some of the functionality of distributed DBMS.

Carnegie-Mellon University in Pittsburgh is developing an ambitious distributed data base that will tie 6,000 to 8,000 Intel Corp. 80386-based personal computers and Sun Microsystems, Inc.-class workstations into a decentralized, campuswide network. The network is based on Relational Technology's Ingres/Star. Students will use it primarily to tap administrative data bases, but each PC and workstation will also have its own local data base capabilities.

Earlham College in Richmond, Ind., is a production site for Oracle's distributed product, SQL Star. Earlham has benefited from its ability to incrementally raise performance without resorting to a mainframe purchase. The college has two networked Digital Equipment Corp. VAX-11/750s. Screen application loads are spread across the CPUs, enhancing the system's power.

In the past, without a distributed data base, users had to log on to the one node on the network on which Oracle resided. SQL Star now allows data bases to reside at the local level. All entities share some general student information, while access to specific data is limited by need.

Houston Lighting and Power Co. has implemented a nuclear power plant spare-parts procurement and inventory system based on a Dataease International, Inc. DBMS. A Prime Computer, Inc. minicomputer holds the master parts list, and the various departments assembling the data base use PCs to download and upload parts information from three mainframes.

The utility company has tied several data bases together and broken the central data base into 16 fragments, any of which is accessible by any node on the network. Charlie Howe, the company's local-area network administrator, says, "We have about 120 employees using about 60 nodes, primarily micros. No one knows that

---

Yalonis is chairman of The Jupiter Group, a Sausalito, Calif., firm that assists companies in the computer industry with research and planning.

Data dispersal

FROM PRECEDING PAGE

they're on a LAN or where the data resides. It comes transparently from any one of 16 servers."

These days, figuring out what really qualifies as distributed DBMS is not easy. The term has been stretched and distorted through its use as a marketing tool.

With a distributed DBMS, different machines on the network are able to exchange data with one another transparently. Data can be stored wherever it is convenient, optimizing the processing load and best utilizing available disk space.

Data access is transparent and can be accomplished readily by any authorised user. The data base administrator disperses data, files or parts of files across the network to local machines that use it most often. Users view data on the network as a single data base, even if the data is located on a number of separate, heterogeneous devices.

Given these capabilities, a sales planner could construct a query to retrieve all the sales of products with prices of less than $100. The request would go across the network to all the product group departments and retrieve the needed product sales information.

Best is yet to be

A real distributed DBMS provides much more than just access to data across a network.

Distributed processing allows users to request data from a server on a remote node and to access one remote data base at a time, assuming the name of the node housing the data is known. This is different from a distributed data base, which allows users to access more than one data base at a time without knowing the data location on the network.

Although some vendors offer parts of distributed DBMS technology, no vendor has yet to put together a full one.

The primary gap, according to Ross, is lack of support for referential integrity. Referential integrity means all entries must be legitimate and clean, checked by the dictionary for reference across all nodes. The data must not be corrupted, and communications links must provide full transparent failure recovery, back-out and provisions for lockout.

"In a heterogeneous environment, this is very difficult to accomplish," Ross says. "So far, it has not been achieved by any vendor."

Seven standards

The Gartner Group, Inc., a Stamford, Conn., market research firm, has established seven standards on which to evaluate distributed data bases, based on types of transparency. Depending on its type, transparency can mean the invisibility of a process to a user or full, simultaneous distribution of functionality to all nodes.

The types of transparency a full distributed DBMS should sponsor are the following:

- **Retrieval transparency,** which means data can be retrieved from any site, regardless of where the transaction originates, and the results received are the same for all sites.

A REAL distributed DBMS allows users to access more than one data base at a time without knowing the data location on the network.

- **Update transparency,** meaning that data can be updated at any site, no matter where the update originates, with the same effect as an update from any other site.
- **Schema transparency,** which means any user can make data definition schema changes from any site, and those changes will be visible throughout the network.
- **Performance transparency,** meaning that a command made at any site performs as the same command from any other site. For comparable performance, a distributed DBMS must have a distributed query optimizer that views the whole network and constructs an access plan to reach a determined processor best suited to process that query.

The query optimizer must analyze the queries for joining data across multiple machines so that the volume of data on the network is minimised. The bulk of the work is directed to the machine with the most available resources or to whatever node a network administrator explicitly designates; otherwise, the shortest path to the data or a copy of it is used.

- **Transaction transparency,** which means that transactions should be serialised to provide efficient concurrent access, updating multiple sites in a two-phase commit process. In the first phase, all target sites are prepared; in the second, the update command is executed. This procedure ensures data integrity because it minimises the update process's vulnerability to disruption from site crashes or simultaneous accessing.

Most distributed DBMSs handle update integrity at the local application level only, not at the network server level. Most likely, true data update integrity will come from this latter approach. Unfortunately, the more integrity rules, the more processing and transmission baggage that is created.

- **Copy transparency,** meaning that the loss of one site does not cost the network any data. Even with the loss of several nodes, the system maintains high

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Capital accumulation

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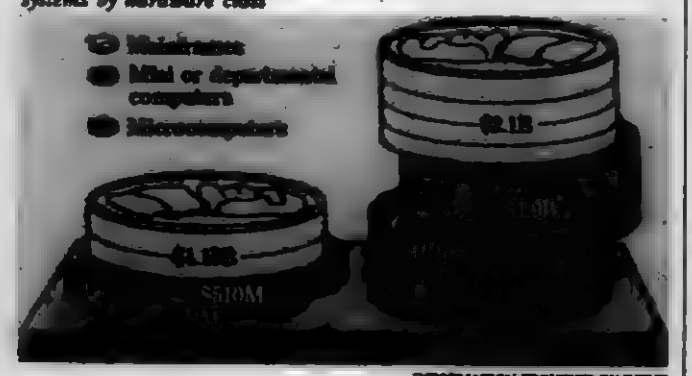

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availability of data with redundant copies. This redundancy presumably improves performance by putting needed data closer to users and by lowering communications costs.

Just as important is the assurance that data can be accessed even when the machine with the original copy is unavailable. In homogeneous environments, replication is accomplished by hardware and the operating system. But in heterogeneous systems, the distributed data base must do the work itself. Application copies throughout the organization must be consistent. New versions must be properly distributed, or users in different departments may end up using different inventory algorithms.

- **Tool transparency**, which means that all tools provided by the distributed DBMS vendor are applicable to all sites.

Here and now

Most vendors introduce their distributed products in phases. The initial phases are products that allow distributed queries. Later, the market will see systems that support synchronization of replicated data and updates across multiple nodes within a single transaction.

Both Relational Technology and Oracle are offering distributed versions of their mainstay data base products, Ingres/Star and SQL Star, respectively. Both systems can transparently retrieve data, perform joins across multiple sites and update any site in the network.

However, current versions restrict updates to only one site at a time. The more difficult feat of performing distributed updates within a single transaction will probably be seen commercially in the near future.

With Ingres/Star, Relational Technology is taking a three-phase approach to full distributed functionality. Phase 1 includes location transparency, multisite read transactions with single-site update, SQL and Quel — Relational Technology's query language — support for VAX and Unix and application tools support.

Phase 2, being implemented now, offers multisite updates, data replication, support for IBM and compatible microcomputers and access to companion SQL-based systems. Within a year, Phase 3 should include gateways to non-SQL-based DBMSs, including IBM's IMS.

SQL Star runs on IBM's VM/CMS systems and DEC's VAX/VMS, with PCs acting as client workstations. It also provides gateways to IBM's DB2 and SQL/DS.

Software AG's Adabas runs on DEC's VAX and on IBM mainframes under a wide variety of operating systems. It incorporates an open architecture to include third-party applications in a variety of hardware environments. In its newest release, Adabas includes a distributed DBMS, integrated text and document-based processing, extended support for SQL and relational data models.

> **DISTRIBUTED updates within a single transaction will probably be seen commercially in the near future.**

Vendors are currently working on products that allow fragmented data base tables and the distribution of those fragments across different nodes.

The upside potential

Although distributed DBMS is still in what could be termed a pilot stage, the approach clearly offers many potential benefits, especially for large, decentralized organizations and consumer-oriented companies with online transaction systems.

One advantage is the fact that data is more available and reliable at the local level. This availability does not compromise the ability to share and consolidate at the global level. Another is that communications costs are reduced by the ability to flexibly decide whether data should be moved to a query or vice versa.

User interfaces are simplified with distributed DBMS, because

Continued on next page

Hierarchical model keeps loyal following

BY BARBARA SEHR

In an era of instant answers, instant recall and instant gratification, hierarchical data bases may seem to some like a throwback to a period of vacuum tubes and slide rules.

Despite the increased penetration of today's generation of relational data bases, however, hierarchical data bases remain the workhorse for intensive transaction processing users. Banks, insurance companies and other high-volume users continue to swear by the old reliable hierarchical data bases such as IBM's IMS, which was developed in 1969.

Programmers find it easier to write applications within the relational environment. However, when compared with a 20-year-old process, relational products represent an untried and unproven technology in which limitations are still being discovered.

Wary of immaturity

Focus Research, Inc., a West Hartford, Conn., research firm, says 17.9% of all mainframe users surveyed in January still use IMS. An additional 15.9% use IDMS/R, a third-party hierarchical system from Cullinet Software, Inc.

Although the survey found that 57% of all IMS users were also running IBM's newer relational product, DB2, these instances were described as "limited use." Many organizations, while willing to convert for certain isolated applications, remain steadfast in their belief that relational products are unsuitable for the bulk of their processing.

Relational products are immature, says Charles Pleasums, acting director of systems research at United Service Automobile Association (USAA) in San Antonio.

DB2 is used at USAA, he says, but only for minor programming functions. The heavy commitment is to IMS, and that commitment was recently reinforced through a five-year, $120 million development program for one of the insurance giant's subsidiaries.

"Relational products are great for small shops with just a few hundred terminals," Pleasums says, "but large shops like ours have to stick with IMS."

John White, vice-president of information systems and services at Texas Instruments, Inc. in Dallas, also says he has doubts about DB2 serving as a primary data base management system in the short term.

"Development time is about a fifth of what it is under IMS," he says. But, he adds, it could be 10 years or more before DB2 is ready to shoulder the burden of an intensive environment.

Like Pleasums, White continues to depend on IMS to handle the majority of his processing requirements. TI runs its complete operations, including inventory, accounting and manufacturing procedures, under IMS. It has done so for more than a decade and just completed a 10-year corporate commitment to convert its operations to IMS, according to White.

> **MANY organizations remain steadfast in their belief that relational products are unsuitable for the bulk of their processing.**

There are two reasons IMS is still around, White says. The first is that the system has built up a huge library of applications in its nearly 20 years of availability. This library gives the relational data base a life of its own.

For TI, a complete conversion to DB2 would probably mean an additional 10-year commitment, he says. "It may not take as long to write [for DB2] as it did for IMS, but the flywheel is bigger — there are a lot more applications now," he says.

The second reason is related to IMS's ability to bear up under demanding applications. "The performance of hierarchical data bases is simply so much better," White adds.

And VAX, too

Strong commitment to hierarchical-data bases among large users is not limited to the IBM mainframe market.

The fast-growing VAX market is an attractive target for makers of third-party relational data bases, such as Relational Technology, Inc.'s Ingres and Oracle Corp.'s Oracle. However, like IMS, hierarchical products within the Digital Equipment Corp. VAX market date back to the origin of the VAX itself, and relational vendors are finding user loyalty tough to penetrate.

Gary Zander, group leader for information systems at International Flavors and Fragrances, Inc. in Union Beach, N.J., says his firm has used DRS, a hierarchical product from Advanced Data Management, Inc., from the time it acquired its first VAX more than 10 years ago. "DRS is significantly faster than relational products," Zander says.

As relational products acquire more muscle and maturity, a shift will eventually occur even in bastions of hierarchical DBMS, says James Russo, vice-president of marketing at Focus Research. But, he says, it will probably happen very slowly and over a long period of time. ●

Sehr is a free-lance writer based in Seattle.

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Data dispersal

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users are insulated from the processes required to locate and access data and develop queries on a variety of hardware, DBMSs and networks.

The potential also exists for a better fit between the DBMS and the organization than undistributed systems can offer. Most organizations are logically as well as physically distributed, and a true distributed DBMS can accommodate that.

Finally, distributed data bases offer reduced hardware expenditures. A firm can obtain better price/performance from departmental systems than mainframes can.

With a distributed DBMS, a company can hook together a number of small and medium-size computers and get much the same power offered by expensive mainframes. An Intel 80286-based data base server may accommodate up to 16 users, possibly 64 using a 386-based server.

For 100 or 1,000 users, the classic mainframe solution is to get a bigger server. Many organizations would rather get a second 80386-based machine, put it on the network and access those two machines as if they were linked together. To do that, you need a distributed DBMS.

Winning acceptance

Right now, sales of distributed DBMS products represent only a tiny fragment of the total DBMS market, which Dataquest, Inc. in Santa Clara, Calif., projects will reach $1.5 billion this year. However, Input, located in Mountain View, Calif., says distributed DBMSs will make up 15% of the data base market by 1992.

Moving up to that position will require some maturation, according to Forrester Research, Inc., a Cambridge, Mass., market research firm. In a recent study, Forrester concluded that the current generation of distributed DBMSs is immature relative to a full distributed DBMS's potential and is likely to appeal only to early adopter types.

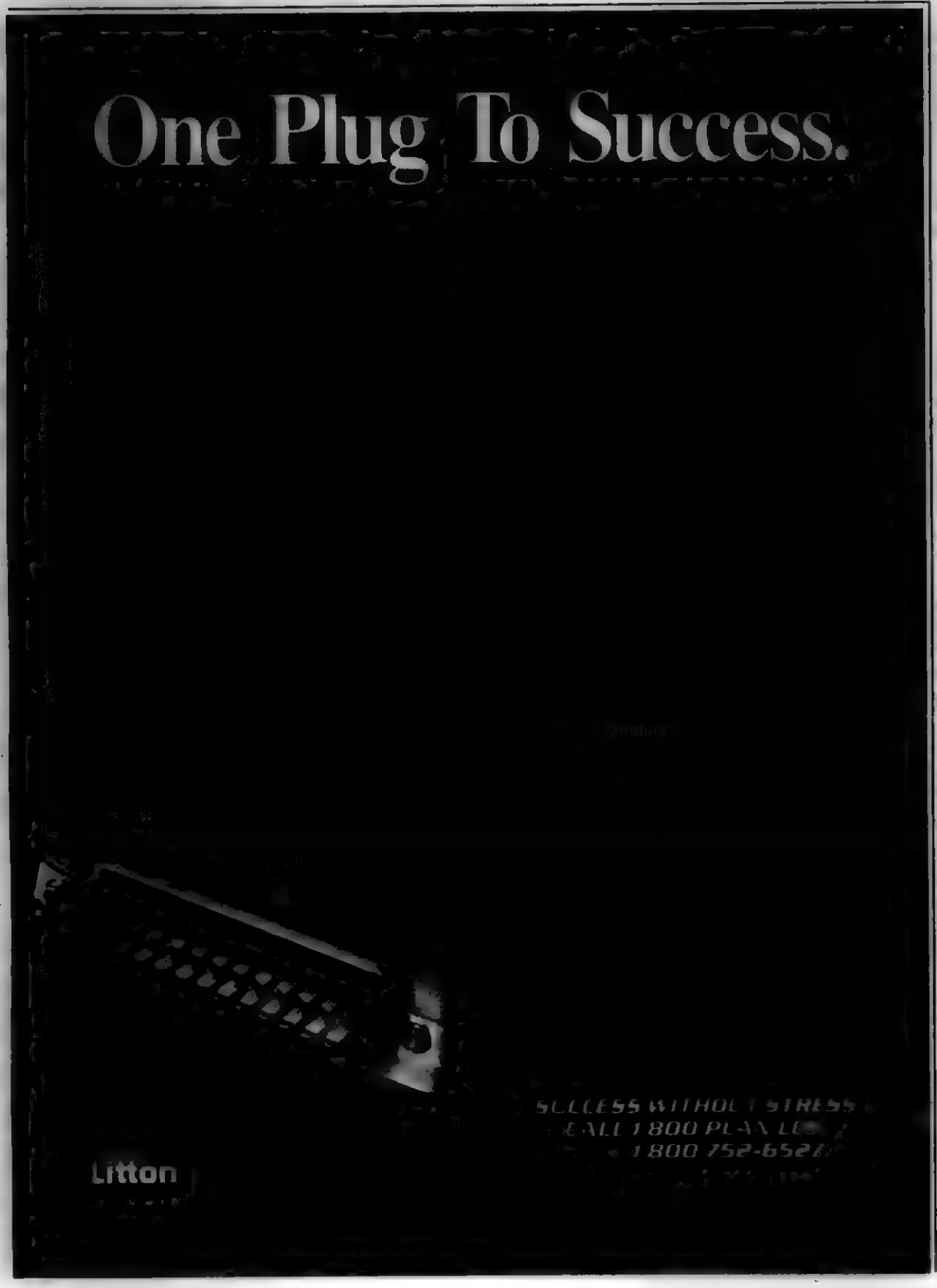
The growth rate of distributed DBMSs also depends, in some part, on how quickly other issues competing for MIS attention are resolved.

MIS directors are currently dealing with more pressing issues, according to Ed Acly, analyst at International Data Corp. in Framingham, Mass. "DB2 is still taking up a lot of MIS directors' attention," he says. "Distributed DBMS is still not at the top of their lists. We'll see real penetration of distributed systems in the early 1990s."

Planning for distributed DBMSs also requires prior planning for network strategy. Before they take that step, many large DP shops are waiting for IBM to clarify its long-term plans.

Several recent developments in standards have helped to stir interest in the distributed DBMS market. Communications standards, such as Open Systems Interconnect and Manufacturing Automation Protocol and Technical and Office Protocol, allow heterogeneous computers to exchange data.

ANSI-standard SQL supports access to different data bases and is being incorporated into most distributed data base products. Finally, IBM's LU6.2 protocol provides a standard interface for transaction processing and allows application programs to communicate via IBM's Advanced Program-to-Program Communications facility.



> "DB2 IS STILL taking up a lot of MIS directors' attention. Distributed DBMS is still not at the top of their lists."
>
> ED ACLY
> INTERNATIONAL DATA CORP.

Technical clouds

A number of technical issues, however, are impeding users from translating into action their interest in distributed DBMS.

A crucial element missing in all current offerings is a comprehensive set of software gateways allowing access to older installed mainframe DBMSs such as IDMS/R and IMS so that they can be incorporated into newer relational data bases. Today's distributed DBMSs are based on relational technology and, as such, link distributed data bases to other relational systems. Constructing a gateway from a distributed data base to a nonrelational data base system is a much bigger challenge.

Another thorny technical problem is the two-phase commit process that ensures data integrity. Today, neither of the two leading distributed DBMSs from Oracle and Relational Technology offer multiple-site update capabilities, although both companies have announced their intentions to provide this function.

Even SQL, which by promising a common user interface has done much to pave the way for distributed DBMS, raises some questions because of its current not-quite-standardized status. Right now, no two SQL implementations are identical, even within IBM, which uses different versions with DB2 and SQL/DS.

In the end, SQL will probably not provide the interface solution that potential users of distributed DBMSs are really looking for. With the proliferation of different microcomputer data base and spreadsheet programs entrenched in users' everyday work styles, acceptance will not occur until someone finds a way for people to use their own favorite

programs to interact with the distributed network. Either that, or most nodes will need to have easy-to-use, custom menus built with limited query latitude.

There are signs that the first avenue may soon be a real option. The market for DBMSs that closely integrate PCs is rapidly evolving and has recently seen several large-scale strategic partnerships form.

In January, Microsoft Corp., Ashton-Tate Corp. and Sybase, a relative newcomer, announced a partnership to develop a relational data base using the Sybase data base engine. Late last month, Lotus Development Corp. and Gupta Technologies, Inc. announced a joint project to develop a relational data base tied to a Lotus DBMS product.

Many of these alliances are aimed at creating bridges between popular microcomputer applications and the powerful relational data bases that run on minicomputers or supermicros. Within a year, IBM is set to introduce OS/2 Extended Edition and its SQL-based Data Base Manager, which will be able to tap DB2.

Relational Technology is working with Sun Microsystems to create a standard data base for workstations. And last summer, Apple Computer, Inc. took a 5% interest in Sybase, which is creating a data base product for the Macintosh.

These alliances will hopefully turn out products to allow customers of future distributed data bases to use their favorite microcomputer applications to interact with the network.

All in the readiness

Not all the technical difficulties associated with implementing distributed DBMS have to do with the products themselves. Some elements within organizations hamper a distributed approach.

One example is "antirelational" data embedded in numerical data bases. Numbers for many organizations are not just numbers but can also designate unique categories or information; consequently, the data has different meanings in different geographical locations or divisions within the same company.

Furthermore, certain types of organizations are structurally unsuited for distributed DBMS. While insurance companies are highly decentralized and thus generally receptive to such a system, some businesses have centralized control, which would not mix with this approach.

Beyond these considerations, there are several questions that anyone contemplating the possibilities of distributed DBMS should consider to determine what sort of product is really needed:

- Should we distribute data, or do we need to distribute only access to data, with the data itself remaining at the site?
- Do we want ultimate authority over data definition and access handled locally, globally or both?
- Will we obtain better performance with compiled or interpreted code, given the characteristics of our applications and the stability of our data bases?
- When a line fails, how do we balance the need for availability with the need for data integrity? How do we balance the cost of recovery with the need for integrity?
- In updating replicated data, how do we weigh the cost of simultaneous updates vs. the need for data integrity?

NOT ALL the difficulties of implementing distributed DBMS have to do with the products. Some elements within organizations hamper a distributed approach.

For your consideration

Unfortunately, organizations that decide they might be candidates for distributed DBMS have a confusing and little traveled path ahead of them. Distributed DBMS products for heterogeneous environments have been implemented for only a year.

The places that have installed such systems are still cutting their teeth on them. Benchmarks are complicated, and even a vendor's test statistics can be manipulated to show its product to the best advantage.

Still, it is possible to enumerate the major must-have features for distributed DBMS. They include the following:

- **Data independence.** The DBMS should divorce the logical from the physical aspects; that is, the data base function should not depend on the physical location of the data. While many new distributed DBMS products incorporate this capability, users of older systems could tell plenty of war stories about having to change entire applications because data needed to be stored on different drives in different locations and the DBMS couldn't support it.
- **No reliance on a central site.** All functions of the system, including the data dictionary, should be distributed. This decreases the danger of performance logjams and reduces the possibility of the whole system going down if the central site fails.
- **Backup and recovery procedures.** These should protect the integrity of the data in the event of a central server or node failure. Synchronizing updates on fragmented data means all nodes must be available in order to complete the transaction. Thus, these transactions hold little threat to data security.

Replicated data that must be updated synchronously requires a strategy for handling processor and line failures.

Line failure poses a real threat to integrity because two processors could, while a line is out, update the same data, perhaps creating values that could never be reconciled without human intervention. Those values could then spread throughout the system like a virus.

One recovery scheme to preserve integrity during a line failure specifies where processing can proceed and stops processing on the replicated data at all other nodes. This strategy completely synchronizes the data bases as soon as communications are restored.

Another recovery scheme restores a data base on an as-needed basis. This method, called lazy or casual recovery, relies on a time stamp mechanism. Once a line fails, the secondary processors that are allowed to update the replicated data initiate a time stamping process.

After the line is restored, the secondary processors compare the time stamps on any replicated data that is accessed. The secondary processors synchronize the data if necessary before initiating the current transaction.

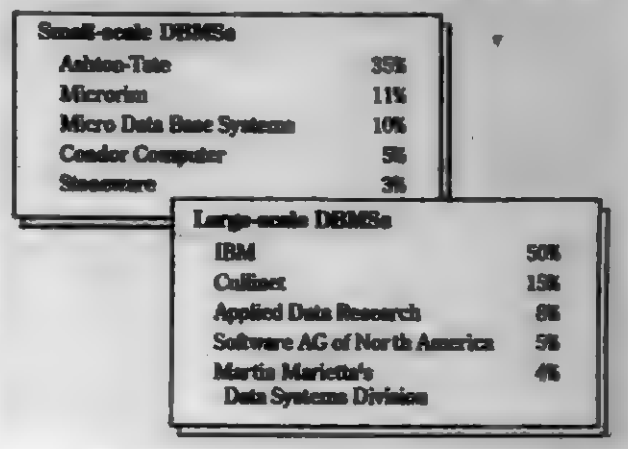
- **Continuous operation.** Adding a new site to the system or upgrading software at one site should not bring the whole system down.
- **Fragment independence.** Data should be able to be fragmented and stored closest to the site at which it is used most.
- **Compatibility with other DBMSs, operating systems, networks and hardware.** Distributed systems need to be able to transfer data back and forth, for example, along and between DEC's Decnet, IBM's Systems Network Architecture, LANs and wide-area networks. Data should be able to be exchanged between a DB2 data base at one site and an Oracle at another.

Because most organizations have diverse needs and require different data bases, the ability to accommodate existing data and programs with known interfaces is critical.

- **Performance.** The system should have a query optimizer that chooses the best route and CPU for processing. Depending on the query processing, a query can be answered in as little as three seconds or as long as 2½ days. Requests can tie up a network and slow down performance, so data cannot be located at the farthest point away from the users who need it.
- **Transparency.** Users should not have any awareness of what drive, what processor or what DBMS is being accessed.
- **Updates.** The storing of data in one server and other data in another remote server complicates the update process tremendously. Users have to make sure that the data in both servers is affected simultaneously.

Class leaders

Market share percentage of top performers in small- and large-scale data base management system software, measured by units or dollars



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CW CHART

This gets even more complicated when the data base has to accommodate possible shutdowns of a node or server or the breaking of a transmission line. Recovery needs to ensure the data integrity of all the relevant data bases throughout the network.

- **Replication independence.** To minimize traffic, pieces of data should be able to be copied and stored at many sites, if necessary. Users should not have to know whether the data is replicated or, if it is, which replicate is being used.
- **Data communications software/interface.** Especially for geographically dispersed organizations, the distributed DBMS adaptability to the data communications configuration is critical.
- **Data base definitions.** The system should directly and automatically support one-to-many and many-to-many relationships between entities.
- **Security.** Access control should be provided to the data item level and, in some cases, down to the value level.
- **File format compatibility.** The system should offer utilities or the capability to harmonize different file formats and data base organizations.
- **Dictionary/directory functions.** These facilities provide intelligence on resources and support administrators and efficient systems development and maintenance. •

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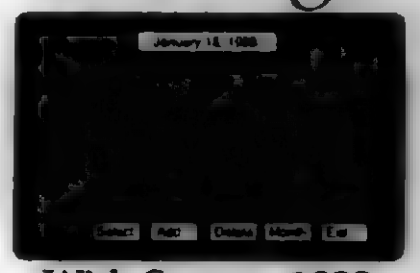

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How PC users cast votes

BY KATIE GURLEY

• Keith Bailey is a stickler for detail. As director of sales and marketing at Orlando Lutheran Towers, a retirement community in Orlando, Fla., his job is to woo and win as many prospective clients as possible. Part of his strategy is to keep track of the personal data — name, age, health, marital status and so on — of hundreds of prospects every day. For Bailey, such information is the lifeblood of making sales.

Gurley is a free-lance writer based in Wellesley, Mass.

• Terry Turner gets yelled at a lot. He also gets complimented. People ask him a lot of questions. Turner takes none of this personally, of course, because it's his job to field hundreds of these verbal fly balls and guide them to their appropriate places in the corporate infield. Turner is in charge of the customer affairs center — generically known as the complaint department — at Seafirst Bank.

These two men work thousands of miles apart and hold very different jobs. What they have in common with each other and with many everyday users of microcomputer data base software are the features they prefer in such packages.

Bailey, Turner and other users like them say their primary considerations in such software are ease of use and the speed and efficiency with which it can assimilate, categorize and organize raw data. Users also appreciate programming capability and mobility, as exemplified in such features as the ability to inload files from other application packages or to access one file while working on another.

As assistant vice-president and manager of the Customer Affairs Center at Seafirst Bank in Seattle, a wholly owned subsidiary of Bankamerica Corp., Turner handles about 1,000 questions, complaints and compliments from customers every year. He estimates that 99% of his work is done on his Apple Computer, Inc. Macintosh 512K using the Omnis 3 Plus relational data base from Blyth Software, Inc.

"The most important thing to me is that this is a very user-friendly system that doesn't require a person to be an expert," he says. "That allows me, as a manager, to be much more productive and efficient."

Turner uses the data base daily to track inquiries by date, source, subject and which bank department the inquiry concerns. About 800 typical inquiries or complaints have been coded. When an inquiry or complaint comes in, the codes are entered into several major files broken down by department.

Using Omnis 3 Plus, Turner keeps track of the status of each problem or inquiry until it is resolved. Other reports generated from the data base keep Turner apprised of patterns in complaints and complaint handling.

Jean Anderson doesn't manage complaints, but she does manage something just as touchy — other people's money. An administrator of pension and retirement plans at the Independent Service Co., a pension and retirement fund administrator in Albert Lea, Minn., Anderson's job is to see that customer funds are correctly divided and dispersed to different accounts for investment.

> "THE MOST important thing to me is that [Omnis 3 Plus] is a very user-friendly system that doesn't require a person to be an expert."
>
> TERRY TURNER
> SEAFIRST BANK

She does this with the help of Powerbase, a Microsoft Corp. MS-DOS data base from Powerbase Systems, Inc., a Compuware Corp. subsidiary based in Farmington Hills, Mich.

"Powerbase calculates the amount for each person and funnels the different funds into different accounts," Anderson explains. "Then it does a hard-copy report for the customers."

Anderson, who has no experience with other data bases, says she finds Powerbase easy to use and is just starting to use it for other kinds of investments managed by the company.

She says her favorite Powerbase feature is Powerlinks, which enables her to load client information from, for example, Lotus Development Corp. 1-2-3 spreadsheets into her data base. Some clients also provide their investment information on a diskette, which Anderson can enter into the data base in seconds, saving her hours of time each month.

Vern Challgren, a research data analyst at Dekalb-Pfizer Genetics in Dekalb, Ill., uses Dbase III Plus from Ashton-Tate Corp. to store data on test crops. Dekalb-Pfizer manufactures agricultural seed. Challgren's data includes what seed is being tested and where, the population of the state and county in which the test crops are and crop yield and quality.

"Using Dbase, we can sort the information, pull out the selected information

Continued on page S16

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Micro relational DBMS: Weighing trade-offs

BY FABIAN PASCAL

The microcomputer data base management system market is undergoing a revolution similar to one that has already occurred at the mainframe level: Traditional products must either adjust to the relational, SQL-based approach or give way to products that are based on it.

Adopting a relational strategy in the micro environment is not easy. The single-user, single-tasking DOS operating system with 640K-byte memory has constrained functionality, performance or both for SQL implementations. Vendors can mimic mainframe and mini versions but only at the expense of simplicity and ease of use.

Furthermore, the current ANSI SQL standard is weak. It lacks some basic capabilities and offers only limited support of others. The American National Standards Institute (ANSI) is only now considering some critical relational features. This means vendors can either adhere to the ANSI standard and limit their competitive edge or add useful functionality and impose on their customers the risks associated with lack of standardization.

> VENDORS can either adhere to the ANSI standard and limit their competitive edge or add useful functionality and impose on their customers the risks associated with lack of standardization.

In general, the tendency has been to not deviate much from the de facto "standard," which is a combination of the ANSI standard and IBM's slightly more functional DB2 dialect. Vendors have extended it into useful areas but have avoided fundamental relational features such as keys, domains, integrity and updatable views. Consequently, all commercial personal computer implementations are both subsets and supersets of the SQL standard.

There are, however, some important differences in how various vendors approach their micro strategies, especially in terms of connectivity. Because only genuine and relatively complete SQL systems will confer on users the full benefits of relational fidelity and standardization, it is most important to look at products that fit this description.

Users should familiarize themselves with relational technology and SQL and beware of incomplete or highly proprietary implementations or of SQL interfaces placed on top of nonrelational systems.

Oracle Corp., in line with its aggressive multiplatform strategy, has ported its full mini/mainframe version of Oracle to the PC. The product is clearly targeted at developers and PC environments, as its considerable customization, administration and tuning options attest.

PC Oracle's SQLplus dialect is broadly compatible with the de facto standard but is profusely extended. The product also offers some unique features such as row-level and recursive functions and extensions for physical space management.

The advantages of PC Oracle are portability of applications across supported platforms (of which there are many), more functionality and control and, for the vendor, simplification of development and support. On the other hand, the PC's architecture is not fully exploited externally. Internally, complexity baggage and extended memory requirements also limit the number of compatible machines.

Oracle is strongly committed to the micro market, and it appears that the firm's connectivity strategy includes a local-area network server under OS/2 — IBM and Microsoft Corp.'s operating system for the Personal System/2 — and its distributed DBMS, SQL Star.

From Unix to DOS

Informix Software, Inc. has also ported its full minicomputer product to the PC, bringing it from Unix to DOS. The Informix SQL dialect, RDSQL, stays close to the current standard. Externally, the product is in tune with the PC environment, sporting a clean, integrated, Lotus-like menu interface.

In addition, the company's latest version of its SQL-based Informix 4GL offers a windowing capability and color. While it is not very resource demanding, the product is also not fully optimized for the PC.

Informix's commitment to the DOS platform has not been very clear, but the company has announced OS/2 support and offers a new SQL engine, Turbo, for the Unix environment. Connectivity is supported with a file server approach under DOS/Netbios and with data base servers under Unix/Starlan.

Relational Technology, Inc. has taken a different approach with Ingres, also a product of mini/mainframe origin.

To minimize compromises on portability, performance and standard PC configuration, certain SQL functions considered to offer primary utility in a shared data environment can be included in PC applications. These take effect, however, only when ported to Ingres multiuser platforms.

Such features — for example, integrity, transactions and concurrency control — are called "no-ops." The core of Ingres SQL dialect is standard-compatible with the usual extensions, but no-ops are in Relational Technology's own relational language flavor, Quel, which is generally considered superior to SQL.

Written to size

Since the Ingres front end was quite compatible with PC user expectations, Relational Technology preserved it. But the package was rewritten for, not ported to, DOS, with very good performance results.

Although an SQL engine has long been announced, Relational Technology has not been aggressive in the PC market. The company focuses connectivity on its advanced distributed DBMS, Ingres/Star, but gateways to other DBMSs — most recently Ashton-Tate Corp.'s Dbase IV — have also been announced.

Gupta Technologies, Inc. has created in SQLbase a product written entirely for the PC but with explicit connectivity intentions. For access to other SQL servers, Gupta kept its SQLtalk dialect close to the de facto standard and chose a server/requester architecture. Its PC orientation yields very good performance.

Gupta's approach commits the company to the micro market, and support for OS/2 and Windows has long been announced. SQLbase is the first — and currently the only — LAN server to run under DOS/Netbios. One IBM Advanced Program-to-Program Communications gateway to DB2, called SQLnet, is available, and similar plans exist for other mini and mainframe SQL servers.

Software Systems Technology, Inc.'s XDB is the PC relational DBMS par excellence. Its SQL dialect is compatible with the standard and provides the usual extensions. It is the only DBMS whose design was done entirely with PC users, including end users, in mind. It offers an integrated, well-designed set of menu-prompt-driven tools that are capable and extremely easy to use.

Various tests have consistently found the performance produced by XDB's explicit PC orientation to be significantly superior to the competition's. The company has announced its intention to include referential integrity and a LAN server under DOS/Netbios.

Tipping the balance

In addition to these, a few new players have announced micro DBMS entries that are noteworthy. The SQL data manager embedded in IBM's OS/2 Extended Edition, Sybase, Inc.'s Dataserver and Lotus's Lotus/DBMS — an SQL LAN product — are certain to change the market equation.

IBM's SQL data manager is rumored to initially provide limited tools but good compatibility with DB2. The Sybase Dataserver will have advanced relational features, and front-end support has been announced by Microsoft, Ashton-Tate and Sybase itself. Lotus/DBMS, with backing from Gupta, will also have an SQL LAN server/requester architecture.

These products and others that will be released in reaction to them are sure to change the market equation. Competition is going to be intense, characterized by claims of superiority.

But as this brief overview shows, PC users should approach the DBMS selection process with a good understanding of the trade-offs and how they relate to the needs of their specific environments. ●

Pascal is a Washington, D.C.-based independent analyst and consultant specializing in relational data base management and SQL on micros. He is affiliated with the Codd and Date Consulting Group.

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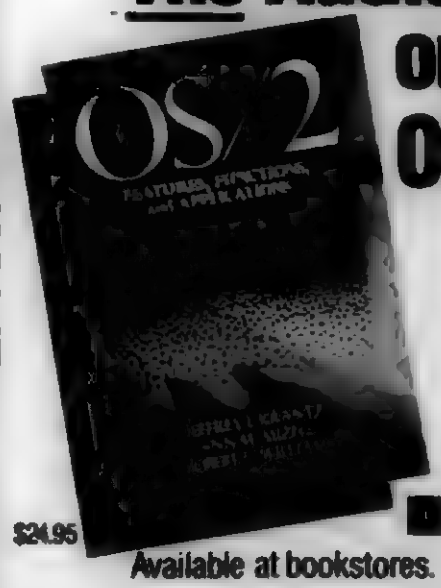

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ASK THE VENDOR

The following questions were solicited from users and conveyed to the vendors for responses.

Why did Advanced Data Management choose to emphasize Digital Equipment Corp.'s VAX environment for DRS? Is the company developing anything new for the product in the IBM environment?

Lou Walker
Computer specialist
Navy Surface Warfare Center
Dahlgren, Va.

ADVANCED DATA MANAGEMENT, INC.: The VAX promised economical computing and well-developed time-sharing in a computer compatible with our then-current PDP product. The richness of the interprocess communications features, the integrated debugging facilities and the VAX standard-call interface make the VAX a very productive machine to develop on.

Current plans for DRS include providing a high-performing data base system in a mixed-vendor environment. ADM is currently in the process of porting DRS to the Unix environment. After a feasibility study is completed, a decision will be made as to whether ADM should reenter the IBM mainframe marketplace.

The IBM Personal Computer environment is a different arena. ADM is providing full DEC Vaxcluster support in its next release. Cluster support is provided as the precursor to generalized network support. At that time, an IBM PC-based workstation could be used to handle local validation and screen formatting chores.

Does Henco Software plan to interface Info-DB+ with RDB, DEC's relational data base? And will there be a gateway for Wordperfect Corp.'s Wordperfect word processing?

Also, when using Info-DB+, how do you define or simulate a matrix variable?

John Forbes
Project manager
Information Planning Associates, Inc.
Falls Church, Va.

HENCO SOFTWARE, INC.: We are currently planning the next major release of Info-DB+ on the DEC VAX. One of the goals of the next release is to implement the most important enhancements to the basic functionality of Info-DB+. We have identified approximately 75 enhancements for the next release of the product, including support for both arrays (matrix variables) and the Wordperfect document format.

Data Access's Dataflex does not currently support SQL. Are there any plans in the future to support SQL standards?

Also, Data Access is working with another company to develop a data base server on a proprietary network.

Are there any plans to support data base servers on IBM Netbios-compatible local-area networks, such as Novell, Inc.'s Netware?

Steve Fisher
Director of software development
Automated Design Systems Corp.
Colorado Springs

DATA ACCESS CORP: Data Access plans to provide SQL connectivity in Dataflex this year. The project referred to is the Dataflex product for Lifenet from Univation. Univation implemented the data base server software, and we integrated it into Dataflex. The resulting product handles both traditional Dataflex files and files managed by the server.

We are currently investigating other data base server software, such as Novell's Btrieve on Netware, for potential integration with Dataflex. We are also considering authoring our own data base server software as an integral part of future Dataflex revisions.

Since traditional data management products offer fourth-generation language features, how will an established fourth-generation product such as Information Resources' Express differentiate itself as a decision support system?

Steve Thompson
Senior systems consultant
First National Bank of Chicago
Chicago

INFORMATION RESOURCES, INC.: We still differentiate the Express product line by continuing to focus on analysis and planning needs, for which traditional data base management systems (relational, hierarchical and so on) are weaker.

In particular, traditional DBMSs are more transaction- than analysis-oriented. They specialize in selecting, updating and displaying detailed, record-oriented data. In contrast, decision support applications require more flexible manipulations on time series and cross-sectional data, typically at more aggregate levels.

The Express family is well suited to these analysis-based

Continued on page S16

Images in memory and on the screen

BY REBEKAH WOLMAN

The Electric Power Research Institute (EPRI) in Palo Alto, Calif., wants to simplify research and speech making for staff members at its more than 600 member utilities. To that end, the institute's Technology Transfer, Energy Management and Utilization Division devoted a year to building a remotely accessible electronic resource library that includes 2,000 slide images and video images of scripts, marketing brochures and technical advisories that support the slide presentations. Division manager Greg Lamb says this resource will offer members access to a supply of ready-made words, images and related research.

A major building block in the creation of this resource facility was Picturepower-HC, one of a line of picture data base systems from Pictureware, Inc. in Bala Cynwyd, Pa., that runs on the IBM Personal Computer and compatibles utilizing a variety of capture/display boards. Picturepower software allows users to capture photographic images in digitized form, edit them and place them in data bases along with text for viewing, retrieval or integration into applications.

The system includes an internal data base but is also compatible with Ashton-Tate Corp.'s Dbase III Plus.

Because EPRI chose to create its image data base in Dbase III Plus, using Nantucket Corp.'s Clipper as the compiler rather than Picturepower's internal data base, users who want to take advantage of the image library are required to set up two monitors: one for text and one for graphics.

"That is the penalty we had to pay for the design flexibility we wanted," Lamb says. Although the situation is not optimal, he says, it is sufficient for getting the project off the ground.

Picturepower-HC is a high-compression version that reduces image storage requirements by as much as fifteenfold. What that means for EPRI is that 2,000 images can be distributed on a 60M-byte magnetic tape cartridge, while the accompanying text goes out on floppies. In the future, when the institute's entire collection has been cataloged, Lamb says, compact disk/read-only memory technology will replace magnetic tape as the storage medium.

Eventually, Lamb says he envisions users supplementing the EPRI data base with their own slides, giving them a tool to organize their own materials and generate their own slides directly from the stored images.

EPRI's Lamb

Obsolescence isn't the issue for another Picturepower user; but keeping records that reflect inventory in its proper form is. In the art world, there is no substitute for image. That's why a large museum in Washington, D.C., has purchased Picturepower-HC to build a picture data base of its 13,000-item collection.

The museum maintains its data base on an IBM Personal Computer AT with a 40M-byte hard disk. It also uses a 100M-byte optical storage disk but has found it will need 150M bytes more in the future. While the mainframe text data base includes such information as dimensions, dates and inscriptions for each work of art, the limited capacity of the museum's PCs dictates that the Picturepower data base include just three fields — accession number, title and artist's name.

> DATA base storage of images is a branch of technology just beginning to flower.

So far, this material has been downloaded from the mainframe into a Dbase III format, and a staff person has begun photographing the works with a Sony Corp. video camera (which is plugged into an AT&T Targa board for digitizing) and appending them to the three data fields. At the rate of 20 images a day, it will take at least 2½ years to complete the project.

The images will be stored on optical disks; the text, on a hard disk. Distribution will probably be accomplished through a few different optical disk stations.

The fact that artwork is stored in various parts of the museum or, in some cases, is out on loan to other museums is what will make the complete catalog so useful. "To see all the works by a particular artist would take a lot of legwork," the registrar says. "Now, using Dbase III's multiple fields, a curator planning an exhibition will query all works of, say, German sculptors from 1910 to 1940 and see the pictures instantly."

In 1983, when Pictureware started working on its system, the closest anyone ever came to images when thinking of data bases were computer-generated graphics.

By 1986, when the first version of Picturepower was released, several hardware developments had converged. Digitiser boards had become available for PCs, and PC processing capabilities had become much more powerful, as had compression and storage technologies. Pictureware currently offers support for optical disk storage of Picturepower data bases.

Pictureware President Michael Marcus says the company had two major applications in mind during the development phases: personnel identification, security and access control; and cataloging merchandise, especially one-of-a-kind high-ticket items like jewelry and Oriental rugs. But now, the software is in use for not only these applications but for more than two dozen others, including slide cataloging projects of the types described.

Pictureware is not the only company that has spotted the opportunity in image making. At least half a dozen others offer products that permit images to be incorporated into data bases.

Information Builders, Inc.'s Focus Vision, which works in conjunction with PC Focus, allows the user to add images to a data base by treating them as a data type. It also allows users to pull images from other applications.

Chorus Data Systems' Color Photobase System works with Dbase III, using Chorus Data's PC-Eye board to pick up images.

Core Analytic's Visiobase offers ready-to-use vertical application shells into which users place data and images. A number of data base systems for the Apple Computer, Inc. Macintosh are also designed to accommodate images.

Data base storage of images is a branch of technology just beginning to flower, according to computer graphics consultant Carl Machover. "Right now," he says, "I would be surprised if it were more than a $10 million or $20 million market, but its potential is enormous." •

Wolman is a free-lance writer based in Cambridge, Mass.

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June 13–15, 1988

1988's most important forum for I/S professionals responsible for defining and implementing a value added DB2 strategy. Learn how to make your implementation of DB2 leverage the inherent power of relational DBMS and achieve the dramatic application productivity gains which are possible given the ever expanding DB2 and SQL/DS Tools marketplace.

What's Happening with DB2?

DB2, IBM's strategic RDBMS, has had a powerful impact on the software industry and the information systems community, validating the viability of the relational approach to information management and application development. A major issue facing DB2 users today concerns obtaining tools that add value to the underlying power of an RDBMS such as DB2.

Mainframe Relational DBMS, specifically DB2, for a large portion of the IBM mainframe community represent the ideal platform for implementing Integrated Computer-Aided Systems Engineering (ICASE) systems and powerful application development tools. Other SQL based RDBMS can be deployed in a heterogenous computing environment to support distributed database applications which leverage the expanding power of workstation environments. DB2 also provides an effective platform for leveraging both application software products and the emerging use of application enabling mechanisms.

And although the Symposium focuses on DB2, the emergence of SQL as an industry standard and the potential impact of SAA suggest that the power of DB2 Tools is *not* limited to a DB2 environment. As a result of a comprehensive SQL interface, a significant number of the tools presented during the Symposium are of value to other RDBMS platforms as well. Furthermore, the best of what competing DBMS vendors have to offer is now being extended to the DB2 environment and represent an opportunity to leverage your existing DBMS as well as DB2 where appropriate.

Essentials Every DB2 Tools Conference Must Have

A Program that:

Provides you with the leading DB2 Tools vendors all in *one* location to save you valuable time, effort, and money.

Explains the important role of Systems Application Architecture (SAA) and how it relates to DB2 and SQL/DS.

Addresses *your* questions and opinions in debriefing sessions with industry experts and vendor representatives.

Covers key DB2 issues in tutorials and interactive panel sessions.

Speakers who:

Have been involved with DB2 from the start, such as Marilyn Bohl, formerly with IBM, Norris van den Berg, IBM, and Paul Hessinger, Research for Computer Task Group, Inc.

Have practical experience with DB2, are familiar with its capabilities and functions, and can show you how to get the most out of *your* system.

Consultants who:

Are objective reviewers who can give you unbiased advice on which DB2 Tools and SQL/DS applications are best suited to *your* needs.

Will meet with you one-on-one to refine or redefine *your* DB2 strategy.

Don't settle for less. Attend Digital Consulting, Inc's DB2 Tools Symposium for the most comprehensive presentation for enhancing your DB2 or SQL/DS strategy.

Symposium Overview

Each day begins with implementation tutorials by Symposium chairman Paul Hessinger and industry authorities. These special lectures and interactive panel sessions will cover DB2 issues of vital importance, including:

- The Relational Family and DB2 Directions
- Re-engineering of Existing Databases and Applications
- Information Asset Management
- CASE for DB2
- The Importance of Value-added DB2 Tools
- Beyond DB2.

Mr. Hessinger opens Day One with an intensive assessment of the DB2 Tools marketplace, including a functional overview of the major categories of tools which should be incorporated into a value-added DB2 strategy. Categories include: Integrated CASE (ICASE) environments, stand alone CASE tools for planning, design, development and maintenance automation, complementary RDBMS with a particular emphasis on distributed database tools, and integrated RDBMS/Tool architecture for the workstation environment, application software, various utilities, and the rapidly growing area of Expert System development tools.

The afternoon sessions as well as the morning of Day Three, feature in-depth product presentations set in a classroom environment and led by representatives from each participating company. These sessions examine the products' features, functionality, and primary applications and will be scheduled to provide you with maximum exposure to each category of DB2 Tools.

At the end of Days One and Two, noted industry experts will discuss key implementation issues associated with the DB2 Tools presented during that day's vendor presentations. These presentations will be followed by debriefing sessions, moderated by Paul Hessinger, where attendees will have the opportunity to engage the experts as well as vendor representatives in a discussion of strategic issues relating to specific products. Also on Day Two, Norris van den Berg, a senior manager from the IBM laboratory in Santa Teresa, the home of DB2, will provide a statement of direction for IBM's "Relational Family."

The Symposium concludes with in-depth user case studies and the definition of alternative 3 to 5 year DB2 implementation scenarios.

<table>
<tr><th>DAY</th><th>MORNING SESSIONS</th><th>AFTERNOON SESSIONS</th><th>WRAP UP SESSIONS</th></tr>
<tr><td rowspan="3">I</td><td rowspan="3">SYMPOSIUM INTRODUCTION
9:00 a.m.–12:30 p.m.
Paul Hessinger
STRATEGIC USE OF TECHNOLOGY
RELATIONAL UPDATE
DB2 CONCEPTS/STATUS
CATEGORIES OF TOOLS

GUEST SPEAKERS
Dr. George Schussel or
Jeff Tash
INDUSTRY ANALYSIS</td><td>PRODUCT FOCUS:
CASE TOOLS</td><td rowspan="3">4:30–5:30 p.m.
GUEST SPEAKER
Vaughan Merlyn
CASE for DB2: Market Research

"Debriefing" of the day's
vendor presentations
(Merlyn and Hessinger)</td></tr>
<tr><td>VENDOR (1:30–2:20)</td></tr>
<tr><td>VENDOR (2:30–3:20)</td></tr>
<tr><td rowspan="3">II</td><td rowspan="2">8:30–11:20 a.m.
Norris van den Berg, IBM
DB2 DIRECTIONS

DISTRIBUTED DATABASE &
SAA IMPLICATIONS PANEL
moderated by Paul Hessinger
w/IBM, 2 users, and 2 vendors</td><td>PRODUCT FOCUS:
CASE, DISTRIBUTED RDBMS</td><td rowspan="3">4:30–5:30 p.m.
GUEST SPEAKER
Marilyn Bohl

DEBRIEFING SESSION
Marilyn Bohl
and
Paul Hessinger</td></tr>
<tr><td>VENDOR (1:30–2:20)</td></tr>
<tr><td>VENDOR (11:30–12:20)</td><td>VENDOR (2:30–3:20)</td></tr>
<tr><td rowspan="4">III</td><td rowspan="2">8:30–10:20 a.m.
GUEST SPEAKERS
Dan Appleton
Charles Bachman
Re-engineering vs. Architecture
for leveraging DB2</td><td rowspan="2">PRODUCT FOCUS:
Utilities and Applications</td><td rowspan="2">SYMPOSIUM SUMMARY
(3:30–5:00 p.m.)
Paul Hessinger</td></tr>
<tr><td>PRODUCT FOCUS:
Utilities and Applications</td></tr>
<tr><td>VENDOR (10:30–11:20)</td><td rowspan="2">VENDOR (1:30–2:20)</td><td rowspan="2">SYMPOSIUM ENDS 5 P.M.</td></tr>
<tr><td>VENDOR (11:30–12:20)</td><td>VENDOR (2:30–3:20)</td></tr>
</table>

Who Should Attend

Past experience indicates that a symposium such as this is most effective when attended by a group of I/S managers from an installation. A senior I/S Manager when accompanied by:

- Managers of DB Administration
- Managers of Application Development Centers
- Managers of Information/ Knowledge Engineering Centers
- System Technology Planners
- Key Project Leaders

can pull together the various elements of an installation's overall systems plan that often get lost in the pressure of the day to day business environment.

By scheduling a brief brainstorming session with Mr. Hessinger or one of the industry experts present at the Symposium, a group of your managers may find it easier to develop a consensus on your organization's strategy for DB2 Tools.

Special Offer for 3-Day Attendees at Inaugural Symposium in New York

To celebrate our Inaugural Symposium in New York, register by March 15 and receive a complimentary ticket to the Broadway production of A CHORUS LINE on April 20. Transportation will also be provided. Tickets are limited so register early.

Faculty

Hessinger

Paul Hessinger, Symposium Chairman, is the Chief Technical Officer and Vice President of Research for Computer Task Group (CTG), Inc. Mr. Hessinger regularly conducts strategic technology planning efforts for large organizations moving into areas such as RDBMS, CASE, and Expert Systems. In February of 1984 in an in-depth article for ComputerWorld, he accurately predicted the strategic impact DB2 has had and was one of the first in the software industry to present SQL as a meaningful standard for all software vendors and users. In September of 1987, he presented a comprehensive analysis of the DB2 marketplace—another widely read and acclaimed ComputerWorld article.

PRODUCT PRESENTATIONS

APPLIED DATA RESEARCH

ADR, an Ameritech Company, is a world leader in system software for the IBM market. IDEAL, currently used to increase programmer productivity in over 1000 sites worldwide, is an interactive application development, maintenance and execution system for mainframe business information systems. Its interactive workstation coordinates and tracks all activity associated with an application from screen prototyping, to report definition, to program compilation, to version and status management and much more. IDEAL is the right tool for meeting any DB2 programming challenge.

ARTHUR ANDERSEN & CO.

Arthur Andersen's product offering for DB2 is an integrated environment for software engineering. Foundation automates the entire systems development life cycle, and includes METHOD/1, a highly-automated information system's methodology, DESIGN/1, a set of PC and LAN-based tools for planning and design, and INSTALL/1, an IBM mainframe-based environment for implementation and support of DB2 applications.

BGS SYSTEMS, INC.

BGS is a leading vendor of performance and capacity management software. DB2 promises productivity improvements but performance concerns are widespread. The CRYSTAL Performance Evaluator for DB2 calculates application performance, resource requirements, and processing costs BEFORE designs are committed to code. This enables developers to evaluate alternatives and proactively plan for implementation.

BROWNSTONE SOLUTIONS, INC.

BrownStone Solutions, Inc., New York City, offers the DataDictionary/Solution, an open-architected, extensible, ER-based dictionary featuring a DB2 repository and relational power within an interactive dialog. The DB2 Admin/Solution manages definitions and control of DB2 objects and security authorizations, allows impact analysis, enforces naming standards, and leverages DB2 administrative functions.

BUSINESS SOFTWARE TECHNOLOGY, INC.

Business Software Technology, Inc. (BST) is a leader in automated change management and control in the IBM mainframe environment. The ENDEVOR (Environment for Development & Operations) system provides integrated change and library management for all source and executable code and procedures. BST's ENDEVOR-C1 product has a specific release for the DB2 environment that gives the user the ability to interface DB2 applications with the ENDEVOR-C1 change control system.

CANDLE CORPORATION

Candle Corporation, the premier company for performance monitoring products in the MVS, CICS, and IMS environments, has announced OMEGAMON for DB2 that will be available in 1988. Candle will demonstrate how the OMEGAMON for DB2 product can solve common problems in DB2 processing, including users who are holding or waiting for locks and active users in DB2 and what they are doing.

CINCOM SYSTEMS, INC.

MANTIS SQL provides an alternative solution to CSP and COBOL/PL1 for application development and production in a DB2 or SQL/DS environment. This presentation will outline MANTIS facilities for screen design, test file design, on-line documentation design and implementation of embedded SQL support within the MANTIS procedural language for CICS, IMS/DC, VM/CMS or TSO environments.

COMPUTER HORIZONS CORP.

MigraData is a menu-driven DB2 Data Dictionary that is self-referential, easily modifiable and has its own tables which eliminate catalog contention. This DB2 application stores business and data modeling information, DB2 objects and corporate and external file data. MigraData is a powerful, flexible product and contains over 170 reports.

COMPUWARE CORPORATION

Compuware Corporation, a developer of quality programmer productivity tools for 15 years, will present Abend-AID for DB2. This tool provides abend analysis support, significantly reducing the time required to implement DB2 application programs. Abend-AID makes it easy for programmers to solve difficult "04E" abends and negative SQL problems.

DATA BASE MANAGEMENT, INC.

Data Base Management, Inc. (DBMI) offers instructor-led and computer-based training in DB2 and SQL/DS. The training is intended for application programmers, analysts, and designers, data base administrators, project leaders and end-users. Courses address application programming, application design, data base design and administration, Query Management Facility and Data Extract. DBMI's experience has been that training is crucial to the successful implementation of DB2.

INDEX TECHNOLOGY CORPORATION

Index Technology Corporation develops and markets the Excelerator family of products that automate the systems development life cycle. Products support strategic system planning, analysis and design of systems, project planning and a series of new interface products that provide linkages to leading application generators, data dictionaries, database management systems, and 4 GLs. DB2 is one example of such DBMS links. These products provide an extensible, flexible and integrated systems development environment for large and small projects.

INFORMATION BUILDERS, INC.

Information Builders, Inc. (IBI), developers and marketers of FOCUS, the leading fourth generation language and database management system (4GL/DBMS) will present an overview of tools for use with SQL-based relational database management systems (RDBMS). With the FOCUS 4GL productivity tools, you can easily perform data analysis and application development with the relational DBMS engine of your choice—including IBM's DB2 and SQL/DS.

INTEGRAL SYSTEMS

Integral Systems is the leading supplier of human resource software to the IBM mainframe marketplace. This session will show you how to use the following SAA components (of the common programming interface) to develop a production application system. Components include: Structured Query Language (SQL); Cross Systems Product (CSP); Query Management Facility (QMF); 1985 COBOL (COBOL II).

PRODUCT PRESENTATIONS

MANAGEMENT SCIENCE AMERICA (MSA)

Management Science America provides a complete line of financial, human resources, manufacturing, and other industry-specific application software for a wide range of operating systems and teleprocessing monitors. IBM-supported environments include MVS, VSE, CICS, IMS/DC, DB2, VSAM, and IMS/DB. MSA's Information Expert will be presented with emphasis on SQL-based capabilities and consistent access to data in multiple physical environments.

MANAGER SOFTWARE PRODUCTS (MSP)

MSP is a leading vendor of a CASE environment driven by mainframe data and information resource management technology. The MANAGER Family of Products (PC and mainframe) is dedicated to automating all phases of the systems life cycle, from strategic information planning to the generation of enabled code. MSP will be presenting the MANAGER Family of products with an emphasis on supporting the Systems Development Life Cycle in the DB2 environment.

McCORMACK & DODGE

M:SDT/DB2 is a pseudo conversational application development, query, and execution environment utilizing McCormack & Dodge's Millennium technology. Applications can be developed combining Millennium features with the capabilities of relational processing. The system includes an SQL generator, ability to access VSAM and DB2 data simultaneously, full support of IBM SQL, and full query support.

MICRO DECISIONWARE

Micro Decisionware provides decision support and cooperative processing tools to MIS and end users. PC/SQL-link is a relational database tool which provides distributed database access across mainframe/mini/microcomputers and database machines. PC/SQL-link offers a standard menu-driven user interface to SQL and multiple host/communication environments. File conversion between PC and host formats provides seamless application connectivity. PC files may be uploaded for database creation/maintenance.

MUST SOFTWARE, INTERNATIONAL

DB2 NOMAD provides seamless integration of a complete range of application development and end-user capabilities with the DB2 database engine. It offers additional relational features not found in DB2, including full referential integrity and complete support for outer joins. For improved performance, DB2 NOMAD passes functions such as sorting and aggregation to the DB2 engine, where they can be handled most efficiently.

ON-LINE SOFTWARE INTERNATIONAL

On-Line Software International presents CasePac—Automated Software Development with a powerful DB2 data dictionary. As the foundation for On-Line Software's CASE platform, CasePac provides a complete, fully active central repository, software engineering facilities including a graphics front end, change management and maintenance facilities, and the capability to use these facilities with existing systems. CasePac's integrated set of tools streamlines the entire software development life cycle.

PANSOPHIC SYSTEMS, INC.

Pansophic Systems, Inc., a leading vendor of software products to improve application productivity and control, will present TELON. The TELON application development system captures design specifications to generate COBOL or PL/1 applications for the following environments: IMS/DC, CICS, IMS/DB, DB2/SQL, VSAM, Batch. TELON assists the transition from analysis to design by providing interfaces to leading front end analysis tools.

RELATIONAL TECHNOLOGY

Relational Technology is a leading supplier of networked information management software. The company's primary product is INGRES, a distributed SQL relational database management system, which enables organizations to access data spanning a variety of computer systems connected in a network. The INGRES family of products is available for all strategic micro, mini and mainframe operating environments.

SAGE SOFTWARE, INC.

The APS Development Center family of application generators produces COBOL-based DB2 applications, offers comprehensive SQL generation and support capabilities and simplifies future maintenance. APS/DB2 Data Base Painter stores information in a "staging area" for defining, inquiring, storing, and generating to the DB2 system catalog.

SOFTWARE AG

NATURAL 2 is an integrated 4GL that includes functions for application development and end user computing. NATURAL 2 gives application developers the ability to create advanced mainframe applications unlike any they have created before. NATURAL 2 is available not only for DB2 and SQL/DS users, but also users that have mixed environments including VSAM, DL/1, and IMS/DB.

TECHNOLOGY INFORMATION PRODUCTS CORP.

Successful implementation of DB2 requires a logical/relational data model. TIP RELATE generates a consolidated 3NF relational data model for direct input into DB2. TIP RELATE automatically removes transitive dependencies, recognizes foreign keys, and creates intersection data groups. This enables DB2 users to predefine JOINS and PROJECTIONS and ensures referential integrity.

TRANSFORM LOGIC CORPORATION

The Transform product addresses the development and maintenance of the entire application life cycle. Using expert system technology, complete COBOL applications are produced for IBM mainframe DBMS's DL/1 and DB2. Transform/DB2 gives programmers without complete knowledge of DB2 access to advanced DB2 features. The program automatically generates the application logic necessary to handle referential integrity requirements of domaining, cascading deletions, and logic parentage existence.

UPDATA SOFTWARE

Updata Software develops and markets DB/ProEdit and DB/CLIST. DB/ProEdit lets application programmers use ISPF commands to generate DB2 test data quickly and easily. A FIND command and the ability to test embedded SQL with host variables are just two of DB/ProEdit's many time-saving features. DB/ProEdit is also available for SQL/DS in either ISPF or XEdit mode. DB/CLIST allows users to access DB2 from a TSO CLIST so they can develop DB2 tools quickly. DB/CLIST users also receive a complete library of productivity tools for free.

Guest Speakers

Schussel

Beyond DB2

George Schussel, President and Founder of Digital Consulting, Inc. and a noted futurist (see *Datamation*, November 15, 1987, "Applications Development in the 5th Generation") will share his thoughts on the coming five years of software to support applications development.

- the importance of distributed database technology
- how CASE will interface with relational databases
- the relative importance of DB2 on a mainframe to SQL systems on PCs
- the coming migration of workloads off mainframes and onto local net based workstations
- how to develop DB2 applications at one tenth of the cost using mainframe TSO
- the role of the DB2 repository.

Appleton

Information Asset Management

Daniel S. Appleton is President of D. Appleton Company, Inc. (DACOM). He specializes in industrial modernization and data resource management.

Mr. Appleton has published numerous technical papers and articles, and he is the most published author in *Datamation* magazine, having had more than 20 articles published.

Bachman

Re-engineering of Existing Databases

Charles W. Bachman is one of the world's foremost authorities on the architecture of information systems and is often referred to as the "father of database management"

Mr. Bachman is currently the founder, President, and CEO of Bachman Information Systems, an organization focused upon the early delivery of a software system for the support of the IBM mainframe environment.

Bohl

The Importance of Value-Added DB2 Tools

Marilyn Bohl is currently Vice President of Product Development, Digital Research Inc., Monterey, CA and has responsibility for all product development and product marketing.

Marilyn is a 19-year IBM veteran. She led DB2 product development and brought DB2 Releases 1 and 2 to market as DB2 Product Manager. IBM's corporate-wide database strategy and SQL evolved under her leadership prior to her joining Digital Research in April 1987.

Merlyn

CASE for DB2

Vaughan P. Merlyn is principal consultant of Merlyn Consulting, Inc.—an independent consulting firm. He is a recognized authority on the subject of software development automation, and the widely-acclaimed research paper "Application Development Systems—The Comparative Consumer Report."

He is currently authoring a major report about analysis/design workbench products and is also co-authoring a text book on application productivity.

van den Berg

The Relational Family and DB2 Directions

Norris van den Berg has spent an intensive career with IBM in software development and management, concentrating in both large complex systems and end-user products for business professional users.

As Manager of Data Systems Architecture and Strategy, he carries responsibility across all of IBM's operating units for architecture and strategic direction, market planning and business goals for IBM data base products.

Features of the Symposium

A strategic assessment of the DB2 TOOLS MARKETPLACE by Paul Hessinger. Categories of tools, repository implementation, the SQL issue.

Integrating CASE tools and DB2—practical research data from Vaughan Merlyn.

A statement of direction for IBM's "RELATIONAL FAMILY" by Norris van den Berg from IBM's Santa Teresa Laboratory, the "home" of DB2.

A dynamic panel discussion of the implications of SAA and Distributed Database issues moderated by Paul Hessinger with panelists representing IBM, the DB2 user community, and 2 leading RDBMS/DB2 TOOL vendors.

One-hour product presentations by leading DB2 Tools vendors, carefully organized into tracts designed to maximize attendee exposure to similar products. Each day of the symposium will focus on selected categories of DB2 Tools with an overview by Paul Hessinger on crucial technical features required for value-added DB2 TOOLS strategies.

Extensive User Case Studies for the various DB2 Tools presented during the Symposium—these case studies are being prepared by Paul Hessinger exclusively for this Symposium.

Daily debriefing sessions where attendees exchange their impressions of DB2 Tools and challenge vendors to clarify product capabilities and directions.

The various tutorials and discussion sessions conducted during the DB2 Tools Symposium will provide you with a dynamic framework for evaluating the powerful tools that will be presented during the one hour vendor sessions. Mr. Hessinger and other industry experts will be available throughout the Symposium for private consultations. Bring your existing plan to the Symposium and work with the experts to refine or redefine your DB2 strategy.

SYSTEMS APPLICATION ARCHITECTURE — FREE ONE-DAY SEMINAR

New York April 21, 1988 **Los Angeles** June 16, 1988

Today, IBM is beginning the evolution of Systems Application Architecture (SAA), a set of interfaces that will provide the foundation for communications connectivity and applications portability. DB2, IBM's flagship relational DBMS, serves as a cornerstone within SAA to support SQL-based access to mainframe databases.

This seminar will examine the SAA solution to IBM's problem of multiple hardware environments and incompatible software products. The architecture will allow a single application to run across the PS/2, System/3X, and System/370 product lines. IBM will support SQL-based RDBMSs, including DB2, SQL/DS, and OS/2 Extended Edition Database Manager, together with QMF- and CSP-like interfaces for all three SAA environments.

Objectives of this Seminar

This seminar will explain IBM's long-term strategic direction focusing on IBM's vision of how to build portable, consistent application systems. It will examine SAA's initial specification of software interfaces, conventions, and protocols that will serve as the foundation for all new IBM hardware systems and control programs, beginning with PS/2, OS/2, and DB2 Release 3. SAA will also drive future technological advancements and tools development for the DB2 environment.

By gaining an early understanding of IBM's framework for designing and developing applications with cross-systems consistency, you will be in a position to quickly ramp-up as new products and new technologies come onstream in the near future.

This seminar will introduce you to what will become the de-facto industry standard for an "application architecture." Just as DB2's SQL and the IBM PC have become overnight industry standards, it is reasonable to expect that virtually every software vendor and applications builder will jump on the SAA bandwagon. You can anticipate an onslaught of SAA-compatible products in the near future.

Who Should Attend

- DP/MIS managers and systems planners who need to understand the impact of SAA in order to set their own strategies.
- Application builders who must begin now to create systems that will be upwardly compatible with SAA's framework for designing and developing applications with cross-systems consistency.
- Application development managers, communications managers, and database/data administrators who will be responsible for the information infrastructure required to support SAA.

Seminar Outline

1. What is an Application Architecture and Why Is It Important?
2. SAA Overview
3. Common User Access
4. Common Programming Languages
5. Common Communications Support
6. Common Applications
7. Summary and Future Directions

Faculty

Tash

Hessinger

Jeffrey B. Tash is President and Founder of Database Decisions, Inc. Previously employed by IBM, DEC, CDC, and Arthur Young, Jeff has extensive experience in relational database management, fourth generation languages, and artificial intelligence.

This seminar was co-developed and will be co-presented by Jeff Tash and Paul Hessinger, Chairman of The DB2 Tools Symposium.

This one-day seminar is free to all 3-day attendees. Please note that substitutes will be permitted.

Proceedings

Each symposium attendee will receive a copy of "The National DB2 Tools Symposium" proceedings. This 500-page resource document includes product data sheets prepared by our consultants and detailed technical descriptions of all products written by the vendors. Your copy of the Symposium Proceedings will serve as a useful reference guide long after the Symposium is over.

Hospitality Suites

The Hospitality Suites provide an opportunity to meet one-on-one with representatives from vendor companies. There will be ample time to have your questions answered and to network with others in the industry. Enjoy the hands-on product demos and the chance to relax and share the company of fellow attendees.

Hotel Information

- New York, April 18–20, The Rye Town Hilton, (914) 939-6300
- Los Angeles, June 13–15, The Stouffer Concourse Hotel, (213) 216-5858

To Register, See Back Cover or Call (817) 478-2800.

THE DB2 TOOLS SYMPOSIUM

Two Ways To Register :
1. Call (617) 470-3880 between 9:00 a.m. and 5:00 p.m. Eastern Time.
2. Fill out and mail in the form below (including mailing label).

Registration Fees

Individual Fee, Entire 3 Days	$795
Second Registration	$695
Third Registration	$495
Fourth Registration	FREE
Fifth Registration and Over	$495

Group Attendance

Previous attendees of our Symposia have told us that the best way for companies to gain the most benefit from the program is to send two or more attendees. Our discount structure is designed to encourage multiple registrations from the same company. Have you considered sending representatives from different departments, divisions, or locations within your organization?

On-Site Seminars

We can bring many of our seminars in-house to your company. Our on-site seminars are one of the most cost-effective ways to update your managers and professionals about the leading software tools and technologies. For more information, call (617) 470-3870 and speak with our On-Site Seminar Coordinator.

Digital Consulting, Inc.

These seminars will be conducted by Digital Consulting, Inc. (DCI), a leader in the field of EDP management training. DCI is headquartered at 6 Windsor Street, Andover, MA 01810, telephone (617) 470-3870.

Cancellation Policy

Cancellations received two weeks or more prior to the Symposium will be accepted subject to a cancellation service charge of $100. Transfers to a different Symposium date or substitution will be accepted with no cancellation service charge as long as the fee is paid and the request is received before the date of the original Symposium. Registrants whose cancellation requests are not received two weeks prior to the Symposium (or no shows) are liable for the entire fee.

DCI sponsors over a total of 25 events specifically designed for Data Processing decision-makers. To receive a current catalog of DCI sponsored seminars and conferences, call (617) 470-3880.

REGISTRATION FORM

Telephone Registration

(617) 470-3880

Call 9 a.m.–5 p.m. Eastern Time

☐ Confirms telephone registration

Method of Payment

☐ Check Enclosed. Make checks payable to Digital Consulting, Inc.
☐ Purchase Order attached
☐ Bill my firm Attn. of _____
☐ Authorized Documents enclosed

Registrants

Name _____

Title _____

Name _____

Title _____

Name _____

Title _____

Company _____

Division/Branch _____

Street _____

City _____ State _____ Zip _____

Phone Number (_____) _____

Authorized Signature _____

☐ I do not wish to register, but please put me on your mailing list.

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The DB2 Tools Symposium

☐ 2045. New York, April 18–20, 1988
☐ 2046. Los Angeles, June 13–15, 1988

☐ YES! I will attend the free seminar.

Type of Registration

☐ Single Full 3-Day $795
☐ Multiple (See Registration Fees)
–FOURTH REGISTRATION FREE

Digital Consulting, Inc.
6 Windsor Street
Andover, MA 01810

DKWC

PLEASE DO NOT REMOVE THIS MAILING LABEL.
MAILROOM: PLEASE ROUTE this brochure to this person's manager or replacement if he is no longer employed at your company.

Relational DBMS

COMPANY	PRODUCT	OPERATING SYSTEMS	QUERY LANGUAGES SUPPORTED	VERSION OF SQL	INCLUDES DATA DICTIONARY	ACCESS CONTROL TO WHAT DATA LEVEL	PERMITS ASSIGNMENT OF USER SECURITY RATINGS	BACKUP AND RECOVERY CAPABILITIES	OTHER DATA BASE ADMINISTRATOR CAPABILITIES	APPLICATION DEVELOPMENT TOOLS	OFFERS ENTITY RELATIONSHIP INTEGRITY	OFFERS DOMAIN INTEGRITY	NUMBER OF LICENSES SOLD	PRICE
Arbor, Inc. (800) 343-4361	4th Dimension/4-D Runtime	Macintosh	Proprietary	NA	NA	Record	Yes	User implemented	4-D tool to repair, clone, create relations, restore	Command procedural language with separate editors, screen/form editor, runtime data base graphical structure editor	No	No	NP	$995
AD & P, Analysis, Design & Programming (703) 790-0433	Ultra-base	MS-DOS, Unix, Xenix, Prime, CTOS	SQL	Proprietary	Yes	Field, record	Yes	NP	Graphics, word processing, spreadsheet	Built-in code, report generator	Yes	Yes	40,000+	$595-$9,600
Advanced Business Microsystems, Inc. (415) 969-4515	Data Ace	MS-DOS	Proprietary	NA	Yes	Record, field, file	Yes	Backup, restore partial, online data base	Creates, deletes, modifies files	4GL	Yes	Yes	2,000	$595
Advanced Data Institute, Inc. (916) 381-6234	Aladin	MS-DOS	Proprietary	NA	No	Record	Yes	Import, export, restart	Graphics, statistics, word processing, creates, deletes, modifies files	None	Yes	Yes	1,200	$249-$399
Ashton-Tate Corp. (213) 329-8000	dBase III Plus	PC-DOS, MS-DOS	Proprietary	NA	No	Field	Yes	None	Application generator, report writer, forms manager	Application generator	Yes	Yes	1.5 million + [illegible] packages	$695
	dBase IV (not for July availability)	PC-DOS, MS-DOS, OS/2	Query-by-Example, SQL	IBM SAA compatible	No	Field	Yes	Full transaction processing, rollback, roll-forward recovery	Report writer, forms manager	4GL, application generator	Yes	Yes	NA	$795 or $1,295 (developer's edition)
Advanced Microsolutions (415) 366-8600	SQL+	HP's Rocky Mountain Basic	SQL	ANSI	No	Record	No	Rollback	None	Command-driven interface, keyboard access	Yes	Yes	150	Starts at $995
	DBmagic	Rocky Mountain Basic	SQL	ANSI	Yes	Record	No	Rollback	None	None	No	No	100	Starts at $1,495
Ampool Corp. (510) 865-7900	RMMS	Unisys 1100 Exec	SQL, proprietary	ANSI	No	Data item, table	No	Backup to host or tape and tape	Data base dump/load; user identification, authentication	None	No	No	NP	$400,000-$500,000
Applied Data Research, Inc. (201) 574-8000	Datacom/DB	IBM MVS, MVS/XA, VM/CMS, VSE	SQL, proprietary	ANSI	Yes	Field, record, file	Yes	Full backup recovery	Performance monitoring, tuning, data modeling, accessing, data base operations	Mod, for building, executing on-line, batch data base applications	Yes	No	1,000	$92,000-$160,000
Bank Software, Inc. (415) 971-0221	Oracle III Plus	Macintosh	None	NA	NP	Record	Yes	None	Master password protection, report writer, field generator	4GL, application generator	Yes	Yes	NP	$695
	Oracle Quick	MS-DOS	None	NA	NP	Record	Yes	None	Master password protection, report writer, field generator	4GL, application generator	Yes	Yes	NP	$795
Boeing Computer Services, Inc. (206) 865-3600	Boeing Sim	VMS, MVS, VM, MOS	Proprietary	NA	Yes	Field	Yes	Transaction logging, rollback	Report generator, screen formatter	None	No	No	450	$4,000-$35,000
Business Intelligence (800) 468-9545	Paradox 2.0	MS-DOS, PC-DOS	Query-by-Example	NA	Yes	Field	Yes	Table recovery	Multiuser reports; label generation; table, record locking commands; program editor	Programming language, application generator	No	Yes	NP	$725
	Paradox 386	MS-DOS, PC-DOS	Query-by-Example	NA	Yes	Field	Yes	Table recovery	Multiuser reports; label generation; table, record locking commands; program editor	Programming language, application generator	Yes	Yes	NP	$995
Brock Software Products, Inc. (815) 459-4210	Brock Keystroke Relational Data Base	Macintosh	None	NA	No	File	Yes	Rebuild function, floppy backup	Label, report printing, merge utilities, batch updating	None	No	Yes	Approx. 400	$40-$140
Cincom Associates, Inc. (513) 662-2000	Telon 2000 Plus	VAX/VMS, IBM, PC-DOS, MS-DOS	Proprietary	NA	Yes	Record, field, file	No	None	Report writer, forms, screen generation; labels	Proprietary file access routines	Yes	Yes	400	$400-$80,000
Century Analysis, Inc. (415) 686-7800	CPMS	NCR VRX, VRX/E	Proprietary	NA	Yes	Field	Yes	Event rollback	Report writer	Screen generator, interactive file maintenance	Yes	Yes	50	$8,000-$40,000
Chang Laboratories, Inc. (800) 972-0999; (818) 884-6800 in Calif.	C.A.T.	Macintosh	Proprietary	NA	No	File	Yes	None	Controls dictionary, design of files, fields	None	Yes	No	10,000	$200.00
Cincom Systems, Inc. (513) 662-2300	Supra	MVS/SP, MVS/XA, DOS/VSE, VSE/SP, VM/CMS	Proprietary	ANSI (in development)	Yes	Field	Yes	Automatic system, transaction-level recovery	Data base design, generation; interactive relational view development, testing; on-line, batch directory maintenance	4GL (Mantis)	Yes	Yes	300+	$77,000-$400,000
	Ultra	VMS	Proprietary	ANSI (in development)	Yes	Field	Yes	Automatic system, transaction-level recovery	On-line directory maintenance; interactive relational view development, testing; high-speed data file maintenance	4GL (Mantis)	Yes	No	300	$30,000-$95,000
Cullinet (800) 4-CULLINET	Knowledge	VAX/VMS, MVS, AOS/VS	Proprietary	NA	Yes	File, field, record	No	Uses backup utilities of MVS/VSE, DOS/VSE	Dictionary maintenance, reporting	Proprietary development language	Yes	No	3,000	NP
Command Business Systems, Inc. (800) 233-2042; (714) 250-7531 in Calif.	Structure/4	Prime, VAX/VMS	Proprietary	NA	Yes	Record	Yes	None	Data dictionary, complete data structure listings, report writer	4GL screen generator; maintenance, data generator	Yes	Yes	150	$16,900-$36,500
Compuserve Data Technologies (617) 861-8400	System 2000 4GL/Enfin	VAX/VMS	Proprietary	NA	Yes	Record	Yes	Uses VMS backup procedure, rollback	Not required	System 2000/Enfin application generator	Yes	Yes	750	$8,000-$60,000
Computer Associates International, Inc. (800) 343-4133	CA-Universe	MVS, MVS/XA, DOS/VSE, VM/CMS	SQL, QUEL	ANSI	Yes	Field	Yes	Import, export, restart	Data modeling, statistic monitoring	UDMS — includes generator, editor, driver, 4GL	Yes	Yes	300+	$84,000-$230,000
Computer Corporation of America (617) 492-8860	Model 204 [illegible]	MVS, [illegible], VM/CMS, DOS/VSE	Proprietary	NA	Yes	File, field, record	Yes	Full, transaction backup; system, media recovery	On-line monitoring, backup, restart/rebuild configuration, file loading	4GL, application generator, menu-driven query/update tool	No	No	600	$20,000-$250,000
Computer Representatives, Inc. (408) 980-9000	Relate/DB	AOS/VS, VAX/VMS, MPE	SQL	Proprietary	Yes	File, field, record	Yes	Logging, recovery	Report writer, graphics interface, 4GL, restructuring, reorganizing	Procedural 4GL	No	Yes	600	$15,000-$80,000

[1]Systems Application Architecture [2]Computer-aided systems engineering [3]Data base management system [4]Random-access memory [5]Artificial intelligence

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. When a vendor is unable to provide specific information about its product, this is designated NP (not provided). When a question does not apply to a vendor's product, this is designated NA (not applicable). Further product information is available from the vendors.

COMPANY	PRODUCT	OPERATING SYSTEMS	QUERY LANGUAGES SUPPORTED	VERSION OF SQL	INCLUDES DATA DICTIONARY	ACCESS CONTROL TO WHAT DATA LEVEL	PERMITS ASSIGNMENT OF USER SECURITY RATINGS	BACKUP AND RECOVERY CAPABILITIES	OTHER DATA BASE ADMINISTRATOR CAPABILITIES	APPLICATION DEVELOPMENT TOOLS	OFFERS ENTITY RELATIONSHIP INTEGRITY	OFFERS DOMAIN INTEGRITY	NUMBER OF LICENSES SOLD	PRICE
Cincom Systems, Inc. (513) 612-2300	Supra	MS-DOS, PC-DOS, Unix, VAX/VMS	None	NA	Yes	Field	No	Backup copies of files	Report writing, sorting, statistics, graphics	None	Yes	Yes	600	$750-$2,500
Concurrent Computer Corp. (800) 631-2154	Reliance Plus	OS 32	Proprietary	NA	Yes	Field	Yes	Transaction roll-forward, rollback, transaction logging	Monitoring, simulation, report generator	4GL	Yes	Yes	300	$10,000-$30,000
Condor Computer Corp. (213) 971-0800	Condor 3 Release 2.20	PC-DOS, MS-DOS	Proprietary	NA	Yes	None	No	Automatic audit trails	Report writer, statistics, full mathematical functions	Program source import, export ASCII files; 4GL	No	No	200,000	$495
Cosmic, the University of Georgia (404) 542-3265	Rim5	VAX/VMS, Primos, CDC Cyber 170 series NOS, NOS/BE	Proprietary	NA	No	File, field, record	Yes	None	Password protection on files, commands; report writer	Complete source code	Yes	Yes	NA	$3,000
Cullinet Software, Inc. (800) 631-4205	IDMS/SQL	VAX/VMS	SQL	ANSI	Yes	File, field, record	Yes	On-line dynamic backup, automatic restart	Utilities to load, unload data; define, delete logs; file manager; check status of journal file; locate unexpected data base terminations	Application generator	Yes	Yes	NA (in beta-testing)	$1,000-$200,000
	IDMS/R	MVS/DOS/VSE, VM/CMS, Siemens BS2000, Fujitsu MSP for Facom-M line	SQL, proprietary	ANSI	Yes	Field	Yes	Automatic rollback, warm start	Backup, restore; load, unload, rollback, roll-forward	CASE, report systems, 4GL, Cobol, Fortran, PL/1, executive presentation	Yes	Yes	2,400+	$200,000-$300,000
Data Access Corp. (305) 238-0412	Database 2.3	Supports more than 30 operating systems	Proprietary	NA	Yes	Field	No	Reindexing utility (allows user to recreate damaged indexes)	Modifies data dictionary, user-saved queries; modifies, recreates indexes; creates reports; allows for ad hoc queries; reindexes post processing facility	Program editor, compiler, applications generator	No	No	100,000	$695 (single user), $1,250 (multiuser), $1,800 (VAX/VMS, Unix V version)
Data General Corp. (800) DATAGEN	DG/SQL	AOS/VS	SQL	ANSI	Yes	Table, record, field	Yes	Archive backup, undo/redo logging for rollback/ roll-forward	Data Definition and System Administration Utility	Preprocessor (Cognos 4GL), present-interactive query, graphics, report writer	Yes	No	HP	$1,200-$17,600
Datawave International, Inc. (303) 274-9600	Datawave	MS-DOS, CTOS, BTOS	Proprietary	NA	Yes	Field, record, file, menu	Yes	Import, export; backup, restore of data base	Assigning user passwords, menus; hardware, configuration set up; printer communications	Applications generator	Yes	Yes	150,000	$600 (single user), $700 (multiuser)
DEC/Ingres, Inc. (408) 296-9600	Relasyn	VMS, VM, Tandem Guardian	SQL, proprietary	ANSI	Yes	File	No	Table replication	File mapping, Relasyn, menu system	4GL	No	No	40	$10,000-$40,000
Dialogics, Inc. (212) 420-8600	Answer/Rim	VAX/VMS, VM/CMS, Primos	Proprietary	NA	Yes	Relation	No	Transaction logging, rollback	Modeling, report writer, graphics, forecasting, statistics	4GL, screen control	No	No	15	$2,500-$60,000
Digital Equipment Corp. Contact your local DEC dealer	VAX RDB/VMS (Relational)	VAX/VMS	Information Builders' Focus; Innovation; Cognos' Powerhouse	ANSI	Yes	Field	Yes	VMS backup for full data base backup; transaction rollback; before/after image journaling with roll-forward, rollback recovery	Statistics, dump, monitor, backup, restore, change, define, convert	Application generator, 4GL, SQL	Yes	Yes	5,000	HP
Empress Software, Inc. (416) 923-1743	Empress with M-Builder	Unix, VMS, MS-DOS	SQL	ANSI	Yes	Record	Yes	Transaction logging, warm restart, backup recovery	Field deleting, modifying, report generator	4GL (M-Builder)	Yes	Yes	3,500	$1,750-$100,000
Ernst Systems & Programming Corp. (914) 268-0444	ERNA-4	AOS/VS, AOS, RDOS	Proprietary	NA	Yes	Field	Yes	Transaction logging	Defines logical files, maintenance of data dictionary	4GL	Yes	Yes	150	$1,250-$30,000
1st Desk Systems, Inc. (800) 523-2200; (617) 532-2303 in Mass.	1stFile	Macintosh	Proprietary	NA	No	NA	NA	None	None	None	Yes	No	20,000	$95
	1stFile 4.0	Macintosh	Proprietary	NA	No	NA	NA	None	None	Run macro documents created by 1stTeam	Yes	No	500	$295
	1stTeam	Macintosh	Proprietary	NA	No	Record, file, field	NA	File copy	None	Takes manual repetitive tasks; plays back automatically	Yes	No	20	$795
Fox Software, Inc. (419) 874-0162	Foxbase +	MS-DOS, PC-DOS, Macintosh	Proprietary	NA	No	Record, field, file	No	None	None	Supports any program written in Dbase	Yes	Yes	30,000	$395
General Data Systems, Inc. (215) 886-1780	GDX	MVS, VSE, MS-DOS, Intel IRMX	Query by form	NA	Yes	Field	Yes	Roll-forward, rollback, warm start	Group deletes, reformats; unload, reload utilities; data dictionary driver; users can create own utilities	Application generator, 4GL	Yes	Yes	15	$2,500-$100,000
Ideon Software, Inc. (617) 899-8070	Ideon-HP+	VAX/VMS	Proprietary	NA	Yes	Base	Yes	None	Add/changes securely cleared	4GL	No	Yes	50	$6,000-$105,000
Hewlett-Packard Co. Contact local HP sales office	Allbase-HP SQL	HP-UX, MPE	SQL	ANSI	Yes	Field, record	Yes	Roll-forward, recovery, single, dual logging	HP	4GL (HP Today), query/reporting (HP View)	No	No	HP	HP
Honeywell Bull, Inc. (800) 328-6111 ext. 89	Inlord	GCOS 8	SQL, proprietary	ANSI	Yes	Data base, subsets, new	Yes	Operating system	Bulk load of data utility, model generation, statistical analysis, data extract	Cobol, Inforite (proprietary tool kit)	No	No	HP	$8,000-$14,000 (original license fee)
IBM Contact local IBM sales office	OS/400	OS/2	SQL, prompted query	ANSI, SAA	Yes	Data base	Yes	Full, selected backup; restore to state of last backup; load, unload table output; warm restart; commit, rollback functions	Full, selected backup; restore to state of last backup; load, unload table output; table reorganization; import, export between data base manager tables, other OS/2 files; conversion to, from ASCII, WKS, WRK, WR1; update catalog with data base statistics	Report generator, IBM C/2 language	No	Yes	Version 1.0 set for availability in July; Version 1.1 in November	$795
	DB2	MVS/XA, MVS/370	SQL, QBE	ANSI, SAA	Yes	Field	Yes	On-line full, partial backup; on-line recovery to current time or point-in-time; conditional, point-in-time restart; two-phase commit, recovery; restart with IMS/VS, CICS	On-line load, reorganization; update of DB2 catalog statistics; full-screen support for executing SQL statements; accounting, statistics, service, performance traces; DB2 performance monitor; data base record editor; application directory tables	4GL, application generator, application directory, report writing, query, graphics, data base input, editing applications	No	Yes	HP	$83,625-$149,800 (First license-OTC)
	SQL/DS	VM/IS, VM/SP, VSE/ Advanced Function	SQL, QBE	ANSI, SAA	Yes	Field	Yes	On-line data base, log archives; recovery to current time or point-in-time; warm restart; two-phase commit, recovery, restart with CICS; commit, rollback functions	Data load, unload; reorganization; process batch SQL statements; on-line update of SQL/DS catalog statistics; interactive SQL; accounting, rudimentary security audit; problem determination traces; relational design tool, data base record editing	4GL, application directory, report writing, query, graphs, data base input, editing	No	Yes	HP	$8,700-$34,800 (First license-OTC)

COMPANY	PRODUCT	OPERATING SYSTEMS	QUERY LANGUAGES SUPPORTED	VERSION OF SQL	INCLUDES DATA DICTIONARY	ACCESS CONTROL TO WHAT DATA LEVEL	PERMITS ASSIGNMENT OF USER SECURITY RATINGS	BACKUP AND RECOVERY CAPABILITIES	OTHER DATA BASE ADMINISTRATOR CAPABILITIES	APPLICATION DEVELOPMENT TOOLS	OFFERS ENTITY RELATIONSHIP INTEGRITY	OFFERS DOMAIN INTEGRITY	NUMBER OF LICENSES SOLD	PRICE
Informix, Inc. (415) 926-6300	Centerprise	MS-DOS	None	NA	No	None	No	Backup, restore	Update, change records; report generator	None	Yes	Yes	NP	$99.95
Information Builders, Inc. (212) 736-4433	Focus	VM, MVS	SQL, proprietary	ANSI	Op 4.0/ 5.0	Field	Yes	Absolute file integrity	Access command control, encryption, password assignment, display control, program accounting	Application generator	Yes	Yes	2,300	$50,000-$100,000
Information Dimensions, Inc. (800) DIMS-INFO	DM	VMS, MVS/XE	Proprietary	NA	Yes	Field	Yes	Backup, restore data base; data consistency checking utils	Communications control facility; data base design, extract, report writer; dump, reload; query, manipulation, journal processor; kernel monitor utility; user record utility	Cobol, Fortran precompilers; form view development module	Yes	Yes	120	$27,000-$90,000
Information Resources, Inc. (617) 859-1160	Express	IBM VM; Prime	Proprietary	NA	Yes	File, field, record	Yes	Update command backs up all changes	Data reader, dictionary manipulation	Menu generator; procedural, nonprocedural 4GL	Yes	Yes	175	$85,000 +
	Express MDB	IBM VM, MVS; Prime; DEC VMS; HP MPE/XL	Proprietary	NA	Yes	File, field, record	Yes	Update command backs up all changes	Data reader, dictionary manipulation	Menu generator; procedural, nonprocedural 4GL	Yes	Yes	30	$100,000 +
Information Resources, Inc. (800) 888-0911	RuleMP	VMS, MSC	Proprietary	NA	Yes	File	Yes	Operating-system backup	File copy, file restructurer	System generator, proprietary application programming language	Yes	Yes	NP	$15,000-$50,000
Informix Software, Inc. (415) 322-4100	Informix-SQL, Informix-4GL	Unix, DOS, VMS, OS/2	SQL	ANSI	Yes	Rel, field, record	Yes	Transaction logs	Audit trails, index file checker	Forms generator, report generator, ad hoc query capabilities (Informix-4GL can create screens, reports, menus, windows)	No	No	NP	$795 (Informix-SQL); $995 (Informix-4GL)
Intelligent Information Systems, Inc. (813) 979-1000	Hyperway	Unix, VMS	Proprietary	NA	Yes	Field, key	Yes	On-line recovery, transaction rollback	Logical/dynamic locking, DBMS files	4GL, symbolic debugger	Yes	No	12	$3,000-$30,000
Interactive Software Systems, Inc. (800) 963-8387; (303) 987-1001 in Canada	UDMS	VMS	Proprietary	NA	Yes	Field	Yes	None	Dictionary, extracts, imports, interface to other relational DBMSs*; report generator	4GL	Yes	Yes	300+	$2,500-$15,300
Interactive Technologies, Inc. (800) 666-0811	IRMA; The Application Developer	VMS; IBM MVS, VM, DOS/VSE; Prime, Data General, DEC, Wang, ICL, Honeywell Bull, Siemens, Unisys, Tandem, Stratus	Query by form, query by interactive process	NA	Yes	File, field	Yes	NP	Copy, extract, merge, print, append, delete, update, port, ASCII conversion, help files	Prototype/application development; translation, form, reports, data manipulation processes, menus, commands, help files	No	No	2,500	$900-$50,000
Interbase Software Corp. (617) 646-3077	Interbase	VMS; Ultrix; SUN SunOS; Apollo Aegis; DomainIX	SQL, proprietary	ANSI	Yes	Field	Yes	Backup, recovery utility	Backup, recovery utility	4GL, forms editor, preprocessor	Yes	Yes	800	$5,000-$75,000
Intelligent Software Systems, Inc. (801) 756-0100	Knowledge	VMS	Proprietary	NA	Yes	Field, file, record	Yes	Local, network data consistency; failure recovery	Import, export to DBMS file structure	Menu, screen, report generator	Yes	Yes	NP	$30,000-$50,000
Macro Systems, Inc. (719) 520-1555	ADBM	MS-DOS	Query-by-Example	NA	Yes	File, field, record	Yes	Internal backup, transact file recovery	File creation, deletion, update, report generator, statistical analysis	Import file structures	Yes	Yes	6,000	$80-$2,500
Magic, Inc. (800) 346-6990	Knowledgeware 2	PC-DOS, MS-DOS, VMS	NA	Proprietary	Yes	File, field, record	Yes	NP	NP	Spreadsheet, graphics, text processing, report generator, forms management	No	No	20,000	$995
Microrim, Inc. (206)882-8080	R:Base	DOS	Proprietary, SQL	ANSI	Yes	Table, row, item	Yes	Load, reload, reload, verify integrity of data base	Network administration	Reports, forms, applications generators	Yes	No	NP	$725-$3695
	R:Base for OS/2 (available by March 31)	OS/2	Proprietary, SQL	ANSI	Yes	Table, row, item	Yes	Load, reload, reload, verify integrity of data base	Network administration	Report, forms, applications generator	Yes	No	NP	$995
Nantucket Corp. (213) 390-9328	Clipper	MS-DOS	None	NA	No	File, field, record	Yes	File copy	Create, edit data base files; indexes, views; generating Clipper commands	Report, database generator	No	No	NP	$495
	Mekler	Macintosh	None	NA	No	File, field, record	Yes	Backup, restore programs via programming language	Report, label generator	Report, label generator; program editor; program compiler; host editor	No	No	NP	$395
National Information Systems, Inc. (408) 988-7100	Account'r	VMS, TOPS 20, 10	Proprietary	NA	Yes	File, record, field	No	Programmable to users' needs	File renaming, programming language, report writer	Built-in programming language, program generators	Yes	Yes	300	$5,000-$50,000
Nexsoft, Inc. (512) 345-4999	NEX	MS-DOS, PC-DOS, DOS 3.0, 3.3 LANS	OSL	Nested ANSI standard	Yes	Field	Yes	Proprietary	Proprietary	Proprietary	No	Yes	2,400	$795
Odesta Corp. (800) 323-5422; (312) 498-6615 in Ill.	Helix VAX	VAX/VMS, Macintosh	Query by form, query by field	NA	Yes	File, field, record	Yes	Logging, rollback, save as, revert to previous save	User permissions; form permissions; validation; enhancer; custom, design modes	SQL	Yes	Yes	NP	Starts at $4,500
	Double Helix II	Macintosh	Proprietary	NA	Yes	File, field, record	Yes	Logging, rollback, save as, revert to previous save	User permissions; form permissions; validation; enhancer; custom, design modes	SQL	Yes	Yes	NP	$695
Online Software Systems, Inc. (800) 645-6477	Rocks Telecomputer System	OS, RSX/IAS, VMS, RT-11, MVS/TSO, MVS/CICS, VM/CMS	Proprietary	NA	Yes	Data base, file, record, field	No	None	Data maintenance; on-line query analysis; full-screen editor to create, modify, validate file descriptions	Structured development language; tool kit for creating, maintaining files; file descriptions; data dictionaries; libraries; procedures, screens, report requests; includes formatted screen manager to build screen-based applications	No	Yes	1,500	$30,000-$100,000
	Rocks/PC Workstation	PC-DOS, MS-DOS	Proprietary	NA	Yes	File	No	None	Mass-based transaction processing; automated DOS utilities for directory, file management; encryption, decryption	Integrated development language; screen painting, interface for uploading, downloading; utility for developing relational library; procedures that run on PC, mainframe	Yes	Yes	2,000+	$495
Oracle Corp. (800) 345-DBMS	Oracle	MS-DOS, OS/2, Unix, Ultrix, VMS, MVS, AOS, Xenix, VM	SQL	ANSI	Yes	File, field, record, value	Yes	Roll-forward, rollback recovery	Export, import SQL*Loader, monitoring tools	Forms, report, menu generator	Yes	Yes	70,000	Starts at $100

COMPANY	PRODUCT	OPERATING SYSTEMS	QUERY LANGUAGES SUPPORTED	VERSION OF SQL	INCLUDES DATA DICTIONARY	ACCESS CONTROL TO WHAT DATA LEVEL	PERMITS ASSIGNMENT OF USER SECURITY RATINGS	BACKUP AND RECOVERY CAPABILITIES	OTHER DATA BASE ADMINISTRATOR CAPABILITIES	APPLICATION DEVELOPMENT TOOLS	OFFERS ENTITY RELATIONSHIP INTEGRITY	OFFERS DOMAIN INTEGRITY	NUMBER OF LICENSES SOLD	PRICE
Prime Computer, Inc. (617) 879-2960	Prime Information	Prime, Unix, DOS	Proprietary	NA	Yes	Field	No	On-line recovery, logging, roll-forward recovery, tape or disk backup	File sizing without tape; operates globally consistent, multi-user data bases; new data additions in real time; real-time index creation	Single-user-based development tool; library; applications code generator; screen-design language	Yes	No	2,000+ (software vendors), 6,000+ (OEM vendors)	$995 (OEM), $5,000-$30,000 (software)
	Prime Oracle	Prime, Unix, MS-DOS	SQL	[illegible]	Yes	Field	No	Rollback after image journaling; dynamic re-start; emulates at API/fmc; dumper, export utility	Transportable, runtime upgrading; Oracle-delay system to watch locking; bottlenecking; data loader to load flat files into data bases	Prolinda, PROPOL, SQL*Forms, SQL*Plus	Yes	No	500+	$1,000-$20,000
Progress Software Corp. (617) 275-4900	Progress	Unix, PC-DOS, VAX/VMS, Xenix, Ultrix, CTOS/BTOS	Proprietary	ANSI (in development)	Yes	Field, record	Yes	Crash-proof data base engine, before-image filing, roll-forward recovery, backup utilities	Data base analysis, index rebuild, I/O analysis	4GL	Yes	Yes	10,000+	$1,000-$125,000
Pyramid Development Corp. (714) 549-8421	Quadrex	Multibank	None	NA	No	None	No	Hard-disk backup	Report writer, fourth	None	No	Yes	Approx. 10,000 shipped	$995
Quadrex Corp. (800) 538-0777	QDMS-2	VAX/VMS	Proprietary	NA	Yes	Field	Yes	Error recovery through VMS	Describes data elements (up to 26 attributes), defines relationships between tables, allocates space, report writer	Screen generator, generalized data entry; menu change, delete, add; letter generator	Yes	Yes	NP	$16,000-$25,000
Relational Technology, Inc. (800) 4-INGRES	Ingres	DOS, VMS, VM/CMS, Unix, AOS/	SQL, QUEL	ANSI	Yes	Field, form, data, value range	No	Checkpoint, journaling, rollback, enhancement	Changes database modifications, data relocation	Ingres (4GL)	Yes	Yes	4,000	$4,000-$400,000
Rim Technology, Inc. (504) 451-8144	RTI Rim	Ultrix, VMS, Unix, MS-DOS, NOS/VE, Aegis, AOS/VS, Cray COS	Proprietary	NA	Yes	File, record	Yes	None	Removing users, setting user access, recovering deleted file space, recovering deleted rows, repairing damaged file structures	Application interface	Yes	Yes	100	$700-$13,000
Sof Corp. (613) 748-8444	Information Management, Processing and Reporting System	VMS, DOS	Proprietary	NA	Yes	Record	Yes	Transaction logging	Jobs, usage reports, user-defined delete records; delete reformat; reformat data; old indexes	Data manipulation language	No	Yes	600	$6,000-$60,000
Smith, Abbott & Co. (301) 951-9411	Autopro	RSTS/E, VMS, MS-DOS, Novell Netware	Query-by-form	NA	Yes	Field	Yes	Audit trails, change logging	File creation, deletion; data base add, delete, modify; report writer	Screen generator, menu generator, query-by-form	Yes	Yes	300+	$750-$15,000
Software AG of North America, Inc. (703) 860-5050	Adabas	VAX/VMS 4, SP4, BS2, VMS SP 1.3, SP 2.1, SP 3.1, MVS/SA, VSE; VMS Systems Division; Fujitsu OS IV; Hitachi VOS	SQL	Proprietary	Yes	File, field, value	Yes	Save, restore with journal, backup/recovery	Load, unload, compress, decompress save, restore; define data base format space; file maintenance; data base maintenance	Editor, system generator, debugging aids, CASE, third-party software, file replacement, SQL-based generator, 4GLs	Yes	No	2,000	$30,000-$100,000
The Software Group, Inc. (614) 277-8660	Enable	DOS	None	NA	No	File, field, record	No	Automatic data base backup, restore	Add, edit, display, sort, merge, archive, delete, undelete, destroy, update, copy, browse, report, export, replace, index, graph, rename	Menu generator, procedural language for data base applications	Yes	Yes	NP	$695
Sperry Corp. (612) 456-2222	Sperry Relational Data Base	VAX/VMS, Sun/Unix, Pyramid OSX (Data-server), VAX/VMS, Ultrix, Sun Unix, Pyramid OSX, PC-DOS (Datasheet), OS/2 (System software in development)	SQL	ANSI	Yes	Field	Yes	Physical backup; multiple data base support; unattended operation of recovery times; log recovery; hot copy program; journaling; table recovery; rollforward, back; recovery check; maintenance tools; concurrency checks	Security control through stored procedures, authorization management, performance tuning	Relational query; transaction control; Power 4th Access/Administrator; Network; Interactive Access; Sperry Corp., SAS Institute	Yes	Yes	200	$1,000-$100,000
Synercom Technology, Inc. (713) 240-8000	Informap 88	VMS	Proprietary	NA	Yes	File	Yes	NA	NA	User creatable	Yes	Yes	100	$1,500-$50,000
Systems Compatibility Corp. (312) 329-2357	Watcom-SQL	Compiler-dependent	SQL	ANSI	Yes	Record, file	Yes	Transaction rollforward backup, restore procedures	Value-added upgrade; performance monitoring; data base conversion; disk compression; disk space analysis	Screen generator, procedure generator, procedure creator	No	No	NP	14 users-$2,000; 4-user license-$795
3CI, Inc. (800) 328-8601	Informix	VMS, AOS/VS, Prime, GCOS 8, OS/32	SQL	Proprietary	Yes	Field	Yes	Checkpointing; interrecovery; logging, journaling file access control; system accounting; file access control	Change data set characteristics, rebuild dataset structures, control security, performance analysis, data base tuning	Macro/4GL builder; form generator; painted forms; report writer; graphics, export, export utility; 3GL applications library; network module; command processor; Help facility; host, all-host editors	Yes	Yes	100+	$4,900-$100,000
Unify Corp. (415) 856-2400	Accell/IDS	Unix, Xenix, others available	SQL	ANSI	Yes	Field	Yes	Transaction logging, data base backup, roll-forward recovery	Security maps access data dictionary reports; utilities to monitor activity; create data dictionaries	4GL, application generator, application processor, host language interfaces	Yes	Yes	10,000+	$2,500-$150,000
	Unify relational DBMS	DOS, Unix, others available	SQL	ANSI	Yes	Field	Yes	Transaction logging, data base backup, roll-forward recovery	Security maintenance; data dictionary reports; utilities to monitor activity; create data dictionaries	Data entry, query/forms, report writer, menus, application generator, host language interfaces	Yes	Yes	100,000	$500-$50,000
Unisys Corp. (215) 542-4187	UDS RDMS 1100	Unisys Series 1100/2200	SQL	ANSI	Yes	File, field, record, table, view	Yes	Duplexed file, audit trail options; optional checksum feature; automatic tape backup	Statistics, performance analysis; automated application recovery; fast dump, load; on-line duplexed file log reconstruction; file placement for performance	SQL integrated with Cobol, Fortran, C compilers; 4GL; Interactive Programming Facility for SQL prototyping, design	Yes	Yes	NP	NP
Wang Laboratories, Inc. (617) 459-5000	Pace	VS	Query-by-Example, SQL	Proprietary	Yes	Field	Yes	Backup-and-data-journals-audit trailers; before-image journaling; rollback; roll-forward recovery	Copy table definition, definition deletion	Built-in application development utility for data manipulation; Wang's Office Information System	Yes	Yes	5,000	$10,000-$50,000
Wordperfect, Corp. (801) 227-5000	Dataperfect	MS-DOS	None	NA	Yes	File, field	Yes	Regenerate indexes, file copy	Proprietary language used to build or modify a structure	NA	Yes	Yes	NP	$695

Differences in dictionaries

BY V. VENKATAKRISHNAN

Interest in data dictionaries is on the upswing again. There are a variety of reasons for this revival, but chief among them is the dawning awareness that the key to productivity is effective integration of tools from multiple vendors.

A basic requirement of this necessary integration is a powerful and flexible cross-referencing facility, which is offered by good dictionary software. The dictionary documents the data resources independently of hardware, software or organizational structure. These resources typically include instruments of process — such as systems, programs and modules — and instruments of information — such as data bases, traditional files in machine-readable or manual form and individual data items.

The totality of interactions between these two types of instruments characterizes the information environment of the enterprise. The data dictionary acts as an automated tool for standardizing and controlling the definitions of, and relationships between, the instruments of process and the instruments of information.

Providing resource information

One of the primary benefits of a data base management system is optimization of data sharing through minimization of unplanned redundancies. But a DBMS by itself is not capable of identifying data resource usage. Only a data dictionary can provide this information. For this reason, dictionary packages provide interfaces to external software such as DBMSs.

All data dictionaries offer interfaces, but the design of those interfaces can considerably vary from tight to loose, and the differences govern both the character of the dictionary and the role it plays in data management.

Some dictionary packages, such as Datamanager from MSP, Inc., interface with many commercial DBMS products but do not require an installed DBMS to function. These are passive.

Other DBMSs are active and require, implicitly or explicitly, the installation of a specific brand of DBMS. For example, Cullinet Software, Inc.'s Integrated Data Dictionary (IDD) requires Cullinet's IDMS/R and is central to the development and operation of IDMS/R applications.

A passive dictionary serves as a repository. An active dictionary serves as a directory and controls the execution of a DBMS or another operational tool.

There are advantages and disadvantages to both kinds of dictionaries. The general or passive package can be used in a non-DBMS environment. It offers flexibility when migrating to a DBMS environment or from one DBMS to another. But it is not tightly integratable with any DBMS. Human intervention is required to decide whether or how to use the interface with the DBMS.

Active dictionaries are tightly integrated with a specific DBMS; in some cases, like IDD, the DBMS is driven by the dictionary.

The obvious problems are that users may not need or want a DBMS or the specific brand of DBMS bound to the dictionary. Or they may want to have the flexibility to change the DBMS and not the dictionary. If any of these is true, then extra caution is required when selecting dictionary software (see chart above).

A third class of dictionary may be classified as DBMS bound. These are not active in the sense that they are not required for the operation of the DBMS. Nevertheless, they require a brand of DBMS to function.

Both the passive and active dictionary roles are vital to a successful operational environment. For data modeling, business definitions and cross-referencing, a passive dictionary is unbeatable and highly desirable.

But fourth-generation languages require an active directory, and application development using SQL or expert systems also requires some form of directory to store parsing structure or knowledge objects. In fact, a well-designed directory system can provide for the integration of data bases and knowledge bases.

No requirement, however, mandates that a single piece of software perform in a dual capacity. In fact, the best possible route for a multivendor installation today seems to be a passive dictionary in conjunction with the directories now routinely built into DBMSs and fourth-generation languages.

As for the directory, each DBMS has one. It is a fairly simple technical task to interface the passive dictionary and the active directory either by acquiring vendor software or following homegrown procedures.

Such a strategy offers both short- and long-term benefits. The major short-term benefit is that the data resource can be administered effectively without cluttering directories with unnecessary text-like descriptions.

A smaller directory makes for better production performance. Furthermore, when a problem arises in production, a smaller directory can be handled faster than a large dictionary/directory containing data not relevant to production.

The primary long-term advantage is that users retain the flexibility to change DBMSs and other tools without redoing or converting data definitions.

Using a powerful passive dictionary and tool-specific directories for the different applications with properly administered interface techniques can pave the way for managing data in centralized, distributed, homogeneous and heterogeneous environments. ●

Active vs. passive data dictionary software

Active	Passive
• Interfaces with a specific DBMS package only	• Interfaces with several data base management system packages
• Requires the installation of the specific DBMS package that it controls	• Does not require the installation of any DBMS package
• Changing the DBMS environment involves changing the dictionary environment as well	• Provides flexibility in migrating to a DBMS environment or when changing the DBMS environment
• Tightly integrated with a specific DBMS package	• Loosely integrated with several DBMS packages
• Results in multiple dictionary tools; organizational data definitions can get fragmented	• Provides a single repository in managing a heterogeneous DBMS environment; all the organizational data definitions are in one place

CW CHART

Venkatakrishnan is a data base consultant with Aetna Life and Casualty Co. in Hartford, Conn.

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Smoothing the data administration path

BY PAUL WINSBERG

When the data administration function first emerged early in this decade, many saw the creation of a position charged with control and management of corporate data as the force that could bring order to the balkanized world of corporate data processing.

Winsberg is a senior consultant at the Codd and Date Consulting Group in San Jose, Calif. He specializes in data base design and the computer-aided systems engineering software marketplace.

In some cases, the promise has been fulfilled, but many data administrators have met only with delay or failure.

One reason for the difficulty may be the sheer size and complexity of the body of information data administrators must manage. Another may be the dual mission assigned to them, which encompasses enforcement of standards and user support. The enforcement function interferes with the support one, ultimately disrupting both.

Still another, and possibly the most important, reason for the generally poor performance of data administration is that data administrators and data base managers speak different languages.

Semantics vs. symbolics

The vocabulary of the data administrator is built around entities, relationships and attributes — that is, a semantic model. The data base manager, on the other hand, implements the semantic model as tables, records, fields and links — in short, a symbolic model.

As a result, the work of the data administrator does not directly materialize as an active, on-line data base. At best, a dictionary documents the correspondence of entities to tables, attributes to columns and so on. More likely, the semantic model and active data base are incompatible. In either case, the data administration mission is once-removed from application systems and thus diluted and weakened.

To explore the friction between data administration and data base management, it is necessary to take a closer look at semantic and symbolic data models.

A data model has three parts: a data structure, operators and integrity rules. A data structure specifies how information is represented as symbols. Widely used data structures include the hierarchy, the network and the table. Operators function as mechanisms for the retrieval and updating of data. Integrity rules are true/false assertions that specify valid data base states.

A symbolic model represents and manipulates symbols, with limited support for their real-world interpretation.

As an example of a symbolic data model, consider the relational model. The data structure of this model involves tables, columns, rows, domains and primary and foreign keys. There are eight basic relational operators. The relational model has two integrity rules — entity and referential. Actually, entity and referential integrity are semantic concepts. Entity integrity expresses the principle that a "thing" must be distinguishable and identifiable. Thus, symbolic models often have some semantic aspects.

IT IS unreasonable to expect the data administrator to adopt the language of the data base manager.

Semantic models

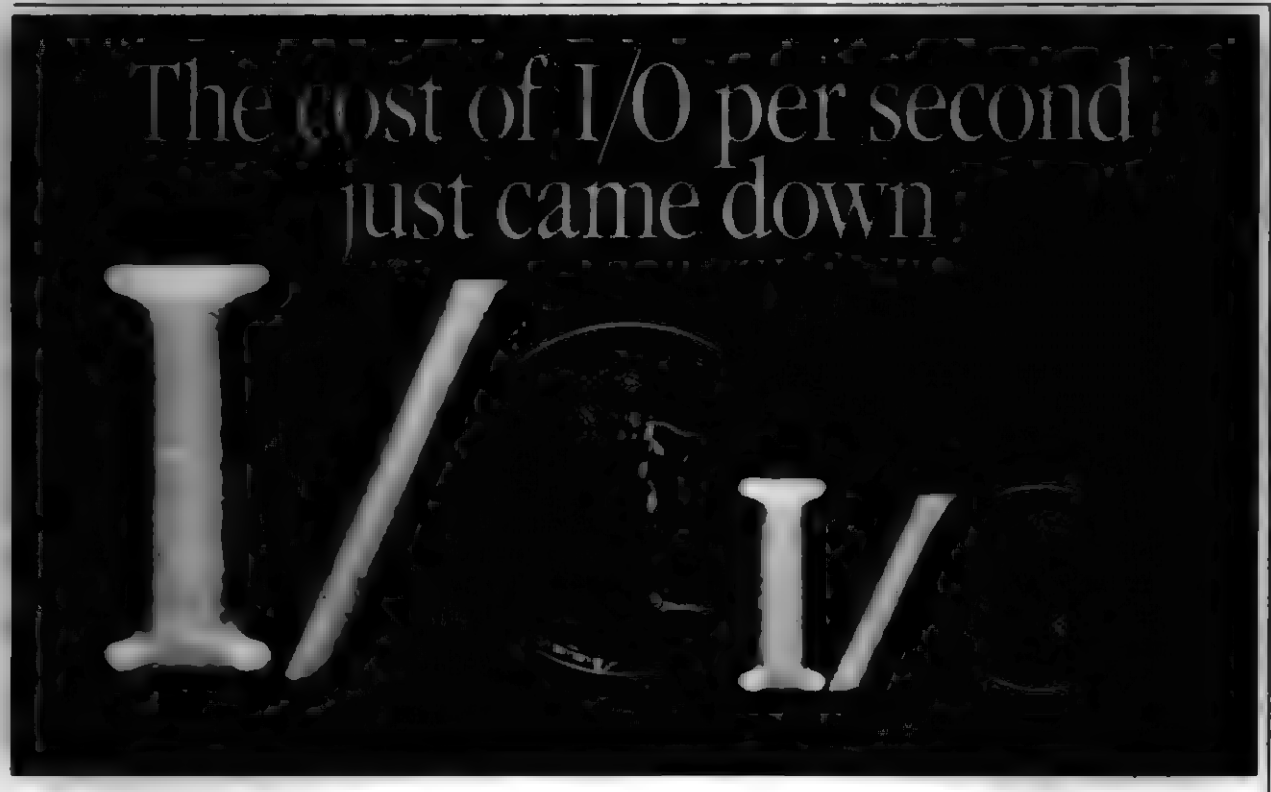
A semantic model incorporates not only symbols but also the meaning of the things the symbols represent. In practice, this means a richer variety of data structures and integrity rules that govern their behavior.

Many semantic data models have been proposed. The favorite of data administration is the entity-relationship model. In fact, there is no standard, well-defined model of this sort. It is actually an amorphous class of models that share a common language. The entity-relationship data structure includes entities, relationships and attributes. Entities represent real-world things, relationships represent connections between things, and attributes represent properties of things.

For example, "employee" and "department" might be entities, "work-in" might be a relationship between the two, and "salary" and "birth date" might be attributes of "employee."

Entity-relationship models usually distinguish subtype from supertype entities. A subtype is a subset of some other entity, called the supertype. For example, "programmer," "sales agent," "manager" and "staff" are subtypes of the supertype "employee."

Entity-relationship models express an



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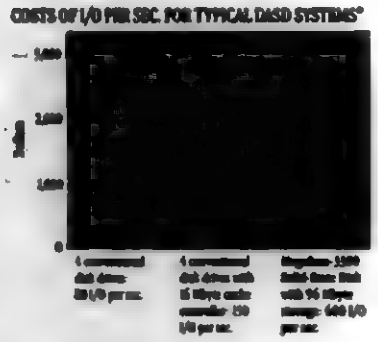

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important range of integrity rules. One such rule, exclusivity, applies to subtype entities. For example, one might insist that the subtypes "programmer" and "sales agent" are mutually exclusive — an employee may not be both simultaneously.

Another integrity rule expressed by these models is cardinality. Given a relationship between two entities, A and B, that relationship's cardinality is the maximum number of As associated with each B and conversely. For example, each employee works in at most one department, but each department may have many employees. Thus, cardinality of the "work-in" relationship is "one-to-many."

Unfortunately, operators for entity-relationship models have not been popularized. For this reason, some observers do not consider these to be bona fide data models.

Below the surface

On the surface, semantic and symbolic models are similar. Loosely speaking, the data administrator's entity becomes a table in the data base management system, a relationship becomes a foreign key and an attribute becomes a column.

However, important differences exist between the two models. Consider, for example, the issue of cardinality. Although relationships generally become foreign keys, a many-to-many relationship requires a separate table. Multivalued attributes, such as the names of children of an employee, also require special handling.

Because symbolic models do not support subtypes and associated integrity rules, these must be implemented at great cost in application software — or not at all.

This kind of discrepancy is the Achilles' heel of data administration. The work of the data administrator is not directly implemented and is, therefore, peripheral to the nuts and bolts of data processing. The problem will persist as long as the data administrator and data base manager use different models.

It is unreasonable to expect the data administrator to adopt the language of the data base manager. After all, the semantic model is, by definition, more expressive than the symbolic one. More likely, the language of the data base manager, that of the DBMS, will migrate to the semantic level. In fact, this is currently happening in the commercial marketplace.

One step for semantics

Unisys Corp. recently announced the Semantic Information Manager (SIM), a DBMS based on a semantic model. SIM supports entities (called classes), subtype entities (called subclasses), relationships (called entity-valued attributes) and attributes. A rich data-type mechanism includes support for user-defined and composite data types.

SIM provides an elegant set of operators that take advantage of these advanced data structures. Consider, for example, the query, "print the names of all managers and the title of the department in which they work."

In SIM query language, this becomes:

```
RETRIEVE  NAME OF MANAGER
    DEPT-TITLE OF WORK-IN
```

The simplicity of this query results from SIM's support for relationships ("work-in"), subtypes ("manager," a subtype of "employee") and composite, user-defined data types (attribute "name of employee"). A similar (but not equivalent) SQL query for DB2 might read:

```
SELECT  FIRST-NAME, MIDDLE-
    INITIAL, LAST-NAME,
    DEPT-TITLE
FROM  EMPLOYER, DEPARTMENT
WHERE  EMPLOYEE.DEPT-NO =
    DEPARTMENT.DEPT-NO AND
    EMPLOYEE.STATUS =
    "MANAGER"
```

Finally, SIM provides a sophisticated set of integrity rules. Cardinality of relationships and attributes is declared to the system and is enforced. Integrity rules associated with subtype entities, such as exclusivity, are also supported.

A RICH VARIETY of semantic data structures and integrity rules exist that can be modeled and supported by a DBMS.

Building from the present

In a sense, there is no such thing as a semantic model. Rather, there are models that are more semantic or less semantic. A rich variety of semantic data structures and integrity rules exist that can be modeled and supported by a DBMS.

For this reason, it is likely that future semantic DBMSs will be extensions of existing DBMSs. In fact, SIM is built on top of DMSII, the Unisys DBMS based on the Conference of Data Systems Languages, or Codasyl, network model. RM/T, a data model published by E. F. Codd in the late 1970s, is based on a relational foundation.

The significance of SIM lies in its advanced support for semantics, as compared with other commercially available mainframe and minicomputer DBMSs. SIM is the first major product to speak the language of the data administrator and enforce related integrity rules.

What this allows is direct implementation of the corporate data model in the DBMS, removing a major impediment to the success of data administration. •

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Users cast

CONTINUED FROM PAGE 6

and generate any number of reports from that," he says. For example, Challgren may need a report that tells him how a test crop grown from one kind of seed is doing in each location.

Build your own

While some people like Challgren use their data bases straight off the shelf, other nonexpert users say the best feature of their packages is menu-driven programming, which enables them to customize their data bases.

Orlando Lutheran's Bailey, who good-naturedly calls himself "user stupid," says he was able to write his own sales management application within his data base package, Powerbase, just by using the menus.

"I went to the report section without ever cracking that section of the manual," he says.

Bailey's self-customized software enables him to track data on prospects in many different but related files.

For example, he keeps one file, called "master," that contains basic information on a client, such as name, age and address.

For more detail, he can key into the "detail" file and find out more about the case, such as who made the initial inquiry or the prospect's marital status.

Before choosing Powerbase, Bailey looked at Dbase III Plus but says he found the manual hard to understand and the programming commands mind-boggling.

Jeff Tarter, another data base user who is also a professional observer of software trends, says more users will take advantage of menu-driven programming features in the future.

"I think you'll see fewer managers sending off for a programmer to come in and create a program. Now they can do it on their own," says Tarter, editor of "Softletter," a Cambridge, Mass.-based newsletter for the software industry.

Tarter says he bases this observation on personal experience. He developed an application for managing his newsletter circulation off the menus of Alpha/Three from Alpha Software Corp. "And," he notes, "I'm no fancy programmer." ●

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Ask the vendor

CONTINUED FROM PAGE 8

requirements because it combines the familiar analytic orientation of multidimensional spreadsheets with relational data base management.

What are Seed Software's plans regarding the implementation of its data base in a workstation environment: Does the company plan to set up a distributed system?

John Adams
Vice-President of operations
Chemshare Corp.
Houston

SEED SOFTWARE CORP.: We are currently porting Seed DBMS into the Unix environment. This version is scheduled for release this summer.

We also recognize that Unix is the dominant operating system in the workstation environment and consider this port to be an important step for workstation market penetration. In addition, we are negotiating with major workstation hardware suppliers to implement Seed DBMS in this environment. The next step will be to implement a distributed Seed DBMS.

Software AG has announced many new features for the next release of its Adabas DBMS.

One of these features is support for full distributed data bases. According to announcement literature, the plans are to support a single logical file that is physically stored in multiple separate data bases residing on multiple CPUs.

In such a distribution, how will a search initiated on one CPU, using a descripter for the file, find records residing in one of the data bases in a different site or CPU?

Randy Ebeling
Software systems specialist
The University of Texas at Austin
Austin, Texas

SOFTWARE AG OF NORTH AMERICA, INC.: The situation described is called horizontal partitioning or concatenated files. It involves storing one logical file on several separate physical files, which in turn may be on separate physical data bases.

Records are distributed by a distribution key. For example, using department number as the distribution key, warehouse records are kept on the warehouse data base, while factory records are kept on the factory data base. In this case, each data base contains the same file structures; only the values are different.

Adanet, the distributed data base option of Adabas, receives the user's single logical request and translates this into what may be multiple physical requests.

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Announcing the 1988 Computerworld button contest!

Every year, as all you button freaks know, *Computerworld* distributes tens of thousands of buttons at trade shows around the country. For several years now, against our better judgement, we have been letting you, our readers, write the slogans for these buttons. To our surprise, you have written some good ones (like those shown here). So we're doing it again.

We're looking for a few good slogans — witty, relevant, SHORT (these are small buttons), and at least moderately clean. You may send in your entries on the form below or a copy.

But you may NOT send us everything that comes into your head. Our offices aren't big enough to handle all that paper! Please take the time to narrow down your ideas to the two best you can come up with (test them on your friends).

All entries will be shown to our panel of judges, who will be tied to their chairs until selections are complete. Six winning slogans will be picked, and everyone who sent in one of those slogans will be eligible for a prize. If you are the only one submitting a particular slogan that wins, you, of course, get the prize. However, if more than one person had the same intelligent idea, we'll pick the prize winner out of a hat. Prize winners will receive a $100 certificate good towards the purchase of software from a friendly neighborhood computer store.

All decisions of the judges will be final, and no representations as to their competence, skill, or sense of humor are being made. All entries will become the property of *Computerworld*. Deadline for entries is **March 18, 1988.**

YES, I'd like to enter *Computerworld's* ridiculous button contest. My two slogans are written below. I understand the rules above, and realize that these entries will become the property of *Computerworld*. I hope your judges can read!

_____

_____

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Name _____

Company _____

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Phone (in case I win) _____

SEND TO: Libby Levinson, *Computerworld*, 375 Cochituate Road Box 9171, Framingham, MA 01701-9171.

NEW PRODUCTS

Local-area network hardware

A device designed to connect two Ethernet/IEEE 802.3 nodes without using transceivers or Ethernet coaxial cable has been announced by **American Network Connections, Inc.**

Called the **ANC-10 Ethernet AUI-to-AUI** direct connection device, the product provides a 10M bit/sec. transmission path up to 330 ft. According to the vendor, it is transparent to Ethernet nodes. It supports station transmission monitoring and operation diagnosis and has a collision test function switch.

The ANC-10 Ethernet AUI-to-AUI device costs $180.

American Network Connections, 462 Oakmead Pkwy., Sunnyvale, Calif. 94086. 408-737-1511.

An add-on card that provides a four-user network for IBM Personal Computer ATs has been introduced by **Intercontinental Microsystems.**

Called the **Quicklink-IV**, the card is compatible with Intel Corp. 80286- and 80386-based file servers, adding four independent, diskless workstations to the file server's bus. User interface is via RS-232 or RS-422 to the dumb terminal or modem.

The card incorporates four NEC Corp. V40 8-MHz processors. Each processor has 768K bytes of zero-wait-state user memory.

The Quicklink-IV is priced at $2,295.

Intercontinental Microsystems, 4020 Leaverton Court, Anaheim, Calif. 92807. 714-630-0964.

Local-area network software

A communications software program for IBM Personal Computers and compatibles has been announced by **Datastorm Technologies, Inc.**

Features of the **Procomm Plus** software include 12 error correcting file transfer protocols, including Xmodem, Ymodem and Kermit; 16 asynchronous terminal emulations, including Digital Equipment Corp.'s VT102, IBM 3101 and IBM 3270; an automated dialing directory; and a script-command language.

Procomm Plus is priced at $75.

Datastorm, Suite G, 1621 Towne Drive, Columbia, Mo. 65202. 314-474-8461.

Personal computer-based contentional ring network software that supports up to 10 computers per network cluster has been announced by **Applied Knowledge Groups, Inc.**

Called **Open-Net**, the software includes a full IBM Netbios module, record and file-locking options, a programmers' interface, simultaneous access to multiple shared printers and support for disks with nonstandard sector sizes to 4K bytes.

Open-Net is priced at $299 per computer.

Applied Knowledge Groups, Suite 102-B, 33 Music Square W., Nashville, Tenn. 37203. 615-244-2828.

Customer-premise equipment

A product designed to store, retrieve, sort and dial voice or data calls from its 2,000-name directory has been announced by **Paracom.**

The **PCphone** uses a 1,200 bit/sec. modem, an existing private branch exchange, a key system and central switches. Features include speaker phone, electronic mail, a perpetual calendar, a calculator, data terminal emulation, serial and parallel ports and security. It supports up to 30 telephone lines.

Prices range from $1,895 to $2,195.

A board-level product called Paralink allows PCphones to share a 200,000-name directory, master scheduler and applications programs in an IBM Personal Computer environment at 9.6K bit/sec. It is priced from $1,295.

Paracom, 310 Paseo Tesoro, Walnut Creek, Calif. 91789. 714-594-3193.

Links

Two products designed to allow personal computer users access to Transmission Control Protocol/Internet Protocol (TCP/IP) environments have been announced by **The Wollongong Group, Inc.**

Win/PC 3.2 supports communications between IBM Personal Computers and compatibles running in either IBM's PC-DOS or OS/2 environments and host systems via local- or wide-area networks running TCP/IP.

With Win/PC 3.2, users can transfer files, send mail or become a user on another host with normal logon procedures, according to the vendor. In addition, support is provided for IBM's Netbios software interface.

Win/PC Route 1.0 provides a gateway for Netbios-based PC LAN users to communicate with Ethernet network environments using TCP/IP. It supports up to three physical interfaces including Ethernet and Novell, Inc.'s Netware software interface.

Win/PC 3.2 costs $395. Win/PC Route 1.0 costs $149.

The Wollongong Group, 1129 San Antonio Road, Palo Alto, Calif. 94303. 415-962-7200.

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SYSTEMS & PERIPHERALS

HARD TALK

James Connolly

Can't live by CPU alone

Number crunching has never been easier. Supercomputers, near-supercomputers, minisupercomputers and personal supercomputers (ugh — flog the fool that came up with that term) are being announced almost weekly with performance ratings that soar past those of existing processors.

Innovative technologies are producing CPUs that can handle complex scientific, engineering and financial applications as fast as their pipelines can feed them the raw numbers. But a red flag flies when one looks at whether these computers can get their numbers fast enough.

During a recent conversation, John E. Ranelletti, computing department head at Lawrence Livermore National Laboratory in Livermore, Calif., made it clear that CPU technology is leaving related technologies — storage, communications and software — in the dust. The result is that users, even at some of the most sophisticated supercomputer sites — such as Ranelletti's own — cannot take advantage of hot processors because the CPUs

Continued on page 69

A tale of two 8100 migrations

One user chooses distributed Microvaxes, one switches to PC networks

BY STANLEY GIBSON
CW STAFF

Like a people forced to leave their homeland, IBM 8100 users have been wandering for the past two years in search of new computing territory.

Their quest began when IBM announced two years ago that the 8100 system would not be enhanced further, reportedly calling the system "functionally stabilized." Seeking a new beginning, those users have reevaluated their computing requirements, considered different vendors and taken a close look at new technology.

"The people who made the decision on the 8100 felt disappointed. They believed they would have a migration path. They were let down," says Matt Hogan, director of the California Assembly's Office of Information Services, expressing the emotional reaction of many users.

Once the initial shock had subsided and the search for a new computing platform had begun, Hogan set a primary target to be a system that would offer architectural continuity for many years to come. Hogan opted for distributed Digital Equipment Corp. Microvaxes linked by Decnet.

In contrast, Joseph Brophy, senior vice-president of The Travelers Corp. in Hartford, Conn., was less startled by the demise of the 8100 and expresses none of the same bitterness. His replacement solution is a series of distributed IBM Token-Ring networks linking IBM Personal Computers.

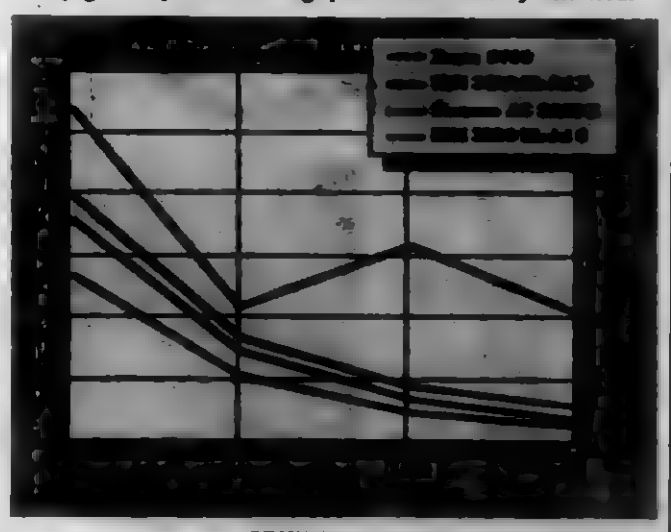
"Looking back on the 8100, it was a good investment," Brophy says. "It made a lot of sense. It had high availability, high performance and good response time.

Continued on page 64

Data View

Volume savings

Per-page costs plummet as large printers handle heavy work loads



INFORMATION PROVIDED BY CAP INTERNATIONAL, INC.
CW CHART

Xenix for the high end

BY STANLEY GIBSON
CW STAFF

IRVINE, Calif. — Bringing the Xenix operating system to as many as 64 users, Corollary, Inc. recently announced the Corollary 386/MP multiprocessor system, which can be expanded from one to five Intel Corp. 80386-based processors.

The product is a successor to Corollary's Intel 80286-based multiuser system.

Each board can contain an Intel 80387 coprocessor and 1M or 4M bytes of memory, according to the vendor. The processor boards are added to Corollary's

Continued on page 69

Sequoia bolsters Series 200

BY STANLEY GIBSON
CW STAFF

MARLBORO, Mass. — Sequoia Systems, Inc. recently boosted connectivity and storage options for its Series 200 family of fault-tolerant systems by announcing an 850M-byte Winchester disk drive, Ethernet support and SNA communications software.

In addition, Sequoia announced support for Transmission Control Protocol/Internet Protocol (TCP/IP).

Introduced last October, Sequoia's Series 200 runs AT&T's Unix System V operating system as well as Pick Systems' Pick operating system and is intended for on-line transaction processing applications.

The Ethernet controller is priced at $10,000, and the TCP/IP software license is priced at $6,000. Both are scheduled to ship in June.

Sequoia's IBM 3270 Systems Network Architecture (SNA) product allows a Series 200 to communicate with an IBM host

Continued on page 65

Inside

- Data digital audio tape backers backing for standards. Page 65.
- HP aims terminal at mainframe PC environments. Page 68.

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Digital has it now.

At Inland Steel, one of the nation's largest steel producers, Digital computers are helping them meet their customers' growing demands for higher quality steel. Notes Lionel Cartright, Manager, Process Automation, "We need instant information feedback for tighter control of the process. With Digital's Ethernet network and VAX™ architecture, information flows freely."

Scattered across Inland Steel's Indiana Harbor Works 1900-acre site, Digital computers are networked for monitoring a variety of operations. "Because Digital's compatible architecture ranges from its largest to its smallest computers,"

"With Digital's network controlling quality, we see Inland Steel becoming America's #1 producer of high-grade steel."

[illegible] communicate among different operational [illegible]. And sharing information is critical. [illegible] yields and reduces errors."

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[illegible] Digital [illegible] Avenue, West [illegible] your local Digital sales office.

[illegible]

Connolly

CONTINUED FROM PAGE 57

are hamstrung by support technologies that lag far behind.

Ranelletti makes the point that it is easy to get caught up in the excitement of CPU technology. He is not looking for disk drives that hold twice as much data or networks with even three times the throughput. He and his peers throughout the supercomputer user community need improvements measured in orders of magnitude.

"There's an old saying in supercomputing that supercomputers turn big CPU problems into big I/O problems," he notes.

> "THERE'S AN OLD saying in supercomputing that supercomputers turn big CPU problems into big I/O problems."
>
> JOHN E. RANELLETTI
> LAWRENCE LIVERMORE NATIONAL LABORATORY

Ranelletti, whose one department at the sprawling laboratory runs six Cray supercomputers and myriad smaller systems, looks at what could be done with today's CPU technology if it were paired with comparable disk, communications and software improvements in balanced systems. He sees the potential for getting 100 times the performance.

But don't expect those gains to be around the corner. It seems that comparatively little attention is being paid to the support technologies by vendors. Ranelletti concedes that individual vendors do reach a point at which they decline to invest in supercomputing because the market is relatively small and the development costs high.

Therefore, he suggests a national supercomputing effort, perhaps a consortium like Microelectronics & Computer Technology Corp., that can lead to the development of balanced supercomputer systems.

Much yet to do

Ranelletti says work is needed at most points throughout a supercomputer system. He cites a shortage of software written to take advantage of today's high-speed processors. He focuses on the lack of tools to allow automatic parallelization and notes that ever-popular Unix just isn't cut out for supercomputing.

He says that while networks and storage subsystems — whether on-line or archival — may be good, they don't match the performance of the host CPUs. New materials and new architectures are needed to boost throughput.

That is why he suggests a consortium — whether driven by the industry or the federal government — to lead the development effort. Ranelletti cites the importance of keeping the U.S. in the lead in supercomputers but adds that such developments would provide benefits to users at all levels of computing. He points to the trickle-down effect of computer technology as innovations in today's supercomputers migrate to future generations of smaller computers.

"I don't think there is anything that goes on at the supercomputer level that doesn't end up on the tabletop," Ranelletti concludes.

Connolly is Computerworld's senior editor, management.

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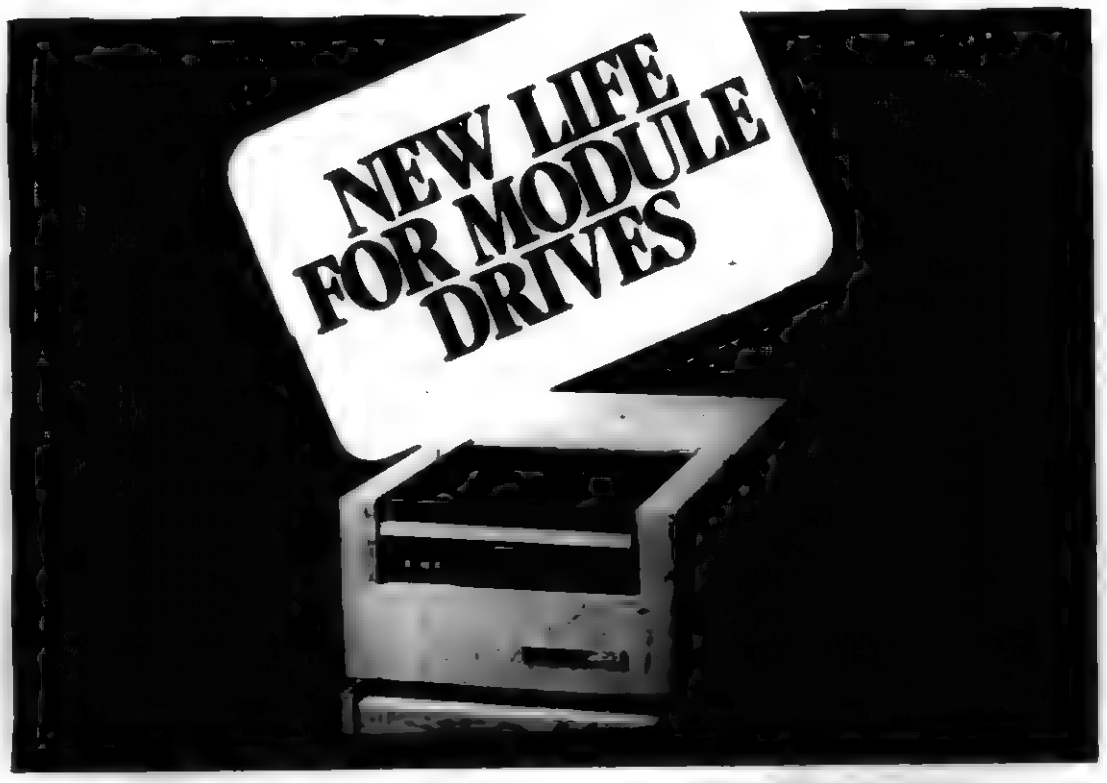

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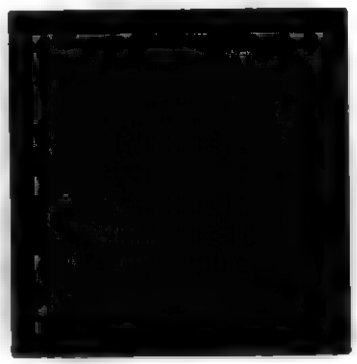

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CONTROL DATA

Xenix

CONTINUED FROM PAGE 57

386-based personal computer, plugging into the system's IBM Personal Computer AT-compatible bus.

At the high end

"The Corollary 386/MP system enables Xenix to serve the high-end market that was previously the exclusive domain of the minicomputer," said Corollary President George White in a prepared statement.

The system will be sold by Corollary value-added resellers and OEMs who specialise mainly in small business applications. Many of those resellers have developed packages for Corollary's 286-based system, which, according to Corollary, will be portable to the 80386-based system.

In order for the system to serve multiple users, an eight-port terminal concentrator, the Corollary 8/TC, must be added.

Shipments of the Corollary 386/MP to key accounts will begin in April, with general availability in May, Corollary said. The suggested retail price is $2,795 for the Corollary 386/MP processor with 1M byte of memory.

The 386/MP processor with 4M bytes of memory is priced at $4,195. Boards containing the 80387 coprocessor cost an additional $1,500.

The Corollary 386/MP extended kernel software, which allows multiple processors to be used under Xenix, is priced at $195.

The Corollary 8/TC terminal concentrators are priced at $595 each.

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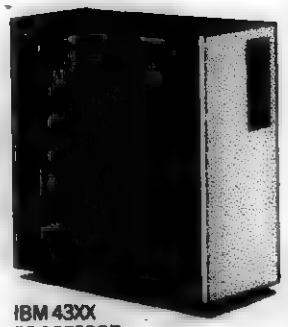
IBM 43XX PROCESSOR

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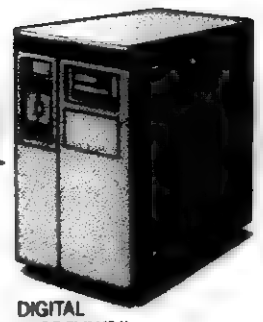
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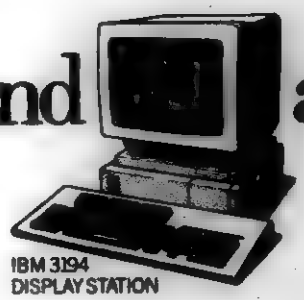
IBM 3194 DISPLAY STATION

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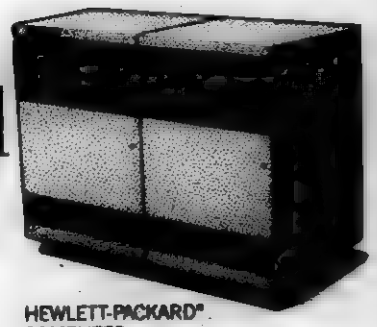
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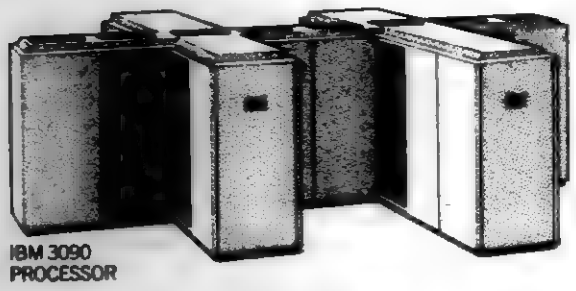
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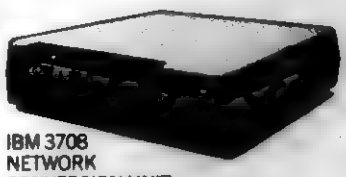
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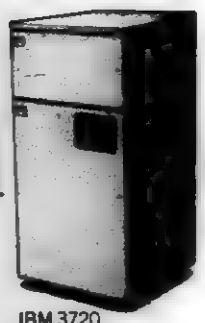
IBM 3720 COMMUNICATION CONTROLLER

and

PUBLIC SWITCHED NETWORK

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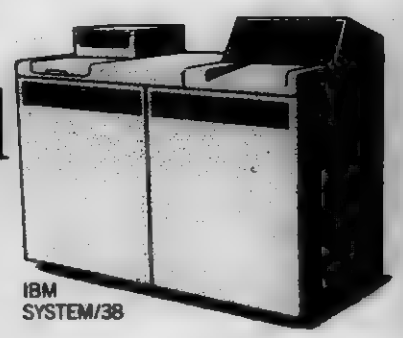
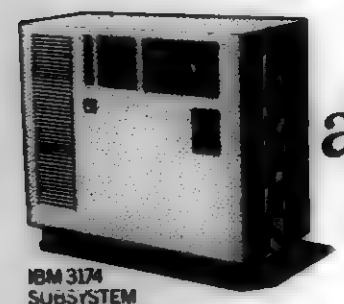
IBM 9370 INFORMATION SYSTEM

and


IBM SYSTEM/38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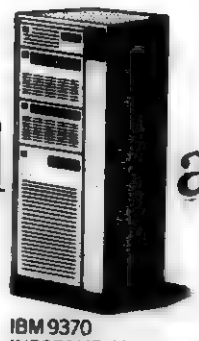
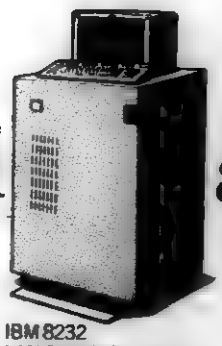
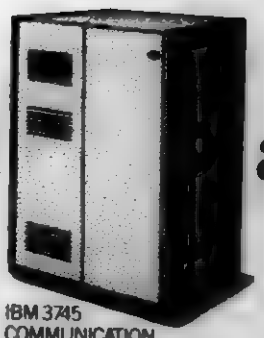
and  and  and and  and

IBM 9370
INFORMATION SYSTEM

IBM 8232
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(TCP/IP GATEWAY)

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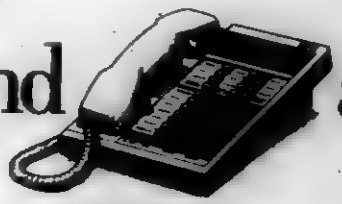
PERSONAL COMPUTER
WITH 3270 EMULATION

IBM 3745
COMMUNICATION
CONTROLLER

and and  and and

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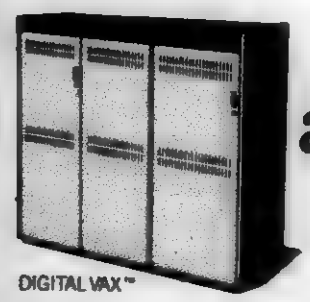
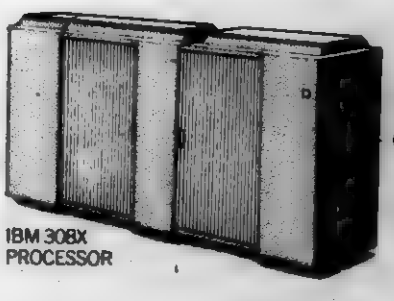
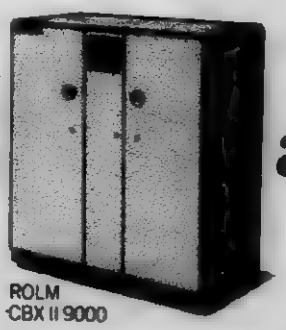

DIGITAL VAX™

and 
IBM 308X
PROCESSOR

and 
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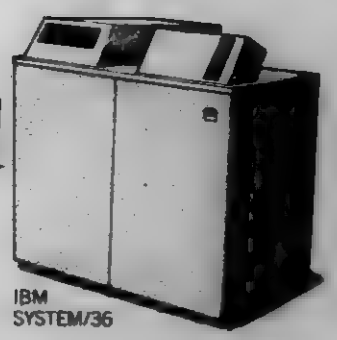
and 
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and
N.E.T. IDNX*
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IBM 9751 CBX,
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IBM 3151
ASCII DISPLAY STATION

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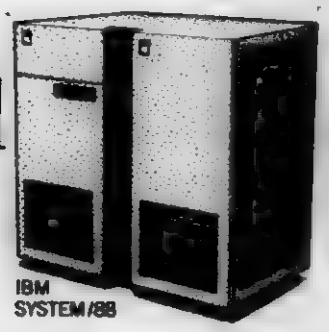
and 
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IBM. The Bigger Picture

Migrations

CONTINUED FROM PAGE 57

But there comes a point with all these machines when maintenance gets too expensive.

"IBM was very visionary in what they were doing. They were beginning to evolve their LAN strategy," Brophy says.

Passing on Token-Ring

Hogan, however, looked at a similar Token-Ring proposal from IBM and passed it over. He says DEC's All-In-1 office automation software and mainframe connectivity through DEC's version of IBM's Systems Network Architecture (SNA) gateway were superior to those offered by IBM's proposed local-area network of its PC ATs connected to an IBM mainframe host through SNA.

Hogan says IBM proposed Displaywrite software on the PC ATs, using Personal Services/PC as a Distributed Office Support System interface with the host. "There were more steps involved communicating with the host than with the DEC solution," he adds.

The state of California's plan is to provide each state senator and representative with two Microvax-based office automation systems: one at the legislator's office in Sacramento and another at his home district office.

The systems in the district offices, each of which supports three or four terminals, were installed a year ago. Each district office is connected over a wide-area network and SNA gateway to an IBM 3081 Model K mainframe running IBM's MVS/XA in Sacramento. The host contains the text of every bill introduced in the legislature, with filing dates and summaries.

All the Microvaxes in the various offices will be identical, containing 13M bytes of memory. The systems and network are to be kept up all the time and will be centrally managed, Hogan says.

Capitol switch

The next stage of implementation calls for the replacement of 34 8100s in capitol offices in Sacramento with some 100 Microvaxes connected over an Ethernet LAN. Looking ahead, Hogan expresses confidence in an upgrade path in which systems requiring more power could be replaced by Microvax 3000 systems.

At The Travelers, a traditionally close relationship between vendor and customer helped soften the blow of the 8100's demise. When the 8100's fate became apparent, Brophy sought to provide the same function by alternate means. The 8100s handled claims processing in offices around the country, communicating with a central host system.

Now, Brophy says, he is convinced that the PC LANs are a superior solution to the distributed 8100s. He says that the move to Token-Rings was inevitable and would have taken place even if the 8100 were still supported.

In-house programmers developed a new system for PCs using screens similar to those used on the 8100-based system, to which more functions were added. Brophy says it took his programmers eight months to develop the application and three months to migrate from the 8100s to the PC networks.

The Travelers is now installing IBM Personal System/2s, replacing existing ATs wherever necessary. Brophy says the ATs were selected because IBM made it clear to him early on that the PS/2, using the Intel Corp. 80286 and 80386 microprocessors, would be related more closely to the PC AT than to other members of IBM's original PC family.

The Travelers is also installing some diskless PS/2 Model 50s [CW, Feb. 1] and may install dumb terminals and servers on the Token-Rings where necessary.

Despite the loyalty of users such as Brophy, the discontinuance of the 8100 has been a wrenching experience for a number of users, according to Brian Blackmarr, president of Blackmarr and Associates, a consulting firm in Dallas.

"In general, 8100 migration was ill-prepared for. Customers did not anticipate and appreciate it, particularly large customers," Blackmarr, a former IBM employee, says.

Blackmarr concludes from a study that most very large accounts do not want to move to a two-tier architecture such as The Travelers'. They view a PC network as difficult to support and limited in function, although it may be inexpensive.

Expertise needed

He adds that a Token-Ring PC network requires considerable expertise on the part of users — someone has to know how to operate PS/2s, load diskettes and so on. Blackmarr adds that diskless PS/2s, such as those used by The Travelers, may be a solution to this drawback.

Meanwhile, IBM's 9370 departmental system is viewed as difficult to run and expensive to support, the consultant says, despite the fact that IBM has promised a migration path to the 9370 for 8100 users with the DPPX operating system.

Almost certainly, the most expensive alternative is a remote connection to a host using telephone lines, a generally unacceptable choice, Blackmarr says.

The end of the 8100 will mean the inevitable erosion of a part of IBM's customer base, Blackmarr's study shows. Seventy-five percent of users surveyed by Blackmarr report that they are willing to consider non-IBM equipment, and of that 75%, DEC is emerging in the dominant position, Blackmarr says. The remaining 25% who are committed to an IBM solution are up in the air, often puzzled by choices, according to Blackmarr.

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HARD BITS

Data audio tape gathers steam

The technology is far from being a dominant force in the storage area, but **data digital audio tape** (Data/DAT) already has its backers for standardization.

According to consultant Lee H. Elizer, president of Peripheral Strategies, Inc. in Santa Barbara, Calif., 24 companies recently sent representatives to a conference on standardization of helical-scan Data/DAT drives, media and components.

The group established planning targets for purposes of alternate OEM sourcing and data interchange format definitions, Elizer said.

C. Itoh Electronics, Inc. and **Acom Computer, Inc.** recently signed an agreement under which they will market C. Itoh's ion deposition printers into IBM System/34, 36 and 38 twinaxial environments. Under the two-year pact, Acom will become the principal distributor and will provide maintenance for C. Itoh's 30 and 45 page/min nonimpact printers.

Acom also provides proprietary protocol converters that enable a page printer to emulate IBM 5219 and 3812 printers.

C. Itoh's Megaline series features line printer emulation, which, at 30 and 45 page/min, are comparable to 2,000 and 3,000 line/min printers, according to C. Itoh. That company also claims its Megapro series of 30 page/min printers provides more sophisticated output.

In a recent series of signings, **Data General Corp.** inked six value-added reseller pacts. The contracts were with real estate automation systems VAR First Data Systems in Nashville; manufacturing software vendor Orbi, Inc. in The Netherlands; investment services systems provider Financial Information Network, Inc. in Van Nuys, Calif.; patient billing and administrative systems supplier Health Care Network in Louisville, Ky.; life insurance applications developer Fipsco, Inc. in Park Ridge, Ill.; and computer-aided software engineering systems vendor Exsys, Inc. in New York.

McDonnell Douglas Manufacturing and Engineering Systems Co. in St. Louis recently got into the Unix market with an agreement to resell **Hewlett-Packard Co.** HP 9000 workstations and minicomputers in combination with McDonnell Douglas's Unigraphics mechanical design and engineering software.

The U.S. Naval Research Laboratory in Washington, D.C., is expanding its 64-node **BBN Advanced Computers, Inc.** Butterfly system with an additional 64 nodes based on BBN's Butterfly Plus processors. The system is used to simulate expert systems for Navy battle management and network optimization.

Sequoia

CONTINUED FROM PAGE 57

over dedicated or switched lines. The system appears to the host as an IBM controller with attached 3270-type displays and 3287 printers and may access applications running on the IBM system. The software license is priced at $7,500.

A 3270 Applications Program Interface lets programs running on a Series 200 communicate directly with application programs on an IBM host. This provides distributed processing without the modification of host-based systems and applications, the vendor said. The license is priced at $5,000.

In addition, a 3287 Printer Emulation product provides SNA LU3 support for standard ASCII printers attached to a Sequoia system. It is priced at $3,500. All three SNA products are scheduled for April shipment to customers.

The new disk is an 850M-byte Winchester drive in packaging identical to that of Sequoia's current 8-in. diameter 368M- and 500M-byte drives. Using the drive, a customer can put more than 13G bytes in a single Sequoia peripheral cabinet, Sequoia said. The 850M-byte drive, manufactured by Control Data Corp., is scheduled to be delivered in April and is priced at $25,500.

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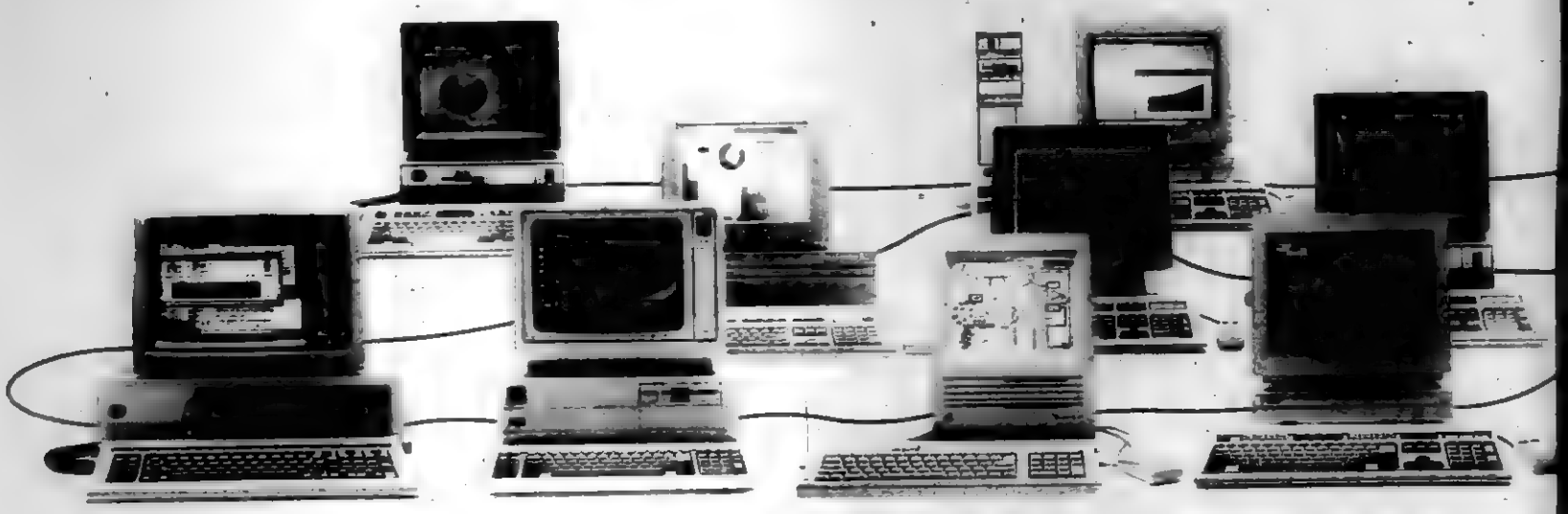

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NEW PRODUCTS

Processors

Applied Digital Data Systems, Inc., a subsidiary of NCR Corp., has introduced an enhanced model of its **Mentor 6000** multiuser system.

The Model 6A can be configured with 2M to 8M bytes of error correction control random-access memory, 16 to 128 serial ports and two to four parallel printer ports. The peripheral subsystem comes with 487M to 1,384M bytes of unformatted disk capacity, one or two ½-in. 1.6M/3.2K bit/in. tape drives and a ¼-in. streaming cartridge tape drive.

Also included is the Mentor operating system, an implementation of Pick Systems, Inc.'s Pick operating system.

Prices for the Mentor 6000 Model 6A start at $80,000.

Applied Digital Data Systems, 100 Marcus Blvd., Hauppauge, N.Y. 11788. 516-231-5400.

A single-board Motorola, Inc. VME-based computer has been introduced by **Heurikon Corp.**

Called the **HK32/V532**, the processor is based on the National Semiconductor Corp. NS32532 32-bit microprocessor. It supports Unix and real-time applications. Features include an integrated on-chip paged memory management unit, 512-byte instruction cache, 1,024-byte data cache, 4M or 16M bytes of on-board dual-access dynamic random-access memory with parity and 128 bytes of nonvolatile RAM.

Prices range from $6,000 to $7,000.

Heurikon also introduced the **HK68/M12E** 32-bit Multibus I microcomputer and the **HK68/M130** 32-bit single-board microcomputer for Unix and real-time applications. The former is based on the Motorola 68020; the latter is based on the Motorola 68030. They cost from $2,395 and $4,995, respectively.

Heurikon, 3201 Latham Drive, Madison, Wis. 53713. 608-271-8700.

Data storage

A multifunction Digital Equipment Corp. Q-bus- and Unibus-compatible subsystem for data storage has been announced by **Summus Computer Systems.**

The **Gigabox-MF** comes in either a 5¼-in. rack-mount or a pedestal enclosure. It features more than 1G byte of hard-disk storage integrated with a 2.33G-byte unattended back-up tape drive. The hard disks offer a 16-msec average access time and a 25,000-hour mean time between failure rate.

The 8mm tape drive is said to be software-transparent. According to the vendor, the drive is compatible with DEC's VMS, Ultrix, RSTS, RT-11 and RSX as well as AT&T's Unix System V.

The Gigabox-MF subsystem is priced from $19,995.

Summus Computer Systems, P.O. Box 820549, Houston, Texas 77282. 713-589-9772.

Terminals

An IBM 3270 replacement display for use in interactive communication system networks has been introduced by **Harris Corp.'s** Data Communications Division.

The **H192-D** display features Coax Multidrop and built-in RJ11 twisted-pair support. Coax Multidrop permits up to

The Harris *H192-D*

eight displays to be attached to a single controller multiplexer port.

Other features include a row and column indicator, a vertical scroll capability and support for four screen sizes.

The H192-D is priced from $1,595.

Harris, 16001 Dallas Pkwy., Dallas, Texas 75248. 214-386-2000.

Hewlett-Packard Co. has introduced the **HP 700/44** terminal for multiuser personal computer-based environments and the general-purpose **HP 700/43** ASCII terminal.

When the HP 700/44 is connected to a PC running The Santa Cruz Operation, Inc.'s Xenix operating system, it can use the same PC application programs. Features include the IBM Personal Computer character set, an enhanced PC keyboard layout and a 14-in. display screen with 80- and 132-col. modes.

The HP 700/43 is an enhanced version of the HP 700/41. It offers four pages of memory, 80- and 132-col. modes, 58 programmable keys and 12 emulation modes.

Both displays come with amber, green or soft-white phosphor. The HP 700/44 costs $575; the HP 700/43 costs $475.

HP, 1820 Embarcadero Road, Palo Alto, Calif. 94303. 800-367-4772.

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Work group computing supports people, not applications

An interview with Patricia Seybold

Can information systems ever provide more than passive support for a group working together? Will we see the day when workstations redefine the way a project team collaborates?

According to Patricia Seybold, president and chief executive officer of The Office Computing Group, Inc., a Boston-based publishing and consulting firm, work group computing is just starting to make its way to real applications.

Seybold spoke recently with *Computerworld* associate editor Kelly Shea about work group computing and how it may change the way people work.

What is — and isn't — work group computing?
It's a computing environment that fosters cooperation. Some people get confused with the term "work group computing." They tend to make it synonymous with departmental computing, or they tend to equate it with a kind of system architecture, such as a PC LAN.

In fact, its prerequisites are that people are linked electronically, that they are typically working on either the same task or different aspects of related projects and that the software might very well be proactive in its support of them.

So, for example, a new project management application designed for work group computing would notice when somebody completes something or is working on something, and it would alert people. It would also notice when something isn't being done and alert other people.

This proactive part means agents in the system will automatically take preprogrammed actions, based on certain conditions. That's a quality that's not always there yet in so-called "groupware." The term that I use to describe that proactive capability is "procedural automation." An example of that is Hewlett-Packard's New Wave product (see chart next page).

So a work group could be a department of people or a small office of people, but it could also be separate, remote individuals?
Right. Or it could be someone from marketing, somebody from engineering and somebody from finance working on a project team. Work group computing is not necessarily departmental computing. We're really going beyond that. We're adding another layer of intelligence to the application.

What are the unique hardware, software and communications needs of a work group?
In terms of special hardware requirements, I'm not sure there are any. From a software standpoint, I think multitasking is a nice prerequisite. It's very difficult to do some of this work if you don't have a multiuser, multitasking environment.

Another important aspect concerns the relative sophistication of the file management system. With many of these applications, you're moving into a requirement for distributed data base. And that which can be distributed doesn't fit our conventional picture of a data base. It's not just data. It might be huge amounts of text; it might be text with graphics.

The kind of hardware and software platform that will allow this type of software to really flourish, particularly with people who are physically proximate, is probably best exemplified by Apollo's Networked Computing System standard. This standard offers a distributed networked environment that allows people and information to hook together interactively in a seamless, transparent way.

ALAN WITSCHONKE

"AS WE'VE automated offices, one of the things we find is that it's not really any easier for groups of people — as groups — to get work done."

That brand of networking is going to start migrating from the Unix, scientific and technical worlds into the commercial marketplace. The DOS, OS/2 and Macintosh environments will begin to take on some of those characteristics.

So there is a flavor of networking that is particularly good for this sort of application, but it isn't really required. The main attributes are that you have the ability to see what other people are working on and to see how their suggestions might affect what you're working on. You can do that in whatever mode you want to.

Are there any particular products actually being used in this kind of environment?
One is a form of electronic mail software, Coordinator from Action Technologies, which goes one step beyond electronic mail. It forces you to be very explicit about making promises, requests and commitments. And then it helps you track promises you've made and ones other people have made to you. What it doesn't yet do is actually go and tap people on the shoulder.

A good example of an application environment that supports work group computing comes from Motorola. It's a family of products called Life, which stands for Linked Information

- **It's not just shared data**
- **For groups that are 'hot and clicking'**
- **A polite way to interface**

For times when two heads are better than one

Do you spend a lot of time in meetings? If so, you may have wondered why, with so much technology out there to help people do their individual jobs, isn't there an automated way to conduct group meetings?

The answer is, you're imagining an implementation of work group computing that is not yet out of the laboratory.

But it's coming. Xerox Corp.'s Palo Alto Research Center (PARC) in California is pursuing the idea. PARC's Intelligent Systems Laboratory created an environment for work group computing called Colab. Begun in 1984 as an offshoot of PARC researcher Gregg Foster's doctoral dissertation, Colab consists of a small meeting room, four desks — each with a Xerox LISP workstation — and a large projection screen. Small groups can conduct meetings using high-technology tools that store and track everyone's ideas.

The project is currently in the prototype stages. Its primary users are the six-member Colab research team, headed by Foster and Mark Stefik.

Colab workstations are connected over an Ethernet network, and its software is built on top of Xerox Interlisp, a LISP dialect. Several software modules have been developed to support the various aspects of group computing.

The module used most successfully so far is Cognoter, an idea processing tool used to prepare presentations. It imitates the process of collaborative writing. Through the Cognoter multiuser software, the group starts with a clean slate.

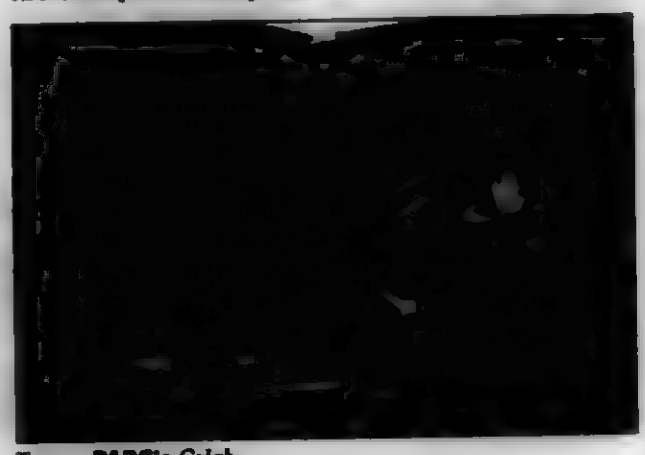
They brainstorm, then organize, then evaluate ideas — all on the shared space of the computing environment. Everyone works individually, but each person's ideas can be made available to other members of the group via windows on their own screens as well as on the large projection screen in front, if that is desired.

Talking among the group is by no means eliminated. As Foster describes a typical Colab work group, "We alternate between focusing on our own screens or working in parallel, which is one of the big productivity gains of the system."

At this point, Colab is not officially being considered a product offering by Xerox. But, says Foster, "My work has improved using these tools."

"The problems we all work on these days are so complicated that they're very hard to deal with as an individual," he says. "I'm convinced that small work groups is the way to get good work done."

KELLY SHEA



Xerox PARC's *Colab*

Environment. It's Unix-based software that consists of a forms-based user interface, where you either design or use existing business forms as the basis for automating procedures among a group of people.

Context is technical documentation software from Context Corp. It's a good example from a document creation and production standpoint, because it combines the notion of multiple authors working on the same document with tracking of all revisions that were either proposed or made. So you just make the changes once, and then they ripple through this data base.

So there aren't really any products from the major vendors?
Not yet. Except HP's New Wave environment. And Lotus recently announced its Notes application [CW, Feb. 29].

What is behind this concept? What are the capabilities it provides that traditional ways of computing do not?
As we've automated offices with electronic mail, calendars, scheduling programs, word processing and data bases, one of the things we find is that it's not really any easier for groups of people — as groups — to get work done.

So, since we're all doing a lot of work on computers, it's a matter of getting to the point where the computers get into the act. Instead of being passive, they start to become more intelligent.

Another reason is simply the notion of cooperative work, where with five or 10 people working on a project, we all need access to the same supporting data. We all need access to each other's notes and thoughts. We all, basically, want to have our own windows into the common set of information and have it set up in such a way so that we can be polite. We can make suggestions to each other without going in and clobbering what somebody else is doing.

I think we're now at the next stage. We have a lot of applications that empower individuals, and we now have the communications infrastructure in place so we can start moving beyond that.

Is MIS prepared for work group computing?
I think there's beginning to be enough written about it so that it may not sneak up on MIS managers.

I would suggest that what they should do is see the parade and run around and get in front of it and try to get themselves educated about the phenomenon and about the different kinds of tools and implications before their users really start clamoring for it.

Can MIS bring work group computing to upper management as a strategic weapon for enhancing competition?
Not yet. We don't have enough applications out there. 1988 will be the time when everybody will begin to identify the need for this kind of environment, a work group computing environment that goes beyond just PC LANs. And it will also be the year in which many of the underpinnings are put in place.

Is anyone actually practicing work group computing?
I don't know of anything beyond pilots per se, other than in specific areas like technical documentation and engineering.

Any final words of wisdom or advice for people who might be thinking about work group computing?
Before people start automating how groups of people work together, it's real important that they understand how groups of people work together. I would strongly recommend MIS managers and user departments thinking along the lines of doing computer support of cooperative work to get some training in working together as a team — whether it's team building or any of the communications workshops people can take.

We have to understand the notion of synergy — when you really get a group that's hot and clicking.

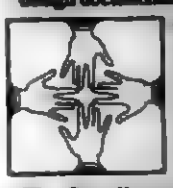
One of the things that's relevant from a computer support standpoint is that a group of people working well together tends to operate in consensus mode. And with consensus, a single dissenting voice can change the whole direction that a group moves in. From an implementation standpoint, then, you realize you've got to make sure everybody has an equal opportunity.

And there may be cases where anonymity is desired so people don't make judgments about the value of a contribution based on who they think said it.

There are a lot of soft sides to this issue that I think need to be looked at before we run around and put it up on computers. ●

Groupware

Selected products that facilitate work group computing



- **Context**, Context Corp., Beaverton, Ore.: A networked environment that allows multiple authors to produce and make changes in technical design documentation; Context helps coordinate and track the changes.
- **New Wave**, Hewlett-Packard, Palo Alto, Calif.: An operating environment that works with Microsoft's Windows 2.0 to facilitate object management; allows group members to move data across applications and to create compound documents of objects, such as graphics, text and voice; provides an agent function for procedural automation.
- **The Coordinator**, Action Technologies, Emeryville, Calif.: An electronic mail product that helps track requests or commitments made by or for group members.
- **Life**, Motorola Computer Systems, Cupertino, Calif.: A family of Unix-based software with a forms-based user interface; helps group members design or use existing business forms to automate group procedures.

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Robert H. Trent

Cornerstone for survival

Entrepreneurship has long been a cornerstone of management thought.

Recently, management theorists coined the term "intrapreneurship" to describe ventures, usually aimed at developing new products generated within an organization. The practice was inspired by the need for entrepreneurial and innovative thinking in large corporations grown bureaucratic to the point that new ideas tended to be stifled. Notable examples of intrapreneurship include the development of Post-it Note Pads at 3M and IBM's Personal Computer.

In parallel with intrapreneurship, a similar activity, perhaps best described as "infopreneuring," has emerged within many corporations. This phenomenon is getting a lot of attention in management literature in conjunction with the use of information and information technology to gain competitive advantage. Numerous examples of it are already well known, such as the development of customer-oriented systems by American Airlines, American Hospital Supply and Merrill Lynch.

In an indication of top managers' recognition of the importance of information and its role as an integral part of corporate strategic planning, many companies have appointed a senior officer responsible for providing information and related technology where and when it is

Continued on page 76

Bottom-line philosophy motivates Seafirst MIS

BY STEPHEN JONES
CW STAFF

SEATTLE — It seems appropriate that the MIS department of Washington's largest bank is preoccupied with dollars and cents, scratching to save money at every turn to help improve the overall corporate bottom line.

While such belt-tightening concerns are not exclusive to MIS shops in the banking industry, Seattle First National Bank, known as Seafirst, takes an almost obsessive approach to saving money.

"We don't allow traditional cost containment; we use cost reduction, which means, 'I don't care what you have to do, just make the cost go down,'" said Timothy Turnpaugh, executive vice-president of Seafirst's operations group and director of MIS.

Shuffling systems, people

Turnpaugh has helped lead Seafirst's MIS shop through a major reorganization during the last three years, changing mainframe systems twice and placing a personal computer on the desk top of nearly every bank employee.

Part of that restructuring involved some big employee layoffs. Since 1985, the MIS work force has been cut by 40%, down to about 100 employees today.

Some of the most drastic staff cuts were made, Turnpaugh said, because Seafirst had managed to install the hardware and software equivalent of two separate MIS shops. Thanks to a slipshod method of acquiring big iron in the late 1970s and early '80s, the bank was running systems from both IBM and Honeywell, Inc.

Cutting down

With each mainframe demanding its own development and support staffs, the first decision became a very easy one: eliminate one of the money-guzzling systems.

The migration from Honeywell to IBM hardware was originally budgeted to take five

Continued on page 76

Data View

Help wanted

Most frequently cited suggestions for improving the workplace, from a survey of 494 Computerworld readers

INFORMATION PROVIDED BY CW PUBLISHING, INC.
CW CHART

No time for games

GE's Ehrlich favors pragmatism over promises

BY ED SCANNELL
CW STAFF

It's easy to label Jeff Ehrlich a cynic. After listening to a few terse comments about vendors who always deliver less than they promise and how some don't understand corporate computing needs, one might recommend he spend a couple of weeks on the beach.

But what may be construed as cynicism is his own steely brand of pragmatism that precisely separates what vendors can deliver to General Electric Co. today from what they merely promise to deliver sometime in the future.

"I have to be pragmatic about what works and what doesn't work," he says. "We are interested in simplicity and usability. I don't have the time to fool around playing games with vendors."

Ehrlich really doesn't have time to fool around. As manager of product technology for GE's Corporate Information Technology group, he is responsible for piecing together a coherent strategy for GE's varied base of 40,000 microcomputer users as well as providing technological guidance for the company's 40 MIS managers.

An example of Ehrlich's pragmatic thinking was his decision to buy a large number of IBM's Personal System/2 series machines but to hold at arm's length IBM's yet-to-be-delivered OS/2 Extended Edition and Systems Application Architecture (SAA).

He justifies the purchase of thousands of PS/2s during the last year by saying they represent a significant improvement in functionality and cost over IBM's Personal Computer series.

PROFILE

Jeff Ehrlich

Position: *Manager of product technology for General Electric's Corporate Information Technology Group*

Mission: *Develop a strategy for integrating GE's 40,000 microcomputer users into myriad of emerging technologies*

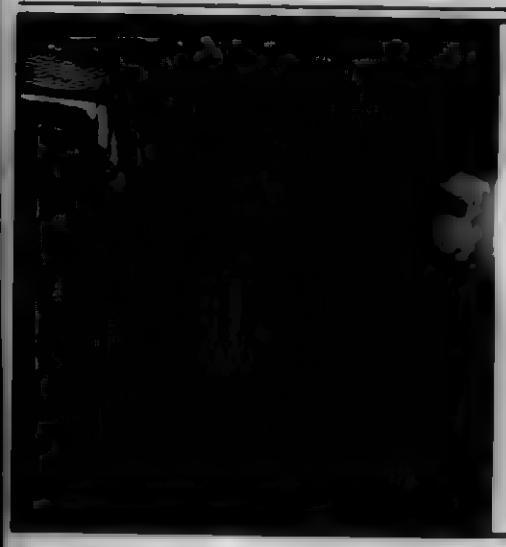
He refuses to become an OS/2 or SAA loyalist, however, until IBM is ready to deliver and prove to him the products' technological worth.

"There is a tendency in this business to talk about what is going to be — and that's fine and sometimes even important. But it doesn't wash away what is," Ehrlich says.

Ehrlich works with what he describes as a close-knit group of 10 people at GE's mammoth

Continued on page 74

- IBM user group Guide delivers greetings to Computer Mission. Page 75.
- IBM extends electronic filing program for business tax returns. Page 74.



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Ehrlich

CONTINUED FROM PAGE 71

plant in Bridgeport, Conn. He says he doesn't believe in formal meetings to direct his group but prefers informal and sometimes spontaneous meetings among three or four staff members.

"We talk to each other all day, every day. There's too much action [to take time out] for formal meetings," he says.

Those who work with Ehrlich say they respect his pragmatic decision making abilities as well as his flexibility.

"He's very objective, which is important," says one co-worker who asked not to be identified. "Some people aren't and will get locked into something they don't want to do, even if it's wrong. I've never seen that with him."

An example of that flexibility was Ehrlich's decision to integrate a significant number of Apple Computer, Inc. Macintoshes into a company that already had 40,000 IBM PCs and compatibles. His decision to do so was based purely on the Macintosh's ability to deliver superior price/performance immediately, unlike IBM's promises to deliver similar capabilities sometime in the future.

The action is fast-paced at GE. With 40,000 users, GE is the target of hundreds of sales agents from all corners of the vendor community. Ehrlich says he regularly listens to half a dozen sales pitches a day from vendors visiting his office and from many more over the phone.

Besides managing his own business, Ehrlich says he has to know as much about the businesses of vendors and dealers as they do. "We know the business of building and selling computers very well here," Ehrlich points out.

Ehrlich has come up with a variety of techniques to manage the mountain of vendor information he constantly faces. Although he is reluctant to give away trade secrets, he says developing the ability to evaluate a product's worth in 10 minutes and to skim journals and technical reports for key facts is invaluable.

No matter how well he manages his time, however, the nature of the business forces him to think about it long after he leaves the office, he notes. Most people in his line of work have no conscious beginning or end to their jobs, he says.

"This is not an 8 to 5 job. If it was just a job to you, you couldn't do it. There is just too much to know," Ehrlich says.

When he does relax, Ehrlich says he still feels a compulsion to be challenged. He turns his favorite hobby, sailing, into a different sort of technology project. "Sailing, to someone else, is a classic vacation. But for me, it involves a lot of planning and worrying about navigation, anchoring and the weather; it's a project. The brain doesn't get tired like a set of muscles," he says.

Back at the office

On the nontechnical side of his job, Ehrlich has a formula for hiring people that involves some degree of intuition. He says

IRS expands filing program

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The Internal Revenue Service continues to expand its program for electronic filing of business tax returns. The IRS recently said it will permit businesses to transmit employee pension plan returns, specifically Forms 5500C and 5500R, beginning in June.

The increasingly popular program allows businesses to file returns either by sending standard half-inch magnetic tapes or by transmitting the data at 4.8K bit/sec., using CCITT X.25 or IBM 3780 bisynchronous protocols, said Allan Firestone, an IRS programmer/analyst.

During a pilot test last year, 2,168 fiduciary and partnership returns (Forms 1041 and 1065) and 65,862 related Schedule K-1s, were filed electronically, the IRS reported. Gradually, the IRS is opening the program to new categories of filers this year, including Subchapter S corporations.

The IRS estimated that participating firms will transmit about 100,000 returns and 750,000 Schedule K-1s for the year. The IRS had no estimate on the volume of employee pension plan returns to be transmitted, but officials noted that they have received about 150 requests for information on procedures for transmitting these returns.

So far this year, about 70 firms have signed up for the program in order to reap the benefits of electronic and magnetic media filings, IRS officials said.

For example, the program permits the IRS to immediately acknowledge receipt of the return and quickly resolve errors, officials said. Also, corporate officials can use a consolidated signature form, which greatly reduces the amount of paper to be signed.

"The program is gaining wide acceptance because businesses have found significant savings in not having to print large volumes of Schedule K-1s," an IRS statement said.

Firestone said limited partnerships must print and fill out two Schedule K-1s for every partner, which in some cases may number in the thousands. With electronic or magnetic media filing, the partnership does not need to print or send the thousands of forms to the IRS, and certain IRS filing requirements are relaxed.

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Exhibitor listing as of 12/28/87. In future, over 500 exhibitors will participate.

candidates have to be smart but that he has a bit of trouble defining that term.

Being smart "is more than just intelligence. [Candidates] have to be action-oriented. We have a lot of work to do here, with a short amount of time and limited resources. We need people who are decisive and who can defend their decisions," he says.

An employee at GE for 20 years, Ehrlich has been involved in managing everything from mainframes to micros. He has been in his current position for the last five years.

Although he holds an engineering degree from the University of Rhode Island and master's degrees in business administration and computer science from Rensselaer Polytechnic Institute, Ehrlich places a high value on experience. "I have some degrees, but there is no substitute for experience," Ehrlich says. "You can learn more from failures than success."

"THERE IS A TENDENCY in this business to talk about what is going to be — and that's fine and sometimes even important. But it doesn't wash away what is."

JEFF EHRLICH
GENERAL ELECTRIC CO.

Although he can't point to specific failures he has experienced at GE, Ehrlich says, his years as a manager have taught him about trading off the short term for the long term, recognizing no-win situations and the limits of his abilities. "One of the few benefits of getting older is that, hopefully, you get smarter," he says.

Ehrlich has no trouble selling new technology ideas to corporate management — an enviable position for any manager of technology. He says corporate management assumes he is on top of all situations and will make the right decisions. GE Chairman and Chief Executive Officer "Jack Welch has other things to worry about besides PCs. That's what he's paying me for," Ehrlich says.

According to Ehrlich, the biggest challenge GE faces over the next two or three years is integrating its massive base of microcomputers into the various technologies just now beginning to emerge from companies such as IBM, Apple and Microsoft Corp. To meet this challenge, GE will have to decide which one to move to and, more importantly, when.

"If you move too soon, you'll waste tremendous amounts of money in conversion costs. If you wait too long, you're looking at obsolete equipment. It's like a poker game, you have to know when to bet," he says.

6th Annual PC EXPO in New York Seminar Series

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Software 1989: What Corporations Can Expect, What Users Want
Selecting a Desktop Publishing System
CASE: A Primer
Making the VAX Connections*
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Security Decisions in a Microcomputer Environment
80386 and Beyond
Distributed Database Management Systems*
Modern Clones and the Corporate Marketplace
Legal Issues in the Technology Field
Costs and Benefits of Microcomputers

Wednesday, June 22
Dealing with the Inevitable: Departmental Systems
The Macintosh in the Corporate Environment*
Artificial Intelligence/Expert Systems
Softline: Candid Comments from Industry Leaders
Network Management: Keeping Your Network Running*
Desktop Publishing — What Corporations are Doing
Electronic Mail and Beyond*
Vendor Quotas: Their Impact on Resellers and End Users
The Backbone's Connected to the...TCP/IP and Other Protocols*
Promoting Responsible End-User Computing
Enhancing Your Computer Graphics
LANs — User Views*
Portable Computers
Micro-to-Mainframe Connections*
Latest Developments in Spreadsheet Software

Thursday, June 23
How to Grow your Net*
Executive Information Systems
The Changing Concept of an Information Center
Workgroup Computing*
New Lives for Old — What to do with Out-dated Equipment
Micro-to-Mini Connections*
End-User Support
Software Support and Upgrades
OS/2 and Networking*
Microcomputer Maintenance
Current Training Issues
LANs and Multiuser Systems*
Implementing Project Management
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Guide donates archives to Carnegie-Mellon

The IBM large-system users group Guide International Corp. recently donated materials tracing 30 years of its meetings to Carnegie-Mellon University's Engineering and Science Library in Pittsburgh.

The Guide archives, made up of bound conference proceedings, will be available for use by graduate students in computer science study and research, according to Guide officials. Former Guide President John E. Nack, of Caterpillar, Inc., initiated the donation drive and said the proceedings chronicle Guide's role in the evolution of information systems technology.

The archives include information from each of Guide's 66 meetings between 1956 and 1986.

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*Advanced 'C' Programming under UNIX	January 6-8 February 10-12 March 16-18 April 20-22 June 8-10 June 29-July 1 August 10-12 September 21-23 October 26-28 December 7-9	February 17-19 April 27-29 July 20-22 September 21-23 November 2-4	February 24-26 May 11-13 August 3-5 September 28-30 November 16-18	$585
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Seafirst

CONTINUED FROM PAGE 71

years, but Turnpaugh claimed to save $13 million by completing the plan in just 16 months.

It recently became clear to Turnpaugh and his staff, however, that even more money could be saved by replacing Seafirst's IBM 3081 with a National Advanced Systems (NAS) XL/80.

Seafirst's Turnpaugh

According to Turnpaugh, the move to NAS brought a 70% increase in mainframe horsepower and a significant decrease in monthly system payments. The drive to conserve dollars also led Seafirst to standardise on Apple Computer, Inc.'s Macintosh in 1985.

Starting with 128K-byte machines that have since been upgraded to 512K bytes, Seafirst now uses more than 3,000 Macintoshes for both text and financial data processing.

Turnpaugh said the Mac was chosen because its ease of use helps reduce user training costs.

He added that training makes up 75% of the cost of owning a PC in the first three years.

Cost-cutting rampant

Cost-cutting measures have been applied to every level of the data processing operation — even nontechnical areas, according to William Browne, vice-president of systems services at Seafirst.

In 1987, Seafirst trimmed $1 million from its MIS budget by cutting the department's paper output by nearly 27 million sheets, down to 101 million pages a year.

"We had enough paper to line a path from here to Chicago and back, but once we decided it had to go, it was out of here," Browne said with a snap of his fingers.

Trent

CONTINUED FROM PAGE 71

needed throughout the organization.

Characteristics of an effective chief information officer include the following:

- A thorough understanding of the business in which the company is engaged.
- Conceptual and technical skills sufficient to develop and manage information resources.
- Infopreneurial instincts to find entrepreneurial and innovative ways to acquire and use information in the pursuit of corporate goals.

There are several strategies executives can use to identify and take advantage of infopreneuring opportunities.

One is to review strategic plans to ensure that information is specifically considered in the formulation of corporate strategies. Information is a corporate asset and should be treated as such.

Another strategy is to assess the role of information both as enhancements to existing products and as potential new products. Objectives here are increasing market share, maintaining a market advantage or inhibiting new entries to the market.

Executives can also examine the role of information as an important component of production and administrative processes. The objective here is to lower costs or change processes.

Other possible moves include these:

- Develop an information plan linked explicitly to the strategic plan, involving all senior functional area executives in the process and encouraging an infopreneurial attitude on their part.
- Include in the information plan strategies for acquiring information externally; intelligence gathering can be an important component of infopreneuring.
- Establish the position of a chief information officer charged with implementing the information plan.
- Insist on measuring the investment and the return on information technology.
- Require that planning and budgeting documentation and internal financial statements provide explicit information about revenue and costs (both capital and operating) related to information acquisition, processing and use.

Clearly, the needs outlined above are more immediate to companies in industries that are highly information intensive, such as financial services.

However, the realities of the information age in which we live seem to require that prudent managers consider new ways to maintain or improve their competitive position. In some cases, survival itself may well depend on who is the best infopreneur.

Trent is the Ralph A. Beeton Professor of Free Enterprise at the University of Virginia's Mclntire School of Commerce.

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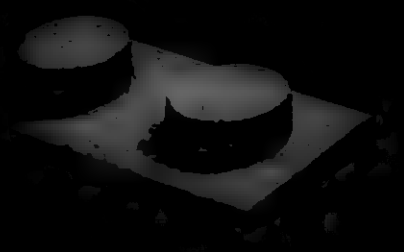

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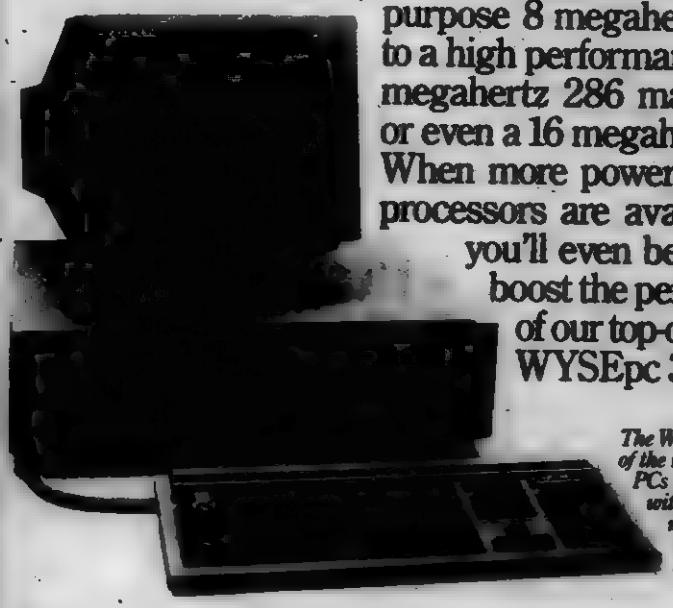

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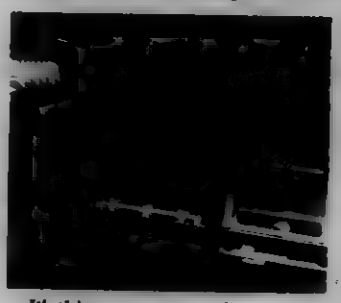

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COMPUTER INDUSTRY

INDUSTRY INSIGHT

William Zachmann

Unix: Maybe good enough

Even on the basis of quite recent surveys, one might readily conclude that interest in Unix on the part of corporate information systems professionals ranks somewhere below the Soviet Union's interest in free elections in Eastern Europe. "Who needs it?" seems to be the attitude in most corporate computer centers.

The typical large organization is accustomed to dealing with a multiplicity of proprietary environments, and moving data among them can be a bother. But, contrary to the widespread hysteria about lack of connectivity options, practical solutions are available for most of the practical problems users have. It isn't absolute lack of connectivity solutions that is the problem as much as the costs in time and effort to implement them.

Adding Unix simply means adding yet another environment — an unfamiliar one, at that. Its immediate effect is to further complicate matters rather than simplify them.

Even though Unix doesn't offer much to the chief information officer concerned about whittling away the applications backlog, Unix is likely to become a key part of most organizations' use of information technology during the next several years.

Hardware economics

The single most important reason has less to do with Unix than it does with the economics of hardware technology. A growing number of more capable microprocessor-based system products are starting to offer minicomputer- and even mainframe-class power at microcomputer prices.

Unix, beyond any question, is the operating system of choice for these ever more powerful microprocessor-based multiuser systems. It isn't that Unix is perfect. Rather, it is that Unix is good enough to deliver the superior price/performance ratios of microprocessor technology in minicomputer- and main-

Continued on page 82

Cullinane re-enters fray: 'I was never really gone'

BY NELL MARGOLIS
CW STAFF

WESTWOOD, Mass. — John J. Cullinane has accomplished a lot of things so far in his 53 years; retirement is not one of them.

Last week, less than six months after ceding the chairmanship of Cullinet Software, Inc. to his own chosen successor, David L. Chapman, and two months after rejoining Cullinet's board of directors, Cullinane was appointed vice-chairman of the company he founded.

"In many ways, I was never really gone," Cullinane said.

Market analysts agreed. Even during the months when Cullinane had no official company position other than that of consultant, "he was still there, more so than may have been apparent," said W. Christopher Mortensen, an analyst at Alex Brown & Sons, Inc. As a consultant, Cullinane maintained an office at company headquarters; as a board member, he occasionally accompanied executives on visits to customers.

"In many ways, this is just an official recognition that he's taking a more active role in sales and marketing and that he's never going to totally extricate himself from the company," Mortensen said.

"It takes more than one mind to run the business," Chapman said.

Seeing red

Cullinane's return to the board in December prompted speculation that the founder, who owns approximately 2.2 million shares of Cullinet stock, was less than satisfied with the continuing red ink on the company's balance sheet.

Continued on page 82

CDLA president dies

Benton's energy praised by leasing industry

BY JEAN S. BOZMAN
CW STAFF

WASHINGTON, D.C. — James F. Benton, president of the Computer Dealers and Lessors Association (CDLA), died last week of a heart attack at his suburban home here. An energetic advocate of the leasing industry and an avid tennis player, Benton, 57, died several hours after completing five sets of tennis last Sunday, the CDLA said. A funeral was held in McLean, Va., on Thursday.

CDLA's Benton

Benton was remembered last week by CDLA associates as a man of great energy, whether on Capitol Hill, where he lobbied for leasing industry issues, or on the tennis court, where he played Secretary of State George Shultz, *Washington Post* owner Katherine Graham and various congressmen and senators.

His accomplishments include improving the CDLA's relationship with IBM. CDLA members lease or sell about 30% of all IBM mainframes.

"Jim had a knack for getting things done," said Ken Bouldin, chief executive officer of Econocom USA, a Memphis leasing firm. "In our relationship with IBM, CDLA was another con-

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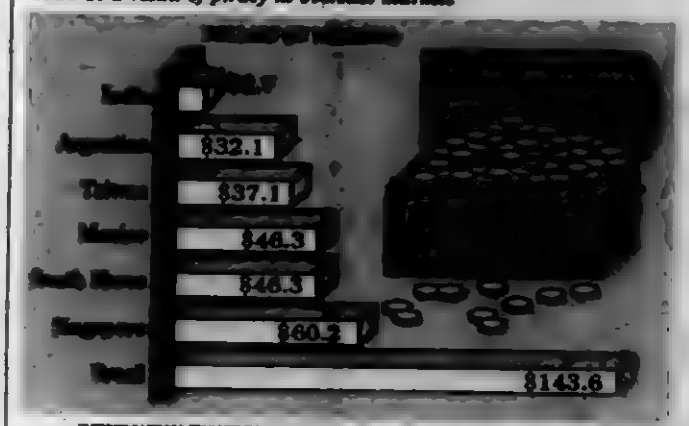
High-tech pirates said to reap billions

Plundered loot

U.S. software companies lost revenue estimated at $374 million in 1986 as a result of piracy in overseas markets



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BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — A recent study by the International Trade Commission (ITC) found that inadequate foreign protection of copyrights, trademarks and patents cost the U.S. computer and software industry $4.1 billion in 1986.

The ITC study, based on a survey of 47 computer firms and 52 software firms, cited the major offenders as Brazil, China, India, Indonesia, Japan, Mexico, Korea, Taiwan and Thailand.

The study is one of two reports issued late last month that estimate the high costs of piracy of U.S. computer, software and semiconductor designs. They are expected to bolster the industry's lobbying efforts for U.S. trade policies that encourage foreign nations to protect intellectual property rights.

The Reagan administration recently launched a campaign for a multinational agreement on intellectual property rights under the auspices of the General Agreement on Tariffs and Trade.

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Inside

- Electronics chip industries join to end dynamic RAM shortages. Page 80.
- Tandem takes $16M loss in shareholder suit settlement. Page 80.

Seeded by IBMers, Netlink grows in the shadow of SNA

BY ELISABETH HORWITT
CW STAFF

RALEIGH, N.C. — A small, feisty young third-party IBM Systems Network Architecture vendor has been flourishing here, literally in IBM's shadow.

Located just a few miles from IBM's Computer Products Division in nearby Research Triangle Park, Netlink, Inc.'s business is enhancing IBM SNA networks. "Some things, like multivendor connectivity, IBM is not going to address in serious ways," said Paul Wood, Netlink's founder and chairman.

For four years, Netlink's SNA gateways, hubs and concentrators have continued to provide customers with value-added capabilities that they still cannot obtain from IBM. This despite the computer giant's recent juggernaut of announcements aimed at filling the gaps in its communications architecture.

Netlink owes much of its ability to stay a step or two ahead of the latest IBM SNA update to a

Continued on page 81

Up & Coming: *Netlink*

[illegible]
Year founded: 1984
[illegible]
Employees: Approximately 100
[illegible]
Of note: Key positions held by former IBM employees with 10 or more years' experience in SNA-related products and strategies.

U.S. chip makers aim to fight unfair trade

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — U.S. semiconductor producers and their customers concluded a rare summit meeting recently, resolving to end shortages of memory chips and fight unfair trade practices by foreign producers.

The American Electronics Association and the Semiconductor Industry Association (SIA) issued a first-ever joint statement that emphasizes the interdependence of the two industries. Horace McDonnell, chairman of Perkin-Elmer Corp., likened the relationship to the food chain, as the electronics industry relys on a strong chip industry.

The nine-point statement discusses the need for an adequate supply of dynamic random-access memory chips and urges U.S. producers to reenter the dynamic-RAM market. It also encourages the U.S. government to ensure that Japan provides a fair allocation of Japanese 1M-byte dynamic RAMs to the U.S. market.

Chip users have reported shortages of dynamic RAMs, but U.S. producers are wary of investing in increased RAM production without protection against Japanese dumping and full access to world markets, officials said.

Jonathan E. Cornell, head of Harris Corp.'s semiconductor division, said that U.S. suppliers have begun to expand production of dynamic RAMs now that U.S. trade sanctions have stopped Japan from selling them below cost.

However, he said, "to provide adequate return to undertake these investments, [U.S. producers] need confidence that they will not be damaged by future predatory pricing." Thus, to stimulate investment in dynamic RAM production, the joint statement encourages long-term purchase agreements between chip suppliers and individual customers.

In a related development, the SIA warned that the U.S. trade sanctions against Japan may need to be revamped or increased if U.S. semiconductor firms do not obtain greater access to the Japanese market.

Despite substantial efforts by U.S. companies operating in Japan, only "limited progress has been made on the market access issue, said Cornell, chairman of the SIA's public policy committee.

INDUSTRY WEEK IN BRIEF

Tandem Computers, Inc. will take a $5 million charge against its earnings in the current quarter as a result of the settlement of a 1984 shareholder class action lawsuit. The suit stemmed from Tandem's 1982 compliance with the Securities and Exchange Commission (SEC), in which the SEC charged the vendor with inadequate accounting practices after Tandem restated its 1982 financial results.

The U.S. semiconductor market shifted into high gear last month as orders hit their highest level in more than three years and shipments showed strength, according to figures released by the Semiconductor Industry Association. February shipments totaled $992.5 million, a 6% increase over January's figure and a 20% rise over year-earlier shipments. Average monthly orders for the three-month period ended Feb. 29 totaled $1.07 billion.

Storage Technology Corp. unveiled a high-level shuffle with the announcement that Vice Chairman and Board of Directors Member Stephen Jacobs will leave at the end of next month.

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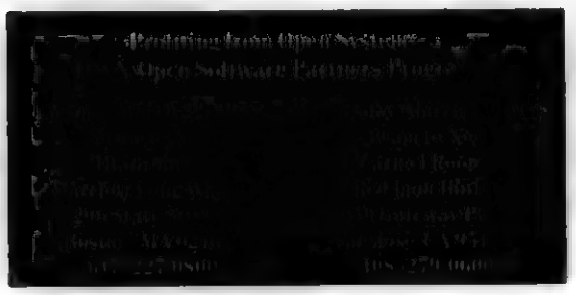

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Netlink

CONTINUED FROM PAGE 79

cadre of executives the company lured away from high positions of responsibility on IBM SNA projects in Raleigh. Wood himself spent 10 years designing and testing SNA networks at IBM Australia.

"We've attracted a lot of IBM SNA people because we are a small group that can offer them the flexibility to build products without the management and laboratory politics that go on in IBM, which tend to stifle some of the best guys," he said.

The company's products are now installed at major corporations such as Automatic Data Processing, Inc. (ADP), Westinghouse Electric Corp. and Aetna Life and Casualty Co.

Rave reviews

"People I have talked to have been very impressed with the caliber of their team, and I don't think anyone is doing quite what they are on the hardware side," said Clare Fleig, director of systems research for Los Altos, Calif., research firm International Technology Group.

Three years ago, when Netlink was just getting started, ADP decided to buy Netlink's flagship product, the 3703 Network Processor. By providing asynchronous connections between customers' personal computer-based payroll workstations and ADP's IBM hosts, the 3703 saved the financial service bureau from having to add more expensive synchronous ports or more IBM 3725 communications processors, according to ADP vice-president of support systems William Meilahn.

Netlink's Wood

"We picked Netlink because it had such a flexible box, whose capabilities were uniquely suited to our needs, at lower cost than anything else we had at the time," Meilahn said.

ADP's initial nervousness about going with a start-up was soothed by the quality of Netlink's equipment and support. ADP was also reassured by testimonials from overseas firms that had bought the 3703 from Systems Technology Pty. Ltd., Netlink's predecessor and current Australian subsidiary, founded by Wood in 1982. ADP was impressed by the number of former IBMers on staff, Meilahn said. ADP has worked extensively with Netlink's vice-president of planning, David McCormick, a former marketing and product development manager for IBM's communications processor line.

Netlink's strong in-house SNA expertise has helped ensure that its customers are not left stranded with obsolete connections to their IBM installations, Wood indicated. Now, Netlink is trying to sell its SNA products and experience to other vendors — in particular, local-area network vendors that need help linking their products to IBM SNA architectures, Wood said.

Netlink also is seeking partnerships with systems vendors that want to improve their SNA connections. During Netlink's last round of financing, Tandem Computers, Inc. invested an undisclosed amount and entered a joint development and resale agreement with the company.

Tandem's backing came at a critical time for Netlink, which had underestimated the amount of time and up-front capital it needed to get its products out the door, according to Fleig. While the market, the team and the products are there, Netlink still needs to become better organized in bringing products from the prototype stage to the market, she added.

CDLA president

CONTINUED FROM PAGE 79

tomer that was always asking them to do things," Bouldin said. "But IBM had great respect for Jim Benton, and for that reason, we were able to get their agreement on some very adversarial and controversial issues."

One recent victory was winning deferral on a 1987 IBM maintenance plan that would have affected leased computers. "He brought a lot of professionalism to our industry, and for that, he will be missed," said Ken Pontikes, president of Comdisco, Inc. in Rosemont, Ill., one of the largest U.S. leasing firms.

Benton used the same conversational skills to convince nay sayers as he presided over the merger of the Computer Lessors Association with the Computer Dealers Association in 1981. After that, Benton was the executive director of the CDLA, a post he held until 1986, when he became president.

"He was a political master," said Tom Martin, president of Computer Financial, Inc. in Hackensack, N.J. "He got 350 members with 350 different ideas and priorities to reach consensus positions on the issues and to take political action on them."

Benton entered the leasing industry as director of the Computer Lessors Association. He took the job in 1970 after friends asked his company, Janus Consultants, Inc., a New York executive search firm, to fill the position. Originally an IBM marketing executive, Benton left IBM in 1967 as national industry marketing manager in Armonk, N.Y., to become marketing vice-president for a New York manufacturing firm. He became president of the firm, Farrington Manufacturing Co., in 1969.

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Zachmann

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frame-class packages.

DOS-, and eventually OS/2-, based personal computer workstations can do many tasks previously reserved for larger systems. When networked and supplemented with network servers, they can do even more. However, for quite some time yet, it will be more traditionally configured multiuser systems that will offer the best options for large applications with large data bases, large computational requirements, large transaction volumes and large communications requirements.

Multiple microprocessor-based systems running Unix in one form or another will offer the most powerful alternatives to far more expensive minicomputer and mainframe systems for larger applications. They will thereby offer larger businesses some of the most attractive ways to take advantage of the lower costs microprocessor technology can provide.

It's so easy

Unlike workstation/server architectures, which are still very new and require time for organizations to learn to use effectively, multiuser Unix systems are very familiar to information systems professionals with a background in a mainframe or a minicomputer environment. It is much easier to go to designing and implementing applications under Unix than it is to master newer workstation/server architectures.

Who needs Unix? Well, the people who are responsible for the development and maintenance of major application systems in large organizations, for one. Unix may not be everything its wild-eyed proponents claim.

Unix is, however, probably the most important single delivery mechanism for major applications capability at microprocessor prices. That's going to make it pretty darn important for information systems professionals, whether or not they have taken much interest in it so far.

Zachmann is vice-president of research at International Data Corp.

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High-tech pirates

CONTINUED FROM PAGE 79

John Pickitt, president of the Computer and Business Equipment Manufacturers Association (CBEMA), said foreign piracy causes the loss of U.S. jobs and the loss of profits that could be used to develop new products and technologies.

ADAPSO, the computer software and services industry association, expressed hope that the ITC report will bring to light the severe economic damage caused by software piracy and will reinforce the urgency of addressing the issue.

Not a good year

A second study, conducted by lawyers and economists at Washington, D.C.-based law firm Dewey, Ballantine, Bushby, Palmer and Wood, arrived at the following estimates for 1986:

- U.S. software companies lost a total of $374 million in sales as a result of piracy in the seven countries studied: Argentina, Brazil, India, Mexico, South Korea, Singapore and Taiwan.
- Brazil was the largest pirate of computer software, costing the U.S. software industry estimated revenue of $143.6 million.
- Sales of pirated computer technology reached $466 million in Brazil and $514 million in Taiwan.
- U.S. semiconductor companies lost $9 million in revenues because of the piracy of chip designs in South Korea.

CBEMA said it is concerned that the U.S. is about to lose a valuable negotiating tool for pressuring Asian nations to protect intellectual property rights. On Jan. 29, the Reagan administration said it would withdraw the duty-free status of Asia's "four tigers": Hong Kong, South Korea, Singapore and Taiwan.

In the past, the administration has used that duty-free status as leverage to pressure the countries into passing copyright legislation.

Cullinane

CONTINUED FROM PAGE 79

Cullinet, legendary in the early 1980s for its high rise and fast flight, ended 29 consecutive growth quarters with a loss in first-quarter 1986 and has yet to make it back into the black. A return to profitability in the fourth quarter of the current fiscal year, ending April 30, is an oft-stated goal and, according to Chapman, a reasonable expectation.

The ex-chairman's vice-chairmanship is unlikely to quell such speculation.

"Obviously, some people will see it as a vote of no confidence in the Chapman administration," Mortenson said. He said he is not among that group.

"Our view is that Cullinet has been involved in a very long and complex comeback plan," Mortenson said. "We never expected it to be fast." Cullinet officially announced a series of strategic redirections, including an ambitious entry into the Digital Equipment Corp. market, in autumn 1986; the company has already realized a number of its "blueprint" goals and is slated to ship its DEC VAX-based relational data base system and tools late this month. "They've been on target; they've met expectations," Mortenson said. "It looks like Chapman has been doing what needs to be done."

PC management up for grabs

Competition hot as MIS pros vie with users for the prize positions

BY ALAN RADDING
SPECIAL TO CW

MIS professionals seeking personal computer management positions face stiff competition from non-technical professionals in end-user organizations as well as their peers.

Also, unlike other computer positions, the PC manager post is not associated with a single department.

Candidates must find where the jobs are buried in the corporation. Growth in PC management positions within traditional information centers is slowing, giving way to microcomputer managers within end-user departments. At the same time, MIS is attempting, in many instances, to reassert its authority over personal computing and lay claim to the PC management role.

In large corporations, "growth of the information centers has flattened out, but user departments are now hiring their own PC managers," says Julian Horwich, executive director of the Chicago Association for Microcomputer Professionals.

These trends, combined with a large talent pool of PC experts from the technical and end-user areas, is causing a great deal of confusion when PC management positions are advertised.

Confusion reigns

For example, a national accounting firm recently received 100 replies when it advertised two PC management positions. The responses spanned the experience range from highly technical professionals to novices. Still sorting through the resumes, the partner conducting the search does not want his company's name published for fear of being inundated with more applicants.

The requirements for the PC manager position vary greatly from company to company. At the accounting firm, the true PC manager is the partner in charge of microcomputing. The PC manager handles training, installation and support.

Job requirements vary

In the financial services industry, the PC manager at a large company may be the corporate peer of the MIS manager. At a large money center bank, the manager can be a full-fledged member of the management team with operational responsibility and budgeting authority for thousands of PCs and dozens of support staffers. The PC manager in a large bank, like his MIS counterpart, is involved in strategic planning, and it is not unheard of for them to compete against each other for information systems funds.

In general, PC management is evolving in two different directions: the information center and the applications developer, Horwich says.

The information center, the traditional setting for the PC manager, supports end users, provides training, installs systems, troubleshoots problems, plans purchasing and establishes hardware and software standards.

The PC manager of the classic information center typically ranks several levels below the MIS director in the corporate hierarchy.

On the applications developer side, the PC manager operates like a programmer analyst in an MIS department. The manager develops microcomputer applications to meet users' needs.

Both types of managerial positions require communications skills in addition to technical microcomputing knowledge. In both cases, the manager works closely with end users, says Jim Combs, managing director of the Boston offices of Source EDP, a job placement service.

Frequently the applications development position attracts people who come out of MIS with formal computer experience. Information center managers often come from nontechnical backgrounds such as teaching and administration.

General management?

Since PC managers are in close contact with general business users, some career advisors suggest that the position offers an opportunity to move into general management.

"They gain exposure to top management, but they can be boxed in if they are viewed as a techie," says Daniel Beckman, systems manager at Eliot Bank in Boston.

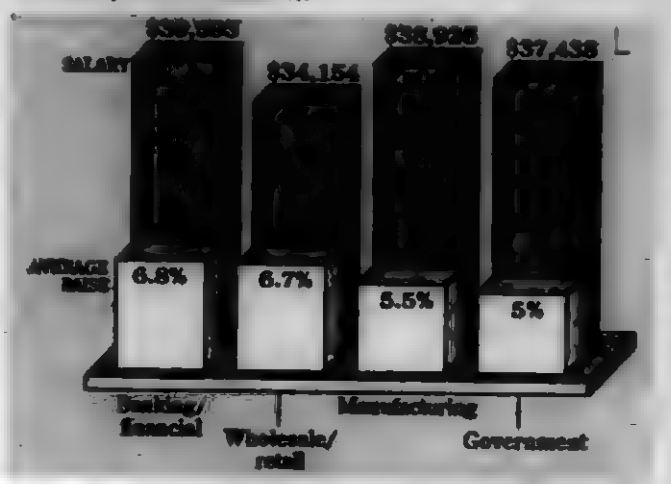
Eliot Bank is seeking a PC manager who will be a one-person department, but the bank is growing quickly and bringing more systems in-house, Beckman says. Under these circumstances, the position can evolve into one of greater responsibility.

Job opportunities for PC managers are expected to increase in the future. Corporate expenditures for PCs are expected to increase dramatically with the introduction of new hardware, software and networking, which requires technical administration and strategic planning.

Radding is a Boston-based author specializing in business and technology.

Where you can earn the most

1,500 MIS professionals rate PC managers' average annual salaries and raises for selected industries



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We have opportunities for on-line and database programmers and systems programmers for both in-house and consulting positions. Fee Paid. Please call or send resume to:

Keith Reichle, CPC
Systems Search, Inc.
203 Heritage Park
Lake Wylie, S.C. 29710
803/831-2120

(local to Charlotte, NC)

SYSTEMS ANALYST

Saint Mary's College has a position available for a Computer Systems Analyst. This position shares responsibility with the director of computer services for the analysis of system needs of administrative offices. Some programming required. Requires five years experience as programmer/analyst. Requires a Master degree in Computer Science/related field or additional experience as a systems analyst. Working knowledge of COBOL language. Database experience desirable. Experience in college information systems desirable. Saint Mary's College is a liberal arts college for women with an enrollment of over 1,800. Competitive salary with excellent benefits. Starting date on or before July 15, 1988. Send letter of application, resume and three letters of reference by March 25, 1988 to:

John L. Cash
Director of Computer Services
Saint Mary's College
Notre Dame, IN 46556

An Equal Opportunity Employer

Western Savings, a leader in the financial industry, is seeking qualified applicants for the following immediate openings:

CICS SYSTEMS PROGRAMMER

2 years minimum experience in installation, maintenance, tuning and debugging of MVS/XA operating system; VTAM and NCP expertise desirable.

SENIOR PROGRAMMER/ANALYST

Working knowledge of IBM 370 assembler and a minimum of 3-4 years experience. Will be working on an IBM 3090 with MVS, JES II, TSO, and SPF. VSAM and CICS background a plus.

EDP STAFF AUDITOR

Requires Bachelor's Degree in computer science, accounting, finance or business. Responsibilities include reviews of internal controls governing EDP operations and applications. Two years EDP audit with background in MVS or OS IBM environment. Knowledge of IBM mainframe environment and COBOL a must. SAS background desirable.

Western Savings offers a challenging and progressive environment, advancement opportunities and a comprehensive benefits package. Please send resume, with salary requirements, to Western Savings, 4001 N. 24th Street, Phoenix, AZ 85016 or call (602) 468-5810.

EOE/M/F/H/V

DATA PROCESSING OPPORTUNITIES

Landmark Land Company, Inc. is a leading commercial real estate developer with major financial services subsidiaries and national innovative country club projects including PGA West, Oak Tree Country Club, Palm Beach Polo and Country Club and many others throughout the United States.

Our computing environment consists of a Unisys A12 central processor location in New Orleans and a Unisys A5 remote processor in Palm Springs, California.

The preferred candidates will have three or more years experience in Unisys large systems with application exposure in areas of Meer thrift package, payroll and general accounting. Strong Cobol programming skills and thorough knowledge of CANDE, DMS II and COMS are essential.

If you are an ambitious Data Processing professional seeking an exceptional opportunity to work with a growing Information Services Team, we want to talk to you.

Send resume with salary requirements to:

Landmark Land Company, Inc.
233 Carondelet Street
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Attention: Employment manager

Landmark Land Company is an equal opportunity employer M/F/H/V

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Boston	Senior	35-40K
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We specialize in EDP Auditing and currently have opportunities throughout the U.S.

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Call Russ Bray, C.P.C.

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Programmer Analysts

Client companies in Texas and California are in urgent need of candidates with Tandem and/or System 36 RPG III experience. Excellent salary and benefits package. The company pays our fee and relocation expense. Send resume in complete confidence to:

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(313) 773-9220

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Dave Grinnell
Vice President & Ad Director
Source Services Corporation
Mountain View, CA

Dave Grinnell is Vice President and Advertising Director of Source Services Corporation, the parent company of Source Edp, the world's largest recruiting firm that specializes in the computer profession. Source Edp has been an advertiser in Computerworld — almost from inception of the publication. Here's why:

"With its fantastic pass-along circulation, Computerworld not only reaches executives in computer management, but programmers, systems analysts and other individual contributors that are in particular demand by our client firms. It helps us reach the heart of our candidate base efficiently."

"Not only does Computerworld reach our market, but it reaches a market that's actively interested in computing and fostering their career growth. Conservatively, over the years, we have helped many thousands of Computerworld readers find new positions within the computer profession; many times more than those readers of other technology or trade publications. How do we know? We have an elaborate tracking system that helps us verify from which media respondents see our ads. Typically, Computerworld generates over four times more respondents who eventually are placed in new positions by Source than the next nearest computer industry publication."

"Because we're national in scope, we need the coast-to-coast coverage and support that Computerworld offers our 75 office network. We've helped Computerworld readers find candidates or move from Houston to Rochester, NY. . . . from Seattle to Miami . . . you name it. That's something that local newspapers, local radio and other media we also use can't accomplish for us with as much direct success."

"In short, why do we depend on Computerworld? First, it's profitable reading for employers. Second, it's profitable reading for those seeking new employment. And third, through our services, it's also profitable reading for us. It's a 'win-win-win' situation for all."

Computerworld. We're helping employers, top professionals and people who help them get ahead get together. Every week. Just ask Dave.

For all the facts on how Computerworld can put you in touch with qualified personnel, call your local Computerworld Recruitment Advertising sales representative.

COMPUTERWORLD

BOSTON: 375 Cochituate Road, Box 9171,
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NEW YORK: Paramus Plaza I, 140 Route 17 North,
Paramus, NJ 07652, (201) 967-1350

WASHINGTON, D.C.: 3110 Fairview Park Drive, Suite 1040,
Falls Church, VA 22042, (703) 876-5100

CHICAGO: 2600 South River Road, Suite 304,
Des Plaines, IL 60018, (312) 827-4433

LOS ANGELES: 18004 Sky Park Circle, Suite 100,
Irvine, CA 92714, (714) 261-1230

SAN FRANCISCO: 18004 Sky Park Circle, Suite 100,
Irvine, CA 92714, (415) 322-3314

An IDG Communications Publication

"Simply put, Computerworld delivers just what we're looking for: top-quality job applicants."

Roger Fraumann
Staff Director
Lachman Associates, Inc.
Westmont, IL

Roger Fraumann is Staff Director for Lachman Associates, Inc. (LAI) of Westmont, Illinois. It is one of the largest privately held computer systems software consulting and development firms in the United States. And Roger is pleased to report that plans call for continuing the 50% annual growth every year for the next five years.

Roger is also pleased with Computerworld's contributions to the company's growth. When he needs qualified people to fill positions as the company grows, he turns to Computerworld.

"Computerworld is the only national publication that we routinely advertise in," says Roger. *"Last year we determined that we needed consistent national exposure. We chose Computerworld, which gave us exactly that. Simply put, Computerworld delivers just what we're looking for: top-quality job applicants."*

"We get about 20 responses per ad, and what really counts is that those responses yield at least two quality applicants per ad," Roger explains. *"Overall, a higher percentage of quality people respond to our ads in Computerworld, as opposed to what other publications deliver. Computerworld works for us."*

Plus, Roger has found added incentive to advertise in Computerworld: *"The same ad that runs nationally in Computerworld costs twice as much to run in the Chicago Tribune, a local newspaper,"* he notes.

Since LAI began advertising in Computerworld, the company has gone from 50 to 130 full-time professionals. *"We've been in Computerworld about every other week. And with the company's plans for growth for the next five years, we're going to continue advertising in Computerworld,"* says Roger.

Computerworld. We're helping employers and top professionals get together in the computer community. Every week. Just ask Roger.

For all the facts on how Computerworld can put you in touch with qualified personnel, call your local Computerworld Recruitment Advertising sales representative.

COMPUTERWORLD

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NEW YORK: Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652. (201) 967-1350

WASHINGTON, D.C.: 3110 Fairview Park Drive, Suite 1040, Falls Church, VA 22042. (703) 876-5100

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An IDG Communications Publication

"The bottom line is results. What I'm seeing, thanks to Computerworld, is beyond our expectations."

— Max Steiner
Director of Marketing
Kenda Systems, Inc.

Max Steiner remembers his days as a salesman, when he would make calls and, invariably, see a copy of *Computerworld* on the desks of his clients. That alone made an impression on Max.

Today, he is Director of Marketing for Kenda Systems, a software services firm with offices in New England, New York and Washington, DC, and specializing in placing contract engineers within the high-tech industry. Having grown by 400 percent annually for the last three years — and having placed several hundred professionals in less than three years, Kenda Systems is an acknowledged leader in the industry.

The impression that *Computerworld* has made on Max early on has been a lasting one. He directs Kenda's advertising. And he directs it to *Computerworld*.

"We are looking for national exposure. First, we want to make people aware of Kenda Systems and then increase the number of resumes sent to us. I believe that greater recognition will lead to greater interest — and understanding of what we can do for people.

"It only follows that we can best accomplish our goals by advertising with the industry leader — it answers all our needs. Computerworld *reaches the qualified software professionals we're looking for.*

"And we have the proof. We've seen as much as a 30 percent increase in resumes coming into our offices. Plus we're getting everything we hoped for: national recognition and responses from top people from all over the country. Clearly, we're quite pleased with the results.

"We're hearing from software engineers who are impressed with the fact that Kenda's in Computerworld. *The bottom line is results. What I'm seeing, thanks to* Computerworld, *is beyond our expectations."*

Computerworld. We're helping serious employers and qualified information systems, communications and PC professionals get together in the computer community. Every week. Just ask Max Steiner. For all the facts on how Computerworld can put you in touch with qualified personnel, call your local Computerworld Recruitment Advertising Sales representative today.

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An IDG Communications Publication

Senior Programmer

A dynamic growth oriented firm in the retail business and located in Hunterdon County is seeking a self-motivated professional with extensive design and programming experience in online environment. Minimum qualifications for this challenging position should include:

- Self-motivated professional.
- 5 plus years programming experience with COBOL
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- Solid experience in:
  - VSAM
  - DOS/VSE environment
  - Other VSE utility skills
- Experience in SQL/DS helpful
- Background in retail environment is preferred

If you meet the above requirements and are interested in a challenging opportunity, kindly submit your resume and salary history to:

Quick Chek Food Stores
Human Resources Department
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Staffware Consulting is the largest data processing professional services firm in Houston, Texas. Houston's economy is revitalizing and because of our extensive and diverse client base, we now have multiple long term contract positions in the following skill sets:

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Interested principals should call or write:

STAFFWARE Inc.
1111 North Loop West
Houston, Texas 77008
(713) 869-6232

1000 DP Opportunities

Corporate Personnel Consultants

SOFTWARE OPPORTUNITIES

EDI SYSTEMS ANALYST

Milwaukee-based company seeks an experienced Lead Analyst to develop new EDI-based services for our expanding client base. Responsibilities include defining product requirements, identifying alternative solutions, developing conceptual designs, creating data models and process specifications, establishing industry-specific EDI standards and coordinating development using structured techniques in a team environment. A minimum of five years experience plus strong oral and written communications skills a must. Familiarity with EDI translation software and store-and-forward systems a plus.

Reply to CW-88088
Computerworld
Box 9171
Framingham, MA 01701-9171

GREATER BOSTON AREA
SYS-36 P/A'S

Expanding sw vendor seeks tech talented pro's for RPG-III apps. devel. & product enhance. proja. Prior fin'l. apps. or vendor exp. desirable. Dynamic environ. w/exceptional tech challenge & desirable coastal loc. Salaries to $40,000. Call the Data Processing Division (in confidence), **ROBERT HALF OF BOSTON, INC.**, 100 Summer Street, Boston, MA 02110. Tel. 617-423-1200. Personnel Consultants. Client company assumes all fees.

CAREER OPPORTUNITY FOR A SENIOR SCIENTIFIC PROGRAMMER/ ANALYST

The Sterling Research Group, the worldwide pharmaceutical research and development organization of Sterling Drug Inc., announces an opening for a Sr. Scientific Programmer/Analyst in the Computer System Development group at Sterling-Winthrop Research Institute.

The position involves all phases of systems development support for the Sterling-Winthrop Research Group Drug Regulatory Affairs and Research Planning and Administration groups. This work includes the analysis, design, development, implementation and documentation of systems.

Candidates should have a BS degree in a scientific or engineering discipline with a minimum of 3 years systems development experience. Specific experience should include development of products on IBM hardware. Knowledge of fourth generation computing languages and text management software is desirable. Good communication skills, both oral and written, are required.

Sterling-Winthrop Research Institute offers an attractive salary and benefits package with opportunity for professional growth. We are located near Albany, NY which is a center for summer and winter recreational activities.

Send resume in confidence to:

Committed To Scientific Excellence

John P. Harvey,
Employee Relations Administrator

STERLING·WINTHROP RESEARCH INSTITUTE

Sterling Research Group
A Division of Sterling Drug Inc.
Columbia Turnpike, Rensselaer, NY 12144
Equal Opportunity Employer M/F/H

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Cullinet, a leader in information management software, has a strategy for success: our 3x3 architecture integrates three types of software products -- database management systems, development tools, and application software -- across three computing platforms -- corporate mainframes, departmental systems and personal computers.

Our other strategy for success lies in our most valuable corporate asset -- our people. To ensure that they enjoy the most challenging careers, we support them with an environment that is highly interactive, creative and open -- an environment that recognizes individual achievement as corporate achievement.

Discover a career blueprint for success -- access Cullinet, today.

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- VAX Databases
- Human Resources
- Distribution
- Manufacturing: Discrete or Repetitive
- Banking
- Financial
- IBM Databases

SYSTEMS CONSULTANTS

We are seeking experienced candidates to join our sales team in providing pre-sales support for our software products. These positions require strong people and presentation skills, the ability to work independently as well as in a team environment and possess conceptual problem solving capabilities. You will be responsible for demonstrating products and assisting in closing business within multi-level organizations. Prior software vendor experience a definite plus. Additional requirements: 3-5+ years' experience in an IBM mainframe and/or DEC VAX environment, a working knowledge of operating systems and in depth experience in one of the following areas:

- Database
- Banking
- Financial
- Manufacturing
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Cullinet offers an excellent compensation and benefits program. For prompt, confidential consideration, please contact your nearest Cullinet Software, Inc., Regional Human Resources Office:

Falls Church, VA (703) 820-2000	**Chicago, IL** (312) 953-8450	**Westwood, MA** (617) 329-7700	**Dallas, TX** (214) 386-8802
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- SQL
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- SAS
- PL-1/DEC/VAX
- IMS DB/DC/PL-1
- DEC/VAX, ORACLE
- TANDEM (PATHWAY COBOL)
- TECHNICAL WRITING
- UNIX/XENIX/DOS/PASCAL/"C"
- INFORMIX 3.3/INFY DB
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COM-PRO offers a competitive salary and comprehensive benefits package with an opportunity to work in a positive and progressive atmosphere. For prompt consideration, call or send resume to the COM-PRO regional office nearest you.

SOUTHEAST REGION
Human Resources Dept. 314
COM-PRO
5110 Eisenhower Blvd.
Suite 120
Tampa, FL 33634
(813) [redacted]

MAI
COM-PRO

NORTHEAST REGION
Human Resources Dept. 314
COM-PRO
140 Allens Creek
Suite 104
Rochester, NY 14618
(716) [redacted]

MODEL 204 SPECIALISTS

ROADWAY EXPRESS, INC., the recognized leader in the transportation industry, is seeking talented candidates for the positions below. Individuals will be working with Model 204 under MVS/XA environment with high performance, on-line database applications. All positions are at the company headquarters in Akron, Ohio.

Database Administrator

Preferred candidate will have three or more years' experience using Model 204. Duties will include system maintenance, administration, file management, and technical support.

Quality Assurance (Systems) Analyst

Preferred candidate will have a strong background in the design and analysis of on-line, transaction driven systems. Knowledge of fundamental design principles with experience using CICS, IMS/DB/DC, IDMS, ADABAS or Model 204 necessary. Duties will include standards development and usage, review of systems design, and staff training.

Programmer/Analyst

Preferred candidate will have a working knowledge of Model 204 User Language. Duties will include building tools and utilities in an on-line environment.

CASH COMPENSATION includes excellent starting salary and incentive pay after six months of service. Fringes include stock plans and insurance.

TO BE CONSIDERED for these expansion positions, please send your resume, transcripts, and salary requirements to the address below.

Department CWM
Supervisor — Personnel
ROADWAY EXPRESS, INC.
P.O. Box 471
Akron, Ohio 44309-0471

ROADWAY

An Affirmative Action/Equal Opportunity Employer. Qualified Minority And Female Candidates Are Encouraged To Apply.

APPLICATIONS DEVELOPMENT OPPORTUNITIES

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Let's examine our state-of-the-art technical environment first. Along with wide use of personal computers, we're operating large IBM mainframe computers. Our CICS on-line environment has been growing at the rate of over 75% per year. We're operating under MVS/XA and VM/CMS utilizing an SNA/ SDLC network consisting of over 2,000 terminals and printers. Our programming environment consists of COBOL, CICS, 4 GL's, and a relational database management system.

Now, about personal lifestyle. In the beautiful Carolinas, your leisure time can take place in the mountains or on the seashore—or in many great areas in between. Year-round, we enjoy a mild but seasonal climate and a wide variety of recreational and cultural events. The area has a moderate cost-of-living, excellent schools and fine housing.

We have a significant backlog of technical and application development projects. We are seeking

SYSTEMS ANALYSTS

5-plus years experience in a development environment. Highly desired experience would include: Relational data design; Structured analysis techniques; and On-line real-time systems.

We offer competitive salaries, excellent benefits, and advancement opportunities. If interested in becoming part of our important team of professionals, send resume with salary requirements to: **Box CW-B5023, Computerworld, P.O. Box 9171, Framingham, MA 01701-9171. An Equal Opportunity/Affirmative Action Employer.**

COMPUTER ENGINEER: Will design, modify, develop, and suggest alternative methods to existing finishing monitoring systems software under a VAX network. Will take into consideration the interrelationship of software and hardware to develop troubleless finishing automating systems to control robot faults and motor overloads and develop preventive maintenance procedures for new automated systems. Will enhance computer automated systems as required and suggest modifications in purchase of new hardware and software. Will make evaluations depending upon the function requirements of such systems, taking into consideration the compatibility of finishing systems and coating materials. Requires M.S. degree in Electrical Engineering with a major field of study in Computer Science. Education to include one course in Robotic Control Systems, Computer Networks, Computer Hardware, and Computer & Control Operating Systems. Education to also include 1 year research in signal processing. Hours: 8:30 am-5:00 pm 40 hrs per/wk at $30,210.00 per/yr salary. Please send resume to: Wisconsin Job Service, Attn: Jan Thomas, telephone no. (414) 638-3346, 618 6th St. Racine, Wisconsin 53402, Job Order #1288944, An Employer Paid Ad.

PROJECT MANAGER - R&D - M.S. Electrical Engineering. Direct, coordinate team of engrs. providing technical consulting/support to customers integrating HP office software products. Establish proj. objectives, modify. Provide technical input, review of strategies. Responsible for monthly proj. status reports. Interview, recruit, select, train technical personnel. Submit performance evaluations, salary reviews. Designate assignments. Establish time/budgetary limitations. Confer w/proj. personnel on technical problems. Other special requirements: Proven ability to solve difficult networking designs & implementations. Exper. supervising/directing engrs. providing customer support. Knowledge of office productivity dtr. software products & HP3000 computer systems. Demonstrated decision-making capabilities both technical/business. Proven ability to communicate w/variety of people, supervise technical people. Minimum M.S. in Electrical Engineering and 4 yrs Software Engineer exper. Supervise 5 employees. 40 hr wk.; Salary $83,000/year - application by resume to Colorado Department of Labor and Employment, 600 Grant St. #900, Denver, CO 80203-3528. Refer to Order No. CO0991340.

TANDEM

Omni Resources is an EDP consulting firm and licensed employment agency. We have long-term consulting assignments and full-time employment opportunities, available nationwide.

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For immediate consideration, please send your resume to: Don Myles - CW314

OMNI RESOURCES, INC.
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Suite 207
Milwaukee, WI 53217
(414) 332-5262
1-800-[redacted]

PROCESS CONTROL ENGINEER: Perform the analysis of process automation and material movement in a semi conductor factory. Must have masters degree in computer science and 1 year experience in position or 1 year related occupation as industrial engineer semi conductor factory. Prior work experience must have included use of semi conductor (IC) Assembly and testing equipment and research in the automation of semi conductor assembly and testing through facilities analysis and production control studies. Candidate must have knowledge and experience with academic or industrial research in computer or process control language design, UNIX and "C". $32,000 per year. Job site Sunnyvale, CA. Send ad and resume to: Job #H00888, P.O. Box 9580, Sacramento, CA 95820-8580. Not later than 3/28/88.

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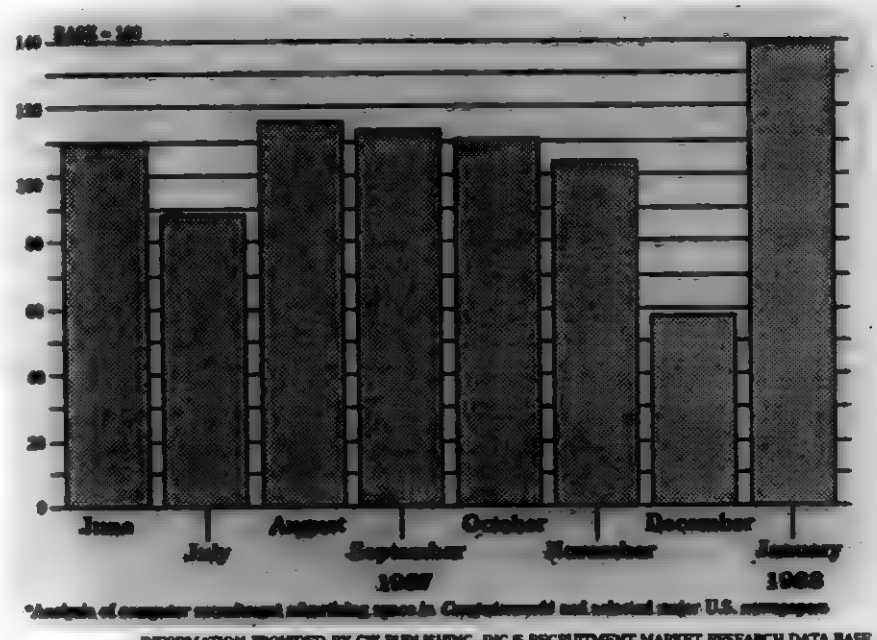
CAREER INDEX

Computer recruitment advertising index*



*Analysis of computer recruitment advertising space in *Computerworld* and selected major U.S. newspapers

INFORMATION PROVIDED BY CW PUBLISHING, INC.'S RECRUITMENT MARKET RESEARCH DATA BASE

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MARKETPLACE

Big Blue's gray market ethics

IBM unofficially declares end of AT Model 339 production

BY ELIZABETH LOZANO
BOSTON COMPUTER EXCHANGE CORP.

The secondary market experienced steady trading during the first week of the month, with IBM Personal Computer AT Model 339s, Hewlett-Packard Co. Laserjets and Apple Computer, Inc. Imagewriters dominating the Big Board.

The recurring issues of industry ethics seem to have had little effect on end users' purchasing decisions.

The picture was rather gray for IBM throughout the week. At the same time the company was busy mandating "prestigious locations," face-to-face transactions and authorized sales offices for legitimate dealers, an IBM division called the Boston Computer Exchange in search of 300 new PC AT Model 399s.

When the broker informed the IBM representative that the transaction was an impossibility because, in his words, "that's a gray market," the IBM employee clarified his request by saying, "I'll take them new or used."

End of the line?

Now that we have received an unofficial confirmation of the end of AT Model 339 production, it is time to ask why IBM, an experienced buyer, had no problem trying to consummate a purchase over the phone with an unauthorized source.

Ironically, the Model 339 closed down in used trading during the week, as rumors of large quantities about to be dumped on the market soured dealers' expectations. The highly desired model fell $50, to $3,350. In contrast, the PC AT Model 099 closed even, at $2,350, as steady demand by end users flavored trading.

IBM PC XT trading volume picked up during the week ending March 4, as supply conditions improved. The XT Model 089 held steady at $1,750, while the XT Model 086 dropped marginally, closing at $1,300. The 256K-byte PC Model 076 closed even at $825, experiencing solid conditions.

Business as usual

In comparison, things were quiet on the Compaq Computer Corp. front. The first week of March produced nothing but business as usual for end users and dealers alike. Compaq's luggable Portable I closed even at $800. The machine that brought transportable computing to users' minds — and Compaq into the money — continues to trade as a standard commodity.

Later Compaq Portable models did not fare as well, illustrating the growing market force of truly portable machines. The Portable II closed down, at $1,575, while the Portable III "lunch box" brought a price of $2,750.

> THE MACHINE that brought transportable computing to users' minds — and Compaq into the money — continues to trade as a standard commodity.

Compaq's Deskpro models performed well all week. The Deskpro 286, complete with a monochrome monitor and a 20M-byte hard drive, closed up, at $2,350.

Used Deskpro 386 models continue to be in short supply, and the 40M-byte, 16-MHz model closed at $4,275 during the week ending March 4.

Apple Macintosh users were out in full force looking for deals all week. A large number of savvy buyers, coupled with steady supply conditions, made for a consistent market.

Warning not heeded

Sales of new Macintosh units continue to be heavily discounted, holding used prices even. Announcements of harsh punishment for gray market activities by the manufacturer seem to have had little or no effect on the gray market to date.

The state-of-the-art Macintosh II held its value of $4,000, while the Mac SE closed down $25, at $1,850. The Macintosh Plus closed even, at $1,250, despite a slight decrease in trading volume. The Macintosh 512E and Mac 512 traded even, at $975 and $825, respectively.

The Boston Computer Exchange can be reached at 800-BOCOEXX or 617-542-4414 in Massachusetts.

The BoCoEx Index

Closing prices report for the week ending March 4, 1988

	Closing price	Recent high	Recent low
IBM PC Model 076	$825	$900	$600
XT Model 086	$1,300	$1,425	$800
XT Model 089	$1,750	$1,875	$1,000
AT Model 099	$2,350	$2,425	$1,950
AT Model 339	$3,350	$3,600	$2,400
Compaq Portable I	$800	$925	$650
Portable II	$1,575	$1,900	$1,475
Portable III	$2,750	$3,000	$2,175
Plus	$1,350	$1,400	$975
Deskpro 286	$2,350	$2,475	$2,000
Deskpro 386	$4,275	$4,575	$3,600
Apple Macintosh 512	$825	$900	$650
512E	$975	$1,075	$800
Plus	$1,250	$1,350	$950
SE	$1,850	$2,100	$1,600
II	$4,000	$4,200	$3,500
DEC Rainbow 100+	$750	$900	$600
Hewlett-Packard Laserjet	$875	$1,000	$650
Toshiba T1100+	$1,100	$1,200	$900

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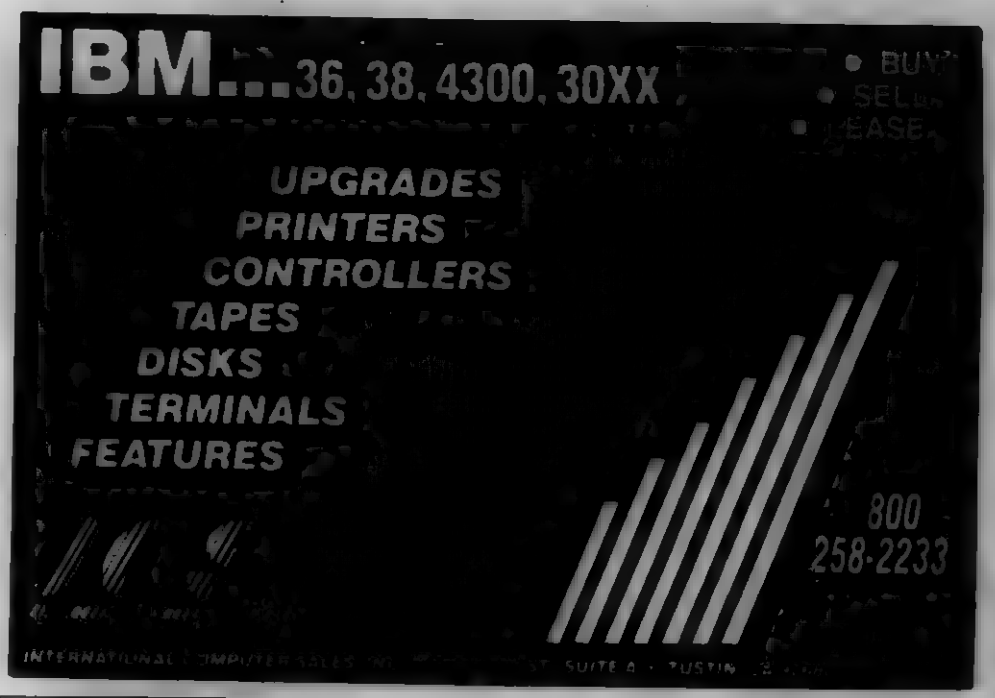

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Training

Dual role in training managers

BY ARVIND SHAH
and LEILANI ALLEN
SPECIAL TO CW

Often seen as a training facility for clerical or professional end users, the information center should also play a significant role in educating management in topics beyond the traditional areas.

But to do so, management training sessions must be particularly well planned to accomplish twin objectives: educating management and selling the value of the information center at the same time.

The success of the center depends on management commitment. Managers must be aware of the center's mission, objectives and functions. Managers at all levels must understand and support center policies, standards and procedures, especially those governing the selection and acquisition of hardware and software.

At the same time, managers must be trained in the use of technology. The type of training depends upon how extensively the managers will be using personal computers or terminals.

Selecting the appropriate method of training can determine the success of the effort. One-on-one tutorials are especially good because managers usually are reluctant to attend formal courses that make heavy demands upon their time. Managers also tend to ask a lot of questions that a "canned" training course cannot handle. They also do not like being in sessions with their subordinates.

To avoid encountering their staffs in training sessions that deal with basic skills, some mangers prefer attending off-site sessions with their peers from other companies. These sessions are often presented by the internal information center staff.

Scheduling off-site training for executives from different companies should not be viewed as detrimental to the internal information center. Instead, the training can be seen as an opportunity to make more use of existing resources and enhance the reputation of the center's staff.

Besides introducing managers to the standard subjects of application selection and PC use, the training should include, preferably at the end, an overview of what the information center is all about and identify it as the source for future help. This session should be delivered by the information center staff.

The orientation should sell managers on why standards are necessary, rather than simply telling them the requirements. Managers should be told if they will eventually be charged for center services.

The orientation should not be an intense event. Refreshments might be served to give managers a good feeling about the information center.

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May 9	Printers	April 22
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June 20	The SNA Market	June 3
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July 25	Productivity Software	July 8
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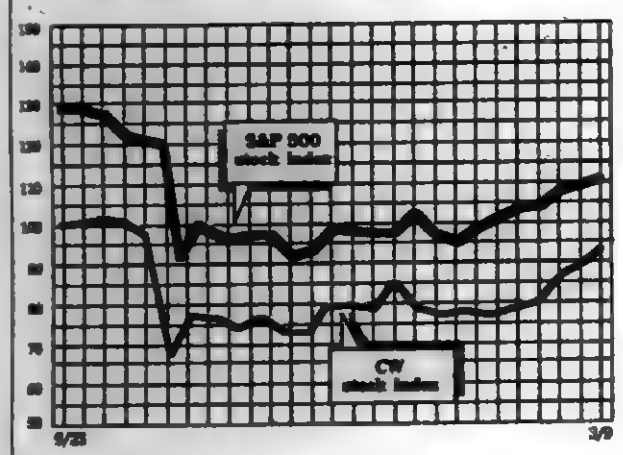

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Computer Systems	101.4	103.9
Software & DP Services	101.6	107.4
Semiconductors	64.0	68.3
Peripherals & Subsystems	87.3	93.2
Leasing Companies	121.9	128.1
Composite Index	90.2	94.5
S&P 500 Index	110.8	111.2

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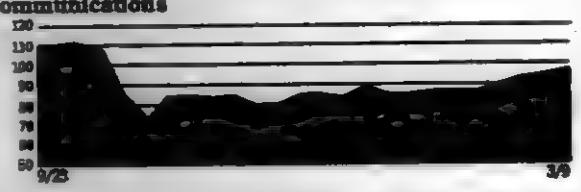

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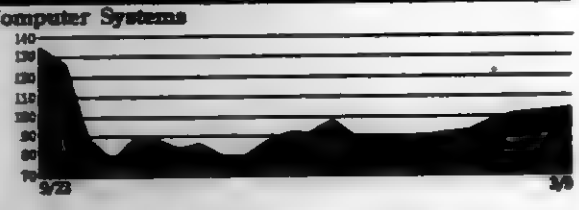

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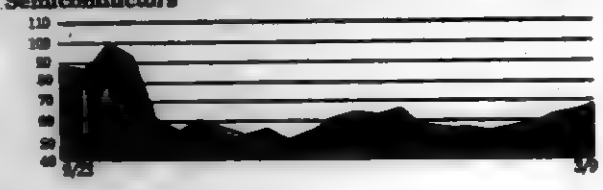

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CLOSING PRICES WEDNESDAY, MARCH 9, 1988

EXCH		52-WEEK RANGE (1)		PRICE CLOSE MARCH 9 1988	WEEK NET CHANGE	WEEK PCT. CHANGE
	Communications and Network Services					
N	AMERICAN INFO TECHS CORP	100	74	91.25	-3.4	-3.6
O	ANDREW CORP	19	11	15.25	0.0	0.0
O	ARTEL COMM CORP	4	2	1.75	-0.1	-3.5
N	AT&T	36	20	28.50	-0.9	-3.0
O	AVANT GARDE COMP INC	6	2	1.88	-0.1	-3.3
O	AVANTEK INC	18	6	8.00	0.8	10.3
O	AYDIN CORP	38	16	22.38	-0.3	-1.1
N	BELL ATLANTIC CORP	80	61	68.88	-3.1	-4.3
N	BELLSOUTH CORP	44	29	38.13	-1.6	-4.0
O	COMPRESSION LABS INC	7	2	3.13	0.0	0.0
O	COMPUTER NETWORK TECH	6	2	1.69	0.0	0.0
O	CONTEL CORP	45	35	34.80	0.4	1.1
O	DATA SWITCH CORP	9	4	8.38	0.6	8.1
N	DIGITAL COMM ASSOC	48	20	35.38	3.3	10.1
O	DYNATECH CORP	42	14	22.00	0.5	2.3
O	FIBRONICS INTERNATIONAL INC	10	2	4.38	0.3	6.3
O	GANDALF TECHNOLOGIES	11	5	7.25	0.8	11.5
O	GENERAL DATACOMM INDS	14	3	4.38	0.5	12.9
N	GTE CORP	46	29	38.13	-0.8	-1.9
O	INFOTRON SYS CORP	12	5	9.00	0.8	9.1
N	ITT CORP	66	42	46.88	-1.5	-3.1
O	M A COM INC	16	7	10.13	-0.4	-3.8
O	MCI COMMUNICATIONS CORP	12	6	11.13	-0.3	-2.2
O	MICOM SYS INC	17	7	12.50	1.1	9.9
O	NETWORK SYS CORP	18	7	9.75	0.6	6.8
N	NORTHERN TELECOM LTD	24	14	18.63	0.5	2.8
N	NOVELL INC	30	12	22.25	2.4	11.9
N	NYNEX CORP	78	56	67.00	-3.4	-4.8
N	PACIFIC TELESIS GROUP	34	8	28.25	-0.5	-1.7
O	PARADYNE CORP	9	4	5.50	-0.4	-6.4
O	PENRIL CORP	6	1	4.25	0.0	0.0
N	PLESSEY PLC	41	29	31.00	0.0	0.0
O	SCIENTIFIC ATLANTA INC	20	8	15.00	1.0	7.1
N	SOUTHWESTERN BELL CORP	48	22	36.88	-1.1	-3.0
N	3 COM CORP	28	12	23.38	2.4	11.3
O	TIMEPLEX INC	41	17	32.25	0.0	0.0
O	UNGERMANN BASS INC	16	5	12.25	0.0	0.0
N	U S WEST INC	60	43	58.88	-1.3	-2.3
	Computer Systems					
O	ALLIANT COMPUTER SYS	37	8	8.28	1.3	17.9
O	ALPHA MICROSYSTEMS	6	3	4.25	0.1	2.0
O	ALTOS COMPUTER SYS	16	9	12.25	0.8	6.5
N	AMDAHL CORP	50	19	36.38	2.0	5.8
O	APOLLO COMPUTER INC	25	9	18.25	0.0	0.0
N	APPLE COMPUTER INC	60	28	48.75	2.0	4.5
O	BOLT BERANEK & NEWMAN	28	12	15.00	-0.3	-1.8
O	BRITTON LEE INC	5	1	2.13	0.8	36.0
N	COMPAQ COMPUTER CORP	78	36	55.13	4.8	9.4
O	COMPUTER AUTOMATION INC	17	5	12.50	-0.4	-2.9
O	COMPUTER CONSOLES INC	11	2	5.00	-0.1	-2.4
O	CONCURRENT COMP CORP	24	11	17.25	-0.8	-4.2
O	CONTROL DATA CORP DEL	38	18	28.00	1.9	7.2
O	CONVERGENT TECH	11	3	4.06	0.4	12.1
O	CONVEX COMPUTER CORP	22	6	10.00	1.4	15.9
O	CRAY RESH INC	136	47	86.38	1.5	1.8
O	DAISY SYS CORP	12	6	8.88	1.4	18.3
N	DATA GEN CORP	37	16	28.50	-0.8	-2.8
O	DATAPOINT CORP	9	3	4.00	-0.1	-3.0
N	DIGITAL EQUIP CORP	200	110	130.50	0.3	0.2
O	FLOATING POINT SYS INC	15	3	4.38	0.1	2.9
N	GOULD INC	36	8	13.00	0.8	7.2
N	HARRIS CORP	43	22	29.00	-0.8	-2.5
N	HEWLETT PACKARD CO	74	38	64.50	0.1	0.2
N	HONEYWELL INC	91	48	88.38	1.4	2.1
N	IBM	178	102	116.63	0.6	0.5
O	INFORMATION INTL INC	17	9	12.50	0.5	3.8
O	IPL SYS INC	3	1	1.88	-0.6	-25.0
O	MASS COMPUTER CORP	14	5	5.25	-1.6	-22.2
N	MATSUSHITA ELEC INDL LTD	201	89	200.75	13.6	7.3
O	MEGADATA CORP	6	3	3.63	0.0	0.0
O	MENTOR GRAPHICS CORP	30	14	28.00	0.3	0.8
N	NBI INC	14	4	6.38	0.0	0.0
N	NCR CORP	87	50	66.88	1.8	2.9
O	PRIME COMPUTER INC	31	12	17.38	-1.3	-6.7
O	PYRAMID TECHNOLOGY	12	5	11.13	0.8	8.0
O	STRATUS COMPUTER	41	16	38.00	1.0	2.7
O	SUN MICROSYSTEM INC	46	14	35.00	1.3	3.7
O	SYMBOLICS INC	6	1	1.38	-0.2	-10.2
N	TANDEM COMPUTERS INC	38	17	22.13	1.4	6.8
N	TANDY CORP	57	38	40.25	-0.4	-0.9
O	ULTIMATE CORP	37	13	15.38	0.6	4.2
N	UNISYS CORP	48	24	36.50	-0.4	-1.0
A	WANG LABS INC	19	10	16.38	1.5	10.1
	Software & DP Services					
O	ADVANCED COMP TECH	6	1	2.00	-0.1	-4.9
O	AGS COMPUTERS INC	20	11	17.50	0.2	1.4
O	AMERICAN MGMT SYS INC	30	9	17.25	0.4	2.2
O	AMERICAN SOFTWARE INC	22	6	13.75	1.8	14.6
O	ANACOMP INC	11	4	9.00	1.3	16.1
O	ANALYSTS INTL CORP	10	4	7.50	0.2	3.4
O	ASHTON TATE	33	13	30.00	1.5	5.3
O	ASK COMPUTER SYS INC	18	6	14.75	2.5	20.4
O	AUTODESK INC	34	12	25.25	2.3	9.8
O	AUTO DATA PROCESSING	58	16	47.00	1.0	2.2
O	BOOLE & BABBAGE INC	12	5	8.00	-0.3	-3.6
O	COMPUTER ASSOC INTL INC	37	18	31.75	2.5	8.6
O	COMPUTER HORIZONS CORP	15	7	9.88	2.4	31.9
O	COMPUTER SCIENCES CORP	73	42	50.75	-0.4	-0.7
O	COMPUTER TASK GROUP INC	17	9	11.00	1.0	10.0
O	COMSHARE INC	28	12	18.00	3.5	24.1
O	CULLINET SOFTWARE INC	14	4	8.00	2.0	33.3
O	CYCARE SYS INC	10	6	7.88	0.0	0.0
O	DUQUESNE SYS INC	33	10	20.75	1.0	5.1
O	DATA ARCHITECTS INC	17	7	13.63	0.8	6.0
N	GENERAL MTRS (CLS E)	51	30	43.63	1.3	4.5
O	HOGAN SYS INC	17	5	5.88	0.8	17.5
O	INFORMIX CORP	31	12	20.38	0.3	1.3
O	INTELLICORP INC	11	2	3.63	0.8	28.1
O	KEANE INC	10	6	8.00	0.5	6.7
O	LOTUS DEV CORP	46	19	32.75	2.3	7.4
O	MANAGEMENT SCI AMER	20	4	7.38	-0.1	-1.7
O	MICRO FRO INTL CORP	6	3	3.63	-0.1	-2.7
O	MICROSOFT CORP	79	37	64.00	4.5	7.6
O	MORINO ASSOCIATES INC	24	7	16	0.5	4.0
O	NATIONAL DATA CORP	38	19	27.25	0.5	2.8
O	ON LINE SOFTWARE INTL INC	22	8	12.75	1.5	13.3
O	ORACLE SYS CORP	19	8	15.75	1.5	11.7
N	PANSOPHIC SYS INC	38	11	18.13	2.4	15.1
O	POLICY MGMT SYS CORP	30	16	25.50	2.0	8.5
O	PROGRAMMING & SYS INC	14	7	12.25	-0.5	-3.9
N	REYNOLDS & REYNOLDS CO	39	14	22.50	1.3	6.2
O	SEI CORP	18	10	16.38	-0.1	-0.8
O	SHARED MED SYS CORP	37	19	25.25	-0.4	-1.5
O	SOFTWARE AG SYSTEMS INC	15	7	11.25	-1.5	-11.8
O	SOFTWARE PUBG CORP	17	5	14.00	0.5	3.7
A	STERLING SOFTWARE INC	14	6	8.38	0.0	0.0
O	SUNGARD DATA SYS INC	21	10	18.75	-0.3	-1.5
O	SYSTEMATICS INC	30	18	27.50	0.0	0.0
N	SYS. SOFT INC.	24	7	16	0.5	4.8
O	VMI SOFTWARE INC	45	7	12.13	0.1	1.0
	Semiconductors					
N	ADV MICRO DEVICES INC	28	8	13.25	0.9	7.1
N	ANALOG DEVICES INC	24	8	14.75	1.4	10.3
O	ANALOGIC CORP	13	5	7.25	0.3	3.6
O	INTEL CORP	42	19	31.63	2.5	8.1
O	LSI LOGIC CORP	17	7	10.75	1.0	10.3
N	MOTOROLA INC	74	35	51.00	2.5	5.2
O	NATL SEMICONDUCTOR	22	10	12.38	0.3	2.1
N	TEXAS INSTRS INC	80	38	55.00	0.9	1.8
A	WESTERN DIGITAL CORP	18	11	15.50	0.6	4.2
	Peripherals					
O	ALLOY COMP.	13	2	5.00	1.4	37.9
O	AM INTL INC	9	3	4.00	-0.1	-3.0
O	AST RESH INC	21	6	10.88	1.1	11.5
O	AUTO TROL TECH CORP	9	3	9.75	0.5	5.3
O	BANCTEC INC	16	6	7.75	-0.1	-1.8
O	CIPHER DATA PRODS INC	16	4	6.88	0.8	7.8
O	COGNITRONICS CORP	8	2	3.13	0.3	8.7
O	COMPUGRAPHIC CORP	26	19	23.25	1.0	4.5
O	COMPUTERVISION CORP	21	7	7.00	0.0	0.0
O	DATAPRODUCTS CORP	24	7	8.50	0.6	7.6
O	DATARAM CORP	9	5	6.25	0.0	0.0
O	DECISION INDS CORP	13	4	10.75	0.1	1.2
N	EASTMAN KODAK CO	71	40	42.88	-1.1	-2.8
N	E M C CORP MASS	28	10	18.38	2.6	24.6
O	EMULEX CORP	9	4	8.00	0.3	3.2
O	EVANS & SUTHERLAND	40	18	21.25	1.3	6.3
O	IDOT CORP	13	5	5.25	0.3	6.0
O	INTERLEAF INC	24	10	10.50	1.9	10.6
O	IOMEGA CORP	6	1	2.88	-0.1	-2.1
O	LEE DATA CORP	9	3	3.75	-0.1	-3.2
O	MASSTOR SYS CORP	6	1	2.13	0.1	3.0
O	MAXTOR CORP	23	6	15.00	1.8	12.1
O	MICROPOLIS CORP	44	13	28.13	1.4	5.0
O	MINISCRIBE CORP	18	5	11.75	1.8	17.5
N	MINNESOTA MNG & MFG CO	84	45	58.38	-0.6	-1.5
O	MSI DATA CORP	29	12	20.13	2.4	13.5
O	PRIAM CORP	6	1	2.50	0.2	8.1
O	PRINTRONIX INC	13	7	9.63	0.9	10.0
O	QMS INC	27	8	11.50	2.1	22.7
O	QUANTUM CORP	23	8	11.75	0.8	6.8
O	SMARTEK CORP	6	3	4.00	-0.1	-3.0
O	RECOGNITION EQUIP INC	24	7	9.63	0.1	1.3
N	REXON INC	14	6	8.38	1.4	19.6
O	SCAN TRON CORP	14	7	12.25	2.0	19.5
O	SEAGATE TECHNOLOGY	46	10	21.63	2.0	10.2
O	STORAGE TECH CORP	6	1	1.88	0.1	7.1
O	TANDON CORP	7	1	1.88	0.3	20.0
O	TEC INC	7	3	4.00	-0.1	-2.7
N	TEKTRONIX INC	41	21	35.75	-2.3	12.7
O	TELEVIDEO SYS INC	3	1	1.25	-0.1	-4.8
N	TELEX CORP	84	39	51.00	0.0	0.0
O	WYSE TECH	40	11	22.63	2.1	10.4
N	XEROX CORP	85	58	58.38	-2.4	-4.5
N	ZIDEX CORP	10	6	6.38	1.5	21.5
	Leasing Companies					
O	CAPITAL ASSOCIATED INTERNATIONAL INC	11	4	5.75	0.0	0.0
A	COMDISCO INC	37	12	23.75	1.0	4.4
N	CONTINENTAL INFO SYS	14	5	9.00	0.8	10.8
O	PHOENIX AMERN INC	6	2	3.25	0.4	13.0
O	SELECTERM INC	6	3	4.00	-0.1	-3.0

EXCH: N—NEW YORK; A—AMERICAN; O—NATIONAL; O—OVER-THE-COUNTER; S—SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Seeing red

Wang, DEC among wounded as bulls turn tail and retreat

After hitting a postcrash high of 2,061.07 on Tuesday, the Dow Jones industrial average's bull market suddenly turned and gored computer issues last week. Chief among the wounded as of Thursday's close were Wang Laboratories, Inc. and Digital Equipment Corp., which both announced that third-quarter financial results would not meet expectations.

Wang's stock took a beating late Thursday on the American Stock Exchange and fell 2⅛ points for the four days of trading to finish at 12⅜. DEC's announcement on Tuesday negated its upswing of a week earlier, as it lost four points for the day and dropped 1⅛ points for the week to land at 120.

Other vendors who fell included IBM, down 3⅛ points to 113¾; Apple Computer, Inc., slipping 1¼ points to 45¼; Unisys Corp., down 1½ points to 34⅛; and Hewlett-Packard Co., down 1½ points to 62.

The few bright spots on the Street included Microsoft Corp., which was up 2 points to 62¾; Amdahl Corp., up 1¼ points to 35¼; and Compaq Computer Corp., which rose strongly on Monday and finished up 1¼ points at 53⅛.

JAMES DALY

Planning begins for super workstation use

BY NELL MARGOLIS
CW STAFF

Months before any mega-MIPS can be delivered to their desk tops, two representative target users voiced enthusiastic interest in Apollo Computer, Inc.'s newly announced 64-bit reduced instruction set computing-based Domain Series 10000 Personal Supercomputer.

Ben Ford, computer-aided design (CAD) systems coordinator at Schwinn Bicycle Co. in Chicago, is already involved in the high-intensity simulation tasks that, according to Apollo, will be made possible and even affordable for the workstation user when the Domain Series 10000 rolls out later this year.

Gus Cinordo, staff engineering manager at the Tarrytown, N.Y.-based central engineering department of General Foods USA, anticipates expansion into such uses.

The Domain 10000's promised three-dimensional graphics component is not scheduled to be announced until the second half of this year, and the box itself is only on the eve of being beta tested. But neither fact fazes Ford.

"We ordered our DN590, which was a very expensive machine for us, before we saw it — in fact, before it was available," he said. Apollo beat its stated shipment date by a month, Ford said, "and everything worked."

'Definitely looking'

"We're just getting into finite element analysis, so we're definitely looking" at the 60 million to 100 million instructions per second that the Domain Series 10000 is promising, Ford said. His department has 12 Apollo workstations for CAD/computer-aided manufacturing use.

Finite element analysis, Ford said, "creates a huge matrix to be solved. A bike frame model, for instance, could easily have 8,000 elements, with about six degrees of freedom — the amount by which a load could shift — per element. That means you're solving for 54,000 degrees of freedom."

If this is what it takes to model bicycle frames, Ford said, "just picture what they're doing for cars or planes."

General Foods' Cinordo said his company does not currently need the Domain 10000's speed. Planned advances into real-time simulation and robotics, however, could make the new product "a real possibility."

Even if General Foods never buys a supercomputer workstation, Cinordo said, the company will benefit from the market niche now being created by the likes of Apollo, Ardent Computer Corp. and Stellar Computer, Inc.

"All these breakthroughs, offering so much more processing power, are driving down prices at the lower end of the workstation market, where our present interest lies," Cinordo said. "If you grow . . . you'll need the machines. If you don't, you'll need their effect on the market."

Lotus

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has some explaining to do.

"They've left a lot of questions in the air," said Thomas White, president of Infonetics, Inc., a Santa Clara, Calif.-based consulting firm.

Many of those questions may be answered by Lotus tool kits that allow Lotus, third-party vendors and MIS shops to write so-called data base drivers that take advantage of the common data-access interface. If Lotus garners broad support for the interface, strategic products such as Lotus/DBMS will support the bulk of non-Lotus data base management systems.

No rewrites needed

Furthermore, because other Lotus applications, such as Lotus/DBMS, 1-2-3/G and 1-2-3/M, will also include this interface, these drivers do not have to be rewritten to work with future Lotus packages, one source said.

The announcement will also include a description of The Application Connection (TAC) 5.0, a new version of TAC offering tighter integration to Lotus spreadsheets through the new data interface. TAC 5.0 will also provide access to hosts other than the IBM 370 and support a broader range of host applications. Lotus, however, will not formally announce TAC 5.0, one source said.

TAC converts data from host to PC formats, allowing users to access host data using a familiar PC interface. TAC, an information center-oriented product, currently works with applications such as IBM's DB2 and Information Builders, Inc.'s Focus.

TAC 5.0, an upgrade provided free of charge to current users, is also a cornerstone of the firm's DBMS communications strategy, particularly in regard to DB2.

"TAC is an important component in our ability to retrieve mainframe data for users working with Lotus/DBMS," said Tom Smaldone, director of product marketing for Lotus's advanced products division, in a previous interview.

With TAC's support of the common data-access interface, existing customers will be able to use it to provide data to Lotus's upcoming products, such as Lotus/DBMS and 1-2-3/G for Microsoft Corp.'s OS/2 Presentation Manager, according to a source briefed by Lotus.

Lotus is also expected to preview communications software that works with TAC to provide the actual data transport. Currently, TAC relies on a customer's existing communications hardware and software.

"The missing piece is still the transport piece, the actual communications software and communications management capability," said another source at a major host software firm.

Lotus is expected to provide further details on how the unshipped Lotus Extended Application Facility (LEAF) language will help tie all of its applications, including Lotus/DBMS, together. "LEAF enables developers to write cross-product applications that link products and exchange live data," Smaldone explained.

So far, Lotus has made little headway in pushing its communications message, a situation that may change as its newer products begin to ship.

For example, the company has been close-mouthed about the actual number of TAC installations. But although sales are believed to be sluggish, the firm considers TAC to be an increasingly strategic product, observers said.

TAC users contacted by *Computerworld* have generally been pleased with the technology. "We used it for a specific need and then expanded it. It was totally effective," said James V. McDonnell, vice-president at The Equitable Assurance Co. in New York. Because of a change in hardware, The Equitable is no longer using TAC.

Tech glitches fixed?

TAC also had some technical problems early on. However, these have been largely resolved, and the product may have a bright future, one large user said, who asked not to be identified.

But some large firms continue to reject TAC for the same reason they have rejected all generic micro-to-mainframe data exchange products.

"Nothing off the shelf will serve their needs," said Larry Rafsky, president of Gari Software, Inc., a Roseland, N.J.-based micro-to-mainframe consultancy. "Users need special security, special modems and a lot of special-purpose code. Lotus has to be willing to go in and customize," Rafsky said.

Cobol 85 compilers with discrepancies

Failed to compile one or more tests in the validation suite

DEC	VAX Cobol 4.0	High	DEC VAX series
IBM	VS Cobol II	High	IBM MVS/370
NCR	VCobol 85	High	NCR 8500 to 9800 series

INFORMATION PROVIDED BY THE NATIONAL BUREAU OF STANDARDS CERTIFIED COMPILER LIST
CW CHART

Checklist on Cobol 85 tests

BY CHARLES BABCOCK
CW STAFF

GAITHERSBURG, Md. — Thirteen Cobol 85 compilers have thus far been certified as meeting Federal Information Processing Standards for users of minicomputer, superminicomputer or mainframe systems, according to the National Bureau of Standards' Certified Compiler List for January.

An additional six Cobol 85 compilers have been validated for IBM's Personal Computer, Personal System/2 and compatibles.

The bureau also listed three compilers that failed one or more provisions of the validation suite of tests and must pass all provisions when they are retested a year after their initial review. The compilers, however, passed a sufficient number of tests to be placed on the validation list. Failure to pass all tests on the second try will result in decertification, spokesmen for the NBS said.

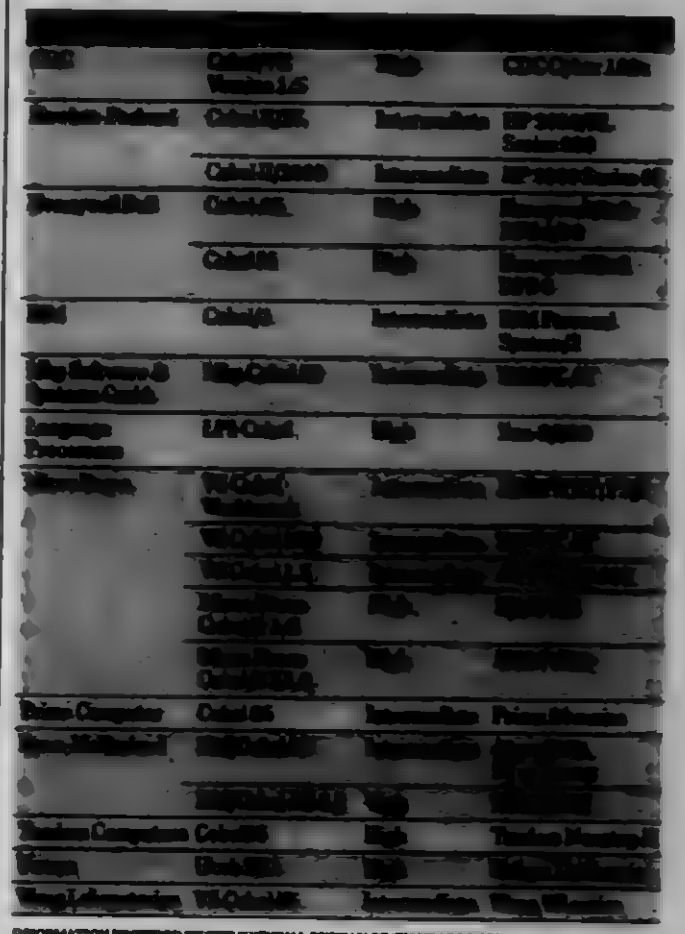
The list is drawn up to advise federal agencies of vendors that have compilers meeting American National Standards Institute standards for Basic, Fortran, Ada, Pascal and Cobol. Vendors must appear on the list or be scheduled to be tested for validation in order to bid on federal contracts requiring one of these languages.

Compilers may be tested for three different levels of validation: low, intermediate or high. The suite of tests grows progressively stringent from the low to high levels.

Copies of the list may be obtained by writing to the Institute for Computer Sciences and Technology at Building 225, Room A266, Gaithersburg, Md.

Micro, mini, mainframe Cobol 85 compilers

Approved by the National Bureau of Standards with no discrepancies



INFORMATION PROVIDED BY THE NATIONAL BUREAU OF STANDARDS CERTIFIED COMPILER LIST
CW CHART

Gone awry

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with problems leading to long delays in taxpayer refunds [CW, April 15, 1985]. According to outside auditors, the problem occurred when the IRS mishandled a cutover to new mainframes and new Cobol software.

The mixup did, however, serve to highlight the fact that the IRS systems were mismanaged and outdated [CW, March 24, 1986].

• Beginning in 1983, Blue Cross/Blue Shield of Wisconsin attempted to convert its entire financial and claims systems. Though the company's MIS officials argue that the $600 million conversion, perhaps the largest of its kind, went off as intended, the local media in Milwaukee observed otherwise.

Blue Cross/Blue Shield contracted with Electronic Data Systems Corp. (EDS) to replace its entire DP environment, which had grown to an unwieldy mass of confusion. Seven different claims processing systems and three different membership systems were filled with old and outdated information.

After two years, EDS implemented the new system, but it caused serious problems for subscribers. Claims were either not paid at all or were overpaid to the tune of tens of millions of dollars. The company lost $28 million in 1985 and nearly as much in 1986.

Furthermore, Blue Cross/Blue Shield reportedly lost more than money: 22,000 subscribers have canceled their memberships since the 1985 implementation. Both Blue Cross/Blue Shield and EDS claim that the system is now up and working as expected.

Best of intentions

In the age of strategic advantage through the use of information systems, it follows that some strategies, implemented with the best of intentions, simply do not work.

According to Charles Wiseman, president of Competitive Applications, Inc., a New York consulting firm, and author of *Strategy and Computers*, MIS alone cannot be blamed for failed strategies.

Often, he says, the failures are not technological in nature but rather a failure to read a particular market or trend correctly. "When the nature of a business changes, cracks appear in the MIS strategy," Wiseman says. "Companies with open and flexible styles and good communications can lessen the impact of a change or new trend. They don't put the onus on one individual in MIS. Usually what is wrong is beyond the control of one person anyway."

It is clear, though, that MIS is becoming a major player in corporate direction. And as such, its strategies can play major, if not dominating, roles in the success or failure of a business.

Computerworld took a look at several MIS strategies that, for one reason or another, did not work. The rationale is simple: If you can learn from success, you can also learn from failure.

The label "failure" is actually too harsh in many cases; the success of these strategies typically depended, as Wiseman says, on many other corporate decisions besides MIS.

Kendall Co.

Kendall, a Boston-based hospital supplies manufacturer and subsidiary of Colgate-Palmolive Co., was in a state of change. Three years ago, Colgate-Palmolive decided that decentralizing was the road to the future and suggested its subsidiaries follow its lead. Since then, Kendall did just that, breaking into seven autonomous business units.

But the MIS department was heading in the opposite direction. The then-MIS director, a centralist, believed strongly in mainframe-oriented, top-down control.

Kendall's MIS department continued to create massive centralized data bases using IBM's IMS and, later, Cullinet Software, Inc.'s IDMS data base management systems. Nearly $3 million was spent on IDMS applications in a two-year period.

Cipolla, Kendall's director of MIS

The MIS staff knew that this strategy was "flying in the face of reality in terms of where the company was going," says Ronald Cipolla, current corporate director of MIS. But the department could not persuade its boss that other options, such as departmental processors running manufacturing resource planning, could be implemented at one-fifth the cost.

Upper management started to question the MIS direction as well. "Are we doing the right thing?" was a frequently heard question, but no one insisted on an answer, Cipolla says.

"We were making adhesives, not building airplane engines," he says. "We just didn't need the functionality of IDMS."

Two years ago, the MIS director was recruited elsewhere, and Cipolla, a high-level MIS manager, took over. It wasn't hard for him to convince top management that the mainframe approach just did not provide the economies of scale required for the company. The centralist MIS strategy was brought to an immediate halt.

The out-of-pocket cost of stopping one strategy and starting another was nearly $6 million in terms of hardware, software and labor, plus the uncalculated cost in man-hours for new planning and retraining. The company also found itself two years behind where it might have been if it had originally embraced the decentralized environment.

Cipolla, however, says he believes the setback was minor compared with the potential disaster.

"The company decided to change its spots just about the time MIS realized it needed to change directions, so the timing was actually perfect," Cipolla says. "If Kendall had decided to decentralize five years ago, the situation now would be tragic."

The frustration, according to Cipolla, led to the departure of many good MIS people from Kendall. MIS's reputation also suffered; much time was spent mending fences.

Under Cipolla, Kendall now has MIS chiefs in each of its seven divisions. Each will run its own data center based on IBM's upcoming Silvertake, the promised follow-on to the System/36 and 38 minicomputers.

IBM Personal System/2s will be the workstation of choice. The company will essentially be devoid of mainframes. The entire network will be based on IBM's Systems Application Architecture as the developmental architecture.

Cipolla says he believes top management did not realize the impact MIS would have by implementing the corporatewide strategy.

"The major lesson we learned is that MIS strategy has got to be a premiere thought in the corporate strategy," he says. "That has been an evolutionary process at Kendall.

"When I joined the company, MIS was an afterthought, and it stayed that way until management started bringing MIS into the decision making process," he adds.

MIS was also at fault, Cipolla says. "We were enamored more with technical elegance than with how the system fit into our business. MIS activities have got to be a function of what the company does. It can't operate in a vacuum."

U.S. Department of Education

You might expect that a $19.6 billion organization would use its accounting systems to generate its year-end statement of financial condition. But at the Education Department in Washington, D.C., the general ledger system just isn't up to the job.

A December 1987 audit by the U.S. General Accounting Office identified the following problems with the agency's financial system:

• It cannot accept and record all relevant payroll expenses and liabilities, such as accumulated leave, from its subsidiary payroll accounting system.

• It fails to record information on receivables, such as collections, accrued interest and insurance premiums.

• It cannot accept much of the data from the department's $2.6 billion college housing loans program because of the incompatibility of the systems.

"Education's general ledger system ... contains unreliable data because of inadequate and inefficient computer systems that support the general ledger and subsidiary accounting systems," the GAO reported.

The situation was so bad that agency officials had to rely on estimates and other records to prepare the annual financial report to the U.S. Department of the Treasury. "Education officials told us that none of the information in [the agency's] statement of financial condition is drawn from the general ledger," the auditors said.

Scrambled since 1979

Ronald C. Oleyar, director of financial management at the Education Department, says the accounting data has been scrambled ever since the agency was split from the former U.S. Department of Health, Education and Welfare in 1979.

The agency has little control over the general ledger system because it is leased from a small, outside contractor, Oleyar adds. But that policy will change this year, when the department buys a new general ledger that meets government accounting standards and can generate financial statements, he says.

The GAO's audit portrayed the ledger problem as part of a general breakdown in financial management systems at the agency.

"Overall, the Department of Education's accounting system does not provide managers with the reliable information they need to protect financial resources from fraud, waste and mismanagement and to satisfy internal and external financial reporting requirements," the audit concluded.

The GAO cites a lack of top management attention and the failure to conduct a follow-through to fix problems that the agency has known about since at least 1984.

For example, while a long-overdue study on upgrading the accounting systems was bumped from the fiscal 1986 budget, the agency was able to find funds for a study on "a universal postsecondary course classification system," the audit noted.

Wang Laboratories, Inc.

Wang has long suffered a reputation for a chaotic order processing and billing system. Customers would wait months for orders to be delivered and invoices to be processed. Repeated attempts by Wang to solve the problems internally failed.

In 1980, in the midst of 40% growth, Wang contracted with a small, independent consulting firm, Computer Partners, Inc. in Wellesley, Mass., to tackle its problem. The joint project with Wang's internal MIS department focused on automating revenue tracking from the time an order is placed to the time an invoice is collected.

The project was scheduled to be completed in 18 months. Three years later, with a drastically overextended budget and no end to the problems in sight, Computer Partners was dismissed. While Wang will not release figures, a former Computer Partners consultant estimates that at the time of its dismissal, the project was costing $10 million per year.

The consultancy had delivered five of the seven major phases of the plan, including a corporate data base and a corporate accounts receivables system, but two key pieces were never finished. According to Brad Sweet, Wang's director of computer operations and technical services, the key to the whole project — the order processing subsystem — was never finished.

A former Computer Partners consultant close to the project says the entire effort was far too complex and beyond his company's capabilities. Though the consultancy enjoys an excellent reputation for handling numerous complex implementations, this one was simply beyond its scope. "The dynamics of system development change so fast that a project that takes three years to complete is self-defeating," the source says. "Modifications start to overtake the original design."

The project encompassed too many applications, all to be ac-

complished in a compressed time frame, according to the consultant. The interdependencies caused a logjam — Part X could not be finished because System Y was not yet running. And there were too many System Ys. The project developer ended up spending too much time on redesign and not enough on coding and testing the system.

"The consulting firm was not at a level of expertise with that technology," the former Computer Partners consultant says. "If Wang had checked into what Computer Partners was recommending, it would have found little experience in that area."

Who's paying attention?

What happened at Wang can be seen as a classic problem for a business growing too fast. No one paid attention to what was going on in revenue tracking, according to Sweet.

At the time, small consulting firms like Computer Partners were being employed throughout Wang to handle various systems projects. Internal MIS was very small and not overly involved in these projects, according to Sweet. In fact, the biggest problem was simply that Wang executives had no idea what they wanted and had no strong internal MIS staff to lean on.

In the 1970s, anyone who wanted one had a Wang 2200 system and could bang out code to create his own applications. Senior management did not track what was being created and how much it cost. Independent accounting and tracking systems popped up throughout the company.

The former Computer Partners consultant estimates that it cost Wang $10 million to correct the situation left by Computer Partners. "There was a gross misunderstanding of the computing resources that such a complex system would take," the source says.

Wang's Sweet would not release estimated costs but acknowledges that it was far more than top management wanted to pay. At the center of the problem was a complicated data base package, which both Wang and Computer Partners underestimated in terms of complexity and resources usurped.

Despite the failure, Wang maintains a cordial relationship with the consulting firm, and members of the revenue tracking project were phased out slowly over several months.

"We were trying to change too many things and create too many systems at once," Sweet says.

Though the project was reportedly finished internally at Wang, the problems in revenue tracking continued for years afterward. Wang, in fact, is currently in the process of redoing its entire order processing system again in hopes of putting this damaging problem to rest once and for all.

First Boston Corp.

Sometimes the technology works just fine, but the strategic information system turns into a disappointment because of mistakes in the marketing approach. That is the story of Shelternet, a mortgage banking network developed by First Boston Capital Group in Tarrytown, N.Y.

The network was launched in 1983 to allow home buyers to search for the best mortgage rates and apply for a mortgage by using an IBM Personal Computer at their real estate broker's office [CW, Sept. 5, 1983].

Users dial into an IBM 4381 host on CCITT X.25 packet-switching networks, according to Bob Hutchinson, vice-president of DP at First Boston Capital Group.

But Shelternet, like a lot of computerised loan origination systems that followed, did not prove very popular with home buyers or real estate brokers, according to mortgage banking experts.

"It simply ignored a critical facet of the business, which is that the customer usually wants face-to-face contact with whoever is going to process the loan," says Fred Portner, senior vice-president of Furash & Co., a management consulting firm in Washington, D.C., that specialises in financial services.

"That wasn't so much a technological failure as a failure to understand how the business is done. They tried to eliminate the human interface, and you can't do it," he says. In addition, Shelternet's original $16,000 service fee was too expensive for many real estate brokers, Portner says.

"Simply putting a PC in a broker's office doesn't mean the salespeople are going to use it," adds Dail Bennewitz, a senior vice-president at the U.S. League of Savings Institutions in Chicago. "Regardless of what appeared on the screen, they would steer the customer toward the [mortgage company] that could get the deal wrapped up."

Beset by these and other problems in its first two years of operation, Shelternet was gradually reorganised so that it acts as a conduit for other mortgage lenders in the secondary market rather than as a loan originator. Company officials downplayed the shift, calling it an expansion of the system.

The revamped Shelternet now purchases loans from about 75 originators and sells the loans to investors, according to Cecily Harrison, a spokeswoman for the parent company, First Boston Corp. in New York. In 1984, Shelternet had 125 originators.

Just last year, First Boston was forced to cut the Shelternet work force in Tarrytown by 20% because of a very soft market in real estate, Harrison says.

While First Boston's mortgage network is limping along, at least six other nationwide mortgage networks have been either discontinued or reduced to providing only rudimentary information, according to a September 1986 survey by *The Washington Post*.

"The concept of using computer terminals to originate mortgages from real estate offices still is alive," the report concludes, "but the benefits so far have not been great enough for the idea to be widely accepted."

The road to ruin

The following is a checklist to follow on a surefire path to strategic disaster in MIS planning:

- Accept the first plan that comes across your desk, especially if it is ill-defined and overly ambitious.
- Allow your systems to get hopelessly outdated so that you are forced to implement massive conversions that create crisis situations within MIS.
- Misread your company's market — the inevitable result of miscommunication between MIS and top management.
- Implement MIS strategies that are inflexible and incapable of changing as the marketplace changes.
- Push for a centralised MIS strategy when the company is going through a major decentralisation campaign.
- Employ technology that is overkill, much more powerful and expensive than corporate applications require.
- Allow top management to dismiss MIS participation in forming corporate strategy.
- Operate in a vacuum. Focus on technical elegance in lieu of corporate needs and direction.
- Depend on other sources for the integrity of your data.
- Rely on consulting firms without thoroughly checking references and business plans to make sure that firm is capable of handling your project.
- Let fast business growth blind you to MIS needs.

IRS ruling raises cloud over contract work status

BY DAVID A. LUDLUM
CW STAFF

The U.S. Internal Revenue Service recently disclosed a private ruling that further complicates the already complex standards for determining when organizations can hire technical service workers as independent contractors.

In a "private letter ruling" handed down in November 1987 and published early this year, the IRS ruled that a contract technical service worker who had been placed at a utility company by a broker should be classified as an employee of the utility rather than as an independent contractor or an employee of the broker.

Private letter rulings do not establish precedents and are intended only to advise the parties that request them. However, they are widely followed by tax specialists for indications of future, binding IRS rulings.

The latest ruling raises the prospect that as a result of Section 1706 of the Tax Reform Act of 1986, organizations using contract technical workers may be liable for back taxes and penalties if an audit determines that they should have classified the workers as their employees.

Section 1706 has caused turmoil among independent contractors and the brokers that place them in jobs by requiring many of the contractors to become employees of a broker.

However, the IRS has previously suggested that it would not require contractors to be classified as employees of the client companies at which they work.

In August 1987, the IRS issued a private ruling involving computer programmers that is nearly identical to the one it issued for the utility worker.

Both rulings appear to contradict a binding, general revenue ruling the IRS issued last year.

IRS officials were not available for comment.

The general revenue ruling states that, because of the so-called safe harbor law passed by Congress in 1978, "no inference should be drawn with respect to whether [a worker] is an employee of the client for federal employment tax purposes."

The private rulings "appear rather inconsistent with the revenue ruling that came out in May," said Allen Bradley, an attorney with the Atlanta firm of Morris, Manning and Martin, which represents brokers as well as client companies.

The private letter ruling suggests that clients of technical service brokers could be found liable for back employment taxes for misclassified workers, along with penalties, according to Bradley.

"In the past, everyone assumed the broker was the one at risk. This letter ruling suggests that the client also runs a risk," he said.

But Bradley said other provisions of the safe harbor law might provide clients with legal means of circumventing the standards used to determine whether a worker should be classified as an employee.

Such companies would have to apply the safe harbor law to their own situations, he said.

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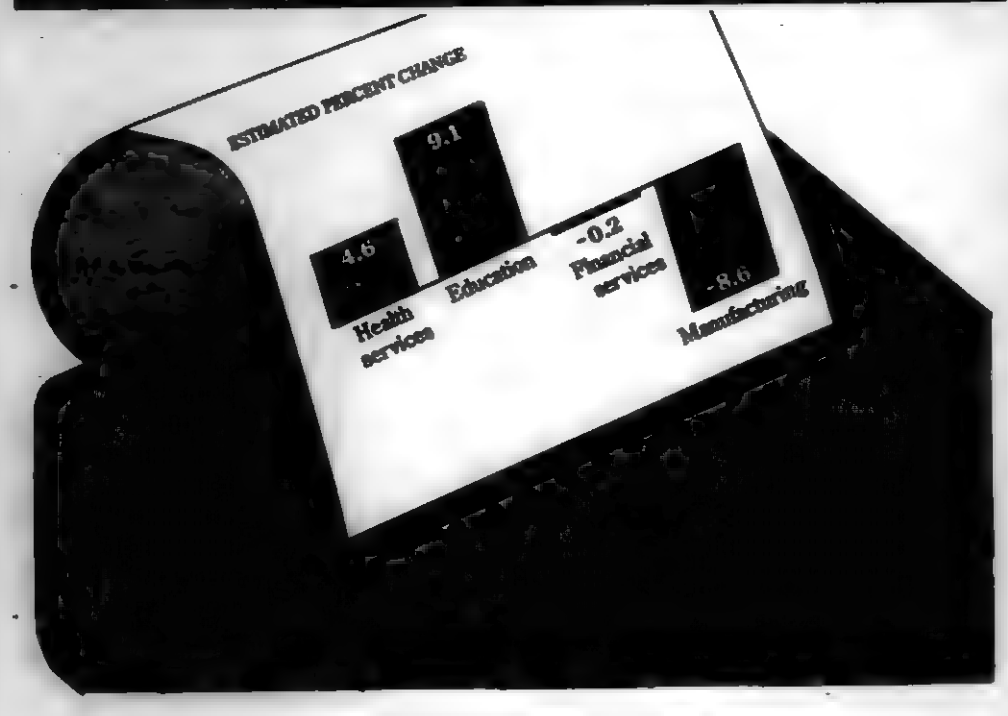
TRENDS

DP spending

'88 budget changes still total up according to industry



Companies in different industries reported decidedly mixed views on the course of their information systems spending in the coming year, according to a recent survey by International Data Corp. (IDC).

Manufacturers projected a sharp reduction a year from now, while educational organizations said they expect a dramatic increase. Health services organizations projected a gain, while financiers expected a slight dip.

The figures come from surveys of U.S. MIS managers conducted in November and December 1987.

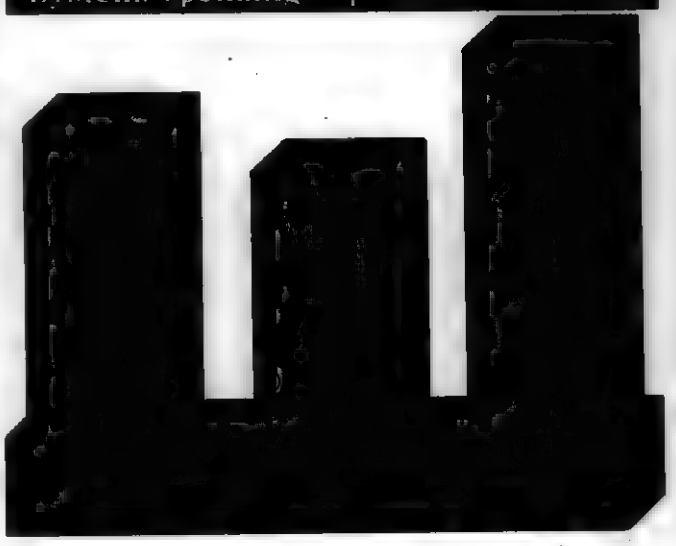
The surveyed companies, excluding banks, said they plan to devote 1.6% of revenue to information systems this quarter, up from 1.1% reported during last year's third quarter. The third-quarter figure fell from 1.3% six months earlier.

Although companies planned to increase the portion of revenue spent on systems in the first quarter, they projected a slowdown in the future growth of actual spending. They predicted a 1.2% increase during the coming year, down from the 5.2% 12-month increase projected prior to last year's third quarter.

By far the greatest rates of growth, 3.5%, were projected by mid-size companies. The overall decline in projected growth stems largely from cutbacks by large manufacturers, banks and other financial services firms, according to IDC.

DAVID LUDLUM

Systems spending as percent of revenue



'88 spending growth by company size

INFORMATION PROVIDED BY GLOBAL DATA RESOURCES GROUP
CW CHARTS: AMY J. SWANSON

INSIDE LINES

Peeking over the horizon. Sun Microsystems will launch its Intel 80386-based workstation April 6, according to sources close to Sun. The system, to be called the 386I, will run both Microsoft's MS-DOS and Unix. It will be offered in both a 3.5-MIPS version, to be called the 386I/150, and a 5-MIPS version, to be called the 386I/250. Sources say Sun officials have yet to determine final prices for the systems but have agreed that they will be in the $8,000 range.

Down the HP path. Hewlett-Packard is set to introduce a microcomputer version of its HP 3000 series minicomputer, probably in April. The HP 3000LX, as it is supposedly called, would cost around $12,000, support six to eight users and offer 400M bytes of main memory; it is designed to compete with DEC's Microvax II and IBM's System/36. The 3000LX is said to be 386-based, with a footprint size not much bigger than that of HP's Vectra PC line.

When demand exceeds supply . . . IBM already faces a 12-month backlog on its 3174 controller, says a source who notes that users can expect a corresponding "fairly radical" price jump in 3274 lease pricing. And while the current version of the 3174 requires users to choose either asynchronous or IBM Token-Ring capability, an upgrade is in the works that will allow users both options.

Sperry revisited. Unisys plans to unveil in New York tomorrow more powerful models in its 2200 series of medium-size mainframes, which the firm announced one year ago. Unisys confirmed a report that the computers will be called the 2200/400 and will effectively replace the firm's 1100/70 and low-end 1100/80 models, although Unisys will continue to offer those machines. The new models will be priced at 25% less than comparable IBM 9370 and 4361 models, a Unisys spokesman said.

One of these days. IBM will make its diskless PS/2 Model 50 generally available when it can ramp up supply, according to Frank King, vice-president of development for IBM's Entry Systems Division. The diskless units use the same set of parts as the Model 50, and King predicted that by the end of the second quarter, the supplies will be in balance.

Time to fish or cut bait. Rumors that Ashton-Tate and Interbase are about to announce a partnership keep coming. Information from a source last week, combined with a wink from an Ashton-Tater, lends credence to the reports. There is also a certain amount of logic behind the deal. Ashton-Tate already has an IBM OS/2 data base server product that Microsoft and Sybase were nice enough to provide. A deal with Interbase could give Ashton-Tate an entry into the DEC VAX market.

Twisted sisters sewing session. The IEEE 802.3 work group on 10M bit/sec. Ethernet over twisted-pair wire is expected to make a standard presentation to an IEEE plenary session Thursday. The work group is considering three proposals and will meet for two days prior to passing its recommendation on. The parent committee will then measure the proposal against three criteria: market need, distinct identity from other standards and compatibility with the 802.3 standard. If all goes well, a draft will be ready for balloting in November. It is expected to take another year and a half before the work group's recommendation becomes a full-fledged standard.

Invest in chips. Shortages of Intel's 80386 chip may drive prices up as radically as the current 100% to 300% increase in dynamic RAMs. The "386 chips could, in 1989, be as hard to get as memory chips are today," predicts the "Technologic Computer Letter." All this means that prices for older systems will continue to drop, while chip shortages and higher hardware demands in running OS/2 will make it more expensive than ever for state-of-the-art PCs.

We don't do Section 1706 in this corner — we let the editor handle those letters — but any other hot items on your mind are more than welcome. Call the Computerworld hot line at 1-800-343-6474 and ask for Pete Bartolik.

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COMPUTERWORLD

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Executive Report — The new MIS: Putting business needs in the front seat. **Page 79.**

In Depth — When consultants rise from your own ranks. **Page 95.**

Ashton-Tate's Dbase plans for the Presentation Manager are expected to revolve around a deal involving Interbase's SQL engine. Page 4.

OS/2 communications functions, independent of IBM's Communications Manager scheme, are separately planned by AST Research and a Microsoft-DCA collaboration. Page 128.

Stellar pledges to be first out the door with a supercomputing graphics workstation. Page 14.

HP promotes a Windows-based network management plan to hook into and compete with IBM's Netview standards. Page 6.

Apple slices 18% off the cost of buying a Macintosh Plus. Page 33.

BASF yanks faulty cartridges plaguing IBM 3480 storage devices. Page 73.

LANs stunt minis' growth spurt

Mighty micros, tightened MIS budgets take toll on departmental systems

BY CLINTON WILDER
CW STAFF

Recent advances in microcomputer power and connectivity, combined with increasing MIS cost consciousness in an uncertain U.S. economy, are suddenly threatening to erode the minicomputer's pedestal in departmental computing.

MIS departments appear to be delaying purchases of minicomputers, which revolutionized corporate computing in the 1970s as an alternative to monolithic mainframes. However, corporations are forging ahead with the purchase of powerful microcomputers, such as IBM's Personal System/2 Models 60 and 80 and Compaq Computer Corp.'s Deskpro 386, to use as departmental file servers.

Last week, minicomputer leader Digital Equipment Corp. announced that earnings for its current quarter will fall below projections because order rates have been heavily skewed to its low-end systems, like the Microvax 3000.

"The days of the minicomputer as the premiere mid-range solution may be numbered," said Merrily Shinyeda, president of Tempe, Ariz.-based research firm The Sierra Group. "We believe that early LAN and file server installations are now perceived to provide at least equal performance in the minds of users . . . and to offer higher value for the dollar."

Growth stops here

In a recent Sierra Group survey, 1,588 MIS executives and departmental managers said they plan to increase their installed base of departmental minis by 20% this year, compared with 60% more local-area networks and 70% more network file servers (see chart below). Only 16% of the sites surveyed said they plan to increase their budgets for departmental minis this year, compared with 40% one year earlier.

"The PC has made further gains as the platform of choice

Continued on page 8

Shifting preferences

Although traditional departmental minicomputers have been the systems of choice, a survey of 1,588 companies indicates that LANs and file servers are rapidly gaining parity

INFORMATION PROVIDED BY THE SIERRA GROUP
CW CHART

Apple suit challenges Windows

BY ALAN J. RYAN
CW STAFF

CUPERTINO, Calif. — In a stunning repudiation of Microsoft Corp., Apple Computer, Inc. last week charged its top Macintosh software developer and Hewlett-Packard Co. with violating Apple's copyrighted user interface.

Analysts said Apple's lawsuit to protect its user-friendly audiovisual computer display could prove to be a serious blow to Microsoft's Presentation Manager, a critical element of Microsoft's MS OS/2 operating system.

The suit claims Microsoft's Windows Version 2.03 and HP's New Wave products infringe on its copyrighted interface.

The Presentation Manager, which will reportedly be based largely on Windows 2.0, is the graphical user interface portion of OS/2.

"Even a court case resolved in Microsoft's favor could hold up the introduction of the Pre-

Continued on page 128

IBM finally tosses lifeline to 8100 users

BY JEAN S. BOZMAN
CW STAFF

IBM last week made good on its promise to deliver a migration path for stranded IBM 8100 users by announcing a conversion aid to its 9370 machine and a revised version of the company's DPPX operating system, DPPX/370.

The conversion aid, which is scheduled to be available in December, changes the 8100's DPPX code into DPPX/370 code so that it can run on the 9370, IBM said. Since both operating systems were written in the same IBM programming language, the code is source compatible.

Although the move potentially affects 40% of the estimated 8,000 IBM 8100 information system users in the U.S., users show no signs of jumping to the 9370.

Inside

• IBM brings AIX to the 370 world and cuts off older 4381 models. Page 129.

"There is a study under way here looking at the alternatives," said Michael McGeough, systems administrator for Mobil Oil Corp.'s 9370 project. Mobil has six 8100s: two in its Fairfax, Va., headquarters and four in a Valley Forge, Pa., data center.

"Before this, we didn't have

Continued on page 129

OS/2 Extended in a fog

Users won't commit without details from IBM

BY ALAN J. RYAN
and ED SCANNELL
CW STAFF

MIS managers admit they will need the capabilities of IBM's forthcoming OS/2 Extended Edition but say their implementation plans have been stifled by a lack of specific technical information from IBM.

Contributing to the information drought is IBM's decision not to beta-test the product. "We have no plans for beta-testing, other than what we are doing in the development laboratories," Dave Harrington, IBM product manager of OS/2 Extended Edition, said last week. Harrington said IBM would rely on internal testing to validate the quality of the system.

Another factor delaying user commitment is uncertainty about applications whose benefits outweigh the significant hardware and software costs of implementing the multitasking operating system.

Of the dozen or so MIS managers interviewed last week by *Computerworld*, only one said he had seen a demonstration of the product from IBM. Those meeting with IBM to discuss the company's plans for OS/2 said they have been getting more marketing hype than useful technical information.

"Generally, the only exposure to OS/2 [Extended Edition] is superficial. So far, it has been mostly marketing rather than technical," said Rick Frye, manager of research and development at Carolina Freight Carriers Corp. in Cherryville, N.C.

IBM said it remains confident it can deliver OS/2 by the end of July, as promised last fall. The product is now in the middle of the systems testing process at

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SECOND CLASS

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Middle ground. Protecting its mid-range customers from the likes of IBM and DEC, Unisys rolls out the 2200/400 family of processors to extend performance of older Sperry line. Page 8.
Going down. AT&T unveils three models of its low-end 6300 Workgroup System, highlighting their ability to accommodate a variety of communications add-in boards. Options include an 8086 processor, floppy drive kits and an expansion board. Page 5.

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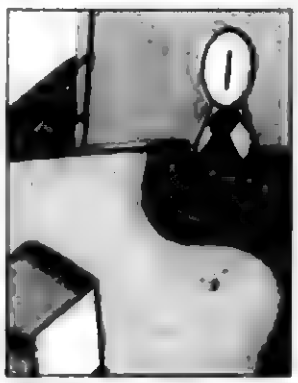

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Quotable

"We plan to be a $400 million to $500 million company in four or five years. There is also a chance we could be a zero-million-dollar company."

JOHN WILLIAM PODUSKA
STELLAR COMPUTER, INC.

See story page 14.

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ACM pioneer Berkeley dies

Remembered as conscience of the industry

BY JAMES CONNOLLY
CW STAFF

Edmund C. Berkeley, the man characterized as the conscience of the computer industry because of his efforts to make computers work for the good of mankind, died recently after a lengthy illness.

Berkeley, a mathematician, author, social activist and editor and publisher of *Computers & People* magazine, had been a noted figure in the computer industry since its early days. He died of cancer March 8 in a Boston hospital at age 78. Services are scheduled for Saturday in Newton, Mass.

A New York native and 1930 graduate of Harvard College, Berkeley worked at the Harvard Computation Laboratory with Howard Aiken on the design of circuits for the Aiken Mark II Relay Calculator and helped plan Prudential Life Insurance Company of America's acquisition of one of the first Univac computers.

Berkeley is credited as the driving force in the founding of the Association for Computing Machinery (ACM) in 1947, and he served as the first ACM secretary. A year later, he founded Berkeley Enterprises, Inc., which publishes *Computers & People* and the *Computer Directory and Buyers Guide*. Berkeley authored 16 books.

But even when he knew he had only months to live, Berkeley staunchly refused to discuss the accomplishments of his early years, preferring to talk about how computers can be used to help the world in the future, according to ACM executive James Adams, who interviewed Berkeley for a 1987 tribute.

"He was really a remarkable individual who had the insight to see what role computers could have in society," said Patrick J. McGovern, chairman of International Data Group, the parent company of CW Publishing, Inc. and *Computerworld*.

Judy Callahan, president of Berkeley Enterprises and a business associate for 15 years, commented, "I think his greatest contribution to the industry was to make the industry itself understandable to the nontechnical person. He always stressed that technology was not for technology's sake and research was not for the sake of research. There had to be a benefit for mankind."

Tandy laps up Grid, steps into corporate marketplace

BY JULIE PITTA
CW STAFF

FORT WORTH, Texas — Tandy Corp. last week reached an agreement to acquire Grid Systems Corp., a Fremont, Calif.-based manufacturer of laptop computers, for about $55 million in Tandy common stock.

Grid, which will maintain its headquarters and management team, will operate as a wholly owned Tandy subsidiary. Grid officials could not be reached for comment.

The purchase of Grid offers Tandy an entrance into new markets, according to Ed Juge, Tandy's director of product development. Grid, which exclusively employs a direct sales force, sells to both government agencies and Fortune 1,000 companies.

Projections call for Grid to reach $100 million in sales this year, Juge added. Tandy has mostly sold to home and small business markets through its Radio Shack retail stores.

The agreement also offers Tandy a U.S.-based product development team and production plant for laptops. Tandy's LT1400, introduced late last year, is produced by Far East suppliers, an arrangement that is expected to continue for now.

The pairing represents an odd couple because Tandy is known for its competitively priced IBM-compatible personal computers, and Grid is a manufacturer of high-performance laptops, said Peter Teige, an industry analyst for Dataquest, Inc.

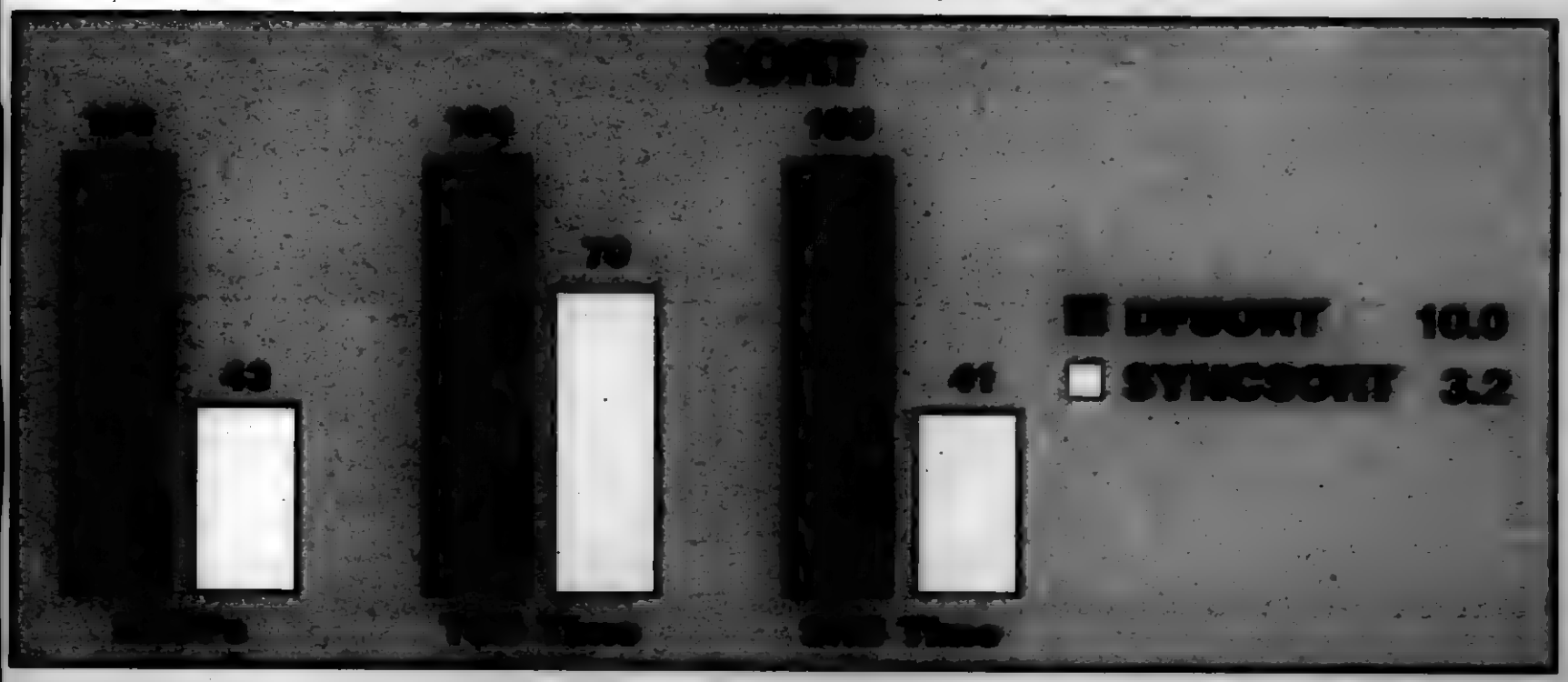
Vive la difference

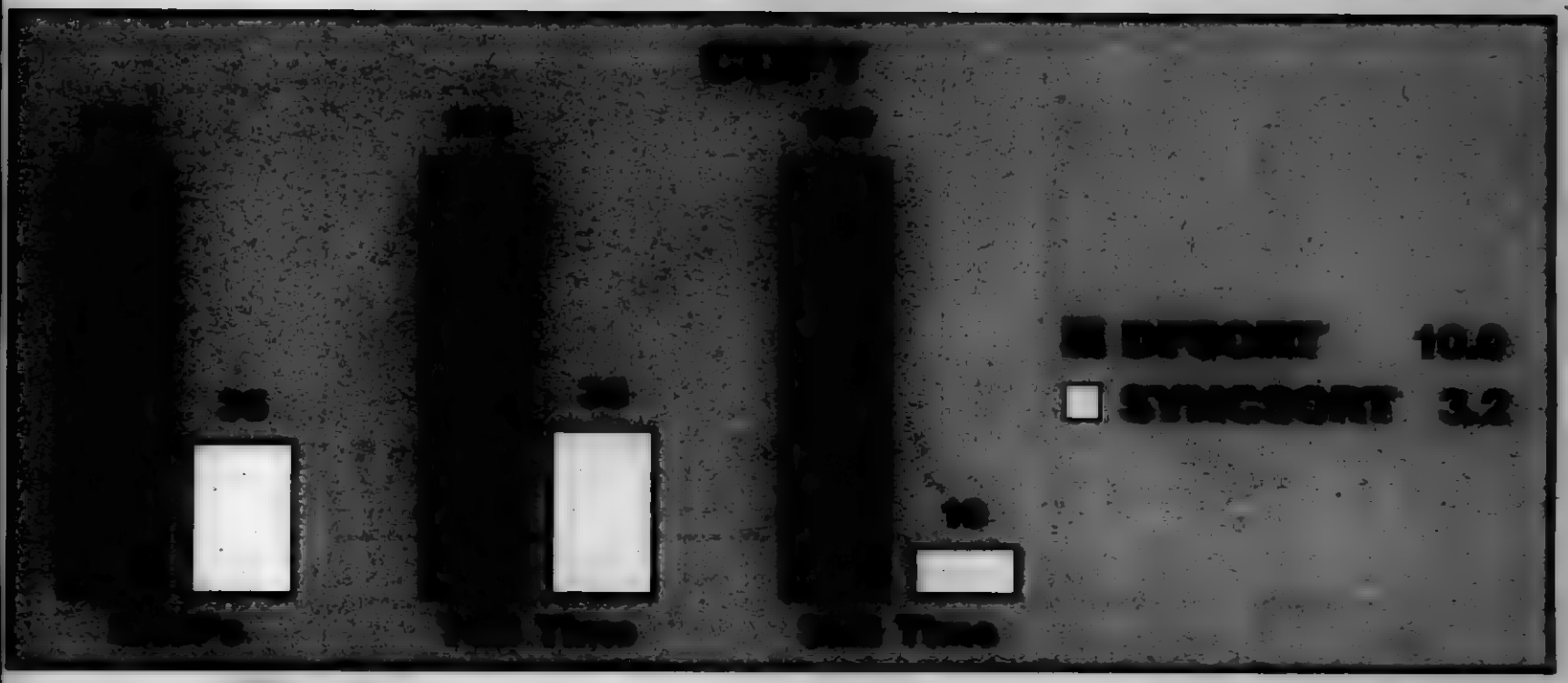
"But that's probably what makes it complementary — there's no overlap in what they do," Teige said. "Tandy is a large mass manufacturer and mass merchandiser," he continued. "Grid is low-volume, premium-priced and almost a custom manufacturer."

According to Dataquest, Grid had between 11% and 12% of the worldwide laptop market last year. About 500,000 laptops were shipped worldwide in 1987, Dataquest reported.

Teige said Grid faces stiff competition from larger domestic and Japanese laptop manufacturers and was likely strapped for cash. Tandy's high-volume purchase of microcomputer components may allow Grid to bring down the prices of its laptops, he added.

SYNCSORT 3.2
vs.
DFSORT 10.0





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Dbase SQL pact near

Ashton-Tate to link up with Interbase engine

BY STEPHEN JONES
CW STAFF

TORRANCE, Calif.— Seeking to placate an SQL-hungry public, Ashton-Tate Corp. is expected to build a Presentation Manager version of Dbase around a transaction-oriented SQL engine furnished by Interbase Software Corp., sources close to both companies said last week.

Through a joint development agreement to be announced next month, the SQL language from Interbase's mid-range relational data base management system will be reworked and embedded into the code for the new Dbase package, according to sources familiar with the partnership.

TO MELD the two products together, developers will have to build hooks into the Dbase language and into the Interbase SQL engine designed to link the two.

Acting as a relational back-end engine through which data can be stored and retrieved, the Interbase component will be able to sit on a personal computer, network server or high-end workstation connected to minicomputers or mainframes.

An Interbase offical confirmed the pending agreement, but both Interbase and Ashton-Tate declined to comment officially.

To meld the two products together, sources familiar with both technologies said that developers will have to build hooks into the Dbase language and into the Interbase SQL engine designed to link the two.

Analysts were skeptical, however, whether Ashton-Tate could complete the shuffling of code to meet its self-imposed deadline of delivering a Presentation Manager version of Dbase within 90 days of the operating system's November release.

The combined product, known informally as Dbase V or Dbase PM, will be a critical one for Ashton-Tate. OS/2 Standard Edition 1.1 with the Presentation Manager is expected to become a major battleground in the emerging relational data base management system market, in which companies such as Lotus Development Corp. have said they will make their first run at Ashton-Tate.

If industry leader Ashton-Tate is to regain some of its lost glory, analysts said, a strong SQL implementation is crucial. "This will be another piece of the technology puzzle for Ashton-Tate — they're filling in some of the holes," said Bruce Johnston, an analyst with First Boston Corp. in New York.

Some observers said that Ashton-Tate had given up on the back-end data base server market earlier this year when it agreed to support Microsoft Corp. and Sybase, Inc.'s SQL Server. But with the Interbase SQL engine incorporated into Dbase V, Ashton-Tate could get back into the running for a share of the back-end market.

Competitive tension

Whether the Interbase SQL engine will be a challenge to SQL Server as an industry standard is not clear, but the new product could create some competitive tension in Ashton-Tate's relationship with Microsoft.

Adopting the Interbase technology could bootstrap Ashton-Tate into the distributed data base processing market across a variety of platforms.

Tyngsboro, Mass.-based Interbase has built a reputation on the strong networking capabilities of its relational data base management system, called Interbase.

The package provides distributed data base access and processing over networks on systems from Digital Equipment Corp., Apollo Computer, Inc. and Sun Microsystems, Inc.

Interbase's relational system is "a first-class data base management system that is particularly good for networks and distributed data processing," said Richard Finkelstein, a senior consultant with the Codd and Date Consulting Group in Chicago.

CORRECTIONS

Readers who want to place a vote in the CW Microcomputer Awards [CW, March 14] may submit a reasonable facsimile of the printed ballot. However, only one entry is allowed per person.

Benchmaster Release 1.2 [CW, Feb. 15] is a product of A&T Systems, Inc., 12501 Prosperity Drive, Silver Spring, Md. 20904. 301-384-1425.

Current users of Symantec Corp.'s Q&A Version 2.0 can upgrade to Version 3.0 [CW, March 7] for $69.95.

MIS's changing role cited as salary levels escalate

BY JAMES CONNOLLY
CW STAFF

CLEVELAND — Inflation and the rising value of systems personnel have driven MIS salaries soaring past income levels that were unheard of only three years ago, according to a study released last week by the Association for Systems Management (ASM).

ASM's survey of almost 2,400 members in the U.S. and Canada showed that median salary rose by 13.3% between 1984 and 1987. It also found that 23% of the MIS professionals earned more than $60,000, compared with none in a 1984 study.

ASM officials cited inflation and the growing recognition of the systems professional as part of the business team as the forces behind the salary increases.

Casting the mold

The report also painted a picture of typical MIS personnel by matching salaries to job titles, responsibilities, experience, age and education.

In addition, the study examined where systems groups fit within their parent organizations and the use of personal computers by MIS personnel. The ASM found that 84% of the respondents used PCs, with 48% using them daily.

The highest paid systems personnel participating in the survey were the 7% earning more than $80,000 in salary and bonuses.

The typical MIS professional participating in the survey made between $50,000 and $59,000 (20% of the respondents), worked in a manufacturing type of company (34%) in the Midwest (35%). That typical worker had more than 20 years of systems experience (35%), had worked for only one company (25%), was between the ages of 40 and 49 (38%) and has an undergraduate college degree (36%) or a master's degree (28%).

What's in a title?

The most common job titles in the survey were manager (30%), senior analyst (12%), consultant (11%) and MIS director (11%). Most of the 173 respondents earning more than $80,000 were executive officers, of which there were 66; MIS directors, numbering 31; and managers or directors, numbering 30.

The ASM noted that supervising large MIS staffs tended to mean higher salaries for the supervisor, with more than half of those respondents in charge of 50 or more people and earning more than $70,000.

However, some ASM members (49) earned more than $80,000 while supervising fewer than five workers.

While the ASM found that salaries are rising for MIS professionals, the survey also showed the number of people receiving benefits in addition to salary to be on the decline in most categories, with the exception of cash bonuses.

ASM officials said salary growth is in part a result of systems groups taking on more important roles in the business organization.

The ASM warned, however, that future salary growth and increases in power for systems personnel are dependent on those MIS people developing new management skills and techniques. It said that growth is also dependent on MIS personnel moving from technology-driven operations to solution-driven operations through strong relationships with end users and senior management.

Upward mobility

An Association for Systems Management survey indicates that 43% of ASM members earn $50,000 or more in annual salary and that 67% of members holding the title of MIS director earn in that range

INFORMATION PROVIDED BY THE ASSOCIATION FOR SYSTEMS MANAGEMENT
CW CHART

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Twisted-pair Ethernet gains favor

BY JAMES DALY
CW STAFF

SAN DIEGO — A six-month stalemate in the development of a standard for 10M-bit unshielded twisted-pair Ethernet 802.3 local-area networks ended late last week when an Institute of Electrical and Electronics Engineers (IEEE) study group recommended a plan developed by Synoptics Communications, Hewlett-Packard Co. and Wang Laboratories, Inc.

In the approved star-wired setup, twisted-pair transceivers are linked to a wiring hub. The wire then runs to another transceiver, which connects to an Attachment Unit Interface (AUI) — a standard, widely installed interface that can be used to connect a personal computer to either a twisted-pair or coaxial cable-based Ethernet. This interface provides users with an easier migration path between existing coaxial networks and the twisted-pair version.

The move by the IEEE's 10BaseT Study Group followed the withdrawal of the last remaining alternative, a proposal submitted jointly by 3Com Corp. and Digital Equipment Corp.

The chosen link

The study group agreed to focus its efforts on a standard optimized for twisted-pair, whereas the 3Com/DEC proposal focused on linking the installed base of coaxial cable-based Ethernets to twisted-pair hubs.

The 3Com/DEC model would have added a thin coaxial cable link to the twisted-pair-connection, which could then support up to 25 workstations in a daisy-chain configuration.

The IEEE study group concluded that the 3Com/DEC model was built on the existing 10Base2 Ethernet standard and, hence, was inadequate. "This group should focus its efforts on a standard optimized for direct connection to twisted-pair," the group said in a statement.

Thought it was new

"The direct AUI attachment approach uses one twisted-pair to transmit and another to receive. It's a different signaling scheme and a different technology, and the group, therefore, felt they had a new standard," said Andy Verhalen, director of marketing for the hardware products division of 3Com.

An earlier joint proposal by Chipcom Corp. and Lannet Co. was withdrawn last month, and another plan by David Systems, Inc. was pulled last week.

The AUI plan has been endorsed by a bevy of companies that includes AT&T, Ungermann-Bass, Inc. and Western Digital Co. since its introduction last September.

The recommendation approved by the IEEE 802.3 Standards Committee Plenary Group has been forwarded to a task force that will begin nailing down specifications for a standard next month. Finalizing the specification should take six to nine months.

AT&T bumps up 6300 series with powerful chip

BY ED SCANNELL
CW STAFF

MORRISTOWN, N.J. — AT&T last week unwrapped a low-end version of its 6300 Workgroup System specifically designed to accommodate a variety of communications add-in boards.

Priced between $1,411 and $2,091, depending on the disk drive configuration chosen, the system has seven expansion slots to hold a combination of networking and memory boards. Users should be able to easily connect the system to the higher end versions of the Workgroup System family, according to Richard McGinn, vice-president of management at AT&T's Data Systems Group.

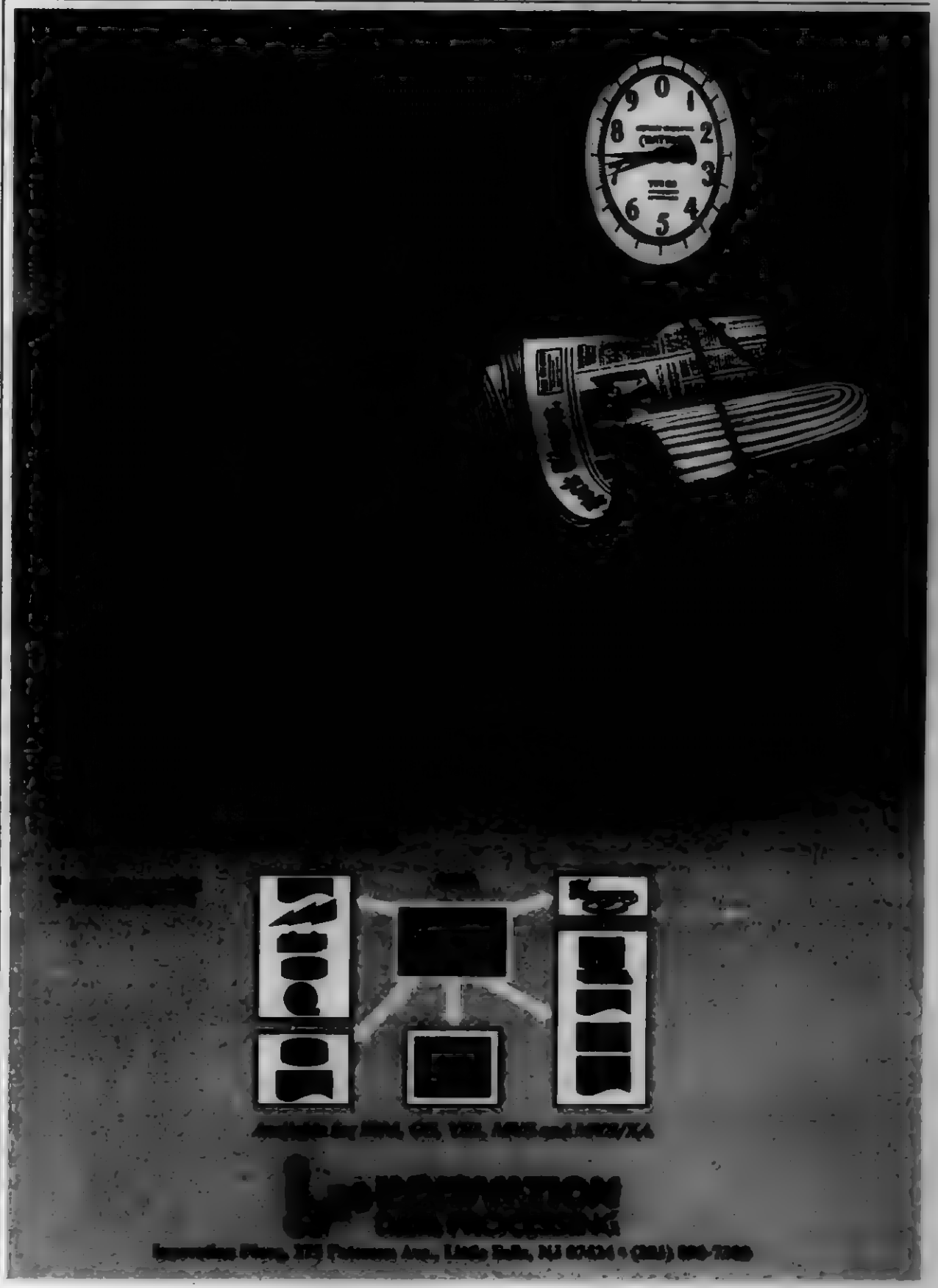
The Model 81, priced at $1,411, has a single floppy drive; the Model 82 contains two floppy drives and costs $1,491; and the Model 83 is a 20M-byte system that costs $2,091.

Choose your weapons

All three systems have a 10-MHz Intel Corp. 8086 processor and a 101-key AT&T keyboard and can be hooked up to any industry-standard monochrome or color monitor. They are compatible with IBM's Color Graphics Adapter, Enhanced Graphics Adapter and Video Graphics Array boards, an AT&T spokesman said.

Options for all three systems include an Intel 8087 math coprocessor, a 3½-in., 1.44M-byte Floppy Drive Unit Kit that permits 3½-in. disks to be used, a 5¼-in, 1.2M-byte floppy drive kit that allows 5¼-in. disks to be used, 40M- and 60M-byte streaming tape units, an AT&T mouse and an expansion board that allows the systems to serve as a facsimile machine.

All three systems are available immediately, AT&T said.



Microsoft's LAN product to reach out

BY KATHY CHIN LEONG and PATRICIA KEEFE
CW STAFF

Microsoft Corp. is expected to announce three OEM pacts next week designed to provide its LAN Manager with support for three major communications standards: Open Systems Interconnect (OSI), Transmission Control Protocol/Internet Protocol (TCP/IP) and IBM's Systems Network Architecture (SNA).

The OEM agreements, along with one between 3Com Corp. and Retix, will be detailed in San Francisco at the Microsoft Advanced Network Developers Conference, slated for March 30 to April 1.

3Com is expected to announce an OEM pact with Retix that is intended to provide OSI support for the latest release of 3Com's network operating system, the LAN Manager-based 3+Open.

Affects future products

Sources within 3Com said the relationship with Retix will extend to future 3Com OSI-related products. 3Com will make several announcements at the conference, a 3Com executive confirmed.

Reportedly, Retix will also provide OSI capabilities for the LAN Manager. Microsoft will unveil a similar, much-delayed OEM pact with San Jose, Calif.-based Excelan, Inc., a leading voice in the TCP/IP market.

The Microsoft-Excelan arrangement was mentioned in passing in a speech last week by Excelan President Richard Moore.

Another Excelan official said he expects that Microsoft will use the TCP/IP software as an option to enhance the LAN Manager.

Provides a link

A third pact with Orion Network Systems, Inc. in Berkley, Calif., will link IBM and Microsoft OS/2-based networks to SNA.

Orion said its server-based software will put IBM's Advanced Program-to-Program Communications interface on top of the Named Pipes feature of the LAN Manager, enabling users to access necessary resources off the network.

A Microsoft spokesman declined to comment on the agreements, but did say, "We believe there are three important protocols in the networking industry: IBM's Netbeui network protocol, TCP/IP and OSI."

OSI sights on distributed data

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The Open Systems Interconnect (OSI) standards committee, celebrating its 10th anniversary, concluded a historic series of meetings last week that set the agenda for the next decade of work on interoperability standards.

The agenda for the OSI's "second era" is to develop a standards model for distributed data bases and to enhance the existing seven-layer OSI model, according to Richard des Jardins, chairman of Subcommittee 21 of the International Standards Organization. The subcommittee is in charge of information retrieval, transfer and management for OSI.

"By the end of the second 10 years, we should have a world information society," characterised by full interoperability of computer systems, des Jardins said.

The meetings in the U.S. capital, which lasted 2½ weeks, drew 400 delegates from 22 countries, including 100 U.S. delegates accredited by the American National Standards Institute.

Building a model

Progress was reported in several OSI projects, but the most dramatic initiative was the creation of a working group to develop a reference model of open distributed processing to ensure that computer users can gain transparent access to data bases stored on various dispersed systems.

Joost van Griethuysen, convener of the new working group, said the model should be completed in about four years but that a draft proposal will be available at the end of 1989. He said the model will be coordinated with OSI and data base management standards.

According to des Jardins, enhancements to the basic OSI model will come in the following three areas:

- Security, including passwords, transport encryption, access controls and authentication. The OSI Security Architecture was completed last week, but the architecture must be applied to each of the seven OSI layers.
- Network management framework. This helps network managers monitor the performance, resources and configuration of the system, according to Harold C. Folts, president of Omnicom, Inc., a Vienna, Va.-based OSI consulting firm.
- Support for Integrated Services Digital Network (ISDN). Thorry Zylberberg, convener of the working group on OSI architecture, said he expects to see the convergence of OSI and ISDN standards by 1996.

Des Jardins cited several major accomplishments in the first decade of OSI work, including the seven-layer model in 1984; the approval of two applications for the seventh layer, FTAM and the CCITT X.400 electronic messaging standard; and wide industry acceptance of three OSI subsets, Manufacturing Automation Protocol, Technical and Office Protocol and the U.S. Government OSI Profile.

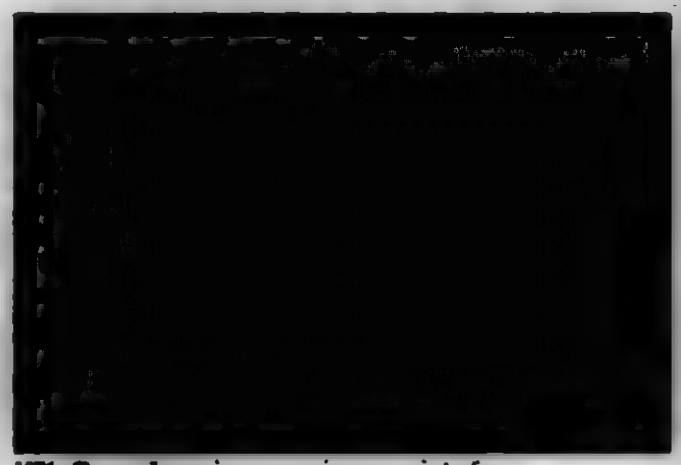
Proposal for No. 3

The subcommittee last week issued a draft proposal for a third OSI application, OSI-Transaction Processing (OSI-TP). Although the proposed application resembles IBM's Systems Network Architecture (SNA) LU6.2 protocol, the subcommittee stressed that OSI-TP has more technically advanced features than LU6.2 or any other proprietary networking architecture.

"OSI-TP is not the same as SNA's LU6.2," said Robin John, convener of the working group on application layer protocols.

There have been reports that IBM tried to force the standards body to adopt LU6.2, but OSI consultant Folts said, "they did not adopt straight LU6.2 by any means. They took a much broader and more advanced approach to satisfy a bigger range of needs."

HP net management promotes open windows



HP's Openview gives users a common interface

BY ELISABETH HORWITT
CW STAFF

CUPERTINO, Calif. — Hewlett-Packard Co. further muddied the network management standard waters last week by introducing its own version of an "open" network management system that is slated for eventual migration to the Open Systems Interconnect (OSI) standard.

The computer vendor's current customers are the immediate targets of the new Openview system, which provides centralised management of a wide range of HP wide-area and local-area networking devices through a graphics-oriented, windows-based IBM Personal Computer-compatible workstation.

But HP is also proposing Openview Windows — the user and software interface at the core of the new system — as an industry standard that would complement OSI network management protocols now under development.

'Common look and feel'

While the International Standards Organization is concentrating on defining OSI services and protocols for formatting, sending and collecting network management information, HP's Openview will provide users with "a common look and feel for managing different devices, as well as a common application interface," said Bernard Guidon, marketing director for HP's information networks group.

While Guidon emphasised that Openview would be linked to IBM's Netview, HP's proposal is likely to compete with Netview for industry-standard status. IBM has made it clear that it is working on its own user and application interfaces, based on its Systems Application Architecture (SAA).

Possibly hoping to defuse Openview's image as a Netview competitor, HP has revealed plans to migrate the system to the Presentation Manager, a component of Microsoft Corp.'s MS OS/2 that IBM has used as the basis for the common user interface within SAA.

Openview is also likely to butt heads with AT&T's Unified Network Management Architecture (UNMA). While the system was designed to manage AT&T network devices, AT&T is trying to get various UNMA elements — including a multiwindow user workstation — adopted as part of the OSI standard.

Closes hole

Right now, however, Openview fills a network management gap that neither OSI nor Netview has addressed by offering users "a standard set of symbols, icons and colors, so that when you look at the screen, it is graphically evident to you what is going on the network," said David Terrie, president of Newport Consulting in Scituate, Mass.

A future higher-end version of the system will "use the PC as a window" into a Unix-based data base engine that will collect network management statistics for later retrieval and analysis, Terrie said.

The HP product allows the operator to simultaneously view different parts of the network in different windows; monitor a map of the entire network; and zoom in on a specific network device or segment to pinpoint a trouble area, Guidon said. An HP Vectra PC-based Openview Windows version is available now and is priced at $6,000 to $8,000, hardware included.

For wide-area network management, HP also introduced four new HP Openview software packages last week that run on an HP 3000:

- Openview Status and Diagnostic Monitor checks the status of remote HP 3000 computers and performs network- and protocol-level diagnostics. The product is priced at $6,000.
- Openview Performance Monitor collects network performance information that can be used to optimise communications traffic. It is priced at $6,000.
- Openview Network Command Interpreter, used with existing HP OPT/3000 software, is said to allow a manager to execute commands and programs and monitor use on remote HP systems. It is bundled with HP Network Services/3000 software at no extra charge.
- Openview In-Service Transmission Impairments Measurement Set Manager analyzes and isolates faults and quality degradation on telecommunications lines and devices. Pricing ranges from $1,000 to $2,000.

A fifth introduction, Openview Bridge Manager, monitors and troubleshoots HP network bridges from an Openview Windows workstation. It is priced at less than $2,500. All five of the above are scheduled to be available by year's end.

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Unisys pumps up 2200 series

Injects MIPS into 'mid-frame' line with one- to six-CPU machines

BY ALAN ALPER
CW STAFF

NEW YORK — Reaffirming a commitment to its Sperry mainframe customer base, Unisys Corp. last week showcased a series of Model 2200 mid-range processors that will significantly extend the performance of the product line when the machines begin rolling out later this year.

The six new models of the 1100/2200 series, called the 2200/400 series, range from an entry-level uniprocessor rated at roughly 2.4 million instructions per second (MIPS) to a configuration of six tightly coupled processors said to operate at about 14 MIPS, according to Neal Waddington, Unisys's vice-president and program general manager for mainframe systems.

Low-end models should be available in November, but the most powerful models are not set to be shipped until the third quarter of next year.

The 2200/400 family offers two to 11 times the performance of the 2200/200, the entry-level processor in Unisys's so-called "mid-frame" line, which was unveiled in late 1986. Installations of the 2200/200 family, which was reduced in price by 20% last week, are estimated by Waddington to be in the hundreds.

Guarding flanks

Aimed primarily at departmental and distributed processing environments, the 2200/400 line is positioned to protect the mid-range of the former Sperry Corp. installed mainframe base from incursions by other vendors, such as IBM and Digital Equipment Corp., analysts said.

The machines, which support a broad array of networking standards — including IBM's Systems Network Architecture — are also expected to provide Unisys with a way to more effectively compete with IBM's 9370 and 4381 and a broad range of DEC VAXs for new accounts requiring dispersed processing, the analysts added.

Base configurations of the six-member family are priced between $177,951 and $952,065, not including mass storage or an operating system.

Very large-scale integration semiconductor technology enabled Unisys to reduce the parts count on the new systems by about 90%, resulting in processors that offer four times the performance, require 70% less space, power and cooling and are less expensive to manufacture and maintain than the 1100 Models 60 and 70 that they effectively replace.

"This product, coupled with the NCR announcement (see story page 10), shows that the old mainframe guys are finally bringing to market competitively priced mid-range products," said Michael Geran, an analyst with The Nikko Securities Company International, Inc. in New York. "Unisys wants to protect its installed base, and they're leveraging new technology to compete from a price/performance perspective with DEC."

All 1100/220 applications will operate on the 2200/400s because the new series, like its predecessor, runs the old Sperry OS 1100 proprietary operating system. As part of Unisys's commitment to open systems, however, the 2200/400 will also run Unix as a guest operating system under OS 1100.

At a New York press conference held to unveil the processors, Unisys Chairman W. Michael Blumenthal said the 2200/400 series is evidence that Unisys is delivering on promises, made at the time of the merger between Burroughs Corp. and Sperry, to preserve Sperry customers' investments in mainframes.

"We said we'd maintain the two mainframe architectures of [Sperry and Burroughs], and we are accelerating the upgrading of the Sperry side to a state-of-the-art system," Blumenthal said.

The long haul

James Ault, president of Use, Inc. — a Sperry users group — and director of information services at Creighton University, said the series indicates that the 1100/2200 architecture will be maintained by Unisys for some time to come. "The important thing is, you don't have to do conversions or rewrites to move applications onto this system," Ault noted.

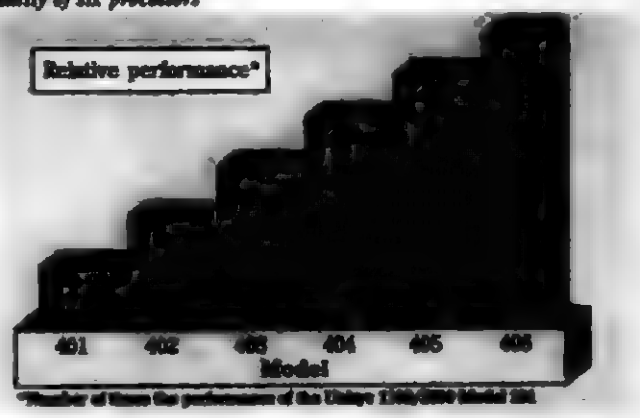
The single- and dual-processor configurations, called the Models 401 and 402, will be available in November; the three- and four-processor machines, the Models 403 and 404, should be shipped in the second quarter of 1989; and the five- and six-processor units, the Models 405 and 406, will be delivered in the third quarter of 1989, the company said. None of the systems have entered beta testing yet, according to Unisys's Waddington.

The Model 401 consists of one instruction processor, one I/O processor, 16M bytes of main memory, an I/O accessory cabinet, a shared I/O processor supporting low-speed communications, a console and maintenance facilities. The initial configuration can be upgraded with a maximum of five instruction processors and nine I/O processors.

Up to 64M bytes of main memory is supported on the Model 401, and up to 64 I/O channels can be connected to any 2200/400, compared with a maximum of 56 on the 1100/70, Unisys said.

Upgraded options

Unisys fills in its mid-range lineup with the upgradable 2200/400 family of six processors



*Number of times the performance of the Unisys 1100/2200 Model 401

INFORMATION PROVIDED BY UNISYS CORP.
CW CHART

Netlink spins SNA Hub into Token-Ring

BY ELISABETH HORWITT
CW STAFF

RALEIGH, N.C. — Netlink, Inc. has turned its SNA Hub into a gateway that the firm said supports up to 200 concurrent IBM 3270 or LU6.2 sessions between an IBM Token-Ring network and multiple hosts.

The gateway gives Token-Ring users access to all the capabilities of Netlink's SNA Hub communications processor, including the ability to run concurrent 3270, LU6.2 or other types of IBM Systems Network Architecture (SNA) sessions on an IBM 370, System/36, 38 or 8100 or a Tandem Computers, Inc. host, according to Scott Palmquist, Netlink's product marketing manager.

SNA Hub can route sessions among multiple hosts that can be attached over either a local link or a Synchronous Data Link Control (SDLC) remote dial-up or leased-line connection, Palmquist added.

Gracious host

SNA Hub provides host access for up to 64 physical units, which can include IBM Personal Computers, other IBM hosts and IBM 3174 cluster controllers. Those 64 physical units can be running up to 200 concurrent sessions, however: For example, an IBM PC or Personal System/2 can be running up to five concurrent host sessions on IBM's 3270 workstation program, and multiple terminals can establish host sessions via a networked 3174, Palmquist said.

"A lot of people have announced gateways with both 3270 and LU6.2 support, but a lot of the other gateways are PC based and don't have the Hub's capacity" to support multiple devices and sessions, said Steven Randesi, chairman of Saratoga, Calif., consulting firm Gen2 Ventures.

SNA Hub gateway's real competition will come from a new and more powerful generation of local-area network gateways running OS/2 Extended Edition, which IBM and other vendors are expected to announce when the operating system is complete, Randesi said.

The new SNA Hub Version 2, which reportedly will offer 2.6 times the performance of the earlier SNA Hub model as well as Token-Ring support, is priced starting at $12,995. The Token-Ring board and software for the SNA Hub are priced at $1,250. Both products are scheduled to be available in May.

Minis

FROM PAGE 1

for software in most applications categories," Shinyeda said. "More managers have reported plans to purchase LAN-based word processing and imaging software this year."

The corporate spending trend away from minis appears to be exacerbated by uncertainty about the U.S. economy. Although both big-ticket mainframes and lower cost micros appear to be holding their own, the minicomputer is the prime candidate for delayed purchase if a company wants to put the brakes on its MIS spending.

"The lead cycle on a mainframe is longer," said analyst George Elling of Merrill Lynch Research. "If you made plans before this quarter to purchase a mainframe, you'll go ahead with them. With a mini or supermini, there's a tendency to make sure your own business is healthy before you go ahead. With PCs and workstations, companies don't have the fear about spending that kind of money."

First to go

Elling's observation is supported by the recently formed 50-member Sierra Group/First Boston Corp. MIS Executive Council. A majority of that group said departmental minicomputer budgets would be cut the most in a recessionary economy.

Mark Steinkrauss, DEC's director of investor relations, said DEC sales representatives have seen "an unmistakable drift to the low end" in booking orders for the quarter ending March 31. "For higher dollar items, the closure time was longer than they expected," he said. "But the demand for workstations, servers and terminals has been much higher than we anticipated."

> "THE ONLY [mini] company that still looks strong is HP."
>
> GEORGE ELLING
> MERRILL LYNCH RESEARCH

Although Steinkrauss said DEC believes the recent introduction of its high-end Polar Star and renewed economic confidence can reverse that trend, investors are not so sure. The stock prices of DEC, Wang Laboratories, Inc., NCR Corp., Prime Computer, Inc. and Data General Corp. have fallen in the past two weeks in a rising market as analysts have turned bearish on the mini business.

"The only [mini] company that still looks strong is Hewlett-Packard Co., because of a new product cycle," Elling said.

The disappointing sales of IBM's 9370, the ballyhooed departmental system, provide further evidence of the trend. Although the 9370 results can be attributed to a variety of factors, at least one early 9370 customer, United Airlines' Covia Corp. subsidiary, scaled back its purchase plans when it was able to run many of its travel agency software modules on PS/2 Models 60 and 80 [CW, Jan. 18].

"The idea of downsizing doesn't just apply to the mainframe; minis are being downsized also," said David Wu of S. G. Warburg & Co. "More and more applications on minis will be done on workstations and networked PCs. The minicomputer business is now a mature business and won't grow very fast."

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Users stall OS/2 plans

Corporate developers stick with ready options

BY DOUGLAS BARNEY
CW STAFF

Although Microsoft Corp. has pitched OS/2 as a panacea for many corporate software development ailments, few shops have begun the arduous task of writing for the new operating system, and some have recently shelved OS/2 projects.

Even though Microsoft shipped some 1,300 copies of the OS/2 Software Development Kit to corporations, most users interviewed last week said they are using it simply to learn about the operating system — not to write software.

Corporate OS/2 development is lagging for several reasons. For some, the flexibility of Unix and IBM's recent Unix backing is reason enough to write for that environment. Others said they are sticking with the MS-DOS environment because it is the most cost-effective.

Waiting it out

Even companies with great faith in Microsoft's operating system strategy are still waiting for prerelease code for the Presentation Manager graphical user interface.

Corporations working on tight budgets have often found Microsoft's MS-DOS requires less training, has lower support costs and runs on less-expensive hardware. For Westinghouse Electric Corp., budget cutbacks killed its project.

"We found it better to back down and go back to DOS to generate the applications," said Chris Brooks, senior engineer at Westinghouse.

It is a similar story at Deere & Co., which may opt for Unix over OS/2. "We are wondering whether OS/2 will be competitive, when you consider the Unix products that are coming out, such as IBM's AIX and X Window," said Ken Wedig, manager of engineering information systems at Deere.

Another user said he is opting for Unix over OS/2 because of its flexibility on Intel Corp. 80386 machines. By running on a wide variety of machines and, in some cases, letting MS-DOS applications run as tasks, Unix has clear advantages, said Rick Frye, manager of research and development at Carolina Freight Carriers Corp.

Although programmers can overcome the difficulties of writing for a new operating system, it may not be as easy to convert users of in-house software.

Difficult migration

A Midwestern firm that is among the top 10 in the Fortune 1,000 has developed a system for users that provides one-keystroke access to applications as well as fast access to hosts. In fact, some users are already attached to multiple hosts, a manager in the firm said.

The firm has chosen not to move the application to OS/2 because of the difficult migration involved, the manager said.

Those with the greatest commitment to OS/2 are still waiting for the Presentation Manager. In the meantime, these firms said they are looking at Microsoft Windows, which reportedly offers an early peek at the Presentation Manager interface and programming techniques.

"I've been learning Windows with the assumption that it will be easy to move to the Presentation Manager," said Charlie McLoughlin, Touche Ross & Co.'s software support manager.

Senior writer Alan J. Ryan contributed to this report.

Pioneers on OS/2 trail

Despite the problems and alternatives, some pioneering firms are writing for IBM and Microsoft Corp.'s OS/2 now.

Peat, Marwick, Main & Co. has already completed three OS/2 applications that are in use, according to Tom Cornell of Peat Marwick's airport consulting services area. Because many of Cornell's applications are ports of existing mainframe programs, OS/2's large memory offers a perfect fit. "We don't have to finesse things into working," he said.

Another OS/2 believer is Robert Metz, senior technical analyst at Whirlpool Corp. Metz is currently working on a "common controller for passing data from the factory floor to an IBM mainframe." The strongest draw to OS/2 for Whirlpool's application is its multitasking. "Now, we can break it up into multiple tasks, such as host communications, factory floor equipment communications and operator control," he commented.

DOUGLAS BARNEY

OS/2

FROM PAGE 1

the company's Austin, Texas, laboratories, according to IBM's Harrington.

One corporate MIS manager who saw a demonstration said the product's final design appeared set but was still missing some pieces, such as Cobol programming tools, which may not be available for another year. He said he believes this is a drawback because OS/2 will be popular with Cobol programmers.

The MIS manager said the data base portion of the program did not seem complete and that the program's SQL implementation did not allow users to fully communicate with the mainframe. "At this point, [the data base portion of OS/2 Extended] isn't amazingly different from Paradox or similar data bases," he said, referring to one of Borland International's data base products.

Until several compelling applications for OS/2 become available, some MIS managers are not even weighing the pros and cons of buying the system.

"We haven't even contemplated it," said Warren Camp, supervisor of information services at Tenneco Oil Processing and Marketing in Chalmette, La. "I just don't see how it fits in."

"I am more concerned with the new IBM systems and price changes" than with OS/2 Extended Edition, said Jeff Ehrlich, General Electric Co.'s manager of product technology. "No one has explained to me yet what the downside would be to wait six months or even a year" to implement OS/2.

While most MIS managers are not sure of their level of commitment, most said they are gearing up for it by buying Intel Corp. 80286- and 80386-based systems with the speed and potential memory capacity that OS/2 requires.

Analysts said they do not expect any widespread acceptance of the Extended Edition by corporate accounts during the next year or two. The Yankee Group, a Boston-based market researcher, reported that it does not expect more than a 15% penetration of the program on 80286- and 80386-based machines by 1991.

Future uncertain

"We don't anticipate any wholesale adoption. A lot will hinge on the ultimate functionality of the LAN server," said Michael Gould, a software analyst for The Yankee Group. "It's just too early to speculate."

"We make sure that anything we buy now can run either OS/2 or something like it," said Larry Stonder, information center manager at Continental Grain Co. in New York.

One of those alternatives is Unix. One MIS manager said he preferred Unix's more flexible multiuser capabilities and its ability to run both Unix and DOS-compatible applications simultaneously.

"Where the big benefits come in with Unix, as opposed to a network arrangement under OS/2, is that you can use the vendor's asynchronous terminals, which cost $400, as opposed to traditional PC equipment in the network," Carolina Freight's Frye said.

OS/2 has several advantages over AT&T's Unix System V, according to IBM's Harrington, including compatibility with the much larger base of DOS applications and a full platform for IBM's Systems Application Architecture (SAA). He added that IBM's version of Unix, AIX, will provide extensions that will be consistent with SAA.

Most MIS managers contacted said they believe less costly OS/2 functional work-alikes will be available soon after IBM delivers the various versions of OS/2 Extended Edition.

Senior Editor Douglas Barney contributed to this report.

NCR System 10000 boasts PC integration

BY STANLEY GIBSON
CW STAFF

NEW YORK — Trumpeting clustering features and personal computer connectivity, NCR Corp. revamped its I series of departmental systems last week to span four models serving from two to 1,000 users. The new System 10000 is based on NCR's ITX operating system and covers a performance range of 1.3 to 5 million instructions per second (MIPS).

Designed to run current ITX applications, the new models are priced from about $31,000 to $227,000 for base configurations. The systems range in memory from 2M to 32M bytes.

There are four models in the series: the Models 35, 55, 65 and 75. The Model 35 is capable of 1.3 MIPS, which is equal to the performance of the 9400 IP system, according to the vendor. Available immediately, the Model 35 is a replacement for the 9200. The Model 55 has the same performance level as the Model 35 but has additional configuration and expansion options. It is slated to be available in the second quarter.

NCR said the Model 65, available in the third quarter, is capable of 2.5 MIPS and can support up to 760 terminals. The Model 65 is the only field-upgradable processor in the series and can be upgraded to the dyadic Model 75, which is slated to be available in the second quarter and is capable of 5 MIPS. The Models 55, 65 and 75 replace the older Models 9300 and 9400.

New computing range

NCR's System 10000 series presents options for small to large work groups

Model 35	1.3	Two to 16	4M	$31,210
Model 55	1.3	Six to 128	8M	$48,700
Model 65	2.5	24 to 760	24M	$121,700
Model 75	5	24 to 1,000	32M	$226,000

* Millions of instructions per second

INFORMATION PROVIDED BY NCR CORP.
CW CHART

Clustering capability

The clustering feature comes with Release 6.0 of ITX, which is required for the new systems. Release 6.0 is also available to previous I series users. Any Multibus system running Release 6.0 can cluster with any other such system that has up to four processors, NCR said.

A four-processor cluster of Model 75s offers a theoretical maximum of 20 MIPS. However, that total is reduced by 5% to 8% in practice due to clustering overhead, said Khaled Marrei, assistant vice-president of ITX and Unix systems at NCR.

The system uses ITX Windows, which is based on Microsoft Corp.'s Windows, and allows a PC user to perform a job on the host or PC, Marrei said. The system currently supports the IBM Token-Ring network standard, although Ethernet support will be offered later, according to NCR. NCR will also later support IBM and Microsoft's OS/2 and the Microsoft LAN Manager, Marrei said.

"It is evident that the PC is the workstation of choice. But the full potential of the PC is only realized when it becomes part of the entire data processing network," he said.

"It's an effort to rejuvenate the ITX line. NCR sold more Unix systems than ITX systems," said Michael Geran, an analyst with Nikko Securities Company International, Inc. in New York.

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Telecom to blossom as users' focus shifts

BY KATHY CHIN LEONG
CW STAFF

BURLINGAME, Calif. — Amid the depressing economic backdrop of the $150 billion U.S. trade deficit and warnings that the Japanese will rapidly surpass the Americans in technology, there is still plenty of opportunity ahead for communications firms that can relate to and understand corporate users.

This was the official word reiterated at the Communications & Computers Financial Outlook Conference, which was held here and sponsored by Technologic Partners and Kidder, Peabody & Co.

"In the 1990s, users will be moving away from focusing on the transport layers and will be giving their attention to applications," said Dixon Doll, consultant and chairman of the DMW Group. "Telecommunications in the Fortune 500 will move from the tactical to the strategic."

Added William Rich, an analyst at Northern Business Information, Inc., "Users need to cut costs, and they want to use their networks as competitive weapons."

As the voice communications and data worlds blur, MIS directors are becoming more involved in decision making, Rich said. "Decision making will be moving out of the hands of the telecom manager and into the power of the MIS director."

With that in mind, industry trends in the 1990s will pave the way for successful start-ups that prove they can trim the MIS budget. There will be increased demand for service companies and products in network management as voice and data networks become increasingly complex, Doll noted.

Seeking control

Research by Northern Business Information in New York suggests users are looking for network management systems to provide high-level control over multivendor environments. "Network management represents many markets," said Jim Anderson, a partner at Merrill, Pickard, Anderson & Eyre. "There will be plenty of opportunity for companies, and they won't require a lot of money."

Other areas opening up will follow emerging standards, such as Integrated Services Digital Network, the ISO's Open Systems Interconnect (OSI) and Electronic Data Interchange (EDI). For example, early OSI player Retix, based in Santa Monica, Calif., entered the market in 1985 and has already secured more than 80 customers and been consistently profitable for the last eight quarters, reported Andy DeMari, Retix's president.

As evidenced by Network Equipment Technologies Corp., the wildly successful T1 multiplexer company in Redwood City, Calif., users will put up capital to maximize use of their T1 and T3 lines in the '90s. As T1 prices continue to drop, users will be taking advantage of T1 lines as local transmission facilities — not just backbone networks.

Seafirst Bank, based in Seattle, is using T1 multiplexer technology from Stratacom, Inc. in Campbell, Calif., for local access to bank branches, according to William Stensrud, vice-president of marketing at Stratacom.

As vendors accept the fact that their systems must coexist in user sites with other machines, the bridge and gateway markets will gain momentum. "I expect there to be explosive growth here," DMW Group's Doll said.

Getting into 'groupware'

Along with openings in the wide-area networking market, the local-area network industry will provide new channels for entrepreneurs. A new class of software applications called "groupware" will emerge, giving users the ability to work on the same project simultaneously, predicted Nat Goldhaber, founder of TOPS, a Sun Microsystems, Inc. networking subsidiary. Electronic mail is one network application in the groupware category.

As users become more sophisticated, their expectations and requirements for LANs will grow, observers said. According to Doll, the individual microcomputer data base is now giving rise to the LAN data base that supports SQL. Companies such as Excelan, Inc. have forged joint-development relationships with mainframe data base vendor Oracle Corp., based in Belmont, Calif.

As standards emerge, products will look more and more alike. Network nodes will become almost indistinguishable from one another. Hence, an increasing factor for success will be to provide excellent service, according to analysts who spoke at the conference. "You have to be a service provider and less a purveyor of product," Northern Business's Rich stressed.

Said William Davidow, general partner of Mohr, Davidow Ventures: "Service is the next battleground for corporate survival."

Stellar enters super-graphics fray

BY STANLEY GIBSON
CW STAFF

CAMBRIDGE, Mass. — Stellar Computer, Inc. in Newton, Mass., fired the third salvo in the desktop supercomputer war last week by announcing the Graphics Supercomputer Model GS1000.

Although following its West Coast archrival Ardent Computer Corp. and East Coast competitor Apollo Computer, Inc. by two weeks on the announcement timetable, Stellar plans to top both rivals by shipping its workstation by the end of this month. Ardent said it will ship its Titan workstation in the fourth quarter, and Apollo is aiming for the same time frame.

"We are going for the roses with this one," said Stellar Chairman and Chief Executive Officer John William Poduska, a founder of Prime Computer, Inc. and Apollo. "We plan to be a $400 million to $500 million company in four or five years. There is also a chance we could be a zero-million-dollar company. But I can tell you, we won't be a $50 million company."

Caters to engineers

The Stellar system was designed for engineers in need of high performance for both graphics and computation. Typical uses are expected to be in such fields as mechanical computer-aided engineering, molecular modeling and computational fluid dynamics.

According to Poduska, engineers currently using a three-dimensional graphics workstation in conjunction with a minisupercomputer are plagued by narrow bandwidths between systems and different programming environments on the various machines. In addition, their cost is typically $250,000 per user, he said. In contrast, a Stellar system performing both graphics and computation can be had for as little as $98,000.

Stressing the system's high bandwidth, Poduska said the GS1000 contains a data path that transfers data to and from the main memory at 512M byte/sec. and to and from the cache memory at the same rate.

The system's microprocessors are configured to perform both parallel and vector processing, and it uses a Convex Computer Corp. vectorizing compiler to prepare code for vector processing, Poduska added.

The GS1000 can perform 40 million floating-point operations per second at peak performance. The system is capable of 20 to 25 million instructions per second of average scalar performance, Stellar claimed.

In graphics, the GS1000 can reportedly form a picture with 64,000 pixels per side. It can also perform 600,000 vectors per second. An antialiasing feature is included but causes a decline in performance, Stellar said. The system comes configured with 16M to 128M bytes of main memory.

It will take time for a leader to emerge in the new market for these types of systems, according to Vicki Brown, an analyst at International Data Corp. in Framingham, Mass. "I am very confident that neither Stellar nor Ardent will emerge as a leader for a year; their graphics and floating-point performance is very similar," she said.

Apollo's workstation will not be fully competitive with Ardent's and Stellar's until the first quarter of 1989, Brown added, but Silicon Graphics, Inc. in Mountain View, Calif., has promised a competing system by the end of this year.

In addition to its main computing engine, the Stellar workstation includes an Intel Corp. 80386-based subsystem connected to the main processor by an IBM Personal Computer AT-compatible bus. The micro also runs Microsoft Corp.'s MS-DOS and Windows and allows a user to run a spreadsheet or word processing as a window on the workstation.

The GS1000 runs the Stellix operating system, Stellar's version of Unix.

Part of Poduska's pitch was to paint a rosy picture of future enhancements and additions to Stellar's product line.

He said Stellar will offer a machine twice as powerful, but priced the same as, the GS1000 a year from now, followed by a similar price/performance increase a year later.

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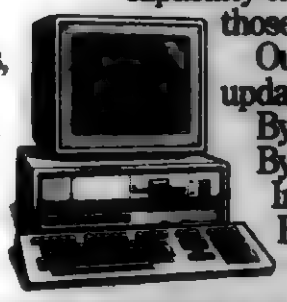

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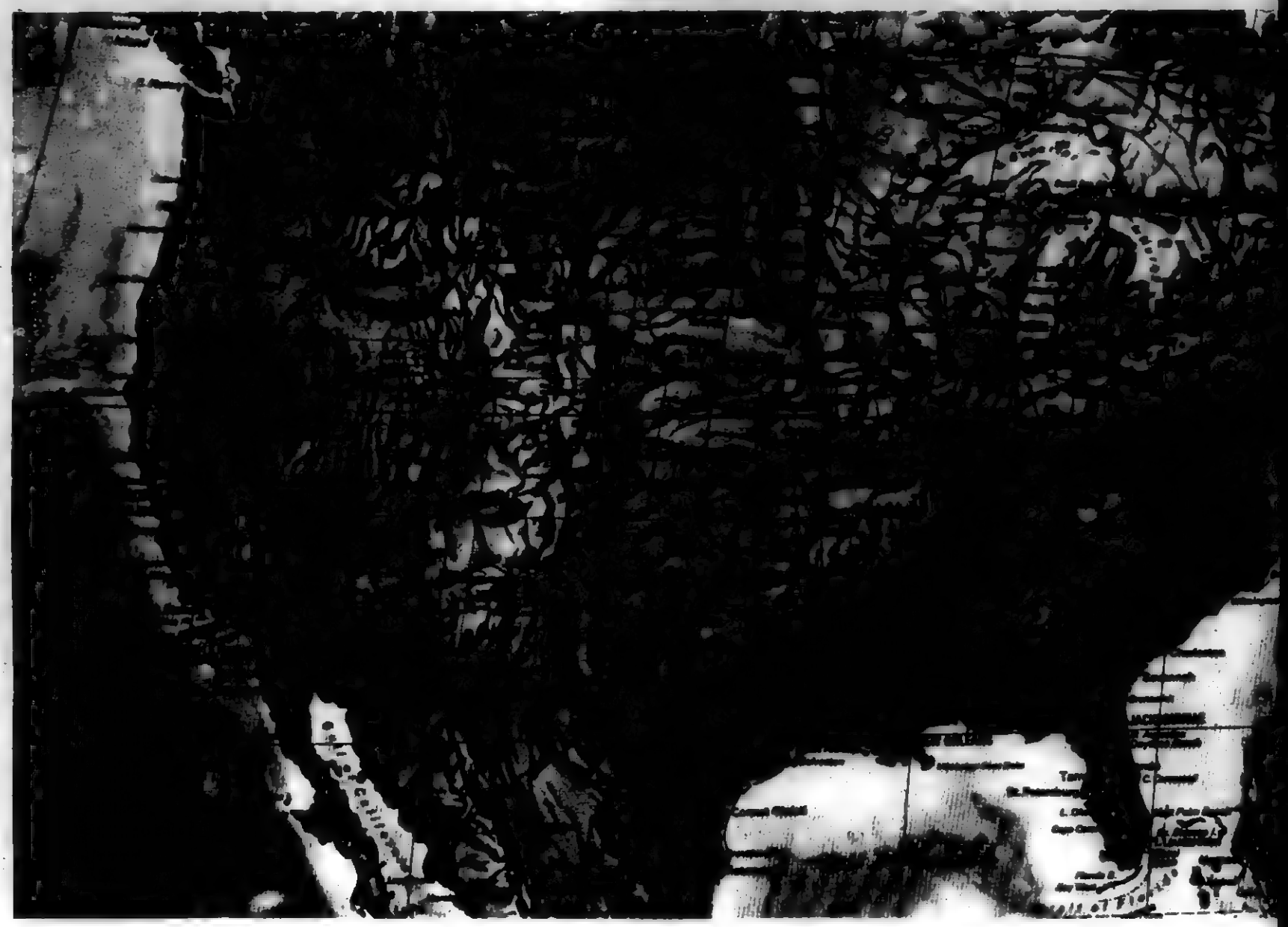

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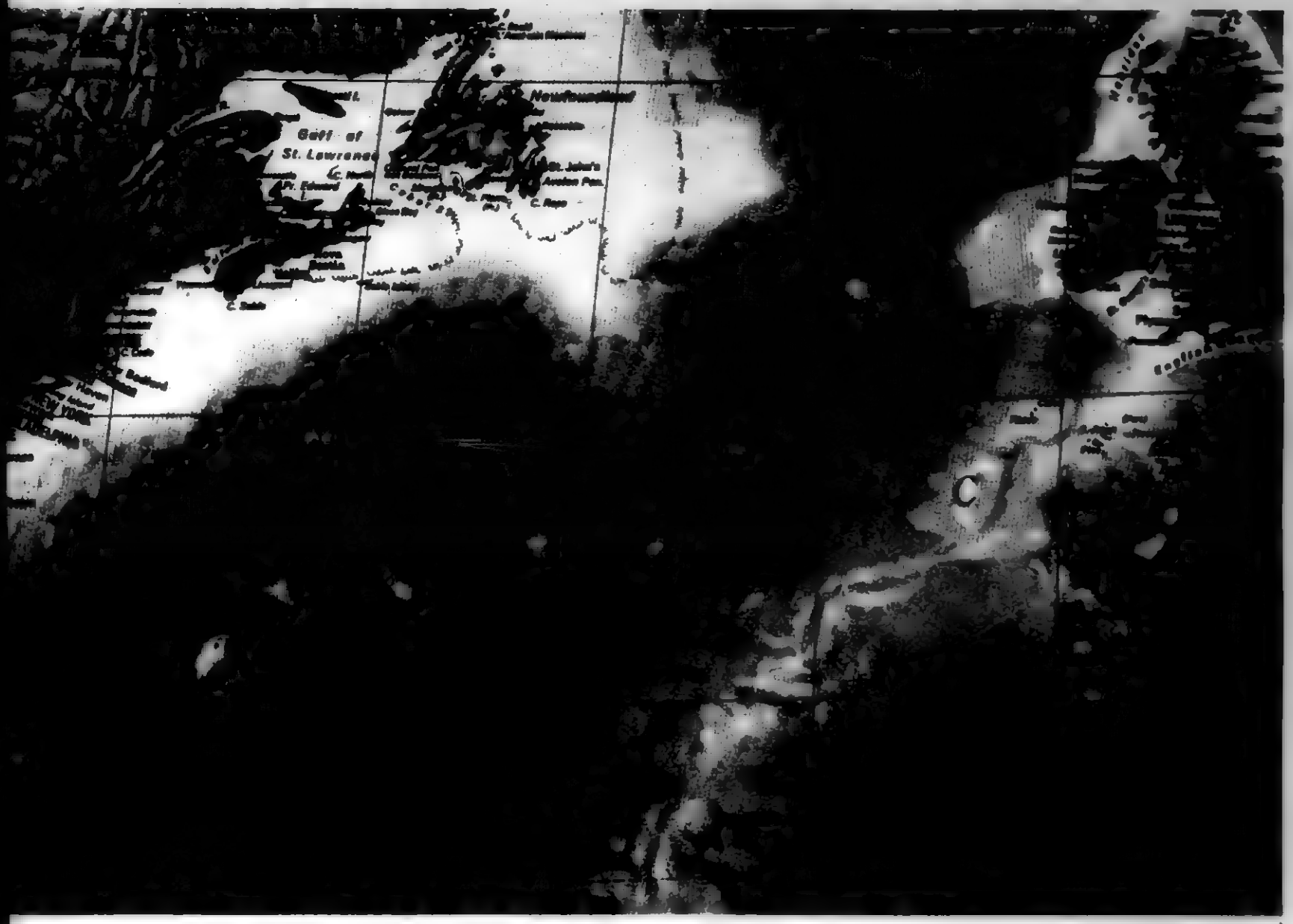

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EDITORIAL

Ports in a storm

With its formal entry into the mainframe market two weeks ago, DEC served notice that it believes it can beat the industry's most formidable competitor on its home turf. DEC's confidence is admirable, but its reasons for attacking IBM directly may have as much to do with market realities as with competitive nerve.

Surveys are now showing that enthusiasm for departmental computing may be beginning to wane. A recent Yankee Group study revealed a surprising surge of interest in mainframes [CW, Feb. 29], and a Sierra Group study released last week shows that minicomputers are taking a hit from below as increasingly powerful network servers take on more of their functions. In contrast, users' mainframe and PC purchasing plans remain strong, the surveys note.

It is doubtful that these trends have escaped DEC's sophisticated research operation. The firm's aggressive moves into the mainframe and super workstation arenas show that DEC wants to diversify to minimize its vulnerability in the mid-range. Fortunately for DEC, its VAX family and VMS operating system are strong platforms on which to do so. But DEC will face the fury of IBM in the mainframe market as it never has before, and its PC offerings continue to be all but nonexistent. DEC would like to find safer harbors in the event of a storm, but it will discover the waters it must navigate are rocky indeed.

Ready or not

Generally, markets for new computer products emerge before the industry really recognizes the opportunity. The current flood of workstation products offering single-user supercomputing power represents an investment of hundreds of millions of dollars for a market that nobody really has a fix on yet.

The introduction of mega-MIPS machines by Apollo and West Coast start-up Ardent [CW, March 7], followed by last week's announcement by East Coast start-up Stellar, could augur the next boom in placing power at individual users' fingertips — or could be as big as the relatively disappointing letdown of the laptop PC.

As much as anything, interest in these systems seems to have less to do with pent-up user demand than with the storied histories of Ardent chief Allen Michaels and Stellar boss William Poduska. As Gene Amdahl's failed quest to claim a triple crown with Trilogy Corp.'s promise of wafer-scale semiconductors for huge mainframes proved, venture capitalists are sometimes taken as much by a resume as by a solid business plan.

But if there is indeed a market for $100,000 workstations, we could be watching the beginning of a new era in computing. If not, it will be just one more example of restless entrepreneurs running on too much adrenaline and easy cash.

LETTERS TO THE EDITOR

Enviable position

I want to comment on the Con section of "Why the Mac will win," by John Xenakis [CW, Jan. 25].

The author said IBM is apparently willing to allow companies to share in Microsoft Corp.'s MS-DOS pie. He seemed to believe IBM set out with this as its strategy. I think it is clear to many observers that IBM did not have personal computers in its long-term strategic plan in the early days. It saw a market opportunity and rushed to assemble a product that it could get to market quickly. To accomplish this, it used existing chips and operating system software from other companies and thus created a cloneable machine.

It is interesting to note that Xenakis argued that Apple Computer, Inc. should also have cloneable machines. From a business perspective, this would cut Apple's attractive profit margins. The author commented that Apple seemed to want to keep the Macintosh market to itself. This is an enviable competitive position with the ability to sustain those high margins. I don't know many businessmen who would disagree.

Xenakis also credited the new Presentation Manager software from IBM and Microsoft as being 90% of the way toward merging the IBM Personal Computer and Macintosh user interfaces. I agree that this may make the desktop file management look similar, but what about the commonality of all application software? It is likely to take a long time for that to look comparable to the end-user community.

John M. Kudin
Druso Corp.
Pittsburgh

The address is . . .

I am writing in regard to the news brief on Northwest Airlines that appeared in "Inside Lines" [CW, Jan. 25].

Northwest Airlines is not headquartered in Minneapolis. The airport in the Twin Cities is Minneapolis/St. Paul International Airport. Its City/Airport Code is MSP, which stands for Minneapolis/St. Paul.

Northwest's address at MSP is St. Paul, 55111. Northwest's new world headquarters is in the St. Paul suburb of Eagan.

References to this metropolitan area should always include both St. Paul and Minneapolis.

Paul Perreault
Mendota Heights, Minn.

Part of reality

I would like to add some clarification to Hadson Gas Systems, Inc.'s position on its local-area networks and other networks as described in Aaron Brenner's "Reality falls short of hopes" [CW, Jan. 25].

The LAN is being used strategically as the bridge from the personal computer-based operating system to a data base transaction processing application system. Our objective is to use the LAN and wide-area networks to also support a virtual terminal network for the applications system.

The product will be a LAN network that works closely with the data base applications system on Hewlett-Packard Co.'s HP 3000; the PCs will provide distributed processing power for spreadsheets, graphics and word processing and also serve as terminals for the application. Other utility software will provide the link for exchanging data between minicomputers and PCs, tying the two environments together.

Hadson Gas is pleased with the performance, capabilities, cost, flexibility and strategic position of twisted-pair. Combined with Starlan and the HP 3000 environment, it is meeting our needs quite well.

We feel the problem of the PC configuration management is common to all LAN environments and is a given in the PC world.

For Hadson, reality has not fallen short; the reality is that LANs require work just like most other computing problems.

Ray Thomas
Office Automation Manager
Hadson Gas Systems, Inc.
Irving, Texas

Multiple solutions

As an information systems manager in the health care field, I read with interest the article, "Shaking off 15 years of DP-as-usual" [CW, Jan. 18]. While the title is accurate, the article could have included additional relevant information.

First, the perspective of hospitals' executive management should be an important part of articles such as this, since information systems should be evaluated by their effectiveness as tools for operating the business. Second, there are significant efforts under way to allow multiple

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Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

Users will be victims if IBM source code battle rages on

DAVID TORY

IBM's Object Code Only (OCO) policy has become a focal point of debate, argument and confrontation. The software industry, as represented by ADAPSO, says that availability of source code for IBM's mainframe systems software products is absolutely mandatory. IBM says its source code is a company asset that must be protected. However, there is middle ground that should enable these protagonists to reach a mutually beneficial accommodation.

Source code has become a heated issue because it is a convenient battle flag around which the software industry can rally and against which IBM can create a blanket of defense.

Unfortunately, if the software industry places too much focus on the need for source code, it could dissipate the energy it needs to counter the real challenges that independent software vendors face with IBM.

Information vs. code

The independent software vendor has a real need for product-related information from IBM. ADAPSO believes, however, that information is available for any specific product only within the source code for that product; the organization is confusing source code with the information we need to build products that add value to IBM's software solutions.

If IBM provides the information software developers need to link into IBM products, then we don't need the source code. The fact that IBM will not change its mind on this issue means we must work with the company to define our specific information needs.

As long as we talk about a generic source code issue, we aren't helping ourselves. As long as we insist on dealing with the problem as a source code issue, we'll have difficulty persuading IBM to provide a mechanism for proper information interchange.

The information we need can be broken down into the following three areas:

- Descriptions of the control blocks, functions and other interfaces to which we would connect our software.
- User exits at key functional points that allow value-added software to function.
- IBM's living up to its commitment to supply the same information to us, as independent party vendors, that it supplies to its internal developers.

With regard to this commitment, IBM has told the industry that each software development group inside IBM is effectively self-contained with respect to interfaces to other products. The only information that would be provided to the IBM development team is information that should also be made generally available to the independent software industry.

IBM breaks its own rules?

If IBM plays by the rules it has established, then the software industry can be confident that it has access to the same information that IBM developers use.

If, on the other hand, IBM shortcuts the rules that it has defined, then the whole process breaks down.

IBM is in a position to make one set of rules for the outside and one for internal development. That puts the independent software developers at a critical disadvantage. If there is such a conflict, IBM must resolve it. A properly prepared case identified to IBM, rather than an ineffective scream of outrage, will greatly assist in resolving that problem.

> IT IS very difficult to force any company to act in a statesmanlike way when the people who want its help are also making nonspecific accusations about the company's motives.

To my knowledge, during the five years since the OCO policy was announced, when a valid need for information has been presented, IBM has acted accordingly.

For example, when IBM created new sort instructions within microcode, the change mattered to our CA-Sort product. We learned of the change and asked IBM about it.

IBM said, "Yes, the change has been made, and here's the information you need to use the new instructions." IBM made that information available to the entire industry.

There is another problem that is currently best resolved by the availability of source code: The demand, from users and independent vendors alike, for a means for themselves to provide some level of technical support of IBM's software — specifically, to shortcut the debug problem diagnosis and resolution process.

IBM's perception is that if it supplies bug-free code, then the problem does not exist. If it supplies code that contains bugs but responds quickly and effectively with fixes, then source code is not needed. It is only when a problem occurs while alien software is co-resident — and IBM does not accept responsibility for resolving the problem — that source code is needed.

An example arose a while back, when our CA-Optimizer product had a conflict with CICS. We were able to find the bug in CICS because we had CICS source code. We did the job of debugging IBM software because IBM wouldn't. IBM has recognized the problem and gone part way toward a solution.

IBM realizes that when it provides a product under its Early Support Program (ESP), the new software must interact with independent software. Each ESP customer is allowed to identify the independent software that is critical to that client's production environment, and the customer is allowed to make use of the independent software during ESP testing.

It's not that big a leap for IBM to go the rest of the way and continue to fully support its software when independent software is present.

Continuing negotiations

The independent software industry needs to continue a reasonable dialogue with IBM. It makes little sense to be unnecessarily combative. It not only damages our relationship with IBM but also affects the credibility of the industry and does nothing to help our customers.

There are too many real issues associated with IBM's dominant and potentially anticompetitive position for us to needlessly destroy that dialogue. Our industry needs IBM to continue providing new hooks and interface documentation to all its systems software. We need the company to respond as the dominant market leader it is when evidence emerges that it is acting anticompetitively.

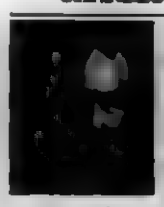
It is very difficult to force any company to act in a statesmanlike way when the people who want its help are also making nonspecific accusations about the company's motives. Industry, and especially the user, will benefit only if IBM and the independent software industry are demonstrably cooperative, not combative.

Tory is executive vice-president of planning at Computer Associates International, Inc. in Garden City, N.Y.

The doggonedest computer ever seen

Japanese unleash K9 to prove their originality

CHARLES P. LECHT



Make no bones about it, folks; the Japanese computer industry has come up with the doggonedest computer we've encountered anywhere. Announced by a secret Tokyo University research council looking into new forms of computer life, the system recently met all its certification tests as the world's first digital system capable of truly organic growth.

Each model features common I/O channels for high-speed data throughput and either one of two special ports, male or female, through which CPUs may be conveniently connected to create new systems.

Code-named the K9, the system is unmatched in its capacity to keep running, come what may; it is the ultimate in fault-tolerant fail-safe performance. The system is water-cooled when especially hot; however, it can run air-cooled for long periods through the use of its dual air-conditioning intake and exhaust ports.

With dual audio input channels for stereo sound recording and dual three-dimensional optical storage channels and supported by four flexible fibrous feet, the K9 has all the redundancy we may ever need to continue operation during the worst and best of times.

The K9 runs the Dog Operating System (DOS) version 3.0913467. End users will find the K9 to be very user-friendly, especially when meaty input is provided. And forget about I/O bottlenecks; the K9 never has any.

With powerful DOS commands like FETCH, OPEN, HEEL, STOP and WAIT available, the K9 performs like a champion. By design, it features natural real-time capability. As for speed, it runs so fast that it can run rings around current PCs. A built-in clock ensures automatic wake up for users who want this feature.

Fierce security features

And K9 has a built-in PROTECT command with teeth. Attempts to penetrate without authorization are met with a Snarl Lockout feature; if this defense doesn't work, the K9's memory releases bite after bite until the would-be intruder gives up. JUMP, ATTACK and DELETE commands are available in the more advanced Extended Version, but entry-level users are forewarned to become very familiar with the STOP and WAIT commands before using these.

The K9 literally chews up and digests the most difficult problems. For example, the K9's performance in the expert systems arena is unmatched in its ability to do pattern recognition. It may be the first system that can recognize its owner.

Through its input sensory devices, the system is almost supernaturally aware of the intentions of human beings making contact with it. One thousand K9s have been ordered by the Tokyo Metropolitan Police De-

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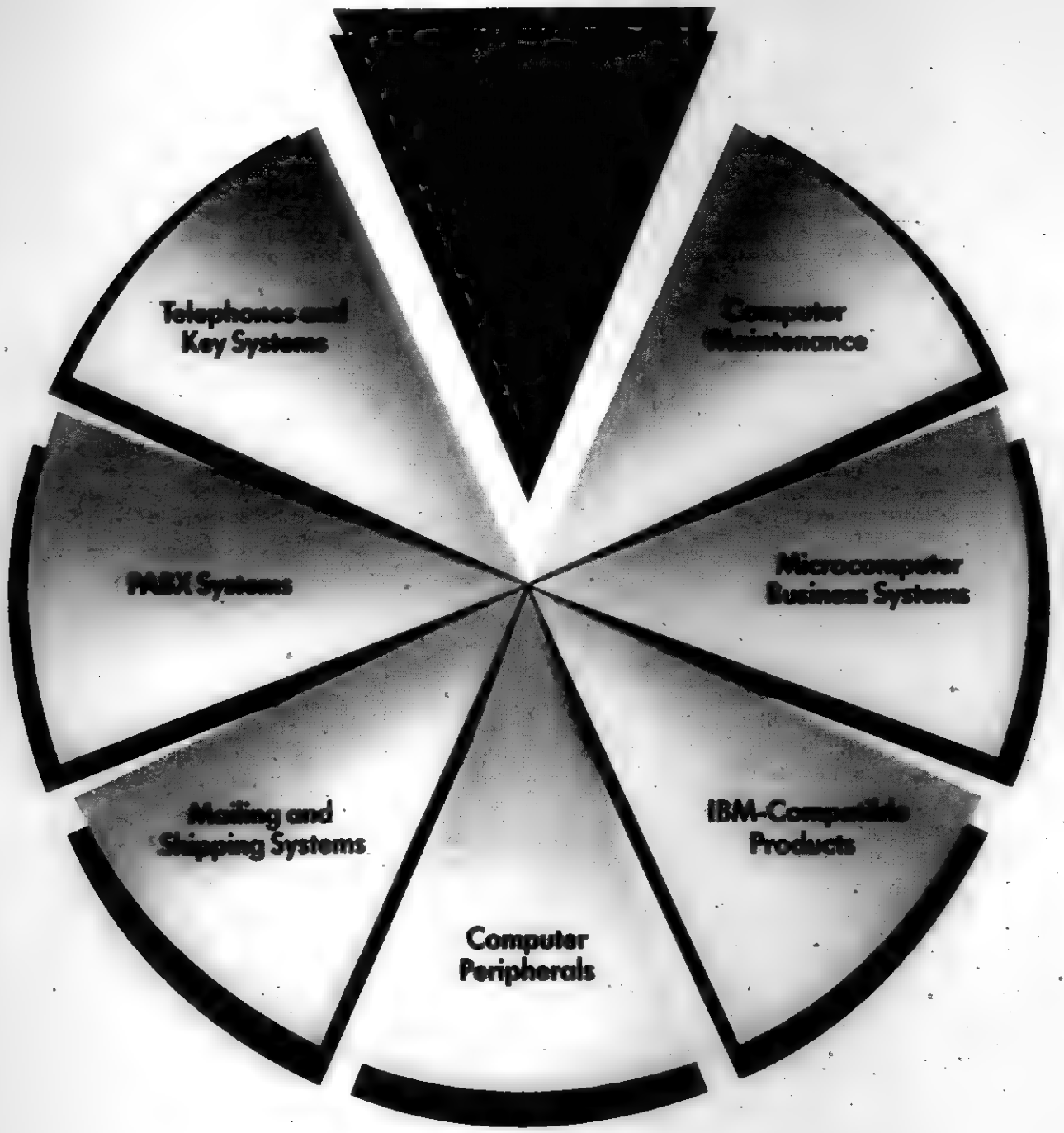
Lecht is an IDG News Service foreign correspondent based in Tokyo.



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Doggonedest

CONTINUED FROM PAGE 19

partment and several other law enforcement agencies for use in early warning security systems.

In the army now

The Japanese Self Defense Forces also plan to use the K9 in more advanced military applications, like those commonly referred to as war games. Highly interactive and capable of emitting a wide variety of sounds, the K9 provides military users with just about all the attack and defense action they may ever need or want in one system.

When it comes to artificial intelligence, the K9 has no competition. A series of routines invented by Soviet scientist Pavlov come with the system to imbue it with classic stimulus and response capabilities.

If one wishes to invoke the system, a built-in American-inspired randomness routine assures unpredictability in the K9's behavior, causing it to offer new solutions to the same problem in evermore differing ways.

WITH THE ANNOUNCEMENT OF THE K9, the Japanese scientific community has offered ample evidence to refute any charges that there is a lack of innovation within its ranks.

What about communications? Can the K9 communicate, and if so, which protocol does it use?

First of all, the K9 can shake hands with just about anyone inclined to make contact with it. Once it verifies that there's no cause to defend itself, the K9, through its emitter control logic brain, can send and receive in asynchronous, bisynchronous or mixed-mode simultaneous voice and data.

Housed in a very simple box-like facility, the K9 will fit on most executives' desks, but floor models are recommended.

Further, the K9 is weatherproof, so it can run in rain and snow.

Rainbow of colors

And talk about color. The K9 comes in most solid and mixed colors. Reds, browns, whites, yellows, you name it; K9s come in all of them or mixtures of as many as five. Spotted K9s are also available. Of course, if you wish basic black, that's OK.

Field-tested standard and hybrid models are now available for export to qualified dealers. K9 training materials are available in English and Japanese. A K9 users group meets Thursday evenings in a field near Yoyogi Stadium.

With the announcement of the K9, the Japanese scientific community has offered ample evidence to refute any charges that there is a lack of innovation within its ranks. The K9 is truly outstanding in its field.

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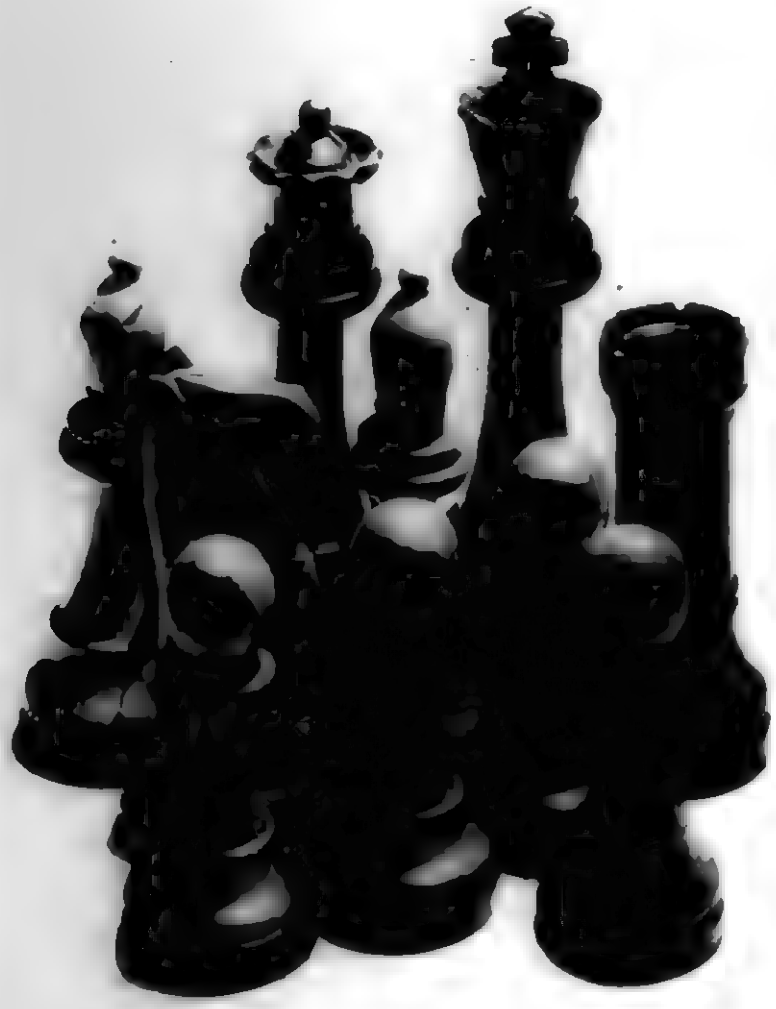

It's true. More than two-thirds of our students work in organizations that use our competitors' machines. They come to us for five reasons:

- Our instructors are veteran system programmers who've practiced what they preach.
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CONTINUED FROM PAGE 18

systems from multiple vendors to interact as an integrated whole — the health care equivalent of the Manufacturing Automation Protocol and Technical and Office Protocol. The article left the impression that the trend is toward fewer vendors, while the opposite is also true.

Since administrative needs have historically been the major economic driving force, systems designed around charge capture have dominated computing expenditures. Actual clinical information has seldom been automated beyond physician viewing because of administrative priorities and significant differences between administrative and clinical data.

A system designed primarily to generate a bill is hard-pressed to manage work loads and costs within specialized departments, such as lab, pharmacy and radiology, and is even harder pressed to address the clinical quality of care needs that must parallel cost-control efforts. The complexity and heterogeneity characteristics of hospital departments are poorly suited to a single-vendor approach — or even a single hardware base — since the limited choices may not be the "best fit" in every area.

Multiple systems, then, are a creative attempt to address these deficiencies, but they also have their problems.

Although using the same hardware vendor may ease connectivity issues, it seldom allows each department to truly select the system solution best suited to its needs, because software is limited to the hardware standard. Furthermore, direct user ownership in a system is the major factor in its effectiveness — more than technology or outside opinions of "the best."

Clearly, there are successful efforts to tie multiple hardware and software vendors together, creating integrated solutions that, incidentally, cost less than single-vendor solutions.

James M. Gabler
Vice-President of
Management Systems
Moses H. Cone Memorial
Hospital
Greensboro, N.C.

SOFTWARE & SERVICES

SOFT TALK

Richard D. Adams

A conflict of interests

The late Vince Lombardi once said he could tell if a football player was an offensive or defensive player by watching him walk down the street. He noted offensive players tended toward structured life-styles and conservative dress, while defensive players tended toward the unstructured and the casual.

He attributed this professional dimorphism to the differences in their responsibilities. Offensive players, he said, are evaluated on their ability to execute on a "specific set of instructions," while defensive players are evaluated on their ability to think on their feet and to react to a dynamic situation.

A similar dimorphism exists between auditors and programmers. They too can often be distinguished by their dress, and they too have conflicting responsibilities.

If the business team has a defensive player, it is the programmer/analyst responsible for reacting without "a specific set of instructions" to the constant and self-perpetuating changes in user requirements. Given the timetable these programmers must work within, the situation can be frustrating — even to Mercury.

At the same time, the auditor, who is responsible for the control function of management, is attempting to determine if the programmer has deviated from a nonexistent specific set of instructions. Thus, we have the program-

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Human resource vendor offers DB2 applications

BY CHARLES BABCOCK
CW STAFF

WALNUT CREEK, Calif. — Integral Systems, Inc., a West Coast vendor of human resource applications, recently started delivering its basic payroll and personnel system for use with IBM's DB2. The rewritten system, coded in IBM's Cross System Product (CSP), is one of the first software lines being delivered in IBM's fourth-generation language application generator.

"We think we're out in front of the bandwagon with CSP. We think CSP will be a winner and widely accepted as a fourth-generation language product," said Integral Systems Vice-President A. W. Duffield.

Duffield said Integral Systems has been named an Application Enabling participant in IBM's Industry Marketing Assistance Program (IMAP). There are about 200 IMAP participants, but most are hardware-oriented vendors. Integral Systems and Policy Management Systems Corp. in Columbia, S.C., are among the few that comarket software with IBM. Under the IMAP program, Integral Systems will use the IBM logo on its sales materials and collect 10% of the fees for any CSP licenses that it helps sell.

First time out

"Personnel is a good first DB2 application. It's not a high-transaction volume application. I don't believe we're going to run into any performance issues," Duffield said.

CSP is IBM's product for developing applications that can be run in the CICS/VS, MVS/TSO, VM/CMS, Small Systems Executive/VSE and 8100/Distributed Processing Executive. CSP applications can also be run under IBM's PC-DOS or OS/2 in a

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Optima airs CASE

Company's debut features data base design tool

BY NELL MARGOLIS
CW STAFF

SCHAUMBURG, Ill. — Action at Ken Orr & Associates, Inc. last week centered around the front door, with a new name being painted on it just as the first commercial release of the company's flagship Design Machine front-end computer-aided software engineering tool was rolling out.

Design Machine Version 2, the first offering of the newly named Optima, Inc., is intended to automate the requirements definition phase of the software design cycle. Based on Ken Orr's Data Structured Systems Development (DSSD) software design methodology, which underlies Optima products and services, Design Machine generates logical data base designs directly from user requirements, according to Orr.

Targeted at professional software designers, Design Machine

Optima's Ken Orr

"lets MIS people build user-oriented tools that are focused on the specific needs of the user in question rather than on an academic ideal that might be elegant but have little to do with what the user actually asked for," Orr said.

The Design Machine software, he said, lets the user select a minimum data set needed to support single-user views and combinations of user views

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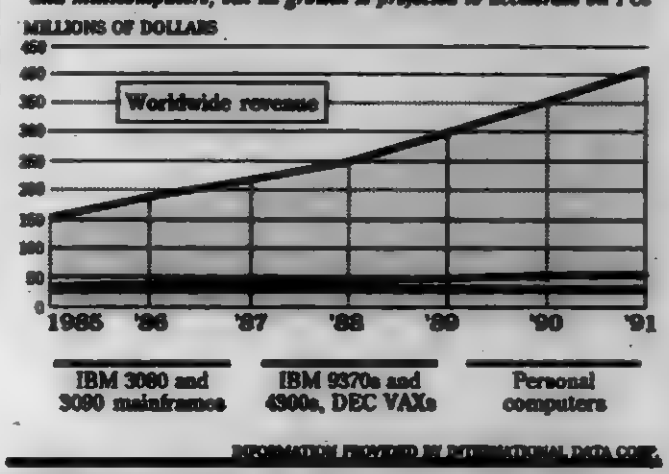
Data View

Word processing blossoms on desk tops

The use of word processing packages remains flat on mainframes and minicomputers, but its growth is projected to accelerate on PCs



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.

Landmark's Eyewitness analyzes CICS crash causes

BY CHARLES BABCOCK
CW STAFF

SPRINGFIELD, Va. — An $18,000 system that helps troubleshoot a CICS dump will reportedly be offered in April by Landmark Systems Corp.

Landmark's Eyewitness for CICS will bring automated debugging and analysis tools to bear on spotting the cause of a CICS crash, the vendor said. Instead of leafing through a massive dump printout, a systems programmer will be able to track problems on a system operator's screen.

"In a matter of seconds, we

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Inside

- ADR DBMS monitor views individual CICS applications. Page 24.
- Thoro EMI enhances financial package. Page 31.
- Precision Visuals designs interactive graphics tool for DEC VAXs. Page 31.

ADR performance monitor zooms in on specific CICS applications

BY CHARLES BABCOCK
CW STAFF

PRINCETON, N.J. — A performance monitor that analyzes a data base management system, an operating system and a teleprocessing monitor in real-time can now monitor activity associated with a specific CICS user application.

Applied Data Research, Inc.'s (ADR) Look/Datacom, which is unusual for its ability to monitor three major systems at the same time, has been given "a finer level of granularity," according to Stephen J. Gerrard, ADR's vice-president of marketing.

"Before, the monitor looked at a CICS [application] as a whole. The reality is that many users run many huge applications simultaneously," Gerrard said.

Bottleneck opener

By zeroing in on specific applications, the monitor can help a system operator identify bottlenecks or problems associated with an individual application, according to Gerrard.

The CICS and operating system parts of the monitor now work under the IBM DOS/VSE operating system as well as under MVS and MVS/XA.

In its earlier release, Look/Datacom would have been restricted to monitoring ADR's DBMS, Datacom/DB, under VSE, according to ADR officials.

Double duty

Overall, the new release of the monitor "has roughly doubled the number of things it can do" under MVS and MVS/XA, Gerrard said.

In addition to viewing and analyzing specific applications, Look/Datacom is said to be able to review the allocation of direct-access storage device volumes I/O request rates. Someone using Look/Datacom would be able to examine the ratio between physical and logical I/O requests for each area within the data bases, ADR officials said.

In addition, monitor users can verify current Datacom/DB configuration, peak amounts of data being processed and the number of buffers. Statistics for buffers at a start-up time or over a given period of time could also be reported, the vendor said.

Look/Datacom is available immediately for processors in IBM's 370 family. It is priced at $15,200 for VSE/SP environments, $35,000 for MVS environments and $36,800 for MVS/XA environments. Short-term leases are also available, ADR said.

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George J. Weiss
Program Director
November 20, 1987

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Adams

CONTINUED FROM PAGE 23

mer's complaint: Without standards, both the audit and its conclusions are meaningless and, therefore, in conflict with the purpose of auditing.

At the same time, programmers are frustrated by a lack of appreciation of their performance based on results, auditors are frustrated by the absence of tangible evidence of their performance in terms of problem definitions, audit trails, test procedures, sign offs and documentation.

But the auditors' frustrations run much deeper, since there are professionals in other fields, such as marketing, engineering and product research, who also function in a reactive mode and yet are able to produce the requested audit evidence.

Education provides insight

I think an answer for the auditors' frustration can be found in the programmers' style of education. Traditional business and science courses stress methodologies with an attitude of, "If your methods are correct, the accuracy of your results is a computational function." These courses require students to provide proofs with their results and condition students to defend their methods.

In contrast, computer programming courses have traditionally stressed results. This approach encourages students to develop ad hoc methodologies and has the effect of teaching technology on the basis of "the end justifies the means."

Thus we have the auditor's complaint: Without a formal methodology, programmers can prove only that they achieved the expected results. They cannot demonstrate the basis of their results or prove that their methods were appropriate, efficient or ethical. However, that is what the auditor is going to determine.

Alone, each complaint identifies conflict created by unresponsive behavior. Together — as they usually are — they identify the chaos created by the divergent missions of both parties.

The solution lies in methodologies. Not just methodologies for auditors and programmers, but methodologies for managers who have either not recognized these conflicts or have tolerated their continuation.

Adams is a management consultant specializing in information systems and is based in Durham, N.C.

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Landmark

FROM PAGE 23

provide a synopsis of the problem and focus on what caused the crash," said Landmark President Pat McGettigan.

The system is organized around a color graphic menu with Help screens that allow the programmer to pursue the cause of a crash. The menu outlines the steps a skilled system programmer would take to resolve the cause of the crash, product director Steve Barnes said. The analysis functions allow the programmer to determine whether the crash was related to a resource bottleneck, the invocation of a CICS self-destruct rule, tainted nucleus code or some other cause.

Eyewitness is said to be able to track CICS links, such as those between CICS regions and CICS applications, since a problem with any participant in the chain could have caused a crash.

Eyewitness is Landmark's second product. Its first was The Monitor for CICS, which has an installed base of about 2,500, according to Datapro Research Corp. in Delran, N.J.

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Optima

FROM PAGE 23

across applications; normalize data into relational tables; design all required logical access paths; and document these design steps.

Following closely on the introduction of Brackets, an IBM Personal Computer-based end-user-oriented diagramming tool that lets users interactively create Warnier-Orr diagrams online, the Design Machine Version 2.0 debut and the Optima name are both emblematic of the 8-year-old software engineering and consulting company's new marketing thrust, said President Patricia A. Palmer. Capitalizing on years of consulting experience with a foundation of DSSD, Optima is offering tools, training and consulting.

Optima's Design Machine runs on the IBM PC XT, AT and compatibles with 640K bytes of random-access memory, a hard disk drive with 5M bytes or more of available disk space and Microsoft Corp.'s MS-DOS Version 3.0 and higher. It works with any monochrome or color monitor; users can select colors.

The $10,000 price tag covers a single copy of Design Machine and two complete days of Optima training. Site licenses and rental arrangements are available.

DB2

FROM PAGE 23

version of the product for microcomputers called Easy Prep and Easy Run.

Integral Systems began marketing its CSP human resources package in November 1987 and has logged six sales of the $250,000 product during its first three months of availability. The company said it expects that its DB2 products will eventually constitute one-third of its sales and 40% to 50% of its revenue. The firm said it will next offer its pension administration package in CSP.

The bulk of Integral Systems' current revenue is based on sales of its human resources product line for use with well established mainframe data base systems, which include Cullinet Software, Inc.'s IDMS/R as well as Software AG of North America, Inc.'s Adabas.

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NEW PRODUCTS

Systems software

Thorn EMI Computer Software, Inc. has enhanced its **FCS** financial modeling software package.

Version 2.7 features enhancements to the FCS-Manager that provide a consistent screen format throughout the product range. The basic FCS system, including FCS-Manager, costs $55,000.

Thorn EMI also introduced the FCS-Professional and FCS-Link modules. FCS-Professional is a high-end version that offers structured language that produces compact code. It runs under IBM VM/CSM and MVS/TSO as well as on Wang Laboratories, Inc. VS systems. Pricing starts at $6,000.

FCS-Link allows users to share mainframe data and access it directly by mainframe FCS or via the microcomputer-based Micro-FCS. Pricing is based on the number of multiple concurrent users. A 50-user license costs $13,000.

Thorn EMI, 285 Mill Road, Chelmsford, Mass. 01824. 617-256-3900.

A **Purchasing Management System** for the IBM System/38 has been announced by **Packagedeal, Inc.**

The system includes purchase order entry, verification and printing, outstanding order tracking and analysis, the printing or receiving of orders and receipt schedules as well as entry and editing or receivers. The system may run standalone or as a module interfaced with Packagedeal's Accounts Payable and Inventory system.

The Purchasing Management System costs $3,650.

Packagedeal, 6366 Guilford Ave., Indianapolis, Ind. 46220. 317-259-4189.

Applications packages

A graphics product designed for interactively creating, revising and displaying line drawings on Digital Equipment Corp. VAX computers has been introduced by **Precision Visuals, Inc.**

Draw: The Precision Visuals Drawing System has three interface modes for three levels of users: command mode, graphics menu mode and tablet mode. Input can come from keyboard, joystick, mouse or graphics tablet. Output can be directed to such hard copy devices as Hewlett-Packard Co. pen plotters, DEC laser printers, Tektronix, Inc. inkjet plotters and all Adobe Systems, Inc. Postscript-based devices.

Primitives include polyline, polygon, arc, circle and library symbol. The system library contains more than 300 symbols. Transformations include zoom, pan, mirror and rotate.

Draw is priced from $3,500.

Precision Visuals, 6260 Lookout Road, Boulder, Colo. 80301. 303-530-9000.

Utilities

A report writer for use with Unix and Microsoft Corp. MS-DOS file structures as well as Prime Computer, Inc. Midas Plus files has been announced by **C Worka, Inc.**

C-Report supports multiple files and all data type formats including packed decimal and floating point. According to the vendor, execution speeds are close to compiled language programs, with an average development time of around 10 minutes per report.

The package is priced from $495 on MS-DOS to $2,500 on large Unix systems.

C Works, Suite 301, 1705 Capitol of Texas Highway, Austin, Texas 78746. 512-327-7301.

Software Techniques, Inc. has introduced an interface between its tape/media librarian system, **Media/Schedule/Vault**, and its file archiving system, **Archive 2000.**

Media/Schedule/Vault is a set of software packages designed to automate offline short-term data storage procedures. Archive 2000 allows information to be taken off-line for long-term storage in an archive.

Designed for use in Digital Equipment Corp. VAX/VMS environments, the software also supports single, clustered or networked VAX systems.

Prices range from $2,200 to $8,250.

Software Techniques also added a technique to its **Diskit 2000** disk-structuring utility that allows it to work transparently with such data base systems as Relational Technology, Inc.'s Ingres. Diskit 2000 costs from $500 to $3,000.

Software Techniques, 6600 Katella Ave., Cypress, Calif. 90630. 714-895-1633.

Development tools

Application Development Systems, Inc. has announced **Xpediter/CICS 2.0**, an enhanced version of its interactive Cobol testing and debugging software package for IBM mainframes running CICS under MVS.

Release 2.0 supports IBM MVS/XA, VS Cobol II and DB2 and features two-terminal testing, the ability to display the source code with or without the command language translator-generated statements and an enhanced VSAM log file.

Xpediter/CICS 2.0 is priced at $19,000.

Application Development Systems, 6840 78th Ave. N., Minneapolis, Minn. 55445. 612-560-8633.

Metier Management Systems has ported its **Artemis** project management software to the U.S. Army's Unisys Corp. 5000/80 computers under the Unix operating system.

Called Artemis 7000U, the fourth-generation language was designed for project management application building. Based on a relational data base with an integrated network and scheduling system, it features a menu-driven, window-based command language.

The Unix version of the Artemis applications, called Artemis Project, is a project management application written in Artemis 7000U. It features window-based network editing, pull-down menus, pop-up windows, multiple calendars, a custom report generator and full critical path capabilities.

Artemis Project on the Unisys 5000/80 costs from $40,000. Artemis 7000U costs from $90,000.

Metier Management Systems, Suite 1300, 2900 North Loop W., Houston, Texas 77092. 713-956-7511

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Ed Scannell

PCs make it with MIS

Who says MIS doesn't care about PCs? The number of companies planning to purchase IBM Personal System/2s and Intel 80386-based machines during the next 12 months will rise 27%, according to recent survey of *Computerworld* subscribers.

The survey also showed that more than one-third of all respondents work at organizations that currently have more than 100 micros, with the average number being 395.

The IBM Personal Computer architecture still dominates the corporate landscape, according to the survey, as four out of five subscribers work in a company using a PC, PC XT or AT.

The most popular add-in boards among subscribers were memory boards, at 84%, followed by graphics boards, at 81%, modem boards, at 71%, and terminal emulation boards, at 63%. Nearly all the respondents — 93% — recommended and/or purchased add-in boards of some kind, with the average company spending $25,000 for them.

Continued on page 56

Mac Plus price cut

Change moves machine well below SE range

BY JULIE PITTA
CW STAFF

CUPERTINO, Calif. — Apple Computer, Inc. last week reduced the price of its Macintosh Plus microcomputer to $1,799 from $2,199.

The price reduction better positions the low-end system for the home and small business markets, according to Apple officials.

The reduction is "long overdue" and better reflects the Mac Plus's street price, according to Dataquest, Inc. analyst Sharon Hashimoto. An average Macintosh Plus sells for as little as $1,299 with dealer reductions, she added.

"The price was getting too close to the SE's," Hashimoto explained, noting that an entry-level Macintosh SE with a single floppy disk drive carries a list price of $2,799 and that a hard-drive version costs $3,599. She added, "The reason it probably took them so long is that if it was selling [so well], why reduce it?"

The price of the Mac Plus remained unchanged despite Apple's introduction of new systems. In April 1987, Apple introduced the Macintosh SE and the Motorola, Inc. 68020-

Continued on page 49

Vortex recovery system takes no time-outs

BY DOUGLAS BARNEY
CW STAFF

PITTSBURGH — Your computer will soon be able to go back in time with the help of the Vortex VAS 1000 from Vortex Systems, Inc.

Unlike most data recovery and backup systems, which capture data at set periods of time, the VAS 1000 captures all information generated from a personal computer and stores it on an 800M-byte optical disk drive from Maxtor Corp. The result is that users can go back to the computer's exact state before a keyboard error or data loss occurs.

"It is a time machine that is recording at all times anything written into memory or saved. It gives you a permanent audit trail," explained Kathleen Kato, controller for Vortex. The VAS 1000 reportedly will ship in May. The price has not been set but will be a high-end price, Kato said.

The product may be especially handy as microcomputers take on more host-style applications, in which data loss can be a disaster. It is also aimed at applica-

Continued on page 50

Data View

Where do you shop?

Value-added resellers handled most of the $7.6 billion worth of PC software sold last year

INFORMATION PROVIDED BY FUTURE COMPUTING/DATAPRO
CW CHART: AMY J. SWANSON

GEM revamp adds menus, VGA support

BY ALAN J. RYAN
CW STAFF

MONTEREY, Calif. — Digital Research, Inc. recently announced the latest release of its GEM operating environment software; the new version includes three modes of menu operation, support for the Video Graphics Array of IBM's Personal System/2 and enhanced laser printer support.

GEM/3, a graphical interface extension to IBM's PC-DOS, Microsoft Corp.'s MS-DOS, DOS Plus and Concurrent DOS, is packaged with GEM Desktop Publisher, GEM Draw Plus, GEM Graph, GEM Wordchart and GEM Presentation Team.

The operating environment has been largely used for graphics and desktop publishing applications such as Xerox Corp.'s Ventura Publisher but has been overshadowed by Microsoft's still-struggling Windows.

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Inside

- Lotus's Silvermule leads off CW's new Product Review section. Page 35.
- Anche adds 386-based system. Page 39.
- Mitac plans what it says will be the first PS/2 compatible. Page 49.

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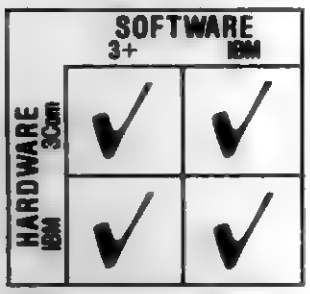

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   - 95. Vendor: Other _____
   (Please specify)
2. TITLE/FUNCTION (Circle one)
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   - 10. Vice President, Asst. VP
   - 21. Dir., Mgr., Supv., IS/MIS/DP Services
   - 22. Dir., Mgr., Supv., of Operations, Planning, Adm. Services
   - 23. Dir., Mgr., Supv., Analyst, of Systems
   - 31. Dir., Mgr., Supv., of Programming
   - 32. Programmer, Methods Analyst
   - 35. Dir., Mgr., Supv., OA/WP
   - 36. Data Comm. Network/Systems Mgt.

   OTHER COMPANY MANAGEMENT
   - 11. President, Owner/Partner, General Mgr.
   - 12. Vice President/Asst. VP
   - 13. Treasurer, Controller, Financial Officer
   - 41. Engineering, Scientific, R&D, Tech. Mgt.
   - 51. Sales/Mktg. Mgt.

   OTHER PROFESSIONALS
   - 60. Consulting Mgt.
   - 70. Medical, Legal, Accounting Mgt.
   - 80. Educators, Journalists, Librarians, Students
   - 99. Others _____
   (Please specify)
3. COMPUTER INVOLVEMENT (Circle all that apply) Types of equipment with which you are personally involved either as a user, vendor, or consultant.
   - A. Mainframes/Supermins
   - B. Minicomputers/Small Business Computers
   - C. Microcomputers/Desktops
   - D. Communications Systems
   - E. Office Automation Systems
   - F. No Computer Involvement

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REVIEWS/NEW PRODUCTS

Silverado data base is mother lode for 1-2-3

BY JIM TOOLE
SPECIAL TO CW

Silverado, a Lotus Development Corp. 1-2-3 add-in from Computer Associates International, Inc., gives 1-2-3 the capacity, query options and reporting flexibility of a full-fledged data base — all in the comfortable familiarity of the 1-2-3 spreadsheet.

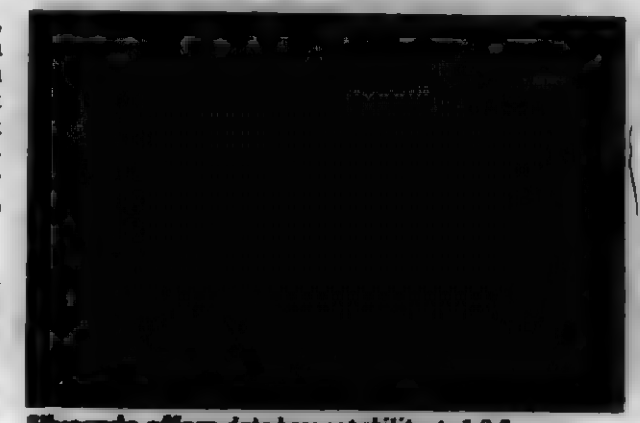
Consider this: You are working on a project analyzing earnings and time records for employees. You normally work with 1-2-3 and feel comfortable with its operation. But the data base on this project is 9,000 records long and includes the details of each employee's pay and hours by job category and pay period. Although 1-2-3 has the calculation capabilities you need, it cannot support this job's volume and reporting requirements. Must you now learn a data base package? Maybe not.

Features: Silverado is disk-based, so size is limited only by the capacity of the disk. You can create data bases that are dependent or completely independent of any existing spreadsheet. You can also import data from existing spreadsheets or from Ashton-Tate Corp. Dbase files. As another option, you can link a spreadsheet and a data base so that the spreadsheet is updated instantly for changes made to the data base.

Silverado takes advantage of 1-2-3's capabilities to enhance its data base. A data base can use the spreadsheet's data, and Lotus macros are used to control Silverado's operation. There is even a function that lets you use any 1-2-3 function not directly supported in Silverado.

Additionally, Silverado gives 1-2-3 some relational operations, including joining data from two data bases to create a third data base. Two other significant features are Silverado's "out liner," which shows output at any level of detail, and Form view, which lets the user look at the data base one record at a time.

A Silverado record can have up to 512 fields, 160 characters per label field and up to 79 characters for a field name.



Silverado offers data base capabilities to 1-2-3 users

Silverado
Price: $149
- Performance: Very good
- Documentation: Very good
- Ease of learning: Very good
- Ease of use: Very good
- Error handling: Excellent
- Support: Poor
- Value: Excellent

Performance: Very good. Although Silverado is no speed demon, we were impressed with its power and its ability to select and report data.

We tested the program's capabilities by converting a business payroll file from 1-2-3. Using the built-in reporting features, we were able to almost instantly generate the W-2 information by employee for the year. With the same earnings record data base, we were able to get summary reports or detail reports by employee by pressing one key each.

Documentation: Very good. Silverado comes with a manual that includes a well-written tutorial and a glossary of terms. The indexes and table of contents are thorough.

Ease of learning: Very good. Silverado's data base operation is actually easier to learn than 1-2-3's. All requirements are selected through menu choices and screen prompts, and context-sensitive Help is always just a keystroke away.

Ease of use: Very good. Silverado makes use of the same interface as 1-2-3 and Lotus macros. For the experienced Lotus user with some data base experience, Silverado is extremely easy to pick up and to use.

Error handling: Excellent. Silverado has extensive error messages, prompts and even a file-recovery option in the menu. The manual includes a section describing the messages, possible causes and remedies.

Support: Poor. Silverado is not copy-protected, and there is no guarantee beyond the media warranty. Telephone support is offered for six months but is not toll-free. Extended support costs $75 a year, allowing unlimited calls to an 800 number.

You must register to get support; the technical staff calls after your registration is completed. We waited 24 hours for a callback.

Value: Excellent. If you use the data base functions in 1-2-3 or use a separate data base because of 1-2-3's limits in capacity or reporting capabilities, you will love Silverado. This package is easy to learn and use and appears to have great depth.

Toole is a CPA and a principal in a training firm in Washington.

Note on reviews

The reviews presented in this section are encapsulated versions of reviews published recently in Infoworld, an International Data Group publication. The text is transmitted by the IDG News Service and edited by Susanne Weinel, a Framingham, Mass.-based freelance writer.

Surpass gives Lotus users easy option

BY JOHN WALKENBACH
SPECIAL TO CW

Surpass Software Systems, Inc. offers Surpass as yet another choice in the newest crop of spreadsheets designed to overcome some of the limitations of Lotus Development Corp.'s 1-2-3. Like Borland International's Quattro and Paperback Software International's VP-Planner Plus, Surpass makes it very easy for 1-2-3 users to make the switch.

Features: Surpass has a visual file manager that you can pop up to select the file or files you will be working with. You can work with up to 32 spreadsheets simultaneously, and you can move and resize the spreadsheet windows at will — just as you can with Microsoft Corp.'s PC Excel.

Surpass not only features a command interface that is practically identical to 1-2-3's, but it also features many of the advanced capabilities of Excel. These include simplified spreadsheet linking, background recalculation, minimal recalculation and an UNDO command.

The UNDO command reverses your most recent action, including accidental deletions. It can also be used for "what-if" operations and for toggling back and forth between your original numbers and modified results.

You can set the width of multiple columns with a single command and adjust each column width in a specified range automatically.

Lacking in Surpass are such niceties as spreadsheet auditing, goal seeking, user-defined functions and cell notation.

Performance: Very good to excellent. Our benchmark timing tests show Surpass's Version 1.0 to be comparable to 1-2-3. It also performs well in our minimal recalc timing tests, showing improvement relative

Continued on page 38

Surpass
Price: $495
- Performance: Very good to excellent
- Documentation: Good
- Ease of learning: Satisfactory
- Ease of use: Very good
- Error handling: Satisfactory
- Support: Very good
- Value: Very good

Total Project Manager takes on big work load

BY VERN MILLER
SPECIAL TO CW

Harvard Total Project Manager (TPM) II, from Software Publishing Corp., was one of the first project management packages to offer cross-project resource allocation, a feature that allows you to track workers assigned to multiple projects. Enhancements in Version 2.01 allow the program to handle an essentially unlimited load by using nested subprojects.

Features: Harvard TPM II 2.01 lets you set up a project four ways: Program Evaluation and Review Technique, or PERT, chart, which links boxes representing tasks to show the work structure; Gantt chart, which lists tasks in a column and draws lines across a calendar to show the use of time; task lists; and the Work Breakdown method, which lets you start with the goal of the project and break it into component subactivities.

Harvard TPM II 2.01 also lets you split off groups of tasks into subprojects, each with a

Harvard TPM II 2.01 *makes the grade*

schedule file linked to the main project. This makes the project capacity subject only to disk drive capacity.

You can schedule forward or backward according to either task duration or resource constraints.

Harvard TPM II Version 2.01
Price: $595
- Performance: Good
- Documentation: Very good
- Ease of learning: Very good
- Ease of use: Excellent
- Error handling: Very good
- Support: Good
- Value: Good

Harvard TPM II 2.01's standard PERT display shows up to 20 tasks. The Gantt display shows only four to eight tasks at once. The program's limited zoom capability does not show task details for PERT or Gantt charts; however, a split screen does display the project in two forms.

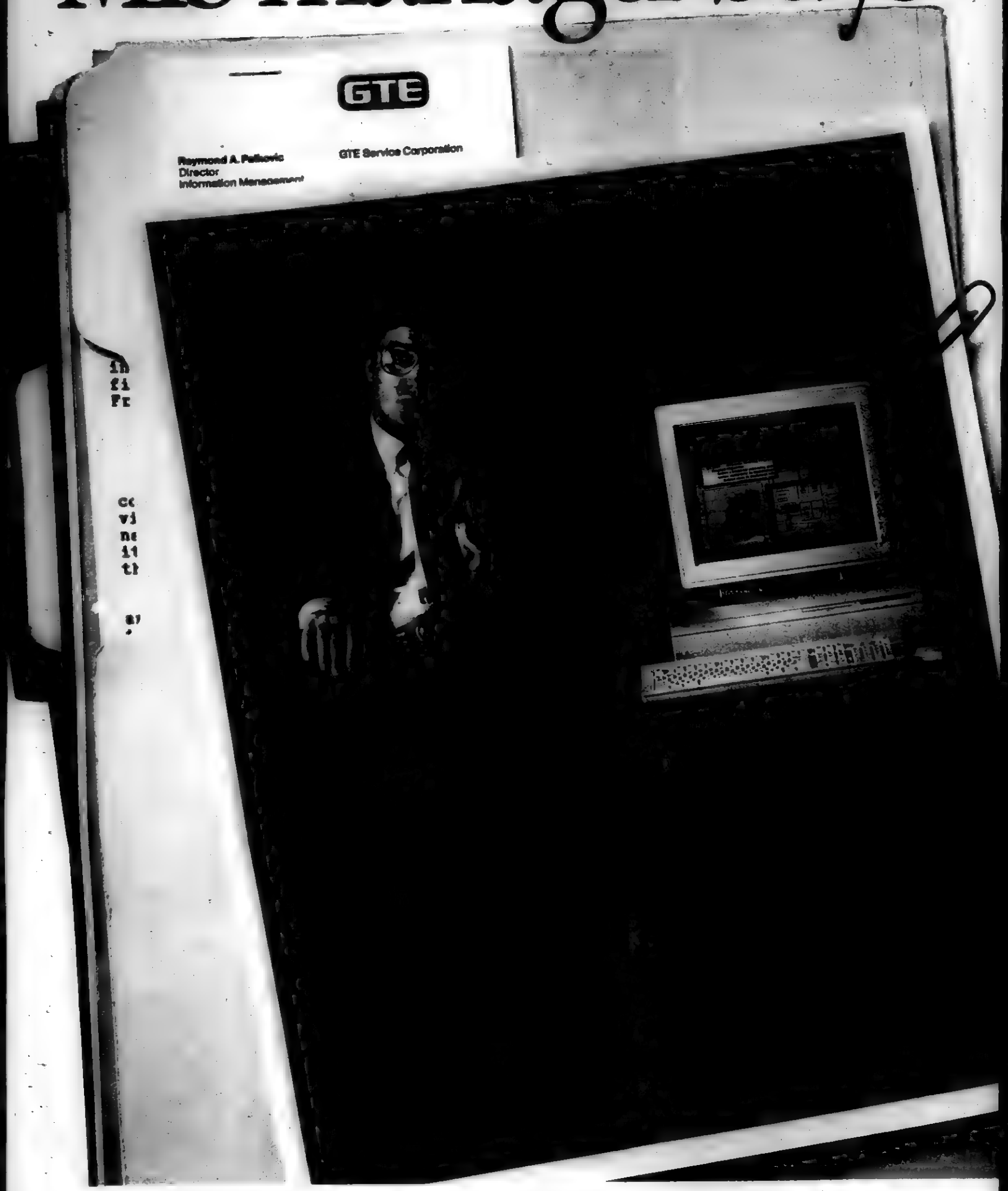
Performance: Good. We ran Harvard TPM II 2.01 on an 8-MHz Intel Corp. 80286-based machine with a hard disk. We designed a project with two subprojects and a combined total of 50 tasks. In the areas of adding, changing and deleting tasks, Harvard TPM 2.01 offers a lot of functionality and power at a reasonable speed.

Recalculating the critical path typically took about 14 seconds. The vendor attributed the relatively slow recalculation to Harvard TPM's complex cross-project resource allocation.

Documentation: Very good. Documentation is thorough and well written. Installa-

Continued on page 38

MIS manager buys



Macintosh, keeps job.

Until very recently, the above headline was the MIS equivalent of "Man Bites Dog."

Because specifying Macintosh™ personal computers for the corporate desktop was an act of sheer daring. Like hang gliding, or wearing a Mohawk.

But now, if the behavior of data processing executives is any indication, we've engineered the thrills out of handing us a purchase order.

Since the introduction of the Macintosh Plus with its 1 to 4 megabytes, and most recently the faster, expandable and MS-DOS compatible SE, hundreds of the *Fortune 500* have put Macintosh to work.

At first we were hired for specific jobs that no one else can do as well. Like low cost CAD/CAM and Desktop Publishing.

But then, our other merits revealed themselves.

Such as the open architecture of the SE and the new Macintosh II.

Which lets you connect seamlessly to DEC's VAX, IBM mainframes, and other popular systems. And by putting Macintosh at the front end, you give people a more civilized way to deal with mainframes.

Another revelation is the wide array of innovative Macintosh business applications–financial analysis, word processing, databases, and, of course, graphics. Which are not only easier to learn than what's running elsewhere, but more advanced.

The point-and-click simplicity of the Macintosh graphic interface is a well known boon for the user.

But it also turns out to be a major time and money saver for you who have to train all those users. Because Macintosh has a lower training cost per desktop than any MS-DOS computer on the market.

Macintosh's simple, straightforward operating style also pays off impressively after the training is over.

In an in-depth analysis of 7 Macintosh installations in business, users consistently reported productivity gains of 15 to 25% and more.

And on top of all this, Macintosh has excellent connections.

While others are pushing the "network of the Near Future," the Macintosh network is here and now. It's called AppleTalk™.

AppleTalk is a networking protocol that is at the same time sophisticated, infinitely flexible, easy to set up. And meets ISO standards.

You can link the system together just about any way you want to–over phone lines, twisted pair, fiber optics or Ethernet.

Plug in a card and you can run AT&T UNIX™ as well as MS-DOS applications. And in fact, there are a variety of other ways to integrate Macintosh into the MS-DOS world.

Including the AppleShare™ file server which lets Macintosh and PC's link and share data.

All of which makes it a simple matter to incorporate Macintosh into any existing network.

Or, to build new ones.

We'd like an opportunity to demonstrate these and a catalogue of other innovations.

Just call your Apple Sales Representative. Or call us directly at 800-446-3000, ext. 400 for the name of the authorized Apple reseller nearest you.

You'll find out how so many DP professionals can buy Macintosh.

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Total Project

FROM PAGE 35

tion is covered clearly, and a brief Tour Guide provides the basic techniques and commands.

Ease of learning: Very good. The self-paced, on-line tutorial provides a quick way to learn all aspects of the program except report generation. The on-line Help and easy menu structure help get you up and running in no time.

Ease of use: Excellent. Harvard TPM II 2.01's clean user interface makes building a project schedule a logical and fast-flowing procedure. Within minutes, we were comfortable navigating the pull-down menus and switching among PERT, Gantt and tabular displays.

Error handling: Very good. We tried to crash the program by entering invalid data in parameter fields. This generated error messages that spelled out options for making corrections. The error messages require a response that, although annoying, discourages hasty mistakes.

One problem we encountered was that we made an error setting up the Gantt time scale and the program would not accept it. We would have liked an automated method for fixing it.

Support: Good. Harvard TPM II 2.01 is not copy-protected, and no warranty is offered. Non-toll-free support is available from 8 a.m. to 4 p.m. Pacific Standard Time.

Value: Good. Harvard TPM II 2.01 offers all the functionality of other full-featured project management packages and more flexibility than most. It is priced in the middle of its market, and though the competition is strong, the program's flexible setup, easy task input and editing of task and resource definitions are a valuable bonus.

Miller has 15 years' experience in managing project development for minicomputer products.

Surpass

FROM PAGE 35

to unadorned 1-2-3. Surpass successfully completes our 1-2-3 compatibility test, including the flawless importation and execution of a feast of macros. It also improves on the graphics capability of 1-2-3. Surpass's graphs are easily on par with Quattro's. The data base features of Surpass are identical to 1-2-3's.

Documentation: Good. The documentation for Surpass is contained in a loose-leaf binder; a 20-page quick-reference guide gives you access to functions, special keys and macro commands. The manual itself is comprehensive, but we would like to see more diagrams and sample screen shots.

Ease of learning: Satisfactory. The package includes a 70-page tutorial in the manual for users who are familiar with spreadsheets. There is no on-line tutorial.

Ease of use: Very good. Some of the additional features in Surpass give it an edge over 1-2-3 in ease of use. However, the drop-down menus do not include a one-line description of each command, nor do they work as intuitively as we would expect.

Error handling: Satisfactory. The UNDO feature is great, assuming you remember it is there. In other areas, Surpass appears to be bulletproof, but there are a few deficiencies related to error messages.

Support: Very good. A toll-free sales number is also accessible for technical support.

Support is available from 9 a.m. to 6 p.m. Pacific time. Our two calls were answered promptly, and both times we were connected to a knowledgeable support representative.

Value: Very good. Surpass is priced identically to 1-2-3 and Excel but is significantly more expensive than VP-Planner Plus and Quattro. Given its performance and flexibility, we think it represents a very good value.

Note: Surpass Software recently updated Surpass to correct minor bugs and improve performance and printing. The new features had not been tested at the time of this review.

Wolkenbach is consumer research manager for a leading savings and loan association in Southern California.

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NEW PRODUCTS

Systems

An Intel Corp. 80386-based personal computer has been introduced by Arche Technologies, Inc.

Called the Arche Rival 386, the switch-selectable 10- or 20-MHz computer offers 2M bytes of memory expandable to 16M bytes of 32-bit, zero-wait state interleaved memory. Features include a 1.2M-byte 5¼-in. floppy disk drive and optional 40M-, 65M-, 80M- and 140M-byte fixed disk drives. It can accommodate up to three half-height storage devices internally.

Also standard is a 101-key keyboard, two parallel and two serial ports, eight expansion slots and a 14-in. monochrome amber monitor.

The Microsoft Corp. MS-DOS 3.3-based system is priced from $4,395.

Arche Technologies, 48835 Kato Road, Fremont, Calif. 94539. 415-683-6758.

An enhanced version of the Computereyes video digitizer has been announced by Digital Vision, Inc.

Computereyes now offers support for the graphics capabilities of Hercules Computer Technology, Inc. cards as well as IBM's Enhanced Graphics Adapter and Video Graphics Array (VGA). VGA images are displayed in up to 64 shades of gray.

Captured images may be saved to disk in a variety of formats independent of the computer's display capabilities. Formats include .PCX, TIFF, .IMG and Microsoft Corp.'s Windows.

Computereyes is priced at $249.95.

Digital Vision, 66 Eastern Ave., Dedham, Mass. 02026. 617-329-5400.

A transputer board featuring four 20-MHz, 32-bit Inmos T800 chips and 4M to 16M bytes of random-access memory has been introduced by Microway.

Called Quadputer, the board operates on Intel Corp. 80386-based computers as well as on IBM Personal Computer XTs and PC ATs.

Quadputer is priced from $8,000 with 4M bytes of 100-nsec RAM to $13,600 with 16M bytes of 100-nsec RAM. Fortran, C, Pascal and Prolog compilers cost $750 each. Transputer Development System software costs $1,500.

Microway, P.O. Box 79, Kingston, Mass. 02364. 617-746-7341.

Zenith Data Systems has doubled its Z-386 personal computer's standard random-access memory to 2M bytes.

The Model 40 Z-386 features a 40M-byte hard disk drive, a 1.2M-byte floppy disk drive and four open expansion slots. The Model 80 Z-386 features an 80M-byte hard disk drive. Zenith bundles Microsoft Corp.'s Windows/386 and MS-DOS 3.21 with all Z-386s. Microsoft's MS OS/2 is also available for the Z-386.

The Model 40 costs $6,499. The Model 80 costs $7,499.

Zenith Data Systems, 100 Milwaukee Ave., Glenview, Ill. 60025. 312-699-4839.

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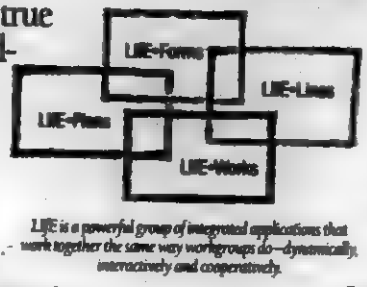

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Software applications packages

MGI/CADD 3, a dual-module two-dimensional computer-aided design (CAD) program for IBM Personal Computers, has been announced by Microcomputer Graphics, Inc.

The schematic drawing module uses cell-size symbols that automatically snap together on the screen. Eight schematic libraries are included and customization is supported.

Features of the mechanical and architectural drafting module include creation of fillet variations with single keystrokes and previewing of tangent combinations prior to execution.

Features of both modules include block functions; a mirror function; scrolling; zoom; snap; break and trim operations; cross-hatching and regular polygons; and layered drawings differentiated by color.

MGI/CADD 3 costs $1,495.

Microcomputer Graphics, 13468 Washington Blvd., Marina Del Rey, Calif. 90292. 213-822-5258.

Software designed for use in preparing federal income tax returns has been announced by Legal Knowledge Systems, Inc.

Called **Ask Dan About Your Taxes**, the software is said to prepare the Form 1040 and related forms and schedules. It uses its knowledge of the new tax law to lead the user through question and answer sessions, resulting in customized returns.

Features include spreadsheet style recomputation, on-screen tax forms, printing, pop-up scratch pads and a menu-driven interface. According to the vendor, the program can accommodate up to 10 partnerships or businesses with a total of 10 depreciation schedules.

The software costs $69.95.

Legal Knowledge Systems, 195 Maplewood St., Watertown, Mass. 02172. 617-923-2322.

Orion Micro Systems, Inc. has enhanced its **FDC/Pyramid** personal computer-based system for collection, consolidation and reporting of business data.

FDC/Pyramid can transmit corporate data over worldwide networks. Reporting requirements are translated into PC-based forms that are then distributed to the remote reporting locations. Cross-checks and downchecks automatically validate the data according to the corporation's rules. Files are transmitted to the corporate office where the data is consolidated.

The software includes currency conversions, multistructure consolidations, adjustments and automatic eliminations for such items as intercompany transactions. Files can be exchanged with Lotus Development Corp.'s 1-2-3.

Pricing starts at $25,000.

Orion, Croft Commons, 95 Scovill St., Waterbury, Conn. 06702. 203-753-1096.

Wingraph, which is a business graphics program that runs in the Microsoft Corp. Windows environment, was recently announced by Palantir.

Wingraph is said to automatically generate charts and graphs from numerical data. Chart styles such as bar, stacked bar, staggered bar, three-dimensional bar, line, line fill, curved line, pie, marker and high/low are included. Wingraph accepts DIF, WKS and ASCII files and writes TIFF, CITY, DXF and HPGL files.

Other features include a slide show program that permits images to be displayed in sequence and the ability to customize style sheets.

Wingraph is part of Palantir's Windows Office Automation Series. The product carries a price of $195.

Palantir, Suite 100, 12777 Jones Road, Houston, Texas 77070. 713-955-8880.

A general-purpose office organizer for use on personal computers has been announced by Occhipinti Technologies, Inc.

Executive Assistant features integrated office functions, word processing and automatic telephone dialing. It can be used in single- or multiuser environments.

The software can run stand-

Plain talk on why more and more workstation buyers are turning to HP.

They're turning for good reason.

HP offers more capability in workstations than ever before.

Namely, an entire family of high-performance workstations that thrive in multivendor environments. They support industry standards in networking, graphics, the UNIX operating system, the X Window System, and a variety of languages.

It means this. HP workstations fit your computing environment. And grow with you instead of growing obsolete.

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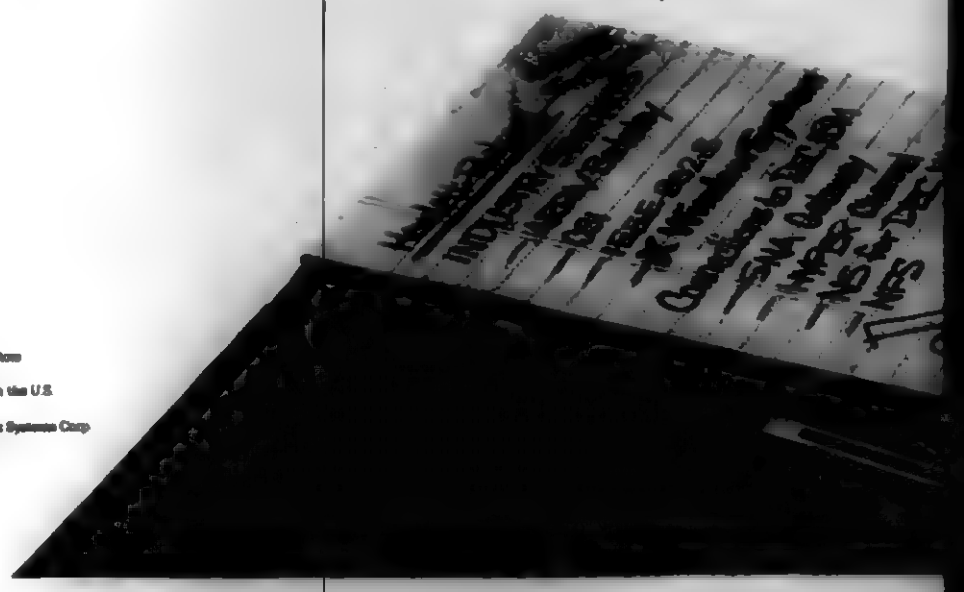

Router assembly data courtesy of SDRC
Automobile data courtesy of Chrysler Motors

UNIX is a registered trademark of AT&T in the U.S. and other countries
HYPERchannel is a trademark of Network Systems Corp.
NFS is a trademark of Sun Microsystems

alone or in memory-resident mode.

In memory-resident mode, certain functions can be used through third-party applications such as spreadsheets and word processors.

Executive Assistant costs $129.

Occhipinti Technologies, 1253 Orion Ave., Metairie, La. 70005. 504-834-0248.

A word processor with desktop publishing capabilities has been introduced by Lifetree Software, Inc.

Called Total Word, the software is said to offer the ability to capture any graphic, regardless of source, and more than 400 scientific and technical symbols with laser printer support.

Word processing features include on-screen editing and context-sensitive Help as well as the ability to share a document electronically. Also included are automatic index, outline, footnote and table of contents generation; a 300,000 word thesaurus and a 170,000 spelling dictionary; a style sheet; text merge; and fill-in-the-blank capabilities.

Total Word runs on IBM Personal Computers and Personal System/2s. It costs $495.

Lifetree Software, 411 Pacific St., Monterey, Calif. 93940. 408-373-4718.

AR/Net, a fully functional version of the Adaptive Resonance Network, a neural network architecture for unsupervised recognition and classification of arbitrary patterns, has been announced by Hecht-Nielsen Neurocomputer Corp.

When used with the vendor's Anza Neurocomputing Coprocessor System on an IBM Personal Computer AT or compatible, AR/Net enables the user to construct a self-programming system that can create and organize its own categories from patterns presented to it. The user can also call the Adaptive Resonance Network as a subroutine from within programs written in C.

AR/Net is priced at $495 if purchased with an Anza system or $600 if purchased separately.

Hecht-Nielsen, 5893 Oberlin Drive, San Diego, Calif. 92121. 619-546-8877.

Software utilities

Datability Software Systems, Inc. has announced a personal computer software package that reportedly allows PC printers to be configured as Digital Equipment Corp. VAX/VMS system printers as if connected through a DEC terminal server.

The RAP Print Server is implemented as 5K bytes of memory-resident software on the PC. Once it is installed, a VAX system manager can define a VAX print queue that automatically prints on a PC-based printer.

The RAP Print Server costs $495 for each PC.

Datability Software, 322 Eighth Ave., New York, N.Y. 10001. 212-807-7800.

A compiler designed for Ashton-Tate Corp. Dbase-type programs has been announced by Sophco, Inc.

Called Force III, the compiler is said to support such Ashton-Tate Dbase III Plus features as full-screen editing commands. According to the vendor, output is stand-alone and can be linked through Tlink or Plink.

In addition to supporting standard Dbase commands, Force III features user-defined functions, arrays, extended math functions, extended character functions, I/O directive capability, file primitives and numeric data types. It is also said to automatically take advantage of on-board math coprocessors when present.

The Force III compiler costs $129.

Sophco, P.O. Box 7430, Boulder, Colo. 80306. 303-444-1542.

A software utility designed to predict the amount of software that must be written for a particular application has been announced by Quantitative Software Management, Inc.

The software, called Size Planner, is said to combine estimates from fuzzy logic, function points, standard components and new, modified and

Continued on page 42

packages from our third parties. So either way, you're covered.

Our new family of 32-bit machines is complete, and gives excellent value from low end to high. Which means you can choose the right workstation, while getting the most from your investment. Our Model 318M, starting at $4,990, sets new standards in entry-level price/performance. And the Models 330, 350, and 825 provide the power for your toughest technical applications.

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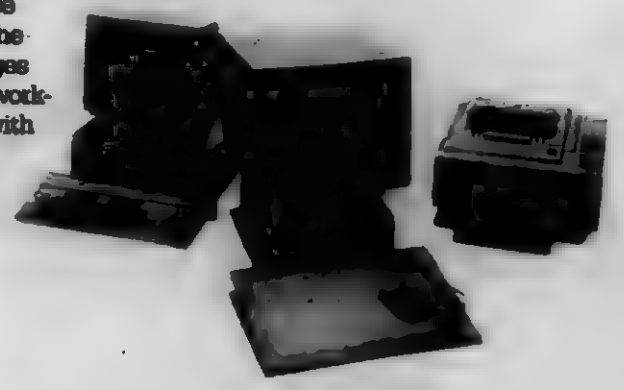
Want extraordinary speed and resolution in 2D and 3D graphics? You'll find it on our entire family. One good example: the new Model 825SRX Precision Architecture Superworkstation. It combines 8 MIP computation power with interactive solid rendering graphics.

Something else you should know. The HP family is modular.



HEWLETT PACKARD

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Continued from page 41
reused code techniques to reduce the uncertainty in the prediction. It also includes a module-to-record sizing history.

Size Planner can be leased annually for $9,500.

Quantitative Software Management, 1057 Waverly Way, McLean, Va. 22101. 703-790-0055.

Software said to encrypt and decrypt files on IBM Personal Computers, PC XTs, ATs and compatibles has been announced by **Digitech Telecommunications, Inc.**

Called **Code Name: Password**, the software is said to prevent unauthorised access to the hard disk drive. It uses the National Bureau of Standards' Data Encryption Standard and allows users to select Define Function keys. Up to 4,000 bits of information can be encrypted or decrypted per second.

Other features include multiple levels of encryption, password protection and the ability to completely erase a file on command.

Code Name: Password costs $99.

Digitech Telecommunications, Suite 210, 342 Madison Ave., New York, N.Y. 10173. 212-557-7230.

Matrixplotter, a software utility that can be used to rasterize graphic images and format them for output on dot matrix printers, has been announced by **Insight Development Corp.**

The random-access memory-resident utility works with any Microsoft Corp. MS-DOS-based Hewlett-Packard Co. HPGL-compatible software. It outputs to Epson America, Inc.- and Toshiba America, Inc.-compatible matrix printers. It converts the drawing vectors used by plotters into the raster-oriented bit-mapped images required by the dot matrix printer. The image is printed at the full resolution of the printer.

Features include a Lotus Development Corp.-style interface, user-selectable line widths and pen sizes and gray scale capabilities.

Matrixplotter costs $99.

Insight Development, Suite 104, 1024 Country Club Drive, Moraga, Calif. 94556. 415-376-9451.

A source code management system called **Advantage VCMS** has been announced by **Lifeboat Associates, Inc.**

According to the vendor, Advantage VCMS automates the process of source code management using such functions as a Make utility, a full-screen interface, the ability to compress data on archive files and a report generator. Report contents can be user-defined, the vendor said, and audit trail reports containing all the information archived can be generated.

Advantage VCMS runs on IBM Personal Computers and compatibles under Microsoft Corp. MS-DOS 2.0 or higher. It costs $379.

Lifeboat Associates, 55 S. Broadway, Tarrytown, N.Y. 10591. 914-332-1875.

California Software Products, Inc. has upgraded its **California 10 Pak** programmer's tools and **Helpme** diagnostic utility for use with IBM and Microsoft's OS/2 on IBM's Personal System/2.

California 10 Pak contains programs for browsing, comparing and sorting the contents of files and memory.

According to the vendor, the tools identify the system's configuration and current state, including a description of the installed video display adapter and its current settings.

Helpme is a set of diagnostic tests for personal computers and local-area networks.

It identifies common problems involving installation and performance, including deviations from IBM standards.

The California 10 Pak costs $79. Helpme costs $99.

California Software Products, 525 N. Cabrillo Park Drive, Santa Ana, Calif. 92701. 714-973-0440.

PC Publishing, Inc. has added to its line of Lotus Development Corp. 1-2-3 add-in utilities.

Delta Manager is an uncertainty solver that allows users to introduce an uncertainty factor on specified cells in a work sheet. It costs $149.

Flash-In, priced at $79.95, provides search, replace and locate features. **Graph-Mania**, priced at $69.95, provides a set of screen management options.

4Base, priced at $149, provides a data base management program with import and export capabilities between 1-2-3 and Ashton-Tate Corp.'s Dbase III. It also has built-in index management and speed management features.

@Tools, priced at $295, is a program that allows users to develop customized @functions in C.

The company also announced **Version 3.0** of **Deja**, its $129.95 data transfer program, featuring index management.

PC Publishing, Suite 800, 1801 Avenue of the Stars, Los Angeles, Calif. 90067. 213-556-3630.

Development tools

Flexus International Corp. has announced a development tool that supports prototyping and user interface management for PC Cobol applications.

Cobol SpII allows users to build interactive models, which can then be converted into a Cobol program. The model can be created without writing any Cobol source code. It also provides two program implementation options for screen-handling logic; users can translate the components of the working model into native

How Customer Support Will Keep Pace with Tomorrow's Modem Technology

Created by Daymarkett, Inc., Winter Park, Florida

Cobol source code, or they can use a prewritten screen-handling subroutine that is linked to the application.

Also included is a panel painter, a panel file manager, a runtime unit and a source code generator.

Cobol SpII supports Micro Focus Ltd.'s Cobol/2; Realia, Inc.'s Realia; Ryan McFarland Corp.'s 74 and 85; and Microsoft Corp.'s Microsoft Cobol.

Cobol SpII costs $395.

Flexus, P.O. Box 9119, Morristown, N.J. 07960. 201-895-4724.

Q-N-E International has announced the **Prowindows** option for its Q-Pro-4 fourth-generation language and data base manager.

Prowindows allows a user to open up to 100 windows for each application. It has facilities that allow the creation of enterable windows, nonenterable dynamically modified windows and Help windows.

Windows can be any size and can be placed anywhere on the screen. Prowindows supports color and sound effects and is compatible with Novell, Inc. and IBM Personal Computer networks with file and record locking.

Prowindows costs $250.

Q-N-E International, 136 Granite Hill Court, Langborne, Pa. 19047. 215-968-5966.

A development version of the **Knowledge Engineering Environment** (KEE) software system for Intel Corp. 80386-based personal computers has been announced by Intellicorp.

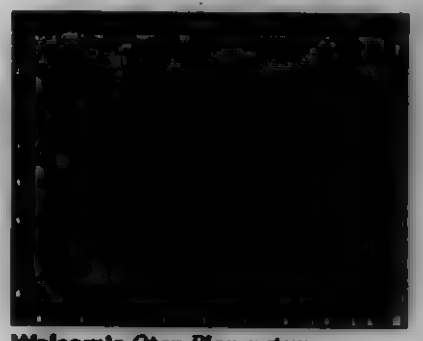
The product is a complete implementation of the KEE system. According to the vendor, KEE on 386-based systems is compatible with KEE on other hardware platforms.

Initially, the development version of KEE will run on Compaq Computer Corp.'s Deskpro 386 and Compaq Portable 386. It costs $15,000.

Intellicorp, 1975 El Camino Real W., Mountain View, Calif. 94040. 415-965-5500.

Software enhancements

Welcom Software Technology has added an interactive graphical program for entering project data to its Open Plan project management system.



Welcom's *Open Plan system*

The enhancement, called Project Worksheet, allows users to enter data in work sheet cells that appear on a spreadsheet format grid of lettered columns and numbered rows. Specific project activities are numbered and entered in boxes on the screen. Boxes are joined to other related boxes to form a logic diagram or project network. Up to 10,000 activities may be input with Project Management, the vendor said.

The user interface includes pull-down menus, pop-up windows and field-sensitive Help.

Open Plan 3.0 is written in Ashton-Tate Corp.'s Dbase III Plus. It costs $4,200.

Welcom Software Technology, Suite 125, 1325 S. Diary Ashford, Houston, Texas. 77077. 713-558-0514.

Version 2.0 of the instant graph generator **Graph-in-the-Box** has been announced by **New England Software, Inc.**

Enhancements include IBM Video Graphics Array compatibility, the ability to create Adobe Systems, Inc. Postscript files, full-page printouts, batch printing and the ability to create sequenced slide shows.

According to the vendor, Version 2.0 makes Graph-in-the-Box compatible with such Postscript-compatible software as Xerox Corp.'s Ventura Publisher.

Graph-in-the-Box Version 2.0 costs $99.95.

New England Software, Greenwich Office Park 3, Greenwich, Conn. 06831. 203-625-0062.

Systems Compatibility Corp. has enhanced its **Software Bridge** file conversion program for personal computer-based word processing packages

Enhancements include translation capabilities for Micropro International Corp.'s Wordstar 2000, Digital Communications Associates, Inc.'s DCA/FFT and DCA/TXT and Borland International, Inc.'s Sprint.

According to the vendor, files converted with Software Bridge maintain function and format codes, which are contained in the source document.

Software Bridge Version 3.0 is available on 5¼- or 3½-in diskettes for $149. Registered users may upgrade for $49.95.

Systems Compatibility, Suite 600, 401 N. Wabash, Chicago, Ill. 60611. 312-329-0700.

Key Systems, Inc. has released **Prospecting Plus**, an enhanced version of its Prospecting sales support software package for personal computers.

Enhancements include access to a file

Continued on page 44

Even as datacomm systems get more complex, users are becoming more dependent on them. That's a double whammy that makes customer support one of the hottest data communications topics of the day.

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For specific product details, contact *Universal Data Systems, 5000 Bradford Drive, Huntsville, AL 35805. Telephone 1-800-451-2369; Telex 752602 UDS HTV.*

Universal Data Systems

Continued from page 43

by company name, contact name, telephone number or follow-up date; and pop-up scripting.

Prospecting Plus also includes the optional features of the previous package, such as a mail manager and an automatic telephone dialer.

Prospecting Plus costs $495 for the first installation and $198 for each add-on. A six-user local-area network or Unix multiuser system costs $1,485. Up to 75 users and 99,999 prospects can be supported on one system, the vendor said.

Key Systems, 512 Executive Park, Louisville, Ky. 40207. 502-897-3332.

An enhanced version of the **Backez** backup and restore utility for IBM Personal Computers has been announced by **EZ-Logic, Inc.**

Release 3.0 features a tape option said to incorporate popular tape devices into the device-independent storage management strategy. According to the vendor, the user will not be able to tell the difference between tape and disk media. A network option allows the user to back up and restore data across a local-area network or mainframe data link.

Other enhancements include on-line Help and the ability to manage data on any Microsoft Corp. MS-DOS-compatible device.

Backez Release 3.0 costs $99.

EZ-Logic, 315 S. El Monte, Los Altos, Calif. 94022. 415-949-2834.

Data storage

A solid-state, nonvolatile add-in memory board for microcomputers has been announced by **Magnesys.**

The **Drivecard** features 360K or 720K bytes of usable memory storage with a personal computer bus host adapter included on the master board. The master Drivecard can support up to six additional Drivecards or Magnesys's Electronic Drives, the vendor said.

The unit is compatible with IBM PC- and Microsoft Corp. MS-DOS Versions 2.0 through 3.2. It costs $1,195. Satellite boards cost $1,105.

Magnesys, 1605 Wyatt Drive, Santa Clara, Calif. 95054. 408-988-1881.

Cipher Data Products, Inc. has announced quarter-in. tape subsystems in 125M- and 150M-byte configurations for the IBM Personal Computer and Personal System/2.

The full-height 125M-byte model is called the **5425F.** The **5150F** is a compact 150M-byte model. The **5550FD** holds one or two half-height 150M-byte tape drives or one half-height 150M-byte tape drive and a half-height disk drive.

Standard software allows users to back up an entire disk on a file-by file or specific partition basis. Selected files can be restored from a fast-image backup.

Versions of the 5150F and 5550FD for IBM PCs cost $1,499; for the PS/2, they cost $1,699. The 5425F for PCs costs $1,299 and $1,499 for the PS/2. Xenix versions cost an additional $100.

Cipher, P.O. Box 85710, 10101 Old Grove Road, San Diego, Calif. 92138. 619-578-9100.

A 1.44M-byte 3½-in. floppy disk subsystem for IBM Personal Computer XTs has been announced by **Franklin Telecom.**

The **FDD1.44XT** is an internal subsystem that can be used with IBM PC- or Microsoft Corp. MS-DOS 3.3 or higher with no software drivers. It may be intalled as either drive A or drive B. Each subsystem includes a controller, a drive and an installation kit. Software for disk backup is included.

The subsystem with a single drive costs $425. An IBM PC AT version costs $295.

Franklin Telecom, 733 Lakefield Road, Westlake Village, Calif. 91361. 805-373-8688.

An optical disk-based storage subsystem for IBM Personal Computers and compatibles has been announced by **Aquidneck Systems International, Inc.**

The PC Access System allows users to read from and write to the vendor's OAS opti-

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Desktop publishing was invented to help you create handsome documents right in your own organization.

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The IBM Personal Publishing System lets you design and print near-typeset quality documents.

available on the powerful IBM PS/2™ Models 50, 60 and 80, in addition to our economical Model 30.

Naturally, our systems help you create captivating documents. But what makes them unique is that they're also built for speed. And the tighter your publishing deadlines, the better our systems look.

How IBM is rewriting performance standards.

In every desktop publishing system, information is passed between the CPU and the printer. And for most systems, that's where the publishing process slows down.

cal disk media.

The system is composed of an optical disk drive, a small computer systems interface card, a cable and a software package compatible with IBM PC- or Microsoft Corp. MS-DOS Version 3.0 or higher, according to the vendor.

The software provides a copy utility, a device driver and an I/O control link. Both 5¼- and 12-in. optical disk drives are supported.

The PC Access System costs from $7,500.

Aquidneck Systems, 650 Ten Rod Road, North Kingstown, R.I. 02852. 401-295-2691.

Relax Technology, Inc. has announced the **Relax SE 171**, an internal hard disk drive for the Apple Computer, Inc. Macintosh SE.

The drive offers 171M bytes of storage and features a 25-msec average access time. It takes the place of the upper 800K-byte floppy disk drive in the Macintosh SE. It includes the vendor's Relax & Save file backup utility, which lets the user back up and restore some or all of the hard-disk files.

The Relax SE 171 carries a price of $3,495.

Relax Technology, #22, 3101 Whipple Road, Union City, Calif. 94587. 415-471-6112.

A nine-track streaming-tape drive designed to meet the data interchange requirements of personal computers and workstations has been announced by **Qualstar Corp.**

The **Minstreamer Model 1260 GCR** drive can store up to 250M bytes on a single tape reel. It incorporates multiple operating appeds to maintain a constant data rate of 80K byte/sec. It comes with standard buffered Pertec Computer Corp. interfaces or a small computer systems interface (SCSI) and can read and write at 1,600 through 6.3K bit/in. densities.

With a Pertec interface, the product costs $6,975. With a 256K-byte cache buffer, it costs $7,575, and with a 3.2K bit/in. capability, it costs $7,275. An SCSI version with a 64K-byte buffered interface costs $7,995.

Qualstar, 9621 Irondale Ave., Chatsworth, Calif. 01311. 818-882-5822.

A 310M-byte enhanced small-device interface drive for the IBM Personal System/2 Models 60 and 80 has been announced by **Core International.**

Called the **HC310**, the drive features an average access time of 17 msec and can provide transfer rates to 10 MHz. Software allows the drive to be partitioned as one volume and to link multiple drives as one, up to 1G byte.

The HC310 costs $6,495.

Core, 7171 N. Federal Highway, Boca Raton, Fla. 33487. 305-997-6044.

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One exception is the IBM Personal Publishing System. Our system features a co-processor in the PC, and a high-speed printer interface. That arrangement, along with our 286 and 386 microprocessors, helps you create documents fast.

What's more, IBM makes it easy to get out of the starting blocks.

The IBM PS/2 Models 50, 60 or 80, with the Personal Publishing option, and the IBM SolutionPac™ Personal Publishing System (available with the Model 30) give you everything you need to turn drab documents into something dramatic.

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Right now, IBM is offering a $1,000 rebate on the IBM PS/2 Model 80 with Personal Publishing. To find out more about our $1,000 rebate, and The Bigger Picture in personal publishing systems, call your participating IBM Authorized Advanced Products Dealer, or your IBM Marketing Representative today.

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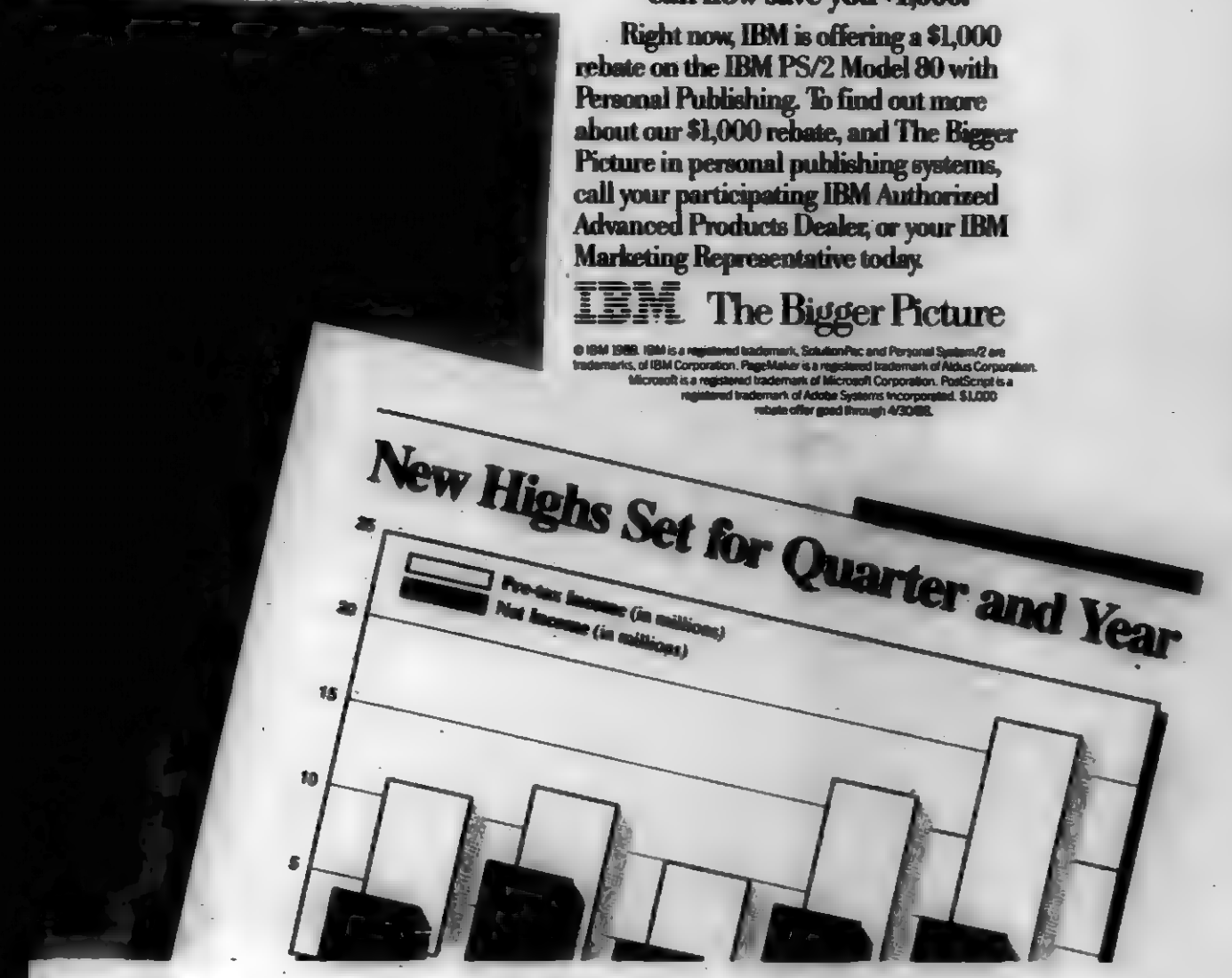

Printers/Plotters/Peripherals

Texas Instruments, Inc. has announced the **Omnilaser 2106**, an Adobe Systems, Inc. Postscript-compatible laser printer.

The printer features 35 resident typefaces and such paper-handling features as a manual paper feed with the ability to accept envelopes and transparencies. It also features interfaces for the Apple Computer, Inc. Macintosh as well as IBM Personal Computers.

The Omnilaser 2106 prints up to six page/min. and has a resolution of 300 by 300 dot/in. It has 2M bytes of random-access memory, four plug-compatible interfaces, including RS-232C, and a Genicom Corp. Centronics parallel interface. Standard emulations include Hewlett-Packard Co. Laserjet Plus and the HP 7475A plotter.

The Omnilaser 2106 costs $4,595.

Texas Instruments, P.O. Box 809063, DSG-163, Dallas, Texas 75380. 800-527-3500.

A version of the **Discover 7320** personal computer-based scanning system has been announced by **Kurzweil Computer Products, Inc.**, a Xerox Corp. company.

The Discover Model 20 features the ability to scan text in four languages — German, French, Italian and Swedish — in addition to English. It also in-

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cludes a landscape mode that enables users to rotate images 90 degrees on a PC screen.

The Model 20 comes with the vendor's software, a user interface and documentation, a coprocessor board with 4M bytes of random-access memory and a desktop scanner. It costs $11,950.

Kurzweil, 185 Albany St., Cambridge, Mass. 02139. 617-864-4700.

Applied Data Communications, Inc. has announced that its multifunction robotic disk handler for duplicating, printing and labeling 3½-in. diskettes is now compatible with Apple Computer, Inc.'s Macintosh SE and Macintosh II.

Copymaker Plus performs copying, labeling and printing operations simultaneously.

The Copymaker Plus *disk handler*

For double-sided, double-density diskettes, the average throughput rate is 64 sec., with complete memory test and verification of copied data.

For printing labels, Copymaker Plus uses an internal nine-pin dot matrix printer capable of printing 15 lines of 23 ASCII uppercase and lowercase characters per label, the vendor said.

Copymaker Plus costs $15,590.

Applied Data Communications, 14272 Chambers Road, Tustin, Calif. 92680. 714-731-9000.

A video port expander for the IBM Video Graphics Array standard that works with all four models of IBM's Personal System/2 has been announced by **Network Technologies, Inc.**

The **Vopex-8V** allows eight monitors to be driven by a single PS/2 at distances up to 50 ft from the computer. All eight output ports are individually buffered.

The Vopex-8V costs $899.

Network Technologies, 19145 Elizabeth St., Aurora, Ohio 44202. 216-543-1646.

Summagraphics Corp. has introduced a version of its **Bit Pad Plus** graphics tablet for the Apple Computer, Inc. Macintosh family of personal computers.

Bit Pad Plus is based on the vendor's Charge Ration technology. It is a 12- by 12-in. tablet and comes with a stylus and a special interface device.

The Macintosh version of Bit Pad Plus costs $495.

Summagraphics, 777 State Street Extension, Fairfield, Conn. 06430. 203-384-1344.

A color transfer system for laser printer presentations has been announced by **Kroy, Inc.**

Called **Kroy Color Plus**, the system adds color to documents created on laser printers.

The user sandwiches the laser-printed or photocopied page with a color transfer sheet of the desired color.

The sheet is then passed through the processor, which bonds the color to the toner image within 30 seconds, the vendor said.

Color Plus is priced at $875.

More than 50 colors of transfer film are available, including metallic foils. They carry a price of about $60 per carton.

Kroy, P.O. Box C-4300, Scottsdale Airpark, Scottsdale, Ariz. 85261. 602-948-2222.

An 18 page/min laser printer has been introduced by **Kyocera Unison, Inc.**

The **F-3010** compact laser printer offers 300 dot/in. resolution. Features include seven built-in emulations, such as the Hewlett-Packard Co. Laserjet Series II, the Epson America, Inc. FX-80, the Qume Corp. Sprint II, the IBM Graphics Printer, the NEC Corp. Spinwriter, the Xerox Corp. Diablo 630 and a generic line printer. Also included are 79 resident fonts and Kyocera's Preacribe control language.

The F-3010 has 1.5M bytes of standard random-access memory expandable to 3.5M bytes. It costs $8,395.

Kyocera Unison, P.O. Box 3056, 3165 Adeline St., Berkeley, Calif. 94703. 415-848-6680.

Copal U.S.A.'s *Writehand 5930*

A dot matrix printer offering a 480 char./sec. print speed in draft mode has been introduced by **Copal U.S.A.**

The **Writehand 5930** employs a 16-bit processor and offers 10 char./in. draft-quality printing at 400 char./sec. and letter-quality printing at 80 char./sec. The standard 16K-byte buffer is expandable to 256K bytes.

The Writehand 5930 comes standard with Epson America, Inc. FX and IBM Proprinter XL emulation. It costs $1,100.

Copal, #105, 2291 205th St., Torrance, Calif. 90501. 213-618-0225.

There's only one DASD tuning tool that does it all.

DASDMON is a real-time and batch DASD performance tuning tool for MVS and MVS/XA. It collects critical performance data, identifies problems, and recommends specific tuning actions. It's like having your own DASD consultant 24 hours a day.

Unique Cache Statistics

DASDMON offers real-time displays that show cache utilization. Only DASDMON collects cache read/write ratios and read-hit statistics to the job and data set level. These statistics show whether or not a data set is a good cache candidate.

Identifies Exact Problem Areas

Define your performance goals, and let DASDMON measure against them. If these goals are not met, then data is automatically collected for analysis and the following problem areas are identified:

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- Volume contention
- Cross-system reserves
- Excessive seeking
- Data set contention

Let DASDMON eliminate your frustrations.

Recommends Specific Actions

To improve identified problem areas, DASDMON's Data Set Placement Manager (DSPM) component provides reports that clearly state specific tuning adjustments. DSPM reports are based on a data base of repeated performance problems that DASDMON maintains. The recommendation may include moving a data set across a path or reorganizing a volume—quick solutions to common problems.

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Introducing a true thoroughbred among 24-wire printers, the new Hewlett-Packard RuggedWriter 480. It's the fastest printer in its class pounding out letter quality text at a furious 240 cps. And breaking the record for draft copies at 480 cps. So you get a full page of text in less than 10 seconds flat.

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The RuggedWriter 480 printer performs equally well for one person or five. On either a personal computer or small business system.

So take an inside tip and put your money on the industry frontrunner, the HP RuggedWriter 480 printer. Call your local HP sales office or dial 1-800-752-0900, ext. 905A and ask for the RuggedWriter Fast Pack. It's a sure bet.

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Board-level devices

A plug-in card designed to facilitate the migration of Texas Instruments, Inc.'s Business System software to IBM Personal System/2 microcomputers has been announced by **Ten X Technology, Inc.**

Called **X-Porter**, the card is said to allow multiuser applications written for TI's DX10 operating system to run on IBM PS/2 Models 50, 60 and 80. According to the vendor, X-Porter does not require any software development, relinking or recompiling of programs.

The package consists of a single board with 512K or 1M byte of local random-access memory and software that generates the DX10 environment. It creates a multiuser, multitasking network for up to three users.

X-Porter for the PS/2 is priced at $3,550.

Ten X, Suite B114, 3933 Steck Ave., Austin, Texas 78759. 512-346-8360.

A line of memory expansion boards for IBM Personal Computers, PC ATs and Personal System/2s has been announced by **Systems Manufacturing Technology, Inc.**

The **Acuram-8meg** is a 2M- to 8M-byte dynamic random-access memory card for the PS/2 Models 50 and 60. The **Acuram-15meg** is a 15M-byte dynamic RAM card for the PC AT and compatibles.

According to the vendor, on-board firmware locates other RAM cards and automatically reconfigures the Acuram cards to use the available addresses. Full-board diagnostics are performed with power up.

The Acuram cards cost $599 each.

Systems Manufacturing Technology, 1145 Linda Vista Drive, San Marcos, Calif. 92069. 619-744-3590.

Hercules Computer Technology, Inc. has reduced the price of its Incolor video card for the IBM Personal Computer and Personal System/2.

The Incolor board is a color version of Hercules' Graphics Card Plus. It is said to be compatible with all standard text programs that support the Hercules monochrome graphics standard and programs that make use of the Hercules Ramfont display mode.

It can display 16 colors out of a palette of 64 in 720- by 348-pixel resolution. It requires a multisynchronous color monitor or IBM's Enhanced Color Display.

The Incolor card is priced at $349.

Hercules, 921 Parker St., Berkeley, Calif. 94710. 415-540-6000.

A graphics board that is said to provide Hercules Computer Technology, Inc.-compatible monochrome graphics as well as I/O expansion capabilities to IBM Personal Computers and compatibles has been announced by **Boca Research, Inc.**

The **Mono-Master/Plus** board allows users to display any graphics software on a monochrome monitor with resolution of up to 720 by 348 pixels, the vendor said.

The Mono-Master/Plus also provides a 25-pin parallel port, a 25-pin serial port and an optional game port.

Mono-Master Plus carries a price of $199.

Boca Research, 6401 Congress Ave., Boca Raton, Fla. 33487. 305-997-6227.

A data acquisition and process control board designed for the IBM Personal System/2 Models 50, 60 and 80 has been announced by **Scientific Solutions, Inc.**

Called the **MC-DAS 1612**, the single-slot board implements the PS/2's Micro Channel interface. It performs burst-mode direct memory addressing transfers as an I/O slave, and all connections to the board are brought out through a 37-pin D shell connector.

The analog-to-digital conversion is based on a single multiplexed 12-bit successive approximation converter with an 8.5-msec conversion time.

The MC-DAS 1612 costs $995.

Scientific Solutions also announced the **MC-IEEE 488**, an IEEE 488 interface for the PS/2 Models 50, 60 and 80. It costs $395.

Scientific Solutions, 6225 Cochran Road, Solon, Ohio 44139. 216-349-4030.

An Intel Corp. 80386-based satellite board for the S-100 bus has been announced by **Macrotech International Corp.**

Called the **MI386S**, the board is compatible with Concurrent DOS environments and runs on such systems as Macrotech's M1286 and Compupro Corp.'s 8085/8088. Up to seven satellites can be installed in a system, the vendor said; each satellite has 1M byte of memory.

The MI386S costs $2,667.

Macrotech International, Bldg. 5, 21018 Osborne St., Canoga Park, Calif. 91304. 818-700-1501.

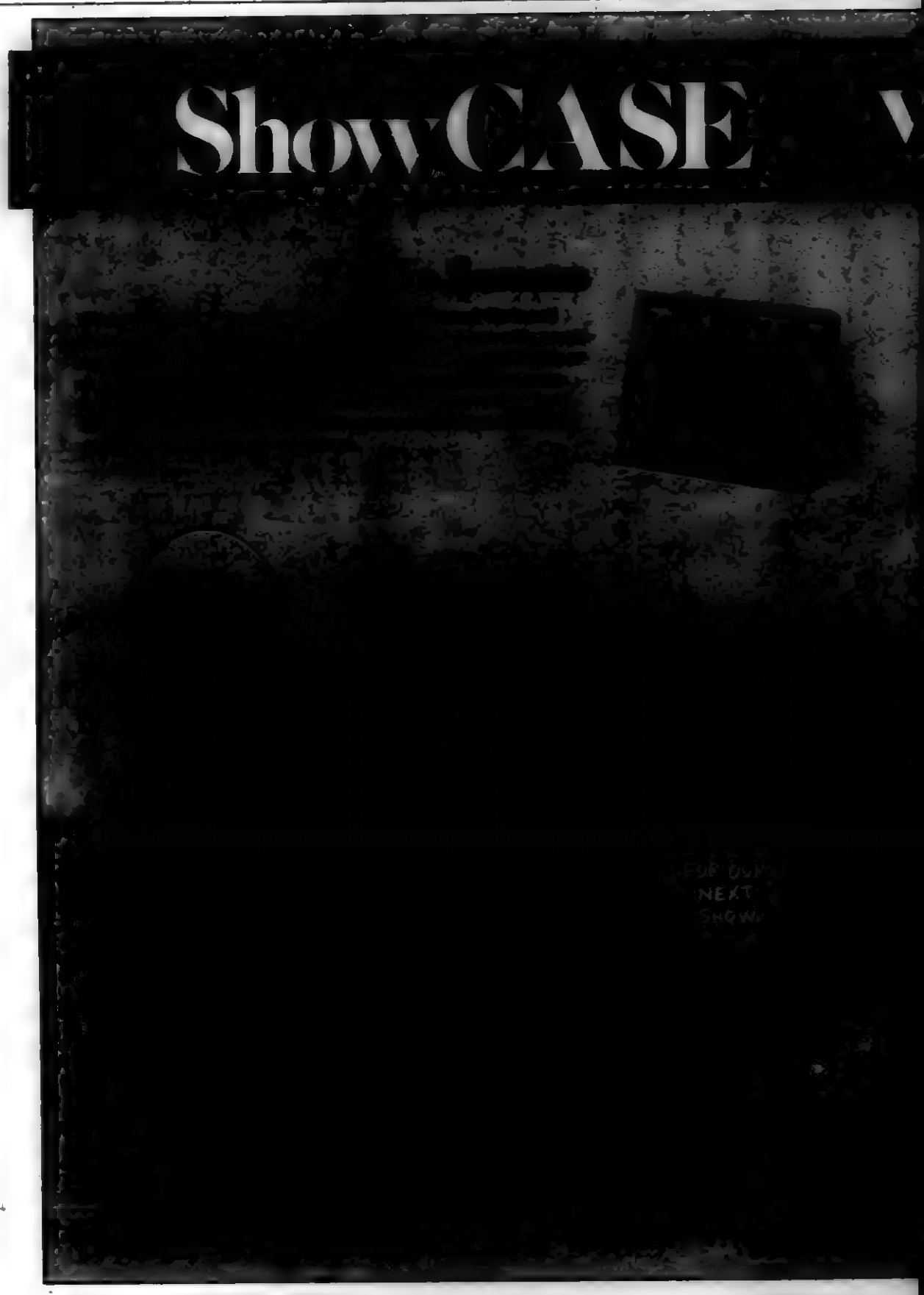
An eight-bit color graphics board for use with Apple Computer, Inc.'s Macintosh II has been announced by **Jasmine Technologies, Inc.**

According to the vendor, the **Rembrandt I** board will be offered with a choice of 15- or 19-in. monitors and will provide users with 256 simultaneous displayable colors and resolutions ranging up to 1,024 by 768 pixels. It operates in both one-bit monochrome and eight-bit color modes in all resolutions.

The board is fully compatible with Quickdraw, Apple's graphics interface.

Rembrandt I costs $995. The 15-in. monitor costs $2,395, and the 19-in. monitor costs $2,795.

Jasmine, 555 De Haro St., San Francisco, Calif. 94107. 415-621-4339.



Mitac plans to introduce PS/2 Model 30 clone in May

BY JAMES A. MARTIN
CW STAFF

SAN JOSE, Calif. — Mitac International Corp., a Taiwanese IBM Personal Computer compatible manufacturer, said recently it plans to introduce what it claims will be the first Personal System/2 compatible on the market.

But Mitac is not cloning the complex and legally challenging Micro Channel architecture bus. Instead, the firm is going after what some call "easy pickings" — the IBM PS/2 Model 30.

Through its U.S.-based subsidiary, American Mitac Corp., Mitac reportedly will formally unveil in May a PS/2 Model 30 clone said to offer 10-MHz performance, Video Graphics Array (VGA) technology and support for the latest Lotus/Intel/Microsoft Expanded Memory Specification Version 4.0, at a cost not yet set but estimated to be between $800 and $1,100.

The Model 30 uses the Multi Color Graphics Array, not the VGA.

In comparison, the basic IBM Model 30 configuration lists for $1,695, but often it is heavily discounted. IBM's system runs at 8 MHz. The Mitac system reportedly offers four full-height expansion slots vs. the Model 30's three.

In addition to Mitac, at least one other Taiwanese-based microcomputer maker, Acer Technologies, Inc., is reportedly planning to enter the PS/2 Model 30-compatible market this spring. Acer, a San Jose-based division of Taiwan-based Acer Group and formerly known as Multitech Electronics, Inc., has designed a Model 30 clone with its own chip set that will run at 9 to 10 MHz. Acer will probably release two versions of its Model 30 look-alike, one with two expansion slots, the other with four, according to Victor Woo, senior vice-president.

Model 30 compatibility is a safe, legal bet, since IBM has continually vowed to protect its Micro Channel architecture through strict patents. The Micro Channel is found on the PS/2 Models 50, 60 and 80. "To make a Model 30 compatible is like making an IBM PC XT compatible, and you don't need a lot of licenses from IBM," said C. K. Cheng, assistant vice-president of U.S. sales. However, Mitac is currently talking with IBM about cross-licensing agreements in general, he added.

Although PS/2 Model 30 chip sets are available from such vendors as Chips and Technologies, Inc., Mitac has jointly developed its own Model 30-compatible chip set with a lesser known U.S. semiconductor supplier it would not identify. The Mitac MPS-100L is said to be register-level compatible with IBM's Model 30 and offer a BIOS from Phoenix Technologies Ltd.

Bigger plans in store

Mitac is easing into the PS/2 compatibility market by first introducing a Model 30 and is set to announce a Model 50 Micro Channel-compatible machine later this year, according to Keddy Chen, company spokesman. Mitac is a relatively unknown microcomputer manufacturer distributing mostly to OEMs and value-added resellers.

"Corporate America is already used to buying clones, so acceptance in the PS/2 Model 30 world should be faster than it was originally in the PC market," said Steve Hess, director of the minimicrocomputer group at consulting firm Creative Strategies Research International in Santa Clara, Calif. There will be some initial hesitation, Hess added, toward a lesser known Taiwanese company's clone. But "at prices lower than Big Blue's, corporate America will at least look at them seriously," he said.

Some specifications for the machine, however, were still being sketched out last week. For example, the company has not decided between the Intel Corp. 8086 and the NEC Corp. V30 microprocessors, although Mitac is "leaning toward" the V30, Chen said.

Mac Plus

CONTINUED FROM PAGE 33

based Macintosh II. The Mac SE and the Mac II could be expanded through the use of internal slots.

The entry-level model in its Macintosh line was phased out last summer. Hashimoto predicted that the Macintosh Plus will be phased out of the Mac line shortly. Last year, Apple shipped 281,000 Macintosh Pluses worldwide, according to Dataquest. In comparison, Apple delivered 340,000 Mac SEs worldwide.

The company also trimmed prices on three hard disk drives containing small computer systems interfaces for the Macintosh.

The price of a 20M-byte hard drive has been cut to $1,099 from $1,299; a 40M-byte drive is now priced at $1,699, down from $1,999; and an 80M-byte drive costs $2,799, down from $3,199. Introduced in January 1986, the Macintosh Plus contains 1M byte of RAM and is priced at $2,199.

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Silicon tools take networking tack

BY JAMES A. MARTIN
CW STAFF

ANAHEIM, Calif. — Silicon Graphics, Inc. unveiled a series of tools last week that reportedly enhance the networking capabilities of its Iris 4D Superworkstation family of reduced instruction set computing graphics workstations.

Iris systems are used for such functions as automobile design and prototyping.

The new products, called the 4D Workgroup, are scheduled for July availability and were designed to improve functions in three major areas of networking: access, distributed graphics objects and resource sharing.

Among the products are emulation packages said to enable Iris workstations to download IBM mainframe VM and MVS files and conduct IBM 3270 or 5080 sessions using that data. Prices are $12,000 for 4D5080 and $2,000 for 4D3270.

Other connectivity tools include 4DDN, a $3,000 tool said to access applications on Digital Equipment Corp.'s Decnet VAX systems.

Silicon's 4D Hyperchannel, priced at $10,000, connects users to a Cray Research, Inc. supercomputer to enable Iris workstation users to transform large volumes of data into graphic images. IBM Personal Computer emulation is offered via 4Dsoft PC, priced at $795.

A network server system, the $49,000 4server, runs at 16 MHz and is said to process more than 13 million instructions per second. The network server also provides up to 9G bytes of disk storage and up to 144M bytes of on-board memory.

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It's a thermal printer with two external boards that maximizes compatibility by letting you mix and match software drivers. So you can get color out of hundreds of popular applications, including those with Microsoft Windows 1.03.

The Colorgrafix 100 maximizes speed, too. It produces a full-color 8½"x11" page or transparency in about a minute. An 11"x17" page in under two. Other printers can take 20 minutes, even longer, to print quality, its 300x300-dot-per-inch resolution equals photostatic printers that cost three times more.

This enhanced performance comes from a powerful QMS controller that uses the new 40-MHz TI 34010 graphics processor. With 12 megabytes of RAM it gives you more accurate color reproduction on the most complex applications. And with 35 resident type fonts, it gives you more flexibility. To get the facts in living color, call 1-800-631-2692, ext. 111.

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Vortex

FROM PAGE 33

tions such as brokerage firms and government agencies, in which security or an audit trail are important, Kato said.

The VAS 1000 may also be applicable for computer-aided design and engineering work, for which users sometimes need to retrieve a previous version of a sketch. "It is not ready for mass market because of the cost," Kato said.

The system can also help a user avoid data loss when exiting an application without saving a file or because of a power problem. The user can return the computer to its state before the data was lost and begin working again, the vendor said.

The system captures each of the computer's activities, compresses the data and routes it through a 20M-byte hard disk drive to its final destination in the write-once read-many drive.

GEM revamp

FROM PAGE 33

Digital Research said the software offers additional ease of use and flexibility by allowing three modes of menu operations. The user can click on a menu, use autodrop-down or use pull-down menus.

Other enhancements are paper tray selection options and support for a variety of paper sizes, including European standard-size paper. Enhanced control of print positioning on the page is offered. Special symbols, such as trademark and copyright, and international characters are also supported, the company said.

The package includes support for Hewlett-Packard Co.'s Laserjet printers and improved Adobe Systems, Inc. Postcript support on the Apple Computer, Inc. Laserwriter and Laserwriter Plus in addition to other Postscript-compatible laser printers and typesetters.

Using GEM/3 and the included Bitstream Fontware Installation Kit, users can reportedly generate HP Soft Fonts and Postscript-compatible fonts. Once generated, other non-GEM applications running on the user's computer can use the fonts as well, the company said.

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BIDS & PROPOSALS

R.F.P.

Project ABACUS

Computing System Proposal

for

Financial Services

THIS IS MY FIRST PASS AT THE BANKING PROJECT RFP. I'VE PULLED OUT THE MAJOR REQUIREMENTS AND PROVIDED WANG RESPONSES.

YOUR THOUGHTS

JIM 3/1/88

JIM

P.S. SEE MY MARGIN COMMENTS

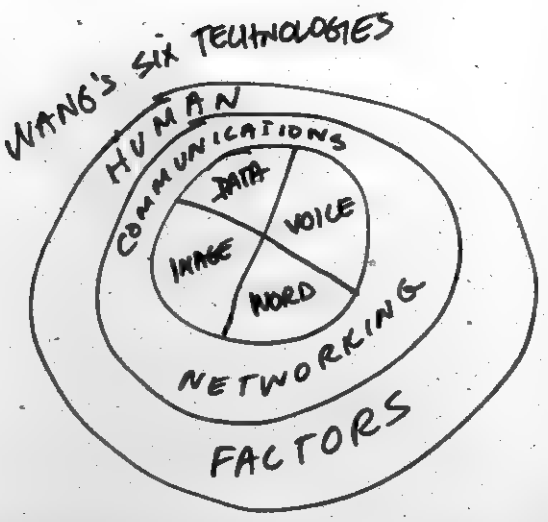
TOM 3/1/88

STRUCTURE YOUR REPLY ALONG THE SIX CUSTOMER NEEDS

WE'VE LEARNED THIS BY LISTENING TO OUR CUSTOMERS

1. SYSTEMS FOR TODAY & TOMORROW
2. COMPLETE SOLUTIONS
3. MULTI-VENDOR ENVIRONMENTS
4. REALIZATION OF PAST INVESTMENTS
5. SENSITIVITY TO THE USER
6. LONG-TERM RELATIONSHIP

WANG IS THE SYSTEM INTEGRATOR



N.B.

This is a representation, not an actual, Request For Proposal. It is designed to demonstrate Wang's preparedness to meet the challenges that face the financial services industry. It is intended to provide summary information for data processing and financial service professionals. We have chosen a banking model in this "representative" RFP only as a way to examine Wang's offerings in one single segment of the diverse financial services industry.

We welcome your comments and invite your input.

Management Overview

Intensifying competition in the banking segment requires increased attention to the issues of customer service and productivity. The bank must bring to market higher quality services more rapidly and at lower cost. A fully integrated information system is at the heart of this effort. An advanced system environment is essential to enable the bank to get maximum return from existing personnel, develop superior banking products and most important, provide a maximum level of customer service.

Project ABACUS Description

ABACUS (Advanced Banking and Customer Service) system objectives are to place the bank in a position to:

- o reduce overhead in order to increase margins
- o improve efficiency
- o be more responsive to market opportunities and increase competitive edge.

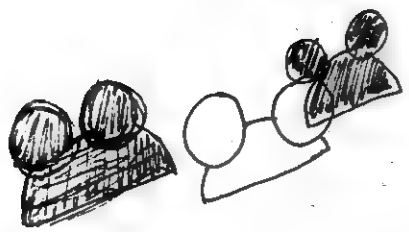
The bank intends to achieve the project ABACUS objectives by acquiring an advanced systems environment that has a modular structure in which the modules combine to support decisions.

To accomplish this, the bank intends to install an advanced business computer solution which will create a sophisticated information system environment. The computer system must employ integrated modules, each of which provides an essential contribution to business operations.

The bank requires advanced customer communications access technologies aimed at maximizing first-hand customer interactions with our product and services. Proposed access technologies must be proven compatible with our current installed systems. [Appendix B] Although not a mandatory requirement for the RFP, vendor should outline their offering in voice response technology.

Wang Response

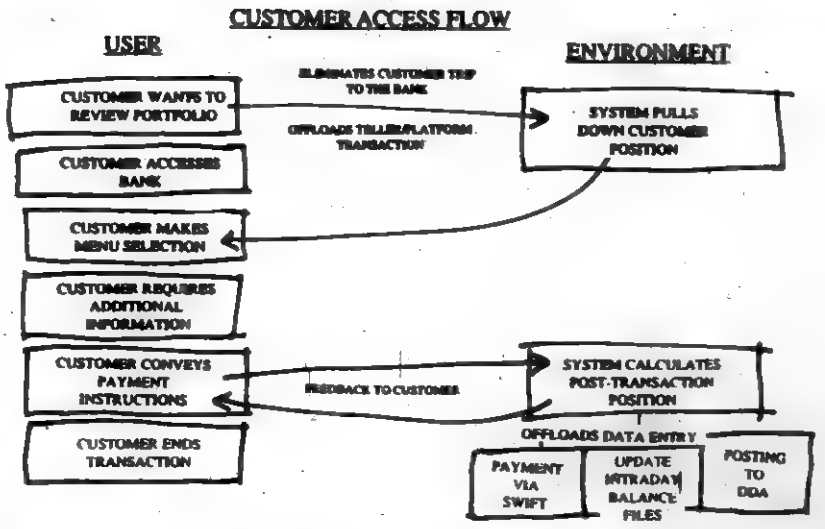
Wang's solutions incorporate leading-edge customer access capabilities. Wang STEP (Speech & Telephony Environment for Programmers) transforms a customer's telephone into a vehicle to access database information for banking products such as DDA balances, revolving credit lines, stock quotations, etc. Industry standard and Wang terminals provide dial-up access to applications for funds transfer, buy-sell orders, market data, break-even analysis, and more.



HAMMER THIS ONE HOME!

ATTACH A FEW SUCCESS STORIES

THE INTEGRATION IS WHAT SEPARATES WANG, BUT IS HARD TO GRASP. SEEING IS BELIEVING — SUGGEST A DEMO



The bank considers data access to be a high priority at every level of the bank. Our requirements include customized data presentation and basic application development at the user level. Additionally, vendors should present their capability in the area of imaging and image processing especially as it applies to bank documents typically stored off-line in paper form.

Wang Response

Wang's fourth generation language offering, PACE, uses a relational DBMS which allows the entire user community within the bank to share select data pertinent to their work as tellers, relationship managers, bank officers, CEO's, etc.

PACE is unique in its ability to effectively manipulate data, text, voice and image files.

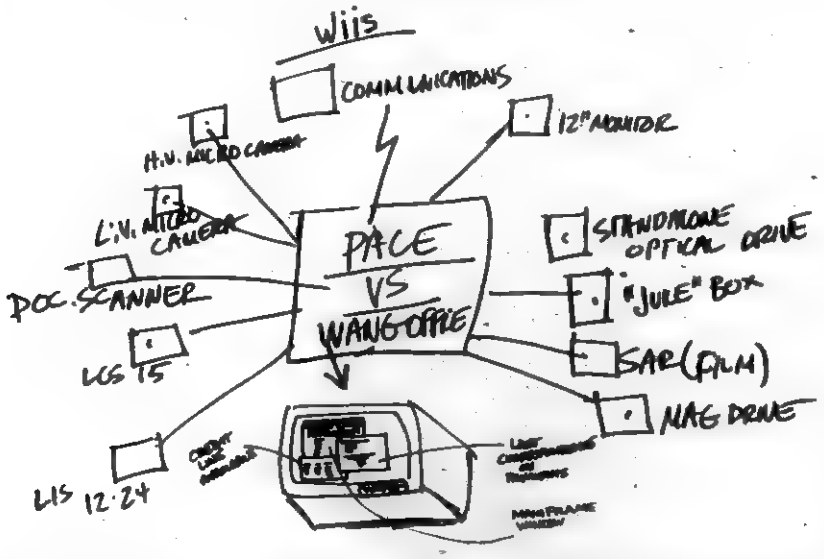
PACE also allows users to develop complete applications without needing the skills of a professional programmer.

Wang, as part of the strategic relationship, will provide a comprehensive needs analysis in order to best apply PACE in the environment.

When compared to traditional development methods, PACE provides significant reductions in application development lead times.

WIIS, Wang's Integrated Image System, is a comprehensive system for managing, processing and communicating text, data and imaging information. The bank can capture documents in image form, such as loan applications, letters of credit, pledges of collateral, P & L statements, etc. that are currently stored off-line in paper form.
The system allows the bank to improve customer service, reduce filing and storage costs and improve management and handling of paper documents.

This means that the bank officer can on a single workstation and, with the touch of a button, access a mainframe window, a Wang VS window, as well as "photocopies" of all the documentation signed by the customer and the bank.



The bank sees user acceptance and user sensitivity to new technology and systems as a chief concern especially as it relates to performance on the job and overall employee well-being. Each vendor is required to explain in specific terms how their system addresses these human factors.

Wang Response

Wang brings to the bank project a history of acclimating users to complex technology. Wang remains dedicated to designing systems which do not require replacement of familiar systems or complicated retraining.

UNLIKE IBM 3X SERIES!

For more than a decade Wang has maintained a consistent user interface. Additionally, because of our single architecture and corporate commitment to preserving your investment in application software only minor changes are required to run programs that may also be ten years old.

YOU MUST DISCUSS WANG OFFICE ROLE AS AN APPLICATIONS INTEGRATION UTILITY —

In response to this RFP, each vendor must set forth its ability to meet the following requirements in the area of applications development:

- o adherence to bank's corporate data standards
- o project management services for project design, such as man-year requirements, critical path, and system capacity planning
- o code efficiency measurement
- o conformance with all industry-standard languages.

← INCLUDE WANG SOLUTIONS CATALOG

Wang Response

Wang conforms to all standard industry languages, including COBOL, RPG II, C language, FORTRAN, PL/1, BASIC, and ASSEMBLER. Further, Wang's solution enables rapid development of code using an integrated interactive set of compilers, debuggers, and editors. Tasks such as analysis, design, prototyping, coding and testing are facilitated by the system.

Address safety and security capabilities. Each vendor should indicate its ability to comply with the bank's rigid safety and security requirements. Cite specific security options available.

Wang Response

The family of Wang VS 32-bit processors with extended security access control option provides:

- *o event logging and violations*
- *o scheduled user access times*
- *o last logon notification*
- *o password encryption and suppression*
- *o user time out*
- *o single or multiple logon*

INSUFFICIENT — APPEND VS SECURITY FEATURES USER GUIDE

Additionally, the entire family of Wang SAFE products have incorporated the SWIFT II standards. Market data feed applications such as SHARK also incorporate similar storage/warehousing design.

The **communications module** must provide at a minimum seamless bridges into the following communications protocols:

- o SNA/SDLC
- o RJE 3777
- o 2780/3780
- o CCITT X.25
- o IEEE 802.3
- o IEEE 802.5

Additionally, vendor must have at least a statement of direction with respect to compliance with the Open Systems Interconnect model. Also, the environment must be able to present a unified appearance to the user community and further, facilitate a smooth transition across the bank's diverse installed base of equipment.

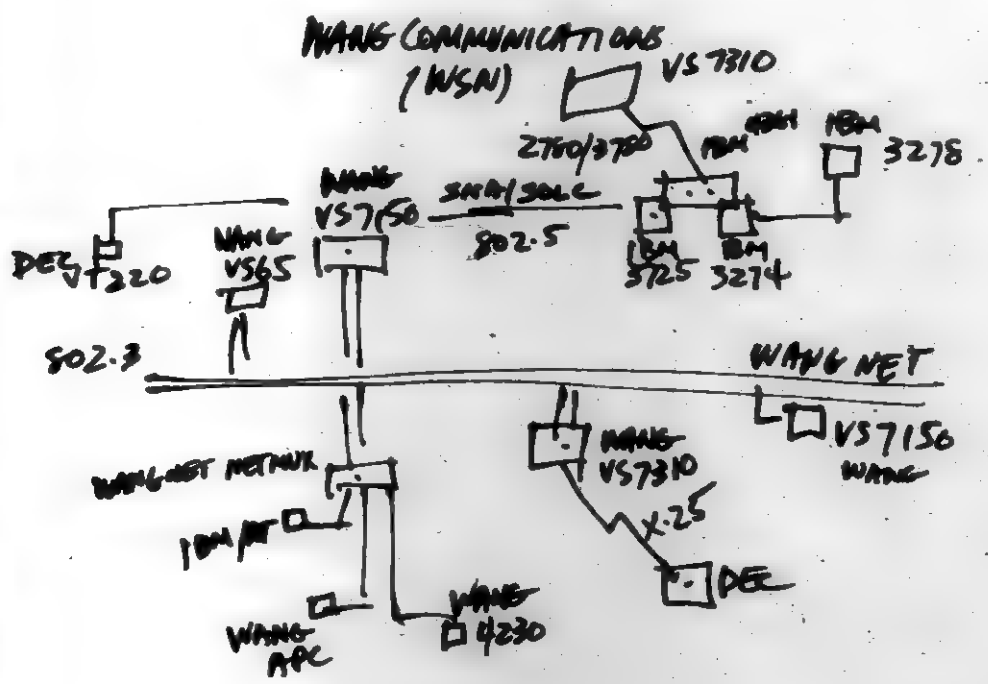
Wang Response

The Wang solution employs an integrated strategy for large-scale systems networking. Wang Systems Networking makes transparent the differences in the local and wide area networking protocols, therefore providing seamless communications across the entire organization. Wang not only connects a corporate network through multi-vendor integration, but also provides the ability to manage and administer the network as well.

DON'T FORGET — IT'S WANG & NON-WANG

Wang's solution accomplishes this by means of the Distributed Management Facility, which manages both the Wang implementation within the building and the wide area network. All network management can be centralized at the system operator's console or be decentralized as required, from host level to terminal. The operators can run backups and download new versions of code, all from the network control center.

As to standards, Wang solutions conform to de facto and generally accepted industry standards.



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And get the late-breaking news — before it's too late.

Printware releases Postscript clone

BY STEPHEN JONES
CW STAFF

ST. PAUL, Minn. — Claiming to be the first company to ship a clone of Adobe Systems, Inc.'s Postscript language interpreter, Printware, Inc. released Printscript last week.

The package was designed to give users running Printware's 720IQ Laser Imager printer full compatibility with the Postscript language. Printware's printer boasts 1,200 by 600 dot/in. laser output, the vendor said.

The Printscript interpreter is bundled with Printware's Image Processor printer controller and sells for $6,270.

The package is also said to be compatible with Hewlett-Packard Co.'s Laserjet printer and a handful of dot matrix machines.

High compatibility

Printware, a manufacturer of high-resolution laser printers, said the interpreter can interface with a variety of software publishing packages, including Aldus Corp.'s Pagemaker, Xerox Corp.'s Ventura Publisher and Laser Friendly, Inc.'s Office Publisher.

The Image Processor component of the package requires a minimum of 1M byte of random-access memory and a multiple page buffer.

Printers with Printscript will be configured with 13 typeface outline masters, the vendor said.

Additional fonts can be downloaded from a host computer. With the package, users can create font sizes ranging from 0.1 to 720 points.

The package supports such editing options as kerning, multiple fonts per line, rotating, shading and reverse type, according to Printware.

Tandy claims SCSI board for AT a first

BY ED SCANNELL
CW STAFF

FORT WORTH, Texas — Tandy Corp. has announced what it said is the first small computer systems interface (SCSI) adapter board for IBM's Personal Computer AT machines. The firm also announced a compatible 80M-byte hard disk drive.

Tandy said the products allow its Model 4000 system to be used as a more effective file server. With the adapter and drive, the company is positioning the system directly against IBM's Personal System/2 Model 80.

Tandy claimed the SCSI-compatible products raise the Model 4000's disk throughput speed to that of a PS/2 Model 80 equipped with a 115M-byte hard disk drive and running under Microsoft Corp.'s MS-DOS.

The SCSI board supports up to three internal storage devices with capacities ranging from 40M to 768M bytes. The adapter board, which contains a 16-bit 10-MHz chip, has a transmission rate of up to 10M byte/sec. and an average disk access time of 28 msec, a spokesman said.

To implement the products, the vendor said, users running MS-DOS must plug in the adapter card, install the hard drive in any internal drive slot and format the hard drive. The SCSI works without a device driver.

The adapter board is priced at $299.95; the 80M-byte hard drive costs $1,799. Both products are available immediately.

Drive aims to check integrity

BOCA RATON, Fla. — Rodime, Inc. has introduced the Rodime RO 5130 R, a 133M-byte, half-height, 28-msec drive. The system will be sold to OEMs and value-added resellers, which will in turn sell the product to end-user organizations. It may also be sold directly to user organizations capable of customizing systems.

The half-height Winchester disk drive, intended for use with a run-length limited controller, was designed to maintain data integrity with such controllers.

Gary Janz, Rodime's director of product marketing, said the run-length limited hard disk drive is intended to add disk capacity and speed for less than $850.

Rodime also announced that all members of its RO 5000 series of disk drives are shipping with enhanced small-device interfaces (ESDI). The half-height 5¼-in. drives are also offered with an embedded small computer systems interface controller and a Rodime ST 507/412 interface.

Janz said the ESDI interfaces will allow customers to either design their own controllers or use off-the-shelf controllers.

The drives are set to sell for approximately $1,200.

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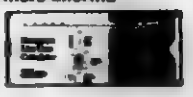

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For network solutions, you should be seeing red.

Scannell

CONTINUED FROM PAGE 33

Quattro hits six figures. Borland has announced that sales of its Quattro spreadsheet surpassed the 100,000 mark in just four months. However, the product's jackrabbit start has to be attributed in part to its 90-day introductory price of $199.95.

As of last week, the product's price was raised to its permanent retail price of $247.50. It'll be interesting to see if Borland can sustain most of this enormous momentum during the next four months. Given the product's features, we suspect it will.

Central to its success will be its speed and its compatibility with Lotus's 1-2-3, which goes right down to the macro level. With its low price and minimum requirements, Quattro has a good shot at cracking a million in unit sales and becoming a serious competitor to 1-2-3.

Hot as the Sun. Benchmarks recently conducted by Workstation Laboratories on Sun Microsystems' Sparc-based Sun-4/260 showed it's almost twice as fast as competing systems. The tests measured the system's I/O, CPU and floating-point performance. The Sun-4/260's Khornerstone rating was 12,474 compared with 6,220 for IBM's reduced instruction-set computing-based RT Personal Computer. Compaq's 16-MHz Deskpro 386 had a rating of 1,941 and IBM's PS/2 Model 60 came in at 1,103.

Dark side of the moon. David Gilmour, who heads up Lotus's Advanced Product Group, isn't someone who is often confused with the lead guitarist of a rock group. However, because he has the same name as one of the founders of Pink Floyd, we understand he's been getting some strange looks at hotels lately when he checks in. "Excuse me sir, but are you . . ."

It might be interesting, though, if the two Gilmours traded places for a year or so. I'm sure the other members of Pink Floyd could expand their musical programming talents, and Lotus's DBMS would have a better chance at topping the rock charts.

You're the disease, I'm the cure. Need a little something to cure those nasty computer viruses going around? Digital Dispatch's Data Physician may be just what you need. The program reportedly detects a "virus activity" in files and system areas and can remove certain types of viruses from an infected program. Data Physician, which works with both DOS- and Unix-compatible machines, runs in the background, so it can continuously monitor a system. The DOS version goes for $199; the Unix version costs $895.

Name of the week. This week's award has to go to Integrated Systems in Kirkland, Wash. "Ask God," through a natural language interface, lets users ask a question, which is then answered in the form of an appropriate quotation from the Bible. Microsoft might consider this as an artificial intelligence shell for MS OS/2 and call it "Ask Gates." Amen.

Scannell is a Computerworld senior editor, microcomputing.

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VM SYSTEMS GROUP

Storage for power users

BY JAMES A. MARTIN
CW STAFF

COLORADO SPRINGS — For conventional users it is clearly overkill, but for storage-hungry applications, a 1.2G-byte optical drive from Information Storage, Inc. may be just the ticket.

Information Storage last week announced what it said is the first 5¼-in., 1.2G-byte write-once read-many (WORM) optical storage system for internal mounting in IBM Personal Computers, PC XTs, ATs and compatibles.

The $5,988 system, available now, comes with a drive, a controller, software and cables and boasts a data transfer rate of 6.5M bit/sec., rivaling the performance of magnetic media, the vendor said. The WORM drive is said to read 20M bytes of data in 40 seconds and write 20M bytes in less than two minutes.

Although the disk storage is not erasable, as a magnetic hard disk is, the system supports all Microsoft Corp. MS-DOS functions, Information Storage said. The firm's Transparent Optical Software (TOS) is implemented into drive-controller firmware, which causes MS-DOS to view the optical disk as just another hard disk drive.

"Our WORM TOS follows standard protocols, looks erasable and uses simple host-interface software," said Steve Popovich, Information Storage's president.

Compared with traditional hard disk systems, optical WORM drives are said to offer higher capacity and improved data integrity for on-line backup and archiving applications.

An external mount version is priced at $6,188. A small computer systems interface option is slated to be available in August at a cost of about $400.

Information Storage's WORM drive is available in a dual-drive 5¼-in. configuration for $9,488. In addition, the company dropped the prices on its 230M-byte WORM internal mount systems from $3,595 to $1,888 and on its external subsystem from $3,995 to $2,088.

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For more information on how Data General has made a difference for companies like Spectrum, send the coupon below. We'll send you the latest issue of PROFILES, our publication devoted to customer success. Or, call: 1-800-DATAGEN. In Canada, call 416-823-7830.

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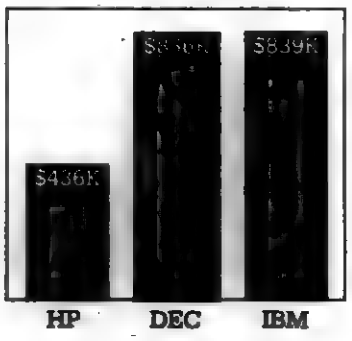

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We know you want more networking options, not less.

Hence the HP commitment to a networking strategy that gives you the true multi-vendor connectivity that proprietary networks simply can't deliver.

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A strategy which adheres to industry standards.

And which supports de facto standards such as SNA.

For example, HP AdvanceNet is based on the OSI seven-layer model. Our HP StarLAN office networking is based on IEEE 802.3. Our networks of UNIX™-based engineering workstations support ARPA/Berkeley services. And our X.25 Private Wide Area Network is based on CCITT standards.

It's this commitment to true multi-vendor networking that will allow you to keep your networking options open in the future, and will protect your existing systems investment.

It's a long-standing commitment supported by years of experience (over 60,000 nodes installed since 1971).

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An example of HP's commitment to standards is HP StarLAN office networking.

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Introducing the HP NewWave environment.

An application environment based on MS™-DOS and Microsoft® Windows 2.0 that lets your people access, manipulate and share information throughout the system.

Effortlessly.

By means of simple, intuitive icons. Pull-down menus. A "mouse." And a common interface across workstation applications.

The NewWave environment incorporates two breakthrough technologies, the HP Object-Management Facility (OMF), and "agents," which together allow users to focus on their business tasks, not their computing tools.

OMF enables users to combine and manip-

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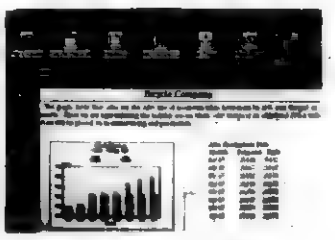

A window to your world.

ulate different data forms— text, spreadsheets, graphics, images, even voice—from disparate sources throughout the system.

All as easily as if working in a single application.

Then, just as easily, the results can be mailed to anyone on the system.

And in the NewWave environment even the novice user can be more productive.

HP integrated workstations with the NewWave environment.

What's more, "agents," which are practical implementations of artificial intelligence principles, can learn and perform repetitive tasks for your users. For example, "agents" can automatically update and distribute a sales report. On a prescribed day, at a certain time.

Furthermore, the NewWave environment will run under OS/2, when available, and provide future support for MIT's X-Window System™ and Microsoft's Presentation Manager.

It will lead the way to a new and more productive era in computing.

You'd have the company with top ratings in customer support satisfaction

No two customers are the same.

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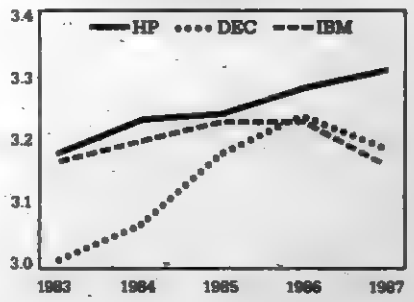

It means asking a lot of "What if..." questions so that solutions can be tailored to your specific needs.

Instead of off-the-shelf solutions routinely handed out.

And it means following up with service and support.

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NETWORKING

DATA STREAM

Thomas L. Nolle

Mid-range gets SNA

The trouble with big hardware announcements, especially from IBM, is that they often overshadow really meaty things that happen at the same time.

Look at the fanfare given IBM's introduction of the 3745 communications processor in February. Sure, it's an important product; but the software announcements IBM made at the same time could have a far greater impact on the way IBM mid-range systems communicate.

Indeed, those packages could provide a viable way into IBM's Systems Network Architecture mainstream for System/36s linked via Low Entry Networking, an SNA-based architecture that provides peer-to-peer communications using the PU2.1 protocol. This, in turn, addresses a long-standing user criticism of IBM's System/36 and 38 series: that it is a maverick computer line that will never fit into — or provide a migration path to — IBM's other computer and communications architectures.

Under old SNA rules, even the smart mid-range processors, called PU2.1 nodes, had a limited ability, at best, to communicate with each other over an SNA network without host intervention. Under the new rules articulated in the recently announced Network Control

Continued on page 60

Tymnet throws weight into system integration

BY KATHY CHIN LEONG
CW STAFF

SAN JOSE — In a dramatic departure from its mainstream packet-switching products and services, Tymnet, McDonnell Douglas Network Systems Co. plans to announce today its intent to become a full-fledged systems integrator within five years.

In a separate announcement, the company unveiled two enhanced mid-range packet switches said to offer three times the throughput of older Tymnet models.

The packet switch vendor started its move toward systems integration last year, when it inked development and reseller agreements for T1 multiplexers with Digital Communications Associates, Inc. (DCA); private-line voice-expansion module vendor Republic Telcom Systems Corp.; and data private branch exchange (PBX) vendor Gandalf Data, Inc. The goal of these and future partnerships is to merge other vendors' products with Tymnet packet offerings to provide a single network that someday will support voice, data and video, Tymnet said.

One-stop shopping

The company expects to announce several more alliances with local-area network, PBX or facsimile machine vendors later this year, according to Tymnet's manager of product marketing, Rick Sprinkle. Tymnet plans to leverage these relationships in an effort to become a one-stop communications shop, targeting what it perceives as a growing demand for voice/data integration among its users.

Continued on page 61

Ottinger on-line

DCA president outlines game plan for OS/2

Amid the popping of flashbulbs and the shaking of hands, the run for the roses to provide OS/2 local-area network connectivity received another important player last Monday when Digital Communications Associates, Inc. (DCA) announced Select CS, an OS/2-based micro-to-mainframe communications server, and an agreement to license and sell Microsoft Corp. and 3Com Corp.'s LAN Manager.

Computerworld staff writer James Daly talked with DCA President James Ottinger on the day of the announcement regarding DCA's plans for the new product as well as future OS/2 connectivity directions.

DCA's Ottinger

How involved was Microsoft in the development of Select CS?

The product development was strictly a DCA responsibility. However, Microsoft worked with us in terms of understanding the specifications. We've had a relationship with Microsoft for quite a long time. We both came to the same conclusion that there was a need for a communications server-based product that took advantage of the advanced features of the LAN Manager and OS/2. There was a

Continued on page 64

Data View

Users' ISDN plans

A correlation of priorities for migrating existing applications to Integrated Services Digital Network, averaged across 600 respondents

INFORMATION PROVIDED BY VENTURE DEVELOPMENT CORP.

TCP/IP net management converges

BY JAMES DALY
CW STAFF

A major obstacle on the path to Transmission Control Protocol/Internet Protocol (TCP/IP) standards was recently cleared when advocates of three proposed TCP/IP network management protocols ironed out their differences and agreed to a unified approach.

After nearly a year of dickering, the TCP/IP Network Management Task Force tentatively decided to use a design based on the Simple Gateway Monitoring Protocol, which has been renamed Simple Network Monitoring Protocol (SNMP).

"With SNMP, the emphasis is on simple; meaning, let's do something in a hurry to put this fire out," said Judy Estrin, vice-president of 3Com Corp. and general manager of Bridge Communications, Inc.

SNMP provides a subset of

Continued on page 61

Modems, Multiplexers and Much More...

Warning: Bargains can be hazardous to your network.

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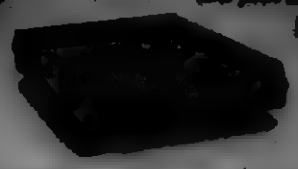

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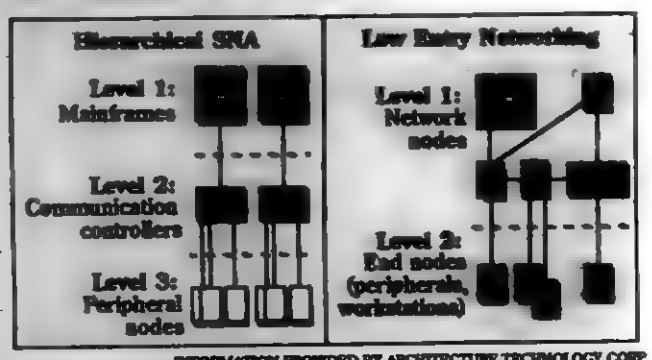
IBM's SNA: Old and new

Hierarchical Systems Network Architecture dictated that master-slave sessions be set up through a host, but Low Entry Networking lets peer nodes communicate without host intervention



INFORMATION PROVIDED BY ARCHITECTURE TECHNOLOGY CORP.

key SNA elements, such as LU6.2, so that programs developed for SNA can run on and communicate across all three system levels: microcomputer, mid-range and mainframe.

This standardization under the SAA umbrella is the key to the closing of the mid-range loophole IBM opened with its nonstandard System/36 and 38 architecture. It also makes the System/36 and 38 line far more palatable to users who want a mid-range system that can function as a liaison between workstation and mainframe architectures.

Some have high hopes that IBM will provide better integration through Silverlake — its long-awaited hybridization of the System/36 and 38. But with tens of thousands of this mid-range line installed, IBM cannot introduce an architecture too divergent from the old; that would simply strand a different group of users at a different place in their development path.

On the other hand, IBM can do much on the software and communications fronts to integrate the mid-range line with its other mainline computer architectures. Through SAA, the System/36 and 38 gain application mobility; through SNA's Low Entry Networking, the series could assume a viable, useful role in IBM's distributed processing strategy.

IBM is working hard to fit its mid-range line into the SNA mainstream — to evolve SNA into a networking architecture that can effectively support a peer-to-peer network of mid-range systems as well as a hierarchical host network. This aspect of IBM's January announcements really deserves the most hoopla and bears close watching.

Nolle is president of Haddonfield, N.J., research company CIMI Corp.

Nolle

FROM PAGE 59

Program (NCP) Versions 4 and 5, SNA peripheral nodes of the PU2.1 class can communicate through intermediary PU2.1 nodes or over an SNA backbone of communications processors such as IBM's 3745 or 3725.

This ability allows System/36s and 38s to communicate over an SNA network using IBM's Advanced Peer-to-Peer Networking (APPN), one of the earliest low-end networking offerings to be released by IBM. The peer communication that PU2.1-based APPN allows can still take place without host involvement, even within SNA.

Another useful enhancement that IBM released with the latest NCP versions is the ability to dynamically update configuration and capabilities tables in an SNA network. This eliminates the need to update NCP tables every time there is a change in a PU2.1 node's logical makeup — for example, the number and type of devices connected to a System/36.

The new release of NCP for SNA controllers also extends the independence of logical units under the control of these peripheral mid-range system nodes. Independent logical units can operate without establishing sessions with the Systems Services Control Point (SSCP) — that is, the mainframe host. And in multihost networks, SSCP ownership of a node can shift without destroying the sessions in progress.

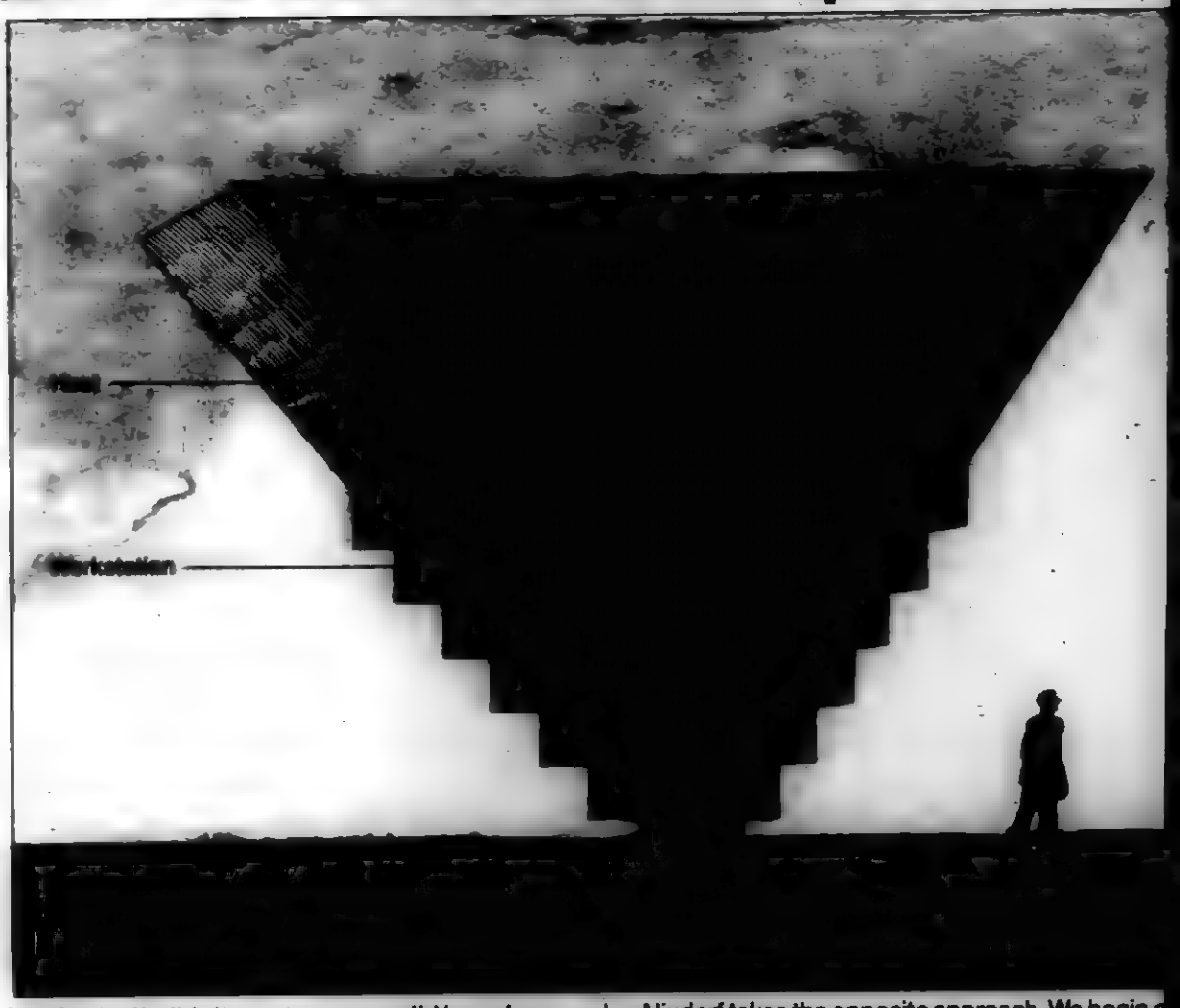
Life after host

All this makes the SNA network using mid-range systems as PU2.1 nodes, or small subarea hosts like IBM 9370s, able to survive the loss of a host.

By building host-independent networking into SNA through the PU2.1 protocol, IBM is making a place for its mid-range systems in the SNA mainstream — and potentially in its Systems Application Architecture (SAA), as well.

IBM has been working hard to develop consistent application programming interfaces for

Nixdorf. The alternative to the upside-down



Nixdorf builds its system on a solid base from the ground up. Because the alternative is mighty unstable.

Most computer companies start with the host, then attempt to bring the awesome power of the mainframe down towards the workstation level.

In theory, this approach should work. In actual practice, it falls short, for the same reason one does not slosh water from a bucket into a drinking glass – it's almost impossible to fill the glass more than half full, and you get water all over the table.

Nixdorf takes the opposite approach. We begin a the workstation level, where all the actual work is done, and work up to the existing host via a powerful Nixdorf 8860, 8870, or Targon® server. Th ensures that all the power in the computer system i usable power, and that none gets wasted in inefficient transmission.

There's another important benefit: The Nixdorf s lution is oriented to delivering maximum informatio and processing power to the ultimate user at work station level. It is thus no longer necessary to leave

Tymnet

FROM PAGE 59

"We might have missed out on some bids because we only had a data solution. We have a small part in the Federal Telecommunications System 2000, but it could have been bigger if we had had a total package," Sprinkle said.

'Two levels'

There will be two levels of integration for Tymnet. One is with our strategic partners, and the other is through our network management interfaces," Sprinkle commented.

Tymnet sources said the company is working on a network management system that will run on a Unix-based workstation and support IBM's Netview and, later, the ISO's Open Systems Interconnect protocols.

Tymnet's formal network management announcement is expected in June at the International Communications Association's users show in Anaheim, Calif. The tool will monitor devices from Tymnet, Gandalf, Republic Telcom and DCA, company sources said.

Tymnet's long-term systems integration plans will not supersede its current packet switch business, Sprinkle stressed.

Tymnet also introduced two enhanced mid-range switches, the Mini Engine XL and the Dual Mini Engine XL, said to offer three times the throughput of the original XL models. The Mini Engine XL is priced from $35,000 to $45,000. The Dual Mini incorporates two Mini Engine XLs in one cabinet and is priced from $65,000 to $80,000. The key difference between the new XLs and the original models is the speed. There is 1M byte of memory and three times the throughput in the new line, Sprinkle said.

Symplex boosts line traffic

ANN ARBOR, Mich. — Symplex, Inc. recently introduced several communications devices said to use data compression to significantly increase the amount of traffic that can be sent over a given leased-line channel.

The Datamizer II SDC-5664A provides a data compression ratio of 2-to-1, allowing up to four 64K bit/sec. devices to share a single 64K bit/sec. leased line, Symplex said.

The product enables one 64K bit/sec. leased-line channel to support the output of up to four NE-64 card sets, each of which supports rates of 2.4K to 64K bit/sec. This allows a company to support its data traffic using fewer 56K or 64K bit/sec. lines, which typically cost $2.50 to $5.00 per mile per month, according to Symplex.

The SDC-5664 supports both V.35 and RS-232/V.24 interfaces and up to 24 ports. NE-64 cards share the device with the older NE-4 and NE-1 card sets. Each NE-64 costs $7,950. The system is available immediately.

Symplex also announced the Quantum Plus series of leased-line modems, which double the throughput of data circuits and continuously monitor circuit conditions, compensating for fluctuations in line quality, the vendor said.

The modems' Automatic Link Intelligence function continuously analyzes a transmission line's actual bit error rate, allowing the device to anticipate and compensate for a major line degradation or failure, Symplex said.

Quantum Plus can adjust transmission speeds and packet sizes as line quality degrades and can grant priority to critical applications. Quantum Plus 28.8 is said to double the effective throughput of a 14.4 bit/sec. leased line and employs Trellis Encoding forward error correction. It costs $9,950. Quantum Plus 19.2 increases throughput of a 9.6K bit/sec. line to 19.2K bit/sec. and costs $7,450.

Both models accept input simultaneously from up to four channels of differing speeds. They are available immediately.

TCP/IP

FROM PAGE 59

the functionality needed for full-scale network management, focusing on the routers or gateways that allow data to be passed between separate or dissimilar networks, Estrin said.

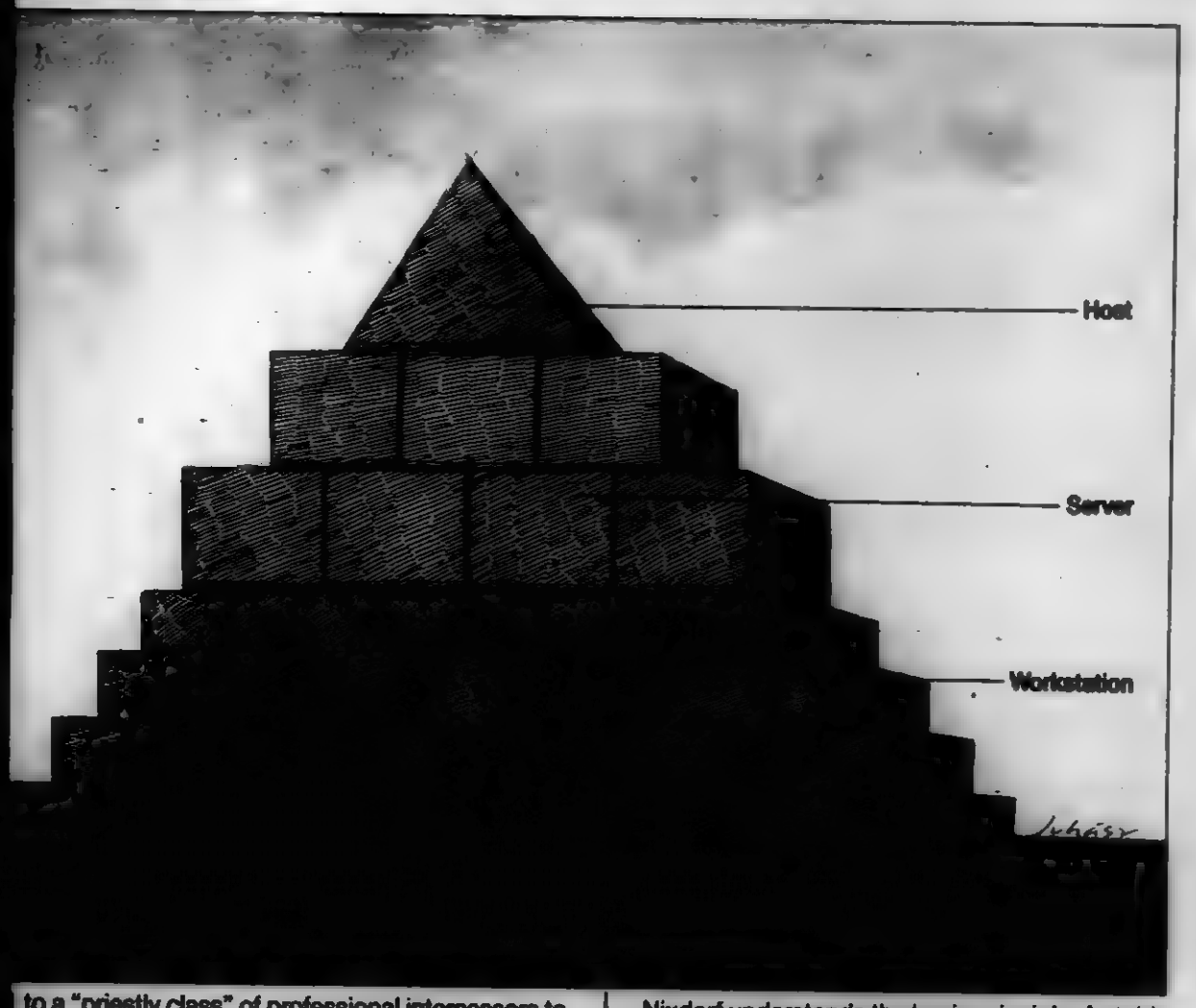
SNMP subsequently will be melded into Common Management Information Protocol, the protocol used in the ISO's still-embryonic Open Systems Interconnect (OSI) standards for network management.

Advocates of the High-Level Entity Monitoring Protocol withdrew their plan.

"This is a very significant agreement in that it maps out a clear migration path for vendors who are interested in developing TCP/IP products today and moving to an OSI architecture in the future," Estrin added.

TCP/IP is a set of multivendor networking standards that has become a de facto standard for a growing number of companies, particularly for the Department of Defense and the engineering and scientific sectors.

solution.



to a "priestly class" of professional intercessors to decide how isolated company executives may use the system. Data need be entered only once, and the system is fully accessible to all workers, allowing them to be creative, and to share their work product, when appropriate, with every other member of the organization, providing maximum synergy.

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For instance, COMPAQ Fixed Disk Drives deliver both high capacity and high performance. You can install up to a 300-megabyte fixed disk drive in the COMPAQ DESKPRO 386/20 and up to a 100-megabyte drive in the COMPAQ PORTABLE 386. More importantly, you can get to that data almost instantly thanks to some of the industry's fastest access times—averaging less than 30 milliseconds. When you combine this speed and capacity with disk caching, the result is the highest-performance storage subsystem in the industry. To take it one step further, Compaq helps

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FROM PAGE 59

considerable exchange of information.

How different is your product from the LAN Manager?
It's very different. 3Com takes data from the workstation to the server, and we take it from the server to the mainframe, so we're an extension of the LAN Manager. The LAN Manager focuses on intra-LAN things, and what we're focusing on is inter-LAN.

Will current Irma users be able to easily migrate to the new product?
Certainly. In fact, that's one of the beauties of our strategy. As all of our current Irma users move into the OS/2 LAN world, they will need no retraining. A new wire just comes to their desk, and poof — it works the same.

Select CS will not be available until the first quarter of 1989. Why the long delay?
Because of the lack of availability of certain components that have to underpin it.

We need to have the LAN Manager shipping, which will happen in mid-summer, and some of the interfaces aren't completely defined by IBM and other people.

Is it fair to call Select CS an alternative to the Communications Manager?
Functionally it's the same, so it can be called a Communications Manager alternative. But it's packaged very differently.

So why buy Select CS instead of the Communications Manager?
Well, if a user has pieces of hardware that can't run OS/2, they can't run the Communications Manager. Plus, we're packaging on a server base and not on each individual workstation, so it's more cost-effective.

AST Research has also said it will produce a Communications Manager alternative. How confusing will all these options be for users?
If you're a user, you are going to look to companies that are experts at this type of product, because it's not a simple product.

DCA has 600,000 Irma boards, and we are looked at as a de facto standard in micro-to-mainframe communications, and we think this is an evolvement of that.

Will there be support of IBM's Advanced Program-to-Program Communications interface, or APPC?
Yes. APPC, SRPI [IBM's Server-Requester Programming Interface] and HLLAPI [IBM's High-Level Language Application Programming Interface, for micro-to-mainframe links] support will all come with the product.

What role will acquisition plans have in future OS/2 connectivity?
We already have the core technology in-house to take advantage of OS/2 connectivity, so we don't have any acquisition plans relative to OS/2 connectivity. But we think the LAN market will continue to evolve over the next few years, and we'll look for opportunities there.

Does Microsoft's alliance with DCA and its earlier team-up with 3Com Corp. further define Novell as odd man out on the OS/2 connectivity scene?
That's a difficult question. As long as Novell recognizes what interfaces are standard and stays compatible with them, they are not out. It's a matter of developing an OS/2 strategy to support the emerging standards.

What communications directions are you moving in?
[DCA has] a tremendous amount of communications technologies [such as the T1 line of networking products from DCA subsidiary Cohesive]. We're going to bring a lot of those technologies together with Irma and the Crosstalk products to make other products.

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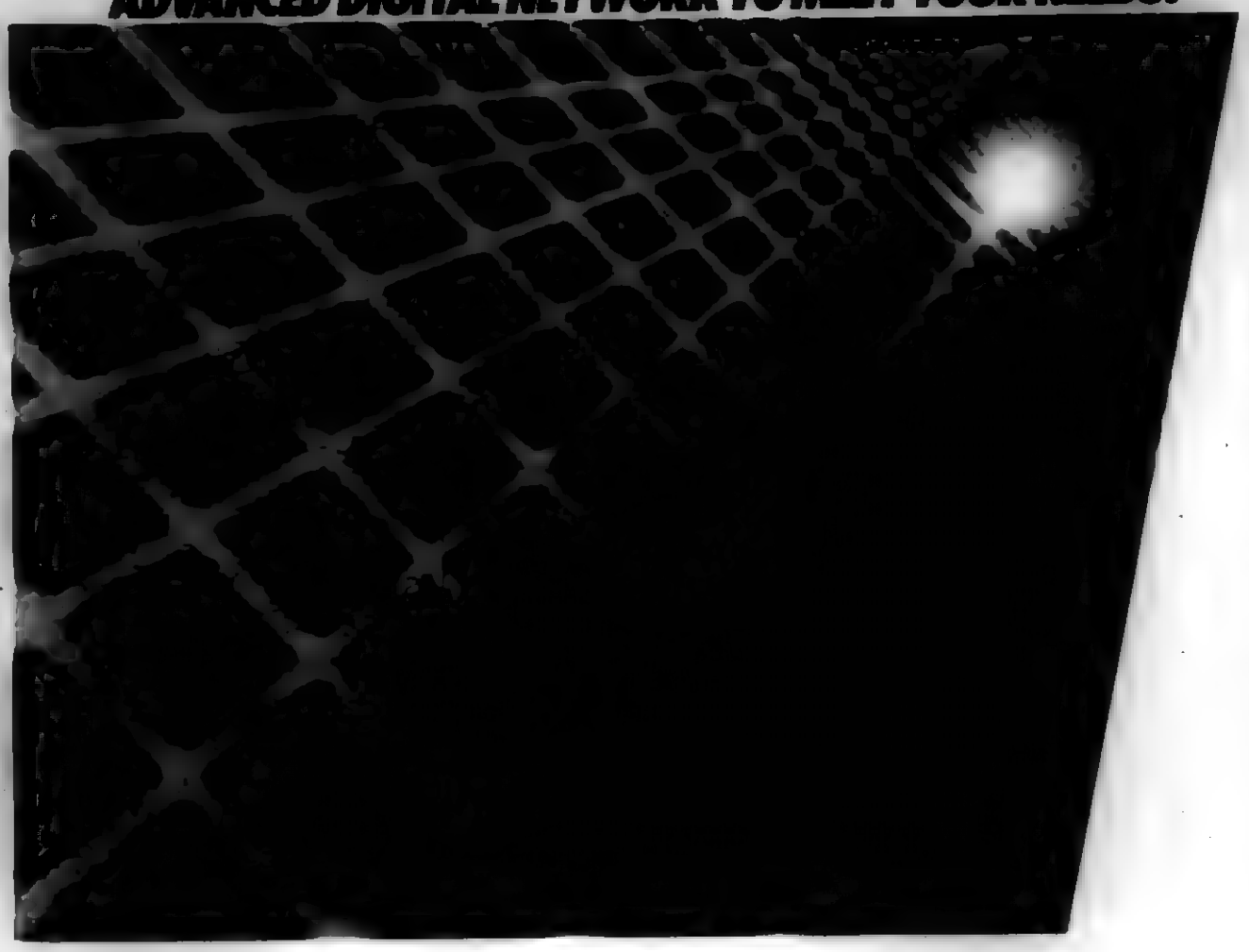

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TANDEM[3] VLX	4 Processors	26	$38,200
STRATUS XA2000	4 Processors	36*	$23,100

1 Based on standardized ETI Benchmark. Results published by FT Systems Newsletter, 1987 ITOM Inter. Co. 2 Audited results published 10/12/87. 3 Using NonStop SQL.™ 4 Prices for systems: Sequoia $929,000; Tandem $995,000; Stratus $830,000.
*Audited results unavailable. Numbers based on estimates published in FT Systems Newsletter, ITOM International Co.

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The Sequoia Systems Series 200 also eliminates some of the faults of other fault tolerant systems.

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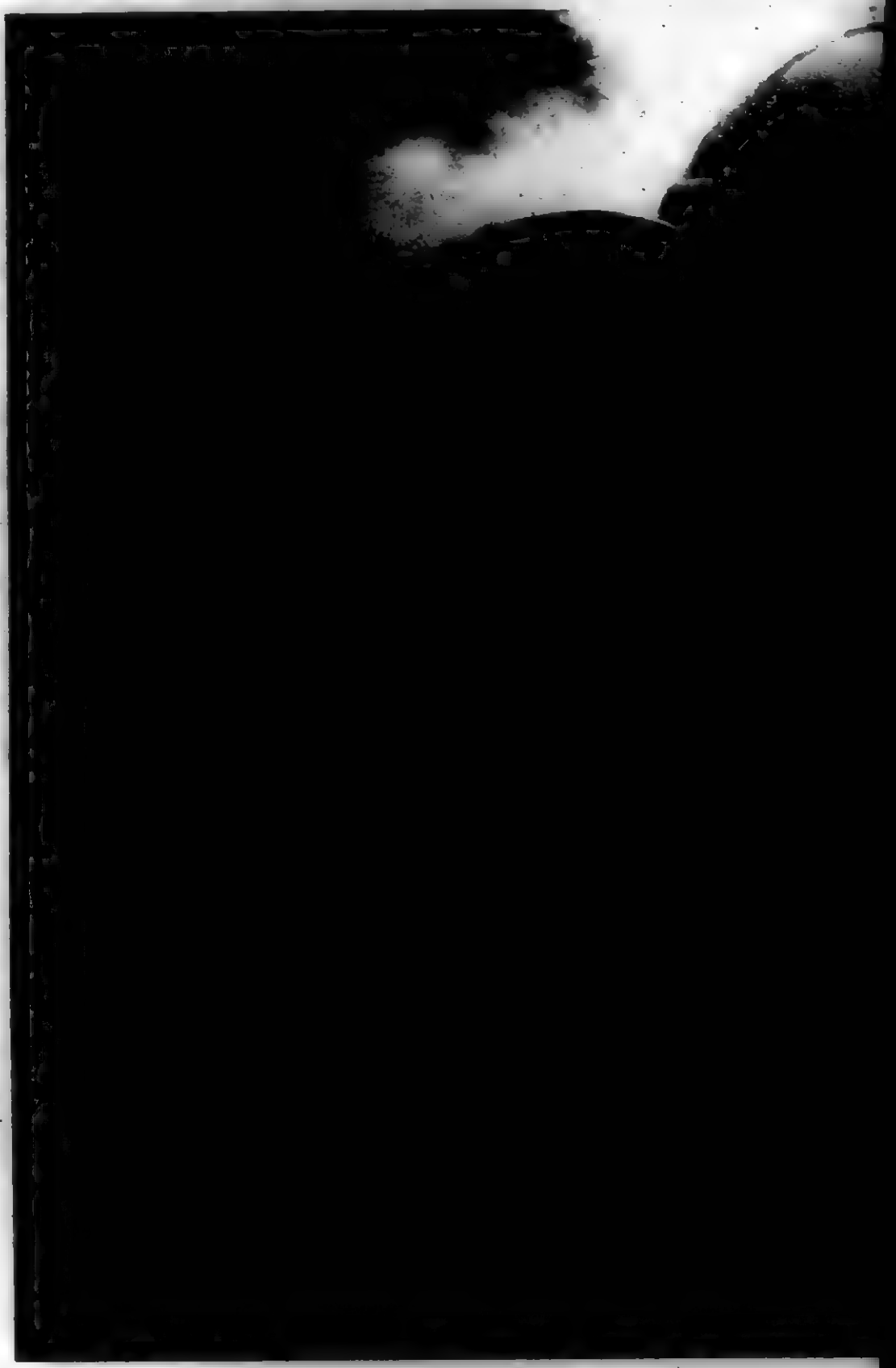

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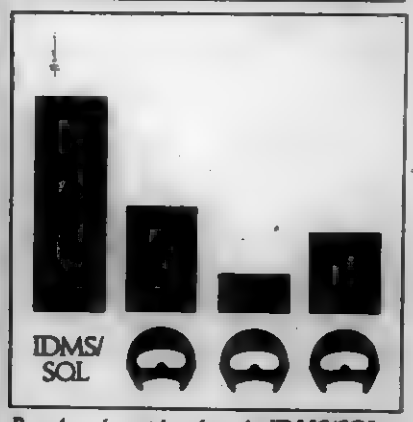

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NEW PRODUCTS

Local-area network hardware

A local-area network transceiver that is compatible with 10M bit/sec. Ethernet Versions 1.0 and 2.0 and IEEE 802.3 specifications has been announced by **TCL, Inc.**

The **Model 2010DM** transceiver offers such features as a switch-selectable 10-MHz heartbeat that is generated by the sending transceiver after each data frame, acting as a signal quality error test and to control collision conditions. A watchdog timer prevents any one terminal from generating continuous transmissions and monopolizing the network.

Prices start at $198.

TCL, 47621 Westinghouse Drive, Fremont, Calif. 94539. 415-657-3800.

An Ethernet terminal server that is compatible with Digital Equipment Corp.'s Local Area Transport (LAT) protocol has been introduced by **Emulex Corp.**

Called the **Performance 4000**, the terminal server plugs directly into DEC's Ethernet network. It is expandable to handle up to 32 terminals at data rates of 19.2K bit/sec. Support is provided for such Decserver features as multiple-host switching, multiple sessions, load balancing, automatic failover and reverse LAT for supporting non-DEC hosts. It features VMS-like command line editing, type ahead and displays.

The Performance 4000 is priced from $3,800.

Emulex, P.O. Box 6725, 3545 Harbor Blvd., Costa Mesa, Calif. 92626. 714-662-5600.

A half card designed to connect up to 32 terminals to an Intel Corp. 80386 Xenix-based system has been introduced by **Corollary, Inc.**

The **Corollary 8x4** multiplexer is a multiple microprocessor I/O subsystem that fits in a half slot. It uses a multiple processor distributed architecture, placing intelligence on both the processor board and a remote eight-channel terminal concentrator unit, the Corollary 8/TC. Up to four Corollary 8/TCs can be connected to the Corollary 8x4 for a total of 32 channels.

A basic kit that supports eight users — expandable to 32 — costs $1,195. It contains the Corollary 8x4 half card, an 8/TC terminal concentrator, Xenix, device drivers and cabling.

Corollary, 18011/E Skypark Circle, Irvine, Calif. 92714. 714-250-4040.

Local-area network software

Western Digital Corp. has announced a local-area network software package based on Novell, Inc.'s ELS Netware 286 Level I LAN operating system.

WD Entry Level Solution (ELS) is a four-user nondedicated Intel Corp. 80286 network system. It allows four active users to share data and resources such as a hard disk, a printer and software. The ELS network operating system is preconfigured for four users, 200 concurrent open files, one spooled parallel printer and one internal hard disk. It can be expanded to support 1,000 concurrent open files, five spooled printers and two internal hard disks.

The WD ELS costs $595.

Western Digital also announced the **WD8000SL Starlan** customized LAN station adapter board for use with Toshiba America, Inc. T3100, T3200/20 and T5100 laptop computers. It costs $299.

Western Digital, 2445 McCabe Way, Irvine, Calif. 92714. 714-863-0102.

Sun Microsystems, Inc. has enhanced its **PC-NFS Network File System** to support IBM Personal System/2 computers.

PC-NFS 3.0, based on the Open Network Computing/Network File System protocol, allows users to transparently share files and resources in a corporate network environment. It offers network support for IBM PS/2s via 3Com Corp.'s Microchannel Ethernet board. When used with Sun's Sunlink products, users can access systems on IBM Systems Network Architecture, CCITT X.25 and Digital Equipment Corp. Decnet networks.

PC-NFS 3.0 costs $395.

Sun also announced **PC-NFS Lifeline**, a network application that provides electronic mail and file backup for personal computers running Sun's PC-NFS. It costs $125 per system.

Sun Microsystems, 2550 Garcia Ave., Mountain View, Calif. 94043. 415-960-1300.

Links

Tolerant Systems, Inc. has announced a software product that supports the CCITT X.25 data communications protocol.

Called **TX.25**, the product is said to allow connection of Tolerant's fault-tolerant computer systems to packet-switched data networks. It consists of an X.25/X.29 interface; a Server for managing X.25 functions; X.3/X.28 packet assembler/disassembler; and the X.UUCP facility for communicating with other Unix systems.

TX.25 is priced at $4,000.

Tolerant, 81 E. Daggett Drive, San Jose, Calif. 95134. 408-292-1688.

Make Your Remote Offices Act Like They're Home.

Far from home, your remote branch offices are struggling to cope with multiple communication lines and multiple communication controllers. On top of all that, they probably want more — like having their PCs networked.

Now Harris has the solution for your dilemma: the 9300 Network Communications System. The Harris 9300 provides your branch offices with access to your central data bases and IBM mainframe applications, while offering PCs all the advantages of NETBIOS-compatible Local Area Networking.

There's no need to purchase separate communication gateways and controllers to provide IBM host connectivity. The Harris 9300 supports the full range of communications with IBM hosts for PCs and 3270 terminals.

If you're interested in making your remote branch offices act like they're home, the Harris 9300 is the best solution when you require any combination of the following:

- 3270 host application or data-base access;
- Remote printing (RJE);
- PC connectivity.

For more information write Harris Corporation, Data Communications Division, 16001 Dallas Parkway, P.O. Box 809022, MS # 5, Dallas, Texas 75380-9022. Or call toll-free:

1-800-4-HARRIS
Ext. 5004

HARRIS

A voice gateway system designed to provide direct access to any computer-resident information via a Touch-Tone telephone has been introduced by **Speech Plus, Inc.**

The text-to-speech output capability allows the **Callitext Voice Gateway System** to convert data base information into voice for appropriate responses to queries. The digitized voice capability enables the recording of a caller's reply. The system can be expanded from four to 32 lines. Each line can run a different application, and multiple host computers can be accessed simultaneously.

The product includes menu-driven application generation tools and a script language for implementing voice output. It is priced from $31,650.

Speech Plus, P.O. Box 7461, Mountain View, Calif. 94039. 415-964-7023.

Protocol converters

The **PSX/MPP**, a four-port communications coprocessor for IBM Personal Computers, has been announced by **Franklin Telecom.**

The PSX/MPP allows terminal devices to be attached to the coprocessor and switched to any host computer. Up to four units can be installed at one time. Eleven protocols are supported, including CCITT X.25/High-Level Data Link Control, IBM's Systems Network Architecture/Synchronous Data Link Control, 3270 and 5250 Host and Terminal, Bisynchronous 3270 Host and Terminal, Bisynchronous 3780 RJE, asynchronous and Burroughs Poll/Select Host and Terminal.

PSX/MPP costs $2,995.

Franklin Telecom, 733 Lakefield Road, Westlake Village, Calif. 91361. 805-373-8688.

File servers

Cubix Corp. has introduced a personal computer add-in board designed to turn an IBM Personal Computer AT into a file server for multiple PCs.

Called the **Add-4-PCs**, the product enables multiple users to share data, programs, printers, hard-disk storage and other peripherals. The board contains four PCs, each with 768K bytes of random-access memory. It runs under Novell, Inc.'s Netware. Up to four boards can be added to the AT bus, and more than 20 additional users can be added to the same file server through the use of an expansion chassis, the vendor said.

Add-4-PCs also works with standard ASCII, ANSI or graphics terminals. Terminals are connected using an RS-232 link. RS-422 connections allow distances up to 4,000 ft.

The board costs $2,295.

Cubix, 2800 Lockheed Way, Carson City, Nev. 89706. 702-883-7611.

A multiprotocol communications card has been introduced by **TDT Group, Inc.** for use with its line of connectivity software.

The card is available for the TDT Honeywell, Inc. VIP terminal emulation software and Honeywell gateway software for personal computer communication to Honeywell mainframes. It is also available for Transfile 3780, a bisynchronous file-transfer program and protocol emulator.

Features include a choice of interrupts; a possibility of several hundred base-register addresses; user-selectable direct memory access; and support for asynchronous, bisynchronous, High-Level Data Link Control and Synchronous Data Link Control protocols.

Pricing ranges from $349 to $699.

TDT Group, Suite 902, 444 Brickell Ave., Miami, Fla. 33131. 305-372-9332.

Modems/Multiplexers

A subrate data multiplexer designed to provide a gateway into the service function of AT&T's Digital Data Service (DDS) has been announced by **Teleprocessing Products, Inc.**

The **Model TP-972** accesses the service function either by way of a 56K bit/sec. DDS line or by way of a customer-premise D4 channel bank connected to the service function via T1 Accunet. In addition, the TP-972 allows users to implement high-speed backbone networks in which the low-speed tail circuits have secondary channel information that must be passed through the backbone to the central site.

The basic unit provides support for five subrate channels at up to 9.6K bit/sec. Secondary channel is supported on all subrate channels.

Pricing starts at $3,350.

Teleprocessing Products, Building 7K, 4564 E. Industrial St., Simi Valley, Calif. 93063. 805-522-8147.

A two-channel asynchronous multipoint line driver has been introduced by **Electro Standards Laboratory, Inc.**

The **Model 4000** unit provides full-duplex transmission over customer-owned four-wire circuits or half-duplex transmission over customer-owned two-wire circuits.

In point-to-point applications, one line driver is required at each end of the link. In multipoint applications, up to 32 drivers can operate over one line.

The Model 4000 is said to be transparent to code, parity and transmission speed. It can operate at data rates up to 40K bit/sec. over one mile of twisted-pair cable. Connection to the unit is via an RS-232 interface.

The two-channel Model 4000 costs $245.

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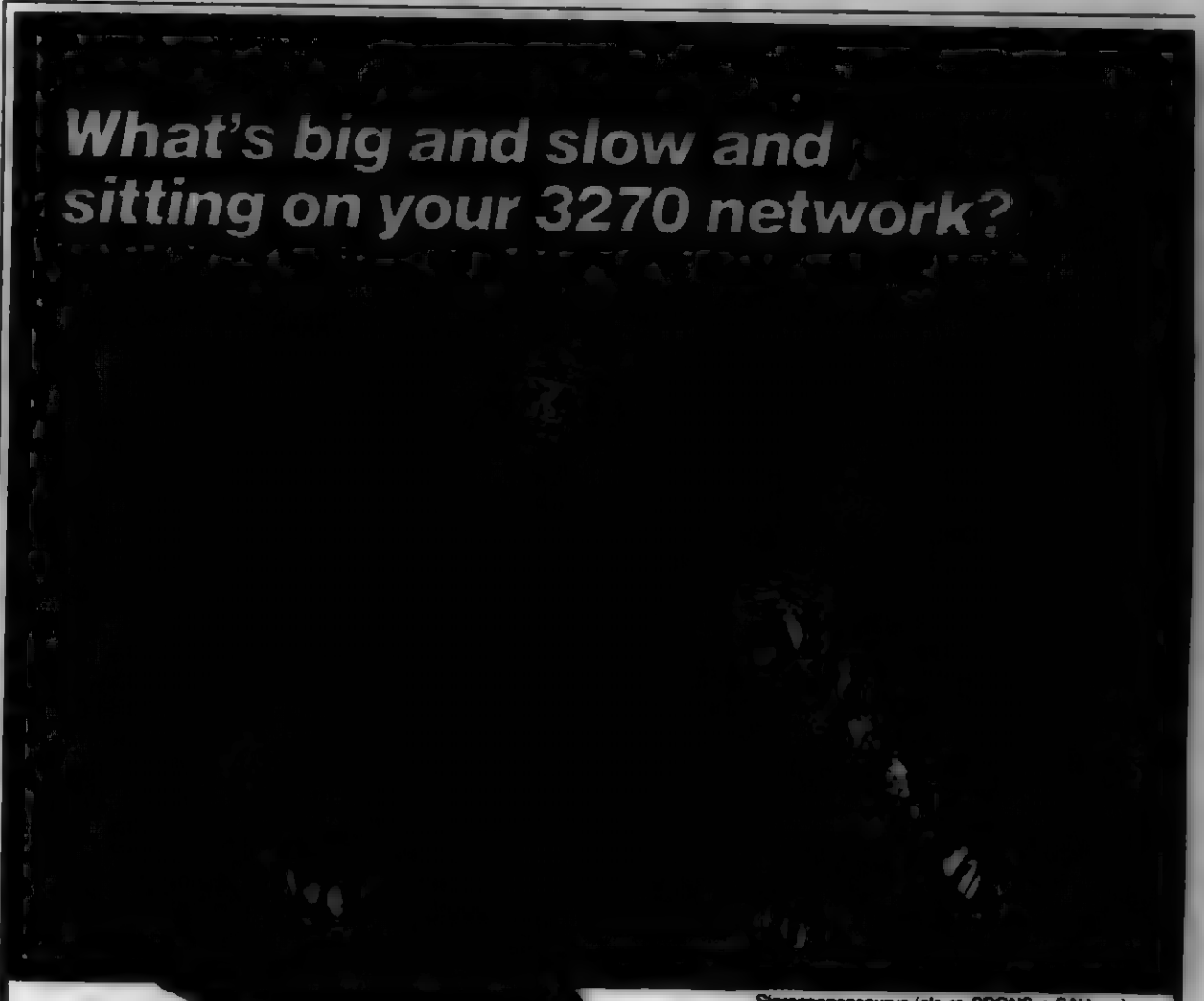

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SYSTEMS & PERIPHERALS

HARD TALK

Jean S. Bozman

High-end roulette

A curious thing has happened during the last few years: IBM and DEC have found out that, in many cases, they have the same large corporate customers.

Until now, DEC President and Chief Executive Officer Ken Olsen has tended to avoid the issue of competing with IBM. So it did not fall on deaf ears when, on March 8, in front of Wall Street analysts and the press, Olsen made it clear that his company intends to push its new VAX 8800 line of peer multiprocessing systems into competition with IBM's mainframe products.

Betting that many large customers are growing tired of the care and feeding of IBM mainframes, Olsen said DEC's appeal with the new VAX 8800 machines will target what he called the "bet-your-business" company. Among such firms are multinationals in the pharmaceutical, manufacturing and aerospace fields, he said, that literally bet their businesses on the information systems they install. Many such customers have vast experience with IBM mainframes, add-on personnel costs and IBM's higher price tags, Olsen suggested.

Sweet deal

To make the case for his competing offering more convincing, Olsen threw in sweeteners formerly reserved for the attache cases of IBM salesmen: six months of on-site software assistance, DEC Solution Packages that preconfigure Vaxclusters and high levels of service after installation.

The largest customers, he said, have come to expect that kind of service from IBM. "We set ourselves to develop the same level of trust with our customers as IBM did," Olsen said. "Our sales force wears dark suits, just like IBM's does. They look like you could trust your business to them."

For years, Olsen has been proposing that the value of a computer lies not in its MIPS or its nameplate but in the actual

Continued on page 74

BASF driven to replace tapes

Cartridge errors traced to lubricant; manufacturer modifies formula

BY STANLEY GIBSON
CW STAFF

Last fall, Andy Gattuso noticed that the tape cartridges for his IBM 3480 had an excessive number of read errors. On examining the cartridges, he discovered white powder on them. A small problem? Hardly. Gattuso, who is manager of computer services at the Cherry Hill, N.J., data center of General Electric Co., has tens of thousands of these tape cartridges in his shop.

After finger pointing between tape vendors and IBM, the drive manufacturer, Gattuso found that the culprit was tape cartridges made by BASF Corp. "They tested a BASF cartridge, and a white substance came out. One pass of the cartridge showed the white powder," Gattuso said, referring to a test run by IBM personnel in his shop. Gattuso is in the process of having all of his approximately 60,000 BASF cartridges replaced at the manufacturer's expense.

The problem was reported at several accounts on the East Coast as well as Gattuso's, according to an industry source familiar with the problem.

In addition, Frederic Sischka, manager of media development at Memorex Corp., said his firm was told of some problems with BASF tapes by some of the Southern California customers that use both BASF and Memorex products. He said he first heard of the problem about 1½ years ago.

John Healion, vice-president of marketing and sales for BASF in Bedford, Mass., said a certain number of BASF cartridges have shown the defect. He said BASF knows the quantity of cartridges, their serial numbers and dates of manufacture, although he declined to disclose that information. He said customers known to have purchased suspect cartridges have been contacted by BASF.

BASF said it has shipped approximately 10 million tape cartridges worldwide, a total that it claims is second only to IBM. All BASF 3480 cartridges are made in Willstaedt, West Germany.

Healion blamed the problem on a combination of temperature change and a larger than usual amount of lubricant in the binder that holds the recording medium — in this case, chromium dioxide — to the tape.

"The shipment was left outside by forwarding people before it was shipped over," Healion said, explaining that the batch was subjected to very cold temperatures and later warmed up to room temperature. "The lubricant was affected by the temperature change and came to the surface," Healion said, describing the lubricant as waxy, rather than powdery.

Gattuso said he was told by BASF that an excessive amount

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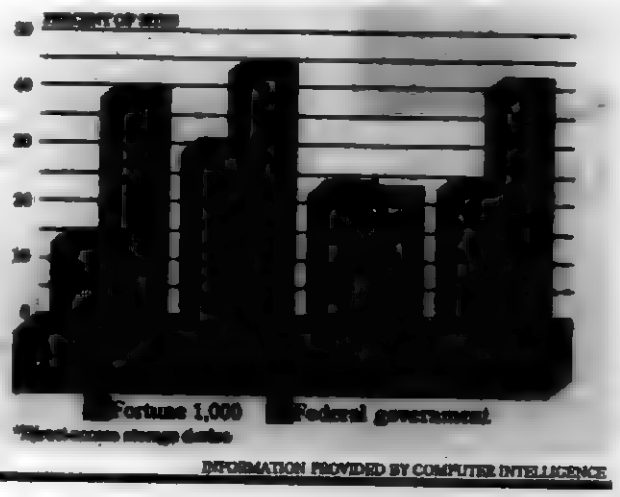
Inside

- Memorex ships IBM-type DASD subsystem. Page 74.
- Decision Data claims printer outperforms IBM's. Page 75.
- Emulex unveils two subsystems. Page 76.

Data View

U.S. goes PCM

Plug-compatible manufacturers find homes in federal government easier than private sector



*Direct-access storage devices

INFORMATION PROVIDED BY COMPUTER INTELLIGENCE

Chilly CPUs seen wave of future

BY J. A. SAVAGE
CW STAFF

In their continuing battle of size and speed one-upmanship with IBM, manufacturers of IBM plug-compatible equipment say they are looking closely at designs for self-contained liquid-cooled systems for future mainframe generations.

National Advanced Systems (NAS) and Amdahl Corp. have, so far, stuck by air-cooled machines. Their IBM counterparts use external refrigeration units to cool water that is passed to and from the CPU through subfloor plumbing. In the CPU, the water circulates through thermal conduction modules, absorbing heat given off by the CPU's microprocessors.

Neither company will say for certain whether their machines will have internal plumbing. However, with advances in liquid-cooling technology that enable a mainframe to efficiently cool itself like a refrigerator, and with continuing pressures to make smaller and faster machines, the companies say it is a possibility.

"Amdahl can't keep up in the MIPS game without liquid cooling," said Robert Tasker, direc-

Continued on page 75

Raster brings parallel processing to GX4000

BY STANLEY GIBSON
CW STAFF

WESTFORD, Mass. — Raster Technologies, Inc. announced a parallel processing capability for its GX4000 family of graphics accelerators for Sun-3 and Sun-4 workstations.

The GX4000 is a board set that plugs directly into the VME backplane of Sun Microsystems, Inc.'s Sun-3 and Sun-4. The GX4000 uses Programmer's Hierarchical Interactive Graphics Standard (PHIGS) and PHIGS+ as its native command set.

Raster Technologies began shipping single-processor configurations of the GX4000 in the fourth quarter of 1987.

Operating at its peak, the system is capable of up to one million three-dimensional vectors per second and up to 225,000 polygons per second, the vendor claimed.

The parallel option allows a system to be configured with up to eight Graphics Arithmetic Processors (GAP), according to Raster.

The board set consists of four primary components:

- The Display List Memory Unit, consisting of an on-board processor capable of 20 million instructions per second (MIPS) to perform display list memory management and traversal. By performing this task in the GX4000 hardware, the Sun CPU is free to perform other application tasks during real-time graphics updates, Raster officials said.
- GAP, which offers speeds of up to 10 MIPS and 20 million floating-point operations per second. Each GAP delivers the graphics power to process 220,000 3-D vectors and 18,000 Gouraud-shaded polygons per second. Up to eight GAPs operating in parallel can be configured. As GAPS are added, no software changes are necessary, according to the vendor.
- The Image Memory Unit, which contains a frame buffer, video output section and custom very large-scale integration drawing processors operating in parallel. The display resolution is 1,280 by 1,024 by 24 pixels with four additional control planes for overlays and window system management.
- A Z-buffer of 1,280 by 1,024 by 16 bits, which handles depth comparisons.

The GX4000 with multiple GAPs is scheduled to begin shipping in 30 days.

A single GAP is priced beginning at $36,000. Additional processors are priced at $12,000 each.

The vendor said the system will be shown at the National Computer Graphics Association exposition, which is taking place this week in Anaheim, Calif.

Memorex unveils DASD subsystem

BY J. A. SAVAGE
CW STAFF

TULSA, Okla. — Offering a lower price compared with its previous solid-state direct-access storage device (DASD) subsystem, Memorex Telex Computer Products, Inc. recently introduced the 6890 Storage Subsystem.

The solid-state subsystem emulates an IBM 3380 disk drive and a 3880 controller, storing and retrieving data at transfer rates up to 3M byte/sec.

The storage capacity of the subsystem ranges from 16M to 256M bytes, growing in increments of 16M bytes. Each 6890 storage unit can emulate up to eight logical disk volumes, giving a maximum of 32 volumes in the full subsystem. The 6890 can be divided into logical volume capacities as small as 1M byte or as large as 256M bytes.

Separate entities

The 6890 Storage Subsystem is not an upgrade of the company's 6880 DASD product. The earlier 6880 with a minimum configuration of 32M bytes costs about 30% more than the new storage system with equivalent memory, according to the vendor. The 6890 subsystem is offered with a smaller, 16M-byte minimum memory configuration and is housed in a smaller box than its predecessor.

The subsystem must be coupled with the company's 6898 storage control unit. Minimally configured with one control unit, it has 16M bytes of storage and is priced at $67,785. With two control units, 16 I/O channels and four 6890 storage units offering 1.02G bytes of storage, the system costs $713,675.

According to Memorex, the system is compatible with IBM 4300, 3080 and 3090 series and equivalent processors running IBM's MVS/XA, MVS/SP, Unix/UTS, VM/XA and VSE/SP.

Memorex also offers an optional power supply backup feature, and a 4.5M byte/sec. transfer rate is set to be available in the third quarter this year.

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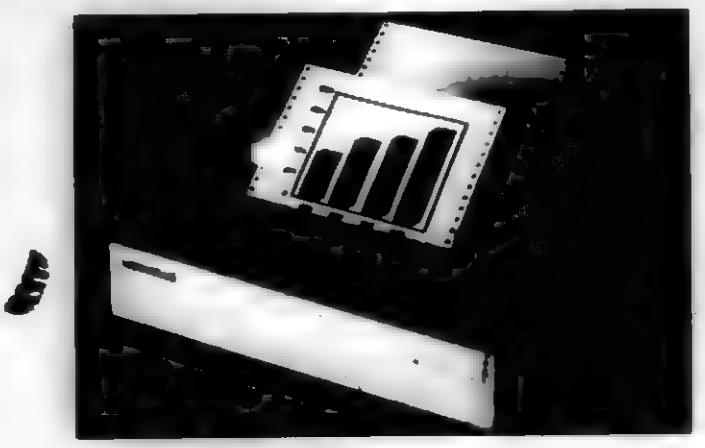

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Bozman

CONTINUED FROM PAGE 73

amount of work it allows you to accomplish in a day. Olsen has termed this "benchmark" a TAD: transactions accomplished per day. The concept was floated at the time of the VAX 8600 announcement in October 1985 but was given wings with the introduction of the VAX 8800 series. Three years ago, DEC made its first product comparisons with the IBM 3080 processors but couldn't compete with the power of IBM's channel-based architecture.

This month's introduction has changed all that. Now, DEC customers can pick from mainframe-level memories of 128M, 512M or 1G byte. They can choose to run multistreaming applications side by side, just as they would on a mainframe. The critical addition of symmetrical multiprocessing was designed to smooth out computations that might have formed bottlenecks before it came along [CW, March 14]. In contrast with IBM mainframe prices, overall system cost is far less — $543,000 to $1.6 million.

Will all these inducements work on

WILL ALL these inducements work on the typical multinational customer who owns both DEC and IBM machines? Based on a quick survey of such companies last week, probably not immediately.

the typical multinational customer who owns both DEC and IBM machines? Based on a quick survey of such companies last week, probably not immediately. Nabisco and United Technologies, to name two, said they plan to use IBM mainframes for financial and administrative tasks and VAXs for shop floor control, distribution and real-time end-user applications.

Even DEC realizes it is more likely to benefit from existing Vaxclusters' getting new tasks than from customers carting their IBM 3090s to the city dump. "We have somewhat different styles of computing," conceded William Demmer, vice-president of mid-range systems at DEC, referring to the way IBM machines and VAXs go about their work. "Our goal is to bring new applications on-line on Vaxclusters and to show that those applications can be accomplished more efficiently with a VAX than with an IBM mainframe."

But in a battle that is counted in TADs, users should stay tuned; DEC has more announcements planned for this year. The VAX 8800 series will be loaded with some high-powered ammunition when DEC adds an on-line transaction processing package. That's the sort of offering that DEC hopes will make its VAXs a realistic choice for mainframe users with high-volume demands.

Then the battle with IBM should really begin to heat up.

Bozman is *Computerworld*'s Midwest correspondent.

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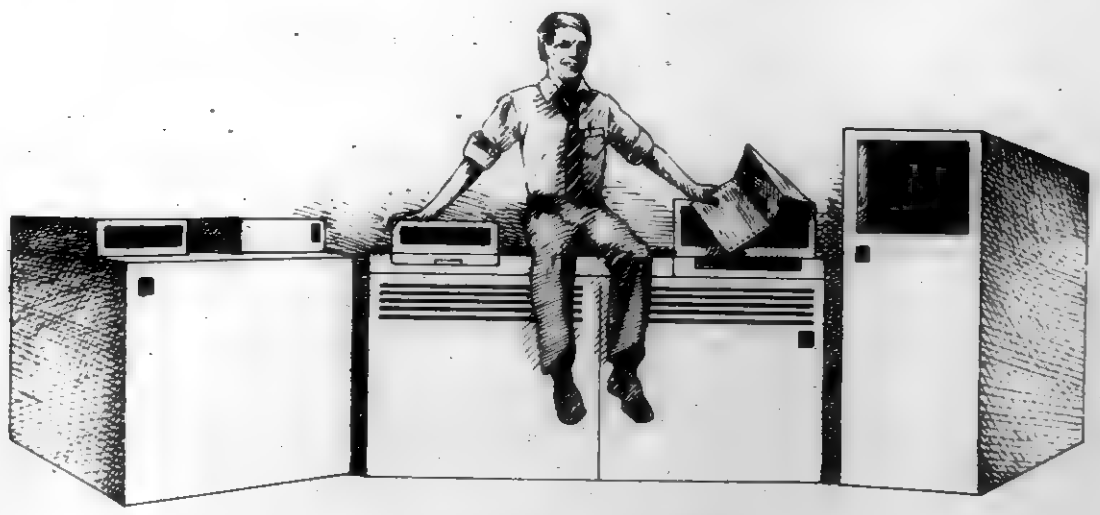

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Printer pitted against IBM

Decision Data boasts of 6815's speed, price advantages

HORSHAM, Pa. — Boasting greater speed and lower cost than is offered by IBM, Decision Data Computer Corp. said it will ship a high-volume, letter-quality printer aimed at IBM System/36 and 38 users this month.

According to the vendor, the 6815 Band Printer is 18% faster, 46% more compact and costs 11% less than the IBM 4245 T14 printer. The Decision Data printer is said to run 1,500 line/min at 48 characters and has a 55 in./sec. skip rate. The unit's footprint is less than one square yard.

The printer has a digital display that enables the unit to make quick verification of font language and paper-handling mode.

The 6815 Band Printer also offers fully formed character sets for up to 30 different fonts, including foreign languages. In addition, it can be run at 64 and 96 char. bit/sec., according to Decision Data.

All the options

The printer has a straight paper path, flat tractor feeds and power paper pullers to reduce misfeeds and jams. It comes with quick release and load for both print bands and ribbons and a five-position adjustable output tray.

The print mechanism is fully enclosed for quiet operation, comes with a built-in vacuum cleaner system and can accept oversized forms up to 17½-in. wide.

The printer is also said to offer self-diagnostic capabilities and a menu-driven setup.

Currently shipping, the 6815 Band Printer is priced at $24,500.

Optimem adds SCSI buffer

MOUNTAIN VIEW, Calif. — Optimem recently enhanced its nonerasable optical disk offerings by announcing the Optimem 1000 6/7 subsystem with a small computer systems interface (SCSI) controller and a 64K-byte data buffer.

The 2.0 SCSI controller is intended to add flexibility by allowing connection of the optical drive to multihost computer systems. It lets users reserve the drive or keep the drive connected to the system until the user releases it and thus reduces contention in multiuser systems, according to Optimem, a subsidiary of Cipher Data Products, Inc. The controller was designed to also improve reliability and reduce power consumption.

The 64K-byte buffer lets the disk spin continuously and reduces latency, Optimem said. The Optimem 1000 6/7 is a write-once read-many system that stores up to 2G bytes of data on removable 12-in. disks. The subsystem costs $13,600. A kit to upgrade an Optimem 1000 1/2 to the Optimem 1000 6/7 costs $2,000.

BASF

CONTINUED FROM PAGE 73

of lubricant was used in the binder that holds the chromium dioxide to the tape.

Healion said the amount of lubricant in these batches of tape was within the limits allowed by manufacturing specifications at that time. But as of October 1987, manufacturing specifications for the amount of lubricant in the mixture were tightened to a narrower tolerance, he said. Healion said after the formula was changed, extensive testing was performed to assure that the new formulation would not be affected by heat, cold and moisture.

However, Memorex's Siachka said he analyzed replacement BASF tape from a data center at the University of California at Los Angeles and found that the lubricant used was totally different from the previous formulation. "They replaced a solid lubricant with a liquid one," he said, adding that better performance can be expected from the liquid type.

Whatever the formulation, and despite the inconvenience and the risk of data loss, the problem is being resolved to his satisfaction, Gattuso said. Approximately 50,000 cartridges have so far been replaced, and the new cartridges give off no powder, he said.

"BASF paid all the expense. They paid for temporary help in relabeling and in initializing the cartridges," Gattuso said, adding that he is pleased with BASF's handling of the problem.

He also said the white substance did not damage the 3480 drives, and no data has been lost as a result. The major difficulty was simply the high number of retrys that were required. Gattuso said he plans to continue purchasing BASF tapes, for which he pays three dollars apiece less than for IBM tapes.

Deja vu

Gattuso's experience recalled difficulties that IBM and Memorex had shortly after IBM's introduction of 3480 tape cartridges a couple of years ago. At that time, both companies had problems with chromium dioxide separating from the binding compound used on those early tapes. A resultant sticky residue gummed up the drive heads.

IBM and Memorex contracted separately with Morton Thiokol, Inc. to develop a new binder that would not decompose in reaction to chromium dioxide. IBM and Morton Thiokol obtained a patent on their new binder formula. The one developed by Memorex and Morton Thiokol was slightly different and has not been patented, according to Siachka.

IBM published its new formula specifications, Siachka said, in order to encourage tape makers to produce problem-free tapes that would lend support to its 3480 hardware standard.

BASF would not say whether it conforms to manufacturing guidelines laid out by IBM. It only said its products are compatible with IBM equipment. Healion said BASF's recent lubricant problem is different from IBM and Memorex's earlier problem. Having analyzed BASF media, Siachka agreed that the two problems are not directly related.

Chilly CPUs

CONTINUED FROM PAGE 73

tor of computer research for the Boston-based market research firm The Yankee Group. With liquid cooling, Tasker estimated that plug-compatible mainframes (PCM) will gain 300 times the cooling ability compared with current air-cooling techniques.

Third party interested

At least one other IBM rival is considering liquid cooling. Digital Equipment Corp., in its drive to challenge IBM on its mainframe turf, is reportedly developing a water-cooled system, code-named Aquarius, according to Stephen Widen, a DEC analyst at International Data Corp. in Framingham, Mass.

The extent to which companies consider liquid cooling is driven by the density of the chips, according to Dennis Stein, manager of processor systems marketing at Amdahl. "The closer you put the chips together, the better performance you get. But the denser the chips, the more heat you get."

The other critical factor in liquid cooling is internal wiring. The I/O components — the bus and cables — must be close to the CPUs in an air-cooled machine for speed and to ensure the integrity of electrical impulses. But close-in wiring hampers efforts to reduce the size of the cabinet. With liquid-cooling, the wiring can be placed farther from the main processors, possibly in another cabinet.

Carl Claunch, director of market planning at NAS, said that in the future, he expects to see the I/O in a separate box connected to the mainframe.

Stein said he envisions a mainframe that may be part air- and part water-cooled, putting the plumbing only in heat-critical areas, such as CPUs.

'Floating target'

Both NAS and Amdahl said there is no specific threshold combination of speed, power and size that would require liquid cooling. "It's a floating target," Stein said.

The decision on which cooling technology to incorporate comes late in the design process because there are constant developments in chip technology, according to Claunch. "The ability to make chips gets better every year. They are either 20% faster or 20% cooler," he said.

The drawback to liquid cooling is the increased risk of leaks. "The engineering guideline is to 'keep it simple,' " Claunch said. Liquid cooling necessitates more parts and an increase in parts also increases the chance that one of them will fail. "If the cooling is interrupted, the components melt," Claunch explained.

A West Coast data center manager in charge of a number of IBM mainframes recalled earlier problems IBM had in inhibiting rust and corrosion in the plumbing when water-cooling was introduced with some 370 series models. Once those difficulties were resolved, however, the manager recalled no failures as a result of the cooling system on any of his mainframes.

In addition, Larry Martin, vice-president of Reliability Research, Inc. in Norwalk, Conn., said that although he has no specific figures on cooling system reliability, cooling system failures have never been discussed by subscribers of the electronic bulletin board his firm runs.

The liquid used in liquid cooling does not have to be water, although Amdahl indicated the company would stick with water instead of other coolants like ammonia or salt-based solutions. NAS, however, indicated that it is leaning toward Freon, the trade name for a group of fluorocarbons used in refrigerators and air conditioners.

Fiber optics play role

One development that may push liquid cooling off into the future is the current move to fiber optics. Both PCMs said they do not want to change more than 30% of their mainframes' technology in a new generation, so it is up in the air which they will implement first, fiber optics or liquid cooling. Fiber-optic filaments are significantly thinner than conventional wires, allowing for a smaller box. They also carry signals much faster.

NAS's XL computer, its largest mainframe, benefits from Teflon-coated wire. "To make signals that must travel at high speed requires exotic wire technology," Claunch said. "Fiber optics is an alternative to exotic wiring, but you have to convert from electric impulse to optical back to electric."

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NEW PRODUCTS

Processors

A 32-bit Unix-based integrated office system departmental processor has been announced by CPT Corp.

Called the **Office Dialog System 120** (ODS 120), the computer supports up to 12 directly connected users. According to the vendor, the ODS 120 also provides server support for communication gateways and business applications.

The ODS 120 is system and application compatible with the larger ODS 300, which supports up to 32 users. CPT workstations, IBM Personal Computers or any standard ASCII terminal can interface with an ODS, the vendor said.

The ODS 120 is priced from $25,000, including one 140M-byte disk, 3M bytes of random-access memory, a quarter-in. tape backup drive and 12 serial ports.

CPT, P.O. Box 295, 8100 Mitchell Road, Minneapolis, Minn. 55440. 612-937-8000.

Graphics systems

An image processing workstation called **Nuvision** has been introduced by **Perceptics Corp.**

Features include an integral digital signal processor on each image memory for parallel processing of multiplane images; frame grabs of 1,024- by 1,024-pixel monochrome, red-green-blue true color and stereo pair images in 0.3 sec.; 1,280- by 1,024-pixel 24-bit true color display; an Apple Computer, Inc. Macintosh II workstation; and integrated software for basic display, spatial, Fourier, geometric and morphological processing, including continuous interpolated zoom.

A base system is priced at $17,210.

Perceptics, P.O. Box 22991, Knoxville, Tenn. 37933. 615-966-9200.

Data storage

Emulex Corp. has introduced versions of its removable storage subsystem and embedded micro subsystem with capacities of 760M bytes per module.

The **Emulex Removable Subsystem** (ER2) is now available in a model that connects to Q-bus computers through Emulex's QD21 controller and as a small computer systems interface model that connects to Q-bus, Unibus or IBM Personal Computers.

Both models offer total subsystem capacities to 1.3G bytes.

The **Emulex Micro Subsystem** (EMS) kit provides a similar single- or dual-disk package for use within Digital Equipment Corp.'s MicroPDP-11 or Microvax II World Box or BA23 enclosures, the vendor said.

Prices for the ER2 start at $14,430; the EMS costs from $10,705.

Emulex, P.O. Box 6725, 3545 Harbor Blvd., Costa Mesa, Calif. 92626. 714-662-5600.

A family of VMEbus data storage and communications products has been announced by **Emulex Corp.**

The products include two disk controllers, a nine-track tape controller, a small computer systems interface-to-VME host adapter and a 16-line communications controller.

The VM21 and VM31 dual-height disk controllers support up to four enhanced small device interface disk drives with transfer rates to 24 MHz. They cost $1,695 and $2,195, respectively.

The VT01 nine-track tape coupler can control drives with recording densities to 6.2K bit/in. and tape speeds of more than 200 in./sec. It costs $1,395.

The VH01 VME host adapter, which is priced at $1,425, can accommodate single-end or differential drives and a floppy-disk port. The VS02 VME 16-line asynchronous communications multiplexer, priced at $1,400, can support 60,000 char./sec. throughput.

Emulex, P.O. Box 6725, 3545 Harbor Blvd., Costa Mesa, Calif. 92626. 714-662-5600.

Printers/Plotters

A vector-to-raster processor that converts graphics data supplied by host IBM 3274 cluster computer environments into a format suitable for printing has been announced by **Logic Sciences, Inc.**

Called the **Turbograph 700 Series III**, the processor provides IBM 3287 emulation in Systems Network Architecture Control String and 3270 Data Stream character modes. Drawing speeds are up to 400,000 vector/sec. Input memory and raster image memory are expandable to 2M bytes.

The Turbograph 700 Series III costs $9,500.

Logic Sciences, 11000 S. Wilcrest, Houston, Texas 77099. 713-879-0536.

Artisan, an eight-pen plotter aid to produce drawings on cut-sheet paper and film, sizes ANSI A to D, at speeds up to 30 in./sec., has been announced by **Calcomp, a subsidiary of Lockheed Corp.**

Features include Calcomp's Plot Manager firmware, a nonvolatile set-up memory that permits up to four users to save such set-up parameters as communications mode, scaling and pen velocity, built-in diagnostics and the Calcomp graphics language interface.

Artisan is priced at $4,895.

Calcomp, P.O. Box 3250, Anaheim, Calif. 92803. 714-821-2142.

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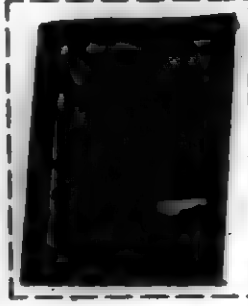

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The restructuring of MIS: Business strategies take hold

BY JOHN KIRKLEY

Although "The First Law of Holes" is invoked far less often than the Peter Principle or Murphy's Law, it's probably more important.

The law simply states, "When you're in one, stop digging." These words of advice should be posted on data center bulletin boards and wherever else MIS professionals are known to congregate.

The hole into which MIS has dug itself through the years is well known: Articles detailing MIS arrogance toward end users, cost overruns, application backlogs and an abundance of jargon-ridden technospeak are commonplace. It's time MIS regrouped.

The MIS function is in the midst of its most significant restructuring since the role began evolving more than 30 years ago. And all bets are on the changes accelerating and becoming even more complex rather than subsiding into a new, clearly defined structure.

Today's MIS managers can no longer use the old paradigms to respond to challenges within their organizations. Instead, successful managers are creating new roles and accepting new responsibilities.

In many cases, managers are making up their job descriptions as they go along in order to cope with constant organizational, technological and managerial change.

"The information systems function will not exist as it's presently constituted," says R. Talmage Fish, manager of information systems at Burlington Industries, Inc., a large textile manufacturer located in Greensboro, N.C.

Fish speaks from experience. He has dealt with the complexities of centralization vs. decentralization, weathered the microcomputer revolution and, most recently, is feeling the impact of the restructuring of the company, the result of a series of unexpected events.

Last September, controlling interest in Burlington Industries was acquired by Wall Street securities firm Morgan Stanley Group, Inc. after the repulsion of a hostile takeover attempt by Dominion Textile, Inc. and corporate raider Asher Edelman.

In the wake of this action came budget cuts, changes in reporting relationships and reshuffling of divisions — all of which changed the function of Burlington's MIS department.

A new mold

Corporate takeovers, mergers, acquisitions and divestitures are all part of today's fluid organizational scene. Information systems have now won their place as a key element in the corporate strategy, a fact that provides new opportunities to and places new pressures on MIS. There are other forces reshaping MIS as well.

First and foremost is the truism that MIS managers can no longer separate themselves from the business in which they work. They can no longer see themselves as just data processing specialists who happen to be applying their trade at an insurance company, bank or airline. Their job now is to support their corporations' financial and strategic goals.

A recent survey of more than 500 MIS executives by The Index Group, Inc. in Cambridge, Mass., shows that the top concerns of senior MIS managers are to bring MIS goals in line with corporate goals, to be involved in more strategic planning and to use information systems to give their company a competitive advantage.

At the same time, the old debate over centralization vs. decentralization rages on, and managers continue to question who will ultimately control networking and telecommunications functions.

Of course, technology continues to be a major factor shaping the future of MIS. In addition to advances in communications, particularly PC LANs, the amount of available millions of instructions per second on the desk top is growing at a staggering rate.

This growth is leading some, like Fred Forman, director of the Corporate Technology Group at American Management Systems, Inc., to express concern

Kirkley is a computer industry writer, editor and consultant based in Warwick, N.Y.

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about the completeness and accuracy of the information being generated by throngs of personal computer-wielding users — users who may be building data bases and making fundamental business decisions on the basis of flawed or inaccurate data.

Innovations in applications development languages are just now beginning to make it possible for users to create their own, fairly complex applications without involving MIS.

One of the results, notes Larry Woods, manager of research at John Deere Information Systems, is the creation of hundreds of scattered data bases, resident on users' hard disks.

"Sure, MIS may have control of the data base on the mainframe," Woods says, "but the users are creating their own to get around the restrictions placed on them by MIS. Maintaining data integrity? Forget it."

The soft scientist

In addition to business and technological considerations, today's MIS managers are finding that it is in their interest to know something more about the so-called soft sciences.

For example, Landen Bain, the administrator for information systems at Ohio State University Hospitals, is currently exploring the impact nontechnical issues have on technical decisions.

When Bain began to network his facilities' scattered departmental systems, he realized that "getting the computers to talk to one another would be an impossible task if I couldn't get the people to talk to each other first." When working with users, Bain adds, psychological factors are just as important as deciding which network to install.

At an even more fundamental level, major developments in physics and philosophy are subtly but forcefully affecting MIS. Patricia Seybold, president of The Office Computing Group, Inc. in Boston, points out, "We are in the midst of a shift that is more than a change from the industrial age to the information age. It is a shift in the way we relate to the world in which we live."

Given the interplay of all these forces, from the continuing PC revolution to new views of interconnection, just how are individuals on the front line restructuring their jobs and the MIS function to meet these challenges?

As is evident in the following profiles, MIS managers are adopting solutions as diverse and complex as today's computer environment.

Regrowth

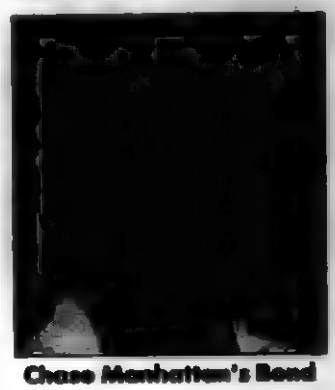
When Elaine Bond, senior vice-president of corporate systems at New York's Chase Manhattan Bank N.A., looks out over the bank's sprawling, highly decentralized operations, she sees not chaos but a new order being formed.

Chase, with more than $90 billion in assets and about 45,000 employees, has 100 data centers as a result of a decentralization program begun in the 1970s.

"We got carried away at first," Bond remembers. "Because the centralized data processing utilities were not responsive, we let the business units have control. It was autonomy almost at the product level."

The 'competency center'

As a result, the organization currently mixes hardware, including IBM's 4300, 3090 and System/34 and 36 machines, Digital Equipment Corp. VAXs, Wang Laboratories, Inc. VS systems and former Burroughs Corp. boxes. As in most large corporations, PCs are ubiquitous, and networking, including the use of PC local-area networks, is on the rise.



Chase Manhattan's Bond

Today, Bond says, she and her colleagues in MIS are looking for opportunities to take advantage of the features that come with diversity. They are interconnecting the islands of automation through distributed processing and networking.

"As the PC LANs tie into our larger systems, we work with the user community," Bond says. "This is where information systems comes into its own: Helping to develop the functional systems is how we earn our keep.

"We have become competency centers with a vision of where the technology is going and how it meshes with the company's overall strategic direction," she adds.

What's in a LAN?

One result of the heavy emphasis on networking, Bond says, is that Chase is now "regrowing the data center." In a sense, networking is a way of centralizing what had become a highly decentralized operation characterized by widespread systems.

After all, she explains, a LAN is really a computer, but one dispersed over a wide geographic area rather than sitting in a room or on a desk. What users have traditionally thought of as computers are simply nodes, integral parts of a larger information system.

Bond points out that, as with more conventional stand-alone computers, "you have to configure a LAN, you have to staff it and manage it. . . . It takes direct-access storage devices . . . and it also allows the user community to make all the mistakes we made back in the early days of data processing.

"There's nothing like experiential learning," she adds.

Bond says she sees two fundamental roles existing for MIS. One is to keep pace with the increasing complexity of the technology: to keep the pieces working together smoothly, to learn how to modify the technology to appropriately meet the organization's needs — in other words, to become high-level systems integrators.

"Our other role," Bond says, "is to advise and counsel the growing ranks of increasingly sophisticated users through the medium of information centers or applications centers and by moving analysts out into the user community."

A bit of both

Burlington Industries' Fish throws up his hands when he hears discussions over the choice between centralization vs. decentralization.

"We've been over this time and time again," he says. "I hope that someday someone will tell us what the real answer is.

"At regular intervals," he continues, "a new manager will come to us and say, 'Look, I can do my job faster and cheaper if I have my own equipment.' That sparks an expensive consulting study, and we always get the same answer — tailor the information system to the desired solution."

Fish says that his organization is neither centralized nor decentralized. "We have a little bit of both," he explains.

At the corporate headquarters MIS shop in Greensboro, which Fish calls the 'glasshouse,' there are two large IBM mainframes, but VAXs populate the manufacturing areas.

In addition, between 600 and 700 PCs are scattered throughout the company's facilities.

"With the VAXs, we now have about three to five times the computing power at the plant level as compared with the IBM gear in the glasshouse," Fish says.

Despite the multivendor shop environment, Fish, like Chase's Bond, says he sees networking as a critical component in MIS's new role.

"We need to beat the off-shore competition," Fish says. "As a result, electronic data interchange and networking are really becoming essential to us as well as to our suppliers."

At Burlington Industries, the MIS organization has always kept it in mind to attempt

Continued on next page

The new MIS

Tips on managing information systems into the '90s

Understand the needs of your company: The business of MIS is to support corporate financial and strategic goals

Keep pace with the increasing complexity of technology: One of MIS's roles is to become high-level systems integrators and to counsel the growing ranks of increasingly sophisticated users through the medium of information centers or applications centers and by moving analysts into the user community

Integrate information systems planning: Incorporate this segment with the company's business planning

Buy back control of the computing resource: Data integrity is an issue with the prevalence of distributed processing

Don't forget people issues: Getting computers to talk to one another is an impossible task if you can't get people to talk to each other first; MIS should build a feeling of trust between itself and those who are operating the user islands of automation

Be the first point of contact with user departments: An information center, reporting to MIS, can function as a large part of this enhanced MIS and end user relationship

MIS profession is not what it used to be

It's agreed: The job you save just might be your own

Once upon a time, there was a company in a pleasant little town on the East Coast that had a data processing department, a mainframe, lots of users and a fat budget. Life was good . . . until one day the company was bought out by a larger organization.

The new managers promptly fired all the DP people, got rid of the mainframe and scattered a handful of personal computers with hard disks among the company's users.

Almost overnight, the firm went from a centralized DP operation to extreme decentralization. And the careers of some three dozen information systems professionals took an abrupt turn.

Keeping a close watch

This scenario, patterned after a real-life incident, does not represent a major trend sweeping the country.

But today's widespread restructuring of the MIS function does mean that information systems professionals need to keep a close watch on how their chosen field is changing.

> "CAREER development [for information systems professionals] is difficult. You need a desire to transcend yourself out of the world of technology to be tomorrow's managers of technology."
>
> FRED FORMAN
> AMERICAN MANAGEMENT SYSTEMS, INC.

The job you save, as the saying goes, may be your own.

"Career development [for information systems professionals] is difficult," says Fred Forman, director of the Corporate Technology Group at American Management Systems, Inc. "You need a desire to transcend yourself out of the world of technology to be tomorrow's managers of technology. . . . The burden is really on the individual to move up the career ladder."

Because the entire information systems profession is undergoing such turbulence, opinions on its viability as a career vary widely.

Know the business

R. Talmage Fish is manager of information systems at textile manufacturer Burlington Industries, Inc. in Greensboro, N.C.

He, too, emphasizes that today's — and tomorrow's — MIS manager must have a much better feel for the business direction of the corporation.

Fish says both he and his manager, the director of information systems, have financial backgrounds in addition to their

information processing skills. One of their roles within Burlington, he points out, is to develop "the business literacy of our information systems people.

"We hire very few pure computer science graduates," Fish continues. "Instead, we employ people with a business degree and a minor in information science. This is more and more of a definite trend."

On the other side of the shop is Larry Woods, manager of research at John Deere Information Systems in Moline, Ill. Woods' information systems function evolved down the technical path, but he stresses that the technical professional's job isn't what it used to be.

"It was fun back in the 1960s. We worked with entire systems; we made very creative patches," he says.

But, Woods adds, as more and more layers of patched code built up on operating systems and the corporation's aging applications, a programmer's job was reduced to applying patches supplied by the vendor — in most cases, IBM.

In large corporations, Woods says, MIS began discouraging its talented programmers from trying to fix the company's large applications.

According to Woods, "the boss told his workers that because of the multiple layers, 'they had a house of cards. His directive was, 'Call the IBM systems engineer. It's too complicated for anyone in-house.' "

Thus, there is very little creativity left in the big shops, Woods says. Fixing bad software is a 9-to-5 coding job.

> THE FUN stuff is done on the PCs, and the sharp programmers are winding up in the end-user departments."
>
> LARRY WOODS
> JOHN DEERE
> INFORMATION SYSTEMS

"The fun stuff is done on the PCs, and the sharp programmers are winding up in the end-user departments," he adds.

Will this movement out to user departments tend to narrow a programmer's range of experience and limit career possibilities?

Probably, Woods says. He points out that MIS is already overspecialized, with career niches being carved out in such narrow areas as data base, Cobol coding, operating systems and so on.

In-house mobility

On the other hand, mobility is the watchword for DP employees at Pepsico, Inc. in Purchase, N.Y., where the corporate culture provides for a wide range of in-house business and DP experience.

Elizabeth Menten, Pepsico's information center manager, reports that there is a frequent movement of information professionals from the systems department into major user departments — and vice versa.

Menten says that at Pepsico, "your career is really up to you. You can make it your business to build a career in a given departmental area. As the role of information systems and the information center matures, the company is recognizing the growing strategic value of the function.

"And there are a lot more opportunities for promotion," she adds.

It is this mobility that William A. Roberts, vice-president of information systems at Pacific Mutual Life Insurance Co. in Newport Beach, Calif., is attempting to deal with as he considers the careers of DP professionals both in and out of the information systems department.

Roberts admits that "the MIS career is not as attractive as it was five years ago." Today, Pacific Mutual provides a mixed environment for its systems professionals as the company continues to centralize some functions and decentralize others, depending on the needs of the user departments.

"All this uncertainty and change has caused some discomfort," he says. "But despite this, there is a clear perception on the part of the corporation that information systems is playing an increasingly important role."

Roberts says he agrees with Deere's Woods that many of the interesting applications are currently being performed on PCs in user departments, but he says the fundamental strategic systems are still housed on mainframes and central minicomputers. "We still are in need of systems professionals skilled in Cobol," Roberts says.

Mix and match

At Chase Manhattan Bank N.A. in New York, Elaine Bond, senior vice-president of corporate systems, provides a unique twist on the question of MIS careers.

"We are a mature enough discipline to be able to blend an organization with different kinds of skills," she says.

Although Bond says an information systems professional cannot be a good leader without having a solid grounding in the technology, she points out that the MIS manager can mix and match to create the blend of technology and business talents required by a particular managerial situation.

There is still a split in preference, though. Bond refers to those in the upper echelons of corporate management as "blue-suiters."

"If the [systems chief's] strength is technology, he or she can buy the blue-suiters to do the talking and the planning," she says. "Or, if they are inclined toward being blue-suiters, then they can buy the technologists."

American Management Systems' Forman offers this advice for those MIS professionals who aspire to the boardroom. Find a mentor, he says — someone in top management who is willing to train you in the various business aspects of the corporation.

Ultimately, however, it is up to the individual to steer his MIS career in a chosen direction.

"There is a lot of personal salesmanship involved," Forman says. "I don't recall many cases where a company's management came to the systems person and said, 'I want to make you the CIO.' "

JOHN KIRKLEY

Restructuring

FROM PRECEDING PAGE

to maintain total compatibility so that all of the organization's PCs and terminals are able to communicate. MIS issues a recommended buy list of hardware and software to guide user departments. In addition, IBM Systems Network Architecture and the Synchronous Data Link Control protocol are installed throughout the company.

"We're now using T1 carriers between major corporate locations," Fish says, "and we're trying out satellite links in an effort to reduce costs further."

Telecom a key

Telecommunications at Burlington Industries is more than installing telephones — it is a key part of MIS strategy. For the last eight years, information systems, telecommunications and office automation have all existed under the same umbrella.

"This has helped us leverage the technology to support the business," Fish says. "I also think it's significant that our director of information services reports to the corporate vice-president of manufacturing services."

Fish asserts that the MIS manager is going to take over the telecommunications manager's job, not the other way around. In fact, when Fish or his colleagues attend AT&T Customer Council meetings, they suggest AT&T direct its marketing to MIS management as well as to the communications department.

"But right now, for MIS at Burlington, I think the biggest issue is to better integrate information systems planning with business planning so that we're both going down the same path at the same time," Fish says. Electronic data interchange, he claims, is forcing this issue.

"More and more, the operational people are coming to MIS and asking how we can meet the moves of our competition," Fish says. "We're taking on an increasingly strategic role within the organization."

A closer plan

"We've moved from fire fighting to acting as a strategic unit," says Elizabeth Menten, manager of the information center at Pepsico, Inc. headquarters in Purchase, N.Y. Menten joined Pepsico about a year and a half ago, after working at the Gartner Group, Inc., based in Stamford, Conn. The major changes that have occurred at the center happened under her leadership.

"When I first arrived, the information center was in a separate building from the Information Systems Group," she recalls. "Users with problems would call in over a hot line. Anyone who was around would take the call and then try to find someone who had the expertise to handle the problem."

All that has changed. One of the first things Menten did was to assign each of the center's staff members to a specific department. This move allowed informa-

> THIS is where information systems comes into its own: Helping to develop the functional systems is how we earn our keep."
>
> ELAINE BOND
> CHASE MANHATTAN BANK

tion center members and department personnel to get to know each other and provide a clearly defined system for reporting and resolving problems.

The center was also heavily engaged in user training, an activity that overloaded the resources of its small staff. Menten contracted with an outside training firm and instituted a chargeback system.

In addition, user departments were uncertain as to which organization in the company handled computer maintenance; the calls would often be routed through the information center. In this case, a single contact point was established within the corporate MIS function. The actual maintenance was, and continues to be, handled by an outside vendor.

Several years ago, Pepsico's management decided to put even greater emphasis on MIS's role as the first point of contact for user departments. The information center, which reports to MIS's Information Systems Group, was very much a part of this enhanced MIS/

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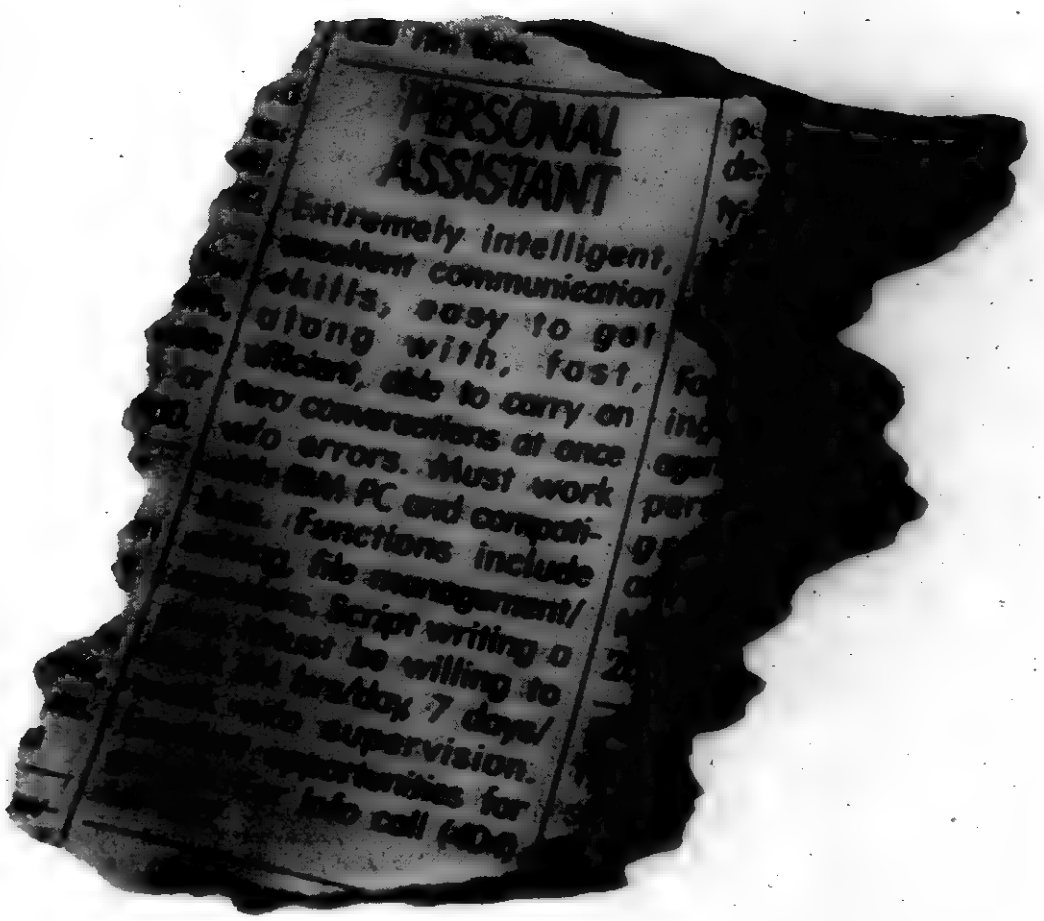

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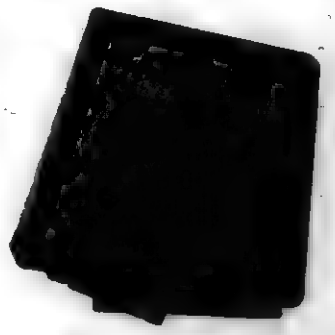

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end user relationship.

With routine functions such as training and PC maintenance assigned to outside sources and the decision to involve the center more in promoting end-user applications, there has been greater opportunity for both the center and the Information Systems Group to take a proactive role in generating strategic projects.

For example, a major, ongoing activity involves the selection, implementation and management of LANs. Menten's staff works closely with the Technical Planning Group within information systems to establish standards.

Recently, the telecommunications organization, which had limited involvement in LANs, expressed an interest in playing a more active role in the process.

LAN club

What has evolved is a LAN administrative body that sets standards, selects vendors and is involved in every installation. Represented at the meetings are the departmental organizations that will ultimately be the users of the network.

"THE operational people are coming to MIS and asking how we can meet the moves of our competition. We're taking on a strategic role."

R. TALMAGE FISH
BURLINGTON INDUSTRIES, INC.

"There's been a change in attitude in recent years," Menten says. "There is far more opportunity for MIS with regard to generating strategic opportunities."

Menten's group, for example, recently worked with the company's Department of Corporate Affairs, which produces the annual report — a $1 million document.

"With our help," Menten says, "they shifted from typesetting the report with outside vendors to using Macintosh SEs and Macintosh IIs and a laser printer to produce the camera-ready copy."

This Apple Computer, Inc. system has saved more than $30,000 in production costs and has made revisions faster and easier.

Last year was a time for evaluation at Pepsico's information center. In an effort to avoid becoming a backwater function — a department devoted solely to training or working only with PCs — the information center is now involved in planning LANs, looking into electronic publishing, developing data management plans and helping to chart overall DP strategy.

"We have definitely become more strategic. . . . We've gone back to what an information center implied in the first place," Menten says. "Our role is to unearth opportunities that exist in user departments and promote those opportunities using today's information systems technology."

A CIO from outside DP

"I've never written a Cobol program," Ohio State University Hospitals' Bain admits.

But Bain, who has a background in business and management and was trained as an industrial engineer, has had extensive experience developing information and productivity systems. He functions as the chief information officer of the hospital system and is one of 11 administrators who together form a peer group chartered to deal with the hospitals' overall business concerns.

"The hospitals are highly decentralized," Bain says, particularly because of changes that

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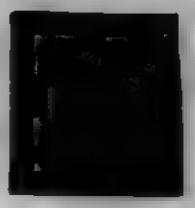

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occurred in the past four to five years.

Initially, DP functions at the university hospitals were those of a traditional IBM shop working on such back-office jobs as accounting, admitting and patient billing. But when departmental computers began cropping up in operational areas such as radiology and cardiology, often without the involvement of DP management and sometimes despite its strong objection, problems arose.

"We had automated the business functions but not the operational ones," Bain says. "The physicians had a lot to do with driving the use of departmental technology; they're used to operating in a semi-autonomous fashion."

Bain says information systems began to establish data links between mainframes and minicomputers in the operational divisions.

"WE HAVE definitely become more strategic. . . . We've gone back to what an information center implied in the first place."

ELIZABETH MENTEN
PEPSICO, INC.

"We were getting lab reports and displaying them on a CICS terminal using IBM 3270 emulation. This was good, but I told my team that there was more to life than 3270 emulation."

Bain was aware of the inroads PCs were making into the organization. When he was promoted to his current position 2½ years ago, he knew he had to pull the scattered operation together.

With the promotion came additional responsibilities for telecommunications, data management and planning, microcomputers, medical records, hospital quality control and utilization review. The latter assignment involves ensuring that hospital resources such as drugs, computer equipment and expensive radiology gear like CAT scanners are being used efficiently.

People first

One of the first tasks Bain undertook was to form a management committee that included the hospital director of management planning and analysis, the director of management engineering responsible for patient statistics reporting and the DP manager. As his next step, Bain embarked on an ambitious program to network the various, scattered departmental systems — many of which were VAXs — and the mainframe.

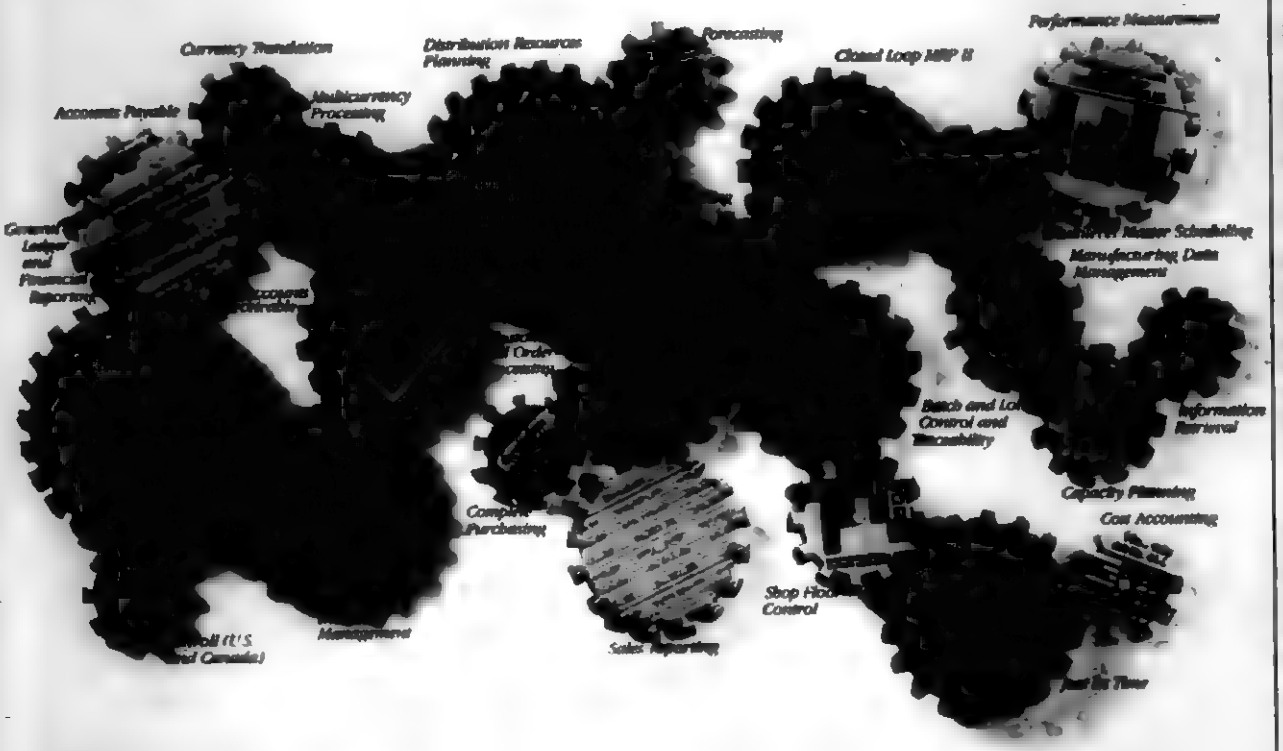
"I made a few false starts, a few clumsy attempts to put together one big happy family," Bain remembers. As a result, he learned that MIS has to build a bond of trust between the information systems group and the people operating the user systems.

To ensure the network's completion, Bain formed an interdisciplinary team made up of members of user organizations, a microcomputer specialist, a registered nurse with experience marketing clinical information systems and a systems engineer from DEC. DEC had been chosen as the vendor to create the overall network using Ethernet.

The network has since been implemented: Ethernet went live in January, and the PC on Bain's desk can now talk to seven minicomputers and mainframes. This data path for the hospital user population will allow MIS to provide such critical functions as routing laboratory test results — nearly four million of them a year — to terminals and PCs, wherever the information is needed.

Now one of Bain's major goals is to build a strategic "physicians network."

Continued on page 91



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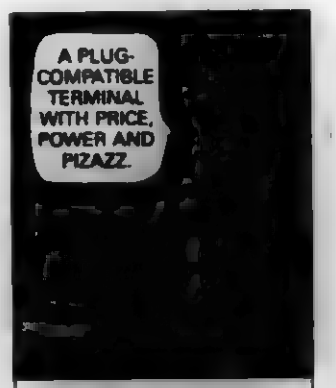

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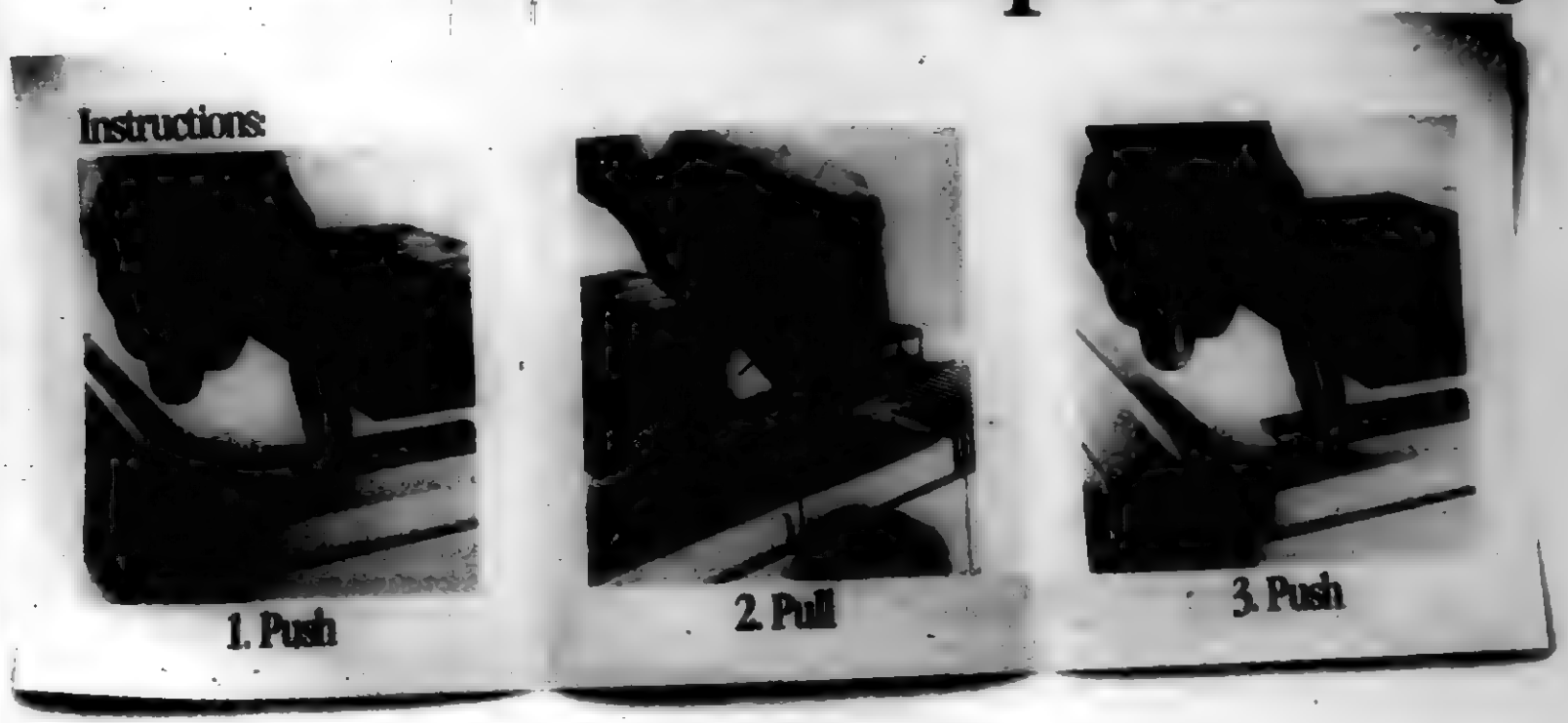

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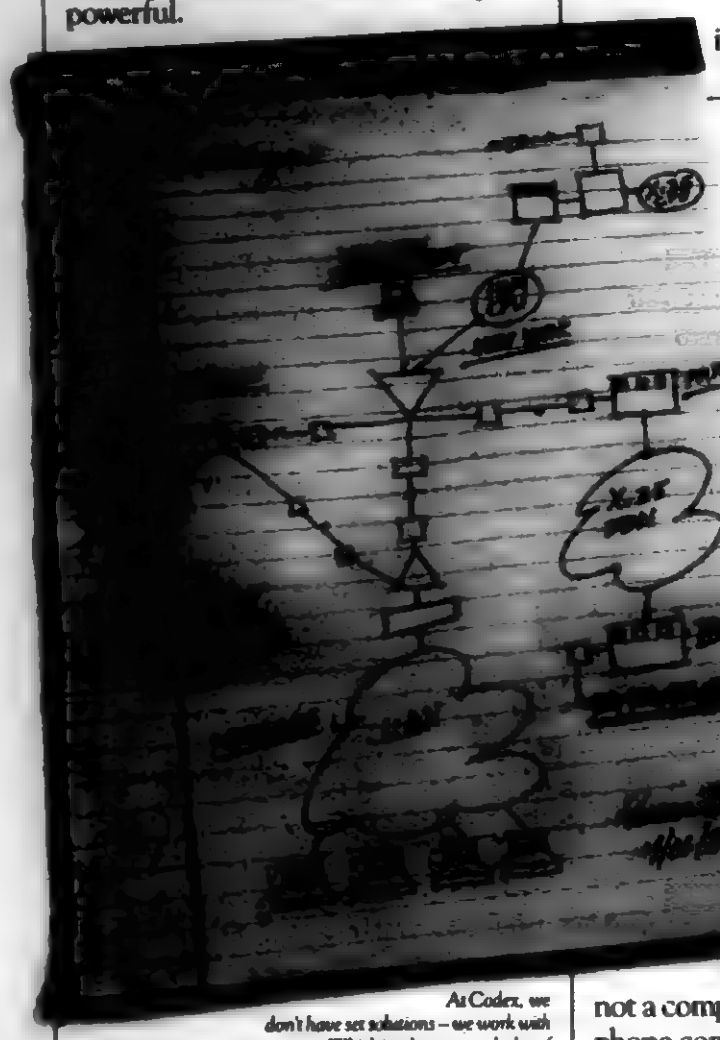

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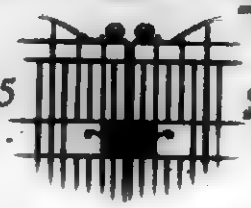

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Distribute or centralize? Strategies for support

BY MICHAEL BALL

One of the realities of information systems management today is the prevalence of distributed or remote computer systems.

MIS managers can commonly support and maintain these systems from a central site by automating as many of the maintenance functions as possible, or they can let the remote site provide its own support, as long as it meets corporate standards. Which method is best depends on the system's complexity and the corporate culture.

Regardless of which one is used, sufficient skills and talent must be available on-line or in residence at the remote sites for operations, emergencies and MIS maintenance.

Ball is a free-lance writer based in Boston.

The following is a tale of two shops. One is trying hard to distribute support; the second has moved to consolidate support at a central location.

The distributed system

"We push the process closer to the decision makers," says Gary Biddle, vice-president of MIS at American Standard, Inc., a home fixtures manufacturer based in New York. His company has a well-established distributed computing strategy and a support system to match.

American Standard's approach is to staff each remote site, letting information systems professionals configure their systems as they see fit and to offer technical services at the remote location's request.

American Standard currently has three distributed sites, and Biddle says he expects 10 more to have distributed manufacturing control systems by the end of the year. The central shop runs IBM 3084 class mainframes supported by three levels of processors. The remotes operate Digital Equipment Corp. VAXs and IBM 9370s.

The motivation for this distributed strategy was typical. "Because the computers are going down in price, we're putting applications in more locations," Biddle says. But moving to a distributed system has not been without problems. In fact, technical data processing realities kept American Standard from immediately implementing the sort of support structure that it had hoping for.

"We wanted to put master scheduling in the sites," Biddle says. "Then [the sites] could have control from planning to release to the customer." Such scheduling fits in well with the strategy of letting those in the company who know the requirements best do the data processing.

"WE FOUND that the part of data lagging the most is the distributed data bases. You can't break data bases apart without complex systems of masters and slaves and a lot of telecommunications."

GARY BIDDLE
AMERICAN STANDARD, INC.

"Unfortunately, we found that the part of data lagging the most is the distributed data bases," Biddle explains. "You can't break data bases apart without complex systems of masters and slaves and a lot of telecommunications."

As a result, the central DP unit downloads later in the cycle and does more of the upfront processing than it had planned. In addition, the central staff still provides technical services and also owns the corporate network, Biddle says. Central support also includes downloading software upgrades and replacing applications portfolios when necessary.

At American Standard, the benefits of this shift to remote sites has been a wash in terms of costs for equipment and people, according to Biddle. However, he says, "the real efficiencies come in reaction time and, culturally, in the people feeling they're controlling their own destiny. And they are."

Looking at lights out

In another corporate culture, United Technologies Corp.'s Hamilton Standard is considering more extreme distributed

Continued on page 91

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Strategies

CONTINUED FROM PAGE 88

site automation and support.

The firm, an aircraft parts and electronics maker, has several sites in Connecticut and is aiming for data centers to be controlled by the central shop. To meet this goal, Hamilton Standard is working on an automated-operator project — a test site that will eventually run small CPUs in shop-floor manufacturing.

"We will maintain a central data base and load subsets down to the interim CPUs," says Timothy O'Connor, manager of office services and telecommunications.

The aim is to control everything from the central location, except switching the power on, resulting in a lights-out center. O'Connor says he expects to implement a shop floor test site this summer.

Keeping it central

In a larger expression of its DP philosophy, Hamilton Standard's central DP office has managerial responsibility for all computers, including distributed manufacturing and engineering, says Jim Garlans, manager of computer operations.

> "THE MUNDANE things people hated about their jobs went away. . . . Our operators have become much more like problem solvers, and they like it."
>
> JIM GARLANS
> HAMILTON STANDARD

The company has three data centers: one IBM site with 3090 Model 200 and 3084 mainframes; one DEC site with two VAX 8700s, a VAX 8600 and VAX-11/785 minicomputers; and a mixed site with a 3084, a VAX 8700 and a VAX 8650. The automation effort includes centralizing an IBM mainframe operation 25 miles away and putting computers where needed.

"In about a three-month period, we went from 1,100 terminals to 3,000, with 15% to 20% less staff," Garlans says.

The changes might appear to overtax staff capabilities and rob users of support. But Garlans says this is not the case. Automation of mundane entry and monitoring tasks frees operators, allowing them more time for problem solving.

Garlans says he told his staff up front that their jobs would change with automation. While a few employees left, others stayed and ended up pleased with the changes. They engage in a quality-circle-like series of meetings to keep fine-tuning the system. "The mundane things people hated about their jobs went away," Garlans says.

"Even with less staff, we found we had time for training because the operator was freed from doing those tasks. Our operators have become much more like problem solvers, and they like it," he adds.

In either case, it is clear that corporate MIS must have a clearly defined strategy for systems support, provided either remotely or centrally. Without a plan, disaster awaits. •

Restructuring

CONTINUED FROM PAGE 84

which will encompass terminals and PCs both within and outside the hospital's facilities. The system, which is based on DEC's All-In-1 integrated office system, will permit physicians and academics associated with the hospital to generate and access patient information through the network.

A network for doctors

With the system in the prototype stage, Bain is finding that what the physicians are particularly interested in is entering and retrieving outpatient information.

If an outpatient has been admitted to the hospital, the records are already in the system and can be accessed by the attending physician and other staff members who need and have the rights to that information.

"This is a strategic system," Bain says. "It's like an airline reservation system in a way. Because it provides so much information as well as convenience, physicians are motivated to send their patients to our hospital."

It may be strategic, but not everyone has wholeheartedly taken to the MIS automation plans.

"There are a few administrators who want nothing to do with computers," Bain says. "But all in all, most of the physicians are very enthusiastic. Many of them who have their own systems and are quite sophisticated in the use of computers are contributing ideas for new and interesting strategic applications."

Let the users decide

When an MIS department is restructured, user involvement can vary widely depending on the openness of MIS management, the wishes of the company's top echelon and the interest generated by the users themselves. Sometimes, MIS has to be dragged to the bargaining table; sometimes a satisfying rapport is established between the information systems professionals and the departments they service.

At Pacific Mutual Life Insurance Co. located in Newport Beach, Calif., the process, begun two years ago, has gone smoothly. At the very start, William

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USA TODAY Decisionline

A. Roberts, vice-president of information systems, went to the company's strategic business units and made them a proposition they couldn't refuse.

Either, or

Roberts told the units they had a choice: They could either decentralize the MIS function and move the information systems' programmer/analysts into their shops, or they could leave the DP functions inside the information systems department and let that division handle their applications development.

Two of the largest strategic business units, Group Insurance and Individual Insurance, chose the decentralization option. About 100 programmer/analysts and applications support people made the move from MIS, a number that adds up to roughly one-third of the information systems staff.

At the same time, another large business unit, the investment function, which had its business analysts in the department and programmer/analysts in MIS, decided to ship all its business analysts back to Roberts' shop.

"GETTING computers to talk to one another would be an impossible task if I couldn't get people to talk to each other first."

LANDEN BAIN
OHIO STATE UNIVERSITY HOSPITALS

"It's really up to the heads of the respective businesses," Roberts says. "Some of them feel more in control with a solid-line relationship with their information systems professionals; others prefer to let MIS worry about reporting relationships."

Whether the information systems professionals are decentralized or, to use Robert's term, "dedicated," his firm attempts to maintain a high level of service and interaction.

He has also taken steps to ensure that the programmer/analysts and applications specialists who have joined user departments still feel they are part of the overall information systems effort within the company.

For instance, Roberts issues a quarterly newsletter to all the information systems professionals in the company "to make them feel as if they are part of a single group, even though they're dispersed throughout the organization," he says.

Recently, information systems hosted an off-site get-together of all the information systems professionals; it was a gathering designed primarily to socialize and maintain personal relationships.

Single personality

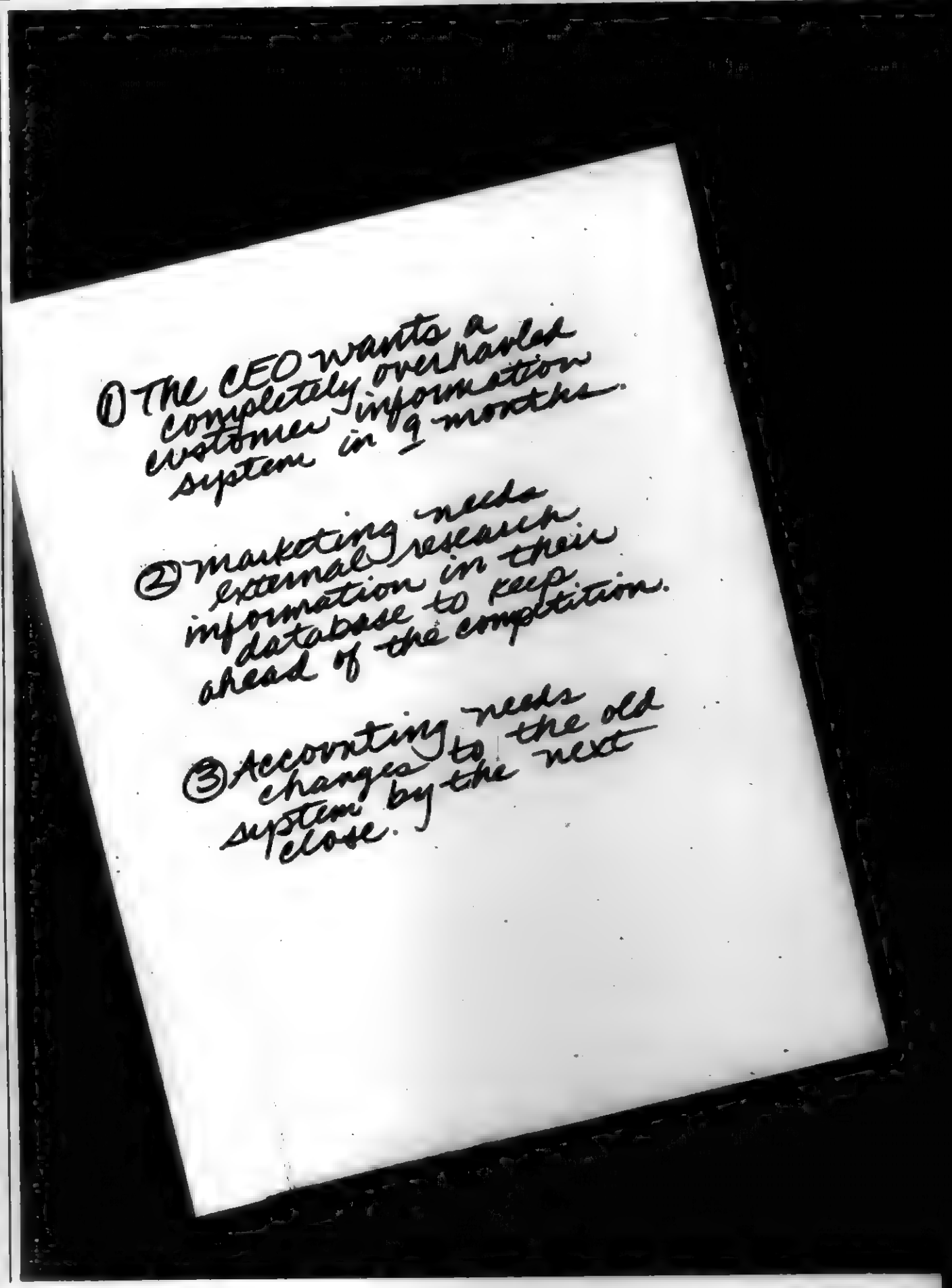
An MIS function that is both centralized and decentralized could develop schizoid tendencies, but Roberts has avoided that problem by forming an MIS council with representatives from all the strategic business units.

Roberts also schedules formal quarterly meetings to decide on common guidelines, standards, programmer/analyst job descriptions and common systems-level methodologies.

"Ten years ago, the information systems department did not need to use logic and goodwill to achieve our ends," Roberts says. "Now we do, and it's a much more healthy situation.

"Both the decentralized and dedicated organizations have been quick to respond positively to this changed state of affairs."

According to Roberts, the influx of PCs made very little impact on the decision to decentralize. PCs are handled by a PC advisory board that operates on



a concept similar to the MIS council. One of its roles is to decide which PCs make the approved buy list. Beyond that point, the individual business units make their own purchase decisions.

One of the major activities of information systems is strategic planning, although, as Roberts points out, today's business environment changes so rapidly that it is difficult to make plans too far into the future.

Each year, prior to the beginning of the budget planning cycle, which starts in August, information systems meets with each business unit to discuss the unit's plans for the coming year. At the same meeting, information systems personnel review systems opportunities that may impact the unit and ask the unit if it wants information systems to adopt any particular technologies or techniques to help it meet its objectives.

Roberts said that in 1987, his department issued 30 white papers on technologies ranging from the implications of three-tiered architectures to expert systems to help the business units in their deliberations.

"Once we talk to the business units," Roberts says, "we regroup and ask, from a systems standpoint, such questions as whether we have to modify our organization and what impact the introduction of new technologies will have on our budget. We document these discussions and send the results back out to the business units for further comment and analysis.

"The results of this activity are not dramatic," he says. "But during the past two years, we have drawn closer to the units." Recent meetings between information systems and user departments have resulted in a somewhat startling conclusion regarding communications: The company decided there is no compelling reason to connect the business units and the central corporation.

A big deal

Given all the talk about connectivity and communications in the press, this was a controversial conclusion, with a big impact on MIS planning at Pacific Mutual.

"We found there was not enough critical information that needed to be sent electronically to justify the expenditures," Roberts asserts. "Maybe if times were fatter we could rationalise expensive communications systems."

MIS does recognise the value of setting up LANs within the business units for intradivisional communication. But, he comments, the department will let others deal with the latest advances in technology; the company will observe the activity from "two or three paces back and save some money," he says.

"TEN years ago, information systems did not need to use logic and goodwill to achieve our ends. Now we do, and it's a much more healthy situation."

WILLIAM A. ROBERTS
PACIFIC MUTUAL LIFE
INSURANCE CO.

Despite the changes and restructuring impacting the insurance industry, Pacific Mutual and Roberts' organization, he concludes that "there is a clear corporate perception that information systems is playing an increasingly important role."

Like many other MIS departments, Roberts and his colleagues in information systems are taking an increasingly proactive part in the development of strategic systems that contribute directly to the success of the business enterprise. ●

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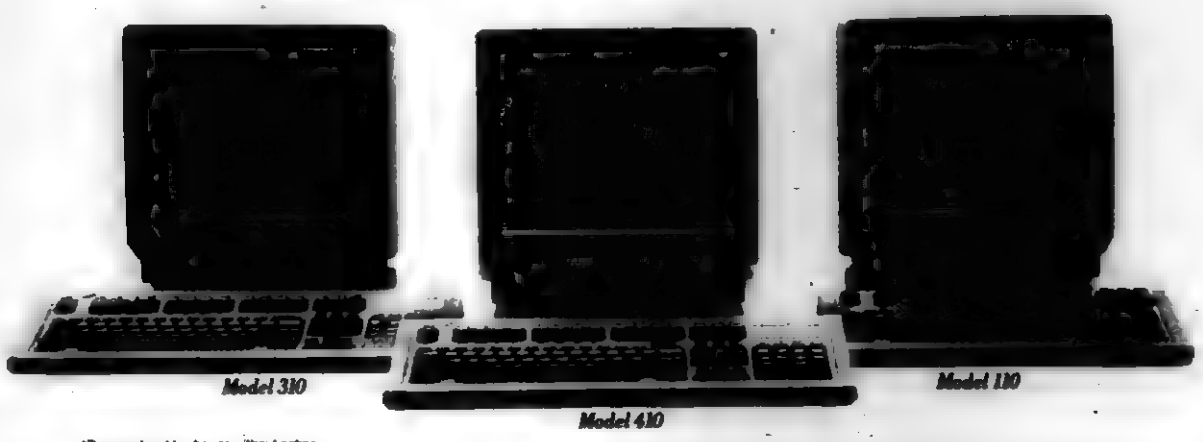

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Not just another end-user liaison

Pick the best of your staff as internal consultants to boost credibility, drain backlog

BY MICHAEL SULLIVAN-TRAINOR

As the challenges of the mid-1980s — personal computing, distributed processing, the need to develop strategic systems — change the rules of the game, MIS managers are creating new roles for their most savvy professionals.

These veterans are becoming internal consultants, charged with bridging the gap between end users and technical staffs to further the goals of information systems and the company as a whole.

Unlike other MIS personnel who mix business awareness with technical tasks, consultants are generally free from long-term technical duties and spend most of their time working directly with end users.

Some MIS organizations designate individuals to respond to user requests as they come up; others set up "strike forces" — teams that actively seek out ways to improve business functions.

A marketable item

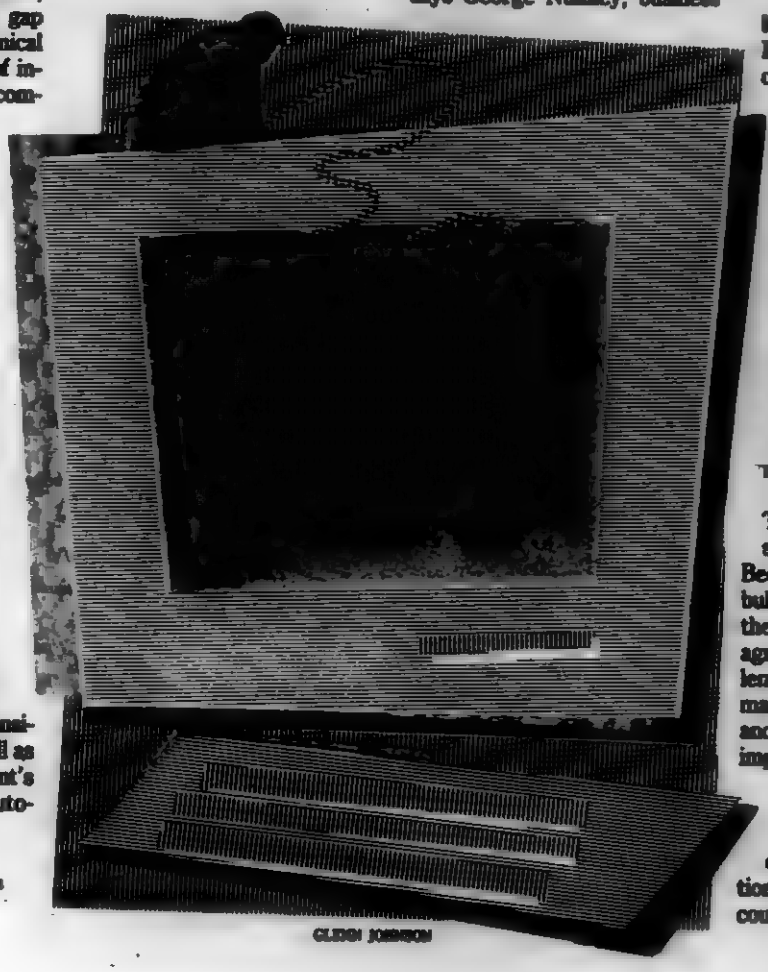
Whether they are a few solo point men or an army of eager applications developers, these professionals are responsible for marketing MIS as well as promulgating that department's unique ability to provide automated solutions.

"Marketing is not selling yourself but giving information about what you can do," says Martin Montgomery, information center specialist at John Hancock Mutual Life Insurance Co. in Boston. Montgomery performs a consultant role at John Hancock, working with users to increase their awareness of MIS services. "We're trying to create an understanding of how we can work in a partnership with other departments to improve the operations of the company," he says.

Montgomery and other internal consultants face growing outside competition for departmental managers' attention.

"At the very least, a business executive can watch the commercials between quarters of football and see a wide variety of hardware and software systems that appear to meet any need," says George Nunney, business systems consultant at TRW, Inc. in Cleveland.

Besides outmuscling rivals as varied as the local personal computer dealer and the newest systems integrator on the block, internal consultants are also overcoming the traditional perception that "MIS is a group of intelligent, very rigid people with preconceived notions about how things should be done," Nunney says.



GLENN JOHNSON

New attitudes

Effective consulting can increase the visibility of MIS within the firm, ensure that systems are developed in line with corporate policy and, eventually, change end users' attitudes about MIS professionals.

An internal consultant has a number of choices in the role he takes — and his success depends on that choice. Management consultants Arnoudse & Oullette Associates, Inc. in Bedford, N.H., define internal consulting roles in the following ways:

The technical expert. This is the role MIS professionals slip into most easily. Because it requires him to do the bulk of the work, this role makes the consultant responsible for diagnosing and solving the problem, initiating communication, making the technical decisions and providing instructions for implementation.

The client takes a more passive role: He explains the problem, answers questions and follows instructions. This scenario does not encourage end-user commitment,

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Sullivan-Trainor is *Computerworld*'s special projects editor.

- **'Strike force' to attack backlog**
- **Technical expert vs. hired hand**
- **Consultants are made, not born**

and if the system fails, the fingers will be pointed at the consultant.

The hired hand. Less assertive consultants can just as easily fall into this role. Here, the client is totally in charge, and it is up to the consultant to match the client's specifications with technical solutions. Also heavy on the consultant's work load, this role absolves him of credit or blame for the project. He can always point to the client as the instigator.

Hancock's Montgomery

The problem-solving partner. In most cases, this is the best tack to take, but it is often the most difficult to attain, as well. It requires the consultant to call on his full complement of skills so that both he and the end user are actively discussing the problem and working toward a solution.

Part facilitator, part assertive interviewer, the problem-solving consultant must place his technical bias behind him and see things as much as possible from an end user's point of view. He must show an understanding of the problem and express the realistic possibilities for a solution.

Most of the consultant's charge is to develop a shared sense of responsibility with the user and reach an agreement on how the matter will be handled.

When end users refuse to be involved in the project except in a peripheral manner, the role of "technical expert" can work. One consequence, however, is that the stereotype of the rigid MIS professional will remain dominant. Furthermore, the end user will not feel ownership for the system, and it may not meet his business needs effectively.

TRW's Nunney

End users who look down their noses at MIS may be satisfied with the "hired hand" solution. But it is unlikely that the consultant will feel satisfied. Again, the old concept of the MIS person as a technician will prevail.

Consultants at the top of their profession strive for the role of "problem-solving partner." Filling these boots can shatter the traditional image of MIS for good.

But, of course, grooming professionals who can become problem-solving internal consultants is not as easy as designating an individual to be the end-user liaison or establishing a team to take on consulting roles. The best consultants are those who can dig deep into their technical expertise and provide a solution that is effective and in tune with business needs. Managers can encourage the development of professionals who straddle the line between business problems and technological solutions by increasing the exposure of their best people to other areas.

"People who have been rotated through various functional areas in the MIS community quickly develop strong consulting characteristics," Nunney says. "They get to see everything from programming to systems management and analysis to user interaction."

PART facilitator, part assertive interviewer, the problem-solving consultant must place his technical bias behind him and see things as much as possible from an end user's point of view.

Start with desire

The making of a consultant can begin with a professional's desire to work more closely with end users, or it can be encouraged by a manager who arranges movement between departments.

When internal consultants are not available from the technical side, they can be recruited by MIS from end-user departments. "Anyone who has been involved in sales and marketing picks up consulting skills, because they have to be good listeners and be analytical and responsive," Nunney says.

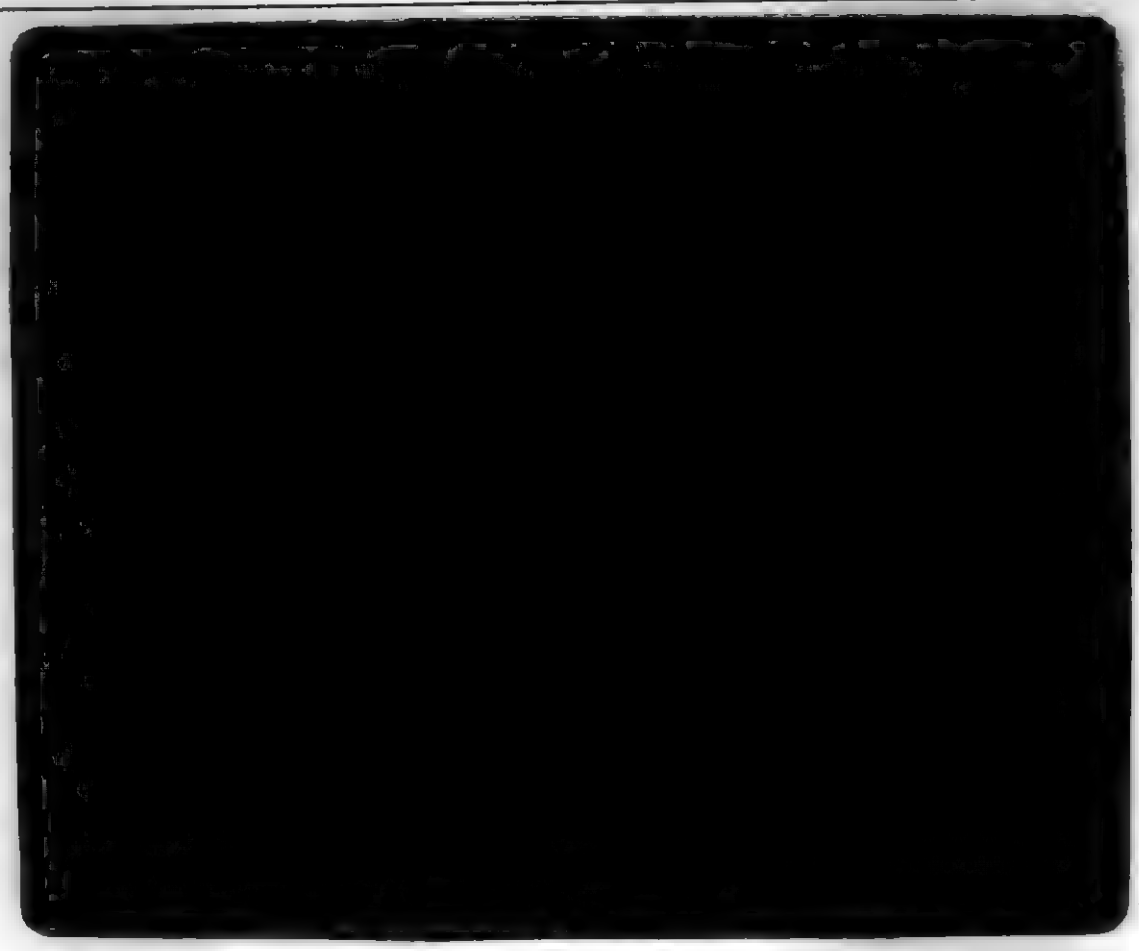
After starting out in sales and marketing, Nunney moved into consulting with a Big Eight accounting firm, making the transition from external to internal consultant at TRW.

John Hancock's Montgomery came to consulting from the MIS side. After graduating with a background in computer science, he worked as a systems analyst and then moved into consulting. Though his initial orientation was technical, Montgomery says he always knew he would not be the average computer professional.

"When I took my first course in Basic, the instructor said that if you want to go into computers, you have to be good at math. Math has always been the death of me," he says.

In the information center environment at John Hancock, Montgomery does not need strong math skills as much as interpersonal skills.

"The consultant who gets hired is the one the client understands and feels the most comfortable with. A lot of that is the way you project yourself, your sense of



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humor and your personal style," he says. "If you're very conservative, tight-tied and rigid in your chair, you're not going to inspire a warm feeling from the user."

Instead, consultants should be relaxed and confident about their expertise yet honest about what they do not know.

Besides an accessible personality, would-be internal consultants also need to be able to learn from experience. For example, Phillip Colaluca, project manager in the telecommunications group at Avon Products, Inc. in Rye, N.Y., gained most of his skills through moving up in the company's information systems division. He began in the operations area, moved into an analytical position and then went into management.

"During the course of that, I picked up a lot of the consulting skills, like listening to people," he says. "I've also learned from past projects."

Aware of a gap

Workshops and seminars can also help internal consultants polish their skills by teaching them to organize their experiences into a conceptual framework.

For example, after attending such a seminar, Colaluca says he became aware of a gap in the way his group was approaching end-user applications. The technical staff was following the end users' requests, but it was not really listening to the client.

In one case, top management in charge of Avon's sales support group wanted a special telephone line and telemarketing unit to address "stranded customers" — those who did not have access to an Avon representative in their area. Sales management responded by saying they wanted 900 service — an interactive telephone service that allowed users to respond immediately to broadcast or printed messages regarding the products they wanted.

Eager to support the sales team — the source of 80% of Avon's income — Colaluca's group investigated the cost and feasibility of the service, examining case studies and vendors. They concluded that it might be too expensive, with little return for the organization. Rather than implement a complex response system, the company could meet the same need and pay much less by using an 800 number and an outside telemarketing firm to handle customer calls.

"We researched the request and not the reason for asking," Colaluca says. "We could have saved ourselves the work if we tried to find out what they wanted the service for. Just because a user has an idea doesn't mean he knows what he wants, and we found that out the hard way."

Now, with the benefit of experience, Colaluca knows better. But in addition, something called the HEAR model at a seminar offered by Arnoudse & Ouillette cemented that knowledge and gave Colaluca a structured way to approach his next client.

The model's simplicity makes it easy to remember:

- "H" stands for accurately hearing the client's words. This means concentrating, eliminating distractions and avoiding attacks on the client's reasoning — even silently in your mind. Consultants should check how effectively they are carrying out the hearing step by paraphrasing and summarizing what the client says in his responses.
- "E" represents empathizing with the client's situation. The consultant needs to show interest in the client's point of view, even if his own point of view is different. Listening to "the music behind the words" or understanding the feelings as well as the content within which the client is operating is also helpful. The consultant should then make another accuracy check by paraphrasing what the client is saying.
- After hearing and empathizing, "A" stands for analyzing the user's problem based on the consultant's experience. The consultant should ask open-ended questions to help the client explore the situation and reveal all the facts. He can combine these with direct, probing questions to pin down the details of the problem. Next, the consultant walks the client through his analysis to form the basis for a shared understanding of the problem, which will later yield a shared commitment to a solution.
- The last stage, "R," simply means respond. After the client presents his situation, response from the consultant is vital to foster the relationship. The response should be connected to previous areas of mutual analysis and should be specific, filled with details on who needs to do what and when to solve the problem. Finally, the client should paraphrase the action described so that the consultant is sure the client understands what was said.

As basic as these points seem, one of the hardest things to do is reduce a complex problem — in which the goal is to bridge two worlds, business and technology — to simple, mutually agreed upon facts and understandings.

"Very helpful"

Since the seminar six months ago, Colaluca used the HEAR technique with an end user who wanted an international traffic study conducted.

"It was very helpful to verify things," he says. "The structured approach satisfied my client, and we agreed on things from the beginning. Now I won't have to go back 10 times for clarification."

Colaluca's next challenge is to install a large T1 network, encompassing eight Avon locations and working with five vendors, including IBM and AT&T. "I'm doing a lot of listening," he says.

Seeing computers as the end user sees them is a necessity in developing consulting skills, John Hancock's Montgomery says.

"In one project, we were going to automate areas that had no technology, and the staff was really suspicious of computer systems," he says. "We overcame that barrier by getting them involved on their level."

Instead of designating the project by its official title — the IDBS Group Conversions Unit — Montgomery nicknamed the project Garfield, after the well-known comic strip cat.

When the system was slow delivering printer output, Montgomery asked users to imagine Garfield, a fat, lazy feline, running from the terminal to the mainframe in the next building and back to the printer.

"They started to get the concept that we were dealing with wires and cables and systems, not magic," he says. "After a while, we were having fun with the system, and people felt more comfortable."

Other people skills were reawakened in him when he took a seminar on consulting skills. For example, Montgomery says, he found his desire to meet clients' needs sometimes led to an emotional reaction. "Even though you read all the books and understand all the skills, under fire you get a little emotional, especially when you are dealing with someone who is bullheaded," he says. "What do you do when they won't listen to common sense?"

Turning it around

To avoid getting angry and releasing feelings that are not conducive to the consulting situation — as well as to refresh his memory — Montgomery now reviews his reading material before going to see a client. "These things have to be internalized, but it helps to have a reminder," he says.

TRW's Nunney also confronts uncooperative end users from time to time. "The MIS consultant should present a business perspective that says, 'While an individualized solution, such as a PC program, may be technically feasible, from a corporate business standpoint it might not make sense,'" he says.

Flexibility is often as important to the consultant as interpersonal skills and technical knowledge. "You have to have a high tolerance for frustration," Nunney says. "You operate in nebulous environments many times in which situations are not clearly defined."

There will be a future need for more experts to tread the no-man's-land between end users and MIS. The most powerful motivator for growth in this area may be strategic applications. A solid team of internal consultants who understand both the users' goals and information systems' capabilities are needed to make such systems a reality. ●

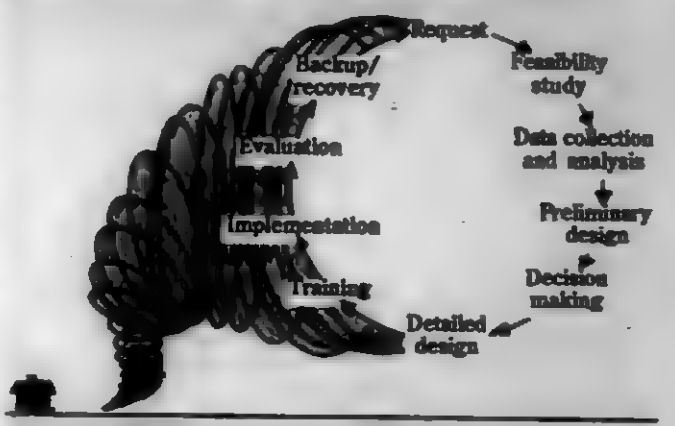
Recipe for a good consultant

A variety of people skills and technical skills is needed

CW CHART: AMY J. SWANSON

White tornado

The consulting cycle should be the quickest way to get things done



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   - 10. Vice President, Asst. VP
   - 21. Dir., Mgr., Supvr., IS/MIS/DP Services
   - 22. Dir., Mgr., Supvr., of Operations, Planning, Adm. Services
   - 23. Dir., Mgr., Supvr., Analyst, of Systems
   - 31. Dir., Mgr., Supvr., of Programming
   - 32. Programmer, Methods Analyst
   - 35. Dir., Mgr., Supvr., OA/WP
   - 36. Data Comm. Network/Systems Mgt.
   - OTHER COMPANY MANAGEMENT
   - 11. President, Owner/Partner, General Mgr.
   - 12. Vice President/Asst. VP
   - 13. Treasurer, Controller, Financial Officer
   - 41. Engineering, Scientific, R&D, Tech. Mgt.
   - 51. Sales/Mktg. Mgt.
   - OTHER PROFESSIONALS
   - 60. Consulting Mgt.
   - 70. Medical, Legal, Accounting Mgt.
   - 80. Educators, Journalists, Librarians, Students
   - 99. Others _____ (Please specify)
3. COMPUTER INVOLVEMENT (Circle all that apply) Types of equipment with which you are personally involved either as a user, vendor, or consultant.
   - A. Mainframes/Supermins
   - B. Minicomputers/Small Business Computers
   - C. Microcomputers/Desktops
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   - E. Office Automation Systems
   - F. No Computer Involvement

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MANAGEMENT

TAKING CHARGE

James Connolly

Cost cutting revisited

The comparisons to the Industrial Revolution and the Space Age can be placed on hold for a while. The yellow caution flags are warning that the birth — or at least the prime — of the information age might be delayed by a few years.

One warning was issued recently by David G. Robinson, president of the Index Group, a Cambridge, Mass., consulting firm. During a speech at the Society for Information Management (SIM) Institutional Members conference in Florida, Robinson noted that an increasing number of MIS organizations are being confronted with belt-tightening mandates, usually as part of a companywide cost-cutting program and often because of the October stock market crash.

Robinson told about 250 SIM members that corporate budget restructuring often means that strategic information systems projects may be delayed for two or three years but that better times are likely after that period.

But what was refreshing was the positive twist Robinson added. It might have been easy for him to tell SIM's MIS directors and chief information officers to retrench to defend themselves

Continued on page 100

Consultants regroup

Shift focus as clients seek one-stop shopping

BY DAVID A. LUDLUM
CW STAFF

With information systems performing increasingly crucial functions for corporate America, consulting firms that specialize in helping companies plan their systems strategies are responding with their own interpretations of shifts in clients' needs.

Three leading firms — Index Group, Inc.; Nolan, Norton & Co.; and John Diebold & Associates, a division of the Diebold Group, Inc. — all lay claim to a focus on the development of strategic information systems. But the firms are taking different routes, particularly on the question of whether to augment planning with hands-on implementation through an in-house programming staff.

One dramatic move came 12 months ago when Nolan Norton, a 14-year-old Lexington, Mass., consulting firm, agreed to be acquired by Big Eight accounting giant Peat, Marwick, Main & Co.

Through the merger, Nolan Norton gained access to Peat Marwick's implementation resources and expertise in vertical markets, providing it with a broader range of services, according to cofounder Richard Nolan, a former Harvard Business School professor.

In creating systems that are vital to different firms' business strategies, it is increasingly important to understand industry issues and monitor implementation, Nolan says. "If you're unable to make the change happen in the organization, or an electronic distribution channel isn't working, we need to immediately replan," he says.

Nolan Norton has not been alone in moving in this direction. Although major systems consulting organizations have traditionally specialized in either planning or implementation, an increasing number of clients seek "one-

Continued on page 101

Data View

Get a job

Methods used in looking for a job, cited by 619 Computerworld readers responding to a survey

Recruitment agencies	71.8%
Network of professional friends	69%
Classified ads in local paper	50.6%
Classified ads in trade publications	48%
Professional association gatherings	26.9%
Other	5.4%

INFORMATION PROVIDED BY CW PUBLISHING, INC.
CW CHART

Smith pumps Arco's MIS, staff's morale

BY JAMES A. MARTIN
CW STAFF

LOS ANGELES — After graduating from Detroit's Wayne State University in 1957 with a bachelor's degree in economics, Allen N. Smith moved to the booming Sun Belt city of Los Angeles to make his fortune as an auditor or an accountant.

Before long, however, Smith found himself on an unexpected career path: developing insurance systems on an IBM 650 mainframe.

In need of money, Smith, then 22, was awaiting offers from two potential employers — Bank of America, with an auditing position, and Occidental Life Insurance Co., with a systems analyst job. Smith had decided he would take the first offer that came his way. As fate would have it, Occidental called, and Smith was committed to a career in MIS.

No regrets

It was a decision Smith, now manager of Atlantic Richfield Co.'s corporate systems, has never regretted. In the top MIS position at one of the country's leading petroleum distributors, Smith oversees a staff of 70 people supporting some 1,100 users on 950 microcomputers and terminals with an annual budget of about $8 million.

In his career, Smith, 53, has gained extensive experience throughout the management, market research and systems areas. He also teaches at the University of California at Los Angeles school of management, has coauthored office automation and information management

PROFILE

Allen N. Smith

***Position:** Manager of corporate systems, Atlantic Richfield Co.*
***Philosophy:** Train and treat people well and they will perform.*

textbooks and recently served as chairman of the American Petroleum Institute's Information Systems Committee.

On top of all those activities, Smith is an avid reader, devouring two books a week, usually on management topics. Married with two children, Smith also keeps active by jogging and playing basketball.

By the age of 25, Smith had his first taste of management, moving to Security Pacific National Bank to head that company's programming and management efforts.

In 1964, Smith transferred to General Electric Co.'s computing division as a consulting sales specialist. Two years later, he joined Computer Sciences Corp. as a group manager. By 1972, Smith rose to director of financial systems, developing IBM

Continued on page 103

MANAGERS ON THE MOVE

Franco named to America West Airlines post

Jorge Franco has been appointed vice-president of information systems at **America West Airlines** in Phoenix, where he will be responsible for a centralized data base system supporting all passenger services, operations and financial departments.

Franco had been director of applications at Piedmont Aviation, Inc. since 1984.

Prior to joining Piedmont, he spent 25 years with the former Sperry Corp., primarily in Sperry's international airline division.

America West Chief Executive Officer Edward R. Beauvais cited Franco's background in both the computer and airline industries as an asset for the company's senior management.

Codex Corp. recently named **Henry E. Morelli Jr.** vice-president for information systems and customer administration, with responsibilities for both domestic and international operations.

Morelli previously worked for Datapoint Corp. He was most recently employed by Intelogic Trace, Inc., where he was vice-president of MIS.

He majored in marketing and then earned a master's degree in business administration from Pace University in New York.

R. William Eaton Jr., chief information officer at **Levi Strauss & Co.**, has been elected a corporate vice-president of the firm. Eaton joined the company in 1978 and assumed his current role in 1987.

According to Levi Strauss Chief Operating Officer Thomas W. Tusher, Eaton has played a key role in the company's success in gaining industrywide agreement to standards that allow electronic links between suppliers, manufacturers and retailers.

Eaton majored in business at the University of Washington and received a master's degree in computer science from the U.S. Navy Postgraduate School.

Pitney Bowes Business Systems, a business unit of Pitney Bowes, Inc., has named **Dennis A. Jones** vice-president of MIS.

The Stamford, Conn., company said Jones will be responsible for the development of strategic direction and operation of all MIS services.

America West Airlines' Jorge Franco

Jones joined the company from Pitney Bowes subsidiary Dictaphone Corp., where he worked for 32 years and most recently was director of administrative services.

CALENDAR

[redacted]

International Congress on CIM Databases '88. Cambridge, Mass., March 27-29 — Contact: Kim Takita, CAD/CIM Alert, 834 Boylston St., Chestnut Hill, Mass. 02167.

ISSA '88. San Francisco, March 27-30 — Contact: Information Systems Security Association, P.O. Box 10248, Newport Beach, Calif. 92658.

The Candle Performance Conference. San Francisco, March 27-April 1 — Contact: Candle Education Registration Office, 1999 Bundy Drive, Los Angeles, Calif. 90025.

Interface '88. Chicago, March 28-31 — Contact: The Interface Group, Inc., Registration Department, 300 First Ave., Needham, Mass. 02194.

1st Annual World Congress on Computing (WCC). Chicago, March 28-31 — Contact: The Interface Group, Inc., Registration Department, 300 First Ave., Needham, Mass. 02194.

International Spectrum USA '88. Anaheim, Calif., March 29-31 — Contact: IDBMA, Inc., Suite 104, 9740 Appaloosa Road, San Diego, Calif. 92131.

Decus Rocky Mountain VAX Local Users Group Regional Conference. Denver, March 31-April 1 — Contact: RMVLUG, P.O. Box 13963, Denver, Colo. 80201.

[redacted]

AIMIA, Inc. (Ankeya users) Spring Conference. San Diego, April 5-8 — Contact: Randal L. Leonard, Gay & Taylor, Inc., P.O. Box 1410, Winston-Salem, N.C. 27102.

PIMA Management Information Systems Conference. Savannah, Ga., April 6-8 — Contact: Scott Bastnuck, Paper Industry Management Association, 2400 E. Oakton St., Arlington Heights, Ill. 60005.

[redacted]

1988 BFIA Expo. Washington, D.C., April 10-13 — Contact: Jim Collas, Electronic Funds Transfer Association, Suite 1000, 1726 M St. NW, Washington, D.C. 20036.

22nd Annual AIIA National Workshop and Computer Systems Demonstrations. Baltimore, April 10-13 — Contact: American Trucking Association Management Systems Department, 2200 Mill Road, Alexandria, Va. 22314.

8th ICSC Executive Forum. Washington D.C., April 10-13 — Contact: International Computers & Communications, P.O. Box 17382, Washington, D.C. 20041.

18th Conference on Computer Audit, Control and Security. Atlanta, April 10-15 — Contact: Program Chairman, EDP Auditors Foundation, P.O. Box 88180, Carol Stream, Ill. 60188.

Atre Forum on Relational Data Base & CASE. Washington, D.C., April 11-13 — Contact: Nancy Caruth, Forum Registrar, Atre International Consultants, Inc., P.O. Box 727, Rye, N.Y. 10580.

Facsimile & Image Communications Conference. Boston, April 11-13 — Contact: Cap International, Inc., One Snow Road, Marshfield, Mass. 02050.

Second Annual Logistics Conference and Technical Exhibit. Dallas, April 11-14 — Contact: American Production and Inventory Control Society, 500 W. Annandale Road, Falls Church, Va. 22046.

1988 AIIM Show. Chicago, April 11-14 — Contact: Association for Information and Image Management, Suite 1100, 1100 Wayne Ave., Silver Spring, Md. 20910.

The Relational Institute DB2 Product Fair. San Jose, Calif., April 11-15 — Contact: The Relational Institute, Suite 105, 6400 Camden Ave., San Jose, Calif. 95120.

Spring 1988 National Symposia and Workshops. Washington, D.C., April 11-22 — Contact: The National Institute for Software Quality and Productivity, P.O. Box 70655, Washington, D.C. 20088

International Programmable Controllers Conference. Detroit, April 12-14 — Contact: Michelle Marzahl, Engineering Society of Detroit, 100 Farnsworth, Detroit, Mich. 48202.

Cost Containment: The 1988 Imperative. Washington D.C., April 13 — Contact: Corey Green, The Yankee Group, 200 Portland St., Boston, Mass. 02114.

The Information Edge. New York, April 13-14 — Contact: Conference Registrar, The Conference Board, Inc., 845 Third Ave., New York, N.Y. 10022.

INDUSTRY WEEK / JULY 27, 1987

INVESTMENT

Northern Ireland works

"Can do" spirit is not PR hype.

By JOHN E. HUGHLETT / Tragic as Northern Ireland's sectarian troubles are, no less tragic and volatile is the picture of Ulster that is perpetuated outside its borders.

The skirmishes between people and the police. The IRA raids. The killings. So widely disseminated are these images that a visitor expects to find Northern Ireland dominated by violence, a land at war with itself. An area where people are so consumed by hatred that cooperation is out of the question and vindictiveness is the dominant human characteristic.

But these are great distortions, just as is the assumption that agriculture dominates economic activity in this Connecticut-sized stretch of budding-green land west of Britain. In fact, manufacturing creates fully 29% of Northern Ireland's gross domestic product. Construction contributes another 6.2%. And agriculture accounts for just 5.5%.

[illegible] Yesterday, the U.S. component—with $1.7 billion invested and 11,000 employees—was among the 140 international firms with subsidiaries in Northern Ireland.

Three Americans are the likes of Ford and Du Pont. Of Hyster Co., the Portland, Oreg.-based producer of forklift trucks. Of AVX, a manufacturer of multilayer ceramic capacitors that has seen annual sales from its Ulster operations surge to $40 million from $4 million since 1979. The U.S. presence also includes Philadelphia's Paper Manufacturers Co., which is linked to Londonderry's Perfecseal Preprint Ltd. in a specialty medical-packaging joint venture. These American firms are not merely chasing cheap labor.

200 choices. Northern Ireland, indeed, is working. In the fiscal year that ended Mar. 31 its Industrial Development Board (IDB) recorded $390 million in new investments from abroad. These commitments are expected to create nearly 2,900 jobs.

Overall, IDB efforts last year attracted $513 million in investment commitments, an amount of money that should generate something close to 4,200 jobs. If IDB can keep the commitments coming and roughly double the rate of job creation (not an unrealistic prospect), unemployment in Northern Ireland could be cut in half at the end of five years, down to 18% from its current 29%.

In Belfast and Londonderry, Northern Ireland's two major cities, some battered and boarded-up buildings and the occasional inflammatory slogan stand testament to the continuing political tensions between Protestants and Catholics.

But in Londonderry, the less visibly prosperous of the two cities, signs of renewal are apparent—largely as a result of the urban investments made by developer Paddy [illegible]. And in Belfast the heart of a Victorian city is being [illegible] new construction [illegible] worst [illegible]

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IDB Northern Ireland

Connolly

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against cutbacks and forget about preparing for the 1990s. Instead, Robinson predicted "tough but interesting times," and advised the attendees to anticipate cost-cutting mandates. He said a cost-cutting order or the possibility of one should be used as a tool to identify, build or tune strategic applications for the 1990s.

To use that tool, MIS must build a partnership with senior management, not middle management, because the strategic decisions will be made at the highest levels, Robinson said.

MIS must then identify those applications, either new or part of the installed base, that best support senior management's goals and focus resources on those applications.

As for the installed base of applications — the mushrooming monster that MIS must ever serve — Robinson noted that long-term savings can be found by making realistic cuts, at least in the area of enhancements. Such cuts may be needed if MIS is to add new applications during budget-crunching times.

What MIS must look at, according to Robinson, is whether the long-term benefits offered by old applications outweigh the benefits of new applications that better fit into senior management's plans.

Robinson predicted that those companies that face cutbacks today will be better prepared for the 1990s if they take a hard look at the installed base and the new applications and then shape their application inventory to support the company as it will look three years from now, not as it was three years ago.

Connolly is Computerworld's senior editor, management.

Consultants

CONTINUED FROM PAGE 99

stop shopping" for both functions, according to John Moore, editor of *Systems Integration Age* (formerly *Computer Consultant*). "They're going to one firm that can do strategic systems planning — systems design and analysis and implementation," Moore says.

Like Nolan Norton, many general management consulting firms whose systems practices have concentrated on planning are adding implementation services, says Ed Hendricks, vice-president of the Association of Management Consulting Firms.

Meanwhile, the Big Eight accounting firms, which have traditionally addressed systems implementation, have been adding planning services, according to Jim Kennedy, editor of *Consultants News*. "Now they are trying to upgrade to offer more true management-level services. They all seem to be doing that," Kennedy says.

Index Group's Thomas Gerrity

Peat Marwick's acquisition of Nolan Norton was spawned when the accounting firm inquired about licensing Nolan Norton technology for planning systems, says Robert Gilges, formerly head of Peat Marwick's Information Technology unit and now a Nolan Norton partner charged with smoothing the merger process.

A CASE for integration

To help link planning with implementation, Nolan Norton wants to develop an automated computer-aided software engineering tool that could be used to generate systems from blueprints developed in the planning process, Gilges says. In addition to creating new systems, the technology would let organizations structure and re-engineer old code and data from changes in specifications.

The Index Group in Cambridge, Mass., is a systems planning specialist founded in 1967 that also characterizes its present focus as implementation of strategic systems, particularly those for sales, marketing and distribution.

In contrast to Nolan Norton's move, Index sold a systems development operation five years ago. Chairman Thomas Gerrity, a former MIT professor, says that sale reflected the view that clients should do much of the implementation of strategic systems themselves. "It's not the kind of implementation you'd want to hand over to an outside organization. We advise going outside when there's a highly structured expectation," he says. Index believes it can provide more objective advice on using implementation services if it does not offer its own, he adds.

Instead, Index emphasizes the managerial and organizational aspects of implementing systems. Company officials contend that implementation revolves less around programming than the organizational and behavioral changes that strategic systems call for.

Gerrity says Index focuses on "strong working partnerships" between MIS management and general managers, which it has backed through cross-functional research and advisory services such as its Alliance program for sales, marketing and MIS executives. "The theme is tighter and tighter integration between an MIS organization and a business organization," Gerrity explains.

Diebold's Theodore Freiser

Officials at Index and Nolan Norton say that compared with five years ago, they see less competition from John Diebold & Associates, an MIS management consulting firm. It is a division of the Diebold Group, which was founded in 1954 by John Diebold, author of the ground-breaking book, *Automation*.

Theodore Freiser, president of Diebold & Associates, says the firm focuses more on clients' specific concerns than do Index and Nolan Norton. He also characterizes the other firms as taking a more theoretical bent. "They have a lot of people from academia; they try to capitalize on that orientation."

Diebold has consciously eschewed providing implementation, although it considers organizational issues and offers project management, according to Freiser. He echoes Gerrity's concern that providing implementation might impair the objectivity of planning services. "You're called upon to make decisions that — if you do implementation — there's a business implication for your firm," he says.

Implementation also requires personnel, such as programmers, who are not interchangeable with business strategists and other planners, and there could be a temptation to use them where they do not belong during idle time, Freiser says.

Although Nolan characterizes his firm's merger with Peat Marwick as a strategic necessity, others say they expect technology users to continue to hire firms specializing in information systems planning.

"There will always be a place for the good niche players in management consulting — firms that can move quickly to fill a need," Hendricks says.

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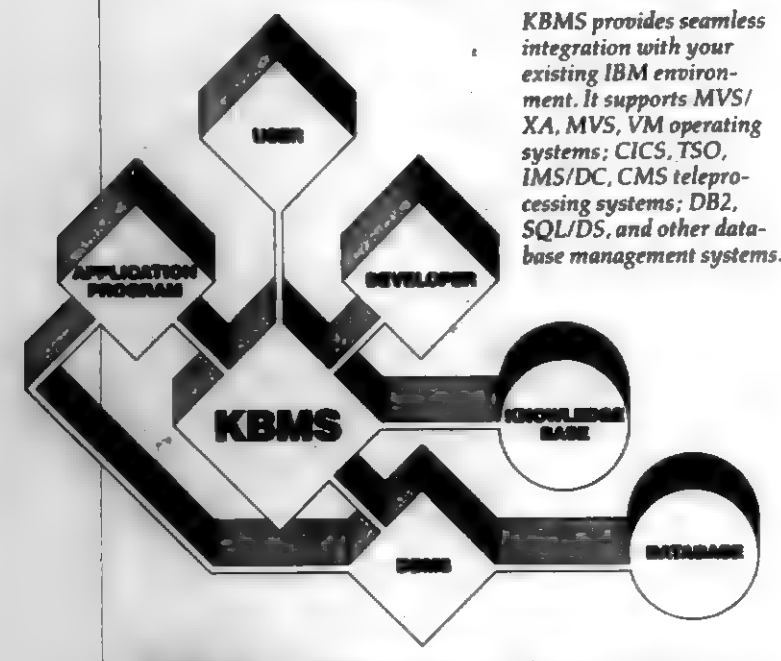

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Smith

CONTINUED FROM PAGE 99

370 on-line systems with complete budget responsibility. He left that year to join Arco.

Arco is currently decentralized into three information systems groups, which have a total annual budget of $240 million: oil and gas exploration, marketing and refining operations and corporate, which Smith heads.

Each group is responsible for its systems, which can range anywhere from an Apple Computer, Inc. Macintosh microcomputer to a Cray Research, Inc. supercomputer. At the center is the corporate information systems group, with three Hewlett-Packard Co. HP 3000 minicomputers.

People skills key to success

Smith's success, as described by his colleagues, is due to his self-improvement and ambition and to his ability to communicate with and manage a staff. "He's a very quiet, unassuming, modest guy, and when he gets mad, he takes it out on the computer console, not the computer operator," says Mike Solo, a free-lance data processing management consultant who has known Smith for 30 years.

Smith says people are "the first and most important thing. There's nothing we can't do with technology, but how we make it useful and how we communicate with people is the key."

"Al knows how to get the most out of his people," adds Don Medley, professor of computer information systems at California State Polytechnic University in Pomona. "He is good at developing strong working relationships and a believer in giving his people ideas of what he wants, the raw materials and letting them go to it."

Medley and Smith worked together planning the 1983 National Computer Conference that — with 97,216 attendees that year — was among the conference's biggest gatherings. "Allen was in charge of the technical program, meaning he worked with over 350 speakers and panelists, among other things," Medley recalls. "His capabilities in brainstorming, coming up with ideas for the conference, were extremely impressive."

As a manager, Smith's style "permits lots of democracy in the workplace," according to William D. Leake, vice-president of Arco's environmental protection group. To increase his staff's chances for advancement, Smith and his workers developed detailed job descriptions and a job-ladder program throughout the department.

"It gave everyone a good understanding of where you entered and led to some cross-fertilization of folks who could see more clearly how to move around in the company," Leake says.

For a man who strongly believes in supporting his people, Smith was faced with one of his biggest career challenges during the oil industry slump of 1985 and '86.

Arco's information systems budget was slashed from $330 million to $240 million and its staff from 2,400 to 1,600, affecting about 40 jobs in Smith's group.

Arco softened the blow by offering early retirement as an option. "If you are fair with your people and give them all the information they need and then let them choose, the bad effects are minimized," Smith says. "It was hard to keep productivity and morale up when this was going on, but we made it work."

> PEOPLE ARE "the first and most important thing. There's nothing we can't do with technology, but how we make it useful and how we communicate with people is the key."
>
> ALLEN N. SMITH
> ATLANTIC RICHFIELD CO.

The experience had its positive side, as well. "It's amazing how much more efficiently you can do things once you're forced to," Smith says. One streamlining method was to eliminate user chargebacks and the bookkeeping and processing that went along with them.

Another cost-saving measure Arco took was to discontinue the education seminars to teach end users about Arco's Information Services. Prior to the slump, Smith had initiated a series of seminars to educate users on technology and Arco's MIS plans as a way of promoting better understanding.

Those sessions were helpful in smoothing the sometimes rocky path between the end user and information systems, Smith says, so as soon as Arco's business — and budgets — stabilized, the seminars were resurrected.

The training sessions reflect Smith's basic management philosophy: train and treat your people well, and they will perform. If you get the best possible performance out of each employee, there is no such thing as a crisis, Smith says. "You've got to have good people, be fair with them and give them challenges, goals and objectives that test them. I want my people to be in deep water — but never over their heads."

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COMPUTER INDUSTRY

INDUSTRY INSIGHT

Alan Alper

Hyper or just hype?

Computer industry companies, like those in other businesses, turn up the hype when market conditions get tough. In the high-performance computer business — which spans desktop workstations, minisupercomputers and supercomputers — the time is right for earmuffs: The hype has reached eardrum-splitting proportions.

You don't have to look too far for the reasons behind the low signal-to-noise ratio. Growth in the high-performance computer business has slowed somewhat after years of spectacular results. The minisupercomputer segment, in particular, has become extremely congested as a host of brash upstarts attempt to plug the price/performance gap between DEC's high-end VAX and the entry-level Cray.

Meanwhile, desktop supercomputing workstations are making their way onto the scene amid great fanfare and expectations. Start-ups Ardent and Stellar will join Apollo and Sun Microsystems in delivering desktop workstations with performance claims of 40 to 100 million instructions per second (MIPS).

Also fighting a war of words are Minneapolis crosstown rivals and supercomputer makers Cray and ETA Systems, which keep leapfrogging one another by extending the raw performance of their respective machines.

Oh yeah?

No wonder chest-beating and one-upmanship regarding whose machines are better, faster or cheaper has become the prevailing theme in this market. It's almost reminiscent of the child who boasts, "My daddy can whip your daddy!"

At the recent debut of Convex's new minisuper line in New York, for example, company chairman and venture capitalist L. J. Sevin proclaimed his firm had removed the "mini" from its minisupercomputer label. His contention was based on perfor-

Continued on page 107

EDS banks on Mtech buy-out

BY CLINTON WILDER
CW STAFF

DALLAS — In a move that would create a giant single provider of data processing services for banks, Electronic Data Systems Corp. (EDS) plans to acquire Mtech Corp. for approximately $350 million next month.

Mcorp, a bank holding firm based here, recently agreed to sell its 80.1% stake in Mtech to the General Motors Corp. DP unit for $281 million, roughly $50 million more than a previous bid by an investment partnership led by the Robert M. Bass Group [CW, Feb. 22]. Mcorp, hard hit by the Texas oil recession, had been seeking a buyer for the highly profitable Mtech unit in an effort to raise much-needed capital.

Mtech and EDS accounted for approximately $400 million in revenue from processing services for financial institutions in 1987. Mtech, with 1987 revenue of $206.7 million, is the leading provider of DP services to commercial banks; EDS leads the market serving credit unions and savings and loan companies.

The acquisition, the largest ever by EDS, is expected to be approved by the GM board at an April 15 meeting. EDS will offer $30 per share in cash and securities for Mcorp's stake in Mtech and will offer the option of $30 in cash or a combination of cash and securities to Mtech's other shareholders, EDS said.

Overlap predicted

Mtech will be merged with EDS's financial services division, but an EDS spokesman said it would be premature to comment on the potential structure of the merged firms. Some observers said there will be considerable overlap between the operations.

"They both do a lot of the same things," said M. Arthur Gillis, president of Computer Based Solutions, Inc. in New Orleans, a consultancy to MIS departments in small and medium-size banks. "They'll have a real opportunity to cut costs through significant merging."

About 35% of Mtech's bank processing revenue comes from Mcorp, and the companies said that relationship will continue after the merger.

The acquisition is a significant boost for EDS's efforts to expand its non-GM revenue stream [CW, Feb. 29]. "This is EDS's first big, bold move in that direction," said Stephen McClellan, a software and services analyst at Merrill Lynch Research. "They need to do two or three more deals like this, but this is a terrific start."

EDS derived 35% of its $4.44 billion in 1987 sales from customers other than GM.

But Gillis questioned the compatibility of the two corporate cultures. Mtech founder Darwin Deason "started a small company, played it his way, and Mcorp let him do that," Gillis said. "I'm not sure how that will mix with EDS, in the same way that [EDS founder] H. Ross Perot couldn't mix with GM. We'll see in the next 12 months."

Data View

Divvying up the Big Blue pie

IBM revenue by product type, 1986 to 1987

INFORMATION PROVIDED BY ARNEX RESEARCH
CW CHART

Tech seeks toxics rules

BY J. A. SAVAGE
CW STAFF

In the first of two pending battles between Silicon Valley high-tech companies and their insurance carriers over hazardous waste cleanup, Advanced Micro Devices, Inc. (AMD) was ordered last month to pay $1.5 million for the cleanup of toxic chemicals at its Sunnyvale, Calif., fabrication plant.

Faced with multimillion dollar cleanup bills, the computer and

Continued on page 106

Atari sues over chip price hikes

BY JAMES A. MARTIN
CW STAFF

SAN JOSE, Calif. — Atari Corp. last week filed suit against Micron Technology, Inc., its dynamic random-access memory chip supplier, charging that Micron's recent price increases are an "unlawful exploitation" of the current dynamic RAM shortages.

In the suit, Atari seeks unspecified damages for breach of contract, bad faith and violation of federal antitrust laws.

"It's a crazy situation," Atari President Sam Tramiel said in a prepared statement. "First, Micron pleads with the government to impose sanctions on the Japanese for selling low-cost dynamic RAM chips, then they raise their own prices to several times their cost of manufacturing the circuits. Instead of using the [government's] import restrictions in a positive way . . . Micron is destroying the competitiveness of the American microcomputer business."

In response to intense lobbying from U.S. chip makers, including Micron, the Reagan administration in 1986 cracked down on Japanese dynamic RAM suppliers for dumping chips into the U.S. market at predatory prices. In recent months, however, dynamic RAM chip shortages have been reported, partly as a result of increased demand. With those shortages, dynamic RAM prices have increased by as much as 300% in some cases.

The Atari suit, filed in U.S. District Court in San Jose, claims that Micron agreed to sell its

Continued on page 107

Morino recruits high-level Uccel execs

BY NELL MARGOLIS
CW STAFF

VIENNA, Va. — Want to work for Morino Associates, Inc.? First, get a job at Uccel Corp.

That appeared to be less a joke than a game plan last week as Morino Associates continued to lure high-level employees from the Dallas-based software house, acquired last year by Computer Associates International, Inc.

Earlier this month, former Uccel systems software executive Peter J. Barris was named president and chief operating officer of Morino Associates, with Mario Morino remaining chairman and chief executive officer. Last week, B. R. Perry, a 10-year veteran of Uccel who headed that company's $125 million systems software group prior to the Computer Associates takeover, signed on as vice-president of sales at Morino Associates.

The Uccel pedigree, Chairman Morino said, is largely coincidental, at least on the domestic front. With regard to rapid-fire expansion in the international sector, he said, "we make no bones about the fact that we're trying to replicate Uccel management." Morino Associates is an emerging rival of Computer Associates in the data center management software and services market.

More defections

Also last week, Richard E. Hanlon, Uccel's former director of investor and corporate relations, became Morino's first vice-president of corporate communications. A second new post, vice-president of corporate development, went to Morino Associates' director and head of sales and marketing, John A. DeWit, who is expected to be the firm's chief acquisition strategist.

"This is a recognition of our having to expand management in order to get ready for the kind of growth we're going to be facing," Morino said, referring to his ceding the president's job to Barris. "We went after the individuals in each of these cases," Morino said, pointing out that both Perry and Hanlon have had significant industry experience outside of Uccel.

Toxics

CONTINUED FROM PAGE 105

semiconductor industries and insurance companies are using the courts to define liability.

At issue is whether insurance policies cover non-sudden accidents. The slow leak of chemicals from a corroded tank may be accidental pollution, but it is a far cry from an earthquake-type accident, which insurance policies normally cover.

A few insurers used to issue policies that would cover environmental damage, but "the capacity doesn't exist for writing environmental impairment liability these days," said David R. Lane, attorney for AMD's second insurer, Allianz Underwriters, Inc. in Los Angeles.

A case involving Intel Corp. that may define what constitutes a sudden accident is currently pending in federal court in San Jose, Calif. In *Intel* v. *The Hartford Accident and Indemnity Co.* in Hartford, Conn., the insurance in dispute is a comprehensive general liability policy. In its filings, The Hartford has maintained that the contamination of soil and groundwater was not an accident.

The AMD case, however, turned not on the sudden nature of the pollution but on the more clear-cut issue of when AMD knew of the problem's existence. According to Ray Wong, attorney for AMD's insurer, Cincinnati-based American Empire Surplus Lines Insurance Co., AMD found out about a leak in an acid neutralization tank in July 1981 during a cleaning.

"The tank was corroded to the point it was so thin that the [cleanup worker] could put his finger through it. There was fluid outside the tank leaking back into the tank. The fluid was found to contain chlorinated hydrocarbons," Wong said.

Chlorinated hydrocarbons, used in the manufacture of semiconductors, are listed under the Environmental Protection Agency's Safe Drinking Water Standards as probable human carcinogens.

According to Wong, AMD signed the insurance policy a month after discovering the leak in the tank. AMD's attorney could not be reached for comment.

Intel has said its case has wide-ranging significance because it will affect other companies with similar claims.

INDUSTRY WEEK IN BRIEF

Computer lessor Capital Associates, Inc. in Colorado Springs has stated that it is interested in making an unsolicited bid to acquire NBI, Inc., a financially troubled Boulder, Colo., maker of office automation products, for a proposed $7 per share, or roughly $65 million. NBI, which has suffered eight consecutive losing quarters, laid off 200 employees last month. Capital Associates is the nation's sixth largest computer leasing company, with assets of about $500 million. NBI has annual revenue of about $280 million.

Filling a five-month vacancy, AT&T's Data Systems Group last week appointed a former IBM marketing executive to head its 1,000-member national computer sales organization. Gordon J. Bridge, 45, who was group director of IBM's U.S. Marketing & Services Group, joins AT&T as vice-president of national data sales and reports to Data Systems Group President Vittorio Cassoni.

The board of directors of Compugraphic Corp. has approved a merger with Netherlands-based Agfa-Gevaert Graphics, Inc., a subsidiary of Agfa-Gevaert, Inc. Agfa-Gevaert Graphics already owns 83% of the outstanding shares of Wilmington, Mass.-based Compugraphic, which would retain its name under the arrangement. The merger must be approved by a two-thirds vote at a Compugraphic shareholders' meeting June 15. Compugraphic is a vendor of computer-based publishing systems and has annual revenue of about $360 million.

Conner Peripherals, Inc. has filed with the Securities and Exchange Commission for an initial public offering of five million shares of its common stock for about $45 million. The San Jose, Calif., maker of 3½-in. Winchester disk drives plans to price each share in the $8.50 to $9.50 range. Former Seagate Technology cofounder Finis Conner started Conner Peripherals in 1986.

IBM Vice-President James J. Perese has been named group executive of IBM World Trade Americas Group, which is responsible for IBM's operations in Canada, Latin America and the Caribbean. Perese succeeds IBM Vice-President Paul J. Kalinski, who will retire this summer after 33 years with Big Blue.

Continental Information Systems Corp. (CIS) in Syracuse, N.Y., the second largest independent computer lessor, has acquired Resource Associates, Inc., a 300-employee Buffalo, N.Y.-based professional services firm operating under the name Corp-Pro. Terms were not disclosed.

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Alper

FROM PAGE 105

mance projections of the four-processor version of the firm's new C series that put it in the same league as a Cray X-MP/14.

Later, Convex Chief Executive Officer Bob Paluck added that "supercomputers are no longer a luxury but a necessity." By this logic, so are personal jets.

Like all companies touting technological advantage, Convex credited its use of new 10,000 gate emitter-coupled logic (ECL) chips and 20,000 CMOS gate arrays as one of the reasons it could provide higher performance systems.

Going one better?

Yet as some companies adopt ECL technology, Cray claims that technology is not good enough. The firm is betting that gallium arsenide chips will enable it to design even higher performance systems.

At a recent New York high-performance computing symposium sponsored by Minneapolis investment firm Piper, Jaffray & Hopwood, ETA took issue with the Cray statement.

The firm's CEO, Carl Ledbetter, claimed that CMOS, ECL and gallium arsenide technology can all provide the same relative performance. Since all companies have access to the same technology, he said, the real issue is how to reduce implementation costs.

"The speed of light is the same in Armonk as it is in Tokyo and the same on both sides of the Mississippi," Ledbetter declared derisively.

While vendors are busy debating the virtues of various integrated circuit technologies, analysts are seeking new buzzwords to describe the high-performance computing market segment.

Gary Smaby, an analyst at Piper Jaffray, has come up with the term "hypercomputing." It encompasses a range of systems from MIPS-munching desktop workstations with high-resolution graphics to uniprocessors capable of performing both scalar and vector processing through parallel processors.

Smaby's coinage seems fitting, given the broad range of computing approaches and target markets. But with all the hype spewing forth, the only thing really hyper about high-performance computers is their marketers.

Alper is Computerworld's Mid-Atlantic bureau correspondent.

Atari

FROM PAGE 105

chips for $3.75 each, a figure nearly triple its manufacturing costs, only to disown that contract in hopes of "commanding even higher prices."

A spokesman for Boise, Idaho-based Micron said the firm had just learned of the suit had no immediate comment.

Atari's suit comes on the heels of an announcement from AST Research, Inc. that stated AST must increase its microcomputer prices 10% to 15% as a result of increased dynamic RAM costs [CW, March 7].

"We empathize with Atari, but AST is not planning any legal responses of its own," said Mike Morand, AST's vice-president of systems marketing. The dynamic RAM shortage "could not have come at a worse time, when all of us were starting to become healthy again," he said. In addition, the Microsoft Corp.- and IBM-developed OS/2 operating system requires more memory, which will in turn increase the need for dynamic RAM chips.

Most analysts said they do not expect a rash of similar lawsuits. "There might be a few others, but my gut feeling is that this is more of a nuisance suit, without a lot of substance to it," said Dan Kiesken, a semiconductor analyst for Montgomery Securities in San Francisco.

The shortage is exacerbated by fast growth in the business and, in some cases, bad planning, some observers said. Computer vendors "don't always anticipate wisely their own chip needs and don't give manufacturers enough lead time," said Mel Thomsen, a chip analyst at Dataquest, Inc.

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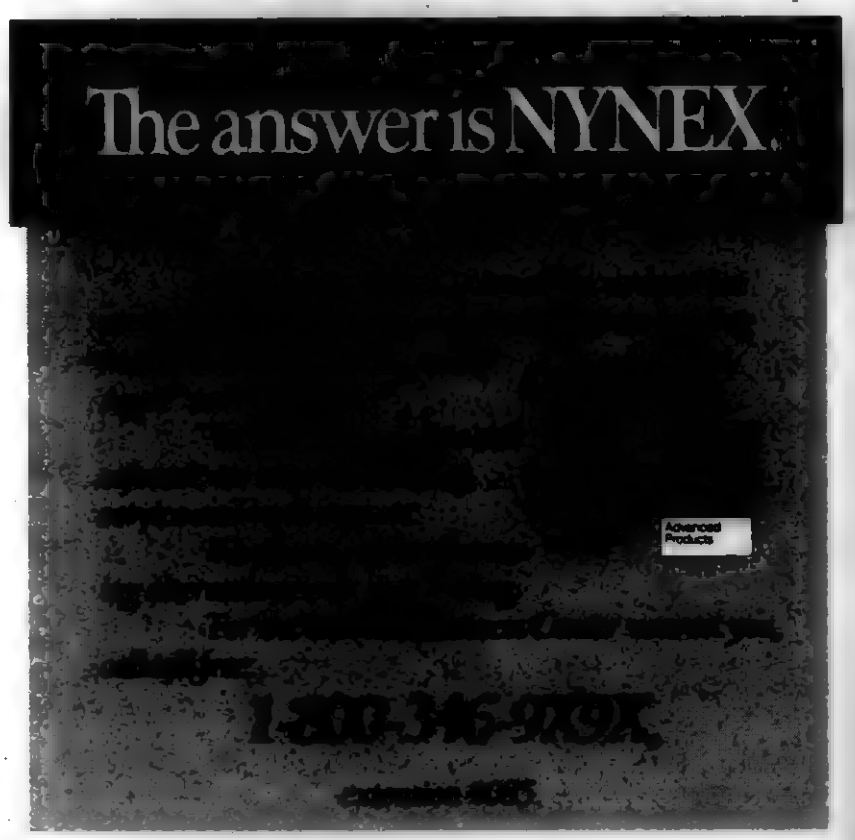

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Top jobs demand business sense

Being No. 1 takes industry know-how as well as management skills

BY JANET MASON
SPECIAL TO CW

It's no simple matter for companies to find the right candidate for a high-level MIS position. The ability to manage, plan and address industry issues and company concerns is more important here than technical skills.

Take the case of Bruce Simkins. He was relatively satisfied with his job as assistant vice-president of MIS at The New England when he was called by a recruiter from Winter, Wyman & Co. As a result, he moved into the top information systems position at Boston-based insurer Cameron and Colby Co.

Cameron and Colby was looking for a chief MIS person with a background in systems development and management — and who also understood MIS strategic planning. Simkins demonstrated this experience in interviews as well as an understanding of how the MIS department fits the needs of the insurance business.

Having been with The New England for 11 years and Massachusetts Mutual Life Insurance Co. before that, Simkins had learned the ins and outs of the industry. "The insurance industry is a complex business," he observes. "And the more I know about the business and how MIS meets those needs, the greater my chances become for success and leadership."

The new position requires Simkins to take a broader view of the business, compared with his old job, in which he only needed to understand the business side of particular applications. "I went from the ability to understand a piece of the business to knowing how MIS relates to the total picture," he says.

Not so lonely at the top

Now a vice-president, Simkins described how the new job entails more responsibility than lower level ones. "There is no other vice-president of MIS to have a rapport with," he says. "I can't say 'What would you do in this position?' because there is no other person making this type of decision." This increased challenge and responsibility attracts him, and so do the subsequent rewards.

Stewart French provides a second illustration of the qualities sought in a top MIS manager. As assistant vice-president of MIS with the Boston Financial Group, he watched fellow employees being laid off last year. The company asked him to step down and return to programming but also offered him the option of leaving with three months of severance pay and use of the office for word processing and telephone calls. "I took a deep breath, went home and discussed our finances with my wife and decided to start looking," French recalls.

> "ONLY A PERSON with a diversified background, excellent technical skills and an innate business sense fits this position. The person who was exposed to one module of the same system for 10 years just won't do."
>
> CAROL MASON
> CAREERS MANAGEMENT ASSOCIATES, INC.

He contacted several recruiting firms, one of which helped place him as director of a new MIS department at Cellular One in Boston, a Southwestern Bell cellular telephone company.

Before the 3-year-old firm hired French, it had been relying on a software consultant to handle information systems needs.

French landed the position because he demonstrated his facility with both the business and technical sides of the job. "In the interview, I discussed the company's relationship with the software consultant in terms of the company's needs," he says.

He discussed technical aspects, along with planning methods to meet the needs of the rapidly growing cellular company. "The finance director [who conducted the interview] valued the combination of technical and business needs," French says. The firm had been frustrated with the software consultants "because the business needs were not in the drivers seat — the computer needs were."

French chose the Cellular One job primarily because he could become part of the company's top management team. His decisions are considered for their impact on the overall business, he says. "It's nice to feel that I'm dealing with crucial issues to the business. My success in creating solutions is part of the total picture."

Another attraction is that the cellular industry and the firm itself are growing rapidly. "It's a new field," French says. "MIS cellular software systems didn't exist more than a year ago. I am defining new answers rather than accepting existing ones."

In addition, French has had the opportunity to create the new MIS department at Cellular One. "Since it was a new MIS department, I was able to define my own job," he says. "For one thing, I hired my own people rather than inheriting a staff from someone else." Hiring his own staff was important to French because he emphasizes intelligence and motivation. Long-term success depends on these characteristics, he says, rather than the knowledge of certain systems, on which most MIS directors focus.

Recipe for success

Executive recruiter Carol Mason, president of Careers Management Associates, Inc. in Bala Cynwyd, Pa., says candidates for top MIS jobs need "the right intangibles."

They include excellent oral and written presentation skills, sales ability and a business instinct that will enable them to sense the needs of the various clients they will work with.

"Only a person with a diversified background, excellent technical skills and an innate business sense fits this position," Mason says. "The person who was exposed to one module of the same system for 10 years just won't do."

Mason is a Philadelphia-based freelance journalist.

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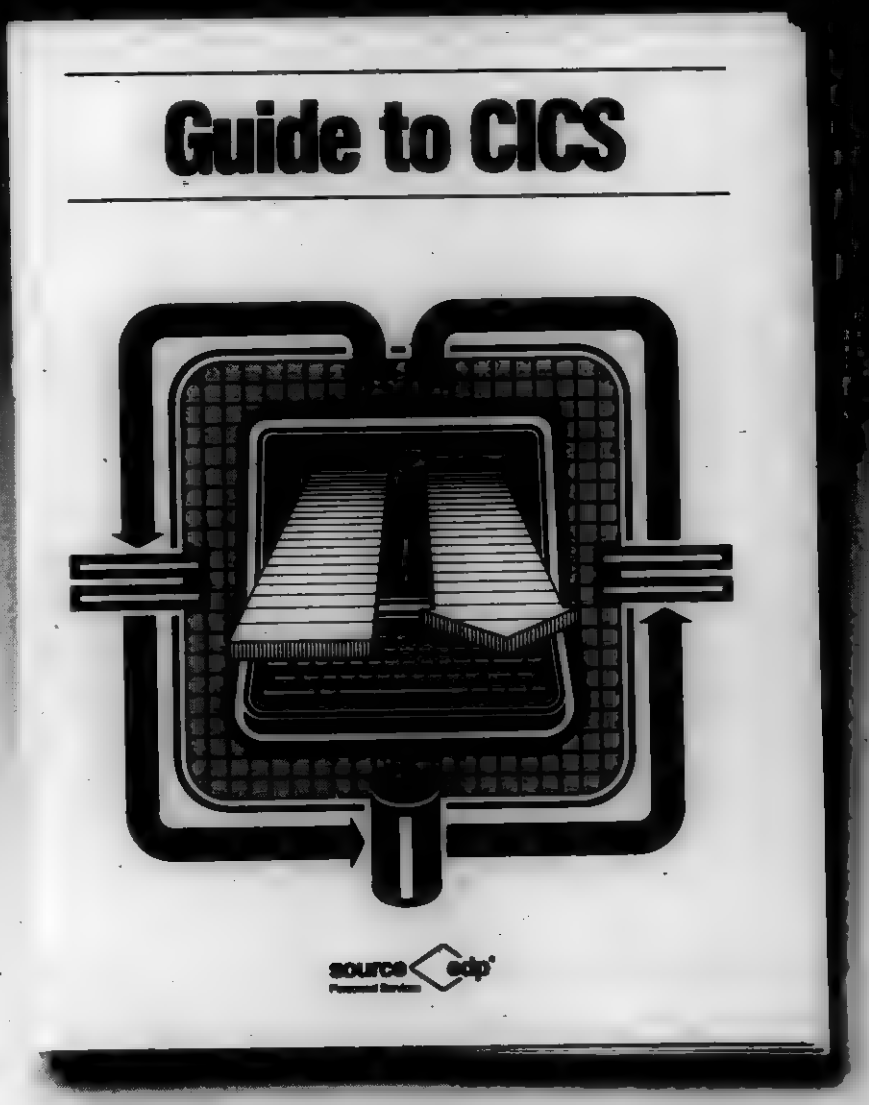

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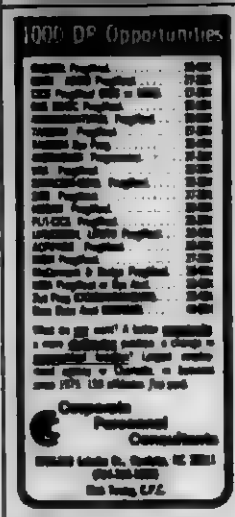

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Experience in evaluating, consulting and training on mainframe decision support tools such as DB2, QMF, FOCUS, INTELLECT and Host Graphics; or Microcomputer hardware and software products, including Local Area Networking.

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Salary Range: US$ 41,927-56,856 per year*

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COMPUTER SCIENTIST – to design architectures for incremental, integrated software development environments. The duties of the job include designing new technologies to support version management, developing new language-based editing technologies; architecting incremental compilation techniques; building on current technologies and combining the above concepts to generate new ideas in order to architect the design of an integrated software development environment. Requires a PhD in Computer Science with experience in integrated software development environments as gained through coursework leading to a degree with one year's experience in job offered or as a computer science instructor in a college/university. 40 hours per week, (work schedule: 8:00 am to 5:00 pm). Salary is $50,000 per year. Send resumes to: Illinois Department of Employment Security, 401 South State - 3 South, Chicago, IL 60605. Attention: Marie Hinneman. Ref.# 7799-N. AN EMPLOYER PAID AD.

ASSISTANT DIRECTOR OF USER SERVICES

Participates in planning academic and research computing at Western Michigan University. Provides technical support, consulting, training, and program development services to academic community. Supervises 9 full-time professionals and 21 part-time (student) staff. Extensive network of mainframe and microcomputers (DEC & IBM) provides opportunities for innovations and research applications.

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Manager of Employment, #88-236
Western Michigan University
Kalamazoo, MI 49008

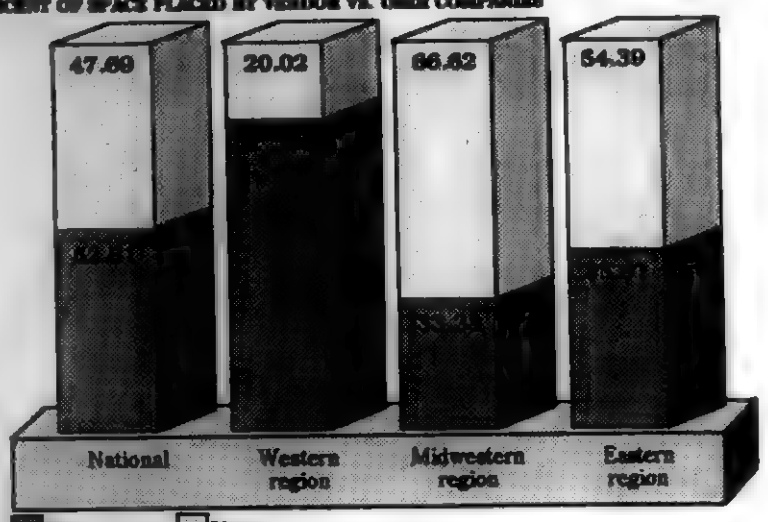
WMU is an EEO/AA Employer

Software Engineer: Design the distributed database management system for printing process. Research & develop concurrent/parallel processing software. Design & implement real-time monitoring & control software packages for Motorola 68000 series microprocessor environment. Must have 1) Master degree in electrical engineering and/or computer science, 2) 6 months experience, or completion of a graduate thesis, involving the use of concurrent/parallel processing of distributed computing systems, & 3) completion of 1 course each involving computer graphics, distributed software, distributed database systems & micro processor on Motorola 68000. $35K per/yr., 40 hrs per/wk, 8am to 5pm. Send resume & transcript to: Illinois Dept. of Employment Security, 401 South State St.- 3S., Chicago, IL 60605. Att: Robert S. Felton, Ref. #V-IL-7738-F. Employer Paid Ad.

CAREER INDEX

January 1988 computer recruitment advertising activity*

PERCENT OF SPACE PLACED BY VENDOR VS. USER COMPANIES



*Analysis of computer recruitment advertising space in *Computerworld* and selected major U.S. newspapers

INFORMATION PROVIDED BY CW PUBLISHING, INC.'S RECRUITMENT MARKET RESEARCH DATA BASE

PROGRAMMER/ ANALYSTS
Outstanding St. Louis based corporation is currently expanding its data processing development group. They seek experienced Cobol Analysts and Programmers with BS degree, MVS, database and CICS knowledge. Any financial package experience is a definite plus. Excellent fringe benefits.

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CHIEF OF OPERATIONS

Electronics-software company in Charlotte, North Carolina desires individual to handle development of Spanish software as liaison between the U.S. and Latin American Firms; knowledge of computer hardware/software desired for mainframe, mini-frame & micro-computer, MBEE and one year experienced in hi-tech electronics required. $30,000/per year. Full Time. If interested, send resume to North Carolina Job Service, 500 W. Trade St. Charlotte, NC 28202, or nearest Job Service Office, refer to Job Order # NC7806578.

Ken Orr & Associates, Inc.

Software Engineers

Responsibilities include design and implementation of enhancements for CASE tool in a workstation environment. Experience in design and implementation of medium to large software systems required. Knowledge of Microsoft Windows or OS/2 desirable. Experience in design and development of graphics for the IBM microcomputer environment also desirable.

Additional position for design/development of mainframe system for on-line access to systems development methodology reference materials. Knowledge of MVS and VM required. Experience with CICS, TSO, CMS, and VSAM also necessary. Some knowledge of MS/DOS development desirable. All positions require five or more years of software development experience.

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Responsibilities include implementation of enhancements for CASE tool in a workstation environment. Experience in implementation of medium to large software systems using Pascal or C highly desirable. Knowledge of IBM PC/AT-class systems, local area network environments and relational databases desirable. Three to five years experience in software development on mainframes, minicomputers, or microcomputers required.

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Responsibilities include all phases of software quality assurance from design walk-throughs through system testing. Previous experience may include any combination of the following:

- Quality control testing of mainframe- or microcomputer-based software packages.
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- Extensive application development using database, 4GL, or other software packages.

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Saint Mary's College
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Senior Systems Analyst Solution Software for computer firm in Cincinnati, Ohio to plan, design and coordinate enhancement of manufacturing application software system to incorporate international manufacturing techniques including: Analyze current international manufacturing techniques to identify required enhancements; determine methods, time frames and procedures for completion of enhancement project; plan and coordinate preparation of entity/relationship diagram, structured analysis document and data base schematic for each stage of proposed enhancements; develop integrated application programs incorporating required enhancements in COBOL and TOTAL DBMS software languages operating in IBM and VAX environments; prepare technical project status reports for Project Supervisor; confer with manufacturing industry consultants to ascertain specific needs of international manufacturers and provide technical advice regarding international manufacturing functionality and techniques; review Manufacturing Industry Consultant reports to update and modify enhancement objectives and plans as needed. Requires BS/BA in Computer Science or Mathematics; and must have 5% years experience in all duties of job described or 5 years systems or programmer analyst experience which included 3 years in COBOL and TOTAL DBMS computer software languages, integrated systems analysis and programming in IBM and VAX hardware environments, support and enhancement of international manufacturing application software systems. 37½ hours/week, 8:30 a.m. - 5:00 p.m., $36,900/year. Qualified applicants apply immediately with resume to R. Lechler, JO# 0888687, Ohio Bureau of Employment Services, P.O. Box 1618, Columbus, Ohio 43216.

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- You must have 2 or more years experience using VAX/VMS* or VAXclusters* in a systems management or user support role. A knowledge of device drivers, file systems, performance and tuning is a decided advantage.
- At least 2 years of experience with Digital's Networks and Communications products in the following areas, as well as extensive knowledge in network applications programming, communication protocols, network analysis and troubleshooting is essential.
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- Ethernet Technology
- Ethernet Terminal Server
- DECserver* 100/200
- Packet Switching Interface (PSI)

Network Systems Consultants

- Network Management
- VMS Systems Management

Both of these positions call for a very high level of programming/analysis skills and experience in FORTRAN, MACRO and DECnet. Each opportunity requires a BS in Computer Science or a non-technical degree with 7 years experience with Digital's equipment. Digital hands-on technical experience may be substituted for degree requirements, if the applicant possesses a superior technical skill set and experience track record. At least 5 years experience with Digital Networks as a Networks Systems Manager coupled with at least 2 years DECSA and DECserver* systems management and programming experience is also required. LAVCluster experience is also a must. Specific requirements for each opportunity are as noted:

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You will provide Networking Programming interfaces for all types of Network components and Systems Management for all VAX Nodes and LAVClusters. At least 5 years experience as a VAX Systems Manager and over 6 months LAVCluster Systems Management is required. You must have the ability to provide the full services of a Networks Systems Consultant. 2 years DECnalt* programming experience desired.

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Director of MIS
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P.O. Box 637
Anderson, CA 96007

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Saint Mary's College has a position available for a Computer Systems Analyst. This position shares responsibility with the director of computer services for the analysis of system needs of administrative offices. Some programming required. Requires five years experience as programmer/analyst. Requires a Master degree in Computer Science/related field or additional experience as a systems analyst. Working knowledge of COBOL language. Database experience desirable. Experience in college information systems desirable. Saint Mary's College is a liberal arts college for women with an enrollment of over 1,800. Competitive salary with excellent benefits. Starting date on or before July 15, 1988. Send letter of application, resume and three letters of reference by March 25, 1988 to:

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Director of Computer Services
Saint Mary's College
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Director of MIS
Simpson Paper Company
P.O. Box 637
Anderson, CA 96007

If you have:

- A minimum of 2 years exp. with Programming or Systems Analysis & Design in an IBM Mainframe or DEC VAX Environment.
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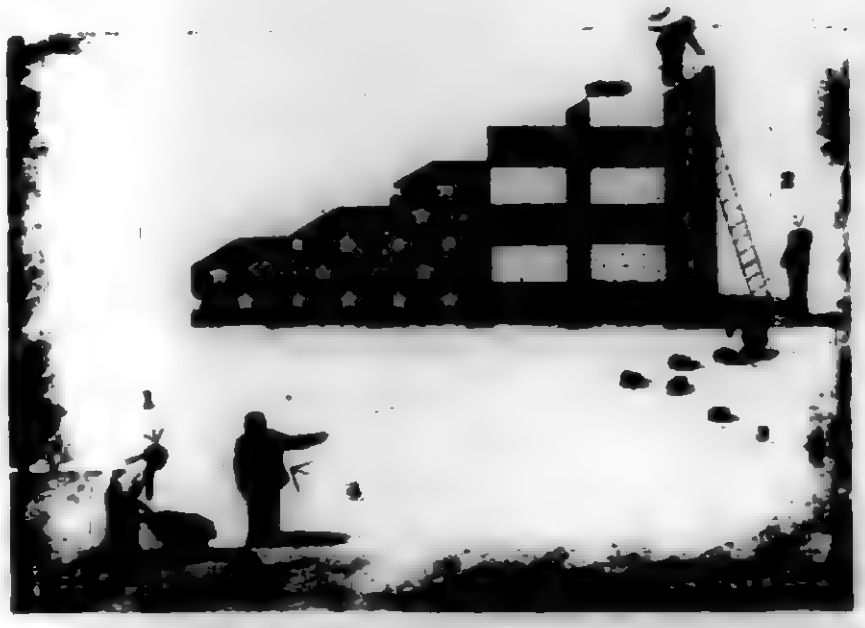

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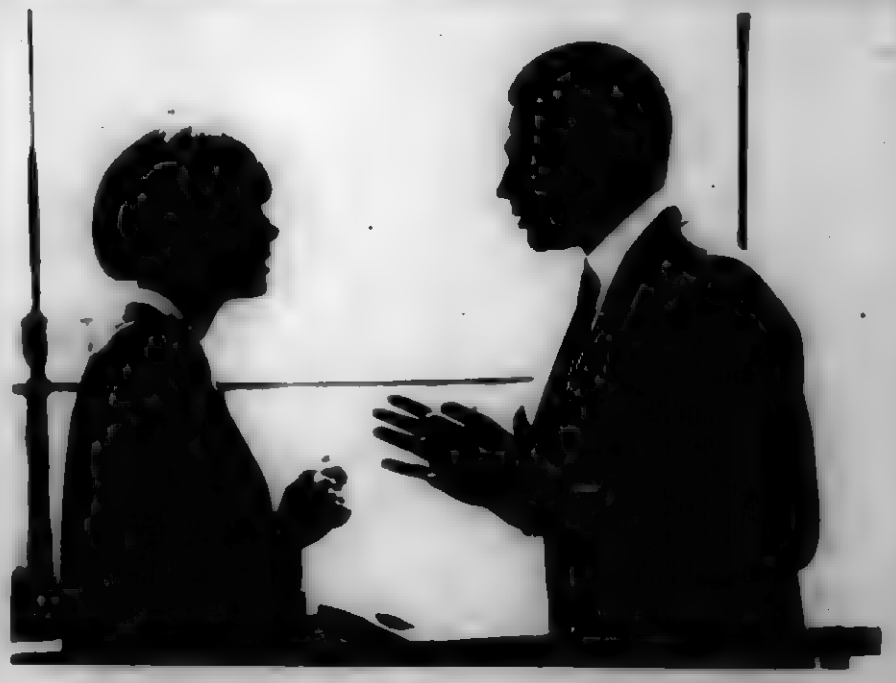

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- SYSTEM/36, RPG III
- TANDEM
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MARKETPLACE

Computer prices spring alive

As a new season begins, the used market looks to the sunny side

BY CAMERON HALL
BOSTON COMPUTER EXCHANGE CORP.

The spring bulbs are up and so are computer prices, as the warm weather brings everyone out. The secondary market is beginning to operate on a floor where discounted prices of new equipment no longer help determine prices of used equipment.

The buyers seem to have lost their market power: They are unable to find this IBM equipment elsewhere and are unwilling to commit to IBM's new Personal System/2s.

Market trading during the week ending March 11 continued to suffer from a shortage of IBM Personal Computer AT Model 339s, PC XT Model 069s, Apple Computer, Inc. Macintosh Pluses, Hewlett-Packard Co. Laserjets and Apple Imagewriters.

A sufficient quantity of the older PC AT, XT and Macintosh models filled buy orders at a steady pace for end users not yet ready to make the switch to the PS/2 or Apple's Macintosh II. Purchasing departments with PS/2s buy configurations among the Model 30 and 50 systems as buyers await the full bloom of OS/2, IBM and Microsoft's next-generation operating system.

The PC AT Model 339 closed up at the end of the week as savvy sellers quoted higher prices, but supplies shortened, and lingering rumors of large quantities about to be dumped on the market created uncertainty among buyers and sellers. The PC AT Model 339 closed up $100, at $3,450. The PC AT Model 099 also closed up, at $2,450, as buyers with the Model 339 on their shopping list settled for any IBM AT model.

> THE Macintosh continues to capture users' fancies. As one buyer said about his just-acquired Mac, "It's simply fantastic!"

PC XT trading volume picked up during the week as supply conditions continued to be good for the 10-MHz XT, and 20-MHz systems sold quickly. The XT Model 089 was up $50 to $1,800, while the XT Model 086 held its own, closing at $1,300.

Also up with the daffodils was the classic dual-floppy PC Model 076, which closed at $925, experiencing solid ground as a machine that continues to add value for end users.

Compaq Computer Corp. trading continued strong this week. Compaq models remaining on the "best sellers" list include the classic Portable I, which remained stable at $800. The Portable I gained market share against the IBM PC as the portables' lower price gave it the lead in dual-floppy systems.

Compaq's Portable II remained at $1,575, and the Portable III continued to sell for $2,750.

Early Compaq Deskpros did not fare well as unmet sell orders made sellers negotiate, and there were bargains to be had. Other Deskpro models performed better. The Deskpro 286 20-MHz model with mono-monitor closed up, at $2,400. Brisk trading of Deskpro 386 models brought selling prices down: The average price for the week was $3,600.

Apple season

Macintosh users seemed to be out in full bloom all week. Early bloomers found themselves waiting for the Mac Plus supply as prices crept higher and higher up to the recent high of $1,350. Those looking for the Mac 512E found the computers up slightly, at $1,025. The Mac II market needed sellers — that unit closed at $4,000 — while the Mac SE sold at $1,850.

The Macintosh continues to capture users' fancies. As one buyer said about his just-acquired Mac, "It's simply fantastic!" His deal included a half-price external Rodime, Inc. 20-MHz drive.

Those jumping from daisy-wheel to desktop publishing for their spring newsletters picked up HP Laserjets and raised prices briefly to $950. Watch for the Microsoft Corp. Mach 10 market to shift into warp speed as a bidding war brews over a bulk lot of these accelerators. They should appear in the retail market at a great price in a matter of days.

The Boston Computer Exchange can be reached at 800-BOCOEXX or 617-542-4414 in Massachusetts.

The BoCoEx Index

Closing prices report for the week ending March 11, 1988

	Closing price	Recent high	Recent low
IBM PC Model 076	$925	$1,350	$700
XT Model 086	$1,300	$1,425	$1,150
XT Model 089	$1,800	$1,955	$1,000
AT Model 099	$2,450	$2,450	$1,950
AT Model 339	$3,450	$3,950	$2,400
Compaq Portable I	$800	$925	$650
Plus	$1,350	$1,400	$1,275
Portable III	$2,750	$3,000	$2,175
Deskpro Model 2	$1,600	$1,800	$1,000
Deskpro 286	$2,400	$2,475	$2,050
Deskpro 386	$3,600	$4,275	$3,000
Apple Macintosh 512	$625	$900	$650
512E	$1,025	$1,075	$800
Plus	$1,350	$1,550	$950
SE	$1,850	$2,400	$1,800
II	$4,000	$4,200	$3,500
DEC Rainbow 100+	$750	$900	$600
Hewlett-Packard Laserjet	$850	$1,000	$550
Toshiba T1100+	$1,100	$1,200	$700

INFORMATION PROVIDED BY THE BOSTON COMPUTER EXCHANGE CORP.

Used Equipment

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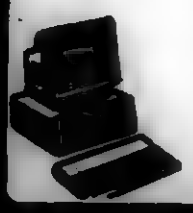

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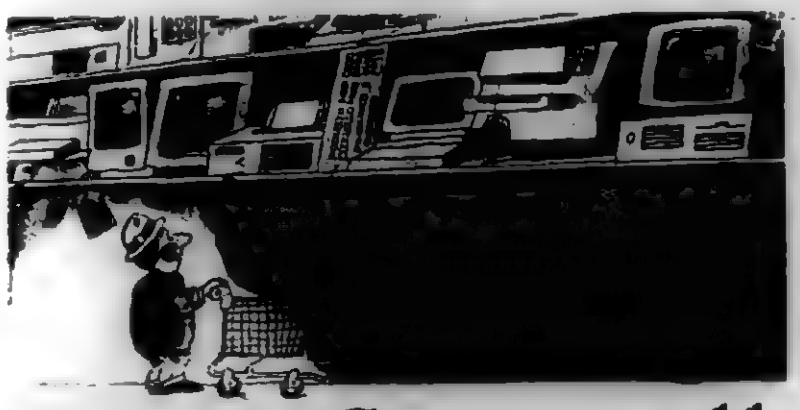

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April 11	PCs (IBM-Compatible) Portables/Laptops	March 28
April 25	Electronic Publishing	April 8
May 9	Printers	April 22
May 23	Data Communications	May 6
June 6	CASE	May 20
June 20	The SNA Market	June 3
July 11	Disaster Prevention & Recovery Products & Services	June 24
July 25	Productivity Software	July 8
Aug. 8	TBA	July 22
Aug. 29	DB2 Market	Aug. 12
Sept. 19	Hardware Roundup: Large, Medium Scale and Special Purpose Systems	Sept. 2
Sept. 26	Hardware Roundup: Small Scale Systems	Sept. 9
Oct. 3	Hardware Roundup: Personal Computers and Workstations	Sept. 16
Oct. 17	AI/Expert Systems	Sept. 30
Oct. 31	Unix	Oct. 14

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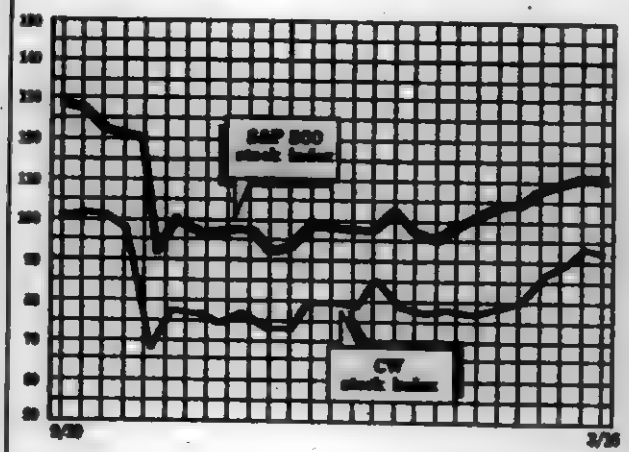

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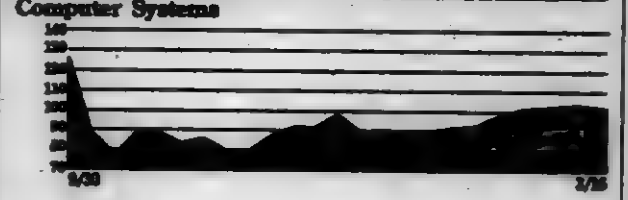
Communications	97.8	98.1
Computer Systems	103.9	101.8
Software & DP Services	107.4	107.0
Semiconductors	68.3	68.4
Peripherals & Subsystems	93.2	93.0
Leasing Companies	128.1	122.8
Composite Index	94.5	93.6
S&P 500 Index	111.2	111.4

Communications

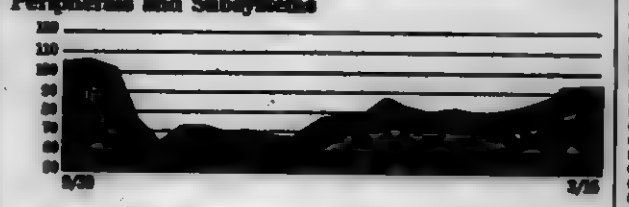
Computer Systems



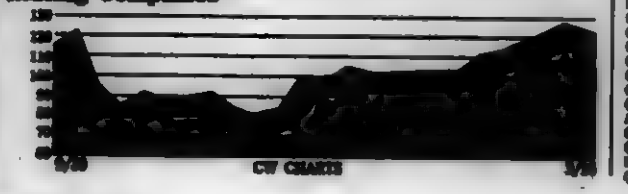
Software and DP Services

Semiconductors

Peripherals and Subsystems



Leasing Companies



CW CHARTS

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, MARCH 16, 1988

	52-WEEK RANGE (1)		PRICE CLOSE MARCH 16	WEEK NET CHANGE	WEEK PCT CHANGE

Communications and Network Services

N	AMERICAN INFO TECHN CORP	100	74	94.50	-2.5	-2.6
O	ANDREW CORP	19	11	15.50	-0.5	-3.1
O	ARTEL COMMUNICATIONS CORP	4	2	2.38	-0.13	-5.2
N	AT&T	34	28	28.75	-0.5	-1.7
N	AVANT GARDE COMPUTING INC	3	2	1.50	-0.13	-8.0
N	AVANTEK INC	9	6	7.88	-0.13	-1.6
N	AVTEX CORP	25	21	23.25	-1.5	-6.1
N	BELL ATLANTIC CORP	77	65	71.38	-2.5	-3.4
N	BELLSOUTH CORP	70	61	68.13	-1.5	-2.1
O	COMPRESSION LABS INC	7	2	2.38	-0.13	-5.0
O	COMPUTER NETWORK TECH	2	1	1.41	-0.13	-8.5
O	CONTEL CORP	32	23	31.25	-1.1	-3.5
O	DATA SWITCH CORP	9	4	8.63	-0.3	-3.6
N	DIGITAL COMM ASSOC	20	4	14.13	-1.5	-9.6
O	SYNATECH CORP	18	10	13.75	-1.5	-9.8
N	FIBRONICS INTERNATIONAL INC	10	5	6.38	-0.5	-6.8
O	GANDALF TECHNOLOGIES	3	2	2.38	-0.1	-1.7
N	GENERAL DATACOMM INDS	5	3	4.38	-0.1	-2.2
N	GTE CORP	32	26	30.63	-0.5	-1.6
O	INFOTRON SYS CORP	9	6	8.00	-0.5	-5.9
N	ITT CORP	63	51	60.25	-2.5	-3.9
O	M/A COM INC	8	4	5.00	-0.5	-9.1
O	MCI COMMUNICATIONS CORP	12	7	11.13	-0.5	-4.3
O	MICOM SYS INC	12	7	11.00	-0.5	-4.3
N	NETWORK SYS CORP	10	7	9.13	-0.5	-5.2
N	NORTHERN TELECOM LTD	52	44	49.25	-2.5	-4.8
O	NOVELL INC	30	12	22.75	-0.5	-2.1
N	NYNEX CORP	70	61	68.50	-2.5	-3.5
N	PACIFIC TELESIS GROUP	34	28	32.50	-1.5	-4.4
O	PARADYNE CORP	9	4	8.50	-0.1	-2.3
N	PENRIL CORP	9	4	4.13	-0.1	-2.9
N	PLESSEY PLC	42	28	28.38	-1.5	-5.0
N	SCIENTIFIC ATLANTA INC	30	20	27.88	-1.5	-5.1
N	SOUTHWESTERN BELL CORP	48	37	37.88	-1.5	-3.7
O	3 COM CORP	32	22	22.75	-0.5	-2.1
O	TIMEPLEX INC	27	17	22.25	-0.5	-2.1
N	UNISEARCH GROUP INC	6	5	12.38	-0.5	-3.9
N	US WEST INC	65	49	54.50	-2.5	-3.9

Computer Systems

O	ALLIANT COMPUTER SYS	37	8	8.50	-0.5	-5.6
O	ALPHA MICROSYSTEMS	6	3	4.31	-0.1	-1.5
O	ALTOS COMPUTER SYS	15	6	11.13	-1.1	-4.2
N	AMDAHL CORP	38	18	37.50	-0.5	-1.7
O	APOLLO COMPUTER INC	28	16	16.50	-0.5	-4.6
N	APPLE COMPUTER INC	68	36	44.13	-0.5	-1.5
N	BOLT BERANEK & NEWMAN	28	12	15.38	-0.5	-1.7
N	BRITTON LEE INC	5	1	2.38	-0.5	-11.6
O	COMPAQ COMPUTER CORP	78	36	53.50	-1.5	-2.8
O	COMPUTER AUTOMATION INC	17	6	10.50	-2.5	-19.0
O	COMPUTER CONSOLES INC	11	2	5.13	-0.1	-2.4
O	CONCURRENT COMP CORP	24	13	16.75	-0.5	-2.9
O	CONTROL DATA CORP DEL	38	25	28.50	-0.5	-1.7
O	CONVERGENT TECH	11	5	3.38	-0.5	-12.9
O	CONVEX COMPUTER CORP	22	8	8.63	-1.4	-12.8
O	CRAY RESH INC	102	47	61.00	-1.1	-2.9
O	DAISY SYS CORP	11	5	6.63	-0.3	-2.6
O	DATA GEN CORP	37	16	24.88	-1.5	-4.1
O	DATAPOINT CORP	9	3	4.38	-0.1	-2.4
N	DIGITAL EQUIP CORP	200	150	117.88	-2.5	-2.4
O	FLOATING POINT SYS INC	15	2	4.75	-0.1	-2.1
N	GOULD INC	36	8	12.50	-0.5	-3.8
N	HARRIS CORP	43	32	38.88	-0.5	-1.3
N	HEWLETT PACKARD CO	74	38	65.00	-0.5	-0.8
N	HONEYWELL INC	91	69	69.75	-0.5	-0.8
N	IBM	175	102	118.25	-1.5	-1.2
O	INFORMATION INTL INC	15	8	12.25	-0.5	-3.9
O	IPL SYS INC	3	1	1.88	-0.0	-0.0
O	MASS COMPUTER CORP	14	8	4.75	-0.5	-9.5
N	MATSUSHITA ELEC INDL LTD	307	98	208.00	-0.5	-2.9
O	MEGADATA CORP	4	3	3.75	-0.1	-2.4
O	MENTOR GRAPHICS CORP	29	14	27.00	-1.5	-5.3
N	NBI INC	14	4	6.63	-0.3	-3.6
N	NCR CORP	92	59	60.88	-4.5	-7.5
O	PRIME COMPUTER INC	31	12	14.88	-0.5	-2.9
O	PYRAMID TECHNOLOGY	12	6	11.00	-0.1	-1.1
O	STRATUS COMPUTER	41	15	28.00	-1.5	-5.1
O	SUN MICROSYSTEMS INC	46	14	34.63	-0.4	-1.1
O	SYMBOLICS INC	6	1	1.38	-0.0	-0.0
N	TANDEM COMPUTERS INC	35	17	20.63	-1.5	-6.8
N	TANDY CORP	57	38	41.38	-1.5	-3.5
N	ULTIMATE CORP	17	13	15.38	-0.1	-0.6
N	UNISYS CORP	48	28	34.50	-2.5	-6.8
A	WANG LABS INC	29	10	12.88	-3.5	-21.4

Software & DP Services

O	ADVANCED COMP TECH	6	1	1.88	-0.1	-4.3
N	ASK COMPUTERS INC	30	11	18.00	0.5	2.9
O	AMERICAN MGMT SYS INC	20	8	18.13	-1.1	-5.7
O	AMERICAN SOFTWARE INC	22	6	13.00	-0.2	-1.9
N	ANACOMP INC	11	4	8.50	-0.5	-5.6
O	ANALYSTS INTL CORP	10	4	7.38	-0.1	-1.7
O	ASHTON TATE	33	13	30.50	0.5	1.7
O	ASK COMPUTER SYS INC	15	6	13.50	-1.5	-9.5
O	AUTODESK INC	34	12	25.00	-0.2	-1.5
N	AUTO DATA PROCESSING	58	46	48.38	-1.5	-3.7
O	BOOLE & BABBAGE INC	12	5	8.25	0.3	3.1
O	COMPUTER ASSOC INTL INC	37	15	30.63	-1.1	-3.5
O	COMPUTER HORIZONS CORP	15	7	9.88	0.0	0.0
O	COMPUTER SCIENCES CORP	73	42	49.00	-1.5	-3.4
O	COMPUTER TASK GROUP INC	17	9	11.00	0.0	0.0
N	COMSHARE INC	28	12	10.63	-1.4	-7.6
O	CULLINET SOFTWARE INC	14	4	7.50	-0.5	-6.3
O	CYCARE SYS INC	10	6	7.88	0.0	0.0
O	DAUPHIN SYS INC	20	10	20.25	-0.5	-2.4
O	DATA ARCHITECTS INC	17	7	13.63	0.0	0.0
N	GENERAL MTRS (CLS E)	51	30	42.13	-1.5	-3.4
O	HOGAN SYS INC	17	5	5.38	-0.5	-8.5
O	INFORMIX CORP	31	12	21.25	1.0	4.9
O	INTELLICORP INC	11	2	3.75	0.1	2.4
N	KEANE INC	20	8	9.00	1.0	12.5
O	LOTUS DEV CORP	43	18	31.00	-1.5	-4.6
O	MANAGEMENT SCI AMER	10	6	6.88	-0.5	-6.8
O	MICRO PRO INTL CORP	8	3	3.88	0.1	2.4
O	MICROSOFT CORP	78	37	64.75	0.5	1.2
O	MORINO ASSOCIATES INC	24	7	14	-0.5	-3.5
O	NATIONAL DATA CORP	34	10	31.00	0.5	1.6
O	ON LINE SOFTWARE INTL INC	22	8	12.63	0.5	4.2
O	ORACLE SYS CORP	19	8	16.50	-0.5	-2.9
N	PANSOPHIC SYS INC	28	11	17.50	-0.5	-2.8
O	POLICY MGMT SYS CORP	35	15	28.00	-0.5	-1.7
O	PROGRAMMING & SYS INC	14	7	12.50	0.5	2.0
O	REYNOLDS & REYNOLDS CO	30	14	21.50	-1.0	-4.4
O	SEI CORP	25	10	16.88	0.5	3.1
O	SHARED MED SYS CORP	37	19	29.50	0.5	1.7
O	SOFTWARE AG SYSTEMS INC	14	7	11.38	0.0	0.0
O	SOFTWARE PUBG CORP	17	8	13.75	-0.5	-3.5
O	STERLING SOFTWARE INC	13	4	8.38	0.0	0.0
O	SUNGARD DATA SYS INC	21	10	16.50	-0.5	-2.9
N	SYSTEMATICS INC	23	10	20.75	0.5	2.5
N	SYS. SOFT INC.	24	7	17	1.0	6.2
O	VM SOFTWARE INC	48	7	13.75	1.5	12.4

Semiconductors

N	ADV MICRO DEVICES INC	23	8	8.50	-0.5	-5.6
N	ANALOG DEVICES INC	28	8	8.50	-0.5	-5.6
O	ANALOGIC CORP	11	5	7.00	-0.5	-6.6
O	INTEL CORP	21	15	21.00	-0.5	-2.3
O	LSI LOGIC CORP	17	7	10.50	-0.5	-4.5
N	MOTOROLA INC	74	36	37.13	-0.5	-1.3
N	NATL SEMICONDUCTOR	22	12	11.75	-0.5	-4.1
N	TEXAS INSTRS INC	83	38	38.38	-0.5	-1.3
A	WESTERN DIGITAL CORP	23	11	14.00	-0.5	-3.4

Peripherals

O	ALLOY COMP.	9	3	3.38	-0.1	-2.9
N	AM INTL INC	11	3	3.38	-0.1	-2.9
N	AST RESH INC	31	8	10.25	-0.5	-4.7
O	AUTO TROL TECH CORP	8	3	3.50	-0.1	-2.8
O	BANCTEC INC	15	4	7.50	-0.5	-6.3
O	CIPHER DATA PRODS INC	6	2	2.50	-0.1	-3.8
O	COGNITRONICS CORP	9	2	2.50	-0.1	-3.8
O	COMPUGRAPHIC CORP	11	4	5.00	-0.1	-1.9
O	COMPUTERVISION CORP	21	7	7.00	-0.5	-6.6
O	DATAPRODUCTS CORP	11	4	5.13	-0.1	-2.4
O	DATARAM CORP	9	4	5.13	-0.1	-2.4
O	DECISION DATA CORP	11	4	10.75	-0.5	-4.4
O	EASTMAN KODAK CO	71	54	63.00	-2.5	-3.8
O	E M C CORP MASS	21	8	17.50	-0.5	-2.8
O	EMULEX CORP	9	4	5.50	-0.5	-8.3
O	EVANS & SUTHERLAND	9	4	5.75	-0.5	-8.0
O	EXAT CORP	11	4	5.50	-0.5	-8.3
O	INTERLEAF INC	11	4	10.50	-0.5	-4.6
O	ISOMEDIA CORP	3	1	2.00	-0.1	-4.8
O	LEE DATA CORP	3	1	2.00	-0.1	-4.8
O	MAGNETIC SYS CORP	3	1	2.00	-0.1	-4.8
O	MAXTOR CORP	6	1	3.00	-0.5	-14.3
O	MICROPOLIS CORP	44	15	27.00	-1.0	-3.6
O	MINISCRIBE CORP	16	6	10.00	-0.5	-4.8
O	MINNESOTA MINING & MFG CO	96	84	88.13	-0.5	-0.5
O	MSI DATA CORP	33	13	27.00	-1.0	-3.6
O	PRIAM CORP	5	1	2.00	-0.1	-4.8
O	PRINTRONIX INC	13	7	8.00	-0.5	-5.9
O	QMS INC	32	8	11.75	-0.5	-4.1
O	QUANTUM CORP	32	8	12.75	-0.5	-3.8
O	SANTEK CORP	8	3	4.00	-0.1	-2.4
O	RECOGNITION EQUIP INC	25	7	8.50	-0.5	-5.6
N	XEROX CORP	63	47	48.50	-2.5	-4.9
O	ZOOM TECH CORP	14	7	11.50	-0.5	-4.2
O	SEAGATE TECHNOLOGY	46	18	22.38	-0.5	-2.2
O	STORAGE TECH CORP	6	1	1.88	-0.1	-5.1
O	TANDON CORP	7	1	1.88	-0.1	-5.1
N	TEC INC	7	2	2.63	-0.1	-3.7
N	TEKTRONIX INC	41	21	28.75	-0.5	-1.7
O	TELEVIDEO SYS INC	3	1	1.13	-0.1	-8.1
O	TELEX CORP	14	7	8.88	-0.5	-5.3
N	WYSE TECH	24	10	11.00	-0.5	-4.3
N	XEROX CORP	63	47	48.50	-2.5	-4.9
N	XIDEX CORP	15	6	6.38	-0.1	-1.5

Leasing Companies

O	CAPITAL ASSOCIATES INTERN.					
N	NATIONAL INC	11	4	5.75	-0.5	-8.0
N	COMDISCO INC	33	13	22.50	-0.5	-2.2
O	CONTINENTAL INFO SYS	6	2	2.88	-0.1	-3.4
O	PHOENIX AMERI INC	6	2	3.00	-0.1	-3.2
N	SELECTRAN INC	8	2	3.75	-0.3	-7.4

EXCH: N—NEW YORK; A—AMERICAN; O—NATIONAL; O—OVER THE COUNTER; S—SPLIT

0-7-C PRICES ARE BID PRICES AS OF 3 P.M. EST LAST TRD
(1) TO NEAREST DOLLAR

Unkind cut

DEC an unfortunate wild card in positive Wall Street skuffle

There are always exceptions to the rule, and Digital Equipment Corp. was the victim in a big way in a bullish New York Stock Exchange last week. While the Dow Jones industrial average was hitting another post-crash high of 2086.04 as of Thursday's close, DEC was citing lower than expected orders of large systems and reducing its third-quarter earnings forecasts for the second time in as many weeks. The Maynard, Mass., giant got hammered on Thursday, when it lost 5⅛ points and finished the four days of trading down 7⅝ points to 112¼.

But all was not storm clouds on the Street. Tandy Corp. jumped 2⅛ points on the heels of its announcement that it will buy laptop maker Grid Systems Corp. and finished up at 41¾. Control Data Corp. also did well, gaining 2⅛ points to close at 29.

Other, more modest, gainers included Novell, Inc., up 1⅛ points to 22⅛; Microsoft Corp., up 1⅛ points to 63⅜; and Ashton-Tate Corp., up 1 point to 30. Slight slippage was experienced by NCR Corp., down 1⅝ points to 61⅛; Tandem Computers, Inc., down 1 point to 30; and Apple Computer, Inc., down ⅝ of a point to 45.

JAMES DALY

DCA serves up plate of OS/2 connections

BY JAMES DALY
CW STAFF

NEW YORK — Digital Communications Associates, Inc. (DCA) last week introduced the first in a line of products intended to provide both OS/2-based terminal-to-host connection and a smooth DOS-to-OS/2 transition path.

Additionally, the Alpharetta, Ga., communications equipment maker confirmed that it will license Microsoft Corp.'s OS/2 LAN Manager, offering it both separately and in conjunction with the newly announced DCA Select OS/2 Communications Server, or Select CS.

Select CS is the latest venture into the still largely uncharted connectivity territory of OS/2, jointly developed by Microsoft and IBM. The server picks up where the micro-to-micro connectivity of the LAN Manager leaves off by allowing personal computers on a local-area network to access information on the host computer.

Some analysts called the product the first alternative to the Communications Manager portion of IBM's OS/2 Extended Edition. Users could then purchase presumably less expensive and possibly enhanced Extended Edition capabilities, including Communications Manager features, from third parties, as opposed to purchasing proprietary software from IBM.

Alternate route?

"Companies like DCA and Microsoft are trying to offer industry-standard solutions, and we think this is the way users want to go," said Mary Ann Bartels, a research associate with J. C. Bradford & Co. in Nashville. "It could be a very effective alternative to the Extended Edition and the Communications Manager."

Thomas White, president of Santa Clara, Calif.-based research firm Infonetics, Inc., conceded that DCA's OS/2 connectivity strategy is "pretty ambitious" but said he will take a wait-and-see attitude.

The turnkey Select CS includes a DOS client workstation on a network, a DOS stand-alone workstation that does not go through the server but connects directly to the host and a similar arrangement with an OS/2 client and stand-alone workstations.

The company also announced the DCA Select MS OS/2 LAN Manager, or Select LM, a product based on the LAN Manager that is said to allow both DOS and OS/2 client workstations to share the server's resources.

Availability for both products is scheduled for first-quarter 1989, with pricing structured according to the number of concurrent workstations using the product.

An entry-level server supporting up to eight concurrent users with up to five sessions per user will reportedly cost less than $3,000. Select LM is set to be available on a server basis for less than $3,000 per server, with each server licensed for an unlimited number of workstations.

Duquesne raided for Uccel files

BY ALAN ALPER
CW STAFF

VIENNA, Va. — Local authorities here last week seized confidential documents allegedly taken by two former Uccel Corp. employees who joined rival systems software company Duquesne Systems, Inc. late last year.

The search and seizure was ordered by a Virginia circuit judge in conjunction with a suit brought by Computer Associates International, Inc. subsidiary Uccel.

In the suit, Uccel is seeking to recover confidential documents that were allegedly misappropriated by two former employees of the firm's McLean, Va.-based office.

Uccel and Computer Associates are requesting unspecified monetary damages, court fees and further relief as determined by the court, according to the complaint.

Uccel is charging former employees James Holland and Kenneth Smart with taking confidential customer account reports, company handbooks and product information when they left the company to join Duquesne's Vienna-based sales office last December.

The complaint alleged that Smart and Holland breeched their employment contracts by circulating Uccel documents to members of Duquesne's sales force.

Sales theft charged

Uccel contends the documents are enabling Duquesne to capture sales from it and its parent, Computer Associates.

Duquesne competes with both Uccel and Computer Associates in a variety of systems software areas, including direct-access storage device performance, network management, job accounting and unintended operations.

Spokesmen for Computer Associates and Duquesne declined comment. A hearing date has not yet been set.

AST keeps pace with OS/2 strategy

BY PATRICIA KEEFE
CW STAFF

IRVINE, Calif. — In a statement of direction issued last week, AST Research, Inc. became the second vendor in a week to challenge IBM head-on by announcing its intent to offer "the same kind of functionality" provided by IBM under OS/2 Extended Edition.

AST's goal is to offer "100% AST-coded products" that provide all the capability of Extended Edition's Communications Manager, said Michael Krieger, manager of the firm's Advanced Products Group in Data Communications. Users would combine this technology with OS/2 Standard Edition and, most likely, Microsoft Corp.'s Presentation Manager, he added.

"Instead of forcing a single, expensive operating system down everybody's throat ... we've decided to take a modular approach with pieces that fit together like a big OS/2 jigsaw puzzle," Krieger said.

Users would need to purchase only modules that fit their communications needs, AST said. Thus, a System/36 or 38 shop would not have to buy the IBM 3270 portion.

AST said it will time product deliveries to coincide with IBM's announced delivery schedule for similar products. AST also outlined the following plans:

- It will migrate a "good chunk" of its remote communications products to IBM's LU6.2 protocol using a pass-through approach instead of relying on older protocols.
- It is investigating which local-area network operating system will make the most sense as a transport for OS/2-based products. Options include Microsoft's LAN Manager; a future version of AST's current network software, Novell, Inc.'s Netware; or something of AST's own design. "We'll wait for the dust to settle before making any firm plans," Krieger said.
- With OS/2 as a multitasking platform, it will provide gateways into IBM's office environment, using IBM's Systems Network Architecture Distribution Services or providing access to Professional Office System electronic mail, co-existing with current AST gateways.
- It will support an SQL data base server, possibly Ashton-Tate Corp.'s, and considers the LAN Manager a "key potential standard."

Users opting for OS/2 Extended Edition will be forced to shell out $800 per user, Krieger claimed, even if they only need one piece of the Communications Manager puzzle. In contrast, AST will price Communications Manager functionality like its current gateways: a one-per-gateway charge for all LAN users, Krieger said. "We will continue, more than likely, to price OS/2 versions in that manner."

Apple suit

FROM PAGE 1

sentation Manager for six months or a year at the very least," said John Rossi, an analyst with Alex Brown & Sons, Inc.

A 1985 visual copyright licensing agreement between Microsoft and Apple for the interface was limited, an Apple spokeswoman said. With Windows 2.03, "we feel that Microsoft has gone beyond the license and is infringing on our audiovisual computer display," the spokeswoman said, declining to provide specifics.

In the suit, Apple asks for damages of $50,000 per infringement and for the "impoundment and destruction of all computer programs known as New Wave and Windows 2.03 or any version, revision or modification thereof or any derivative work based thereon."

The Apple spokeswoman said the suit will likely go on for quite some time. She declined to speculate on whether there is a possibility for an out-of-court settlement.

Rossi and other analysts said that by blocking Microsoft's entry into the ease-of-use arena, Apple could preserve its position as the only company able to offer the friendly interface for the business and education markets, at least temporarily.

According to the suit, HP once sought a license from Apple for Macintosh's audiovisual works, but Apple declined to grant the license.

"Nonetheless, Hewlett-Packard has developed a computer program called New Wave that embodies and generates a copy of the Macintosh audiovisual works," the suit reads.

New Wave reportedly requires Windows 2.03 to operate.

Analysts also questioned how much strain the lawsuit might put on the Microsoft development efforts for the Macintosh. Microsoft is reportedly the leading developer of software for the Macintosh.

"There is a certain amount of risk in what Apple is doing in the possibility of alienating Microsoft and other independent software vendors working to support the Macintosh platform," said Philip Barton, an analyst at Fidelity Investments in Boston.

According to Delbert Yocam, Apple's chief operating officer, Apple has no plans to initiate litigation against third-party application developers.

Sources close to Microsoft Chairman Bill Gates said Gates feels he made a significant contribution to the development of the Macintosh interface through features he incorporated in Microsoft's applications and other software products.

Microsoft and IBM declined comment on the suit. In addition, HP spokesman declined to comment on specifics of the suit but said HP does not believe it has violated any Apple copyrights or patents in the development of New Wave.

West Coast correspondent Stephen Jones and Senior Editor Ed Scannell contributed to this report.

Legal risk fails to scare firms

A pending "look and feel" lawsuit pitting Apple Computer, Inc. against Microsoft Corp. and Hewlett-Packard Co. will have little impact on large corporate users and developers, according to an informal *Computerworld* poll.

In a similar suit last year, Lotus Development Corp. sued Mosaic Software, Inc. and Paperback Software International, claiming the companies' financial spreadsheet products too closely resembled Lotus's popular 1-2-3. The Lotus suit had a negative impact on competitive products.

Robert Coyle, senior vice-president of operations at Sears Roebuck Acceptance Corp. in Wilmington, Del., echoed the sentiments of several MIS managers when he said "I would think that if we had a need for existing software, we would go ahead and buy it."

To Charlie McLoughlin, manager of software support for Touche Ross & Co., the situation is irritating but will not stop him from writing in-house applications for Microsoft's Windows or the Presentation Manager.

"There are windows all over the place," McLoughlin said. "Every workstation has a windows kind of approach. How can you copyright that?"

ALAN J. RYAN

IBM's Unix version to be Posix compatible

BY CHARLES BABCOCK
CW STAFF

NEW YORK — IBM is turning to Unix to create a software architecture that will offer a multiplatform, public domain alternative to its own Systems Application Architecture (SAA).

IBM will start by making a version of its workstation Unix, known as Advanced Interactive Executive or AIX, available a year from now to run on a mainframe as a guest under VM, according to officials at IBM's Madison Avenue offices here last week.

While AIX/370 will manage its own resources, such as I/O, paging and scheduling, it will also give an AIX/370 user access to standard VM facilities. Since AIX is already on the IBM RT Personal Computer workstation and slated to be on the Personal System/2 Model 80, a desktop Unix user could gain access to the Professional Office System under VM/CMS or the SQL/DS relational data base management system, pointed out Thomas K. Dow, AIX product manager in the IBM Data Systems Group in Kingston, N.Y.

'Very serious'

"It's the same two million lines of code across all three hardware platforms," said Judith S. Hurwitz, editor of "Unix in the Office," a publication of Patricia Seybold's Office Computing Group in Boston. "IBM is very serious about Unix this time around," Hurwitz added.

AIX/370 will be compatible with AT&T's Unix System V, Release 2, with job control provided by the University of California at Berkeley's Unix 4.3 rather than System V. AIX/370 will also conform to Posix, the standard under development by the Institute of Electrical and Electronics Engineers, Inc.

Offering a version of Unix that meets industry standards allows IBM to give its customers who are purchasers of Sun Microsystems, Inc. workstations or other Unix-based hardware a way to develop applications capable of running in a multivendor environment, Dow noted. That application portability is one of the goals of IBM's SAA, announced a year ago, for IBM's own varied hardware platforms.

R. Joseph Stockhus, software marketing manager for Amdahl Corp., said IBM was probably experiencing customer demand for Unix on mainframes. Amdahl has offered its version of Unix, UTS, on its plug-compatible mainframes for five years and sold 200 licenses, he said.

The announcement of AIX/370 immediately eclipsed IX/370, IBM's existing version of Unix available for mainframes. IX/370 represented an acquired product, while AIX/370 was developed internally to optimize its operation under VM.

AIX/370 includes the following features:

- Support for 3090 processor Vector Facility for numerically intensive computing in scientific and technical computers under Unix.
- AIX Family Definition, or a consistent set of screen formats, commands, menus and application interfaces across the AIX product line, scheduled to be published in July.
- Network File System (NFS), a separately licensed program that provides support for NFS 3.2 protocols developed by Sun that enables an AIX/370 system to work with other Unix systems attached via Ethernet or the IBM Token-Ring LAN.
- Transparent Computing Facility (TCF), which allows the transparent distribution of data and processes among 31 nodes on an IBM Token-Ring or Ethernet LAN, or Channel-to-Channel Adapter tying together CPUs.

AIX/370 will be sold at a one-time charge of $27,000 for Group 10 processors and $144,000 for Group 40 processors. AIX/370 NPS will be sold for $2,400 to $9,600.

8100 lifeline

FROM PAGE 1

any easy path for migration," McGeough said. "Now, we'll have to decide whether our special applications will outgrow the 9370s over time. Because of the demands on our 8100s, those applications would have to be moved to a dedicated 9370."

Other IBM 8100 users questioned last week said that they had not yet received the customer letter. But some users said that Anthony Mondello, an IBM Application Systems Division vice-president, through personal visits and a videotape presentation, has played an important role in convincing IBM 8100 users to wait for the IBM conversion aid.

Too late for some

Last week's announcement came exactly two years after IBM executives promised Guide International Corp. users that a conversion aid would provide a migration path to the IBM 9370 by 1988. But in that time, many 8100 users have moved to other non-IBM machines, particularly to Digital Equipment Corp.'s VAX machines [CW, March 14].

Dallas consultants B. R. Blackmarr and Associates, which conducted a survey of 8100 users last year, concluded that more than 60% of 8100 users are open to converting to new architectures. "We are seeing a phased replacement of 8100s," said Brian Blackmarr, president of the consulting firm. "A lot of people have been depreciating their machines, or waiting until they come off lease before they decide whether to get rid of them."

But Blackmarr expects many IBM shops to stay with DPPX as long as they can, particularly among Fortune 500 users who have 8100s controlling warehouse operations and factory terminals. "IBM's conversion aid can be seen as a way to smooth the feathers of the hardcore users," Blackmarr said.

The DPPX conversion works this way: A user pays a one-time charge of $35,580 to $62,270, depending on machine size, to buy the DPPX/370. The one-time fee also allows the user site to run a VS Cobol II compiler on an IBM MVS host to develop DPPX/370 applications and to carry out the DPPX migration.

DPPX/370 will not support the IBM 8100's "loop" local-area networking scheme, IBM said. Instead, DPPX/370 substitutes a direct-connect cable to link the attached devices in a factory-floor setting. It will, however, support IBM's Token-Ring protocol for office applications. DPPX/370 also supports IBM's Systems Network Architecture and the X.25 communications protocol.

Additional fees must be paid for the Cobol facility, which costs $10,800 or $18,900, depending on the size of the 9370 machine, and for a monthly license DPPX/370 charge of $2,900. IBM's Cross System Product Application environment will cost $2,400 or $4,200, depending on machine size, IBM said.

Playing to strength

IBM 8100 users running the DPPX operating system, targeted by IBM's 9370 migration strategy, are more heavily concentrated in MIS functions than those running DPCX

INFORMATION PROVIDED BY B. R. BLACKMARR AND ASSOCIATES
CW CHART

Netview functions expanded

NEW YORK — IBM last week announced centralized Netview control of IBM local-area networks under VM. Also introduced was remote access linking Personal Computer and Personal System/2 users to IBM Token-Ring or PC Networks via telecommunications lines.

Together with IBM's previously announced Intersystem Control Facility/Personal Computer Program (ICF/PCP), the ICF Feature for VM extends Netview system operations support to control and monitor multiple networks from a centralized point under VM.

The host program can support multiple ICF/PC stations and their attached systems. PC communication is accomplished via Advanced Communication Function/VTAM channel support or IBM 3174- or 3274-type controllers.

The IBM Remote Netbios Access Facility Program Version 2.0 rectifies a drawback of Netbios, which only defines what is locally attached. Version 2.0 supports remote telephone asynchronous access to print and file servers on IBM local-area networks.

Remote access is provided via the Rolm Corp. Rolmphone 244PC on the CBX II Models 8000 and 9000, the IBM 9750 Business Communications System, private-branch exchanges and ordinary telephone lines.

The remote access software has a one-time charge of $245 and is slated for delivery in August. Available March 25, the Netview application software has a basic license fee of $7,000. A DSLO license costs $5,250.

IBM 10 series gets yanked

RYE BROOK, N.Y. — With the shipment of the third generation of its 4381 superminicomputers, IBM last week withdrew most of the second-generation 4381s from marketing.

The machines to be taken off the market June 15 are the 4381 Model Groups 12, 13 and 14. The firm has begun shipments of the "20" series during the past three months.

An IBM spokeswoman said the 10 series was withdrawn because the 20 series is now available. The low-end 4381 Model Group 11 remains available as an entry-level system, she said.

With the withdrawal, IBM will no longer sell new 4381 Model Groups 12, 13 and 14 or upgrades within that line. IBM said users with installed systems will see no changes in their support and that upgrades to the 20 series are available.

In a similar announcement, IBM said it will also stop marketing model and memory upgrades for the 4381's predecessor systems, the 4341 series, June 15.

Second-class postage paid at Framingham, Mass., and additional mailing offices.
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TRENDS

Token-ring networks

Users take twisted approach to token-ring

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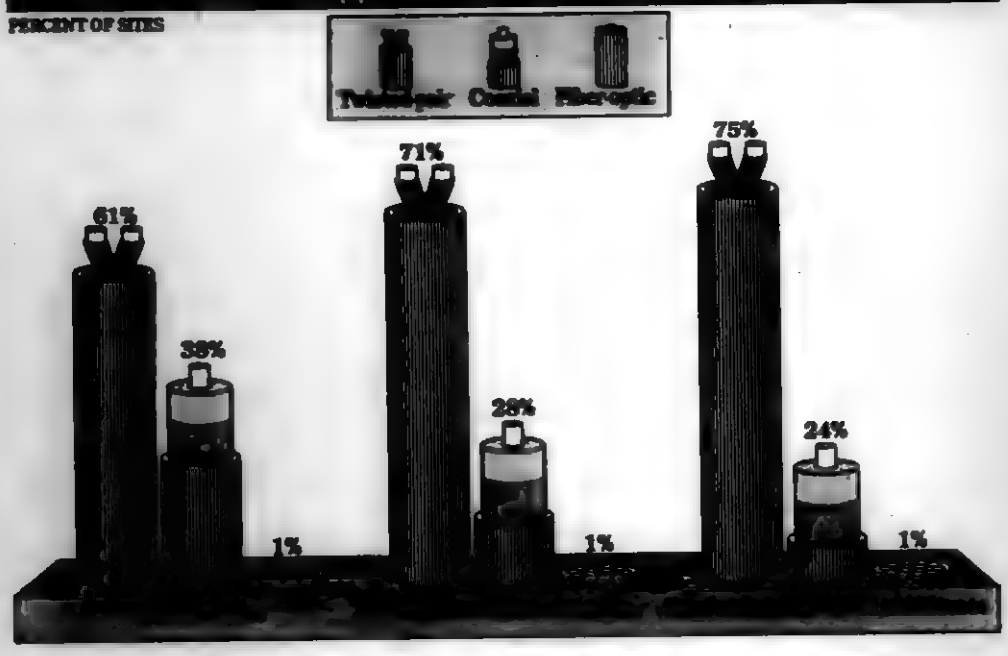


Despite IBM's puzzling two-year inability to ship its Token-Ring boards in volume, industry analysts say token-ring sales are rapidly rising.

Fueling that contention are IBM claims that almost 90% of its top 250 installations have standardized on the Token-Ring. IBM recently executed a settlement with the holder of the token-ring patent to allow use of its adapter cards in non-IBM personal computers. And last month, IBM said it expects to resolve volume distribution problems by the end of the second quarter.

Interest in token-ring technology is evident across the board, according to a recent survey of 3,500 IBM and plug-compatible mainframe sites by Computer Intelligence in La Jolla, Calif. A breakdown of IBM Token-Ring sites by industry revealed that the finance, insurance, medical and education segments have some of the biggest installed bases. Surprisingly, business services recorded the lowest use.

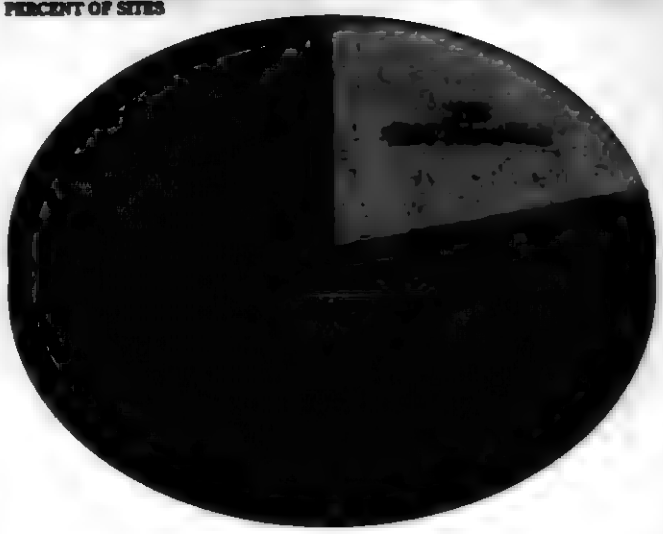
Of sites with installed networks, 21% said they had IBM Token-Ring networks. And 26% of sites planning to install networks during the next 12 months said they would purchase IBM Token-Rings. Another 28% cited a mix of other networks, while a whopping 46% said they were undecided.

The majority of token-ring sites responding to the survey said they use twisted-pair cabling, followed by coaxial cable.

PATRICIA KEEFE

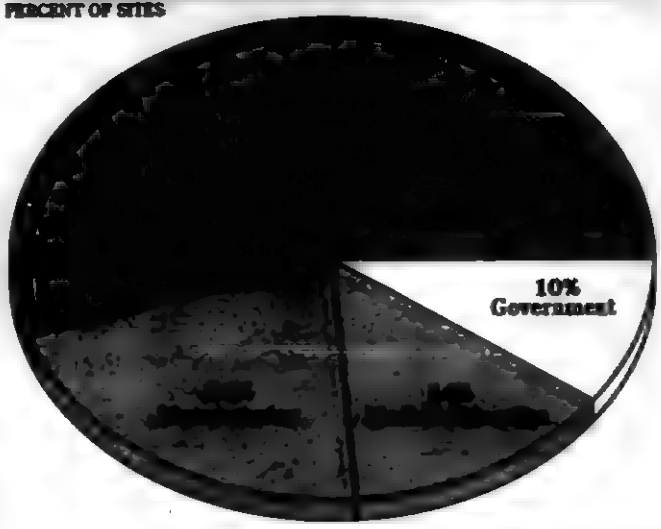
LANs at IBM mainframe sites

PERCENT OF SITES



Business use of IBM's Token-Ring

PERCENT OF SITES



INFORMATION PROVIDED BY COMPUTER INTELLIGENCE
CW CHARTS: FRANK C. O'CONNELL

INSIDE LINES

Uncle cries "Uncle!" The FCC is dropping its highly controversial plan to make value-added network users pay higher access charges, congressional and industry sources say. The proposal to boost connect charges by about $4.50 per hour generated 2,000 angry letters to the FCC as well as strong opposition in Congress [CW, Oct. 12, 1987].

Vapor falls to earth. After 18 months in the hype-o-sphere, International Microcomputer Software has begun shipping Pageperfect, a $495 package that combines word processing, desktop publishing and graphics. Wonder how long it will take to bring out an update?

Finally, the bottom line. Business users who have been uneasily wondering how much they'll have to pay for ISDN services will get their first solid information March 29, when Illinois Bell becomes the first U.S. carrier to file a regular ISDN tariff with the FCC. Two weeks later, Southern Bell will initiate its commercial ISDN service offering, a special tariff for five customers, including AT&T Network Systems, Prime Computer and Trust Company Bank.

Let's get small. In the next several weeks, Wang is expected to announce replacement systems for the VS 5E, 6E and 75E systems introduced last fall. The new VS 5400 and 5600 models, scheduled for July 1 availability, will have full implementation of Wang's VS 7000 architecture, filling in the lower end of the VS 7000 series. Wang senior vice-president of marketing Bob Ano had hinted at such CMOS-based systems when the 5E, 6E and 75E were announced last October.

A 386 machine is old hat. The very thought of an Intel 80486 chip is enough to send anyone screaming in terror. At the HP New Wave Developer's Conference last week in San Jose, Calif., Microsoft's Russell Werner reassured the audience that OS/2 is the operating system "for the next 10 years" and will support a 486 microprocessor without a great deal of recoding. He also predicted on the near horizon mass-market PCs costing $500, an 80386-based machine priced at less than $1,000 and OS/2 Version 1.1, with the Presentation Manager fully integrated.

Bad karma. After less than a year as senior vice-president in charge of the analytic software group, Charles J. Digate has left Lotus. Digate, who was responsible for the firm's spreadsheet, data base and mainframe software efforts, resigned last week out of a desire to try something different and because of "a difference in operating philosophies with Jim Manzi," he said. Digate declined to describe what those differences were.

Higher aspirations. For years, cigar-chomping Rep. Jack Brooks (D-Texas) has used his position as chairman of the House Committee on Government Operations to exert extraordinary influence over Uncle Sam's computer and communications systems. But it appears he'll be leaving that post next year for the chairmanship of the House Judiciary Committee now that Rep. Peter Rodino (D-N.J.) is retiring.

Texas two-step. Less than a year after signing on, Dell Computer's senior vice-president of sales and marketing, Graham Beacham, has resigned "for personal reasons," according to Dell officials. Beacham, formerly vice-president of Tandy's Radio Shack Business Products Division, came to Dell last July, bringing a number of Tandy employees with him. A Dell spokesman said Beacham will not be replaced. His duties will be divided between Dell Chairman and Chief Executive Officer Michael Dell, President Lee Walker and Marketing Vice-President Mark Yamagata. Beacham could not be reached for comment.

Suits, countersuits and, especially, Blue suits; we'll listen to them all if there's a hint of a scoop or a titillating scandal. Call the Computerworld hot line at 1-800-343-6474 (unless you're calling inside Massachusetts, in which case you'll have to call 617-879-0700, at least until June when they zap us with a new area code and we'll have to go through this whole thing again — but that's technology for you!) and ask for News Editor Pete Bartolik.

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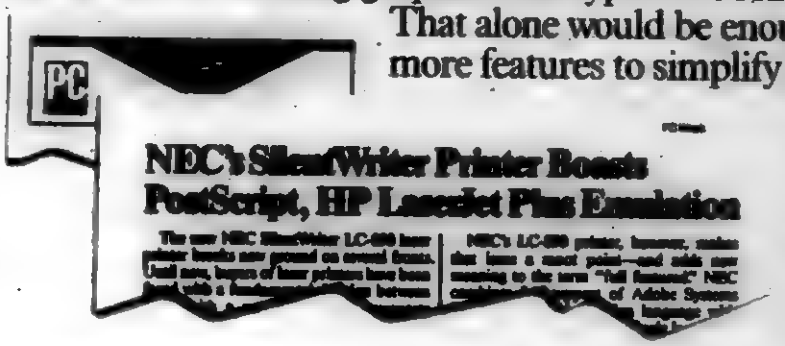
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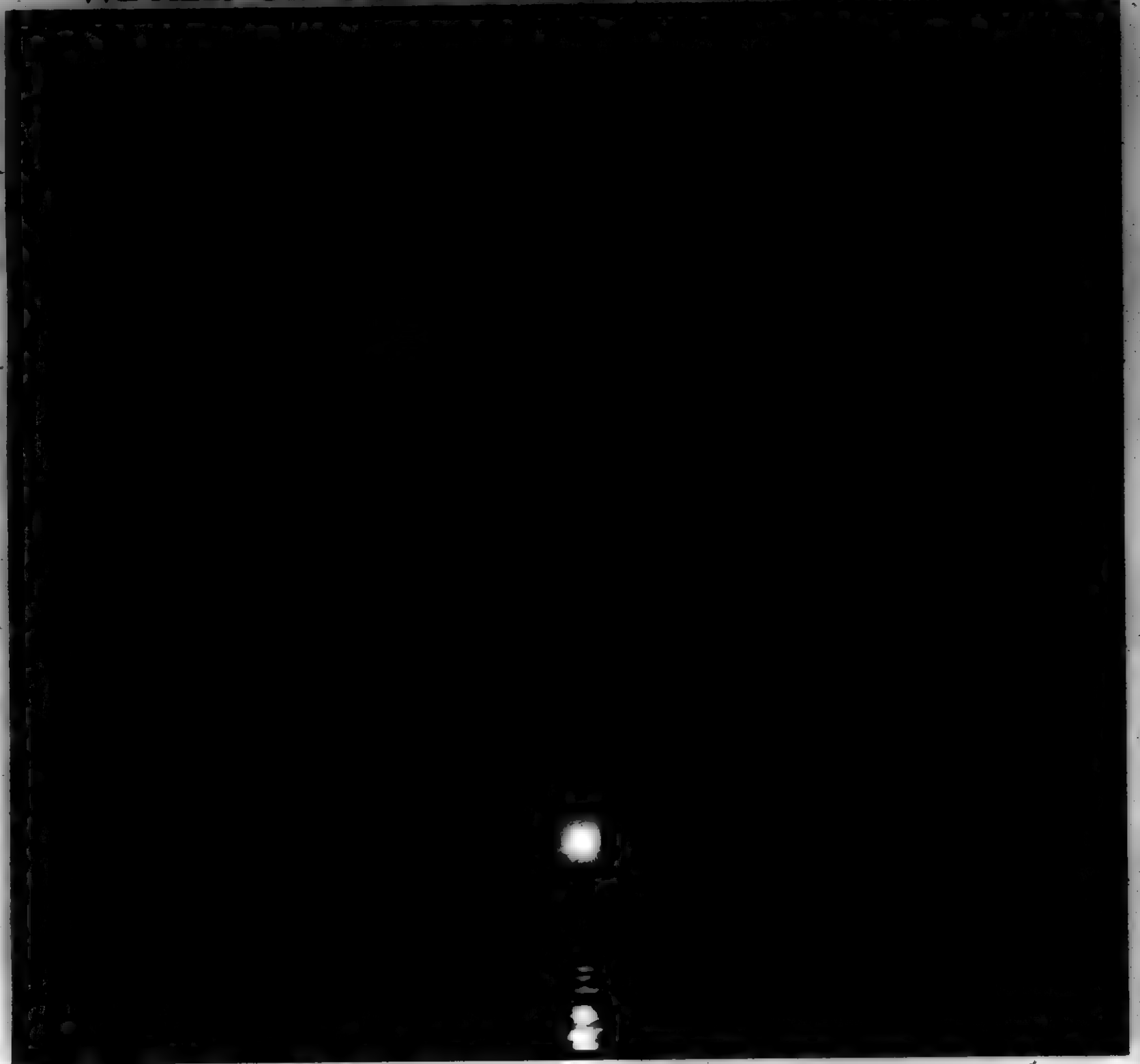

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"We had to update our entire accounting system. We needed to provide more information in a more timely fashion, and now we do," says Paul Berra, Comptroller for the City of St. Louis. "Thanks to MSA software, we have up-to-date information, instantly." St. Louis gets this up-to-date information through the MSA financial systems, which include General Ledger, Accounts Payable, and Budgetary Control. "Now we have the tools and time for analysis, review, and auditing," notes Rita Houghasian, the city's Deputy Comptroller. "And, we can provide the information necessary for bond rating...something we couldn't do before."

John Zalobe, Accounting Systems Manager, adds, "MSA products are excellent, and so are their people. All my contacts with them have been good experiences. And I wouldn't hesitate to recommend MSA to any other city government."

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COMPUTERWORLD

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DG reincarnation designed to exploit demand for intelligent networks. Page 111.

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Nomad brings referential integrity into the tent as Must Software enhances its acquired package. Page 113.

Instant management: A 90-day deadline to exit Polaroid's market helped prepare Katherine Hudson to become Kodak's first chief of centralized MIS. Page 77.

Apple suit fails to shatter Windows force

BY ED SCANNELL
CW STAFF

Software developers were almost unanimous last week in their pledges to continue developing applications for IBM's Presentation Manager despite the threat posed by the suit Apple Computer, Inc. has brought against Microsoft Corp. and Hewlett-Packard Co.

Developers took their positions at the same time that IBM and Microsoft were acting quickly to calm fears that the suit would slow work on the Presentation Manager and Microsoft Windows.

"The suit doesn't have any merit in our evaluation of it," said Bill Gates, chairman of Microsoft. "We're certainly not changing anything we're doing. It's hard for us to understand what Apple's thinking."

Microsoft's Bill Gates

"We're continuing to work on the Presentation Manager," said William P. Lyons, IBM's general manager of personal systems merchandising. "We plan to keep October as our [ship] date, and it's all systems go, as far as we're concerned." Lyons declined to comment on the specifics of the suit.

Microsoft eased the anxieties of third-party developers by sending out hundreds of electronic mail memos and letters assuring them that Windows development will continue.

Speaking at a meeting of the Boston Computer Society last week, William C. Lowe, president of IBM's Entry Systems Division, further calmed developers, saying that all work done on the Presentation Manager by

IBM and Microsoft is based on the original work of the two companies. "My anticipation is that our products will be free of any accusations," Lowe said.

Borland International was the only major developer to change its planned development course

Continued on page 6

HP Spectrum winning fans at first sites

BY JAMES A. MARTIN
CW STAFF

Early users of Hewlett-Packard Co.'s long-delayed Spectrum series of superminicomputers say they are pleased with the fast performance and uncomplicated migration path from lower end HP 3000 models.

However, they warn, be wary of unexpected software upgrade fees and peripheral incompatibilities.

MIS managers interviewed by *Computerworld* said converting from the HP 3000 Series 70 — the previous high end of the line — to the Spectrum Models 930 and 950 is, as HP promised, a relatively smooth process. They said many applications run four times faster on the Spectrum systems.

"I've been associated with many conversions before where you had to rewrite 90% of your code to go from an IBM System/36 to a System/38 or to a 4381 mainframe. Moving from the 70 to the 950 is the easiest conversion I've ever made," said Terry Reffner, information systems specialist for General Electric Co.'s Erie, Pa., division.

In addition, users said, Spectrum processing speeds are often four or five times faster than those of the Series 70.

"Some batch jobs that used to take half an hour on the Series 70 now take five minutes on the Model 930," said Jeff Pour, section manager at the Human Re-

Continued on page 111

Lotus fumbles upgrade

BY DOUGLAS BARNEY
CW STAFF

CAMBRIDGE, Mass. — To the chagrin of eager customers and the delight of its spreadsheet rivals, Lotus Development Corp. revealed last week that the shipment date of its long-awaited upgrade of 1-2-3 has been pushed back six months, placing it at the end of the year.

While the news sparked a sell-off of Lotus stock on Wall Street, Lotus customers expressed little concern about the delays, saying their investment in training and support is too great to warrant a switch to a competitor.

The six-month delay for 1-2-3 Release 3 may also postpone the release of critical products that Lotus revealed during last year's parade of preannouncements, including 1-2-3 for Apple Comput-

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TURNING POINT

Cullinet braces for battle of its life

BY NELL MARGOLIS
and ROSEMARY HAMILTON
CW STAFF

WESTWOOD, Mass. — Cullinet Software, Inc. has invested $100 million, five acquisitions and close to two years in an all-out effort to transform a beleaguered mainframe data base vendor into a triple-threat software house.

How wisely the company spent its money and time will begin to show next week, as Cullinet christens the flagship of its Digital Equipment Corp. VAX-based product line, IDMS/SQL, a transaction-processing relational data base management system.

To date, Cullinet's fortunes have been dogged by a string of seven losing quarters. Reversing that trend depends on Cullinet's gamble that it can quickly diversify its product line at the expense of short-term profits. For that gamble to pay off, the products set for introduction next week and during the

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Cullinet product mix changes

Applications make up bigger piece of company revenue this year, slicing into other contributors' shares

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Room with wheels

Consortium plans hotel/car reservation system

BY ALAN ALPER
CW STAFF

NEW YORK — AMR Information Services has joined with three travel services companies to design a mainframe-based system to handle hotel and automobile rental reservations.

The information services affiliate of American Airlines and partners Hilton Hotels Corp., Marriott Corp. and Budget Rent-A-Car Corp. said they are in the final six months of the design phase of the project. Once the design is completed, the partners will decide whether the system, called Confirm, should be developed. If all goes well, Confirm should go on-line in early 1991, the partners said.

Once implemented, the companies said, Confirm will provide features not currently available in car and hotel reservation systems, such as instant reservation confirmation, up-to-the-minute tracking of room and car availability and the ability to handle special promotional programs for participating firms.

Interfaces to other airline reservation systems, such as American Airlines' Sabre, will also be provided, company spokesmen said.

The advantage Confirm offers over other systems is one-stop shopping for independent agents and corporations making travel plans, the participants said. Travel and hotel reservation agents will also be able to access Confirm via their current workstations.

Confirm is expected to run on large-scale IBM mainframes running IBM's TPF, according to Nick Bredimus, president of AMR Travel Services, a division of AMR Information Services. An IBM SQL-compatible fourth-generation language and database management system will be used to develop a decision support component for ad hoc queries and report generation, Bredimus added.

Much of the development work will be conducted at Compass Computer Services, Inc., a Dallas company jointly owned by Hilton and Budget that previously developed a hotel and car rental reservation system. That system, called Compass, will be operated by AMR Travel Services until Confirm goes on-line. Compass Computer Services will merge with the AMR Information Services division once the design phase of Confirm is completed, spokesmen said.

A minimum of $60 million is expected to be spent by the time development is completed, according to Russell Harrison, president of AMR Information Services.

HP follows Ardent, Stellar into super workstation waters

BY JULIE PITTA
CW STAFF

PALO ALTO, Calif. — Hewlett-Packard Co. launched its entry in the embryonic supercomputing workstation market last week with its HP 9000 Models 835 and 350 TurboSRX.

As part of HP's Precision Architecture systems based on reduced instruction set computing (RISC), the workstations use the 14 million instructions per second (MIPS) Model 835 computational engine, offering performance of 2.02 million floating-point operations per second in a single-user environment. Added is the TurboSRX, a graphics engine that enables three-dimensional graphics and imaging.

According to HP, performance for the graphics subsystem has been measured at 900,000 transformations per second; 240,000 3-D vectors per second; and 50,000 clipped, checked, 50-pixel triangles per second with Z-buffer and Gouraud shading.

The graphics subsystem has also been added to HP's Model 350, a Motorola, Inc. 68020-based workstation offering 4 MIPS performance. The Model 835 TurboSRX costs $91,500; the Model 350 TurboSRX costs $70,000. They should become available after April 1.

Applications developed for HP's earlier Models 835SRX and 350SRX workstations can be ported to the new systems without modification, according to HP. Both the Model 835 TurboSRX and the 350 TurboSRX run HP-UX, HP's version of the Unix operating system.

Brad Smith, an industry analyst at Dataquest, Inc., said the workstations make HP the latest player in the graphics supercomputer market, established just last month by introductions from Stellar Computer, Inc., Ardent Computer Corp. and Apollo Computer, Inc. "It's their shot at the Stellar and Ardent arena," he said, adding that he expects Sun Microsystems, Inc. to enter the market and Apollo to add more complex graphics capabilities to its system.

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IBM's Pactel Spectrum buy-out to boost Netview

BY PATRICIA KEEFE
CW STAFF

ARMONK, N.Y. — IBM's Netview network management system took a step closer to full support of non-Systems Network Architecture (SNA) devices with IBM's purchase last week of Pactel Spectrum Services.

An unregulated subsidiary of Pacific Telesis Group, Pactel Spectrum provides services for isolating failures between customers' communications equipment and the interconnecting telecommunications facilities by placing remote testing equipment at customer sites.

"We do plan to tie together Netview and Spectrum capabilities," an IBM spokesman confirmed, but he could not provide a timetable. "This will expand IBM's network management capabilities to pinpoint problems with additional non-SNA devices and associated communications lines," an IBM executive said in a prepared statement.

Under the terms of the agreement, IBM has acquired the technical and operational assets of Pactel Spectrum for cash. The purchase price was not disclosed, although industry estimates ran as high as $75 million.

Layoffs possible

The transaction is expected to be final within 30 days, and IBM said it will offer positions to about 80 of Pactel Spectrum's approximately 125 employees. Those employees, along with Spectrum's services, will be folded into a division under the National Services Division.

IBM also inherits Spectrum's customer base, which observers place at between 25 and 50 mid-size companies. Pactel Spectrum had initially targeted the top 200 corporate customers, said Clare Fleig, research director for International Technology Group in Los Altos, Calif.

IBM is expected to benefit from its technology acquisition, but Pactel Spectrum was not a success. Analysts pegged losses at $250 million, an estimate knocked by a Pactel Spectrum spokeswoman as "rather high." However, she admitted, the venture was not profitable.

"What we found was that many customers prefer to buy a full range of network management services [from one provider], and we only offered a niche product, or one element," the spokeswoman said, citing regulatory restrictions that Pactel claims kept it from offering certain services.

Group pitches speedy filer protocol

BY ELISABETH HORWITT
CW STAFF

Convinced that popular networking protocols such as TCP/IP and OSI are too inefficient to take advantage of the upcoming generation of high-speed fiber-optic networks, a consortium of computer vendors is working toward a new networking standard designed to support data rates of up to 1G bit/sec.

Express Transfer Protocol (XTP) was originally developed by Gregory Chesson, chief scientist at Mountain View, Calif., workstation vendor Silicon Graphics, Inc.

The protocol addresses the needs of users "who want to do real-time networking between DEC, Sun, HP, IBM and Silicon Graphics computers" but have found existing standards to be too slow and proprietary solutions too expensive, Chesson said.

XTP goes public

Silicon Graphics put the protocol into the public domain and commissioned a recently formed company, Protocol Engines, Inc., to license it and generate industry support for the protocol as a networking standard.

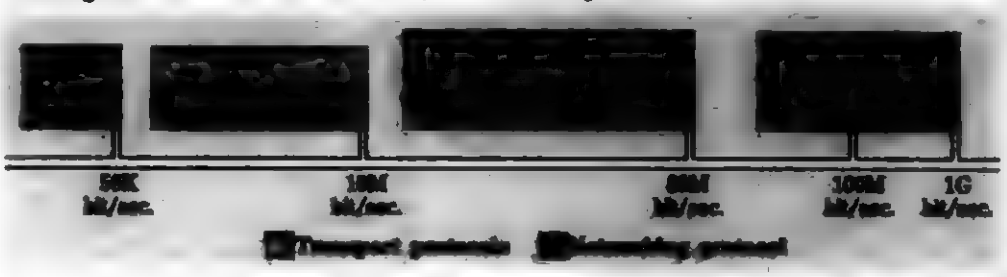
XTP will perform the same functions as transport-layer protocols such as the ISO's Open Systems Interconnect (OSI) standard and the Transmission Control Protocol/Internet Protocol (TCP/IP), which were "designed to run on slower systems," Chesson said. "TCP/IP was developed for [Department of Defense network] Arpanet, which runs at 56K bit/sec. Even with [10M bit/sec. Ethernet], it adds a lot of processing overhead to execute commands."

In contrast, XTP is designed to take advantage of the 100M bit/sec. bandwidth of the Fiber Distributed Data Interface (FDDI) networking standard and can support even faster rates of up to 1G bit/sec., Chesson said.

The protocol is said to streamline communications in a variety of ways; for example, by using network flow control to avoid potential traffic jams and eliminating handshaking for certain types of transmission. In addition, XTP is designed to be "cast directly into silicon," providing a cost-effective way for vendors to incorporate the protocol into their workstations without adding significant overhead to the main processor, Chesson said.

Transmission factors

XTP was designed to overcome limitations of earlier protocols that were initially intended for network technologies much slower than the 100M bit/sec. bandwidth of FDDI



CW CHART

A group of 60 to 70 interested companies met in January to discuss future directions for XTP. Current board members are Silicon Graphics, Unisys Corp., Apollo Computer, Inc., Interphase Corp., Artel Communications Corp. and systems integrator Martin Marietta Aero and Naval Systems. The organization will also be working toward proposing XTP to the American National Standards Institute as a future standard.

The consortium aims to have a stable protocol by June. Apollo, Unisys and Martin Marietta plan to be the first companies to develop board-level implementations of XTP for testing on their own systems, with the ultimate goal of "getting it down to a couple of intelligent chips," Chesson commented.

The protocol could prove useful to "some of our clients who have told me that OSI chews up all of a computer's CPU cycles on an FDDI network, making it very hard to take advantage of that bandwidth," said David Passmore, a principal at Fairfax, Va., consulting firm Network Strategies, Inc.

Martin Marietta plans to evaluate XTP for possible inclusion in Safenet, a growing collection of networking protocols that the U.S. Navy, and possibly other U.S. military organizations, will adopt as a networking standard. XTP "looks very promising [as] the first transport-layer protocol that will be put" on a chip, said Richard Steinberger, a manager of digital design at Martin Marietta.

The Baltimore systems integrator is particularly interested in XTP's support of FDDI, which has already been incorporated into Safenet, according to Steinberger.

While the majority of naval computer operations do not currently need the bandwidth XTP and FDDI provide, the organization needs to implement networking products that will fill its needs for the next 20 years, Steinberger said. "The Navy is slow to make technological changes, because it means you have to take the ship apart," he explained. "If the bandwidth isn't used now, it will be soon," especially since the Navy is in the process of going from centralized to distributed computing.

Alternatives available

Potential alternatives to XTP do exist. One is a streamlined version of TCP/IP, still in the development stages, which reportedly runs five times faster than the current version. Another is Minimap, a "bare-bones version of the Manufacturing Automation Protocol" that was developed for processor controller networks, Passmore said. Minimap is based on Layers 7 and 2 of the MAP protocol, excluding Layers 3 through 6. This eliminates certain functions, such as internetworking, "but boy, does it run fast," Passmore said.

Unlike these protocols, however, XTP does not sacrifice functionality for speed, according to Chesson. The protocol "has everything TCP/IP has," including routing and network management capabilities and a flexible addressing scheme for internetworking, he said.

One of XTP's unique features is a method by which lost or faulty packets can be identified and retransmitted during a multicast transmission — one workstation simultaneously sending the same data to several other computers. This feature is a prerequisite for ensuring consistency among distributed data bases, Chesson said.

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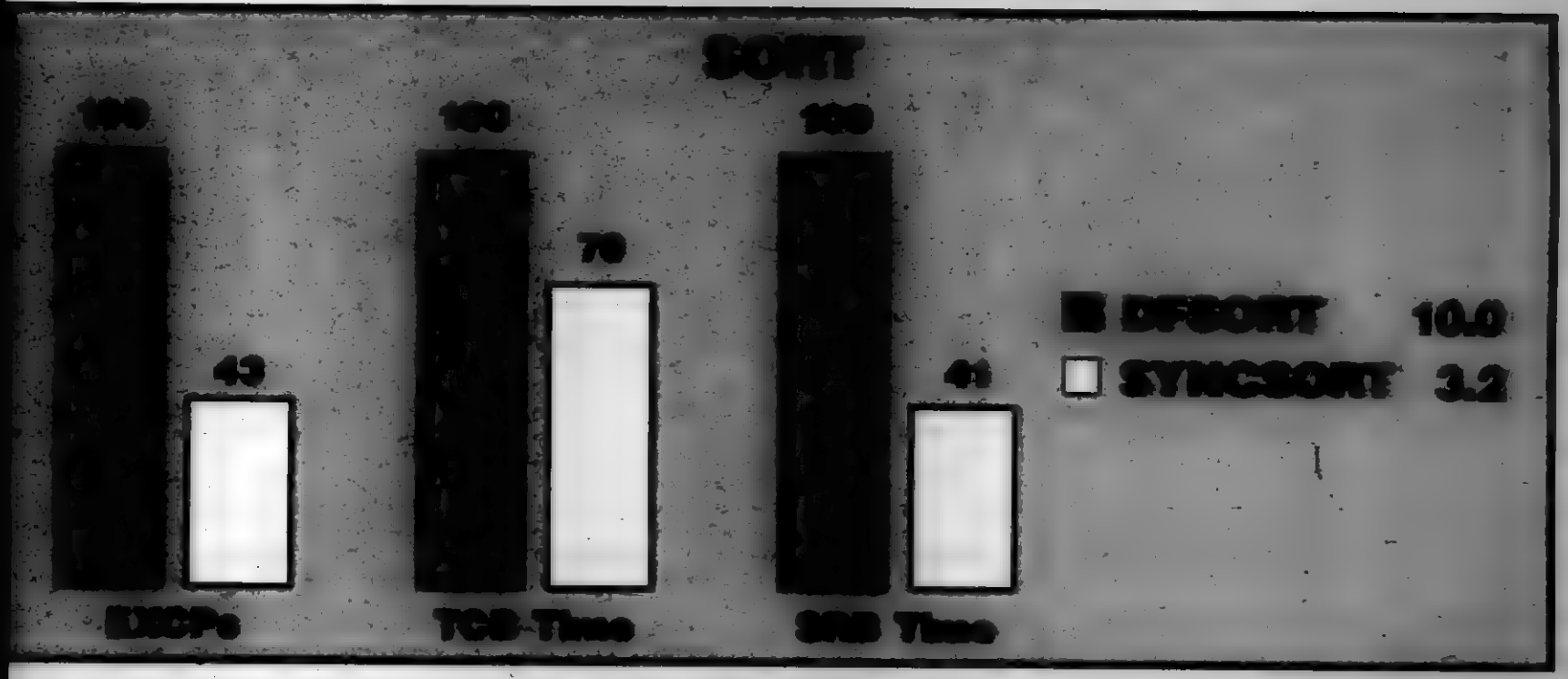

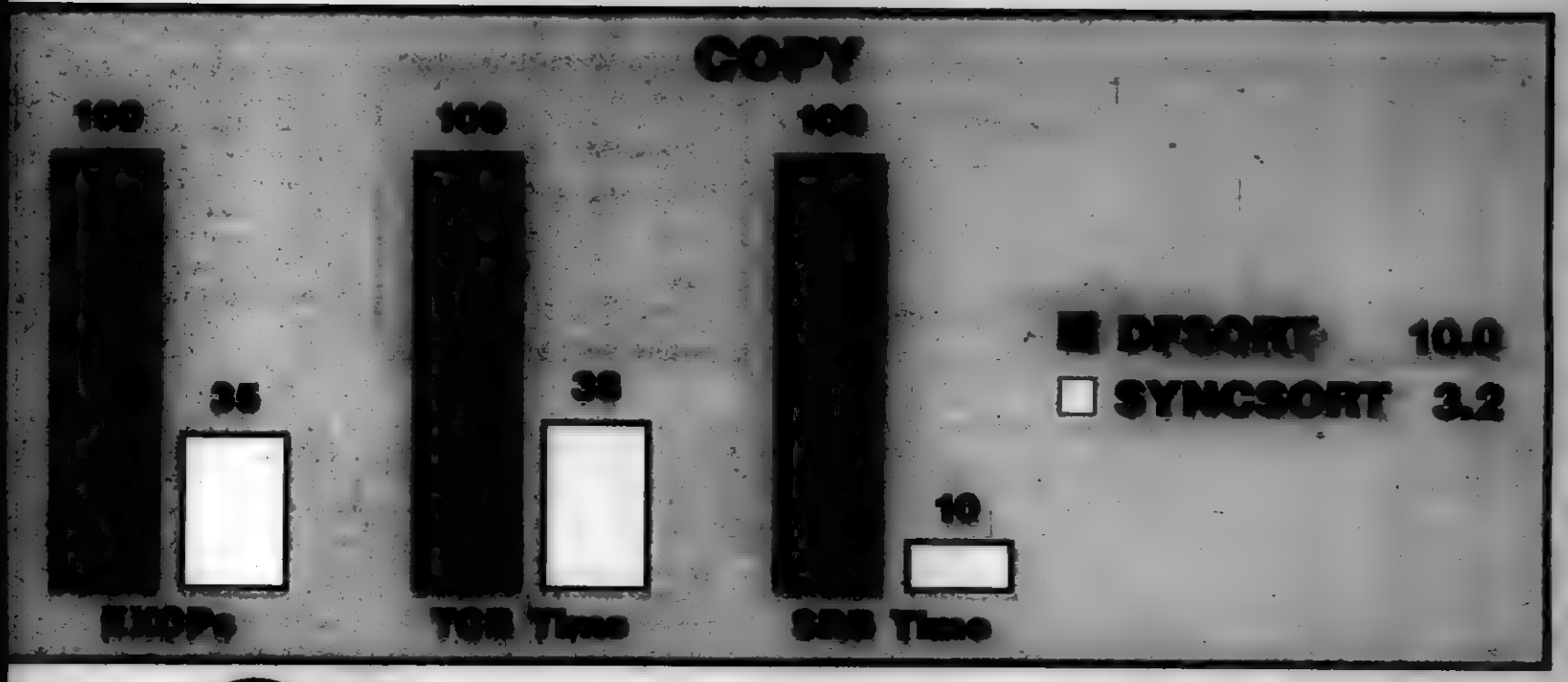

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Bits, icons and windows: An interface time line

Following is a brief history of the graphical user interface and the Macintosh:

1965: A professor at Stanford University, credited with devising the first mouse-like device, experiments with textual representation through a graphics interface.

Mid- to late 1970s: Engineers at Xerox Corp.'s Palo Alto Research Center (PARC) pick up on the graphics approach and develop what eventually becomes the Star computer and its Smalltalk system. Apple Computer, Inc. later uses the Star interface as a model for the windows and icons look of its Lisa and Macintosh. But priced at nearly $20,000, the Star is too expensive for its own good.

1979: Apple co-founder Steve Jobs attends a software developers conference sponsored by Xerox to spark interest in its Star machine. Jobs follows up with a visit to PARC and walks away convinced that the graphical, intuitive interface spawned at the center is the key to the computer of tomorrow.

1983: Apple's Lisa personal computer is introduced and almost immediately flops, too slow and expensive to carry out Jobs' vision of commercial success.

1984: Apple's first Macintosh rolls out and touches off a new software market, to be called desktop publishing, with its graphical user interface. A cadre of loyal followers begins to line up.

1985: Apple formally licenses use of the Mac's look and feel to Microsoft Corp. for current and future Macintosh versions of Multiplan, Chart, File, Excel, Word and Windows Version 1.0.

1986: Apple threatens Digital Research, Inc. with a lawsuit for using certain graphical features in its Gem applications program manager. Digital Research backs down and makes changes in the program.

1988: Apple sues Microsoft and Hewlett-Packard Co. for infringing on copyrights that Apple says protect the audiovisual look and feel of the Macintosh.

STEPHEN JONES

Apple decides enough is enough

BY JULIE PITTA
CW STAFF

CUPERTINO, Calif. — Apple Computer, Inc.'s decision to file suit against Microsoft Corp. and Hewlett-Packard Co. appears to be a recognition that the competition is gaining on its user-friendly technology, according to industry watchers.

Those close to the company caution that Apple does not enter into litigation lightly and expects to win. "It took [Apple Chairman and Chief Executive Officer] John Sculley a year to decide to do this," one source said. Added another, "It became sort of a give 'em an inch, take a mile sort of thing. At some point, Apple decided, 'Too much is too much. This is becoming dangerous.'"

Apple's graphical user interface has been the most important part of its appeal and has differentiated the Macintosh from other personal computers. Unlike IBM, Apple had managed to maintain its uniqueness. The lawsuit may be Apple's attempt to protect its user-friendly interface, with heavyweights like HP and IBM closing in with the help of Microsoft.

What Apple would consider to be a victory remains cloudy. Despite its action, it is not likely that Apple expects to eliminate window-type environments for PCs other than the Mac.

"Even if Apple wins, I don't think you can say that there won't be any graphically oriented interfaces in the PC market," said Rich Edwards, industry analyst for Robertson, Colman & Stephens. Apple "seems to be telling the industry how close you can get to the Mac before it will take action."

Roadblock

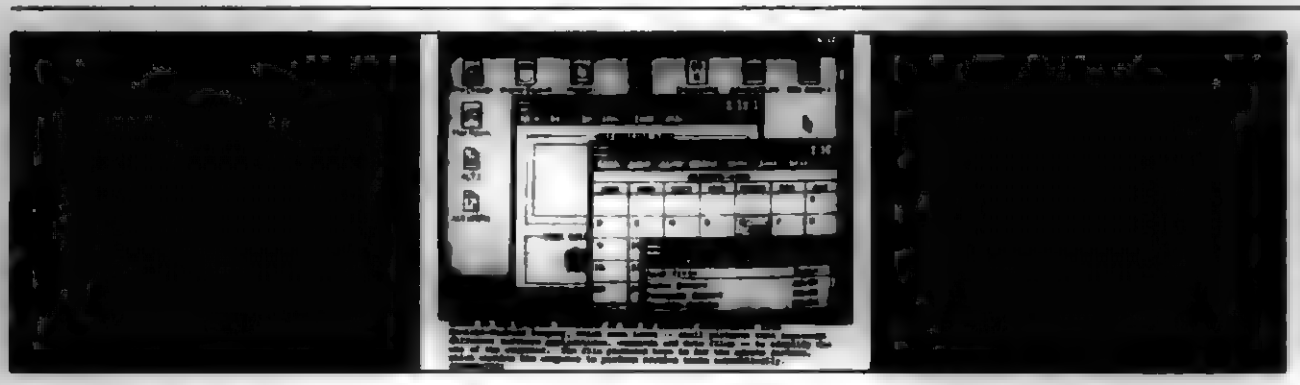
Apple may consider its efforts a success if it impedes the progress of Microsoft's Windows 2.03 and, in turn, IBM's Personal System/2 line, which will use that technology in its Presentation Manager component of OS/2. If the future of Windows 2.03 appears uncertain, third-party software houses may stop developing for the Windows environment. Last week, Borland International said it will cease development of a Windows version of its popular data base package Paradox.

"The victory will be in bringing fear, uncertainty and doubt in the minds of Windows developers," said a source close to the company who requested anonymity. "The victory will be in making developers move to the Macintosh."

For its part, Apple said it wishes to defend its "intellectual property," despite the fact that the company "borrowed" the technology from Xerox Corp.'s Palo Alto Research Center. In the suit, Apple asks that Microsoft's Windows Version 2.03 and HP's New Wave operating environments be removed from the market.

"Copyrights cover the expression of ideas that also cover computer software," said an Apple spokeswoman. "It's that unique expression of ideas that differentiates the Mac, particularly the screen display."

Although Microsoft Chairman William Gates is irate over the suit, it is unlikely that Microsoft will abandon the Macintosh as a platform for its applications. However, the suit sends a clear message that Apple thinks it is no longer solely dependent on Microsoft for its success.



Windows Version 2.03 *(right) features overlapping or tiled windows, something present in Apple's scheme (left), but not in earlier Windows versions, while HP's New Wave (center) utilizes that feature and an increased use of the icon approach favored by Apple*

Suit

FROM PAGE 1

because of the allegations made by Apple. The company has decided to stop all development on a Windows version of its Paradox data base management system. Although about 80% of the project is completed, Borland President Philippe Kahn said the lawsuit poses too many potential problems.

"At this point, we need to develop for environments that are going to be commercial successes, and this lawsuit casts too much doubt on the future of Windows," Kahn said, adding that Borland will continue to work on its version of Paradox for the Presentation Manager.

One other hesitant developer was Heidi Roizen, president of T-Maker Co. in Mountain View, Calif. T-Maker will continue work on its Windows-compatible application, but Roizen questioned whether IBM and Microsoft will emerge from the suit unscathed.

"We're going to ignore the angry gods for a while and keep our noses to the grindstone. But you have to wonder how you could sell applications if no environment exists," she said.

Lightweight suit?

Developers said the suit has little merit and added that they do not clearly understand the technical grounds on which Apple bases the litigation.

One pointed out that Microsoft changed its applications icons from Windows Version 1.04 to 2.03. In Version 1.04, the applications icons were located at the bottom of the screen and could not be moved. In Version 2.03, the applications icons could be moved around the screen, giving the interface a look that is more like that of Apple's Macintosh.

HP's New Wave operating environment, which was also cited in the Apple suit, uses movable applications icons even more extensively, making it look even more like the Mac interface (see story page 35). HP is credited with contributing underlying code to Windows Version 2.03.

"In effect, HP got Microsoft involved in this suit by extending Windows 2.03," one developer said.

Another developer thought the suit could backfire on Apple by stimulating interest in Windows. Paul Grayson, chairman of Micrografx, Inc. in Richardson, Texas, compared the action to the 1984 poisonings that rocked Johnson & Johnson's Tylenol.

"While it hurt Tylenol sales for a while, that made the product a household name," Grayson said. Through the suit, "Apple could end up only educating people about how similar Windows and the Mac are, which could increase Windows' sales."

Washington correspondent Mitch Betts and West Coast correspondent Stephen Jones contributed to this report.

Gates responds

A visibly irritated William Gates, chairman of Microsoft Corp., responded to Apple Computer, Inc.'s lawsuit against his company last week, saying the Apple Macintosh's interface techniques could not be copyrighted and asserting that a 1985 license agreement between the two companies invalidated Apple's claims.

Speaking at a press conference in Alexandria, Va., Gates said Microsoft has made no modifications to its Windows interface that violate the terms of the agreement. The accord gave Microsoft access to the Macintosh's "visual display" for current and upgraded versions of Windows Version 1.0.

"There's nothing that's happened in Windows to move it closer to the Mac," Gates said. "The suit will just be there for years." He said the major changes from Version 1.0 to Version 2.03 of Windows were the addition of windows-based multitasking and a change to the interface that allows windows to overlap each other. Apple's multitasking software, called Multifinder, "doesn't do the windows in the same way at all," Gates said.

Gates said the Apple suit took Microsoft by surprise. "I talked to [Apple Chairman] John Sculley [the day before the suit was filed] about other issues, and he didn't mention anything of the kind," he said.

Feud shrouded in ambiguity

BY STEPHEN JONES
CW STAFF

Nestled in the heart of the raging controversy between Apple Computer, Inc. and Microsoft Corp. is an ambiguous 1985 license agreement bearing the signatures of William Gates and John Sculley.

Microsoft believes the pact gives it open-ended access to Macintosh's visual display for current and upgraded versions of a number of applications and the Windows 1.0 operating environment. Apple, on the other hand, contends the agreement does not cover some Windows 2.03 screen displays that it claims illegally copy the windows and icons of the Macintosh interface.

Confusing? Throw in some controversial "look-and-feel" legal precedents, an ongoing debate on the difference between inventors and copycats and questions over the actual origin of the Macintosh interface, and you have the makings of a monumental computer industry debacle.

Reading the fine print

Legal experts said the crux of this legal entanglement can be found in the paragraph of the two-page agreement that grants Microsoft "worldwide, royalty-free and perpetual" use of the Macintosh look-and-feel in certain Microsoft applications and the Windows environment in "present and future" versions of those programs. The simplicity of that description, attorneys said, apparently gives Microsoft an edge before the courtroom doors are even opened.

"The implication is that Microsoft has been granted general rights with specific limitations, and it looks like they haven't gone past those limits," said G. Gervaise Davis III, a veteran of software copyright protection law with Schroeder, Davis and Orliss in Monterey, Calif.

Davis said the document was drawn up in a way that actually benefits Microsoft more than Apple. While Apple gave up perpetual rights to the Macintosh interface for future versions of such applications as Word and Excel, Microsoft only granted Apple access to the new screen displays that it will develop for up to five years after the Nov. 22, 1985 contract.

Observers also questioned whether Apple believes it can use the loosely defined agreement to cripple the adoption of Microsoft's Windows and eventually OS/2 Standard Edition 1.1 with the Presentation Manager.

The fact that Apple had not filed a request for a temporary restraining order and subsequent injunction blocking the continued sale of Windows led some to believe that Apple was after something other than a landmark court decision. To receive an injunction, a substantial likelihood of success in the lawsuit must be proved by the plaintiff.

"In this situation, a company would typically file for an injunction; it suggests that the publicity of the suit was probably a large motivating factor for Apple," said Donna Sherry, an expert on high-tech legal issues and a partner with Gaston & Snow in Boston. "Maybe they decided they wouldn't have a high percentage of success if they filed for an injunction."

Users: Apple suit rotten

Apple Computer, Inc.'s lawsuit against Microsoft Corp. and Hewlett-Packard Co. seems to be about as popular with users as a system crash.

"It is stupid and disruptive," fumed a software developer at a Big Eight accounting firm.

While most users said the suit will not affect their plans to move to Microsoft Windows or the OS/2 Presentation Manager, some are not so sure.

"It puts the industry in a quandary on connectivity, support, open-ended architecture, etc.," said Ronald Blystone, director of MIS at Harsco Corp. in Camp Hill, Pa. "All of a sudden, there's this smell of something corrupt — a rat in the woodpile."

"The uncertainty slows down some development. It puts you in a wait-and-see mode," said a manager at a large Midwestern firm in charge of more than 50,000 microcomputers.

Another suit possible?

Liam Egan, director of end-user computing for Dean Witter Reynolds, Inc.'s financial services group, said he is most concerned about whether Apple will file a similar suit over the OS/2 Presentation Manager, which is being jointly developed by Microsoft and IBM.

Egan's group has committed to OS/2 Presentation Manager as its future operating system. But with 150 copies of Windows Version 2.03 installed, he cannot help but worry about the pending lawsuit.

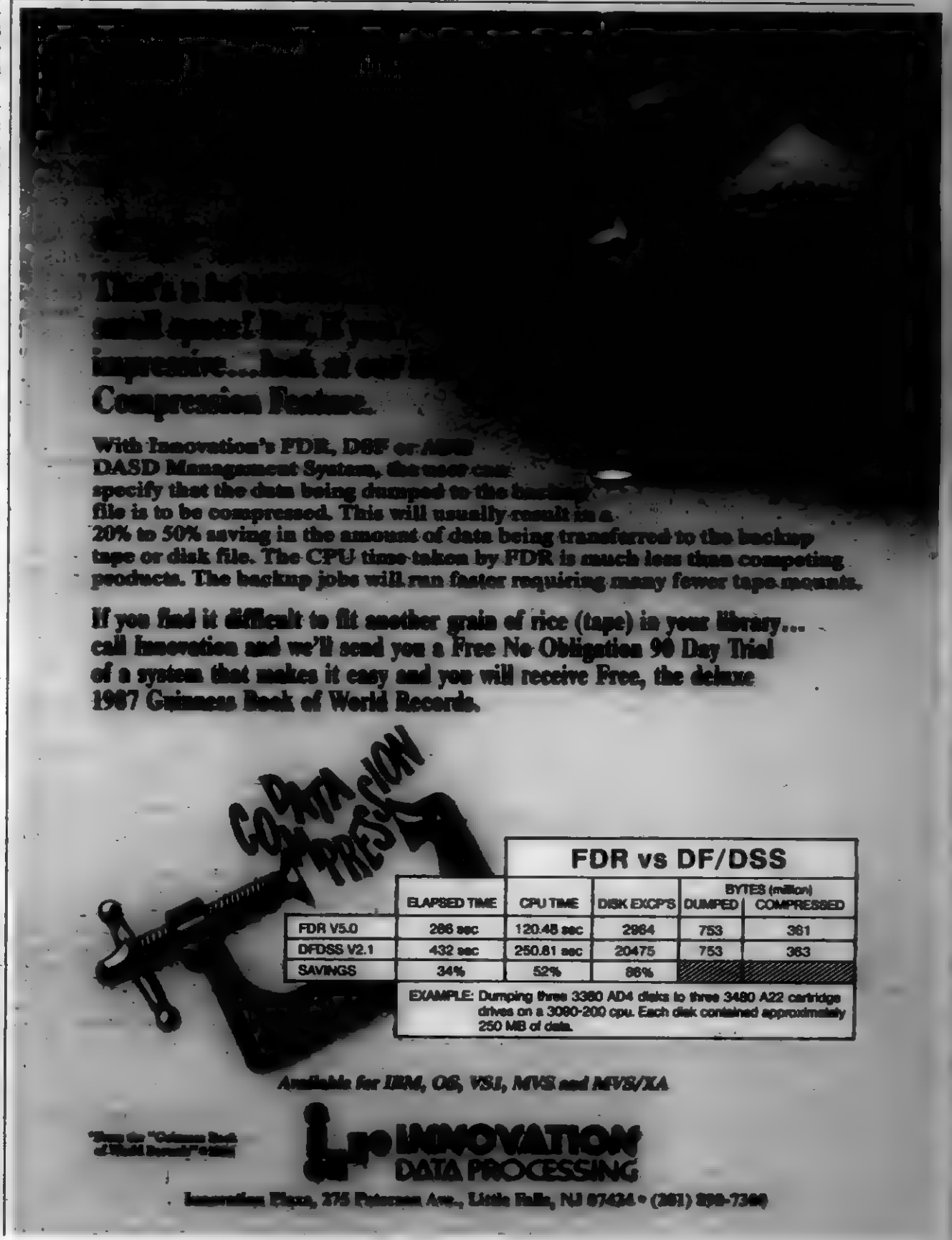
"It's definitely a concern that we have a product that we might not be able to use in the long-term," Egan said.

Recall not a concern

One thing users are not worried about is a product recall.

"There has never been a precendent where someone forced a recall," the Big Eight developer said.

"They can fight it out. Meanwhile, I have the software," he added.



Ideal joins DB2 world

BY CHARLES BABCOCK
CW STAFF

PRINCETON, N.J. — Applied Data Research, Inc. (ADR), the supplier of a bitter competitor to IBM's DB2, has modified its fourth-generation language, Ideal, to allow it to generate DB2 applications.

With last week's announcement, ADR followed on the heels of Software AG, which last year modified its Natural fourth-generation language to work with DB2. Both ADR and Software AG offer their own mainframe data base management systems.

"In order to compete with DB2, they have to become compatible with DB2," added George Schussel, president of Digital Consulting, Inc. in Andover, Mass.

More IBM than IBM

ADR's Release 2.0 of Ideal, a $175,000 product, is now more compatible with DB2 than IBM's own fourth-generation language, Cross System Product (CSP).

Release 2.0 of Ideal, available immediately, will include an application dictionary that can store definitions in DB2 tables. CSP definitions have to be stored in the CSP dictionary. Sources familiar with both products said the CSP naming convention is limited to eight characters, while names of up to 18 characters are recognized by the DB2 catalog.

Versions of programs and audit trails of who worked on which program are tracked and created by the change control facility in Ideal, noted Philip J. Gray, manager of systems services at Datasolve, a beta-test user of Release 2.0 in Sunbury, England.

Like CSP, Ideal supports either static or dynamic SQL. The latter speeds application development, and the former enables the same program to run in batch mode, Gray said.

Changing from dynamic to static SQL requires the change of one parameter on an Ideal screen, he said.

Software AG's Natural will add static SQL this fall.

Many DB2 users running batch applications under IBM's TSO teleprocessing monitor used the Attach TSO facility. ADR chose to use the Call Attach facility, which avoids the overhead of TSO, in running a batch application, ADR's Mary Anne Borge said.

These DB2 features have been added to a language that is recognized for offering "a very nice, structured environment" and "highly readable, English-like syntax," Digital Consulting's Schussel said.

ADR officials said Ideal can also pass to DB2 all the information needed to generate an application plan, a precompile process that determines what resources the program will need.

Gray said Datasolve, a subsidiary of Thorn EMI, has more than 1,000 programs written in Ideal and yields a 7-to-1 gain in speed of coding over Cobol.

No party for PS/2

At age 1, uncertainty, high price hurt popularity

BY ALAN J. RYAN
CW STAFF

IBM's Personal System/2 celebrates its first birthday this week. But while users said the line is maturing, that still doesn't mean the new bus architecture on some models and the endorsement of television's *M*A*S*H* cast add up to widespread corporate acceptance.

Although some hardware enhancements are finally in place, users indicated that the systems themselves are still pricey and, some said, overrated.

Some users claimed the Micro Channel architecture, touted in some PS/2 models, is the drawing card, but others remain uncertain about specific benefits of the new bus.

"To me, the Micro Channel architecture is fine, but there is nothing magical about it," said Jeff Ehrlich, manager of product technology for General Electric Co.'s product technology group.

Ehrlich termed the IBM bus's purported ability to accommodate multiple master processors as "no big deal. You can buy an Irma card [from Digital Communications Associates, Inc.] with a processor on it; you don't need the Micro Channel to put microprocessors on expansion cards," he said.

One user said the new bus was just another way for IBM to plant itself even deeper into the personal computer marketplace.

"I see it as IBM's consolation — without increased capability — to the higher end customers, those who will buy only IBM," said Stuart Denrich, vice-president of data processing at Vons Food, Inc. in Baltimore.

It's in the numbers

According to Dataquest, Inc., a San Jose, Calif.-based research firm, IBM shipped approximately 700,000 PS/2s in 1987, and that number is expected to grow to 1.7 million this year. By 1990, when software applications for OS/2 should be abundant, shipments could climb to six million, Dataquest predicts.

Most users contacted by *Computerworld* last week said they would purchase PS/2s specifically to run OS/2, the operating system IBM developed with Microsoft Corp. They also said they are awaiting applications written for OS/2.

"The only reason I would buy the PS/2 would be to position myself to utilize the software," said Joseph Chester, manager of MIS at American Tape Co. in Marysville, Mich. "Other than that, there is not a lot of benefit to the PS/2."

"The PS/2 will hit its stride when the Micro Channel architecture and OS/2 begin to blossom a bit," said Joseph Vincent, director of technology planning at Humana, Inc. in Louisville, Ky.

Also holding some users back is the fact that IBM has already announced plans to upgrade the line with better price/performance.

Those contacted last week said the PS/2 Models 50, 60 and 80 were becoming increasingly popular. Camp Hill, Pa.-based Harsco Corp. expects to purchase several Model 80s later this year to act as file servers, according to the firm's MIS director, Ronald Blystone.

Allison Eisenberg, systems manager of microcomputers at Liz Claiborne, Inc. in Secaucus, N.J., said her company has standardized on the PS/2 line.

"We started buying them when they came out, and that's all we use. They're fine," she said. "But if I could buy a different machine, I might."

At first, Eisenberg said, the scarcity of emulation boards for the computers created problems, but those have since been eliminated.

Study: RISC isn't for business

BY STANLEY GIBSON
and JULIE PITTA
CW STAFF

Most businesses seek to avoid risk. If the results of a recent study are widely followed, they may want to avoid RISC, too.

Neal Nelson & Associates recently made public the results of tests performed on Sun Microsystems, Inc.'s Sun-3 and Sun-4 workstations, in which the reduced instruction set computing (RISC) processor-equipped Sun-4 sometimes lagged behind its Sun-3 predecessor.

According to Sun, the Sun-4, which contains the company's Scalable Processor Architecture (Sparc) microprocessor, offers more than 10 million instructions per second (MIPS), and the Sun-3 is capable of 4 MIPS.

Back to business

Neal Nelson, president of the research firm, said Sun's claim of 10 MIPS is based on results obtained from running the Dhrystone benchmark, a technical computing measurement. However, Nelson applied his firm's Business Benchmark to test the general-market usefulness of the Sparc processor and of RISC machines in general.

Nelson said Business Benchmark, a multitasking benchmark written in C, measures a computer's performance in computation- and disk-intensive tasks. The test showed that in eight of the 18 tests that make up the suite, the Sun-3 ran up to 50% faster than the Sun-4.

A Sun spokesman said the company does not disagree with the results of Nelson's tests. "What they've done is a benchmark of business applications. It focuses on I/O performance, not CPU performance. Business applications aren't the markets we've targeted," he said.

Nonetheless, Sun has been licensing its Sparc chip for use by a wide variety of computer vendors, some of which specialize in commercial applications.

AT&T, the first major Sparc licensee, has said it plans to migrate its general-purpose computers to the Sparc design. However, an AT&T spokesman declined to comment on the test.

Floating Point minisupers for high end

BY J. A. SAVAGE
CW STAFF

BEAVERTON, Ore. — Floating Point Systems, Inc. targeted two of its rivals last week by unveiling five minisupercomputers it claimed are up to 70% faster than its competitors' fastest machines at a 27% price premium.

Weakened and unstable from its $29.2 million loss in 1987, this year's first-quarter loss of $5.7 million, a management shake-up and the layoff of one-fourth of its work force, Floating Point is concentrating mainly on its scientific market.

Two weeks ago, the company said it would discontinue its T series parallel supercomputer if a development partner could not be found. No T series machines were sold in the past quarter.

Beyond belief?

"Floating Point has a credibility problem," said Sanjiv Hingorani, an analyst at Salomon Brothers, Inc. in New York. "It's going to take more than a single product to make them viable."

However, if the high end of the line can perform as claimed, other analysts said, at least the one product could be a hit, although few see the market growing until late this year.

"There is an insatiable need for power in the scientific/engineering community," said John Logan, an analyst with Boston-based The Yankee Group. The top of the M64 line is the 145 Model G with 31 processors, which the firm says can deliver 341 peak million floating-point operations per second (MFLOPS) at $1.75 million. Floating Point compared that model to Convex Computer Corp.'s fastest system, the C240, which Convex says runs at 200 MFLOPS at $1.35 million.

Floating Point's closest competitors, Convex and Alliant Computer Systems Corp., have announced machines in the last two months. Convex said its fastest one will be available in the fourth quarter. Three machines in the series are available now.

Alliant's FX/80 is its fastest machine; it has eight processors and is claimed to run at 158.8 MFLOPS at a cost of $653,000. All are currently available.

In addition to Floating Point's 31-processor machine, there are four lower end M64/145 models, the C, D, E and F, which reportedly range from three to 17 processors and 33 to 187 peak MFLOPS, according to Floating Point. Prices are guaranteed for the first three months, beginning at $396,000.

Parallel feats

Floating Point adds five models to its M64/145 line of minisupers, using up to 31 processors to achieve 341 MFLOPS[1]

Model G	341	31	101	$1.75M
Model F	187	17	79	$986,000
Model E	99	9	55	$637,000
Model D	55	5	36	$463,000
Model C	33	3	24	$396,000

[1] Millions of floating-point operations per second
[2] 1,000 by 1,000
[3] Until June 15

INFORMATION PROVIDED BY FLOATING POINT SYSTEMS, INC.
CW CHART

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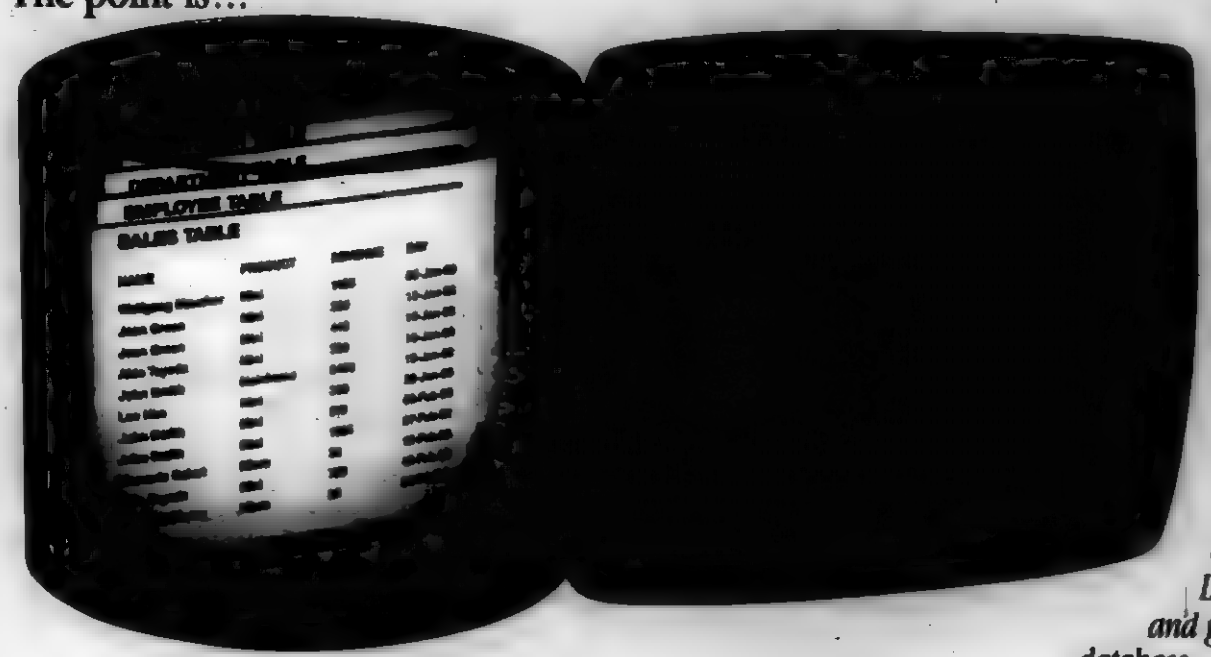

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Lotus fumbles

CONTINUED FROM PAGE 1

er, Inc.'s Macintosh and 1-2-3/G for the OS/2 Presentation Manager, observers speculated. Although Lotus declined to provide delivery dates, observers said the products will not ship until the tail end of this year or perhaps 1989.

Lotus's 1-2-3 Release 3 was originally scheduled to ship early this year and had already been pushed back to late in the second quarter before the firm announced the most recent delay last week. Lotus said it needed the additional time to fit the product into the memory space of Microsoft Corp.'s MS-DOS.

Lotus 1-2-3/M, a critical mainframe application for both Lotus and co-marketer IBM, will not be delayed, Lotus said. Lotus 1-2-3/M, originally set to ship shortly after Release 3, is now expected to ship before the new PC spreadsheet.

"You don't have similar memory constraints on the mainframe as you have for DOS," said Iran Salim, Lotus vice-president and general manager of the firm's PC Spreadsheet Division.

Although disturbed by the delay, Lotus users contacted last week appeared unwilling to switch wholesale to another spreadsheet.

"Lotus enjoys a very entrenched installed base. There is a major commitment to training and the development of models and templates. Changing a release date won't change all those factors," said a manager in charge of more than 50,000 micros at a large Midwestern firm.

"We are disappointed," said Jon Seebach, director of microcomputer resources for McGladrey Hendrickson & Pullen, the 12th largest accounting firm in the U.S. Although disappointed, Seebach said he is not ready to switch plans. "We might have a few users move to Quattro, but we are not just going to throw 1-2-3 Release 2.01 away."

One user saw Lotus as vulnerable. "Lotus runs the risk of seeing their market erode, but it will be gradual," said Frank Diasparra, vice-president of the advanced technology group of Fidelity Investments in Boston.

As a result of the Release 3 delay, Lotus's ambitious communications strategy will also not get off the ground anytime soon. The scheme, called Blueprint, consists of a common data interface that will debut with Release 3 and will be extended to the rest of the Lotus product line. The interface allows Lotus applications to communicate with each other and with applications from vendors who support the Lotus data interface.

Party time

Last week was Mardi Gras for Lotus's competitors. "We are already all drunk, we spent the night partying," joked Philippe Kahn, president of Borland International, which has made a low-end run at 1-2-3 with its popular Quattro integrated spreadsheet. Borland has shipped 125,000 copies of Quattro since last December, Kahn said.

Although sober, Microsoft Chairman Bill Gates also celebrated the Lotus delay. "There were certainly a lot of excited people back in Redmond," he said.

Tensions and personality conflicts between Microsoft and Lotus employees have escalated recently with Microsoft's aggressive pitching of its Excel spreadsheet against 1-2-3. "People will look even harder at Excel and not have this new version [of 1-2-3] looming over them," Gates argued.

Top Lotus execs liquidate stock

Lotus Development Corp. took some additional heat last week with the news that several of its key executives, including Chairman Jim P. Manzi, sold off large blocks of stock in February, just one month before the firm announced the delay of its revamped 1-2-3.

Lotus has acknowledged that the Securities and Exchange Commission has started an informal investigation into insider trading, but it downplayed threats of a class action lawsuit by shareholders.

The sales, including a 250,000-share transaction by Manzi, "were timed with the exercise of stock options, along with some personal obligations," said Tom Lemberg, Lotus's vice-president and general counsel. "Nobody had any knowledge that the announcement [of the delay] would be made."

Lotus did keep one card up its sleeve to play amid last week's bad news: It named Frank King, former vice-president of development at IBM's Entry Systems Division, senior vice-president of its Software Products Group. King replaces Charles J. Digate, who recently resigned. King was not available for comment.

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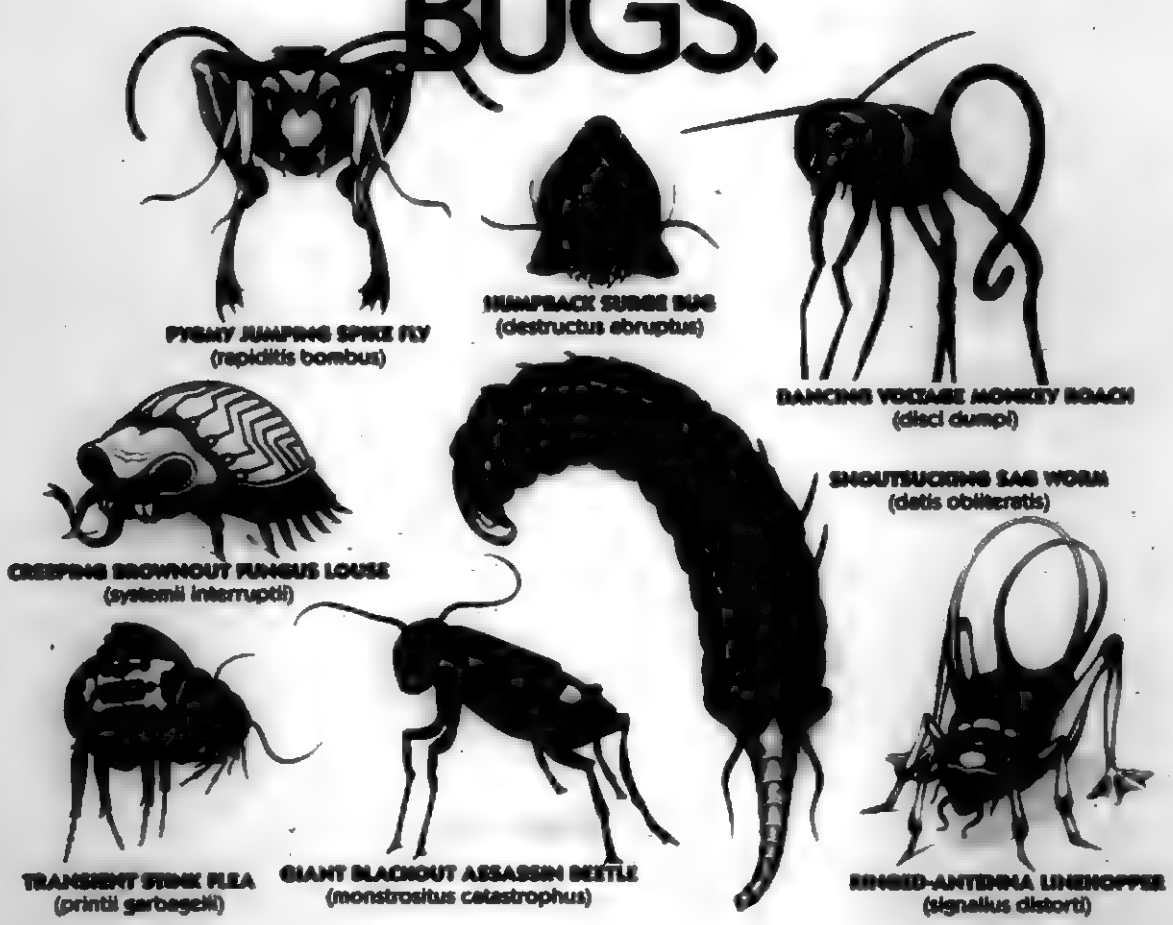

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Flurry of products to debut at Interface '88

BY PATRICIA KEEFE
CW STAFF

CHICAGO — Interface '88 kicks off here today with a dual focus on network integration and distribution issues.

The show is expected to attract 15,000 attendees, 2,000 more than last year, while the newly launched World Computing Conference is expected to draw another 5,000.

Few major product announcements are expected at what is shaping up to be a quiet connectivity exposition. However, a robust schedule of product announcements features a number of introductions in some hot topic areas:

IBM's LU6.2.

• Eicon Technology Corp. in Montreal will detail plans to support LU6.2 and CCITT X.25 on IBM's Micro Channel architecture under OS/2. Eicon is also scheduled to announce three additions to its line of IBM Advanced Program-to-Program Communications/LU6.2 products, including support for IBM's Synchronous Data Link Control, X.25 and third-party emulation and enhancements to its IBM 3270 and 5250 gateways.

Network management.

• Connect Computer Co. is set to unveil an interface to IBM's Netview for its Lanscope network management system.

• Tellabs, Inc. is set to introduce Telemark, a comprehensive network management and control system designed to provide single-point control and maintenance of voice and data networks.

• Retix is slated to announce the Retix Network Manager, integrated network management for its Retixgate series of Ethernet bridges. It features software that resides in bridges, gathering statistics and responding to control messages, and a personal computer-based software module that acts as the central control for the network.

Fiber optics.

• Fibercom, Inc. is set to introduce Whisperlan/TP, said to be the first twisted-pair Ethernet configured with a fiber-optic ring backbone.

Open Systems Interconnect (OSI).

• Philips Information Systems, Inc. in Mountain View, Calif., will unveil the OSI-PC board, said to enable developers to implement OSI applications protocols. A communications processor with a large memory manages the seven layers of OSI, freeing the CPU to perform typical PC functions. The card also functions as a local-area network and X.25 gateway.

• San Fransisco-based Cisco Systems, Inc. is set to introduce the International Standards Organization (ISO) Gateway, said to implement ISO network layer, or Level 3, support. Priced at more than $1,000, it is set to ship in June. Also set to debut is a Hybridge network card that works as both a bridge and router. The $6,200 board, which links Ethernet networks, also allows users to tie into Digital Equipment Corp.'s Decnet terminal server network.

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DSC's third-generation LAN competes with Novell, 3Com

BY KATHY CHIN LEONG
CW STAFF

SANTA CLARA, Calif. — Filling the gap for increased file server storage and instantaneous network backup, DSC Communications Corp. has unveiled what it calls a third-generation local-area network designed to rival IBM, 3Com Corp. and Novell, Inc. products.

Announced by the DSC Business Network Systems Group, which includes the former Nestar Systems, Inc., the Nexos LAN family is considered a third-generation network when compared with the initial LANs that served as printer-sharing devices and second-generation LANs that linked local devices without providing connections outside the network.

The Nexos LAN features its own network operating system; network interface cards that support token-ring, Ethernet and Arcnet; 1.3G-byte file servers; and communications gateways into the CCITT X.25 and IBM Systems Network Architecture worlds. The firm will need plenty of marketing muscle to go up against the mainstream networking giants, but DSC's products appear to provide some benefits not readily available. "DSC is going after the power user," said Gary Kwok, director of marketing at the Lanquest Group. "These products are designed to attract MIS directors with network sites in multiple locations."

According to DSC officials, the Nex/OS operating system offers data base engine support and support for multiple servers through a multiplexing driver. Eric Siegal, DSC's director of marketing programs, said 3Com, Novell and IBM do not currently offer these features.

As a result of a joint agreement with Wordtech Systems, Inc. and Data Access Corp., customized data base versions have been developed for Nex/OS. In-house tests revealed that Nex/OS can process versions of Wordtech DBXL Database Manager and Data Access Dataflex Database Manager up to 600% faster than original off-the-shelf versions when users process index records at the file server, not the workstation.

The operating system, priced between $1,195 and $3,995, will support applications written for the Novell Netware environment — a feature that has set 3Com back from sales, said Tom White, president of Infonetics, Inc. He stressed that DSC will have a tough road to hoe. "These features are here now, but how long will it take for others to catch up?"

Illinois Bell ready with first ISDN FCC rate petition

BY ELISABETH HORWITT
CW STAFF

CHICAGO — Illinois Bell is expected this week to be the first U.S. carrier to file a regular Integrated Services Digital Network (ISDN) tariff with the Federal Communications Commission.

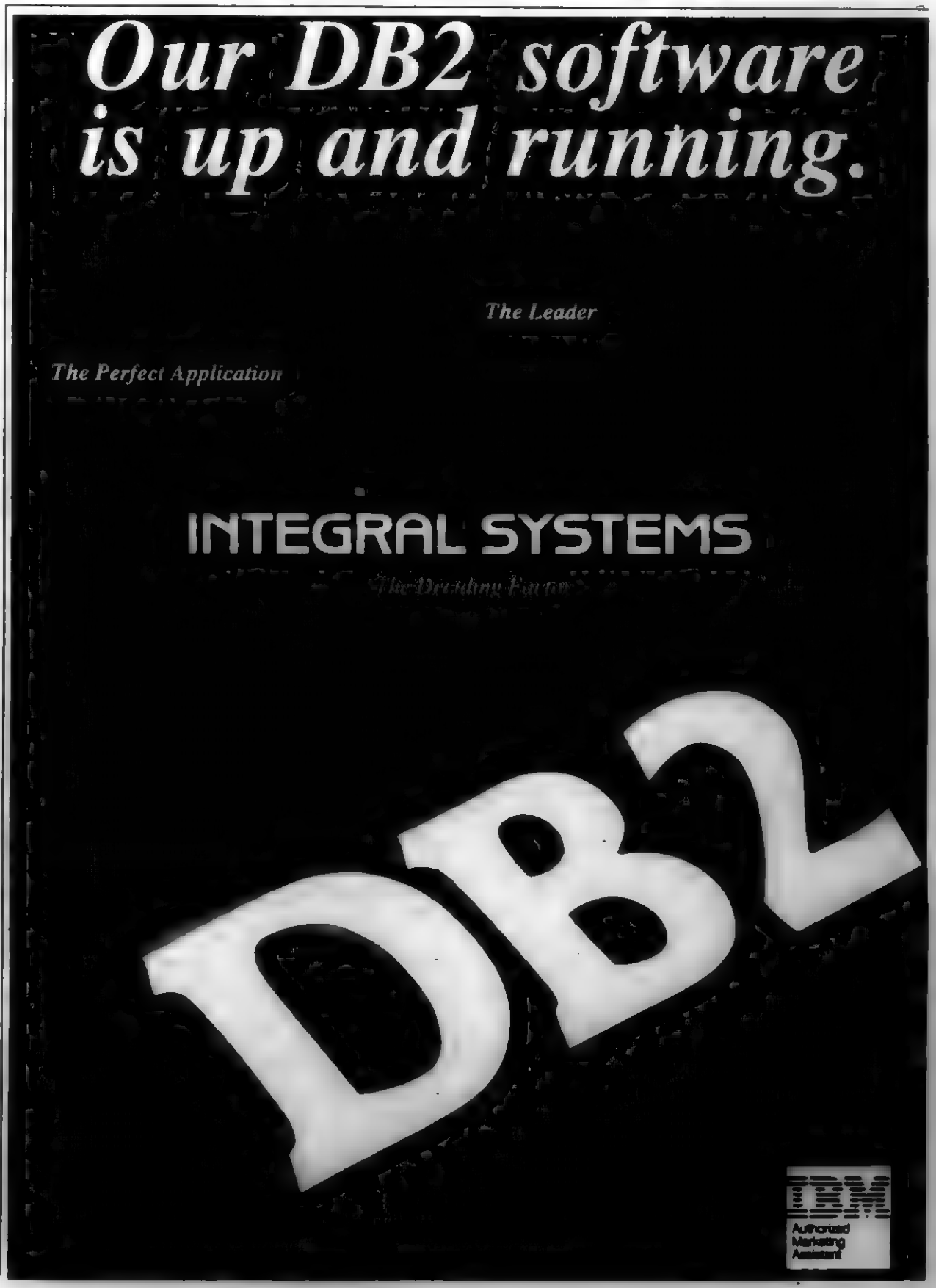
The Ameritech-owned divested Bell operating company confirmed that it will announce a Basic Rate Interface ISDN tariff at the Interface '88 conference to be held here this week. While Illinois Bell would not give details on the rates it will request in the tariff, several industry sources agreed that the cost of one Basic Rate line, which defines two 64K bit/sec. digital transmission channels, will be between 1½ and two times the cost of regular digital Centrex lines. This would put the service's price at between $20 and $30 per month per line, according to Joaquin Gonzalez, a vice-president at Stamford, Conn., consulting firm the Gartner Group, Inc.

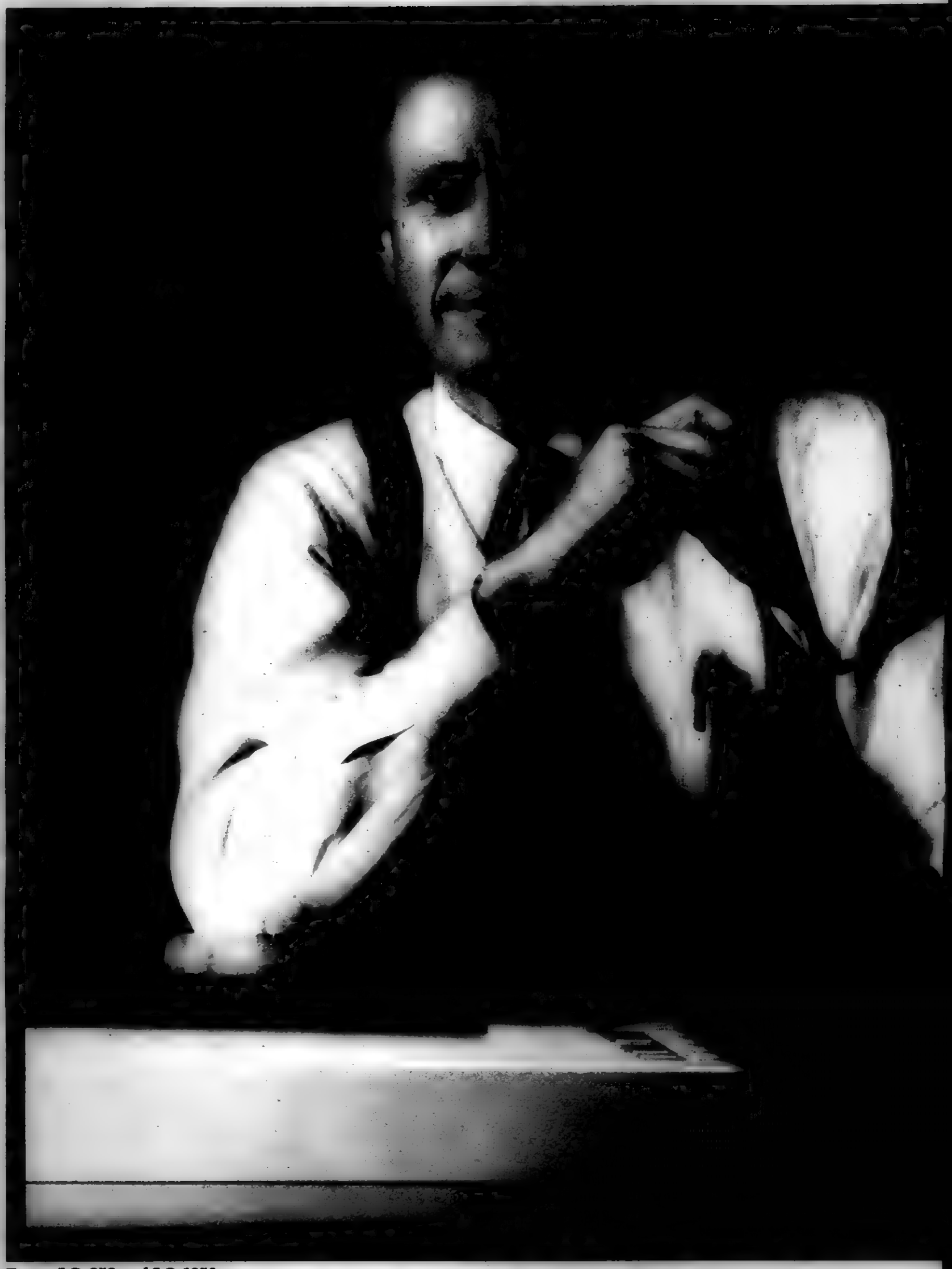
The initial attractiveness of the ISDN service to customers will depend on whether Illinois Bell, and eventually other Bell operating companies, charge only a set monthly per-line rate for Centrex-like ISDN services that are provided by one central office switch, Gonzalez said. "If the Bell operating companies decide to charge for usage, consider ISDN dead; if they don't, tell me more," he said.

A flat $40 monthly rate for a point-to-point connection would make ISDN an inexpensive alternative to point-to-point 56K bit/sec. Digital Dataphone Service connections, which can cost between $200 and $300 per month per line, Gonzalez said.

Tenneco, Inc. made sure it would get a flat monthly rate and no usage-sensitive charges when it worked out its ISDN contract with Southwestern Bell, said John Saccente, the holding company's director of telecommunications.

Tenneco's ISDN service, which is scheduled to go on-line in mid-May, is not a regular tariff, but rather a Customer-Specific Proposal that Southwestern Bell Corp. filed as a special tariff. A Southwestern Bell spokesman said the company plans to file a non-usage-sensitive tariff in early 1989.





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EDITORIAL

Facing the music

IN THE MOVIE *Bad Day at Black Rock*, Spencer Tracy played a crippled war veteran who descends on a small town in search of links to his past. His search eventually turns the community inside out, as the frailties and long-hidden sins of the town and its inhabitants inexorably bubble to the surface.

Similarly, the last couple of weeks have been uncharacteristically bad for some of the big boys in the personal computer industry.

Last week, Lotus announced a six-month delay in shipping the eagerly awaited Release 3 of 1-2-3. At the same time, it was disclosed that Lotus's top managers unloaded more than a half million shares of Lotus stock just weeks before the shipping delay was announced.

Apple, feeling antsy about the encroachment of IBM hardware into its world of user-friendliness, sued Microsoft and Hewlett-Packard over their use of a graphical interface. The suit raised questions about the ability of Microsoft and IBM to bring the critical Presentation Manager interface to market on schedule this fall.

Then IBM and its Personal System/2s were the subject of a not-so-flattering front-page article in the *Wall Street Journal*, which painted the Micro Channel as being as much or more "an audacious marketing gambit" than the clone-proof secret ingredient of the PC of the future.

These companies and the woes they are experiencing have one thing in common: They are being victimized by expectations of their own creation. Caught between the realities of developing and selling increasingly complex products for an increasingly integrated computing environment on the one hand and Wall Street on the other, these firms had effectively staved off the bears by pointing to rosy visions of the future.

Only now the question is, Do these companies have the ability to fulfill their promises? Probably they do. While last week's news cast a pall over the PC industry, it was also a necessary cleansing process. Lotus has swallowed a bitter pill in admitting it cannot meet its deadlines, but it presumably has now set a date for the next version of 1-2-3 that it can live with. Microsoft and Apple will be forced into discussions that hopefully will produce a technology agreement both parties can live with. And IBM realizes it has much educating to do to convince a skeptical market that the Micro Channel is more than just a flashy marketing campaign.

There is a lesson here for the PC companies if they hope to avoid such damage to their images in the future. If those firms expect to compete in a maturing market, they must focus on customers and stop worrying so much about Wall Street. Statements of intention and product positioning have their place but are no substitute for deliverable products. Similarly, bickering between influential vendors only raises doubts among customers and threatens to drive them into another supplier's camp. It is difficult to feel sorry for any of the companies involved here. As Shakespeare wrote in *Julius Caesar*, the fault "is not in our stars, but in ourselves."

LETTERS TO THE EDITOR

Not all rosy

The report on IBM's earnings [CW, Jan. 25] was a textbook example of the effect of price cutting in a service business. The chart on IBM's revenue indicated that the company shot itself in the foot in the maintenance division. IBM's maintenance revenue grew at a miserly rate of 4%.

The chart indicated IBM enjoyed a growth rate of 17% and 21% for maintenance services in 1985 and 1986, respectively. However, in 1987, the maintenance revenue growth fell to slightly more than 4%. This is largely a result of the Corporate Service Amendment (CSA) to IBM's maintenance agreement. This marketing program had the net effect of reducing the maintenance revenue paid by IBM's mainframe customers by a minimum of 20% per year.

The announcement of the mid-range services amendment in the fall of 1987 can only spread the bad news to the balance of the IBM product line, the mid-range world.

The 1987 quarter-to-quarter comparisons make even worse reading for an IBM stockholder. The company managed to absolutely level the maintenance revenue in 1987 while it increased the pool of equipment eligible for maintenance by $34 billion, the value of the equipment it shipped throughout 1986. In effect, IBM has reversed the two-year growth curve of the maintenance division from approximately 19% per year to a negative growth curve after factoring in a $34 billion increase to the value of the equipment maintenance pool.

I assume that the marketing objective of the CSA program was to drive third-party competitors out of the business. To date, I have not seen any withdrawals from the maintenance business by any of the major companies, nor has there been any withdrawal of regional maintenance operations.

As a stockholder, an ex-IBMer and one who earns a living on the fringes of the IBM maintenance business, I only hope that the company does not aim any higher with maintenance policy changes this year.

Franklin J. Cone
Membership Director
Systems Maintenance Cooperative
Bradenton, Fla.

It can work

Reports of the apparent lack of IBM 9370 applications software [CW, Jan. 25] do not stand up to the test of reality.

In late December, Global Software, Inc. completed installation of a 9370. Immediately afterward, we installed one of our most popular products, Carms, which stands for credit and accounts-receivable management system. It was installed in less than a day.

The initial test of Carms was performed with seven users concurrently working against the most resource-intensive parts of the application. Two CICS partitions were active. Response time was excellent — consistently under two seconds. Batch processing was equally efficient.

This test goes a long way toward validating IBM's claims about system performance of the 9370.

At the same time, it is obvious to us that applications software must be efficient by design to perform well on the 9370. After-the-fact retrofitting — or as a vendor in the article said, "shoehorning" — will not get the job done.

Tight, well-written mainframe application code performs effectively on the 9370. And it dramatically displays the shortcomings of poorly designed programming.

Ronald J. Kupferman
President
Global Software, Inc.
Lynnfield, Mass.

Too exclusive

I am writing in reference to "Unisys confronts power of 3 masters" [CW, Feb. 8].

Your so-called exclusive *Computerworld* survey in January must have been really exclusive. Since the Burroughs Corp.-Sperry Corp. merger, service to large former Burroughs mainframe customers in the San Francisco Bay area by both field engineering and marketing has shown a marked improvement from good to better. No one contacted our site for the "exclusive" survey. We have a Unisys Corp. A9F mainframe, more than 100 on-line terminals and a cadre of satisfied users. After talking with some of my MIS peers in the Bay area, I suggest you re-survey the Unisys user community for a more accurate picture.

Arnold D. Schapiro
Director, MIS
Orchard Supply Hardware
San Jose, Calif.

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

'Butterfly Effect': Everything's a part

Hierarchical, reductionist managing won't work in our increasingly interrelated world

JOHN KIRKLEY

Butterflies. Airborne scraps of summer color moving through fields of flowers.

But there is more to butterflies than decorating the landscape, pollinating flowers and providing tasty snacks for hungry birds. They are also the basis for an analogy in weather circles that has implications far beyond the boundaries of that discipline — implications that may affect the way MIS professionals manage tomorrow's information systems.

I encountered the "Butterfly Effect" in James Gleick's fascinating new book, *Chaos*. In the prologue, Gleick writes, "The modern study of chaos began with the creeping realization in the 1960s that quite simple mathematical equations could model systems every bit as violent as a waterfall. Tiny differences in input could quickly become overwhelming differences in output — a phenomenon given the name 'sensitive dependence on initial conditions.'

"In weather, for example, this translates into what is only half jokingly known as the Butterfly Effect — the notion that a butterfly stirring the air today in Peking can transform storm systems next month in New York," Gleick writes.

The unfolding of this new science, peppered with unfamiliar terms like fractals, smooth noodle-maps, bifurcations and intermittencies, is beginning to profoundly affect the way scientists, and ultimately, all of us, view the world around us. "Chaos," Gleick writes, "breaks across the lines that separate scientific disciplines. . . . It is a science of the global nature of systems."

These scientists of chaos believe they are looking at the whole, rather than analyzing a system according to its parts, as the reductionists do.

Despite quantum physics, relativity theory, Heisenberg's uncertainty principle — despite

Continued on page 22

Kirkley is a computer industry writer, editor and consultant based in Warwick, N.Y.

Adjustable management mechanics

WILLIAM D. HARRISON

I began working in the computer field in 1960 as a systems engineer on a high-speed printer project at RCA.

At that time, high-speed printers were very expensive devices. The machine that RCA was developing printed at a rate of 600 lines a minute and cost about $50,000.

The engineering approach to designing the printer could be described as precision mechanics. The individual print hammers were manufactured to tolerances of one thousandth of an inch. Some of the early prototypes for the machines were made in Switzerland.

The basic design philosophy was to control print density and alignment by designing and manufacturing all of the printing components to precise specifications. There was one adjustment, and it was set at the factory.

The printer was a masterpiece of engineering, but it was not a great printer. Both print alignment and density drifted during printing.

Room for changes

While RCA was struggling to correct the deficiencies in its printer design, a small, entrepreneurial company took an innovative approach. Instead of producing parts to very rigid tolerances, this start-up added as many adjustments as possible to the printing mechanism.

The adjustments were used to compensate for variations in tolerances in manufacturing. The "adjustable printer" was very successful. It was also less costly than the RCA model.

Eventually, RCA phased out its printer and used the adjustable printer company as its supplier.

Adjustable solutions

After I became a manager in 1970, I saw the adjustable printer scenario repeated many times. The managers who had

Continued on page 22

Harrison is an engineering manager at Siemens Information Systems in Boca Raton, Fla.

Going the way of the whale

Don't let real programmers become extinct; support the creative ego

FRANCIS WALNUT

The programmer is an endangered species in the world of software development and may soon become extinct.

Programmers used to be software developers who did it all. They defined, designed, coded, debugged and maintained programs. They made the new phenomenon of "programming" into a craft, taking immense pride in what they created and being totally involved in what they did. Programmers, who lived to write good code and to see it work, were largely responsible for the great programming achievements of the 1950s, '60s and '70s.

Perhaps because managers are not able to cope with the artisan, they are eliminating the role of the programmer in software development and assigning the function to two autonomous groups: the Analysts and the Coders.

Analysts are individuals who talk knowingly about current computer science topics and who prepare diagrams and documents defining mythical systems. They like to be considered software designers only, and they abhor writing code. Analysts prepare voluminous detailed instructions defining how programs should be written and give these instructions to the pariah of the software community, the Coders.

Coders (often mistakenly referred to as programmers) write, debug and maintain programs according to the Analysts' instructions. Coders are limited to the preparation of sterile code, avoiding any creativity in either coding techniques or program structure. They are seldom aware of how their tasks fit into the overall system design, and management normally feels that they have no need to know.

A house divided

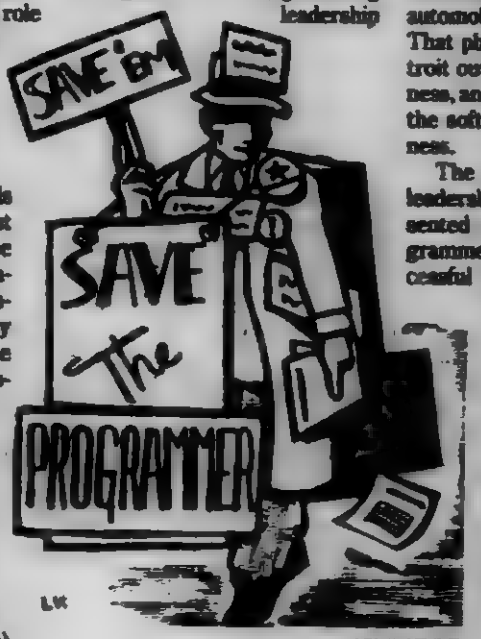
The frightening result of this divide-and-conquer approach is the elimination of programming expertise. That combination of skill, knowledge and understanding that allows the programming craft to become intuitive can only be achieved through many years of active program development and maintenance.

Once achieved, however, expertise allows a programmer to think in a programming language, conceptualize in terms of system design, know instinctively what will work and what will not for a given application and debug successfully through deja vu.

Programming expertise cannot be obtained with college degrees or through adherence to structured design concepts; it can only be obtained through grassroots programming experience. This type of experience is now considered unimportant, and it is only a matter of time until programming expertise disappears.

Misplaced leaders

As a result of the demise of programming expertise, programming leadership is gradually being replaced by software management. Programming leadership assumes that the people in charge are expert in their area of supervision; software management assumes that successful supervision requires only the ability to monitor, motivate and administrate.



LEE KAUFFMAN

Programming expertise is actually considered a detriment to successful software management because it is felt to detract from the esoteric management techniques.

Recently, when a software manager bragged that his technical credentials consisted of the fact that he had written "one program that never worked" he was applauded — by other software managers.

Although it may be true that a preoccupation with technical details may interfere with successful management, it is equally true that only programming expertise can provide a realistic knowledge of what is required to get things done and an understanding of how to do them.

Often when there is management without expertise, logical program implementation is replaced by protective memos and irrelevant schedules.

In addition, the new software management philosophies are destroying dedication and pride of achievement, which were the programmers' driving forces. Each individual in a modern software development organization has his or her isolated function and is effectively buffered from any responsibility for the finished product.

Meeting artificial deadlines becomes their primary concern, and quality assurance becomes merely the function of another group in the organization.

We are now producing "egoless" programs using the same management philosophy that had Detroit producing egoless automobiles a few years ago. That philosophy almost put Detroit out of the automobile business, and it may well put us out of the software development business.

The programming expertise, leadership and dedication represented by the innovative programmer is essential for the successful completion of any significant programming project. Those of us who lived through the implementation of OS/360 are willing to admit that it represented a great managerial achievement, but we also feel that it represented a triumph for the innovative programmer.

Although the writing of the individual parts of OS seemed to go well under management control, serious problems were encountered when we tried to put the system together. Nothing seemed to fit.

It was then that the innovative programmers took over. They added a little here, took away a little there, redesigned a little, rewrote a lot and worked such long hours that it became a corporate concern. Innovation and creativity were everywhere. And OS/360 was born.

I often wonder if OS would ever have seen the light of day if egoless programming had been in vogue 20 years ago.

"But," we declare, "it took us 10 years to get the programmers out of their sneakers and jeans. We have finally convinced them that program design is an architectural exercise and that coding is merely a clerical activity. Perhaps we still cannot produce programs efficiently, but at least we are in control."

This obsession with control has ruined many healthy businesses and is now threatening to

Continued on page 22

Walnut is president of Documentation Research in Drexel Hill, Pa., a company that prepares programs and consults on automated documentation.

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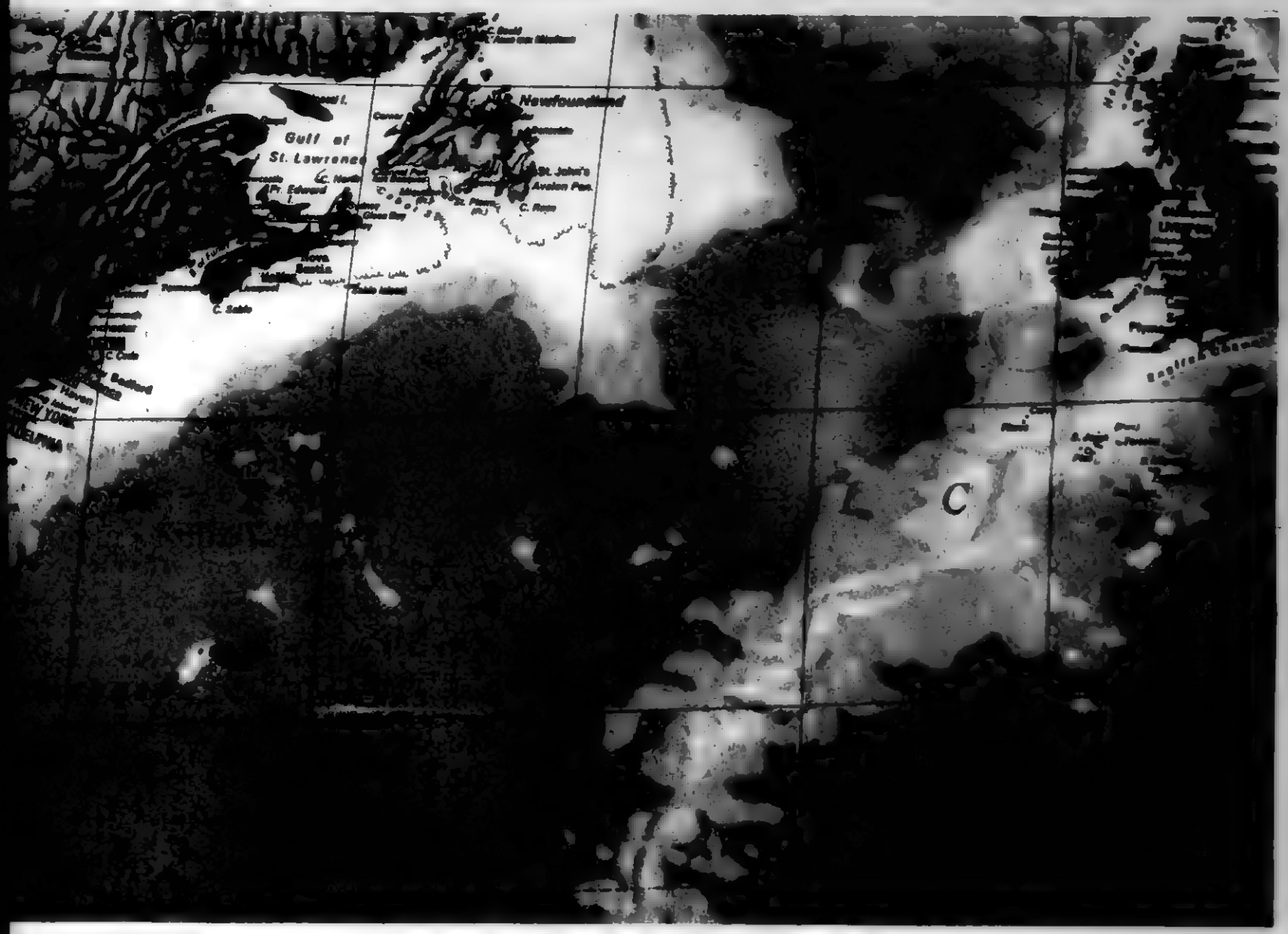

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Butterfly Effect

CONTINUED FROM PAGE 19

discoveries that the universe we inhabit is paradoxically more simple yet infinitely more complex in its interdependent interconnections than we imagined — we still carry with us the useful yet burdensome baggage of world views grounded in Cartesian rationality and Newtonian physics.

In many ways, we still see the universe as a great machine put in motion by some celestial engineer. To understand the machine, we need only unravel the secrets of its parts. In addition, we see ourselves as separate from the people and the world around us. We stop at the boundaries of our skin; beyond that, all the rest begins.

Physicist Geoffrey Chew is known for the "bootstrap hypothesis." As explained in *The Tao of Physics*, by Fritjof Capra, this hypothesis postulates that "nature cannot be reduced to fundamental entities, like fundamental building blocks of matter, but has to be understood entirely through self-consistency. This bootstrap philosophy ... accepts no fundamental entities whatsoever — no fundamental concepts, laws or equations. The material universe is seen as a dynamic web of interrelated events. None of the properties of any part of this web is fundamental; they all follow from the properties of the other parts, and the overall consistency of their interrelations determines the structure of the entire web."

Perhaps eventually the interrelatedness of all things will creep into our collective conaciousnea, replacing the Newtonian notions of separateness and reductionism. There are already signs in our own field of computer technology that this change is happening. There is the development of groupware — software that permits people, all connected by networks and personal computers, to share ideas, exchange comments, develop projects and, in general, go about their business not so much as separate entities but more as parts of a collective whole.

And then there is the fast growing area of distributed network computing. We're already taking the first steps with Sun Microsystems' Network File System, DEC's Decnet System Services and Apollo's Network Computing System.

These networking schemes not only provide the benefit of load-leveling across computer resources but make it possible for users and their equipment to concurrently access multiple servers on the network. This interaction, in turn, leads to the promise embodied in yet another new computer industry catch phrase, Computer Supported Cooperative Work.

Users weaving webs

With or without the help of MIS, users are beginning to mold themselves into interrelated webs of cooperative enterprises. In the workplace, they are beginning to emulate the world view implicit in tomorrow's physics.

MIS managers who attempt to manage the evolution of information systems from the old Cartesian view of a hierarchical, reductionist world will find themselves totally out of phase with their users.

And what of butterflies? The wise MIS manager will help facilitate this increasing interrelated web of user interaction. He will remember that in a holistic world, a small perturbation in one part of the system can lead to massive perturbations somewhere else.

Tomorrow's savvy network managers will be not only know their protocols, they'll be minding their fractals as well.

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Way of the whale

CONTINUED FROM PAGE 19

destroy the software development business by eliminating the programmer.

Since the programmer is at least as important as the whale, we should embark immediately on a "Save the programmer" crusade.

We should resurrect the concept that creativity at the coding level is desirable, encourage the development of programming expertise, develop programming leaders and put the ego back in programming.

Above all, we must learn to work effectively with the programming craftsman and avoid the tendency to destroy what we do not fully understand.

If, however, we are unwilling to take these steps, let us at least be kind to all the programmers we may meet. They feel neglected and betrayed. So, be nice to a programmer today — if you can actually find one.

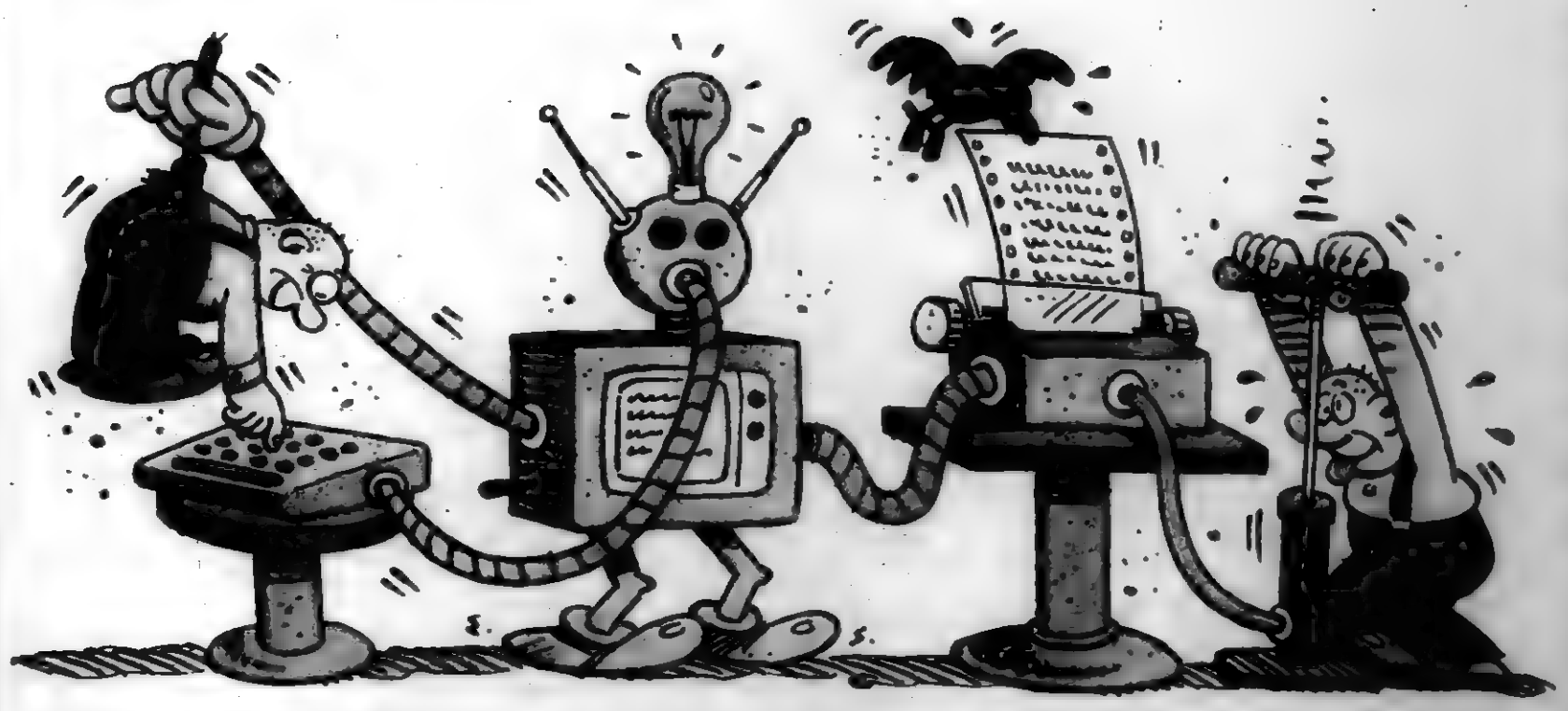
Mechanics

CONTINUED FROM PAGE 19

the highest failure rates always planned in a precise manner, down to the smallest detail. They also implemented rigid controls over each task in product development.

The most successful managers produced a solid overview but rarely planned in detail beyond a three-month period. Limiting detailed planning appears to provide flexibility to respond to the many unforseen events that can occur during product development. It also seems to help software engineers focus on today's problem rather than worry about a task that need not be done until far in the future. The successful managers used "adjustable solutions."

As one successful manager said to me, "I love to make plans. It gives me something to change."



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SOFT TALK

Thomas O'Flaherty

CASE's next generation

The next generation of CASE? Most of us haven't yet digested the hundred — give or take 25 — CASE products available.

Actually, many organizations need the next generation right now. Few computer-aided software engineering, or CASE, products promise coverage of the entire software life cycle. A less obvious but equally limiting defect is the lack of a way to fit previously developed, non-CASE applications into a standard CASE environment.

The next CASE generation, CASE II, will be differ in the following ways from what we now think of as CASE, both functionally and in how CASE presents itself to users:

- Full, integrated functions. The larger CASE vendors have already begun a kind of "race to the sea" whereby a customer would get support for all life cycle components from a single, integrated source.
- Mix and match. This will allow customers to implement the CASE phases they feel ready for, while having assurance that other CASE modules will be available when needed.
- Methodology support. CASE tools and implementation are driven, at least implicitly, by a particular approach to sys-

Continued on page 29

Bachman on direction of DBMS

Software guru sees users adopting multiple data base approach

In a recent interview, Charles W. Bachman, president and chief executive officer of Bachman Information Systems, Inc. in Cambridge, Mass., outlined where he sees data base management systems headed in the near future.

Bachman is the originator of the Bachman diagramming technique and recently received a patent (his 17th) for a data translation model. He spoke with *Computerworld*'s Joanne Kelleher, senior editor of *Spotlight*.

In what direction do you see DBMSs heading?

I think we are building toward a point where, instead of one or even two data base systems, people will have a family of them installed on their computers and will choose the one they think is appropriate for each application.

There was a time when there was a great fervor about whether relational systems or hierarchical systems or network systems were right. There have been some great debates on the subject. But I think that is passing. In the future, there won't be an all IMS shop or an all IDMS/R shop or an all VSAM shop.

People want to look and say, "What information does the business need, and how shall I implement it?" And they really want to hold off the decision to bind to a particular data base system as late as possible.

Are there any limitations in the current models that you think could and should be rectified?

I think we have maybe reached a stable point. While there are things that could be done to the data models or a lot of the current data bases that would make them better, maybe it wouldn't be enough . . . to move people from where they are.

Some of the current models have their known inadequacies, but they also have their known behaviors. And people will not move easily to something new, unless it offers them a substantially larger benefit.

Charles W. Bachman

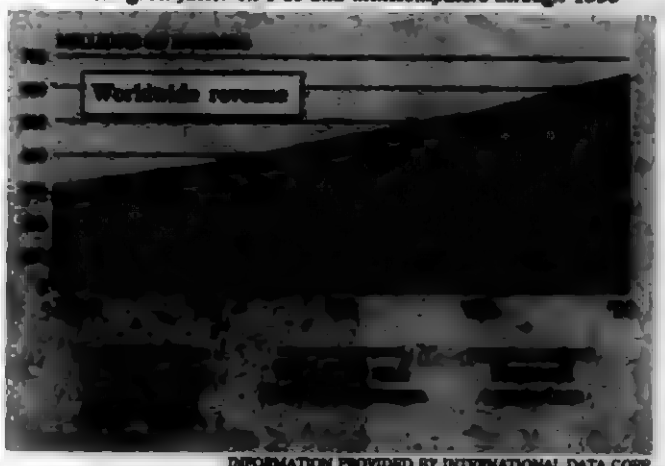
That higher level of specification you are referring to is the Partnership Data Model, for which you recently received a patent. Can you describe what that is?

Continued on page 30

Data View

Accounting software use rising on nonmainframe platforms

Use will grow faster on PCs and minicomputers through 1990



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.

Mainframe Unix to get SAA bridge

BY CHARLES BABCOCK
CW STAFF

IBM's version of Unix for the mainframe, AIX/370, contains features that originated with smaller companies and have been adopted by IBM to provide interconnectivity, the company revealed recently.

In addition, AIX/370 and IBM's proprietary software architecture, Systems Application Architecture (SAA), will have bridges between them, even though they represent two worlds of software that will remain distinct for many years.

In one instance, a Unix- and Ethernet-based communication protocol — Transmission Control Protocol/Internet Protocol (TCP/IP) — will not only be offered across the entire AIX/370 line but will also be extended to the IBM MVS and OS/2 worlds, company officials said.

Continued on page 29

Inside

- Unisys offers manager for its Prizm system. Page 32.
- Computer Translations reworks converter, adds ability to run on VMS systems. Page 32.

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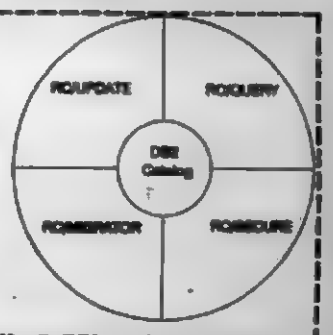

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O'Flaherty

CONTINUED FROM PAGE 25

tem development that permeates a particular CASE approach. Vendors now generally adopt one of two approaches: offering a single proprietary design philosophy or allowing a user to interface with a methodology of the customer's choice.

In the future, vendors will have to support, say, two to four design methodologies — enough to give users reasonable choices without placing unrealistic support requirements on the vendor.

• Integrated restructuring. Having full, integrated CASE functions will be important for new systems but won't be of much help to the many organizations with huge investments in already operational systems. Finding ways to redevelop in place is often of higher priority than finding elegant ways to build totally new systems.

Future CASE tools will have to be time travelers, enabling customers to go back into an older system to restructure it into at least a semi-CASE environment.

• End-user CASE. Many CASE vendors stress the necessity of end-user, and even top management, involvement in the CASE development process. Unfortunately, they provide little advice in mobilizing end users; too many CASE tools seem to depend on system-friendly users rather than user-friendly systems. The next CASE generation will have to, at a minimum, hide a great deal of current technical interfaces and/or add another layer of business-oriented interfaces.

• Consulting plus software. The current CASE focus has been, quite legitimately, on CASE tools and methodologies. The problem for typical users is not so much learning how to use a product but figuring out how it should be used. CASE will only prosper in most organizations when it is not just a software product but a way of life.

At the least, a customer will usually have to be assisted in implementing several medium-size projects. Since CASE at its most mature is a disciplined way of organizing an enterprise's data resources, a vendor may well continue to supply the CASE "shock troops" to keep CASE pointed in the right direction.

Implications

CASE has significant implications for both customers and vendors:

• Standards. Interface standards, between both functional models and design representation systems, will be both a cause and effect of CASE advancing to its next generation. The lack of enthusiasm for the CASE standards group of the Electronic Industry Association shows this will not happen overnight.

• Investment. CASE II will be expensive and take substantial time to develop. The investment is not limited to vendors, since a full-fledged CASE environment will be costly in time and money for users to implement.

• Consolidation. Large investments in product development and distribution suggest that there will be a natural drift toward forming a relatively few large vendors that are strong both technically and financially.

O'Flaherty is a principal of Information Service Strategies, Manhattan-based consultants, and specializes in information systems planning.

Mainframe Unix

CONTINUED FROM PAGE 25

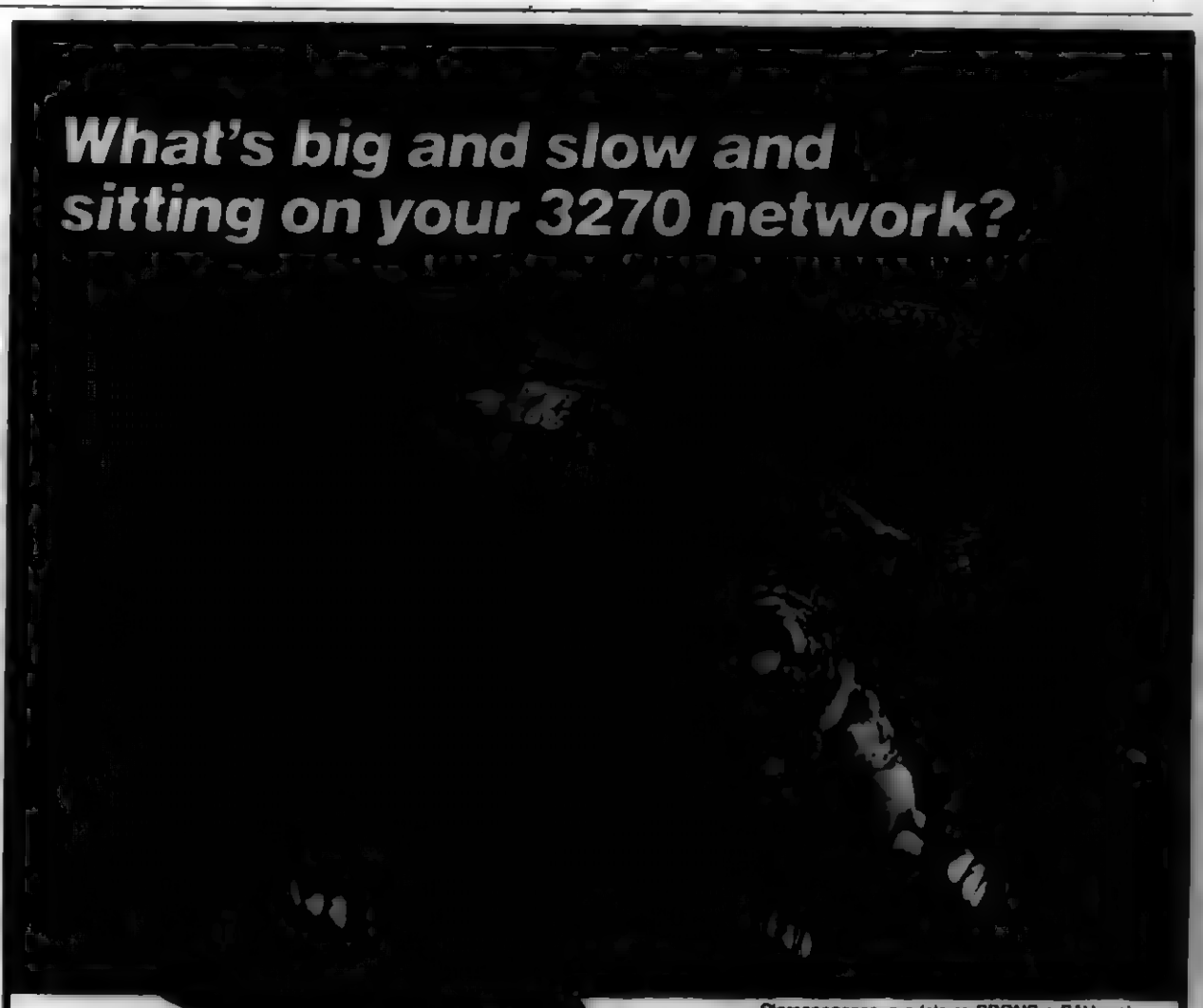
Also, IBM users implementing SAA with LU6.2 "might find that protocol helpful to have in the Unix environment. Although LU6.2 might not become a Posix standard, our intent is to provide our customers an LU6.2 communications vehicle so that data from the SAA environments can be incorporated into AIX," said George H. Conrades, senior vice-president and general manager of IBM's Personal Systems Division.

Thus, the primary communication protocol of the respective software architectures will have a bridge into the other, otherwise largely incompatible, world, explained Thomas K. Dow, AIX product manager in IBM's Data Systems Division in Kingston, N.Y. No time frame was set for either move, but Dow claimed the TCP/IP initiative is not very far away.

One feature of AIX, its Transparent Computing Facility (TCF), originated with Locus Computing Corp. in Santa Monica, Calif. TCF allows the creation of a TCF cluster that offers "a single system image" to an application program or user on the cluster, Dow said. The cluster can include up to 31 nodes connected by an IBM Token-Ring, an Ethernet local-area network or an IBM Channel-to-Channel Adapter. Files may be accessed from any node, and a system operator can designate different processors for various tasks to distribute the work load on the cluster, IBM said.

A single, distributed, hierarchical file system is featured in the TCF cluster. If an AIX user at one location cannot find a file at his departmental IBM 9370 data base, his query can be automatically rerouted to a mainframe or other processor where the data base has been replicated, according to system operator specifications.

A second option under AIX/370 that was developed outside IBM is Network File System (NFS), a Sun Microsystems, Inc. protocol enabling AIX/370 to work with other Unix systems connected via an Ethernet or Token-Ring LAN. NFS is a separately licensed program set to become available at the same time as AIX/370 in March 1989.



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Bachman

FROM PAGE 25

At a time when people were trying to understand how data bases operated, there was a considerable amount of research work done under the auspices of the ANSI organization. One of the problems they attacked was the question of what they called data independence.

First, they came up with a conceptual schema, which was a view of the information in a business independent of how it might be stored in a data base or, in fact, how it might even be kept in paper form.

Then, the next step was to come up with a way of describing the information that transcended specific coding dialects.

So the Partnership Data Model was created not to be the basis for another data base system but to be a basis for translation — a Rosetta stone of data models, if you want to think of it that way.

It gives you the power to understand what is going on in the other models, so that someone can map a description in IMS or [IBM's] DB2 or [Cullinet Software, Inc.'s] IDMS onto the Partnership Model and then translate it back to a different model, without the loss of semantics.

How does the Partnership Model relate to your company's new products, Data Analyst and Database Administrator?

The Database Administrator is not one product but several modules. The first module was designed to work with IDMS. Two others — one for DB2 and another for Cobol files — will be delivered this fall.

At that level, the product is very much implementation-oriented, very much directed toward optimizing designs of data bases.

The product that sits just above those is the Data Analyst product, and it was designed to be independent of any of the four programming languages or data base languages below it. So you can capture data descriptions in these traditional data base languages and file processing languages and actually reverse-engineer them to bring it up to a higher level of abstraction.

That is the point at which we use the Partnership Data Model.

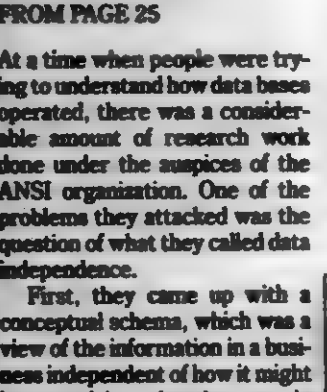
We would factor out all the peculiarities of both a particular data base system to create a form that is more specific to the business requirement. When you take a logical and conceptual design from that level forward for implementation, you translate that idealized level into the programmatics of whatever data base systems model you want.

Is the Partnership Data Model an expansion of or a replacement for data dictionary products?

It is an expansion on that concept and one that tends to make it a much more active concept. Beyond the definitions, there is a very close tie back to actual files being maintained in those various forms.

How real do you think distributed DBMSs are at this stage?

To begin with, I think you have to differentiate between having multiple data bases and having a



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single data base that treats information stored in multiple locations as if it were all one set of information.

The key distinction is in consistency control. If you have more than one data base, then it is the responsibility of something outside the data base management system to keep the two or 10 or a thousand data bases consistent.

If you have a distributed data base, it is up to the data base management system to make sure that when information is changed in one place, it is also appropriately updated wherever else that information is stored.

In that sense of a distributed data base, I see very little going on. I hear about military systems that have done a lot of this, and you read a lot of research papers, but I have not met anybody from a large U.S. corporation who talked to me about having a distributed data base by that definition.

What about the products that are advertised as distributed DBMSs?

I think that what is really happening is that some companies with regional centers are doing things like running identical programs against identical data bases — but with regional partitioning of information. But that really isn't a distributed data base, because if you want information about a Michigan customer, you still have to call the Michigan office.

What do you think of relational data bases acting as a platform for connectivity across various systems?

If someone has implemented the same basic system from very small machines to very large machines, then it is much easier for someone to think about moving files between those machines. And it is a matter of fact that the current strong vote for data bases is to move in the relational direction because it is easier to think about, in some sense, using the relational view.

The thing we know, though, is that it is much more difficult to design an efficient relational data base than it is to design one for a more traditional data base — like a network one or a hierarchical one. And the reason is that the thing that makes relational [DBMSs] easy to use is the fact that they don't require certain information, which means that you are given fewer cranks or handles to manipulate if you are trying to deal with efficiency.

So you don't think that relational systems are the real answer for multivendor connectivity and distributed DBMSs?

The reason why relational data bases may be the way to do that today is because relational data bases are the ones that are currently being commercialized for all sizes of computers. Therefore, it is easier to get the same standards on big and small machines than it would be with more traditional things.

It is the commercial reality that makes it work and not the particular advisability or unadvisability of relational systems.

What is your alternative?

By understanding the semantics of each data model, we avoid the necessity of going to a single physical data base system.

You can take what is a hierarchical file on a mainframe and, when you want to migrate that to files distributed on 10,000 minicomputers, just go through the reverse-engineering to convert the hierarchical file description into the Partnership Data Model. Then forward-engineer it to the relational system, and you are ready to go.

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NEW PRODUCTS

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Two compatible versions are available: Amis/38, priced at $35,000, runs on the System/38; Amis/PC, priced at $1,500, includes networking software and runs on IBM PCs and Personal System/2s.

Interactive Software, Suite 306, 4825 N. Scott St., Schiller Park, Ill. 60176. 312-671-4450.

An optional information manager feature has been made available by **Unitronix Corp.** for its **Praxa** integrated manufacturing application system.

The **Praxvu Information Manager** allows users to access, report on, edit, update and manipulate information contained in the Praxa system files.

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Praxvu is designed for use with RMS files in the Digital Equipment Corp. VAX/VMS software environment.

It costs between $2,125 and $11,000 depending on host VAX.

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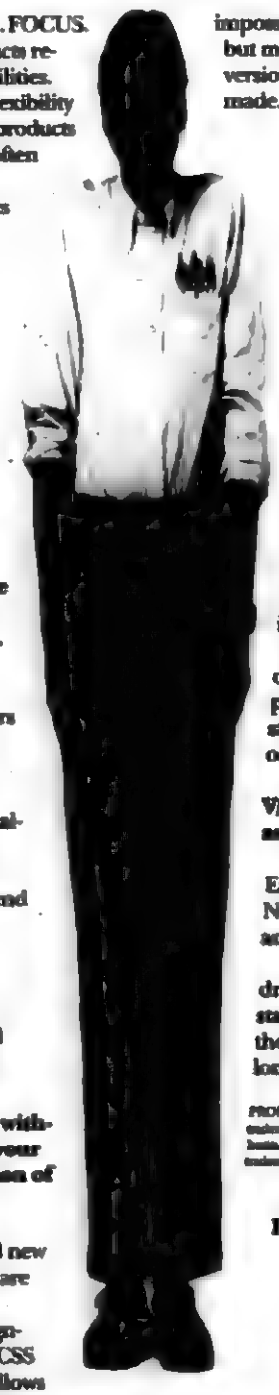

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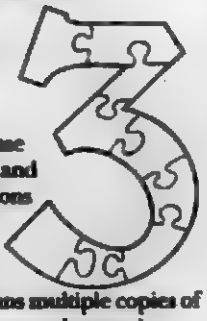

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Utilities

Computer Translations has enhanced its **VM77** converter to run on Digital Equipment Corp. VMS-based systems.

VM77 is a conversion tool that identifies and converts nonstandard DEC extensions in Fortran programs, producing portable Fortran code that conforms to the ANSI-77 Fortran standard.

Additional enhancements to the DEC extensions have been added into the VM77 converter, including Associate Variable, Find and Rewrite, Logical Inside If, Close Options, Define File and Byte Data Types.

A license for a single system costs $3,500.

Computer Translations, 2235 W. Potter, Phoenix, Ariz. 85027. 602-582-9515.

GT Software, Inc. announces **Release 2.1** of **Assist/GT**, a productivity tool for use with CICS.

Assist/GT allows Help windows, Help screens and on-line manuals to be added to CICS applications without program modifications.

Release 2.1 adds an exit allowing data to be obtained directly from existing CICS files and placed into a Help display. Also available is the ability to define the size and location of a Help window.

Release 2.1 also offers a data stream compression feature and a memory feature designed to simplify tasks of the CICS System Administrator.

Assist/GT costs $5,500 for VSE/SP and $6,900 for MVS/XA.

GT Software, 1111 Cambridge Sq., Alpharetta, Ga. 30201. 404-751-1400.

Integrity Solutions, Inc. announced enhancements to its automatic journal archiving product, **JMS/Switch.**

JMS/Switch Release 1.2., designed to secure vital on-line VSAM data, addresses on-line CICS journal management requirements by providing automatic journal archiving.

The product's job submission selectivity capability has been enhanced to allow user-specified submission of different jobs based on the phase of CICS execution. It also includes a symbolic parameter feature that allows use of the same set of JCL and processing options for multiple CICS regions or journals.

It also includes a series of on-line, real-time status displays and a function that can automatically activate an interval control timer to force a journal switch for selected journals.

JMS/Switch licenses for $4,500.

Integrity Solutions, 7921 Southpark Plaza, Littleton, Colo. 80120. 303-794-5505.

Interactive Solutions, Inc. has enhanced its Ads testing and debugging tool to provide the ability to directly insert Cobol code into a session without having to recompile the program.

According to the vendor, Ads alerts CICS users when a program attempts to access storage that it does not own. Ads supports Cobol II, CICS 1.7 and IBM's MRO, DOS and MVS/XA.

Ads costs $19,900 for an IBM OS CPU license; the product is priced at $14,900 for DOS.

Interactive Solutions, 53 W. Fort Lee Road, Bogota, N.J. 07603. 201-488-3708.

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MICRO BITS

Ed Scannell

Nice suit you got there

Fighting over the pot of gold.

Apple's suit against Microsoft has resurrected some interesting, and perhaps important, stories about the work that Steve Jobs and Bill Gates did in developing the Mac interface. The story goes that Gates was one of the first people Jobs turned to when he had a prototype of the Mac up and running. Gates reportedly gave Jobs some advice on creating the Macintosh interface and also put some features in Microsoft applications that became part of that same interface.

Two years ago at a Comdex party, according to one source, Gates talked about the technology exchange agreement he was about to sign with Apple over the licensing rights to the Mac. Our source says Ol' Bill was rather ticked off that he had to sign such an agreement, since he felt his contribution gave him co-developer rights.

While no one knows for sure, chances are there is nothing in writing between Jobs and Gates saying who did what work on the interface. Unless either Jobs or Gates is willing to make public what actually transpired be-

Continued on page 44

HP sees daylight in lawsuit cloud

Dismisses Apple's claims, continues development of New Wave

BY JAMES A. MARTIN
CW STAFF

SAN JOSE, Calif. — Third-party developers said last week that they are confident Hewlett-Packard Co.'s New Wave application environment is going to be an important microcomputer architecture in the future, regardless of the recent lawsuit by Apple Computer, Inc.

"We will continue our development efforts for New Wave," said Nancy Haydt, director of software engineering for Forum Systems, Inc. in Santa Barbara, Calif. "The Apple lawsuit is not going to change any of our plans."

On March 17, Apple filed suit against Microsoft Corp. and HP, charging that Microsoft's Windows 2.03 and HP's New Wave infringe on the "look and feel" of Apple's own graphic user interface [CW, March 21].

HP dismissed Apple's claims as unfounded and said it "intends to oppose the suit vigorously." In the meantime, the notorious lawsuit may actually generate additional interest in New Wave, according to Robert J. Frankenberg, general manager of HP's Information Systems Group. "We've had a lot of calls and responses since the suit from developers who weren't that familiar with New Wave and wanted to know more."

There is a good deal of excitement among developers regarding New Wave; developers say its object management and agent facilities go far beyond Apple's own technology. "For that reason alone, New Wave is not likely to die quickly on the vine," according to Sonny Margolis, president and chief executive officer of Computrac, a third-party developer in Dallas.

Indeed, momentum was high at a New Wave developers' conference held the day before the Apple lawsuit was announced.

New Wave is "24 months ahead of any graphical environment in its integration capabilities," said Christine Hughes, analyst with the Gartner Group, Inc. in Stamford, Conn.

Developers seemed more concerned about compatibility issues than Apple's lawsuit, in fact. In the corporate environment, for example, "a lot of programmers will have a problem" switching from Microsoft Corp.'s C code, in which most microcomputer software applications are written, to New Wave's object-oriented code, ac-

Continued on page 44

Firm finds antidote for PC virus

BY ALAN J. RYAN
CW STAFF

On May 13, 1988, computers all over Israel were set to be the target of an attack.

The so-called Israeli computer virus, designed to destroy all data on the hard disk of host systems, was fortunately discovered before it could perform its foul mission. But now all of the software programs it infected must be identified, and time is running out.

The Israeli scenario, related by John McAfee, is not all that uncommon. McAfee is president of Interpath Corp. in Santa Clara, Calif., a company that has developed an antiviral shield for IBM Personal Computers and compatibles. The product, C-4, is set to ship next month.

For Apple Computer, Inc. Macintosh users, CE Software, Inc. in Des Moines, Iowa, recently put its Mac Vaccine antivirus program out on electric mail services.

The figures on computer vi-

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Inside

- Apple's Gassee shares his vision. Page 37.
- The ups and downs of Quickbasic 4.0. Page 37.
- Oak Park Software adds time scheduler. Page 45.

Data View

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Boosting productivity is by far the prime benefit of microcomputer use, according to a survey of 2,500 systems professionals

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Reduces labor costs	411	19%
Improves organization of business	387	18%

INFORMATION PROVIDED BY THE ASSOCIATION FOR SYSTEMS MANAGEMENT
CW CHART

G-2 develops chip for PS/2

BY JAMES A. MARTIN
CW STAFF

MILPITAS, Calif. — G-2, Inc., an independent subsidiary of LSI Logic Corp., is set to announce this week an IBM Personal System/2 Model 30-compatible microprocessor that reportedly offers faster CPU speeds and greater OEM design flexibilities.

The 10-MHz chip is compati-

Continued on page 43

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SMALL TALK

William Zachmann

OS/2, PS/2: One year later

When IBM introduced the Personal System/2 line of personal computers in April 1987, the OS/2 operating system was presented as an integral part of the announcement. It was easy for the casual observer to believe that OS/2 and PS/2 were intimately related to one another.

The rosy impression many got from IBM's advertisements and commercials was of a new line of personal computers designed for a new operating system. There was lots of talk about dramatic new developments in software resulting from OS/2.

Now it is a year later. IBM OS/2 Standard Edition 1.0, the initial release of OS/2, has been available for several months. And to the surprise of many, the impact of OS/2 on personal computer use rounds off to zero. There isn't any sign of the software millennium that the first flush of "/2" enthusiasm seemed to foreshadow.

By now, hopefully, everybody knows that there isn't really any more link between OS/2 and IBM's PS/2 than there is between OS/2 and everybody else's Intel-based personal computers. In fact, roughly six out of every 10 PS/2s shipped so far can't run OS/2 at all.

Continued on page 42

Apple's bubbly philosopher sees fun and fortune as the company grows up

Jean-Louis Gassee can be called Apple Computer, Inc.'s resident philosopher. The 44-year-old vice-president of research and development peppers his speech with phrases like "the gestalt of the system." He refers to Apple not as the more than $2 billion company it has become, but as an entity with a soul.

This June, Gassee celebrates his 20th anniversary in the computer industry. "I've heard a lot of buzzwords," he says of the last two decades. "I've said some stupid things myself."

Recently, Gassee discussed his unique vision with *Computerworld* West Coast senior correspondent Julie Pitta. However, what he won't talk about is Apple's nemesis in the personal computer market — IBM. "I have the very un-American attitude of not talking about the competition," Gassee explains.

Jean-Louis Gassee *charts Apple's plans for the next decade*

What will result from Apple's relationship with Digital Equipment Corp.? Is it a policy statement or will we see co-developed products resulting from the agreement?

We will have a developers' conference in August and will come out with the full specifications and product suite at that time so that developers can play in the framework that Digital and Apple are establishing. Digital will develop services inside VMS to serve Apple protocols. We'll provide a DEC windows server inside the Macintosh and VAX nodes and VAX mail agents. We'll provide a router box that connects the local talk cable to Ethernet. That is decided. What we have to provide are the technical specifications so that third-party developers, who have made us who we are, can provide the best applications for that environment.

IBM appears to have learned some lessons from Apple, such as the

Continued on page 43

Excel's high performance too high priced for many

BY STEPHEN JONES
CW STAFF

With all its advanced systems requirements and added overhead, Microsoft Corp.'s Excel could be called the spreadsheet of the rich and famous — well, at least the rich.

While the Microsoft MS-DOS version of Excel boasts exceptional graphics capabilities and souped-up functionality, widespread implementation of the product can prove to be a costly endeavor for MIS. Users and analysts contacted by *Computerworld* said a major drawback of the program is that it carries too much baggage for simple installation.

In addition to plunking down $495 for the Excel software, the user has to have an Intel Corp. 80286- or 80386-based machine, about 2M bytes of additional memory, a high-resolution monitor and a graphics card — not to mention a high-resolution printer to output the improved graphics.

Price not right

The cost of memory upgrades alone can be prohibitive when multiplied across hundreds or thousands of machines in a large corporate MIS shop.

"I wish it wasn't such a memory hog," lamented Liam Egan, director of end-user computing at Dean Witter Reynolds, Inc.'s financial services group in New York.

But that has not stopped Egan and customers like Arthur Andersen & Co. in Chicago from making big commitments to the

Continued on page 38

Excel

Price: $495

Requires:
- Intel 80286- or 80386-based PC
- 640K bytes RAM
- MS-DOS 3.0 or higher
- Windows 2.0 or higher
- Hard disk drive
- Graphics adapter card

Quickbasic: 'Mostly excellent but a little awful'

BY T. A. ELKINS
SPECIAL TO CW

I first learned of Microsoft Corp.'s Quickbasic 4.0 from a Microsoft public relations employee while it was being beta-tested. She said the program "breaks new ground. It is a wholly new technology."

And it just happens that this woman is both knowledgeable and honest. So I listened.

Quickbasic 4.0 does break new ground. The new technology is something very special, and almost everything good you hear about it is true.

But not everything done by Quickbasic is done well.

Quickbasic is really two systems, one of which is an interpreter. Interpreters are nice, and that was why, in large part, the original Basic became so popular. With an interpreter, it is possible to check a bit of logic, run a few lines of code and annihilate bugs on the fly.

And the interpreter is fast — very fast. In fact, it may reach more than half the speed of an .EXE file, which is remarkable.

Finally, Quickbasic formally adds a host of things to Basic that it has needed for a long time. With Quickbasic, procedures and long functions are a breeze. There is no need to ever write GOSUB ... RETURN again. Quickbasic uses math coprocessors, speeding calculation programs right along. It also has a nice long integer that is fast to process and offers a useful alternative to floating-point operations for users without math coprocessors.

Quickbasic's second feature is its editor. This programing advance does a sizable job of syntax checking as a program is written, checking every line of code entered. There is no danger of a program having a totally unacceptable line of code in a subroutine that never got executed until it was too late. It also hides the procedures and functions so that they only come up on the screen when they are needed.

The messenger

A real advance is Quickbasic's ability, when testing a program, to return to its editor at the point of a problem with often-useful error messages. This allows most of the features of the program to be altered and yet leaves the program restartable.

The editor's environment is also replete with little hints about the system's operation and has a fairly good Help system.

But all is not golden with Quickbasic 4.0. The program is still several times harder to use than it needs to be. It is needlessly complex, and it fails in the fundamental compiler design criteria of symmetry and uniformity. Quickbasic's documentation, albeit a major improvement on some past Microsoft efforts, still gives far too little information.

Using the Quickbasic system editor is not particularly hard, but in dozens of ways, it is not intuitive. As a result, the program takes both learning and relearning when taken up again after a hiatus. In addition, the editor is inconsistent, which is a major and continuing failure of design.

Consider the simple process of loading a program into Quickbasic. After several sessions, I would still use the Load feature on the files menu. Unfortunately, Quickbasic wants to see the Open selection made. I wondered for a good amount of time why I had to select my only program as the main module every time I loaded it.

There is nothing evil about this approach, but it must be learned and kept in mind each time it arises. When dozens of these editor oddities are added up, the result is a much heavier programmer load and much less reliability with the final result than could or should have been the case.

Quickbasic 4.0 is a large and powerful program with a great many features that make other software houses cringe with anguish and green with envy, but it follows the too believable Microsoft "standard" of mostly excellent except for a little awful. This from a company that has resources enough to do the job not just well but admirably.

Elkins is a computer and management consultant with academic interests in advanced public-key data encryption systems.

Pageperfect hits the shelves after 18 months

SAN RAFAEL, Calif. — Pageperfect, a software package combining word processing, desktop publishing and graphics, has started to ship after some 18 months on the vaporware list.

The program, created by International Microcomputer Software, Inc., reportedly allows users to switch back and forth from word processing to page composition with one keystroke while maintaining a document on the screen. The user will be able to see what changes are being made to a document, whether in the word processing or in a page-layout mode.

Graphics capabilities of the $495 program include a picture librarian, which stores pictures and allows them to be accessed while a document is on either screen. Pictures can be scanned directly into a document or into the picture librarian. Pageperfect comes bundled with Desktop Publisher's Graphics, which allows the user to change any dot on a picture.

Picture this

Using Pageperfect, a user can manipulate picture placement on the page at any time, and pictures can be added, deleted, moved, copied, resized or rescaled at any time, the company said. Using the same commands, the user can also move columns, rows, headers, footers, captions, margins and borders.

The program's word processor feature can be made to behave like Micropro International Corp.'s Wordstar or Ashton-Tate Corp.'s Multimate, the company said. A spelling corrector and Houghton Mifflin Co. thesaurus are also included.

Included in the product's desktop publishing capabilities are typographical and page-layout control, Bitstream, Inc. fonts, different point sizes, letter, word, line and paragraph spacing and positioning. The style of any letter, word or paragraph can be changed by the user, and additional fonts also can be added.

Excel

CONTINUED FROM PAGE 37

Microsoft spreadsheet. Citing Excel's relative ease of use, Andersen's Audit Division recently began swapping Excel with 4,000 copies of Lotus Development Corp.'s rival 1-2-3.

Andersen and others have been attracted by Excel's graphical user interface, which is said to mimic the interface of Microsoft's OS/2 Standard Edition 1.1 with the Presentation Manager.

Although Apple Computer, Inc.'s lawsuit against Microsoft has created some confusion about the future of Windows-based products and the Presentation Manager, Excel is still positioned as a tool that will bridge today's DOS world to the upcoming graphics-based operating system.

'Close enough'

"We're committed to a much more common user interface than what you get at the C prompt, and the Excel interface is close enough to Presentation Manager that it will make the future migration easier for users," said Jack Dreiss, director of development for Andersen's advanced computer audit techniques group.

Ironically, users seem to be attracted to Excel more because of its crisp graphics capabilities than its improved spreadsheet functionality. Although the program features an automatic macro recorder, minimal cell recalculations and built-in auditing tools, most users said they bought the product for its presentation capabilities.

"I was never satisfied with the quality of graphics from [1-2-3] — they were just ugly," said Vallerie Shelton, a technical assistant at McAdams, Roux & Associates, a Denver oil company. "With Excel files, I can dress up presentations that appeal to our investors."

However, Excel's inability to support multidimensional data bases has forced Shelton to store historical data of the firm's 60 oil wells on a hard disk in files from Borland International's Paradox data base.

A promise kept

Excel received high marks for making good on promises to bring the capabilities of Apple's Macintosh to DOS-based PCs. Many companies that have adopted a DOS- and OS/2-based strategy are reluctant to standardize on more than one machine, meaning that companies tend to stick with a PC standard and give up on advanced graphics.

"A lot of people love the Mac, but we decided to standardize on the PS/2. The challenge was to provide Mac functionality on an IBM PC, and Excel and Windows does that for us," Dean Witter's Egan said.

Dean Witter's financial services group is currently running 150 copies of Excel on IBM PS/2 Model 60s connected over an IBM Token-Ring local-area network with Novell, Inc. software. Taking advantage of the network, one manager can control master spreadsheets that are shared by many users with read-only access.

Excel, however, does have its problems when running over a network. Egan said the program has trouble interfacing smoothly with the group's network and that its spooling functions can be "clunky" when printing on the network.

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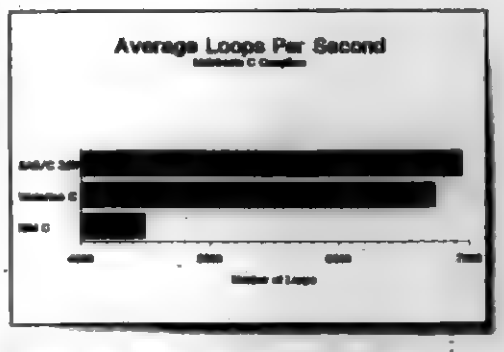

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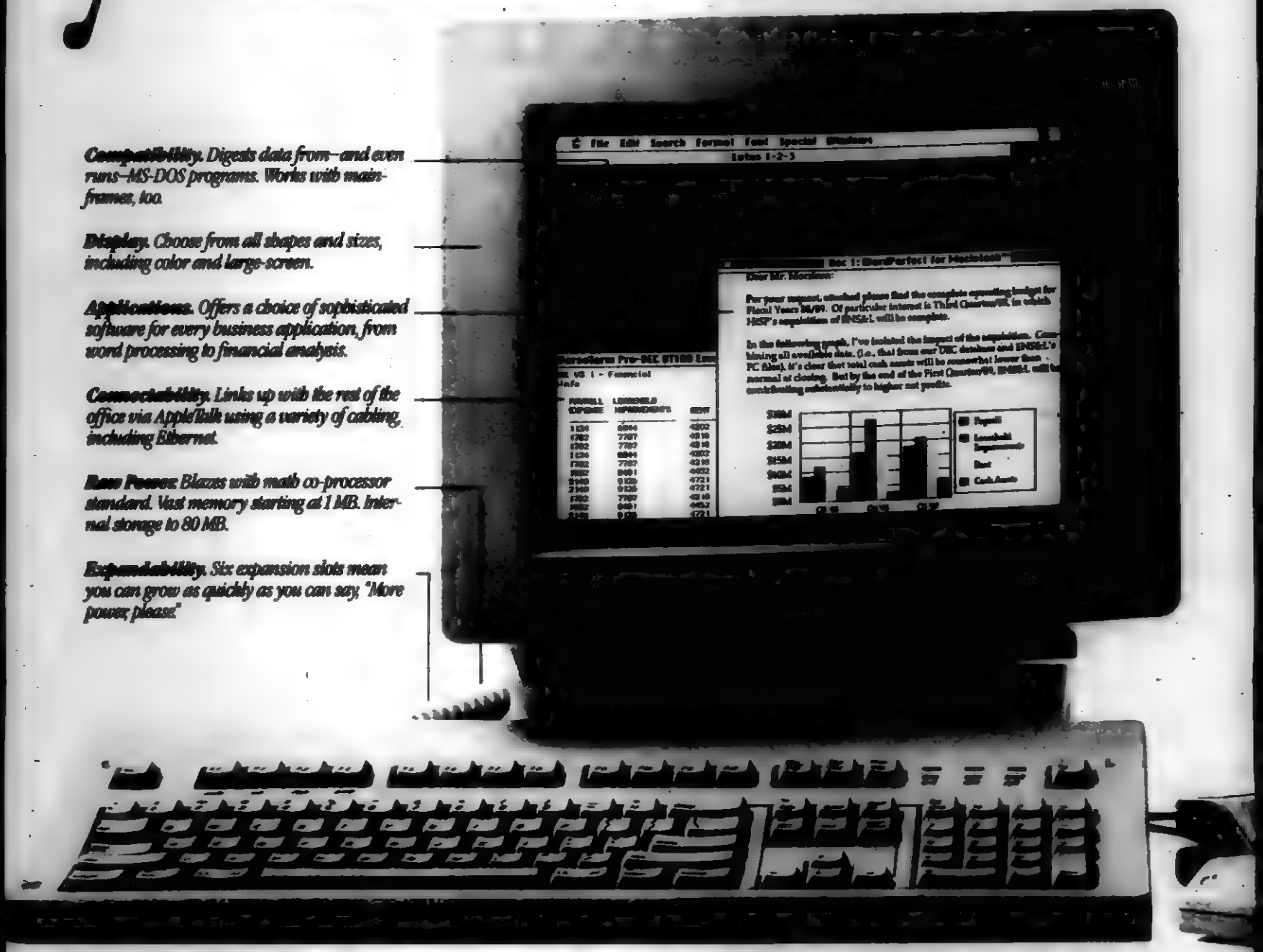

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Zachmann

FROM PAGE 37

The PS/2 Models 30 and 25 are based on the Intel 8086 microprocessor and can't run OS/2 at all. Despite this major limitation, the Models 30 and 25 accounted for 62% of IBM's 1987 PS/2 shipments.

And despite IBM claims, nearly all the Intel 80286- and 80386-based AT bus-compatible systems from IBM's competitors will run OS/2 as well as or better than PS/2 Models 50, 60 and 80.

A Compaq Deskpro 386 Model 20 like the one I am using to write this column will handily outrun even the top-of-the-line IBM PS/2 Model 80 running OS/2 — and just about everything else, for that matter.

It is beginning to look like only about one out of every 20 PS/2s sold so far will really be able to run OS/2.

The problem is that though the PS/2 Models 50 and 60 based on a 10-MHz 286 microprocessor are able to run OS/2, they are not fast enough to deliver satisfactory performance. And once the graphical OS/2 Presentation Manager is added to OS/2 Standard Edition 1.1, the processing speed of a 10-MHz 286 will be sorely pressed and unable to provide adequate performance.

Still not enough

In fact, even the faster 12-MHz 286-based systems widely available from nearly every vendor but IBM aren't likely to be fast enough. OS/2 complete with Presentation Manager looks like it'll tax the capabilities of just about any 286-based system.

Ironically OS/2, designed for and thereby incorporating the limitations of the 16-bit 286 microprocessor, is not likely to provide satisfactory performance with anything less than the 32-bit 386 chip. Users expecting to be able to run OS/2 on their IBM PS/2 Models 50 or 60, as well as on 286-based AT compatible systems from other vendors, are likely to be disappointed.

Worse yet, for IBM, the inadequacy of 286-based systems in running OS/2 will be further aggravated by IBM's proprietary OS/2 Extended Edition. While OS/2 Standard Edition 1.1 will be slow enough to leave most users disgruntled on 286-based systems, OS/2 Extended Edition 1.1 will be even worse.

The PS/2 Model 50 simply won't be able to run OS/2 Extended Edition 1.1 at all. It hasn't got enough disk capacity or memory. The Model 60 will be able to run Extended Edition, but just barely. It will be roughly the equivalent of trying to run the original 1.0 version of Microsoft Windows on an IBM Personal Computer XT.

A major consequence of all this is likely to be the generation of a considerable backlash against IBM by those who bought PS/2s — other than the Model 80 — thinking that they were buying into the technology of the future.

Those who really want access to the new world of OS/2 software are going to find that they need a 386-based machine with lots of memory and a large hard disk. For the rest, OS/2 is likely to provide little beyond what is already available with MS-DOS and Windows. Until more powerful 386 machines are widely used, don't expect too much of OS/2 and OS/2 software.

Zachmann is vice-president of research at International Data Corp.

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NEC

Gassee

CONTINUED FROM PAGE 37

graphical-user interface. How will Apple maintain an edge?
I see the Mac evolving in power — and we'll obviously put more power into the existing framework. We can do that through what Motorola does with its processor line. We can do that with ASICs. We can do that through coprocessor cards. We will do that by developing the operating system over the months and years. Since we own the operating system, it will be easier for us to integrate all the parts together. We'll keep improving the user interface. Hypercard was a step forward for the user interface.

How do you see the battle for the desk top playing out?
I feel we have done something in networking of late that will play out in the market. We are reconciling two apparently different cultures. The host mainframe programming culture and the Macintosh personal computer culture are being reconciled through Mac APPC [Advanced Program-to-Program Communications], Macworkstation and other products we will introduce in the unspecified future.

The way we play the game of the multivendor environment will give us a competitive weapon. Examples are the Digital-Apple agreement, and the Apple provision of LU6.2 functionality with the Hypercard user interface on top of it. Macworkstation is another example where a Cobol programmer can control a Multifinder session from the mainframe — it allows a Mac user to do personal computing the way he or she is used to doing Cobol programming.

How much work remains to efficiently integrate the Mac into multivendor environments?
It's done.

What are the advantages of the Nubus architecture used in the Macintosh?
I think what Nubus does for developers, customers and systems managers is to provide them with a way to install additional functionality into the Macintosh without disturbing existing software; without dealing with DIP switches and stuff like that. You can bring networking functions, intelligent cards, display cards, printer controllers — what an open hardware architecture is supposed to do.

Can you identify the technologies that will be most important to Apple in the future?
There are a number of them. Systems software, ASICs, very high-speed networks, magneto-optical storage devices, high-density displays and color printing will all be important.

Describe the Apple of the 1990s.
Apple will be even more fun, because we will have very nice products, and products make us who we are — a place where individuals can have an effect on the business. We'll be an adult organization; adult as in both responsible and humble about our limitations, but not apologetic. We'll continue to be an example for some areas of the business, but not all areas. We'll continue to display a keener insight into why human beings like computers. That will keep us alive, financially and spiritually.

Antidote

CONTINUED FROM PAGE 35

rones are alarming. "According to the National Bulletin Board Society, nearly 1% of all public-domain software is infected by one kind of virus or another," McAfee said. "The fact that many of the viruses are benign is not helpful. There are many that are not benign." Benign viruses are those that just print messages or scramble screens.

McAfee said viruses pose an especially high threat to corporate data bases and companies using networks. "The average user is aware that they exist," he said, but they do not realize that viruses are more threatening than bombs, which do things like destroy data on the hard disk but do not spread to other programs.

McAfee said most viruses are set to go off many months or sometimes years after they are planted. "Hackers do that to infect as many systems as possible. Once the virus has been activated, their fun is over."

Interpath's shield has reportedly been field-tested using more than 1,000 infected public-domain and commercial software packages.

C-4, which will retail for $29.95, resides permanently in the host PC system and monitors all host activity. It uses the Cylene-4 matching technique to identify characteristic viral signatures, and on detection, it freezes the viral activity and notifies the system user, McAfee explained.

Once caught by the program, the virus is unable to spread or multiply to infect other software in the system. After removal of the infected software, the system is returned to normal.

McAfee said if his product is put on a clean, virus-free system, it will prevent it from every becoming infected. However, "there is nothing to say that some hacker will not come out with a virus that we cannot detect. If a new technique is developed that can somehow circumvent our system, will will have to play catch-up again."

G-2 chip

CONTINUED FROM PAGE 35

ble with both the Intel Corp. 8088 for IBM Personal Computer XT clone development and the Intel 8086, for the PS/2 Model 30. The chip, said to be faster than the 8-MHz PS/2 Model 30, will be available in production volumes in May.

G-2 said it hopes to compete with the likes of Chips and Technologies, Inc. in selling PS/2 Model 30-compatible chips. A spokesman for G-2 said that although no large orders have been placed for the chip, the company has received inquiries from Taiwanese and Korean clone manufacturers.

IBM PC-compatible makers now have a greater number of chip vendors from which to choose.

The variety of vendors is not expected to make a great deal of difference to the end user, analysts said, unless the increased competition in the chip set market eventually forces some prices down. At this time, however, a price dip is unlikely because of the increasing costs of dynamic random-access memory chips.

With the current legal uncertainties surrounding the PS/2 Micro Channel models, G-2 said it plans to stick with the XT-bus Model 30 chip for now, according to Bill O'Meara, president. However, O'Meara said, G-2 will make a PS/2 Micro Channel-related announcement in June.

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Scannell

CONTINUED FROM PAGE 35

tween the two, the formal agreement signed by Gates and Sculley Nov. 22, 1985 is the basis for any settlement, whether made by the courts or worked out between the two companies.

Some observers say the battle between Microsoft and Apple over the interface is like two thieves fighting over a pot of gold. That pot of gold being Star, the operating environment developed at Xerox a couple of years before Jobs and Gates ever got together. Xerox, however, has given Apple the licensing rights to borrow technology for the Mac interface.

Why, besides some generalization about Microsoft violating "certain visual displays," is Apple suing? It's only second guessing, of course, but we suspect it wouldn't hurt Apple's chances in the corporate market if the firm could slow IBM's Intel 80386-OS/2-Presentation Manager juggernaut.

CHANCES ARE there is nothing in writing between Jobs and Gates.

It's hard to believe, however, that this suit will affect the delivery dates of something like the Presentation Manager, which borrows some traits from Microsoft's Windows 2.03. It may temporarily freeze the decision of some corporations that have decided to port their Microsoft MS-DOS applications to the Presentation Manager via Windows. But ultimately, the suit will be seen for what it is, a nuisance suit, and will be settled relatively amicably between the two parties out of court.

A new chip for the old block. Video Seven in New York today is set to introduce a graphics board that reportedly improves on IBM's Video Graphics Array, which is standard in its Personal System/2 line. A year after its introduction, it's good to see the PS/2 series finally getting some decent add-in boards.

Enter the laptop. A pretty good source has told us that Hitachi will make its debut in the U.S. market with a laptop system in either the second or third quarter. The company's decision to enter with a laptop and not a desktop system perhaps indicates its lack of confidence in making any kind of dent in that market.

Scannell is a *Computerworld* senior editor, microcomputing.

New Wave

CONTINUED FROM PAGE 35

cording to John Stankiewicz, project analyst in the Information Systems Division of Toronto-based Imperial Oil Ltd. "The switch to object-oriented code may not be as easy as some say, because there are differences."

New Wave uses object-management technology and artificial intelligence components to provide users with a single view of multiple applications on a network of computer resources. It is HP's method of tying systems together with an ease-of-use environment to rival IBM's Systems Application Architecture (SAA) and the Digital Equipment Corp. architecture.

New Wave's user interface is built on Microsoft's Windows and the OS/2 Presentation Manager. But writing a program or application for Windows is not necessarily the same as writing for the Presentation Manager, Stankiewicz said. As a result, he said his company is uncertain which path to take.

"If you develop for Windows, the programming is more cooperative-oriented, whereas Presentation Manager is preemptive," Stankiewicz said.

"OS/2 Presentation Manager is similar to Windows," said Russell Warner, Microsoft director of systems marketing. "Windows is the strongest base to begin developing OS/2 applications."

Other conference attendees said New Wave needs a full-fledged word processing application supporting it in order to build the kind of "compound documents" — voice, graphics, text and eventually video — that New Wave could deliver.

At this time, New Wave supports only encapsulated word processing that does not offer the full functionality of an application. Some attendees speculated that Wordperfect Corp. would be the likely candidate.

Wordperfect officials were not present at the conference, but a spokesman for the firm confirmed that it is looking into New Wave but has no definite plans for porting its software to that environment.

Pete Peterson, Wordperfect's executive vice-president, said his firm is interested in New Wave but is "concerned about all these different environments."

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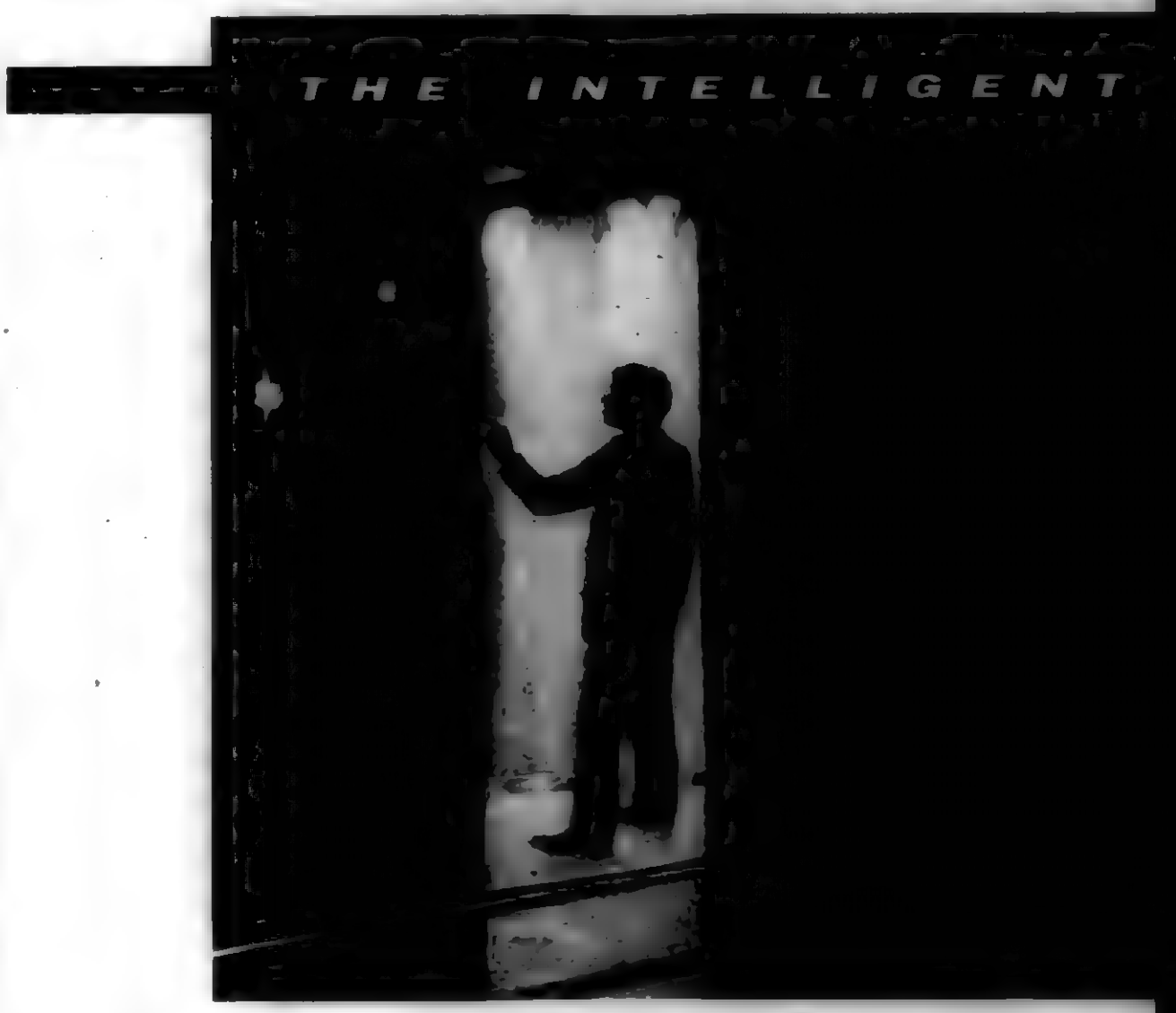

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Software applications packages

Time/X, a time scheduler for use on IBM Personal Computers and Personal System/2s, has been announced by **Oak Park Software, Inc.**

Time/X is said to automate reminder notes, to-do lists, appointment books, calendars and tickler files. It allows unlimited access to past as well as future schedules and maintains a history of scheduled activities.

Other features include automatic pop-up reminders; a built-in word processor; identification of scheduling conflicts; generation of printed schedules; import and export capabilities; and password protection.

Time/X costs $82.

Oak Park Software, P.O. Box 710, Milwaukee, Wis. 53201. 414-797-7911.

Process Integrity, Inc. has added a Cost of Quality module to its **Quality Management Data System.**

The new module incorporates a host algorithm that allows a user to measure activities in dollars, the vendor said. Inquiry by reporting unit and individual cost element is done in real-time.

The software system runs on IBM Personal Computers and compatibles as well as on IBM's Personal System/2.

The Cost of Quality Module can run stand-alone or as an integral part of the Quality Management Data System. It is available for $495 in a single-user version, $2,495 for a small network and $6,995 for a large network.

Process Integrity, #340, 2301 E. Lamar, Arlington, Texas 76006. 817-633-4765.

A project planning and management tool called **Topdown Project Planner** has been announced by **Ajida Technologies, Inc.**

According to the vendor, Topdown allows users to merge graphics outlines into a work breakdown structure. Projects are composed of hierarchically arranged tasks. High-level conceptual tasks are progressively divided into smaller and smaller subtasks. At each level, resources, expenses and precedence relationships may be assigned and summary reports generated.

Features include graphics generation; individual resource calendars; filtering and sorting; Gantt charts, Pert networks, resource histograms and cost graphs; and on-line Help.

Topdown is available for IBM Personal Computers and Personal System/2s. It costs $495.

Ajida Technologies, 613 Fourth St., Santa Rosa, Calif. 95404. 707-545-7777.

A software test case generator called **T** has been introduced by **Programming Environments, Inc.**

The software is said to allow developers to construct testable requirements with the help of input screens. T uses the requirements to automatically produce test cases that exercise every requirement for 100% function coverage and every most probable error (MPE) for 100% MPE coverage.

T works on IBM Personal Computer ATs under IBM PC-DOS. It requires 640K bytes of main memory, 10M bytes of hard disk and 1.2M bytes of floppy disk memory. Test case input files may be transmitted via a Hayes Microcomputer Products, Inc.-compatible modem from the PC to a host computer.

T is priced at $6,500, including training.

Programming Environments, 4043 State Highway 33, Tinton Falls, N.J. 07753. 201-918-0110.

A document processing and executive management package has been announced by **Lanier Business Systems Division**, part of Harris Corp.

Deskworks is an integrated office application offering word processing and document creation capabilities. Features include forms generation; automatic outlining; windowing; Greek, scientific, statistical and math capabilities; floating footnotes, headers and footers; page numbering; global search and replace; list merge; and the ability to exchange files with other applications, including Samna Corp.'s Samna, Micropro International Corp.'s Wordstar, IBM's Displaywrite III and Wordperfect Corp.'s Wordperfect 4.1.

Also included are a telephone directory with automatic dialer, a scheduler, a 92,000-word spelling checker and a thesaurus.

Deskworks, priced from $395, runs on IBM Personal Computers and Lanier's personal computers and workstations.

Lanier, 1700 Chantilly Drive N.E., Atlanta, Ga. 30324. 404-329-8000.

An Apple Computer, Inc. Macintosh version of the **Labtech Notebook** data acquisition software package has been announced by **Laboratory Technologies Corp.**

The software is said to set up a Macintosh with multiple channels that gather data samples from and send control information to attached instruments and other devices used in laboratory and process-control applications.

Labtech Notebook operates on Macintosh computers equipped with a compati-

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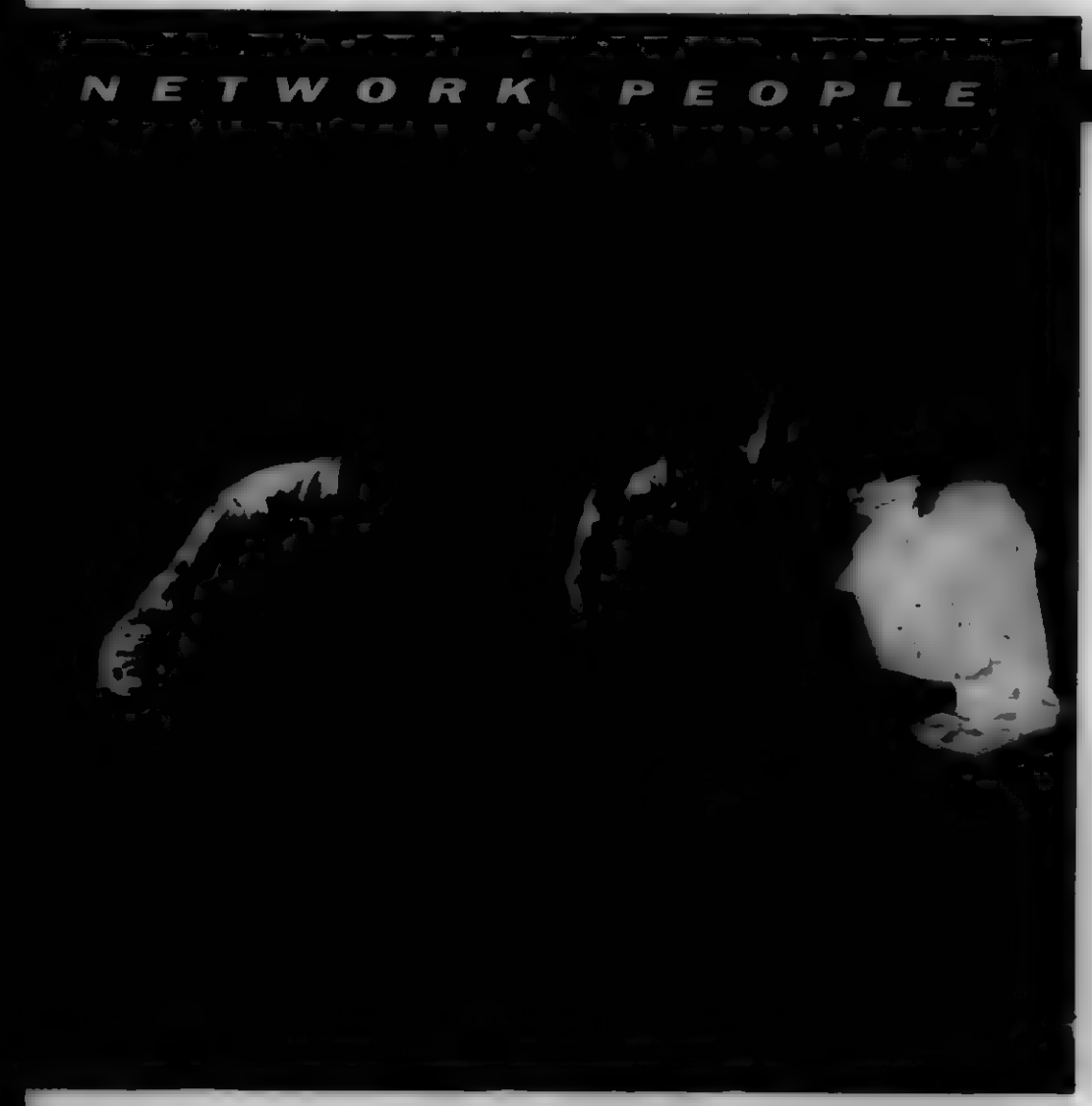

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Continued from preceding page
ble data acquisition interface board and data acquisition systems connected to the Macintosh via an RS-422 port.

Functions include user-definable control and display setups and parameters; real-time mathematical, statistical and signal processing calculations; data replay; and continuous data collection.

The Labtech Notebook costs $995.

Laboratory Technologies, 400 Research Drive, Wilmington, Mass. 01887. 617-657-5400.

An automated testing system has been announced by **Software Recording Corp.**

Autotester allows users to create test tapes that can run unattended while simultaneously documenting the process and providing analytical information, the vendor said.

A library of test tapes is created for exercising each feature. A feature can be retested an infinite number of times in an infinite number of combinations.

The testing sessions are said to subject systems to regressions testing in order to confirm that isolated changes do not impact unexpected areas.

Autotester runs on a personal computer concurrently with other applications or with terminal emulation or communications software. A single-CPU license costs $3,000.

Software Recording, Suite 122, 6060 N. Central Expwy., Dallas, Texas 75206. 214-368-1196.

The Personnel Director, a data base system designed for tracking personnel, has been announced by **Jeja Software.**

The Personnel Director runs on IBM Personal Computers and Personal System/2s. It maintains statistics on all employees, the vendor said. Features include a built-in word processor and a menu-driven user interface with context-sensitive Help screens.

The Personnel Director costs $199.95.

Jeja Software, P.O. Box 1834, Herndon, Va. 22070. 703-689-3259.

A data graphing package that transforms ASCII, DIF and SYLK data into two- and three-dimensional graphs has been announced by **The Small Computer Co.**

FPgraph transforms data from the vendor's Filepro 16 and Filepro 16-Plus data base management systems under Microsoft Corp.'s MS-DOS. Features include more than 400 colors from a palette of 16, a five-key user interface, Help screens and 976 preset graph type and viewing angle combinations.

Users can also pan, zoom, stretch, shrink and change the perspective of a graph.

FPgraph requires an enhanced graphics adapter, a color graphics adapter or a Hercules Computer Technology, Inc. monochrome adapter. It costs $250.

The Small Computer Co., 41 Saw Mill River Road, Hawthorne, N.Y. 10532. 914-769-3160.

An employee management system for personnel administration has been announced by **Softland International, Inc.**

Called the **Personnel Manager Plus**, the software is capable of handling up to 500 employees. It allows storing, retrieval, modification and reporting of personnel data such as background information, wage reviews, warnings and commendations, classes taken, absences, workmen's compensation claims and vehicle accidents.

Personnel Manager Plus runs on IBM Personal Computers under IBM's PC-DOS or Microsoft Corp.'s MS-DOS 3.1 or higher. It costs $199.95.

Softland International, Suite A, 320 Harris Ave., Sacramento, Calif. 95838. 916-921-6403.

A personal computer-based project management system has been announced by **Poc-It Management Services, Inc.**

The program, called **Microman II**, is said to plan, schedule, monitor and report on tasks as well as supply management summaries.

Users can compare actual to planned project performance; schedule projects individually or concurrently; display planned resource assignments and track resource utilization; track service requests and project work load backlog; and produce custom reports.

Features include windowing, context-sensitive Help, multilevel security, support for local-area networks and the ability to interface with other application programs, such as Lotus Development Corp.'s 1-2-3 and Ashton-Tate Corp.'s Dbase products.

Microman II costs $2,895.

Poc-It, Suite 512, 606 Wilshire Blvd., Santa Monica, Calif. 90401. 213-393-4552.

Digital Communications Associates, Inc. has announced that its **Irma 3279 Graphics** software now supports IBM's Personal System/2 Micro Channel architecture-based computers.

The Micro Channel version of Irma 3279 Graphics allows a PS/2 Model 50, 60 or 80 to emulate an IBM 3279 S3G color terminal, thus enabling the user to create mainframe color graphics in any IBM 3270 processing environment. Users can display graphics created from the mainframe and store them on disk in order to redisplay or print on a PC printer or plotter at a later time.

The version of Irma 3279 Graphics costs $1,995.

Digital Communications, 1000 Alderman Drive, Alpharetta, Ga. 30201. 404-442-4000.

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NETWORKING

DATA STREAM

Elisabeth Horwitt

Voice/data: the real thing

It's happened before, it'll happen again: Vendors start hyping some brand new way to do networking long before they have real products and applications that will do their customers some good. By the time they really have something worth looking at, users are so tired of hearing the hype that they ignore the good stuff when it arrives — to everyone's loss.

This could be happening now with voice/data integration. And that would be a real shame.

Vendors like Wang Laboratories, Inc., Northern Telecom and IBM's Rolm subsidiary have been glorifying voice/data integration on the digital private branch exchange (PBX) for years now. But they haven't come up with the applications or products capable of weaning computer users away from their local-area networks and data PBXs. Rolm now offers primitive integration of voice and electronic mail on PBXs and hosts and some low-level alerts traveling from Rolm switches to IBM's Netview. Industry scuttlebutt has it that true synthesis with IBM hosts will come with the next generation of Rolm central branch exchanges.

But what do users really want? A recent survey by Market Information Center, Inc. showed data makes up only 8% of digital PBX traffic today; that

Continued on page 46

The joy of Mac-to-IBM links

'Adventurous souls' overcome host-access hurdle at shipping firm

BY JULIE PITTA
CW STAFF

OAKLAND, Calif. — When Apple Computer, Inc.'s Macintoshes began to show strong signs of overtaking IBM Personal Computers as the corporate workstation of choice at American President Companies, Ltd. (APC), the company acquiesced to user preference. But having done so, the $1.9 billion shipping firm found itself confronted with a serious problem: how to provide Mac devotees with the same level of host access enjoyed by PC users.

APC keeps its IBM mainframes in two computer centers located in San Mateo, Calif., and Hong Kong. Personal computer users at various APC sites routinely access data center mainframes through their micros for information pertaining to all areas of shipping, including cargo destinations, how cargo is stored, the type of vehicle it is stored in and the type of cargo.

Until recently, those PCs were strictly IBM. Today, users are requesting Macintoshes 9-to-1 over Microsoft Corp. MS-DOS-based machines, according to Michael Cromar, APC information resources director.

Quiet Mac attack

Macintoshes began sneaking in the door at APC in late 1986, despite some resistance from APC's information systems hierarchy. Unlike some organizations, APC said it allows its users to have significant influence over the type of systems they use. Today, there are 250 Macintoshes at APC, all connected to the firm's IBM mainframes. But MS-DOS-based machines still hold a commanding lead — APC has about 2,000.

"It took a few adventurous souls to bring the Mac in and demonstrate its usability," Cromar said. "One of the things that broke barriers was that some of the early Mac users were senior managers in the information resource department."

Much of APC's initial reluctance to deviate from IBM on the desk top was tied to the fear that Macintoshes could not easily be

Continued on page 55

LAN vendors explore distribution options

Following in the footsteps of personal computer vendors, local-area network suppliers are expanding their distribution options, according to consulting firm Infonetics, Inc.

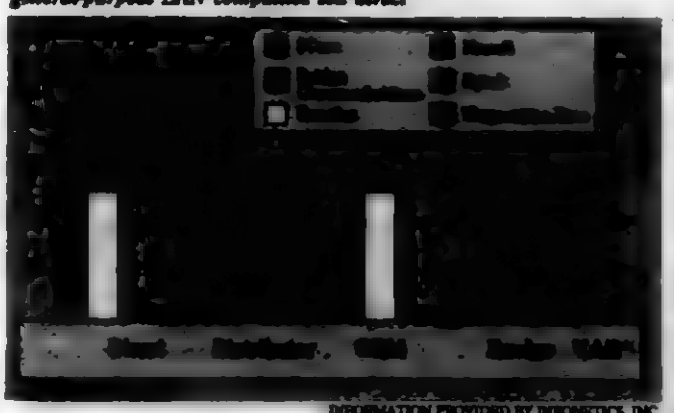
Companies that manufacture general-purpose LANs connecting a wide variety of systems — such as Bridge Communications, Inc. and Ungermann-Bass, Inc. — tend to sell both directly and, to a lesser extent, through OEMs, the Santa Clara, Calif., consulting firm said in a recent report (see chart at left).

In contrast, PC LAN vendors such as Novell, Inc. and 3Com Corp. tend to sell through third parties, including dealers and value-added resellers. VARs are increasingly selling PCs into specialized vertical markets, creating an aftermarket for LANs, Infonetics noted. Novell also sells through distributors.

However, dealers are less likely to have the personnel required to sell, support and install LANs effectively. Novell, 3Com and IBM are cutting down on the number of dealers authorized to sell their networking equipment, both to weed out poor performers and to cut down on price competition.

LAN distribution channels, 1987

Personal computer LAN vendors favor dealer outlets, but general-purpose LAN companies sell direct



INFORMATION PROVIDED BY INFONETICS, INC.

Timeplex enhances T1 switch

BY ELISABETH HORWITT
CW STAFF

WOODCLIFF LAKE, N.J. — Timeplex, Inc. introduced several enhancements last week said to provide more effective management and utilization of bandwidth on its Link/2 Data/Voice Network Exchange T1 switch. Also unveiled was a data option for the Link Packetized Voice Subsystem (LPVS).

A new framing algorithm incorporated into Link/2 is said to ensure that "all bandwidth on the trunk will be used for transporting meaningful information," with some overhead allowed for synchronization and supervisory control, Timeplex said.

The new algorithm can allocate more bandwidth to the supervisory communications channel — resulting in faster supervisory responses for remote nodes — while also supporting an enhanced alternate routing feature that automatically switches data over to a backup channel when the primary channel goes down. It is scheduled to ship in May. Existing Link/2 systems can be upgraded, Timeplex said.

Continued on page 55

Inside

- NSA communications line supports Hayes modem features. Page 50.
- Orion to support OS/2 LAN Manager under SNA. Page 50.
- DEC adds interface for Microvax 2000. Page 60.

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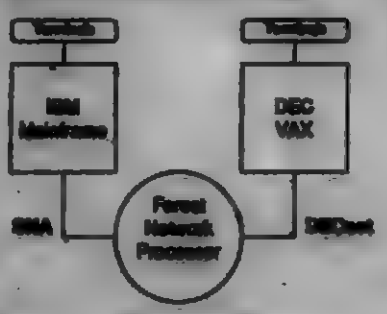

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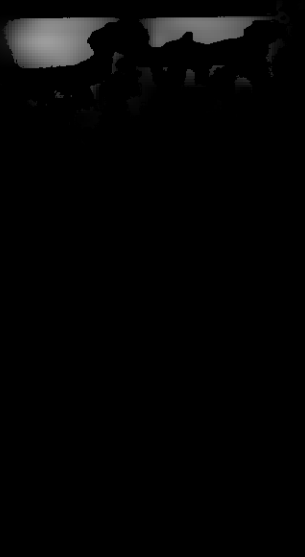

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NSA tools support Autosync

Network Software Associates, Inc. recently said that its entire AdaptSNA line of communications software now supports **Hayes Microcomputer Products, Inc.'s** Autosync features in 2,400 and 9.6K bit/sec. modems. Autosync reportedly automates the execution of asynchronous-to-synchronous data conversion.

This turnkey combination reportedly enables an IBM Personal Computer or compatible equipped with a Hayes modem to serve as a remote IBM 3270 workstation for synchronous access to an IBM mainframe.

Touch Communications, Inc. in Scotts Valley, Calif., is working with **Motorola Computer Systems** to port the Touch Open Systems Interconnect (OSI) family of networking products to AT&T's Unix System V, Release 3. The ported products will run on Motorola's Unix-based System 8000 family.

Touch also said its OSI software will now run on **Kinetics, Inc.'s** Etherport II board, which runs in an Apple Computer, Inc. Macintosh II.

Network software developer **TOPS**, a Sun Microsystems, Inc. company, has announced it will market **Kinetics'** line of hardware products. The $800,000 agreement enables TOPS to include Kinetics networking hardware and software as part of its TOPS for Sun workstations in order to provide customers with a Macintosh-to-Unix internetwork package.

In addition, TOPS is licensing Kinetics' K-Talk, an implementation of Appletalk networking protocols for Unix 4.2 and 4.3 implementations, including Sun's SunOS 3.X.

Virtual Microsystems, Inc. and **Ungermann-Bass, Inc.** have inked a joint OEM agreement under which Virtual will license its Network Co-Processor technology to Ungermann-Bass for incorporation into the company's next-generation Digital Equipment Corp. VAX product line. The Network Co-Processor is an internetwork operating system for integrating VAXs into heterogeneous local-area networks.

TRW Information Networks has signed a $5 million technology license agreement with **Crosscomm Corp.** to manufacture and supply Crosscomm-designed products worldwide. TRW will build a LAN bridge and bridge software compatible with its Transmission Control Protocol/Internet Protocol ACU 2000 product line.

TRW also announced a $500,000 networking agreement with Monsanto Chemical Co.'s Decatur, Ala., Plant and Technical Center.

TRW will install a dual-cable broadband network linking more than 30 buildings, an array of VAXs and DEC PDP-11s and more than 150 personal computers in the industrial complex.

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Orion to support LAN Manager

BY PATRICIA KEEFE
CW STAFF

SAN FRANCISCO — Orion Network Systems, Inc. is set to announce support for Microsoft Corp.'s OS/2 LAN Manager under its version of IBM's Systems Network Architecture (SNA) software today.

The move will let users of large SNA networks integrate OS/2-based local-area networks into IBM backbone networks.

The announcement precedes a demonstration at the Microsoft Advanced Network Development Conference here. Orion will demonstrate its SNA62 Facility, which includes support for PU2.1 and LU6.2, as well as its SNA0123 Facility. Both programs will be implemented using a pair of Intel Corp. 80286-based micros equipped with adapter cards from 3Com Corp. and AST Research, Inc., running OS/2 with the LAN Manager.

Orion's approach to bringing SNA connectivity to IBM Personal System/2 LANs involves putting an Advanced Program-to-Program Communications (APPC) interface on top of Named Pipes, an applications programming interface under LAN Manager. APPC provides peer links into mainframes using IBM's LU6.2 SNA protocol.

Orion's client/server-based approach provides SNA support within the LAN environment by enabling users to access resources off the network. "Any personal computer on the LAN can access non-LAN resources via the communications software on the server," Orion claimed.

This server-based approach also conserves memory and processing requirements by necessitating that only a thin layer of interface code reside on each PC. The full set of communications software is located on the server.

Orion contrasted its approach, which uses a gateway implementation, with IBM's approach as implemented in the Communication Manager feature of OS/2 Extended Edition. Orion claimed IBM will require each PC on the LAN to run its full set of communications.

Orion's software also supports Apple Computer, Inc.'s Macintosh operating system and Unix.

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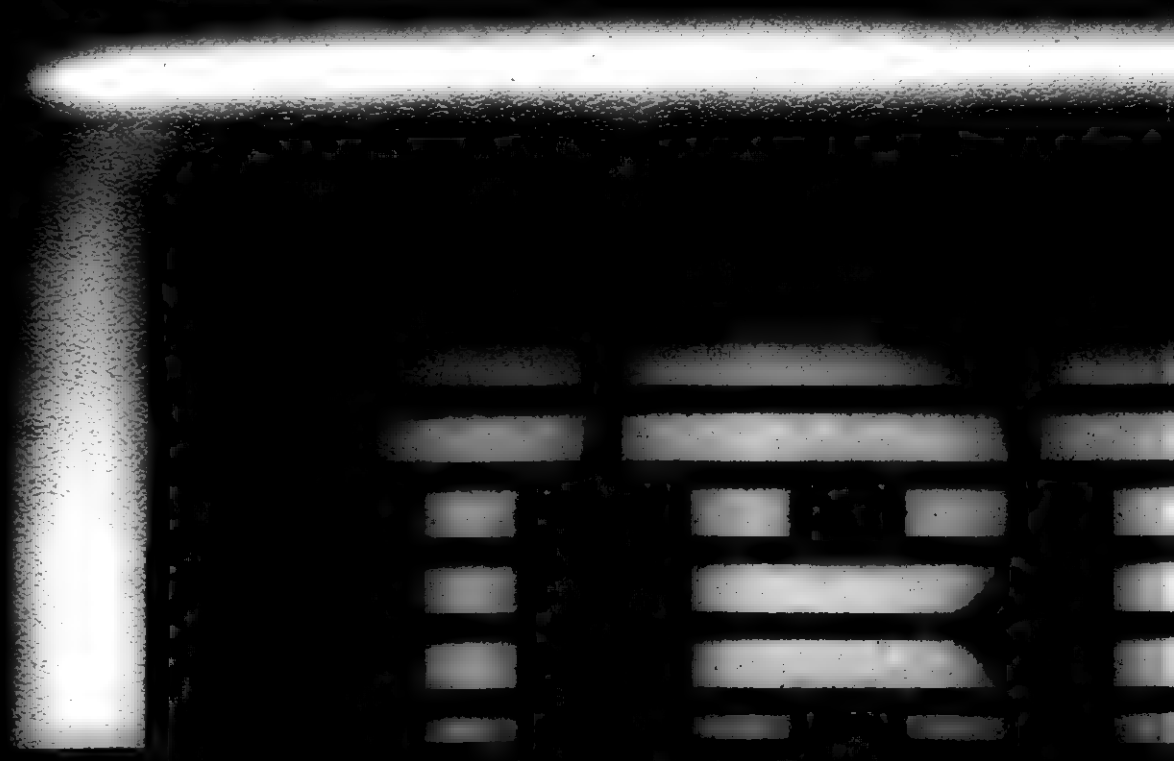

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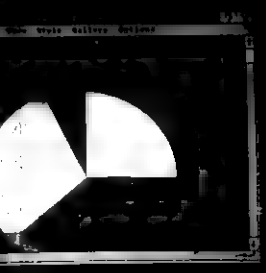

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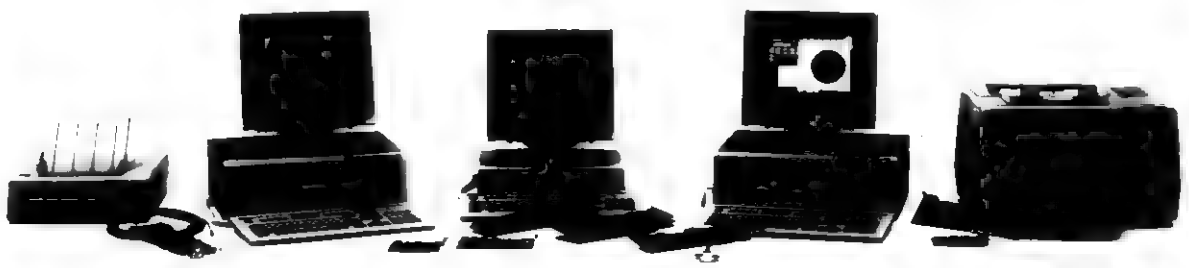

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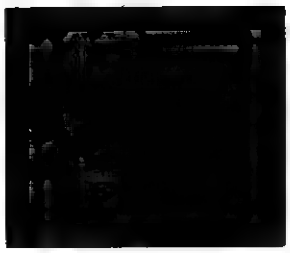

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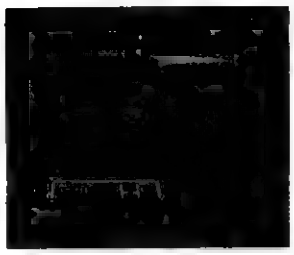

availability. And, its powerful, easy-to-use management facilities give you complete control of your network.

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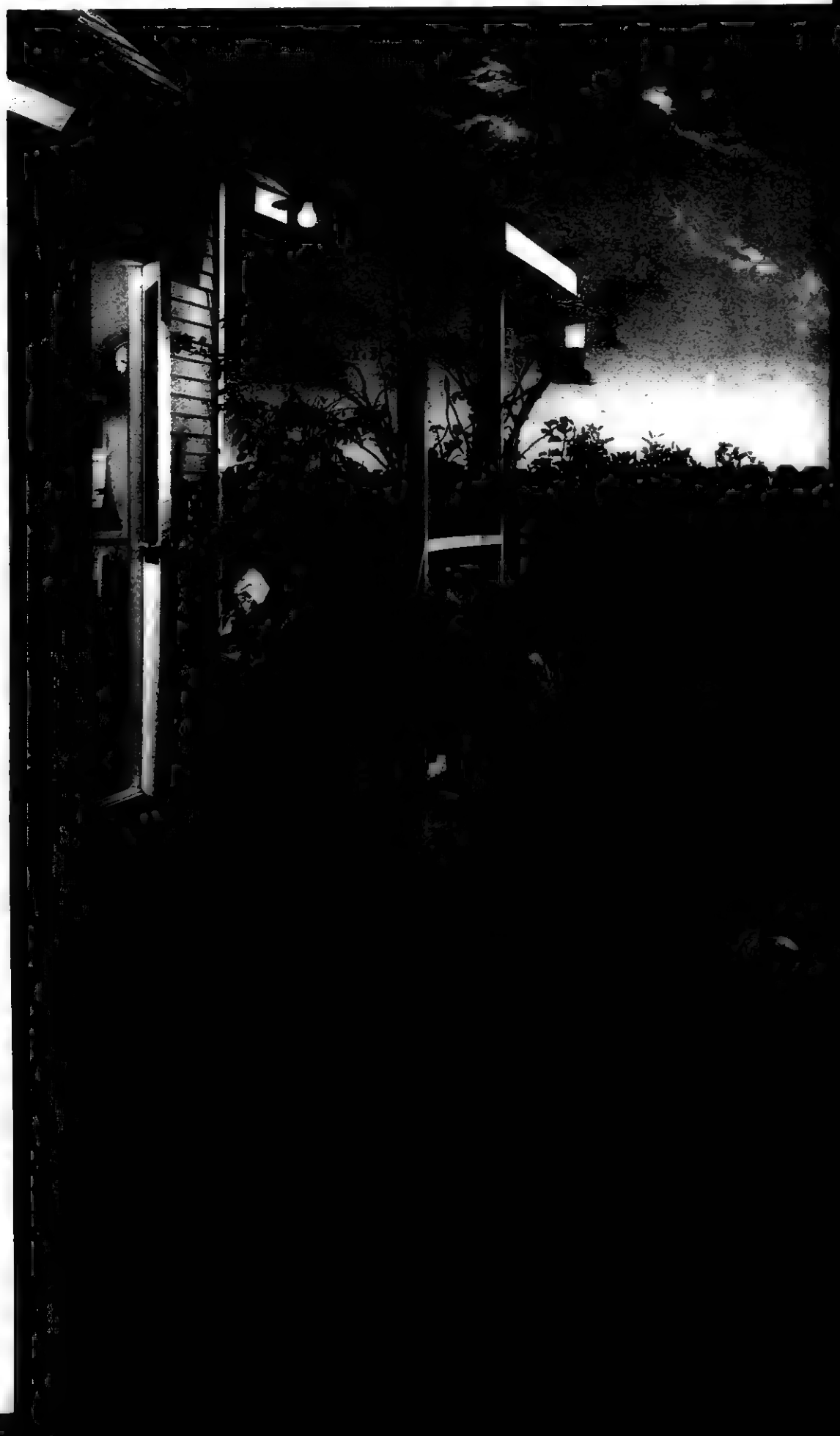

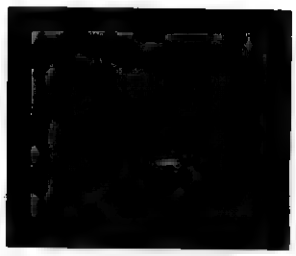

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FROM PAGE 47

figure is seen increasing to 20% during the next two years. And Northern Telecom's attempts to sell a combination PBX switch and office automation node have failed abysmally.

True, T1 switches have been handling a lot of data recently, as firms seek to link remote sites to data centers and to save money through voice/data integration. This trend has clearly provided some of the impetus behind IBM's alliance with Network Equipment Technologies, Unisys's purchase of Timeplex and Hewlett-Packard's rumored search for a T1 partner.

But these vendors also seem to be trying for application-oriented voice/data integration that would go far beyond using a PBX or T1 multiplexer to feed data into the computer.

"People ask, 'What is the next magic application for tying PBXs, computers and networks together?' " says Bart Stuck, a vice-president at Probe Research. Stuck's answer: Anything that requires an agent to call up data on the screen while talking over the phone. For example, a PBX or switch could route a prospective customer's call to a disengaged telemarketing representative or service agent, at the same time sending the customer's file to the agent's screen.

A switch-computer hybrid could greatly improve agents' responsiveness to customers, by feeding them call-related information, prioritizing incoming calls and, if all representatives are busy at one office, routing calls to another site.

Busy market

DEC seeks to address the above markets with its Computer Integrated Telephony program, a series of alliances with PBX vendors aimed at developing voice/data applications through links between an intelligent PBX switch and a VAX. Data General is attacking the market from another angle through its agreement with Japanese PTT Nippon Telegraph and Telephone to co-develop an intelligent network switch that combines circuit and packet switching with the computing power of a DG host.

Both IBM and DEC are marketing their computers as data base engines and application processors that would work closely with local carriers' central office switches. This would make it far easier for the telephone companies to provide the types of applications discussed above as services. Now that District Judge Harold Greene has further expanded their boundaries, the regional Bell holding companies should be entering this market rapidly.

At the very least, computer-telecom integration will provide more efficient ways to distribute data and applications within their organizations and to customers and business partners. The far more imaginative ways to exploit computer-telecom integration are already being explored in-house by financial services, airlines, insurance companies and other deregulated, highly competitive sectors in which customer service and rapid deployment of data are competitive weapons. For example, Chase Manhattan Bank is working on a natural-language application that automatically validates funds-transfer telexes and eventually will reformat the information and route it to the right department's computer.

What computer vendors and their telecom allies offer is a cost-effective way for other companies — not bleeding-edge innovators, but the smaller, more cautious firms — to sample the possible benefits of intelligent networking applications without making too big an investment in software development, or even hardware if they go with a Bell company's service. The real question is whether companies will be willing to make drastic changes to the way they do business. And their decisions will determine more than the fate of a few vendors; they could have long-term implications for their ability compete in the future.

Horwitt is a *Computerworld* senior editor, networking.

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Exposition organized by Information Gatekeepers, Inc., in conjunction with:

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Links

CONTINUED FROM PAGE 47

hooked into the firm's worldwide IBM Systems Network Architecture network, he explained. Before the introduction of the Mac SE and the Mac II last spring, Apple's networking capabilities were limited, Cromar added.

To link the two worlds, APC has settled on a mix of Apple and third-party products. Within Appletalk networks, APC has implemented Tridata Corp.'s Netway protocol conversion box bundled with Tridata communications software. Sixteen Macintoshes can be connected to one Tridata box using Farrallon Computing's Phonenet, which allows Appletalk cables to connect to standard twisted-pair cables.

Tending to speed needs

For users who require faster processing speeds, APC has equipped Macintoshes with Digital Communications Associates, Inc. Irma 3270 terminal emulation boards. Despite its lower connection speeds, APC will continue to use Tridata's box because it costs approximately $200 per Mac connection, while Irma boards cost slightly less than $1,000 per connection, Cromar said.

"The first difficulties in hooking the Macs to the mainframe involved the very different user interface of Mac software and mainframe software," Cromar maintained. "For example, when people accessed E-mail, they expected the same ease-of-use in those sessions as when they use the Mac."

To solve this problem, APC licensed Macworkstation, Apple's software product that allows a Macintosh to retain its user interface when connected to a host computer.

Connecting Macintoshes to IBM mainframes allows APC users to call up information from the mainframe, download it and then "cut it out and paste it into" Mac applications, which provides superior graphics capabilities compared with PC packages, Cromar said. Currently, APC is working on an application that allows the Mac to access data regarding cargo storage from the mainframe and then organize that information graphically so loads can be stored more efficiently.

Timeplex

CONTINUED FROM PAGE 47

Another Link/2 enhancement, biased routing, is said to allow users to predefine how transmission load can be balanced among several T1 channels and to configure network traffic to avoid certain routes.

Timeplex also announced an internodal partitioning feature that allows users to provide local control of network segments on a node or data link basis while leaving some nodes to be centrally managed through the Link Network Management System.

In addition, Timeplex's LPVS, which is said to provide a 10-to-1 voice compression ratio, has been enhanced to support data on a separate channel.

The LPVS-6/1 accepts a single 9.6K bit/sec. data channel and six voice channels. The LPVS-4/1 accepts one 19.2K bit/sec. data channel and four voice channels.

NSA claims SAA features for AdaptSNA

BY PATRICIA KEEFE
CW STAFF

LAGUNA HILLS, Calif. — Network Software Associates, Inc. (NSA) has introduced Version 4.0 of its AdaptSNA personal computer-to-host communications software family.

According to NSA, AdaptSNA is the first communications software product that implements the principles of Systems Application Architecture, IBM's device-independent global connectivity strategy.

Available for immediate delivery, the new products run on IBM Personal Computers, PC XTs, ATs, laptops and compatibles, implementing a full range of IBM Systems Network Architecture. The protocols supported include IBM's 3270, LU6.2/Advanced Program-to-Program Communications (APPC), 3770/RJE and LU0.

In addition, NSA reported that each AdaptSNA package is now link-independent.

This means that the same software — including all user interfaces — can now be used over any physical link, including a remote Synchronous Data Link Control line using a variety of integrated or external synchronous modems, a coaxial link via a remote or channel-attached IBM 3274/3174 controller or even an asynchronous link, according to NSA.

This is particularly important because it provides PC users with a cost-effective migration path, allowing them to change physical transmission links without sacrificing investments in applications interfaces or operator procedures and training, NSA added.

Prices for modules under Version 4.0 remain unchanged. The 3270 costs $585, APPC is $285, RJE costs $785, and LU0 is $585.

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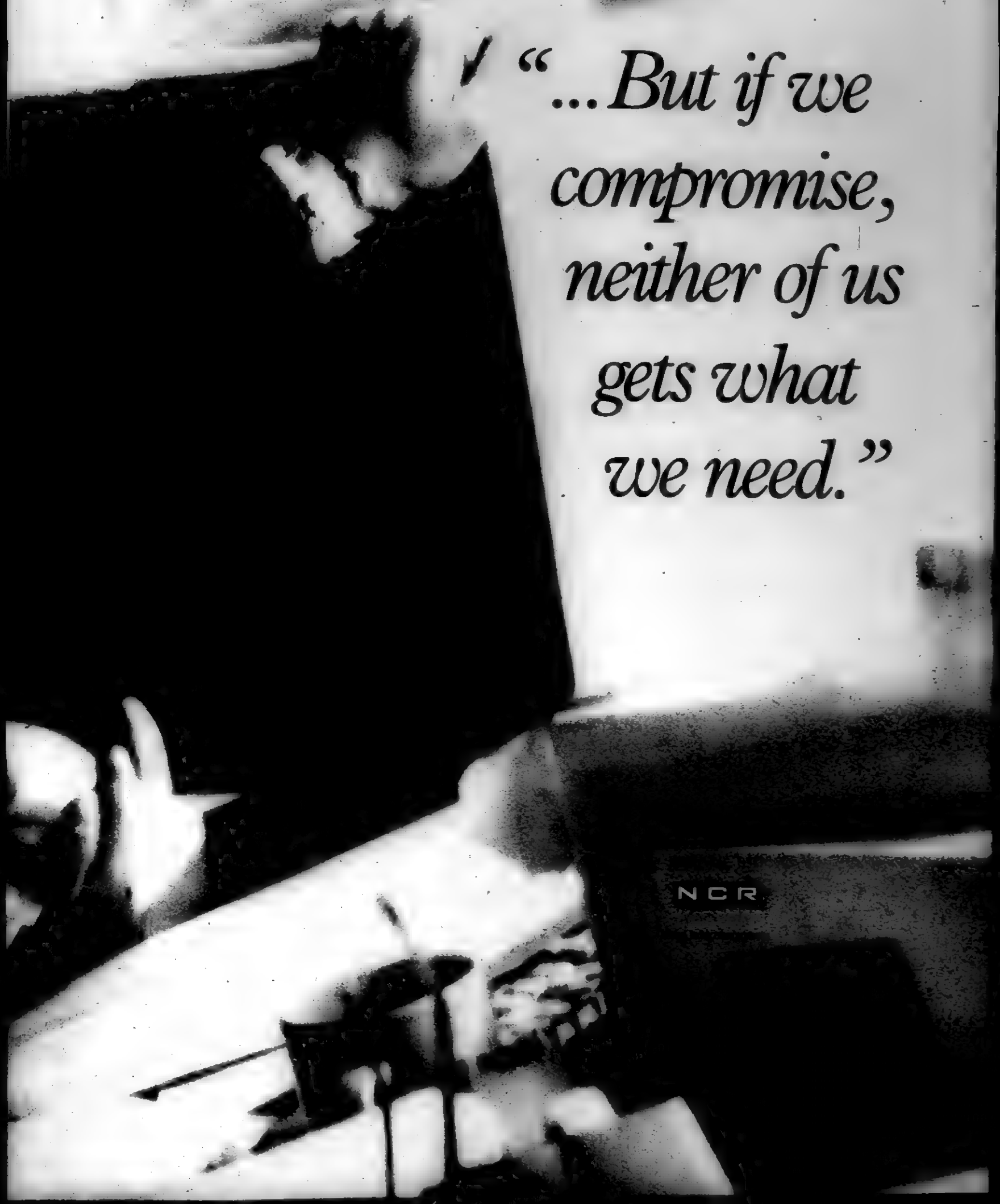

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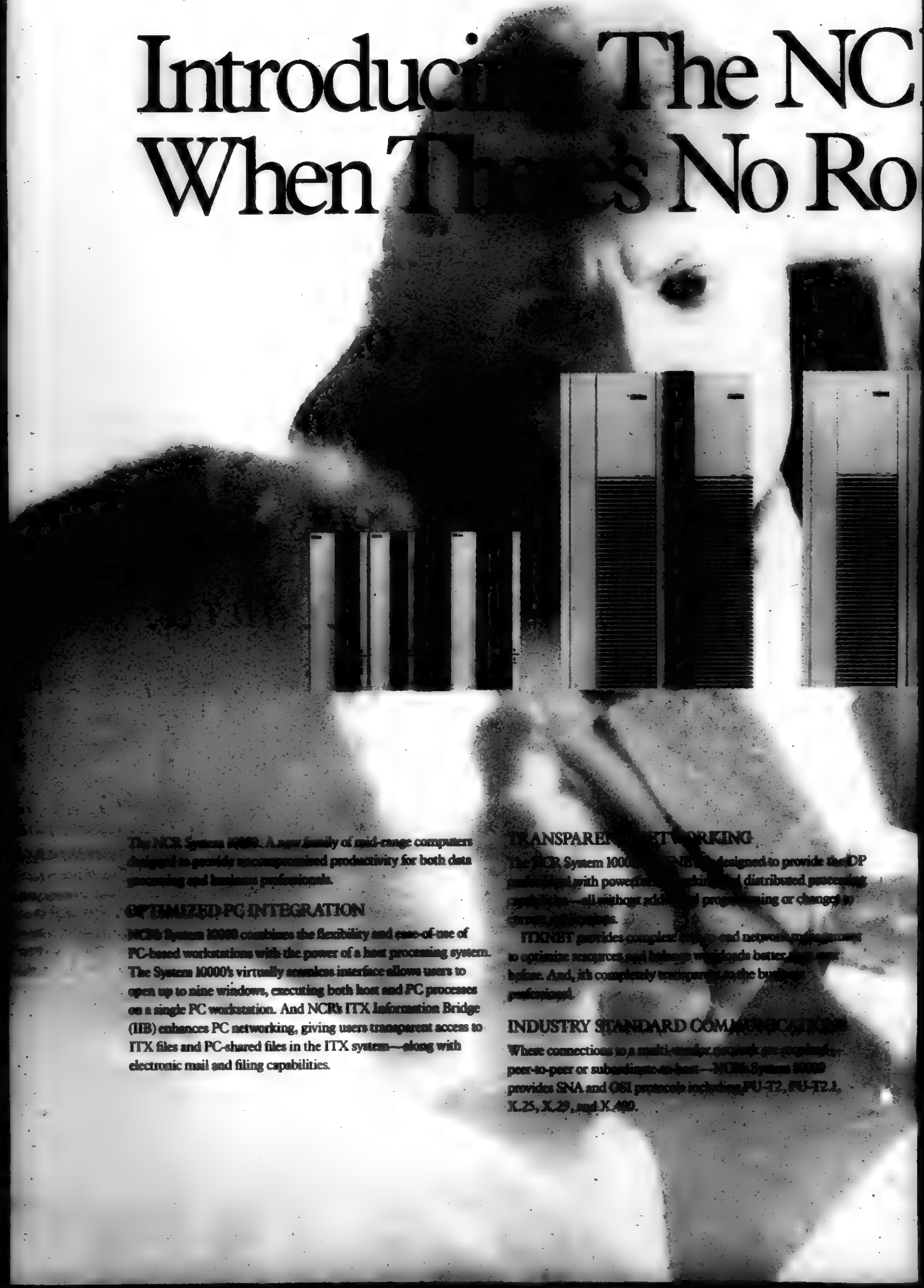

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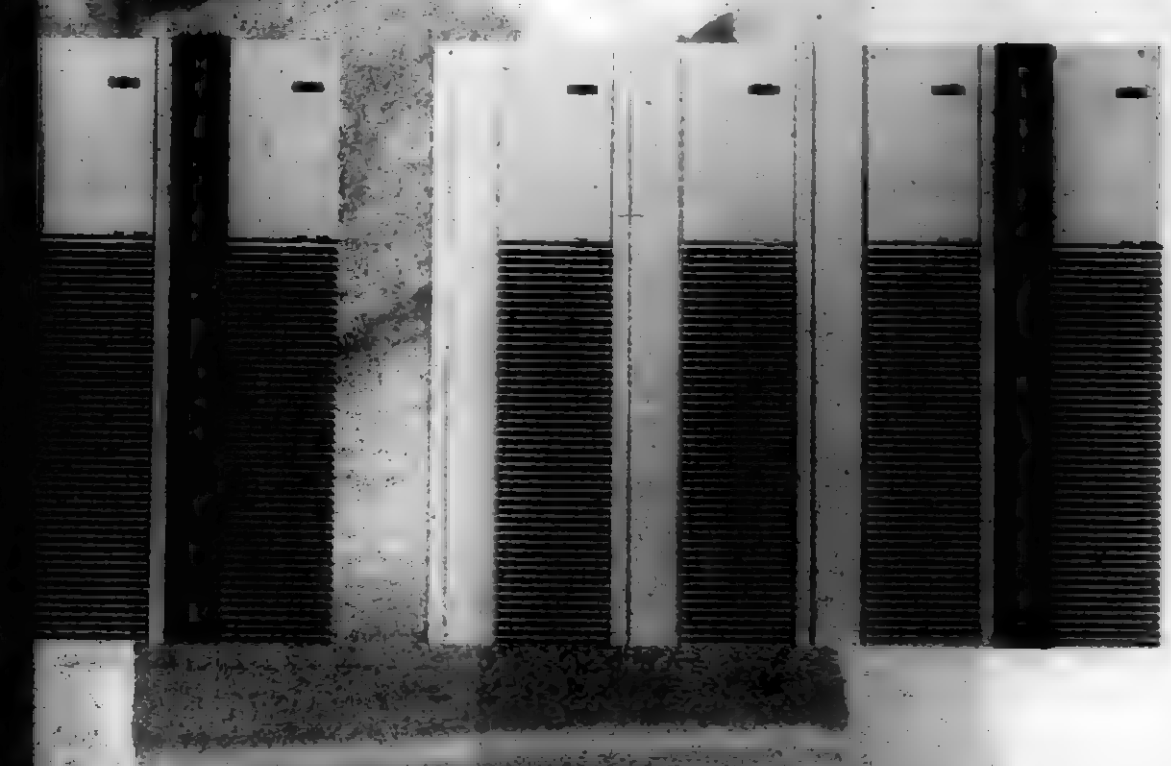

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NEW PRODUCTS

Local-area network software

Asynchronous communications service software for use in networks running Corvus's PC/NOS network operating system has been announced by **Corvus Systems, Inc.**

Called **Nostalk**, the software allows modems located anywhere on the network to be accessed by any user on the network. It is Hayes Microcomputer Products, Inc.-compatible and features a script language with a learn mode. It also includes communications server software as well as user communications software.

Support is provided for the Hayes AT command set, modem speeds from 300 to 19.2K bit/sec. and Digital Equipment Corp. VT100 terminal emulation.

The Nostalk asynchronous communications service for PC/NOS networks costs $495.

Corvus, 160 Great Oaks Blvd., San Jose, Calif. 95119. 408-281-4100.

Customer-premise equipment

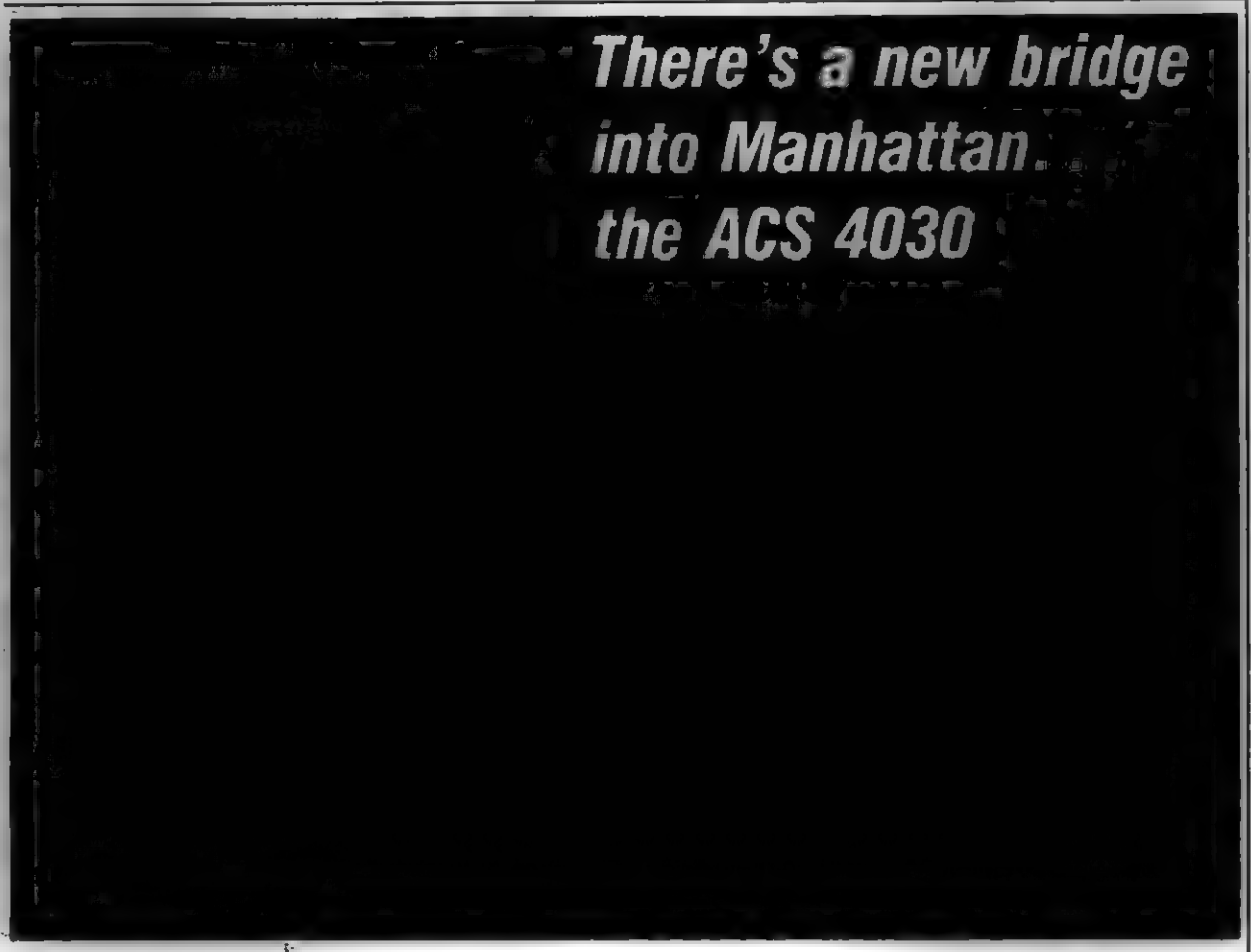
A data service unit that allows user data terminal equipment to access Dataphone Digital Service with Secondary Channel has been introduced by **Racal-Milgo.**

The **Communications Management Series** (CMS) **DSU 1556** provides data throughput of 56K bit/sec. point to point for such applications as file transfers and computer-to-computer communications. It accepts network timing from external master clock supply sources and can operate as a limited-distance point-to-point modem at synchronous data rates of 19.2K, 38.4K or 56K bit/sec. over private networks.

The CMS DSU 1556 can be used to test, monitor, configure and report alarms to central or remote sites.

The unit costs $1,695.

Racal-Milgo, 1601 N. Harrison Pkwy., Sunrise, Fla. 33323. 305-475-1601.



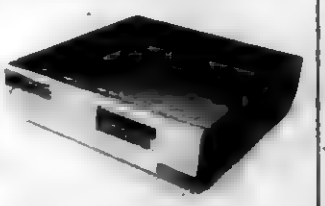
"The ACS 4030 dramatically cut our communication costs and maintained reliability – at a quarter the price of other Ethernet bridges." Charles Fischer
Director of Operations, Dalcomp, Inc.

Dalcomp, a supplier of online information for the financial industry, needed a better way to connect offices on both sides of the Hudson. Dalcomp had five point-to-point connections using expensive dedicated lines. Dalcomp needed to cut network costs, but couldn't afford to sacrifice network performance. Dalcomp chose the ACS 4030 to connect Ethernets already in place.

Dalcomp saved on equipment costs and cut network charges by 60%. Dalcomp looked into another remote bridge; it was four times as expensive. Dalcomp saved by choosing the ACS 4030 and saved again by reducing the number of dedicated lines from five to two. The ACS 4030 can save you money too.

Saving money doesn't mean sacrificing reliability. Says Fischer, "In our business, we deal directly with major financial institutions. Our service transmits crucial information and we cannot have a down time." Because the ACS 4030 provides load-leveling, if one critical line goes out, the others automatically pick up the slack.

The ACS 4030 fits into your existing system. No need to buy other expensive equipment. And ACC has been developing and supporting networking systems for over 12 years. If you need to connect Ethernets across a river, a parkway, or an entire state, the ACS 4030 can bridge the distance and cut costs, not performance. Call ACC today.



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An automated voice-response telephone system that uses artificial intelligence to diagnose and solve customer problems without the intervention of support personnel has been announced by **Intellisystems, Inc.**

Techsys can carry on diagnostic sessions with up to 32 users simultaneously. Callers interact with the system using a Touch-Tone telephone. When the system cannot field a call, it is automatically transferred to a customer support representative.

Based on Intel Corp. 80386 processors running in parallel, Techsys can route calls, take messages, handle extension dialing, track products and customers by serial number and support account number and deliver up to 35 hours of information to callers. Up to eight terminals can be added to the system.

Prices start at $38,000 for a four-line system.

Intellisystems, 3946 Stone Canyon Ave., Sherman Oaks, Calif. 91403. 818-906-7575.

A device designed to enable an IBM Personal Computer or compatible to communicate with Group III facsimile machines over standard telephone lines has been announced by **Omnium Corp.**

The **Omnium PC Fax System** provides menu prompts and Help keys and supports merging of text and graphics.

Other features include the ability to send single or multiple documents and to send documents at a predetermined future time, a built-in mail list manager, transmission speeds of 2.4K, 4.8K, 7.2K and 9.6K bit/sec. with automatic fallback, automatic redial, activity reporting, destination polling, send and receive verification and the ability to view received documents on-screen or print them out.

The PC Fax System costs $1,199.

Omnium, P.O. Box 186, Stillwater, Minn. 55082. 800-328-0223.

Links

A communications option for the Microvax 2000 has been announced by **Digital Equipment Corp.**

The single-line synchronous communication interface supports DEC's VMS/SNA Software System Version 1.2 and VAX Packet Switching Interface Version 4.1 running under VMS Version 4.6. According to the vendor, it simplifies the connection of the Microvax 2000 systems to IBM host systems. It also supports the CCITT X.25 protocol.

The options costs $1,500.

DEC, 146 Main St., Maynard, Mass. 01754. 617-897-5111.

A micro-to-mainframe software package designed to allow an IBM Personal System/2 to display mainframe graphics has been announced by **Attachmate Corp.**

Hypergraph/8514 software uses the on-board graphics processor of the IBM 8514/A adapter.

Hypergraph/8514 is an add-on option to Attachmate's Extra connectivity software, a multiple-session IBM 3270 emulation system.

Extra costs $45. The Hypergraph/8514 option costs $895.

Attachmate also announced the **Advanced 3270 Adapter/2 3270**, a micro-to-mainframe adapter for the PS/2 Micro Channel priced at $595.

Attachmate, 3241 118th Ave. S.E., Bellevue, Wash. 98005. 206-644-4010.

SYSTEMS & PERIPHERALS

HARD TALK

Stanley Gibson

SAA: Not cast in stone

If a vendor asked you to sign purchase and sales agreement documents that included the phrase, "Whether or not we support this system and how long we support it depends on how many other people buy it," would you sign on the dotted line?

You would stop and think, that's for sure. But, in reality, that is what users have often been faced with in the past from some vendors.

IBM, reputedly the safest of "safe" vendors, has not been above that strategy. Witness the demise of the 8100, which reached a dead end when IBM decided it was no longer strategically valuable.

Any time a vendor offers multiple architectures, users, analysts and the press always want to know which is really the strategic one. Unisys has been dealing with such questions since the Burroughs-Sperry merger last year. IBM, likewise, with its multiple low-end and mid-range architectures, faces similar questions.

Right now, if you own a small business, are buying your first computer and would like to

Continued on page 63

NAS drive aims to leapfrog IBM

Firm unveils 9½-in. DASD amid performance, space-saving claims

BY J. A. SAVAGE
CW STAFF

SANTA CLARA, Calif. — In a move that promises to save valuable floor space in mainframe data centers, National Advanced Systems (NAS) recently announced a 9½-in.-diameter direct-access storage device (DASD).

The announcement ran counter to the customary practice of waiting for IBM to move first in the peripherals market. Rather than wait until after IBM's expected announcement of a sub-14-in. DASD sometime in the next two years, NAS went ahead with its 7380 Disk Storage Subsystem Model K. The DASD's 9½-in. platters make it 46% of the size of IBM's 3380 Model K, according to the vendor.

The 7380 Disk Storage Subsystem Model K was originally announced in October 1987, one month after IBM unveiled its Model K, but no information was available at that time on what it would look like.

Bold move

The announcement of the smaller disks is significant "because Japanese suppliers have never been willing to pre-empt IBM," said Dave Vellante, a storage systems analyst at Framingham, Mass.-based research firm International Data Corp. Hitachi Ltd. supplies the systems to NAS. According to a NAS spokesman, Hitachi announced an indentical drive for the Japanese market last week.

Some analysts predicted brisk demand for the drives. "The more adventurous users will buy them," said Bob Katzive, vice-president of Disk/Trend, Inc. in Los Altos, Calif. "NAS has a good reputation as a vendor of drives. People won't worry about embarrassing habits. It won't make a mess on the floor."

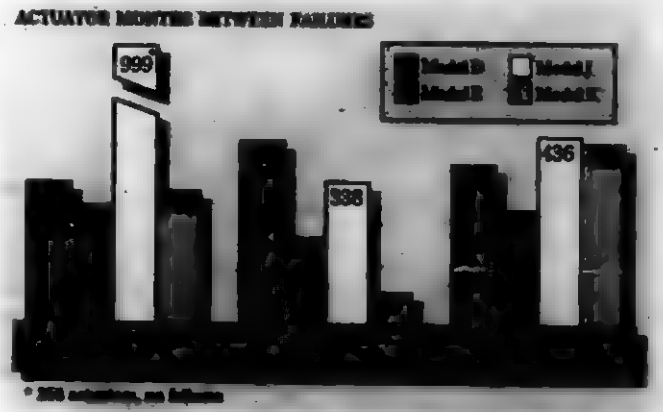
A major auto products manu-

Continued on page 62

Users embrace IBM Models J and K drives

IBM 3380 reliability

New J and K models outperformed older D and E models in February



INFORMATION PROVIDED BY RELIABILITY RESEARCH, INC.
CW CHART

BY STANLEY GIBSON
CW STAFF

Despite some earlier glitches, IBM's 3380 Models J and K are off and spinning, offering users increased storage with superior reliability. A random sampling of initial users of Model J and K triple-density drives found them to be very satisfied with their disk drives.

"The 3380 Model K direct-access storage device is a lot better than the other devices," said Pete Quinn, a senior software analyst at Fingerhut Co., a direct-mail retail concern in St. Cloud, Minn. His shop is populated entirely with 3380 drives,

Continued on page 62

Motorola lengthens 68030 line

BY ALAN J. RYAN
CW STAFF

TEMPE, Ariz. — Aiming to boost its technical systems offerings, Motorola, Inc.'s microcomputer division recently introduced two new systems based on its 68030 microprocessor.

The systems allow users to upgrade to the higher performance 68030 from the 68020 without losing their software and hardware investments, the company said. The machines are targeted at systems integrators and real-time simulation and image processing users.

Both products, part of the VME Delta series, can perform 5 million instructions per second (MIPS), according to the vendor.

The Motorola systems compete against IBM, Hewlett-Packard Co., Digital Equipment Corp. and Sun Microsystems, Inc. offerings in the technical market, according to Thomas A. Beaver, vice-president and general manager of the microcomputer division.

Continued on page 63

Inside

- Sigma designs reqgedized system chassis for Microvax II and Q-bus configurations. Page 64.
- Mitsubishi rolls out 300 dot/in. color printer. Page 64.

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IBM drives

CONTINUED FROM PAGE 61

Models D, E, J and K. He said the reliability of his K models has been about the same as his D models but about five times better than his E model drives. Quinn said his K models have been installed since November.

Satisfaction

Tom Wieland, a data center manager at the Connecticut Bank & Trust Co. division of Bank of New England Corp. in Hartford, Conn., said he is satisfied overall, despite some earlier problems.

"The K model is running just fine. We did have one drive which we couldn't use at all," he said, adding that on another drive, IBM replaced one head-disk assembly (HDA) as a preventive maintenance move. Wieland's shop has eight full strings with four boxes per string.

The supervisor of operations at a Midwestern farm equipment manufacturer also reported having an HDA replaced.

Figures compiled by Reliability Research, Inc. since December 1987 show better than expected reliability for 3380 Model J drives. Early results for Model Ks were not up to par in January, but February reliability figures have shown a sharp rebound (see chart page 61). "The J has been above its competitors from Day 1, and the K is coming along," said Larry Martin of Reliability Research.

K models showed 97 actuator months between failures in January, but that figure leaped to 422 in February. J models had 338 actuator months between failures in January and 436 in February. February figures for both J and K models are above those of both D and E models.

Actuator months between failures is the number of months an actuator can run without a permanent I/O error. IBM HDAs contain two actuators. According to Reliability Research statistics, a failure is a permanent I/O error that requires immediate operator attention. Data need not be permanently lost, however.

Varying reasons

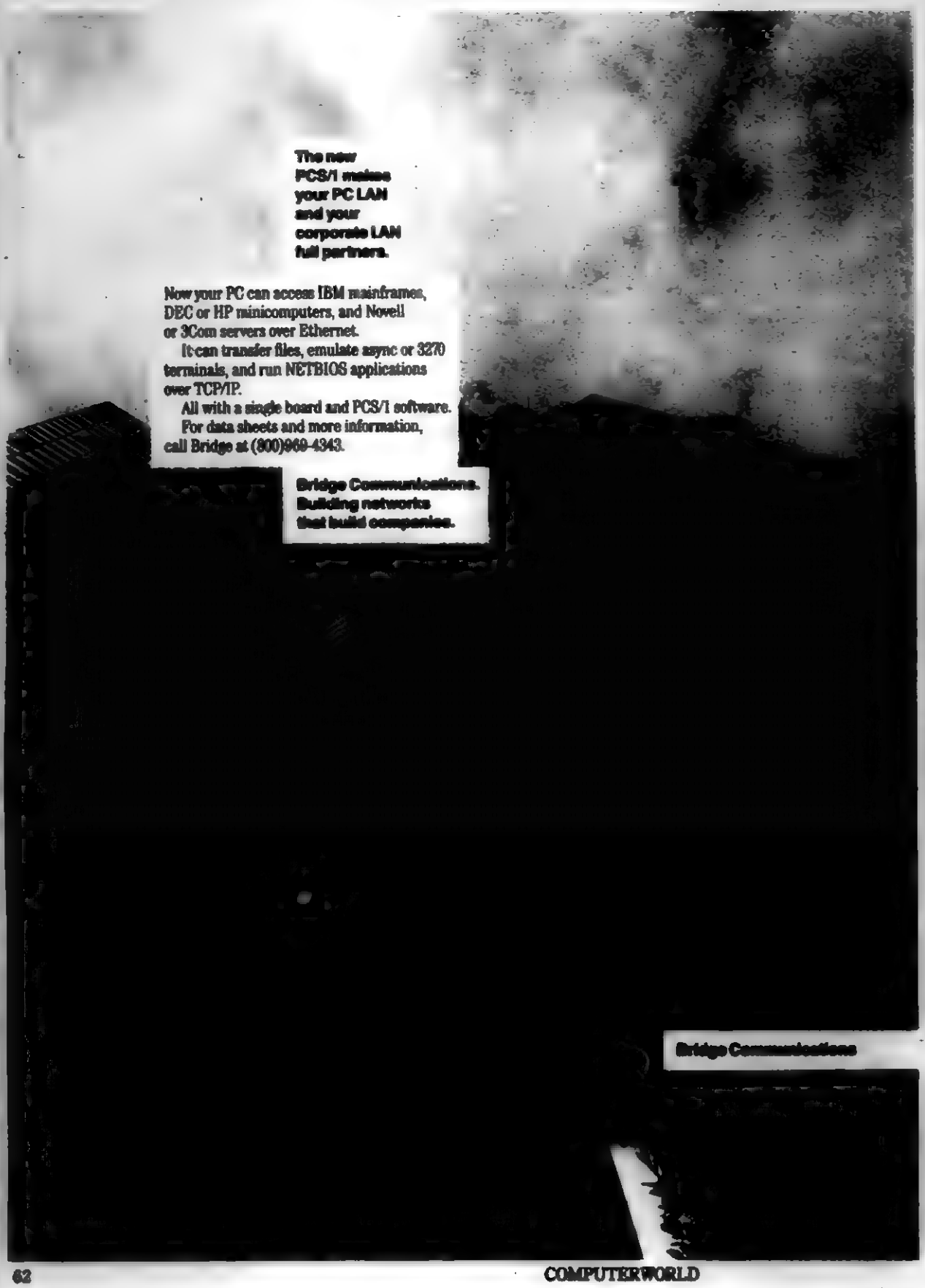
Martin said the low figures for the K drives in January were a result of lower results across a wide range of accounts. However, one account that had a large number of failures said it thought the problem was due to installation and had been cleared up.

Another user, who said he has historically had somewhat strained relations with IBM, had a larger than usual number of problems, according to Martin.

"If I were going to say where the problems were, I would say they would be in the upgrade of the 3880 controller, which is required to run the J and K drives at the 4.5M byte/sec. transfer rate." It's a large upgrade, and a controller can affect an entire string, Martin said.

He also said he talked to four or five Reliability Research customers who indicated the controller had not been quite right after the upgrade was performed.

Martin said that in the past, new disk drives took longer to attain high reliability figures than the J and K models had so far. "Typically, there is a much longer learning curve," he said.



NAS drive

CONTINUED FROM PAGE 61

facturer and large NAS user said he already has a couple of the drives on order. "The smaller space [utilization] is an asset, but not a governing factor. You have to have performance — even if you have to build another building," he said. "They have better performance than equal IBM drives, and the reliability is just unbelievable. Besides, IBM's prices are ridiculous."

Disk/Trend's Katzive said the smaller size, rather than the storage system's other attributes, will drive sales. "The signature [footprint] on the floor is an important economic consideration for users."

Amdahl may counter

NAS's competitor in the IBM plug-compatible market, Amdahl Corp., has never had a 14-in. DASD. It originally announced a 10½-in. disk storage system in 1982. A spokesman for the company said he expects new storage technology announcements this year, but he would not specify a product.

NAS's Model K can pack eight head-disk assemblies stacked vertically into a standard cabinet, according to the company. Each assembly can store 1.88G bytes of data, compared with IBM's 3.75G bytes. A full configuration consists of four cabinets, rather than the eight needed for IBM's Model K.

Average seek time, according to NAS, is 12.5 msec, and 1 msec is the minimum seek time. This is 25% and 50% faster than IBM's Model K performs, according to NAS.

No price has been named, but according to the company, the list price will be 90% of IBM's asking cost.

Due to its smaller size, NAS said, its Model K will use 25% less power than IBM's.

The DASD can allow four independent data paths to each actuator, enabling four transfer operations to be carried on at the same time. And it can be hooked up to the NAStrack diagnostic system to monitor and analyse it for performance, the vendor said.

NAS is slated to begin shipping a limited supply in the third quarter. The company said it expects to ship in quantity by early 1989.

Gibson

CONTINUED FROM PAGE 51

buy from IBM, you are faced with four choices. You could buy a Personal System/2 local-area network, a System/36, a multiuser RT Personal Computer or, possibly, a 9370.

Given that you could find a suitable application on any of these, which should you choose? The presence of an incremental, easy to implement, reasonably priced growth path that could protect your software investment would be perhaps the next most important decision after finding an application.

Are all growth paths the same with all these systems? Will IBM continue to offer wholehearted support for them all?

Cast your ballot

During a recent interview, Frank King, vice-president of development for IBM's Entry Systems Division, was questioned at length as to which were IBM's entry-level systems of choice. King responded that it is better to have choices than not to have them. In the end, he said, "the market will vote" for the systems it wants.

That sounds fine. That means the customer is always right. But does this mean there will be winners and losers? That some processors won't get enough votes and will go the way of Gary Hart and Alexander Haig?

In the past, there would be no way to get around that conclusion. But now there is IBM's Systems Application Architecture (SAA). Under SAA, even if the hardware system you choose does not evolve the way you wish, you can migrate your application to a more appropriate platform. Or so we have been led to believe.

Thus, SAA becomes a panacea for all growth and migration anxieties. With SAA, IBM offers more safety than Fort Knox. An entry-level IBM customer with migration concerns should really ask, How much can I believe in SAA? Is the system I am buying fully supported under SAA? Here, you are buying a promise.

At least with the System/36 and 38, it's a promise that is very unspecific. Neither RPG II nor RPG III, the programming languages for those systems, has been announced under SAA. We probably must await the arrival of Silverlake to resolve this dilemma. Until then, System/36 and 38 users will be left to sport the anti-SAA buttons that they were seen wearing at a recent meeting of the Common users group.

SAA, although critical in protecting user investments, is not cast in stone. IBM has indicated that SAA will evolve, just as Systems Network Architecture evolved in networking. Because it can change, it probably will, and one can't be sure that SAA will always solve all migration problems.

In fact, even SAA could be a hedging decision. If it began to look like a group of users of a certain language or architecture had little requirement for the benefits of SAA, then support could be curtailed on those languages or architectures. SAA will only come to full fruition if there continues to be strong user demand across a variety of systems for such an offering for several years.

The requirement of SAA, cross-system consistency, has long been a demand of some users and their organizations, such as Guide International. If demand should dry up, then it's a fair bet that SAA would go the way of certain Gothic cathedrals in Europe that have, to this day, never been completed.

Despite the importance of SAA in guaranteeing a customer's investment, it's probably impossible to get a written statement from IBM specifying what SAA will or won't do in the future. SAA, in all likelihood, will always be a promise.

As such, users should examine it very carefully. A entry-level user should ask, "Will I need SAA and will it be there when I need it?" Users should be as specific as possible in pinning IBM down on what SAA features are scheduled to appear and when.

Gibson is *Computerworld*'s senior editor, systems & peripherals.

Motorola

CONTINUED FROM PAGE 61

Among the new systems are the Model 3600, a Unix system targeted at the large work group systems market, according to Glenn Lesniak, systems product manager for the VME Delta series. The 3600's basic configuration provides 4M or 8M bytes of memory with a single-board computer leaving 11 VME slots open for application-specific expansion.

The Model 3600 reportedly supports up to 132 serial connections and up to 1.2G bytes of mass storage. The model is geared toward software development and applications requiring large data storage capability. When more power is needed, the processor capability of the 3600 can be doubled by moving up to an 8 MIPS cache processor, Motorola said. Pricing starts at $11,895 in OEM quantities, and shipments are slated to begin in June.

The company also announced the multiuser Unix-based VME Delta series Model 3300, targeted to serve the open technical systems platform market. The basic system will sell for $6,995 in OEM quantities, and shipments are scheduled for next month.

The Model 3300 is a six-slot system geared toward commercial, technical and networking applications, the company said. It reportedly can support up to 8M bytes of memory, up to 300M bytes of disk storage and up to 20 users or asynchronous devices.

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NEW PRODUCTS

Processors

A ruggedized system chassis designed for Digital Equipment Corp. Microvax II or LSI-11/73 Q-bus configurations has been announced by **Sigma Information Systems.**

The **SA-H169** supports four drives. Drive access is via a front door. A 500W power supply with power-fail circuitry is self-contained.

The SA-H169 costs $9,167.

Sigma also announced a freestanding enclosure that expands Microvax II or Microvax 3200 systems by providing additional backplane slots.

The **SA-H162** enclosure includes attachments to expand the Microvax with 16 additional dual-Q22 backplane slots and up to four additional 5¼-in. pluggable disk drives. It costs $3,750.

Sigma, 3401 E. LaPalma Ave., Anaheim, Calif. 92806. 714-630-6553.

Data storage

Digital Equipment Corp. RA series-compatible disk drive subsystems have been introduced by **Distributed Logic Corp.** (Dilog).

The **Fixed Disk RA** subsystem provides up to 2.3G bytes of storage per unit. The **Quick Disconnect RA** subsystem provides data security and portability. Both employ a protocol conversion board that translates from the Storage Module Device or the enhanced small device interface protocol to DEC's standard RA-compatible SDI protocol.

A Fixed Disk RA subsystem with two 576M-byte drives costs $28,802. A Quick Disconnect RA subsystem with two 288M-byte drives costs $22,884.

Dilog also announced an 8mm streaming tape subsystem offering up to 2G bytes of storage capacity per tape cartridge for backup of hard disks in DEC Microvax, VAX, PDP-11 and LSI-11 computers. It costs $6,855.

Dilog, P.O. Box 6270, 1555 S. Sinclair St., Anaheim, Calif. 92806. 714-937-5700.

A Sun Microsystems, Inc.-compatible storage module device VME disk controller has been announced by **Xylogics, Inc.**

Called the **Xylogics 753**, the board is compatible with the Sun-3 Eurocard board set. According to the vendor, it combines a 128K-byte first-in first-out cache architecture with read-ahead and the company's Dynathrottle direct-memory access (DMA) control. It supports disk speeds up to 3M byte/sec.

The Xylogics 753 also provides full 32-bit support and is 100% compatible with SunOS, the vendor said. Capabilities include setting interrupt and vector levels and changing DMA parameters as well as scatter/gather support, asynchronous command queueing and enhanced 48-bit error correction control.

The Xylogics 753 costs $2,895.

Xylogics, 53 Third Ave., Burlington, Mass. 01803. 617-272-8140.

Printers/Plotters

A 600 line/min. matrix line printer has been announced by **Output Technology Corp.**

The **OTC 2161** features a two-line-per-pass printing technique, the vendor said. Other features include two expansion slots for user-installable option cards, built-in bar codes, dot-addressable graphics, downloadable fonts and font cartridge capability. Centronics Data Computer Corp. and Dataproducts Corp. interfaces are also included.

Standard emulations include the Printronix, Inc. P6080 and the Epson America, Inc. FX-286E.

The OTC 2161 costs $6,450.

Output Technology, Suite #6, E. 9922 Montgomery, Spokane, Wash. 99206. 509-926-3855.

A 300 dot/in. color printer has been introduced by **Mitsubishi International Corp.**

The **Shinko CHC 345** is an A size printer said to be capable of producing more than 270,000 colors. It features four-color ribbon support and a tractor feed. Also available is the CHC 645 D size printer. It features a full-page buffer.

The CHC 345 costs $6,000. The CHC 645 costs approximately $12,000.

Mitsubishi, GMD Dept. B, 520 Madison Ave., New York, N.Y. 10022. 212-605-2343.

A 40 page/min laser printing system has been introduced by **NBS Southern, Inc.**

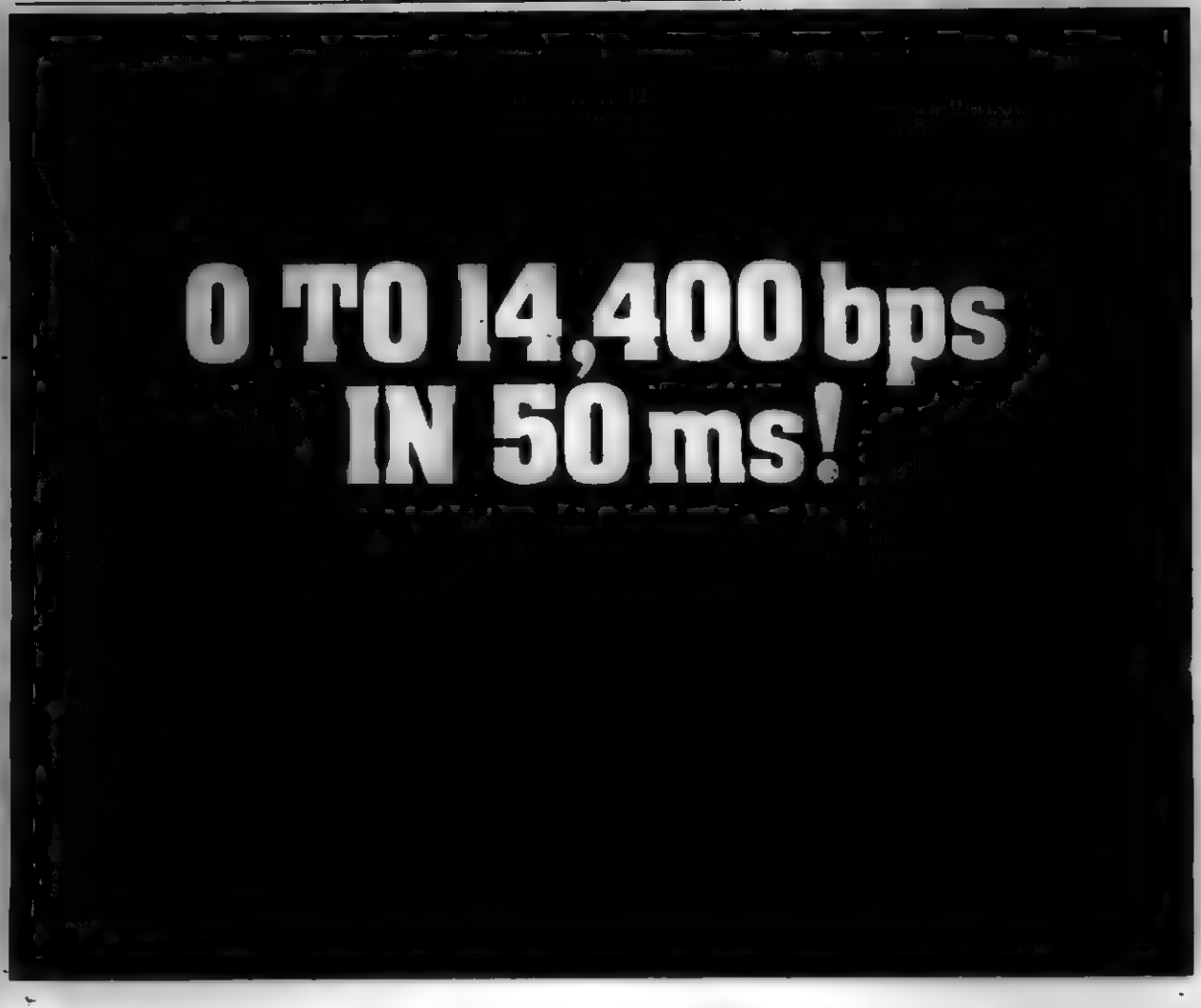
The **Model 3840** has a standard resolution of 300 by 300 dot/in. and comes with 42 resident fonts. Resolution of 240 by 240 dot/in. is available as a factory option, and total font storage can be expanded to more than 100; the full Bitstream library of fonts is supported, the vendor said.

Plain cut-sheet paper can be accommodated. IBM and Digital Equipment Corp. interfaces can be used to drive the Model 3840.

The printer can operate in a computer room or remotely. It offers imaging capabilities and forms design; graphics images may be presented as input from a personal computer or workstation.

The Model 3840 costs $45,000.

NBS Southern, 100 N. Belcher Road, Clearwater, Fla. 34625. 813-441-1981.



The hottest number in dial-up data communications is the UDS 14.4A/B modem! Strap it into its "B" configuration and it goes to 14.4 kbps from a standing start, after an RTS-CTS delay of only 50 milliseconds — and that's over the switched telephone network.

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For detailed specs and quantity prices, contact Universal Data Systems, 5000 Bradford Drive, Huntsville, AL 35805. Telephone 800-451-2369; Telex 752602 UDS HTV.

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A lender, a vendor and a micro defender

Tales of three women who gained power in the industry

BY MARGUERITE ZIENTARA

Power. The very word does something to people — especially those without any. It goes hand-in-hand with money, prestige and freedom and, therefore, carries with it the promise of all the things millions of people strive for every working day.

The women described here — Portia Isaacson, Therese Myers and Jacqueline Morby — gained power and made their mark in one of the most fast-moving and unpredictable industries ever to emerge. The microcomputer burst onto the scene in the mid-1970s, and popular culture hasn't been the same since.

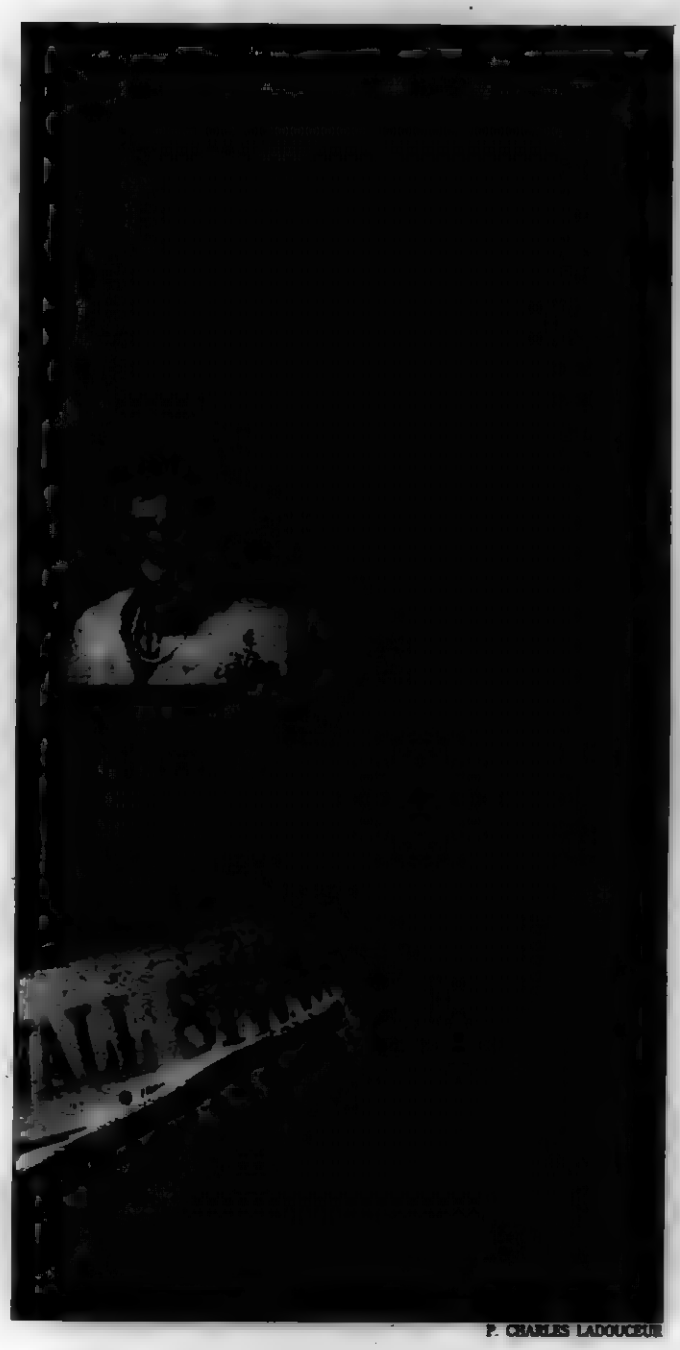
Historically, most women have avoided the technical world. But a few who dared and persevered in this industry have reaped great rewards: Several are multimillionaires; all are highly respected within the industry.

Although, of course, no one person can take full credit for creating an industry, Portia Isaacson has very possibly done more than any other person to help shape the microcomputer business. Isaacson was a true pioneer of personal computing, having opened one of the first microcomputer stores in the nation with her then-husband in 1976 — only one year after the microcomputer had become a reality.

"I became well known because I was really evangelistic about personal computers being the most important technology the computer industry's ever brought to mankind," Isaacson says.

She rather quickly became *the* expert on personal computers. "I experienced everything about the industry as it grew," Isaacson explains. "I lived through all its mistakes."

Isaacson also founded the first, and at one time the largest, microcomputer-related market research firm in the country, Future Computing, Inc. in Dallas. Future Computing — which was sold to McGraw-Hill, Inc. in 1984 — was for years the only source for hard statistics about microcomputer sales.



P. CHARLES LADOUCEUR

Dreaded news

While sales of IBM's Personal Computer were fueling Isaacson's business, IBM cast a long shadow across the paths of many other gifted innovators. One survivor is Therese Myers, co-founder and president of Quarterdeck Office Systems in Santa Monica, Calif.

Quarterdeck's story started out on a high note. In its first full year, 1982, Quarterdeck was able to attract $6.4 million in venture capital and the firm suddenly became "something to watch."

The cause of such a stir was a

- **Future Computing's Portia Isaacson**
- **Venture capitalist Jacqueline Morby**
- **Quarterdeck's Therese Myers**

Zientara is Boston bureau chief for Computer Currents magazine and a former senior writer for Computerworld. This article is excerpted, by permission of the publisher, from Women, Technology & Power. ©Copyright 1987 by Amacom, a division of American Management Association, New York. Reprinted by permission. Available in bookstores.

new idea for integrating software. Quarterdeck had a working prototype called Desq, which would allow a user to combine up to nine application software packages of choice from different vendors and switch back and forth among them easily. The idea was unique, brilliant — and obviously worth a lot of cash.

But after the hard work of developing Desq, Quarterdeck was in for a real shock. Just three months after Desq finally came out, IBM preannounced Topview.

Life can be dangerous for a small company with a single product. Once IBM gets that gleam in its eye, it can call on its army of development and marketing personnel to bring a product to fruition quickly and lay it out before the public.

"It just proves Desq was a brilliant idea," Myers said then, unconsoled by the thought.

But Quarterdeck has survived. Desq and its follow-up product, Desqview, received excellent reviews, which is more than IBM can say about Topview. Quarterdeck surprised many observers who wrongly sensed a sinking ship.

The battle isn't quite over for this company, but you won't see Myers waving a white flag anytime soon. In an industry where any software firm has only a 50-50 chance of surviving beyond its fifth year, Quarterdeck has already beaten the odds.

Timing counts

Jacqueline Morby started out in venture capital in the early days of the personal computer industry. She helped shape the industry by pouring $8 million into fledgling micro software companies for her Boston employer, TA Associates, one of the oldest and largest venture firms in the country.

It's not *how much* she invested that sets her apart, however, but *when* she invested it. Morby was one of the first to discern the lucrative potential of micro software in the late 1970s, and she helped blaze the investment trail.

In spite of some doubt and controversy within her own company, she recommended — and TA made — four highly promising investments in software companies.

Morby, who reentered the business world after 15 years as a homemaker, immediately got onto a fast track, both within her company and out in the world at large. Her controversial risk taking paid off big, for the software industry and for her personally. Only four years after joining TA Associates, she was made a general partner.

.....

On being powerful

"By giving great value in our society, you get great rewards back," Isaacson says. "In hindsight, I spent my life building unique value. That is, if you have anyone who competes with you in skills or in products, then that limits the value of what you offer, because someone else offers it too."

When Isaacson realized in college that physics was the most difficult of the sciences, she decided, "I will be a physicist." She reasoned that if she became something that few people were, she would easily be able to make a living.

> "YOU don't have to act and look tough to be tough. It's easier with friendliness and niceness instead of confrontation."
>
> JACQUELINE MORBY
> TA ASSOCIATES

Although she went on to become possibly the most influential voice in the PC industry, Isaacson has reservations about how to describe herself.

"The word 'powerful' turns me off a little bit, but if you'll allow me to think of it in a positive way, the answer has to be yes, [I am powerful]. We use the word 'influence' most often."

Like others, Isaacson feels keenly the responsibility that goes along with power. "In our own company, we discuss a lot what influence means and how we should manage it," she said when she ran Future Computing.

Morby, like many other women in business, feels her polite exterior belies her true nature. "People misjudge me," she says. "They wonder, 'Is she tough enough?' They don't understand there's a difference.

"You don't have to act and look tough to be tough. Your mannerisms can be friendly and nice, but underneath is a determination to achieve what you want to achieve. It's easier with friendliness and niceness instead of confrontation."

What Morby may not realize is how others see her. "She has a powerful presence," says one industry observer. "When she walks into a room, you know she's there."

Morby, though, has amazed herself. "It surprised me that I was as aggressive and competitive as I am," she says. "I really want to have the best investments and do the best. I need to compete."

As a company, she says, "We're dealing with people's dreams. And those dreams can come true because we're able to say, 'We think you've got something here, and we think you can do it,' and give them the pure start-up money to start a company.

" 'Power' is not the right word, but I guess a venture capitalist does feel a sense of responsibility to all these dreams," Morby says.

Quarterdeck's Myers does not in any

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way see herself as powerful. "No, we're a small company," she says. "Our work was done as a team effort. None of us could have done it without the others. I couldn't have done it without [cofounder] Gary [Pope]."

Power, however, resides not necessarily in numbers but sometimes in attitude. Myers and Pope had to have the daring to compete, as well as a strong survival instinct and the mettle for sticking it out through the hard times. For Quarterdeck, with a dozen or so employees, to compete against Microsoft Corp. with its hundreds and IBM with its thousands takes guts.

Myers won't take the credit, but she is undoubtedly a large part of the company's success. "Terry Myers is a great manager," a Quarterdeck publicist says. "She's rarely wrong. She has the thoroughness of the small-business mentality but the strategic capability of a corporate executive."

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On being female

"Women at all levels generally set their goals too low," Isaacson says. "How many women would think of leaving Intel or Texas Instruments and going after venture capital to start their own company?" she asks. "It's a very important point that very few women set their goals on doing that."

"There are more women in power in the micro industry than anywhere else, certainly compared with the Fortune 1,000 companies," Morby says. "There are women heading companies and many vice-presidents of marketing.

"I've never had problems being female," she continues. "In the beginning, when I was first calling on companies, I worried they might look at me as a woman and not want to deal with me. But they were always interested in my background, how I got into the business. It was more of a curiosity than anything else."

The scarcity of women worked to Morby's advantage in some cases. Entrepreneurs unaccustomed to dealing with women in business were often surprised into letting down their guard. "I sometimes find out incredible things that the entrepreneur really shouldn't tell me," Morby told *Business Week* in 1981. "and then I don't invest in the company."

Isaacson also feels that being a woman was a plus but in a different way from most.

"In front of an audience, I get by with things a normal person wouldn't, in a way a three-piece-suited guy wouldn't," she says. "It's because they have no set of expectations, because I'm not out of any mold. In fact, at that point, being female becomes very much an advantage, except for the occasional guy who's threatened by it. But they're very rare nowadays."

She understands, though, that her dynamism can backfire. When Isaacson speaks in public, she holds her audience in the palm of her hand through a combination of dramatics, startling opinions and sheer personal magnetism. "I'm reasonably entertaining," she says, "and 90% of the audience winds up liking me. But the rest are thinking, 'My God, what a brassy, bossy, yucky lady!' "

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In the nick of time

The excitement surrounding the micro industry was just about to break when Morby found her way into that enclave. By 1980, several factors had combined to put Morby into a valuable position. For one thing, political changes had suddenly made high-tech investments very attractive to venture capitalists. In 1978, thanks largely to the efforts of the American Electronics Association, the capital gains tax was lowered from 48% to 28%. This meant that success was newly affordable — and the money people wasted no time.

Whereas in 1977 venture capital firms had committed $39 million to invest in new businesses, that figure skyrocketed the very next year to $570 million — almost 15 times as much.

Naturally, besides making billions of investment dollars available, the situation also created a need for more people capable of making the investment decisions. The year the money would start to fly, Morby graduated from Simmons Graduate Management School and joined the world of venture capital full-time.

From her first day at TA Associates in Boston, Morby was on her own. "You don't get a lot of help or coddling here," she says. Besides being a self-starter, Morby is very intuitive, which has contributed to her personal success. "You have to judge and understand people. I'd say it's 30% to 40% of our job."

Some credit also goes to her experiences in South America, where her husband's work had taken the family several years earlier. "Down there, I was dealing with uncertainty all the time," Morby notes. "I was negotiating my way around in another language, and there was always unfamiliar territory, both physically and socially. I think it was good training."

> "NOTHING is more exciting than to find a company that's a terrific investment. It's like discovering gold."
>
> JACQUELINE MORBY
> TA ASSOCIATES

With keen insight, she soon identified the then-neglected area of mainframe software as potentially lucrative. "It seemed to me then that hardware was going to become more of a commodity," she explains, "and software would be where the value existed in computer systems." That happened to be a fundamental truth that was not yet obvious, even to most people in the computer industry.

It was not an easy road. Morby made cold calls on about 100 companies in 1978 to 1979, and at least 30 of those were mainframe software companies. Many didn't need venture capital; some had never heard of it. It fell to Morby to educate them, evaluate her prospective investments and, if they looked promising, try to persuade them to accept venture capital in return for bargain-basement-priced stock in the company.

Morby's scores of company visits resulted in just three mainframe software investments: McCormack & Dodge Corp. in Natick, Mass.; Capex Corp. in Phoenix; and Alcorp, Inc., formerly Artificial Intelligence Corp., in Waltham, Mass. McCormack & Dodge and Capex were later sold, giving TA Associates its payback, and Morby has a seat on the board of directors of Alcorp.

'Interesting' frontier

Having gained entrance into the mainframe software arena, Morby began to hear rumblings about microcomputer software and figured, "there must be something interesting here." Her timing again was exquisite.

Morby's hard work and intuition led her to four micro software investments: Digital Research, Inc., maker of the CP/M operating system; Sierra On-Line and Spinnaker Software Co., on whose boards of directors she sits; and Softsel Computer Products, Inc., one of the largest distributors of microcomputer software.

"Nothing is more exciting than to find a company that's a terrific investment," Morby says. "It's like discovering gold."

While Morby knew exactly what she was doing, her early investments in micro software did not always earn the approval of her colleagues. "Spinnaker was a controversial investment around here because the principals weren't from operating backgrounds," she recalls. They were two sharp Harvard Business School graduates, working in high-tech-oriented Boston consulting firms.

As it turned out, it was the two Harvard graduates who almost turned Morby away. One of them dropped in at TA Associates' office on a fact-finding mission, hoping to see the manager of the office. Instead, the manager's secretary told him, "Jacqui Morby will see you." Morby then suggested lunch.

"I didn't want to have lunch with her," admits Bill Bowman, Spinnaker's cofounder. What Bowman didn't realize was that the manager he wanted to see was actually junior to Morby.

"I didn't know who [Jacqui Morby] was — a secretary or what," Bowman recalls. "I had never heard of her. But a consultant never misses an opportunity to B.S."

Over coffee, Morby asked Bowman, "Why don't you and Dave work up something we can finance?" He and Dave Seuss, his partner, did, and Morby liked what she saw. In May 1982, Spinnaker got its first infusion of venture capital — $800,000 from TA Associates.

"If we hadn't taken them on, who knows if they would have been financed by other people?" she asks. Others saw it as something of a long shot, but Morby's belief in her own judgment was quickly justified.

"Spinnaker was unbelievably successful," she says. "In four months, they had products out in the marketplace, and they were beating the projections all along the way."

Changing with the times

Of course, only the future will tell how successful Morby's investments really were. The industry shakeout and slump of 1985 to 1986 have added up only to a disquieting uncertainty. Failure is an ever-present possibility — and therein lies the most difficult part of Morby's job. "When your companies don't do well, it's upsetting," she says. "It's not fun to lose money. It's embarrassing for you and for the firm, and it's difficult because you feel responsible: The investors put their trust in you. But ultimately you do [lose money], sooner or later."

Every year, TA Associates makes 30 to 40 investments in all areas of technology — and occasionally in other areas of business — and rejects out-of-hand about 1,000 business plans that come over the transom.

Morby and other first-wave micro venture capitalists, of course, moved out of the micro arena long ago, on to such other areas of technological interest as telecommunications, data communications, semiconductors and networking systems. "The microcomputer industry is no longer an interesting area for investments," Morby says.

Morby's reasons delineate

Off to a good start

• Morby

Born Jacqueline Collins, June 19, 1937, in Marysville, Calif. Graduated from Stanford University and Simmons College Graduate Management School. Work experience: writing, student teaching, market research, volunteer work for art institutions and venture capital. Spent five years, 1969 to 1974, in Argentina and Brazil. Married to Jeffrey Morby; has two children.

• Myers

Born July 1, 1944, in McKeesport, Pa. Graduated from Newton College of the Sacred Heart, Carnegie-Mellon University's graduate program in industrial administration and Northwestern University's master's degree program in accounting. Work experience: international banking, accounting, leasing, on-line systems and product design.

• Isaacson

Born Portia Midgett, Sept. 7, 1942, in Oakland, Calif. Childhood heroine: Marie Curie. Graduated from Oklahoma East Central State College, North Texas State University's master's degree program in computer science and Southern Methodist University's Ph.D. program in computer science. Work experience: dairy farming, industrial chemistry, U.S. Army, teaching, programming, retailing, consulting and speaking. Married and divorced five times; has three children.

CW CHART: AMY J. SWANSON

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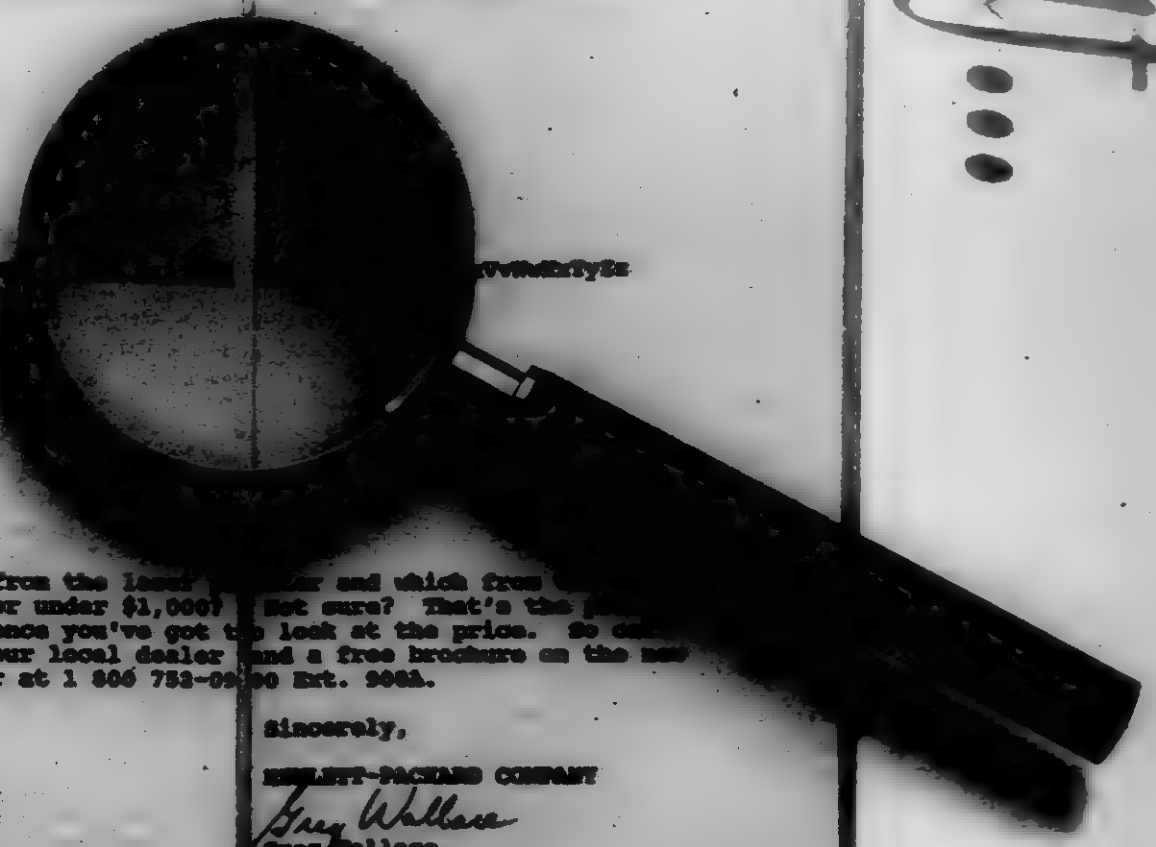

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perfectly the current state of the industry. "The market's changed dramatically and is now dominated by one company — IBM — so the micro area is not a new market anymore," Morby explains. "Suddenly it's an industry of big companies."

But it was fun while it lasted. "Seldom in the history of venture capital investing has there been an industry where companies could grow so large so quickly," Morby notes. "I don't think there will be similar instances in the future where growth is so rapid and there's such a boon for investors."

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First of a kind

Before Myers' Quarterdeck Office Systems started developing its Desq product, there was no such thing as an operating environment.

While the rest of the world was going bananas over integrated software, this company turned the concept of integration inside out. Quarterdeck's idea was to let users indulge their old habits while gaining more versatility at the keyboard.

"We said, 'We'll take on the burden of being smart — of making all these programs run together, because people have lots of files written for different software, and they've already developed work habits using that software,' " Myers explains.

In the words of one admirer, Quarterdeck came on the scene as nothing less than the Great Liberator. "Terry Myers represents the freedom of the Western mind," says Stanton Kaye, a filmmaker who has done promotional work for Quarterdeck.

> "WE'LL TAKE on the burden of being smart — of making all these programs run together, because people have already developed work habits using that software."
>
> THERESE MYERS
> QUARTERDECK OFFICE SYSTEMS

1984, "I hate machines. I can't really operate them. I'm the one who says, 'I can't make this work,' and my colleagues go back and make it easier for me."

She is skilled at avoiding a frequent mistake developers make: assuming the user knows as much as they do. "I'm a user of computers but not really adept," she admits, "so I like things to be obvious."

In developing what would become Desq, technical wizard Gary Pope wrote his own artificial-intelligence-like development language, which he called Simple. Begun in September 1981, Simple was finished by the following April, and the developers spent a grueling six months writing the intricate code for Desq.

But November 1982 brought some startling and unwelcome news. With Quarterdeck still still deep down in the minor leagues.

"I called Gary and said, 'It looks just like us,' " Myers recalls. The blow to Quarterdeck was severe, since the world now began its wait for windowing software from a proven hard-hitter, while Quarterdeck was

During the next two years, Quarterdeck suffered other major setbacks as Microsoft, then IBM, joined the race. Microsoft announced Windows, and IBM introduced Topview.

Initially dismayed, Myers soon channeled her mental energy into the satisfaction that Desq was a more powerful product.

Only Desq allowed someone to keep using his favorite Microsoft MS-DOS software packages from different vendors, while allowing up to nine applications to be displayed at the same time on one screen. At the time, the preannounced but nonexistent competition was "tightly coupled," a limitation that meant it could integrate only its own application packages or other vendors' specially rewritten versions.

one block from Santa Monica's sparkling Pacific, working six days a week, keeping at it until 2 a.m. at least every other night.

"Desq was a nightmare in some ways," Myers says. "Much of the software out there bypassed standard DOS programming conventions in the interests of speed and performance, so it needed changes. And every time, we had to figure out how its programmers had bypassed conventions. It was a trial-and-error process."

But there were bright spots, even during this discouraging period. In December 1983, Quarterdeck attracted another $5.6 million in its second round of venture financing. And during 1983 alone, Myers had turned down four offers from companies that wanted to buy Quarterdeck. All four suitors would have kept Quarterdeck's top management in place but wanted to relocate the company. Myers was tempted, but after careful consideration, she said no. "The company's ours. That's what makes it exciting."

By May 1984, Desq finally went out the door, and the kudos finally came in. In June, "The Seybold Report" newsletter deemed Desq "limitless in its potential" and called its documentation "the best." A July review in *Infoworld* magazine called the software "big, powerful, effective and complex." The October *IBM PC Update* called Desq "a delight." All in all, Desq again felt like a hit.

Place in the sun

While 1985 was nothing but trouble for most of the PC industry, ironically it brought a great deal of satisfaction to Quarterdeck, longtime underdog to industry leaders Microsoft, Visicorp and IBM.

Even though Quarterdeck's business suffered as much as any other company's from the industry slowdown that year, at the same time its Desq software came into its own as, one by one, its competitors' products hit the store shelves.

After the shock of Aug. 14, 1984, when Myers witnessed the unveiling of IBM's strikingly similar Topview operating environment, Quarterdeck immediately laid off 20 low-level employees (nearly half its total) and consulted Arthur D. Little, Inc. for a prognosis. That company rightly predicted that the industry would go through a period of

evaluating Desq against Topview — once it finally appeared — as well as against Microsoft's Windows, slated to come out later in 1985.

Early in February 1985, there was rejoicing in Santa Monica when Topview was finally released. Proud as IBM was of its product, Quarterdeck was even more proud of Desq, which it felt was the hands-down winner between the two.

The critics seemed to agree. "Topview debut stirs little interest among major software vendors" read the front-page headline in one industry publication.

Double blade

With the ever-present irony facing those who compete with IBM, its rivals hoped that the success of Topview would validate the philosophy behind their own products while simultaneously showing them off to competitive advantage.

At the same time, rivals hoped to ride on the coattails of IBM's success by adjusting their windowing software to accept programs written specifically for Topview. They would be "Topview-compatible," which meant they would become a viable alternative to IBM.

Immediately after the Topview announcement, in fact, Quarterdeck had started working on a streamlined version of Desq that would be completely Topview-compatible. Desqview would be for more casual computer users, not the power users of Desq. It would also be easier to use than Desq, yet more versatile.

Desqview shipped in May 1985 with an attractive $99 price tag. At the same time, Quarterdeck dropped Desq's price to $199 from the original $399. IBM's Topview remained priced at $149.

IBM, meanwhile, true to its commitment to Topview as its strategic software product, started pushing the product more aggressively than it had ever pushed a software product before. That May, IBM caused a stir by offering free copies of Topview and two other software packages (one being Software Publishing's Assistant Series) to buyers of its Personal Computer XT.

The 90-day promotion caused dismay among IBM competition, who considered it predatory, and Janelle Bedke of Software Publishing Corp. went on record as being unhappy because the offer could be seen to diminish the perceived value of her company's Assistant series.

A month later, IBM was giving away more free copies of Topview, this time to selected volume users. IBM had often given away demonstration disks (falling short of a complete program but suggesting its capabilities), but this marked the first time Big Blue had parted with

Twenty-twenty foresight

"Adam Osborne was a reference of Gary Kildall when I made the DRI investment," recalls Jacqueline Morby, general partner at TA Associates venture capital firm. "So when I called Adam, he said, 'Hey, I'm putting together a company called Brandywine Computers, so I'll send you the business plan.' For a long time I looked at Brandywine but I didn't [invest in] it."

Brandywine Computers turned into Osborne Computer Co., a flashy high roller whose performance was spectacular for a time. And every milestone of Osborne's increased Morby's wistfulness. "I regretted [not making the investment] for a long, long, long time," she admits.

But Osborne went bankrupt in September 1983, only five months after abruptly pulling out of its scheduled initial public offering. It turned out to be the failure that marked the beginning of the decline of the industry.

"Now I don't regret it anymore," Morby notes, "because I would have lost my money. But it looked awfully good for a long time."

MARGUERITE ZIENTARA

Of course, not everyone saw it that way, especially the legions of integrated software proponents. Quarterdeck set sail squarely in the face of the prevailing wisdom. But total dedication to the company was the hallmark of the Quarterdeck crew as it set about creating this new kind of software.

Also invaluable was Myers' natural ability to put herself in a nontechnical person's shoes. As she told *Fortune* magazine in more than a year away from having a finished product, a chillingly similar software product was displayed at the micro industry's major trade show, the semiannual Comdex.

The well-established and respected Visicorp had announced its Vision windowing software. For most of the technical community, the concept of windowing or integrating was new, and Visicorp was the first to tout it publicly.

Preannouncements certainly plagued Quarterdeck, but there was yet another unforeseen challenge — that of making Desq work with existing MS-DOS programs. Quarterdeck had to modify and remodify Desq to accommodate every MS-DOS program the company wanted on its "100% compatible" list. For six months, from December 1983 to May 1984, 11 developers and testers sequestered themselves in cramped offices

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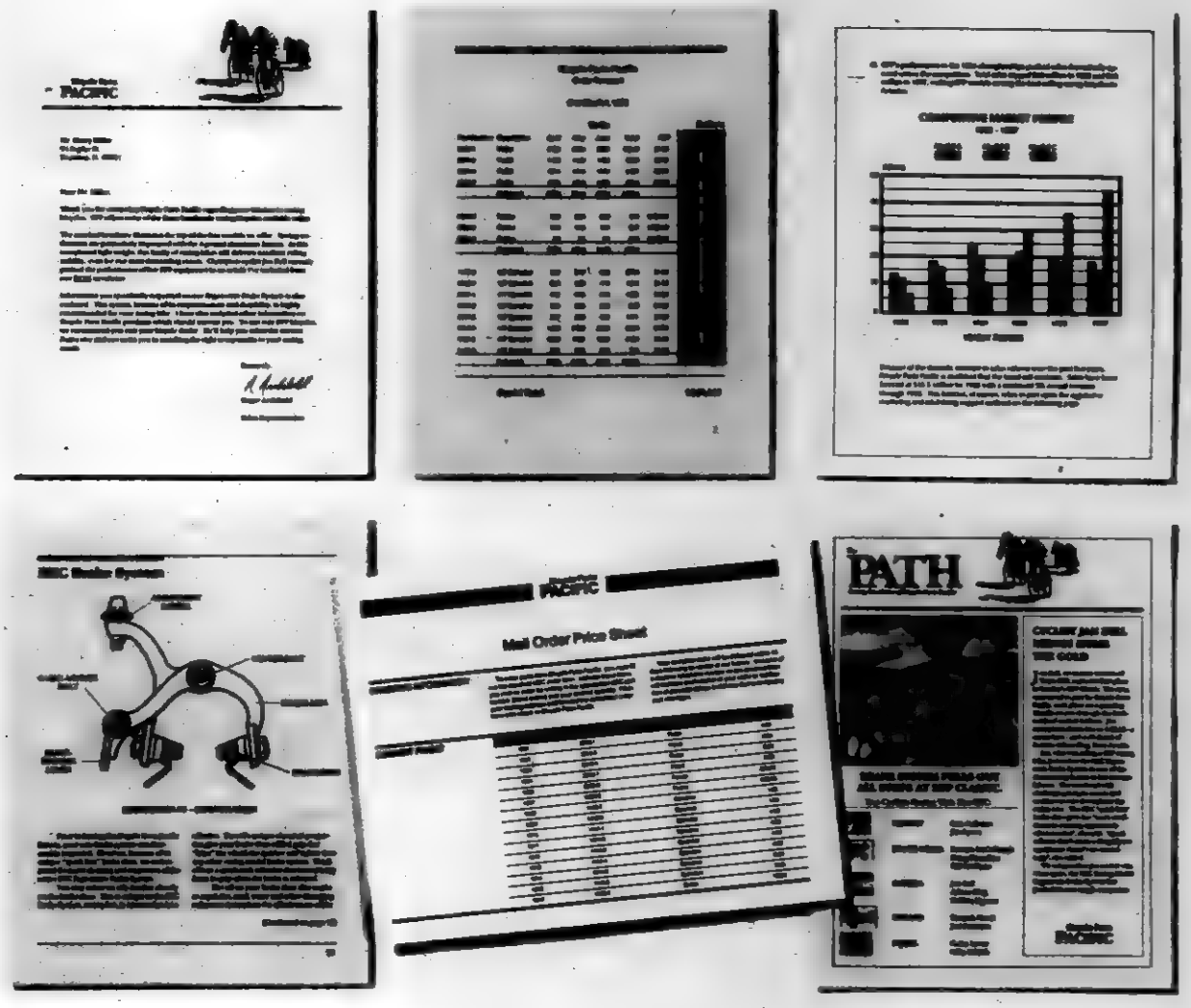

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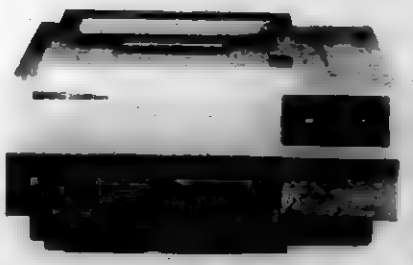

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thousands of full-fledged copies, absolutely free.

One has to wonder how a tiny company like Quarterdeck could continue to survive in such a climate. Who but IBM could afford to give away tens of thousands of free copies of its software? On the other hand, it could be said that IBM couldn't afford not to give Topview away — considering the lukewarm reception it was getting.

In June 1985, *Infoworld* concluded that Topview was "slow, memory-hungry and requires far too much technical knowledge." And even a free copy doesn't guarantee that anyone will use it.

By the end of 1986, however, more than 250,000 copies of Desq/Desqview were said to be in use, mostly by corporate power users. Myers remained confident that time would bring a surge in demand. "Given the choice, would you rather prepare a nine-course meal on a hot plate or on four burners and an oven?" she asks.

Trump card

Despite the formidable industry troubles of 1985 to 1986, Quarterdeck hung in there with a product that could only be considered a bridge to the future. Far more powerful computers — with extended memory and faster microprocessor chips — were just around the corner, and operating environment software would be the first to maximize the new technology.

If the technology evolved as expected, it would play right into Quarterdeck's hand. Many computer users were envisioning being able to routinely run several programs at once, exchange data among programs and files instantaneously and generally work the way office workers have always worked, whether they're secretaries or executives — namely, with interruptions.

It would take savvy, patience and continued sales for Quarterdeck to see itself, and the industry, through to the next phase of office automation, but dedication is one thing the company has never lacked. "You have to have staying power, I think," Myers says she guessed early on. And she's got plenty.

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Influential

"What Future Computing has done that is not public knowledge — particularly in our early days — is more important than what is [public knowledge]," Isaacson claims. "Although I can't discuss it, I have worked with nearly every major computer manufacturer that has come into the retail channel, and I've influenced each one's whole approach to that channel."

Isaacson's and Future Computing's involvements with manufacturers have called for hammering out serious details, such as the terms and conditions of a vendor's market-entry plan, identifying which and how many stores a product should be in and developing product rollout strategies.

"That's how we're inside the industry at the bargaining table," Isaacson explained while at Future Computing. While other industry analysts — like Esther Dyson, for example — may be privileged to see new products before they are officially introduced, they're not generally in on the decision to produce them.

The fast growth of Future Computing in its first four years mirrored, and in fact was intertwined with, the growth of the PC industry itself. The fact that some of the biggest names in the minicomputer and mainframe businesses came calling on Isaacson for advice about their micro plans gave her enormous influence in helping to shape the micro industry.

Future Computing was one of the few sources of hard facts and figures in existence, since it had shrewdly established a network of 1,000 representative computer and specialty stores that faithfully reported their actual sales figures each month. While most market research firms relied only on vendors or distributors for unit sales information — which was often inflated to make everyone look good — Future Computing's sales data was inarguable.

Risky business

Its long-range projections, on the other hand, sometimes were not. Although Future Computing built its reputation on early and accurate insight into the potential impact of the IBM PC, the firm later came to be known for predictions that often turned out to be too optimistic. In the fast-moving personal computer world, fortune-telling is by definition very risky business.

Future Computing projected in 1983, for example, that the educational software market would grow more than 70% per year and reach nearly $1 billion by 1987. That's not quite how it worked out.

> **"WE HAD a new organization chart every day. That meant building the organization — and unbuilding it — having to shuffle people around, always dealing with people's egos, emotions and insecurities."**
>
> PORTIA ISAACSON
> FUTURE COMPUTING

But mistakes or not, Future Computing in many ways led the PC industry by the hand into its maturity. Not only was Isaacson's timing perfect in offering the guidance the industry needed, but her own personality and charisma practically guaranteed that her venture would flourish.

"You've [probably] seen a speaker who, through whatever technique, holds the audience right here," she says. "And you've listened for two hours and thought it was 10 minutes." Dispensing with false modesty, as usual, Isaacson puts herself squarely in that category. "On a public forum, I'm a very powerful, dynamic, opinionated speaker," she claims, and few would deny it.

In the less public debates of business negotiations, too, Isaacson long ago figured out how to be irresistible. "I took a course called Persuasion by Hypnosis, which sounds real sensational," she says, "but it's not."

"The course was about controlling the group, in a way, and how to use what are called 'waking hypnosis techniques,' " she continues. "I had, in fact, used them and didn't know it before I took the course." Isaacson was even using them back in her Stratford, Okla., high school debates. "Even then I could hold an audience," she says.

Without these particular attributes in its founder — as well as Isaacson's already established relationships in the computer community — it's questionable whether Future Computing would have ever gotten off the ground. She was the company's prime attraction and major product from the first day.

With Isaacson at the helm, the company not only got off the ground but rocketed straight up. The micro industry's boom in the early '80s propelled Future Computing's own expansion, and within two years, it had gone from strictly consulting to a product-oriented company.

At its height, Future Computing had more than 300 clients paying $15,000 to $50,000 a year for its reports, newsletters and consulting services. Aside from IBM and Sears Roebuck and Co., Future Computing's clients have included Apple Computer, Inc., Digital Equipment Corp., AT&T, Xerox Corp., Eastman Kodak Co., Gillette Co., RCA Corp. and *Time* magazine.

Never the same

Any business that boosts its income more than 900% in its first two years has to move extremely fast. And Future Computing did.

"We had a new organization chart every day," Isaacson says, "and I spent probably most of my time — and definitely most of my emotional energy — on the people. That meant building the organization — and unbuilding it — having to shuffle people around, always dealing with people's egos, emotions and insecurities."

The company had to scramble in other ways, too. "Because we'd grown so fast with no outside funding, there was never a payday I knew I would make in the first three years of the company," she reveals. "But we made every one, and in fact, we never stretched our suppliers."

Future Computing's astounding growth brought changes not only in the company's functions but also in Isaacson's functions within the company. By the time her then-husband, Egil Juliussen, had been with Future Computing for a year, its rapid growth meant that someone had to assume responsibility for the firm's overall functioning.

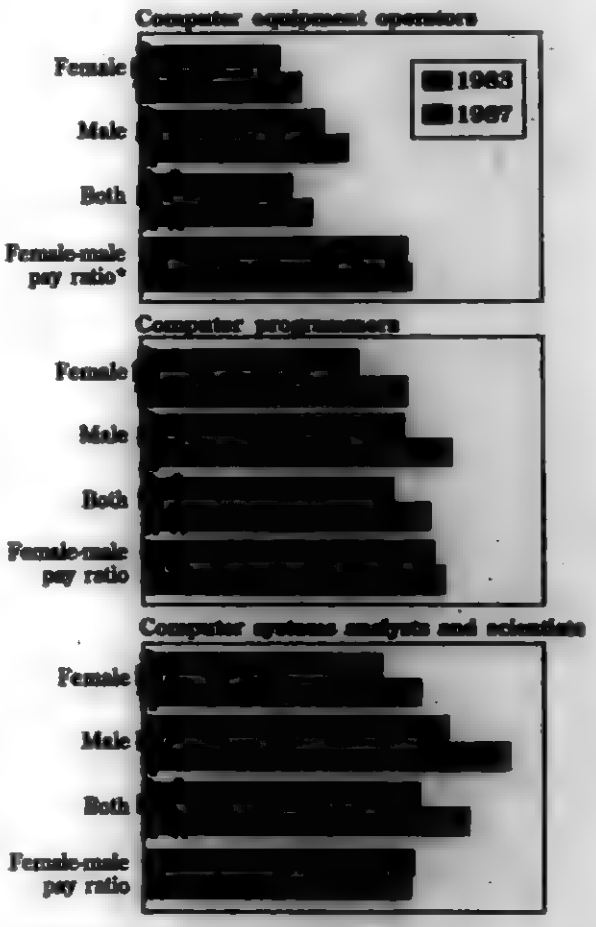
"Egil had no desire to manage," Isaacson says, "so I had to and wanted to manage the company, while juggling the client work. I had to [make the] transition from being the company's primary product to being the general manager of the company." It turned out to be the hardest thing she had ever done.

"Being a general manager is a balancing act," she explains. "To any general manager report, in some way, product development, marketing, planning, finance, personnel, sales, building facilities, computer systems — everything about the company falls on [the general manager's] back ultimately.

"So if you've done a good job, you've tried to hire strong managers in all areas that report to you," she says, "but you never

Be a programmer

Median weekly wages for full-time employees in computer-related jobs show that women have not caught up yet



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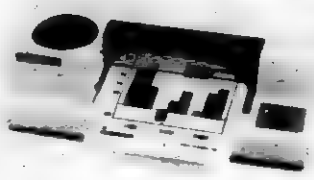

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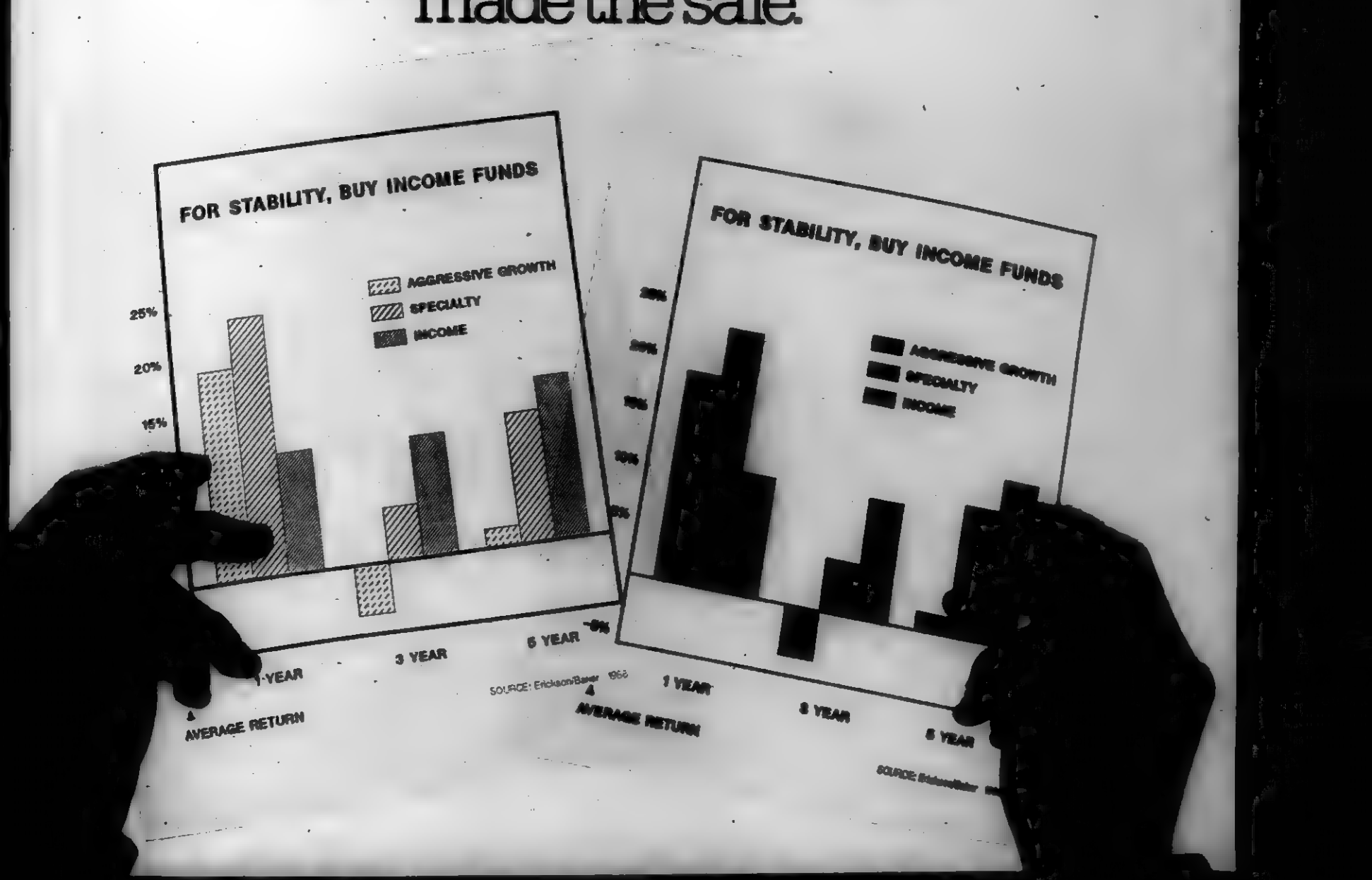
Guess which presentation made the sale.



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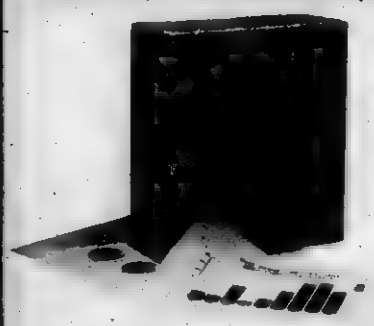

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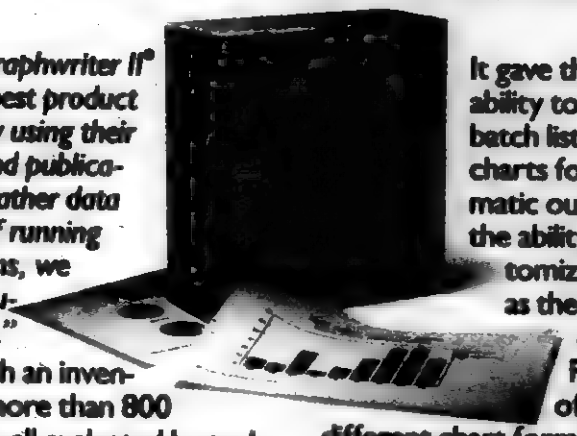

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But Isaacson is not happy with the balance. She wants to be a superstar at all times. "I need to feel like I'm winning all the time, that I'm doing it well. When I started Future Computing, I was doing consulting, doing business strategies, analyzing and explaining the industry to people and so on, and I was really good at that and still am."

But as her role in the company evolved from consultant to general manager, so rose her level of stress, and the mental anguish took a physical toll. She started experiencing extreme pain in her back, which sent her to a chiropractor and a massage therapist. She also put on 40 pounds in three years.

"I've asked myself why Future Computing would affect me more adversely [in terms of stress] than all this other stuff I've been through. Future Computing is nothing compared with going to the grocery store with three babies all under 2 years old," she laughs.

Isaacson has concluded that the source of her stress is a feeling of lack of control. "People say, 'Gee, Portia, it must be really neat to have your own business,' and I say to them, 'I don't think you understand. This [expletive] business has me!' I mean 24 hours a day, seven days a week, this business has me," she says.

In late 1983, however, Isaacson started to see a glimmer at the end of that long, dark tunnel. Future Computing was approached by three potential buyers at about the same time. "If we had picked three companies we wanted to talk to, the three that came to us were the three," Isaacson says.

In July 1984, McGraw-Hill bought Future Computing from Isaacson and Juliussen for a reported $8 million in cash, plus additional payouts based on future profits. McGraw-Hill was a dream come true for Future Computing. "We took their first offer," Isaacson says. "It was just right."

Nevertheless, Isaacson was waving good-bye to the entrepreneurial Future Computing. "It's exactly like when a child goes off to college," she says. "It's something you want to happen — because for the company to mature, grow, exist forever, it needs to happen. At the same time, you are giving something up as it grows and matures. There are some feelings of 'Gee, I miss the kid.' "

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On family and career

One of the most compelling conflicts for the successful woman is the tug-of-war between her professional life and her personal life. There is always a trade-off when a woman with a family enters the business world.

"I did not really get to enjoy my children when they were young," Isaacson says. "Things were really bad — we didn't eat very well — so enjoying my kids was almost impossible."

Ironically, her only regret is that her kids don't remember their early years of poverty, from which she protected them so well. "In later life, I came to understand that it would have been very good for them to have been consciously through it with me," she says. "But you don't think that way in the beginning."

> "I NEED TO feel like I'm winning all the time."
>
> PORTIA ISAACSON
> FUTURE COMPUTING

Instead, they recall a seemingly endless supply of money. "I manage them like a business," Isaacson reveals. "I'm their authority figure, and that's derived from the fact that I'm the source of all funding. They have a weekly allowance, I pay all their bills, and if they do well in school, they get lavish vacations."

Isaacson seems to have been reincarnated several times over without ever having to die. She's had five marriages and five divorces. She's had several careers in academia and in business. For years, she admits, ambition blinded her to everything but her work, and consequently she lost everything but her work. Besides that, she usually married for all the wrong reasons.

"I am as driven to having a close personal relationship as I am, I think, anything else," she explains. "So if I don't have one, I'm actively looking. I don't know that that's all positive, by the way. It probably stems from insecurity of some type — of just wanting to have that relationship."

'It's no secret'

In sharp contrast is the enviable stability of Morby's experience. She has been married to Jeffrey Morby for more than 25 years. "It's amazing," she marvels. "We've been married since we got out of college, but we don't feel like we've been married that long." What's their secret? "It's no secret," she says. "It's luck and everything else. But the basic reason is we have a lot in common. We both love sports, travel, reading, movies and the theater."

Others wonder how Morby executes her balancing act between job and family so gracefully. "Our people spend 60% of their time on the road," TA Associates managing partner Kevin Landry told *Venture* magazine in July 1986. "I don't know how Jacqui does it. It's tough on all of us who are married."

But to Morby, it's not an issue. When asked whether the constant travel bothers her, she quickly replies, "Oh no, it's fun. If I stick around too long, I feel like I'm not getting anything done."

Unlike some whose very identities are wrapped up in their careers, Morby doesn't rely so much on TA Associates for her sense of self. That may be partly because she spent several years quite contentedly as a homemaker before entering the business world.

Her success in business has added a whole new dimension to her marriage, Morby says. "We've always been very close, but probably [my success] was a surprise to him — and to me. Who knows what one can really do?"

Last time

Myers' dedication to Quarterdeck has paid off in business success, but it robbed her of crucial years of personal time. "You miss opportunities to meet somebody," she says, "but the choices that were there weren't more attractive than the work."

Whoever the choices were, they would have had to be awfully patient to put up with the kind of schedule Myers kept. "No one who worked all those hours was married," she says. "None of us could have had families then, in terms of hours. I had no personal life and would just see friends occasionally."

Having paid such a potentially high price for success, does Myers regret it? "No," she says. "To feel comfortable as a person, the last several years have been very valuable." •

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Anthony Reed

Resignation season

This is the beginning of data processing resignation season. It is easily recognizable by the number of programmers using their company's word processors and copiers to mass produce resumes at 2 a.m.

If they're lucky, they'll land a job offer and then prepare their resignation. Some will prepare a one-liner such as, "This is to inform you of my resignation effective . . ." Others will prepare a three-page salute or a tongue-lashing about the managers and company before the "I quit" sentence.

It really doesn't matter how the letter is written. Most companies will respond in one of three ways: "The sudden death," "The DP death march" or "The squeeze play" method.

Sudden death

As its name implies, the sudden death response is quick and supposedly painless. It involves walking the employee out of the company within hours after he has submitted his resignation. This supposedly prevents him from breaching the computer's security. However, if he wanted to do this, he would have done so when he found out about the job offer — not when he submitted the resignation.

It's not uncommon for an employee to start removing company property, such as technical manuals, reference cards and copies of programs, before he resigns. Many managers have discovered empty

Continued on page 81

Awards recognize importance of MIS

BY JAMES CONNOLLY
CW STAFF

Strategic use of information and partnerships between MIS and business units are capturing the attention of corporate America and, as a result, appear to be spawning professional awards for recognition of success in those areas.

Two groups recently opened nominations for their second year of information technology awards with eyes toward honoring managers and organizations that make strategic use of information technology, particularly through partnerships or while overcoming tough obstacles.

"The feeling was that there really wasn't an award that could really highlight achievements in this area," said Charles H. Kriebel, a professor at the Carnegie-Mellon University Graduate School of Industrial Administration.

Carnegie-Mellon and American Management Systems, Inc. (AMS) recently opened nominations for their cosponsored Second Annual Awards for Achievement in Managing Information Technology. Those awards, five of which were given last year, will be presented in November and are open for nominations until May 1.

"What we were primarily looking for wasn't just that the information was being used in a strategic manner or in an innovative way, but also that the individual faced some obstacles," Kriebel said. He said the 1987 winners overcame barriers such as budget problems, bureaucracy and tight deadlines while implementing systems that helped their organizations, whether they were corporations or government agencies, to gain information advantages.

Limelight for all

Although Carnegie-Mellon, in Pittsburgh, and AMS, a Washington, D.C.-area consulting and software firm, are orienting their efforts toward individuals who carry out information technology strategies, the Chicago-based Society for Information Management (SIM) is looking first at the parent organization and second at the individuals.

"This is not so much a person being honored — it is a partnership — and, if you think about it, it is the company itself that is being honored because it makes that partnership possible," said Henry S. Givray, the executive director of SIM.

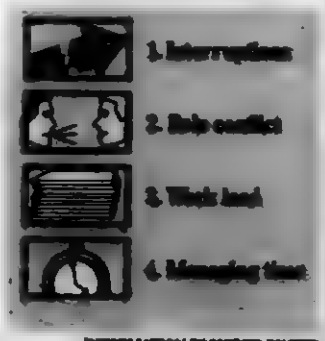
"The kind of relationship we are looking for is not only in the way these people are able to identify opportunities but in the

Continued on page 80

Data View

Stress tests

Most frequently cited sources of on-the-job stress, according to 344 managers surveyed



INFORMATION PROVIDED BY THE ADMINISTRATIVE MANAGEMENT SOCIETY
CW CHART: FRANK C. O'CONNELL

Focused on success

Kodak's Hudson strives to create MIS harmony

BY KATHY CHIN LEONG
CW STAFF

Everyone remembers when, three years ago, the U.S. District Court in Boston upheld Polaroid Corp.'s patent infringement charges against Eastman Kodak Co., forcing Kodak to stop manufacturing and selling instant cameras.

Katherine Hudson remembers it well. As then-general manager of the division, she handled the thankless task of shutting down the instant products group, redeploying 1,200 employees within Kodak and offering trade-ins for the 16 million Kodak instant cameras already in customers' hands.

"We had just 90 days to exit the business, and we did it on time," she recalls. It was a management challenge that prepared her for her January promotion to corporate vice-president and director of corporate systems.

Coincidentally, Hudson is the first female corporate vice-president the company has ever had. So is it a big deal? "I guess it is to my mom," remarks the 41-year-old Rochester, N.Y., native. "I guess the best thing about it is that no one here makes it a big deal, because the selection was based on the best person to fit the job. It happened to be me."

The position is as new for Kodak as it is for Hudson. Prior to her appointment, no such title existed. MIS executives were scattered throughout the decentralized subsidiaries, each running systems that were incompatible with other divisions'.

Hudson's charter is not an easy one. Kay Whitmore, the president of Kodak says, "We knew it would be an immense challenge to create a corporate environment for systems to meet the needs of Kodak for the future, as opposed to adjusting to the problems of the past."

Kodak, a $13.3 billion conglomerate, has an array of businesses and products. With each division setting its own course for surefire success, Hudson must sculpt a broad enough plan so that systems and networks forge ahead uniformly.

Computer room roots

Her systems experience is broad, ranging from her initial job as a systems programmer, in which she had to create her own mainframe forecasting applications and financial models. She managed groups in Kodak's business imaging systems area and became more familiar with computer systems, Kodak's storage products and the role of information technology in the market.

Continued on page 80

PROFILE

Katherine Hudson

Position: *Corporate vice-president and director of corporate systems, Eastman Kodak Co.*

Mission: *To sculpt a broad enough plan so that systems and networks forge ahead uniformly within each division.*

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T-1 Risk Management Spotlight

The Jury-Rigged Network.

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The main characters are professionals like yourself, faced with the complex task of evaluating and implementing network strategies in the face of constantly shifting carrier regulations and options, rapidly changing technology, and a rising chorus of vendor claims and promises that hold more smoke than substance. Just like a fairy tale, you have to travel through this fantasy-filled world in order to safely arrive at a happy ending. The danger is, you could very well end up with something we call the "Jury-Rigged Network".

And it won't resemble a happy ending.

The Jury-Rigged Network And How To Avoid It.

In simple terms, a Jury-Rigged Network is one that was never designed or implemented within a *total* systems perspective. The individual components, too often a mix-and-match assortment, are forced to perform at degraded levels to achieve *ad hoc* compatibility. In effect, the whole network becomes less than the sum of its parts, with the end user left to discover—as he certainly will—the weak links built into his network by a vendor who never really held more than a few pieces to the puzzle. A vendor who may not be around when the puzzle comes apart.

Therefore, the key to managing risk in the development of your network lies with selecting the right vendor. A vendor more interested in developing a long-term strategy for your success than selling his off-the-shelf products. Choose wisely and you're no longer talking about a vendor.

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That level of sophistication and excellence becomes more dramatic when you realize the technology was developed within a strategic framework that anticipated regulatory trends and tariff opportunities. We have an entire staff dedicated to studying and forecasting regulatory changes. That results in truly unique—and tangible—product advantages.

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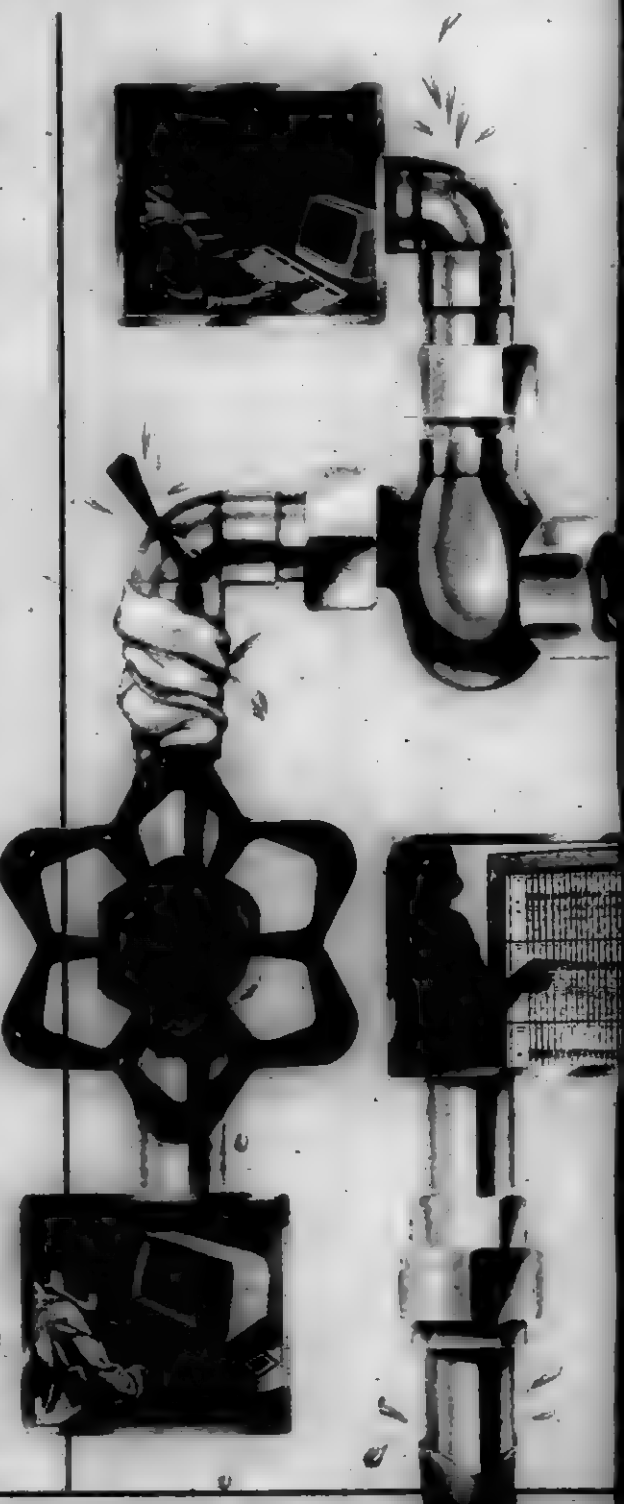

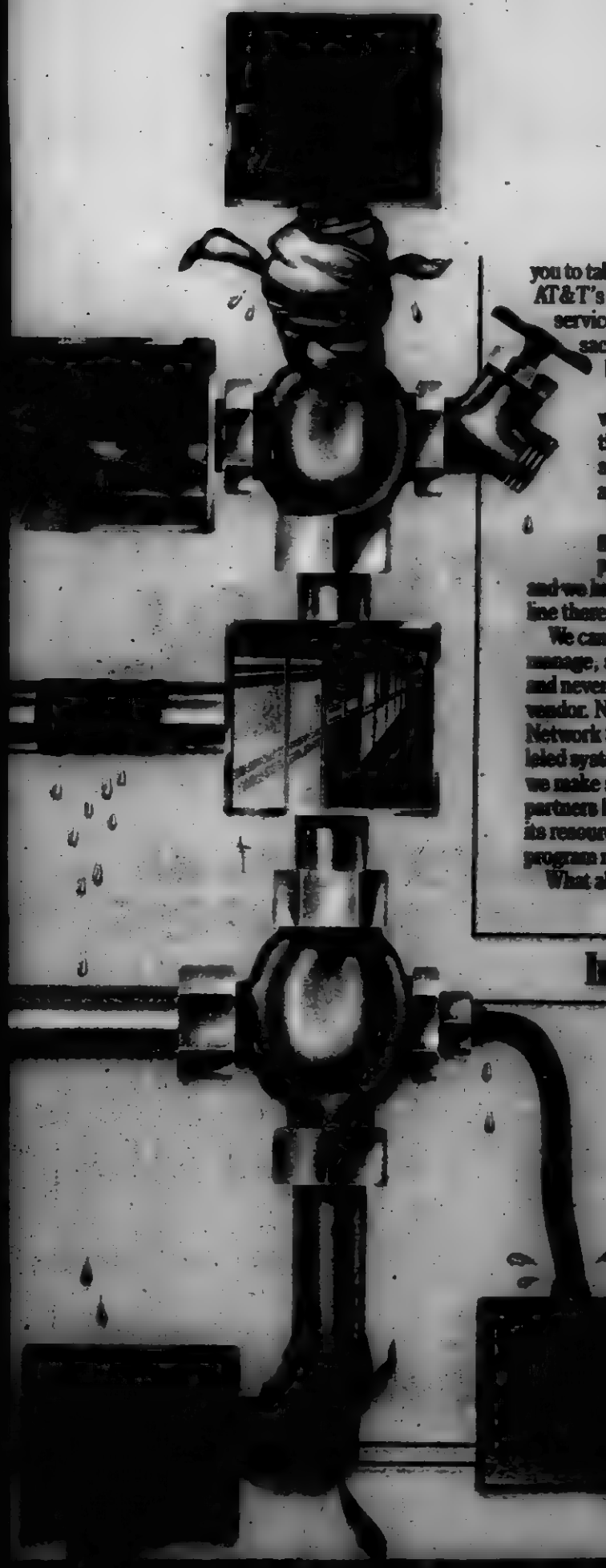

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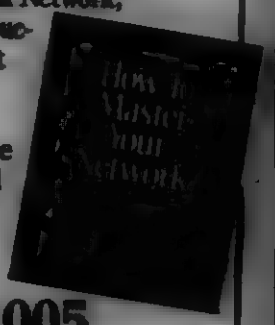

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Focused

FROM PAGE 77

"I can see clearly that you have to marry the information systems stategy to the business strategy," Hudson says.

Remarks one staff member in the MIS department, "It's going to be a tough job; all the business units are used to going their own way."

Dual careers

While building an organization, Hudson is also juggling the joys of building a family. As a first-time mother of a 6-month-old child, she's been adjusting to late-night feedings and has on many occasions rocked the child on one knee while working out of an open briefcase on the other.

If she were to write a book, Hudson says, she would would title it: *How to Survive on High Energy.*

"I am definitely a morning person," she says, "but recently, I am learning that I have to be a more flexible one as well."

According to Whitmore, Hudson was exactly the right choice for the job. "In establishing this new corporate office, we were looking for someone who had broad business experience; an individual who also has the dynamics and energy to be an agent of change," he says.

IF SHE WERE to write a book, Hudson says, she would would title it: *How to Survive on High Energy.*

Today, Hudson must define the boundaries of her job as she goes along. "Right now, I am paddling around listening to people's views — the employees', vendors' and consultants'. If our actions are not servicing customers, then we know we have done something wrong."

Hudson is anxious to deliver more helpful information services to the subsidiaries. "But first, we have to understand where we are," she says. "The second priority is to determine where the company wants to go. Third, we have have to move ahead."

By the end of this year, "we hope to have a solid, shared vision with alternative strategies for the future," she says with determination.

Something that will help Hudson accomplish her goals is the fact that she is well liked by her co-workers.

"She's a combination of brains and personality," one of her employees says. "Kathy is one of those people who loves life and is very innovative."

Hudson says she often discusses business with her husband, who is also an executive at Kodak.

It's academic

Although Kodak is the only company at which she has ever worked, that move was unintentional. Years ago, Hudson dreamed of becoming a university professor of economics. Hence, after finishing her bachelor's degree in business management at Indiana University, she rushed off to Cornell University to secure a master's degree in economics.

While all the pieces seemed to fall neatly in place, what didn't cooperate was the campus political climate, as the Vietnam War gave rise to student riots. Hudson decided to put a collegiate career on hold until the situation improved and went to Kodak as a systems analyst.

Expecting to stay a year, Hudson says she was so impressed with the company that she has remained for 18.

Hudson's view of management is simple: Set a strategic direction, get the right people for the right job and give the people the right tools. "Then my time can be spent communicating with people and working on the fun stuff," she says.

Civic duties

Hudson demonstrates her commitment to people both on and off the job. Last year, she was the chairman of the 75th anniversary celebration of the Girl Scouts, and she is now vice-president of the local Boy Scout Explorers council. "I'm concerned with young people, because they need the opportunity to explore different careers," she says. "I like to be there to make that happen."

In her years at Kodak, Hudson has been fortunate enough to have had many mentors along the way. She says she wouldn't be surprised if she retired from the company.

"At my retirement party, I would like to be remembered with people telling me things like: 'Do you remember when you helped me with this?' or even 'Kathy Hudson was there, and after that time, I was able to go forward and pursue my goals.' That would be nice."

Awards

FROM PAGE 77

way they are able to communicate those opportunities and then make them happen," Givray said, noting that the two partnerships that won SIM's 1987 Partners in Leadership award were made up of MIS and general business people who united to achieve information-related benefits for their companies, such as new products and better services for users.

Winners in both competitions will receive customized sculptures. Carnegie-Mellon and AMS also provide honorariums.

The 1987 winners of the SIM award were Sara Lee Corp.'s Consumer Products Group executives Paul Fulton and John Owens and Du Pont Co.'s Medical Products Department executives Robert Ridout and J. Stark Thompson.

The five winners of the Carnegie-Mellon/AMS awards were Michael P. Cruskie of the New York State Division of Criminal Justice Services, Joseph T. Brophy of The Travelers Corp., C. Clinton Joyce of Albertson's, Inc. supermarkets, Ron J. Ponder of Federal Express Corp. and Michael R. Zucchini of General Re Corp.

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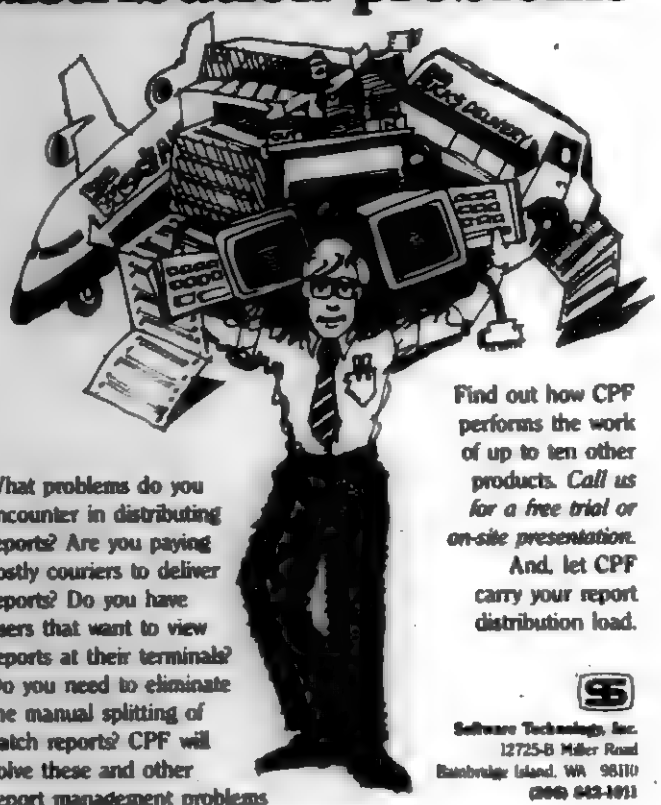

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FROM PAGE 77

binders that once contained technical manuals after an employee has left.

Using "quick and dirty" programming methods and violating standards isn't unusual for the departing employee, either — he won't be around to clean up the mess.

The sudden death method also lowers the morale of the other programmers. They begin to view the managers and the company as being insensitive. They begin to wonder whether it's worth giving 110% when they'll be treated like a shoplifter caught in a department store when they resign. Watching a co-worker pack his belongings under the watchful eye of a security guard and a manager is a sight employees don't easily forget.

The DP death march

The DP death march is the reverse of the previous method. The employee works until the effective date on his resignation. Each day on the old job seems like a Monday — it just drags on and on.

This response poses a different set of problems. While morale isn't affected as much, productivity goes down as numerous well wishers stop by to visit the employee before his departure.

At worst, the employee might show up to work and do nothing or take advantage of his sick days. After all, he will be leaving in two weeks and feels that he's worked enough overtime to deserve the rest. If he's well respected by his peers but disliked by management, this can lead to lower productivity and morale as the employee becomes more vocal about his complaints. At this point, the sudden death response becomes an acceptable solution.

The squeeze play

The squeeze play response is a combination of the earlier two. The employee stays until he schedules his exit interview. It can be that afternoon or two weeks later. Either way, he gets paid up to the effective date of his resignation or one or two weeks, whichever is earlier.

If documentation is written before, instead of after, production changes are implemented, the resignation will have minimal impact. A smart employee will say his good-byes and leave within two or three days for a short vacation rather than sticking around.

This tactic has the advantages and disadvantages of the previous methods. The person leaves with "respect" and productivity is only briefly interrupted. However, there still may be breaches in security.

These methods leave the company in a vulnerable position, particularly if it does not have standards in place to guard against employee theft or to continuously monitor quality and productivity.

Companies should conduct source code reviews of all production changes. However, when this isn't possible, it should review the changes implemented by the former programmer over the previous one or two months.

So — if you find that your company experiences high turnover, consider establishing a formal, post-resignation review policy and adopt the squeeze play response.

Reed is director of business systems for a Dallas-area institution.

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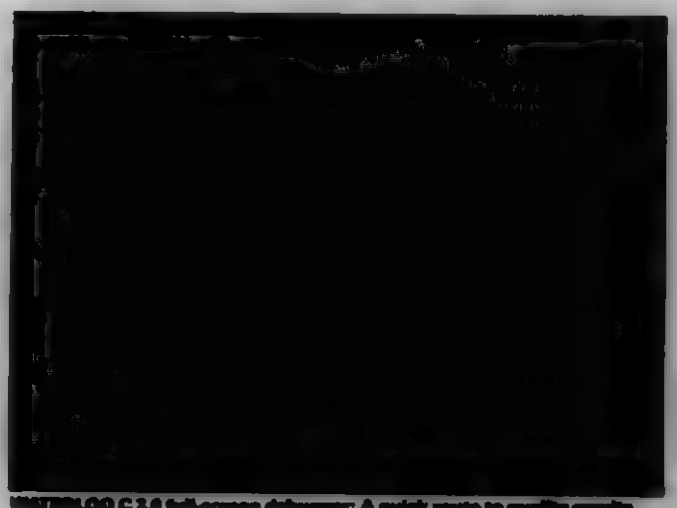

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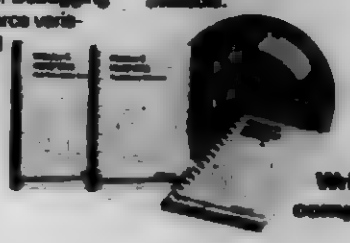

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CALENDAR

AIIM, Inc. (Micrographics and Optical Information Technologies) Spring Conference. San Diego, April 5-8 — Contact: Randal L. Leonard, Gay & Taylor, Inc., P.O. Box 1410, Winston-Salem, N.C. 27102.

PIMA Management Information Systems Conference. Savannah, Ga., April 6-8 — Contact: Scott Beamrick, Paper Industry Management Association, 2400 E. Oakton St., Arlington Heights, Ill. 60005.

1988 EFTA Expo. Washington, D.C., April 10-13 — Contact: Jim Cullen, Electronic Funds Transfer Association, Suite 1000, 1726 M St. N.W., Washington, D.C. 20036.

22nd Annual AIA National Workshop and Computer Systems Demonstrations. Baltimore, April 10-13 — Contact: American Trucking Association Management Systems Department, 2200 Mill Road, Alexandria, Va. 22314.

8th ICAC Executive Forum. Washington D.C., April 10-13 — Contact: International Computers & Communications, P.O. Box 17392, Washington, D.C. 20041.

10th Conference on Computer Audit, Control and Security. Atlanta, April 10-15 — Contact: Program Chairman, EDP Auditors Foundation, P.O. Box 88180, Carol Stream, Ill. 60188.

Atre Forum on Relational Data Base & CASE. Washington, D.C., April 11-13 — Contact: Nancy Carifa, Forum Registrar, Atre International Consultants, Inc., P.O. Box 727, Rye, N.Y. 10580.

Facsimile & Image Communications Conference. Boston, April 11-13 — Contact: Cap International, Inc., One Snow Road, Marshfield, Mass. 02050.

Second Annual Logistics Conference and Technical Exhibit. Dallas, April 11-14 — Contact: American Production and Inventory Control Society, 500 W. Annandale Road, Falls Church, Va. 22046.

1988 ABM Show. Chicago, April 11-14 — Contact: Association for Information and Image Management, Suite 1100, 1100 Wayne Ave., Silver Spring, Md. 20910.

The Relational Institute DB2 Product Fair. San Jose, Calif., April 11-15 — Contact: The Relational Institute, Suite 106, 6489 Camden Ave., San Jose, Calif. 95120.

Spring 1988 National Symposia and Workshops. Washington, D.C., April 11-22 — Contact: The National Institute for Software Quality and Productivity, P.O. Box 70535, Washington, D.C. 20088

Data 88 With Telecom. Stockholm, Sweden, April 11 — Contact: MMS Datasenter AB, Box 4113, S-181 04 Lidingo, Sweden.

International Programmable Controllers Conference. Detroit, April 12-14 — Contact: Michelle Marzahl, Engineering Society of Detroit, 100 Farnsworth, Detroit, Mich. 48202.

AUTOFACT, The Automated Manufacturing Exhibition and Conference. Greenville, S.C., April 12-14 — Contact: State Board for Technical & Comprehensive Education, Special Events Management, 11 Executive Center Drive, Columbia, S.C. 29210.

Cost Containment: The 1988 Imperative. Washington D.C., April 13 — Contact: Corey Green, The Yankee Group, 200 Portland St., Boston, Mass. 02114.

The Information Edge. New York, April 13-14 — Contact: Conference Registrar, The Conference Board, Inc., 845 Third Ave., New York, N.Y. 10022.

Association for Systems Management Annual Systems Conference. San Diego, April 17-20, — Contact ASM, 24587 Bagley Road, Cleveland, Ohio. 44138.

Info Canada '88. Toronto, April 18-19 — Contact: Data Processing Management Association, P.O. Box 1004, Postal Station F, Toronto, Ont., Canada M4Y 2L4.

Eastern Simulation Conference. Orlando, April 18-21 — Contact: The Society for Computer Simulation, P.O. Box 17900, San Diego, Calif. 92117

ISMM/88. St Louis, April 18-22 — Contact: Information Gatekeepers, Inc., 214 Harvard Ave., Boston, Mass. 02134.

Advanced Manufacturing Systems Exposition and Conference (AMS '88). Chicago, April 19-21 — Contact: Cahners Exposition Group, P.O. Box 5060, 1350 E. Touhy Ave., Des Plaines, Ill. 60017.

Corporate Electronic Publishing Systems (CEPS) Show and Conference. Chicago, April 19-21 — Contact: Cahners Exposition Group, P.O. Box 3833, 999 Summer St., Stamford, Conn. 06905.

Third Annual DMC Software User Group Meeting. Houston, April 19-22 — Contact: Marianne Levandoski, AT&T, Room 51A40, 30 Knightsbridge Road, Piscataway, N.J. 08854.

ANSI X12 EDI '88 Seminar & Technical Exhibit. San Francisco, April 20-21. Contact: Data Interchange Standards Association, Meetings Dept., Suite 365, 1800 Diagonal Road, Alexandria, Va. 22314.

ID Expo — The Third Annual Conference and Exposition of Automatic Identification and Keyless Data Entry. Boston, April 20-22 — Contact: Anthony Scalisi, Show Manager, Expocon Management Associates, Inc., 3695 Post Road, Southport, Conn. 06490

Computer Dealers and Lessors Association Spring Meeting. Palm Desert, Calif., April 20-23 — Contact: CDLA, 1212 Potomac St. N.W., Washington, D.C. 20007.

Information Industry Association Spring Conference & Exhibition. New York, April 18-20 — Contact: Information Industry Association, Suite 800, 555 New Jersey Ave. NW, Washington, D.C. 20001.

The DB2 Tools Symposium. New York, April 18-20 — Contact: Digital Consulting, Inc., 6 Windsor St., Andover, Mass. 01810.

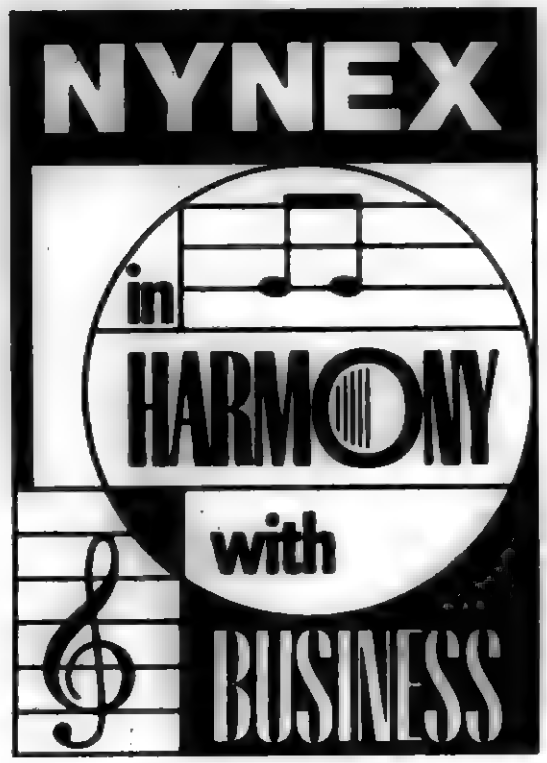
TEXPO '88. Anaheim, Calif., April 20-22 — Contact: Pacific Bell, Room 615, 140 New Montgomery St., San Francisco, Calif. 94105.

Technology Opportunity Conference, Optical Storage for Small Systems. San Francisco, April 20-21 — Contact: Rothchild Consultants, 256 Laguna Honda Blvd., San Francisco, Calif., 94116

Nacem:88. Nashville, Tenn., April 24-27 — Contact: Federation of NCR User Groups, Mail Station USG-2, Dayton, Ohio 45479.

Ingres Users Association Spring 1988 Conference. San Diego, April 24-27 — Contact: Paula Adams, Program Committee Chairperson, Effective Systems, Inc., Suite 1-2, 2601 Wyoming Blvd, N.E., Albuquerque, N.M. 87112.

Computer-Based Training Conference & Exposition. Washington, D.C, April 24-27 — Contact: Julia Stasio, Registrar, Computer-Based Training Conference, Weingarten Publications, Inc., 38 Chauncy St., Boston, Mass. 02111.



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   - 85. Computer & DP Services, including Software/Service Bureau/Time Sharing/Consulting
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   - 31. Dir., Mgr., Supvr., of Programming
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   - 11. President, Owner/Partner, General Mgr.
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COMPUTER INDUSTRY

INDUSTRY INSIGHT

Jean S. Bozman

IBM's tough dance lessons

In the early 1980s, IBM watchers liked to say the IBM elephant had learned to tap dance. Indeed it had, with the addition of independent business units — such as the operation to speed the development of the Personal Computer.

Times have changed, and now that there is competition in the scientific and engineering market, the elephant is learning some new steps. IBM will continue to offer its standard mainframe solutions and to build on the standards of its MVS, VM and OS/2 operating systems, but each product will be marketed with a scientific twist for customers who require scientific capability. This change in the product line is a true business opportunity for expansion — if IBM plays its cards right.

IBM recognizes that the large corporations that use its mainframes to run their businesses have often turned away from IBM for scientific solutions. Examples abound in the petrochemical, consumer-goods manufacturing and aerospace industries.

The science shuffle

Scientific computing is back on the front burner, largely as a response to the demands of such large customers for a single, cohesive computing platform. But it is also there because in bid after bid, the federal government has stubbornly required Unix to ensure compatibility between systems made by different vendors.

IBM responded in a big way this month with a new version of Unix for the mainframe, AIX, that is completely compatible with AIX running on the IBM PC and on mid-range machines like the firm's 9370. Significantly, the AIX standard displaced the resource-hungry IX/370, IBM's first Unix offering for its mainframes.

"That's a real comfort factor for the true-Blue people," says Stephen Josselyn, program manager at Framingham, Mass.-based International Data

Continued on page 86

Are Apple and Lotus unfair?

Pros and cons of copyright laws dominate discussion at ADAPSO

BY CLINTON WILDER
CW STAFF

PALM DESERT, Calif. — The most potentially explosive lawsuit in software industry history brought almost universal criticism from industry executives and analysts gathered at the ADAPSO spring management conference here last week.

With the filing of Apple Computer, Inc.'s copyright infringement suit against Microsoft Corp. and Hewlett-Packard Co. just three days before the conference opened, the topic became a major theme of several sessions and discussions. In a staged debate on software protection, even the panelists who defended the concept of legal "look-and-feel" protection were critical of Apple's litigious tactics.

"Companies should not be seeking to gain a monopoly through the use of copyright law," said Harry Reinstein, president of Aion Corp., a Palo Alto, Calif.-based developer of expert systems tools. "That creates an unfair advantage."

"I do believe in protection; what people create should benefit them," said Esther Dyson, editor of the "Release 1.0" newsletter. "But I don't believe in robber barons. The best remedy is to license the technology. IBM, for example, should protect the PS/2 but license it. Then they have an advantage, but not an unfair advantage."

The IBM-bashing of other ADAPSO conferences in the past 18 months was noticeably absent. But IBM's leading adversary on the source code issue, Martin Goetz, applied a favorite Big Blue criticism to Apple and Lotus Development Corp., which has sued Paperback Software and Mosaic Software Corp. on the look-and-feel issue.

"Existing copyright law was never intended to protect look and feel or user interfaces," said Goetz, the Applied Data Research, Inc. co-founder who is now at Syllogy Corp. "Lotus and Apple are using FUD — fear,

Continued on page 86

Data View

High-tech high flyers

Top 10 revenue gainers among major hardware vendors, 1987

INFORMATION PROVIDED BY SHEARSON LEHMAN HUTTON, INC.
CW CHART: FRANK C. O'CONNELL

Intel witness recants story

BY KATHY CHIN LEONG
CW STAFF

SAN JOSE, Calif. — Dr. David Patterson, an Intel-hired expert witness involved in the NEC Corp. vs. Intel Corp. copy infringement lawsuit, last week reversed his testimony, saying that a portion of the original NEC microcode is not similar to Intel microcode. The change of heart scored a point in favor of NEC.

At a hearing in federal court here, attorneys said that after Patterson had examined the

Continued on page 84

Chip firms thrive after setback

BY JAMES DALY
CW STAFF

The inventory purge that has sent the semiconductor industry reeling during the past three years has eased, allowing chip makers National Semiconductor Corp. and Micron Technology, Inc. to post vastly improved quarterly net income and revenue results.

Micron also received a further boost last week when it signed on Intel Corp. to market its dynamic random-access memory chips.

The prospects for U.S. dynamic RAM chip makers were nearly dead just three years ago, after the Japanese had flooded the market with cheap memory chips and sent many firms, including Intel, scurrying.

But since the Reagan administration clamped a lid on Japanese memory chip imports last year, the U.S. market has prospered.

Other firms joining the first trickle of quarterly fiscal reports included 3Com Corp. — which posted quarterly gains behind industry confidence in its pair-up with Microsoft Corp. and its merger with Bridge Communications, Inc. last year — as well as On-Line Software International, Inc., which had a strong quarter.

Breakdowns of the financials

Continued on page 90

Entrepreneurs' start was Touch and grow

BY KATHY CHIN LEONG
CW STAFF

SCOTTS VALLEY, Calif. — While trying to woo people into working for Touch Communications, Inc., founders Brian McGann and Dennis Morrison used a highly unorthodox approach.

They offered no guarantees of profit sharing, bonuses or jaw-dropping salaries. In short, they offered no guarantees — period.

And people still came to them.

"All we could offer was our trust," McGann recalled, viewing the mountains from his window office. "We started with a lot of good intentions and a lot of powerful people."

That start was exactly three years ago, in March 1985, when McGann and Morrison penciled out their business plan in McGann's kitchen. The dream was to offer applications software supporting the ISO's Open Systems Interconnect (OSI) communications standard, an evolving architecture that will someday allow users to link dissimilar machines together in one network.

McGann came up with the company name because it was human-oriented, he recalled. "Anyway, high-tech names are shallow," he said.

The OSI market is getting off the ground with only a few specialty companies, such as Retix in Santa Monica, Calif. Analysts said they believe Touch Communications is well positioned to catch interested users, because the company focuses on providing OSI software that works with existing applications.

"Touch is obviously a pioneer in what it is doing," observed Nina Burns, senior analyst at Infonetics, Inc., a Santa Clara, Calif., network research firm.

"There is no question that networking in large companies is a big need," said Touch President Bill Fello, formerly president of Xerox Computer Ser-

Continued on page 90

Up & Coming:
Touch Communications

Location: Scotts Valley, Calif.
Year founded: 1985
Co-founders: Brian McGann and Dennis Morrison
Employees: Fewer than 100
Product line: OSI software for VAXs, Macintoshes, IBM PCs and other machines
Of note: First OSI software company that targets end-user accounts.

Intel

CONTINUED FROM PAGE 83

NEC Clean Room Microcode Reset sequence, he decided that the Reset sequence in the original NEC microcode compared with the Intel microcode does not show "substantial similarity," a claim that must be proved in copyright infringement cases.

"Of course, this bit of testimony is good for us, but now I also question the merit of the witness," said Linnet Harlan, a NEC attorney. "This causes me to question his approach to the entire analysis of the case."

When questioned about the case, Intel spokeswoman Jacki Jarvey would not discuss the ligitation in detail but stressed, "The witness reversed his testimony on only one of 54 sequences that are in dispute."

NEC initially sued Intel in December 1984, hoping to have Intel's copyrights over microcode overturned. Microcode is a set of embedded instructions that tells the microprocessor how to respond to certain electronic signals. NEC stood firm on its position that similarities in microcode are impossible to avoid.

However, in February 1985, Intel filed a countersuit alleging copyright infringement. It was because of Patterson's original testimony that Intel charged that NEC's code was a violation of the Intel microcode copyright.

Harlan said in a prepared statement, "It appears that Patterson's change in testimony was required in order to follow Intel's party line."

Defending NEC's belief that all microcode is somewhat similar in nature and should not be copyrighted, Harlan said that the two NEC microcodes are very similar . The Clean Room Microcode was developed by NEC, without access to Intel microcode, to prove that microcode similarities are inevitable.

"Intel wanted to take the position that the Clean Room Microcode is different from the Intel microcode while simultaneously arguing that the original NEC microcode is substantially similar to the Intel microcode," Harlan said .

The trial for the case has been set for June.

INDUSTRY WEEK IN BRIEF

NBI, Inc. President and Chief Executive Officer Thomas Kavanagh has sent a polite but firm "thanks, but no thanks" letter to Capital Associates, Inc. President Richard Kazan after Kazan indicated recently that his Colorado Springs-based firm is interested in acquiring Boulder, Colo.-based NBI for $7 per share, or roughly $65 million. NBI said, however, that other bids will be considered.

Professional services vendor **Computer Task Group, Inc. (CTG)** has completed the $10.5 million acquisition of Scientific Systems Services, Inc., a Melbourne, Fla.-based computer services firm specializing in software systems for the manufacturing process control and power industries. Buffalo, N.Y.-based CTG is one of the largest providers of computer services, with annual revenue of $170 million and 60 branch offices.

The federal government health care field has become fertile ground for **Digital Equipment Corp.** The Maynard, Mass.-based firm will supply clustered VAX 8600 and Microvax 3000 series computers to 104 Veterans Administration hospitals and medical centers under the terms of a $100 million contract recently awarded by the VA. The award came one week after DEC was named a $480 million subcontractor in a $1 billion health care information system awarded by the Department of Defense.

AT&T has agreed to purchase all the stock of Tridom Corp., a Marietta, Ga.-based designer and manufacturer of data communications equipment used in satellite-based networks. Following approval by the Federal Communications Commission, AT&T will acquire Tridom's shared-use earth station in Marietta and all proprietary software rights and related network management and control capability.

Print system manufacturer **QMS, Inc.** plans to acquire and fold Imagen Corp., a Santa Clara, Calif., image-processing system maker, into a newly created and wholly owned subsidiary of QMS in exchange for approximately 1.85 million shares of Mobile, Ala.-based QMS's common stock, worth more than $22 million.

An Wang, the founder, chairman and chief executive officer of Wang Laboratories, Inc., has been inducted into the National Inventors Hall of Fame for his 1948 invention of the pulse-transfer controlling devices that enabled the use of magnetic core memories in computers, which in turn led to more powerful and compact machines. The Arlington, Va.-based Hall of Fame includes 68 inventors of the 19th and 20th centuries.

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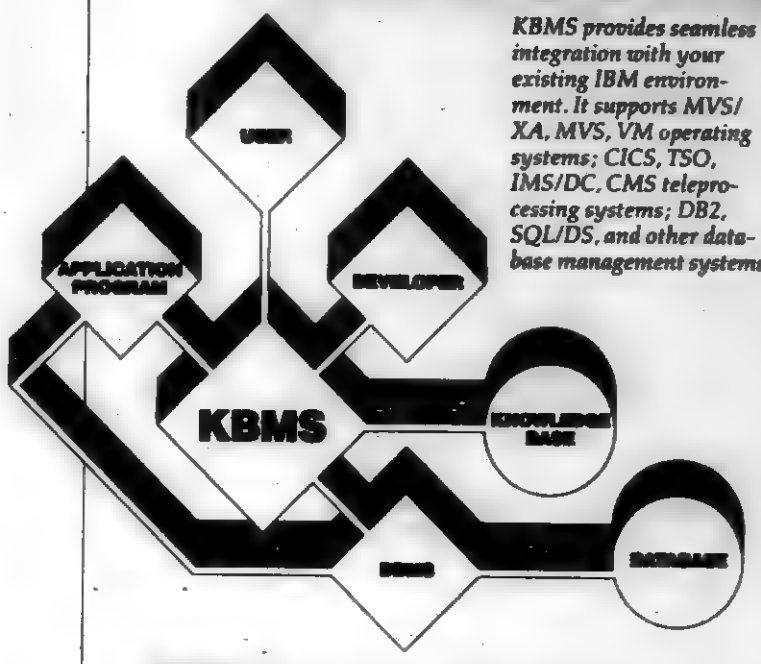

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A leading financial services company has substantially reduced bad credit losses with a computerized system they developed based on artificial intelligence.

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ADAPSO

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uncertainty and doubt — to beat their competitors."

The conference attracted a high number of microcomputer software panelists and attendees, most of whom said Apple has done nothing to help either the industry or its own image. "I have yet to come across a single vendor or user who thinks this suit will benefit anyone, including Apple," said Rob Shostak, chief scientist at Scotts Valley, Calif.-based Borland International.

Claris Corp. President William Campbell, formerly Apple's top marketing executive, did not comment directly on the suit but noted that it is "absolutely consistent" with Apple's track record of legally protecting its technology. He cited Apple's successful 1983 infringement suit against Apple II clone maker Franklin Computer Corp. and its fight against illegal Macintosh II imports and mail-order house trade practices.

Other ADAPSO conference highlights included the following:

• Focus Research Systems, Inc. released a study dramatically illustrating the IBM 9370's slow start in the U.S. and Canada. The study, which showed the 9370 being used primarily as an MIS- rather than department-based CPU [CW, March 7], also found that only 44% of intended 9370 purchases were actually installed in the past year.

Focus President Thomas Niehaus contrasted that number with his firm's typical fulfillment rate of 85% for intended CPU purchases. "The 9370 numbers are more typical of emerging technologies," he said.

But J. Fritz Skeen, IBM's director of mid-range systems marketing, said that in the worldwide marketplace, IBM has met the forecasts it projected when the 9370 was introduced.

• There will not be any rekindled 1987 rumors of a merger between Oracle Corp. and Ashton-Tate Corp. by anyone who watched the verbal sparring by their respective chairmen, Lawrence Ellison and Edward Esber. The two clashed heatedly over their different philosophies on distributed data base architecture.

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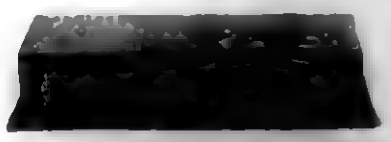

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CONTINUED FROM PAGE 83

Corp.'s systems and peripherals service. IBM's move to better meet special user needs was assisted by the company's recent reorganization, Josselyn says.

But just as it is opening the door to scientific computing, IBM is also making itself vulnerable to competition outside the proprietary world of Systems Network Architecture because the firm is designing within the scientific community's standards of Ethernet, Open Systems Interconnect, Unix and Transmission Control Protocol/Internet Protocol.

Even so, IBM's move toward scientific computing is clear. There is a drive toward greater graphical representation in IBM interfaces — something beyond what was developed in the computer-aided design and manufacturing arena for use with the AIX-driven RT PC. Icon-driven applications should, for the most part, come to replace menu-driven ones, say MIS executives who have been allowed to peek into IBM's laboratories.

Supers are back

Supercomputers are back on IBM's agenda, having been out of it since the cancellation of the Josephson-junction project in the early 1980s. Now IBM has turned to former Cray Research designer Steve Chen and to his small Wisconsin start-up, Supercomputer Systems, Inc., to build a supercomputer IBM can sell as its own. But a tangible supercomputer from this project is, by Chen's admission, four or five years away.

For all this change, there are still a few steps the elephant hasn't mastered. Missing, industry observers say, is an on-line transaction processor (OLTP) that is IBM's own. Such a processor is needed for real-time control of experiments and factory-floor operations. IBM is, instead, reselling a Stratus fault-tolerant computer as the IBM System/88. Yet executives from DEC, Unisys and Tandem have privately remarked that they are amazed IBM doesn't have a homegrown machine to compete in the fast-growing OLTP market.

Without its own OLTP machine or supercomputer, IBM will still have a short dance card when it goes looking for scientific and engineering customers. There are simply too many non-IBM choices available on the market — DEC VAXs, Convex minisupers, Cray supercomputers and CDC's ETA supercomputers among them. By contrast, a standard IBM 3090, even outfitted with VF, cannot equal a standard Cray.

That's why it is easier to find a 3090 with VF at an academic institution like Cornell University than it is at an oil company. In the past few months, IBM has asked prominent computer scientists to enhance VF's functions and has asked chemists and physicists to prepare programs optimized for the 3090 with VF. But these two-step solutions may not please everyone.

"IBM is going to have to realize that customers are going to want to go all the way," Josselyn says. "They're going to want to dedicate a computing resource to their scientific computing needs." And for most, that scientific solution hasn't been to go dancing with IBM alone.

Bozman is *Computerworld*'s Chicago-based Midwest correspondent.

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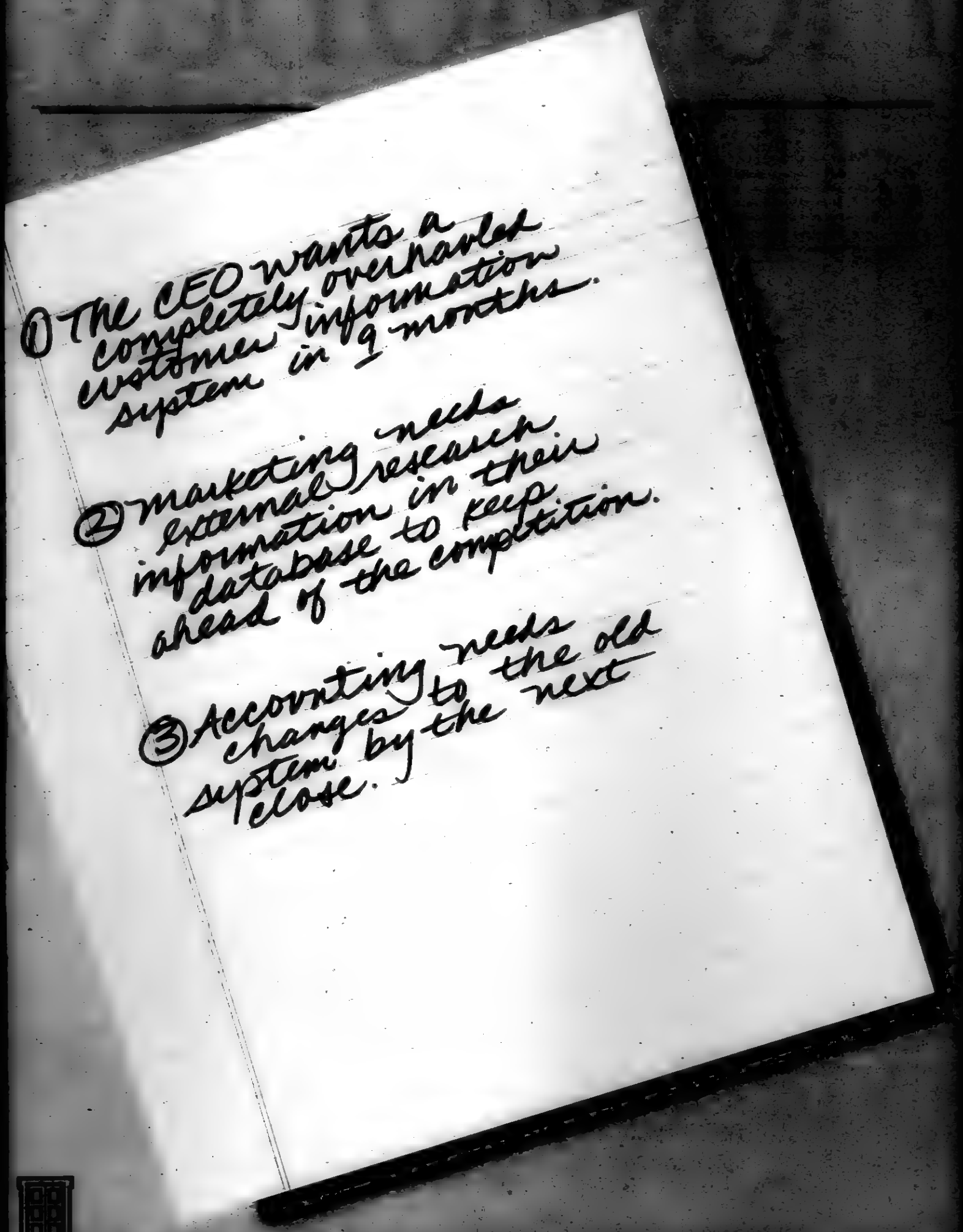

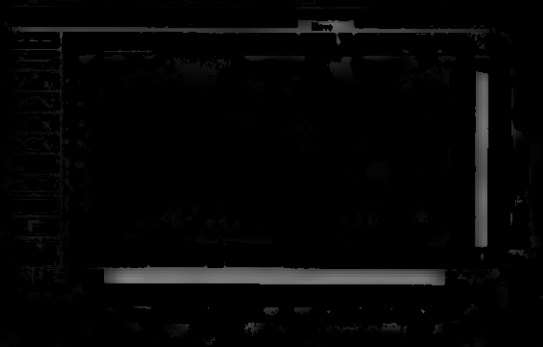

FOUNDATION

Touch

FROM PAGE 83

vices. "A standard approach is needed, and that is what OSI brings."

Since its inception, the company has passed some major milestones. In December, it shipped its initial product, Touch OSI, a software package that supports Microsoft Corp.'s MS-DOS over Ethernet. Touch has aligned itself with major investors, including Apple Computer, Inc., and has signed agreements with key vendors, notably Motorola Computer Systems, Inc.

Touch Communications' *Bill Fello, Dennis Morrison and Brian McGann (seated)*

No pay

For the first six months, the initial team of 10 developers lived on no pay. Before Oak Investment Partners came through with initial seed money, founders McGann, who is vice-president of strategic programs, and Morrison, vice-president of operations, told the engineers to start lining up other jobs. "You have to be honest with people," McGann said. "We wanted to make sure they had something to fall back on if this didn't work out."

"We lived on our own resources, and then we supported each other," Morrison recounted. "We even paid for each other's mortgages on our credit cards."

If long suffering and tenacity represent typical business birth pangs, then Touch is still in the start-up mode. "We are not out of the woods yet — until we are profitable," Morrison said. "That will take a while."

Touch has a strong plan and vision. The founders credit company Chairman Charlie Bass, co-founder of network vendor Ungermann-Bass, Inc., as their mentor in the early stages. Bass was one of the first industry supporters who had enough faith in the tiny company to influence his own connections in the venture capital community.

Money matters are very private at Touch. Like many small businesses with less than 100 employees, annual income is kept top secret. The company has raised, however, $4.8 million from investors, including Hambrecht & Quist, Inc., Morgan Stanley Venture Capital and Sequoia Capital.

If OSI technology had a spokesman, it would be the ebullient McGann, who loves to suggest that the Transmission Control Protocol/Internet Protocol de facto networking standard is "dead in the water" and show how the OSI standard is more flexible and durable than any other communications technology around.

The outspoken McGann is the visionary behind Touch. Formerly at Advanced Computer Communications, he wanted to focus on end-user sales and standards.

"Interoperability was a big deal for me back in 1981," he said.

Although employees worked endless hours to meet project deadlines, they also remembered how to have a good time. When the company celebrated its third birthday, Touch threw its biggest bash ever, and Morrison, a drummer by night, provided entertainment with his rock band.

What is in store for Touch in the future? The company has its sights set on nothing less than the stars. Fello said he would like to see Touch become "the Microsoft of OSI applications."

WHAT IS IN STORE for Touch in the future? The company has its sights set on nothing less than the stars. President Fello said he would like to see Touch become "the Microsoft of OSI applications."

Chip firms

FROM PAGE 83

included the following results:

National Semiconductor. The Santa Clara, Calif.-based firm reported net income for the 13-week quarter ended Feb. 28 of $14.7 million, or 11 cents per share. This is compared with a loss of $25.6 million, or 31 cents per share, the firm recorded for the 12-week third quarter of last year.

"People thought they could live with much less inventory [during the computer sales slowdown]. Bringing people back up to their needs when sales recovered was a significant cause of the upturn," said Stuart Johnson, vice-president of research at Wertheim Schroder & Co. in New York

Similarly, revenue was up 74% to $692.2 million, compared with $398.1 million for the same quarter in 1987.

Last year, sales were hit with a $15 million restructuring charge; in contrast, this quarter's net income included an extraordinary credit of $1.5 million, or 1 cent per share.

Results for the quarter included three months of sales and operating performance of the acquired Fairchild Semiconductor Corp., which Johnson said attained its first break-even period since National Semiconductor bought it last fall.

Micron Technology. In a near duplicate of National Semiconductor's turnaround, net income for the second quarter ended March 3 was $16.9 million, or 60 cents a share, compared with a loss of $10.9 million, or 46 cents per share, recorded for the like quarter last year.

Revenue for the Boise, Idaho, firm was $58.3 million, a 190% increase over the $20.1 million reported in the same period in 1987.

Much of the rebound was credited to a newly robust market for U.S. dynamic RAM chip firms.

"After Reagan put tariffs on the Japanese to stop their dumping of dynamic RAMs in the U.S., the Japanese did too good a job of cutting production, and shortages occurred. Micron has benefited from that," said Andrew Kessler, a securities analyst at Paine Webber, Inc.

3Com. Last June's strategic alliance with Microsoft to co-develop and market the OS/2 LAN Manager and September's merger with Bridge may be starting to yield dividends. Sales and orders continued strong for the third quarter ended Feb. 29.

The networking firm posted net income of $6.6 million, or 23 cents per share, a 43% increase over the $4.6 million, or 18 cents per share, reported for the same period in 1987. Revenue was $66.2 million, a 56% increase over the $42.4 million reported for the same period a year earlier.

"The alliance with Microsoft has only just begun to affect 3Com. I'm sure we'll be seeing more of the same in the quarters to come," analyst Richard Kimball said at a recent Montgomery Securities briefing.

On-Line Software. Strong international sales fueled a robust period for the Ft. Lee, N.J.-based systems software manufacturer. Net income for the third quarter was $1.9 million, a 27% increase over the $1.5 million reported for the same period in 1987. Revenue for the quarter was $23.6 million, a 19% increase over the $19.8 million reported for the same period in 1987.

Despite its overall success, On-Line indicated that a restructuring of its sales approach caused revenue from domestic licensing of software products to fall short of expectations.

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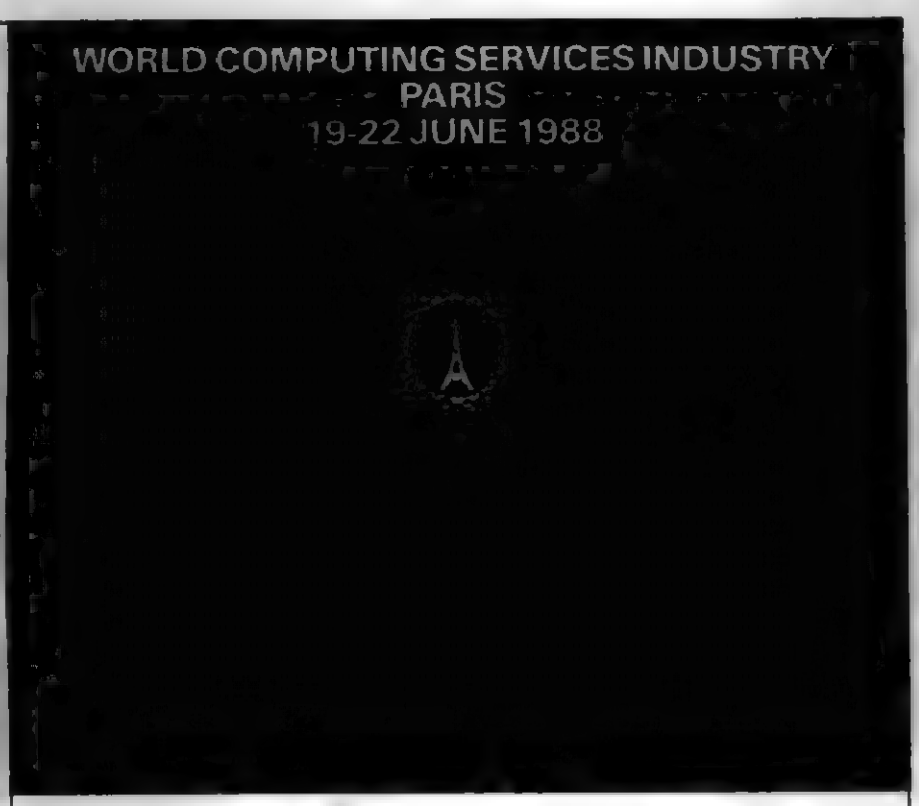

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COMPUTER CAREERS

People-oriented data centers

Combination of people skills, business sense in short supply there, too

BY MICHAEL BALL
SPECIAL TO CW

Increasing business, and in some cases changing technology are creating job openings at data centers.

Managers report that technical specialists seem to be in adequate supply, although they still command handsome wages. Finding business-oriented data processing staffers is another matter.

Not surprisingly, the greatest demand for outside recruiting stems from the need for managers and specialists. "We've had to buy higher level people," laments Kevin Dinger, technical support manager at Medical Data Reports, Inc. in St. Paul, Minn., "and they are extremely expensive, partly because they always go through headhunters."

'Worth their weight'

One area in which this trend holds true is the need for CICS systems programmers, whom Dinger describes as "worth their weight in gold." But he says that even here, it has been relatively easy to find enough people, even though they can command high salaries.

It is often more difficult to find a generalist than a specialist, says Dinger, who adds that he has become a little leery of specialists because they may be short on people and technical skills. "Our qualifications are pretty stringent, especially our people skills," Dinger says. "There are a lot of people with the technical qualifications we need, but we look for attitudes too — career attitudes and people attitudes."

Dinger has found that the addition of a network and PCs is changing duties and interactions, at least at the managerial level.

"There's no doubt our users are different. We now need people who can talk with our MIS staff and end users, both corporate and client," Dinger says.

Interviews crucial

Identifying candidates with the right blend of talents has led to greater emphasis on interviews, Dinger says. "We can see the technical skills on the resume, but we have to sit down and talk to see what the people skills are."

But addressing the new needs does not necessarily lead to searches for people with the appropriate attributes. "When we have the time, I'd prefer to grow my own," Dinger says. "We train our existing [employees], sending them to the litany of IBM-recommended courses."

Dinger notes that he also finds a need for increased communication skills and intuitive thinking in his own position.

> "OUR QUALIFICATIONS are pretty stringent, especially our people skills. . . . There are a lot of people with the technical qualifications we need, but we look for attitudes, too — career attitudes and people attitudes."
>
> KEVIN DINGER
> MEDICAL DATA REPORTS, INC.

The same sort of technical and managerial expertise is sought at the Chicago data center of retailer Carson Pirie Scott & Co., but the company is hiring as well as training as it grows and upgrades from the DOS operating system to IBM's MVS.

"We're presently growing, and this means we can add people we need and keep those we have doing what they do well," says Michael Szajek, data center supervisor with the company's Information Communication Systems division. He, too, finds that there is a sufficient supply of talent but that getting and retaining it is expensive. "To keep the best ones, we definitely have to pay," Szajek says.

With less client orientation than some data centers, the Carson Pirie Scott center finds itself focusing career paths on technical tracks with increasing challenge, rather than on development of communication skills and related abilities.

"There are plenty of technical places to use our people here," Szajek says. His effort is to steer them away from repetitive tasks, mixing more mundane but necessary jobs with special duties. "People don't just play operator here. We have them doing projects, such as environmental documentation, to keep them interested."

Career paths are similar at a smaller center with fewer options, according to Alexander Rivier, data center director at The Children's Place, a clothing retailer based in Pine Brook, N.J.

The course chosen there is to offer more responsibilities and new assignments while training and promoting from within. When possible, this path leads to new titles. "We are constantly reevaluating our staff structure with this in mind," Rivier says.

The clothing retailer's shop is technologically stable but still growing enough to demand regular attention to internal development and recruiting. Rivier looks for both college-educated professionals for management positions and graduates of technical or trade schools for operations jobs. He says he has not had trouble finding candidates for the technical and professional openings generated by the center's modest growth.

Candidate supplies ample

The same has held true at Munich American Reassurance Co. in Atlanta, according to Janet Baughman, director of data processing. The data center's needs are not growing rapidly, and "enough qualified people seem to be passing through Atlanta that we have no problem finding the programmers we need," Baughman says.

The company, which runs an IBM mainframe shop with a microcomputer network, sees future needs limited to people to support new languages and products as they are added.

Munich American is another company that emphasizes training. "We're small, but we still try to develop our people within the company," Baughman says.

Ball is a free-lance writer based in Boston.

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CAREER INDEX

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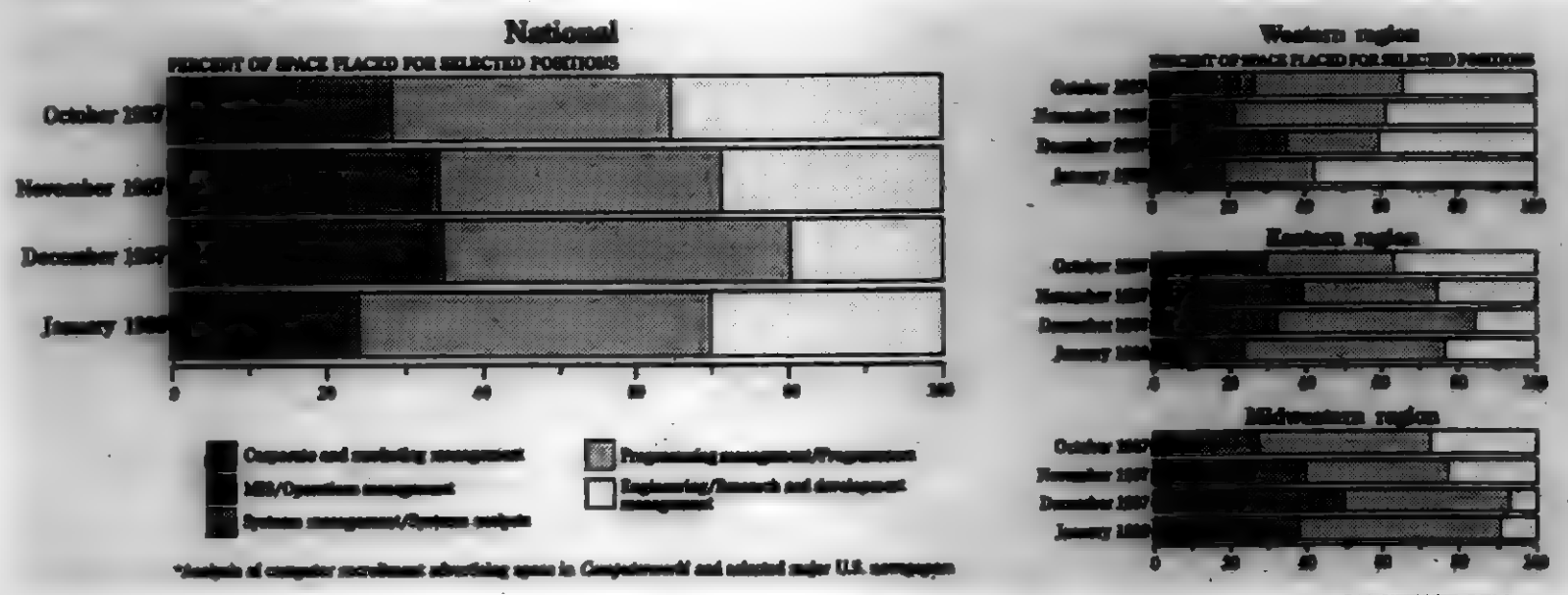

*Analysis of computer recruitment advertising space in *Computerworld* and selected major U.S. newspapers

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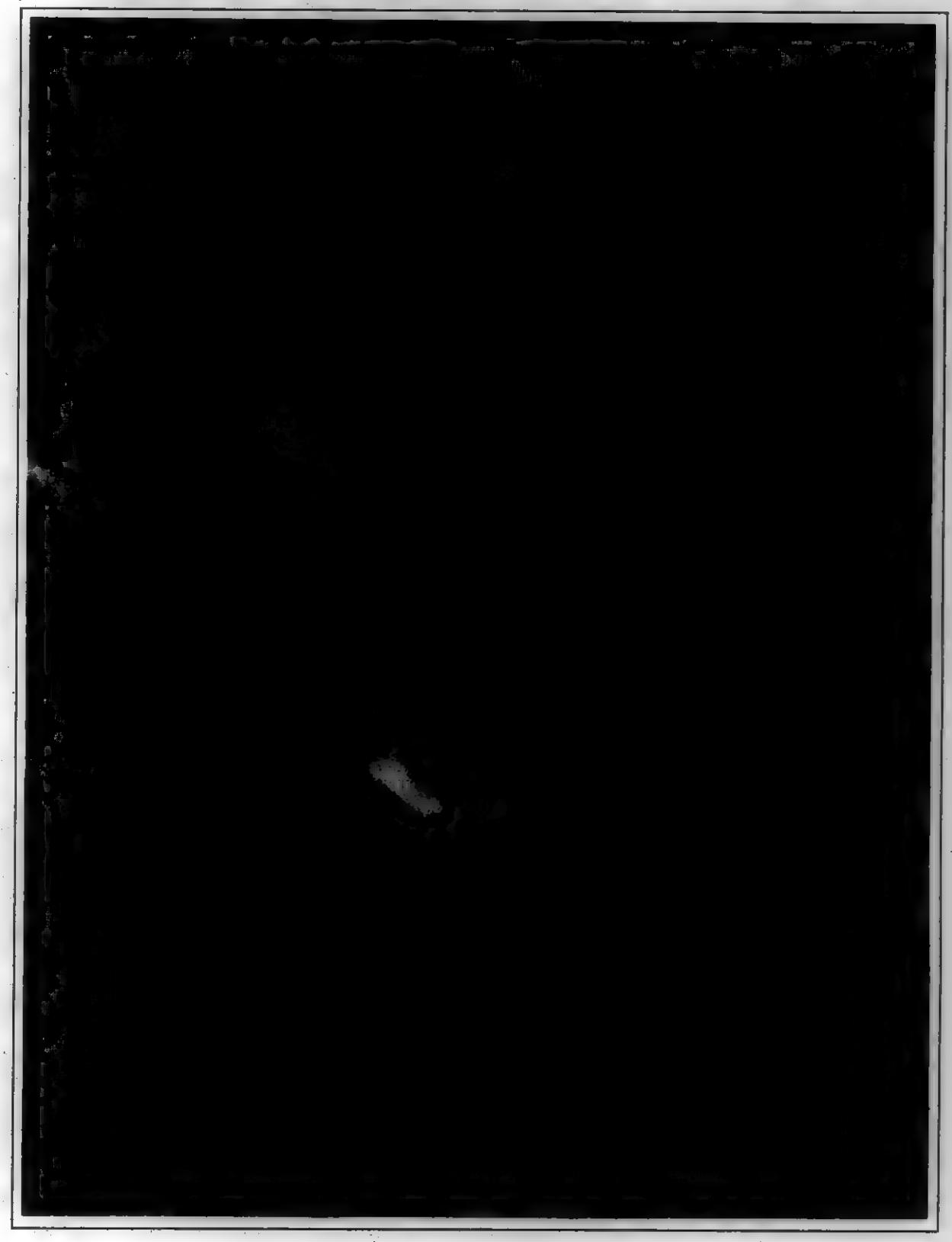
SPOTLIGHT

MICRO-TO-HOST LINKS



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INSIDE

A Logical Extension
Micro-to-host links pop up in operating system offerings. Page S2.

Plotting a Route
Once the question was whether you could even get to the mainframe from your PC. Now, the issue is choosing the most suitable connection path. Page S6.

The Check is In the Network . . .
A private communications link aids in quick delivery on income tax refunds. Page S7.

Will They Take a Mile?
MIS is giving users a freer rein with mainframe data but remaining vigilant about security. Page S8.

Vendor Viewpoints
Advances in micro-to-host links have shifted the balance of power in corporate computing toward the PC. Page S11.

Once you sort out the acronyms, it's apparent that application program interfaces differ in the amount of stretch they require. Page S12.

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PC users want quick, invisible access to host data, but hiding the mechanics is a job vendors are only starting to tackle

DREAMS OF ACCESS WITHOUT EFFORT

BY PETER SCISCO

JULIA TALCOTT

Ric Green, project manager in the communications sector of Motorola, Inc. in Shaumberg, Ill., hasn't a doubt that micro-to-host links will eventually revolutionize the corporate culture. The integration of personal computers with host systems, he says, will profoundly affect the way businesses use information resources. As happened when companies switched from typewriters to word processors, turnaround time will be telescoped dramatically. But while changes are already happening, technology has not yet reached the degree of transparency necessary to shake up the organization on the scale Green envisions.

Motorola's two main computing centers, in Shaumberg and Phoenix, house IBM 3090s. The company has a mix of 11,000 IBM Personal Computer XTs, ATs and Personal System/2s and 7,000 Apple Computer, Inc. Macintoshes, the majority of which are or will soon be connected through 3270 emulation products. IBM 3270 emulation represents the mainstream of micro-to-host linkage today. But as Green knows, that strategy will not satisfy users for long.

Recently, for example, Green installed a micro-to-host link that downloads mainframe data and reformats it as a Lotus Development Corp. 1-2-3 work sheet file. His intention was to facilitate the task of manufacturing cost analysis for a general manager who oversees several divisions. The system automated the previously manual task of entering each division's history and current information into a spreadsheet. More important, the process of retrieving information from separate data bases on several host systems was placed under the manager's control, rather than MIS's, and the time needed to complete the task shrank from days to minutes.

But even that fell short of expectations. "The first time we showed it to [the manager], he said, 'That took too long,' " Green says. "You have to be sensitive to the fact that even though [a link] improves the process, managers still won't understand why it still takes three to five minutes."

Speed is not the only issue, Green says. Managers also want the flexibility of working within applications they already know rather than adjusting to the mainframe environment.

Making it their own

Moving data between mainframes and microcomputers is nothing revolutionary. What is new is the fact that the user community is demanding the right to perform that operation themselves and to own tools with which to do it without having to learn new and arcane procedures.

"The question of transparency is really just the user saying, 'I want access to all this stuff, but I want it to look familiar.' It's a user-driven phenomenon," says Paul Saffo, a research fellow at the Institute for the Future in Menlo Park, Calif.

Departmental managers and high-level executives, once satisfied with running local cost projections and spreadsheet analyses on their PCs, are beginning to realize the limits of the local processor. Saffo points out that the notion of a machine being one-person, one-task, one-terminal is history. Users need to be able to do multiple

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things at once.

"What really is different is the recognition that end users just don't want to know anything about [the linking] process, and they want to have the idea or flexibility that when they get mainframe data, they haven't really left their PC," says Larry DeBoever, president of DeBoever and Associates, Inc., a consulting firm in Acton, Mass.

Seamless access to mainframe data from within a familiar PC application is what users really want. But moving from the point of imagining true transparency to the point of implementing it has proven difficult.

SUNY's Steinbach

"A lot of people talk about transparent access, but I haven't really seen it getting off the ground," says Scott Jensen, a senior systems programmer in the Applied Technology Division of Litton Systems, Inc. in San Jose, Calif. "People have been downloading for years, but it's never been very convenient to do, and I don't think many people have been doing it."

Litton's San Jose facility has 63 IBM PC XTs, ATs and PS/2s linked to the corporate IBM 3090 mainframe in Los Angeles. Most are being used as host workstations, Jensen says, and there is some downloading from the host. "But it's not transparent to the user, I know that," he says. "Downloading is still not an easy thing to do."

Universal Foods' Randall

"Transparent access is typically a hard-won thing unless you're dealing in a vendor-specific environment," says Merv Adrian, managing editor of the *Focus Systems Journal* for Information Builders Publishing in New York. "That's not a typical model, and what we don't have is a lot of generic links."

The user interface ranks as the major challenge for developers of transparent micro-to-host links, according to Charles Pitcher, director of product planning at Rabbit Software Corp. in Malvern, Pa.

What end users want, Pitcher says, is a "single linguistic context. The context they want is whatever they do for a living. If you're a trust officer in a bank, you want every single language term on that screen to be what a trust officer can understand."

IBM 3270 terminal emulation may be the market leader, Pitcher says, but its inconsistent user interface for different applications is a major drawback. "The problem is that all the old IBM 3270 protocols assumed no intelligence on the other side of the network," he says.

Give them what they want

Right now, achieving what passes for transparent linking of microcomputers and hosts requires significant programming effort on the part of data processing professionals.

"Most users don't have the expertise to do it themselves," Jensen says, "so you need to give them [a link tool] that won't require MIS help for them to use." Right now, he adds, the only way to obtain such tools is to write them yourself, which is what he plans to do.

At the State University of New York's (SUNY) Health Science Center at Brooklyn, Len Steinbach, manager of the information center, has also taken the matter of user interfaces into his own hands.

The information center is putting together a 40-node network — a mix of IBM and Zenith Data Systems PCs — and linking it to an IBM 4381 mainframe. The center will use the network in the human resources department to develop and maintain personnel records, coordinate various reports and perform analyses.

The software heart of the SUNY link is VM Personal Computing, Inc.'s Relay Gold, an asynchronous communications package that started shipping in September 1987. Steinbach's team has structured a standard interface around that product that Steinbach says solves a major obstacle confronting PC users who want to routinely access mainframe data.

"We don't want most people to know much more about the micro-to-mainframe interface other than a menu selection," he says. "That's really the key. Then we'll get them where they want to go."

At Universal Foods Corp. in Milwaukee, Bob Randall, microcomputer coordinator, also heard user demand for a micro-to-mainframe link that could be easily initiated from within a PC application.

He eventually decided that "if that link is what they want, then the mainframe people have to

Continued on next page

Operating systems grow extensions

BY LARRY DEBOEVER

In the last 12 months, user demand for transparency has given a new twist to the developmental path of micro-to-mainframe links. Links are now materializing as extensions of operating systems.

Because of their diverse computing environments, most medium-size and large organizations will continue to require a variety of link products.

But it is fairly certain that as a ready-made alternative, link facilities offered by operating system vendors such as IBM, Digital Equipment Corp., Microsoft Corp., Novell, Inc. and Apple Computer, Inc. will eventually capture significant market share.

In general, these link products rely on a virtual-disk user interface, which was first tried on local-area networks and later applied to micro-to-mainframe links by companies such as Micro Tempus, Inc. and Phaser Systems, Inc.

Close relatives

The current batch of products from operating system suppliers, however, are most closely related to the original LAN model. In this context, a virtual-disk interface allows a personal computer user to copy files to and from a file server — usually a dedicated PC — by treating the file server as if it were simply another disk drive on the PC. A user might have several such virtual drives allocated on the file server.

The best-known protocol for accomplishing this is Netbios, developed by IBM and Microsoft.

IBM's newest link facility, Enhanced Connectivity Facility (ECF), has been identified as part of the company's Systems Application Architecture. ECF is clearly a major product strategy for the company, which has stated that the facility will replace all of its currently existing link products.

ECF provides a virtual-disk micro-to-mainframe link facility between a PC and an IBM host, as well as virtual-print and virtual-record abilities.

It is an extremely rich facility that includes a wide variety of data transformation capabilities and is clearly intended to provide full PC-mainframe integration. It can also be used to distribute PC software and updates.

DeBoever is president of DeBoever and Associates, Inc., an Acton, Mass., research and consulting firm.

ECF is available on both IBM MVS systems and the 9370 departmental processor under VM/GCS. It uses IBM's Server/Requester Protocol interface, which has been included in the company's OS/2 Extended Edition specifically for ECF support — thus effectively making ECF the micro-to-mainframe link of choice for OS/2 Extended Edition.

DEC gets into the act

For some time, DEC has offered Decnet-DOS, a virtual-disk facility that allows PC users on Decnet to copy files to and from a DEC VAX. This facility is much more limited than ECF, effectively treating the VAX as nothing more than a file server with limited facilities for VAX-to-PC data interchange.

> IT IS certain that as a ready-made alternative, link facilities offered by vendors like IBM, DEC, Microsoft, Novell and Apple will capture significant market share.

DEC did little to promote Decnet-DOS, principally because — until recently — the company was, for all practical purposes, anti-PC. This was probably because DEC did not possess a strong PC product, and every PC purchased by a DEC user meant the company had one less VT100 sale.

In light of its recent deal with Apple to bring Macintosh support to Decnet, DEC is clearly revising its strategy. On the same day that it announced its deal with Apple, the company also said that Decnet-DOS would be bundled at no charge on every version of VMS. In other words, every VAX running VMS is now a PC file server.

These actions amount to a recognition by DEC that, as it increasingly provides systems — VAXs, Ethernet LANs, RDB software and so on — to its customers, those systems will be used by users who are connected to the LAN from a PC.

Part of the plan

Both Microsoft and Novell appear to have developed their own strategies to add link technology to their servers. It is a safe bet that Microsoft will provide a link capability, which could include interfaces to both ECF and Decnet-DOS, as an installable system service for the OS/2 LAN Manager.

An installable system service is an application that will run on top of the OS/2 LAN Manager and will be available to all users of the network. Microsoft has already introduced its first product of this kind, the SQL Server.

Microsoft seems to be acting on the belief that the end user ultimately drives the connectivity process, meaning that the user will have the greatest impact on various connectivity product decisions.

Novell also sees the requirement to provide connectivity to mainframe and departmental processors and is developing a strategy similar to Microsoft's by adding value-added services to its Netware Server.

To underscore this point, Novell announced two micro-to-host software products this month, jointly developed with Phaser Systems, a company privately owned by Raymond Noorda, Novell's chief executive officer, through his investment in Dialogic Systems Corp. Clearly, Novell has come to grips with the market demand for standards-based solutions, causing the company to reconsider its OS/2 posture.

Apple's touch

Not to be outdone, Apple has developed an excellent connectivity staff and invested in Touch Communications, Inc., whose Open Systems Interconnect technology will allow Apple users to access remote hosts as if the hosts were icons.

The company has also worked with Simware, Inc. to develop Mac3270, a link technology that allows Macintosh computers to interface with IBM mainframes as block-mode 3270 devices via various types of asynchronous connections.

In addition, Apple recently acquired Network Innovations Corp., which has developed some excellent connectivity support. An important question is whether there will be room for other link suppliers if all the major operating system vendors provide this capability. The answer is a strong yes, particularly if link vendors are prepared to support interfaces to both ECF and Decnet-DOS within the next 12 to 18 months.

The increasing complexity of networks and the diversity of functions required by users will ensure a considerable and continuing demand for other types of link products.

It is reasonable to expect, for example, that an OS/2 user connected to the corporate network will also require concurrent access to dissimilar hosts located on a LAN, a CCITT X.25 network and an IBM Systems Network Architecture network. •

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adjust to it."

In Randall's case, adjusting meant using Micro Tempus, Inc.'s Tempus-Link and writing code to create a virtual-disk link that users can invoke through a menu.

"For us, the access is transparent to the user. I've written some code where the user doesn't even know his Drive D is really on the mainframe," he says. "I don't know if you can get more transparent than that."

3M's Waldman

Meeting end-user demand prompted 3M Media Services, Inc. in Stamford, Conn., to move from its strict time-sharing activities to a more interactive role with its customers. Bob Waldman, 3M's technical director, says the firm's MSI Plus package grants publishers remote access to 3M's two IBM 4341 mainframes and lets them bring down data they are interested in.

"It's a one-button kind of operation," he says. "Downloads can go from five minutes to 14 hours. We've set it so they can do it in the middle of the night. It's absolutely idiot-proof."

MSI Plus incorporates Relay Gold and Borland International's Paradox, with a shell around both packages. Waldman is currently running the package in three beta-test sites. Users inside MSI Plus move to MSI Link, a part of the Plus package, advance automatically to the mainframe and extract the needed data. They then move to MSI Base, which is the Paradox-based part of the product.

From there, users can transport the data to a Lotus or Ashton-Tate Corp. Dbase III application pretty cleanly, Waldman says. "The data comes down and automatically goes into Paradox," he says. "And then users can manipulate it to their heart's content."

Many users, however, harbor visions of transparent micro-to-host linkage that extend beyond any of these carefully stitched link/interface combinations. Peter Hermann, a director in the computer science division of data processing at The Travelers Corp., says he wants a way to integrate PC documents and specialized files into the firm's central messaging system. His firm has 14,000 to 15,000 PC-XTs, ATs and PS/2s in its U.S offices, with IBM 3090s and 3081s in its Hartford, Conn., headquarters and in Norcross, Ga.

Litton's Jensen says he would like to see a link that "would actually download host data in a Lotus format without having to parse it, run an SAS program on it or anything like that. That product would sell a lot of copies. People would love it."

That same belief inspired Lotus's The Application Connection (TAC) development platform product line. "If I'm in 1-2-3 and I need data from [IBM's] DB2, I should be able to make my request and answer all the questions from within 1-2-3," says Scott Eliot, TAC program marketing manager. But for the moment, some see significant gaps in the TAC offering.

Motorola's Green says he would like to see Lotus work on the communications link for TAC, even though that company has kept itself completely out of the communications area. If TAC were linked to an operating system, he says, it would be easier for most companies to install it, adding that getting MIS to build a generic communications routine is difficult.

Unanswered questions

Three levels of concern need to be addressed when looking at micro-to-host links, according to the Institute for the Future's Saffo: "Can I get the data to my machine? And once I've got it, can I process it? Finally, does the data stay alive — can I get it out, can I integrate it?"

Those questions are not yet easily answered by generic products, Adrian says. For a link to function effectively, he says, it must be constructed along three lines:

- Data extraction that gives the user only the information requested — no more, no less.
- The data communications aspects, such as the actual transport of the data.
- Presentation services.

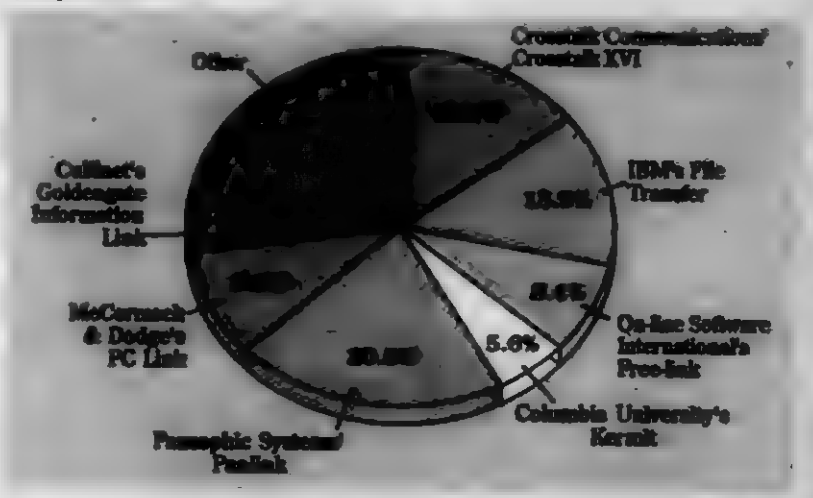
"The different products spread out all over the continuum on how they support one or another [category] or all three," Adrian explains.

Just how much progress is being made and how quickly is a matter of debate. "If you look at what an end user can do with a link, the actual capabilities haven't changed a whole lot in the last few years," says Paul Weinberg, vice-president of Network Innovations Corp. in Cupertino, Calif. "Whether it's a high-speed LAN connection or a low-speed asynchronous direct connection, the capabilities have pretty much stagnated and fall into one of several categories."

These categories start with 3270 terminal emulation, which Weinberg says automatically decreases the value of the PC as an intelligent workstation. The next level is file transfer, which he maintains is not much better, since it still does not recognize the intelligence of the PC.

Preference vote

Market shares for micro-to-mainframe links at IBM and compatible mainframe sites



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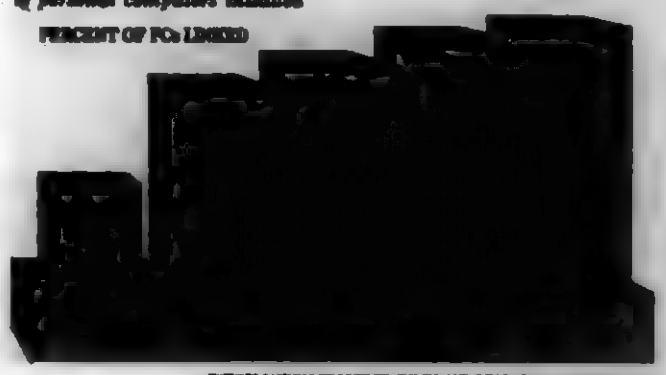
Adoption pattern for micro-to-mainframe links

Penetration at U.S. IBM and compatible mainframe sites by number of personal computers installed



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"Now what you get to do is transparently extend the local hard-disk storage on the PC across the network into the bigger disk on the host," Weinberg says.

DeBoever, on the other hand, maintains that micro-to-host link technology has made significant strides in a short time. "We're in a new generation of links," DeBoever says. "A lot of people haven't paid attention to it. They looked at it a couple of years ago and think they know it. But they don't realize how improved the technology is. And it really has improved substantially."

Transparency of linkage is, after all, an issue that only recently began to demand attention. Before users can begin to think about refinements, they must first be exposed to the possibility of connection, and only now is that happening on a significant scale. Adrian, for example, estimates that of six million potential board-level micro-to-host connections, only about one million have been made.

The Travelers' Hermann

However, micro-to-host connectivity will clearly become a major issue in the near future. International Data Corp. in Framingham, Mass., estimates that by the end of 1991, more than two million PC boards will be communicating with IBM mainframes. And as connectivity advances, some say MIS will discover reasons of its own to support transparent access. Allowing users to request mainframe information on their own solves MIS's application backlog, Adrian says, allowing one person to support large numbers of users.

For years, MIS has maintained strict control over the flow of information within corporations. The trick now is to supply access to that information without jeopardizing security or integrity.

It's payback time for corporations that have invested heavily in PCs and now want to recoup their investments by making the machines — and the people who run them — more productive. And it's pay-up time for vendors, which must create easy-to-use micro-to-mainframe links that operate within MIS's long-established constraints.

A number of vendors have announced up offerings that aspire to that objective. Network Innovation's Connectivity Language/1 (CL/1), released in January, is an SQL-based connectivity language that the firm hopes micro software developers will integrate into their PC programs. In addition, the company released a developer's tool kit for the Macintosh last month.

Weinberg calls CL/1 interactive and session-oriented. "What that means is you could click on a cell that could be translated by the application into a CL/1 request. And then each of the records could be retrieved one by one and placed back into the application — all invisibly," he says.

In January, users also saw Digital Equipment Corp. extend its Network Applications Support (NAS) to the Apple world. Look for Apple to move Appletalk under Open Systems Interconnect, which DEC already has in place, says Joanne Correia, DEC's PC interconnect marketing manager. NAS is also available for Microsoft Corp. MS-DOS and IBM OS/2 applications developers.

A link between DOS-based PCs and Unix-based multiuser systems was announced last month by Altos Computer Systems. This product, Adlantes — scheduled to be released in May — uses Microsoft Windows to allow users to access either type of application.

IBM is making its move toward more transparent links with its Enhanced Connectivity Facilities (ECF), announced last fall. ECF includes virtual-disk technology as well as extraction and formatting of host data for use on PCs. Virtual capabilities are offered through PC-resident requester programs and host-resident server programs.

ECF moves way beyond 3270 terminal emulation but not so far that experienced users will forget how they got there.

"Any 3270 user who's familiar with interacting with a mainframe environment would be able to use [ECF] without a lot of technical expertise," says Steve Randesi, a consultant with Gen2 Ventures in Saratoga, Calif.

IBM provides some translation capabilities that reformat the mainframe data into some of the more popular PC formats,

Randesi says. "The problem is that the translation is done on the mainframe, and it only goes in one direction — from the mainframe down to the PC," he explains. The only reformatting allowed in both directions are sequential files from EBCDIC to ASCII and back again.

Rabbit Software's Pitcher says IBM's High-Level Language Application Program Interface (HLLAPI) allows application developers to write programs that solve the reformatting problem. "The real advantage of HLLAPI might be that it talks to four or five host programs at the same time," he says. "But the user doesn't have to switch back and forth."

What HLLAPI applications have not solved, Pitcher points out, is the way data is sent across the network. The PC interfaces are still being created on the host rather than on the PC. This is an economically inefficient solution, he says, noting that "some-

> "YOU don't know how many people are going to go shopping. That may be OK for a supervisor but not necessarily for just anyone."
>
> LEN STEINBACH
> SUNY

where between 20% and 50% of the host in a heavy on-line transaction environment is involved in creating the screen processing for the user."

The solution for that kind of inefficiency can be found in IBM's Advanced Program-to-Program Communications and in that protocol's transport mechanism, LU6.2.

Once the host recognizes the intelligence of the PC, the PC applications can reformat the data received from the host. From there, the user can dump the reformatted data into a familiar PC application.

How quickly fully transparent link products will materialize and what effect they will have when they do are questions that lack firm answers so far. DeBoever says he expects that within two years, users will be routinely moving 100M bytes of data around networks.

"I've already planned that into our growth," Universal Foods' Randall says. As part of his company's linking its computer resources, he says, token-ring networks will play a pivotal role. "We have configured those token-ring networks to have central servers with a minimum of half a gigabyte each. So if people want to pass files of that size, they'll be able to do it."

There is little doubt that beyond file sharing and data access, data security and integrity are the foremost areas that will be affected by transparent micro-to-host links.

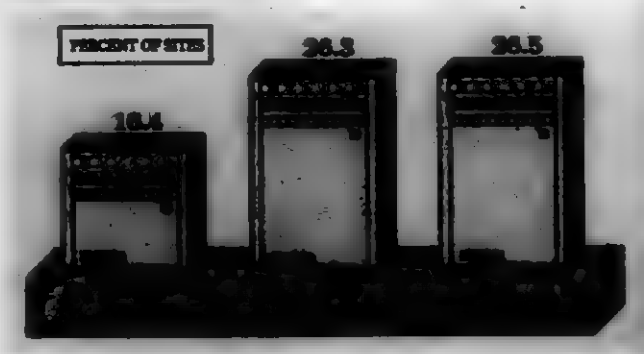
"You have to make sure the appropriate software controls exist in order to know and identify who's doing what," says Mark Wilberts, director of telecommunications and network systems at Land O'Lakes, Inc. in St. Paul, Minn. Most of that firm's 400 or so PCs are linked to an IBM 3084 with Digital Communications Associates, Inc. Irma boards. "If you're an Irma board, we know who you are, at least physically," he says.

But when transparent links bring local-area networks and hosts together, the security problem becomes stickier. "We have one user with supervisory rights, who uses the term 'going shopping' when he wants to see what's going on in the network," SUNY's Steinbach says. " 'Going shopping' is an interesting phrase to use. You don't know how many people are going to go shopping. That may be OK for a supervisor but not necessarily for just anyone."

Obviously, the software that makes access to host data easy and automatic should be strictly controlled within organizations. The products themselves will do

Slowing tide

Penetration of micro-to-mainframe links levels off at IBM and compatible mainframe sites



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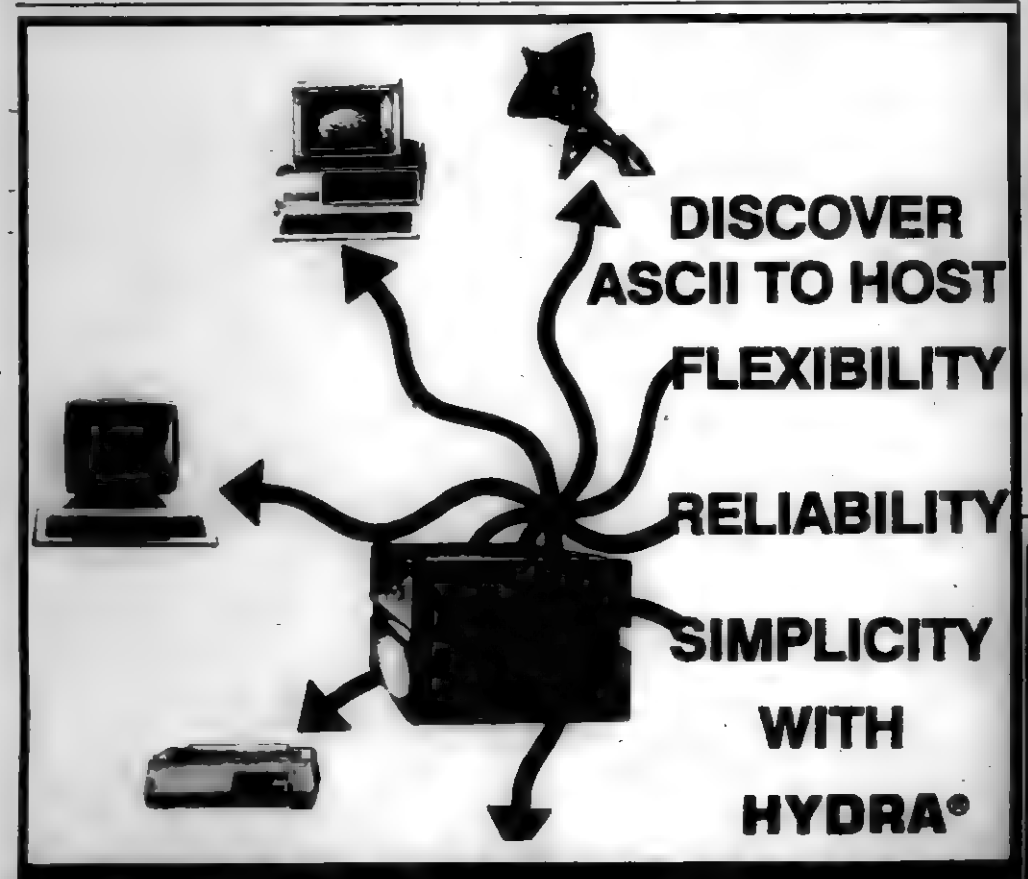
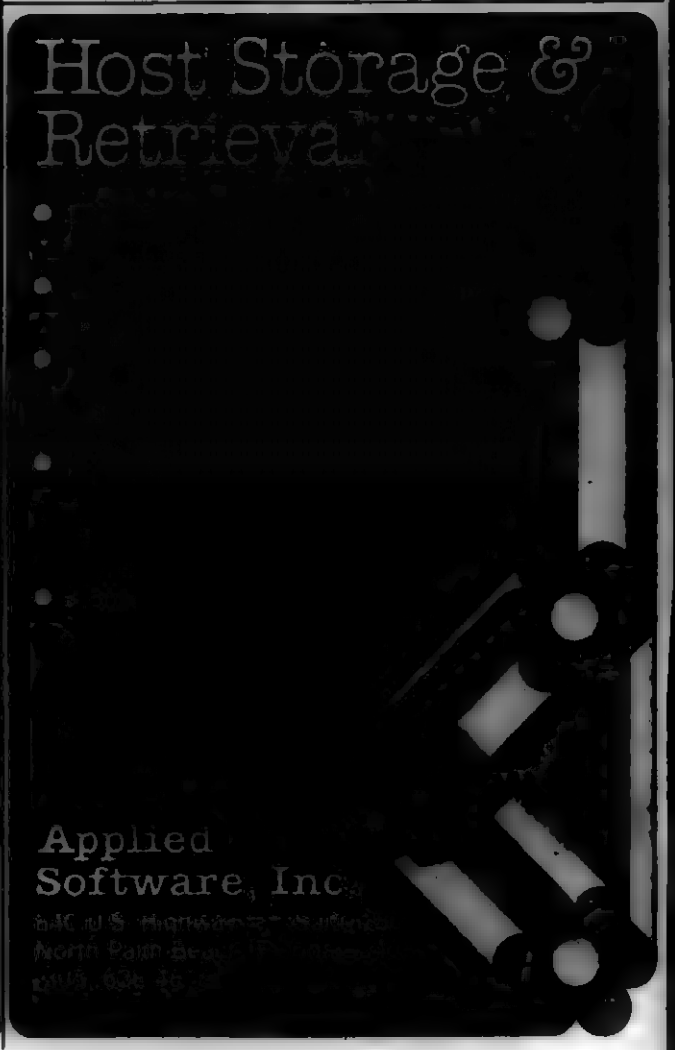




nothing to change the traditional role of MIS as the controller of security as well as information; in fact, the products will most likely emphasize that role.

"MIS has grown up around the idea that they are the guardians of the data, and it's appropriate for them to be," Adrian says. "Any product that purports to provide access to people who need to use it has to make sure that it does that within the constraints legitimately established by the MIS people."

"Once MIS has coded security, there's no way they're going to listen to an upstart like Lotus say, 'Hey, abandon your security, we're going to supply it for you,' " Lotus's Eliot says. "Maybe if you don't mind having your lungs pulled out through your mouth, it's OK."

Land O'Lakes' Wilberts

"We've got some real paranoid people on our mainframe," Randall says. When Universal Foods put its first asynchronous environment together, he explains, there were quite a few reservations and questions.

"They were afraid you'd hear some guy at a party say, 'Hey, do you want to see what the president makes?' and log on and look at it." That scene has never played out, Randall says, but it is indicative of the resistance transparent micro-to-host links face as they come into the workplace.

Keeping data shipshape

Maintaining mainframe security on the eve of link transparency may cause MIS managers some sleepless nights. But the thought of maintaining the integrity of the host's data after it has been manipulated on the PC level conjures visions of dazed DP managers awash in roiling seas of inconsistent records and files.

"We're going to have some real interesting problems," SUNY's Steinbach maintains. "I think it's going to be an interesting experiment in the management of that department."

Easy-to-use links and more LANs means that more and more data will be carried out on the networks, DeBoever says. "It'll be a huge administrative nightmare, once you get going, to try and manage distributed data. We'd like to think that somebody's going to manage it, but in the near term, I don't see any organization that's willing to step up to that problem," he says.

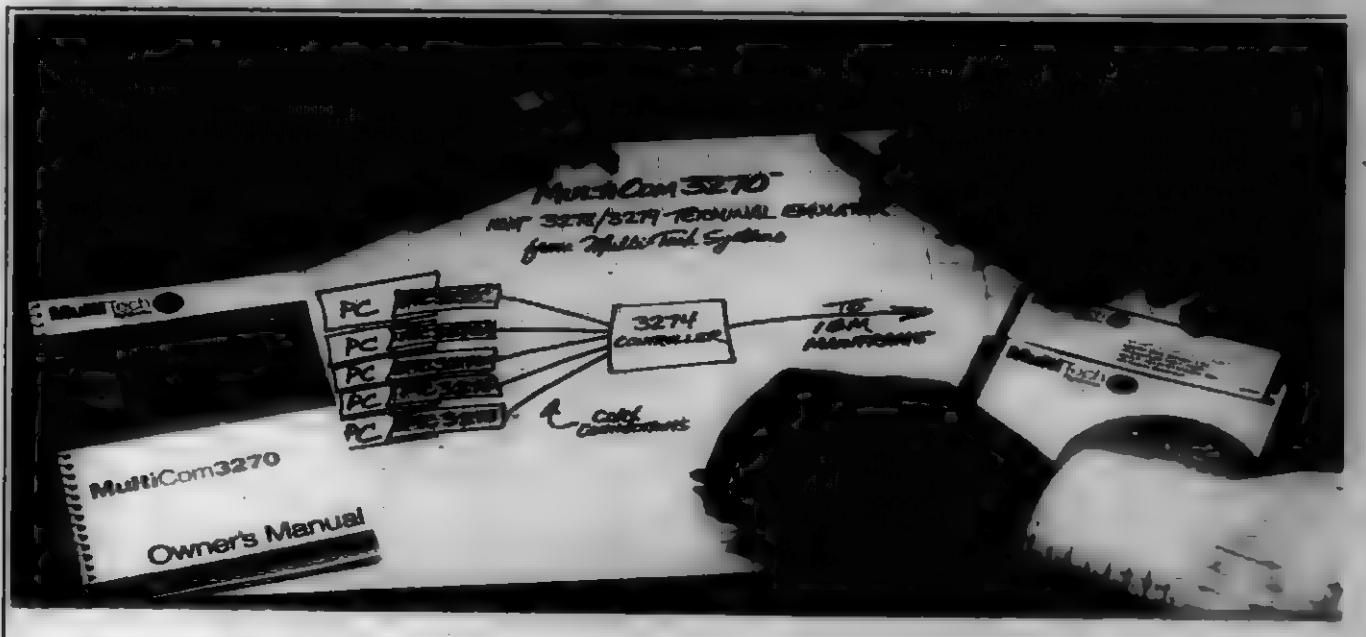
Others downplay the problem of mainframe data integrity, arguing that the same filters that maintain integrity now will function similarly in the future. The number of users accessing the data is not a problem as long as constraints are placed on the upload process.

"If the user can go on-line and change the data, that's fine. He's functioning as part of the system," Land O'Lakes' Wilberts says. "But I'm concerned about moving it back up, unless the process is written in a systems environment where a programmer or systems analyst has written the PC part as part of the system and doesn't let the user go in and modify that code."

Making sure the PC data matches the host data should not be MIS's concern, Universal Foods' Randall says. "If you want lots of users to get identical information, you want to keep it on the mainframe," he says. "Once it's down on the PC, if any data doesn't jibe with a report that was created on the host, it's tough. It's the user's problem."

Besides, the Institute for the Future's Saffo says, the benefits of more open exchange really do outweigh the risks. More transparent access to mainframe data will increase the data's value to the company.

"We tend to entomb information in large computers, and the process of entombment is so complex that people are relieved just to leave it there," he says. •



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Making sense of mainframe access

BY GLENN MILLER

A main course of action on the business agenda for the next decade is to further leverage corporate information assets. One way to do this is to provide end users with greater access to mainframe data bases.

While many issues, such as security, data administration and software integration, must be considered, there are only three basic methods of connecting the personal computer to the host: modems, direct connections and links through local-area network gateways.

Modem connections are widely used today. They involve a PC concurrently running a terminal emulation package and a modem control program. The PC is connected to, or internally houses, a modem that allows it to dial into a second modem connected to the host computer.

Modem connection is distinguished by its low cost and flexibility. Modems, used with either asynchronous or synchronous protocols, range in speed from 300 to 56K bit/sec. Modems ranging in speed from 1,200 to 9.6K bit/sec. cost between $400 and $1,500 and can be easily relocated to accommodate mobile users.

The limiting performance factor for this type of connection is the phone line's bandwidth. While 2,400 to 9.6K bit/sec. is suitable for basic terminal emulation, this speed range would typically be unacceptable for file transfers, heavy screen transfers and cooperative processing.

Direct connections are also in widespread use, having been popularized by Digital Communications Associates, Inc.'s Irma card. The PC runs special emulation software and communicates with the add-in emulation board. This board is connected via coaxial cable to a mainframe front-end processor or a cluster controller, making the PC look like an IBM 3270-class dependent terminal.

Distinguishing features

Direct connections are distinguished by high performance, convenience and higher cost. As a directly connected workstation, the PC can transmit as fast as the cluster controller will allow, since it is not sharing the connection line with other PCs. When standard coaxial cable is used as the connecting medium, no additional cabling is required other than what might already be present for 3270-class terminals. The higher cost of direct connection is attributable to the expense of the emulation board and software, which average $1,200 per workstation.

An increasingly popular option is LAN gateways. In this case, one PC on a LAN maintains a connection with the host via cable or modem, with the other PCs sharing this connection. This spreads both the cost and the bandwidth of the connection across the PCs.

THE current question is not whether connection to the mainframe is possible but which method makes business sense.

The lower cost of the LAN connection — between $500 and $850 per node — vs. direct connection — with a cost of about $1,000 to $1,400 per node — makes the former option look attractive from a cost-justification standpoint. Although there are other cost considerations, such as cabling and installation, gateways often make good business sense for as few as six to 10 workstations.

LAN gateways offer several other advantages. With the availability of enhanced protocol conversion, these gateways can permit multiple connections to multiple environments, fostering integration of the IBM Personal Computer, Apple Computer, Inc. Macintosh and Unix platforms.

Today, gateways exist for both standard Ethernet and token-ring LANs. The PC that acts as a liaison between the LAN and the host can be connected either directly or via a modem. In addition, token-ring networks offer direct connection into selected models of the cluster controller or front-end processors.

The performance trade-offs for this solution are predictable: A shared resource can become a bottleneck. If the bandwidth requirements are high, a direct connection will perform noticeably better than a PC working via a LAN gateway.

In the past, the question was, "Can I connect my PC or Macintosh to my mainframe?" Now, the question is radically different: "Of the many ways to make this connection, which one makes the most business sense for this user community?" The second question, now that workable options exist, is considerably safer from a strategic MIS standpoint. •

Miller is director of strategic planning at Businessland, Inc. in San Jose, Calif.

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Data link speeds tax filing, refunds

BY BILL BRANDEL

There is no escape from taxes, but computer connectivity is helping to ease the pain of filing for some taxpayers. A private communications link connecting field offices of tax preparer H&R Block, Inc., a special loan division of Beneficial Finance in Peapack, N.J., and the IRS, now offers the prospect of quick delivery on income tax refunds.

At IRS-approved electronic filing centers run by H&R Block, customers have the option of expediting their refunds via a service called Rapid Refund.

H&R Block, which began the service in a more limited version without electronic data transfer in 1976, currently uses data link software to send tax refund data to the Beneficial Finance subsidiary, Tax Masters, which sends back authorization to tender a return check. The authorized amount is then "loaned" to the customer from a Beneficial subsidiary bank located in Wilmington, Del.

Simultaneously, H&R Block sends the customer's income tax return information to the IRS, which then transfers the refunded amount electronically to Beneficial, thus paying off the loan.

New package used

The link software currently employed by all the participants in the exchange is Blast Private Network from Baton Rouge, La.-based Communications Research Group.

This product, which recently replaced another link package — Rcom from Computer Vectors, Inc. — consists of file transfer software that can integrate with applications software by connecting micros, minis and mainframes running different operating systems.

It can also transfer data from a diskette into these systems and offers full-duplex data transfer over asynchronous lines.

Blast Private Network is customized for every purchaser to allow communications between designated operating systems. In this instance, customer information files had to be uploaded to and downloaded from Digital Equipment Corp. VAX 8550 equipment at H&R Block's Kansas City, Mo., headquarters and IBM Personal Computer XTs and ATs at its field offices as well as to Data General Corp. MV/4000 minisupercomputers and IBM 3080 mainframes at Beneficial and IRS sites.

The key for H&R Block, having invested considerable effort in developing its own software to process complicated tax forms, was to find a product that would interface reliably among all the systems involved and permit secure, unattended communication.

Using the Blastscript programming language, unattended VAXs can automatically dial the PCs and download or upload tax information overnight. A security feature provides password control and allows the system manager to stipulate who can send data on which network.

There were other factors that influenced Beneficial's decision to make the shift to Blast Private Network.

"We needed something that was ASCII-compatible," says Tom Trader, director of data processing for Beneficial's Tax Master program. "Then too, Communications Research licenses this package in volume, which dramatically decreases our purchase costs, and offers capabilities to provide data links in a multivendor environment."

> **H&R BLOCK, overwhelmed by the unanticipated popularity of Rapid Refund, has thus far been unable to keep its initial promise of overnight delivery.**

As is usually the case when taxes are involved, there have been complications. H&R Block, overwhelmed by the unanticipated popularity of Rapid Refund, has thus far been unable to keep its initial promise of overnight delivery, despite an upgrade from Microvax II to VAX 8550 machines and a refinement of its own software to increase processing speed.

According to Bill Hicks, H&R Block's director of information systems, the current logjam has nothing to do with the link product but with inadequacies in supporting equipment and staffing. In an effort to get ahead of the present backlog, Hicks has purchased faster modems and multiplexers, beefed up his supply of DEC VT220 and VT320 terminals and added IBM Personal System/2s.

Even that shopping list does not address the heart of the problem, however. "The real problem," Hicks explains, "is that we are a seasonal employer, with 15 people on our technical support staff, and we are supposed to support all this."

Still, the company's plans for expansion remain ambitious. While only about 10% of H&R Block's tax preparing offices have implemented the service, the goal is to have one-third of its offices using Rapid Refund next year.

"I've been told that the IRS intends to offer nationwide electronic filing by 1991," Hicks says. "We intend to be in step with that expansion." ●

Brandel is a free-lance writer based in Allston, Mass.

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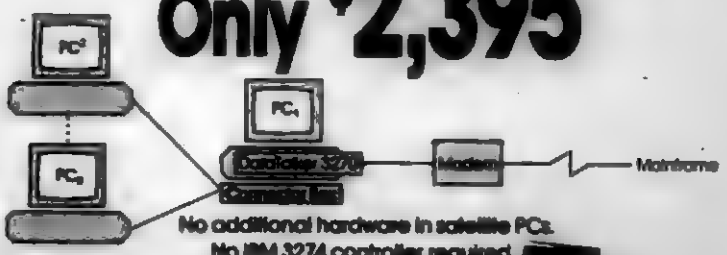

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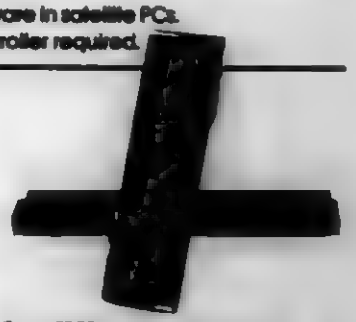

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MIS changes tune on data access

BY GARY ROBINS

MIS managers still voice some concern about the security and control of data in micro-to-host links. But the companywide benefits reaped from such connections have tipped the scales in this technology's favor. End users on micros are obtaining more and more access to the mainframe, with MIS taking an active role in initiating the changes.

"We're giving end users the hook instead of the fish," says Ron Stockton, director of MIS at Club Corporation of America (CCA)-Financial Management Corp. in Dallas, describing his organization's effort to invest end users with the ability to query, extract and download data from the mainframe data base.

CCA is in the hospitality business, managing more than 170 clubs and resorts throughout the U.S.; Financial Management maintains the central records for each club and resort on an IBM 4300 series mainframe at its headquarters in Dallas, using a variety of Applied Data Research, Inc.'s (ADR) software tools in conjunction with ADR's Datacom/DB relational data base.

CCA's regional management teams use information provided by the host system to oversee the organization's business, which is segmented into five geographical regions. Traditionally, information had been provided on printed reports, and regional managers would rekey the data from those into their IBM Personal Computer XTs, ATs or Personal System/2s or their Compaq Computer Corp. or Epson America, Inc. IBM-compatible microcomputers.

Now, however, CCA is bridging the gap between Financial Management's mainframe system and the micros of its regional managers using ADR's PC Datacom link. With PC Datacom, managers can tap the mainframe for the data they need, from demographic information to financial data for exception reporting to specialized information such as how many members enjoy horseback riding.

Cautious in his approach to providing nontechnical end users with a micro-to-host querying tool, Stockton evaluated PC Datacom during a nine-month period. His security concerns about access to mainframe data were satisfied with the PC product, because it works in conjunction with another ADR mainframe product, ADR/Datadictionary. The dictionary is able to control requests for data and restrict access down to the data value level.

CCA's Stockton

CCA managers use their micros to formulate their own queries. These queries are passed to ADR/Datadictionary for validation and are then moved to the data base.

Stockton says he regards the step of providing micro-equipped managers with query capability as a necessity, not an option.

"As long as it's controlled, then I'm taking away a large backlog of user demands in a traditional application development sense," he says. "And I'm also giving the front-line managers what they really need to make good business decisions in a timely fashion."

One of the missions of the MIS organization at Campbell Soup Co. in Camden, N.J., is to make data more accessible to users, says Harry Wallaesa, Campbell's vice-president of management information systems.

Furthermore, Campbell is an IBM DB2 site, and the company is committed to the goal of constructing an environment that takes full advantage of the relational data base, including its suitability for ad hoc queries. "I think our commitment to a relational data base is indicative of our commitment to giving users these kinds of facilities," Wallaesa says.

The corporate office at Campbell uses a combination of approximately 800 PC ATs and IBM 3270 workstations tied to two IBM 3090s. IBM's 3270 PC Workstation Control Program is the company's standard micro-to-host link, providing rudimentary file transfer.

The IBM program, according to Wallaesa, also provides a jumping-off point for more sophisticated products used by the firm, such as Micro Decisionware, Inc.'s PC/SQL-Link.

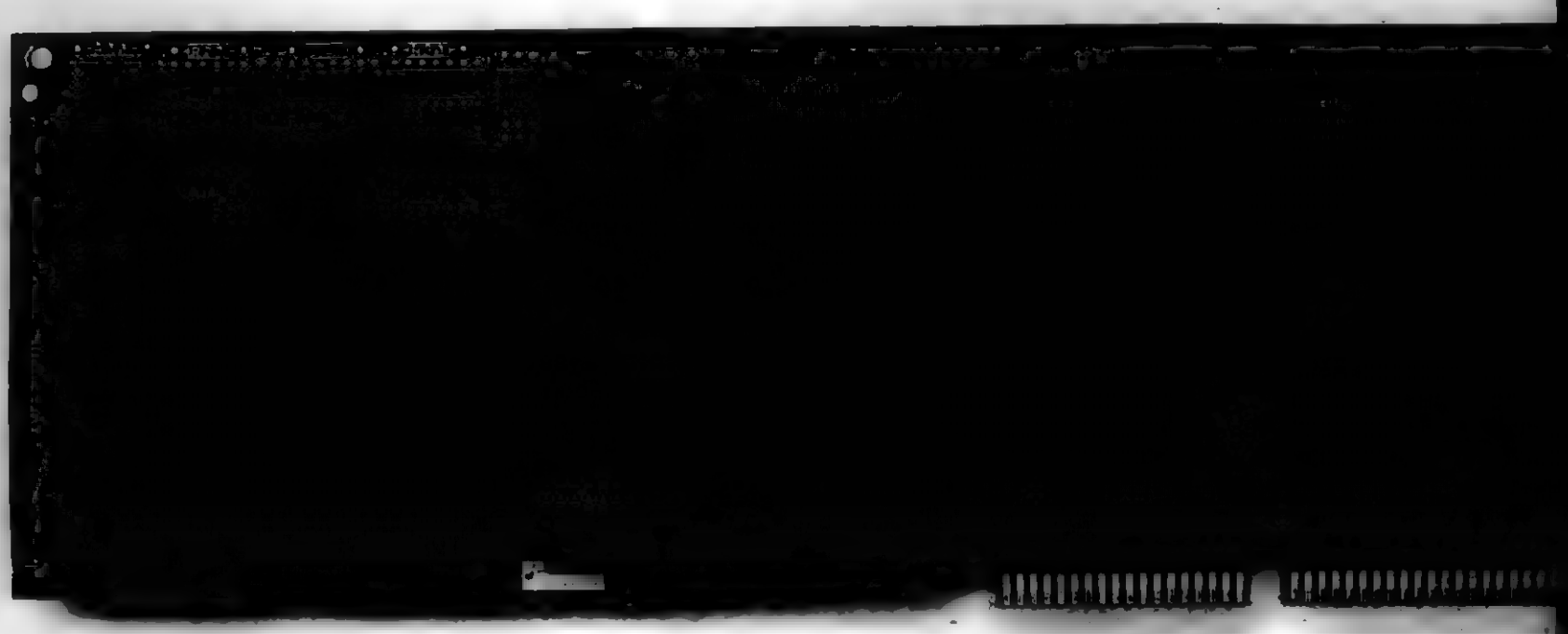
Controlling ownership

Wallaesa's security concerns focus not just on the mainframe-resident data but also on the data drawn from the mainframe and currently residing on the micro. Once on the micro, the data is in an unprotected environment: Security controls are minimal, access is difficult to control, and the data can be "owned" by anyone with an extra diskette.

To help with security at the micro level, Wallaesa is investigating the concept of distributed security administration.

Currently, security is administered by MIS; under distributed security, responsibility would be handed to the end-user departments. Security policies and standards would be clearly defined by the company, but each department would be responsible for setting and enforcing

Robins is a free-lance writer based in Philadelphia.



its own security parameters.

While security at the micro level is still open for discussion, at the mainframe level it seems to be generally well in hand. Tony Bachman, administrator of information services for the city of Columbus, Ohio, reports that mainframe security was not a major concern for him in micro-to-mainframe linking.

Bachman notes that all links to the city's four Unisys Corp. systems — three V380s and one B3955 — must first go through a Unisys CP3680 communications processor on the front end. The communications processor has five levels of security, addressing Bachman's mainframe access concerns.

Today, the city of Columbus has 94 micros, 35 of which are linked to a host with Intercomputer Communications Corp.'s (ICC) The Perfect Mate communications products.

At this point, the link provides emulation and file transfer capabilities via ICC's Intercom 102 emulation software and File Express file transfer packages. While Bachman says he is apprehensive about offering users data base extraction capabilities, he is comfortable with giving those who want to work locally the ability to download files.

One of his major concerns, however, is end users' penchant for products not cleared by his department. According to city regulations, all hardware and software purchases must be approved by a municipal commission. However, some users had been getting around that by buying on their own. Now, controls have been tightened so that nothing can be purchased without first going through the commission.

Columbus's Bachman

For the future, the micro-to-host relationship in Columbus may be on firmer ground: One of the areas Bachman will be exploring is the use of diskless workstations that use the host for all storage. This technology may also help alleviate some of the security concerns at the micro level, since users will not be able to store data locally.

As the concept of the diskless workstation indicates, the responsibilities on each side of the micro/host equation are becoming more clearly defined. MIS executives who have been involved with micro-to-host links through the years are eager to see this definition develop.

The Federal Home Loan Bank of San Francisco has been using micro-to-host links for more than three years. The bank uses Digital Communications Associates, Inc.'s (DCA) Irma and Forte communications products to handle emulation and file transfer requirements for its PC ATs. The bank uses the DCA tools mainly to provide an interface for its IBM Professional Office System (Profs) and to tie the micros into the overall network.

According to Nancy Guglielmotto, administrator of the bank's information center, one of her department's goals is to provide full document transfer capabilities throughout the network. When this is achieved, the responsibility of storing the data will probably fall on the mainframe.

"Right now," Guglielmotto says, "the users have the option of storing their documents wherever they want. But we are looking to implement Profs document handling on the mainframe, which we think will be valuable in controlling their documents."

Giving users easier access to data without their having to worry about managing disks or backing up data is also a major point with Norman Shaw, vice-president of MIS for Toronto's Dylex Ltd., one of Canada's largest retailers. Dylex has been involved with micro-to-host links for several years and uses different products, including McCormack & Dodge Corp.'s PC Link and On-Line Software International, Inc.'s Free-Link, to extract and download data, depending on the file or data base to be accessed. The company maintains an ADR Datacom/DB data base and uses PC Datacom as the micro-to-host link.

Dylex's Shaw

Shaw has been trying to determine when it is best to download data to the micro and when it is best to leave it on the mainframe. For example, he asks, if a user is going to produce a customized report, is it better to produce the report on the micro using micro-based software or on the mainframe using mainframe-based products that can produce the same report?

Many variables need to be considered, but Shaw focuses on two factors. One is the amount of data that needs to be brought down; the other is what the user is ultimately going to do with the data.

If the amount of data requested is large or if the user is only going to browse through the data, he says, it is better left on the mainframe. If the user is going to do something more with the data than just look at it — develop reports or spreadsheets, for example — and if the user is able to select a relatively small amount of data, it is better to download.

Users should benefit from the micro's ease of use, Shaw says, but they should also take advantage of the mainframe's data management capabilities so that they need not be bothered with managing a hard disk, backup or any associated tasks.

"If you marry the micro properly with the mainframe," he says, "you can get the best of both worlds." ■

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A virtual disk-based link on IBM PCs and compatibles. Provides uploading and downloading of files to mainframes under IBM MVS/CICS, TSO and CMS, VSE/CICS and IMS/DC.

The Corporate Tie
A mainframe-to-micro network communications systems operating under IBM MVS/CICS and VSE/CICSthat provides file transfer, interactive menus and a PC-based language. Supports IBM PCs and compatibles.

Pathway Design, Inc.
(617) 237-7722
PCpath SNA-3270/PCpath SNA-3770
A terminal emulation product for connecting IBM PCs or compatibles to host mainframe resources over an IBM Systems Network Architecture network.

Persoft, Inc.
(608) 273-6000
Smarterm
A family of terminal emulation products for linking IBM PCs and compatibles to minicomputer and mainframe systems. All products include error-free file transfer protocols.

Phaser Systems, Inc.
(415) 434-3990
PSAM/Net
An IBM MVS or VM mainframe connectivity system for 3270-attached IBM PCs, PC XTs, ATs or Personal System/2 series micros and compatibles. Includes direct file access to mainframe data sets with PC and host application program interface.

Protocol Computers, Inc.
(818) 880-4900
Smartlink
PC-based software that allows

Continued on page S16

VENDOR VIEWPOINT
The road to global access

BY LEN PALMER

Terminal emulation products and their more capable descendants, micro-to-mainframe links, have played a pivotal role in corporate information processing in its evolution from a centralized DP environment to one that is distributed, or "PC-centric."

Thanks in large part to the continual advances made in that family of products — from basic emulation to application program interfaces, multiple-session capabilities and, most recently, local-area network gateways — personal computers are now becoming the center of distributed processing. The mainframe, meanwhile, is becoming just another resource in corporatewide networks.

PC capacity has increased enormously in recent years, giving micro-to-mainframe link users much higher processing performance.

For example, the current IBM Personal System/2 Model 80, with its 20-MHz Intel Corp. 80386 processor and addressable memory of 4G bytes, exceeds the capacity of many mainframes. Because of this kind of growth, processing that used to take hours can now be done in a matter of seconds.

While PC processing power was increasing, applications like Lotus Development Corp.'s 1-2-3 were being developed, and micro-to-mainframe applications such as Micro Tempus, Inc.'s Tempus-Link were offered.

Another important area of concurrent development has been network technology. In 1976, IBM announced its Systems Network Architecture (SNA), which provides the ability to connect terminals, or workstations emulating terminals, to computers. Along with basic connectivity, the seven-layer model of the SNA protocol stack has dramatically reduced the time required to provide computer solutions. Applications firms can concentrate on their areas of expertise. Graphics, data base and terminal emulation vendors can now offer integrated solutions.

As SNA took shape, LANs entered the marketplace and provided the ability to economically share printers and store files.

The golden gateway

All of these strains of development came together at the evolutionary juncture, where the mainframe became a resource to be shared on the LAN. This was accomplished by extending micro-to-mainframe technology to the LAN through a gateway. Evidence of these gateways' importance to terminal emulation users on the LAN is shown by projections provided by Framingham, Mass.-based International Data Corp. These statistics say installed gateways will increase from 11,000 units in 1986 to 67,500 in 1989.

In the future, global information sharing among PCs will be provided through peer-to-peer communications. IBM has already signaled its intent to support the LU6.2 protocol under Systems Application Architecture (SAA).

In this scenario, PCs, mainframes and other intelligent devices within the SAA environment will communicate with one another with equal facility, no longer bound by the hierarchy of host control.

IBM's plan will permit the off-loading of mainframe processing to other intelligent devices. Worldwide access to these devices will be provided to users through the extension of LAN technology to wide-area networking via peer-to-peer communications.

With SAA, data base access will be possible across a range of computers acting as network nodes. For example, maintaining a distributed parts inventory would be feasible under SAA through the linkage of geographically distant warehouses to the headquarters host.

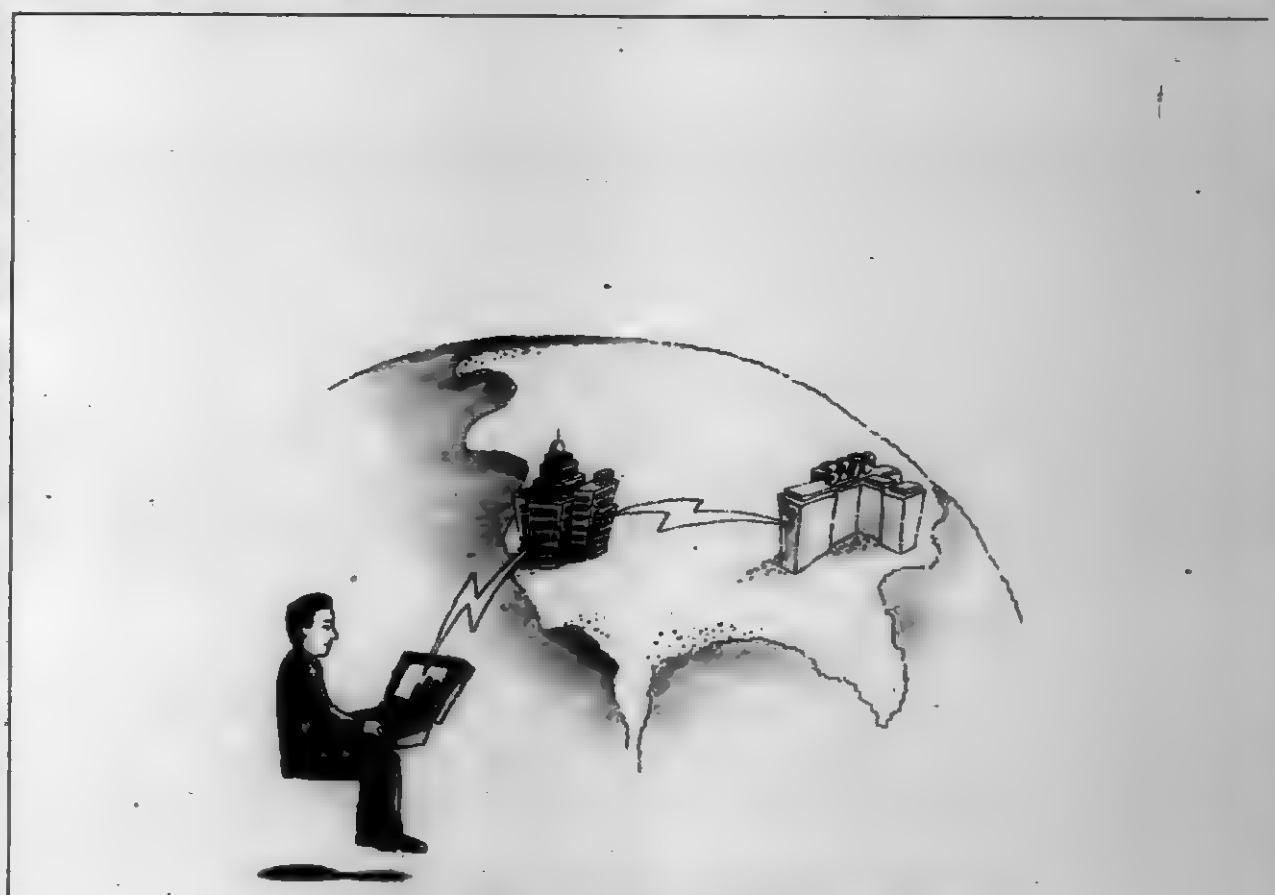
Each local warehouse could maintain its own accurate inventory, based on its time zone and processing schedule. Inquiries about parts availability anywhere on the network would result in systemwide transactions using an SQL-based data base retrieval system.

The number of on-line transactions processed at the central site would be reduced, as the data and inquiries tend to be localized on a particular LU6.2 node even though the data continues to be available to the central computing resource.

As SAA advances, the token-ring network will become the standard connectivity medium. Transmission speeds of 500M bit/sec. are being discussed for future implementation.

The new structure of corporate computing is still evolving and, in fact, will take years to complete. But as micro-to-mainframe links and earlier terminal emulation products helped move PCs into the business environment, future developments in the realm of PC-centrism will build on these foundations. ●

Palmer is vice-president of marketing for the communications division of Novell, Inc. in Mountain View, Calif.



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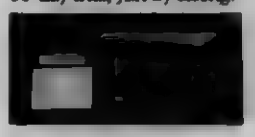

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APIs: Next step to link micros with mainframes

BY MIKE NEW

Application program interfaces (API), which take advantage of the intelligence in personal computers to improve the exchange of corporate information, represent the next logical step in micro-to-mainframe links.

An API allows an application program running on a personal computer to interact with another one on the mainframe and to perform tasks ranging from the simple — such as taking care of routine logon operations — to the sophisticated — such as integrated PC-to-mainframe data base management.

End users as well as vendors are already taking advantage of APIs to tie PCs and mainframes more closely together. As this trend continues, what we've come to know as connectivity will look completely different.

Right now, however, just sorting through the variety of API acronyms and options can be a daunting task. Terms like APPC, HLLAPI and ECF/SRPI are being tossed around as if we all understood them. What are they? And how do you decide which one — if any — is best for you?

The major options

IBM has defined three major APIs for micro-to-mainframe links: Advanced Program-to-Program Communications (APPC), Enhanced Connectivity Facilities/Server-Requester Programming Interface (ECF/SRPI) and High-Level Language Application Program Interface (HLLAPI).

APPC and ECF/SRPI both require special applications software on the mainframe. They were designed for new applications and will be used most often by vendors offering highly integrated micro-to-mainframe application products.

HLLAPI does not require special mainframe software; it was designed for use with existing mainframe applications such as order entry, payroll and inventory. In this case, the PC provides all of the enhancements, and nothing is disturbed on the mainframe.

Realistically, a company could end up using all three of these APIs. They are not mutually exclusive, and each one possesses unique strengths.

Of the three, APPC is the interface most talked about, because it represents the ultimate realization of the concept. But while there is no question that APPC, with the comprehensive set of functions it offers, is a powerful API, actual implementation may be a long and expensive process.

APPC requires the LU6.2 protocol, which differs considerably from the 3270 LU2 protocol that now predominates. APPC and LU6.2 are based on a peer-to-peer architecture, in which computing power is distributed throughout the network, and any processor, including the personal computer, may initiate and control sessions.

Current mainframe applications, however, were probably designed to talk to IBM 3270 terminals; all of the intelligence and session control is in the host. Likewise, major IBM subsystems such as CICS and IMS have been designed to support the 3270.

The changeover to APPC is complex and probably out of the question for current applications. APPC applications should be designed from the ground up in order to take advantage of distributed processing.

To make things easier, IBM introduced ECF/SRPI. Like APPC, ECF/SRPI requires special software on both the PC and the mainframe, but it stops short of peer-to-peer protocols. Instead, it uses the familiar 3270 protocol to exchange information between PC and mainframe applications.

Once again, rewriting applications to use ECF/SRPI is probably not feasible, but doing so protects the investment in the 3270 protocol. The terminal drivers in CICS, TSO, CMS and so on are still useful, as are current VTAM, ACF/NCP and 3074 series control units.

IBM's first round of Enhanced Connectivity Facilities, introduced last fall, uses ECF/SRPI to allow mainframe resources to be treated as extensions of the PC. The virtual-disk facility allows mainframe disk storage to be accessed using common

JUST sorting through the variety of API acronyms and options can be a daunting task. Terms like APPC and HLLAPI are being tossed around as if we all understood them.

New is vice-president of marketing at Attachmate Corp. in Bellevue, Wash.

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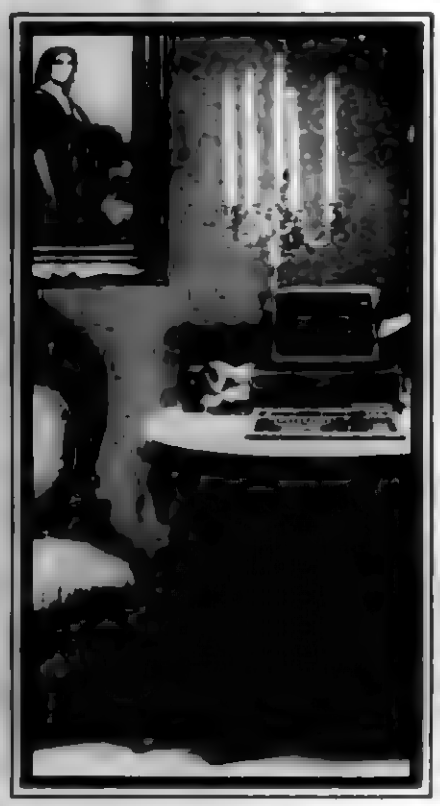

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- **Improve Application Usability:** Screens can be enhanced with help functions, color and easy to understand labels. This makes them easier to use and also reduces the learning curve for new and temporary employees.
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INFRONT also has an automated runtime process that allows it to immediately recognize which 3270 screens have PC-based forms. If there is a PC-based form INFRONT will display it, otherwise the original 3270 screen will be displayed. This means that you don't have to convert all of the 3270 screens in an application in order to use INFRONT. You only convert the screens that need to be converted. In short, INFRONT can move your use of the PC into a new realm, the realm of cooperative processing.

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DOS commands. Virtual print makes high-speed mainframe printers appear as PC-connected printers. Virtual file facility provides a simple mechanism for translating files between PC and mainframe formats.

IBM has also indicated that these ECF/SRPI applications will migrate to APPC.

If you are not quite ready to scrap your current payroll system and rewrite it for APPC or ECF/SRPI, HLLAPI may be the best choice. With some simple PC programming, you can reap substantial increases in productivity without ever touching the host software. HLLAPI uses the PC's intelligence to improve the way people work with the mainframe while still looking like a basic 3270 terminal to the host applications.

The concept of HLLAPI is simple: What the user sees on the PC screen can be different from what the mainframe presents. Instead of a complicated logon, for example, the PC user might simply select a task from a menu. The HLLAPI would then perform all the mainframe transactions necessary to complete the task.

Whether users see these transactions or something completely different is up to MIS. It's a great way to breathe new life into hard-to-use mainframe programs — without changing a single line of code.

When used with 3270 software with multisession capability, HLLAPI provides the means to integrate separate mainframe applications. If, for example, order entry and inventory applications are on different systems, the personal computer can be used to combine the information into one simplified screen — once again, without mainframe reprogramming.

HLLAPI was first introduced with the IBM 3270 Personal Computer and has since gained considerable popularity. It allows PC programs written in high-level languages like Cobol, Pascal, C or Basic to interact with the mainframe. HLLAPI remains available for use with 3270 emulation programs from IBM and Attachmate Corp. and will be included with OS/2 Extended Edition.

WHILE THERE IS no question that APPC, with the comprehensive set of functions it offers, is a powerful API, actual implementation may be a long and expensive process.

APPC, ECF/SRPI and HLLAPI will play important roles in future products from IBM. Some time remains before APPC becomes viable, but both ECF/SRPI and HLLAPI can offer solutions today. Of the two, HLLAPI is the clear choice for improving existing mainframe applications.

All three APIs have one thing in common: They go beyond basic terminal emulation and put the PC processor to work in ways that make good business sense. •

Ask the vendor about . . .

- IBM-compatible personal computers, portables and laptops
- Printers
- Data communications
- Computer-aided software engineering products

Upcoming issues of Spotlight will explore these subjects. We invite readers to submit vendor-specific questions in these areas so we can obtain the answers for you and for others with similar concerns.

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COMPANY	PRODUCT	PROTOCOLS SUPPORTED	MICROCOMPUTERS SUPPORTED	HOST SYSTEMS SUPPORTED	TYPES OF TERMINAL EMULATION	NUMBER OF SYNCHRONOUS PORTS	NUMBER OF ASYNCHRONOUS PORTS	TRANSMISSION MODE	BIDIRECTIONAL	SPEED CONVERSION	MODE CONVERSION	INTERFACE CONVERSION	ON-BOARD PROCESSORS	OFFERS MENUS	SECURITY FEATURES	PRICE
[illegible]	CP-100	[illegible]	IBM PC, XT, AT and compatibles	[illegible]	[illegible] printer	0	2	[illegible]	Yes	Yes	Yes	Yes	Yes	Yes	NP	$1,195
	Adapter PC	[illegible]	IBM PC, XT, AT and compatibles	[illegible]	[illegible] printer	0	2	[illegible]	Yes	No	No	No	No	Yes	NP	$795
	CP-200	[illegible]	IBM PC, XT, AT and compatibles with some emulation limits	[illegible]	None	0	1	[illegible]	No	Yes	Yes	Yes	No	Yes	NP	[illegible]
Apple Computer, Inc. (408) 996-1010	AppleLine Protocol Converter	Coax RS-232 serial cable	Macintosh Line, Apple III	IBM 3274, 3276 controllers	IBM 3278 Model 2	NP	NP	Asynch	Yes	NP	NP	NP	NP	NP	NP	$1,295
[illegible]	CB70	[illegible]	IBM PC and compatibles	[illegible]	[illegible]	1 or 2	1 or 2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	No	Optional	From [illegible]
	CB90	[illegible]	IBM PC and compatibles, any asynch terminal	[illegible]	[illegible]	1 or 2	1 or 2	[illegible]	No	Optional	No	Yes	Yes	No	Optional	From $2,490
AT&T (800) 367-1212	AT&T 4251 Flex Protocol Converter	IBM 5250 SNA/SDLC[1]	Any ASCII device	IBM System/34, 36, 38	IBM 5250 SNA/SDLC	NP	4, 8, 16, 24 or 32	Synch, asynch	Yes	NP	NP	No	NP	Yes	Modem autocall-back, autologon, definable security password for control port	$3,875-$10,580
	AT&T 4271 Flex Protocol Converter	IBM 3270 BSC	Any ASCII device	Any IBM bisynch	IBM 3271 control unit, IBM 3277, 3278 terminals, IBM 3286 printers	NP	4, 8, 16, 24 or 32	Synch, asynch	Yes	NP	NP	No	NP	Yes	Modem autocall-back, autologon, definable security password for control port	$4,055-$10,705
	AT&T 4276 Flex Protocol Converter	SNA/SDLC	Any ASCII device	IBM 3705, 3725, 4331, 8100 front-end processor	IBM 3278 terminals, 3278 printers	NP	4, 8, 16, 24 or 32	Asynch	Yes	NP	NP	No	NP	Yes	Modem autocall-back, autologon, definable security password for control port	$3,875-$10,520
[illegible]	Synet PC Card	[illegible]	IBM PC and compatibles	[illegible]	[illegible]	1	15	[illegible]	Yes	Yes	No	No	Yes	Yes	[illegible]	[illegible]
Avatar Technologies, Inc. (617) 438-6872	PA 100G	SNA/SDLC	IBM PC, XT, AT and compatibles	IBM 360, 370, 3080, 3090 series, 4300 series	IBM 3278 Models 2, 3, 4; IBM 3279 Models 2A, 2B, 3A, 3B	NA; IBM plug-in card	NA; IBM plug-in card	Coax Type A	Yes	NA	NA	NA	No	Yes	Password	$479
	PA 100SG	SNA/SDLC	Any supporting asynch communications	IBM 360, 370, 3080, 3090 series, 4300 series	IBM 3278 Model 2	NA	2	Asynch, Coax Type A	Yes	Yes	No	No	Yes	Yes	Password	$995
	Macmainframe DX	SNA/SDLC	Macintosh 512KE and higher models	IBM 360, 370, 3080, 3090 series, 4300 series	IBM 3278 Model 2	NA	2	Asynch, Coax Type A	Yes	Yes	No	No	Yes	Yes	Password	$1,195
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2	NP	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	None	1	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	NP; 1 token	Up to 7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Cimmetron, Inc. (301) 721-3000	The CX-80 Data Exchange	SNA, SDLC, bisynch, X.25 (asynch and NCP Packet Switching interface)	Any with DEC VT100 emulation or via Irma boards	IBM 3270	NA	2 or 4	5 to 45	Asynch, synch, Coax Type A	Yes	Yes	Yes	Yes	Yes	Yes	Password protection, screen resource control and restrictions	$5,995-$15,000
[illegible]	Micro/E	[illegible]	Any	[illegible]	[illegible]	1	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	PC Companion	[illegible]	IBM PC and compatibles	[illegible]	[illegible]	1	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Datagram Corp. (800) 258-8030	DM803TTY/ DM807TTY	Asynch ASCII, Unisys poll and select	Any	Unisys A series, medium- and small-scale systems	None	1	3 or 7	Asynch	Yes	Yes	Yes	Yes	Yes	Yes	None	$1,795-$3,495
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Fibronics International, Inc. (617) 778-0700	PC3001	IBM to RS-232	Any with RS-232 interface	IBM	DEC VT100 emulated	0	1	Asynch	Yes	Yes	Yes	Yes	Yes	Yes	None	$800
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1	7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[1]SNA character stream [2]IBM Systems Network Architecture [3]IBM Binary Synchronous Communications [4]Synchronous Data Link Control [5]Display System Protocol [6]Qualified Link-Level Control [7]Asynchronous Packet Assembler/Disassembler [8]High-level data link control [9]Binary Coded Decimal [10]Burroughs Corp. Two-Wire Direct Interface [11]Airline line control [12]Transmission Control Protocol/Internet Protocol

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. When a vendor is unable to provide specific information about its product, this is designated NP (not provided). When a question does not apply to a vendor's product, this is designated NA (not applicable). Further product information is available from the vendors.

COMPANY	PRODUCT	PROTOCOLS SUPPORTED	MICROCOMPUTERS SUPPORTED	HOST SYSTEMS SUPPORTED	TYPES OF TERMINAL EMULATION	NUMBER OF SYNCHRONOUS PORTS	NUMBER OF ASYNCHRONOUS PORTS	TRANSMISSION MODE	BIDIRECTIONAL	SPEED CONVERSION	MODE CONVERSION	INTERFACE CONVERSION	ON-BOARD PROCESSORS	OFFERS MENUS	SECURITY FEATURES	PRICE
IBM (Contact local IBM dealer)	IBM 3299 Network Connection Unit	SDLC/async	IBM PC, PS/2	IBM 370, 4300, 3090 series, System/36, 38, 8100	IBM 3270, 3279 as Model 3278 Models 81C, 61C	1 or 2	8 or 9	Synch, async	Yes	Yes	Yes	Yes	Yes	Yes	Password protection, session termination or disconnect	$4,860
	IBM 3174 Subsystem Control Unit, Async, Emulation Adapter	SDLC, BSC, async, channel attach	IBM PC, PS/2	IBM 370, 4300, 3090 series, System/36, 38, async	IBM 3270, 3101, DEC VT 100	32	Up to 24	Synch, bisynch, async	Yes	Yes	Yes	Yes	Yes	Yes	Password protection, session termination or disconnect	From $8,300
	IBM 8370 Information System, ASCII Emulation Controller	Async	IBM PC, PS/2	IBM 8370	IBM 3270	0	16 per adapter	Async	Yes	Yes	Yes	Yes	Yes	Yes	DP	$925 per card
	IBM 7171 ASCII Device Attachment Control Unit	Async	IBM PC, PS/2	IBM 370, 4300	IBM 3270, 3270 Model 10	0	16 to 64	Async	Yes	Yes	Yes	Yes	Yes	Yes	Password protection, operation control	From $12,420
Ungermann-Bass, Inc. (415) 769-7717	IC 100 series	SNA, BSC, async, X.25, ALC[1]	IBM PC and compatibles	All Tandem, Unisys, NCR, DEC, AT&T, HP mini- and mainframe-class CPUs	DEC VT100, IBM 3270, ASCII, ALC	1 to 4	1 to 4	Synch, async	Yes	Yes	Yes	Yes	Yes	Yes	None	$12,500
[illegible] Systems, Inc. [illegible]	[illegible]	Coax Type A	IBM PC and compatibles	IBM 3274 controller and compatibles	IBM 3287 printer	1	1	DP	No	Yes	Yes	NA	Yes	No	DP	$1,395
Integrated Design Engineering, Inc. (314) 343-6006	IDE Excel	NCR 301	IBM PC, XT, AT, 3390 workstation; NCR PC 6, 7, 8	NCR 8600	NCR 796-301; ADDS Viewpoint Plus	0	1 to 4	Async	Yes	Yes	Yes	Yes	Yes	Yes	Multilevel security	$1,850
[illegible], Inc. (714) 660-1811	[illegible] 3000, 4000	IBM PC to ASCII	Any ASCII type	IBM System/36	IBM 3287	1	1	Synch, async	No	No	Yes	Yes	Yes	Yes	None	Under $500
JBM Electronics Co. (314) 731-7781	MAPC-3270	IBM 3270 SNA/SDLC, BSC	IBM PC and compatibles	IBM	IBM 3270	1	Up to 16	Synch, async	Yes	Yes	Yes	Yes	Yes	Yes	Password, logon and logoff messages, dial-back security, inactivity timers	From $1,495
	MAPC-Tandem	HP	IBM PC and compatibles	Tandem	IBM 6530	1	16	Synch, async	Yes	Yes	Yes	Yes	Yes	Yes	Dial-back security, password, logon and logoff messages	From $1,595
	MAPC-Univac	Universal Terminal System and Uniscope synch	IBM PC and compatibles	Univac	Universal Terminal System	1	16	Synch, async	Yes	Yes	Yes	Yes	Yes	Yes	Dial-back security, password, logon and logoff messages	From $1,595
[illegible] Microprocessing Associates (800) 99-[illegible] (714) 770-[illegible] (CalBL)	Hawk	Async, Channel Attach	Any ASCII type	IBM 360, 370, 4300, 3000, 3090 series	IBM 3270	0	8 to 64	Async	Yes	Yes	Yes	Yes	Yes	Yes	Call-back, multilevel password, passive logoff	$4,995-$10,950
KNW Systems Corp. (512) 338-3000	Series II HASP	BSC	Apollo workstation	Mainframes running IBM protocols	IBM 360 RJE workstation	1	Up to 8	Synch, async	Yes	Yes	Yes	Yes	Yes	Yes	None	From $4,595
	Series III Coax	SNA LU.1 or LU.2, BSC, DSC, SCS, Datastream	IBM PC and compatibles	IBM 3274, 3174, 3276 or compatibles	IBM 3278 printers	1	1	Synch, async	Yes	Yes	Yes	Yes	Yes	Yes	None	$1,295
	Series III Twinax	IBM twinax	Macintosh, IBM PC and compatibles	IBM System/34, 36, 38	IBM 5291, 5251, 5225, 5256, 5219 printers	1	1	Synch, async	Yes	Yes	Yes	Yes	Yes	Yes	None	$1,195
	Series II Twinax	IBM twinax	Macintosh, IBM PC and compatibles	IBM System/34, 36, 38	IBM 5291, 5251, 5225, 5256 printers	1	Up to 7	Synch, async	Yes	Yes	Yes	Yes	Yes	Yes	None	$1,495-$3,595
	Series II 3770	SDLC	IBM PC and compatibles	Mainframes running IBM protocols	IBM 3776, 3777	1	Up to 8	Synch, async	Yes	Yes	Yes	Yes	Yes	Yes	None	From $4,595
	Series II 3270	SNA, SDLC, BSC	IBM PC and compatibles	Mainframes running IBM protocols	IBM 3278, BSC 3271, IBM 3270 printers	1	Up to 8	Synch, async	Yes	Yes	Yes	Yes	Yes	Yes	None	From $1,495
	Series II IBM 2780, 3780	BSC	IBM PC and compatibles	Mainframes running IBM protocols	IBM 2780 or 3780 RJE workstations	1	Up to 3	Synch, async	Yes	Yes	Yes	Yes	Yes	Yes	None	From $1,995
Lee Data Corp. (708) 498-8282	8000 series	SNA, SDLC, BSC	IBM PC and compatibles	IBM 4300, 3090, 3080 series	IBM 3270	32	32	Synch, asynch	Yes	Yes	Yes	Yes	No	DP	Multilevel password	$6,000-$10,000
Local Data, Inc. (213) 330-7126	Datalynx/3174	SNA, BSC, async	IBM PC and compatibles	IBM 370, 3080, 3090, 4300 series; any ASCII minicomputer	IBM 3278, 3279, 3178, 3179	2	4 to 32	Synch, async	Yes	Yes	Yes	Yes	Yes	Yes	Inactivity timer for sessions, LU passwords	$3,000-$10,500
	Datalynx/3274	SNA, BSC	IBM PC and compatibles	IBM 370, 3080, 3090, 4300 series	IBM 3278, 3279, 3178, 3179	2	3 to 9	Synch, async	Yes	Yes	Yes	Yes	Yes	Yes	Inactivity timer for sessions, LU passwords	$4,888-$9,375
	Datalynx/5251	SNA, async	IBM PC and compatibles	IBM System/34, 36, 38	IBM 5251 Model 12, 5294	2	3 to 9	Synch, async	Yes	Yes	Yes	Yes	Yes	Yes	Inactivity timer for sessions, LU passwords	$3,000-$6,000
	Interlynx/5251	IBM twinax, async	IBM PC and compatibles	IBM System/34, 36, 38	IBM 5251 Model 11	1 twinax port	1 to 7	Twinax, async	Yes	Yes	Yes	Yes	Yes	Yes	Passwords available for System/34, 36, 38 connection, reconnection, configuration	$1,500-$3,350
Micom Systems, Inc. (800) MICOM-US	MIS-SNC, MIS-BPC	BSC, SNA/SDLC	IBM PC and compatibles	Any supporting IBM 3270 protocol	IBM 3270 Model 2, 3278, 3279	1	4, 16 or 32	Synch, asynch	Yes	Yes	Yes	No	Yes	Yes	Logon and logoff messages, callback option, time-out disconnect, passwords	$2,000-$6,500
Modem[illegible], Inc. (404) 488-3232 (ext. 12)	Snap	BSC, SNA	Any	Any	Any ASCII type	1	1	Synch, async	Yes	Yes	Yes	Yes	Yes	Yes	None	$1,395-$1,625
	Microsnap	BSC, SNA	IBM PC and compatibles through 80386 type	Any IBM BSC or SNA system	NA; PC-specific	1	1	Synch, async	Yes	Yes	Yes	Yes	Yes	Yes	None	$995
[illegible] Corp. (813) 539-[illegible]	Coaxial Integrated Protocol Converter	Asynch passthrough, BSC 3270	Any with ASCII terminal emulation	IBM full compatibles	48 asynch terminals	1	20	Asynch 9.6-19.2	Yes	No	No	No	Yes	Yes	Password protection, DOS queue flushing, status menu on disconnect, inactivity time-out	$6,395-$13,450
Netlink, Inc. (818) 878-6618	SNAgate	SNA, SDLC	Any PC with DSC or IBM emulator	IBM running MVS or DOS	DEC VT100, VT220, IBM 3101, 3270/BSC cluster controller	Up to 8	Up to 16	Synch	Yes	Yes	Yes	No	Yes	Yes	Password	$4,000-$8,000

COMPANY	PRODUCT	PROTOCOLS SUPPORTED	MICROCOMPUTERS SUPPORTED	HOST SYSTEMS SUPPORTED	TYPES OF TERMINAL EMULATION	NUMBER OF SYNCHRONOUS PORTS	NUMBER OF ASYNCHRONOUS PORTS	TRANSMISSION MODE	BIDIRECTIONAL	SPEED CONVERSION	MODE CONVERSION	INTERFACE CONVERSION	ON-BOARD PROCESSORS	OFFERS MENUS	SECURITY FEATURES	PRICE
Packet/PC, Inc. (800) 672-2861	Packet/3270	SNA	IBM PC and compatibles	IBM systems running MVS/VM; System/34, 36, 3270	IBM 3270	NA; reference only	NA; reference only	Asynch	Yes	Yes	Yes	Yes	No; 8-16 MHz 8/16	Yes	Optional data encryption and session ID	$995
Potrero Electronics Co. (301) 975-1000	Model 220 RS-232 to V.35 Converter	Transparent	Any using RS-232C or V.35	Any using RS-232C or V.35	NA	NA	2	Synch. full- or half-duplex data rates to 2048K bit/sec.	Yes	No	No	Yes	No	No	None	$275
	Model 221 RS-232 to V.21 Converter	Transparent	Any using RS-232C or X.21	Any using RS-232C or X.21	NA	2	NA	Synch	Yes	No	No	Yes	No	No	None	$275
	Model 222 RS-232 to V.36 Converter	Transparent	Any using RS-232C or X.21	Any using RS-232C or X.21	NA	2	NA	Synch	Yes	No	No	Yes	No	No	None	$360
PCI, Inc. (Subsidiary of Technology Dynamics Inc.) (617) 890-4400	Connect Series 200	Intel	IBM PC, XT, AT and compatibles	IBM 360, 370 SNA with front-end NCP Packet Switching Interface	IBM 3270, SNA controller	NP	NP	Asynch	Yes	Yes	NP	NP	NP	Yes	Automatic file transfer/control	NP
	Connect Series 300	SNA/SDLC, BSC	IBM PC and compatibles	IBM System/34, 36, 38	IBM 3270, 3270	NP	NP	Asynch, synch	Yes	Yes	Yes	Yes	NP	Yes	Asynch, synch, Kermit	NP
Quadramation, Inc. (800) 345-4182 (412) 741-3083 (Pa.)	Q-8000 series	HDLC/SDLC X.25, BSC, RS-232 asynch, Ethernet	Any supporting RS-232 asynch-remote port	Any supporting RS-232 asynch-remote port	None	2	8	Synch, asynch	Yes	Yes	Yes	Yes	Yes	Yes	None	NP
Rycom Corp. (313) 426-5544	7100 Gen	SNA/SDLC, BSC, asynch, X.25	Any	IBM 360, 370, 3000 series, 4300 series, IBM 9370	IBM 3274 Models 1C, 2C through 61C, 3767, 3270, 3279	2	Up to 32	Synch, bisynch, asynch, X.25	Yes	No	No	No	Yes	Yes	Optional operator password protection, dial-back security for communications interface	$7,495-$15,795
Sadas Corp. (408) 986-1000	Rainbridge 5250 Link Protocol Converter	IBM 5250 twinax	IBM PC, XT, AT and compatibles, PS/2	IBM System/34, 36; IBM 5294 Remote Control Unit	IBM 5291 display; IBM 5256 printer	NA	7 per twinax attachment; 2 attachments per CBX card set	Asynch	Yes	Yes	No	Yes	Yes	Yes	Automatic lockout, power-on self test, password protection	NP
Spoch, Inc. (800) 538-9316	6000, 6002, 6050	TCP/IP*, Syncnet, Novell, Ethernet, Xerox Network Systems	IBM PC, XT, AT and compatibles; Apple	Any ASCII or IBM host	Any ASCII, any IBM 3270 Coax Type A	NA	Up to 16,000 access nationwide	Asynch	Yes	Yes	Yes	Yes	Yes	Yes	Password protection, access control, data encryption	$5,000-$9,000
3Com Corp. (800) NET-3COM (408) 562-6400 (Calif.)	CS/1-SNA	SDLC/3270	Any	IBM 370 and compatibles	NP	1	Up to 48	Synch, asynch	Yes	Yes	Yes	Yes	Yes	Yes	User access control, dedicated and pooled LUs	$11,500
3COM, a Bell Microproducts, Inc. company (510) 249-0900	TapeNetwork	AppleTalk	IBM PC, XT, AT and compatibles running DOS	Mix; distributed file network	NP	0	0	Fiber-optics, twisted-pair, AppleTalk cabling	Yes	Yes	NA	Yes	Yes	Yes	Password, read-only/write-only	$999-$2,999
Tri-Data Systems, Inc. (408) 746-2000	Netway 1000	BSC, SNA	Macintosh, IBM PCs on AppleTalk or Phonenet	IBM mainframes with 3270 architecture	IBM 3278	1	0	Synch	Yes	Yes	NA	NA	Yes	Yes	Password connect special workstation to special LU	$3,195
	Netway 1100	BSC, SNA, SDLC, Unisys poll and select, ASCII point-to-point, EBCDIC, EBCDIC BCD, others	Any	Any using aforementioned protocols with lines to 56K	DEC VT100, IBM 3270, SSI interface	4	Up to 128	Synch, asynch	Yes	Yes	Yes	Yes	Yes	Yes	Password security	$900-$1,000 per user
Unit Data, Inc. (800) 433-3288 (800) 882-0777 (Illinois)	DCP II Models 6, 10, 15	SNA, SDLC, BSC (3270, 5250 (SNA)	Any PC running MS-DOS	IBM System/36, 38, IBM 360, 370	IBM 3270, 3270	1 to 5	6, 10 or 15 per line	Synch, asynch	Yes	Yes	Yes	No	Yes	Yes	Optional dial-back mode	$1,995-$5,995
	Emugate/PC	SNA, SDLC, BSC (3270, 5250 (SNA)	IBM PC, XT, AT and clones	IBM System/36, 38, 360, 370	IBM 3270, 3270	3 or 5 ports per card	1 to 8 per card	Synch, asynch	Yes	Yes	Yes	No	Yes	Yes	Optional dial-back mode	$1,395-$1,595
Westerholzer, Inc. (313) 663-3662	Datastaller	3270/BSC, 3270/SNA, 3780/BSC	IBM PC and compatibles under MS-DOS or Unix, IBM PS/2	Any IBM 3270-based architecture	IBM 3270, 3279	1	1 to 8	Synch	Yes	No	Yes	Yes	Yes	Yes	None	$995-$2,395
Wren, Inc. (813) 971-8000	Universal Interface	All except SDLC	Any	Any	IBM 3270, 2780, any ASCII	8	4	Synch, asynch	No	Yes	Yes	Yes	Yes	No	None	$3,500-$4,000
	X3000 Interface	All except SDLC	Any	Any	IBM 3270, 2780, any ASCII	8	32	Synch, asynch	Yes	Yes	Yes	Yes	Yes	Yes	Passwords	$7,000-$14,000

Link software

FROM PAGE S10

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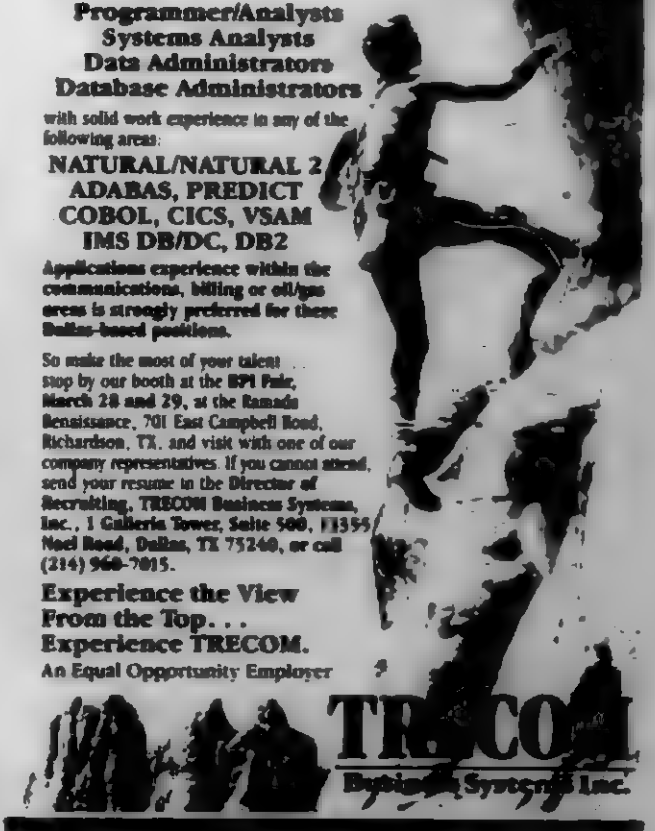

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data processing

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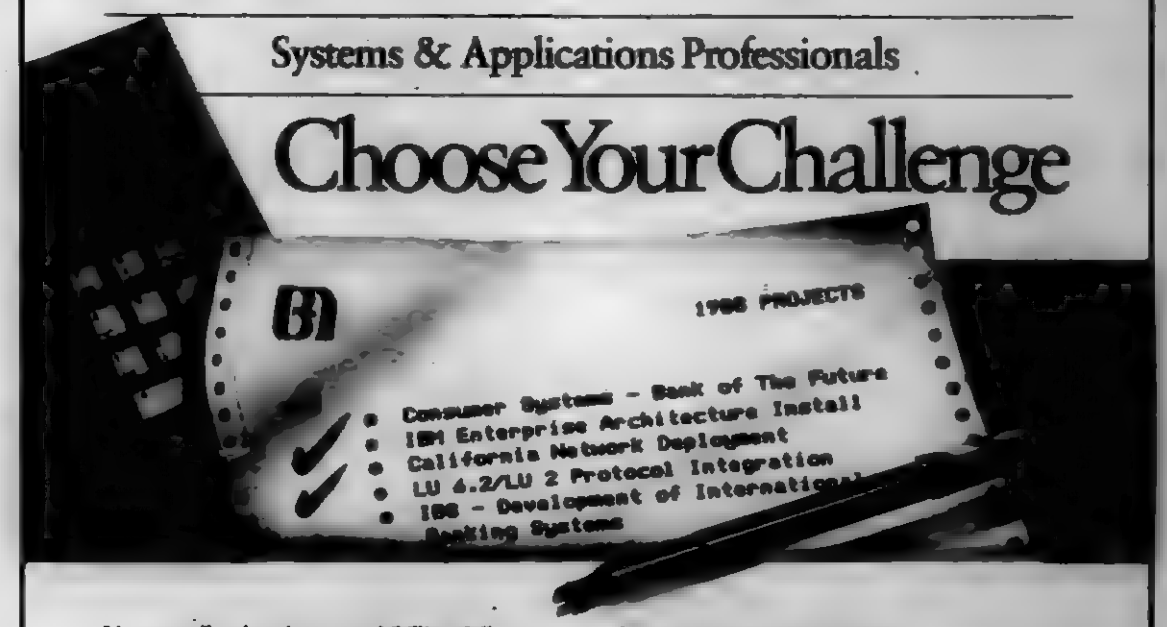

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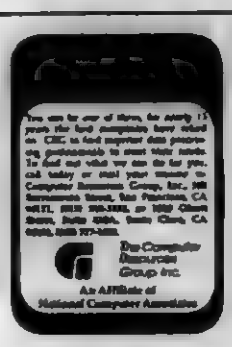

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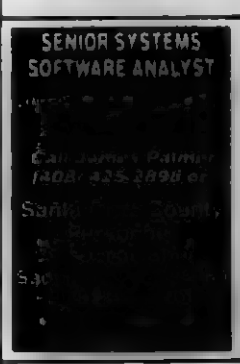

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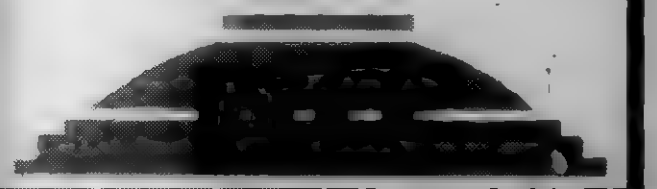

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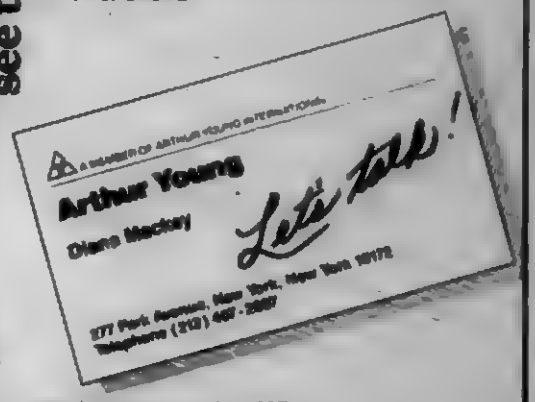

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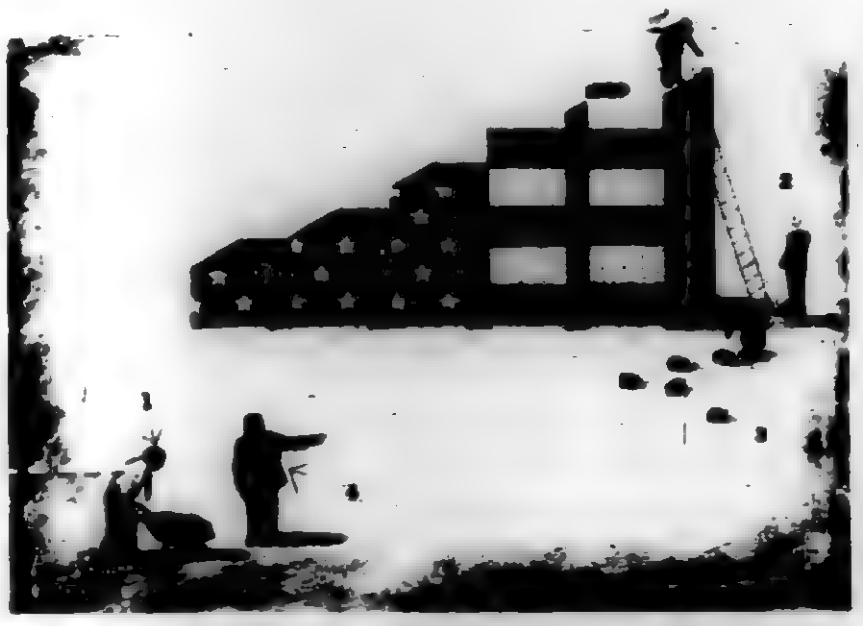

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MARKETPLACE

Rumors sour Apple market

Uncertainty about discontinuation of Mac Plus keeps buyers away

BY CAMERON HALL
BOSTON COMPUTER EXCHANGE CORP.

The upbeat mood of the market the week of March 11 has been lost amid uncertainty and falling prices in the Apple Computer, Inc. Macintosh market. Rumors of the discontinuation of the Macintosh Plus worked to lower the machine's prices, and the availability of Macintosh SE upgrades kept buyers on the sidelines as prices kept dropping.

Micro managers with older Macintosh models and retail chains with new inventory were both coming into the market to sell. "Sliding down" was the phrase used to describe the bids one corporate seller got as he offered many Mac Plus machines for a quick sale. His hopes for cash to purchase Mac SE upgrades faded as many sellers offered their Mac Pluses in a buyer's market. The trading motto for the week was "Sell low before you have to sell lower."

Traders in the IBM market were still looking for the IBM Personal Computer AT Model 339s and IBM XT 089s that were rumored to be in the West and the Midwest. It turned out that they were not True Blue models at all.

The purchasing agent for a large value-added reseller with government and Fortune 100 clients footnoted her frustrated search for machines by saying, "Ninety-five percent of my clients are only interested in discontinued IBM and Compaq models."

AT still machine of choice

Major consulting groups say the machine of choice for the average corporate user is still the PC AT: It is fast enough for today and allows users to keep the OS/2 — IBM and Microsoft Corp.'s next-generation operating system — option open for later developments.

The question in the minds of most confused IBM micro buyers is whether there really will be applications that make it worthwhile to switch to the hardware of IBM's Personal System/2.

Most word processing workers and spreadsheet users are asking, Do I really need to multitask when I can really only do one thing at a time?

On the IBM floor, the AT Model 339 closed down $150, at $3,300. Also down for the week ended March 18 was the AT Model 099, which closed at $2,400. PC XT machines traded steadily all week: The XT Model 089 was down $175, to $1,625, after previous pressure on prices brought sellers to the market. The XT Model 086 closed at $1,300 under favorable supply conditions, and the XT Model 3270 was changing hands at $1,400. The standard of standards for all users, the IBM PC, was down $75 to $850.

Business as usual

The Compaq Computer Corp. market was strong all week. Steady demand continues for these machines, which have not made their users face the OS/2 dilemma.

The original Portable I closed at $850, up from the previous week's $800, while the Portable II system with a 20-MHz drive closed at $2,150. The Deskpro 286 closed up $75 at $2,475 as buyers switched from the higher priced IBM AT Model 239.

In the Macintosh market, new Mac SE equipment was discounted as low as $2,200, which drove prices of the used equipment down $50 to $1,800 by week's end. The Mac Plus supply dropped to the recent low of $1,250, and the 512E was also down slightly, at $1,000. The Mac II market remained at $4,000 in light trading.

The Boston Computer Exchange can be reached at 800-BOCOEXX or 617-542-4414 in Massachusetts.

The BoCoEx Index

Closing prices report for the week ending March 18, 1988

	Closing price	Recent high	Recent low
IBM PC Model 076	$850	$925	$650
XT Model 086	$1,300	$1,425	$1,150
XT Model 089	$1,625	$1,800	$1,500
XT Model 3270	$1,400	$1,500	$1,000
AT Model 099	$2,400	$2,450	$1,950
AT Model 239	$2,750	$2,750	$2,660
AT Model 339	$3,300	$3,450	$3,200
Compaq Portable I	$850	$925	$750
Portable II	$2,150	$2,250	$1,825
Portable III	$2,725	$3,000	$2,675
Plus	$1,300	$1,400	$1,275
Deskpro Model 2	$1,600	$1,800	$1,600
Deskpro 286	$2,475	$2,475	$2,050
Deskpro 386	$4,000	$4,000	$3,600
Apple Macintosh 512E	$1,000	$1,075	$800
Plus	$1,250	$1,300	$1,100
SE	$1,800	$2,200	$1,800
II	$4,000	$4,200	$3,500
AT&T 382	$4,500	$4,500	$3,500
DEC Rainbow 100+	$600	$750	$600
Hewlett-Packard Laserjet	$875	$950	$800

INFORMATION PROVIDED BY THE BOSTON COMPUTER EXCHANGE CORP.

Users seem eager to follow DEC growth path

BY KARLYN KILROY
IDC FINANCIAL SERVICES CORP.

The Digital Equipment Corp. marketplace has been fairly active recently. It seems as though more and more users are getting involved with DEC equipment. This is a result of DEC voicing its future plans and reassuring users that it will continue to provide new growth paths for them. DEC has done this by introducing products with better price/performance than had previously been offered.

Although activity in the secondary market has increased, it appears that DEC is trying to obtain every possible sale.

According to industry sources, whenever DEC hears of a deal, it underbids dealers by as much as it has to to win the deal. Although this is not favorable for dealers and lessors, it results in DEC having a sale and the end user receiving a better deal.

Current fair market values for DEC's VAX 11/730, 11/750 and 11/780 lines have been decreasing gradually, with the exception of the 11/785.

According to third-party lessors, the 11/785 has risen approximately $20,000 in the past several months as a result of supply drying up. Unless demand for these machines subsides or supply is replenished, these values could rise slightly higher in the near future.

In December 1987, IDC Financial Services Corp. said the VAX 11/785s were trading at a retail current fair market value of 30% of list price. As of last week, the 11/785s were trading at a retail current fair market value of 38%.

Microvax II in demand

According to current fair market value calls, DEC's Microvax II is still a very viable product. Overall, values of this machine have held fairly stable during the past year, with the retail current fair market value at 70%.

Third-party lessors have reported that demand for Microvax IIs is high and that they are able to move a Microvax II out as soon as they get one in.

At one point, DEC had increased the VMS license on the Microvax II to try to encourage users to migrate to the low end of the 8000 line rather than purchase a Microvax II. According to how well the market has held up, it appears that this move had no effect on sales of the Microvax II.

Mid-life kickers

DEC's recent announcement of the 8800 series consisted of mid-life kickers to the 8700 and 8800 processors. The new models — the 8810, 8820, 8830, 8840 and 8842 — provide a new growth path for current 8000 users.

The 8810 replaced the current 8700 and features the same performance, pricing and hardware as the older model. On the other hand, the 8820, 8830 and 8840 are enhanced versions that offer better price/performance. In addition, the Model 8842 is a preconfigured cluster of two 8820s. All of the 8800 series processors feature the new symmetric multiprocessing capability.

As expected, this new 8800 series is based on the 8700 processor and is scheduled to ship immediately.

In general, the 8000 models are beginning to trade on the used market. It is likely that this announcement will cause secondary market activity to pick up even more, since DEC has provided a new growth path for users.

Going down

Current fair market values for the 8200s and 8250s are declining. Currently, indications from the DEC market are that the introduction of the Microvax 3500 and 3600 will make the Microvax 8200 and 8250 processors obsolete.

Although the Microvax 3500 and 3600 have not yet begun shipping in volume and probably will not until this summer, they have already begun to impact the low end of the 8000 line.

Two of the more popular models within the 8000 line are the 8600 and 8650. Even though they are the oldest in the line, values on these models seem to have held up fairly well. Since they are based on the older Unibus architecture, they can use the same peripherals as the VAX 11/730, 11/750, 11/780, 11/782 and 11/785. Other models that have begun to trade are the Microvax 8550s and 8700s.

For more information, contact IDC Financial Services Corp.'s Terri LeBlanc at 617-872-8200.

DEC processors

Current retail fair market value

	Date shipped	Use value	Percent of list price
VAX 11/785	June 1984	$100,000	38%
Microvax II	May 1985	$25,000	70%
VAX 8600	April 1986	$469,875	70%
VAX 8650	April 1986	$522,375	73%

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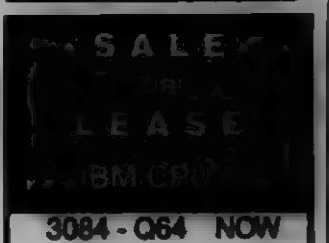

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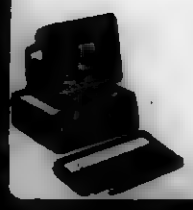

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9/38-600	0.88	8 to 16
9/38-700	1.1	16 to 32
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4381-1	2.1	4 to 16
*4377-60	2.5	8 to 16
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4381-12	2.7	8 to 32
†4381-22	3.2	16 to 32
4381-13	3.6	8 to 32
3083EX	4.4	32 to 64
4381-3	4.5	8 to 32
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4381-14	6.1	8 to 32
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†4381-24	7.5	16 to 64
3090-120E	7.5	8 to 32
3083CX	8.1	32 to 64
3081D	10.0	16 to 32
*4380-180E	10.0	32 to 64
3083JX	10.7	16 to 64
3081K	11.7	32 to 64
4381-24	11.7	16 to 64
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3083HX	27.7	64 to 128
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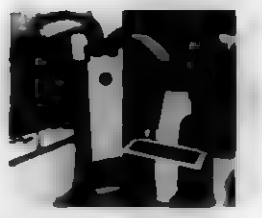

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Training

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BY PATRICIA TAYLOR
SPECIAL TO CW

When asked to plan or provide training for your corporation, how do you determine the most efficient and effective approach? Choosing between live instructors and computer-based training (CBT) will depend on your audience and the subject matter, according to experts.

In addressing technology issues, instructor-led training is a must for beginners, even if they are self-starters, according to Karen Sanders, manager of personnel development at Marits, Inc. in St. Louis. These students need information on how to learn about computing. "When left to their own devices, they will quite often give up before getting anywhere because they 'don't know what they don't know,'" Sanders says.

Working with a partner, in addition to the instructor, often helps neophytes vent frustration and get questions answered, Sanders says.

The more experienced students — ones at a "technical level above ground floor" — will find CBT a valuable vehicle for filling in gaps in their knowledge, Sanders says.

The ability to jump forward in the program and to review when necessary allows the students to acquire specific pieces of information in a convenient and timely way.

According to Sanders, some exposure to the instructional materials prior to class will help students formulate concepts.

The appropriate medium can also vary with the nature of the subject material, according to Robert Rouse, assistant dean of the School of Technology and Information Management at Washington University in St. Louis.

"If you are looking to affect attitudes and judgment, use an instructor. If you are merely passing data, [CBT] is sufficient," Rouse says.

Joseph E. Wehr, president of Data Base Management, Inc., a Manchester, Conn.-based provider of training and consulting services, believes instructor-led classes are most appropriate for materials that are "subjective, qualitative or require value judgment."

He regards CBT as a primary vehicle for presenting structured or quantitative materials. "It is most effective when the student can view three or four screens and then is forced to respond," he adds.

Wehr says that CBT can effectively complement instructor-led classes; it can be used as a follow-up for testing retention. According to Rouse, machine-based instruction can be enhanced by the availability of an informed professional to answer questions by telephone.

Although approaches to training and education vary, professionals agree that automated training tools will never completely replace instructors in the classroom. But the automated tools offer value in providing flexibility in the presentation of repetitive materials, follow-up and review and personally paced study.

Taylor is an associate with the Center for the Study of Data Processing at Washington University in St. Louis.

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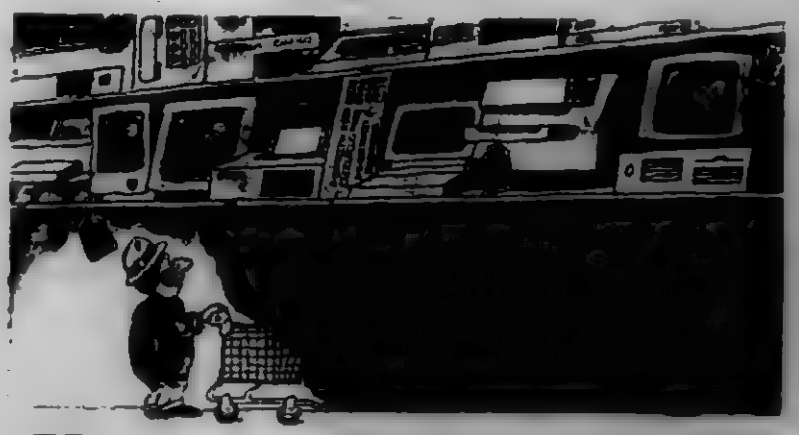

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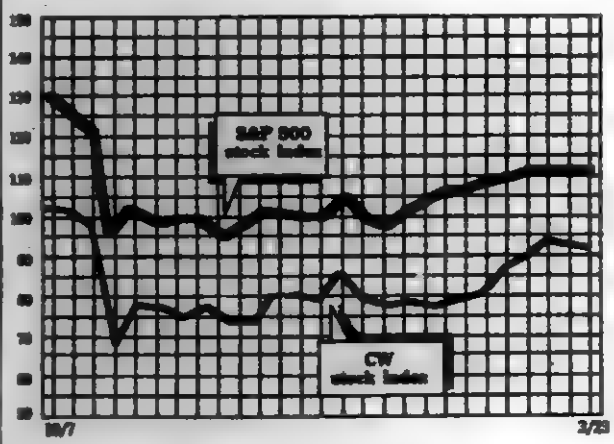

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Semiconductors	68.4	67.1
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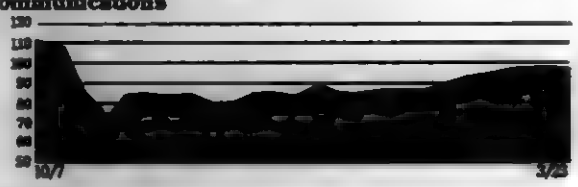

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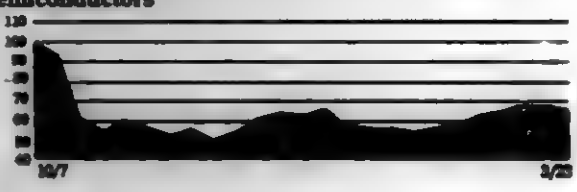

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O	ARTEL COMM CORP	3	2	2.00	-0.2	-11.1
N	AT&T	36	30	28.25	-0.5	-1.7
O	AVANT GARDE COMP INC	6	3	1.88	0.2	11.1
O	AVANTEK INC	17	8	7.38	-0.1	-1.7
N	AYDIN CORP	38	19	25.50	2.1	9.1
N	BELL ATLANTIC CORP	80	61	70.00	-1.3	-1.8
N	BELLSOUTH CORP	44	29	40.00	-0.1	-0.3
O	COMPRESSION LABS INC	7	2	3.25	-0.1	-3.7
O	COMPUTER NETWORK TECH	6	1	1.41	0.0	0.0
O	CONTEL CORP	40	25	32.13	-1.3	-3.7
O	DATA SWITCH CORP	10	4	8.63	0.0	0.0
O	DIGITAL COMM ASSOC	49	20	34.38	0.3	0.7
O	DYNATECH CORP	36	14	23.25	-0.5	-2.1
O	FIBRONICS INTERNATIONAL INC	8	2	4.50	0.3	5.9
O	GANDALF TECHNOLOGIES	11	5	7.00	-0.4	-5.1
O	GENERAL DATACOMM INDS	14	3	3.75	-0.8	-14.3
N	GTE CORP	45	29	38.00	-0.5	-1.3
O	INFOTRON SYS CORP	12	5	8.75	-0.3	-2.8
N	ITT CORP	66	42	46.38	0.1	0.3
N	M A COM INC	16	7	11.00	0.5	4.8
O	MCI COMMUNICATIONS CORP	12	8	11.13	0.0	0.0
O	MICOM SYS INC	17	7	12.50	0.6	5.3
O	NETWORK SYS CORP	16	7	8.88	-0.3	-2.7
N	NORTHERN TELECOM LTD	24	14	20.13	0.9	4.5
O	NOVELL INC	30	12	23.00	0.3	1.1
N	NYNEX CORP	78	66	66.38	-2.6	-3.8
N	PACIFIC TELESIS GROUP	34	9	29.38	-0.1	-0.4
N	PARADYNE CORP	9	4	5.38	0.0	0.0
A	PENRIL CORP	6	1	4.13	0.0	0.0
N	PLESSEY PLC	41	23	28.50	0.3	0.9
N	SCIENTIFIC ATLANTA INC	20	8	15.38	-0.5	-3.1
N	SOUTHWESTERN BELL CORP	46	22	37.50	-0.4	-1.0
O	3 COM CORP	28	12	21.38	-1.4	-8.0
N	TIMEPLEX INC	40	17	32.30	0.0	0.2
O	UNGERMANN BASS INC	16	5	12.25	-0.1	-1.0
N	U S WEST INC	60	43	53.75	-0.3	-0.6
Computer Systems						
O	ALLIANT COMPUTER SYS	36	5	7.88	-0.1	-1.6
O	ALPHA MICROSYSTEMS	6	3	4.50	0.2	4.3
O	ALTOS COMPUTER SYS	15	9	10.50	-0.6	-5.6
A	AMDAHL CORP	50	19	34.38	-2.6	-7.1
O	APOLLO COMPUTER INC	25	9	15.13	-0.4	-2.4
O	APPLE COMPUTER INC	60	28	42.50	-3.6	-7.9
N	BOLT BERANEK & NEWMAN	28	12	17.25	2.0	13.1
O	BRITTON LEE INC	5	1	2.38	0.0	0.0
N	COMPAQ COMPUTER CORP	79	66	51.50	-2.0	-3.7
O	COMPUTER AUTOMATION INC	17	5	9.63	-0.9	-8.3
O	COMPUTER CONSOLES INC	11	2	5.25	0.1	2.4
O	CONCURRENT COMP CORP	24	11	17.25	0.5	3.0
N	CONTROL DATA CORP DEL	36	18	27.88	-0.6	-2.2
O	CONVERGENT TECH	11	3	3.44	-0.1	-3.5
O	CONVEX COMPUTER CORP	22	8	8.00	-0.6	-7.2
N	CRAY RESH INC	136	47	78.50	-3.5	-4.2
O	DAISY SYS CORP	11	5	7.75	-0.9	-10.1
N	DATA GEN CORP	37	16	23.88	-1.0	-4.0
N	DATAPOINT CORP	9	3	4.38	0.0	0.0
N	DIGITAL EQUIP CORP	200	110	111.38	-6.3	-5.3
N	FLOATING POINT SYS INC	15	3	5.13	0.4	7.9
N	GOULD INC	34	8	12.88	0.4	3.0
N	HARRIS CORP	43	22	31.75	1.8	6.3
N	HEWLETT PACKARD CO	74	38	62.50	-2.5	-3.8
N	HONEYWELL INC	91	49	67.13	0.4	0.6
N	IBM	176	102	111.63	-3.8	-3.1
O	INFORMATION INTL INC	16	9	13.00	0.8	6.1
O	IPL SYS INC	3	1	1.75	-0.1	-8.7
O	MASS COMPUTER CORP	14	4	4.50	-0.3	-5.3
N	MATSUSHITA ELEC INDL LTD	213	93	212.75	6.3	3.0
O	MEGADATA CORP	6	3	3.38	-0.4	-10.0
O	MENTOR GRAPHICS CORP	39	14	26.38	-0.6	-2.3
N	NBI INC	14	4	6.88	0.3	3.8
N	NCR CORP	87	60	58.00	-1.9	-3.1
N	PRIME COMPUTER INC	31	12	17.25	0.4	2.2
O	PYRAMID TECHNOLOGY	12	5	11.25	0.3	2.3
O	STRATUS COMPUTER	41	15	26.50	-2.5	-8.6
O	SUN MICROSYSTEMS INC	46	14	26.88	2.3	9.5
O	SYMBOLICS INC	6	1	1.38	0.0	0.0
N	TANDEM COMPUTERS INC	38	17	18.63	-2.0	-9.7
N	TANDY CORP	57	38	41.63	0.4	0.9
N	ULTIMATE CORP	37	13	14.38	-0.8	-5.7
N	UNISYS CORP	48	24	32.75	-1.8	-5.1
A	WANG LABS INC	19	10	12.13	-0.8	-5.8
Software & DP Services						
O	ADVANCED COMP TECH	6	1	1.75	-0.1	-5.7
N	AGS COMPUTERS INC	30	11	18.38	0.4	2.1
O	AMERICAN MGMT SYS INC	20	9	16.25	0.1	0.8
O	AMERICAN SOFTWARE INC	22	6	13.38	0.4	2.9
N	ANACOMP INC	11	4	9.00	0.5	5.9
O	ANALYSTS INTL CORP	10	4	7.75	0.4	5.1
O	ASHTON TATE	33	13	28.00	-1.5	-4.9
O	ASK COMPUTER SYS INC	18	6	13.13	-0.4	-2.8
O	AUTODESK INC	34	12	24.75	-0.3	-1.0
N	AUTO DATA PROCESSING	65	16	44.25	-1.0	-2.2
O	BOOLE & BABBAGE INC	12	5	8.25	0.0	0.0
N	COMPUTER ASSOC INTL INC	37	19	27.75	-2.9	-9.4
O	COMPUTER HORIZONS CORP	15	7	9.88	0.0	0.0
N	COMPUTER SCIENCES CORP	73	42	48.63	-0.4	-0.8
N	COMPUTER TASK GROUP INC	17	9	11.13	0.1	1.1
O	COMSHARE INC	26	12	17.00	0.4	2.3
N	CULLINET SOFTWARE INC	14	4	7.50	0.0	0.0
O	CYCARE SYS INC	10	6	7.88	0.0	0.0
O	DUQUESNE SYS INC	39	10	20.25	0.0	0.0
A	DATA ARCHITECTS INC	17	7	13.63	0.0	0.0
N	GENERAL MTRS (CLS E)	51	30	40.13	-2.0	-4.7
O	HOGAN SYS INC	17	5	5.25	-0.1	-2.3
O	INFORMIX CORP	31	12	19.50	-1.8	-8.2
O	INTELLICORP INC	11	2	3.38	-0.4	-10.0
O	KEANE INC	10	6	9.00	0.0	0.0
O	LOTUS DEV CORP	40	19	25.25	-2.8	-10.5
O	MANAGEMENT SCI AMER	19	6	6.50	-0.4	-5.8
O	MICRO PRO INTL CORP	6	3	3.38	-0.1	-3.6
O	MICROSOFT CORP	79	37	60.00	-4.8	-8.9
O	MORINO ASSOCIATES INC	24	7	16	0.8	4.8
O	NATIONAL DATA CORP	35	19	31.00	0.0	0.0
O	ON LINE SOFTWARE INTL INC	22	9	13.13	-0.5	-3.7
O	ORACLE SYS CORP	19	8	16.00	-0.5	-3.0
N	PANSOPHIC SYS INC	28	11	17.63	0.1	0.7
O	POLICY MGMT SYS CORP	30	15	24.25	-0.8	-3.0
O	PROGRAMMING & SYS INC	14	7	11.50	-1.0	-8.0
O	REYNOLDS & REYNOLDS CO	39	14	21.50	0.0	0.0
O	SEI CORP	28	10	17.25	0.4	2.2
O	SHARED MED SYS CORP	37	19	28.13	-0.4	-1.8
O	SOFTWARE AG SYSTEMS INC	14	7	11.38	0.1	1.1
O	SOFTWARE PUBG CORP	17	8	13.75	0.0	0.0
A	STERLING SOFTWARE INC	13	6	8.38	0.0	0.0
O	SUNGARD DATA SYS INC	21	10	17.25	0.8	4.8
O	SYSTEMATICS INC	32	19	31.75	1.0	3.3
N	SYS. SOFT INC.	24	7	16	-1.5	-8.7
O	VM SOFTWARE INC	45	7	12.75	-1.0	-7.3
Semiconductors						
N	ADV MICRO DEVICES INC	25	8	12.25	0.0	0.0
N	ANALOG DEVICES INC	24	8	14.38	-0.6	-4.2
O	ANALOGIC CORP	13	5	7.60	-0.5	-6.7
O	INTEL CORP	42	18	31.75	0.8	2.4
O	LSI LOGIC CORP	17	7	9.75	-0.6	-6.0
N	MOTOROLA INC	74	35	46.38	-0.8	-1.6
N	NATL SEMICONDUCTOR	22	10	12.38	0.6	5.3
N	TEXAS INSTRS INC	80	36	80.38	-4.9	-5.8
A	WESTERN DIGITAL CORP	35	11	16.75	0.8	4.7
Peripherals						
O	ALLOY COMP.	13	3	3.63	-0.9	-19.4
O	AM INTL INC	9	3	4.25	-0.1	-2.9
O	AST RESH INC	21	6	9.25	-1.0	-9.8
O	AUTO TROL TECH CORP	9	3	5.25	-0.3	-4.5
O	BANCTEC INC	16	5	8.75	1.0	12.9
O	CIPHER DATA PRODS INC	16	4	9.00	0.1	1.4
O	COGNITRONICS CORP	6	2	3.63	0.1	3.6
O	COMPUGRAPHIC CORP	28	19	25.88	0.0	0.0
O	COMPUTERVISION CORP	20	7	7.00	0.0	0.0
A	DATAPRODUCTS CORP	24	7	9.50	-0.6	-6.2
N	DATARAM CORP	8	5	6.38	0.0	0.0
N	DECISION INDS CORP	13	4	10.75	0.0	0.0
N	EASTMAN KODAK CO	71	40	41.75	-1.3	-2.9
O	E M C CORP MASS	29	10	17.00	0.0	0.0
O	EMULEX CORP	9	4	7.94	-0.3	-3.8
O	EVANS & SUTHERLAND	38	18	20.00	0.3	1.3
O	ICOT CORP	13	3	5.00	0.0	0.0
O	INTERLEAF INC	24	11	19.50	-1.0	-4.9
O	IOMEGA CORP	5	1	3.50	0.7	24.4
O	LEE DATA CORP	9	3	3.75	-0.1	-3.2
O	MASSTOR SYS CORP	6	1	2.88	0.4	15.0
O	MAXTOR CORP	33	8	14.00	-0.5	-3.4
O	MICROPOLIS CORP	44	13	28.50	-0.5	-1.9
O	MINISCRIBE CORP	18	5	10.88	0.3	2.4
N	MINNESOTA MNG & MFG CO	84	46	62.00	-1.1	-1.8
A	MSI DATA CORP	29	12	26.75	-0.3	-0.9
O	PRIAM CORP	6	1	2.13	0.1	6.3
O	PRINTRONIX INC	13	7	9.63	-0.3	-2.5
O	QMS INC	27	8	11.75	0.0	0.0
O	QUANTUM CORP	32	8	12.00	-0.8	-6.9
O	RANITEK CORP	6	2	3.50	-0.5	-12.5
N	RECOGNITION EQUIP INC	22	7	9.38	0.1	1.4
O	REXON INC	14	5	7.88	-0.5	-6.0
O	SCAN TRON CORP	14	7	12.50	-0.8	-5.7
O	SEAGATE TECHNOLOGY	46	10	22.00	-0.3	-1.1
N	STORAGE TECH CORP	5	1	1.88	0.0	0.0
O	TANDON CORP	7	1	2.13	0.3	13.3
A	TEC INC	7	3	5.13	0.1	2.5
N	TEKTRONIX INC	41	21	29.75	1.0	3.5
O	TELEVIDEO SYS INC	3	1	1.19	0.1	5.8
N	TELEX CORP	54	39	50.00	-0.6	-1.2
O	WYSE TECH	40	11	19.63	-1.4	-6.5
N	XEROX CORP	85	50	56.13	-0.8	-1.3
O	XIDEX CORP	16	6	6.13	-0.1	-2.0
Leasing Companies						
O	CAPITAL ASSOCIATES INTERNATIONAL INC	11	4	5.63	-0.1	-2.2
N	COMDISCO INC	37	12	22.38	-0.1	-0.6
N	CONTINENTAL INFO SYS	14	5	8.25	-0.6	-7.0
O	PHOENIX AMERN INC	6	2	3.13	0.1	4.2
O	SELECTERM INC	8	3	3.75	0.0	0.0

EXCH: N—NEW YORK; A—AMERICAN; O—NATIONAL; O—OVER-THE-COUNTER; S—SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Losing wait

Delay of 1-2-3 sinks Lotus; Apple suit hurts all involved

The stock market does not take kindly to product delays, and Lotus Development Corp. realized that in a big way last week. After pushing back the delivery date of a 1-2-3 upgrade from the second to the fourth quarter, Lotus plunged 3½ points Wednesday and finished at 24¼ as of Thursday's close, off 5¾ points from a week earlier. In a way, the drop was indicative of the bruisings computer issues took in a market that wandered aimlessly before taking a sharp slide on Thursday when the dollar plunged.

Wall Street also did not deal softly with Apple Computer, Inc.'s suit charging Microsoft Corp. and Hewlett-Packard Co. with copyright infringements. All three fell: Apple dropped 3⅛ points to 40⅜; Microsoft was off 1¾ points to 56½; and HP slipped 1⅛ points to 60¾.

Other companies hit hard in the four days of trading included IBM, down 4½ points to 109¾; Cray Research, Inc., off 3¾ points to 78; 3Com Corp., down 3¼ points to 20⅛; Compaq Computer Corp., down 3⅛ points to 50⅛; and Digital Equipment Corp., which hit a point even lower than after October's crash, when it dropped 3⅛ points to 107⅝.

JAMES DALY

DG changes style, pins hopes on telecom

BY ELISABETH HORWITT
CW STAFF

WESTBORO, Mass. — After being lambasted by DEC in the Fortune 2,000 market, pummeled by layoffs and facing a $71 million net loss in fiscal 1987, Data General Corp. is gearing up for a new market reincarnation as a telecommunications vendor.

The company has spent the last 2½ years hiring, acquiring and allying with the telecommunications expertise and marketing presence it needs. But DG still may have started too late to establish itself as a major telecommunications player — especially against the aggressive telecommunications strategies of giant rivals IBM and Digital Equipment Corp.

The linchpins of DG's new strategy will be two new products that combine the intelligence of DG hosts with voice/data switching capabilities.

The products, expected to be introduced within the next year and a half, are the Integrated Office Controller (IOC) in addition to an intelligent network switch being developed jointly with Japanese carrier Nippon Telegraph and Telephone Public Corp. (NTT) under the code name "Asparagus" (see chart at right).

IOC strategy

The IOC will provide local distribution to personal computers and telephones on the user desk top. DG recognizes that the IOC is tackling a market where several digital private branch exchange (PBX) vendors, notably Northern Telecom, Inc., have come to grief, acknowledged Colin Crook, senior vice-president of DG's Communications Systems Group.

The company hopes to uncover where the real demand is for "tighter coupling of voice/data applications" Crook noted, refusing to elaborate.

The network switch will act as a gateway between users and resources on the local network and at remote sites, Crook said. It will be able to assign user transmissions on demand to either circuit-switched or packet-switched networks and will act as a gateway between different types of networking environments, such as IBM's Systems Network Architecture and the Open Systems Interconnect standard, he added. The switch will also support Integrated Services Digital Network (ISDN) protocols, Crook said.

DG seeks to differentiate its network switch from other T1 switches through integration with DG hosts, said Joseph Forgione, director of marketing for DG's communications division. The resulting hybrid will assume responsibility for administrative tasks such as usage monitoring and troubleshooting.

Is it too late?

"While DEC is busy trying to attach Macintoshes to VAXs," DG is developing a "mainframe-to-micro, wide-area network-to-local-area network, geographically dispersed system" that potentially could beat DEC at its own networking game, said Joseph Payne, an analyst at Baltimore investment firm Alex Brown & Sons, Inc. "The trouble is, it will take too long," Payne said.

DEC already is a strong presence in computer-based networking and is moving rapidly to integrate its hosts with various vendors' PBX systems, as well as with the seven regional Bell holding companies' central-office switches.

DG may also have a tough time convincing business customers it has successfully metamorphosed from computer company to switch vendor. "I doubt that a Citibank would turn to DG for a networking system that needs to be 99.9% reliable," one consultant said.

DG's Crook admitted, "People do ask us, 'Do you really understand [networking protocols such as] ISDN and SS7?' "

More than two years ago, DG began hiring and acquiring the telecommunications talent it lacked, Crook said. The alliances include the following:

- In 1985, DG acquired the Integrated Digital Network operation of United Technologies Corp. The IOC system will reportedly be based on a PBX product that the operation had previously developed.
- In February 1987, DG paid $28 million for Dasa Telecommunications Corp., in Parsippany, N.J. The network service company is now part of DG's Rockville, Md., Network Services Division.
- DG recently became a reseller of Bridge Communications, Inc.'s network products and seeks similar agreements with vendors that sell other types of network products, Forgione said.
- In October 1987, DG formed a joint development agreement with NTT on the Asparagus intelligent network switch.

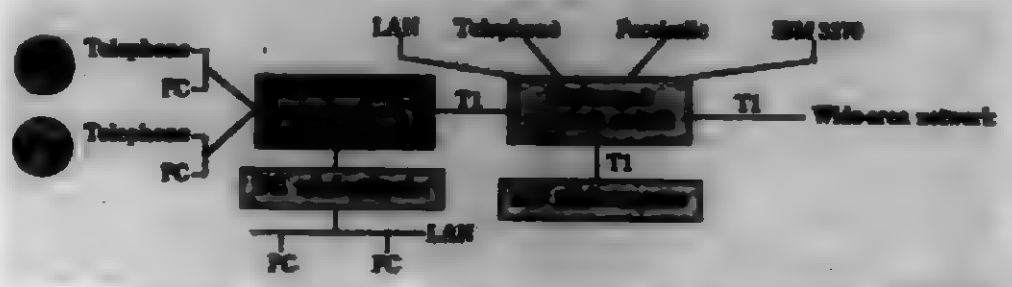
While DG plans to sell the network switch directly and through OEMs, NTT will be a major distributor of the product. DG hopes that European and U.S. carriers will also sell the system as a complement to their own networking services.

"We're designing the system so that it can be flexible in terms of where the networking intelligence lies — at the carrier's central office or on the customer's premise," Crook said.

DG's Crook

As DG sees it

Data General's plan will use computer/switch hybrids; Asparagus will connect local voice and data resources to wide-area networks, and Integrated Office Controllers will deliver applications to the desk top



CW CHART

Spectrum

FROM PAGE 1

sources Information Systems division of McDonnell Douglas Aircraft Co. in St. Louis. "The performance is, on the average, four times faster."

The HP Spectrum models have been a long time in coming. First discussed as far back as 1983 and formally unveiled in February 1986, the 32-bit machines are based on what was then seen as a radical architecture for a high-end minicomputer: reduced instruction set computing (RISC).

'Exceeds expectations'

An HP spokesman said the company does not divulge shipment levels on individual systems but that 930 and 950 shipments to date have "exceeded our expectations." HP has an installed base of some 26,000 HP 3000 units worldwide.

Two years after their debut, Spectrum models are just beginning to show up in corporate data centers. The rollout was delayed for about a year when software I/O bugs were uncovered and HP found it necessary to streamline some overcomplicated code.

So far, according to users, HP's efforts have paid off. Because the Model 950's MPE XL operating system is compatible with the Series 70's MPE VE operating system, users can run code from the 70 on the 950 in compatibility mode without any alterations but without the performance benefits of the Model 950.

To take full advantage of the new architecture, applications only have to be recompiled, not rewritten, according to HP.

"There is a recompiling that you do to run in native mode, but it's easy to do," GE's Reffner confirmed. "As long as you adhere to Cobol 74 and just take source code over to the 950 and recompile it in native mode, you'll be fine."

Unexpected fees

Although the migrations have mostly gone as planned, some users did report a few unpleasant surprises.

Baltimore Aircoil Co., an air-conditioner manufacturer in Jessup, Md., found itself shelling out some $60,000 in unexpected software upgrade fees in order to run its Series 70 applications on the Model 950. The company had been running Ask Computer Systems, Inc.'s Materials Requirement Planning and Cognos, Inc.'s Powerhouse fourth-generation development language, among other applications, on its Series 70.

"We found when we moved to the 950, we had to pay an upgrade fee of $45,000 to Ask and $15,000 to Cognos, just to be able to run the same software on a different architecture," said Jack Sutkaytis, director of MIS at Baltimore Aircoil. "That's an awful lot of money we weren't expecting to pay just to run enhanced versions of their software."

"Our pricing structure is not a secret, and we aren't sneaking anything by anyone," said David Sohm, vice-president of marketing at Ask Computer. "We have a tiered-pricing structure based on the CPU the customer has."

Cognos' Powerhouse costs $30,450 for the Series 70 and $47,850 for the Model 950, according to Mike Laginski, marketing manager for Cognos' HP products. He said the cost of porting to the RISC architecture and performance advantages on the Model 950 justify the higher price.

Sutkaytis said Baltimore Aircoil was advised by consultants that it should upgrade the standard 32M bytes of memory of the Model 950 to 64M bytes to take full advantage of the architecture, and that "set us back another $50,000."

In addition, the Spectrum series does not support HP's older IBM 3270-compatible terminals, including the HP 2624A. "We had the option of installing some new chips into the terminals to make them work, but since the terminals were dispersed around the country, it was better to just replace them," Sutkaytis said.

Prefer Model 950

For the most part, HP shops said they are skipping the Model 930 in favor of the 950, which offers 6.7 million instructions per second (MIPS), compared with the 930's 4.5 MIPS. During the delays, HP promised its loyal customers the opportunity to upgrade from a Model 930 to a 950 at a minimal, or no, additional cost. Some users, however, said they are sticking with the 930, at least for now.

"We took the 930 because it was available first," said Jim Burns, vice-president and director of corporate data services at Houghton Mifflin Co. in Burlington, Mass. "We knew we could use it in the field when we need a 950 at headquarters."

Not everyone migrating to Spectrum will do so from an HP environment. The San Bernardino County (Calif.) Central Credit Union, for example, said it plans to convert from a Digital Equipment Corp. VAX-11/785 to a Model 950.

"Primarily, we're switching to the 950 because the software package we chose runs on it," explained Ken Facer, vice-president of the credit union. "The monthly maintenance costs on the HP were about half that of the 8700, and there's a much better secondary market for HP equipment than there is for the VAX."

Cullinet

FROM PAGE 1

next eight months must begin to generate new revenue in short order, or else drastic measures would be needed to prevent a snowballing loss of confidence.

Holding the key

Cullinet customers who use both IBM and DEC processors — approximately 60% of the customer base — may hold the key to the quick success or failure of the new offerings. *Computerworld* interviews with a sampling of customers revealed that most approved of Cullinet's bold strategy.

"Its software concepts are on the leading edge," said David Hale, director of materials and distribution at Racal-Milgo, Inc. in Miami.

Douglas Cook, business systems manager at Babcock & Wilcox-NNFD in Lynchburg, Va., said, "I think our future is pretty much VAX-oriented. . . . I see Cullinet as the only major software company that's really in line to go both ways, IBM or DEC."

However, such praise was often tempered by an acknowledgment of the magnitude of Cullinet's task, and few customers said they were currently ready to put their money down on a VAX product from the Westwood, Mass., firm.

Cullinet "has got an awfully big job on its hands — and a tough one," said Melvin Stuckey, director of information systems at Jeppeson Sanderson, an aviation chart supplier in Englewood, Colo.

"In some ways, Cullinet's view is a little too wide, like it is looking for each and every opportunity," said Jerry Peters, senior vice-president of information services at Exchange National Bank of Chicago.

Cullinet has a new supporter in its comeback attempt. DEC has made it clear that it views a recovered Cullinet as a potential ally in its own competition with IBM. Although IDMS/SQL will compete with DEC's relational data base, RDB, DEC officials said they see the product as the precursor to Cullinet's conversion of its mainframe applications to the VAX (see story below).

"The bottom line is, we're pretty bullish on Cullinet," said William M. Steul, DEC's corporate systems vice-president.

But some observers still see little to be bullish about. Cullinet founder John J. Cullinane, who told *Computerworld* five years ago, "Our strength is that we have no weaknesses," abruptly returned to the company from a short-lived retirement this month to help combat a formidable array of setbacks.

Cullinet has been losing money since the start of fiscal 1986, and it is touch and go as to whether it will return to profitability by April 30, the end of its fourth quarter for this year. Cullinet's stock dropped 3¼ points to 7⅜ in the Oct. 19 crash, off a high of 14⅛ in September, and has yet to recover. It was hovering around 7½ last week.

Cullinet still gets about 60% of its revenue from its mainframe DBMS, IDMS/R. That is an improvement over its 99% dependence on IDMS/R six years ago, but it still leaves the company vulnerable to damage from IBM's DB2.

There are even signs that Cullinane's abrupt return as vice-chairman, looking over the shoulder of the management team he named before he left, has caused unease within the company.

When Cullinane agreed to provide a background interview for this story without any other employees being present, one company official called *Computerworld* to find out what Cullinane had said.

Coming attractions

To further improve its product mix, Cullinet executives said, the company will make the following moves during the next eight months:

- The April 5 release of IDMS/SQL will coincide with enhancements to another product, Knowledgebuild, a VAX-based application generator that has been available since January. After the IDMS/SQL introduction, Knowledgebuild will be able to use IDMS/SQL files as well as DEC RMS files.

  It will also incorporate an expert system, added with Cullinet's own Application Expert product, to help programmers build applications and allow them to embed an expert system in an application.
- It will introduce a version of the Application Expert expert system-building shell that allows users to embed expert systems in their IDMS/R applications. Application Expert/IDMS is now in beta testing.
- Cullinet will launch a consumer banking system, to be priced in the range of $2 million, built on the IDMS/R data base and including all the Cullinet tools, including Application Expert, embedded in it, according to James Fox, Cullinet's banking vice-president.

  The software will function as "both an application and an overarching environment" that will let users "build [consumer banking] products pretty quickly, online, real-time and tailored to the bank," Fox said. Banking software is a high-priced product, and Cullinet's line is coming out at a time when other vendors have yet to succeed in the market in any major way.

Cullinet's banking software has been installed at a handful of beta-test sites since mid-1987, and it has been a big hit at at least one site — the Exchange National Bank.

"It's a vastly superior design," the bank's Peters said. "It's not like any other system on the market."

Building blocks best

Peters said Exchange National reviewed packages from such well-established software vendors as Hogan Systems, Inc. and the former Uccel Corp. But the Cullinet approach, which Peters termed a building block method, was best suited to the bank's needs.

Overall, Cullinet is betting on an ambitious strategy that it calls its "3X3 architecture." Three-by-three is shorthand for three main product lines running across three hardware platforms: integrated data base, applications and programming tools on mainframe, VAX and microcomputer platforms.

An even more ambitious strategy, still unannounced but under development and scheduled to be released in the next two years, envisions an applications environment centered on a server-type distributed data base and tied together by SQL, said David Litwack, Cullinet executive vice-president of systems products.

For example, IDMS/Architect, a personal computer-based tool for designing applications that will run on mainframes, VAXs or PCs, will be integrated with Knowledgebuild to form an application-building system that spans the development steps from front-end design to final debugging, Litwack claimed.

Gaining mobility

Such an application-building system would be able to take advantage of the cross-platform mobility of SQL commands and build them into distributed applications.

"It'll be able to go everywhere — not only to all Cullinet data bases but to many SQL-based data bases outside the Cullinet environment," Litwack said.

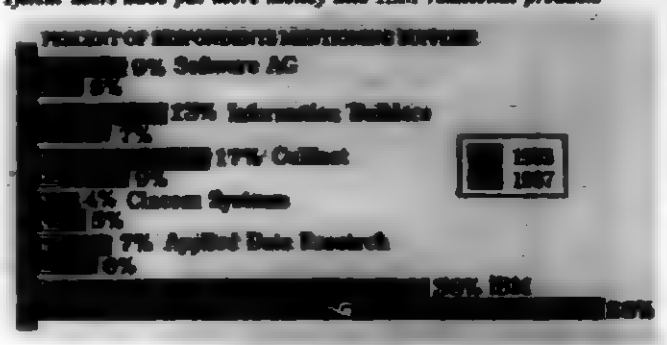
Regardless of long-range plans, Cullinet must make its move into the VAX market pay off in the short run.

The move toward the VAX may win the company praise from Wall Street, which views DEC as a winner, but the sampling of Cullinet customers turned up few with plans to buy IDMS/SQL at this point.

"We're not really giving [IDMS/SQL] any consideration,

Buying intentions shift to IBM

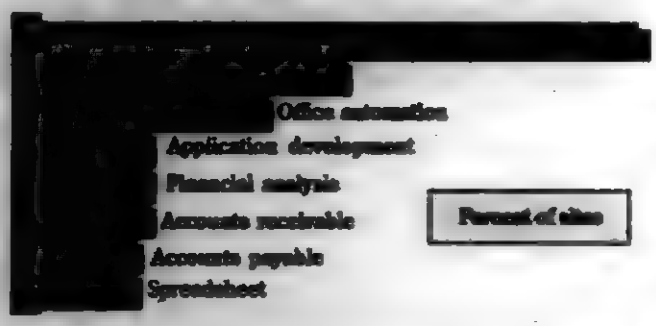
Since the introduction of DB2, mainframe data base management system users have put more money into IBM relational products



INFORMATION PROVIDED BY COMPUTER INTELLIGENCE

Data base management system distant second

Network control tops shopping list with DBMS second in a survey of 11,500 commercial DEC VAX users' software buying intentions



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DEC alliance builds quietly

Nine months after the announcement of a feasibility study for a possible joint development effort, not much seems to be happening in the on-again, off-again DEC and Cullinet alliance.

Through two companies acquired last year — Applied Development Corp. and Distribution Management Systems, Inc. — Cullinet Software, Inc. became a Digital Equipment Corp. cooperative marketing partner. Nevertheless, rumors persist, encouraged by DEC and Cullinet themselves, that there is something brewing beyond a standard marketing relationship.

Cullinet Chairman David L. Chapman said earlier this month that the DEC alliance "is moving right along." Some "technical questions have been worked out, and we're going on to the next step," he added.

"We see Cullinet as a very viable partner, in the loose sense of the word, over a long time; and we're very hopeful that they do well," said DEC's corporate systems vice-president, William M. Steul. "We wish them the best of luck and have offered to help them in any way that we can."

At least some measure of help is already being given: Both companies confirmed that a DEC development employee is currently enjoying office privileges at Cullinet and a Cullinet employee at DEC, with an eye toward facilitating a future relationship, whatever form it takes. The form it is most likely to take is that of an alliance to target a DEC VAX-based version of Cullinet's banking system at the banking industry.

Cullinet Executive Vice-President John Landry ruled out several application areas for potential cooperation between DEC and Cullinet; two he declined to rule out were computer-assisted software engineering and banking.

"DEC is extraordinarily interested in banking," Landry noted, "and their gear is well suited to banking's distributed environment." Two forthcoming DEC products — the 8800 series and VMS Version 5, "which will include multiprocessing capabilities" — are likely to increase DEC's appetite for the banking market.

"DEC clearly doesn't want to just play in the departmental market any more," Landry said. "It wants the whole game."

"We're having ongoing discussions with Cullinet regarding banking," Steul said. "Both of us see good reasons to develop products, and there is still the chance that we could co-develop products."

NELL MARGOLIS

because DEC's own products are adequate to our needs. We have 25-odd data bases built using RDB," said Michael Johnson, VAX systems manager at Du Pont Co. in Brevard, N.C.

An MIS manager for a Southeastern electric utility said, "We're an [IBM] VM environment. We keep our data base on the mainframe and our office systems application on the VAX," and each will remain in its own sphere.

Jeppesen Sanderson's Stuckey, another user of IBM and DEC equipment, said he sees a need for IDMS/SQL even if he has no immediate plans to purchase it.

Cullinet is "really addressing the heart of our business with IDMS/SQL," Stuckey said. "It would be nice to go to one hardware system eventually, and we're glad Cullinet will be there for us if we do."

Tough market to crack

But no matter how technically promising IDMS/SQL proves to be, it is a latecomer in a crowded market. VAX users are already served by not only DEC and such entrenched third-party suppliers as Relational Technology, Inc., Informix, Inc. and Sybase, Inc. but also Oracle Corp., whose marketing pitches often evokes comparisons to the early Cullinet.

"It's unfortunate that Cullinet is entering [the VAX market] the same way it has entered every other market — by buying an incompatible piece of software," said Peter Tierney, vice-president of marketing at Belmont, Calif.-based Oracle.

"There have been times when I've been worried about the competitive threat posed by a company entering this market," said Gary Morgenthaler, chairman of Relational Technology. "This isn't one of them."

Customer loyalty

Doubts notwithstanding, Cullinet customers who were contacted remain surprisingly loyal to the company during its troubled times.

"We're committed to the three-by-three architecture that Cullinet is planning," said Gus Chicola, data base administrator at the County of Metro Dade Office of Computer Services in Miami, an IDMS/SQL beta-test site. "Cullinet has enough invested in it — and we have too much invested in it — to turn around and say, 'OK, let's go to another company right now.' "

Even some Wall Street analysts said that they are willing to give Cullinet the benefit of the doubt. "I anticipate that they'll make a profit in the fourth quarter of '88 — but that's not the issue," said Rick Shenlund, an analyst at Goldman, Sachs & Co. "The issue is, let's get the products out the door and see how they do."

Cullinet has enough cash to continue losing money for a while, and revenue has continued to grow even as the company entered its losing quarters, Shenlund noted.

A return to profitability "is an absolute must for users who are thinking of Cullinet as their strategic partner in an MIS structure. They have to prove that they're an ongoing entity," warned Robert Anderson, an analyst at Sutro & Co. in San Francisco.

"I'd be foolish to say that we're not cognizant of Cullinet's [unprofitable streak] or that we're not concerned," Chicola said. "But we have had many discussions with Cullinet executives and have come away feeling that our faith in the company was well placed. Now, it had better play ball."

DB2 drives IBM's improving market share

DB2 and SQL/DS gave IBM 56% of total data base management system purchases planned at year-end 1987

INFORMATION PROVIDED BY COMPUTER INTELLIGENCE

Users consider options

There is no such thing as a typical Cullinet customer, but the comments of users interviewed by *Computerworld* touched on a number of common concerns.

Fourteen users surveyed said they are managing environments with a mixture of IBM and Digital Equipment Corp. hardware or expect to be doing so soon. Although Cullinet Software, Inc. wants to find new customers with its DEC VAX product lines, its existing mixed-vendor customer base represents one of the few available sounding boards for its corporate strategy.

Despite Cullinet's recent financial troubles, users said they are generally optimistic about the company's prospects, and most applauded the firm's effort to provide a relational data base management system on the VAX. "Cullinet, like other vendors, is absolutely correct in addressing other platforms," said James Warenda, manager of data base administration at the Public Service Co. of New Hampshire.

"It's very exciting, what they're doing," said David Hale, director of materials and distribution at Racal-Milgo in Miami. Hale expressed interest in Cullinet's VAX-based IDMS/SQL relational DBMS despite the fact that his company is not currently a VAX site.

For Gus Chicola, data base administrator at the County of Metro Dade Office of Computer Services in Miami, which is serving as a beta-test site for IDMS/SQL, the prospect of a VAX data base that might be able to work with Cullinet's IDMS/R holds particular allure. "IDMS/SQL is a strategic tool in our eyes," he said. "What if we have a department that is using VAXs and it needs information that's in IDMS/R on the mainframe? The future compatibility of IDMS/SQL with IDMS/R is certainly an attraction." Cullinet has committed itself to providing full SQL support in IDMS/R Version 11.

User response to Cullinet's direction, however, was not uniformly enthusiastic. Robert Curran, executive director of computer services at Tufts University in Massachusetts, said he supports the company's agenda, but he cautioned that Cullinet "needs to maintain a close contact with the customer base."

Product offerings won high marks, and although many users raised concerns regarding the company's long string of unprofitable quarters, most said they feel that panic at this point would be premature. "Profit and loss statements don't tell you everything about a company," Curran said.

"Profit worry? No," Racal-Milgo's Hale said. "I think Cullinet has a very good product line, and that's what counts in the long run."

ROSEMARY HAMILTON and NELL MARGOLIS

Must Software pumps up Nomad with referential integrity

BY ALAN ALPER
CW STAFF

NORWALK, Conn. — Must Software International last week broadly enhanced its recently acquired Nomad fourth-generation language and data base management system, adding support for referential integrity and cooperative processing.

Must also announced two add-on modules for Version 4.50 of Nomad, which runs on IBM mainframes. The two add-ons are a performance analyzer, said to monitor and record machine resources consumed by Nomad applications, and a session manager, which reportedly allows multiple Nomad users and applications to run in a single address space under IBM's MVS operating system, thus eliminating the overhead of TSO.

As expected [CW, Oct. 26, 1987], Nomad's referential integrity is implemented by entering rules into a schema or data dictionary. The rules specify relationships among data elements in tables in a relational DBMS and are applied whenever the elements are modified.

Applications developed using Nomad will also have referential integrity when run against other SQL-based DBMSs, such as IBM's DB2, noted Frank Fish, Must's executive vice-president.

Data consistency

The new release will generate all the SQL statements needed to ensure that data modified in one table will also be changed in related data in another table, Fish explained. Nomad's SQL interfaces have also been enhanced.

Cooperative processing support enables developers to allocate portions of a Nomad application to a mainframe and other parts to a personal computer or to multiple microcomputers.

Communications facilities let applications share record-level dialogues among the different processors. Must's micro version of Nomad, PC Nomad, and a version for Digital Equipment Corp.'s VAXs are also scheduled to support cooperative processing when they are released in April and July, respectively.

With the Nomad Session Manager, access to Nomad is available directly through VTAM under MVS. Because Nomad no longer needs to reside in the TSO region, response time for users on the system is improved, Fish said. Pricing is based on processor size and ranges from $17,000 to $25,000.

Using the Nomad Application Performance Analyzer, an experienced Nomad developer can increase application performance by as much as 80%, Fish said. Prices for the performance analyzer, which runs on both MVS- and VM-based systems, range from $7,000 to $15,000, based on machine size.

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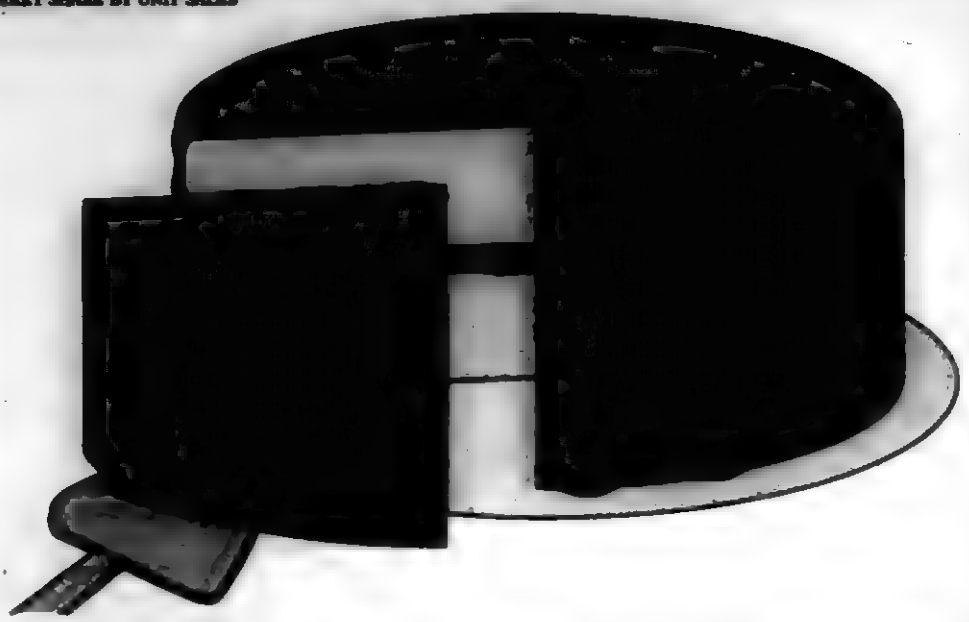
TRENDS

PC printers

HP takes the cake in the laser market

MARKET SHARE BY UNIT SALES

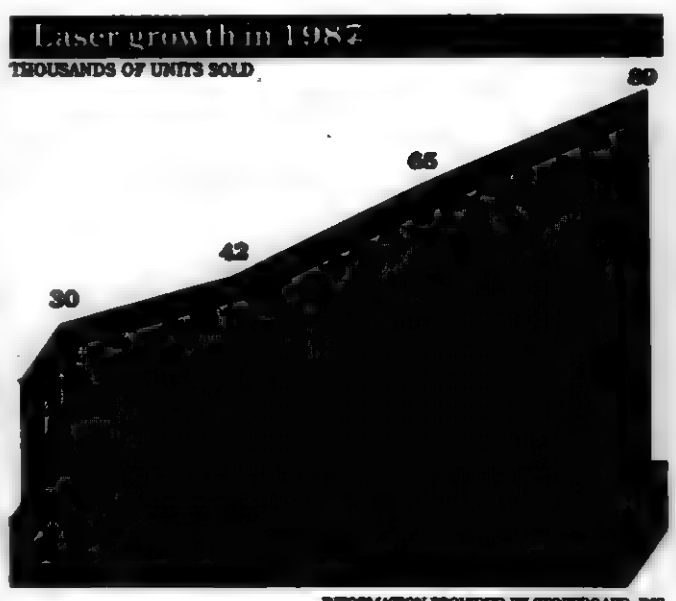


Impact printers

MARKET SHARE BY UNIT SALES

Laser growth in 1987

THOUSANDS OF UNITS SOLD



INFORMATION PROVIDED BY STORBOARD, INC.
CW CHARTS: AMY J. SWANSON

Apple Computer, Inc. came in second not once but twice in last year's race for printer dominance.

The firm ran a distant second to Epson America, Inc. in the impact printer market and an even more distant second to Hewlett-Packard Co. in the laser printer market.

Epson had a 31.8% share of units and a 31.2% share of all money spent in this market.

Even Apple, known mostly as a desktop computer vendor, nipped IBM in the impact market. Apple had 17.5% of the total dollars spent, while IBM, with its popular Proprinter series, had 16.9%. The retail channel pumped 1.4 million impact printers into the market last year, far outstripping shipments of laser printers.

The laser printer market, a bit more monopolistic, was captured by HP, which held 77.3% of all units sold. A recent announcement that HP will support Adobe Systems, Inc.'s Postscript page description language may add to the firm's share as well.

But there is hope for HP competitors, as this market nearly tripled in size over the course of the year. Unit sales of laser printers grew from 30,734 in the first quarter to 89,025 in the fourth quarter. Total unit sales hit 227,589.

Much of this growth is due to lower prices and the rapid rise of the desktop publishing market, which relies on laser printers for the output of gussied-up documents.

DOUGLAS BARNEY

INSIDE LINES

Mark the calendar. IBM is planning a major rollout in June that will see "multiple" Personal System/2 announcements, Intel 80386-based systems and upgrades, according to sources. The company is planning to invite about 4,000 people, mostly dealers, to a two-day event in Dallas at which IBM President John Akers will make the keynote address.

Shades raised in Moscow. Glasnost reached the computer industry this week as Microsoft reportedly made an agreement in principle with USSR-based Dialog, which will act as exclusive distributor of MS-DOS in the Soviet Union, sources said.

KGB in Armonk? A poster plastered at IBM's headquarters aims to keep employees looking over their shoulders: "Do you know the person behind you?"

Stating the obvious. Invitations went out late last week for the official debut of the Sun Microsystems low-end workstation, which will be based on the 80386 microprocessor. After dozens of mentions in the press and months of speculation, it would seem the April 6 press event will be anticlimactic. But Sun is being a good sport. On the envelope that contained the invitation was the phrase "We know you know it's a 386."

Bench wars. Sybase has fired the opening salvo in what may become the war of the benchmarks. It launched an upgraded version of its relational data base management system that doubles its transaction throughput capability. Release 3.0 is accompanied by a standard TP1 benchmark, vouched for by an independent performance evaluator, that shows 29.3 transactions per second on a DEC VAX 8700. Cullinet is set to announce next week its VAX product, IDMS/SQL, which the firm says it plans to market on a transaction processing basis with its own benchmark results. Oracle plans to introduce a transaction processing facility later this year but has shied away from benchmarks.

Paradox goes naked. Borland International will reportedly release a bare-bones version of its Paradox data base this year that is designed to let developers write applications in a variety of Borland languages, including Prolog, Turbo C, Turbo Pascal and Turbo Basic. The package will feature only Paradox's 200K-byte data processing engine and the program's Query By Example module.

Dbase deals. The shroud of uncertainty over the future of Migent's Emerald Bay DBMS was lifted last week as Ashton-Tate settled a suit that it had filed against Migent and Emerald Bay author Wayne Ratliff (previously Ashton-Tate's lead developer for Dbase) more than a year ago. Details on the settlement were not disclosed, but the $695 Emerald Bay data base engine and server began shipping without a fully Dbase-compatible language, as originally intended; the company does offer, however, the $495 Eagle, a data base language resembling Dbase.

Easy payment terms. The current television commercial touting General Motors Acceptance Corp.'s (GMAC) financing for boats and homes as well as cars may soon be able to add a new segment — professional computer services. GM's Electronic Data Systems (EDS) subsidiary is exploring the option of offering GMAC financing for EDS services, Input analyst Bob Goodwin said at an ADAPSO conference session.

He's at it again. High-tech corporate raider Asher B. Edelman's latest target appears to be Centel Corp., a Chicago-based vendor of local telephone exchange systems, communications systems and cable TV services. Edelman, in partnership with New York cellular telephone vendor Metro Mobile CTS, last week announced a proxy fight to place three nominees on Centel's 10-member board.

"Just what I wanted," the news editor purred after his switchboard started lighting up. So keep tipping us off to those impending cat fights by calling Pete Bartolik at the CW hot line, 800-343-6474 (or 617-879-0700), and curl up for a chat.

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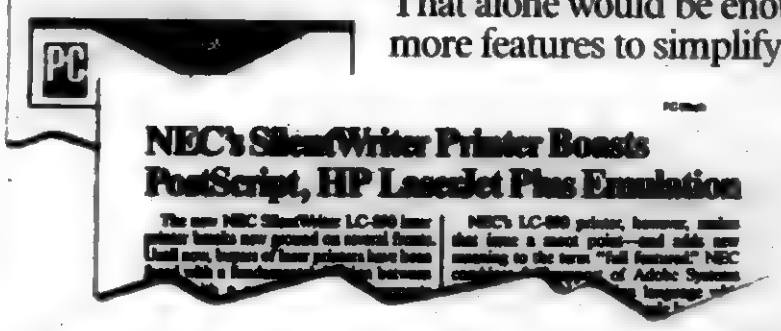
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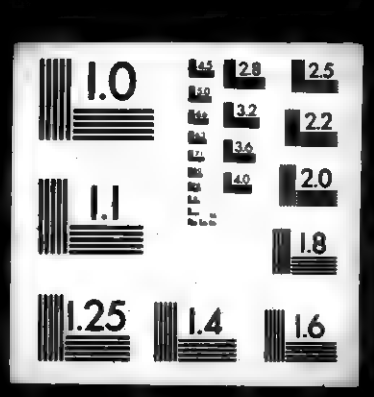
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COMPUTERWORLD

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Cullinane in control

Replaces Chapman as Cullinet boss, sets profit goal

BY NELL MARGOLIS
CW STAFF

WESTWOOD, Mass. — With a revived product plan in place but profits still elusive, Cullinet Software, Inc. reinstalled founder John J. Cullinane as chairman last week. The move was part of a shake-up of top staff triggered by the departure of David L. Chapman, the executive Cullinane himself had charged with turning the company around.

The changes came less than a week before the slated April 5 debut of the IDMS/SQL data base management system, the flagship product in Cullinet's assault on the Digital Equipment Corp. third-party market and key among the new entries intended to restore the company to profitability.

The data base and attendant tools are already garnering a favorable reaction from early users and market analysts. In the past several weeks, however, Cullinet executives have confirmed that the prospects of black ink in the fourth quarter of fiscal 1988, which ends April 30, are borderline. The company has not reported a profitable quarter since fiscal 1986.

"Cullinet has done some truly outstanding things over the past couple of years, and we've made a lot of money," Cullinane said. "Now it's time to focus on the bottom line. This is a case of fine-tuning."

Continued on page 97

REINSTATED

John J. Cullinane

RESIGNED

David L. Chapman

HP to widen Spectrum; rollout pace quickens

BY JAMES A. MARTIN
CW STAFF

Hewlett-Packard Co. is expected this week to unveil a range of systems, including three additions to its Spectrum series, two RISC-based engineering CPUs and two extensions of its Micro 3000 line.

Sources close to the company said it will announce the HP 3000 Model 955, a 9 million instruction per second, reduced instruction set computing system that will extend the Spectrum's high end beyond the current 7-MIPS limit of the Model 950 superminicomputer.

In an effort to further flesh out its RISC offerings to the commercial marketplace, HP reportedly will also introduce the 5-MIPS Model 935 and the 3-MIPS Model 925.

HP plans to position the new Spectrum systems as upgrades to the existing 930 and 950 models, which were formally announced in February 1986 but subsequently delayed for more than a year because of software I/O bugs.

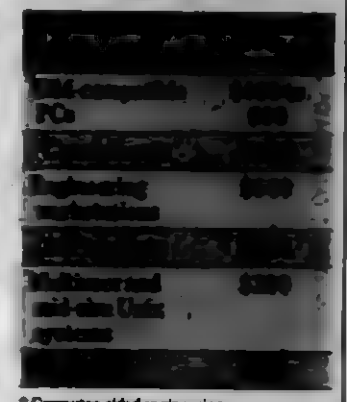
No longer top pick

"The 930 and the 950 will quickly fade as the choice machines for HP customers," predicted Adam Culney, a technology analyst with Kidder, Peabody & Co. in San Francisco. HP often upgrades systems every two years, he added. "The 930 and 950 were announced two years ago, so the timing is perfect."

Continued on page 8

The bottom line

Almost half of Hewlett-Packard's 1987 revenue from computer products was generated by the HP 3000



* Computer-aided engineering

INFORMATION PROVIDED BY ROBERTSON, COLMAN & STEPHENS
CW CHART

Users say PC promises wearing thin

BY DOUGLAS BARNEY
CW STAFF

In February, Lotus Development Corp. President Jim Manzi surprised an early morning crowd at the PC Forum conference by announcing a radical work group computing software product called Notes. Manzi provided few specifics about the product's design and named a vague shipment date that was more than a year away.

But the Lotus executive had the presence of mind to bring color photographs of a prototype Notes screen for attending reporters.

At a New York press conference a month later, Ashton-Tate Corp. outlined plans to resurrect its flagging fortunes in the data base management system market by introducing a new version of its Dbase product line, due in July.

But the alpha-test version of Dbase demonstrated at the event was so shaky that it crashed under the weight of company Chairman Ed Esber's keystrokes.

And just last week, Lotus added to its industry-leading list of "vaporware" — or products that have been announced but not delivered — by announcing Blueprint, which the firm calls a data access architecture. Do not look for the Blueprint vapor to precipitate until the end of this year, when Lotus's 1-2-3 Release 3 ships.

Such tactics are raising serious questions about the manner in which PC companies create, and sometimes destroy, users' expectations in pursuit of a marketing edge; they have also created an increasingly uneasy user community.

"I do no planning based on product announcements," said Art Skopec, senior PC analyst at Memorial Sloan-Kettering Cancer Center in New York.

Blueprint, Notes and Dbase IV are just symptoms of a fast-spreading marketing technique in the personal computer indus-

Continued on page 6

System bugs breed $635M tax oversight

BY J. A. SAVAGE
CW STAFF

SACRAMENTO, Calif. — Bugs in a new mainframe-based tax accounting system caused the state of California to fail to collect $635 million in business taxes, the California Auditor General charged late last month.

But the Employment Development Department, the second largest tax collector in the country after the Internal Revenue Service, claimed to have resolved the problem by last Friday and mailed bills to the employers affected by the snafu.

The bugs were largely a result of erroneous data that existed in the department's original files at the time the conversion started in 1980, according to the EDD. The changeover was com-

Continued on page 4

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IN THIS ISSUE

The A train. Unisys powers up its A series mid-range systems with a dual-processor and upgrade kits said to boost power by 75% over the previous single-processor models. Page 4.
T for one. Micom extends its T1 options with the DX-LAN Bridge Extension, which lets a T1 multiplexer line support a long-distance LAN-to-LAN connection, and a statistical multiplexer that intersperses voice/data packets over the same channel. Page 14.

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21 DOD contractor's system gives PC users entry into VAX-based data bases.

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Brophy shifts gears

Moves from MIS to benefits post at Travelers

BY JAMES CONNOLLY
CW STAFF

HARTFORD, Conn. — One of the best-known MIS executives in the U.S., Joseph Brophy of The Travelers Corp., is shifting from information systems to the general administration side of the company.

Brophy, senior vice-president and chief of information systems at the Hartford-based insurance company [CW, March 7], is taking on an assignment as senior vice-president for employee benefits, according to a Travelers spokeswoman.

Brophy will be replaced as head of the data processing and telecommunications department by Lawrence E. Bacon, 49, who has been with the company since 1964 and most recently served as vice-president for agency marketing group systems.

Focus on teamwork

Bacon said he will continue to pursue the company's goal of moving information systems closer to business units. He said that goal means a shift in focus rather than a shift in personnel. "We are trying to get more teamwork or interplay of skills with people working more closely together," he said.

Bacon said he will continue with existing projects and will emphasize the importance of standards, which, at The Travelers, has often involved standardization on IBM hardware, software and interfaces.

Brophy, 54, has been with the company since 1971 and has been honored by the Data Processing Management Association, Carnegie-Mellon University and American Management Systems, Inc. for his achievements, which include the development of The Travelers' On-Line Processing System. The outgoing Brophy has been active as a speaker on data processing and has caught the public eye because of his diverse interests, which range from playing the bagpipes to studying Chinese.

The Travelers' Brophy

Bacon, a 1960 graduate of the University of Connecticut, joined The Travelers as a programmer trainee in 1964 and worked his way up the corporate ladder, according to the company. In his most recent post, he was responsible for developing systems that could be used by independent agencies and are compatible with The Travelers' host systems.

Regarding his management style, Bacon said, "I like everybody to participate. And I like to keep things moving. Once we set a goal, we keep moving toward it. We have a lot of meetings, a lot of people talking to each other."

Mips RISC chip hits 20 MIPS

BY J. A. SAVAGE
CW STAFF

SUNNYVALE, Calif. — A week after the speed for business applications of reduced instruction set computing (RISC) was questioned by benchmarker Neal Nelson & Associates, Mips Computer Systems, Inc. splashed down with a chip it claimed is 50% faster than all other RISC-based processors.

Mips Computer claimed its R3000 chip will perform at 20 million instructions per second (MIPS) on a sustained — not peak — rating. Nelson made public a week earlier test results that showed Sun Microsystems, Inc.'s Sun-4 Scalable Processor Architecture, or Sparc, RISC chip — which Sun claimed runs at 10 MIPS — ran slower than claimed in computation- and disk-intensive tasks.

"RISC doesn't seem to look as good as those splashy ads," said Neal Nelson, adding that he was afraid the stampede toward RISC would diminish development of more traditional technology. But "it could be the people at Mips Computer know something," he said.

A Mips Computer spokesman said the firm benchmarked on its own testing facilities. "Sun called us and wanted to know if they could use our benchmark machines," said William Jobe, Mips Computer's vice-president of sales.

The R3010, a floating-point coprocessor the firm said performs 4 million floating-point operations per second (MFLOPS) double-precision and 7 MFLOPS single-precision, was also introduced last week.

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Miller quits Software AG

Bails out as firm's West German parent moves in

Stuart Miller, president and chief executive officer of Software AG of North America, Inc., resigned last week as the company completed its transition from a publicly held company to a privately owned one.

Miller would not make a public statement regarding his departure. However, the company's chairman, John Maguire, confirmed that Miller sent an internal memo last week announcing his resignation.

According to Maguire, Miller is leaving Software AG because he does not want to continue working with a private company.

Software AG had been a publicly held company until recently, when it was reabsorbed by its parent company, Software AG of Darmstadt, West Germany.

The tender offer that returned the U.S. entity to its parent was completed last Thursday.

Maguire said Linwood Pearce, executive vice-president of sales and marketing, will function in a chief operating officer capacity until a replacement for Miller is named.

Software AG's Miller

Maguire also said he does not expect any major business changes as Software AG takes on a privately held status.

A strategy statement is being put together and will be released later this week, Maguire added.

Oversight

FROM PAGE 1

pleted in October 1986. An estimated 104,000 errors were copied into the new system and not found until inaccurate billings were made. The Tax Accounting System (TAS) also identified the errors by issuing 300,000 exception reports for mismatched information.

The audit, which was delivered to the state legislature last month, reported that 24,000 employers contacted the department with incorrect bills sent out by the system.

The EDD was responsible for collecting $13 billion in taxes through employee withholding last year. Each of the 700,000 employers in the state must report to the department. According to the audit, the EDD stopped sending out bills for collection on old accounts last April because of the file errors.

Undercollections were not the only problems created by TAS. The audit also found that the EDD incorrectly refunded $800,000 to 3,600 employers and that although the department knew of the error that caused the refund, the checks still went out. Most of the money has reportedly been recovered.

The origin of the problems dates back to 1980, when the EDD decided to fully automate its 19 ledger systems, including the Employer Tax Subsidiary Ledger, referred to as Edsel by the MIS staff. Six years and $13 million later, the department had installed 450 terminals, two Recognition Equipment, Inc. Tartan XP 80 optical disk scanners capable of processing 55 page/min and Amdahl Corp. 5090 and IBM 3090 mainframes.

During that time, 60 million employer files were converted from the ledger systems to the single TAS application. "The conversion took about 12,000 person-hours," said Karl Grossenbacher, deputy director of the department's tax branch.

"We recognized some areas that needed to be worked on within a few days of the system's implementation," said Steve Howe, chief of data processing for the EDD.

On the system's christening day in October 1986, however, the state proclaimed it to be phenomenal and a milestone in automation history.

But when TAS started spitting out collection notices, some employers who thought they had paid up got scared. "We had to spend a considerable amount of time telling them, 'Don't panic,' " Grossenbacher said.

The EDD did not have any idea that its original files carried so many errors because, "the old system was a lot more human," Howe said. "With human intervention, people would discover errors and reconcile the files."

Although last month's auditor's report made public the problems the EDD was having, the department did not wait to be taken to the woodshed.

Two months after the errors were found, Kaye Kiddoo, director of the EDD, put together a task force of executives. "He locked us in a room and relieved us of our other responsibilities," Grossenbacher said. "He asked for a plan to fix it and didn't let us out until January."

Unisys boosts A series power with low-end dual processor

BY STANLEY GIBSON
CW STAFF

DETROIT — Unisys Corp. added a dual-processor system to the low end of its A series last week, reportedly boosting power 75% over a previous single-processor model.

The A 6 Model K is a two-processor version of the A 6 Model F, announced in September 1987 as a replacement for the A 5 Model F.

Unisys also announced a kit to upgrade the A 6 Model F to the A 6 Model K. In addition, Unisys announced an upgrade for A 5 Model F users and A 3 Model K users, turning those systems into dual-processor A 5 Model Ks at the same performance level as the A 6 Model K. Both the upgraded A 5 Model K and the A 6 Model K offer approximately 2.8 million instructions per second each, according to *Computerworld* estimates.

Competitive edge

"These products compete with the IBM 9370 and DEC products," said Mike Deneen, Unisys program marketing manager. He said the systems offer symmetrical multiprocessing, in which both processors share the same memory and a single copy of the operating system.

With the dual-processor systems, Unisys unveiled a new I/O processor, said to speed up transmission to 4.5M byte/sec. from 3.5M byte/sec. on the previous systems.

Unisys also introduced a magnetic tape subsystem, the Model 2145, an open-reel device designed for mid-range systems. The subsystem can operate at either 50 or 100 in./sec.

The A 6 Model K can be configured with 24M to 96M bytes of memory in 12M-byte increments, using 1M-bit dynamic random-access memory chips. The maximum memory on the previous A 6 Model F was 48M bytes.

The upgraded A 5 Model K uses 256K-bit RAM chips and can be configured with 12M to 48M bytes of memory — double the capacity of the A 5 Model F.

The A 6 Model K is the first A series system to utilize the new B 9493-280 built-in disk drive. The 5¼-in. disk drive features a formatted capacity of 280M bytes per drive. Up to four of the drives can be contained in one cabinet.

Third-quarter availability

The A 6 Model K, starting at $230,000, will be available in the third quarter of this year. The upgrade kit that changes the A 6 Model F to the A 6 Model K is also scheduled to be available in the third quarter for $115,000.

Kits to upgrade the A 5 Model F to the A 5 Model K will reportedly be available in the second quarter for $115,000.

Kits to upgrade the dual-processor A 3 Model K to the A 5 Model K are priced at $150,000 and are slated for second-quarter delivery.

Duquesne hit with $5M suit

BY ALAN ALPER
CW STAFF

FAIRFAX, Va. — Uccel Corp. and its parent company, Computer Associates International, Inc., last week asked a state court here to enjoin Duquesne Systems, Inc. from using information gained from confidential documents allegedly taken from its premises by two former employees.

The complaint was filed 12 days after local authorities seized Uccel customer account reports and other documents found at Duquesne's Vienna, Va., office [CW, March 21]. The documents were allegedly misappropriated by two former Uccel employees, James Holland and Kenneth Smartt, when they resigned to join Duquesne last December.

In the suit, Holland and Smartt are charged with violating their employment contract with Uccel by allegedly taking the documents and circulating them at Duquesne. Duquesne is charged with conspiring to secure the documents and using them to take sales from Uccel.

In addition to requesting a permanent injunction against using information contained in the documents, the complaint asks that Holland and Smartt be prevented for two years from working in the same market area they handled at Uccel while employed by Duquesne or any other competitor. It also asks for compensatory damages in an amount equal to its lost profits and not less than $5 million in punitive damages.

A hearing on a temporary injunction is scheduled for April 13. Duquesne declined comment on the suit.

A Computer Associates attorney said the amount of compensatory damages could only be ascertained by scrutinizing Duquesne's accounting records. The judge hearing the case will make that determination, he added.

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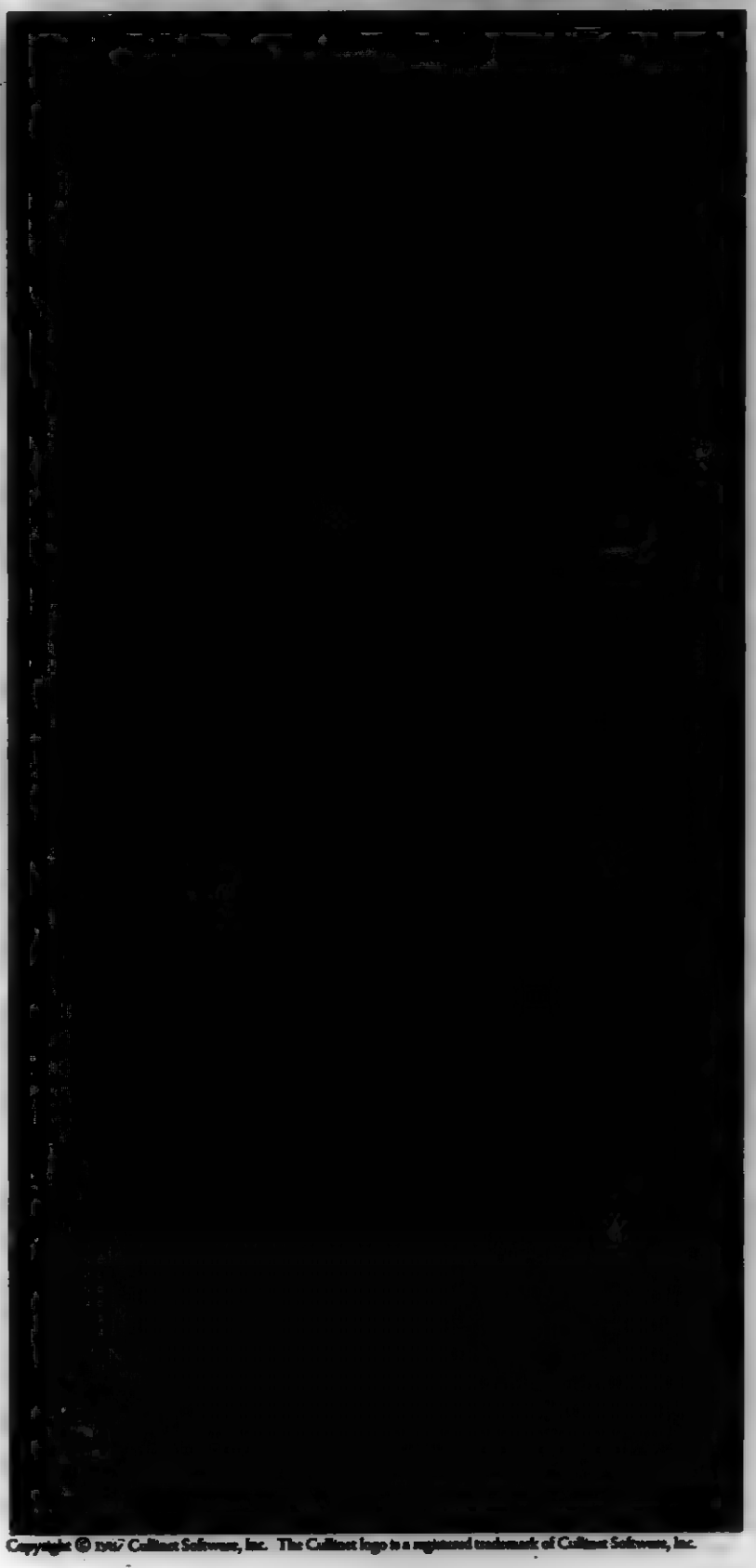

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Tandy to offer clone of IBM's Micro Channel

BY JULIE PITTA
CW STAFF

FORT WORTH, Texas — Tandy Corp. will be the first vendor to formally announce a personal computer duplicating IBM's Micro Channel architecture with the introduction later this month of a microcomputer compatible with IBM's Personal System/2.

Intel Corp. has supplied Tandy with its as-yet-unannounced Micro Channel-compatible chip set, sources said. So far, only Chips and Technologies, Inc. and Western Digital Corp. have offered such chip sets. Intel officials could not be reached for comment.

Tandy officials also declined to comment on the new system. However, sources said the company is expected to formally introduce its version of the PS/2 Model 80 at a press conference set for April 21 in New York.

Sources said the Tandy system will be based on Intel's 20-MHz 80386 microprocessor. It will offer 2M bytes of random-access memory, expandable to 16M bytes, and a 16-bit IBM Video Graphics Array card.

An IBM PS/2 Model 80 with a 115M-byte hard disk drive and a 12-in. color monitor is priced at $11,695. Sources said Tandy may price its system as much as 20% less than IBM's, although the company has yet to determine a price.

Vote of confidence

Recently, while publicly questioning the existence of any demand for a Micro Channel-compatible system, Tandy Chief Executive Officer John Roach expressed confidence that earlier cross-licensing deals with IBM should safeguard Tandy from legal moves designed to protect IBM's proprietary technology.

Jumping into the market with the first PS/2 compatible is an attempt by Tandy to enhance its image. A leading supplier to home and small-business users because of its pricing edge, Tandy has eagerly targeted the corporate market and formed a small direct sales force to reach those users last year. So far, Tandy's success in the Fortune 1,000 has been limited.

Tom Eagan, microcomputer manager at Wells Fargo Bank NA, a Tandy corporate customer, said he has no plans to purchase PS/2s or compatibles. "We aren't rushing out there. We don't see any particular strategic advantage to it," he said.

Senior Editor Ed Scannell contributed to this report.

Lotus's Blueprint supplys data access

BY DOUGLAS BARNEY
CW STAFF

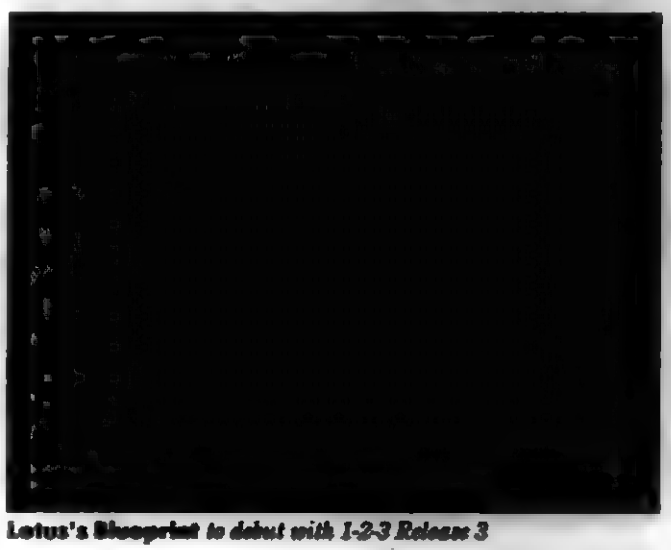
CAMBRIDGE, Mass. — If Lotus Development Corp. has its way, its Blueprint data-access interface will be a boon for communications-hungry MIS professionals when it arrives late this year.

Lotus said Blueprint, which was announced last week, will debut with the shipment of 1-2-3 Release 3 and will also be included in every major Lotus application that ships thereafter.

With Blueprint, users reportedly will be able to query a variety of microcomputer and host data bases without leaving the Lotus application. The network-independent interface automatically translates the files into a 1-2-3 format and allows direct querying and record updates from the personal computer, according to the vendor.

It is also said to convert field names and data, provide a hot view for live data feeds and allow transaction-level data base updates.

Among the data base developers pledging support for Blueprint are Oracle Corp., Relational Technology, Inc., Microrim, Inc. and IBM. For most of them, support means writing drivers to connect their data base management systems to Lotus applications. For IBM, it means selling 1-2-3/M, an IBM 370 spreadsheet product that will include the Blueprint interface.



Lotus's Blueprint *to debut with 1-2-3 Release 3*

Lotus said it will also connect its applications to the Microsoft Corp./Ashton-Tate Corp./Sybase, Inc. SQL Server through a driver it licensed from Synex Systems Corp. If the product is successful, 1-2-3 will compete with Ashton-Tate's Dbase in the market for SQL Server front-end tools.

But much more needs to be accomplished for Lotus to meet its goal of making 1-2-3 the center of a networked universe.

In particular, 1-2-3 Release 3, Blueprint, 1-2-3/M and a variety of third-party drivers must ship. Most of these components are expected to emerge before the end of this year, but there is no guarantee of this.

According to one vendor, Blueprint is more than just a way for 1-2-3 to talk to data bases. It may also be a way for Lotus's still-unshipped DBMS tools to connect to a wide variety of non-Lotus DBMS products.

"Blueprint is only the first shoe that Lotus will be dropping. They want to provide the ability to connect its DBMS tools to a variety of data stores," said Peter Tierney, vice-president of marketing for Oracle.

Lotus will also offer a $250 Blueprint tool kit for software vendors and MIS shops to create drivers tying applications to Blueprint.

Users called Blueprint a good plan. "It makes sense to try and standardize the application programming interface in general, because overall, it gives users more flexibility," said R. Bruce Johnson, manager of the PC resource center at Deloitte, Haskins & Sells.

"It is a really good trend. It makes room for even more add-on packages by opening the product up," said Wayne Maples, a PC manager at the Federal Reserve Bank of Dallas.

PC promises

FROM PAGE 1

try. During the past year, users have been bombarded with promises of spectacular products, often accompanied by vague technical specifics, fuzzy shipment dates and skimpy pricing details.

In other cases, a high level of detail is provided about products that are in fairly early stages of development.

Critical delays

Among the list of critical products that have been subject to early demonstrations but long delays are Ashton-Tate's Dbase Mac; Microsoft Corp.'s Microsoft Windows 1.0 and 2.0; IBM's OS/2, Presentation Manager and Systems Application Architecture; Lotus's Agenda, Notes, 1-2-3 Release 3 and Blueprint; and a host of IBM PS/2 clones.

Toss into that brew the still-unrealized potential of IBM's highly touted Micro Channel architecture and IBM's recent promises made in a seminar to deliver new machines with lower price points, and the vapor has begun to choke vendor credibility.

"They try to create a market position to keep people from shifting to a competitor. That is pretty tacky. It is an old IBM ploy: scareware," said Wayne Maples, a manager of PCs at the Federal Reserve Bank located in Dallas.

"Where's the beef?" another user asked.

PC vendors cite two major reasons for preannouncing products. One is that users need to know what is coming in order to plan for a product's arrival. The other is the need to build a competitive edge.

Microsoft drew on the first strategy to prime the pump for its MS OS/2 operating system. Nearly two years before MS OS/2 was announced in April 1987, Microsoft spoke in vague terms about a protected-mode DOS, which was alternately called 286DOS, Advanced DOS and DOS 5.0.

Even IBM began to demonstrate the OS/2 Presentation Manager nearly a year before the tool kit for developers ever shipped.

It was a similar story with Microsoft Excel for the PC, which was leaked, publicly discussed, leaked some more, announced and — finally — shipped.

Balancing act

Developers say balancing users' need to know with their distaste for the unavailability of products is a seemingly impossible task. On the one hand, increasingly cynical users say they now view announcements and statements of direction with an alarming dose of cynicism.

"I believe nothing IBM tells me, and I don't believe anything we hear from Lotus until the product has gone into beta," Skopec said.

But the issue is a catch-22. For all their skepticism, none of the users interviewed by *Computerworld* said they want vendors to stop providing information.

"It is a double-edged sword. For planning, I like to know what is coming," said R. Bruce Johnson, manager of the PC resource center at Deloitte Haskins & Sells. "The only problem is, I have to validate whether they can fulfill the promises they put forth. If you are burned a few times, you learn who to trust and who not to trust."

What can vendors do? Most users suggested toning down the hype and providing more realistic information about a product's development cycle. Another suggestion was for vendors to be less ambitious about upgrading a product by giving users the enhancements in stages rather than in often-delayed major upgrades.

Anticipation

Micro software vendors are quick to announce but slow to deliver

Pagemaker	IBM	September 1986	18
Wordperfect Mac	Wordperfect	January 1987	14
Sprint	Borland International	February 1987	13
OS/2 Standard Edition 1.1	IBM	April 1987	12
OS/2 Extended Edition 1.1	IBM	April 1987	11
1-2-3G	Lotus	April 1987	11
1-2-3 Release 3	Lotus	April 1987	11
Ami	Peachtree	June 1987	Nine
3+Open	3Com	July 1987	Eight
1-2-3 Mac	Lotus	October 1987	Five
Agenda	Lotus	November 1987	Three
SQL Server	Ashton-Tate/ Microsoft	January 1988	Two
Full Impact	Ashton-Tate	February 1988	One
Dbase IV	Ashton-Tate	February 1988	One

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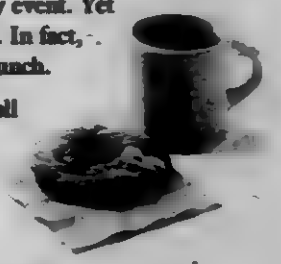

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Cleveland, OH April 29	New Orleans, LA April 6	Regina, SK May 3
Dallas, TX April 5	New York, NY April 20	San Francisco, CA April 12
Detroit, MI May 17	New York, NY May 18	St. Louis, MO April 26
Hartford, CT May 12	Oakland, CA April 13	Toronto, ON April 19
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Telenet, Pacific Gas ink deal for packet-switched network

BY KATHY CHIN LEONG
CW STAFF

CHICAGO — Telenet Communications Corp. announced an agreement last week, valued at just under $10 million, for a private packet-switched network with Pacific Gas & Electric Co., one of the country's largest utilities.

Telenet revealed the pact at the Interface '88 show here; it also chose to unveil a CCITT X.25 encryption service along with an international service that connects Telenet's public network to Japan.

According to John Holmblad, Telenet's vice-president of network systems, Pacific Gas is embarking on a companywide plan to link disparate systems in smaller networks together on a single backbone network. The San Francisco-based utility runs a myriad of Digital Equipment Corp. Microvaxes and IBM hosts and networks from Banyan Systems, Inc., Novell, Inc. and others.

Additional access

When all five Telenet TP4255 switches and 22 concentrators are installed by the end of 1990, Pacific Gas expects to give more users access to five key applications.

These applications include the following: data analysis and distribution for gas, data analysis for electric power, corporate administration, electronic mail and private branch exchange management. The key application focuses on the Gas Scada Network, which carries information on customer billing and gas consumption.

"Our attempt is to build a corporate resource that does not obsolete anything that we have in place now," said Dave Langholff, director of data communications at Pacific Gas. The utility has more than $100 million invested in hardware. "We wanted something economical, since we do have an obligation to our ratepayers," he said.

According to Langholff, an extensive scrutiny of existing hardware and networks showed that the most common and most agreed upon interface would be X.25. Pacific Gas will also be using Telenet's Network Control Center management tool to monitor its new investment carefully. Holmblad said the company is one of the few utilities that has decided to run its own packet network.

Hoping to attract users who are worried about security, Floyd Trogdon, vice-president and general manager at Telenet, said a new X.25 encryption service will give Telenet Public Data Network customers peace of mind. The encryption service now puts Telenet ahead of Tymnet, McDonnell Douglas Network Systems Co., which has no encryption features.

Priced at approximately $200 per connection, the service is based on a device manufactured by Technical Communications Corp. in Concord, Mass.

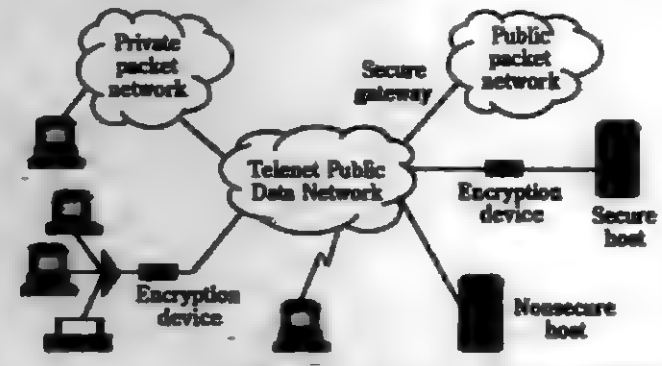
Encrypting data packets is tricky, since information is sliced up routinely. Addresses that need to be recognized may be encrypted by mistake, other vendors said. "You have to selectively encrypt the right data, and that is very hard to do," one source said.

However, Trogdon countered the remark and said, "The encryptor has intelligence to scramble only the data and not the addresses." One government customer is already a user of the encryption service, he added.

In continuing efforts to broaden network connections, Trogdon said Telenet has signed an agreement with Japanese public packet vendor Global Van Japan, Inc. for services between the two countries' networks. The new service would give users additional node access along with protocol conversion capabilities.

Keeping the lid on

Telenet provides encryption devices to allow transmission of data on packet networks without fear of interception



INFORMATION PROVIDED BY TELENET COMMUNICATIONS CORP.
CW CHART

First WCC suffers birthing pains

Organizers predict better attendance if show stays linked with Interface

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — If the World Congress on Computing (WCC) was an infant this year as it adjoined the Interface '88 conference at McCormick Place here, it had better be weaned by the age of one.

That is because The Interface Group, Inc., which conceived WCC as a replacement for the defunct National Computer Conference, plans to keep WCC in Chicago, returning March 29, 1989, while Interface '89 is scheduled to move to the Jacob K. Javits Convention Center in New York March 13.

But based on the slightly lower than expected attendance for both shows together — about 15,000 against a projected 20,000 — the Needham, Mass.-based sponsor is considering a change in plans.

"I can tell you that although there are contractual obligations to have WCC and Interface in different cities next year," Interface Group spokesman Peter Young said, "the idea of keeping them together is being considered."

In general, WCC's vendors were smaller and their exhibits more modest than their counterparts on the Interface floor. "All the double-deck booths are on the second floor, where Interface is," noted Joyce McKee, vice-president of B. R. Blackmarr & Associates, a Dallas firm that studies trade shows. The second floor was the site of a two-tier IBM booth, which operated like a Disney World attraction.

A helping hand

Nevertheless, the very first WCC seemed to benefit from Interface crowds that stopped on their way to view the Interface exhibits on the floor above the WCC show.

With 130 vendors compared with Interface's 250, WCC also faced the 16-year-old Interface's competing conference schedule. Some WCC seminars were well attended, but other seminar rooms were nearly empty, depending on the time of day.

A common perception surfaced that WCC and Interface were one and the same conference. "After a while, it all sort of runs together," observed Robert Liggett, regional manager of Reliable, Inc. in Conyers, Ga. "It would make sense if WCC were to continue to be attached to some show like Comdex. That would bring in a greater cross section of the computing world."

Some attendees ventured to guess that a Comdex/WCC show is being planned, but the Interface spokesman said the possibility has not yet been explored.

The concept of linking smaller, narrowly focused shows with larger, well-established shows is catching on in the trade show industry, Blackmarr's McKee said. "We're seeing other show managements trying to combine a conference program with a larger show. That way, they're shooting for very high numbers in attendance and drawing good numbers from the city where the show is held for the educational programs."

Spectrum

FROM PAGE 1

A spokesman for HP confirmed that the company would be introducing the Models 925, 935 and 955 as well as two new systems for the technical sector, one of which is rumored to be an HP 9000 Model 855.

In addition, the spokesman confirmed that two versions of an HP Micro 3000, the 3000XL, will be unveiled.

One version of the 3000XL is expected to cost around $12,000, support six to eight users and offer 400M bytes of main memory.

HP is scheduled to release full details at a press conference Wednesday in New York. The company would not elaborate on details prior to the formal unveiling.

Users and analysts said last week that they are not surprised that HP will roll out additional Spectrum models only a few months after getting the long-delayed systems out the door.

There's more to RISC

"HP needs to impress upon people that RISC is not just a way to have fast machines, but that it is really a platform for more efficient development that will allow them to roll out machines much quicker than traditional designs would," said Gwen Petersen, an analyst with Dataquest, Inc.

The success of Spectrum in the marketplace is crucial to HP's future growth, Petersen added. "It's like asking, 'How important are telephones to AT&T?' "

HP has previously promised that Precision Architecture — the company's version of RISC — will eventually be implemented across a range of technical and commercial sector products, a strategy that would offer users greater compatibility between low- and high-end systems.

"The one concern I've had is when HP would come out with smaller systems in the Precision Architecture, and it looks like they are addressing that concern," said Isaac Blake, technical support analyst for the City of Tempe, Arizona's Information Systems Division.

Two-way satisfaction

Precision Architecture also enables HP to significantly reduce the amount of hardware development needed to satisfy users in both the commercial and engineering sectors.

The HP 3000 Model 925, for example, will essentially be the same box as the HP 9000 Model 825, according to some sources.

The main differences are that the Model 925 runs the MPE XL operating system — the Model 825 runs HP-UX, HP's version of Unix — and will offer at least 16M bytes of standard memory, compared with the Model 825's 8M bytes.

Similarly, the Model 935 is expected to be an MPE XL variation on the HP 9000 Model 835, a supercomputing workstation that was announced two weeks ago at the National Computer Graphics Association exposition in Anaheim, Calif. (CW, March 28).

The HP 9000 Model 855 system is expected to bear a physical likeness to the HP 3000 Model 955.

Separate technology

Sources predicted that the Models 925 and 935 will use the transistor-to-transistor logic technology employed by the Model 930, which consists of a single central processor made up of five circuit boards.

The Models 950 and 955, however, utilize the NMOS technology, enabling use of a single-board processor and greatly increasing throughput. The NMOS technology is considered too expensive and power-hungry currently to be placed in a lower end machine.

The Model 930 is a 4.5-MIPS system that sells for $190,000 with software; a Model 950 preconfigured with software is $270,000.

An estimated 255 Spectrum 930 and 950 models have been shipped to date, according to Kidder Peabody, a figure that should climb to 550 by the end of this month.

The Model 950 will make up 65% to 75% of the Spectrum models shipped by the quarter's end this month.

Paine Webber, Inc. predicted HP will sell 1,500 to 2,000 commercial Spectrum machines this year, totaling $300 million to $400 million in revenue. The HP 3000 series brings in about $2 billion in annual revenue for the company.

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	Oakland	Apr 27
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COMPUTERWORLD

PC data base sales growth slipped in '87

BY ALAN J. RYAN
CW STAFF

PLYMOUTH MEETING, Pa. — Data base software sales in microcomputer specialty stores took a strong downward turn during 1987, while the software industry in general enjoyed substantial growth, according to a study by IMS America's Computer Markets Division.

According to IMS year-end audit reports of 500 stores, Ashton-Tate Corp. continued to lead in the data base software category. Second-place honors went to Borland International, which displaced the former No. 2 firm, Software Publishing Corp.

The study showed that the data base market declined 2% in dollar growth and 16% in unit growth during 1987, while all other software categories enjoyed growth of 10% or more.

Analysts contacted last week said the study results were puzzling. With personal computer sales up approximately 35% in 1987, they said, it was difficult to believe that data base software had taken a downward turn.

"Ashton-Tate's Dbase sales were flat sequentially during 1987, but I assumed clones were gaining market share," said Rick Sherlund, an analyst with Goldman, Sachs & Co.

A spokeswoman for Ashton-Tate said although the firm is seeing no decline in its data base software sales, the study results may indicate that more data base sales are being moved through other channels, including value-added resellers and direct sales.

Gary Hromadko, a partner at Robertson, Colman & Stephens, said although it is possible that the data base software growth rate declined somewhat, that segment of the industry continues to grow at a brisk clip.

"If anything, the data base software category is more alive than it has been for some time," Hromadko said, adding that the opportunity for data management software continues to improve because of ease of use and increased functionality.

The analysts said the data base software market is still an open field, thus a decline in growth would not stem from oversaturation. However, one analyst said, new offerings coming down the pike may be contributing to any decline in unit sales.

Plot thickens

"There has been a great deal of controversy surrounding the data base as a desktop tool because of the announcement of OS/2 and OS/2 Extended Edition," Hromadko said.

The IMS study further concluded that total software sales to the store channel grew 48% in dollars and 45% in units in 1987 compared with 1986.

Ron Rehling, vice-president of IMS's Computer Markets Division, said the data base packages available to users were more powerful, but also slightly more costly, during 1987 as compared with 1986.

Paradyne sends flotilla into Netview waters

BY KATHY CHIN LEONG
CW STAFF

CHICAGO — Sinking its teeth heavily into network management, data communications vendor Paradyne Corp. last week officially proclaimed its commitment to supporting IBM's Netview and announced a bevy of products supporting that direction.

Not only has the Largo, Fla., company formed a new business unit responsible for network management, it also launched a new line called Netcare Integrated Network Systems that, according to Paradyne officials, will later support standards such as the ISO's Open Systems Interconnect and AT&T's Unified Network Management Architecture.

The first piece in the line is Netcare/Netview Interface (NVI), a graphically oriented software environment that acts as a gateway to Netview and Netview/PC to let users monitor IBM and Paradyne networks from an IBM Systems Network Architecture terminal. Paradyne products include T1 switches, statistical multiplexers and modems.

Netcare NVI, originally announced in September 1987 as Analysis NV/PC, has been revamped and renamed. It will reportedly support other vendors' hardware upon request. Priced at $2,500, it is set to ship in the second quarter.

The company also announced two remote services: Netcare/Nightwatch and Netcare/Hotline. Under the Nightwatch service, Paradyne provides a remote network management device on user premises aimed at monitoring and troubleshooting equipment after normal business hours. Netcare/Hotline, starting at $500, gives users advanced problem diagnosis, Paradyne said.

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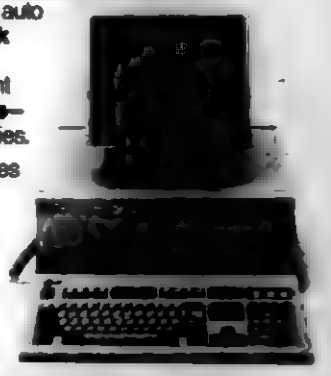

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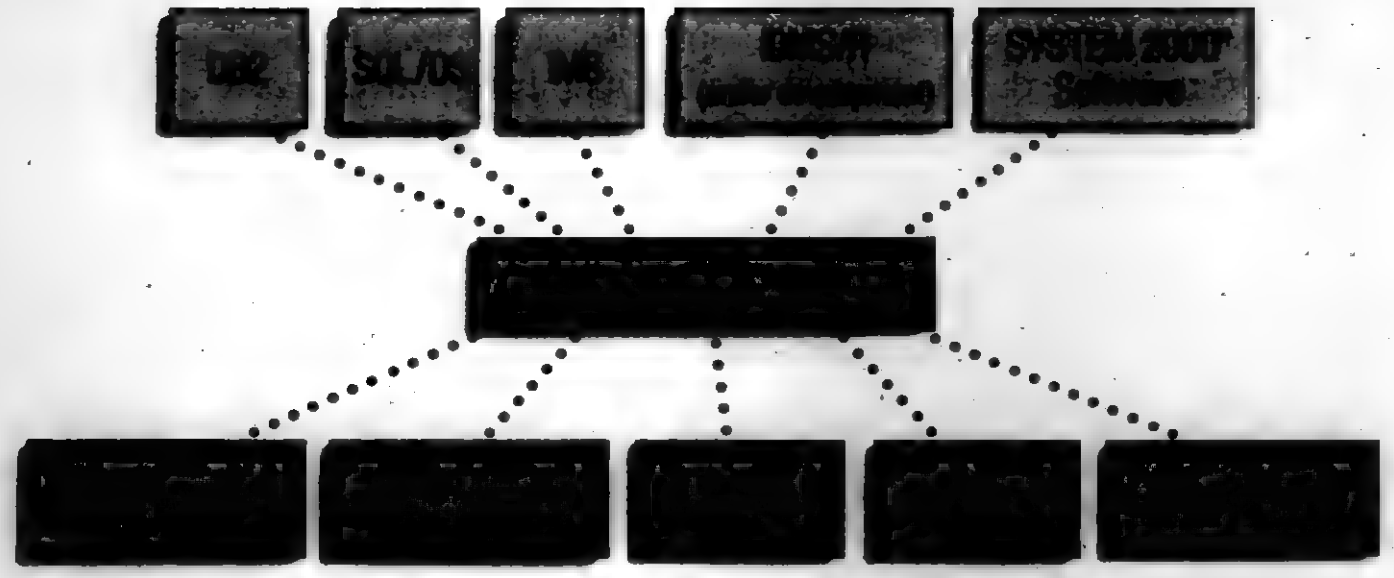

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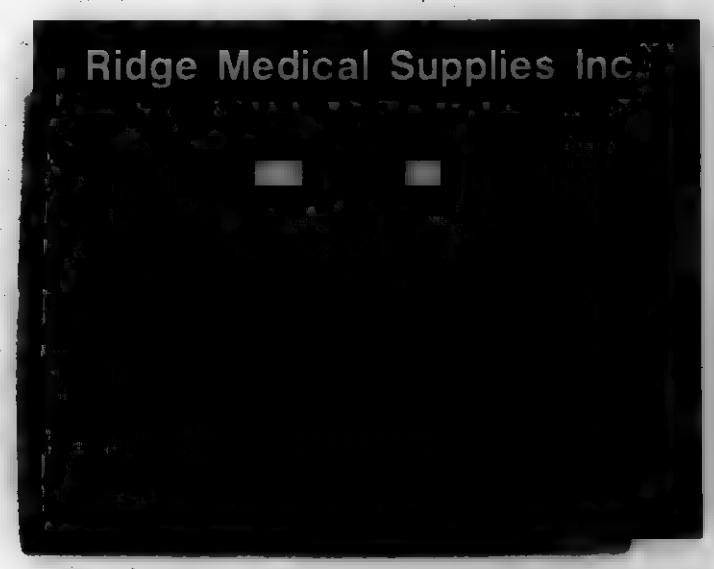

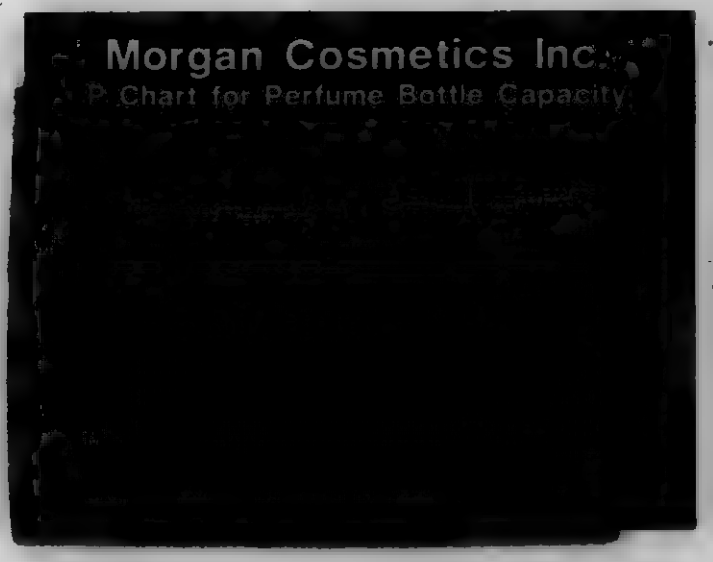

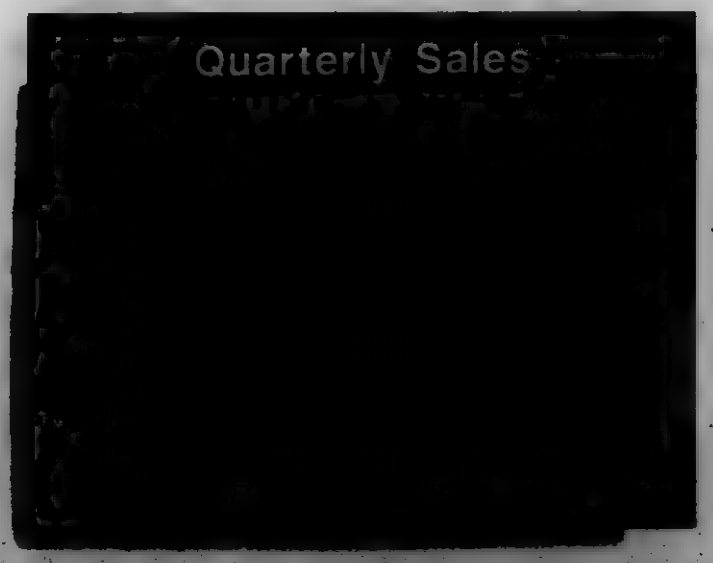

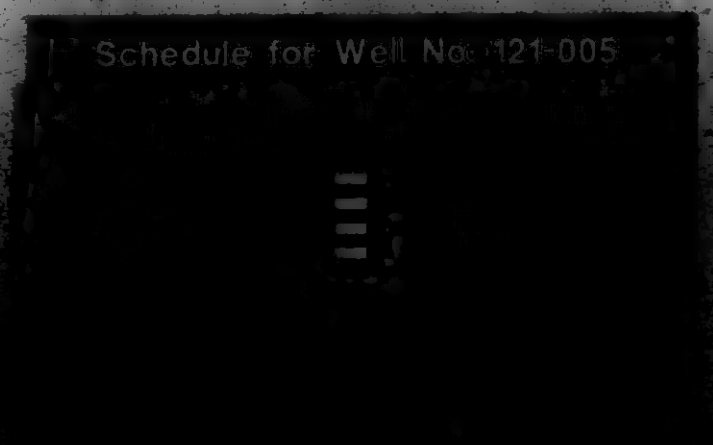

Micom adds voice, LAN options

BY ELISABETH HORWITT
CW STAFF

CHICAGO — Trying to boost its share of the T1 multiplexer market, Micom Systems, Inc. last week announced products that it said push two of the industry's hot buttons: voice/data and local-area network to wide-area network integration.

One add-on is said to let Micom's T1 multiplexer line support a long-distance LAN-to-LAN connection; a second introduction permits a Micom statistical multiplexer to intersperse voice and data packets over the same channel, significantly increasing total throughput, Micom said. Both offerings debuted here at the Interface '88 conference.

The DX-LAN Bridge Extension (DX-LBE) allows the communications manager to allocate T1 multiplexer bandwidth on an as-needed basis to either LAN-to-LAN communications or voice or data transmissions, Micom said.

Micom designed its bridge "from a wide-area networking perspective, where bandwidth still costs money and it's important to manage network resources as efficiently as possible," Micom senior marketing manager Lee Zipin said. Most bridges are currently offered by LAN vendors that are used to assuming that bandwidth is inexpensive and plentiful, Zipin added. Many of these products take up an entire T1 channel, even though LAN-to-LAN communications frequently require only 56K bit/sec. or less.

In contrast, a Micom T1 multiplexer equipped with a DX-LBE can allocate between 9.6K and 1M bit/sec. to a point-to-point LAN connection.

The DX-LBE's filtering capabilities allow the network manager to restrict what types of network packets go over the bridge, as a way to alleviate traffic bottlenecks or limit user access to certain network resources, Zipin said. The operator can also monitor and collect error and usage statistics from the bridge, using Micom's Digital Wideband Exchange T1 Resource Manager.

Simi Valley, Calif.-based Micom's approach to bridging may make it easier for telecommunications managers to deal with increasing demands for LAN connectivity within their corporations, according to Chester Frankfeldt, a senior associate at New York research company The Diebold Group, Inc.

"When it comes time to hook LANs together, you are bringing entirely new demands to telecommunications people who probably are used to having total control of the T1 link," Frankfeldt said. According to a recent Diebold Group report, LAN bridge installations grew by 85% in the industrial sector and by 100% in the service sector from 1986 to 1987.

The DX-LBE is said to provide transparent support for networking protocols such as Digital Equipment Corp.'s Decnet and Transmission Control Protocol/Internet Protocol. It is set for May delivery at a price of $6,975.

Another bridge coming

Later this year, Micom plans to introduce a second bridge product that will support long-distance connections between multiple LANs at speeds greater than 1M bit/sec., Zipin said.

Micom also introduced Stat V, a statistical multiplexer that uses Micom's Advanced Packetized Voice technology to convert voice transmissions into digital packets that can be interspersed with data packets, resulting in 100% channel utilization, Micom product manager Gregory Iverson said. Stat V uses an estimated 60% of capacity unused by voice traffic to transmit data packets, he said.

Stat V operates over a leased analog line at rates of up to 19.2K bit/sec. or over a 56K bit/sec. digital circuit. The product is available now at prices starting at less than $5,000.

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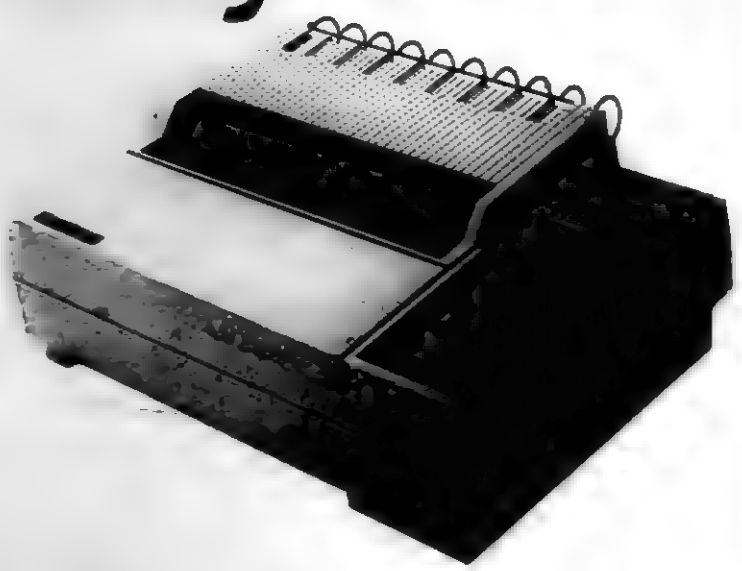

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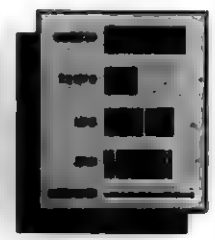

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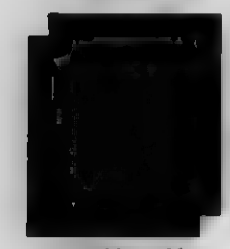

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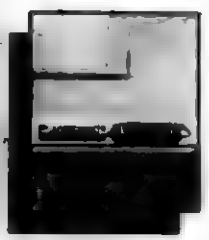

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Oracle offers a little here, there

BELMONT, Calif. — Call them semiannouncements, or perhaps dribbleware. Either term could describe what Oracle Corp. has become very good at: making announcements that are a mixture of new and old information, with promises of more to come.

Oracle's latest is a set of two special bundling deals that it said will allow Lotus Development Corp. 1-2-3 users to access data from Oracle and IBM DB2 data base management systems. The options are based on Oracle's SQL Star distributed networking package. Oracle, however, will not provide pricing or licensing information until next month.

Oracle said one option was designed for dynamic access to DB2 or an Oracle distributed data base that is tied into DB2. The package, called Lotus to DB2/Oracle, includes special licensing agreements for SQLConnect.

The other option is said to provide 1-2-3 users with access to Oracle DBMSs and up to 58 supported host computers using a variety of protocols, such as IBM's 3270 and Digital Equipment Corp.'s Decnet.

In order to take advantage of these options, customers also must use the Oracle Database Add-In for 1-2-3. The options will be available in volume by June, according to Mark Rollins, director of marketing communications at Oracle.

Unix transaction processing stronghold falls

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — The 23-year-old Pick operating system has landed on another beachhead: on-line transaction processors that normally run under the Unix operating system.

Last week, Pyramid Technology Corp. Chief Executive Officer Richard Lussier announced at the Interface '88 conference here that Pick Systems' Pick will run on superminicomputers operating at 7 million instructions per second made by Redwood City, Calif.-based Pyramid. The Pyramid announcement followed similar ones made during the last two years by other Unix-based transaction processing vendors, including Sequoia Systems, Inc. and Encore Computer Corp., both located in Marlboro, Mass.

The Pick-Unix agreements answer the demands of thousands of Pick users who have found that their Pick applications are running out of steam on older machines. "The Pick marketplace was desperate to find hardware platforms that could support a large number of users," explained Gil Figueroa, executive vice-president of Pick Systems in Irvine, Calif., which licenses the Pick operating system to 32 hardware vendors. "Applications are still driving the Pick marketplace. But until recently, no matter which machine you would choose, it would run out of horsepower."

Yet Pick has a strong appeal, especially to small and growing companies, since there are more than 3,000 off-the-shelf Pick applications on the market, including hundreds of financial and manufacturing applications. Users can easily install the prepackaged applications, which typically run on computers for which little or no programming staff exists. Pick is also praised for its built-in data base manager and as a good supervisor of computerized transactions.

Pyramid's Lussier, who said his firm expects to sell 10 machines running Pick this year, added that Systems Management, Inc. in Rosemont, Ill., will be supplying Pyramid's Pick applications. A third partner in the Pyramid announcement is Vmark Computer, Inc., developer of the Uni-Verse software system that allows Pick to be run as a shell under Unix.

"This partnership is an acknowledgment that after years of Pick vs. Unix battles, there are Unix users who need Pick's off-the-shelf applications and Pick users who need the power of high-end Unix machines," said George Ridgway, Systems Management's chairman.

The porting of Pick to Unix was carried out by two companies: Vmark and Concurrent Operating Systems Technology, a firm located in Newport Beach, Calif., that was recently acquired by Sequoia.

Pick goes shopping

Pick's newest platform, the high-speed supermini, is optimized for fault-tolerant transaction processing. Leading the Pick-Unix trend was Sequoia, which has about 10 installed machines running the Pick system, said Peter Johnson, a Sequoia marketing manager. "One of the systems was bought by a cable television shopping network based in Philadelphia," Johnson said. "They handle 25,000 orders a day using Sequoia as their transaction processor."

Even IBM's 4300, 9370 and RT Personal Computer machines have been sold as Pick processors during the last several years, although usually in a custom application, according to Steve Christensen, an executive at turnkey developer Seattle OS, Inc., an IBM value-added dealer based in Bellevue, Wash. "IBM doesn't often say it, but the RT PC can be made to run under Pick and can support up to 40 users for $50,000," Christensen said.

Dick Pick, author of the Pick operating system and president of Pick Systems, commented that he sees the porting of his 1965-vintage operating system onto superminis as a natural step for one of computing's longest lived products.

Pick multiplying on minis

CIE, Fujitsu, General Automation offer multiuser units

BY J. A. SAVAGE
CW STAFF

ANAHEIM, Calif. — Despite the lack of IBM's blessing on the technology, the range of minicomputers running the Pick operating system is expanding to serve the burgeoning army of its dedicated business-oriented users.

CIE Systems, Inc., a subsidiary of C. Itoh Electronics, Inc., along with one of Japan's largest companies, Fujitsu Microsystems of America, Inc., and General Automation, Inc. (GA) unveiled multiuser systems at Spectrum U.S.A. '88 last week.

IBM has not given its blessing to the Pick operating system by employing it in its own computers. However, The Ultimate Corp. has two IBM computers, a 4381 and a 9370, which Ultimate remarkets with a Pick system. A spokesman said the firm has sold about 100 of each.

The Pick operating system makes it easy to run a data base with a small, moderately sophisticated MIS staff, according to show coordinator Gus Giobbi. Pick has a business-only reputation, with specific application software ranging from manufacturing to cemetary plot management.

Licensed to 32 vendors by Pick Systems, the operating system is used on 70,000 computers worldwide, company managers estimated, thereby reaching about one million end users and making the total industry worth more than $2 billion annually.

CIE added two eight-user systems to its CIES 680 line. According to the company, the 680/45 costs less than $10,000 and is based on a Motorola, Inc. 68000 microprocessor running at 10 MHz. It comes with 1M byte of random-access memory, a 53M-byte hard disk drive and a floppy drive. The 680/55 is priced at less than $15,000 and runs at 16.7 MHz with the same configuration.

Additionally, CIE unveiled a high-end system, the 680/275, that supports 128 users for $56,000. It reportedly runs on a Motorola 68020 CPU at 16.7 MHz.

Fujitsu announced a top-of-the-line 160-user addition to its Series 2000, called the Model 80. The company said it runs at 25 MHz for a base price of $149,000.

GA unveiled both high- and low-end systems in its Zebra line. The Zebra 1620 and 1820 can serve 16 and 32 users, respectively. Based on a Motorola 68020 processor at either 12.5 or 16.7 MHz for the 1620 and 16.7 or 20 MHz for the 1820, the systems start at $12,000 and $17,000.

The Zebra 6830 can reportedly accommodate up to 256 users. It runs on a Motorola 69030 chip at 25 MHz. A minimum configuration costs $200,000.

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Expert shell analyzes equipment failures

Consortium's product prompts development of diagnostic systems to prevent downtime

BY ALAN ALPER
CW STAFF

NEW YORK — An expert system shell for developing applications to diagnose and repair large complex machines was unveiled last week by Carnegie Group, Inc. and Texas Instruments, Inc.

Called Testbench, the expert system shell is the first product to result from joint development and marketing agreements signed during the last two years by the two firms. TI is a major investor in Carnegie Group.

Testbench's primary goal is to enable companies to quickly develop machine-specific diagnostic systems that reduce downtime of large-scale equipment on factory floors, noted Dennis Yablonsky, Carnegie Group's president and chief executive officer. It also can be used as a training system — a significant application for companies whose repair expertise is limited — and by hot line operators at maintenance companies, he added.

One Testbench customer, General Tire and Rubber Co. in Akron, Ohio, estimated repair costs for its rubber processing machine at $2,000 a day and idle labor costs at $3,000 to $8,000 per hour. This results in unproduced units numbering 367 to 829 per hour and production delays that cause customer dissatisfaction. General Tire is using Testbench to build a diagnostic system that it hopes will reduce machine downtime and costs while improving customer service.

The expert system will provide the company's maintenance staff at three separate plants with a standardized method of repairing the machine that should ensure that it gets fixed correctly the first time, Yablonsky noted.

With Testbench, a knowledge base is built by gathering relevant repair information from experts on TI's symbolic processing workstation, called Explorer. A development module, called Testbuilder, is used to structure the knowledge base via a fill-in-the-blanks methodology and graphics templates.

The resulting diagnostic environment can be run on Explorer or on IBM Personal Computer AT-class microcomputers under a second module called Testview. A third module, called Testbridge, translates the knowledge base created on Testbuilder from LISP to C code so that it can run on a micro.

The first-copy price of Testbench is approximately $42,000, which includes all three modules, one year of software maintenance and one week of training. It will be available starting June 30.

Much of the core technology for Testbuilder grew out of work Carnegie did for another equity investor, Ford Motor Co. An expert system to diagnose vehicle failures and recommend repairs was built using Carnegie's Knowledge Craft application development tool.

Ford is using Testbench to develop two diagnostic applications: one for wave soldering equipment and the other for fuel injection grinding machines, according to Dave Fawcett, an AI specialist at Ford. "Delivering a diagnostic system on a PC is a very important feature for us because we're using it in a factory," he said.

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Third parties offered free Tandy licenses

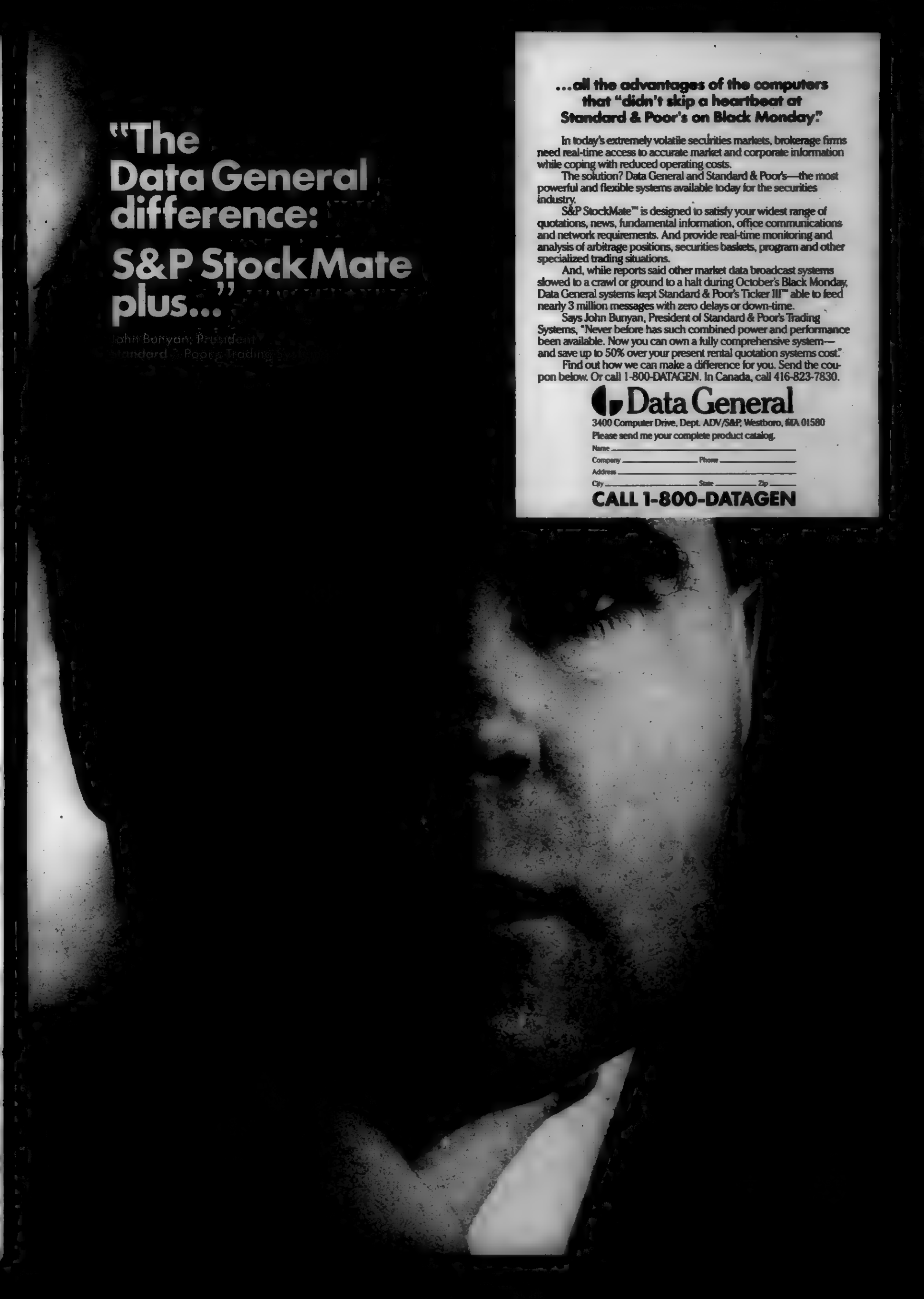
FORT WORTH, Texas — Tandy Corp. last week said it will offer free licenses for its Deskmate operating environment for Intel Corp. 8088, 8086 and low-end 80286 systems to third-party software developers.

Officials at Tandy said offering the license is critical for the low end of the personal computer industry to grow. Tandy's decision stands in stark contrast to Apple Computer, Inc.'s current lawsuit against Microsoft Corp. and Hewlett-Packard Co. that charges those companies with infringing on the Macintosh's user-friendly interface.

"I hate to see someone ebbing the flow of what should happen in this industry," said Ed Juge, Tandy's director of market planning, regarding the Apple lawsuit. "We feel so strongly about that, we're offering this for free."

Introduced last summer, Deskmate is a graphical user interface using pull-down menus and pop-up dialogue boxes requiring 384K bytes of random-access memory. It is compatible with Microsoft MS-DOS-based systems and supports video modes such as IBM's Color Graphics Adapter and Enhanced Graphics Adapter and Hercules Computer Technology, Inc.'s Hercules.

Third-party developers that have made a commitment to Deskmate include Activision, Inc., Electronic Arts and Symantec Corp.



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EDITORIAL

A nasty bug

A MINI PANIC is gripping the industry regarding an invasion of devious little parasites called computer viruses. These viruses, which are really destructive or annoying programs written by hackers, have turned up with alarming frequency in recent months in everything from IBM's electronic mail network to shrink-wrapped copies of Aldus's Freehand package. Usually, they do little more than freeze the system and maybe leave a message gloating about their dirty work. At worst, they can format hard disks, destroy data and spread like wildfire to any computer that comes in contact with them.

There's really nothing new about computer viruses. Hackers have been playing electronic pranks practically since computers were invented. What is new is the amount of publicity the latest epidemic has received. That's partly a function of the clever new label that's been placed on them — rogue programs, like viruses, can mutate and spread contagiously — and partly a reflection of the fact that so many people now use computers and are thus susceptible.

How seriously should MIS take this latest scare? Pretty seriously. Publicity has a way of turning isolated events into trends. The Tylenol poisoning scare of 1983 spawned a rash of copycat crimes, and a series of teenage murder-suicides last Christmas appeared to relate to media coverage of earlier incidents. The specter of attacks striking computers worldwide should concern everyone who operates large systems.

That concern should be particularly great in industries that are in turmoil right now. Given that the vast majority of computer crimes are committed by insiders, companies involved in layoffs, takeovers and financial crises need to be wary of the damage that disaffected employees can wreak. In other words, if you're going to give an MIS employee his walking papers, take away his logon at the same time.

Software vendors should also take note of their vulnerability to viral epidemics. Although liability issues have never been tested in court, developers could be leaving themselves open to lawsuits for unintentionally shipping programs containing parasites.

With any hope, this latest panic will encourage MIS professionals and vendors to exercise greater caution. In the same manner that the Tylenol poisonings led to wider use of tamperproof containers, so should viral epidemics cause software makers to certify products as "clean." Now is also a good time for MIS operations to review security. How resistant are dial-up lines to unwanted intruders? Do you need an extra level of password security? If a virus were to invade your system, would you know it was there?

A dose of user education is also in order. There's no excuse for critical data sitting on hard disks without backup copies existing elsewhere.

Viral epidemics will no doubt recede from view as public interest wanes. But there's no time like the present to take measures to ensure against reinfection.

LETTERS TO THE EDITOR

Who's at fault?

The author's defensive plea to not blame computers in "Computers should not be market crash scapegoats" [CW, Feb. 15] is too often heard on the heels of a disaster in which automated processes played a role.

It is a weak argument — intellectually and morally akin to the comment often attributed to the National Rifle Association, "Guns don't kill people, people kill people."

In each case mentioned, the computer was initially identified as the culprit. Only after the dust had settled was the human act of omission or commission in the use of the computer recognized as the real source of the problem. In none of the cases, fortunately, was the real or imputed cost as great as that of the October 1987 stock market debacle.

But does it make any difference — this slight lack of semantic precision? Don't we all know what we're really talking about?

When you become bold enough in using a computer that you program it to initiate actions dependent on complex sets of criteria, you owe it to yourself to be very careful. It seems apparent after last October that that simple truism also applies to programmed decisions involving humans who get out of control.

It's time that the computer profession stop crying "fault" when the computer is blamed and, instead, employ the evidence of misuse or poor design to demonstrate that prudence, technical know-how and common sense should always be applied when using computers — particularly where the potential cost of not doing so is high.

Richard D. Harris
Rochester, N.Y.

Cheers for Amiga

I was intrigued by William Zachmann's comments concerning OS/2 [CW, Feb. 15]. Zachmann listed his view of the three main benefits of IBM and Microsoft Corp.'s OS/2 as multitasking, access to more memory and the Presentation Manager, the graphics interface.

I have a computer that does all that. My Commodore Business Machines, Inc. Amiga 2000 runs a multitasking operating system that can access 9M bytes of autoconfiguring random-access memory. It has a windows-and-icons-style interface and a Command Line Interpreter. The operating system uses less than 128K bytes, so you do not need extra memory to get booted.

Microsoft's MS-DOS compatibility comes on a card. With the card installed, a user can just open a window to run his personal computer applications, and, while his PC spreadsheet is recalculating, he can prepare three-dimensional video presentation graphics, publish a magazine and play an electronic harpsichord all at once on the Amiga.

If Zachmann is really looking for state-of-the-art hardware, then he is looking in the wrong place. Commodore has been building Amigas for more than two years now, and the competition is still catching up.

Christopher R. Hertel
Programmer/Analyst
Winnetka, Ill.

A few pointers

For future reference, we would like to offer a couple of points regarding the article on text retrieval systems [CW, Feb. 1].

A major one is that basing a market overview on IBM-only sites is misleading in view of the role that departmental computing, primarily on Digital Equipment Corp. systems, has played in the evolution of text systems.

Minicomputers and supermicrocomputers have traditionally been the primary platform for such software, with mainframes used by organizations that wish to centralize or have extremely large data bases. IBM is entering this segment with the 9370, but we all know that its progress has been uncertain to date.

In this wider frame of reference, Information Dimensions, Inc. would represent a very significant player.

Regarding DEC's All-In-1 interface, Illinois Bell initially developed an in-house program to link All-In-1 to Information Dimensions' Basis. However, Illinois Bell then served as a beta-test site for Information Dimensions' own All-In-1 interface, announced last fall, and is now using the Information Dimensions program. In other words, Illinois Bell did not come up with an interface to be marketed by Information Dimensions — the opposite occurred.

I do, however, feel that the piece was very positive in making *Computerworld* readers more aware and educated concerning this rapidly emerging category of primary software.

David C. Holscher
Director, Client Services
Hughes/Rob, Inc.
Columbus, Ohio

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

Users and standards: Who needs whom?

JOHN L. BERG

Add computer standards to your list of changes restructuring our industry.

I mean real standards, the formal kind developed by the American National Standards Institute or the International Standards Organization (ISO), the kind users can build their businesses on — not the other kinds, which help vendors build their own businesses. Whether future standards will better serve users depends on you.

Historically, vendors have formed the establishment of formal standards groups for the simple reason that they immediately feel the benefit or harm from a decision. Only the largest users have seen the advantage of joining them.

Standards organizations have long sought broader participation, but most users find the process slow and expensive, the results unpredictable and the returns marginal. Many feel excluded from a standards system that might require them to spend several hundred thousand dollars to participate.

As a final insult, the companies that don't participate benefit just as much from the standard without spending a dime.

Berg consults in strategic, technological and competitive edge planning from Long Lake, Minn. He is editor in chief of "Computer Standards & Interfaces" and serves on the planning committee of the 1989 International Conference on Standardization.

Collaborative competition

Recently, the main arena for information technology standardization has moved to the international level, at which participation requires even deeper pockets. And a new trend — regional consortia of vendors promoting certain standards — changes the way they develop even more. The consortia provide a shield under which vendors can jointly lobby for standards without the fear of being in collusion.

Obviously, standardization is a competitive issue. Why else would we have formal, de facto, regional and vapor standards?

Standards open markets, and the resulting competition benefits users. Witness the extraordinary price reductions in PCs and the impact on how business is conducted.

But technology has moved in a direction that makes standardization much more important to users. The cost of connectivity, integration, end-user access, cost reductions and shorter application development times will depend squarely on the existence of formal standards.

Users take action

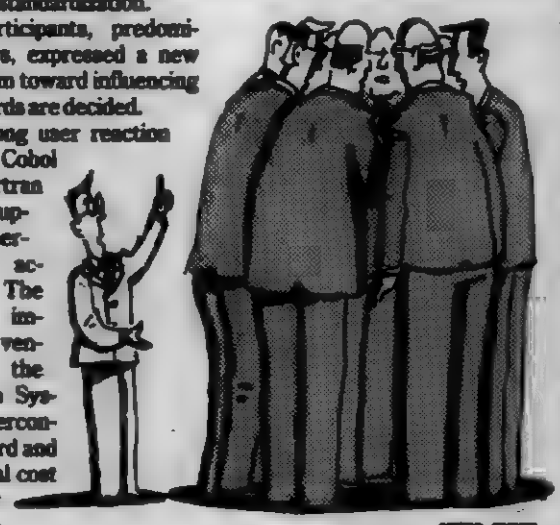
Will users support formal standards? A workshop was held recently by West Germany's equivalent of the National Bureau of Standards to plan an international conference to examine the process of information technology standardization.

The participants, predominantly users, expressed a new user activism toward influencing how standards are decided.

The strong user reaction to recent Cobol and Fortran standards supports this perception of activism. The increasing importance vendors give the ISO's Open Systems Interconnect standard and the potential cost saving for users have produced several active consortia initiated by large users.

Even the Corporation for Open Systems, once suspected of existing to oppose consortia of European and Japanese vendors, has an active User Committee that could turn it into a vehicle of influence for those outside the traditional standardization process.

In fact, the growing trend toward MIS centralization to produce increased buying power will naturally lead to third-party testing, as Underwriters Laboratories certifies electrical appliances. The technical foundation — the ability to specify and validate software — must be laid first, of course, for our own industry before such testing can work.



PETER STEVENS

Vendors as allies

In the U.S., a group of vendors found themselves in a user role relative to Ashton-Tate's Dbase III data base package. They are currently seeking formal specification of the interface on which their companies' products are built.

Compaq is seeking support for the de facto IBM Personal Computer standard over IBM's Personal System/2; the company may eventually suggest developing a formal standard around the PC.

Independent software vendors learned long ago that depending on information given by an umbrella vendor is very tenuous; European vendors turned to the courts to get timely interface data from a major vendor.

In short, the user now finds new allies among the vendors.

What should users do? Figure out how standards fit into your business's self-interest. With that as motivation, seek out like-minded users and standards participants toward challenging the standards decision-making process itself.

No time to fight about Unix

Cooperative, not competitive, thinking is key to Unix development

AMY WOHL

Unix has been in the news a lot lately — which is nothing new. We are always peering curiously over Unix's shoulder, feeling great expectations and hoping that now is finally the time.

That it is the time for the child to grow up, for the soup to boil — the time when we will at last have a universal, portable operating system that all users can use and that all developers can write software for.

Recently, Sun Microsystems and AT&T signed agreements to merge their Unix efforts to create a single, richer version of the operating system. Interestingly, this deal is viewed in many quarters as Sun lending credibility to AT&T, rather than the other way round. AT&T, the mother of Unix, must feel rather like Xerox Star developers viewing the Macintosh interface: so much work, so little credit.

Wohl is president of Wohl Associates in Bala Cynwyd, Pa., and editor of "The Wohl Report on End-User Computing" newsletter.

This agreement angered many vendors that have been strong Unix supporters. They fear AT&T and Sun will optimize new versions of Unix to Sun's Scalable Processor Architecture (Sparc) processor chip, thus favoring vendors like AT&T, Sun and Xerox, which intend to use this reduced instruction set computing processor. Such a move would cast doubts on the future universal acceptability of Unix as a multivendor operating system environment.

Meanwhile, others join the Unix bandwagon. Unisys signed up for AT&T and Sun's version. IBM, perhaps afraid of being left behind, has expressed broader commitment to its AIX half-brother. Apple just announced its AUX version.

No gray area

What is going on here? Unix is becoming a major, mainstream issue for not only computer philosophers but vendors and users as well. More users want to employ hardware from multiple vendors in their systems designs. The proprietary operating systems of individual vendors get in the way of this grand view.

Selecting a particular proprietary operating system locks you into a vendor — its plans, its implementation against those plans and its future success or failure. Users like more flexibility and less risk.

Of course, this view of Unix is based as much on hopes and dreams as on any current reality. There is no single Unix. Rather, in the kingdom of Unix, there are many castles, each ever so slightly different from the others — and, therefore, ever so slightly incompatible.

AT&T, THE MOTHER OF UNIX, must feel rather like Xerox Star developers viewing Apple's Macintosh interface: so much work, so little credit.

With compatibility, like pregnancy, you either are or aren't. Being a little incompatible is not necessarily going to get users close to their goal of intervendor, intersystems portability. It probably will keep you from getting there at all.

The federal government and the European computer community have sweetened the pot by implying that Unix-based products will be favored, or even required, in their requests for proposals.

This suggestion may be premature and cause such systems to end up looking like patchwork quilts and based on unexciting or inadequate software, since the amount of available first-class business-oriented Unix software remains small.

A brightening horizon

However, encouraging signs have emerged recently, indicating that we may begin to see much more business Unix software.

First, the PC software development community is beginning to move individual popular personal productivity packages, especially word processors, to Unix platforms.

Second, although attempts to sell multiuser office automation systems as single-decision, monolithic purchases have been very slow, selling office automation as an incremental purchase — such as adding it on top of existing personal computer investments — is getting ready to take off. Unix seems a likely operating system environment for this "groupware."

These efforts will cause the amount of Unix software to increase substantially and make the ongoing growth of Unix as a business computing environment much more likely to happen.

But none of this progress counts for much if suddenly, just as we are getting more abundant Unix software — and software that needs the multiuser, interconnecting tasks point of view that Unix can offer — we divide the Unix community into incompatible camps.

True, it is far easier to port software from one version of Unix to another than from one proprietary operating system to another, but this advantage is not enough. Customers have been waiting too long for the promise of Unix — a universal operating system that is truly hardware and vendor independent. They will not quietly settle for less.

We could wait for the technology that permits diverse operating systems to work together in an entirely interoperable environment, but that day is still somewhere in the future. Unix lies enticingly much closer, but only if we can hold onto the initial vision and avoid burying the promise of Unix beneath a heap of short-sighted quarrels and short-term commercial advantages.

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*[illegible]

SOFTWARE & SERVICES

SOFT TALK

Craig Carlson

SAA benefits marketplace

IBM's decision to implement Systems Application Architecture (SAA) has far-reaching implications for users, third-party applications vendors and Big Blue itself.

Once SAA is implemented, it will be easier for IBM users to upgrade to larger systems when their needs outgrow current computing power. With SAA, a system upgrade should not result in a need to retrain users or convert applications.

A second benefit will be even more substantial. When SAA is fully implemented, third-party applications should proliferate as never before, and competition among third parties is likely to become much more intense.

Once there is a consistent interface available to all applications developers, a fundamental change may occur. Vertical markets, once regarded as the private preserve of specialized vendors, are likely to become accessible to a broader range of competitors.

Product differentiation is a key concern of applications vendors. Tremendous effort goes into adding capabilities and functionality to product offerings.

Continued on page 22

Performance challenge issued

Sybase benchmarks Release 3 of relational DBMS, throws down gauntlet

BY CHARLES BABCOCK
CW STAFF

BERKELEY, Calif. — The most recent release of Sybase, Inc.'s relational data base management system incorporates a 100% improvement in transaction throughput as measured by a standard industry benchmark, company officials said recently.

The TP1 benchmark was conducted by Sybase on Release 3.0 and corroborated by Russ Sears, principal engineer of Aim Technology, a Palo Alto, Calif., performance evaluation firm that reviewed the test.

The TP1 benchmark simulated a standard consumer bank account transaction. When running on a Digital Equipment Corp. VAX 8700, the Sybase system was measured at 29.3 trans/sec. with an average response time of 0.68 sec. while simulating the work load of 600 users. The average transaction was assumed to take 30 sec., although in actual practice, consumer bank transactions typically take 90 sec. A data base of 100,000 accounts was used for the test, Sybase Vice-President Stewart A. Schuster said.

The results indicated that Sybase on a VAX 8700 "could support the day-to-day transactions of a mid-sized bank," claimed Robert Epstein, Sybase's executive vice-president.

In benchmarking data base performance, the nature of the transaction becomes the key unit of measure, along with disclosure of the conditions that surround its processing, such as average response time and whether transaction logging has been executed. Logging impacts performance by adding overhead to a system, but it is also needed to provide recovery from system failure. The Sybase benchmark included the logging function, Schuster said.

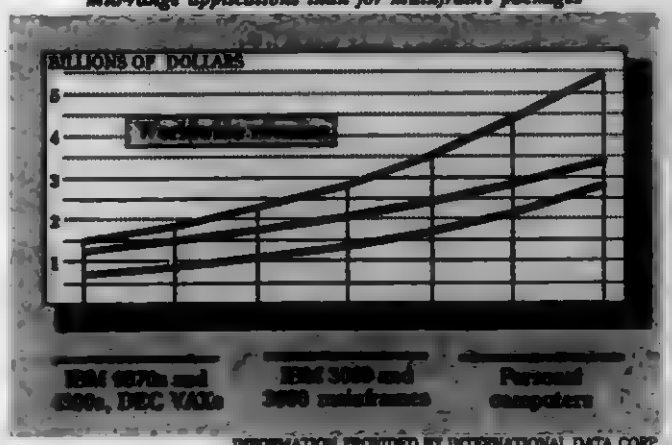
Sybase officials, in effect, have issued a challenge by making a highly specific benchmark public at a time when other vendors, such as Oracle Corp. and Cullinet Software, Inc., are pre-

Continued on page 23

Data View

Applications keep on climbing

Through 1991, revenue is expected to grow faster for PC and mid-range applications than for mainframe packages



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

SOFTWARE NOTES

DB2 loses to Oracle DBMS

In a rare head-to-head competition last year, Oracle Corp.'s Oracle was selected over IBM's DB2 as the mainframe data base management system at Monsanto Co. in St. Louis [CW, Nov. 23]. The firm has a mixed hardware environment as a result of consolidation and was looking for a DBMS that could operate across Hewlett-Packard Co. and Digital Equipment Corp. VAX platforms as well as on a mainframe. Questions remain about how well copies of Oracle

Continued on page 22

Tool puts VAX queries in English

BY NELL MARGOLIS
CW STAFF

ANDOVER, Mass. — Long-term Department of Defense contractor Dynamics Research Corp. (DRC) has taken its first step into the commercial marketplace with a software system that gives workstation and personal computer users easy entry into VAX-based data bases through an English language-type interface.

In its first implementation, SPOCK (System Protocol for Online Communication of Knowledge), which is available immediately, targets Oracle Corp.'s data bases. Future versions will bring in additional data bases as well as expand the number of hardware platforms; next in line is a SPOCK version that accesses Relational Technology, Inc.'s Ingres and is slated for shipment by the fourth quarter, according to John Ragosta, marketing manager at DRC.

Ragosta said SPOCK reduces

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Inside

- Advanced Software Products releases DASD space monitor. Page 24.
- Sequential Software announces file transfer utility for IBM's VM/CMS operating system. Page 24.

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Carlson

CONTINUED FROM PAGE 21

Early accounts payable systems, for example, did little more than track invoices and issue checks.

As the industry developed during the 1970s, vendors added functions, such as the ability to match invoices to purchase orders and receipts, discount terms and project cash requirements, hoping to beat the competition by offering a more useful product.

Look-alikes?

As vertical markets matured, it became much more difficult to differentiate products by adding functionality. In time, for instance, all the major accounts payable products gained much the same functionality.

So vendors looked for other means of differentiation. Powerful technologies, like data bases and on-line capabilities at the mainframe end of the spectrum, and the ease of microcomputers stimulated a lot of interest in the marketplace. Vendors reacted by adopting these technologies as ways to distinguish their products. Data base management systems, on-line system interfaces and on-line transaction processing were developed. Report writers and screen manipulation tools appeared, along with other end-user tools. Expert systems are simply the latest of these technology-based product differentiators.

Today, no major applications vendor is without a technology product offering, and the competition is fierce.

SAA will change all of that. The architecture will, in effect, standardize the very technology-based features that have become the focus of competition among third-party applications vendors.

SAA has four main components. The Common User Interface defines the way end users will interact with systems. The Common Programming Interface defines the parameters of application system design and will standardize the programmer's approach, including his tool kit. The Common Communications Interface solidifies IBM's dominant position in communications protocols. The fourth component will be IBM's application product offerings from its Application Systems Division.

Obviously, products that don't conform to SAA standards will become obsolete. Ultimately, applications vendors will be forced to rewrite their products. That's a painful exercise for vendors with broad product portfolios.

Function is the future

The second consequence is even more challenging. Once conversion to SAA is accepted, vendors will lose their ability to position their products on the basis of technology features; all SAA-compatible vendors will have portable products. The investments of the 1980s will become obsolete, and the battleground for product distinction will shift again from technology to business functionality.

Most industry watchers expect to see the first commercial SAA releases in late 1989 and 1990. The first applications are likely to be office automation products. From 1991 onward, new application releases can be expected from the general field of vendors across the spectrum of applications.

SAA may inject new vitality into the marketplace by making it easier for new companies to enter a market that had posed substantial barriers. For users, SAA will mean more applications and smoother transition to new systems.

For third-party application vendors, the post-SAA world will be more competitive and require major readjustments. Vendors lacking a clear strategic response to SAA, or the will to adapt to it, will fail, regardless of their current strengths. But those firmly committed to establishing themselves in the SAA world stand to gain all the competitive benefits the new standard represents.

Carlson is executive vice-president of Walker Interactive Systems in San Francisco.

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DB2

CONTINUED FROM PAGE 21

interconnect in a multivendor environment, according to sources outside both Monsanto and Oracle who are familiar with the installation. Both Monsanto and Oracle officials declined comment.

The "Heard on the Street" column of *The Wall Street Journal* recently noted that **Computer Associates International, Inc.** founders Charles and Anthony Wang have been selling part of their stock holdings since November. Charles reportedly has sold 6%, or 4.5 million Computer Associates shares, and Anthony has sold 10%, or 2.1 million shares.

TLM, Inc. in Port Chester, N.Y., is publishing five $20 to $30 books on IBM's DB2 and SQL by Boris Musteata and Robert Lesser, who previously authored books on VSAM and CICS. The volumes include *The DB2 Guide: Developing DB2 Applications and SQL Programming* and *Relational Data Base Design for DB2 Applications.*

SPC Software Services, Inc., a subsidiary of Security Pacific Corp., announced it has acquired **Precision Business Systems Ltd.**, a New York firm specializing in transaction and communications software for the financial services industry.

Challenge

CONTINUED FROM PAGE 21

paring to launch their own versions of relational transaction processing systems.

In a comment directed at Oracle, Schuster said, "We don't believe you can announce high performance and at the same time put your system on 30 to 40 hardware platforms."

In addition to the doubling of transaction throughput, Sybase officials said new fault-tolerant features will be included in Release 3.1, slated to be released in the second quarter of this year. The Sybase data base engine will replicate a copy of the data base and transaction log on a second disk system when running on a VAX, Sun Microsystems, Inc. workstation or Pyramid Technology Corp. 9820 superminicomputer. In case of disk failure, Sybase will access the intact copy and transaction log.

The fault-tolerant features on a Vaxcluster will allow a companion data base engine to be ready at all times, awaiting rerouted transactions in the event of primary-engine failure. Sybase claimed its Vaxcluster fault tolerance will be the first to provide on-line recovery with a negligible performance penalty.

On a Vaxcluster, Sybase will avoid the VAX/VMS lock manager by building a record-locking supervisor into the data base engine. Sybase avoids the I/O involved in using the VMS lock manager as long as the records accessed by the Sybase CPU are on disks directly tied to it. The VMS lock manager is a commonly recognized bottleneck for transaction throughput on a Vaxcluster.

In addition, Sybase achieves its transaction throughput by packaging the data base query, updates and data manipulation into a single, compiled transaction. Most relational systems execute one SQL statement at a time, waiting for acknowledgment on each step before proceeding, according to Berl Hartman, director of product marketing.

The Sybase system is priced from $20,000 to $100,000 for superminicomputers and from $2,000 to $10,000 for supermicro workstations. The Companion Server for mirroring data bases and logs is priced from $1,500 to $7,500.

Measuring performance

The Yankee Group, in its "The Future of Transaction Processing" report last year, cited a similar bank branch debit-credit transaction, dubbed ET1, as the basis for Tandem Computers, Inc. citing its SQL-based fault-tolerant system as being able to process 200 trans/sec. The Tandem system was run on a 32-processor machine, the VLX 804. There are differences between ET1 and TP1 transactions, so the results are not directly comparable.

Other cited ET1 benchmark results include the IBM 4381 Model 13 system at 14 trans/sec. and IBM's DB2 on a 3090 Model 200 at 40 trans/sec. The Yankee Group report also cited an ET1 benchmark of the predecessors of Version 3.0 of Sybase as yielding 15 trans/sec. on a Sun-3/160 AT&T Unix System V machine.

The on-line transaction processing market has been estimated by The Yankee Group as worth $17 billion in hardware and software sales in 1987; the market is projected to grow to $34 billion by 1991.

VAX queries

CONTINUED FROM PAGE 21

the need for a user to understand data base query languages. An internal, DRC-proprietary communications language takes the user's English requests, translates them into whatever query language the relevant data base receives and routes them to the data base. The translation process is then reversed so that the user receives the requested data in English, as well.

Routing is determined by SPOCK's global data dictionary, which sits on the user's PC or workstation, Ragosta said. The data accessor component of the SPOCK package resides on the data base host hardware. Such features, combined with SPOCK's specially engineered cross-system join capability, allow the software to serve distributed data base environments, Ragosta explained.

Because the integration of the data takes place at the workstation and PC level, Ragosta said, very little processing actually takes place on the VAX, thus conserving computer resources.

Custom features

"Also," he added, "we have addressed a frequent failure in natural language interfaces: SPOCK allows for domain-specific customization." The software has a vocabulary of 1,000 words and employs more than 3,000 lexicographical rules. It can be highly customized to a user's specific business, Ragosta said.

What is more, he said, SPOCK continues to "learn" as it interacts with the user. For example, a user might enter the query, "How much is the XYZ operation worth to us in deutsche marks?" If SPOCK replies "I don't understand deutsche marks," the user need only type in "A deutsche mark equals such-and-such many dollars." The software, which already has "dollars" in its working vocabulary, will add deutsche marks, and be able to deal with the term the next time it arises.

The software offers data base, table and field-level security.

The VAX-PC-Oracle version is available at prices ranging from $6,000 to $35,000, depending on CPU.

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NEW PRODUCTS

Utilities

Advanced Software Products Group, Inc. has introduced a utility for measuring an allocating direct-access storage device (DASD) space.

Called **DASDtrak**, the product records DASD space allocation activity and monitors DASD space usage down to the second, the vendor said. It uses the DASD monitor table in main memory and writes space utilization records, including all transient scratch files and temporary data sets.

DASDtrak is priced at $9,500 for the first CPU and $6,650 for subsequent CPUs.

Advanced Software Products Group, Suite 401, 2335 Tamiami Trail N., Naples, Fla. 33940. 813-649-1548.

A CICS data stream compression package designed to improve terminal response time and network performance has been announced by **Data 21**.

Turbo Response 1.1B provides both standard compression of 10% to 35% and turbo compression of 50% to 85%. A memory management feature allows users who have limited CICS dynamic storage area to obtain higher levels of compression, the vendor said.

Another feature is the ability to intercept read buffer requests issued by applications that need to save terminal screens, while transparently performing the function. Also included is a feature that allows the viewing and logging of another terminal's screen.

Standard compression costs $50. Turbo compression costs from $2,995 for DOS versions to $5,995 for MVS versions.

Data 21, Suite 121, 3838 Carson St., Torrance, Calif. 90503. 213-543-5599.

A utility that lets Digital Equipment Corp.'s VAX/VMS software developers license their products on a user basis has been announced by **Owen & Davis Systems, Inc.**

Called **Box Office**, the product tracks the number of people using a software application program and prevents user access beyond a predetermined limit set by the software developer.

It is an external subroutine that works with any programming language supported by the VMS operating system, the vendor said.

The Box Office user tracking system is priced at $695.

Owen & Davis Systems, Suite 116, 3100 Airway Ave., Costa Mesa, Calif. 92626. 714-540-8878.

Xcopy, a file transfer utility for IBM's VM/CMS operating system, has been announced by **Sequential Software, Inc.**

Xcopy replaces the CMS Copyfile command. It transfers data stored in CMS files and allows users to copy, concatenate, append, compress and reformat CMS files.

Some features of Xcopy include support for assembler exits for data modification; the ability to run as a nucleus extension; the ability to encrypt files; the ability to restrict input to either packed or unpacked files; and the ability to create a list of output files from a copy operation, writing it to a file or stacking into the console buffer stack.

Xcopy can be leased for a fee of $500 per year.

Sequential Software, 62 Washington Ave., Dumont, N.J. 07628. 201-385-9360.

Data base management systems

Interactive Software Systems, Inc. has announced that its **UDMS** data management and retrieval product now supports Relational Technology, Inc.'s Ingres data base management system for Digital Equipment Corp.'s VAX/VMS environment.

UDMS features a window-based approach to reporting, exporting, querying and updating. It offers full table processing, support for up to 32 relationally joined files and data bases, full field editing capabilities, multiple printer support, a dictionary interface to Fortran, Cobol, Basic and Pascal, screen refresh for remote users and automatic setting of terminal characteristics.

The UDMS system ranges in price from $2,950 to $15,300.

Interactive Software Systems, 7175 W. Jefferson Ave., Denver, Colo. 80235. 303-987-1001.

Training software

Innovative Software Solutions, Inc. has announced **Version 3.00** of **TMauthor**, the authoring language for its Teachme/3000 computer-based training series for the Hewlett-Packard Co. HP 3000.

Version 3.00 enhances the links into the HP 3000 MPE operating system, simplify the handling of question and answer routines and menu processing and improve the formatting capabilities available to course authors, according to the vendor.

The software costs $3,000 for new users and $2,500 for users who already have Teachme/3000 modules.

Innovative Software Solutions, 10705 Colton St., Fairfax, Va. 22032. 703-273-5025.

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MICRO BITS

Douglas Barney

Breaking all the rules

Those dog-gone 12 rules of relational. We've jumped on the SQL and microcomputer data base server bandwagon with as many feet as anyone, but one result we don't want is to belittle some very fine non-SQL data base products. Nor do we wish to imply that using microcomputers as data base servers is an entirely new concept.

Clearly, SQL is the wave of the micro data base future, but is there more to today's data bases than SQL? Well, for the 1.5 million users of Ashton-Tate's current Dbase, the answer is yes. And for David R. Leininger, projects manager for Micro Data Base Systems (MDBS), the answer is an emphatic yes.

Leininger recently took issue with *Computerworld*'s coverage of the emerging interest and development in SQL data base server technology and made several excellent points. Cullinet Chairman John Cullinane, who was embroiled in a brouhaha over Codd and Date Consulting Group's criticisms of his "nonrelational" software, would be proud. Cullinane, how-

Continued on page 33

VGA board uses video RAM

Video Seven claims its specialized chip outhustles PS/2 adapter

BY ED SCANNELL
CW STAFF

NEW YORK — Video Seven, Inc. last week introduced what it said is the first IBM Video Graphics Array (VGA) product to use video random-access memory on a microcomputer.

Compatible with Intel Corp. 80286- and 80386-based systems, the Video RAM VGA board uses a proprietary chip recently announced by Video Seven that enables it to outperform the board used in IBM's Personal System/2 Display Adapter, according to the company.

All VGA boards currently available use dynamic RAM, which is intended for system memory. The Video Seven product uses video RAM, which is specifically optimized for video controllers.

"Video RAM VGA takes the brakes off the processing power of 80286- and 80386-based personal computers when running graphics applications," said Paul Jain, Video Seven's president and chief executive officer.

The product is targeted at power users with 386 or high-end 286-based machines, particularly those running graphical operating environments such as Microsoft Corp.'s Windows or those intended to run IBM's unreleased Presentation Manager.

"With these environments [Windows, Presentation Manager], we find the issue is performance. IBM's VGA or similar devices slow down the machine by producing too many wait states," said Tom Stevenson, Video Seven's vice-president of sales and marketing. "The significance of the zero-wait states of this product means that a user who shells out big bucks for high-performance machines will get the performance he paid for."

Stevenson claimed Video Seven's video RAM VGA is the fastest graphics board available.

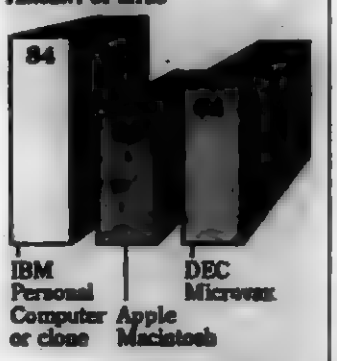
The standard version of the product includes 256K bytes of on-board video RAM, displays four colors and has a resolution of 1,024 by 768 pixels. Users

Continued on page 30

Data View

Mix and match

A survey of Decpo West '87 attendees reveals a variety of PC installations in DEC sites



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CW CHART

Emerald Bay leaves the dock as Ashton-Tate suit settled

BY STEPHEN JONES
CW STAFF

INCLINE VILLAGE, Nev. — A shroud of uncertainty over the future of Migent Software, Inc.'s Emerald Bay data base management system was recently lifted when Ashton-Tate Corp. settled a lawsuit it had brought against Migent to stymie Emerald Bay's development. The long-awaited $695 data base server product recently began shipping.

Ashton-Tate filed suit against Migent and Emerald Bay author Wayne Ratliff more than a year ago, charging Ratliff with incorporating proprietary Ashton-Tate Dbase technology into the data base he was writing for Migent. Ratliff was previously employed by Ashton-Tate as the lead developer of Dbase and chief scientist.

Ashton-Tate's suit apparently forced Migent to reduce Emerald Bay's compatibility with Dbase, but Ratliff said last week that "Emerald Bay is the product that I want it to be."

The timing of the settlement could not be better for Incline

Continued on page 33

Bare-bones Paradox to hit street

BY STEPHEN JONES
CW STAFF

SCOTTS VALLEY, Calif. — Borland International is set to release a bare-bones version of its Paradox data base this year that will reportedly be designed to let developers write applications in a variety of Borland languages, including Prolog, Turbo C, Turbo Pascal and Turbo Basic.

The new package will only include Paradox's 200K-byte data processing engine and the program's Query-By-Example module, said Philippe Kahn, president of Borland. Missing from the program will be its standard high-level Paradox Application Language (PAL), which Borland inherited when it acquired Paradox and Ansa Software last year.

Borland will leave it up to developers to decide if they want to work with the old PAL or with the firm's more popular implementations of C, Pascal and Basic. The product, which has not

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- Polaroid's Dunay gives Apple-DEC time to develop. Page 27.
- Orion claims better data transmission path. Page 27.
- HP designs CAD graphics tablet. Page 34.

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SMALL TALK

Mort Rosenthal

OS/2: Grin and bear it

If you're an information center manager or an MIS manager, the news about OS/2 is both good and bad.

On one hand, IBM and Microsoft's OS/2 is an operating system that was designed with the corporate computing environment in mind.

On the other, to go from today's DOS world to the OS/2 world seems like an almost impossible task. The issues are complex, the potential for incompatibility is enormous, and the amount of new information you need to absorb is vast. And meanwhile, you've got all you can do to support the relatively simple DOS world of today.

Don't delay

As tempted as you may be to postpone dealing with OS/2, it makes more sense to deal with it now.

Don't forget how the personal computer information center got started: It developed because the data processing departments in most companies were not prepared to support PCs. So the most sophisticated PC user — who might not have been in the MIS organization — became the PC coordinator.

If MIS had been involved from the beginning, a lot of today's problems might have been avoided. That is why it makes sense for you to assume a proactive role in the transition to OS/2.

Users are hearing about OS/2 today, and they're hungry

Continued on page 31

Polaroid's info manager is giving Apple-DEC, OS/2 some time to develop

As information technology manager at a company constantly on the leading edge of photographic technology, Peter Duray has a clear picture of how his department and its developments impact the corporation.

At Polaroid Corp. in Waltham, Mass., Duray constantly takes mental snapshots of what the company's technology users tell him they need. Part of this task is learning about some products before they are announced, such as Digital Equipment Corp.'s Vaxmate, which Duray beta-tested.

Further, it is Duray's job to determine what the users need and then manage the implementation. "We tend to be bureaucratic if they haven't picked things from the recommended lists," he said, "but if somebody has a good reason, they can buy almost anything."

Polaroid's Duray *focuses on end users' needs*

Duray recently discussed MIS strategies and the role of microcomputers, networking and artificial intelligence at Polaroid with *Computerworld* senior writer Alan J. Ryan.

Are you still continuing to buy into the Digital Equipment Corp. Vaxmate market?

Not particularly. I would say the Macintosh announcements for that have put people on hold as far as connecting to DEC systems, and they're waiting to see what unfolds there.

What about VAX/VMS service for DOS?

We have a version of it running on our VAX 8700 in the data center to demonstrate connectivity between IBM Personal Computers and the VAX. We're also running a Novell local-area network to show people in the company what the two technologies are that we think are most viable here.

Are the services through a PC as good as those through a Vaxmate?

They're not as high-performance between the Vaxmate and the VAX as between a PC to the VAX, but people seem to be more satisfied with the real thing — a real IBM PC.

Do you favor the concept of a personal VAX?

Yes. We have a Vaxstation 2000 here that we use for things in the low-end local-area Vaxcluster, and it performs very well.

Which personal computers do you have at Polaroid?

Predominantly IBM PCs and [Apple Computer, Inc.] Macintoshes, but we also have Wang systems, DEC systems and a small number of others. We have a couple Vaxmates.

Is it difficult to support PCs

Continued on page 28

Fuming over 25-cent stamps? Orion claims a better way

BY ALAN J. RYAN
CW STAFF

WATERBURY, Conn. — Mail, boats, cargo planes, phone lines, telex, facsimile machines and satellite transmissions: There are many ways to route data to and from remote locations.

But Orion Microsystems, Inc., based here, claims it has a more productive way to collect information using personal computers and public or private communications networks, such as GE Information Services.

Typical applications for the product, called FDC/Pyramid, include the collection and consolidation of financial data, personnel data, updates on manufacturing operations and sales analysis by territory, according to Joseph DiCioccio, vice-president of Orion.

In the collection location, a system administrator identifies the information it needs to gather from the reporting locations. Next, the administrator can design forms on which the necessary information can be entered using standard formats provided by the software.

The system also includes currency conversion, adjustments, allocations, eliminations, multistructure consolidations and report writing capabilities, DiCioccio said.

"FDC/Pyramid doesn't rely on external software products,

FDC/Pyramid

Price: $20,000 (central location)
$750 (remote location)

Requirements:
Central location
• IBM PC AT or compatible
• 40Mb-byte hard drive
• Modem
Remote location
• Dual floppy IBM PC or compatible with 256K bytes

but it can work with any software that creates ASCII files first," said Robert Trenck, Orion senior vice-president.

Users said the major benefit of FDC/Pyramid is its ability to receive accurate data at the collection site. Information does not have to be rekeyed or checked for accuracy because it must be completely tested before it can be sent to the collection site.

Dimitri Get, a data administrator at Emhart Corp. in Farmington, Conn., said his company's former methods for receiving remote data had been telex, telephone and the mail. He is currently using an older version of the Pyramid product.

No margin for error

"People were able to send in information that wasn't accurate," he said. "With [FDC/Pyramid], you can't transmit if the data is incorrect."

Because Emhart is a multinational corporation, Get said, data problems can be costly. "We had a lot of problems with data inconsistencies, and because the data was inaccurate, it took a long time and a lot of people to prepare a monthly report."

At The Stanley Works in New Britain, Conn., the story is much the same. "We were looking for

Continued on page 28

Avoid hard times for hard drives

BY T. A. ELKINS
SPECIAL TO CW

A hard disk is a precision device. And with most precision devices, things can sometimes go terribly wrong. Fortunately, there are several third-party software products, and some new disk drives, that will help users avoid hard disk drive pitfalls.

The chances that your highly precise disk drive will go out of whack are based on a number of factors. For example, the increasingly popular lower priced hard disk drives may seem like a bargain initially, but when valuable data is lost, the low price loses its luster.

These lower priced hard disks have a life expectancy of about a year in daily commercial service. This lack of longevity can make the medium-range, more costly drives from such firms as Control Data Corp. and Core International attractive for reliability-conscious buyers. The Core drives, for example, carry a three-year warranty — evidence that Core has confidence in its product.

But there is hope for less expensive drives. Both disk-caching and disk-defragmentation software can help speed performance and increase life span.

In testing, I ran several drives using older technology against a Core drive. The old drives offered access times of one-tenth to one-fifth of a second, but the Core drive turned in an impressive 19- to 25-msec access time range.

There is really nothing that can make a drive itself faster than its internal functions will allow, but one software product and another software and hardware combination can both improve apparent performance and

Continued on page 30

Top sellers

Software: March 21-25

1	Lotus's 1-2-3
2	
3	Ashton-Tate's Dbase III Plus
4	
5	IBM's PC-DOS
6	
7	IBM's Displaywrite 4
8	
9	Microsoft's Word
10	

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CW CHART

Ana Tech scans desktop market

In an attempt to capture the burgeoning corporate in-house publishing niche, Ana Tech Corp. recently introduced a scanner for formats up to 17 by 24 in. to be run on desktop or workstation publishing systems.

The desktop-size Eagle 1760 uses camera technology to convert black-and-white text and images, including photographs, to raster or vector data. For raster-only conversion, the scanner costs $32,000. For raster and vector conversion, the system costs $47,000, according to a spokesman.

The operational software runs on Apollo Computer, Inc., Digital Equipment Corp., IBM Personal Computer AT and Personal System/2 and Sun Microsystems, Inc. systems. The software includes editing tools.

Ana Tech's earlier scanners are primarily for engineering applications, the spokesman said.

Orion

FROM PAGE 27

a data entry vehicle that would provide us with transmission capability and provide a way to transmit machine-readable balanced and edited data to us," said William Negrilli, manager of corporate systems.

Because the forms are generated by the systems administrator, Negrilli added, the learning curve for the field staff was minimal, "and it also made it easier for multiple countries and multiple languages," he said.

Negrilli is currently working on a plan to implement the most recent version of FDC/Pyramid. "It's a much smoother product today," he said. "The key things we were looking for were ease of use and the ability to be maintained by users in the field."

Money matters

Although Negrilli said Stanley was able to speed up its closing cycle and reduce the expense of overnight packages, telexes and long phone calls, he said the system is probably equal in cost to his former methods. "We didn't have a network in place before. But the cost of those factors in the past were buried in the user accounts in the field."

Emhart's Gat said his firm has realized a cost savings. "It decreased the time it took to close the books by as many as 10 days." He added that the vendor also plays a part. "You have to look at that to find a good vendor and get a good rate."

Emhart is using FDC/Pyramid in more than 100 locations worldwide to collect business information monthly; Stanley has some 40 or 50 remote locations.

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Lotus Symphony 2.0

Info manager

FROM PAGE 27

from multiple vendors?

It's difficult, but it's what makes life interesting. You just can't turn to somebody for an A to Z list of what to do — you have to make it up yourself.

Sometimes it's a real problem, because you're never sure if what you're recommending is going to be what's truly viable six months or a year from now. It's not some stated strategy from a vendor, it's one you've put together. But, at the same time, you're not locked into the lack of certain options that vendors put you in.

Given a choice, would you standardize on one personal computer?

Probably not. It doesn't fit the mode of operation or our culture at Polaroid. We're a very diverse company.

Are there any special considerations because of the kind of firm Polaroid is?

Yes. You have to justify your guidelines and accept that people aren't going to always follow them. People who have come from very autocratic organizations that are run from the top down find it a major concern and frustration to them that the amount of latitude in buying, maintaining and configuring

Continued on following page

Continued from preceding page
computer hardware is so broad here.

How are your PCs networked?
Predominantly, we're using Ethernet to link our PCs. The Macintoshes that are linked together to date are linked through Appletalk. We also have a Novell network in VAX/VMS services. Some people are just using Decnet task-to-task in factory applications over Ethernet, but the most common thing is Ethernet, which is in very broad deployment in Polaroid.

We have an Ethernet that extends from Cambridge to Waltham to Norwood, [Mass.], and it's the same local-area network, so a PC in Norwood could be connected over that network to a mainframe, PC or server in Cambridge or Waltham.

What is the role of PCs at Polaroid?
I would say that if you could gather all the applications in the world, we probably do 95% of them at Polaroid. Everything from office automation tools with word processing and spreadsheets to CAD tools to process monitoring tools and quality control tools. And we use it for image processing work to graphical output work, which are some important mainstream technologies to Polaroid. We even produce peripherals — Polaroid Pallette — to go with these things. And we've introduced an electronic identification system that is based on a PC, which will take your picture and store it in a mainframe data base and network it anywhere in the world for ID purposes.

Into what kinds of mainframes are the PCs tied?
We have both IBM MVS and VM systems; the PCs are tied into the mainframes predominantly through two communications software packages, and the transports are mostly asynchronous to the mainframe. There is a scattering of the coax cards, of course. You name it, we do it.

Are you planning to standardize on IBM's Personal System/2s?
Yes. We were one of the early converts, and we standardized on PS/2s as our preferred IBM PC within 45 days of IBM's announcement last April. We're buying predominantly Model 50s, some 60s and a few 80s. We're also buying a few Model 30s but are not recommending them.

What about IBM and Microsoft's OS/2?
We're taking a very go-slow attitude. I think there are very few PCs with it available. IBM, I think, donated 25 copies of OS/2 to us for our PC support to get us familiar with it — but there is no production to my knowledge.

Are you waiting for the more advanced versions of OS/2?
Absolutely. To become accustomed to that, we are suggesting people use [Microsoft] Windows Version 2, and we are using it in our LAN with a number of applications.

Will the extensive memory requirements of running OS/2 be a problem because you're buying PS/2 Model 50s?
Yes, and I hope the shortage of memory chips today and high price pulls some companies back into the market, so when we're ready, the price is back down again.

Tell me a little about your data center strategies.
We have put in a Novell LAN, and it has 3270 gateways to our IBM mainframe and Transmission Control Protocol/Internet Protocol gateways to our DEC systems. Our strategy is to provide a model in the company of linking the PCs into the minis and mainframes, so that people can more easily move around information and perform the computing that is most cost-effective on the platform it is most cost-effective on, as opposed to being limited to a PC or a mainframe terminal or something like that.

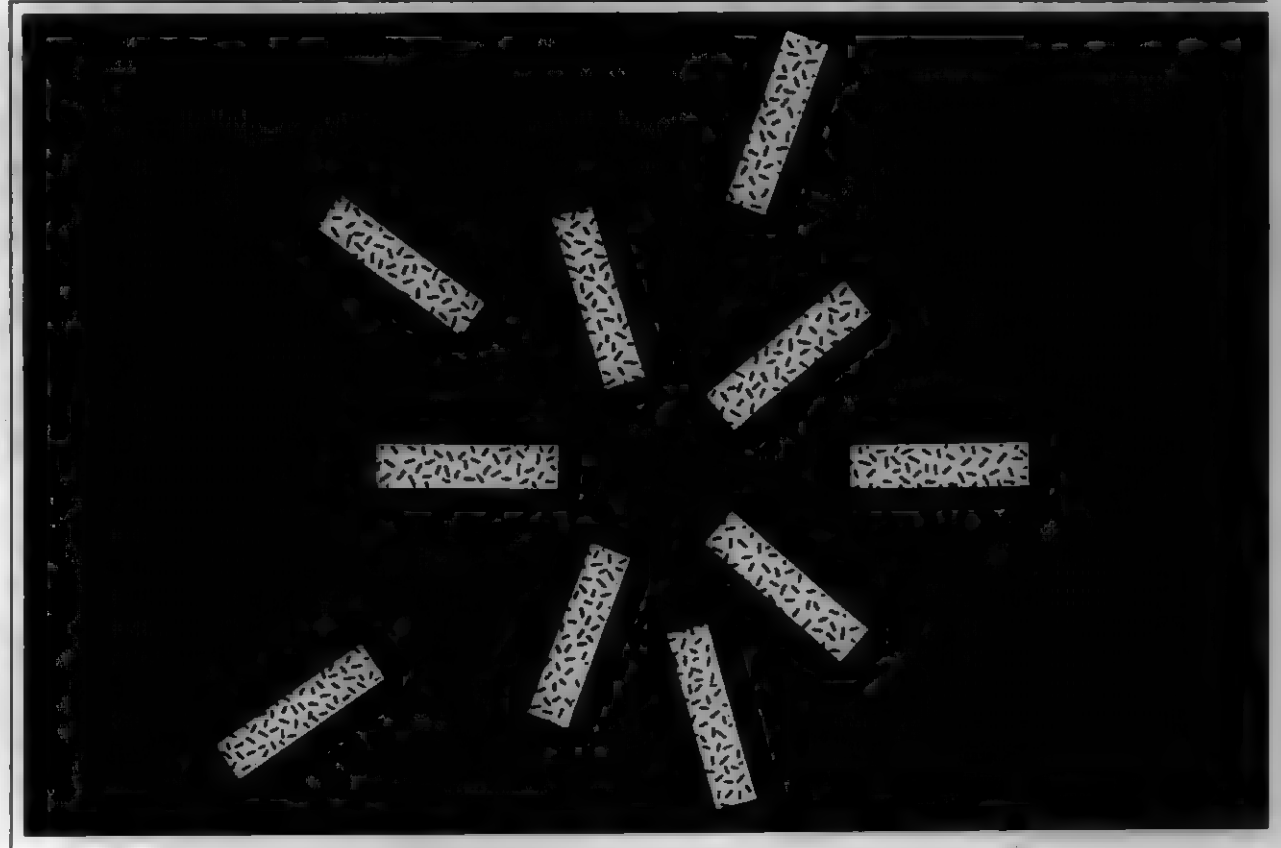
Also, because we've added a lot of VAX systems — I think we're up to 73 today, which we've added over the last three or four years — terminals and PCs with both DEC VT and 3270 capabilities are becoming very important to us.

What do you see as the future for micros compared with low-end workstations?
I actually see the low-end workstations as being much more capable and cost-effective today when compared with high-end PCs.

What are you doing in the artificial intelligence area?
We're trying to standardize on some tools. We're currently in the process of putting the finishing touches on an expert system to help people configure PCs in the company so that the user or one of our site coordinators could get on this application that will run on a VAX and go through a dialogue with the expert system and get a recommendation on what type of PC would fit their needs.

What are some of the challenges facing you?
Doing more with less people. It's been the posture of our MIS division for the last three or four years to hold or decrease head count and hold or decrease budget — yet to do more.

Is it working?
Some people feel overloaded, and some people who aren't hard workers look for employment elsewhere, but I think we're succeeding in what we're trying to do.



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Hard disks

CONTINUED FROM PAGE 27

extend the life of a drive in the bargain.

Microsoft Corp.'s MS-DOS operating system deals with disks in clusters. The trouble comes when MS-DOS stores, erases and then restores new files. Each cluster that is no longer needed because its file was erased is freed for use with another file. So after several write-erase sequences, there will be an odd lot of individual blank clusters mixed with clusters in use. When a new file is saved or copied, MS-DOS might put it on any number of clusters. Also, searches for that data may become longer and longer.

Because the MS-DOS 3 versions use a better algorithm to choose clusters for a file than the MS-DOS 2 versions, they offer an advantage over the earlier systems. Both, however, can benefit from a defragmentation program.

Slow start

One of the first commercial defragmentation programs for the PC was Disk Optimizer from Softlogic Solutions, Inc. in Manchester, N.H. This program started out, as seems to be the case with all such programs, running rather slowly. Processing a 10M-byte old-style disk could take more than an hour. Fortunately, Disk Optimizer has sped up considerably.

In addition, the current version offers considerable user control in disk organization. Static files such as EXE or COM files, which do not change often, can be grouped together at either end of the disk. Important directories can be given priority placement for faster access, and the ordering of directories and their subdirectories is automatically improved.

For users, particularly MS-DOS 3 users, who will not take the five to 20 minutes weekly required to keep their disks compressed and defragmented, Golden Bow Systems in San Diego offers another approach with Vopt. Vopt does not bother with every blank space between files; it only arranges all the file clusters to be contiguous. And it is fast.

Thus, Disk Optimizer will fine-tune a hard disk with great precision and high safety, and for users with self-discipline troubles who do not take the time to compress their disks, there is Vopt.

Even greater performance benefits can come from a good disk-caching program and a Lotus-Intel-Microsoft Enhanced Memory Specification (EMS) board. A disk-caching program will automatically and invisibly store files in random-access memory when they are first accessed and then retrieve them from RAM, not the disk itself, when they need to be reread. Such access is easily 50 times faster than disk reads, and about 75% of all system reads can ordinarily come from the cache.

I cannot prove that disk caches will extend the life of hard disks, but they arguably can double or triple the life of well-cared-for disks. Any system that is spared three-quarters of its reads and a substantial number of its writes must profit considerably from the reduction in work load.

Winners

Two particular cache programs are very capable. Flash, from Software Masters in Indianapolis, allows all types of fine-tuning by users. It also caches floppy disks. Flash will allow a RAM disk to be set up using cache buffers. The result is a cache of variable size and a very convenient RAM disk.

Vcache, from Golden Bow, is less sophisticated and adjustable than Flash but seems to be a bit faster and use up less memory space. However, Vcache will not cache floppy disks.

Slow drives can appear to operate faster through careful use of defragmentation and EMS caching. They are not the equal of something really fast, like the Core drives I tested them against, but small users that cannot afford more costly equipment can make do with them. And even the Core drives benefit from caching.

If the use of a defragmentation program and a cache system extend the life of a hard disk only from one to two years, the savings in the second year would pay for the EMS board and the programs. And the benefit of greatly increased disk access speed would have already been enjoyed for two years.

Elkins is a computer and management consultant with academic interests in advanced public-key data encryption systems.

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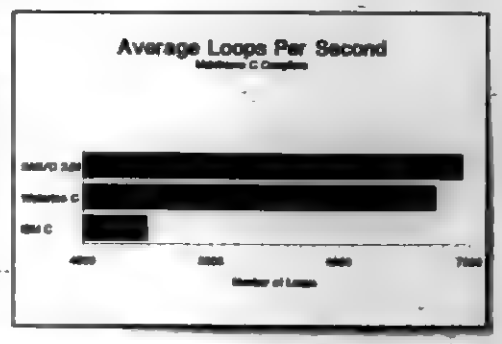

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Mail to: SAS Institute Inc., Attn: CC, SAS Circle, Box 8000, Cary, NC, USA, 27512-8000

VGA board

CONTINUED FROM PAGE 25

can have up to 512K bytes of video RAM with an option for an additional 256K bytes and a 256-color display.

The video RAM VGA board incorporates Fastwrite, a memory-caching mechanism that, when used in conjunction with the company's video RAM interfacing technology, takes full advantage of the performance benefits of on-board video RAM while maintaining compatibility with best-selling software programs.

The new board is 100% compatible with IBM's PS/2 Display Adapter and IBM's VGA product for the Personal Computer AT. The company claimed video RAM VGA is the only board to offer the IBM high-bandwidth monochrome mode and said this mode, which is undocumented, allows video RAM VGA to double the frequency of CPU memory access.

Video RAM VGA has a suggested retail price of $799 and will be shipped next month, according to a Video Seven spokesman.

Rosenthal

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for more information. These users are substantially more sophisticated than those of a couple of years ago, when the PC movement first started — which means you get asked a lot of questions you wish you weren't.

Limited understanding

Conversely, we have a relatively unsophisticated understanding of OS/2's capabilities. Although OS/2 is physically here today, it doesn't really provide multitasking yet because of a lack of OS/2 applications.

OS/2 also has a limited ability to deal with today's DOS world. Did you know that the DOS compatibility window only works with well-behaved programs that do not address the hardware directly? And it will not allow access to extended or expanded memory and cannot run communications or networking products. Already there are expectations that you have to manage.

After a few users start to use OS/2, you will discover incompatibility problems you never even dreamed of. Whether it is determining configurations, getting all the applications software to work together or making an OS/2 machine work with the DOS environment of today, translating all your existing applications into an OS/2 world presents a monumental task.

In addition, applications that will be emerging for OS/2 are going to be infinitely more complex than those we're used to. There will be applications that work across groups; they will be more difficult to install, more complicated to build on and tougher to explain.

So why have the hassle today? Understandably, you may be inclined to delay worrying about OS/2 just yet and wait until next year or the year after, when everything becomes more clear. You've already got a full set of problems and don't need any more.

But you better get on the ball now.

Keep your customers happy

Remember, individual end users are ultimately your customers — the people that give you power in the organization. And your power is contingent on your ability to serve them well. Despite how painful it may seem, you've got to be the one who provides the OS/2 answers.

You've got to know what applications are out there and when they're really expected to ship. You've got to create realistic expectations for the users. Even if you don't have a lot of resources to do all this, you must commit to taking this position.

While you've got to become more future- and leadership-oriented, you also have to make sure that the support is done today. This means handling the support demands of today more efficiently.

There are plenty of outside options available. For openers, you can start relying more heavily on your vendors. Consider choosing a hardware manufacturer that is a technology leader and has the financial stability to be one of the survivors. Ask potential suppliers what service and support they are prepared to provide for the transition.

Select software products from vendors that have coherent OS/2 transition and upgrade strategies that will allow compatibility and ease your move into the future.

Finally, ask yourself these questions about your PC product suppliers:

- Do they know about the OS/2 compatibility issues of today?
- Are they committed to investing the resources needed to maintain technical leadership?
- Can they provide timely and objective information that cuts across vendor lines?

And, most importantly, ask yourself if they can help you achieve the level of efficiency you need today so that you can provide leadership for tomorrow.

Rosenthal is chief executive officer and chairman of the board of Corporate Software, Inc. in Westwood, Mass.

Paradox

CONTINUED FROM PAGE 25

been named, will also support SQL commands for connection to other data bases, Kahn said.

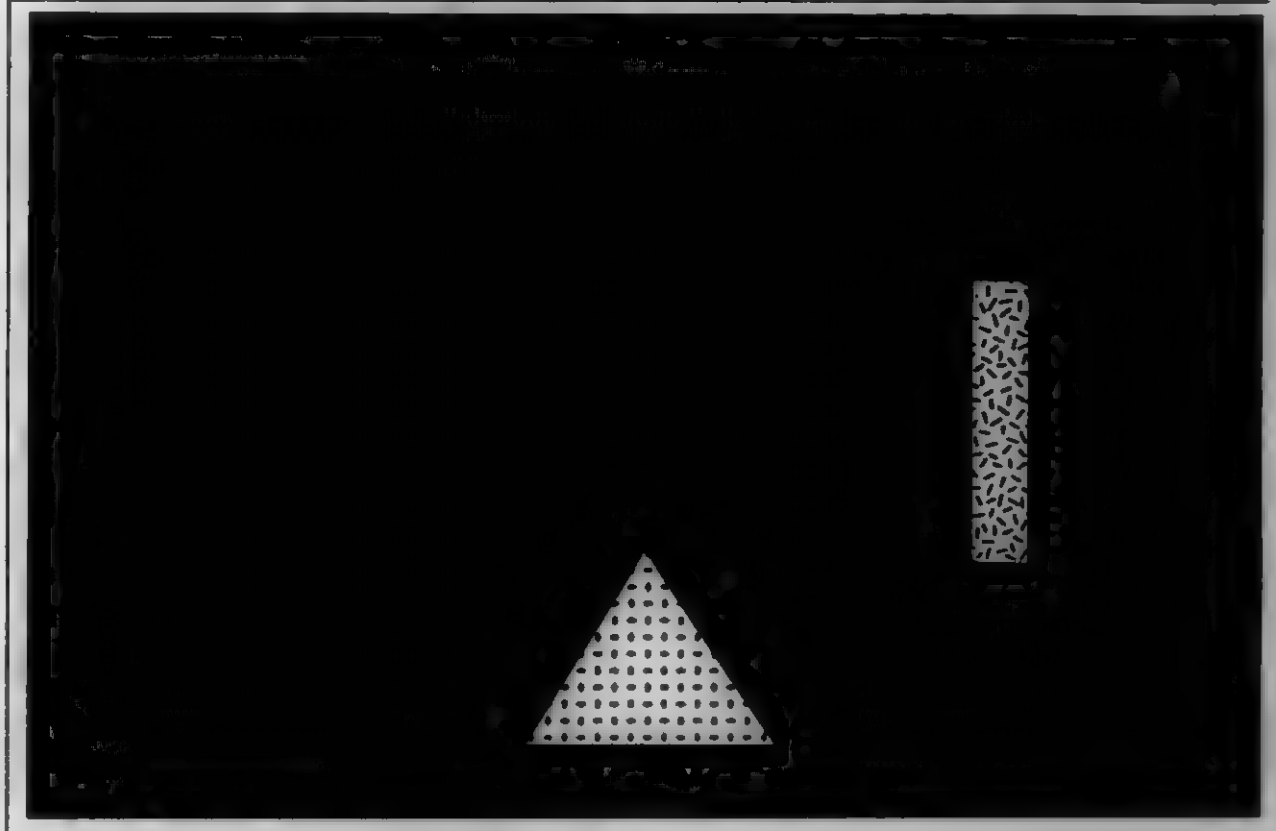
The Paradox engine will contain hooks to which the Turbo languages link. By tying into the stripped-down Paradox program, Turbo language developers can create applications with some of Paradox's powerful features, including querying, sorting and indexing, Kahn said. Routines written with the Turbo languages can be combined with current programs written in PAL through Paradox's DOS Link command.

Pricing and availability were not disclosed by the vendor.

Kahn said the product is aimed directly at Ashton-Tate Corp.'s upcoming Dbase IV, which he said offers developers only limited programming language choices. The new Paradox version will also help Borland integrate the data base into its existing product line, according to Kahn.

But analysts questioned the idea of Borland stripping away Paradox's PAL and leaving the product without its own full programming language.

"Hooking the compilers into Paradox is a good idea, but as a true relational data base, it would make more sense if they leave the [PAL] macro language intact," commented Bill Higgs, director of software research at Infocorp in Cupertino, Calif.



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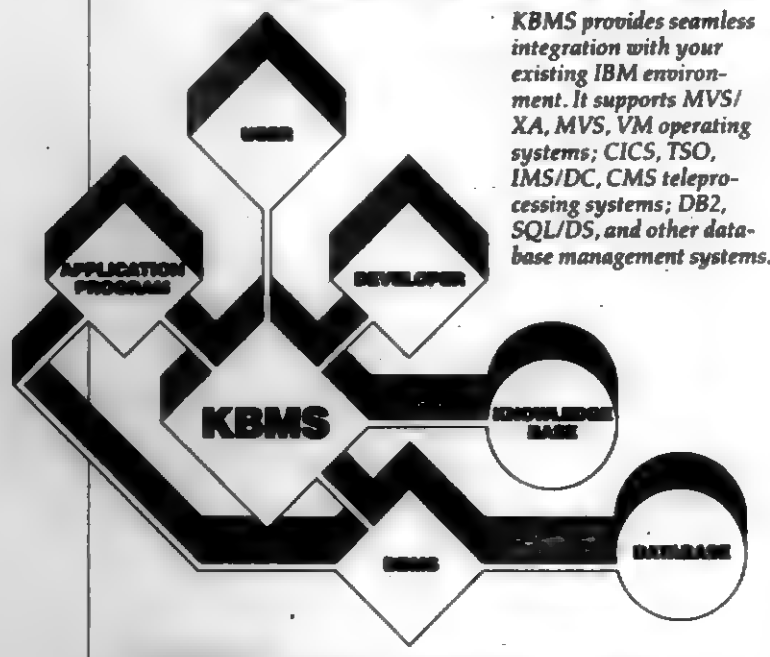

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KBMS makes it possible for you to develop practical solutions for whole new applications areas–applications that are strategic and crucial to your business, but simply have been too complex to solve with traditional, procedural programming approaches.

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Barney

CONTINUED FROM PAGE 25

ever, ended up on the downside of that debate.

Shunning Codd and Date's 12 rules of relational, MDBS still adheres to the extended network data base management system model, which maintains the lion's share of mainframe production data bases. Although mainframers are moving toward relational SQL products, many users have been wary of shifting production data away from the tried and true.

On the micro side, it will take time for SQL and fully relational to supersede other data base architectures, however inevitable this move may be.

According to Leininger, the extended network approach has particular strengths, especially in production-style applications. Leininger says personal computer-based systems addressing hundreds and hundreds of megabytes of nonredundant data that also require more than 100 relationships are beyond the scope of today's relational micro systems.

As you might have guessed, Leininger's proposed solution is his own product, MDBS III, which he said can directly model many-to-one, many-to-many, one-to-one, one-to-many and forked and recursive relationships without extra coding or dummy records.

There is no doubt that products such as MDBS III have served users well. But the argument that extended network architectures are more effective than relational products in some hard-core data bases should very likely generate controversy.

We hope this is not the last word on the subject and are willing to allow this column to serve as an informal forum for the variety of opinions concerning the optimum data base architecure of today and tomorrow. Gimme a call.

I have to get permission to buy a cheaper machine? This is the kind of deal we could learn to love. At Coca Cola Foods, you need a good excuse to not buy an Intel 80386-based machine. Cheryl Currid, who manages micros at the carbonated beverage and snack-food giant, says the 386 can support the software coming down the pike more effectively than Intel 80286 machines, which still suffer from a mild case of brain damage. If users want to buy a 286 machine, they better have a darn good reason, Currid says.

Please, can I get a Leading Edge Model D with floppy disk drives and a monochrome monitor? Well, OK. I guess I'll take the Compaq Deskpro 386 if I have to.

A darn good idea. Software developers sometimes decide to sue each other for copying a user interface, and know-nothing judges sometimes decide if these vendors are right. But it is users who ultimately suffer when innovation is stifled due to fear or when a key vendor is hurt by a lawsuit.

Frank Disparra, vice-president of the advanced technology group at Fidelity Investments in Boston, thinks it is time users have their say. "I would like to see the user community get involved in that scenario. We have businesses to run and have to exploit technology," Disparra says. You know what most users would say about these suits: Enough!

The absurdity of nondisclosure. We are noticing a disturbing trend among software developers. In what have sometimes progressed into orgies of preannouncements, these vendors introduce products to the world that will not ship for six months, a year, two years or more. Then customers or interested journalists who want to get a peek at the product have to sign a nondisclosure agreement and promise not to talk about it. Let me get this straight. I have to sign an agreement to not talk about a product you just talked about? Egads.

Barney is a *Computerworld* senior editor, microcomputing.

Emerald Bay

CONTINUED FROM PAGE 25

Village-based Migent, which started shipping Emerald Bay at least three months before Ashton-Tate was scheduled to release its Dbase upgrade, called Dbase IV. Ratliff said he was concerned that the specter of a lawsuit would otherwise have had a chilling effect on potential users.

"When you know there's a lawsuit going on, everybody worries that if the vendor loses the lawsuit, you might have to give everything back," he said.

Ratliff said the lawsuit has been a frustrating experience for him and Migent, slowing the development of Emerald Bay. Ashton-Tate officials would not comment on the suit, but Ratliff claimed Ashton-Tate's allegations of trade secret infringement were groundless.

"This whole thing started because Ashton-Tate took rumor and fragments of fact about Emerald Bay, assumed a worst-case scenario and built a lawsuit around it," Ratliff said.

Emerald Bay, which runs under Microsoft Corp.'s MS-DOS, will eventually allow multiple applications to share data simultaneously in both single and multiuser environments, according to Migent.

The first pieces to ship will be the data base engine itself; a $495 C tool kit; a $195 Lotus Development Corp. 1-2-3 add-in called Summitt; and Eagle, a $495 Dbase-like programming language. SQL support will come later, Migent said.

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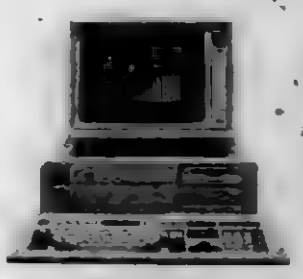

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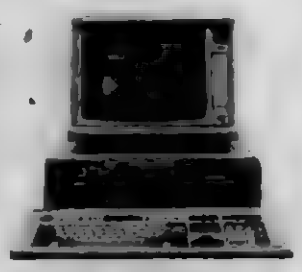

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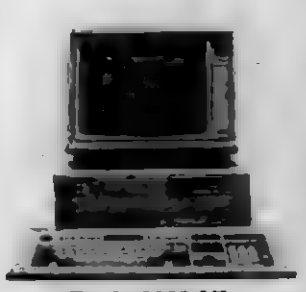

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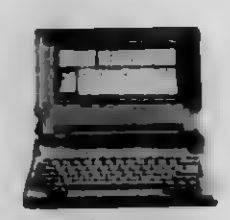

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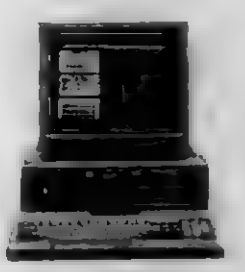

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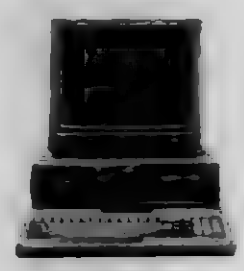

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NEW PRODUCTS

Printers/Plotters/Peripherals

A graphics tablet for use with personal computers and computer-aided design (CAD) workstations has been announced by **Hewlett-Packard Co.**

Called **HP Sketchpro**, the tablet comes with such accessories as a stylus, a four-button cursor, an HP Vectra PC-IBM Personal Computer AT serial interface cable; a PC AT adapter cable; Microsoft Corp. Mouse driver files; a CAD menu-overlay hold-down/protector; and set-up instructions for third-party PC CAD software applications, including Autodesk, Inc.'s Autocad.

Resolution is up to 480 lines per centimeter with accuracy within 0.5mm of the selected point and repeatability of 0.25mm.

The tablet has an active area of 11 by 11 in.

The HP Sketchpro is priced at $649.

HP, 1820 Embarcadero Road, Palo Alto, Calif. 94303. 800-367-4772.

A device designed to allow IBM Personal System/2s and Personal Computers or compatibles to drive high-speed laser printers has been announced by **Spur Products Corp.**

The **Universal Subsystem Adapter/PC** drives laser printers made by Datagraphics, Hewlett-Packard Co., IBM, Eastman Kodak Co., NCR Corp., Siemens AG and Storage Technology, Inc. The product also drives ion deposition printers from Xerox Corp.

According to the vendor, no enhancement boards or software changes are necessary. The adapter is rack-mountable.

The Universal Subsystem Adapter/PC costs $9,000.

Spur Products, 13469 Beach Ave., Marina Del Rey, Calif. 90292. 213-822-7100.

A 300 dot/in. flat-bed scanner for use with the Apple Computer, Inc. Macintosh has been announced by the Apple Products Division of **AST Research, Inc.**

The **Turboscan** scanner is said to give Macintosh users the capability of scanning bound documents and three-dimensional objects at 300 dot/in. resolution. It accepts documents and objects any size up to 8½ by 14 in., the vendor said.

The flat-bed Turboscan costs $1,899. AST has also reduced the price of its Turboscan sheet-feed model to $1,699.

AST Research, 2121 Alton Ave., Irvine, Calif. 92714. 714-553-0340.

Imagen Corp. has announced its **PC Publisher Kit Series II**, a desktop publishing package that supports the Hewlett-Packard Co. Laserjet Series II line of laser printers.

The PC Publisher Kit Series II is composed of a raster image processor on a card that resides in an IBM Personal Computer or compatible. It provides all desktop publishing functions, including full-page graphics and font capabilities. Other features include a standard set of 22 typefaces and a utility package. The kit costs $1,995.

Imagen, P.O. Box 58101, 2650 San Thomas Expwy., Santa Clara, Calif. 95052. 408-986-9400.

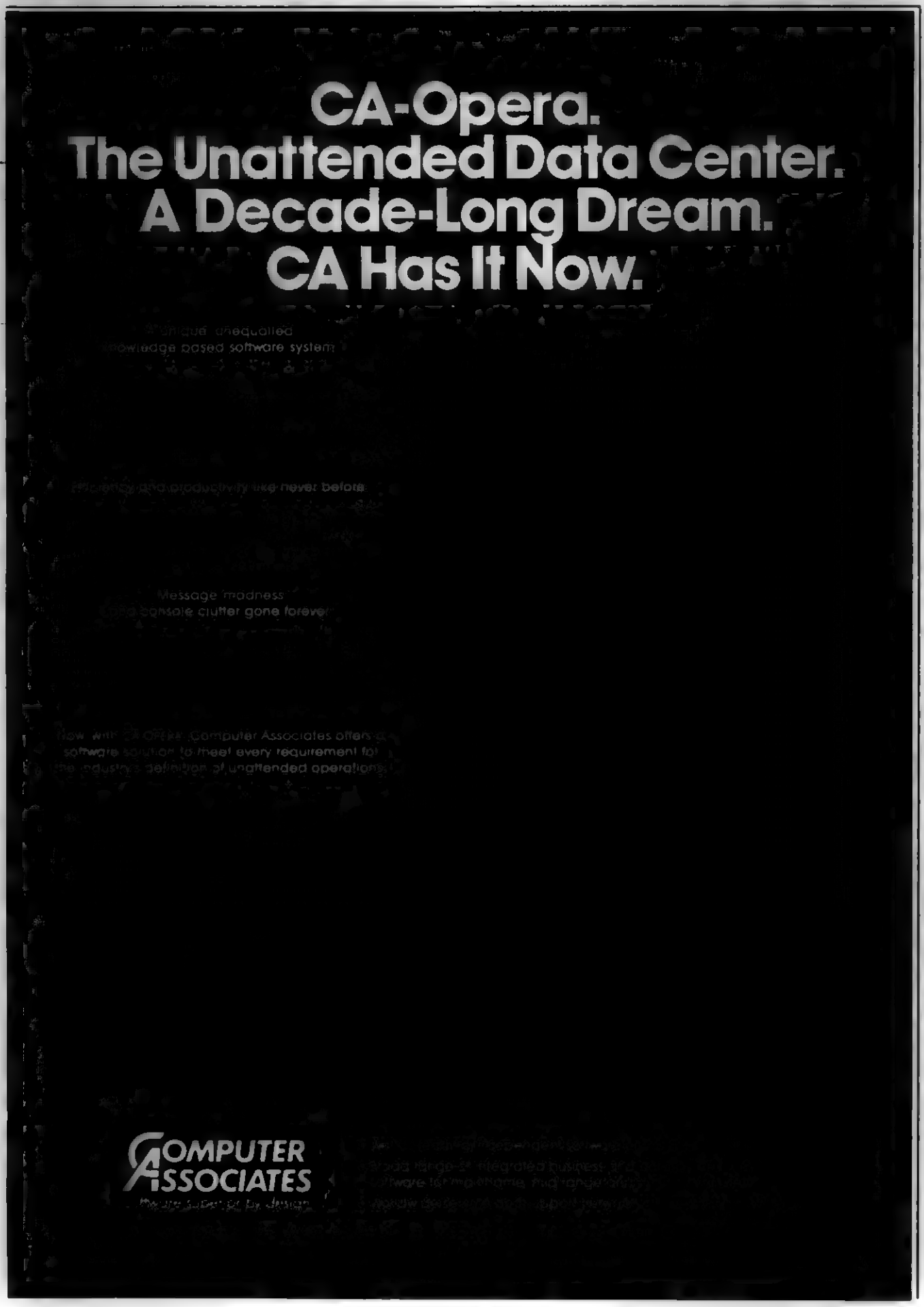
Board-level devices

Two plug-in floating-point array processor boards for IBM Personal Computers, PC XTs, ATs and compatibles have been announced by **Communications Automation & Control.**

The boards are based on AT&T's DSP32 single-chip floating-point digital signal processor. An applications library callable from the C language provides such routines as optimized math, matrix manipulation, signal processing, image processing and graphics.

Two versions are available: one for the XT and one for the AT. Prices start at $695.

Communications Automation, 2348 Eden Lane, Bethlehem, Pa. 18018. 215-865-9706.



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DATA STREAM

Kathy Chin Leong

Just stick to the specs

It happens all the time. We want to get the most bang for the buck, so we cheat — only to discover we are cheating ourselves. One East Coast bank recently learned this lesson the hard way.

After installing a backbone Ethernet network that ran through all 40 floors of a single building, one group of users wanted to add another segment of cable to bring their colleagues into the net. Gradually, other users in the building noticed that response time on the network was slowing down. It got so bad that some users had to wait so long when trying to access a file that their terminals would take a time-out, requiring them to log on again.

The network manager was getting complaints left and right. Unaware of what was wrong, she took an inventory of every node, every length of cable, every tap and concentrator on the local-area network. Eventually, she realized that the addition of the extra cable segment had made the total end-to-end network a little longer than recommended under the original Ethernet specifications. In effect, the network had been stretched beyond its capacity.

"Never again," she told me ashamedly. "From now on, we stick to the specifications. We thought that we would be able to add a little bit here and there."

Continued on page 39

Hospital net skirts roadblock

AT&T switch links many vendors' LANs, computers in building complex

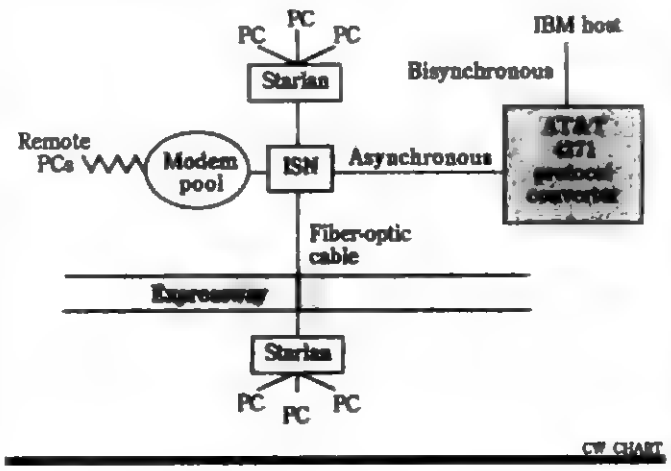
BY JEAN S. BOZMAN
CW STAFF

CHICAGO — Two years ago, Rush-Presbyterian St. Luke's Medical Center began a $4.2 million project to install a data networking system for its hospital complex, which stretches across the Eisenhower Expressway here. The six-lane road literally separates the hospital center from an office building that handles many of the center's administrative tasks — including data processing — thus creating a formidable obstacle to the plan's success.

The problem of how to connect the two sides of the hospital complex was solved by installing a fiber-optic cable alongside one of Chicago's famed elevated train tracks.

Rush eyes ISN as PC-to-mainframe link

AT&T's Information Systems Network data switch beats IBM 3174 on cost per connection



CW CHART

Forging unity

A more complicated issue was the question of how to implement a unified networking scheme to connect Rush's extensive installation of local-area networks, computers and telephones. The medical center eventually decided to rewire its complex with AT&T's twisted-pair Premises Distribution System (PDS), which will serve as a uniform wiring system for both voice and data. An AT&T System 85 switch now handles more than 6,000 voice lines.

At the heart of the data network is an AT&T Information Systems Network (ISN) switch, located in the office building's computer room. Together, the System 85 and the ISN switch cost Rush approximately $4 million.

Supporting a total throughput of 8M bit/sec., the ISN routes transmissions along Rush's network installation on both sides of the expressway. Multiple IBM Token-Rings, Digital Equipment Corp. Decnets and several 1M bit/sec. AT&T Starlans link users throughout Rush's building complex.

The ISN also acts as a gateway to the outside world for a DEC Vaxcluster, which is used for laboratory applications that can send data to an IBM 3083 mainframe. "The laboratory system runs on Decnet, which is wired throughout the laboratory," explained William Wellman, assistant vice-president of administrative affairs, who oversees telecommunications at Rush.

Because the ISN is indifferent to what type of data it passes along, it can interconnect Rush's

Continued on page 37

Telematics promises DEC-IBM gateways

BY PATRICIA KEEFE
CW STAFF

FORT LAUDERDALE, Fla. — Telematics International, Inc., a supplier of wide-area packet-switched networks, shifted gears into the IBM-to-Digital Equipment Corp. connectivity market with last week's launch of its Network Access Products division.

The division will develop and market gateway systems designed to link IBM, DEC and Open Systems Interconnect (OSI)-based equipment to private or public packet-switched networks.

"There has not been a lot of activity in this area using a packet-switching type of approach," said Clare Fleig, director of research at International Technology Group in Los Altos, Calif. "IBM has been real slow about bringing X.25 into Systems Network Architecture, but that is changing," she added, predicting growing interest in providing packet switching as an alternative to IBM's Synchronous Data Link Control (SDLC).

During the next several years, Telematics said it will introduce a series of IBM and DEC access products, including IBM's Advanced Program-to-Program Communications and Distributed Network Architecture Decnet servers as well as protocol conversion tools.

However, initial product offerings do little more than link each environment separately to a packet-switching network. Specifically, Telematics is scheduled to introduce:

- An IBM Systems Network Architecture (SNA) packet assembler/disassembler (PAD) for linking IBM 5250 and 3270 terminals to multiple IBM hosts over a standard CCITT X.25 packet network. It is slated for release in August at prices ranging from $4,000 to $10,000.
- A DEC VAX front-end processor and a VAX PAD. The processor will be able to handle up to four VAX hosts using a standard

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Inside

- Protocon breaks ground with TCP/IP connectivity device. Page 36.
- Host of products blow into Chicago for Interface '88. Page 39.
- Link for DEC, IBM systems debuts. Page 40.

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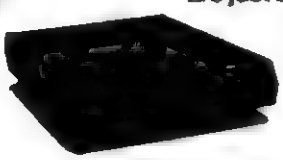

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Proteon supports LAN-to-LAN TCP/IP

BY ELISABETH HORWITT
CW STAFF

WESTBORO, Mass. — Proteon, Inc. last week introduced what it claimed is the first commercial product to support a recently approved Transmission Control Protocol/Internet Protocol (TCP/IP) standard for managing LAN-to-LAN connectivity devices.

This latest generation of Proteon's P4200 Router series also provides significant performance improvement over earlier models, Proteon claimed.

The updated P4200 Router supports the TCP/IP Simple Gateway Management Protocol (SGMP) that allows an operator at a central workstation to monitor, reconfigure and collect information from local-area network gateways, bridges and routers, Proteon product marketing manager Michael Scully said. By allowing users to monitor and troubleshoot LAN interconnectivity devices, the system addresses an increasing demand for reliable long-distance connections between LANs, Proteon Chairman Howard C. Salwen said.

Built around a Motorola, Inc. 68020 microprocessor and a new code structure, the revised P4200 reportedly provides twice the throughput of the older model. Increased buffer space enables the revamped router to more effectively handle high-speed workstations that send multiple data blocks in rapid bursts, Scully said.

The P4200 interconnects multiple IEEE 802.3 Ethernet and 802.5 token-ring LANs as well as Proteon Pronet-10 and Pronet-80 token-ring LANs. It provides inter-LAN routing for transmissions generated by TCP/IP, Digital Equipment Corp. Decnet and Xerox Corp. Network Systems nodes.

LANs can be connected in a local or campuswide environment, over Proteon's Pronet-80 high-speed fiber-optic backbone; long-distance linking over dedicated 56K or 1.5M bit/sec. T1 lines is also possible, Proteon said. The latest version is scheduled for volume shipment this month at a price of $7,900.

Telematics

FROM PAGE 35

DEC interface under the VAX/VMS operating system and is available now for $40,000 to $100,000.

The VAX PAD will aid multisite VAX users who need to support remote terminals over X.25 networks.

The VAX PAD is available now for $15,000 to $60,000.

• The Smartnet 4000 series family of asynchronous, SNA and X.25 PADs.

These products reportedly provide SDLC-to-Quality Logical Link Control protocol conversion to allow the transport of SNA transactions over switched networks.

Smartnet 4000 is available immediately and costs $3,000 per unit.

• The Series 5000, a family of programmable backbone packet switches said to offer two to three times more data throughput than the older Telematic Net25 line of switches.

The Series 5000 family uses Motorola, Inc. 68020 chips with 64K bytes of on-board cache memory to provide data throughput in excess of 2,000 packets per second. Slated to be available in June, Series 5000 prices will range from $78,500 to $200,000.

In addition, Telematics said its network access strategy will focus on development of OSI transport and session layer communications servers. Using this capability, Telematics said it will also develop message-handling systems based on the CCITT X.400 electronic mail standard.

Also reported to be in the works are a line of multifunctional terminals, communications tools and applications servers that will provide protocol adaptation and conversion as well as applications access.

SQL Performance for OLTP.

Tandem challenges anyone.

Hospital

FROM PAGE 35

broad range of computer systems. These include the 3083, a Vaxcluster based on three VAX 8500s, three Tandem Computers, Inc. TXP processors, an AT&T 3B Model 400 hosting Starlan and another AT&T 3B5 attached processor.

Soon to be included is a Prime Computer, Inc. 9955 to be used by administration.

"We're trying to stay flexible because a lot of the hardware decisions that are made here are determined by the kind of packaged software available," Wellman said.

It was a proliferation of buying decisions during the 1970s and early '80s that led to the variety of host systems populating the Rush campus today, he added.

> "USERS are closer to one-stop shopping for their laboratory data than ever."
>
> WILLIAM WELLMAN
> RUSH-PRESBYTERIAN ST. LUKE'S MEDICAL CENTER

Rush had considered building its data network around IBM's Systems Network Architecture — except that the SNA system would have cost approximately twice as much as the ISN network, Wellman said. Overall, he looked at 75 bids.

Room for expansion

AT&T's PDS wiring scheme can handle many times the traffic currently supported, according to Wellman, leaving room to expand the current networking installations.

To keep data transmission costs low, Rush is considering the idea of using an AT&T 4271 asynchronous controller, which is already attached to the ISN switch, to provide IBM host access to thousands of IBM Personal Computers around the Rush campus and hundreds more in remote locations.

The organization currently uses IBM 3174 cluster controllers that support far more costly bisynchronous connections between PCs and IBM mainframes.

As a result of Rush's networking scheme, most end users can access data from a variety of hosts without worrying about compatibility problems.

"Users are closer to one-stop shopping for their laboratory data than ever before," Wellman said.

"They can go to their IBM PC, log onto the DEC-based laboratory system and get the same results as they would from a DEC VT220 terminal," he added.

Rush's Medical Decision Support Systems software group is developing multifunction terminals that will be able to automatically log on to several of the Rush host systems.

"We have smarts in the PCs in the form of terminal emulators that know how to create an end-to-end circuit," Wellman said. "Eventually, we'll assign different classes of data access according to the type of end user assigned to the machine." Many of the machines will end up on patient-care wards of the hospital center.

"We're positioning ourselves strategically to serve the physicians who make their rounds here at the medical center," said Richard T. Shirey, director of Medical Decision Support Systems. "We want to create a system that will allow them to access patient data and laboratory results from their IBM PC before they ever go on their rounds."

Networking has also brought updated mainframe data closer to in-house PC users.

"Before ISN, users had to ask us to update their data files overnight," said Hooman Bahmandeji, network communications manager for Shirey's group. "Now, they can call up the data themselves." The year-old networking scheme has already provided a qualitative improvement for Rush staff members, Bahmandeji said.

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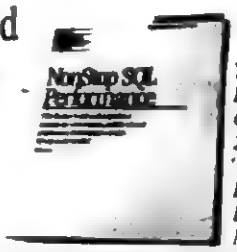

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ISDN Task Group formed

The Manufacturing Automation Protocol/Technical and Office Protocol (TOP) Users Group has formed a TOP Integrated Services Digital Network (ISDN) Task Group whose major goal will be to seek ways to integrate ISDN with the ISO's Open Systems Interconnect standard. The task group will work closely with a special interest group of the National Bureau of Standards Implementors Workshop, which is working on developing vendor implementation agreements for ISDN protocols.

Waterloo Microsystems, the developer of the Port network operating system, will shortly unveil a strategy for IBM OS/2 connectivity that includes support for OS/2 servers and clients, Microsoft Corp. MS-DOS and Port software over the same network. A Waterloo spokesman said the firm's approach will more closely mirror that of Novell, Inc. and Banyan Systems, Inc. than that of 3Com Corp., which chose to build the LAN Manager into its software.

The success of **Spectrum Concepts'** Xcom 6.2 file transfer software link to the Apollo Computer, Inc. Domain workstation has Spectrum working overtime porting the tool to other Unix-based machines. A product developer at the company says the firm is working on "quite a few other ports," including hook-ups to Apple Computer, Inc.'s Macintosh II and to Sun Microsystems, Inc. and Prime Computer, Inc. machines. Xcom 6.2 is a family of turnkey software products that use LU6.2 to provide peer-to-peer data transfer among disparate machines.

The ink is reportedly drying on a pact between **Wang Laboratories, Inc.** and neighbor Banyan. The agreement allows Wang to resell Banyan's Vines network operating system with Wang's VS minicomputers. The idea, a source close to Wang said, is to enable a VS to function as a departmental server and stave off any sales lost to personal computer networks. Banyan already supports Digital Equipment Corp.'s VAX.

The American National Standards Institute recently approved a draft proposal for a standard way for divested Bell operating companies to transport information over fiber-optic links. Last week, Bell Communications Research proposed a related protocol, called Synchronous Optical Network (Sonet), that would standardize the way user equipment transmits over such fiber-optic connections. If Sonet is approved, the local carriers will be able to support broadband applications such as full-motion video and interactive graphics, Bellcore said.

Communications Satellite Corp. (Comsat) has obtained Federal Communications Commission approval for a new tariff that will reduce rates for overseas satellite-based transmission services offered by its International Business Service. The biggest rate cuts will apply to multiyear customer contracts and will range up to 17.3%, based on geographic region and frequency.

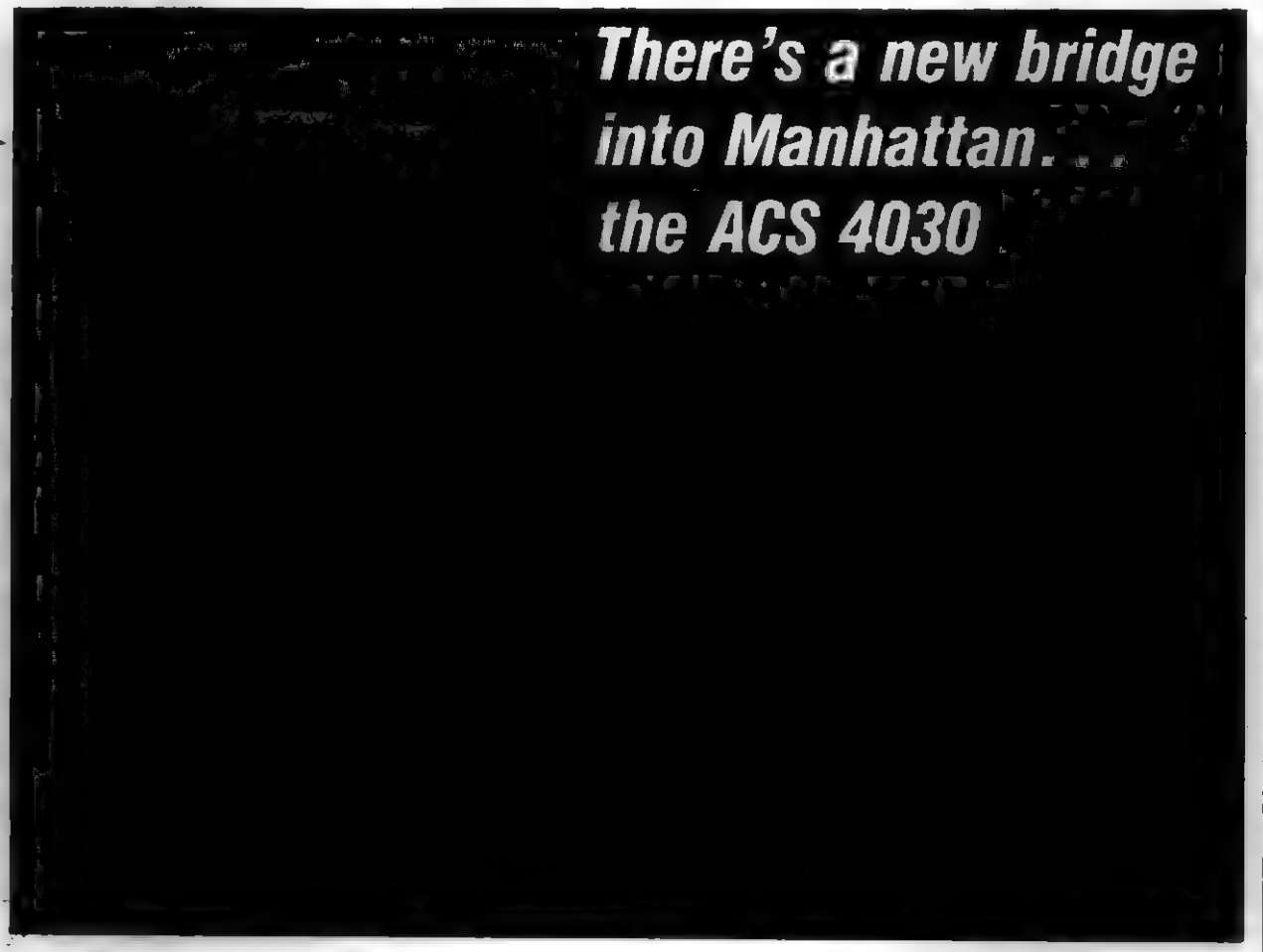
ACS Network Systems, a supplier of electronic data interchange (EDI) software for IBM System/36 and 38 computers, has signed a distribution agreement with J. D. Edwards and Co. in Denver. In response to customer requests, J. D. Edwards will distribute ACS's EDI/38 data communications and translation software in conjunction with its own financial and wholesale distribution systems software.

Silicon Graphics, Inc. has joined approximately 20 Unix computer vendors in support of **Technology Concepts, Inc.'s** Community as a way to link up with Decnet. Silicon Graphics will begin shipping the Decnet Phase IV-compatible software under the product name 4DDN in July.

Rabbit Software Corp. recently announced Rabbitscript, a high-level language interpreter said to allow users to write interface programs for the Rabbitgate local-area network gateway and the Rabbitstation IBM 3270 emulation product. Rabbitscript automates operator tasks, including data entry; watches for screen updates; and transfers data to or from sessions and local personal computer files. Rabbitscript is included in Rabbitstation or can be ordered as an option for Rabbitgate. List price is $150 per workstation.

Wang VS customers have been offered the Wangpac Dataconnect Service, a special pricing structure for Wangpac value-added network users seeking to connect only to the data bases offered over the network. The service fee is $750 per month, with $1.50 discounted for every connect hour to any data base.

The Ohio Co., a Columbus, Ohio-based securities firm, has contracted with **Tridom Corp.** for a $1.5 million satellite-based data network linking the firm's branch offices to its headquarters. Tridom's Clearlink Ku-band network will provide high-speed interactive data and video communication networking, as well as integrated broadcast data services, to brokers, clerical and management personnel.



"The ACS 4030 dramatically cut our communication costs and maintained reliability – at a quarter the price of other Ethernet bridges." Charles Fischer
Director of Operations, Dalcomp, Inc.

Dalcomp, a supplier of online information for the financial industry, needed a better way to connect offices on both sides of the Hudson. Dalcomp had five point-to-point connections using expensive dedicated lines. Dalcomp needed to cut network costs, but couldn't afford to sacrifice network performance. Dalcomp chose the ACS 4030 to connect Ethernets already in place.

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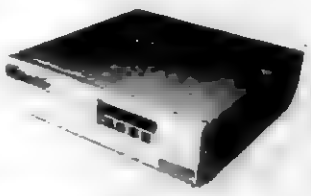

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Product barrage at Interface

BY PATRICIA KEEFE
CW STAFF

CHICAGO — Situated out here in the Windy City, Interface '88 served as the launching pad for a whole host of communications products.

T1 links and packet switches.

• Newbridge Networks, Inc. in Herndon, Va., announced the 4602, a more powerful model of its network management system based on a Sun Microsystems, Inc. workstation. The product provides centralized monitoring and diagnostics for Newbridge's T1 multiplexer line. The software costs $50,000 for a single license.

Also introduced by Newbridge was the 3630 multiplexer, base priced at $8,000, which supports two T1 channels; and the high-end 3645 switch, said to support up to 256 T1 links or four 45M bit/sec. T3 links. Pricing for the 3645 was unavailable.

Both products can interface with Digital Access and Cross-Connect System-compatible carrier services. They are equipped with T1 circuit cards that reportedly can support 12 Integrated Services Digital Network (ISDN) Basic Rate Interfaces, each of which is made up of two 64K bit/sec. digital channels.

• Telematics International, Inc. in Fort Lauderdale, Fla., introduced the Series 5000 line of programmable network backbone packet switches. The processors are said to offer two to three times more data thoughput than is currently obtainable from Telematics' 25Net line. With data throughput estimated in excess of 2,000 packet/sec., Series 5000 models range in price from $78,500 to $200,000.

• Tymnet, McDonnell Douglas Network Systems Co. in San Jose, Calif., introduced a CCITT X.25-to-Synchronous Data Link Control conversion feature for its packet-switching network service. The feature is said to allow IBM 3270 and 5250 terminals and hosts to communicate over Tymnet's X.25 network.

• Transtream, Inc. in Augora Hills, Calif., released the T-1000 Data Unit, said to provide access to the circuit-switched digital network through Northern Telecom, Inc.'s DMS-100 central office switch or SL-100 private branch exchange. The T-100 reportedly supports full-duplex, synchronous data transfer at speeds up to 64K bit/sec., or 19.2K bit/sec. asynchronous. A combination of applications packages provides support for different dialing protocols.

• Data Switch Corp. in Shelton, Conn., unveiled the Model 9015 host channel extender, which directly connects peripheral control units to an IBM or plug-compatible mainframe over 1.5M bit/sec. T1 links, enabling users to bypass front-end processor bottlenecks, the vendor said. Scheduled for shipment in September, the product is priced at $85,000 for the first link and $75,000 for additional links.

ISDN.

• Progressive Computing, Inc. in Glen Ellyn, Ill., introduced two IBM Personal Computer-based products for ISDN developers and users: A protocol analyzer for the ISDN Basic Rate Interface and a terminal adapter said to allow the use of existing telephone installations to send voice and data over ISDN systems.

Fiber-optic networks.

• RAD Data Communications, Inc. in Rochelle Park, N.J., unveiled Fonet, a fiber-optic Ethernet-compatible product with the IEEE 802.3 standard. The network supports 10M bit/sec. data transmission and can be integrated with regular coaxial or twisted-pair Ethernet installations, the vendor said. The product comes in a six-channel star priced at $3,660 and a 12-channel star priced at $5,460. Also available is a fiber-optic transceiver, priced at $595, which interfaces a workstation or another network to Fonet. Synchronous-link signaling eliminates the need for repeaters, so the network can be configured to support successive layers of backbones over a total area of 45 times that of coaxial Ethernet, according to RAD.

• BICC Data Networks of Westboro, Mass., introduced the Isolan family of fiber-optic networking products. The 1180 fiber-optic transceiver is priced at $595, the 1150 fiber-optic repeater is priced at $1,195, the 1126 fiber-optic multiport repeater is priced at $6,800 and the 1160 fiber-optic hub is priced at $4,750.

Quadram hooks PS/2 to mainframe

BY JAMES DALY
CW STAFF

NORCROSS, Ga. — Quadram Corp. entered the IBM Personal System/2 micro-to-mainframe market with its recent introduction of Mainlink IIM, a version of its Mainlink II 3270 emulation board that takes advantage of the PS/2's Micro Channel architecture.

Although Mainlink IIM is competing in a crowded field, Quadram said it is confident it can shake market share from other Micro Channel-based 3270 emulation boards such as Digital Communications Associates, Inc.'s (DCA) industry-leading Irma board and similar products from IBM, Attachmate Corp., CXI, Inc. and Ideaseociates, Inc.

Mainlink IIM's major selling points are its price and its compatibility with established terminal emulation boards, Quadram said. Because the product is compatible on an interface and hardware level with the Irma board and IBM micro-to-mainframe boards, it runs applications written for those vendors' products.

Additionally, no DIP switches need to be set when jumping between IBM and Irma applications running on Mainlink IIM. "You run Irma software one day, and tomorrow, when you want to run IBM, you don't have to go in and pull the cover off your PC and flip a DIP switch," said Bruce Watson, division manager for communications products at Quadram.

Mainlink IIM is available immediately and is priced at $495. A version featuring Quadram's emulation and file-transfer software is scheduled for availability later this month for $645. In contrast, DCA's PS/2-compatible Irma board retails for $1,195, and IBM's PS/2-compatible product costs $595 and requires up to $500 worth of software, depending on configuration, said Noreen Powell, an account manager at the Nynex IBM Product Center in Natick, Mass.

Leong

CONTINUED FROM PAGE 35

She now realizes that when you cheat, while you may not notice problems right away, other areas on the network might be impacted, and you won't know why.

"It's not like adding another extension cord to the television set cord because it's too far from the wall. Networks are very fragile and sensitive," one consultant stressed. Yet experts and technical support people out here in LAN Land tell me that a lot of users are still green when it comes to putting together networks — and this often causes trouble.

Running on empty?

There are, of course, legitimate reasons why users are stretching the specifications. And sometimes, you can get away with adding more nodes to the network than are recommended, because certain specs tend to be conservative in nature. But that isn't always the case. It's like driving a car past the empty-gas mark to see how far you can go. Chances are, you won't get that far before the whole thing stops.

Networks are sensitive critters. If you feed them the wrong things, they'll choke. One consultant says he had a client who failed to connect the cable adapter correctly on the LAN workstation. The file server wouldn't recognize the user.

A 3Com technical support manager says she often talks to frustrated users who add unusual hardware to 3Com LANs, which were never designed to handle such equipment. "We're finding now that it is very common for LAN users to want to use their single-user software packages as LAN applications," says Natalie Churchill, head of 3Com technical support. "These packages were never intended for network use."

Don't get me wrong. This isn't a treatise to punish delinquent users who have failed to read the fine print.

Mike Kanthal, who is the former president of the Association for Data Communications Users, reminded me sternly, "The vendors have to make sure what they say on their brochures is accurate. They say a network can handle a lot of nodes to get the sale, but they don't tell you what the network can realistically support."

There's got to be a happy medium somewhere. Vendors have to say what they mean and mean what they say. During sales presentations, users have to ask the right questions: "You said in the brochure it supports 200 nodes. Does that mean 200 active users, or 200 workstations with 50 active users or what?" or "The brochure said the network speed is 10M bit/sec. How does that vary under a heavy load?"

The key phrase here is never assume, or you make an . . . well, you know the saying.

Leong is Computerworld's West Coast bureau chief.

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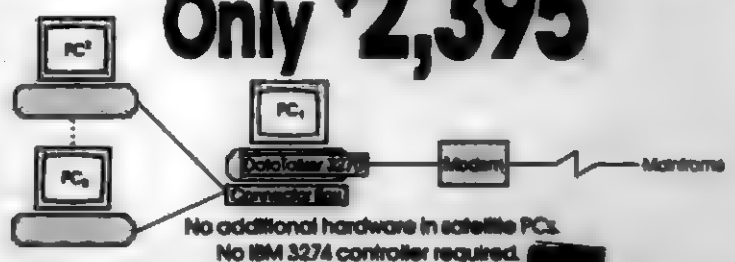

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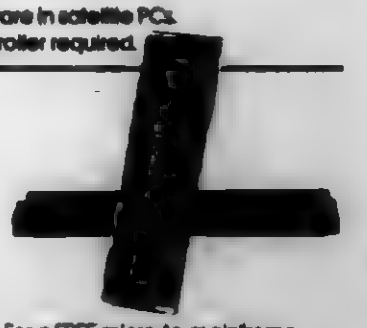

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NEW PRODUCTS

Links

Rabbit Software Corp. has released a version of its **Rabbitplus 3270-SNA** and **Rabbitplus 3270-BSC** products for personal computer systems operating under the Santa Cruz Operation, Inc.'s SCO Xenix 386.

Rabbitplus 3270-SNA lets an Intel Corp. 80386-based PC communicate with an IBM mainframe using generalized IBM 3270 data streams and IBM Systems Network Architecture protocols.

Rabbitplus 3270-BSC lets a 386-based PC communicate using binary synchronous protocols. It can operate as a standalone workstation or in a multiuser environment with attached asynchronous terminals.

Rabbitplus 3270-SNA costs $1,395. Rabbitplus 3270-BSC costs $1,995, including a multiprotocol adapter board.

Rabbit Software, Great Valley Corporate Center, Seven Great Valley Pkwy. E., Malvern, Pa. 19355. 215-647-0440.

Software said to interface Digital Equipment Corp. VAX and Microvax systems with IBM and compatible computers running IBM's DOS/VSE/Power in addition to JES2 and JES3 has been announced by **Datanex, Inc.**

EZSNA/RJE software offers IBM 3777-4 Systems Network Architecture/Remote Job Entry workstation functionality to VAX and Microvax systems. It is a complete RJE subsystem for the VAX computer.

The product uses standard DEC interface hardware and can operate on a single VAX system or, with its RJEnet option, can provide RJE and file-transfer services to several VAX systems in a Decnet network or on a Vaxcluster.

Prices range from $3,750 for the Microvax II to $7,500 for the Microvax 3000.

Datanex, P.O. Box 1728, Eugene, Ore. 97440. 503-687-2520.

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An IBM 5080 emulation product has been announced by **Hewlett-Packard Co.**

Called **HP 98855A**, it allows users of HP 9000 engineering workstations to access IBM mainframe-based applications, such as Cadam, Inc.'s Cadam.

In a multiuser configuration, up to 16 simultaneous 5080 emulations on the HP workstations can communicate with the IBM mainframe, according to the vendor.

The 5080 emulators can be added to existing IBM mainframes using Spectragraphics Corp.'s channel controllers and IBM-compatible 5080 terminals.

The HP-Spectragraphics design-aet channel controller can support up to 64 simultaneous users and up to eight local-area network gateways.

The HP 98855A is available with 16-, 12-, eight- and four-simultaneous user licenses.

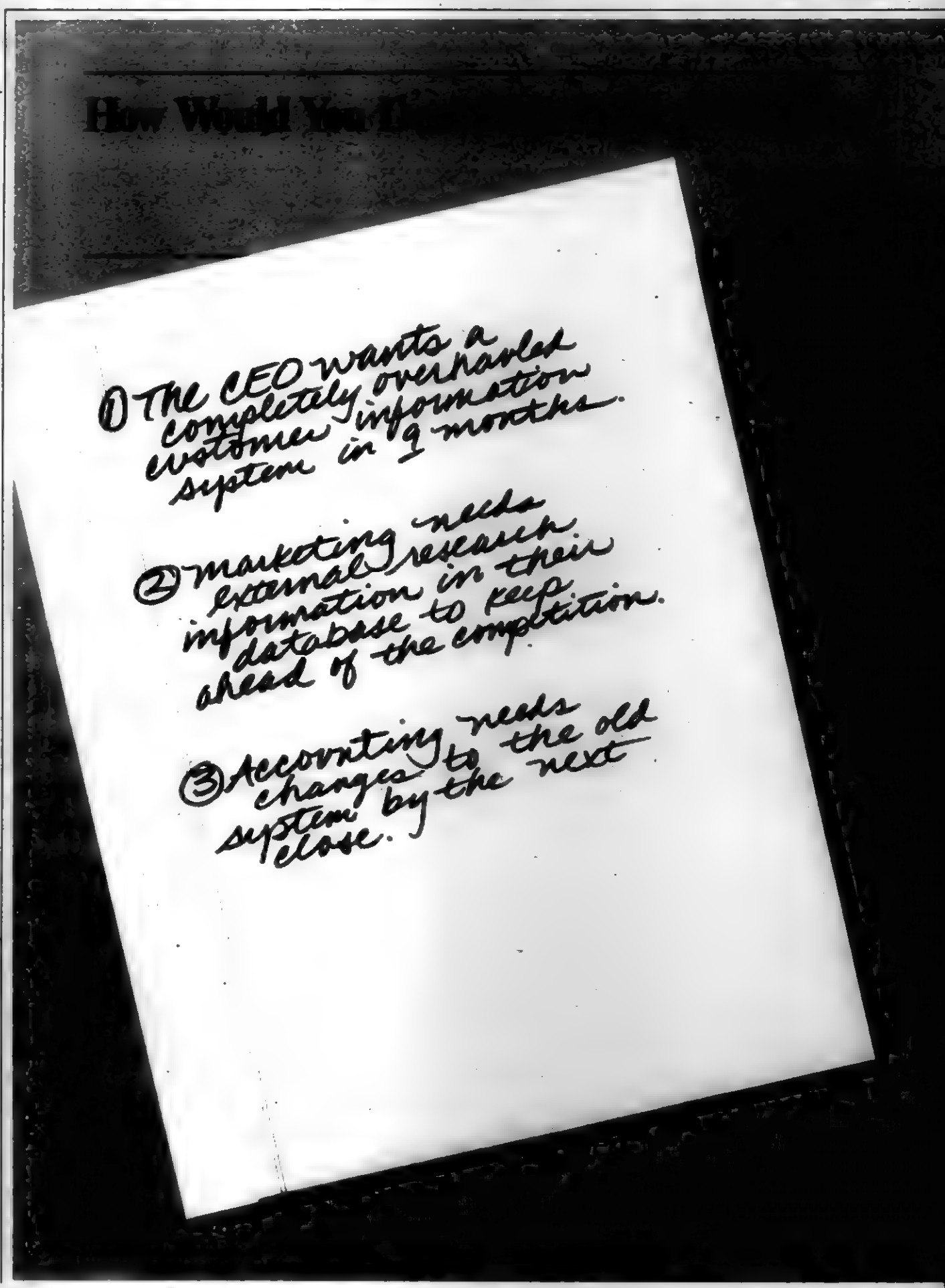
Prices range from $9,629 to $32,858.

HP, 1820 Embarcadero Road, Palo Alto, Calif. 94303. 800-367-4772.

Protocol converters

A Multibus network protocol processor called the **NP322** and aimed at the AT&T Unix System V, Release 3 environment has been announced by **Micom-Interlan**, a division of Micom Systems, Inc.

The NP322 combination



hardware and software package is said to provide a set of tools for Transmission Control Protocol/Internet Protocol (TCP/IP) processing. It integrates a Unix System V, Release 3 and a University of California at Berkeley 4.2 socket interface library.

The hardware includes an Intel Corp. 80136 microprocessor, an Intel 82586 local-area network coprocessor and 512K bytes of random-access memory on a single-slot Multibus I interface card.

The product incorporates all of the TCP/IP functions. It supports Streams and AT&T's Remote File Sharing features for Unix System V, Release 3. Also included is a C-callable socket interface library.

The processor costs $2,190.

Micom-Interlan, 155 Swanson Road, Boxboro, Mass. 01719. 617-263-9929.

File servers

The **286 Network Manager**, a four-user network system, has been announced by **Advanced Digital Corp.**

Based on the Intel Corp. 16-bit 80286 microprocessor, the 286 Network Manager supports 1.5M bytes of random-access memory on the motherboard, a 40M-byte hard disk drive, a 1.2M-byte 5¼-in. floppy drive and two hard disk drives. It supports four IBM Personal Computer AT-compatible systems running under Novell, Inc.'s Netware.

Other features include a 101-key IBM PC AT-compatible enhanced keyboard, a keylock switch, a real-time clock/calendar and parallel and serial ports.

Two- and four-user versions are available. The basic multiuser system costs $4,450.

The vendor also announced **Transformer 2**, an expansion board that provides multiuser support for all IBM Personal System/2 models. It costs $1,695.

Advanced Digital, 5432 Production Drive, Huntington Beach, Calif. 92649. 714-891-4004.

Modems/ Multiplexers

Newbridge Networks, Inc. has enhanced its **3600 Mainstreet Bandwidth Manager**, a T1 multiplexer.

The manager supports up to 16 links. Additional features include a digital emulation of analog multidrop lines, subrate multiplexing and channel switching.

A typical node of the 3600 Mainstreet Bandwidth Manager is priced starting at $16,000. Single T1 multiplexers start at $5,000.

Newbridge Networks, Suite 160, 13873 Park Center Road, Herndon, Va. 22071. 703-834-3600.

A two-channel synchronous data multiplexer designed to allow users to connect non-T1 networks and devices operating at data rates from 56K to 1.544M bit/sec. to a T1 network has been announced by **Verilink Corp.**

Called the **Connec-T1 Data Service Unit**, the device includes an integral Verilink channel service unit. It operates in either D4-type or extended superframe T1 networks. Up to 16 preselected data rates can be on each of the two channels.

The device costs $3,495.

Verilink, 145 Baytech Drive, San Jose, Calif. 95134. 408-945-1199.

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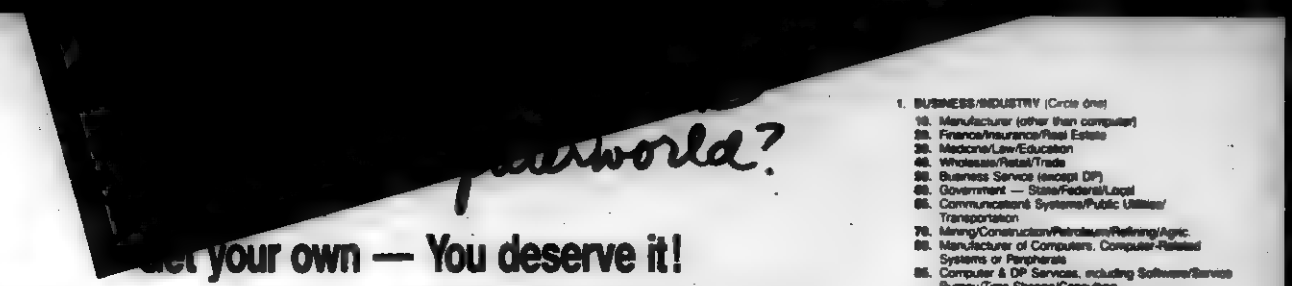

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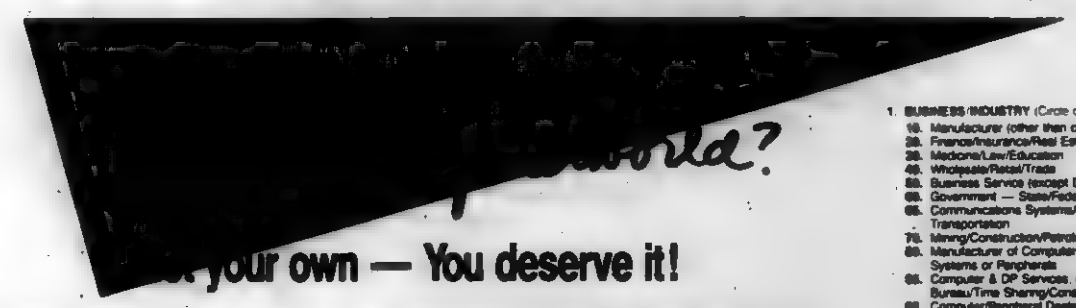

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SYSTEMS & PERIPHERALS

HARD TALK

Stanley Gibson

Olsen poses slick question

Is Unix really snake oil? That is the question gripping the computing community these days.

At the recent announcement of the VAX 8800 series and its much-vaunted symmetrical multiprocessing, DEC President and Chief Executive Officer Ken Olsen made remarks that seemingly affixed the label of "snake oil" to Unix.

You could feel the collective cringe of the DEC public relations corps. They must have thought: "There he goes again. Popping off with a controversial quote that'll haunt us for months as we try to explain, 'What he really meant to say was. . . .'"

Well I, for one, say more power to Olsen. Why shouldn't the boss of the world's second largest computer company feel free to speak his mind? Why should his First Amendment rights be violated just because of his job?

If the opinion of anyone in the industry should be taken seriously, shouldn't Olsen's? His professional career has spanned the computer age, from the 1950s to the present. He is a techie, an MIT graduate. He has appeared on the cover of magazines.

And as a matter of fact, what he really meant to say was not that Unix itself is snake oil. What he said was that the ven-

Continued on page 45

Multiprocessing all the rage

Mid-range vendors, lured by fast transaction abilities, pile on bandwagon

BY STANLEY GIBSON
and JEAN S. BOZMAN
CW STAFF

Symmetrical multiprocessing, although most celebrated in the recent announcement of Digital Equipment Corp.'s much-anticipated 8800 series of processors code-named "Polar Star," is currently offered by a number of major mid-range systems companies.

While mainframe vendors such as IBM and Unisys Corp. have boasted the architecture for more than a decade, companies like Prime Computer, Inc., Sequent Computer Systems, Inc., Pyramid Technology Corp., Wang Laboratories, Inc. and Data General Corp. have introduced symmetrical multiprocessing within the past few years. Several that have recently introduced the capability say they plan to expand their product families by increasing the number of processors that can compute symmetrically.

DEC's March 8 announcement was a family of four systems with one to four VAX 8700 CPUs. Enhancements to the company's VMS operating system allow symmetrical multiprocessing, improving throughput from what would be available with asymmetrical multiprocessing, such as that offered on DEC's dual-processor 8800. The four-processor 8840 offers 3.7 times the throughput of a single 8700, DEC said.

The power of one

According to Frederic Withington, an independent consultant in New York, a system performs symmetrical multiprocessing if each processor uses only one copy of the operating system, which is located in shared memory. In addition, he said, the system must look like one computer to the user.

In a cluster, however, each processor has its own copy of the operating system and each processor has its own memory, which is not shared among other processors, Withington said. In addition, a user must log on to one processor at a time, rather than logging on to the multiprocessor as a single unit. However, a DEC Vaxcluster is symmetrical, Withington said, because no single processor is given dominant status, as is the case in asymmetrical multiprocessing. In asymmetrical multiprocessing, one CPU handles job scheduling and I/O for the entire system.

Harriet Cohen, VMS product manager at DEC, suggested that the difference between the symmetrical multiprocessing of the 8800 series and that of Vaxclusters is simply that a cluster is loosely coupled, whereas the 8800 series is tightly coupled.

Continued on page 46

DEC adds VAX-based AI family

BY STANLEY GIBSON
CW STAFF

MARLBORO, Mass. — Beefing up price/performance in its artificial intelligence offerings, Digital Equipment Corp. recently introduced systems based on the Microvax 3000 and Vaxstation 2000.

The single-user systems replace previous Microvax II-based AI workstations, which will be phased out, according to Steve McIntosh, DEC's product manager for AI packaged systems.

DEC introduced three AI Vaxstations based on the 3200 and 3500 workstations and a low-cost Vaxstation 2000 desktop system. DEC said it hopes to sell the systems to finance and

Continued on page 45

Data View

Low-end growth

Workstations and office clusters will fuel growth in use of intelligent printers and copiers

INFORMATION PROVIDED BY CAP INTERNATIONAL, INC.

Securities system debuts

BY ALAN ALPER
CW STAFF

NEW YORK — A recently formed unit of a Swedish conglomerate is taking on the hotly contested securities trading systems market with a turnkey approach that combines the networking and software portability of Digital Equipment Corp.'s VAX computers with its own proprietary software.

The company, Transvik, Inc., is affiliated with Invik & Co. AB, the $100 million merchant banking arm of Industriförvaltnings AB Kinnevik in Stockholm. Transvik is targeting its efforts primarily at second- and third-tier markets as well as at marketplaces in emerging geographical areas, according to Transvik President David Rosenauft.

The system is aimed at exchanges or marketplaces that trade securities such as options, futures and bonds.

Transvik, as the system is

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Inside

• Sigma Investment Inc. adds expansion chassis. Page 52.
• Emerson taps VAX market with plug-compatible uninterruptible power system. Page 52.

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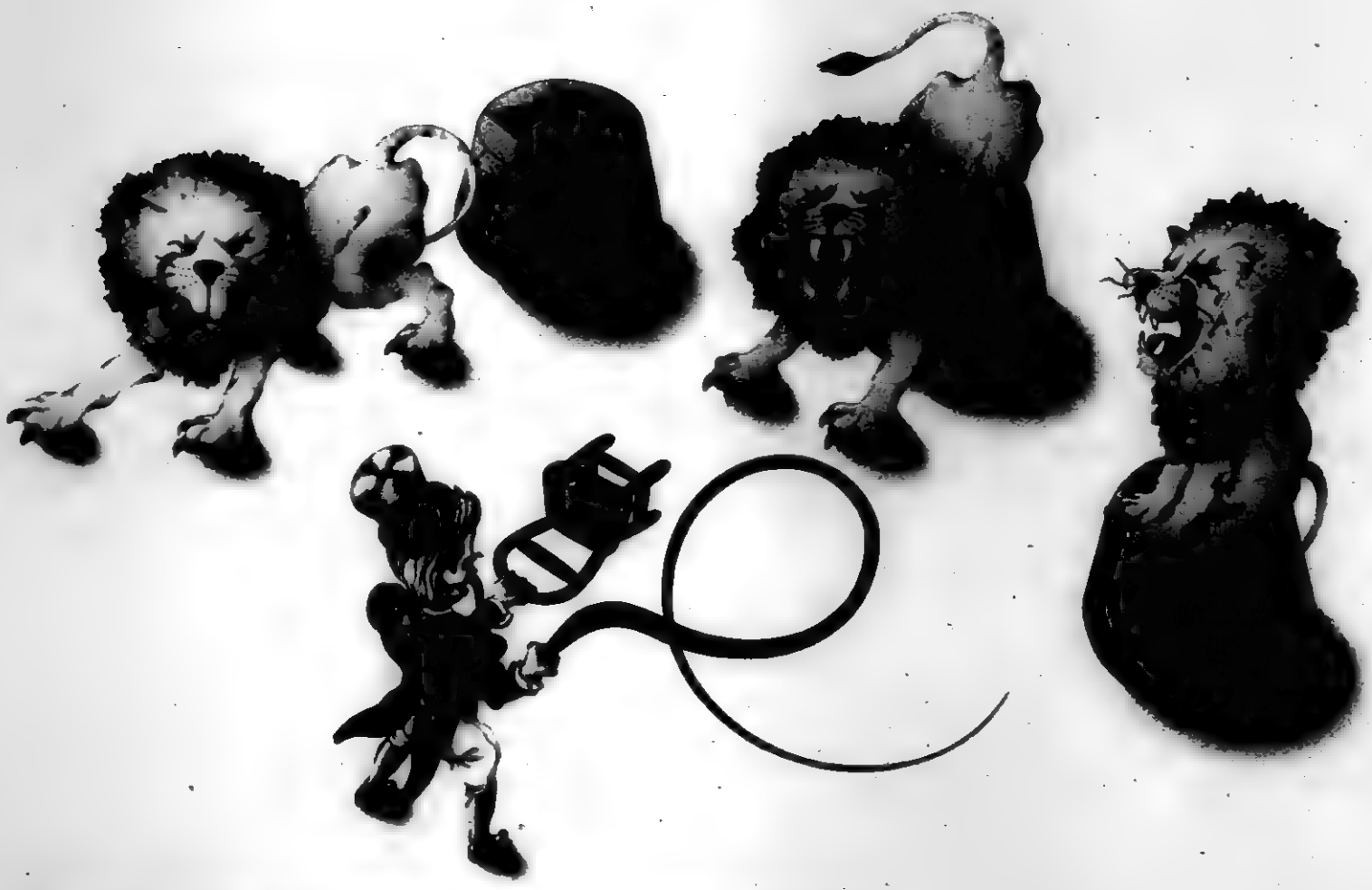

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Gibson

CONTINUED FROM PAGE 43

dors of computer systems claiming that because they support a version of Unix, they have at their immediate disposal a vast library of Unix-based software, are like the proverbial snake oil salesmen, claiming to offer a cure for all ailments.

Olsen wanted to say that users should not be so gullible as to believe such a claim. With virtually as many variations of Unix as there are systems, it is, in fact, quite improbable that very many "Unix" applications will run on any given "Unix" system without significant alteration.

Indeed, the press releases that cross this editor's desk touting Unix-based systems show a vast array of different Unix flavors and remarkable creativity on the part of marketing types in thinking up names for them. AIX, AUX, Xenix, Dynix, Stellix and, of course, Ultrix are but a sampling of Unix variants.

Olsen went on to question the claim of some vendors that Unix is an industry standard. He drew the distinction between an operating system that is the property of a company and the kind of standard that is hammered out by such groups as the American National Standards Institute and the International Standards Organization. Unix, he pointed out, is the property of AT&T, even though it is freely licensed.

DEC could get warmer

Olsen suggested that if Unix were handled by impartial standards groups, DEC's feelings toward it might be warmer than they are. Indeed, the implication was that when the Posix standard is determined, DEC's position on Unix will thaw.

It should be noted that currently, and probably until the Posix standard is drawn up, there is no widely used operating system that is the fruit of an impartial standards group. All operating systems in popular use are actually someone's property. They are either freely licensed or licensed for use with a specific hardware system.

Microsoft's MS-DOS attained the status of an industry standard because IBM sold a lot of systems that required it. OS/2 will probably also gain such a position as a result of Big Blue's marketing muscle. Unix could gain similar currency, but if it does, it will likely reduce hardware vendors to commodity suppliers — not a market to which DEC feels naturally attracted.

Was Olsen speaking up to toot DEC's horn? Of course. To cast possible doubt on competitors? Yes. But I have never been to a product rollout of any kind where that was not done.

How much better it is to hear Olsen colorfully voice an opinion — for which a good argument can be made — than to listen to the typically sanitized vendor drivel to which we have become accustomed.

Olsen may have dressed up his salesmen in blue suits, but he himself hasn't changed. Bless him.

Gibson is Computerworld's senior editor, systems & peripherals.

DEC AI

CONTINUED FROM PAGE 43

insurance companies, petrochemical, manufacturing and aerospace firms, the federal government and educational institutions.

Harvey Newquist, an AI consultant at DM Data, Inc. in Scottsdale, Ariz., saw the AI workstation announcement as a response to recent announcements by Sun Microsystems, Inc. and Texas Instruments, Inc.

"There is no new product here. They [DEC] just put together a package following the Micro Explorer announcement," he said, referring to the recently announced version of Apple Computer, Inc.'s Macintosh that includes TI's LISP-based Explorer microprocessor.

Newquist also pointed out that Sun recently announced a version of LISP to run on its workstations. Both developments drive the cost of entry-level AI workstations down.

Expert systems for any VAX

The new systems can be used to develop expert systems for delivery on any other VAX computer, according to DEC. All three include licenses for VAX LISP and either the DEC Ultrix or VMS operating system. In addition, a license for VAX OPS5, a rule-based expert system development tool, is included with VMS systems.

The AI Vaxstation 2000 comes packaged for use as part of a local-area Vaxcluster. An optional tape cartridge drive is required for the system to be used as a stand-alone device. The AI Vaxstation 2000 includes 6M bytes of memory, a 19-in. monochrome monitor and a 71M-byte disk drive. The system is priced at $13,570.

The AI Vaxstation 3200 has 16M bytes of memory, a 19-in. black-and-white monitor, a 159M-byte disk drive and a 95M-byte tape drive. The system is priced at $35,965.

The AI Vaxstation 3500 comes with 16M bytes of memory, a 19-in. color monitor, a 280M-byte disk drive and a 296M-byte tape drive. Maximum memory is 32M bytes. The Vaxstation 3500 is priced at $59,505.

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Securities system

CONTINUED FROM PAGE 43

called, can be customized to the requirements of any securities marketplace, Rosensaft said. Its capabilities can be distributed among single or networked VAXs at one or many central facilities or on a local level via Microvaxes and Vaxstations, the firm said. DEC workstations on the network perform local processing, store personal files, access market feeds and news services and can be linked to back-office systems using industry standard interfaces, Rosensaft said.

Unlike some existing systems, Transvik can automatically execute any size trade at the push of a button, according to Rosensaft. "The trading process for the most part is still a manual process," he said. "Most of the systems out there automate pre- and post-trade activity. We do that and automate the transaction."

The DEC workstations have been adapted so that they are operated without the need of a keyboard. Users invoke commands appearing on a series of overlapping windows using a three-button mouse. The workstation can be configured to automatically trigger buy or sell orders based on predetermined parameters and can be set to alert users to specified trading opportunities.

The company declined to provide pricing, noting that each individual marketplace and exchange has different requirements.

Multiprocessing

CONTINUED FROM PAGE 43

"DEC has discovered tightly coupled multiprocessing. There are only so many computer architectures. They have rediscovered where IBM was 10 years ago," Withington said.

However, as Withington and several other observers pointed out, DEC has also discovered what it once had itself in the Decsystem-10, which consisted of up to four symmetrical multiprocessors. That system was discontinued in DEC's move to the VAX architecture.

Symmetrical multiprocessing offers perhaps its greatest benefit in boosting performance in transaction-intensive commercial applications. "Tightly coupled multiprocessing is a very valuable thing for transaction processing," Withington said, because any processor can initiate I/O. In asymmetrical multiprocessing, because only one processor can handle that function, a bottleneck of I/O tasks can occur.

In a cluster, meanwhile, memory is not shared between the processors, and a user can only log on to one processor at a time, two factors that also limit throughput in high-transaction environments.

Most symmetrical multiprocessors offer dynamic load balancing, which means that high-priority jobs coming into the system can be processed immediately by the most appropriate processor rather than having to wait until a processor is free.

Similarities between systems

DEC's 8800 series resembles Pyramid's Series 9000, which also consists of one to four processors. William Gimple, Pyramid's vice-president of system engineering, said the systems form a closely coupled symmetrical configuration. As in the VAX 8800 series, the processors share a common systems bus.

In the Pyramid series, two processors yield 1.85 times the performance of one processor; three processors, 2.7 times the power; and four processors, 3.6 times the performance. These are virtually identical to the ratios claimed by DEC for each of its four 8800 models.

The Pyramid system is Unix-based; the DEC 8000 series is VMS-based. "We had to overhaul the internals of Unix" to arrive at symmetrical multiprocessing, Gimple said. DEC, however, said it will soon support symmetrical multiprocessing under its Ultrix version of Unix.

Unlike DEC, Pyramid does not offer a clustering capability. But Gimple says Pyramid expects to offer symmetrical multiprocessing support for more than four processors "in the not-too-distant future."

In late December, Wang quietly announced its top-of-the-line VS 7320, the company's only multiprocessor. As shipped to early sites, the VS 7320 is a tightly coupled symmetrical system based on two VS 7310 CPUs. By offering a symmetrical multiprocessor, Wang was able to sell a machine 1.9 times as powerful as a VS 7310 uniprocessor at only 50% more cost.

To upgrade a VS 7310 uniprocessor to a VS 7320 requires the addition of a second processor board to the VS 7310's cabinet, Wang said.

"The VS 7320 establishes a technology platform on which Wang will build even larger, more powerful systems," said Bob Ano, Wang's corporate marketing senior vice-president, when the 7320 was introduced, indicating that symmetrical multiprocessing will probably be extended to include additional CPUs.

DG also offers a multiprocessing system, which offers "near-symmetrical multiprocessing," according to Stan Dolberg, manager of DG's Integrated Systems Group. The MV 20,000 Model 2, introduced in November 1985, contains two CPUs running on one copy of the operating system.

Just as Wang is planning to extend its symmetrical multiprocessing design, so is DG, Dolberg said. "Our customers are pushing all of the computer vendors, us included, toward providing a well-balanced, global computing resource. Our operating

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system is capable of supporting more than two processors, and we have other multiprocessing machines on the drawing boards."

Sequent's Symmetry system, currently available with up to 10 Intel Corp. 80386-based CPUs, performs symmetrical multiprocessing as well. The system uses an adaptation of Unix, called Dynix, that has been altered to perform symmetrical multiprocessing.

Each processor uses a single copy of the operating system in shared memory. When a so-called "copy-back cache" feature becomes available next month, the system will perform symmetrical multiprocessing with up to 30 CPUs, according to Sequent.

Sequent developers created what they call the Unix scheduling algorithm, in which high-priority jobs are tagged with a priority number so that they will be able to interrupt jobs of lower priority, said Ron Parsons, manager of technical marketing. "The Unix algorithms had to be changed to multiprocessing algorithms," he added.

Users of Sequent's Symmetry and its earlier Balance systems, which are based on National Semiconductor Corp.'s 32032, can elect to perform parallel processing on the same machines, Sequent officials said.

Balancing the work

Prime's 6550 system consists of two symmetrical multiprocessors. Both processors use a single copy of Prime's Primos operating system residing in shared memory. "The real key to being able to exploit more than one processor is the ability to balance the work load," said Walter Jones, director of CPU development at Prime.

"If a task is waiting on one processor, then you want to move it to the other CPU," he said. In the Prime 6550, the dispatcher function is in microcode on each CPU. The two CPUs are connected directly through a channel. The direct connection helps the two processors communicate to share the work load, Jones said.

Jones added that using only two processors is an advantage over using three or four, which can create greater complexity, leading to greater operating overhead and decreased throughput. The 6550 is rated at 23.6 million instructions per second, according to Prime.

Spinlock is key

In DEC's 8800 series, the key innovation that allows the sharing of resources and prevents contention is something called the spinlock. "To initiate I/O, a processor must own the spinlock. It must test to see if the spinlock is available," Cohen said. A spinlock is a bit in memory, a binary condition and a part of the VMS operating system, he added. The spinlock is known as a kind of semaphore, or signaling, function.

In the Sequent Symmetry system, some 100 spinlocks are used, according to Parsons.

In DEC's systems, the spinlock was added to the VMS scheduler, which exists in all VMS systems, whether uniprocessor or multiprocessor.

In a cluster, the VMS lock manager handles synchronization. It is similar to the spinlock used in the 8000 series, Cohen said. However, there is no dynamic load leveling in the cluster. A job with highest priority will always be processed before lower priority jobs on a symmetrical multiprocessing system; on a Vaxcluster, it will not automatically go first.

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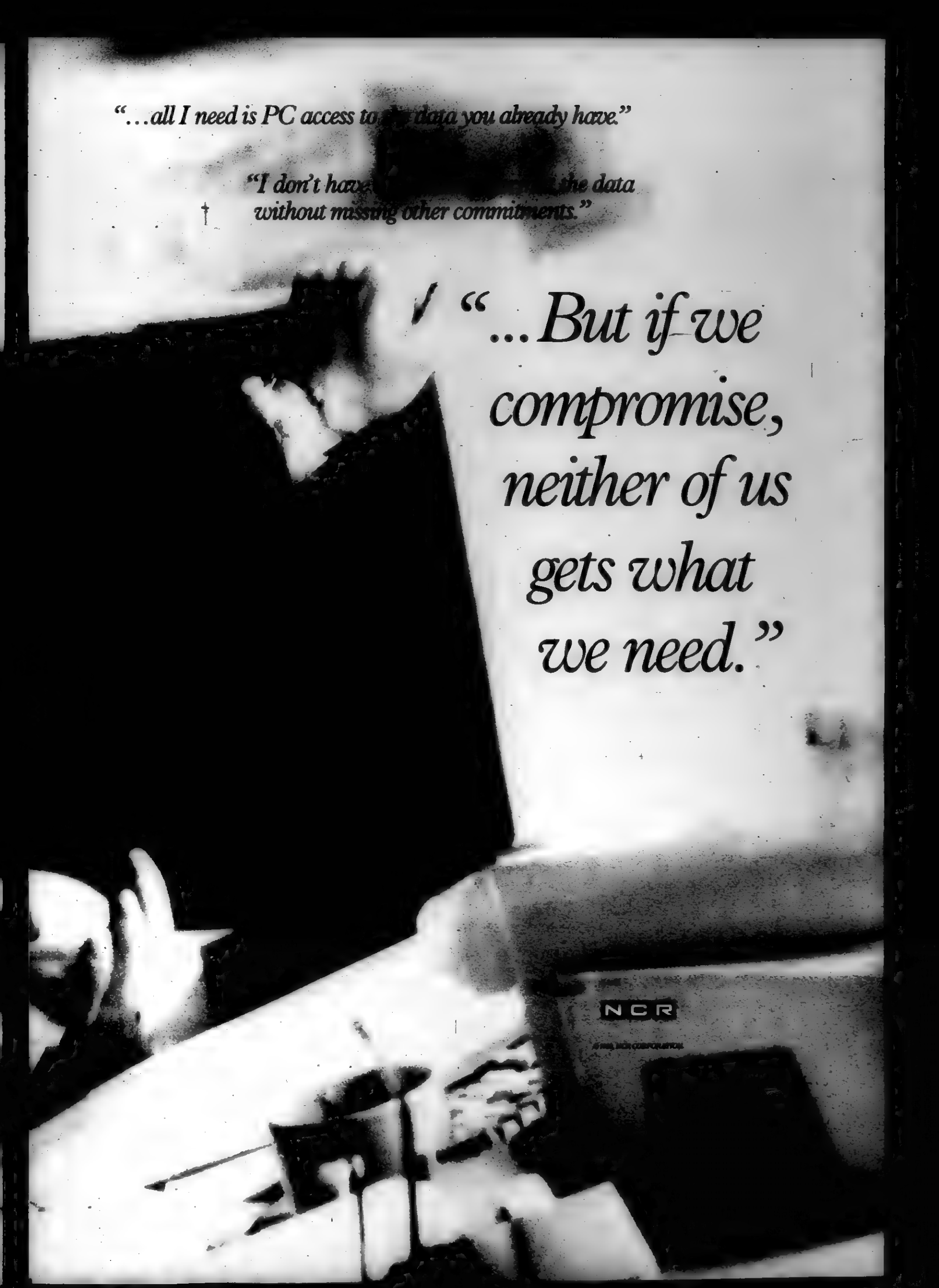

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NEW PRODUCTS

Data storage

An expansion chassis for pluggable 5¼-in. Winchester disk drives has been announced by **Sigma Information Systems.**

Called the **SA-H163**, the chassis holds two drives that can be transported. Each drive mounts on a drive bracket. The drive brackets include drive power and data connectors that mate with low-insertion-force docking connectors inside the chassis.

The product can be configured to operate both drives from a single controller or each drive from a separate controller. The chassis can be daisy-chained for operation of four drives from a single controller.

The SA-H163 costs $1,431.

Sigma, 3401 E. LaPalma Ave., Anaheim, Calif. 92806. 714-630-5417.

Toshiba America, Inc. has increased the storage capacity of its **WM-S500** 12-in. write-once read-many optical disk drive to 5G bytes.

The drive stores up to 2.5G bytes per side, the vendor said. The data transfer rate ranges from 4M to 8M bit/sec., and the average seek-access time is 160 msec. The WM-S500 features a small computer systems interface and a built-in power supply.

The drive costs $13,995. The 5G-byte cartridge costs $395.

Toshiba, 9740 Irvine Blvd., Irvine, Calif. 92718. 714-583-3108.

A nonerasable optical disk drive for jukebox applications has been announced by **Optimem**, a subsidiary of Cipher Data Products, Inc.

The **Optimem 2400** offers a data storage capacity of 2.4G bytes on a 12-in. disk. It uses 48,000 tracks per disk. According to the vendor, it is compatible with existing Optimem 1000 optical media. Other features include single-insertion operation.

The Optimem 2400-1 model costs $14,990. The Optimem 2400-6 model, a save-drive-without-controller product, costs $13,370.

Optimem, P.O. Box 85170, San Diego, Calif. 92138. 619-578-9100.

Printers/Plotters

A series of eight-pen plotters consisting of D- and E-size models has been announced by **Schlumberger Technologies'** Graphics Division.

The dual-mode plotters, called the **18 series**, feature an automatic pen-changing system for unattended operation, vector optimization software and built-in storage facilities for supplies and accessories.

Both models accept any type of media in sizes A through E.

Prices range from $6,890 to $8,890.

Schlumberger, P.O. Box 7169, 385 Ravendale Drive, Mountain View, Calif. 94039. 415-964-7900.

Giltronix, Inc. has added a low-end buffered printer-sharing device to its line of peripheral-sharing products.

The **EZqueue 1000** offers printer and plotter sharing for work groups of two to six users. It features six programmable RS-232 serial I/O ports and two IBM-type parallel output ports. Also included is a 256K-byte print spooler and a random-access memory-resident pop-up menu software program for printer selection.

The EZqueue 1000 is nonexpandable but can be daisy-chained. It costs $95.

Giltronix also announced the **ESP Surge Protector** for use in safeguarding equipment from electrical spikes conducted through RS-232 cable. The price is $49.95.

Giltronix, 3780 Fabian Way, Palo Alto, Calif. 94303. 415-493-1300.

A color upgrade kit said to provide seven-color printing capability for Toshiba's **P351SX** 24-pin dot matrix printer has been annouced by **Toshiba America, Inc.**

According to the vendor, the color ribbon that is now available for the kit has a life expectancy of 750,000 characters per band.

The color upgrade kit is priced at $239.

Replacement ribbons cost $20.

Toshiba, 9740 Irvine Blvd., Irvine, Calif. 92718. 714-583-3000.

Power supplies

A series of on-line, plug-compatible uninterruptible power supply (UPS) systems for Digital Equipment Corp.'s VAX-11/725, 730, 750, 8200 and 8300 computers has been announced by **Emerson Electric Co.**

Called the **AP101/VAX series**, the products provide a streamlined connection between the electric power source, the UPS system and the computer, according to the vendor.

The products are available in 3, 5 and 10kVA models with I/O frequencies of 50 or 60Hz.

A 10-minute internal battery system is standard.

Prices range from $8,500 for a 3kVA system to $16,500 for a 10kVA model.

Emerson Electric, 3300 S. Standard St., Santa Ana, Calif. 92702. 714-545-5581.

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3 Advanced Revelation's Dictionary Driven Database centralizes intelligence

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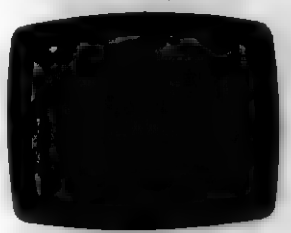

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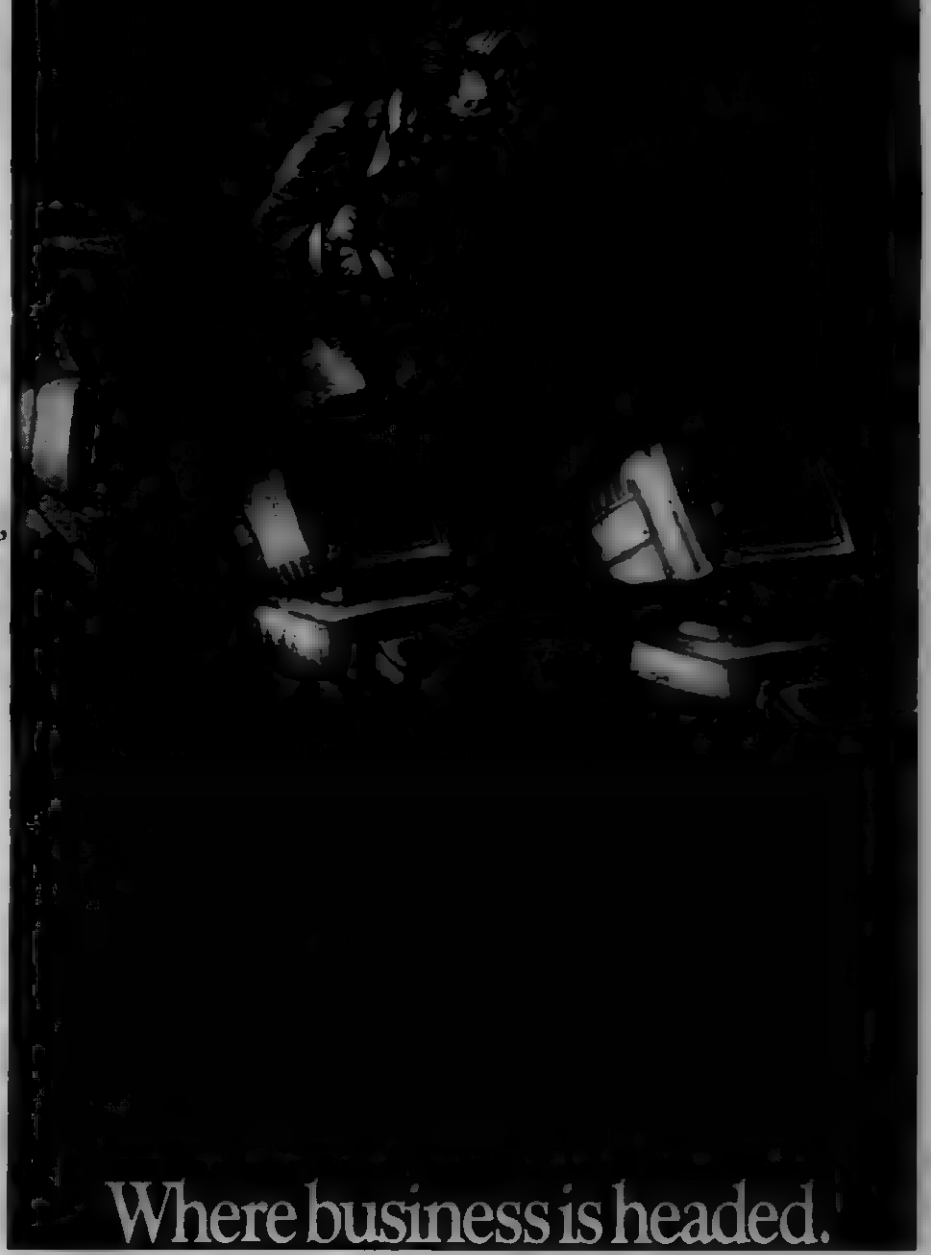

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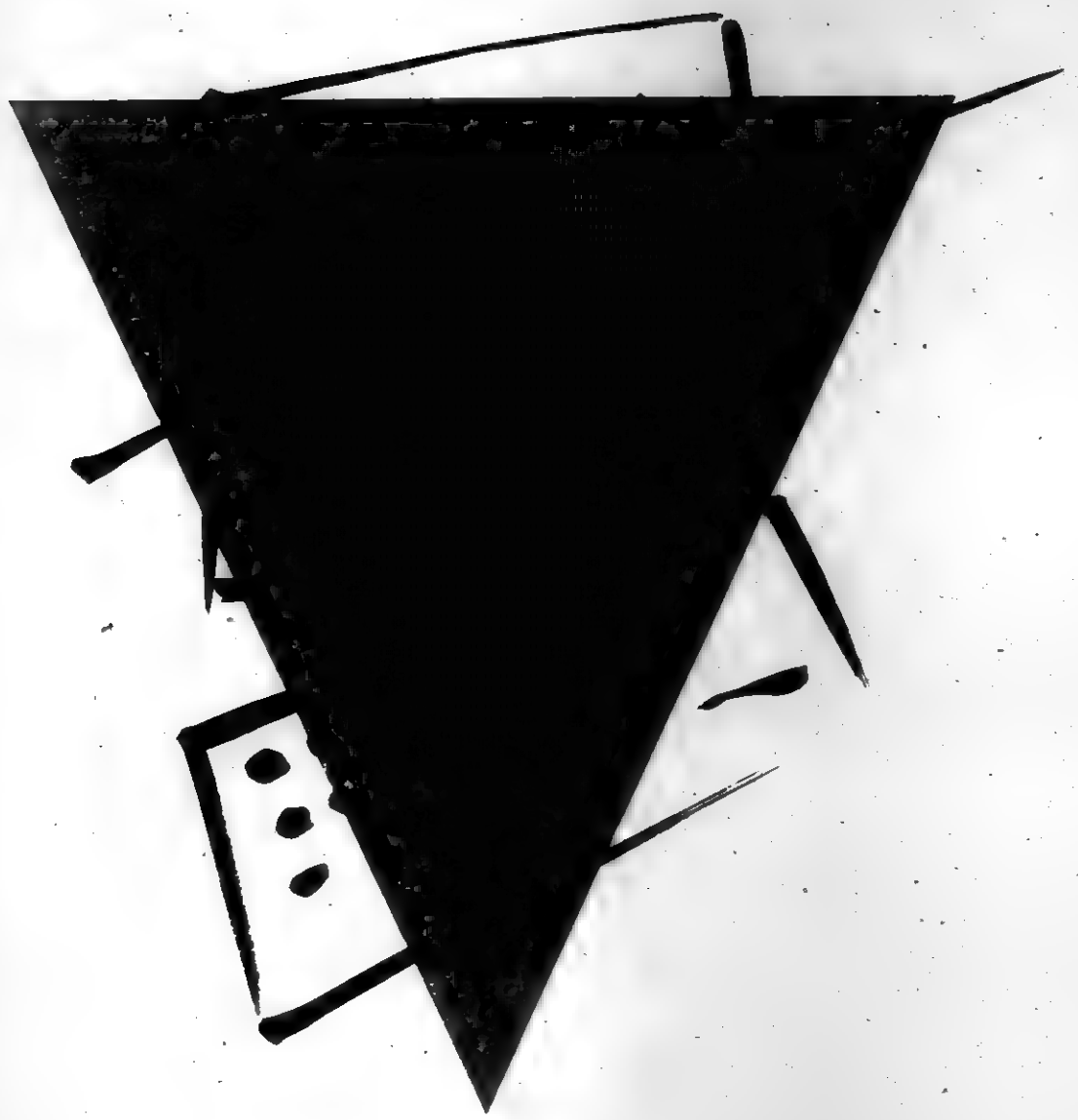

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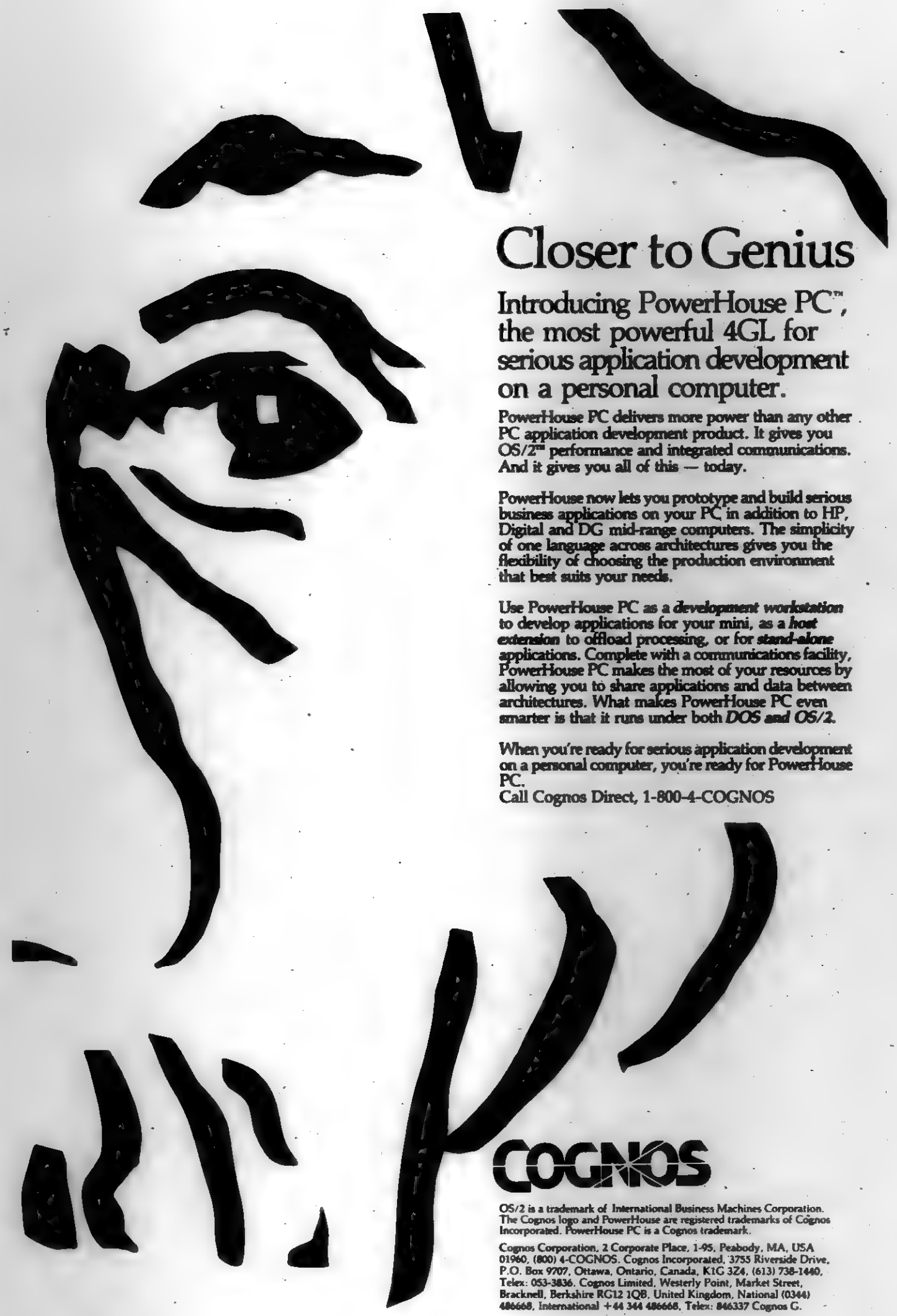

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MIS hiring and training: In search of business savvy

BY MICHAEL BALL

As information systems take on strategic roles in business, MIS managers face a pressing need to recruit or train employees whose technical knowledge is balanced with business savvy.

"There is no greater need than understanding the business problems and strategies," says Stephen Tucker, head of a corporate program at General Electric Co. aimed at developing information systems leaders.

"As the technical skills become common, we are simply going after the best people," adds Dave Novak, Firestone Tire & Rubber Co.'s section manager of corporate systems in Chicago. "I'll go with the better, well-rounded, business-oriented person every time."

Developing human resources is one of the obstacles that stands between MIS managers and the strategic advantages they envision. But this is just the sort of challenge in which optimists find opportunity, as can be seen from some of the organizations that have already taken up the gauntlet.

Leaders of The Travelers Corp. in Hartford, Conn., are among those who recognized the need for well-rounded MIS managers and dealt with it properly, according to David Miron, a principal and organizational analyst at consulting firm Temple, Barker & Sloane, Inc. in Lexington, Mass.

"They took the best business guy they had out of his job and had him spend a full year focusing on MIS issues," Miron says. "That is a very expensive way to do it, but they ended up with someone who truly understood both."

Both sides now

In another case, First Interstate Bancorp in Los Angeles is turning to a management training program to develop business-oriented MIS employees as it seeks to maintain or expand its systems work force of 2,000.

"We have a management training program, and we seek degreed employees with a willingness and aptitude to specialize in DP," says Sam Muhawi, an employment manager at the company.

First Interstate's idea is to produce IBM-style account managers who are able to understand both the MIS and business sides of a job.

"When we have a major contact with a client, they know how to deal with it," Muhawi says. "Traditional DP suffers in this kind of relationship." His program offers new opportunities for those who can straddle the disciplines, he says.

Other examples of companies currently using human resources to develop corporate-minded MIS executives include the following:

- GE is trying to develop leadership in systems recruits through its training program and by rotating job assignments.
- Arthur Andersen & Co. is actively recruiting qualified, entry-level systems professionals who hold nontechnical degrees, sometimes finding them in unexpected places.
- In decentralizing, Firestone is seeking workers for both its central systems staff and dispersed units who fit the description of being business-oriented, well-rounded and good at working with others.

Molding leaders

At GE, business units are responsible for recruiting their own people, but they can petition help from a corporate program aimed at developing information systems leaders.

"We are definitely trying to get the leaders of the future, the technology leaders, the best data base people, the best managers of information systems in the world," Tucker says.

Students in the program hear repeatedly that the purpose of their training and the GE work experience that follows is to turn them into strategic thinkers — the MIS leaders the company is looking for.

"Students today all have technological skills," Tucker says. "We look for leadership and try to develop it."

The program starts with recruitment. "We work with colleges and want the same group that everybody else does — the top-quartile grade point averages," Tucker says. While it does not expect to end up with a roster of perfect candidates, GE works with a profile of those it expects will flourish in the program.

The first thing the company looks for is experience and drive. One indication of these qualities is cooperative education or summer work — with GE or another organization — ideally in a computer-related field.

"Those who have done good summer or cooperative work can

LES KANTUREK

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Excitement is key to retention
Page 61

Ball is a free-lance writer based in Boston.

Hiring

FROM PRECEDING PAGE

override a lower grade average," Tucker says.

Perhaps more important, however, recruiters review application materials and listen during interviews for evidence of an interest in using computer systems to solve business problems. "We pay commensurate with their impact on the business," Tucker claims.

But Tucker contends that the program is neither sold nor bought on the basis of financial reward. "Our starting salary is competitive, but it is the program that attracts people more than an extra $1,000 a year," he says. The job comes with a promise of "the right tools and experience to do the crucial things, like rotating their assignments to round them out and find talents."

No guarantee

Unfortunately, many candidates do not enter the program as strategic thinkers, even if they are accomplished in their schoolwork, and quite a few will finish it without becoming ideal leadership material. The nature of changing the way even bright people think and act is neither sure nor swift.

"Within two years, we can't stamp, 'This person is a strategic thinker' on their foreheads," Tucker says. "But we and they can begin to see where they're headed."

Tucker says he does not consider the program to have fallen short if every student is not a paragon of leadership.

"Even if they are not those leaders we are looking for, they and we benefit if they come out only thinking 20% better," he says.

"WE LOOK for leadership and try to develop it."

STEPHEN TUCKER
GENERAL ELECTRIC CO.

Ready supply

Arthur Andersen, a company that typically undertakes heavy recruiting of college graduates, is finding a ready supply of candidates who are more well-rounded for systems jobs, according to Skip Battle, managing director of Andersen's Northern California offices.

The Big Eight accounting and management consulting firm finds that many college and graduate school students with nontechnical degrees are making themselves more marketable by taking MIS-related courses.

Majors in subjects such as economics and English bring new and different sets of knowledge with them, abilities that augment the traditional computer science backgrounds of the typical Andersen data processing staff member.

"We hire the vast majority of our people off college campuses," Battle says. "In the last several years, an awful lot of graduates, regardless of their majors, came out with fairly substantial [DP] backgrounds."

Not from these parts

Students from schools not traditionally associated with MIS prospects have successfully approached the firm's recruiters. "We find that many more are arranging their electives to provide a broader range of knowledge when they graduate," Battle says.

In other cases, colleges have let the company know that their curriculum has been revised, making their graduates attractive to the company.

Andersen's Battle

Some graduates who never thought of working for a Big Eight firm have reacted well to being courted for the field, Battle says. "We find that some disciplines that have been less aggressively courted have a heartwarming response."

Although Andersen says it likes the new source of recruits, the bulk of its MIS people will continue to come from computer science backgrounds.

"We will never replace computer science graduates, but we will augment them," Battle says.

Specifically, Andersen says it expects at least three-fourths of its entry-level hires to have technical or business degrees and the others "a clear quantitative aptitude," according to Battle.

But the trend toward generalist recruits suits Andersen's growing demand for more diverse skills in MIS and its need to hire 20% to 25% more MIS and DP people this year.

In addition, it fits in well with the company's traditional strategy of "hiring very bright, very energetic graduates and making sure they have ongoing education," Battle says. "We spend over $100 million a year on this, and after 20 years, I'm still getting updated."

The need for MIS staffers who possess multifold abilities is crucial in a decentralized or

To maintain top employees, practice what want ads preach

BY SHERYL KAY

The MIS world has come to a general consensus about what it takes to attract and keep good employees. Thumb through the help wanted pages: Advertisements for technical professionals almost always offer the best compensation, management, working environment and career growth.

But how can MIS managers be sure their companies really offer what they're advertising?

Even today some of America's most well-known corporations still have no true hiring assessment procedures in place. With the computer's impact on business, companies that take a nonchalant approach toward assessing their own hiring practices of computer professionals will find it impossible to stay on top.

Taking steps

There are several steps MIS managers can take to ensure their companies practice what they preach.

First, overburdened MIS managers might do well to rely on their company's human resources department. "Remember that human resources' primary responsibility is to educate and assist management in how to do the job effectively in order to maximize profitability and productivity," says George E. Biles, professor of management at the Kogod College of Business Administration at American University in Washington, D.C.

Second, it is possible to quantify and assess employee views on management's performance regarding certain human resources issues. This is often best done through questionnaires.

"WE AREN'T big enough for a formal compensation system, so surveys and other candidates' salary histories are important."

KATHERINE KNOWLES
ISALY KLONDIKE CO.

Some hiring practices are relatively easy to assess. Whether a company is big or small, managers should make sure they budget to offer competitive salaries.

Katherine Knowles, director of personnel and administration at Isaly Klondike Co., a St. Petersburg, Fla., ice cream maker, notes that geography can be a big factor when considering salary ranges. "Good, high-level people are hard to find around here, especially with the skills we require," she says.

To ensure that Isaly Klondike is competitive, Knowles obtains salary surveys from several organizations, including the Pinellas Suncoast Personnel Association, of which she is vice-president.

She also periodically checks with state and federal government agencies and national recruiting firms for salary ranges for MIS professionals in other regions. Knowles shares this information with Kevin Harrigan, Isaly Klondike's DP director.

"We aren't big enough for a formal compensation system," Knowles says, "so surveys as well as other candidates' salary histories are important."

What are the benefits?

Employees also take insurance and other benefits into consideration when reviewing compensation plans, so offering a comprehensive plan is important.

At GE Capital Corp. in Stamford, Conn., where 40 MIS positions became available in 1987, Bill Wilson, manager of human resources development, says he tries to make sure his organization's benefits program is as good as or better than what is offered at other firms.

Complementing national surveys conducted by the company's parent corporation, General Electric Co., GE Capital conducts an internal Practice Survey every 18 to 24 months. In that survey, "we ask our employees for written feedback in many areas, one of which is satisfaction with benefits," Wilson says.

Sense of direction

Good management is another issue that concerns MIS professionals.

"Some employees may have left another firm because there was no sense of direction, no goals set for them for today, this week or this year," Isaly Klondike's Harrigan says. "In a company of our size, if a manager is not good, it becomes obvious very quickly."

Jay Verneuil, GE Capital's vice-president of corporate information systems, says the same is true in larger organizations, so GE Capital also collects data on employee views of management in its Practice Survey.

Managers seeking to foster a good working environment should consider the physical attributes of the office, such as lighting, noise and furniture. All these factors may need to be modified to suit the work needs of technical professionals.

Roundabout research

Isaly Klondike's Knowles says she is able to gather information on environments at companies in her local area through interviews with job candidates.

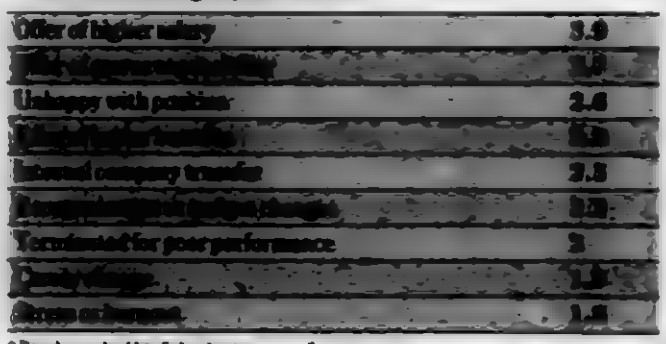
"If I know they're interviewing at other places, I always ask them what the other firms may be offering in a general sense," she says.

GE Capital also monitors training as well as career growth, in part because of the importance of these considerations to systems professionals,

Kay is an MIS human resources consultant based in Tampa, Fla.

DP's rolling stones

The most common reasons for turnover among information systems staff members, according to a survey of 370 organizations with a median budget of $10 million*



* Based on scale of 1 to 5; 1 = least common, 5 = most common

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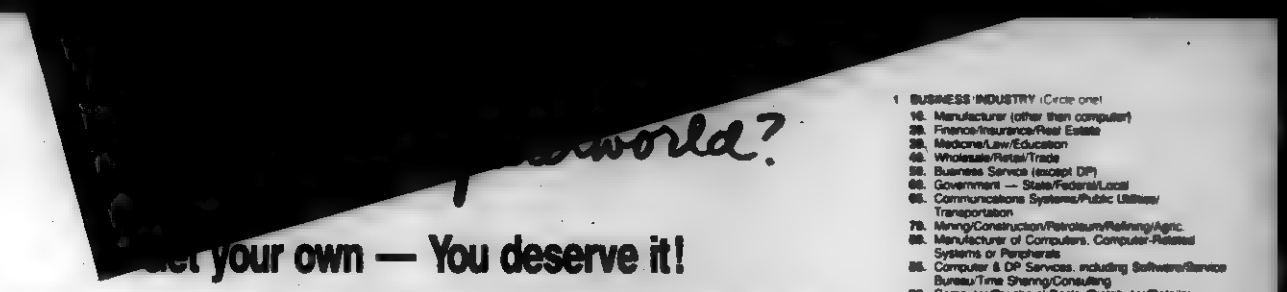

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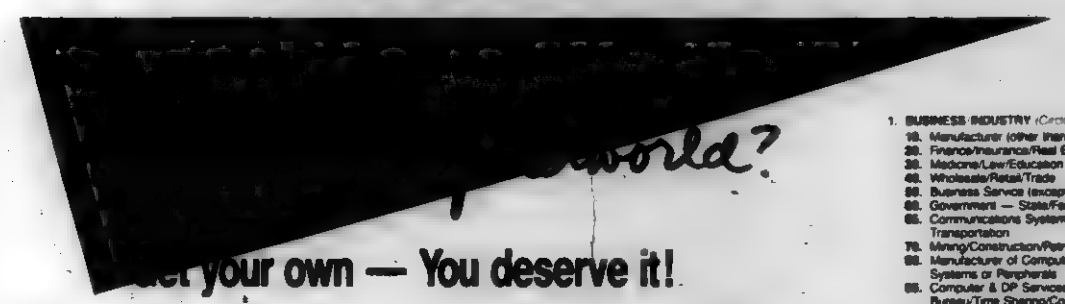

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departmentalized company, according to Firestone's Novak, whose firm is in the middle of diversifying and, simultaneously, addressing the impact of microcomputers and departmental systems.

To cope with these issues, Novak says, "you can have expertise at the top, but there is a need for better people and also different people at the central location." His company looks for employees who display broad knowledge and experience; it prefers those who possess an ability to work well in a small group.

Getting the job done

In seeking someone able to work with a small group, the company has to weigh the benefits of inspiration against the value of getting a job done quickly and well. At least at Firestone, the day of the hotshot, shoot-from-the-hip programmer is over.

"We look at the person and see if he is compatible with our goals," Novak says. "Our new challenge is to provide enough commonality, use enough standards to get everyone to work alike, without stifling creativity."

Getting the right people requires good management and training, and Novak says the trend toward better-rounded students and MIS staffers helps with this concern. "We get less concerned with technical skills because there are so many people coming in with the skills already," he notes.

In Firestone's case, the ideal candidates display a blend of computer and business skills.

"The emphasis here is to not think of MIS as an only career," Novak says. His trainers nurture the application of business skills, breed them in MIS and put them in the client area. "That's where they know both sides of the job," Novak says. That done, it is the company's responsibility to use the talent and skills wisely. "You make them managers, not clerks," Novak says.

Firestone's experience is not unique, according to Ted Freiser, president of consulting firm John Diebold & Associates. "Getting the right number of people with the right skills into decentralized locations is a challenge," Freiser says. "First you have to ask how many in a centralized location meet the profile and are fit to become decentralized." He notes that a large shop can tolerate a few people who are surly, overly independent and even dictatorial.

Reeling in the staff

Degree of success among methods for recruiting staff, according to a survey of 370 systems organizations with a median budget of $10 million*

Search firms	3.5
Colleges	3.1
Internal recruiters	3.1
Employee referrals	3
Advertising	3
Transfers from user departments	2.7
Cooperative education programs	2.5
Walk-ins	1.8

* Based on scale of 1 to 5; 1 = least successful, 5 = most successful

INFORMATION PROVIDED BY TOUCHE ROSS & CO.
CW CHART

'People' people

In contrast, a smaller, remote shop would attach high value to reaching a consensus and encouraging interpersonal skills. As relatively self-contained units, these shops demand a greater variety of knowledge and skills.

Furthermore, decentralized sites tend to require workers who blend business and technical knowledge and have what Freiser calls a sales orientation. "The new attitude is, 'We'd better be a viable, pleasant service,' " he says.

Decentralization often calls for redeploying some members of the central staff, Freiser adds. "As you distribute, you need only so many [centralized] programmers and analysts," he says. "Those who are mistitled become obvious quickly."

Furthermore, as the central group gets smaller, it becomes less challenging to manage and requires fewer managers skilled at running a large organization. Freiser advises companies to move such people into areas other than data processing or MIS, such as another centralized corporate organization.

"That would be a consulting resource from then on," he says.

All these changes should be made with subtlety, Freiser says. "We advise companies to involve the human resource organization very early on and to plan the transition to take place slowly, not 'Monday, you report to this person from now on.' "

Finally, in decentralizing, managers often overlook the need to make sure that those who remain centralized do not feel left behind or as though they missed an opportunity. Getting the right people who work well in a central environment is one step. The other, according to Freiser, is to make them feel they have a new, major role, that their jobs have a new vitality because they are in the main shop.

Top managers needed

The need for business-oriented MIS managers often goes right to the top of organizations, according to Temple's Miron. "Today, MIS needs an information plan just as well done as the company plan, and it must be created by business managers working with technology managers," Miron says.

"I'LL GO with the well-rounded, business-oriented person every time."

DAVE NOVAK
FIRESTONE TIRE & RUBBER CO.

"Many companies are hooked into projects that are not on the critical path of strategy, just not serving the strategic needs of the organization," Miron says.

The traditional separation of MIS from the corporate strategy lies at the heart of this problem.

If the chief executive officer or general manager does not specify the company's needs clearly, or if the MIS manager does not understand these needs, the MIS staff may end up spending months working on a misguided project.

In the end, it is only when the CEO demands, "I want this!" that the situation is finally resolved.

"It is not until that happens that the specification becomes clear," Miron says, "and perhaps seven months have gone by at that point." He concludes that the "good general manager is probably the scarcest commodity of the [MIS] business." •

Verneuil says.

"Several years ago, we went through a real effort to create a job ladder showing our employees the jobs and experience they would need to get to other opportunities for a multitude of career paths," he says.

"Along with this," he continues, "we developed and utilize a very formal review process to see just where people have gone and where they are going, a very candid evaluation with managers and employees."

Big on training

GE follows a policy of closely monitoring training, Verneuil says. "Each course we offer to an employee — internally or externally — is followed up by a written assessment from each participant on various aspects of the course . . . the materials, the teacher, the facility," he says.

"Over many years, we have paid careful attention to these written reviews and have continued to weed out, so that this past year we maintained an 8 to 9 out of 10 rating, overall, on all of the courses we offered," he continues.

MIS professionals may also consider whether credit and recognition are given in reward for good work; they may research the availability of new technology and the openness of communication between professionals and all levels of management, as well.

Other issues must be monitored to assess the effectiveness of the human resources department; legal compliance must be inspected. For example, DP shops must conform to Equal Employment Opportunity laws.

Finally, managers should monitor their own performance on human resources issues, such as their response time in filling vacancies. The need for speed in this area varies, depending on the nature of the job being filled.

"At Isaly, all of our MIS staff are highly visible, so we are always looking for very special, aggressive individuals," Harrigan says. "We'd rather spend three months looking for the cream of the crop than settle quickly for what turns out to be the wrong person."

Once the right candidate is identified, however, the manager must act quickly. Especially for top talent, the half-life of an available candidate can be short, Wilson says.

"WE utilize a very formal review process . . . a very candid evaluation with managers and employees."

JAY VERNEUIL
GE CAPITAL CORP.

Watch turnover

Turnover should be calculated and monitored at least annually. Wilson says GE Capital does this by separating uncontrollable departures — such as when a worker's spouse relocates — from those considered controllable.

Such data collection marks only the beginning of human resources management concerns, however. Analysis of the data and continuous follow-up will help ensure MIS managers that they are in tune with their employees.

"If you don't pay attention on a day-to-day basis to these issues, you may be OK," Verneuil says.

"However, if you don't keep them in front of you during the year, at one time or another, it will come back to haunt you." •

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EXECUTIVE REPORT

Creating careers out of maintenance

While MIS managers face a growing need for workers with business knowledge, they must still attend to the age-old problem of maintaining an able work force to perform crucial — if relatively unprestigious — technical jobs.

"There are areas that nobody wants to do, like data conversions from one system to another," notes Bob LoPresto, senior partner and managing vice-president with executive recruiter Korn/Ferry International.

> "WE DON'T want to make prima donnas from these people, but we have to have certain skills."
>
> WAYNE CHASTAIN
> LYKES BROTHERS, INC.

In software maintenance — perhaps more than any other field — companies are confronted by a high demand and a short supply of motivated staffers. This problem becomes particularly crucial as the body of corporate software matures.

Not one but two

Some firms are concentrating on retaining valued technical experts by offering them dual career paths that offer premium pay and prestige in lieu of promotions to management positions; in fact, these workers might not excel at or even be interested in going the managerial route.

One company is working toward a vision of providing employees with a career in maintenance. "We've already made the decision to separate new development from the maintenance function," says Wayne Chastain, director of corporate systems development at Lykes Brothers, Inc., a diversified agribusiness firm in Dade City, Fla.

Previously, maintenance at Lykes Brothers suffered the fate it does in many companies: "It had to get done, but it fell by the wayside," Chastain says. That came as no surprise, he says, since "industrywide, there is something of a stigma attached to maintenance." It is often a job given to new staffers, who are not in a position to object. Unfortunately, this brings its own set of problems.

"In many companies, the new guys do it and then move on as quickly as they can," Chastain says. That can add to the amount of maintenance necessary, he says, "because a lot of maintenance is slowed by dealing with the spaghetti code the new guys have done over the years." Companies also suffer when maintenance programmers are promoted to areas such as analysis before they are ready, perhaps because the company offers no other career path.

To address the situation, Lykes Brothers is working from several fronts. The company is restructuring maintenance salaries by upgrading them and eventually creating more grades within a function.

"We don't want to make prima donnas from these people, but we have to have certain skills," Chastain says.

But while Lykes Brothers aims to separate maintenance from new development, the company finds that, for now, it must let maintenance professionals delve into new projects to maintain their enthusiasm.

"It is a slow evolution," Chastain admits. "It is easy to say we need to separate these, but the agonizing part is how do we go about making this attractive?"

Lykes Brothers is developing job descriptions in programming analysis to provide programmers with the opportunity to make more money and gain status without going into business analysis. Chastain says he would like to do the same for software maintenance and that he thinks that will help achieve the permanence and high-performance

Most OLTP isn't.

levels he wants.

"Maintenance is one of the more important things we do," he says. "I would eventually like to see people wanting to stay in maintenance and be managers."

However, Ted Freiser, president of consulting firm John Diebold & Associates, predicts widespread problems would accompany efforts to implement technical career tracks, even though many companies claim to have such options.

"I don't know of many companies that really have a dual career path," he says. "They can have a form of one from entry-level to senior programmer, but there's not much most companies can do except allow [workers] to carry the fictitious career title of senior analyst."

MICHAEL BALL

Money isn't everything

As if instilling business acumen in systems workers was not enough to worry about, MIS managers also must concentrate on retaining the technical talent that — at considerable expense — they recruited or trained.

While money is often the key to keeping employees, several authorities say that providing challenging and rewarding work is also critical.

"They can say what they want, but money and benefits are still on top of the list of requirements for candidates," says Sam Muhawi, an employment manager at First Interstate Bancorp. But even though his company and many others offer competitive salaries and benefits, Muhawi says that, beyond that, most candidates really do want challenges — which he says a large, busy MIS environment can offer.

All that glitters

Bob LoPresto, managing vice-president and senior partner at executive recruiter Korn/Ferry International in Palo Alto, Calif., says that in trying to retain employees, "money comes in when work isn't so glamorous and projects aren't interesting and challenging."

In many companies, managers don't mind paying their best technical people well, realizing what it would cost to replace them. However, leading-edge companies have an advantage in attracting and retaining top people with work that is perceived as challenging and exciting.

Arbitron Ratings Co. in Beltsville, Md., is concerned

Arbitron's Evans

with keeping employees who were recruited or trained in conjunction with the company's conversion from Control Data Corp. and Data General Corp. equipment to IBM machines.

Like many other companies, Arbitron cannot always find people who exhibit the level of skill it seeks in areas such as IBM CICS and DB2. "As a result, we sometimes compromise [by hiring] younger people with some experience and then training them in what they don't know," says Evan G. Evans, Arbitron's manager of information systems.

Evans is currently wrestling with ways to prevent newly trained workers from being recruited elsewhere. "It's not necessarily money, we know that," he says. "It's how you treat people."

Arbitron is finding success in giving MIS employees the opportunity to attend outside seminars and be involved with similar professional activities. Evans says he strives to keep his staff active and challenged on the job as well, which he says they clearly want.

"You have to create small project teams and then step back and let them get the job done," he says. "Our way, you do more than on a large project and don't feel trapped in one narrow area."

MICHAEL BALL

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Programmers: *Not* a breed apart

Stereotyped personality defects are far from unique to the field

BY BRETT MIDDLETON

Proponents of robopsychology warn that computers can be hazardous to our mental health and emotional well-being. They tell us that programmers who spend long hours at their terminals learn to respond to the world as they do online.

Do programmers expect instant gratification in all things? Are they impatient, uncompromisingly logical and, as a result, uncreative?

Tim Lynch's use of a few personalities — stereotypical "computer nerds" — to indict the effect of computers on society strikes me as a backward view of the problem [CW, Oct. 19, 1987]. The personality traits he discussed do not impress me as being even remotely unique to programmers.

I am an intensive computer user and do have some of the personality traits mentioned, such as an occasional shortage of patience and less-than-ideal social skills. However, I had these traits long before I first touched fingers to a keyboard, which wasn't until I was in graduate school. My self-analysis may not be accurate, but I see no sign that my computer experience has exaggerated these behaviors.

Middleton is a research analyst at American Polled Hereford Associates in Kansas City, Mo.

Born that way?

Computing is not a very old field. I suspect that most programmers who have been in the field for several years were adults at the time of their first encounter with a computer, and I seriously doubt that their exposures to programming have been at all responsible for any radical change in their personalities.

I suspect that programming just happens to attract people who already feel a large amount of frustration in social situations. They find they can withdraw into an environment in which they have a great deal of control — control they lack in their social lives.

Certainly this running away is not the healthiest approach to the problem, but you cannot lay the blame for fleeing on the destination.

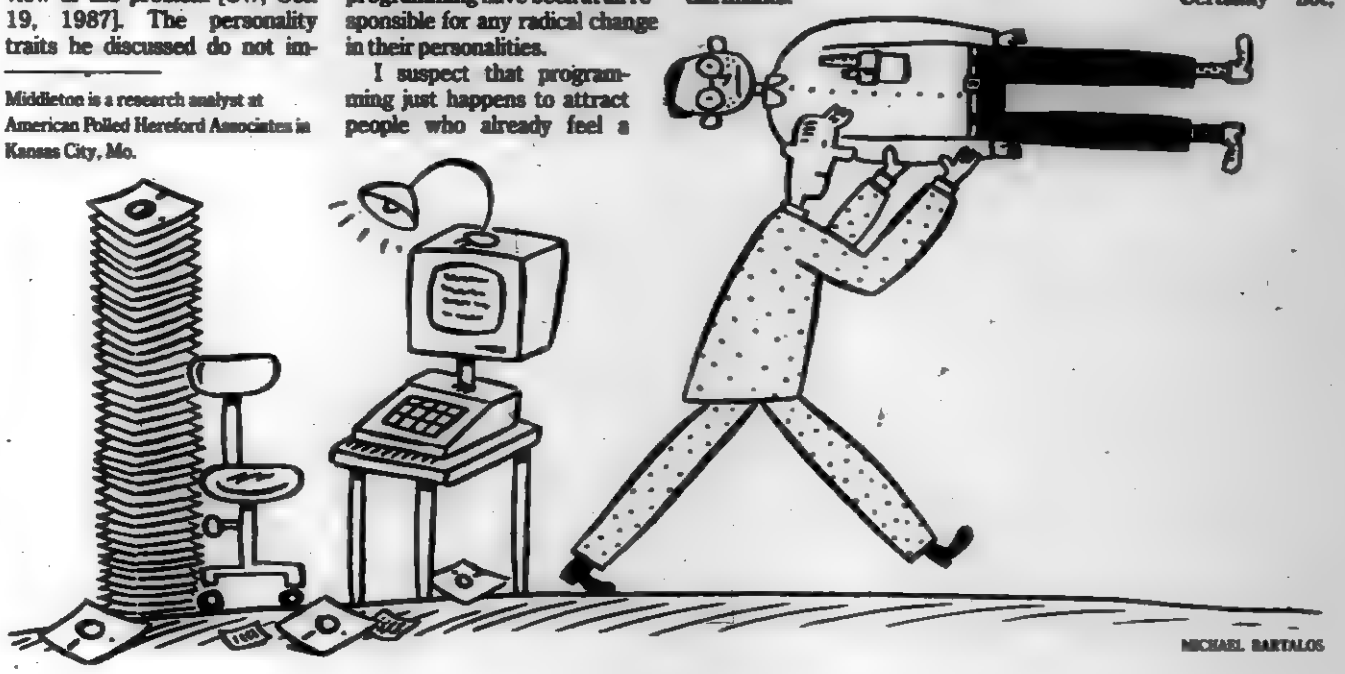
If computers did not exist, then surely these individuals would withdraw into something else. Would they become mechanics and work under the hood of a car? Sheepherders in the mountains? Night watchmen?

Some people in those professions probably chose their occupations for unhealthy reasons, but the occupation itself is not at fault. The worst you could say about these jobs is that they serve as attractive havens for social misfits.

I see computers as having the power and flexibility to enhance creativity, not stifle it. There is plenty of opportunity in programming for flashes of insight and creative problem solving. It is no less creative to analyze a problem for a computer solution than to analyze one for any other type of solution.

Debate, trial law and mathematics also require a disciplined, logical approach to problem solving. Do lawyers or mathematicians lack creativity?

Creativity is determined by the purposes for which a tool is used, not by the method of applying the tool. Have you ever seen nail art? Is the hammer used differently for this purpose than for the purpose of fastening shingles to a roof? Certainly not.



MICHAEL BARTALOS

- **Does programming draw certain types?**
- **Computers: The catalyst for creativity**
- **Rigid logic vs. sheer patience**

yet very different amounts of creativity are involved.

Let me provide some examples of real-life problem solving.

Case A: Joe is a good professional programmer. When he wants to work with a new software package, the first thing he does is sit down and read the manual or at least browse through it extensively. When he gets an error message, he collects all pertinent information — with great attention to detail — and thinks the problem out before taking action. He often spends hours poring over obscure hexadecimal printouts in order to find the source of a bug.

Frankly, there aren't very many people out there like Joe — people who can correctly solve a problem in the least amount of time without making things worse first.

But his ability in this area does not come out of an expectation of instant gratification. On the contrary, it is because of his sheer patience in working things through. Joe may appear to get results quickly, but only because he handles a situation with a minimal amount of hysteria and wasted motion.

Case B: Fred is an ordinary business user of computers, a typical manager. Now here is a guy who really expects instant gratification. He won't take the time to pick up the manual for any reason, because he has to have an answer *right now*. Looking in the manual would take too much time. Instead, Fred will usually just call Joe. Fred has a thousand excuses for doing so, such as, "I can't find the information I want in these gobbledygook manuals," which means that he never learned to use an index and table of contents.

Of course, Fred is in such a tearing hurry for instant solutions that he can't take time to figure out exactly what it is that he needs to know. So Joe has to patiently tease the information out of him by asking a number of questions to define the problem clearly. Joe knows that Fred will often only read half of the error message to him over the phone, because Fred is in too much of a rush to really see the screen that he's looking at.

Fred also has a number of other interesting habits. For example, if a command produces an error, he will often issue the same command again in the same way, sometimes repeatedly. His intuitive, nonlogical, "human" thought process seems to tell him that the command will work if he insists on it.

Even worse, sometimes Fred feels that he doesn't have time to even call Joe, much less pick up the manual. So he begins to play word association games, entering any and every command that pops into his mind. Surely one of them will get him the quick results he needs. When he finally has things totally hashed, then he'll holler for Joe to come fix it. By that time, he's created hours of work for Joe, but he's still in a rush, so he relieves his frustration by hovering over Joe and chewing him out.

Funny thing, but Fred seems to be treating poor Joe like an extension of the machine. Oh well, after all, Joe is supposed to be an expert in this stuff, right? We expect miracles from the shamans who understand the machines, even when they protest that what they do isn't magic.

But Joe had better not so much as hint that Fred has been proceeding in an unreasonable or irrational manner, because

IF COMPUTERS really do change their users, training them to think before acting and to consider several possibilities and alternatives, then more power to them.

Fred is nobody's dummy, and no snotty programmer is going to tell him that he's being careless, hasty or unobservant.

Real-life horror

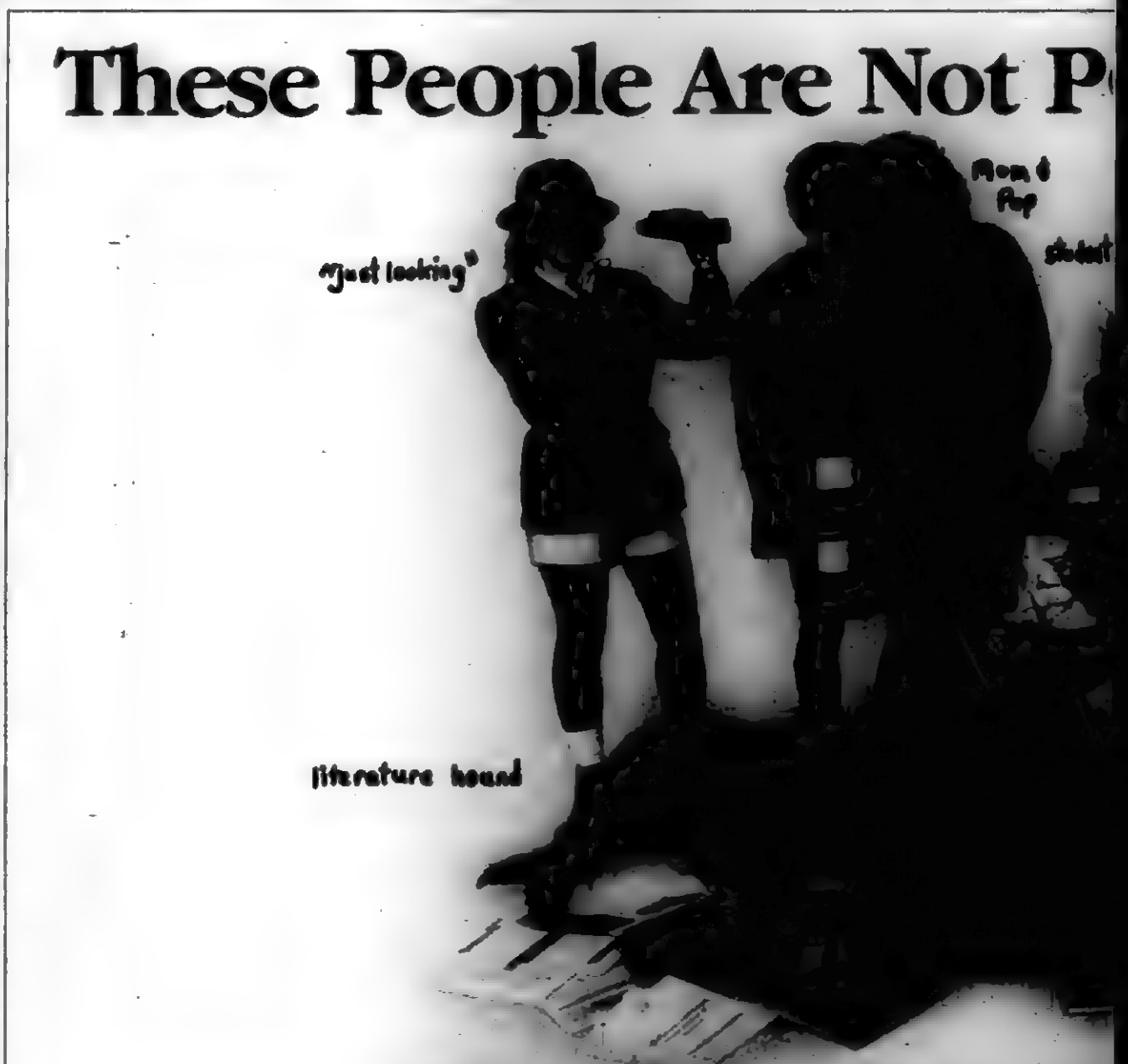
In my experience, there are at least 10 "Freds" in the world for every "Joe." I can give you dozens of real-life horror stories of just this kind of Fred behavior. If computers really do change their users, training them to think before acting and to consider several possibilities and alternatives, then more power to them. But the skills involved in programming are the same skills needed to do library research.

The inability to methodically state and research a problem may be "normal human behavior" — the yardstick of robopsychologists — but it is not necessarily desirable. And most of the people who can't solve a problem this way are just making excuses if they say, "Well, I guess I'm just the creative type."

Robopsychologists also seize upon cultural collisions, such as that which occurs between a programming team and a marketing department. These collisions occur because it is difficult for someone to approach his own field of knowledge from the outside. But one could also make the same observation about an engineering or biomedical research team.

Those who can overcome this handicap are rare in any field, which is why the career of science writing exists. How many Isaac Asimovs are there in the world? Criticizing an average programmer for not having above average communication skills is like telling your wife to stop humming around the house because she's not Beverly Sills.

Furthermore, sometimes users expect easy solutions to what are difficult



PC EXPO Welcomes Volume Bu

On June 21-23, PC EXPO in New York, the trade show *PC WEEK* names as "the industry's most important," once again welcomes the nation's Professional Volume Buyer community. For three days, Corporate Volume Buyers and Volume Resellers will meet with hundreds of their primary vendors to make the purchasing decisions that determine how their firms will stay on the cutting edge of microcomputer innovations and technology. PC EXPO: The Professional Volume Buyer Show.

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- Almost 9 out of 10 PC EXPO attendees are involved in their companies' personal computing purchasing decisions.*
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6th Annual Volume Bu

problems. Fred is often angry with Joe because Joe can't answer his question in 25 words or less. The question may appear simple to Fred, but the answer may involve things that took Joe many hours to learn. Is it reasonable for Fred to expect to absorb the benefit of Joe's learning without exerting the effort?

What if the answer that Fred wants can't be given without some prior knowledge? Fred often assumes that Joe is being deliberately obscure, difficult or condescending if he doesn't give him a snap answer. One solution to communication gaps and unfulfilled expectations is for marketing and technical staff to sit down together. Sadly, this approach requires time and patience, which may be in short supply on both teams.

Another conclusion of robopsychology is that programmers become devoid of emotional intensity. It strikes me that an emotional response can result from any job that a worker enjoys and does well.

Whose behavior is more acceptable: the emotionless programmer who acknowledges a problem and works calmly to correct it or the intuitive, creative thinker who curses at his screen and kicks his desk?

Personally, if I had to pick a behavioral extreme, I'd rather be overly rational than wracked by emotional storms.

Further research

For some time now, I've been observing behavior on computer bulletin board systems. There are thousands of these systems across the country on which users can leave messages and chat with each other on-line. These systems also come in a number of flavors. Some are meeting grounds for special-interest groups; some are general in appeal; and others are positioned as high-tech singles bars and swinger's clubs.

I think this is a fertile area for psychological research. I find it interesting to look at the ways in which people express their personalities (and emotion, perception or creativity) on these systems, especially in comparison with the impressions they make in person.

Many of these users are techies, but some are novices who know only enough to make a computer dial the phone. Some of these boards host extensive discussion on topics that would qualify as robopsychology. There are some real insights available, at least for a layman like me.

I can recall seeing only one other study, about 10 years ago, on human interaction via computer messaging, and that one was limited: It did not deal with the wide range of age, intelligence and educational levels among the people who now have access to each other on-line. It also didn't address the unique public forum provided by message boards and multiparty chat, which I believe are outstanding innovations.

Seeking out opportunities

I don't think I'm exaggerating when I say that this could have a social impact that would make television seem as trivial as the hula-hoop. But unlike television, this is not a passive activity, and its effect on individuals who use it could be positive.

To borrow a line from Lynch's conclusion, computers are changing our society functionally and psychologically. But rather than concentrating on the hypothetical dangers of this transition, we should be looking for the inherent opportunities available.

ARE WE NOW relegating ourselves to the level of the machine, or are we freeing ourselves from that role?

Are we now relegating ourselves to the level of the machine, or are we freeing ourselves from that role? Not many years ago, the only way to solve complex mathematical problems in the "hard" sciences, such as physics, was to gather some graduate students and set them to punching away at mechanical adding machines for hours or days at a time. These students were exercising their fingers, not their creativity. Let's also keep in mind that the word "computer" originally referred to a job description, not an electronic device.

By thrusting the drudgery of calculation and data retrieval onto our computers, we free our attention and time for creative thought and social interaction. Researchers are free to find good solutions to problems rather than wasting creativity by searching for methods that are computationally feasible.

Today, we can tackle problems that we couldn't even dream of approaching before, because our computers are knocking down the barriers to our creativity. And far from imposing restrictions, the time we spend in front of a terminal can widen our social horizons by connecting us with the thousands of technical and nontechnical users who are part of the national electronic community. ■

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MANAGEMENT

TAKING CHARGE

James Connolly

Learn basics before Basic

Something is missing in the American education system, and the result is a lot of computer users who do not know how to use a computer.

The irony is that the person who cannot format a floppy can usually write a heck of a program. It looks like someone has placed the proverbial equine at the rear of the two-wheeled unmotorized vehicle: in other words, put the cart before the horse. People learn Basic without knowing the basics.

Recent conversations with young people moving into the work force revealed that a Basic language programming course was required in general high school and college curricula.

Those required courses, however, did not explore the differences among various types of computers, the roles of peripherals like disk drives or what can be done with packaged software.

One young person could program, but he had been so isolated from off-the-shelf software that he could not believe his neighbor had a word processing package that could slip into a floppy drive,

Continued on page 74

Taking pulse of MIS

Baxter's Heschel monitors quality of work life

BY JEAN S. BOZMAN
CW STAFF

MCGAW PARK, Ill.— Michael S. Heschel knows how to listen.

At Baxter Healthcare Corp.'s 250-acre complex here, Heschel is corporate vice-president of Information Resources and administers a budget of $145 million for the $6.2 billion hospital supply company's worldwide computer operations. But Heschel believes that one key element is his information systems strategy doesn't have a price tag — the creation of ongoing and effective communications with senior management, end users and 750 staffers.

"We have a classical organization here, with a classical chain of command," Heschel, 46, says. "I have five people who report to me about our organization. But I've tried to create an esprit de corps by providing a challenging work environment, a good career path and some rewards. We have an open atmosphere, because people have to feel good about what they're doing to be productive."

Talking it up

Heschel goes about the task of communicating with information systems staffers in several ways: by holding quarterly "all-center" meetings attended by all information systems employees; by writing a biweekly newsletter called "FYI"; and by making himself available for discussion. He also attends departmental social gatherings and drops in on after-hours pizza parties.

Longtime associate Carl Steiner, who is Baxter's vice-president of planning and administration, says Heschel's extra effort to communicate pinpoints problems before they surface.

"You tend to hear the good news from your people," Steiner says. "But if you want to hear about whatever trouble is brewing, you have to aggressively go after it."

Heschel takes the affirmative course via monthly breakfast meetings attended by 10 to 18 people with a variety of job titles.

Continued on page 72

PROFILE
Michael S. Heschel

Position: *Corporate vice-president of Information Resources, Baxter Healthcare Corp.*

Goals: *To open lines of communication between systems and end users, keep MIS staffers' morale up.*

MIS TRAINING

Grooming managers pays long-term dividends

BY DANA DAVIS
SPECIAL TO CW

In the not-so-distant past, many MIS departments thought nothing of breaking in new managers via the sink-or-swim technique. And while some of the more technically oriented managed to stay afloat, others sank beneath the weight of their new responsibilities.

Gradually, companies awakened to the fact that new managers were not "a dime a dozen" and that the constant replacement of important personnel was costing valuable time, money and manpower.

Today, many corporations provide new leaders with extensive in-house and vendor-supported managerial training. Firms realize that high company performance is closely bound to managerial excellence.

"There is no way a company can improve unless it invests in the improvement of its individuals," says Alan Bignall, vice-president of corporate information services for IDS Financial Corp., an American Express Co. subsidiary located in Minneapolis. "Companies that don't believe in the continued education of employees will only succeed in cutting their own throats," he says.

BLAIR THORSLEY

Bignall knows from whence he speaks. IDS first began designing management workshops about five years ago, when the company was purchased by American Express.

"We realized [that] if we wanted to be value driven, we would need to develop training and educational programs," Bignall says. "The purchase of IDS was the catalyst that pushed [the workshops] into action."

Today, MIS managers at IDS attend Supervisors College, a series of one- to five-day sessions focusing on the main responsibilities of a supervisor.

Topics that the supervisor will review include management of individuals, project teams and scheduling.

Continued on page 73

Inertia often stifles new technology

BY ALAN ALPER
CW STAFF

NEW YORK — Introducing new information technology without first restructuring the organization is one major reason many companies do not achieve productivity gains.

That was the prevailing sentiment at a recent seminar here concerning information technology's impact on organizational effectiveness. The seminar was sponsored by the United Communications Group in Bethesda, Md.

Productivity consultants emphasized that most companies do not reap the benefits of information technology because they do not build organizations that accept change and share in planning. Information technology can enhance productivity and product quality once work flow and staffing requirements are changed, the consultants said.

"Technology is an enabler," said Winnie Rogow, a principal with Nolan, Norton & Co., a management consulting firm in Lexington, Mass. "Companies that use technology beneficially actually change the way work is done."

Tear down the wall

Although information technology expenditures per employee rose fivefold from 1980 to 1986, few firms have actually become more productive, Rogow stated. Many of the big spenders have been unable to achieve productivity gains because they did not break the wall between task and process automation.

"They created islands of automation for single tasks and only got an incremental return," Rogow said.

The problem starts with a lack of coordinated planning and an inability to restructure the work force prior to technological change. "People are reluctant to give up head count," Rogow said. "Part of the problem is the reward system: 'The more people I have, the more money I'll get.' "

Gerald Simonson, manager of technical and management information systems at Martin Marrieta Corp.'s Information and Communications Systems Division in Denver, agreed. "A lot of companies keep budget responsibility for computer and office automation technology separate from labor," he said. "Of course, every time labor goes and asks for a technology project to be done, they're suspect. The technical organization feels as if it's spending its budget on someone else."

One way to circumvent this problem is to create organizations that transcend functional departments, Rogow said. Companies must obtain accountability across all business functions if they are to harvest the fruits of technology. "Let everyone have skin in the game," Rogow said.

Soup to nuts

In order to do this, senior management must create multidisciplinary teams that guide the organization from planning through implementation. The resulting organization has cross-functional integration, Rogow said. "This is a first step in an eventual reorganization."

To achieve the maximum benefits of office technology, organizations must first focus on the needs of the most critical employees, noted David Shay, a productivity consultant with Peat, Marwick, Main & Co. in New York. "We believe that 20% of employees provide 80% of an organization's value," he asserted.

Peat Marwick's 80-20 ratio methodology allows companies to cost-justify office technology in terms of productivity prior to making any expenditures. The methodology involves intensive scrutiny of the entire company: its cost and organizational structure, production processes, competition and customers.

"The role of technology is not to replace workers with machines but to increase the quality, efficiency and competitive posture of the company," Shay said. "That invariably means increasing productivity."

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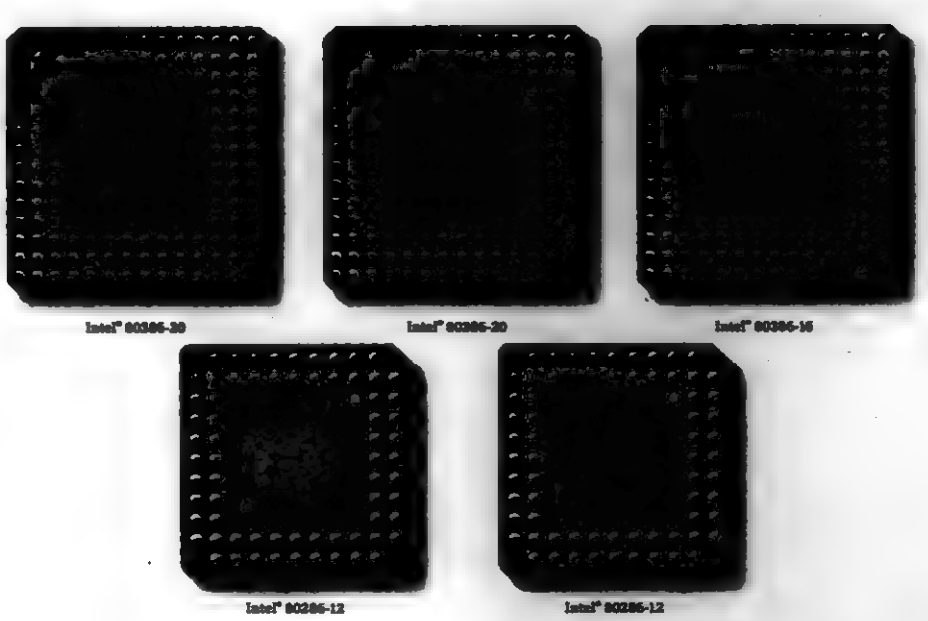

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Science Applications wins $1B DOD contract

BY JAMES CONNOLLY
CW STAFF

WASHINGTON, D.C. — The U.S. Department of Defense last month brought to a close a nine-year planning, test and selection process by awarding a $1 billion contract for a standardized, decentralized health care information system.

The eight-year contract, awarded to Science Applications International Corp. in San Diego, is for systems that will be installed at 754 Defense Department hospitals and clinics, supporting 53 million outpatients and six million inpatients throughout the world. The systems will be based on Science Applications' health care software and various Digital Equipment Corp. hardware platforms.

Science Applications won the contract after an 18-month competition with three other vendors in which the bidders ran on-site operational tests at four military hospitals. Those tests centered on a set of requirements known as the Composite Health Care System (CHCS) that were established by the Tri-Service Medical Information Systems Program Office during the testing of 100 commercial systems between 1979 and 1984.

According to the U.S. Army Information Systems Selection and Acquisition Activity, CHCS will automate seven major functional areas in hospitals and clinics: patient administration, patient scheduling, laboratories, radiology, pharmacy, nursing and clinical dietetics. The system is also intended to provide communications, maintenance and operations support for those functions.

"CHCS is a revolutionary step forward for the Department of Defense. The ability to integrate our medical information and provide standard automated support worldwide through CHCS will change the way we provide health care in the DOD well into the 21st century," said Dr. Michael Mestrovich, director of the Defense Medical Systems Support Center, in announcing the pact.

Case of the MUMPS

Science Applications, which tested its systems at Ireland Army Community Hospital in Fort Knox, Ky., uses what it calls a "hosted cluster" architecture based on DEC minicomputers and the Massachusetts General Hospital Utility Multi-Programming System, better known as MUMPS. The company said the applications run on DEC VAX and PDP-11 minicomputers, personal computers and any other processor with ANSI-standard MUMPS. Science Applications is subcontracting $400 million of the contract to DEC.

The largest DOD hospitals will be equipped with multiple DEC VAX 8550 superminicomputers, while DEC Microvax 3500s and PDP-11s will be installed at smaller hospitals and clinics.

In a smaller contract award, DEC won a $100 million pact for patient-care systems at 104 Veterans Administration hospitals and clinics.

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22nd Annual AIA National Workshop and Computer Systems Demonstrations. Baltimore, April 10-13 — Contact: American Trucking Association Management Systems Department, 2200 Mill Road, Alexandria, Va. 22314.

8th ICAC Executive Forum. Washington D.C., April 10-13 — Contact: International Computers & Communications, P.O. Box 17392, Washington, D.C. 20041.

Associated Information Managers Annual Conference & 1988 AIM University. Boston, April 10-13 — Contact: Associated Information Managers, 10005 Rhode Island Ave., College Park, Md. 20740.

18th Conference on Computer Audit, Control and Security. Atlanta, April 10-15 — Contact: Program Chairman, EDP Auditors Foundation, P.O. Box 88180, Carol Stream, Ill. 60188.

Atre Forum on Relational Data Base & CASE. Washington, D.C., April 11-13 — Contact: Nancy Carala, Forum Registrar, Atre International Consultants, Inc., P.O. Box 727, Rye, N.Y. 10580.

Facsimile & Image Communications Conference. Boston, April 11-13 — Contact: Cap International, Inc., One Snow Road, Marshfield, Mass. 02050.

Second Annual Logistics Conference and Technical Exhibit. Dallas, April 11-14 — Contact: American Production and Inventory Control Society, 500 W. Annandale Road, Falls Church, Va. 22046.

1988 AIIM Show. Chicago, April 11-14 — Contact: Association for Information and Image Management, Suite 1100, 1100 Wayne Ave., Silver Spring, Md. 20910.

The Relational Institute DB2 Product Fair. San Jose, Calif., April 11-15 — Contact: The Relational Institute, Suite 105, 4440 Camden Ave., San Jose, Calif. 95130.

Spring 1988 National Symposia and Workshops. Washington, D.C., April 11-22 — Contact: The National Institute for Software Quality and Productivity, P.O. Box 70555, Washington, D.C. 20088

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CONTINUED FROM PAGE 67

"I have some unwritten rules about the breakfast meetings," Heschel says. "I give them my personal commitment that no names will be used, and their staff managers are not present." That promise makes interchanges lively, something Heschel encourages, even in larger meetings.

The quarterly All-Center meetings feature two hours of formal discussions, followed by a question-and-answer period. But, Steiner notes, Heschel doesn't like the sessions to end in a polite silence. "There have been times," Steiner says, "when he didn't let the audience go until they asked a few more questions."

What Heschel encourages is an environment in which quality and cost-effectiveness are highly prized commodities.

Following the 1985 merger of Baxter Travenol Laboratories, Inc. and American Hospital Supply (AHS) Corp., where Heschel was corporate vice-president of information resources, the combined staff was 850. Now, the staff has been cut to 750 — a level at which it should stay, Heschel says.

At that staffing level, quality of work is a key value emphasized by printed slogans on data center walls. As part of that quality effort, Baxter writes its most strategic applications programs, rather than buying off-the-shelf software. "I feel that it's a sign of weakness in the MIS organization if that organization does not have the capability to do the development work required by its business," Heschel says. An exception to the rule about developing systems in-house, he says, might be a high-priority project with a short turnaround that exceeds the organization's staffing ability.

> "GOOD PEOPLE want a challenge, and I give them the responsibility."
>
> MICHAEL S. HESCHEL
> BAXTER HEALTHCARE CORP.

"Good people want a challenge, and I give them the responsibility," Heschel says. "Even when we use an outside consultant on a project, our people are always the program managers." The best efforts are sometimes rewarded with an evening on the town, paid for by Heschel, or with a $2,500 check for outstanding work on a project.

Recent tasks at Baxter included the installation of 160 IBM Token-Ring local-area networks and IBM's Netview network management system, and the creation of query programs that enable managers to analyze timely data from IBM's DB2. Other programs are written for the company's array of Digital Equipment Corp. VAX minicomputers, which support scientific research as well as distribution activities.

The ultimate goal

Heschel's goal is to use information systems technology to create what he calls the "computer-integrated corporation," an infrastructure in which information is handled by both people and machines.

"I see the whole corporation layered according to function: research and development, engineering, manufacturing, distribution, sales and marketing and corporate administration," he says, reaching into the air to indicate a stack of functions. "I see very significant virtual links between these layers, for example allowing designers to have a view into the manufacturing and engineering process."

Maintaining that vision is just part of steering Baxter's information systems organization through the next five years, Heschel believes. At Baxter, the leveraging of raw data has already produced competitive advantages, such as the company's famed Analytic Systems Automated Purchasing (ASAP) order-entry system. While at AHS in the early 1980s, Heschel supervised the enhancement of ASAP, which now feeds hospital orders from 7,000 remote terminals into Baxter's 75,000-sq-ft computer room.

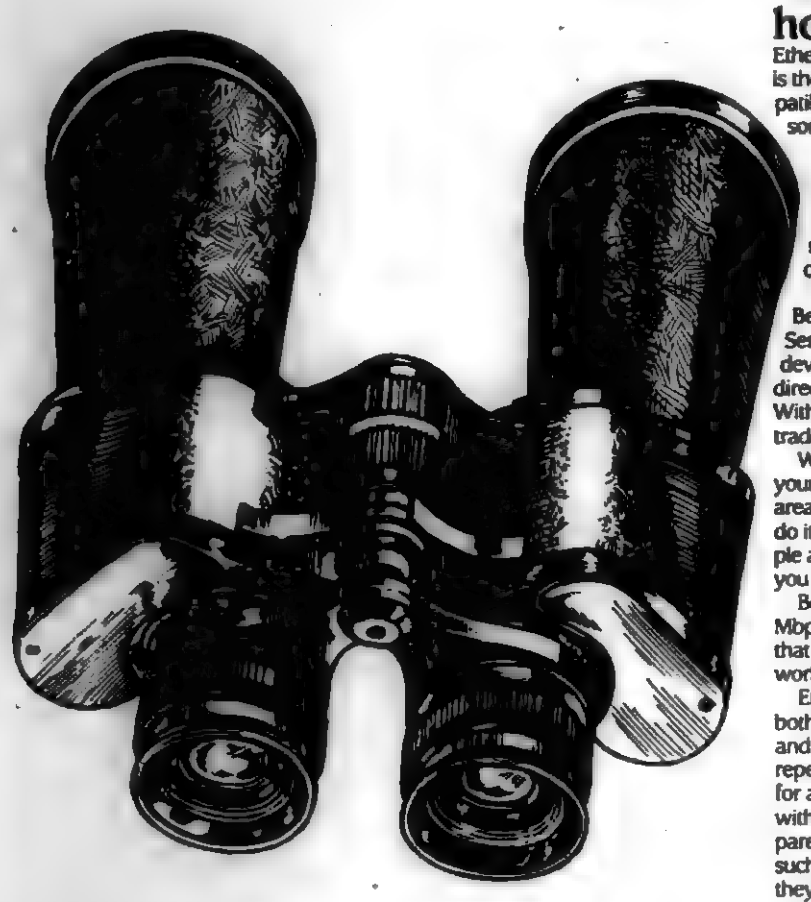
Getting the funds for new technology is one of Heschel's priorities.

"Mike has been able to show senior management how MIS could contribute to the business," said Bob Kretz , vice-president of systems development at Baxter, who has known Heschel for eight years. "He raised the visibility of the information systems function, and showed the executives how the corporation's business plans could be tied into those of the information resources group."

To sharpen his information systems strategy, Heschel spends about 30% of his time traveling to user sites, meetings with hardware vendors and meetings with his peers in other large corporations. "Mike doesn't take the surface answer from the sales and marketing people," Steiner says. "He digs for information from the vendors."

Heschel describes his role as being made up of four primary components: providing an architectural vision; ensuring that information systems meets end users' computing needs; providing cost-competitive information systems services; and ensuring that the information systems infrastructure keeps pace with changing needs.

Because Heschel's job is wide in scope, it has been likened to that of a chief information officer. "We don't have the CIO title here," Steiner observes, "but that's the closest description of what Mike does."



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Grooming

FROM PAGE 67

In addition, the curriculum contains a segment on quality control and quality recognition.

After the manager has had time to put his training into practical use — approximately two years — he will then go through another program called Upward Feedback. "This is where the people who are being supervised get a chance to evaluate their manager," Bignall says.

The evaluations are done by anonymous questionnaires, which the manager reviews. Later, the manager receives a videocassette tape of actors playing out scenarios depicting the manager's weak points.

"First, they act out the incorrect way to handle the situation, and then they perform the right way," Bignall explains.

Setting the example

At Aetna Life and Casualty Co. in Hartford, Conn., the "right way" to educate managers includes providing them with a good example from senior management.

As a result, Aetna now offers a course that "concentrates on the difficulties of managing managers," says Bill Zeigler, corporate director of management education and general skills. The course was designed to improve the senior managers' delegation, influence and communication abilities.

Before the course begins, the manager is critiqued by his subordinates, peers and supervisors. Then, during the workshop, "he will concentrate on those skills that need improving," Zeigler says. "Senior managers take this course within the first six months of assuming their new positions," he adds.

In total, Aetna offers its managers a three-tiered training program, which includes the new middle manager, the experienced middle manager and the

IDS Financial's Bignall

advanced manager courses.

Both the new middle manager and the experienced middle manager schools are taught internally four times a year. Each school lasts for three days, and approximately 100 managers attend each school annually, Zeigler says.

He adds that the advanced manager school spans nine days and is conducted three times a year. Outside vendors take part in instructing the 135 senior people who come through the advanced manager program annually.

Not counting time away from the job, outside courses cost an average of $250 per person per day, depending on the course, Zeigler explains.

"We use a combination of internal and outside instructors because of the vast array of material presented at this level," he says.

Zeigler adds that internal instruction or classes taught by actual Aetna personnel work well because "people can always call up the Aetna employee who presented the material with any later questions they might have."

Although internal trainers are far more accessible than their outside counterparts, sometimes vendors can provide more in the way of course diversity and "famous" experts.

For example, Walter Popper, director of the Index Group, Inc., an executive-level management trainer in Cambridge, Mass., points out, "We have access to a variety of presenters that corporations just don't have. We get top-quality professors from business schools such as Harvard, MIT and Columbia."

Popper offers courses in technology, business and interpersonal skills. He also requires participants to fill out self-assessment forms. "This helps people identify their thinking style. Technical people tend to be more comfortable around ideas and analysis. That's why those managers with the technical background generally need to improve their presentation and interpersonal areas."

At the podium

Most companies recognize that these programmers-turned-managers tend to lack persuasive speaking skills. They were not called upon to use them too often in the data processing shop, but with subsequent promotions, that changes.

"We're finding situations where these new managers from information systems must make presentations to our users," says Brenda Wire, manager of management training at The Prudential Insurance Co. of America in Roseland, N.J.

Consequently, managers are strongly encouraged to participate in the company's public speaking class.

In addition, new information systems managers take a two-day course "that deals primarily with the information systems environment and situations that arise there," Wire says.

Prudential also makes use of an outside vendor that delivers consulting skills and project management workshops to new managers. "We've run these courses twice a year for the last three years. Approximately 60 people a year go through this training," Wire says.

She adds that "managers coming from an information systems background are very high achievers." Prudential helps them succeed further by offering an individual, in-house career-counseling session five times a year. "This is where management informs their good performers (who may also be managers) of career paths and promotions," she says.

Potential problems

While the typical corporate training program may provide numerous benefits to those who want to be upper level MIS managers, some feel it poses potential problems.

According to Joseph Berman, chief of electronic data processing placement at Robert Half of New York, Inc., "It might make some managers too slick, and fewer people will trust them. There's always the danger of elevating form over substance. For instance, one guy might take all these interpersonal training programs and end up looking really smooth. But he never actually gets anything done. And then you have this other poor guy, down in the trenches, doing all the hard work. He has no presentation skills, but he still gets all the work done. Unfortunately, he has no polished way of relaying what he's been working on all this time."

Prudential's Wire

Despite this minor problem, Berman says the trend toward in-house managerial education will increase.

As a result, new managers in MIS will no longer need to endure sink-or-swim performance evaluations. Instead, they will feel more confident knowing they can take advantage of top-notch educational programs that will enable them to sail through corporate waters and chart a smoother course for their future departments.

Index Group's Popper

Davis is a research analyst with Information Data Search, Inc. in Cambridge, Mass.

So you want to be a manager

Skills and characteristics required of a data processing technician and an MIS manager

DP environment	Management environment
• Analytical	• Presentation
• Autonomous	• Supervision
• Technical	• Motivation
• Programming	• Delegation
• Individual performance assessment	• Work group performance assessment

CW CHART

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Data 88 With Telecom. Stockholm, April 11 — Contact: MMS Datamassor AB, Box 4113, S-181 04 Lidingo, Sweden.

International Programmable Controllers Conference. Detroit, April 12-14 — Contact: Engineering Society of Detroit, 100 Farnsworth, Detroit, Mich. 48202.

AUTOFACT, The Automated Manufacturing Exhibition and Conference. Greenville, S.C., April 12-14 — Contact: State Board for Technical & Comprehensive Education, Special Events Management, 11 Executive Center Drive, Columbia, S.C. 29210.

Cost Containment: The 1988 Imperatives. Washington, D.C., April 13 — Contact: Carey Green, The Yankee Group, 200 Portland St., Boston, Mass. 02114.

The Information Edge. New York, April 13-14 — Contact: The Conference Board, Inc., 845 Third Ave., New York, N.Y. 10022.

Association of Banyan Users International Spring Conference. Cambridge, Mass., April 13-15 — Contact: Jennifer Kerr, Association Manager, Association of Banyan Users, 75 Union St., Sudbury, Mass. 01776.

Success on the Uses Manufacturing in the 90s. Stanford, Calif., April 16 — Contact: The Manufacturing Conference, Graduate School of Business, Stanford University, Stanford, Calif. 94305.

APRIL 17-21

Association for Systems Management Annual Systems Conference. San Diego, April 17-20 — Contact ASM, 24587 Bagley Road, Cleveland, Ohio 44138.

Info Canada '88. Toronto, April 18-19 — Contact: Data Processing Management Association, P.O. Box 1004, Postal Station F, Toronto, Ont., Canada M4Y 2L4.

Information Industry Association Spring Conference & Exhibition. New York, April 18-20 — Contact: Information Industry Association, Suite 800, 555 New Jersey Ave. N.W., Washington, D.C. 20001.

Touch Computer Business Users' Group Annual Conference. Fort Worth, Texas, April 18-20 — Contact: Michele Ryan, Radio Shack, 1700 Gen Touch Center, Fort Worth, Texas 76102.

The 1988 Tools Symposium. New York, April 18-20 — Contact: Digital Consulting, Inc., 6 Windsor St., Andover, Mass. 01810.

Business Simulation Conference. Orlando, Fla., April 18-21 — Contact: The Society for Computer Simulation, P.O. Box 17900, San Diego, Calif. 92117.

SHARE/88. St. Louis, April 18-22 — Contact: Information Consultants, Inc., 214 Harvard Ave., Boston, Mass. 02134.

Common Users' Exchange Spring Conference. Fort Lauderdale, Fla., April 18-22 — Contact: Dave Baran, CUE Coordinator, NCR Comten, 2700 Snelling Ave. N., St. Paul, Minn. 55113.

Advanced Manufacturing Systems Exposition and Conference (AMS '88). Chicago, April 19-21 — Contact: Cahners Exposition Group, P.O. Box 5060, 1350 E. Touhy Ave., Des Plaines, Ill. 60017.

Corporate Electronic Publishing Systems (CEPS) Show and Conference. Chicago, April 19-21 — Contact: Cahners Exposition Group, P.O. Box 3833, 999 Summer St., Stamford, Conn. 06905.

Third Annual UNIC Software User Group Meeting. Boston, April 19-23 — Contact: Marianne Lewandoski, AT&T, Room 51A40, 30 Knightsbridge Road, Piscataway, N.J. 08854.

ACH FOG Seminar, Dearborn, Mich., April 20 — Contact: National Automated Clearing House Association, P.O. Box 64193, Baltimore, Md. 21264.

ANSI X12 EDI '88 Seminar & Technical Exhibit. San Francisco, April 20-21 — Contact: Data Interchange Standards Association, Meetings Department, Suite 355, 1800 Diagonal Road, Alexandria, Va. 22314.

Technology Opportunity Conference, Optical Storage for Small Systems. San Francisco, April 20-21 — Contact: Rothchild Consultants, 256 Laguna Honda Blvd., San Francisco, Calif. 94116.

ID Expo — The Third Annual Conference and Exposition of Automatic Identification and Keyless Data Entry, Boston, April 20-22 — Contact: Anthony Scalisi, Show Manager, Expocon Management Associates, Inc., 3995 Post Road, Southport, Conn. 06490.

Institute for Graphic Communications Conference: Color Hard Copy, Downers Grove, Ill., April 20-22 — Contact: Lynn Boothhiller, Conference Registrar, Institute for Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

UNIFO '88. Anaheim, Calif., April 20-22 — Contact: Pacific Bell, Room 615, 140 New Montgomery St., San Francisco, Calif. 94105.

Computer Dealers and Lessors Association Spring Meeting. Palm Desert, Calif., April 20-23 — Contact: CDLA, 1212 Potomac St. N.W., Washington, D.C. 20007.

APRIL 24-30

Manage/88. Nashville, April 24-27 —

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Connolly

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ready for work.

It is true that many, maybe most, colleges offer a principles of data processing course. But too often it is Basic that students are required or urged to take, frequently while sitting at a dumb terminal rooms away from a mysterious minicomputer.

While learning Basic certainly helps to expose future computer users to the concept of programming, the first step should be to learn what computers are all about and how to boot a personal computer, not to write a program that calculates compounded annual interest rates or prints out a 14-foot sign on form-fed paper.

SCHOOLS MUST teach the history of computing, outline functions of the key parts of a computer and walk students through word processors, spreadsheets, data bases and the like before approaching programming.

Corporate America is no less guilty than educational America. Plenty of users have terminals and PCs on their desks but are limited to a single application with a handful of menu-driven activities, and they have no idea why the system does what it does. The burden rests on MIS to encourage, not limit, computer use and user curiosity.

That does not mean MIS should train users to be hackers. Rather, companies should learn from those firms that have in-house programs for user education — programs in which everyone is encouraged to explore what computers can do for them.

For their part, schools must teach the history of computing, outline functions of the key parts of a computer and walk students through word processors, spreadsheets, data bases and the like before approaching programming. Some schools do this now, but it should spread to all of them.

The combination of a more computer-literate work force and a more open MIS group is a key element in any company's efforts to form tighter bonds between MIS and the general business organization, allowing the construction of strategic systems they need to survive in the 1990s.

Connolly is Computerworld's senior editor, management.

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Contact: Federation of NCR User Groups, Mail Station USG-2, Dayton, Ohio 45479.

Ingres Users Association Spring 1988 Conference. San Diego, April 24-27 — Contact: Program Committee Chairperson, Effective Systems, Inc., Suite 1-2, 2001 Wyoming Blvd. N.E., Albuquerque, N.M. 87112.

Computer-Based Training Conference & Exposition. Washington, D.C., April 24-27 — Contact: Computer-Based Training Conference, Weingarten Publications, Inc., 38 Chauncy St., Boston, Mass. 02111.

Common Spring '88 Conference: Managing Technology. Hollywood, Fla., April 24-28 — Contact: Common, Suite 600, 111 E. Wacker Drive, Chicago, Ill. 60601.

Technomart Wang: The Wang-Compatible Tradeshow and Conference. Los Angeles, April 25-26 — Contact: Data Base Publications, Suite 205, 8310 Capital of Texas Highway, Austin, Texas 78731.

Special Briefing and Workshop on the New Computer Security Act. Reston, Va., April 26-27 — Contact: Advanced Information Management, 1986 Opitz Blvd., Woodbridge, Va. 22191.

NLOG '88. San Jose, Calif., April 26-27 — Contact: International Planning Information, Inc., 465 Convention Way No. 1, Redwood City, Calif. 94063.

Distributed Network Computing. Cambridge, Mass., April 27-29 — Contact: Patricia Seybold's Office Computing Group, Suite 612, 148 State St., Boston, Mass. 02109.

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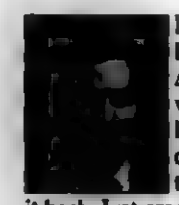
INDUSTRY INSIGHT

Stephen Jones

Sculley puts book in mouth



It's all there in black and white. And no matter what John Sculley says or does, he'll have trouble taking it back. Just crack open *Odyssey*, the Apple chairman's 1987 autobiography, and you'll find a classic case of someone sticking his foot in his mouth.

In the Pepsi-to-riches narrative, Sculley makes some comments that are disturbingly out of step with Apple's current hard-line stance against Microsoft. Beyond contradicting the rationale behind Apple's allegations of copyright infringement by Microsoft, Sculley's remarks confirm the problems Apple may face as a result of suing Microsoft.

Describing Microsoft's Windows as an environment that brings a graphics interface to IBM Personal Computers, Sculley wrote that a legal entanglement over Microsoft's use of the Windows system would only "bloody" Apple. "If we sued our most important software supplier [Microsoft], our business customers would think we'd lost our minds," he wrote.

Sure enough, current and potential Apple customers and third-party software developers have widely criticized the company for attempting to stymie industry innovation.

You said it, John

On the subject of whether Microsoft would move Apple's graphical user interface technology to the Microsoft MS-DOS world, Sculley preaches compromise, not conflict: "We had worked too hard to turn Apple around. Open warfare with Microsoft would destroy everything we had accomplished with our reorganization."

With that in mind, Sculley opted to license the Macintosh interface technology to Microsoft in November 1985 for use in a limited number of Microsoft products — including Windows.

So what was Sculley thinking when he and Apple blindsided the entire industry and dragged Microsoft into court?

Not only is the company fac-

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Silicon Graphics gets infusion

CDC will inject $68.9M into OEM partner in red-hot workstation arena

BY CLINTON WILDER
CW STAFF

MOUNTAIN VIEW, Calif. — Silicon Graphics, Inc. became the latest player to seat itself at the graphics workstation market's high-stakes table last week, announcing that OEM partner Control Data Corp. will acquire 20% of the company for $68.9 million.

Minneapolis-based CDC, which has resold Silicon Graphics workstations as its Cyber 910 product line since late 1986, extended that OEM agreement for three years as part of the transaction. CDC will also gain a seat on the Silicon Graphics board of directors later this month.

The deal marks the year's second significant equity investment by a major computer systems vendor in a relatively young workstation manufacturer. AT&T agreed in January to acquire up to 20% of Sun Microsystems, Inc., also based in Mountain View, for $300 million and also gained a seat on Sun's board [CW, Jan. 11].

While it will not touch off the industry uproar that the AT&T-Sun alliance created because of AT&T's potential for domination of the Unix market, Silicon Graphics' move demonstrates the fiscal imperative for players in the red-hot workstation market. Already ignited by Sun's phenomenal growth, the market recently welcomed two more potentially significant competitors, Ardent Computer Corp. and Stellar Computer, Inc.

"Capital is an important strategic weapon," said Richard Shaffer, president of Technologic Partners, a New York-based industry consulting firm. "Sun now has an enormous amount of money for a company its size,

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Slow 9370 sales scar VM Software

BY MITCH BETTS
CW STAFF

RESTON, Va. — There's nothing like an 88% drop in quarterly profits to make a high-flying company like VM Software, Inc. get a lot more conservative in its spending habits.

VM Software, the leading vendor of systems software for IBM's VM operating system, is now recovering from a rough 1987, when it went on a spending spree under the mistaken assumption that sales of IBM's 9370 would take off, analysts and company executives said.

"We thought we were going to bring in a fair amount of 9370 business early in the year, and we spent money in anticipation of that business. The 9370 business didn't happen, and the spending of the money did," explained Robert E. Cook, VM Software's chairman and chief executive officer.

When IBM announced the 9370 mid-range processor in late 1986, it seemed like a dream come true for VM Software. At one whack, IBM had reaffirmed

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Growth curve glitch

VM Software hitched its wagon to IBM's 9370 star, and 1987 profits fell 30%

INFORMATION PROVIDED BY VM SOFTWARE, INC.
CW CHART

Analyst: New era for industry

BY JAMES DALY
CW STAFF

BOSTON — The storm clouds that boiled over the computer industry for the past three years are drifting off, leaving a restructured, standards-based industry in their wake, a Montgomery Securities analyst claimed at a recent presentation to investors.

"The balance of power has shifted," said William Shattuck, head of computer investment strategy for software and services at the San Francisco-based investment firm. "We're transitioning toward an industry geared to standards-based products and open systems architectures where products must be interoperable with other vendors' products. Vendors just can't lock customers into proprietary systems anymore."

Shattuck said the growing pains of the democratization of companywide information resources were a key cause of the 1985 to 1987 industry slump. "Designing and constructing multivendor corporatewide information networks is extremely complex, expensive and risky," he noted. "It represented a huge challenge that affected traditional product and competitive strategies, priorities and technological direction."

Shattuck credited advances in networking and software portability as the primary impetus

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Japanese threat makes strange bedfellows

BY CLINTON WILDER
CW STAFF

ANALYSIS

Is IBM so worried about Japanese competition that it would share its closely guarded chip-making technology with archrival Digital Equipment Corp.?

That question was raised in the industry last week in the wake of published reports that Big Blue offered to do just that last year, according to a new book by the U.S. Department of Commerce's former chief trade negotiator with Japan. In a rather vague reference, author Clyde Prestowitz Jr. wrote that in mid-1987, IBM approached DEC with an offer to "transfer certain key technologies . . . to prevent DEC from falling even further into Japanese hands."

Was that offer, which apparently referred to chip-making techniques, truly a confirmation of IBM's global view that it must take an active role in helping its U.S. rivals counter the Japanese threat? Or was it simply an IBM attempt — unusual only because of the potential partner — to boost its revenue with a licensing agreement or sales contract? IBM makes most of its own semiconductors, while DEC is a major customer of the Japanese for its memory chips.

Industry observers interviewed last week expressed a full range of opinions. "IBM believes that the Japanese situation is very worrisome," said Richard Shaffer, president of Technologic Partners in New York. "How can they prevent all the chip-making technology from going offshore? One way is to help a major U.S. company remain competitive."

Blue chameleon?

But according to Bob Djurdjevic, president of Annex Research in Phoenix, was more skeptical of IBM's motives.

"It's quite common to cross-license technology," he said. "All this flag-waving is just smoke. IBM runs ads in Britain saying how British they are, Charlie Chaplin speaks German in Germany, and in the U.S., IBM drapes itself in the Stars and Stripes. [IBM Chairman] John Akers and his team are pragmatic businessmen; IBM would never hurt itself for the sake of a competitor."

What is apparent here is the degree to which the U.S.-Japan trade and technology situation throws an intense spotlight on what might otherwise be routine business issues in the U.S.

The truth, as usual, lies somewhere in the middle. IBM — like any large U.S. company — certainly does not want to see its entire industry dominated by powerful Japanese conglomerates closely aligned with the Japanese government. But it is hard to believe that IBM would do anything to help a U.S. competitor if the move did not also fill IBM's own coffers — particularly in light of Big Blue's problems in restoring its own profit growth.

Jones

CONTINUED FROM PAGE 75

ing a potential firestorm of objection from every corner of the computer business, but Apple is picking a fight with a company that has already threatened to pull out all the stops if faced with litigation.

In *Odyssey*, Sculley attributes a mighty strong threat to Microsoft Chairman Bill Gates, who, by the way, is characterized as looking like Woody Allen. In debating whether Apple would license the Mac interface to Microsoft, Gates reportedly offered an ultimatum: Microsoft would either receive access to the technology or stop "development on all Mac products." Strong words, which apparently led Sculley to back away from a potential lawsuit.

What makes Apple's turnabout so hard to fathom is that most of Sculley's concerns still hold water today: Users are likely to be put off by Apple's attempt to wall in the Mac interface, and Microsoft holds a trump card as the top developer of Mac software.

A clue behind Apple's new posture might be this: Apple has made it big. Its profits are up significantly, it is no longer considered a toy maker, and the Mac has made some impressive inroads into the Fortune 1,000 as a business machine.

Now that the company has gotten its sea legs, maybe it feels it doesn't need some software developer from Washington State to prop it up. Growing at breakneck speed and with a zealousness for success that harkens back to the days of Steve Jobs, Apple is understandably a little cocky. That newfound confidence seems to have changed Sculley's initial belief that suing Microsoft would be akin to corporate suicide.

Now, if he can just find a way of sharing more details on this turnabout with the rest of us. But the way Sculley has been playing uncharacteristically mum on all this, we might just have to wait for another book from him. Maybe something like *Odyssey II: What I Really Meant to Say the First Time.*

Jones is a *Computerworld* West Coast correspondent.

INDUSTRY WEEK IN BRIEF

Survivors of former IBM executive Phillip "Don" Estridge and his wife were recently awarded almost $8 million in compensatory damages by a federal jury in a wrongful death suit brought against Delta Air Lines as a result of an August 1985 crash at Dallas-Fort Worth Airport.

During the proceedings, the jury heard testimony speculating that had Estridge not been killed, he could have joined the upper ranks of IBM management and that he had rejected top job offers from Apple Computer, Inc. and Sun Microsystems, Inc. [CW, March 14].

According to the attorney for the survivors, Delta has asked for a new trial.

Computer lessor Capital Associates, Inc. has withdrawn its unsolicited bid to acquire office products manufacturer NBI, Inc. for $7 a share, or about $62 million, one week after NBI said it was not interested.

Oracle Corp. continued to set the software world afire last quarter by coupling a huge leap in net income with a continuation of at least doubling its revenue in every quarter as a public company. Net income for the third quarter ended Feb. 29 increased 169% to $13 million, while revenue for the Belmont, Calif., firm jumped to $76.3 million, a 119% increase.

Filling a five-month vacancy, AT&T's Data Systems Group recently appointed a former IBM marketing executive to head its 1,000-employee national computer sales organization. Gordon J. Bridge, 45, who was group director of IBM's U.S. Marketing and Services Group, joins AT&T as vice-president of national data sales.

Unisys Corp. may boast the power of two, but MIPS Computer Systems is prepared to go it one better. On the day it unveiled a powerful new reduced instruction set computing chip with one hand, the Sunnyvale, Calif., firm rolled three semiconductor partners — Integrated Device Technology, LSI Logic Corp. and Performance Software — into a single software company with the others. The newly created Synthesis Software Solutions, Inc. starts off with a kitty of $10 million and will acquire, modify and distribute third-party software packages for machines that will run on MIPS' new R3000 chip.

Network Management, Inc. continues to let its wallet do the talking. The Fairfax, Va., systems integrator has announced the acquisition of telecommunications systems designer Programmation, Inc., which it will in turn merge into recently purchased CRC Systems. Programmation is also based in Fairfax.

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VM Software

CONTINUED FROM PAGE 75

support for VM, set a goal of selling 5,000 9370 units in 1987 and, VM Software executives thought, opened a new market opportunity.

But 9370 sales reached only an estimated 3,500 units last year. Although IBM has claimed that the system has met its worldwide sales forecasts, analysts and users reported that the 9370 lacks the necessary applications and connectivity software to make sales take off.

As a result of its mismatch between spending and revenue, VM Software's profits took a nosedive in mid-1987 and are only now beginning to revive. The company hit bottom in the second quarter, when its revenue of $6.8 million generated a net income of only $116,365, a drop of 88% compared with the year-earlier quarter. The combination of disappearing profits and the October stock market crash sent VM Software's stock from a high of 45 to a low of 7 last year; it is now trading at about 12.

VM Software's Robert E. Cook

"We spent too much money, and we didn't have enough sales people on board to do the job," Cook said.

Cook said the firm now has its spending under control. "We've basically been flat on expenditures since the end of June, and we plan to stay that way for a while," he said. In addition, VM Software replaced its senior marketing executive and boosted its sales staff.

In its most recent financial report, for the fourth quarter of 1987, the vendor showed signs of improvement with a profit of $2.3 million [CW, Feb. 15]. "Profitability was solid, if not spectacular, and there was some reasonable revenue growth. So the fourth quarter indicated that they've certainly started to get back on track," said Kenneth J. Burke, an analyst at Alex Brown & Sons, Inc. in Baltimore.

And VM Software is no longer banking on the 9370. "If [the 9370 business] shows up in 1988, fine. If it doesn't, it'll be along in 1989. We're doing our plans based on our traditional business," Cook said.

Analysts applauded the firm's more conservative stance. "Even if 9370 sales are not yet robust in 1988, the company is in a better position for having learned from some of the mistakes of the past," said industry analyst Ulric Weil of Weil & Associates in Washington, D.C.

Meanwhile, the firm's aging VMbackup product is facing competition from two newcomers to the VM systems software market, Sterling Software, Inc. and Diversified Data Resources, Inc. But a major rewrite of VMbackup is slated for release this summer [CW, Nov. 9, 1987].

Silicon Graphics

CONTINUED FROM PAGE 75

and Ardent and Stellar are both well financed and could raise more [venture capital] easily. Silicon Graphics had to do something to take advantage of an emerging market that Ardent and Stellar have called attention to."

In addition to CDC, Prime Computer, Inc. also sells Silicon Graphics workstations on an OEM basis. Silicon Graphics receives half its revenue through indirect channels.

The stake in Silicon Graphics represents CDC's first major investment in a computer partner since its restructuring and cost cutting began two years ago.

Gil Williams, vice-president of CDC's Computer Systems Division, said CDC wanted to cement the relationship to work toward offering its technical customers a seamless environment from the desk top to its highest powered supercomputers.

"Our customers need good graphics capabilities with a lot of computer power behind it," Williams said. Silicon Graphics "have one, and we have the other. If you've got a common view of the world and you like each other, [an equity investment] makes sense, doesn't it?"

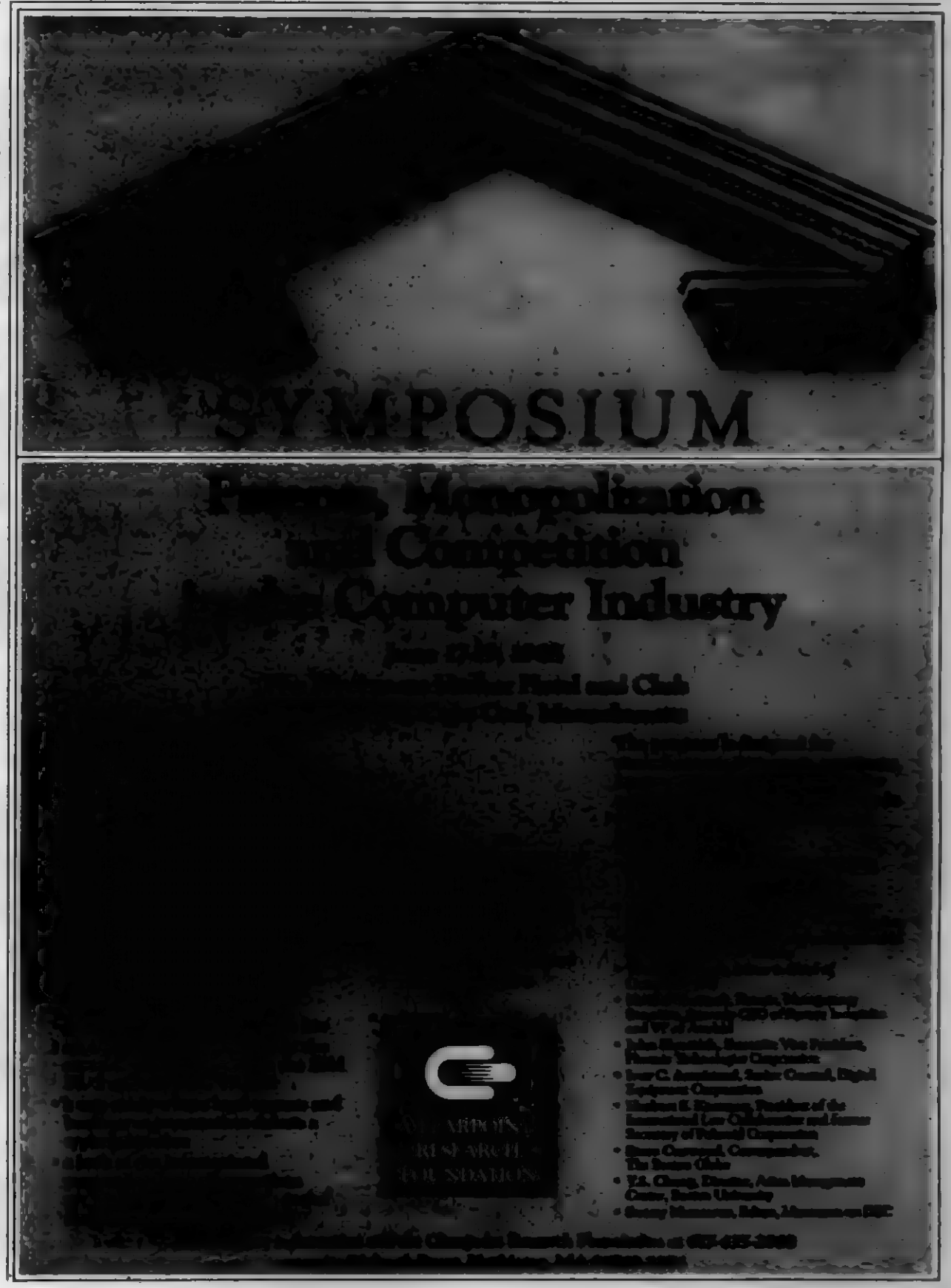
New era

CONTINUED FROM PAGE 75

driving the change. "We are just beginning to see the second generation of local-area networks," he said. "Where before they were toys not capable of supporting commercial operations, now they are an integral part of data integrity, system integrity and information backup. Likewise with advances in software portability."

While the restructuring period was painful — it brought the fabulous growth of systems vendors like Wang Laboratories, Inc. to a crashing halt and slowed down IBM for three years — it was not all-pervasive, Shattuck said. Many companies that rolled with the punches and adapted had stock growth greater than 300% for the three years. Firms like Microsoft Corp. and Novell, Inc. flourished, hitting a growth rate of better than 900%.

Shattuck said it is this new end user-driven strategy that will fuel growth into the 1990s. "Although all sectors of the industry will not participate in the growth — the minicomputer section is already too saturated — there will be no slowdown," he said.



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When the headhunter calls

Recruiters can open doors, but there are pitfalls for the unwitting

BY ANTHONY REED
SPECIAL TO CW

Your office telephone rings, and it's another professional recruiter. Anyone with more than one year of experience may be the target of data processing headhunters. A recruiter may sound like your friend but might turn out to be your foe.

Unscrupulous headhunters will use the "shotgun approach." They will revise your resume and mail it to local DP shops without your knowledge.

Mass mailings may seem appealing, but you increase the risk that your manager will learn of your activities.

An experienced recruiter will take a more direct approach and focus on specific companies that match your requirements.

These few tips can help you select a professional recruiter and use him to your advantage.

Who's calling?

First, remember that the phone caller may not be a recruiter.

Someone from your company may be acting as a recruiter in order to identify disloyal employees prior to determining pay raises, promotions or lay-off candidates.

Ask unsolicited recruiters for their company name, tell them you're not interested and say goodbye.

If you're interested, you can always get their telephone number from the directory and call them back.

It's nice to be needed

Remember that the recruiter makes a commission if you're hired. You're a commodity to be sold, but you're also in a position of power. Recruiters realise that while you can get a job without them, they can't make a commission without you.

Prior to meeting with a recruiter, prepare a list of specific requirements for your next position.

These might include job responsibilities, the chance to transfer within the company, the amount of overtime you're willing to work, geographical locations, benefit packages, hardware and software configurations, size of the company and DP shop and salary requirements.

Also indicate the companies that don't interest you and the ones you've already contacted.

This procedure narrows the search and lets the recruiter know that you're looking for something more substantial than just another job.

A good recruiter will ask for your resume and then interview you to determine whether it reflects your true skills.

He may even conduct a technical interview to let you get a feel for the questions his client may ask.

The recruiter should take an objective view of your situation. After reviewing your resume and conducting his interview, he should determine whether or not you're ready to leave your company.

Many programmers have fallen victim to overzealous recruiters who encourage job-hopping for the sake of a commission.

It's not uncommon to find a programmer with 10 years of rookie experience spread over five companies: Despite the years of experience, he never stayed long enough to get promoted or gain responsibilities.

A good recruiter would encourage the programmer to stay put and help him develop a long-term career plan.

When the recruiter rewrites your resume, demand to see it before he distributes it. You'd be surprised at the number of misrepresentations or typographical errors found on revised resumes. Some recruiters even misspell Cobol.

The resume is an extension and a reflection of you, and you are responsible for its content.

> REMEMBER THAT the recruiter makes a commission if you're hired. You're a commodity to be sold, but you're also in a position of power. Recruiters realize that while you can get a job without them, they can't make a commission without you.

If you disagree with the format or content of the resume, tell the recruiter. If he doesn't want you to see it, or won't make revisions, don't use that recruiter.

You don't want to interview for your dream job with a nightmarish resume.

Trust me

Tell the recruiter not to show your resume to a client without your permission. His client may be your manager's spouse. He may try to avoid identifying his client until the eve of the interview, leaving you unable to adequately prepare for it.

There must be a mutual trust between you and the recruiter. If he doesn't trust you with the client's name, why should you trust him with your resume and career?

Ask questions

Since the recruiter should be knowledgeable about the client's DP shop and the specific opening, he should be able to answer the taboo questions that you shouldn't ask the interviewer, such as the position's salary range, the shop's turnover rate, background information about the interviewer and how the position was created.

If an offer is extended, beware of a recruiter sneak attack: When the recruiter knows you are seriously considering taking another job, he calls your manager and tells her that she may have an opening in the near future.

And, of course, the recruiter has the perfect person who can fill that future opening.

On becoming the hunted

Your manager could go on a witch-hunt, looking for the unfaithful employee.

This tactic is used to pressure you into accepting the offer while also getting the headhunter a new client.

If you understand just what can go wrong in dealing with a recruiter, you're more likely to establish a mutually beneficial relationship based on knowledge, not just trust.

Reed is director of business systems for a Dallas educational institution.

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Massachusetts

Project Manager—Banking Systems—(MA-1) Boston-based commercial bank seeks a team leader to lead a major on-line development project. Financial Systems experience in an IBM OS environment sought. Banking experience a plus. To $55,000.

CICS Programmer/Analyst—Learn DB2—(MA-2) Major MVS/XA shop located south of Boston is installing DB2 as part of a major systems expansion. The company will train on-line COBOL Programmers with two or more years experience in DB2. To $35,000.

Principal Software Engineer—(MA-3) Industry leader needs Principal and Senior-level Engineers to develop on-line TP systems. Five or more years experience with data base management systems, operating systems and/or real time processes desired. Experience with C, ACMS, BLISS, CASE, VAX/VMS are a plus. To $70,000.

Programmer/Analyst—Become a Software Engineer—(MA-4) Cambridge-based software firm is developing a new family of leading-edge IBM software products. The company offers exciting software development opportunities to IBM, COBOL, BAL or PL/I Programmers. Experience in data base or 4th GL a plus. To $42,000.

IBM RPG Programmer/Analyst—Learn New IBM Midrange—(MA-5) Will develop new networked applications on the soon-to-be-announced IBM Midrange computer. Two years IBM 36 or 38 experience sought. Three positions are available including Project Leader. To $52,000.

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VAX Programmer/Analyst—Become a Project Leader—(MA-7) Rapidly-growing downtown VAX shop seeks a strong COBOL Programmer/Analyst who is ready to move up to Project Leader. Will play a lead role in several new projects. DBMS a plus. To $45,000.

ADA Consultant—(MA-8) Five years overall industry experience with two years working with ADA or other Artificial Intelligence/Natural Language products. Will work on the development and support of a new expert system product for real-time applications. To $38,000.

IMS COBOL Programmer/Analyst—Major Development Project—(MA-9) Downtown IMS shop is embarking on the installation of a major new system. The selected candidate will initially play a lead technical role and move up to Project Leader within a year. Five years IMS COBOL sought. To $44,000.

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Programmer/Analyst—(MA-15) Two years IBM programming and CICS preferred. Opportunity to work on multiple engineering and financial systems for a high-tech firm. To $32,000.

Data Base Analyst—(MA-16) Three or more years large-scale IBM data base applications design, development and implementation with either IDMS/R or IMS sought. Opportunity for project leadership. $40,000.

Scientific Programmer/Analyst—(MA-17) Two or more years PL/1, PASCAL or C programming on a variety of engineering or mathematical-based applications including Artificial Intelligence and image processing desired. To $42,000.

Programmer/Analyst—(MA-18) Two or more years IBM COBOL programming and analysis experience sought. IDMS manufacturing applications experience preferred, but will train. To $35,000.

4th GL Systems Consultant/Project Leader—(MA-19) Three or more years of strong design, user interface, analysis, programming and implementation of various applications in FOCUS, ORACLE, or other 4th GL data base tools in either IBM or DEC environments sought. Will be using evolutionary project development tools with the opportunity to work with both DEC VAX and IBM-based systems. B.S. desired. To $55,000.

Communications Consultant—(MA-20) Three or more years experience with large-scale network planning, analysis, software installation and support with SNA/SDLC, X.25 or other large-scale network protocols sought. Will work with major clients on the planning and implementation level. High-visibility. To $50,000.

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Vice President & Ad Director
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Staff Director
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Roger Fraumann is Staff Director for Lachman Associates, Inc. (LAI) of Westmont, Illinois. It is one of the largest privately held computer systems software consulting and development firms in the United States. And Roger is pleased to report that plans call for continuing the 50% annual growth every year for the next five years.

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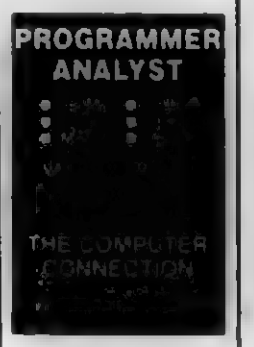

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MARKETPLACE

Forecast unseasonable for some

Apple market dips to new lows; IBM, Compaq show warming trend

BY CAMERON HALL
BOSTON COMPUTER EXCHANGE CORP.

There is nothing like a New England spring. One day it's like Miami, the next, Alaska. During the week ended March 25, the used-computer market whipped itself into a frenzy of rapidly rising and falling prices, reaching Miami highs but also dipping to the lows of Alaska.

Apple Computer, Inc. computers led the roller coaster, with the Macintosh Plus plunging to a new all-time low retail price. The secondary market struggled to adjust to this new pricing from Apple dealers, who were making new machines available for $1,350.

Although the full effect of this price reduction has not reached the used computer market yet, the early Macintosh models were down across the board. Increased confidence in the Mac SE and the Mac II pushed their prices up.

Prices of the former Mac favorite, the Mac Plus, were down again this week, off $100 to close at a new low of $1,150. Lower end Macintoshes also all closed down for the week following the drop of the Mac Plus, with the Mac 512E down $75 to $925.

The upside of the Mac market was with the Mac SE and the Macintosh II, with the SE getting a boost with its flagship designation. The two-disk drive Mac SEs closed up, at $1,850, and hard drive models gained ground and popularity, selling for $2,300. Mac IIs are still the power user's machine of choice, although trading was slow during the week, with the machine closing at a stable $4,050.

> IBM's Personal System/2 line slowed to a snail's pace in light trading during the week. Even with the good deals available on all models, buyers prefer the older DOS-era models.

IBM machines traded steadily all week with very few surprises. IBM's Personal Computer AT Model 339 moved around in the marketplace in small quantities, with buyers willing to purchase the equipment in large lots. Large lots were not available, however, and the Model 339 closed down $50.

The PC AT Model 099 was steady all week, closing at $2,400. The plain vanilla PCs traded steadily at $800, down $50 from the prior week's close.

IBM PC XTs experienced an increase in demand, which acted to keep prices steady, although buyers are beginning to show reluctance at the current price levels. IBM's Personal System/2 line slowed to a snail's pace in light trading during the week. Even with the good deals available on all models, buyers prefer the older DOS-era models.

Compaq Computer Corp. computers remained popular, and buyers snapped up machines in an active market. Sellers upgrading to the new Intel Corp. 80386-based models continue to fuel the supply side of the market, giving slightly lower prices to those looking to buy these models.

Portable machines again captured the "most popular award," and the Compaq Portable I enjoyed steady trading conditions all week. It closed down $25 from the previous week's $850 as it followed price trends set by its IBM competitor. The Compaq Portable II has its own market niche and showed upward movement. It closed at $2,175.

The exception to the activity in the portables was the Compaq Portable III, which had sparse trading even at reduced prices.

As for the Compaq Deskpro models, the original Deskpro hit oversupply in a market with few buyers, and it had few trades. The Deskpro 286 monochrome 20-MHz system again closed at $2,475, as buyers sought this workhorse for a desktop tool. Power users looking for a race-horse rather than a workhorse pushed prices of the Compaq Deskpro 386 up $75 to $4,075.

The Boston Computer Exchange can be reached at 800-BOCOEXX or 617-542-4414 in Massachusetts.

The BoCoEx Index

Closing prices report for the week ending March 25, 1988

	Closing price	Recent high	Recent low
IBM PC Model 076	$800	$900	$625
XT Model 086	$1,300	$1,355	$1,150
XT Model 089	$1,625	$1,750	$1,500
AT Model 099	$2,400	$2,450	$1,950
AT Model 239	$2,750	$2,750	$2,500
AT Model 339	$3,250	$3,600	$3,200
PS/2 Model 50	$2,450	NA*	NA
Compaq Portable I	[illegible]	[illegible]	$750
Portable II	$2,175	$2,250	$1,975
Portable III	[illegible]	[illegible]	$2,475
Plus	$1,200	$1,275	$1,200
Deskpro Model 2	$1,600	$1,600	$1,475
Deskpro 286	$2,475	$2,475	$2,050
Deskpro 386	$4,075	$4,600	$3,600
Apple Macintosh 512	$725	$800	$650
512E	$925	$1,075	$800
Plus	$1,150	$1,250	$1,100
SE	$1,850	$2,200	$1,800
SE 20 MHz	$2,300	$2,300	$2,225
II	$4,050	$4,200	$3,800
AT&T 3B2	$4,200	$4,500	$3,500
Leading Edge Model D	$825	$825	$450
Hewlett-Packard LaserJet	$800	$875	$750

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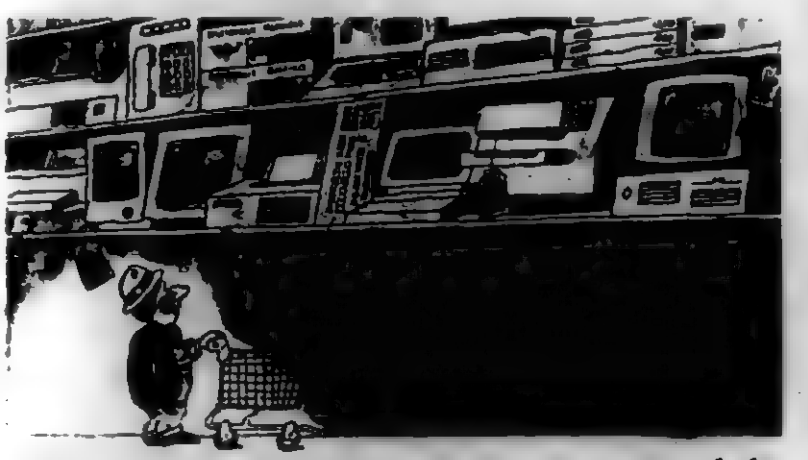

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May 9	Printers	April 22
May 23	Data Communications	May 6
June 6	CASE	May 20
June 20	The SNA Market	June 3
July 11	Disaster Prevention & Recovery Products & Services	June 24
July 25	Productivity Software	July 8
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Aug. 29	DB2 Market	Aug. 12
Sept. 19	Hardware Roundup: Large, Medium Scale and Special Purpose Systems	Sept. 2
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Oct. 3	Hardware Roundup: Personal Computers and Workstations	Sept. 16
Oct. 17	AI/Expert Systems	Sept. 30
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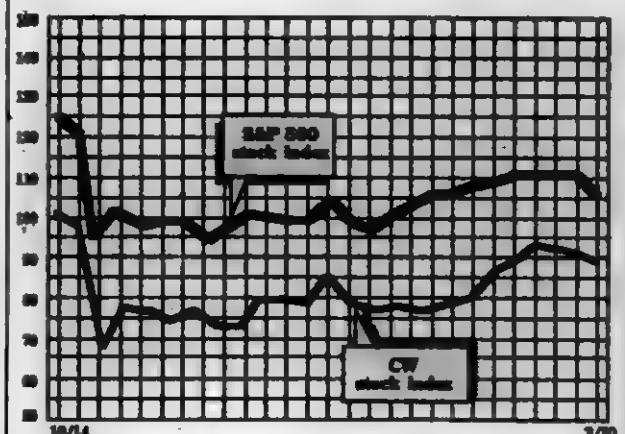
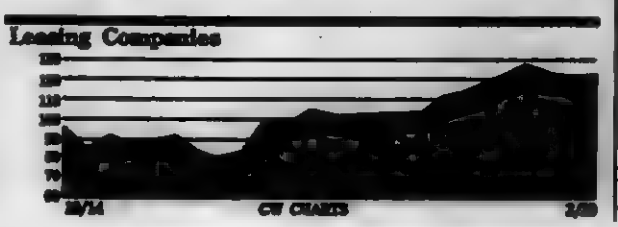


Index	Last Week	This Week
Communications	97.6	93.6
Computer Systems	100.0	97.3
Software & DP Services	105.0	100.8
Semiconductors	67.1	63.0
Peripherals & Subsystems	93.1	89.1
Leasing Companies	121.4	121.8
Composite Index	92.4	89.2
S&P 500 Index	111.5	107.0



Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, MARCH 30, 1988

EXCH		52-WEEK RANGE (1)		PRICE CLOSE MARCH 30 1988	WEEK NET CHNGE	WEEK PCT CHNGE
Communications and Network Services						
N	AMERICAN INFO TECHS CORP	108	74	87.50	-4.6	-5.0
N	ANDREW CORP	18	11	14.38	-0.6	-4.7
O	ARTEL COMM CORP	3	2	2.00	0.0	0.0
N	AT&T	36	20	28.50	-1.5	-4.2
O	AVANT GARDE COMP INC	6	2	1.81	-0.1	-3.5
O	AVANTEK INC	17	6	6.88	-0.5	-6.8
N	AYDIN CORP	26	16	22.25	-3.3	-12.7
N	BELL ATLANTIC CORP	68	51	66.38	-4.5	-6.3
N	BELLSOUTH CORP	44	36	38.63	-1.4	-3.4
O	COMPRESSION LABS INC	7	2	3.25	0.0	0.0
O	COMPUTER NETWORK TECH	6	1	1.41	0.0	0.0
O	CONTEL CORP	46	28	33.00	0.9	2.7
O	DATA SWITCH CORP	10	4	8.25	-0.4	-4.3
O	DIGITAL COMM ASSOC	48	25	31.00	-1.0	-3.8
O	DYNATECH CORP	26	14	22.00	-1.3	-5.4
N	FIBRONICS INTERNATIONAL INC	8	2	4.13	-0.4	-8.3
O	GANDALF TECHNOLOGIES	10	5	6.88	-0.1	-1.4
O	GENERAL DATACOMM INDS	14	5	3.50	-0.2	-4.7
N	GTE CORP	46	28	38.50	-1.5	-3.8
O	INFOTRON SYS CORP	12	6	9.00	0.3	2.9
N	ITT CORP	68	42	44.88	-1.5	-3.2
N	M A COM INC	16	7	10.50	-0.5	-4.5
N	MCI COMMUNICATIONS CORP	12	6	11.00	-0.1	-1.1
O	MICOM SYS INC	17	7	12.13	-0.4	-3.6
O	NETWORK SYS CORP	16	7	8.50	-0.4	-4.2
N	NORTHERN TELECOM LTD	24	14	19.13	-1.0	-5.0
O	NOVELL INC	30	12	20.63	-2.4	-10.3
N	NYNEX CORP	78	58	63.75	-2.0	-3.0
N	PACIFIC TELESIS GROUP	34	28	28.63	-0.8	-2.6
O	PARADYNE CORP	9	4	6.13	-0.3	-4.7
N	PENRIL CORP	9	1	4.25	0.1	3.0
N	PLESSEY PLC	40	28	29.25	-0.5	-0.8
O	SCIENTIFIC ATLANTA INC	20	9	14.63	-0.6	-4.9
N	SOUTHWESTERN BELL CORP	48	32	36.25	-1.5	-3.9
N	3 COM CORP	28	12	19.63	-1.5	-8.2
O	TIMEPLEX INC	40	17	32.50	0.0	0.0
N	UNDERMANN BASS INC	16	8	12.25	0.0	0.0
N	U S WEST INC	68	48	51.88	-2.1	-4.0
Computer Systems						
O	ALLIANT COMPUTER SYS	38	8	7.25	-0.6	-7.9
O	ALPHA MICROSYSTEMS	6	3	4.50	0.0	0.0
O	ALTOS COMPUTER SYS	15	8	10.25	-0.3	-2.4
N	AMDAHL CORP	50	16	32.13	-2.3	-6.5
O	APOLLO COMPUTER INC	25	9	14.00	-1.1	-7.4
O	APPLE COMPUTER INC	60	28	39.50	-3.0	-7.1
N	BOLT BERANEK & NEWMAN	26	12	16.50	-0.8	-4.3
N	BRITTON LEE INC	6	1	2.25	-0.1	-4.3
N	COMPAQ COMPUTER CORP	78	27	48.63	-2.9	-5.6
O	COMPUTER AUTOMATION INC	17	5	11.75	2.1	22.1
O	COMPUTER CONSOLES INC	11	2	6.00	0.8	14.3
O	CONCURRENT COMP CORP	24	11	17.75	0.5	2.9
N	CONTROL DATA CORP DEL	36	16	26.50	-1.4	-4.9
O	CONVERGENT TECH	11	3	3.38	-0.1	-1.8
O	CONVEX COMPUTER CORP	22	6	6.88	-1.1	-14.1
N	CRAY RESH INC	136	47	79.13	-0.4	-0.5
O	DAISY SYS CORP	11	6	7.38	-0.4	-4.8
N	DATA GEN CORP	37	16	22.38	-1.5	-6.3
O	DATAPOINT CORP	9	3	4.75	0.4	8.6
N	DIGITAL EQUIP CORP	200	102	102.75	-8.0	-7.7
O	FLOATING POINT SYS INC	15	3	4.38	-0.8	-14.6
N	GOULD INC	24	8	12.13	-0.8	-5.8
N	HARRIS CORP	43	22	29.50	-2.3	-7.1
N	HEWLETT PACKARD CO	74	38	61.00	-1.5	-2.4
N	HONEYWELL INC	91	49	63.00	-3.5	-5.2
N	IBM	179	102	105.13	-6.5	-5.8
O	INFORMATION INTL INC	16	8	12.88	-0.1	-1.0
O	IPL SYS INC	3	1	2.19	0.4	22.0
O	MASS COMPUTER CORP	14	4	4.75	0.3	5.8
N	MATSUSHITA ELEC INDL LTD	218	98	214.75	2.0	0.9
O	MEGADATA CORP	8	3	3.25	-0.1	-3.7
N	MENTOR GRAPHICS CORP	28	14	26.25	-1.1	-4.2
N	NBI INC	14	4	6.00	-0.9	-12.7
N	NCR CORP	67	33	57.00	-2.0	-3.4
N	PRIME COMPUTER INC	31	12	16.63	-0.6	-3.6
O	PYRAMID TECHNOLOGY	12	3	10.00	-1.3	-11.1
O	STRATUS COMPUTER	41	18	28.75	0.3	0.9
O	SUN MICROSYSTEM INC	46	14	34.88	-2.0	-5.4
O	SYMBOLICS INC	6	1	1.25	-0.1	-9.1
N	TANDEM COMPUTERS INC	28	17	17.88	-0.8	-4.0
N	TANDY CORP	57	28	38.75	-1.9	-4.5
N	ULTIMATE CORP	27	15	13.63	-0.8	-5.2
N	UNISYS CORP	48	24	32.25	-0.5	-1.5
A	WANG LABS INC	19	10	11.75	-0.4	-3.1
Software & DP Services						
O	ADVANCED COMP TECH	6	1	1.88	-0.1	-7.1
N	AGS COMPUTERS INC	28	11	16.63	-1.9	-8.5
O	AMERICAN MGMT SYS INC	25	9	14.50	-1.6	-10.8
N	AMERICAN SOFTWARE INC	23	6	12.25	-1.1	-8.4
N	ANACOMP INC	11	4	8.50	-0.5	-5.6
O	ANALYSTS INTL CORP	10	4	7.50	-0.3	-3.2
N	ASHTON TATE	33	13	27.00	-2.0	-6.9
O	ASK COMPUTER SYS INC	16	6	12.25	-0.9	-6.7
O	AUTODESK INC	34	12	23.25	-1.5	-6.1
N	AUTO DATA PROCESSING	55	38	42.00	-2.3	-5.1
O	BOOLE & BABBAGE INC	12	5	7.75	-0.5	-6.1
O	COGNOS INC	4	2	7.88	0.0	0.0
N	COMPUTER ASSOC INTL INC	37	16	26.88	-0.9	-3.2
N	COMPUTER HORIZONS CORP	16	7	10.00	0.1	1.3
N	COMPUTER SCIENCES CORP	73	42	47.25	-1.4	-2.8
N	COMPUTER TASK GROUP INC	17	9	10.63	-0.5	-4.5
O	COMSHARE INC	26	12	16.75	-0.3	-1.8
N	CULLINET SOFTWARE INC	14	4	7.63	0.1	1.7
O	DUQUESNE SYS INC	26	10	20.50	0.3	1.2
A	DATA ARCHITECTS INC	17	7	13.75	0.1	0.9
N	GENERAL MTRS (CLS E)	61	30	38.50	-1.6	-4.0
O	HOGAN SYS INC	17	5	9.00	-0.5	-4.9
O	INFORMIX CORP	31	12	18.25	-0.5	-1.3
O	INTELLICORP INC	11	2	3.50	0.1	2.7
O	KEANE INC	10	6	9.00	0.0	0.0
O	LOTUS DEV CORP	45	19	22.50	-2.5	-10.0
O	MANAGEMENT SCI AMER	10	6	8.88	-0.6	-6.6
O	MICRO FRD INTL CORP	6	3	3.06	-0.3	-8.2
O	MICROSOFT CORP	75	37	64.75	-4.3	-7.2
O	MORINO ASSOCIATES INC	24	7	15	-1.0	-6.2
O	NATIONAL DATA CORP	34	19	29.00	-2.0	-6.5
O	ON LINE SOFTWARE INTL INC	22	9	11.00	-2.1	-16.2
O	ORACLE SYS CORP	19	8	15.75	-0.3	-1.8
N	PANSOPHIC SYS INC	23	11	16.50	-1.1	-6.4
O	POLICY MGMT SYS CORP	30	15	22.88	-1.4	-5.7
O	PROGRAMMING & SYS INC	14	7	12.38	0.8	6.5
N	REYNOLDS & REYNOLDS CO	30	14	21.25	-0.3	-1.2
O	SEI CORP	25	10	18.50	-0.8	-4.3
O	SHARED MED SYS CORP	28	10	28.00	-0.1	-0.4
O	SOFTWARE AG SYSTEMS INC	14	7	11.00	-0.4	-3.3
O	SOFTWARE PUBS CORP	17	8	14.38	-0.6	-3.8
A	STERLING SOFTWARE INC	12	6	8.38	-0.1	-1.5
O	SUNGARD DATA SYS INC	23	10	18.75	-0.5	-2.9
O	SYSTEMATICS INC	32	18	21.88	-0.3	-0.8
N	SYS. SOFT INC	24	7	14	-1.8	-11.1
O	VIA SOFTWARE INC	44	7	12.13	-0.6	-4.9

Semiconductors

EXCH		52-WEEK RANGE (1)		PRICE CLOSE MARCH 30 1988	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADV MICRO DEVICES INC	28	8	11.00	-1.3	-10.3
N	ANALOG DEVICES INC	24	8	13.13	-1.3	-8.7
O	ANALOGIC CORP	13	5	7.00	-0.5	-6.6
O	INTEL CORP	42	15	28.88	-2.5	-8.1
O	LSI LOGIC CORP	17	7	8.88	-0.1	-1.3
N	MOTOROLA INC	74	38	44.00	-2.4	-5.1
N	NATL SEMICONDUCTOR	32	10	11.13	-1.3	-10.1
N	TEXAS INSTRS INC	68	38	46.75	-2.5	-7.2
A	WESTERN DIGITAL CORP	28	11	19.63	-1.5	-10.4

Peripherals

EXCH		52-WEEK RANGE (1)		PRICE CLOSE MARCH 30 1988	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALLOY COMP.	13	3	4.25	0.5	17.2
N	AM INTL INC	9	3	4.00	-0.2	-4.8
O	AST RESH INC	21	6	6.75	0.3	5.1
O	AUTO TROL TECH CORP	9	3	5.63	-0.3	-4.8
O	BANCTEC INC	16	5	8.50	-0.3	-3.9
O	CIPHER DATA PRODS INC	16	4	10.00	1.0	11.1
O	COGNITRONICS CORP	6	2	3.63	0.0	0.0
O	COMPUGRAPHIC CORP	28	16	25.63	-0.3	-1.0
O	DATAPRODUCTS CORP	24	7	9.25	-0.3	-3.9
O	DATARAM CORP	8	5	6.38	-0.1	-2.0
O	DECISION INDS CORP	13	4	10.75	0.0	0.0
N	EASTMAN KODAK CO	71	40	60.75	-1.5	-2.4
N	E M C CORP MASS	28	10	17.00	0.0	0.0
O	EMULEX CORP	9	4	7.63	-0.3	-3.9
O	EVANS & SUTHERLAND	25	15	19.38	-0.5	-2.5
O	IDOT CORP	12	3	4.88	-0.1	-2.0
O	INTERLEAF INC	24	11	17.38	-2.3	-11.5
O	IOMEGA CORP	5	1	3.31	-0.2	-5.3
O	LEE DATA CORP	5	3	3.88	-0.1	-2.5
O	MASSTOR SYS CORP	6	1	2.75	-0.1	-4.3
O	MAXTOR CORP	28	8	13.50	-0.5	-3.6
O	MICROPOLIS CORP	44	13	23.00	-3.5	-13.2
O	MINISCRIBE CORP	16	5	10.25	-0.5	-4.7
N	MINNESOTA MNG & MFG CO	94	46	57.88	-4.4	-7.1
O	MSI DATA CORP	20	12	14.13	-0.5	-3.6
O	PERSONAL COMPUTER PRODUCTS INC.	7	4	5.00	0.2	5.4
O	PRIAM CORP	6	1	1.38	-0.2	-11.5
O	PRINTRONIX INC	13	7	8.75	-0.0	-0.1
O	QMS INC	27	8	10.88	-0.8	-7.4
O	QUANTUM CORP	28	8	10.75	-1.3	-10.4
O	RANTEK CORP	6	1	1.44	-0.1	-5.9
O	RECOGNITION EQUIP INC	22	7	8.88	-0.8	-8.0
O	REXON INC	14	5	7.88	-0.3	-3.7
O	SCAN TRON CORP	17	7	15.25	2.8	22.0
O	SEAGATE TECHNOLOGY	48	10	20.38	-1.6	-7.4
O	STORAGE TECH CORP	5	1	2.00	0.1	6.7
O	TANDON CORP	7	1	2.25	0.1	5.9
O	TEC INC	7	3	4.88	-0.2	-4.9
N	TEKTRONIX INC	41	21	26.38	-3.4	-11.3
O	TELEVIDEO SYS INC	3	1	1.19	0.0	0.0
N	TELEX CORP	52	30	40.13	-0.9	-1.9
O	WYSE TECH	20	11	13.38	-1.3	-8.4
O	XEROX CORP	68	50	61.25	-2.0	-3.1
O	XIDEX CORP	18	6	6.25	0.1	2.0

Leasing Companies

EXCH		52-WEEK RANGE (1)		PRICE CLOSE MARCH 30 1988	WEEK NET CHNGE	WEEK PCT CHNGE
O	CAPITAL ASSOCIATED INTER- NATIONAL INC	11	4	5.50	-0.1	-2.2
N	COMDISCO INC	37	12	20.75	-1.6	-7.5
N	CONTINENTAL INFO SYS	14	5	8.50	-0.3	-3.6
O	PHOENIX AMERN INC	8	2	3.25	0.1	4.0
O	SELECTRON INC	8	3	4.13	0.4	10.0

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Comeback

Late rally saves troubled Lotus from crying in its Easter basket

A Thursday rally reversed the two-week downward spiral of many leading computer stocks, ending a week shortened by the market's close in observance of Good Friday on a high note. Although the gains did little to erase recent losses — Lotus Development Corp. finished the four days of trading at 23½, off only ½ of a point for the week but down nearly 9 points from early March — they eased pressure on issues recently painted as a lead necklace dragging the Dow Jones industrial average down with them.

The rally was particularly beneficial to Digital Equipment Corp., which hit a 52-week low Wednesday when it traded as low as 101⅛ but recovered the next day to finish the week unchanged at 104. IBM also sank early in the week but picked up 2½ points Thursday to finish up ⅝ of a point at 107⅝.

Big gainers among other leading issues included Cray Research, Inc., up 2⅝ points to 79⅝; Amdahl Corp., up 1⅝ points to 33⅛; NCR Corp., up 1⅛ points to 57⅛; Hewlett-Packard Co., up 1 point to 60⅝; and Sun Microsystems, Inc., also up 1 point to 35¼. Control Data Corp. slipped the most on the computer front, dropping 1⅝ points to 26⅛.

JAMES DALY

Presentation Manager pieces start shipping

BY STEPHEN JONES
CW STAFF

REDMOND, Wash. — Developers writing applications for Microsoft Corp.'s OS/2 operating system may find that the transition from OS/2 Standard Edition Version 1.0 to the Presentation Manager version will not be as simple as they had thought.

Thanks to changes in the Presentation Manager upgrade of Microsoft's OS/2 Software Development Kit, developers can expect to make source code-level changes to some programs written for OS/2 Standard Edition 1.0, the vendor said. Pieces of the tool kit, which includes the first release of Presentation Manager beta code, started shipping last week.

Source code reshuffling is required if developers want to move applications written for the character-based Standard Edition 1.0 to the graphics-oriented OS/2 Standard Edition Version 1.1 with the Presentation Manager, said Adrian King, director of marketing for systems software at Microsoft.

The conversion process takes about three hours and involves making changes in the code used for header files, from all capital letters to a mixed letter display.

Although King admitted that most developers are expected to move to the Presentation Manager development environment, he claimed that few companies will want to port existing OS/2 applications to the advanced graphics-based system.

"People are viewing the Presentation Manager environment as the thing to target for development; most of the development will be starting from scratch," King said.

> "THERE'S A whole bunch of bugs in it, but we're now at the stage where we're fixing them very fast."
>
> ADRIAN KING
> MICROSOFT CORP.

Microsoft officials said that developers using the tool kit for OS/2 Standard Edition 1.0 had been informed several months ago that some specifications would be changed in the Presentation Manager.

Developers will have to wait about three weeks to receive all five components of the kit, which include the operating system, the Windows 2.03 Software Development Kit, Microsoft's C language compiler, other development tools and source code examples — about 32 disks in all.

Microsoft is recommending that users with the Version 1.0 development kit reinstall the Presentation Manager version because of its massive size. Users will need 15M bytes of hard-disk space and at least 3M bytes of memory.

Non-IBM cards in future

Developers will also find that some display adapter cards that work with OS/2 Standard Edition 1.0 will not work with the Presentation Manager tool kit. King said the package will only run with IBM or fully compatible display adapters but that future releases of the code will work with non-IBM cards.

As a beta-test copy, the Presentation Manager is said to contain roughly 200 bugs that developers will have to work around. But King said the presence of bugs in the early version does not mean the Presentation Manager is going to miss its October shipping deadline.

"There's a whole bunch of bugs in it, but we're now at the stage where we're fixing them very fast," he said.

The tool kits are being sent as free upgrades to the 4,000 users who paid $3,000 last year to get a head start on OS/2 applications development with starter kits.

HP rebuffs Apple suit

BY CHARLES BABCOCK
CW STAFF

CHICAGO — A Hewlett-Packard Co. official charged last week that Apple Computer, Inc. filed suit to slow innovation when it realized competitors were about to launch windowing environments for IBM desktop machines that could outstrip Apple's Macintosh.

"I think the suit goes beyond the audiovisual display. I think it's an anti-user-friendly suit," said Rudy W. Batties, manager of HP's industry consultants program, before a session of the World Congress on Computing here.

The HP New Wave technology incorporates an object management system, an Agent Facility to automate the execution of tasks in the manner of a super-macro routine, built-in computer-assisted training and "encapsulation," or the capability to run existing Microsoft Corp. MS-DOS applications.

These, along with windowing features, will find their way onto IBM Personal Computers and Personal System/2-compatible machines, a fact that is threatening to Apple because it is still trying to get its Macintosh established in business offices. HP has a two-year lead on Apple in PC technology over and above windows, Batties claimed.

Furthermore, he said, Apple was a recipient of the first versions of New Wave in early March and sent a staff of 13, including lawyers, to HP's New Wave developers' conference in San Jose, Calif., March 16.

In discussions at the conference and in previous communications between the firms, there was no hint that Apple viewed the look and feel of New Wave as a violation of its proprietary technology, Batties said.

Says Apple altered screen

In an interview with *Computerworld*, Batties also charged that Apple needed to use a New Wave developer's tool kit to modify the appearance of the New Wave file management screen "to make it look much more like the Macintosh's" file management screen. Apple released pictures of the two screens dominated by file folders to support its contention that New Wave was borrowing directly from the Apple approach.

Batties said the New Wave version does not resemble the Apple version as closely as the pictures handed out to the press with the announcement of the suit would indicate. The pictures were run side by side in a San Jose newspaper without HP having a chance to point out the modifications, he said.

HP does not believe it is being sued over the look of its audiovisual display alone. "It's a major threat to stop [other] innovation," Batties claimed.

Dbase links with data on System/38

BY ALAN J. RYAN
CW STAFF

TORRANCE, Calif. — Ashton-Tate Corp. last week further nudged open the door to IBM minicomputer connectivity by announcing a software package that links its Dbase III Plus data base management system with data residing on the IBM System/38.

Dbase Direct/38 is a superset of the Dbase Direct/36 product announced last fall. The program allows users to view and use System/38 files from within Dbase III Plus as if they were Dbase files and offers the ability to join up to 32 files.

Highlights include more sophisticated manipulation of files, the ability to upload files to the System/38 CPU and the support of aggregate functions, said Shelley Symonds, System/36 and 38 connectivity product manager for Ashton-Tate.

Although Dbase Direct/38 and the System/38 marketplace are not strategically critical for Ashton-Tate, the latest niche product shows that Ashton-Tate's connectivity platform is progressing, according to Bruce Johnston, an analyst with First Boston Corp.

Priced at $2,995 per System/38 CPU, the tool costs more than its System/36 counterpart, priced at $1,695 per CPU. "We priced the System/38 product higher because there are typically more PCs connected to the System/38 than to the System/36," Symonds said.

The product will reportedly support any System/38 operating under CPF Release 8.0, an IBM System/38 operating system, and PC Support/38, an IBM-supplied utility that connects microcomputers to the System/38. It also requires an IBM Personal Computer, PC XT, AT, Personal System/2 or compatible system with 640K bytes of memory, IBM 5250 emulation, IBM PC-DOS 2.0 or higher and Dbase III Plus or Dbase IV, which is scheduled to ship in July. Dbase Direct/38 is set for availability in June.

The product will work with IBM's OS/2 when Dbase IV is available under that operating system, Ashton-Tate said.

Microsoft pledges protocol support

Third parties to write transports for LAN Manager to key protocols

BY STEPHEN JONES
CW STAFF

SAN FRANCISCO — Microsoft Corp. used a local-area network developers' conference here to rally support for its OS/2 LAN Manager last week, announcing development pledges from independent software vendors and detailing a plan to support key network transport protocols.

Quieting concerns that the LAN Manager may not be compatible with certain communications transport protocols, Microsoft enlisted the help of third-party developers to cover all the protocol bases for future networking environments.

Widespread compatibility will mean that corporate users can mix and match protocols and otherwise incompatible hardware when using the LAN Manager, said Paul Maritz, general manager of Microsoft's networking business unit.

Most notably, the LAN Manager will be able to work with IBM's upcoming LAN Server and current microcomputer LAN systems by supporting IBM's network extended user interface program, also known as Netbeui. The LAN Manager will be linked to the ISO's Open Systems Interconnect environment through support of ISO Transport Class 4 and Transmission Control Protocol/Internet Protocol (TCP/IP).

Analysts praised the move to support both current protocols, such as IBM's extended user interface, and potential future standards, such as TCP/IP.

Too much to ignore

"There is too much TCP/IP and ISO transport out there for Microsoft not to support it," said William Shattuck, an analyst with Montgomery Securities in San Francisco. "It makes good technology and marketing sense for Microsoft to be working with these companies."

Two companies will team up with LAN Manager co-developer 3Com Corp. to provide an IBM extended user interface and an ISO transport. Mudge Networks Ltd. will write the interface-compatible transport for the LAN Manager. Retix will use its own ISO source code to develop an ISO protocol with 3Com. The version of IBM's interface reportedly will ship to OEMs in the second quarter, and the ISO package will be available during the fourth quarter.

On the TCP/IP front, Excelan, Inc. said it is writing the transport protocol for the LAN Manager. The TCP/IP protocol should ship in the fourth quarter.

Each transport is being written to Microsoft's Media Access Control interface, which calls for a standard method of writing low-level drivers for network adapter cards.

Twenty vendors at the conference announced product plans for the LAN Manager. The third parties included Consumers Software, Inc., which announced a package called Network Courier that supports Microsoft MS-DOS and OS/2 PCs running with the LAN Manager. Also, TLB, Inc. said it plans to release the Solomon III server-based accounting package, which will use the LAN Manager to connect to the package's front end on a workstation.

Cullinane

FROM PAGE 1

The fine-tuning included several other adjustments to the executive structure:

• Tuned out: Chapman, Cullinane's personally groomed successor, who took over the chairmanship in a much-publicized passing of the torch last fall. Chapman resigned from Cullinet, citing personal reasons and a desire to pursue other activities, but reportedly will continue to serve the company in a consulting capacity.

• Tuned up: President and Chief Operating Officer George W. Tamke, former IBM executive and Chapman recruit for Cullinet. Tamke will continue in his current offices but will handle an expanded portfolio, taking on development, legal, financial and administrative responsibilities, many previously handled by Chapman.

• Tuned in: John B. Landry III, who moves from executive vice-president of applications to the newly created position of executive vice-president of development, with responsibility for all technical development, including that formerly presided over by David Litwack, executive vice-president of systems products.

• Stay tuned: Robert K. Weiler, executive vice-president and

George W. Tamke

group executive of Cullinet's Business Units, who made no formal appearance in the list of executive changes. However, according to Tamke, "Weiler's role will do nothing but expand in terms of responsibility and importance" in the new administration.

Early reaction from Wall Street — the clear target of the changes — was favorable. "The crisis is over; the organization will change; the products are solid. This is the beginning of the new Cullinet, Phase Two," said Bob Therrien, an analyst with Paine Webber, Inc. "The three key guys at Cullinet for some time have been George Tamke, John Landry and Bob Weiler, who is one of the best — if not the best — heads of sales in the software industry."

A new Churchill?

Chapman, Therrien said, was a good choice to preside over the transition, "but now the company needs a new kind of operating guy." He likened Chapman to Winston Churchill, who guided England through World War II only to find himself surprisingly out of favor in peace time.

"It's going to mean a lot to three constituencies: investors, customers and employees, all of whom want to think that their company will remain viable," said Mark Finley, an analyst at Stamford, Conn.-based Gartner Securities Corp.

John B. Landry III

Finley noted that Chapman's unstinting investment in research and development and acquisition of companies and product lines, intended to transform Cullinet from an IBM data base firm into a far-ranging software applications company, was badly balanced by his reluctance to pare the firm's head count.

On the other hand, Finley said, "people shouldn't run out and say, 'Hey, the savior's back.'" Cullinane, he said, "turned the company over to Chapman when it was already well into its profit problems."

Toward profits not only gained but sustained, Tamke said, "What we've been about over the past 60 days is a very conservative — and I mean conservative — revenue plan for our next year, which starts on May 1, coupled with an equally conservative expenses plan."

Although he did not comment directly on the possibility of layoffs, Tamke said, "We are going to focus with laser-like intensity on every aspect of this company. If we find anyone or anything that can't be leveraged toward a profitable company, we'd better hear a pretty good reason why not. Nothing is sacred."

Market analysts registered little surprise at Cullinet's executive changes. When Cullinane actively returned to the company in the role of vice-chairman earlier this month, industry observers widely speculated that the former chairman, who owns roughly 7% of Cullinet's stock, was running out of patience with his designated corporate heir's continuing failure to turn a profit. As of the close of the first nine months of fiscal 1988, Cullinet showed $152.3 million in revenue and a $26.5 million net loss.

The wait for VM lengthens

BY ROSEMARY HAMILTON
CW STAFF

The long wait for IBM's high-end VM operating system is about to continue.

An IBM spokesman confirmed last week that the company had missed its target date of March 1988 for the general availability of VM/XA SP Release 1. A revised delivery date has not been set, he added.

The IBM spokesman said he could not comment as to why the first VM/XA is late but that the company would announce a general availability date early in the second quarter.

The missed deadline sparked industry speculation that VM/XA SP Release 1 may be replaced by VM/XA SP Release 2.

"I hear they were going to be late with Release 1, but meanwhile, Release 2 is supposed to be up and running in Kingston," said Wayne Robinson, manager of software systems at Prudential Life Insurance Company of America. The IBM facility developing VM/XA is located in Kingston, N.Y.

Premature praise

IBM introduced both releases of VM/XA in mid-1987 and initially won high marks from VM users who have gone without a true high-end operating system for IBM 3090-class installations.

Release 2, originally scheduled for shipment in the first quarter of 1989, has far more functionality than Release 1, including the critical support of IBM's Systems Network Architecture. IBM recently moved the 1989 shipment date to December of this year.

Some large IBM shops contacted by *Computerworld* earlier this year said they would rather wait for the second, more complete release of the XA offering than install Release 1.

ISDN costs laid out in filing

BY ELISABETH HORWITT
CW STAFF

CHICAGO — Illinois Bell last week filed the first regular Integrated Services Digital Network (ISDN) tariff, giving business users their first glimpse at how much more they can expect to pay for services based on the digital telecommunications standard.

The Ameritech-owned divested Bell operating company's Centrex-like ISDN service, scheduled to become available this fall, will provide customers with up to 50 ISDN Basic Rate connections, all passing through the same central office switch. Each Basic Rate line supports two 64K bit/sec. digital channels for circuit-switched voice and data plus a separate channel for packet-switched data.

Customers will pay a one-time charge of $146 plus a $16.58 monthly charge per line for up to 50 ISDN voice-only connections, Illinois Bell said. If a customer wants voice, data and packet-switched connections, each ISDN line will cost $246.50 plus a $29.68 monthly charge.

But according to Fred Chanowski, president of Needham, Mass., consulting company Telecommunications Management Corp., Illinois Bell's voice/data service "won't sell" at the current $30 per-month per-line rate, particularly since businesses must also expect to pay $500 in equipment for each ISDN voice/data connection.

"I would have been impressed by rates down in the low $20s," Chanowski said.

Other routes

Local voice/data networking can be implemented at less cost through either a digital private branch exchange or a central office local-area network service, which is typically priced between $17 and $20 per month, according to Chanowski.

Illinois Bell's $16.58 monthly charge for voice-only transmission cannot compete with current Centrex rates of $10 to $15 per line.

Illinois Bell's local ISDN service also includes usage-sensitive charges based on the amount of switching capacity Illinois Bell must provide to handle user traffic, Ron Czaplewski, the company's ISDN product manager, said.

IBM upping security level

IBM last week said it intends to upgrade its major mainframe operating systems and security systems to a higher level.

The company said it will present both MVS/ESA and VM/SP for a formal evaluation to the National Computer Security Center (NCSC), which is part of the National Security Agency, by year's end.

The firm said it will present VM/XA SP and RACF for that environment for formal evaluation by the end of 1990.

Computer Associates International, Inc. claimed IBM's plans are a response to its competing security systems products, which currently have a higher security level than RACF.

IBM is shooting for a B1 classification for its operating systems. The NCSC has established four major security classifications labeled A through D, with A reflecting the highest level of security and D the lowest.

Currently, IBM's RACF security product, as well as MVS/SP and RACF for the MVS/ESA environment, are under formal evaluation for a C2 classification. Computer Associates' Top Secret and ACF2 product have been officially approved as C2 products, according to Computer Associates.

The NCSC's C classification dictates discretionary access control by the user; its B classification is based on mandatory security procedures, Computer Associates said.

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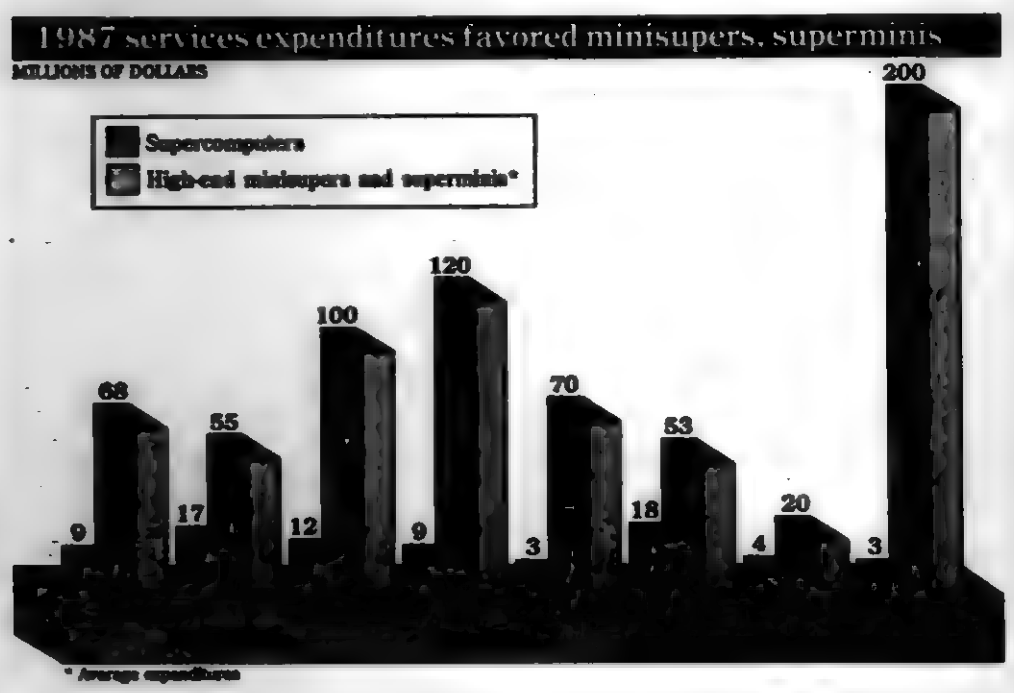
Remote technical computing



Despite the increasing popularity of superminicomputers and the proliferation of new types of minisupercomputers in recent years, the use of supercomputers by technical computing service customers is on the rise. The reason is simple: The gain in performance for each dollar spent justifies the use of a supercomputer.

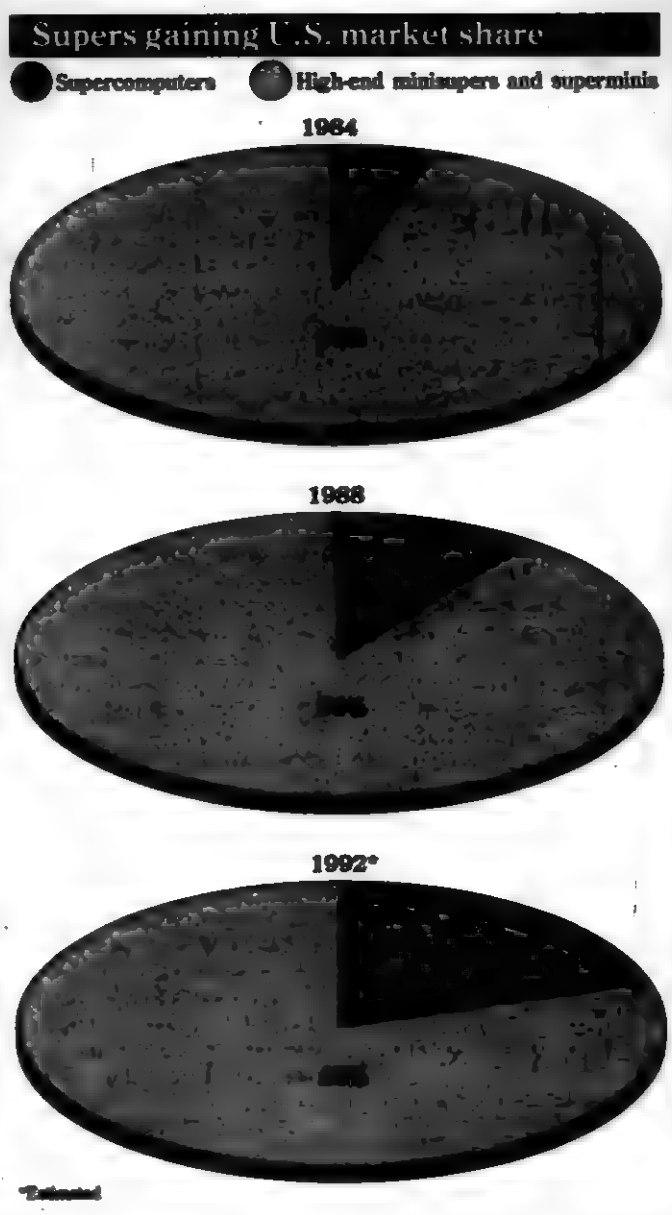
"Most companies gain a time advantage between 10-1 and 20-1 when using a supercomputer. However, the cost of using a super is not 10 to 20 times as great," said Charles Newton, president of Newton-Evans Research Co., a firm that studies the computing services market.

While the ever-increasing power of minisupers has been seen by many as cutting into the market share of the far more expensive supercomputers, their market erosion does not extend to the remote computing services market.

Newton said the use of supercomputer services has been increasing steadily for the past four years, from 5% of the market in 1984 to 10% today. He said he anticipates supercomputer use to increase at the same rate during the next four years, with supercomputers claiming 20% of the technical computing services market in 1992.

Not only will supercomputer use be spurred by the desire of users to save time, but users will increasingly want to run the specialized applications written only for supercomputers, Newton said.

STANLEY GIBSON



INFORMATION PROVIDED BY NEWTON-EVANS RESEARCH CO.
CW CHARTS

INSIDE LINES

Curtain coming down. Scientific computer maker Celerity will discontinue operations this month barring a last-minute infusion of cash, the company announced last week. The San Diego-based vendor said it has found neither additional financing nor a buyer for the company. A maker of reduced instruction set computing-based superminis, Celerity was founded in 1983.

Want to race, PAL? Borland International is expected to crank out a compiler for its Paradox PAL programming language that is supposedly even faster than the firm's Intel 80386-specific version of the data base package. A Borland beta tester recently said he is anticipating delivery later this year.

Modern Jazz is aging. It was called Galaxy when announced last year. Then it was renamed Modern Jazz. Now it is late. The integrated spreadsheet Lotus has been writing to compete with Microsoft Excel on the Macintosh was supposed to ship last week. The latest date is early May.

C what you can do? Like Oracle Corp., the SAS Institute is discovering the benefit of the portable C programming language. SAS has rewritten its statistical analysis package in C and announced to the firm's 3,200 users group conference attendees in Orlando, Fla., last week that SAS has been moved under AT&T's Unix System V Interface Definition 2. It will be first implemented for Unix on Hewlett-Packard's HP 9000 minis. The C version has already been moved under IBM's PC-DOS and Microsoft's MS-DOS. Once the million-line system became available in C, only 10% needed to be rewritten for a new host, SAS said.

Wait a couple of months. "It's the biggest PBX price war I've seen in 15 years," said Fred Chanowski, president of Telecommunications Management Corp. IBM's Rolm division set things off with a price-slashing campaign to grab market share for its new 9751 private branch exchange (PBX). This forced AT&T and Northern Telecom to follow suit, and now PBX shoppers are paying up to 25% less than they did two or three months ago, Chanowski says. Voice/data and Integrated Services Digital Network interface boards for PBXs are also coming down; an IBM data port now costs about $400.

Thanks for the memories. MCI will buy back IBM's 16% stake in the company over the next four years, MCI confirmed last week. The 1985 IBM investment, much ballyhooed at the time as a major Big Blue push into telecommunications, turned into one of the biggest nonstories in recent years. While MCI struggled with restoring its own financial momentum and with the absence of Chairman Bill McGowan after a 1987 heart attack, MCI received little attention in IBM's strategic plans, according to industry sources.

No more pillow talk. One source in the know tells us that IBM's nondisclosure agreements now state that the person signing the agreement can't publicly state that he has signed it. Forget you ever read this.

Where have we heard that line? "There's something our competition doesn't want you to see," was the wording on IBM's booth at Interface '88 last week. Every 4½ minutes, a new group was ushered up a staircase so that they could peer down onto IBM's state-of-the-art integrated office. Key elements: a System/36, a 9370 (but it was in the corner), a Rolm Cypress phone, a Rolm CBX and a PS/2 Model 80 acting as file server for an IBM Token-Ring. The big finish, spoken by an IBM saleswoman, was this: "It makes sense, and it's available now."

Although Cullinet didn't make its shuffle official until Thursday, the CW hot line was informed Monday that inquiries went out the previous week for a potential executive replacement. Kind of makes you wonder exactly what is meant by "personal reasons" when a resignation is delivered. News Editor Pete Bartolik handles these "personal calls" and can be reached at 800-343-6474 (or 617-879-0700).

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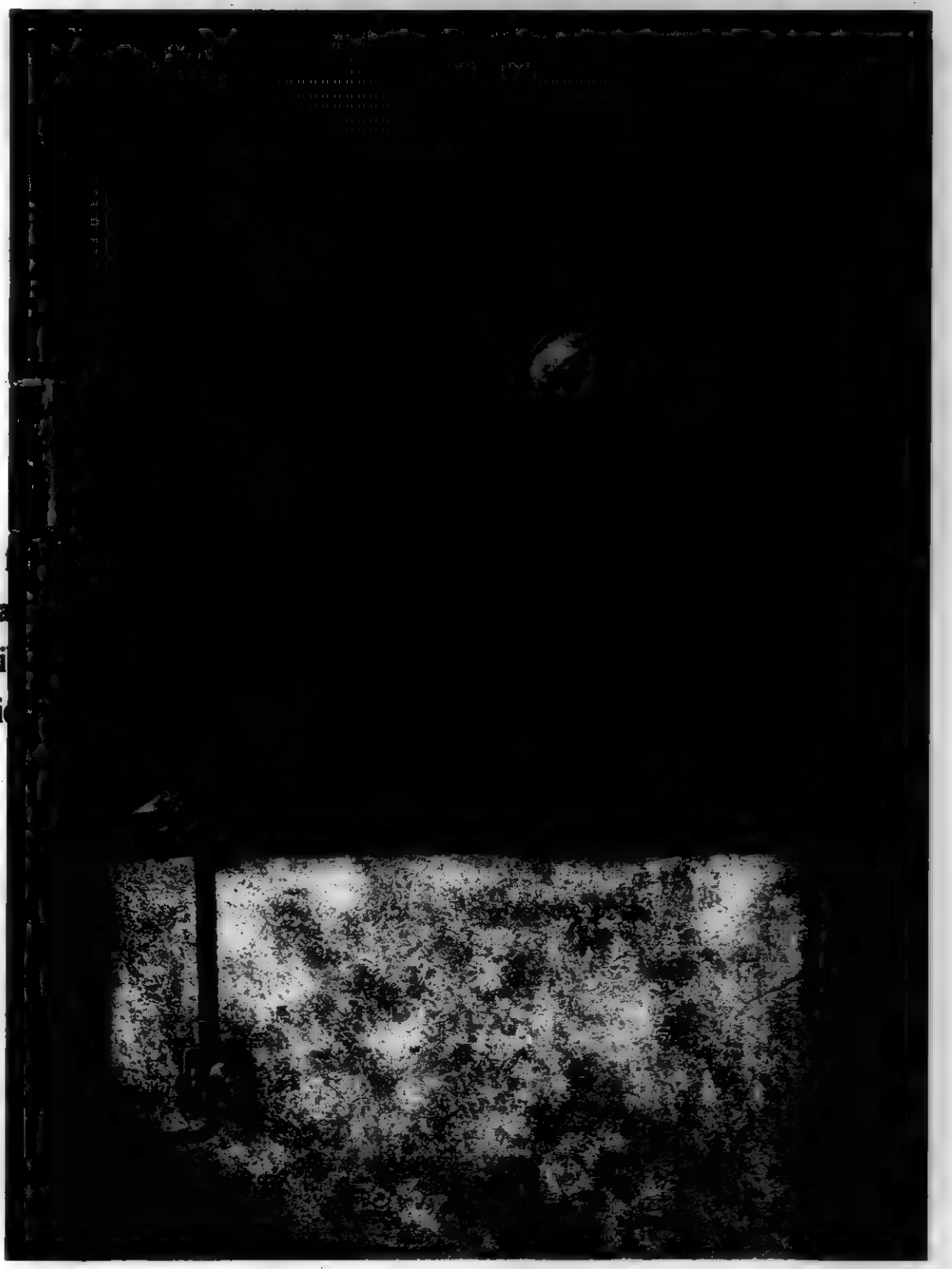

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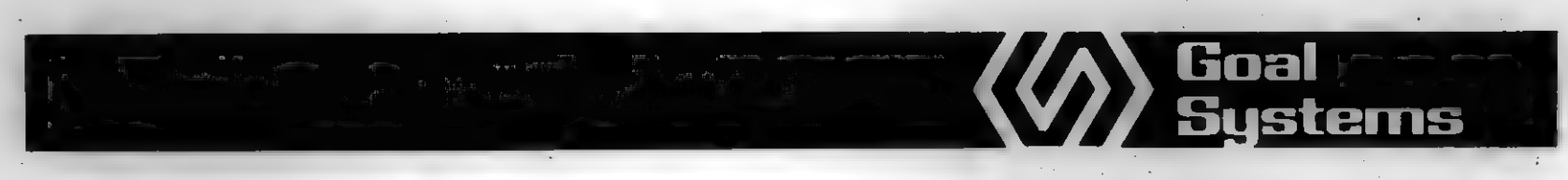

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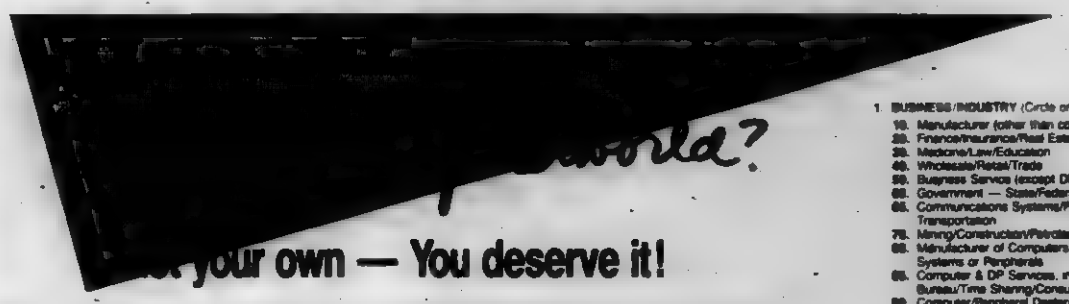

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in focus

IT CAN'T HAPPEN HERE Most of us take threats to our homes, lives and loved ones seriously, so why do we treat the safety of our computer systems with any less caution? Many factors are working to make our systems less secure — the increase in connectivity, the rising sophistication of users and management's unwillingness to take the problem to heart. Blase attitudes can harm the best intent to put a security plan in place. The author takes a look at the state of mind in the security industry today. By Patricia Keefe. *Page 12.*

BEYOND THE BLUE Disaster recovery services aren't just for IBM anymore. While the large providers continue to concentrate on IBM equipment and sites, smaller companies are targeting their offerings to the likes of Data General and Unisys. Certain firms, such as Digital and Wang, have even taken matters into their own hands and set up recovery services for their customers. Read about the non-IBM recovery services market and the organizations that are looking out for No. 2 and 3 and 4 . . . By Stan Kolodziej. *Page 19.*

Portrait of a fortress

By Michael Tucker. Take a journey through a secure storage facility with the MIS manager of mythical XYZ Corp. and find out about the inner workings of a data and equipment storage stronghold. *Page 17.*

Catching disasters

By Kenneth Brill. This site uptime consultant says the conditions that lead to disasters can be identified and safely eliminated *before* catastrophic downtime strikes. By learning to read the warning signs and taking precautionary steps, your company can be a safe haven for data. *Page 23.*

The ins and outs of UPS

By Stan Kolodziej. The market for uninterruptible power supply wares is moving out of its traditional bastion in industry and the military and into the DP arena. Products are being revamped, making the technology increasingly attractive to MIS. Discover what's new. *Page 25.*

Your systems' vital signs

By Stan Kolodziej. MIS is turning to performance monitors to help pinpoint critical weaknesses in existing machines. Monitoring can catch culprits chewing up resources through task activities or running a program in a loop; it keeps close watch on CPU and device use and so on. Best of all, these tools can help MIS squeeze better performance out of its systems. *Page 31.*

COVER BY DAVE SHANNON

SPECIAL SECTION

Disaster recovery plans

How better to show you that disaster recovery planning pays than to let you read about the experiences of those who survived misfortune? Senior Writer Helen Pike interviews MIS professionals who speak candidly about what their companies went through and the importance of having a plan of action in place. Plus: A security expert analyzes how much security is enough. Starts on page 27.

From the Editor
Including your letters to us. *Page 4.*

News & Analysis
Mainframe security remains profitable; NBS pushes for more security standards; U.S. rethinks stance on Toshiba; Unix goes secure; NYSE systems after the crash. *Page 5.*

Manager's Corner
Jim Young on MIS job security. *Page 10.*

Q&A
Two MIT professors discuss their data security projects. *Page 10.*

Blue Beat
Brian Jeffery on postreorganization IBM. *Page 35.*

Products
Tech Talk on a garage-turned-storage-facility; Harris' encryption/decryption device; the "televaulting" concept; low-tech security options for protecting PCs. *Page 35.*

Calendar
Industry events. *Page 39.*

The Insider
Michael Millikin on relying on lazy, sloppy users for security. *Page 40.*

Log Off
U.S. figures verify the high cost of disasters. *Page 40.*

The reasons
may vary, but the
choice is
the same.

Right tool, wrong use: 4GLs shaped by management decree

While I appreciated the remarks on fourth-generation languages (4GL) in the story, "The fate of 4GLs," in the Feb. 3 issue of *Computerworld Focus*, I would like to add my own observations on the 4GL identity crisis. I have worked in Information Builders, Inc.'s Focus as a contractor for a few years now, and I have yet to see Focus used in a truly 4GL project.

More than likely what happens is that someone at the top in DP decides that the company will use a 4GL for its new projects. Management further down the chain acknowledges that edict, so everything from then on is written in 4GL, and dummies like me end up hammering away at Focus to make it behave like and replace an existing 10-year-old Cobol/IMS reporting system.

Also, most projects that I have worked on presume that we must use Focus data bases, which just happens to be a major cause of our problems and delays.

While Ford Motor Co. is an outstanding counterexample (it liked to use Focus with IBM DB2 files), most users have failed to grasp that Focus does not need to use its own data bases.

One last observation: There are still a lot of suckers out there who think that they can be independent of their programming department. Actually, Focus has been a secret weapon to make sure that programmers like myself stay employed.

Walter Aardsma
Duluth, Ga.

Recent MIS graduate discovers a catch-22 in new job prospects

I just finished reading your "Teach your pupils well" editorial in the Feb. 3 issue of *Computerworld Focus*. Being a "new" MIS graduate (having graduated in Dec. 1986), I can sympathize somewhat with your article.

According to you, the percentage of students "seeking careers as computer programmers and analysts has decreased since 1983," but it is also true that one of the main reasons for this situation is the lack of MIS employment opportunities.

Employers want analysts and programmers with three to four years of experience; therefore, any new MIS graduate is turned down and given a new career path that is easier to access and grow is while waiting for an opportunity to come up.

There are a lot of MIS graduates out there that would like to have the chance to spread their wings and give data processing a shot. But is anybody out there willing to give us a chance?

Idalia Lopez-Hernandez
Systems Operator

Will a business or technical slant better open MIS doors?

Without attempting to invoke a sentimentalism akin to the "Dear Abby" letters in the newspaper, I seek an additional perspective on my position in the MIS industry.

Reading the "Teach your pupils well" editorial in the Feb. 3 issue of *Computerworld Focus* caused a number of mixed feelings, many of which were pleasing. On the one hand, I questioned whether the MIS industry might slowly sink back into its data processing background because of the lack of students willing to prepare themselves to become future MIS management. On the other

Continued on page 7

FROM THE EDITOR

A healthy paranoia

First, some items of interest. Second, a question.

Item 1: Last year, a group of West German computer hobbyists successfully entered an international computer network belonging to the U.S. National Aeronautics and Space Administration. They were "ethical" hackers and didn't break anything. But still, they had the run of the place for at least three months.

Item 2: Early this year, a California-based distributor shipped an IBM 9375 to an address in Florida after someone ordered it over the phone. The computer, worth $200,000, vanished. It is a good bet that it is now either on the black market or in Havana.

Item 3: There is a story, widely reported, that sometime last December, somebody sent a holiday greeting into the internal communications network of a certain large computer maker based in New York state. (Three guesses which one.) The kicker is that the electronic mail contained a virus, a self-replicating program. Within a matter of days, it had spread through the entire network and brought a worldwide communications system to its knees.

Now, the question: Is anybody paying attention?

Each of these cases was relatively harmless. Yet each should give you nightmares as an MIS professional. If you sleep peacefully, then you are either one of those rare MIS officers who has made a real effort to defend your data, or, more likely, you do not comprehend the peril you face. And it's easy not to understand. MIS wants to develop open systems. Its business, after all, is making data available, not locking it up.

Yet, increasingly, the value of information is becoming apparent to thieves and vandals, and MIS must protect it. But that effort will require that MIS officers jettison some of the openness — call it innocence — that has marked their profession in the past. Instead, they must cultivate something of the paranoia that must be a part of the business strategist's psyche. That idea is grim, but the alternative is worse. If MIS officers cannot impose security on computing, then someone else — someone from top management — will do it for them.

Michael Tucker

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news & analysis

UPDATE

Security low on users' lists

Paradox time. On the vendor side, there's always a flurry of computer products dealing with securing data, but when it comes to the users of these products, enthusiasm for security always seems to be on the back burner.

"We recently sent our clients a list of about two dozen potential research topics for 1988 and asked them to rate the topics in order of importance," explains Jack Freeman, senior analyst in data communications for The Yankee Group in Boston. "Security came in dead last."

Freeman says the same thing happened at a recent network seminar sponsored by his research group. "For two days they talked personnel, vertical integration, network costs — everything except security."

How could the vendors' and users' attitudes on security apparently be such worlds apart?

"Vendors keep creating security products that users never use," Freeman says. "Users don't care about security because they can't quantify it to justify security's expense to management. If you put in a network with 30 personal computers and a server, that's easy to quantify. Not security."

The result, Freeman says, is that many vendors pay token service when it comes to integrating security into products outside the banking and financial communities, which, by law, are required to adhere more strictly to data security regulations. And users who are genuinely serious about security will have to pay for it.

"I just talked to some vendors that were offering the option of the [National Bureau of Standard's] Data Encryption Standard on their leased-line modems and asked them why the security cost so much," Freeman says. "The answer was, 'Because nobody's buying it.' "

If attitudes change, Freeman reasons, maybe the price of security will come down.

IBM, Tandem make moves in fault-tolerant market

Seismic activity continues in the fault-tolerant market. IBM has introduced two entry-level models of its System/88 fault-tolerant systems line. IBM is aiming the machines at customers that need fault tolerance for lighter volumes of on-line transaction processing.

Surprise: Both systems are being supplied by fast-tracking Stratus Computer, Inc., the Marlboro, Mass., company that has lately been stringing together a long list of big-profit quarters.

In the meantime, Stratus's archrival, Tandem Computers, Inc., has swept in and taken the fair hand of networking company Ungermann-Bass, Inc. from the clutches of erstwhile suitor Digital Communications Associates, Inc. (DCA), which has been on an acquisitions spree lately.

Actually, DCA's hostile takeover attempt appeared to drive Ungermann-Bass into the arms of fault-tolerant stalwart Tandem. Under terms of the merger, Ungermann-Bass will become a wholly owned subsidiary and independent division of Tandem.

Analysts see the Tandem/Ungermann-Bass merger in a positive light. For Ungermann-Bass, which usually competes against IBM and Digital Equipment Corp. in selling communications networks to large corporate clients, the tie with Tandem will probably supply a needed infusion of operating cash as well as access to Tandem's global marketing and support services. For Tandem, Ungermann-Bass will provide broader enterprisewide networking capabilities to its fault-tolerant systems, something for which many banking, retail and finance customers are asking.

Fail-Safe boasts first fault-tolerant PC system

The fault-tolerant market got a little hotter in January when Fail-Safe Technology, Inc. in Los Angeles introduced its FS 66, a system that the company claims is the first fault-tolerant personal computer.

To drive its point home, Fail-Safe officials claim that the FS 66 is guaranteed for three years of mean time between failures and needs no more than

Continued on page 9

Big iron security

Leading packages in IBM and plug-compatible mainframe sites

INFORMATION CULLED FROM 1987 COMPUTER INTELLIGENCE CORP. STATISTICS TAKEN FROM A BASE OF 11,500 U.S. IBM AND PLUG-COMPATIBLE MAINFRAME SITES. OF THE 11,500, 35% USED AT LEAST ONE BRAND OF COMMERCIAL MAINFRAME SECURITY SOFTWARE; 4% DEVELOPED SECURITY SOFTWARE IN-HOUSE; AND 61% DID NOT USE ANY MAINFRAME SECURITY SOFTWARE AT ALL.

GRAPHIC BY BRUCE SANDERS

Mainframe security plods along profitably

Suppliers of mainframe security software are part of a select and profitable bunch. Computer Intelligence Corp., a La Jolla, Calif., research firm, reports that IBM and Computer Associates International, Inc. control 80% of the total U.S. market for mainframe security software. Trailing far behind in market share are On-Line Software International, Inc. with 8% and VM Software, Inc. with 4% (see chart above).

No one has ever accused mainframe security software of being a glamorous market, however. Such software basically resides on an IBM mainframe and is used to control system resource access and manage directories and disk space for IBM VM and MVS operating systems.

IBM's RACF is a venerable, aging product that has come under some criticism for its relative inflexibility and continuing emphasis on strict, centralized control in a time of transition, when users are asking for more flexible security at the personal computer level.

"I think we're seeing changes in the attitudes of users," explains Jim Graves, marketing manager at VM1, a Los Angeles-based vendor of security software for the VM operating system.

"I think users want to be able to control security, handle their own encryption and do it easily at their level, and I don't think they can do that with the mainframe software now available. They want to be able to hit a command and decide their encryption queue quickly after they've finished editing or creating a file," he says.

But Mary Welch, marketing manager at Computer Associates, says mainframe security

Continued on page 6

The NYSE's systems are still feeling the heat months after the crash. Page 8.

NBS plans to push for more security standards next year

The National Bureau of Standards (NBS) expects to make a major push forward in fiscal 1989 in its research of security issues affecting networks, programming languages and system interfaces as well as data encryption.

"The security aspect of all these technologies needs to be addressed," stressed Sheila Radack, spokeswoman for the NBS's Institute for Computer Sciences and Technology. "There has been much attention paid to building in security in the [International Standards Organization's Open Systems Interconnect] architecture. There is substantive work to be done."

Radack made her comments in mid-February, shortly after the U.S. Department of Commerce submitted its $2.4 billion budget proposal for fiscal 1989, which begins Oct. 1. The NBS, a division of the Commerce Department, has a proposed $158 million allocation. Of that amount, $8.58 million is tagged for the Institute for Computer Sciences.

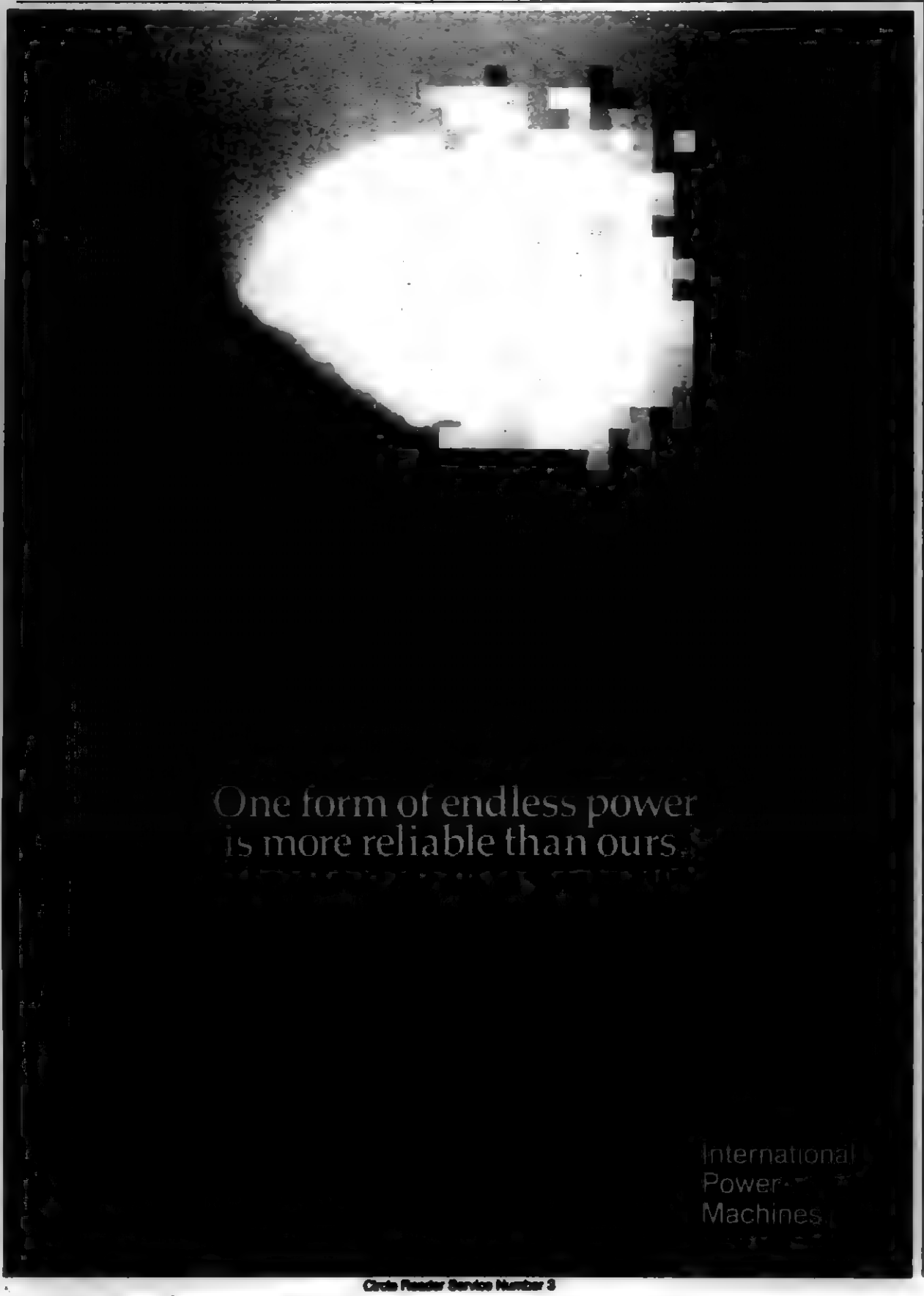
An extra $3 million is proposed for the implementation of the Computer Security Act of 1987 that legally establishes responsibility for the Data Encryption Standard (DES) with the NBS. Previously, the National Security Agency (NSA) had expressed an interest in maintaining the DES, which has evolved into a de facto standard for nonclassified data. The legislation requires that the NBS establish security standards and training programs for federal agencies using nonclassified information systems.

The NBS and the Secretary of Commerce review the DES every five years to determine its adequacy to protect computerized data. Although the DES is used widely by both the public and private sectors, such as the American National Standards Institute and the American Bankers Association, Radack says interest is picking up in general business and electronic data interchange applications.

As a result of the Computer Security Act, the NSA retains authority over security for classified systems as well as for telecommunications when cryptography is involved. Under National Security Decision Directive 145, passed in 1984, the NSA had received the responsibility to design security programs for some data, including financial data, not related to national defense. However, private sector businesses said they found the NSA programs too expensive and complicated for their use, in particular jeopardizing millions of investment dollars in security technology based on the DES.

The Computer Security Act of 1987 requires the NBS, however, to use the technical security guidelines from the NSA "to the maximum extent feasible." It also requires establishing a 12-member advisory board to provide advice to the private sector.

"The NBS will work more with the private sector in the coming years," Radack says, citing cost-effectiveness as a leading government goal where security is concerned. "The problems in the public and private sectors are the same. Nobody wants the government to be expensive. We want to bring the cost down for everyone." — HP



Circle Reader Service Number 3

Mainframe

Continued from page 5

software has kept up with the times.

"These security products are designed for major IBM operating systems, and that means centralized control," she says. "I think they've evolved very well during the past 12 years. They all stem from IBM's original design for RACF, which was to protect a few data sets, but now these systems can protect any resource — data sets, IBM CICS resources, transaction terminals, CPUs and a whole range of things.

"One advance," Welch continues, "is security backup through a process called 'by default,' which means that even if the security system doesn't know about certain data to be protected, the information is still locked off, users can still access it and you don't have something sitting out there that isn't protected."

However, Jeffrey Beeler, industry analyst at Dataquest, Inc., a San Jose, Calif., research firm, says he thinks that mainframe security software firms have been given an easy ride. "Users are demanding more customized security software, and that's why PC security software has made some strong advances. But there still isn't enough pressure on vendors to make the kinds of changes necessary at the mainframe level," Beeler maintains.

"The problem is not just with the mainframe security industry," he adds, "but with computer security as a whole. Users are simply not interested enough in security. When that changes, you'll see dramatic changes in the software. Until then, it's business as usual." — SK

U.S. reassesses its stance in Toshiba-Soviet caper

Toshiba Corp., the Tokyo-based multinational giant, may yet escape the fury of the U.S. Congress. Late last year, Toshiba found itself in the middle of a major security-related scandal when one of its branches, Toshiba Machine Co., was part of a scheme to sell restricted technology to the Soviet Union.

In a deal straight out of a John La Carre espionage novel, Toshiba Machine and a Norwegian firm, A/S Kongsberg Vapenfabrikk in Konsberg, Norway, allegedly sold the Soviets computer-controlled machine tools to make improved submarine and ship propellers. Military analysts have said that subs equipped with the new propellers will be much quieter and much more difficult to detect with sonar than subs with older props.

In response, Congress debated imposing a total ban on Toshiba imports to the U.S. for up to five years. In fact, there is still legislation pending that may mete out exactly that kind of harsh punishment.

However, Toshiba may yet be spared. As federal authorities investigated the case, it became increasingly apparent that it may not be just to hold Toshiba totally responsible for the actions of Toshiba Machine. According to one international trade analyst, who declined to be named, "Most Japanese corporations are rather feudal in nature. Individual divisions or subsidiaries may function very much as if they were independent business entities. Toshiba may be, say, the Holy Roman Emperor, but Toshiba Machine is a very independent North German prince."

Evidence has surfaced, for instance, that Toshiba Machine actively misled its parent and the Japanese government.

As a result, there is now a movement afoot in the U.S. House of Representatives to impose sanctions on Toshiba Machine but to exempt the parent company from the ban. A spokesman for Toshiba notes, "There is a chance for a happy resolution of the matter with punishment falling on the really guilty without hurting innocent people in the process."

Toshiba still faces a battle, though. It must somehow convince congressmen that the parent should not be held accountable for the actions of the child. Further, it must do so in an election year, when the U.S. public is growing resentful of the Japanese closed-shop tariff system, which makes it easy for the Japanese to export to the U.S. but almost impossible for goods to go back the other way.

And the fact is not going to be lost on congressmen that Toshiba was preparing to counteract the export ban's restrictions by establishing manufacturing facilities in the U.S. — and so provide U.S. citizens with jobs. — MT

dB

By Rich Tennant

Institute: Computer security business posts banner decade

The current decade has seen more data security and training companies set up to do business than in any 10-year period since 1950, according to figures compiled by the Computer Security Institute in Northboro, Mass.

The institute, which publishes an annual buyer's guide on security products and services, recently released its 1988 edition in which 525 vendors were listed. Of that figure, 199 companies were launched since 1980.

"The growth has just been monumental," comments Rick Koening, the institute's associate director. The networking of minis and personal computers into a communications system is one reason behind the upswing in business, he says.

In the 1950s, the security market showed a 2% increase of companies launched, and those were primarily vendors of safes for keeping magnetic tapes, according to Koening. The 1960s saw a 5.7% increase, while business activity heated up in the 1970s with an 11.6% increase. But from 1980 to 1986, businesses almost tripled to a stunning 28.4%.

Koening admits it is difficult to translate the number of companies into a number of available products and services. However, he does cite certain hot product categories. On the list are PC security, including access control and smart cards; network security, especially for local-area networks; and security sensitivity training for internal corporate affairs.

"The current hot button on the PC and minicomputer fields is good for a least three to five years," he estimates. Koening further observes that demand for mainframe security is holding steady, except in multivendor networks, in which case the demand is rising.

"A lot of interconnectivity issues have [yet] to be resolved," he adds, referring to the relationship between implementing security and the push for communications standards.

Koening, who used to be in charge of computer and data security at Union Carbide Corp., stresses that MIS managers should have more contact with hardware and software companies, talking to them about their unique security and compatibility needs. "No one denies a solution is needed. [But] vendors need to be able to justify their development costs," he says.

There is an ironic twist to users' burgeoning interest in security. Koening says, "Whenever a bunch of incidents about computer viruses gets reported in the press, that heats up interest with those people who have shelved the security issue." — HP

Letters

Continued from page 4

hand, I could see myself competing for MIS positions from a smaller pool of eager beginners. I prefer the latter.

Visualize a community college honors graduate in electronics and computer technology being hired as a DP operations technician in charge of the maintenance of terminals, printers, modems and all associated cabling. Now visualize that same individual, two years later, working as a DP operations technician solely in charge of a 30-station keyphone system, administrating a modest superminicomputer and a data communications network with leased lines spanning two phone companies — along with his previous duties as an electronics technician.

Although, in my own mind, my current responsibilities touch on the basic concepts of MIS, the want ads seem to say that I don't have what it takes to make it in MIS. What further strengthens this sense of insecurity is the fact that the demand is for people with a degree in computer science or business while I am continuing my education in the evenings in electrical engineering/business.

What does MIS want for the future, an engineering/technical base with business to fill the gaps or a programming/business base with a touch of technology just to keep up with the real world?

John H. Campbell
DP Operations Technician
Agrinorthwest
Tri-Cities, Wash.

From promoters to resistors: MIS changes for the worse

I am writing in response to the editorial, "Emotional Feedback," in the March 2 issue of *Computerworld Focus*.

The mental picture that I get of the those interviewed for this piece is of people with skinny neckties and flattop haircuts who can't think beyond 80-card columns. It is interesting to find out that the people who during the last 30 years have been so instrumental in introducing technological change to business are now so resistant to the continued growth of these technologies. It would appear that their interests are purely self-serving and not in the interest of the businesses they serve.

Thirty years ago, when we were introducing automation to general business on a large scale, employees in the production and financial departments were asking, "Who are these people anyway, coming into *our* departments, telling us how to do *our* work and taking *our* work away from us?"

Listen to the attitudes expressed by some of the people you interviewed. They are asking similar questions, aren't they? What goes around, comes around.

Information systems people are very quick to call themselves "professionals." They often perceive their function as a line department function. What many of them tend to forget is that their function in the corporation is a staff function, in support of business operations. And unfortunately, much of the business community does not yet accept these people at the professional level. Certification of these people in technical areas has yet to influence hiring and promotion on a wide scale.

If we are to gain the acceptance in business that we desire, we must first get with the business. We must quit looking upon those in the business areas of our companies as users, a description that has come to be used in a derogatory fashion. We are also users.

Continued on page 8

All not quiet on the Unix front

Spurred by federal users, industry pushes for secure Unix

This year's Uniforum was haunted by the concept of security.

Uniforum is a Unix trade show, held by the /usr/group, that took place at the Infomart exhibition center in Dallas in February. Most observers said that it was a quiet show, with only a few major product announcements.

The obvious action was provided by certain big-name vendors, each of which was making a bid to be the leader of the Unix world. Specifically, the would-be kings of Unix included Apple Computer, Inc., IBM and Sun Microsystems, Inc. in alliance with AT&T.

The Unix oxymoron

But there were other, concealed stories at Uniforum. Those stories had to do with secure Unix and the large number of attendees from federal and military agencies. Increasingly, the government is requiring Unix on its systems, but it is also requiring levels of security that Unix was simply never designed to provide. "Let's face it," said one attendee, an Air Force officer who asked not to be named, "until recently, secure Unix was a contradiction in terms."

Unix's problem with security is that its original home was in software development, where openness is a virtue. Most Unix systems are meant to allow communications, not prevent them. (This quality was one of the objections to commercial Unix. During the 1980s, observers and analysts decried the operating system's lack of file and record locking.)

However, vendors and standards groups are addressing the security issue in Unix via a variety of means. Some are trying to provide the Unix operating system with security through proprietary rewrites of sections of the kernel. Others are trying to codify and exploit capabilities already in Unix that might provide greater security.

X/Open, a London- and San Francisco-based standards organization made up of Unix vendors, is one of the latter. "The thing about Unix," notes Robert Ackerman, X/Open's chief marketing officer, "is that it contains so very many things that it is difficult to know exactly what is there already. We are attempting to see what is in Unix that can provide real security and produce documentation on how to use it."

To this end, X/Open is currently developing a handbook on Unix security.

Meanwhile, a number of vendors at Uniforum displayed new or revised methods of making Unix fault tolerant. For example, Tolerant Systems, Inc. in San Jose, Calif., showed X.25 software that allows its fault-tolerant Unix offering, TX, to connect to packet-switched data networks.

However, for many of the exhibitors at this year's Uniforum, the real issue was their own financial security, rather than that of their products. On the first day of the show, within hours of one another, three groups — Apple, IBM and the Sun-AT&T allian e — all made claims to the leadership of the Unix world.

The first was Apple, whose Chief Executive Officer John Sculley gave the keynote address. In a multimedia event complete with a minimovie displaying Apple's conception of the computer of the future, Sculley introduced AUX, Apple's Unix implementation for its Macintosh.

IBM won't be outdone

Within 30 minutes of the Apple press conference, IBM staged a competing event in which it discussed its strategic directions regarding Unix. In the process, IBM announced that AIX would be, from hence forward, the sole Unix system for Big Blue machines and that it would eventually be available on IBM's entire product line.

That evening, Sun, AT&T and mainframe maker Amdahl Corp. announced that they would be cooperating on a single Unix standard.

Each of these three groups hopes to bring Unix deeper into MIS departments. In the process, though, they, too, will encounter the security issues that currently vex government buyers. Some analysts are suggesting that the security of Unix will become one of the industry's chief preoccupations.

"In the end, we all face the same problem," said one Uniforum attendee who identified herself only as an employee of a government agency involved with intelligence. "Whether it is electronic funds transfer or intelligence data, the goal is to keep the wrong fingers out of the right places." — MT

NYSE systems still feeling aftershock of Oct. 19 crash

The infamous stock market crash of Oct. 19, 1987 has produced its share of finger pointing, with several aimed directly at the computer systems used at the New York Stock Exchange (NYSE).

While a congressional committee, chaired by Sen. William Proxmire (D-Wis.), is studying a wide range of stock trading issues following the aftermath of the market meltdown, a report already issued by the General Accounting Office (GAO) has tarnished some of the gleam of the once-touted exchange computer systems.

The basic thrust of the GAO report concentrated on a number of temporary breakdowns involving nine of the NYSE's 12 computer systems Oct. 19, sometimes for as long as 75 minutes, during which time trade orders were not being processed.

"The result," according to a GAO spokesman, "was that about 8,000 orders were never executed, and based on the information we received from the exchange, those orders involved about 320,000 shares of stock."

Not the only hellish day

It was not just that fateful day in October that all hell broke loose. The GAO indicates that the computers also delayed printing orders Oct. 20 and Oct. 21. Once the problems began, the GAO says, they escalated, causing other problems.

For example, regional exchanges, in such cities as Chicago and Cincinnati, to which many orders are directed from the NYSE, have a two-minute window in which to execute an order. On Oct. 19, however, only about one-third of these orders met the two-minute window. The remainder backed into the NYSE computers and aggravated the situation.

The NYSE then asked other exchanges not to use the system for an hour and 15 minutes, and on Oct. 21, the entire system had to be closed for two hours just to process the order backlog.

What caused the problem? First of all, the GAO says, the Tandem Computers, Inc. fault-tolerant systems and IBM mainframes were simply not enough to handle the estimated 600 million shares that passed through the NYSE on the 19th.

Those directly involved with Black Monday do not dispute that accusation. Charles McQuaid, president of Securities Industry Automation Corp., the New York group responsible for the computer systems at the NYSE and American Stock Exchange, says that what his organization faced between Oct. 16 and Oct. 20 "were five successive days when the volume exceeded by 10% to 100% the volume of the biggest single previous day in the history of the New York exchange.

"Until then," McQuaid says, "the biggest day had been 300 million shares on Jan. 23, 1987."

Preparing for the future

According to McQuaid, the NYSE testified before the Proxmire commission that it was preparing for somewhere between 425 million and 450 million shares by year-end 1987 and that 600 million shares were on the horizon for 1989 or 1990.

"You have to keep it in context," McQuaid argues. "We had problems with the systems, but under the circumstances, they came through marvelously."

Dave Kelly, president of New York-based National Securities Clearing Corp., which handles all the clearing of traded shares on the New York, American and over-the-counter exchanges, also jumps to the defense of the status quo.

Big bucks

"We did about $60 billion worth of activity on Oct. 19 for settlement on Oct. 26," according to Kelly. "After the biggest trading day in history, after everything washed through the system, we only wound up with a fail charge of $200,000."

Both McQuaid and Kelly agree, however, that there is room for improvement, and some of the GAO recommendations involving beefing up the processor and storage capacity of the computers have already been implemented.

"What this has done is focus the attention of Congress and the nation on vital issues surrounding the exchanges," McQuaid explains. "That's going to lead to long-term, positive changes." — SK

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Letters

Continued from page 7

We must learn to accept the fact that, because we are continuing to educate students to acquire business degrees and to follow business goals but also to have technical knowledge, these graduates will enter business knowing how to solve business problems with technology and without our help.

We must acknowledge the fact that just as we were the instruments of change, so must we be open-minded to the inevitable change that will happen to us. We must supplant our own departmental goals with those of the corporation. Only when we do this will we grow. Only when we become part of the corporate team will we be accepted.

Gustave Neuse III
Cincinnati

Another reason LANs will overtake minis

Add this to the reasons why local-area networks will overtake minicomputers in departmental computing ["Are the mini's days numbered?," *CW Focus*, March 2]: LANs can now run the same applications as minicomputers.

This ability is possible thanks to software that emulates the IBM System/36 environment on IBM-compatible personal computers and LANs. One such software product is California Software Products, Inc.'s Baby/36. Up to now, some users were forced to choose minis because that was all their chosen applications would run on. With the ability to port minicomputer applications to LANs, Baby/36 software will give users another choice.

Mark Tennisson
California Software Products, Inc.
Santa Ana, Calif.

Update

Continued from page 5

one millisecond to recover from a hardware failure. At $2,000, the IBM Personal Computer XT-based machine is priced right, and Fail-Safe is slated to soon introduce Intel Corp. 80286- and 80386-based models.

Ironically, Fail-Safe introduced its systems at the recent Armed Forces Communications Electronics Association show in Anaheim, Calif. It is ironic because fault-tolerant technology cut its teeth in the aerospace industry but has long since high stepped it into the glamour of the commercial market, and Fail-Safe is no exception.

To make the FS 66 reliable, Fail-Safe says it has rigged a system consisting of two PCs, each in its own box, sharing a common chassis. Each personal computer also has its own electronically isolated motherboard and power supply.

Spies scour U.S. data bases looking for likely victims

On the spy front, it seems foreign agents could be busy penetrating data bases of large U.S. credit bureaus such as Cleveland-based TRW, Inc. and Chilton Corp. in Dallas. These felons are looking for the names of people who might have both access to classified information and personal financial problems, according to a report issued by the U.S. House Armed Services Committee.

U.S. Department of Defense officials are worried that credit data bases can provide information on whether a person has U.S. government security clearance.

That is a bad enough scenario, but if the data base also reveals that the person is in poor financial condition, foreign agents could use the combination to exploit that person's problems to their own advantage. That could spell national security trouble.

A DOD spokesman indicated that it would not be too difficult for such miscreants to gain illegal access. All they would need is a legitimate customer password to get inside and, with thousands of existing customers, that could be easier than it appears.

Though an extreme case, these problems at the credit bureaus might help to point out the problems inherent with computer passwords as well as other basically inadequate security methods now widely used in the commercial market.

Come one! Come all! It's IBM's traveling OS/2 show

Taking its cue from a World War II recruitment poster, IBM wants you — to sign up for its Personal System/2 micros and OS/2 operating system.

IBM is midway through a three-month recruitment drive it is calling the PS/2 OS/2 Applications Forum. The road show has 13 cities on its itinerary, and IBM is not traveling alone. Seven software developers have signed on to help IBM spend two or three days each week giving demonstrations to regional IBM marketing personnel, Fortune 1,000 accounts and dealers.

The road show is a follow-up to IBM's forum on PS/2 hardware held last fall.

IBM's software traveling companions that are swearing by the OS/2 system are as follows: Torrance, Calif.-based Ashton-Tate Corp.; Borland International, Inc. in Scotts Valley, Calif.; Micropro International Corp., located in San Rafael, Calif.; Redmond, Wash.-based Microsoft Corp.; Novell, Inc. in Provo, Utah; Mountain View, Calif.-based Software Publishing Corp.; and Z-Soft Corp. in Marietta, Ga. All coming to a venue near you. — SK

News section compiled and written by *Computerworld Focus* staff members Stan Kolodziej, Helen Pike and Michael Tucker.

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MANAGER'S CORNER

Protection from the pink slip

Jim Young

I feel a profound sense of irony whenever I reflect on what attracted many of today's MIS professionals to the field. As recently as 10 years ago, people whom I taught or interviewed gave a variety of reasons for their career choice — from rapid advancement to the ability to work independently. While many of these motivations may have lost some of their validity, no reason seems quite so hollow as that given by many acolytes — that of job security. Indeed, many people changed careers just for the aura of protection that a job in the computer field suggested.

Yet in the years of 1981 and 1982, companies in difficulty ceased protecting MIS resources from the freezes and reductions that plagued other departments. Even industries in which MIS historically provided backbone services, such as insurance, banking or financial services, recently have witnessed a decimation of their MIS ranks. Each headline seems to bring vicarious trauma as more bad career news emerges. Clearly, the MIS profession has lost its cachet of protection.

Unfortunately, the trend toward disposable MIS is not confined to companies with economic difficulties. The rise in acquisitions has forced or, in some cases, inspired, MIS-related consolidation or elimination. Even the threat of hostile takeover can provoke some organizations to perform shortsighted, panic-prompted emergency surgery.

On an objective level, such actions are unfortunate because they treat MIS as ballast or excess baggage. Even more significantly, the dismissals of MIS staff ignore the curative contributions that MIS could make. However, as the maxim states, "If you are not part of the solution, you are part of the problem."

MIS may be somewhat culpable by not putting itself in a more constructive position. Yet a postmortem is small condolence for those workers personally affected. It is at this more subjective level that involved MIS professionals are forced to concentrate their assessment.

The important question for anyone facing treacherous circumstances is, "How do I minimize the risk?" The following are some steps that help lower the risk without compromising professionalism:

• **Adjust to changing company values.** Organizations are becoming more demanding of functions like MIS and, in turn, the people that perform these functions. Intangible qualities like loyalty or institutional experience are being heavily discounted in favor of bottom-line benefits. Under pressure, top management is unlikely to give much credence to undemonstrated potential. Specific and ongoing contributions to cost savings or growing revenue streams are the coin of the realm. MIS professionals need to ensure that their performance can be translated into these terms and that this role is visible and well established. It is not that loyalty and institutional knowledge are unimportant but rather that these benefits can no longer be relied upon solely to justify a professional's existence in a company.

• **Stay versatile.** In times when organizations must stay light on their feet, it is helpful if the supporting professionals can contribute to the organization's flexibility. This means being psychologically prepared for change and proficient enough to accept alternate or additional assignments. It also includes being sufficiently responsive to execute necessary redirections quickly, if not spontaneously. As MIS professionals, we have a special challenge to stay technically versatile. Interestingly, this depends as much on our mental attitude as on specific training. Professional curiosity, transference of knowledge and intellectual alertness count for a lot here.

• **Stay cosmopolitan.** Another area that is a state-of-mind issue is the perception of our universe. A dangerous trap to fall into is allowing one job or one organization to become a boundary containing our professional career. While it is probably not necessary to cure organizational claustrophobia by jumping ship, a more healthy attitude can be generated by at least expanding our professional horizons.

Develop contacts with professionals outside of a restricted community. Through other professional activities, MIS people can increase their awareness of other organizations, other technologies, even other careers. Just as travel is said to broaden people's horizons, so, too, will professional sojourning build a beneficial sense of perspective and reassure us of alternatives. Even the therapy of adding accomplishments to a resume can help wean us of a psychological dependence on the increasingly dismal prospects in MIS.

• **Do not become paranoid.** Despite personally discouraging circumstances, there is every reason to maintain an optimistic outlook. While many areas have been affected by breaks in our discipline's earlier track record of job security, fortunately the trend is not universal. Many organizations that are retrenching now will recover, giving employees nothing more serious than a good scare. It would be a shame if the MIS professionals involved took needlessly desperate action. Even for professionals in organizations that cannot recover unscathed, desolation is not warranted.

In general, projections still paint an attractive picture for our profession. It is just becoming more obvious that participation in this rosy scenario may require some inconvenient and even painful personal rethinking. The changing scene may mean one or more job changes. It may require a redefinition of the role MIS plays within organizations. It might even influence a career decision. For example, an increasing need for consulting help as opposed to in-house technical talent is guiding more people into the consulting area.

Whatever the adjustment, it is clear that an MIS career is not the milk run it used to be. However, it can still be quite rewarding, provided we learn to roll with the punches dealt by today's harsh conditions. Better yet, the right career positioning and the right attitude can avoid these punches altogether.

Young is managing director of MIS for the Wheeler Group, a division of Fitzroy Brown, Inc. in Hartford, Conn.

Q AND A

Jerome Saltzer, Ronald Rivest

A lesson in perseverence: MIT computer science professors study ways to maintain data integrity

Jerome Saltzer and Ronald Rivest are computer science professors at MIT in Cambridge, Mass. Each has an interest in data security. But beyond that similarity, their disciplines diverge.

Saltzer is technical director of Project Athena, a 5-year-old research program that is developing interactive computing methods for education. For the last 18 months, Saltzer has been involved in designing a modus operandi for network authentication. Named Kerberos after the three-headed dog that guards the gates of hell in Greek mythology, it follows a development path analogous to Project Athena's X Windows graphical interface. MIT would like to see Kerberos become a de facto industry standard.

Rivest has spent the last 10 years exploring the intricacies of encrypting data as a means of securing it. In addition, he is a founder of RSA Data Security, Inc. in Redwood City, Calif., one of the earliest firms to write public-key encryption and authentication software for commercial use. Public key is an encryption algorithm that protects private communications within a network. The decryption algorithm is provided by a private key.

In separate interviews, each professor talked with Senior Writer Helen Pike about his respective method for maintaining data integrity.

Rivest

What is the status of data encryption?
RR: During the last couple of years, data encryption has really picked up tremendously in the commercial area. The new public-key technologies are really starting to take off.

Is there a development in technology that dovetails the academic with the commercial interest?
RR: I think the development of the workstation and the development of the network are the two primary forces. Additionally, there are a lot of things you can do with public-key technology that you can't do with conventional technology.

One of these [capabilities] I find most exciting and interesting is a digital signature. You can take your workstation and write a memo and effectively sign it by adding an electronic digital signature to the end of the file. This signature can be verified but not forged by anyone else.

Is this the type of signature that we have come to associate with a pen and pencil?
RR: It is not a pen and pencil thing. It's an electronic analogy of that. Doing business electronically without cryptographic protection or digital signatures is very much like doing business on typed postcards.

Do you use the keyboard or a mouse to enter the signature?
RR: You use your workstation to compute your digital signature for a message by applying a secret function that only you know.

Would a personal computer or minicomputer be able to do this also?
RR: Sure. The computational requirements are very modest. There are, for example, software packages commercially available that allow one to sign messages using an ordinary PC. With a mini, it's even easier.

Can the signature's security be broken?
RR: In principle, any such code can be broken, but it might require billions of years of computer time on our fastest supercomputers.

Is data encryption making an MIS manager's life easier or harder?
RR: Generally, it makes it harder day to day in the sense that there are more things to manage. But it's certainly easier in the long run in that you are avoiding certain kinds of disasters that come once in a while when somebody penetrates the system.

Are MIS managers coming in to help write the software or are they sending network managers in to do this?
RR: It depends on the structure of the company — who first perceives the need for cryptographic security and [then] acts on it.

Are there any competitors to public key?
RR: Public key incorporates a lot of different things. Within public key, there may be some variations, but in terms of basic technology, there isn't any alternative.

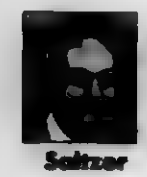
Continued on page 11

Interview

Continued from page 10

What is the best approach for using public key?
RR: Public-key technology is most applicable in a distributed, decentralized networked environment. Using conventional techniques can sometimes work OK, especially in a small or highly centralized system.

If distributed processing becomes more prevalent, will we probably see more public-key implementation?
RR: Yes, absolutely.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What was the thinking behind Kerberos?
JS: Whether you are trying to do something that goes under the roof of distributed processing, or a remote login or a file transfer, you still have the same need at the bottom: to know for sure that your correspondent is the person you think you're talking to.

The fundamental issue is if we've got two activities that are better separated with a network in between them, [then] we need a way for the two activities to know that each is authentic. That's what Kerberos provides.

Authentication is a requirement we had to do in order to be able to deliver network services to the students. The next step was to figure out what computing facilities they wanted, such as being able to pick up mail and have remote files.

The way Kerberos works is when you go to the system, it gives you a ticket that is ciphered with your password and you decipher it. You use this ticket, and you go to the service.

The first thing you do when you log in is you send a message to Kerberos saying you want to use the post office. Kerberos sends back a string of bits that consists approximately of your name enciphered and the post office password.

The idea is that I can get to the post office, and the post office finds it can decipher the ticket. The reason it can decipher it is because I got the ticket from Kerberos. So it knows for sure that it's me. That's the overall idea that's involved.

Why is that idea important in a networked environment?
JS: When a client requests a service across the network, the service needs to know who the client is. Authentication is basically just verifying the identity of the client.

What was Kerberos's origin at Project Athena?
JS: During the last several years, there have been a number of protocols. . . . We adopted a variation of one . . . [the above-mentioned post office concept]. Having adopted that variation, we have implemented a server that provides a service of checking a user's identity. Then, we made changes to several of the network service protocols to make them use Kerberos authentication.

For example, we use a mail system complete and ready to use from Santa Monica-based Rand Corp. The only thing that was not adequate about it was that it did not check the identity of the user asking for mail.

So we have modified it to use Kerberos authentication. When you ask for mail, it checks to see that you are the person whose mail you're asking for. That's the essence of what we did. We have modified the [Sun Microsystems, Inc.] Network File System to require Kerberos authentication before it allows you to attach to your remote file directory.

We have also modified the remote login features of University of California at Berkely Unix 4.2 to be mediated by Kerberos.

This is an example of a network service and a facility that we could not find off the shelf from any of our vendors or from any other source. That is why we felt it necessary to develop it.

Is it Project Athena's intent to make Kerberos available to the commercial field?
JS: We do intend to make it available to the world one way or another, but we haven't decided how. And we do want to encourage its use as a standard if that's possible.

When will it be available outside of MIT?
JS: I'm not sure of the exact timing, because we went through 11 iterations of X Windows before we finally got to the stage at which we were convinced that the right thing to do was to push it out to the world.

I don't know how many more iterations we have ahead of us for Kerberos. It's on its second iteration.

Have you found that there has been a lot of outside interest in this effort?
JS: Yes. Actually, we've found that some people have been quite interested in it. Whenever it's mentioned, we find that people immediately begin asking questions.

There is no question there is a problem here for which we have to come up with a solution. That's why we put the system together.

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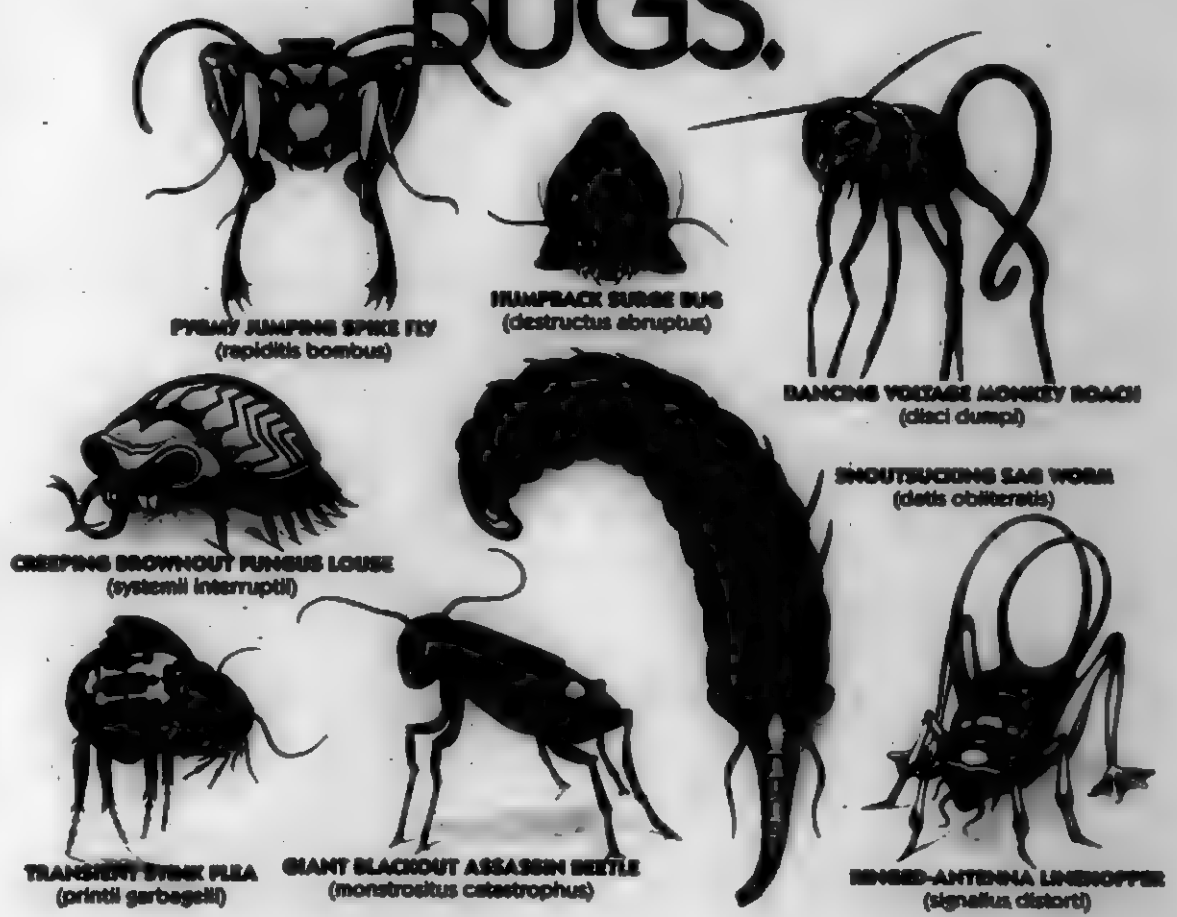

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It can't happen here...

Blasé attitudes spell trouble

BY PATRICIA KEEFE

Computer crime is a lot like any other kind of crime, particularly when it comes to the blasé attitudes prevalant among would-be victims. Everyone assumes it can't happen to him, whether it be robbery, rape or unauthorized access to sensitive data.

Yet even the most optimistic among us takes certain precautions. We don't wander the streets alone at night. We don't flash wads of bills in front of strangers, and we routinely lock our doors and windows. Sure, it requires a little effort, but common sense, abetted by a daily dose of screaming headlines, assures us the expenditure is worth it.

But to hear security consultants tell it, the fearless business world could use a good dose of that same common sense.

Implementation of computer security programs is highly incident-driven, says Carl Jackson, a computer security specialist with Ford Aerospace Corp. in Newport Beach, Calif., and past president of the Information Systems Security Association (ISSA). This means the Fortune 1,000 appears unwilling to give much thought to security unless, for instance, a major security breach involving a competitor receives significant media play.

"Our best clients are the ones that were just ripped off," adds Donn Parker, a computer security consultant with SRI

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It is unclear what percentage of firms in the Fortune 500 have data security officers in place. One long-time security consultant says he believes most of these companies at least have begun to look at security issues. Other consultants find that trend optimistic.

There are exceptions, of course. Some industries are either mandated by law to secure their data or are bound by what is referred to as "a high standard of care."

These industries include government offices, defense contractors, financial institutions, insurance companies, as well as automakers and cosmetic and toy vendors, which rely on trade secrets to stay competitive, says computer security expert Robert E. Johnston, a senior manager with Advanced Information Management, Inc., a consulting firm in Woodbridge, Va.

Even so, "security considerations are normally not a primary factor in DP strategy," observed a recent report on data security, entitled "Information Security Products and Services in the U.S." (#A1753), from New York-based market researcher Frost & Sullivan, Inc.

This attitude is especially unfortunate given that few victims, often ripped off to the tune of hundreds of thousands — even millions — of dollars, are willing to go public with such embarrassing news. As a result, Parker, who has about 2,000 documented cases on file, says it is difficult to provide valid numbers on the extent of computer crime.

So if you have been lulled by the seemingly low incidence of high-tech crime, you should run, not walk, to the nearest risk analysis package and figure out just what you stand to lose. Because if you think your data is safe, think again.

Revenge of the nerds

What's more, you can forget the "revenge of the nerds" theory: Most security breaches are not committed by outside hackers but, rather, come from within a corporation. Actually, this situation is to be expected. To gain access, hackers, aided by "demon dialers" (devices that keep dialing successive numbers in search of a modem signal), still need a lot of luck to guess two passwords correctly. Besides, although the hackers you read about are those who steal credit card numbers and damage corporate data banks, most security consultants and data security officers view the average hacker as someone in benign pursuit of an intellectual challenge, not malicious damage.

Whether security breaches are committed by internal or external culprits, they are helped immensely by the trend toward connectivity. The explosion in networking, coupled with the decentralization of information, will put host data access into the

> **Few victims, often ripped off to the tune of hundreds of thousands — even millions — of dollars, are willing to go public with such embarrassing news.**

hands of an unprecedented number of microcomputer users during the next five years. Because greater access leads to greater vulnerability, decentralization necessitates that responsibility for security increasingly will be placed into the hands of users. All of which will place a corporation in the awkward position of having to trust the very people from which it is trying to protect itself.

Who are these users? Obviously not the majority of employees. Security consultants point to several kinds of perpetrators, as follows:

- **The ignorant.** This group includes any user who accidently wanders into the wrong files, unintentionally deletes or writes over information or creates any

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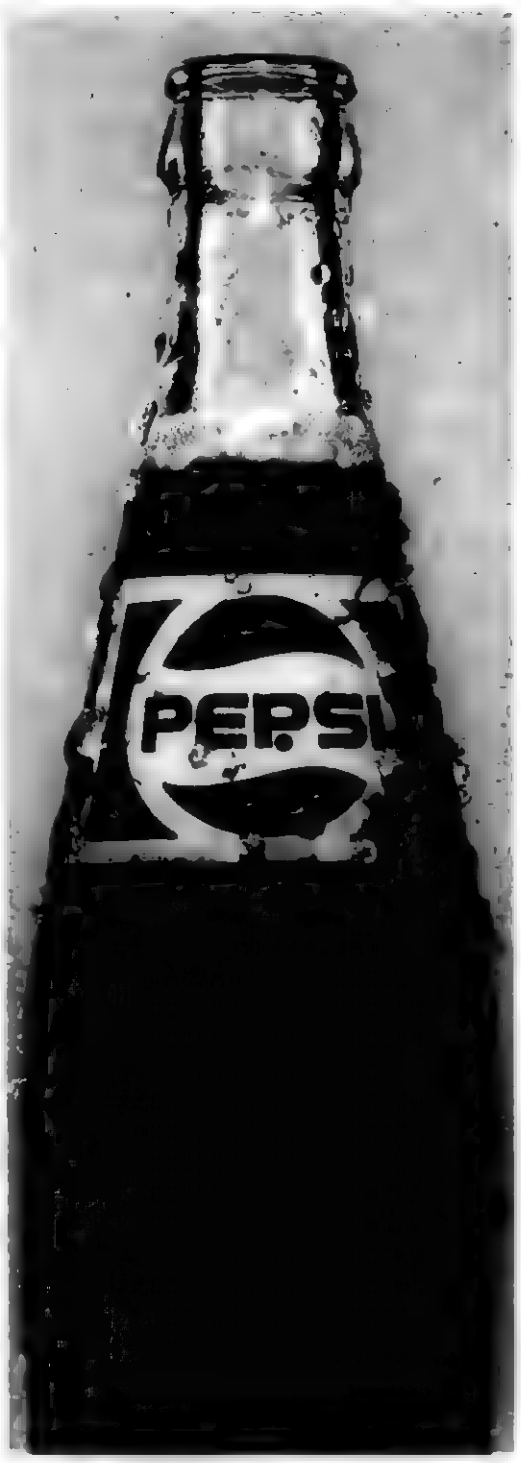

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kind of error likely to result in downtime and expensive, corrective measures. This type of breach makes up the bulk of security problems, consultants and data security officers agree. Data security officers responding to a 1987 Ernst & Whinney survey and a recent report from International Resource Development, Inc. in New Canaan, Conn., attributed unauthorized employees as the greatest threat to security.

• **The disgruntled.** Angry employees seeking revenge may either abscond with sensitive information or deliberately destroy data or equipment. These people are not usually concerned with hiding their handiwork.

• **The financially savvy.** These users possess the know-how, that is, the knowledge of accounting and financial systems, to alter data, steal money and cover their tracks. Not necessarily computer literate, they nonetheless possess the access required to pull off a scam. In some cases, it can be years and millions of dollars later before their crimes are detected. (See story this page.)

With employees like this, MIS barely has time to worry about its enemies. It has been an uphill battle, but many companies are beginning to get the point. As awareness rises, so do purchases of security equipment and software.

The Frost & Sullivan report broke security purchases down into four areas and predicted the following figures: The first area is mainframe security, at $102 million in 1988, jumping to $144.5 million in 1992; second is computer security, at $145 million in 1988, almost doubling in 1992 to $263 million; third is network security, at $202 million in 1988, moving up to $224 in 1992; and fourth is security services, at $139 million in 1988, rising to $319 million in 1992.

Overall expenditures for security purchases are expected to total $588 million in 1988, virtually doubling to $950.5 million in 1992, the report predicted.

Knowing the enemy is perhaps less important than knowing what you have to lose. It seems few companies outside the long arm of government regulation have bothered to assess and classify what the security industry considers a company's most valuable asset — data.

Many companies that fear for their data are opting to turn the task of protection over to specialists. The ISSA boasts approximately 1,000 members and is working toward setting some professional standards for data security officers. This setting of guidelines is important, notes one security consultant who claims he never knows what to expect when first contacting a client's data security officer. Experience levels vary widely for such a critical post, he claims.

Smaller companies that cannot justify the expense of in-house security personnel are fueling the growth of the security services industry, says Lawrence Dietz, a vice-president with Coin Financial Systems, a systems integrator in Norcross, Ga., and a project director for Frost & Sullivan. He is also the author of the Frost & Sullivan report on information security. Dietz explains that to provide security, these firms have two choices: go to traditional consultants or hire hackers, a very controversial trend.

Following convictions, some high-tech pirates have gone legitimate with consulting services aimed at their former targets. This turncoat maneuver makes perfect sense to some consultants, who often hire former pirates unbeknownst to their clients. "A hacker is the data security officer's best friend," says one security veteran, who asked not to be named.

But that idea outrages some ISSA members, including Ford Aerospace's Jackson, and other security consultants. They see it as akin to letting the fox into the henhouse. "It is horrible, terrible and irresponsible and a dangerous thing to do," SRI's Parker exclaims. "These people have already proven at least once that they are of a criminal persuasion."

For those not so willing to unlatch the coop, further guidance is available from the National Computer Security Center in Fort Meade, Md. The center puts out a number of security books, the most well-known of which is the "Orange Book." The book recommends procedures for compartmentalizing data, Jackson says. "The idea is that by separating data into a variety of boxes, you make access more difficult," he explains. Soon to come is the "Brown Book," which provides similar guidance but is network specific.

On the defensive

Regardless of who is appointed to monitor and administer security measures, organizations are advised to locate their weakest point and most sensitive data and to build out from there.

According to Parker, the most common type of computer abuse is "data diddling," or manipulation. In response, users will find an array of control applications on the market to forestall, if not prevent, that activity. Among the tools Parker recommends are floor limits, which require that transactions exceeding a set amount be checked or reported; reasonableness controls, which involve checking data for unusual patterns or input deviations from normal activity; integrity checks; cross-footing, that is, totaling figures across the top and bottom of a matrix; and backup.

Possibly the simplest step, separation of duty, is also effective. "I call it the 'maker, checker, signer' rule," Parker says, referring to a method of safeguarding sensitive documents by sharing responsibility.

Because inadvertent errors remain the most costly and frequent of all security breaches, more and more vendors are building safeguards, such as decision checks, multiple levels of passwords and access control, into their software packages and operating systems.

Security certainly is not new to mainframe vendors or users, nor does it seem to be much of an issue unless personal

Lessons learned the hard way

WHO AMONG US DOESN'T LIKE a good thriller now and then? Because people very often have difficulty relating abstract warnings to their own situation, it can take a sobering report about someone else's brush with terror to bring the point home. And let's face it, the bottom line for any business is profit and reputation. With that in mind, the painfully expensive examples below should widen the eyes of any hardened executive, if not strike fear deep into the heart of his system.

• Security Pacific National Bank of Los Angeles suffered a $7 million loss when someone tampered with its electronic funds transfer system, but the bank didn't find out about the breach until notified by the Federal Bureau of Investigation that it "had a problem."

• Persons inside and outside of Volkswagen AG in Wolfsburg, West Germany, manipulated the books to cover up an estimated $259 million in trading losses on foreign currencies. Although the loss occurred in 1984, it was not discovered until March 1987.

• Tyson Jolliffe, an official in charge of computer security for the Immigration and Naturalization Service, took advantage of his access to create fake immigration documents, which he then sold to illegal aliens. Jolliffe and his cohorts earned at least $800,000 before the scheme was uncovered. He is now serving a five-year jail sentence.

• In a survey conducted by Ernst & Whinney at the 1987 annual conference of the Northboro, Mass.-based Computer Security Institute, more than 50% of 562 respondents said they had suffered financial losses via tampering with their computer systems. Another 12% estimated those losses at between $50,000 and $500,000.

It may do well to remember a maxim from the internal computer security policy of Newport Beach, Calif.-based Rockwell International Corp.: "Recipe for Big Trouble — Use remote-access distributed data systems to electronically transfer information among separate locations. Mix in millions of personal computers. Sprinkle with a computer-wise generation." — PATRICIA KEEFE

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computer manipulation of host data is involved. In fact, a major selling point of several IBM operating systems is their security features.

Overall, the mainframe security market is pretty much sewn up by three packages: IBM's RACF and Computer Associates International, Inc.'s Top Secret and ACF2.

In contrast, the personal computer security market is wide open with an anticipated annual growth rate of about 10% a year, according to Frost & Sullivan. A swarm of small start-ups offer a myriad of add-on and add-in products, ranging from risk analysis packages to software locks and password systems to data encryption and diskless workstations. (See story this page.)

Most of these defense mechanisms can be purchased at a relatively low cost, according to Frost & Sullivan. "A commodity seller approach accounts for the fact that no vendor has emerged as the market leader," the report states.

One noteworthy development is a trend toward using a PC as a security device rather than merely as a piece of equipment to be secured, Coin Financial Systems' Dietz says. Specialty software can be run on PCs for applications ranging from disaster recovery planning to inventory control to bomb defense. Pricing for these PC packages tends to be higher and may include some consulting services.

Network security

As PCs and, in turn, networks proliferate, new problems spring up. Networks are funny — they can open up a whole new can of worms by providing access to corporatewide data. Networks are particularly conducive to three types of security problems: disclosure, alteration of data or programs and damage to equipment.

Sites that don't have a good handle on their network installations are bound to experience at least one of these woes. "How can you block out a node if you don't know it's there?" Jackson asks. "The left hand doesn't know what the right hand is doing."

Then again, many problems can be averted by having the network perform some functions that might otherwise be performed on individual workstations. For example, file, administrative and host access controls can be centralized, even as information becomes decentralized. Generally speaking, network security is approached from one of three levels: operating system, physical hardware or application software.

Security features, such as password control, audit trails and software locks, are increasingly being built into the network operating system. Examples of network operating systems that provide some of these features include Banyan Systems, Inc.'s Virtual Networking System 3.0, Novell, Inc.'s Advanced Netware and 3Com Corp.'s 3+ and 3+Open.

Physical security includes locked disk drives, diskless workstations and personal tokens, which seem to be gaining in popularity among local-area network users for their ease of use and volume pricing.

Application software can require access keys and passwords or lock out unauthorized users.

Any good security system will utilize a mix of the above-mentioned technology and possibly some customized packages. The trick is to make security easy enough so that users won't override it or not cooperate with security efforts.

Make or break

User participation can make or break a security system, especially in this era in which connectivity and personal ownership of information appear to be on a collision course. By distributing the data throughout an organization, LANs have imposed accountability on the individual worker, SRI's Parker says.

"But you don't want to set up a bureaucracy that will impede users' ability to do their jobs," warns Solon D. Young, director of data management and applications engineering for American Airlines' Sabre reservations system.

Also, you want to make sure users know you mean business by following up every violation alert, Jackson adds. Consultants stress the importance of educating users and making security a part of their job descriptions, as is common in the government and defense industries.

The key to security, then, is to prepare an adequate defense and to involve all levels of the company in carrying out that defense. In addition, users can pressure vendors to incorporate security features into their products as a matter of course.

According to Parker, the bottom line is this: The computer grants the perpetrators the same leverage over information and money as it does the victims. There is no such thing as a secure facility; security is everyone's responsibility. ◆

Keefe is a senior editor for networking at *Computerworld* newspaper, published in Framingham, Mass.

Security technology primer

WHAT FOLLOWS IS a primer — taken in part from a July 1987 report from Computer Intelligence in La Jolla, Calif. — of some of the more common methods of computer and data security. Any good security scheme will employ a number of these methods customized to an installation's particular needs.

- **Risk analysis.** Software packages, many of which are personal computer based, are available to help quantify potential exposure to security breaches. This is the starting point in assessing your need for and development of a plan of action.
- **Security levels.** It serves a company well to distinguish its levels of security for data, such as top secret, confidential, restricted or unclassified, and determine each category's backup needs.
- **Access levels.** Users can be assigned a variety of access privileges, such as read only, remote access, specific file or directory access, ability to upload or download data from a mainframe or network data base and access to printer capabilities.
- **Lockout.** This method uses a password to get at a specific resource known to all users of that resource.
- **Passwords.** An inexpensive, low-level form of user identification combined with a specific logon can alert the system to specific profiles on access rights.
- **Callback.** Callback devices prevent unauthorized access to the communications channels of a computer. Some devices require a caller to provide an identification number and hang up. After verifying the user's access rights, the device calls the user back. When combined with a password, the system requires that the correct user ID also be provided from a specific location (modem number).
- **Verification/authentication.** Another key feature is a method of verifying that data is not altered between the time it is sent and received. Banks using electronic funds transfer are heavy users of this technology. A popular standard is the ANSI X9.9 message authentication protocols.
- **Data encryption.** This category consists of software or hardware that safeguards data during transfer between locations, for example, over leased lines, by encoding the data before it is sent. A software key is required on the receiving end to decode the information. The most popular method is the Data Encryption Standard, issued in 1977 by the National Bureau of Standards.
- **Data compression.** These are software products that can reduce the number of bits necessary to represent characters for line speed purposes. Combined with encryption, data compression is said to be especially effective.
- **Diskless workstations.** Not only are diskless PCs less expensive and more reliable because they have fewer parts to break down, but they also can be used to prevent users from withdrawing data and walking off with it. In addition, with diskless PCs, files remain under the central control of the server software.
- **Audit trails.** This option provides a comprehensive record of all network or system activity, including who logged on when and where, accessing what and for how long. Audit trails also track errors and unsuccessful attempts to violate access privileges.
- **Smart cards.** A smart card is a card with magnetic strips or embedded chips that contains access information. After inserting the card into a reading device, users type in a personal identification number (PIN) to gain access. More widely used in Europe than in the U.S., these cards can be used either to activate a PC or open a building or room.
- **Biometrics.** These high-tech devices measure some physical characteristic of the individual seeking access, such as fingerprints or retinas. Biometric measures are often combined with PINs to determine authorization rights. Considered to be an intrusive technology, biometrics is mostly limited to areas requiring high security clearance. — PATRICIA KEEFE

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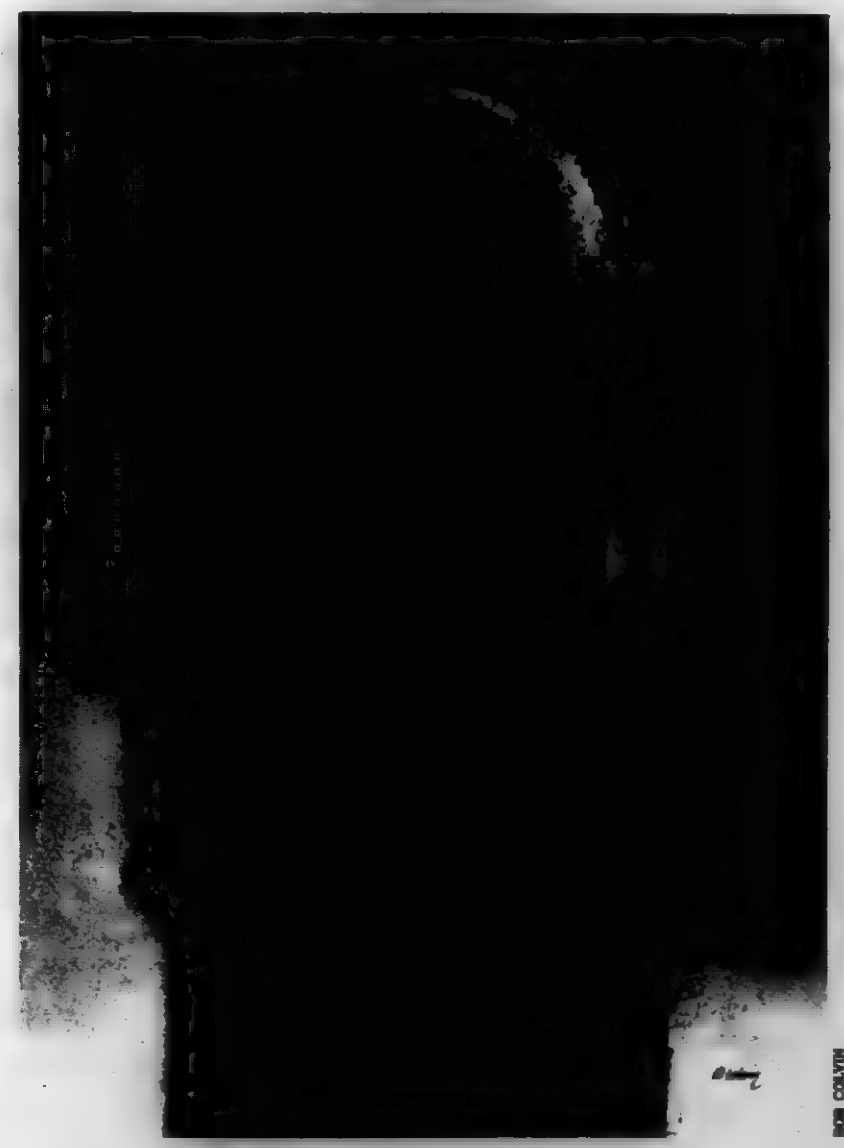


BOB COLVIN

Portrait of a fortress

BY MICHAEL TUCKER

5:00 a.m. — It begins. The phone rings. My editor is on the line. We have a simulated disaster under way. I stand blinking in the glare of the overhead kitchen light, holding the phone and trying to comfort my 3-year-old son, who has been awakened by the call. My editor gives me the grim details. We are now employed by mythical XYZ Corp., located in Arlington, Mass. For the past two months, XYZ has received threats from a terrorist group, the Kommittee for the Liberation of the Aryan-American Nation (KLAAN).

Twenty minutes ago, KLAAN struck. A suicide truck bomber drove into our data center, and nothing remains of the installation but rubble. We have lost not only our hardware but also our entire tape library.

I am charged with putting into effect our disaster recovery plan at a cold site and

Tucker is *Computerworld Focus*'s features editor.

tape storage facility in Rhode Island.

8:30 a.m. — Judith Brackley, the director of corporate communications for the Boston-based Iron Mountain Group, Inc., is at the door of my apartment. We will drive to an Iron Mountain Group facility somewhere in Rhode Island.

Actually, if this were a real emergency, things would have happened much more quickly. Brackley tells me that within 30 minutes of informing the Iron Mountain Group's on-site representatives of a disaster, things would have started in motion.

For this exercise, we've obtained Iron Mountain's cooperation. The firm has agreed to pretend that XYZ is one of its clients and that I am XYZ's MIS officer, which is why there is now an unmarked car sent by Iron Mountain waiting for me outside. Later, William D. Bianchi, the vital records manager for the New England region of Iron Mountain, tells me, "Security is mostly a service business, . . . and it changes according to the situation. It may be, for instance, that I'll have to arrange a shuttle bus service to get my client's personnel to the site. [In that case], I'd be in the transportation business."

9:10 a.m. — We are on the road heading south. The country grows gradually more rural.

We have picked Iron Mountain for this simulation because of its standing in the secure storage business. It does not have a particularly big name in disaster recovery, and it maintains no hot sites, but in the storage arena, it has few peers.

The company name is a story in itself. "Iron Mountain" is just that, a mountain in New York state. During the civil war, Brackley explains, it was a major source of iron ore. When the ore played itself out, some entrepreneur converted the abandoned mine into a mushroom farm.

Then, in the 1950s, during the Cold War period when a nuclear conflict was widely expected, the site was converted into what was effectively the biggest bomb shelter in the world. At that time, the facility was known as the Iron Mountain Atomic Storage Co. Several large corporations moved their paper records there, fully expecting that, should World War III break out, somehow they would be capable of carrying on their businesses.

Eventually, Iron Mountain Atomic experienced financial difficulties. Most of its customers left, and the Iron Mountain installation very nearly reverted to the bats and mushrooms that were its original inhabitants. However, at the close of the 1950s, it was purchased by its current owners and converted into a secure storage facility for paper records and microfilm. Today, it is a James Bond-type place, according to those who have seen it, full of vaults built deep into the mountain itself.

During the years, Iron Mountain Group has branched out to purchase or build additional storage facilities. Among the company's other locations is "The Cave" in Rosendale, N.Y. This location is a huge limestone cavern, nearly 15 acres in size. Within it, the firm has constructed buildings, roads and even artificial parks. It is, effectively, an underground city dedicated to secure storage.

The facility toward which we are now driving is much, much smaller. But it is, in some ways, even more secure.

10:10 a.m. — We are driving along a country road in an apple orchard. Brackley turns on a side road. It seems to lead nowhere except into a grassy field. The road dips and bends. We round a low hill, and suddenly, we confront the white expanse of a concrete bunker.

10:11 a.m. — We park and walk to the bunker's face. We enter a small, glassed-in foyer. Before us is an immense, black steel door. Discreet signs on the walls warn about guard dogs and against standing too close to the door, which is automatic and swings open into the foyer.

I realize that there are at least two cameras positioned in the ceiling of the foyer. I wonder if there are others, perhaps watching the drive. I ask Brackley about this. She smiles and does not answer.

10:12 a.m. — Brackley picks up a phone on the inside of the foyer and calls someone. A moment later, the immense black door swings open. Bianchi is standing alone in front of us. He greets us and requests two forms of identification.

10:14 a.m. — My driver's license, press credentials and a major credit card eventually get me through the great door. We step inside, and it shuts behind us, slowly and silently.

I find myself in a small concrete room. Behind me is the first door, and in front of me is a second metal door, every bit as huge as the first. Again, there are cameras in the ceiling.

I realize that we are in a mantrap. Should anything go wrong now (if, say, bunker personnel decide I am not who I said I was), they could seal us in here.

I spend a moment thanking heaven that I'm not claustrophobic. At least, not yet.

10:14:30 a.m. — I am overjoyed to see the second door open. It moves with the same ominous silence of the first door.

We step inside the data site's entry area, and walk down a short decline. I find myself in what looks like a small office. It is a room about 45 square feet in size. There are desks, a counter and a small computer system. Several young women in white laboratory coats work at terminals or personal computers. It could easily be mistaken for an insurance agency or a doctor's office.

Then, of course, I start to notice the little reminders that we are now 18 feet underground. Attached to the counter is a box marked "Emergency Air Supply: Five Minutes!"

I discover later that Iron Mountain has its clients send their disaster recovery crews here for drills long before any actual need arises. This practice session is partly done so that the staffs of both Iron Mountain and its clients can prepare for life after a disaster, but it is also partly done as a screening of sorts. "Some people," Bianchi explains, "are just not made to work underground. Better that we learn about it now, before they actually have to be here."

10:20 a.m. — We enter another small office within the complex. Again, I am struck by how much it is like any other line manager's office. There is the usual desk, terminal and clutter. I don't even feel as if I am underground here because one of the walls is glass and opens out on the center of the bunker.

Here we meet William Dreyer, Iron Mountain's vice-president of sales and marketing, who has come down from Boston for the day. He fills me in a little more on Iron Mountain's history. Originally, the firm had only been involved with document and microfilm/microfiche storage. But "in the 1980s, the company realized that computer media storage was a logical extension of that business."

Dreyer also tells me about this particular bunker's history. It was built in the 1960s as a joint venture between a large bank — no names, please — and the U.S. government. The plan stipulated that in times of peace, the bank would do its own secure storage here. If, however, a nuclear war broke out, government monetary authorities would move in to manage the currency for the New England area. In effect, the bunker would become the regional Federal Reserve bank.

Bianchi adds, "This place was built to withstand nuclear strikes in both Boston and Providence, R.I. All the heavy equipment is on springs, for instance, and the pipes all contain flexible, braided copper sections so that they could survive the shock waves from explosions."

Eventually, both the bank and the government outgrew the bunker. Iron Mountain purchased it and turned it into a media vault on a grand scale.

11:00 a.m. — We return to the central section of the bunker. Bianchi and Dreyer lead the way to the other side of the building. There, a glass door opens into the main magnetic media storage site. On the other side, I see row after row of tape and cassette racks stretching off for many feet. A woman in a lab coat moves among them, mysteriously noting things on a clipboard.

"We're almost entirely magnetic media here," Bianchi says. "We try to make certain the only paper is material referring to how the tapes should be used." He gestures to two armored bloodred boxes in a corner.

If my company had really been subject to a disaster, then boxes like these would contain my previously arranged instructions and recovery plan. It would be to these instructions that the Iron Mountain specialists would turn first.

11:10 a.m. — As we exit the tape library, Bianchi shows me a solid wall of electronics attached to the library, including environmental and fire suppression controls, meters, alarms, telephone links and the like.

If a fire broke out or if someone attempted to break in, the alarms would summon help in seconds.

11:15 a.m. — We meet the head librarian. She explains that the bunker does more than just store materials in the event of a disaster. Most of Iron Mountain's clients are more interested in the bunker as secure storage rather than as disaster preparation. Here they may keep computer data on file, safe from on-site hazards and without the expense of maintaining their own secure facility.

Clients can also get tapes back again within a few hours. Indeed, the bunker's daily business is that of tapes arriving and departing on a regular basis. Each day, four unmarked trucks wind their way through the apple orchard to pick up and drop off crates of magnetic media.

The librarian shows me how each tape and each crate is uniquely marked and managed. Clients can send in instructions for tape storage or delivery by phone or modem. Either way, though, they must identify themselves via passwords and "other security measures," she says.

11:45 a.m. — We leave the tape storage area to enter the cold site, which is a large and currently empty room. It is a typical cold site with a raised floor, power supply connections and so on. "This is where you would set up your equipment," Bianchi says. "If this place were occupied, we'd have armed guards here to protect you and your investment and to maintain the security of the rest of the tape library."

12:20 p.m. — There is a door in the back of the cold site. I'm led through it in silence. On the other side is a darkened complex of small rooms filled with huge machines. There are two diesel generators that would supply power to the bunker if the outside lines went down. "There are two underground fuel tanks outside the bunker," Bianchi notes. "If we had a customer's mainframe running in the shell, we could last several months without power. If there were no mainframe here, . . . I don't know how long we'd last. Indefinitely, say."

In these back rooms, there are also power conditioners, humidity control devices and an immense compressor. Each piece is mounted on huge shock-absorbing springs attached to the floor. "To withstand the blasts," Bianchi explains.

For effect, Dreyer kicks a particularly large piece of equipment. It rocks and rolls like a bucking horse, then comes slowly to rest. "It works," he says, with grim humor. "Let's hope we never get a chance to give it a *real* workout."

1:00 p.m. — We return to the lobby. Dreyer and Bianchi talk about security. According to Bianchi, "Things like the shock absorbers and the alarms, those are nice bells and whistles. But it is people that make security happen — or fail." Iron Mountain's own personnel are investigated and bonded before they are hired. Each of the bunker staff members must live within a 30-minute drive of the installation.

1:10 p.m. — Fictitious XYZ has been saved. In theory, duplicates of all our tapes exist at the site in the tape library. A duplicate of our hardware is on its way to this cold site, a factor that, for an additional fee, Iron Mountain was happy to arrange for us. In spite of the car bomb and the best efforts of the mythical KLAAN, we may even turn a profit this year.

Yet as we stand in front of the first set of massive doors on the mantrap, I am haunted by Bianchi's comment about people being the real basis of security. Although Iron Mountain's personnel may be cleared and bonded, XYZ's staff is not. Iron Mountain, and companies like it, can help MIS protect itself against threats of man and nature, but ultimately, security is the responsibility of the companies themselves. If a firm does not have a realistic security plan of action, then no amount of bells and whistles can save it.

As we prepare to exit, Bianchi points to a small but massive metal door next to the mantrap. "That's one of the holdovers," he says. "It leads to a lead-lined vault. Today, we use it for nonessential storage. But orginally, the idea was that after the bomb dropped, the currency people would come in and throw their irradiated clothing in the vault. Then, they were going to run the money supply."

The huge door swings open to readmit us to the gloom of the mantrap. Bianchi shrugs and explains, "They thought they had a handle on it." ◆

Beyond the Blue

Recovery services aren't just for IBM anymore

BY STAN KOLODZIEJ

Computer disaster recovery doesn't always have to be a game for the big players. Though the disaster recovery business is dominated by nationwide, massive recovery providers such as Rosemont, Ill.-based Comdisco, Inc. and Wayne, Pa.-based Sunguard Recovery Services — both of which service IBM customers — there are a growing number of smaller disaster planning and recovery services in which bigger is not necessarily better and you don't have to be an IBM customer to apply.

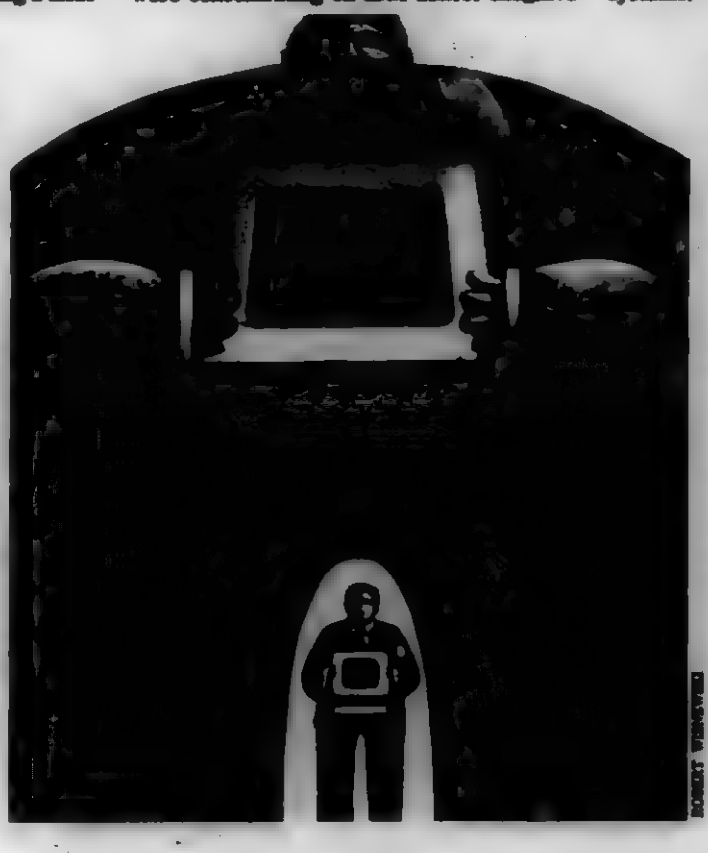
John O'Neill, president of O'Neill Data Systems in Aston, Pa., and a former Data General Corp. OEM, started his disaster recovery operation several years ago after learning just how difficult it was for DG customers to find adequate recovery arrangements following a disaster.

"One disaster involved a fire at the World Life Insurance Co. in King of Prussia, Pa.," O'Neill explains. "World Life lost its entire building and wound up having its people spread out over three motels with no computers and no paperwork."

O'Neill says that World Life almost went bankrupt while it waited 30 days for DG to supply a replacement computer and another 20 days to get itself up and running. "Luckily, World Life had been storing critical computer tapes, so they were able to save most of their data. Otherwise," O'Neill says, "it would probably have gone under."

Not long afterward, O'Neill saw another one of his OEM customers suffer through a computer room flood after a problem arose with the building's air-conditioning system. Again, O'Neill says, the customer had problems getting his operation up and running.

"I saw that there was a real need for DG customers to have the adequate protection that they weren't getting from the big vendors, who were concentrating on IBM almost exclusively," O'Neill says. "The big guys will offer certain protection for DG and the equipment of other vendors, but it's usually under an IBM umbrella plan and doesn't concentrate on providing specific protection aimed at these other systems."



ROBERT WEINBERG

O'Neill offers DG clients a contingency plan in the event of a computer emergency, including access to a hot site with a Data General MV/10000 minicomputer and office space for processing and management staff. For an annual fee, O'Neill says he will prepare a disaster recovery plan outlining emergency measures. Company operational procedures are programmed into the computer system for immediate retrieval if necessary, and an inventory of equipment is prepared for insurance purposes.

In case of a problem, O'Neill Data consultants assist in the transition of people and operations to the firm's temporary hot site quarters in Lenni, Pa. The 6,500-square-foot facility is equipped with enough office equipment and furniture to house about 70 clerical personnel and 20 managers. O'Neill claims that he can have a typical client company in full computer swing within two hours.

Even so, O'Neill says business is

Kolodziej is *Computerworld Focus*'s senior editor.

not booming for him. One problem, he explains, is that selling contingency planning and disaster recovery to potential clients is like trying to sell an insurance policy. "Everybody knows they need one, but they keep putting it off," he says. "Sometimes it takes a full year to close a deal."

Another drawback is the fact that O'Neill Data offers a more regional service; it cannot handle backup services via remote communications facilities as can many other disaster recovery services. Not everyone wishes to leave their premises and relocate their computer operations, even if the situation is just temporary. And at this stage, O'Neill says, he is glad he can fall back on his more lucrative consulting business to bolster earnings.

One company that is apparently doing well in the DG disaster recovery market is Data Assurance Corp. of Englewood, Colo. Started in 1985, Data Assurance now has nearly 60 customers, only five of which are located in Colorado, according to Dan Kilburn, president of the company.

DG backup from afar

Kilburn says that one of the reasons his firm is enjoying success is its ability to handle hot site backup remotely using dial-up lines, modems, multiplexers and the company's Data General MV/20000 and MV/10000 computers.

Data Assurance's communications pool includes Anderson Jacobson, Inc. and Codex Corp. modems and Codex 6740 and Timeplex, Inc. IIE statistical multiplexers, a setup that Kilburn claims ensures compatibility with equipment at both ends. "Unlike the O'Neill operation, we can handle recovery from a distance, so we offer customers more options," Kilburn says. "We can't expect our customers to move their entire operation to our hot site in Denver, so a large part of our business relies on communications."

How Data Assurance reacts depends on the severity of the emergency, Kilburn says. If clients are still able to operate from their usual locations, then Data Assurance goes in and hooks up its clients' CRTs to Data Assurance modems to communicate with Data Assurance computers. "We can run at a minimum of 4.8K bit/sec. data speeds," Kilburn says. "It's the customer's call whether he wants to control the computer at our end or at his end. We're flexible."

Data Assurance and DG have recently signed a pact whereby DG now automatically refers customers interested in disaster recovery to Data Assurance.

As for diversifying beyond DG customers, Kilburn says there is currently enough business within the DG world, in large part because that market as well as others outside the IBM mainframe spectrum have been virtually ignored by the big disaster recovery players.

That logic is basically why the Onguard Disaster Recovery Program was founded by California Federal, Inc. in Los Angeles. Onguard now services 10 clients, all users of Sperry Corp. (now Unisys Corp.) mainframes. The program runs a hot site situated in Phoenix that contains a Sperry mainframe, a number of Sperry cache disk subsystems, 36 tape units and several printers.

The mother of invention

The story of Onguard's formation points out some of the difficulties customers face in getting disaster recovery services in an IBM world. According to Randy Seia, Onguard's vice-president of sales and marketing, Onguard came into being a few years ago after the Internal Revenue Service stiffened requirements that compel companies to be more responsible for the accuracy of information in the event of disaster.

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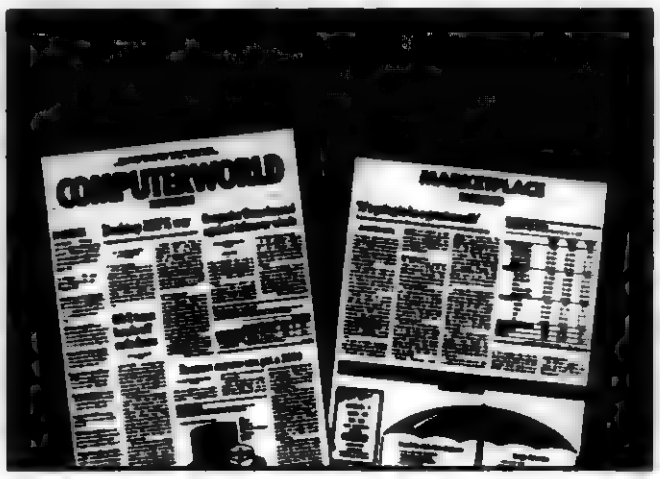

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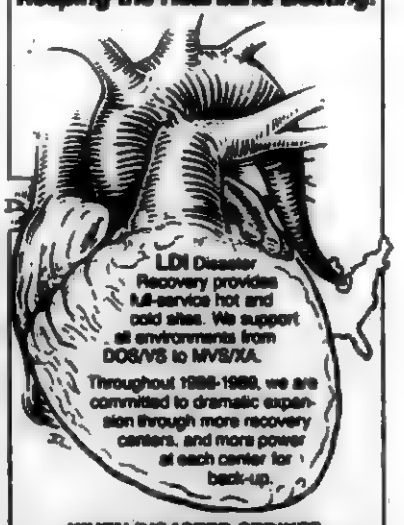

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The IRS moves "really put pressure on Cal Fed to do something together with Sperry to accommodate the new requirements," says Seia, who was an account representative for Sperry at the time. "Cal Fed had Sunguard to protect its IBM equipment, but when it went to pursue the Sperry side, there wasn't anything available."

Instead, Seia says, he figured that there had to be other Sperry customers in similar situations, so he brought Cal Fed and Sperry together.

Both parties decided to form a joint venture whereby Cal Fed purchased all the hardware for the site, leaving Sperry with the responsibility of finding a suitable location in which to house the equipment. The company found a spot in Phoenix at the Sperry Aerospace and Marine facility.

Eventually, Cal Fed assumed total responsibility for the disaster recovery site and created Onguard. "To offset the cost of the equipment, we were going to sell subscriptions to the service to other Sperry users," Seia explains. "Since then, we've been pretty successful at attracting business."

But not successful enough. With only 10 customers, Seia and others at Onguard feel it is time to grow again. "We've come to the conclusion that we're going to require more hardware, so we're looking at a major expansion in the next six months and a major sales effort," Seia explains.

Seia is also quick to point out that the Phoenix operations are not considered by Onguard to be a regional concern. "We have an airstrip next to the facility, so theoretically, people in, say, Florida and Pennsylvania could load their tapes into a plane and be out here in five hours."

Seia says the company is trying to limit the geographical concentration of subscribers so that if someone in Salt Lake City decided to sign on, "we would block out most of that metropolitan area for them to alleviate any problem with having a concurrent disaster in the same area," Seia explains. "We want a real geographical dispersion of clientele.

"We've also decided that if we feel clients are going to contend for testing time and other considerations, then we'll open another center," Seia says.

Even some computer manufacturers are beginning to find disaster recovery a good business and a sales hook to bring in clients. The lack of nationwide third-party firms providing coverage for non-IBM equipment has spurred Hewlett-Packard Co., Wang Laboratories, Inc. and some others to actively look into providing contingency planning and disaster recovery services for their own customers.

DEC services

Digital Equipment Corp.'s often-overlooked Restart software and Recover-All hardware recovery programs, for example, have been available to its clients for some years now. Steve Goldfarb, DEC software services marketing manager, says that he finds DEC customers are more apt to implement contingency plans if they use consultants (which DEC provides) than if they tried to rely on their own internal resources.

"Our Restart service guarantees that clients will have the contingency plan within 90 days, and we'll guarantee that we'll have it in place," Goldfarb says.

He explains that the Restart DEC plan includes identifying the major client recovery team members, then integrating critical users into backup and emergency procedures. Benchmarks to determine how long it would take to get critical applications on-line are set up, and then the recovery plan is tested at one of two DEC Restart hot site centers located either in New Jersey or just outside Chicago.

Following a disaster, some customers can be up and running in four hours, depending on the level of subscription, Goldfarb says. However, all customers, he claims, are guaranteed to be up and running in 24 hours. The DEC hot sites can run critical customer applications for up to 30 days either remotely or on site. Goldfarb says the on-site facilities include up to 20 terminals for customer use.

DEC's Recover-All is a field service program covering the hardware part of disaster recovery. "Recover-All provides service support not covered under the usual service contracts," explains Robyn McHugh, Recover-All product manager. "That includes fire, floods and power failures, though the majority of cases involve accidents such as power surges and problems with sprinklers. And there is no deductible involved."

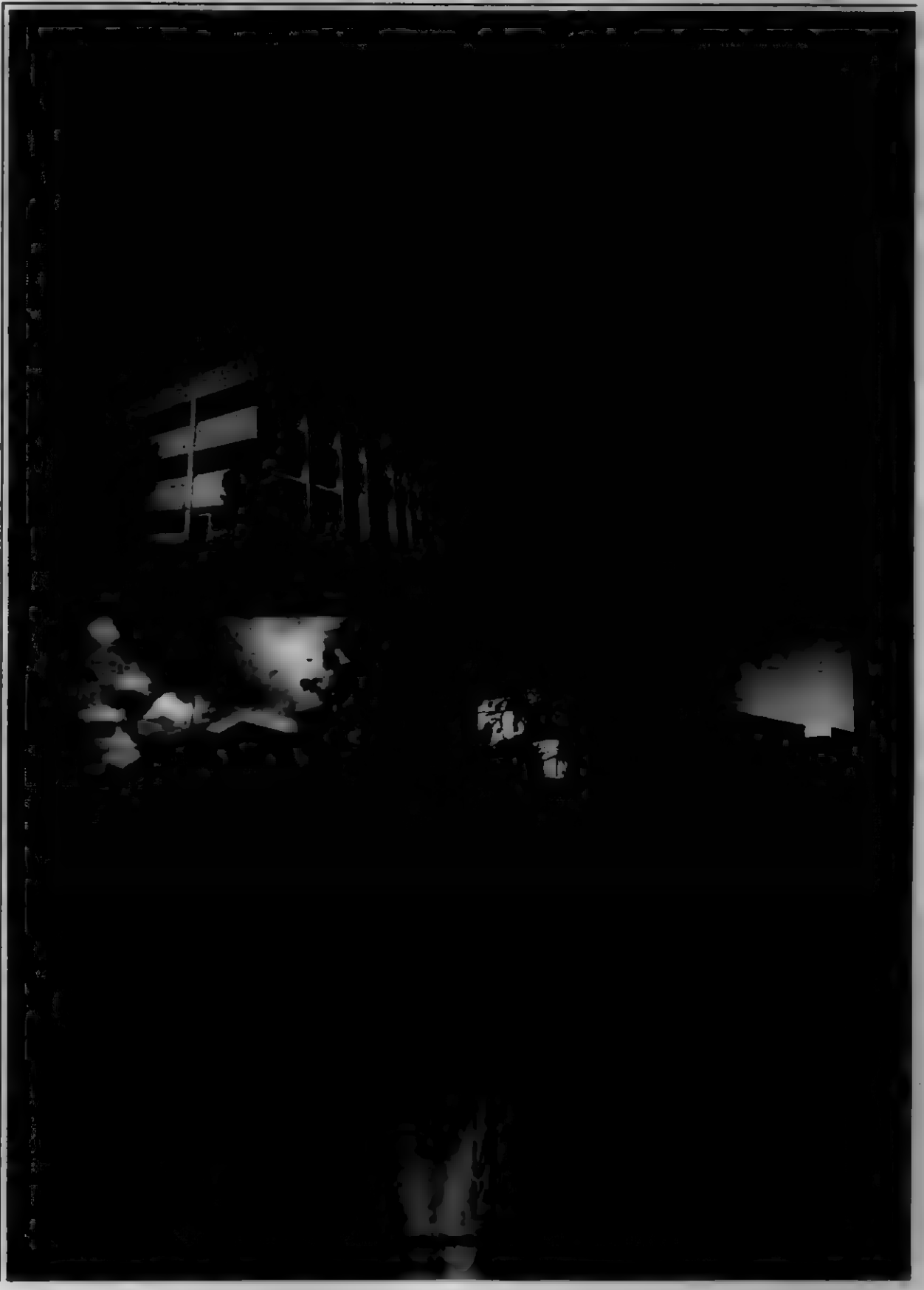
All in the family

On the software side, Goldfarb says, the Restart DEC program does not cover IBM or other systems software, only DEC-related applications running under DEC VAX or PDP-11 systems. On the hardware side, McHugh says, third-party hardware will be covered with Recover-All only if it is first covered under a DEC services contract.

"We have to address the issue of covering other vendors' systems in our programs," Goldfarb admits. "As more vendors' systems become tightly integrated, I think there's going to be growing pressure from customers to provide [disaster] planning and services across vendor lines."

Finally, if the idea of moving out after a disaster or conducting business remotely doesn't appeal to your company, there is an option.

Provident Recovery Systems, a Cary, N.C., sister company of Compusource, Inc., which is a major disaster recovery



firm also in Cary, will bring a data center to you. Provident has a mobile trailer that is capable of providing from 600 to 3,500 square feet of relocatable data center environments. This movable data center is equipped with Halon fire protection, raised computer room flooring, air-conditioning, humidity control and diesel generators.

Perhaps more important, however, is the Provident claim that the mobile unit is basically vendor equipment independent, providing backup for systems from IBM, Wang, HP, Unisys, DEC and others.

Staying put

One of the major attractions of bringing the data center to customers is what Provident claims to be a significant reduction in off-site processing expenses. Following a disaster, the client notifies Provident, which dispatches a consultant to the client to verify that disaster recovery specifications are up to date.

Provident then contacts the utility and telephone companies in the client's district to arrange for power and telecommunications hookups as close to the client facilities as they can get. Next, they arrange with the computer vendor or vendors for delivery of machines to the mobile unit.

If everything works properly (and that's a big question mark), clients should be up and running within a few days, according to a Provident spokesman. Clients can continue to use the mobile data center for up to four months if necessary.

But both O'Neill and Kilburn, as could be expected, are skeptical of such mobile backup units.

"The mobile unit is an empty shell, it's a cold site," O'Neill says. "There is no guarantee they [Provident] will get the computer equipment from the vendors in good time."

As for Kilburn, he says, "What is the difference between a mobile van and having somebody in the used [computer] equipment business load a semi tractor trailer full of equipment and deliver it to the nearest available office space? Not a big difference."

On the surface, there are other drawbacks to the mobile cold site approach. Trying to fit a trailer into congested downtown areas in major U.S. urban centers could be tough enough; furnishing a cold site is an additional burden to those already in the middle of trying to reestablish a data center after a disaster has occurred.

> **"I think there's going to be growing pressure from customers to provide [disaster] planning and services across vendor lines."**
>
> STEVE GOLDFARB
> DIGITAL EQUIPMENT CORP.

Another problem is the distance from the disaster site. The farther the site is from the mobile unit, the longer it will take to set up and the greater the chance that the unit could be struck or perhaps have engine problems and become immobilized on the way to the disaster site.

However, Provident, for its part, has since added a mobile hot site unit that carries an IBM 4300 mainframe configuration and up to 2,000 square feet of operations space.

"What we're offering is an alternative to customers that I think is a sign that the industry is maturing," according to Wayne Edge, president of Provident.

Although Kilburn is not a wholehearted promoter of the mobile unit concept, he says the diversity of such services is healthy for the industry.

As an example, he points to a friend who is planning on providing mobile disaster recovery services for U.S. banking customers using Burroughs Corp. (now Unisys) computers. "There are going to be more of those kinds of services," Kilburn says. "The disaster recovery industry has room for specialized services that offer users some variety." ◆

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Catching disasters before they happen

BY KENNETH BRILL

Once burned, twice shy is an adage that many disaster survivors take to heart. But are policies put in place only after a disaster occurs the most prudent way to run a business? Ask the MIS professional who just lost his data to fire or flood or other cataclysm whether the recovery plan he put in place this week will bring back lost information and dollars. It may be too late for him, but for you, disaster avoidance and prevention may be the smartest advice you will ever get.

Disasters do not just happen, they are caused by conditions that can be identified and safely eliminated before catastrophic downtime strikes.

Even hurricanes, tornadoes, earthquakes, floods and other acts of God follow predictable patterns that can be anticipated and countered skillfully. For example, a data center located in a basement or on a first floor that is lower than a flood plain is sooner or later asking for trouble, as a number of Chicago sites found out last October after a freak nine-inch rainfall. If your site is susceptible to floods, either locate the data center and all support equipment including utilities on a higher floor or leave equipment in place but provide a means for keeping the area pumped out.

Respond to warnings of potential natural disasters; the information is available, don't be caught unprepared. Months prior to last year's huge earthquake in Southern California, the National Science Foundation released a major study predicting that in Southern California, only one out of every 20 companies was prepared for the kind of damage an earthquake could inflict on data processing operations.

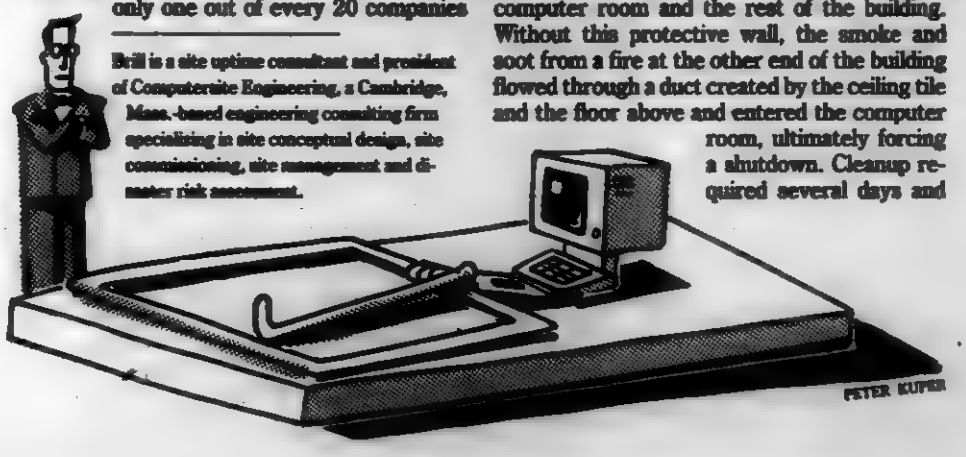
There are few disasters in which something happens that is totally unprecedented. In fact, virtually every computer disaster can be traced back to ignorance of external environmental or weather threats or to internal engineering or maintenance deficiencies that allowed minor problems to escalate into major disasters because there was no built-in means of defense. This pattern of simple but common inadequacies repeats itself over and over again.

Despite these facts, too many disaster recovery plans are based on the assumption that "no disaster can be planned for, but the recovery can be planned." Nothing could be further from the truth.

Take the example of one New England-based manufacturer that experienced very expensive disasters twice during the last seven years. The company still has not learned this most basic lesson.

The company's first data disaster was exacerbated by the lack of a fire wall between its computer room and the rest of the building. Without this protective wall, the smoke and soot from a fire at the other end of the building flowed through a duct created by the ceiling tile and the floor above and entered the computer room, ultimately forcing a shutdown. Cleanup required several days and

Brill is a site uptime consultant and president of Computersite Engineering, a Cambridge, Mass.-based engineering consulting firm specializing in site conceptual design, site commissioning, site management and disaster risk assessment.



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cost hundreds of thousands of dollars.

Despite this tremendous expense, no one apparently thought to investigate whether there might be other building inadequacies. Several years later, a 1½-inch water pipe to a toilet broke on the floor above and water cascaded down onto the mainframes, again forcing a shutdown and recovery expenses running in the high six figures. To this day, this company continues to focus on how it could have recovered better, rather than facing up to the reality that both disasters were predictable and easily preventable.

Historically, most computer room damage is caused by water leaks from broken pipes, backed-up sewer lines, leaky roofs or fire sprinklers. The source of this water does not have to be within the computer room. In fact, most water damage disasters originate from outside the computer room. Water comes down through the upper floors via electrical or plumbing chases or through sidewalls with adjacent spaces. If the path of least resistance is through the computer room, that is where the water will flow.

So take a minute. Is your computer room prepared for this identifiable and frequent source of damage, which could trigger your company's disaster recovery plan? Are sidewall and ceiling entry points sealed? Are there dams and drains to keep water from flowing through the computer room? Do you have tarpaulins on hand to cover up computer hardware to protect it from cascading water? Do you have wooden wedges that can be driven into accidentally discharging sprinkler heads to shut them off quickly? Are the locations of emergency water shutoffs prominently posted? Do you have a way to know that water has gotten under the raised floor and a means for getting it out?

'It's not my problem'

It is easy to say, "That's not my problem; I've already got more to worry about than I can handle, and besides, I'm not an engineer." Such comments are understandable. Yet disaster avoidance must be an integral part of every disaster recovery plan. Recovery planning is a tacit acknowledgment by top management that a disaster could happen at any time and that having a recovery plan is prudent. If it is cost-effective to plan recovery from a disaster, then avoiding disaster in the first place must be an even greater priority.

Avoiding a predictable disaster saves money in the long run. After calamity strikes, not only does the original problem have to be fixed, but the damaged hardware and software must also be repaired or replaced at great expense and disruption to the entire organization. And no matter how good your insurance coverage is, you will experience aggravations for days, weeks or months after the physical disaster is cleaned up. With these kinds of risks and costs, how can you afford not to address physical disaster risks in your disaster recovery plan?

Internal disasters follow predictable patterns. Most impact the computer room by forcing their way in from the outside. Broken water pipes are one example; smoke is another. Even if the flames don't reach the computer room, smoke and soot from a fire can be absolutely devastating. Soot naturally seeks out the coolest places, which means it will be sucked into every nook and cranny of the computer room. No matter how tightly covered or stored equipment is, soot can find its way into every data storage device and can be deposited onto the media.

Composed of chlorides and other salts from burning plastic, soot is an even greater threat than fire to the internal guts of your computer's hardware. The high humidity in the air from putting the fire out plus the chlorides and salts carried by the soot get deposited on the metal innards of your computer's electronics and combine to form a battery that starts to corrode circuits immediately. Within a week, this corrosion appears as a white, fuzzy film on circuit cards. If it continues, you can expect to have a lot of future random hardware malfunctions that may eventually force you to replace the whole computer.

Most large computer rooms have installed Halon systems to extinguish a fire before it gets hot enough to trigger the building's water sprinklers. But did you know that the fire suppression of a Halon system can be compromised by an open door, holes in sidewalls where data cables enter or leave and other openings that may allow the Halon gas to escape?

To put out a fire, a 5% concentration of Halon must be maintained for 10 minutes. Because Halon is a gas five times heavier than air, upon discharge it immediately flows to the floor looking for any holes through which to escape. Knowing how to prevent the escape of Halon is the critical factor in successfully extinguishing a fire. A typical installation requirement for a new Halon system is a discharge test showing that the room has been made tight enough for the gas concentration to be maintained for 10 minutes.

If it is cost-effective to plan recovery from a disaster, then avoiding disaster in the first place must be an even greater priority.

Discharge tests are expensive because they waste Halon, which costs thousands of dollars per test, yet past experience has indicated that the only way to know whether a room is tightly sealed is to perform a test.

The precaution of the Halon system is all well and good, but what happens five years later? Most of the people involved in the project then are gone. Does anybody remember that the effectiveness of the computer room's expensive, reassuring fire suppression system is totally dependent on preventing Halon gas from escaping? What is the value of an initial discharge test if no one ever follows up and makes sure that the room's integrity has not been subsequently compromised?

Let's take disaster avoidance a step further. Large data centers typically have a host of equipment that allows the computer to continue running despite power failures or other external problems. But who checks to see that this equipment will work in an emergency? Many sites have a secure feeling because they have an emergency generator that they run every Friday for 30 minutes. But based on experience, there is a 95% probability that these tests are being conducted under a no-load condition, a situation that is probably the worst thing that could be done to assure emergency readiness. Engines need to get hot and work before they can be certified as emergency ready. This problem is so serious that the National Electrical Code was modified several years ago to require load testing for hospitals dependent upon emergency systems.

Regular disaster avoidance audits should be Item 1 of your disaster recovery plan. The first several audits will be more time-consuming than later ones, because data center construction must also be carefully evaluated for potential design defects, especially in regard to potential natural disasters. Do not take anything as a given. While this advice may seem overly dramatic, it is best not to assume all is safe, especially if changes are made after the completion of the building. What is physically in the building now is what counts, not what the drawings specify.

Evaluate how well the building will protect occupants and equipment from floods, hurricanes or other geography-specific problems. Identify single-point failure modes, such as water flowing from a pipe that has burst directly above your uninterruptible power system, in which one malfunction can take the entire data center down.

Every audit should evaluate the emergency readiness (availability and expected performance) of the 17 site subsystems typically found in most large sites. Of these, 10 are on continuously providing power and cooling. The other seven, which include the Halon system, for example, are off-line waiting to operate automatically upon detection of an emergency. Failure of any one of these subsystems to perform can result in anything from a small to a major disaster.

Each subsystem needs to be rated green, yellow or red according to the system's viability. A red flag means that a subsystem cannot be depended on for protection because of known but unresolved technical problems. A yellow flag means caution, a malfunction is possible, and green means the system is in working condition. When a company goes through this procedure for the first time, it may be surprised by the number of subsystems that have been tagged with yellow and red flags. What this exercise illustrates is that real protection is based on whether the equipment has been properly engineered and is currently ready for use and not on how many hundreds of thousands of dollars have been spent on it.

Over and over again, major protection systems are crippled by a lack of minor parts or problems that exist well down in the chain of command. The red, yellow and green rating system provides a simple, easily communicated summary that, when circulated to top management, can be used to get funding or break organizational bottlenecks that have prevented problem resolution.

Physical disasters are predictable and can, therefore, be avoided if you know what to look for. While it may not be the disaster planner's job to personally search out physical disaster risks, he is responsible for alerting top management that regular disaster avoidance audits are a crucial part of every disaster recovery plan. ✦

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For those who want to keep the juice flowing, here are

The ins and outs of UPS

BY STAN KOLODZIEJ

Times are changing for uninterruptible power supplies (UPS), those unheralded systems that keep computers running when the power goes off.

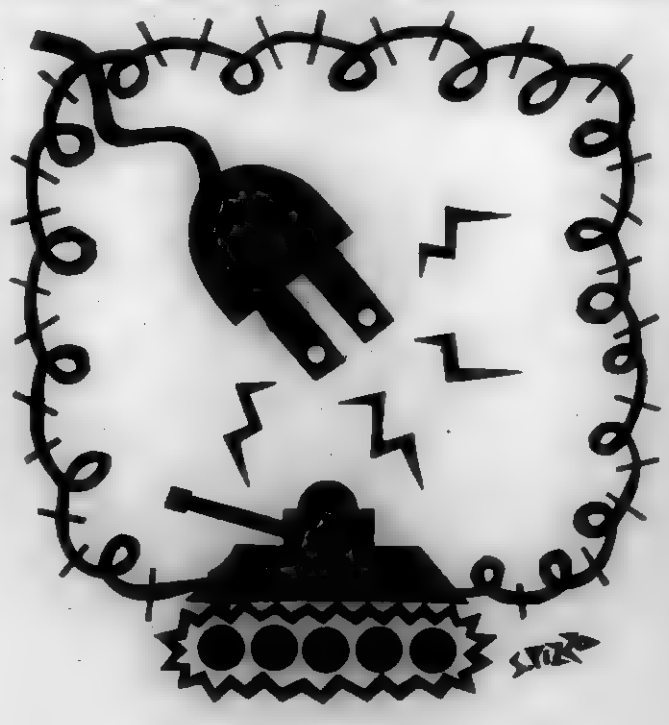
Take the market for UPSs, for instance. Not so long ago, UPSs were confined primarily to the shop floor of America's industrial heartland and the military, where unornamented, ruggedized UPS systems blended in with process control equipment and military ordnance. The emphasis was on work, not style.

According to Dan Kennedy, project director at Venture Development Corp., a Natick, Mass., research firm, 60% of UPS revenue today comes from the data processing market, while the traditional UPS presence in the industrial market and the military has faded to about 10% and 3%, respectively. This is almost a complete reversal of the overall UPS market in the past.

While the market thrust has been changing, UPS product lines have also been revamped. Kennedy says that the big demand now is for so-called static, as opposed to rotary, UPSs. Static UPSs are electronic systems relying primarily on batteries when the power fails. Rotary systems, on the other hand, use a generator, most likely driven by a diesel engine, as backup.

Rotary UPSs, in general, are used in situations in which any extended downtime is considered absolutely disastrous — in a hospital, for example. "In that case, they will probably want an on-line generator installed so they'll be okay if they have no power for 24 hours," Kennedy explains.

Both static and rotary UPSs can be on-line or off-line to the computer systems they protect. According to New York-based consulting group Frost & Sullivan, Inc., on-line systems have a commanding market lead over standby, off-line systems, with on-lines accounting for nearly three-quarters of all U.S. sales.



In recent years, UPS manufacturers have been busy adapting their systems for design changes that will enable UPSs to fit easily and less conspicuously into data centers and on the office floor.

One important advance has been the development of new batteries for UPS systems. Kennedy explains that traditional wet lead acid/calcium batteries have long lives but require adequate ventilation and periodic maintenance. UPS manufacturers instead have developed sealed, maintenance-free batteries for use in UPS products.

Many UPS manufacturers have also been switching from

Kolodziej is *Computerworld Focus*'s senior editor.

noisier, heavier magnetically regulated UPS inverters (devices that convert direct current into alternating current) to quieter and lighter electronic inverters, which make UPSs more suitable for computer environments. A lighter UPS system, for instance, prevents damage to the raised floors of data centers.

UPS vendors are even restyling UPS systems to stand alongside and blend in with the colors and streamlined design of minicomputers and mainframes.

Kennedy says the UPS market continues to get a boost from the inability of many power utilities to provide clean power with minimal line aberrations. Another problem helping the technology is the escalating amount of electromagnetic interference caused by the growth of intercity communications systems.

Mike McCullough, data processing manager at Levi Strauss & Co.'s distribution center in Henderson, Nev., a suburb of Las Vegas, says that anything that can go wrong between clothier Levi Strauss and the power station directly affects the distribution center's computers.

"We're out in the boondocks, all by ourselves, and at the end of the line as far as the local power company is concerned," McCullough explains.

Though he says that nothing major has ever happened to the Levi Strauss distribution center in the way of a power outage, an on-line hybrid static/rotary 125-kVA UPS guards the company's IBM mainframe, 75 terminals and telephone system. He explains that if there is a power failure, the computer system automatically defers to the battery-powered static UPS. When the batteries dim, the rotary UPS system kicks in with its diesel-powered engine that keeps generating power as long as fuel is put in it, he says.

"We installed the UPS four years ago, after we experienced periodic power outages," McCullough explains. "It was an add-on after the mainframe was installed. The power problem got critical."

Though McCullough says the power service is more reliable, the firm still experiences about two power outages a month. "The computer equipment we were using years ago was half as energy efficient as our new computers," he explains.

Bob Coyle, senior vice-president of operations at Sears, Roebuck Acceptance Corp. in Greenville, Del., says his company moved recently from the inner city to a subdivision where there are no above-ground power lines, thereby minimizing line fluctuations. Even so, Coyle's 50 personal computers and IBM System/38 are protected by a 40-kVA UPS.

"We also have a diesel generator backup system that is activated after a five-second interruption of power," Coyle says. "We decided when we moved that we still needed adequate protection."

Some still gamble on the odds, however. Eugene Lallier, MIS director at the East Greenwich, R.I., distribution arm of fastener manufacturer Stanley Bostitch, says his company recently refused to spend $100,000 to bring in a UPS system to protect its IBM mainframe, 150 in-house terminals and 250 remote terminals.

"Management's attitude was that for the amount of time that we would conceivably be down, it wasn't worth the money," Lallier says. "But when you look at the bottom-line impact at this company, with the types of transactions we process, if we go down, we suffer big damage."

> **The approximately $50 the firm spent on individual personal computer power boxes was worth every penny. "That's a cheap price for peace of mind."**
>
> BOB COYLE
> SEARS, ROEBUCK ACCEPTANCE CORP.

Lallier says that even if there were a power outage of a period of only 15 minutes, it would take three hours to bring the system up again with a warm start so that the company would lose as little data as possible. "So we would be down effectively for three hours with any kind of power failure, but I can't remember the last time that happened," he explains.

"When I try and put data together that justifies the fact that the machine is going to go down and that it's worthwhile to spend the money, I still can't come up with enough hard information that says we go down enough," Lallier says.

The division's field systems are all on-line, sending in crucial transaction data such as order entry, billing and invoicing. Lallier says that Bostitch does have fallback procedures that enable it to continue shipping products even if the computers go down.

Playing the odds

For this year, however, it appears the company will continue playing the odds. Lallier says he probably will not resubmit a proposal for a UPS, even though the division's computer-aided design and manufacturing (CAD/CAM) section, which runs independently of the office system, also is not protected by a UPS.

"I'm having enough problems just getting money to expand my computer room 600 square feet to add a direct access storage device," he says. "That's a more do-or-die situation for us."

Perhaps the biggest change in UPS technology has been ushered in by the microcomputer revolution. Venture Development's Kennedy projects that the UPS market, which tends to be divided into two segments — under 10kVA for micros and 10kVA and over for minis and mainframes — will enjoy healthy growth until 1991. It is the under-10kVA segment, containing off-line, standby UPS systems that support small minis and microcomputers, that is taking off.

UPSs for micros go cheek by jowl with vendors offering an array of backup equipment, including surge suppression, voltage regulation and power distribution units for users.

Until recently, power backup for micros was not worth its high price because of the relatively small amounts of data saved within personal computers. The high cost, sometimes up to $2,000 per kVA of power capacity, meant that a UPS system often could cost more than the micro it was protecting.

"The growth, however, in local-area networks, file servers and more powerful micros has justified a market requiring smaller, more specialized backup systems for individual and group users," Kennedy says. "Also, the prices are coming down with these standby systems."

Hal Goldman, president of Elek-Tek, Inc., a Lincolnwood, Ill., distributor of small UPS systems, maintains that micro-based UPSs have now gone from an afterthought in the minds of most MIS managers to an integral part of the micro purchasing decision. "In many cases now, MIS won't buy micro disk drives without adequate power protection," Goldman says.

These micro systems, which Goldman says are not quite true UPSs, are usually the innocuous-looking devices found sitting under users' computer monitors or on their desks beside their micros.

"In our systems, there are rows of LED status lights that should be in direct view of the user," says Jay Goldstein, marketing manager with Perma Power Electronics, Inc., a Chicago supplier of micro UPSs. "The user should be aware at all times of the status of his system so he can react quickly."

These micro protection devices can range from low-cost line conditioners or surge suppressors that cost about $30 each and prevent disk drives from being injured, to intricate systems costing thousands of dollars and performing tasks from line monitoring to full backup procedures.

Bostitch's Lallier says his company bought surge protectors at about $30 each for every PC. "We got them because we experienced hits in which we've blown several PC disks."

Sears's Coyle says that the approximately $50 the firm spent on individual PC power boxes was worth every penny. "That's a cheap price for peace of mind," he says.

Elek-Tek's Goldman adds that the advent of expensive micros carrying the powerful Intel Corp. 80386 processor into the office and into CAD/CAM applications provides new incentive for considering micro UPSs and for opting for those more expensive UPS systems with more features.

"I know customers using 386-based machines with 100M-byte hard disks," Goldman says. "I don't know why they need all that [computing] power, but there are a lot of them out there. These machines contain a great deal of data and need protection right at the micro level. These power users deal a lot with consultants who usually recommend getting everything, including UPSs; sometimes [these features are] more than the user really needs."

Goldman maintains that a 386-based micro, even with as much as 300M bytes of hard disk, may sound like it would need a great deal of electrical power, but in reality, it doesn't use that much power, "so a 2-kVA UPS is overkill."

Goldman also says that as micros become more powerful, users are demanding more from backup systems. Despite the fact that most micro users could still tolerate short power breaks without losing much data, Goldman says that even this situation is becoming too much.

"They don't like the idea of there being any transfer time between the power failure and the backup system kicking in," Goldman explains. "Most units only have a millisecond or two transfer delay, which is completely transparent to users and results in no data loss. It's almost like being on-line, except the backup unit doesn't kick in until it's needed. Even so, users want full-fledged UPS at the micro level."

Perma Power's Goldstein says the real trend in micro UPSs is in having intelligent backup that interacts with the CPU or file server, enabling the micro user to define what will happen when the power goes off.

"There's software resident in the CPU or file server, and it picks up a signal from the backup that it has gone into backup and that there's only so much time left," Goldstein says.

"The CPU can log off the nodes and shut itself down for a certain time, and it can even shut down the battery backup so it won't wear down the rest of the batteries," he says. When the power returns, users could have the system return them to where they left off, come up to a front-end menu and so on.

"How you configure UPSs at the micro level will vary," Goldman explains. "Network file servers would definitely be backed up, but each independent workstation is an option, depending on whether the workstations keep their own data or only access it from the server. We've found it necessary to have every server UPS protected."

The UPS systems market, big and small, is getting crowded with vendors. Goldstein estimates that the U.S. market for micro protection equipment is currently entertaining about 120 Underwriters Laboratories-listed brands of surge suppressors and about 60 brands of battery-backup devices. "What we're seeing," Goldstein says, "are many garage operations starting up."

The market is dominated by Santa Ana, Calif.-based Emerson Electric Co. (which recently purchased Liebert Corp., another big UPS player), Exide Electronics Corp. in Raleigh, N.C., and a few others. AT&T Technology Systems recently joined the fray by introducing several UPS models in the under-10kVA range.

Prices down, features up

"What I think we're going to see in the coming years is more competition from the low-end standby systems vendors," says Jack Dicton, AT&T market operations manager. "You're going to see prices coming down and features going up to challenge the on-line micro UPS systems."

Frost & Sullivan predicts that the smallest UPS systems, those under 2 kVA, will see the biggest market surge, climbing 25% annually through 1991. The under-2-kVA segment is also the market containing the highest proportion of micro UPS standby systems.

Dicton and others also predict that in the next few years there will be a lowering of quality in the UPS market because of the influx of increasing competition, including the Japanese, unless there is some movement to introduce standards into the UPS industry. "I think as quality deteriorates, there will be a movement by vendors and users to coalesce around some officially sanctioned UPS standards," Dicton maintains.

Venture Development's Kennedy is not so sure. "I hear a lot about the lowering of quality in the [UPS] market," he says. "But I hear it mainly from vendors, not from users.

"UPS has few gray areas," Kennedy continues. "If a UPS system doesn't work, users will let you know and word gets around. The impression I have is that these systems are pretty reliable." ◆

DISASTER RECOVERY PLANNING

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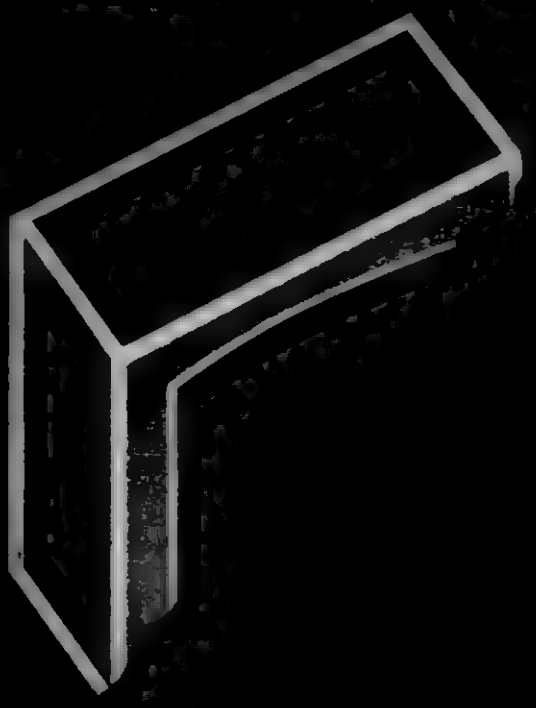


STEVE LYONS

Survival planning for data disaster

BY HELEN PIKE
SENIOR WRITER

Data corruption rarely shows mercy: It doesn't matter if the disaster is an act of God or an act of a hack programmer. If it is missing or damaged, data can be gone without a hope or prayer of getting it back. Most acts that sap data integrity result in taking the system down; and *at that*, users get nervous and angry.

Hindsight says most disasters could have been avoided with planning. Foresight, obviously, looks to do just that in order to preserve a company's competitive business position. The latter is a trend that's becoming more widespread, while examples of the former become more awesome and chilling in their telling.

Take the case of 25,000 gallons of water that broke through air-conditioning ducts at a financial services firm in New York and destroyed five of the company's seven mainframes. Or the West German computer club whose members cracked their way into the National Aeronautics and Space Administration's European network and had unrestricted access to scientific data for three months last summer.

Then there are disaster stories in which damage is less extreme. Reverberations from an earthquake in southern California moved data equipment in a savings and loan office three inches across the floor. And at a data center in Connecticut, 6,000 tapes and related hardware were subjected to a fire and then, five years later, a flood. In both cases, the data centers were operating in a matter of days because of planning.

Weigh the risks vs. the costs for a successful security strategy. Page 30.

Companies are finding out that not having a security or recovery plan means, in the words of one MIS manager, that "you become the disaster."

"The whole security issue is starting to mature," observes Richard C. Koenig, associate director of the Computer Security Institute in Northboro, Mass. "Businesses are accepting it as part of the cost of doing business."

According to Koenig, the phrase "accepted good practice," coined by computer auditors, is becoming more frequently used in disaster recovery circles.

"It's getting so businesses are regarded as delinquent in some way if they don't have access control software or a password system," explains Koenig, who has chronicled a rise in disaster recovery planning and data security implementation during the last five years.

"It's easy to find a role model in your own industry," he adds.

The Job of MIS

"I tell them I'm waiting for pestilence," jokes Ross Ahntholz when he speaks to users groups about how he weathered separate plagues of fire and water at the data center of Stamford, Conn.-based Olin Corp.

But Ahntholz, who has spent 22 years as a programmer and eight years as Olin's Information Services Director, is serious about what happened to him and equally serious about getting other MIS managers to plan for recovery.

"We got religion in terms of disaster recovery," Ahntholz explains about the staff of programmers, operations personnel and technicians at his organization. "It's not a this, then that, but a who, what and where."

He was faced with answering those rhetorical questions after a three-hour fire burned 25% of Olin's corporate headquarters early Saturday morning July 25, 1981. The fire was 50 feet from the data center. Affected by the blaze and the efforts of firefighters to put it out were an IBM 3081 mainframe, a 4381 mid-range model, 6,000 data tapes and the company's telephone equipment.

Olin makes its $1.8 billion annual revenue through the manufacture and sale of chemicals, ammunition and brass. Most of the purchase orders are phoned in to company headquarters in Stamford.

> **"We got religion in terms of disaster recovery. It's not a this, then that, but a who, what and where."**
>
> ROSS AHNTHOLZ
> OLIN CORP.

"We're in a commodity chemical business," Ahntholz explains. "If a [customer] can go next door, that's a lost sale. We wanted to divert that."

At the time of the fire, Ahntholz admits he had very little training in disaster analysis and that his backup plan was limited to tapes stored off-site and a telephone list only of his immediate staff. Given these drawbacks, Ahntholz observes, "We got lucky."

One piece of luck in his favor was learning that the data center had to be chemically cleaned before IBM would bring the systems back up. "I wanted to bring the computer up right away. But they [IBM] told me to wait until it was clean," Ahntholz says. "There would have been head crashes on every device had we brought it up dirty."

The second piece of luck was finding someone who could do the job of chemically cleaning away a residue of thick smoke and greasy soot that coated the data center.

Although at the time Ahntholz did not know of a cleaner, a member of his operations staff did. Eight employees from Hurley Chemicals, Inc., also in Stamford, spent 18 hours that weekend taking down ceiling and pulling up floor tiles to prepare the room for reactivating the computer systems.

"It's a good to get to know who's out there so you can evaluate their work before you need them," he notes, adding that this is one checklist item managers should consider when forming a disaster plan.

Next up for cleaning were the data tapes. MIS colleagues from neighboring General Electric Credit Corp. agreed to come in and run Olin's bits per inch, or BPI, tapes on GE Credit's drives.

"We cleaned the tapes with tape cleaner and mounted them on their computer just to see if there was heat or particle damage," Ahntholz recalls. "There was a sigh of relief when they turned out to be all right."

Twenty-four hours a day for a week, Ahntholz's staff worked at cleaning the rest of the 6,000 tapes before they were remounted on the tape drives. "We procured six tape cleaners from other companies in Fairfield County," he says, adding that the only data entries that were lost were those in which the filters and equipment had been neglected in the cleaning process.

After who, what and where, the fourth question Ahntholz had to answer was how to make Olin's customers believe it was business as usual on Monday morning.

At 4 p.m. Saturday afternoon, the decision was made to recable 80 CRTs used for order entry — terminals left untouched by the fire but stranded on the other side of the building without telecommunications capability.

> **"I had to fight off the disbelief. All you can do is be positive and look at the challenge."**
>
> FRANK PELUSO
> CALIFORNIA FEDERAL, INC.

"That's 40,000 feet of coaxial cable," Ahntholz emphasizes.

It turned out to be fortuitous that an Olin programmer brought his portable ham radio set to headquarters on the day of the fire, using the airwaves to get help to the stricken site, because by the time firefighters were finished, the company's telephone system was under two feet of water.

"He started shouting out to the world," Ahntholz recalls, still pausing with some amazement about the radio request for cable, "and the answer came back, 'How much do you need?' "

Two dump trucks dispatched to Elmsford, N.Y., on Long Island returned with cable and connectors. "At this point, we still didn't know if the data center would work. We made an educated guess that we would come back up."

AT&T and Southern New England Telephone Co. were contacted. In turn, they located an AT&T Dimension 4000 system and sent it to Stamford on the back of a flatbed truck. By Sunday, AT&T had 400 telephones wired for business, including in-Wats and out-Wats lines for Olin's 800 number. By Monday morning, Olin was ready for business.

Today, Olin has a hot site provided by Wayne, Pa.-based Sunguard Recovery Services, and Ahntholz conducts twice-a-year tests, a couple of surprise tests, management simulations and what-if workshops to keep the staff on its toes.

There is also a telephone list, reduced to the size of a credit card, with the essential numbers: sales representatives and their home numbers plus two additional people in case the reps can't be found; all the members of the MIS technical team; and numbers for key executives at Olin.

"Keep the list current and three deep," Ahntholz advises other managers, and know when to use your staff. For example, don't have technical services personnel performing nontechnical tasks such as handling cable, he says. Bring them in only when you are ready to boot up the operating system.

Plague No. 2

Just how well Olin's preparedness training would pay off was tested April 11, 1985, when a valve cap on a second-floor toilet adjacent to the data center's ceiling blew up. Two thousand gallons of water pushed by 85 lb of pressure per square inch poured out of the lavatory, down concrete walls, through a hole, across the false ceiling over the data center and collected there — until the mass of water just got too heavy.

This time, while the response time to the disaster was fast, Ahntholz acknowledges that the recovery was not as easy. Friday business was reduced to taking orders and holding them for processing.

"It took until noon on Saturday to re-environmentalize the room," he says.

In addition to fans set up to dry the data room and equipment, IBM went out and bought seven hair dryers for a more concentrated approach, according to Ahntholz.

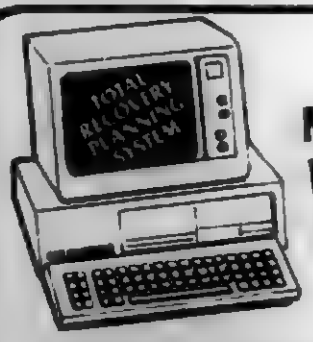
"It took longer than the fire did to get the humidity and temperature down to acceptable levels," he adds.

IBM had to replace all the memory boards and gates in the 3081 and IBM 3082 machines, Ahntholz recalls, and it was 8 a.m. Sunday before the systems were running again.

In fact, Ahntholz says, Olin came close to being Sunguard's first client to declare a disaster at that time. "We were within 30 minutes of declaring a disaster. I knew I needed 24 hours to recover at Sunguard, that I had to call at midnight [Saturday] to get the process moving. At 11:30 p.m., life came back."

When data processing managers swap disaster stories, invariably the East Coast is cast as the locale for most of the country's fire and flood disasters while California is the magnet for earthquakes.

Ahntholz's counterpart across the Mississippi River, then, is probably Frank



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Piluso, the senior vice-president of computing and communications for California Federal, Inc., a diversified financial company based in Los Angeles.

Having implemented a recovery plan three years ago at Cal Fed's savings and loan subsidiary in Rosemead, Calif., Piluso got to see how fail-safe it was when two earthquake shocks rocked the organization's data center last October, moving the equipment three inches across the floor.

Piluso also shares Alsthole's sense of professional duty to describe in public how well recovery plans can work and how they can be implemented at other data sites.

"It's a moral responsibility to have a plan," Piluso says. Not only do customers deserve that security from a vendor, but company employees do as well, he states.

The savings and loan's data base is used by 6,000 employees spread throughout California and as far east as Florida and Georgia. Located on the first two floors of a four-story building, the data center is made up of a Sperry Corp. (now Unisys Corp.) 1194, two IBM 3081s, a Digital Equipment Corp. VAX 8550 and a Tandem Computers, Inc. TPX processor. The library has 40,000 tapes. In addition, the building is wired for 1,000 phones on a Rolm Corp. CBX system.

About 100 employees were already at work at 7:42 a.m. when an uncharted fault slipped, registering 5.9 on the Richter scale; and at the data center "it all went down inelegantly," according to Piluso.

Along with the equipment went the power, a water main on the fourth floor and what would gradually amount to 11 tons of debris, including 90,000 ceiling tiles and 12 miles of cable. Approximately $1.5 million worth of terminals had to be replaced.

To make matters worse, Oct. 1 was the first day of the fourth financial quarter, and the third quarter's notes were due at the Securities and Exchange Commission (SEC) branch office. "It was the worst possible time" for the quake to occur, Piluso says, later adding, "I knew it was going to be a helluva day."

But within the first hour after the earth shook, Cal Fed employees under Piluso's direction and according to his recovery plan rolled out 40,000 square yards of plastic sheeting to cover all the computer areas. The plastic had been originally installed to protect against water from the sprinkler system in the event of a fire.

"We saved everything but one CBX panel," Piluso says. The library was spared because the tapes were hung in prebuilt, cross-braced cabinets designed to withstand seismic shocks.

One hour later, the contingency plan was activated, requiring Piluso to call corporate headquarters with a status report of what happened and what needed to be done.

Covering all the bases

Among other things, the plan established the parent company's Los Angeles headquarters as a command center to handle business and anxious inquiries from users and customers alike. An understanding was reached with the SEC. Furthermore, drinking water, portable johns, walkie-talkies, food and cash were supplied to the 450 recovery workers, including vendors, technicians, laborers and electricians, through 29 nonstop hours of work.

At the end of that time period, every piece of equipment had been recertified, Piluso says. By 8:45 a.m. Oct. 2, power came back, and by 1 p.m., the automatic teller machines were back on-line. The data base was intact, and it was business as usual — until Saturday night.

While an exhausted Piluso slept, a second shock reverberated through what is now called the Whittier Narrows. This time, it was a 5.5 on the Richter scale.

"I had to fight off the disbelief," Piluso recalls. "All you can do is be positive and look at the challenge." This time recovery only took nine hours.

As a goodwill gesture in the earthquake's aftermath, Cal Fed's chief administrative officer had T-shirts printed up for everyone with the motto: "We beat the quake with teamwork." They were placed on each employee's desk Monday morning along with a vase containing three carnations.

"The morale is still high," Piluso said when contacted in early February.

Cal Fed's contingency plan also included a Sungard hot site in Rancho Bernardo, Calif., and a disaster recovery service in Phoenix designed by Piluso for the Sperry mainframe. Employees had been sent to both sites to await the recovery outcome.

Piluso, who also does quarterly simulated tests, reemphasizes one of his main points: "A lot of data processing types think it won't happen to them. But I wasn't singled out by God." ◆

Trials can minimize tribulations

THOSE WHO HAVE drafted and implemented contingency plans will agree the road to a disaster is paved with good intentions.

As the following three examples will show, a trial run can expose bugs and glitches in the procedure, updating recovery plans can save money, and if business goes on as usual, corporate revenues may not even experience a blip.

Chase Manhattan Bank has about 4,000 employees working in its largest production facility in New York City. On a daily basis, these people handle an average of three million checks and more than 60,000 transfers of domestic and international funds.

An electrical fire Jan. 4 closed the building Chase rents at the tip of Manhattan, but work went on without any loss of revenue to the company at three other offices designed for double duty.

"We're very cost-conscious in contingency planning: Don't spend money unless you have to," explains John Sciutella, an 18-year veteran at Chase who is in charge of corporate operations and systems and who has honed the company's contingency plan during the years.

Sciutella moved the fund-transfer activity to a Long Island Chase facility in Lake Success, N.Y., where the employees' lounge had been precabled for terminal hookups. "We just pulled the wires down through the ceiling and set up CRTs we had stored in the closets," he says. About 500 employees were bused there daily from a central point in the city.

Sciutella saw to it that data from Chase's back office trading activity was moved to 80 Pine St. in Manhattan, where the bank operates an IBM mainframe and Digital Equipment Corp. minicomputer for systems development and enhancement. Check processing was moved to 60 Maiden Lane, and employees worked longer hours so there wouldn't be any backlog.

"The employees were cheery. There was no panic," Sciutella says, recalling that the first business day of the New Year saw 135% of normal volume. "The customers were incredibly understanding. They waited the day out with us."

AT CONNECTICUT GENERAL Corp. in Windsor, Conn., Hollis Whitehead is systems director of disaster contingency planning. The insurance company, a Cigna Corp. subsidiary, has had two two-year contracts with Wayne, Pa.-based Sungard Recovery Services for a hot site. Whitehead says he expects to finish negotiations for a five-year contract this month at a savings of $114,000, according to his estimates.

"There are many areas of cost savings that can be achieved," says Whitehead about updating contingency plans. He also will be reining in costs this year by implementing Sungard's remote operations control software, known as the Remote Operations Controller (ROC). Along with multiplexers and modems, ROC will allow Whitehead's staff to execute twice-yearly tests from a backup site in nearby Bloomfield, Conn., rather than to physically go to Pennsylvania.

Instead of the $25,000 line item in his budget to send about 25 people to Sungard, Whitehead estimates it will cost $13,000 to do the IBM CICS, batch and network executability tests from Bloomfield.

In the future, the possibility exists for on-line vault placement of data directly into the recovery site as a further savings, Whitehead adds.

IT WOULD HAVE looked like a recovery plan in progress except that one man held a stopwatch to time a programmer, data manager, operations supervisor and the hot-site operator who gathered at 9:30 a.m. Saturday, July 18 in Culver City, Calif., for a dry run of Teleflora's contingency plan.

Teleflora, a subsidiary of ADI Corp. in Los Angeles, acts as an accounting clearinghouse for flowers ordered by wire. Teleflora chose a sister company, API Alarm, as its hot site because of compatible hardware and software. Teleflora is an IBM VM/CMS shop. It uses DOS/VSE as a guest operating system under VM/SP with a National Advanced Systems 8043 host. Teleflora has 12 volumes of 3350-type and eight volumes of 3380-type direct access storage devices, both of which are made by Storage Technology Corp.

After the 14-hour experience, the group saw a few wrinkles that could use some smoothing out, observes Larry Krietzberg, a senior systems analyst at Teleflora.

As Krietzberg explains, the signature for receipt of the backup tape at a hot site must match that on the tape's original deposit.

The contract further mandated that the tape be delivered to Teleflora's downtown L.A. address. For this simulation, however, the signatures matched, but the recovery team was in the wrong location.

Beyond that, Krietzberg notes, was the importance of having information critical to rebuilding the system readily available.

For example, he says, in order to use the VM backup system to restore the rest of Teleflora's user community data, it was necessary to have a sample of how the VM backup system itself was defined so it could be properly redefined at the hot site.

Krietzberg also foresees the need to review and update documentation as hardware and software changes. He states that, overall, "there is a feeling, a need, to have a clear direction to go in." — HELEN PAIK

How much is enough? Expert says security efforts should pay, not cost

BY WILLIAM MURRAY
SPECIAL TO CW FOCUS

Maintaining the delicate balance between spending too much or too little on data and computer security is an art. Because it is easy to misjudge which areas will require what amount of security, MIS should follow one basic rule of thumb: Security should pay — not cost. As with other facets of business, management should invest in security only to the extent that the money put in will eventually contribute to the organization's overall goals.

A successful security program adds to these objectives by reducing losses and risks. If the losses it prevents or mitigates are greater than the security system's cost, then it has made a net contribution to profits.

Security can be defined as a "condition of safety." To achieve this condition, management must accomplish certain tasks. In this context, security is used to refer to all of the provisions that management makes for the integrity and confidentiality of data and for the continuity of the business during any loss of critical services.

Murray is a consultant and management trainer specializing in computer and data security. He is associated with Ernst & Whinney as a Fellow in Information System Security. He has more than 20 years' experience in data processing and more than 20 years in security.

Because the computer is responsible for storing and processing most of a business's data and because the business depends heavily on it, there is a temptation to try to deal with security solely as a computer problem. However, an organization should look at security as a business problem as well.

In most cases, it is not the cost of security or even the cost of losses that should concern management but rather the sum of the two factors (see chart). MIS should want its organization operating at the point at which the total cost (losses plus the cost of security measures) is at a minimum. Focusing on one factor in lieu of the other can be a costly mistake. For example, if a company does not pay for fire alarms and extinguishers (security measures), then it is more likely to pay for fires (losses).

Diminishing returns

The upward swing of the security curve suggests that the more secure a firm becomes, the more the next increment will cost. This situation reflects the law of diminishing returns; that is, there is a very high return on the first security dollar spent, but subsequently, it will take more and more dollars to buy what you need. It costs more to reduce the expected rate of fire from one in 19 years to one in 20 years than it does to reduce that same rate from one in nine years to one in 10 years. The only way to be 100% secure is to incur infinite costs.

Conversely, a company does not get the same reduction in risk from fire extinguishers 991 through 1,000 that it does from one through 10.

In the chart, the slope of the total cost curve is very steep. This suggests that an efficient program does not happen by accident; it requires constant management attention.

Because the slope is steep, firms will get a big return on whatever management or staff time they invest. Although the return on the time managers spend acquiring and maintaining security measures is not likely to exceed the return on the time managers devote to their primary business objectives, neither is it trivial.

Of course, a technology loss or a fire does not occur on a regular basis. Finding out how to spend the right amount of time and resources is complicated by the fact that security deals with events that have uncertain consequences and rates of occurrence. Furthermore, budgets assume that this year's spending will bear some resemblance to that of last year.

But there is a method that will allow MIS to account for the unexpected in its business plan. By multiplying the estimated cost of a loss by its rate of occurrence (times per year), MIS can estimate the annual loss expectancy.

The loss curve represented in the chart is smooth only for very large organizations or across long periods of time. For smaller companies, the curve would be very irregular. That is, losses do not occur in small, regular increments over time; organizations can expect to take some big hits infrequently and irregularly.

To calculate the chances of facing a situation in which a company's security plans must go into effect, MIS can divide the possibilities into four categories, as follows:

- High rate of occurrence with high consequences.
- Low rate of occurrence with low consequences.
- High rate of occurrence with low consequences.
- Low rate of occurrence with high consequences.

Fortunately, events with devastating consequences do not happen often. Therefore, the high rate/high consequence category can be discounted. Companies can also afford to ignore incidents that seldom happen and that have limited cost. It is on the remaining two categories — high rate/low consequence and low rate/high consequence — that security measures should be focused.

Devastating events that seldom occur should be covered by insurance. Businesses should have insurance to spread the cost of such an event over time and across organizations. Very large firms can afford to self-insure. They have a sufficient number of facilities to absorb a loss. For example, while a large oil refiner might insure against the loss of an entire refinery, it may plan to absorb the loss of one tank. Similarly, IBM or General Motors Corp. can absorb the loss of one computer.

It is the events that have low consequences but occur with relatively high frequency that cost the greatest amount of money. These losses are due to incidents such as pilferage or errors that happen with measurable frequency and cost.

For example, in distribution and manufacturing, the cost of pilferage is significant. And as much as 25% of the cost of data processing operations may be consumed in correcting errors or making protective, backup copies. While many point to computer crime as a justification for security measures, often it is the real and measurable cost of errors that may underscore the need for security. Anecdotal data suggests that many computer crimes had their origins in innocent errors to which management failed to respond.

Management can safely apply the first and inexpensive increments of common security measures to alleviate these high-frequency low-consequence events without fear of overspending. For example, excluding programmers from the computer room is not expensive and, for its cost, provides a substantial risk reduction.

However, expensive measures, particularly those that address limited exposures or that have risks of their own, should be applied only after they have been justified with a rigorous risk assessment. Such a risk assessment compares the loss expectancy with the direct cost of the measure and chooses the lowest cost option. In-house security staffs or outside consultants can provide risk analyses.

An example of a measure requiring justification through a risk assessment would be the installation of uninterruptible power supplies (UPS). In this case, there is only one risk, the loss of electrical power. Depending on geography, the frequency of occurrence of a power loss can vary significantly. The risk also has a wide range of effect, depending on the duration of an outage, from milliseconds to hours. The consequences also vary from that of a nuisance to a catastrophe.

There are a number of alternatives to ensure uptime, from dual sources to flywheels to batteries to generators. The solutions range in cost from tens of thousands to millions of dollars. Each alternative introduces some risk of its own that would not be there in its absence. For example, one new UPS caused one outage for every 50 that it prevented. However, when it was 10 years old, it caused one outage for every 10 that it prevented. At this point the trade-offs of the UPS's effectiveness become marginal.

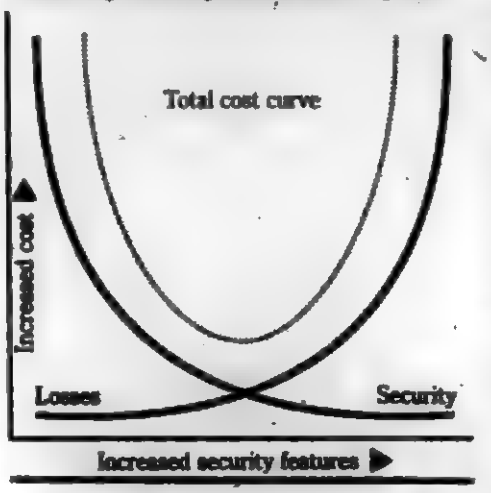
Because the pros and cons of various security measures may be difficult to specify and accept, MIS professionals need to carefully examine the economic risks of acquiring security solutions. It should be clear that measures such as these must be carefully justified, engineered and accepted.

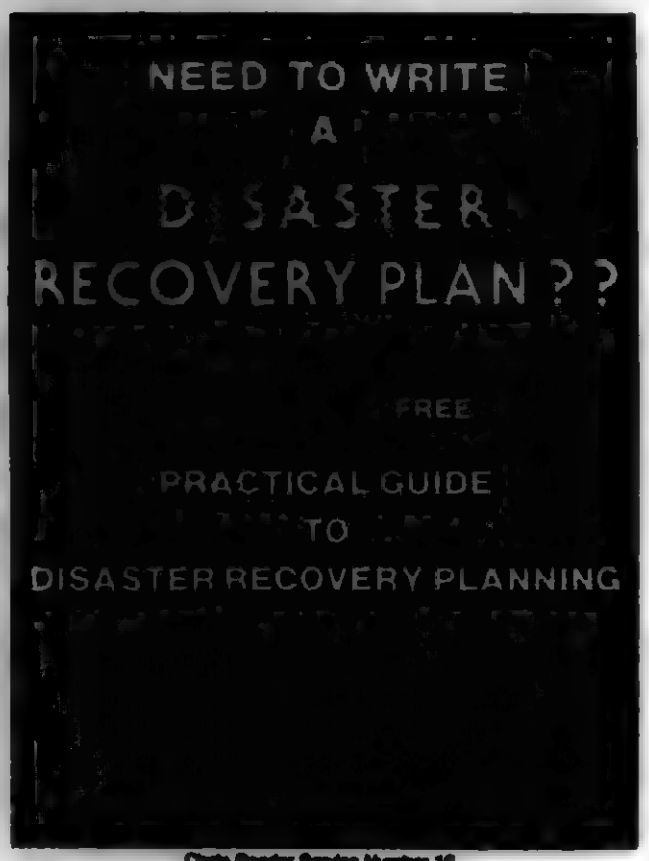
Security provisions are usually more efficient if they apply an inexpensive measure broadly than if they apply an expensive measure narrowly. Thus, it is generally better to apply passwords and ports to all users than it is to apply signature verification to privileged users and ports. Likewise, business-wide measures are more efficient than those limited to DP activity.

Remember, security is a business issue, not a technology issue. When understood and well managed, the idea of security is to maximize protection for the least cost. It is as important to avoid overspending as it is to minimize losses. ◆

The sum of its parts

Management must factor in both the cost of security and the cost of losses





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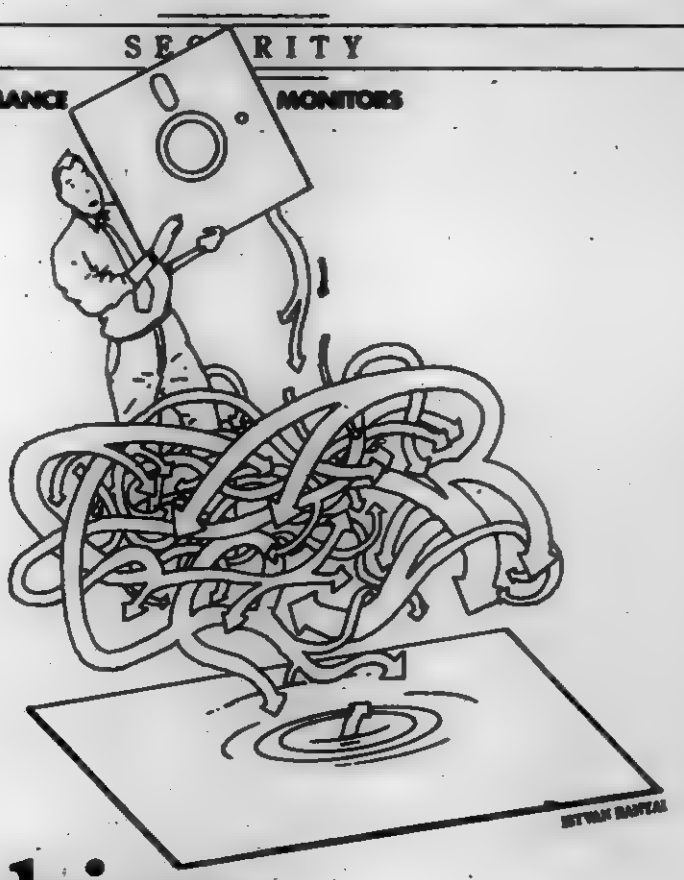


Checking your systems' vital signs

Monitors pinpoint critical weaknesses

BY STAN KOLODZIEJ

Fine-tuning is the name of the game with large computer systems. In these days of fiscal responsibility, corporations are looking to their information systems departments to toe the line and squeeze better performance from existing machines. To help them do this, MIS professionals are turning to the growing market of performance monitors, software tools that delve into systems and pinpoint crucial performance weaknesses.

The result is a booming market. Performance monitors enable a person to plug directly into the day-to-day operations of a CPU and keep an on-line pulse of how that CPU is handling I/O channels, direct access storage device (DASD) use and paging. They also show the amount of resources users and programmers are chewing up in task activities, as well as a variety of other performance statistics for single- or multiple-system platforms.

"I know right away when a programmer might be unwittingly running a program in a loop, or when a user is running away with system resources," according to Louise Kirby, systems manager at the Bank of Vermont in Winooski, Vt. "Monitoring gives us an instant insight."

Kolodziej is *Computerworld Focus*'s senior editor.

PERFORMANCE MONITORS

Dean Prokos, systems programming manager at United States Surgical Corp. in Norwalk, Conn., is using a performance monitor to oversee three CPUs, one running under IBM's CMS and the other two running under IBM's VSE environments.

"The performance monitor gives us on-line reports about CPU utilization, dual-processing performance, device use and so on," he says. "It's invaluable."

Both Kirby and Prokos, who use Vital Signs, a performance monitor from Blue Line Software, Inc. in Minneapolis, also say that monitoring results are playing a bigger role in their firms' overall systems capacity planning, something in which they are not alone.

"Most of our customers are vastly more concerned about performance monitoring now than they were a couple of years ago," explains Jeff Bernard, performance product family manager at Columbus, Ohio-based Goal Systems International, Inc., which produces the Explore family of performance monitors.

"There is a necessity now of knowing where your system is at all times, especially with IBM's CICS systems, which are popular for day-to-day transaction processing," he says. "A performance monitoring system that lets you get into your CICS system when it's hung and lets you cancel the transaction that's screwing up your system is of enormous benefit. Downtime runs about 15 minutes to 90 minutes in the large IBM MVS shop, and that could take thousands of terminals out of service. Uptime is all-important."

A system crash could have further long-term consequences. It could seriously affect corporate service-level agreements, which are agreements between one internal organization and another covering system uptime as well as capacity planning, which Bernard says is where the performance field is heading.

10% of your time

"As a systems programmer, you almost have to dedicate a percentage of your time, perhaps 10%, just to monitoring what's going on and watching your system and tuning it as you go," Bernard explains. "You can do all the capacity planning in the world, but if you don't tune your system properly, you're never going to get anywhere."

As for service-level agreements, Bernard says that if a company is serious about accountability with service contracts, performance monitors can enable it to meet those contracts. Otherwise, people could lose their jobs if they are consistently unable to maintain the performance levels indicated in the contract.

"At the Computer Measurement Group '87 meeting in November, there was a consensus that, should the economy take a downturn, there would be more reliance on performance monitors to help people maintain contracted response time," explains Van Morris, Goal Systems' director of marketing for its data center management division. "The profession of capacity planning has really taken leaps and bounds in the last five years."

Korak Mitra, a product manager at Palo Alto, Calif.-based Hewlett-Packard Co., says many customers of HP's On-Line Performance Tool performance monitor have reached critical mass with the number of systems they have and are looking for ways to better utilize existing machines through capacity planning.

"Companies tend to have longer planning cycles now," Mitra explains. "Performance monitors let them plan for future hardware and software upgrades. They let them pinpoint trends and how resources are now being utilized. Most of those who are doing this are larger customers with big systems."

Big systems, indeed, and part of a big mainframe market awaiting vendors of performance monitors.

International Data Corp., a Framingham, Mass., research outfit, has pegged the 1987 worldwide installed base of mainframe systems at 25,000, compared with 19,000 systems operating worldwide in 1985. Some analysts argue, and maybe rightly so, that the widespread installation of microcomputers has only strengthened the need for corporate mainframes to handle micro-to-mainframe links and networking facilities.

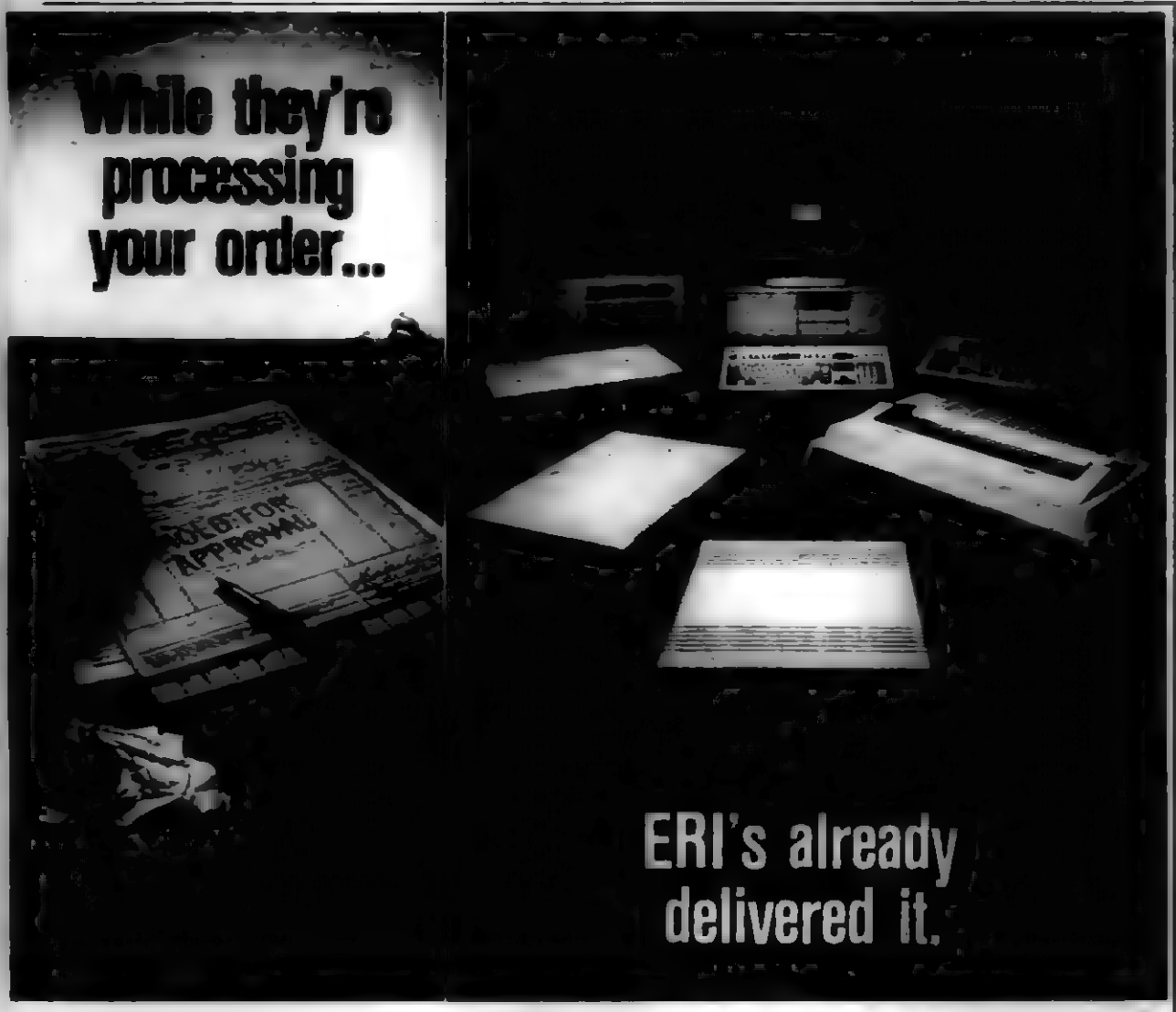
Boole & Babbage, Inc., a Sunnyvale, Calif., vendor of performance monitors,

> **"There is a necessity now of knowing where your system is at all times.... Uptime is all-important."**
>
> JEFF BERNARD
> GOAL SYSTEMS INTERNATIONAL, INC.

claims that more than 70% of these mainframe systems will incorporate IBM or IBM-compatible hardware. That is significant because the IBM CICS and IMS processing environments running under IBM MVS and VM are the bread and butter of the performance monitor market.

So it goes for Marsha Sachs, manager of systems software at Richmond, Va.-based paper products manufacturer James River Corp. Sachs says her company has been using The Monitor for CICS, a performance package from Landmark Systems Corp. in Springfield, Va., for three years to monitor CPU utilization, I/O use and job accounting statistics.

"Everything changed when we were looking to buy our second CPU," Sachs says. "At that point, we had to do a lot of selling to our upper level management to



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justify the second system. That's when capacity planning and the monitoring stats became very important. The performance stats we were keeping with The Monitor were used to present system use graphs and trends to upper management. That convinced them that a second system was necessary."

Despite VM's appeal, IBM's MVS large systems operating environment has generated most of the activity in performance monitor systems, and little wonder. Introduced in 1975, MVS is IBM's flagship operating system and has enjoyed an almost unchallenged reign as the dominant environment in U.S. mainframe computing.

During the years, however, IBM's attempt to bolster MVS's weak points, such as resource allocation, added a great deal of processing baggage along the way, creating a difficult environment for systems programmers to manage. In a way, the success of MVS has also caused its reputation for unmanageability, because MVS has been used more and more to handle heavy throughput applications programming in recent years.

Both IMS and CICS transactions developed under MVS have also become more complicated, generating higher volumes of transactions, requiring higher degrees of system availability and powerful program-switching capabilities and needing higher levels of built-in facilities that would ensure data integrity.

IBM might not be in any hurry, however, to put a premium on streamlining MVS and offering performance monitoring features.

"IBM is in the business of selling hardware and MIPS," says David Thomas, technology analyst at New York brokerage firm Hambrecht & Quist, Inc. "The more inefficient the operating system, the more hardware and MIPS IBM can sell."

To give an indication of how MVS falls short in performance monitoring, the operating system does not even have built-in features for detecting shortages in common storage areas, a situation that occurs often in large systems use. Many third-party monitors can give an operator a warning before such a situation becomes damaging, but with MVS, there is no way to detect a critical common storage area situation unless the operator is specifically looking at it.

Some users feel that IBM has also stumbled with its VM performance monitoring. "We tried using IBM's VM MAP monitoring system," Kirby explains, "but it was like conducting an autopsy. Everything was examined after the fact, after the damage was done. VM MAP is just not interactive enough."

Kirby says that one of her biggest concerns is monitoring DASD use, something that ranks high on many systems professionals' lists, especially those people working in the CICS program development environment in which DASD use is heavy.

IBM, for example, has indicated that more than 75% of system response time performance problems can be traced to the DASD I/O subsystem.

And Boole & Babbage says a recent survey of its international user base revealed that DASD contention is perceived as the most significant cause of CICS performance problems, with inadequate capacity planning a close second.

Big changes

According to Ian Riddle, manager of international marketing at Boole & Babbage, nearly 80% of the companies contacted indicated that they would be making hardware changes in the next year and a half, with 50% changing processors and another 50% upgrading their DASD configurations. A total of four out of five respondents were planning on doing both.

"CICS sites represent a growing market for DASD manufacturers," Riddle says, "but those users of performance monitoring tools also indicated that their current DASD performance data was inadequate and that there was a need for greater ease of use and less restrictive batch analysis and reporting."

Seek time was once pointed to as the primary candidate for DASD performance tuning, but seek time has been improved dramatically by IBM's recent releases of faster storage devices.

Instead, path contention delay is now being isolated as the leading culprit in DASD performance problems. Path contention delay increases with more data path utilization, concurrent requests and shared DASD. Delays occur when an I/O path is unavailable at the same instant the device is trying to reconnect for data transfer.

When this happens, the device must keep rotating until the requested data passes under the read/write head and the path is available for data transfer. But when such misses start piling up, big delays result in system service times, and trouble begins down the line.

Most performance monitoring tools on the market, however, offer components that keep track of DASD activity, and a few, such as Boole & Babbage's DASD Advisor, have been unbundled and sold separately to handle DASD fine-tuning specifically.

DASD is also another area in which MVS fails in function. For example, if a systems application schedules a reserve against a DASD volume and if that reserve is held too long, it will create a performance problem on the other side of the system. This is a fairly common system occurrence.

Under MVS, trying to find out which job holds the reserve is pretty much a hit-or-miss proposition. Every job allocated to the specified device must be displayed and then canceled individually until the job holding the reserve is located, usually through a process of elimination. Performance monitors, however, can pinpoint these jobs on the spot.

In larger systems use, in which an I/O subsystem (of which DASD is a part) can become a bewildering network of hundreds of devices and path mazes, expert systems technology is now being considered. This technology is seen as a way to better analyze the hundreds of rules that govern systems and DASD performance tuning.

According to Goal Systems' Morris and Bernard, expert systems technology is desperately needed in I/O performance monitoring to quickly read and interpret critical data from the burgeoning volumes of statistics being presented to the programmer and operator with monitoring systems.

"Expert systems technology, such as degradation analysis, will become more important in systems performance monitoring," Morris says. "Expert systems are going to enable more advanced information processing, because users will be able to specify certain sets of rules or, if they have service contracts, specified amounts of uptime. Then the expert systems will automatically take the steps to help them make sure they get their performance rules answered and fulfill their contracts."

With a lot of market attention being focused on DB2, IBM's relational data base management system, this might be a good opportunity to improve on IBM's own DB/2 Performance Monitoring System that some analysts, including Shalu Atre, president of Atre International Consultants, Inc. in Rye, N.Y., claim devours too many system resources.

Some performance monitor vendors, such as Landmark Systems, already have introduced DB/2 interfaces to their monitoring systems, but not all vendors are ready just yet to jump on the relational bandwagon.

"Based on our market studies," Morris explains, "DB/2 is something a lot of people are looking at but few have actually implemented.

"We think there's more than enough for performance monitors to handle in existing systems environments." ◆

In the spotlight

A sampling of performance monitors

Vendor	Product	Computer and Operating System	Price
Applied Data Research, Inc. Princeton, N.J.	ADR/Look, an on-line diagnostic and troubleshooting tool that also monitors ADR's Datacom relational data base management system.	Any IBM 370-class mainframe or compatible running under IBM DOS/VS, DOS/VSE, VSE, SP2, MVS or MVS/XA.	From $12,600 for a basic ADR/Look system running under DOS/VS or DOS/VSE to $47,200 for a fully configured system under MVS.
Boole & Babbage, Inc. Sunnyvale, Calif.	CMF, an on-line capacity planning system that includes data collection, data manipulation, applications analysis and data center reporting components.	Any IBM 370, 3030, 3080 and 3090 series, 4300 or compatible running under MVS Release 3.8 and above.	$72,000 for the total system.
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Goal Systems International, Inc. Columbus, Ohio	Alert/CICS, a menu-based on-line monitor focusing on three levels: system, terminal and operation resources.	Any 370, 3030, 3080 and 3090 series, 4300 or compatible running DOS/VSE, OS/VSI or MVS supporting CICS/VS 1.5 or higher.	From $9,100 for a single CPU with DOS/VSE license to $14,980 for the MVS version.
Landmark Systems Corp. Springfield, Va.	The Monitor for CICS, an on-line and batch facility operating in a single, screen-oriented environment.	Any 370-class computer or compatible supporting the IBM CICS/VS communications monitor.	From $8,000 for a single-site DOS/VSE permanent license to $21,000 for a similar MVS license.

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TECH TALK

No parking: Former garage converted to storage facility

By Michael Tucker

Elsewhere in this issue of *Focus*, you'll find an article on one of the Iron Mountain Group, Inc.'s secure storage facilities, which is located in the safest possible place — a rural setting physically removed from the customer's own MIS site. In theory, with this type of setup, your office could be vaporized by an errant nuclear warhead and yet, your records would remain intact.

But what if your security requirements are restricted? Suppose you absolutely must have your data within the same urban area as your office? Suppose, too, that you are storing not only records and magnetic media but other things as well? Perhaps yours is a company that maintains an inventory of small but valuable goods — coins or objets d'art.

What you need, then, is some kind of storage that falls between a safety deposit box and a warehouse. It must be secure, close by and inexpensive. That last requirement is the hardest to find because it means the storage facility, which probably exists on some of the most expensive ground in the world — downtown real estate in a major urban area — would not be charging the rent that normally goes with its location.

City-based storage facility is a warehouse, safety deposit box hybrid.

Fortunately, services exist to fit this particular bill. One such facility is The Fortress Corp., based in Miami with a division in Boston (expansion plans include New York and other major metropolitan areas).

The Fortress exists to provide what its founders call "museum-quality storage" within the central business districts of major cities. To do this, the organization exploits a technology that is among the most exotic available in the storage industry but that is nearly 20 years old.

In the early 1980s, the Fortress's founders, brothers James N. Levis and Ladd Levis-Thorne, began to look into the secure storage business. In the process, they discovered an abandoned parking garage in Miami.

Boston's Fortress, *a secure haven overlooks the city bustle*

In 1963, this garage had been a high-tech experiment. The builders had constructed a system in which motorists would drive their cars into the facility and park them in metal cages inside special shafts, rather like elevator shafts. Many cages, connected in a kind of endless chain arrangement, could fit into one shaft. When a car was parked, the auto and its cage would lift up into the shaft, and an empty cage would come in from below. When the customers returned for their cars, the proper containers would rotate back to the garage door.

For a variety of reasons, the garage failed and the technology was forgotten. After a heroic effort, Levis and Levis-Thorne managed to reassemble the long unused parking system and to improve it. They also applied it to storage. In particular, they replaced the automobile cages with vault-like steel containers to hold valuables.

Today, each Fortress installation is a tower several stories tall. In its core is a standard media vault. Along the periphery there is a series of shafts full of secure containers. To use the system, customers must first pass through a checkpoint at a perimeter wall and then meet an armed guard in the lobby. Once cleared and identified, customers proceed with an attendant to a shaft door and, rather than going to their storage room, their storage room comes to them.

The result is a system that is

Continued on page 36

Tucker is *Computerworld Focus*'s features editor.

PRODUCT CLOSE-UP

NSA backs encoding tool

The Custom Integrated Circuits Division of Melbourne, Fla.-based Harris Corp. has announced the HS3447 Cypher I, an encryption/decryption device endorsed by the National Security Agency (NSA) and used in applications to secure sensitive but unclassified information.

Harris said the Cypher I was designed and developed following the Department of Defense's ON304455 encryption algorithm and offers an alternative to National Bureau of Standards' Data Encryption Standard devices.

Cypher I reportedly operates at data rates up to 20M bit/sec. and is integrated into communications equipment through the NSA Commercial Comsec Endorsement Program. (Comsec stands for communication security, a U.S. government directive to secure internal communications; the Commercial Comsec Endorsement Program enables government contractors to procure secure communications equipment directly from commercial manufacturers.)

On-line backup minus the expense and transportation woes. Story, page 36.

Harris claimed that the Cypher I can be used in standard encryption applications or in spread-spectrum communications applications. Spread spectrum is a modulation technique that prevents signal jamming and interference because it widens the transmission bandwidth to make it larger than the transmitted signal bandwidth.

Cypher I was designed to encrypt and decrypt a serial data stream using an NSA-endorsed algorithm. The device encrypts a

Continued on page 39

BLUE BEAT

Clash of the units

Brian Jeffery

New, improved IBM. With 30% more efficient decision making. Enriched with the new wonder ingredient, Business Unit. More decentralized than other leading brands. And now available in the the new enterprise size. Hurry while stocks last. (Offer not available in Wisconsin.)

Now that the dust has settled on the IBM reorganization, it is time to look past the marketing hoopla and see what, if anything, has really changed.

The place to start is IBM corporate management. Before the reorganization, there was a small corporate management committee that acted as the inner sanctum of IBM decision making. That situation hasn't changed; John Akers is still firmly in charge, Jack Kuehler and Allen Krowe are still his main No. 2 men and Kaspar Cassani (as overseer of the World Trade groups and marketing and two years from retirement), David McKinney (in the old Buck Rogers role as head of corporate staff operations) and Frank Metz (in the old Krowe role as chief finance man) still remain. No real changes here, but certainly striking personalities to share the decision making authority.

The continued role of Krowe in IBM top management is worth thinking about, though. Krowe is generally regarded as the architect of IBM's disastrous financial strategy from 1982 to 1985, when the firm converted its rental income to sales too rapidly. He doesn't seem to have been penalized for that. But then, he is

Continued on page 38

Tech Talk

Continued from page 35

inexpensive — one can get a section of a container for less than $50 — and remarkably secure. Consider, for instance, the difficulties a thief would have getting at any particular record or valuable. Even if he made it past the wall, the checkpoints, the alarms, various sound and motion detectors in the building and the guard, he would still have no idea where in the tower any specific container was located within a shaft. It could be at the top, the bottom or anywhere in between.

Then even if he discovered the container he wanted and knew where it was, he would have to bring it into the lobby. That would mean that he would either have to operate the storage machinery himself, which he could not do without raising an alarm, or else obtain the assistance of Fortress personnel, which he could not do without being seen.

His only other option would be to enter the shaft and climb through the containers to reach his prize. *That*, however, would require the skill of an acrobat, or a death wish, for at any moment the machinery might swing into action and plunge him to the bottom of the shaft.

A Fortress building is also immune from most acts of God. While it could be destroyed by major catastrophies like earthquakes, it's still reasonably safe from the garden-variety disasters. For example, it is spared electrical threats because its machinery is anchored deep within the earth, and thus, as an accidental side effect of its design, it is about as grounded as an installation can be.

Moreover, the Fortress contains the usual automatic defenses against fire, with the added kicker that should a fire get started in one of the containers, it could be rotated to the top of the building, where it would burn out harmlessly. The rest of the installation would probably not even feel the heat.

Of course, no building is ever completely safe from misfortune or human enemies sufficiently determined to overcome any resistance. However, The Fortress facilities show what can be done to provide security even within what might otherwise seem insecure surroundings. It is, in short, the sort of installation that MIS officers might wish to study given the fact that their glass houses frequently occupy similar surroundings and face similar threats.

Circle Reader Service Number 18

Data backup with a twist

'Televaulting' is an alternate to vaults, dual data centers

Today, preparing for a disaster may mean one of two things for MIS: vaults or dual data centers. If a company is very large and very rich, then it may take the latter strategy, maintain two DP centers and link them via a network. If one system goes down, the other should survive.

The dual data center approach is relatively foolproof but expensive. More often, MIS simply tries to protect its backup tape records. MIS can contract with a protection service to physically remove its magnetic media to a secure location.

Now, however, Total Assets Protection, Inc. in Arlington, Texas, is offering a middle path between these two strategies. Operating via a new subsidiary, Televault Technology, Inc., also based in Arlington, Total Assets Protection is about to introduce what it calls a "televaulting" route to data security.

Although it sounds like an event from some future version of the Olympics, televaulting is a simple concept. When you sign up as a client of their service, Total Assets and Televault Technology set up a direct, high-speed T3 data link via a fiber-optic cable between your system and one of their secure installations.

At your site, a connector is placed at every workstation, terminal or personal computer. Once the system is in place, each keystroke an employee makes is recorded and transmitted to the Televault system. Without the risk of physically transporting your tapes and without the expense of a second mainframe, you can have an on-line record of everything that happens at every keyboard in your building. Moreover, because Televault is simply recording those keystrokes, the data is stored according to your tape management system, potentially eliminating any crude conversion problems.

You can then access those tapes any time and in pretty much any way you like. You can even have them transmitted back to you via the T3 line.

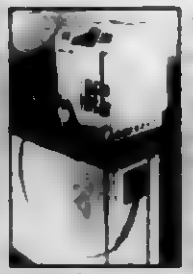
Prices for the service vary according to the installation and distance from Televault. — MICHAEL TUCKER

Circle Reader Service Number 104

Low-tech path to high security

Personal computers have created a whole new nightmare in data security. Where it is relatively easy to safeguard mainframe data, doing the same for PC data is almost impossible. Information in PCs can be copied, bugged, tapped and spied on with maddening ease. But what may be the most embarrassing threat of all is that a PC can be physically picked up and stolen. The data within it could be protected by all manner of sophisticated devices and still be vulnerable to a bit of common second-story work.

As a result, there has been a renewed interest in low-tech responses to this high-tech threat. For instance, a number of vendors are marketing various locks and restraints that reduce the chances of a PC being lifted by a thief. Qualtec Data Products, Inc. in Santa Clara, Calif., for instance, offers a line of cable, security plates and padlocks that can be used to fasten a PC to a desk or a wall. Qualtec's products range from $8 to $99.



Qualtec lock and cable

There are number of other vendors with similar products, but the common characteristic of all these firms is that they are in the hardware business in a precomputer sense of the term. Their products provide a physical response to a physical threat. As such, these offerings can be overcome by a thief equipped with enough determination and a good hacksaw.

Therefore, the real value of these products is that they make computer theft a more complex affair than it might be otherwise. These devices make certain that computers will not be stolen on a lark and may slow down a professional thief long enough for other measures, such as alarms or guards, to come into play.

Another low-tech response to PC security deals with physical media. One of the major problems in PC data security is that every disk is similar in appearance. A floppy with a vital customer record on it may look identical to one that contains nothing but a few outdated ASCII files.

So several companies are offering color-coded disks and diskettes. It is an incredibly simple idea, but as minor a thing as having classified material on bright red media can actually go far to reduce theft. Kao Corp., a Tokyo-based industrial combine whose U.S. division is located in Mountain View, Calif., is one company offering a line of such brightly colored disks and diskettes.

PCs are also particularly diabolic in that they produce scads of printouts. Increasingly, the easiest way to steal data is to visit a trash can. Thus, a good document shredder is becoming part of the standard operating equipment of any MIS shop.

Simple shredders slice paper into long strips. For most operations, that level of security is enough. But shredders can be overcome. A famous example of that fact is the takeover of the U.S. embassy in Iran in 1979. At that time, several classified documents were shredded before they fell into the hands of Iranian militants. The militants then proceeded to painstakingly paste the documents back together again.

Thus, MIS shops with sensitive documents may wish to investigate machines that go even further to make information on paper unreadable. Some firms, such as Security Engineered Machinery, Inc. in Westboro, Mass., offer grinders that can turn documents into a fine, sand-like powder. — MICHAEL TUCKER

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PRODUCT CHECKLIST

Thumbscan, Inc. has announced the **Boot** family of security access products for personal computers.

PCboot and **Lanboot** restrict access to individual PCs or local-area networks. **Dealerboot** adds a timing capability that lets dealers enforce trial periods for hardware and software.

PCboot and Lanboot can prevent unauthorized users from initializing or booting the PC, from using software application programs, from accessing data, files and template programs and from gaining access to system resources such as disk drives, serial ports and modems, the vendor said.

The products consist of the vendor's Gordian Access Key device and a half-slot board. PCboot costs $179.95, Lanboot costs $379.95, and Dealerboot costs $225. Additional Gordian Access Keys cost $75 each.

Thumbscan, Suite 800, Two Mid-America Plaza, Oakbrook Terrace, Ill. 60181.

Circle Reader Service Number 106

Biometric devices are increasingly finding use in personal computer-based applications. **Identix, Inc.** makes a line of fingerprint readers that are widely credited as ranking among the most accurate on the market. The smallest of Identix's systems is the **IDX-10**. It is not a new product, but what is new is its drastically reduced price of $5,000 (down from $7,500) and the machine the IDX-10 can now be fitted to guard — the IBM Personal System/2.

With the IDX-10, a PS/2 can be rendered inoperable until a would-be user properly identifies himself with a fingerprint reading.

Identix, 2452 Watson Court, Palo Alto, Calif. 94303.

Circle Reader Service Number 107

Fischer International Systems Corp. is scheduled to unveil an upgraded version of its **Watchdog** data security product for personal computers.

Fischer claimed that Watchdog Version 5 provides access control, multiple permission levels, automatic data encryption (using a proprietary encryption algorithm), an audit trail facility and a number of other mainframe-like security features to the IBM PC-DOS and Microsoft Corp. MS-DOS world.

Watchdog is also one of the few PC security products to be placed on the U.S. Department of Defense's National Computer Security Center's official Evaluated Products List for Trusted Computer Systems.

Watchdog Version 5 will cost $295.

Fischer, 4073 Merchantile Ave., Naples, Fla. 33942.

Circle Reader Service Number 108

A "new" product that can never seem to escape that introductory status is the smart card, a credit card-size device that contains a single microprocessor.

Smart cards now have a U.S. champion in **Micro Card Technologies, Inc.**, which has introduced two even smarter smart cards: the **MC89000**, which has 64K bytes of erasable programmable read-only memory, and the **MC49000**, which boasts 16K bytes of electrically erasable programmable read-only memory.

A single MC49000 card is priced at $6.85, and the MC89000 costs $6.10. There reportedly are substantial discounts for volume purchases.

Micro Card Technologies, 14070 Proton Road, Dallas, Texas 75244.

Circle Reader Service Number 109

Another type of smart card can be had from **Security Dynamics, Inc.** The firm markets **Secur ID**, a device that combines the features of a smart card with those of a personal access device. Each card contains a tiny processor that generates a pseudo random number every few seconds. Meanwhile, a host computer runs a program that generates the same number at the same moment. In other words, both the host system and user's card are producing a new unpredictable number every minute, but it is the same unpredictable number for both of them.

To gain access to the host, a user must type in the number shown on his card. If it doesn't match the host's number, he is denied access. This year, Security Dynamics has introduced a new version called the **Banker's Card**, which increases security further by displaying the personal identification number only when directed to do so and remaining blank when not in use.

Prices vary according to the installation.

Security Dynamics, 2067 Massachusetts Ave., Cambridge, Mass. 02140.

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Blue Beat

Continued from page 35

in good company. In that era, the key decisions in IBM were made by the IBM Policy Committee, which included John Opel, Paul Rizzo (now retired), Akers and Krowe. Note that IBM is being run by the same men who were in large measure responsible for the firm's earlier failures.

The major change has been in reducing the role of IBM's Corporate Management Board, which used to be the main vehicle for operational decision making. More day-to-day authority has now gone to the new business units: Enterprise Systems (370 products), Application Business Systems (System/36 and 38), Communication Systems (telecommunications), Personal Systems (workstations and terminals, including the Personal System/2) and Technology Products (components and packaging). This setup is interesting. IBM has gone back to something very much like its 1970s contention management structure, with Enterprise Systems in the old Data Processing Division role and Application Business Systems in the old General Systems Division role. If anything, the potential for contention is even greater.

Personal Systems will now be in the field with high-end PS/2s that encroach on the mid-range bracket. Personal Systems is headed by Georg onrades, who is an IBM heavyweight likely to fight for his product lines. Meanwhile, Communications Systems will be fielding its own distinct product lines. Adding to the centrifugal tendency here is that key product marketing responsibilities are moving out of the U.S. Marketing and Services Group into the product business units, which means that sales and marketing strategies are increasingly going to be set to meet business unit profit-and-loss objectives rather than broader IBM plans.

An unenviable job

The remedy for this potential contingent is supposedly Terry Lautenbach and IBM United States. Formerly vice-president of the Information Systems and Communications Group, Lautenbach has a new job as general manager of IBM United States, a move that has inevitably given rise to speculation that he has acquired a major power role. Forget that. Most IBM staff members don't see him in line for the Akers succession. Lautenbach may move up a notch into one of the second-level corporate posts, but he won't make it all the way. And he has the unenviable job of trying to coordinate a product line whose components are managed by profit-and-loss units headed by IBM management heavyweights with continued direct access to the top.

Picture, if you will, one of the closed-door planning meetings. Conrades or Carl Conti of IBM Enterprise Systems wants to introduce a new product. He has to have the product to meet this year's sales objectives. Hundreds of millions of dollars ride on the deal. "No," Lautenbach cries. "Absolutely not! It's not Systems Application Architecture compatible!" There are no prizes for guessing the outcome.

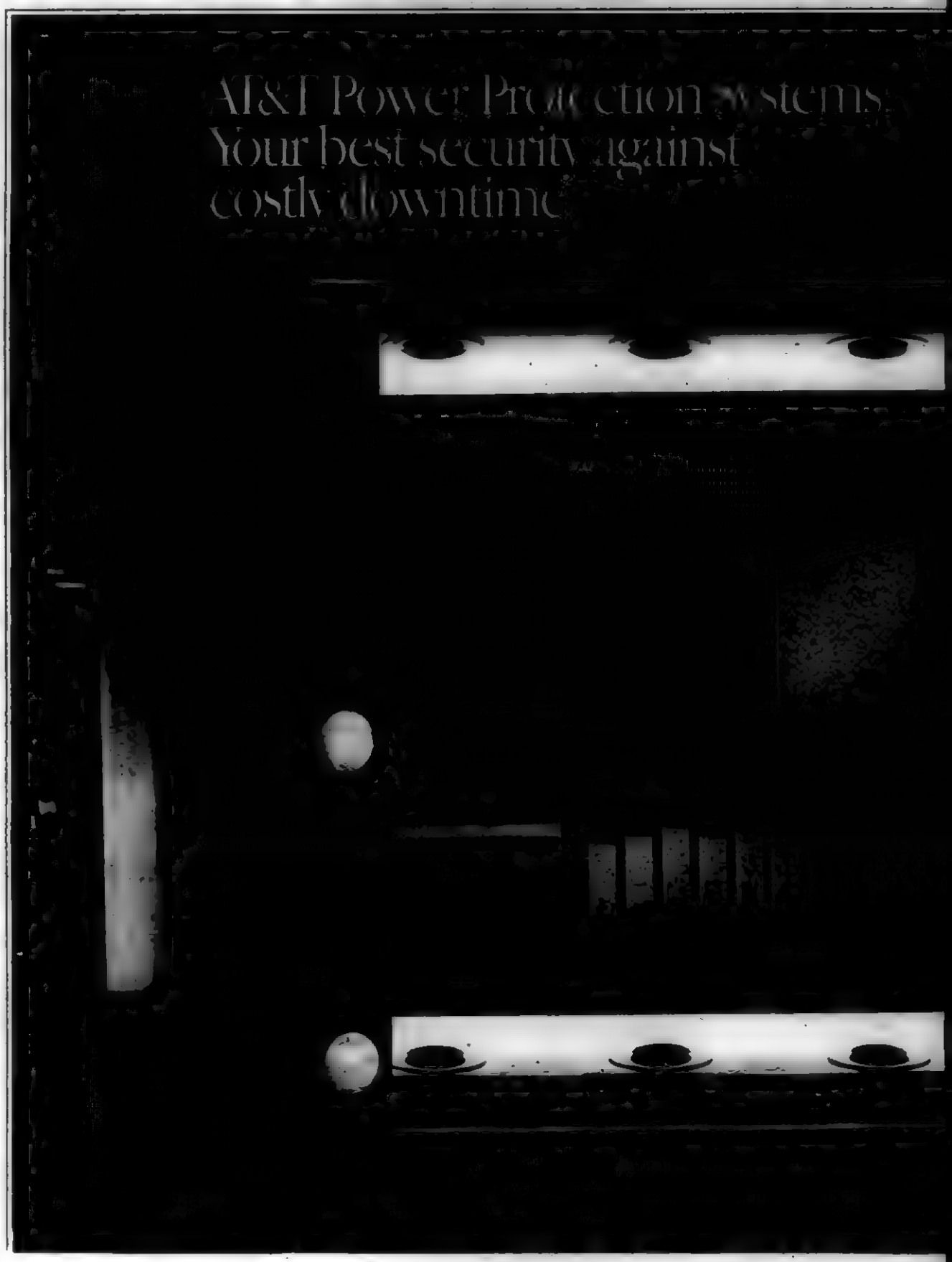
Also, looking at the IBM management appointments in the reorganization, it is clear that we are dealing with a somewhat less than radical revolution. All of them are ex-mainframers, all of them are former marketing men and all of them have continued their rise in the corporate hierarchy quite routinely. During the last five years, IBM has gone from boom to bust, has, by its own admission, made serious mistakes and has lost the confidence of whole chunks of its customer base. Some older executives have been retired, but the core of IBM management has not changed, the outlook has not changed and the thinking patterns have not changed.

If anything, IBM is growing *more* conservative. The reorganization takes us back to the 1970s, even to the 1960s. The 370 is king again. Out in the field, the focus is on salesmanship and hand-holding. Bundling is coming back. IBM is even reverting to its practice of hardball competitive marketing and products announced with unreal availability dates to forestall customer commitments to competitors. These tactics have not been seen since Frank Norris, then chairman of Control Data Corp., arm-twisted the federal government into bringing an antitrust suit against IBM in 1968.

The most disturbing aspect of this situation is that IBM seems to have run out of ideas. It still refuses, in any real sense, to acknowledge problems with its products and does not seem to realize that it is no longer dealing with the docile, big-iron-oriented MIS community of the 1960s and early 1970s. It seems that IBM has, perhaps irrevocably, lost the capacity to generate change within its own ranks, and the prospects for any kind of real external pressure for change look remote.

Could IBM customers generate that pressure? After all, IBM says it is listening to its users. But then again, did customers have anything to do with the latest shakeup? Did MIS officers take Akers aside and say, "Hey, John, what about reintroducing contention management? You know, so that we can have the 370 guys and the System/36 and 38 guys doing their own thing. I'm getting real tired of this coordinated product line business." Of course, they didn't. But then, the Year of the Customer was last year.

Jeffery is managing director of the International Technology Group, a management consulting and market research firm in Los Altos, Calif.



CALENDAR

April 10-16

Local-Area and PC Networks. Dallas, April 11-12 — Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

Private Networks: Tariffs and Design Techniques. Washington, D.C., April 11-12 — Contact: Conference Registrar, Telecom Publishing Group, P.O. Box 1455, Alexandria, Va. 22313.

DEC Systems, Architectures and Networks: A Detailed Examination of Digital Equipment Corp.'s Products. Andover, Mass., April 11-13 — Contact: Information Engineering Institute, Suite 207, 5119-A Leesburg Pike, Falls Church, Va. 22041.

Supporting End-User Strategies: The Convergence of OA and the PC. San Francisco, April 11-13 — Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

Atre Forum on Relational Data Base & CASE. Washington, D.C., April 11-13 — Contact: Nancy Carafa, Atre International Consultants, Inc., P.O. Box 727, 16 Elm Place, Rye, N.Y. 10580.

The Association for Information and Image Management-1988 AIIM Show. Chicago, April 11-14 — Contact: James Breuer, AIIM, Suite 1100, 1100 Wayne Ave., Silver Spring, Md. 20910.

Local Communications Systems. Dallas, April 13-15 — Contact: Systems Technology Forum, Suite 150, 10201 Lee Highway, Fairfax, Va. 22030.

Application Prototyping: Implementing the New Systems Development Technology. Palo Alto, Calif., April 14-15 — Contact: Digital Consulting, Inc., 6 Windsor St., Andover, Mass. 01810.

April 17-23

Introduction to ISDN. Chicago, April 18-19 — Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

Building Operational Expert Systems. Los Angeles, April 18-20 — Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

The National DB2 Tools Symposium. New York, April 18-20 — Contact: Digital Consulting, Inc., 6 Windsor St., Andover, Mass. 01810. Also being held June 13-15 in Los Angeles.

CEPS/Spring Corporate Electronic Publishing Systems. Chicago, April 18-21 — Contact: Cahners Exposition Group, P.O. Box 3833, 999 Summer St., Stamford, Conn. 06905.

What's New in the Management of Telecommunications. Wellesley, Mass., April 19 — Contact: Jerry Kanter, Center for Information Management Studies, Babson College, Wellesley, Mass. 02157.

The 1988 Records Management Southern Conference: Basic to Advanced Technologies. Columbia, S.C., April 20-21 — Contact: Connie Owens, Standard Federal, 1339 Main St., Columbia, S.C. 29201.

April 24-30

Telemanagement Software: How To Plan and Select. New York, April 25-26 — Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

Speech Tech '88. New York, April 26-28 — Contact: Stan Goldstein, Media Dimensions, 42 East 23rd St., New York, N.Y. 10010.

FOCIS '88: The Federation of Conferences on Information Systems. Washington, D.C., April 26-28 — Contact: FOCIS '88 Registration, P.O. Box N, Wayland, Mass. 01778.

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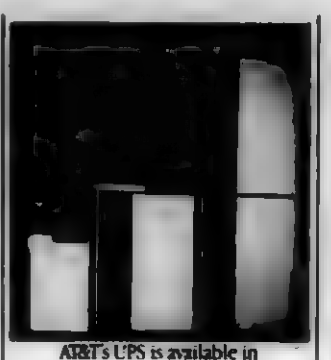

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NSA backs tool

Continued from page 35

plaintext message, using a specified variable, to produce ciphertext data. At the receiving end, the ciphertext data is decrypted to produce the original plaintext data.

According to Richard H. Robinson, director of Secure Communications Programs for Harris, the target market applications for Cypher I will be commercial, satellite, mainframe communications, banking, brokerage and regular business transactions.

The HS3447 Cypher I is priced at $80 each in 1,000-unit quantities. According to the vendor, production units are available now. — STAN KOLODZIEJ

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log off

Safety, in numbers

U.S. figures show disaster can be costly

* Power surges are the most common cause of loss. Many may not be reported because power surges are not covered under ordinary insurance.

INFORMATION PROVIDED BY A 1986 LOSS STUDY BY SAFEWARE, THE INSURANCE AGENCY, INC. OF 25,000 OF ITS INSURED MICRO SITES. THE U.S. FIGURES ABOVE ARE SAFEWARE'S PROJECTIONS MADE FROM THIS BASE.

GRAPHIC BY BRUCE SANDERS

OF
INTEREST

"Our best clients are the ones that were just ripped off."

DONN PARKER
COMPUTER SECURITY CONSULTANT
SRI INTERNATIONAL

See story page 13

next issue

As a top MIS communications concern, connectivity still reigns supreme. May's *Computerworld Focus* will examine a range of networking issues from the rise of local-area networks that operate within a limited area to multinational network management and control. In addition, we'll delve into the "hidden" expense of maintaining a network for the long haul. Read about the latest developments in the acceptance of the Open Systems Interconnect protocol and what is delaying the government's FTS 2000 telecom project. Our Special Section reviews AT&T and IBM, the contenders now waging a market battle for network dominance. To the victor go the spoils, but what will this fracas mean for MIS? See these stories and more in next month's *Focus*.

In users we trust

Michael D. Millikin

Users are dangerous. Not to mention lazy, ignorant and sloppy. Ask any MIS person concerned with data security.

It was bad enough when terminals were the primary window into the information processing system. Even then, users tended to flout authority and precautions by taping passwords to their keyboards or desk drawers. But at least MIS had the data under lock and key.

Now that's all changed. With more than 20 million personal computers humming away on desks, sensitive data is distributed all over the place. From the perspective of security, it is as if a bank decided to guard its money by removing it from the vault and flinging it off a rooftop.

Of the many aspects to PC data security, two stand out. First, there is the well-known antipathy of users to any procedure resembling routine backup (until they lose data, that is).

As long as it is only the user's resume that vanishes into electron heaven, most in MIS could care less. But increasingly, there is sensitive corporate data resident on the disk. Then that ascension becomes a BIG problem.

A second aspect is the removable nature of PC data storage. Piracy is a snap when all you have to do is copy a file to a floppy. In some cases, thieves have even snatched entire hard disk drives.

A partial solution to the first problem is slowly evolving with the incorporation of PCs into local-area networks. A server restores data — especially sensitive data — to a central location.

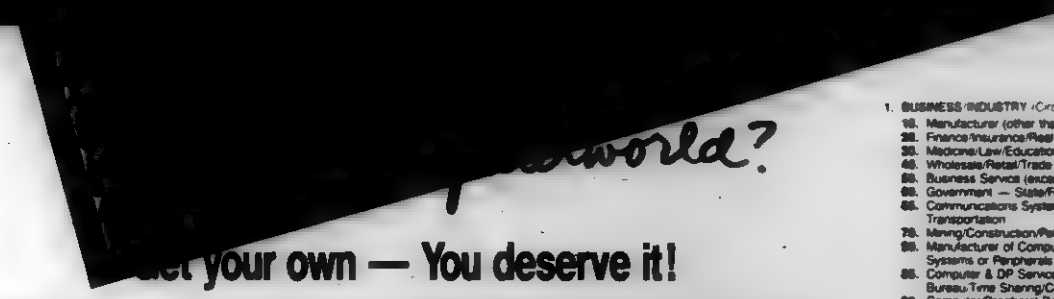
Even better from an MIS point of view are the evolving configurations offering centralized software distribution as well as data storage. Backup and security recede as headaches in such a situation. For example, Digital Equipment's Network Applications Services strategy (embracing Microsoft MS-DOS, the Apple Computer Macintosh operating system, IBM OS/2 and DEC Ultrix) will offer users the workstation or terminal window of their choice, within limits, and provide MIS with centralized control. This is a win-win situation.

But such architectures don't solve the problem of removable storage. Solutions to this remain a hardware issue. One approach is to make removing the hard file extremely easy so that users can lock it away in a safe at night. IBM recently sanctioned this approach with a new external removable hard disk.

Another approach is the use of diskless network stations. These are a compromise between the world of intelligent workstations and terminals. The trade-off is in user convenience.

Currently, MIS must recognize that it has to rely upon those dangerous, lazy, ignorant and sloppy users for broad-based security. The key is the education of users in security issues — what to do and how to do it. Memos won't hack it. Users must buy into the concept if there is to be a chance of success.

Millikin is vice-president and senior analyst with Patricia Seybold's Office Computing Group in Boston.



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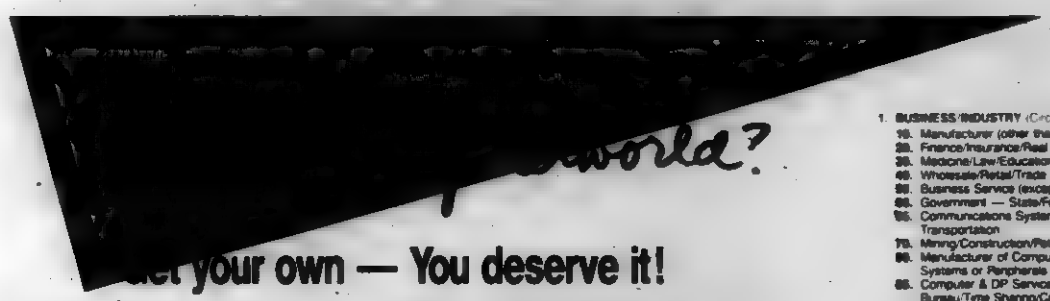

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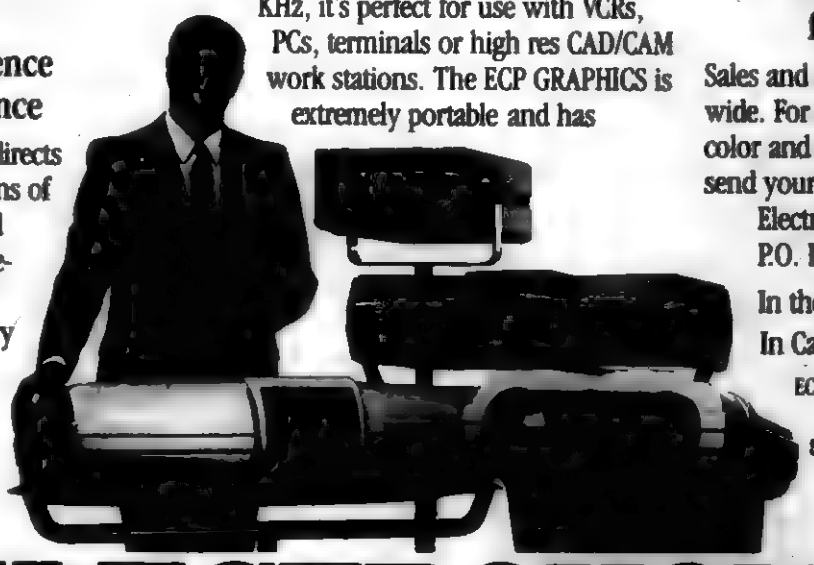
The ECP Graphics

This new single lens system can project images generated by high resolution (1024 × 1280 pixels, non-interlaced) CAD/CAM terminals, as well as video. Because it automatically locks on scan rates from 15-80 KHz, it's perfect for use with VCRs, PCs, terminals or high res CAD/CAM work stations. The ECP GRAPHICS is extremely portable and has VARI-FOCUS for screens 5' to 14' diagonal (front, rear or curved).



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COMPUTERWORLD

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The wait is almost over for IBM's central data dictionary. Page 4.

Microsoft returns fire, charging Apple with slander in copyright suit. Page 105.

Presentation Manager looks fine, but some feel queasy over migration demand. Page 6.

Bug attack prompts IBM to revise VM High Performance Option. Page 104.

AT&T files tariff for first ISDN service, four months behind schedule. Page 7.

Cullinet's VAX entry draws praise, but competitive clouds loom. Page 4.

Interleaf anointed as IBM desktop publishing partner. Page 33.

PC heavyweights to back emerging Unix standard

BY DOUGLAS BARNEY
CW STAFF

NEW YORK — A controversial version of Unix that is being jointly developed by AT&T and Sun Microsystems, Inc. should get a major boost today as the leaders of the microcomputer spreadsheet and data base management system markets pledge support for the operating system.

Lotus Development Corp. and Ashton-Tate Corp. are both expected to announce support for the upcoming Unix System V, Release 4. Many observers have claimed the new version will give Sun an unfair edge in the market because that company will be privy to specifications for the new operating system before other vendors.

If AT&T and Sun garner enough support for their Unix version, which will include a graphical user interface, Unix will be able to offer the same features as Apple Computer, Inc.'s Macintosh and Microsoft Corp.'s OS/2 Presentation Manager.

However, Unix System V, Release 4 will not even ship in beta-test form until later this year and will not formally ship until next year, giving competitors ample time to react, observers said.

Lotus confirmed that it will develop a Unix version of its market-leading 1-2-3 package, thus ending months of industry speculation. Lotus declined to provide pricing or a ship date, but the product is expected to use the core code from its upcoming 1-2-3 Release 3 spreadsheet.

Continued on page 6

Silverlake software scramble

BY STANLEY GIBSON
CW STAFF

As the announcement date draws near for IBM's System/36 and 38 follow-on processor, commonly called Silverlake, developers are scrambling to test System/36 and 38 programs for compatibility with the new machine.

Silverlake is expected to run not only existing software for System/36 and 38 minicomputers but also Systems Application Architecture-compliant software in native mode, causing developers to look ahead to SAA compatibility issues.

The consensus of developers interviewed by *Computerworld* is that Silverlake will roll out June 21. Those developers also expressed the following opinions:

- In order to assure that software will be available at the time of the Silverlake introduction,

Continued on page 8

Fired-up DB2 due

ESA/370 will fuel major boost in throughput

BY CHARLES BABCOCK
CW STAFF

IBM's next release of DB2, expected to be announced by the end of this month or early in May, will tap features of IBM's new ESA/370 operating system to boost transaction throughput by 25% to 30%, according to sources who said they had been briefed by IBM.

In addition, the next release of DB2 is expected to incorporate an implementation of referential integrity more extensive than previously believed, according to industry sources and a spokesman for IBM's Santa Teresa, Calif., development laboratory.

The double-pronged improvements will be aimed at addressing the weaknesses that have constrained DB2's use for large production applications.

Although an immediate performance gain of 25% to 30% might be considered standard for a new release of DB2, larger gains are expected to follow as the produ is reworked and applications are restructured to take advantage of ESA features, according to Tony Deakins, vice-president of the consulting firm Aunco in Orlando, Fla. Aunco is part of Cincinnati Bell Information Systems.

Some sources claimed IBM will refer to the next release of DB2 as Version 2.0, instead of Release 4.0 of the first version, to signal a departure from the first round of releases. Others said they had heard IBM officials dub the release in the prean-

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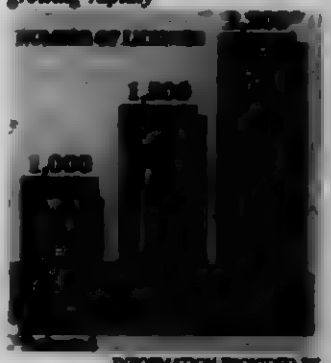
Tower of power
IBM DB2 installed base growing rapidly



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CW CHART

Eastern recruits MIS to plug brain drain

BY ELISABETH HORWITT
CW STAFF

Computer power is replacing some of the human expertise that Frank Lorenzo is said to be draining from Eastern Airlines. After a year and a half of concentrated development work, Texas Air Corp. subsidiary System One Corp. has begun test flights of the new systems it hopes will pull Eastern's customer service record out of its current nosedive.

When only 61.5% of its January flights arrived on time — that is, within 15 minutes of their schedules — Eastern earned the worst performance record in the industry for that month, according to the Department of Transportation. In February, Eastern boosted its on-time flight percentage to 70.6% and moved up from 14th to 11th place.

Continental Airlines, another Texas Air subsidiary, slipped from 11th to 13th place, with 67.7% of its flights on time that month.

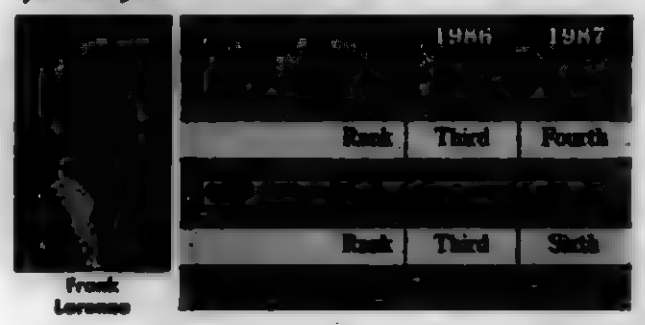
Eastern also reportedly received more customer complaints than any other airline except Continental.

Wage cuts create exodus

Industry sources attributed Eastern's service problems to the recent exodus of experienced personnel, reportedly brought on by Texas Air Chairman, Chief Executive Officer and President Lorenzo's wage cutting and battles with the unions. The carrier reportedly has lost 20% of its cockpit

Continued on page 104

Doing more with less
Texas Air trimmed nearly one-quarter of Eastern's work force after the buy-out



Frank Lorenzo

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Early arrivals. Just five weeks after announcing high-end Cyber 990s, CDC unveils a revamped Cyber 930 line, which is slated to ship in July. Page 14.

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MICROSOFT CORP.

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NEWS

Tax act sets back IRS systems projects

BY J. A. SAVAGE
CW STAFF

WASHINGTON, D.C. — You can call the bank and get your account balance, and you can call the overnight mail service to find the whereabouts of your package, but you still cannot call up the Internal Revenue Service to find out the status of your international business return.

As a result of the reforms of the Tax Reform Act of 1986, the IRS suffered a six-month setback in its drive to establish customer service via computer-generated information.

So, if you cannot get accurate tax reference information over the phone this week, blame it on Congress.

Mammoth undertaking

The reforms "took more reprogramming than any other single piece of tax legislation," said Jerry Rabe, director of the tax systems division of the IRS. He estimated that as many as 200 staff years were spent reprogramming.

According to Rabe, the project employed almost 300 programmers, some of whom worked nights and weekends to rewrite 25% of the IRS's Cobol code.

Rabe insisted that thus far, the rewritten system has handled processing the new returns exceptionally well. He said he expects the system will not have any trouble handling next week's expected deluge of tax returns processing.

Hands tied

Projects aimed at automating and tying together data bases — so the IRS can find out if its left hand knows whether or not its right hand has recently been in your pocket, and if so, how deeply — have been postponed.

In one instance, an attempt to automate tax referencing by connecting it to an accounting system was postponed until next year's tax season. Instead, "our energy was spent in training 9,000 people to answer questions on the 1986 Tax Reform Act," said Bob LeBaube, the director of the IRS tax service.

If programmers were available to devote the same amount of time and energy to upgrading the system as was spent on the reprogramming, the accuracy of the service received this year would be increased, the IRS said.

Thus, due to the delay in instituting this tax information service, the information dispersed by the IRS operator this year will most likely be dependent on memory. Next year, LeBaube said, the Automated Tax Service System should be in place, allowing operators to retrieve information from computer data banks. With the system, the IRS will only have to train its staff to operate the system, not to know all the answers.

Other upgrades planned in the near future but delayed for the Tax Reform Act include a project to link together the IRS's data bases.

Only three of the IRS's nine divisional data bases can communicate: the service, collections and examinations divisions. As a result, the international division cannot call up your collections file if you have international operations.

Rabe warned, however, that it will not be long before each data base will have the ability to access the others to make certain that the information in all branches matches.

Despite the allocation of programmers to implement reforms prompted by the Tax Reform Act, a voice-prompted data-collection project was implemented without delay, according to LeBaube.

Wires tapped

The Integrated Test Call System, an operation that tracks the type of calls coming into the IRS and the accuracy of the responses, was instituted in January.

Calls coming into the service can be monitored by IRS supervisors, and data can be entered into the computer through a voice-prompted program. The information on the most frequently asked questions is collected by "ringers" — in the field personnel who call the service to pose questions and who then evaluate the accuracy of the response given by the operator. The accuracy of the data is entered into the system through the field worker's personal computer.

"Unfortunately, it is revealing that the quality level [of the responses] isn't what it should be," LeBaube said.

> If programmers were available to devote the same amount of time and energy to upgrading the system as was spent on the reprogramming, the accuracy of the service received this year would be increased.

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IBM repository fog burning off

Data dictionary, due by early '89, seen as CASE framework in first phase

BY NELL MARGOLIS
CW STAFF

IBM plans to announce its long-awaited repository, or central data dictionary, for Systems Application Architecture (SAA) by early 1989 at the latest, according to industry consultants recently briefed by the company.

IBM expects the repository to emerge as a storage facility for vital information across operating systems. But in its first implementation, the dictionary will act largely as an underlying foundation for a computer-aided software engineering (CASE) system, according to Paul Hessinger, chief technology officer at the Computer Task Group, Inc. in Buffalo, N.Y.

"I believe that within the next three months, you will see IBM prepared to articulate a clear-cut direction with regard to its repository," said Hessinger, adding that he has been in close touch with key personnel on the IBM repository project development team based at the company's research facility in Santa Teresa, Calif.

IBM officials with whom Hessinger has recently conferred believe that a repository is required as a foundation for CASE, Hessinger said. "It will supply the framework for other vendors to interface their products with IBM environments. It is definitely within IBM's reach to accomplish its goal of providing this framework."

George Schussel, president of Andover, Mass.-based Digital Consulting, Inc., recently spoke with staff members at IBM's Santa Teresa development laboratory and came away with the understanding that the repository will include an application generator and will sit on top of a relational data base manager.

"IBM believes — rightly, in my opinion — that the guts of a CASE environment is the back-end application generator rather than the front-end design modules," Schussel said. IBM, he said, anticipates that third-party software companies will supply front-end CASE tools to interface the repository-based IBM back end.

In fact, the effort to line up such cooperative partners is probably already under way. IBM's Workstation Aided Software Engineering product, announced March 1 and slated for late May availability, contains tasks, activities and panels aimed at providing users with an integrated set of IBM application development products as well as products provided by designated third-party members of IBM's Vendor Logo Program. One of the products includes Index Technology Corp.'s Excelerator analysis and design software.

Multilingual?

The forthcoming repository, according to Schussel, will deploy three IBM fourth-generation languages: Application System, geared toward professional business analysts; Query Management Facility, a query facility and reporter with links to third-generation programming languages; and Cross System Product (CSP), a programmer's tool. All three, as part of SAA, will interface with a wide variety of IBM environments, including VSAM and IMS/DL as well as SQL and DB2, Schussel said.

"CSP, particularly, will play a key role in building CASE environments," he added. "This is IBM's contention, despite the fact that CSP is now felt to be a very modest product."

For customers, according to Barry Brown, director of Manhattan-based Brownstone Solutions, Inc., which makes and markets tools for IBM's DB2, "the repository's being SAA compliant is the critical element. It's the emergence of a repository standard, not the availability of a repository product itself, that's so important."

News of an imminent IBM repository announcement, Digital Consulting's Schussel noted, brings with it a certain sense of deja vu. "IBM's own staff freely admits that the company has promised a repository product for about the past 10 years and has never delivered one," he said. "The usual caveats apply." However, he added, "they're at least acting like they're very serious about this one."

Cullinet DBMS draws raves, but will it sell?

BY NELL MARGOLIS
CW STAFF

WESTWOOD, Mass. — Cullinet Software, Inc. marched its IDMS/SQL relational data base management system squarely into the DEC VAX-based data base market last week and took its best shot at the likes of Sybase, Inc., Relational Technology, Inc., Digital Equipment Corp. and Oracle Corp.

Market analysts found the newcomer technologically impressive and strategically well-thought-out.

"I was blown away by it," said Bob Therrien, an analyst at Paine Webber, Inc. Therrien saw IDMS/SQL and its attendant tool kit demonstrated a week before its official debut. "Its ease of use, the speed of its engine, the whole thrust toward transaction processing — the technology is solid, and Cullinet will also be able to build good applications on top of it as time goes by."

IDMS/SQL and the Knowledgebuild tool set "look real strong, real competitive," said William Shattuck, an analyst with Montgomery Securities, Inc. in San Francisco. "All points considered, I think that Cullinet is going to make a strong showing in the VAX market. It won't happen overnight; it's going to be a building process. But they've got all the pieces in place."

However, Shattuck added, "no matter how good the product looks, the big question is going to be, Can Cullinet sell it?" IDMS/SQL is a late entry in a crowded market.

Chief among the pieces in place is IDMS/SQL itself, "designed from the ground up to be a production-powered data base," according to David A. Litwack, Cullinet's executive vice-president of systems products.

Bench wars

Using the TP-1 benchmark, which is a simulation based on a standard debit/credit banking application, IDMS/SQL turned in 13.4 transaction/sec. against a data base of one million account records, the company claimed.

That performance was shadowed somewhat by rival Sybase's own claim, made two weeks ago, that it had used a TP-1 benchmark of its Release 3.0 to record 29.3 transaction/sec. on a data base containing 100,000 accounts.

To substantiate its claim that IDMS/SQL weds relational DBMSs' ease of use with the speed, reliability and integrity necessary for multiuser, high-volume transaction processing, Cullinet pointed to a barrage of features:

- Modular architecture consisting of an SQL command parser, a query optimizer and a data engine. The three-part design supports query optimization and compiled queries, multithreading, bulk data access and enhanced indexing capability, all of which combine to yield what Cullinet said is high performance and throughput.
- Twenty-four-hour availability. The Cullinet system, Litwack said, requires minimal human intervention and never has to be taken down to perform any data base activity, including maintenance.
- On-line, automatic recovery, as well as several alternative kinds of journaling and archiving features that give the user multiple safeguards against system crashes and data corruption.
- A central data dictionary that defines and houses referential integrity rules and data constraints. Dictionary-driven integrity, Litwack said, not only ensures transapplication consistency but increases programmer productivity in that programmers do not have to rewrite integrity rules for each application created.
- Various features designed to let users access and update tables in a multiuser environment, including nested transactions, which let users begin new transactions while others are still in progress; multilevel data locking; and priority-based deadlock resolution, which means that when two or more transactions go against one data base table simultaneously, the software will take the more important transaction first.
- Multilevel security, including full support for authorization groups. By allowing data base access to be assigned to groups of similarly situated users, rather than requiring authorization on a user-by-user basis, IDMS/SQL can save wear and tear on the MIS director, Litwack said.

Cullinet's Litwack

He added that IDMS/SQL fulfills all requirements of a fully distributed data base system within any VAX network and will soon be able to connect on-line to IBM data bases.

"This is a scope of capabilities you don't expect to see in the first release of a new data base," said Robert Meurer, president of Rnet, a data processing consultancy in Boston.

But the battle, Meurer said, "will be waged at the tools level, and that's where Cullinet has a real advantage: Knowledgebuild and Application Expert."

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Presentation Manager presents porting chore

BY STEPHEN JONES
CW STAFF

REDMOND, Wash. — What was expected to be a smooth bridge between Microsoft Corp.'s Windows applications and its OS/2-run Presentation Manager has turned into a bumpy road for programmers trying to port Windows applications to the new operating system.

These difficulties may stall the emergence of some early Presentation Manager applications if the porting process proves to be more difficult than Microsoft originally promised.

Because it so closely resembles that system, Windows has been portrayed as the only graphics-based development environment that offers trouble-free upward compatibility to the Presentation Manager.

But instead of tackling a simple porting task, developers will be required to convert much of their Windows application code manually, on a line-by-line basis.

The reason: Microsoft's Presentation Manager software development kit does not include the automatic conversion tools that were originally expected to be included in the package, said Adrian King, director of marketing for systems software at Microsoft.

Reams of code

As a result of the lacking automation, King said, the code conversion could take a minimum of two days for a basic Windows application consisting of a few hundred lines of code. When put in the context of a complex commercial application with tens of thousands of lines of code, developers could find writing to Windows to be a major task.

"At one point, we hoped we could provide tools that would make the conversion automatic, but we fell short on having an automated processor," King said.

Developers who are writing to Windows said last week that the absence of automatic conversion poses only small problems. King said he expects that all Windows developers will want to port their applications to the Presentation Manager.

But other companies that have spurned Windows said such potential difficulties confirm initial doubts about the Windows/Presentation Manager compatibility issue.

"Microsoft had been saying, 'If you code for Windows, you code for OS/2,' but that just isn't true," said Brad Silverberg, vice-president of research and development at Borland International. "You shouldn't underestimate the effort of porting a Windows application."

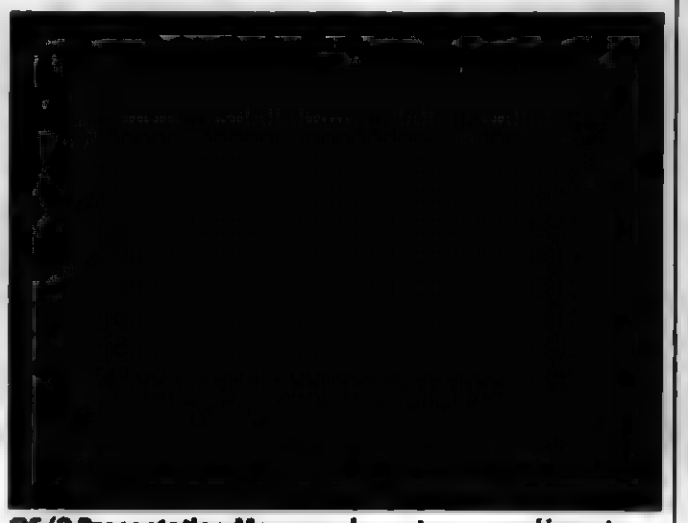
To ease the pain of mechanical- and manual-code switches, Microsoft is bundling a guidebook called "Rosetta Stone" with the developers tool kit. This will provide step-by-step tips on how to reorder parameters within a Windows function call or add new parameters to match with the Presentation Manager.

The tool kit features an online version of the documentation.

Developers such as Aldus Corp. that said Windows will grease the path to the Presentation Manager said they expected the line-by-line coding requirements and have development staff and finances to meet the task at hand. But some developers expressed concern over just how much work the recoding would require.

"Conversion of some kind was expected, but this could be more than anticipated," said Jeff Allen, manager of developer relations for Blyth Software, Inc. in Foster City, Calif.

Microsoft said it hopes to include automatic conversion tools in a future upgrade of the development kit, but it was not clear if the software would be available before the Presentation Manager's expected release in October.



OS/2 Presentation Manager *bears strong resemblance to Microsoft's Windows, but porting the two proves no easy task.*

Heavyweights

FROM PAGE 1

Although it will not announce products, Ashton-Tate also intends to reveal support for Unix, a source close to Ashton-Tate confirmed.

Ashton-Tate's biggest money maker, Dbase, was developed under Unix, Ashton-Tate officials said. As a result, moving to Unix has always been a marketing dilemma rather than a technical challenge.

Although he would not specify how his firm will support the new version, Ashton-Tate Chairman Ed Esber said such a product would make Unix a more viable alternative to Microsoft and IBM's OS/2. "This could lift Unix out of the realm of CP/M," Esber quipped.

Systems software and user interface kingpin Microsoft, which provided no code for the graphical interface, is not expected to announce any applications support. In fact, as of press time, company officials had not decided whether Microsoft Chairman Bill Gates would attend the pledging event.

It was also unclear as of press time what effect the joint Sun and AT&T announcement would have on Microsoft's plans to develop a Presentation Manager-like front end for the version of Unix it is co-developing with AT&T for machines based on Intel Corp.'s 80386. Called Unix 386, it has yet to ship.

The Unix graphical user interface element will clearly add to the software development burden and raises the question of when applications fully supporting the interface will ship. Many vendors, including Lotus and Ashton-Tate, appear to have their plates full upgrading existing products and writing for OS/2. And AT&T is not expected to announce tools that will make OS/2 Presentation Manger or Microsoft's Windows applications portable to the new proposed environment.

As a result, industry observers cautioned users not to expect the applications anytime soon.

Despite the wait, the friendly Unix interface is a key part of AT&T's long-term strategy for broadening the user base of Unix.

West Coast senior correspondent Julie Pitta contributed to this report.

Sun courts DOS users

Intel 80386 workstations eye corporate buyers

BY JULIE PITTA
and ED SCANNELL
CW STAFF

BOSTON — Sun Microsystems, Inc. last week blazed another trail from its traditional engineering stronghold into the front office, introducing two Intel Corp. 80386-based workstations that can run both Unix and Microsoft Corp. MS-DOS applications.

Although the system is expected to boost the Mountain View, Calif., firm's presence in corporate accounts, industry watchers said it may be some time before Unix becomes accepted among those customers.

The Sun386I workstation is offered in 3 million and 5 million instructions per second versions. A standard configuration provides 4M bytes of random-access memory with four expansion slots, allowing a possible 16M bytes of RAM. Both models feature a 1.44M-byte 3½-in. floppy disk drive. Options for hard-disk storage range from 91M to 327M bytes.

Additionally, five different monitors are available, ranging from a 19-in. color monitor to a 15-in. monochrome monitor. Pricing ranges from $7,990 to $13,990. Sun said it has already shipped hundreds of units to selected sites.

A software coprocessor supplied to Sun by Phoenix Technologies Ltd. lets the workstation run MS-DOS sessions under Unix. Using a mouse, users can click between MS-DOS and Unix applications and cut and paste text between Unix and MS-DOS windows.

Currently, the company has no plans to offer an OS/2 version of the workstation.

Sun also ushered in a version of its SunOS operating system, adding a number of new user-friendly features, including an icon-based desktop manager for the operating system.

Although industry watchers said Sun is hoping to branch out from the technical computing environment in which it first made its name, Sun President and Chief Executive Officer Scott McNealy said the company has already made significant progress in the commercial market. "At a [projected] billion dollars, we're not just selling CAD machines," he said.

The Sun386I will be sold through Sun's direct sales force, OEMs and value-added resellers, with the possibility of retail sales still being reviewed.

"So far, there's not tremendous evidence that corporate MIS wants Unix," said Omri Serlin, president of Itom International, a Los Altos, Calif., market research firm. "But the progress of Unix is unstoppable. Eventually, it will penetrate corporations."

"They're not going to take the world by storm," said Michael Orsak, an industry analyst for Robertson, Colman & Stephens. "DOS allows them to get their foot in the door in large corporations. It helps their overall mission."

Bridgework

Sun Microsystems' Sun386I workstations run both SunOS and Microsoft MS-DOS operating systems

Microprocessor	Intel 80386	Intel 80386
Clock speed	[illegible]	[illegible]
Main memory		
RAM*	4M bytes	8M bytes
Maximum	16M bytes	16M bytes
Data bus width	32 bits	32 bits
System bus interconnect		
Type	[illegible]	[illegible]
Number of slots	[illegible]	[illegible]
Number of expansion bus slots	Three 16-bit, one 8-bit	Three 16-bit, one 8-bit
Hard disk capacity	[illegible]	[illegible]
Access time	18 msec	18 msec
Graphics adapter	[illegible]	[illegible]
Color displays		
Formats	14-, 16-, 19-in.	16-, 19-in.
Resolution	1,024 by 768 (14-in.), 1,152 by 900 (16-, 19-in.)	1,152 by 900

* Random-access memory

INFORMATION PROVIDED BY SUN MICROSYSTEMS, INC.
CW CHART

Layoffs imminent as Prime restructures

BY NELL MARGOLIS
CW STAFF

NATICK, Mass. — Prime Computer, Inc. last week restructured its business operations in the wake of its recent purchase of Computervision Corp. But even as the company announced its new corporate reporting chart, reports of imminent layoffs by the CAD/CAM giant, based here, swirled through the industry.

Confirming earlier statements of intent, Prime announced the formation of two separate marketing divisions.

The Computervision division will concentrate on the computer-aided design and manufacturing (CAD/CAM) market.

The commerical and technical division will center its resources on the markets previously served by Prime.

Fischer retains post

Under the new corporate structure, Robert A. Fischer, president of Computervision at the time of the merger, will remain as president of the Computervision division.

Fischer's commercial and technical division counterpart will be W. L. "Roy" Brubaker, formerly Prime's vice-president of worldwide sales.

A single manufacturing and customer service organization will support customers of both divisions, Fischer said, as will one systems marketing and development organization.

Within each such organization, Fischer added, resources will be dedicated to each Prime division.

Reports of an approaching layoff of 500 to 1,000 employees as a result of redundancies created by the merger with Computervision spread within hours of the corporate structure announcement.

A company spokesman confirmed that layoffs are in the offing but did not say how many of Prime's 13,500 employees are likely to be dismissed.

"Positions will be eliminated in a number of areas in the company," the spokesman said, "most likely in operations and in corporate support functions."

Sales staff safe

Manufacturing, where there is excess capacity, is a likely layoff target, according to the spokesman, while direct sales is likely not to be hit at all, according to the spokesman.

Commenting on the imminent end of a Prime record of not laying off employees, the company spokesman said, "When you put two large companies together, there are going to be redundancies."

The company neither confirmed nor denied that the number of layoffs could reach the vast ballpark figure rumored.

AT&T seeks FCC approval for first ISDN rate plan

BY JAMES DALY
CW STAFF

NEW YORK — AT&T filed a tariff with the Federal Communications Commission last week for its first Integrated Services Digital Network (ISDN) service, a networking option that will give users high-speed access to its Megacom voice and Accunet data transmission services.

AT&T's ISDN service will support up to 23 64K bit/sec. voice or data channels over a 1.5M bit/sec. trunk, as defined by the ISDN Primary Rate Interface protocol. It will be the first ISDN Primary Rate Interface service and the first long-distance ISDN service offered in the U.S.

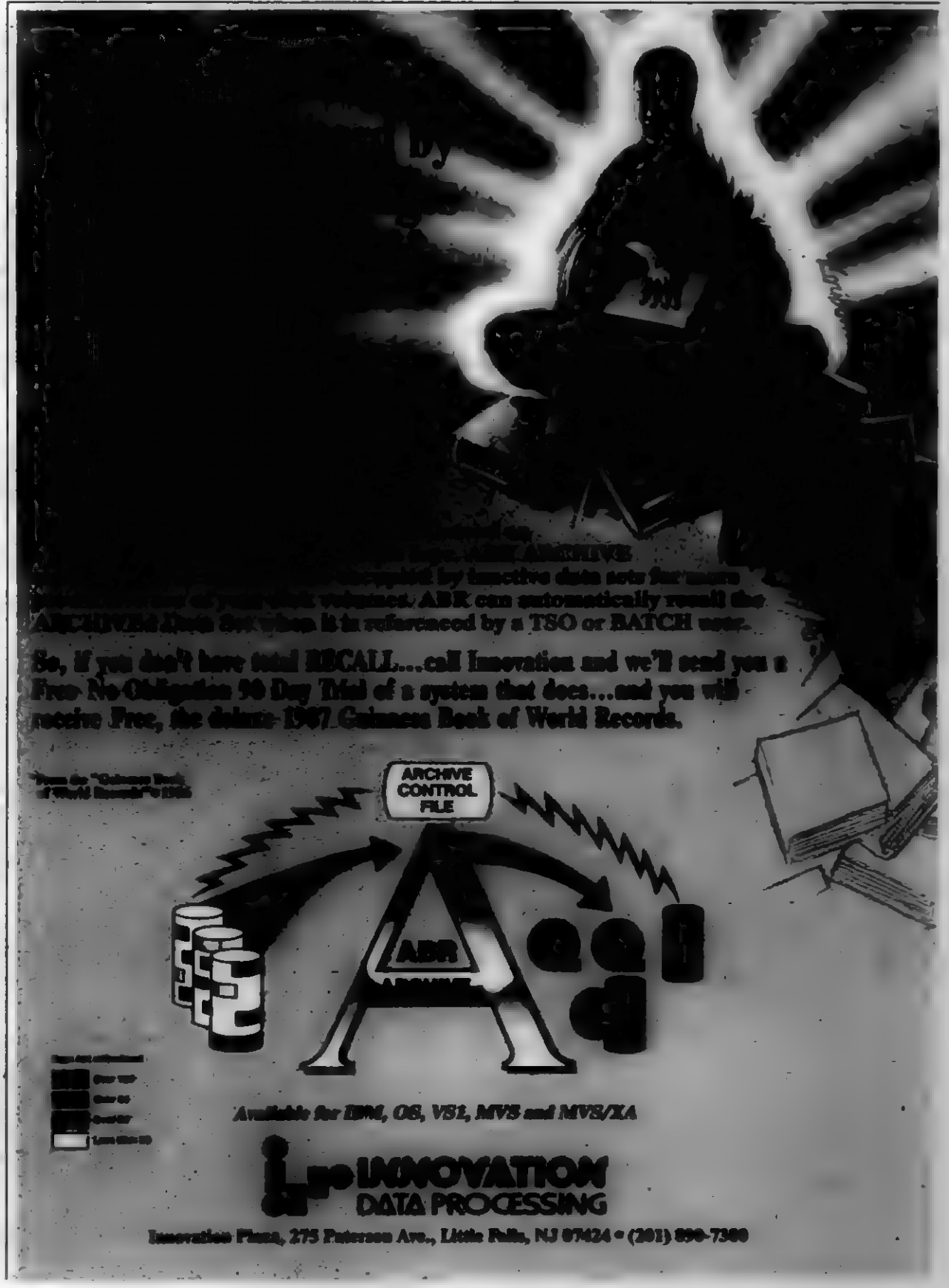
"This will make ISDN available over the whole national geography," said Thomas Nolle, president of Haddonfield, N.J.-based consulting firm CIMI Corp. The long distance service is "the only pervasive form of ISDN possible, because it doesn't require the concurrence of a half-dozen Bell operating companies to make a connection." Two weeks ago, Illinois Bell became the first regional Bell operating company to file a commercial ISDN tariff.

AT&T's tariff, which was filed four months behind schedule, includes a Call-by-Call Service Selection option to allocate 64K bit/sec. channels within the trunk to various AT&T services. A second option is Info-2, an automatic number identification capability that forwards the calling party's billing number to the ISDN customer's premises.

The Call-by-Call Service Selection is "what will make ISDN go," said W. Edward Hodgson, manager of computers and communications at Westinghouse Electric Corp., adding that his company plans to implement AT&T's service.

AT&T plans a $3,000 nonrecurring charge to set up an ISDN link plus a $400 charge per Primary Rate Interface link. Call-by-Call Service Selection carries a one-time $250 charge, plus a $200 charge for reallocating channels within a call-by-call access group. Channels can be reallocated within 24 hours. Info-2 costs three cents for each Info-2 number delivered plus a one-time fee of $200.

The tariff should become available within 90 days, pending FCC approval, in 18 U.S. cities.



HP boosts minis across the board

Precision Architecture rapid-fire releases cover entire spectrum

BY JAMES A. MARTIN
and ALAN ALPER
CW STAFF

NEW YORK — In hopes of gaining an edge on rivals Digital Equipment Corp. and IBM, Hewlett-Packard Co. last week announced minicomputers across its entire product range, from the low-end Micro 3000 to a high-end Spectrum model.

The press conference held here last week was to showcase HP's Precision Architecture, a reduced instruction set computing (RISC) environment the company is positioning as its platform for the future.

Because the first machines in the new line, the HP 3000 Models 930 and 950, were delayed for more than a year by software bugs, HP is now trying to gain back some momentum by releasing products at a rapid rate.

Take the broad road

"This gives us a product line that is as broad as or broader than DEC's — and one that overlaps four architectures and operating systems from IBM," said Doug Spreng, general manager of HP's commercial systems group.

Analysts were generally upbeat about HP's chances for gaining ground on its minicomputer competitors. "The ease of field upgradability, coupled with their price/performance, creates a new benchmark against what other vendors will do," said Christine Hughes, an analyst at the Gartner Group, Inc.

With its Precision Architecture environment, HP's product line is better positioned than any other vendor's to take advantage of the transition to distributed networked computing, according to Michael Millikin of Patricia Seybold's Office Computing Group in Boston.

Among the announcements was the HP 3000 Model 955, an 11 million instructions per second (MIPS) system for commercial applications designed to compete in price and performance with DEC's VAX 8840 and IBM's high-end 4381.

The Model 955 reportedly provides 50% greater performance than the previous HP 3000 high-end machine, the 7-MIPS Model 950, according to HP's Spreng. In addition, Model 950 users can upgrade to the Model 955 with add-in boards at a cost of $120,000.

HP expects to increase the Model 955's performance at a compound annual rate of 40% to 50%, Spreng said. He declined to say how that increase will be accomplished but added that the company is investigating a variety of means, including quadratic symmetrical processing — similar to what DEC has announced for its Polar Star project.

The HP 3000 line was further expanded with the Model 935, a 6-MIPS system that supports up to 240 users for $150,000; the Model 925, with 3.2 MIPS and support for 152 users at $80,000; and the Model 925LX, the new low end of the Spectrum line, with 3.2 MIPS and support for 32 users at $50,000.

The Model 925LX can be upgraded to the Model 925, as can the 925 be to the 935, through what Spreng called a "simple board swap." In comparison, upgrading within the IBM 9370 family or DEC VAX line requires a box swap, he noted.

Gone from the Spectrum lineup is the Model 930. It was announced with the Model 950 in February 1986, but both systems were delayed for more than a year because of software bugs. By the time the Model 930 rollout began last fall, the majority of HP customers were opting for the more expandable, more efficient Model 950. The Model 950 accounts for about 65% to 75% of all Spectrum models being shipped today, according to Kidder, Peabody & Co.

The Model 930 will continue to be supported by HP, but manufacturing will discontinue this year, according to Spreng. Users who ordered or installed a Model 930 will receive full credit toward the purchase of a Model 950, the company said.

New in Unix

HP also introduced three models in its HP 9000 series of multiuser systems based on HP-UX, the company's version of the Unix operating system. The Model 835S supports up to 30 users and costs $45,000; the 835SE supports up to 70 users and costs $99,000. Both will be available this summer.

The HP 9000 Model 855S is said to offer performance boosts of more than 50% over the previous high-end system, the Model 850S. Scheduled for availability in early 1989, the Model 855S costs $320,000.

HP is targeting small business, branch offices and company departments with two additions to its Micro 3000 line. The Micro 3000LX, priced at $10,950, comes standard with 2M bytes of memory and five expansion ports and supports up to eight users.

The Micro 3000GX comes standard with 2M bytes of memory, supports up to 16 users, offers eight expansion ports and costs $15,950.

The Micro 3000 series is not based on HP's Precision Architecture because a less expensive approach was needed to keep the low-end competitive, according to Spreng.

Range of the Spectrum

Hewlett-Packard fills out its reduced instruction set computing-based HP 3000 family

[1] Millions of instructions per second
[2] Replaces the Model 930

INFORMATION PROVIDED BY HEWLETT-PACKARD CO.
CW CHART

Silverlake

FROM PAGE 1

IBM has given Silverlake prototypes to developers or is allowing them to test their software on Silverlake machines on IBM premises.

- With Silverlake, IBM will probably introduce a new version of the RPG language that an IBM official has referred to as RPG-IV. The new version reportedly will include RPG-II and RPG-III and will be offered in SAA and non-SAA versions.
- According to a developer who has had a Silverlake prototype for six months, Silverlake will run System/36 source code after being compiled to run on the new machine. System/38 software, however, will run in object code, he said. Ray Hughes, president of CRT Distribution Systems, Inc. in Waukesha, Wis., said there will also be a so-called "Silverlake-SAA" mode.

Hughes said that adapting his firm's System/38 programs to run in SAA mode was not difficult. Performing the conversion meant changing the System/38 data base features to an SQL-type data base.

He also said that System/36 programs might not perform as well on Silverlake as they do on the System/36 because the latter's source code must be compiled to run on Silverlake.

'No problem'

John Birch, corporate vice-president of McCormack & Dodge Corp., said he has been given all the information necessary to compile System/36 programs to run on Silverlake. He added that he has taken his firm's System/36 and 38 applications to IBM's Rochester, Minn., facility and run them on an engineering model of Silverlake. "We are very confident about compatibility," he said.

Birch said that although a System/36 user must have a software developer compile his program to run on Silverlake, a System/38 user should be able to run the program without alterations.

"The System/38 and Silverlake architectures are closely related," Birch said. Converting the System/38 relational data base with an SQL-based data base will not be a very difficult task, he added.

> "THE System/38 and Silverlake architectures are closely related," so converting the System/38 relational data base with an SQL-based data base will not be a very difficult task.
>
> JOHN BIRCH
> McCORMACK & DODGE CORP.

Birch reported that at a recent M&D users' meeting in Florida, an IBM official referred to RPG-IV in describing the new version of RPG that will be used on the Silverlake machine.

Carolyn Nimmy, manager of education at Insight Database Systems PLC, a London-based firm that develops software for the System/36 and 38, said developers at her firm are busily studying SAA manuals.

"We have been getting familiar with SQL for a while so that we can get familiar with the new box," because the Silverlake data base management system will require SQL, Nimmy said. Insight expects to receive a prototype system soon, she added.

Nimmy said she understands that there will be two versions of RPG-IV: One will be a migration path for current System/36 and 38 users, and the other will be SAA-compliant.

Necessary conversion

Nimmy agreed that System/36 developers will be required to convert System/36 code to run on Silverlake but said such intervention will not be required in the case of System/38 programs.

She suggested that any performance lag that System/36 users might experience will be compensated for by increased performance in Silverlake. Nimmy said IBM officials indicated to her that performance will be boosted by the use of new technology in Silverlake.

However, because Silverlake's SAA-compliant native mode will be the fastest and will include the migration potential promised with SAA, developers will be most attracted to write in the new mode.

BMC partners sue for $20M

HOUSTON — Two former partners of BMC Software, Inc. in Sugar Land, Texas, have filed suit against the third partner and present owner, John Moores, in Fort Bend County Court.

The suit was filed by Scott Boulette of Amherst, Mass., and Daniel Cloer of Harris County, Texas. Cloer and Moores were the original founders of BMC. Richard E. Barry, also of Harris County, has filed a complaint against BMC as well.

The 240-employee firm produces utilities for IBM's MVS and VM and reported $40 million in revenue in 1987.

The suit alleges that Barry and Cloer were instrumental in developing the BMC product line in exchange for receiving one-third of the gross sales on the software. The suit charges the firm reneged on the agreement after July 1982.

BMC President Rick Hosley said he cannot comment on the suit but added, "We have done nothing wrong." The suit seeks $20 million in damages.

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† *Digital News*, December 1, 1986. ‡ Gartner Group currently available research.
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U.S. SEMINARS

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AL	Birmingham	Mar 24
	Montgomery	Mar 17
AR	Little Rock	Mar 31
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	Tucson	Feb 24, Apr 22
CA	Costa Mesa	Feb 11, Mar 31
	Los Angeles — Feb 16, Mar 16, Apr 13	
	Newport Beach	Mar 17
	Oakland	Apr 7
	Ontario	Apr 14
	Sacramento	Apr 9
	San Diego — Feb 09, Mar 16, Apr 20	
	San Francisco — Feb 11, Mar 30, Apr 27	
	San Jose	Mar 09, Apr 6
	Santa Barbara	Apr 23
	Walnut Creek	Apr 8
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	Colorado Springs	Apr 16
CT	Hartford	Apr 14
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	Stamford	Apr 13
DC	Washington	Apr 7
FL	Jacksonville	Mar 31
	Miami	Apr 7
	Orlando	Apr 9
	Tampa	Apr 8
GA	Atlanta — Feb 16, Mar 23, Apr 20	
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	Springfield — Feb 25, Apr 22	
IN	Indianapolis — Feb 16, Mar 24, Apr 21	
KY	Lexington	Apr 16
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LA	New Orleans — Feb 19, Apr 16	
MA	Boston	Apr 7
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	Baltimore	Apr 15
	Bethesda (Federal) — Feb 16, Apr 13	
ME	Portland	Apr 16
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	Grand Rapids	Apr 7
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	St. Louis — Feb 19, Mar 16, Apr 13	
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	Princeton — Feb 24, Mar 22, Apr 20	
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	Cleveland — Feb 24, Mar 24, Apr 21	
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	Tulsa	Apr 14
OR	Portland	Mar 15
PA	Allentown	Mar 22
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	Philadelphia — Feb 11, Mar 09, Apr 15	
	Pittsburgh	Mar 23
	Scranton	Feb 25
	Valley Forge — Feb 16, Mar 16, Apr 21	
SC	Charleston	Mar 09
	Columbia	Apr 08
	Greenville	Apr 06
TN	Knoxville	Feb 03
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TX	Austin	Apr 23
	Dallas — Feb 02, Mar 09, Apr 06	
	El Paso	Mar 15
	Ft. Worth	Mar 22
	Houston — Feb 10, Mar 17, Apr 28	
	San Antonio	Apr 21
UT	Salt Lake City — Mar 10, Apr 13	
VA	Richmond	Mar 09
	Virginia Beach	Feb 11
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COMPUTERWORLD

New face in supercomputing

BY ALAN ALPER
CW STAFF

NEW YORK — Graphics hardware maker Evans & Sutherland last week became an unlikely player in the supercomputer arena, disclosing that it has been developing a general-purpose supercomputer for the past 18 months.

Evans & Sutherland said that the machine it will introduce later this year will exceed the scalar processing performance of Cray Research, Inc. computers.

The supercomputer will be built around a moderately parallel architecture, scalable to eight processors, that uses custom-designed very large-scale integration CMOS technology. It will contain a tightly coupled graphics engine, support up to 2G bytes of memory and run the University of California at Berkeley's Unix 4.2, according to Robert Stevenson, vice-president of marketing at the firm's computer division.

Each processor will contain two computational units offering 50% of the performance of IBM's 3090 mainframe and shared access to the system's large memory space, Stevenson said. The machine's 64 I/O channels will operate at 20M byte/sec. and will have access to hundreds of gigabytes of disk storage, Stevenson said.

In contrast to other supercomputers that operate in a batch-oriented mode, users will work interactively with Evans & Sutherland's supercomputer, Stevenson said. That will enable users performing graphically intensive applications to see the results of their work almost immediately, he contended.

In its largest configuration, the machine is expected to operate at more than one billion instructions per second and deliver one billion floating-point operations per second of vector performance when it goes into production early next year, Evans & Sutherland claimed. It will range in price from $3 million to $8 million, Stevenson noted.

Evans & Sutherland said it expects to compete with Cray, ETA Systems, Inc. and IBM, which offers a vector-processing facility with its 3090. The firm is hoping its reputation within the scientific and technical market, in both the commercial and government segments, will help ease its entry into the business.

"We'll be selling to the same customers who use our simulation and graphics systems products," Stevenson said. "We're not XYZ start-up company."

Marsha Brooks, an analyst with International Data Corp. in Framingham, Mass., said Evans & Sutherland has a well-conceived architectural approach and is properly positioning its product. "There's definitely room for another player in the very high-performance portion of the technical computing market," she said. "They have a strong background in technical applications, a good reputation among their customers and a good chance of succeeding by pushing price/performance."

Balanced processing

Evans & Sutherland's supercomputer will reportedly offer balanced scalar and vector processing, in contrast to the emphasis on vector processing by other supercomputers and minisupercomputers.

The company took a balanced approach because many computing problems are not easily vectorizable, Stevenson claimed. "Some users we talked to said that at 70% vectorization, they were only getting 12% of their machine's performance. That's an inefficient approach; they're throwing away resources."

Evans & Sutherland established a computer development and marketing division in Mountain View, Calif., 18 months ago, said Jean-Yves Leclerc, the division's president. Evans & Sutherland expects to have spent about $20 million on the machine's development, he said.

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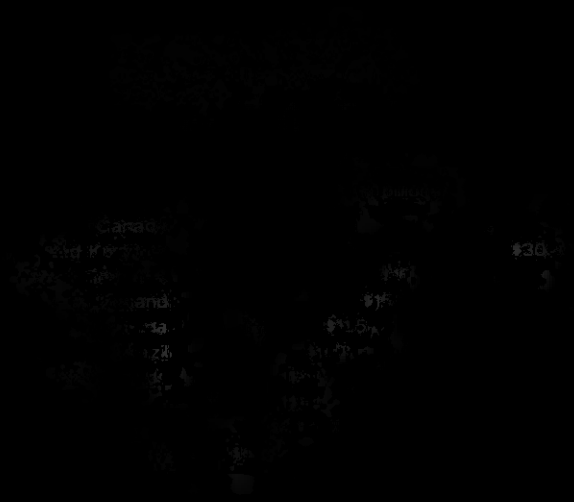

CDC refurbishes Cyber line, aims to revive profits

BY JEAN S. BOZMAN
CW STAFF

MINNEAPOLIS — As bad news began to circulate about its financial position last week, Control Data Corp. took the second of three major steps toward reviving its fortunes, by announcing a revamped Cyber mainframe product line.

The Cyber 930 machines, scheduled for July shipment, emerged just five weeks after high-end Cyber 990s were announced — and two weeks before the planned debut of a new mid-range machine, the Cyber 960, CDC spokesmen said.

Next Monday, CDC is also expected to make significant functional changes to its NOS/VE operating system that will provide greater connectivity for Cyber mainframes by supporting Transmission Control Protocol/Internet Protocol and Ethernet communications standards, CDC spokesmen said.

Timing essential

The revamping of CDC's mainframe line could not have come at a more critical time. After spending the mid-1980s in the throes of a corporate reorganization, the company is just beginning to field new product lines and to reach profitability again.

"Control Data is gradually making progress, but the rate of progress is being retarded by trouble in the area of its peripherals and educational divisions, both of which lost money last year," said Mike Geran, senior research analyst with the Nikko Securities Company International, Inc. in New York. "CDC sold $975 million in disk drives and other peripherals last year and still lost money."

CDC is banking on the fact that the Cyber 930s have proven to be entry points into new accounts, both in the U.S. and abroad. CDC's traditional mainframe base has been steadily eroding, industry analysts said. There are just more than 1,000 Cyber installations worldwide.

Reports deceiving

CDC's annual report, released last week, shows that the firm's $3.37 billion in revenue masks some underlying weaknesses, including the following:

- CDC operated with a negative cash flow in 1987, although it realized a profit from the $313 million sale of its Commercial Credit business unit. The sale allowed CDC to eke out a $19.3 million profit last year — the first year in three that the company has shown a profit.
- The company ended its fiscal year without carrying any domestic lines of bank credit. CDC had to pay off all domestic bank loans after issuing junk bonds in 1987, Geran said. Overseas banks provide CDC's continuing financing, he added.
- CDC said there were cost overruns of $2.5 million associated with the $50 million development cost of the Cyber 930. Financed by a limited partnership formed in 1982, the machine was introduced in March 1987 as the company's first departmental computer. CDC chose to pursue the limited partnership so that it could begin designs for the Cyber 930 while the company was being reorganized.

Last week, CDC provided a dual-processor 930, called the Cyber 932-32, that is priced at $213,800 for a unit with 16M bytes of main memory. The 932-32 acts as a symmetrical multiprocessor, since either CPU can initiate I/O requests or process incoming jobs.

Both new Cyber 930 uniprocessors — the $60,000 Cyber 932-11 and the $125,900 Cyber 932-31 — have redesigned 8M-byte CPUs that are powered by fewer printed-circuit boards than older 930 models. New 64M-byte memory boards, powered by 1M-bit chips, are so compact that a second processor can be added to the 930 cabinet as an $80,000 field upgrade, according to Mike Deck, a Cyber 930 product manager.

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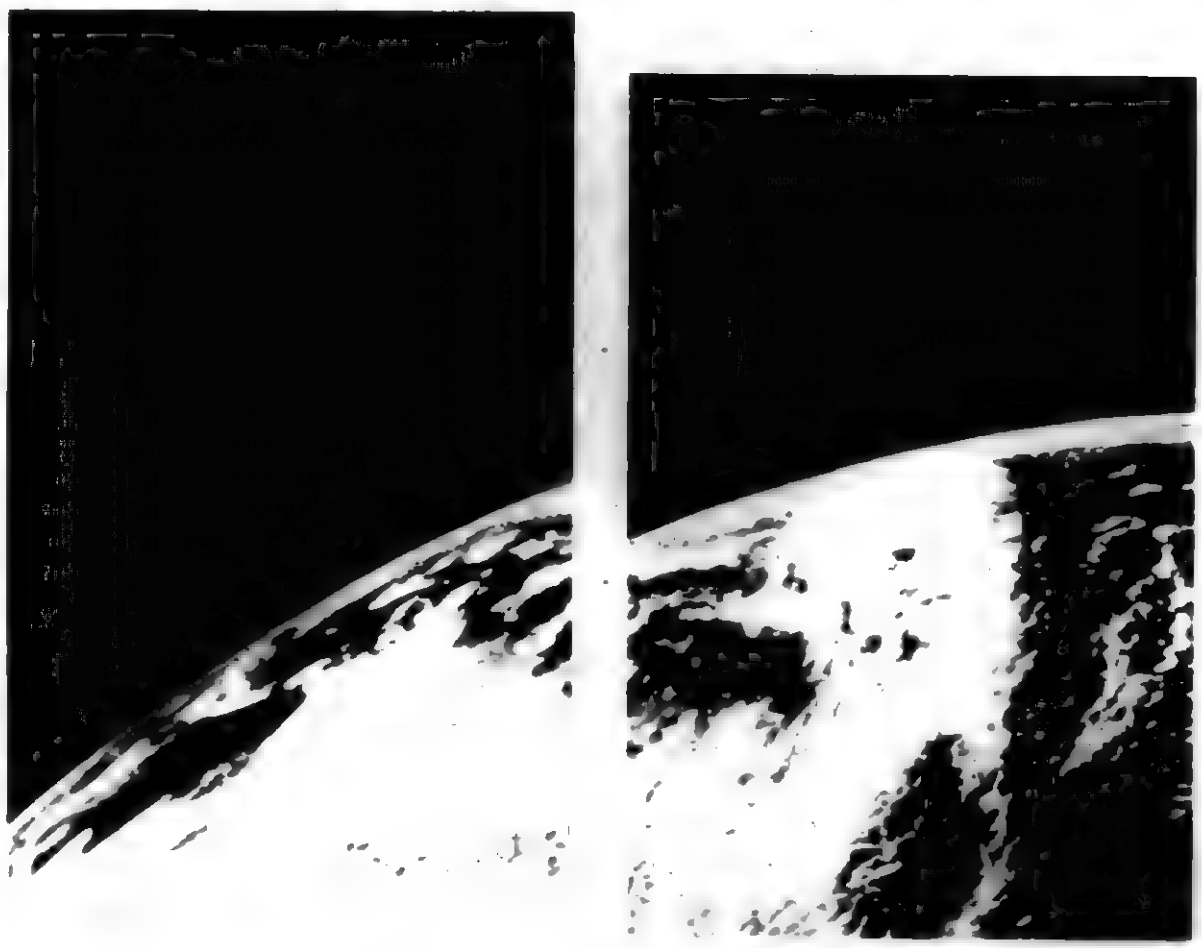

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Wang tweaks image-storing system

Adds AT conversion board, hopes to drive wedge into rivals' sites

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — Looking to drive its Wang Integrated Image Systems (WIIS) deeper into installations dominated by other vendors, Wang Laboratories, Inc. last week broadly enhanced the WIIS line and introduced an add-on board for the IBM Personal Computer.

The year-old WIIS, which turns a Wang VS computer into a filing cabinet for thousands of digitally stored images, will be responsible for $100 million in sales by October, or a little less than 5% of the company's $2.84 billion in annual revenue, according to Wang managers.

The most dramatic of the new WIIS products is a printed-circuit board that will convert an IBM PC AT or IBM-compatible model into a WIIS workstation. Until now, only Wang Advanced Professional Computers could be used to retrieve and display image files from a Wang VS minicomputer.

The PC AT upgrade, which is slated to be available during the third quarter, will cost $1,200 for the board and a 16-in. full-page monitor, according to Ron Arenson, senior marketing manager for Wang applications products. "A large company with hundreds or thousands of ATs can now make them capable of displaying images through the addition of the WIIS board," Arenson explained.

Wang's AT add-on boards were designed to make the firm's imaging technology more attractive to large IBM sites that might consider buying the $200,000 Wang VS computer that supports WIIS.

Limited time only

As an added incentive, Wang also recently established a trial program that allows corporations to try WIIS for three months for a flat fee of $16,500. Arenson said Wang is acutely aware that it must grab market share before major competitors like IBM and Digital Equipment Corp. unveil competing imaging systems.

"We were told by consultants that we had a 12- to 18-month lead on the competition," Arenson said, "and that lead time is just about over. There is very little question that all our major competitors will be in the imaging market fairly soon."

Other new WIIS products include two preconfigured imaging workstations based on Wang Professional Computer 240s. One workstation, priced at $6,940, displays three image windows with 100 dot/in. resolution, while the other, priced at $7,940, displays two windows at 200 dot/in.

For image-intensive applications, Wang introduced the 4620 Image Workstation, a $7,940 terminal that uses a mouse to manipulate on-screen icons for document selection.

Fax server coming

To promote the networking of WIIS, Wang said, it plans to market a VS facsimile server this fall. The server would allow Wang Office electronic mail messages to be distributed to remote facsimile machines, even on a worldwide basis. The $13,900 VS Fax Server hardware and software is compatible with any industry-standard Group III facsimile machine, Wang spokesmen said.

Finally, Wang added an intelligent optical character recognition (OCR) device that it said allows paper documents scanned into a WIIS to be automatically indexed in a WIIS data base. The $34,630 OCR device and a $7,200 controller that interfaces with the VS computer are scheduled for shipment in the fourth quarter, Wang said.

Wang's hardware announcements were accompanied by the introduction of nine WIIS off-the-shelf applications and eight WIIS software packages developed by third-party vendors.

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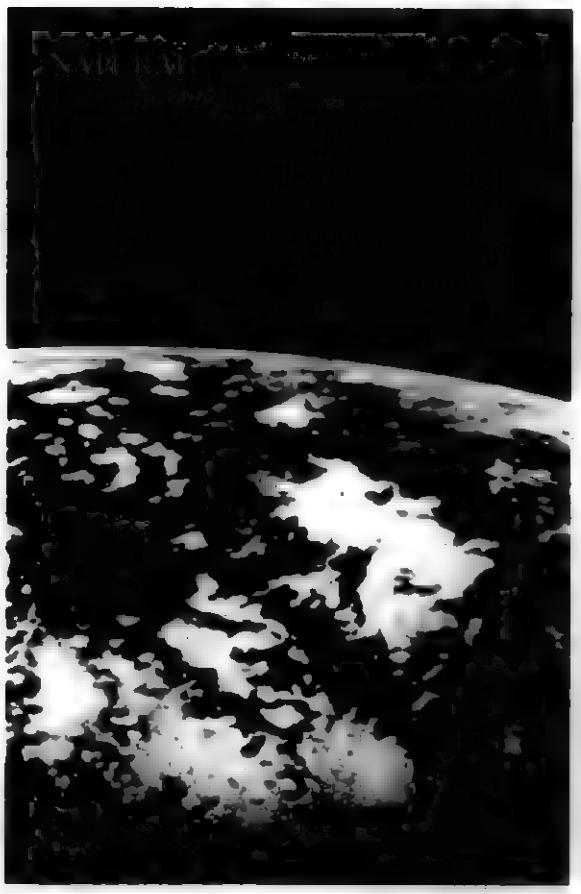

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DEC wriggles way into WORM market

BY STANLEY GIBSON
CW STAFF

MARLBORO, Mass. — Digital Equipment Corp. last week slid its first write-once ready-many (WORM) optical disk drive into the market but opted for the more established 12-in. format rather than the newer, but less widely used, 5¼-in. size.

DEC's RV-20 optical disk drive handles 12-in. disks capable of storing 1G byte of data on each side.

DEC also announced a software package called Storage Library System, which reportedly can help users store and manipulate data on DEC's RV-20 subsystem as well as on tape subsystems. The library system can prevent the wrong volume from being mounted and the wrong user from seeing it, DEC said.

DEC added that it expects the RV-20 to find acceptance in the financial services, health care, engineering and pharmaceutical industries, in which long-term storage of important data is necessary.

Analysts were undecided on the drive's chances for success. "The DEC WORM drive will be regarded as an advancement in the eyes of the computer industry, but the reality is that it's a total dog. It's at least a generation behind," asserted Jay Bretzmann, a storage systems analyst at International Data Corp.

However, Louise Biggs, a storage analyst at Dataquest, Inc., was more positive. "I thought it was a great announcement. They're the second serious systems manufacturer, after Tandem, to integrate optical drives. It's a real positive indication for the optical industry. The 12-in. technology is proven and thoroughly tested. Systems vendors, such as DEC, are much more cautious than third-party vendors about what they will integrate."

Bretzmann, however, said that DEC should have utilized 5¼-in. media because major technological strides are being made in that area and it is considerably less expensive.

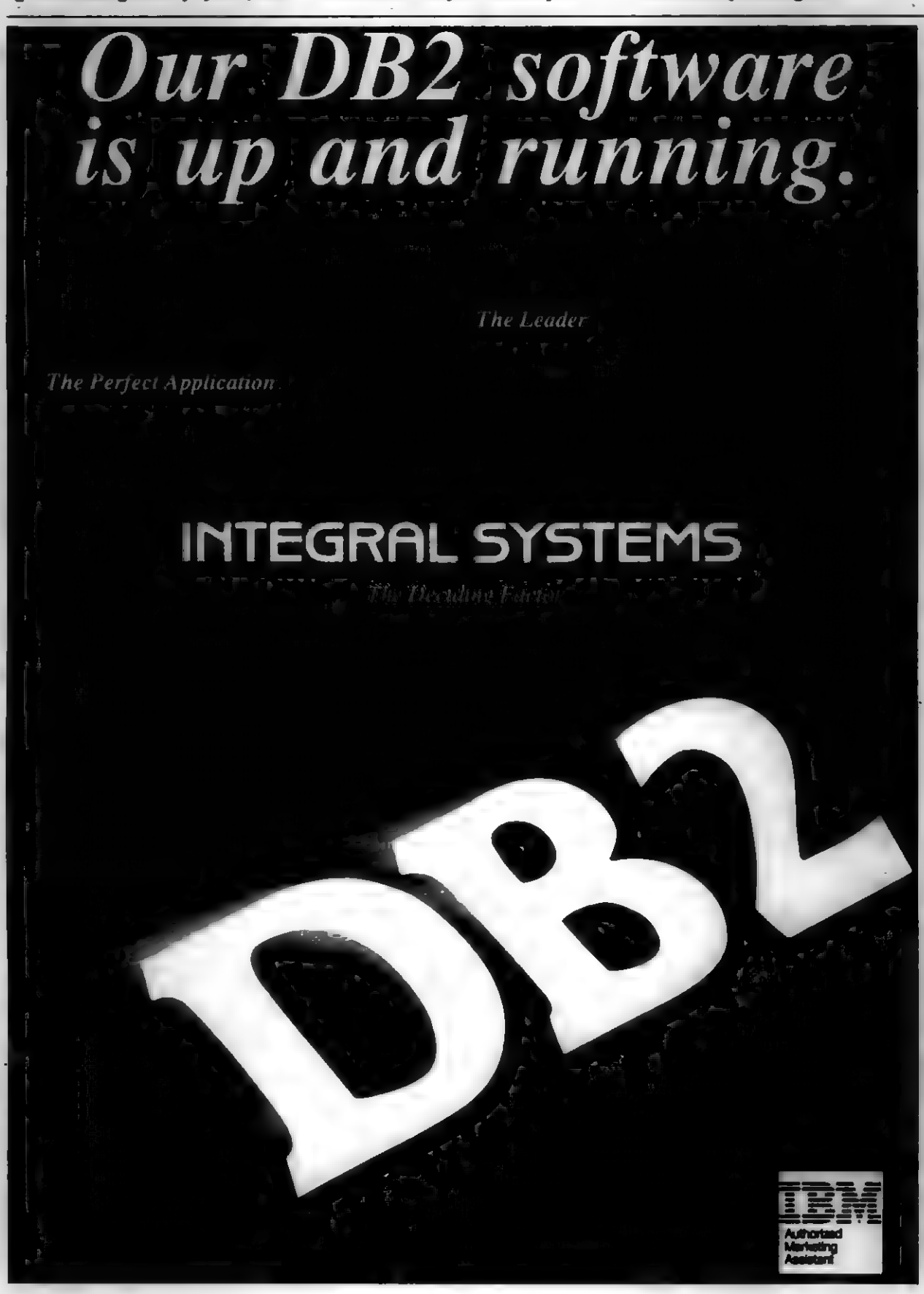
"A third party could come out with a 5¼-in. product in the next year that could blow [DEC] away," Bretzmann said. The DEC-compatible optical storage devices now available from third parties are already generally as good as, if not better than, DEC's, he added.

The RV-20 subsystem is available immediately for BI and Q-bus systems; Unibus support will be available in the future, according to DEC. Currently, the system is offered under DEC's VMS operating system, although DEC said support under its Ultrix will be offered later.

The RV-20 consists of an adapter card connected to a master drive, which consists of a controller and one drive. Three additional slave drives may be connected.

The RV-20 is priced at $30,000. Additional RV-20 drives cost $25,000, and each optical disk is priced at $400. The subsystems and media are available 30 days after receipt of order, DEC said.

The Storage Library System, scheduled to ship next month, will be licensed according to number of users, with fees starting at $500.



Apple slices up sales, marketing

BY JULIE PITTA
CW STAFF

CUPERTINO, Calif. — Apple Computer, Inc. last week restructured its sales and marketing organization into three separate units addressing different geographic regions. The regional distinction reflects the growing importance of international markets to the company, an Apple spokeswoman said.

The company also established an end-user services organization, allowing large end users to obtain service directly from Apple on a fee basis.

As a result of the restructuring, the Apple sales and marketing division is now composed of Apple USA, Apple Europe and Apple Pacific. Last year, international sales accounted for one-third of Apple's revenue.

Heading Apple USA will be Charles M. Boesenberg, former senior vice-president of U.S. sales and marketing and now vice-president and group executive for the new unit.

Jerry Malec, previously vice-president and general manager of Apple's Central region, has been appointed vice-president of the Business Markets Group. Apple is searching for an executive to direct the Education Markets Group, which in the interim will be headed by Boesenberg.

The Marketing and Support Group will be led by Joseph Schoendorf, who joined Apple last year as vice-president of marketing.

James Buckley, formerly sales manager for North Central operations, has been promoted to vice-president and general manager of the Central Marketing Group.

Apple International has been split into Apple Europe and Apple Pacific, encompassing Canada, Australia and Japan and exploring opportunities in Latin America and the Pacific Rim region.

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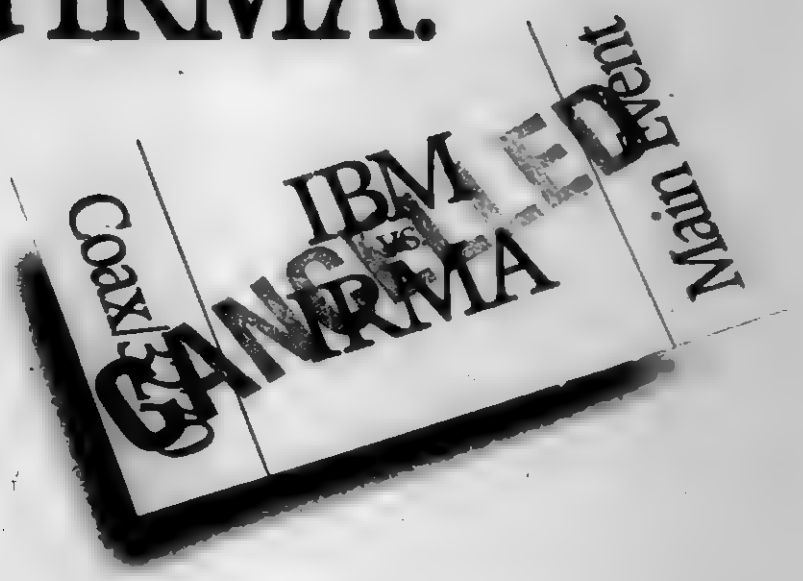

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EDITORIAL

Beyond promises

THE SPECTER OF personal computer myopia — the vision of a world where everything except microprocessor-based hardware is incidental to the professional computing environment — is threatening to take a new twist.

The high priests of this vision are now throwing superminis onto the mainframe pyre, pointing to the faltering market performance of DEC and others as proof positive.

They also point to the heightened demand for local-area network servers relative to the slackening demand for minis and superminis as further evidence of the inexorable march to smallness in system design.

Instead of listening to this high-tech hoopla, perhaps it is a better idea to heed the message that is showing up regularly in the business press: The greatest threat to American competitiveness is the fixation on the short term.

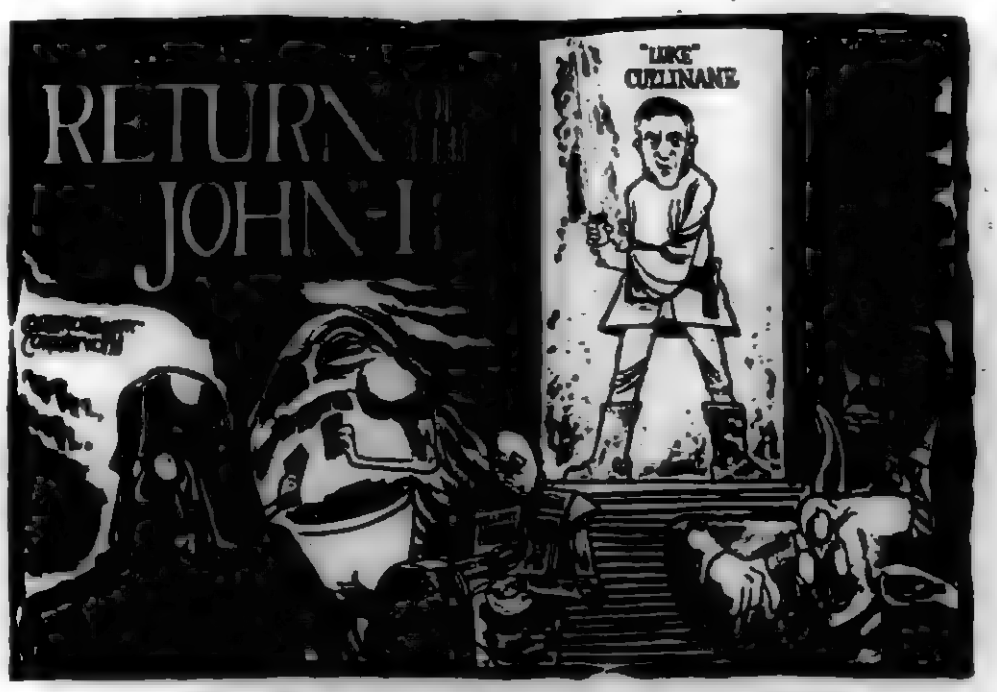
Ironically, this fixation is promoted within the business media, where quarterly performance gains so much attention at the expense of real trends. This is a particularly important point for information professionals to comprehend, because their environment is increasingly tied to the long-term plans and goals of their companies.

The fact is that the relatively slack performance of some minicomputer makers can be traced to product cycles, as well as to general uncertainty about the U.S. economy in this election year. DEC is on the downward slope in a major product life cycle, while Hewlett-Packard is just mounting the up-side of the cycle with its Spectrum series, and HP's market performance reflects this.

There is absolutely no denying the vital role to be played by microprocessor-based distributed systems in information systems of the 1990s. But it is crazy to assume — as the high priests would have us doing — that technology stands still in some segments while it races ahead in others. The DEC PDP-11s of 15 years ago appear archaic next to the superminis of today, which won't hold a candle to their own offspring 10 years hence.

Wisely, the vast majority of large businesses appear to be taking a cautious approach to implementing PC networks other than in self-contained situations. The reasons are many, including the limitations of the microprocessor and PC operating systems for large, multiuser configurations; the lack of progress in developing true distributed data base technology that can maintain integrity in a large-scale environment; and the simple fact that a million instructions per second on a mini or mainframe is not at all like a MIPS on a micro.

Despite the 16M-byte potential address space of IBM's Personal Computer AT, practical applications tapping more than 640K bytes were never developed in the four-year life span of that machine. Serious systems development cannot live on promises.



LETTERS TO THE EDITOR

Debate continues over object-code only

Regarding the object-code only (OCO) article [CW, Feb. 8], the view from the mountain top is much nicer than it is from the trenches.

In the IBM VM world, OCO has made the job harder for the troops. In the past, we could debug the problems in bringing up a new release of our operating system. Now we cannot, and IBM's support center is not much help. So instead of improving migration in the complex VM shop, it has slowed down migration. Further, it has made migration more expensive. Instead of fixing the problem, we have to talk to someone at IBM who might be able to fix it.

The story as presented by Peter Schneider is much rosier than it is viewed by many of us. We see new features minimplemented in new releases that we cannot change. The full-screen support of VM/SP Release 5 CMS is a classic example. The company promised us exits, and we have been given excuses.

I think IBM's OCO policy has had one beneficial effect. We certainly look much more closely at Brand X software vendors that provide source than we might have otherwise.

T. Y. Johnston
Manager, Systems Programming
Stanford Linear Accelerator Center
Stanford University
Stanford, Calif.

I would like to go on record as being one customer who does not support the idea of object-code only. I disagree with the idea that IBM software is "functionally complete" as stated by Peter Schneider. For me, the strength of many of IBM's software products has lain in my ability to tailor them to my environment. Changes that make business sense for some installations might not for others, and it may be difficult to justify inclusion in subsequent product releases.

I realize that modifications cause maintenance problems for myself and IBM. But it is important to remember that my business is to provide performance and functionality to my user community, not to make things easy. Most shops do not modify IBM code lightly, performing a serious cost/benefit analysis before doing so. IBM apparently considers itself more capable than its customers of managing customers' environments.

IBM has attempted to assuage customers by stating that exits and other interfaces will be supplied to replace the need for access to the actual code. I doubt that these new exits will be available at all except in cases of "sufficient demonstrated need," leaving customers with specialized needs to look to other vendors or do without.

I am not willing to sacrifice my ability to serve my users to solve IBM's problems.

J. R. Garrett
Manager
Technical Services
Fina Oil and Chemical Co.
Dallas

I enjoyed the discussion of IBM's object-code only policy. However, I must take exception to Martin Goetz's comments regarding IBM's DB2.

Goetz argued that "the only interface to DB2 is SQL" and that this limited the capabilities to build complementary software for DB2. One of DB2's primary objectives is to guarantee the integrity of DB2 data.

However, in manuals for DB2, the internal structures of the DB2 data areas are rigorously defined. This information can and has been used to develop third-party data base design tools. A performance monitoring tool, developed by a non-IBM company, is scheduled to be available in the third quarter of this year and will be more powerful than IBM's current offerings.

Goetz also stated that "there is no way to determine through SQL where the data physically resides." This is because DB2 uses VSAM data sets to physically store the data. These sets are catalogued and follow strict naming conventions to identify the table space they belong to.

I agree that IBM has made third-party developers' jobs more difficult, but I believe IBM has also given them sufficient information to provide competitive products. I feel comfortable supporting non-IBM products that utilize DB2's standard interfaces because they will utilize the capabilities of DB2 as that product is enhanced without jeopardizing its integrity.

Tom Umberger
Consultant
Spectrum Technology Group, Inc.
Tampa, Fla.

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

When a skeptic tastes a Macintosh — and likes it

ASHLEY GRAYSON

The culture shock of adopting the Macintosh after 20 years with command-line interfaces can be overcome even by a skeptic like me.

Part of the reason is the increasing availability of applications. However, Macintoshes were not brought into my shop in a search for more applications — we can't use even a fraction of those available for the IBM PC.

We tried the Apple machine because our Mac enthusiast's evangelism finally got to us. We adopted it because of the growing efforts of PC software developers to adopt Mac conventions.

The Mac offers a seamless user environment that brings two benefits: a uniform interface, which allows skills learned in one area to be immediately applied elsewhere; and the ability to commingle text, graphics and spreadsheet data in a single compound document.

Neither of these qualities has been a PC hallmark. However, as PC developers attempt to build these capabilities on top of a recalcitrant DOS, they demonstrate the superiority of the Macintosh approach — a single environment that can be shared by all programs.

The improved DOS-based products provide value to us PC users, but the seams show. If the most popular software packages redefine the PC environment, why not adopt the source of their inspiration?

A tool for the job

And there are some applications that are best solved with the innovative Macintosh tools. Our organization has a unique requirement for a small text data base that is unified with a tickler file — or "to do" list — a phone directory and a spreadsheet.

After two years of searching for a tool to implement the data base on a PC, we decided that Borland International's Paradox running on an IBM PC AT-class machine was the best answer. But this package was too big to pop up, wouldn't link to a spreadsheet and would take too much programming effort.

Using Apple's Hypercard on a Mac, I was able to implement our application in just three days. And it was fun. Fun is too important to overlook as a factor. A current Apple television ad positions the Macintosh as a system that beats the training bottleneck because "the users train

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MIKE MASC

Grayson is the founder of ADG, a San Pedro, Calif.-based organization that develops sales tools and programs for high-technology companies.

What's not in a name

ELISABETH HORWITT

Vendors that tend to be a trifle austere and pragmatic, not to say unoriginal, in their choice of product names have come up with some weird project code names for systems and software packages still on the drawing board.

Perhaps it's just that although a formal offering must fit into a vendor's long-term marketing theme or numbering scheme, a development project is out of the public eye, unofficially the property of techies with their own senses of humor.

Take IBM, whose idea of a catchy microcomputer brand name is something that starts with the word "personal." The vendor got positively silly when its Personal Computer AT, PCjr and PC Convertible were in the development stage, dubbing them Popcorn, Peanut and Clamshell, respectively.

At other times, IBM project directors have revealed a penchant for the aesthetic. A mysterious communications processor rumored to be in the works at IBM is code-named Monet. And, of course, there's Silverlake, which evokes visions of some romantic vacation spot rather than a convergence of IBM's mid-range computer line.

Named after Dad

IBM PC software companies tend to reflect the whims of their founders when code-naming important projects. Lotus founder Mitch Kapor's appreciation of music — he used to be a disk jockey — is said to be behind product names like Symphony and Jazz. Lotus's 1-2-3 was code-named Trio during its development stages. (We understand that Kapor named his firm Lotus because of his involvement with transcendental meditation).

Microsoft's Word was code-named Cashmere because founder Bill Gates is a sweater enthusiast.

Finally, there are names clearly meant to inspire developers. For example, Xerox dubbed one of its projects Worm in hopes that it would produce a computer that could eat into Apple's market share.

But one questions some choices, such as the wisdom of Data General choosing the code name Asparagus for a switch it is co-developing with Nippon Telegraph and Telephone. A DG spokesman explains that the name was chosen because "asparagus requires a lot of nurturing and fertilizer and takes two or three years before it is edible." Not necessarily a good omen for a key component of DG's networking strategy.

Horwitt is a *Computerworld* senior editor, networking.

Tales of laundry, gunnery and AI

History repeats itself; don't look for AI overnight

JOHN BARNES

It can be a mistake to extrapolate too much from the past, but now and then I run across a pattern in the history of technology that fits some present-day problems.

One that might bear on the continuing quest for artifical intelligence — not so much about how AI is likely to be achieved but in what sort of environment — begins with the humble washing machine. Once upon a time, the basic technique was to take clothes down to the river, smear soap on them, beat them against a flat rock, rinse them and squeeze the water out with your hands. A "clothes washer" was the person who performed this operation.

Then people learned to make a better shaped flat rock — the washboard — and to keep the soapy water in a single container — the washtub — thus saving soap and effort.

In the next stage, you pumped a foot treadle to rotate a washtub around an agitator, drained the soapy water, refilled the tub with rinse water, did it again, drained the rinse water and ran the clothing through a crank wringer.

Although the same things were getting done to the clothes and a human being still had to be there to make the machine do the job, the machine was doing the bulk of the work. Machine-assisted washing had arrived.

More stages followed. The drum and wringer were powered; then a spin drum replaced the wringer; then the machine did everything in one drum. The machine "learned" to add the right amounts of water at the right temperatures at the right times and then to shut itself off when it was done. It became the automated washer, a step at a time.

A British 'computer'

In another case, some of the immediate ancestors of the computer were machines used by the British government to work out, entry by entry, the values for naval gunnery tables.

These figures were then printed in a book. When it was time to use them, a man took the bearings from spotters, looked up the corresponding values, processed them with a slide rule, pencil and pad into a bearing and elevation and finally ordered the gunners to lay the gun accordingly. That man was called the "computer."

Later, the calculating machines became so cheap that ships could carry their own and take the values directly without looking through the book. Then the machines learned to do the job of the slide rule/pencil/man system from data entered by the spotters. And then to do their own spotting. And then to aim the guns. . . .

Building smarter people

Maybe the question we should be asking is not, "How can a machine get smarter?" but, "How can a machine help a person be smarter?" Eventually, the machine will end up being smart for the person.

In some ways, it already is. The oldest word processor I know of uses the next period, question mark or exclamation point as the terminator of a sentence. If there isn't one, it goes right to the end of the file. More recent word processors stop at a paragraph end, are not fooled by Mr., Ms., Mrs. or Dr. and treat an ellipsis as a single period.

The current model knows that, "Oh! Dr. Mangrove! You startled me . . . what are you doing?" is probably all one sentence and will check with the user to make sure. The word processor is evolving toward doing what a program needs to do to understand English prose.

Similarly, a doctor using a text processor to research cases toward a diagnosis is on the road to a true diagnostic system. Based on historical precedent, one can imagine the machine taking over parts of the job of deciding what's relevant, then perhaps of deciding what's similar, until one day the system can discover previously unknown syndromes and write research protocols to identify them.

We can draw the following few ideas from the history of other technologies:

• Shoot for a small increment every time rather than a great leap forward. Make every program just a little smarter than it has to be. A program that mails collection notices might first write a short report on several collections from each ZIP code or phone exchange. Later, it might

Continued on page 20

Barnes is the Pacific Northwest area manager for ADG, a high-tech marketing organization based in San Pedro, Calif. His first novel, *The Man Who Pulled Down the Sky*, was published by Congdon & Weed. His second novel, *Sins of Origin*, will be published this spring.

Macintosh

CONTINUED FROM PAGE 19

themselves." Apple may be uncomfortable saying so to "serious business people," but it is the fun factor that drives self-training. It's a fundamental element of the Macintosh experience that you can't plan for but can depend on.

Much PC training is rote procedure. Employees really learn how to do things by working with people already doing them. Mouse skills for the Mac are better developed by a good game than by a training module. This learning experience bypasses the need to put concepts into words, the critical hang-up in documentation. Thus the Mac hasn't so much solved the documentation problem as dodged it.

Proficiency at Lotus's 1-2-3 will not make you a more efficient user of Microsoft's Word on the PC because the metaphors are so different. On the Mac, however, every software package you use will enhance your skills with the machine because everything builds on the common base. Add-in word processors for 1-2-3 are trying to simulate a common metaphor, but they're starting too far down the chain.

Pluses and minuses

In the Mac community, the quintessential machine is the Macintosh Plus. Available at tempting discounts compared with the new flagship Macintosh SE and able to run virtually every package yet developed for the Mac family, it's a good first buy. But consider Mac Plus an opportunity rather than an investment. The Mac SE delivers the Macintosh look and feel in a tighter package and includes a 20M-byte hard disk drive.

The Macintosh II, however, delivers a different psychological impact. Essentially a Motorola 68020-based workstation, it is the first packaging of the Mac that resembles a PC AT; like the Intel 80286-based computers, a truly high-performance system must be custom-built from third-party components.

For example, my favorite 286-based system is a Hewlett-Packard Vectra with a Video Seven, Inc. Deluxe extended Enhanced Graphics Adapter controller and a NEC Multisync Monitor. To replicate this approach in the Macintosh environment, we acquired a stripped Mac II. This $3,000 package included 1M byte of memory, one 800K-byte floppy disk drive and no video controller or monitor.

Surprisingly, it took a month to get add-in memory chips at reasonable prices. Third-party sources complained that Apple had dropped its own list price below the compatible vendor's cost but hadn't actually shipped any product. I finally had to sweat out installing an additional 4M bytes of Mac memory cards. An anomaly in the Mac world, the process is nonintuitive, mechanically challenging and best left to an experienced dealer.

Even including the memory woes, our high-performance package flew together, the entire system booting up in less than an hour. To the basic Mac II we added three components from Supermac Technology: an XP150I, which is a 150M-byte internal hard disk, an HP Spectrum video card and a Trinitron-based 19-inch color monitor.

Since our existing Mac Plus configuration included an external Apple hard disk drive, we simply screwed the small computer systems interface connector to the back of the Mac II and copied 15M bytes of applications directly to the Supermac hard disk. With a "shareware" program to colorize the standard Mac programs, we had the ultimate California Macintosh — aqua-tinted screen with salmon-color menus showing beige highlights — in less than an hour.

This is the real Mac II experience; it's like producing a motion picture. More than $12,000 worth of hardware and the talents of a creative director have brought alive amazing images on the screen.

But I wonder, is it a personal workstation or a departmental resource? And will we draw a large enough audience of users to the wide screen to make back the investment?

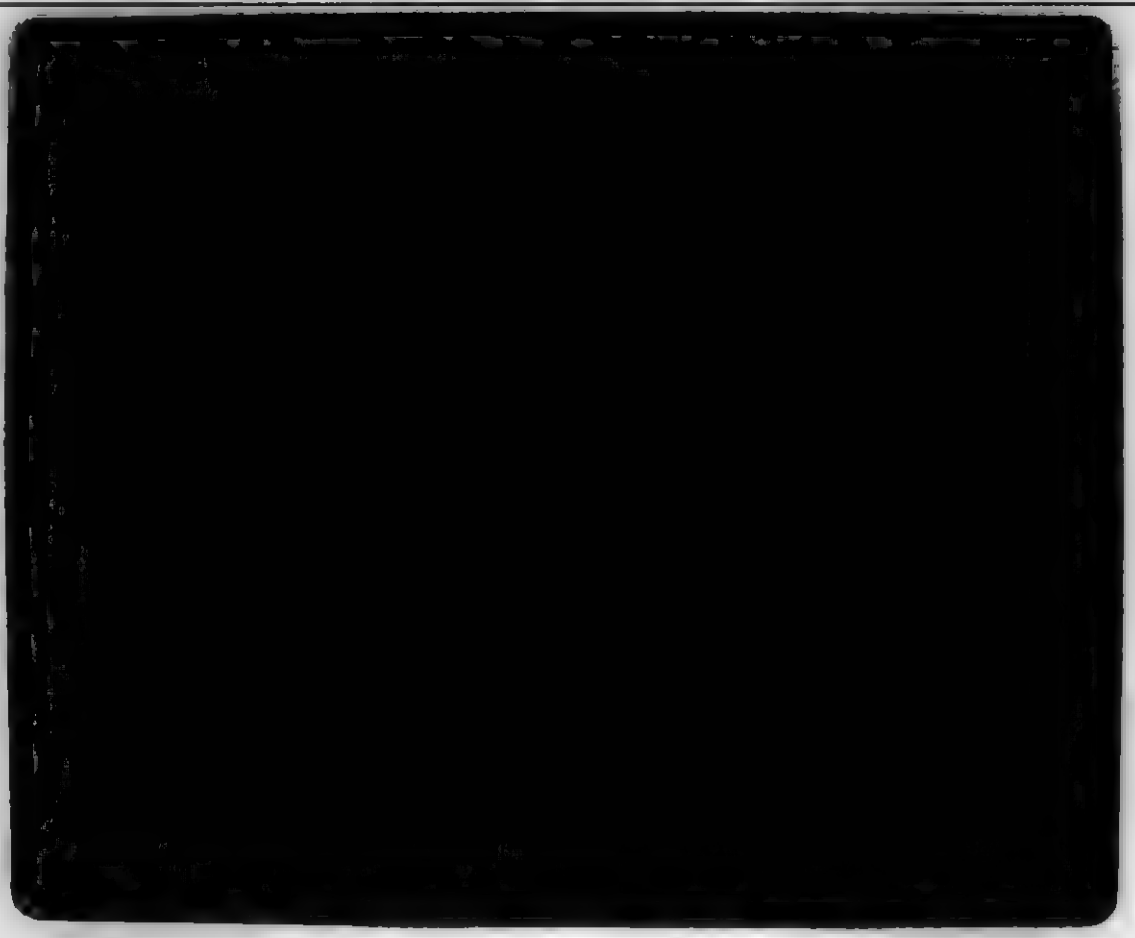
Laundry

CONTINUED FROM PAGE 19

be allowed to find out where collection notices make the most difference.

- Ask the people who read the output what they wish were included. Who would know better? Then, see if there's a way for them to tell the program, instead of you, what they want.
- Ask the output's readers what they do after they read it. Maybe part of the process can be integrated into the program.
- Upgrade existing programs by giving them better front-end filters and wider access to data. Historically, automation comes in steps — first the machine that does the work under guidance, then the self-guided machine and, finally, the machine that decides what needs to be done. The more a program knows about what it is supposed to do, the fewer restrictions there need be on what data it can access — and the closer you are to AI.
- Keep risks low. Every program should automate as much as it safely can — no more. Shoot for machine-assisted natural intelligence in data base searching, but not in updates. A weird search costs little, but a weird update can be disastrous.

The key point is that it doesn't all come at once. If history tells us anything, true AI won't be born in one blinding moment. More likely, it will evolve slowly into existence from what can be called machine-assisted natural intelligence.



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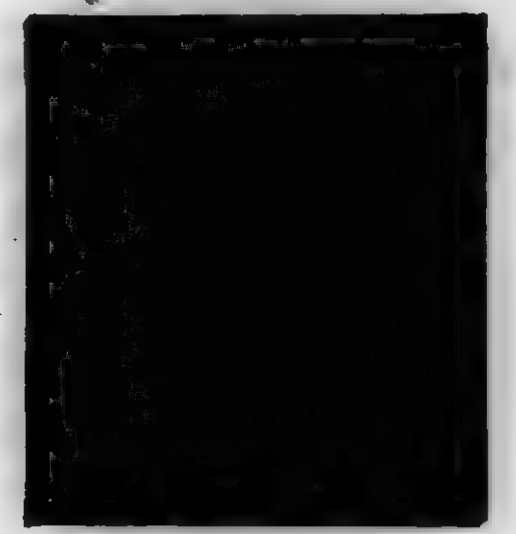

It goes without saying that a software package has to support the latest operating systems, processing environments, databases and the like.

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SOFTWARE & SERVICES

SOFT TALK

Charles Babcock

IBM's magic carpet ride

IBM's recent moves indicate it is attempting to escape its history as a silicon-and-sheet metal hardware manufacturer and instead wants to transport its customers to a new level of computing proficiency, allowing computer use to spread beyond current limits.

At this higher level, systems will work the way they logically should, rather than depend on specific machine and procedural requirements. Users will float above the fray, not caring about their underlying processor or data base management system.

They will be transported through this ethereal world as if on a magic carpet, with all bumps smoothed and all obstacles crossed as they enjoy an uninterrupted view of the business at hand.

IBM's Systems Application Architecture (SAA) is a giant step in the direction of such a pseudo-machine environment. With its SAA approach, IBM could introduce underlying technologies without changing the way programmers develop applications or the way end users view their computing resources.

In its more recent announce-

Continued on page 26

Rebutting System/36, 38 fears

Users group president Sutherland takes calmer look at SAA issues

Since introducing Systems Application Architecture (SAA) a year ago, IBM has had little to say about how its mid-range System/36 and 38 follow-on, code-named Silverlake, will fit into its plan to provide application portability across its major environments.

As a result, members of Common, IBM's mid-range users group, have not been shy in expressing concerns about the lack of attention to the System/36 and 38 line in SAA. In a recent interview with *Computerworld* senior writer Rosemary Hamilton, Robert Sutherland, the president of Common, addressed those fears and took a calmer approach to the SAA issue.

Robert Sutherland

What are Common's concerns about SAA?

It at first appeared that the System/3X community is — not completely excluded — but there were concerns that SAA is a 370 thing. I don't feel that's true. The concept is a great idea. I believe [IBM's] intent is not to exclude us, but this has been a real hot button.

IBM has said Silverlake will come under the SAA umbrella. What is IBM's position regarding the current System/36 and 38 line and SAA?

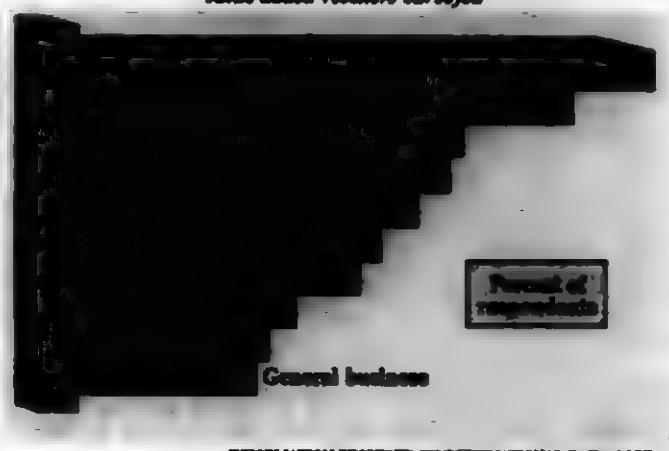
They have been offering classes for writing [System/36 and 38] software for the future. They

Continued on page 27

Data View

Applications planned by Unix VARs

Manufacturing and medical top the markets targeted by 303 value-added resellers surveyed



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

Accountant takes CASE

BY ALAN ALPER
CW STAFF

NEW YORK — Claiming the ability to automate the entire application development life cycle, Arthur Andersen & Co. last week formally unveiled what it characterised as a fully integrated computer-aided software engineering (CASE) package.

The Chicago-based consulting services and accounting firm tied its existing application design and development system to a new data dictionary and code

Continued on page 25

Pro/Fit eases time burdens

BY NELL MARGOLIS
CW STAFF

FALLS CHURCH, Va. — The latest offerings from Wang Laboratories, Inc.'s captive software house, Information Management Consultants, Inc., target professionals for whom time is money as well as nonprofit associations.

With Pro/Fit, a four-module software package that tracks billing and expenses and analyzes how those factors fit into the overall company profit picture, Information Management aims to ease the time-keeping burden of architects, public relations personnel, business consultants and others involved in time-bound services.

In addition to Accounts Receivable, Accounts Payable and General Ledger, Pro/Fit provides a Time and Billing module with which detailed information is automatically tracked for professionals working on billable or

Continued on page 26

Inside

- Computervision ports Product Data Manager to VAX. Page 25.
- Ross Systems releases simulation system for $10-$ family. Page 31.
- TBS Software rolls out Replate Release 2. Page 31.

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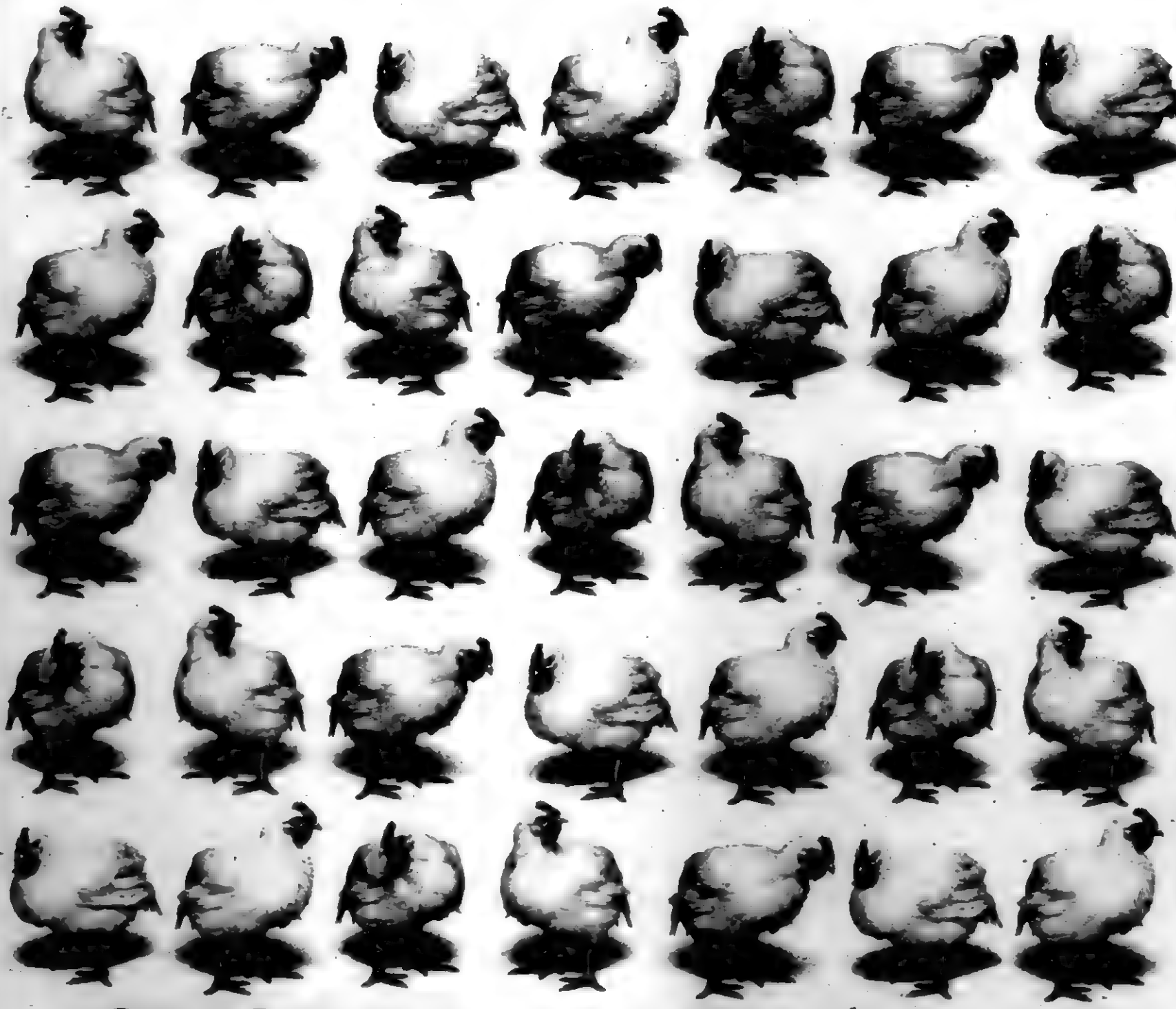

CINCOM Boosts Production At Holly Farms.

***PROBLEM:** Improving programmer productivity in order to reduce a large applications backlog*

***CINCOM SOLVED IT:** With MANTIS Application Development System*

Mr. Bill Clontz
Director of Computer Services
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"MANTIS was ideal for us because you don't need 2-3 years of experience to use it," explained Bill Clontz, Director of Computer Services at Holly Farms. "It lets us take new graduates, quickly train them and, in a matter of weeks, turn them into valuable programmers."

As a result, programmer productivity at Holly Farms has reached an all-time high. "We've seen substantial improvement ratios," Clontz said. "In the time a programmer might turn out one CICS command-level program, he can turn out from six to eight programs on MANTIS."

Most of the 500-plus MANTIS applications now in production at Holly Farms are aimed at streamlining costs. For example, Data Processing used MANTIS to develop a model of how chickens consume feed over the course of their lives, allowing Holly Farms to cut production at one of its feed mills by 1½ days a week.

"We've got key users who are picking up on the term 'MANTIS,'" Clontz noted. "Around here, MANTIS has become a synonym for 'get it done quickly.'"

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Accountant

CONTINUED FROM PAGE 23

generation facilities into a package named Foundation. The CASE tool kit, which the company has been advertising for several weeks, is aimed initially at developing applications for IBM's DB2 relational data base management systems that run in CICS environments on IBM mainframes.

The company is also developing implementations of Foundation for Digital Equipment Corp. VAX and Honeywell Bull, Inc. DP 7 and DP 8 systems, but did not say when they will be available.

The name game

Arthur Andersen is entering the CASE business at a time when Big Eight rivals Arthur Young and Peat, Marwick, Main & Co. are also marketing application development systems to compete with the panoply of stand-alone and integrated products offered by independent software vendors. Arthur Andersen is betting that its name recognition among the Fortune 500 and its 25 years of software consulting will ease its entry into the market.

"Customers are looking to share development and maintenance costs," said Melvyn Bergstein, managing partner of Arthur Andersen's Management Information Consulting practice. "They're looking for partners with experience in CASE."

Key to Foundation is its active data dictionary for DB2 that provides referential integrity for all applications developed, noted Glover Ferguson, Foundation development director. Foundation fills a temporary void in IBM's DB2 product offering since IBM has yet to offer an active data dictionary for DB2.

Arthur Andersen will modify Foundation's data dictionary to support an IBM DB2 repository, which industry observers expect will debut in the fall.

Foundation consists of three integrated modules: Method/1, a set of life cycle methodology tools that run on an IBM Personal Computer; Design/1, which includes a data repository that resides on a file server to facilitate the sharing of design specifications among networked micros; and Install/1, the mainframe environment for implementing DB2 and CICS applications and generating Cobol II code.

An integrated development methodology provides a consistent approach to development and maintenance, Ferguson said, since specifications can be shared and reused in various development stages.

Design/1 has a screen design aid for creating field definitions, a graphics facility that is mouse controlled and offers a library of icons for data flow diagrams and a prototyping facility. Design/1 generates specifications that can be used to create documentation and operates on most networks that support IBM's Netbios protocol, the company said.

Specifications developed with Design/1 can be automatically uploaded to populate Install/1's data dictionary on the mainframe via an integrated data extraction and management facility, Ferguson said.

A single copy of Install/1 lists for $200,000; a Method/1 site license costs $50,000. Prices for Design/1 start at $7,300 for a single copy and decrease to about $4,300 per networked workstation, depending on the number of workstations.

Computervision PDM software eyes VAX

BY NELL MARGOLIS
CW STAFF

BEDFORD, Mass. — The Computervision division of Prime Computer, Inc. is reportedly bringing its Product Data Manager (PDM) mainframe software to the Digital Equipment Corp. VAX in the second quarter.

Designed to manage computer-aided design, manufacturing and engineering data bases at both the MIS and departmental levels, PDM is made up of three basic facilities, said Al Hopkins, Computervision's systems marketing director. The first facility, Controlled Storage, allows for central security control of a data base storage area with the systems manager creating authorization levels.

Data Distribution lets users store, retrieve, move and manipulate data elements with a single keystroke command, while central control remains vested in the systems administrator.

A third facility, Data Management, provides a release/revision control system that ensures designs, plans or other collections of data that go through a review process are released only after all responsible parties have signed off on them. For instance, Hopkins said, if 10 people have to review design changes, the release and revision system is automatically invoked, and an altered design cannot be sent on to the next step until all 10 people have approved the change.

In addition, the Data Management facility includes an administration module and a customer programming interface. Through the interface, Hopkins said, users can program in macros or sets of procedures that can then be invoked with a single command.

The vendor recommends PDM for VAXs capable of 1.5 million instructions per second or more. PDM on the VAX will be priced starting at $75,000, Computervision said.

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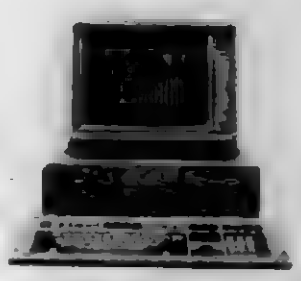
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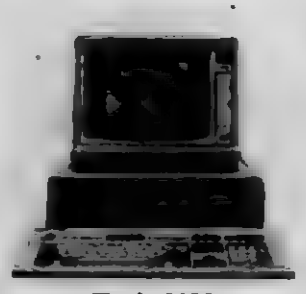
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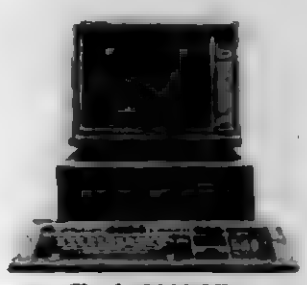
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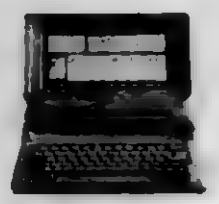
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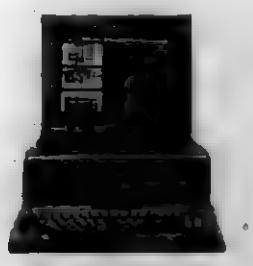
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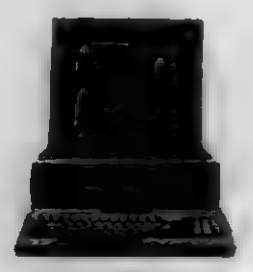
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Babcock

FROM PAGE 23

ment of AIX, a Posix-compliant type of Unix, for the mainframe, IBM indicated it will offer a second software architecture that will complement SAA. With high-connectivity features, AIX will link to other Unix-oriented systems and tie them to the host. In effect, IBM is offering a bridge between the quasi-public world of Unix and its proprietary mainframe environments.

Although application portability is the most commonly stated goal of SAA, it offers the possibility of freeing both IBM and its customers from being circumscribed by incompatible hardware platforms. The conversion nightmares undergone by some customers trying to leap the wall between a mid-range IBM System/36 or 38 into the 370 family would be eliminated.

IBM at the controls

Lest we become mesmerized, it should be noted that IBM will exercise a great deal of control over this world and will sell a great deal of software in it. While SAA embraces public standards where they exist, it necessarily includes a great many features that only IBM can provide — and can change at will. SAA leverages IBM's programming resources, now heavily committed to the firm's existing product lines rather than innovation, and multiplies them by letting them develop for more than one hardware arena.

SAA also eliminates the need within IBM to constantly reinvent the wheel. The user interface will be set across all systems. One drawback to this, however, is that someone else will do the work if the interface is to be advanced.

In a world dominated by SAA, IBM will control the mainframe DBMS and have it closely tied to the operating system. The announcement of ESA/370, a new MVS dressed up with data spaces, was a step in that direction. Having undisputed control of the host and already owner of the network architecture, IBM also wants to be the possessor of the means of distributing corporate data.

Once IBM has convinced customers that all will benefit from this new software uniformity, it can begin addressing a larger base of end users. Instead of being isolated experimenters, this growing pool would be tied closely to a host through distributed data base systems and cooperative processing applications. And that software would become the engine that finally drives the demand for mainframes forward.

Babcock is Computerworld's senior editor, software & services.

Pro/Fit

FROM PAGE 23

nonbillable client accounts. Editing, review and reporting features are included so that final bills and in-house records can be generated by the software.

Written in Speed II, a fourth-generation language from Seattle-based Tom Software, Pro/Fit can reportedly be customized to fit the individual company's client billing, accounting and reporting structures, Information Management President Sudhakar Shenoy said.

Wasted time

Just as professionals spend too much time tracking time, so do professional societies, trade associations and other nonprofit organizations that get bogged down in the attempt to track and manage membership and meetings, Shenoy said.

Information Management provides automated aid in the form of a second four-module software suite called Executive Director.

Membership Management System, Meetings Management, Exhibit Administration and Membership Accounting make up the Executive Director system, which is also written in Speed II.

Pro/Fit and Executive Director, both of which run on Wang VS computers, are available immediately at prices ranging from $8,000 to approximately $50,000, depending on the modules purchased and the amount of support.

SQL Performance for OLTP.

Tandem challenges anyone.

Rebutting

FROM PAGE 23

wouldn't be offering those courses for nothing. So in my opinion, SAA will be available on the System/36 and 38.

From your work as a consultant and your position as the president of Common, what have you picked up as user concerns regarding SAA?
My clients are small businesses and are typically not concerned. In the overall System/3X community, they have been concerned that SAA is too 370 oriented, and they've been worried that they would have to learn the 370 environment and learn how to write for that world.

Has Common been offering users any guidance on SAA?
Common doesn't offer specific guidance, but we are encouraging users to learn about SAA. We can't tell them what to do.

What about in your role as a consultant?
There are a lot of little users who are not concerned with SAA or what the new [Silverlake] system will look like. What they care about is what a system costs. Many of them are happy and see no need to make plans for change.

For instance, I just helped a client upgrade from a System/34 to a 36. He had the System/34 for 10 years. The new System/36 is his investment for the future.

How do users feel about IBM's overall mid-range strategy, which incorporates the 9370 and the System/36 and 38 line?
I haven't seen the 9370 become a big issue. Other than SAA, I don't see much confusion.

Has IBM addressed Common on its SAA strategy?
There have been some SAA sessions, yes, with IBM speakers.

What has IBM told you?
I couldn't answer, since I wasn't at those sessions.

Do you know what IBM's position is regarding the existing System/36 and 38 line and SAA?
Not exactly. I know their intent is to put RPG III [under SAA].

I get the impression that you view the System/36 community as isolated from whatever else IBM is doing.
You could say that. There isn't a need for change in the 36 area. I don't see it.

Are you saying that System/38 users should be more concerned about SAA than System/36 users?
That's a fair statement.

Why?
Primarily because they are data base oriented. From what I hear, SAA is geared toward that environment. If you look at SAA, in my opinion, it would allow you transportability from PCs to a high-end 370.

And that is a function that doesn't have a purpose in a System/36 environment?
Not today.

What about in the future?
Who knows what that will bring. The gain is that it will give [System/36] users other options, in terms of hardware platforms, for the future.

But that wouldn't be the case if the current System/36 line isn't under the SAA umbrella.
I don't believe IBM will leave it out of the scheme of things. It's been the best-selling hardware for years. They won't exclude it.

IBM's intent may not be to exclude it, but what has the firm said that indicates it will include SAA?
They had a session at Common that explained how SAA would fit together. A System/36 text processor was used under SAA as an example of what would be incorporated under SAA.

Have you been briefed about Silverlake?
No comment.

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logy played a major role in Kaman's choice. Levenson stated, ed reliability, flexibility and as few people as possible to run the system. ributed transaction processing system to track the state of our the most cost-effective of all the alternatives we've examined. be more competitive; we'll run our business and serve our ers better, faster and smarter."

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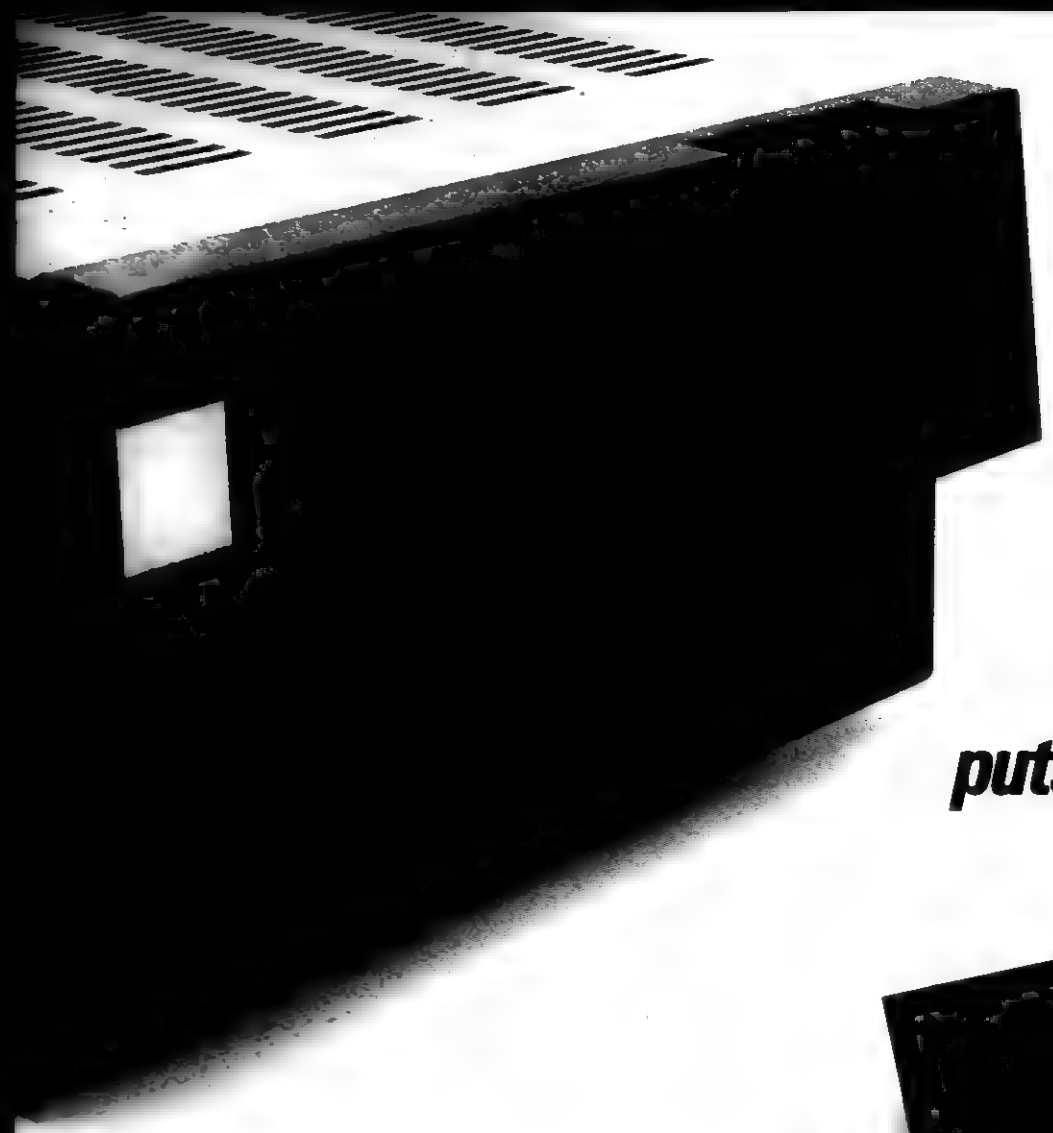

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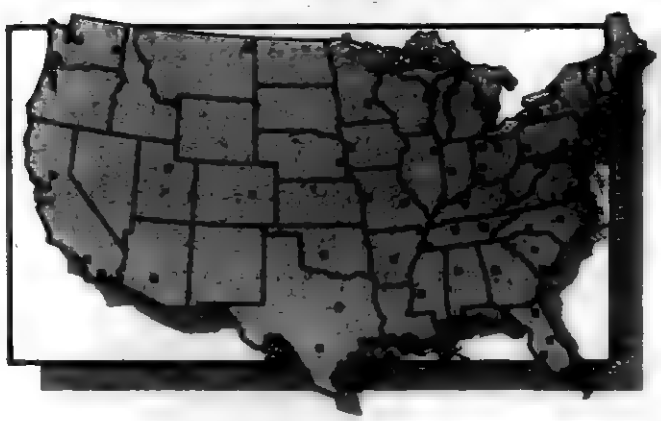

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NEW PRODUCTS

Systems software

Ikos Systems, Inc. has released a version of its simulation system for Sun Microsystems, Inc.'s Sun-3 family of workstations.

The Sun-based **Ikos Simulation System** consists of the Ikos system software and an Ikos 800 or Ikos 1900 hardware accelerator module and an interface card. The system may be configured as a shared-network resource, allowing a single Sun workstation to act as a server for up to four Ikos accelerator modules.

The Ikos 800 accelerator module provides modeling of up to 64K-byte primitives and simulation speeds up to 20 million events per second; the Ikos 1900 has the capacity to model up to 246K-byte primitives and offers simulation speeds up to 75 million events per second.

The Ikos Simulation System for the Sun platform is priced from $57,000.

Ikos Systems, 145 N. Wolfe Road, Sunnyvale, Calif. 94086. 408-245-1900.

Utilities

TBS Software, Inc. has announced **Release 2** of **Hupdate**, its IBM Distributed Office Support System (Disoss) on-line HUP management system.

Hupdate is a CICS transaction that lets the Disoss system administrator view, add, update and delete user definitions while the Disoss region is active and users are logged on.

Enhancements include support for Disoss Version 3, Release 4; support for working relationships; support for IBM MVS/XA 31-bit addressing; logging of updates; post-update user exit; and such usability enhancements as expanded access code fields, more primary commands, improved documentation and new installation options.

A single-CPU perpetual license is $5,000. A single-site multiple-CPU license costs $6,000.

TBS Software, 28 Viamede Circle, North York, Ontario, Canada M2K 2A8. 416-221-5140.

An operations tool for users of IBM's CICS designed to enable the user to streamline operations and manage resources has been announced by **Main Frame Software Products Corp.**

Called **Know/CICS**, the menu-driven product offers information about terminals, transactions, files, storage areas, response times and system usage. It also automatically logs off terminals after a specified interval of time.

Other features include broadcast facilities, screen-capture facilities and diagnostics.

Know/CICS uses standard command-level CICS. License fees range from $2,900 to $3,900.

Main Frame Software Products, 1 Hollis St., Wellesley, Mass. 02181. 617-239-0288.

Services

A methodology for information resource management has been introduced by **M. Bryce & Associates, Inc.**

According to the vendor, **Pride-EEM**, which stands for Enterprise Engineering Methodology, is a universal approach for enterprise modeling and the development of an enterprise information strategy.

Pride-EEM consists of five phases. Each phase contains a defined set of activities and tasks to model the enterprise, both logically and physically.

A license fee for the methodology is $25,000.

M. Bryce & Associates, 777 Alderman Road, Palm Harbor, Fla. 32683. 813-786-4567.

Development tools

Information Resources, Inc. has announced a version of its **Express Decision Support System**, which features multidimensional data base capabilities.

Called **Express MDB**, it is written in the C language and is available for the IBM MVS/TSO environment. According to the vendor, Express MDB increases system efficiency by using more compact code than Express. It also streamlines system operation by simplifying the command structure. It reduces the number of system commands from 1,100 to 100.

Express MDB costs $125,000.

Information Resources, 200 Fifth Ave., Waltham, Mass. 02154. 617-890-1100.

Tominy, Inc. has ported its **Data Base-Plus** and **Mach 1** application development systems to minicomputer and microcomputer environments.

The products are now available for Santa Cruz Operation, Inc.'s SCO 386 Xenix, AT&T's 3B2 computers running Unix System V and IBM's System/36 Model 5363. According to the vendor, any previously developed Tominy-based application programs are 100% portable to the new environments.

Data Base-Plus includes a data base manager, a screen handler, a print handler, utilities, an SQL-based query/report writer and programming language interfaces.

Development licenses range from $1,500 to $16,500; runtime licenses range from $750 to $4,000.

Tominy, 4221 Malsbary Road, Cincinnati, Ohio 45242. 513-984-6605.

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Says Rod Bosscawen, Senior Vice President at NCNB:

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MICROCOMPUTING

MICRO BITS

Douglas Barney

C is for criticize

Assembler is better, you C. The ever-effervescent Philippe Kahn of Borland International recently had some choice words about the delay of Lotus's 1-2-3 Release 3. According to the Kahn-man, the delay came as little surprise. "They said Release 3 had been delayed because they needed additional time to shrink and optimize their code. But it is not easy to shrink C code. The best way to make a spreadsheet fast and small is to do what we did with Quattro, and what they had done with the first release of 1-2-3 — write it in assembler," Kahn said in an interview.

Kahn reasserted his theory in an MCI Mail letter sent to some 70 journalists and industry observers. Kahn raked Lotus over the coals for unkept promises that he said "hurt users and the industry" and then launched into the "assembler is better than C for spreadsheets" diatribe.

Who's right? Both. It is reasonable to assume that an assembler-based spreadsheet can be faster and smaller, but it is also true that Lotus will provide Microsoft OS/2 and MS-DOS

Continued on page 39

Publishing systems hit the desk

IBM PS/2-, RT PC-based units readied for shipment in hot market

BY ED SCANNELL
CW STAFF

NEW YORK — IBM last week unveiled two systems aimed at boosting its flagging share of the fast-growing desktop publishing market.

The firm added turnkey desktop publishing systems based on its Personal System/2 Model 80 and RT Personal Computer along with a marketing and development agreement with Interleaf, Inc.

The first product IBM will ship under the agreement is the IBM Interleaf Publisher, a high-end publishing package intended for users in both the corporate and technical markets. The program will be available by the end of May, a spokesman said.

IBM also plans to market a core version of the Interleaf program for its RT PC. The program is an upgraded version of Interleaf's TPS Release 4 and was designed for groups of writers whose systems are networked. It is set to ship in October.

Pact and lips sealed

The agreement calls for Interleaf to develop a number of publishing packages for a range of IBM systems. Both companies refused to comment on future products. The agreement gives IBM worldwide marketing rights to all Interleaf's DOS-compatible products.

Interleaf's version for the PS/2 Model 80 will compete directly against that company's version for Apple Computer, Inc.'s Macintosh. The agreement with Interleaf is seen by some observers as a serious attempt by IBM to break into the desktop publishing market, in which Apple has established a commanding lead.

The two IBM-Interleaf offerings have text, graphics and image capabilities and were designed to work primarily with long and complex documents. Both programs are capable of producing programs compatible with Adobe Systems, Inc.'s Postscript language.

IBM and Interleaf officials said they believe a major advantage of their products over desktop publishing packages is that users can lay out documents hun-

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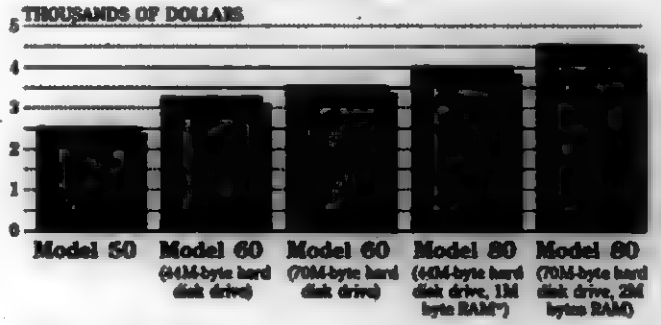
Data View

On the street

Lowest retail prices for IBM Personal System/2 Micro Channel models in February



INFORMATION PROVIDED BY WOHL ASSOCIATES
CW CHART

Epson has its ups, downs

BY ALAN J. RYAN
CW STAFF

TORRANCE, Calif. — The fluctuating values of the Japanese yen and the dollar was one reason Epson America, Inc. cited as it hiked prices on its microcomputer printers and dropped prices on some of its personal computers.

The company increased the prices of the printers between $30 and $100. New pricing for

Continued on page 38

Everex aims 386 system at Deskpro

Everex Systems, Inc. has introduced a 20-MHz Intel Corp. 80386-based system capable of processing 5 million instructions per second that will be positioned directly against Compaq Computer Corp.'s Deskpro 386 Model 20.

Christened the Step 386/20, the company claimed the machine is the fastest 386-based system now on the market and is priced about 30% below the Deskpro 386 Model 20.

The Step 386/20 achieves its processing speeds through the company's proprietary Advanced Memory Management Architecture. This memory scheme allows microcomputers to use write-back caching for the first time, a spokesman said. This technology is commonly used in mainframes.

The cache size is scalable, allowing it to increase according to the amount of main memory being used, a spokesman said. Although Everex has been selling systems for several years, the

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Inside

- Phoenix's Levandov chimes around. Page 36.
- Lotus draws blueprint to data access. Page 35.
- VM Personal Computing's Relay Gold goes for the network. Page 40.

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SMALL TALK

Rich Finkelstein

IBM plants PC DBMS roots

Data base announcements have been splashed across a lot of front pages lately, with much of the downpour generated by personal computer data base management system vendors' scrambling for a position in the emerging SQL market.

But the entrance of a new and highly conspicuous player has also turned a few heads. IBM's announcement of the OS/2 Extended Edition data base manager, the Data Manager, sent a message out loud and clear — IBM means business and wants a piece of the PC DBMS action. And unlike many of its newest competitors, the IBM OS/2 product will ship this summer — not late this year or sometime next year.

The Data Manager is not only an essential ingredient of IBM's Personal System/2 hardware strategy but is also the foundation of its future data processing and data base architecture.

Division of labor

Built from the ground up for the PS/2, the Data Manager may usher in a new age of cooperative processing. Instead of monolithic, overworked and overloaded mainframes, corporations will be able to divide the work among layers of data base servers, using the OS/2 Data Manager at the front end and IBM System/34, 36 and 38s, 9370s or 3090s at the back end. Key to this strategy is the Data Manager's support for two major components of IBM's Systems Application Architecture (SAA), Advanced Program-to-Program Communications (APPC) and SQL.

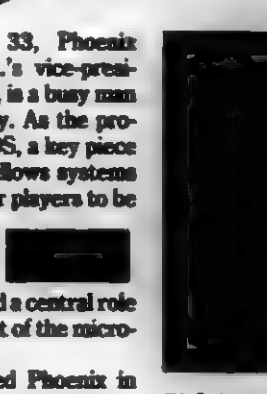
Cooperative processing requires a rich communications protocol suitable for multiple platforms. Rather than use its own LAN Manager Netbios protocol, which only provides a PC network solution, IBM has chosen to build the Data Manager around OS/2 Extended Edition Communication Manager's APPC protocol. Applications systems using APPC support will be able to access remote data bases such as DB2 or SQL/DS seamlessly on a peer-to-peer basis.

Of equal importance is support for SQL, a common data in-

Continued on page 39

Phoenix Technologies' Levandov urges PC makers to send in the clones

Rich Levandov, 33, Phoenix Technologies Ltd.'s vice-president of marketing, is a busy man at a busy company. As the provider of ROM BIOS, a key piece of software that allows systems from several major players to be legally 100% compatible with those from IBM, Phoenix has played a central role in the development of the microcomputer market.



ED SLAMAN

Rich Levandov *advocates Micro Channel cloning*

Levandov joined Phoenix in June 1984. Prior to that, he worked for two years at Wang Laboratories, Inc. as a product manager for that company's Professional Computer series. Before joining Wang, Levandov worked as a director of marketing at CSSN, Inc., a Boston-based systems supplier, and at the former Burroughs Corp. as a software support engineer. He holds a B.S. degree from Harper College and a master's degree in computer science from MIT.

Levandov has been so busy these days, in fact, that he had to conduct this interview with Senior Editor Ed Scannell over his car phone on his way home from a usual 10-hour workday of meeting with vendors.

Is IBM's Micro Channel worth cloning?

We think it is. Actually, there are two answers to that. The first is that on engineering merit, compared with the [IBM Personal Computer] XT and AT bus, I believe it is a better bus. It is cleaner, has more capabilities, and it is better defined.

The other thing people talk about is, "What is the perceived value to the end user [of the Micro Channel]? Well, does the end user really care about the bus? I think the answer is, if end users don't care that much about a bus, then there is nothing wrong with it.

What is Phoenix's role in cloning the Micro Channel?

Our role in that technology is obviously one of analysis and consultation and [establishing] close working relationships with silicon manufacturers as to the systems-level design issues involved. Another role is in development of the A BIOS and the systems software set.

We needed to be very aware of the feature sets of the different silicon platforms we were going to be incorporating so we could "turn on" via the BIOS. It is the BIOS that essentially is the first piece of software in any personal computer to become active.

How far will IBM go in defending its patents? How much is intimidation to gain time, and how much is real?

For IBM to be at the de facto standard centering around their technology, they have to understand, internally, that industry adoption of this bus is good for the industry and, therefore, that it is very good for IBM. This also relates to licensing.

I think there has been enough said to make people believe they are going to license the utility patents. In a market share orientation, everybody knows it is better to get a smaller piece of the bigger market than 100% of no market.

What kind of Micro Channel clones can we expect to see?

[Clone manufacturers] will be able to legally emulate the function of the Micro Channel bus such that any option board that plugs into an IBM product will plug into a compatible product. And it will all be done under the proper methodology such that no one brings on patent or copyright infringements toward them. If that involves licensing from IBM, it will happen.

Continued on page 36

PCtools Deluxe top buy?

Disk utilities package scores in completeness

BY T. A. ELKINS
SPECIAL TO CW

In this article, I plan to examine the relative strengths and weaknesses of various disk utilities programs.

Central Point Software's recently introduced PCtools Deluxe, priced at $80, may become the new best buy in disk utilities. It is clearly a good and very complete software package.

The PCtools Deluxe has a defragmentation program that is leisurely but very reliable. It also has a good backup utility. Central Point has even tossed in three format protection procedures and two surface-scan programs that provide considerable routine maintenance.

In addition, the central program undeletes, moves, copies, edits, word processes in small ways, maps and generally maintains files and directories in just about all the ways they need to be altered. Not a bad lineup.

Peter Norton Computing's popular Norton's Utilities has most of the capabilities of PCtools but is missing the Move Directory ability. It also lacks the disk cache and backup programs. On the other hand, it has unique extras like disk and file wipe utilities for obliterating files that should not be kept around and an interesting timer program called Time Mark.

There is one serious problem with the Norton package: Utilities got confused by ANSI key reassignments and could well have trashed a disk during a tricky test. But this point aside, Norton is the current standard, and Advanced Edition Version 4 of Utilities is very good software.

Another competitor in this field, Paul Mace Software, Inc.'s Mace Utilities, includes a mix of some convenience features, such as undelete, defragment, an excellent cache and some hefty disk maintenance features. Some have called the Mace-like unformat and disk scan additions to both Norton's Utilities and PCtools Mace clones. But this is one of the pleasant cases in which users profit from a fight for market share between software houses.

Despite an array of features, the Mace Utilities should be viewed as a heavy-duty disk maintenance system first and everything else second. The Surface Fix feature of Mace's Remedy scans every part of a hard disk's data area looking for weak, marginal or bad spots.

Continued on page 38

Lotus link's generality surprising

BY MERV ADRIAN
SPECIAL TO CW

With Lotus Development Corp.'s recently announced Blueprint, the software giant's path into expanded data access has become more clear.

Attempts by Lotus to make its applications the center of a networked universe came as no surprise. There was a surprise, however, in the breadth and generality of the Blueprint specification, which was positioned as a generic link layer to not only host data but also to any other data in Microsoft Corp. MS-DOS platforms — a "transparent back end," as Lotus called it.

In short, the Lotus application in use at the workstation connects to an interface called a data driver, which is provided by the vendors in most cases. Lotus, however, is supplying several drivers itself, including one for Ashton-Tate Corp.'s Dbase.

Once connected, the application may query the driver, depending on the driver's sophistication, for a list of available data maintained in its format. It may then begin retrieving or manipulating the data with the application's commands directly, such as with the Data External command in Release 3 of Lotus's 1-2-3, without any need to consider the architecture of the connected data or the syntax supported by the hosting product.

As is typical with announcements of this type, a list of vendors pledged support.

Although no official confirmation was forthcoming, sources indicated that Network Innovations Corp., now owned by Apple Computer, Inc., is working on a driver for the Ethernet environment. Thus, the platform may become as transparent as the pipe.

An interesting side note was that Synex Systems Corp.'s driver for the SQL Server, jointly developed by Microsoft, Ashton-Tate and Sybase, Inc., will be a key competitor for the forthcoming Lotus/DBMS in the departmental, client-server networked data base management system market.

"Their salesmen will be able to make the case that clients can have SQL Server and still use 1-2-3. We will have to prove to that customer that our [data base] offering is equally worthy," said Mussie Shore, senior product manager for Lotus's connectivity products division.

It will be intereating to see

Continued on page 37

Everex

FROM PAGE 33

Step 386/20 is the first system to be sold under the vendor's own label.

Besides the 20-MHz 386 chip, the standard configuration of the machine consists of 1M byte of main memory with zero-wait state operation, expandable to 16M bytes; Advanced Memory Management Architecture with 54K bytes of random-access memory cache, expandable to 256K bytes; a 1-to-1 interleave hard-disk/floppy-disk controller; a 101-key keyboard; and a floating-point coprocessor compatible with Intel's 80387 and Weitek, Inc.'s 1167.

Everex has introduced its first authorized reseller program to help get the Step 386/20 off to a fast start, a spokesman said. The system will be sold only through the company's authorized dealers.

The 20-MHz version of Step 386/20 is priced at $4,399; the 16-MHz model carries a suggested retail price of $3,699.

Micropro upgrades Wordstar

SAN RAFAEL, Calif. — Adding capabilities such as advanced page preview and newspaper-style columns, Micropro International Corp. recently announced plans to roll out the latest version of its word processing program that has, in the past, been criticized as difficult to learn.

Wordstar Classic Release 5 will incorporate approximately 300 features that previous versions lacked, the company said. The program is able to run on IBM Personal Computers and compatibles.

Release 5, which is slated for availability in mid-May for $495, allows users to view the look of the entire document before printing, the company claimed. It reportedly displays font styles and sizes exactly as they will appear.

The program includes a user interface compatible with IBM's Systems Applications Architecture. It is able to perform telecommunications, outlining and mail-merge, the company said, and offers increased support of laser printers.

Other features include windows for editing two documents at once, a speller and a thesaurus.

Current Wordstar Professional owners can update to Classic for $89 until May 1. After that, upgrades will be available for $119.

Levandov

FROM PAGE 35

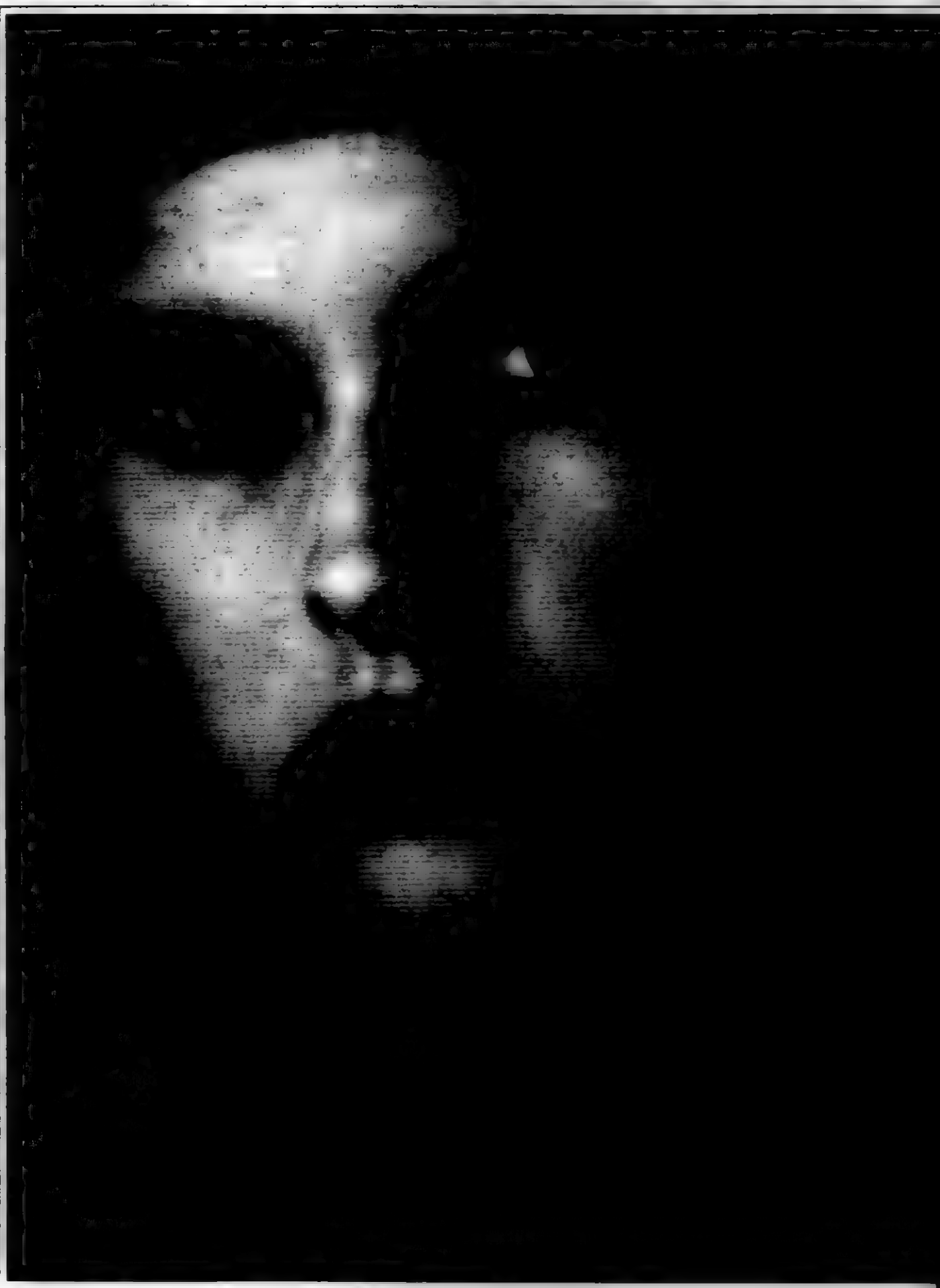
And the types of clones we'll see, once again, will be compatible under the strictest tests of compatibility. The ante is high. It is a much more sophisticated set of rules to achieve compatibility. It's not just the Micro Channel, it is BIOS-affected and OS/2-affected; it is DOS implementation-level-affected as well.

Will the cloners of the Micro Channel be able to run IBM's OS/2 Extended Edition?

That is where the A BIOS begins to grow in importance. I think that is going to become a very important new criterion in the analyzer's role in evaluating the new crop of Personal System/2s — what defines compatibility and running IBM software no matter how it is written. It is also important to the extent that we can stay away from straying into gray areas that will affect the pristine nature of our copyright.

Do you think cloning is necessary to establish the Micro Channel as a standard?

I think it is absolutely essential. The problem IBM has is that for six years, they and the industry have put between 15 million and 17 million machines into circulation with a certain kind of bus. There is a critical mass of option boards supporting that bus. So for a critical mass to be achieved again — in order for major cor-



porate purchasing decisions to sway toward the PS/2 — there is going to have to be feeling that the industry is behind the standard.

The consortium is always as important as any one player; therefore, the signal will be, if the clone industry successfully rolls out some clones in the next couple of months, it will indicate a win-win situation for IBM and the clones.

Do you expect to see many more systems like Sun Microsystems, Inc.'s 386i, which runs multiple operating systems?
Yes. The technology we provide, coupled with the growing MIPS capability of the underlying processors, blends into that technology. Users want to get all the benefits and maximum leverage out of the boxes they buy; and benefit and maximum leverage is a function of the software. The fact that the hardware is getting more powerful, higher in bandwidth and faster in cycle times supports the concept nicely.

How can Micro Channel cloners price their systems lower, given the large up-front investment in technology?
That is a good question. It looks like one must licensee the technology from IBM and some from Phoenix and buy some chips sets and then manufacture all this stuff. I believe with all that, the economics are there, so they can be very competitive with IBM. It is not like we are charging $75 a machine.

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Lotus link

FROM PAGE 35

whether a link that is easier to use than the current state of Microsoft's Windows Dynamic Data Exchange protocol will become available. As it exists, that protocol builds a dependence on the less than universal windows operating environment into application links for the MS-DOS world, a restriction that seems less useful than one providing a tie to 3 million Lotus users.

As it did with The Application Connection (TAC), Lotus is publishing a format for data exchange in its driver, a so-called "envelope" that will go a long way in helping users to realize the long-promised benefits of application-to-application communications. The envelope is used to send units of information and commands back and forth between cooperating processes.

Communications product independence is a critical aspect of the design. Blueprint will work with the Dynamic Data Exchange under Windows in the DOS world — the Data Link Libraries are under OS/2. In local-area network environments, the named-pipes protocol will be an alternative. At the departmental level, there is no reason why DEC shops cannot join the party if Network Innovations delivers.

Blueprint will rely heavily on Lotus's LEAF. "LEAF is the front end in the architecture," Shore said. The runtime version will coincide with 1-2-3 Release 3, allowing front-end customization for software vendors and corporate programmers.

For Lotus users, Blueprint is the enabling step for true peer-to-peer applications. With TAC, near-time update is possible today through an autorefresh capability that polls host data bases and updates the workstation application when appropriate. In a true LU6.2 environment, a scenario driven by host events is possible, since either end of the connection may initiate actions.

Adrian is managing editor of the Focus Systems Journal for Information Builders Publishing in New York.

SDSF for VM/CMS

The CMS/MVS Toolkit provides CMS users with a facility like TSO's SDSF.

ChicagoSoft

(312) 525-6400

PCtools

CONTINUED FROM PAGE 35

When it finds one — and, over time, it will find more than one — it tries very hard to recover the data at risk.

It then moves this data and locks out the bad cluster so that other data will never again be assigned there.

And it offers excellent format protection; its own Format program can lift data, format a track and replace the data. PCtools apparently now also has this ability, but it was not able to be tested in the time available.

Also distributed by Mace is a package called Htest/Hformat. If viewed on a cost-per-use basis, this would be one of the most expensive programs around. In fact, this package might well be used only once per system.

Htest tests the hard-disk controller card as well as what the software can be expected to be able to do. It then goes on to test the disk itself in a number of ways that used to be accessible only with hand-written programs.

Over and over

Hformat does a low- or machine-level format of a hard disk, but it does not stop there. It also tests each track repeatedly, to the limits of its user's patience, for bad spots.

This kind of per-use testing can save a host of troubles later and could even find a poor disk within its warranty period.

But the real glory in this package comes from its Hoptimum program. This program will test a whole computer, drive card and disk system as a single unit — not for integrity, as other programs do, but for a very tricky performance issue.

Features for efficiency, speed

Hard disks have a feature called interweave. After a unit of data comes around the disk to be read, the system might find that it needs the next data sector or cluster.

For a plain vanilla IBM Personal Computer XT or PC AT, it is too late to read the next unit of data at this point, because these machines are not fast enough. To keep efficiency up, the data is woven.

On an XT, a continuous file uses every sixth or seventh location on the track; with an AT, every third file is used in most cases.

But what is optimum? It took more than a week to test an XT clone some years ago with different interweave factors and thus discover that in this case, a value of seven was optimum.

If you have a system that is in any way nonstandard or that may have been suboptimally adjusted at the factory — even IBM was guilty of this some years ago — the use of Hoptimum can buy you modestly to considerably improved performance with minimum effort.

Elkins is a computer and management consultant with academic interests in advanced public-key data encryption systems.

Publishing

CONTINUED FROM PAGE 33

dreds of pages long rather than one page at a time. For instance, if a user inserted a new paragraph into the first page of a very long document, the IBM-Interleaf program would automatically reposition the text or graphics throughout the rest of the document. This is something most personal publishing systems cannot do, according to IBM.

Among the enhancements announced last week were data export programs allowing both the Model 80 and the RT PC to create a bridge to IBM's mainframe-based publishing products and foreign language dictionary programs for French, German and Spanish that let the RT PC Edition perform concurrent multilingual spelling verification, correction and hyphenation within the same document.

With the aid of a special adapter card and interpreter program for Postscript, users can use IBM's 4216 Personal Pageprinter with the RT PC under AIX for the first time, a spokesman said. AIX is IBM's Unix-compatible operating system.

The Interleaf Publisher requires an Intel Corp. 80386-based PS/2 Model 80 with at least 6M bytes of random-access memory and a 40M-byte hard disk. It is priced at $2,495. The RT PC Edition is priced at $6,595.

Epson

CONTINUED FROM PAGE 33

the EX-800 is $699; the LQ-500 is now $529; the LQ-850 is $849; and LQ-1050 is priced at $1,199.

The PC price decreases ranged from $96 to $196, the company said. The price for the hard-disk configuration of the Equity III+ PC dropped to $3,299, and the price of the floppy-disk version dropped to $2,199. The price of the Equity II+ PC dropped to $2,699.

According to Steve Lapinski, vice-president of marketing, market conditions caused Epson to increase productivity at its Portland, Ore., manufacturing facility. Epson recently completed an expansion of that facility, which added 100,000 square feet of work space that will be used to produce more Equity III+ and Equity LT PCs and the FX-286E and LQ-1050 printers.

Lapinski said the ramped-up production facilities will "ensure more consistent pricing and reduce our offshore production capacity."

WeakCASE

Staff Isolation

This is what happens when you approach the application development life cycle with unintegrated CASE tools, each with its own logic, language and information base. The members of your development team waste more time in redundant effort and correcting errors due to faulty communication than actually creating your applications.

Up Front Savings

If you think it's what's up front that counts, you'll probably be satisfied with one of the "application generators" that pass for CASE tools. But most of these simply generate code—not complete applications—and they'll do nothing to ease the maintenance backlog that can represent up to 70% of your total application life cycle cost. So up front is the only place they'll save you money, if they save you money at all.

Speculation

Did you ever wonder where the CASE vendors of today were yesterday? Or where they'll be tomorrow? You should. Because many of them are start-up companies backed by little more than faith and venture capital. Frankly, we don't see why you'd want to speculate with your business.

Barney

CONTINUED FROM PAGE 33

compatibility in the same box, something you need C to do. C is combined with a healthy dose of assembler anyway, the Lotus folks say.

The main reason Lotus is rewriting the product in C is to make it portable to a broad range of environments. Hopefully, the C implementation will avoid the possibility that subsequent versions will not be so late.

Hey Phil, isn't Paradox, your speedy data base package, written in C? And don't you sell a product called Turbo C? If C is so slow, you could rename that product C Snail.

And a super wait for Supercalc? Computer Associates may or may not hold back the release of a new version of Supercalc due to Lotus's 1-2-3 Release 3 delay.

"We are looking to come out at the same time as Release 3. We don't want to give Lotus a chance to react to our features. But if 1-2-3 is really late, we will have to go ahead and release our product," says Abraham Poznanski, president of the micro products division of Computer Associates. If you want to kick in an opinion, give Abe a call.

Hype always hurts the ones we love. Information professionals who have been around the block a few times understand that vendors blow a lot of hot air and that promised products are almost always late. But not everyone can see that the emperor is so scantily clad.

Individual end users are buying more magazines, reading more hype and believing this stuff. And the people who manage the end users and their systems are being asked a lot of dumb questions, like "Can I upgrade to Dbase IV?" or "When can I run OS/2 on my XT?" or "Can you get me SAA?"

Meanwhile, information pros are saying things like, "Maybe when it's ready" and "Forget it" and "SAA what?"

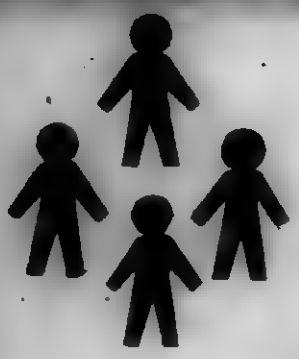
To make matters worse, the computer publications often begin to break stories about products when they are little more than a twinkle in a programmer's eyes.

"The biggest problem I have with my users is someone with less experience reading about something when it hasn't hit the streets yet," explains R. Bruce Johnson, manager of the PC Resource Center for Deloitte Haskins & Sells.

Some users have suggested an interesting solution. If a publication is writing one technical article aimed at the savvy, it should write another aimed at the less sophisticated. The second article would explain what is really going on. Typical headlines would probably read: "Don't even think about this," "They were late before and will be again" or "Your system just can't handle this software."

Barney is a *Computerworld* senior editor, microcomputing.

S PACBASE



Teamwork

PACBASE is an integrated, comprehensive system with a common user interface for each phase of the application development life cycle. It lets analysts, designers, programmers, data and database administrators work with the same set of specifications stored in an active enterprise dictionary. This integrated approach fosters communication and allows each team member to build on work from preceding phases to get applications up and running quickly.

Life Cycle Savings

PACBASE was designed to help you realize cost savings throughout the application development life cycle. Up front, it saves by automatically generating complete applications, including COBOL programs, screen maps, database descriptions, on-line help and documentation directly from your specifications. Because these specifications are reusable, successive applications may draw upon earlier ones to increase savings and development efficiency. Maintenance savings are even greater. Change a specification and PACBASE will regenerate all components of all affected applications.

Investment

At CGI, CASE is a long-term investment, not a speculation. We've provided solutions with PACBASE for more than 15 years, at over 550 installations worldwide. With current earnings exceeding $115 Million—and 20% of earnings invested annually in R&D—we are financially stable and committed to keeping PACBASE state-of-the-art.

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Finkelstein

CONTINUED FROM PAGE 35

terchange and query language. Because of numerous SQL dialects, IBM chose to emulate its own DB2 SQL, permitting the development of tightly integrated and portable applications. The Data Manager duplicates DB2's return codes, error messages and catalog names. It also duplicates DB2's SQL program-bind logic to an extent that other PC SQL vendors cannot match.

Implicit in cooperative processing is the notion that all participating platforms have equal reliability and stability. Together with the PS/2's hardware reliability, the Data Manager offers a powerful DBMS platform that includes automatic transaction management, full security and a complete set of data administration utilities.

In its initial release, the Data Manager will support an end user-oriented SQL facility. This will help end users develop SQL queries through a series of windowed questions and answers. IBM's version of the C language will have a forms-based application development system, which will be in the first release. Future releases will support Cobol, Pascal and a more robust forms system. IBM will also complete the SQL syntax with the inclusion of the Union command.

These tools are just the beginning. IBM will woo third parties with an open data base platform and a potentially huge customer base. Borland International has already pledged its support, and more tools are on the way.

Eventually, there may be hundreds, or even thousands, of vendors supporting the Data Manager. This will give users more choices and will ease users' transition from a stand-alone environment to the new world of cooperative processing.

But the single-user world that IBM will target initially has limited value in the era of cooperative processing. IBM, however, has already announced intentions to ship a multiuser, requester-server version of the Data Manager.

Corporations will likely consider the Data Manager to be an important component in IBM's future distributed DBMS architecture. Whether IBM will dominate the PC world the way that IMS and DB2 have ruled the mainframe world is an open question, but the potential is definitely there.

Finkelstein is a senior consultant with the Codd and Date Consulting Group in Chicago and publisher of the "SQL Review" newsletter.

NEW PRODUCTS

Software applications packages

A product for use in disaster recovery plan development has been introduced by **M-Plus Consulting Services.**

Called **Basic-Recovery**, the product provides a planning document that includes the required project work plan, 20 predefined planning forms, a maintenance and testing process and a supporting personal computer-based data collection and reporting module.

Basic-Recovery costs $975.

M-Plus, 1806 E. Northwest Highway, Arlington Heights, Ill. 60004. 312-255-7400.

A software system that enables a user to analyze and cross-reference a multicustomer data base and manage time and activity schedules has been announced by **Marcar Personal Computing, Inc.**

The **Eighty/20 Client Information Management System** allows analysis of customers based on up to 16 different criteria, such as company type, sales volume, buying patterns, distribution and pricing. As a time and date manager, the software turns appointments into a visual calendar and offers a choice of daily or monthly schedules.

Other features include a built-in word processor and add-on modules for completing expense reports, product and price tracking and time billing.

Eighty/20 costs $495. On-site training is available at additional cost.

Marcar, 6101 Baker Road, Minneapolis, Minn. 55345. 612-931-1290.

A graphics modeling program that allows users to create personal computer-based models that can be used to perform finite-element analysis of engineering designs has been announced by **MacNeal-Schwendler Corp.**

Called **MSC/Mod**, the software allows users of finite-element analysis to create and edit models of proposed designs and analyze their reactions to stress, vibration, pressure and temperature without building a physical prototype.

MSC/Mod files can used by both microcomputer-based finite-element analysis software and mainframe-based packages.

MSC/Mod costs $495.

The company also announced enhanced versions of its **MSC/Pal**, a three-dimensional static and dynamic stress and vibration analysis package, and its **MSC/Cal**, a heat-transfer program analysis package. The packages cost $2,295 and $1,795, respectively.

MacNeal-Schwendler, 815 Colorado Blvd., Los Angeles, Calif. 90041. 213-259-3875.

A personal computer-based mapping package that allows users to analyze information in existing data bases and then display the results has been announced by **Map Info Corp.**

Called **Mapinfo**, the software automatically creates pin maps as well as thematic maps. Users can locate a data point at any street address on the map, search a data base for points that lie within specified boundaries, create a window on the screen to display the complete data record behind any specific point or region on the map or determine the latitude or longitude of any point on the map.

New data can be loaded, or information can be used directly from Ashton-Tate Corp.'s Dbase III.

Mapinfo costs $750.

Map Info, 200 Broadway, Troy, N.Y. 12180. 518-274-8673.

A list management system that develops, maintains, analyzes, segments and prints lists on IBM Personal Computers and compatibles has been announced by **The Integrator.**

List Tamer allows the user to profile, record and retrieve specific information for each record within a list. According to the vendor, it can handle any number of lists, and each list can contain up to one billion records.

Features include a memo section for each list; user-defined codes and profiles; tickler capabilities; a mail-sort option; built-in Help; and import facilities.

Print output features include the ability to print mailing labels in 13 formats and merge listings to most word processing systems.

List Tamer is priced at $199.

The Integrator, 731 Indiana Ave., Trenton, N.J. 08638. 609-393-7277.

Dreams, an integrated set of computer-aided design tools for use on the Apple Computer, Inc. family of Macintosh personal computers, has been introduced by **Innovative Data Design, Inc.**

The basic Dreams program can be customized with different optional modules in the form of tool palettes, symbol libraries, utilities and an integrated data base. Other features include full Macintosh II color support, layers limited only by memory, keyboard entry, zoom up to 32 times, text handling and compatibility with Adobe Systems, Inc.'s Postscript.

Dreams is priced at $500. It will reportedly be available in July.

Innovative Data Design, Suite A, 2280 Bates Ave., Concord, Calif. 94520. 415-680-6818.

ASA/Micro-MRP, Inc. has added a configuration control option to **Max, The Production Manager**, its microcomputer-based manufacturing and financial control system.

The configuration control capabilities allow Max to be used in manufacturing environments where the finished product is made up of features and options specified at order time, the vendor said. It provides control over unique customer orders that specify features or options to be assembled or added to a base product.

Because requirements information is accessed through a primary set of bills of materials, new bills of materials are not required for every possible configuration choice.

The configuration control option costs $2,995.

ASA/Micro-MRP, 1st Floor, Century Plaza 1, 1065 E. Hillsdale Blvd., Foster City, Calif. 94404. 415-345-6000.

A network version of the **Relay Gold** personal communications software package and micro-to-mainframe link has been announced by **VM Personal Computing, Inc.**

The network version, available for the IBM Personal Computer network, the IBM Token-Ring network, Novell, Inc. networks and other IBM Netbios-compatible networks, is said to allow users to transfer files with IBM mainframes running the vendor's Relay/VM or Relay/TSO mainframe software. Network members can connect asynchronously through IBM 3270 emulation boards or protocol converters.

Other features include background operation, a script language and an unattended mode.

The network version of Relay Gold costs $250 plus $75 per node.

VM Personal Computing, 41 Kenosia Ave., Danbury, Conn. 06810. 203-798-3800.

An accounting software package for the health care community has been announced by **Great Plains Software, Inc.** and **Health Care Communications, Inc. (HCC).**

Called **Plains & Simple Healthcare Accounting**, the program was designed for use with HCC's Machealth series of software. It can be used for general ledger and accounts payable functions, while the Machealth series automates patient records and billing procedures.

Features include sample charts of accounts, retention of accounting detail, the ability to review reports on the screen, Help messages and support for multiple windows.

Plains & Simple Healthcare Accounting costs $695. It is available for the medical, optical, dental and chiropractic fields.

Great Plains Software, 1707 S.W. 38th St., Fargo, N.D. 58103. 701-281-0550.

Software utilities

IMRS has introduced an interface to its Micro Control personal computer-based financial reporting system for users unfamiliar with syntax-driven report writers.

Called **Telepath**, the interface incorporates IBM's Systems Applications Architecture standard screen format, the vendor said. It is menu-driven and prompts the user to follow the most typical and logical path of report creation. Standard report formats can be predefined, but a user may also redefine the formats to meet specific needs.

Telepath is available to current Micro Control users at no cost. It is included with a site license of Micro Control, which is priced from $70,000.

IMRS, 1033 Washington Blvd., Stamford, Conn. 06902. 203-323-6500.

A version of the **Bookmark** disaster recovery software program has been announced by **Intellisoft International** for use with Apple Computer, Inc.'s Macintosh Plus and Macintosh SE.

Bookmark is a desk accessory designed to store unsave work in a hard disk. It can also be used to save files to floppy disks at user-specified intervals.

Bookmark supports the Apple Macintosh Switcher environment. It can be used as a multi-level Undo function.

Bookmark costs $99.95.

Intellisoft International, 51 Digital Drive, Novato, Calif. 94949. 415-883-1188.

A random-access memory resident utility designed to increase storage capacity on hard disks used with IBM Personal Computers has been announced by **Isogon Corp.**

According to the vendor, **Newspace** automatically and transparently compresses word processing, spreadsheet and other data files. In addition, users can retrieve the last five deleted files. Files that are backed up or copied onto diskettes arrive uncompressed.

Isogon, 330 Seventh Ave., New York, N.Y. 10001. 212-967-2424.

An add-in utility for Lotus Development Corp.'s 1-2-3 that includes six tools has been announced by **Funk Software, Inc.**

The six tools that make up **Worksheet Utilities** are a formula editor, a file manager, a search and replace facility, a print settings manager, a range column width function and an automatic save facility.

The package is offered on both 3½- and 5¼-in. diskettes. It costs $99.95.

Funk Software, 222 Third St., Cambridge, Mass. 02142. 617-497-6339.

International Microcomputer Software, Inc. has announced several software utilities for IBM Personal Computers and compatibles.

Pageperfect is an integrated word processing and desktop publisher. It costs $495.

Dr. Halo III is an enhanced version of the original Dr. Halo freehand graphics software. It includes lasso, color palette editor and support for the virtual-page feature and video graphics array. It costs $139.

Reflection is a file transfer and conversion program that provides compatibility among IBM, Apple Computer, Inc. Macintosh and Commodore Business Machines, Inc. Amiga computers. It costs $79.

The **Turbohalo** graphics tool kit lets users add graphics to Borland International Turbo C and Turbo Pascal. It costs $95.

Risc is said to allow programmers using the C language to write high-level assembly routines. It costs $79.

International Microcomputer Software, 1299 Fourth St., San Rafael, Calif. 94901. 415-454-7101.

Ewing Systems has introduced a proofreading utility for use with Wordperfect Corp.'s Wordperfect secondary merge files.

Prufread scans a Wordperfect secondary merge or notebook file and automatically removes exact duplicates, flags possible duplicates, flags records that do not contain the proper number of fields and reports on missing end-of-record marks. The information is then sent to a Wordperfect file or to a printer, where it can be used to make corrections.

Prufread runs on IBM Personal Computers and compatibles. It costs $69.95.

Ewing Systems, Suite 14, 409 W. 24th St., New York, N.Y. 10011. 212-675-1974.

Technical Systems Consultants, Inc. has introduced **Uniflex/RT** for Apple Computer, Inc.'s Macintosh II computer system.

Uniflex/RT is a real-time operating system designed for the Motorola, Inc. 68000 series of microprocessors. It was written in assembler language and offers such features as message exchanges, shared data sections, a named enqueue/dequeue mechanism for semaphores and resource control, full real-time task priority control and a con-

Continued on page 42

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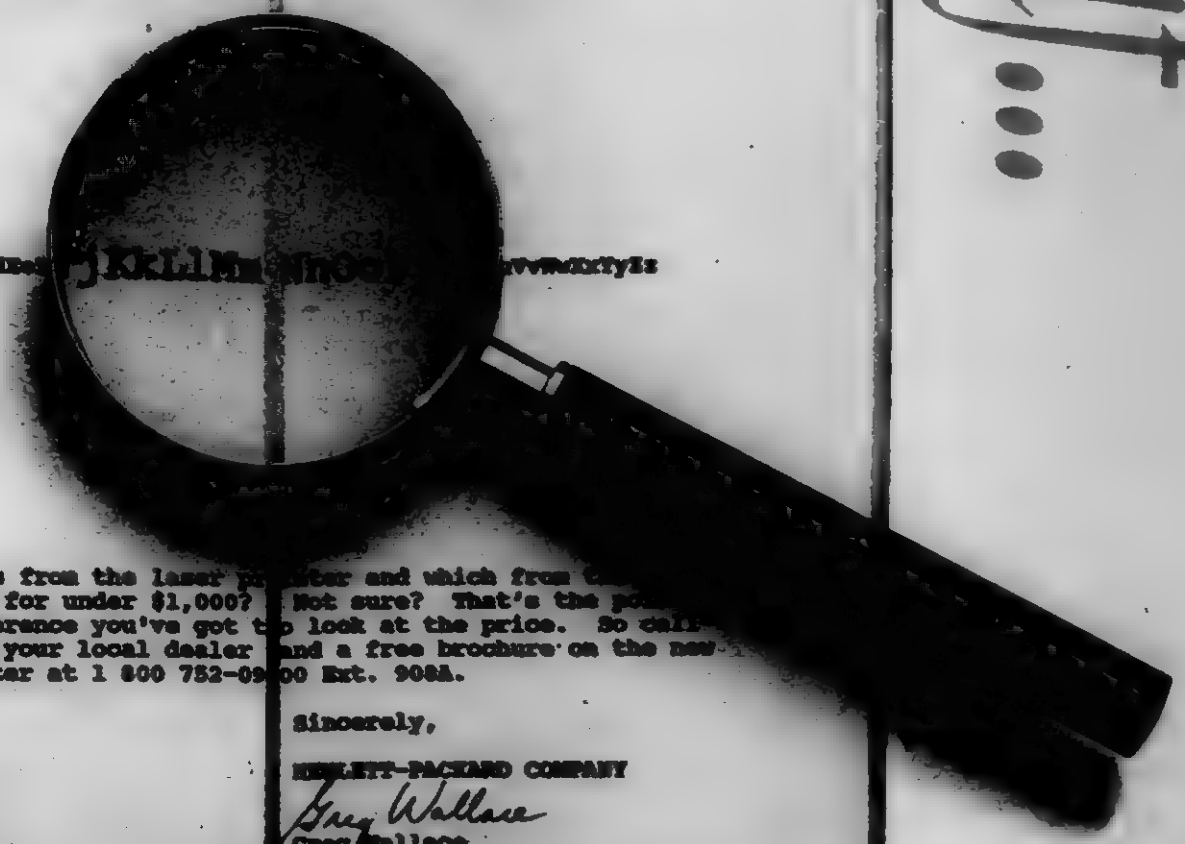

So which half is from the laser printer and which from the DeskJet Printer for under $1,000? Not sure? That's the point. To see the difference you've got to look at the price. So call for the name of your local dealer and a free brochure on the new HP DeskJet Printer at 1 800 752-0900 Ext. 908A.

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Continued from page 40
tiguous file system.

A standard system is priced from $750.

Technical Systems Consultants, 111 Providence Road, Chapel Hill, N.C. 27514. 919-493-1451.

A software utility that allows Hewlett-Packard Co.'s Deskjet printer to print engineering drawings and business graphics has been introduced by Insight Development Corp.

Called Deskplotter, the software is a personal computer-resident program that converts vector information into a format that can be printed by the Deskjet.

The user sets certain print characteristics to match application requirements. Pen patterns and pen widths can be selected from a menu. A gray-scaling option is also included.

According to a company spokesman, Deskplotter allows any program that outputs HP's HPGL to be used on the Deskjet.

Deskplotter costs $129.

Insight Development, Suite 140, 1024 Country Club Drive, Moraga, Calif. 94556. 415-376-9451.

A front-end data handling software package called Dataplex has been announced by Tools & Techniques, Inc.

Written in Microsoft Corp.'s Microsoft C, Dataplex provides a consistent user interface for all data entry and handling tasks, the vendor said. It automatically recognizes inherent patterns in data and accommodates them.

Information acquired in Dataplex's own disk format can be stored or transferred directly into Ashton-Tate Corp.'s Dbase, Lotus Development Corp.'s 1-2-3 or ASCII files. In addition, Dataplex can filter and sort records and format and rearrange fields while data is being transferred. Dataplex also reads the same file formats it writes.

Dataplex costs $149.

Tools & Techniques, 1620 W. 12th, Austin, Texas 78703. 512-482-0824.

Software enhancements

Sapana Micro Software has enhanced its Mail-Track-II and Mail-Track-III mailing list management packages for IBM Personal Computers and compatibles.

Enhancements include a utility for creating mail application templates and report-generation formats; the ability to report near duplicates based on user-specified criteria while merging two files and entering addresses; up to 10 levels of duplicate detection; a report format that includes page breaks, field headings and page headings; and global search and replace.

Mail-Track-II, priced at $95, can handle up to 32,766 addresses; Mail-Track-III, priced at $195, can handle up to 999,999 addresses in a file.

Sapana, 1305 S. Roose, Pittsburgh, Kans. 66762. 316-231-5023.

An enhanced version of the Officewriter document processing applications package for IBM Personal Computers and compatibles has been announced by Office Solutions, Inc.

Officewriter 6.0 has more than 40 additional capabilities, including graphics page preview, Adobe Systems, Inc. Postscript printer support and forms management. A forms creation and list processing program allows users to create forms, enter information into a form, manage lists and print a form with merged information.

Included in Officewriter 6.0 are user guides, keyboard templates, a reference ruler and a quick reference guide.

Officewriter 6.0 costs $495.

Office Solutions, 2802 Coho St., Madison, Wis. 53713. 608-274-5047.

Dragonfly Software has released Version 3.0 of its Nota Bene word processing software package for IBM Personal Computers.

Enhancements include a 100,000-word spelling checker with a 15,000-word exceptions dictionary, a thesaurus and screen editing, font handling and document formatting features designed to optimize the software for use with laser printers.

Other features include text retrieval, the ability to mark additions and deletions to text for confirmation, a word count display, expanded file import and export support, 15 automatic section outlining levels and automatic envelope printing.

Nota Bene costs $495.

Dragonfly Software, Suite 600, 285 W. Broadway, New York, N.Y. 10013. 212-334-0445.

An enhanced version of the Pertmaster Advance project management software has been announced by Pertmaster International.

Version 2.0 reads and writes data on project progress and schedules to data bases for reporting and graphics, according to the vendor.

Support is provided for such data base packages as Ashton-Tate Corp.'s Dbase III and Ansa Software's Paradox.

Other features include the ability to provide reports to Capec government specifications and output to color printers.

Pertmaster Advance Version 2.0 is priced from $1,495.

Pertmaster International, Suite 340, 3235 Kifer Road, Santa Clara, Calif. 95051. 408-736-6800.

Version III of Instant Replay has been announced by Nostradamus, Inc.

Version III includes screen compression, a keystroke editor featuring a full-page editor mode, prompt compression, improved branching menu support, replay macro calls, network support, a look-ahead editor, an updated manual, IBM Personal System/2 support, support for nested menus and an insert guide addition.

Instant Replay Version III costs $149.95.

Nostradamus, 3191 S. Valley St., Salt Lake City, Utah 84109. 801-487-9662.

An enhanced version of the VCN Concorde presentation graphics and desktop video software package has been announced by Visual Communications Network, Inc.

Version 3.0 supports IBM's Video Graphics Array standard. Also, all images in the data base make use of IBM Enhanced Graphics Adapter resolution and color. Enhancements to text capabilities include left, right and center justification and a command for grouping objects and clauses.

Features include such objects as interpolated curves, polygons and multiline drawings and high-low-close business charts. Output devices supported include Calcomp's Plotmaster, Hewlett-Packard Co.'s Paintjet and Canon, Inc.'s Laserprinter LBP-8A2.

VCN Concorde costs $695.

Visual Communications, 238 Main St., Cambridge, Mass. 02142. 617-497-4000.

Meta Software Corp. has ported its Design/2.0 hierarchical design graphics editor to IBM microcomputers and compatibles under Microsoft Corp.'s Windows.

Design/2.0 supports standard and custom designed objects, allowing users to create or import graphics objects for specialized needs.

Design/2.0 diagrams can be transferred back and forth between an IBM micro and an Apple Computer, Inc. Macintosh.

Features include the ability to resize objects, assign text to any object or connector and use hypertext in associating descriptions with an object without obscuring it. Hierarchical multipage diagrams can have up to 9,999 pages.

Uses include system design flow charts, communication networks, simulation diagrams, technical documentaion and organizational diagrams.

Design/2.0 costs $350.

Meta Software, 150 Cambridgepark Drive, Cambridge, Mass. 02140. 617-576-6920.

Lifeboat Associates, Inc. has enhanced Timeslicer, which is a multitasking, linkable library of C functions.

Timeslicer Version 5.0 is compatible with Microsoft Corp.'s C language Versions 4.0 and 5.0, Borland International's Turbo C and Lattice, Inc.'s C 3 family. Enhancements include multiple, user-defined critical classes, terminate and stay-resident functionality, the ability to terminate tasks other than the current one, math coprocessor support, improved event counters and timers and expanded documentation.

Timeslicer 5.0 costs $295. Registered users can upgrade for $75.

Lifeboat, 55 S. Broadway, Tarrytown, N.Y. 10591. 914-332-1875.

Harvey Software, a division of BHC, Inc., has released Version 2.0 of its Computerized Parcel System United Parcel Service manifesting software package for IBM Personal Computers and compatibles.

Enhancements include nine new zones, including support for Canada, Europe and Alaska; multiple printer support; multiple label formats; ASCII data file interface; and a user interface that includes automatic label eject, a second address line, an optional information label and simplified rate calculations.

The Computerized Parcel System costs $395.

Harvey Software, P.O. Box 06596, Fort Meyers, Fla. 33906. 813-482-8600.

Microstat-II, an enhanced version of the Microstat microcomputer-based statistics package, has been introduced by Ecosoft, Inc.

According to the vendor, Microstat-II features expanded graphics and color capabilities, allowance for unequal cases, aliased variables, a simplified command mode and enhanced import-and-export data capabilities.

Microstat-II costs $395.

Ecosoft, 6413 N. College Ave., Indianapolis, Ind. 46220. 317-255-6476.

Training

A video-based training program designed to introduce users to Lotus Development Corp.'s 1-2-3 spreadsheet application package has been introduced by Softvision, Inc.

The course complements an organization's ongoing training program, allowing users to become familiar with 1-2-3 prior to attending a course. It can also act as a supplement to Lotus-supplied manuals.

Softvision's training program videotape is set in a business environment. It guides users through a series of integrated tasks, ending with the successful completion of a spreadsheet.

The program includes a videotape in either VHS or Beta format, an instructor's guide and a student kit complete with workbook and a 5¼- or 3½-in. diskette. It costs $449. Additional student kits cost $39 each.

Softvision, 140 Wood Road, Braintree, Mass. 02184. 617-849-3551.

Data storage

Rodime, Inc. has announced three external Winchester disk drive subsystems for Apple Computer, Inc. Macintoshes.

The Rodime 60 Plus, the Rodime 100 Plus and the Rodime 140 Plus offer formatted capacities of 62M, 104M and 144M bytes, respectively. All feature a 28-msec average access time, and all have embedded small computer systems interface controllers.

The Rodime 60 Plus costs $1,795; the Rodime 100 Plus costs $2,295; and the Rodime 140 Plus costs $2,595.

Rodime, 901 Broken Sound Pkwy. N.W., Boca Raton, Fla. 33431. 305-994-6200.

General Computer Corp. has added Hyperdrive FX/80, Hyperdrive FI/80, Hyperdrive FX/60 and Hyperdrive FI/60 to its series of hard disks for the Apple Computer, Inc. Macintosh.

The Hyperdrive FI/80 and FI/60 are internal hard disks for the Macintosh II that offer 80M and 60M bytes, respectively. They connect to the Mac's internal power and small computer systems interface (SCSI) connections.

The Hyperdrive FX/80 and FX/60 are portable external versions of the FI models for the Maintosh Plus, Macintosh SE and Macintosh II. They attach externally to the Mac's SCSI.

The Hyperdrive FX/80 costs $1,999; the Hyperdrive FI/80 costs $1,899; the Hyperdrive FX/60 costs $1,699; and the Hyperdrive FI/60 costs $1,599.

General Computer, 580 Winter St., Waltham, Mass. 02154. 617-890-0880.

A 32M-byte removable disk drive for IBM Personal Computers has been introduced by Western Dynex Corp.

The Dynex Datamodule can be exchanged among all IBM PCs, PC XTs, ATs and compatible computers, the vendor said, allowing different computers to access the same 32M bytes of data. It is a Winchester disk drive, and additional Datamodules can be added, providing unlimited storage.

Prices start at $695.

The company also introduced a 310M-byte fixed and removable subsystem with a small computer systems interface. Called the DM3100, the subsystem contains one fixed and one removable 155M-byte Winchester drive. It costs $12,000.

Continued on page 44

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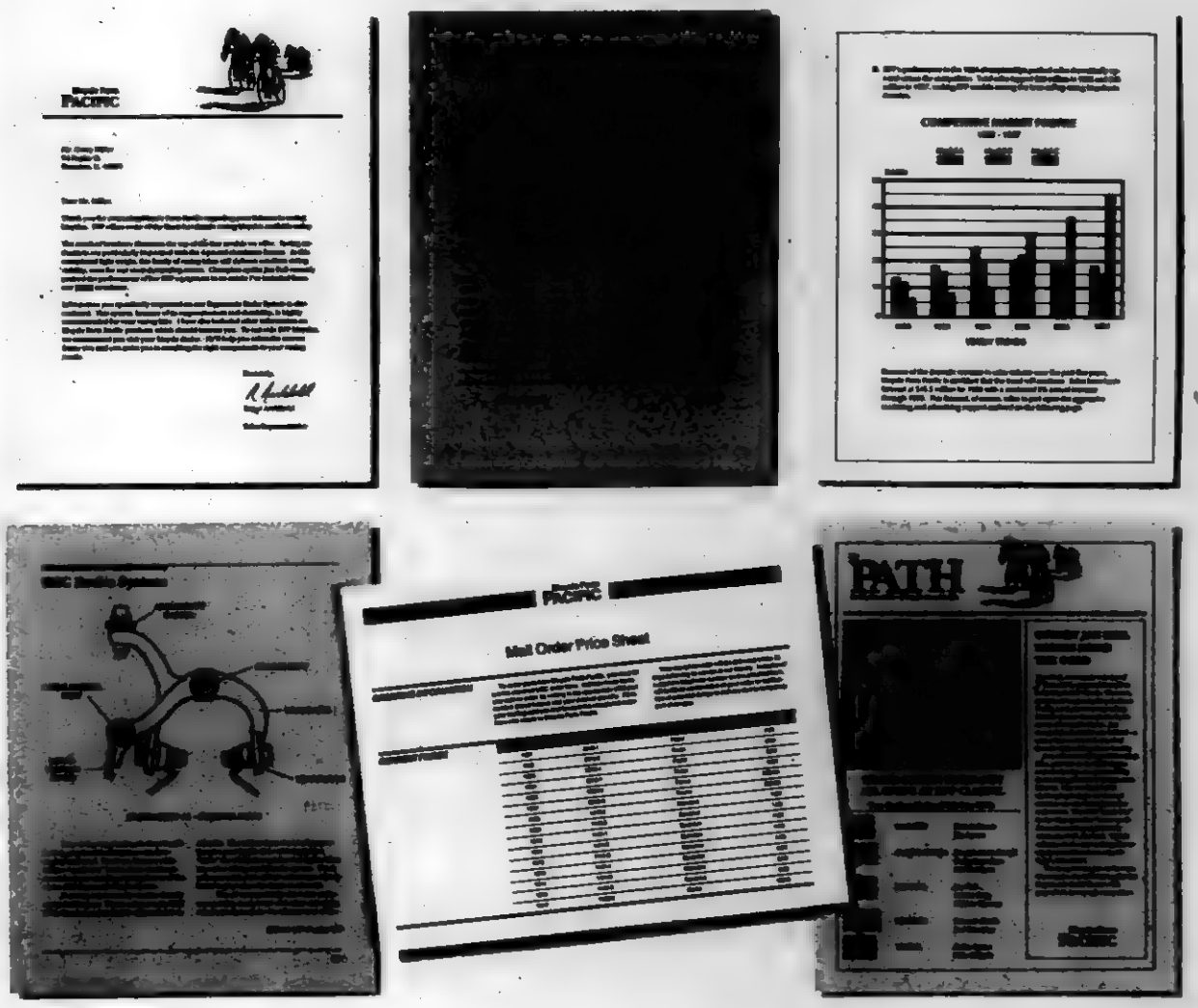
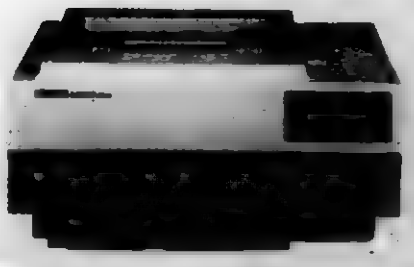


to finish.

The HP LaserJet Series II Printer.



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HEWLETT PACKARD

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Print samples were created using Microsoft Word, Microsoft Excel, and Aldus PageMaker.

Continued from page 42

Western Dynex, 3536 W. Osborn Road, Phoenix, Ariz. 85019. 602-269-6401.

A 49M-byte hard-disk card for use with IBM Personal Computers and compatibles has been announced by **Origo International.**

The **Inboard-49** offers an average access time of 65 msec. It installs in one slot of the PC and can be used as a second drive with the existing hard-disk controller. It is Intel Corp. 80286 compatible and operates in 8- and 16-bit slots.

The Inboard-49 costs $749.

Origo, 20675 Bahama St., Chatsworth, Calif. 91311. 818-340-7552.

A family of **multifunction tape drives** developed for the Apple Computer, Inc. Macintosh has been introduced by **Irwin Magnetic Systems, Inc.**

The systems offer support for A/UX, Apple's Unix operating system for the Macintosh II. The external drives use the small computer systems interface (SCSI) and operate with industry-standard DC 2000 minicartridge tapes. The two currently available models are capable of storing 40M and 64M bytes.

The 40M-byte tape drive for the Macintosh II A/UX system costs $1,395. The 64M-byte model costs $1,595. Prices include Irwin's Estape-A/UX backup software, a selectable SCSI, a 256K-byte cache memory and a self-contained power supply.

Irwin Magnetics, 2101 Commonwealth Blvd., Ann Arbor, Mich. 48105. 313-996-3300.

A series of hard disk drives for the Apple Computer, Inc. Macintosh has been announced by **Giga Cell Systems/Nudata, Inc.**

The **Slimline** series includes 40M-, 60M- and 90M-byte hard disks and a 45M-byte hard disk drive and tape backup combination unit. The 40M- and 60M-byte hard disk drives feature an average access time of 28 msec. The 90M-byte drive offers a 16.5-msec average access time. The products feature embedded small computer systems interface controllers and come with software utilities that include backup and a laser writer spooler.

Prices range from $1,395 to $2,529.

Giga Cell Systems, 4201 Burton Drive, Santa Clara, Calif. 96054. 408-727-1049.

A 360K-byte, 5¼-in. external floppy-disk subsystem for the IBM Personal System/2 family has been announced by **Dolphin Systems Technology.**

Matchmaker offers an average access time of 81 msec. It operates with IBM PC-DOS 3.2 or higher. PS/2s can run programs directly from Matchmaker, or programs can be copied from Matchmaker to the system hard disk or the internal 3½-in. floppy disk drive.

Matchmaker costs $349.

Dolphin Systems, 603-B E. Alton Ave., Santa Ana, Calif. 92705. 714-546-6938.

Two IBM Micro Channel-compatible tape backup systems have been introduced by **Sysgen, Inc.**

Smart Image Plus and **QIC-File Plus** are external devices providing 60M bytes of data backup capacity on one tape. Smart Image Plus records data onto digital data cassettes; QIC-File Plus uses quarter-inch cartridges. Both feature automatic backup capabilities and are compatible with Novell, Inc. Netware local-area network software.

According to the vendor, the systems provide users of IBM Personal System/2s with access to data stored on IBM Personal Computer ATs and PC XTs.

Smart Image Plus costs $795; QIC-File Plus costs $995.

Sysgen, 556 Gibraltar Drive, Milpitas, Calif. 95035. 408-263-4411.

A 133M-byte storage subsystem for use with IBM Personal Computers has been announced by **Storage Dimensions**, a subsidiary of Maxtor Corp.

Speedstor AT133 can be upgraded with a custom BIOS chip to increase capacity to 160M bytes, the vendor said.

Storage Dimensions also announced price reductions on its Speedstor AT120, a 120M-byte subsystem for Microsoft Corp. MS-DOS applications, and on its Lanstor LAN115, a 115M-byte subsystem for Novell, Inc. applications.

Speedstor AT120 now costs $2,495. Lanstor LAN115 costs $2,795.

Storage Dimensions, 981 University Ave., Los Gatos, Calif. 95030. 408-395-2688.

Printers/Plotters/Peripherals

A computer graphics drawing tablet called **Easyl PC** has been introduced by **Inforite Corp.**

Easyl PC is a pressure-sensitive 1,024- by 1,024-pixel tablet for use with IBM Personal Computers and compatibles. According to the vendor, it allows the user to draw or trace directly into the computer with an ordinary pen or pencil on paper.

It is compatible with software such as Z-Soft Corp.'s PC Paintbrush and Media Cybernetics, Inc.'s Dr. Halo in IBM's Color Graphics Adapter or Enhanced Graphics Adapter modes. It also works with software that operates under Digital Research, Inc.'s GEM or Microsoft Corp.'s Windows environments.

Easyl PC is priced at $539.

Inforite, Suite 201, 1670 S. Amphlett Blvd., San Mateo, Calif. 94402. 415-571-8766.

An enhanced version of the **Discover 7320** personal computer-based scanning system has been announced by **Kurzweil Computer Products, Inc.**

Model 20 of the Discover scanner features the ability to scan text in German, French, Italian and Swedish as well as English. It also includes a landscape mode that enables users to rotate images 90 degrees on a PC screen.

Discover 7320 Model 20 includes Kurzweil software, a user interface and documentation as well as a coprocessor board with 4M bytes of random-access memory, a scanner interface and a desktop scanner. The board inserts into a single slot in an IBM Personal Computer XT, PC AT or compatible.

Discover 7320 Model 20 costs $11,950.

Kurzweil Computer Products, 185 Albany St., Cambridge, Mass. 02139. 617-864-4700.

Kurta Corp. has enhanced its **IS/One Input System** to include an Autodesk Device Interface driver and new templates for Autodesk, Inc.'s Autocad and Versacad applications.

The Autodesk driver is called the IS Pensmith Version 6.1. It ensures that all Kurta tablet functions are supported by Autocad. It also supports user-programmable macros via the function keys on the Kurta tablet.

The templates are plastic overlays with preprinted commands grouped, color-coded and labeled by function.

The Autodesk Device Interface driver is bundled with all IS/One Input Systems for DOS. IS/One costs from $525 to $995. The Autocad templates cost $295, and the Versacad templates cost $139.

Kurta also announced a corded 12-button cursor for use with the IS/One graphics tablets. It costs $195.

Kurta, 4610 S. 35th St., Phoenix, Ariz. 85040. 602-276-5533.

QMS, Inc. has added the **QMS-PS 810** laser printer to its line of Adobe Systems, Inc., Postscript-based products.

The printer features a Canon, Inc. SX engine and supports the Postscript page-description language. The controller includes 2M bytes of random-access memory, 1M byte of read-only memory and a 16-MHz Motorola, Inc. 68000 microprocessor.

In addition to support for the Postscript typefaces, the product offers resident emulation of Hewlett-Packard Co.'s Laserjet Plus, HP's 7475A plotter and Diablo Systems, Inc.'s Diablo 630. Print speed is 8 page/min.

The QMS-PS 810 carries a price of $5,495.

QMS, One Magnum Pass, Mobile, Ala. 36618. 205-633-4300.

Board-level devices

Tecmar, Inc. has released IBM Video Graphics Array (VGA) adapter boards for IBM Personal Computers.

The **VGA Display Adapter** boards support all 17 VGA display modes as well as IBM's Enhanced Graphics Adapter (EGA), Color Graphics Adapter and Monochrome Display Adapter standards. According to the vendor, the boards can drive IBM analog monitors as well as fixed- and variable-frequency digital monitors. They also provide EGA resolution of up to 800 by 600 pixels.

Two models are available: The VGA Display Adapter, priced at $394, and the VGA/AD, priced at $545. The VGA/AD includes software drivers for Autodesk, Inc.'s Autocad, Microsoft Corp.'s Windows and Digital Research, Inc.'s GEM.

Tecmar, 6225 Cochran Road, Solon, Ohio. 44139. 216-349-0600.

An extender board for use in developing add-in hardware products for IBM's Personal System/2s has been announced by **Tiara Computer Systems, Inc.**

Called the **PS/X**, the board acts as an extension cord for a printed-circuit board. According to the vendor, it lifts the board being tested from inside the computer housing, allowing access for instrumentation.

The PS/X is compatible with IBM's Micro Channel architecture. It features a four-layer printed-circuit board design and a logic ground-bus bar along the edge of the connector.

The PS/X costs $225.

Tiara, 2700 Garcia Ave., Mountain View, Calif. 94043. 415-965-1700.

Two variable-resolution graphics boards for IBM Personal Computer ATs have been announced by **Dolen Computer Corp.**

The **Multimax** and **Multimax XL** boards are based on National Semiconductor Corp.'s Raster Graphics Processor (RGP) and Advanced Graphics chip set. They can be programmed for resolutions from 800 by 600 to 1,600 by 1,200 pixels. In addition, the basic eight-plane, 256-color board can be expanded to 24 planes and 16 million simultaneous colors.

The Multimax XL has 2M pixels of video random-access memory, 256K bytes of program storage, 2K bytes of dual-ported RAM, 128K bytes of erasable programmable read-only memory and a 38.4K bit/sec. serial port.

The Multimax costs $4,995. The Multimax XL costs $5,495.

Dolen Computer, 18 Knight St., Norwalk, Conn. 06851. 203-855-0895.

A plug-in transaction processor board for real-time data collection applications using IBM Personal Computers and compatibles has been announced by **Burr-Brown Corp.**

The **TM9000** board features a 7.4-MHz, 16-bit microprocessor and 512K bytes of random-access memory. Such user-defined functions as prompt and edit transactions, local validation tables, local, global and terminal-associated data variables and conditional branching and testing can be incorporated.

Each TM9000 can control up to 64 data collection workstations. Seven can be connected to a single IBM PC, PC XT or AT.

The TM9000 costs $3,495.

Burr-Brown also announced **Dspeed**, a PC-compatible processor board for digital signal processing. It features 64K bytes of RAM and serial and parallel interfaces. It comes with a utilities debugging program and a utilities library and costs $995.

Burr-Brown, P.O. Box 11400, Tucson, Ariz. 85734. 602-746-1111.

Tecmar, Inc. has expanded its line of IBM Micro Channel memory and multifunction boards for the IBM Personal System/2 with the addition of two Microram boards.

The **Microram AD** offers serial and parallel I/O capabilities. It offers up to 8M bytes of IBM OS/2-addressable memory on a single expansion board as well as the ability to expand Lotus/Intel/Microsoft Expanded Memory Specification (EMS) 4.0-compatible memory to 8M bytes on a single board for Microsoft Corp. MS-DOS users.

The **Microram 50/60** offers up to 2M bytes of memory expansion and is hardware-compatible with EMS 4.0.

The Microram AD with 2M bytes of memory costs $1,145. The 2M-byte version of the Microram 50/60 costs $995.

Tecmar, 6225 Cochran Road., Solon, Ohio 44139. 216-349-0600.

An expansion card, called the **Addcard**, designed for use with Tandy Corp.'s Tandy 1000 and 1000A has been announced by **Merak Industries.**

The device adds four slots inside the system unit. According to the vendor, expansion cards connected to the Addcard operate as direct extensions of the bus. No external cabinet is required.

The Addcard costs $89. A version for IBM Personal Computers costs $79.

Merak Industries, 8704 Edna St., Warren, Mich. 48093. 313-562-9646.

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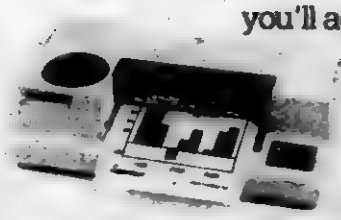

All you need is a Hewlett-Packard ColorPro Plotter like we used here, or the HP PaintJet Color Graphics Printer. Together with a PC—IBM compatible or Apple Macintosh—you can use all the popular graphics software like Lotus Freelance Plus, Cricket Presents, HP's Graphics Gallery (used below), Microsoft Chart and Harvard Graphics.

At under $1,300, the HP ColorPro Plotter may be just where you want to start. It will turn your ideas into colorful, easy-to-grasp visuals. Or, if you need to combine near-letter quality text with color graphics, you can rely on the HP PaintJet Color Graphics Printer for under $1,400. Whichever you choose, you'll create desktop presentations with startling color and greater impact.

For a colorful sample overhead and the name of your nearest dealer, call 1 800 752-0900, Ext. 903A.

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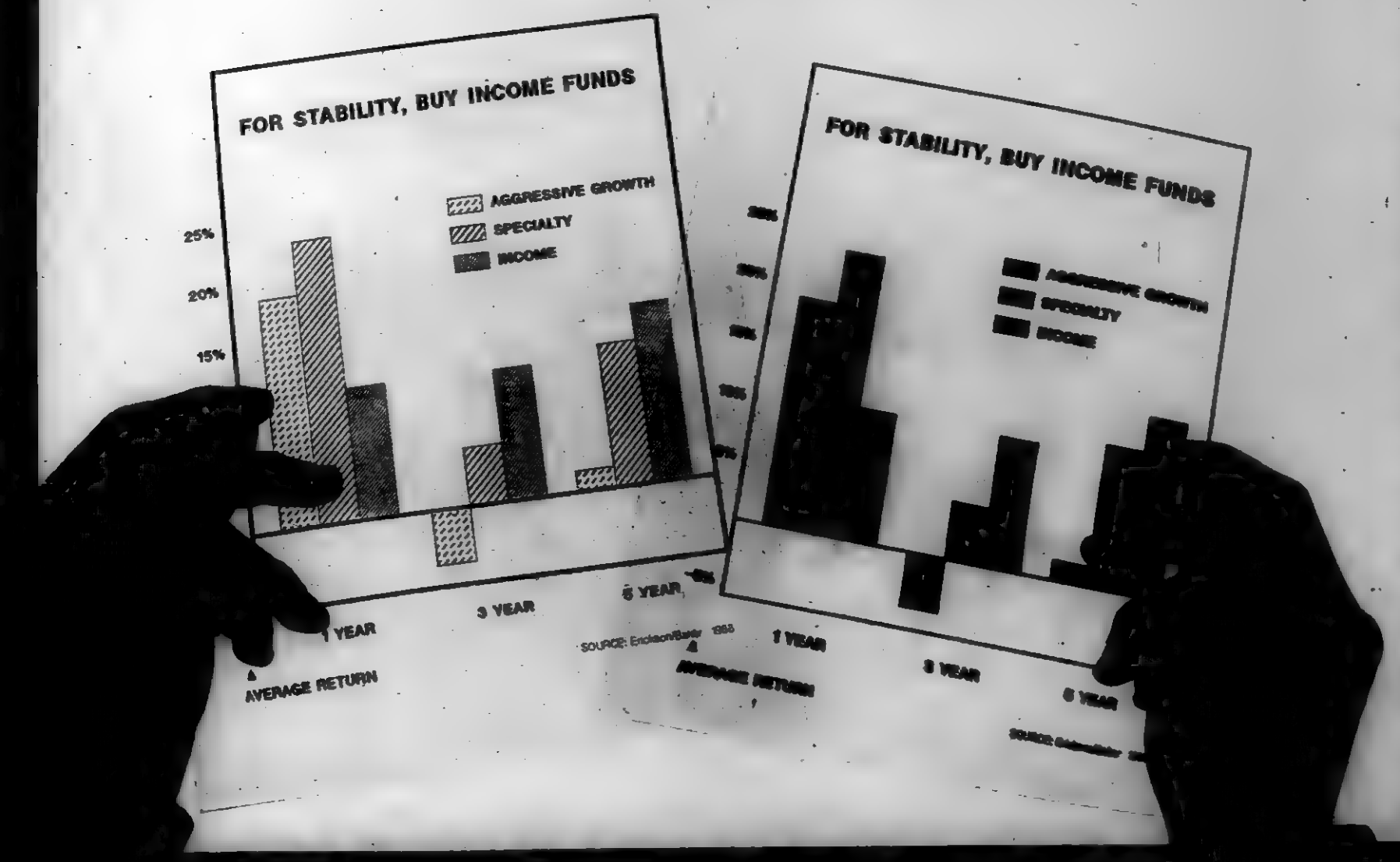
Guess which presentation made the sale.



NETWORKING

DATA STREAM

Walter Ulrich

Bells' E-mail ringing sweet?

Last month, U.S. District Judge Harold H. Greene finally acceded to the AT&T regional holding companies' request for greater freedom to provide voice and text electronic mail services. The new order clarifies Greene's September 1987 ruling, which permitted the regional holding companies to offer information transmission services but left in doubt whether they could provide voice and data messaging or videotex, all of which involve the processing and storage of information.

Now that this has been cleared up, the holding companies are free to launch themselves into the voice, E-mail, videotex and audiotex markets.

In anticipation of such a decision, some of the holding companies have already designed services and begun product development.

For example, Pacific Telesis Group and Bell Atlantic have already received Federal Communications Commission approval to offer voice messaging services and plan to initiate trials later this year.

Meanwhile, customers and

Continued on page 52

Contrary to myths, ISDN works

BY PATRICIA KEEFE
CW STAFF

CHICAGO — A handful of myths about Integrated Services Digital Network (ISDN) are impeding user acceptance, according to Ian Angus, president of Angus Telemanagement Group, Inc. in Pickering, Ontario.

And they should not have, because ISDN no longer stands for "I still don't know," he told Interface '88 attendees here recently while speaking on "ISDN Test Site Revelations."

Angus, who is admittedly bullish on the technology, noted that ISDN is even mentioned in in-flight magazines now — a sure sign that it has achieved broad general awareness, he joked. And the most recent AT&T ads promoting ISDN, he added, do not even bother to explain what the term means.

A cornucopia of ISDN test sites have produced real examples of ISDN applications, enabling the technology to progress to the point at which the correct interpretation of ISDN should be: "It starts delivering now," Angus said.

Concerns not validated

Angus set about exploring a series of misconceptions culled from a list of concerns clients had asked him to investigate. But the trials have failed to validate most of these concerns, he said, adding that ISDN works.

"We are no longer discussing whether we can deliver ISDN over twisted-pair in large environments. We are in the final details of how to deliver," he said. And given that ISDN is working, the issue now is whether anyone wants to work with it, Angus stressed.

In no particular order, Angus addressed the following typical user concerns:

- ISDN competes with local-area networks. There may be some overlap, but LAN strength lies primarily in a work group typically supporting fewer than 10 workstations, Angus said. ISDN's raison d'etre, he said, is linking to the wide-area network or functioning as a bridge between LANs. It is not a replacement for LANs.
- ISDN does not offer enough bandwidth. Claiming this theory is put forth by Digital Equipment Corp. and other LAN companies, he said that ISDN's 64K bit/sec. transmission rate is 40 times as fast as most applications today.
- ISDN is a way of making users pay for the telephone networks. It is true that users are not demanding ISDN, Angus said, but

Continued on page 51

Nets beat system mix

Real estate firm links 160 nationwide offices

BY PATRICIA KEEFE
CW STAFF

NEW YORK — When real estate giant Grubb & Ellis Co. set about building its empire of 160 nationwide offices, a troublesome side effect of its acquisition spree was a crazy quilt of incompatible computer equipment.

After several false starts, the company recently embarked on a distributed network strategy that will link users within local offices as well as to other offices and a centralized data base.

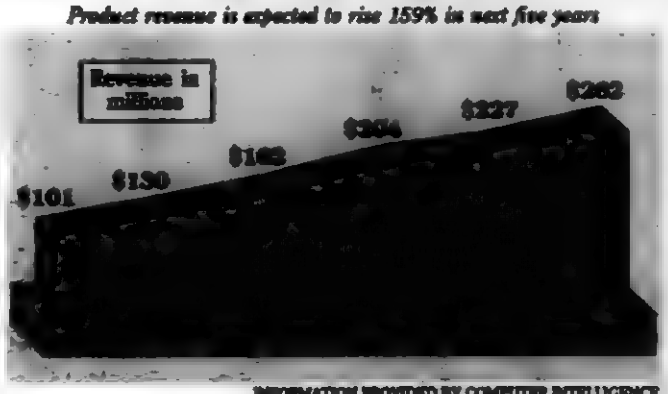
About five years ago, residential realtors Grubb & Ellis branched out into the commer-

Continued on page 51

Data View

Network management forecast

Product revenue is expected to rise 159% in next five years



INFORMATION PROVIDED BY COMPUTER INTELLIGENCE
CW CHART

SAA still has a way to go

BY KATHY CHIN LEONG
CW STAFF

CHICAGO — Has IBM got it made with its new Systems Application Architecture (SAA)? Not necessarily, according to William Mayburn, vice-president of Ann Arbor, Mich.-based consultancy DMW Group, Inc.

Quite a few pieces are missing, yet, Mayburn told Interface '88 attendees at a session entitled "SNA: Enhancements for a new era," adding that IBM will be faced with several difficult challenges in the years ahead.

For starters, users' network trends in the 1990s will focus on better management, security and availability, he said. So the pressure is on for IBM to im-

Continued on page 53

Inside

- Interface slow, but foreign buyers show. Page 48.
- Phase two of Maxxon SNA Gateway debuts. Page 48.
- Voice-mail system for IBM PC XTs and ATs available. Page 56.

Can Your Unix DBMS Guarantee Data Integrity?

Data integrity is essential for any commercial application. Unfortunately, no Unix-based DBMS product is able to provide absolute data integrity without sacrificing performance or forcing the use of complicated raw devices. Except the ORACLE® RDBMS.

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The Solution

Unix has a special option called "write-through cache" which allows blocks of data associated with a particular file to be marked for an immediate write to disk; your application cannot continue until the write has been completed. ORACLE uses this feature to guarantee that those blocks of data associated with your database are on disk before the words "transaction completed" ever appear on your terminal's screen. Other Unix database vendors — 1) Don't address the problem at all, 2) Force a complete flush of all data in the buffer cache causing tremendous performance degradation or 3) Require the use of complex raw devices.

Other Unix database vendors:
1) Don't address the problem
2) Sacrifice performance
3) Use complex raw devices

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CONFERENCE NOTEBOOK

Interface '88 slow out of the gate

BY PATRICIA KEEFE
and AMY SOMMERFELD FIORE
CW STAFF

CHICAGO — The recent disappointingly slow Interface '88 left many exhibitors and attendees harking back to warmer thoughts of rival conference Communication Networks. Held in January, it was bustling by comparison. One exhibitor cracked that he measured the success of a show by "alleys," or how far he could roll a bowling ball. At Interface, he reckoned, he could count on a good roll.

Domestic buyers were a disappointment to exhibitors, but Interface did attract a lot of serious international buyers, according to William Lanfri, manager of market development at Mountain View, Calif.-based Synoptics Communications, Inc. A number of French vendors banded together in one huge booth, hoping, no doubt, to attract some Yankee dollars.

U.S. West soothes ISDN doubters with an old quote from DEC's Ken Olsen: "There is no reason for any individual to have a computer in the home."

In other words, Integrated Services Digital Network (ISDN) should no longer be considered a "solution in search of a problem." The fact is, it works today, showgoers were told.

IBM ignore ISDN? Not according to Toby Terrell, manager of ISDN Systems and Market Planning at IBM's Communication Products Division. First, he said to look for IBM to launch a second U.S. ISDN trial in August. (IBM is already involved in the Nynex Corp. trial.)

Terrell also said ISDN will enhance IBM's Systems Network Architecture, adding that the two are complementary, not competitive.

INTERFACE '88

The icing on the cake were the following recommendations, which Terrell said are required to push ISDN to a point at which it can begin to help customers: finish standards, make sure the implementation is consistent across vendors, get competitive general tariffs that are cheap and widely available and provide planning information about availability of service, performance characteristics and projected tariffs.

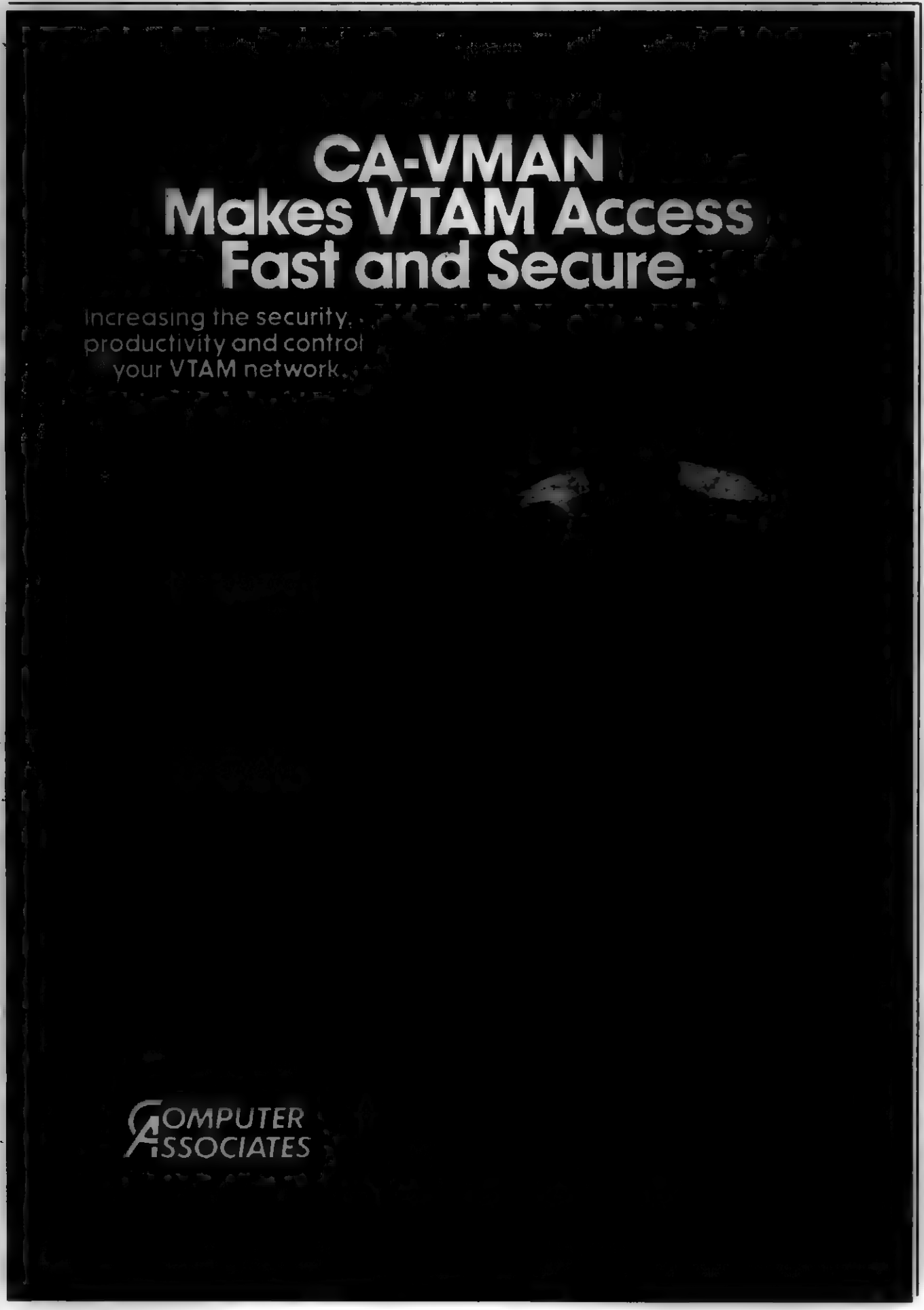
Interface abounded with ISDN time lines. This one comes from Scott Augerson, ISDN product manager at Siemens Information Systems: By late 1988 or early '89, expect some ISDN-based private branch exchange (PBX) announcements offering limited shipments with a focus on circuit switching only. By 1989 or 1990, look for expanded services on ISDN, full shipment of new PBXs with a focus shift to packet switching. The 1990s will feature broadband ISDN at 600M bit/sec. and an increasing pot of services.

Wavering over token-ring? You might want to consider David Levin's point of view. Despite what you may have heard, the token-ring is not all things to all people, the president of Netcomm said.

The strengths of IBM's annointed network lie in departmental or subdepartmental networking with a gateway to a broadband network. Added Synoptics' Lanfri, Ethernet sales are hot overseas, while token-ring sales are growing at a steady clip here.

Speaking of Ethernet, despite the buzz over twisted-pair wire, coaxial cable is not dead, Levin said. He advised users considering twisted-pair to consider how robust or efficient that approach might be and suggested they take a hard look at vendors' claims of supporting networking over twisted-pair.

Continued on page 49



CSI unveils OS/2 gateway

BY KATHY CHIN LEONG
CW STAFF

SAN JOSE, Calif. — Communications Solutions, Inc. (CSI) recently introduced phase two of its Maxess SNA Gateway, a product said to support Microsoft Corp. OS/2-based file servers as well as IBM 3270 and LU6.2 applications.

Maxess SNA is the first IBM Netbios-compatible network gateway to support concurrent 3270 and LU6.2 sessions, CSI claimed. The gateway will work with Microsoft's OS/2 LAN Manager.

If users only require concurrent LU6.2 and 3270 functions, the gateway reportedly can eliminate the need for the Communications Manager, a feature of IBM's OS/2 Extended Edition.

The Communications Manager provides additional 3270 and LU6.2 emulation and IBM Token-Ring network attach interfaces.

The Maxess SNA gateway reportedly can run alongside the Communications Manager without affecting any of its functions.

The first release of Maxess SNA Gateway, which supports Microsoft's MS-DOS, was announced in February and ships this month. According to CSI, the gateway runs up to 32 concurrent sessions and cuts costs by running at the file server vs. in each network node.

When the Maxess Gateway for OS/2 servers ships in January, it will only support MS-DOS workstations as network nodes, CSI said.

Pricing for Maxess SNA will be set later in the year. A third version of Maxess SNA will extend OS/2 support to the workstation. When all three versions of the Maxess SNA Gateway are in place, users reportedly will be able to run both OS/2 and MS-DOS on workstations and file servers on a single network.

Eicon unveils APPC support under OS/2

BY PATRICIA KEEFE
CW STAFF

MONTREAL — Eicon Technology Corp. used the recent Interface '88 to launch EiconAPPC, an intelligent adapter that provides IBM Advanced Program-to-Program Communications (APPC) support under IBM's OS/2 and Microsoft Corp.'s MS-DOS for IBM Personal System/2s, Personal Computers and compatibles.

In addition, Eicon introduced enhancements to its CCITT X.25 and IBM 5250 and 3270 LAN gateways. Eicon claimed to be the first vendor to demonstrate LU6.2, or APPC, under OS/2 using an intelligent communications card, adding that it provides complete LU6.2 functionality with only 15K bytes of PC memory.

In addition, EiconAPPC is fully compatible with IBM's APPC/PC, using a 25K-byte software driver to interpret IBM calls, Eicon said. Total memory cost is less than 235K bytes; APPC/PC needs more than 250K bytes, Eicon claimed.

EiconAPPC consists of hardware and software supported over either IBM Synchronous Data Link Control (SDLC) lines or X.25 networks and multiple sessions using both PU2.1 and PU2.0.

The card is available in stand-alone configurations or on Eicon's gateways for IBM Netbios local-area networks.

EiconAPPC reportedly offers full implementation of the LU6.2 protocol, including basic and mapped conversation verbs, control operator functions and security functions as defined by IBM. When used over X.25 networks, LU6.2 is encapsulated in IBM's Qualified Logical Link Control.

The intelligent controller performs all APPC functions and, when required, X.25 protocol processing, off-loading these tasks from the host PC or PS/2.

Three different controllers are available: The SPCC card, featuring IBM Micro Channel architecture support under DOS or OS/2; the Network Adapter, for connecting PCs or compatibles to external modems under DOS and OS/2; and the Dial Network Adapter, for supporting an integrated synchronous modem on PCs.

The SDLC versions of EiconAPPC under OS/2 are priced at $1,120; the X.25 versions cost $1,320; and the Dial Network Adapter version costs $1,420 to $1,620. Commerical release is in May.

INTERFACE '88

Interface '88

CONTINUED FROM PAGE 48

If you're looking to cut costs, and you don't mind a little complexity, the latest trend in cheap nets is packet-switched radio, according to Robert Linebarger, a professor at Brigham Young University.

Licensed by the Federal Communications Commission, this novel approach to local-area networks works within a five-mile radius and eliminates the need to drop cable every time a user moves or is added to the network.

Horsing around. Peter Vidmar, once the darling of the men's gymnastics world, was the darling of the U.S. Sprint Communications Co.-Telenet Communications Corp. booth at last month's Interface show.

The display attracted scores of attendees, due more to the star quality of its diminutive celebrity guest than to its products or services.

At the booth, the blond Olympian periodically went through his paces on the pommel horse, signed autographs and just generally looked cute.

Novell, Inc. added another notch to its TCP/IP belt with The Wollongong Group's release of WIN/PC Release 3.2 and WIN/PC Route Release 1.0, said to provide complete Transmission Control Protocol/Internet Protocol services and routing capabilities for Novell's Netware.

Excelan, Inc. and Micom-Interlan, Inc. already provide TCP/IP services to Netware users.

Look for Telenet to offer IBM Professional Office System compatibility via the CCITT X.400 standard in the near future, according to Miles Morimoto, Telenet's X.400 product manager.

Going to any lengths to keep exhibitors happy, The Interface Group presented awards for the best booth in a variety of categories at the show.

Much to Novell's amusement, it received "The Shelly Award" for the "Outstanding Mega-Island and Peninsula Exhibit." Sounds like fishing directions. If there was such an award, IBM no doubt was cited for the "Outstanding City Block-Sized Exhibit."

CW staff members Charles Babcock and Kelly Shea contributed to this report.

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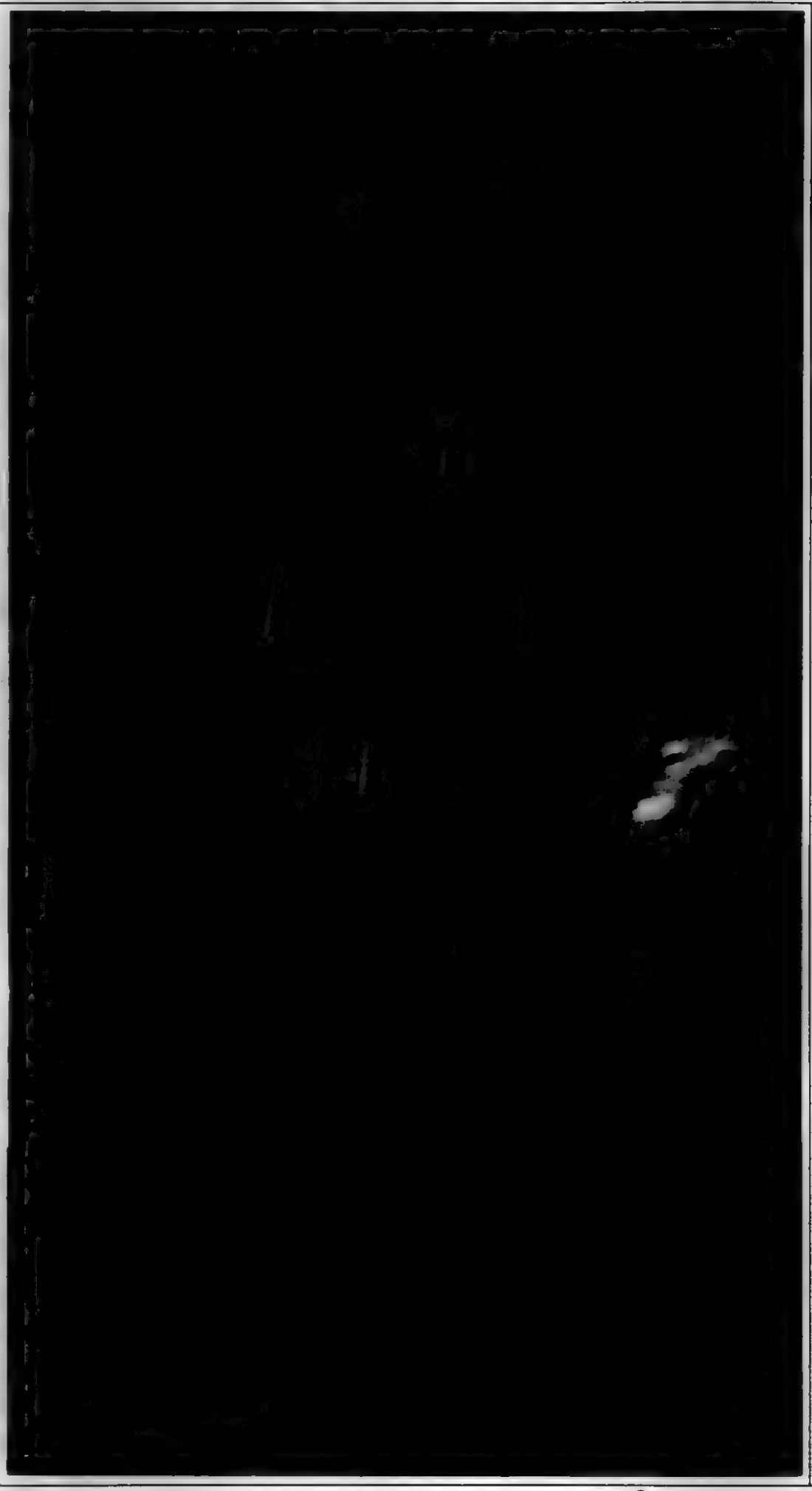

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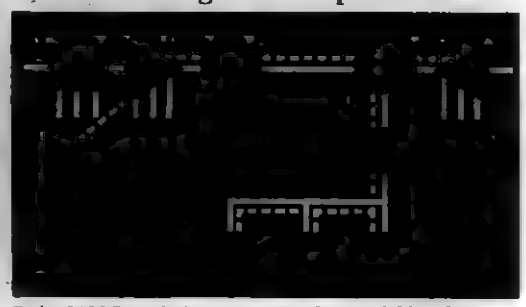

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Nets beat mix

CONTINUED FROM PAGE 47

cial market and began buying up the top two or three real estate offices in each major market. "Two years ago, the company began to realize what a mess its computer system was in," said Kevin Pritchard, manager of computer operations in Grubb & Ellis's Pacific Southwest region.

A key competitive tool was a data base developed in the 1970s to run on Texas Instruments, Inc. minicomputers. It was expanded into about 35 offices in the early 1980s, but efforts to bring other offices on-line soon ran into a wall of incompatible units from vendors such as the former Sperry Corp. and Burroughs Corp., Wang Laboratories, Inc. and Digital Equipment Corp., said Jeff Cantor, director of MIS for Grubb & Ellis's New England region. The only point of commonality were some IBM Personal Computers.

In the meantime, Pritchard and Cantor, unbeknownst to each other, had implemented several pilot local-area networks. Both networks were based on Novell, Inc.'s Netware network operating system and supported software from Lotus Development Corp. and Wordperfect Corp., along with Borland International's Paradox and Meridian Technology, Inc.'s Carbon Copy.

Both systems were very user oriented and featured a seamless environment, work-group data sharing and tailored, context-sensitive on-line Help screens.

All systems go

Inevitably, the two put their LANs together and came up with a plan to resolve Grubb & Ellis's information-sharing woes that used the experience of its predecessors. In January, the plan got the green light from the board of directors on down, Cantor said. "We won't rip out something that works, but we are definitely committed to LANs," Pritchard added. About half of the minicomputer equipment is leased and can be written down, he said.

Today, there are a total of six Netware LANs, three each in the two regions, supporting about 100 workstations. At least three more LANs will be launched this year, with plans to install 10 more next year. Out of 8,000 employees, the firm hopes to have 3,000 on-line by 1992. About 85% to 90% of its information needs are local.

Grubb & Ellis also revamped its prized data base, launching a new system called Corebis designed chiefly by Pritchard and Cantor. With heavy user input, the two developed a system to provide information about properties and clients on a national, regional and local level. "Every level is allowed to add on their own reports and data fields customized to their level around a core of information," Cantor explained. This is important since real estate brokerage procedures differ across the country.

Corebis is currently in alpha testing. The first beta-test site goes on-line in New York in mid-July, followed by a site in Los Angeles in the fall. The plan is to tie in two networks per month. Once Corebis is executed on a national level, realtors will have the options of being property- or client-centric. For example, a broker in Rye Brook, N.Y., could obtain a listing from the data base of all IBM-owned property nationwide, which might provide a thumbnail sketch of IBM's modus operandi in real estate, Pritchard said.

Retix adds to Ethernet line

BY PATRICIA KEEFE
CW STAFF

SANTA MONICA, Calif. — Retix, a supplier of Open Systems Interconnect software, recently unveiled the Retix Network Manager, which provides integrated network management services for its Retixgate series of Ethernet bridges. Also introduced were two bridge models: the 2244M, priced at $2,450, and the 2255M, priced at $2,850.

Key to Retix's bridge strategy is its ability to build a product that meets the operational requirements of Ethernet local-area networks, a spokesman said.

Priced at $950, the network management system has two components: the Network Management Agent, software that resides in bridges, gathers statistics and responds to control messages; and the Network Manager, a personal computer-based software module that acts as the central control for the network. It provides the system administrator with feedback from — and full control of — the network, including bridges, Retix said.

Ethernet, Starlan supported

Both the 2244M and 2255M support IEEE Starlan in addition to Ethernet. The two bridges differ only in that the 2255M further supports thin Ethernet.

The network management system reportedly allows for segmentation of a large LAN into small pieces, each connected with a bridge. This permits new levels of control, performance and system security, Retix claimed.

Segmentation has not previously been cost-effective because of the high price of bridges. But for less than the cost of an additional PC, users can drastically increase the efficiency of their overall network, the vendor claimed.

ISDN works

CONTINUED FROM PAGE 47

the fact is, the cost of running a network is just as prohibitive for carriers as for users. As carriers increasingly go to ISDN to keep their costs under control, it is only natural that users will begin to take advantage of these services.

• ISDN will cost too much. Telecommunications costs are a serious problem for most users, Angus said, adding that this is an area in which user and carrier interests coincide: keeping costs down.

• ISDN requires users to first convert all components from analog to digital — an all-or-nothing proposition. The fear of ISDN islands is greatly exaggerated, according to Angus. All the ISDN trials now under way have interfaces between ISDN and other network components, he said.

• ISDN is a long way from reality, so it is safe to ignore. "ISDN will come much faster than you think, and it will have little to do with user demand," he said. "The telcos have to do something [to cut the costs] of their networks."

Session Chairman Clark N. Okun, vice-president of STI Communications in Rutherford, N.J., said he conducted a recent survey on private branch exchange issues among large, medium-size and small companies and that IDSN showed up as the No. 2 topic of interest across the board.

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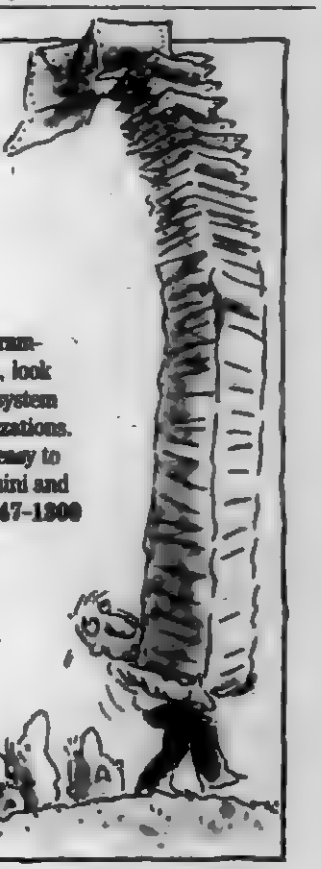

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Ulrich

FROM PAGE 47

competitors alike are wondering how the regional holding companies will use their new freedom. Will they blow the competition out of the water? Will they give the market a healthy shot in the arm with easier local access for long-distance vendors? Or will they simply flounder awhile and then go back to just being carriers?

The regional companies, each of which is in the Fortune 50, have powerful franchises. They have an established relationship with almost every consumer and business within their regions. They already bill those customers on a monthly basis. They have mastered accounting for small transactions and sending out itemized bills for them. Altogether, this is an imposing list of attributes for any company entering the E-mail field.

Modest risk

On the voice-mail side, the companies' attributes are even more significant. All Greene suggests is that telephone services and store-and-forward voice services are greatly interdependent. The tie to telephony, the telephone instrument and the telephone company is even stronger. For voice services, the risk is modest. The restrictions are manageable, and the prospects are excellent.

However, the restrictions related to text E-mail are more troublesome. Today's E-mail users demand national — and sometimes international — reach. The regional holding companies are, by definition, regional and are prohibited from providing communications services between local access and transport areas (LATA).

According to a survey Coopers & Lybrand conducted last spring, 75% of large companies were already using E-mail. Can the regional holding companies hope to compete in such a market that is already fiercely competitive?

The best opportunity for the regional companies is with market segments that are not yet heavy E-mail users: most consumers and many small businesses, for instance. While public data networks Compuserve and The Source have made some inroads, these markets remain largely untapped. It is in precisely these areas that the regional holding companies can leverage their strengths and minimize the restrictions they face.

This kind of consumer and small business E-mail and information transfer service is exactly what Greene wants to promote.

The analogy between E-mail and telephone services makes an interesting model. The regional companies provide telephone services locally, handing off long-distance services to inter-LATA carriers. Similarly, the regional companies could handle local E-mail while handing off long-distance mail to inter-LATA message carriers. Low-cost local messaging services for consumers coupled with efficient interconnection to national services and big business would certainly hasten the adoption of E-mail by a large new group of users.

If this eventuality were to occur, it would be beneficial to consumers, large and small businesses and most of the E-mail industry. Whether this happens is dependent upon many factors, including further regulation, marketplace dynamics, competitive reaction and the holding companies themselves.

Steve Glasgow of Coopers & Lybrand says he sees Greene's recent order as part of a long-term tendency to gradually loosen the bonds of the Consent Decree. To the extent that this is true, the regional holding companies can be expected to aggressively provide permitted services, competing strongly with existing players. Although controversial, the short-term implications of the regional holding companies' new freedoms are favorable. This year promises to be an exciting one for the E-mail industry, for the AT&T regional companies and for mail users everywhere.

Ulrich is president of Walker Ulrich Consulting, a subsidiary of Coopers & Lybrand.

Everybody talks OLTP.

Tandem does it.

SAA

FROM PAGE 47

prove its network management capabilities.

In particular, Maybaum asked, "How is IBM going to manage shops with decentralized systems?" Exactly how IBM will integrate other vendors' products into its network management picture remains to be seen. For now, third-party developers are left to create their own hooks into IBM's Netview, but actual offerings are slim.

And as AT&T's regional holding companies move to open up their networks as a result of Open Network Architecture, IBM continues to drag its feet on introducing a plan that will link user networks into the central office switch and on creating a plan that will let users monitor both voice and data lines from a central network management system, Maybaum said.

Another issue that IBM must resolve is support for international communications standards. IBM has said that its Systems Network Architecture will interface with the CCITT X.25 standard. However, "IBM has to realize that support for [Open Systems Interconnect] is crucial, and interfaces for X.25 aren't enough," Maybaum charged. While IBM has plans to support most major communications protocols under SAA, "it's not clear to users [or vendors] what that really means."

Maybaum ended on a bittersweet note: "IBM is working on all of these things, but, being IBM, it just can't respond fast enough."

While IBM works out its snags, some users say they are willing to wait. Travelers Insurance Co., a subsidiary of The Travelers Corp., for example, is moving right along with plans to implement IBM's Token-Ring network, according to Travers Waltrip, vice-president of telecommunications at The Travelers.

Four years ago, Travelers decided every new building would be installed with IBM-type twisted-pair cabling. Today, there are approximately 60 Token-Ring networks all wired up at the insurance company, with many more to come. In addition, the company is migrating all of its 20,000 IBM Personal Computers to the successor Personal System/2 models. Clones need not apply in this IBM shop.

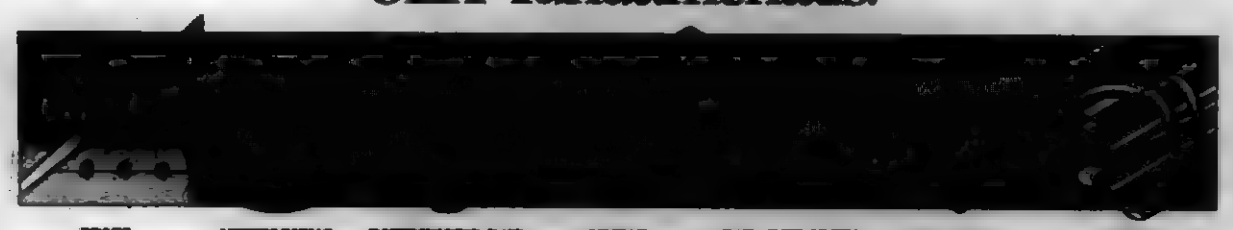
Dedication

Travelers is as dedicated to this industry giant as they come. Devoted to the IBM game plan, it has no intention of migrating to the International Standards Organization's OSI model.

"Why should we?" Waltrip asked. "OSI is good for companies that have many overseas offices. We are mainly concentrating here in the U.S. and Canada. Our presence overseas is trivial."

However, IBM gear cannot be found everywhere within the company. Several years ago, Travelers developed its own IBM network management program called Netpic, which manages both SNA and packet-switching networks. "We will wait and see how Netview matures and possibly convert later," Waltrip said.

OLTP fundamentals.



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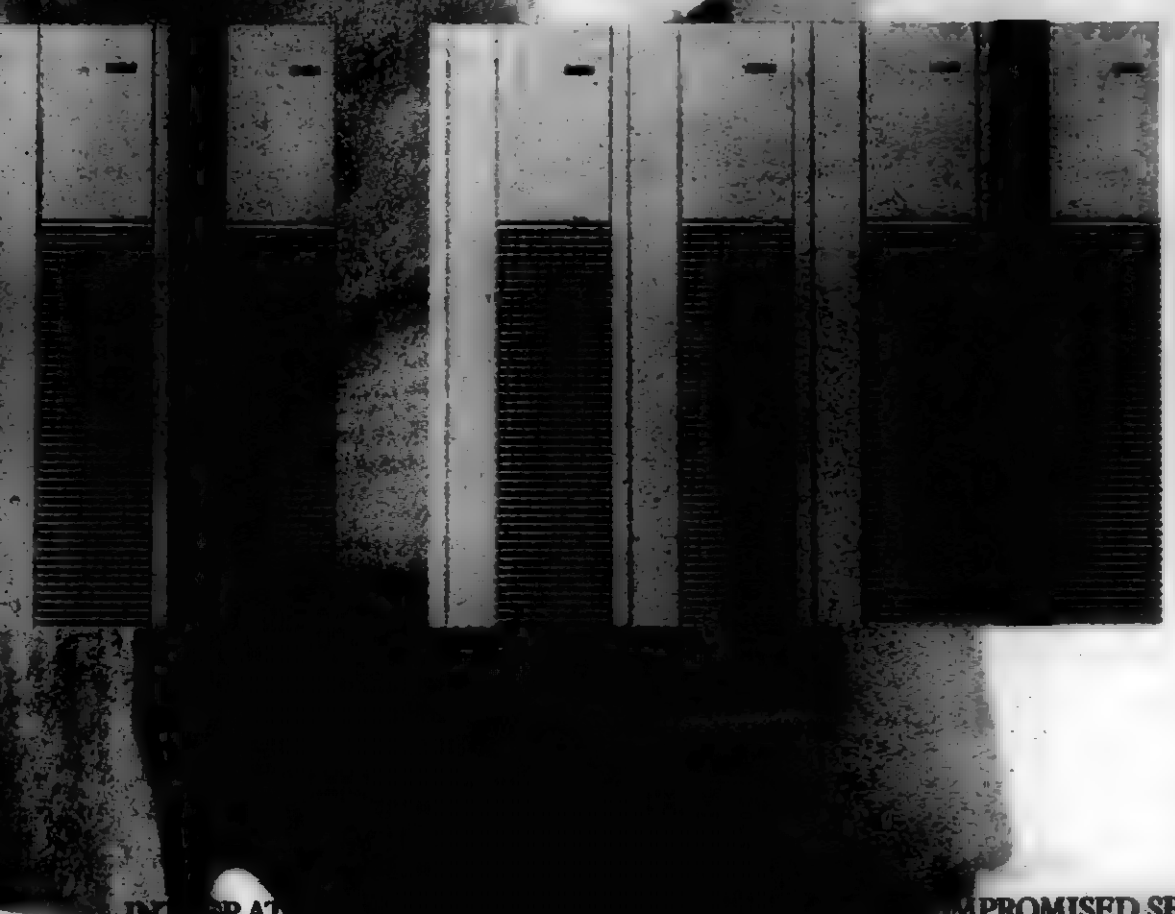

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NEW PRODUCTS

Local-area network hardware

Paraport, an IBM-compatible parallel four-port board, has been released by **The Software Link, Inc.**

Designed to run with the vendor's Lanlink 5X software-based local-area network, Paraport can also be used as a multiple printer board. It supports parallel connections at rates to 0.5M bit/sec. It also uses a proprietary cabling scheme that supports a bidirectional flow of data.

Paraport costs $495.

The Software Link, 3577 Parkway Lane, Atlanta, Ga. 30092. 404-448-5465.

Local-area network software

Network Software Associates, Inc. (NSA) has adapted its entire **AdaptSNA** line of communications software for IBM Personal Computers and Personal System/2s to be compatible with Hayes Microcomputer Products, Inc.'s Autosync feature, which is incorporated in all Hayes 2,400 and 9.6K bit/sec. modems.

According to the vendor, once the telephone connection has been established, Autosync enables the modems to transmit synchronous data over standard asynchronous links by automating an asynchronous-to-synchronous data conversion process.

The software line includes AdaptSNA APPC, priced at $285; AdaptSNA RJE, priced at $785; and AdaptSNA 3270, priced at $585.

NSA, 22982 Mill Creek, Laguna Hills, Calif. 92653. 714-768-4013.

Customer-premise equipment

Voice Computing, Inc. has released a version of its **Voiceline** voice-mail system for IBM Personal Computer XTs and PC ATs.

Voiceline Version 1.3 offers standard voice-mail functions as well as the ability to activate the host computer when it is turned off, call forwarding, departmentalization of messages and interruption of or transfer to the system.

The system administrator also has the ability to activate such functions as maximum message length, transfer to operator, security codes, log file, changing ID codes, line greeting, no-erase messages and customized message recipient lists.

Voiceline is priced at $1,695.

Voice Computing, 1250 Fenrite Drive, Madison, Wis. 53716. 608-221-0001.

Protocol converters

Wang Laboratories, Inc. has enhanced its IBM Systems Network Architecture (SNA) emulation products for the Wang VS minicomputers.

VS SNA Release 2.60 emulates IBM 3274 and 3777 devices and provides access to interactive and batch SNA applications on the IBM host computer. Enhancements include support of CCITT X.25 connections between the SNA host and the VS, a provision for leased-line connections that support data transmission rates to 64K bit/sec. and dial-up lines supporting speeds up to 19.2K bit/sec.

Emulation options for IBM's 3278 Model 2, 3278 Model 5 and 3279 Model S3G are offered.

VS SNA Release 2.60 includes VS SNA Standard Components, priced at $1,000; X.25 Standard Components, priced at $1,000; 3274 and 3777 Emulation, priced at $1,250; VS SNA Endpoint, priced at $750; and Virtual Terminal Interface, priced at $750.

Wang, One Industrial Ave., Lowell, Mass. 01851. 617-459-5000.

Electronic mail

Personal EMC2, a personal computer-based electronic-mail software package, has been introduced by **Fischer International Systems Corp.**

According to the vendor, Personal EMC2 allows users to read and answer the vendor's host-based EMC2 mail while not connected to the host system. Users can also create mail, letters and documents. Features include an editor, in baskets, out baskets and the ability to access mainframe EMC2 to perform standard functions.

When necessary, connection to the mainframe can be made via an asynchronous dial-up connection, an IBM 3270 coaxial connection or an IBM Synchronous Data Link Control/Systems Network Architecture remote configuration.

Personal EMC2 costs $89.

Fischer International, P.O. Box 9107, 4073 Merchantile Ave., Naples, Fla. 33942. 813-643-1500.

Security

A stand-alone computer security device said to prevent unauthorized computer access through a modem has been introduced by **Adalogic, Inc.**

Called **Gateway II**, the product installs between the modem and the computer port. If a valid password or ID code is not entered, it terminates the call. When the dial backup option is used, Gateway II will dial an authorized user at a predetermined number. Gateway II stores up

Continued on page 58

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BIM-PACK is priced at $8,000 for a permanent license, $4,000 on an annual lease, or $400 on a monthly rental. Based on the potential disk space savings BIM-PACK should pay for itself over and over again.

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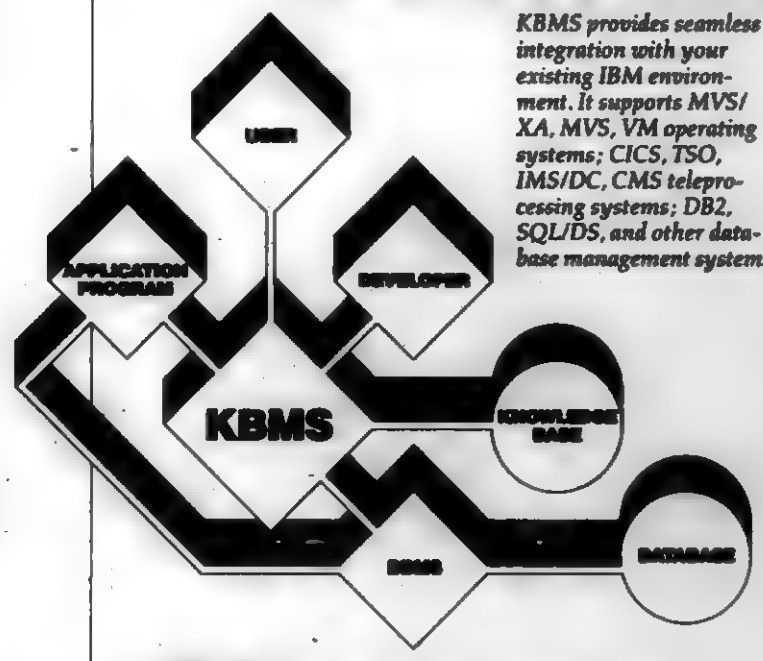

KBMS provides seamless integration with your existing IBM environment. It supports MVS/XA, MVS, VM operating systems; CICS, TSO, IMS/DC, CMS teleprocessing systems; DB2, SQL/DS, and other database management systems.

A major computer company is saving over $25 million a year on product ordering and configuration, thanks to expert systems they developed in-house.

A leading financial services company has substantially reduced bad credit losses with a computerized system they developed based on artificial intelligence.

These are true stories. Yet expert systems still have not taken a serious place in the business world.

Why? Because they've been available only on specialized systems using esoteric languages like LISP and PROLOG. So, like the companies described above, you could only benefit from knowledge-based systems if you had a great deal of money, people and time to make them work.

Until now.

THE PRACTICAL BREAKTHROUGH: FULL INTEGRATION WITH IBM AND DATABASE SYSTEMS.

Now AICorp has developed a knowledge base management system called KBMS that is ready to take its place—along with database management and fourth-generation languages—as a major competitive business tool.

KBMS is a mainstream software system that is an extension of conventional DP practices. It provides seamless, high-level integration with your existing applications and databases.

The system runs under major IBM operating systems, teleprocessing systems and database management systems. It can be integrated with your existing applications by calling a KBMS module from a standard COBOL program, or vice versa. It even has the speed and processing power to be used in high-volume, transaction processing applications.

Perhaps most important of all, you can implement KBMS using the experience, hardware and software investment you have in place already.

IMPLEMENT A NEW CLASS OF APPLICATIONS.

KBMS makes it possible for you to develop practical solutions for whole new applications areas—applications that are strategic and crucial to your business, but simply have been too complex to solve with traditional, procedural programming approaches.

For example, manufacturing companies can use KBMS to build an expert system for reviewing every incoming order for proper configuration. Insurance companies can use it for underwriting decisions to guarantee that corporate policy is always followed. Energy generating companies can use it to better predict energy needs. And financial organizations can use KBMS to enforce credit approval guidelines.

Any business problem that is complex, governed by many interrelated rules and policies, and subject to frequent change is a candidate for KBMS.

HOW KBMS WORKS.

KBMS, which stands for Knowledge Base Management System, incorporates the four key techniques of AI programming methodologies: goal-directed reasoning (backward chaining), data-driven reasoning (forward chaining), hypothetical reasoning, and object-oriented programming.

By combining these techniques in one integrated system, KBMS gives your business applications the full "reasoning" power of expert systems technology, allowing you to address a wide range of applications with a single product.

A FREE SEMINAR WILL SHOW YOU HOW KBMS CAN GIVE YOU A COMPETITIVE ADVANTAGE TODAY. CALL (617) 890-8400.

AICorp, a developer of AI-based mainframe applications for more than 10 years, and the creator of the INTELLECT™ natural language system, is holding a series of seminars that will show you how KBMS can provide a measurable, significant and immediate return on investment for your company.

To register for the seminar in your area, please call (617) 890-8400. AICorp, 100 Fifth Avenue, Waltham, MA 02254-9156.

AICORP

Bringing AI Software to Business

AT LAST. A PRACTICAL KNOWLEDGE BASE MANAGEMENT SYSTEM FOR YOUR IBM MAINFRAME ENVIRONMENT.

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Continued from page 56

to 100 passwords and telephone numbers and provides an audit trail of all log-in attempts.

Two models, the Gateway II and the Gateway II Dial Back, are available. Gateway II costs $395; Gateway II Dial Back costs $495.

Adalogic, 7844 McClellan Road, Cupertino, Calif. 95014. 408-257-1352.

Modems/ Multiplexers

A multiplexer and packet assembler/disassembler (PAD) for public and private CCITT X.25 packet-switched digital networks has been announced by **Gandalf Data, Inc.**

Mmux is said to provide asynchronous statistical multiplexing, synchronous multiplexing, intelligent local switching and X.25 access for four to eight desktop devices or computer peripherals. It features an integrated modem card for direct connection at 9.6K bit/sec. to leased company lines. It supports input channels up to 19.2K bit/sec. and offers split-speed operation. The output composite link can operate at any speed up to a full 64K bit/sec. level.

The four-channel Mmux costs $995; the eight-channel version costs $1,495.

Gandalf, 1020 S. Noel Ave., Wheeling, Ill. 60090. 312-541-6060.

Two stand-alone desktop modems designed for use over dial-up lines have been introduced by **Digital Equipment Corp.**

The **DF212** and the **DF242** models feature four levels of security, automatic speed adjustment, the ability to store up to 30 telephone numbers 36 characters long and automatic dialing capabilities. Also included are on-line error correction, built-in diagnostics and two command languages.

The DF212 transceives data at 300, 600 and 1,200 bit/sec. in asynchronous mode and at 600 and 1,200 bit/sec. in synchronous mode. The DF242 transceives data at 300, 1,200 and 2,400 bit/sec. asynchronously and at 1,200 and 2,400 bit/sec. synchronously. The products cost $645 and $795, respectively.

DEC, 146 Main St., Maynard, Mass. 01754. 617-897-5111.

A transcoder said to allow twice as much voice traffic on existing 1.54M bit/sec. T1 lines has been introduced by **Analogic Corp.'s Telecommunications Products Group.**

The adaptive differential pulse-code modulation unit is called the **ATC-48.**

The product is configured as a single stand-alone unit and, according to the vendor, can handle all standard voice and data formats, including M44 bundled or 48-channel, robbed-bit 4.8K bit/sec. data, which embeds signaling in voice to provide four extra lines.

The transcoder supports transparent and bypass modes for high-speed end-to-end digital data transmission. Automatic rerouting of one T1 line reroutes signals around the unit should failure occur.

The ATC-48 costs $5,000.

Analogic, 8 Centennial Drive, Peabody, Mass. 01961. 617-647-1900.

An internal 300/1,200/2,400 bit/sec. modem for IBM Personal System/2 Micro Channel-based computers has been announced by **U.S. Robotics, Inc.**

The **Courier 2400/PS** fits into any PS/2 Model 50, 60 or 80 Micro Channel expansion slot. It offers autodial and autoanswer capabilities and is CCITT V.22 bis compatible at 2,400 bit/sec. and Bell 212A- and 103-compatible at 1,220 and 300 bit/sec., respectively.

Features include Help screen summaries of commands and settings, on-screen call-progress monitoring, call duration reporting and automatic speed matching with the remote modem, the vendor said.

Courier 2400/PS costs $449.

The vendor also announced a Unix-adapted version of its 9.6K bit/sec. Courier HST modem bundled with a Unix-based data communications program. The package costs $1,295.

U.S. Robotics, 8100 N. McCormick Blvd., Skokie, Ill. 60076. 312-982-5010.

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The Komstar system is just what you'd expect from the leader in dry laser on-line installed COM systems. And living proof of Kodak's commitment to COM. It's a complete, integrated system for managing documents that uses laser technology to print your mainframe output on film, process it without chemicals, duplicate it, collate it, and now even create distribution labels for maximum throughput. With minimal operator intervention. And, as always, the best reliability in the COM industry, plus Kodak service and support to keep it that way. Talk to your Kodak Business Imaging Systems representative about the Komstar system, or call 1 800 445-6325, Ext. 300.

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HARD TALK

Stanley Gibson

Unearthing RISC worms

A bucket of cold water was dumped on a hyperventilating group of reduced instruction set computing (RISC) advocates recently when Neal Nelson & Associates, a Chicago-based consulting firm, released a set of benchmark results that showed the Sun Microsystems RISC-based Sun-4 being outperformed in some tests by its complex instruction set computing-based predecessor, the Sun-3.

Whether or not the test is valid is a question that will be batted around for months and perhaps years to come. If the test was valid, then RISC advocates have a lot of explaining to do.

It may be too early to tell if the test was a fair one for Sun's Scalable Processor Architecture (Sparc) chip. The 10 million instructions per second (MIPS) of which Sun claims the Sun-4 is capable were reportedly compiled while running the Dhrystone benchmark, a measure of technical performance.

Responding to the Nelson results, a Sun spokesman termed the benchmark an "I/O test," not a measure of proces-

Continued on page 63

Breuners binges on automation

Boasts second place in furniture industry due to tight inventory control

BY J. A. SAVAGE
CW STAFF

SAN RAMON, Calif. — For the last 15 years, the MIS department at Breuners Home Furnishings has ridden a financial roller coaster as a result of the firm's business environment: The company was bought, sold and transferred with management alternately funding and ignoring MIS.

Breuners is now on an automation roll with its own industrial roller coaster equivalent: huge, fast elevator cranes for grabbing furniture that operate in an enormous warehouse. As a family-owned business founded in 1856, Breuners claims it is now the second largest furniture retailer in the country. Still family-owned in the early 1970s, it was an innovator in technology. With IBM, it developed BOLTS, or Breuners On Line Terminal System. BOLTS ran for six years on an IBM 371/58.

MIS couch potatoes

The company, which now has revenue of about $225 million, was bought by Marshall Field & Co. in 1977. According to John Longridge, management information services director at Breuners, Marshall Field left MIS in a "static" situation.

Marshall Field was using then-Sperry Corp. equipment and wanted Breuners to move to Sperry Univac machines, but that posed compatibility problems with Breuners' IBM equipment. Instead, both companies kept their vendors, and Marshall Field eventually adopted IBM machines.

Breuners, however, began to restructure its business from a decentralized model in which each retail store had its own warehouse — the plan for BOLTS — to a centralized model, with a parent warehouse and satellite stores.

When this was done, BOLTS caused problems with the parent-satellite structure. BOLTS was rewritten to accommodate the new arrangement, and in the

Continued on page 64

Data View

Packing disks

Amdahl 5870 supports highest average disk capacity at Amdahl user sites

INFORMATION PROVIDED BY COMPUTER INTELLIGENCE
CW CHART

Quotron gets major boost

BY ALAN ALPER
CW STAFF

NEW YORK — Spurning the entreaties of a host of other vendors, Paine Webber, Inc. recently extended an offer to Quotron Systems, Inc. to continue using its stock quote system at Paine Webber's 285 offices in North America. The precise value of the multimillion-dollar, five-year contract extension was not disclosed.

The brokerage firm said it will install Quotron's Unix-based

Continued on page 63

Mid-frame Unisys line appealing

BY ALAN ALPER
CW STAFF

NEW YORK — Unisys Corp.'s recently disclosed extensions of its 1100/2200 "mid-frame" processor family are giving many users of entry-level Sperry Corp. 1100 mainframes a reason to remain loyal to their supplier, according to a cross section of customers surveyed recently.

Unisys Chairman "W. Michael Blumenthal did what he promised by creating a third company [from the merger of Sperry and Burroughs Corp.] that has advanced the 1100 architecture," said James Ault, president of Use, Inc., a Sperry users group, and director of information services at Creighton University.

The six-member 2200/400 family, which ranges from single- to six-processor systems, offers a hardware migration path from the 1100 Models 60 and 70 that preserves user investment in applications running under Sperry's proprietary operating

Continued on page 60

Inside

- Stratus improves customer service network. Page 60.
- Unisys adds low-cost banking printer. Page 64.
- Memorex division rolls out ASCII terminal. Page 66.

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Forms-handling advantages include automatic paper parking, no-waste demand-document tear-off, and a straight path for stiff forms. No extra-cost gadgets are required.

Extra features and all, the ISI 7224 costs much less than its IBM counterpart.

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Telex: 810-223-6058

► The ISI 7224 prints at 53.7 dBA — quieter than the IBM 4224. And since it's only seven inches tall, it fits tighter spaces.

Stratus maintenance centers get redundance

BY STANLEY GIBSON
CW STAFF

MARLBORO, Mass. — Stratus Computer, Inc., known for the redundant hardware components in its on-line transaction processing systems, recently said it plans to add redundancy to its worldwide network of maintenance centers as well.

Under the plan, which will be implemented gradually this year, four of Stratus's principal maintenance sites will become, in effect, exact copies. The centers, located here and in London, Amsterdam and Hong Kong, will each contain the same customer information, which will be instantly updated as changes occur.

As a result, any center will be able to handle a call from any customer in the world, because information on that account will be stored at the customer center.

Worldwide help line

"This provides experts on a 24-hour basis, without a third shift being on call," said William Elliott, Stratus vice-president of product marketing. Calls made late at night will be placed to whichever center is open at that hour, according to Elliott. For example, if a New York data center makes a call in the middle of the night, the call may go to Hong Kong, where that customer's information would be stored, Elliott said.

The system will make use of the remote diagnostics currently offered to Stratus customers who are connected to Stratus's Marlboro headquarters. Stratus said it does not plan any additional charge for what it claims will be improved service.

In response to questions about the security of customer data transmitted worldwide, Elliott reiterated Stratus's current policy regarding remote customer hookups: a customer may determine what data is sent to Stratus. "The security level is controlled by the user," he said.

Elliott said customers requiring extremely high levels of confidentiality may establish their own service networks using Stratus software. He added that several customers thus far have purchased Stratus software for this purpose.

The four centers will be connected by leased lines, although Stratus said it is as yet unclear on whether the centers will be connected in a star configuration with Stratus's Marlboro headquarters as the hub or whether each center will be connected directly to all other centers.

Elliott said Stratus plans to add more customer centers with identical data bases to the network once the connection of the initial four is complete.

Unmatched Screen Image

Buy The One On The Left And You'll Have To Put It Where The Sun Don't Shine.

The monitor on the right, however, can be placed anywhere you like. Even in direct sunlight. It's the new *Flat Technology Monitor* from Zenith Data Systems—winner of *PC Magazine's* coveted "Technical Excellence Award" in the hardware category for 1987.

You Have To See Zenith To Believe It

So clear. So precise. So lifelike. It's the only monitor with a completely flat screen. A breakthrough that has redefined monitor quality forever. Industry experts are already convinced. And once you see it in person, you'll be a believer, too.

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Our Flat Technology Monitor has an impressive 14-inch display. And even though it's bigger, it's 50% brighter than conventional CRT's and it has 70% greater contrast. So you get colors with greater depth and definition that make your reports, charts and graphs come alive like never before.

The Flat Technology Monitor is virtually glare-free. So you can work longer without the usual headaches and eyestrain. And that means greater productivity. But to get the whole picture, you have to see it with your own eyes.

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You also get full compatibility with the high resolution VGA Video generated by IBM's new PS/2® computers. And with Zenith's Z-449 or other VGA-class video cards, you can enjoy CGA, MDA, Hercules and EGA graphics as well.

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Unisys

CONTINUED FROM PAGE 59

system, OS 1100 [CW, March 21]. The series, which is set to ship in the fourth quarter, also extends the performance of the older 2200 family to 14 million instructions per second, the company said.

Ranging in price from $177,951 to $952,065, the 2200/400 series should appeal to customers who seek to disperse processors throughout various locales or departments within their organizations. By using very large-scale semiconductor technology, Unisys said, it was able to reduce the parts count on the systems by almost 90%, resulting in systems that offer four times the performance and require 70% less space, power and cooling than the 1100 models they effectively replace.

Creighton's Ault said the university is considering upgrading its two 1100/72s at some point during the next 18 months and is leaning toward the 2200/400 family rather than going with 1100 Models 73 or 74. "The price/performance of the new series is impressive for our environment," he said.

Ault said he has also entertained proposals from IBM and Digital Equipment Corp. but remains unconvinced that those vendors can match the price/performance of the 2200/400. "They've not showed us that they can tie things together with our current environment," he said.

A less obvious advantage of the 2200/400s is their ability to operate with minimal data center personnel, Ault noted. "There's a PC-based facility that provides operatorless functionality that makes the products perfect for departmental use."

Power needs spark applause

Other users pointed to the low power consumption and reduced footprint as key features of the 2200/400. "This product uses electricity at the same rate as a copier," said Allen Elliott, data center director of Westchester County in New York.

Westchester County recently installed a four-processor 2200/204 that will not need to be upgraded for some time, Elliott said. The county is also interested in higher end additions to the 2200 family to offload from its workhorse 1100/94.

"We're using an 1100/94 that is partitioned into four regions: three are used for production, the fourth is used for development," he said.

A Unisys spokesman declined to comment on follow-ons to the 2200/400 line beyond saying an announcement is planned for later this year.

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1. Industry (check only one)

Noncomputer-related businesses

☐ 1. Aerospace
☐ 2. Agriculture, mining, construction, oil
☐ 3. Business consulting (noncomputer-related)
☐ 4. College/university
☐ 5. Elementary/high school
☐ 6. Engineering/architecture
☐ 7. Finance, banking, accounting, insurance, real estate
☐ 8. Government
☐ 9. Health/medical services
☐ 10. Legal services
☐ 11. Manufacturing
☐ 12. Military
☐ 13. Other business services
☐ 14. Publishing/advertising/public relations
☐ 15. Research and development
☐ 16. Retail/wholesale
☐ 17. Transportation, communications, utilities
☐ 98. Other (specify) _____

Computer-related businesses

☐ 18. Computer consultant
☐ 19. Computer retail
☐ 20. Distributor/wholesaler
☐ 21. Manufacturer (computers, software, peripherals)
☐ 22. Service bureau
☐ 23. VAR/systems house/integrator
☐ 99. Other (specify) _____

2. Title (check only one)

☐ A. Chairman/president/owner/partner
☐ B. Vice president
☐ C. Controller/treasurer/accountant
☐ D. Director/supervisor/manager
☐ E. Project manager/chief/group leader
☐ F. Art director/writer/chief/group leader
☐ G. Engineer/scientist
☐ H. Administrator
☐ I. Consultant/advisor
☐ J. Microcomputer specialist/manager/analyst
☐ K. Programmer
☐ L. Educator
☐ M. Professional (lawyer, doctor, etc.)
☐ Z. Other (specify) _____

3. Department or function (check only one)

☐ A. Accounting/finance
☐ B. Administration/management/personnel
☐ C. Consulting
☐ D. Education/training
☐ E. Engineering/R&D
☐ F. Manufacturing/production
☐ G. Microcomputer center/office automation
☐ H. MIS/DP
☐ I. Purchasing
☐ J. Sales/marketing/distribution
☐ Z. Other (specify) _____

4a. Does your company own or lease any mainframe computers at this location?

☐ **Yes** (indicate quantity below) ☐ **No**

	Existing (quantity)	Plan to buy (quantity)
☐ 1. IBM		
☐ 99. Other (specify)		

4b. Does your company own or lease any minicomputers at this location?

☐ **Yes** (indicate quantity below) ☐ **No**

	Existing (quantity)	Plan to buy (quantity)
☐ 1. IBM		
☐ 2. DEC VAX		
☐ 3. Sun/Apollo		
☐ 99. Other (specify)		

5. Does your firm have or plan to buy any of the following types of personal computers or microcomputer systems at your location?

☐ **Yes** (indicate quantity below) ☐ **No**

	Currently own	Plan to buy within 1-12 mos.
1. Macintosh 128/512		
2. Macintosh Plus		
3. Macintosh SE		
4. Macintosh II		
5. IBM or compatible		
6. Sun/Apollo workstation		
99. Other (specify)		

6. Please indicate your involvement with each of the following types of personal computers or microcomputer systems (check all that apply)

	Macintosh	Software	Networks & Peripherals
A. Approve purchase	A. __	A. __	A. __
B. Develop/manufacture	B. __	B. __	B. __
C. Evaluate/select vendor	C. __	C. __	C. __
D. Own one	D. __	D. __	D. __
E. Own two or more	E. __	E. __	E. __
F. Purchase or acquire	F. __	F. __	F. __
G. Establish specifications	G. __	G. __	G. __
H. Recommend to others	H. __	H. __	H. __
I. Sell	I. __	I. __	I. __
J. Train people to use/or provide support	J. __	J. __	J. __
K. Use	K. __	K. __	K. __
L. No involvement	L. __	L. __	L. __
Z. Other (specify by name and quantity)	Z. __	Z. __	Z. __

If you have no involvement with any of the above, skip to question 8.

7. Do you recommend, buy, specify or approve microcomputers, software, and/or peripherals?

☐ **Yes** ☐ **No**

If yes, please indicate for how many Macintosh personal computers you have this involvement. (check only one)

☐ A. 1-3 ☐ E. 50-99
☐ B. 4-9 ☐ F. 100-499
☐ C. 10-19 ☐ G. 500+
☐ D. 20-49 ☐ H. None of the above

8. How many people are employed by your entire company? (check only one)

☐ A. 1-9 ☐ D. 100-499 ☐ G. 2500-4999
☐ B. 10-24 ☐ E. 500-999 ☐ H. 5000-9999
☐ C. 25-99 ☐ F. 1000-2499 ☐ I. 10,000 or more

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1. Industry (check only one)

Noncomputer-related businesses

☐ 1. Aerospace
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☐ 10. Legal services
☐ 11. Manufacturing
☐ 12. Military
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☐ C. Controller/treasurer/accountant
☐ D. Director/supervisor/manager
☐ E. Project manager/chief/group leader
☐ F. Art director/writer/chief/group leader
☐ G. Engineer/scientist
☐ H. Administrator
☐ I. Consultant/advisor
☐ J. Microcomputer specialist/manager/analyst
☐ K. Programmer
☐ L. Educator
☐ M. Professional (lawyer, doctor, etc.)
☐ Z. Other (specify) _____

3. Department or function (check only one)

☐ A. Accounting/finance
☐ B. Administration/management/personnel
☐ C. Consulting
☐ D. Education/training
☐ E. Engineering/R&D
☐ F. Manufacturing/production
☐ G. Microcomputer center/office automation
☐ H. MIS/DP
☐ I. Purchasing
☐ J. Sales/marketing/distribution
☐ Z. Other (specify) _____

4a. Does your company own or lease any mainframe computers at this location?

☐ **Yes** (indicate quantity below) ☐ **No**

	Existing (quantity)	Plan to buy (quantity)
☐ 1. IBM		
☐ 99. Other (specify)		

4b. Does your company own or lease any minicomputers at this location?

☐ **Yes** (indicate quantity below) ☐ **No**

	Existing (quantity)	Plan to buy (quantity)
☐ 1. IBM		
☐ 2. DEC VAX		
☐ 3. Sun/Apollo		
☐ 99. Other (specify)		

5. Does your firm have or plan to buy any of the following types of personal computers or microcomputer systems at your location?

☐ **Yes** (indicate quantity below) ☐ **No**

	Currently own	Plan to buy within 1-12 mos.
1. Macintosh 128/512		
2. Macintosh Plus		
3. Macintosh SE		
4. Macintosh II		
5. IBM or compatible		
6. Sun/Apollo workstation		
99. Other (specify)		

6. Please indicate your involvement with each of the following types of personal computers or microcomputer systems (check all that apply)

	Macintosh	Software	Networks & Peripherals
A. Approve purchase	A. __	A. __	A. __
B. Develop/manufacture	B. __	B. __	B. __
C. Evaluate/select vendor	C. __	C. __	C. __
D. Own one	D. __	D. __	D. __
E. Own two or more	E. __	E. __	E. __
F. Purchase or acquire	F. __	F. __	F. __
G. Establish specifications	G. __	G. __	G. __
H. Recommend to others	H. __	H. __	H. __
I. Sell	I. __	I. __	I. __
J. Train people to use/or provide support	J. __	J. __	J. __
K. Use	K. __	K. __	K. __
L. No involvement	L. __	L. __	L. __
Z. Other (specify by name and quantity)	Z. __	Z. __	Z. __

If you have no involvement with any of the above, skip to question 8.

7. Do you recommend, buy, specify or approve microcomputers, software, and/or peripherals?

☐ **Yes** ☐ **No**

If yes, please indicate for how many Macintosh personal computers you have this involvement. (check only one)

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☐ C. 10-19 ☐ G. 500+
☐ D. 20-49 ☐ H. None of the above

8. How many people are employed by your entire company? (check only one)

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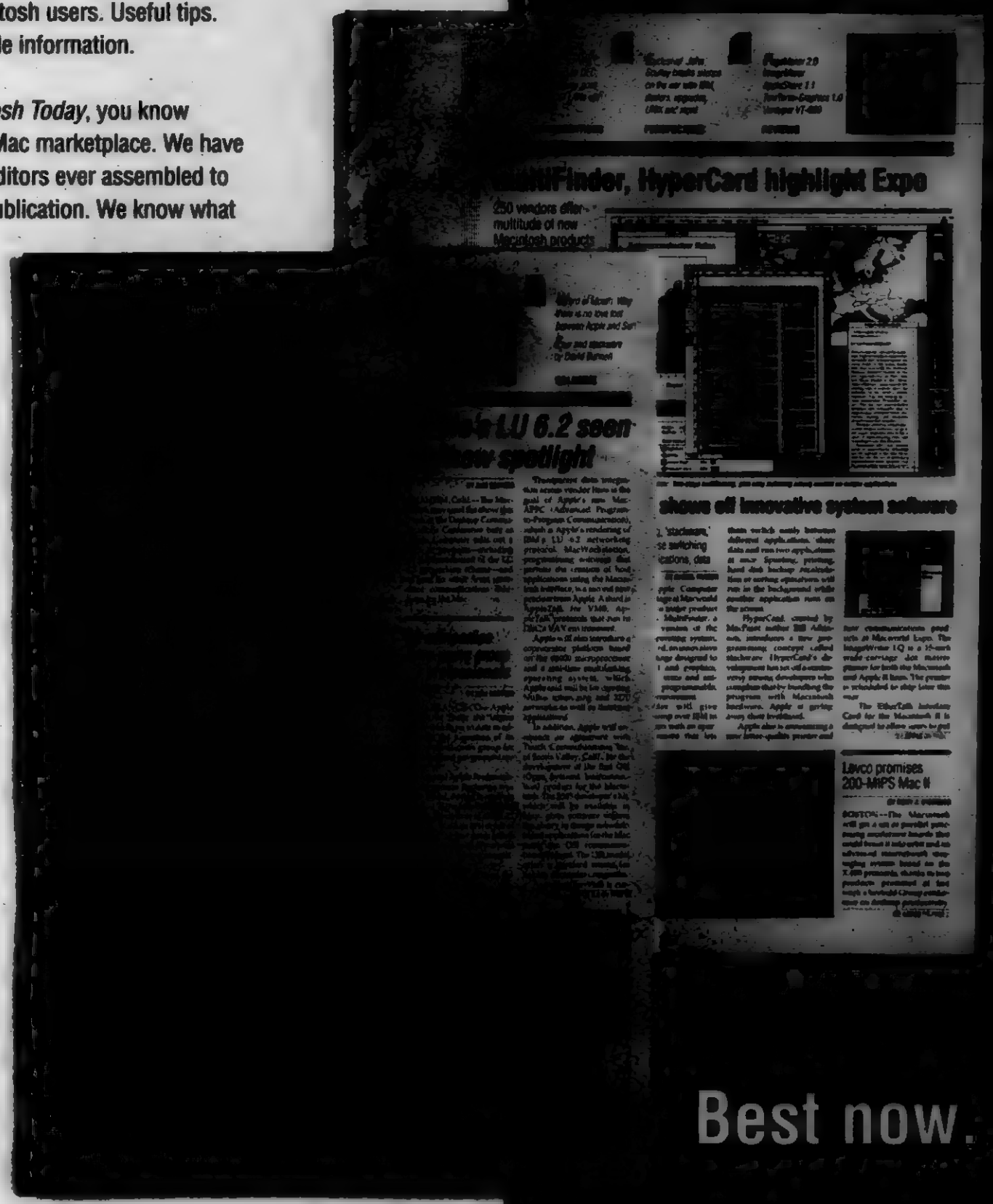

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Gibson

CONTINUED FROM PAGE 59

sor speed. Well, isn't I/O the manner in which most jobs, especially commercial ones, are performed?

Sun also said the Sun-4 has not been targeted for business applications. Maybe the Sun 4-hasn't, but it sure has sounded like the Sparc chip has been. The clear message has been that the Sparc chip is intended to be the platform of choice for all kinds of computing as Sun and AT&T lead the user community into a brave new Unix-based world. For some time, Unix backers have been trying to get Unix into general use in business applications.

Indeed, at least one Sparc licensee, Arix (formerly Arete Systems), sells general-purpose business systems.

AT&T has said that its general-purpose computer systems will be migrated to the Sparc architecture, which it is licensing from Sun. AT&T still wants to crack the business market, doesn't it?

In other tests, Nelson benchmarked other RISC-based systems, including the IBM RT Personal Computer, the Mips Computer processor and the Hewlett-Packard Spectrum system. In all cases the results were similar: The RISC-based system underachieved.

Not content with Nelson's single voice, I recently posed the RISC-as-a-business-processor question to a high-ranking official in hardware development at a major minicomputer manufacturer. The executive told me that in general use, he found that the Sun-4 generally delivers about half of the 10 MIPS claimed. The executive's company has no ax to grind, because it does not compete with Sun.

No short cuts

The reason RISC sometimes offers no benefit is apparently that RISC instructions, being reduced, are shorter, and more of them may be required for the same task that a single instruction of a complex instruction set computing system might require. Thus, a high MIPS rating would not necessarily indicate that work can be accomplished faster. Only in an application in which the short instructions performed the same work of longer instructions would this be the case.

It may be that many applications need to be optimized for RISC. If so — fine. But that means that more work will have to be done: work that is not being factored into the current headlong rush toward RISC, we suspect.

It is still early in the game: the Nelson benchmarks have just been released. But they are an auspicious opening for what promises to be a lively period of discussion. There are signs that they are generating intense interest from all sides. Sun and others invited scrutiny by their MIPS claims. Their response so far has been incomplete.

Gibson is *Computerworld*'s senior editor, systems & peripherals.

Quotron

CONTINUED FROM PAGE 59

Q1000 system at each branch location to distribute stock quote information, financial news, office automation applications and proprietary research to brokers and executives using a mix of intelligent terminals and desktop microcomputers.

Paine Webber, which has evaluated the technology for the last two years, chose Quotron over a host of stock quote vendors, including Automatic Data Processing, Inc. (ADP), Unisys Corp. and Wang Laboratories, Inc., observers said.

THE PAINE WEBBER contract extension is considered a substantial victory for Quotron, which is struggling to retain brokerage industry customers.

Installation in the first 30 offices is expected to begin next month.

The contract extension is considered a substantial victory for Quotron, which has struggled to retain major brokerage industry customers following its acquisition by Citicorp two years ago. Merrill Lynch & Co. and Shearson Lehman Hutton, Inc. are said to be considering replacing Quotron with ADP because they are wary about doing business with Citicorp, which is viewed as a major competitor.

Paine Webber Corporate Vice-President John Murphy said the firm chose Quotron because it met all of Paine Webber's current technical requirements. "It seems we don't have the same concerns about dealing with Citicorp as some of the other firms have," he explained.

Stock quote information and news will be piped into Q1000s via Quotron's proprietary network, while client and product information residing on Paine Webber's IBM mainframe will be accessed through the branch processor.

Spreadsheet and word processing applications will reside on the Q1000, Murphy said.

Approximately 1,500 Q1000s have been installed since February 1986, according to George Levine, Quotron's marketing vice-president. Other Q1000 customers include Smith Barney, Harris Upham & Co., Dean Witter Reynolds, Inc., Shearson Lehman and certain offices of Merrill Lynch, he added.

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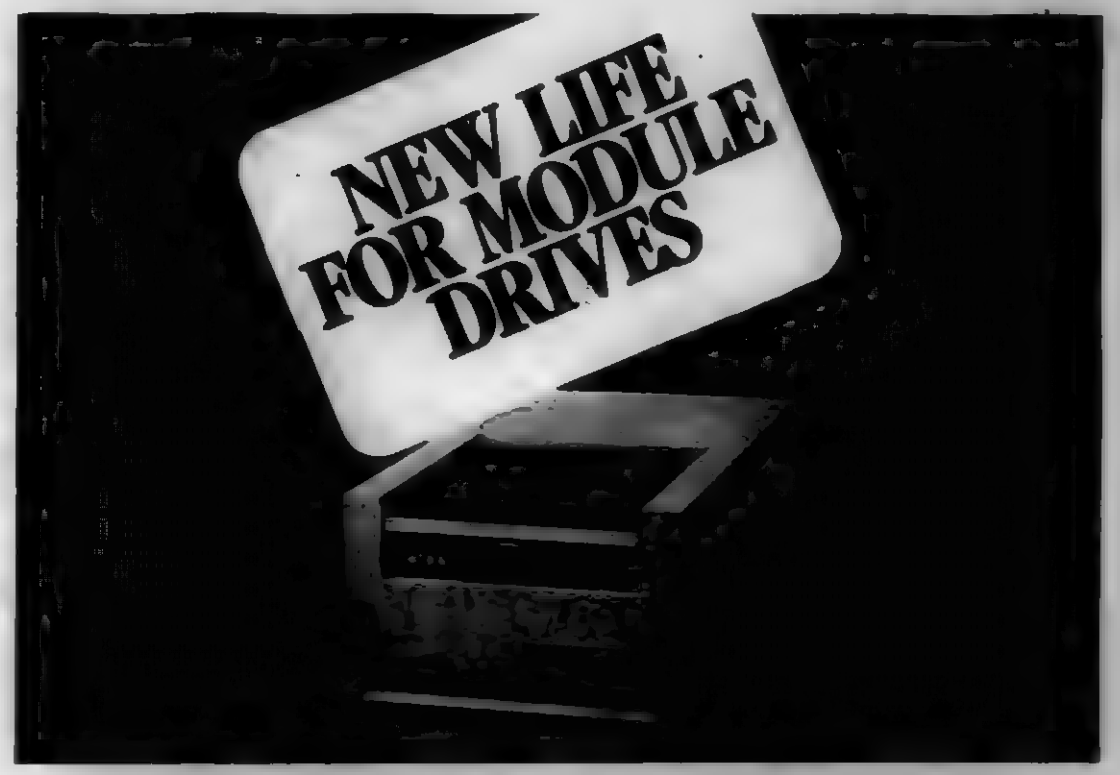

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CONTROL DATA

Breuners

CONTINUED FROM PAGE 59

process was changed from nonnative CICS macro into command-level CICS language.

Until 1983, when Longridge was brought in during a management changeover to upgrade the MIS shop, little support was given to systems. "They were down about 12% of the time," Longridge said. For two years, it took all his time just to keep the old IBM CICS system from going down. Since then, he said, the system is down less than 2% of the time.

In 1985, an MIS savior arrived in the form of one of Great Britain's largest corporations, Batus, Inc., the U.S. division of London-based B.A.T. Industries PLC. Batus, which took over Marshall Field in 1985, "changed us from a maintenance to a development shop," Longridge said. At the time, BOLTS was running on an IBM 4341; the shop was upgraded to a 4381.

Breuners' John C. Longridge

With the shop under control and management interested in new projects, Longridge began the most ambitious of the company's new undertakings — consolidation of the company's 20 warehouses into one. The job is expected to be completed in July.

The consolidated warehouse is 70 feet high and dark inside except for the headlights of the roving elevator cranes that run at seven miles per hour up and down the building's narrow aisles. The cranes brandish long-range bar-code scanners to locate furniture from distances of up to seven feet.

Longridge said the rack space used for the cranes alone would account for 20 football fields with half a field left over. Also in the building are two refinishing centers and a truck maintenance facility.

The "high-bay" warehouse is run by a Hewlett-Packard Co. HP 9000 on Dispatcher software developed by Logisticon, Inc. in Santa Clara, Calif. The system manages both the storage and retrieval of material and the resources needed to carry out the tasks.

Purchase order information is downloaded from the 4381 to the HP 9000 with the aid of a protocol converter that changes EBCDIC to ASCII.

"In one transaction, the system checks stock, makes a reservation, gets credit approval and figures the next available delivery date based on the buyer's ZIP code," Longridge said. The warehouse, which is the major part of a $16 million investment in customer service, puts Breuners "absolutely ahead" of the competition, Longridge said, and will contribute to "astronomical savings."

He estimated that the centralization project will eliminate the need not only for warehouse workers but also for some clerical workers. He said it will also contribute to substantially less damage and pilferage.

Furniture assembly

"The system is old technology, but it's never been put together for a furniture application," Longridge said. He said the scanner idea was borrowed from manufacturing applications and that the high-bay approach is used in Europe.

Although Longridge is on Breuners' management team, he said it took him years to get funding for the automated warehouse.

Since being acquired by Batus, the company is also planning to install personal computer-based cashiering. Longridge said using PCs will eliminate dual processing. The company's current IBM 3683 point-of-sale systems cannot interface with information in the CICS: Information must be entered twice. "We need the ability to get into CICS. With a PC, we can have one single entry point for information," he said.

Other MIS projects include an as-yet unspecified relational data base system at to be acquired the beginning of next year with a fourth-generation language. Longridge estimated this will cut his programming staff in half. Also, Breuners will be switching from dedicated analog data lines to digital lines in each of its 20 stores and phasing out half-inch tape to install cassette-based storage systems.

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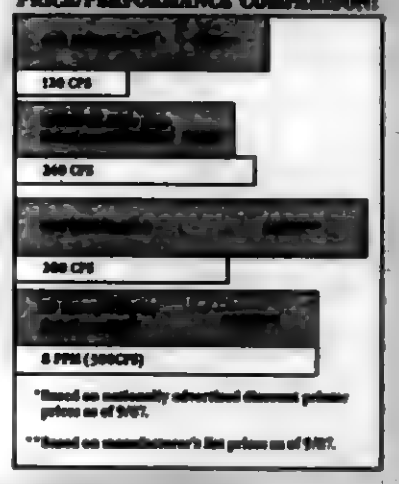

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Unisys banks on passbook printer

BLUE BELL, Pa. — A printer designed to sit at bank teller windows is now available from Unisys Corp. for $2,300.

The EF 4565 Passbook and Document Printer is a low-end extension of Unisys's EF 4560 line of printers. Other printers in the series contain daily journals and ticket dispensing devices.

The top of the four-printer line has a character recognition device that can read the last line of a passbook and provide information on the account. In this new version, a user must key in that information. The EF 4565 is priced $3,600 less than the top-of-the-line model.

The printer is a nine-wire dot matrix printer that prints 10 to 16 char./in. at 100 to 160 char./sec. in either draft or near-letter-quality mode.

The device has two RS-232C ports for two Unisys B 25 workstations or two EF 7000 financial terminals.

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NEW PRODUCTS

Processors

A 16- or 32-bit single-board microprocessor that employs Motorola, Inc.'s MC68000 running at 8, 10 or 12 MHz has been announced by Swisscomp, Inc.

The **M68K512MB** has 32K bytes of operating system in firmware, 512K bytes of user random-access memory, a socketed area with 96K bytes of erasable programmable read-only memory, two RS-232C interfaces with selectable data transfer rates of up to 38K bit/sec. for input and data display, three 16-bit parallel ports, a real-time clock, 40 I/O lines and four 62- or 64-pin connectors for future expansion.

The M68K512MB costs $999.

Swisscomp, 5312 56th St., Tampa, Fla. 33610. 813-628-0906.

Graphics systems

A video frame-grabber option has been announced by Chromatics, Inc. for use with its Le Mans and Baja Colorgraphic display systems.

Features of the **CX Frame Grabber** include real-time video frame grabbing at 30 frame/sec. and software-selectable mapping configuration and resolution. The frame grabber allows users to integrate computer-generated graphics with real-time video images. It digitizes signals from video cameras, optical disk players, videocassette recorders and other RS-170A devices and stores them in either bit-map memory or bit-map overlay.

Prices start at approximately $9,000.

Chromatics, 2558 Mountain Industrial Blvd., Tucker, Ga. 30084. 404-493-7000.

Data storage

An external optical drive subsystem said to add 2.4G bytes of storage to micro and minicomputers and to put 1.2G bytes of memory on-line full time has been announced by Information Storage, Inc.

The **525GBX2** houses two 1.2G-byte write-once read-many 5¼-in. optical drives on a single controller.

Information Storage also announced the **525GB**, an optical disk subsystem for internal mounting. It offers 1.2G bytes of storage.

The 525GBX2 costs $9,488. The 525GB costs $5,988.

Information Storage, 2768 Janitell Road, Colorado Springs, Colo. 80906. 303-579-0460.

Terminals

An ASCII display terminal has been announced by Memorex Telex, a division of Memorex Corp.

The **Memorex Telex 0220 ANSI Display Station** is a plug-compatible replacement for Digital Equipment Corp.'s VT220, VT100 and VT52 display terminals. According to the vendor, the product can be used in both DEC and IBM environments.

Features include a flat 14-in. nonglare screen, an 80- or 132-char. by 25-line screen, a tilt-and-swivel base and a choice of green, amber or white phosphors. Along with the ASCII character set, the Telex 0220 displays the full DEC supplemental and special graphics character sets as well as any VT220-compatible down-line-loadable character sets.

The 0220 costs $545.

Memorex Telex, 611 S. Milpitas Blvd., Milpitas, Calif. 95035. 408-957-1000.

Printers/Plotters

An internal interface card that enables Hewlett-Packard Co.'s Laserjet Series II printer to be used with IBM System/36 or 38 minicomputers has been announced by I-O Corp.

The **I-O 8200HP Lasercard** connects through the Laserjet Series II's internal I/O port. It features Auto DP Mode, which the vendor said allows automatic selection of the appropriate font and page orientation to allow printing of 80-, 132- or 198-col. data processing output.

According to the vendor, a Laserjet with a Lasercard appears to the IBM host as plug-compatible with an IBM 5219 printer.

The I-O 8200HP Lasercard costs $995.

I-O, 2256 S. 3600 West, Salt Lake City, Utah 84119. 801-973-6767.

Decision Data Computer Corp. has announced the letter-quality **6815 Band Printer**, designed for use with IBM System/36 and 38 minicomputers.

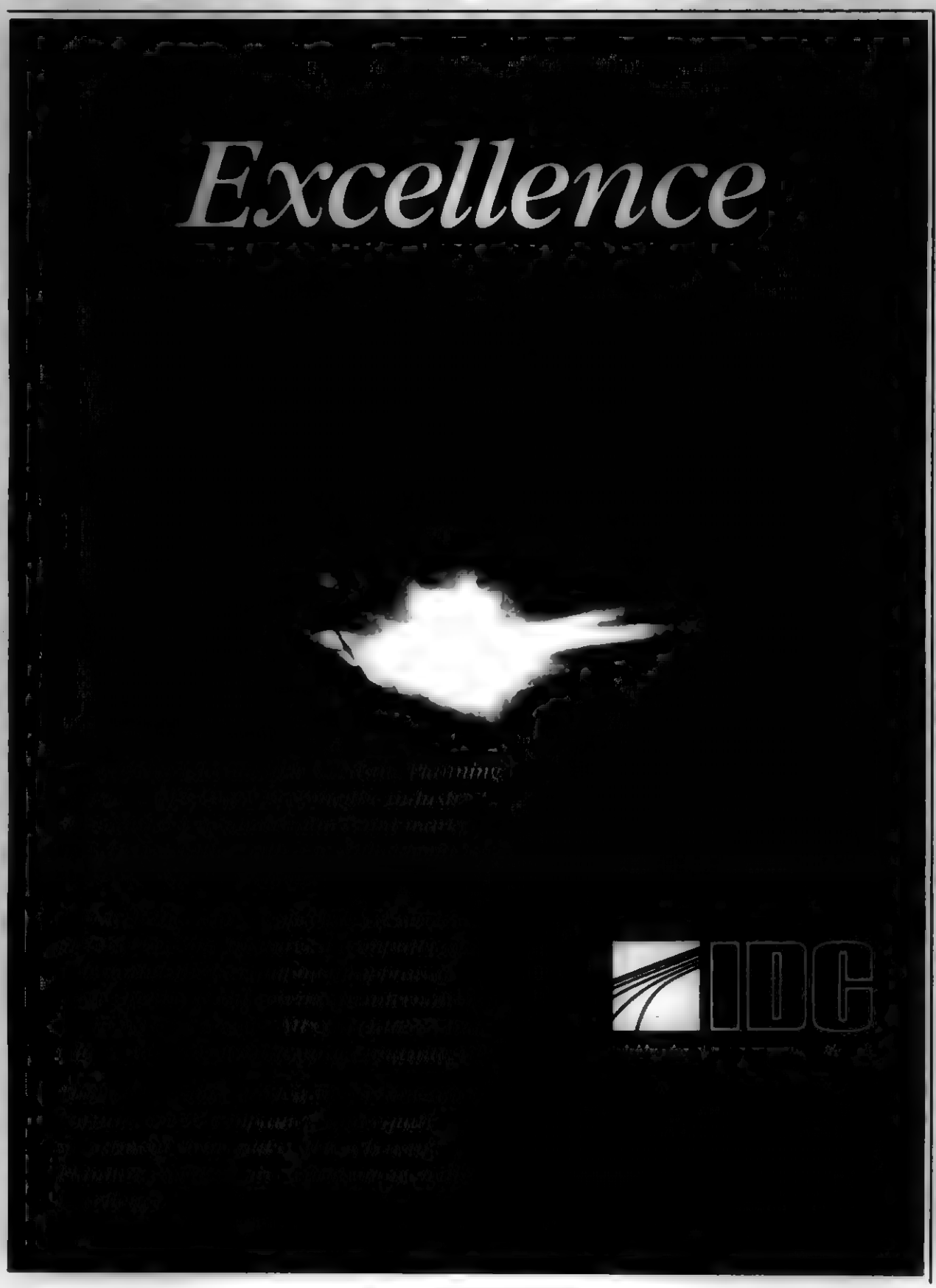
According to Decision Data, the 132-col. printer offers full IBM 4245 emulation. It is said to print 1,500 line/min at 48 char./sec.

Other features include a straight paper path, flat tractor feeds and powerized paper pullers, a wide carriage throat, a five-position adjustable output tray, a digital display, self-diagnostic capabilities with error conditions shown on a 32-char. display and five LED indicators.

The 6815 accepts continuous feed, multipart and oversized forms up to 17½ in. wide. Fully formed character sets for up to 30 fonts, including foreign languages, are available.

The 6815 Band Printer is priced at $24,500.

Decision Data, 400 Horsham Road, Horsham, Pa. 19044. 215-674-3300.



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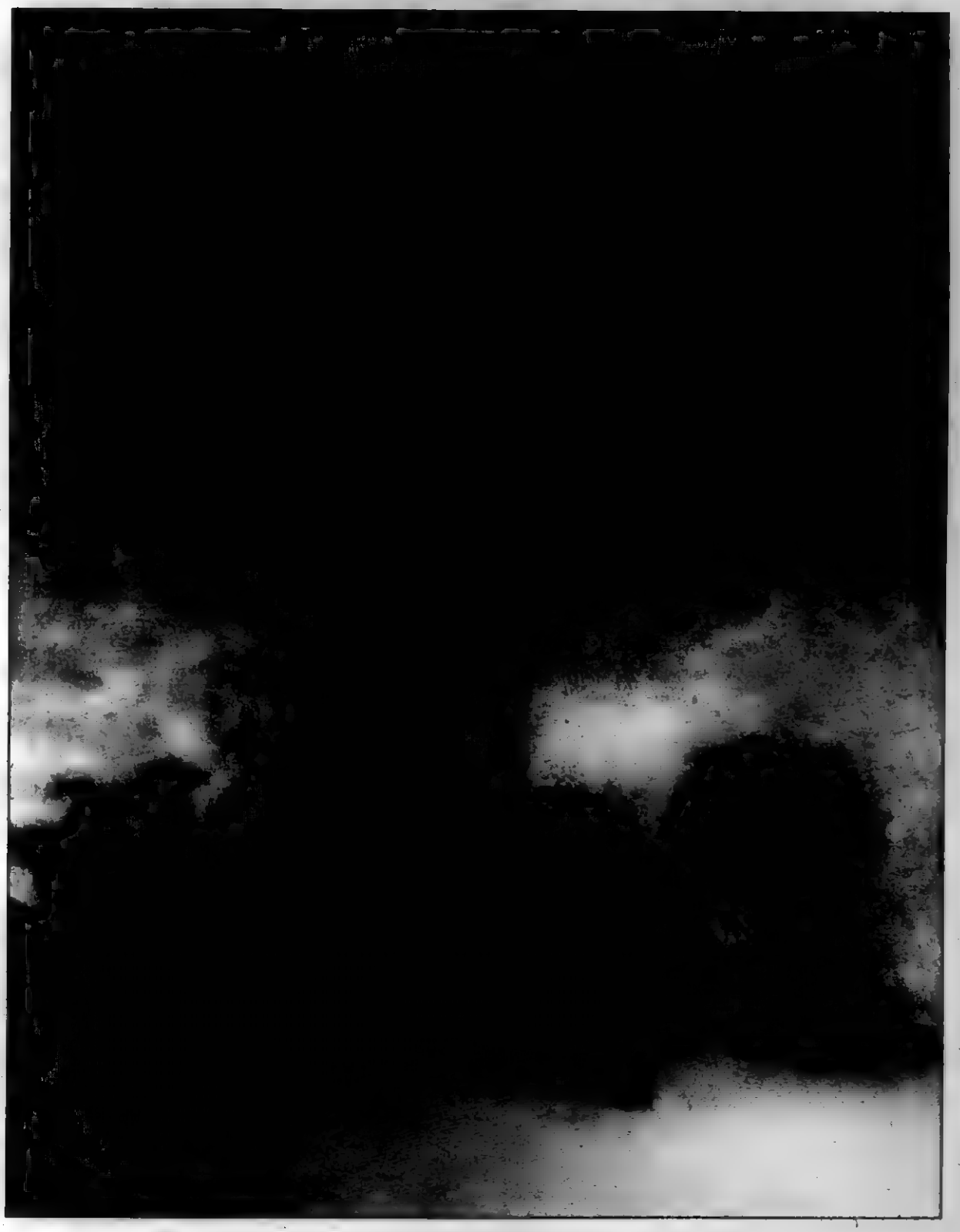

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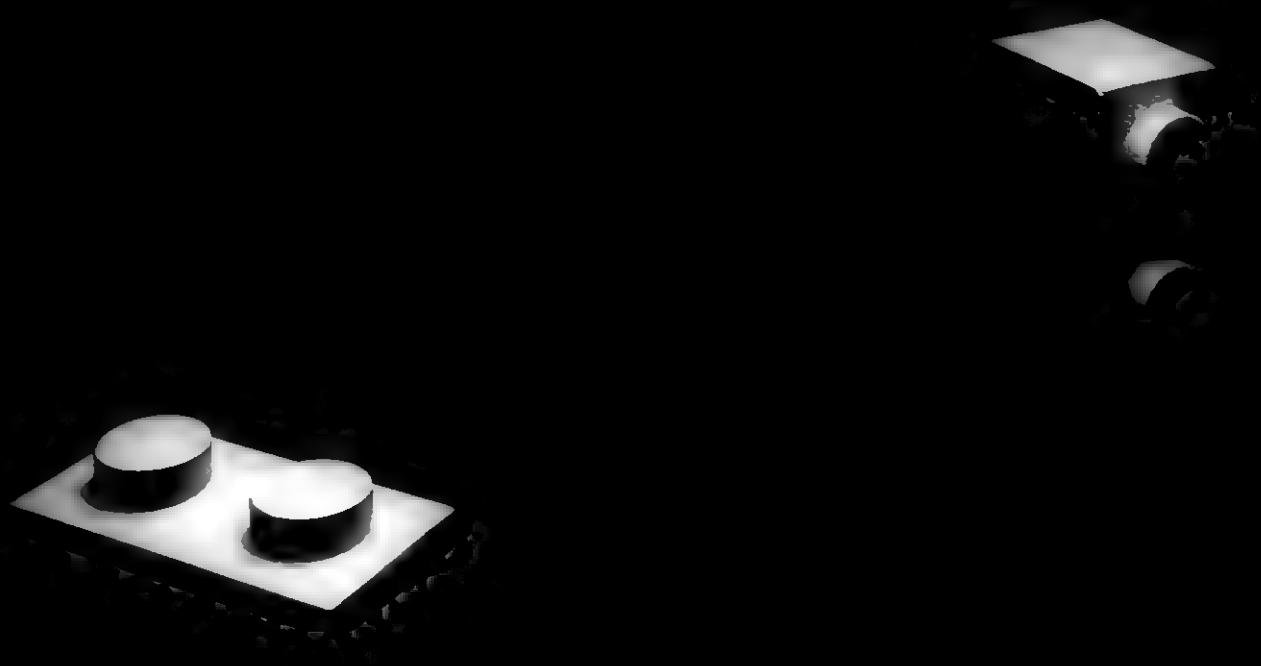

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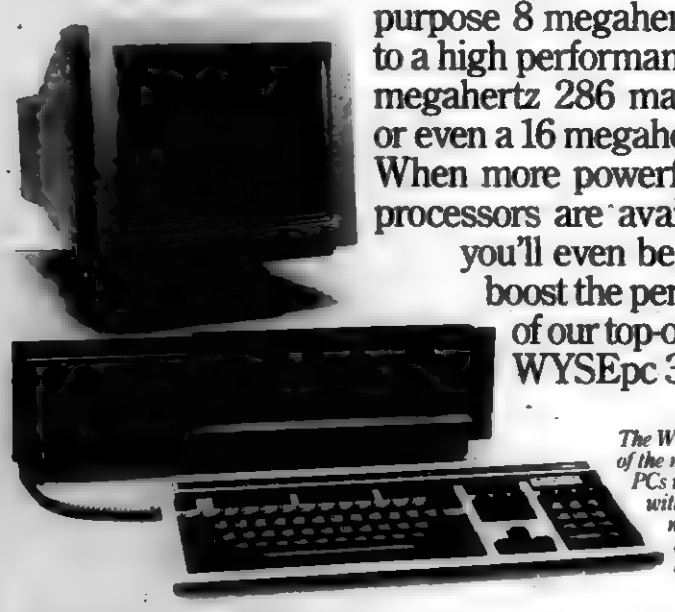

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   - 65. Communications Systems/Public Utilities/ Transportation
   - 70. Mining/Construction/Petroleum/Refining/Agric.
   - 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
   - 85. Computer & DP Services, including Software/Service Bureau/Time Sharing/Consulting
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   - 75. User: Other _____
   - 95. Vendor: Other _____ (Please specify)
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   - 23. Dir., Mgr., Suprv., Analyst, of Systems
   - 31. Dir., Mgr., Suprv., of Programming
   - 32. Programmer, Methods Analyst
   - 35. Dir., Mgr., Suprv. OA/WP
   - 36. Data Comm. Network/Systems Mgt.
   - **OTHER COMPANY MANAGEMENT**
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Organizations are estimating how much life is left in the 286 and deciding if 386 performance is worth the higher price

EDGING TOWARD POWER MACHINES

BY ALAN RADDING

MICHAEL McGLAUGHLIN

Small skirmishes are taking place in organizations throughout the country over which chip technology to choose for IBM and compatible computers. Microcomputer managers are staving off anxious users — who want a machine built around the Intel Corp. 80386 chip simply because it is the latest advance in microcomputer technology — while wrestling with the classic quandary of performance vs. cost.

"I've had two or three user requests for 386 machines, which we've beaten back," says Chuck Davis, who oversees 300 microcomputers as vice-president of strategic technology for Chicago-based Computech Systems, Inc. Davis says he discouraged these requests because they were prompted not by need but by the lure of owning the newest and the best.

Jim Wilt, office systems analyst at Sundstrand Corp., an aviation components manufacturer based in Rockford, Ill., says he is also standing fast and refusing to jump into 80386 commitments. "For us, the issue is a simple one: cost vs. speed," says Wilt, who manages roughly 350 personal computers. Cost, he adds, is winning out. "We're buying only 80286 machines for the average desk."

Not all the decisions being made favor the status quo, however. Addison-Wesley Publishing Co. in Reading, Mass., recently implemented a new computer purchasing strategy that puts the organization squarely in the 80386 world. "We are recommending [to user departments] that the IBM Personal System/2 be the new standard," says Robert Petersen, manager of user services.

A dedicated IBM shop, Addison-Wesley has approximately 500 Personal Computer XT and ATs and is warning user departments that, following IBM's lead, it will eventually phase out support for the PC. Departments can buy PS/2s based on older chip technology, but Petersen advises against it. "I'm telling them that if they are going to want high-powered tools, they are going to have to go beyond the PS/2 Model 30 or face having to upgrade within two years," he says.

Radding is a Boston-based author specializing in business and technology.

Two sides to every issue

Just as people can cite the Bible to support opposing sides of the same issue, computer professionals can find evidence in computer history that will justify either staying with current technology or buying the latest improvement.

Since computing needs always catch up to, and eventually surpass, the performance of existing equipment, a company can justify buying the most computing power it can afford; sooner or later, it will need it. It is also true, however, that prices always come down, and as long as a company's productivity isn't suffering, waiting until the last possible moment can also make sense. When a company finally needs 386 power, it will likely be able to buy it at a lower cost.

The issue governing most organizations is whether the need for 386 performance is pressing enough to justify paying the premium this equipment commands.

Right now, the retail price of an 80386 16-MHz machine from a major manufacturer with 2M bytes of random-access memory and a

Edging

FROM PRECEDING PAGE

40M-byte hard disk is about $4,500 but is discounted to less than $4,000. An 80286 10-MHz machine from the same maker with 640K bytes of RAM and a 40M-byte hard disk goes for $2,500 but is discounted to $2,000.

In the IBM PS/2 family, the Model 80, an 80386 16-MHz machine with 1M byte of RAM and a 44M-byte hard disk, lists for about $7,000, while the PS/2 Model 60, an 80286 10-MHz machine with 1M byte of RAM and a 44M-byte hard disk, lists for about $5,300.

Stripped-down model

While it is possible to buy a generic 80386 16-MHz machine with 512K bytes of RAM and a 20M-byte hard disk for less than $2,000, that price, like those quoted above, does not take into account other expenditures that may be required to take full advantage of 386 technology.

These extras include a larger hard disk drive, a high-resolution color graphics monitor and possibly a laser printer to capitalize on presentation-quality graphics. Fully configured, the average price of an 80386-based system actually ranges somewhere between $6,000 and $10,000.

Furthermore, many analysts predict that, before long, yet another round of price cuts will occur in the 286 chip class.

Lee Doyle, a senior PC analyst at International Data Corp. (IDC) in Framingham, Mass., for example, couples his projections for continued dominance of 286-class PCs through this year with predictions for a price drop to around $1,500.

Money down the drain

Whether the current and projected differentials between 286 and 386 machines are sufficient to discourage organizations from plunging ahead with 386 purchases depends on more than budgetary constraints. One issue is whether companies believe 286 machines will hold their value for a reasonable depreciation interval.

Stephen Barry, a senior manager at Price Waterhouse in Washington, D.C., says most of the large financial institutions he consults with do not. "A lot of the people I work with are looking at the 386 machines more and more," he says. "They think that buying a 286 machine is like throwing money down a drain."

Bill Kirwin, program director of personal computing policies and strategies at the Gartner Group, Inc. in Stamford, Conn., says he is inclined to agree. While Kirwin expects the 286 machine will remain a significant market factor until 1991, he says the smart money is going with the 386.

"As a long-term investment, the 386 chip is a better buy . . . [but] it depends on your threshold of pain," he says. If an organization is prepared to spend $5,000 anyway, it might as well make the extra investment for the 386 machine.

"You could argue that the 8088 [at less than $1,000] is a great buy, but if you have to replace the machine in two or three years rather than six years, you eliminate any savings," Kirwin says. The organization, he adds, has to look at the full cost of the machine throughout its entire life cycle.

Still, the question remains whether there is a pressing need for companies to buy into the 386 chip now. To begin answering that question, you have to understand the basic differences between the two chip types.

The chip difference

To most users, computer power means either processing speed or the ability to address more memory at the hardware level. A chip like the 386, which handles a 32-bit data word, is faster than the 286, which handles a 16-bit data word, because each cycle of the 386 can process more information and address more memory on the hardware level. The fastest commercial 386 chips currently operate at 20 MHz, while 286 chips offer a top-end speed of 12 MHz.

The speed difference between the two chips can best be seen in how each handles mathematical processing. To multiply or divide, the 286 must run more cycles of processing to accomplish the same result, because it must break the data into smaller pieces and perform more operations.

Just how important this difference is depends to a large degree on both the type and size of applications that a machine would be expected to handle.

Some contend that for the average PC user, the practical difference between the chips is small. This is because the extra processing capabilities of the 386 chip are not apparent when working with character-based business applications, such as simple spreadsheets or word processing.

"If you're doing spreadsheets, word processing or simple data bases, you don't have an overwhelming need" for the faster speed, says Marc Sokol, executive vice-president at Realia, Inc., a Chicago-based software company.

Undoubtedly, a large Lotus Development Corp. spreadsheet will recalculate significantly faster with a 386 machine; other than that, however, 1-2-3 with a 386-based machine will not be much different from 1-2-3 on a 286, Sokol says.

That may be true for basic spreadsheet use, Price Waterhouse's Barry counters, but if a user adds in some heavy-duty calculation, the equation changes.

Price Waterhouse, for example, is putting 386-based machines into its operations for stand-alone spreadsheet applications. "We wouldn't have gotten them if we were just doing simple addition and subtraction," Barry says, "but we use a lot of logic functions that take time, and we use a lot of the math coprocessor."

Under those circumstances, the extra speed of the 386 technology is not a luxury but a true productivity gain.

Furthermore, he says, for applications that require a lot of processing, such as graphics, the newer chip provides a distinct advantage. In particular, banks are adopting the 386 technology, according to Barry, because they are making increased use of sophisticated graphics.

In it for the graphics

Bankers Trust Co. in New York is already in the process of moving to the 386 architecture, says Leslie Fiering, assistant vice-president of advanced technology.

Fiering's interest in the 386 chip is encouraged both by the chip's speed and the growing number of applications designed to run on it, particularly Microsoft Corp.'s Windows 386 and Ansa Software's Paradox 386. She says she is also attracted by the graphics opportunities presented by 386 technology.

For instance, Microsoft's Excel for the PC has powerful graphics, which, combined with the spreadsheet, provide near-desktop publishing quality for forms, a large part of a bank's operation, Fiering explains.

Most analysts agree, however, that the first batch of 386-based software products do not really take advantage of the new technology's best capabilities. Where the analysts part is on whether 386-based products offer enough to warrant a new machine purchase.

IDC's Doyle says that as many as 30% of today's users have needs that go beyond the capabilities of the PC. Within two years, he says, those users will have to move to a 386 machine or upgrade their existing machines with 386 technology.

Doyle also maintains, however, that the difference between the two chips is, in most situations, more theoretical than practical. What is missing, he says, is the applications software required to harness 386 power.

The Gartner Group's Kirwin, on the other hand, says momentum is inexorably moving to the 386 machine and that, while current products do not offer all the functionality of OS/2, they still offer compelling reasons to look at 386 machines.

Steven Roth, vice-president of application systems development at Marine Midland Bank, Inc.'s technical analysis group in New York, says he agrees that the promise of the 386 chip makes the new machines worth a look.

"The 386 is the first real step for PC technology in addressing serious number-crunching needs," Roth says, noting that the real payoff for the new machines is just beginning to appear. "We'll really be able to answer the 386 question when OS/2 comes out."

OS/2 without 386

Although most people see the two as inextricably entwined, IBM and Microsoft's OS/2 does not require — nor is it a requirement for — the 386 chip. OS/2 will run on the 286, even though it is expected to perform best on 386 machines.

In addition, 386 machines can perform without OS/2. The operating system will give 386-based machines mainframe-type computing capabilities, such as distributed processor computing, in which intelligent peripherals can assume some CPU functions. However, other operating systems, such as Unix, will also provide such abilities in the future.

In fact, despite Roth's comment about OS/2 determining the 386's popularity, he is looking at the potential of the 386 chip for alternatives to OS/2. Roth says he is more interested in the possibility of running Unix than OS/2. "The 386 is the first machine to make Unix viable for the PC. All the capabilities of OS/2 are available in Unix and Xenix," he says.

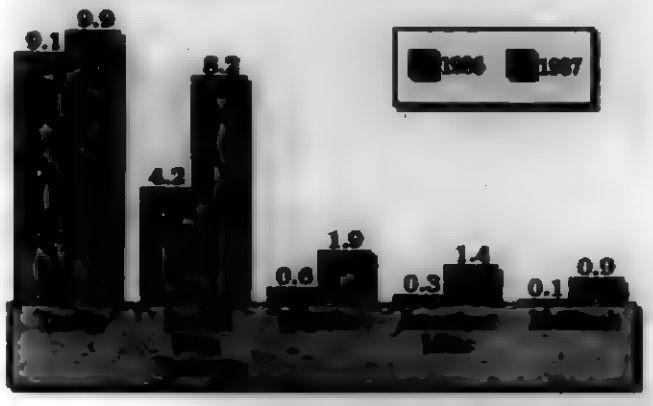
The fate of Unix on the microcomputer should become apparent very quickly, according to some. "There is an opportunity for Unix, but if it is going to make it into the PC market, it will have to do it within the next year," says Patricia Seybold, president of the Seybold Office Computing Group in Boston.

OS/2 began shipping early this year. By February, there were 79 applications programs registered, according to Seybold. Those who are waiting to see 386-based applications can expect about 1,000 OS/2 application programs by the end of the year. But while that may sound like a lot, there are more than 20,000 Microsoft MS-DOS applications in existence.

In the meantime, there are some applications that, even in MS-DOS, would provide a powerful incentive for shifting to the 386 platform. Julian Horwich,

The win column

Producers in the IBM PC and compatible market with largest U.S. share increases between 1986 and 1987



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The loss column

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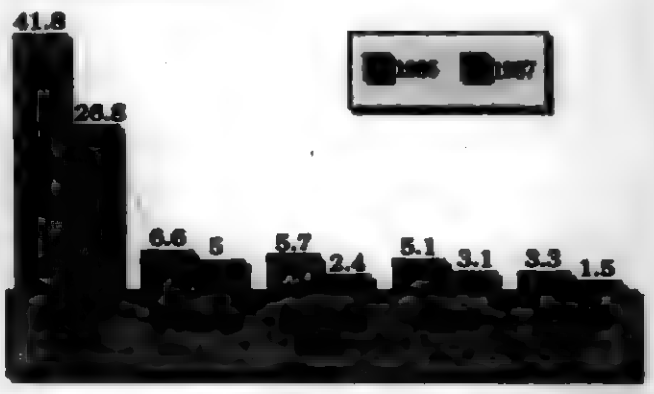

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CW CHART

executive director of the Chicago Association of Microcomputer Professionals and manager of office technology at a large Midwest company with several thousand micros, says that in addition to graphics, there is a need for 386 software in the desktop publishing area. "Desktop publishing is a pain at 10 MHz," he says.

"YOU HAVE to look at the individuals' needs. If they need power and have the cash, then go with the 386. If they don't need the power or the budget is an issue, go with the 286 machine."

JULIAN HORWICH
CHICAGO ASSOCIATION OF MICROCOMPUTER PROFESSIONALS

Change on demand

Virginia Talamo, microcomputer technology manager at Coopers & Lybrand in New York, says she expects her organization to eventually switch to 386-based machines but that it will not be in 1988. Coopers & Lybrand currently has 700 PCs and expects to have 1,000 by the end of the year. Talamo says she will recommend the changeover to the new chip when users demand software applications that require 386 technology.

Exactly what software applications those might be is not clear yet. If new word processing software for the 386 were to evolve into full-featured text processing, "that would put a glint in my eye," Talamo says. But, she adds, she wouldn't leap at it because her users currently have a mainframe-based central word processing and document-control data base, and she could risk losing compatibility and connectivity if she switches.

Horwich

Because Talamo has not seen much software yet, she says she has opted to wait. "I'm waiting to see how soon the actual software arrives and how necessary it is for my users," she says.

At this point, most microcomputer managers are approaching the question on an individual basis, Horwich says. "You have to look at the individuals' needs. If they need power and have the cash, then go with the 386. If they don't need the power or the budget is an issue, go with the 286 machine," he says.

A prime example of special-case purchasing is Boston's Spaulding Rehabilitation Hospital. The hospital just bought its first 386-based computer, according to Davis Sweet, manager of information services at Spaulding.

Sweet says he bought the 386 to address a particular problem, a very large data base. In that case, he says, speed issues overrode cost. "We had been doing this particular application on a 286 machine, but the difference in speed is incredible. With some operations, it is over three times faster," he says.

Still, the hospital primarily runs 8088 and 286 machines. Sweet says the 386 machine's cost would have dissuaded him from purchasing it if it hadn't been that top executives favored — and actually originated — the idea. "We would have saved about $1,000, all told, if we bought a 286," he notes.

Incremental strategies

Many companies are approaching the chip migration issue incrementally, either choosing key applications and key users for early purchases of 386 PCs or upgrading through board-level additions.

Seybold says some of the first logical fits for 386 technology are in graphics applications, for IBM's Micro Channel architecture or an alternative bus or when a mainframe connection through IBM's Systems Network Architecture gateway is required.

Although Wilt's policy at Sunstrand is to stick with the 286 technology, his group uses one 386 machine for a computer-aided design application, which has clearly benefited from the 386's 20-MHz speed and greater processing power.

At his Midwest firm, Horwich uses a 386 machine to test 386 software. While at one time he discouraged requests for the new technology as a matter of policy, his attitude is changing now that he sees software run on it. But Horwich says he would not stop users from buying an 8088-based machine "if their needs are modest and they will be comfortable with the machine for a few years."

Although Computech's Davis discourages most users from buying 386 machines, he purchased several of them himself to use as high-speed servers. This, he says, is an application for which the machine's advanced speed provides an immediate advantage.

Not cheap, but cheaper

The add-on board strategy is not necessarily a cheap solution, but it is certainly less expensive than buying a whole new machine; it constitutes a $2,000 vs. a $5,000 investment. Still, many people shy away from the board solution.

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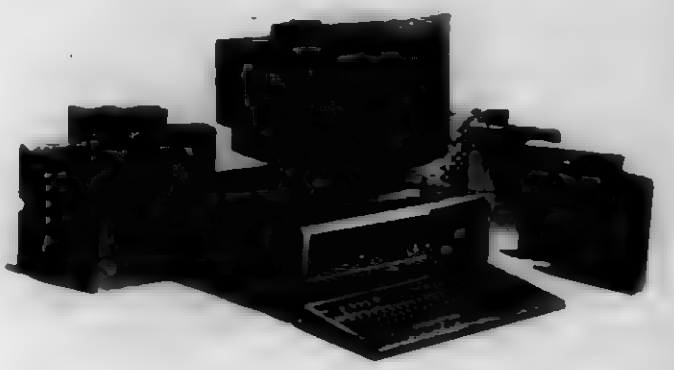

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stuffing a hot automotive engine into a cheap compact car," the Gartner Group's Kirwin says. "You go fast off the line, but you will run into other problems." You will still be stuck with old disk drives and an old bus, he says, and if you don't have the right architecture, you'll limit your new CPU's capabilities.

Spalding's Sweet agrees. "I've been leery of upgrade boards. It's a lot like hot-rodding. I believe you should buy something designed to do the entire job," he says.

Bankers Trust's Fiering

Marine Midland's Roth offers some examples to back up these concerns. "A couple of traders looked at [upgrade boards] but ran into compatibility problems," he says. Typically, accessories, extra memory and peripherals may not be compatible with the accelerator board. "I don't see it paying off," Roth concludes.

Tinker or trade?

Coopers & Lybrand's Talamo says she prefers to buy new equipment if the need arises and pass the old equipment along to users in the organization who can use it.

Sundstrand's Wilt agrees. "I don't get any comfort from accelerator boards," he says. "I don't believe in supercharged old machines."

Computech's Davis

Not all microcomputer professionals agree. Horwich says he has a 386 accelerator board in his IBM Personal Computer AT. "It's a trade-off of time and effort vs. dollars," he says. Computech's Davis says he will also approve the use of accelerator boards under some conditions. "I'll say yes, provided the user isn't constrained by some other factor, like bus speed," he notes.

Price Waterhouse's Barry says that in general, firms will use add-on boards when they want to do the same thing as before, only faster. But, he adds, "if you're looking at adding a new application, most organizations will go with a new box."

Ironically, Barry's own company just bought new machines rather than upgrading, not because of any new applications but because it needed the additional machines. As a side benefit, the company's processing-intensive spreadsheets can gain from the 386 technology.

Eventually, user organizations may be forced to move on to 386 machines, either by their own work requirements or by those of vendors. Despite promises to support current technology, most vendors are moving to the 386 chip. Compaq Computer Corp. markets only one 8088-based machine, and consultants agree that both Compaq and IBM will likely drop the 8086, 8088 and 286 chips altogether in favor of the 386.

In the meantime, however, there are good reasons, beyond price, for not jumping into a purchase decision. Technology based on the 386 chip promises — in addition to making the PC faster and giving it more memory — to expand its capabilities. Unfortunately, 386-chip bus architecture lacks a standard.

As a strategic consideration, the 386 bus is one of the biggest drawbacks, Bankers Trust's Fiering says. "Five companies are showing me their bus, but there is no industry standard for the 32-bit bus," she notes, referring to IBM, Compaq, AST Research, Inc., Intel and PC's Limited. In the short term, the bus is not a problem because there are no applications to run on it, but Fiering predicts it will become one, when users become concerned with bus compatibility issues.

Most users are ignoring the bus question until they learn more about potential applications. "We're thinking about [the alternative bus], but it has no impact on our decisions," Sundstrand's Wilt says. "When a certain bus shows an advantage for particular applications, then we'll make [consideration of] it part of our decision."

Tough questions

Coopers & Lybrand's Talamo suggests that very few companies are committing themselves to an alternative bus strategy. "I don't see a lot of companies jumping to the Micro Channel. That's why they're buying low-end [286 chip-based] PS/2 machines," she notes.

And the 386 bus is not the only question mark looming right now. The 20-MHz 386 chip is about to be surpassed by a 25-MHz version. Intel says it has an 80486 chip under development. And users may soon have to contend with a Motorola, Inc. 32-bit reduced instruction set computing chip offering 80386 emulation.

If you thought the choice between a 286 and 386 chip was complicated, just wait. Things could get a lot more interesting. ●

PRODUCT FACE-OFF
Hot-rodding on top-line 386s

BY DAVID PHILLIPS

While there are hundreds of personal computers in the marketplace to choose from, when it comes to picking the top-of-the-line for power, the field narrows down to a very few, with Compaq Computer Corp.'s Deskpro 386/20 and IBM's Personal System/2 Model 80 heading the list.

Even when choosing between these two computers, however, there are numerous levels and options that can become confusing. For example, the "20" in the Deskpro 386/20 means it runs on Intel Corp.'s 20-MHz microprocessor, making it the fastest machine in Compaq's line. Other Deskpro 386 machines run at 16 MHz.

For its part, the PS/2 Model 80 has submodels, two that run at 16 MHz (Models 80-041 and 80-071) and two that run at 20 MHz (Models 80-111 and 80-311). This discussion will be confined to the PS/2 Model 80-111, which is a peer of the Deskpro 386/20 and will be referred to generically as the PS/2 Model 80 throughout.

Both machines are extremely fast and, to the naked eye, about equal in speed. When a user loads a program, it is on the screen in a blink. Running a Lotus Development Corp. 1-2-3 spreadsheet with 9,450 formulas and hitting the CALC key (my own benchmark) caused the red "wait" mode indicator to flash on for about a second with both machines. Huge data bases are sorted in half the time it takes on other computers.

Are they for everyone?

"So what?" a user may ask. "Does everyone really need that speed and power? And what are the differences between the machines?"

It's true that not everyone needs that power. Just as you wouldn't buy a race car to drive to the supermarket, top-of-the-line PCs are not appropriate for every use. The PS/2 Model 80 and Deskpro 386/20 are designed for power users — people who run departmental applications or even some previously mainframe, corporatewide applications on their PCs. The machines are also excellent dedicated file servers on local-area networks.

One business line manager at a large bank says the main reason he opted for Compaq's 20-MHz machine was because he was constantly fine-tuning an important departmental application that was executed in 1-2-3 with a lengthy macro.

He says he used to go out to lunch and come back, and the macro would still be running on his IBM Personal Computer XT. Migrating to a 386 machine at 16 MHz helped substantially, but the extra jump up to the Deskpro 386/20 gave him an additional 25% savings in time.

Compatibility

One area in which the Deskpro 386/20 holds an edge over the PS/2 Model 80 is in its compatibility with older equipment.

> IF USERS try to even the machines out according to equipment, the Deskpro still comes out cheaper, but the gap is narrowing.

The Model 80 comes with one 3½-in. disk drive. Since an internal 5¼-in. disk drive will not fit into the system unit, if a user wants to run the machine in a nonnetworked work group environment alongside older machines, he has to buy an external 5¼-in. disk drive. Even that drive, however, must be a normal-density drive. Remarkably, the Model 80 cannot run high-density diskettes, even on an external drive.

This is a serious drawback because it severely hampers compatibility in an IBM Personal Computer AT environment. You would have to go through some sort of file transfer from one machine to the other, which can be tedious and is certainly more difficult than physically passing the diskette around.

The Deskpro 386/20, on the other hand, comes with a high-density disk drive and allows users the option of both a 5¼-in. normal-density drive and a 3½-in. disk drive built into the system unit. In fact, with a 60M-byte half-height hard disk drive, users could actually have all three diskette drives installed in their system unit.

Both machines will run Microsoft Corp. MS-DOS 3.3 and OS/2. The Deskpro 386/20 will even run IBM OS/2, although it has its own proprietary version of the operating system that is optimized to run on its hardware and carries additional screen drivers for displays, which Compaq supports.

Compatibility with the future is a tougher subject to tackle. Since Compaq has not officially seen a copy of IBM's OS/2 Extended Edition, the company says it cannot comment on whether it will work on a Deskpro 386/20.

While both computers support a long list of options, one particularly interesting option is the size of the hard drive.

The Deskpro offers the initial drive at 60M, 130M and 300M bytes. The PS/2 Model 80 series offers hard drives at 44M, 70M, 115M and 314M bytes, but the 20-MHz models start at 115M bytes.

Since many users collect as much data as will fit onto their hard drive, managers may want to confine that space to something reasonable, such as 40M to 60M bytes. Such intentions are thwarted on the 20-MHz PS/2s. On the other hand, since these machines are designed for the power user and for LANs, such a large minimum storage threshold may not be a real problem.

Purchase costs

Because there is a difference between what these two machines offer as standard and optional — for example, the display and mouse port are included in the Model 80 as standard but are options in the Deskpro — we're comparing apples and oranges when trying to differentiate between these machines' prices.

According to two New York retailers that sell both machines, a stripped Deskpro — with a 130M-byte hard drive and no options — costs $1,000 to $1,500 less than the PS/2 Model 80, but the Model 80 comes with more standard features.

If users try to even the machines out according to equipment, the Deskpro still comes out cheaper, but the gap is narrowing. However, discounting, as well as the aforementioned scavenging, can change this equation.

From a technical perspective, both computers offer similar speed, power and storage capabilities at a comparable price, and both are well suited for power use and LAN server duty.

However, the differences in compatibility with the past and possibly with the future, as well as in maintenance costs, deny managers the luxury of just flipping a coin: The choice demands a careful and honest appraisal of a company's current environment and future needs. ●

Phillips is president of David Phillips Associates, Inc., a West Hempstead, N.Y., management consulting firm specializing in information centers and end-user computing strategies.

Can Japan annex the desktop PC?

BY GLENN RIFKIN

Dan Bartoli likes Epson personal computers, but when he put out a request for proposals in 1987 on an acquisition of up to 400 PCs, he felt compelled to go with an American vendor.

Bartoli, a financial analyst in charge of PCs at Dallas-based Southmark Management Corp., was not swayed by nationalistic feelings or anti-Japanese sentiment. His decision was a pragmatic one based on the fact that Epson Corp. submitted a proposal designating Sears Roebuck & Co. as its front-end reseller.

Since Southmark is a realty company with 400 apartment complexes in 36 states, Bartoli felt that Sears simply did not offer the field support to adequately cover the network he wanted to establish. He eventually purchased NCR Corp. PCs. "I didn't go with Epson because I wanted to deal directly with the vendor," Bartoli says.

Not much luck yet

Bartoli's reasoning is illustrative of corporate America's tenuous relationship with Japanese PC makers. It helps explain why Japanese vendors have had so much difficulty gaining a foothold in the lucrative U.S. personal computer market.

According to market research firm International Data Corp. (IDC), six Japanese firms selling PCs under their own names accounted for less than 8% of the $20 billion U.S. IBM-compatible market in 1987.

And though IDC analyst Aaron Goldberg predicts that figure will rise to 11% in 1988, it remains clear that the Japanese are not, as was once anticipated, taking the market by storm. Epson, the most successful Japanese vendor in the U.S., accounted for only 3.1% of the market last year, with 181,000 units shipped.

Japan's relatively small impact on the PC market is more than a bit surprising to many seasoned observers. The prevailing theory had been that as soon as the technology settled down and became more of a commodity market, Japanese vendors would take advantage of their ability to diminish costs, add features and improve quality and style, producing the same kind of success with PCs that their compatriots have enjoyed with small cars, VCRs and cameras.

There is only one area in which the Japanese have made visible and significant progress: The laptop PC market, which is slowly but surely gaining momentum, is the only PC category now dominated by the Japanese. Regardless of brand name, virtually every laptop machine sold in the U.S. is built by a Japanese company. IBM's PC Convertible is an exception but a fairly negligible one, since it has done poorly in the market.

Indeed, the machine that launched the laptop market, the Tandy Corp. Model 100, is made by Kyocera Corp. in Japan. Toshiba Corp., the leading Japanese laptop PC maker, assembles five of its six models in the U.S. (the T1000 is made in Japan), but all its components come from Japan. *Computerworld* has also learned that Hitachi Ltd. will start selling a laptop in the U.S. in the second or third quarter of this year.

'No compelling strength'

"Outside the laptop market, the Japanese have shown no compelling strength," says Douglas Cayne, vice-president and director of personal computing at the Gartner Group, Inc. "They are nowhere near the presence they could be."

"If the Japanese equipment was noticeably cheaper or better, they would do well here," adds Kenneth Boeonworth, president of International Resource Development Corp. in Stamford, Conn. "By and large, they've had very little success. One expects them to do better."

But there is more than one way to skin a computer, and the Japanese have decided to start from the inside out with the U.S. computer market. Although the brand names may not be Japanese, the innards — random-access memory chips, monitors, add-on boards, disk drives — of virtually all major PCs, including IBM's, come in part from Japan.

Private labeling agreements also abound, with U.S. companies selling Japanese PCs under their own names. Unisys Corp. and ITT Corp., for example, both private-label Mitsubishi Corp. PCs.

"The Japanese have made lots of progress in the PC market that we don't see," says Richard Shaffer, editor of the "Technologic Computer Letter." "If you sell the RAM and peripheral chips and the monitors, does it matter if you don't sell the CPU and have your name on the machine?"

Japan's growing influence, in fact, has alarmed such industry giants as IBM, which reportedly offered its own proprietary chip technology to leading rival Digital Equipment Corp. and others in order to thwart Japan's progress in the U.S.

Still, it is becoming apparent that the big Japanese players would like to own a piece of the corporate PC market under their own names and, furthermore, that they now see possibilities in that direction that didn't exist just a few years ago.

Already, companies like Epson, NEC Corp. and Toshiba Corp., as a reason for that company's increased success. Epson currently builds 30% of its PCs there and intends to increase that percentage. "Having that presence in the U.S. gives us the ability to reach the market more quickly and to build relationships with resellers in which they know we will deliver," he says.

Although Lapinski concedes that the IBMs, Tandys and Compaqs will be tough — if not impossible — to catch, "there's a continued need to serve small to medium-size users," he says.

Made in Japan

U.S. shipment patterns of major Japanese producers of IBM-compatible personal computers, 1986 to 1987

INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

have shown enough progress to significantly increase U.S. production, and others are joining the fray. Matsushita Electric Industrial Co., which sells its Panasonic line in the U.S., decided in December to start producing PCs here.

To come in the front door under its own umbrella, however, a Japanese PC maker must first pass a tough test. Without a solid, coordinated U.S.-based headquarters, a Japanese PC maker simply will not be able to provide the kind of marketing and support services a successful vendor requires.

"From a profitability standpoint, the Japanese disposition to build products for everyone else may certainly be viewed as an intelligent strategy to keep the bottom line black," says Charles P. Lecht, an IDG News Service foreign correspondent based in Tokyo. "At the prices PCs sell for, servicing a foreign community that cannot read Japanese would require too much investment to make it worthwhile."

Combine strategies

On the other hand, Steven Lapinski, vice-president of marketing for computers and printers at Epson America, Inc., says Japanese companies must integrate manufacturing, marketing and engineering closely and effectively in order to be a major player in the U.S.

Lapinski cites Epson's manufacturing facility in Portland, Ore., as a reason for that company's increased success. Epson currently builds 30% of its PCs there and intends to increase that percentage. "Having that presence in the U.S. gives us the ability to reach the market more quickly and to build relationships with resellers in which they know we will deliver," he says.

Although Lapinski concedes that the IBMs, Tandys and Compaqs will be tough — if not impossible — to catch, "there's a continued need to serve small to medium-size users," he says.

"Not everyone needs a high-powered IBM PC."

NEC, which tried unsuccessfully for several years to market a PC in the U.S., has also focused its attention on its U.S.-based production facilities in Boxboro, Mass., and now ranks second among Japanese desktop vendors in the U.S.

"We're assuming a greater role in the development of the product in the U.S.," says Frank Girard, vice-president of systems marketing at NEC Information Systems, Inc.

NEC is out to compete head-to-head with the big boys. It sells only Intel Corp. 80286- and 80386-based PCs, putting it in competition with IBM and Compaq Computer Corp. In order to do that and build beyond the 113,000 machines it sold in 1987, NEC is focusing its attention on attractive programs for dealers and resellers and pushing the image of quality that Japan's NEC insists on.

Girard insists that Japanese vendors have not encountered anti-Japanese biases in selling their machines. "Having a 'Made in the U.S.' label makes that less of a problem," he claims.

IDC's Goldberg is not so sure. In large corporations, especially those with strong unions, he says, Japanese vendors are unwelcome because, even if the machine is U.S.-made, the profits eventually head back to Tokyo.

Stumbling block

For the desktop players, the path to success is already blocked by another obstacle: IBM's Personal System/2 models and the portent of the proprietary Micro Channel architecture.

The Gartner Group's Cayne says he believes IBM's and Microsoft Corp.'s OS/2 could be a problem for Japanese vendors. "OS/2 makes people even more nervous about standards," Cayne says. "It's a lot easier for the Japanese vendors to sell printers."

A bigger concern is gaining credibility with MIS shops in big corporate accounts. The issue of buying clones remains a major one in corporate environments.

In the long run, the issue will not likely be decided by the machine's origin. As consultant Shaffer puts it, "Does anyone care if a Canon copier comes from Japan? No. All the customer wants is a product that meets his needs." ●

Rifkin is a *Computerworld* senior editor.

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Portables: A technology whose time has come

BY G. BERTON LATAMORE

Mobility is becoming a sought-after characteristic in corporate personal computers. Sales departments and traveling executives were the first to latch onto portable and laptop computers and are still among the heaviest users, but organizations are also finding many other applications for totable computers.

Salespeople are the primary beneficiaries of portable computers at the Aid Association for Lutherans (AAL), a national fraternal benefit society based in Appleton, Wis. Insurance sales representatives at the society are seldom seen without Data General Corp. Data General One portable computers, even though they must shoulder the cost of the equipment.

Despite the fact that purchase of the computers is entirely voluntary, Jim Bork, director of new ventures at the organization, estimates that 1,800 sales representatives out of a total force of 2,000 have opted to invest in them as well as companion Hewlett-Packard Co. 2225P ink-jet printers.

"Of course, we get a large discount for volume purchases from Data General, which we pass along. And we offer very favorable financing arrangements," Bork says. Just the same, he adds, the fact that so many salespeople decide to take the step strikes him as a testimony to the machines' effectiveness.

Not only do laptops and portables simplify routine tasks by giving sales representatives the means to use tools such as a custom-written prospect file system, Bork says, but they also help in the sales process itself. "We do financial-need analyses and illustrations of our products that we print out and leave with the prospective member as part of our sales process," he says. "When the computer comes back with a recommendation, the prospective member tends to believe it more than if the recommendation comes from the salesperson."

The AAL is also testing the use of an electronic insurance application form. "Conceptually, you would expect this to be the first application for portables," Bork says. "But as a practical matter, it is a little hard to pull off. To get the real benefit, you need to get into direct transmission of applications to the mainframe. We don't have the electronic link set up yet, but we do have the logic captured."

AAL's Bork

The program of making portables available to salespeople started in 1986, but the organization had actually been considering such a move since 1983. Until the DG model came along, however, none seemed to meet all of the AAL's criteria, which included IBM compatibility, an 80- by 25-pixel screen that could be read easily from a variety of angles, 512K bytes of random-access memory, two disk drives and an internal modem with a speed of at least 1,200 bit/sec.

Of these, the display was the most critical factor, according to Bork. The sales force needed a screen that at least three people — the salesperson, the client and the client's spouse — could read simultaneously in normal indoor light.

Driven to portables

Screen legibility is also a critical issue at Atlantic Richfield Co. (Arco) in Los Angeles, where most users are managers trying to keep up with office responsibilities while traveling. "Mainly, it was first- and second-level managers who drove the company into portables," says Chris Broome, senior technical consultant at the company. "They wanted something they could use to get their electronic mail when they were on the road. We were using dumb terminals, but when the portables came out, they were smaller, and they had computing power."

Broome estimates that Arco has several hundred portables, although, he says, it is difficult to get an exact figure because the machines are treated as commodities and bought by individual departments rather than through central purchasing.

"In differing numbers, we have IBM PC Convertibles, Toshiba 1100 Pluses, Toshiba 3100s," he says, "and we're just starting to get into Toshiba 1200s and Grid 1520s."

The high-end Toshiba America, Inc. T3100s are for people who need hard disks. Right now, that means mainly engineers who use the portables to run test calculations in the field. But, as Broome observes, hard-disk support is becoming a requirement in many areas.

"We're starting to find that as we put

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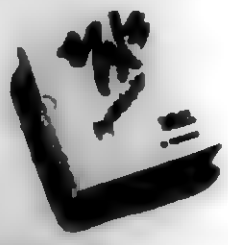

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real business applications on these machines, we really need the hard disks," he says. "The programs take up a considerable amount of room, let alone the data."

Arco has started giving portables to its field representatives to use while visiting individual service stations. "They need battery power and hard disks, and that's why we bought the Toshiba 1200s and Grids. They are two approaches to the same technology," he says. "We hope to focus on one or the other soon."

Ironically, sharp screen display may be a drawback for this application. "We're concerned that we might have a problem with station managers or owners looking over the field rep's shoulder and reading sales data from other Arco stations off the screen," Broome says. "The reps will have to be careful about positioning their computers before turning them on.

"We're starting to think we should automatically put in a laptop the way we used to automatically put in a printer as part of every new desktop configuration we install in the office," Broome continues. "The Toshiba 1000's street price is only about $600 — the same cost as the small dot matrix printers we often use at individual desks. So why not just automatically include one?"

Price, as well as durability, is what drew Standard Oil Co. in Cleveland to portables. In May 1987, the firm installed Tandy Corp. TRS-80 Model 100s and 102s in its more than 1,000 service stations.

Although the Model 100s and 102s rank among the lightest portables on the market, Standard Oil was never interested in transportability. The attraction was price — the machines cost little more than $200 each — and durability.

Deloitte Haskins' Matsuo

"We're talking about a service station environment that is definitely hostile," says Ralph Rocco, manager of retail automation. "The computers can get dropped, attendants spill Coke and coffee on them, there may be problems with power supplies. We have more than 1,000 units out there, so we need something durable and backed by a good national service organization." From Standard Oil's view, PC compatibility and a fancy screen would be distracting. The company took out the models' read-only memory-based generic programs and replaced them with software created by an employee.

While the number of computers in the program is stable, the scope of their use is expanding rapidly. "We started with one application, and now that it works so well, management is constantly asking us to do more," Rocco says. "We've downloaded more than 50 program enhancements to the stations."

Even high-end laptops are not enough for some people, however. The Big Eight accounting firms, for example, need both portability and real computing power. Portability is important because these companies' accountants often work in clients' offices rather than their own, and they need to take computers with them.

The answer for Arthur Andersen & Co., Price Waterhouse and Deloitte Haskins & Sells is Compaq Computer Corp. machines. "We have Compaq Portable 386s, Portable 3s and Portable 286s," says Jon Matsuo, systems consulting manager at Deloitte Haskins.

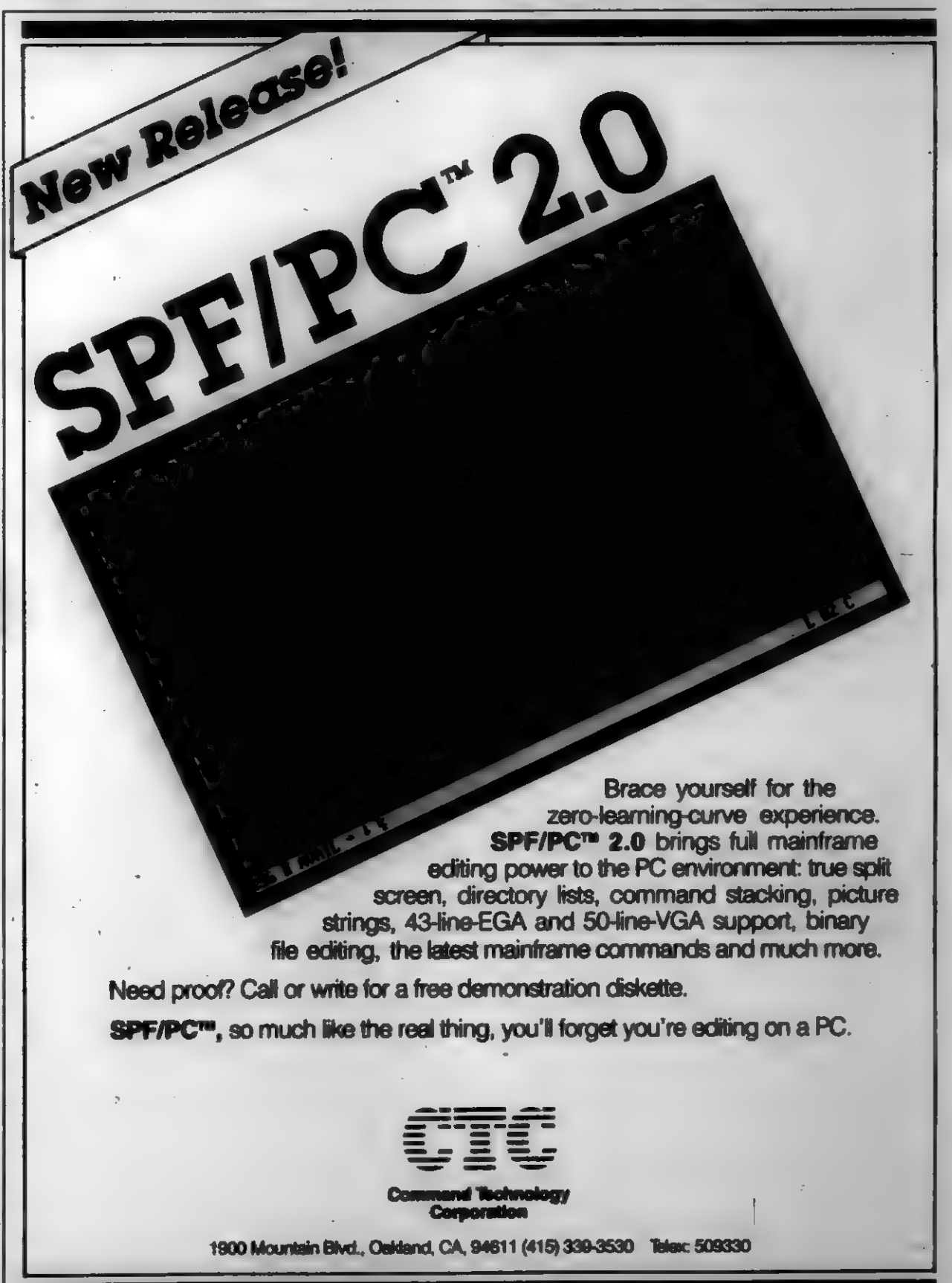
> "WE DEVELOP accounting systems, financial models . . . and data base information systems, so we need portables with the power to do all these things."
>
> JON MATSUO
> DELOITTE HASKINS & SELLS

The worldwide accounting firm has two sides to its business: systems development, which Matsuo heads up, and traditional accounting and auditing for major corporations. Both sides equip consultants and accountants with Compaqs.

"We build systems for clients and conduct audits of our clients," he says. "Just about everything we do is of a very high level and very sophisticated. Otherwise, the clients can do it themselves. We develop accounting systems, financial models and sophisticated financial modeling packages and data base information systems, so we need portables with the power to do all these things."

What these applications demand, Matsuo says, is a full PC that employees can carry with them. Laptops just do not deliver enough speed and storage capacity, mainly because their design philosophy is to pack as much as possible into a small package of predetermined size and weight. Compaq, on the other hand, starts with a full IBM-compatible PC, then shrinks it as much as possible without losing any capabilities.

In fact, Matsuo says, even executives who do not travel have switched from PCs to Compaq laptops. "Almost all our new computer purchases are Compaq portables," Matsuo says. "I don't think we buy any desktop machines anymore."●



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PCs gain maturity

BY SALLY CUSACK

Personal computer users are now a force to be reckoned with in many organizations as they push for dispersal of information, create new applications and shove their desktop machines onto center stage.

In the retailing field, one generally recognized as lagging in technological implementation, there are clear signs that PCs are beginning to play a more pivotal role. Vahe Katros, MIS PC coordinator at Wm. Filene's Sons Co., a Boston-based retail chain, attributes that change to the creative energy of PC users.

Until recently, Katros says, PCs were not a driving element in corporate decision making. "In our industry," he says, "senior management is just becoming aware of the value of the end user being in control of data."

Hitting the stores

Filene's, which operates 31 stores, is moving gradually from centralized to decentralized computing as more funds are made available for end-user support. Originally, PCs were brought into the company by finance department employees interested in running Lotus Development Corp. spreadsheets. Now, 100 to 150 PCs — IBM Personal Computer ATs, Personal System/2 Models 30, 50 and 80, Compaq Computer Corp. portables and IBM 4680 AT controllers — are installed throughout all Filene's locations, and more purchases are planned.

The store is currently installing an executive information system — a front-end system capable of turning mainframe information into graphics and exception reports for chief executive officers and analysts.

Filene's is also using PC technology to revive the old-fashioned concept of service. It is developing local-area network-based systems for customer service and personalized shopping assistance. The increased level of PC acquisitions at Filene's is, Katros says, largely attributable to the success of user-developed applications.

User sophistication is also changing the way things are done at Hartford Insurance Group in Hartford, Conn. According to Michael Fontana, product evaluation group leader, today's user is "sophisticated in not only the application but the hardware that powers it."

Filene's Katros

Many of these users, Fontana says, perform much of their own maintenance. Respecting that know-how, Fontana regularly includes them in product evaluations.

Jeff Lee, senior marketing manager at Focus Research Systems in West Hartford, Conn., agrees that user sophistication is on the rise and says that as it continues to grow, users will demand more direct data access from MIS.

Price to pay

With power and visibility, however, come regulations and controls. Now that organizations have begun to realize the scope of the PC phenomenon, they are also thinking about standards and cost containment.

Organizations are pursuing better control through a number of measures, Lee says, including appointing microcomputer managers and maintaining strict inventory counts.

"Purchasing departments are now looking at cost. A 'more for less' philosophy is emerging," Lee says. "This also results in more individualized cost accounting and workstation configuration, which means we will see more clones, more compatibles and more mixtures such as Korean keyboards with the IBM machines."

At Dravo Engineers, a division of Dravo Corp. in Pittsburgh, efficiency has meant mixing Apple Computer, Inc. with IBM machines. In the near future, the company plans to further drift away from a pure Blue shop toward IBM compatibles, according to Sandra LaPietra, manager of computer services.

In its 400-employee engineering division in the Pittsburgh area, Dravo currently mixes IBM PC XTs, Compaq 386s and Apple Macintoshes. Sixty-five XTs and Compaqs equipped with Intel Corp. 80387 math coprocessor chips are used for engineering applications, and 85 Macintoshes are used for electronic mail, document creation, spreadsheet analysis and data base functions. According to LaPietra, Compaq 386 Model 20s are taking the places that might have gone to PS/2s.

"The Compaq 386 Model 20 is more powerful at a lower cost. We can't afford to wait for IBM and OS/2," she says.

Combining resources

At Hartford Insurance, where there are currently about 2,000 PC users working on a mixture of IBM, Wang Laboratories, Inc. and ITT Corp. machines, allocation is decided on the basis of business need.

For employees whose normal work loads do not cost-justify a PC installation, Hartford has created Shared Centers — walk-in facilities housing PCs, plotters and laser printers.

At Filene's, control is maintained by a requirement that all departmental requests for PCs must be approved by Katros' division. The purpose, Katros explains, is not only cost containment but standardization. Filene's is trying to keep the variety of hardware it purchases to a minimum, with the eventual goal being a standardized move to the PS/2. ●

Cusack is a researcher at *Computerworld*.

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ASK THE VENDOR

The following questions were solicited from users and conveyed to the vendors for responses.

I recently purchased a Tandy 4000/386. When I used my high-resolution graphics display board, I found an address conflict at memory location C6000:000. When and how does Tandy plan to resolve this issue?

Gary Oberg
Manager of Office Systems
Reliance Electronic Industrial Co.
Greenville, S.C.

TANDY CORP: The BIOS Version 1.03.01 did have an address conflict at memory address C6000:000. An upgraded BIOS Version 1.03.02 is necessary and is available by special order from your local Radio Shack store, a Radio Shack Computer Center or a participating dealer.

The Toshiba T1000 laptop has Microsoft Corp. MS-DOS 2.1 built-in read-only memory. Why didn't Toshiba install MS-DOS 3.2? Any plans to upgrade?

Jeff Tanner
Controller
Texas Instruments, Inc.
Dallas

TOSHIBA AMERICA, INC.: The primary enhancements of MS-DOS 3.2 are in three areas. Two of these are 3.2's ability to deal with hard disks and networks, neither of which is likely to be a factor on the T1000. The third is its ability to function with 3½-in. diskettes, a feature Toshiba has added to its MS-DOS 2.11.

MS-DOS 2.11 is smaller than MS-DOS 3.2. In the T1000, the ROM disk holds 256K bytes, not enough to fit MS-DOS 3.2. MS-DOS 3.2 is available on the T1000 as an option.

As an IBM-compatible microcomputer supplier, what is Zenith's response to the Micro Channel on the IBM Personal System/2s?

Jeff Rienke
Director of Advanced Information Technologies
Whirlpool Corp.
Benton Harbor, Mich.

ZENITH DATA SYSTEMS: The real issue of PS/2 designs is the Micro Channel bus, which is incompatible with IBM Personal Computer XT and AT add-on cards. Also, despite advertised claims, the bus can slow the PC in key applications. PCs are purchased to solve a problem, so performance and features are key. PS/2s from IBM or other companies will need to solve the performance deficiencies of the PS/2 products to compete with faster, less expensive AT compatibles.

We have one NEC Powermate 286, one NEC Powermate 386 and two other 80286 machines from Wyse Technology operating as stand-alone computer-aided design stations. Is it possible to network these machines together?

Ron Reed
Lead Design Draftsman
Telect, Inc.
Spokane, Wash.

NEC INFORMATION SYSTEMS, INC.: The NECIS personal computer hardware platforms support all networking products that would run on an IBM Personal Computer AT machine. Networking the systems will not diminish the speed on the 386. Degradation will occur, however, as the number of nodes on a network is increased.

The top 15 IBM PC compatibles

IBM
(Contact local sales office)
Personal System/2 Model 25
Based on an Intel Corp. 8086 processor with speed of 8 MHz. Optional Intel 8087 math coprocessor. Offers 512K or 640K bytes with one or two 740K-byte 3½-in. diskette drive configurations. Includes one full-size and one 8-in. expansion slot.

PS/2 Model 30
Based on the 8086 processor with speed of 8 MHz. Optional 8087 coprocessor. Standard 640K-byte random-access memory, with two 740K-byte 3½-in. diskette drives or one 740K-byte diskette drive and a 20M-byte hard disk. Includes three expansion slots.

PS/2 Model 50
An Intel 80286 machine with speed of 10 MHz. Optional Intel 80287 math coprocessor. Offers 1M-byte RAM expandable to 7M bytes via adapter cards. Standard configuration is 1.44M-byte 3½-in. diskette drive with 20M-byte fixed disk. Includes three expansion slots.

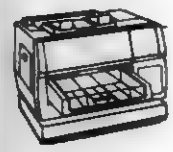
PS/2 Model 60
Same processor as the Model 50, with 1M-byte RAM expandable to 15M bytes via adapter cards. Standard configurations include one 1.44M-byte diskette drive with 44M- or 70M-byte fixed disk and seven expansion slots.

PS/2 Model 80
Based on Intel 80386 microprocessor, runs at 16 or 20 MHz. Optional Intel 80387 coprocessor. Offers 1M- or 2M-byte RAM on system boards expandable to 16M bytes. Standard configurations include one 1.44M-byte 3½-in. diskette drive and44M-, 70M-, 115M- or 314M-byte fixed disk. Also offers seven expansion slots.

Tandy Corp
(817) 390-3700
Tandy 4000
Based on an Intel Corp. 80386 microprocessor operating at 16 MHz, with a 3½-in. 1.44M-byte floppy disk drive and four single-in-line-memory modules in the base configuration of 1M byte. Includes dedicated 32-bit expansion slot and two open half-height front drives. Optional 20M- and 40M-byte hard drives.

Continued on page S12

And choose.


NBI, Inc.
Model 908

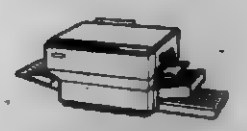
QMS-PS®
800 II, 810

Linotype Company
Linotronic™ 100, 300, 500

Texas Instruments
OmniLaser™ 2106

Texas Instruments
OmniLaser™ 2108, 2115

The Laser Connection
PS Jet/PS Jet+™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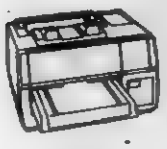
LZR™ 2665

Clune Corporation
ScriptTEN™

Digital Equipment Corp.
PrintServer 40™ ScriptPrinter™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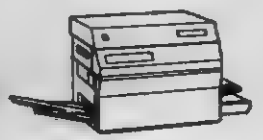
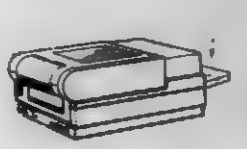
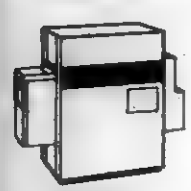
Turbo Laser®/PS

IBM 4216-020
Personal Pageprinter™

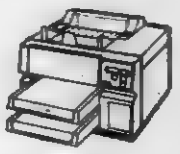

Varityper
VT-600


Apple Computer Inc.
LaserWriter® IINT, IINTX

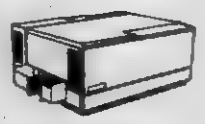
Quadram
Quadlaser™ PS

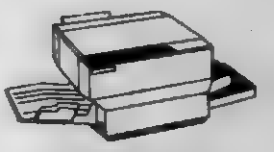

Agfa-Gevaert
P400PS™

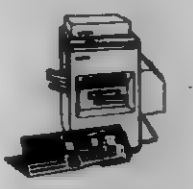
General Computer
Business LaserPrinter Plus™


Wang
LCS15™

NEC Information Systems
SilentWriter™ LC-890


Diconix
Dijit® I/PS


Apollo Computer Inc.
Domain/Laser 26™


QMS-PS® 2400,
QMS® JetScript™

Portables and laptops

COMPANY	PRODUCT	MICROPROCESSOR	CLOCK SPEED (MHZ)	WEIGHT	FOOTPRINT (IN INCHES)	SCREEN DIMENSIONS	SCREEN RESOLUTION (IN PIXELS)	SCREEN TYPE	BATTERY POWER	NUMBER OF KEYS	MEMORY: RAM STANDARD/ MAXIMUM (IN BYTES)	STORAGE: STANDARD/ MAXIMUM	TYPES OF MONITOR PORTS	INCLUDES SERIAL/ PARALLEL PORTS	NUMBER OF EXPANSION SLOTS	PRICE
American Micro Technology Corp. (714) 731-6660	Xtra Pro Lite	8088, 80C88, 80286	4.77-8; 6-10; 8-12; 6-10; 8-20	20lbs	40 x 36 x 16.7 cm	NP	9 x 10	LCD	No	86	640K/6M	Two 3½-in. floppy drives/1024-byte hard disk	RGB, EGA*	Optional	Five	$1,300-$3,300
Amstrad, Inc. (214) 519-0660	PPC640	8086	8	11.75 lbs	17.7 x 9 x 4	NP	640 x 200	LCD	Alkaline C	NP	640K standard	Two 3½-in. floppy/20M-byte hard disk	NP	Both	Four	$1,000-$1,199
Bondwell Industrial Co. (408) 486-1360	Model B Turbo	80C88	4.77, 8	13 or 15 lbs	2.5 x 19.6 x 12	10-in. diagonal	80 x 25	Supertwist LCD backlit	Lead, acid	95	128/256	Dual 3½-in. floppies or 3½-in. with 20M-byte hard disk	RGB	Both	None	$1,000-$2,795
Casio, Inc. (201) 361-5400	PB-1000	HD61700	1	17.1 ounces	1 x 7 x 7.4	NP	192 x 32	LCD	AAA3	65	8K/40K	One 3½-in. floppy, optional 320K bytes	Touchscreen LCD	Both	One	$219.95
Compaq Computer Corp. (713) 370-0670	Compaq Portable 286	80286	10	30 lbs (Model 40); 31 lbs (Model 100)	9.8 x 24 x 7.4	6.3 x 6.8	640 x 400 text; 640 x 400, 640 x 200, 320 x 200 in graphics	Electro luminescent	No	91	128/640K	One 5¼-in. diskette drive, 40M-, 100M-byte hard disk drive	RGB	Both	Two	$7,000-$8,000; $9,999 (Model 100)
DAP Technologies (415) 681-7833	Microlite PC 1000	80C88 CMOS	4.9	2.4 lbs	2.1 x 4.4 x 10.4	2.5 x 2.5	128 x 128	LCD	AA rechargeable	47	256K/1.7M	One 3½-in. floppy with 896K-byte RAM disk	None	Both	None	$1,000
Data General Corp. (617) 366-8911	DG/One III	16-bit 80C86-2	4.77 or 7.16	14.5 lbs LCD version, 11.5 lbs electro luminescent version	14.8 x 11.8 x 3	4.8 x 7.8 electro luminescent; 7.5 x 10.38 LCD	640 x 200	Supertwist LCD backlit, electro luminescent	Nicad	89	512K/1.02M	One 3½-in., 720K diskette drive/Two 3½-in., 720K-byte disk drive, 10M- or 20M-byte internal hard drive	RGB	Both	Four	$1,595
Datavue Corp. (404) 564-5566	Spark	80C88/ NEC V20	4.77 or 9.54	9 lbs	13.2 x 13 x 2.5	9.5 x 4	320 x 200; 640 x 200	Supertwist LCD, electro luminescent backlit (optional)	Nicad	77	384K/ 640K	One or two 3½-in. floppies	RGB, composite	Both	None	$995
	Snap 1 + 1	80C88/ NEC V20	4.77 or 9.54	9 lbs	13 x 13 x 3.2	9.5 x 4	320 x 200; 640 x 200	Supertwist LCD, electro luminescent backlit, amber gaslight (optional)	Nicad	84	640K/ 1.25M	Two 3½-in. or one 3½-in. floppy and 20M-byte hard disk	RGB, composite	Both	One	$2,295-$3,095
	Datavue 25	80C86	4.77	16 lbs	12.7 x 6.2 x 16.5	9 x 4	320 x 200; 640 x 200	Amber gaslight fluorescent backlit	External rechargeable	83	256K/ 1.25M	Two 3½-in. or one 3½-in. floppy and 20M-byte, 5¼-in. optional	RGB, composite	Both	None	$1,945-$3,095
Dauphin Electronics (609) 924-9393	LP-880	80C88	4 or 12	15 or 16.8 lbs	12.8 x 12.6 x 3	6.8 x 6.7	720 x 400	Backlit LCD	6-volt lead, acid	78	128/640K	One 3½-in. floppy/1.44M-, 20M-byte hard disk	MP	Both	MP	$2,695
Data Basic Systems Corp. (301) 258-6400	Tempest Tele PC	8088	4.77	45 lbs	9 x 19 x 26	7.5 x 2.3	640 x 200	Electro luminescent	No	84	640K/ 640K	One 360K-byte floppy drive/One 10M-byte hard disk	RGB	Both	Seven	$10,895
Dulsh Computer Systems (800) 458-5581	Dulsh Pac	80286, 80386	10 zero-wait state (80286); 16 or 20 zero-wait state (80386)	20 lbs	8.5 x 18.5 x 7.5	6 x 8.25	640 x 400	Backlit supertwist LCD, plasma	Auxiliary pack	84	2M/8M	Two 3½-in. floppies or one 5¼-in., one 3½-in. floppy, one hard- height hard drive	RGB	Both	Six	$8,000-$12,000
Federal Data Corp. (301) 294-0083	Federal Data EAT	80286	6 or 8	24.5 lbs	8 x 15 x 14	9-in. diagonal	640 x 200; 320 x 200	Green phosphor	None	83	512K/2M	One 360K-byte floppy/20M-byte hard drive	RGB, composite	Both	Three	$2,995
Flexible Computers, Inc. (800) 722-0325	Express	NEC V30	Dual 4.77, 9.54	Just under 10 lbs	12.5 x 18 x 2.5	6.5 x 4	640 x 200	Backlit LCD	Right-hour charge	77	640K standard	Two 3½-in. floppy drives (standard)	Combined	Both	Four	$1,595
	Express 2	NEC V30	Dual 4.77, 9.54	14 lbs	12.5 x 18 x 2.5	6.5 x 4	640 x 200	Backlit LCD, gas plasma (optional)	Right-hour charge	84	640K standard	One 3½-in. floppy/One 20M-byte hard disk	Combined	Both	One half-height	$2,495
Grid Systems Corp. (800) 222-GRID	Gridlite Plus	80C86	4.77 or 8	9.7 lbs	11 x 13	NP	640 x 200	Supertwist LCD backlit	Nicad	74	640K/1M	One 3½-in. floppy with optional 10M-byte hard disk	RGB	Both	Eight	$1,900
	Gridcase 1500 Series	80C286, 80C386	10 or 12.5	12 lbs	2.3 x 11.5 x 15	10 in.	640 x 200 or 640 x 400	Backlit LCD, gas plasma (optional)	Nicad	72	1M/6M	Two 3½-in. floppy/10M-, 20M-, 40M-byte hard disk	RGB	Both	Two	From $3,495
	Gridcase EXP	80C86	4.77	15 lbs	15 x 11.5 x 3.5	NP	640 x 200	Supertwist LCD or gas plasma	Nicad	72	640K/1M	One 3½-in. floppy/One 20M-byte hard drive	RGB	Both	Two	$4,640
Hewlett-Packard Co. Contact local HP sales office	HP Portable Vectra CS	8086	7.16	17.6 lbs	3.8 x 16.8 x 12.6	10-in. diagonal	640 x 400	Retractable supertwist LCD	Lead, acid	88	640K/20M	Two 1.44M-byte 3½-in. flexible disk drives/One 20M-byte hard disk drive, one 1.44M-byte 3½-in. flexible disk drive	RGB	Standard	Four	$5,495
Husky Computers, Inc. (813) 966-8100	Husky Hawk 8118	80C1...	6.14	780 grams	210 x 148.5 x 36 mm	NP	240 x 64	LCD backlit	Nicad	68	992K	720K- or 1.43M-byte 3½-in. double floppy disk drive (optional)	None	Serial	NP	$3,147
IBM (800) 447-4700	PC Convertible Model 1, Model 2	80C88	4.77	12.17 lbs	2.64 x 13.19 x 14.17	10.5 x 8.5	25 x 80	Reflective supertwist (Model 1); backlit supertwist (Model 2)	Rechargeable battery pack	78	256K/640K	Two 720K-byte 3½-in. floppies	None	Optional	None	$1,595 (Model 1); $1,695 (Model 2)
International Systems Marketing, Inc. (301) 670-1313	Express 286/VGA	80286	12	33 lbs	8.5 x 17.5 x 18	10-in. diagonal	640 x 480	RGB monitor	None	84	1M/6M	1.2M-byte floppy; 3½-in. floppy/40M-byte hard disk (standard)	RGB, TTL*/ Analog	Both	Eight	$5,995

*Enhanced Graphics Adapter *Transistor-Transistor Logic *Random-access memory

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. When a vendor is unable to provide specific information about its product, this is designated NP (not provided). When a question does not apply to a vendor's product, this is designated NA (not applicable). Further product information is available from the vendors.

COMPANY	PRODUCT	MICROPROCESSOR	CLOCK SPEED (MHZ)	WEIGHT	FOOTPRINT (IN INCHES)	SCREEN DIMENSIONS	SCREEN RESOLUTION (IN PIXELS)	SCREEN TYPE	BATTERY POWER	NUMBER OF KEYS	MEMORY: RAM STANDARD/ MAXIMUM (IN BYTES)	STORAGE: STANDARD/ MAXIMUM	TYPES OF MONITOR PORTS	INCLUDES SERIAL/ PARALLEL PORTS	NUMBER OF EXPANSION SLOTS	PRICE
International Systems Marketing, Inc. (301) 870-1813	Xpress 286/VGA	80286	16 or 20	25 lbs	6.5 x 17.5 x 16	10-in. diagonal	640 x 480	RGB monitor	None	84	256/896K	1.2M-byte floppy; 20-in. floppy/40Mb-byte hard disk (standard)	RGB, TTL/ Analog	Both	Eight	$6,995
Ivy Microcomputer Corp. (617) 653-6914	Ivy AT A/B/C	80286	10	30 lbs	8.4 x 17.5 x 17	9 in.	640 x 200	CRT	No	84	640K/1M	One 5¼-in. floppy, one 20M-, 40M- or 80M-byte hard disk	None	Both	Eight+	From $2,595
	Ivy 386 A/B/C	80386	20	31 lbs	8.4 x 17.5 x 17	9 in.	640 x 200	CRT	No	84	1M/4M	One 5¼-in. floppy/One 40M-, 80M-, 130M-byte hard disk	None	Both	Eight	From $3,595
	Ivy XT	8088	10	30 lbs	8.4 x 17.5 x 17	9 in.	640 x 200	CRT	No	84	256K/640K	One 5¼-in. floppy/One 20M-byte hard disk	None	Both	Eight	From $1,595
Kaypro Corp. (619) 481-4300	Kaypro 286i+	80C286/ NEC V30	6.77 or 8	26 lbs	23 x 11.6 x 2.5	8.6 x 0	640 x 200	Supertwist LCD with cold-cathode fluorescent backlighting	Lead-acid	77	768K standard	Two 3½-in. floppy drives (standard)	EGA, RGB, Monochrome	Both	None	$6,795
Mini-Micro Business Systems Corp. (303) 444-3746	Executive Laptop	80286, 80386	12 or 20	14.9 lbs	3.5 x 15 x 15.9	7.5 x 5.5	640 x 400	Gas plasma	Nicad	86	1M/12M (80286); 2M/16M (80386)	1.44M-byte floppy drive/15MB-byte hard disk (standard); 5¼-in. floppy (optional)	EGA	Both	Four	$3,495-$5,995
	Ultraspeed	8088, 80286, 80386	10, 12, 20	17 lbs	9.5 x 15.5 x 6	9 x 6	640 x 400	Supertwist LCD backlit	None	88	640K/ 640K (8088); 1M/12M (80286); 1M/16M (80386)	360K-byte floppy (8088); 1.2M- byte floppy (80286); 720K-byte floppy (80386) (all standard)	EGA	Both	Six	$1,295-$2,995
National Semiconductor, Inc. (817) 885-5700	Data-computer 3.0	80C86	4.8	36 ounces	2.6 x 4.9 x 0.9	2 x 3.6	80 x 200	Reflective LCD	Four AA, AA alkaline, Nicad pack	67	128K/640K	CMOS battery-packed RAM	None	Socket	Only for [redacted]	$2,000
	Data-computer 2.5	80C86	4	30 ounces	2.56 x 4.78 x 11	0.5 x 2.6	2 x 24 characters	Backlit LCD	Three AA alkaline	47 or 57	64K/256K	CMOS battery-packed RAM	None	Socket	Only for [redacted]	$1,495
NEC Home Electronics (USA), Inc. (312) 860-9500	Multispeed HD	NEC V30	9.54/4.77	14.3 lbs	3.6 x 13.6 x 12.5	4.7 x 9.1	640 x 200	Supertwist LCD backlit electro luminescent	Nicad	85	640K standard	One 20M-byte hard disk, one 720K-byte floppy drive	RGB	Both	One	$3,695
	Multispeed EL Model 2	NEC V30	9.54/4.77	11.5 lbs	3.35 x 13.6 x 12.4	4.7 x 9.1	640 x 200	Supertwist LCD backlit electro luminescent	Nicad	85	640K standard	Two 3½-in. 720K-byte floppy drives	RGB	Both	One	$2,595
	Multispeed	NEC V30	9.54/4.77	11.2 lbs	3.1 x 13.6 x 12.4	4.7 x 9.1	640 x 200	Supertwist LCD	Nicad	85	640K	Two 3½-in. 720K-byte floppy drives	RGB	Both	One	$2,195
NEC Information Systems, Inc. (800) 343-4419	Power Mate Portable	80286	8 or 10	22 lbs	11.2 x 15.5 x 6.9	6.95 x 6.95	640 x 200	Backlit LCD	No	98	640K/4.6M	One 3½-in. floppy drive/3½-in. 20M-byte or 40M-byte hard drive, 5¼-in. 360M-byte or 1.2M-byte floppy drive (optional)	RGB	Both	Three	$6,995
Polymatic Computer Corp. (416) 738-4000	PCC Portable XT	8088	4.7 and 10	28 lbs	7.5 x 19 x 16	6 x 7.5	MP	TTL monochrome	None	Same as standard IBM XT	640K/ 640K	20M-, 30M- or 40M-byte hard disk (standard)	TTL	Both	Seven	$2,795-$3,695
Remote Equipment Corp. (317) 897-4448	Splat 88	80C88	12	16 lbs	4.5 x 16.5 x 17.5	8 x 7	640 x 200	Electro luminescent	Nicad	101	640K/ 2.64M	20M-byte internal hard disk/40M-byte internal hard disk	CGA, EGA	Both	One	$4,495
Sharp Electronics Corp. (201) 529-9500	PC-4501	V40 (80186 compatible)	7.16	10 lbs	3 x 12¾ x 13.75	9.25 x 4.5	640 x 200	Supertwist LCD	Lead	78	256K/ 640K	One 3½-in. floppy	None	Parallel	Three	$995
	PC-4502	V40 (80186 compatible)	7.16	10.5 lbs	3 x 12¾ x 3.75	9.25 x 4.5	640 x 200	Supertwist LCD with electro luminescent backlit	Lead	88	640K/ 1.6M	Two 3½-in. floppy disks	MP	Parallel	Three	$1,795
	PC-45-01	V40 (80186 compatible)	7.16	12.4 lbs	3 x 12¾ x 3.75	9.25 x 4.5	640 x 200	Supertwist LCD with electro luminescent backlit	Lead	88	640K/ 1.6M	One 3½-in. floppy with 20M-byte hard drive	MP	Parallel	Three	$2,995
	PC-7000A	80C86-2	7.37	17.5 lbs	8.5 x 16¾ x 6.25	9.75 x 4.5	640 x 200	Supertwist LCD with electro luminescent backlit	No	84	320K/ 704K	Two 5¼-in. floppies	MP	Both	Two	$1,995
	PC-7100	80C86-2	7.37	19 lbs	8.5 x 16¾ x 6.25	9.75 x 4.5	640 x 200	Supertwist LCD	No	84	320K/ 704K	One 5¼-in. floppy with 20M-byte hard drive	None	Both	Two	$2,595
	PC-7202	80386	6, 8 or 10	21 lbs	9.3 x 16¾ x 6.25	9.75 x 4.5	640 x 200	Supertwist LCD with electro luminescent backlit	No	102	640K/ 1.6M	Two 5¼-in. floppies	MP	Both	One	$2,995
	PC-7221	80286	6, 8 or 10	21 lbs	9.5 x 16¾ x 6.25	9.75 x 4.5	640 x 200	LCD supertwist with electro luminescent backlit	No	102	640K/ 1.6M	One 5¼-in. floppy, one 20M-byte hard drive	MP	Both	One	$3,995
Tallent Corp. (702) 786-6818	Tallent Comet Portable	8088, 80286, 80386	8/10, 8/12 switchable (80286); 8/10, 8/20, 8/24 switchable (80386)	20 lbs	8.10 x 17.8 x 18	9 in.	720 x 350 (mono), 640 x 350 EGA	CRT	No	84	640K/12M (80286); 1M/16M (80386)	1.2M-byte floppy, 40M-byte hard disk/Two floppies, 20M-byte hard disk	EGA	Both	Eight	$2,495-$9,495 (80286); $4,595-$5,995 (80386)
	Tallent Comet Laptop 286, 386	8088, 80286, 80386	8/10, 8/12 switchable (80286); 8/10, 8/20, 8/24 switchable (80386)	20 lbs	9.4 x 15.5 x 8.1	9.5 x 4.5	640 x 200	Supertwist LCD backlit	No	84	640K/1M (80286); 1M/4M (80386)	Two 5¼-in. drives	RGB	Both	Five	$3,595 (80286); $4,995 (80386)
Tandy Corp. (817) 390-3700	Tandy 1400 LT	NEC V20	4.77 or 7.16	13.5 lbs	3.5 x 12.3 x 14.5	4.5 x 9.5	640 x 200	Supertwist LCD backlit	Nicad	78	768K/ 768K	Two 3½-in. 720K-byte floppy drives (standard)	RGB	Both	One	$1,599
Tulsan Corp. (918) 627-3900	PTC 8810	80286	4.77	10 lbs	2.58 x 10 x 11.4	6.40 x 10.80	640 x 350	Supertwist LCD backlit	Nicad	81	640K/ 2.6M	One 3½-in. floppy/720K-byte hard disk	RGB	Both	One	$2,999

COMPANY	PRODUCT	MICROPROCESSOR	CLOCK SPEED (MHZ)	WEIGHT	FOOTPRINT (IN INCHES)	SCREEN DIMENSIONS	SCREEN RESOLUTION (IN PIXELS)	SCREEN TYPE	BATTERY POWER	NUMBER OF KEYS	MEMORY: RAM STANDARD/ MAXIMUM (IN BYTES)	STORAGE: STANDARD/ MAXIMUM	TYPES OF MONITOR PORTS	INCLUDES SERIAL/ PARALLEL PORTS	NUMBER OF EXPANSION SLOTS	PRICE
Toshiba America, Inc., Information Systems Division (714) 583-3969	T3100	80286	8 or 10	19 lbs	3.5 x 12.2 x 14.3	8.75 x 7.5	640 x 4800	Gas plasma	None	68	256/640	One 40M-byte hard disk, one 3½-in. 1.44M-byte floppy (standard)	EGA	Both	One	$7,499
	T3200	80286	8 or 12	18.7 lbs.	3.9 x 14.6 x 14.6	8.75 x 8.5	640 x 400	Gas plasma	None	95	120/640	One 40M-byte hard disk, one 3½-in. 720K-byte floppy (standard)	EGA	Both	Two	$8,799
	T3100/20	80286	4 or 8	15 lbs	3.1 x 12.2 x 14.3	8.75 x 7.5	640 x 400	Gas plasma	None	81	640K/2.6M	One 20M-byte hard disk, one 3½-in. 720K-byte floppy (standard)	RGB	Both	One	$4,099
	T1200	80C86	4.77 or 9.54	11 lbs	2.6 x 12.2 x 12	4 x 9	640 x 200	Supertwist LCD	Nicad	92	128/256	One 20M-byte hard disk, one 3½-in. 720K-byte floppy (standard)	RGB	Both	One	$3,499
	T1000Plus	80C88	4.77 or 7.16	10 lbs	2.6 x 12.1 x 12	4 x 9	640 x 200	Supertwist LCD	Nicad	61	640K/1.6M	Two 3½-in. 720K-byte floppies	RGB	Both	One	$2,699
	T1000	80C88	4.77	6.4 lbs	2 x 12.2 x 11	3 x 9.5	640 x 200	Supertwist LCD	Nicad	92	512K/1.2M	One 3½-in. 720K-byte floppy (standard)	RGB	Both	None	$1,199
Texas PC Systems (512) 346-8020	Texas PC 286 LCD Portable Computer	80286	10 (standard), 12 (optional)	21 lbs	9.45 x 15.75 x 8.15	4.5 x 9.45	640 x 200	Nonglare supertwist LCD backlit	No	86	1,024K	One 5¼-in. floppy, 1.2M-byte drive, one 30M-byte 3½-in. shock-mounted hard disk drive	RGB	Both	Six	$2,225
	Texas 386 Portable Computer	80386	16, 20 (optional)	31 lbs	8.2 x 17.3 x 16.9	5 x 7	640 x 480	CRT monochrome	No	84	1,024K/ 2,048K	One 5¼-in. floppy, one 30M-byte 3½-in. hard disk drive	RGB	Both	Seven	$3,225
Wang Laboratories, Inc. (800) 835-9264	Wang Laptop Computers	V30	8	14.38 lbs	4 x 13.9 x 11.9	2.9 x 8.5	640 x 200 or 200 x 200	Supertwist LCD	Nicad	76 plus 16 special-function keys	512K/1M	1024-byte Winchester (built-in)/Up to two disk drives can be added; 3½-in., 5¼-in. available	CGA	HP	Two	$3,830 includes built-in 1.04-byte Winchester disk drive, thermal transfer printer
Xcel Controls, Inc. (310) 260-7804	UP/DOC Model 19	80C286	12.5	18 lbs	10 x 16 x 8	5.7 x 9.2	640 x 400	Supertwist LCD, electro luminescent backlit	Starved electrolyte	88	512K/4M	One 3½-in. floppy (standard)	RGB	Both	Three	$2,995
	UP/DOC Model V30	80C286	4.77 or 12	18 lbs	10 x 16 x 8	5.7 x 9.2	640 x 400	Supertwist LCD, electro luminescent backlit	Starved electrolyte	88	512K/1M	One 3½-in. floppy (standard)	RGB	Both	Three	NP
Zenith Data Systems (312) 699-4200	Z-183 Laptop	80C86	4.77 or 8	13.3 lbs	2.65 x 12.4 x 13.9	10.5	640 x 200	Electro luminescent supertwist LCD backlit	2.5 Ahr Nicad	70 (standard), 101 (optional)	640K/ 1.44M	One 3½-in. floppy with 720K-byte storage, 30M-byte hard drive	RGB, composite monochrome	Both	Two	$3,399
	Z-181 Laptop	80C88	4.77 or 8	11.9 lbs	2.1 x 12.4 x 11.6	10.5	640 x 200	Supertwist LCD backlit electro luminescent	2.0 Ahr Nicad	75	640K	Two 3½-in. floppies at 720K-byte storage per drive	RGB, composite monochrome	Both	One	$2,399

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Z-159
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Z-157
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Uses the 80286 processor operating at 8 MHz, one-wait state. IBM PC AT compatible. Offers four open expansion slots, one serial and one parallel port and 512K-byte RAM.

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Compaq Deskpro 286
IBM PC AT compatible. Dual-speed Intel 80286 architecture, with 12 or 8 MHz selectable, and an 8-MHz Intel 80287 coprocessor socket. Includes a 5¼-in. 1.2M-byte diskette drive, seven expansion slots and 256K- or 640K-byte RAM.

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A 32-bit, Intel 80386 microprocessor with 1M-byte RAM expandable to 14M bytes. IBM PC AT compatible. Includes one 40M-byte hard disk and one 1.2M-byte diskette drive, sockets for Intel 80387 and 80287 coprocessor boards.

Compaq Deskpro 386/20
Intel 80386, 20-MHz microprocessor using a 32-bit architecture and the Intel 82385 cache memory controller. IBM PC AT compatible. Includes 1M-byte RAM with additional 32K bytes of static RAM. One 60M-byte fixed disk drive, one 5¼-in. 1.2M-byte diskette drive.

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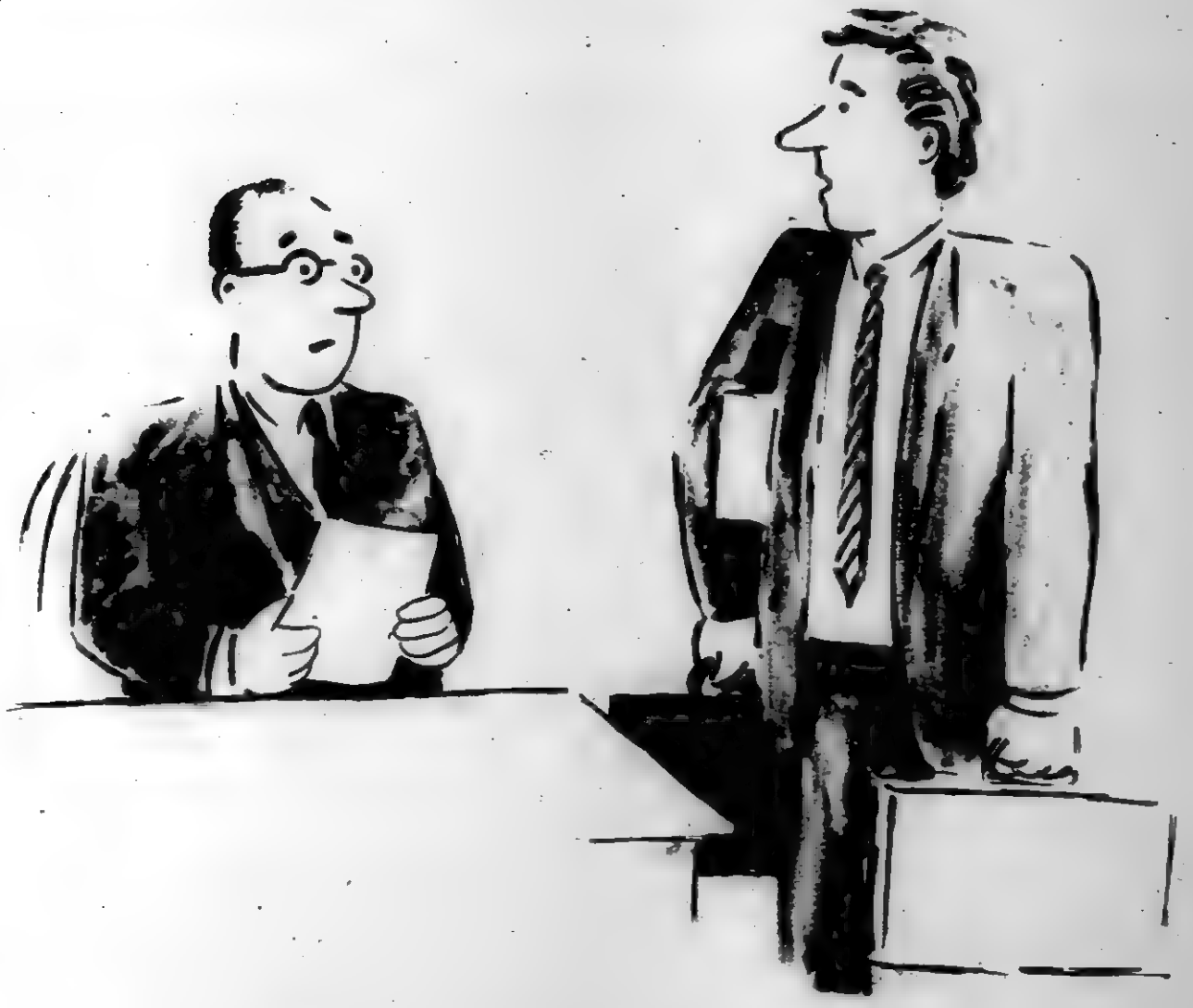

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A competitive strategy for the rest of us

Even the small or mid-size company has the wherewithal to gain an edge

BY MICHAEL PACKER
and JANICE BRODMAN

Top executives have heard that information systems should deliver a competitive edge — yet they remain skeptical. The legacy of poor relations between the systems function and top managers means that any investment has to be justified every step of the way. But as MIS managers know, an aggressive use of technology requires a major investment.

The problem rarely lies in a lack of opportunity for using information systems; the hang-up is in the execution. As one manager comments, "It's not that we can't get good ideas for using systems strategically. Where we hit a brick wall is in actually making it happen faster or better than our competition."

Four ways to go

The firm that wants to use information systems for competitive advantage can choose from among four strategies:

- Proprietary advantage.
- One step ahead.
- Discontinuity.
- Implementation.

The first three strategies are the ones we usually hear about. In a proprietary advantage strategy, the firm develops a distinctive technology, one that sets it apart from the rest of the industry. Then it protects that technology with barriers, such as patents, extraordinary investment, long lead time or a rare skill base.

This way, the company can keep the technology away from its competitors long enough to profit and gain market share. Lotus Development Corp.'s 1-2-3 spreadsheet is an example of proprietary advantage.

A one-step-ahead strategy demands that the firm continually release new and improved technology. This ongoing innovation keeps it just ahead of the competition, despite rivals' abilities to duplicate any particular feature of the technology.

Pittsburgh National Bank is a good example: This organization was the first in its market to approve automobile loans within 24 hours. Pittsburgh National then raised the stakes to a two-hour turnaround time, and now it is pushing for 10-minute approval. Ongoing innovations like these have brought Pittsburgh National market share and kept the bank ahead of its competition.

With a discontinuity strategy, a firm applies technology to produce a quick, decisive shift in the fundamental competitive structure of the market it serves.

One outstanding case is Citibank NA. The bank's

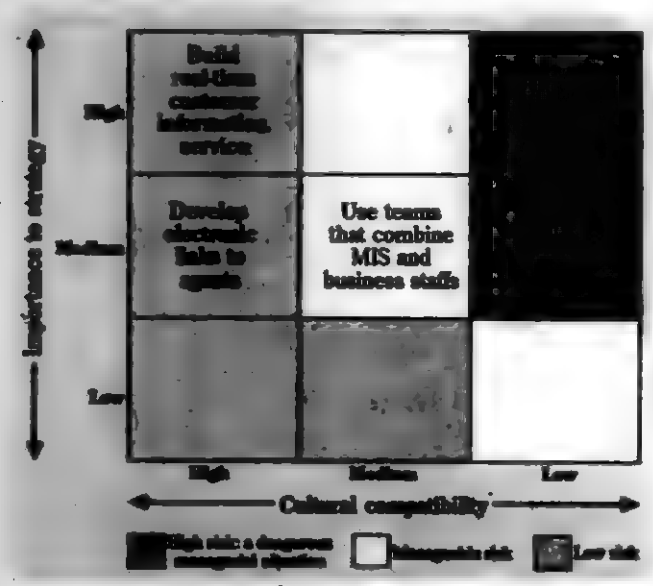
BOB ERRSOL

Packer is director of the information technology group at The Mac Group, an international management consulting firm based in Cambridge, Mass. Brodman is a professional associate at The Mac Group.

- **Choose from four game plans**
- **Implement, implement, implement**
- **Are there penalties for inaction?**

How risky is your project?

For each step you take toward the strategic use of information systems, weigh the move's relative importance against the risk of violating your corporate culture



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widespread installation of automated teller machines in New York City reportedly almost tripled its market share. When the other area banks installed their own ATMs, they found it difficult to recapture the customers they had lost. Citibank had created a discontinuity in the market.

These strategies may all make great stories, but how many companies can imitate that kind of success? The truth is, very few.

There is a fourth strategy, however, which, though rarely discussed, is potentially even more powerful than the other three. Many organizations that could pursue the implementation strategy successfully do not even recognize it as an option.

The overlooked strategy

The core of an implementation strategy is to apply commonly available technology uncommonly well.

The executive who complained that his information systems strategies hit a brick wall identified implementation as the culprit. His predicament shows why an implementation strategy can offer a double payoff: It can deliver a competitive advantage in itself, and it improves the performance of other information systems strategies.

The advantage comes neither from cutting-edge technology nor from being first to lock up customers. It comes from detailed management know-how that makes it possible to achieve optimal performance. Those superior implementation skills then add power to every other information systems strategy.

An MIS manager has the leverage at hand to improve systems implementation. There are six key steps to follow:

- Build knowledge.
- Develop a shared vision.
- Determine desired changes in values and beliefs.
- Translate new values into concrete behavior.
- Reorient power to support new values and behavior.
- Harness high-impact management techniques.

The goal of the first step, knowledge building, is to develop a clear understanding of what is at stake for the firm and how an information systems strategy

THE CORE of an implementation strategy is to apply commonly available technology uncommonly well.

can contribute. The manager must learn and be able to communicate to others the company's strengths and weaknesses. He must size up the corporate culture, including beliefs about the role of information systems, and zero in on the firm's customers and competition.

To start, draw a picture of the chain of business activities in the firm and the company's relationship to the outside world. For each activity, identify its cost, the support information systems provides it and the dynamics of support costs as demand changes. Also, consider how customers are affected if the activity is performed extremely well or very poorly.

Then, ask yourself these three questions:

- Can information technology improve the business process? Can you serve customers more quickly, improve the consistency of internal decisions or restructure the expense base of the firm? For example, will giving sales agents laptop computers reduce order-to-shipping time?
- Are there penalties for inaction? If you don't begin today, will you fall behind rivals who did invest in system flexibility and can now develop new products faster than you can respond?
- Are there ways to use information systems to add value via distribution channels? For example, can an interorganizational computer system linked to customers make it easier and more attractive for them to buy from your firm rather than from rivals?

It is also important to look at the ways the firm has used information technology successfully in the past and what people's expectations might be about how the systems organization can make the biggest contribution. In the small appliances division of a large consumer products

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firm, senior management wanted an information strategy that would deliver bottom-line results. The goal was to reduce the number of tasks required to serve customers, cut costs and shorten response times. Senior managers told the head of information systems that they would support his efforts to involve end users. But at the same time, they were wary of ambitious information systems efforts because of previous lackluster results.

The head of MIS pulled together an informal team of systems managers and some interested end users. He chose a respected business manager to lead the group, and together the team identified what changes would reap the highest payoff. It chose supporting retailers and streamlining links with suppliers.

Using information technology to restructure the business process could reduce the number of steps in processing a customer order from 19 to nine, cut costs by 23% and reduce turnaround time by 60%. Moreover, the team found that functional managers had sought these improvements in the past but did not understand the costs and capabilities of the technology deeply enough to construct a specific action plan.

The team's report became the basis of an implementation strategy that contributed significantly to the division's marketing and distribution capability. Other divisions eventually used the strategy as a model for building their own courses of action.

Clear the way

The success of an implementation strategy depends on a clear vision of how it will contribute to the firm. It is up to the head of MIS to take the lead in developing that vision.

To do so, the manager must address three questions:

- How will information systems contribute to the firm's ability to compete?
- How will those systems contribute to the firm's ability to manage itself?
- How will the firm manage the technology?

It is critical that the MIS leader's words and actions consistently support the strategic vision. Discussions with systems staff and end users, the way the leader allocates time and even the information center's newsletter should all send the same message. Each group manager should then carry the message to his part of the systems organization.

In the appliance division mentioned above, the head of MIS carefully built a shared vision of how the implementation strategy would contribute to the business. First, he developed the vision among his own people, emphasizing that they would focus on making it easier to do business with their firm than with their competitors.

He explained that the new systems could provide retailers with fast inventory when they needed it and up-to-the-minute information about their orders. Electronic links with suppliers could eliminate paper and telephone interactions for routine transactions, reducing operating costs. The MIS head also made sure that when he talked with fellow officers, he discussed how information systems could improve distribution and operations.

Wanted: Changed values

In all companies, the corporate culture holds implicit or explicit beliefs about the role information technology should play.

IT IS CRITICAL that the MIS leader's words and actions consistently support the strategic vision. Discussions with systems staff and end users, the way the leader allocates time and even the information center's newsletter should all send the same message.

One way to determine the fit between your implementation strategy and the firm's beliefs is through a cultural risk assessment. There are two major steps to the process:

- Define the beliefs about information technology by developing a list of simply stated "rules of the game."
- Assess the fit between those beliefs and the implementation strategy. How compatible is each element with the corporate culture? How important is each element of the strategy to its overall success?

If an important element of the implementation strategy is incompatible with the organization's beliefs about the technology, it represents an area of high cultural risk that must be resolved (see chart page 70). One resolution is to change the strategy. Another is to try altering the current corporate beliefs. The latter solution is difficult, however, and you will need solid commitment from the top to fulfill it.

Consider the experience of one multinational insurance company. A team of information systems staff and end users conducted a cultural risk assessment of the firm's new implementation strategy. First, the team listed the major elements of its strategy:

- Use teams of systems staff and full-time, dedicated business representatives to specify, build and implement systems. Have the teams report to senior business executives — not to MIS.
- Build a real-time customer service

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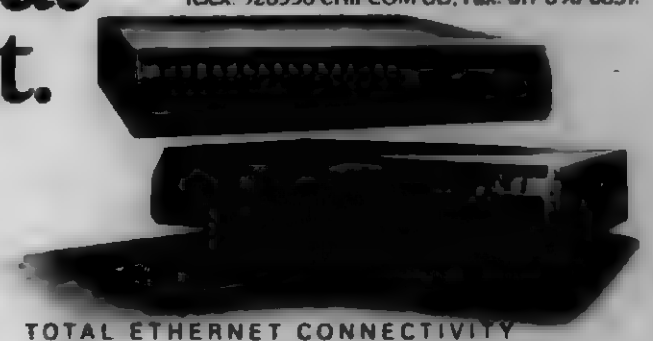

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information system.

- Hire liberal arts graduates to work in the information systems department. Use their people skills and teach them technical skills.
- Push for customised coverage analysis and policy issuance.
- Build electronic links between independent agents and the firm's data bases using push-button phones and personal computers.

If the shoe doesn't fit

The team members then examined how well each element fit the firm's beliefs on information technology. They concluded that the firm's preconceptions would have to be altered. Within the systems organization, for example, it was important for people to view themselves as initiators. Systems staff needed to see their role as building entire businesses, not just computerised information systems.

The team also felt that end users needed to view the information systems organization as a partner in developing the business rather than as just a support function. The head of MIS began a series of meetings with the chief executive officer and other top executives to help them understand how changes in these beliefs would be critical to success.

Finally, the team decided that some strategy elements were too risky. Hiring liberal arts graduates in the systems organization, for example, would create divisiveness. The team also dropped the idea of automating customised coverage analysis — it would trigger too much resistance among agents.

Translating values into concrete behavior is the step at which a new implementation strategy is likely to run into strong resistance. Managers must give consistent support to the new values or people will return to old values and patterns of behavior.

When you handle this step successfully, you create informed, committed groups in various parts of the company that can translate the values of the implementation strategy into on-the-job reality.

Under control

It is helpful to distinguish between areas under your direct and indirect control. Where you have direct control, there are several processes you can use to change current behavior patterns and explain what the implementation strategy means for particular jobs.

One highly effective technique is to establish regular problem-solving meetings within the systems department and between that organization and end users. These could focus on identifying new behaviors that need to be adopted, obstacles to developing that behavior and ways to overcome the obstacles. Training is often essential to helping systems staff and end users understand the kinds of decisions and behavior that support the implementation strategy.

Also, make sure key systems staff get regular feedback about how well their actions and decisions promote the implementation strategy.

In a major regional bank, for example, the implementation strategy called for improved responsiveness to managers' requests. The MIS head designed brief, periodic surveys of progress, which he measured against selected performance measures.

One of the most important surveys focused on how promptly MIS responded to "quick-change" system requests. It began with a meeting between the head of MIS and the heads of the bank departments. Afterward, the MIS manager led a review within each systems group, bringing together systems managers and key users.

Where a manager wields only indirect influence, he will have to use more subtle tactics. A good approach is to pick a couple of key issues that have already captured general management's attention, then show how the strategy will help resolve those issues.

A manager can, for example, build a model of how the MIS strategy will contribute to the cost structure of various businesses or functions. Another technique is to show how the strategy will improve management information.

Sometimes it is necessary to use strong-arm tactics. In the regional bank, the MIS manager convinced the CEO to come down hard on one line of business that was undermining the new strategy. A year after the bank adopted the implementation strategy, many members of the MIS staff had gained new skills and were responding to bank managers' requests more quickly. The relationship with general managers had substantially improved.

By the end of the second year, the systems organization was being given explicit credit for helping the bank improve service and introduce new products.

Reorient power

The best way to convince people that a new information technology strategy is real is to shift power to support the new values. It is essential, however, to provide a clear rationale for the power shifts, because if people do not understand changes in power, they wonder about their own value to the organization.

Bypassing the normal succession process is one way to send a loud signal to the company. A manager may want to reach

Six action items

1. Build knowledge
- Look at your company's competitive strengths and culture
- Pin down the role and cost of systems in your business chain
- Identify competitive opportunities and penalties for inaction

2. Develop a shared vision
- Learn to show how information strategy will contribute to your firm
- Demonstrate commitment to the vision
- Build a team to spread the word

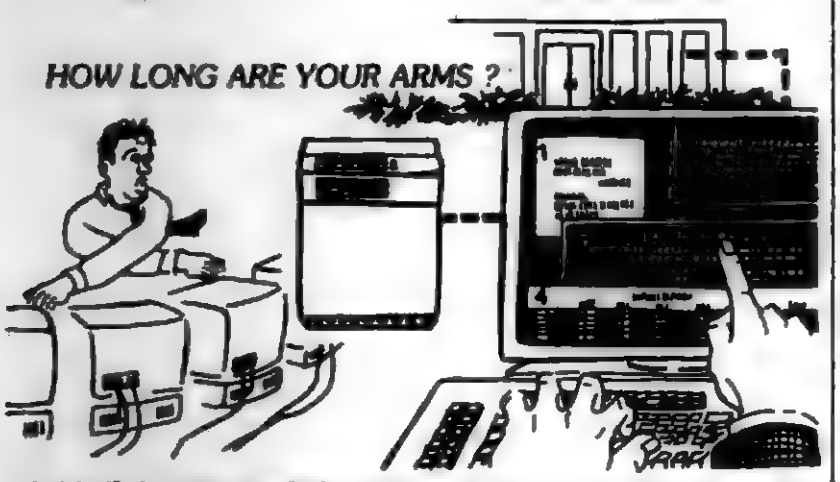
3. Pull strategy and organization together
- Pinpoint when information strategy conflicts with values and beliefs
- Think about changing parts of the strategy that won't fly
- Think about changing beliefs that clash with the strategy

4. Translate new values into concrete behavior
- Help employees apply the strategy's values in their jobs
- Set up feedback mechanisms so MIS can test its decisions
- Recruit powerful allies, when necessary, to explain rewards

5. Reorient power to support new values and behavior
- Figure out who will resist and who will support your strategy and why
- Shift power toward employees whose skills, beliefs or functions support it
- Link these power shifts, in the staff's eyes, to the strategy's values

6. Harness high-impact management systems
- Focus on the most influential management techniques
- Alter high-impact systems to support the strategy
- Make sure systems capture the information manager's need

CW CHART



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down into the organization to place his own people in leadership positions. If this tactic is clearly linked to the values of the new strategy, it provides a compelling incentive for them to come on board. In addition, he may want to bring in outsiders whose skills and values support the strategy.

More visibility

The manager can also alter the structure of power by advancing roles that contribute to the new strategy. In one large brokerage firm, the implementation strategy demanded attention to new technologies and better teamwork between systems staff and end users.

AN implementation strategy offers companies the opportunity to gain an edge without a massive investment in capital resources.

The vice-president of operations, who was also head of information systems, raised the systems' advanced technology group, which reported within systems engineering, to the departmental level.

The manager also took someone from the computer operations group who had been unusually responsive to end users and gave him departmental-level responsibility for development.

Knowing this, many managers in the systems area paid more attention to end-user responsiveness in performance evaluations, and critical projects were turned around faster. Those who could not adapt were shifted into purely technical support roles or moved elsewhere in the firm.

Power redistribution is often difficult because it tends to become a zero-sum game. Furthermore, a manager may have to take power away from those who have been loyal to him. The ability to deal directly with the issue of power, however, will strongly affect the success of the implementation strategy.

High-impact management

It is best to figure out early which management methods have the greatest impact on behavior and which behaviors can be influenced.

Compensation is one of these high-impact tactics. Performance appraisals tied to compensation can be used to encourage behavior that supports the new strategy. For example, since an implementation strategy calls for getting the details right, a manager may need to realign performance appraisals so they reward the precision-oriented master craftsman as well as the creative worker.

Resource allocation also carries a lot of impact. The head of information systems in a major bank led the systems review board in cutting projects not supporting his implementation strategy and shifting resources to those that did. As a result, critical projects were completed almost 30% more quickly than in the past.

It is also useful to conduct a review of the firm's information systems to make sure they capture the information manager's need. In some cases, data that is supposed to be in the system and is needed to make implementation successful is not actually entered or proves to be inaccurate. This may have to be worked out with executives of end-user departments.

An implementation strategy is difficult to pursue successfully. However, it offers companies the opportunity to gain an edge without a massive investment in capital resources. This is the strategy the Japanese have often used to outmaneuver U.S. firms.

What poses an unusual challenge for many managers is the need to consider both "soft" management systems — vision and values — and "hard" ones — compensation plans and the organizational reporting structure. These areas can be orchestrated to reinforce one another.

By improving implementation from the ground up, a manager can make the value of his strategy visible to senior executives. With support from the top, he can deliver a powerful competitive edge for the firm. ●

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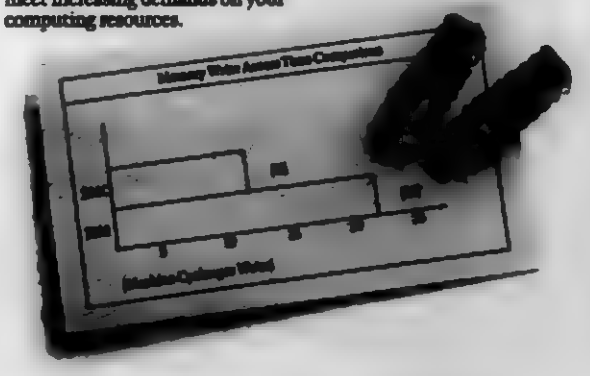

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TAKING CHARGE

James Connolly

Don't do it all yourself

For all the talk about the importance of training MIS employees to become managers by sending them to seminars on human interaction and budget planning, too many people forget about a simple lesson that must be learned the hard way.

Asked to reflect on the toughest aspect of their transition from MIS employee to MIS manager, a frequent reponse by those who have made the grade is that they had to learn to delegate both authority and the work load. That is "delegate," as in "to appoint as one's representative" and "to assign responsibility or authority," according to Merriam-Webster.

Several managers, speaking in formal presentations or informal conversations, recall how they went to the School of Hard Knocks to learn how to let their subordinates do what subordinates are supposed to do.

The common thread running through these managers' experience is that when they were promoted, they found they could do correctly in a matter of hours the work that their former peers — now subordinates — were messing up after days of work.

The new managers found themselves saying, "It's easier

Continued on page 78

Debit cards negotiate the road to acceptance

BY JAMES DALY
CW STAFF

You're on your way home one evening and you notice the old Chevy is low on gasoline. You stop at the nearest gas station, fill 'er up and pull out a small magnetically striped card. The attendant quickly swipes it through a machine, and you're on your way.

Halfway home, you swing by the cleaner's to pick up shirts dropped off that morning. Out comes your wallet and the same card. A clerk behind the counter handles it with the same ease and confidence that the gas station attendant did. There's one final stop: a convenience store to pick up a half-gallon of milk. Again, the card comes out.

Sound farfetched? It may not be in a few years. Although debit cards are hardly household items, there are many who think they will be. And when a special task force at the Electronic Funds Transfer Association (EFTA) Expo meets this week in Washington, D.C., to begin ironing out the particulars of the customer-retailer debit card relationship, it may be laying the groundwork for a device that task force members said could one day be as common as a 24-hour automated teller machine card.

"We've been trying to introduce these cards since the 1960s, but today there are so many consumers walking around with bank ATM cards capable of similar electronic payment services that we feel the time of the debit card has arrived. We've already cleared a major psychological barrier," said Paul Schmelzer, vice-president of Deluxe Data Systems, Inc. and chairman of a task force sprinkled with retailers ranging from oil companies and banks to public policy and consumer affairs representatives.

Continued on page 76

Data View

Micros in MIS

Most systems personnel surveyed use personal computers; almost half use them daily

INFORMATION PROVIDED BY AN ASSOCIATION FOR SYSTEMS MANAGEMENT SURVEY OF 2,300 MEMBERS
CW CHART

Carrying the load

Transport firm's MIS boss keeps freight moving

BY JULIE PITTA
CW STAFF

OAKLAND, Calif. — As the recently appointed chief information officer at American President Companies Ltd. (APC), Jim Marston once again finds himself in the transportation business. "I've always been in transportation, one way or the other," he concedes.

Marston is no stranger to the peculiar needs of directing the MIS efforts of large transportation concerns. He began his career in the U.S. Air Force in the mid-1950s, starting as a pilot and eventually flying B-52 bombers. Before he stopped flying in 1974, Marston discovered what he calls his first love — managing a large data processing and communications organization.

Today, he is in a position in which he uses information technology as a strategic weapon to help APC, a $1.2 billion international shipping company, grow.

Service discipline

In the Air Force, Marston learned some of the disciplines he brought with him to APC. "The Air Force gets out in front of technology as it's evolving," he says, noting that as with APC, the Air Force's systems are dispersed over a vast geographical area requiring a strong dependence on telecommunications and networking.

After retiring as an Air Force colonel, Marston joined American Airlines in 1982, signing on as vice-president of data processing and communications. Five years into the job, Marston was asked to take the helm of AMR Technical Training Corp., one of the airline's high-technology spin-offs.

As president there, he managed what amounted to a technical training academy for travel industry personnel. Technical training offers classes in airline reservation systems and telecommunications management for American Airlines personnel. Additionally, it boasts a school for future travel agents on a tuition basis. Not only are students trained on systems they will use

Continued on page 77

PROFILE

Jim Marston

Position: *Chief information officer, American President Companies Ltd.*

Mission: *To use systems as a strategic weapon in the competitive, cost-conscious shipping industry*

Inside

- Televised MIS seminars set for September debut. Page 76.
- Fall Joint Computer Conference put on hold. Page 77.

Job One: MIS quality measurement to soar in importance

BY JAMES CONNOLLY
CW STAFF

ORLANDO, Fla. — MIS quality measurement, which results in the quantification of factors such as project costs and customer satisfaction, is set to grow in importance in MIS groups during the next two years, according to a survey of organizations now involved in or contemplating a measurement program.

But even among the 69 organizations that showed an interest in quality measurement, just more than half already have a formal measurement program, and those groups have been doing measurement for an average of only 2.7 years. Almost all said they expect quality measurement to become more important within two years.

The Quality Assurance Institute recently released the results of a survey conducted at its 1987 National Conference on Measuring Data Processing Quality and Productivity, held here. The institute is an Orlando-based company that promotes quality in data processing and vendor products through conferences and seminars.

The key benefits already realised from quality measurement — with more than half of the respondents reporting that they have identified tangible results — include identification of areas and activities needing attention, an increased consciousness of customer concerns and a shorter time span to fix defects.

Hallmarks of success

The MIS organizations surveyed, which the institute called leading-edge — although not necessarily representative of the DP world as a whole — said the most effective measures of quality are the cost of an activity or MIS-built product, project and activity budgets and computer or terminal availability.

Those same organizations said the measures they plan to introduce during the coming year include customer satisfaction surveys, defects in system and program development and function points as an estimating and management tool.

The institute noted that only 7% of the organization representatives know their defect rates in relationship to development or production defect rates as measured in defects per 1,000 lines of code.

In addition, most of the respondents said quality measurement remains a largely manual task. They said the best sources of data for developing measures are job accounting systems, problem reporting systems and manual reporting systems such as project status reports.

The respondents listed the biggest obstacles to a successful measurement program as determining what to measure and gaining the acceptance of the DP staff and support from MIS management.

They said the best arguments for having a measurement program include not knowing whether MIS projects succeed or fail when they are not measured, improved quality and productivity, improved customer satisfaction and identifying areas in which improvements can be made.

Debit cards

CONTINUED FROM PAGE 75

Debit cards — "an awful term," Schmelzer sniffed, "and one of the things we'll definitely have to work on" — essentially function the same way credit cards do.

Deduct it now

But instead of the consumer paying all or part of the bill when a statement arrives each month, funds are immediately deducted at the point of sale from an account the customer keeps with a bank or the retailer.

"The debit card is pulled through a card reader, you enter a personal identification number, and your account is debited for a transaction," said Jim Callan, senior director of the EFTA. "But there's no interest charged, no statement to sign and no fee for the card."

Deluxe Data's Paul Schmelzer

No interest? No fee? So who foots the bill? "We're still working that out," Schmelzer confessed, "but we're looking at the retailer for many reasons. We're convinced customers are going to use it, and retailers can use it as a means of attracting customers.

"We're also hoping they see the value in consolidating the unbelievable amount of transactions that come across their desks," Schmelzer continued. "Retailers also know from experience that noncash payment alternatives tend to produce larger sales."

Hard questions

While Callan and Schmelzer said they anticipate tough questions from the retailers on the task force, they are already preparing their ammunition. "Debit cards are already successfully testing the water around the country," Callan asserted.

"If you belong to one of four or five banks in California, you can use your bank's ATM card at any of a number of Lucky Stores. There is another organization out West, called Star Systems, which is used mostly for gasoline stations," Callan added.

While both Schmelzer and Callan admitted there are still formidable barriers to clear — with start-up costs and delays at the checkout counter being the major sticking points among retailers, according to Schmelzer — both said they are confident that debit cards will survive.

"We're facing the same challenges as did the guys who introduced the automobile, the airplane, the radio or the TV," Schmelzer said. "There's a whole battery of technological and psychological considerations we must face in successfully selling this card, but we feel its time has come."

Televised MIS seminars set for fall debut

STEWART MANOR, N.Y. — The producer of an MIS and telecommunications seminar series has planned a September debut for the interactive, televised program that will be transmitted to corporate sites via satellite.

The Computer Channel, Inc. said it will announce in May the schedule for six months of telecasts with a goal of two or three full-day programs offered each month.

Computer Channel Chief Executive Officer Joe Rizzo, formerly an executive with Private Satellite Network, Inc. (PSN), said Computer Channel is taking a different approach than PSN, with which Rizzo worked for more than a year on a pilot program to produce continuous MIS-related telecasts. He said Computer Channel will offer one-time viewing with its scheduled all-day seminars.

"It's very much in the sense of a nationwide classroom," said Rizzo, whose company is receiving funds and production support from the Technology Transfer Institute. He said two types of seminars will be offered; the first will be professional education seminars, and the second will be industry research or overview productions.

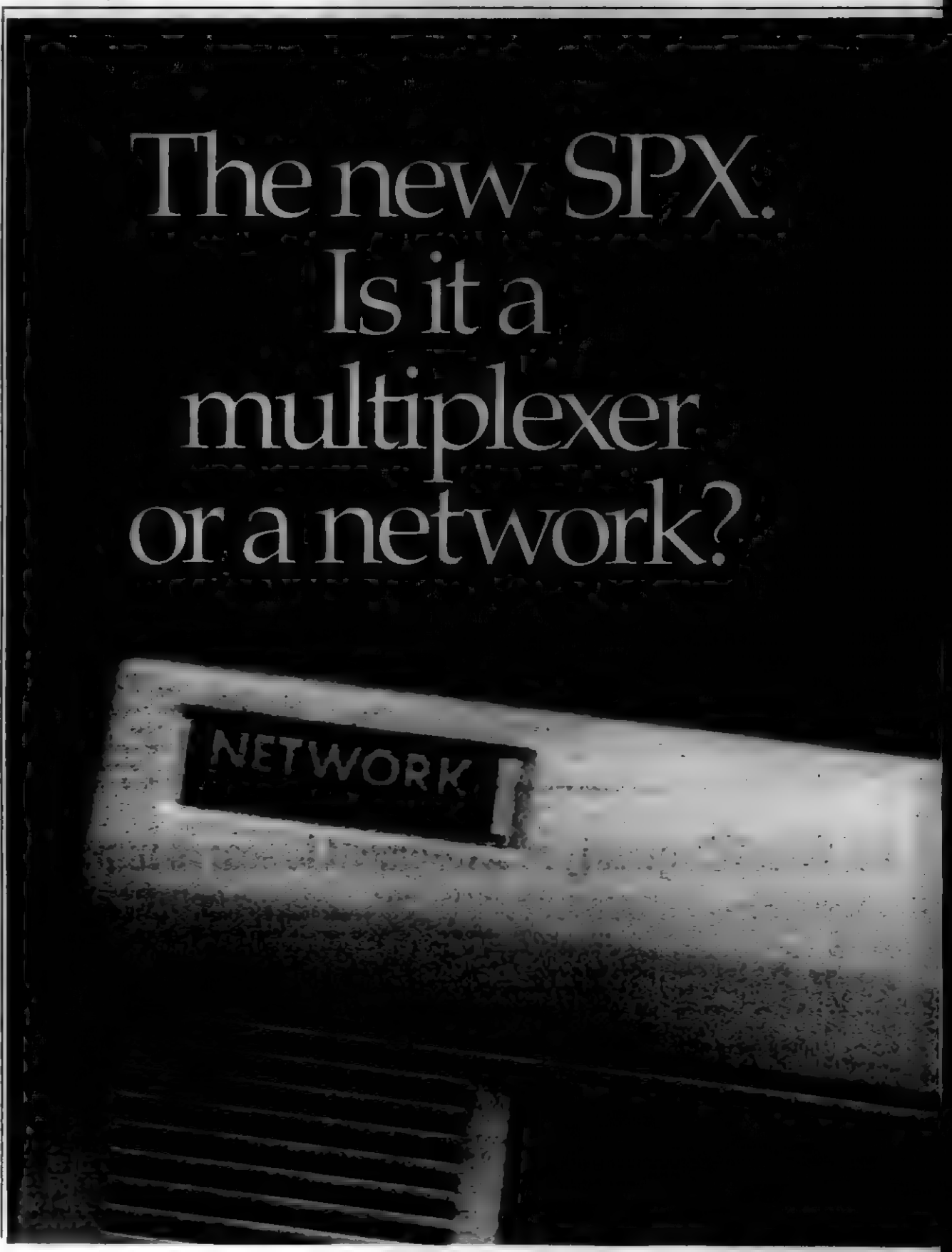
However, Rizzo declined to provide details about which topics or speakers are expected to appear on the programs.

He claimed the telecast seminars will offer savings for customers in comparison with live seminars offered at hotels or conference centers.

Rizzo said he is targeting MIS organizations in which an entire staff might be brought into a conference room to view the telecast seminar. The seminars will include lectures and question-and-answer sessions involving customer sites.

Rizzo said fees will range from $1,500 to $2,000 per site, depending on the program being offered. He said companies that do not have satellite dishes can rent them on a daily basis for prices that range from $600 to $1,000 per day, depending on location. Rizzo said that satellite subcontractors have not yet been selected.

Rizzo said Computer Channel currently has one other employee and that three more will be hired when the company moves into offices in Floral Park, N.Y.



ACM, IEEE conference postponed

The joint effort of the Association for Computing Machinery (ACM) and the Computer Society of the Institute of Electrical and Electronics Engineers, Inc. to build a broad-based conference around educational issues has suffered a setback with the suspension of the 2-year-old Fall Joint Computer Conference (FJCC).

The conference, held in Dallas in 1986 and 1987 and tentatively scheduled for Orlando, Fla., this year, has been postponed, and its functions are being dispersed to various other special-interest group meetings. The conference targeted such issues as technology transfer and legal concerns relating to computers.

"The postponement or suspension of the FJCC was part of a strategic plan to expand the number of ACM conferences," said Pegotty Cooper, manager of conferences for the ACM. She said the ACM's focus has turned more toward vertical conferences and that the organization is stepping back and will re-evaluate the FJCC concept at a later date. She said administrative functions carried out at the FJCC, such as awards, will be spread among 31 ACM special-interest group meetings.

The FJCC attracted about 1,250 attendees in 1987, according to that conference's organizers. Much of the focus at last year's conference was on educational seminars aimed at helping organizations deal with issues such as the transfer of computer technology from research groups to the commercial world and making nontechnical managers familiar with the computer technology that they rely on or must market.

Cooper said the cosponsor relationship between the ACM and the Computer Society of the IEEE remains intact for about 12 other conferences that the two organizations host.

Carrying the load

CONTINUED FROM PAGE 75

as travel agents, but they are also taught other skills required for the job during a four-week course.

While at his desk one day, Marston received a call "out of the blue" from APC Chairman and Chief Executive Officer W. B. Seaton. It took three visits with Seaton to convince him to leave American Airlines to join the shipping firm. All Marston will say of his decision is: "He made me an offer I found difficult to turn down."

At APC, Marston's task is to manage an international network of systems that supports the company's air, rail and overseas shipping business. APC operates two computer centers: one in San Mateo, Calif., and the second in Hong Kong. Both house IBM mainframes. Additionally, the company has minicomputers in six locations in the Far East to handle heavy local processing requirements at those sites.

Nearly 2,000 terminals and 950 personal computers allow remote locations domestically, in the Far East and in the Middle East to access shipping information stored in the mainframes. Through that intricate and far-flung network, an office in Nashville can access the IBM mainframe to receive detailed information regarding a shipment.

Ace in the hole

Information systems has evolved from a support function to a strategic tool for APC, Marston says. In fact, he is reluctant to offer specifics on any upcoming investments the company will make in systems because he wants to shield APC's future strategy from competing firms.

"The transportation industry — outside of the airlines — was probably not as forward-thinking as other industries," Marston says. "But there's been a recognition of growing competition in the shipping industry, especially from the Far East."

As in other industries, shipping firms have been engaged in a cost war. With Far East companies having the advantage of less expensive labor, U.S. firms were left seeking a way to keep up. They found it with computer technology, Marston explains.

MIS has become so important to APC that Marston became its first chief information officer, a title that has become somewhat controversial among MIS professionals. Although he concedes that the CIO title can sound "awfully presumptuous" and that it has become generic, he defends its use at APC.

"It's serving a purpose," Marston maintains. "It's a recognition that information systems are a strategic element of the business. It has become a fundamental underpinning of what we do here."

The message that MIS is key to APC's strategy must reach its remote locations, Marston says. Although the firm's widely dispersed offices are linked technically, that does not always mean they are otherwise connected.

"The biggest challenge is the fact that we have a very diverse geographical spread," he explains. "There's diversity in the level of computer literacy in the companies that we operate in. For example, in the Middle East, most people haven't used computers on a day-to-day basis. We have to bring some regions that are only beginning to understand information systems into the fold."

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CALENDAR

APRIL 17-23

Association for Systems Management Annual Systems Conference. San Diego, April 17-20 — Contact: ASM, 24587 Bagley Road, Cleveland, Ohio 44138.

Info Canada '88. Toronto, April 18-19 — Contact: Data Processing Management Association, P.O. Box 1004, Postal Station F, Toronto, Ont., Canada M4Y 2L4.

Information Industry Association Spring Conference & Exhibition. New York, April 18-20 — Contact: Information Industry Association, Suite 800, 555 New Jersey Ave. N.W., Washington, D.C. 20001.

Tandy Computer Business Users' Group Annual Conference. Fort Worth, Texas, April 18-20 — Contact: Michele Ryan, Radio Shack, 1700 One Tandy Center, Fort Worth, Texas 76102.

The DB2 Tools Symposium. New York, April 18-20 — Contact: Digital Consulting, Inc., 6 Windsor St., Andover, Mass. 01810.

Eastern Simulation Conference. Orlando, Fla., April 18-21 — Contact: The Society for Computer Simulation, P.O. Box 17900, San Diego, Calif. 92117

SEMA/SE. St. Louis, April 18-22 — Contact: Information Gatekeepers, Inc., 214 Harvard Ave., Boston, Mass. 02134.

Comten Users' Exchange Spring Conference. Fort Lauderdale, Fla., April 18-22 — Contact: Dave Beran, CUE Coordinator, NCR Comten, 2700 Snelling Ave. N., St. Paul, Minn. 55113.

Advanced Manufacturing Systems Exposition and Conference (AMS '88). Chicago, April 19-21 — Contact: Cahners Exposition Group, P.O. Box 5080, 1350 E. Touhy Ave., Des Plaines, Ill. 60017.

Corporate Electronic Publishing Systems (CEPS) Show and Conference. Chicago, April 19-21 — Contact: Cahners Exposition Group, P.O. Box 3833, 999 Summer St., Stamford, Conn. 06905.

Third Annual SNMC Software User Group Meeting. Houston, April 19-22 — Contact: Marianne Levandoski, AT&T, Room 51A40, 30 Knightsbridge Road, Piscataway, N.J. 08854.

ACH POS Seminar. Dearborn, Mich., April 20 — Contact: National Automated Clearing House Association, P.O. Box 64193, Baltimore, Md. 21264.

ANSI X12 EDI '88 Seminar & Technical Exhibit. San Francisco, April 20-21 — Contact: Data Interchange Standards Association, Meetings Department, Suite 350, 1800 Diagonal Road, Alexandria, Va. 22314.

Technology Opportunity Conference, Optical Storage for Small Systems. San Francisco, April 20-21 — Contact: Rothchild Consultants, 256 Laguna Honda Blvd., San Francisco, Calif. 94116

ID Expo — The Third Annual Conference and Exposition of Automatic Identification and Keyless Data Entry. Boston, April 20-22 — Contact: Anthony Scalisi, Show Manager, Expocon Management Associates, Inc., 3065 Post Road, Southport, Conn. 06490.

Institute for Graphic Communication Conference: Color Hard Copy. Downers Grove, Ill., April 20-22 — Contact: Lynn Boothilier, Conference Registrar, Institute for Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

TEXPO '88. Austin, Calif., April 20-22 — Contact: Pacific Bell, Room 615, 140 New Montgomery St., San Francisco, Calif. 94105.

Computer Dealers and Lessors Association Spring Meeting. Palm Desert, Calif., April 20-23 — Contact: CDLA, 1212 Potomac St. N.W., Washington, D.C. 20007.

APRIL 24-30

Nexum/88. Nashville, April 24-27 — Contact: Federation of NCR User Groups, Mail Station USG-2, Dayton, Ohio 45479.

Ingres Users Association Spring 1988 Conference. San Diego, April 24-27 — Contact: Paula Adams, Program Committee Chairperson, Effective Systems, Inc., Suite 1-2, 2001 Wyoming Blvd. N.E., Albuquerque, N.M. 87112.

Computer-Based Training Conference & Exposition. Washington, D.C., April 24-27 — Contact: Julia Stasio, Registrar, Computer-Based Training Conference, Weingarten Publications, Inc., 38 Chauncy St., Boston, Mass. 02111.

Common Spring '88 Conference: Managing Technology. Hollywood, Fla., April 24-28 — Contact: Common, Suite 600, 111 E. Wacker Drive, Chicago, Ill. 60601.

Technomost Week The Wang-Compatible Tradeshow and Conference. Los Angeles, April 25-26 — Contact: Data Base Publications, Suite 385, 8310 Capital of Texas Highway, Austin, Texas 78731.

Special Briefing and Workshop on the New Computer Security Act. Rosslyn, Va., April 26-27 — Contact: Advanced Information Management, 1966 Opitz Blvd., Woodbridge, Va. 22191.

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Connolly

CONTINUED FROM PAGE 75

for me to do it now and do it right."

Wrong!

The lessons they learned were that they were paid to manage, not to program, and that their subordinates followed one of two paths: They didn't get a chance to improve their performance by being forced to do so, or the employees were perfectly happy to watch the new boss do everybody's work. The first group of employees couldn't be blamed for not developing their skills if they were not driven. As for those in the second group, they aren't stupid, they are just the folks who seem to survive in every type of organization.

What successful managers say they have learned is that they are better off if they risk taking the heat from senior management when their first few projects are a little late in order to develop a qualified, experienced staff, rather than feed their own ulcers by doing everyone else's job just to have the project come in on time.

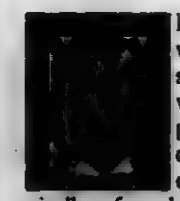
The new managers who let their workers develop — and the senior management that recognizes why a project is running late under that new manager — are the ones who can build a capable team that will very quickly learn to meet deadlines with quality work and a minimum of tummy aches.

Connolly is *Computerworld*'s senior editor, management.

INDUSTRY INSIGHT

William Zachmann

IBM: Back to the future



Individuals, when under stress, often revert to behavior patterns typical of an earlier period in life. Technically referred to as regression, this psychological phenomenon can result, in extreme circumstances, in adults engaging in infantile behavior.

Although not nearly as extreme, IBM's recent reorganization, which created five business units under IBM United States, has a strong flavor of regression. In many ways, it involves a return to a structure with remarkable similarities to the IBM of the late 1970s, prior to John Opel's reign as chairman and chief executive officer.

These similarities are not immediately apparent to the casual observer. The underlying similarity, however, is quite distinct in the three product groups that make up the bulk of IBM's business: enterprise systems, application business systems and personal systems. These bear an uncanny resemblance to IBM's old Data Products Division, System Products Division and Office Products Division structure.

Tech territories

The Enterprise Systems business unit, like the Data Products Division, is big mainframe territory dominated by the 370 architecture of the company's 3090 series down to the 9370 machines. Like the old division, the new group is also a territory for large, Fortune 2,000 accounts. This is where the big, expensive and complicated monsters of the traditional air-conditioned raised-floor computer room live.

The Application Business Systems unit, like the System Products Division, is the place where nonconforming specialised architectures — initially and still primarily aimed at providing applications solutions to small and medium-size businesses — are located. Originating with the former System/3 processors, these became the System/32 and 34 during the late 1970s. The current System/36

Continued on page 81

Edelman wants all of Datapoint

Arbitrageur leads $60M leveraged buy-out offer for LAN, mini firm he chairs

BY CLINTON WILDER
CW STAFF

SAN ANTONIO — For the second time in less than three years, Datapoint Corp. Chairman Asher B. Edelman has offered to take the sluggish minicomputer and local-area network company private in a leveraged buy-out.

A management and investors' group led by Edelman announced last week that it has offered $6 per share, or a total of about $60 million, for Datapoint's outstanding shares.

Edelman had offered an identical $6 per share in his first leveraged buy-out attempt in 1985; however, a greater number of outstanding shares made that offer total an estimated $100 million [CW, Sept. 9, 1985].

Canceled offer

Edelman withdrew his 1985 offer several months later [CW, May 12, 1986], citing Datapoint's expected return to profitability. Although the firm has reported profitable quarters since then, upheavals at the company have not stopped.

Former Datapoint President and Chief Executive Officer Edward P. Gistaro resigned suddenly in early 1987, and the company reported a loss of $57.8 million on revenue of $312 million in the fiscal year ended Aug. 1, 1987.

The group currently seeking to take control of Datapoint through the buy-out includes Edelman, Datapoint President and CEO Robert J. Potter and two investment firms: Citicorp Capital Investors Ltd. and KBA Partners L.P.

Edelman personally owns about 10% of Datapoint's 10 million shares.

Profitable pattern

If the Datapoint buy-out is successful, Edelman could follow the pattern of his first computer industry takeover, that of Management Assistance, Inc. in 1985. He proceeded to sell units of Management Assistance for tidy profits.

Both units are now prospering under new owners — the Sorbus independent computer maintenance business under Bell Atlantic Corp. and the MAI Basic Four, Inc. turnkey business systems vendor as a publicly held firm chaired by New York investor Bennett LeBow.

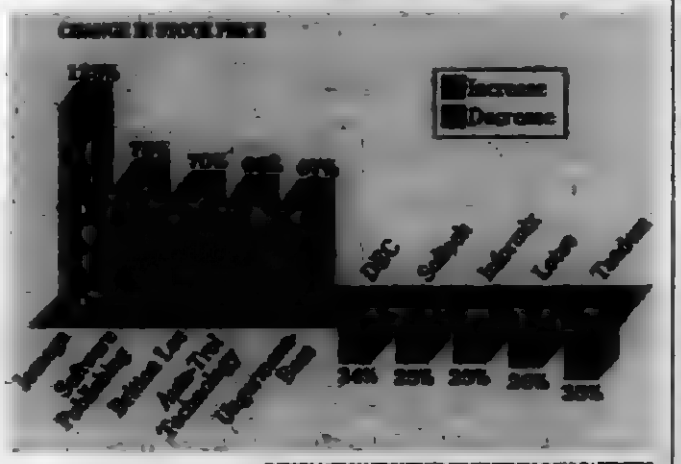
Edelman was widely expected to follow that pattern after his successful hostile takeover of Datapoint in 1985. Although he did spin off Datapoint's service business as a separate company, Intelogic Trace, Inc., he has retained the chairmanship of and significant equity positions in both firms.

Edelman could not be reached for comment last week.

Data View

Blue chips tumble

Top five and bottom five technology stock performers, January through March 1988



INFORMATION PROVIDED BY TECHNOLOGIC PARTNERS
CW CHART

Mini profits seen for mini firms

BY JAMES DALY
CW STAFF

Financial analysts are painting a first-quarter earnings forecast that resembles a huge Golden Gate Bridge stretching across the computer industry.

As most major vendors report their financial results in the next two weeks, analysts predict the industry will be staunchly supported by on-target results in the personal computer and mainframe sectors but will sag badly in the center, where mid-size computer sales reside.

Indicators of a flattening in the minicomputer sector have been in the wind for about a month. In mid-March, heavy hitters like Digital Equipment Corp. and Wang Laboratories, Inc. scaled back their first-quarter earnings expectations, while rumors widely circulated that Prime Computer, Inc. was in the same boat.

Analysts said the falloff stems

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Inside

- Ungermann-Bass stock sale buoys DCA quarter. Page 80.
- Intecom President John Thibault resigns. Page 80.
- AT&T to use environmentally safe cleaning agent. Page 83.

The British are coming — checkbooks open

BY NELL MARGOLIS
CW STAFF

Where is Paul Revere when you need him? Or, for that matter, Paul McCartney?

With or without a Paul to spread the news, it is "British invasion" time again. UK vendors continue to gobble up companies in the software and services sector — many of them U.S. firms — in a trend that is establishing Europe in general, and the UK in particular, as fertile ground for the software and services industry.

The recent merger of British services giant CAP Group PLC, itself a three-time buyer in 1987, with Sema-Metra SA, one of France's largest software and services entities, has created a $450 million, 6,500-employee hybrid called Semacap. The Semacap deal, currently awaiting shareholder approval but widely expected to close, is only the most recent in a series of mergers and acquisitions that are shifting ownership in the software and services industry into European, and largely British, hands.

Growth swells

According to Fort Lee, N.J.-based deal-maker and acquisitions research firm Broadview Associates, the combined total of UK and U.S. mergers and acquisitions swelled from 356 transactions in 1986 to 438 in 1987. However, growth in the UK mergers and acquisitions market has continued to outpace the combined markets, surging 55%, from 51 transactions in 1986 to last year's record number of 79.

In addition, Broadview partner Charles Federman said, non-U.S. firms are also acquiring U.S. software and services firms more frequently, with 25 buys in 1987, up from 19 in 1986 and only six in 1985.

"We're seeing three trends here," Federman said. "First, there's the globalization of this sector. Second, European companies are positioning themselves for 1992, when the Common Market trade barriers are due to fall."

Finally, Federman said, the UK — always a strong professional services market, partly because of a relative scarcity of British packaged software, is becoming a more aggressive shopper. UK buys, according to Broadview, accounted for four of the top 10 foreign acquisitions of U.S. software and services companies last year, for a total of $126.2 million.

"There's a message for U.S. companies in all of this: Get in on the global market. Make deals in Europe," Federman said.

The message is being received. "Over the last two years, our revenues from European operations have almost doubled," said a spokesman for El Segundo, Calif.-based Computer Sciences Corp., a $1 billion player in the computer services industry. "During the 1987 to 1991 period, we have more than $200 million budgeted for acquisitions, and European professional services companies are one of the key areas we're looking at."

INDUSTRY WEEK IN BRIEF

Key executive departures made news at several computer and communications firms recently. Interactive Systems, Inc. in Allen, Texas, named [illegible] branch engineering subsidiary of Wang Laboratories, Inc., as general vice president. Previously, [illegible] Interactive CEO Al Spitzer resigned last week to become senior vice president of product operations at Motorola, Inc. communications unit Codex Corp. in Canton, Mass.

Raymond Collins, a Wang senior vice president, was named Interactive's acting president until a replacement is found.

Former IBM marketing exec H. K. "Buck" Rogers has resigned his post as vice president of Sigma Technology, Inc. and president of Sigma's Sigma Cable Communications Corp. unit to join Cable Communications Systems, Inc. in Stamford, Conn. as president and chief operating officer. Sigma will be left with [illegible] Sigma Computer Corp. and Sigma Corp.

Russell B. Fleischer, a general partner at New York venture capital firm J. H. Whitney & Co., has been named acting president and CEO of Massachusetts Computer Corp., replacing resigned CEO Angelo Buonomo. Buonomo's three-year-old firm, which specializes in [illegible] publishing and services, Boston-based, also resigned.

Amdahl Corp. has named [illegible] as its Systems [illegible] Previously, Bakes was [illegible] Amdahl's [illegible] Bakes will be responsible for [illegible] Amdahl's customer [illegible] Amdahl's [illegible] Bakes will be based in Amdahl's [illegible] Sunnyvale, Calif.

Ronald Sommer, former president of Siemens Corp., has been named president of Siemens Rolm Communications Inc., which is a joint venture between Siemens Corp. and Rolm Corp. Sommer will be based in Rolm's Santa Clara, Calif. headquarters. Rolm Systems, Inc., which is a joint venture between Siemens Corp. and Rolm Corp.,

Zachmann

FROM PAGE 79

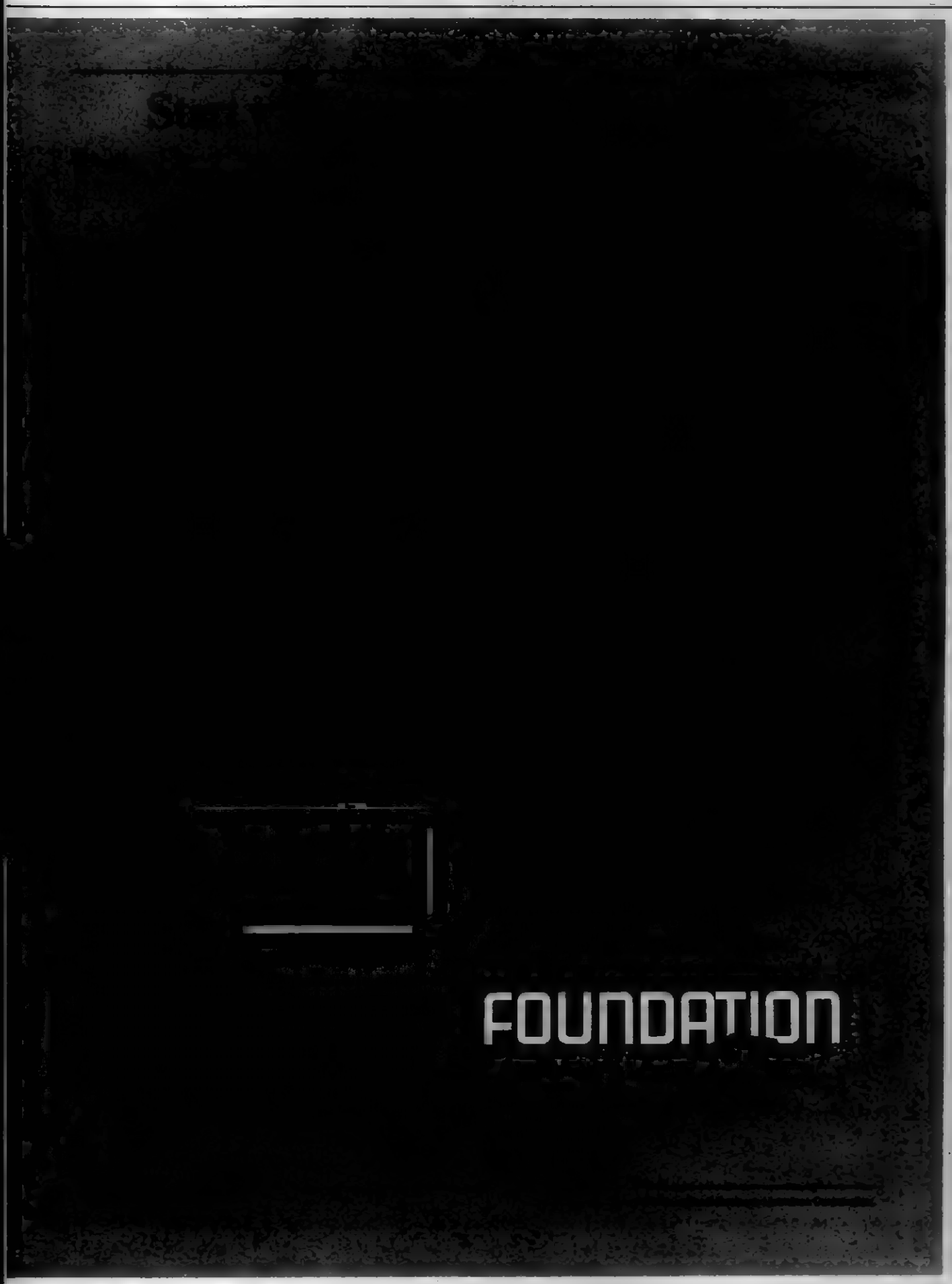
and 38 are their current representatives, soon to be replaced by the follow-on code-named Silverlake.

Finally, the Personal Systems unit, like the old Office Products Division, includes typewriters and microprocessor-based workstations. Formerly encompassing just IBM Displaywriters, the unit now includes IBM Personal System/2s and RT Personal Computers.

The remaining product groups that make up IBM United States, Communication Systems and Technology Products, are more in the business of providing background technology rather than specific products.

THE PROBLEM, however, was that customers just weren't buying what IBM's Information Services said users presumably wanted.

The latter supplies IBM's semiconductors, and the former, which is headed by newly promoted IBM Vice-President Ellen Hancock, develops IBM's networking infrastructure.



By far, the bulk of IBM's product business resides in the three product groups that so closely parallel the old divisions. Therein lie some important clues as to what effect IBM's reorganization is likely to have on its product strategy in the next few years.

IBM's explanation implies that there will be no change in product strategy as a result of the reorganization. The company's stated purpose is to help IBM be more responsive to the market and get products to market faster. IBM's basic problem is not so much the speed with which products get to market as the question of which products are brought to market and who decides among the possible candidates.

Prior to the reorganization, the former Information Services Group, now the Marketing and Services Group headed by Ed Lucente, was the primary gatekeeper. This marketing and sales organization had great influence on future product plans. The problem, however, was that customers weren't buying what Information Services said users presumably wanted.

Garden party

With the new structure, IBM has adopted what amounts to a "let 100 flowers bloom" strategy: Customers will far more likely be able to truly decide what the company should sell if IBM takes into account what users buy and don't buy. In other words, IBM's new organization means that product introductions are likely to be more numerous, more diverse and more likely to compete with one another than in the recent past.

Rather than let planners in the Information Services Group "rationalize" the product line, IBM will now adopt a more liberal "throw it up against the wall and see if it sticks" approach to product introductions. Proponents of products within IBM are more likely to get their ideas to market. At the same time, IBM will also be much more likely to kill off unsuccessful products.

A potential casualty of all this will be IBM's recent efforts to approximate DEC's "one company, one architecture" strategy. While IBM will certainly continue to tout the integration of solutions like Systems Application Architecture, the reality is likely to be more diversity and more internal competition among IBM products.

The superficial result will be an even more chaotic situation regarding IBM's overall strategy. The deeper and more promising prospect, however, is a more vigorous IBM that really does start building what users want — instead of what IBM planners think they want.

Zachmann is vice-president of research at International Data Corp.

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AT&T opts for natural cleanser

BY J. A. SAVAGE
CW STAFF

NORTH ANDOVER, Mass. — In its printed-circuit board manufacturing process, AT&T is making one small step toward preserving the earth's ozone layer.

This year, three of the company's circuit board manufacturing plants are set to replace 20% to 30% of their annual consumption of the ozone-depleting chemical CFC-113, or chloroflourocarbon-113, with an organic substitute called Bioact EC-7. AT&T plants in Illinois, Massachusetts and Nebraska use CFCs to clean printed-circuit boards for computers and telecommunications equipment.

AT&T plans to increase the use of Bioact EC-7 in the future, according to a spokeswoman. "Of course, the environmental reason is strong, but there is also an economic side. There will be less CFCs to be had in the future. And although the replacement cost is about the same, you can reuse Bioact. You cannot reuse CFCs," she said.

The substitute was jointly developed by AT&T and Petroferm, Inc. in Fernandina Beach, Fla. It is based on chemicals derived from citrus products and coniferous trees.

CFCs are used as a solvent in cleaning semiconductors and circuit boards. According to a 1984 report by Menlo Park, Calif.-based SRI International, 37% of all CFCs are used in the electronics industry. CFC-113 is nontoxic to humans in the workplace and has been historically vented openly.

Last month, the National Aeronautics and Space Administration reported the ozone layer over the U.S. had declined an average of 2.3% annually since 1969 and blamed the decrease on CFCs. The decline was far higher than expected, increasing humans' risk of developing skin cancer from exposure to ultraviolet rays, which are screened by the ozone.

Finding alternatives to CFCs will be critical to the computer and electronics industries in the next few years as scientists predict destruction of the ozone layer to continue. Late last month, Du Pont Co. said it would phase out manufacturing of its CFCs, which are marketed under the trade name Freon. Du Pont currently makes one-fourth of the world's CFCs.

Other major users of CFCs in computer manufacturing may not be as ambitious as AT&T but are also exploring alternatives. John Harris, IBM's director of product and process engineering, said he expects to see substantial improvements in his company's CFC consumption in the next two years. Instead of substituting chemicals, IBM's near-term plans are to improve enclosures to keep CFCs from being vented. He said IBM uses about 16 million pounds of CFCs per year — more than five times AT&T's use.

Mini profits

CONTINUED FROM PAGE 79

from pressure created by heightened sales of networked PCs and workstations, which continue to elbow in on the low end of the mini market [CW, March 21].

"Downsizing has become a fact of the industry," said David Wu of S. G. Warburg & Co. "Workstations are picking up the slack in the technical area, while networked PCs are becoming a bigger fact of life in the commercial sector."

Although conservative spending early in the year often makes this period the toughest for vendors, there are indications that the minicomputer squeeze play may be somewhat more than seasonal. A recent study by The Sierra Group, a Tempe, Ariz.-based research firm, indicates that the minicomputer's work is increasingly being usurped by powerful network servers. Another study by The Yankee Group in Boston outlines a surge of interest in mainframes. Both reports showed that users' mainframe and PC purchasing plans remain strong.

"The only reason that mainframes weren't affected this quarter is that they were hit earlier," S. G. Warburg's Wu said. "Microcomputers are now doing to the minicomputers what the minicomputer did to the mainframe."

"No one is going like gangbusters on the mainframe front, but we'll see IBM with a slight uptick in orders and earnings, NCR and Amdahl with a super earnings quarter and Cray with strong orders," said Peter Labe, vice-president of research at Drexel Burnham Lambert, Inc.

Shortfalls on first-quarter expectations at DEC and Wang may have also been the by-product of flourishing fourth quarters last year. "The revenue shortfalls were relative to expectations; people got a little too enthusiastic," said Michael Geran, a senior vice-president of research at The Nikko Securities Co.

Some analysts said economic uncertainty in the wake of last October's stock market crash has affected capital spending for technology. "People are waiting to see what is going on with the economy before committing to major projects," said George Elling, vice-president of research at Merrill Lynch & Co.

But others cautioned against using the economy as a safety net for poor performance. "Yes, people are being careful with their money, but it's not the economy, because then PC and mainframe sales would have been affected, and they haven't been," Wu said.

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COMPUTER CAREERS

Health care needs specialists

Ailing industry seeks combination of clinical insight and systems skills

BY DAVID A. LUDLUM
CW STAFF

Current prospects for a career in the medical world seem less than healthy for systems professionals who don't possess a comprehension of both Cobol and cardiac arrest.

After the rapid expansion of recent years, the health care industry is currently mired in slow growth; an abundance of competitors now face the prospect of a shakeout.

"Hospitals are closing or consolidating. It's not a good time to write 'there is a boom,'" says a manager at one leading vendor of health care information systems. But, the increased competition is creating some opportunities for the most qualified prospects — those who combine systems skills with a knowledge of the clinical environment.

Opportunity knocks

These opportunities stem from efforts by health care providers to cut costs and provide better service, which has led them to integrate formerly isolated systems and introduce new ones.

"Health care has been lagging in applying computers," says Fred Firman, senior vice-president of information systems at Humana, Inc. in Louisville, Ky., which operates 85 hospitals across the country. "But with the competitiveness that has emerged, every health care provider is looking for a better way to provide service, [and that] depends on computers."

The emphasis is on implementation of packaged software or turnkey systems: customizing programs, making sure data is accurate and systems are easy to use and training end users. These tasks call for analysts and project managers who understand nursing and medical technology.

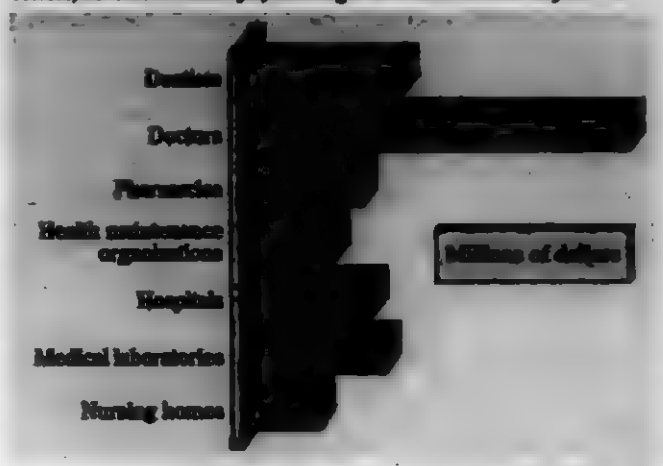
"It's easier to find the technical folks, harder to find qualified, experienced systems analysts and project managers who really know the milieu," says Edward Heller, chief of computer operations at Massachusetts General Hospital in Boston.

The trend is spreading to the vendors of health care systems, according to Scott Holmes, a spokesman for Shared Medical Systems Corp. in Malvern, Pa. "Hospital MIS departments all have [former] nurses as analysts, and we're beginning to see that at vendors," Holmes says. "I think the classic Cobol and MUMPS programmer is in trouble."

The fragmentation of the health care systems field provides a solid source of employment for technically elite software engineers, according to John Slipola, chief of the Northern California region of data processing recruiting for Robert Half International, Inc.

Health care potential

Projected sales of automated systems to first-time users in health care sectors, based on a survey of 250 organizations earlier this year



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CW CHART

In the medical systems divisions of General Electric Co. and Hewlett-Packard Co., there is a demand for software engineers to develop high-tech diagnostic systems for functions such as axial tomography and nuclear resonance imaging, Slipola says.

Unlike health care MIS, this field appears to be more and more technically oriented, calling for a command of both Unix and C. "It becomes more difficult for someone with a broad, generalized education," Slipola says. Salaries for the positions are competitive within the systems engineering community.

What about the salary for developing and deploying health care information systems? Hospital MIS departments traditionally have lagged behind competing employers, including developers of health care information systems, but seem to have closed that gap.

"We're seeing [that] hospitals are able to compete salary-wise, so they hire people out of the industry," Shared Medical's Holmes says.

"We view our pay scales as satisfactory, probably no different from many other industries," adds Massachusetts General's Heller.

Two sides to every story

There are differences between the two sides of the health care information systems field. Vendors can offer career paths unavailable at hospitals, such as a move into marketing. Also, they generally provide more generous remuneration to senior managers, Heller says. On the other hand, hospital jobs offer the satisfaction of working to help the sick.

The future is likely to bring closer cooperation between the vendors and health care providers as they set their sights on increasingly sophisticated systems, Heller says. The needs will include long-term computerized storage and management of medical records and more hands-on use of systems by physicians, including decision-support applications.

Such projects will call for a grasp of obscure technologies, but hiring will still be oriented toward practical implementation at Massachusetts General, Heller says. There is no great demand for the more esoteric skills now, he says, but "if somebody walked in here with a clinically practical point of view, I'd probably hire him today."

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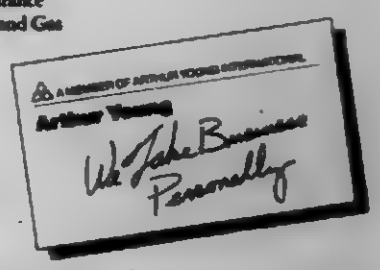

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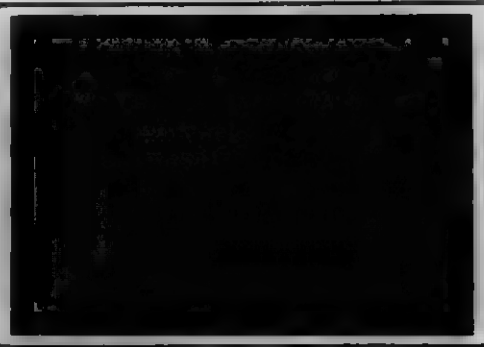

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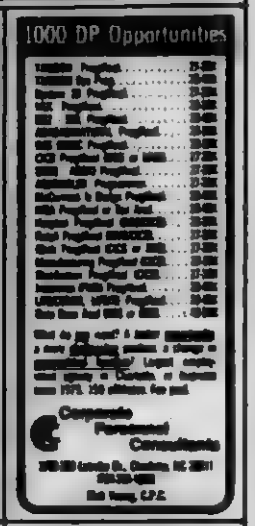

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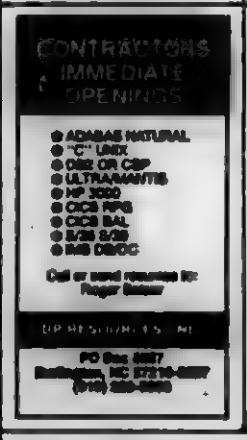

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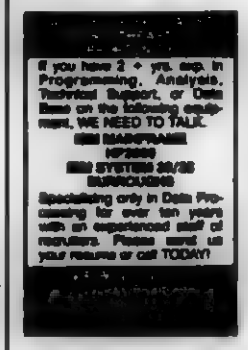

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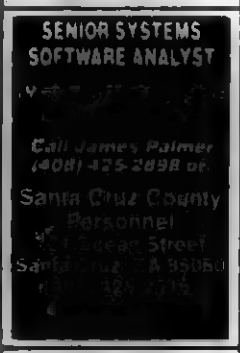

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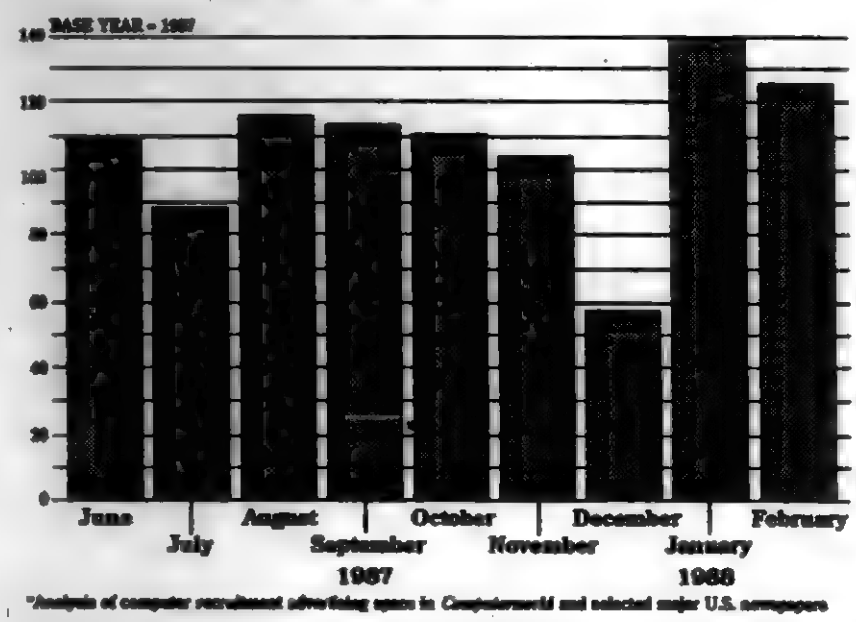
CAREER INDEX

Computer recruitment advertising index*



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Roger Fraumann is Staff Director for Lachman Associates, Inc. (LAI) of Westmont, Illinois. It is one of the largest privately held computer systems software consulting and development firms in the United States. And Roger is pleased to report that plans call for 50 percent annual growth for the next five years.

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COMPUTERWORLD

An IDG Communications Publication

MARKETPLACE

IBM trying to win PS/2 race

Lack of software, 'look and feel' lawsuit slow new machines' acceptance

BY CAMERON HALL
BOSTON COMPUTER EXCHANGE CORP.

It is a year since the introduction of IBM's sleek Personal System/2 computer. It is a year in which 1.5 million machines were sold, and the market still awaits the software that will make the promised wonders of this machine come true.

The recent announcement of Apple Computer, Inc.'s "look and feel" lawsuit against Microsoft Corp.'s Presentation Manager — the cornerstone of OS/2 elegance and user-friendliness — has made this promise look farther away. Developers got a curveball, delaying the introduction of OS/2-specific software into the computer market.

What is the essence of the look and feel lawsuit? An industry insider, when asked for his comments, mentioned a meeting he'd recently had with Dan Bricklin, co-originator of Lotus Development Corp.'s Visicalc, who first felt the look and feel challenge. The insider walked up to Bricklin, gave him a hard stare and murmured, "Looks like Dan Bricklin." He gave Bricklin a poke and mused, "Feels like Dan Bricklin." Then he wandered away muttering, "Wonder if it really is Dan Bricklin?"

Just as the enthusiastic acceptance of the original IBM Personal Computer hinged on the availability of applications software, so too does the PS/2. The 1.5 million early adopters (estimated to be two million by mid-year) have a faster, slicker machine with better resolution, but this is still an incremental change from the IBM PC-DOS machines, not the quantum leap into the usability that should be seen under OS/2 applications. So far, the only real winner is IBM, which is regaining some market share it lost to the clones. This may be short lived if the rumor of a Tandy Corp. Micro Channel machine becomes fact in the near future.

> THE INSIDER walked up to Bricklin, gave him a hard stare and murmured, "Looks like Dan Bricklin." He gave Bricklin a poke and mused, "Feels like Dan Bricklin."

In the secondary market, Easter week was active with steady trading as buyers desiring a wide variety of machines flooded the market. No April Fool's surprises were in store for market participants as most prices remained stable under good market conditions.

Ups and downs

The IBM market was up, the Compaq Computer Corp. market was virtually unchanged, and the Apple Computer, Inc. market was slightly down.

The old Personal Computer models that IBM phased out were still in ready supply. Now the only place to purchase these popular machines is the secondary market. The latest — and last — PC XT and AT models had prices rising in a demand-oriented market.

The PC XT Model 089 was up $50 to $1,675, and the PC AT Model 339 was up $100 to close at $3,350. The PS/2 Model 50, still under light supply conditions, also closed up $100 at $2,550. All other models traded at last week's prices.

The Apple market continued down this week, with used Macintosh prices on early models still sliding. The Macintosh 512 was down $75, the Macintosh 512E was down $75 and the Mac Plus was down $25. Macintosh SE and Macintosh II models remained at the previous week's closing prices.

In the Compaq domain, the Deskpro 286 models were the most popular all week, with the Portable II up $25 to $2,200 and the Deskpro 286 down $50 to $2,425. Other prices remained unchanged.

The Boston Computer Exchange can be reached at 800-BOCOEXX or 617-542-4414 in Massachusetts.

The BoCoEx Index
Closing prices report for the week ending April 1, 1988

	Closing price	Recent high	Recent low
IBM PC Model 076	$800	$900	$750
XT Model 086	$1,250	$1,350	$1,175
XT Model 089	$1,675	$1,700	$1,535
AT Model 099	$2,400	$2,450	$1,950
AT Model 239	$2,750	$2,750	$2,500
AT Model 339	$3,350	$3,600	$3,200
PS/2 Model 50	$2,550	$2,655	$2,450
Compaq Portable I	$825	$825	$800
Portable II	$2,200	$2,225	$2,000
Portable III	$2,625	$2,725	$2,475
Plus	$1,300	$1,275	$900
Deskpro Model 2	$1,800	$1,800	$1,450
Deskpro 286	$2,425	$2,475	$2,050
Deskpro 386	$4,075	$4,000	$3,600
Apple Macintosh 512	$650	$800	$650
512E	$850	$1,075	$800
Plus	$1,125	$1,250	$1,100
SE	$1,850	$2,200	$1,800
SE 20 MHz	$2,300	$2,350	$2,225
II	$4,050	$4,200	$3,800
AT&T 3B2	$4,200	$4,500	$3,500
Leading Edge Model D	$825	$825	$450
Apple LaserwriterPlus	$3,500	$3,500	$3,100
Hewlett-Packard Laserjet	$850	$875	$750

INFORMATION PROVIDED BY THE BOSTON COMPUTER EXCHANGE CORP.

Purchasers of used Rolm PBXs at a crossroads

BY JONATHAN L. ROGERS
IDC FINANCIAL SERVICES CORP.

Dealers in the secondary private branch exchange (PBX) market have not yet reported seeing an influx of Rolm Corp. CBX II systems being displaced into the used market by the October introduction of the Rolm 9751 CBX. Rolm is a subsidiary of IBM.

However, IDC Financial Services Corp. current fair market calls revealed significant drops in these PBXs' values between October 1987 and last February. The VSCBX dropped 33%, the CBX II 8000 dropped 23% and the CBX II 9000 dropped 17% in retail value. Market values should stabilize somewhat if IBM formally announces a secondary market support program.

As of February, CBX II 9000s with Rolmbus 74 were trading at 52% of current list price. Dealers have reported seeing mostly CBX II 9000 systems equipped for voice-only transmission. The CBX II 9000 systems do not compete against the 9751 as much as a voice/data CBX II 9000 does on the used market.

Active switch

The CBX II 8000 is the most actively traded switch in the CBX II family. It was introduced four years ago and falls in the popular and highly competitive size range of 100 to 600 lines. In February, the 8000 was trading at 46% of current list price.

In the low-end market, there is much stronger demand for the VSCBX with the 8000 processor than with the older 7000 processor. In February, the former was trading at 40% of current list price; the latter was trading at 18%. The VSCBX 8000 offers more line capacity and data capability and is given more support by IBM and Rolm than the 10-year-old VSCBX 7000.

Following in the wake of the 9751 announcement, CBX II end users have been appraising the need to swap for the extra flexibility and functionality the 9751 offers. End users are also compelled to make a judgment call as to how long they believe IBM will render quality support for the CBX II family and whether this period covers the length of time they will require this support. This is an important point, because IBM is going to encourage the CBX II installed base to migrate to the 9751.

Supply of the CBX II product line in the secondary market will be determined by how CBX II end users choose between the three options now available.

The first option is IBM's 20% discount off the 9751 list price to CBX II end users who installed a CBX II after Jan. 1, 1986. This offer should send many CBX IIs into the secondary market, because the discount is substantial and original phone sets and other equipment can be retained. Banks, brokerage houses and other businesses that require the latest technology should jump at the discount, which will last until year-end 1989.

The second option regards a segment of end users requiring only basic switching with an emphasis on keeping expenditures for new phone equipment low by maximizing the existing system. These end users are likely to retain their CBX IIs and use the secondary market to obtain low cost parts and upgrades.

The third option applies to CBX II users who have experienced problems with the switch or support of the switch by IBM and Rolm. These users will be tempted to change vendors. Northern Telecom, Inc. is hoping to be the PBX pied piper by luring the CBX II uses away from IBM. Since Feb. 1, Northern Telecom has been offering a $40-per-port rebate to CBX II users who switch to its Meridian SL-1. To make this rebate financially attractive, end users will need to sell the line cards, cabinets, phone sets and other peripherals in the secondary market.

For more information, contact IDC Financial Services Corp.'s Terri LeBlanc at 617-872-8200.

Rolm CBX II PBXs
Current retail fair market value

	Date released	Line size capacity	List price per line	Percent of list price
VSCBX 7000	1979	144	$650	18%
VSCBX 8000	1Q/1984	384	$570	46%
CBX II 8000	1Q/1984	600	$640	46%
CBX II 9000 with Rolmbus 74	1Q/1985	10,000	$615	52%

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2. **PRODUCTIVITY IN SALES AND SALES MANAGEMENT**
By Mike Bosworth, President of Bosworth Selling Systems on Tuesday, Wednesday and Thursday, May 24, 25, and 26.

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3. **THE PRACTICE OF PRODUCTIVITY: Making it work in the real world.**
By Clair Vough, author of *Productivity*, Vice President of IBM from 1960 to 1975. Thursday, May 26.

You can learn methods Clair Vough developed at IBM. Since 1975 he has applied them in small businesses, also returning them large profits. Learn how you can use pay, promotions, training, and the assignment of responsibility to get the maximum productivity and the highest quality.

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By Thomas F. Gilbert, author of *Human Competence*. Wednesday, Thursday, and Friday; June 1, 2, and 3.

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Presented in conjunction with COMPUTERWORLD

Computers come to conference centers

BY MICHAEL BALL
SPECIAL TO CW

Add operators of conference centers to the businesses that are exploiting the potential of computers.

About two-thirds of the 120 conference centers in the U.S. have been built in the last five years, and they generally have the capability to conduct microcomputer training for small groups, says Paul Gletow, director of Chase Manhattan Bank NA's Development Center.

One center with a particular emphasis on computers is the Center for Financial Studies in Fairfield, Conn., which is set up to accommodate groups of up to 35 users, says Jim Shumway, general manager of the center.

Students tend to be middle and upper managers — those at a level high enough that companies will foot the bill to provide them with off-site training lasting from one day to two weeks.

Companies often use the facility to prepare managers for the installation of new hardware or software or to conduct business simulation exercises.

A year ago, the center retrofitted a conference facility it operated on the campus of Fairfield University in Fairfield, Conn. Its parent company recently opened a microcomputer facility at Babson College in Wellesley, Mass.

Classrooms in Fairfield are equipped with 16 IBM Personal System/2 Model 50s with 20M-byte hard drives along with printers, scanners and a monochrome projection system. There are 10 IBM Personal Computer AT clones on carts that can be wheeled to the rooms where trainees sleep.

Such facilities meet a need for Roger Raber, director of education for the National Council of Savings Institutions in Washington, D.C. His organization sponsors about 100 courses for more than 600 institutions.

Raber says the council now needs computers in its classrooms, preferably ones that trainees can wheel back to their rooms.

That's particularly true for a graduate-level program, the council's National School of Finance and Management, which meets for two-week sessions during consecutive summers.

A highlight of that program is a simulation in which students compete as directors of rival banks. "It's almost like a big computer game, but it's serious," Shumway says. "The computer tells them how they're doing and keeps changing the situation. They must calculate and react quickly."

Using the Fairfield center is more expensive than housing students for such programs in a college dormitory, which the council did in the past, but less costly than putting them up at a resort, Raber says.

The center is preferable to standard hotels, which specialize in lodging and dining rather than training, Raber claims. "Here, we can run from 7 a.m. to midnight in an atmosphere that's conducive to [training]."

Ball is a free-lance writer based in Boston.

COMPUTERWORLD

Training Sections

Turn to the Training section of COMPUTERWORLD's issues for an interesting editorial feature addressing these and other questions.

4/25 Marketing advanced end user training What are the pros and cons of these approaches?

5/9 Mainframe vs. micro computer-based training. Ware the pros and cons of these approaches?

5/23 The cost of setting up an in-house training center. What do you need and how do you justify paying for it?

6/6 The advantages and disadvantages of teletraining. How costly and useful is it to broadcast instructor-lead sessions to remote locations?

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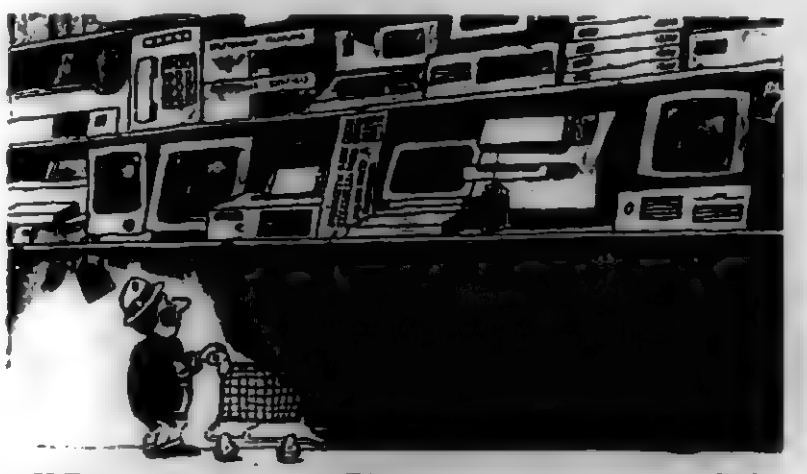

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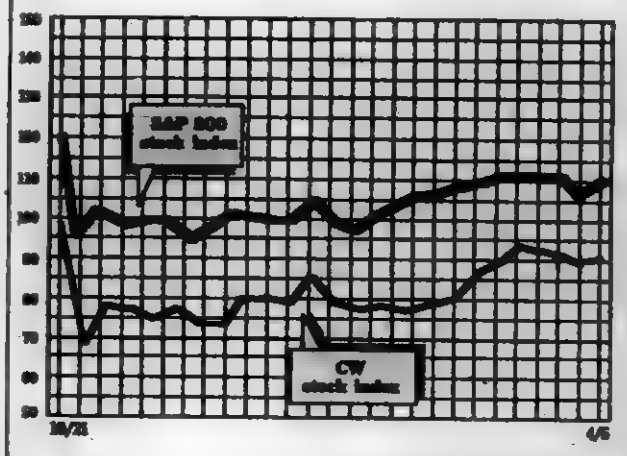

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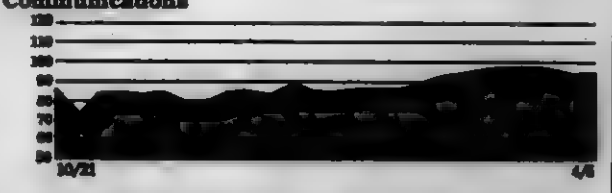

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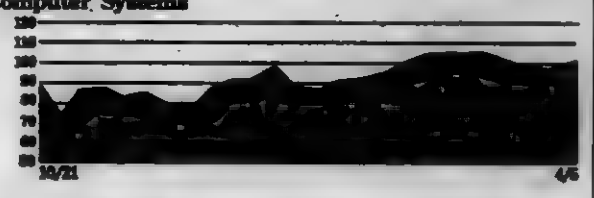

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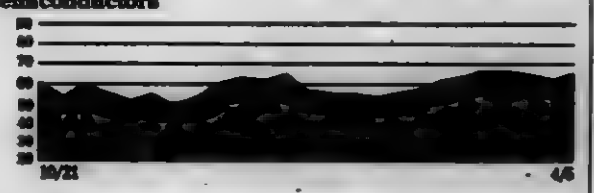

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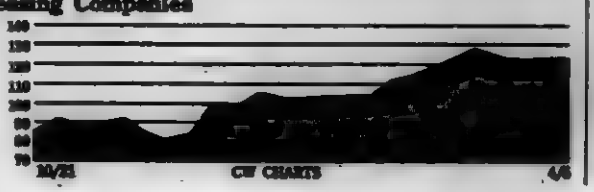

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EXCH		PRICE 52-WEEK RANGE (1)		CLOSE APRIL 6 1988	WEEK NET CHNGE	WEEK PCT CHNGE
	Communications and Network Services					
N	AMERICAN INFO TECHS CORP	100	78	88.75	1.8	2.0
O	ANDREW CORP	13	11	14.25	-0.1	-0.9
O	ARTEL COMM CORP	3	2	1.88	-0.1	-4.3
N	AT&T	36	28	28.13	1.8	6.1
O	AVANT GARDE COMP INC	4	2	1.63	-0.2	-10.4
O	AVANTEK INC	17	6	6.88	0.0	0.0
N	AYDIN CORP	36	16	34.38	2.1	9.6
N	BELL ATLANTIC CORP	80	61	68.50	3.5	5.0
N	BELLSOUTH CORP	44	39	39.75	0.1	0.3
O	COMPRESSION LABS INC	7	2	3.13	-0.1	-3.8
O	COMPUTER NETWORK TECH	6	1	1.34	-0.1	-4.5
O	CONTEL CORP	40	26	34.50	1.5	4.5
O	DATA SWITCH CORP	10	4	8.38	0.1	1.5
O	DIGITAL COMM ASSOC	40	20	32.25	1.3	4.0
O	DYNATECH CORP	38	14	21.75	-0.3	-1.1
O	FIBRONICS INTERNATIONAL INC	5	2	3.88	-0.2	-5.1
O	GANDALF TECHNOLOGIES	10	5	7.00	0.1	1.8
O	GENERAL DATACOMM INDS	14	3	3.38	-0.1	-3.6
N	GTE CORP	45	36	36.75	0.3	0.7
O	INFOTRON SYS CORP	12	8	9.25	0.3	2.8
N	ITT CORP	65	42	44.88	2.5	5.9
N	M A COM INC	16	7	10.75	0.3	2.4
O	MCI COMMUNICATIONS CORP	12	6	11.88	0.8	8.0
O	MICOM SYS INC	17	7	12.88	0.8	6.2
O	NETWORK SYS CORP	15	7	9.25	0.8	8.8
N	NORTHERN TELECOM LTD	24	14	19.25	0.1	0.7
O	NOVELL INC	35	12	22.25	1.8	7.9
N	NYNEX CORP	78	58	65.25	1.5	2.4
N	PACIFIC TELESIS GROUP	34	23	26.88	0.3	0.9
N	PARADYNE CORP	9	4	5.00	-0.1	-2.4
A	PENRIL CORP	6	1	4.00	-0.3	-6.9
N	PLESSEY PLC	40	23	28.00	-0.3	-0.9
N	SCIENTIFIC ATLANTA INC	20	8	14.88	0.3	1.7
N	SOUTHWESTERN BELL CORP	46	32	36.25	0.0	0.0
O	3 COM CORP	26	12	19.38	-0.3	-1.3
N	TIMEPLEX INC	40	17	32.20	0.0	0.0
N	UNGERMANN BASS INC	16	5	12.13	-0.1	-1.0
N	U S WEST INC	60	43	54.38	2.5	5.3
	Computer Systems					
O	ALLIANT COMPUTER SYS	26	6	7.50	0.3	3.4
O	ALPHA MICROSYSTEMS	6	3	5.13	0.6	13.9
O	ALTOS COMPUTER SYS	15	8	9.75	-0.5	-4.9
A	AMDAHL CORP	38	25	34.13	2.0	6.2
O	APOLLO COMPUTER INC	25	9	15.00	1.0	7.1
O	APPLE COMPUTER INC	50	28	41.75	2.3	5.7
O	BOLT BERANEK & NEWMAN	25	12	16.50	0.0	0.0
O	BRITTON LEE INC	6	1	2.00	-0.3	-11.1
N	COMPAQ COMPUTER CORP	79	30	52.75	4.1	8.5
O	COMPUTER AUTOMATION INC	17	5	12.25	0.5	4.3
O	COMPUTER CONSOLES INC	11	2	6.88	0.9	14.6
O	CONCURRENT COMP CORP	24	11	17.75	0.0	0.0
N	CONTROL DATA CORP DEL	38	18	28.63	0.1	0.5
O	CONVERGENT TECH	10	3	3.25	-0.1	-3.7
O	CONVEX COMPUTER CORP	21	6	7.38	0.5	7.3
O	CRAY RESH INC	138	47	82.38	3.3	4.1
N	DAISY SYS CORP	10	5	7.63	0.3	3.4
N	DATA GEN CORP	37	16	22.63	0.3	1.1
N	DATAPOINT CORP	9	3	5.50	0.8	15.8
N	DIGITAL EQUIP CORP	200	102	105.38	2.6	2.6
N	FLOATING POINT SYS INC	14	3	4.50	0.1	2.9
N	GOULD INC	34	9	11.88	-0.3	-2.1
N	HARRIS CORP	43	22	31.13	1.8	6.5
N	HEWLETT PACKARD CO	74	38	64.38	3.4	5.5
N	HONEYWELL INC	91	49	88.50	2.9	4.5
N	IBM	176	102	109.63	4.5	4.3
O	INFORMATION INTL INC	16	9	13.50	0.6	4.9
O	IPL SYS INC	3	1	2.19	0.0	0.0
O	MASS COMPUTER CORP	14	4	4.63	-0.1	-2.6
N	MATSUSHITA ELEC INDL LTD	220	99	220.00	5.3	2.4
O	MEGADATA CORP	6	3	3.38	0.1	3.8
O	MENTOR GRAPHICS CORP	30	14	27.50	2.3	8.9
N	NBI INC	14	4	6.38	0.4	6.3
N	NCR CORP	67	30	58.38	1.4	2.4
N	PRIME COMPUTER INC	31	12	16.13	-0.5	-3.0
O	PYRAMID TECHNOLOGY	12	5	10.75	0.8	7.5
O	STRATUS COMPUTER	41	15	28.75	0.0	0.0
O	SUN MICROSYSTEMS INC	48	14	38.50	1.8	4.7
O	SYMBOLICS INC	6	1	1.31	0.1	5.0
N	TANDEM COMPUTERS INC	37	16	17.38	-0.5	-2.8
N	TANDY CORP	57	28	43.00	3.3	8.2
N	ULTIMATE CORP	37	13	14.25	0.6	4.6
N	UNISYS CORP	48	24	33.88	1.8	5.6
A	WANG LABS INC	19	10	12.13	0.4	3.2
	Software & DP Services					
O	ADVANCED COMP TECH	6	1	1.69	0.1	3.9
N	AGS COMPUTERS INC	30	11	16.50	-0.1	-0.8
O	AMERICAN MGMT SYS INC	25	9	14.50	0.0	0.0
O	AMERICAN SOFTWARE INC	21	6	12.13	-0.1	-1.0
N	ANACOMP INC	11	4	9.13	0.6	7.4
O	ANALYSTS INTL CORP	10	4	7.50	0.0	0.0
O	ASHTON TATE	32	13	28.00	1.0	3.7
O	ASK COMPUTER SYS INC	18	6	13.25	1.0	8.2
O	AUTODESK INC	34	12	26.75	2.5	10.6
N	AUTO DATA PROCESSING	65	35	41.00	-1.0	-2.4
O	BOOLE & BABBAGE INC	12	5	8.00	0.3	3.9
O	COMPUTER ASSOC INTL INC	37	15	28.75	1.9	7.0
O	COMPUTER HORIZONS CORP	15	7	10.00	0.0	0.0
O	COMPUTER SCIENCES CORP	70	42	46.50	-0.8	-1.8
N	COMPUTER TASK GROUP INC	17	9	11.50	0.9	8.2
O	COGNOS INC.	17	4	7.38	0.1	1.7
O	COMSHARE INC	28	12	18.75	0.0	0.0
O	CULLINET SOFTWARE INC	14	4	7.50	-0.1	-1.8
O	DUQUESNE SYS INC	32	16	19.75	-0.8	-3.7
A	DATA ARCHITECTS INC	17	7	13.75	0.0	0.0
R	GENERAL MTRS (CLS E)	51	30	39.88	1.4	3.6
O	HOGAN SYS INC	17	5	4.75	-0.3	-5.0
O	INFORMIX CORP	31	12	19.50	0.3	1.3
O	INTELLICORP INC	11	2	3.25	-0.3	-7.1
O	KEANE INC	10	6	9.00	0.0	0.0
O	LOTUS DEV CORP	40	18	25.13	2.6	11.7
O	MANAGEMENT SCI AMER	18	6	6.63	0.8	12.8
O	MICRO PRO INTL CORP	6	3	3.00	-0.1	-2.1
O	MICROSOFT CORP	79	37	58.13	2.4	6.2
O	MORINO ASSOCIATES INC	24	7	15	0.0	0.0
O	NATIONAL DATA CORP	31	19	28.63	-0.4	-1.3
O	ON LINE SOFTWARE INTL INC	22	9	9.88	-1.1	-10.2
O	ORACLE SYS CORP	19	8	16.50	0.8	4.8
N	PANSOPHIC SYS INC	28	11	17.13	0.6	3.8
O	POLICY MGMT SYS CORP	33	18	23.75	0.9	3.8
O	PROGRAMMING & SYS INC	14	7	12.25	0.0	0.0
O	REYNOLDS & REYNOLDS CO	38	14	21.50	0.3	1.2
O	SEI CORP	18	10	17.00	0.5	3.0
O	SHARED MED SYS CORP	34	18	25.50	0.5	2.0
O	SOFTWARE PUBG CORP	17	5	14.63	0.4	2.8
A	STERLING SOFTWARE INC	12	6	9.00	0.8	9.1
O	SUNGARD DATA SYS INC	21	10	17.50	0.8	4.5
N	SYSTEMATICS INC	32	19	30.75	-0.8	-2.4
O	SYS. SOFT INC.	24	7	15	1.0	7.1
O	VM SOFTWARE INC	49	7	12.13	0.0	0.0
	Semiconductors					
N	ADV MICRO DEVICES INC	28	8	12.00	1.0	9.1
N	ANALOG DEVICES INC	34	8	13.38	0.3	1.9
O	ANALOGIC CORP	13	6	7.00	0.0	0.0
O	INTEL CORP	43	16	31.75	2.9	10.0
O	LSI LOGIC CORP	17	7	9.75	-0.1	-1.3
N	MOTOROLA INC	74	36	46.25	2.3	5.1
N	NATL SEMICONDUCTOR	22	10	12.13	1.5	8.0
N	TEXAS INSTRS INC	80	36	49.50	1.5	3.7
A	WESTERN DIGITAL CORP	28	11	14.50	0.5	3.3
	Peripherals					
O	ALLOY COMP.	13	3	4.00	-0.3	-6.9
O	AM INTL INC	9	3	4.00	0.0	0.0
O	AST RESH INC	21	6	10.38	0.6	6.4
O	AUTO TROL TECH CORP	9	3	5.13	0.1	2.5
O	BIANCTEC INC	16	5	8.38	-0.1	-1.5
O	CIPHER DATA PRODS INC	16	4	9.38	-0.6	-6.3
O	COGNITRONICS CORP	5	2	3.00	-0.6	-17.2
N	COMPUGRAPHIC CORP	26	15	25.63	0.0	0.0
O	DATAPRODUCTS CORP	9	2	9.25	0.0	0.0
A	DATARAM CORP	9	5	7.00	0.0	12.0
N	DECISION INDS CORP	13	4	10.75	0.0	0.0
N	EASTMAN KODAK CO	71	40	62.38	1.5	2.5
O	E M C CORP MASS	29	10	14.75	0.0	0.0
O	EMULEX CORP	8	4	7.88	0.3	3.3
O	EVANS & SUTHERLAND	25	10	19.50	0.3	1.3
O	IDOT CORP	9	3	4.13	-0.8	-15.4
O	INTERLEAF INC	24	11	18.75	1.5	8.7
O	IOMEGA CORP	6	1	3.44	0.1	2.8
O	LEE DATA CORP	6	3	3.63	0.0	0.0
O	MASSTOR SYS CORP	6	1	2.94	0.2	6.8
O	MAXTOR CORP	16	6	14.38	0.6	4.5
O	MICROPOLIS CORP	44	15	25.50	2.5	10.9
O	MINISCRIBE CORP	18	5	10.38	0.1	1.2
N	MINNESOTA MNG & MFG CO	94	45	80.88	1.5	1.9
A	MSI DATA CORP	30	12	25.38	1.5	6.2
O	PERSONAL COMPUTER PRODUCTS INC.	7	4	5.63	-0.1	-1.1
O	PRIAM CORP	5	1	2.13	0.1	12.9
O	PRINTRONIX INC	13	7	9.13	0.4	4.3
O	QMS INC	27	8	10.25	-0.8	-6.7
O	QUANTUM CORP	20	8	11.25	0.5	4.7
O	RAMTEK CORP	6	1	1.63	0.2	12.0
O	RECOGNITION EQUIP INC	22	7	8.63	0.6	8.0
O	REXON INC	14	7	8.75	-0.9	-11.5
O	SCAN TRON CORP	17	7	15.88	0.6	4.1
O	SEAGATE TECHNOLOGY	46	16	21.75	1.4	6.7
N	STORAGE TECH CORP	5	1	2.06	0.0	0.0
O	TANDON CORP	7	1	2.44	0.2	11.4
A	TEC INC	7	3	4.88	0.0	0.0
N	TEKTRONIX INC	41	21	37.50	1.1	4.3
O	TELEVIDEO SYS INC	3	1	1.38	0.1	3.2
N	TELEX CORP	55	20	49.25	0.1	0.2
O	WYSE TECH	40	11	19.13	0.8	4.1
O	XEROX CORP	65	40	54.63	1.5	2.8
O	XIDEX CORP	16	6	6.38	0.0	0.0
	Leasing Companies					
O	CAPITAL ASSOCIATES INTERNATIONAL	11	4	5.38	-0.1	-2.3
N	COMDISCO INC	37	12	21.75	1.0	4.8
N	CONTINENTAL INFO SYS	14	5	7.88	-0.1	-1.5
O	PHOENIX AMERN INC	6	3	3.13	-0.1	-3.2
O	SELECTRON INC	6	3	4.13	0.0	0.0

EXCH: N—NEW YORK; A—AMERICAN; O—NATIONAL; O—OVER-THE-COUNTER; S—SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Money talks

Most tech stocks come back, cash in on dollar's surge

Although Monday's down-trading started the second quarter off on a soggy note, a surge in the U.S. dollar Wednesday sent the Dow Jones industrial average up more than 64 points and helped most major computer companies post modest gains as of Thursday's close.

The market's rise was especially beneficial to leaky Digital Equipment Corp., which sagged to as low as 102 during Tuesday's trading but jumped 2¾ points on Wednesday. Despite the boost, the Maynard, Mass.-based giant still finished the four days of trading down ⅛ of a point at 104⅜.

Gainers during last week's trading included Cray Research, Inc., which jumped 3½ points to 83⅛; Hewlett-Packard Co., up 1⅝ points to 62⅝; Compaq Computer Corp., up 1⅜ points to 52⅛; Computer Associates International, Inc., up 1⅜ points to 29; IBM, which halted its recent downward slide and moved up 1⅜ points to 109¼; Amdahl Corp., up 1¼ points to 34⅜; Control Data Corp., which, despite issuing an annual report that afforded a dismal outlook for the future, climbed 1⅛ points to 27⅛; and Microsoft Corp., up ¾ of a point to 57⅛.

JAMES DALY

IBM repairs VM/SP HPO 5

BY ROSEMARY HAMILTON
CW STAFF

IBM confirmed last week that it will ship a revised release of VM/SP High Performance Option Release 5 to replace the current release, which has problems in what a spokesman called "various areas."

The new release, which the company called a "refreshed version," is scheduled to be announced at the end of this month, according to IBM. The original shipment of VM/SP HPO Release 5 began in October.

"The experiences with HPO 5 have not been pretty ones," said Bruce Mancinelli, vice-president of marketing at VM Systems Group, Inc., which sells utility software for the VM operating system.

The HPO versions of the VM operating system were designed for the larger IBM mainframes and are the highest performing versions for the 370 architecture. The graduated one-time charge ranges from $57,665 to $92,265.

Problem with spool file

Although IBM did not detail the problems of HPO Release 5, users contacted last week said the primary glitch concerns the new spool file system. With HPO Release 5, IBM changed the constraint of 9,900 spool files per system to 9,900 per user, a change that required a significant redesign, users said.

"It wasn't that there were a lot more problems with this release, but it concerned the spooling system. That is a very sensitive area," said Peter Kronenberg, a systems programmer at Information Builders, Inc. in New York.

Kronenberg said his facility installed HPO Release 5 in October and was not able to move to production mode until February. The process typically takes a few weeks.

The spool file system governs the movement of all files throughout the system, including those sent to the printer or passed among users. Each time Kronenberg's group brought the spool file up, another program bug would appear, he said.

"We have been making adjustments and will be coming out with a refreshed version that incorporates all adjustments made," an IBM spokesman said.

Romney White, president of VM/CMS Unlimited, Inc., a VM utility software company in Boston, also said the spool file system has caused users big problems.

"It was a fairly massive rearrangement," White said. "They didn't get it right, and they didn't test it enough."

Delivery date slips on IBM 3990 cache

BY STANLEY GIBSON
CW STAFF

RYE BROOK, N.Y. — Causing relief for plug-compatible manufacturers (PCM) and concern for users, IBM announced last week that the important cache memory function for its 3990 Storage Control Unit will not be shipped on schedule.

The 3990 controller, announced with IBM's 3880 Models J, K and CJ2 disk drives in September 1987, was expected to be shipped in the third quarter of this year. While the hardware will ship in that time frame, microcode necessary for sophisticated cache functions will not be ready until the first half of 1989, IBM said.

"This is going to cause PCMs to break open a few bottles of champagne, and it will cost IBM some revenue in 1988," said Bob Djurdjevic, president of Annex Research in Phoenix. "This delay lengthens the window for PCMs to sell older products."

A spokesman for National Advanced Systems said his firm is going ahead with hardware development for its competing controllers and plans to deal with compatibility when microcode becomes available.

"This will make the PCMs nervous, because if IBM has a problem, then it is likely that they will have one too," said Louise Biggs, a storage analyst at Dataquest, Inc. "End users will have to redo their decision process."

IBM said the 3990 Models 1 and 2, which do not come with enhanced cache functions, will be shipped August 26. A customer may also choose to receive a Model 3 without enhanced cache functions and add those functions in the first half of 1989.

Eastern

FROM PAGE 1

crews as well as some 500 pilots. Experienced baggage handlers are likely to go if Lorenzo gains acceptance of his recent proposal to the International Association of Machinists and Aerospace Workers, which calls for handlers' wages to fall from $15.60 to $8 per hour in the next two years.

The new regime at Eastern also caused the early retirement of many senior computer operators who made key decisions on how the carrier responded to flight delays, breakdowns and other emergencies, according to Peter Zegan, Eastern's former director of systems analysis and design. Zegan, who is now a professor of MIS at Florida International University, left Eastern in 1983 "when it looked like they were going to lay off 53% of my people."

'Flapping in the breeze'

The brain drain at Eastern will continue to plague the carrier's service levels for some time to come, according to David Stockman, associate airline analyst at Paine Webber, Inc. "Texas Air is flapping in the breeze until [Eastern's labor problems] are settled, and it will be hard to bring people back once they have left," he said.

But System One's development staff is exploring computer-based solutions that will improve service while minimizing the need for highly paid human experts. Intelligent scanning and decision support systems now under development are intended to automate much of the decision-making process in areas, such as flight scheduling and baggage handling, in which Lorenzo's cost-cutting measures are taking their toll.

While Lorenzo carried on his campaign to trim Eastern Airlines' operations, he was beefing up the carrier's former computer services division, System One. Now a separate subsidiary supporting all Texas Air carriers, System One's staff has increased from 2,300 at the beginning of 1987 to its current level of 3,500.

The division's systems development work is focused on two main objectives: supporting Texas Air's computerized reservation system, which currently holds approximately 18% of the market; and developing systems to improve Texas Air carriers' performance in the most visible areas of customer dissatisfaction. Those areas include lost baggage and cargo and scheduling delays, said David Hultsman, System One's staff vice-president of technology planning.

Pulling System One out of the Eastern morass and infusing its technical staff with new blood "was a smart way for Texas Air to spend its dollars," Stockman said. "You can't move forward in this industry without a state-of-the-art computer system, because all the other carriers have them."

And yet, Eastern's operational problems do not stem from its existing computer technology, which includes "some very excellent real-time systems that know exactly where every airliner is, when it is due in, what crew members are on board and where they are supposed to go next," he said. The systems provide real-time information to a team of experienced operators, including one person to coordinate flight crews, another to look after passengers and a third to keep track of aircraft resources. The real source of trouble is the increased turnover that has left fewer seasoned operators, according to Zegan.

Don't blame the computer

Baggage delays are also caused primarily by human, rather than machine, error within Eastern, Zegan added. Although the airline has one of the industry's more advanced baggage-tracking systems — it is now used by several other airlines — "the problem is that people have to put the baggage on the right airliner and take it off again," Zegan explained. "We've had cases of a 500-pound item sitting on a Boeing 711 for two weeks."

System One hopes to address both of these trouble spots by using computers to minimize human error, Hultsman said.

For example, a prototype system currently running at Houston's Hobby Airport generates bar codes for each baggage tag, from which a video scanning system can read each item's flight number, ultimate destination and owner name. Computer-controlled ramps then route each bag to the right flight. "All the handlers need to do is prevent the bags from falling off the ramp," Hultsman said.

Not a menial job

Union spokesman James Conley disagreed with Hultsman's implication that baggage handling expertise can be computerized so easily. "Lorenzo has been trying to make the baggage handler sound like a menial job," he said. In fact, handlers "do a lot more than route the baggage to the right airplane"; they need to balance various items to ensure aircraft stability and efficient fuel use while in flight.

Although the video scanning system might eventually do an adequate job, "knowing what we know about implementing any new technology, I would venture to say the flying public will suffer a great deal while they're ironing out the glitches," Conley said. And "knowing Lorenzo, [the new technology] would definitely bring about a reduction in the labor force."

Texas Air also plans to automate much of the passenger intake process through a new ticketing system being tested at Continental's Newark Airport terminal in New Jersey. Passenger information is coded on a magnetic card that is input when the passenger enplanes.

The information culled from the magnetic cards would then be fed back to the massive IBM mainframe complex in Houston — which houses Texas Air's centralized scheduling and reservation systems — and also into Tandem Computers, Inc. machines that are currently being installed by Texas Air.

Directing traffic

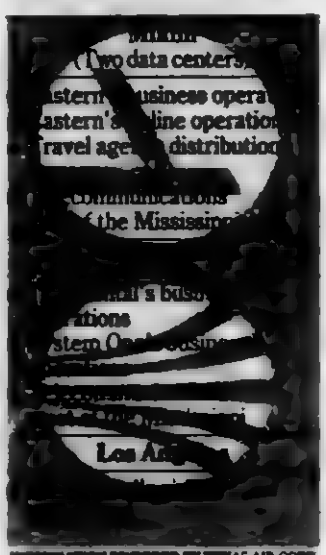
In an effort to address scheduling and other service-related problems, System One is trying to "automate as much of flight operations as possible" through knowledge-based systems that will embody the expertise some employees may lack, Hultsman said. An expert system called Gatekeeper, which is now running on an alpha-test basis on Symbolics, Inc. and Digital Equipment Corp. computers at Houston Intercontinental Airport, is said to make judgment calls on the routing of incoming aircraft to terminal flight gates. If the trial is successful, the system will soon go into operation at other Texas Air terminals, beginning with Miami and Denver.

Late last month, System One began developing a knowledge-based system that allocates backup aircraft to minimize delays when flights are held up "during irregular scheduling periods," Hultsman said. Developers should have a prototype running within three to four months.

Such systems will save the company money, Zegan said, by "reducing the number of people required to make decisions." On the other hand, Texas Air might run into more trouble with Eastern's unions if they get the idea that the new technology is just another of Lorenzo's strategies for getting along with a smaller — or at least lower paid and less skilled — work force.

One for all

System One operates data centers in three locations to automate airlines acquired by Texas Air



INFORMATION PROVIDED BY TEXAS AIR CORP.
CW CHART

IBM creates division around SAA, tools

BY CLINTON WILDER
CW STAFF

PURCHASE, N.Y. — Moving quickly to coordinate and focus its Systems Application Architecture (SAA) efforts, IBM late last week announced the formation of IBM Programming Systems, its first business organization dedicated exclusively to software.

Led by Vice-President Earl F. Wheeler, IBM Programming Systems will be responsible for developing IBM's applications development tools, data base management software — including IMS and DB2 — and programming languages under SAA guidelines. Significantly, the unit provides a focus for SAA efforts independent of IBM's three specific hardware architectures.

Wheeler will report directly to Terry R. Lautenbach, senior vice-president and general manager of IBM United States. That indicates Programming Systems' status as IBM's sixth line of business in the U.S., on par with the firm's three hardware architectures, communications and semiconductors.

"It looks like they are turning SAA into a real business," said Peter Burris, a research consultant at Framingham, Mass.-based International Data Corp.

Leiss report to Wheeler

Reporting to Wheeler will be IBM's IMS, DB2 and SAA code development laboratory in Santa Teresa, Calif., as well as its Cary, N.C., lab, which focuses on applications development tools.

"Clearly, the moves are assurances and confirmations of the Solutionpac idea and SAA," said Robert Tasker, director of computing research at The Yankee Group in Boston.

Customers will see very little or no change in IBM's management of support for existing products as a result of the new unit, according to IBM spokesman Jim Cypher. Operating systems and utility programs will remain within their current hardware architecture operations.

"We want to make sure customer expectations for SAA are met," Cypher said. "Our customers understand the SAA concept now; this [reorganization] gives Lautenbach and the corporation greater assurances that it is managed properly and closely."

At a lower level, IBM announced the Application Solutions line of business, which will be part of the U.S. Marketing & Services Group under group executive Edward E. Lucente.

Headed by Ned C. Lautenbach, Terry's brother, Application Solutions will include the Application Systems Division (ASD) formed last year as well as a new Systems Integration division, support of third-party software developers and the IBM Information Network.

The Yankee Group's Tasker was less enthusiastic about the role of the ASD as a result of last week's changes. "ASD was supposed to be the biggest game in town, running SAA," he said. "I'm not sure IBM knows what they're doing [with ASD]."

Senior writer Rosemary Hamilton contributed to this report.

Microsoft countersues Apple, cries slander

BY STEPHEN JONES
CW STAFF

SAN JOSE, Calif. — Microsoft Corp. fired legal return volleys at Apple Computer, Inc. last week, filing a countersuit to Apple's claim of copyright infringement that charges Apple with slander and an attempt to stifle all Windows-based applications development.

In a 20-page document filed in U.S. District Court here, Microsoft alleges that the lawsuit Apple brought against Microsoft last month was a premeditated act aimed at damaging the developer's future contractual and business relations and designed to choke development of software that competes with Apple products.

Apple's lawsuit against Microsoft charges that Microsoft's Windows 2.03 and Hewlett-Packard Co.'s New Wave violate the look and feel of Apple's Macintosh user interface. Both companies were required to respond to the suit by last week, but HP received a 60-day extension.

Microsoft refuted all of Apple's claims and stated its belief that it can freely market and license the Windows technology.

In a series of counterclaims to Apple's allegations, Microsoft paints its opponent as an unethical foe that launched an "aggressive campaign of seeking, stimulating and influencing press coverage" with its suit to cast the Windows operating environment in a bad light.

Microsoft's suit calls Apple's repudiation of a 1985 licensing agreement between the two companies a "slander" of Microsoft's claim of ownership for Windows 2.03. Microsoft charges that Apple's "false statements" resulted in monetary losses, apparently related to current and future Windows 2.03 sales and software development.

Apple officials were not available for comment.

A passage in Microsoft's suit reflects the belief of many industry watchers that Apple is trying to block the development of the OS/2 Presentation Manager as a graphical user interface for IBM Personal Computers. "Apple has undertaken these actions with the intent of wrongfully inhibiting" the development of Windows-based systems by Microsoft and other companies, the documents stated.

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Fired-up DB2

FROM PAGE 1

nouncement stage as DB2 Fast Path. Fast Path is the name used by IBM for its mainstream IMS data base system after it has been specially tailored for high-transaction throughput.

Natives are restless

There are signs that DB2 customers are growing restless for better transaction processing. The MIS director of a large IBM installation in New York, who asked to remain anonymous, said that as his firm's DB2 production applications have grown, "one of the problems we've had is tuning them extensively to get the performance we need." His staff greeted the March ESA/370 announcement as opening the door to DB2 performance gains.

"There's a sense among some of my compatriots that if it doesn't lead to that, we're wasting our time," he said.

The announcement of ESA/370, to be available in August, was timed to lay the groundwork for the next release of DB2, according to Paul Hessinger, chief technology officer at Computer Task Group, Inc., a Buffalo, N.Y., consulting firm.

In particular, ESA/370's expansion of virtual memory for data to 16 terabytes created the possibility of making huge DB2 buffer pools inside the processor. If major segments of a data base can be moved inside the processor before data is accessed, time-consuming I/O operations can be avoided, Hessinger noted.

Although the current release of DB2 allows users to create large buffer pools, they are static or frozen until a systems programmer reallocates them, Amxco's Deakins said. Under ESA/370, the buffer pools will be able to expand or shrink dynamically according to the needs of the application, he said.

At many large shops, systems such as CICS and IMS demand large amounts of virtual memory, which employs a fraction of real memory. In such situations, data base administrators are uncomfortable freezing up large amounts of virtual memory for DB2 when doing so will create more contention for the system's real memory.

No trespassing

"You can't get to existing physical memory easily because so many partitions have been formed. You find yourself in a neighbor's backyard — and unwelcome," Deakins said.

ESA/370, with its seemingly unlimited amount of virtual memory, can get around "hardened boundaries" and set up "more portable partitions. ESA is a very exciting thing," Deakins added.

In addition, ESA/370's data spaces, or virtual memory reserved for data, allow DB2 to read and manipulate data in larger chunks. Under its predecessors, IBM's MVS/SP or MVS/XA, virtual memory could be occupied by a mix of operating system code and program logic as well as data, so pointers were necessary in order to move from one block of data to another.

This overhead will be eliminated when data can be loaded into ESA/370 data spaces in continuous sets and accessed in multiples of 4K-byte blocks, according to Shaku Atre, president of Atre Computer Assistance, Inc., a consulting firm in Rye, N.Y. IBM is "tidying up its data" by providing it with its own form of virtual memory, Atre said.

IBM hikes PC royalty rates

BY ALAN J. RYAN
CW STAFF

ARMONK, N.Y. — In a move that could adversely affect pricing on future IBM Personal Computer- and Personal System/2-compatible products, IBM last week hiked royalty rates for companies that license current and future IBM patents.

The increased rates apply to more than 32,000 IBM patents, including those of IBM's PS/2 family. Although IBM's announcement mentioned the PS/2 by name, the provisions do not appear to affect the Micro Channel architecture, which is central to IBM's PS/2 strategy.

The Micro Channel is not currently available under licensing because it is protected by copyrights as well as other forms of intellectual property protection, according to Michael Starks of IBM's corporate information department.

Starks would not comment on who currently has patent licensing agreements with IBM, but he said the patents would be available "to everyone — under reasonable terms and conditions."

Don't knock

Analyst Peter Labe of Drexel Burnham Lambert, Inc. said the new rates will not change IBM's patent licensing policies. "They're not going to just license anybody who knocks on the door," he said. "People seem to think that now the flood gates are open, and IBM will license PS/2 patents to anybody and everybody, but that's not true."

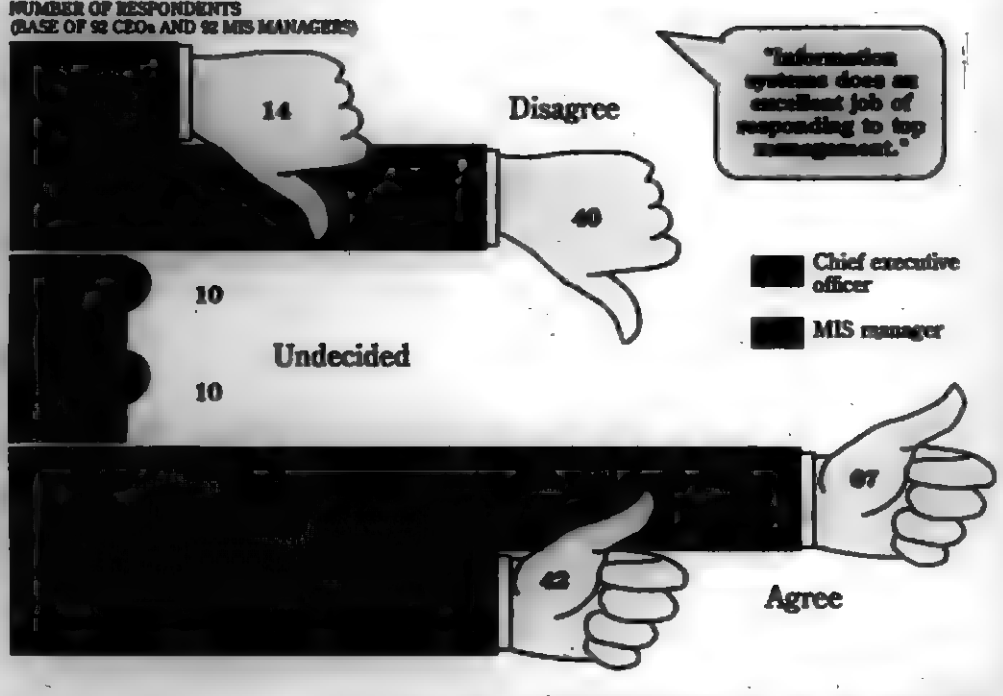
Existing patent licensing agreements will be not be affected under the new structure.

The rates, which had netted IBM up to 1% of sales revenue on products using IBM patents, will now range from 1% to 5%.

TRENDS

MIS management

MIS tougher on its performance than top management is



There is a saying that a little guilt never hurt anyone. In the case of an MIS executive, that might be amended to include the phrase "even if you're innocent."

It appears that information executives — those carrying the title, or at least the job description, of chief information officer — may be their own harshest judges, at least compared with how their chief executive officer bosses judge MIS manager accomplishments. That is one conclusion from a survey of CEOs and information managers conducted by United Research Co. and *Businessweek* magazine.

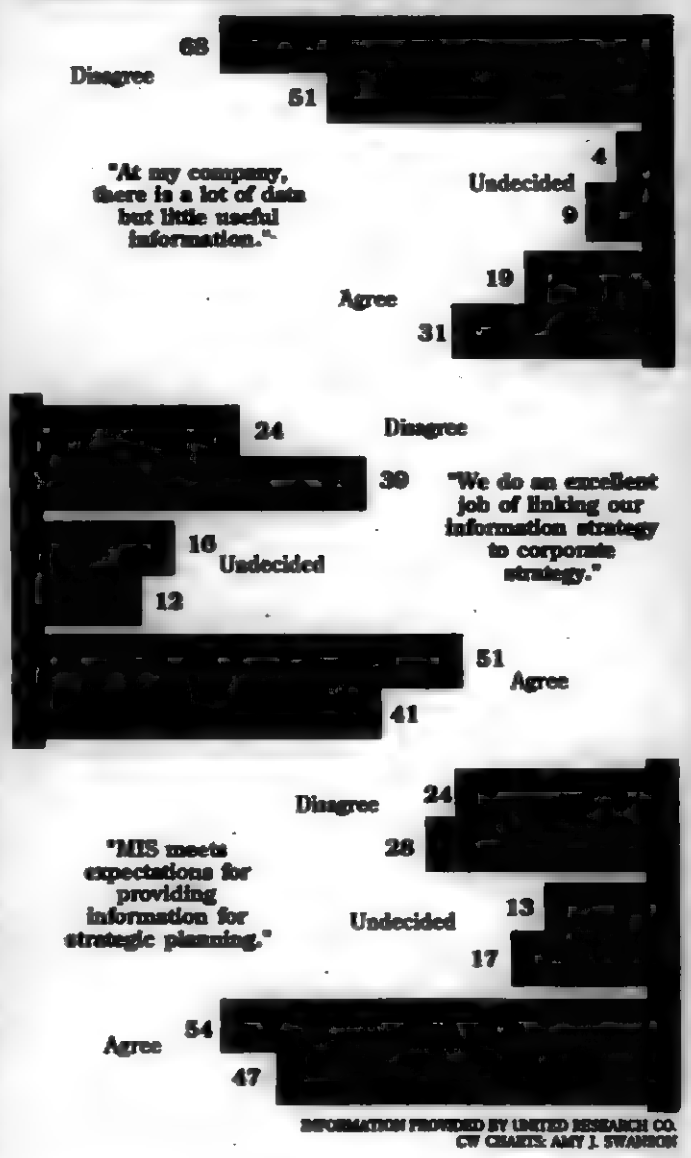
As part of a survey of 876 executives, United Research matched the responses of 92 CEOs with their top information managers. The results show a pattern of CEOs giving the information systems groups higher marks than those groups' managers gave themselves.

Some of the sharpest differences appeared in questions relating to corporate relationships and strategies and how information is used. For example, 67 out of 92 CEOs, but only 42 out of 92 MIS managers, agreed with the statement that MIS does an excellent job of listening to and designing systems for managers at the top management level.

But the contrast blurred when the questions moved away from the CEO's immediate realm; more CEOs were unsure of their opinions.

JAMES CONNOLLY

Meets information needs, strategic goals



INFORMATION PROVIDED BY UNITED RESEARCH CO.
CW CHARTS: AMY J. SWANSON

INSIDE LINES

Taking the long (Dec)view. Don't hold your breath waiting for Decview, DEC's long-expected answer to IBM's Netview juggernaut. A consultant who spoke recently with DEC reports that the company will put off any major network management announcements until next year, although it is likely to introduce a Netview link by year's end. The reason for the delay: DEC wants to build its system around ISO Open Systems Interconnect protocols, which are still pretty amorphous.

I know, it's only floppy disks, but it's dumping. Verbatim, the Kodak subsidiary that makes floppy diskettes, has convinced the U.S. International Trade Commission to investigate charges that Japanese firms are dumping 3½-in. diskettes in the U.S. Verbatim says the prices of Sony, Maxell and Fuji diskettes are 50% lower in the U.S. than in Japan. However, Verbatim's complaint must go through several more government steps before a final ruling, so don't look for any remedies until late this year or early 1989.

Just the fax, please. Datafax Corp. will introduce Microfax Version 2.0 tomorrow, reportedly adding 30 new and enhanced features — including compatibility with most popular scanners and printers — at no increase in price from the earlier version. Reportedly designed to exceed the capabilities of many stand-alone facsimile machines, Microfax Version 2.0 will include network node compatibility, a faster print speed, a 9.6K bit/sec. transfer of any computer file — not just fax files — and group file support, said to let users set up distribution lists and groups of documents to be faxed automatically. In addition, users create documents without leaving the Microfax program.

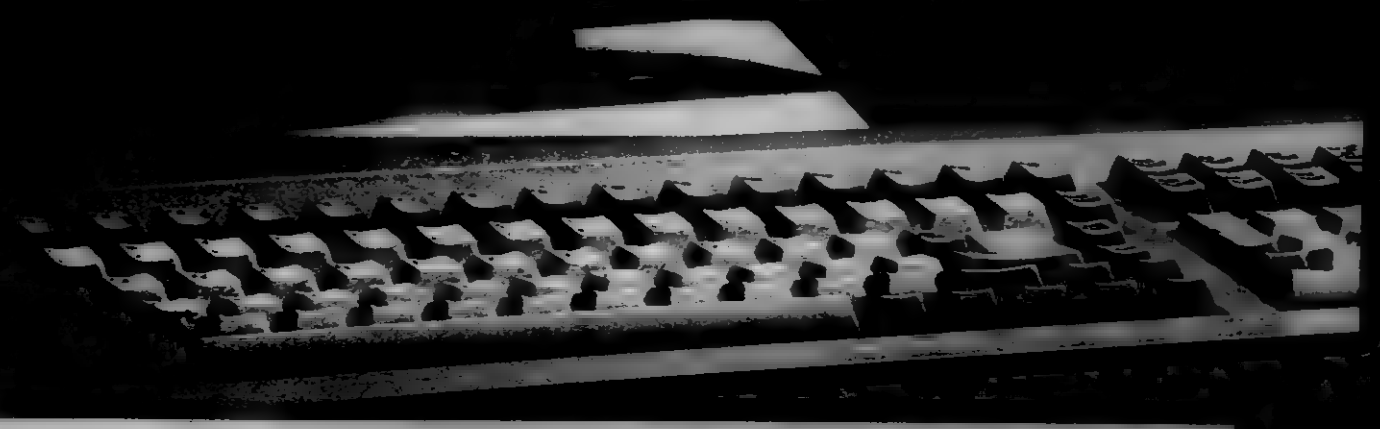
Call it NETSNAXLINKS and sell it like sausage. Joining Tandem's Snax and Snaxlink is the hors d'oeuvre the firm hopes will whet the appetite for connectivity in the IBM world: Netlink's SNA-Hub. Tandem says it will resell the $17,000 communications concentrator, made by Netlink, in which Tandem bought an equity stake last year.

Good things come in threes: The IEEE will award its 1988 Alexander Graham Bell Medal to 3Com founder and Ethernet principal inventor Robert Metcalfe in a ceremony May 9. Metcalfe will receive a gold medal and a $10,000 cash prize, which he plans to donate to The Computer Museum in Boston. He serves on the museum's board of directors and was recently elected chairman of the Corporation for Open Systems. 3Com recently announced the shipment of its 500,000th Ethernet adapter, a milestone that coincides with Ethernet's 15th birthday.

Damn the lawyers and pass the ammunition. Apple's "look and feel" suit against Hewlett Packard's New Wave has heightened interest in HP's integrated applications environment. The order rate for New Wave developer's kits has doubled since the suit was filed, according to Robert Frankenberg, general manager of HP's Information Systems Group. More than 100 have been sold to date, he claimed. HP has also decided to hold two more New Wave developers conferences: one on the East Coast and another in Europe.

Doughboy, Take Two. What do you get when you merge Tandem and Ungermann-Bass? Why T-UBoy, of course, say Silicon Valley quipsters. The recently formed entity is expected to announce its plans tomorrow for providing fault tolerance under IBM's OS/2 and Microsoft's LAN Manager at a press conference at the East Coast version of Microsoft's Advanced Network Development Conference.

Like, this'll be wicked awesome. Microsoft will have an "incredibly major" press conference in New York Wednesday at the second go-round of the above-mentioned network developers' conference. What was to be a small briefing has snowballed into something larger, a Microsoft executive said, promising vaguely that a lot of "high-quality" companies will attend. A source close to Microsoft speculated that a lot of second-tier Microsoft network OEMs, such as Intel, Western Digital and DEC, will probably be announcing plans to license the LAN Manager.



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AT&T Chairman James Olson on indefinite leave following cancer surgery. Page 111.

Recrafted VAX series takes form

BY STANLEY GIBSON
CW STAFF

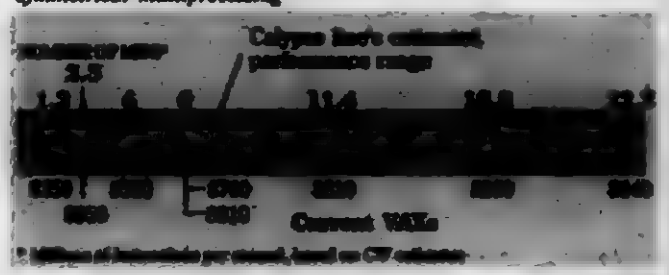
Digital Equipment Corp. will take the wraps off the long-awaited Version 5.0 of its VMS operating system tomorrow and will also unveil a mid-range family of four models — its second symmetrical multiprocessing system introduction in the past seven weeks — according to sources close to the company.

The announcement continues DEC's drive into the mainstream of commercial transaction processing, to which symmetrical multiprocessing is well suited, analysts said.

The new mid-range line, code-named Calypso, will bring symmetrical multiprocessing and its improved transaction-processing capabilities to virtually the entire power range covered by DEC's existing VAX 8000 series.

On March 8, DEC announced its most powerful VAX models, the 8800 series, which similarly consists of one to four VAX 8700 processors capable of symmetrical multiprocessing.

Between the lines
DEC's 6200, or Calypso, series will overlap current VAXs but offer symmetrical multiprocessing



CW CHART

Report performance
The Calypso line will consist of one to four tightly coupled DEC Microvax 3000 processors and will perform from 2.8 to 11 million instructions per second, according to one source.

That roughly spans the range now covered by DEC's VAX 8350, 8530, 8700, 8810 and 8820 systems.

Stephen Widen, a DEC analyst at International Data Corp. in Framingham, Mass., said DEC customers and beta-test users told him the Calypso systems will be designated the 6210, 6220, 6230 and 6240.

VMS Version 5.0 is currently being shipped in a prerelease version that was announced with the VAX 8800 series. One feature of Version 5.0 is symmetrical multiprocessing support.

Mixing clusters
VMS 5.0 will permit mixing local-area Vaxclusters and standard Vaxclusters based on DEC's Cluster Interconnect, the

Continued on page 4

LAN Manager wins backers

Endorsements boost image as 'safe choice'

BY PATRICIA KEEFE
CW STAFF

NEW YORK — Just two months before it is scheduled to ship, Microsoft Corp.'s OS/2 LAN Manager appears to have gained the critical mass of support necessary to position it as one of three OS/2 connectivity standards.

The developments should boost the LAN Manager's image as a safe choice for local-area networking, because the software is now supported by most of the major personal computer and network suppliers.

During the last two weeks, 35 vendors, including a contingent of European firms, have announced plans to license Microsoft's network server program.

Even Microsoft rival Novell, Inc. recently did an about-face. The company announced support for two prominent LAN

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Soap opera unfolds in Unix world

BY ROSEMARY HAMILTON
CW STAFF

Open Look, the Unix user interface being promoted by AT&T, may benefit desktop computer users in the long run simply by offering them another environment from which to choose.

But in the short term, users should be prepared for a soap opera, because the Open Look introduction has created an industry drama worthy of the television serials.

If AT&T has its way, Open Look, which it developed in conjunction with Sun Microsystems, Inc. and Xerox Corp., will primarily compete with the IBM OS/2 and Presentation Manager platform and the Apple Computer, Inc. Macintosh. Open Look may push Unix into the realm of legitimacy, because it breaks the user-unfriendly barrier that has long been the operating system's Achilles' heel.

AT&T and Sun sketched out shipment dates last week for

Continued on page 6

COMPUTERS AND POLITICS

High-tech issues fire campaign

BY MITCH BETTS and JAMES DALY
CW STAFF

All of the presidential candidates campaigning in New York's primary election tomorrow carry some political baggage, but only one carries a laptop computer.

Albert Gore Jr., the 39-year-old senator from Tennessee, has assured himself a footnote in the computer industry annals by being this year's only major presidential candidate who is also a hands-on computer user.

But the 1988 campaign also marks another milestone for the computer community. While political disagreement during an election may be as certain as death and taxes, this campaign has seen both Republicans and Democrats rally in support of federal policies to help high-tech industries drive the U.S. economy, spur innovation and restore American competitiveness in the world market.

A *Computerworld* review of the men shopping for real estate on Pennsylvania Avenue shows that each has drawn up a multipronged set of competitiveness proposals that use the high-technology business as a linchpin.

Without exception, the candidates are calling for federal incentives for scientific research, improvements in the educational system so that future workers are armed with a solid background in computer skills and faster assimilation of laboratory technologies into commercial markets.

Findings of the survey of the four active candidates in the New York primary — Republican frontrunner George Bush and Democrats Michael S. Dukakis, Jesse L. Jackson and Gore — include the following:

- Bush, Dukakis and Gore support the computer and software industries' goal of making the federal tax credit for re-

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In the running. Unisys's Intel-based U 6000 series is capable of running MS-DOS and Unix simultaneously to function as either a small departmental computer or a PC server. Page 15.

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"The mainframe is not the dinosaur that people thought."

STEVEN MILUNOVICH
FIRST BOSTON CORP.

On strong first-quarter earnings by IBM and Unisys.
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DB2 extends specs

Product manager clarifies referential integrity

BY CHARLES BABCOCK
CW STAFF

ARLINGTON, Va. — The next release of DB2 will extend support for the referential integrity requirements of the relational model and include features suited for production use, IBM's DB2 product manager said last week.

Mainframe production conditions create circumstances, such as recovery from system failure, that require data integrity even though they are not necessarily covered by the conditions of the model. "If a dozen tables are interrelated, it's important that they don't get out of sync as you store or recover one of them," said Gary J. Ferdinand, IBM's DB2 product manager in Santa Teresa, Calif.

In another example, a DB2 development spokesman at the same site noted that a partition of a DB2 table might not fit the referential integrity restraints that the full table does. If its integrity is called into question, DB2 should have a reporting mechanism to note why integrity cannot be guaranteed and perhaps a method of reasserting the rules over the partition, the spokesman said.

Fact or fiction?

Ferdinand did not specify that referential integrity will be part of the next release of DB2, which is expected to be announced by early May, but he spoke of implementing referential integrity almost as an accomplished fact.

"We've taken quite a while to do this. . . . It is, I think, going to be a complete piece of work," Ferdinand told his audience at an Arlington conference last week on computer-aided software engineering and relational data base sponsored by consulting firm Atre Computer Assistance.

Ferdinand specified that referential integrity will mean the data base administrator will be able to define foreign and null keys and have them enforced by the data base manager, rather than leaving them to be inserted by the application programmer.

Other areas of improvement in future releases cited by Ferdinand included:

- **Query optimization.** The optimizer, through its ability to follow rules for accessing data and digest accessing patterns, chooses the path a query will take to retrieve data. "There's no reason the DB2 optimizer can't read more statistics," Ferdinand said.
- **Performance monitoring.** The current monitor provides batch monitoring, and customers want on-line performance information.
- **Index use.** Today, DB2 can use only one index with an SQL command. If two indexes were available, it should be able to use both.

Ferdinand said development is carrying DB2 in the direction of working with multiple processing units, such as the six processors in the IBM 3090 Model 600E. Ferdinand replaced Marilyn Bohl as DB2 product manager in August.

Paul Hessinger, chief technical officer at the Computer Task Group, Inc. in Buffalo, N.Y., predicted that under IBM's ESA operating system, DB2 will be able to make use of large multiple buffers, each tied to its own processing unit. He said such an innovation will multiply transaction throughput but is unlikely to appear for two years.

Shaku Atre, a Rye, N.Y., consultant and organizer of the conference, predicted that IBM will give DB2 users the option of storing special data handling instructions in hiperspace, a piece of expanded storage reserved under ESA to serve as a small part of a direct-access storage device inside the processor.

CW brings home top press award

The Computer Press Association last week named *Computerworld* "best computer newspaper" and one of *Computerworld*'s 1987 stories one of the "best news stories" in a computer publication as the organization presented its annual Computer Press Awards.

The third annual competition attracted more than 700 entries, including more than 70 publications, vying for awards in 15 categories that covered newspapers, magazines, books, newsletters, articles and broadcast programs.

Runners-up in the best computer newspaper category were *Government Computer News* and *Computer & Software News*. The judge for the category was *Businessweek* editor Geoff Lewis.

Computerworld senior writers David A. Ludlum and Alan J. Ryan shared runner-up honors for best news story in a computer publication for their May 18, 1987 article on the decline of the National Computer Conference, "It's the worst of times for NCC."

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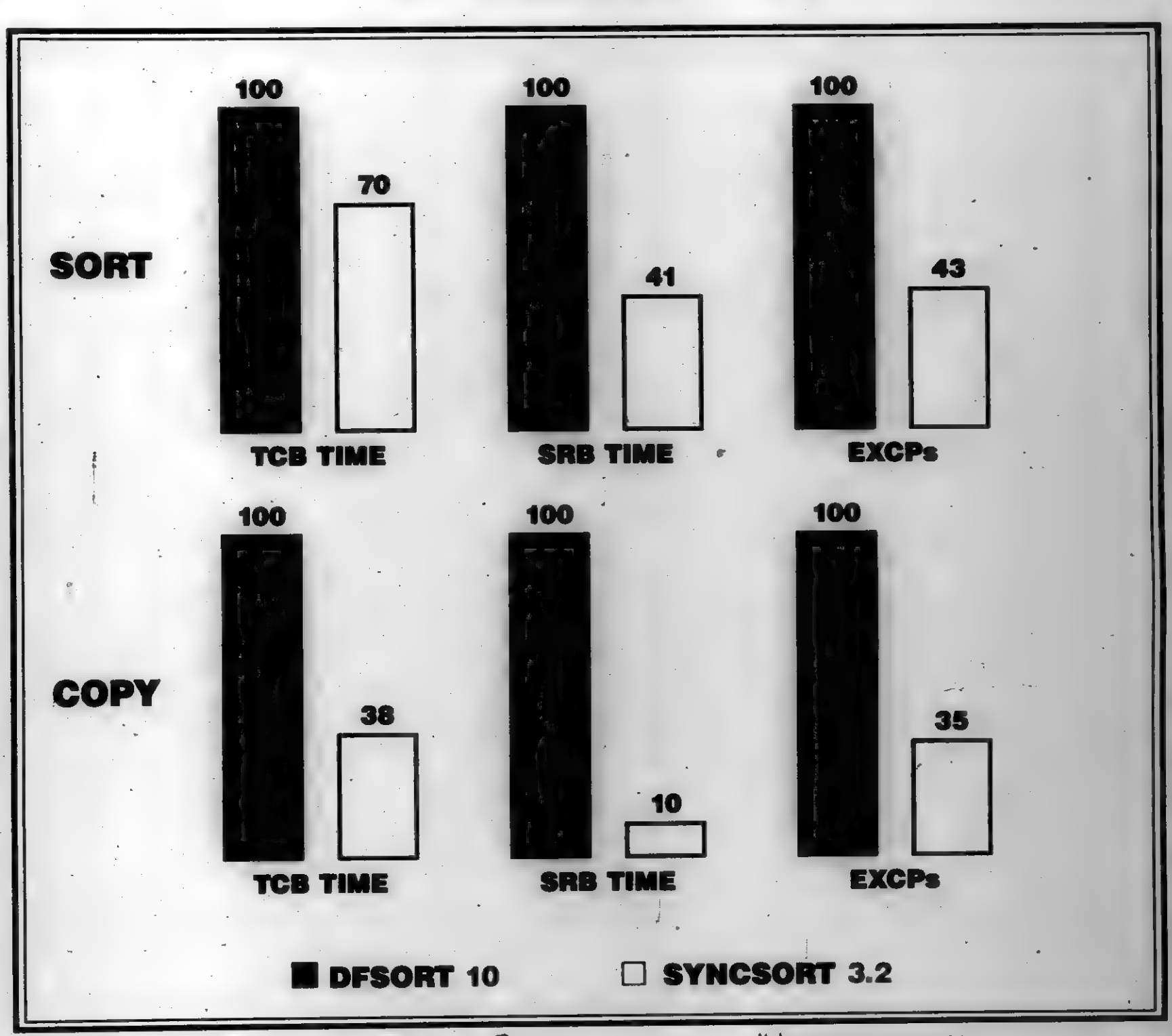
vs.
DFSORT 10



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Good news for IBM; slow times for DEC

BY CLINTON WILDER
CW STAFF

Reflecting rejuvenated mainframe demand and a sudden slowdown in minicomputer sales, IBM's first-quarter performance outshone rival Digital Equipment Corp.'s for the first time in more than three years.

In financial results announced last week, IBM met or exceeded analysts' expectations with a 16% gain in profits on a solid 10% revenue increase. DEC's earnings fell 0.8%, the first glitch in its enviable growth curve since September 1985. DEC reported a 17% rise in sales.

Although DEC had warned earlier that its profits would not meet year-earlier levels [CW, March 21], its drop contrasted sharply with the earnings growth of IBM and the second largest mainframe vendor, Unisys Corp. That firm, continuing to reap the fiscal harvest from its consolidation of Burroughs Corp. and Sperry Corp., saw its earnings surge 35%.

"The mainframe business is hanging in there," said First Boston Corp. analyst Steven Milunovich. "The mainframe's new roles as a communications network manager and data base manager are at least offsetting its lesser use as an applications processor. People still need more mainframe power."

Best gain since 1985

IBM notched its third straight quarter of increased earnings after five consecutive down periods. Excepting the fourth quarter of 1987, when a lower tax rate, favorable foreign currency translations and the sale of Intel Corp. stock gave profits an abnormal boost, the 16% earnings growth was IBM's best year-to-year gain since the fourth quarter of 1985.

The stock market's reaction confirmed IBM's positive momentum as the firm's stock jumped 2½ points last Wednesday, closing at 116⅛. Although DEC announced its results after the market closed Wednesday, its stock plunged 5¼ points to 103⅛ Thursday amidst the marketwide sell-off spurred by the trade deficit (see story page 135). IBM was only slightly more fortunate, losing 4¾ points, closing at 111⅜.

Analysts said strong sales of high-margin 3090 mainframes and 3380 disk drives sparked IBM's growth, which was aided by the company's expense reductions of the past two years. The 10% revenue growth outpaced expense growth of 9.2%, and after-tax profit margin rose from 7.4% to 7.8%.

The February announcement of MVS/ESA was the key to unlocking demand for IBM's most powerful mainframes, said Peter Labe of Drexel Burnham Lambert, Inc. "It calmed the fears of people afraid to buy a machine that would be an orphan six months later," he said. "Customers didn't know if a 3090E would fit in the new environment or not."

Total first-quarter revenue rose from $10.68 billion one year earlier to $11.75 billion. Hardware sales grew 14% to $7.43 billion, while software sales continued to boom, rising 22% to $1.71 billion. Revenue from maintenance, continuing to reflect IBM's 1987 price cuts, declined 4% to $1.87 billion.

Earnings were $913 million, or $1.53 per share, compared with $785 million, or $1.30 per share, in the first quarter of 1987.

VAX growth sags

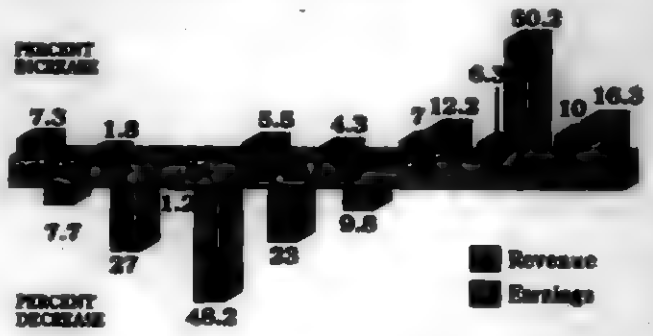
The results from Maynard, Mass.-based DEC confirmed what the firm said last month — that its robust sales came from lower margin workstation products, while high-end VAX systems growth was disappointing. The booming workstation market was in strong evidence last week; both Sun Microsystems, Inc. and Apollo Computer, Inc. reported outstanding quarters (see story below).

For its third fiscal quarter, DEC reported earnings of $305.1 million, down slightly from $307.6 million a year earlier. Per-share income rose from $2.29 to $2.33, reflecting a lower number of shares outstanding. Revenue rose 17% to $2.82 billion from $2.41 billion, but analysts said DEC needed a 20% sales growth to hit its targets.

The balance of the year will determine whether the quarter was an aberration or the beginning of tough times for DEC and other minicomputer vendors victimized by price/performance competition from workstations and local-area network-linked personal computers.

On track

IBM revenue slide with third consecutive quarter of earnings growth



INFORMATION PROVIDED BY IBM
CW CHART

Business booms for Sun, Apollo

The engineering workstation market has continued to flourish despite a shortage of memory chips: Both Sun Microsystems, Inc. and Apollo Computer, Inc. reported strong quarters last week.

"Business is booming, particularly at the low end," said Michael Orsak, industry analyst at Robertson, Colman & Stephens. "I don't think it has peaked. Demand is growing."

For the third quarter ended March 25, Sun reported net income of $14.3 million, or 39 cents per share, on net revenue of $259.7 million. In comparison, the company posted net income of $10.2 million, or 29 cents per share, on net revenue of $143.2 million for the corresponding quarter last year.

For the first nine months of fiscal 1988, Sun's net income was $41.2 million, or $1.13 per share, on net revenue of $686.5 million. That compares with net income of $25.4 million, or 80 cents per share, on net revenue of $351.6 million for the same period in 1987. Sun officials said the rising prices for memory chips and a scarcity of these components resulted in lower profit margins than expected. However, they said such activity is not expected to impact growth in succeeding quarters.

Apollo posted net income of $10.4 million, or 29 cents per share, on net sales of $168.9 million for its first quarter ended April 2.

JULIE PITTA

VAX series

FROM PAGE 1

source close to the company indicated.

An East Coast user said such a feature would be attractive to workstation users on a local-area Vaxcluster because it would allow them to access applications and disk storage and share files with users on a Cluster Interconnect-based cluster.

Gradual process

Widen predicted DEC will not immediately begin to phase out the older VAX processors overlapped by Calypso. He said, however, that gradual replacement can be expected. DEC also continues to offer models overlapped by the 8800 series.

"If you are a new buyer, you would not buy the old line," Widen said. But he added that in some cases, such as scientific applications, a VAX uniprocessor could deliver more efficient performance than a comparable VAX symmetrical multiprocessor. This is because of the additional power used by the operating system to make four processors work together.

Commercial users will find the symmetrical multiprocessors better suited than a uniprocessor to transaction processing applications, Widen predicted.

> IN SOME cases, a VAX uniprocessor could deliver more efficient performance than a comparable VAX symmetrical multiprocessor.

Widen said he believes the models will be priced from approximately $200,000 to $560,000. "It sounds like they're going to price it relatively high," he said

A base model of the Microvax 3500 containing the same CPU as a Calypso 6210 model is priced at $74,800; a VAX 8350, capable of 2.4 MIPS, carries a base price of $124,000; and a base model of the VAX 8700, offering 6 MIPS, is priced at $542,000.

Such prices tend to indicate that DEC does not plan to replace its existing models but will, rather, offer them to users who prefer a uniprocessor to a multiprocessor, Widen said.

The Calypso series will also include a new memory bus called the XMI bus, Widen added, that transmits at 100M byte/sec., compared with the 60M byte/sec. NMI bus used on the VAX 8800 series. Widen said this fact fuels his belief that the 8800 series may be enhanced before long to include the faster bus.

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NET set to purchase Excelan

Merger to provide enterprisewide connectivity

BY PATRICIA KEEFE
CW STAFF

REDWOOD CITY, Calif. — Positioning itself as a one-stop source for enterprisewide networking, Network Equipment Technologies, Inc. (NET) announced plans last week to purchase Excelan, Inc., which will become a wholly owned subsidiary.

NET is a supplier of wide-area networking, T1 and network management products. Excelan builds local-area networks based around Ethernet and Transmission Control Protocol/Internet Protocol. With no overlap between product lines, analysts lauded the surprise merger as a good fit.

The merger reflects a continuing trend in the communications industry toward consolidation. Companies specializing in only one type of network technology face a significant impediment to growth, explained Andy Shopick, an analyst with Gartner Securities Corp.

"Today, there are only two high-growth communications markets — wide-area networks and LANs — and we [will] have a foot in each," NET President Bruce Smith said. But he quickly added that the lines between the two markets are fast becoming blurred.

Under the terms of the agreement, which is subject to stockholder approval, Excelan shareholders will receive two-thirds of a share of NET common stock for every share of Excelan common stock currently held. The merger is expected to be finalized by June.

No layoffs are planned. However, Excelan said President and Chief Operating Officer C. Richard Moore had resigned from the company to pursue other interests. Kanwal Rekhi, Moore's successor, denied rumors of political infighting at Excelan.

After the merger is completed, Rekhi will continue to head up the subsidiary but will also become a NET senior vice-president and join NET's board of directors. Smith will continue as president and chief executive officer of NET.

Principals and analysts cited the merger as an offensive move by NET to advance into the LAN market. Profitable and with little or no debt, the companies individually are experiencing growth rates of 70% to 80%.

Getting serious

Excelan and NET "have talked off and on for a long time, but the serious discussion took about a month," Rekhi said.

Although the merger's impact on customers is unlikely to be felt before 1989, the most important benefit will be the ability to interface between the LAN and wide-area network markets across standards. Principals said a closer linking of the two markets will also simplify maintenance and support issues. Merging the product lines will also include extending NET's network management to LANs.

Joint product development will focus initially on gateways and routers between the two environments, according to Excelan's Rekhi.

NET's effort to round out its technology portfolio and extend its reach throughout the corporation may strengthen it as a competitor to IBM, with which NET has a distribution agreement. IBM sells and services several NET T1 multiplexers under an agreement executed in June 1987. That pact also calls for IBM to contribute some funding toward development of future NET products.

Consolidation on the rise

Network Equipment Technologies, Inc.'s (NET) plan to buy out Excelan, Inc., announced last week, is just a continuation of the consolidation juggernaut that has rolled through the communications industry during the last 18 months. And it is not expected to be the last.

Typically, most of these mergers have involved profitable firms seeking to expand their technology bases into new markets. Customer pressure is driving the mergers, according to vendors and analysts.

The pressure results from the fact that networks are pieced together with equipment from a variety of sources, leading to nightmarish situations in pinpointing the causes of problems. "Users were saying, 'For God's sake, we don't care how, but get your network management to include local distribution problems,' " NET President Bruce Smith said. NET and Excelan plan to merge their network management software.

Users are trying to bridge the gap between local-area and wide-area networks, which requires extending network management from one technology to another. They also desire one network management system to collect alerts from all ends of the network.

PATRICIA KEEFE

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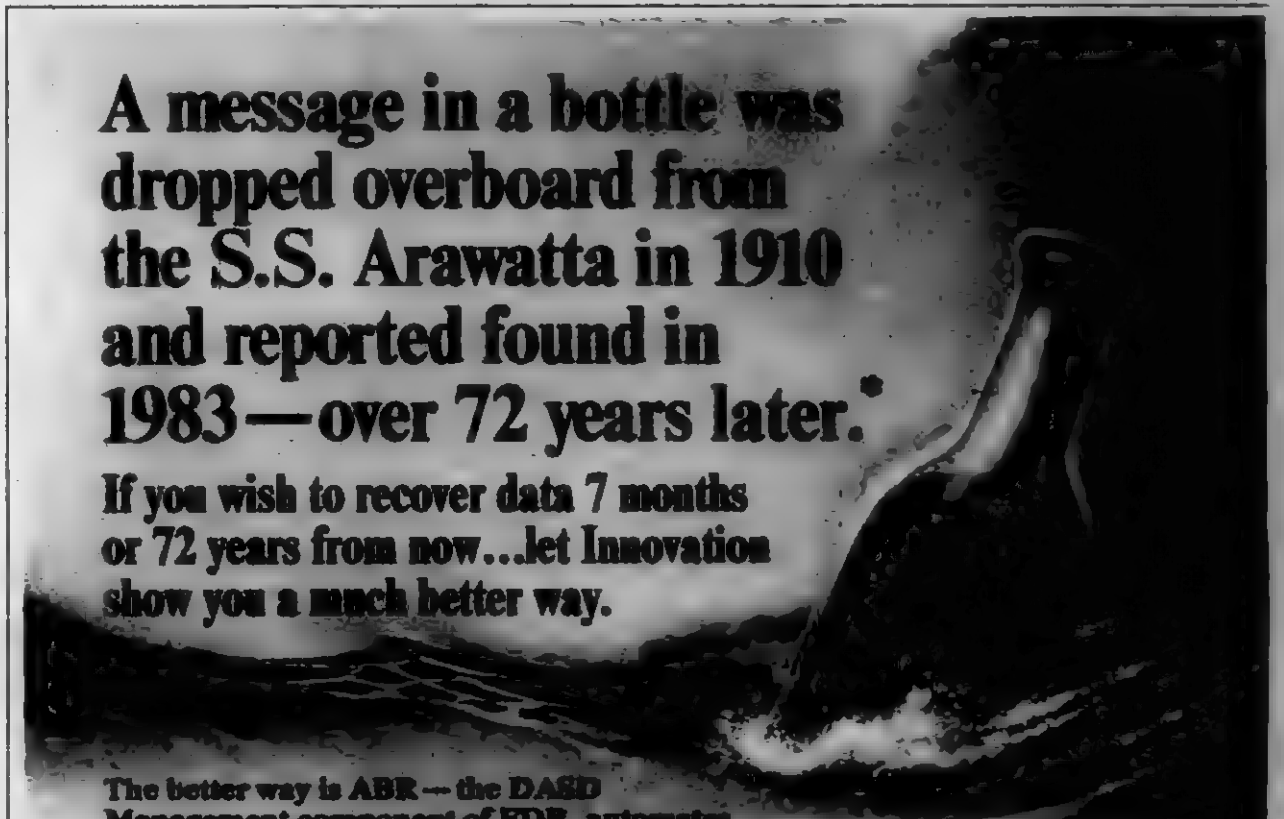

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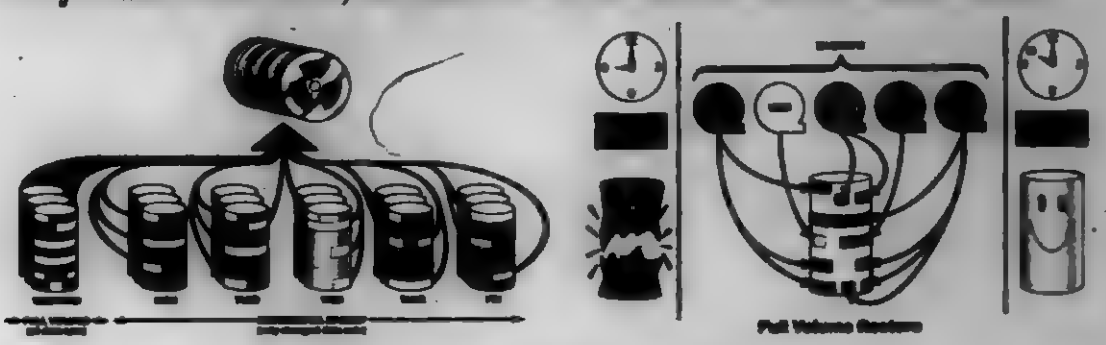

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Wary users unconvinced about Unix

BY JULIE PITTA
CW STAFF

While corporate users may be less likely to dismiss Unix than they were before last week's commitments from Lotus Development Corp. and Ashton-Tate Corp., they are not likely to jump onto the Unix bandwagon anytime soon.

"The fact that a company is willing to endorse something doesn't give me a warm feeling," said Michael Cromar, information resources director at American President Companies Ltd., a $2 billion shipping firm based in Oakland, Calif. "I'll wait until they deliver something. Until then, we'll keep buying the way we've been buying."

A lack of mainstream applications for desktop computing, coupled with Unix's complexity, have continued to discourage that environment's acceptance beyond the engineering departments of most large corporations. To give Unix a more user-friendly demeanor, Sun Microsystems, Inc. has licensed Xerox Corp.'s graphical user interface to be included in Sun and AT&T's Unix System V, Release 4 (see story page 1).

However, that release will not be ready until mid-1989, and no firm schedules as yet exist for a Unix version of Lotus's 1-2-3 and Ashton-Tate's Dbase III Plus. Nonetheless, Sun Vice-President of Research and Development William Joy claimed that Lotus has already ported 1-2-3 to Unix. And critics like Hewlett-Packard Co. and Digital Equipment Corp., which have said that Sun will enjoy an unfair advantage, are likely to continue to oppose the alliance and push their own versions of Unix.

Choice and confusion

As a result, corporate users may be more confused than ever. "When we had fewer options, the choices were easier," said David Malmberg, director of strategic planning and new technology at McKesson Corp. in San Francisco. "More choices add confusion."

Users pointed to portability as Unix's primary advantage. "Unix is the only operating system able to run on a wide range of systems, from the smallest desktop to the largest mainframe," said Bill Anderson, senior vice-president of new technology at Seafirst Bank, a Seafirst Corp. division in Seattle. "The more people that embrace Unix, the better it will be."

However, Seafirst will not standardize on Unix because that would require a massive investment in new equipment, Anderson said.

The investment required will likely dissuade American President from converting to Unix, Cromar said, although he said he is a proponent of a single operating system spanning a range of hardware. "Unix looks like the best hope for a single operating system, [but] in the sense that users have invested in other platforms, it's difficult."

Not all see Unix as a viable alternative in mainstream computing environments.

"It's bad enough with OS/2, DOS and the Mac," said Jeff Ehrlich, manager of information technology at General Electric Co. "The last thing on earth that I need is something else."

Ingres prepped for OLTP race

BY NELL MARGOLIS
CW STAFF

ALAMEDA, Calif. — Relational Technology, Inc. clocked in last week with claims of a dramatic speed increase and a multiserver architecture for its Ingres relational data base management system. The announcements continue the escalating race by DBMS makers in the on-line transaction processing (OLTP) market.

Ingres Release 6.0, which began shipping late last month, is targeted at large users running the high-volume, speed-intensive applications typified by airline reservation or stock market monitoring software packages. It was substantially re-engineered for multiprocessing hardware platforms.

The result, according to Robert Healy, Relational Technology's marketing vice-president, is a relational DBMS that provides scalable, or linear, performance in a multiprocessing environment. Ingres Release 6.0's multiserver architecture lets multiple copies of the data base engine, each on its own CPU, go against the same data base.

This configuration works best in a multiprocessor hardware environment like Digital Equipment Corp.'s Vaxcluster or Polar Star multiprocessing models, Healy said, because in a single-server data base architecture, front-end programs write SQL statements to a data base server that responds to all calls.

In a Vaxcluster, new nodes can be added to the cluster without a proportional increase in performance because of the bottleneck that results when the lone server has to process increased data base queries.

Multiserver architecture, on the other hand, lets the data base administrator balance the load. Different servers, Healy said, can be assigned different tasks; for instance, high-priority applications can be run on a faster node. Since fewer processes are running at any given time, the CPU is less taxed.

Speeding bullet

To further fit Ingres for OLTP, Relational Technology included fully automated recovery techniques and an advanced journaling system. An enhanced version of Ingres's artificially intelligent query optimizer adds significantly to the performance of Release 6.0, according to Healy.

Moreover, to illustrate Ingres 6.0's potential for transaction processing, Relational Technology announced that its internal speed improvement project, code-named "Silver Bullet," has resulted in a significantly faster Ingres. Tests run on a hybrid of Ingres Release 5.0/05 and Release 6.0, using the ET1 debit/credit benchmark, showed a speed of 54 transaction/sec.

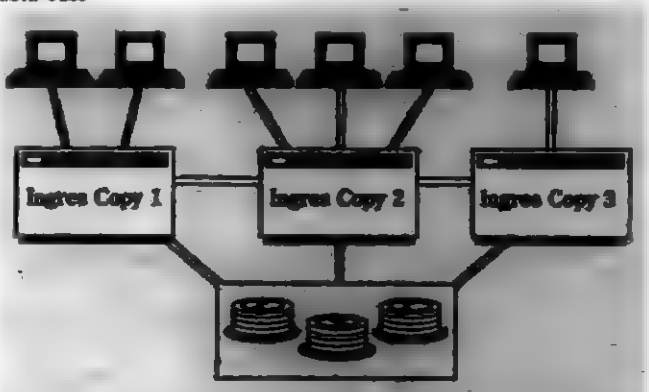
In a report on the future of transaction processing published last year, The Yankee Group, based in Boston, cited several ET1 benchmark results; IBM's DB2, running on an IBM 3090 Model 200, notched 40 transaction/sec.

The Silver Bullet benchmark was run on a Sequent Computer Systems, Inc. Symmetry S27 parallel processing computer under Sequent's multiprocessor version of Unix. Healy said the results are similar to those of the same test if run on a Vaxcluster or Polar Star under the imminent VMS Version 5.

Release 6.0 is available as an upgrade or at an initial license fee ranging from $5,000 to $160,000.

At your service

The multiserver architecture of Relational Technology's Ingres lets multiple copies of the data base management system act on a single data base



INFORMATION PROVIDED BY RELATIONAL TECHNOLOGY, INC.

Soap opera

FROM PAGE 1

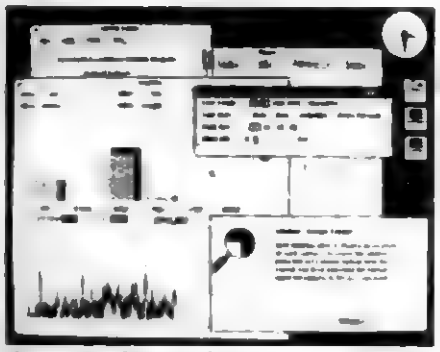
Open Look that span a period lasting from this summer to next year. They also won key endorsements from microcomputer heavyweights Lotus Development Corp. and Ashton-Tate Corp. as well as mild support from other companies.

All of these elements indicate that Unix and Open Look have a real shot at the desktop market.

"It's all futures, but I think this makes Unix-on-the-desktop civilized," said Molly Upton, manager of integrated business systems at International Data Corp. in Framingham, Mass.

Other industry analysts agreed. "There is more than one kind of user, so there's a place for more than one user interface," said Brian Boyle, an analyst with Novon Research Corp.

That, however, is the simple story. Before the desktop market reaches the point at which it has three legitimate alternatives, the soap opera aspect needs to play itself out.



Open Look *graphical user interface: It's as good as watching the soaps*

Picture a scene similar to a cliff-hanger episode of *Dallas*. What will happen to Microsoft Corp. and its own co-development deal with AT&T? Was it cast aside by AT&T in favor of Sun? What will IBM do? What about the so-called Hamilton Group, a collection of Unix vendors that recently opposed the initial Sun and AT&T alliance? Will it embrace Open Look or find another interface? And what impact will the messy lawsuit brought by Apple against Microsoft and Hewlett-Packard Co. have on Open Look?

Based on interviews with the companies and industry analysts, this is the way the drama shapes up:

- **Microsoft.** The company was noticeably absent from the AT&T press conference last week. There are indications that Microsoft was unsuccessful in convincing AT&T to port an interface based on Microsoft's Presentation Manager to Unix. When asked if the idea had been rejected by AT&T, Adrian King, Microsoft marketing manager of operating systems, said, "I'm sure we talked to them about Presentation Manager, and, in a sense, it could be seen as a lost sale."

Industry speculation is that Microsoft will go ahead without AT&T and introduce a Unix user interface.

- **IBM.** Placed in an awkward position by last week's events, IBM is saying nothing. The company has simultaneously become the great promoter of Presentation Manager for the OS/2 environment and a self-proclaimed Unix devotee.

"I don't think they'll support Open Look because they really want Presentation Manager to be the one of choice," said Jeff Silverstein, publisher of "Software Industry Bulletin."

- **The Hamilton Group.** Fate unknown. The group of vendors active in the Unix market was unable to put forth a united front last week. Digital Equipment Corp. is taking a tough-guy approach, claiming that its DEC Windows interface, now in beta testing, is better than Open Look.

However, Apollo Computer, Inc., another Hamilton Group member, expressed concern that it had not been included in the AT&T Open Look effort. "We're frustrated," said Mark Hatch, Apollo's manager of portable software products. "Despite AT&T's apparent acknowledgment of our concerns, here is an example of Sun getting things ahead of time."

- **The Apple lawsuit against Microsoft and HP.** While a cloud of doubt hangs over Presentation Manager and HP New Wave, AT&T and Sun have skirted the problem through an agreement in which Sun licensed Xerox's graphical interface for use in Open Look. AT&T can now appeal to users with the idea that its product is safe from litigation.

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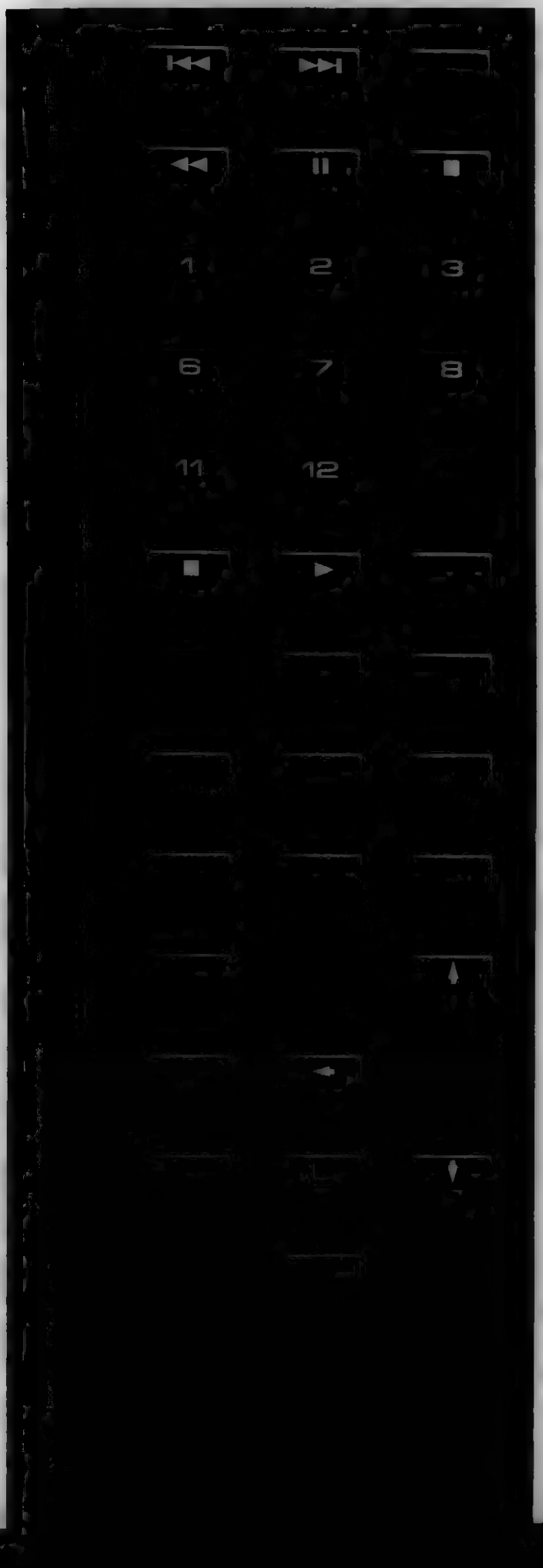

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Presentation Manager wave still out at sea

BY DOUGLAS BARNEY and ED SCANNELL
CW STAFF

The OS/2 Presentation Manager may well be the wave of the future, but MIS managers need not break out their surfboards anytime soon.

Despite optimistic reports, most Microsoft Corp. OS/2-based graphical applications will not ship on the heels of the Presentation Manager, and some may not emerge for many months or even years after that product's release.

The snag lies in the dramatically more complex environment of Presentation Manager, which requires that applications be written with bit-mapped graphics, menus, windows and more esoteric features.

While a raft of applications vendors have promised Presentation Manager-based applications, none, including Microsoft itself, have announced delivery schedules.

Few are daring to say more than that their applications will be delivered "soon after" the Presentation Manager or "in a timely fashion." Some, most notably the ambitious Borland International, are promising a wait of less than six months after the interface ships.

Although most ship dates have yet to be shored up, one thing is clear: It is going to take much longer for these packages to hit the shelves than many users believe.

Knowledgeable graphics programmers caution that there will probably be no more than a dozen simple applications afloat by the end of the year, and it will be mid-1989 before a sizable number appear on the market. All of this presumes that IBM and Microsoft will deliver Presentation Manager by Halloween, a date that many developers have begun to doubt.

Unlike programming models in the DOS world, designing graphically oriented software requires a firm understanding of esoteric concepts like dynamic-link libraries and interprocess communications. This sort of learning curve could tack years onto some software development projects.

"If you build a product from the ground up, it is a few years of work," said Arun Gupta, chief executive officer of Dataease International, Inc. "If you take a product like our [Dataease DBMS], which is already menu- and forms-oriented, and do full justice to the Presentation Manager, it is a little over a year."

As a result of its early work with Microsoft Windows, Gupta said he expects Dataease to release a product some three months after the shipment of the Presentation Manager.

But given that most vendors have little experience in the complex world of bit-mapped graphics, the year or more wait may be par for the course.

No flood until 1990

"You will start seeing Presentation Manager applications coming out in 1989, but you won't see the floodgates open until late 1989 and 1990," said Umang Gupta, chairman of Gupta Technologies, Inc.

In fact, even relatively simple nongraphics-mode applications have been plagued by major delays as features are added. A graphical user interface puts a larger burden onto developers and, thus, stretches out development time. As a result of the added complexity, Microrim, Inc. Chairman Wayne Erickson said he simply does not know how long it will take to develop for the Presentation Manager because his firm has never developed that kind of software.

In addition to learning to work in a graphical environment, many developers have had to switch from programming in assembler to coding in C.

A precedent in history

According to a source close to Microsoft, it could take a year or more for vendors to develop for the still unshipped graphical user interface. In fact, it took Microsoft some two years to move Excel from the already graphical Apple Computer, Inc. Macintosh environment to Windows.

Although a few key firms have been working with prerelease Presentation Manager code, most have not gained a head start. While some product design and conceptualization has taken place, the developers tools, which include a beta-test version of the interface, just recently began to ship.

Even porting Windows applications to the Presentation Manager promises to be a time-consuming chore, because of a lack of conversion tools.

Despite the lack of tools, applications currently working under Windows are the most likely candidates to be ported first. Presentation Manager is based, at least in part, on the fledgling Windows interface.

"People [with Windows applications] who start right away should be able to have a port within the first half of next year. If anyone ships in 1988, it will be on December 32," said Paul Grayson, chairman of Micrografx, Inc. in Richardson, Texas.

Dbase IV delivery doubts persist

BY STEPHEN JONES
CW STAFF

Ashton-Tate should have seen it coming.

Although the shipping deadline for Ashton-Tate Corp.'s long-awaited Dbase IV is still about four months away, there is already speculation that the data base program is going to be late. Concern has been fueled by reports from early users that their versions of Dbase IV code is "raw" and bug-ridden.

But observers said the company brought the criticism upon itself by preannouncing the Dbase III Plus upgrade far in advance of its ship date. Driven by growing competition and the need to hold onto an upgrade-hungry installed base, Ashton-Tate announced the product six months early, in February, against its self-proclaimed goal of not announcing products until they are ready to ship.

Now, the Torrance, Calif., developer is feeling the pressure to deliver on its promises by July 31. "Until it ships, Dbase IV is a phantom," said Liam Egan, director of end-user computing at the Financial Services Group of Dean Witter Reynolds, Inc.

Nevertheless, Ashton-Tate is sticking to its guns. Development managers at Ashton-Tate compared notes on Dbase IV's progress last week and concluded that they foresee no serious delays for the product, a company representative said.

One consultant stressed that it is too early to judge the Dbase code, since it is still in early alpha-test form and prone to crashes. "They have four months to develop Dbase IV. Four months is not a whole lot of time, but it's enough," said Richard Finkelstein, a senior consultant with the Codd and Date Consulting Group in Chicago.

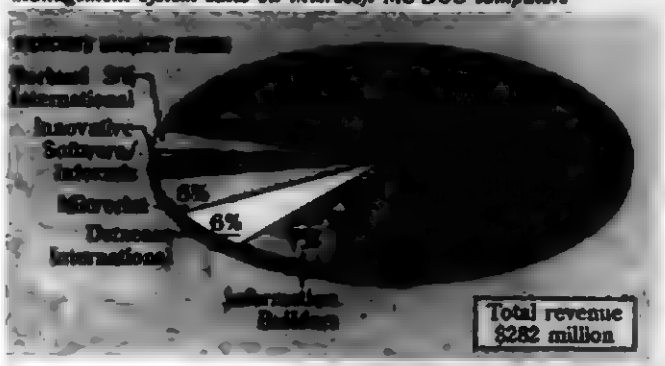
Yet nagging questions persist about whether Ashton-Tate developers will be able to pull the 400,000 lines of Dbase IV code together by the July deadline. Sources familiar with the development project said Dbase IV has not been sent to Ashton-Tate's top corporate clients because it is not capable of supporting application development.

It is also difficult to judge the program's overall effectiveness because its separate components do not work together as one integrated package. One analyst who has worked with the Dbase IV code said that such important elements as the package's SQL language, application generator and report writer are not connected and crash the system when run together.

Some sources close to the product's development questioned whether all components will be folded together in time to meet the delivery deadline.

Much at stake

Ashton-Tate still overwhelmed competition in 1987 data base management system sales on Microsoft MS-DOS computers



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CW CHART

Design flaws?

Potentially more troubling for Ashton-Tate are shortcomings related to the basic design of Dbase IV. Some analysts said they believe the need to stay tied to the old Dbase language will drag down the potential of Dbase IV's SQL implementation. "One of the drawbacks of Dbase IV is that they had to scale it back to maintain the backward compatibility," said Adam Green, a data base consultant and author.

One of the biggest pitfalls of the system, observers said, is that Dbase is a procedural language and, therefore, requires that users manipulate downloaded data from a remote source on a record-by-record basis.

Ashton-Tate opted to keep the record-processing approach in order to provide a migration path for the approximately two million users currently working with applications written in earlier procedural Dbase languages. As a result, Dbase IV is split into halves — one based on next-generation SQL technology and the other on a remnant of an aging language.

Ashton-Tate looks to minis

Partnership to yield Dbase for OS/2, Unix, VMS

BY STEPHEN JONES
CW STAFF

TORRANCE, Calif. — Ashton-Tate Corp. charted a course for future Dbase development last week by revealing plans to jointly develop IBM OS/2 Presentation Manager, Unix and Digital Equipment Corp. VMS versions of its data base management system with Interbase Software Corp.

Ashton-Tate will build Dbase products around Interbase's transaction-oriented SQL engine [CW, March 21]. Interbase developers will team up with Ashton-Tate to rework the former's minicomputer and high-end workstation-based relational technology and embed components of the code into new Dbase packages.

The first application from the joint development agreement will be a Presentation Manager version of Dbase, known informally as Dbase V or Dbase PM, which Ashton-Tate said will ship within six months of the Presentation Manager's expected release this October, company officials said.

In addition to licensing the Interbase technology, Ashton-Tate took an unspecified equity position in the Tyngsboro, Mass.-based company. Ashton-Tate reportedly will share ownership of the jointly developed technology but will receive exclusive marketing rights to any related products.

Analysts have recently said the partnership will give Ashton-Tate a much-needed technological boost as it takes on all comers in the high-end relational DBMS market.

"The market was wondering how Ashton-Tate was going to respond to competition from the mid-range developers, but this shows that the company is making the right moves to stay on top," said Randy Sutherland, an analyst at Dataquest, Inc. in San Jose, Calif.

By cozying up to Interbase, Ashton-Tate is expected to get a crack at distributed data base processing across a variety of operating system platforms, such as Unix and DEC's VMS. The Interbase DBMS currently provides distributed access and processing over networks on mid-range systems from DEC, Apollo Computer, Inc. and Sun Microsystems, Inc.

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Tandem LAN to support OS/2

BY KATHY CHIN LEONG
CW STAFF

NEW YORK — In the first announcement since their February agreement to merge, Tandem Computers, Inc. and Ungermann-Bass, Inc. last week revealed separate plans to support Microsoft's OS/2 and LAN Manager. The companies made their introductions here together.

Although the product plans do not reflect any joint development between the companies, Tandem officials said the announcement underscores a unified consensus that both firms are working toward pursuing the new market of desktop on-line transaction processing (OLTP).

Tandem officials said OLTP users are looking for additional horsepower at the workstation level. Tandem said it considers bringing OLTP features to the personal computer level via local-area networks a natural move. "The workstation can be a true peer in OLTP," Tandem product manager Jeri Edwards said.

During the product introduction, Tandem said it will license MS OS/2 from Microsoft Corp. and resell the operating system to customers with Tandem PCs. The company revealed that its Multilan, which links other vendors' networks to Tandem hosts, will support OS/2-based workstations and LAN Manager-based networks.

The firm will initially support networks from Ungermann-Bass. By September, Tandem said, it will certify other vendors' networks for Multilan interoperability.

Tandem also said it will port its existing Microsoft MS-DOS applications to OS/2 for Multilan workstations. The first product slated for conversion is the PC6530 terminal emulation and file transfer package, set to be available late this summer.

Ungermann-Bass said it has licensed the LAN Manager from Microsoft. By the third quarter, the company plans to sell its Net/One Universal Workstation bundled with the LAN Manager. Pricing has not been set.

LAN Manager

CONTINUED FROM PAGE 1

Manager applications programming interfaces, Named Pipes and Mail Slots.

Yet Microsoft has by no means locked up the OS/2 connectivity market. Industry observers said they see a three-way horse race for LAN market share and split the remainder between Netware and whatever network access method will be supported by IBM's forthcoming OS/2 Extended Edition.

What remains unclear is whether users will be able to mix and match pieces of all three currently unshipped environments.

Thomas White, president of Infonetics, Inc., a consultancy in Santa Clara, Calif., said he expects the LAN Manager to open the LAN market to a greater number of competitors, possibly leading to price wars that could undermine network support.

Too big to ignore

As a result, several industry observers said they expect IBM will be forced to formally announce support for Named Pipes and Mail Slots under its LAN Server. "IBM can't ignore all these announcements," said Cecilia Brancato, an analyst with Oppenheimer & Co.

An IBM acknowledgement would ease concerns of users who fear being locked out of OS/2 Extended Edition and the IBM environment if they opt for third-party network products.

The bulwark of LAN Manager support came from 29 hardware OEMs that announced plans to license the OS/2 server program at a Microsoft development conference held in New York last week.

Those licensees included such industry heavyweights as AT&T, Convergent Technologies, Inc., NCR Corp., NEC Corp., Nixdorf Computer AG, Ing. C. Olivetti & Co., Siemens AG, Micom Systems, Inc., Tandem Computers, Inc., Tandy Corp., Retix, Toshiba Corp., Televideo Systems, Inc., Western Digital Corp., Standard Microsystems Corp. and many licensees of the LAN Manager's predecessor, MS-Net.

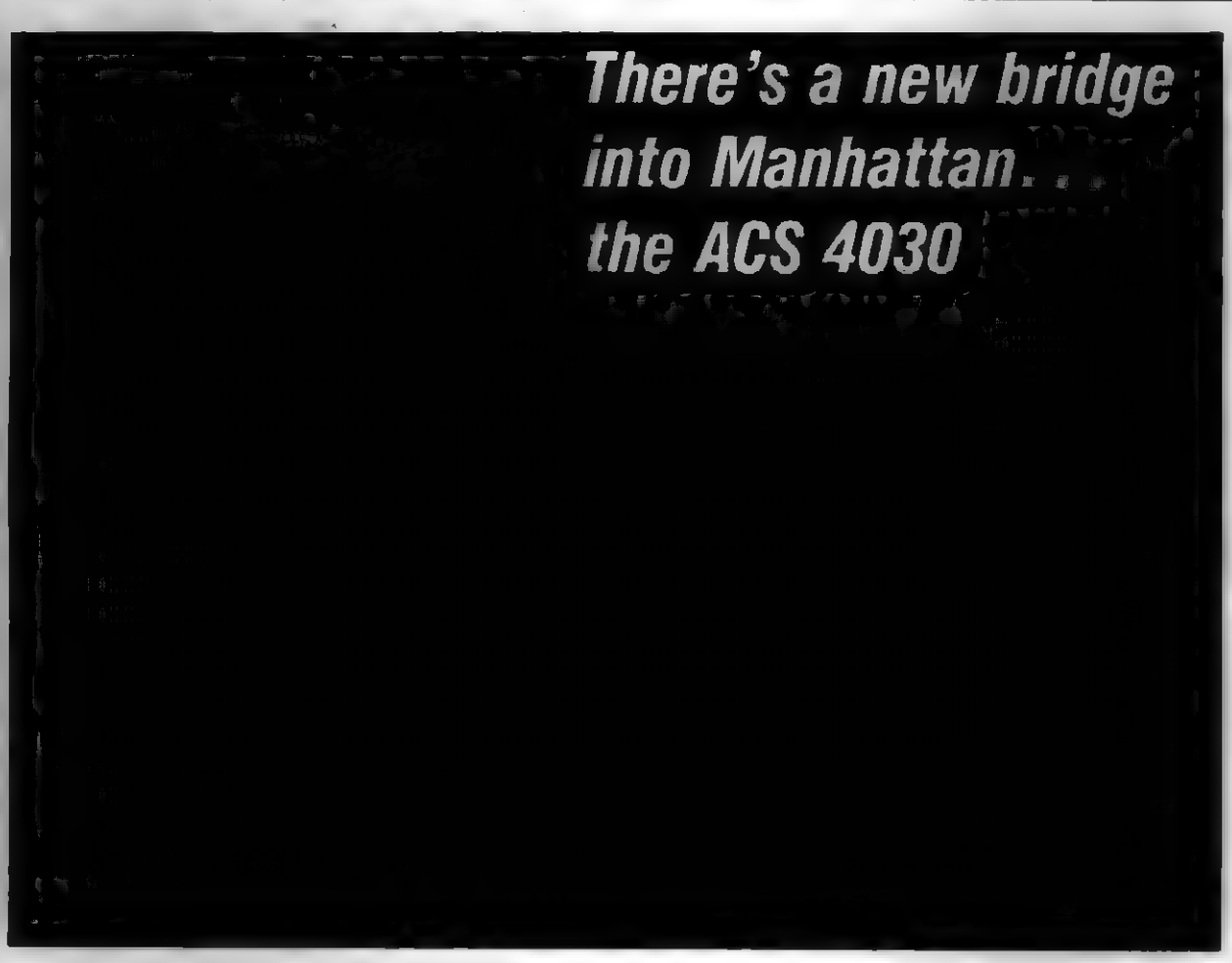
The prevailing theme underlying this support was twofold: pressure from customers seeking direction and Microsoft's assurance of being able to mix and match products.

These announcements fall into two groups: those from hardware vendors that will ensure their products are compatible with LAN Manager; and those from networking product and software vendors that are building programs around a LAN Manager core.

This groundswell of support crowding the LAN Manager bandwagon follows similar earlier announcements from 3Com, Hewlett-Packard Co., Digital Communications Associates, Inc., Excelan, Inc. and Torus Systems, Inc.

Another five PC vendors did not license LAN Manager but said they would support it. They included Compaq Computer Corp., Apollo Computer, Inc., Tandon Computer Corp., Wyse Technology and Zenith Data Systems.

Despite the rush to embrace the LAN Manager, few licensees have revealed availability dates for their versions of that software. Products with announced ship dates include 3Com's 3+ Open network operating system, in June; NCR's product line, May 10; and Torus Systems' Tapestry II, in the third quarter.



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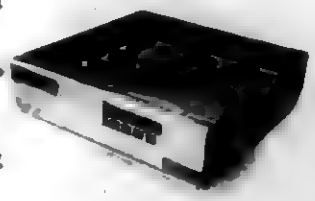

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	Houston	Feb 16, Mar 17, Apr 28
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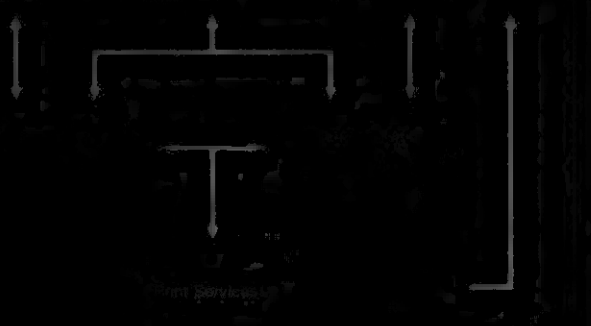

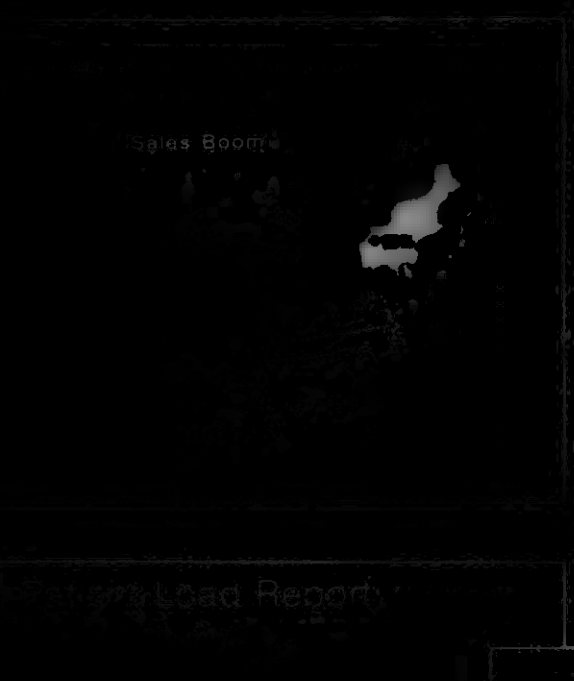

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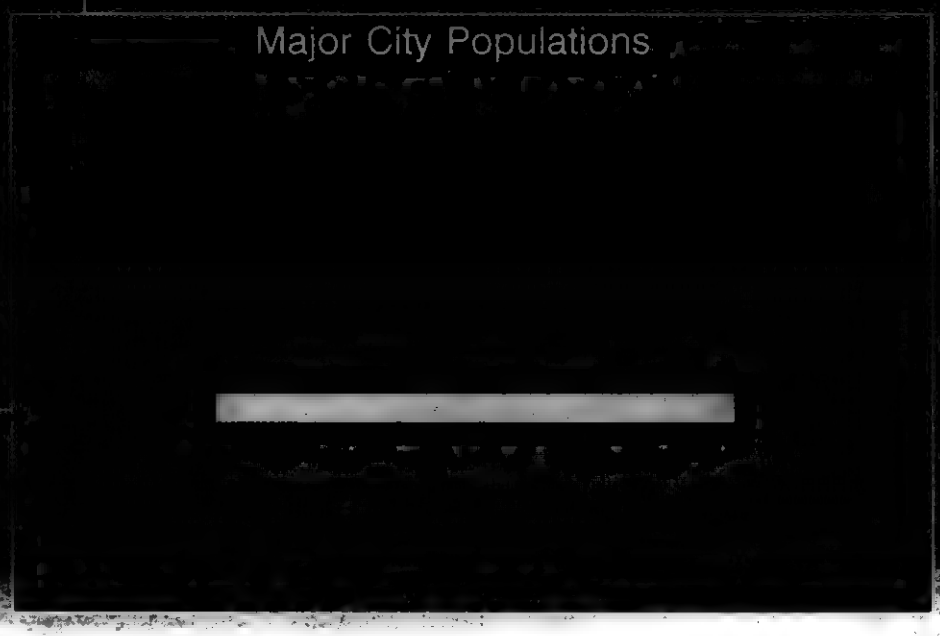

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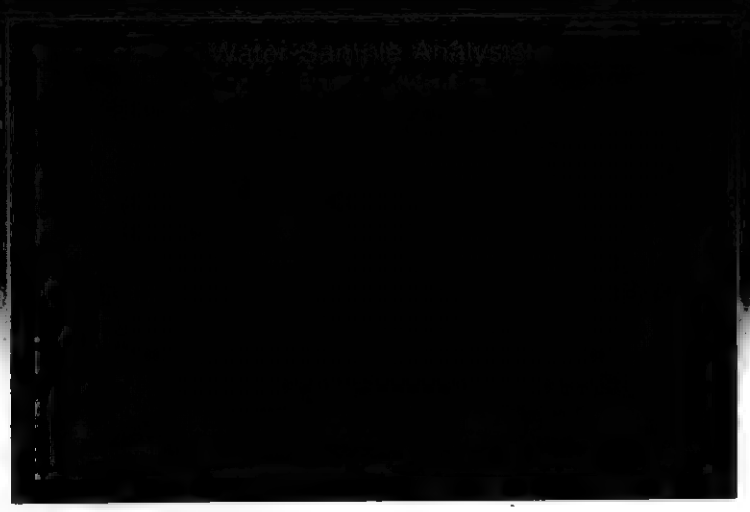

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DEC tailors suit for Clearpoint

BY NELL MARGOLIS
CW STAFF

BOSTON — Digital Equipment Corp. picked up the legal cudgel once more and hit Hopkinton, Mass.-based Clearpoint, Inc. with a lawsuit alleging multiple counts of copyright, patent and trademark infringements last week.

"This should be good for our business," said Clearpoint Vice-President John Stadler. "Getting sued by DEC is a sign of arrival in the DEC market."

The legal action, containing three main thrusts involving DEC's proprietary VAXBI technology, was filed last week in the U.S. District Court for the District of Massachusetts.

DEC contends that Clearpoint's VBIRAM memory product infringes on three DEC patents. Further, DEC charges Clearpoint with infringing on its copyright on the VMS operating system. DEC is seeking an injunction and monetary damages on both the copyright and patent claims. Finally, according to the complaint, Clearpoint is violating a series of DEC trademarks, including those of the VAX and Microvax.

Clearpoint's Stadler pointed out that DEC obtained trademark protection for its acronyms only two months ago — long after Clearpoint allegedly copied or imitated them.

"That has no legal relevance whatever," a DEC spokesman retorted. "Infringement is infringement."

While the battle has been joined, Stadler suggested that Clearpoint is not the only company DEC is fighting. "Cynically, I find it hard to believe that this isn't just DEC trying to scare a lot of people," he said. None of the actions cited in the complaint are recent, he pointed out. What is recent, however, is that "at least two other companies have been talking about coming out with VAXBI products. This looks like a pre-emptive strike on DEC's part," he said.

During the past year, DEC has reached out-of-court settlements on two other infringement actions — one against Systems Industries, Inc. and one against Emulex Corp. Under the terms of the settlements, Systems Industries and Emulex each ended up paying royalties to DEC for use of the contested technology.

Symbolics goes software

CAMBRIDGE, Mass. — In a bold departure from the dedicated LISP workstation line for which it is known, Symbolics, Inc. last week introduced an expert systems shell with an embedded programming language.

Joshua, as the package is called, is the first step in Symbolics' redirection; it is a tool for building expert systems that can then be embedded in larger applications.

According to a spokesman, the value added — the basis on which Joshua can be differentiated from other expert systems development products on the market — is that Joshua is built on top of LISP as well as layered on Symbolics' Genera operating system.

Initially, Joshua will be available on all Symbolics hardware platforms. However, the company spokesman said Joshua-created applications are not locked into the Symbolics proprietary environment. Currently active networking capabilities, he said, will give users a link to IBM, Digital Equipment Corp. and most Unix-based computers. Moreover, board-level systems based on Symbolics' forthcoming Ivory chip, slated for fourth-quarter or earlier delivery, will support Joshua.

Scheduled for June availability, Joshua is expected to be priced at $15,000 per CPU, or $60,000 for a subnet license.

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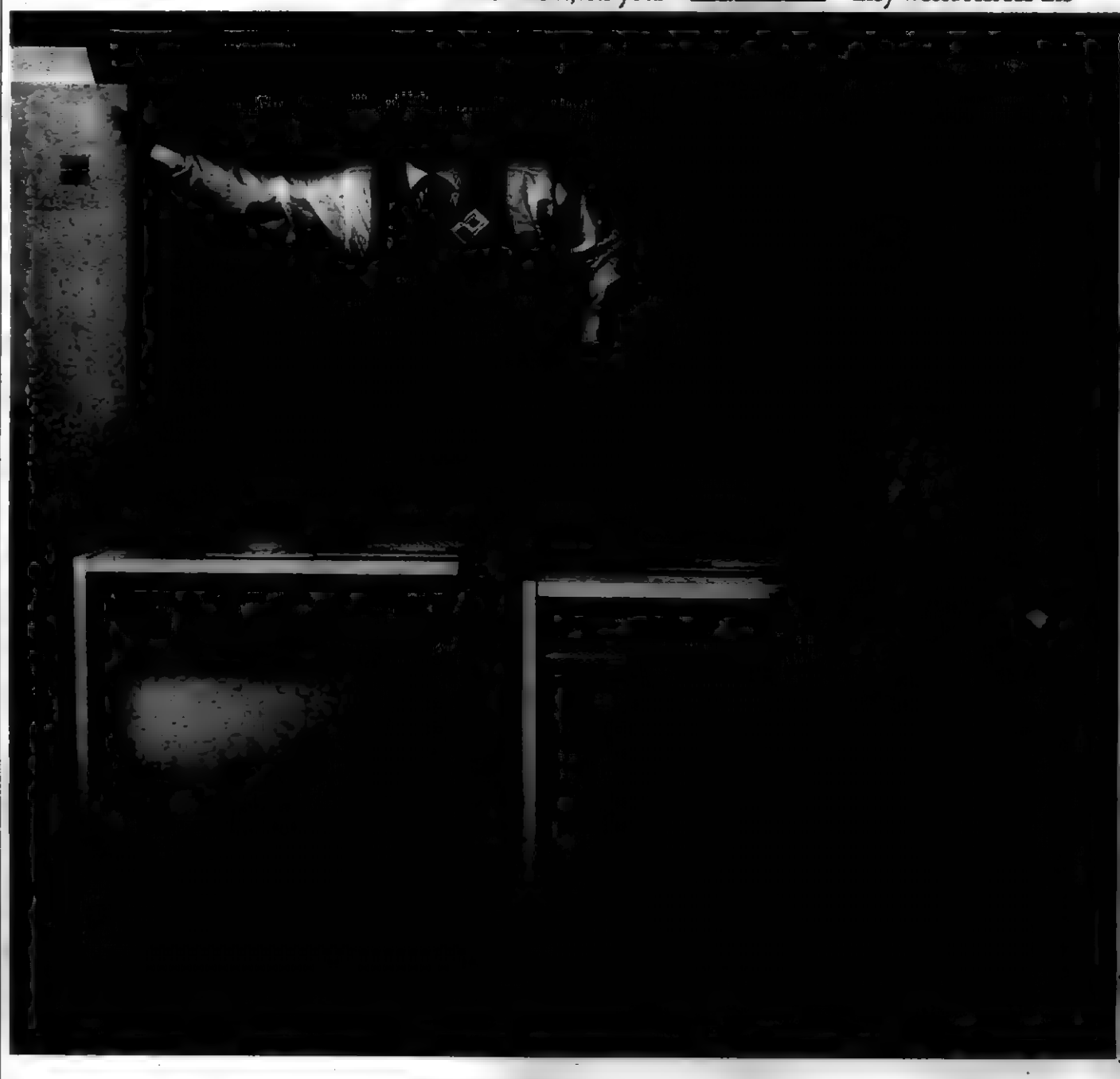

How To Go Fa

IBM tries to calm OS/2 developers

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — William Lowe, president of IBM's Entry Systems Division, promised last week that 1,000 applications for his firm's OS/2 operating system will be available by year's end.

IBM executives further worked to calm fears that the OS/2 Presentation Manager is behind schedule.

Lowe and William P. Lyons, IBM's Personal Systems Merchandising general manager, underlined a commitment to meet the July deadline for shipping OS/2 Extended Edition 1.0 and the October target for the Presentation Manager.

Microsoft Corp. Chairman Bill Gates, who, along with the IBM executives, spoke at a seminar here, said developers have had some unexpected difficulties working with the Presentation Manager tool kits. The problems might slow the delivery of full OS/2 applications.

"OS/2 has a better file system, and the way it buffers information is more efficient than MS-DOS," Gates said. "But it takes more machine cycles to put stuff up on the screen, and developers need to learn how to work with it."

Meanwhile, IBM hinted at future enhancements of its Personal System/2 intended to make it more attractive to current minicomputer users.

Among the enhancements IBM predicted for the next two to three years are the following:

- Support for the IBM System/36 line's RPG II language under OS/2.
- Support for the REXX development language, now supported under the mainframe VM operating system.
- Support of up to three simultaneous ASCII communications sessions under the OS/2 Communications Manager.
- The addition of a Remote Data Services module to OS/2 Extended Edition to create distributed data bases across a company's nationwide communications network. Use of IBM DB2 relational data base management system concepts as well as automatic record-locking and data validation would be essential to ensure data integrity across the network, IBM said.

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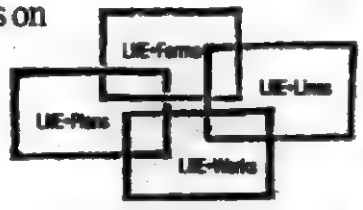

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Unisys eyes DOS/Unix

BY J. A. SAVAGE
CW STAFF

BLUE BELL, Pa. — In an effort to be all things to all departmental users, Unisys Corp. last week introduced a series of small computers capable of running Unix and Microsoft Corp.'s MS-DOS simultaneously. The U 6000 series machines function either as small departmental computers or personal computer servers.

The first in the Intel Corp. processor-based U 6000 series is the 6000/50, which the company claimed supports up to 32 users for $24,500. It is slated to be available next month.

The U 6000/50 basic configuration consists of 4M bytes of main memory, 170M bytes of fixed-disk memory, a 150M-byte ¼-in. cartridge tape drive and three asynchronous ports. Licensing the Unix operating system, the MS-DOS 3.2 operating system and a Locus Computing Corp. Merge 386 program, which allows MS-DOS to run under Unix, costs $3,000.

The company claimed the system runs at 4 million instructions per second at a clock speed of 20 MHz. For scientific applications, an optional floating-point processor, which runs at 9.4K Dhrystone million floating-point operations per second (MFLOPS) or 2.5K Whetstone double-precision MFLOPS, is also available.

Unisys said it will include free maintenance for one year if the system is installed by the company. A spokesman said that installation costs should run less than $300.

Sony promises first optical erasable drives

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — Sony Corporation of America last week said it plans to be the first company to sell erasable optical disk technology for end-user systems.

The company, which in April 1987 announced plans to develop a 5¼-in. erasable optical disk drive, said it intends to ship the first erasable drives to manufacturers in May.

The new erasable media "can be erased and written upon more than one million times," Sony Chairman Masaki Morita commented in a speech at the Association for Information and Image Management (AIIM) show, which was held here last week.

The 5¼-in. optical disk will be encased in a plastic cartridge similar to those used for today's 3½-in. floppy disks. The 650M-byte disks are double-sided and achieve error rates of less than one error per trillion bytes through error-correction firmware, according to Sony.

The Sony drive, which includes a small computer systems interface card in its controller, is set to be sold initially to computer vendors for $7,000 per unit, with the erasable disks priced at more than $200 each. Prices are expected to come down once volume shipments begin in early 1989, Sony said. The company claimed burst data-transfer rates of 1.2M byte/sec. and user data-transfer rates of 680K byte/sec.

Beating the competition

If Sony meets its target date, it will ship before Osaka, Japan-based Sharp Electronics Corp. can ship its 5¼-in. erasable optical drive, according to Bob Katzive, vice-president of Disk/Trend, Inc., a Mountain View, Calif., market research firm. Eastman Kodak Co.'s Verbatim Corp. subsidiary also plans to release a 3½-in. erasable drive this year.

However, Katzive added, "it probably won't be until 1989 that we see Sony or any other company ship quantities of 50,000 to 100,000 units of erasable optical disks."

The Sony disk technology works like this: Existing data is erased by a laser with a one-micron beam. Then a changeable magnetic field records new data on the optical disk by alternating its direction, according to Takeshi Yazawa, assistant manager of Sony's Tokyo-based Optical Disk Drive Division.

Other highlights of the AIIM show included the following:

- Filenet Corp. in Costa Mesa, Calif., introduced a $30,000 facsimile capability that it said allows its document storage and retrieval systems to send data, text and images to remote sites.
- ICI Electronics, a $20 billion British conglomerate, introduced an optical storage media called digital paper. Digital paper was presented as an inexpensive alternative to optical disks. It relies on a polyester-based substrate covered by an infrared-sensitive coating. ICI claimed a storage capacity of 600G bytes on a 2,400-ft reel of ½-in. tape.

Kaypro lays off 40 employees

BY JAMES A. MARTIN
CW STAFF

SOLANA BEACH, Calif. — Faced with production problems and dynamic random-access memory chip shortages, Kaypro Corp. last week said it has laid off 40 employees across-the-board and is considering further staff reductions within the next few weeks.

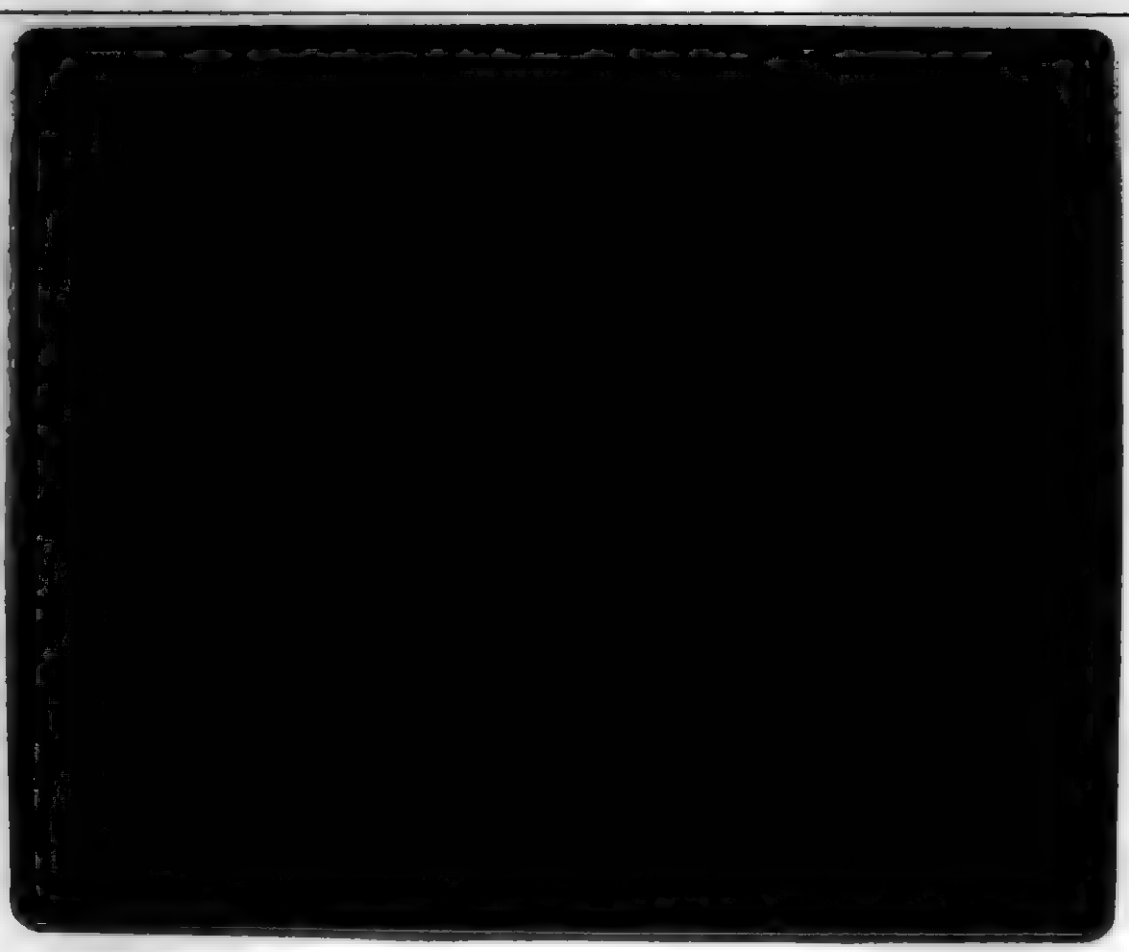
The recent dynamic RAM price increases and shortages have reduced Kaypro's production and shipment levels. In addition, shipment of the Kaypro 2000 Plus laptop has been delayed for months because of "other component shortages," President David Kay said. He did not elaborate.

Kaypro has not managed to pull itself out of the bottom of the IBM Personal Computer-compatible market, analysts said, and it is therefore more vulnerable to losses from such delays and shortages.

The layoffs, coupled with Kaypro's recent announcement that it plans to be among the first to ship microcomputers compatible with the IBM Personal System/2 Micro Channel architecture [CW, Feb. 29], show that the company is trying to shake its laid-back image and become more aggressive, observers said.

"A former employee at Kaypro once summarized the problem with Kaypro very well," said Richard Shaffer, editor of "Technologic Partners' Computer Letter" in New York. "He said there are too many Kays and not enough pros," in reference to the Kay family that has run the company since its days as Non-Linear Systems, Inc. in the 1950s.

Kaypro originally stated it would begin shipping a Micro Channel-compatible system by late May. However, Kay said last week that the company has not decided which chip set it will use in the system and has pushed back shipment to the third quarter. No details were given on which PS/2 Micro Channel machine — Model 50, 60 or 80 — would be cloned.



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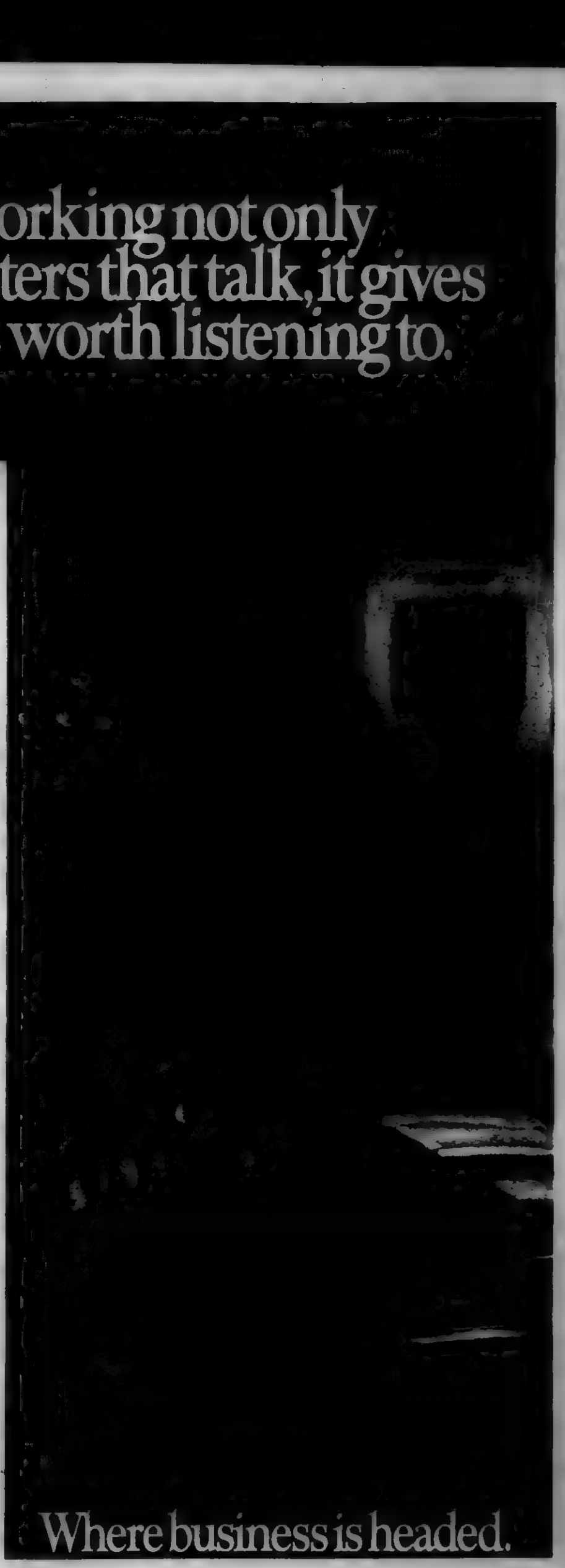

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EDITORIAL

Campaign agenda

OF THE FOUR presidential candidates who will slug it out in tomorrow's all-important New York primary, who is best equipped and positioned to lead our budding information society to full bloom?

In seeking some answers to this critical question, our investigation of the records of Bush, Dukakis, Gore and Jackson turned up some interesting findings (see story page 1). Although the four span the political spectrum from the moderate right to the relative left, the campaign rhetoric up to this point aligns each candidate with policies designed to fuel the U.S.'s burgeoning information business.

And that's really the problem. Because, as our report shows, one really needs to get beyond the rhetoric to begin to see just how much of this high-tech bluster is spoken from the heart and how much reflects pure political survival instinct.

Let's take Gov. Michael Dukakis. He's toned down the "Massachusetts Miracle" hype that saw him through the earlier primaries and is likely to keep it even more quiet as a result of recent reports that have skewered Dukakis's credit-taking for the success of the Bay State economy. In fact, many who remember Dukakis's first term as governor of Massachusetts will recall someone who was perceived by businessmen as anything but a friend of high-tech. Oh well, Mike, if chameleons can change, so can people.

Or how about Vice-President George Bush? He says he wants to be known as the "education president." That's all well and good, but how does he justify his No. 2 spot in the presidential administration that presided over the deepest cuts in history to education? The Japanese have leapt decisively ahead of us in technical education, and that's happened on your watch, George.

Jesse Jackson says his presidency would stem the flow of jobs from the U.S. to other nations, with a key plank in his platform being tighter regulation of key businesses like telecommunications. But somehow, tighter regulation of businesses coupled with a $20 billion hike in corporate taxes doesn't really mesh with the concept of creating more information-age jobs. Jesse, this needs some work.

And then there's young Sen. Al Gore, the only computer user in the bunch. Perhaps more than any other candidate, Gore's record and campaign rhetoric come close to matching. But his candidacy will likely be history after the New York primary. Too little too late, Al.

As much as the candidates sound alike vis-a-vis information society policies, the ability of each to ram his plans through Congress will ultimately separate the wheat from the chaff.

And let's keep in mind what's *not* being addressed by any of the candidates, as the counsel for ADAPSO pointed out — the crucial issue of how society will be able to cope with a technology that is rapidly outpacing the ability of our institutions to accommodate it.

LETTERS TO THE EDITOR

Make no mistake

Contrary to the editorial titled "A bitter pill" [CW, Feb. 8], we — the Chicago Area VM Enthusiasts — would like to go on record as vociferous in our concern about the object-code only policy, lest anyone else mistakenly perceive that our potential fury is quelled because IBM has been quick to respond to specific user problems.

Gregory Pinkowski
Hinsdale, Ill.

Setting it straight

We received a number of inquiries regarding comments attributed to a Cullinet Software, Inc. spokesman in the story "Cullinet wipes the slate clean" [CW, Feb. 8]. We do not in any way take issue with the reporting done on that story. However, in order to help set the record straight, we wish to clarify the following points:

- It is our stated goal to return Cullinet to profitability in the fourth quarter of this fiscal year, and we believe we are very close to achieving that goal.

Our ability to do so will largely depend on the acceptance rate of our new release of IDMS/R and the speed with which we can increase revenue from our Digital Equipment Corp.-based products.

- The article stated that the write-downs taken in the third quarter will "result in an approximately thousand-dollar dip in the firm's break-even point for the next 13 quarters or so." A more accurate figure, however, is approximately $1 million per quarter.
- Remarks regarding the performance of the Planning Control International, Inc. software are related to sales performance in a changing market; for example, the market acceptance rate of the products rather than the quality of the software.

John W. Moriarty
Director, Industry Relations
Cullinet Software, Inc.
Westwood, Mass.

Who's responsible?

I have been closely following *Computerworld*'s coverage of Section 1706 of the Tax Reform Act of 1986. The issue certainly is an important one for the software and services industry and its clients.

The editorial "Hitting a nerve" [CW, Feb. 22] included some information that could later prove quite damaging.

The statement that the federal tax law insulated data processing clients from penalties for using misclassified workers — which is interesting because the law does not expressly go after DP shops if contract workers are found to violate the tax code — is incorrect.

Relying on Revenue Ruling 87-41, which was issued in May 1987, the Internal Revenue Service recently ruled that certain computer programmers — those who are placed at a client's site by a broker — were employees not of the broker but of the client.

The IRS found that the client, rather than the broker, directed the programmers both as to the work they were performing and the manner and method by which that work was to be performed.

The IRS also found that programmers' services were rendered to the client at the client's premises on a substantially full-time basis, that programmers used the client's equipment and that they were required to submit weekly reports to the client.

In addition, the IRS said that the client reserved the right to discharge programmers if the work performed was not acceptable.

John P. Courtney
1988 ADAPSO Chairman
Arlington, Va.

Opens options

Recent issues have given considerable attention to the SQL data base inquiry language.

I have yet to see mention of a program I have been using since 1984 called Open Access from Software Products International. What perplexes me is that Open Access has always used the SQL interface, yet magazines and newspapers repeatedly ignore this program.

I have had minimal user-unfriendliness, yet Open Access allows me to join up to eight data bases. Thanks to SQL, it is simple. The data base can also be molded into applications with the included programmer. It has a spreadsheet with windows, links or consolidates models and has goal seeking. It does three-dimensional graphics and has a word processor and communications capabilities. There is even a local-area network version of this integrated package.

Wayne Barnes
RWB Enterprises
Tulsa, Okla.

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

Working backward to strategic systems

EFREM MALLACH

Push the talk button of any information systems guru these days and you'll hear about strategic or mission-critical systems. The concept is simple: Company X gains an edge if it can collect and then assemble data into useful information better than Company Y can.

The hard part is getting past the pontificating guru stage and applying the ides to a specific company in a specific situation. When people try to invent a useful strategic information system, they often draw a blank.

This is not surprising. Most successful strategic systems are accidental by-products of systems originally developed for another reason. There are checklists that can focus attention on specific areas, but often, these do not get the creative juices flowing. Consequently, we need another source of ideas.

Against the grain

One approach is to do things backward. Conventional systems development wisdom says to start with the objective of a system — what it is intended to produce — and work back to the processing and the input. But in conceiving new ideas, it can help to start with the available inputs, perhaps mixed together, and see what they can create.

To organize the inputs, we can use a list that divides all the data in the world into six categories. As people brainstorm for examples in each category, they usually think of useful information they did not know existed or did not realize they could get. Practical, innovative, strategic ways of combining information are quick to follow.

The first category consists of information that is already in your computer and in the right format, such as customer lists. That data can be accessed easily and used immediately. Many successful strategic systems are based on the idea of integrating the customer more closely with a supplier's internal functioning.

Next comes information that is already in your computer but in the wrong format. An example is product cost or manufacturing scheduling data. You might let customers check directly on the production dates for their shipments. If they can do so with you and not with your competitors, naturally they will prefer to deal with you.

Just on paper

Now we get to information that resides somewhere in your organization but not in your computer. This third category covers paper records and information not currently captured. Federal Express Corp. gains an edge by recording via bar code readers when and where every package moves from one stage of the deliver process to the next. Their competitors generally do not.

You can do the same thing by capturing the times at which each lot moves from one production step to the next. That way, your customers can find out not only when their order is scheduled to be produced but how it is progressing in accordance with that schedule.

Fourth is information available outside your organization; for instance, government economic data to help forecast demand trends. This type of information is often grossly underutilized. Much of it is free — or already paid for with our taxes.

If the same application that customers use to dial into your manufacturing system also gives them other useful information such as industry forecasts, they will tend to dial into it often, strengthening their link with your firm.

It is a short step from this category to the fifth one: information not immediately available to you but which you think you can find. Market research data that requires a new survey might fall in here. By putting such data on your system, you add value to your product by giving customers a valuable commodity that they cannot get elsewhere.

It's raining ideas

Last comes information that you have no idea where to get. Interestingly, once a person proposes an item in this category, somebody else often suggests where to get it. Another person may offer an idea on how this information could be used if the organization had it. And so the strategic system concept develops.

This approach lends itself to structured brainstorming. Lists of information items on flip-chart pads taped to conference room walls encourage creativity, especially if an experienced leader

Continued on page 23

Mallach is a faculty member of the Boston College School of Management and a consultant to user and vendor executives. Based in Needham, Mass., he recently published *Win Them Over: A Survival Guide for Corporate Consultant Relations Programs.*

How to take the temperature of your software company

Stop, look, listen, ask lots of questions — and become Wall Street-wise

SHAKU ATRE

Wall Street can be a good barometer as to the financial health of a software developer. When a stock starts to fluctuate and the dives become more frequent than the rises, a company may be headed for trouble.

A good example of dropping stock prices signaling problems is Cullinet Software, Inc. Even a rising star like Oracle Corp. needs to be watched closely on the Street. The company is doing fine today, but the stock market shows how it will do tomorrow — before customers realise any problems.

Aside from financial indicators, what are the symptoms that users should watch for to judge if a software company is heading for trouble?

• **A thinly spread infrastructure.** When a software company's revenue grows at a dizzying rate of more than 50% every year, the support structure cannot expand fast enough to accommodate both old and new customers.

Support on all fronts — technical, maintenance, disaster recovery — is as important as the initial installation of the product, if not more so. Maintenance is of paramount importance: If your car is no better than your mechanic, your software is no better than your software vendor.

The result of a thinly spread infrastructure is that phone calls go unanswered or are returned too late to solve your end users' problems, leaving you to struggle on your own. The number of unreturned phone calls appears to be inversely proportional to the success of the quarterly financial report. Software vendors sometimes forget that the high-profit numbers Wall Street investors so love come from customers.

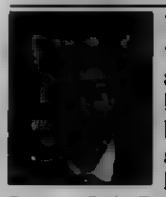
• **Rapid organization expansion.** In order to support the growing infrastructure, employees are hired indiscriminately. There is usually an insufficient number of qualified professionals in any given geographical region to fill a vendor's sudden demand for more staff. Consequently, the organization's salespeople or in-house support group often end up knowing less than some of your own staff members

Continued on page 23

Atre is president of Rye, N.Y.-based Atre Computer Assistance.

Now, that's saying a mouthful

AMY SOMMERFELD FIORE



What do you get when you cross an investment bank with a lender with a savings and loan? You get Boston Safe Deposit and Trust Co. — The Boston Co. — a subsidiary of Shearson Lehman Brothers, Inc., an American Express Company.

Quite a mouthful, eh? In the avalanche of mergers and acquisitions, many firms are experiencing a creeping concatenation of names. There's Sorbus, Inc., a Bell Atlantic Company. There's Honeywell, Inc., a Groupe Bull Company, a subsidiary of Compagnie des Machines Bull. There's Atre International Consultants, Inc., a Computer Assistance Company — which is sometimes shortened to Atre Computer Assistance.

Now consider the way the Spanish do things. You start out as Juan Colon. You marry Rosalita Hernandez. Your wife becomes Rosalita Hernandez de Colon, and your daughter is Juanita Colon Hernandez. If your daughter marries Ramon Alonso, then her son — your grandson — will be Pablo Alonso Colon. Each generation drops one name, so the children carry the heritage without gaining obese and unwieldy monikers.

If the folks at Shearson Lehman Hutton, Inc. were good Spaniards, they would have dropped the oldest name and become simply Shearson Hutton. In fact, they keep all three and amend "an American Express Company" to boot.

What's their point? Do long names carry more status? They may in some cases: IDS Financial Corp. was acquired by American Express and now uses both names — IDS American Express — which must surely help the field representatives establish immediate credibility.

Does it gain you name recognition? It may for Atre consultants, whose parent is known by business people in its 15 branch locations. Does it signal a certain breadth of capabilities, as in "Computervision Corp., a division of Prime Computer, Inc.?"

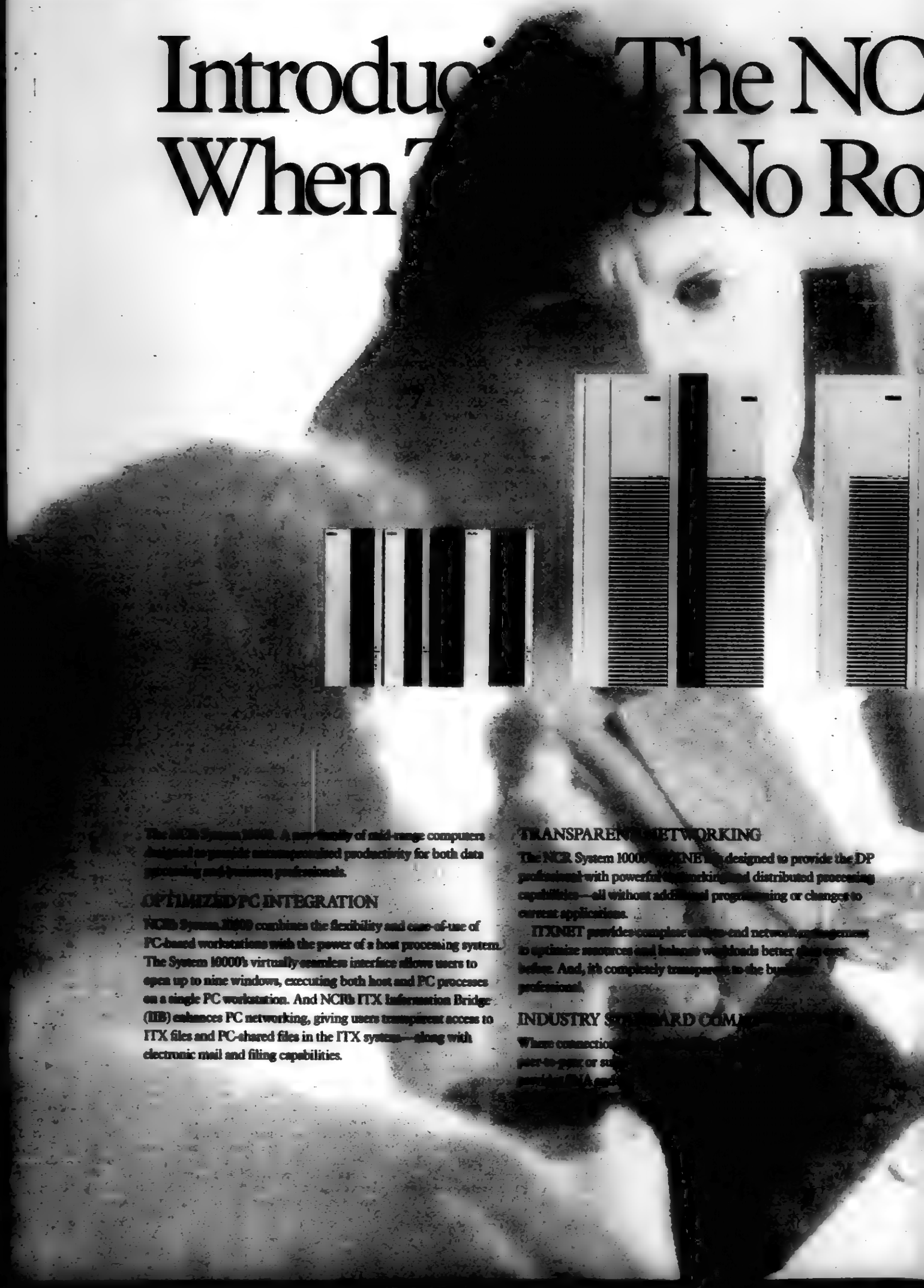
If so, then why don't we buy cans of Minute Maid orange juice that say, "a Coke-Coke, Inc. beverage?" Well, for one thing, that brings to mind a rather unappetizing combination of flavors and fizz that would turn off many thirsty consumers.

For another, soft drink vendors do not need to inspire the same level of confidence. If the merger is friendly, big businesses have nothing but goodwill to gain by trading off each other's names and reputations.

So get ready to do business, perhaps someday, with Ashton-Tate McCormack Dodge Morino Sage & Cullinet, Inc.

Fiore is a *Computerworld* senior editor.

Introduc[illegible] The NC[illegible]
When T[illegible] No Ro[illegible]



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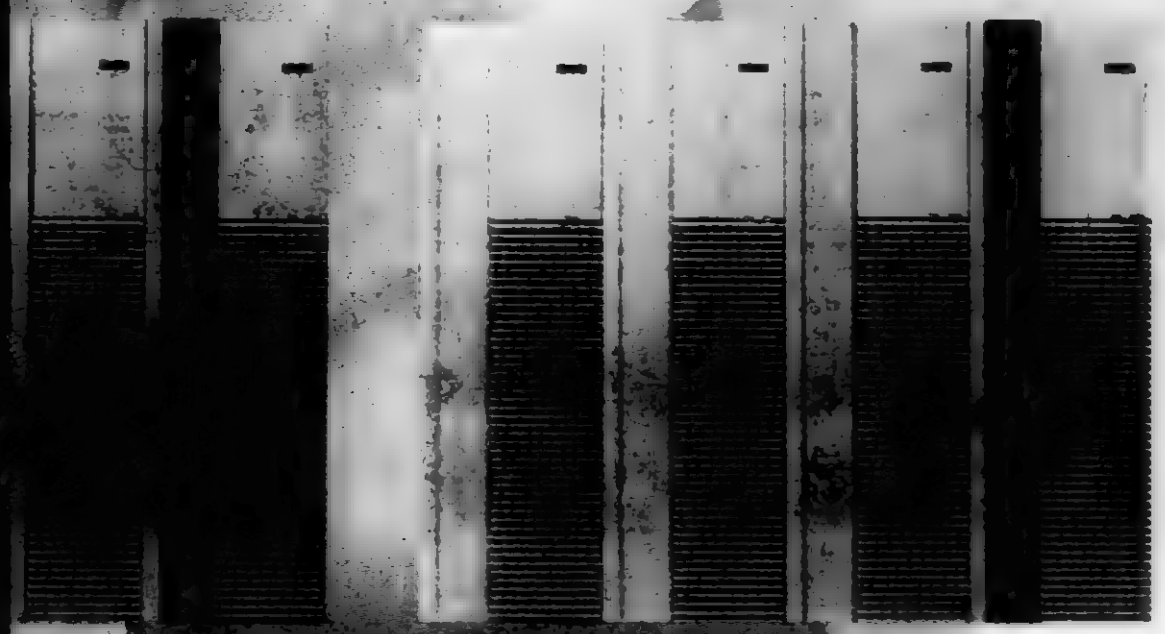

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Temperature

CONTINUED FROM PAGE 19

about how a product really functions.

Before committing yourself to a product, prepare a list of technical questions and call the vendor's designated in-house experts. Ask specifically about using the software in your vertical market for your particular application.

Some questions you might want to research include the following: How are disaster recovery and backup as well as reorganization taken care of? Are there any customer references for the claims of increased programmer productivity? What phase of the life cycle does the productivity increase refer to — coding, testing or maintaining?

What type of work load can the software sustain when a number of other tasks are running? What technical support does the vendor provide — and in which format? How close is the next branch office that has resident technical experts, not sales representatives?

How integrated are the various components of the product line? Integration is an over-used term. The vendor must demonstrate how a change in a program or in any component of the system ripples through the rest of the software. Most vendors are purposefully vague when it comes to "change management."

Talking directly to the product experts will give you insight into the part of the organization you might well rely on following the purchase. After a contract is signed, chances are small that you will often see the friendly and efficient marketing representative, unless a supplementary product is announced and you are one of the potential clients again.

• **Copycat product announcements.** Products are announced just because a competitor has introduced a similar product, and you cannot see any apparent fit between the product's features and the company's existing architecture.

• **Products for all occasions.** There are two courses that software vendors sometimes follow, and either can lead to trouble. At the one extreme, they tie all their products to one vendor's machines. As the hardware vendor encounters fortune and misfortune, so the software developer heads toward boom or bust.

On the other extreme, the software developer operates like a kid in a candy store, wanting one of everything. Chasing every hardware option means maintaining the software product across many operating systems, a resource-intensive task. In most instances, a software developer should not try to support more than one or two product lines each from mainframe, minicomputer and microcomputer vendors.

As a customer, you should inquire as to whether the software vendor spends at least 10% of its revenue on research and development of software for the hardware and operating system you use. In smaller companies, if the chief designer leaves, find out if there is a talented backup ready to take his place.

• **Jumping on the bandwagon.** Every few years a technology bandwagon comes along that vendors and customers like to ride on: relational DBMS, CASE, distributed data bases, SQL, SAA, fifth-generation languages and so on.

Bandwagons roll on, despite obstacles in the road. For instance, there are too few people even within IBM who can convincingly explain what Systems Application Architecture is, let alone how it will be successfully implemented. In regard to languages, we are still sorting out the fourth generation, yet there are some vendors claiming fifth-generation products.

If the signs of a software company in trouble are hard to read, then watch Wall Street. Investors, even if not high-tech wizards, usually bet their money on reliable software — and reliable software companies.

Backward

CONTINUED FROM PAGE 19

keeps the group thinking positively.

For instance, a plumbing fixture supplier could combine customer records and government demographic forecast data. It could then produce a customized report for each distributor, predicting changes in demand for its products and the specific items the store should order more or fewer of next year.

If the population in a given area is growing more affluent, kitchens there may be being built larger; they may be getting smaller in an area where land is increasingly selling at a premium and small apartments are more popular.

Distributors are more likely to order from a manufacturer that supplies them information as well as products. Perhaps a distributor in a conservative geographical region could benefit by knowing last year's preferences in trendy parts of the country.

Clearing the path

This sort of competitive edge is the objective of any strategic system. It is possible to achieve it on purpose, but it's not easy.

Many obstacles can arise on a company's route to a strategic system: tunnel vision gets in the way, the customer viewpoint may be difficult for many people to adopt, brainstorming sessions can seem like a waste of time to hard-driving executives and it takes a skilled leader to keep the discussions moving productively.

The incentive? Maybe you'll get that strategic system you couldn't think up any other way.

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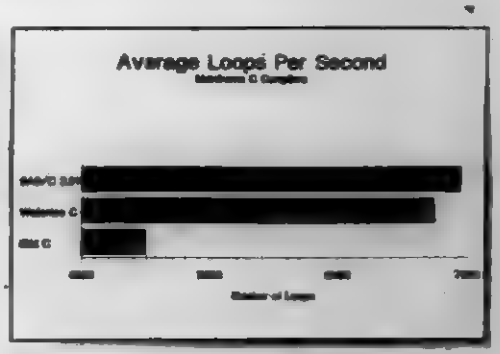

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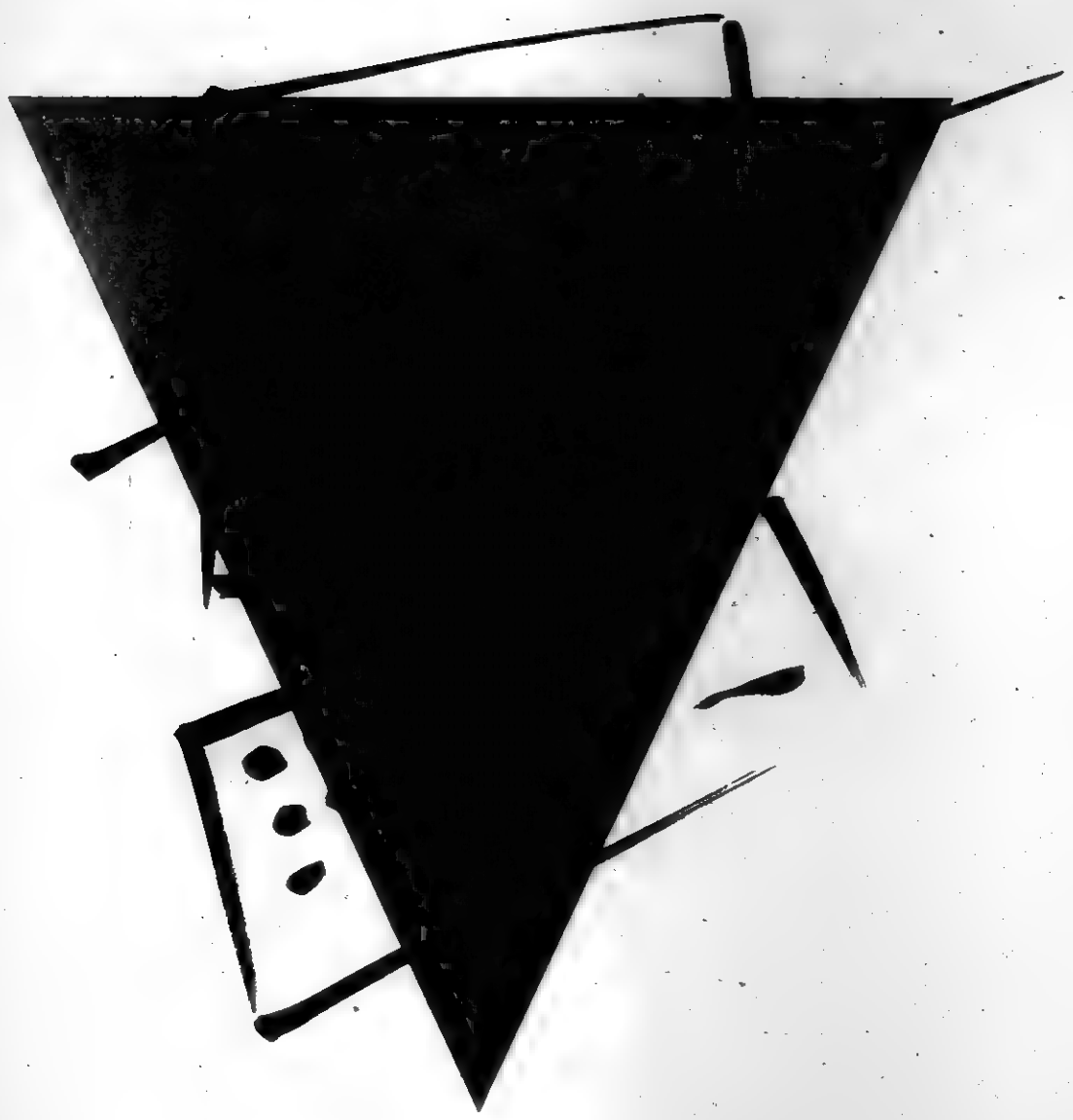

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SOFTWARE & SERVICES

SOFT TALK

Steven Pfrenzinger

Re-engineer with CASE

Traditional maintenance of existing Cobol systems is a huge burden on most data processing organizations, consuming two-thirds or more of their budgets — and still growing.

Computer-aided software engineering (CASE) technology is now addressing this maintenance problem through the concept of re-engineering. The term "re-engineering" is used to describe the modernization of existing systems during the maintenance phase. It currently has three basic categories: code restructuring, reverse-engineering and major upgrades.

While most CASE vendors are offering tools for the design (front-end CASE) and development (back-end CASE) of new applications, very few have addressed the maintenance of existing systems. Most design and development CASE tools can be used successfully to maintain Cobol systems that were originally developed with these tools. However, they do nothing for the 75 billion or so lines of Cobol code written worldwide without them.

Many of these Cobol systems are critical applications that were written as long as a decade or two ago. They are usually difficult and sometimes impossible to maintain; and at a cost of $10 to $25 per line, a complete rewrite of the system

Continued on page 30

Dictionary awaits ANSI seal

Central data directory standard would alleviate product disparities

BY NELL MARGOLIS
CW STAFF

NEW YORK — The American National Standards Institute (ANSI) is expected to soon put its stamp on a central data dictionary standard that could help end decades of confusion, redundancy and inaccuracy for software users and developers.

The Information Resource Dictionary System (IRDS) standard has been under development since 1980. It is an extensible dictionary system that describes, controls and manages information resources such as data bases, elements, records, screens and systems used by data processing organizations, according to David Carpenter, products development manager at Pansophic Systems, Inc. and vice-chairman of the ANSI committee that drafted the proposal.

The absence of such a standard has created a situation that one user called "one of the biggest problems to plague the software industry."

Carpenter said users have tolerated multiple proprietary dictionaries, or control files, housing fragmented, disparate descriptions of information resources. In their many forms, those dictionaries cram valuable disk storage space with redundancies, retard intraproject communication and erect a formidable roadblock to integration of off-the-shelf products.

Carefree migration

With IRDS, on the other hand, "we can migrate from system to system and data base to data base without worrying about dictionary contents," said James Squier, acting chief of the data administration division of the Department of Commerce.

"This is terribly long overdue," said Vaughan Merlyn, chairman of Bellevue, Wash.-based CASE Research Corp.

As proposed, IRDS is a global repository structure to hold all descriptions of a user company's information resources to be shared by all of the company's systems development tools. It is structured to meet new requirements for information resource descriptions and defines a complete programmatic interface that lets users query and update IRDS from within a program. The latter ability, Carpenter said, allows IRDS to function as a data base.

Three additional interfaces will be layered on top of the programmatic, or services, interface, Carpenter said. A command language interface will serve as the primary batch interface to IRDS; a panel interface will serve on-line; and a specialized dictionary-to-dictionary interface will let different implementations of the central data dictionary exchange dictionary schema and information.

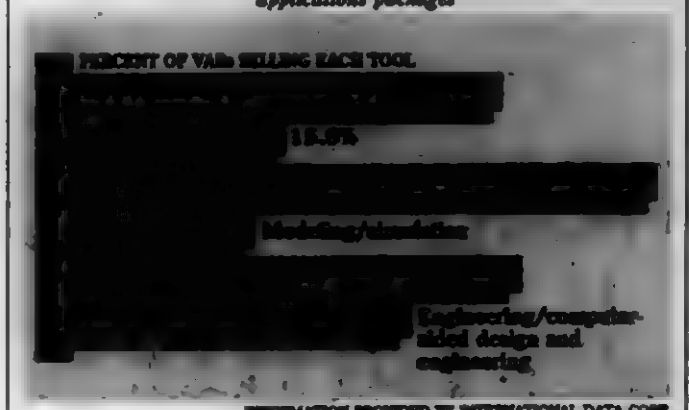
IRDS is based on an entity re-

Continued on page 30

Data View

DBMSs dominate Unix tool sales

A survey of 806 value-added resellers cites most popular Unix applications packages



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

Medusa gets a face-lift

BY NELL MARGOLIS
CW STAFF

NATICK, Mass. — Prime Computer, Inc.'s Computervision division last week introduced two software packages and offered an update on the company's plans for its Medusa drafting, design and documentation tool.

Primecontrol is an engineering and management software system designed to organize and track vast amounts of product development information com-

Continued on page 31

M&D to customize accounting

BY CHARLES BABCOCK
CW STAFF

NATICK, Mass. — McCormack & Dodge Corp. wants to revitalise the maturing accounting software market by putting more options to customise its packages into the hands of its customers.

The company is starting with the old war-horse in the field — the general ledger — by offering a new version of that package with options to tailor it to a particular business. Called GL:Millennium 3.0 for M&D's previously successful integration platform and fourth-generation language, the package is slated to be available in June for $175,000.

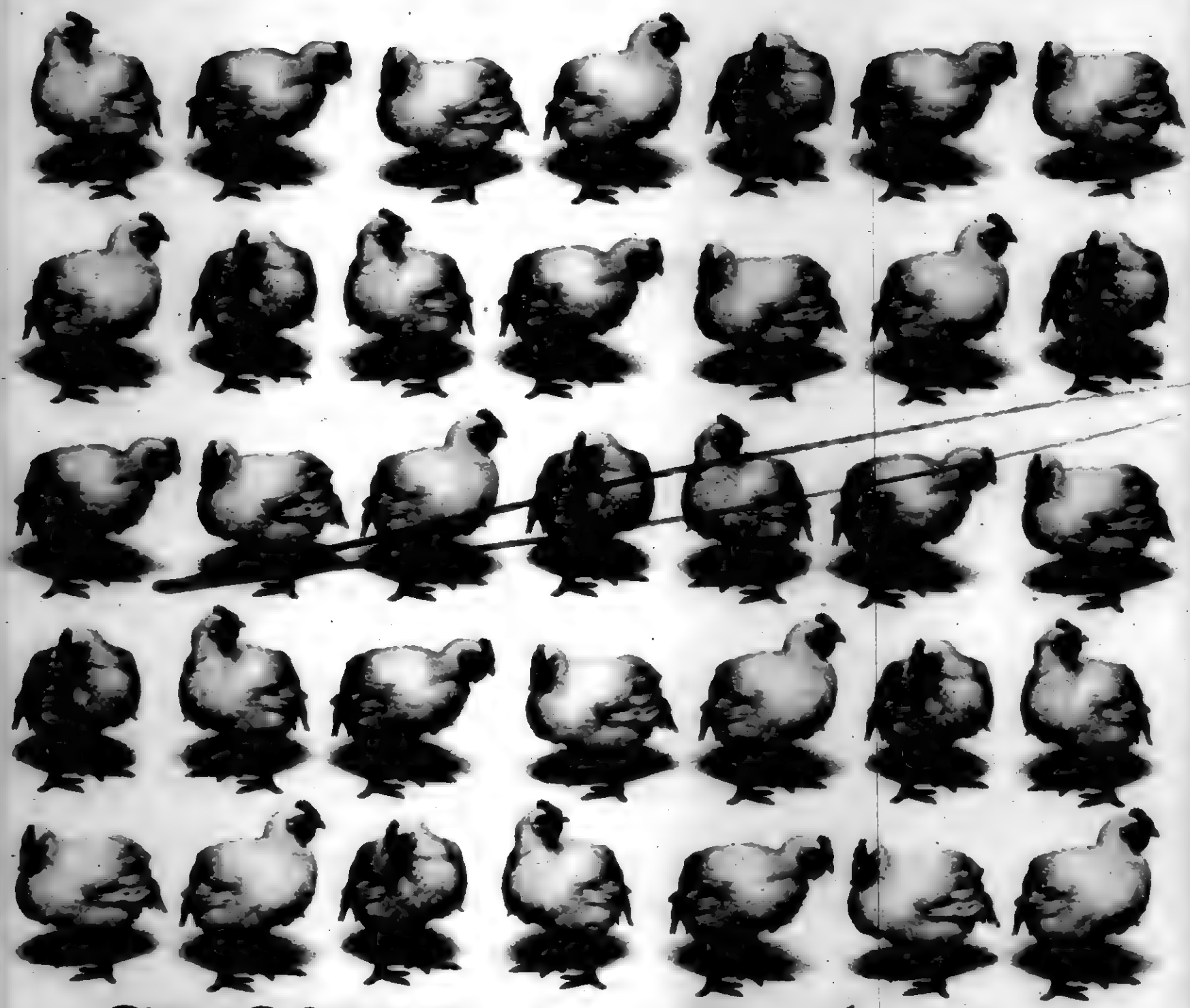
At the same time, M&D announced new currency management and mainframe-to-micro link packages.

Most accounting packages predefine keys and amount classes, prompting businesses to fit their practices into a mold. That is one reason why half of the general ledger systems in the U.S. were developed in-house by a design team that understood the nature of their employer's business, said Lynne Sarikas, M&D's marketing manager.

The new version of GL:Millennium allows a user to set up a key by division, product, state or

Continued on page 31

- MCBA to slim enhanced business tools at large Unix users. Page 33.
- Symbolics reveals Genera package. Page 33.



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As a result, programmer productivity at Holly Farms has reached an all-time high. "We've seen substantial improvement ratios," Clontz said. "In the time a programmer might turn out one CICS command-level program, he can turn out from six to eight programs on MANTIS."

Most of the 500-plus MANTIS applications now in production at Holly Farms are aimed at streamlining costs. For example, Data Processing used MANTIS to develop a model of how chickens consume feed over the course of their lives, allowing Holly Farms to cut production at one of its feed mills by 1½ days a week.

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MCBA re-engineers Unix accounting, manufacturing line

BY NELL MARGOLIS
CW STAFF

GLENDALE, Calif. — MCBA, Inc., a leading manufacturer of accounting software for Digital Equipment Corp.'s VAX/VMS, is about to make its bid for a similar stance in the Unix market with an 18-module accounting and manufacturing software line.

Technically an enhancement of the company's current Unix line, MCBA's Release 4 has been rewritten in RM/Cobol 85, re-engineered and expanded to include eight new modules, said Gary Hedge, vice-president of software engineering.

First-time entries include a suite of manufacturing software packages — Job Costing, Standard Product Routing, Labor Performance, Standard Product Costing and Capacity Requirements — as well as a Fixed Assets and Depreciation module and a Sales History module featuring analysis reports, comparisons and detailed history.

MCBA's first six packages in the new Unix series will be Accounts Payable, Accounts Receivable, General Ledger, Payroll, Inventory Management and Report Writer. Slated to be available late next month, they will be able to run on a standalone basis or as part of an integrated system, as will be the case with all forthcoming modules, according to Hedge.

Repetitive tasks targeted

The 18 modules, all of which are expected to ship by the fourth quarter, will function together as a manufacturing resource planning system, targeted toward both job shops and repetitive manufacturing.

Only about 1,000 of MCBA's more than 25,000 current installations are in the Unix world, according to a company spokesman. MCBA, being keenly aware of the business world's increasing interest in Unix, hopes to greatly increase its market share with Release 4, he said.

The new line features expanded capabilities aimed at large companies. For example, Hedge said, the current Unix line includes a general ledger code number of 10 digits divisible into two subgroups; Release 4's version allows for 24 characters divisible into five subgroups.

Release 4 packages will run on Motorola, Inc. 68000-based computers, including the NCR Corp. Tower series and the Unisys Corp. 5000. Single-license prices are slated to range from $1,500 to $9,000, depending on the CPU.

SOFTWARE NOTES

H&W Computer sorcerer behind Wizard Mail

H&W Computer Systems International in Boise, Idaho, plans to sell an electronic mail system for the IBM CICS environment. Wizard Mail, recently purchased from Steel Heddle Manufacturing Co. in Greenville, S.C., includes calendaring and scheduling facilities as well as a gateway to Western Union Telegraph Corp.'s Easylink product. Wizard Mail will be offered to data processing shops with minimal E-mail needs. The systems range in price from $3,500 to $14,000.

The management information consulting practice of **Arthur Andersen & Co.** has been named an IBM Authorized Marketing Assistant. The arrangement is intended to allow Arthur Andersen marketing directors to assist IBM representatives in selling the consulting firm's DCS/Logistics system.

Hewlett-Packard Co. has teamed up with **Cimlinc, Inc.** in Elk Grove Village, Ill., to market the Cimlinc computer-aided manufacturing package for HP 9000 Series 300 workstations. Initial shipments of the joint product are expected in July.

London-based **Unisoft Corp.** will act as **Motorola, Inc.'s** exclusive agent for future products based on Unix System V, according to an agreement signed by the two companies. Unisoft has offices in Boston. The Motorola semiconductor division is located in Austin, Texas.

Language Processors, Inc. in Framingham, Mass., has agreed to port its LPI-PL/I compiler to the HP 9000 Series 300 engineering workstations. LPI-PL/I is an implementation of ANSI-standard PL/I that includes an optimizer for both global and local optimization. It includes PL/I extensions for compatibility with IBM and Digital Equipment Corp.'s versions of PL/I.

At a loss for props for your next presentation? **E-Ke Ltd.**, in Dublin, Ohio, is offering a card game called Expert-Knowledge Engineer that was designed to acquaint novices with expert system technology. The company uses the card game at its seminars and is now offering it for $9.95.

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Pfrenzinger

FROM PAGE 27

may be out of the question.

Restructuring code. Code-restructuring products are one category of maintenance-oriented CASE tools that offer great potential. They essentially read the unstructured and often complex Cobol code and product from the top down, creating a structured code that is far easier to understand and maintain. All of this can be done at a cost of $2 or less per line, making the process an attractive alternative to entirely re-specifying an older system.

Among such products is Recoder from Language Technology, Inc., a highly automated restructuring tool.

Restructuring products currently address the Cobol procedural issues, not data issues such as data name rationalization, building a dictionary or migrating to a different data base management system. Bachman Information Systems, Inc. recently announced a series of products that are focused on data issues.

An alternative to restructuring is to leave the code alone and seek an intelligent editor to help programmers analyze programs before making maintenance changes. Via/Insight from Viasoft, Inc. is an example of an ISPF-based product that supports such change and impact analysis for Cobol programs.

Reverse-engineering. In simple terms, reverse-engineering is the translation of an end product — that is, Cobol source code — back into its design-level representations. Being able to maintain systems at this higher level is one of the most important objectives of CASE.

Elevating procedural logic and data requirements to an abstract level is the first essential step in a comprehensive reverse-engineering process that makes forward-engineering much easier.

Several vendors have already accomplished this. Language Technology's Recoder reverse-engineers the Cobol procedural logic into a high-level control flow diagram before actually restructuring the code. Bachman's products, assisted by artificial intelligence technology, use various diagrams and models to support these reverse- and forward-engineering capabilities on file and data base issues, such as migration from Cullinet Software, Inc.'s IDMS/R to IBM's DB2.

Major upgrades. In re-engineering terms, major upgrades are oriented toward modernization rather than traditional maintenance enhancements such as adding reports to screens. They occur after the existing systems have undergone a transformation via restructuring or reverse-engineering and include moves to on-line or data base environments, changes in hardware or software platforms, performance optimization and any other significant upgrade.

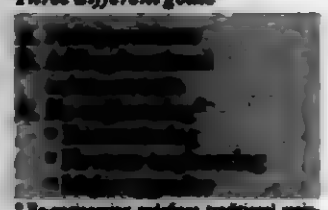
Re-engineering life cycle. Re-engineering projects have a different life cycle from new development efforts. The cycle includes: evaluating the condition of the code for all existing systems; selecting the candidate systems and programs for modernization; restructuring and reverse-engineering; applying the major upgrades, using the improved data base system; implementation; and sustaining or keeping the system structured and maintainable in the future.

Benefits. The utilization of CASE for re-engineering existing Cobol applications will bring substantial productivity and quality improvements to the areas that consume the majority of the DP budget. This frees additional dollars for new development. It will also make re-engineering an appealing career path for many programmers who previously avoided maintenance assignments.

Pfrenzinger is president of Information Management Systems Consulting Inc., a Northridge, Calif.-based firm specializing in the development and modernization of IBM's IMS DB/DC and CICS applications.

Maintenance

Three different goals



* Re-engineering redefines traditional maintenance by addressing the modernization of existing systems

Re-engineering

*Reworking existing systems**

* The re-engineering life cycle for existing systems is different from that for new development

Dictionary

FROM PAGE 27

lationship model similar to that used in many proprietary dictionaries, including IBM's. A competing repository standard promulgated by the International Standards Organization (ISO) employs a data model similar to SQL's.

Carpenter said ANSI chose the entity relationship model because "its compatibility with existing systems will allow users to convert to IRDS in an evolutionary, not revolutionary, manner," and also because it more clearly creates the central repository as a stand-alone resource.

In contrast, "the ISO model sees IRDS more as an extension of a data base management system," he explained. "Also, since SQL is obtaining popularity, they felt their standard would be better received by users."

However, Carpenter pointed out, the ISO dictionary standard has yet to go through a review process, "so this isn't the opinion of users, but of a bunch of dictionary experts."

While the ISO standard is winning support in such countries as Japan, the UK and Canada, the U.S. organizations are strongly backing the ANSI posi-

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tion, as is West Germany and such leading U.S. vendors as IBM, Applied Data Research, Inc., Pansophic, Cincom Systems, Inc. and Cullinet Software, Inc. Earlier this year, an IBM spokesman attended an ISO meeting and vocally threw the company's support behind the ANSI position.

"Our customer comments," said Dana Marks, IBM advisory product planner, "tell us that IRDS is the way to go."

"Ultimately, I don't see any contradiction," said Alan Goldfine, leader of the IRDS development project at the Institute for Computer Sciences and Technology at the National Bureau of Standards, which co-developed IRDS with ANSI. "We can have an ANSI standard right now. Even under the best of circumstances, I don't see an ISO standard for at least two to three years. By then, IRDS will be ready for expansion and revision anyway." At that point, he added, ANSI could adopt ISO features as desired.

One thing that is clear, Goldfine said, is that there will be a Federal Information Processing Standard. Even in the event that IRDS does not receive ANSI approval, he added, his group has stated that the ANSI version of IRDS will be such a standard.

M&D

FROM PAGE 27

any other basis for tracking information that he wishes. A product-oriented manufacturer would do it differently from a regulation-minded utility, she noted. The user may use up to 44 characters in the key to create up to 12 reporting elements.

Instead of facing a set number of references to previous accounts, such as a budget with balances listed for the previous three years, a user can determine how many years of historical data he wants and how many versions of the budget he wants to maintain, Sarikas said. A user can also define the accounting period in which he plans to make entries, using up to 54 in a year. Traditional accounting software offers 13 periods, Sarikas said.

Standard features of the existing Millennium product work with the new package, M&D officials said.

Beta-test user

R. J. Reynolds Tobacco International, Inc. started working with a beta-test copy of GL:Millennium 18 months ago when its reporting requirements changed after acquiring Nabisco. Charlotte E. Myrick, manager of financial reporting development, said the flexibility of the product allowed it to replace an in-house system "very quickly. With the old system we would have needed several months to go in and add new amount classes, vs. a few hours with M&D."

Reynolds created a table behind its master key explaining each code found in it, "a terrific function for us." The key used seven of the 12 possible levels for reporting financial data, she noted. As part of an industry with legal reporting requirements, Reynolds used GL:Millennium to create management and legal reporting structures without using two separate general ledgers, she said.

GL:Millennium 3.0 runs under IBM's MVS or DOS on 4300 or higher processors.

M&D is also offering Currency Management:Millennium 3.0, which is said to let a company manage its business in multiple currencies working in conjunction with GL:Millennium 3.0. Also available in June, that package will be priced at $65,000.

M&D has added a common end-user front end to its micro-to-mainframe link, PC Link 3.0, so a personal computer user can have access to both mainframe and microcomputer functions at the same time, said M&D Vice-President Dean Redfern. A selective uploading feature allows a user to point to the appropriate mainframe field on a screen for uploading micro data.

PC Link 3.0, also available in June, will be priced at $1,100 per micro or $800 in quantities of 10, with a $35,000 charge for the mainframe component.

Medusa

FROM PAGE 27

monly housed in a large, distributed engineering data base.

Two subsystems, a Prime 50 Series minicomputer-based Central Data Manager and a Local Data Manager resident on a workstation or a separate 50 Series system, combine to oversee the flow of information through design and approval cycles, said Robert A. Fischer, Computervision's president.

The Central Data Manager module ranges in price from $23,900 to $75,000, depending on the 50 Series configuration. License fees for the Local Data Manager range from $900 to $3,800.

Primedesign, which runs on Prime's PXCL 5500 workstation, offers users three-dimensional solid, surface and wireframe modeling capabilities on an integrated basis. Designed to complement Prime's Medusa and Graphical Numerical Control software, Primedesign, in addition to a wide range of standard modeling features, uses a complex geometric technique to represent curves and surfaces with a high degree of precision, company spokesmen said.

Primedesign drew favorable comments from both market analysts and beta-test users.

The software ranges in price from $79,900 to $104,900, which includes a Prime PXCL 5500 workstation. An optional component, the Detailer Module, can be licensed for $7,500.

Prime also rolled out enhancements to Medusa, including a new module for building layout and planning. The company, Fischer said, will continue to support and enhance both its own Medusa and CIS Medusa, the flavor marketed by Computervision, while actively working toward a converged product that will run on Digital Equipment Corp., Sun Microsystems, Inc. and Prime platforms.

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NEW PRODUCTS

Systems software

On-Cue Release 1.4, a menu-driven query and reporting program for IBM mainframes, has been announced by **Decision Technology, Inc.**

On-Cue leads the user through a path of fill-in-the-blank menus that design reports and generate input to the vendor's Decision Analyzer batch report program. On-Cue contains on-line report design capabilities, batch and machine language execution and minimal memory requirements.

Added features include the ability to use field names in arithmetic expressions to calculate and assign the results to a new field name. On-Cue also supports requests against IMS and DL/1 data bases.

On-Cue is available for use with IBM DOS/VSE and MVS operating systems using CICS, TSO or VTAM. Prices range from $4,000 to $8,000.

Decision Technology, 4390 U.S. Route 1, Princeton, N.J. 08540. 800-322-9370.

A product designed to improve CICS response time and relieve virtual storage constraints has been announced by **Axios Products, Inc.**

Fetch/XA breaks the single-thread CICS loading bottleneck by processing all program load requests asynchronously at storage-to-storage speed from IBM's MVS/XA. Its multithread loading mechanism improves CICS response time by reducing program wait on the load library. It addresses I/O, compression and overall CICS throughput problems as well.

Fetch/XA is priced at $15,000.

Axios Products, 1455 Veterans Highway, Hauppauge, N.Y. 11788. 516-348-1900.

Symbolics, Inc. has enhanced its **Genera** operating system software.

Genera Release 7.2 features improved interactive response time and upward compatibility with Genera 7.1. According to a company spokesman, the user interface has been extended consistently across major system components.

In addition, the spokesman said, eight manuals were added to the documentation set, including a workbook for new users.

Other features include an Undo facility for the editor, a Hints facility, reduced disk-space requirements, additional metering tools with a graphical interface and a graphics system that uses the Adobe Systems, Inc. Postscript imaging model.

All Genera 7.2 sources are available as part of the operating system or on the Supplemental Genera 7.2 source tape, priced at $7,500.

Symbolics, 11 Cambridge Center, Cambridge, Mass. 02142. 617-621-3100.

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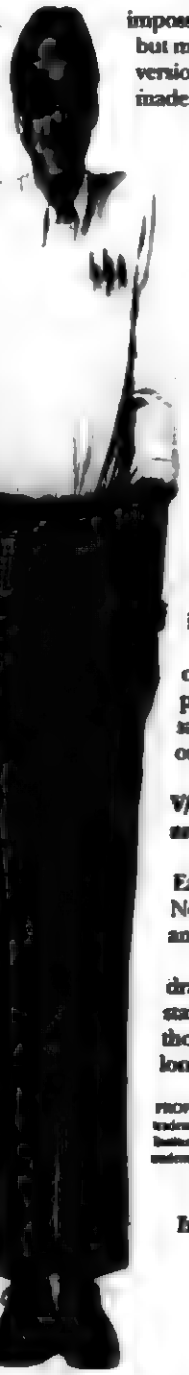

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V/SEG's Alias Assignment feature provides a DCSS renaming capability that allows you to thoroughly test new software releases in parallel with your full production versions—something that is normally impossible with DCSS-resident programs. Not only that, but most testing is transparent to the users and faulty versions can be easily backed out while corrections are made.

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In addition, V/SEG creates a visual display of DCSS by virtual storage. This improved mapping utility cuts the time needed to allocate new saved systems and to adjust the location of existing ones.

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Applications packages

Avcom Corp. has announced **Release 9** of Autodesk, Inc.'s **Autocad** for Sun Microsystems, Inc. workstations.

Autocad Release 9 features an advanced user interface with pull-down menus, icon menus and dialogue boxes that supplement the keyboard, screen menu and digitizer template as a means of entering commands. The pull-down and icon menus are programmable.

Other new features include improved curve generation using B-splines, 20 additional text fonts, enhancements to the Autolisp programming language, support for a faster Autodesk Device Interface driver for displays and a drawing slide utility program.

Autocad Release 9 for Sun workstations costs $2,850.

Avcom, 119 University Ave., Palo Alto, Calif. 94301. 415-326-8686.

Utilities

Executive Software, Inc. recently announced that its **Diskeeper** disk defragmenter is now available for Digital Equipment Corp.'s Vaxstation 8000 computer.

According to Executive Software, Diskeeper keeps the Vaxstation 8000's disks from becoming fragmented and impacting the processing capabilities.

In addition to managing the disks, Diskeeper groups free space at the front of the disk.

Diskeeper is priced from $249 to $3,250.

Executive Software, Suite F, 3131 Foothill Blvd., La Creacenta, Calif. 91214. 818-249-4707.

A set of CICS programs that allow viewing and browsing of CICS status queues from any terminal has been released by **D. L. Brickey & Associates, Inc.**

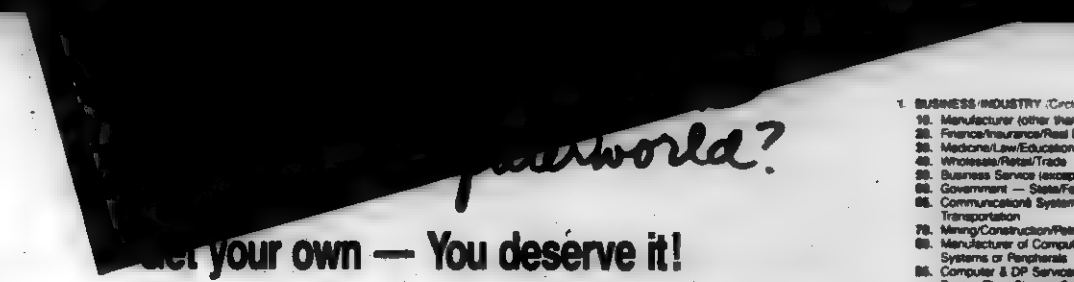
CICS Log Browse includes Cobol command-level source code. It operates under CICS Release 1.5 and later under the IBM MVS and DOS/VSE operating systems.

The **Unedit Module** reportedly reverse-edits any numeric field entry mapped in from an IBM 3270-type terminal.

The Unedit Module includes source code and sample Cobol programs and runs under IBM's MVS/XA in 31-bit mode.

CICS Log Browse can be licensed for $800. The Unedit Module can be licensed for $600.

D. L. Brickey & Associates, P.O. Box 614, Rochester, Ill. 62563. 217-498-8479.



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MICRO BITS

Ed Scannell

Say what you mean, IBM

What the president meant to say was . . . At a two-day technical seminar in Boca Raton, Fla., in February, Bill Lowe, president of IBM's Entry Systems Division, gave the distinct impression that his company will dramatically reduce prices on its Personal System/2 series by year's end.

Lowe said, "What we will be doing is improving the price/performance offered at each of our current price points. . . . Where we have a Model 25 with an Intel 8086 today, by the end of the year, we may have an 80286 product at that price point; and by the end of 1989, or in that vicinity of time, we'll probably have an 80386-based system at that price point."

From these statements, one could justifiably think that IBM planned to drop the price of its Intel 80286-based machines to the level of its PS/2 Model 25, now priced at about $1,300, by year's end and that its current Intel 80386-based machines would be similarly priced by the end of 1989.

Well, it appears this is not quite the message Mr. Lowe

Continued on page 66

NBI's Legend ties applications

Joins list of combined desktop publishing and word processing products

BY DOUGLAS BARNEY
CW STAFF

BOULDER, Colo. — Yet another entrant into the new market for products that combine word processing and desktop publishing was shipped last week.

Called Legend, the $695 software package from NBI, Inc. is aimed exclusively at users of high-powered Intel Corp. 80286- and 80386-based PCs.

Other packages in this market include Pageperfect from IMSI and Total Word from Lifetree Software, Inc. Both of those packages eliminate the need to use a separate word processor and then export text files to a desktop publishing system for fancy formatting.

These systems may also verify former Apple Computer, Inc. Chairman Steve Jobs' prediction that enhanced word processing packages will eventually eliminate the need for stand-alone desktop publishing software.

Legend joins the small but growing list of word processing packages that run under Microsoft Corp.'s Windows operating environment. NBI was apparently undeterred by Apple's recent lawsuit charging that Windows infringes on its copyright.

Legend provides the capability to produce so-called compound documents, combining text, graphics, fonts and sophisticated formatting. The user interface is selectable and can be either menu- or function key-based. The word processing component includes table generation, word search and style sheets, which enable a user to design a page and then fill it with the appropriate text. In addition, the package can handle documents of up to 750 pages.

The system is able to import and export a variety of text file types, including ASCII, Wordperfect Corp.'s Wordperfect, IBM's Document Content Architecture and Microsoft's Word files. It can also import data files and graphics files. Legend supports most conventional printers as well as Adobe Systems, Inc. Postscript-based laser printers.

The system requires at least 640K bytes of random-access memory, IBM's Enhanced Graphics Adapter, a 20M-byte hard disk and a mouse.

Inside

- Review: Lotus's Symphony sequel. Page 35.
- The Brooklyn Bridge ties up highway agency. Page 56.
- Symantec updates Time Line for high end. Page 65.

Data View

Cool deals

Lowest retail prices for Apple Macintosh models in February

INFORMATION PROVIDED BY WORL ASSOCIATES
CW CHART

Brand-name PCs give cheap clones the boot

BY ALAN J. RYAN
CW STAFF

Corporate MIS departments are funneling their hardware investment funding away from low-cost IBM clones now more than ever, instead favoring actual IBM Personal Computers or major IBM PC compatibles.

Analysts interviewed last week said price reductions and hardware upgrades on leading compatibles, IBM's improved low-end products, the quasi-mysterious IBM Micro Channel architecture and a tumultuous dealer arena have caused more of corporate America's buyers to stick with big-name brands.

Analyst Bruce Stephens of Framingham, Mass.-based International Data Corp. (IDC) forecast that the market for Intel Corp.'s 8088 and 8086 processors will drop from 2.07 million in 1987 to 1.65 million this year, while the Intel 80286 processor will climb from 1.98 million in 1987 to 2.9 million in sales this year.

Yet even as more clones enter the 286 race, it is unlikely that they will win big there, either.

"From the corporate standpoint down to medium-size busi-

Continued on page 65

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REVIEWS/NEW PRODUCTS

Upgrade keeps Symphony in shadows

BY JOHN WALKENBACH
SPECIAL TO CW

Sometimes, users of Lotus Development Corp.'s Symphony must feel neglected: Lotus's 1-2-3 gets the glory, while Symphony remains in the shadows.

Finally, Lotus has come through with a Symphony upgrade. Unfortunately, Symphony aficionados might be disappointed with Release 2.0. Most of the enhancements are in word processing, but at least copy protection has been dropped.

Features: Built around a 1-2-3-like spreadsheet, Symphony offers views into data by means of an integrated spreadsheet, a word processor, an outliner, a data base, modem communications and graphics modules. The major enhancement to the spreadsheet function is a minimal recalculation feature, which allows you to recalculate only affected cells.

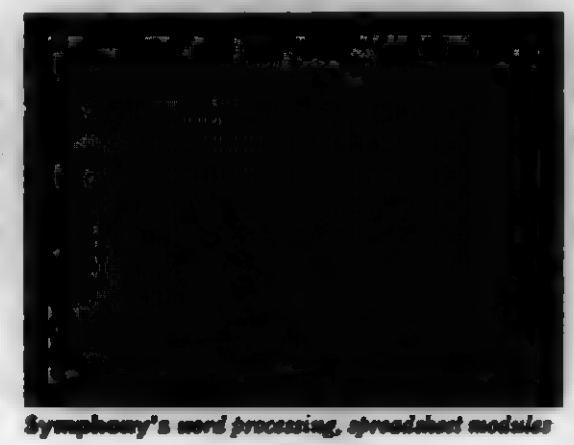
The most impressive enhancements are in Symphony's word processing module. Added features include automatic paragraph reformatting, on-screen dynamic display of page breaks, a spelling checker add-in, easier selection of character attributes and a clipboard for pasting text within a document.

You can now specify up to 256 fields in a data base record as well as insert, move or delete fields from a data base form. The communications module features a Digital Equipment Corp. VT100 terminal-emulation add-in.

Performance: Satisfactory to very good. Since all of Symphony's data resides in random-access memory, everything has to fit into free memory. Release 2.0 makes better use of expanded memory, however. But if you do not have Lotus/Intel/Microsoft Expanded Memory Specification, Symphony will probably seriously limit the size of your work files.

The word processing environment is fairly fast, but it is slower than most popular stand-alone word processors. Its main drawback is its RAM dependency. Symphony's data base is a simple flat-file system. The Form mode makes it very easy to update records, indicate selection criteria and generate reports.

Documentation: Very good. We found Symphony's new manuals to be thorough, well written and organized for easy access. The on-line Help is context-sensitive and includes an index.



Symphony's word processing, spreadsheet modules

Symphony Release 2.0

Price: $695

- Performance: Satisfactory to very good
- Documentation: Very good
- Ease of learning: Satisfactory
- Ease of use: Satisfactory
- Error handling: Satisfactory
- Support: Satisfactory to very good
- Value: Satisfactory

Ease of learning: Satisfactory. Mastering Symphony is no easy feat. The overwhelming number of menus, as well as the use of multiple windows, can get confusing. However, use of a common user interface helps, and Lotus provides the necessary teaching tools.

Ease of use: Satisfactory. Considering the complex nature of the program, once learned, Symphony is no harder to use than most other high-end applications. Symphony makes good use of the function keys, and the word processor has several accelerator keys so you can bypass the menus for some common operations.

Error handling: Satisfactory. Symphony responds appropriately to common error conditions such as open disk drive doors and full disks. We were surprised to discover, however, that a well-known problem remains: It is still relatively easy to abandon or overwrite a work sheet without saving it. On the plus side, the word processing environment now has an Undelete function.

Support: Satisfactory to very good. Lotus staffs its customer support phone lines — which are not toll free — from 8 a.m. to 5 p.m. Eastern Standard Time. A premium support service, called Prompt, costs $75 per year. This includes a toll-free telephone number, 15 unlimited-time calls during the period of the subscription and hint books and demonstration disks of new Lotus software.

Both the calls we made to Lotus were handled by knowledgeable technicians after only a brief time on hold.

Value: Satisfactory. Its $695 price tag places Symphony Release 2.0 on the expensive end of the personal computer software spectrum, but it does buy a lot: a 1-2-3-equivalent spreadsheet, a good word processor with a spelling checker, a functional data base management program, simple communications capabilities, rudimentary graphics functions and a powerful macro facility — and they all work together.

Walkenbach is consumer research manager for a leading savings and loan association in Southern California.

Note on reviews

The reviews presented in this section are encapsulated versions of reviews published recently in Infoworld, *an International Data Group publication. The text is transmitted by the IDG News Service and edited by Suzanne Weixel.*

Flexcache goes Compaq one better

BY STEPHEN SATCHELL
SPECIAL TO CW

Advanced Logic Research, Inc. has improved its line of Intel Corp. 80386-based computers with the introduction of its Flexcache 386 series.

The Flexcache 20386, like Compaq Computer Corp.'s Deskpro 386/20, implements a dual-bus architecture that separates 32-bit memory from the rest of the system.

But with Flexcache, Advanced Logic Research has gone Compaq one better. Not only is the system faster than the Deskpro 386/20, it is also considerably less expensive.

Features: The Flexcache 20386 runs at 20 MHz with virtually no wait states. The floor-standing unit comes standard with 1M byte of 80-nsec random-access memory. The system board can handle up to 2M bytes of RAM, with an additional 8M bytes available. A 20-MHz Intel 80387 math coprocessor can be plugged into the system board.

Flexcache 20386

Price: $5,990 to $9,990

- Performance: Poor to excellent
- Documentation: Good
- Ease of use: Satisfactory
- Setup: Very good
- Serviceability: Good to very good
- Value: Very good

The Flexcache 20386 uses the Intel 82385 high-performance caching controller chip with 32K bytes of 35-nsec cache RAM. Advanced Logic Research claims the computer will find RAM data in zero-wait state cache memory more than 95% of the time. The other 5% of the time, the RAM search requires two wait states.

The system board has two 8-bit slots, four 16-bit slots and a pair of slots that provide 32-bit memory expansion but do not accept standard controller cards.

The basic system comes with a battery-powered clock/calendar, an enhanced IBM Personal

Continued on page 38

Slidewrite Plus tops charts for ease, support

BY KEN MILBURN
SPECIAL TO CW

Recently updated to Version 2.10, Advanced Graphics Software, Inc.'s Slidewrite Plus really shines at providing flexibility in formatting data for business, scientific or statistical graphs.

But other presentation graphics packages are significantly stronger in the support of slide-making output devices and capabilities for producing illustrations and word charts.

Features: Slidewrite Plus provides formats for seven major graph types: bar, line, pie, scatter, high-low, area and mixed. The program has extensive user options for displaying charted text and data. For instance, line charts can be displayed as straight lines or curves.

Most of the standard options for choosing color, fill pattern, marker style, line style and text style are available. You can put several charts of any type on a page. You cannot, however, control the width of a bar or the width of a line in a high-low chart. You also cannot rotate horizontal axis labels if text would otherwise overlap. And there is no way to specify the weight or color of border frames.

Slidewrite Plus *provides business, scientific graphics*

Slidewrite Plus Version 2.10

Price: $345

- Performance: Good
- Documentation: Satisfactory
- Ease of learning: Very good
- Ease of use: Good
- Error handling: Very good
- Support: Very good
- Value: Good

Slidewrite Plus includes Draw and Text modules. Drawing capabilities are rudimentary compared with those in Lotus Development Corp.'s Freelance or Software Publishing Corp.'s Harvard Graphics.

Slidewrite Plus's drawing primitives include lines, arrows, boxes, circles, text and a library of 101 figures. The text module is for typing bulleted word lists in the preferred type style and size.

Performance: Good. Slidewrite Plus efficiently performs its calculations and displays the graphical results on-screen. Executing commands, bringing up forms and regenerating charts occur instantaneously on a 10-MHz IBM Personal Computer AT.

Data entry limits for each of the modules are quite generous. You can have 2,600 text characters on a page and 4,000 data points in a chart. You are limited

Continued on page 38

The Sudden Appearance Of Network Carpetbaggers.

Beware of "Johnny-Come-Lately's" who talk a good game but don't hold all the essential cards.

It's a rough world out there for anyone trying to make an educated buying decision–the right decision–about communication networks.

On top of sorting out your own needs against constantly shifting carrier regulations and rapidly evolving technology, there's the problem of sorting out the vendors, the claims, the promises–all of which seem to be multiplying faster than fat cats around spilled cream.

So, how can you travel through this world of fantasy and smoke, negotiate the risks, and arrive at a successful network strategy?

Learn to ask the right questions.

How To Avoid Network Carpetbaggers.

Ask the right questions. We'll give you a few to get started. And while we're giving you questions, we'll also give you answers. The General's answers. We believe you'll find they're the right answers to the right questions. And that they'll help you separate the "Serious Contenders" from the "Great Pretenders" in your search for a qualified network partner.

How long have you been developing data communications products and network strategies?

The General introduced its first modems, data sets and multiplexers in 1969. Communications, from small systems to multi-national networks, has been our only focus since that time.

How big is your installed T-1 customer base?

The General has the largest installed T-1 customer base in the industry.

What distinguishes you from all other network vendors?

We're a true, single source solution. We can design, build, stage, test, install, manage, service and upgrade your network and never lift the phone to dial a third-party vendor. Not for products or services.

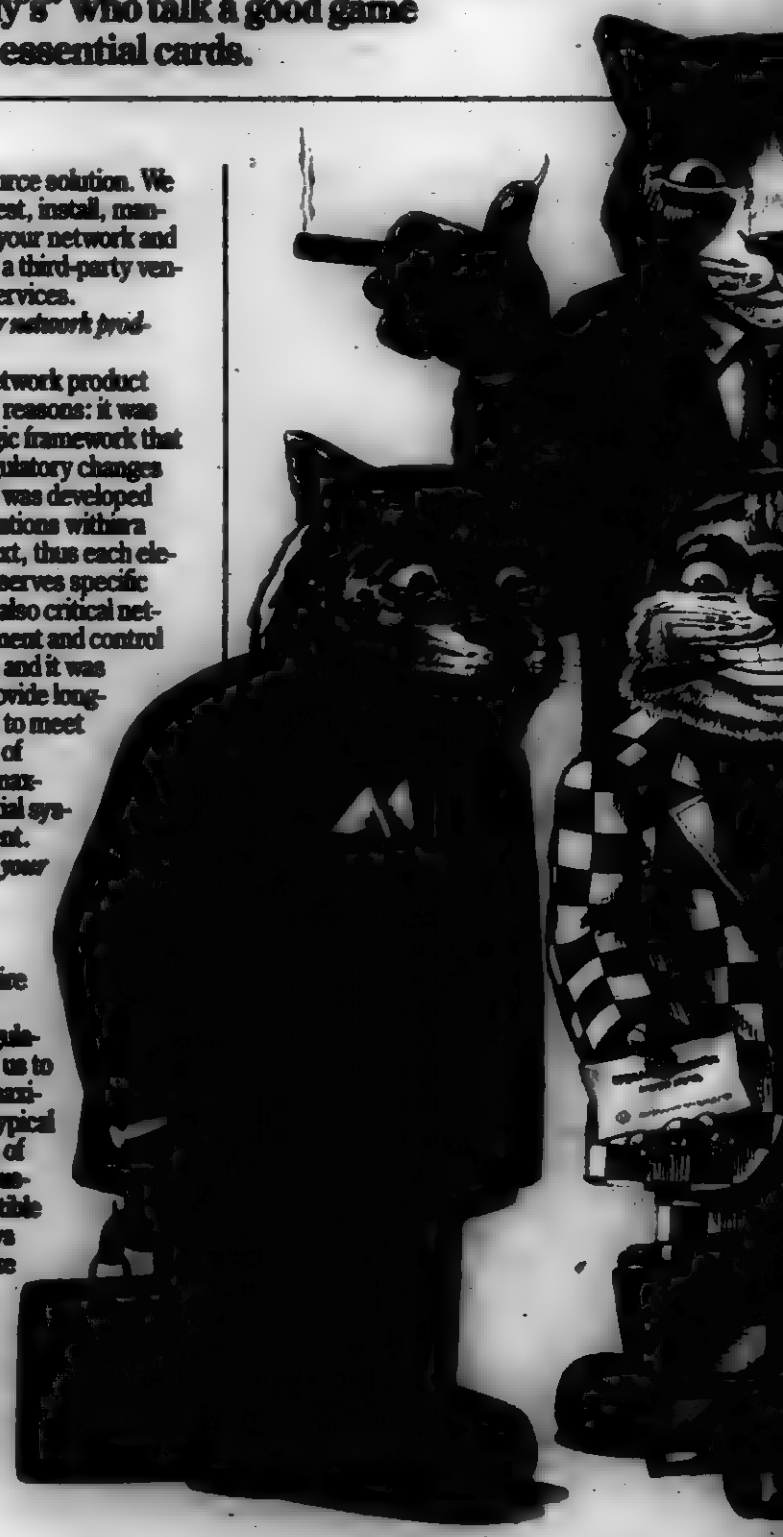
What distinguishes your network products from everyone else's?

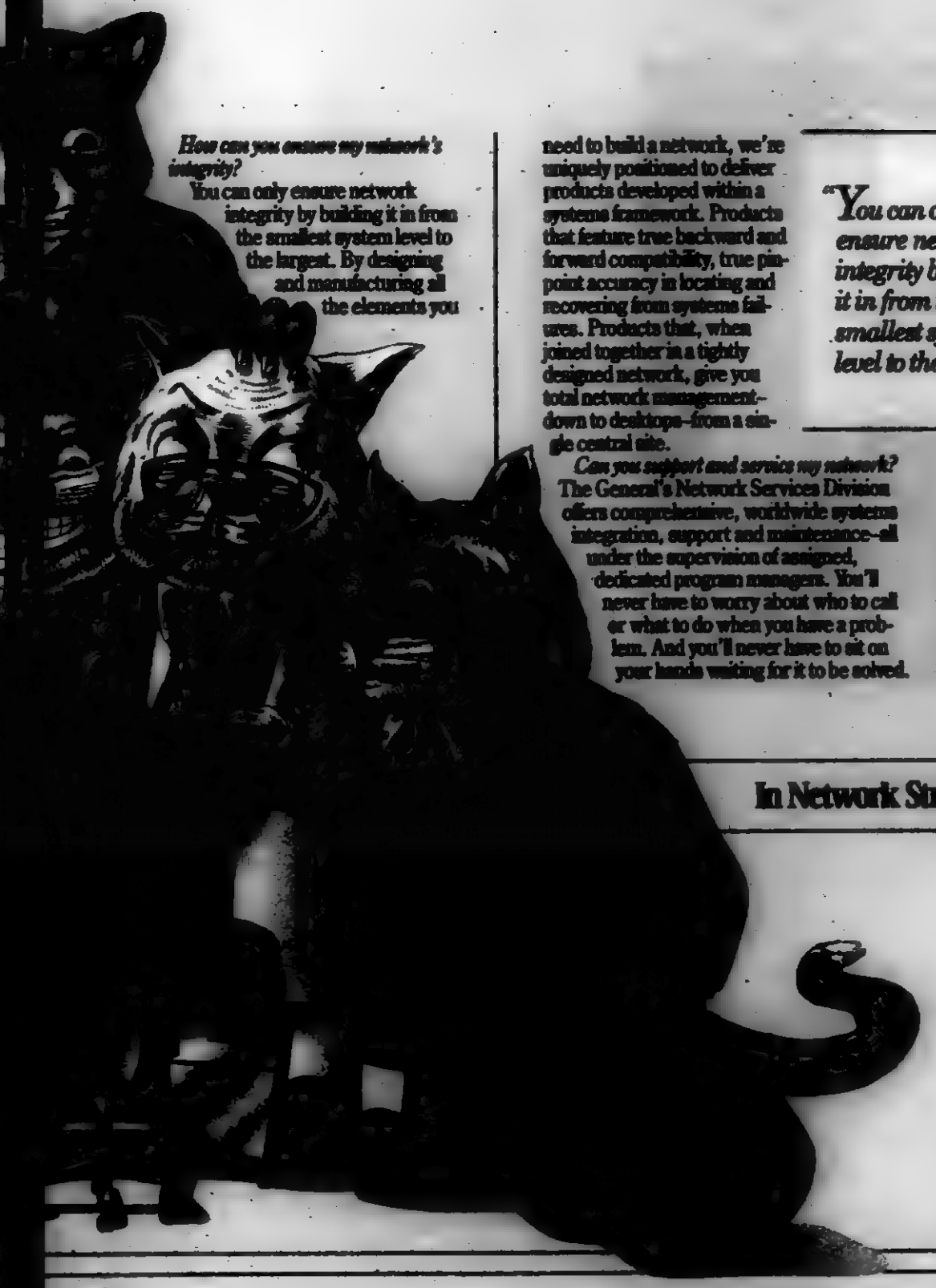
The General's *entire* network product line stands apart for three reasons: it was developed within a strategic framework that anticipates regulatory changes and options; it was developed for global operations within a systems context, thus each element not only serves specific functions, but also critical network management and control requirements; and it was designed to provide long-term flexibility to meet the challenges of growth while maximizing the initial systems investment.

"The General's entire network product line was developed within a strategic framework that anticipates regulatory changes and options."

How do you ensure that your network products reflect emerging standards and opportunities?

The General has an entire staff dedicated to tracking trends and forecasting regulatory changes. That allows us to develop technology that maximizes network options. Typical of that is our development of MEGASWITCH®, the industry's premier DACS compatible T-1 multiplexer, which allows our network partners to take full advantage of AT&T's current and future public service offerings without sacrificing the benefits of private networking. It gives them the best of both worlds, all under the control of a single network management system.





How can you ensure my network's integrity?

You can only ensure network integrity by building it in from the smallest system level to the largest. By designing and manufacturing all the elements you need to build a network, we're uniquely positioned to deliver products developed within a systems framework. Products that feature true backward and forward compatibility, true pinpoint accuracy in locating and recovering from systems failures. Products that, when joined together in a tightly designed network, give you total network management–down to desktops–from a single central site.

Can you support and service my network?

The General's Network Services Division offers comprehensive, worldwide systems integration, support and maintenance–all under the supervision of assigned, dedicated program managers. You'll never have to worry about who to call or what to do when you have a problem. And you'll never have to sit on your hands waiting for it to be solved.

"You can only ensure network integrity by building it in from the smallest system level to the largest."

Get More Of The Answers You Need.

Call the General, General DataComm, and find out more of what you need to know. Call the number below and, for starters, we'll send you our TRUTH OR CONSEQUENCES wheel. It's a handy tool for learning the TRUTH about network vendors before you pay the CONSEQUENCES.

And when you call, ask to see one of our sales representatives. They've got a lot more questions–and answers–that can help you distinguish the big players from the big talkers in communications networks.

And these days, you need all the help you can get.

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Flexcache

CONTINUED FROM PAGE 35

Computer AT-style keyboard, one serial port, one parallel port, a 1.2M-byte floppy disk drive and a hard disk of 60M, 100M, 150M or 300M bytes. It can hold two full-height and three half-height drives.

Performance: Poor to excellent. We found Advanced Logic Research has achieved its goal of outperforming the Deskpro 386/20. We traced the system's slightly faster CPU speed to main RAM: Advanced Logic uses 80-nsec chips, and Compaq uses 100-nsec chips. Hard-disk performance is equally outstanding. The 150M-byte enhanced small device interface drive and controller racked up impressive values on our benchmark test.

However, the system falters in the area of hardware compatibility. It does not support any third-party memory boards. The only problem with software compatibility is that the 386 offers only 20- and 10-MHz compatibility speeds.

Documentation: Good. The manual is clearly written and well organized. It includes installation and operation information as well as a table of contents and an index. There is no glossary. Flaws include minimal troubleshooting information and the lack of instructions for installing storage devices.

Ease of use: Satisfactory. With the exception of the power switch, located behind a door in the rear of the unit, all operator controls are within easy reach. If you are using the Flexcache 20386 as a file server or in a multiuser operating system, however, you cannot automatically restart the system if the console is locked.

Setup: Very good. Advanced Logic Research provides everything for setup except an operating system. Installing internal options is simple, as the side panel is easily removed. The vendor also provides utilities for initializing the hard disk.

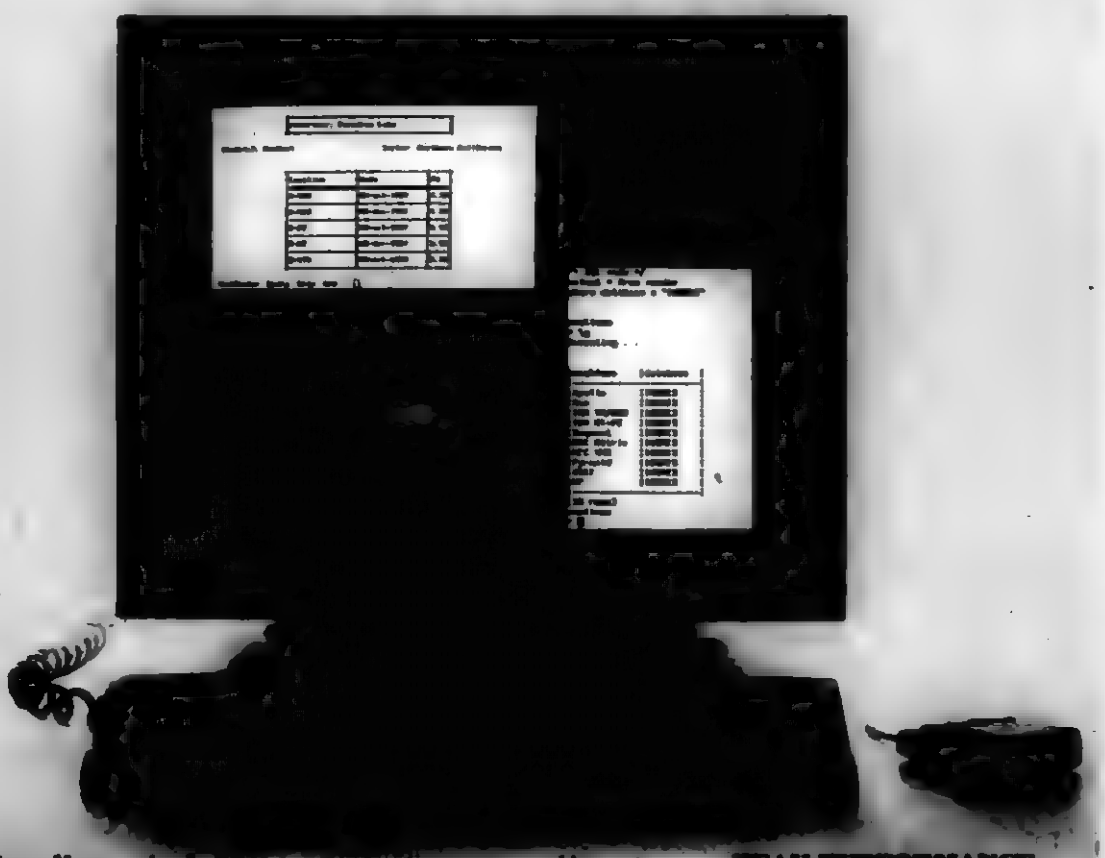
Serviceability: Good to very good. The system is double-cased, and the inner case bolts into the floor stand. The hard disk is self-parking. The soldering job is up to par, and we found no evidence of last-minute changes.

Advanced Logic Research offers a one-year limited warranty on the Flexcache 20386. Repairs are handled by both authorized dealers and the vendor. Extended warranties are available for up to three additional years. Advanced Logic Research also offers a 30-day money-back guarantee. A non-toll-free technical support line is available from 8 a.m. to 5 p.m. Pacific Standard Time, and it answered all our questions quickly and accurately.

Value: Very good. The Flexcache 20386 is priced considerably lower than comparable Compaq systems. The 20386 Model 60 sells for $5,990, contrasted with Compaq's price of $7,499. The remaining models are also priced competitively, ranging from $6,490 for the Model 100 to $9,990 for the Model 300.

Satchell is *InfoWorld*'s director of hardware testing.

INGRES DBMS TURNS YOUR WORKSTATION INTO A POWERSTATION.



Power. Most people take it for granted. But with the power of INGRES DBMS you can maximize workstation productivity. And that's something no one takes for granted.

Here's what INGRES means to you: Our distributed database capabilities give you the power to put the right information in the hands of the right users, across a network of different operating systems, databases and hardware.

POWER OF THE DISTRIBUTED DATABASE.

In a network of workstations and servers, it all comes down to access. With INGRES in place, workstation users can transparently access any information in a network, without knowing where it resides. And with INGRES/STAR, the distributed database, users can access and integrate data across a wide spectrum of hardware and operating systems. Sun, Apollo, DEC VAXstations and Hewlett Packard applications can access data from each other or from servers running VAX/VMS or UNIX.

POWER TOOLS.

To make the perfect relational DBMS, it takes more than just transparency and distributed capabilities. It takes the very best in end-user and application tools to increase productivity, and to provide for complete portability. And that's where the power of INGRES really comes through. Our innovative 4GL leads the industry in functionality and performance, and we're continuing to set the pace with new tools designed especially for the workstation environment.

PEAK PERFORMANCE.

INGRES contains a powerful database engine that maintains a high level of efficiency at all times, while preserving data consistency and integrity. With its unique optimization and high speed transaction capabilities, network traffic is minimized and superior performance is maximized.

Call us today and find out why INGRES is the one relational DBMS that can power up your entire network.

Turn on the power of INGRES—call 1-800-4-INGRES for more information. And ask about our free INGRES seminars.

INGRES
RELATIONAL TECHNOLOGY / INTERSOLV

Slidewrite Plus

CONTINUED FROM PAGE 35

to 240 lines in a drawing but can have 234 boxes, 234 circles and 221 figures.

Seven background and seven foreground colors are supported. Direct support for any Adobe Systems, Inc. Postscript printing device is lacking, as are ultra-high-resolution film recorders that are most widely used by service bureaus.

Documentation: Satisfactory. Slidewrite's manual is clear and concise. It includes a fine tutorial, a table of contents, an index, a reference section and appendixes. Nine pages of corrections and updates are inserted at the front of the binder-type manual. We found at least one instance in which the instructions were incomplete.

Ease of learning: Very good. Slidewrite Plus is easy to grasp. The commands are executed with function keys whose labels are printed at the bottom of the screen. Creating charts is easy, too. You specify how you want them to look and what data they should reflect by filling in an on-screen form.

Ease of use: Good. If you need quick boardroom materials with few frills, Slidewrite's simplicity should be appealing. The lack of drawing power, however, means you will find it difficult or impossible to create quality figures, such as company logos. Users of floppy-disk systems should pay particular attention: There are only two 360K-byte floppies, instead of Harvard's four or Freelance's eight.

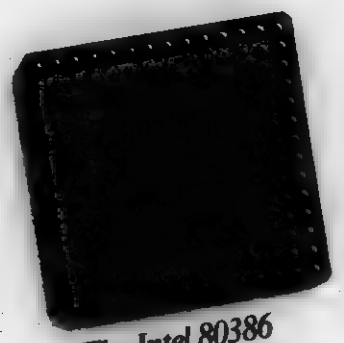
Error handling: Very good. In-context error messages that tell how to correct mistakes flash at the bottom of the screen when you do anything illegal. One complaint: You are not always prompted to follow the proper sequence in pushing function keys when editing in Draw mode.

Support: Very good. Advanced Graphics does not provide a toll-free number. There is, however, a 30-day unconditional guarantee and free technical support for registered users. Three of our calls to technical support were answered promptly; one was returned within 24 hours. We were treated courteously and given knowledgeable answers.

Value: Good. Users who cannot afford to spend a lot of time learning a graphics program or who need straightforward and flexible charting capabilities would be hard put to find a program significantly more competent than this one — especially if they are concerned with complex data, statistics or scientific charts.

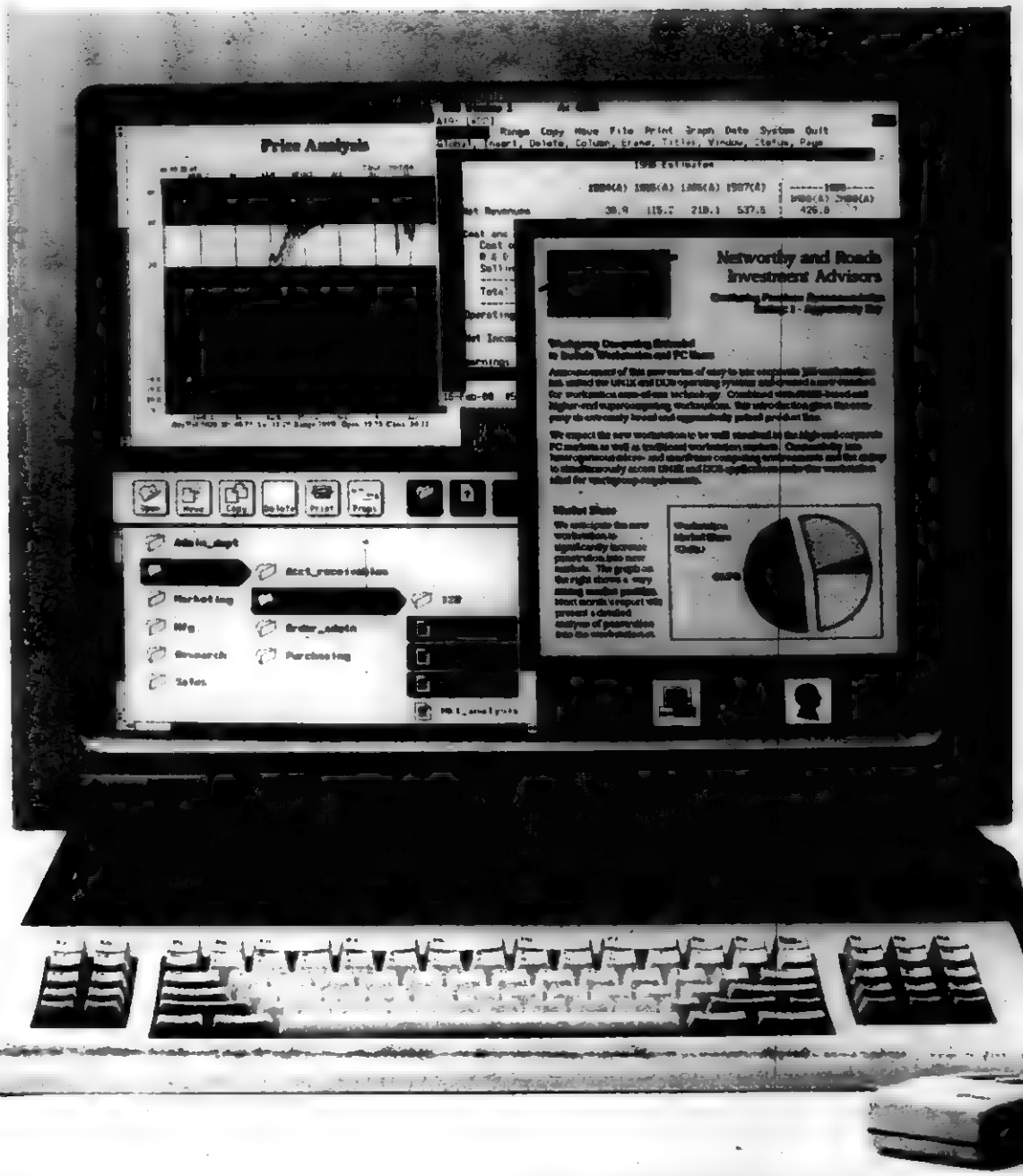
Milburn is a small-systems consultant.

This chip is too smart to be in a personal computer.



The Intel 80386 microprocessor

Introducing the corporate 386.



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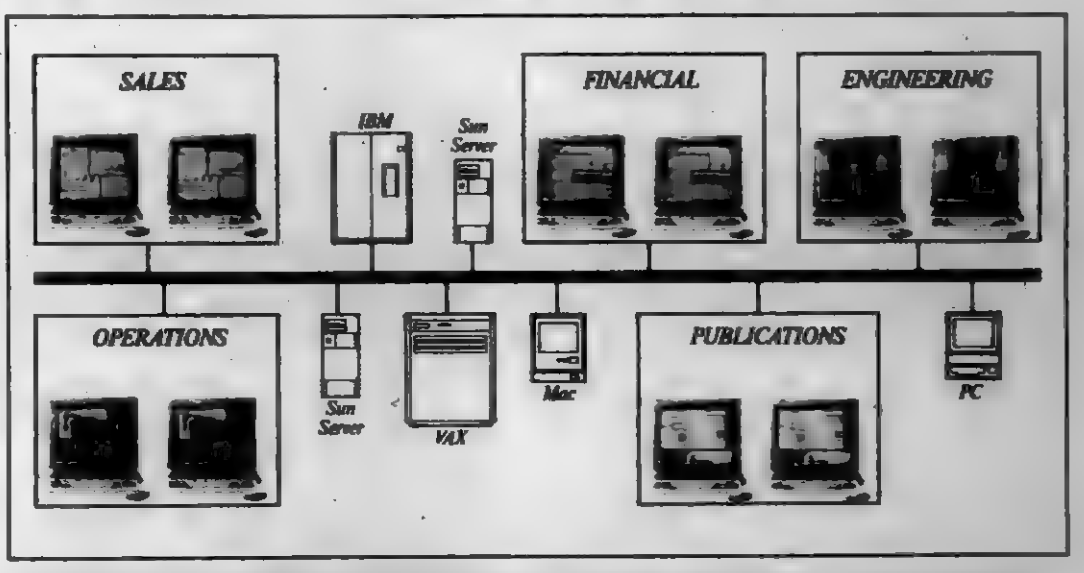
The 386-based personal computers offer the individual raw power.

But, in most corporations, the real work is done by many people, all trying to work together. Computers should aid this process, by giving individuals the personal power they need, and by helping groups of people work together productively.

Different groups need to share and work with the same information, even though they may be using different computers, or their data is kept on remote mainframes.



In real-world corporate applications, PC users need access to a large variety of computing resources. So the Sun386i runs Sun's open distributed computing environment, built around the UNIX® operating system. Which lets it become part of a powerful open network that can include every computer in your company.

Personal 386s fall short of meeting these needs. Because they use underpowered and primitive operating systems.

So they can't handle the really demanding applications. And they only talk to themselves, with some difficulty, rather than to all of your computers.

That's why we're introducing the corporate 386. The Sun386*i*™ workstation. It has the same high-performance Intel® 80386 chip as the PCs.

But not their personal limitations.

Because it runs Sun's open, distributed computing environment, built around the UNIX® operating system.

So, you have transparent access to every computer in your company. No matter which vendor's name is on the box.

Unlike the PCs, the Sun386*i* lets you take full advantage of the thousands of powerful applications designed around the UNIX operating system. But it also lets you run all of the PC DOS applications that millions of users have developed so much expertise in.

And with its 5-MIPS power, UNIX and DOS applications can run simultaneously and at full speed.

But with all this power and sophistication, isn't a Sun386*i* harder to use than a PC?

Not at all. In fact, it's easier.

Because we've given it a friendly, icon-oriented user interface with an integrated help facility. And a file organizer, to easily find, open, and keep track of files all over the network.

There's even an automated network administrator, that lets you personally install the Sun386*i* in minutes. Instead of hours.

So look to Sun for total networking solutions that help pull a company together.

If you'd like to know more, call 1-800-223-6736. In CA 1-800-322-6736. And we'll show you the difference between a personal machine.

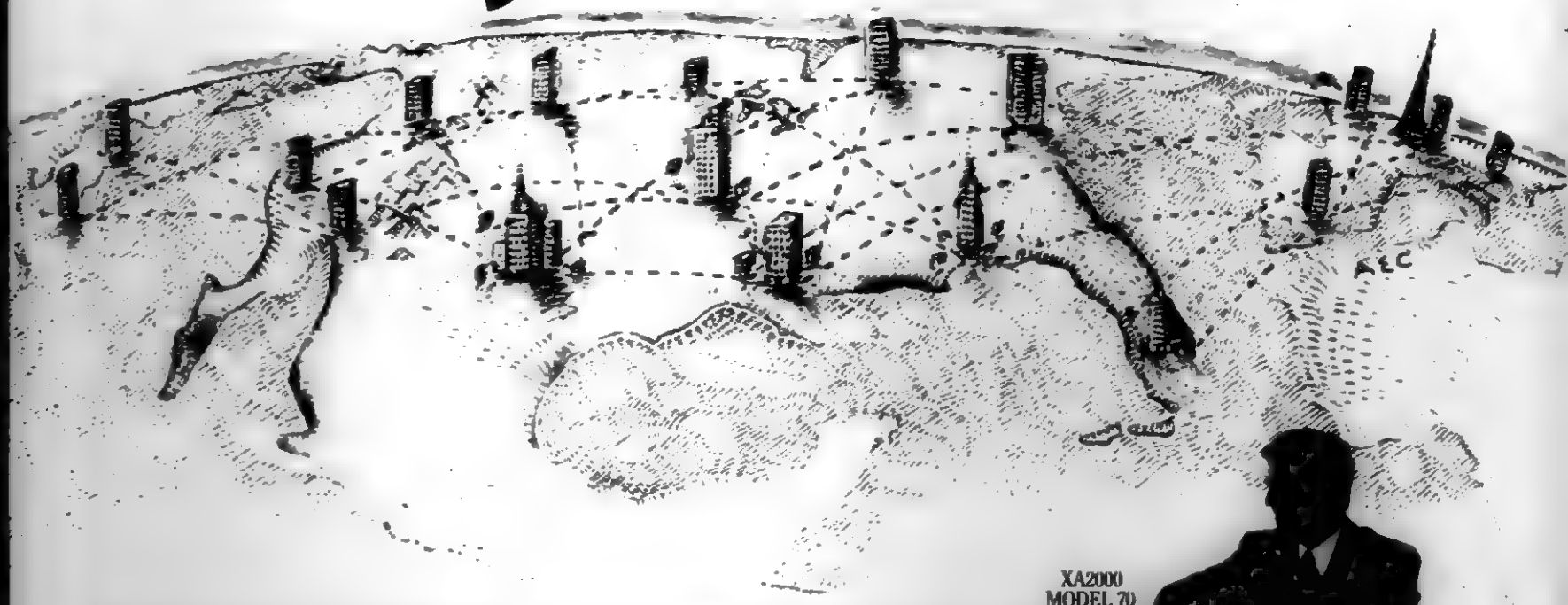
And the right corporate choice.

sun microsystems

The Network *Is* The Computer™

STRATUS INTRODUCES THE XA2000 MODELS 50 AND 70.

Now OLTP is within everyone's reach.

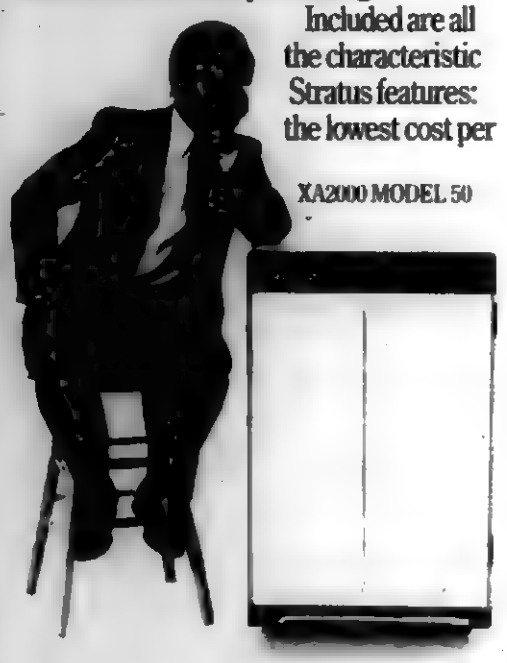


With the introduction of the XA2000 Models 50 and 70, Stratus has extended its OLTP platform. Making it easier than ever for you to extend your business.

DISTRIBUTED PROCESSING MADE AFFORDABLE.

Our new Models 50 and 70 represent an economical yet powerful on-line transaction processing solution to the cost and performance issues of local processing.

Included are all the characteristic Stratus features: the lowest cost per transaction, transparent fault tolerance, rapid-fire processing, and modular expandability. All neatly packaged in a compact 34" or 54" chassis that you can install anywhere.



XA2000 MODEL 50

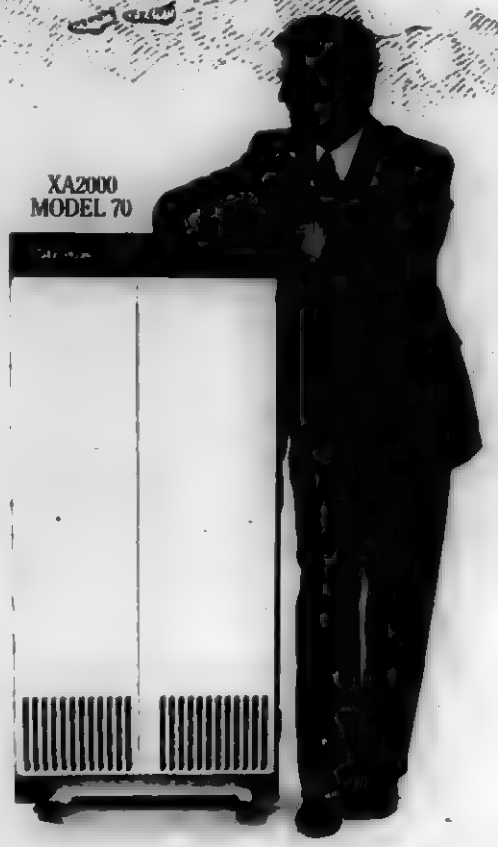
ALL THE RIGHT CONNECTIONS.

The Models 50 and 70 provide fast links to Stratus hosts or other vendors' systems. And they offer more communications options than ever, including an ingenious new independent subsystem that efficiently takes charge of communications, leaving your CPU's free to process transactions, and allowing you to easily custom design an OLTP network that meets your own needs.

SERVICE COULDN'T BE EASIER.

All our XA2000 systems are so advanced, they self-diagnose and, if necessary, dial for help themselves – while your application keeps running at top speed! And our comprehensive Remote Service Network ensures that no matter how far away you are, you are connected to the Stratus Customer Assistance Center for immediate personal attention.

Today, major firms worldwide in financial services, brokerage, manufacturing, retailing and telecommunications rely on Stratus technology to build global OLTP networks. With the introduction of the XA2000 Models 50 and 70, the Stratus OLTP platform becomes even more accessible. For more information, call your local Stratus representative or phone (617) 460-2192.



XA2000 MODEL 70

Stratus

The OLTP Solution.

NEW PRODUCTS

Systems

Four Intel Corp. 80286- and 80386-based IBM-compatible personal computers have been announced by **TBS International.**

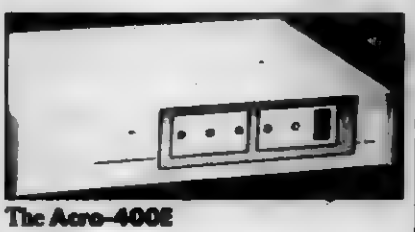
The **TBS Turbo Plus** machines feature 1M or 2M bytes of random-access memory, a 65M-byte hard drive, eight expansion slots, I/O ports, a 220W power supply, a 101-key keyboard and a monochrome monitor. The TBS Turbo Plus 386/16, priced at $3,299, operates at 16 MHz. The Turbo Plus 286/12, priced at $2,099, operates at 12.5 MHz. The 386 machine features a 10-MHz bus, and the 286 machine features an 8-MHz bus.

The **TBS Turbo** series consists of entry-level machines. The Turbo 286/12, priced at $1,299, operates at 12.5 MHz and includes 512K bytes of RAM, a 20M-byte hard drive, a 1.2M-byte floppy drive, a keyboard and I/O ports. The Turbo 386/16, priced at $1,999, operates at 16 MHz.

TBS International, 20 Main St., Ashland, Mass. 01721. 617-881-7322.

A personal computer-based data acquisition and control system that includes Basic programming has been announced by **Acrosystems Corp.**

The **Acro-400E** is said to be capable of performing a programmed routine while completely separated from a host



The Acro-400E

computer. It can be programmed by downloading a program from a host or by way of a dumb terminal. Programs may be stored in the battery-backed semi-random-access memory. Data stored in dynamic RAM can be off-loaded to a host.

Other features include 16 differential analog inputs, 32 digital I/Os and up to two analog outputs. Communications to a host is via the standard RS-2320/RS-485 serial interface. Up to 31 units can be multidropped, the vendor said.

The standard Acro-400E costs $1,895, including the Acrolog 400 software package.

Acrosystems, P.O. Box 487, 66 Cherry Hill Drive, Beverly, Mass. 01915. 617-927-8880.

A floor-mount tower enclosure that supports a standard IBM Personal Computer AT motherboard as well as combinations of four fixed- and removable-media 5¼-in. drives has been announced by **Sigma Information Systems.**

The **SA-H124/AT** features a keylock on-off switch and an LED that may be used for disk access indication. The rear of the chassis contains a keyboard connector, a jack for a composite monitor and a nine-pin connector for a monochrome or red-green-blue monitor.

The SA-H124/AT can optionally mount Sigma's backplane to replace the AT motherboard. It costs $946.

Sigma, 3401 E. LaPalma Ave., Anaheim, Calif. 92806. 714-630-6553.

Software applications packages

Micro Design, Inc. has announced a modular format for its field services software package, **Concert.**

The modular format enables field service operations to choose only the functions best suited to fill its needs, the vendor said. The Concert system includes five interactive modules: Call Handling and Dispatch, Inventory, Invoices, Autopage and Contracts and Technical Assistance. The modules are integrated, the vendor said, so the user does not have to exit one module to access another.

Modules are priced from $500 for Autopage to $2,650 for Handling and Dispatch. A site license costs $6,700.

Micro Design also announced a scaled-down version of Concert for smaller organizations. Called Ensemble, it costs $2,975 for a site license.

Micro Design, Suite 509, Benjamin Fox Pavilion, Jenkintown, Pa. 19046. 215-884-1112.

A three-dimensional modeling and analysis software package for use with IBM Personal Computer ATs and compatibles has been announced by **Innovative Computer Aided Technology, Inc.**

DES-3 is a free-form design system. For wire-frame geometric construction, it features standard point, line and circle as well as ruled and sculptured surfaces with annotation and labeling capabilities.

For geometric modification and manipulation, the features of DES-3 include grouping, filleting, 3-D space curve transforms, dynamic rotate, scale and pan, multiple plane projection and intersection and full 3-D geometric curvilinear analysis.

DES-3 is priced at $5,000.

Innovative Computer Aided Technology, Suite 2, 14979 Prairie Ave., Lawndale, Calif. 90260. 213-644-2949.

A computer-aided process planning system designed to run on IBM Personal Computers as well as Digital Equipment

Continued on page 44

LEAVE DEVELOPMENT TROUBLES BEHIND

With Realia's development tools, you can build efficient mainframe applications right on your PC. Every stage of development gets easier, whether you're maintaining an existing application or creating a new one.

- Realia COBOL, the fastest PC COBOL compiler, produces the most efficient executable programs.
- REALCICS® lets you develop and run mainframe CICS programs on the PC.
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Choose Realia, and your applications backlog can soon be just a memory.

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Continued from page 43

Corp. VAX workstations has been announced by **Houtzeel Manufacturing Systems, Inc.**

The **Houtzeel CAPP** manufacturing process planning system enables users to create a data base of manufacturing procedures for use in generating shop floor instructions, quality control manifests and other documents.

Features include the ability to recall large blocks of standard text from the data base and insert them into a process plan; system security options; real-time validation of data, text and entry formats; and a report generator.

The software costs $1,800.

Houtzeel, 318 Bear Hill Road, Waltham, Mass. 02154. 617-890-2811.

A Lotus Development Corp. 1-2-3 workalike spreadsheet package has been introduced by **Goldstein Software, Inc.**

Called **Joe Spreadsheet**, the package provides a maximum spreadsheet size of 256 columns by 8,192 rows, supports full macro language and is available in both 5¼- and 3½-in. formats. It also runs all 1-2-3 templates, the vendor said.

Other features include an on-screen file name, an on-screen guide to function keys, an on-screen reminder of the available random-access memory, a warning signal if the spreadsheet is changed, an automatic generation of backup files and the ability to write both 1-2-3 1A and 2.0 file formats.

Joe Spreadsheet, priced at $49.50, does not support color graphics or extended memory and is not copy protected.

Goldstein Software, Suite 340, 12520 Prosperity Drive, Silver Spring, Md. 20904. 301-622-9020.

A computer-aided design and engineering integrated software package for end-to-end circuit design, simulation, printed-circuit board layout and circuit board fabrication has debuted from **Visionics Corp.**

EE Designer III accommodates up to 2M bytes of above-board memory using the Lotus/Intel/Microsoft Expanded Memory Specification. Features include a user interface with a three-button mouse and hierarchical menus, a prompt line, 1,284- by 960-pixel graphics resolution and support for the IBM Enhanced Graphics Adapter and Color Graphics Adapter.

EE Designer III costs $3,995.

Visionics, 343 Gibralter Drive, Sunnyvale, Calif. 94089. 408-745-1551.

A payroll module for the **Multipac Business Management System** has been introduced by **Financial Information Systems.**

Features of the system include the ability of users to define all employee deductions and employer expenses and the ability to define multiple work locations. Several miscellaneous payments can be credited to the employee per pay period. Pay frequencies may be established for each pay transaction. Government report requirements are adhered to, the vendor said.

The module will replace the existing module in future releases. It can be purchased separately or as part of the full system. It also can be added to existing systems, with the data converted automatically.

The module costs $595.

Financial Information Systems, Suite 107, 411 Industrial Drive, Richardson, Texas 75081. 214-680-8696.

Infoteam Turbo Accounting, an accounting software package featuring five modules, has been announced by **Info Designs, Inc.**

The modules include general ledger, accounts receivable, invoicing, accounts payable and check writing. Each module features built-in tutorials. The system operates in real time, and on-line customer and vendor maintenance, monthly budgeting with comparisons and management reports are all standard.

The software comes on 5¼- or 3½-in. diskettes. It costs $99.

Info Designs, 445 Enterprise Court, Bloomfield Hills, Mich. 48013. 313-334-9790.

A software program designed for plotting data collected from laboratory experiments, prototype testing or engineering analyses has been introduced by **Binary Engineering.**

Techgraphpad is said to integrate data retrieval, data manipulation and data output requirements. It accesses data generated by its own built-in editor or that has been stored in spreadsheets such as Lotus Development Corp.'s 1-2-3 or Symphony. It also provides a range of plotting and graphing capabilities, including linear, log and R-Theta plots.

Other features include repetitive graphing, recall and overlay of previous graphs and color control output to Hewlett-Packard Co. or Houston Instruments, Inc. plotters.

Techgraphpad runs on IBM Personal Computers and compatibles. It costs $275.

Binary Engineering, 100 Fifth Ave., Waltham, Mass. 02154. 617-890-1812.

A text data base for personal computers has been announced by **Dataflight Software.**

The **Concordance Information Retrieval System** supports editing, input and retrieval of both formatted and unformatted data. According to the vendor, the product accepts input for most media, including existing text and data base files, optical scanners and manual typing.

Features include the ability to perform keyword, Boolean, context and re-

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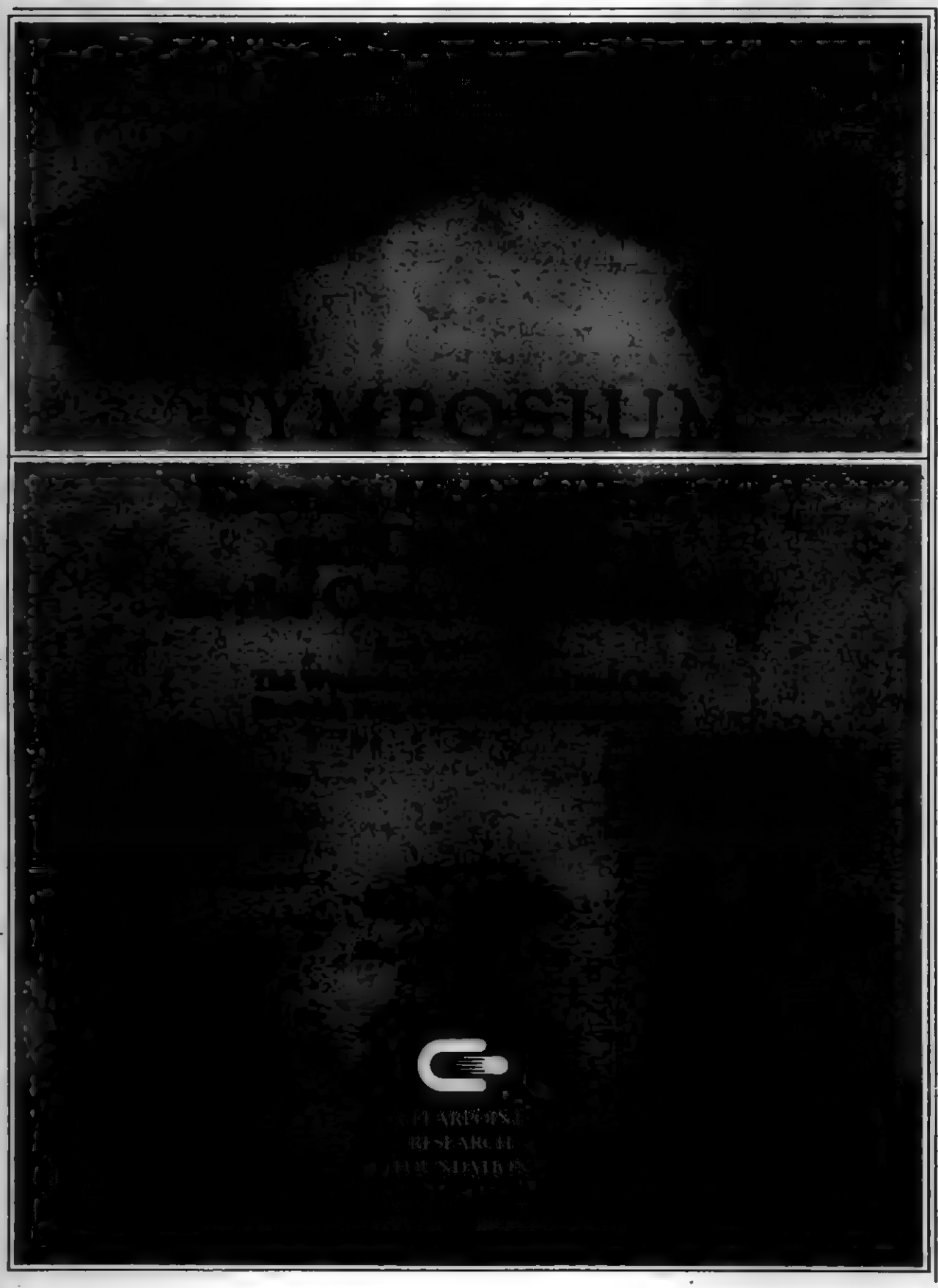
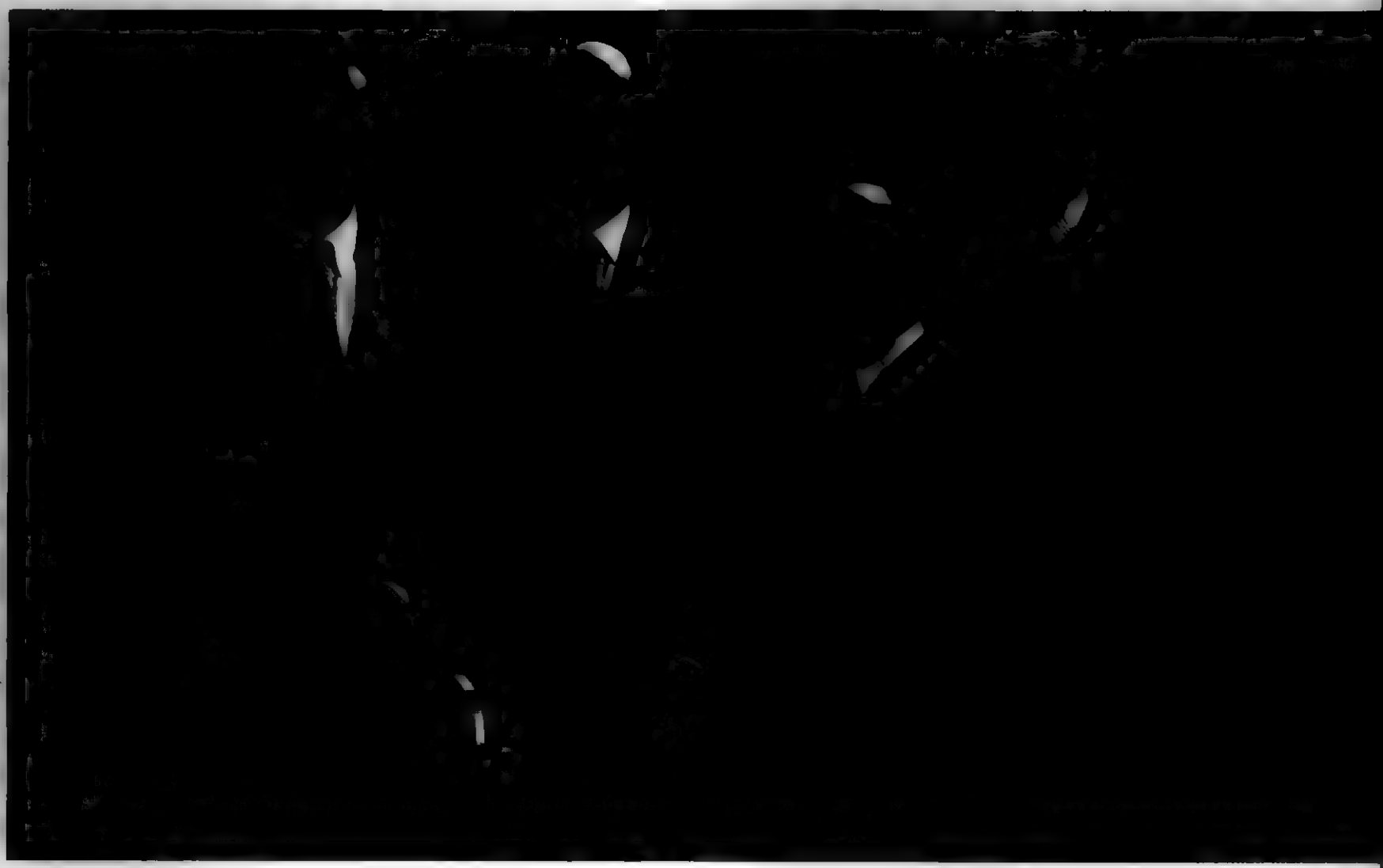


Some companies make workstations for just about anyone.



We engineer ours onl with a passion for per

While some companies sell a lot of computers because they make something for everyone, we sell a lot because we don't.

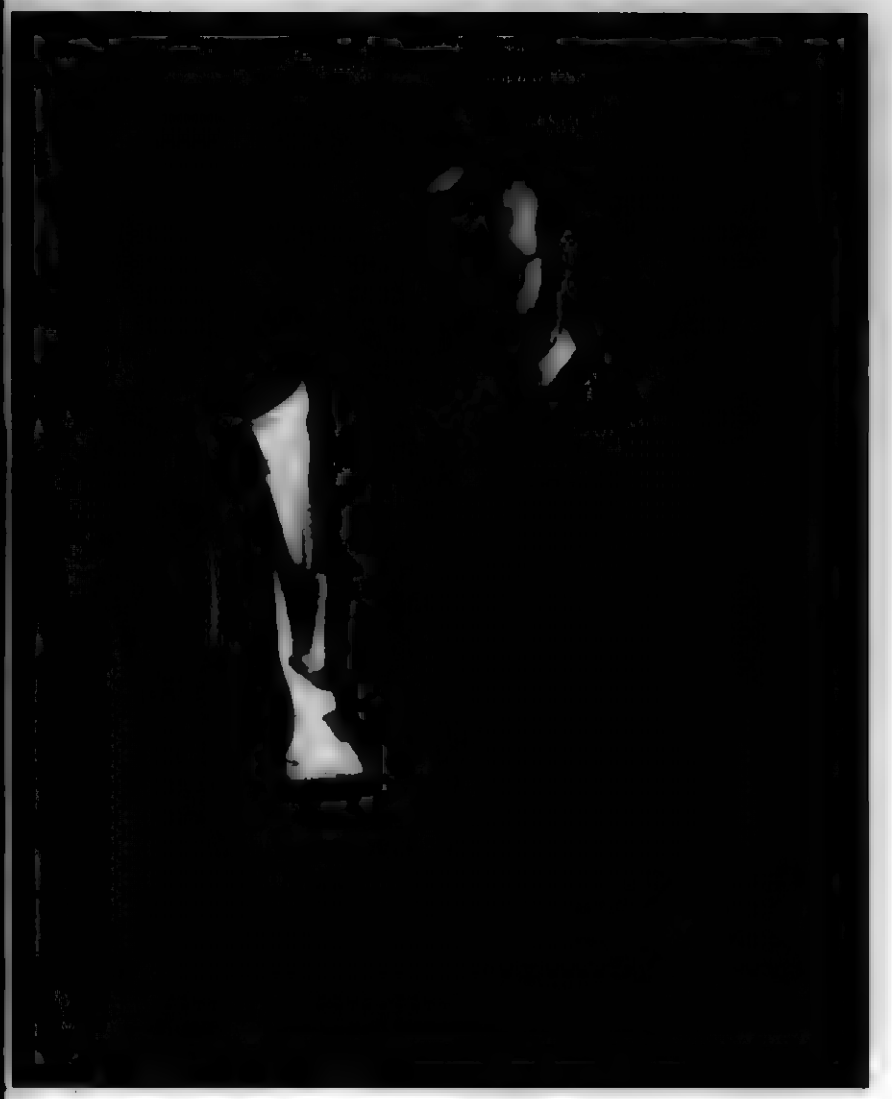
All the workstations we make, the applications that run on them, and the networking power that unites them with the other computers in your company were created for a select group of people.

Namely the engineers, product designers, software developers and other professionals who demand nothing less than ultimate compute performance.

People who clamor for access to processing power and graphics. Who possess an insatiable appetite for information. And who can ill afford to endure the delays, limitations and obstacles that typically hinder the effort to attain it.

If you're such a person, you should have an Apollo workstation. For you'll realize the moment its screen is in front of you that the issue of performance is behind you.

An Apollo workstation will grant upon you enough dedicated compute power to keep your imagination charged permanently. Letting you choose from a compatible family of workstation systems whose prices start as low as a personal computer and whose per-



y for those formance.

formance extends to that of supercomputers.

These machines will grant you imagery so brilliant you won't want to blink for fear of missing something. With real time two- and three-dimensional graphics that render up to 16.7 million colors at 130,000 vectors per second. And they'll open your eyes even wider with networking power and elegance.

Every Apollo workstation, from the Series 3000™ Personal Workstation™ to our new Personal Supercomputer,™ functions as a command center from which you have unequalled access to data, processing power, development tools, and applications. So that every mainframe, minisuper, and microcomputer on your network is at your beck and call.

In a manner almost invisible to you, our workstations show you networking performance you probably thought impossible.

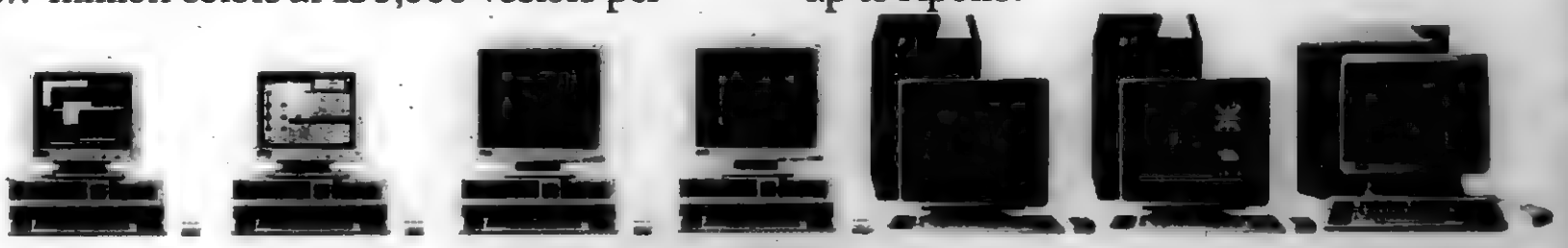
For with the industry's first implementation of Network Computing Architecture,™ they make your multi-vendor network appear as one computing environment.

Letting you run a single application on a network of computers by automatically dispatching portions of a program to the processors most qualified to execute them. And providing the tools to develop and debug code running on different machines.

All while freeing you to create applications, access network resources and even move from one operating environment to another with whatever language, menus and file names you define.

A fact that might inspire you to wonder if we don't engineer our workstations only for you.

Today, there is more than one way to measure computer performance. But when the criteria include processing power, graphics and network computing, nothing measures up to Apollo.



apollo

For more information, call 1-800-323-1846. In Massachusetts call 1-800-847-1011. Or write Apollo, 330 Billerica Road, Chelmsford, MA 01824.

Apollo is a registered trademark and Series 3000, Personal Workstation, Personal Supercomputer and Network Computing Architecture are trademarks of Apollo Computer Inc.

Continued from page 44

lational search logic; virtual memory manager; pull-down menus; context-sensitive Help; an English-like query language; and Script and Browse mode.

Concordance runs on IBM Personal Computer, PC XT, AT and Personal System/2s. It costs $295.

Dataflight Software, Suite 68, 10573 W. Pico Blvd., Los Angeles, Calif. 90064. 213-785-0623.

A formatted-field indexing system that allows long text files to be retrieved by 16 formatted fields has been announced by **RHM & Associates.**

Autotrieve 16 was designed to support text files of any length, in any format and containing any information. According to the vendor, existing text files may be used without rewriting.

Features include the ability to combine directories and information types and to add historical data.

Autotrieve 16 costs $39.95. It runs on Microsoft Corp. MS-DOS-based micros.

RHM & Associates, 913 Helen St., Midland, Mich. 48640. 517-631-9334.

A personal information management software program has been announced by **Symantec Corp.**

Called **Grandview**, the product allows users to outline plans, memos, letters, lists and other action items and then to track and organize the information. It also allows users to view data in customized ways.

Grandview runs on IBM Personal Computers. It costs $295.

Symantec, 117 Easy St., Mountain View, Calif. 94043. 415-964-6300.

A word processor that uses a graphical interface with icons, drop-down or pull-down menus and Help facilities has been announced by **Digital Research, Inc.**

Gem 1st Word Plus offers such standard word processing features as a spelling checker, a mail merge utility, pagination and search and replace as well as hyphenation, footnote management, decimal tabulation, personal style sheets and mouse- or keyboard-driven block operations.

Other features include on-screen visual support for international characters, superscripts and subscripts as well as a what-you-see-is-what-you-get display.

Up to four windows can be opened simultaneously, the vendor said.

Gem 1st Word Plus is priced at $199.

Digital Research, Box DRI, Monterey, Calif. 93942. 408-649-3896.

An object-oriented graphics package said to provide freehand drawing and editing capabilities to IBM Personal Computer users has been announced by **Microsystems Engineering Corp.**

Mase-11 Draw 5.0 allows users to scale and edit pictures, convert sketches to precise bezier curves, trace and convert scanned raster images to compressed vector images and use word processing functions within the graphics products. Print resolution is from 300 to 2,500 dot/in.

Other features include 1% gray scaling; rotating and scaling combined objects; support for Adobe Systems, Inc.'s Postscript; zoom range of 32-to-1; and a symbol library.

Mase-11 Draw 5.0 costs $495.

Microsystems Engineering, Suite 400, Hoffman Estates, 2400 W. Hassell Road, Ill. 60195. 312-882-0111.

A free-form page makeup software package has been introduced by **Texet Corp.** for use with its Texet Live Image Publishing System.

Freepage is a graphically oriented package that allows the interchange of text and graphics with Live Image Publishing Systems. It supports interfaces with all devices supported by Texet, using standard Texet drivers.

Freepage documents typically consist of both text and graphics that can be moved and reshaped to facilitate page design.

Text can be typeset in a variety of fonts, styles and sizes with automatic hyphenation, track and pair kerning, justification and letter- and word-space control.

Freepage costs $2,500.

Texet, Box 127, 37 Broadway, Arlington, Mass. 02174. 617-641-2900.

CG Type for the Macintosh, the link between desktop publishing and Compugraphic typographic systems, has been announced by **Compugraphic Corp.**

The typefaces provide users of Apple Computer, Inc.'s Macintosh personal computer with access to the Compugraphic library. Supported by any Macintosh program, CG Type can be output to any printer that supports Adobe Systems, Inc.'s Postscript language.

CG Type packages for the Macintosh initially offer one typeface in matching weights — roman, italic, bold and bold italic. Screen fonts are included for each typeface.

The typeface packages are priced from $145.

Compugraphic, 200 Ballardvale St., Wilmington, Mass. 01887. 617-658-5600.

Manzanita Software Systems recently announced the **Payroll** module of **Businessworks PC** for IBM Personal Computers.

The payroll system is said to be capable of handling an unlimited number of employees, tracking such items as dates of hire, review and termination, cash and charged tips, sick leave, vacation and comp-time hours and wage history.

Continued on page 52

The CompuServe data network and Sherwin-Williams. Uncovering new ways to cover the earth.

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Beyond NetWare, Novell offers PCOX™ software for linking PCs and LANs with mainframes and minicomputers. And bridging software to connect separate LANs.

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be seeing red.

Novell also provides programming tools like MHS, and Btrieve® and XQL® file management software. Plus extensive support for independent developers of network applications.

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For network solutions, you should be seeing red.

Continued from page 48

The system produces paychecks and stubs and is said to be able to handle after-the-fact payroll. It also tracks state and federal tax liabilities and deposits.

The Payroll module costs $295. Other accounting modules cost $295 each, or $695 bundled together.

Manzanita Software Systems, Suite 200-A, One Sierragate Plaza, Roseville, Calif. 95678. 916-781-3880.

Manzanita's **Payroll module**

Software languages

Digitalk, Inc. has introduced an Intel Corp. 80286- and 80386-based implementation of its Smalltalk programming language.

Smalltalk/V 286 runs in protected mode and can address up to 16M bytes of memory directly, the vendor said. It was designed to operate with both IBM PC-DOS and OS/2 operating systems and is compatible with Smalltalk/V.

Smalltalk/V 286 is priced at $199.95.

Registered owners of Smalltalk/V are able to obtain upgrades from Digitalk for $75.

Digitalk, 9841 Airport Blvd., Los Angeles, Calif. 90045. 213-645-1082.

Software utilities

Watcom Products, Inc. has announced an optimizing C compiler called **Watcom C6.0** and an integrated C development environment called **Watcom Express C**.

Watcom C6.0 includes a debugger, fine-tuning capabilities, a register allocation scheme, true register variables and flow analysis. It comes with a copy of Watcom Express C. Watcom Express C is an integrated editor, compiler, debugger, linker and runtime system.

Both products run on the IBM Personal Computer and Personal System/2. Watcom C6.0 costs $495. Watcom Express C costs $125.

Watcom, 415 Phillip St., Waterloo, Ontario, Canada N2L 3X2. 519-886-3700.

A software-based security system for IBM Personal Computers has been announced by **AZ-Tech Software, Inc.**

Datasafe allows the user to prevent unauthorized use of data as well as to encrypt one or more data files. Users can also scramble off-site backups. According to the vendor, Datasafe can make files invisible to DOS, and obsolete files can be wiped clean.

Datasafe costs $49.

AZ-Tech, 305 E. Franklin, Richmond, Mo. 64085. 800-227-0644.

A key-indexed file management system designed for use with any programming language in either single or multiuser local-area network environments has been announced by **McSoft, Inc.**

Called **Axos**, the IBM Personal Computer and compatible software is based on a three-level binary tree structure. It uses a common protocol to interface with application programs written in Basic, Cobol, C, Fortran, Pascal and assembler. Files created by a program in one language may be accessed and updated by programs written in any of the other languages.

File management functions include automatic data encryption and compression, file creation and deletion, record retrieval, record insertion, replacement and deletion, optional write verification, record suspension and activation, record hold and free.

Axos costs $595.

McSoft, P.O. Box 12044, Atlanta, Ga. 30355. 404-923-5448.

A personal computer-based software program designed for loading data into existing Lotus Development Corp. 1-2-3 and Symphony spreadsheets has been announced by **Research & Planning**.

Called **In2lot**, the software loads data into spreadsheets by matching labels in an input file to labels in a spreadsheet. Data and formulas in the spreadsheet are not erased and input data may be created on any mainframe, minicomputer or PC, the vendor said.

Individual users can share the same input file for different spreadsheet formulas and layouts.

In2lot is priced from $100 to $600.

Research & Planning, Suite 2323, 222 Third St., Cambridge, Mass. 02142. 617-547-5061.

A software product to help developers understand Ashton-Tate Corp.'s Dbase code has been announced by **Clear Software, Inc.**

Clear for Dbase reads the source code of any Dbase application and instantly produces the system tree chart, program flow charts and formatted source listings, the vendor said.

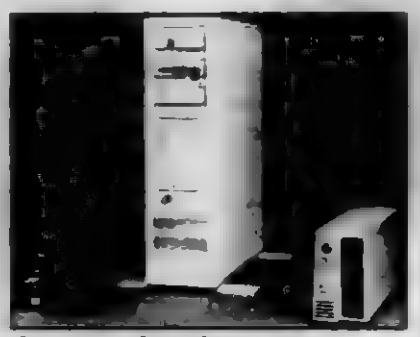
Clear runs on IBM Personal Computers. The dot matrix version costs $99.95 plus $5 for shipping and handling. With a Hewlett-Packard Co. Laserjet option, it costs $149.95 plus $5 shipping.

Clear Software, Suite 204, 637 Washington St., Brookline, Mass. 02146. 617-232-4720.

Data storage

A line of tape backup systems for IBM's Micro Channel architecture was recently released by **Genoa Systems Corp.**

Dubbed the **Galaxy/MC** series, the systems make it possible to transfer files from older IBM Personal Computer XTs



Genoa's **Galaxy/MC series**

and PC ATs to Personal System/2s. The line is also said to be cross compatible with other Galaxy tape systems.

The Galaxy/MC is available in 60M-byte data cassette form and 60M- or 125M-byte streaming tape cartridge. Both internal and external systems are available.

Prices range from $1,250 to $2,500.

Genoa Systems, 73 E. Trimble Road, San Jose, Calif. 95131. 408-432-9090.

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		June 2	Cleveland		

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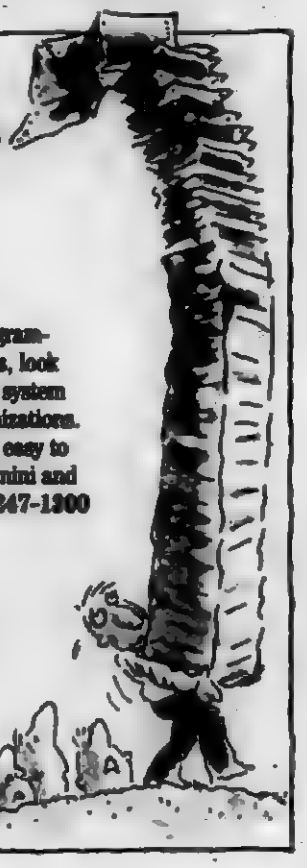

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MS-DOS is a trademark of Microsoft Corp. Multibus II is a trademark of Intel Corp.

An internal half-height compact disk/read-only memory (CD-ROM) drive has been introduced by Amdek Corp.

Called the **Laserdek 1000**, the drive fits into a single floppy drive slot on IBM Personal Computers and compatibles. According to the vendor, it provides users with simultaneous access to information in text, audio or graphic form. Each compact disk can store 552M bytes of information, which is equivalent to 270,000 pages of text, 5,000 images, one hour of sound or 150 floppy diskettes.

Priced at $895, the Laserdek 1000 includes an interface card, a device driver, cable, audio software and Microsoft Corp. MS-DOS CD-ROM extensions.

Amdek, 1901 Zanker Road, San Jose, Calif. 95112. 408-436-8570.

An external disk drive designed for use in migrating data between 5¼- and 3½-in. diskettes has been introduced by **Practical Office Systems, Inc.**

The **Practical Uicro Datadisk** provides formatting capabilities at 720K bytes as well as at 1.44M bytes and can coexist with installed drives in IBM Personal Computer XTs, PC ATs and compatibles, regardless of the DOS version, the vendor said.

Priced at $379, the Practical Uicro Datadisk comes with a controller card and utility software.

Practical Office Systems, 3972 Walnut St., Fairfax, Va. 22030. 703-385-3332.

The High Capacity Series I 150M- and 300M-byte hard-disk subsystems for IBM Personal Computer ATs, Personal System/2s, Intel Corp. 80386-based microcomputers and Apple Computer, Inc. Macintosh systems has been announced by **N/Hance Systems**, a division of Symphony Systems, Inc.

The **HCS-PCS150** and **HCS-PCS300** hard-disk subsystems provide 148M and 299M bytes of formatted storage respectively for IBM PCs. The drives provide 16.5 msec average access time. The **HCS-Mac150** and **HCS-Mac300** are the subsystems for the Macintosh.

The HCS-PCS150 costs $3,699. The HCS-PCS300 costs $5,299. The HCS-Mac150 costs $3,499. The HCS-Mac300 costs $4,399.

N/Hance, 908R Providence Highway, Dedham, Mass. 02026. 617-461-1970.

Board-level devices

Advanced Computer Solutions International has announced two models of its **Graphax 20/20** graphics controller: the Model 20/20 MS-40 and 20/20 MS-48.

The new models include appropriate monitor support files for NEC Corp. Multisync I and II, NEC Multisync Plus and NEC Multisync XL.

Advanced Computer also announced an Autocad device interface driver for Autodesk, Inc.'s Autocad Release 9 for the 20/20 products.

Features of the driver include screen save functions, three user-configurable palettes, an optional menu overlay feature and basic single-monitor operation support. The Graphax Model 20/20 MS-40 and 20/20 MS-48 controller cards cost $1,795.

Advanced Computer Solutions, Suite 330, 2105 Luna Road, Carrollton, Texas 75006.

A video BIOS system that enables Hercules Computer Technology, Inc. monochrome graphics adapters to emulate IBM Color Graphics Adapters has been introduced by **Athena Digital.**

The **Athena BIOS** system supports all Hercules graphics adapters, the vendor said, including Plus, Incolor and Ramfont cards. The system consists of random-access memory-resident software that replaces the ROM BIOS video program as well as a printed-circuit board emulation adapter that installs in any available expansion slot.

The Athena BIOS system costs $60.

Athena Digital, Suite 567, 2351 College Station Road, Athens, Ga. 30605. 404-354-4522.

An add-on motherboard said to convert a Zenith Data Systems Model 248 computer into a 32-bit Intel Corp. 80386-based machine has been announced by **American Micronics, Inc.**

Two versions of the **Zenith card** are available, operating at 16 or 20 MHz. Both are capable of zero-wait state operation, the vendor said. A 32-bit piggyback memory board was also released for the Zenith card, providing up to 8M bytes of CMOS memory.

According to the vendor, the boards run IBM PC-DOS as well as all 386 operating systems.

The 16-MHz version costs $2,595. The 20-MHz version costs $2,995. The memory board option costs $695 with no memory installed and $7,795 with 8M bytes of memory.

American Micronics, Suite A, 18005 Skypark Circle, Irvine, Calif. 92714. 714-261-0693.

A backfilling memory board designed for the IBM Personal Computer AT has been announced by **Boca Research, Inc.**

Called **Tophat II**, the add-on board uses a 64K- by 4-byte random-access memory (RAM) chip, so it requires only six RAM chips. It is compatible with both IBM PC-DOS and OS/2, the vendor said, and it operates at CPU speeds to 10MHz. Tophat II provides automatic parity checking, connects to a standard 16-bit bus and backfills system memory from 512K to 640K bytes.

Tophat II is priced at $145.

Boca Research, 6401 Congress Ave., Boca Raton, Fla. 33487. 305-997-6227.

Unretouched Screen Images

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The monitor on the right, however, can be placed anywhere you like. Even in direct sunlight. It's the new *Flat Technology Monitor* from Zenith Data Systems—winner of *PC Magazine's* coveted "Technical Excellence Award" in the hardware category for 1987.

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So clear. So precise. So lifelike. It's the only monitor with a completely flat screen. A breakthrough that has redefined monitor quality forever. Industry experts are already convinced. And once you see it in person, you'll be a believer, too.

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Our Flat Technology Monitor has an impressive 14-inch display. And even though it's bigger, it's 50% brighter than conventional CRT's and it has 70% greater contrast. So you get colors with greater depth and definition that make your reports, charts and graphs come alive like never before.

The Flat Technology Monitor is virtually glare-free. So you can work longer without the usual headaches and eyestrain. And that means greater productivity. But to get the whole picture, you have to see it with your own eyes.

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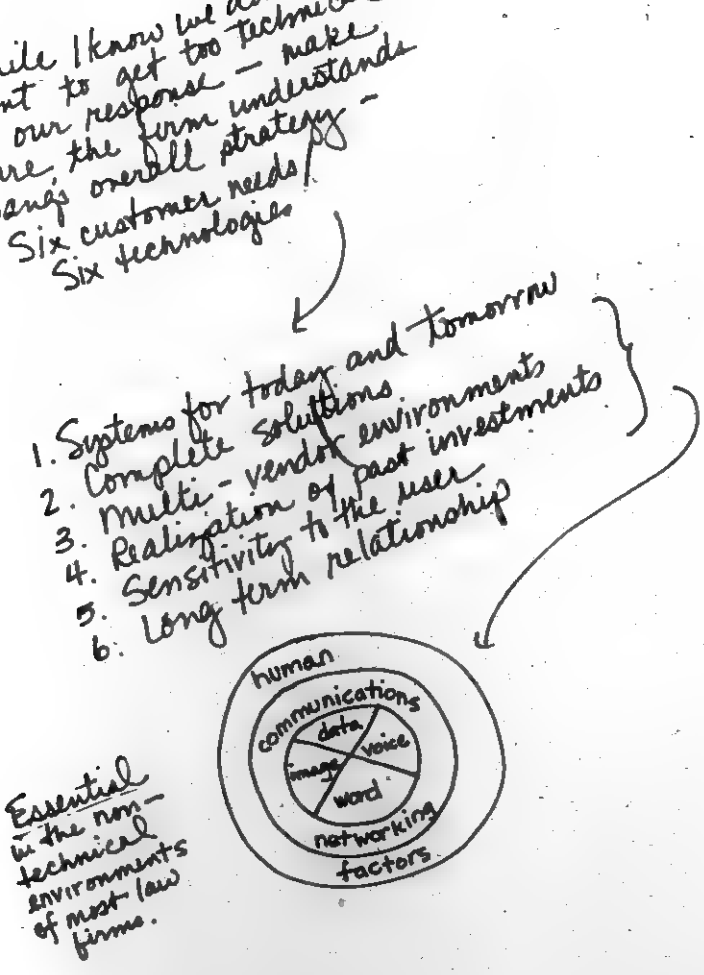


N.B.

This is a representation, not an actual, Request For Proposal. It is designed to demonstrate Wang's preparedness to meet the challenges that face the legal industry. It is intended to provide summary information for data processing and legal professionals.

We welcome your comments and invite your input.

Project Overview/Purpose

This firm has traditionally been dedicated to employing leading-edge technology to make better, faster, more informed decisions on behalf of its clients. In an era in which clients themselves have vastly improved their technological capabilities, they expect nothing less from the law firm which represents them. As part of this continuing effort, the partners have decided to implement an integrated and distributed law office automation system which will assist them in providing improved services to their clients through increased professional productivity and client communications.

The firm is international, with offices of varying size dispersed throughout the world. As such, the vendor must consider and be able to address environments in which there is a variety of existing equipment, different currencies and business practices, as well as the issue of different time zones.

The firm prides itself on its respected international reputation and for the quality of its practice, and will not simply purchase technology for technology's sake. In this day of client cost consciousness, the chosen technology will be managed by the firm's existing staff. The firm is not interested in having, nor does it expect its clients to pay for, a large number of data processing professionals.

Vendor's solution must include application development tools, productivity tools, capability to effectively manage databases, and an easy-to-use and powerful inquiry tool and an ad hoc report generator. Solution must lend itself to utilization (and possibly extension) by the non-technical user.

Emphasize the PACE training and that it's perfect for the non-technical user.

Wang Response

Wang's fourth generation database offering, PACE, uses a relational DBMS which allows the entire user community within the firm to share select data pertinent to their work as litigators, researchers, paralegals, administrative assistants, etc.

PACE is unique in its ability to effectively manipulate data, text, voice and image files. PACE also allows users to develop complete applications without necessarily needing the skills of a professional programmer.

Wang, as part of the strategic relationship, will provide a comprehensive needs analysis in order to best apply PACE in the firm's environment.

When compared to the traditional development methods, PACE can provide very significant reductions in application development lead times.

Since the firm anticipates that information processing requirements will significantly increase over time, vendor must describe CPU growth path -- for processors resident in both the host and on the desktop -- as well as the software growth path.

Wang Response

Wang's family of 32-bit processors provides you a seamless upgrade path, thereby avoiding complex conversions as you upgrade CPU's. In addition, Wang's family of personal computers offers power at the desktop as well as Wang VS system access and compatibility. The Wang PCs are all fully IBM/AT compatible and support OS/2. Further, the integration of Wang WP and Pagemaker™ on Wang PCs offers the user a complete desktop publishing solution.

Wang's design strategy has also historically been sensitive to human factors. Therefore, Wang will offer a solution which does not require replacement of familiar systems or complicated retraining as the system grows.

For more than a decade Wang has maintained a consistent user interface. Additionally, because of our architecture and corporate commitment to preserving your investment in application software, only minor changes are required to run programs that may also be ten years old.

Let's make sure we don't get too technical — what you're saying is that Wang systems don't need to be replaced when they need more horsepower.

∴ Business is not disrupted.

The solution which is chosen by the firm must be able to make full use of the important role which a phone system plays in the practice of law.

Wang's Response

Wang's solutions incorporate leading-edge customer access capabilities. Wang STEP (Speech & Telephony Environment for Programmers) transforms a customer's telephone into a vehicle to access database information compiled by the firm.

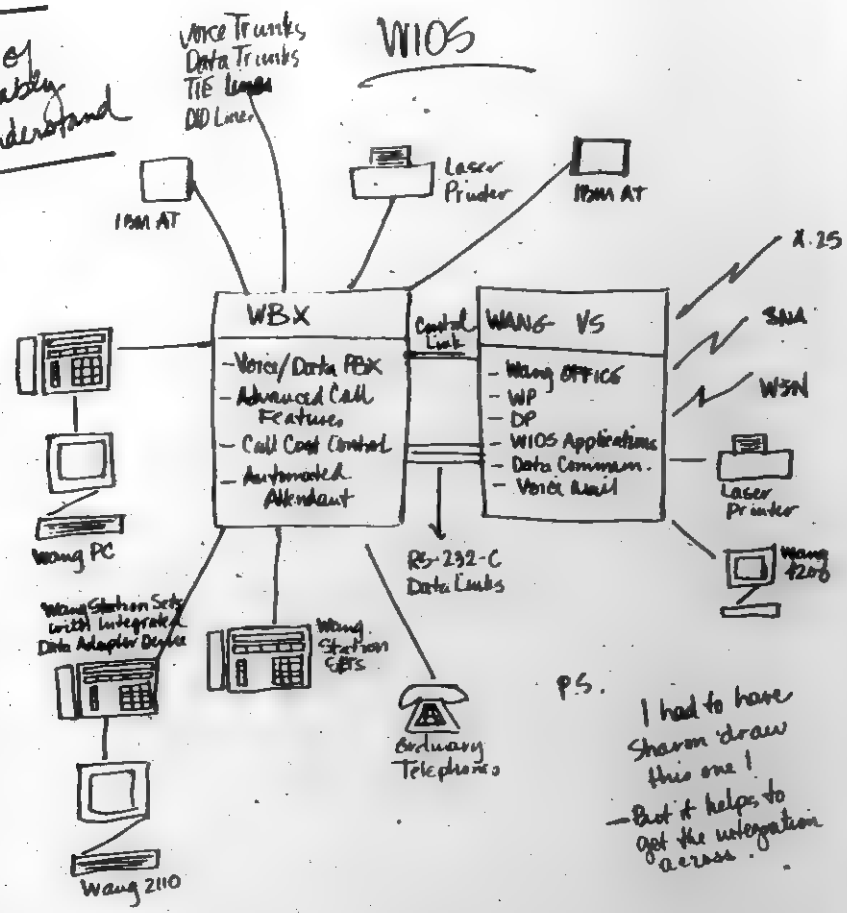
The Wang Integrated Office System (WIOS) provides the integration of voice and data. The WIOS system utilizes the Wang VS, on which all Wang Systems Networking (WSN), software such as PACE, WP+, and all 3rd party software solutions reside, the Wang Business Exchange (WBX) which is a digital office controller, and the Wang Station Set (WSS - "the phone").

The WIOS system provides system administration the ability to allocate and administer time charges, providing cost savings and control for the firm. Additional features include:

- *80 character LCD display*
- *Built in speakerphone*
- *Speed dialing and directory*
- *Automatic answering of incoming calls*

The firm can use this to capture attorney billable time!

A diagram of WIOS is probably easier to understand



P.S. I had to have Sharon draw this one! — But it helps to get the integration across.

The solution must include flexible client time accounting which suits the firm's special business needs; firm management reporting must also be able to access data from integrated general ledger and accounts payable systems.

Wang Response

Wang has a wide variety of applications software developed and implemented through third-party software providers with special expertise in legal systems. Among these solutions are state-of-the-art software packages for:

- *calendar/docket*
- *conflict-of-interest systems*
- *integrated general ledger and accounts payable systems*
- *legal time billing/accounting systems which accommodate different currencies and varying international financial practices.*

Also mention our strategic relationships with Comptafo, Mead Data, Aptech, David Wynn, West Publishing, Information Management Consultants, Custom Software Services, MSM Business Services — and now we've acquired Informatics!

Essential to the firm is a fully functional word processing editor with features to assist in legal document production. Vendor should address ability to provide this sophisticated word processing capability.

Wang Response

Wang's solution includes an extremely advanced word processing editor, WP Plus, with enhanced capabilities for the legal industry. WP Plus is not only capable of integrating the technologies dealt with in this RFP, but is also capable of operating on any size Wang VS without conversion or upgrade.

Include the Wang WP features page and highlight the foreign language options.

- Spelling verification
- word wrapped and tabular columns
- split screen editing, etc.

* Be sure to mention Wang's 25% share of the legal market among firms with mainframes and minicomputers

The firm regards timeliness of receiving information as extremely important, as well as the ability to merge into one communications network the various electronic databases which the firm must access daily. Vendor must address technological advancements which can improve intra- and inter-office communications.

Wang Response

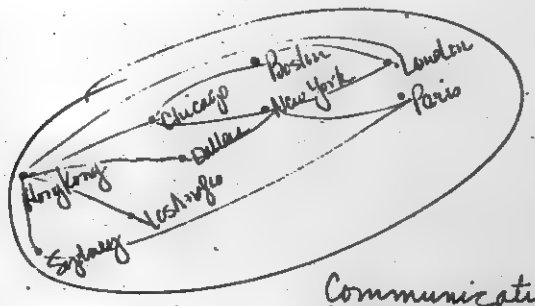
The Wang solution employs an integrated strategy for large-scale systems integration. Wang Systems Networking makes transparent the differences in the local and wide area networking protocols, therefore providing seamless communications across the entire organization. Wang not only connects the firm's network through multi-vendor integration, but also provides the ability to manage and administer the network as well. Wang Systems Networking will support numerous point-to-point or multi-point communications links to a VS in other parts of the country or the world. WangPac enhances this ability even further. Across Wang's own X.25 international network, one WangPac link can support 24 concurrent users. Every user on the system will be supported by Wang OFFICE, an electronic mail and messaging system designed to serve as the umbrella application which manages all the technologies proposed in this RFP.

As to standards, Wang solutions conform to de facto and generally accepted industry standards, including:

- *SNA/SDLC*
- *RJE 3777*
- *2780/3780*
- *CCITT X.25*
- *IEEE 802.3.*

Maintain the Wang OFFICE security system - important when sending confidential documents back and forth.

This means that while several people can access LEXIS or WESTLAW, others can be transmitting overseas and still others could be accessing ABAnet.



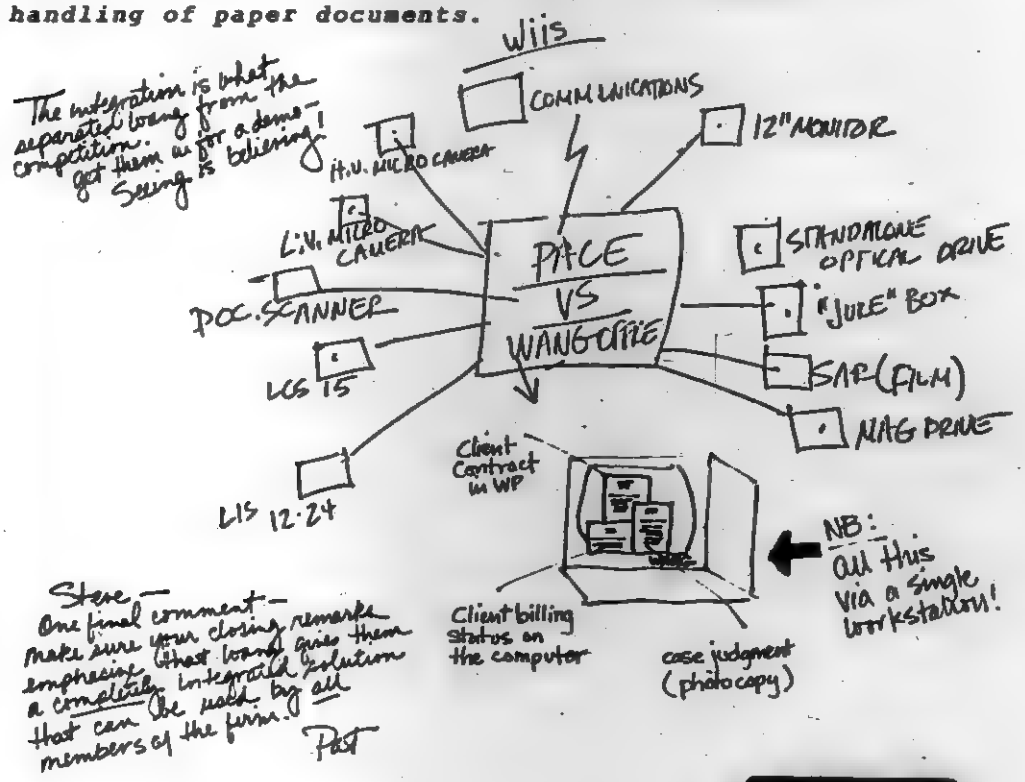
Communications are not just Wang to Wang or just within the firm, but also with the client, Wang to IBM, and Wang to DEC.

Vendor's solution must be capable of handling large amounts of documents and files in complex cases and must address the limited amount of space and large number of people who must access the firm's records management system. Although not a mandatory requirement for the RFP, vendor should present their capability in the area of imaging and image processing, especially as it relates to documents typically stored by the firm in paper form.

Wang Response

Words are just one component of an integrated office solution. The documents and files which are generated on the part of both the client and lawyer can be managed by Wang's Integrated Image System (WIIS).

WIIS is a comprehensive system of managing, processing, and communicating text, data, and image information. The firm can capture contracts, judgments, wills, trust documents, corporate records, damage appraisals, etc. that are typically stored off-line in paper form. The system allows the firm to access documents more efficiently, reduce filing and storage costs, and improve management and handling of paper documents.



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COMPUTERWORLD

An IDG Communications Publication

The Winning Slogans of the 1988 Computerworld Button Contest:

SEE US AT COMDEX - BOOTH #1214

Bridge keeps the Victors from spoiling

BY JAMES DALY
CW STAFF

ATLANTA — Robert Naumann was trying to figure out how to save his stable of Victor Technologies, Inc. 9000 personal computers from becoming very expensive paperweights.

Six months after the Federal Highway Administration (FHA) purchased the machines for eight of its southeastern offices, Victor was floundering. "The machines never really caught on, and the company never offered any support," said Naumann, a management analyst for the FHA. "Finally, the company went belly-up into Chapter 11."

With a tight budget and a data base already developed for the Victor machines, the department could not simply abandon the machines. But it was hard to feel comfortable entering data into a machine that seemed doomed. The 9000s were still functional, but their support and service base was gone.

Instead of continuing to fix a leaky boat, the agency decided to buy a new one. A new order went out that the FHA would be switching to IBM Personal Computer ATs. But there was one significant problem: the Victor machines were not IBM compatible.

"We had two choices: relkey in all this information, which was a depressing thought; or modem the stuff over, which was going to be rather expensive," Naumann said.

The modem method won out. "But sending data between just two microcomputers used to call for two modems and two packages of communications software. That totaled $600, tied up two telephone lines and took forever to send one large file," Naumann said.

Partway through the modem transformation, Naumann stumbled onto The Brooklyn Bridge, a $129 data transfer utility released by White Crane Systems in Norcross, Ga. "We were looking for anything that could communicate between Victor and IBM, and I think we got the only thing that can do the job," he said.

The hookup went rapidly. "We used the same software and cable and just hooked each end up to the serial port of the machines," Naumann said.

Speed of light?

Where the modem method was transferring data at 1,200 bit/sec., The Brooklyn Bridge was able to operate at 115K bit/sec. "Immediately, we were able to transfer the data about 100 times faster than the modem hookup and without tying up the telephone lines or attaching a modem to each machine," Naumann said.

Another added benefit came when the first IBM Personal System/2 models reached Naumann's offices. "We faced similar compatibility problems transferring data from the 5¼-in. floppies on the AT to the 3½-in. floppies on the PS/2s," Naumann said. "We take the same cable used to connect the Victor and the AT and plug it into the PS/2 and the AT. It kills two birds with one stone."

Field representatives who take NEC Corp. laptops on inspections and enter data on-site can also use The Brooklyn Bridge to move the data into the IBM PC data bases.

Wyse decision: ink multiuser deal with SCO

SAN JOSE, Calif. — Wyse Technology, Inc. reported recently that it will market the Santa Cruz Operation, Inc.'s (SCO) Xenix 386 operating system under a $2 million, three-year colabeling agreement, which will mark Wyse's entry into the multiuser market.

Wyse's distributors have estimated that between 10% and 30% of its microcomputers are used as part of multiuser systems, according to Michael Richman, marketing vice-president at Wyse.

Wyse/SCO Xenix will be sold independent of Wyse's Intel Corp. 80386-based systems, according to Wyse officials. Under the agreement, Wyse has licensed SCO Xenix and may resell it during the next three years. Wyse and SCO will jointly support the package until the third quarter of this year, Wyse said. After that time, Wyse alone will support the product.

Making it easy

Richman said Wyse opted for Xenix because of its relative ease of installation. AT&T's Unix operating system required altering a number of widely used third-party applications software packages for Wyse microcomputers.

Wyse will endorse SCO Xenix until a standard merging Xenix and Unix is available, Richman said. He added that he expects the two operating systems to be combined sometime during the next year.

Priced at $695, Wyse/SCO Xenix is currently available to Wyse resellers.

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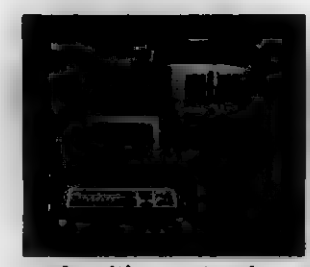

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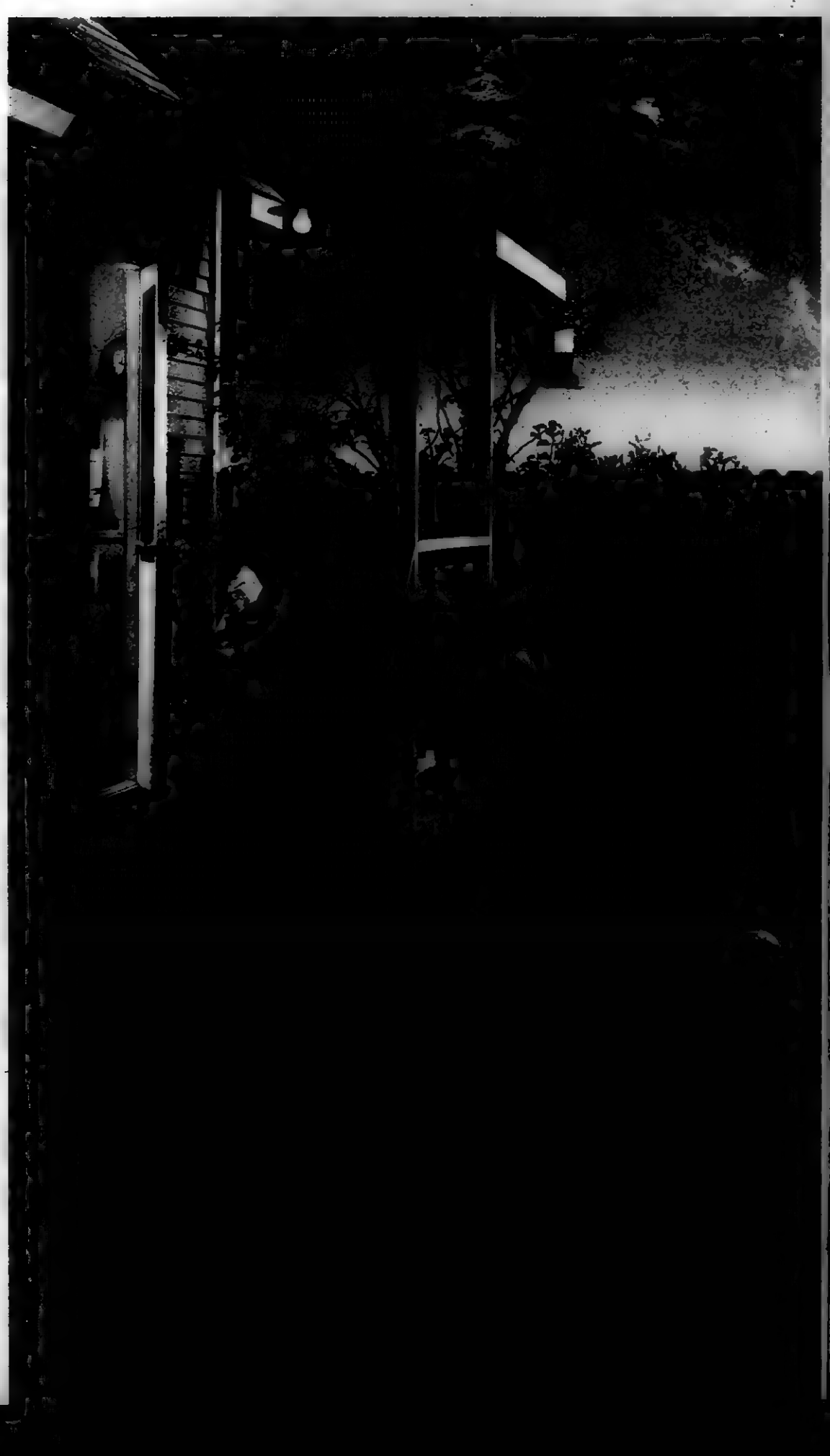

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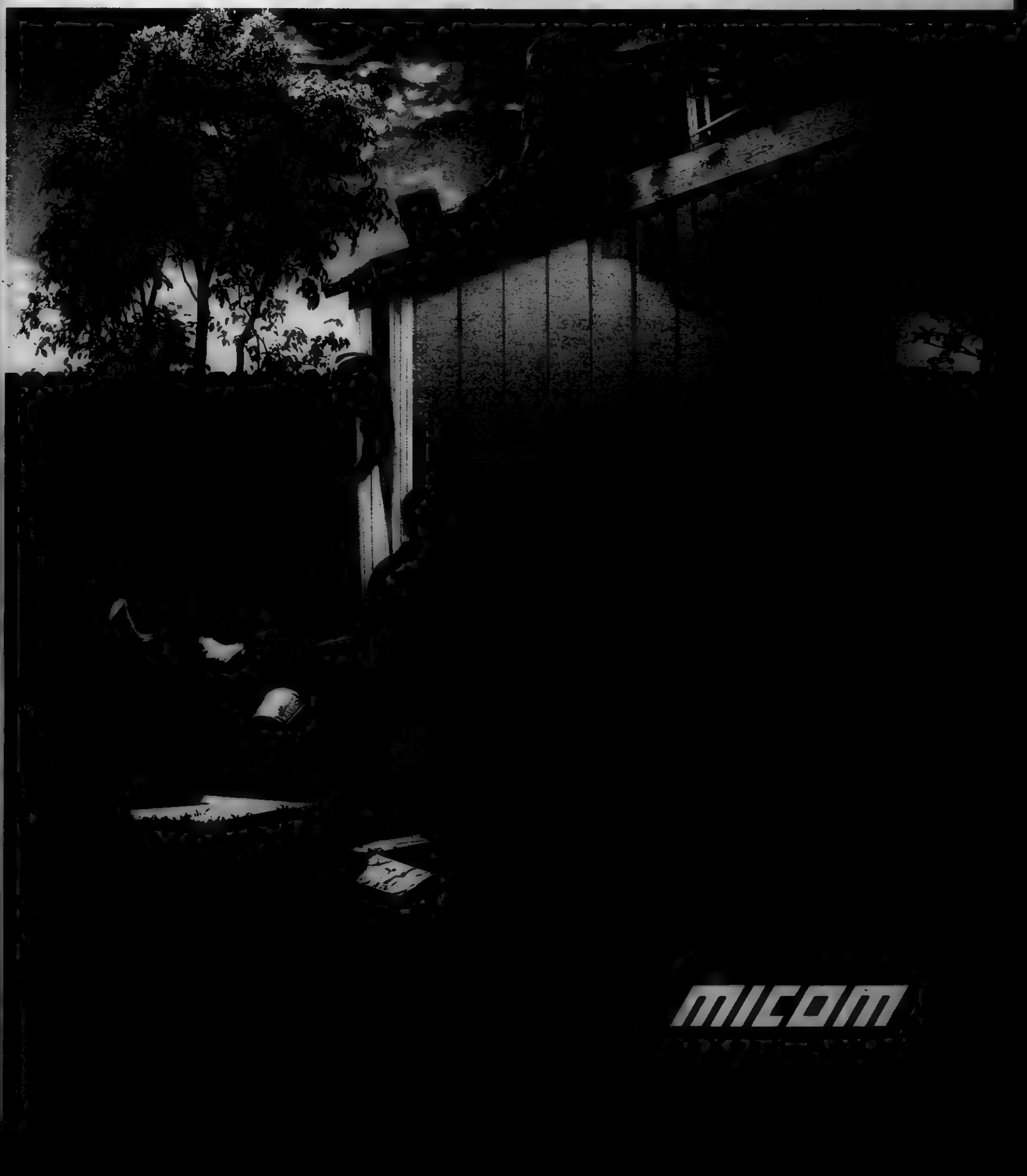

MICOM

PC-based security package boasts risk analysis, planning

BY ALAN ALPER
CW STAFF

TARRYTOWN, N.Y. — A Dutch consulting company that has its U.S. headquarters here is marketing a software package that helps companies assess potential data and physical security threats and craft contingency plans.

Parnassus, Inc., a division of Microlife-Holland, recently acquired U.S. marketing rights to the package, which was developed by Coseco BV of the Netherlands. The package, which runs on the IBM Personal Computer and compatibles, contains six different modules that cover a wide variety of data center security procedures, including risk analysis and contingency planning.

The risk analysis module estimates an organization's monetary risks and provides a cost/benefit assessment of possible security measures. "The package includes statistics gathered from a variety of sources that tell a company when something could happen," noted Willem de Vries, Parnassus's president.

Also included are an audit module that evaluates existing data security measures, a guideline and procedures module, a review diary and a control module that links each individual module. The modules cost from $6,000 to $25,000 and require a system running Microsoft Corp.' MS-DOS Version 2.1 or higher with a minimum of 256K bytes of memory.

Parnassus is also offering a set of question-and-answer diskettes, called "risk-ettes," to aid in a quick analysis of all physical security issues. Data center managers rate on a scale of one to 10 their exposure to a variety of security risks and are provided with feedback on where the dangers lie.

Areas covered include access control, fire prevention, environment, systems and application software, data security, contingency planning and off-site storage. The diskettes cost $180 each.

Data stored in the contingency planning module can be transferred directly into Wordperfect Corp.'s word processing package for report writing purposes, de Vries said. "For many companies, it takes one year to plan and another year to put a contingency plans together," he noted. "With this package, it takes no longer than a week."

The package has been marketed in Europe for five years, de Vries said. Customers include Price Waterhouse's Holland branch, he added.

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KMW Systems' channel interfaces are offered on popular, industry-standard bus structures — VME, Multibus, and Q-bus. Additionally, KMW Systems offers a board-level channel interface that uses a programmable parallel interface instead of a bus connection. This product depth ensures that OEMs can find the board-level product that best suits their system integration needs. Every Auscom channel interface allows attachment to an IBM or compatible channel, with data transfer rates of up to two megabytes per second.

Reliability no one else can match.

KMW Systems' channel interfaces have a history of reliability, with field-tested MTBFs as high as 19 years.

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Innovative rolls out Mac spreadsheet

LENEXA, Kan. — Taking a stand opposite Microsoft Corp.'s Excel, Innovative Software, Inc. recently announced a spreadsheet package for Apple Computer, Inc.'s Macintosh that integrates numbers, charts, words and images.

Slated for second-quarter delivery, the product, called Wingz, features "what you see is what you get," or WYSIWYG, capabilities and a fourth-generation language for use in applications development.

Wingz "can be used to do everything from straight spreadsheet applications to computer-aided design and manufacturing," a company spokeswoman said.

According to the firm, the heart of the product is the spreadsheet, which features a 32,768- by 32,768- matrix. The built-in text processor allows the addition of blocks of text, each measuring up to 22 by 22 in., with multiple fonts, styles or sizes and formulas. The work sheet can also be used as a data base to sort, search and query, the vendor said.

Standard graphics capabilities encompass desktop presentation and charting functions. Included are 21 basic chart types, a palette of 16 million colors, 256 patterns and shades, three-dimensional rotation of images and automatic data smoothing. Charting types included are polar, pie, layer and wire-frame.

With WYSIWYG capabilities, users can generate and lay out numbers, charts, words and images on a single screen and then output to a single printed page, the vendor said, simplifying the transition from data to business reports, proposals and presentations.

The Wingz development environment is based on Innovative's Hypersheet programming language. Commands and functions include array processing, global and local variables, procedures with parameter passing and other structured programming commands.

Also offered in Wingz are windowing, dynamic links to spreadsheets, automatic or manual layout, password security and data encryption.

According to the Innovative spokeswoman, Wingz, which has not reached the beta-test stage, should cost less than $500. It will run under the Macintosh Operating System and Apple's A/UX implementation of Unix.

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The message is simple. Customer-controlled software makes everybody's job easier. To find out more, or to inquire about any of our Financial, Human Resource, Manufacturing and Application Development software, call McCormack & Dodge at 1-800-343-0325.

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CONTINUED FROM PAGE 33

nesses, the [IBM PC AT compatible] is not a strong buy right now," said analyst Clare Fleig of the International Technology Group (ITG) in Los Altos, Calif. "The systems doing well right now are Intel 386-based like Compaq's portable or Tandy's 386 model."

John Murphy, senior consultant at Wohl Associates in Bala Cynwyd, Pa., said IBM is currently offering its authorized dealers substantial promotional discounts on PS/2 Model 60s that are often passed along to the customer. A 40M-byte hard-drive version can be obtained for less than $3,000, he said, adding that aggressive pricing is making competition more difficult for the clones.

Michael Goulde, an analyst at The Yankee Group in Boston, agreed. "The clones can't get much cheaper than they already are."

ITG's Fleig said most companies not

> THE CLONES can't get much cheaper than they already are."
>
> MICHAEL GOULDE
> THE YANKEE GROUP

buying into IBM's latest and greatest still want the most technologically advanced products they can get. "They want to stay in the DOS world with a vendor they can trust. In that market, low-cost clone sales are almost nonexistent," she added.

Additionally, the higher end compatible vendors are offering better price/performance ratios with their "classic bus" products in response to the Micro Channel architecture. "In the last year, since the emergence of the PS/2, there is a definite downturn in clones," Fleig said.

Lloyd Cohen at IDC said one vendor taking a hard hit is Leading Edge Hardware Products, Inc. in Canton, Mass. The company, which once made some inroads into corporate America, saw its U.S. shipments fall from 189,800 in 1986 to 140,000 in 1987. Meanwhile, IBM has announced that it will ship its two millionth PS/2 unit later this month; the product line is one year old.

But the falling off of sales to some corporations and medium-size businesses does not augur failure for the clones. Their sales are still strong to the small business and home markets, said JoeAnn Stabel of Storeboard, Inc. in Dallas.

Although corporations are more likely to buy through direct sales forces than through retail channels, firms that do hit the stores tend to buy brands they trust.

Additionally, established dealers are more likely to get business from corporations.

"There's a very high churn in the lower tier of dealers," said The Yankee Group's Goulde. "It's one thing for a vendor to say it's got 500 dealers, but are they the same 500 they had last week?"

On the low end, Goulde said, IBM's PS/2 Model 25 and Model 30 are more likely to be accepted in corporations than their lower priced competitors. Part of the reason, he said, is that the low-end competition often ends up in the hands of dealers who have a low profile in corporations, and the competition is high.

Time Line revamp targets high end

BY STEPHEN JONES
CW STAFF

NOVATO, Calif. — Symatec Corp.'s Breakthrough Software Division is positioning its Time Line 3.0 project manager as a high-end alternative, featuring advanced outline capabilities and an interactive Program Evaluation and Review Technique (PERT) chart, to the product's earlier version.

Time Line 2.0 will continue to be aimed at small-business users with floppy disk-based DOS personal computers, while the enhanced version was designed to run on Intel Corp. 80286- and 80386-based PCs with hard disks, Symantec said.

The firm is betting that as much as 60% of the 100,000 current Time Line users will upgrade to the 3.0 package, according to Rod Turner, general manager of the Breakthrough Division.

Requirements

Time Line 3.0 requires 640K bytes of random-access memory, IBM PC-DOS Version 2.0 or higher and a hard disk. The project manager costs $595, with a $195 upgrade charge for Time Line 2.0 users.

Turner said 75% of the program's code was reworked to include the outlining functions that help users manage large schedules, multiple projects and reports.

The PERT chart allows users to enter and edit notes for reports while viewing the chart and features automatic layout and zoom capabilities that display each level of an outline.

If a mistake is made in the development of an outline, users can tap an undo-redo function that can retrace a project's steps with no limit to correct an error, Symantec said.

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CONTINUED FROM PAGE 33

wanted to convey. At another IBM seminar held in late March, IBM's Mike Maples said Lowe wasn't necessarily promising these sorts of price cuts on existing PS/2s. He said Lowe was only referring to the price/performance improvements advanced technology has permitted in the past — and will continue to allow for in the future — and that IBM will take advantage of it.

It's funny, though, that every publication attending the Boca Raton conference assumed the same thing: that IBM will dramatically reduce prices on existing systems. According to one IBM insider, what Lowe *meant* to get across was that IBM will improve the functionality of a system like the PS/2 Model 25 or 30 by adding its Micro Channel and keeping the machines at the same price point. Similarly, the source said, IBM will upgrade current 286-based machines to 386-based machines while keeping them, too, at their current price points.

Garbled transmission

Now some might say this is like the difference between calling something six of one or half a dozen of the other, but this misinterpretation could cause IBM some problems with its corporate accounts. When corporations read that IBM was planning to significantly reduce prices, some began thinking it might be wise to hold off on buying PS/2s until the price cuts were announced — price cuts that it now seems will not be coming.

IBM would be smart to more clearly articulate its pricing strategy before customers begin building future purchasing plans around what they believe Lowe means. The company is rumored to be making some major product announcements in Dallas in June. Maybe a lot of this will get straightened out then.

Actually, corporate customers waiting for IBM to dramatically lower prices on PS/2s before they buy don't have to wait. Just a couple of weeks ago, Computer Town, a mail-order chain, had a three-day sale advertising PS/2 Model 60s with 44M-byte drives for $2,995 and Model 50s with 20M bytes for $2,595.

One competing dealer said Computer Town can't be making more than $350 to $400 from each Model 60 at that price. Some dealers must be feeling the pressure to maintain their authorization under IBM's latest quota increases. However, it's a situation that a lot of companies could take great advantage of.

Hardly hurting

But it appears IBM's shipments of PS/2s haven't been hurt too badly by this pricing confusion. The company announced it will ship its two millionth PS/2 sometime this month. Of course, this gets into IBM's definition of "shipped," but that's a subject for another day.

Speaking of PS/2s. A recent study released by Focus Research Systems concluded that IBM finished last year with a firmer grasp on the Fortune 1,000 than it had when the year started. While IBM's fortunes were up and down over the course of 1987, its share of new business was 68% by the third quarter, spearheaded by the PS/2 line. The company's share of new business had dropped to 56% in the second quarter, down from 61% in the first.

Focus believes IBM's position in the market will improve as developers begin delivering OS/2-compatible applications, which will further drive up PS/2 sales.

Scannell is a *Computerworld* senior editor, microcomputing.

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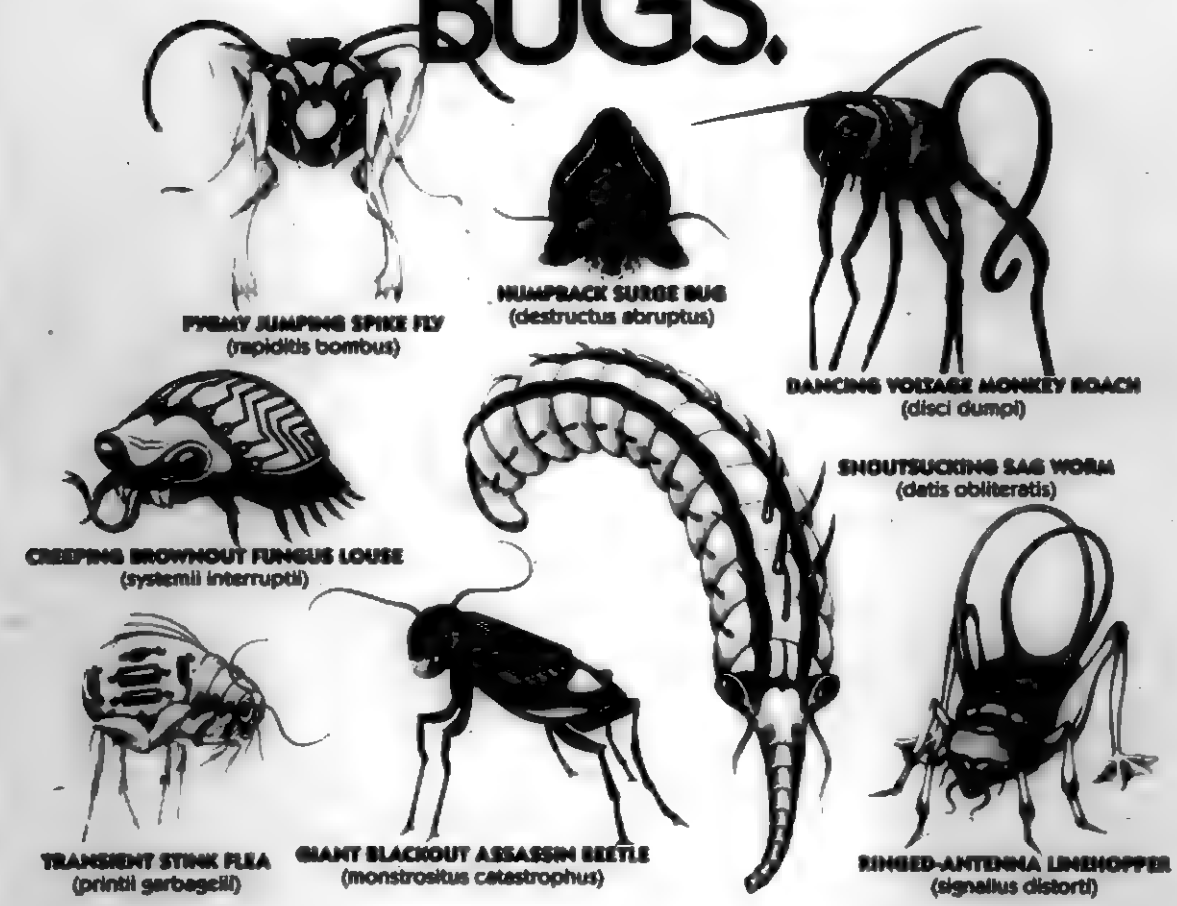

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Pact aimed at speeding slide transmission

MOUNTAIN VIEW, Calif. — Software Publishing Corp. and Autographix, Inc. have signed an agreement that allows Harvard Graphics users to receive 35mm slides and transparencies overnight.

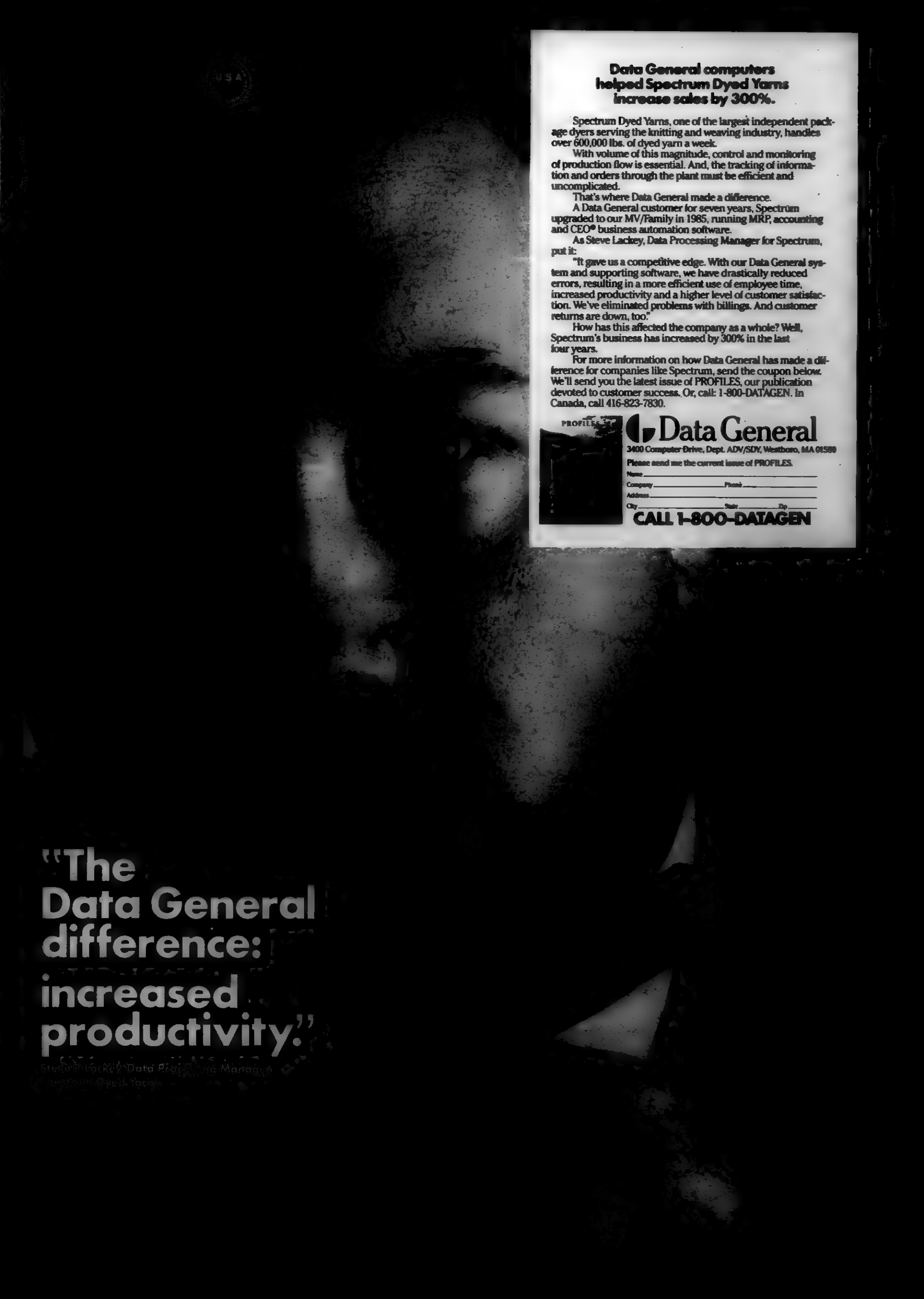
Through the agreement, the firms said, users will be able to send chart files to Autographix Imaging Centers in several major cities via a modem or floppy disk and receive slides or transparencies back in less than 24 hours.

The new relationship will provide users with two major advantages, according to Wesley Richards, Software Publishing's vice-president of marketing sales.

"First, our users get the highest possible visual fidelity between a chart as displayed on the screen and the slide made from the chart," Richards said. "Second, users can create slides automatically, without any cumbersome and time-consuming installation or file conversion procedures."

Richards contended that the production of slides with high visual fidelity had been a long-standing problem for personal computer-generated slides, which did not always match what was created on-screen.

The firms stated that the service will be available to U.S. customers beginning in June. Customers can send chart files to centers in New York, Boston, Chicago and Los Angeles. Other centers will be opened in Canada, Europe and Australia a month after the service is available in the U.S.



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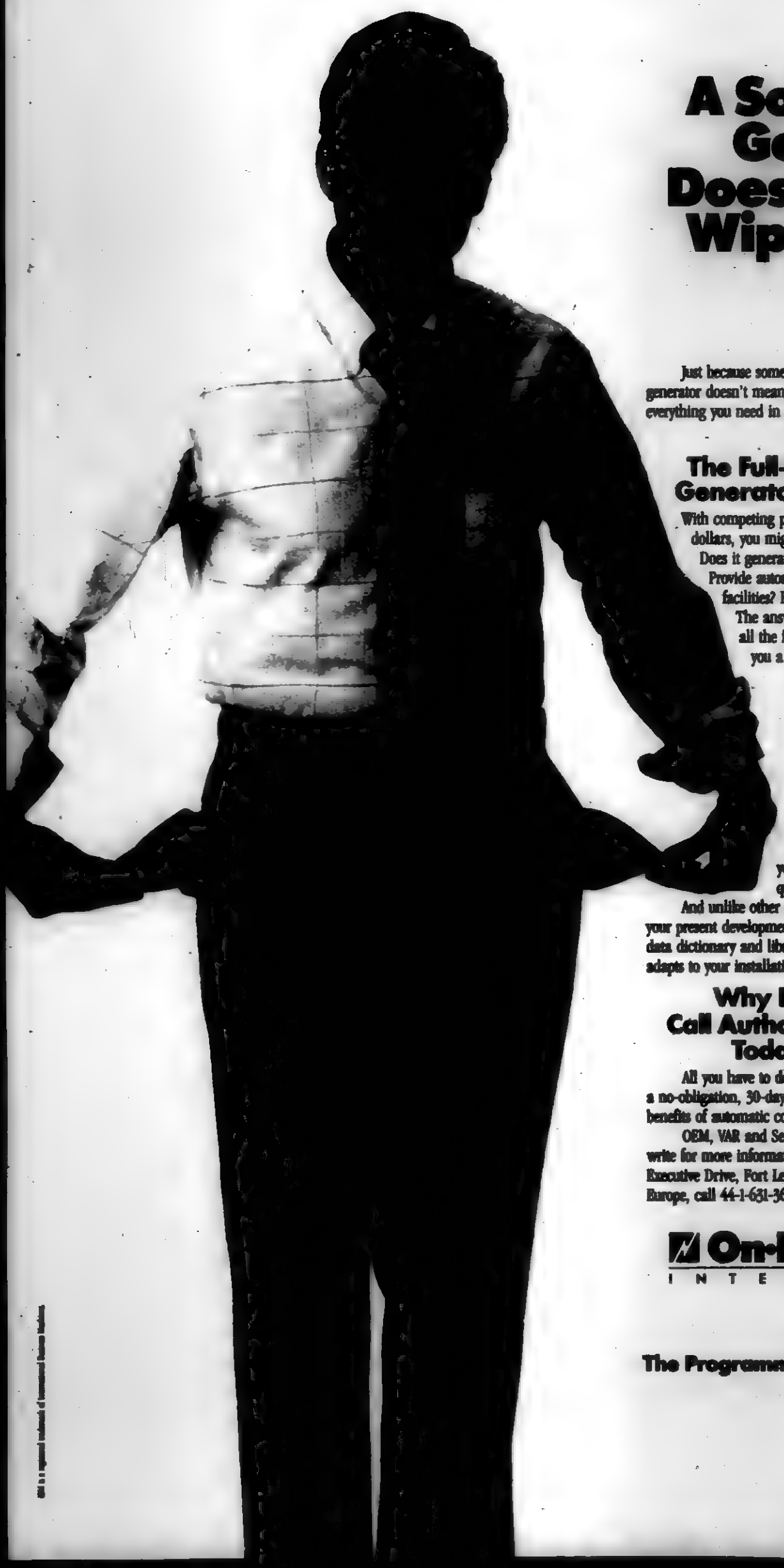

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DATA STREAM

Elisabeth Horwitt

Pity pioneers of standards

We are all tired of vendors telling us that they will "absolutely, positively" support various industry standards "as soon as they have been firmed up."

Sounds like a marketing ploy, cynical observers — myself included — have sneered. Easy enough to promise support when you know the protocols won't be ready to go for another year or two or three.

But I've changed my tune. I am now convinced that most major computer companies really are trying their best to follow the standards path because they have accepted that their customers won't put up any longer with all-proprietary solutions. If their efforts are slow and at times ineffectual, they are to be pitied more than censured.

The path to true standardization remains muddy, rocky and full of forks that lead to dead ends.

Hewlett-Packard, Wang and Data General have clearly adopted an "if they hand you a lemon, make lemonade" approach. They can't keep IBM and DEC off their customers' premises, so they are making a selling point out of their superior ability to link up with their rivals' products. But this strategy requires them to stay in the vanguard when it comes to implementing popular networking protocols — and it isn't always easy

Continued on page 75

Linked PCs deliver newspaper

Distributed LAN brings expandability, sanity to beleaguered daily

BY ALAN J. RYAN
CW STAFF

FRAMINGHAM, Mass. — Insufficient memory and a system that crashed eight to 10 times a day were unbearable, but *The Middlesex News* managed to plug along and get the paper published daily.

As time went by, however, meeting news deadlines became a nightmare as reporters competed for open terminals and new terminals, since the aging computer system could no longer be updated. The 45,000-circulation daily newspaper either had to stop growing or adopt an alternative system.

In response to this problem, the newspaper's management formed a team that began a months-long search to replace the more than 10-year-old ECRM, Inc. publishing system. The patched and repatched system boasted a Digital Equipment Corp. mainframe at its heart that was replaced with a distributed network of personal computers, according to Eric D. Bauer, director of editorial operations.

Bauer said many minicomputer-based alternatives were explored, but the project team was leery of any system that could crash, bringing down all of the reporters and editors as well as the advertising department, while also cutting off access to news wire capture services like The Associated Press and United Press International.

With a distributed PC network, "There's no CPU to crash across the network," Bauer said. "Individual terminals could crash, but as a system it wouldn't crash, so it's more reliable."

The chosen system, implemented Feb. 29, was pieced together by Information International, Inc. in Culver City, Calif., a supplier of newspaper and magazine publishing systems that features Tecs/2 publishing software developed by Morris Publishing Co. in Augusta, Ga.

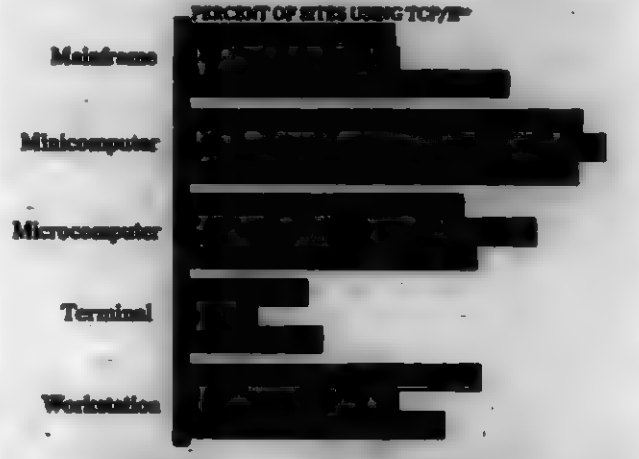
The main CPU on each desk top is a generic 8-MHz, 40M-

Continued on page 74

Data View

TCP/IP use

The de facto standard is proving most popular for minicomputer networking and least popular for terminal-to-mainframe connections



*Transmission Control Protocol/Internet Protocol

INFORMATION PROVIDED BY NEWTON-EVANS RESEARCH CO.
CW CHART

Tapestry gets turbocharged

BY PATRICIA KEEFE
CW STAFF

REDWOOD CITY, Calif. — Torus Systems, Inc. recently unveiled the second generation of its Tapestry network operating system, said to support Microsoft Corp.'s MS-DOS, OS/2, IBM's Netbios and the Server Message Block (SMB) protocols.

Tapestry II is targeted at large, multisite networks and features domain network and time management systems.

Torus is licensing the Microsoft Networks redirector for DOS networks and the OS/2 LAN Manager redirector for OS/2 networks for incorporation into Tapestry II. The software reportedly will let the two environments communicate freely.

Continued on page 74

Users extol Microsoft LAN plans

BY KATHY CHIN LEONG
CW STAFF

SAN FRANCISCO — Corporate users who attended the recent Microsoft Advanced Network Development Conference gave a strong thumbs-up to Microsoft Corp.'s OS/2 LAN Manager, which has so far been endorsed by more than 20 software and hardware vendors.

Although network managers at the conference said it is still too early to make any commitments to the LAN Manager, they agreed with Microsoft's strategy to have the network program adhere to standard communications protocols such as Transmission Control Protocol/Internet Protocol, IBM's Netbeui and the ISO's Open Systems Interconnect.

Users also lauded the multitasking features the LAN Manager will provide as a result of its ties to OS/2. "LAN Manager appears too tightly coupled to OS/2 for users to ignore it," a user from a major power utility said.

The conference drew a hoard of vendors, but approximately 12 users also attended the three-day forum, ranging from network novices to managers, all thirsty for concrete information. The companies represented in-

Continued on page 75

Inside

- Illinois Bell files ISDN tariff structure. Page 72.
- DEC, DSC agree to start telecom platform. Page 73.
- Bicc Data expands Isolan fiber-optic line. Page 76.

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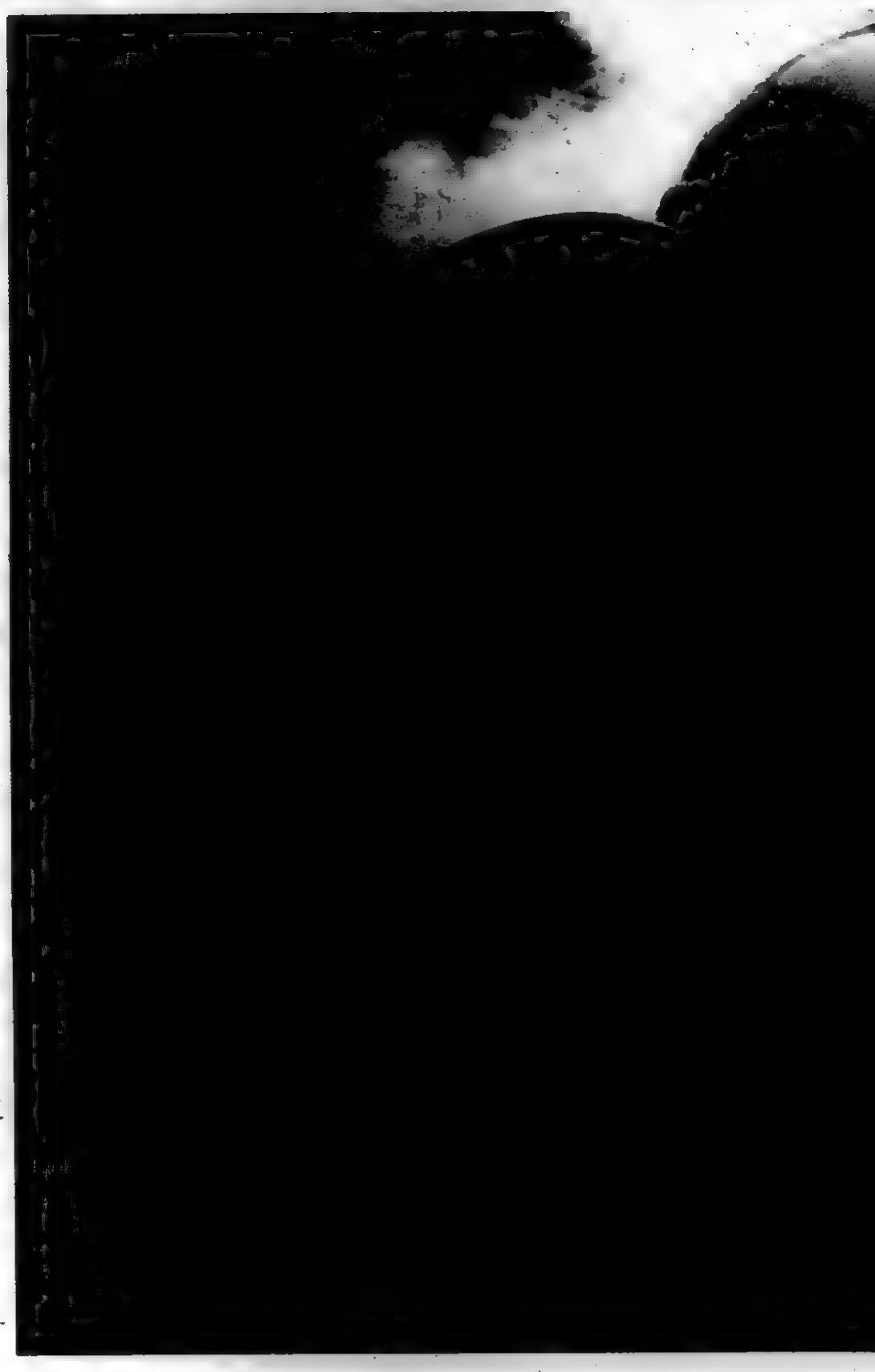

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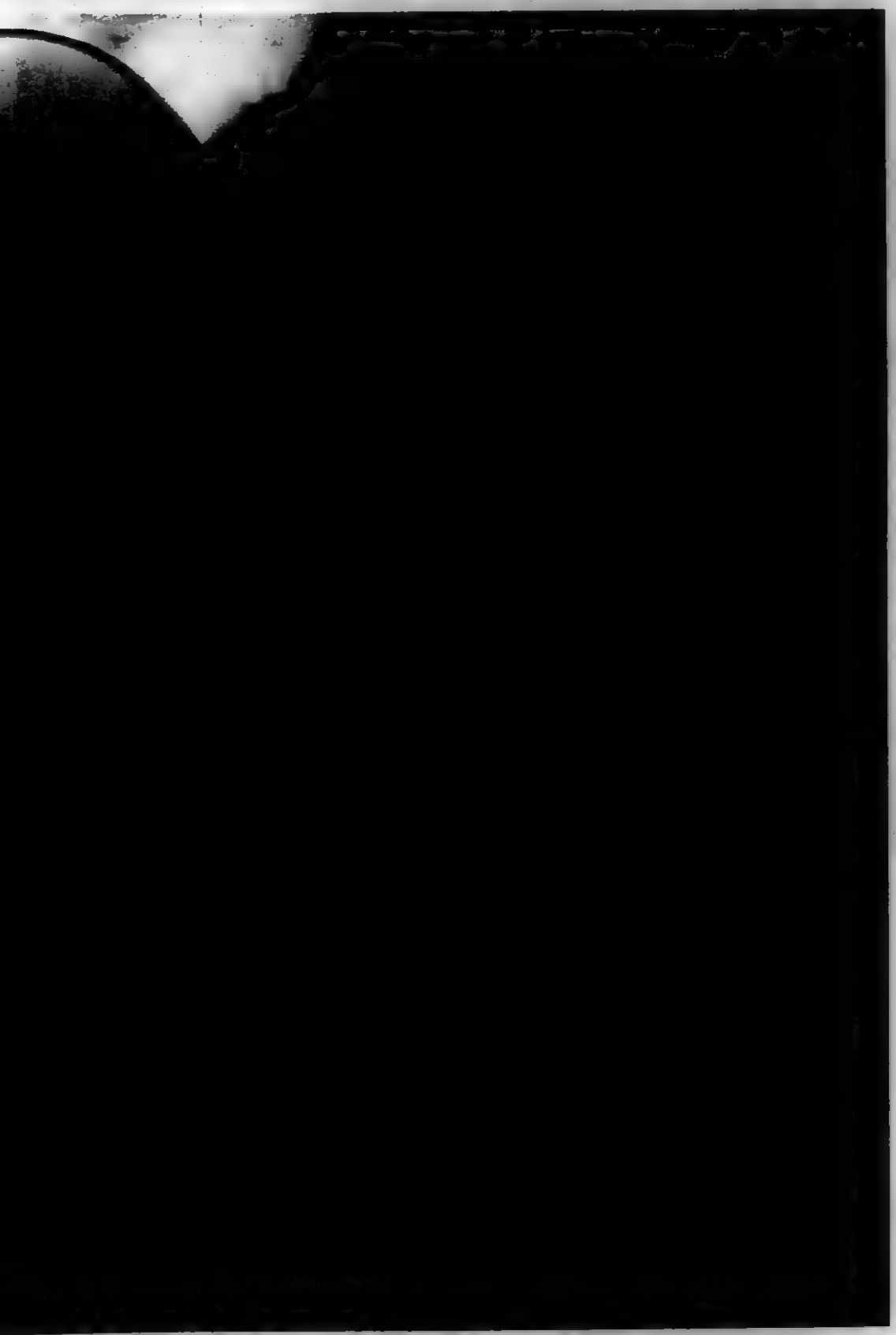

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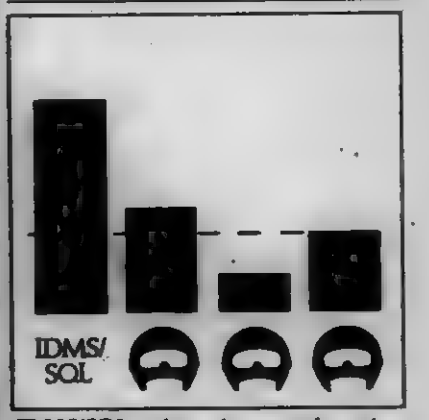

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Telecom service areas heating up

"ISDN Newsletter" said it has just published a copy of the nation's first Integrated Services Digital Network (ISDN) tariff structure, which was filed with the Illinois Commerce Commission March 29 by Ameritech's **Illinois Bell**. This four-page report, which includes a summary of Ameritech's introductory ISDN systems to business users, is available free by writing on company letterhead to Information Gatekeepers, Inc. in Boston.

Bell Communications Research Corp. (Bellcore) said it will present a proposal for a network traffic management operations system to be used by the former Bell operating companies. As new network architectures and services are introduced, the system is needed to manage network traffic on an integrated basis, according to Bellcore.

A Technology Requirements Industry Forum will be held this week at the Adam's Mark in St. Louis to discuss Bellcore's proposed generic requirements for the operations system and network element interface.

Voice-messaging services were targeted by **Southwestern Bell Telephone Co.** in its Comparably Efficient Interconnection (CEI) plan, which was filed April 1.

This marks the company's initial entry into enhanced services opportunities allowed under the March 7 ruling on the Modified Final Judgment information services ban. The CEI plans specifically target voice mail and telephone answering services. Field trials in those applications are slated to begin this summer and will consist of limited offerings in selected wire centers within Southwestern Bell's five-state service area.

Avanti Communications Corp. has signed a letter of intent with a subsidiary of **Bell Atlantic Corp.** to jointly develop a general-purpose carrier-based network management system that reportedly will enable users to merge and manage public and private network services.

Bell Atlantic will be able to use Avanti's Open Network Management system as a base platform for its future expanded system. The vendors claimed their joint project will be the first system to support equipment from multiple vendors and multiple products such as multiplexers, central offices and private branch exchanges. Third parties are encouraged to enter the development process and can contact Avanti's vice-president of marketing, George R. Kushin.

McDonnell Douglas Computer Systems Co. has certified its Material Management System (MMS) as compatible with its EDInet communications network. The MMS/EDI certified package complies with the ANSI X.12 standard and will allow professional buyers of health care products to electronically transmit purchase orders to multiple heath care suppliers. Currently, purchase order transactions are handled by phone or electronically transmitted to a single supplier.

McDonnell Douglas said it plans to certify its system with the electronic data interchange networks of competing companies.

Synoptics Communications, Inc.'s Lattisnet has been certified to run on **Northern Telecom, Inc.'s** Integrated Building Distribution Network cabling system. Lattisnet is an implementation of 10M bit/sec. Ethernet that runs over unshielded twisted-pair.

In addition, Synoptics announced that **Bell Canada Enterprises, Inc.** will be distributing the network as a key element of its Landscape general-purpose local-area network products.

Micom Systems, Inc. has in-

stalled its 3,500th data private branch exchange, at Anheuser-Busch.

Digital Communications Associates, Inc. (DCA) announced that **Siemens AG** will market its System 9000 T1 network processors on an international basis. In return, Siemens has granted DCA the rights to distribute its packet-switching products and utilize this technology in future DCA products. In addition, the two companies plan to jointly develop Integrated Services Digital Network interfaces for the System 9000.

In a little more than two years of operation, **GE Information Services** has signed up its 100,000th subscriber, claiming to be the second largest service provider in the on-line information services business.

Joiner Associates, Inc. in Madison, Wis., developer of Jnet IBM-to-Digital Equipment Corp. connectivity products, has been selected by IBM to assist in the national marketing and installation of IBM mid-range products under IBM's Industry Marketing Assistance Program.

DEC inks telecom pact

BY PATRICIA KEEFE
CW STAFF

MAYNARD, Mass. — Digital Equipment Corp. and DSC Communications Corp. in Dallas have announced an agreement to establish a technical platform for a line of telecommunications network products for sale to equipment suppliers of the divested Bell operating companies.

The announcement is probably of more interest to customers of the former Bell operating companies than to DEC networking customers, conceded a DEC spokesman.

"We are in the very early stages of studying ISDN [Integrated Services Digital Network] and intelligent networks," the spokesman said, adding that DEC hopes to sell VAXs and other computing engines to telecommunications equipment suppliers.

The nonexclusive pact reportedly will apply DSC's strength in telecommunications and DEC's strength in computer networks to the development of a series of products designed to "aid the provisioning" of services in the intelligent network.

Specific terms of the agreement were not disclosed. However, the two companies said that early efforts may be compatible with DSC's Megahub, a multifunctional network node.

According to the two vendors, other areas of potential Megahub applications include the following:

- Common channel signaling products.
- Computer-controlled switching applications to link telecommunications and digital computer networks.
- ISDN-related applications for voice and data networks.
- Advanced applications for value-added network services.
- Network management and operations support systems.

DEC announced a similar relationship with Siemens AG in March, the spokesman said, adding that it is unlikely any products will result from either alliance this year. Also, a communications development pact was announced with Apple Computer, Inc. earlier this year, but details will not be available until August.

"All these words don't tell me anything," complained Thomas White, president of Infonetics, Inc., a market research group in Santa Clara, Calif. "Companies have to stop this stuff. There's got to be a point where they stop sending press releases and start shipping products."

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Turbocharged

CONTINUED FROM PAGE 69

The program can retain and extend the icon-based user interface and functions — such as electronic mail, file management and telephone directory management — of its Tapestry predecessor, Torus said.

Tapestry II is Torus's platform for supporting the unreleased LAN Manager's interprocess communications and IBM's LAN Server. OS/2 is supported on both the server and workstation sides.

To enable users to integrate into their networks a wide array of third-party products, such as specialized servers providing fault tolerance, Tapestry II will support any SMB file or print server and any Netbios gateway or interconnect bridge, regardless of the manufacturer, the vendor claimed.

To allow networks of unlimited size to be efficiently controlled, Torus has introduced domain network management. Domains are logical rather than physical groupings of personal computers and can be used to reflect the organizational structure of a company. Domains may be managed from any authorized network node.

The domain configuration reportedly allows network details, including user details such as user name, password and privilege; and it allows node details, such as workstation hardware and operating system, to be specified and edited.

Internetworking is supported through Netbios interconnect bridges, such as Torus's recently announced CCITT X.25 Interconnect Bridge, which links Tapestry II domains over X.25 packet-switched networks or leased lines.

Further, new versions of Torus's Remote Network Link and Remote Access Gateway for Tapestry II will allow users to access a network across telephone wire, according to the company.

Also introduced was an E-mail system that supports communications of text and other data among users at single or multiple sites. A specialized server supports and manages the E-mail system to maximize performance and efficiency, Torus said. The mail-server management facilities enable a manager to clean up the mail system by checking the status of messages or discard them.

Tapestry Version 1.0E, scheduled to ship May 1, is a preliminary version that allows customers to install, use and evaluate the network prior to final release.

However, the product does not include OS/2 support, is not appropriate for use on Intel Corp. 80386- and 8088-based PCs and does not provide integrated communications facilities.

It is free of charge on a 60-day evaluation and return basis.

Tapestry II Version 1.0 is the final release and is slated to ship in the third quarter. Pricing starts at $695 for the Domain Manager Pack and ranges from $395 to $12,500 for Extension Packs, depending on configuration.

Linked PCs

CONTINUED FROM PAGE 69

byte hard-disk system based on Intel Corp.'s 80286 chip. The distributed system, which also features an IBM Enhanced Graphics Adapter-compatible Amdek Corp. color monitor for each user and a 1.2M-byte, 5¼-in. floppy drive, is networked using Proteon, Inc.'s Pronet 10 10M-bit token-ring network.

Bauer said the system is readily expandable. With the ECRM system, the terminals were proprietary. Once the company went out of business, the terminals became harder and harder to find.

The Information International system allows the editors to converse more easily with bureau locations. Reporters had previously been using Tandy Corp. Radio Shack Model 100 portables. The new system provides the bureaus with two-way communications access to the home office.

"This is the first piece of what will be a multiyear effort, called the integrated text processing system project," Bauer said. "We want a totally integrated, totally electronic prepress operation." The company also plans to install a classified advertisement system, an advertising make-up system and an editorial pagination system.

The system has no central data base, but there is a designated master station to which only editors have access and which allows them to work on stories for the next day's paper.

From the user perspective, there were drawbacks to the PC-based system, Bauer said. Because there is no distributed data base, reporters do not have access to other queues as they did previously. And, although the system offers many benefits, the additional features have made it more complex.

In order to ease the transition from the "elegantly simple" old system, the company held a series of classes followed by a one-month period in which users could tinker with the new system while still relying on the old.

Still, when the day arrived to complete the transition, problems arose. Fortunately, it took place on a Sunday evening, the paper's easiest night. "We had a pretty tough night," Bauer admitted, "but there were no problems with the system. Some people were slow, but on the second day we saw a dramatic improvement." After several weeks in place, the paper is back to full speed, Bauer said. This time, though, there are no crashes waiting in the wings.

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LAN plans

CONTINUED FROM PAGE 69

cluded Bechtel Corp., A. C. Nielsen Corp., Chevron Corp., Atlantic Richfield Co. (Arco) and United Airlines.

Microsoft has stated repeatedly that the LAN Manager will be available to users through OEM channels.

This means interested users will have to wait until many of the products demonstrated at the show are commercially available.

At least one user said he expects to adopt the LAN Manager sometime within the next six months. Marty Wiltse, MIS director at the Kansas Turnpike Authority in Wichita, has already purchased the Microsoft Software Developer's Toolkit to develop in-house OS/2 applications for auditing and other tasks.

"We don't have any local-area networks now, but I would think that we would use the LAN Manager to do some simple things like file and printer sharing. Having the multitasking environment of OS/2 at the server level will be very useful for us," Wiltse said.

"We are committed to LAN Manager," said Alan Brittner, manager of systems services at Arco in Los Angeles. The company is currently using 3Com Corp.'s 3+ network operating system throughout its headquarters and plans to move to the next generation, 3+ Open, which is based on the LAN Manager and is supposed to ship in June.

"By using 3+ Open, we will be able to have better security and network management features," Brittner said.

At Bechtel, the product will have a tougher time passing through top management. According to one anonymous user, "We are running Novell [Inc.]'s Netware over most of our networks — token-ring, Starlan and Ethernet. Getting LAN Manager in here is more of a political question."

Analysts tracking the market said the LAN Manager is on its way to success. "Even though it isn't out in the hands of users yet, there is going to be a snowball effect," predicted Brad Baldwin, an analyst at Dataquest, Inc. in San Jose, Calif. "Users are anxious to see what it will finally look like."

Horwitt

CONTINUED FROM PAGE 69

to figure out ahead of time which protocols are going to be popular and what their final form will be.

The problems arise with the higher level protocols that define network functions, such as distributed data base access, micro-to-mainframe communications and network management.

To commit or not to commit?

IBM and the International Standards Organization (ISO) are still working on those problems, leaving would-be supporters with a dilemma: If they hold off implementing a potential standard until it is better defined, they run the risk of falling behind competitors in the race to provide multivendor connectivity. But should they commit too quickly, they could end up wasting a lot of time and money linking products to protocols that will eventually fall by the wayside.

Computer companies also have to figure out which protocols will become the norm for linking IBM microcomputers to host systems.

Even less clear are vendors' plans for providing links between their own hosts and IBM Personal System/2s. The problem, shared by numerous networking and computer companies, is figuring out whether to support IBM's Communications Manager and LAN Server or Microsoft Corp.'s OS/2 LAN Manager — or both strategies.

Then there is the network management dilemma. HP recently came out with such a system; DG promises to have one soon. They are also being pressured to support the ISO's Open Systems Interconnect (OSI), as the most likely multivendor networking standard, and Netview, because it is IBM's.

Although few users have current plans to manage their HP, DEC or DG installations through Netview, "They are asking us to support it because they are not sure that they won't want it someday," comments HP spokesman Bernard Guidon.

Go figure

DEC's position is hardest to figure. It fervently claims to be moving toward true OSI conformance, but such a move seems against DEC's interests, given the the age-old industry adage that "standardization benefits the underdog." The "it" in "Digital has it now" mostly refers to DEC's proprietary networking architecture, Decnet, which DEC claims is better than anyone else's — most definitely including IBM's.

Industry sources expect DEC to provide sufficient OSI support to allow other vendors to communicate with its systems but to continue offering extra features on Decnet, which will not be available through the OSI connection. This is probably the best compromise for DEC to make — given that it is not IBM.

IBM is the only vendor that doesn't seem to be floundering in the standards swamp; it is the only company that can impose its proprietary networking protocols on the world. Of course, the big guy has had to make a few concessions to the standards movement — but only when user demand reaches a certain level.

Horwitt is a *Computerworld* senior editor, networking.

NEW PRODUCTS

Local-area network hardware

Bicc Data Networks, Inc. has added four products to its **Isolan** fiber-optic networking line.

The **Isolan 1180** fiber-optic transceiver provides the connection from a workstation or a computer-interface board to a fiber-optic network. The **Isolan 1150** fiber-optic repeater joins two copper segments with a fiber-optic link. The **Isolan 1126** fiber-optic multiport repeater connects several network segments in a 10M bit/sec. local-area network. The **Isolan 1160** fiber-optic hub allows the interconnection of numerous fiber-optic segments by forming a central fiber-optic hub in a star-shaped LAN.

The Isolan 1180 costs $595; the 1150 costs $1,995; the 1126 costs $6,800; and the 1160 costs $4,750.

Bicc Data Networks, 1800 W. Park Drive, Westboro, Mass. 01581. 617-898-2422.

Network management

Rabbitscript, a language interpreter that enables users to write interface programs for the Rabbitgate local-area network gateway and Rabbitstation 3270 terminal-emulation products, has been announced by **Rabbit Software Corp.**

Rabbitscript automates operator tasks involving any sessions or features, including data entry, watching for screen updates and transferring data to or from sessions and local personal computer files.

Other features include use of all IBM 3270 and PC keys, access to all data in host and local sessions, control of multiple sessions, file I/O, windowing control and handling of host busy and host wait.

Rabbitscript is included in Rabbitstation or can be ordered as an option for Rabbitgate for $150 per workstation.

Rabbit Software, 7 Great Valley Pkwy. E., Malvern, Pa. 19355. 215-647-0440.

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Links

Cross network and parallel link capabilities have been announced by **NTX Communications Corp.** for its IBM Systems Network Architecture (SNA)-based networking products.

The **Cross Network Facility**, or XNF, allows applications and subsystems to transfer data at T1 speeds between independent SNA networks. XNF is used in conjunction with the NTX 3800 Communications Processor, a front end that attaches multiple T1 links in a point-to-point or multipoint configuration.

Parallel Link Support (PLS) for the NTX 3800 Communications Processor permits multiple T1 links to be run in parallel between a single pair of host computers.

XNF and PLS are available as enhancements to the NTX Cross Domain Control Program for a license fee of $200 per month.

NTX, 508 Tasman Drive, Sunnyvale, Calif. 94089. 408-747-1444.

Modems/Multiplexers

A V.22 bis modem capable of achieving an effective throughput of 7.2K bit/sec. over standard dial-up telephone lines has been announced by **Microcom, Inc.**

The **AX/2472** employs Microcom Networking Protocol (MNP) Class 7, featuring enhanced data compression.

The AX/2472 also supports CCITT V.22 bis, V.22, AT&T 212A and 103, MNP Classes 1 through 4, the Hayes Microcomputer Products, Inc. AT command set and the Microcom SX command set.

Features include automatic line equalization, automatic fall-back, autodial, redial, autoanswer and support of asynchronous and synchronous data.

Offered in stand-alone and rack-mount models, the AX/2472 is priced at $899.

Microcom, 1400 Providence Highway, Norwood, Mass. 02062. 617-762-9310.

An eight-port very large-scale integration-based multiplexer for connecting IBM-compatible 3270 terminals and printers has been announced by **Intelligent Information Systems, Inc.**

Called the **IS-399**, the multiplexer is compatible with IBM's 3299 Model 2 and 3 multiplexers and connects to the vendor's IS-374R communications controller or the IBM 3274 cluster controller via single coaxial or twisted-pair cable.

The IS-399 is priced at $399.

Intelligent Information Systems, 92 Kansas St., Hackensack, N.J. 07601. 201-343-8353.

Two 19.2K bit/sec. trellis-coded leased-line modems were recently announced by **Anderson Jacobson, Inc.**

The **AJ 1911-L** and the **AJ 1911-LD** provide synchronous operation over conditioned leased lines and feature automatic fall-back and fall-forward to speeds of 16.8K, 14.4K, 12K and 9.6K bit/sec.

The two modems are identical; the distinction being that the AJ 1911-LD features unattended automatic-dial backup capabilities.

Other features include a built-in two-channel multiplexer, a front panel control and self-diagnostics.

The AJ 1911-L costs $4,995, and the AJ 1911-LD is priced at $5,595.

Anderson Jacobson, 521 Charcot Ave., San Jose, Calif. 95131. 408-435-8520.

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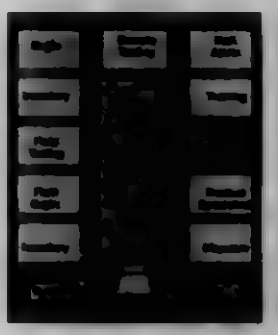

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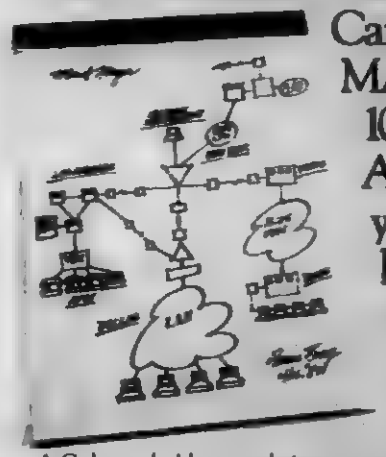

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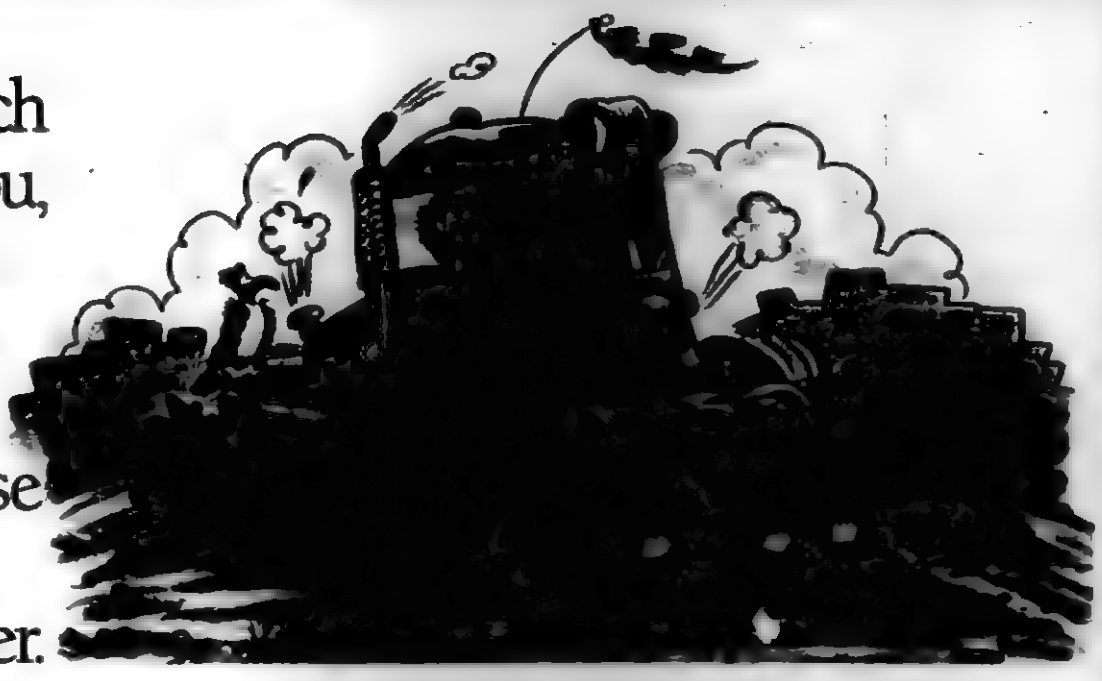

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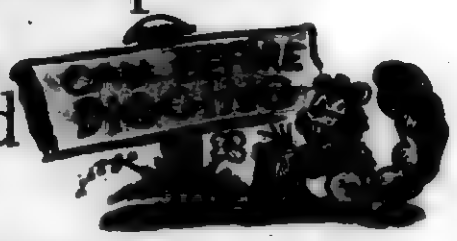

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HARD TALK

Stanley Gibson

WORMs may outlive us all

How do you squash a worm? Most people have committed that cruel act so many times they do it without a second thought.

For vendors of write-once read-many (WORM) optical storage devices, the question of destroying WORMs is similarly given little attention. But it probably should be given more.

WORM vendors and users are so wrapped up in making WORM media resistant to potentially destructive forces that they have apparently ignored what they will have to do when the data contained on the disks is no longer valuable. Indeed, the problem of WORM elimination is something that vendors and data center managers will have to face someday.

At the recent rollout of DEC's WORM drive, the RV-20, DEC's marketing people devised the gimmick of serving pastries on the 12-in. optical platters. Once the press corps had consumed the delicacies, the disks were wiped clean, fed into a WORM drive and read by a computer system. The procedure, having no doubt been rehearsed a few times, came off without a hitch.

But if one believes all the

Continued on page 84

Multihead monster draws stares

Stellar announcement sparks multiuser superworkstation debate

BY ALAN J. RYAN
CW STAFF

Another species will likely make its way into the increasingly populated workstation kingdom: the multihead superworkstation. Such a system would reduce the cost per seat of superworkstations, but many vendors say the need for the multihead unit is low.

The category came to life when Stellar Computer, Inc. Chairman and Chief Executive Officer John William Poduska announced his company's intent to deliver a multihead version of its recently announced Graphics Supercomputer Model GS1000 (CW, March 21).

Adding users to the traditionally single-user workstation is not an entirely new concept. Many companies, including Stellar, network their products as front ends to larger supercomputers or as back ends to workstations over Ethernet. But many of Stellar's competitors said the multihead concept offers few advantages over using workstations in a network.

The Stellar concept, as hinted at briefly by the company, differs from multiuser workstations because it would reportedly allow users to share applications through one workstation with multiple heads.

Stellar declined further comment on the future product, saying the company does not want "to set any market expectations." Some say, however, that a multihead workstation runs counter to the intent of workstation computing.

"In a way, it defeats the concept of a workstation. You're sharing, and that's a problem intrinsically," said Vicki Brown, an analyst at Framingham, Mass.-

Continued on page 85

DISTRIBUTED DATA PROCESSING

Sharing the wealth

BY BARBARA SEHR
SPECIAL TO CW

The users are winning.

More of them want power on the desk top, and they're getting it, as distributed data processing gains widespread MIS acceptance. Corporations are doling out data in a variety of ways: over clustered processors, local-area networks and desktop processors.

But is distributed processing right for your company? Can you justify it, cost-wise and otherwise? Marty Gruhn, executive vice-president of The Sierra Group in Phoenix, contends that the application, not the amount of processing power needed by the user, should determine whether distributed

Continued on page 81

PETER PEERY

Filenet links PCs, fax server

BY ALAN ALPER
CW STAFF

NEW YORK — Filenet Corp. recently widened its distributed processing architecture by introducing a file server to ease document and image transmission between facsimile machines and workstations.

The facsimile server consists of an Intel Corp. 80386 processor, a network interface and a subset of Filenet's Image Access Facility (IAF) networking software. IAF provides remote access to Filenet's optical disk-based storage and retrieval system running its proprietary image and data processing software, Workflo.

Once received by the Filenet system, documents can be automatically indexed using an Oracle Corp. data base management system and permanently stored on optical disk. Users can then view the electronically transmitted documents from workstations.

Requests to transmit docu-

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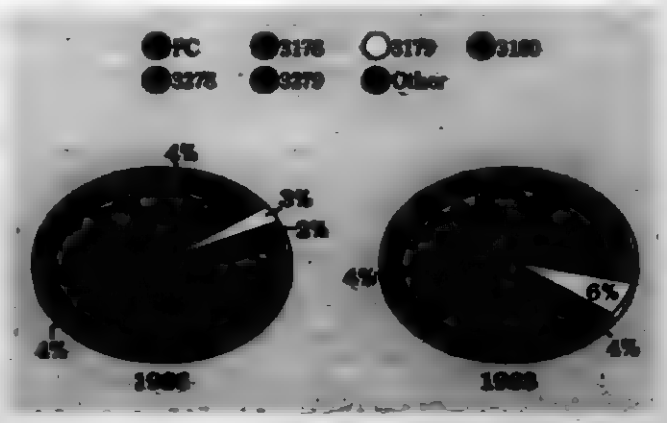
Inside

- Unisys fills gaps in two mainframe lines. Page 80.
- Gould streamlines record management system. Page 80.
- Spectragraphics adds graphics, communications system. Page 86.

Data View

PC chips away

IBM 3278 terminals still dominate mainframe shops, but IBM PCs are gaining



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CW CHART

User patient with IBM 3390 delay

BY STANLEY GIBSON
and J.A. SAVAGE
CW STAFF

IBM's announcement that advanced cache features for its 3990 storage controller will not be ready when the units ship in August has prompted speculation that the delay stems from IBM's desire to include features that will make the controller one of the building blocks for future architectures.

"So it's late. I am genuinely excited about the whole direction they are taking. The net benefits of the faster channel speed, the new disks and the controller will outweigh the delay," said George DiNardo, executive vice-president at Mellon Bank NA in Pittsburgh. He said he understands that the controller, initially announced to support 4.5M byte/sec., will eventually support 6M byte/sec. channel speeds as well as fiber-optic channel transmissions.

"We really need these things in terms of saving time and effort," DiNardo added.

Bill Husband, senior consultant at the Meridian Group, a computer leasing firm in Deerfield, Ill., said he concurs with the view that IBM's delay is tied to the firm's intention to introduce features that will be part of future mainframe architectures.

"The 3990 has advanced technology for advanced architectures that haven't been announced yet," he said. "The process of getting to those architectures is starting today." Like DiNardo, Husband said the controller will be able to handle the much-discussed fiber-optic channels that IBM is widely expected to add to its mainframe products.

Husband also said he believes a new direct-access storage device (DASD) will be shipped in the first quarter of 1989 and will be announced sometime this year. The new disk, however, will have a fixed-block architecture that will make it necessary to change from the count-key data format that the 3880s sup-

Continued on page 84

Unisys supplements disparate mainframe lines

BY STANLEY GIBSON
CW STAFF

Carrying out its stated policy to enhance its two disparate computer architectures, Unisys Corp. recently filled gaps in each of its mainframe lines.

Unisys announced the Model 15 in its mid-range System 80 family, which is made up of former Sperry Corp. systems. The Model 15, performing at 1.5 million instructions per second (MIPS), fits between the Models 10 and 20 in the System 80 series.

Unisys also expanded its A 12 line of large-scale computer systems, adding the A 12T to the former Burroughs Corp. systems.

The System 80 Model 15 is compatible with other members of the System 80 family, offering about 50% greater performance than the 1-MIPS System 80 Model 10. Slated for delivery in the fourth quarter, the basic system is priced at $130,000.

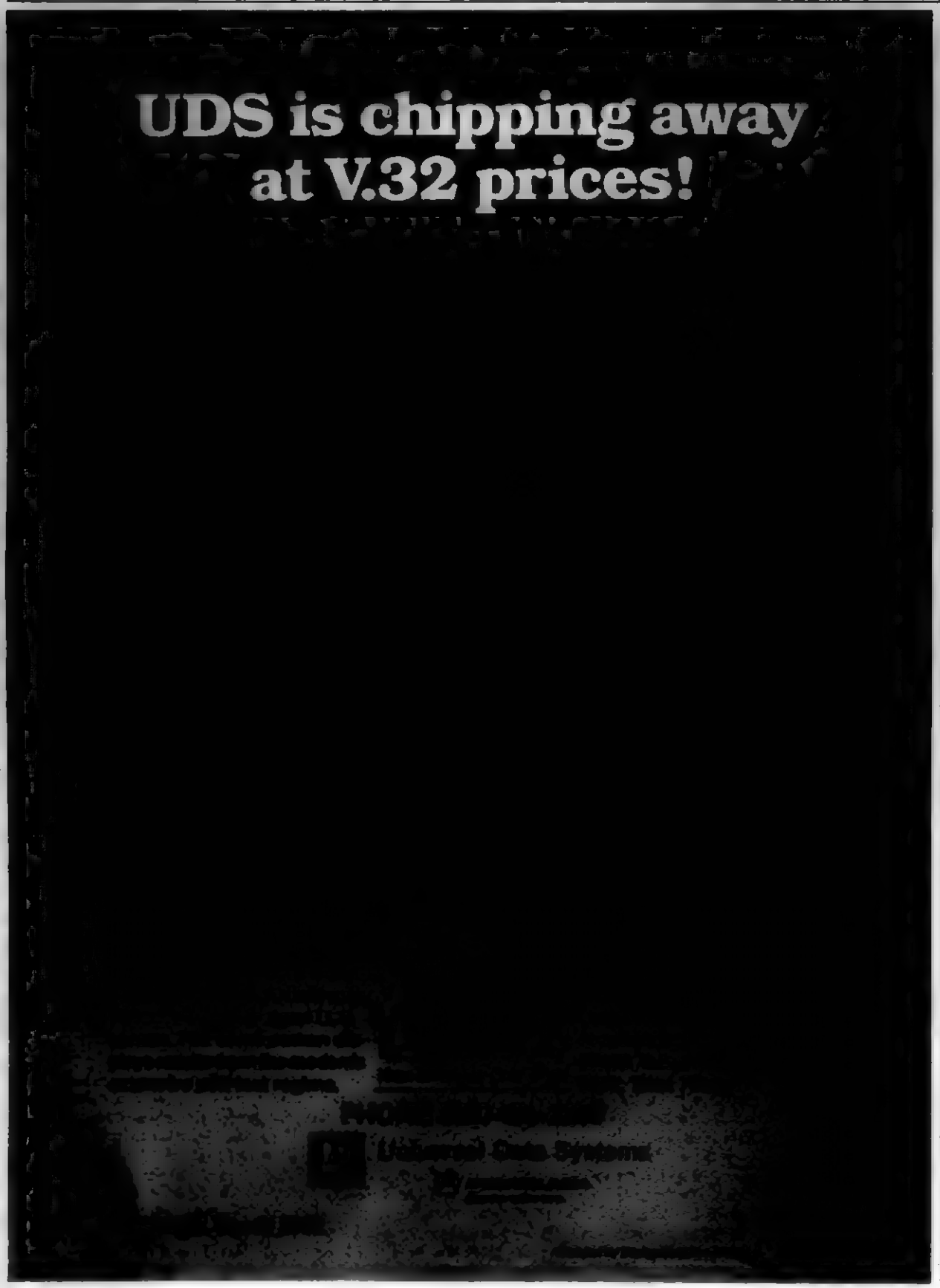
Unisys also said it plans to introduce several common peripherals to support the System 80 Models 8, 10, 15 and 20, including a family of magnetic tape systems and a 1,200 line/min printer.

In addition, Unisys announced Fortran 77 and Pascal compilers for use with System 80 models.

The Unisys A 12T, offering 12.6-MIPS performance, is the most powerful of the three A 12 models offered by Unisys. Ranking below it in power are the A 12, announced in March 1986, at 8.4 MIPS, and the A 12E, capable of 5.4 MIPS. The A 12E was announced in November 1987. All three models are single-processor systems.

The A 12T was designed for high volumes of transaction processing in the price/performance range between the A 12 and the A 17, according to the vendor.

The A 12T is priced at $1.9 million and is slated to be available in May.



Gould polishes workstation

FORT LAUDERDALE, Fla. — Gould, Inc.'s Federal Systems Division has streamlined its 1-year-old graphics and text Records Management Workstation for use in general storage and retrieval situations, offering a version that is slightly faster and allows for increased expansion.

The workstation was originally designed for the U.S. Patent Office with five boards and room for seven more, according to the company. The new version has two boards, allowing for greater expansion. The single workstation price is $50,000.

The advantage of the workstation is that it can compress and decompress images, leading to an increase in speed, the company claimed. Accordingly, the decompressor can deliver 20M pixel/sec. to the screen, allowing the workstation to display a new page in less than 0.7 seconds. The patent office version was clocked at one page in 0.8 seconds.

Uses less storage space

"Compression takes advantage of an area in an image, either in a graphic or photograph, which is the same shade. It stores repetition rather than the image, which reduces storage requirements. Instead of using one megabyte, it gets down to 100,000 bytes or less," a spokesman said.

The workstation comes with 4M bytes of main memory and 330M bytes of disk storage.

Gould said the boards execute a real-time executive, Psos, which is separate from the workstation's Unix operating system. Psos off-loads computing power from the main processor to the system.

Rexon expands for VAR market

CULVER CITY, Calif. — A general data processing system that can support up to 32 users and is field-upgradable to support 128 users is now available from Rexon Business Machines Corp., a division of Rexon, Inc.

The Summit 3000 is aimed at businesses that want future expansion capability, according to a Rexon spokesman. Both the new Model 3000 and Rexon's larger, older Summit 4000 are based on the 16-MHz Intel Corp. 80386 processor.

Both systems are sold only through value-added resellers and OEMs. The average dealer price for a Summit 3000 is $22,510, including 1M byte of memory, a 178M-byte small computer systems interface disk drive, a quarter-inch cartridge tape drive, eight serial ports and a 1.2M-byte diskette drive.

Upgrading the Summit 3000 to be equivalent with a Summit 4000 supporting up to 128 users entails the addition of a 32-bit VMEbus and a card cage for $20,000. A Summit 4000 is priced at $45,000.

A Summit 1000, for one to eight users, and a Summit 2000, for eight to 32 users, are also available but are nonupgradable desktop units, the spokesman said.

Sharing

FROM PAGE 79

processing can be cost-justified for an MIS operation.

"It has to depend on what people are doing," she stresses, noting that some applications require infrequent use of mainframe data while others need to be updated almost constantly.

So what are people doing? *Computerworld* recently interviewed MIS professionals to find out where and how distributed processing succeeds — and where it doesn't.

In the air

Deregulation — the force that scrambled schedules, put airline ticket prices on a permanent roller coaster and set up a series of geographic hubs at airports across the country — has pushed the commercial airline industry to embrace distributed processing. "Some requirements cannot be met by a single host," notes John Testa, director of product and system engineering at Covia Corp., the wholly owned data processing subsidiary of United Airlines.

Covia is responsible for running the 60,000 devices — dumb terminals, intelligent workstations, printers and ticket processing machines — that schedule flights, log reservations and spit out tickets for the nation's largest domestic carrier. The nationwide network had been run from Unisys Corp. 1100/90 and IBM 90-series centralized mainframes until deregulation made this too complex.

At that point, Covia took a global look at its needs, Testa says, considering first its networking requirements and second the need for cost savings.

The network represented a major challenge, being the largest of its kind outside the federal government and the military. By moving to a distributed system, in which the company's domestic and international schedules are run on separate IBM hosts (from 4300 series machines to 3090s), Covia was able to satisfy user demands for more functionality and, at the same time, give them more local control.

The company also experienced a net drop in communications costs, although as Testa points out, that was not a primary motivation in the project.

The Sierra Group's Gruhn

At a hospital

Health care facilities place another type of demand on processing power. At Atlanta's Grady Memorial Hospital, the nation's third largest, clustered processors help ensure access to critical medical information.

There, Henry Camp has developed a Digital Equipment Corp. Ultrix-based data base that holds more than six million patient records. Part of the hospital's Theresa medical information system, the data base is distributed over four DEC VAX 8550 systems and one VAX 8530. The network now supports 350 terminals of various brands and ultimately will connect up to 1,000 terminals. "This is life-critical data," Camp says. "We cannot afford to have a data integrity problem."

Camp — who is now president of Medical Systems Development Corp., the spin-off company for the Theresa project — set up a data base that holds 10G bytes of information, or approximately 320 million data items. The data includes approximately five million prescriptions, 600,000 radiology reports and 60,000 discharge abstracts.

The benefit of the system is that doctors can help diagnose an illness by cross-referencing the patient's symptoms with those of other patients. Treatments in other cases can be recalled in seconds.

For such critical data, reliability is paramount. When a doctor dealing with an emergency requires instant access to a patient record, precious time can be lost if a processor fails. By having the data base distributed over several systems, another processor is always available with the information.

While that may sound like a fault-tolerant system, Camp says the performance available in the distributed system is far greater than that of a fault-tolerant system. "With a fault-tolerant system, the user gets 50% of the horsepower 100% of the time. In the distributed system, the user gets 100% of the horsepower 99.5% of the time."

State social services

Although reducing strain on a host system and cutting costs are important, demand for local access to data by remote users remains a far more important factor in the establishment of a distributed system.

The State of Oregon, for example, has 47 branch offices that determine eligibility for social services. Each branch receives information from the central processing center in the state capital of Salem. Recently, a groundswell of demand arose from the field offices, which were looking for Salem to share its data base. There was little objection. "About 25% of the data we keep here has no value to the central office," says Carl McIntyre, manager of information systems for the state.

McIntyre says his MIS department took the lead in examining the role of the central office and what data should be shared through a statewide network. As for cost-justification, he says it was a matter of determining the capacity of the IBM 3090 mainframe against what it would cost to install IBM Systems Network Architecture nodes in the field offices. The network uses a fault-tolerant system from Tandem Computers, Inc. as a file server to IBM Personal Computer XTs in the field offices.

With the network installed in only 18 of the field offices so far, McIntyre says it is too early to weigh the all the benefits — or headaches — caused by the new system.

Can you support it?

Support is a major challenge when distributing DP. Some MIS departments may not have the expertise to handle the increased demands of users who have been given greater control over local processing. "Users may want more than MIS can handle," The Sierra Group's Gruhn says. "This can open up a real Pandora's box."

At the University of Houston, as with many institutions of higher education, computers not only run the university but are also used as learning tools. There, the decision makers of tomorrow might be more willing to open a Pandora's box in hopes of discovering a positive learning experience.

To this end, the university recently decided to rebuild its computer system from scratch in order to "build a software base for the 90s," says James Johnson, the university's vice-president of computing. Johnson says the task has not been an easy one. The university's ambitious MIS group is developing its own data base management system, which will contain all pertinent student information and will need to be accessed from a variety of locations.

The 40,000-student, state-supported university is a natural candidate for distributed processing, with several remote campuses scattered throughout the metropolitan area that surrounds the sprawling central city campus.

Although scheduling classes may not be as complex as scheduling airline flights, faculty members, buildings and students must be coordinated according to various limitations. Concurrently, the campus network must be complex enough to handle the requirements of scientific research and students' electronic desktop publishing. "We [in university MIS management] just dispense information," Johnson says. The users "turn it into value."

Grady Memorial's Camp

The university keeps four VAX systems clustered at its main campus and an additional VAX at each remote campus, all running on a single high-bandwidth network via microwave transmission. The main network is DEC's Decnet and connects everything from Apple Computer, Inc. Macintoshes to IBM PCs to dumb terminals.

In addition, each remote campus has its own local-area network. The clustered system has been running since January, but there has been no review of its performance thus far.

Where it didn't work

Distributing data processing is not always the best solution. One factor that holds its implementation back in some cases is the difficulty of getting mainframe information onto smaller systems. Indeed, MIS directors at traditional shops may find it counterproductive to bring their applications into a distributed environment.

The University of Houston's Johnson

That was the experience at Transamerica Insurance Co. in Los Angeles. Robert Livingston, vice-president of technical systems, says his company launched a move to distributed processing back as early as the mid-1970s. At the time, the company was developing its own applications programs.

Initially, 11 VAX series minicomputers were installed to handle the needs of the 27 geographically dispersed offices of the nationwide insurance company, connecting a combination of IBM and Compaq Computer Corp. personal computers and IBM 3270-type dumb terminals. Over time, however, the experiment did not generate the anticipated solution.

As more packaged mainframe applications became available, the company's emphasis moved toward the purchase, rather than development, of programs. The applications that were available in the market primarily ran on IBM mainframe systems. While an attempt was made to transport the mainframe applications to Transamerica's minis, the task was slow and painful. "The retrofit was slowing down the implementation of the data distribution," Livingston says.

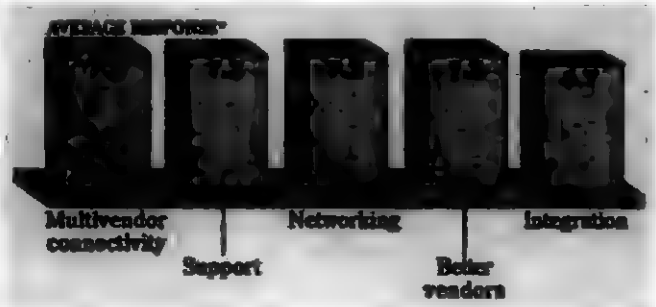
As a result, Transamerica decided to return to a centralized data source, running an IBM 3090 Model 400 and a few IBM 9370s and System/36s. Today, although the company has some PCs running mainframe terminal emulation programs, it does not maintain any separation of its processing power. And even with the advent of faster desktop processors, Livingston says, the picture will not change for Transamerica.

Whether or not distributed processing is right for your users, at least the tools are now available for conducting an investigation. "It all depends," adds The Sierra Group's Gruhn, "on how the tools are used."

Soler is a free-lance writer based in Seattle.

MIS concerns address distributed data processing

Three of the top five overall needs involve distributing DP



*Taken from 1,586 respondents' comments rated with a 10, 5 or 1; the average was calculated by dividing the number of answers by the sum of the ratings for each category

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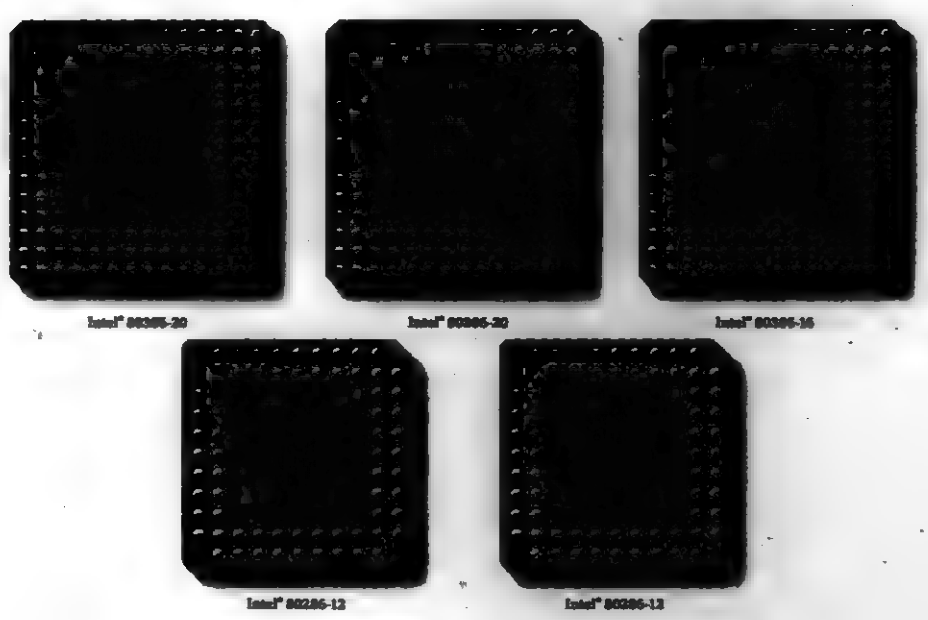
CW CHART

These give you high-performance personal computers.



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COMPAQ

It simply works better.

Gibson

CONTINUED FROM PAGE 79

marketing promotion surrounding WORM drives, then the media will resist much more than mere pastry residue — admittedly a tall order for other media, such as magnetic tape. The disks are made of an alloy based on the element tellurium and are sealed with glass.

The whole point of the WORM media seems to be that long after Western civilization has vanished, WORMs will survive, impervious to the depredations of time. But while the WORM community is busy planning for eternity, it may be missing the obvious point that it is highly unlikely that data contained on WORM disks will be worth preserving beyond a span of about 30 years. That is, in fact, as long as DEC is willing to guarantee the integrity of its media.

After such a period of time, the data contained on the disks — insurance records, legal papers, construction blueprints and so on — will not serve a useful purpose. Should a building's blueprints be preserved when the building is no longer standing?

Bidding society of WORMs

Hence, whoever is managing the data center decades from now will be faced with the job of getting rid of quantities of WORM media.

Even if the data contained on the disks is no longer valuable, it still may not be appropriate simply to toss the disks into a trash bin, where they could be stolen or curious individuals could gain access to possibly confidential data.

It would be nice to erase the disks and then recycle them. It seems a shame that the costly platters, sold for $400 apiece by DEC and others, can't be used over. But that idea runs counter to the very nature of the disks, as implied by their name: write-once, read-many.

Physical destruction, I am told, is the way to get rid of the WORMs. But it seems there is no planned way to do this as yet. The best the WORM marketing people at DEC and elsewhere could come up with was talk about swinging a sledgehammer against the disks, or maybe winging them like Frisbees against a concrete wall.

The goal of any of these operations would be to shatter the glass. But one marketing person mentioned that the glass on the DEC disks was believed to be bulletproof. Even if the glass did shatter, having an employee working in proximity to the glass splinters sounds like a good way to create a very poor workmen's compensation record.

A safer but probably less effective method would be to perform a programming operation to conceal the disks' formats and, hence, their data. This would prevent the data from being accessed without some serious decoding being done. But a dedicated hacker would probably leap to the challenge.

Another response sounded like the best. Place the disk in an oven, heat it to 500 degrees Fahrenheit, and the data will be destroyed. Then the disk could be sent back to the foundry or tossed out. Come to think of it, wouldn't paper go up in smoke at 500 degrees? It looks like we're back where we started.

Paper, of course, is widely recycled. There are also special incinerators, such as those used by the U.S. Department of the Treasury in getting rid of tattered paper money. Maybe similar furnaces could be created for optical media.

One thing is certain. As WORMs come of age, finding a low-cost, safe and secure way to get rid of them in a timely and orderly manner is a need that all users of the devices will have to address.

At some point, the computing community will have to overcome its squeamishness and face head-on the question of WORM disposal. If we don't, archaeologists thousands of years from now will unearth our cities to find that our civilization did not collapse from decadence but from being overrun by WORMs.

Gibson is *Computerworld*'s senior editor, systems & peripherals.

User patient

CONTINUED FROM PAGE 79

port. "Inside the 3990 there has to be the capability to handle a new format of data," Husband said.

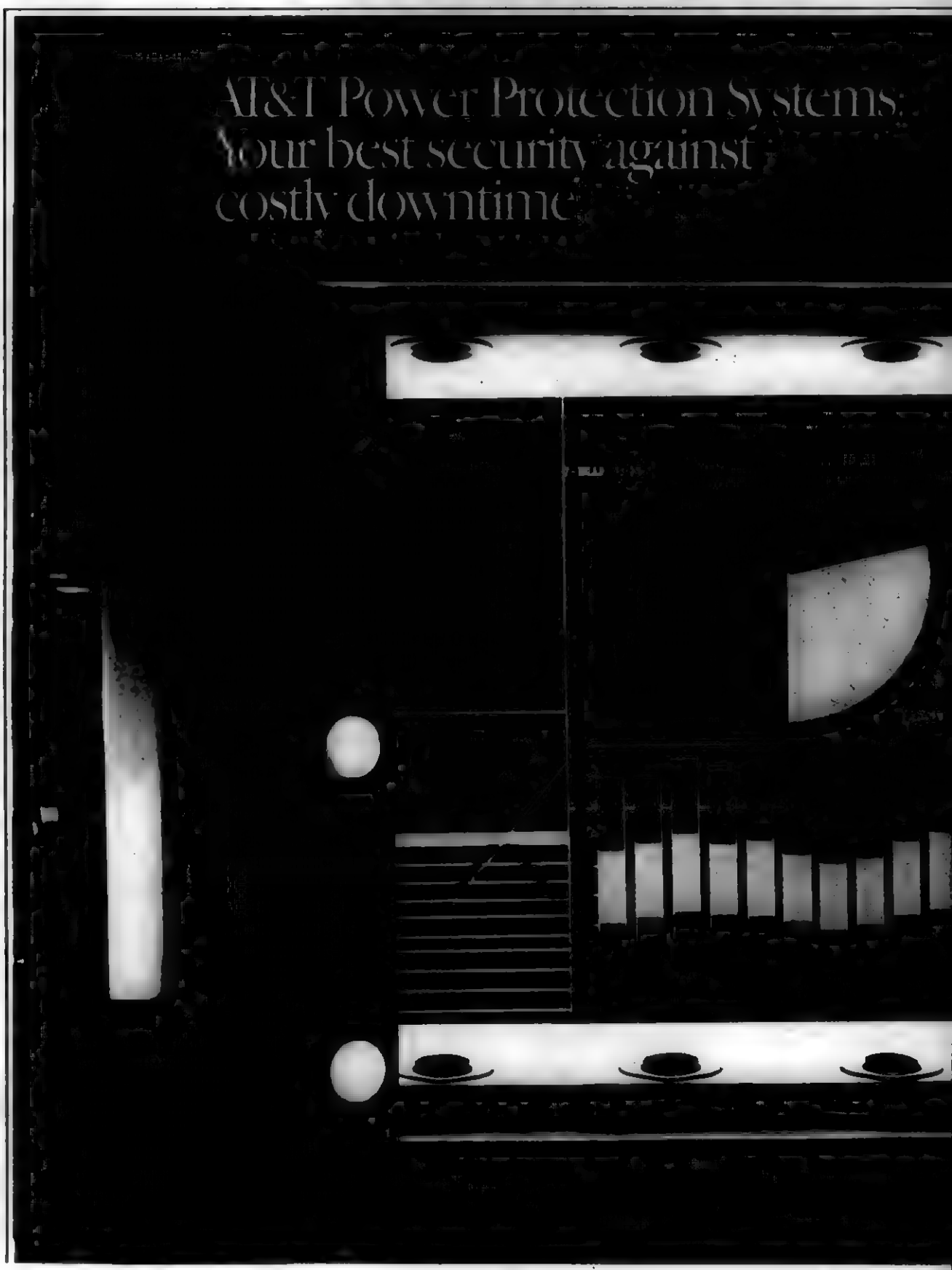
He also said the anticipated 3090 F models will probably feature 6M byte/sec. channels, which the 3990 will support.

Jim Porter, president of Disk/Trend, Inc. in Mountain View, Calif., said the IBM delay gives competitors such as National Advanced Systems, Memorex Corp. and other plug-compatible manufacturers (PCM) some technological breathing room.

But, Porter cautioned, "they still don't have a clear running track. There is concern over what IBM's underlying problem is. No one believes IBM's press release. They are looking for the Machiavellian scheme in White Plains. The simple thing is that they're late on the microcode, but no one believes that."

The PCMs themselves, however, showed little reaction to IBM's delay. Tracy Hawkey, project manager of large-system DASD at Memorex Telex in Millpitas, Calif., said his firm has not yet decided whether to emulate the 3990.

"We won't decide until a couple of months after we get our hands on it," Hawkey said. Memorex Telex's 6898 controller, which works with its 6890 DASD, emulates IBM's 3880 controller and 3380 DASD configuration, according to Hawkey.



Multihead

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based International Data Corp. (IDC).

Most workstation users do not want a second or third user to affect their performance, said Arun Taneja, acting director of workstation division marketing at Sun Microsystems, Inc. in Mountain View, Calif.

"When you take a workstation and try to make it look like it can give you two equal performance levels for two individuals, that's asking for too much," Taneja added.

But there can also be benefits to the multihead machine, and Stellar, in taking a different tack from other superworkstation vendors, may realize unique advantages, according to IDC's Brown.

By marketing the units with more than one monitor, Stellar will significantly lower the cost per seat of its systems, making those computers more attractive to prospective buyers, Brown said. With just two or three users per workstation, the units might become affordable to a much larger number of firms, she suggested.

Pricing for the Graphics Supercomputer Model GS1000 starts at $98,000 in its basic configuration with 16M bytes of main memory. Configurations go up to 128M bytes of main memory.

"Typical users doing interactive work could live very nicely with 64M bytes each," Sun's Taneja said. "But bringing in hungry applications like finite element analysis or large simulation may eat up memory quite rapidly, and there would be repercussions in terms of performance."

Although Stellar would not comment on how many heads it will put on a machine, most vendors and analysts speculated that the number would remain low.

Forget the eight-hour workday

Most users rarely work at the workstation for eight hours a day, and sharing the resource could be helpful, Taneja said.

However, "if the first user is a heavy power user and uses the system for 20% of a given day, 80% of that day is still available, but the other user does not know when that 80% is available," Taneja said. Another use of a multihead machine, according to Taneja, is as a larger viewing screen. He said some Sun customers have requested multiple monitors so they can view a large layout between the two screens at the same time.

Still, those contacted said tuning one system with multiple users would certainly show up at times.

With the multihead workstation, the degradation as users are added will be similar to that of a minisupercomputer, said Steven Gary Blank, vice-president of marketing at Ardent Computer Corp. in Sunnyvale, Calif.

Some don't want to share

Paul Bemis, product manager of high-end products at Chelmsford, Mass.-based Apollo Computer, Inc., likened the concept of multiple ASCII terminals working off of one workstation to time sharing. "The problem is sharing one CPU," he said.

Bemis said that because each user on the system would be allotted only a certain amount of time, the response time will lag proportionately with the number of users on the system.

Additionally, Bemis said, "the issue is distribution of computational resources. Each user has as much power as his wallet will allow him to purchase."

Blank said Ardent will continue to pursue its heterogeneous distributed network rather than consider multihead versions of its superworkstations. "We have a number of customers interested in hooking up terminals and workstations through Ethernet or NFS, and it can be done today," he said. NFS is Sun's Network File System.

Bemis said that using the multihead approach could be less effective than using workstations networked to a server. "When I issue three or four print requests at once, the workstation doesn't have time to respond to my input anymore," he said. "If I had a server, I could put that on the server and let the server get bogged down while I continue to work. You've got to distribute the computing."

Filenet

CONTINUED FROM PAGE 79

ments to a facsimile machine can be made through the Filenet system, and transmission times can be programmed to take advantage of lower cost phone rates, the Costa Mesa, Calif., company noted.

Up to two Class III-compatible facsimile machines are supported on a file server. Priced at $30,000, the file server is expected to be available in the fall.

The facsimile server will expand Filenet's appeal beyond its mainstay financial services and government customers to a new range of users, noted Robert Castle, Filenet's vice-president of marketing.

One car dealership is considering using the facsimile server to electronically transmit customer loan applications to leading institutions. Loan proposals would be processed on the institution's Filenet system and a decision would be transmitted back to the dealership. "This would accelerate the loan approval process," Castle claimed, adding it would also provide a competitive edge for car dealers seeking to enhance customer service.

As long-distance phone rates have dramatically decreased, the facsimile market has become a more attractive communications medium for document transmission, observers said.

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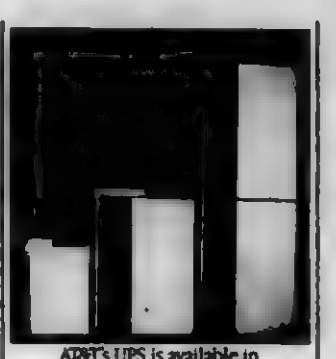

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NEW PRODUCTS

Processors

The S 40 desktop document processor has been announced by Unisys Corp.

Designed for use in automated payment processing applications, the S 40 reads, encodes and endorses financial documents. It features four pockets, an audit-trail printer and an optional automatic document feeder. It can read several combinations of fonts and has a built-in processor and memory, the vendor said.

An entry-level system, including one S 40, a Unisys B 26 workstation and a matrix printer, costs $27,000. Additional S 40s cost about $22,000 each.

Unisys, P.O. Box 500, Blue Bell, Pa. 19424. 313-972-9515.

Graphics systems

Spectragraphics Corp. has added a graphics and communications system to its Commset workstation connectivity product family.

Called Commset 1080, the system is said to implement full IBM 5080 Model 2A graphics and IBM 3270 alphanumeric capabilities in dynamic Digital Equipment Corp. VMS or Ultrix windows on a DEC Vaxstation. It also provides an IBM mainframe link, allowing Vaxstation users to access mainframe-based computer-aided design and manufacturing applications programs directly from the Vaxstation.

Commset 1080 includes a graphics and communication controller, a video interface module and window-control software. A basic system, including 1M byte of display list memory, 256-color support and documentation, costs $9,900.

Spectragraphics, 9125 Rehco Road, San Diego, Calif. 92121. 619-450-0611.

Terminals

A data terminal for use with Hewlett-Packard Co. computers has been announced by Houston Computer Services, Inc.

The terminal, called the **Plus10 Model 92 CRT**, is said to be compatible with HP's proprietary 2392A and 700/92 terminals. Features include a tilt-and-swivel display, a detached keyboard with HP-compatible keys and a printer port. It also includes 2392A character-mode and block-mode compatibility, a 14-in. display and choice of a green, white or amber display.

The Plus10 Model 92 costs $699.

Houston Computer Services, Suite 200, 11001 S. Wilcrest, Houston, Texas 77099. 713-568-9900.

A coaxial IBM 3191 plug-compatible information display station with an integral bar-code reader has been announced by Term-Tronics, Inc.

The **Miracle-191B** features menu-selectable bar-code parameters and the ability to automatically discriminate among symbologies. According to the vendor, no external boxed power plugs or hardware or software changes are required. Options such as a light pen and a separately addressable printer port providing IBM 3287-type printer emulation are available.

The Miracle-191B costs $1,995.

Term-Tronics, 4990 Viewridge Ave., San Diego, Calif. 92123. 619-565-6330.

Printers/Plotters

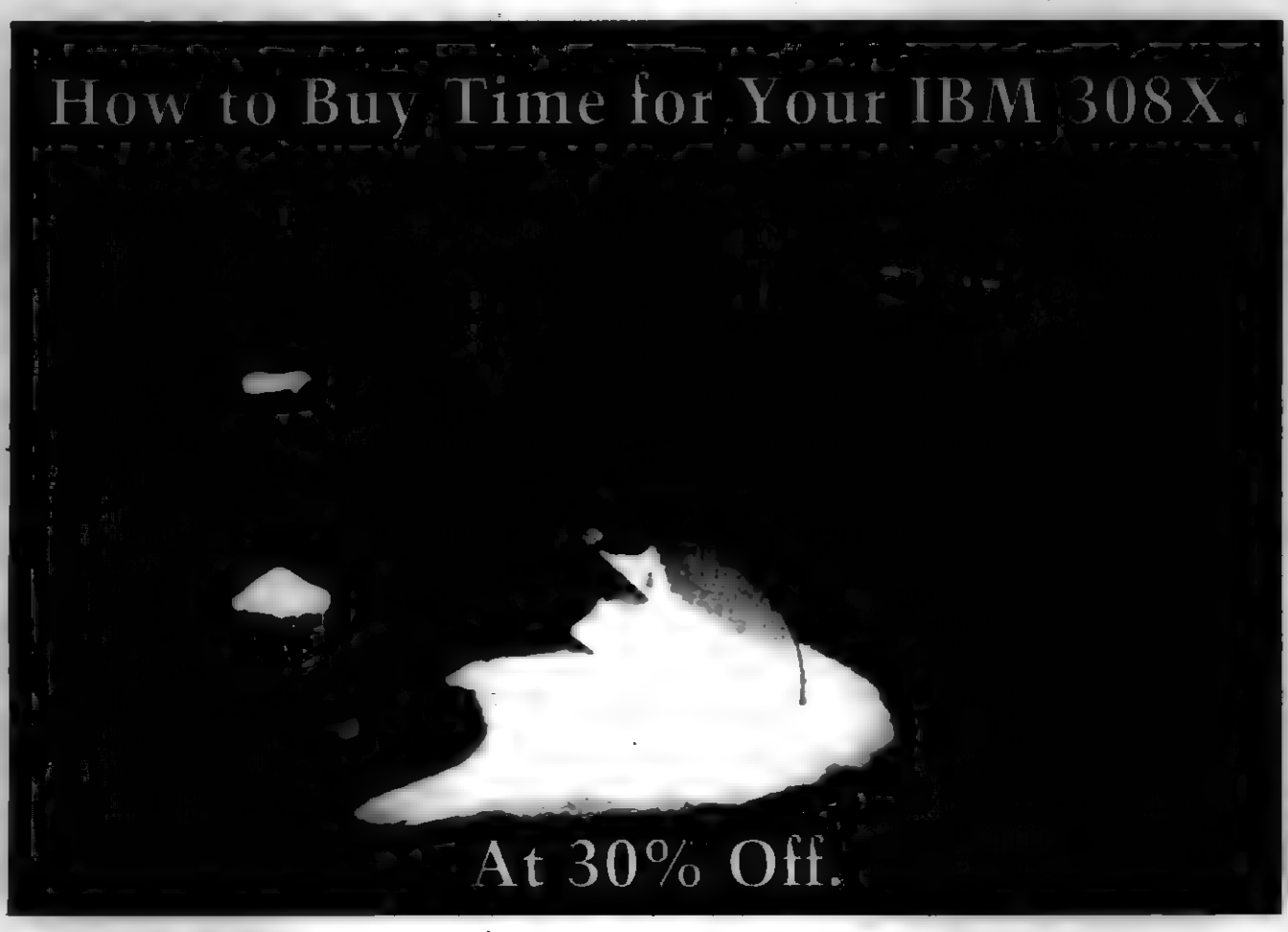
A family of B-size thermal-transfer color output devices has been announced by Calcomp, Inc.

Called **Colorview**, the family includes the Model 5612 printer, the Model 5912 plotter/printer and the Model 903 color video controller. The Model 903 interfaces to workstations with red-green-blue output and captures a screen image. It also supports the Calcomp Colormaster and Plotmaster plotter/printers. It is packaged with the Model 5612.

The 5612 and 5912 offer 200 dot/in. resolution. The 5912 costs $9,995; the 5612 costs $7,995; the 903 costs $8,995.

Calcomp, 2411 W. La Palma Ave., Anaheim, Calif. 92801. 714-821-2142.

How to Buy Time for Your IBM 308X.



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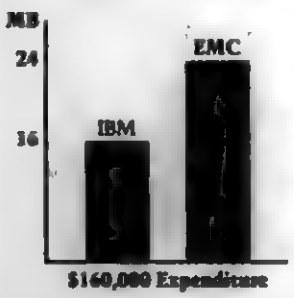
2. Maximize Your Savings.

EMC uses state-of-the-art technology and production methods to offer our 308X upgrade at 30% lower cost than IBM. A 16MB upgrade from IBM is priced at $160,000. For that same price you could buy 24MB of EMC main storage. That's an additional 8MB of main storage or a savings of $50,000. Either way you save with EMC. EMC also features coterminous leases and trade-up credits so the return on your investment continues after your purchase.



3. Improve Performance.

By increasing your 308X's main storage capacity, you will improve system response time and increase your users' productivity.

EMC's 308X upgrades are 100% hardware and software compatible with IBM 3081, 3083, and 3084 CPU's. Upgrades are provided in 16MB increments and run all IBM diagnostics. Use of EMC upgrades will have no effect on your IBM maintenance.

4. Add Reliability.

To guarantee the most uptime possible for your 308X system, our upgrades use pre-tested logic components. Then they are subjected to 100-hours of test and burn-in procedures, which include qualification in one of our own 308X computers prior to shipment.

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5. Call EMC.

If you're interested in buying time for your 308X system, call EMC today at 800-222-EMC2 for your free information kit. Our 308X upgrade is the "midlife kicker" that saves you money and improves your 308X's performance.

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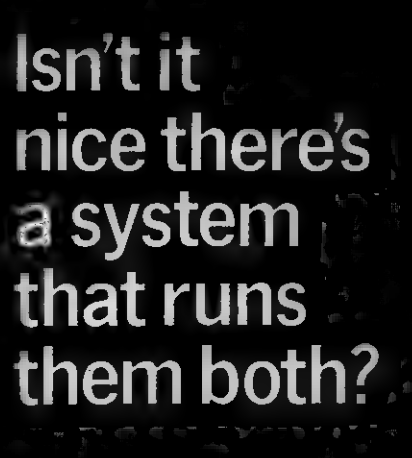
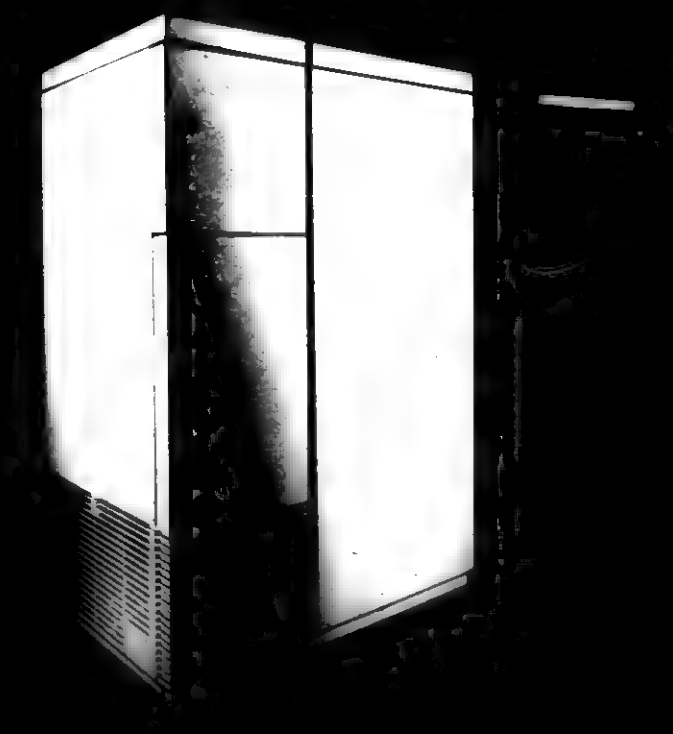
There are two dominant open operating systems:


Isn't it
nice there's
a system
that runs
them both?



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BY G. BERTON LATAMORE

DAVE JOLY

This year, U.S. offices will exchange an estimated two billion electronic mail messages. By 1991, that volume will grow to 8½ billion messages, and "by the year 2000, I can't imagine any businessperson not being as adept at using E-mail as using the telephone," says Walter Ulrich, electronic mail expert and partner at the consulting firm Coopers & Lybrand in Dallas.

By then, some 60 billion E-mail messages will originate in the U.S., barring some catastrophic economic or military disaster, Ulrich predicts. While some of these messages will replace phone calls, surface mail and facsimile messages, others represent new ways of communicating altogether, such as binary file transfer — the exchange of working files like spreadsheets, word processing files and parts of data bases.

Of these, Ulrich says he expects private systems — using off-the-shelf software such as IBM's Professional Office System (Profs) or Digital Equipment Corp.'s Vaxmail and running on in-house hardware — will carry five-sixths of all messages by the year 2000. The other portion will run on a common carrier, such as a public packet-switched network. The question companies must ask is, Which way are the trends running, and which type of network will work best for us?

Most companies' initial experience with E-mail is on a common carrier. The reason is based on economics: If a company's E-mail volume is low, subscribing to a public system is cheaper than running a private one. As message volume grows, corporate management may begin to consider bringing such operations in-house.

The M. W. Kellogg Co., a Houston-based international engineering firm, makes heavy use of both private and public systems. According to David Lee, information center manager, "Theoretically, you can do anything on a private system that you can on a public one."

In practice, however, public E-mail has a unique part to play in corporate communications. Ultimately, Ulrich argues, companies will need both public and private systems, just as they need both public and corporate telephone systems.

24-hour support

The largest costs of a private E-mail system are the hidden ones, according to Marilyn J. Bardsley, vice-president of marketing and business development at Dialcom, Inc. in Rockville, Md., one of the leading U.S. suppliers of public E-mail.

Running electronic mail requires support for all corporate users — including technical professionals, power users and, on the other extreme, occasional users with no computer knowledge, Bardsley says. If the system is nationwide, someone has to be available at least from 9 a.m. Eastern Standard Time to 5 p.m. Pacific time each weekday. If the system is worldwide, it needs 24-hour support. That level of support may not be feasible for some companies.

Second, the system must be reliable. Corporate executives

Latamore is a free-lance writer based in Burlington, Vt.

- **Break-even costs of going to private E-mail**
- **Public: Best for international mail**
- **When security counts**

will not tolerate an E-mail system that crashes any more than they will a private branch exchange that breaks down, Bardsley says.

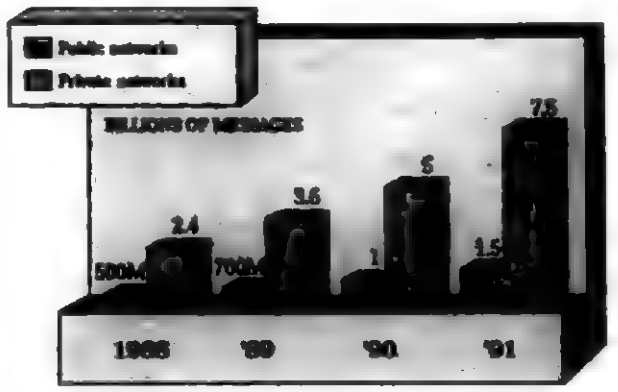
Third, she says, the organization has to be ready to install upgrades as they become available — or in some cases develop its own to meet corporate needs.

According to Bardsley, the break-even point — when it is no more expensive to run your own system than to use a public one — usually arrives when the monthly E-mail bill reaches $30,000 to $40,000.

Obviously, Bardsley's angle on the matter is a public network vendor's; Ulrich disagrees with her figures but backs the gist of her analysis. "A company that's spending $10,000 a month with an external service vendor to provide electronic mail between offices in a headquarters or other discrete site should clearly bring it in-house," he says. Often, he says, he sees a jump in mail volumes when his clients do so.

Electronic mail growth spurt

Steady, strong growth is predicted for traffic across both public and private networks, assuming there is no major stock market fallout



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The bottom line

"There's an economic disincentive to using public electronic mail to [message] people in nearby offices," Ulrich says, and corporate executives who watch the bottom line are aware of that and set policy accordingly. "If it is going to cost your department 40 cents to send a message down the hall, you'll probably just walk down there. But if it costs only 3 cents, you'll probably use electronic mail."

Other issues, however, can make the choice less clear-cut. If a company needs connections to many customers' and suppliers' offices or for a large, mobile field sales or maintenance staff, public systems will probably be more practical because they offer almost universal local dial-up access through the public packet networks.

"Sometimes we do have our field people dial directly into our internal Vaxmail system over long-distance telephone lines," Kellogg's Lee says. "Sometimes our customers call into our system to leave messages, too.

"On the other hand, we certainly don't want one of our field engineers dialing direct from a construction site in Australia to send us a long CAD file. It is much cheaper to use GE Information Services' network," he continues, referring to Quik-Comm, which is developed by that division of General Electric Co. In addition, he says, for such a great distance, the connections are much more dependable over the Rockville-based common carrier than by telephone.

Out of your hands

However, when you use a public system, you lose some control, which may affect security. For instance, you trust the common carrier not to read your messages — just as you trust the telephone company not to listen to your calls. In the U.S., that does not pose a problem. However, in some West European and Far Eastern countries — and in all Eastern bloc countries — the government-owned telephone company listens in on calls that cross national borders. These same agencies run the national public E-mail systems.

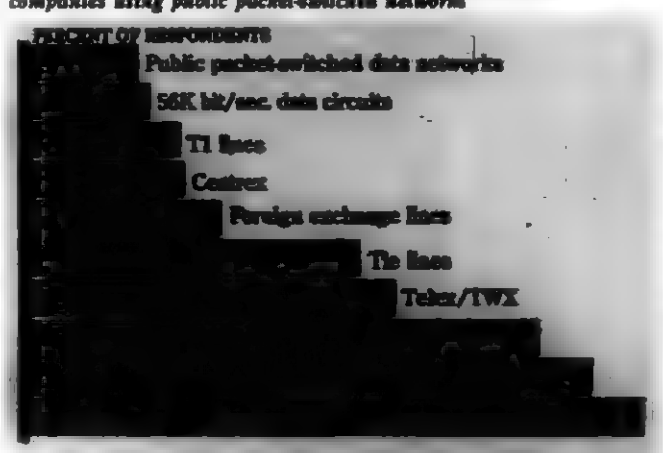
Automatic backups are another issue — as Lt. Col. Oliver North found out. He sent incriminating messages through the Pentagon's Profs, thinking it was a good way to avoid having copies fall into the wrong hands. Those messages were backed up by the system and discovered by congressional investigators.

Both public and private systems make backups to ensure data in the case of a crash. For instance, Kellogg's Vaxmail system automatically backs up all messages in storage at the end of each day. One of these backups is held for a week and one for a month. The end-of-year backup is held for a year.

Again, there are advantages and disadvantages to backups. A vice-president in a large corporation might send a message to corporate lawyers asking advice on a sensitive business negotiation. Taken out of context, the message might look like a request for instructions on how to lie legally — not a message anyone would want hanging around.

Public network facilities

A survey of large businesses shows a relatively low percentage of companies using public packet-switched networks



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Close contact

One reason for choosing a common carrier over a private E-mail system is to keep in close touch with a large population of suppliers and customers scattered throughout a wide geographic area in an automated environment.

Continental Holding Co., a national food wholesaler in Concord, Calif., generates 4,000 to 5,000 messages at a cost of $5,000 to $6,000 a month. The service it uses is Easylink from Western Union Corp. in Upper Saddle River, N.J. Easylink allows Continental to handle $300 million in food orders a year with only 120 employees, according to Ed Capella, Continental's assistant director of MIS.

"The bulk of the messages are orders for product shipments to our approximately 1,000 suppliers — 'Send X number of cases to a customer or warehouse' — or orders to us from the 50-odd national retail grocers we sell to," Capella says. Many of these messages are computer generated.

A typical message sequence starts when one of Continental's customers places an order. "The order may involve anywhere from 10 to 50 different items," Capella says. "Some may be in our warehouses, but we may have to order some direct from the suppliers, many of whom are fairly small and specialize in one or two crops."

The order comes in via Easylink or over the phone and is fed into Continental's mainframe — an IBM 4381 Model 2 — which consolidates it with other orders, determines the best source for each item and places the appropriate requests to Continental's suppliers via Easylink.

When products are shipped, the suppliers and warehouses send back confirmations. The system then generates bills and sends them to customers. In many cases, nothing is printed on paper until the checks are cut. The next step will be

Continued on page 92

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You don't have to be trying to subvert the Constitution to be concerned. You may just not want messages containing sensitive business information saved and possibly read a year later.

If the message is saved by a corporate system, the company has some control over who reads it. On the other hand, a user might prefer the message to be in an anonymous file on a public system — when sending a resume, for instance.

Is it safe?

When you use a common carrier, you also trust it to protect you against hackers and industrial spies who might try to read messages. Because they concentrate solely on providing good electronic messaging, public systems carriers may maintain better security than a corporation can.

Certainly public systems carriers provide better protection against wiretapping, simply because they use packet networks rather than dedicated long-distance phone lines. It poses a major challenge to any hacker to tap a packet network line and then capture and identify all the packets of a particular message; it isn't impossible, but it's not really worth the trouble, either. It is also illegal, thanks to the Electronic Communications Privacy Act of 1987.

There are still other privacy concerns. For example, at Kellogg and many other companies, even the president uses E-mail. In fact, Lee says, it is often more private than either surface mail or the phone. Because electronic messages are less formal than letters, executives usually write them themselves rather than dictate them to secretaries. Because E-mail eliminates telephone tag and telephone interruptions, executives handle their own sending and receiving.

This directness does bother some top-level executives who prefer to have calls and mail screened by a secretary. "Our president has realized that anyone could send him an electronic mail message, and that worries him some," Lee says. "We heard the same thing from one of our clients — a major petroleum company. With electronic mail, anyone can get right to executives with messages that may waste their time."

Leading E-mail contenders

Today, more than 50 public electronic mail companies compete for the U.S. market.

In terms of features, the leaders offer binary file transfer for sending working files, but they differ as to which connections they offer to facsimile machines and other communications networks.

When it comes to cost, pricing structures vary. For example, MCI Mail from MCI Communications Corp. incurs no minimum monthly standard fee, as it bases charges on message length. This makes that product a good choice for small companies and individual professionals whose usage volume is fairly low.

Most of the other services charge standard monthly subscription fees that can range up to several hundred dollars, but they charge little for actual usage. This makes those offerings more attractive for large companies that plan to be heavy users.

Following are a few products from the dominant suppliers:

• **Easylink.** Sold by Western Union Corp. in Upper Saddle River, N.J., Easylink is one of the easiest services to work with, although it may not be the easiest to learn. With only two prompts, it may confuse inexperienced users. However, prompts get in the way when auto-uploading messages, and Easylink makes that process particularly easy. The product provides connections to international and domestic telex and facsimile networks. It offers connections to dominant public services in several countries.

Easylink also provides access to more than 800 research data bases.

• **MCI Mail.** Sold by MCI Communications in Washington, D.C., MCI Mail is available as both a standard and an advanced service. The standard service provides full prompting and was designed for beginning users. MCI Mail offers connections to facsimile and other networks.

MCI Mail offers a direct connection to the Dow Jones News/Retrieval service and to dominant services in several other countries.

Unlike other services, MCI Mail originally identified small companies and individual professionals as its main market. It developed a unique pricing structure with a one-time sign-up fee of approximately $10 and no monthly minimum charge, which makes it attractive to that market. However, MCI is willing to provide other pricing schedules to potential large customers.

• **Dialcom,** offered by Dialcom, Inc. ITT Corp. sold this Rockville, Md.-based company to British Telecommunications PLC, which runs Telecom Gold, the dominant E-mail service in Great Britain. Dialcom is particularly proud of its electronic news service, which allows users to establish a list of preferred subject areas on which the service follows up, delivering news stories on those subjects to the user's mailbox as they arrive over the news wires.

Dialcom is particularly strong in international connections, mainly because the company has sold its software to the leading E-mail vendors in more than 30 countries.

• **Quik-Comm.** Sold by GE Information Services, a division of General Electric Co. in Rockville, Md., Quik-Comm uses the international packet network gateways to provide interoffice communications for large corporate clients. It provides telex gateways and off-the-shelf interfaces to IBM's Distributed Office Support System, Professional Office System and Digital Equipment Corp.'s All-In-1. IBM Personal Computer-compatible and Apple Computer, Inc. Macintosh-compatible front ends are available.

GE Information Services tailors messaging capabilities on the network to customer applications. Quik-Comm can be configured with electronic data interchange-like features for large customers.

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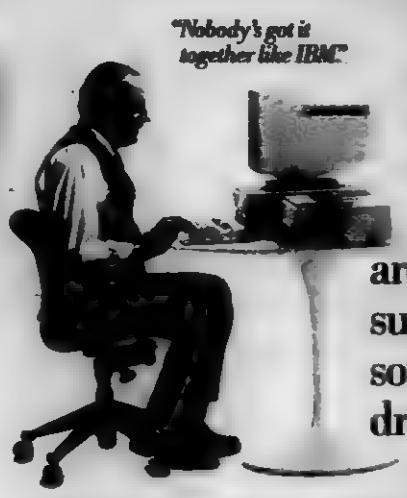

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E-mail

FROM PAGE 88

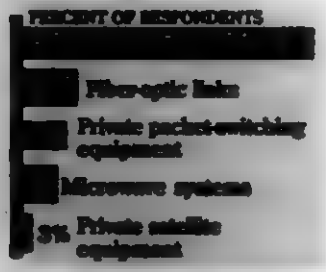
direct payment via electronic funds transfer.

Continental has been placing orders over Easylink for two years, and it has proved so efficient that the company now requires its suppliers to use electronic mail. Easylink is several times faster than the alternative method, TWX, Capella says. He says it took four to five hours to send a day's orders via TWX. Today, it takes less than two hours to upload all the day's orders, and because order handling can be automated, it is faster, easier, less expensive and more efficient. Although the system is highly automated, Capella distinguishes it from true electronic data interchange (EDI) because it lacks such characteristics as financial report features.

However, Capella says he foresees the day when Continental will attain full EDI functionality on Easylink. At that point, there will be no paper and no manual handling of routine ordering, billing and payment. In fact, Easylink now offers an EDI service because of the direction Continental and several other large customers have taken in their electronic mail usage.

Private network facilities

A survey of large businesses shows that facsimile is their most often-used equipment



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CW CHART

Across the seas

In general, public systems have a major role to play in international communications. Kellogg, for instance, has field offices equipped with personal computers at building sites worldwide. Communicating with these sites is vital to Kellogg, yet often hard to establish.

"It's nice to have someone with the clout GE Information Services has to help you get a communications system set up in foreign countries where you have different communications laws, government administrations and so forth," Lee says. "That's where GE has helped us a lot."

John M. Thorp, office automation specialist at Arthur D. Little, the Cambridge, Mass.-based consulting giant, agrees that the public carriers are helpful in expediting international communications. With offices in cities worldwide and consultants constantly on the move, Little is concerned about efficient communications.

"I can dial a local number anywhere and get on Dialcom," Thorp says. "The main reason we picked Dialcom and stay with it exclusively is worldwide access." Dialcom supplies the electronic mail software used by the dominant common carriers in several European companies, including West Germany and Great Britain. Sending a message to any other system may require knowing only the recipient's system ID and a three-letter, three-number address.

Little generates more than 1,000 messages a day, seven days a week. "We have a big energy group in London, an energy group in Houston and an energy group at headquarters," Thorp says. "We often put people from all three together to do a report, and they work over electronic mail. We've almost eliminated facsimile, and we've avoided trips to London this way."

Little's usage goes beyond simple messaging. All the company's budgeting is done by using Lotus Development Corp.'s 1-2-3, and consultants exchange spreadsheets via E-mail. Recently, a pair of consultants in the U.S. and one in London put together a budget for a proposal in four hours over Dialcom, Thorp says. It used to take several weeks because of delays in international communications.

Of course, some private

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systems also support this feature. "Binary file transfer will definitely increase in importance to Little and to most large companies," Thorp says. "It will become a major reason that companies turn to electronic mail."

Attitude switch

Ulrich says he has detected a change in attitude toward E-mail in the last seven years. In 1981, he recalls, most nontechnical executives among his clients were apprehensive about the technology and unwilling to use it.

By 1984, while most still had no personal experience and did not completely understand what it might do for them, Ulrich's clients were aware of E-mail through articles and ads in the business press. They recognized that they needed better business communications and thought E-mail might answer their needs.

Ulrich attributes this change to education and particularly to newspaper articles. Before 1981, he says, the business press paid virtually no attention to the technology. Between 1981 and 1984, however, such magazines as *Forbes*, *Fortune* and *Business Week* regularly published articles on the potential business benefits of E-mail.

While this publicity created a receptive atmosphere, few nontechnical executives in 1984 actually used the services. Today, however, it is hard to find executives who do not already have electronic mailboxes, Ulrich says.

One difference is in the level of convenience. Most executives have PCs on their desks, so they do not have to share terminals. Furthermore, the user interfaces of most services and software have improved, and terminal emulation software has been introduced for Microsoft Corp. MS-DOS and Apple Computer, Inc. Macintoshes.

Instead of the phone

At the same time, evidence of the hard business benefits of E-mail is appearing. Kellogg's Lee recently looked at E-mail as an alternative communications medium between Kellogg's Houston and London sites. This traffic is handled by Vaxmail between DEC VAX-11/780 clusters in the two offices. Previously, the only alternative was the telephone.

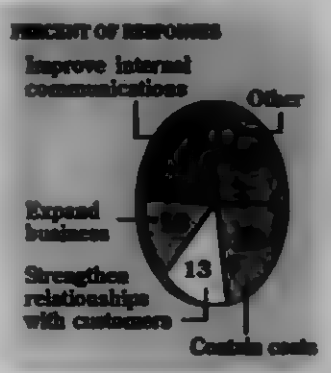
"In November 1987, we generated a little over 23,000 messages on our internal system," Lee says. Of these, about 1,000 went outside the Houston office to other connected systems. Of that, 680 messages went to London. "We presumed that half these London-bound messages displaced telephone calls," Lee says. "Our average call to London is a $13 charge, and the savings between that cost and the average cost of sending a message via Vaxmail was enough to pay for our entire Vaxmail system. That's less than 3% of the messages on the system."

Ulrich observes, "In 1984, we were just finishing the beginning of the PC wave. Since then, people have lost their fear of keyboards, and the promotion has continued." Furthermore, the pilot tests of 1984 have developed into full-blown systems, and more companies are using electronic mail. This tends to validate the technology as a business tool in the eyes of many executives who do not yet use it themselves.

"Demand for electronic mail will become even stronger in the future, and the day is fast approaching when it will be as common as the phone," Ulrich says. ●

What do you want from a network?

402 businesses with annual sales of more than $100 million share a few near-term objectives for communications



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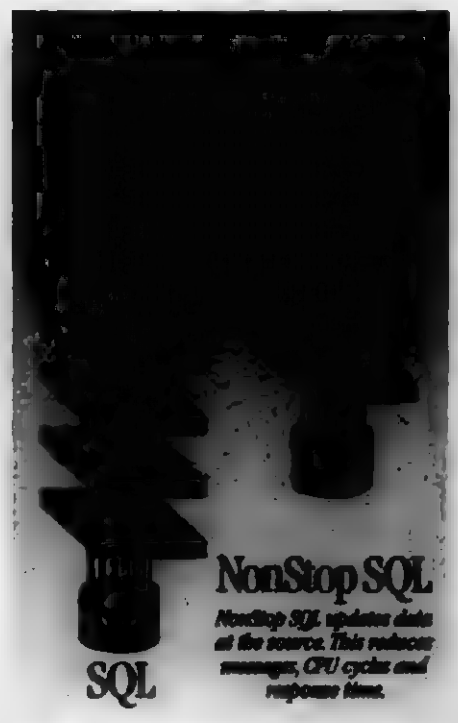

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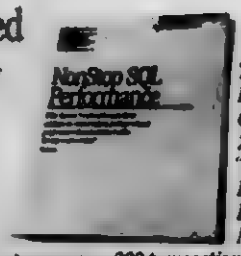

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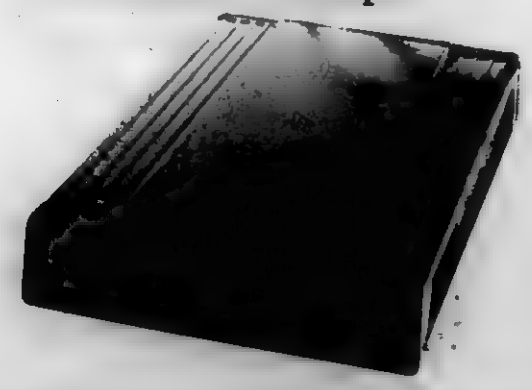

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E-mail pros from an evangelist

Competition among vendors of electronic mail systems for the Apple Computer, Inc. Macintosh is heating up.

Inbox, from the Think Technologies Division of Symantec Corp., holds a commanding share of today's market as the most popular E-mail server for Apple's Appletalk local-area network.

In addition, Microsoft Corp. recently purchased Intermail, another Appletalk E-mail server, from Newton, Mass.-based Internet Systems Corp.

The company is marketing it as Microsoft Mail. Dayna Communications, located in Salt Lake City, and several other vendors are also expected to jump in this year.

Andrew Singer, 45, is general manager and one of the founders of Think Technologies in Bedford, Mass.

Singer was instrumental in developing Inbox for Think Technologies, and he is particularly concerned with the human elements of interface design. He is also an E-mail evangelist.

Singer recently spoke with Alan Radding, a Boston-based free-lance writer.

With the first X.400-compatible products being announced, has E-mail's time finally arrived?

People say 1984 was the year of the PC or that now we have the year of the network, but that isn't quite true. We never had a year of the PC. We did have the year of the spreadsheet and the year of the word processor. People are much more interested in the solution, not the machine.

Andrew Singer

The real question is, Why do we have networks? What is the application that really makes the network meaningful? The application is electronic mail.

In terms of productivity, what is E-mail best for? What is it not too good for?

E-mail is better for some things, like delivering bad news.

In tests [at Think Technologies], E-mail reduced copier costs. You also save money on support people who copy and distribute memos. The system changes the way people work. You can eliminate a lot of meetings.

Have ease-of-use issues changed at all lately?

There are two tiers to consider. First, there is ease of learning. It must be easy to learn to use, but that really just gets people in the door.

The second tier is that it must be convenient to use. We did a study that showed that an E-mail system typically handles an incredible number of small, 30-character messages. The user has to be able to send the message in a second. If it is faster to pick up the phone or scribble a message, people will do that.

E-mail is competing with facsimile, Federal Express and the phone — they're all competing for a person's modality.

Does E-mail also compete with voice mail?

Voice mail is a feature of the phone system, and it will remain there until voice is easily transcribed to text.

Voice is like graphics. You can integrate it into the system, but it is not comprehended [by the system]. It is simply included.

I think people will experiment with multimedia E-mail, but I think it is years away.

When will we see seamless, worldwide E-mail?

Customers don't realize that this is a problem yet. E-mail is in its infancy. People are still using it for prearranged communications, not general communications.

It actually would be very surprising at this stage if all the E-mail systems were integrated.

Is the time right for an international standard like X.400?

There is a need for standards, but X.400 doesn't solve all the problems. Computer people like the idea of a single standard, but X.400 is really a good solution only for very large-scale E-mail applications. For most users, however, it is standards overkill. I've been talking to some vendors about a de facto standard for small applications right now.

Your company plans to publish the Inbox protocols in an effort to become the de facto standard. Do other vendors see the need for a standard right now?

The customer wants something now. The trouble with standards is that they are trumpeted long before they are real.

What will happen to the Macintosh E-mail market now that Microsoft is in?

It's going to make it grow. We might lose some market share, but I can live with a smaller share of a much larger market. ●

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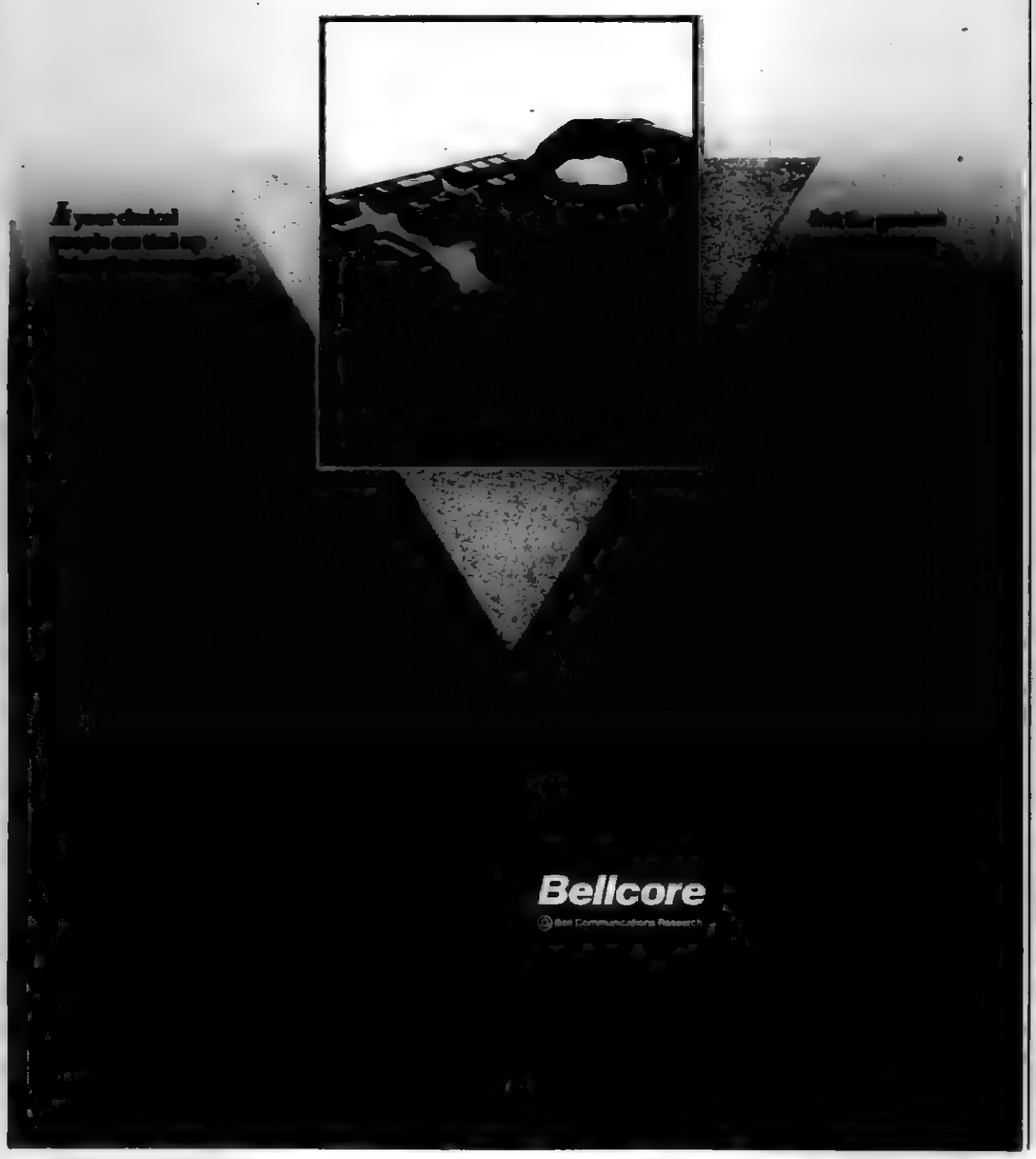

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And get the late-breaking news — before it's too late.

Expert systems: Are you already behind?

You can expect an explosion of knowledge-based systems fielded by your competitors in late 1989

BY HENRY ERIC FIRDMAN

Corporations are quietly gaining expertise in knowledge-based systems before making the big leap into commercial development. This is good news for many newcomers: If they can put together a well-planned, goal-oriented effort, they can even surpass the early birds that let their artificial intelligence capabilities grow in an exploratory, unstructured way.

Today, the number of fielded commercial AI applications in the U.S. is very small — in the low hundreds. Fielded applications refers to those developed by one group of people — knowledge-based designers — and used by another.

There is actually nothing surprising in this low number. According to a number of sources, the development cycle from inception to field use for a mid-size to large knowledge-based system ranges from two to four years. If this is so, we can expect a relatively large number of fielded knowledge-based systems to appear no earlier than late 1989 or 1990. However, this projection holds true only if developers always succeed with their first AI application, which is usually not the case.

In fact, most companies do not even intend to use their first application as a production system. They look at the first application more as an experimental tool for training developers and then plan something more ambitious by the second or third project.

As a result, we can realistically expect the growth of fielded knowledge-based systems to explode in late 1989 or even 1990 (see chart page 100).

A passing phase?

Very few off-the-shelf commercial AI applications exist today. The question is whether knowledge-based technology is just a temporary phenomenon and how fast this segment of the AI market is going to grow. If it had grown quickly, many companies could have just waited for an off-the-shelf application to fit their needs instead of developing their own AI capabilities.

However, the real story is more disappointing. There are reasons to believe that knowledge-based technology will not expand significantly. Looking at three major companies in this area — Applied Expert Systems, Inc. and Palladian Software, Inc., both in Cambridge, Mass., and Syntelligence, Inc. in Sunnyvale, Calif. — we can see why such growth is not expected:

- All three companies have extraordinary in-house AI expertise. Each employs two or three world-class AI professionals. Unfortunately, the number of such experts is limited, so the chances of seeing many new companies of this rank are pretty slim.
- None of the three companies trust commercially available knowledge-based systems development tools and have, instead, developed proprietary tools. What is horrible from a software engineer's viewpoint is that these companies were developing the tools — and the applications written in the tools — simultaneously.

Where in conventional software development would you ever find someone developing an application program in Pascal and a Pascal compiler at the same time? It is forbidden, but not in the world of AI. Why can these companies do this? Just because of a tremendous level of expertise?

- All three companies develop well-defined vertical products and would like to sell them "as is." Unfortunately, this is not what customers want. Users want tools customized to their specific environments.

For example, the banking industry does not believe there is such a thing as a general-purpose lending adviser. Each bank follows idiosyncratic lending regulations and policies and wants these specialized requirements to be incorporated into the lending adviser.

Imagine a company like Syntelligence becoming so successful that it can sell 1,000 copies of its lending adviser product. Then it has to keep track of 1,000 different customizations of the same "generic" product — which is not so generic anymore. This is no trivial problem, and I'm not sure there is anybody in the world today who knows how to solve it.

To summarize, I believe two main factors — shortage of high-level AI expertise and the ad hoc nature of AI applications — will severely limit the growth of the market for off-the-shelf AI application products.

If I am right, we will see venture capitalists losing interest in AI, which would mark the first indication of market weakness in

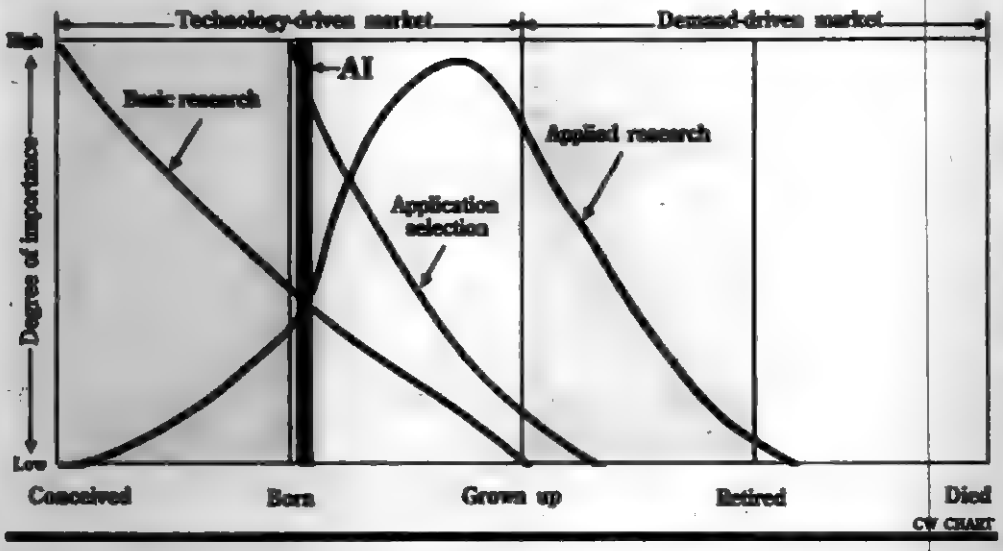
KEN CONDON

Firdman is president of Henry Firdman & Associates, a Fallbrook, Calif.-based consulting firm specializing in AI. He is former director of the Artificial Intelligence Laboratory at the Russian Academy of Science. A longer version of this article appeared in the January issue of "AI Through the Looking Glass," a newsletter published by Graeme Publishing Corp., Amherst, N.H.

- **Don't wait for off-the-shelf applications**
- **There's good news for newcomers**
- **Technology-driven, supply-limited market**

Infant technology

Artificial intelligence has gone beyond basic research, or pure science, and is at the stage at which selecting appropriate applications for it is crucial, but AI is still far from a demand-driven market



CW CHART

generic AI application products. Venture capitalists like high-growth industries (not services, such as consulting), little competition (not knowledge-based systems development tools) and high return on investment (not ad hoc AI applications).

Poverty-stricken

There are two other interesting — but often overlooked — factors indicating current trends in commercial AI: a lack of any significant breakthroughs in AI research and poor educational and training efforts within corporations.

In commercial knowledge-based systems development today, we use results of basic research done in the early to mid-1970s. That amounts to a gap of at least 10 to 12 years between research and commercial results. If this gap does not close up and no significant AI research results were found five years ago, we can predict that five years from now, AI applications will still be based on today's technology. If no breakthroughs occur today, we will be using the same technology 10 years from now.

The question is, Did we see any significant breakthroughs in AI in the last five years? I would say no. I follow AI research by looking over proceedings of the American Association for Artificial Intelligence and the International Joint Conference on Artificial Intelligence and have not seen any drastic changes in knowledge representation.

Moreover, I see AI research and commercial applications actually going in two different directions. The situation reminds me of one that existed 20 years ago: Early computer scientists were solving minimization problems in terms of a number of inputs (transistors), while people working in microelectronics tried to achieve the silicon area minimization by *increasing* the number of transistors but in regular configurations.

Educational and training efforts are other factors that indicate trends in the AI market. Universities do not produce knowledge engineers. Need I say more?

Very few companies provide well-organized and practically oriented training curricula. Digital Equipment Corp., Boeing Computer Services, Unisys Corp. and Texas Instruments, Inc. are among the few firms that do offer effective training courses.

If training continues to lag, the shortage of qualified knowledge engineers and knowledge-based systems designers may become a major bottleneck in AI market development. By conservative estimates, we will need about 10,000 to 12,000 qualified knowledge engineers and knowledge-based systems designers in this country in three to four years. Today, we may have 2,000 to 2,500 but certainly not much more.

I recommend three kinds of education: for top management, for the end-user community — including middle management — and for developers.

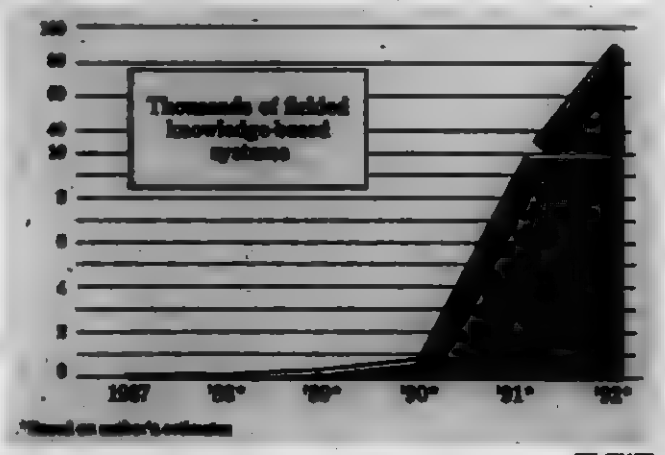
Trend watching

Based on an analysis of current trends in AI technology and the marketplace, there are three major trends to watch in the near future:

- The AI market will still be technology- rather than demand-driven. As a result, application selection will remain a critical factor in the success of commercial knowledge-based systems development (see chart left).
- The AI market will remain limited by supply rather than by demand. There will be a shortage of qualified knowledge engineers and knowledge-based systems designers. In addition, a short supply of cost-effective runtime environments, as opposed to knowledge-based systems development environments, may prohibit many mid-size companies from entering the AI market and developing in-house knowledge-based systems.
- Large-scale knowledge-based systems will be built relatively slowly, mostly in-house and primarily by big companies. For the

How many expert systems will there be?

The number of knowledge-based systems—fielded, production systems—may grow exponentially during the next four years



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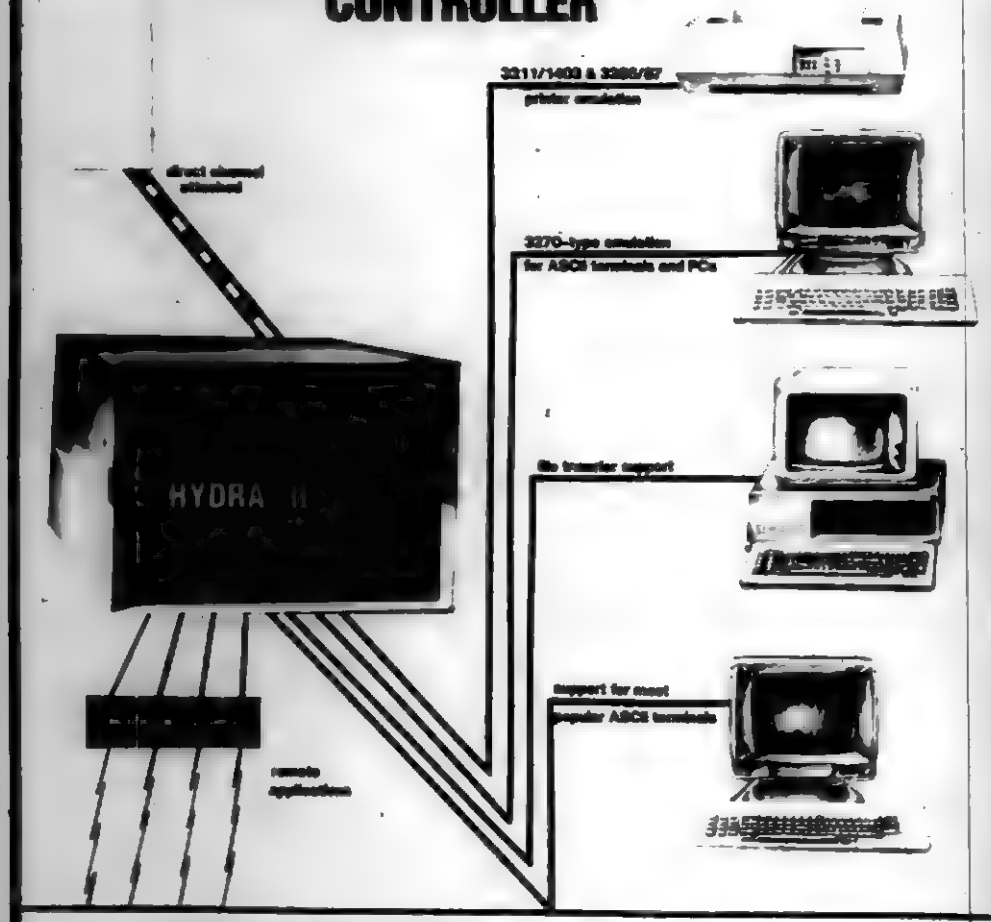

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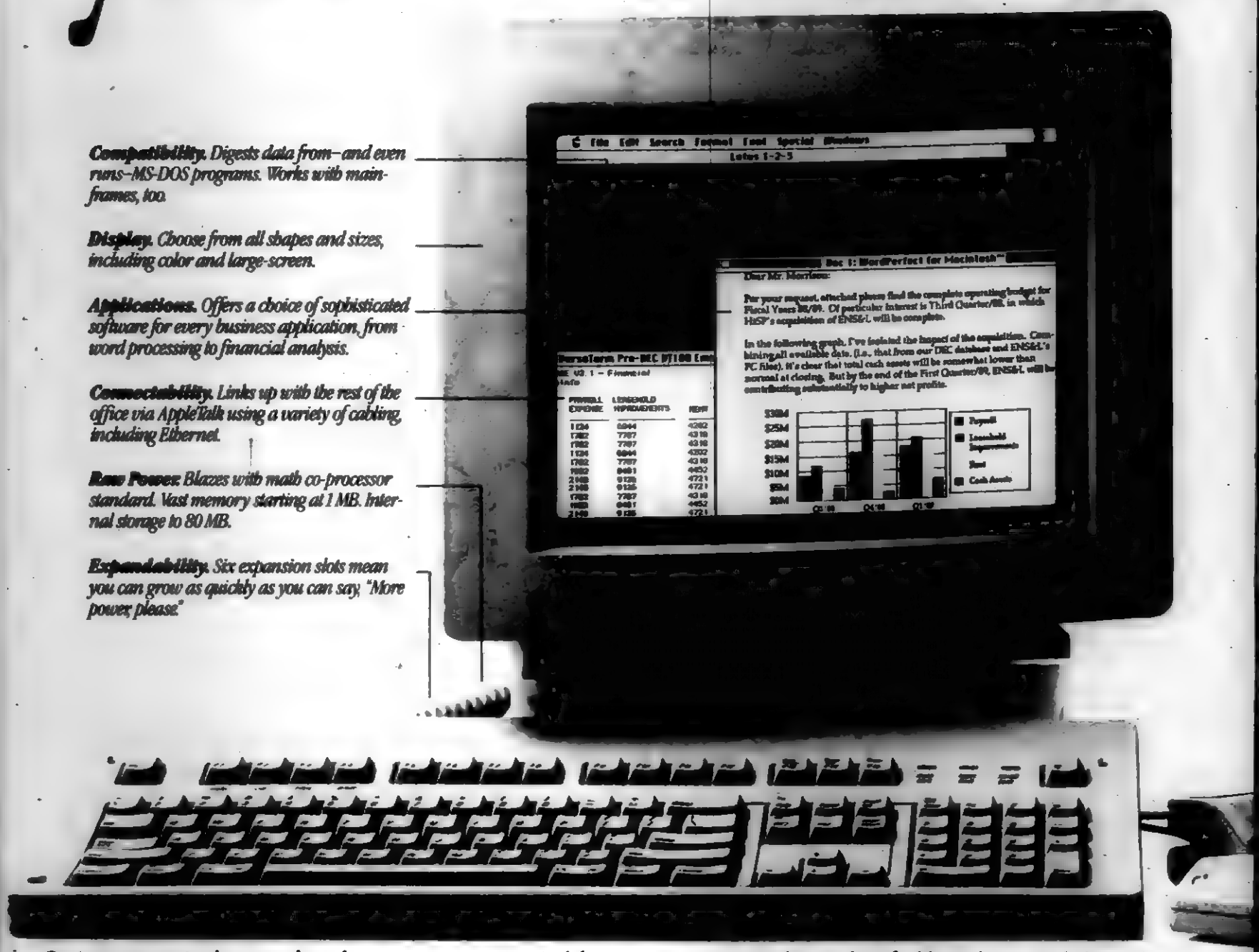

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next couple of years, small-scale knowledge-based systems will dominate; that is, doable systems will prevail over high-impact ones. Companies will be cautious in adopting AI technology, and AI projects will be mostly low-risk and low-benefit.

Strength in numbers

In the next year we will see further consolidation in the tool segment of the AI market. Some companies will go out of business, while others will survive, owing to strategic alliances with giants. I also predict hard times for hybrid tool vendors, such as Intellicorp in Mountain View, Calif., Inference Corp. in Los Angeles and Carnegie Group, Inc. in Pittsburgh, unless they become contracting companies like Teknowledge, Inc. in Palo Alto, Calif.

IN HUMAN resources, corporations will initiate expert systems projects in anticipation of retiring experts.

In addition, the LISP machine market will survive as a niche market only. The only thing that could change this situation, at least for some time, would be drastic price reductions attributable to the single-chip LISP processors developed by TI and Symbolics, Inc. in Concord, Mass. According to some sources, Xerox Corp. is about to announce its own single-chip LISP processor.

Also in the next year, we will see an avalanche of knowledge-based systems development tools with access to mainframe data bases and application packages written in conventional languages. IBM's Knowledgetool is only the first robin in spring. That company will also come up with a high-level knowledge-based systems development tool, perhaps a version of Intellicorp's Knowledge Engineering Environment. IBM will provide compatibility for its tools across all of its computers.

In the coming months, I also expect many hardware and software tools to be readied for delivery. In terms of successful fielded AI applications, however, almost nothing will happen.

Take three

Looking ahead three years, we will see an explosive growth of successfully fielded large-scale, integrated AI applications developed for in-house use.

I also expect to see the first embedded LISP machines — for military applications — and the first embedded knowledge-based systems, mostly for fault diagnosis applications. Various pieces of equipment delivered by vendors will contain embedded knowledge-based systems for preventive maintenance.

By this time, there will also be a few off-the-shelf AI application products for the manufacturing industry. In the human resources area, corporations will initiate expert systems projects in anticipation of retiring experts. And, finally, knowledge management will become one of the major functions of corporate information centers.

The further into the future one looks, the easier it becomes to make predictions. I don't think, however, that five years is too far down the road. By that time, I expect the following to happen:

- Integration of AI technology with conventional software will be pretty much completed. The term "AI industry" will not even be used because, frankly, there is no such industry, just as there is no industry of the second law of thermodynamics. The automobile industry and the software industry will use AI technology.
- In five years, the software industry will grow to be very powerful, because as hardware becomes more and more a commodity, software will increasingly add value to the turnkey product.

This should be a warning signal for companies that make most of their revenue in hardware. In five years, they will be typical commodity vendors, which compete mostly on a cost basis. Can you imagine IBM competing on a cost basis?

For two reasons, AI will play the most important role in

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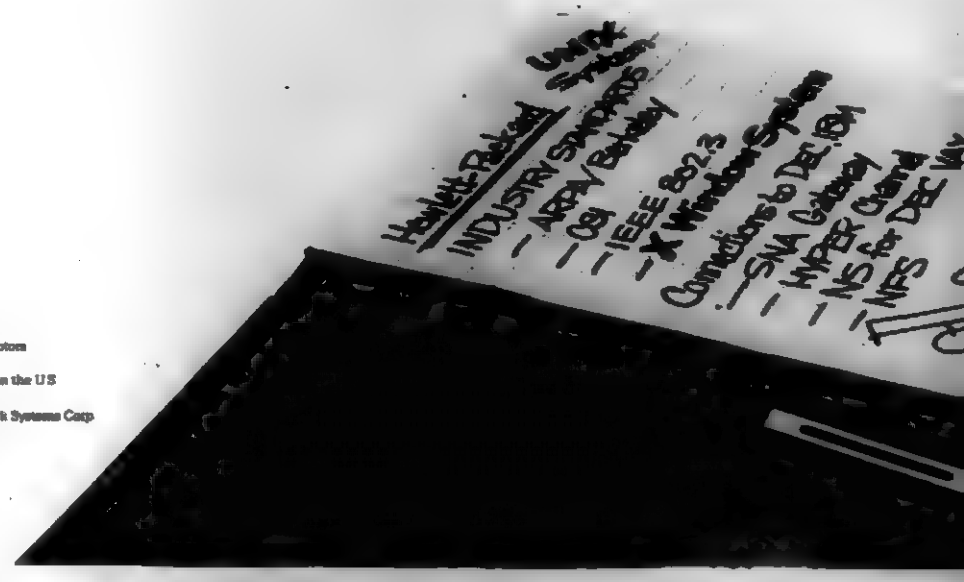

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making the software industry powerful. First, it will add more value than any other computer technology I know of and will eventually make the difference between value-added and commodity-like software.

Second, a few far-sighted companies that have never before been in the software business will start developing in-house, ad hoc AI applications and end up as software vendors, at least in their respective industries. As they develop their AI and general software capabilities, they will see that the software business can provide some fat profit margins.

• Some of these fledgling software vendors will come up with general-purpose AI application packages based on their own expertise in both the problem domain and knowledge-based systems development. We can expect generic packages to come from these companies rather than from more specialized AI companies.

WE WILL notice the impact of AI on organizational structures, cleaning up the current mess in information and control flows.

• On another front, we will see the first computer-integrated enterprises in industries in which computers are intrinsic to the business, such as finance or manufacturing.

• We will notice the impact of AI technology on corporate organizational structures, reducing the number of subordinate levels and cleaning up the current mess in information and control flows.

• On the technological side of AI, we will see the proliferation of problem-oriented shells — knowledge-based systems development tools aimed at specific classes of problems, such as fault diagnosis, scheduling, planning and access to data bases.

• On the scientific side, there will be some breakthroughs in applied knowledge representation theory, especially focused on decision making and planning applications.

Act or wait

You can sit back and wait for the outcome of these predictions, or you can try to make them come true yourself. In the latter case, what should you do? To start, you should address four major issues:

• **Education.** Management and prospective users of knowledge-based systems must understand the strategic importance of AI technology and its social implications.

• **Corporate acceptance.** AI efforts have to be carefully planned and fostered within your company.

• **Application selection.** Knowledge-based systems development teams need to have expertise sufficient to select feasible and high-impact applications.

• **Integration.** Knowledge-based systems developers need to work on integrating those systems into existing conventional software, such as data sources and applications, rather than just develop stand-alone knowledge-based systems prototypes.

You should do all this not merely to justify my predictions. Addressing these issues determines whether you do or do not reap commercial benefits from AI technology. •

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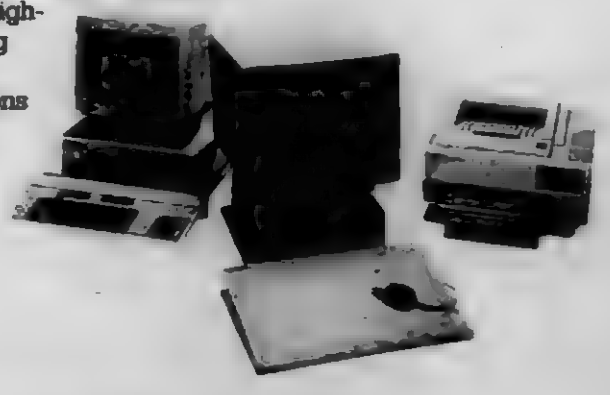

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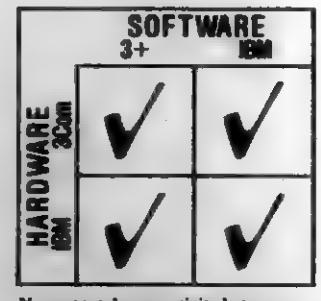

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MANAGEMENT

TAKING CHARGE

Don Ferruggia

The personal touch crucial

Data communications has become an incredibly technical field. Gone are the days when intrepid programmers would string wires between computers and invent their own methods for data transmission. Instead, we now have international standards, bit-stuffing protocols, local-area networks, LUs, PUs and X-dot everything.

To implement a network, you need detailed training and expertise, but the results are worth the effort: global, reliable data communications systems that can expand to meet changing requirements. This is well understood in the MIS community.

What is not well understood is that communications between human beings has its own technology, a technology that has been advancing as quickly as data communications. The state of the art in human communications lies far beyond what most people consider possible: Personal communication can be precise, efficient, reliable and comfortable. This is true for anyone, no matter how easy or how "difficult" they are to deal with.

When communications are established between computers, the first messages that pass between them ensure that the communications link is sound. These "handshaking" messages have become quite detailed in the newer communications protocols. Yet even in the oldest asynchronous and teletypewriter systems, the first message of

Continued on page 109

Migration hits mark

National Semi draws Fairchild into MIS fold

BY JAMES CONNOLLY
CW STAFF

SANTA CLARA, Calif. — Faced with the integration of a decentralized, minicomputer-based MIS group into its centralized, mainframe-based operation, National Semiconductor Corp. recently met its deadline of converting key systems within four months of its acquisition of a former competitor.

Moving Fairchild Semiconductor Corp.'s worldwide distribution and customer service group off IBM System/38s did not go without a hitch, but the headaches were kept to a minimum during the transition project that ate up about 30,000 man hours, according to Patrick O'Haren, National Semiconductor's vice-president for computing and telecommunications.

The project was the first step in National Semiconductor's integration of Fairchild's MIS operation, which began when the acquisition was finalized in October 1987 and should be completed by the end of this year, according to O'Haren.

Quite an accomplishment

"Around the world, as systems and data were brought together, I saw a real feeling of accomplishment," O'Haren said. He said that in the 60 days following the first Fairchild locations being brought onto the National Semiconductor systems, there were a few complaints from users about particular features needing more work, but those generally were ironed out.

O'Haren and his 700-employee MIS group faced technical and sociological barriers when they began their conversion.

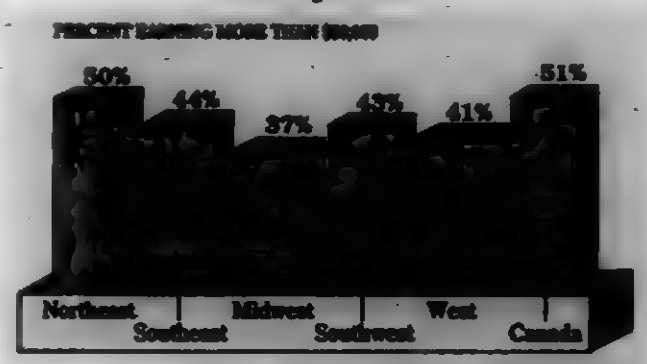
Fairchild's System/38 network was decentralized in both the physical sense and in how the systems were managed. Local groups had control at various locations throughout the U.S., Eu-

Continued on page 110

Data View

Northern lights flash green

Systems professionals in Canada and northeastern U.S. report the most high salaries



INFORMATION PROVIDED BY AN ASSOCIATION FOR SYSTEMS MANAGEMENT SURVEY OF 2,300 MEMBERS
CW CHART

Prudential's MacKinnon champions MIS cause

BY ROSEMARY HAMILTON
CW STAFF

Malcolm MacKinnon, soft-spoken and small of stature, is not the sort of man that stands out in a crowd.

Luckily, looks can be deceiving. As senior vice-president and head of information systems at the Prudential Insurance Company of America, MacKinnon has been chosen to lead a large crowd — some 85,000 employees — into a more technology-oriented future.

MacKinnon describes his role as helping to push the insurance giant into a more competitive future in which technology will help separate the leaders from the also-rans. His work is ideas, not the nuts and bolts of MIS. His job is more akin to a traveling preacher than to a traditional DP professional. His technique is to sell the MIS concept, again and again, throughout the company until the 30 business units have married their business plans to their MIS plans.

Having taken the post six years ago, MacKinnon says he believes he has a way to go in achieving this goal, but he also says there have been big improvements in the corporate attitude toward information systems.

Prudential information systems executives have a similar assessment of MacKinnon's progress.

"He has created an awareness that didn't exist, or wasn't as heightened as before, that we can use technology in a strategic sense," says Lee Taylor, vice-president of information services at Prudential's district agencies group headquarters in Newark, N.J. "He's been very effective at moving Prudential along."

Coordinating Prudential's information systems efforts with an overall strategic plan is a mammoth task. Prudential's structure is based on 30 business units, each of which has its own data processing organization. Altogether, there are 5,000 information systems employees. Each business unit has a chief information systems executive who reports directly to the business unit president and indirectly — through a dotted-line structure — to MacKinnon.

MacKinnon is based at Prudential's Roseland, N.J., data center, its corporate data hub. He is directly responsible for an annual information systems budget of $130 million. In addition, the Roseland facility serves as a clearinghouse for the multiple

Continued on page 108

PROFILE

Malcolm MacKinnon

Position: *Senior vice-president and head of information systems, The Prudential Insurance Company of America.*

Mission: *To help push the company into a more technology-oriented future.*

MacKinnon

FROM PAGE 107

business units' information systems efforts. While each business unit DP executive is responsible for his own budgeting and planning, MacKinnon maintains a watchful eye and has the authority to veto decisions.

MacKinnon says the business plans of each unit as well as the information systems plans arrive at his office each year. He reviews them to see how closely the plans dovetail.

Links on the rise

"The amount of linkage between the two plans is increasing every year," MacKinnon says. "More than half the units have linkage by now. But there's a continuing need to improve the plans."

Citing the competitive nature of Prudential's business, MacKinnon was reluctant to discuss the concrete results from this increasing unification.

Instead of giving away details of the more critical "technology weapons," MacKinnon points to obvious innovations for which he takes credit, such as the use of laptop personal computers by the company's agents.

Agents, MacKinnon says, are more frequently winning clients with a single sales call, rather than with two or more, because most of a potential client's questions can be answered on the spot with the data stored in the laptop.

To ensure that programs like the use of laptops are implemented, MacKinnon takes to the road regularly, stopping at each of the company's business units to meet with the DP executives. In addition, he promotes his ideas in the executive suite of Prudential so that a pro-information systems attitude flows from the very top.

But seriously, folks . . .

According to the business unit's information systems leaders, MacKinnon is effective at stirring up interest in technology because his presentations are typically laced with humor and often have a "Star Wars" tone to them.

He is also known for his presentation wrapups, in which he illustrates the highlights with stick figure drawings of the DP executives and their statements. "He is soft spoken, but he's not reserved," says Joseph Carroll, vice-president of information systems for Prudential's group insurance unit.

MACKINNON'S work is ideas, not the nuts and bolts of MIS. His technique is to sell the MIS concept throughout the company.

MacKinnon says the humor is a deliberate ploy to help get his message across. It is incorporated into his positive-reinforcement campaign to bring people around to his way of thinking. "He is an effective communicator," Taylor says. "He doesn't ram stuff down our throats, but he does stay on top of me and my counterparts."

Technology champion and humorist were not the roles MacKinnon envisioned for himself 34 years ago when he stepped out of the University of Toronto in the city in which he was raised, and landed a job as an actuary student with Prudential. He saw only a career opportunity with a reputable company. He makes it clear that his commitment is to Prudential first, not to a particular line of work within the company.

As such, he has willingly taken a series of jobs since the mid-1950s that moved him from different departments, across the country and back again. MacKinnon has helped create family insurance policies and headed the company's pension operations. In the 1970s, he did a six-year stint as an MIS executive in Newark.

But he is not a DP career man. "There's no danger of me doing systems programming," he says. In fact, MacKinnon claims, if it served Prudential to reassign him to still another post, he would gladly accept the offer.

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Hughes Aircraft Company's advanced air traffic control system developed for the Republic of Korea won the only 1987 industrial award given by the Air Traffic Control Association. The award recognizes outstanding industrial contributions to the field of air traffic control. Hughes delivered the system within budget and within a tight, 28-month schedule. It features advanced conflict alerts, modern aircraft control displays, advanced computers and a high-speed local area network. The new system, based in Taegeu, South Korea, has operated without failure since it began service in 1986.

The Hughes Probeye® Thermal Video System is being used to detect defects in printed circuit boards (PCBs) well in advance of component failure. Overheating defects in PCBs are the most prevalent cause of problems, and are frequently impossible to localize prior to actual failure using conventional testing methods. The Probeye Thermal Video System "looks" at the PCB, develops a thermal signature, then compares it with thermal parameters on a board known to be without defects. Hidden problems are quickly revealed, and corrective action can be taken before the board leaves the factory, thereby eliminating downtime, improving customer service, and decreasing costs.

A system for night reconnaissance, border surveillance, and specialized military applications has recently completed 150 successful cross-country demonstration flights. The approach utilizes a Hughes Night Vision System (HNVS) aboard Schweizer Aircraft Corporation's new SA 2-37A Special Purpose Aircraft. The HNVS is a forward-looking infrared (FLIR) system that lets crew members see at night and in poor visibility conditions. Unlike radar, the FLIR emits no energy of its own that can be detected during operations. It can locate and track vehicles and, at its maximum magnification setting, can even delineate individual tree limbs and branches. HNVS is in use by the U.S. Army and the U.S. Customs Service, and was selected for use on the proposed V-22 Osprey tilt-rotor aircraft.

Hughes designed and built a probe for the Galileo Mission, which is expected to unlock the secrets of Jupiter, providing scientists with data about the planet's atmosphere. Scheduled for launch from the Space Shuttle in late 1989, Galileo will employ a solid-fueled Inertial Upper Stage rocket, aided by gravity assists from Venus and Earth, to boost itself from the Shuttle's orbit to the giant planet. Once Galileo is within reach of outer Jupiter, the Hughes-built probe will be released into the Jovian atmosphere. During its 60-minute descent to the surface, the probe will continually broadcast scientific data back to Galileo, which will then transmit the information to Earth.

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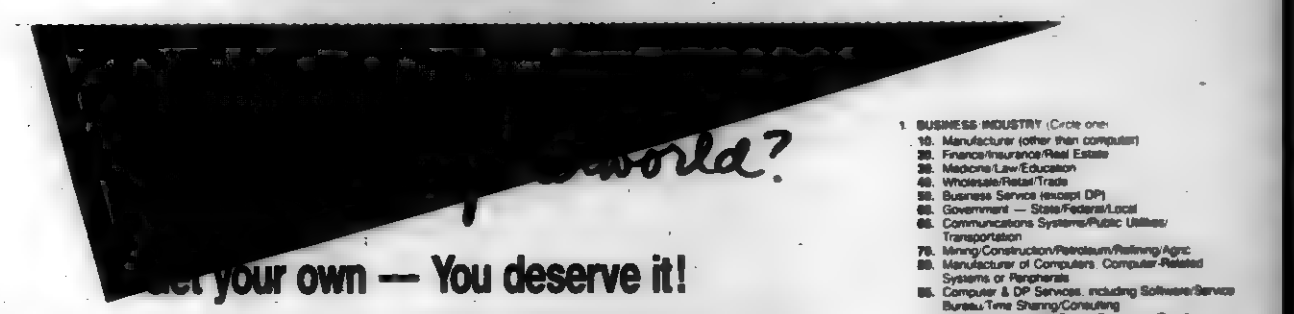

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Ferruggia

CONTINUED FROM PAGE 107

the day was usually "hello" or "good morning," just to make sure the line was working.

How often is this important step forgotten in human communications? Consider this scenario:

John has been working feverishly on a production problem and has now located the critical area in the program. He has worked overtime for the last two days and has come in early this morning; he is sure he is close to the solution. Suddenly, he hears a voice behind him. It belongs to his manager: "You were supposed to have your status report on my desk an hour ago!"

John is likely to become upset and may shout a few choice words at his manager. He may feel his manager doesn't know or care about his work and doesn't appreciate his effort. Is this really the case? Probably not.

What has actually happened is that John was shocked by the abrupt change in context.

See me, hear me . . .

To understand his manager's communication, John's brain must hear the voice behind him, recognize that the voice is directed at him, identify it as his manager's and break his concentration.

He then must understand the literal meaning of the sentence, reconstruct the first few words he probably lost, search his memory to support or disprove the manager's factual allegations and construct a reply.

Finally, after John's interaction with his manager is complete, he must re-establish his concentration and return to the point at which he was interrupted.

What was missing in this scenario was a handshaking sequence. Handshaking is important in human communications, especially when you are interrupting. The handshake identifies the speaker, establishes the relative importance of the communication and allows the listener to shift his attention smoothly from his work.

Power of politeness

How differently would John have reacted if his manager stood in front of him and said, "Excuse me," waited for him to look up and then said, "I know you're busy, but could you give me your status report as soon as you get a chance?"

By standing in front of John and saying, "Excuse me," John's manager gets his attention and makes it easy for John to identify who is speaking. It also gives John a chance to put his concentration on hold and turn his attention to his manager. This will also make it easier to return to his state of concentration after the interaction is complete.

By saying, "I know you're busy," John's manager lets him know that he understands the importance of John's work and that the content of this communication has a somewhat lower priority. By saying, "Could you give me your status report as soon as you have a chance," he delivers his communication as a request rather than a statement of fact. In this way, John can accept it as is and act on it as soon as possible.

In the previous scenario, when the manager told John "You were supposed to . . . ," John could not even understand the communication without actually searching his memory to determine whether he was in fact supposed to do so. When the same communication is phrased as a request, John does not need to refer to his memory, and, thus, his attention is less distracted from his work.

The points to remember when beginning a communication with someone who is working at a task are the following:

- Make your presence known by standing in the person's field of vision and saying something to get his attention.
- Wait for the person to acknowledge your presence.
- If possible, tell the person how your communication relates to what he has just been doing.

JOHN HAS BEEN working feverishly on a problem and has located the critical area in the program. He has worked overtime and has come in early this morning. Suddenly, he hears his manager behind him: "You were supposed to have your report on my desk an hour ago!"

- State your communication as succinctly as possible. If you want the person to do something, phrase it as a request or question and let him know whether it needs to be done before or after he finishes his task.

When beginning a communication with someone who is not concentrating on a task, the steps are as follows:

- Make your presence known, and get the person's attention.
- Talk about trivial matters until you are both comfortable. This is known as "building rapport."
- State the topic you want to discuss.
- Engage in conversation.

Ferruggia is a psychologist and president of Personal Excellence, Inc. in Warwick, N.Y.

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Mugnet'88. Nashville, April 24-27 — Contact: Federation of NCR User Groups, Mail Station USG-2, Dayton, Ohio 45479.

Ingres Users Association Spring 1988 Conference. San Diego, April 24-27 — Contact: Paula Adams, Program Committee Chairperson, Effective Systems, Inc., Suite 1-2, 2001 Wyoming Blvd. N.E., Albuquerque, N.M. 87112.

Computer-Based Training Conference & Exposition. Washington, D.C., April 24-27 — Contact: Julie Stein, Registrar, Computer-Based Training Conference, Weingarten Publications, Inc., 38 Chauncy St., Boston, Mass. 02111.

Common Spring '88 Conference: Managing Technology. Hollywood, Fla., April 24-28 — Contact: Common, Suite 600, 111 E. Wacker Drive, Chicago, Ill. 60601.

Technomart Wests The Wang-Compatible Tradeshow and Conference. Los Angeles, April 25-26 — Contact: Data Base Publications, Suite 385, 8310 Capital of Texas Highway, Austin, Texas 78731.

Special Briefing and Workshop on the New Computer Security Act. Reston, Va., April 26-27 — Contact: Advanced Information Management, 1968 Opitz Blvd., Woodbridge, Va. 22191.

HILOG '88. San Jose, Calif., April 26-27 — Contact: International Planning Information, Inc., 455 Convention Way No. 1, Redwood City, Calif. 94063.

Expert Systems — Solutions in Manufacturing Conference and Exposition. Dearborn, Mich., April 26-28 — Contact: Maria Nowakowski, Engineering Society of Detroit, Suite C 500, 24 Frank Lloyd Wright Drive, Ann Arbor, Mich. 48105.

Distributed Network Computing. Cambridge, Mass., April 27-29 — Contact: Patricia Seybold's Office Computing Group, Suite 612, 148 State St., Boston, Mass. 02109.

MAY 1-7

ISUG/Cobol Users Group. Clearwater Beach, Fla., May 1-4 — Contact: Willard S. Kantter, Executive Director, ISUG/Cobol Users Group, P.O. Box 2156, Altamonte Springs, Fla. 32715.

SCI 1988 Annual Conference, Management of Change and Innovation Supporting the Explosion of End-User Computing. Dallas, May 1-4 — Contact: Information Center Institute, 3220 Commander Drive, Carrollton, Texas 75006.

International Association of Synercom Users Conference. Houston, May 1-4 — Contact: Gary E. Carson, P.O. Box 1329, Sugar Land, Texas 77487.

Spring Conference on Disaster Recovery and Computer Security. Marco Island, Fla., May 1-4 — Contact: Pat Watkins, Harris Devlin Associates, Corporate Offices, 2715 Tuller Parkway Drive, Dublin, Ohio 43017.

International Symposium on Information Resources Management. Toronto, May 1-5 — Contact: Business Forms Management Association, Inc., Suite 712, 519 S.W. Third Ave., Portland, Ore. 97204.

The Elusive Payoff in Information Technology Conference. New York, May 2-3 — Contact: Aida Rivera, Business Week Executive Programs, 1221 Avenue of the Americas, Suite 4049, New York, N.Y. 10020.

Guidelines Macintosh Forum '88. Chicago, May 2-3 — Contact: Guidelines — Mac Forum '88, Box 456, Orinda, Calif. 94563.

DBMS User Group Meeting. Chicago, May 2-4 — Contact: Beverley Van Kirk, Conference Coordinator, DBMS, Inc. 600 Olympian Office Center, 4343 Commerce Court, Lisle, Ill. 60532.

Eastern Communications Forum'88. Rye Brook, N.Y., May 2-4 — Contact: Eastern Communications Forum88, Suite 4900, 505 N. Lake Shore Drive, Chicago, Ill. 60611.

Westinghouse National User Group Meeting. Pittsburgh, May 3-4 — Contact: Westinghouse Electric Corp. Management Systems Software, P.O. Box 2728, Pittsburgh, Pa. 15230.

A/E/C SYSTEMS '88. Chicago, May 3-5 — Contact: Sharon Price, A/E/C Systems '88, P.O. Box 11216, Newington, Conn. 06111.

Autocad Expo '88, For the Drafting and Design Professional. Chicago, May 3-5 — Contact: Autodesk, Inc., 2320 Marinship Way, Sausalito, Calif. 94965.

International Forum for Air Cargo, Air Cargo Tomorrow — Intermodal, Automated, Distributed. Miami Beach, May 3-5 — Contact: Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, Pa. 15096.

National Conference on Managing DEC-IBM Integration. Chicago, May 3-4 — Contact: Gregg Martin, DeBoever & Associates, Inc. Suite 220, 179 Great Road, Acton, Mass. 01720.

Data Entry Management Association Desktop Publishing Conference/Exposition. New Orleans, May 3-5 — Contact: DEMA, 101 Merritt 7 Corporate Park, Norwalk, Conn. 06851.

Facilities '88 — International Facilities Management Automation Conference. Chicago, May 3-5 — Contact: Nancy Greenberg, Summit Tower, Suite 1410, 11 Greenway Plaza, Houston, Texas 77046.

CASEXPO-Spring - The National Computer Aided Software Engineering Conference & Expo. Dallas, May 3-6 — Contact: CASEXPO-Spring Coordinator, 3825-1 S. George Mason Drive, Falls Church, Va. 22041.

Artificial Intelligence and Advanced Computer Technology Conference/Exhibition. Long Beach, Calif., May 4-6 — Contact: Dr. Murray Tebell, General Program Chairman-AI '88, c/o Intelligent Choice, Suite D, 1050 Duncan Ave., Manhattan Beach, Calif. 91109

Pittsburgh Conference on Modeling and Simulation. Pittsburgh, May 5-6 — Contact: William G. Vogt, Modeling and Simulation Conference, 348 Benedum Engineering Hall, University of Pittsburgh, Pittsburgh, Pa. 15261.

MAY 8-14

Temple University Symposium on Telecommunications: State Regulatory Alternatives for the Future. Hershey, Pa., May 9-10 — Contact: School of Communications and Theater, Temple University, 15 Annenberg Hall/TUP, Philadelphia, Pa. 19122.

Comdex/Spring '88. May 9-12, Atlanta. Contact: The Interface Group, 300 First Ave., Needham, Mass. 02194.

Annual Meeting of the AIH Users' Group. St. Louis, Mo., May 9-13 — Contact: Jamie L. Schlosser, Missouri Department of Mental Health, P.O. Box 687, 1915 Southridge Drive, Jefferson City, Mo. 65102.

Electro/88: The Technology Bridge. Boston, May 10-12 — Contact: Electro, 8110 Airport Blvd., Los Angeles, Calif. 90045.

National Online Meeting. New York, May 10-12 — Contact: Learned Information, 143 Old Marlton Pike, Medford, N.J. 08055.

Distribution/Computer EXPO '88. Chicago, May 11-12 — Contact: C.S. Report, Inc., Box 463, Exton, Pa. 19341.

NRMA Seminar On POS and In-Store Systems. Dallas, May 11-13 — Contact: National Retail Merchants Association, 100 W. 31st St., New York, N.Y. 10001.

Electronic Networking Association Conference: Beyond Electronic Mail. Philadelphia, May 12-15 — Contact: Nan Hawkins, c/o Electronic Technologies, Inc., ENA Conference, 2744 Washington Street, Allentown, Pa. 18104.

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Migration

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rope and Asia.

"We were dealing with a number of previously autonomous units that were organized first around products and second around functional groups like sales and marketing," O'Haren said.

In addition, Fairchild used Digital Equipment Corp.'s Vaxmail electronic mail system. System/38 users accessed Vaxmail through gateways to Fairchild's DEC VAX manufacturing and engineering systems, which were linked via Decnet and CCITT X.25.

National Semiconductor's distribution and customer service system ran on National Advanced Systems (NAS) mainframes in conjunction with Cullinet Software, Inc.'s IDMS/R and ADS/On-Line.

National Semiconductor also ran Decnet but relied primarily on IBM's Systems Network Architecture with the Synchronous Data Link Control protocol and IBM's Professional Office System (Profs).

The transition required bringing Fairchild users onto Profs and ensuring that orders entered anywhere would go into a common data base under IDMS/R.

Another challenge was to deal with the various conventions, such as order forms, packing lists and identification numbers, that Fairchild had used, thus ensuring that a product delivered with the help of the new system and National Semiconductor's forms and formats was what the customer had ordered.

O'Haren cited factors that worked in National Semiconductor's favor during the transition period. The first was that National Semiconductor, as the acquirer, had a presence in areas in which Fairchild had facilities.

In addition, National Semiconductor had experience in bringing together users of diverse systems, having brought its European operation onto the NAS systems a year earlier.

A final advantage was Fairchild's own premerger leanings. "Prior to our acquiring Fairchild, they had ideas about doing something similar. They were already tending toward putting in a somewhat centralized system," O'Haren said.

National Semiconductor is now looking at the remaining steps, which include more combined data bases, integration of financial systems and integration of customer information and sales systems.

National Semi's Patrick O'Haren

One strategy adopted from Fairchild was the spin-off of the computer-integrated manufacturing systems group from MIS. That group now reports on a parallel track alongside the MIS organization.

O'Haren offered two points of advice for other organizations attempting similar mergers. The first is the exposure of prospective changes to close scrutiny, "working in the minutest detail so all elements can be checked and cross-checked."

"When it becomes certain that you are going to do it, set a specific goal for when you will have it done," he said. "Then move quickly to achieve that goal — even to achieve perfection, don't extend that deadline because otherwise enthusiasm could wane, and you may never finish."

COMPUTER INDUSTRY

INDUSTRY INSIGHT

Clinton Wilder

Who woulda thunk it?

Nothing lasts forever. Expect the unexpected. The leading-edge technology of today becomes tomorrow's Edsel.

These business maxims can almost always apply to the computer industry. But this year, at least as of tax day last week, has had more than its share of surprises.

Compared with what was supposed to happen in the industry as per the predictions of the past three years, this year's headlines are leaving MIS executives scratching their heads. Like the old-time baseball fan marveling at the unexpected success or failure of a beloved team, computer industry observers are looking at the following developments and asking, "Who woulda thunk it?"

The major copyright and patent infringement suit of the year is filed by Apple, not IBM.

When Big Blue introduced its compatible-killing Personal System/2 line one year ago, clone makers from Taipei to Fort Worth were nervously anticipating what the Armonk

Continued on page 116

Is EDS stalling non-GM dealers?

Auto sellers stuck in neutral with on-again, off-again service

BY ELISABETH HORWITT
CW STAFF

DETROIT — Auto dealers that sell non-General Motors Corp. cars say their computer operations are getting short shrift from GM-owned Electronic Data Systems Corp. (EDS).

When EDS purchased the rights to American Financial Resources' (AFR) finance and insurance software package in September 1987, it inherited AFR's customer base of about 100 non-GM car dealers, 80 GM car dealers and 40 marine customers, according to EDS public affairs representative Anthony Good. On March 3, EDS sent a letter to the former AFR customers announcing that it would terminate service and maintenance contracts in 30 days. The company, however, would continue to support GM dealers "under a variety of alternatives," Good said.

But on April 1, EDS cancelled the cancellation, informing non-GM dealers that it will continue to service their AFR packages until an alternative provider can be found. The company is currently considering several alternative ways to continue service to non-GM dealers, such as contracting with former employees of Indianapolis-based AFR, Good said.

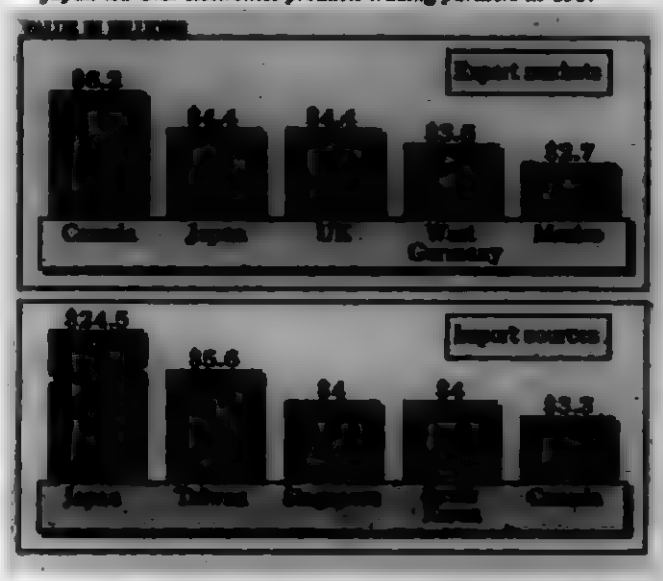
"A lot of [non-GM] dealers like ourselves are up in the air, shut off by EDS with no support. We have contacted our attorneys," said Richard Jorgensen, finance and lease manager for Mid Ohio Imported Car Co. in

Continued on page 115

Data View

Rising sun shone brightly

Japan led U.S. electronics products trading partners in 1987



INFORMATION PROVIDED BY THE AMERICAN ELECTRONICS ASSOCIATION
CW CHART

Relational goes public

BY NELL MARGOLIS
CW STAFF

ALAMEDA, Calif. — A funny thing happened to Relational Technology, Inc. on its way to the public stock market.

The maker of the Ingres relational data base management system filed its much-debated, long-awaited initial public offering at 3:00 p.m. Friday, Oct. 16, 1987 — which explains why the offering was put on hold the next week.

But six months after Black Monday, Relational Technology is knocking on the door of the Securities and Exchange Commission (SEC) once more. The company amended its earlier filing

Continued on page 117

Support net keys SSA's big growth

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — If distributed processing is the key to success in the IBM System/36 and 38 market, software vendor System Software Associates, Inc. (SSA) has applied the same principle of distribution to the area of customer support.

SSA President Roger Covey credits that distributed principle with boosting 6-year-old SSA from a $3.9 million firm in 1984 to a $30.8 million firm last year. The key to SSA's dramatic expansion, 32-year-old Covey said, is the unique affiliate program the Chicago-based firm has put in place around the world.

From the U.S. to Europe, Asia and Australia, SSA's 45 affiliates are a network of support providers that install and maintain its software at 2,400 customer sites. In exchange for their efforts, affiliates get commissions from client fees; the software license fees go directly to SSA's headquarters. SSA projects that it will end its 1988 fiscal year with about $60 million in revenue from those licenses.

What the affiliates are selling is SSA's Business Planning and Control System (BPCS), the umbrella product for more than 20 applications modules. BPCS was designed by Covey and SSA's first three employees as an inte-

Continued on page 116

AT&T's Olson takes time off to recuperate; Allen fills in

BY ALAN ALPER
CW STAFF

NEW YORK — AT&T Chairman and Chief Executive Officer James Olson has relinquished his responsibilities for an indeterminate time while recovering from major surgery, the company disclosed last week.

Olson, 62, underwent surgery March 25 for removal of a malignant tumor and is recuperating at his Short Hills, N.J., home, an AT&T spokesman said. President and Chief Operating Officer Robert Allen, 53, is running the company in Olson's absence, the spokesman said.

Under AT&T bylaws, the president assumes the responsibilities of the chairman if the latter is unable to fulfill those duties, the spokesman said. There is no provision regarding how long Allen can continue to run the company without board approval, he added.

Timing critical

Olson's illness comes at a critical juncture for the telecommunications and computer company. In his 18 months on the job, Olson has been instrumental in reducing expenses, which has bolstered the firm's bottom line, and has adopted strategies that have strengthened AT&T's position in its core telecommunications business.

Moreover, AT&T appears to have finally found a winning computer strategy based on its networking expertise, ownership of the Unix operating system and a licensing agreement with Sun Microsystems, Inc.

Chairman Olson

President Allen

"Olson has done a lot in a short period of time," noted Bart Stuck, an analyst at Probe Research, Inc. and a former Bell Laboratories employee.

Allen is considered the odds-on favorite to succeed Olson when he reaches mandatory retirement at age 65. "Allen would be the right guy for the job," Stuck said. "He's a capable manager, and right now, it's no longer an issue of strategy for AT&T, but one of blocking and tackling."

Disclosure of Olson's illness came in response to press queries last week. AT&T was not obligated by Securities and Exchange Commission regulations to disclose the situation.

The AT&T spokesman said it is too early to say when Olson will return to his job. Olson's recovery is proceeding well, he noted, adding that it is unlikely the chairman will attend the company's annual shareholders' meeting this Wednesday.

Olson joined AT&T in 1943 as a splicer's assistant at the Northwestern Bell division. He worked his way through the Bell system and was named president and chief operating officer of AT&T in 1985 before succeeding former Chairman Charles Brown in 1986.

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INDUSTRY WEEK IN BRIEF

EDS

CONTINUED FROM PAGE 111

Columbus, Ohio.

Jorgensen's complaint illustrates the potential pitfalls for computer users when their software or services vendor is acquired by a company that competes directly with those users in another industry. GM's attempt to gain a competitive edge through computer technology may conflict with the business goals of some EDS customers.

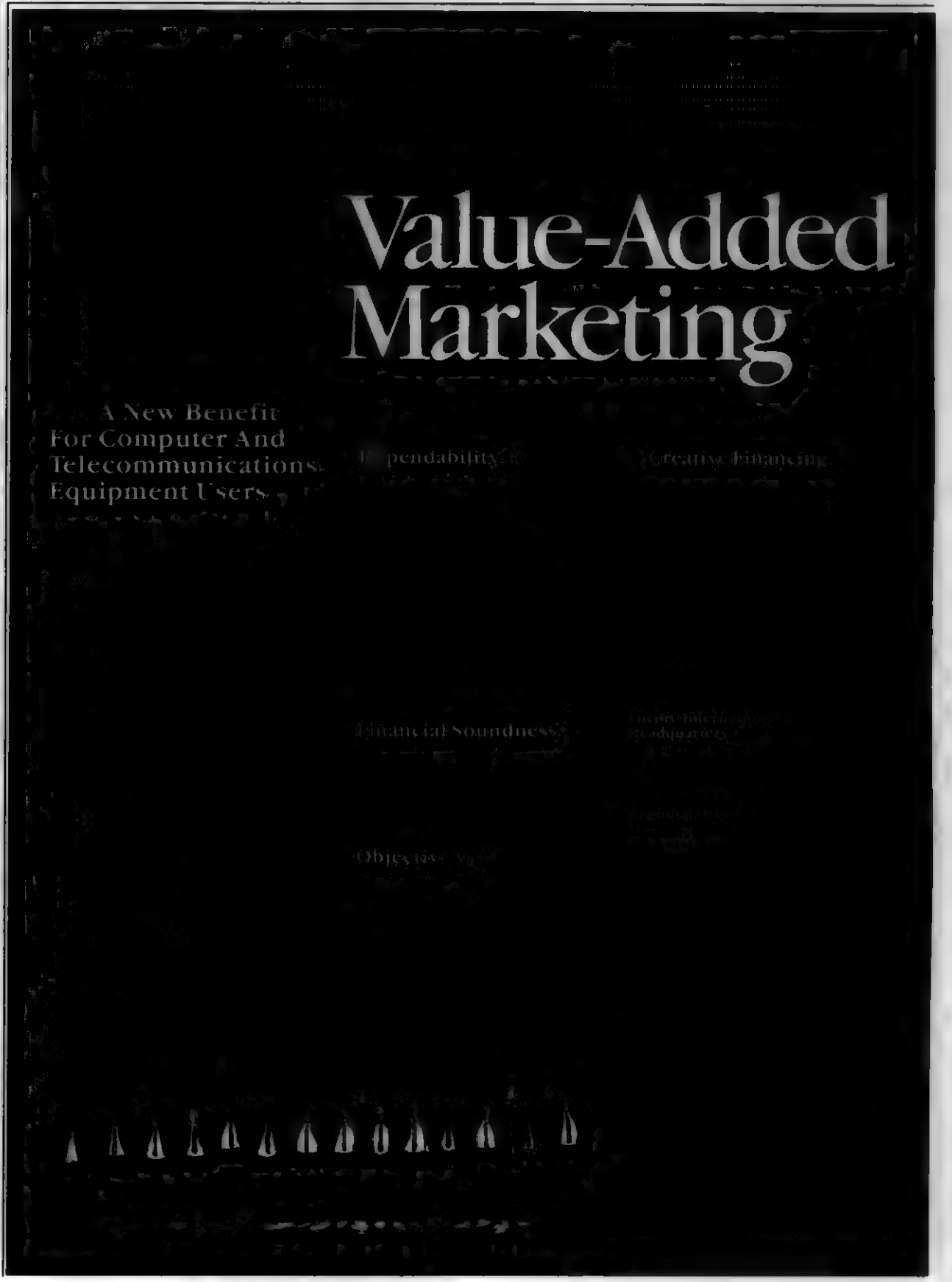
EDS decided to discontinue the service "probably as a way to make trouble for non-GM dealers," Jorgensen said. "Now, I think they've gotten way too many complaints, and attorneys are getting involved, so they're backing off and saying, 'Hey, let's give them support until they have an alternative.' "

EDS's Good said the Dallas-based processing services giant decided to discontinue direct service to non-GM dealers that originally bought "stand-alone software from AFR, not from us." EDS bought the AFR software in order to sell it as part of Dealerline, a family of software products that the company developed and began marketing last June to GM dealers only, he added.

One strong motive for EDS to divest itself of its non-GM service contracts is to free more resources for servicing the 200 GM dealers that have purchased Dealerline packages so far. EDS has "run into trouble providing adequate support" for those customers, Good said. "We got more customers than we expected."

So far, the company has installed Dealerline packages for 160 dealers, and it is delaying installation of the remaining 40 until it can support them, Good added. EDS has suspended sales of new Dealerline systems until October.

According to Mid Ohio's Jorgensen, "Service levels started going downhill when EDS took over the AFR contract." Mid Ohio has been waiting more than two months for EDS to fix an error in the software that handles its bank lease contracts, Jorgensen said. "They tell me they've been really backlogged from all the work that got dumped on them [from AFR's customer base], so they are only responding as people call and complain."



Support net

FROM PAGE 111

grated series of programs, including manufacturing, materials handling, financial, data base, distribution and decision-support packages.

Because the modules are compatible, they allow a small company to put together an ambitious business plan without having to hire a large programming staff to write customer software.

Multinational support

Covey said he sees the affiliate concept as one that projects SSA's products around the world with a minimum of overhead and a maximum of local support, even if it is in French, Spanish, German or Chinese.

"We've built a network around the world of independent software and professional services firms," Covey said. "Some of our affiliates are IBM MAPs [Marketing Assistance Program members] or VARs, but they all are systems integrators that can provide strong, local support for our customers. You don't have to have a direct sales force to serve your customers well."

Unlike software agents, affiliates view their resale of SSA's System/36 and 38 application software as part of their own success, according to analysts who follow SSA. "It's more like a family relationship," said Donald Wompach, director of research at Oberweis Securities, Inc., a Chicago brokerage firm. "Both parties — the affiliates and SSA — want to protect each other's interests."

Sometimes, the SSA family ties are cemented by its acquisition of the affiliates as SSA subsidiaries. That is what happened last year to Chicago-based Syncrocom, Inc., New England affiliate ASE Services, Inc. and SSA's Australian affiliate, Admin EDP.

Covey's theory is that the world's mid-size companies — those with annual revenue in the hundreds of millions — present the greatest business opportunities for software vendors such as SSA. These growing firms often add system capacity and software applications as their businesses expand yet face changing system requirements with little or no programming and staff.

"The mid-size customers have the same kinds of problems that mainframe sites do," Covey observed, "but as a software vendor, you simply can't drop off the software tapes and walk away."

> "YOU DON'T HAVE TO have a direct sales force to serve your customers well."
>
> ROGER COVEY
> SYSTEM SOFTWARE ASSOCIATES, INC.

Companies like that will need even more software support in June, when IBM is expected to introduce the latest member of the System/36 and 38 family, code-named Silverlake. The machine will most closely resemble a System/38, Covey said, although it has been designed to run System/36 programs, too. Covey said he has been briefed on IBM's System/36 and 38 product plans because SSA is an IBM value-added reseller within IBM's National Distribution Division.

SSA has a direct sales and support service for its largest corporate clients — among them Procter & Gamble Co., Ciba-Geigy Corp., Philip Morris Co. and Pfizer, Inc.

"If you're a multinational client, you probably have some corporate policies in place," said Rick Bowles, general manager of SSA's major accounts division, which includes 30 marketing and support personnel. "We provide the coordination and implementation of corporate policies these large firms are looking for."

Affiliates pick up slack

SSA can provide that support with a total corporate staff of just 240, about half of whom are in Chicago. It is the affiliate program that compensates for the geographic distances, Covey explained.

The large amount of affiliate oversight SSA provides may be a tiring task, Covey said, but it has some pleasant aspects, too. One of these is the collection of Asian artifacts that decorate SSA's new offices in the tower above Chicago's Northwestern railroad station.

"Local support, particularly with respect to the Chinese- and Japanese-language firms, is important," Covey said. "It takes great strategic focus on the part of software and services companies to provide that kind of support. It takes a long-term commitment."

Wilder

FROM PAGE 111

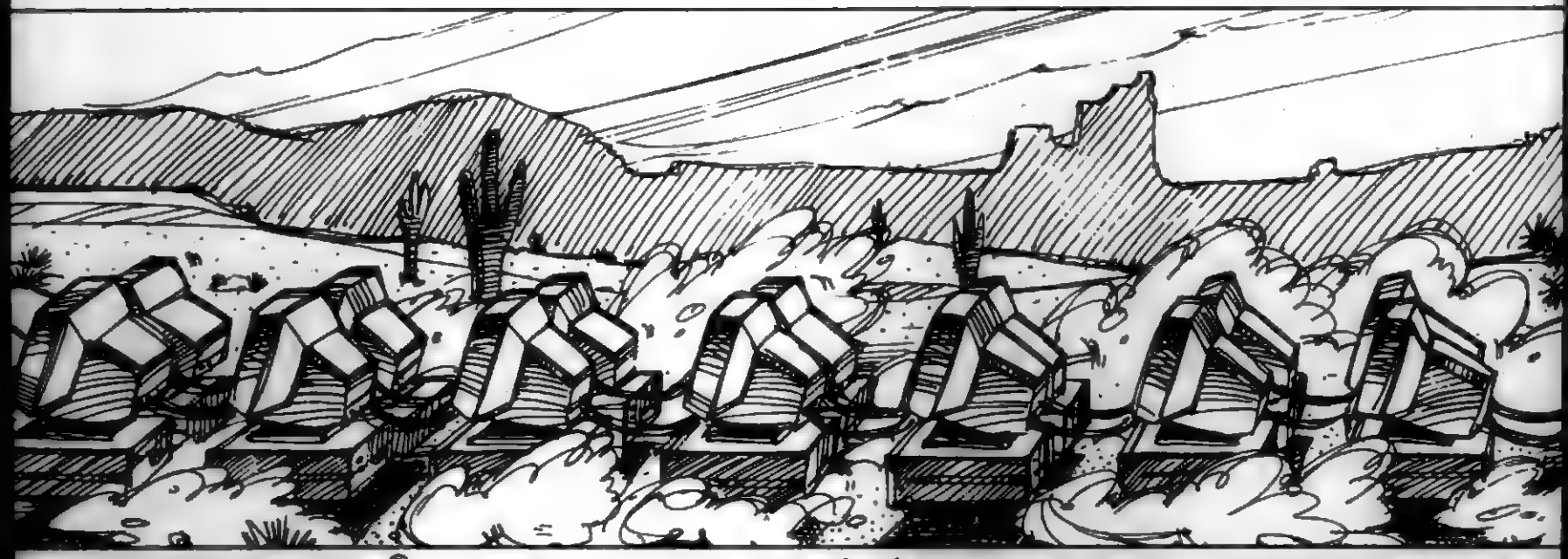
legal team might do to potential market share nibblers. They are still uneasy, but on the opposite coast, Apple decided that Microsoft and Hewlett-Packard were getting a little bit too user-friendly for Apple's taste.

Given Apple's precedence of tough, successful legal actions against Apple-like software developer Digital Research and hardware vendor Franklin Computer, the Microsoft-HP suit shouldn't have been as surprising as it was.

Despite Apple's image as a laid-back Hawaiian-shirts-and-sneakers company, John Sculley and friends didn't get the firm to where it is today without being tough.

The supply of dynamic random-access memory chips can't meet demand; U.S. memory chip makers boom, but systems makers worry.

Absolutely unbelievable. Two years ago, U.S. companies were stampeding out the memory chip industry exit door while throwing trade sanctions at their Japanese competitors for causing the RAM glut. Now they want the Japanese to play



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Arbiter provides a single, flexible communication interface between PCs and VM/MVS hosts. The result is a centrally administered and controlled PC network where processing tasks are shared according to the strengths of the PC and host, and not limited by the host connection. This is accomplished with low host overhead while achieving transfer rates unmatched by TSO, CICS, and CMS-based "links".

Depending on the user's needs, Arbiter delivers a vast range of advanced services, such as peer-to-peer communications between PCs and APPC (LU6.2) environments like CICS, S/3x, and token ring LANs.

Arbiter supports transparent data access and file transfer between the PC and host, either through virtual disks or directly with host files.

ball and ensure that there are *adequate* supplies of dynamic RAMs. Whew.

This is uncontestable proof that semiconductors are a cyclical business. Chip vendors misjudged that fact when they overextended their RAM production capacities at the beginning of the decade and appear to have done it again when they exited the business. But they're cheering from the mountaintops in Boise, Idaho, where tiny RAM chip stalwart Micron Technology is cashing in its you-know-whats.

DEC stock plunges below postcrash levels.

OK, so the company said its first calendar quarter wouldn't be up to snuff, but it's still hard to believe DEC is trading some 90 points below its high-water mark of 199½. The market was incredibly unforgiving to DEC a few years back, and despite the company's enviable track record since then, Wall Street seems to have a long memory.

DEC will have a tough time duplicating its growth rates of the past two years, and it does face a price/performance challenge to its more expensive VAXs — both from Sun-type workstations and its own Microvaxes. But Wall Street seems to be ignoring the fact that DEC has clearly established itself in the MIS world after years of resistance. With the exception of a few all-Blue user bastions like the insurance industry, DEC's momentum has put it on a lot of MIS approved-vendor lists. These guys will be around for the long haul.

AT&T gets industry "credibility" by teaming up with Sun.

Remember a short time ago, when AT&T was about to challenge IBM in the new global computer and communications industry, and Sun was little more than an interesting Silicon Valley start-up? The best measure of how much things have changed is the current Unix controversy.

> REMEMBER when Sun was little more than an interesting Silicon Valley start-up?

AT&T was frustrated for years because no one took commercial Unix seriously. But the moment AT&T named Sun as its Unix partner, Hewlett-Packard, NCR and other vendors cried that the partnership might lock them out of the new industry standard.

IBM will sell back its 16% stake in MCI.

AT&T isn't the only corporate giant whose vision of the computer and communications technology marriage fell short of reality. Three years ago, the IBM and MCI partnership was supposed to be a major — and not cheap — piece of IBM's communications strategy; many felt Big Blue would eventually acquire MCI as it did with Rolm, to offer cradle-to-grave networks of voice and data to its large customers.

Instead, both IBM and MCI met some unexpected hard times in their own houses, and the inside word is that MCI became a victim of IBM benign neglect. MCI has gotten back on its feet while IBM has pulled back from or downplayed, with the exception of Rolm, almost all of its much-heralded partnerships: Intel, Stratus, Merrill Lynch and Hogan Systems. Score another one for the skeptics of "strategic alliances."

Wilder is Computerworld's senior editor, computer industry.

Relational

FROM PAGE 111

April 7 and is now undergoing SEC review. Within the next 1½ to two months, Relational Technology expects to be actively trading over the NASDAQ national market system.

According to Paul E. Newton, president of Relational Technology, the crash never crushed the company's hopes of going public in the near future. "It was disappointing to us," he said, "but we've looked on it as a temporary setback, not as a catastrophe."

For some time, Newton said, a public offering of Relational Technology has been more a matter of "when" than "if."

In addition to seeking cash funding for continued growth, the company, which recently announced a racy release of its flagship Ingres DBMS, is hoping that its emergence as a public company will boost its credibility.

"[We've seen] customers who somehow feel more comfortable if they're dealing with a public company, for some reason," Newton said. "Certain competitors like to make snide remarks about the confidence level of a company that remains private; we'll be happy to live without that."

Relational Technology's archrival is Belmont, Calif.-based Oracle Corp., one of the most successful technology stocks of the past two years.

Something else the people at Relational Technology will be happy to live without, Newton said, is the edifice of meetings and paperwork that rises from a contemplated public offering.

"This has been very time-consuming, and we have other things that we want to get on with," Newton said. Among them is the firm's campaign to reposition itself as a marketing-oriented, rather than exclusively technology-driven, business.

"After all," Newton said wryly, "this is the company that started out saying that all we had to do was have the finest technology, and the world would beat a path to our door. We've finally noticed that it doesn't work quite that way."

Now that Relational Technology is poised "to toot our own horn a little," Newton added, "we want to get on with it."

The offering will consist of 1.8 million shares of common stock: 1.5 million shares of company-issued stock, with the remaining 300,000 shares offered by shareholders.

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OS programming gets complex

And now employers expect systems programmers to be personable too

BY KATY GURLEY
SPECIAL TO CW

***Desperately seeking systems programmer** for 300-person MIS shop in Fortune 1,000 banking firm near New York City. If you have a minimum of two years' experience with MVS and networking, know assembly language, are a creative problem solver and relate well to people, we want you. Knowledge of DEC VAX a plus. Undergraduate degree preferred. Salary: $33,000-$37,000. Excellent opportunity for growth.*

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That's the assessment of headhunters, market researchers, MIS directors and systems programmers of the marketability of systems programmers today. MIS departments are scouring the country for these experts and paying them well.

"This is an area that has always had demand," says Edward Perlin, president of compensation consultants Edward Perlin Associates, Inc. in New York. "I've never seen a point where there is an oversupply. Usually, there is a shortage."

Recruiters say the most important entries on a systems programmer's resume are knowledge of assembly language and operating systems from IBM or Digital Equipment Corp. and two or more years' experience.

Experience required

Entry-level people are not in great demand. Most systems programmers come from operations or applications programming and go through a kind of apprenticeship before they move over to systems.

Today, systems programmers usually monitor the network and operating system, help maintain system software, act as vendor liaisons, program utilities, troubleshoot system glitches and manipulate the operating system to boost processing or storage capacity.

Perlin estimates that MIS departments need one systems support programmer for every 20 applications developers. Howard Levin, director of recruiter RSVP Services in Cherry Hill, N.J., says he places one systems programmer for every 30 developers.

Even though demand for systems programmers is strong, companies are increasingly selective. Forced to pay top salaries because of the scarcity of qualified people, they will search for as long as several months to find the right candidate.

Darwin Wolfe, director of information services for Atlas Powder Co., a Dallas manufacturer of industrial explosive products, has found the search for well-rounded systems programmers difficult.

"I look for the person who is logically oriented and who is a good problem solver," Wolfe says. "I would expect the person to know the lower level languages, like assembly. I also expect them to communicate well with people and to produce good documentation. If they are going to create a utility for someone else to use, then they are going to tell them how to use it. I also like a good, healthy dose of common sense."

Personal relations skills is one of several new qualifications high on MIS wish lists. Systems programmers were once considered the real "techies" of MIS and were not expected to be particularly personable. But MIS directors want to move more systems people into management, where communication skills are crucial, recruiters say.

Levin says technical requirements also have changed with the evolution of technology. In the last 10 years, while operating systems have become more complex, they have also become easier to maintain, he says.

The age of specialization

Systems programmers once did both programming and maintenance. Now, those areas are specialties within systems programming. The change is because of an increase in the number and variety of operating systems, Levin says.

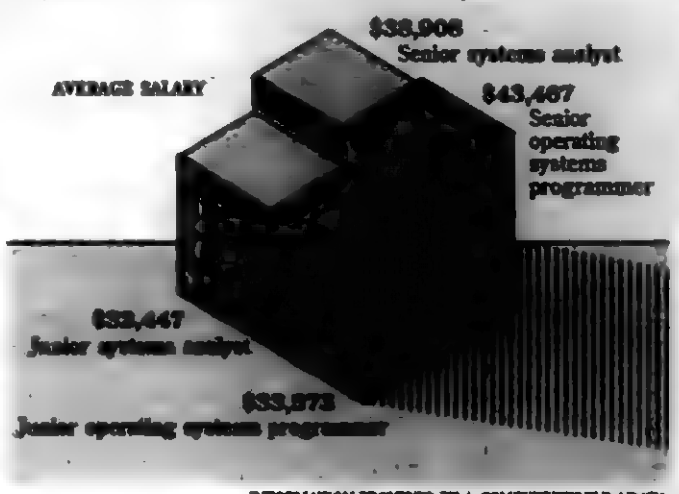
In another change, companies now prefer candidates who understand networking and Unix, although mastery of them is not usually required. In the future, however, companies may require systems programmers to be well-versed in a variety of operating systems, according to Brian Leary, senior recruiter for Management Dimensions, Inc. in Wellesley, Mass.

With such specific experience sought, an undergraduate degree in computer science or business is not always required. However, Leary says that not having one may be a handicap when applying for management positions down the road.

Gurley is a free-lance writer based in Wellesley, Mass.

Ahead of analysts

Average annual salaries for junior and senior operating systems programmers exceed those for systems analysts



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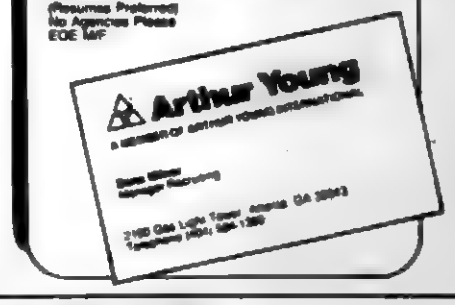

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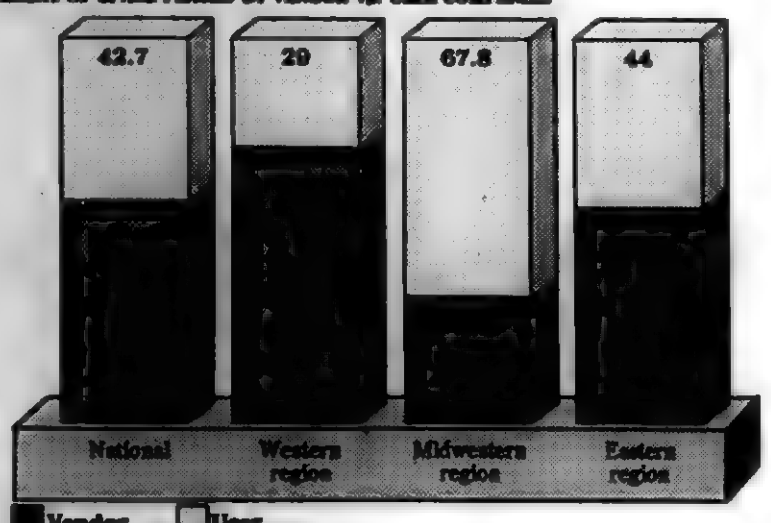
CAREER INDEX

February 1988 computer recruitment advertising activity*



*Analysis of computer recruitment advertising space in Computerworld and selected major U.S. newspapers

INFORMATION PROVIDED BY CW PUBLISHING, INC.'S RECRUITMENT MARKET RESEARCH DATA BASE

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Organization: The position reports to the Director of the Department of Data Processing and will manage a staff of eight Programmer and Analyst personnel.

Environment: The UCSD Medical Center clinical applications operate on a large scale IBM mainframe as well as multiple host connected mini-computers and IBM PC's. Programming is primarily BAL, COBOL and 4th Generation language with a DBMS under CICS with a DOS to MVS/XA conversion in progress.

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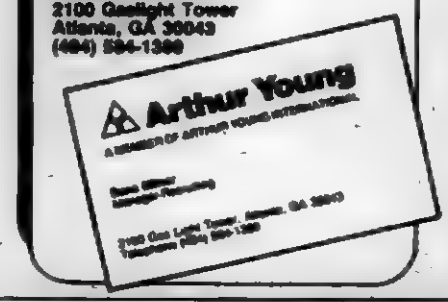

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NEW YORK: Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652; Warren Kolber, Regional Manager, 201-967-1350; Jay Novack, Account Executive 800-343-6474.

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CHICAGO: 10400 West Higgins Road, Suite 300, Rosemont, IL 60018; Patricia Powers, Regional Manager, 312-827-4433; Ellen Casey, Account Exective 800-343-6474.

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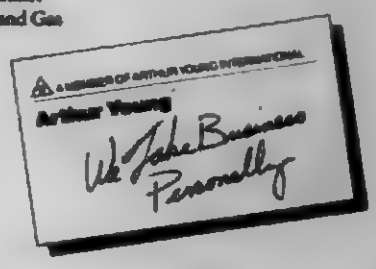

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MARKETPLACE

Virus scare infects clone sales

Wary users guard against bugs with doses of IBM, Apple, Compaq

BY CAMERON HALL
BOSTON COMPUTER EXCHANGE CORP.

It is spring flu season, and computers are catching the virus. Tiny bugs seem to be creeping into everyone's system, and the little critters are wreaking havoc with buyers.

Whether the software bugs are really there or are just a reasonable fear is not clear, but buyers are expressing new concern about clone software and hardware. One wary consumer stated: "There's no way I'd buy something that might have Asian flu!"

Buyers saw the virus scare as just one more reason for sticking with tried-and-true brands, specifically IBM, Apple Computer, Inc. and Compaq Computer Corp.

Even though real viruses may be scarce, buyers reported real fears that software copies and off-brand equipment may harbor a surprise. Clone demand was off during the week as buyers turned their backs on unknown brands and made purchases from companies they know well.

All's quiet

The week ended April 8 was relatively quiet on the Big Board, with volume deals slowing somewhat and single units trading at stable prices. While the brokers retrenched for the next few days of income tax deadline frenzy, prices of major makers' hardware settled down from the gyrations of late winter.

On the IBM trading floor, most models traded at stable prices, with the exception of the IBM Personal Computer XT Model 086, which lost popularity like a presidential candidate with one delegate. The XT Model 086, a 10-MHz system, was down last week and continued to decline to close off $25 at $1,225, with a new low of $950 during midweek trading.

The PC AT Model 339 was the clear frontrunner in this race, as it climbed $315 over the previous week's figures. The availability of the AT Model 339s in the market is bringing more eager buyers in, increasing demand and causing the numbers to jump.

Mac deflated

Some people used to call Apple's Macintosh 512 the Fat Mac, but during the week ended April 8, it might as well have been called the Flat Mac. Buyers and sellers met at last week's prices of $650 and $850 in flat trading, with fewer willing to sell at the new lows to which Macintoshes have fallen in the past few weeks.

The Macintosh Plus, up from last week's low, rose $50 to $1,175 but was still under continuing pressure from new retail discounting.

A dearth of Macintosh Pluses also left willing buyers waiting for a Mac with greater value per dollar at those prices. Macintosh SE floppy- and hard-drive models both experienced increased demand and higher prices during the past week.

Compaq trading was generally down during the beginning of April, and the bottom seems to be falling out of the Compaq Portable Plus, which traded at a low of $800.

The Plus, which is the venerable luggable — the first machine with a real hard disk — is losing its value in most buyers' eyes. It seems to be time to sell the Compaq machine, before it becomes the donation item of choice.

Think charity

Tax season always makes people think about deductions, and bargain hunters this year are still searching for new wrinkles on the IRS rules.

Even though they will not see the green of the deduction until next year, shrewd sellers in the market are thinking about tax consequences, and they are discovering their personal computers can turn into tax deductions, simply by donating the machines to the handicapped.

The donor gets a cash deduction equal to the fair market value of a computer if it goes to a suitable organization for the handicapped. Owners of older machines have been opting for this fast tax break in lieu of the slower wait for a buyer with cash.

The Boston Computer Exchange can be reached at 800-BOCOEXX or 617-542-4414 in Massachusetts.

The BoCoEx Index

Closing prices report for the week ending April 8, 1988

IBM PC Model 076	$800	$900	$600
XT Model 086	$1,225	$1,350	$950
XT Model 089	$1,875	$1,700	$1,175
AT Model 099	$2,400	$2,450	$1,750
AT Model 239	$2,750	$2,750	$2,200
AT Model 339	$3,665	$3,850	$2,800
PS/2 Model 50	$2,550	$2,655	$2,450
[illegible]			
Apple Macintosh 512	$650	$750	$600
512E	$850	$1,075	$725
Plus	$1,175	$1,450	$950
SE	$1,925	$2,200	$1,600
SE 20 MHz	$2,400	$2,400	$2,100
II	$3,800	$4,200	$3,250
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Leading Edge Model D	$825	$825	$450
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Hewlett-Packard Laserjet	$850	$875	$650

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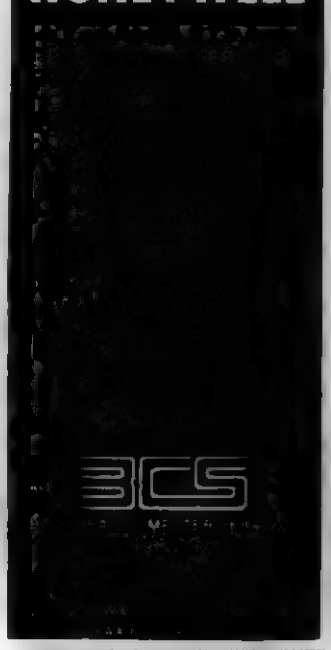

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Staff Director
Lachman Associates, Inc.
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Roger Fraumann is Staff Director for Lachman Associates, Inc. (LAI) of Westmont, Illinois. It is one of the largest privately held computer systems software consulting and development firms in the United States. And Roger is pleased to report that plans call for continuing the 50% annual growth every year for the next five years.

Roger is also pleased with Computerworld's contributions to the company's growth. When he needs qualified people to fill positions as the company grows, he turns to Computerworld.

"Computerworld is the only national publication that we routinely advertise in," says Roger. *"Last year we determined that we needed consistent national exposure. We chose Computerworld, which gave us exactly that. Simply put, Computerworld delivers just what we're looking for: top-quality job applicants."*

"We get about 20 responses per ad, and what really counts is that those responses yield at least two quality applicants per ad," Roger explains. *"Overall, a higher percentage of quality people respond to our ads in Computerworld, as opposed to what other publications deliver. Computerworld works for us."*

Plus, Roger has found added incentive to advertise in Computerworld: *"The same ad that runs nationally in Computerworld costs twice as much to run in the Chicago Tribune, a local newspaper,"* he notes.

Since LAI began advertising in Computerworld, the company has gone from 50 to 130 full-time professionals. *"We've been in Computerworld about every other week. And with the company's plans for growth for the next five years, we're going to continue advertising in Computerworld,"* says Roger.

Computerworld. We're helping employers and top professionals get together in the computer community. Every week. Just ask Roger.

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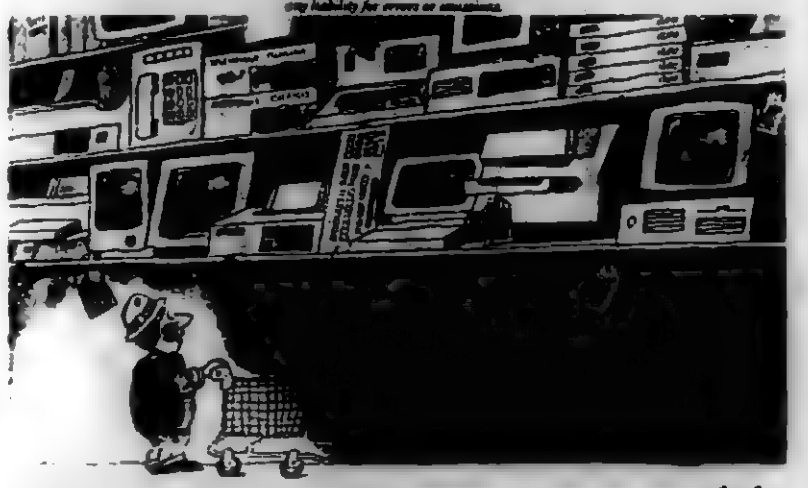

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May 9	Printers	April 22
May 23	Data Communications	May 6
June 6	CASE	May 20
June 20	The SNA Market	June 3
July 11	Disaster Prevention & Recovery Products & Services	June 24
July 25	Productivity Software	July 8
Aug. 8	TBA	July 22
Aug. 29	DB2 Market	Aug. 12
Sept. 19	Hardware Roundup: Large, Medium Scale and Special Purpose Systems	Sept. 2
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Oct. 3	Hardware Roundup: Personal Computers and Workstations	Sept. 16
Oct. 17	AI/Expert Systems	Sept. 30
Oct. 31	Unix	Oct. 14

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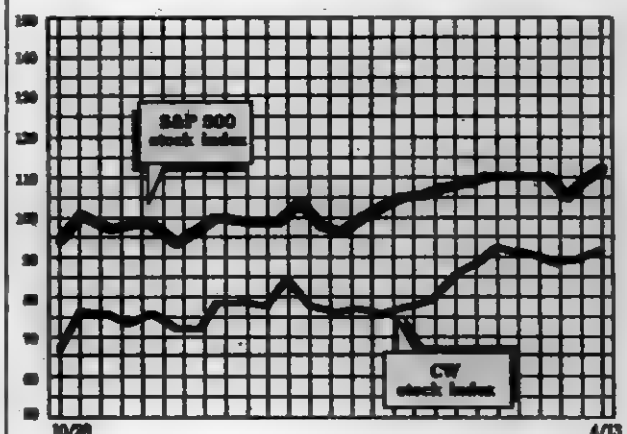
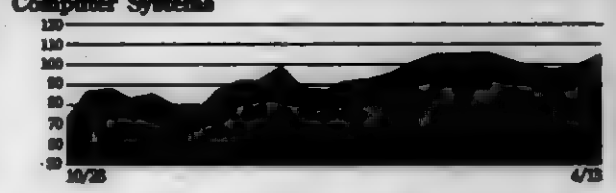
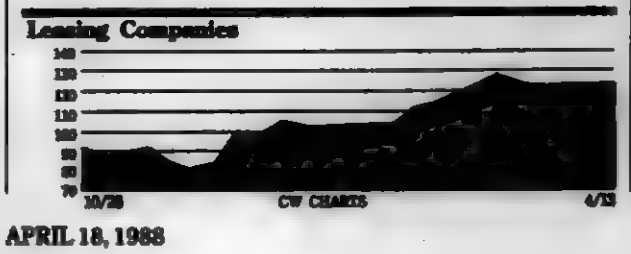


Indexes	Last Week	This Week
Communications	94.7	96.6
Computer Systems	100.8	104.5
Software & DP Services	100.7	103.0
Semiconductors	65.5	69.5
Peripherals & Subsystems	91.0	93.8
Leasing Companies	121.1	122.2
Composite Index	90.7	93.5
S&P 500 Index	110.1	113.0





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CLOSING PRICES WEDNESDAY, APRIL 13, 1988

E X C H		52-WEEK RANGE (1)		PRICE CLOSE APRIL 13 1988	WEEK NET CHANGE	WEEK PCT CHANGE
	Communications and Network Services					
N	AMERICAN INFO TECHS CORP	100	74	91.00	2.3	2.5
N	ANDREW CORP	18	11	13.75	-0.5	-3.5
O	ARTEL COMM CORP	3	2	2.00	0.1	5.7
O	AT&T	36	28	28.00	-0.1	-0.4
O	AVANT GARDE COMP INC	4	2	1.63	0.0	0.0
O	AWA TEK INC	17	6	7.38	0.5	7.3
N	AYDIN CORP	25	16	24.25	-0.1	-0.5
N	BELL ATLANTIC CORP	80	61	69.00	0.5	0.7
N	BELLSOUTH CORP	44	28	38.75	1.0	2.6
O	COMPRESSION LABS INC	7	2	3.38	0.2	8.0
O	COMPUTER NETWORK TECH	4	1	1.34	0.0	0.0
O	CONTEL CORP	46	25	35.13	0.6	1.8
O	DATA SWITCH CORP	10	4	8.75	0.4	4.5
O	DIGITAL COMM ASSOC	49	16	32.50	0.3	0.8
O	DYNATECH CORP	23	14	22.50	0.6	2.4
O	FIBRONICS INTERNATIONAL INC	8	2	4.13	0.3	6.5
O	GANDALF TECHNOLOGIES	10	6	7.38	0.4	5.4
O	GENERAL DATACOMM INDS	14	3	3.50	0.1	3.7
N	GTE CORP	43	28	36.75	0.0	0.0
O	INFOTRON SYS CORP	12	5	10.25	1.0	10.8
N	ITT CORP	55	42	47.75	0.9	1.9
N	M A COM INC	16	7	10.63	-0.1	-1.2
O	MCI COMMUNICATIONS CORP	13	6	12.88	1.0	8.4
O	MICOM SYS INC	17	7	13.13	0.3	1.9
O	NETWORK SYS CORP	14	7	10.00	0.8	8.1
N	NORTHERN TELECOM LTD	34	14	18.88	-0.4	-1.9
O	NOVELL INC	33	12	21.25	-1.0	-4.5
N	NYNEX CORP	78	58	65.88	0.6	1.0
N	PACIFIC TELESIS GROUP	34	23	29.13	0.3	0.9
N	PARADYNE CORP	9	4	4.75	-0.3	-5.0
A	PENRIL CORP	6	3	4.13	0.1	3.1
N	PLESSEY PLC	40	28	28.50	-0.5	-1.7
N	SCIENTIFIC ATLANTA INC	30	8	15.25	0.4	2.5
N	SOUTHWESTERN BELL CORP	48	32	38.63	0.4	1.0
O	3 COM CORP	28	12	19.50	0.1	0.8
O	TIMEPLEX INC	40	17	32.50	0.0	0.0
O	UNGERMANN BASS INC	16	5	12.13	0.0	0.0
N	U S WEST INC	60	43	54.13	-0.3	-0.5
	Computer Systems					
O	ALLIANT COMPUTER SYS	26	8	7.75	0.2	2.3
O	ALPHA MICROSYSTEMS	6	3	5.38	0.3	4.9
O	ALTOS COMPUTER SYS	15	9	10.25	0.5	5.1
A	AMDAHL CORP	50	19	36.88	2.8	8.1
O	APOLLO COMPUTER INC	25	9	15.75	0.8	5.0
O	APPLE COMPUTER INC	60	28	41.25	-0.5	-1.2
N	BOLT BERANEK & NEWMAN	25	12	18.63	2.1	12.8
N	BRITTON LEE INC	5	1	2.13	0.1	6.3
O	COMPAQ COMPUTER CORP	70	38	64.13	1.4	2.6
O	COMPUTER AUTOMATION INC	17	6	12.38	0.1	1.0
O	COMPUTER CONSOLES INC	11	2	7.63	0.5	10.9
O	CONCURRENT COMP CORP	24	11	18.00	0.3	1.4
O	CONTROL DATA CORP DEL	38	16	26.50	-0.1	-0.5
O	CONVERGENT TECH	9	3	3.06	-0.2	-6.8
O	CONVEX COMPUTER CORP	20	6	7.75	0.4	5.1
N	CRAY RESH INC	138	47	64.13	1.5	2.1
O	DAISY SYS CORP	10	5	8.38	0.8	9.8
N	DATA GEN CORP	37	16	24.38	1.5	7.7
N	DATAPOINT CORP	9	3	5.50	0.0	0.0
N	DIGITAL EQUIP CORP	200	102	108.38	3.0	2.8
N	FLOATING POINT SYS INC	13	3	4.50	0.0	0.0
N	GOULD INC	34	8	11.88	0.0	0.0
N	HARRIS CORP	43	22	31.13	0.0	0.0
N	HEWLETT PACKARD CO	74	35	64.50	0.1	0.2
N	HONEYWELL INC	81	48	69.25	2.8	4.1
N	IBM	176	102	116.13	6.5	5.9
O	INFORMATION INTL INC	16	9	13.00	-0.5	-3.7
O	IPL SYS INC	3	1	2.25	0.1	2.9
O	MASS COMPUTER CORP	14	4	4.00	0.0	0.0
N	MATSUSHITA ELEC INDL LTD	227	96	226.75	5.5	2.1
O	MEGADATA CORP	6	3	3.13	-0.3	-7.4
O	MENTOR GRAPHICS CORP	39	14	38.75	2.3	6.3
N	NBI INC	14	4	6.13	-0.3	-3.9
N	NCR CORP	87	50	62.50	4.1	7.1
N	PRIME COMPUTER INC	31	12	18.00	1.9	11.8
O	PYRAMID TECHNOLOGY	12	5	11.50	0.8	7.0
O	STRATUS COMPUTER	41	15	27.00	0.3	0.9
O	SUN MICROSYSTEM INC	46	14	39.25	1.8	4.8
O	SYMBOLICS INC	5	1	1.75	0.4	33.3
N	TANDEM COMPUTERS INC	37	16	17.88	0.5	2.9
N	TANDY CORP	57	38	44.13	1.1	2.6
N	ULTIMATE CORP	37	13	14.38	0.1	0.9
N	UNISYS CORP	48	24	36.13	1.3	3.7
A	WANG LABS INC	19	10	11.88	-0.3	-2.1
	Software & DP Services					
O	ADVANCED COMP TECH	6	1	1.88	-0.1	-7.4
N	AGS COMPUTERS INC	30	11	17.25	0.8	4.5
O	AMERICAN MGMT SYS INC	20	9	14.88	0.4	2.8
O	AMERICAN SOFTWARE INC	20	6	13.75	1.6	13.4
N	AMACOMP INC	11	4	10.00	0.9	9.6
O	ANALYSTS INTL CORP	10	4	7.25	-0.3	-3.3
O	ASHTON TATE	33	13	29.75	1.8	6.3
O	ASK COMPUTER SYS INC	18	6	13.50	0.3	1.9
O	AUTODESK INC	34	12	27.88	2.1	8.3
N	AUTO DATA PROCESSING	66	16	44.38	3.4	8.2
O	BOOLE & BABBAGE INC	12	5	7.75	-0.3	-3.1
N	COMPUTER ASSOC INTL INC	37	15	28.63	0.9	3.0
O	COMPUTER HORIZONS CORP	15	7	10.50	0.5	5.0
N	COMPUTER SCIENCES CORP	73	42	46.00	-0.5	-1.1
N	COMPUTER TASK GROUP INC	17	9	10.88	-0.6	-5.4
O	COGNOS INC	17	4	7.00	-0.4	-6.1
O	COMSHARE INC	26	12	17.25	0.5	3.0
N	CULLINET SOFTWARE INC	14	4	7.75	0.3	3.3
O	DUQUESNE SYS INC	32	10	18.00	-0.8	-3.9
A	DATA ARCHITECTS INC	16	7	13.75	0.0	0.0
N	GENERAL MTRS (CLS E)	51	39	42.75	2.9	7.2
O	HOGAN SYS INC	17	5	4.63	-0.1	-2.6
O	INFORMIX CORP	31	12	19.00	-0.5	-2.6
O	INTELLICORP INC	11	3	3.13	-0.1	-3.8
O	KEANE INC	10	8	8.50	-0.5	-5.6
O	LOTUS DEV CORP	40	19	25.25	0.1	0.5
O	MANAGEMENT SCI AMER	17	6	7.63	1.0	15.1
O	MICRO PRO INTL CORP	6	3	2.81	-0.2	-6.2
O	MICROSOFT CORP	76	37	67.00	-1.1	-1.9
O	MORINO ASSOCIATES INC	24	7	15	0.0	0.0
O	NATIONAL DATA CORP	34	19	20.00	1.4	4.8
O	ON LINE SOFTWARE INTL INC	22	9	10.00	0.1	1.3
O	ORACLE SYS CORP	19	8	17.00	0.5	3.0
N	PANSOPHIC SYS INC	28	11	17.38	0.3	1.5
O	POLICY MGMT SYS CORP	30	15	25.25	1.5	6.3
O	PROGRAMMING & SYS INC	14	7	13.75	1.5	12.2
O	REYNOLDS & REYNOLDS CO	28	14	22.00	0.5	2.3
O	SEI CORP	18	10	17.50	0.5	2.9
O	SHARED MED SYS CORP	31	18	28.25	-0.3	-1.0
O	SOFTWARE AG SYSTEMS INC	14	7	7.00	0.0	0.0
O	SOFTWARE PUBG CORP	17	5	16.50	1.8	12.8
A	STERLING SOFTWARE INC	12	8	8.38	0.4	4.2
O	SUNGARD DATA SYS INC	21	10	17.25	-0.3	-1.4
O	SYSTEMATICS INC	32	19	20.25	-0.5	-1.8
N	SYS. SOFT INC.	24	7	16	1.0	6.7
O	VM SOFTWARE INC	42	7	13.75	1.8	15.4
	Semiconductors					
N	ADV MICRO DEVICES INC	25	8	13.38	1.4	11.5
N	ANALOG DEVICES INC	24	8	14.38	1.0	7.5
O	ANALOGIC CORP	13	5	7.25	0.5	8.5
O	INTEL CORP	40	15	32.50	0.8	2.4
O	LSI LOGIC CORP	17	7	10.38	0.6	6.4
N	MOTOROLA INC	74	36	48.13	1.9	4.1
N	NATL SEMICONDUCTOR	22	10	13.13	1.0	8.2
N	TEXAS INSTRS INC	68	38	54.13	5.6	11.6
A	WESTERN DIGITAL CORP	25	11	15.50	1.0	6.9
	Peripherals					
O	ALLOY COMP.	13	3	4.25	0.2	5.3
O	AM INTL INC	9	3	4.50	0.2	5.9
O	AST RESH INC	21	8	16.63	1.2	8.2
O	AUTO TROL TECH CORP	9	3	4.75	-0.1	-1.3
O	BANCTEC INC	15	3	5.75	0.3	4.5
O	CIPHER DATA PRODS INC	15	4	10.00	0.3	2.7
O	COGNITRONICS CORP	5	2	2.38	0.0	0.0
N	COMPUGRAPHIC CORP	22	10	20.25	0.3	2.4
A	DATAPRODUCTS CORP	22	7	8.63	0.4	4.1
O	DATARAM CORP	9	3	7.88	0.3	12.5
N	DECISION INDS CORP	13	4	10.88	0.1	1.2
N	EASTMAN KODAK CO	71	40	42.63	0.3	0.8
O	E M C CORP MASS	20	10	14.25	0.5	3.6
O	EMULEX CORP	9	4	8.38	0.5	6.3
O	EVANS & SUTHERLAND	35	15	21.00	1.5	7.7
O	GCT CORP	8	3	3.88	0.2	4.1
O	INTERLEAF INC	24	11	18.38	0.4	2.0
O	IOMEGA CORP	5	1	3.75	0.2	5.1
O	LEE DATA CORP	6	3	3.88	0.2	5.5
O	MASSTOR SYS CORP	6	1	3.25	0.2	6.5
O	MAXTOR CORP	25	8	15.25	0.1	0.7
O	MICROPOLIS CORP	44	15	25.25	-0.5	-1.9
N	MISCRIBE CORP	15	5	11.50	1.0	10.0
N	MINNESOTA MINS & MFG CO	84	65	82.00	1.1	1.4
A	MSI DATA CORP	25	8	17.00	0.4	2.3
O	PERSONAL COMPUTER PRODUCTS INC.	7	4	6.88	0.2	2.7
O	PRIAM CORP	6	1	2.00	0.1	5.9
O	PRINTRONIX INC	15	7	8.88	0.2	2.7
O	QMS INC	37	8	10.25	0.2	2.0
O	QUANTUM CORP	26	8	11.50	0.2	2.2
O	RANTEX CORP	6	1	1.38	0.2	21.1
N	RECOGNITION EQUIP INC	23	7	9.25	0.6	7.2
N	REXON INC	14	5	6.38	0.3	24.1
O	SCAN TRON CORP	17	7	16.50	0.5	3.0
O	SEAGATE TECHNOLOGY	46	19	22.50	0.3	1.1
N	STORAGE TECH CORP	6	1	1.88	0.1	4.3
O	TANDON CORP	7	1	2.38	0.1	5.1
A	TEC INC	7	3	4.88	0.2	3.9
N	TEKTRONIX INC	44	21	27.50	0.5	1.8
N	TELEVIDEO SYS INC	3	1	1.25	0.0	0.0
O	TELEX CORP	23	3	4.38	0.2	5.3
O	WYSE TECH	48	11	20.13	1.5	8.2
N	XEROX CORP	85	55	84.50	2.1	2.5
O	XIDEX CORP	16	6	6.63	0.4	6.9
	Leasing Companies					
O	CAPITAL ASSOCIATES INTERNATIONAL INC	11	4	4.94	0.4	8.1
N	COMDISCO INC	37	12	23.38	0.5	7.5
N	CONTINENTAL INFO SYS	14	5	7.88	0.5	6.8
O	PHOENIX AMERN INC	6	2	3.50	0.1	4.8
O	SELECTERM INC	6	2	4.00	0.4	9.1

EXCH: N—NEW YORK; A—AMERICAN; O—NATIONAL; O—OVER-THE-COUNTER; S—SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Hit and run

Trade deficit rams market; DEC asks for license number

What initially looked like a good week for computer issues and the market in general was blindsided Thursday when news of a higher trade deficit sent the Dow Jones industrial average tumbling 101 points. Although the market hit successive postcrash highs on both Monday and Tuesday, Thursday's plunge developed into the fifth worst one-day decline in the market's history.

The drop was particularly painful to Digital Equipment Corp., which had halted its recent skid before dropping 5¼ points Thursday and dipping to 101⅛ by late Friday, down 4 points from a week earlier.

Microsoft Corp. was also hard hit, losing 4 points Thursday and dropping to 54¼ by late Friday, down 3¾ points for the week. Other losers included Hewlett-Packard Co., down 2⅛ points to 61⅛; Cray Research, Inc., down 3⅜ points to 80¼; Seagate Technology, down 2⅛ points to 20⅛; and Lotus Development Corp., down 1⅛ points to 24. The few winners included AST Research, Inc., up 2¼ points to 15⅜; and IBM, whose better-than-expected first-quarter earnings helped the stock jump 2¼ points for the week to 113⅜.

JAMES DALY

George Bush

Advisers: Dean Burch, director general of Intelsat and former FCC chairman (1969-1974); Charles W. Greenleaf Jr., the vice-president's domestic policy aide.

Technology: Favors strengthening intellectual property protection to encourage innovation. Supports closer relationships among business, government and academia to move scientific advances to the marketplace.

Taxes: Favors making the R&D tax credit permanent and cutting the capital gains tax rate to 15% on investments held for at least one year.

Trade: Opposes mandatory reduction in trade imbalances (the Gephardt amendment).

Telecommunications: Generally supports deregulation and competition, although adviser Burch also emphasizes the need to enforce existing laws and regulations.

Other: Advocates requiring high school students to be computer literate before graduation.

Supporters: Political action committee contributions from Ameritech ($5,000), AT&T ($3,000), Computer Dealers and Lessors Association ($1,000), GTE Southwest ($1,000), NCR Corp. ($1,000), Nynex Corp. ($5,000), Pacific Telesis Group ($140), Recognition Equipment, Inc. ($500), Southern Bell Telephone and Telegraph Co. ($4,000) and Southwestern Bell Corp. ($3,000).

Michael S. Dukakis

Advisers: U.S. Rep. Edward J. Markey (D-Mass.), chairman of the House telecommunications subcommittee; Larry Summers and Robert Reich, Harvard University professors.

Technology: Supports federal funding for the Sematech semiconductor consortium and similar ventures if federal funding is matched by the private sector. Would create a national network of Centers of Excellence for new and applied technology.

Taxes: Supports making the R&D tax credit permanent.

Trade: Opposes mandatory reduction in trade imbalances (Gephardt amendment) but supports a measure that imposes tougher sanctions on countries with unfair trade practices. Would provide temporary relief to troubled industries if they make investments in modernization.

Telecommunications: Likely to be pro-regulation.

Other: Favors use of computer-based learning technologies to combat illiteracy. Supports advance notice of plant closings.

Supporters: Joe Henson, chief executive officer of Prime Computer, Inc.; An Wang, CEO of Wang Laboratories, Inc.; Mitch Kapor, founder of Lotus Development Corp. and current chairman of Go Corp.; and Patrick J. McGovern, chairman of International Data Corp.

Dukakis does not accept political action committee contributions.

Albert Gore Jr.

Advisers: Peter S. Knight and Roy Neel, Senate aides.

Technology: Federal government should support and collaborate with private-sector R&D efforts and increase private sector's access to federal labs.

Taxes: Cosponsored legislation to raise the R&D tax credit to 25% and make it permanent.

Trade: Opposes mandatory reduction in trade imbalances (Gephardt amendment). Supports legislation to provide temporary relief to industries hard-hit by foreign imports.

Telecommunications: Sponsored bill to allow regional Bell holding companies to diversify into all fields, subject to FCC approval and regulation. Skeptical of FCC proposal to replace traditional rate-of-return regulation.

Other: Supports creating an Office of Critical Trends Analysis to help the president analyze technological trends. Cosponsored legislation to require advance notice of plant closings.

Supporters: Political action committee contributions from AT&T ($2,500), Bellsouth Corp. ($3,000), Communications Satellite Corp. ($500), Competitive Telecommunications Association ($500), Computer Dealers and Lessors Association ($1,000), National Venture Capital Association ($1,000), Pacific Telesis Group ($1,500), Service Employees International Union ($5,000) and South Central Telephone Co. ($1,000).

Jesse L. Jackson

Advisers: Benjamin Hooks, former FCC commissioner (1971-1976); Carol O'Cleireacain, labor economist; and Mark Steitz, economic policy adviser.

Technology: "My administration would shift the incentives from corporations merging and purging jobs to reinvestment in America, retraining workers and research and development for commercial use. . . . Science and technology are essential for restoring competitiveness."

Taxes: Raise corporate taxes by $20 billion.

Trade: Generally opposes mandatory reduction in trade imbalances in principle but would support such a measure because, he says, President Reagan "hasn't been vigilant enough on trade."

Telecommunications: Believes the industry is not competitive and must be strictly regulated.

Other: Supports advance notice of plant closings.

Supporters: Political action committee contribution from Service Employees International Union ($5,000).

Profiles were compiled from interviews with campaign aides, candidates' literature, Federal Election Commission records, research by Alan Pearce of Information Age Economics, Inc. in Bethesda, Md., and a study by the Council on Competitiveness. Information was selected for relevance to the computer industry.

Campaign

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search and development permanent. The 20% credit is slated to expire at the end of this year.

- Each Democrat says he believes that too much scientific talent and money is directed toward the military and should be retargeted toward the commercial market.
- Bush emphasizes his support of stronger protection of intellectual property rights at home and abroad, to foster innovation.
- Jackson stresses the need to stop manufacturers from pulling up roots and setting up shop in countries where wages and other labor conditions are far below U.S. standards.
- Bush, Dukakis and Gore oppose mandatory retaliation against countries that maintain trade imbalances due to unfair trading practices — the trade bill amendment sponsored by Rep. Richard Gephardt (D-Mo.). Dukakis supports stronger sanctions against unfair trading, and Jackson reluctantly supports the Gephardt amendment.
- All of the candidates support an increased effort to attain computer literacy, retraining programs for displaced workers and increased federal funds to improve research facilities at universities.
- Dukakis has been endorsed by top executives at Prime Computer, Inc. and Wang Laboratories, Inc.; Bush's financial backers include NCR Corp., Nynex Corp. and Ameritech; and Gore has received money from Bellsouth Corp. and the National Venture Capital Association.

Although the exact details of their programs vary, the candidates' attention to high-tech issues is a welcome surprise to many industry insiders.

Charlotte LeGates, spokeswoman for the Computer and Business Equipment Manufacturers Association (CBEMA), praised the attention the men have been lavishing on high-tech and competitiveness issues, particularly the R&D tax credit.

Computer industry officials such as Samuel H. Fuller, vice-president of research and architecture at Digital Equipment Corp., said the tax credit gives companies an extra incentive to pump some of their funds into R&D ventures that will produce the next generation of computer systems.

Contradictions

LeGates, however, expressed concern that some candidates have positions that, when viewed from the computer industry's perspective, are contradictory. For example, she said, Jackson's plan to raise corporate taxes by $20 billion directly conflicts with his support for high-tech industries. "You can't say that technology is important for competitiveness and then just take all of the money you're supposed to invest," she said.

CBEMA plans to provide the party nominees and the presidential transition team with a document describing how the computer industry works and the effects tax and trade policies have on it, LeGates said.

Despite all the talk about competitiveness, Milton R. Wessel, a computer law professor at Georgetown University in Washington, D.C., said the candidates are still failing to address what he called the key question of information age policy: "How can society deal with technology that is moving faster than our institutions can accommodate?"

Wessel, the special counsel for ADAPSO, a computer software and services industry association, noted that ADAPSO has pushed for an information age commission to explore issues such as the effects of computer networks on the economy and individual privacy.

Compute-Intensive Gore

Lugging around his Zenith Data Systems Z-181 laptop, Gore represents a new generation of candidates who are comfortable with technology.

Whether hunkered down in a car on the way to a speech or in his hotel room at night, Gore uses his ever-present laptop to tap out messages and revise speech drafts with his campaign headquarters staff.

"Of all the candidates, I think Gore probably knows the most about technology issues," said Robert Adams, a science policy

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consultant in Arlington, Va., and spokesman for the Association for Science, Technology and Innovation.

Adams noted that Gore has served on the telecommunications and science and technology subcommittees and has been a leader of the Congressional Clearinghouse on the Future.

Gore's interest in future technologies was demonstrated in 1985, when he sponsored a bill to create a future-oriented Office of Critical Trends Analysis in the White House to help the president analyze technological trends.

In addition, the senator sponsored a bill in 1986 describing in great detail how the Federal Communications Commission should regulate AT&T and the regional Bell holding companies.

But Gore is not the only candidate drawing on his high-tech background. Massachusetts Gov. Dukakis wears the high-tech businesses that encircle Boston like a chip-laden crown. Since the early days of his campaign, Dukakis has touted his state's low unemployment rate and his ability to attract high-tech business to previously crumbling mill towns as "The Massachusetts Miracle."

His claim, however, has met with anything but universal agreement. "We don't believe in miracles," retorted Howard Foley, president of the Massachusetts High Technology Council. "A lot of the things people see when they talk about the Massachusetts success story are the results of things the governor originally opposed. And some of the things he supported — an increased tax on capital gains, a tax on custom computer software — we successfully fought against. Yet the governor has been a beneficiary of our fight."

A matter of location

Others argued that Dukakis has reaped the political benefits of many a chief executive officer's decision to locate his company near the intellectual breeding ground of MIT, Harvard University and the dozens of other colleges and universities in and around Boston.

But Interleaf, Inc. President David Boucher supported the governor's claim, remembering the early days of his now-successful software company, when the Dukakis-sponsored Massachusetts Technology Development Corp. (MTDC) stepped in to buy stock in the fledgling firm. "The growth in the Massachusetts economy has been largely built on the computer industry," Boucher said. "Setting up MTDC was an example of Dukakis's understanding that new technologies can generate significant economic growth but [that] you need to create an infrastructure of support to help that happen."

Dukakis has also been hanging his political hat on taming the merger and acquisition lion currently swallowing up smaller businesses. "We've got to get control of the merger and acquisition binge that's gobbling up capital, tearing corporations apart like erector sets, making millions for a few and leaving the average working man and woman holding the bag," he said during a recent speech in Milwaukee.

Vice-President Bush has made friends in the industry by vowing to fight the piracy of intellectual property, such as software copyrights. "That's a continuation of the strong emphasis the Reagan administration has put on intellectual property protection. And I strongly suspect that the others would be equally supportive," CBEMA's LeGates said.

Bush calls technology "America's fountain of youth," opposes protectionist trade measures and says he wants to be known as the "education president." He also supports a cut in the capital-gains tax that would benefit small high-tech companies that depend on venture capital.

Jackson is riding the crest of his wave of worker support to stress labor issues. He has emphasized the need to help employees and communities that are hurt when U.S. factories are closed. "American multinationals, chasing short-run profits and concerned with quarterly statements, have taken American jobs to low-wage labor markets abroad," Jackson says.

Jackson also stresses the importance of education; he proposes doubling the federal education budget. "There needs to be an emphasis on basic skills — from reading literacy to computer literacy — that will prepare our children for the world of work as it exists now and as it will exist in the future," he says.

But CBEMA is troubled by some of Jackson's "populist rhetoric," CBEMA's LeGates said. U.S. firms move jobs abroad only when there are sound economic reasons for doing so, she said, and U.S. companies need foreign offices to help export products, stay competitive and preserve jobs.

Judge by his advisers

One way to gauge the presidential candidates is to identify their technical advisers, according to Alan Pearce, president of Information Age Economics, Inc., a Bethesda, Md.-based research and consulting firm.

Dukakis, for example, gets his telecommunications advice from Rep. Edward J. Markey (D-Mass.), the pro-regulation chairman of the House Telecommunications Committee. Bush often lends an ear to Dean Burch, who was chairman of the FCC during the Nixon administration.

Pearce, who worked at the FCC under Burch, predicted that a Bush administration would not push deregulation as hard as the Reagan administration has. Burch was a vigorous regulator of the predivestiture Bell system and has said he believes in upholding the existing law and regulations until Congress defines a new regulatory structure.

"Although Bush is supposed to be a clone of Reagan, he may turn out to be more pro-regulatory than many of his supporters would believe," Pearce said. If that is true, deregulation of the communications industry may come to a halt no matter which candidate wins the White House job in November.

Defining the issues

As the presidential hopefuls set the national political agenda in ringing oratories delivered to crowded halls across the country, *Computerworld* afforded some of the leaders of the computer industry's key organizations a similar opportunity. The question: "What are the computer-related issues that should be addressed this election year?"

John Pickitt, president of the Computer and Business Equipment Manufacturers Association

Some candidates are attacking companies for obtaining parts outside the U.S. and incorporating them into products sold in the U.S. But we must be able to buy the best products at the lowest prices, no matter where we find them. To cut ourselves off from global sourcing would dramatically slow today's information technology industry.

We also need to emphasize the quality of education, especially in the challenging areas of science, math and engineering.

Steve Adamson, international president of the Association for Systems Management

If we get control of the deficit, the foreign trade imbalance and merger mania, our MIS managers may still have their jobs. If we don't, a significant number of them probably will be laid off because they find themselves superfluous in a merged organization or the country in the throes of a recession.

We should also stop graduating illiterates from high school. The cost of a lost education not only affects our global competitiveness but hits internal budgets through the amount of time required for job training.

John Imlay, chairman of the board and chief executive officer of Management Science America, Inc.

Free trade is right at the top of my list. An unrestricted trade policy is vitally important to the future of the software industry. I'd also like to see the protection of intellectual property rights and continued efforts against software piracy. Finally, there needs to be a stimulation of new U.S. businesses in the software industry by the continuation of the R&D. tax credit.

Christian Meyer, president and chairman of the Data Processing Management Association

I'd like to see the healthy free-market operation of the computer industry continue, but I'm also concerned about competition from abroad. We're handicapped by the benefits given some of our foreign competitors. We need at least a moderately level playing field for American firms to compete effectively; right now, it resembles a mountainous terrain.

George DeBakey, executive director of ADAPSO

We don't want to see a protectionist trade policy, which could backfire if countries in turn close their borders. We would also like to see our government working with foreign governments to stop software piracy, here and abroad, through the improvement of copyright, patent and trademark laws.

We'd also like to see the government buy software and services off the shelf, rather than internally create their own. And we'd like to see a computer education bill whereby federal funds are earmarked for the increased acquisition of computers in schools, especially in financially deprived areas.

Paul Berger, president of the Society for Information Management

We need to establish severe penalties to protect company data bases from hackers and people who specialize in industrial espionage. We also ought to encourage the free flow of technology across borders. Finally, we need to pay close attention to health issues, like the potential dangers from lengthy exposure CRTs.

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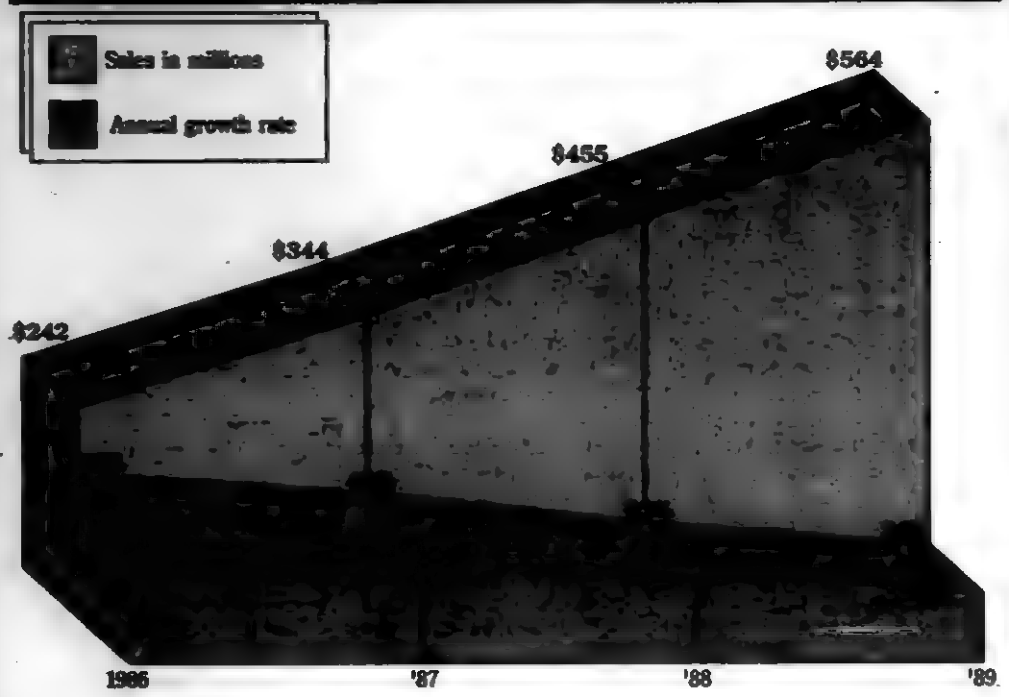
TRENDS

High-end communications

T1 forecast: Growth slows, but long-distance nets stay strong



While the T1 switch market seems to be coalescing around a few major players, the industry should still benefit from an infusion of new blood and technology as computer companies, carriers and other vendors seek their share of the expanding private networking pie.

Users should see better integration of T1 and computer networking systems through IBM's technology transfer agreement with Network Equipment Technologies, Inc. and Unisys Corp.'s recent acquisition of Timeplex, Inc.

Hewlett-Packard Co. is likely to ally with either Digital Communications Associates, Inc. or Stratacom, Inc. by this fall, according to Salomon Brothers, Inc. Digital Equipment Corp. also seeks allies, but it, too, is likely to connect with a range of T1 products.

Network switch vendors, computer firms and carriers are beginning to lock horns over the issue of who will manage customers' networks — an issue that has direct bearing on who will supply customers' networking equipment.

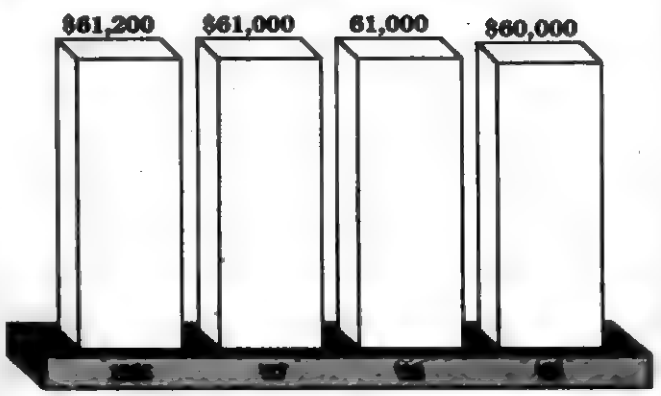
Carriers will offer network management as a lure to bring private T1 network users back to their own services.

Salomon Brothers estimates that approximately 35% of the Fortune 1,000 corporations will continue to use T1 network services.

ELISABETH HORWITT

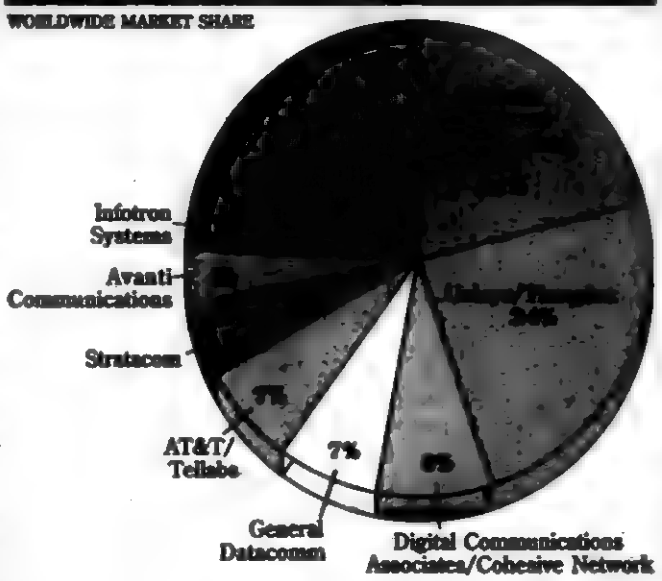
Equipment costs not falling much

COST PER BASIC SWITCH UNIT



Many vendors slice up $455M market

WORLDWIDE MARKET SHARE



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CW CHARTS

INSIDE LINES

Bridge repairs in progress. In a tribute to the power of user muscle, 3Com announced last week a joint development agreement with archrival Novell. The deal will allow Novell's Netware to run on 3Com's new Ethernet adapter cards, which are supported on IBM's Micro Channel architecture. One source said Novell might be having problems developing its own Micro Channel adapters. Insiders at 3Com said the agreement was spurred by company President Bill Carrico, who has stressed that the firm should concentrate on strategies that sell products rather than build on past grudges.

Crash barriers. The New York Stock Exchange is discussing more curbs on computerised stock trading in hopes of preventing another stock market crash. Now, the NYSE is considering a ban on the use of its automated order system for all forms of program trading — particularly the hedging strategy of portfolio insurance — on days when the Dow Jones industrial average moves more than 150 points. The NYSE already has a voluntary limit on one form of program trading, called index arbitrage, when the Dow moves more than 50 points.

A word from the Wyse. Wyse Technology President Phil White said his company's version of IBM's OS/2 is at beta-test sites and will begin shipping soon. In other yet-to-be-seen talk, White said Wyse is developing an IBM Personal System/2-compatible computer that might ship later this year and will ship in volume in 1989. The company is also planning to introduce PS/2 add-in boards next year.

Better than nothing — we guess. Floating Point Systems has agreed to acquire what's left of Celerity Computer, paying Celerity's shareholders with $1.25 million worth of Floating Point stock. Floating Point, which has been treading water with a loss of $35 million in the last five quarters, said it will take on support of Celerity's 100 customers.

No hard look-and-feelings. Even as it rebukes Apple's lawsuit over alleged look-and-feel violations, Microsoft is still asserting its love for the Macintosh. Microsoft has just committed to upgrading all of its Mac applications this year, despite its war of words — and lawyers — with Apple.

Looking back over the dance card. Excelan had at one point discussed a merger with Network Equipment Technologies rival and frustrated suitor Digital Communications Associates (DCA). "But we have in place a channel of distribution geared to the high end of the market that Excelan [and DCA] don't reach," said NET President Bruce Smith, adding that cultural similarities and geographic proximity helped cement NET's relationship with Excelan. DCA, which is not above attempting hostile takeovers, should take note: A personal touch counts.

Buy them by the dozen. Dell Computer is set to become the first PC maker to announce an IBM Micro Channel architecture-compatible system today. Two PS/2 clones are slated for introduction, though the firm wouldn't reveal when the machines will ship. Dell will also unveil a series of aggressively priced systems today, highlighted by the System 310, a 20-MHz Intel 80386-based machine with an IBM Video Graphics Array (VGA) monitor and 40M bytes of memory that is priced at $4,099. The company is also scheduled to roll out the System 220, a 20-MHz Intel 80286-based system with a VGA color monitor and 40M bytes of memory priced at $2,799, as well as the System 100, a 9.5-MHz Intel 8088-based system with a VGA color monitor and a single 3½-in. floppy drive priced at $1,199.

Big secret. IBM is expected to make a major DB2 announcement tomorrow — sooner than anticipated in many quarters of the industry. Top IBM spokesmen have made themselves available to comment on DB2's direction in the last few days, and an IBM public relations figure declined to deny the announcement is coming April 19.

Don't let another presidential primary go by without sharing a news tip. Call News Editor Pete Bartolik at 800-343-6474 (in Massachusetts, dial 617-879-0700).

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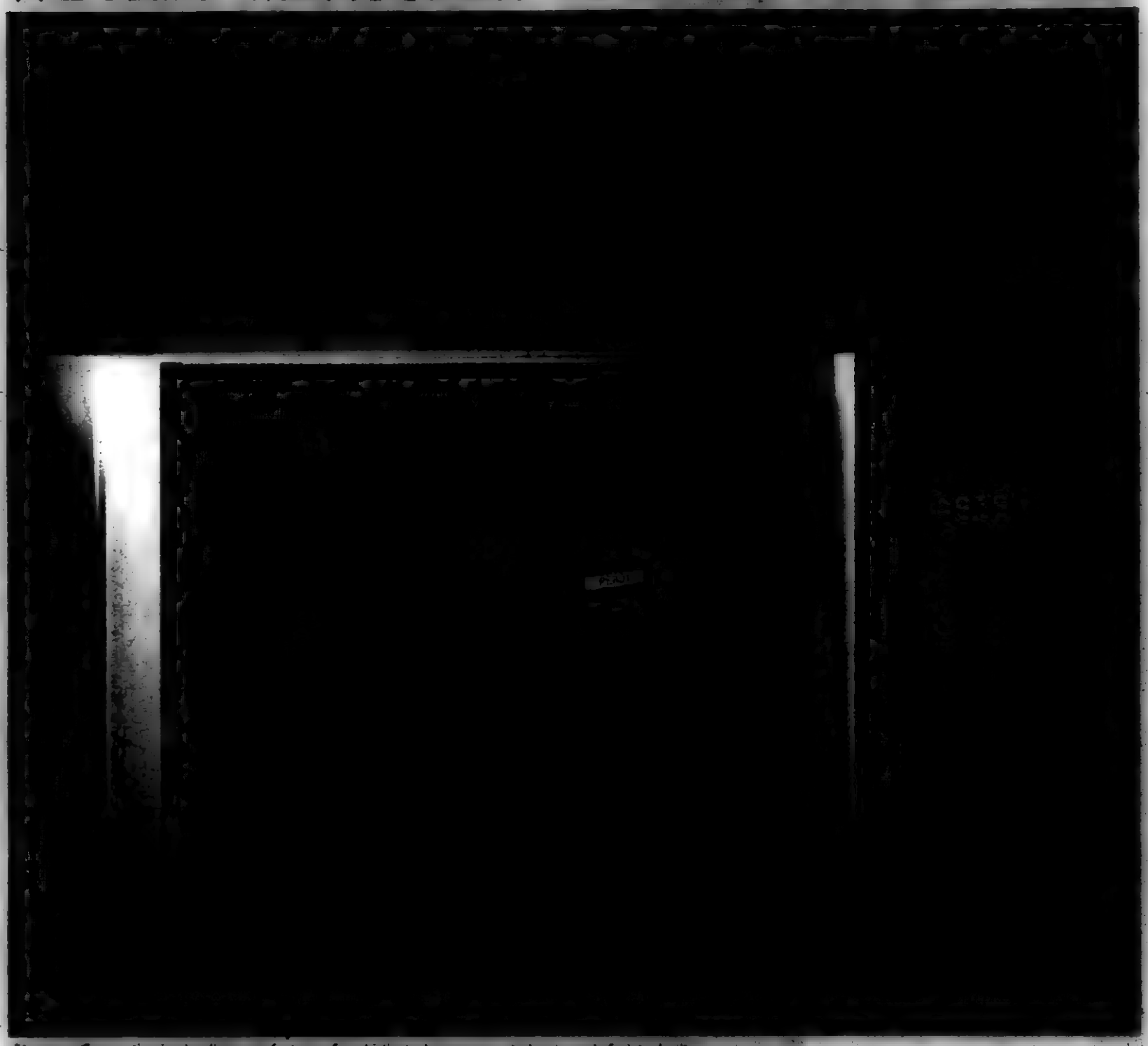

Measurex Corporation is a leading manufacturer of sophisticated process control systems. In fact, today it is well on its way to revolutionizing the process manufacturing industry with the introduction of its VISION 2002™ Network, the first true, computer-integrated manufacturing (CIM) control system with plant-wide capabilities.

The introduction of CIM technology, though, is only one measure of the Measurex success story. Measurex has also been extremely successful at managing its own internal operation by gaining more control over its inventory. But in order to accomplish this, Measurex first had to seek new software technology to reconcile the differences between its two incompatible databases—one for financial reporting and one for production.

After careful review of several software vendors, Measurex turned to Management Science America, Inc., for the solution. We showed them integrated manufacturing and financial software, making it possible for every department to work from the same information. This resulted in greater control over inventory and the elimination of costly write-offs.

Jerry Raffel, Senior Vice President, Operations for Measurex, put it this way: "By the way it's integrated, MSA Software helps us realize that we're all one company. Everyone—people in accounting, purchasing, production and finance—now has the same perspective, the same visibility, to see what's taking place in manufacturing."

We can help you size up your company's performance more accurately, too. For more information, call Robert Carpenter at (404) 239-2000.

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COMPUTERWORLD

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RISC parade grows, with Motorola signing up 20 systems vendors for latest chip set. Page 109.

AI tools at Chase Manhattan to eliminate hassles of processing telex traffic. Page 55.

CDLA names one of its own, Econocom Chairman Kenneth A. Bouldin, to direct the leasing association. Page 4.

Scientists want 3G bit/sec. nationwide fiber-optic network. Page 2.

IBM propels DB2 into data base top spot

BY CHARLES BABCOCK
CW STAFF

NEW YORK — IBM tapped the resources of its new MVS/ESA operating system last week to push the throughput of DB2 up to 186 transaction/sec. or higher.

The company also upgraded a host of other MVS subsystems, including the nonrelational IMS data base management system, so the systems can make greater use of the virtual memory and automatic memory management available under MVS/ESA (see story page 108).

The startling performance gain of DB2, combined with the addition of referential integrity, prompted IBM officials to pronounce its relational product capable of replacing the deeply entrenched IMS for new applications — a step they declined to take with DB2's initial three releases.

"I would recommend a customer attempting to build a new system ask himself, 'Why not DB2?' It is good for well into 90% of application usages," said Gary J. Ferdinand, manager of advanced data base products at IBM's San Jose, Calif., General Products Division.

Continued on page 108

Ramping up
The latest DB2 uses IBM's MVS/ESA to attain transaction rates approaching those of IMS

DB2 Release 1.3	MVS/XA	3090 Model 200	52
DB2 Version 2.0	MVS/ESA	3090 Model 600E	186
IMS Full Function	MVS/XA	3090 Model 400	200

INFORMATION PROVIDED BY IBM
CW CHART

Mistrial for optical system

Technology delivers in court, but witnesses balk

BY JAMES A. MARTIN
CW STAFF

SAN BRUNO, Calif. — It was to be the first time in history that optical storage technology would be used throughout a trial in a courtroom setting, with witnesses, attorneys and the presiding judge examining digitized reproductions of paper evidence on CRT screens.

But what sounded great in theory proved unsuccessful in practice. After a five-month trial run, the optical storage system purchased by California's San Mateo County for use in a $2 billion Shell Oil Co. lawsuit against 35 insurance companies has been pulled out of the courtroom.

The problem, ironically, was not the judge. Although there are those in the judicial system who remain uncomfortable with evidence submitted on optical disk or image processing systems, presiding Judge William Lanam supported the use of the technology in this complicated trial from the beginning.

The problem was not with the technology. The Filenet Corp. document image processing system, based on AT&T's Unix operating system and Motorola, Inc.'s 68000 microprocessors, performed as expected in storing and retrieving the reams of paper involved in the proceedings.

Reluctant witnesses

The system failed in the courtroom because neither the witnesses nor the attorneys involved in the case were comfort-

Continued on page 109

Micro Channel cloned

BY JULIE PITTA
and ALAN ALPER
CW STAFF

Fellow Texans Tandy Corp. and Dell Computer Corp. last week became the first personal computer makers to announce clones of IBM's Micro Channel architecture-based Personal System/2s. The moves were seen as attempts by both companies to capture the attention of corporate America as leading-edge PC makers.

Tandy, hampered by a reputation as a retail electronics supplier, and Dell, which has made its name in mail order, have looked to broaden their business into Fortune 1,000 accounts. Both companies have added larger outbound sales

Continued on page 4

MANAGEMENT PROFILE

He changed the rules in banking

BY GLENN RIFKIN
CW STAFF

Phyllis Diller was as ugly as a woman could be who actively worked at it. But she made Johnny Fisher laugh like hell in 1962 when she played in a supper club in Columbus, Ohio. So Fisher convinced the comedienne to do some television commercials for City National Bank, where he was in charge of marketing.

It was the kind of brazen move that would characterize Fisher's 28-year career at the bank — a career in which Fisher, now senior vice-president, has emerged as the foremost coupler of computer technology and marketing in the banking industry.

The ads caused predictable results in the sleepy town in the early 1960s. The bank president called. "Johnny, several of the bank's directors think you ought to take her off the air. Do you understand this is the ugliest woman I've ever seen? After all, we're a bank." But Fisher already understood back in 1962 what P. T. Barnum said about getting noticed: You've got to wiggle your ears.

Banc One's Fisher

City National, now Banc One Corp., was the third largest bank in Columbus in the early 1960s, dwarfed by Bancohio National Bank across the street and "dead in the water," according to Fisher. With just $300 million in assets and the prospects for growth grim, Fisher started to wiggle his ears.

Fisher not only understood television and outlandish comediennes, but he also had a prescient view of computers and data processing and what they could do for the banking business. During the next three decades, despite two notable setbacks, Fisher revolutionized the banking industry by driving the marriage of technology and marketing at Banc One in innovative ways.

He helped bring the credit card to U.S. consumers, turned

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SECOND CLASS

IN THIS ISSUE

Calypso beat. DEC brings symmetrical multiprocessing to the heart of its VAX line via VMS Version 5.0 and the VAX 6200 series. Code-named Calypso, the series consists of one to four Microvax 3000 CPUs and uses a 100M byte/sec. internal bus. Page 6.

Assault with battery. Zenith strengthens its position in the laptop arena with a battery-powered 386-based computer that features a high-contrast display and a 40M-byte hard drive. Page 108.

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7 Allen succeeds Olson as AT&T chairman, chief executive.

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GARY J. FERDINAND
IBM

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Nationwide net sought

Funding woes keep high-tech dreamers tossing

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The U.S. science community likes to think big. At a conference last week, the nation's research institutions said they want a nationwide fiber network capable of transmitting data at speeds of up to 3G bit/sec. within 15 years.

"Imagine a global information technology-induced university," said one speaker, Donald N. Langenberg, chancellor of the University of Illinois in Chicago.

The problem is, no one knows how to pay for such a project. This so-called funding problem, as well as questions about how to develop and manage such a meganetwork, were issues at the National Net '88 conference.

Of the conference's 319 attendees, 137 were information systems managers from North American universities or research laboratories who said they want to connect their campuswide networks to the national backbone network.

"Enormous task ahead"

"It was clear to me that we have more problems than solutions, and we have an enormous task ahead of us," said Kenneth M. King, president of Educom, a Princeton, N.J.-based nonprofit consortium that helps colleges and universities apply information technology.

The lofty goal for the national education, research and development network is to link about 100 special-purpose and regional research networks so that scientists and students in different areas can collaborate.

Scientists said the huge bandwidth is needed to handle the volume of data and the thousands of users contemplated. For example, in order to transmit a moving, full-color image generated by a supercomputer, a bandwidth of nearly 1G bit/sec. would be needed to transmit the 30M-bit image at a rate of 30 frames per second.

The tentative plan is to upgrade existing networks to the T1 level, tie them together into a virtual network and develop an architecture for the 3G bit/sec. backbone network.

The National Science Foundation's NSF Net and the New York State Education and Research Network are considered models and building blocks for the national network.

The White House Office of Science and Technology Policy endorsed the plan last November, and the idea is also championed by such industry luminaries as Gordon Bell, vice-president of Ardent Computer Corp.; Ellen Hancock, an IBM vice-president; Robert Kahn, the father of Arpanet; and Erich Bloch, of the National Science Foundation.

IBM seeds developers with OS/2 Extended beta code

BY STEPHEN JONES
CW STAFF

Software developers took their first look at beta code for the most advanced versions of IBM's OS/2 operating system last week. The OS/2 development kits provide the first strands of source code that top commercial and corporate developers will use to write a spate of Extended Edition and LAN Server applications.

IBM doled out the packages of beta code for OS/2 Extended Edition 1.0 to developers who attended a recent OS/2 seminar in San Francisco. The $2,200 attendance fee also bought developers access to later releases of source code for OS/2 Standard Edition 1.1 with the Presentation Manager, OS/2 Extended Edition 1.1 with local area network support and the LAN Server.

Developers that received the development kits, such as Borland International and Oracle Corp., declined to comment on the condition of the code until they had more time to put it through a series of checks and test procedures.

IBM said it plans to hold similar seminars in Dallas and New York in May to drum up support for the new operating system and win commitments from developers for next-generation applications.

The first kit to reach developers included source code for OS/2 Extended Edition 1.0, which contains a relational data base manager and a communications manager that provides intersystems communications and terminal emulation. The kit also contained documentation on OS/2 Extended Edition and pointers on understanding IBM's SQL.

According to documents given to developers, IBM is loaning the beta code to third parties for up to two months after the first commercial shipment of each OS/2 version. OS/2 Extended Edition is scheduled to be released in July.

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PC compatibles still thriving

BY ALAN J. RYAN
CW STAFF

Quarterly results reported last week by Compaq Computer Corp. and AST Research, Inc. indicate that the IBM Personal Computer-compatible market is still thriving despite IBM's Personal System/2.

According to analysts, many companies continue to buy into the IBM PC AT-style bus architecture, which IBM has discontinued in favor of its Micro Channel architecture. However, some say the days of the AT bus may be numbered.

"IBM is selling futures with the Micro Channel," said analyst David Wu at S. G. Warburg & Co., "but it doesn't do users any good today."

'Interest will shift'

But according to John Rossi, a microcomputer and peripherals analyst at Alex Brown & Sons, Inc. in San Francisco, bus confusion will begin to take its toll during the summer months. "Consumer interest will start to shift to PS/2s and compatibles, even though there will still be a price-sensitive market for AT compatibles," he said.

Rossi said that although there will not be a rapid transition to the Micro Channel, buyers anticipating it will reduce the number of AT-style computers they purchase.

For now, at least, the non-Micro Channel vendors are faring well.

Compaq recorded sales of $439 million in the first quarter of this year — more than twice the sales of $211 million in the first quarter of 1987. Earnings equaled $47 million, or $1.21 per share, which is a 132% increase from last year's same-quarter earnings of $20 million, or 56 cents per share.

Alex Brown's Rossi said that the Compaq earnings were quite solid, but the higher cost of dynamic random-access memory, the reduced pricing of computers based on Intel Corp.'s 80286 microprocessor and higher overhead costs are chipping away at Compaq's gross margin.

At AST, quarterly results were quite favorable as well. The company reported worldwide sales of $105.8 million for its fiscal third quarter, an increase of 91% over the $55.4 million recorded in the comparable 1987 period. AST earnings for the period rose to $5.2 million, or 45 cents per share, compared with $3.3 million, or 29 cents per share, earned during the third quarter of fiscal 1987.

Compaq President and Chief Executive Officer Rod Canion said the rise in sales was attributable to the acceptance of the Compaq Deskpro 386/20 and the growth of Compaq in international markets.

Micro Channel

FROM PAGE 1

forces during the last year to reach corporate customers.

"In the case of both Tandy and Dell, you have two companies that have not been positioned head-to-head with IBM in corporate accounts," said Peter Teige, an analyst at Dataquest, Inc. "Just having a Micro Channel machine won't make them a threat to IBM, but it moves them in the right direction."

Remains to be seen

But just how IBM-compatible Tandy's and Dell's new systems are is uncertain. "I don't think anyone will have an idea of how compatible they are until they are released for independent testing," Teige said.

Fort Worth-based Tandy will be the first of the two companies to ship a PS/2-compatible system; volume deliveries are scheduled for July. Tandy's Tandy 5000 MC, based on the Intel Corp. 80386, will be marketed through the firm's 365 Radio Shack Computer Centers, its direct sales force and 200 independent value-added dealers. Tandy may later introduce an Intel 80286-based Micro Channel-compatible system, officials said.

Dell's 80286 system, based on a Micro Channel-compatible chip set supplied by Chips and Technologies, Inc., and its 80386 PS/2 clone, based on a chip set said to be supplied by Intel, are scheduled to follow in the fourth quarter. Pricing is estimated at 30% higher than comparable micros with an IBM Personal Computer AT bus architecture. Actual shipment dates for Dell's two PS/2 compatibles will not be announced until August.

Tandy officials said they believe prior arrangements with IBM protect Tandy from any patent infringement litigation regarding IBM's proprietary Micro Channel architecture.

The first wave

Tandy and Dell Computer are first to formally announce personal computers compatible with IBM's Micro Channel architecture

	Intel processor	Memory options (megabytes)	Hard disk options (megabytes)	Availability	Price
Dell System 400	80286	1M to 16M	40M, 80M, 150M	Fourth-quarter	NA*
IBM Personal System/2 Model 60	80286	1M to 15M	44M, 70M	Current	$5,295 to $6,295
Dell System 500	80386	2M to 16M	40M, 90M, 150M, 322M, 610M	Fourth-quarter	NA
Tandy 5000 MC	80386	2M to 16M	40M, 84M	June or July	$4,999 to $6,999
IBM PS/2 Model 80	80386	1M to 16M	44M, 70M, 115M, 314M	Current	$6,995 to $13,995

* Not available

CW CHART

Regarding the patent issue, Dr. John Patterson, Tandy's senior vice-president, delivered the following prepared statement: "The product we are announcing today is covered by our existing patent license agreement with IBM. IBM has informed us that PS/2 patents to be issued to IBM in the future are not licensed and will be the subject of future license negotiations." The company declined to further explain its licensing agreements with IBM. Tandy Chairman John Roach said, "Our statement is clear. We're not aware of any grounds for any challenge, but I can't speak for IBM."

Dell Chairman and Chief Executive Michael Dell said his company is currently negotiating a licensing agreement with IBM and hopes to reach a final pact in several weeks. He declined to elaborate further.

Dell said his company will not actively promote the new systems. "There are some corporate customers leaning in the direction of Micro Channel in the long-term, but in the short term, they want to buy the AT bus," he maintained, estimating that 20% of the company's sales next year will be Micro Channel-based systems. "Conceptually, Micro Channel could offer faster data transfer rates and processing speeds, but IBM's PS/2 offers significantly higher prices and lower performance when compared to the current industry standard."

In contrast to his earlier statements that there is no demonstrated demand for Micro Channel-based microcomputers, Tandy's Roach said customer reaction to its PS/2 compatible has been positive.

Dataquest's Teige said the Micro Channel will become the industry standard, although current demand for PS/2s is "not overwhelming.

"IBM has already shipped about one million Micro Channel units," he said. "It's inevitable that it will become the standard. But it will take a while for hardware and software to come together to exploit its advantages."

IBM claims to have shipped more than two million PS/2s, not all of which contain the Micro Channel.

Bouldin wins CDLA top spot

PALM DESERT, Calif. — Kenneth A. Bouldin, chairman of Econocom-USA, Inc., was named president of the Computer Dealers & Lessors Association (CDLA) Friday after unanimous election by the board of directors at the association's spring meeting here.

Bouldin, who will resign his Econocom position, fills the vacancy created by James F. Benton's death last month. Benton, CDLA's first executive director and later president, suffered a fatal heart attack March 6.

The appointment is effective June 1. Bouldin founded Memphis-based Econocom 17 years ago and has long been active in CDLA affairs and lobbying efforts. He is currently one of five CDLA vice-presidents and is a past recipient of the association's prestigious John Oliver Executive of the Year award.

Bouldin will maintain his Memphis residence but will spend several days a week at CDLA headquarters in Washington, D.C., CDLA Chairman Robert Gulko said. Econocom, the U.S. subsidiary of Amsterdam-based Econocom International N.V., is one of the largest lessors and brokers of IBM mid-range computers.

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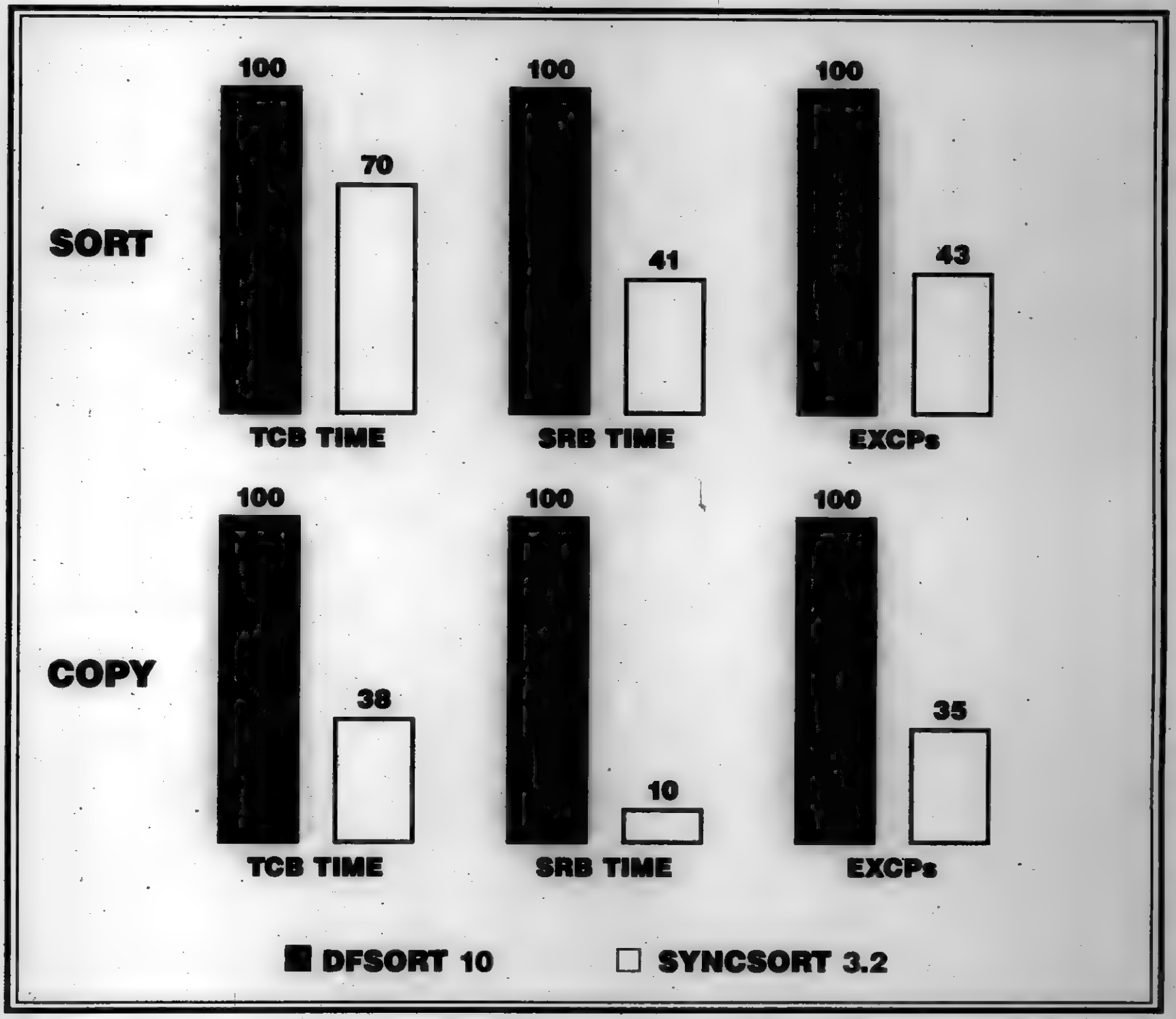

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VAX sets sail on symmetrical

Calypso out; Olsen promises OLTP to 'pesty' banks, insurance firms

BY STANLEY GIBSON
and NELL MARGOLIS
CW STAFF

Digital Equipment Corp. brought symmetrical multiprocessing to the heart of its VAX line last week, announcing the widely anticipated VAX 6200 series and VMS Version 5.0.

The series, code-named Calypso, consists of one to four Microvax 3000 CPUs. The VMS version and 6200 series are available immediately.

Although DEC's introduction of symmetrical multiprocessing is viewed as boosting the performance of its on-line transaction processor (OLTP) VAX line, DEC chose not to make another much-anticipated announcement that included OLTP facilities.

Get off my back

"We are soon to make a major announcement in transaction processing," DEC President and Chief Executive Officer Ken Olsen said. "We are making major investments [in OLTP] because banks and insurance companies have been putting tremendous pressure on us to do so. They have been pests."

The VAX 6200 systems overlap several VAX 8000 series systems, which DEC said it will continue to offer. However, DEC lowered the price of the VAX 8550, which now sells for $351,000 to $453,000, depending on the configuration and operating system used.

Prices for typical configurations had previously been more than $500,000.

Key to unleashing the power of Calypso is VMS Version 5.0, which allows the processors to perform symmetrical multiprocessing, share memory and make a common copy of the operating system.

"The big news is that [VMS 5.0] establishes a structure into which DEC can just drop increased performance," said Bob Randolph, director of DEC advisory services at International Data Corp. in Framingham, Mass. "The theoretical limit is much higher than four processors. There are no major restrictions — the only question is the capacity of the bus."

Calypso systems use a 100M byte/sec. internal bus, a faster data path than the 60M byte/sec. bus used in the larger 8800 symmetrical multiprocessing family announced in March. William Demmer, vice-president of mid-range systems at DEC, acknowledged that the 100M byte/sec. path is designed to support more processors than the four currently supported.

He said the reason it was not used on the 8800 series was that to do so would have meant completely overhauling the VAX 8700 processors used in the system. Future growth for the 8800 line will come in a redesigned system, containing a faster bus and more processors, Demmer said. Such a system is "a year or more away," he added.

More nodes

VMS 5.0 increases the nodes that can be in a Vaxcluster and will allow the grouping of Ethernet-based local-area Vaxclusters and Vaxclusters based on the Computer Interconnect (CI) bus.

Up to 42 systems can be clustered on a local-area Vaxcluster or in a combined CI-based and local-area cluster, said Harriet Cohen, VMS product manager at DEC. The previous maximum was 26, she said. A solely CI-based cluster remains limited to a maximum of 16 nodes.

In addition to the VAX 6200 line and VMS Version 5.0, DEC introduced a new version of its Fortran compiler. The compiler, tailored to run on either single- or multiprocessor systems, will bring parallel processing to the VAX line for the first time.

Another dimension

DEC's VAX 6200 series, built around CMOS processors, spans a performance range currently covered by mid-range VAX 8000 models

6210	One	2.8	32M to 256M bytes	$170,500
6220	Two	5.5	64M to 256M bytes	$283,400
6230	Three	8.3	64M to 256M bytes	$386,800
6240	Four	11	128M to 256M bytes	$537,400

* Millions of instructions per second, based on CW estimates

INFORMATION PROVIDED BY DIGITAL EQUIPMENT CORP.
CW CHART

VMS loaded for control

BY NELL MARGOLIS
CW STAFF

VMS Version 5.0 will be remembered for bringing symmetrical multiprocessing to the VAX line. But the new version of Digital Equipment Corp.'s proprietary operating system also includes "about 20 to 30 things that VMS bigots are just going to love to get their hands on," said John Dean, a DEC analyst at Montgomery Securities in San Francisco.

Prominent among these features are improved system management facilities that centralize Vaxcluster management and let a system manager register, track and control software licenses.

Users will also be able to issue commands to any number of VAXs in a cluster rather than just one.

Around the world

Also included in the announcement is a suite of "internationalization" features that allow for easier worldwide dissemination of VAX-based applications. A utility built into the operating system software allows VMS 5.0 to handle programs and messages written in characters other than English.

Under a new clusterwide licensing option — effectively a price cut — large Vaxcluster customers can save 60% to 70% on VAX licenses, according to a DEC spokesman.

Formerly, each computer in a cluster required its own license. That pricing structure tended to become prohibitive for users as clusters grew in size, said Nick Pappas, software licensing and pricing manager at DEC.

One cluster, one license

A second new license option was designed to allow cost-effective occasional use of interactive software — the Datatrieve query facility, for example — on large VAXs and Vaxclusters, Pappas said.

With the User/Activity option, a four-user software license is available at a price independent of the processor; up to four more users can be added at no additional charge.

In addition, VMS 5.0 will be sold with Microvaxes as well as with other VAX systems; until now, the company recommended MicroVMS with the smaller system, according to Harriet Cohen, a VMS product manager at DEC.

DEC said VMS 5.0 will be out for the first time in compact disk/read-only memory format this summer, at prices starting at $910.

Refreshed CDC focuses on clustering, transparency

BY ALAN ALPER
and STANLEY GIBSON
CW STAFF

Control Data Corp. last week continued to renew its line of Cyber processors by adding six Cyber 960 models, positioned as mid-range mainframes between the 990 series at the high end and the 930 series at the low end.

The air-cooled systems, which are capable of performing 8.9 to 26.7 million instructions per second (MIPS), replace the water-cooled Cyber 860.

The company also announced that the next release of its proprietary operating system, NOS/VE Release 1.3.1, will be available within the next month and will enable customers to cluster as many as eight NOS/VE-based Cyber systems. The clustering feature will allow transparent file access among clustered systems, CDC officials claimed.

CDC also set forth a strategic direction, called the transparent computing environment, in which it plans to tie together the processors of different vendors, offering standard user interfaces.

Hospital stay

The introductions cap a hectic 18-month effort in which CDC replaced its entire Cyber line, unveiled new supercomputers from its ETA Systems, Inc. subsidiary and committed to a strategic relationship with technical workstation vendor Silicon Graphics, in which it purchased a 20% equity interest.

"Two years ago the patient, meaning us, was on the operating table, bleeding profusely. But the hemorrhaging has stopped," said Gil Williams, CDC computer systems vice-president, describing the corporate turnaround symbolized by replacing the Cyber line.

Three of the new Cyber 960 models run NOS/VE, while the other three, offered at the same performance levels, run both NOS and NOS/VE. The three running only NOS/VE are the single-processor 962-11, capable of 8.9 MIPS; the single-processor 962-31, which can perform 14.8 MIPS; and the dual-processor 962-32, which can perform 26.7 MIPS, according to CDC.

The three models running both NOS and NOS/VE are the 960-11, the 960-31 and the 960-32. All models are scheduled to be available in the third quarter. The dual-processor models 962-32 and 960-32 offer symmetrical multiprocessing.

CDC said a Unix-based operating system will be available for the 962 models and for its Cyber 930 series of departmental processors in late 1989.

The 962-11, with 32M bytes of memory, carries a base price tag of $533,500; the 962-31, with 64M bytes of memory, starts at a price of $951,750; and the 962-32, also with 64M bytes of memory, is priced from $1.6 million.

The 960-11 begins at $705,000, the 960-31 is priced at $1.06 million and the 960-32 starts at $1.7 million.

Bad old days

Compared with equivalent products from DEC (the VAX 8700 and 8800) and IBM (low-end 3090 machines), the Cyber machines offer a 10% to 15% lower price and a 50% increase in raw performance, according to Williams. The processors operate at a clock speed of 11 nsec, he added.

Williams attacked DEC's VAX architecture as "embedded in the 1960s" and IBM's computing approach as splintered among a variety of architectures and operating systems.

He noted that while DEC has recently delivered symmetrical multiprocessing, CDC has offered it on the Cyber line since 1967.

CDC's transparent computing environment will include CDC's Desktop/VE, which provides a seamless interface from a Macintosh environment to a Cyber system.

CDCnet, another component of the transparent computing environment, is the company's distributed architecture and supports both Ethernet and Transmission Control Protocol/Internet Protocol.

The goal of the transparent computing environment, to which CDC says it plans to add enhancements, is to give users access to any corporate computing resource.

"They won't need to know where the processing is taking place," Williams claimed.

Allen takes AT&T helm after Olson's death

BY ALAN ALPER
CW STAFF

NEW YORK — AT&T's board of directors last week formally appointed Robert E. Allen chairman and chief executive officer, succeeding James E. Olson, who died of cancer last Monday.

Allen, who was named president and chief operating officer 20 months ago, had been running the company since Olson became ill last month. The board did not name a president to succeed Allen.

A career AT&T employee, Allen is expected to closely adhere to his predecessor's strategy of focusing on the long-distance telephone business and expanding the company's reach in international telecommunications. He is also expected to continue bolstering AT&T's presence in the computer industry by emphasizing its strengths in networking technology and the Unix operating system, while building on a recently established alliance with Sun Microsystems, Inc.

"I fully intend to continue leading AT&T on the course Jim set out for us," Allen said in a prepared statement. "The other officers and I concurred [with] the basic strategies Jim laid out in 1986, and they are no less worthy today than they were at that time."

Cost-cutting inheritance

Allen also inherits Olson's stringent cost-reduction program, which has returned luster to the company's balance sheet but cost about 27,000 AT&T employees their jobs.

"Olson set in motion the operations consolidation phase," said Fritz Ringling, an analyst with Booz Allen & Hamilton, Inc. "That process will take another couple of years to complete."

That cost-cutting strategy has enabled the company to bolster profits, despite relatively stagnant revenue growth. In conjunction with AT&T's shareholders meeting last Wednesday, the company announced first-quarter profits of $492 million, an 11% increase from $445 million a year before. Revenue increased only 2.8% in the year-to-year comparison, rising from $8.12 billion to $8.35 billion.

Some observers considered Olson, who became chairman at age 60, an interim leader. But they said they expect Allen, 53, to leave a legacy at the telecommunications behemoth by the time he reaches 65, the mandatory retirement age.

"He's a capable manager," noted Bart Stuck, an analyst at Probe Research, Inc. "He'll be good at exploiting the strategy that Olson started."

Yet other analysts contended that like Olson, Allen will avoid making many of the tough decisions the company needs for full recovery. Olson deferred deciding such questions as whether to approve private information networks and whether to acquire a computer-industry company or withdraw from the business, these analysts pointed out.

One of Allen's first tasks is to select a second-in-command. Many observers believe AT&T needs an executive with a strong marketing background to help fuel growth, particularly within its Data Systems Group. Others say the company needs an executive with an eye for strategic acquisitions.

The leading presidential candidates come from the office of the chairman. Besides Allen, that office includes vice-chairmen Charles Marshall, 58; Morris Tanenbaum, 59; and Randall Tobias, 48.

Some analysts consider Tobias, who heads AT&T's long-distance and computer marketing businesses, Allen's first choice.

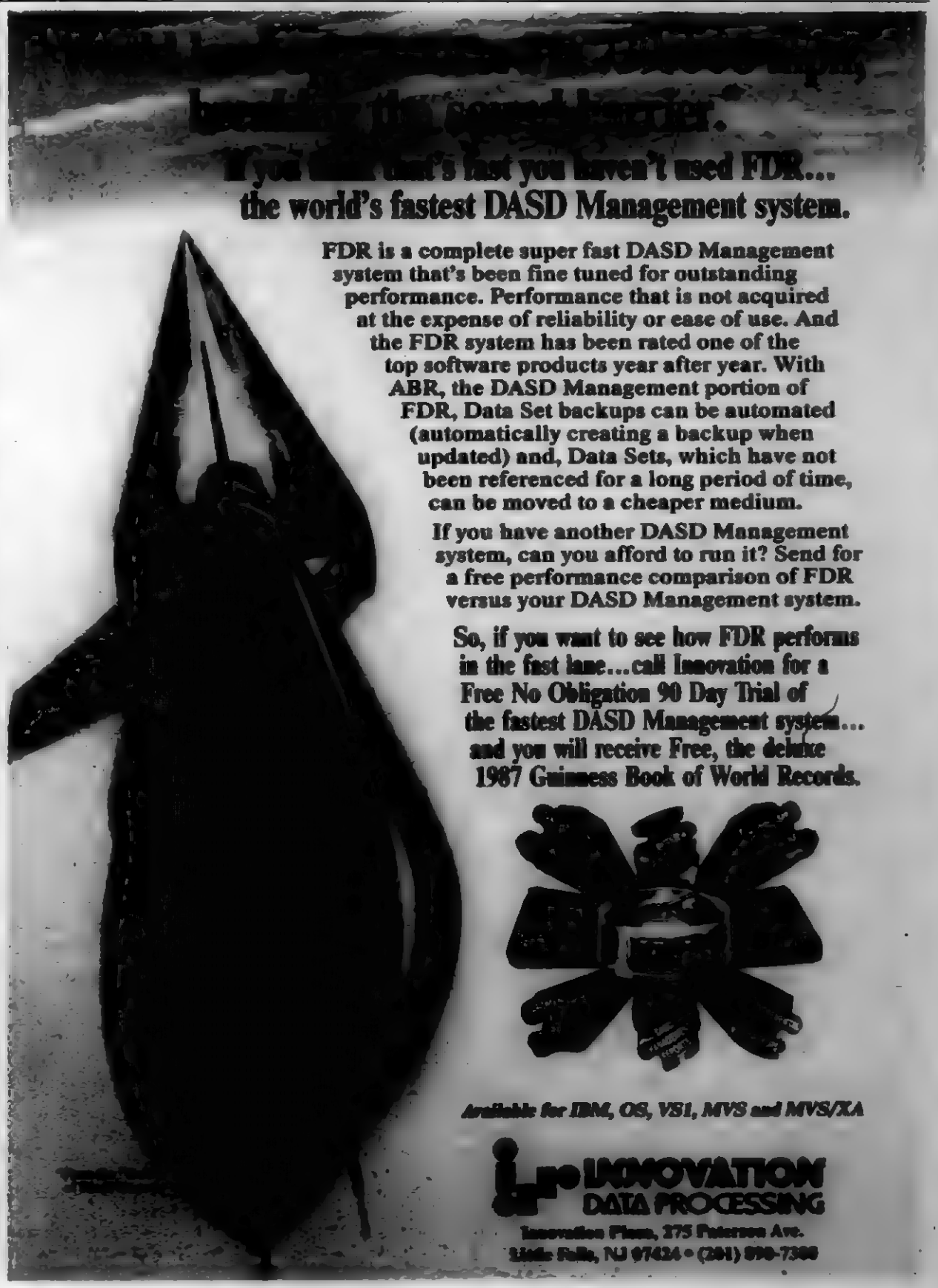
Allen joined AT&T in 1957 after graduating from Wabash College; he followed the prototypical Bell system executive fast track. He served in a variety of management capacities before becoming vice-president of Bell of Pennsylvania in 1974.

Chairman and CEO Allen

From 1976 to 1978 Allen was chief operating officer at Illinois Bell, the divested Bell operating company that AT&T had used to groom up-and-coming executives. In 1981, he was elected president of the Chesapeake and Potomac Telephone Co.

Just before AT&T's divestiture of its regional operating companies in January 1984, Allen was asked to be president of Bell Atlantic Corp. He opted instead to serve as AT&T executive vice-president and chief financial officer.

Olson, who presided over AT&T for 20 months, will be remembered as an energetic, no-nonsense CEO who restored order to the telecommunications giant after years of disarray. He was an operations specialist who prided himself on having worked his way up from the position of splicer's assistant and who claimed never to have lost touch with lower level employees.



Users, vendors snub ONA plans

Bells' proposals seen as 'confusing hodgepodge of bundled services'

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The Open Network Architecture (ONA) plans of the regional Bell holding companies got a scathing critique last week from network users groups and vendors. They called the ONA plans a confusing hodgepodge of bundled services.

The proposals, totaling some 7,000 pages, "are a waste of good trees," said the ONA Users Group, a coalition that includes the Association of Data Communications Users and other business network associations.

ONA is the Federal Communications Commission program that allows the Bell companies to offer enhanced network services, unfettered by separate subsidiaries, if they give competitors equal access to unbundled elements of their networks [CW, Feb. 1].

The main objections were the charge that the Bell companies failed to honor the FCC's requirement for unbundling of basic service elements and that the seven regional plans showed virtually no national uniformity.

The ONA plans, filed in February and subject to FCC approval, "offer some new bells and whistles but cannot be fairly described as opening the public network itself," the ONA Users Group concluded.

The harsh criticism came not only from users groups but also from value-added network vendors such as Telenet Communications Corp.; Tymnet, McDonnell Douglas Network Systems Co.; and ADAPSO, a trade association for computer services companies. The critics urged the FCC to require the Bell companies to draw up new ONA plans.

Freedom of choice

The users and network vendors had hoped ONA would allow them to pick and choose the basic service elements to buy from the Bell operating companies once transport and switching functions were unbundled.

However, the Bell companies' ONA plans combine basic service elements into packages called Basic Serving Arrangements (BSA). The regional Bell holding companies argued that these BSAs are fundamental connections and cannot be further unbundled. Southwestern Bell Corp. called a BSA "the barest possible fundamental interconnection to the network."

With the exception of Nynex Corp.'s plan, the ONA plans generally offer features attractive to the voice side of the industry, such as telephone answering services. However, Nynex will offer an interoffice data-over-voice service that is valuable to large data users, the ONA Users Group said.

Users had requested four types of ONA services:

- Access to the Bell companies' operations-support systems for diagnostic and traffic information.
- Calling-number identification, which would help identify dial-up hackers who break into computer systems.
- Derived local-loop channels to transport voice and data simultaneously.
- Gateways to foster information and banking services.

But a study by John G. Williams, vice-president of the Telecommunications Consulting Group, Inc. in Washington, said the Bell companies tended to declare these functions "beyond the scope of ONA."

Williams' report said that only Ameritech and Nynex are working on customer access to their operations support systems. Nynex will implement a data-over-voice service, and Bell South Corp. may do so, but the others have no plans for such a service and may be waiting for full-scale implementation of Integrated Services Digital Network (ISDN), the study said.

Keeping pace

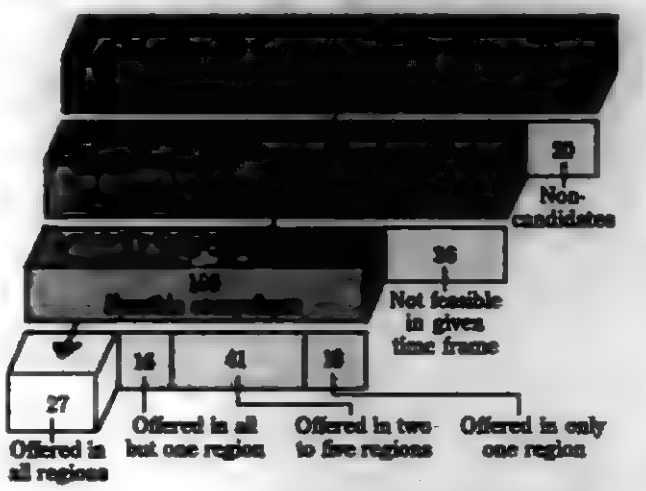
Data-over-voice technology would meet current demands for simultaneous transmission of voice and data in advance of ISDN and would avoid the inconvenience of blocked voice calls and the expensive alternative of a second loop dedicated to data, the Williams report said.

The regional Bell holding companies arrived at their ONA plans by whittling down a list of 158 service requests from enhanced service providers and users. According to a study by Hatfield Associates, Inc., a Boulder, Colo.-based consulting firm, the process yielded only 27 services to be deployed in all seven regions next year. About 75 other services will be offered in some, but not all, regions.

"The mixed availability seems particularly curious, since by and large, all Bell operating companies use the same basic switching technology and a similar transport architecture," the Hatfield study said.

Network wish lists

Of 158 requests for Open Network Architecture basic services received by regional Bell holding companies, only 27 are considered feasible to be offered in all seven regions by September 1989



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CW CHART

MSA narrows its focus, heads back home to IBM

BY ROSEMARY HAMILTON
CW STAFF

CHICAGO — While most mainframe software companies are loosening the IBM apron strings, Management Science America, Inc. (MSA) is going back home to the industry giant.

MSA users and industry analysts appear to applaud that strategy, although it defies the current trend, because they say MSA can be most successful at what it knows best.

At the annual Interact conference for MSA users, held here last week, company executives said MSA is shifting its development focus away from multiple hardware platforms, including Digital Equipment Corp. VAXs, and back to an IBM strategy.

In continuing its traditional business of mainframe applications, MSA has also decided to put its money on IBM's soon-to-be-announced mid-range offering, the System/36 and 38 follow-on, which is commonly called Silverlake.

The focus on IBM takes MSA back to its roots. For most of this decade, the company has attempted several new ventures. Some have bombed, such as a foray into personal computer software that ended in 1985. Others, including an effort to provide applications for Honeywell, Inc. and Unisys Corp. hardware, have been moderate successes. MSA continues to offer applications for those platforms, although the lines are not central to its business.

As recently as last year's users group meeting, MSA was promoting new ventures into the DEC market and plans to port its Information Expert, an interactive front end for its applications, to microcomputers and at least four minicomputer platforms. None of these plans have been scrapped, but they now fall well below IBM on the priority list, MSA executives said.

"The way they had been going was confusing, but now they are one single image again," said Gary Biddle, vice-president of MIS at American Standard, Inc. in New York.

This shift likely comes in response to 1987, which was a difficult year for MSA. While the company showed a 43% increase in revenue last year, it ended with a loss of $221,000. The loss was caused by a change in accounting procedures as well as the troublesome acquisition of RTS Ltd., which wound up costing the company more than it bargained for.

Shortly after the financial setback, MSA restructured, setting off a management exodus in the process. The recently formed manufacturing subsidiary was pulled in closer to the company, prompting the departure of Dennis Vohs, who had been with

> "THE WAY they had been going was confusing, but now they are one single image again."
>
> GARY BIDDLE
> AMERICAN STANDARD, INC.

MSA for nearly two decades (see story page 25). There is now one executive, Michael Hunt, in charge of all research and development, and another, Douglas MacIntyre, in charge of all sales and marketing.

Previously, the manufacturing subsidiary, Advanced Manufacturing, Inc., had its own R&D and sales efforts. It remains a separate subsidiary but will function more as a division within MSA. The new organization was set up to address a series of vertical markets, including manufacturing, and to execute the plan to focus more intensely on the IBM platform.

Analysts said they see MSA returning to the IBM fold after taking unsuccessful shots at other opportunities. "For a number of years, they tried lots of new markets, and they found that to be painful," said Mark Dunkel, a first vice-president at Robinson Humphrey Co. in Atlanta. "They are not now contracting but focusing on what they've traditionally done well. They are a much more subdued MSA. They are not going to do anything drastic or risky."

The MSA presented to users at Interact was one closely aligned with IBM. Such an image contrasted with last year's meeting, at which executives discussed big plans for the DEC VAX market as well as other hardware platforms.

Last week, however, Hunt, who in addition to his R&D responsibilities serves as president of the manufacturing group, summed up the company's spending this way: "In allocating our dollars and knowing IBM's power, it's a higher priority to spend on IBM than DEC. We see our potential here and put more emphasis back on IBM."

"This is a lower growth strategy, but what they know best is IBM, and they'll be sticking to that for the near future," Robinson Humphrey's Dunkel said.

According to Hunt, it would not have been financially feasible to simultaneously port MSA's applications to the DEC platform and support the IBM Systems Application Architecture strategy and its new mid-range platform.

IBM expansion

Users said MSA plans to continue to improve its traditional applications and expand into the IBM mid-range platform, which fits with user needs.

"I've been associated with MSA for 14 years, and right now, I'm hearing a lot of positive things," said Toni Marie Everhart, a vice-president at The Arizona Bank in Phoenix. "They are acknowledging for us that distributed processing is here."

Robert Therrien, an analyst with Paine Webber, added, "What will happen is their growth rate will slow, but that doesn't mean they'll be a bad company. The most salient point to MSA is that their customers are very happy. Their products work, and that says a lot."

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	Cleveland — Feb 04, Mar 04	Mar 19
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TX	Austin	Apr 22
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COMPUTERWORLD

Apollo cuts processor costs

BY NELL MARGOLIS
CW STAFF

CHELMSFORD, Mass. — Apollo Computer, Inc. last week slashed prices on its Series 4000 Personal Super Workstation line and reduced memory and disk prices on both the Series 4000 and Series 3000 Personal Workstations.

Although Apollo has enjoyed impressive success with its Series 4000 line, analysts said the company has saturated its installed base and is attempting to entice new customers.

With the entry price for the Series 4000 — including a 19-in. monochrome monitor and 4M bytes of main memory — cut 35% to $8,990, Apollo can hold out the offer of a 4 million instructions per second (MIPS) workstation for less than $9,000, an Apollo spokesman said. The color version is available starting at $13,990, representing a 26% price cut.

"It's a very aggressive price cut," the spokesman said. "The Series 4000 is already a best-selling entry in the mid-range workstation market; we want to maintain its price/performance advantage."

"These price cuts caught everybody by surprise," said Peter Schleider, an analyst at Minneapolis-based Wessels, Arnold & Henderson. The dramatic price change, he said, appears to be a Sun block. "The Sun [Microsystems, Inc.] 3/60 has a four-month backlog, so for the time being, people have to go elsewhere. Apollo is giving them someplace to go."

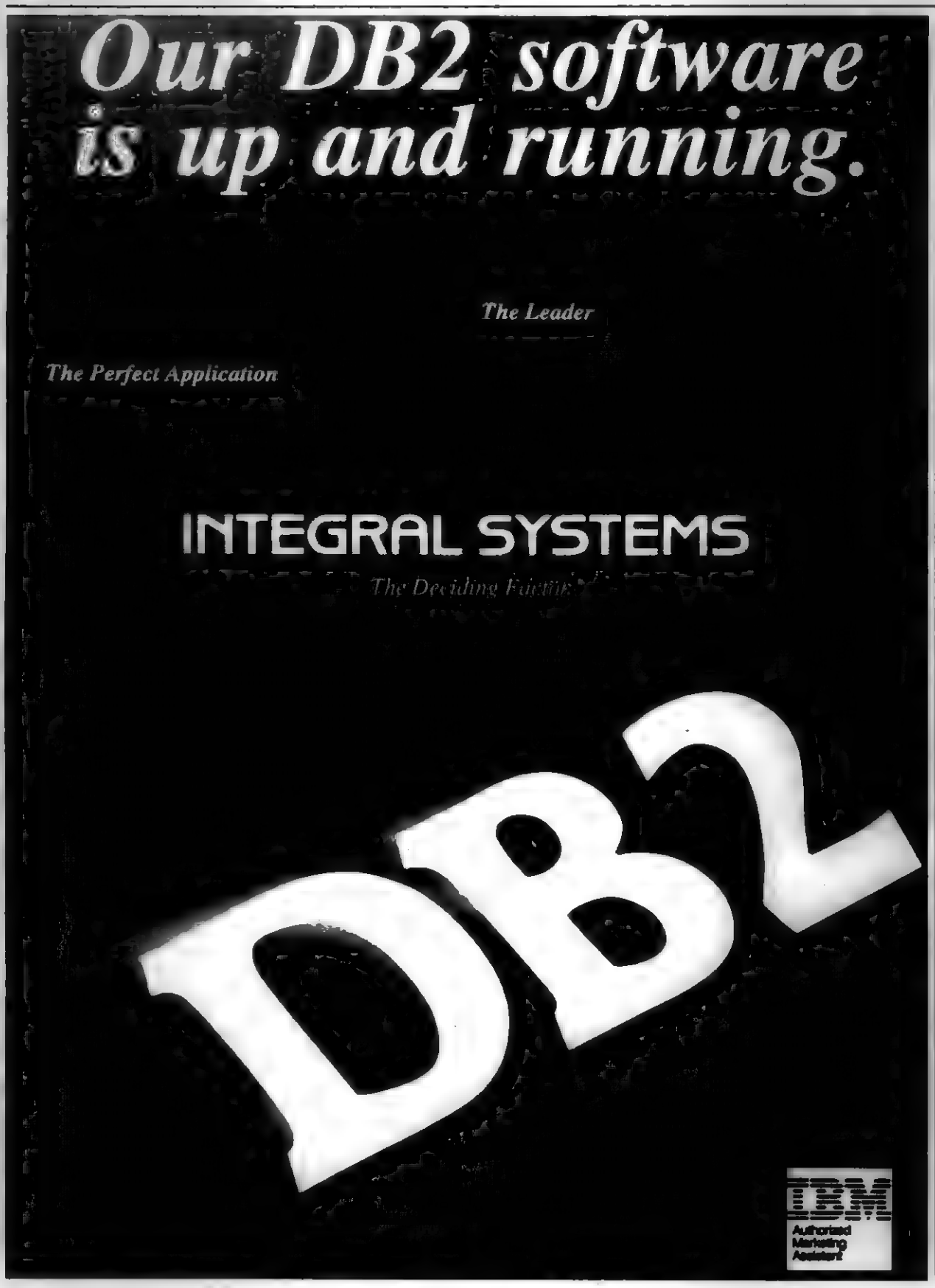
When the going gets tough. . .

"Apollo's first quarter was a blowout because of the 4000," Schleider added. But now, "they've milked their installed base; the easy sales are gone. Now they've got to hustle."

Robert G. Herwick, an analyst at Hambrecht & Quist, Inc., said that the Series 4000's performance was impeded somewhat by the small size of its cache memory. The Series 4000 has an 8K-byte virtual cache memory.

"Some benchmarks would rate it no higher than 2.5 MIPS," Herwick said. "This puts it at a disadvantage compared to the Sun 3/60, its most direct competitor." The dramatic price cuts, he added, cast the Series 4000 in a more favorable price/performance light.

Apollo also sliced prices by as much as 29% on a broad range of mass storage devices for the Series 4000 and 3000 workstations. Furthermore, the company announced an 18% price drop on Series 4000 memory prices and a corresponding 20% drop in memory prices for the Series 3000. It also added a floating-point accelerator that it said boosts Series 4000 processing speeds by up to 300%.



Firm revs up RISC chip set

BY STANLEY GIBSON
CW STAFF

Computer Consoles, Inc., riding a revival in its computer division sales, is scheduled to join today the parade of vendors promising Unix-based reduced instruction set computing (RISC) processors by announcing what it claims is the most powerful RISC-based chip set.

Designed for the Unix environment, the chip set will be capable of sustained performance of 25 million instructions per second (MIPS) and peak performance of 40 MIPS, Computer Consoles officials said last week.

The chip set will be included in a new series of minicomputers, called the CCI Power 7/64, that will be formally announced later this year, the company said.

Computer Consoles also said that in the first quarter of this year, it earned $3.2 million on sales of $39.2 million, up from profit of $833,000 on sales of $35.6 million in the year-earlier quarter.

The firm said its computer products division is currently breaking even — an improvement over its 1987 losses of $13 million. When John Cunningham, Computer Consoles' chairman and chief executive officer, took over the firm in 1985 after leaving the president's post at Wang Laboratories, Inc., Computer Consoles was awash in a sea of red ink; it lost $42 million that year.

Cunningham said the planned systems will be able to run compiled code intended for Sun Microsystems, Inc.'s Scalable Processor Architecture (Sparc) unit at only 55% of its normal speed — still, he claimed, faster than any current version of the Sparc chip.

The chip set includes an instruction processor chip, a bus switch chip and interfaces to Texas Instruments, Inc.'s floating-point processors. The two chips in the set that were designed by Computer Consoles will be fabricated in CMOS by Performance Semiconductor in Sunnyvale, Calif. The chips are expected to have a cycle time of 20 nsec., according to Computer Consoles.

The CCI Power 7/64 systems will be source-code compatible with the existing CCI Power 6/32 systems. The 6/32 is resold by Unisys Corp. as its 7040 and 7050 and by International Computers Ltd. as the Clan 6 and Clan 7.

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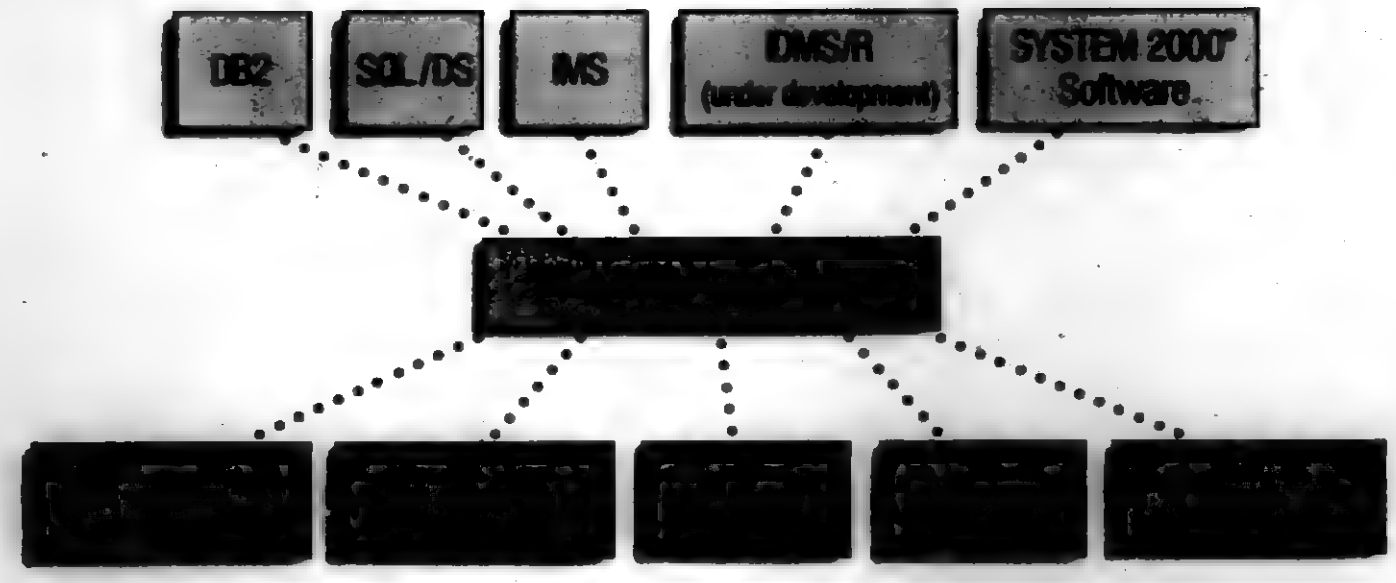

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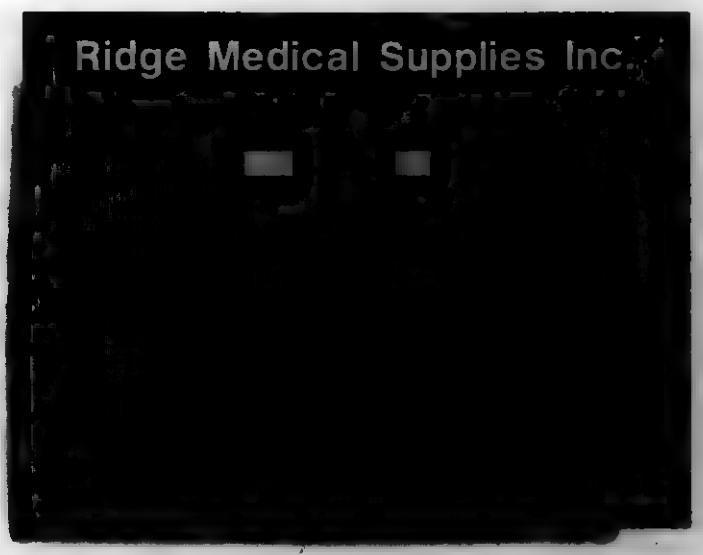

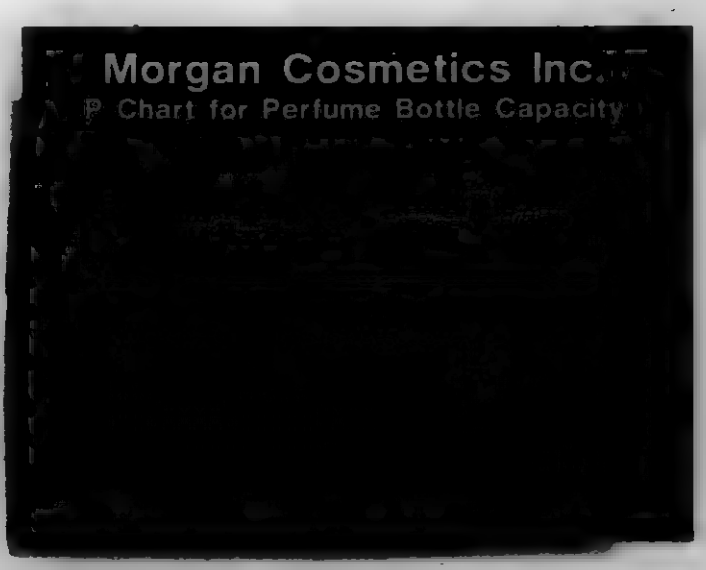

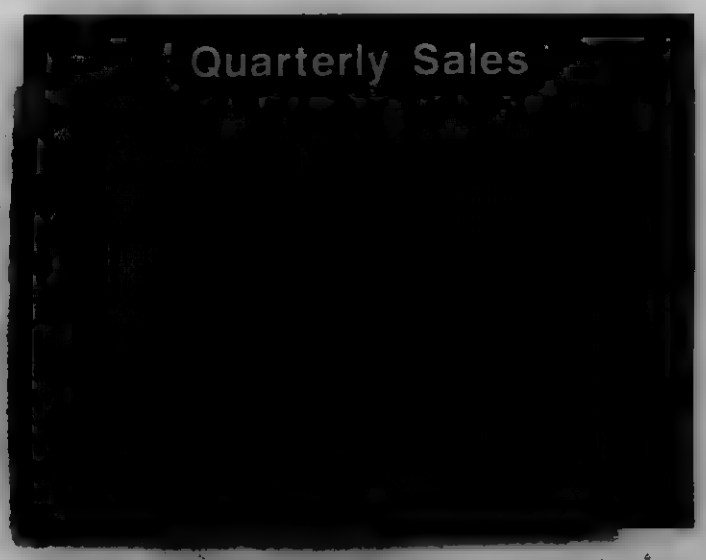

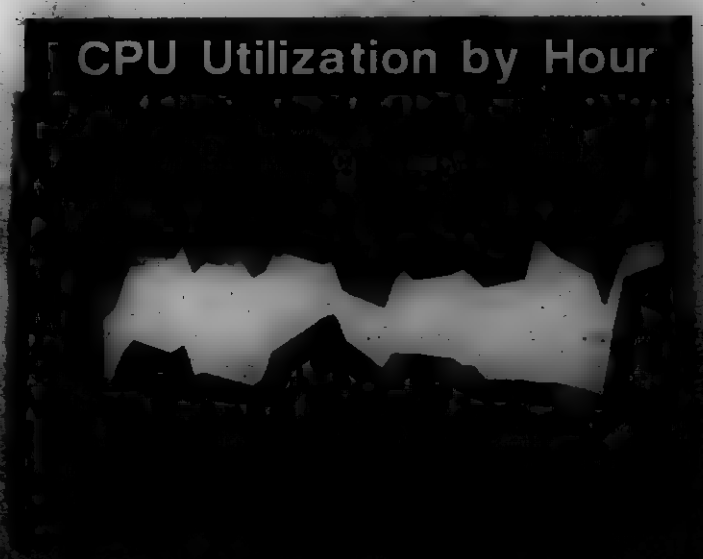

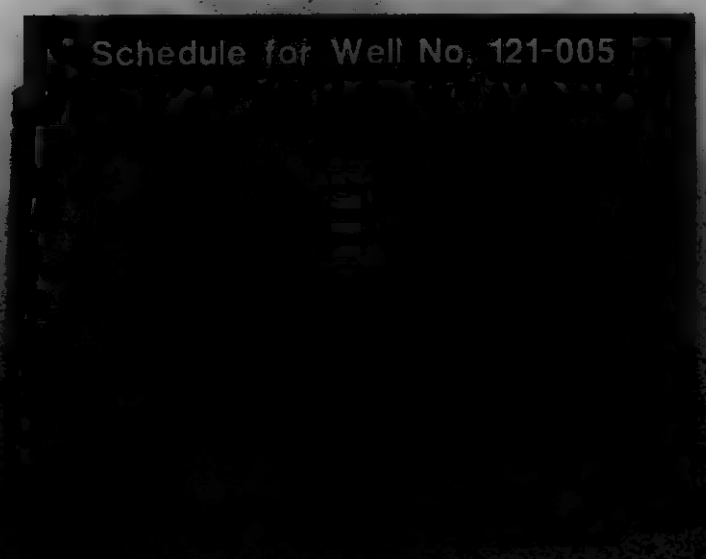

Time to take action, EDI users say

BY KATHY CHIN LEONG
CW STAFF

SAN FRANCISCO — Hal McDonald at 3M Corp. issued a challenge here last week: "You either change or get changed. EDI will be an absolute business necessity for 1990."

But McDonald, 3M's specialist for electronic data interchange (EDI), was preaching to the already converted. More than 1,000 users, vendors and consultants turned out for the ANSI X12 EDI conference, a first-time seminar that only 500 were expected to attend.

Momentum is building for the concept of electronic selling and trading with business partners. Nearly half the users at the show acknowledged they had solid EDI installations or pilot projects at their companies and were seeking to expand their implementations.

Furthermore, high-profile companies such as 3M, Union Carbide Corp., Eastman Kodak Co. and Levi Strauss & Co. are making EDI a corporatewide commitment. Recent findings from a Coopers & Lybrand joint study with EDI Strategies, Inc. in Marietta, Ga., showed that more than 5,000 domestic companies are current EDI users.

Be there or be square

EDI users, vendors and consultants addressed the conferees with a sense of urgency to adopt EDI, declaring that now is the time to prove to senior management that EDI will give their businesses a competitive edge. They warned that as more corporations become EDI users, they will force their suppliers and customers to comply.

"You can't implement if you are sitting out in the woods somewhere and thinking about EDI," McDonald said. "You have to act."

There is a wellspring of concern among pundits that the standard must be a priority. "This is not a technical issue," stressed Jack Shaw, president of EDI Strategies, during the conference's opening session. "This is a business issue."

The study by EDI Strategies and Coopers & Lybrand discovered that in the automotive, chemical, pharmaceutical and railroad industries, EDI is a requirement for present and future business partners.

"That is, you are at a severe competitive disadvantage if you are not already doing EDI," Shaw said.

The research, which included the responses of 600 companies, showed that by 1990, current EDI users will triple their number of electronic trading partners. And by 1990, it predicted, eight times as many companies will be using EDI, compared with 1987. In its own analysis, Service Merchandise, Inc. cut the price of a single purchase order transaction from $50 to $15 using EDI.

Bill Eaton, vice-president of information services at Levi Strauss, stressed that the elimination of paper invoices and purchase orders via EDI can reduce inventory overhead and ramp up the sales cycle.

"For the textiles and garment industries, one day of shortened inventory is a savings of $96 million," he said.

Although start-up costs were high in the early 1980s, more vendors are addressing the market with new products and services, making entry into EDI easier than in the past.

For example, Control Data Corp. and Spectrum Concepts, Inc. in New York reached a pact to allow EDI users to transmit LU6.2 protocols on CDC's Rednet public data network when using the Spectrum Xcom 6.2 file transfer software.

In addition, Tandem Computers, Inc. announced an agreement with Transettlements, Inc. in Atlanta to jointly sell Translate, an EDI software package supporting Tandem Nonstop computers. According to the agreement, Transettlements will sell the software to Tandem users, giving them the ability to translate proprietary formats to industry-standard EDI formats.

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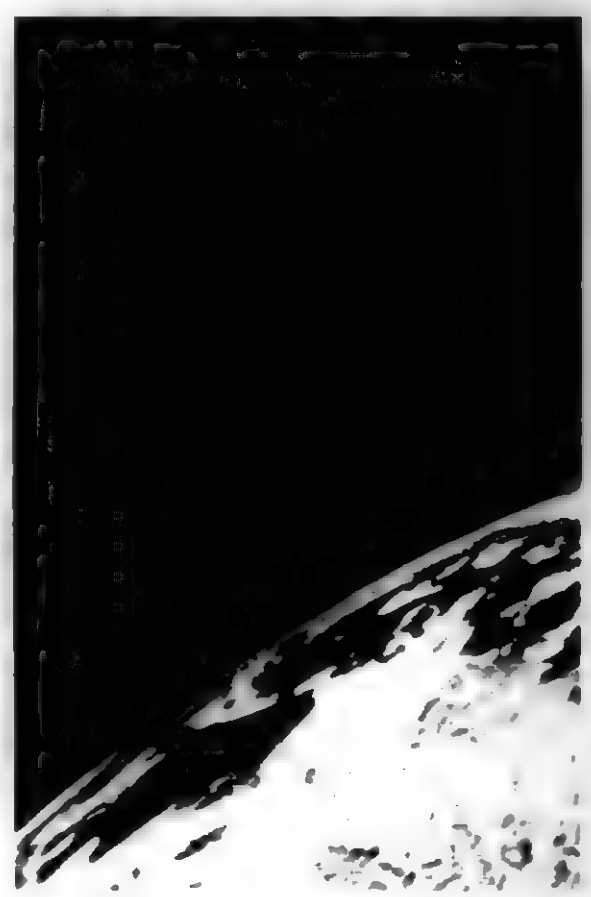

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3M turns EDI into way of life

BY KATHY CHIN LEONG
CW STAFF

Today, whenever any 3M Corp. vice-president discusses company direction, electronic data interchange (EDI) is always part of the conversation.

It has taken at least six years of spadework, but Hal McDonald, the firm's EDI specialist, is fully confident when he says, "3M is totally committed to EDI in our plans for the future."

At the ANSI X12 EDI conference in San Francisco last week, McDonald gave other users a peek at how a $9 billion international bureaucratic organization was able to turn the EDI concept into reality.

McDonald directs a 12-member EDI task force within the decentralised corporation. Early on, when he shared his vision with top managers, he admitted he was unable to prove dollar savings; nevertheless, he convinced them that EDI was a business necessity.

"I told them we couldn't afford not to go with EDI. In the 1990s, we might not have any business left, because we would get eaten for breakfast by our competitors," McDonald said.

Four years ago, 3M started a pilot project that involved three suppliers familiar with EDI. These days, the company employs the EDI services of three value-added network suppliers: GE Information Services, a division of General Electric Co., Control Data Corp. and McDonnell Douglas Computer Systems Co.

The company works with 26 of its major suppliers using the X12 standard for electronic invoicing, purchase ordering and a handful of other transactions. Suppliers and 3M split the transmission costs for the network.

In the EDI arrangement, customers ordering from 3M will transmit requests through one of the value-added network suppliers. The supplier will then send the EDI order to the closest 3M branch, and that branch will hurry the order along to the central IBM mainframes at 3M's St. Paul, Minn., headquarters. The order is processed electronically to Hewlett-Packard Co.'s HP 3000 minicomputers at a 3M distribution site. The company uses EDI mainframe software from New York-based RJ York, Inc.

Part of the plan

The paperless method is already ingrained into 3M policy. Any of the 46 operating companies that wish to use another EDI vendor or write EDI software must get the approval of the EDI corporate review committee, McDonald said. Every quarter, 3M holds an internal user's group meeting to share EDI experiences and allow other divisions to implement similar EDI procedures.

Approximately 2% of all 3M's orders are processed using EDI, according to McDonald, who stressed that the percentage will definitely grow this year.

The cost for EDI is absorbed by the company's MIS budget for now, but McDonald said tentative 1989 plans call for each division to pay for the services.

"We are still examining the results," he said. "EDI is definitely saving us time and making everything more efficient. There are soft savings at this point, but the company is thoroughly convinced this is the way to go."

According to McDonald, the company does not force its suppliers to adhere to EDI but encourages them by saying they will be considered the company's "preferred vendors" if they start using it.

"You can't arm wrestle them into doing this," he said. "Many of our suppliers are our customers, so we don't want to lean too hard."

During the last five years, the company has invested less than $1 million in EDI efforts. So far, the reaction to the new way of doing business has been positive, McDonald said.

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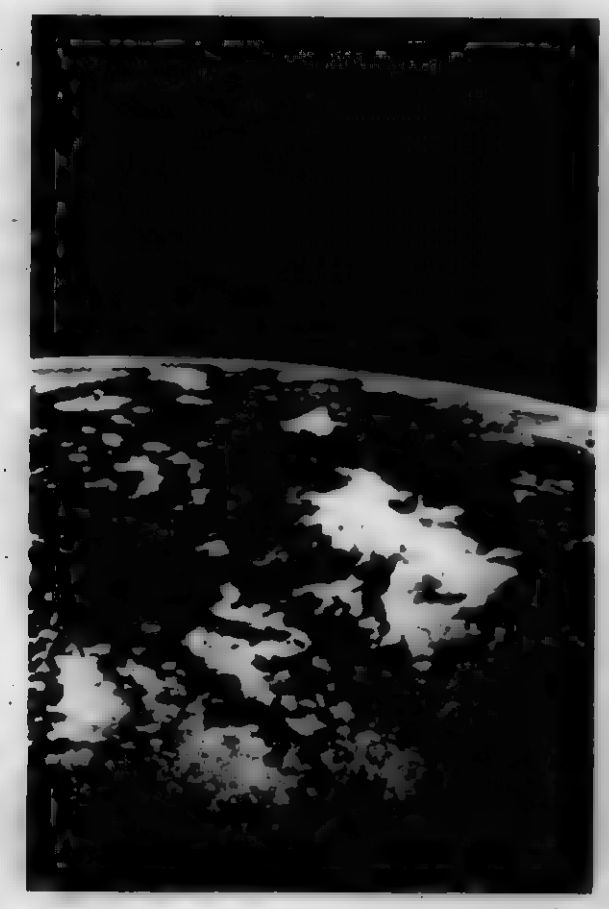

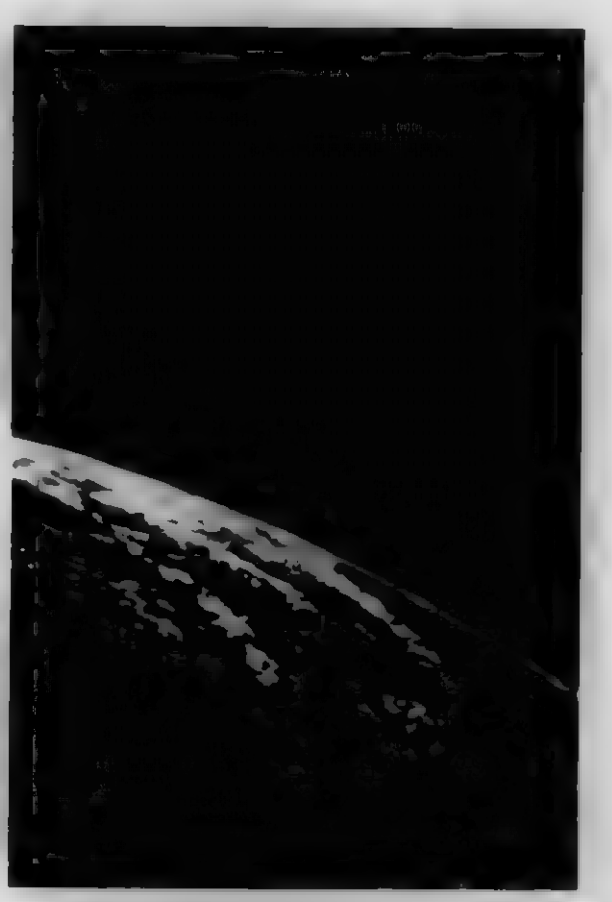

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CIM taking care of business these days

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — Computer-integrated manufacturing (CIM) integrates a company's business functions as much as its manufacturing process. That was the message trumpeted at the Advanced Manufacturing Systems (AMS) conference held here last week.

"INTEGRATING the business function is just as important as bringing engineering and manufacturing closer together."

RICHARD KAHN
PEAT, MARWICK, MAIN & CO.

"Our focus on CIM was on three areas this year: engineering, manufacturing and marketing," said Richard Kahn of Peat, Marwick, Main & Co., which acted as systems integrator for this year's Impact demonstration of CIM. "Integrating the business function is just as important as bringing engineering and manufacturing closer together."

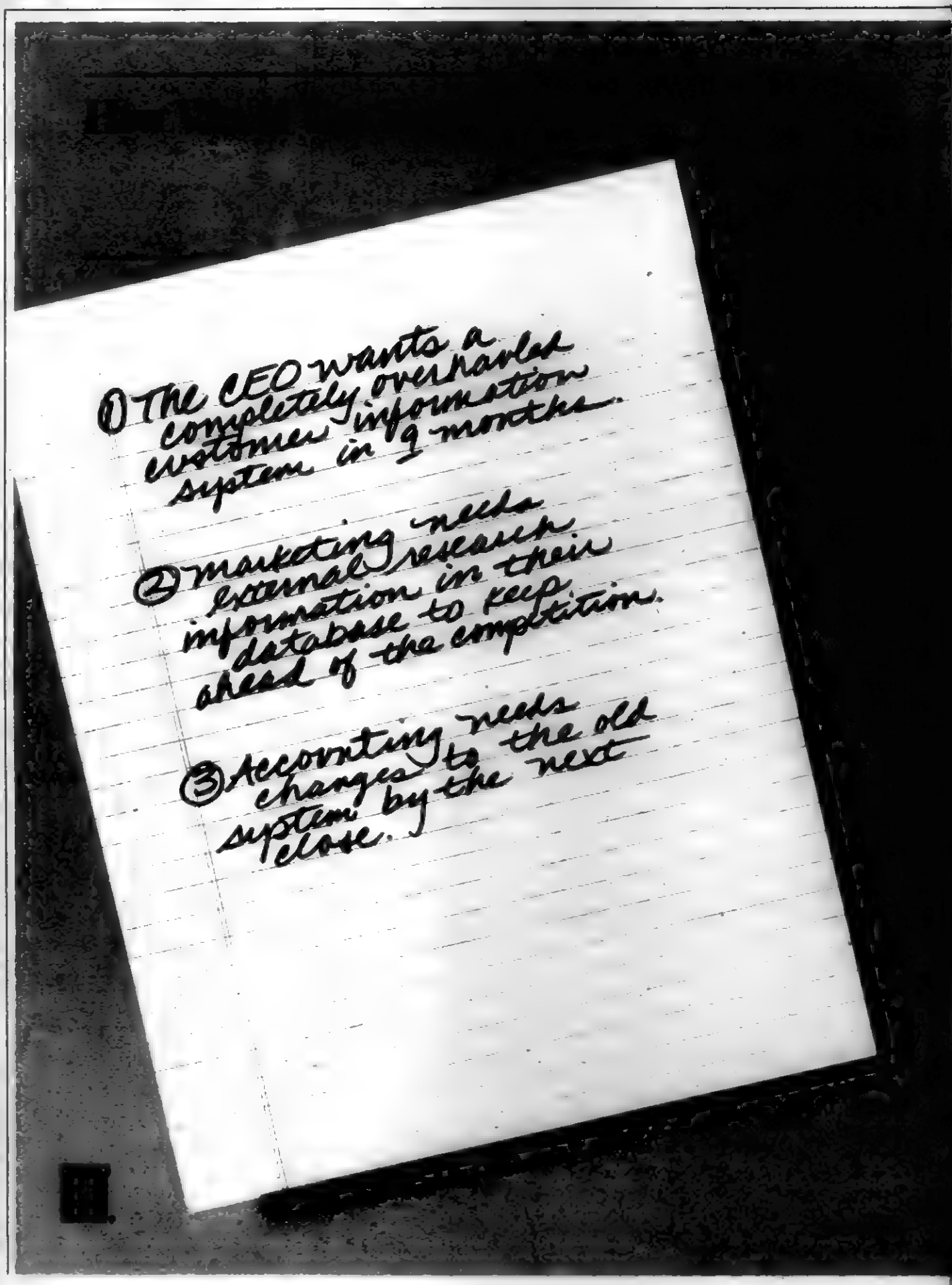
Impact, somewhat shortened and simplified since last year's one-hour-plus presentation, featured videos showing the five-year progress of CIM in a fictitious company, ATR Industries. At the end of the 45-minute presentation, Impact visitors toured an on-site mini-factory.

Surrounding Impact were displays spread over 50,000 square feet of exhibit space — about 10,000 square feet less than at last year's AMS show, according to the sponsor, Cahners Exposition Group. Impact alone took up 6,000 square feet. Some of AMS's 140 booths repeated their themes of last year, including Tandem Computers, Inc.'s Tandem Integrated Manufacturing Environment, or TIME, CIM system, Allen-Bradley Co.'s CIM Cell exhibit and Stratus Computer, Inc.'s demonstration of its XA 2000 on-line transaction processing system.

New developments

There were some new developments, including these:

- Intergraph Corp. in Huntsville, Ala., announced the first major revision of the Intergraph Engineering Modeling System. The Intergraph Clipper workstation-based drafting and design system features more drafting functions, a simplified user interface and a greater ability to handle modeling of surfaces and solids.
- Panaphic Systems, Inc. in Oak Brook, Ill., introduced an inventory control module for its Panaphic Manufacturing/38 software. The Forecasting Workbench module allows users to monitor manufacturing material and production forecasts from a single screen on their IBM System/38 computer.
- Prime Computer, Inc. in Natick, Mass., demonstrated its Design solid-modeling software and Control flexible manufacturing system. Control directs the flow of information stored in a common Oracle Corp. data base from engineering to manufacturing systems, updating drawings as needed. Design allows users to create, rotate and enlarge engineering drawings, whether they are wire-frame, three-dimensional or solid-modeling.
- Carnegie Group, Inc. and Texas Instruments, Inc. demonstrated Carnegie Group's new Testbench knowledge-based troubleshooting software for the repair of complex machinery such as cars and motorcycles. The Testbench package runs on TI's Explorer workstation, and both companies will market the package, according to Carnegie Group Chief Executive Officer Dennis Yablonsky.



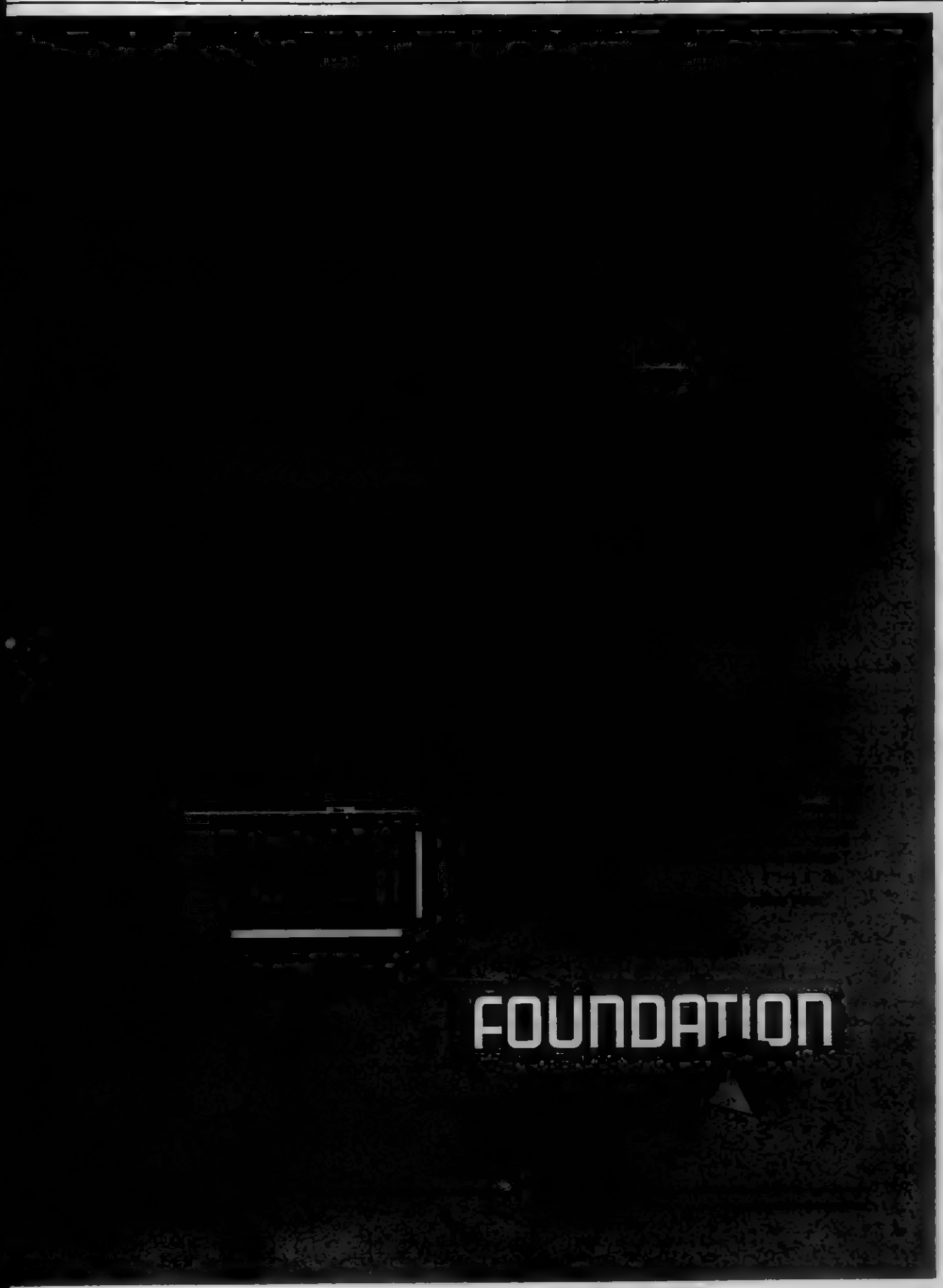
Publishing: Beyond WYSIWYG

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — WYSIWYG, the electronic publishing systems acronym for "what you see is what you get," has taken a backseat to a new phrase. Vendor marketing executives at last week's Corporate Electronic Publishing Systems (CEPS) show, held here, said the name of the game is now: "what you don't see is what you need."

"This is the year we all get to go through the looking glass," said David Henry Goodstein, chairman of the CEPS conference and president of Interconsult, Inc. in Cambridge, Mass. "We want to get beyond the shimmering goal of WYSIWYG and decide that electronic publishing is all about information management," he added.

And so it was that icon- and mouse-based graphics have won the battle of the interface, which raged at last year's CEPS show. The icon presentation was shown at most of the 70 booths here. IBM's April 5 endorsement of Interleaf, Inc.'s icon-based publishing package seems to have underlined the company's earlier move to include Microsoft Corp.'s Presentation Manager in its Personal System/2 line.



New frontiers

Accordingly, the discussion at CEPS moved on to other issues: networking, distributed data base management and micro-to-mainframe links. "WYSIWYG was just the tip of the iceberg," said Howard Woolf, manager of Digital Equipment Corp.'s Electronic Publishing Systems Group.

"The desktop is just another island of automation," Woolf continued. "People need to have access to accurate and timely information on their desktop — and that can only be achieved by the delivery of publication services throughout a corporation's network."

Examples of these services include printing, central storage in a data base and electronic distribution of documents, Woolf said.

Storage in a central data base was the theme at IBM's booth, too. Documents created on both IBM mainframes and the PS/2 Model 80 — the only PS/2 model that supports Interleaf's Publisher software — can be combined into central data bases for compilation and centralized publication.

IBM also demonstrated recently revised versions of its Processmaster, Bookmaster and Browsemaster mainframe-based publishing software, all of which were shown running on an IBM 9370 Model 60 under the firm's VM operating system.

Apple watchers

Apple Computer, Inc.'s crowded booth drew the sparsely attended show's largest crowds. Apple Macintosh IIs, many showing color graphics on high-resolution screens, overpowered monochrome demonstrations on Macintosh SE models.

However, Larry Tesler, Apple's vice-president of advanced technology, asserted that his firm is attempting to expand its definition of electronic publishing to include multimedia presentations.

Building on its Hypercard data base management system, Apple is working on compression techniques that would lower the cost of electronically storing audio and video clips on compact disk/read-only memory, Tesler said.

CORRECTIONS

Figures for the network management forecast Data View were supplied by Frost & Sullivan, Inc. [CW, April 11].

Thomas O'Flaherty is director of research at Broadview Associates, a Fort Lee, N.J., information technology mergers and acquisitions firm.

EDITORIAL

For shame

IMAGINE WHAT WOULD happen if General Motors announced it was teaming up with Goodyear to develop a new radial tire for small cars. The tire would be a different size than other tires and would feature a proprietary design created by Goodyear. GM and Goodyear would announce that the new tires would be the basis for all their future small cars and that both would scrap their line of existing tires in favor of the new incompatible "standard."

Now imagine that GM also cut a similar deal with Firestone to design another line of radial tires. These tires would use a different sizing scheme from the GM-Goodyear tires and wouldn't fit any of the same cars. Competitors would be free to adopt the new design but only after GM and Firestone had completed development and released their own line of products.

This mythical scenario is not that far removed from the ridiculous drama now being played out by AT&T, Sun Microsystems, Microsoft and other Unix vendors. And, like a confused car buyer in the automotive example, it is the computer users who stand to lose.

AT&T and Sun have joined forces to create a graphical user interface for Unix that they plan to publish as an industry standard. The deal is a coup for Sun, which has now been anointed to co-develop an operating system destined for standard status. But it's also a snub at Microsoft, which has a similar co-development deal with AT&T for a product called Unix386. Microsoft has industry-standard plans of its own in the form of Presentation Manager, but that graphical interface was apparently passed over by AT&T in favor of Open Look.

Dozens of other Unix companies were also omitted from the AT&T-Sun party. They won't be permitted to get the kind of advance peek at future Unix specifications that Sun gets from the deal. IBM was left out as well. It has chosen the Presentation Manager for its interface standard, a fact that no doubt contributed to AT&T's decision to choose something else.

Now, computer buyers must sit on their hands while the industry leaders play out their little soap opera. It's ironic that Unix, broadly perceived as a portable and standardized operating system, should be the subject of so much conflict. It's a pity that vendors are sniping at each other when they could be banding together to offer a stable alternative to the embattled Presentation Manager.

Shame on AT&T for trying to trump IBM and Microsoft by introducing yet another element into the battle. Shame also on the dozen or so software and hardware vendors that announced vague intentions to "evaluate" Open Look at the AT&T press conference. They should either make a commitment or stay out of the picture.

It's time now for users to state their case. Do you really want to become embroiled in a marketing war with your own corporate standards as the battlefield? Better to snap the wallet shut and let your Unix suppliers know it will stay shut until they can resolve their differences.

LETTERS TO THE EDITOR

What was meant

In a recent story [CW, March 28], I was quoted as saying that the IBM 3380 Model J and K drives were performing better than the competitors' drives. What I meant to say was that they were performing better than comparable IBM drives. The difference is a very large one, and the IBM drives are, in fact, not performing better than some of the competitive drives.

Larry J. Martin
Vice-President
Reliability Research, Inc.
Norwalk, Conn.

New ball game

The search for talent in dynamic, technology-driven disciplines, like MIS, will continue to worsen as the overall work force and unemployment shrink [CW, March 7]. Companies that rely on dependable sources of talent — advertising, college recruiting, internal referrals — will have a difficult time satisfying their needs in specialized functions.

Organizations that find it difficult now should seriously evaluate their corporate attitude toward employment so they can adjust their methods and expenditures to meet the current climate. Organizations should base employment decisions on skills and traits, not experience. This will allow them to attract and retain people who share common values with the organization.

In hard-to-hire areas, consider using a specialist to solve your problem. Go to someone who looks for these people every day, not just when the need arises. Sources are available for all skill sets regardless of how scarce, but it takes a changed attitude, creativity, perseverance and looking in the right places using the right techniques to successfully solve today's problems.

It will be a progressive company that will evaluate its employment procedures and techniques now to meet the challenges of today and the years ahead.

James E. Doherty Jr.
Systems Personnel, Inc.
Media, Pa.

For the record

Wang Laboratories, Inc. would like to set the record straight regarding references to the relationship between Wang and Computer Partners, Inc. in "Strategic systems plans gone awry" [CW, March 14].

In contrast to opinions attributed to an anonymous former Computer Partners consultant, Wang has had a fruitful relationship with Computer Partners. Their expert consultation was instrumental in helping Wang design and implement an ambitious set of management information systems that are in place today and working splendidly.

There were some redirections that led to periodic delays in the completion of the project. They were not due to any lack of effort or ability on the part of Computer Partners, as your source implied, nor was Wang required to "correct the situation left by Computer Partners." As planned from the start, the role of Computer Partners was assumed in phases by Wang personnel. Wang found Computer Partners to be a fine firm with excellent resources and management techniques that, combined with Wang talent, served to deliver some good solutions.

Wang is not, as the article stated, redoing its entire order processing system again. During the period discussed in the article and in subsequent years, Wang's internal systems have vastly improved the company's relationship with its customers. The information systems development process is a dynamic one in which system enhancements are performed regularly.

Bradford R. Sweet
Group Director, CIS
Computer Operations and Technical Support
Wang Laboratories, Inc.
Lowell, Mass.

Shocking reaction

I find it personally shocking when a relatively bland and innocuous *Computerworld* article, "Independents' backs to the barricades," [CW, Feb. 1] generates such a barrage of hate mail. If the letter writers [CW, Feb. 29 and March 7] show this utter contempt for independent contractors, who do not work for them, then how do they feel about the people who do work for them? With attitudes like this, it is surprising that we do not have programmers' unions.

The self-righteousness of those letters disguises the fact that they are taking bread out of my mouth and money out of my wallet. What's the matter? Did the article threaten the windfall profits their companies are making from Section 1706?

Phil Nowak
Chicago

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.*

Sometimes, more is too much

Intelligent text retrieval will let you find the needle in the haystack

HARVEY NEWQUIST

Throughout computing history, one concern has overridden all others as we progress from software level to software level and hardware architecture to hardware architecture. That concern is MORE.

More speed, more power, more memory, more functions, more features, more users, more flexibility, more everything. We really want more of all these things so we can store more information in more places. That is the bottom line, more or less.

Yet, as we strive for this goal, we've created a data world in which information goes in but does not always come out. We've found enough ways to put information in: scanners, digitizers, mice, voice systems, joysticks, digitizing tablets, electronic mail messages and on and on. If it is in paper form, we want it on computer disks so it can be accessed electronically.

There is one problem with so much "more" going in: How are we supposed to get out the exact bits and pieces of information we need? Think of all the times you've reached into a four-drawer file cabinet and have not been able to find that one piece of paper critical to today's meeting.

On a larger scale, think of going into the Library of Congress, where just about all of the world's printed material resides. Then ask for something specific, such as *A Collection of Edgar Allan Poe's Short Stories*. Imagine the librarian saying, "The volume is in there somewhere, probably under fiction." Well, that's a big help; it limits your search to about eight million books instead of 20 million.

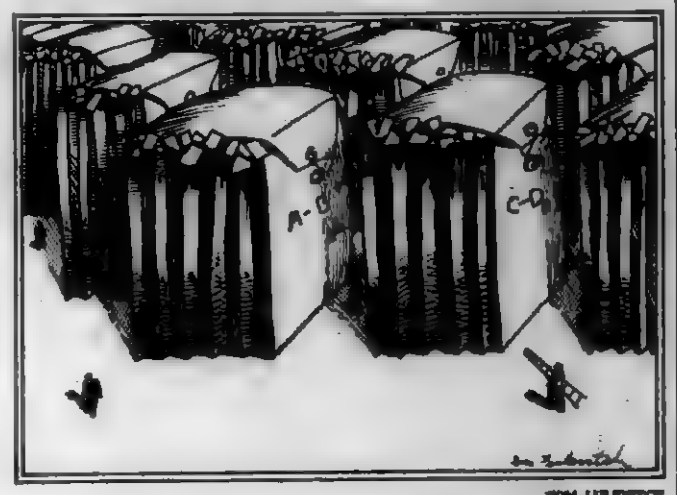
A similar situation is being created in computerdom today.

In the last few months, there has been renewed interest in the problem of getting out specific pieces of all the "more" that went in. The effort is being exerted by a segment of the computing community that exists just between artificial intelligence and text management. The concepts behind "text-based management systems" and "intelligent text retrieval" are the hottest things since this morning's on-line headlines.

Essentially, the goal is to create software management systems that allow any user to define what kind of information is relevant to him. In so doing, the user creates a sort of filter and priority system, which sorts through the information contained in all those hundreds and thousands of data bases.

Thus, instead of getting a huge load of data dumped onto

Continued on page 23



TOM LULEVITCH

Newquist writes and consults on artificial intelligence and other advanced high-technology topics from his office in Scottsdale, Ariz.

Oh, holy copyright! God's suing

DOUGLAS BARNEY

In a move unanticipated by computer analysts, God himself has filed suit against nearly the entire software industry for violation of a long-standing audiovisual copyright.

The suit, filed last week in East Heaven District Court, alleges that all computer firms, including Apple Computer, Inc., Lotus Development Corp. and Paperback Software International, have illegally copied God's original look and feel.

God, however, declined to file suit against Microsoft Corp. and its well-compensated founder Bill "Pearly" Gates. "I can't very well sue my business partner, now can I?" God said in an exclusive interview with Oral Roberts last week.

Contrary to popular belief, pull-down menus, windowing and icons did not originate at the Xerox Palo Alto Research Center but at St. Peter's Research Center. "Heck, I used a graphical user interface when laying out the continents and ran the program on my heavenly host," God said.

As the ultimate creator, God also claimed ownership of all software innovations. According to the perfect logic behind the suit, God created man in his own image. Man in turn created software based on God's intellectual property. Therefore, God created software, the suit claimed.

"All software was created either by me or in my own image — that is except for Topview, which was Lucifer's doing. Now these upstart firms are selling my creations and making millions," God said. Lucifer could not be reached for comment, but sources close to the fallen angel described his reaction as "heated." When asked who would hear the case, God replied, "I'll be the judge of that."

In fact, because of one of God's copyrights, Microsoft's popular word processing package, originally called God's Word, was renamed Microsoft Word.

"Bill and I teamed up on that one, but I was left out of developing Windows," God claimed. "Maybe that's why it was so late."

God was surprisingly blunt when asked about the recent lawsuit by Apple alleging copyright violation against Microsoft. "I knew a firm named Apple was bound to be bad," he said.

Apple President John Sculley shrugged off the suit. "I wrote the Book of John, called *Odyssey*. And I created a miracle by giving the Macintosh expansion slots, something Job, I mean Jobs, refused to do."

The suit seeks an unspecified number of pennies from heaven and an immediate injunction preventing all software vendors from distributing products. It also asks that computer journalists stop taking God's name in vain, goshdarnit!

Barney is a *Computerworld* senior editor, microcomputing.

An Apple's an Apple, and a suit's a suit

AMY WOHL

Life is settling down again in the computer industry. For a few weeks we were agitated, perturbed and perhaps even distressed: Apple was suing Hewlett-Packard and Microsoft, claiming infringement on its Macintosh interface.

There are the obvious issues, as well as some obvious answers:

- Can Apple claim an interface that was actually developed by Xerox? Probably not.
- How similar do two interfaces have to be for one to be an infringement on the other's copyright protection? The legal term specifies "substantially similar." Based on prior decisions, that phrase seems to mean "virtually identical."
- Did Microsoft actually have a valid license to the interface? Maybe.
- Had HP previously applied to Apple for a Macintosh interface-appearance license and been turned down? HP says it asked for information about a license and never received a reply; an Apple spokesman says HP applied and was turned down.

Emotions run high

Let's look at the real reasons why some Apple employees are embarrassed, Xerox employees alternately furious and triumphant and industry gurus, while never speechless, are puzzled.

The industry feels strongly that while Apple can claim a few bits (or bytes) of the Macintosh interface, most of its components were developed at SRI International in the 1960s and at the Xerox Palo Alto Research Center in the '70s.

The mouse pointer, the idea of windows and pull-down menus, the concept and even the appearance of icons all predate the design and announcement of the Macintosh product.

Too, there is the widespread belief that if Xerox permitted Apple to use its innovative concepts in the Lisa and the Macintosh, Apple should be pleased that its refinements are being further used and refined.

Also, the computer developer community is a close-knit tribe. They often think of themselves more as brother scientists, partners in creating better and better products rather than as employees of aggressively competing corporate empires.

Apple has nearly always been a proponent of the brotherhood of computer developers and users and has often profited from the friendly feelings the community has held for it. For many, this lawsuit creates the uneasy feeling that Apple has joined the world of big corporations. Left behind is the noble pursuit of building the best products because that is what good people

FOR MANY, this lawsuit creates the uneasy feeling that Apple has joined the world of big corporations.

should do with their talents.

Perhaps we were hopelessly naive. Perhaps the Apple that existed in our minds never existed in reality. Perhaps we must understand the inevitable laws and stresses of the marketplace.

Sincerest flattery

Nevertheless, we should not forget in our distress that the Macintosh is still one of the best computing environments available. That, in fact, is why it has been paid the compliment of imitation.

But it is the discipline with which Apple surrounded its interface, rather than the exact appearance of the interface itself, that makes the Macintosh different and appealing.

Macintosh-like environments on other platforms come with similar interfaces, but they do not show the same interface predictability or discipline. Too many popular applications with too many different interfaces already exist.

DOS environments must compromise to accommodate the continuing use of this existing software. Windows, Presentation Manager and New Wave will all run new programs as well as the old DOS programs, each with its own dissimilar interface.

The bottom line is this: The Macintosh offers ease of use at the cost of somewhat less flexibility; DOS (and OS/2) will offer more flexibility but less ease of use. You pay your penny and you take your choice.

Few believe that this lawsuit is really about Hewlett Packard's New Wave product. (The product, by the way, is worthy of notice. In fact, a very real by-product of Apple's lawsuit may be the additional attention it will bring to New Wave. Perhaps HP

Continued on page 23

Wohl is president of Wohl Associates in Bala Cynwyd, Pa., and editor of "The Wohl Report on End-User Computing" newsletter.

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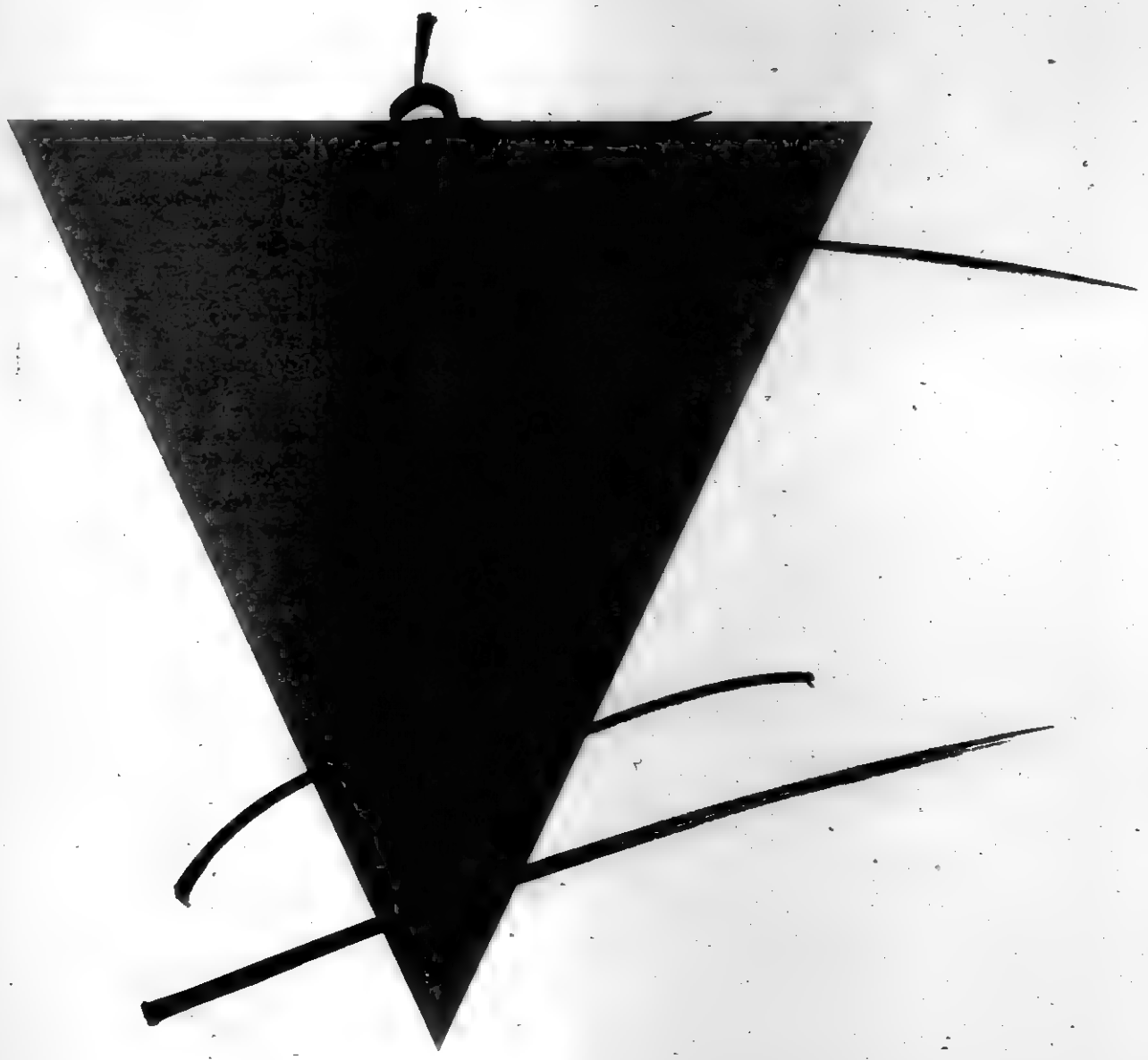

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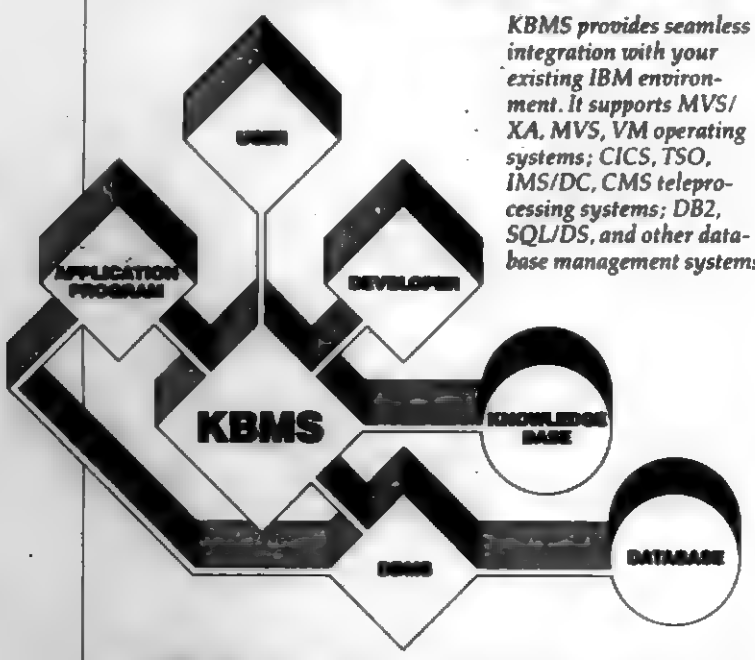

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More

CONTINUED FROM PAGE 19

the computer (like downloading the entire *Wall Street Journal*), the user receives a sifted version based on rules about what is important, relevant and desired.

Companies like Brattle Research Corp., Intelligent Technology Group and Information Access Systems, Inc. are working on ways to tailor information retrieval to the needs of each user.

What do The Beatles make?

Suppose I wanted to sift through a data base of articles published during the last five years concerning the entertainment industry. These articles may have been culled from *Billboard*, *Variety*, *The New York Times*, the *Los Angeles Times* and numerous trade publications.

For this inquiry, I want only information on how much money is being made by the renewed interest in The Beatles' music — reissued compact disks, television commercials, videos and so on. Key-word searches would probably get me everything from information on Beatles' fan club gatherings to George Harrison's ramblings about Indian mysticism.

Now let's apply a little intelligence to the retrieval process. In my system, I have already defined "financial matters" as being the issues directly related to, one, money and how it is made and used; two, economic and business pursuits; and, three, licensing, royalties, remuneration and compensation.

I have also defined the individual members of The Beatles, key people associated with the group, such as managers and wives, and miscellaneous areas, such as Apple Records, fan clubs, record albums, movies and so on.

At this point, the textual data can be searched and weighed against the information I provided as guidelines for the system, based on rules I outlined for it. Consequently, I should now receive only articles such as an interview with Paul McCartney on his wealth, an assessment of Nike's licensing arrangement for "Revolution" and comments from Ringo Starr as to the money he made from dressing up as a polar bear for Sun Country Wine Coolers. You get the general idea.

The intelligent clerk

Remember that this retrieval technology is still in its infancy and so is not yet functioning to its potential. But I am getting what I need, not whatever the system decides to dump on me. Of course, I must tailor the system, spending time defining certain terms and their relative importance in light of other topics.

The whole idea is to look at the computer retrieval system as an intelligent clerk or librarian. The more this assistant knows about what you're looking for, the closer he can come to getting you exactly the information you need. Intelligent retrieval systems may be put onto on-line data bases. Think of how your information overload could be lessened: Instead of scanning four newspapers a day, page by page, you could create your own filter that gives you the topics you already know you'll be looking for. The system omits noise — topics that are nothing but clutter in your daily information intake.

Although intelligent text retrieval has not yet been perfected, it holds the promise of allowing you access into the information void into which so much data has disappeared.

Apple

CONTINUED FROM PAGE 19

should send Apple a thank-you note?)

Rather, the lawsuit is broadly perceived as a trial balloon, a kind of warning to IBM that the Presentation Manager — based on Microsoft's Windows — is also subject to Apple's examination and possible future litigation. In fact, many believe the real point of the lawsuit is to discourage developers from spending resources on the OS/2 Presentation Manager and to redirect them to the Macintosh camp.

Interest in the suit is already ebbing. Developers have correctly decided that this is Apple's and Microsoft's problem and that Apple has promised not to come after software developers on this issue.

Of course, if Apple succeeds in removing Windows from the marketplace, developers will have difficulty in finding a market for their Windows-compatible programs. Also, if Apple intends to pursue this case through the courts with, as its spokesman says, no intention of settling and no desire to speed things up, the process will take a dozen years — plenty of time for others to write and profit from two or three generations of software.

Let's get on with it

This lawsuit seems to embody much larger issues than the appearance of an icon or a menu. We need to learn the proper relationship between protecting unique intellectual property developed by a single company with the intention of making a profit and the interworkings of jointly developed concepts and ideas that belong to the complex network of developers, scientists, users and vendors that make up the computer industry.

I suspect we are all too dependent on our colleagues and competitors to give up those relationships and retreat to well-protected corporate ivory towers.

For if we did, we would then have to dream up the next generation of computers and interfaces without the intellectual stimulation that our unpredictable interactions provide. And, I suspect, none of us is prepared to be quite that lonely.

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SOFT TALK

Charles Babcock

IBM flexes DB2 muscles

With its announcement of DB2 Version 2.0, IBM is trying to leave the debate over relational performance behind and open a new era of relational data base use.

The relational approach brought a flexibility to the data base field that its predecessors lacked. But the price of open-ended access, many users intuited, was unpredictable performance. Even the relational advocates admit that an SQL query may take either four minutes or four days, depending on how it is phrased.

Perhaps the most emblematic feature of Version 2.0 is its resource governor. The data base administrator may now impose restrictions on how long a query will run and the number of CPU cycles it will consume. Offering this level of control over DB2 removes one of the hang-ups of using a relational data base in the production environment.

Indeed, with its much faster transaction processing capabilities, IBM has set a standard for relational performance on its 3090E series mainframes that threatens to leave its competitors far behind. In the past,

Continued on page 29

MSA growth hardy, profits low

Chairman Imlay says acquisitions hurt firm's profits in 1987

Management Science America, Inc. (MSA), the Atlanta-based applications giant, held its annual users group meeting in Chicago last week. The following is an interview with MSA Chairman John Imlay conducted by *Computerworld* senior writer Rosemary Hamilton before the meeting.

MSA has recently gone through financial difficulties and has seen the departure of a dozen executives. What happened?

Revenue last year increased 43%, independent of the acquisitions, so that means growth. But we had decided to make a change in revenue recognition, meaning we took out almost $70 million.

MSA's Imlay

At the same time, the acquisitions cost us more than we anticipated.

RTS [Real Time Systems, an MSA European subsidiary] gave us grave difficulty. The strategy of RTS was outstanding. But the losses were much more than expected. The sales didn't materialise, but the expenses went right along.

We determined that to be more profitable, we needed to streamline. We had Advanced Manufacturing, Inc. [an MSA group] as one company and the rest of the products as another. But those two companies were pulling apart.

So what we did was streamline that organization. And Dennis [Vohs, former president of Advanced Manufacturing] wanted to be a chief operating officer-type of person and did not want to go back to development. So he left the company. With him, a whole Advanced Manufacturing

Continued on page 28

CASE focus on quality prescribed

BY CHARLES BABCOCK
CW STAFF

Implementing computer-aided software engineering (CASE) tools and methodologies is likely to succeed if a shop's goal is quality, but most implement CASE to achieve productivity, CASE consultant Vaughan Merlyn said last week.

When quick productivity gains do not occur, the tools become "shelfware," noted Merlyn, president of Bellevue, Wash.-based CASE Research Corp. Merlyn made his remarks at the Atre Computer Assistance forum on relational data base and CASE in Arlington, Va.

Those who advocate CASE frequently find they can implement it on a trial basis, but this is part of the shortsighted, productivity-oriented approach, he added.

"Most trials end in a hanging," Merlyn warned, "and the CASE tools get hung."

Instead, a site that wants to

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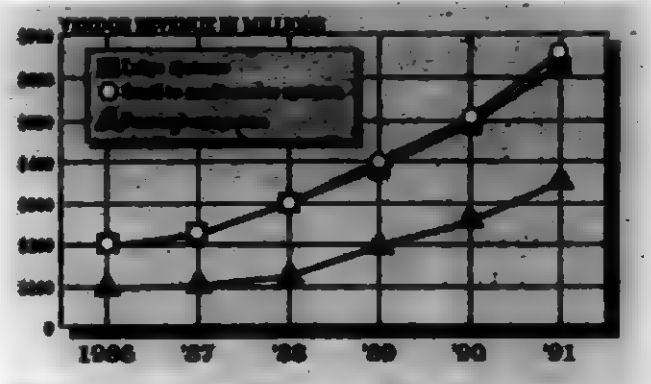
Data View

Banking software draws interest

Over a six-year period, banking and financial packages will be increasingly used across all hardware tiers



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.

Nastec links CASE, Telon

BY NELL MARGOLIS
CW STAFF

SOUTHFIELD, Mich. — In pursuit of a total CASE environment, Nastec Corp. recently announced an interface between its CASE 2000 Designaid front-end computer-aided software engineering system and Panoptic Systems, Inc.'s Telon application generator.

The Telon Interface Option creates a bridge from the specification and design stages of the

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Inside

- Duquesne enhances MVS, JES supervisor. Page 26.
- Ross welcomes Access to the MAPS family. Page 27.
- Universal offers disk management tool for IBM systems. Page 30.

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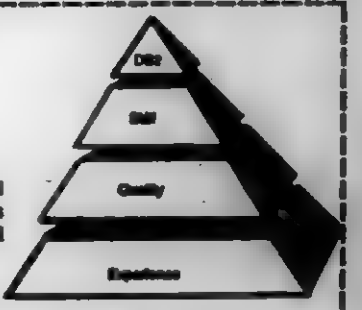
APRIL Portfolio Spotlight

The PLATINUM Education Curricula



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- **DB2 Database and System Administration** – To give you the details needed to efficiently and effectively administer your DB2 environment.
- **CSP Application Programming** – For a full understanding of how to design, code, and implement your DB2 applications using CSP.
- **Using DB2 and QMF** – To introduce your managers & end-users to DB2.

Duquesne offers tests and reviews

PITTSBURGH — Duquesne Systems, Inc. has added a capability to its Automate/MVS operating system supervisor that helps a console operator test the rules he is using to automatically respond to IBM MVS and JES messages.

When used in conjunction with two other Duquesne system utilities, the operator can retrieve SYSLOG data — the job activity, error and event information messages that MVS and JES routinely put out to the system console. Usually the information is printed out from the console if it is saved, but Release 3.3 of Syslog Management and Retrieval and Release 4.1 of Joblog Management and Retrieval allow it to be saved on direct-access storage devices and tape. The information may also be selectively printed or called up for on-line review, said Gregory Coticchia, Duquesne's product group manager.

Once called back to the system console, Automate/MVS can take the SYSLOG data and run it against rules developed by the system operator as the correct responses to the messages. "You can retrieve archived SYSLOG and submit it to the product for testing. It gives you instant replay or playback," Coticchia said.

The testing capability was added to Release 1.1 of Automate/MVS. It is priced from $7,500 to $15,000, depending on processor size. Syslog Management and Retrieval and Joblog Management and Retrieval are priced at $7,500 for a site license.

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Lotus Symphony 2.0

Portability feather in firm's CAP

TORONTO — More and easier portability to IBM environments led the list of enhancements included in Netron, Inc.'s latest version of the VAX/VMS-based Netron/CAP Development Center, offered this week by the Canadian software company.

CAP, or computer-automated programming, is based on Bassett Frame Technology, an architecture developed by Netron Research Vice-President Paul Bassett that facilitates code reusability by segregating specific and generic software program components into "frames" that can then be accessed and copied as needed. CAP was designed as an application development system that allows for prototyping as well as easy-to-maintain applications, according to Netron.

The just-released Version 2.03 includes interactive debugging capabilities and a frame tree utility that produces a diagnostic listing of all frames, engineering breakpoints and custom code used in a program as it is developed.

The main emphasis in the latest CAP, however, was on easing the route to non-VAX hardware platforms for CAP-created applications. It included, according to a Netron spokesman, "improved portability for VAX-based development and maintenance of complex batch and CICS systems for IBM MVS and DOS/VSE mainframes."

CAP's design component underwent several modifications. All errors or omissions that would keep software developed on the VAX from working under the CICS teleprocessing monitor or IBM's MVS operating system are listed on Capscreen, so that the user can make modifications as needed.

The Netron/CAP Development Center is priced from $12,000 per user for a three-terminal license to $3,520 per user for a 50-terminal license. The IBM mainframe development option is available, starting with a five-terminal license, for an additional $40,000. Site licensing can also be obtained.

Ross and Access marriage begets new MAPS executive info system

BY NELL MARGOLIS
CW STAFF

PALO ALTO, Calif. — Ross Systems, Inc. has married its MAPS family of VAX-dedicated accounting software to Access Technology, Inc.'s 20/20 spreadsheet to offer an executive information system (EIS) tailored to the needs of financial executives.

Available immediately, MAPS/EIS features the 20/20 spreadsheet, an inquiry and reporting tool through which users can simultaneously use all Ross financial accounting applications, a link between the MAPS line and personal computer-based spreadsheets, a report writer that allows users to extract data from the MAPS general-ledger module and an Access Technology-crafted tool that gives users access to data bases directly from the 20/20 spreadsheet.

MAPS/EIS also includes an interface to Digital Equipment Corp.'s All-In-1 office automation software system.

Using the generalized EIS software products currently available, financial executives at large companies are likely to be inundated with information they do not need, said Sue Sweeney, Ross Systems' director of strategic marketing.

Time is money

As a result, she said, the user is saddled with a sorting task and a possibly time-consuming effort to find his bottom line with help from the MIS department — and all this comes on top of a huge bill for excess-function software and a cumbersome and expensive training period.

MAPS/EIS, on the other hand, "doesn't require an MIS department — it's so easy that accountants can use it by themselves," Sweeney said.

What is more, she added, the Ross offering, customized for the financial executive's needs, reduces the complexity of the generalized EIS product.

According to Sweeney, Ross Systems, which claims a 72% share of the mainframe-class financial software installations on the VAX, is in no way entering the generalized EIS market with MAPS/EIS.

"We made a conscious decision to remain very focused. We're sticking to the VAX as our only supported platform and accounting as our target industry," she said.

MAPS/EIS, which can be purchased as an integrated package or on a component basis, is priced from $3,500 to $15,000, depending on CPU and software configuration.

CASE focus

CONTINUED FROM PAGE 25

implement CASE should seek a management commitment to produce better quality software. Productivity gains are likely to follow, but quality can be established as the first systems come out of the development cycle. When challenged on that point, Merlyn said quality can be measured by the amount of maintenance a system requires, its ease of modification, its documentation and the consistency with which it meets system requirements.

Management too often views CASE as a product or set of products that will speed the development of applications. CASE is both a tool set and a disciplined methodology, and both must be implemented for a shop to gain the benefits of CASE.

Specification and design methodologies impose a common discipline on what otherwise becomes a highly individualistic craft, according to Merlyn.

Defense contractors overcame this tendency when the Department of Defense required that a delivered system match DOD requirements.

The requirement can be met through a CASE methodology but is hard to accommodate without it. So defense contractors tend to be consistent CASE users.

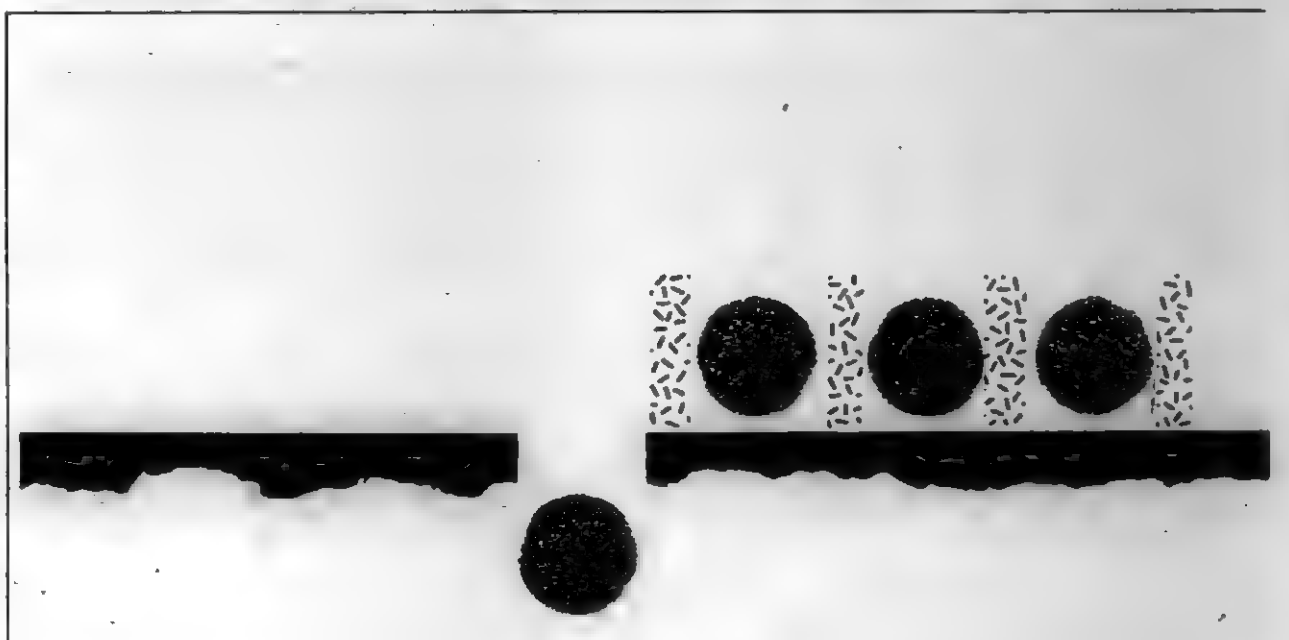
Projects the leading edge

The discipline and tool set imposed by CASE allow for much more effective project management, and the Europeans and the Japanese lead the U.S. software industry in this respect, he said. U.S. firms tend to use CASE to mobilize individual programmer's talents by augmenting them with as much workstation technology as possible.

In a survey of 42 IBM DB2 users, Merlyn found that 50% of them were also CASE users: a high percentage, considering that CASE vendors are believed to have penetrated only 3% to 4% of the possible market.

When asked why DB2 and CASE seemed frequently to go hand in hand, Merlyn said relational data base is not a prerequisite for successful CASE implementation, but the larger, more aggressive shops tend to be very data oriented and quickly recognize tools for working with it.

He said the DB2 shops also tend to express the most dissatisfaction with their CASE tools, indicating a desire to work at a higher level of performance than currently possible.



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crew left at that time, too. Dennis is now looking for a position and so are those four or five others.

At the same time, we streamlined development. Again, we were not making enough profit, so we put both manufacturing development and the other development under one executive, Michael Hunt — and he now can shift resources across the two lines.

Then that group of executives left in response to the reorganization?
That's correct.

Were any of these people laid off?
We knew they wouldn't like it when we did it, but we had to take strong action. So, we made these decisions and lots of times there's no place for someone. So, some were [laid off], some weren't and some left on their own.

But someone like Dennis, who had been with me for 17 years, just didn't want development.

In terms of additional streamlining, will there be further cutbacks in personnel?
You never say never. But in this particular instance, there won't be any major layoffs. There will be people leaving and we're hiring at the same time.

How would you characterize this period of time for MSA in its overall history?
This is our 25th year in business and in those 25 years, we've had four bad years financially. This is break even — this isn't as bad as when I took over the company.

Both strategically and growth-wise, it was a sensational year for us. . . . We still spent $64 million in research and development, and we didn't cut it. However, we continued to do all the development necessary to keep us ahead of the game. How would I coin it? I would say it was good and bad.

Is there a particular message you'd like to get across to customers if the recent events have caused them concern?
The key thing is that we streamlined the organization to better serve them, so that anyone within MSA can service any request that comes along. That should cut some red tape that we had developed in the separate organizations.

In terms of all the R&D money that has been spent, what is the status of MSA's entry into the VAX marketplace?
We made the acquisition of Information Associates [a higher education software supplier], and 50% of their revenue comes from the VAX market, [thus] leading us into the VAX market very strongly. That's been the major area in which we have been working with DEC [Digital Equipment Corp.].

You will see us, as time moves forward, putting more on the VAX. But beyond the Information Associates situation, there's nothing, or no product announcements yet.

Are the mainstream MSA applications on the VAX yet?
No, they aren't available on the VAX.

A second area to discuss is manufacturing applications. There is RTS, Comserv Corp. and MSA mainframe applications as well. How is all of this coming together? Is there any level of integration at this point or are you targeting different markets.
The RTS product is used mainly in the international marketplace in mid-range areas. It's designed for small manufacturers and it has been sold very sparingly in the U.S. on a few specific accounts. The Comserv and original MSA products are being developed in tandem to come up with this super manufacturing product.

So the combination of the two are put together, and we are working to come up with a series of products for process manufacturing or repetitive manufacturing. A great deal of integration has already been done on new releases of Amaps [manufacturing software], which is the product out of the Comserv group, with MSA's financials.

In the long term, the initial MSA products in manufacturing and the Comserv products are coming together.

Update us on IBM DB2 support. General Ledger and Information Expert [MSA products] with DB2 support have been in beta-test phase, right?
We have installed a production General Ledger system with DB2 support installed at a couple of customer sites.

Is the plan to provide DB2 support for all MSA applications?
Absolutely. As the world goes DB2, the commitment will be very strong to DB2.

What's the status of your effort to comply with IBM's Systems Application Architecture (SAA)?
As the SAA world progresses, we'll be right there with it. We're right on top of it. DB2 is already part of it.

Has MSA committed to the IBM mid-range follow-on, called Silverlake?
We've signed some nondisclosures; that's all I can say. I think I put up my wife and children with it.

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IBM has had little cause to be self-congratulatory about its software once it gets beyond operating systems and utilities. But with DB2 2.0, it has advanced the state of the art of relational data base.

To a great extent, IBM's Feb. 16 announcement of ESA/370, an extension of the MVS/XA operating system, was spadework for a later DB2 announcement. By expanding the capability of virtual memory from 2G bytes to 16 terabytes for data and creating new forms of operating system-controlled CPU memory, such as hyperspace, IBM has created room for radically improved relational data base performance.

"ESA positions us for very huge processor storage," Gary J. Ferdinand, DB2 product manager, noted last week. As an increase is realized in both real memory and expanded storage — the internal memory reservoir under the control of the operating system's paging supervisor — "DB2 can use just about every byte you can throw at it," Ferdinand added.

Granting wishes

Thus, IBM appears to have taken a giant step in the direction of satisfying what, until now, has been an academic wish that unlimited memory inside the processor be put at the disposal of a relational data base management system.

Such a move will not free a mainframe user from all constraints. On the contrary, warns ESA advocate Anthony Deakins at Amco Consulting, it raises new problems as well as possibilities.

> "DB2 CAN USE just about every byte you can throw at it."
>
> GARY J. FERDINAND
> IBM

Trying to manage the data of large data bases when it is frequently in motion between disk and DB2 buffers raises new exposures. Trying to update a data base of several million records while operating in real time creates new risks.

In addition, ESA and the 3090E processors represent the most expensive products in IBM's stable. Customers would be well advised to look not only at how much work they can do with DB2 but also at the price per transaction.

Nevertheless, IBM has succeeded in pushing back the limits of relational DBMS operation on several fronts at once. It appears the door will open one day to the use of DB2 for multiprocessing work. As Paul Hessinger of the Computer Task Group has suggested, IBM can work on tying each processor in a multiprocessor machine to a separate DB2 buffer and multiply transaction throughput accordingly.

There is a second shoe that will drop before the ESA saga fully unfolds and that is the IBM repository. An application development system based on an introductory IBM repository, it could offer tools to speed the development of DB2 applications. With the ease-of-development capabilities already offered by relational systems — the programmer does not have to define where the data is — a repository and DB2 combination could begin to attack the application backlog at some of IBM's largest customers.

Babcock is Computerworld's senior editor, software & services.

Nastec links CASE

CONTINUED FROM PAGE 25

software development cycle to the coding and testing, or back-end, phases. The former is represented by Nastec's Designaid multimodular system, the latter by the Oakbrook, Ill.-based, Pansophic Telon, which supports IBM's CICS, IMS/DC or batch environments and includes a facility for defining program characteristics, a generator that produces native Cobol or PL/I source programs and an integrated testing facility.

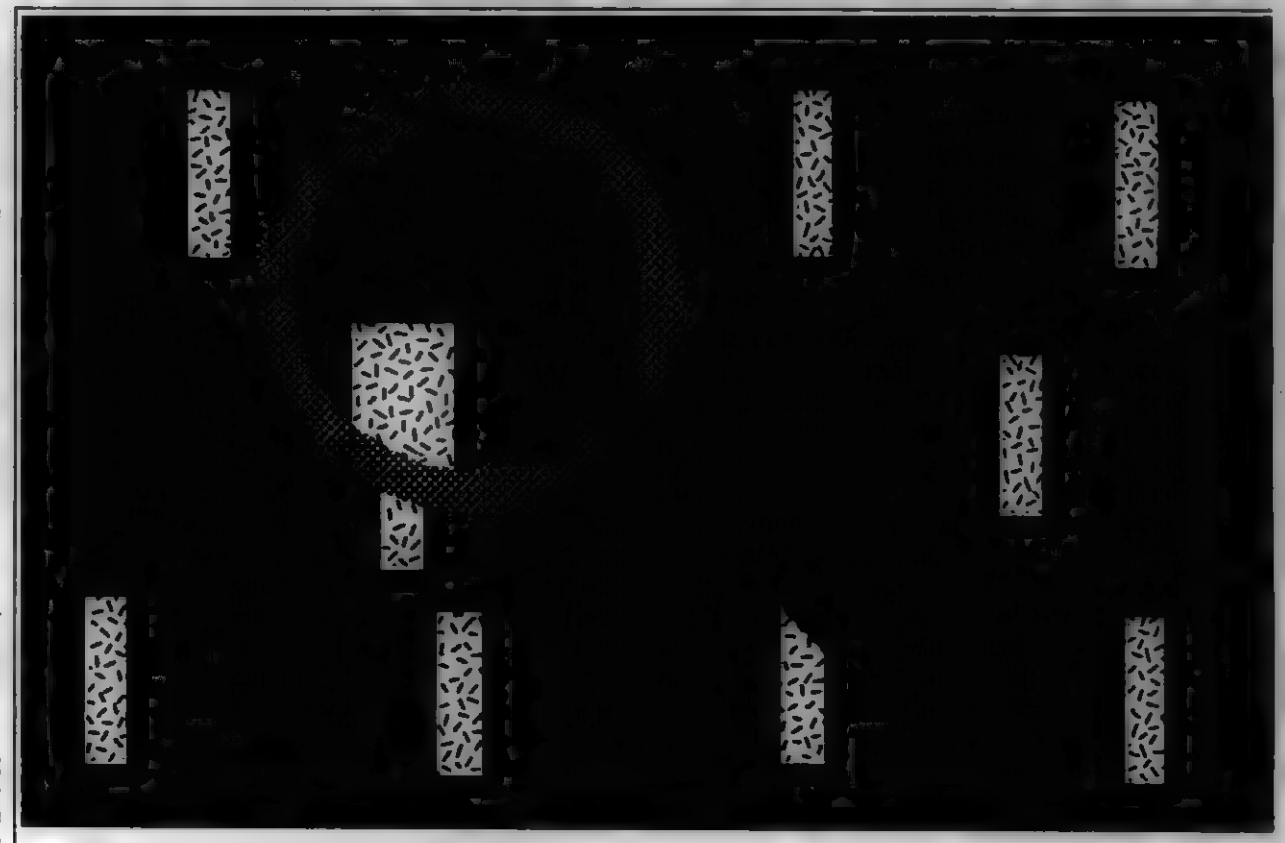
Conversion into Telon

The Designaid/Telon united system, which runs on IBM PCs and compatibles and IBM mainframes, converts user-created Designaid screens and reports into Telon "panel definitions," merging them into specification documents for analysis and review, according to Nastec.

Because the screens and reports become source code in Telon, the interface automatically decreases redundancy, which in turn cuts down the error potential, a company spokeswoman said.

While the majority of the information flows from Designaid to Telon at this stage, the interface is a two-way street with which the user can bring screens back into Designaid for updating of specifications. "And this is just the beginning," said the spokeswoman, who confirmed that Nastec is already at work enhancing the interface, particularly in increasing the two-way aspect.

The Telon Interface Option is available immediately at a site license price of $9,900.



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NEW PRODUCTS

Applications packages

An optical document recognition system said to capture document structure as well as ASCII characters and page layout has been announced by **Context Corp.**

The **Document Recognition Solution Pack** includes the vendor's Network Recognition Engine hardware driven by the ScanED software application. The recognition capability includes text, pictures, page layout and structures like sections and lists.

Other features include omnifont performance for more than 20,000 font sizes ranging from six to 28 points. Scanning speed is 250 recognized char./sec., the vendor said.

The Document Recognition Solution Pack is priced to $38,000. It will be available in the third quarter.

Context, 8285 S.W. Nimbus Ave., Beaverton, Ore. 97005. 503-646-2600.

Utilities

A utility said to speed the process of converting files from Cobol to Speed II, Tom Software's fourth-generation language for Wang Laboratories, Inc. VS computers, has been announced by **Tom Software, Inc.**

Lexigen automatically creates Speed II data dictionary records from information contained in the select and record definition portions of Cobol source code programs.

Lexigen is a menu-driven system featuring a program that automatically searches the system for any Cobol source code programs and creates a cross-reference file that includes all Cobol file names referenced in those programs, the vendor said.

Other features include error checking and a log of the conversion process.

Lexigen carries a price starting at $1,500.

Tom Software, 127 S.W. 15th St., Seattle, Wash. 98166. 206-246-7022.

A disk management tool for IBM DOS/VSE-based systems, said to provide automatic data compression for VSAM files, has been announced by **Universal Software, Inc.**

VSAM-Lite is a table-driven system that does not require any program or IBM JCL modifications. The user specifies the data sets to be compressed, and VSAM-Lite automatically and transparently does the compression, the vendor said.

Features include elimination or postponement of direct-access storage device upgrades; improved system performance and on-line response time; reduced disk I/O activity and channel contention; and improved backup and restore processing and backup tape use.

VSAM-Lite costs from $7,250 for a permanent license.

Universal Software, Brookfield Office Park, Brookfield, Conn. 06804. 203-792-5100.

Development tools

Two C compiler packages designed to assist users of Versados to migrate development to Unix System/68 on Motorola, Inc.'s 11/31 have been announced by **Whitesmiths, Ltd.**

The first package provides a native C compiler for System/68; the second provides System/68 hosted C cross-compiler support for Versados. In addition to Whitesmiths' standard Versados C native compiler, support is provided for all of Motorola's 68K-byte-based operating systems. Both packages provide support for stand-alone code production for embedded systems.

The C Cross Compiler costs $3,000; the System/68 C Native Compiler costs $1,500.

Whitesmiths, 59 Power Road, Westford, Mass. 01886. 617-692-7800.

A family of knowledge-based environments designed to facilitate the development of applications that extend SQL relational data bases has been announced by **Quantum Inknowvations Corp.**

The **Progenesis** family operates as an expert front end to such relational data base management systems as IBM's DB2, Oracle Corp.'s Oracle and Sybase, Inc.'s Sybase. It provides transparent access to SQL relational DBMS systems, integrated use of local-area networks, knowledge-based reasoning and windowing user interfaces.

Progenesis is priced from $895 to $4,995. Runtime versions are also available.

Quantum Inknowvations, 2953 Bunker Hill Lane, Santa Clara, Calif. 95054. 408-496-6933.

An automated Ada-based analysis tool called **Adamat** has been announced by **Dynamics Research Corp.**

According to the vendor, Adamat uses more than 150 Ada-specific metrics. Adamat provides a detailed analysis of Ada source code. It also provides users with tools for monitoring project progress and pinpointing problem areas at any stage in the development process.

Adamat runs on Digital Equipment Corp. VAX and Microvax computers. Prices range from $2,495 for a Microvax II or 2000 to $34,985 for a VAX 8978 or 8974.

Dynamics Research, 60 Frontage Road, Andover, Mass. 01810. 617-475-9090.

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MICRO BITS

Douglas Barney

Why the long wait?

Did it have to take so long? Recent speculation that IBM and Microsoft's OS/2 Presentation Manager may not meet its October delivery deadline and the realization that most of the applications for the interface aren't even being written yet make some users' blood boil. But to get really steamed, just think of the way it might have been.

Knowledgeable software developers claim this whole wait-and-then-wait-some-more situation could have been averted and that Microsoft Windows applications could be running under OS/2 today. That is, were it not for IBM.

Developers say Microsoft's original plan was to port Windows as quickly and smoothly as possible over to OS/2 and have that serve as a graphical front end. Since this was the plan, Windows developers were told that their applications would be automatically OS/2 compatible. Yup. If this had happened, current Windows applications would be running on OS/2 today.

Instead, IBM traded its endorsement of Windows for the right to redesign the code-un-

Continued on page 45

Few users speeding to OS/2

Dearth of applications, looming customization ward off PC managers

BY ALAN J. RYAN
CW STAFF

NEW YORK — OS/2 implementation is progressing at a snail's pace due to the lack of applications and the daunting support requirements, according to PC managers at the recent Microcomputer Managers Association meeting here.

An overwhelming majority of managers attending a session entitled, "OS/2: Who needs it?" replied, "No one."

The managers cited the lack of applications written for the operating system as one reason for holding off their OS/2 purchases. However, some said they fear losing their independence by switching to OS/2. Because OS/2 must be extensively customized for each brand of PC, there is only one source for the operating system.

Others said they are considering OS/2 but have not ruled out alternatives like Unix, which also provides large memory addressing and multitasking. Unix will also support a graphical user interface when Open Look from Sun Microsystems, Inc. and AT&T arrives.

The personal touch

Customization is one aspect of OS/2 that many users have not considered.

Paul Mace, president of Paul Mace Software, Inc. in Ashland, Ore., said many users do not realize that with OS/2 they may be forced to customize their software and hardware. "You've been accustomed to buying off-the-shelf software and hardware, but that won't necessarily be possible in the future," he said.

Making those packages work together is the problem. "Users will need either inside or external support to tie it all together," Mace said. He added that by bringing out OS/2, IBM is trying to control the PC revolution, which until now has been fueled by user wants and needs.

"This goes back to 20 years ago," one audience member said. "Users won't have independence with Unix or OS/2." This criticism was raised even

Continued on page 40

Ampro tool burning up

BY ALAN J. RYAN
CW STAFF

SUNNYVALE, Calif. — Forget floppies. Forget hard drives. Burn that software into read-only memory (ROM). At least that is what Ampro Computers, Inc. hopes MIS professionals will do with the firm's new utilities package for embedding software into any Ampro Little Board/PC.

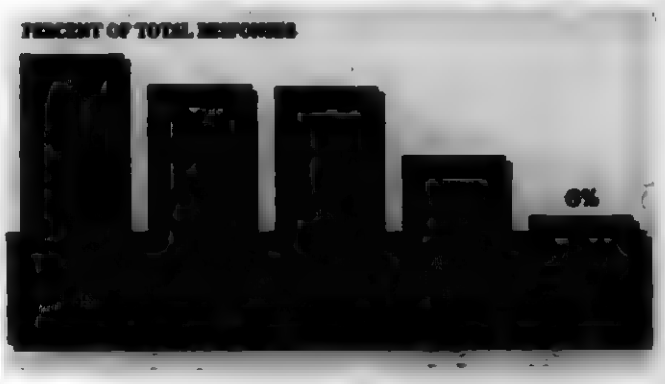
But do not unhook your disk drives yet. The Ampro system is intended primarily for use in harsh environments, where floppies die as fast as fruit flies. Typical applications include point-of-sale terminals, industrial control systems, remote data loggers

Continued on page 46

Data View

Training places

Less expensive, on-site training methods are used more often than costly off-site methods, according to 2,500 systems professionals



INFORMATION PROVIDED BY THE ASSOCIATION FOR SYSTEMS MANAGEMENT

DEC hookup lures techies to Apple fold

BY JULIE PITTA
CW STAFF

CUPERTINO, Calif. — One result of Apple Computer, Inc.'s well-publicized alliance with Digital Equipment Corp. may be a greater acceptance of Apple's Macintosh by technical users.

Even before its joint development agreement with DEC, Apple had a devoted following of engineers who had taken to its graphical user interface. However, many engineers have used the Macintosh computer for general purposes, rather than for more sophisticated technical applications.

Apple's union with DEC — which boasts a formidable presence in engineering environments with its VAX minicomputer — lends credence to the

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Inside

- Peat Marwick's MIS boss savors Apple. Page 33.
- Pioneer package blazes data base trail. Page 36.
- Qualogy adds ruggedized AT compatible. Page 48.

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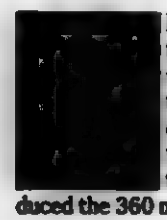


It was in 1964 that Bob Dylan wrote, "The times, they are a changin'." It was also in 1964 that IBM introduced the 360 mainframe architecture that has, since then, dominated computer use in large organizations.

We are presently at the threshold of an equally dramatic period of technological change. Traditional mainframe and minicomputer architectures — the most successful of which have been the IBM 360 and 370, introduced 24 years ago — are as surely doomed today as were the dinosaurs 65 million years ago when, some say, a meteorite struck the earth and altered the climate.

The personal computer revolution that has swept the industry during the past seven years is just the tip of the iceberg. The real action is just beginning, and it will ultimately result in the replacement of traditional mainframe and minicomputer systems with microprocessor-based alternatives.

While it is microprocessor technology that makes this transformation possible, it is economics that makes it inevitable. Computer professionals, from programmers and analysts right on through senior information systems managers and

Continued on page 43

Peat Marwick MIS boss took early shine to Apple, now reaps a bumper crop

A self-proclaimed Macintosh "bigot," Peat, Marwick, Main & Co.'s Richard Webb was one of Apple Computer, Inc.'s earliest MIS fans. As partner in charge of Peat Marwick's audit technology, Webb was instrumental in purchasing Macintoshes as early as 1983, when most MIS professionals dismissed the Mac as no more than a toy, lacking the power and sophistication to be a business tool.

Neither Webb nor his firm have regretted what others may have considered a risky decision to go with Apple. In the first four months of this year, Peat Marwick has already purchased another 500 Macintoshes. And Webb watches approvingly as other corporations increasingly buck tradition and opt for Apple over IBM.

Webb likes what he sees *in the Mac's future but won't rule out other PCs*

Recently, Webb, a 20-year MIS veteran, spoke to *Computerworld* West Coast senior correspondent Julie Pitta about the advantages he perceives in Macintoshes and his early days as a Mac proponent.

When you first brought the Mac into Peat Marwick, did you encounter any resistance from within the firm?

Virtually the entire operating committee of the firm was involved in making the decision to go with the Macintosh. At that time, we were comparing it to the IBM Personal Computer and the Hewlett-Packard Touchscreen PC. Fortunately, we had a lot of good support from people outside the audit department who felt the analysis we did at the time was objective.

When did the Macintosh first come into Peat Marwick? Why did you buy it?

The first two we got were in April of 1983. We announced we were going to buy it when Apple announced the product in 1984. Our first order was for 3,500 machines. In 1987, we bought 2,000 machines.

We actually decided on the Macintosh in May of 1982, when all we were buying was specifications.

We knew Apple was relatively new, but it had a means of servicing us wherever we did business. And of course, cost was important. But that was last on the list. The user interface was the No.1 differentiator.

I always get my dander up when people say it is a toy. When

Continued on page 42

Clipper saves time, lives at bone marrow registry

BY ALAN J. RYAN
CW STAFF

ORADELL, N.J. — Saving lives is the name of the game at the New Jersey Human Leukocyte Antigens Registry, which matches bone marrow donors and recipients. For the registry, saving time can translate into saving more lives, which led to an ongoing search for faster data base software and processors.

The registry was formed in late 1986, and things soon becoming hectic when the donor pool reached 500. A bit of computer automation was desperately needed, according to Elie Katz, president of the registry.

To speed the matching of donors and patients, Katz and a friend first wrote a program in Ashton-Tate Corp.'s Dbase II. The program, running on an Intel Corp. 8088 microprocessor-based personal computer, included the key factors that must be met to match a donor with a recipient. For instance, a donor's marrow must match six antigens in order to be considered.

"If you think of the quantity of capabilities, it became quite tedious. We had 500 donors and 400 patients. It took 3½ to four weeks to do matching for them," Katz said. The registry's system was eventually converted to Dbase III.

Needed some speed

With the size of the donor and patient pools growing daily, Katz needed a faster matching system. Steven Dunn of Custom Software Development in Englewood, Colo., suggested Clipper, a Dbase compiler from Nantucket, Inc. in Los Angeles. Katz decided to take a look at it.

Because the registry is a charitable foundation, with funding generally spent on tissue typing, Katz called Nantucket directly and asked for a complimentary copy of Clipper. It was quickly sent.

In February, Katz sent the source code of his program to Dunn, who compiled it with Clipper. "When we put it together, our matching program went from 3½ weeks to 18 hours to finish everything," Katz said.

"It translates into better

Continued on page 40

Alpha/3 brings Dbase format to common man

BY DOUGLAS BARNEY
CW STAFF

When Dave Garcia evaluated four data base software products, he chose not one, but two packages. Making the first choice was almost too easy. As a technically oriented end user at magazine publisher Diamandis Communications, Inc., he gave Ashton-Tate Corp.'s market-leading Dbase III high marks. But for those less skilled in the ways of data base programming languages, he picked Alpha/3 from Alpha Software Corp.

Unlike Dbase and other high-end data base packages, Alpha/3 is fully menu-driven and has no programming language. Despite these absences, the product can still do a decent job manipulating and tracking data, users said.

Perhaps the product's biggest selling point is that it uses the Dbase file format, so those with Alpha/3 can use the same disks as the technical people who hammer away at Dbase.

Alpha/3 competes with Software Publishing Corp.'s Professional File, Symantec Corp.'s Q&A and Ashton-Tate's Rapidfile. Of these products, however, Alpha/3 is the only one that uses the Dbase file format. The others rely on file import and conversion.

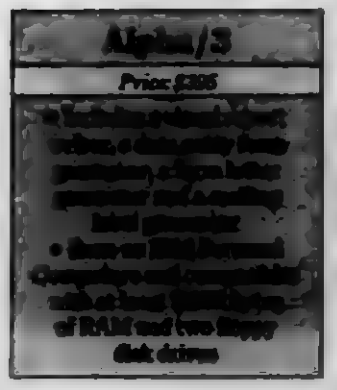
Icing on the cake

For Garcia, the file format closed the deal. "We chose Alpha/3 because it uses the Dbase file format," explained Garcia, who serves as a personal computer analyst for Diamandis.

Now Diamandis users can generate mailing lists and manage contacts without ever seeing the dot prompt so central to Dbase. In fact, *Popular Photography Magazine*, published by Diamandis, uses Alpha/3 to manage a mailing list of 600 names. Even for more complex applications, Garcia avoids throwing Dbase at the users' feet. "Instead, we will design a Dbase application for them."

For Tom Cancillo, the ease of use combined with Dbase file compatibility made Alpha/3 the package of choice. "We have 40 PC users in our department, and most are not experts," said Cancillo, supervisor of automation at PPG Industries, Inc.

Despite the lack of programming, Alpha/3 is not used for lightweight applications. Already, PPG users have some 30 to 40 Alpha/3 applications that do everything from tracking retirement benefits to keeping



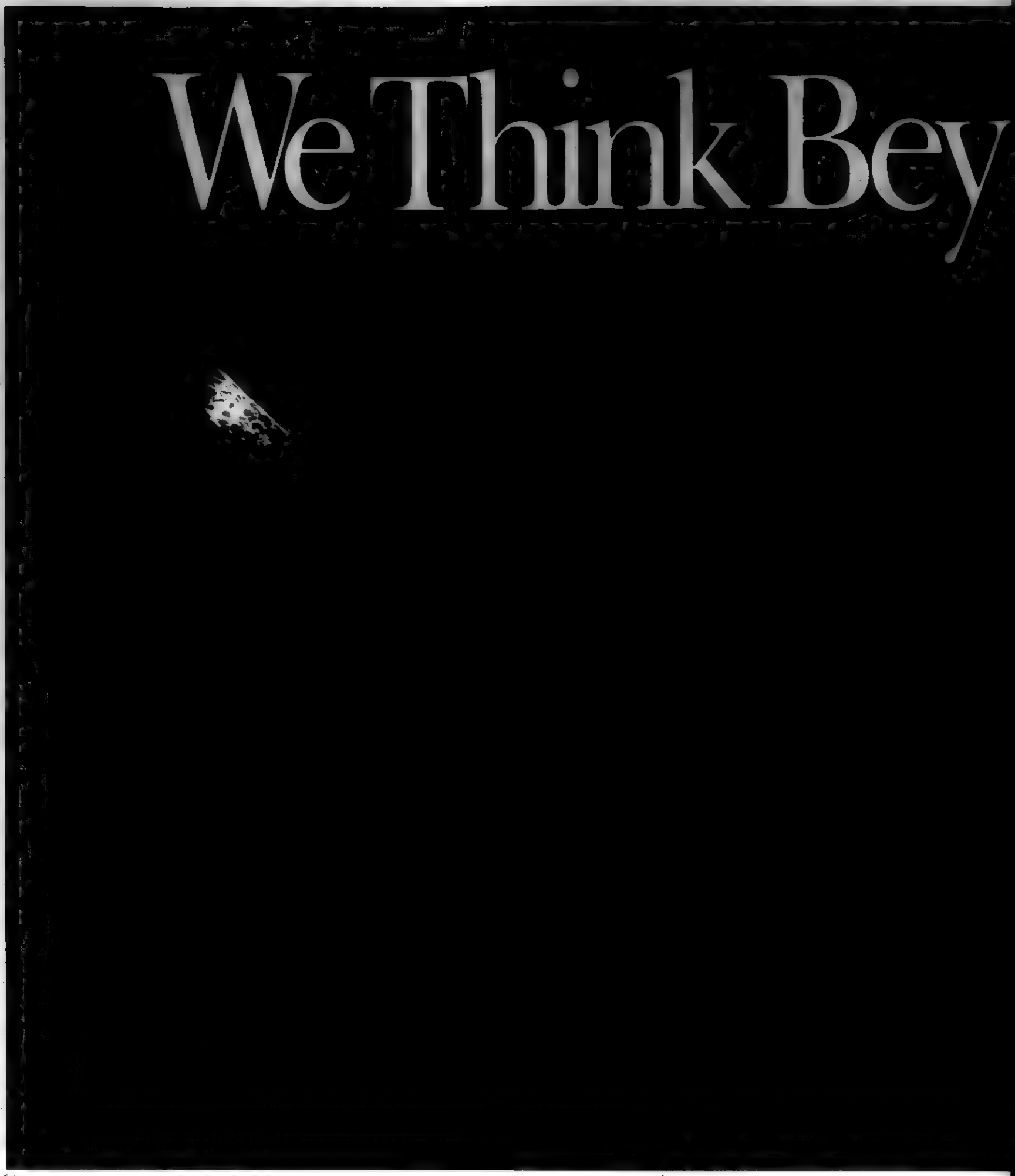
tabs on the income of overseas employees. "We used to use Dbase III, but since we have Alpha/3, we don't anymore," Cancillo said.

It was elementary economics that led Security Pacific Information Services, Inc. to hook onto Alpha/3. "We have a large user community and a small support staff," explained Teresa S. Young, a programmer and analyst at Security Pacific. "We have a lot of need for data bases but lack the skills, resources and money to have applications written in Dbase."

While Alpha/3 does a lot of jobs for Security Pacific, it is not the ultimate solution to all problems. "If Alpha/3 doesn't offer what we need, we use Dbase as a back end," Young said.

Alpha/3 may be good, but no software is bug-free. Cancillo has run across some pesky problems with Alpha/3. One in particular is the way the package handles the computation of intermediate fields. If an intermediate field is included in another computation, the program may lop a couple of digits off the final result. Instead of fixing the bug in the next release, Alpha/3 is focusing on converting the flat-file manager into a relational product, one user said.

We Think Bey



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Citizen adds AT compatible

BY SALLY CUSACK
CW STAFF

SANTA MONICA, Calif. — Formerly known only as a printer and peripherals outfit, Citizen America Corp. last week plunged into the IBM Personal Computer AT-compatible waters.

Christened the Citizen Mate/12, the firm's new system is positioned in the mid-range compatible market, competing primarily with Epson America, Inc., AST Research, Inc. and Wyse Technology, Inc. personal computers.

The Citizen Mate/12 marks the firm's first foray into the PC market.

According to Michael Del Vecchio, senior vice-president of sales and marketing at Citizen, the product's somewhat unique motherboard capabilities offer potential savings for MIS. Del Vecchio said, "Cost effectiveness is achieved by adding chips to the motherboard instead of adding cards to the system."

Priced from $2,149, the Intel Corp. 80286-based, 12.5- or 6.25-MHz system is available in three models. Citizen Mate/12 includes 1M byte of random-access memory.

Four expansion slots and Microsoft Corp. MS-DOS 3.3 are included with the system, and a mouse comes standard.

Two fresh views on the use of PC data bases

Innovative ways of probing existing data bases have been announced by Pioneer Software Systems, Inc. in Raleigh, N.C., and Pantheon-Delphic Systems, Inc. in Belmont, Calif.

The $129 Pioneer package, called Q&E, is based on the Microsoft Corp. Windows graphical interface and can be used to query and edit Ashton-Tate Corp. Dbase or compatible files. The system provides ad hoc and stored-query capabilities and a full complement of editing functions, such as deleting or adding records and updating fields.

Q&E is also being ported to work with data base management system products from Oracle Corp. and the SQL Server from Ashton-Tate and Microsoft.

Pantheon has set its sights on more than Dbase. In fact, the Pantheon Development and Delivery System allows MIS to build a general interface to products built on either the hierarchical or relational models. As a result, end users can be shielded from the syntax of particular data base systems.

The Pantheon system includes several components; the $4995 Pantheon Developer, the $495 Delivery System, an ad hoc system for $895 and a tool kit that provides access to the Pantheon data base engine for $1,195.

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Portable hard disk from Plus

BY JAMES A. MARTIN
CW STAFF

MILPITAS, Calif. — Removable hard disk drives that are said to be transportable between older IBM Personal Computers and compatibles and the the newer IBM Personal System/2 models were announced last week by Plus Development Corp.

The Plus Passport hard disk, available in either 20M- or 40M-byte capacities, is a self-contained, 3½-in. Winchester disk drive encased in plastic. The systems are reportedly compatible with the IBM PC XT, AT and all PS/2 models.

The Plus Passport was designed to ease data exchange between PCs and PS/2s, but it is also aimed at users in need of data security and hard-disk expansion, Plus said. The primary markets targeted are government, banking and finance.

"Plus has done a beautiful engineering job and has addressed nicely the needs of users who want removable drives that can survive the rigors of transit," observed Robert H. Katzive, vice-president of Disk/Trend, Inc., a data storage consultancy in Mountain View, Calif.

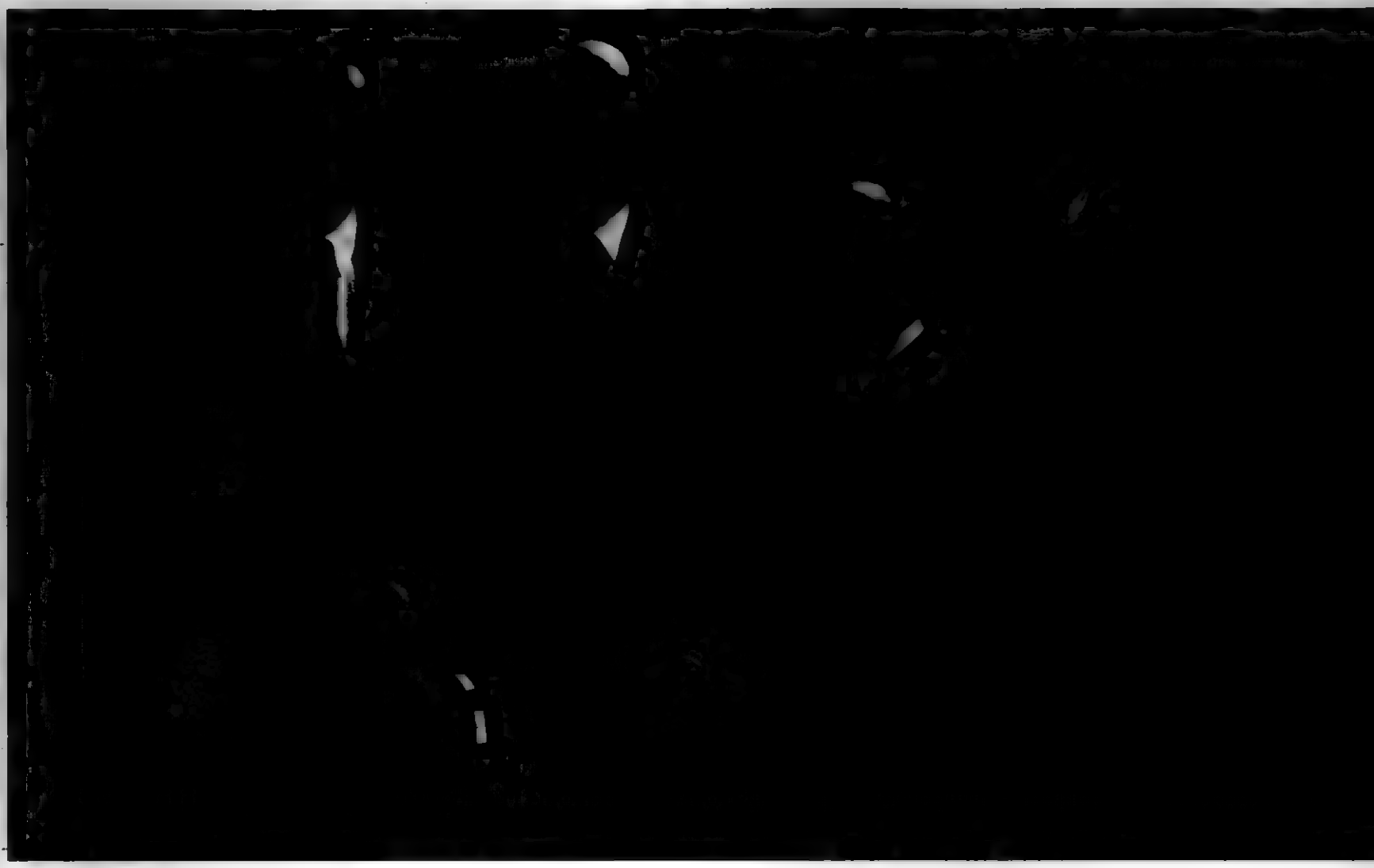
The Plus Passport must vie for attention with the Iomega Corp. Bernoulli Box, an external system with removable hard-disk cartridges for IBM PCs and compatibles, and Tandon Corp.'s Personal Data Pac technology, removable hard disks for Tandon microcomputers. In addition, the product must compete with an increasing array of high-capacity floppy disk drives from companies such as Data Technology Corp., Eastman Kodak Co. and Konica Technology, Inc.

A complete 20M-byte Passport kit for the IBM PC will retail for $1,250, with an IBM Micro Channel version costing $1,350. A 40M-byte kit costs $1,450 for the PC and $1,550 for the Micro Channel.

Additional media, however, will run $595 for 20M bytes and $795 for 40M bytes. "Since the media unit is the price of a whole drive, it would be pretty costly to build a hard-disk library with this product," Disk/Trend's Katzive said.

Passport is scheduled to begin shipping in June and will fit into a 5¼-in. hard-disk slot.

Some companies make workstations for just about anyone.



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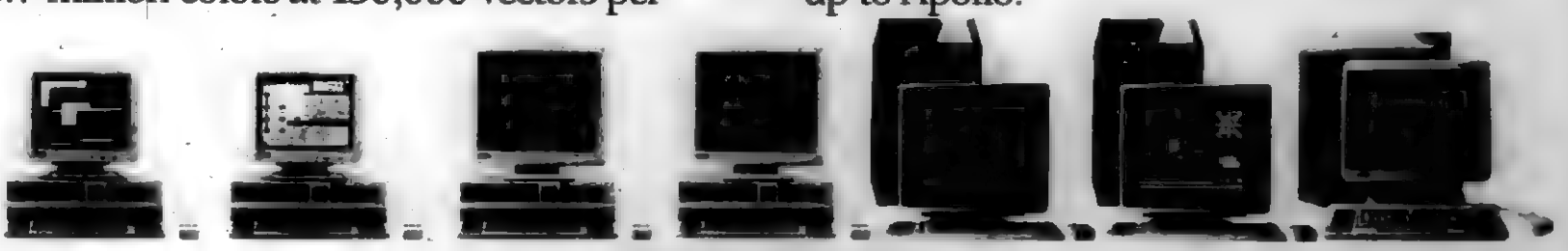

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DEC hookup

CONTINUED FROM PAG

Macintosh, industry watchers said recently. It also broadens the recognition of a natural synergy between the Mac and the VAX.

"It used to be kind of taboo to use the Macintosh for computer-aided design [CAD] applications," said David Burdick, an industry analyst at Dataquest, Inc.

Sophisticated use encouraged

The agreement with DEC represents only the latest argument for engineers to use their Macintoshes for more than writing memos or compiling spreadsheets.

With the introduction of the Macintosh II a year ago, Apple offered technical professionals a powerful platform based on the Motorola, Inc. 68020 microprocessor. The firm also finally assented to an open architecture allowing the addition of graphics boards for engineering applications.

Dataquest's Burdick said the Mac II has captured the attention of independent software developers, such as Versacad Corp. and MacNeal-Schwendler Corp., specializing in engineering packages. More are expected to follow, he added.

"The Mac II generated a lot of excitement," Burdick said. "Almost all the CAD/CAM software vendors are going through a Macintosh port right now," he added, referring to CAD/computer-aided design.

The availability of widely used engineering packages for the Macintosh should give it a significant boost among technical users.

That is already starting. In 1986, Apple shipped 8,000 Macintoshes worldwide for use in CAD/CAM. That figure jumped to 38,000 units worldwide last year. Burdick said he expects shipments of the Mac to those environments to double over 1987 levels by year's end.

Probing markets

To exploit its opportunity in technical markets, Apple established a marketing organization for the engineering and scientific markets nine months ago.

That group six months ago launched an effort to sign value-added resellers servicing technical customers.

"It's a serious commitment for Apple," said Dave Kulbarsh, manager of marketing programs at Apple's engineering and scientific marketing group.

Technical sales up

Apple has estimated that between 8% and 12% of Macintosh sales are now to technical professionals.

Kulbarsh said the Mac offers engineers a balance between a technical tool and a general-purpose system. "Our strategy is that technical professionals spend less than half their time on pure technical applications," he explained.

A single computer on the desk has to do both technical and general office functions, he added.

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Speeding to OS/2

CONTINUED FROM PAGE 31

though virtually every major personal computer maker will have its own version of OS/2.

IBM's Mike Maples, director of software business systems at IBM's Entry Systems Division in White Plains, N.Y., pointed out OS/2's flexibility. "OS/2 allows users to do user things when appropriate, work group things when appropriate and corporate things when appropriate."

Unix was also defended. Dale Hazel, at AT&T's Unix product planning department in Summit, N.J. said Unix's level of complexity does not take independence away from users.

The eventual arrival of OS/2 applications could change many minds. Last week, Maples cited a study that found that developers are putting 90% of their resources behind OS/2.

But one user said the statistics do not accurately portray the interest of users. "If software developers are putting 90% of their resources behind OS/2, it's because they're talking to other software developers, not to us. We're not that interested," he said.

Another user criticized IBM for not making an OS/2 version optimized for Intel Corp.'s 80386 microprocessor. Many companies are moving to microcomputers based on the 80386; OS/2 is optimized for the Intel Corp. 80286.

Clipper

CONTINUED FROM PAGE 33

matches more quickly, with the ability to now consider even more factors in the matches," Dunn said.

However, the donor pool continues to expand and has climbed to 1,200. The matching process time has gone up to 2½ days. Katz is now seeking an IBM Personal System/2 Model 80 with a 20M- or 40M-byte hard disk.

"If we get a 386, it will narrow the process down to half a day," he said. "And every time we find a match, we have the capability of saving an individual."

Because the registry is part of the American Association for Bone Marrow Donors, Katz said, he will send the program to the four other sites under that umbrella around the U.S. "It might even go all over the world, because other registries have expressed an interest in it," he said.

Why You Should Consider Not Buying All Your Software From The Same Vendor.

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Peat Marwick

FROM PAGE 33

we first made the decision to buy in the Mac in '82, we felt it would satisfy our business needs, and it did. The 128K-byte version was used for almost two years before we went to the [512K-byte] Mac Plus, and it was satisfactory for 90% to 95% of our users.

Our so-called power users felt it didn't have enough power for them. It's unfortunate it got the label as a toy way back when, because if something's easy to use, it doesn't get taken seriously.

What were some of the problems you encountered being one of Apple's first major corporate accounts?

We wanted to be a national account with them; we didn't want to go through dealers, because we didn't think they could support us. One of the advantages we've had in working with Apple was, we created a worldwide support organization and direct it from here.

We order everything from here; we tell Apple where to ship it and bill it. We do of all the software development — in terms of proprietary software development — from here. We tell the vendors to duplicate the disks and where to send them. We develop all the training materials and ship them around the world. We do everything ourselves, and we want to do it that way because we want a uniform way of implementation.

How are purchasing decisions made at Peat Marwick today?

It was very easy at the beginning, because everything that came out we wanted to look at. Now we have to be very picky, because with all that's out there today, it can absorb all of our time. We get down to fine points — the amount of real estate a machine would take up on a desk, the number of pieces an auditor would need to transport. At the time we chose the Mac, we evaluated technical specifications like a comparison of the 8088 and the 68000 processors; expectated speed of processing; memory. We have one person who does an initial evaluation to screen a product to see if it's something we even want to consider. Before we decide to purchase a product, we obtain a couple of evaluation copies and have people within my group use it.

Do you feel that Apple is losing its technological edge to IBM?

I think IBM — with OS/2 and the Presentation Manager — has made it more difficult for Apple to compete, but I don't know that it's lost its technological edge. I'm confident that where Apple is today isn't where it will be tomorrow. They have products under development that will take advantage of the user interface in ways that probably aren't anticipated in the IBM world. They're willing to try a lot of things, and they're spending a lot of money in R&D.

Do you foresee that you'll be buying microcomputers other than the Mac?

You can never say never, but not based on what I know today. I don't think IBM's PS/2 at this point is a cost-effective solution. Comparably speaking, in terms of the extra things you need to buy, and with the cost of OS/2 and Presentation Manager as software on top of the hardware, you're talking about a more costly solution. When you're talking about IBM Token-Ring as a network, Appletalk blows it away on price/performance.

What will it take for the Fortune 500 to fully embrace Apple and the Macintosh?

Apple has to be able to convince corporate America that they can service the customer better than IBM. Not as well, but better.

Apple is without a doubt fighting a mentality that's out there. But I think that mentality is changing. The next two years is their window of opportunity, as products are being developed for the Presentation Manager.

What would you like to see Apple do next?

I'm always telling them, "Make it faster, with more capacity, and smaller."

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Zachmann

FROM PAGE 33

chief information officers, should ponder deeply Dylan's words in the context of modern information technology.

The mainframe and mini solutions that have best met the information systems needs of business for the past four decades are no longer adequate. Information systems professionals trying to maintain a posture of business as usual in the present technological and economic environment are doomed to failure.

A million 32-bit complex instructions per second on a mainframe computer today cost considerably more than $100,000. Microprocessor-based alternatives can deliver the same 32-bit complex instructions per second for as little as $1,000. The difference between the two is like the electrical charge that builds up in the anvil-shaped cumulonimbus cloud of a fast-moving cold front: It is poised to discharge dramatically upon the industry, with a lot of thunder and lightning.

Sure, big applications, big data bases, big transaction volumes and big computations are going to continue to require big computers. For the short term, big computers will continue to mean traditional mainframes and minis. They aren't going to disappear overnight.

However, lots of small and medium-size applications can already be run on microprocessor-based systems. Not just the increasingly powerful Intel 80386- and Motorola 68000-based personal computers, but a growing selection of network servers and multiple microprocessor-based systems, are starting to offer effective platforms even for quite large applications.

Microprocessor-based systems like Stratus's — sold by IBM as the System/88 — and Sequent's are already threatening mid-range minicomputer systems and are starting to move into mainframes' power ranges and territory. This is just the beginning.

Information systems professionals who are interested in a career that lasts through the 1990s can't afford to stick their heads in the sand and pretend that the mainframe and minicomputer world of the past will carry them successfully into the future. Dinosaur farming, to put it simply, is not the way to future success.

Rather, it will be through harnessing the incredibly less expensive capabilities of increasingly standardized microprocessor-based alternatives to traditional systems that the successful information systems careers of the 1990s will be built. It will not be those who master the details of the latest overpriced mainframe software who pull out ahead in the 1990s. Rather, it will be those who master the grammar and syntax of personal computers, local-area networks, server and client architectures, the C language, IBM's OS/2 and Unix.

Designing and building large-scale corporatewide information systems on inexpensive microprocessor-based platforms is the factor most critical to the success of information systems professionals in the 1990s. The future focus of my column here in the Microcomputing section of *Computerworld* will be on how we can do that. Take a few minutes to write to me in care of CW, if you would, and tell about what you'd like to see here. I'll do my best to respond.

Zachmann is vice-president of research at International Data Corp.

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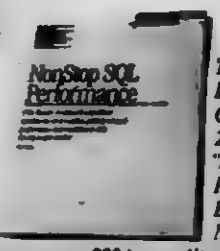

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Barney

CONTINUED FROM PAGE 31

derlying interface. IBM gained the right to add this mainframe graphics technology, called GDDM, in the name of improving Windows. So now, rather than a smooth port, it's major rewrite time for Windows developers.

The math is simple. Tack on a year or so to develop the Presentation Manager itself, add the years it takes to write robust applications, and you get an extra two- to four-year wait for Presentation Manager software. That is long enough for the typical machine, perhaps bought to run these phantom applications, to become fully depreciated and worn out.

The guru speaks SQL. Recently, we presented the views of Micro Data Base Systems (MDBS), a firm that is attempting to debunk the mythology of micro data base servers. MDBS, with its extended network architecture, was supposed to run circles around today's SQL products when it came to complex applications.

Ironically, later that same week, we received word from MDBS that the firm intends to support Ashton-Tate and Microsoft's SQL Server with its Knowledgeman, MDBS III and Guru data base software. SQL ain't so bad after all.

But is it still snake oil? For those interested in the SQL-vs.-the-world debate, calls ran two to one against SQL last week. Some believe SQL is snake oil and a memory hog designed by IBM to sell faster, and more expensive, systems. Others — particularly SQL vendors — maintain that SQL is God's gift to data base technology and well deserves its recent accolades.

One savvy SQL debunker is Jon Roland, chairman of Starwood Corp., a San Antonio-based software development and consulting firm. Roland believes he has given SQL a fair shot but claims it is too difficult for most humans and makes inefficient use of systems resources.

Another problem is that many are trying to use SQL as the foundation of complete development languages — a use for which it is ill-suited, Roland says. Nor does SQL permit single-record-at-a-time commands, a popular form of querying for many data base users.

Older, more established architectures are in many ways better, and new concepts may be on the way that could conceivably kick SQL's behind, Roland believes. He has much much more to say about SQL, including advice about alternatives, and we are trying to find the space for him to say it. So stay tuned.

Drop it now! One of the most alluring characteristics of Lotus's 1-2-3 Release 3 is not spreadsheet linking, or better graphics, or OS/2 compatibility. Instead, it is something that speaks to the very center of an MIS professional's being. That new element is simply the end of a nasty feature called copy protection.

Yet users expected Release 3 early this year, then expected it by mid-year, and now don't expect it till year's end. But Lotus doesn't have to rewrite 1-2-3 in C to end copy protection. They just have to remove it. So if you would like Lotus to stick to its original deadline, give 'em a call and ask them to dump it now. And tell them *Computerworld* sent you.

Is this the OS/2 blockbuster? Enyart Development Corp. may not be a household name, but the firm has laid claim to producing the first application written from the ground up to run under OS/2.

Although the product is called Tickler/2, it is not meant to entertain or torture your children or your spouse. Instead, it is designed to remind you to do things at particular times. Also, by using OS/2's multitasking ability, Tickler can automatically cause the computer to execute a command, such as printing a file at the same time every week or sending the same electronic mail reminder, in background, without user intervention.

While Tickler/2 may not do for OS/2 what 1-2-3 did for DOS, it does show off some of the unique capabilities of the new operating system.

Barney is a Computerworld senior editor, microcomputing.

Ampro tool

CONTINUED FROM PAGE 31

and vending machines.

Some users have used the board to build specialized portable computers, but Elliott Korenthal, Ampro's vice-president of sales, said the product was designed for small, low-power embedded systems rather than consumer-oriented laptops.

The concept is simple. Korenthal said his firm's Solid State Disk utilities allow users to run any standard Microsoft Corp. MS-DOS software without disk drives. The user needs only an Ampro Little Board/PC equipped with erasable programmable read-only memory, nonvolatile random-access memory or both.

Many of the burned-in applications will be custom written rather than off the shelf. "The customer will develop and debug his application program under DOS using a floppy- or hard disk-based system," Korenthal explained. Next, the user can take the result of the development, run it through the utilities and then burn it onto the Little Board, he added.

The utilities software sells for $249, and a minimally configured board sells for $393.

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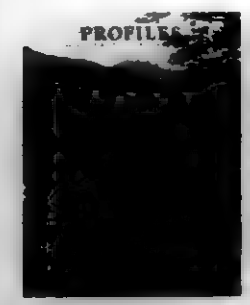

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NEW PRODUCTS

Systems

A ruggedized 19-in. rack-mountable IBM Personal Computer AT-compatible system has been introduced by **Qualogy, Inc.**

The **QPC-7000** AT compatible uses a 12-slot passive backplane. It features an Intel Corp. 80286 microprocessor operating at 10 MHz, 1M byte of random-access memory, a socket for Intel's 80287 math coprocessor, a floppy-disk controller, a small computer systems interface Winchester controller, serial and parallel ports and a clock/calendar with battery backup.

Qualogy's *QPC-7000*

Also included is a disk carrier assembly capable of holding up to 3½-in.-tall drives, a drive-area cover door with a security lock, a system reset button and a 200-W power supply.

System prices start at $2,790.

Qualogy, 2241 Lundy Ave., San Jose, Calif. 95131. 408-434-5200.

Development tools

American Expertech, Inc. has announced **Release 2.0 of XI Plus**, its personal computer-based expert system shell.

Enhancements include forms and screen-capture facilities and knowledge base-controlled explanations.

Other enhanced facilities include the ability to change question, Help, why and report windows; the ability to control the examine conclusions menu; a C interface to large-memory models; file and library memory copy facilities; an options statement to extend the question definition; new reset command options; a knowledge base dictionary; printer control options; ease-of-use options; a virtual disk facility; an extended tutorial; and a range of supplied external programs.

XI Plus Release 2.0 costs $1,995.

American Expertech, Incline Village, Nev. 702-831-0136.

Software enhancements

An Apple Computer, Inc. Hypercard version of the task and time organizer **Executive Life** for the Apple Macintosh has been announced by **New West Software.**

Features of Executive Life include automatic posting calendars; contact demographics; a phone dialer with an automatic call log; up to 10 next-action items per contact; automatic notification of past-due action items; automatic to-do listings on variable time periods; a project manager; a categorized notes and numbers section; and unlocked code.

Executive Life costs $79.95.

New West Software, Suite B, 5462 Oceanus, Huntington Beach, Calif. 92649. 714-898-1039.

A version of **Quick Connect**, a multiuser operating environment for personal computers using the Intel Corp. 80386 processor chip, has been announced by **Virtual Systems, Inc.**

Quick Connect allows up to 12 active users or 32 casual users to simultaneously access spreadsheet, word processing and data base management programs, including Lotus Development Corp.'s 1-2-3, Wordperfect Corp.'s Wordperfect and Ashton-Tate Corp.'s Dbase III Plus. It also provides electronic mail and password security and supports modem communications.

The 386 version is compatible with existing versions for the IBM Personal Computer XT and PC AT. The product costs $595 for a seven-user system and $995 for a 32-user system.

Virtual Systems, Suite 406, 1500 Newell Ave., Walnut Creek, Calif. 94596. 415-935-4944.

An enhanced version of **Frontpage**, a desktop publishing program for IBM Personal Computers, has been announced by **Haba Computer Systems, Inc.**

The program uses an icon-oriented display and comes with a font library as well as some form and letter templates. Features include full hyphenation and justification, the ability to mix type styles and sizes and on-screen editing.

Frontpage accepts standard ASCII file formats as well as such graphics formats as Hewlett-Packard Co.'s HPGL.

Several add-on modules, such as a 20,000-word hyphenation dictionary, font packs and utilities for interfacing to typesetting equipment, are also available.

Frontpage costs $199.

Haba Computer Systems, Suite D, 16580 Harbor Blvd., Fountain Valley, Calif. 92708. 714-775-0695.

An enhanced version of the **Harvard Graphics** software program has been introduced by **Software Publishing Corp.**

Version 2.1 features a built-in spelling checker and approximately 300 symbols. Users can convert chart elements to symbols in order to edit each object in the graph independently.

Other capabilities include importing and exporting CGM metafiles to and from other graphics programs and exporting Adobe Systems, Inc. Postscript and Hewlett-Packard Co. HPGL files to desktop publishing programs.

The program supports the direct graphics interface standard and the vendor's Harvard Graphics LAN Pack, which provides multiuser access to Harvard Graphics 2.1

Harvard Graphics 2.1 costs $495. Current users can upgrade for $50. The LAN Pack program costs $1,795.

Software Publishing, P.O. Box 7210, 1901 Landings Drive, Mountain View, Calif. 94039. 415-962-8910.

An enhanced version of the **20/20** spreadsheet for multiuser computers has been announced by **Access Technology, Inc.**

20/20 Release 2 features a macro facility, a global rounding capability to control calculation precision, improved consolidation links and an iterative recalculation option to solve simultaneous equations and resolve circular references, the vendor said.

Other features include file password protection, graphics enhancements, improved report generation and additional financial, calendar, string and work sheet functions.

Worksheets that are developed under 20/20 Release 2 have the ability to run on all hardware platforms supported by 20/20, the vendor said.

Configured to run under Microsoft Corp.'s MS-DOS 2.0, 20/20 Release 2 costs $500.

Access Technology, 6 Pleasant St., Natick, Mass. 01760. 617-655-9191.

Ken Orr & Associates, Inc. has enhanced its **Brackets** computer-aided

Continued on page 52

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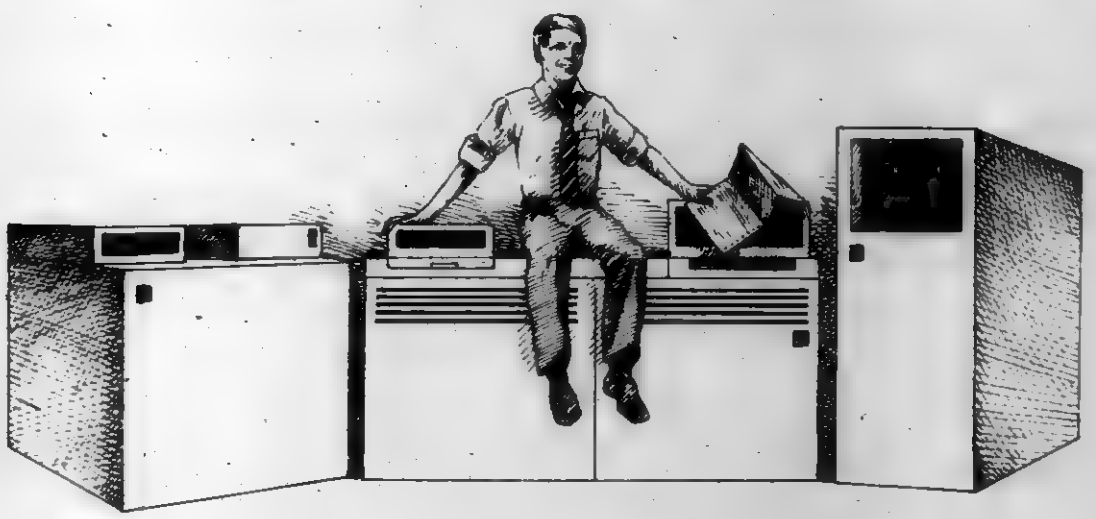

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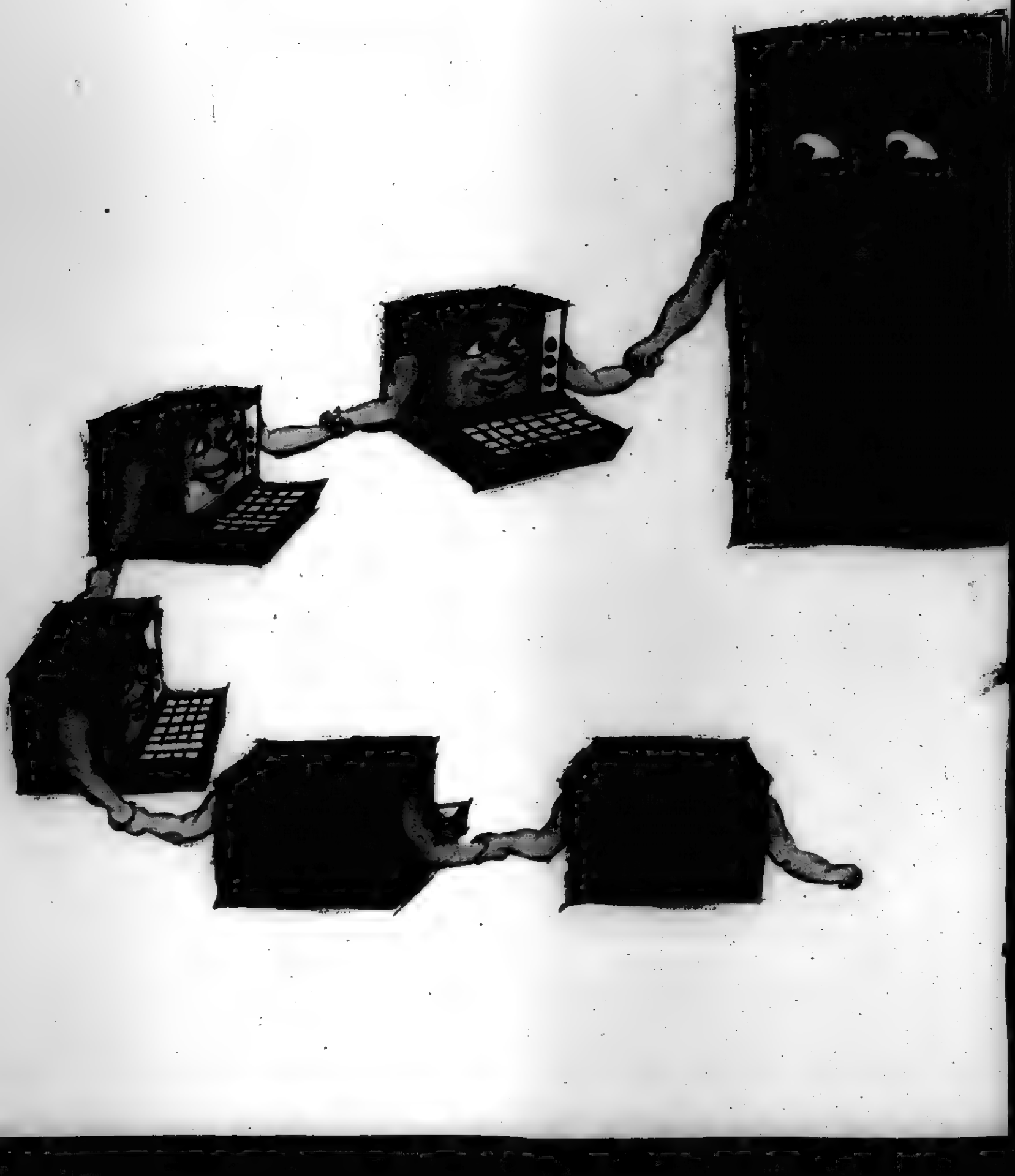

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The PC war is over, and the computer professionals have won.

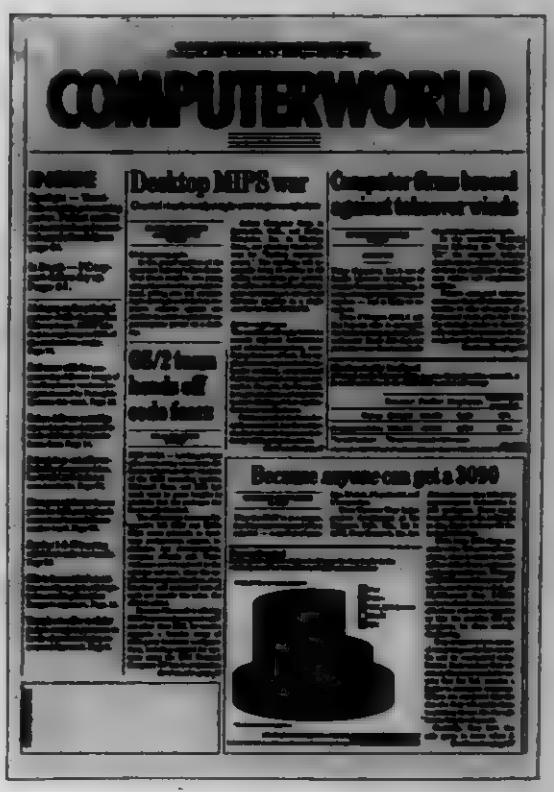
Almost overnight, the market for personal computers has changed. The individual user no longer runs out and buys whatever strikes his or her fancy.

PC's have grown up, and MIS has taken over responsibility for their role in the corporate information system. "During the past three years, everything has become integration," says Leon Jackson, senior research analyst at Arthur D. Little. "The only computer force that can provide integration is MIS."

The standalone personal computer has become part of a network. And MIS departments are working to set PC standards so that their organizations can benefit from sharing of information, including databases and software.

The stakes are huge. This year, companies will spend more dollars buying PC's than they will spend on mainframes.

And who will control this spending? The readers of Computerworld, of course. It's the newspaper of record for information systems management. Put your money where your market is. In Computerworld.


COMPUTERWORLD

Desktop MIPS war

OS/2 team heads off code fears

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Continued from page 48

software engineering tool to include the automatic generation of Cobol code from Warnier-Orr diagrams.

Brackets is an interactive diagraming system for IBM Personal Computer-compatible workstations. Version 2.0 provides a menu-driven DOS shell utility; unlimited Warnier-Orr diagram sizes; a search-and-replace function within diagrams and code; context-sensitive Help; user control of print format and pagination; and full-screen text processing.

Two forms of Brackets are available: Brackets Plus, priced at $475, includes a Cobol code generator; Brackets Basic, $275, provides thought organizer capabilities.

Ken Orr & Associates, Suite 301, 955 American Lane, Schaumburg, Ill. 60173. 312-843-7020.

Computer Associates International, Inc. has announced an enhanced version of its Superproject Plus resource and project management software package.

Version 3.0 features a Lotus Development Corp. 1-2-3-style interface; a choice of experience level; content-sensitive graphic Help screens; outline and worksheet breakdown, integrated with Pert and Gantt structures; top-down planning with outline spreadsheet; custom multiple resource calendars and graphic histograms; report generation; and a link to mainframe systems.

Superproject Plus 3.0 costs $395.

The company also announced **Compress**, a spreadsheet file compression program for use with Lotus's 1-2-3 and with Computer Associates' Supercalc4. It costs $79.

Computer Associates, 1240 McKay Drive, San Jose, Calif. 95131. 408-432-1727.

A version of **Cadkey**, a two- and and three-dimensional mechanical engineering system for personal computers that uses memory above DOS's 640K-byte barrier, has been announced by the Cadkey division of **Micro Control Systems, Inc.**

Cadkey 3 Plus incorporates A.I. Architect, Inc.'s OS/286 and OS/386 software to reportedly migrate as much as 4G bytes of memory above the conventional 640K-byte addressable memory limit.

By breaking the 640K-byte barrier, the product moves into protected mode and leaves at least 350K bytes available for other applications, according to the vendor.

Cadkey 3 Plus is priced at $3,690.

It is available as an upgrade to Cadkey 3 for $495.

Cadkey, 27 Hartford Tnpk., Vernon, Conn. 06066. 203-647-0220.

A local-area network version of CATS, an IBM Personal Computer-based computer asset tracking system, has been introduced by **Bendata Management Systems, Inc.**

CATS was designed for controlling and managing PC and mainframe hardware, software and data lines through on-order management, inventory management, problem management and change management.

The LAN version allows an unlimited number of simultaneous users, the vendor said. Also, entire records may be added or edited without locking other users out of available functions.

Other features include the use of temporary report index files, the use of common source code for both the LAN and single-user versions and an IBM Netbios-compatible set of commands, the vendor said.

The LAN version of CATS costs $3,250.

Bendata, Suite 530, 4144 N. Central Expwy., Dallas, Texas 75204. 214-823-2784.

An enhanced version of the **Media Master** disk-to-disk format conversion utility for IBM Personal Computers and Personal System/2s has been announced by **Intersecting Concepts, Inc.**

According to the vendor, the utility permits an IBM PC to read, write and format more than 200 CP/M and Microsoft Corp. MS-DOS disks.

Features of Version 5.0 include support for the PS/2 computers using 1.44M- and 720K-

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The AST PC-to-Mainframe family also includes 3770, 3780, BSC and SNA Gateway products.

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Enhanced AST-5251/11 Plus™ has captured the attention of the industry with its emphasis on features. Features like: seven concurrent display/printer sessions,

byte floppy disk drives, the ability to customize the program through set-up files, full color support, on-line context-sensitive Help, first-letter menu selection and a simplified installation procedure.

Media Master 5.0 costs $49.95.

Interacting Concepts, Suite 1A, 80 Long Court, Thousand Oaks, Calif. 805-373-3900.

Nostradamus, Inc. has announced Version 5.0 of its Turbo Plus.

Turbo Plus has been upgraded to support Version 4.0 of Turbo Pascal. It does not support the earlier versions of Turbo Pascal.

Other new features include a screen painter, an I/O source code generator, a support library with display mapping, screen genie support, color mapping, a color map generator, sound, dynamic menus, universal menus, screen support, special effects, a keyboard, a cursor, diagnostics, file handling, system resources, critical error handling and sample programs.

Also included is customizable pop-up Help.

Turbo Plus 5.0 costs $99.95

Nostradamus, 3191 S. Valley St., Salt Lake City, Utah 84109. 801-487-9662.

Concentric Data Systems, Inc. has announced Version 3 of its **R&R Relational Report Writer** for use with Ashton-Tate Corp.'s Dbase III and Dbase III Plus on IBM Personal Computers.

R&R allows users to create reports without programming. Enhancements to Version 3 include support for simultaneous users on networks, reduced memory requirements for R&R runtime and user-defined functions.

R&R can relate and report from up to 10 files at once using Lotus Development Corp. 1-2-3-like menus.

Free-form text and fields can be printed in any layout. New fields can be calculated using more than 75 predefined functions plus any number of user-defined functions.

R&R carries a price of $149.

Concentric Data Systems, 18 Lyman St., Westboro, Mass. 01581. 617-366-1122.

Data storage

An optical disk-based storage and retrieval system that attaches to an IBM mainframe channel through a channel adapter has been announced by **Aquidneck Systems International, Inc.**

According to the vendor, Optical Archiving Systems 3420 provides access to more than 10G bytes of on-line data. It reportedly allows attachment of a standard nine-track 1,600/6.3G bit/in. magnetic tape drive unit.

Data may be transferred to tape in pass-through mode or transferred to optical disk in on-line mode, according to the vendor.

Other devices attached to the channel adapter can access the data on the optical disk directly.

The unit emulates the IBM 3803 Model 2 control unit and 3420 tape drive at any subset of the 256 host subchannel addresses.

Optical Archiving Systems 3420 is priced from $35,000 to $56,000.

Aquidneck, 650 Ten Rod Road, North Kingston, R.I. 02852. 401-295-2691.

Printers/Plotters/Peripherals

An IBM Video Graphics Array controller card for the IBM Personal System/2 has been announced by **Moniterm Corp.**

Designed to interface Moniterm's 19-in. Viking 1 monitor with IBM PS/2 Models 50, 60 and 80, the controller supports a resolution of 1,280 by 960 pixels at 66Hz.

According to the vendor, the product is compatible with such operating environments as Microsoft Corp.'s Windows, Digital Research, Inc.'s GEM, Media Cybernetics' Dr. Halo and Lotus Development Corp.'s 1-2-3 as well as Autodesk, Inc.'s Autocad.

The Viking 1 for the IBM PS/2 costs $2,395.

Moniterm, 5740 Green Circle Drive, Minnetonka, Minn. 55343. 612-935-4151.

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NETWORKING

DATA STREAM

Mitch Betts

FCC chair on wobbly legs

One of the rules of Washington politics is that each politician has a certain amount of political capital — assets measured in power, public support and goodwill. Every time a politician asks for someone's support for a controversial idea, he spends some of that capital.

Well, Dennis Patrick, the chairman of the Federal Communications Commission for the past 12 months, has managed to use up more political capital than he ever had to begin with. He's in the hole, having squandered his chips on three dead-end projects:

- A proposal to raise the access charges on enhanced-service providers such as Telenet, Tymnet and Compuserve by roughly $4.50 per hour. This notion drew thousands of letters of protest from users of value-added networks and has since been quietly withdrawn.
- A proposal to raise access charges for private corporate networks that leak traffic to the public-switched network. Amazingly, the FCC launched into this proceeding without any assurance that the local telephone company could even measure this leaked traffic, which is likely to peter out in the next few years anyway.
- A vague proposal to dramatically reform the way that AT&T's common carrier ser-

Continued on page 62

Chase automates telex intake

AI system routes messages to departments, eliminating grunt work

BY ELISABETH HORWITT
CW STAFF

NEW YORK — The Chase Manhattan Bank NA has developed a natural language system that could eliminate a lot of the grunt work involved in processing incoming telex messages, according to Richard Pandullo, division executive at Chase's Telegraphic Services Division.

Pandullo oversees Chase's message network, which processes approximately 3,500 telex messages daily, 24 hours a day. Operators view each message on-screen to determine whether the subject is administrative or financial, which department it should go to and whether it is a sensitive document, such as a request to transfer $100 million to another account.

The fact that most telexes are free-form documents — they lack a standardized format for presenting and laying out key data — makes the scanning process labor-intensive and costly, Pandullo said. "And, if you don't do it right, it causes the bank a lot of embarrassment."

Two years ago, Pandullo concluded that he could boost the quality, speed, efficiency and productivity of the telex intake process by implementing natural language processing — software using artificial intelligence that would abstract and interpret key information from telex documents. At the time, "AI didn't seem mature enough" to begin the design process, Pandullo said. A little more than a year ago, however, he proposed and received approval for his project.

Task force

The six-month development effort involved three seasoned programmers, a systems officer and a line manager. "We needed to incorporate the money-transfer and telex-processing expertise from both the systems and telegraphics staff," Pandullo explained. A 10-person task force made up of auditors and systems and operations people reviewed the project's progress every two weeks.

The initial system, named Autoscreen, was written in Pascal and runs on a Digital Equipment Corp. VAX-11/780. It automatically extracts test keys — code words that are used to validate the type of message — and identifies whether the message is a letter of credit, a funds transfer request or some other type of business document. "The system determines that yes, this came from the Bank of Tokyo, it is valid, and it goes to the letter-of-credit department for processing," Pandullo said.

In its next phase of development, Autoscreen will be able to route documents automatically

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Users want something that works

BY PATRICIA KEEFE
CW STAFF

ANALYSIS

It's always jumping out here on the LAN-scape. If it's not the rumbling of mergers, it's the grumbling and ranting associated with de facto standards wars. And God knows we've got more communications-related standards than the average local-area network manager can shake a cable at, with no end in site.

On-site it's a different matter. Users don't really care much about cutting-edge technology. They're too afraid of slitting their own throats.

Nope, their desires are simple. They just want something that works, something that's

Continued on page 60

Data View

T1 sales growth, 1986 to 1989

Networking T1 multiplexer sales pace projected to moderate; point-to-point multiplexer sales to pick up next year

INFORMATION PROVIDED BY VERTICAL SYSTEMS GROUP AND SALOMON BROTHERS, INC.
CW CHART

IBM to push EDI hard

Firm links user hosts to value-added net

BY PATRICIA KEEFE
CW STAFF

TAMPA, Fla. — IBM has big plans for Information Network, its entry in the value-added network sweepstakes. Serving as a lightning rod for all those value-added services is electronic data interchange (EDI), an electronic method of billing and payment between trading partners.

"In the last 18 months, we've made big strides in this area. It [EDI] is the big new area of growth," said Jim Pickerill, IBM's director of marketing and support under Inter-Organizational Systems (IOS). "We aim to be a major player."

IBM's game plan is pretty straightforward: Attach IBM host accounts to the Systems Network Architecture (SNA)-based Information Network and

Continued on page 62

Inside

- Fujitsu, Pepperidge Farm team up to deliver remote networking services. Page 58.
- Azure releases data scope to support IBM SNA networks. Page 66.

Superior IBM - DEC Connectivity

The Forest Network Processor is the superior multivendor connectivity solution for organizations with IBM and DEC networks.

Superior Features

The Forest Network Processor's network services include bi-directional virtual terminal emulation, file transfer, network statistics, and diagnostics.

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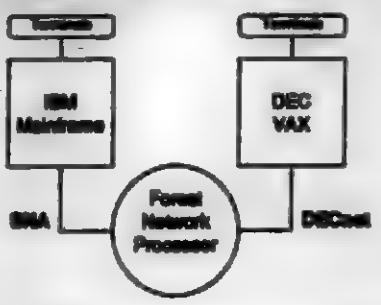

For a Forest Network Processor product information kit, please call (517) 349-4700.

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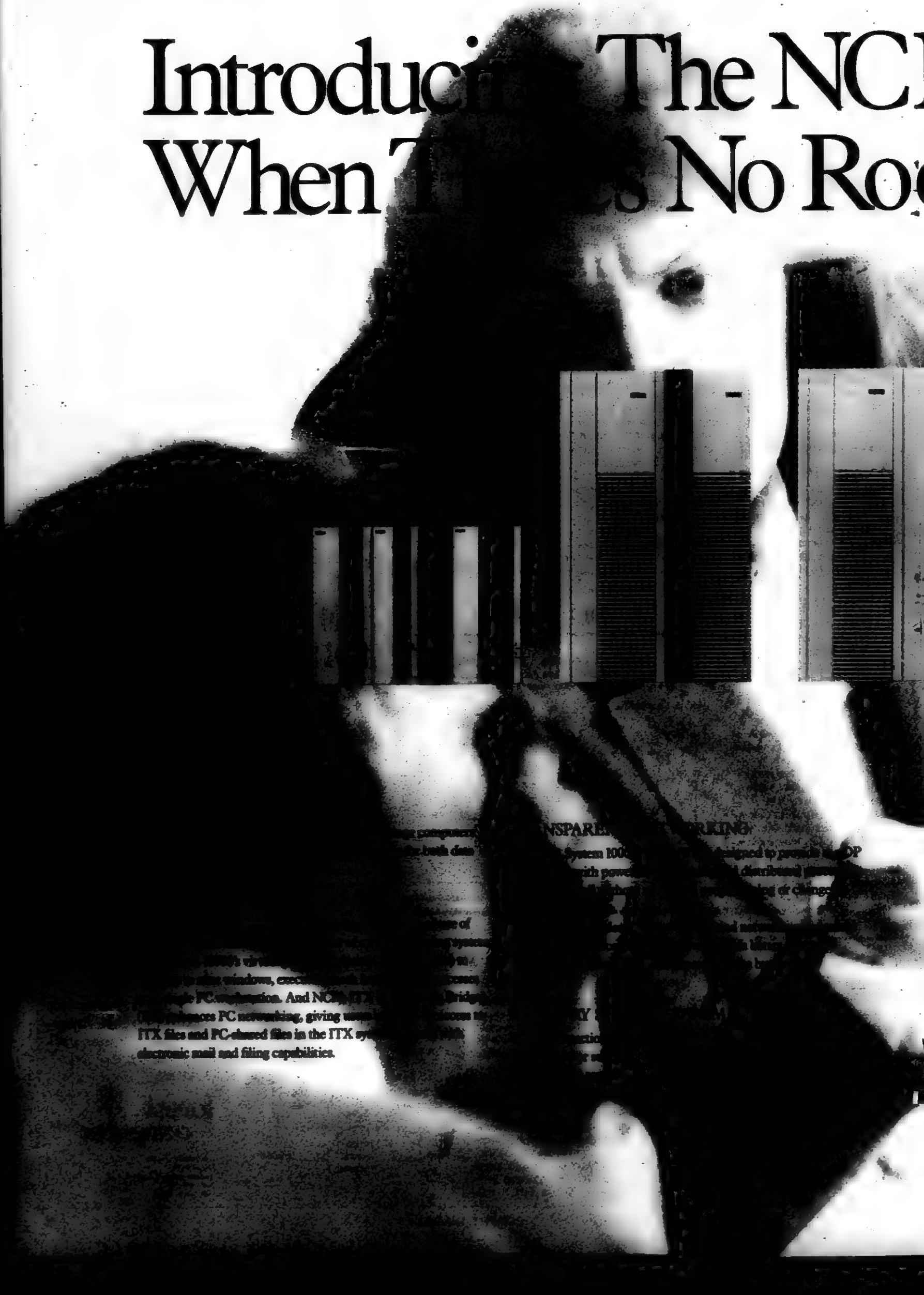

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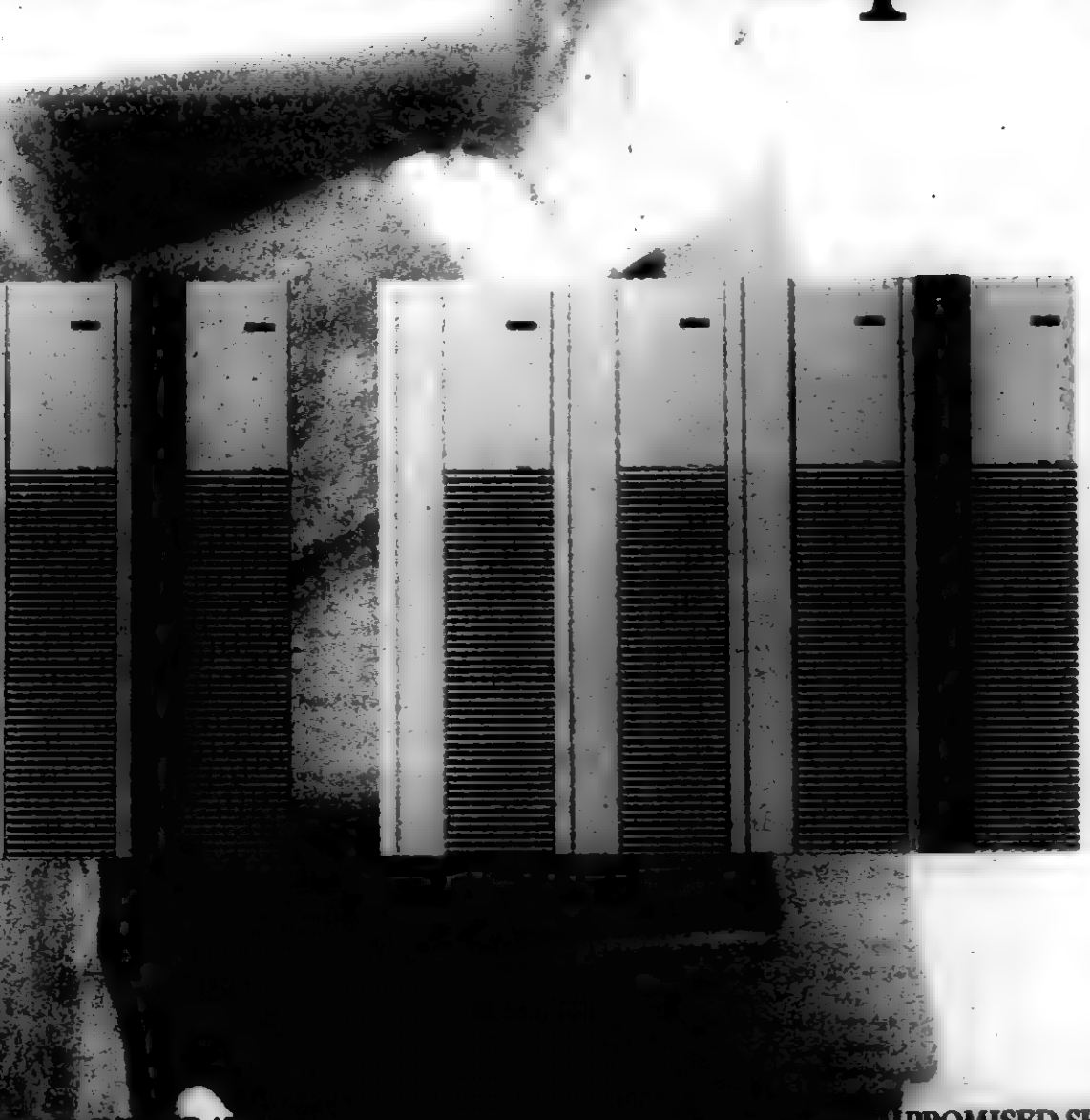

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Fujitsu delivers hit recipe for mobile link

BY KATHY CHIN LEONG
CW STAFF

NORWALK, Conn. — Pepperidge Farms, Inc., a nationwide purveyor of baked goods, has risen to the challenge of delivering remote networking services to its 2,400 independent distributors to help accelerate the ordering process.

A subsidiary of Campbell Soup Co., Pepperidge Farms has penned a multimillion dollar pact with Fujitsu America, Inc. for handheld computers, printers and communications interface units that will be installed in the company's delivery trucks.

The bakery unit has recently finished a trial of the system in the greater Boston area, where it tested the mobile computers for reliability and durability.

MIS leads the way

According to Douglas Parrish, vice-president of MIS at Pepperidge Farms, "Our company recognized the need to push information strategies out into the forefront of the company to help us to do a better job. For months, we tested products from several manufacturers to make sure their units could endure climate ranges — from the humidity of Florida to the subfreezing temperatures of Chicago."

Even though the Sales Trans Action Routing System (STARS) will not finish its rollout to all distributors until the end of 1989, according to Parrish, those that have been delivered have already had an impact.

Until now, the existing ordering system has been purely manual. Each independent distributor mails his orders and invoices to the company, and the data is then keyed into a terminal attached to a mainframe.

"Let's say a distributor is ordering something for next week," Parrish said. "By the time we get the order sent here, several days have elapsed. What we mainly want to do with STARS is accelerate the information flow."

The handheld computer developed by Fujitsu contains 296K bytes of memory and is powered by Nicad batteries when placed in the communications interface unit cradle mounted in the truck.

The unit reportedly can upload sales and settlement information to the mainframe by way of a modem at speeds of up to 9.6K bit/sec.

Orders updated on-board

Drivers can enter orders, create invoices and obtain hard copy from an on-board 80-col. printer.

They can also get a purchasing history on each customer and keep track of when the last delivery was made.

At the end of the day, the data is routed through a public packet-switched network and uploaded into Pepperidge Farms' mainframes.

Although the system is not an interactive on-line network, according to Parrish, the application is suitable for what the drivers need to accomplish — to make the correct deliveries on time. "In our business, we are dealing with perishable items," he explained. "By ordering early, we will be able to deliver faster and more accurately."

Sales information can also be transferred to the company's marketing department for future forecasting.

"We were doing that before [manually], but now everything is done much faster," Parrish said.

Fujitsu may have supplied the hardware, but the MIS department at Pepperidge Farms insisted on developing its own software for the network.

'A shared investment'

Pepperidge Farms is in a unique business position because of the fact that its distributors are independent businessmen and not employees.

"There are a lot of features we put in our software that are tailored to the distributors," Parrish stressed. "We consider this a shared investment, and they will also help pay for the system."

Parrish said the system is relatively easy to learn, and the company is sending out employees to install STARS and train the drivers through the use of manuals and videocassette tapes.

STARS is only the beginning of what promises to be several more applications that will be created for the drivers, according to Parrish.

This application falls under the umbrella of bakery-route accounting, a relatively new application in the foods industry. The Pepperidge Farms pilot follows a similar rollout by Frito-Lay, Inc. which involved 10,000 handheld units.

Fujitsu's Gary Chapman, vice-president of handheld systems, said the snack delivery business has utilized automated delivery systems since the late 1970s.

"It hasn't been until the last three years that the technology has come down to make this more economic [for users]," he said. "Battery life is longer, and there is more memory in the system than ever before."

U.S. West adds net tools

Answers user call for open systems development

BY KATHY CHIN LEONG
CW STAFF

BELLEVUE, Wash. — U.S. West Network Systems, Inc. has added a second key component to its line of network management tools that is said to juggle products from multiple vendors.

The announcement is a response to user pressure for network management suppliers to develop open system support.

A wholly owned subsidiary of U.S. West, Inc., the firm is one of a few independent specialists in the increasingly complex field of multivendor network management.

The recently introduced Netcenter Inventory Information Management (IIM) uses a data base to monitor IBM Systems Network Architecture (SNA) and non-SNA devices.

Cincom Systems, Inc. in Cincinnati, with its popular Netmaster host-based SNA network management software, is a well-known competitor of U.S. West.

Netcenter IIM, which is slated to ship in the third quarter, must be used in conjunction with Netcenter Graphic Network Monitor (GNM), Network Systems' first product and the foundation of a full complement of management tools.

The Netcenter family features a graphical personal computer interface that can be customized to display a network configuration on a map, the vendor said.

Simpler is better

"Network management has to get simpler as it gets pushed farther away from the data center. These tools have to be made so that less technical users will be able to manage networks," said Clare Fleig, an analyst at International Technology Group in Los Altos, Calif.

GNM gives users the ability to view the current status of their SNA networks, but it does not deliver any detailed information about the components or give users the ability to monitor non-SNA gear.

Netcenter IIM reportedly works with IBM's Netview and runs on IBM mainframes running MVS/XA and VTAM as well as on IBM Personal System/2s supporting Microsoft Corp.'s MS-DOS.

Priced from $15,000, the software keeps inventory records of components, displays who to call when a node is down and gives a detailed description of individual network parts.

U.S. West Network Systems said it will seek development partnerships that will allow Netcenter to interface to other vendors' products and network management tools.

Interlink extended gateway supports TCP/IP and Decnet concurrently

BY PATRICIA KEEFE
CW STAFF

FREMONT, Calif. — Interlink Computer Sciences, Inc. recently announced what it called a major extension of its 3732 Gateway technology by offering multichannel and concurrent support of Transmission Control Protocol/Internet Protocol and Digital Equipment Corp.'s Decnet.

Interlink said its long-term goal is to provide a multivendor gateway.

Additional features of Interlink's 3732 Model 450 Network Controller include data transfer rates in excess of 1M bit/sec.; 256 simultaneous session, or logical link, support; and channel interface technology said to provide optimum throughput capabilities and the ability to expand the functionality of the high end of Interlink's Gateway family.

The channel interface is a replacement of older technology and supports multiple network protocols simultaneously on a single channel, the vendor said.

The Model 450, when combined with other Interlink software, provides bidirectional file transfer and terminal emulation, program-to-program communications, distributed data base access and electronic mail exchange.

The multiple channel attachment feature gives users a choice between attaching a single Interlink network controller to several IBM mainframes running IBM's VM or MVS or attaching to several channels on one mainframe. Data may then transfer between the mainframes directly without accessing the network, Interlink said.

The basic 3732 Model 450 Network Controller costs $82,950 and is expected to be available in this quarter. Upgrades are available for customers using the older Model 400.

Enhanced OA system unites DOS, OS/2 users

BY JAMES DALY
CW STAFF

SAN LEANDRO, Calif. — Conetic Systems, Inc. has released an enhanced version of its Higgins office automation software, which is said to join Microsoft Corp. MS-DOS and IBM OS/2 users on a single network.

Version 2.25 runs in the protected mode of OS/2 and provides a single user interface to networks with both MS-DOS- and OS/2-based personal computers.

The upgrade is available immediately and is the first in a product suite based on OS/2, according to Howard Case, vice-president of marketing at Conetic Systems.

E-mail coming

The company also plans to deliver an OS/2 version of Higgins Mail, the firm's stand-alone electronic mail package, within 30 days.

Although Case added that Conetic Systems is planning a new set of Higgins products based on OS/2, Microsoft's OS/2 LAN Manager and IBM's Presentation Manager, he assured current MS-DOS users that the company will not abandon them.

"DOS will continue to play an important role in corporate computing for a long time yet, and we will support DOS users as well as users with a mixture of systems," Case noted.

The full spectrum

Aimed at work groups, Higgins software is a broad-spectrum office system of E-mail, scheduling and project-tracking functions designed for local-area networks.

A battery of users can tap into a relational data base that gives access to group calendars, shared project information and a personal filing system, according to Conetic Systems.

Version 2.25 is priced at $995. However, users of the current release who wish to acquire OS/2 support may upgrade for $25.

If you can see the difference, you must be looking at the price.

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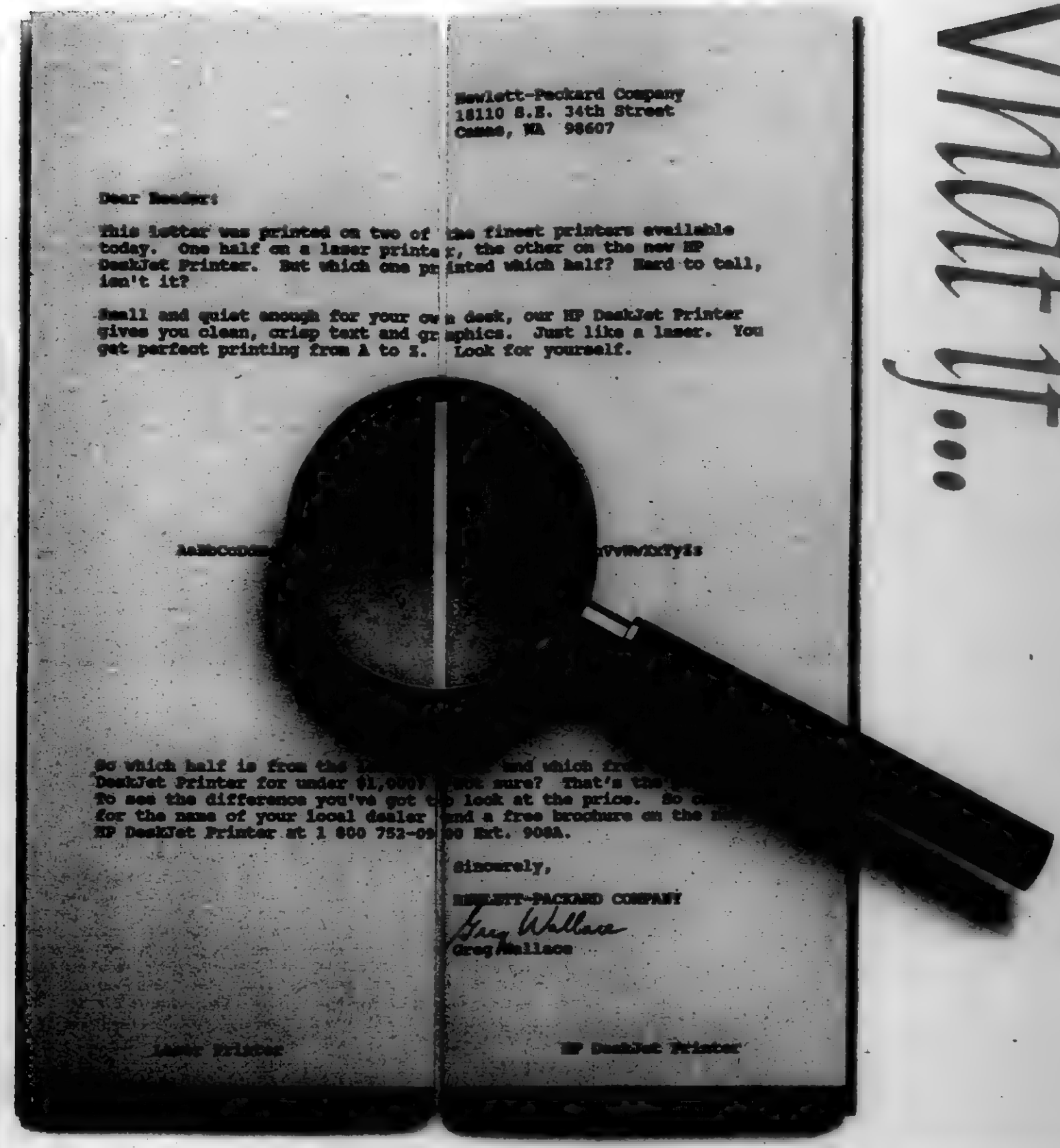

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'EDI Yellow Pages' goes to press

Users looking for trading partners or suppliers of electronic data interchange products and services now can consult the "EDI Yellow Pages," published by EDI, Spread the Word. The publisher estimated that 97 of the Fortune 100 companies use electronic data interchange. The directory is free to qualified purchasing and traffic managers and listed companies. It costs $19.95 for others and for multiple copies.

Tandem Computers, Inc. has successfully concluded its tender offer for **Ungermann-Bass, Inc.** A preliminary count shows more than 95% of the outstanding shares of common stock were tendered. The merger is expected to be completed by June 30.

Altos Computer Systems recently signed a $13 million agreement with **CLSI, Inc.** to market the Altos 386 Series 2000 computer, a Unix-based multiuser system. CLSI, a supplier of library automation systems, will market the Series 2000 as a hardware platform for its Unix-based software for small and medium-size libraries.

US Robotics, Inc. announced that it is now offering **Hilgraeve, Inc.'s** Hyperaccess data communications software as an option to users of the modem maker's new Courier 2400/PS internal modems for IBM Personal System/2s. Tests by both companies of the modem/software combination reportedly documented data transmission rates in excess of 10,000 bit/sec. for ASCII and binary file transfer.

Digital Equipment Corp. and **Micotel Ltd.** have announced an agreement to jointly develop an integrated public network management system called Networks. It is targeted at network operations managers of North American public exchange carriers, such as the former Bell operating companies, large independent phone companies, interexchange carriers and Canada-based telephone companies.

Networks will be designed to provide network management capabilities for telecommunications equipment in multivendor environments. It reportedly will integrate any number of standalone operating support systems and encompasses both digital and analog systems. High-level interfaces to Networks will be published, the vendors said.

Omnitel, Inc. and **Spectrum Cellular Corp.** are jointly developing an error-checking protocol they claim will double modem speed for cellular laptop modems by adding data compression and synchronous capabilities. Normal land-line modems and error correcting protocols are not effective in cellular environments, Omnitel said.

The Enhanced Cellular Error-Correcting Protocol is slated to be available in the fall, with pricing in the $700 to $800 range. The data compression reportedly will allow users to increase throughput from 2,400 to 4.8K bit/sec. It will also avoid environmental-related signal losses or distortions. The enhancements will be provided through a daughter card that plugs into the motherboard.

Stanford University has chosen **Develcon, Inc.'s** TCP-PAD gateway to link the school's Ethernet network to CCITT X.25 environments. The gateway, which is currently installed and operating, provides one Transmission Control Protocol/Internet Protocol and three X.25 interfaces. The TCP-PAD allows remote users worldwide to access host computers located on the Ethernet local-area network via the Telenet public data network.

Gandalf true to IBM

WHEELING, Ill. — Gandalf Data, Inc. recently unveiled Starpatrol, an integrated operational control system said to show the company's commitment to supporting IBM's Netview network management concept.

Targeted at users of hybrid networks, Starpatrol initially will operate as a service point to provide administration and management for non-IBM Systems Network Architecture and other non-IBM devices and systems.

It reportedly will be expanded to full focal point control, which will provide centralised control and deliver network management services to all attached components within the monitored environment via a series of enhancements scheduled for later release.

To ensure upward migration with IBM's Netview/PC, Starpatrol is based on IBM's Personal System/2 family. It attaches to networks operating with Gandalf's Starmaster virtual channel connectivity system or Pacx 2000 data private branch exchange family.

Starpatrol provides for real-time data capture, storage and display capability for centralised network administration and maintenance of data communications devices on the network, according to the vendor.

By providing a single collection point platform that enables the console facility to be operated from anywhere in the network, Starpatrol reportedly minimises the need for duplicate site-oriented subsystem and technical staffing resources.

Release of the product and price information is slated for May.

Users

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easy to use and something that will leave them with change in their pockets.

Whatever they buy has got to work, because they don't have the time, energy or job security required to cope with a lemon. It's got to be easy to use, because chances are there will be problems, and getting help after the sale can prove trickier than isolating the problem in the first place.

Geo. No: N-E-T

Which bring us to the gee-whiz factors associated with networks. Novell has always been a master at marketing. Microsoft's ability to not only gather 35 licensees of LAN Manager but keep everything under wraps until it decided it was showtime proved the folks in Redmond are no slouches themselves when it comes to marketing.

One of the biggies when it comes to hype is performance — that is, speed — a recurring theme in each stage of LAN evolution, including today's sprint toward OS/2 connectivity.

Vendors rave about it, but I suspect many users don't lose much sleep over it. Of course, they expect their networks to be faster than sneaker net, and server bottlenecks are a problem. But most users are not looking to drag race; they'll settle for an adequate solution tailored to their needs.

Those needs have to take into account whatever equipment and cabling morass is in use, so it's no wonder that LAN vendors and resellers have always offered users an array of software, hardware, cabling and, yes, standards.

> USERS' DESIRES are simple. They just want something that works, something that's easy to use and something that will leave them with change in their pockets.

The need for those choices will naturally spill over into the OS/2 world, which is at least a year away from a serious stab at reality.

So all the hullabaloo over Microsoft's LAN Manager vs. IBM's LAN Server vs. third-party proprietary software from Novell and Banyan is really just that.

Chances are there will be room for all three solutions. (There always seem to be at least three choices in any networking situation.) But if any one group holds the key to this dilemma, it certainly isn't the vendors.

It's the developers and the OEMs. If you are worried about Novell's future — given its current predeliction for pretty much ignoring LAN Manager proper — I suggest a poll of Novell OEMs and developers might be in order.

A number of these people have thrown their support behind LAN Manager. But with the exception of one, Excelan, no vendor has publicly backed away from Netware in an OS/2 environment. As long as developers write to both environments, or as long as Novell supports the necessary parts of OS/2 to ensure compatibility with applications written to OS/2, there's really not much to worry about.

With an estimated half of the current network nodes on its networks, Novell isn't going to fade into the sunset. It might move on to bigger and more costly networks, but it certainly isn't going to be sucker-punched by Microsoft. If necessary, Novell is capable of reversing its not-invented-here attitude. It has already reversed itself enough to announce plans to support two key LAN Manager applications programming interfaces.

True Blue

IBM, of course, is IBM and will do whatever it darn well pleases, secure in the knowledge that millions will buy whatever it is selling.

As for Microsoft, well, the LAN Manager is a significant improvement over its predecessor, Microsoft Networks. And Microsoft has succeeded in rounding up an impressive array of support for the LAN Manager, encompassing not only big-name vendors but the critical communications components necessary to compete with IBM's OS/2 Extended Edition Communications Manager.

The vendor to gain the most market share will undoubtedly be aided by a combination of when its products are available and when applications are available. As one user from a major New York bank said recently, "It all looks good on paper; we'll just have to wait and see whether any of it works."

Chase

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to the right department through the computer system, he said. It will then convert documents to whatever format a particular department uses. "That should mean big savings," Pandullo said.

Traffic flow

Autoscreen came on-line in February and now processes 100% of incoming private network traffic with a 65% success rate. "That means it extracts the meaningful information from 65% of incoming messages," Pandullo said.

The software gives up on the remaining 35% of messages, he said, sending them on to be processed by human operators. Pandullo's group expects a higher accuracy rate after it has refined the software.

As luck would have it, shortly after Chase began developing Autoscreen, MCI Communications Corp. began offering a similar system as part of its telex transmission service. Chase uses services like MCI's as well as its own private network to transmit documents.

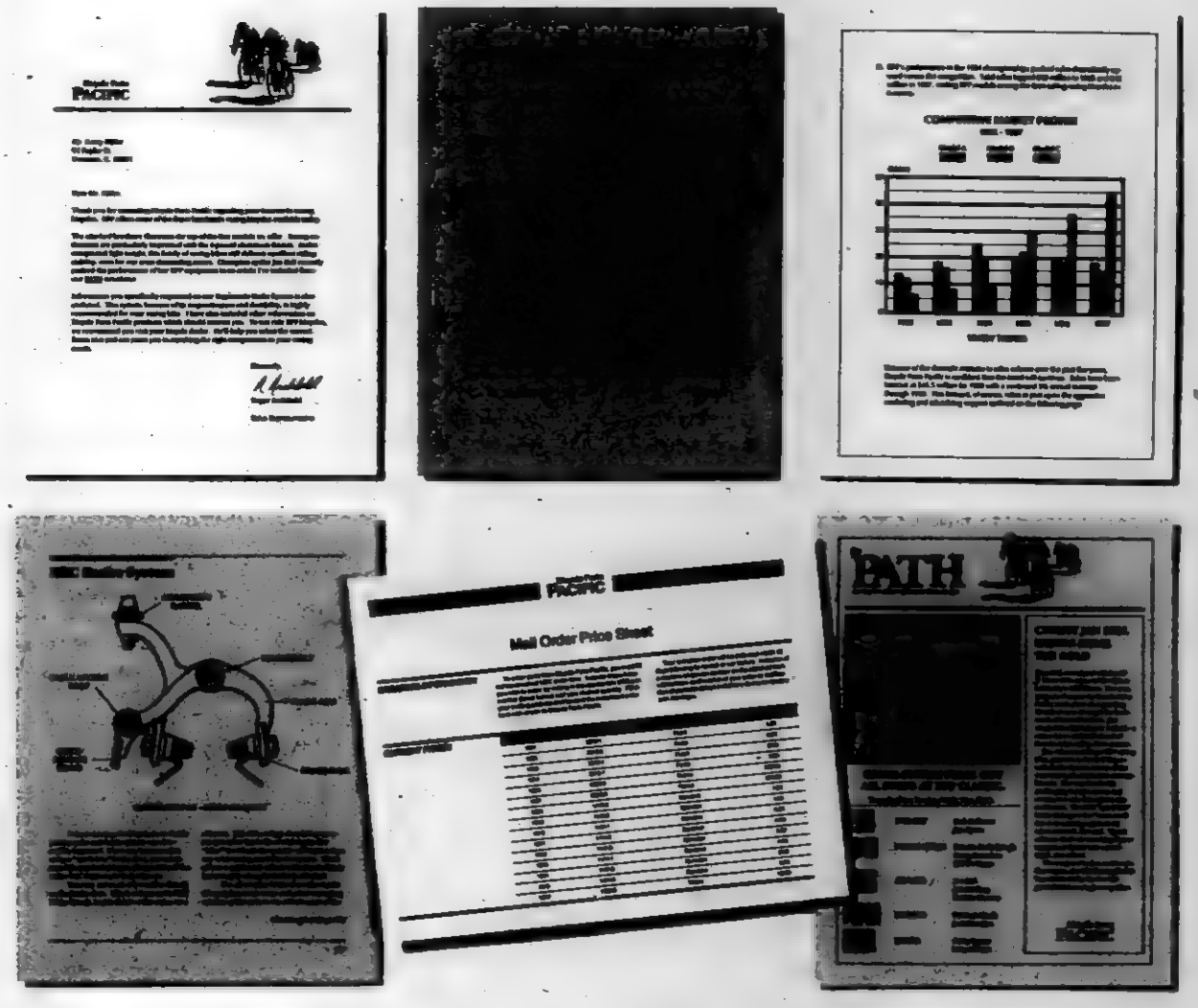
Saving energy

At Chase, Autoscreen will be used to process telexes that come in through Chase's private network, and telexes that come in by carrier will be processed by the carrier's system "so we don't have to expend as many processor cycles" on document scanning, Pandullo said.

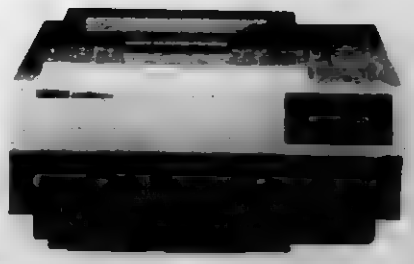
Chase is now insisting that all the telex carriers it uses provide document scanning and support the financial company's internal document formats. "I'm not going to customise Chase's system to conform to a bunch of different carriers' formats," Pandullo said.

Chase has just begun using MCI's scanning service and is looking at other carrier-based document-scanning services, such as a recently announced offering from TRT Telecommunications, Inc.

How to look good from start...



to finish.



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we never stop asking

What if...

Gateway unveils Micro Channel card

BY KATHY CHIN LEONG
CW STAFF

IRVINE, Calif. — Sustaining the industry trend toward IBM Personal System/2 support, Gateway Communications, Inc. recently announced a PS/2 Micro Channel bus version of its G/Ethernet network adapter. The adapter is said to increase speed by as much as 54% over the firm's older, eight-bit Ethernet board.

During the next few months, a board of local-area network vendors are expected to roll out their versions of Micro Channel cards supporting either Ethernet or token-ring technology. 3Com Corp. has been shipping Etherlink/MC since last October, and Ungermann-Bass, Inc. is expected to follow suit soon. Novell, Inc. has announced it is supporting the 3Com Micro Channel card.

Gateway officials said the firm expects to woo new users by stressing that its card will be one of the fastest on the market. Through a special queuing algorithm and use of 64K bytes of on-board cache memory, the G/Ethernet Micro Channel Gateway can significantly increase the data transfer rate between the card and the CPU, according to Walt Schramm, vice-president of marketing.

Performance measures

"There are several ways to judge performance," Schramm said. "Before, users mainly looked at the cable rates of 10M bit/sec. for Ethernet. But users have to also look at the operating systems, the type of file server used, the kind of application that will run on the system and the adapters." He would not specify how much faster the board will run, because that rate depends on the network configuration.

Like the 3Com Etherlink/MC board, the Gateway offering will use IBM's PS/2 Programmable Option Select program feature, eliminating the requirement for DIP switches and jumpers.

According to Schramm, the company will be testing its Micro Channel boards against other vendors' cards within 30 days. In addition, it will test its boards against earlier eight-bit Ethernet versions. Schramm said Gateway will publish its findings and offer them to independent testing houses for verification.

The G/Ethernet Micro Channel Gateway will ship to dealers and distributors this week and will support only Novell's Netware network operating system, the vendor said. Priced at $525, it supports standard and thick Ethernet RG-58 cable. Plug-compatible with networks from 3Com, Novell, AST Research, Inc. and Western Digital Corp., it can be used to extend other vendors' networks.

"We are expecting that the PS/2 Model 80 in particular will serve as an excellent file server to support users' multitasking needs. Now what we need to see are more applications to take advantage of [Microsoft Corp.'s] OS/2," Schramm said.

In addition, Gateway will soon be shipping its token-ring adapter cards. Although Schramm would not specify the ship date, he indicated that other related token-ring announcements will be made.

COS releases conformance test system

MCLEAN, Va. — The Corporation for Open Systems (COS) has released its Open Systems Interconnect Message Handling Systems Conformance Test System.

COS is an international research and development consortium of more than 60 manufacturers and users focused on systems that tests conformance to international standards.

COS said it is moving to fill existing orders for the test system from vendors planning to sell and exhibit Message Handling Systems products in connection with the Enterprise Networking Event '88 International, set for June 5-9 in Baltimore.

Stocking up

Comparing its conformance test with other X.400 testing systems, COS claimed its system includes a full suite of test cases, more favorable licensing terms, international support capability and COS Mark Program compatibility.

Also, COS said it will release its File Transfer, Access and Management (FTAM) Test System, designed to monitor FTAM's conformance with international standards, later this month.

The U.S. government and other large information technology users will be requiring OSI conformance testing as part of their procurement process, COS said.

EDI

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from there, leverage those accounts into EDI systems where they can avail themselves of other applications, such as electronic mail, IBM's Professional Office Systems and Distributed Office Support Systems and data base access.

"Once host-attached, it is much, much easier to sell other value-added services," observed Michael Ribet, manager of the marketing support program for IOS.

Or, more simply put, "he who controls the customers' connection really controls the accounts," Ribet added.

Initially targeting 37 IBM plants and their top 2,000 suppliers as EDI Services candidates, IBM signed on 750 customer sites in the first quarter. IBM itself expects to reap $60 million in savings by 1992 under this plan. "We will not be the shoemaker's children," said Bruce Jackson, manager of IOS marketing and support.

With 20 pilots already under way with market leaders, IBM will spend the next 90 days implementing those orders. The third quarter will be spent cementing these "electronic partnerships."

No question about it, IBM is "very excited and very serious" about its EDI Services offering, Pickerill said, adding that it was first announced in December 1985. It is so serious that a closer look at the waves of structural reorganizations sweeping IBM during the last six months reveals a boost to EDI marketing efforts.

Pushing Information Network and EDI is the concept of IOS, which involves networks linking separate enterprises. "We've yet to find a company unreceptive to IOS," said Jackson, adding EDI is the "leading iceberg in IOS."

Effective Jan. 1, IBM combined product marketing and marketing support for EDI and IOS into one organization, reporting to Jackson. This month, IBM announced a new line of business called Applications Solutions, which reports to Ned Lautenbach, an IBM vice-president and general manager of the Application Solutions Division. It has four functions, among them Information Network. "This shows the importance that IBM puts on what we do," Pickerill said.

IBM's EDI view

EDI truisms that have not escaped IBM's attention, nor reaction, include the following:

- Business, not technology, is driving EDI, as users begin to realize the savings in labor, time, error reductions and other cost-efficiencies available to them via EDI. IBM expects that senior management will continue to recognize the value of EDI, even in tough economic times.
- The service element is more important then the technology, especially among smaller businesses. IBM is recruiting developers with vertical EDI packages for its Marketing Assistance Program — four so far this year.
- Many trading partners will be "coerced" into adopting EDI systems by major buyers. IBM will work with customers seeking to convert business partners to an EDI system.
- As the lines between industries blur, most users will have to deal with more than one EDI format. As such, IBM supports a number of industry EDI formats and has embarked on a campaign of forging alliances in specific industries, including hospital supply and independent insurance agents.
- Many would-be EDI participants do not have SNA networks; in some cases, they may not even be automated. In a recent interview at Information Network headquarters in Tampa, IBM officials repeatedly guaranteed support for non-SNA and non-IBM devices — for example, via non-SNA IBM RJE connections. "Whatever equipment they have, they should be able to use on our EDI," Ribet said.
- The needs and requirements of suppliers and vendors are roughly equivalent. "We've yet to find a significant difference in the statements of direction of EDI needs and requirements between customers and our suppliers," Ribet added.
- ANSI's X.12 data format standard has emerged as the dominant U.S. EDI standard. IBM announced X.12 support in December. Internationally, IBM relies on SNA and X.25 links. As for CCITT's X.400 standard, "it is still evolving. We don't see anything there yet," Ribet said.

Betts

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vices are regulated, by replacing the traditional rate-of-return regulation with Patrick's price caps. This one's going nowhere fast, because of pervasive skepticism in Congress and in the industry.

Down on his luck

Patrick's political standing is so low in Congress that he can't even get the Senate to schedule confirmation hearings for nominees to fill two vacant seats on the commission.

It's surprising that so much could go wrong for Patrick, who is personable, smart, young and ambitious. All three proposals are intellectually honest attempts to regulate in the public interest.

What went wrong is that Patrick picked the wrong agenda. He took on projects that he couldn't possibly finish before the next presidential administration. Worst of all, he picked projects that generate more angry opponents than supporters — and even the supporters are lukewarm — without demonstrating that the measures will have big benefits.

In the two access-charge cases, Patrick spent scarce political capital on projects that will produce only minuscule revenues for the local exchange coffers. And, there was no burning crisis in access charges that needed resolving.

Concerning the price caps initiative, there may be some merit to replacing rate of return as the focus of AT&T regulation. But Patrick failed to lay the all-important intellectual and political foundation for making such a fundamental change in policy.

Whatever you may think of the Tax Reform Act of 1986, it was a major overhaul of the tax code that was accomplished only after years, not months, of political groundwork by its supporters. This means a steady stream of research studies and conferences by think tanks, press coverage of horror stories, coalition building, public speeches, hearings, meetings and compromises with Congress.

Patrick can be commended for starting the dialogue on alternatives to rate-of-return regulation, but he should have waited to start the official FCC proceeding until the issue had ripened.

It's especially disappointing that Patrick chose such an unproductive agenda, because he had such a good one staring him in the face. And he still does: make the Third Computer Inquiry work.

Breaking ground

The Third Computer Inquiry is a whole new, untested regulatory structure for AT&T and the regional Bell holding companies, allowing them to offer an array of enhanced telecommunications services, unfettered by requirements for separate subsidiaries.

Congress and U.S. District Judge Harold Greene, along with the telecommunications industry, are watching to see if the FCC can pull this off. It's not a sure bet. Success will require, aside from good faith and honesty by the former Bell companies, aggressive efforts by the FCC to ensure that the accounting rules and Open Network Architecture really work to discourage anticompetitive behavior.

It may not be as glamorous as launching new initiatives, but this agenda is far more important. Too bad Patrick has already used up his political capital.

Betts is *Computerworld's* Washington, D.C., correspondent.

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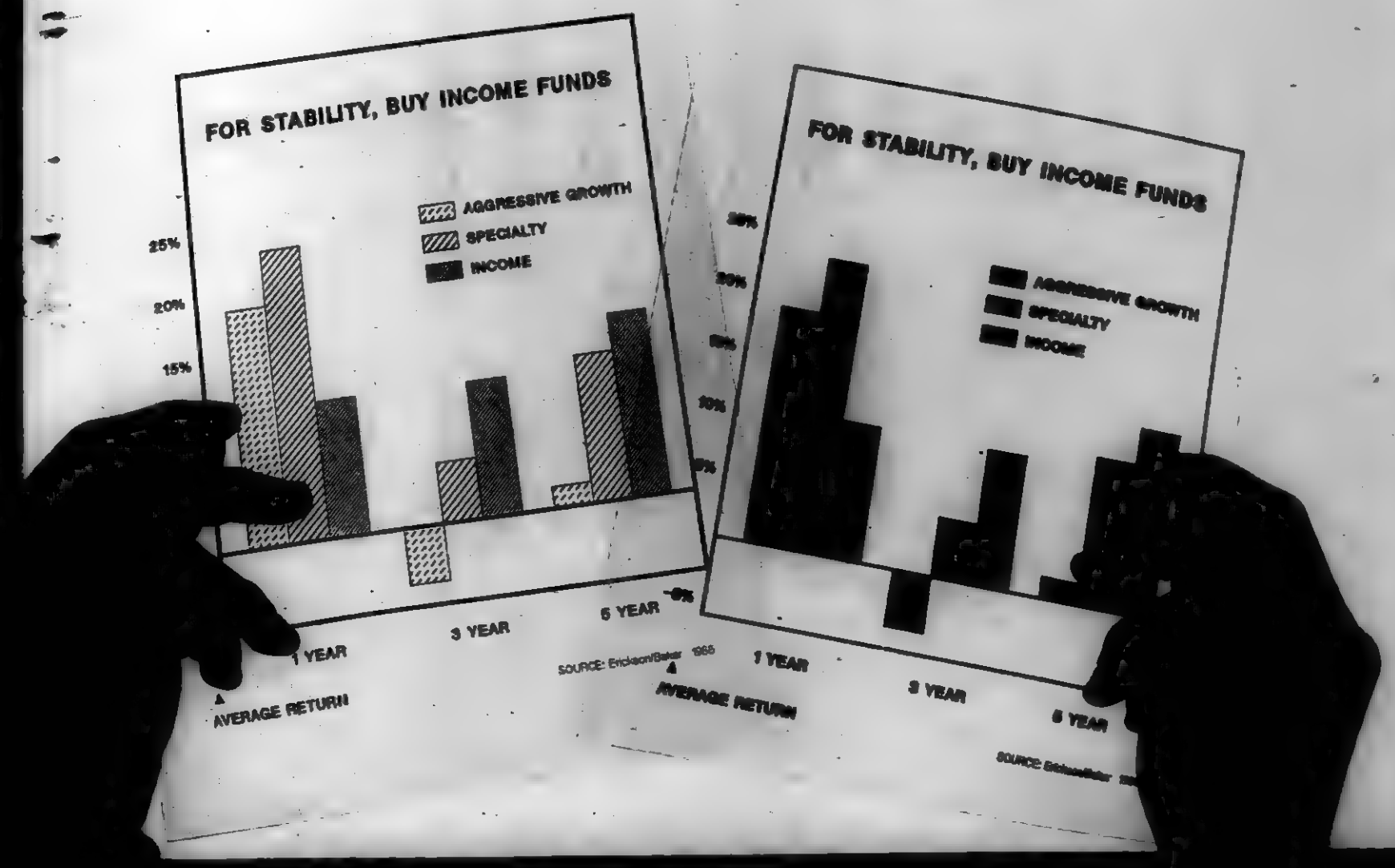


NEW PRODUCTS

Local-area network hardware

An eight-channel dual-line data compression system has been announced by Symplex Communications Corp.

The Symplex Datamizer II SDC-8E is said to automatically sustain network sessions and response times despite leased-line degradation or failure. Features include peak-load leveling, the ability to accept an aggregate input ranging up to 76.8K bit/sec., compatibility with most synchronous and asynchronous networking protocols and the ability to operate with a different protocol and speed on each channel.

The Datamizer II SDC-8E costs $9,750 in rack-mount configuration and $9,950 in a stand-alone enclosure.

Symplex, 5 Research Drive, Ann Arbor, Mich. 48103. 313-995-1555.

Network management

A communications package for IBM's System/36 has been announced by Kisco Information Systems.

The software, called Remote Batch Control/36, includes a remote batch job feature that can start any batch job on a remote system, a printer pass-through feature that can route printed output to any attached System/36 and support for file and program transfer between machines.

The software requires the SSP communications feature from IBM on all attached machines. Peer System/36s can be attached over permanent or dial-up connections.

The package costs $300 for two sites. Additional sites cost $50 each.

Kisco, Suite 1B, 120 Beverly St., Mount Kisco, N.Y. 10549. 914-241-7233.

A software emulation of its Communication Management Series (CMS) network diagnostic terminal for IBM Personal Computers has been announced Racal-Milgo.

According to the vendor, when CMS PC-Link software is loaded into a PC, the user has full color access to CMS. In addition to providing CMS network diagnostic, control and restore functions, CMS PC-Link can also be configured to support a second port. It also supports color printing on Tektronix, Inc. printers or Diablo Systems, Inc. color ink-jet printers.

Available in both 3½- and 5¼-in. diskettes, CMS PC-Link costs $1,500.

Racal-Milgo, 1601 N. Harrison Pkwy, Sunrise, Fla. 33323. 305-475-1601.

Modems/Multiplexers

Paradyne Corp. has added models to its 3400 Series Network Diagnostic Modem family.

The modems feature interchangeable Personality modules that supply operating characteristics such as data rates. The modems are available in three configurations: desktop models, with a time-division multiplexer, a modem-sharing device and dial restoral; rack-mount models with the ability to support up to 48 modems; and desktop models, suited for remote multidrop configurations.

The Personality modules available support data rates from 1,200 to 9.6K bit/sec. over unconditioned leased lines.

Pricing ranges from $1,400 to $4,500.

Paradyne, P.O. Box 1347, 8550 Ulmerton Road, Largo, Fla. 33540. 813-530-2000.

A point-to-point time-division multiplexer called the Megaplex-1 has been introduced by Rad Data Communications.

Megaplex-1 is said to be capable of multiplexing 10 synchronous subchannels, expandable to 20, into a single T1 or 2M bit/sec. channel. The product operates over microwave links and provides any port-to-any port routing via front panel controls.

Selectable subchannel data rates range from 56K to 768K bit/sec. Field-selectable subchannel interfaces include V.35, X.21 and RS-422. The main channel interface is compatible with AT&T's T1 CSU cross-connect interface requirements.

The Megaplex-1 costs $4,500 with 10 subchannels or $5,900 with 20 subchannels.

Rad Data Communications, 151 W. Passaic St., Rochelle Park, N.J. 07662. 201-587-8822.

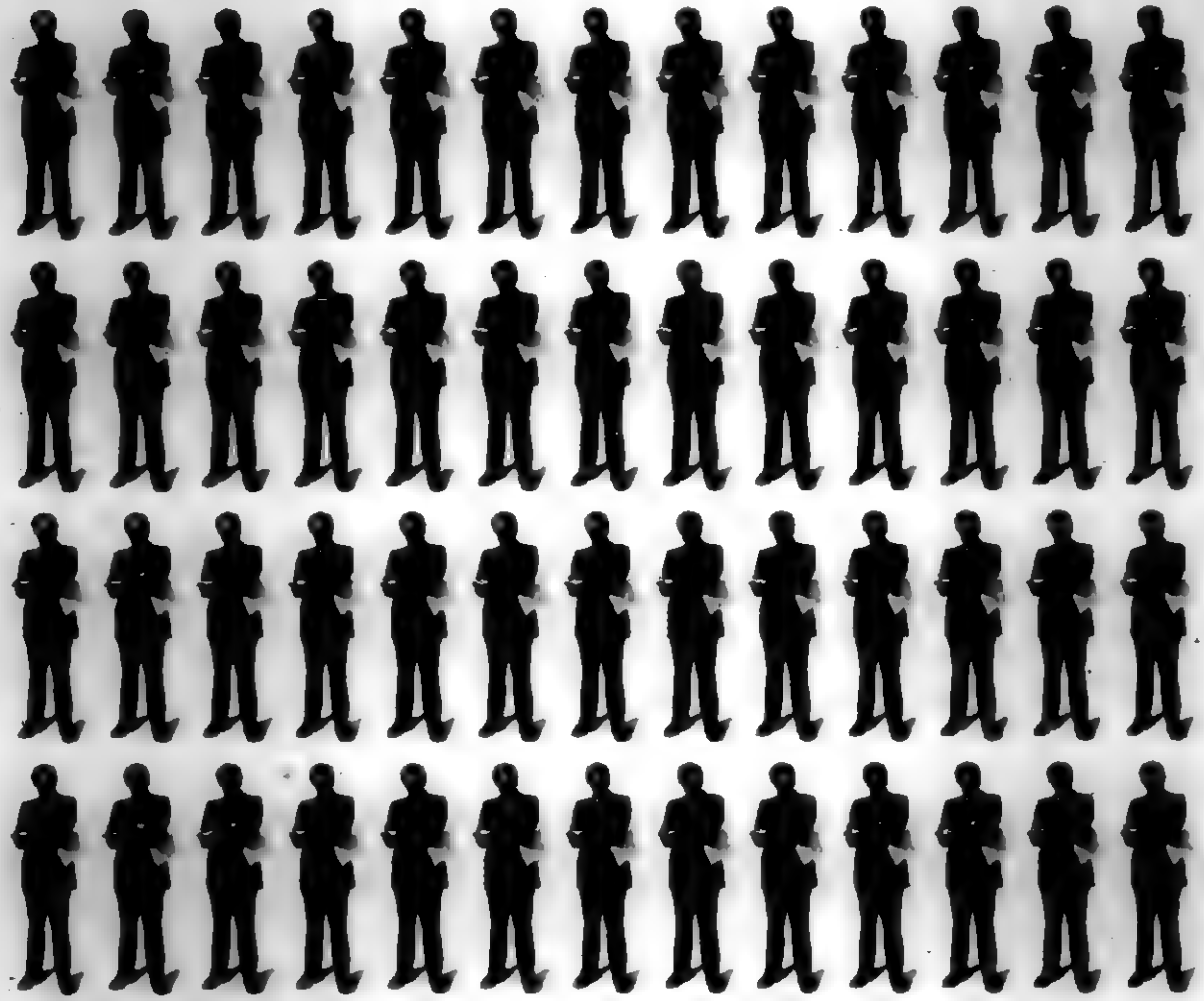
Siemens Information Systems, Inc. has announced two data communications interfaces and software designed to expand the personal computer networking and data communications capabilities of its Saturn II, IIE and III digital voice and data systems.

The interfaces, one internal and one external, allow transmission of data in synchronous or asynchronous protocols. They can emulate a Hayes Microcomputer Products, Inc.-compatible modem.

The OC III software supports synchronous data communications at speeds to 64K bit/sec. and asynchronous transmission between Saturn systems at up to 19.2K bit/sec. over T1 facilities.

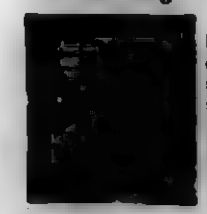
OC III costs $1,000; the external interface costs $500; and the internal interface costs $250.

Siemens, 5500 Broken Sound Blvd., Boca Raton, Fla. 33487. 305-994-8100.



CINCOM Keeps Northwestern Mutual In Full Force.

PROBLEM: Maximizing network availability for more than 8,000 users
CINCOM SOLVED IT: With NETMASTER Network Management System



When Northwestern Mutual Life's network goes down, it hardly goes unnoticed. In fact, with more than 2,000 home-office employees and nearly 7,000 field agents depending on the network for up-to-the-minute policy information, it becomes an event of major proportions.

Which is exactly why NETMASTER® from Cincom® has become such a valuable asset to "The Quiet Company." "NETMASTER has made life much easier from a network control point of view," explained Northwestern Mutual's Wayne Gajkowski. "It definitely keeps the network more available. For example, in one instance, it helped us eliminate a problem with NCP slowdowns, which had caused considerable downtime—as much as two hours a week or more."

Driven by a powerful Network Control Language, NETMASTER not only helps decrease downtime, it helps cut costs at Northwestern Mutual. As VTAM Specialist George MacDonald points out, the system's multiple sessions capabilities have allowed his company to delay hardware purchases and, in many cases, hardware upgrades as well as improve productivity. "I wouldn't want to have to manage a network like ours without something as high quality as NETMASTER," said MacDonald, whose company also utilizes SUPRA™ and MANTIS® from Cincom. "There's just no way in the world to do it."

Find out why NETMASTER is the best policy for your network, too. Call us today for more product and customer-success information, or write Marketing Services Department, Cincom World Headquarters, 2300 Montana Avenue, Cincinnati, OH 45211.

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When we challenged you in March to make us laugh, we were looking for humorous slogans for our annual button contest.

We got them.

Your response was impressive, to say the least. And your slogans were terrific. We received hundreds of responses from all over the United States. They were all quite good, so choosing just six winners was no easy task.

But it was enjoyable. Our panel of Computerworld judges was thoroughly entertained by your creativity.

Be sure to look for these buttons at upcoming trade shows and conferences — the 1988 buttons will debut at Comdex Spring, May 9-12, so stop by the Computerworld booth and pick up yours.

Congratulations to the winners and many thanks to all who entered. We'll see you again next year!

COMPUTERWORLD

An IDG Communications Publication

The Winning Slogans of the 1988 Computerworld Button Contest:

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TelOAS is more than a computer system. It's a new way of looking at solving your computer needs. TeleVideo engineers created a system that can be anything you need it to be. From a data entry terminal to a powerful CAD/CAM workstation to a LAN fileserver, TelOAS combines power and flexibility in a system every user can afford.

TelOAS protects your investment by combining the latest technology with industry standard hardware and software. To give you added assurance, standard TelOAS models include one-year limited ON-SITE warranty* service from Intelogic Trace with over 250 service locations. All standard TelOAS models come bundled with MS-DOS™ and BASIC to give you access to the widest range of software available. It's all there to make sure TelOAS open architecture systems will meet your needs today, and grow in the future.

*U.S. only

Standard TelOAS Configurations Matrix

Product	Model	CPU/ Speed	Standard RAM	No. of Slots	Floppy	Hard Disk	Keyboard	Video Board	Monitor	Power Supply
TelOAS I	NH	88/8	512K	4	360K	Optional	AT	MD/Her/CGA	Optional	80W
TelOAS II	NH	286/12	1M	8	1.2M	Optional	Enh. AT	Optional	Optional	155W
TelOAS II	20	286/12	1M	8	1.2M	20M	Enh. AT	Optional	Optional	155W
TelOAS III	NH	386/16	1M	12	1.2M	Optional	Enh. AT	Optional	Optional	240W
TelOAS III	40	386/16	1M	12	1.2M	40M	Enh. AT	Optional	Optional	240W
TelOAS III	70	386/16	1M	12	1.2M	70M	Enh. AT	Optional	Optional	240W
TelOAS III/20	NH	386/20	1M	12	1.2M	Optional	Enh. AT	Optional	Optional	240W
TelOAS III/20	70	386/20	1M	12	1.2M	70M	Enh. AT	Optional	Optional	240W

TelOAS I. Flexibility Is The Heart Of The System.

The key to the new TelOAS Open Architecture Solutions is being able to build the computer that's right for your applications. Our modular design lets you choose the TelOAS CPU you want: an 8MHz 8088, a 12 MHz 80286, or your choice of a 16 or 20MHz 80386. Now choose the drives you want, the monitor, keyboard, and the footprint you want. Then combine them in the configuration that gives you the solution you need. When your needs change, the TelOAS system changes right along with you.

We didn't forget that even the most flexible system has to work in the real world, so we made sure the TelOAS system is compatible with industry-leading software to give you access to the most versatile and powerful programs.

TelOAS I packs a lot of power and versatility into a very compact 4" high package. Its open-architecture passive backplane design gives it great flexi-

bility. The passive backplane has four full slots (three 16-bit and one 8-bit) and room for two half-height drives. To make your connections, there's one serial and one parallel port.

To keep everything safe and sound from unauthorized use, there's a convenient front-mounted security lock with removable key.

There's also a LED On-Off power switch/reset key that falls right at hand. A small point, but an indication of the care TeleVideo engineers took designing our most advanced system ever.

The standard TelOAS 1 configuration includes an 8088 CPU, 512K RAM, 360KB floppy disk drive, floppy disk controller, Hercules®/CGA graphics controller and 84-key AT compatible keyboard. It's shown here with the optional high-resolution 14" amber screen monitor.

TelOAS II. Advanced Technology Is The Brain Of The System.

The TelOAS Open Architecture Solutions use some of the most advanced design and assembly technologies to deliver computers that are as dependable as they are powerful.

TelOAS advanced passive backplane technology makes it easy to upgrade your system as your needs change. Increasing memory can be as easy as plugging in a new TelOAS Single Inline Memory Module (SIMM). Slip out your half-height drives, slip in full-height hard disks and you can have to up 300 MB storage capacity, enough to run sophisticated System Fault Tolerant backup systems and LAN configurations.

Our Surface Mount Technology (SMT) increases the functionality and reliability of TelOAS computers, and decreases their

power consumption.

And that's enough to make even a power user smile.

TelOAS II increases your flexibility with a choice of TelOAS 12 MHz 80286 or 16 MHz 80386 CPUs, plus a socket for an 80287 or 80387 coprocessor. The passive backplane has eight full slots (seven 16-bit and one 8-bit), and room for four half-height drives. There are two serial and one parallel port, a security lock with removable key, and a LED On-Off power switch/reset key.

The TelOAS II standard configuration includes a 12 MHz 80286 CPU, 1 MB RAM, 1.2 MB floppy disk drive, floppy and hard disk controllers, and 101-key Enhanced AT keyboard. We've shown it here with an optional 13″ color monitor.

While TeleVideo's engineers were designing our most powerful and most flexible computer system ever, they made sure it was also the most reliable.

TelOAS Open Architecture Solutions use the most advanced design and production technologies to reduce the number of parts in each system, and to make sure each of those parts maintains our stringent quality control requirements.

To make sure our computers remain very reliable and trouble-free, each TelOAS system has complete diagnostic features that give you extensive hardware tests.

TelOAS III is the top of the line, perfect for users who expect a lot from their computers. Unique for TeleVideo, TelOAS III can be configured to support up to 600 MB, giving users the capability to run large disk storage programs, LAN configurations and System Fault Tolerant back-

TelOAS III. The Best Solutions Are The Most Reliable Solutions.

up systems, as well as powerful CAD/CAM engineering workstations.

TelOAS III accepts TelOAS 12 MHz 80286 and both 16 MHz and 20 MHz 80386 CPUs. There's a socket for a 32-bit memory expansion connector, and an 80387 coprocessor. The 20 MHz 80386 CPU also accepts a Weitek™ 1167 floating-point processor. The passive backplane has eight full-size and four half-size slots (ten 16-bit and two 8-bit), and room for two full-height and two half-height drives.

There are two serial and one parallel port, and a LED On-Off power switch/reset key.

The TelOAS III standard configuration includes a 16 MHz 80386 CPU, 1 MB RAM, 1.2 MB floppy disk drive, floppy and hard disk controllers, and 101-key Enhanced AT keyboard. It's shown here with an optional 19" high-resolution color monitor.

TeleVideo has the perfect terminals to go with our TelOAS Open Architecture Solutions.

The affordable 905 is a very reliable ASCII terminal with all the basic features you look for in a data-entry terminal, priced with maximum economy in mind.

The bright new 900C color terminal lets you bring all the benefits of color to your monochrome applications. Just plug it in to take advantage of its 64-color palette and 14" non-glare screen.

The powerful 965 is perfect for just about everything. With an Enhanced PC keyboard, it's a low-cost workstation for your TelOAS system running DOS. As an ASCII or ANSI terminal with the corresponding keyboard, you can use it on your TelOAS system in a UNIX® multi-user configuration.

The 965 uses an ultra-reliable single board design with a 16-bit

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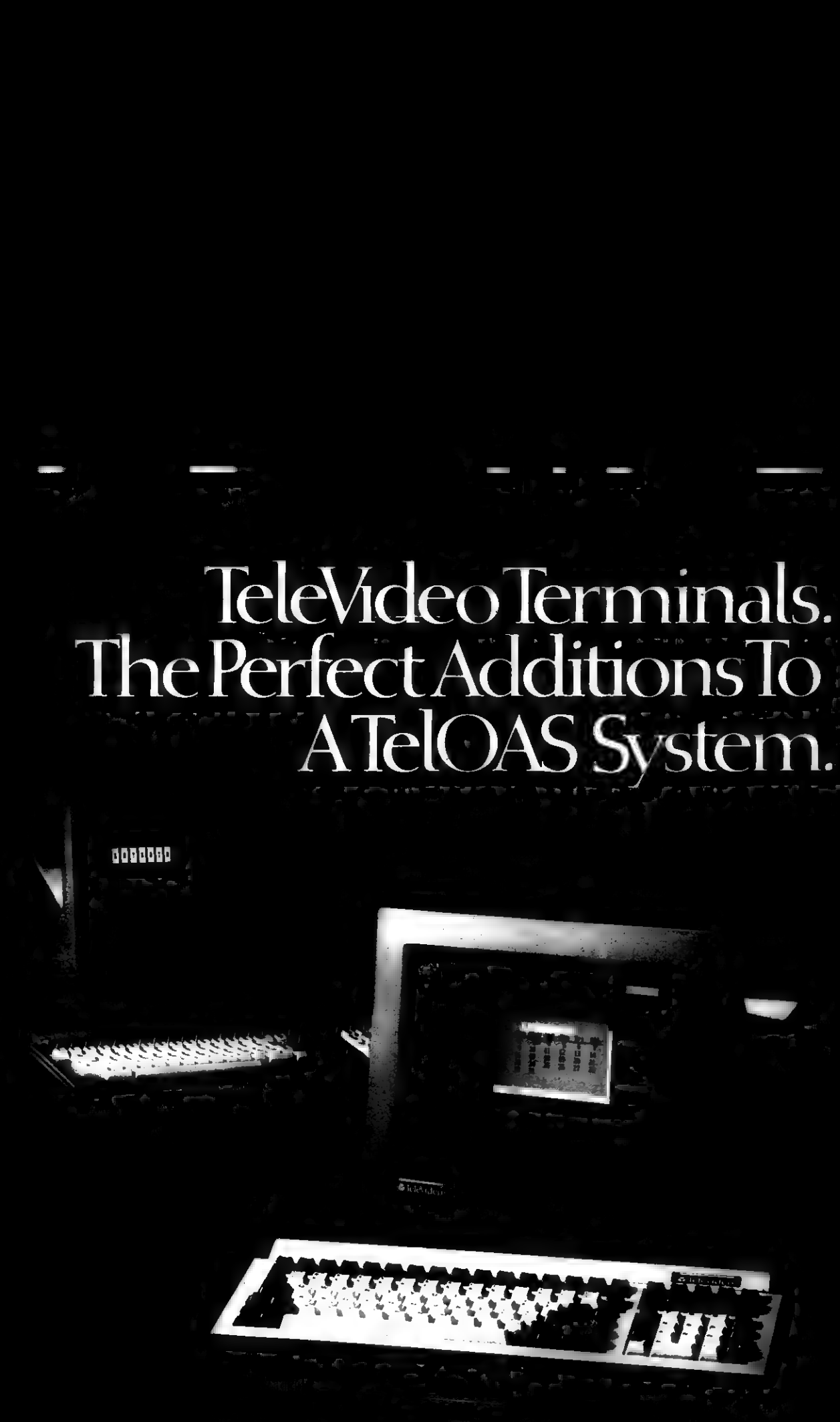

CPU and sophisticated gate array to give you all the power you need. Its 14" high-resolution flat screen displays up to 49 data lines to show large spreadsheets or two pages of text at a time. That's more than any other terminal in its class. It also supports up to 23 terminal emulations, again more than anything in its class.

And the 9320 is a DEC® VT320™ compatible terminal with more flexibility and features than the VT320. It has DB25 and DECconnect™ host and printer ports, two pages of display memory, and an enhanced VT320 keyboard.

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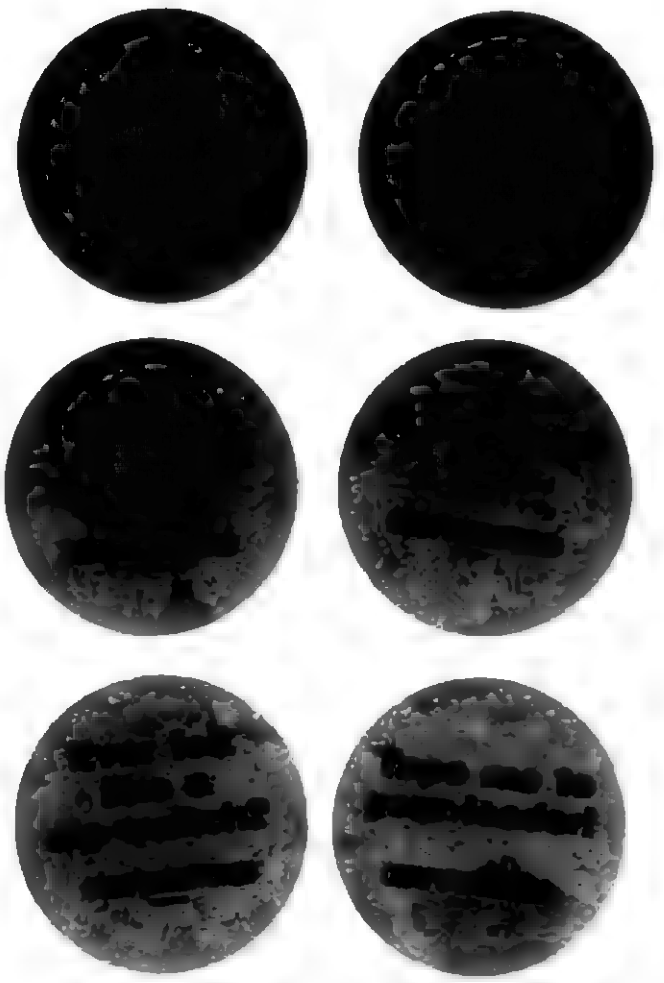
Congratulations to the winners and many thanks to all who entered. We'll see you again next year!

COMPUTERWORLD

An IDG Communications Publication

The Winning Slogans of the 1988 Computerworld Button Contest:



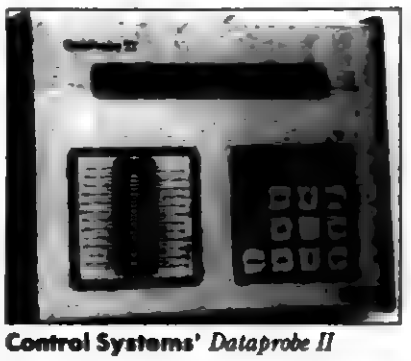
SEE US AT COMDEX - BOOTH #1214

Diagnostic equipment

A protocol analyzer and emulator designed for installing and maintaining data communications networks has been announced by **Control Systems Technology, Inc.**

Dataprobe II can capture or generate data at up to 19.2K bit/sec. It features a battery backed-up 30K-byte capture buffer that can be dumped to a computer or printer. Protocols available include Async; IBM's Binary Synchronous Communications, Synchronous Data Link Control, Systems Network Architecture and high-level data link control; and CCITT X.25.

Other features include dual-line auto-



Control Systems' *Dataprobe II*

configuration, the ability to determine and display protocol, data rate, clocking and other link parameters for both the data terminal equipment and the data communications equipment device simultaneously.

Dataprobe II models are priced from $1,695 to $1,995.

Control Systems Technology, 19045 Cherry Bend Drive, Germantown, Md. 20874. 301-540-8614.

Coax Data Scope, a product designed to support IBM 3270 Personal Computer Systems Network Architecture (SNA) networks, has been announced by **Azure Technologies, Inc.**

Consisting of a personal computer board and software, Coax Data Scope converts an IBM PC AT or XT into a data scope for use in monitoring and analyzing IBM's Type A coaxial protocols and the data streams that are transmitted using the coaxial medium.

According to the vendor, Coax Data Scope supports all modes of operation. It allows the data to be viewed in any of the protocol levels allowed on the SNA medium. The protocols can be displayed simultaneously in user-defined windows. The product also allows the capture of data files up to 16M bytes.

Coax Data Scope is priced at $2,995.

Azure Technologies, 38 Pond St., Franklin, Mass. 02038. 617-520-3800.

Cabling

A half-card-size personal computer board said to allow PCs to transmit over fiber-optic cable has been introduced by **Black Box Corp.**

The **Fiber Optic PC Boards** are available with one or two programmable full-duplex channels. Once installed, the vendor said, transmission up to 2.5 miles is possible at rates of up to 76.8K bit/sec.

The single-port model costs $255; the dual-port model costs $320.

Black Box also introduced the **Tote-A-Modem**, a portable, battery operated modem. It features Hayes Microcomputer Products, Inc. AT command set compatibility, autoanswer, autodial, pulse and tone dialing and storage of up to 20 commands. The 1,200 bit/sec. model costs $199; the 2,400 bit/sec. model costs $359.

Black Box, P.O. Box 12800, Pittsburgh, Pa. 15241. 412-746-5500.

An IBM Token-Ring local-area network fiber-optic extender has been announced by **Raycom Systems, Inc.**

An enhanced version of the Raycom 3400, the **Raycom 3410** was designed for networks operating from 1M to 16M bit/sec. with Manchester coding.

Distances can be extended up to 4 km using common multimode fiber-optic cable.

The Raycom 3410 reportedly allows attachment to the IBM Multistation Access Unit's Ring In and Ring Out ports in addition to attachment to the unit's eight lobe ports.

Support is provided for redundancy, the vendor said.

The Raycom 3410 is priced at $1,415. An extended distance version, which operates over single-mode fiber, is available for $2,265.

Raycom Systems, 6395 Gunpark Drive, Boulder, Colo. 80301. 303-530-1620.

An I/O module designed to extend an IEEE 802.3 IBM Token-Ring network over optical fiber at a data rate of 4M bit/sec. per channel has been introduced by **Fibermux Corp.**

The **CC4465T** is part of the vendor's Magnum FX4400 I/O module line. It is an eight-partition, 40M bit/sec. aggregate bandwidth fiber-optic backbone network, reportedly allowing up to eight independent token-rings to run over a single fiber pair.

According to the vendor, the network can be extended up to 10 km.

Features include on-line testing and remote failure detection. Optional features include optical redundancy, switchover logic and network management software.

An FX4400 configured with the CC4465T Token-Ring support ranges from $4,500 to $15,000.

Fibermux, 9428 Eton Ave., Chatsworth, Calif. 91311. 818-709-6000.

"Obviously, these people never considered the advantages of incorporating planned rentals into their capital equipment acquisition strategy."

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SYSTEMS & PERIPHERALS

HARD TALK

J. A. Savage

Truth beats vaporware

Amazing things happen when reporters get to speak with computer company officials without the regulation flock of public relations people hovering over every word. Once in a while, a comment with the ring of truth leaks out.

It came as a pleasant surprise when, during the announcement of his firm's supercomputer division, David Evans — chairman, president and chief executive officer of Evans and Sutherland Computer Corp. — said there is a chance that the company's high-powered processor may not work out.

Evans and Sutherland aims to ship the graphics supercomputer at the end of this year. The vendor claimed it will be 15 times more powerful than recently announced graphics supercomputers by Ardent and Stellar and even claimed it to be more powerful than a Cray supercomputer.

Company officials said their machine will be priced in the $3 million to $8 million range, depending on configuration.

"It's conceivable that we can't do it. And it's conceivable

Continued on page 70

Vendors weather stormy rates

Amdahl, NAS insulate users from impact of yen-dollar turbulence

BY J. A. SAVAGE
and STANLEY GIBSON
CW STAFF

Despite facing the threat of profit margin erosion because of the current yen-dollar exchange rate, IBM plug-compatible manufacturers (PCM) Amdahl Corp. and National Advanced Systems (NAS) thus far have shielded their customers from higher prices.

The dilemma faced by Amdahl and NAS is simple: The less the dollar is worth, the more dollars they must spend on computer components from their Japanese suppliers, Fujitsu Ltd. and Hitachi Ltd. Paying higher prices for parts threatens to force the vendors to charge their customers more.

In the IBM plug-compatible mainframe market, the ability to undersell IBM is crucial. The free-falling dollar has caused both Amdahl and NAS to scramble for creative strategies to deflect the pricing damage that the exchange rate could cause.

"We expected it [a price increase], but we haven't noticed anything yet," said Don Breitenbach, vice-president of MIS at American Family Mutual Insurance Co. in Madison, Wis.

An Amdahl user since 1979, American Family purchased one 5890 in late 1987 and another early this year. He said the prices, which were settled in October 1987, reflected the usual cost advantage over IBM.

A government user reported that he has not yet seen a change in the current exchange rate because his contracts are locked in for five to seven years, and none have expired recently.

"I would expect to see it in the next round" of requests for proposals, he said.

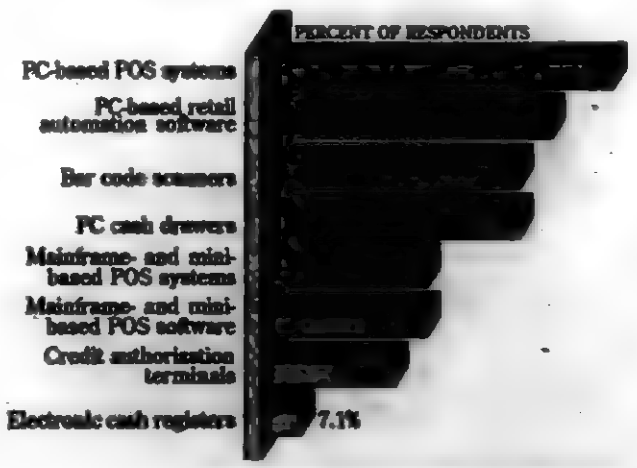
Both PCMs have come up with different approaches to the problem. Amdahl is now depend-

Continued on page 71

Data View

PCs gain at point of sale

Personal computer POS products dominate systems sold by value-added resellers surveyed



INFORMATION PROVIDED BY VENTURE DEVELOPMENT CORP.

HP airs new interface

BY STANLEY GIBSON
CW STAFF

PALO ALTO, Calif. — Responding to user demands for standard peripherals interfaces, Hewlett-Packard Co. recently introduced its first small computer systems interface (SCSI) cards and disk drives. The products are intended for the HP 9000 Series 300 technical workstation family.

"Major users want a standard interface, such as SCSI. The greatest user demand was for those workstations," an HP spokesman said.

The SCSI provides standard

Continued on page 70

Okidata builds on print line

BY ALAN ALPER
CW STAFF

NEW YORK — Okidata Corp. last week expanded its family of dot matrix printers by unveiling 24- and nine-pin units that feature ruggedized designs and a variety of paper handling capabilities designed to meet most business applications.

The new printers' cases and chassis are made from a proprietary composite of materials that are used in high-stress applications, such as safety helmets and automobile bumpers, the Mount Laurel, N.J., company said. The printers are also equipped with a printhead made from a proprietary carbide alloy said to print almost 200 million characters during its lifetime.

All of the printers carry a mean time between failure rating of 5,000 hours, which is 25% better than the firm's competition, claimed Edward Golderer,

Continued on page 68

Inside

- Stellar inks distributor pact with Tokyo-based Mitsui. Page 68.
- Storage Technology offers more tape for less money. Page 70.
- EMC reveals Prime-compatible memory card. Page 72.

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Fully integrated (no box!), the ISI 7224 connects directly to IBM 3174/3274/3276 controllers or S/3X twinaxial cable.

Forms-handling advantages include automatic paper parking, no-waste demand-document tear-off, and a straight path for still forms. No extra-cost gadgets are required.

Extra features and all, the ISI 7224 costs much less than its IBM counterpart.

For more information, call 1-800-544-4972 (in Michigan, 313/769-5900). Or write.

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► The ISI 7224 prints at 53.7 dBA — quieter than the IBM 4224. And since it's only seven inches tall, it fits tighter spaces.

HARDWARE NOTES

Stellar chipping at trade imbalance

Laying the groundwork so that it may play its part in reversing the U.S.-Japan trade imbalance is Stellar Computer, Inc., which recently announced that it has signed a distributor agreement with Mitsui & Co. in Tokyo. This follows Stellar's recent announcement of a distributor agreement with Asahi Chemical Industry Co. as Stellar's industrial distributor in Japan.

And Stellar will not just be returning Japanese chips to their point of origin. The custom-built microprocessors that are the heart of Stellar's GS 1000 graphics superworkstation are made by California's LSI Logic Corp.

ETA Systems, Inc. recently reported some success in placing its supercomputers. The St. Paul, Minn.-based subsidiary of Control Data Corp. has signed a $7 million contract with the National Aeronautics and Space Administration's Ames Research Center in Mountain View, Calif.

Under the agreement, NASA will lease an Initial Computer System for one year with an option to lease an ETA HSP-2 system for two years after that.

The total value of the contract, including money to be paid for both processors and hardware upgrade options, is $40.5 million. The Initial Computer System will be capable of more than 250 million floating-point operations per second (FLOPS), according to ETA.

It will also have 500M bytes of common memory and 25M bytes of storage. The HSP-2 is capable of one billion FLOPS, ETA claimed.

Meanwhile, ETA will also be shipping an ETA 10 Model P entry-level supercomputer to the Total Compagnie Francaise des Petroles, a major French petroleum company. The $2 million contract calls for an ETA 10 Model P to be shipped in July. ETA claimed its low-end machine can perform 375 million FLOPS.

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Okidata

FROM PAGE 67

Okidata's vice-president of marketing. "That equates to 1,000 letters per week over 2½ years," he said.

The two 24-pin printers operate at 270 char./sec. for utility printing and 90 char./sec. for letter quality. Marketed as the Microline 390 and 391 — the latter is a wide-carriage version — the printers cost $699 and $949, respectively.

The printers come with IBM X/24 and Epson America, Inc. LQ compatibility and two resident fonts: Courier Letter Quality and Gothic. Additional font cards are also available and cost $49. The printer comes standard with a parallel interface, although an optional, user-installable serial interface attachment will be made available in August, Golderer said.

Offered with a standard push tractor, the printers can be configured with a pull-tractor mechanism to facilitate the use of continuous forms, a cut-sheet feeder with 170-sheet capacity and an acoustic cover. Users can automatically switch from continuous-form to cut-sheet printing by parking the tractor mechanism and snapping the single-sheet feeder into place.

The two nine-pin printers operate at 300 char./sec. in high-speed draft mode at all pitches, 250 char./sec. for utility printing and 63 char./sec. for near-letter-quality output. The Microline 320 costs $499, and the wide-carriage version — the 321 — is priced at $699.

The printers contain the same optional paper handling capabilities as the 390 models but are not equipped to handle font cards, Golderer said. The 320s have co-resident Epson 86 and IBM Proprinter emulation, and two resident near-letter-quality fonts — Courier and Sans Serif — come standard, the company said.

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☐ 5 times a day ☐ 10 times a day ☐ 15 times a day
☐ I stopped counting

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Storage Tech offers 18-track tape system

LOUISVILLE, Colo. — Storage Technology Corp. recently announced an 18-track cartridge tape subsystem that boasts a lower initial cost than its 9-track system.

The Model 4980 allows minicomputers to interchange data tapes with IBM 3480 and compatible mainframes at a transfer rate of 3.3M byte/sec. using a small computer systems interface (SCSI), according to a company spokesman.

Storage Technology offers its own interface, which has a dual host attachment. That interface allows a transfer rate of 1.5M byte/sec. The firm's 9-track system offers a peak 1.25M byte/sec. transfer rate with SCSI.

STORAGE Technology offers its own interface, which allows a transfer rate of 1.5M byte/sec.

The basics

The basic configuration with one control unit and one transport in quantity to the OEM market is $33,750.

The 9-track system costs $35,700. The controller is powered by dual microprocessors and has a 1M-byte cache buffer that allows multiple tape drives to be used simultaneously, according to the company. The unit is said to be field upgradable with the addition of an extra transport or a slave cabinet that has two transports.

Storage Technology said the system will be generally available in the third quarter of this year.

Storage Technology also announced that it has adapted its 5000 Series Printer Subsystem to attach directly to DEC VAX systems.

The Storage Technology 5000 series of printers includes model 021 at 2,100 lines per minute (lpm); model 028 at 2,800 lpm; and model 050 at 3,000, 3,800 and 5,000 lpm.

Storage Technology said the models are upgradable from lower-speed to higher-speed models.

"DEC users have been encouraging us to enter their market with a relaible, heavy duty printer," said Richard R. Douglas, corporate senior vice-president in a prepared statement.

The 5,000 Series printer subsystem is list priced from $35,000 to $74,000. General availability will be this month.

HP interface

CONTINUED FROM PAGE 67

SCSI features, including support for up to eight devices on the bus, parity and bus arbitration.

Support software, designed for use only with magnetic disks, implements the ANSI-standard common command set for direct-access devices.

The three SCSI-compatible disk drives, which are manufactured by HP itself, include the HP 7957S, offering 107M bytes of storage; the 7958S, capable of storing 161M bytes; and the 7959S, which stores 323M bytes.

The disk drives all use a 5¼-in. Winchester disk, which offers a seek time equal to 17 msec and a burst transfer rate of 1.5M byte/sec., the vendor said.

The HP 7957S is priced at $5,675, the 7958S costs $7,300, and the 7959S is priced at $9,350. The drives are available eight weeks after receipt of order.

Customers can use third-party SCSI devices, integrating them with an HP system using HP's software tools, which were announced with the drives and interfaces.

SCSI cards are priced at $795 for the Model 319, $1,100 for the Model 330 and $1,100 for the Model 350. The cards are available four weeks after receipt of order.

The HP spokesman said the firm may offer SCSI-compatible products on its Spectrum series later.

Savage

CONTINUED FROM PAGE 67

that people won't like it," Evans said.

Evans added that the machine is being debugged without actually existing. This debugging is done on the company's own simulators — products for which Evans and Sutherland is better known.

I detect a loyalty to scientific truth rather than gee-whiz marketing in Evans' statements. A former computer science and electrical engineering professor and a computer professional for 38 years, Evans appears to be a true techie. Those with purely technical backgrounds often see reality in truer hues than the rose-tinted shades perceived by marketing types.

And fair is fair. If the Evans and Sutherland graphics supercomputer is not available late this year, I will report it, but I promise I won't call it vaporware.

Savage is a Computerworld West Coast correspondent.

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Remember, no matter what your mainframe looks like: without CCA, high performance is just an empty promise.

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Stormy rates

CONTINUED FROM PAGE 67

ing on exchange-rate arbitrage to hold its profits. In contrast, NAS has shunned this approach, relying on agreements with Hitachi to smooth out exchange-rate turbulence. Although both measures are intended to avoid cost increases, the strategies themselves are expenses that promise to escalate.

Amdahl has been hedging its dollars since late 1985, according to Ed Thompson, the company's chief financial officer. And hedging in the currency market costs money. The company reported that it spent $2 million on hedging in 1986 and more than $5 million in 1987. John Luhtala, Amdahl's international treasury manager, handles the firm's hedging; he reported that the strategy will cost more this year.

Amdahl hedges primarily by playing the options market. "If we didn't play this game, the cost of goods would skyrocket. It puts enormous pressure on our margins," Luhtala said.

Another way Amdahl tries to keep down the cost of its source hardware is by locking in exchange rates at the beginning of the year, or "future buying." This is simply a contract with Fujitsu that specifies a price for hardware delivered at a certain time.

This is not as advantageous as currency hedging, according to Luhtala. "This is locked into a delivery plan. With options, you can walk away from it," he explained. Fujitsu is taking the risk that the dollar will still be worth something at the time of delivery, but Amdahl must take the goods whether the inventory needs them or not, Luhtala added.

NAS is not currently an active player in the options market, although it is now evaluating whether it should take part. So far, it appears that Hitachi has been taking most of the risks for its partner.

NAS has relied on the future buying technique. In an effort to spread risk, there are yen-dollar price triggers in the two companies' contracts. When a given exchange rate is reached, vendor and supplier must head to the the negotiating table to hammer out a new agreement, according to Atam Lalchandani, NAS's chief financial officer. "The trigger has been activated in the last 18 months," he acknowledged.

Amdahl also has triggers in its contracts, but the contingencies are mapped out so that the firm does not have to go back to the bargaining table with Fujitsu, according to Luhtala. There is a "Plan A" and a "Plan B," depending on the situation, he said. "That means we don't have to spend endless amounts of time in negotiations."

Even though the dollar has continued to fall, Lalchandani said that six months ago, it was still not economical for NAS to hedge in the options market. "The cost of hedging six months into the future is about 1.5% of the dollar volume at today's prices. If, say, you were hedging $40 million worth, that's a significant cost."

Lalchandani said he cannot tell just how much Hitachi is suffering from the currency situation. "I'm not sure that its incremental profit is negative. I hope that's not true." Another NAS source said the currency dilemma has "put a stiffness in negotiations."

International safety valve

One safety valve for both vendors has been international sales. The relatively weak dollar against European currencies has helped boost sales in Europe.

"The exchange rate will probably hurt them domestically, but it may help them elsewhere. It may be a wash," offered Jeffry Beeler, an industry analyst at Dataquest, Inc. in San Jose, Calif.

Luhtala said that because IBM obtains some key hardware components from Europe, the European-American exchange rate works to its disadvantage, helping to level the playing field for the PCMs. Buying in European currencies is just about as bad as buying Japanese, Luhtala noted.

Despite the exchange rate acrobatics the vendors must perform, both NAS and Amdahl firmly maintained that they need not raise prices. The vendors said their pricing structures are independent of the cost. "The pricing is not based on subassemblies, but on the market," a NAS spokesman said.

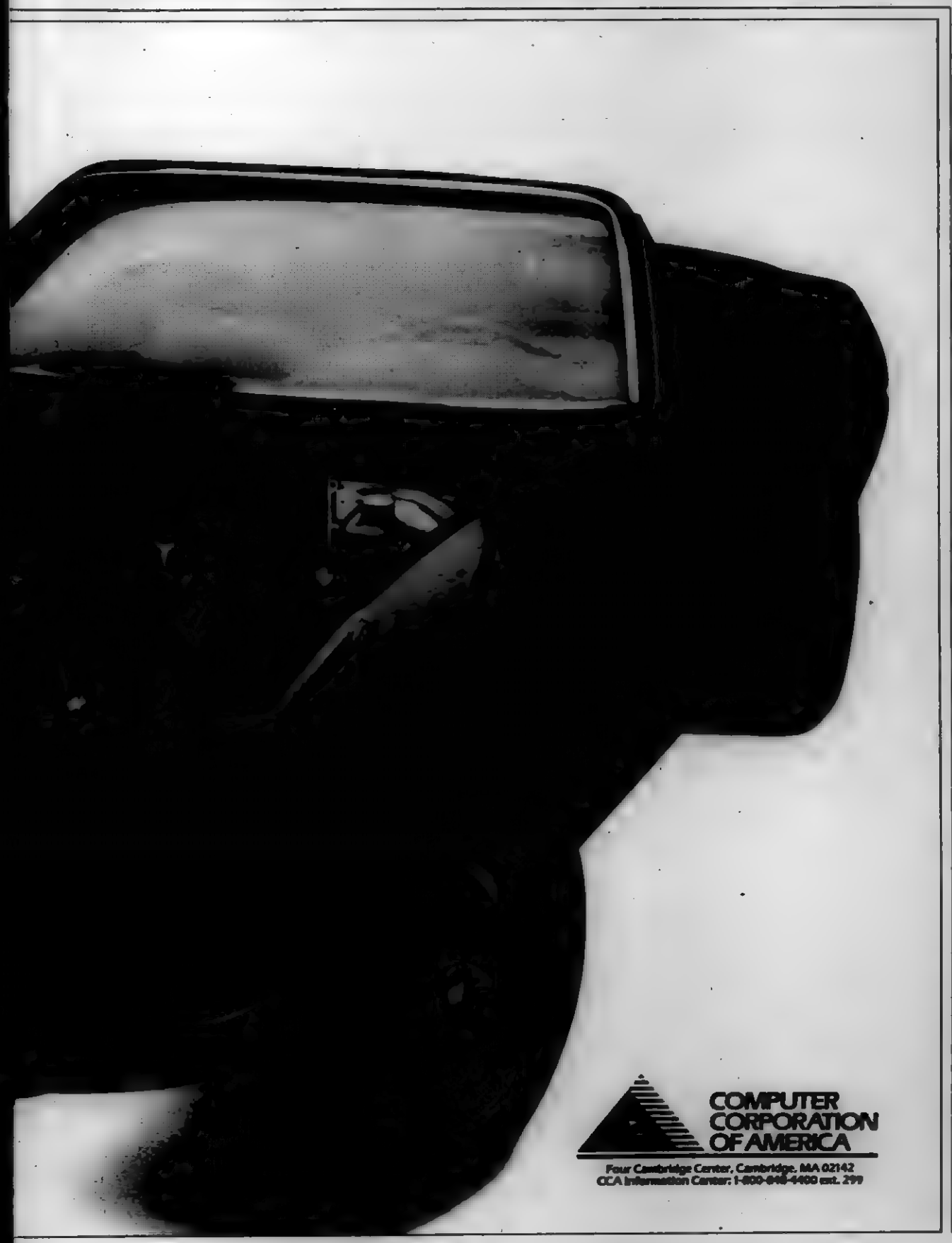
"We don't necessarily pass on [manufacturing] costs to customers," Lalchandani said. "It is part of management's job to keep up with the changing external market. We have to come up with strategies to keep making money — we never want to give anything away."

Pick-based minis hit the market

McDonnell Douglas Computer Systems Co. recently announced two minicomputers, the Series 18 Model 300 and Model 600, based on Reality, the company's version of Pick Systems' Pick operating system. Reality is a dictionary-driven relational data base, which the firm claimed allows users to determine access and retrieval of data.

The company said its proprietary Reality CPU has a cycle time of 160 nsec; the Models 300 and 600 have clock speeds of 10 MHz and 25 MHz, respectively.

The Series 18 Model 300 supports from eight to 96 users at an entry-level price of $39,000. An entry-level Series 18 Model 600 system, priced at $199,000, supports 32 users.



NEW PRODUCTS

Processors

A compatible memory card for Prime Computer, Inc.'s 6350 and 6550 processors has been announced by **EMC Corp.**

Called **E6000-8MB**, the card is also compatible with Prime's 4050 and 4150 office environment computers. It uses 256K bytes of random-access memory chip technology and provides 8M bytes of main memory.

The E6000-8MB costs $16,800; a 32M-byte version costs $38,500.

EMC also announced a price reduction on all its **Falcon series** disk subsystems for Hewlett-Packard Co. minicomputers. Prices now range from $9,900 for the Falcon 400H 406M-byte subsystem to $28,650 for the Falcon 1200, a 1.25G-byte subsystem with 4M bytes of cache memory.

EMC, Hopkinton, Mass. 01748. 617-435-2541.

Graphics systems

Ramtek Corp. has announced **true-color imaging** for its Ramtek 4660 Imagine Display System.

The 4660 option displays a 1,280- by 1,024-pixel by 24-bit image and eight additional bits of graphics overlay. Each of the image look-up tables is configured to process eight bits of refresh memory, providing 256 shades per primary color of red, green and blue.

A fourth graphics overlay table provides up to 64 simultaneous overlay colors, image look-up table partitioning and output selection and a 10% overlay brightness selection.

Other features include 4.5M bytes of display list memory, a direct memory access interface and the ability to combine graphics and imaging in a single controller.

The true-color imaging option costs $4,500.

Ramtek, 2211 Lawson Lane, Santa Clara, Calif. 95054. 408-988-2211.

Terminals

A terminal said to emulate Digital Equipment Corp.'s VT320 has been announced by **Relisys.**

The **Model RA320** features a 14-in. nonglare screen in amber, green or paper-white phosphor. The format includes 24 data lines in either 80 or 132 columns plus a 25th status line. Other screen attributes include reverse video, underline, bold, blink, blank and double-height, double-width characters, split screen, screen saver and menu set-up screen.

The unit comes with a DEC-compatible keyboard with 15 programmable function keys. Communications over DEC 423 and RS-232C serial communications and printer ports are at 75 to 19.2K bit/sec.

The Model RA320 costs $545. It will be available in May, the vendor said.

Relisys, 320 S. Milpitas Blvd., Milpitas, Calif. 95035. 408-945-1062.

Printers/Plotters

Bruning, a division of AM International, has cut the price of its dual-mode **Zeta 824CS** and **Zeta 836CS** plotters.

The 836CS plotter produces A- to E-size plots, and the 824CS produces A- to D-size plots. Features include a continuous-roll capability of up to 120 ft as well as single-sheet capabilities.

The plotters support Bruning's Graphic Machine Language, Hewlett-Packard Co.'s HPGL, Calcomp's 960 and Tektronix, Inc.'s Plot 10 graphics languages. They offer IEEE, RS-232C and IBM coaxial interfaces.

The plotters offer speeds to 25 in./sec. Functions include scaling, windowing and rotating.

The 824CS costs $5,950, and the 836CS costs $9,900.

Bruning, 777 Arnold Drive, Martinez, Calif. 94553. 415-372-3427.

The triple-bin **Laserfeeder**, a product for Wang Laboratories, Inc.'s LPS-8 laser printer on Wang OIS and VS systems, has been announced by **BDT Products, Inc.**

Laserfeeder is said to automatically feed paper and envelopes into the Wang LPS-8. Users can select two different types of paper or feed envelopes using standard Wang software, the vendor said. Laserfeeder expands the capacity to 540 sheets of paper and 60 envelopes.

Laserfeeder fits directly behind the Wang printer. It costs $1,795.

BDT Products, 17152 Armstrong Ave., Irvine, Calif. 92714. 714-660-1386.

Power supplies

A power protection device for IBM System/34 and 36 computers has been announced by **HDR Power Systems.**

Called **Line/UPS**, the system consists of a line power conditioner module with dual output voltages to protect against spikes, dips, noise and transients.

It includes an integral transfer switch that automatically connects the computer to the commercial power source should the conditioner fail or become overloaded.

Line/UPS modules cost approximately $3,000.

HDR Power Systems, 600 Oakland Park Ave., Columbus, Ohio 43214. 614-262-6832.

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CORPORATE ELECTRONIC PUBLISHING

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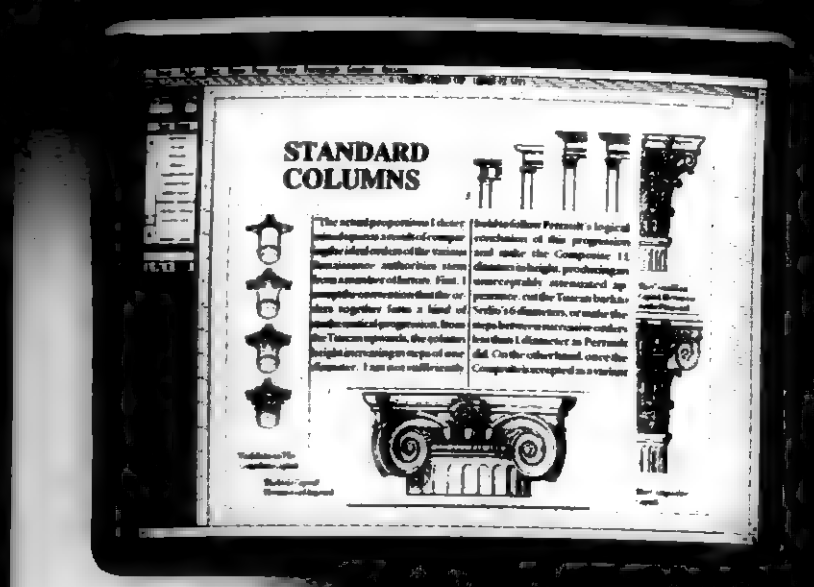

The Standards.

The Wyse WY-700 Graphics Subsystem. In desktop publishing, PC users have set high standards for themselves. Among displays, their first choice is our WY-700 high resolution monitor and video board. It's the best seller by a wide margin, for reasons that are plain to see. The WY-700's sharp 1280 x 800 pixel resolution rivals subsystems costing twice its $999 price. No one else gives you nearly as many pixels per dollar. And its 15" paper white screen presents two full, truly WYSIWYG pages in high resolution mode.

It should come as no surprise that the leader in displays is also the leader in software compatibility. As the standard, the WY-700 graphics subsystem now runs over 100 programs in high resolution mode. Including Xerox Ventura Publisher and Aldus PageMaker/PC, plus many other DTP applications. And if you do more than desktop publishing, the WY-700 supports packages like Microsoft Windows and Excel, Lotus 1-2-3, and AutoCAD.

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Publishing is starting to become a strategic undertaking as companies contemplate pooling document resources

PIECING TOGETHER THE BIG PICTURE

BY SCOT FINNIE

P. CHARLES LADOUCEUR

There are levels of meaning in the phrase "electronic publishing" that corporations are just beginning to uncover. To Debbie Sharp, production manager at Associates Corporation of North America, electronic publishing stands for producing better-looking training manuals with less labor. Before the Dallas-based Gulf & Western, Inc. financial unit acquired its NBI, Inc. 5000 series multistation electronic publishing system in April 1987, preparing the manuals, which are distributed to its customer and field personnel, "was a lot of work, and they looked terrible," Sharp says.

The process, she recalls, involved preparing text on a Wang Laboratories, Inc. PC, with graphics developed separately on an Apple Computer, Inc. Macintosh. The result was documents that consisted of both daisywheel and laser printer output.

The NBI system has saved the company about $25,000 in time and labor costs so far, according to an analysis done five months after the system was installed.

Electronic publishing, as defined at Associates, is a giant step forward from a few years ago, when organizations either sent their document preparation work out of house or struggled through the pitfalls of inadequate homegrown and desktop methods.

But it is only primer material compared with what others are either attempting or beginning to envision.

In New York, NBC maintains a Kodak Ektaprint Electronic Publishing System network of workstations from Eastman Kodak Co. and a Sun Microsystems, Inc. node running Interleaf, Inc. software hard-wired into NBC's companywide Wang word processing system.

The result is a centralized, integrated electronic publishing system that can print documents on in-house laser printers or a phototypesetter, either as finished products or as art for a copier duplicator or an offset printer.

Applications for the system include business presentation documents and charts, training and operating manuals and personnel materials.

Federal Express Corp. in Memphis takes yet another shape. Until recently, it maintained a Wang VS 100-based publishing system. The 75-terminal Wang system produced about 500 operations and procedure manuals that support airplane maintenance, ground crews, electronics systems, telecommunications operations and domestic and international shipping laws and policies.

The company is currently making the transition to its second generation of electronic publishing. All publishing files based on the Wang system are being moved to a recently installed Digital Equipment Corp. Microvax II.

In addition, the company is evaluating software to link its large installed base of Macintoshes to its DEC system and to bring page make-up and what-you-see-is-what-you-get capabilities to the Macintoshes. The Wang mainframe composition package does not offer that capability.

According to David Artman, a corporate publishing strategies research analyst at the Gartner Group, Inc., a Stamford, Conn.-based market

Finnie is a free-lance writer based in Stamford, Conn.

Big picture

FROM PRECEDING PAGE

research firm, technical documentation and engineering applications in the aerospace area represented — at 30% — the largest market for electronic publishing sales in 1987.

That trend may change, however. John Cuozzo, an associate director of computer publishing systems at CAP International, Inc., a Marshfield, Mass., market research firm specializing in computer printing and publishing, says he expects electronic publishing's largest growth to come in office and administrative areas. A slowdown is expected in the technical documentation market cutbacks in Pentagon expenditures for defense-related projects. But even more importantly, organizations are discovering the cost and waste involved in their current methods of handling printing and publishing requirements.

Interconsult, Inc., a Cambridge, Mass., consulting firm specializing in corporate electronic publishing, projects that U.S. corporations spend from 6% to 10% of their gross revenue dollars on printing and publishing documents such as marketing brochures and personnel pamphlets. A substantial cost savings could be realized if these existing applications were partly or fully prepared by employees using in-house systems.

Federal Express, for example, approached the purchase of its first electronic publishing system several years ago with the expectation that costs for producing a full page of text or graphics would be reduced by 35%. "Instead," says John Slangerup, managing director of publishing services, "we cut them by 60% and paid for our equipment investment in less than two years."

Not always bottom line

Consultants and others who have been through the process stress that not every company will see this kind of bottom-line savings, because new printing applications often spring up when electronic publishing is brought in-house. "Almost invariably, latent applications show up with the availability of in-house publishing capabilities," says Ted Freiser, president of New York-based John Diebold & Associates.

That large well of latent applications is one of the things that makes industry observers so sure that this technology is about to become a corporate imperative. Figures vary on the current and potential size of the corporate electronic publishing market. Interconsult puts the current figure at $5.5 billion and projects that it will level off at about $7 billion annually in 1989 and 1990. CAP International shows the industry to be at about $1.5 billion in sales in 1987, growing to $4.1 billion in 1991.

What everyone does seem to agree on, however, is that corporate electronic publishing is on the verge of becoming a major industry and a significant force of change within organizations.

Publishing is the cutting edge of all the important things happening in computers right now, says Jonathan Seybold, president of Seybold Publications in Malibu, Calif., which publishes the "Seybold Report on Publishing Systems" and the "Seybold Report on Desktop Publishing."

"What will ensue is that people will begin to look at publishing as part of an overall computer and information strategy within their organizations," he says.

The best way

Before the full potential of corporate electronic publishing can be realized, however, there are other issues organizations must address, not the least of which is figuring out how to approach implementation.

At the core of the discussion is whether to implement a centralized publishing service for the entire company or to set up specialized units by department.

On one side, there is the low-cost, self-determination option offered by desktop publishing, which in the original sense of the term means single-user systems consisting of a personal computer, a laser printer and a stand-alone page-makeup program.

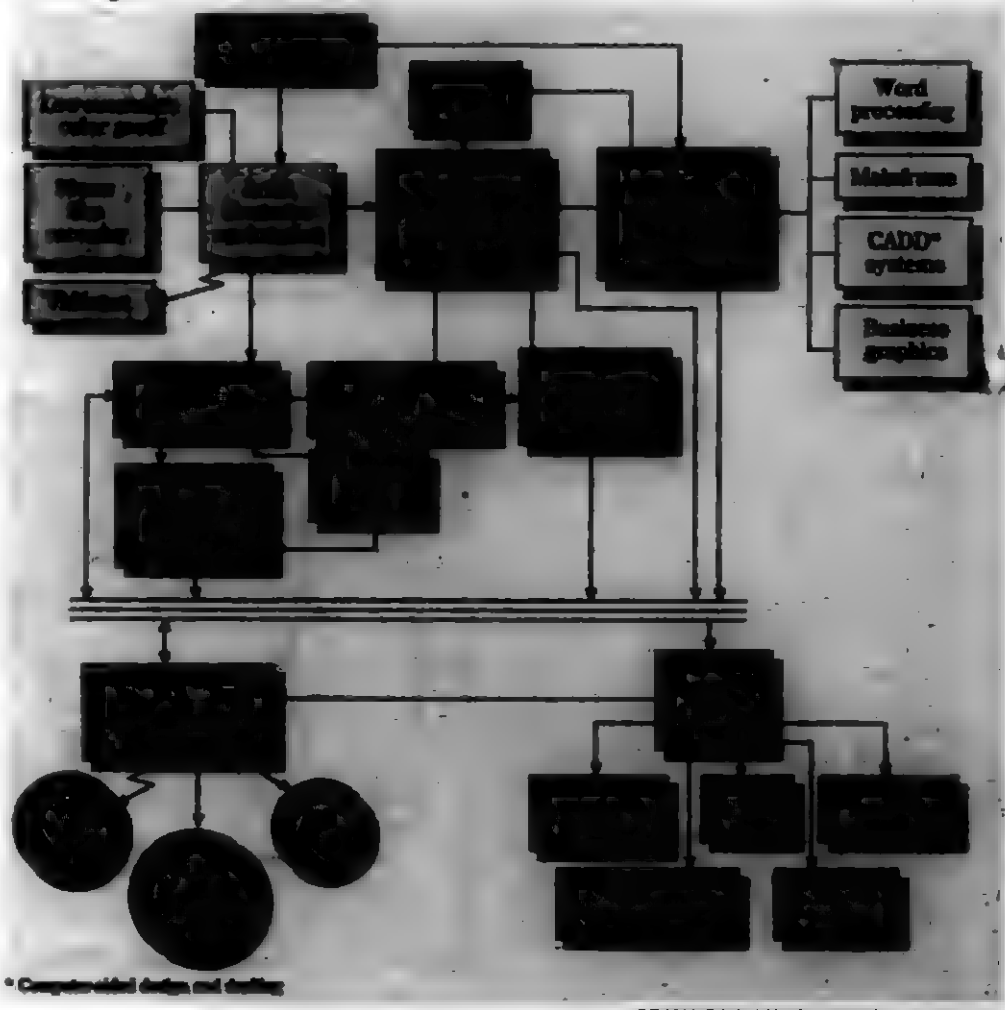
Many companies have defaulted to desktop approaches at a departmental or personal level, because individual employees thought it was the cheapest, fastest, easiest way for them to go, explains Frank Romano, electronic publishing consultant and publisher of *Typeworld* in Salem, N.H.

Meanwhile, Romano says, corporations are looking at the problem and wondering if it wouldn't be smarter to bring in large centralized systems operated by skilled people.

The problem with assigning too much work to decentralized desktop publishing systems, according to Michael Bosniak, NBC's manager of support services, is that, despite the impressions left by some of the market-

The shape of tomorrow

The corporate electronic publishing system of 1990 will feature expanded input and output options and overall integration



* Computer-aided design and drafting

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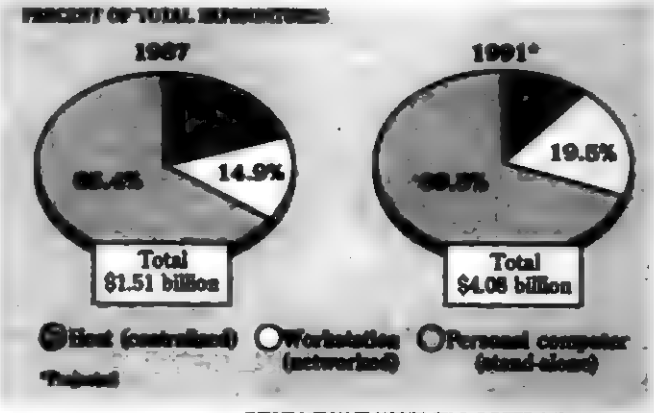
Investment vehicles

How corporate investments in electronic publishing divide among system types



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CW CHART

ing for these systems, design is not a universal skill. "You can train people to run the equipment, but that doesn't guarantee the product will be good," he says.

Another common corporate concern about desktop publishing is preserving the company identity in printed material. "With so many people in the company designing their own documents, you could lose control of your corporate image," says Cheryl Nanos, supervisor of printing services at Unum Life Insurance Co. in Portland, Maine.

After going public recently, the company established a strong corporate-identity program promoting an image Nanos describes as "very conservative." But, she says, when Unum employees use desktop publishing, they tend to integrate "funny little graphics. If the audience is internal, we can live with that. But we need to be careful that that is not what our clients see, because it is not our image."

Alternatives to desktop publishing are offered by vendors such as Context Corp., DEC, Interleaf, Kodak, NBI, Texet Corp., Wang, Xerox Corp. and Xyvision, Inc., which have products based on a range of platforms.

In every case, these vendors' solutions were designed to address the needs of a work-group environment, the level at which experts say most corporate publishing is undertaken. In some cases, these products are also specially structured or configured to address specific needs.

Striking a balance

Many companies end up with a combination of products to meet the varied needs of a broad spectrum of users. In the real world, a balance is struck between centralized and decentralized services. Unum is a case in point. While several of its employees use micro-based desktop publishing packages, the company also maintains a centralized Xyvision system.

But juggling that kind of variety requires more planning than organizations typically put into their investments.

According to David Boucher, president of Interleaf, very few corporations currently have a strategy in place for coordinating publishing throughout their businesses, but many are beginning to think they need to address the issue.

"It is a hot topic right now," Boucher says. "We are going to see pilot programs over the next 12 to 18 months that will be publicised as case studies."

Other vendors agree. Howard Woolf, DEC's manager of electronic publishing systems, contends that companies that develop an overall electronic publishing strategy will have a competitive edge over those that do not. Some corporations, he says, are looking at enterprisewide electronic publishing as a tool for generating revenue and increasing market share rather than as just a cost-saving application.

One hurdle enterprisewide electronic publishing strategists face is a political one. Departments sometimes look on the

ownership of a computer system as a symbol of corporate power — and struggle over it.

Straightening it out

Romano, for example, says that in his capacity as a consultant to companies looking to solve electronic publishing problems, he is often called on to act as a referee between such departmental groups as in-house printing, MIS and administrative services, each of whom tends to see electronic publishing as its own domain. It is important for any organization planning a major electronic publishing effort to resolve such territorial disputes now because there is an even more potentially volatile issue — document sharing — looming just over the horizon.

For the moment, the Holy Grail of electronic publishing is the companywide system. Because electronic publishing is generally the answer to the document processing needs of employees from one end of the organization to the other, it is also an application on which many are pegging their hopes for systems integration.

Instead of waiting for the integration solutions on the way from DEC, IBM and others, however, many companies are developing their own methods. The truth is, companywide electronic publishing does not seem to exist — yet. But plans are definitely on the drawing boards of some companies. The evolution of electronic publishing is being driven by the fact that while organizations are using it to save on printing costs, they have also developed electronic document data bases in the process.

In addition to being able to use these documents over and over again, users are also spreading that information around the company. Moreover, observers say, as MIS managers continue to find it difficult to manage the archiving, revisions and multiple copies of electronic documents, they will begin to want an even better solution.

Seybold, for one, says many businesses will begin to develop highly integrated electronic publishing systems that will give their employees general access to large electronic corporate document data bases.

'The real challenge'

That thought has already occurred to Wes Ervin, technology and development manager of the investment banking arm of First Boston Corp. in New York, where three separate multiple-workstation-based electronic publishing systems serve different parts of the company.

"The connectivity stuff is the beginning of wisdom, but the document management aspects are where the real challenge begins," he says.

With an enterprisewide electronic publishing system, the possibilities for improved efficiency seem boundless. For example, the marketing, sales, finance and technical writing departments could draw electronic data about a new product directly from engineering materials instead of having to start from scratch. They might even begin to do so while engineering is in the development stage.

At Unisys Corp., management is pursuing a corporate strategy for developing a common electronic data base of product information accessible for publication by any user group in the company. To accomplish this, William G. Wagner, Unisys's director of commercial product information, says the company is developing a set of generic codes that identify content elements. These codes will enable the establishment of document management standards, thereby permitting further implementation of a document data base to a wide variety of users.

> "THE CONNECTIVITY stuff is the beginning of wisdom, but the document management aspects are where the real challenge begins."
>
> WES ERVIN
> FIRST BOSTON CORP.

Unisys, which currently uses a Xyvision electronic publishing system consisting of nodes at 17 locations throughout the country, expects to settle on the codes and begin converting its documents by the end of the year.

Electronic delivery

The next step in electronic document management may be electronic distribution of documents. No one is predicting a truly paperless office, but the opportunity to transfer documentation to interested parties is surely not going to go untested once the systems are in place.

The U.S. Department of Defense has already issued an initiative calling for standards that could make the delivery of electronic documents from defense contractors to the department practical beginning in 1990.

The department's Computer-Aided Acquisition and Logistics Support initiative is likely to have far-reaching effects on electronic distribution and document format standards as they relate to electronic publishing. Vendors will support the DOD standards in order to remain marketable to defense and aerospace contractors. As a result, those standards will be in place for corporations as well.

Hand in hand with electronic document distribution is the concept of extended enterprise networking and publishing. Instead of one company maintaining its own system, this concept would allow systems within several companies or divisions to be tied together into one integrated publishing system. Defense contracting companies, which often work in partnerships with the DOD, may find the most use for this application. Wagner notes that the system Unisys is putting in place will enable it to work out extended enterprise systems with partners. At least one other major electronics manufacturer, which requested anonymity, is already circulating documentation on defense projects with several partners.

At this point, there is little likelihood that companies would purchase a companywide electronic publishing solution from just one systems vendor. Instead, it would probably be easier for companies to swap data internally, perform file conversions and maintain software compatibility. These integration issues crop up in virtually every electronic publishing system installation.

Interleaf seems to have taken the lead in the systems integration area because its software runs on many levels and brands of hardware. But that does not mean the rest of the field is not pursuing the issue. A rash of vendor alliances and joint agreements announced in recent months — including those between Apple and DEC, Texet and Wang and Sun Microsystems, Inc. and Xerox — could help further the causes.

Vendors are also working to develop and promote standards in several areas. Some examples are Adobe Systems, Inc.'s Display Postscript, DEC's Digital Document Interchange Format and the DOD-supported Standardized Generic Mark-up Language.

"If an electronic publishing system doesn't fit into the standards," says Arlene Karsh, a Stoneham, Mass., electronic publishing industry consultant, "don't even consider it."

Toward common ground

Related to the compatibility issue is the general industry trend away from proprietary publishing hardware toward more standard hardware platforms. Software based on these platforms is apt to be more portable than that locked into proprietary systems. In addition, standard-platform hardware usually retains its resale value longer than proprietary hardware because it can be put to several uses.

Xyvision, the last major holdout in proprietary electronic publishing hardware, says it is

Continued on page S12

PRODUCT FACE-OFF
Lasers get serious

BY JAY LUCAS

An emerging category of high-end laser printers, offering resolutions of 600 dot/in. or higher, promises to bridge the gap between phototypesetting and electronic publishing.

The objective of these powerful laser printers, best exemplified by East Hanover, N.J.-based Varityper's VT600 and the Printware 720 IQ Laserimager from Printware, Inc. in St. Paul, Minn., is to economically extend in-house electronic publishing systems into regions heretofore dominated by professional phototypesetting services.

An investment of roughly $15,000 in one of these printers will buy magazine-quality in-house execution of difficult printing tasks such as detailed drawings and fine print. Printers capable of 300 dot/in. resolution can make a mess of such projects because of their tendency to produce jagged diagonal lines and blurry fine-line drawings.

For organizations that need output of this quality, the benefits of producing it on-site are significant. Time is saved preparing print-ready masters and proofs, and these masters can be changed in minutes.

Leading lights

The Varityper VT600 is a beefy tabletop machine that weighs in at 161 pounds and occupies about as much space as a photocopier. It is also a prodigious power consumer — its two power cords draw 1,100W — and is best used with a dedicated line. It consists of a clean, straight-through paper-feed laser printer and a raster image processor designed to fit smoothly on the printer's top.

The raster image processor is quite powerful. It includes 6M bytes of random-access memory, a Motorola, Inc. 68020 microprocessor controller and a standard 20M-byte hard drive for font and cache storage built right into the box.

Although the processor must handle four times as many pixels as the standard 300 by 300 dot/in. printers, it can do so in much less time — a quarter of the time required by an Apple Computer, Inc. Laserwriter in one test.

The Varityper VT600 is capable of a crisp 600 by 600 dot/in. resolution, able to both distinguish fine hairlines and lay down blocks of ebony black.

At a typical cost of $13,500, plus about $200 per font family, the VT600 is clearly a serious purchase. It has an Apple Appletalk port that allows it to be connected to an Apple Macintosh Plus computer, using full Postscript capabilities. However, it also contains an RS-232 serial connection and a Centronics Corp. parallel port, making it very versatile.

The Printware 720 IQ Laserimager with 1200HD Image Processor takes a different approach but has roughly the same market in mind.

The 720 IQ sells for $12,980 and up, depending on the options for Adobe Systems, Inc.'s Postscript and the number of font families installed beyond the standard three. It was designed around a new resonant galvanometric approach to deflecting the printing laser beam.

This approach requires fewer moving parts and allows a resolution of 1,200 dot/in. horizontally, 600 vertically. The improvement over even 600 dot/in. is clearly visible under a magnification glass, where dots on the Printware machine can be seen to be about half the diameter of those on the Varityper, promising superior resolution in critical applications.

The Printware Image Processor is a separate box, enabling it to be placed at a distance from the printer if space is short.

Quick to clone

Printware is notable for its development of one of the first Postscript clones, its proprietary Printscript. It is said to be fully compliant with Adobe's Postscript language, and it can properly print standard Postscript pages from Xerox Corp.'s Ventura Publisher without a hitch. Currently, only an RS-232 and Centronics Parallel interface are available, but Appletalk and small computer systems interfaces are promised to be available by this summer.

Both printers deliver superior print quality, although the Printware machine has an edge over the Varityper with its higher resolution and duty cycle. The question is whether you care to make the extra investment in both purchase price and the undeniably higher upkeep costs that these advanced machines require.

Although there are compelling arguments for each of these machines, it is impossible not to think about the five to seven conventional laser printers that could be obtained for the same amount of money as one of these marvels. ●

Lucas is a management automation specialist at the U.S. Patent & Trademark Office in Washington, D.C.

ASK THE VENDOR

The following questions were solicited from users and conveyed to the vendors for responses.

Will it be possible on The 'Puter Group's TC: Ventura to display the correct Compographic Corp. fonts either on-screen or on an Adobe Systems, Inc. Postscript laser printer, including the correct widths?

Maynard Kebab
Rosern Publications
Arlington Heights, Ill.

THE 'PUTER GROUP: We regret that there is no easy way to match the large Compugraphic font library to the smaller Postscript library for Postscript printer proofs. A Xerox Corp. spokesman says the company plans to allow for an external file to the Postscript driver in Ventura Publisher to permit products such as TC: Ventura to treat Postscript as a draft device. However, no dates for this update were mentioned.

In Xerox's Ventura Publisher, what are width tables, and how are they used?

Herbert Morrison
Aero Products Division
Litton Systems, Inc.
Moorpark, Calif.

XEROX CORP.: Ventura Publisher has calculated how each output device that it supports prints characters and spaces. These calculations are put into reference tables called width tables, which are used to generate the screen and print images for each character and space.

What hardware and software support for its TPS customers will Interleaf provide in the future?

Bob Medinger
Switching Systems Division
Rockwell International
Downers Grove, Ill.

INTERLEAF, INC.: A number of users are turning to us for help in integrating hardware from a variety of vendors and software running a variety of applications. As publishing increasingly becomes the central, integrating application in large, demanding environments, we expect to assist in establishing and maintaining such networks.

We're also making it easier for users to automate routine systems support tasks. The next TPS release contains a macro language that enables users to create scripts that can access the operating system as well as Interleaf documents.

Does Talaris plan to include Metafont in standard Texsupport distribution?

Brian Tillman
Smiths Industries
SLI Avionic Systems Corp.
Grand Rapids, Mich.

TALARIS SYSTEMS, INC.: Talaris does not currently plan to include Metafont, a public domain program, in its standard Texsupport distribution. However, it does plan to provide a tools facility to convert standard Metafont PK format output to the PK format used by the Talaris 1590 Printstation. ●

PRODUCT FACE-OFF
Pick a pair of Mac packages

BY RUSSELL LIPTON

At first glance, the Macintosh versions of Pagemaker and Interleaf Publisher have little in common.

Pagemaker from Aldus Corp. was custom-designed for personal computers, with its strength lying in page composition. Interleaf, Inc.'s Interleaf Publisher, originally developed for engineering workstations, was optimized to support cross-work-group management of large multidocument projects.

A closer look however, reveals something of a convergence. Pagemaker has added a variety of document management aids, and Interleaf Publisher, now available for micros, has picked up free-form page-layout capabilities. The fact that each runs on Apple Computer, Inc.'s Macintosh shows how desktop and corporate publishing are themselves meeting at the PC workstation.

Style conscious

Pagemaker Version 3.0 has been enhanced by features such as style-sheet support, including the ability to import some existing style sheets, and support of spot color.

From its origin, Pagemaker has been a cleanly designed product that supports stylish desktop publishing work. However, its word processing support is rather weak, providing limited direct functionality and few support aids. Furthermore, while Pagemaker has built a reputation for its graphical support, it is limited mainly to the layout process; the draw/paint process is barely addressed.

The persistent bugginess of the product, however, is its most troublesome aspect. Pagemaker freezes, misformats and otherwise plays strange tricks with material frequently enough to leave the heavy user frustrated. This bugginess applies, alas, to some output as well.

Eccentric but versatile

The Macintosh version of Interleaf Publisher has been on the market for only about six months. Its largest initial problem is its heavy resource consumption. On top of this, the product uses its own iconic and command structure, creating a desktop different from that of the Mac. This prevents users from using certain iconic commands, for example, in the same way they would on a Macintosh.

However, there are many positive things about Interleaf Publisher. Its interface, while eccentric, is intuitive and more context-sensitive than Pagemaker's. Interleaf provides the heavy-duty environmental support that its rival lacks.

Style sheets are integral to Interleaf Publisher. Documents are constructed as a series of linked textual and graphical objects. Each object has properties that can either be applied automatically or overridden during the editing process.

Graphics are created within frames through diagraming. Object grouping is provided in addition to rotation, isometric projection and other support operations. An image editor allows paint-style refinements on new or existing graphics.

> PAGEMAKER will remain the choice for short documents with extensive design. . . . Interleaf Publisher is ideal for lengthy documents with longer life cycles.

While it is not a dedicated word processor, the product can be used to write entire documents from scratch. It provides a total environment for producing sophisticated documents, from text creation through figure design to pasteup.

Interleaf Publisher does have some deficiencies. For example, it does not support kerning and cannot match Pagemaker's support of document zooming, facing page display and the printing of thumbnail sketches. In addition, it does not support either a color interface or direct design for color output.

Finally, document import is noticeably more awkward with Interleaf Publisher because of its revised desktop. While the import function itself seems solid, extra movements and command operations are required.

Long and short of it

Despite their gradually converging trajectories, each product is still targeted at different audiences. Pagemaker will remain the choice for users requiring short documents with extensive design and varied page layout as well as for documents with a short life cycle. For this audience, the $495 price is fair.

Interleaf Publisher is ideal for managing lengthy documents with longer life cycles and for environments in which many authors, revisers and artists must share work on the same documents. Considering the product's word processing and graphics features, its unequaled document management capability and its page layout and composition features, its $2,500 price is also fair.

Given the volume and variety of publishing tasks in today's corporations, these two products do represent complementary choices, and most companies could find reason to invest in them as a pair. ●

Lipton is vice-president of Information Builders Publishing, Inc. and editor-in-chief of *Focus Systems Journal* in New York.

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Scanning the horizon

BY BRUCE PAGE

Integration is currently the hottest buzzword in the scanner market.

Because performance differentiation in terms of dot-per-inch resolution and scanning speed is no longer as drastic as it once was, many top-of-the-line manufacturers are emphasizing integration as a way to distinguish their products in an increasingly crowded market.

Two kinds of integration are at issue in scanner technology. The first involves the bundling of separate scanning functions into a single unit. The second addresses the need to make scanners a functional part of a complete electronic publishing environment.

TO INTEGRATE the scanner into the office environment, it must be connected into the network.

In the first instance, since the task of pattern recognition required for optical character recognition (OCR) can be relegated to software, many of the most sophisticated systems existing today use a simple bit-map scanner bundled with easily upgraded applications — which do the real work.

Unfortunately, the hoopla over integration has led manufacturers to construct complete solutions in this fashion. Often, users would be better off choosing the hardware/software combinations that best meet their needs.

That is not to say there are no good, functionally integrated systems available. Kurzweil Computer Products, Inc.'s Discover 7320 is not only a standout OCR scanner but also a serviceable 300 dot/in. image scanner.

Beyond the combination of bit-map scanning and OCR lies what manufacturers now call integrated image-management systems, which combine scanning functions with information processing and communication functions.

Adapting to the environment

One company that has a foot in both doors is AEG-Olympia, which recently introduced a scanner system called Doc Master. Doc Master features the same capabilities as Discover but also includes an optical disk "jukebox" system for storage. This technology allows users to call up a virtually unlimited number of stored documents for graphical or textual editing.

Scanners are already capable of supporting multiple functions in an office. But to integrate a scanner into that environment effectively, it must be connected into the network.

The importance of image processing as a network application cannot be overestimated. One of electronic publishing's benefits is its ability to coherently organize the writing and production efforts of a work group; this cannot be accomplished without networking.

Doc Master is a good example of this kind of connectivity. It has an interface to IBM Systems Network Architecture networks as well as to standard office local-area networks.

Another example is Ricoh Corp.'s R2100 facsimile machine, which can provide scanning functions for large work groups, thanks to its asynchronous CCITT X.25 network interface.

An additional development takes integration one step further: It allows users the capability of scanning filmed as well as paper documents.

A scanner system jointly developed by Phillips N.V., which invented optical disk technology, and Agfa-Gevaert, a traditional supplier of microfilm and microfiche systems, reads not only standard hard copy but also microfilm and then transfers it to optical disk.

Double standard

An important part of integrating image files with existing office equipment is ensuring that display and processing systems will be compatible with the growing base of image files.

Today, many different scanning standards exist, from the common 240 dot/in. standard to the 480 dot/in. one beginning to appear in Europe. Xerox Corp.'s ProImager scanner solves most resolution questions with its scanning range of 72 to 600 dot/in., allowing it to produce compatible image files for nearly any display and image processing software.

Flexibility of this kind is becoming increasingly important, because the scanner is more than a desktop peripheral. Now generally recognized as an essential component of any electronic publishing system, the scanner will play an even greater role in the future as the link between paper publishing and electronic distribution media, such as facsimile and online data base services. •

Page is president of Magnetic Press, Inc., a New York-based research and intelligence firm specializing in emerging information and communications technologies.

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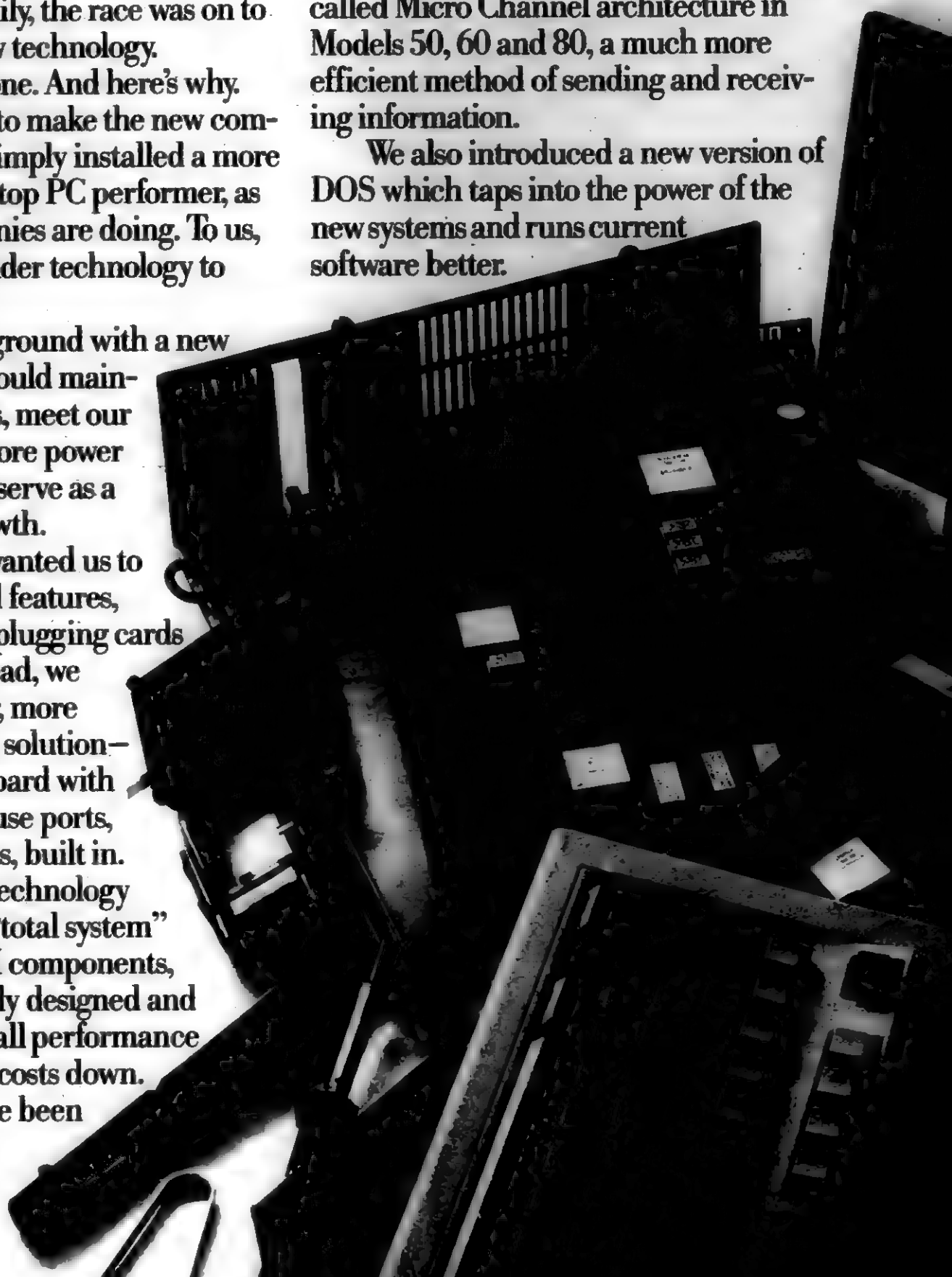

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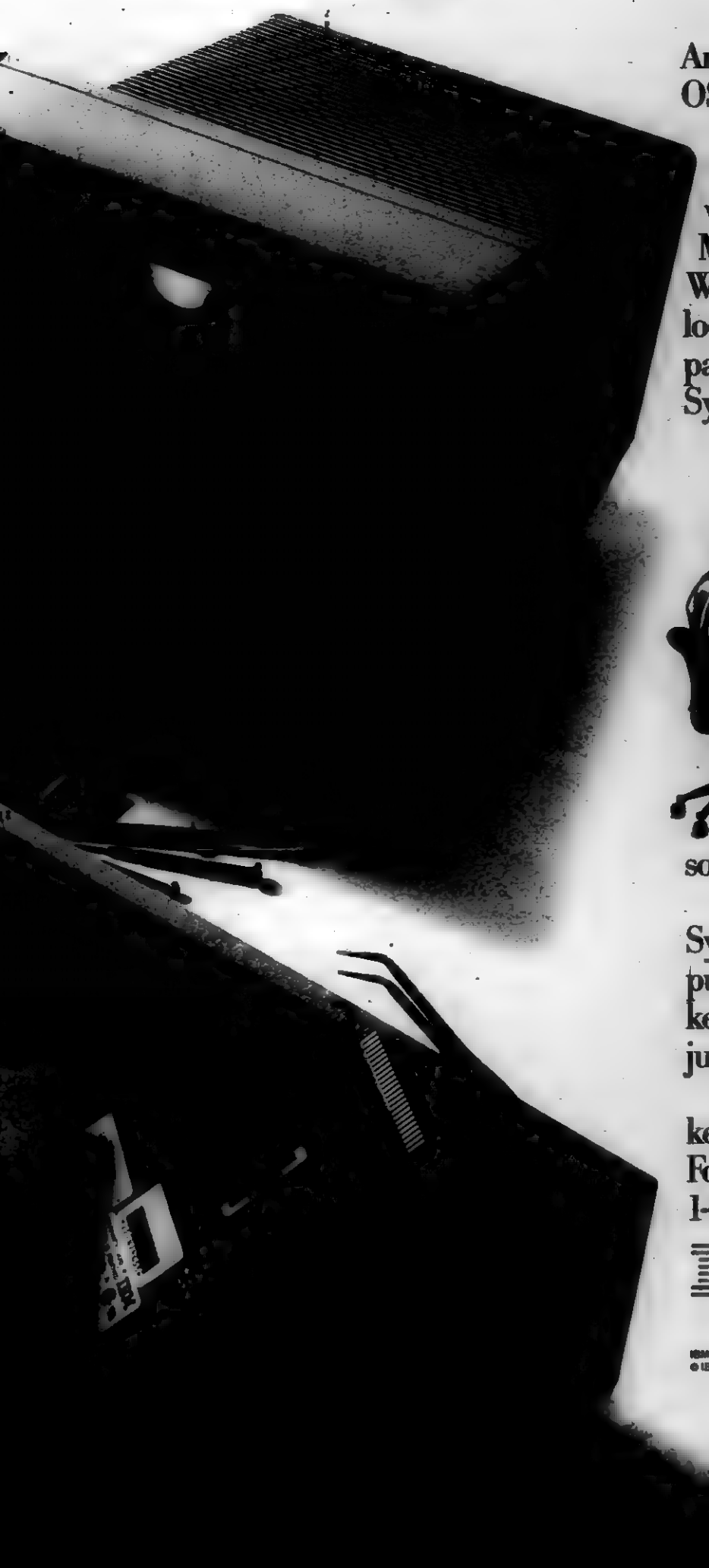

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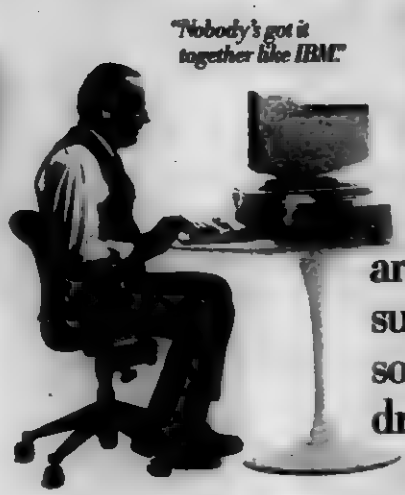

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Advanced Vision Research, Inc. (408) 434-1115	Magnacom	IBM PC, XT, AT and compatibles	640K	Any ASCII-based	All PCX, TIFF[2], BMP[3] file formats	HP Laserjet Series II	Proprietary, HP Scanjet, Canon IX-12	Yes	No	Neither	No	Yes	Yes	Cropping, enlargement, scaling, reduction	$2,695
Alltus Corp. (310) 825-2580	Pagemaker 3.0 for PC	IBM PC AT, PS/2 and compatibles	640K	Wordstar, Executive Memomaker, Microsoft Word, Multimate, Xywrite III, Wordperfect, Windows Write; IWP[4], DCA[5], ASCII-based	All supporting Microsoft Windows	All supporting Windows, Postscript; Linotronic, Compugraphic and Varityper typesetters	All supporting TIFF	Yes	Yes	Both	Yes	Yes	Yes	Cropping, enlargement, proportional scaling	$795
	Pagemaker 3.0 for Macintosh	Macintosh Plus, Mac II, Mac SE	1M	Macwrite, Microsoft Word, Microsoft Works, Wriesow, Wordperfect, Wordstar, Xywrite III; DCA-, ASCII-based	Adobe Illustrator and Freehand, Cricket Draw and Graph, Canvas, Pollpaint, Macdraw, Macdraft, Macpaint, Superpaint, EPSF, TIFF, Pict[6], Macpaint	Postscript-compatible lasers for Macintosh, Linotronic 100, 300	All supporting bit-map, TIFF	Yes	Yes	Both	Yes	Yes	Yes	Cropping, enlargement, proportional scaling	$949
Alsus Computer Systems (408) 946-6700	ADM Desktop Publisher	Alsus 1086, 2086, 3086, 386-2000, 386-1000, 3088	1M	ADM II Plus, Uniplex	PC Paintbrush	HP Laserjet Plus, Quadram Quadlaser, Canon LBA2	Microtek 300	No	Yes	Both	Yes	Yes	Yes	Resizing	$995
Archetype, Inc. (617) 492-8750	Designer	Most 80286 and 80386 machines	2M - 8M	Any ASCII-based	All supporting Windows, IFS, TIFF or PCX	Postscript-compatible devices, Autologic APS-5, Micro 5, Compugraphic 8000, 8400, 8600, 9600, Monotype	All supporting PCX, TIFF	Yes	Yes	Both	Yes	Yes	No	Aspect, anamorphic, proportional, nonproportional scaling, individual tracking	$2,995 - $5,995
Ashton-Tate Corp. (213) 329-8000	Byline	IBM PC, XT and compatibles with a CGA[7], Hercules, Hercules Plus or EGA[8] graphics adapter	512K	Multimate, Advantage II, Wordstar, Wordperfect, Xywrite II, Xywrite III; ASCII-based	PC Paintbrush, Macpaint, Windowpaint, PC Paint, Fontasy Art Folders, T/Maker Clipart	Epson, IBM, Okidata 9- and 24-pin dot matrix; Toshiba Plus lasers, HP Laserjet Series II, Okidata Laser, Apple Laserwriter, Laserwriter Plus	All supporting PCX	Yes	Yes	Justification	Yes	Yes	Yes	Cropping, scaling	$295
Bausman Foster, Inc. (914) 835-3100	Powerset Formatter	IBM PC, XT, AT and compatibles	512K	Any ASCII-based	Any	Any	Any	No	Yes	Both	Yes	Yes	Yes	No	$199
	Powerset Bookmaker	IBM PC, XT, AT and compatibles	512K	Any ASCII-based	Any	HP Laserjet	Any	No	Yes	Both	Yes	Yes	Yes	No	$199
Bestinfo, Inc. (215) 891-0500	Superpage II	IBM PC, XT, AT and compatibles	640K	Any ASCII-based	Autocad, PC Paintbrush, HPGL[10]	All Postscript lasers; various typesetters	Datacopy, Imagitex	Yes	Yes	Both	Yes	Yes	Yes	NP	NP
Compound Technology Corp. (415) 329-8899	GMLPC V2.0	IBM AT and compatibles, all 80386 machines	640K	Any ASCII-based	Autocad, Micrographix Ix-Vision, Windows Draw, Window Graph, Publishers Paintbrush, Freehand Plus; all offering EPS	HP Laserjet Plus and compatibles, Laserjet Series II, all Postscript	None	No	Yes	Both	Yes	Yes	Yes	None	$995
Context Corp. (603) 645-1881	Documentation Workstations	Apollo DN 3000, DN 4000 series	4M	Proprietary	Proprietary	Postscript, Imagen	All supporting TIFF, Apollo GMF	Yes	Yes	Both	No	Yes	Yes	Cropping, sizing, resolution scaling, edge enhancement, half-toning	$4,900 - $19,900
Data Translation, Inc. (800) 525-1501	Pentrix	IBM PC, XT, AT and compatibles	512K	Any ASCII-based	Proprietary	More than 150 dot matrix; thermal, ink-jet, laser	None	Yes	Yes	Justification	No	Yes	Yes	Independent magnification, cropping, negative image and color printing	$295
	Pentrix for Apple II	Apple II Plus, IIC, IIE, IIGS	64K	None	Proprietary	More than 150 dot matrix; thermal, ink-jet, laser	None	Yes	No	No	No	Yes	Yes	Independent magnification, cropping, negative image and color printing	$95
	Pentrix	IBM PC, XT, AT and compatibles	256K	Microsoft Word, Wordstar, Wordstar 2000, Wordperfect, Bankstreet Writer, ASCII-based	Proprietary	More than 150 dot matrix; thermal, ink-jet, laser	None	No	No	Justification	No	Yes	Yes	Independent magnification, negative image printing, cropping, color printing	$189
	Pentrix for Apple II	Apple IIE with extended 80 col card, IIC, IIGS	128K	Appleworks, Wordperfect, Word Juggler, Appleworks II, ASCII-based	Proprietary, Pentrix	More than 150 dot matrix; thermal, ink-jet, laser	None	No	Yes	Justification	No	Yes	Yes	Magnification, color printing, positioning	$95
Digital Equipment Corp. (Contact local sales office)	DEC Page	VAX/VMS	Varies	WPS Plus	Any Regis-compatible format, EPS	Postscript, LN01, LN03, LN03 Plus, LN01.5, Printserver 40	Microtek	No	Yes	Both	Yes	Yes	Yes	Cropping, enlargement rotating, flipping	$3,150 - $18,900
Digital Research, Inc. (408) 649-3896	GEM Desktop Publisher	IBM PC, XT, AT and compatibles, PS/2, 3270-PC	640K	GEM Draw Plus, GEM Graphics, GEM Paint, GEM Write, Wordstar, Wordperfect, Multimate; ASCII-based	Proprietary, all applications supporting GEM[9], IMG	Apple Laserwriter, Laserwriter Plus; HP Laserjet Plus and compatibles; Polaroid Palette; Epson EX, FX, JX, LX, MX, LQ series; IBM Proprinter, Graphics Printer, Color Jetprinter; Xerox 4020 Color Inkjet	All supporting GEM or IMG	Yes	Yes	Both	No	Yes	Yes	Scaling, cropping	$299
Frame Technology Corp. (408) 433-3311	Frame Maker	Sunstations 2, 3, 4; Sony News Workstation; Interform Graphics Workstation; Tektronix 4300 series	2M	Built-in, any ASCII-based	Macdraw, Macpaint	All Postscript, Imagen compatibles	All supported by Sun hardware	Yes	Yes	Both	No	Yes	Yes	Scaling, cropping	$2,500
H. G. Graphics, Inc. (617) 229-6900	Desktop Design Edition	All MS-DOS machines	256K	Any ASCII-based	PC Paintbrush, Doctor Hole II, Microsoft Icon, Datacopy WIPS, Lotus 1-2-3, Symphony Graphics	HP Laserjet; all lasers with Canon engines; Kaser Plus; Compugraphic typesetters	Microtek, Datacopy, Canon	No	Yes	Both	Yes	No	Yes	NP	$1,995

[1]WYSIWYG: What-you-see-is-what-you-get [2]TIFF: Tag image file format [3]BMP: Bit image format [4]IWP: International Word Processing Association [5]DCA: Digital Communications Associates, Inc. [6]EPS: Encapsulated Postscript [7]Pict: A picture file format [8]CGA: Color Graphics Adapter [9]EGA: Enhanced Graphics Array [10]HPGL: HP printers [11]GEM: Object format [12]IGES: Initial Graphics Exchange Specification [13]IFF: Image file format [14]PCL: HP lasers and compatibles [15]PSX: Microsoft bit-mapped file format [16]DXP: Data exclusive file

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. When a vendor is unable to provide specific information about its product, this is designated NP (not provided). When a question does not apply to a vendor's product, this is designated NA (not applicable). Further product information is available from the vendors.

COMPANY	PRODUCT	HARDWARE	MEMORY REQUIRED (IN BYTES)	WORD PROCESSORS SUPPORTED	GRAPHICS PACKAGES SUPPORTED	OUTPUT DEVICES SUPPORTED	SCANNERS SUPPORTED	WYSIWYG[1]	AUTOMATIC COLUMN CREATION	AUTOMATIC HYPHENATION/ JUSTIFICATION	AUTOMATIC KERNING	INTEGRATION OF TEXT, GRAPHICS	CREATION/STORAGE OF FORMS	IMAGE MANIPULATION OPTIONS	PRICE
G. O. Graphics, Inc. (617) 229-0909	Decision Screen Pack	All MS-DOS machines	640K	Any ASCII-based	PC Paintbrush, Doctor Halo II, Microtek Intar, Datacopy WIPS, Lotus 1-2-3, Symphony Graphics	Epson dot matrix	Microtek, Datacopy, Canon	No	Yes	Both	Yes	No	Yes	HP	$495-$695
Good Ideas (617) 475-7288	Type-Set-It	IBM PC, XT, AT, PS/2 and compatibles	512K	Any ASCII-based	None	All IBM, Epson dot matrix and compatibles	None	Yes	Yes	Both	Yes	No	Yes	None	$395
Harvey (800) 321-0000	Page Composition Package	IBM PC, XT, AT and compatibles	384K	Any ASCII-based	All supporting PCX	All HP lasers and compatibles	None	No	Yes	Both	Yes	Yes	Yes	Resizing	$395
Image Network, Inc. (415) 987-6642	Xenif	All supporting Unix, VMS	256K	Proprietary	Pict	All lasers; Autologic APS, Compugraphic typesetters	None	No	Yes	Both	No	Yes	Yes	Scaling	$950-$20,000
[illegible] (800) 223-GRAF (800) 669-GRAF (Calif.)	Page Perfect	IBM AT and compatibles, PS/2	640K	Built in: also Wordperfect, Wordstar, Multimate, Displaywriter	All HP LaserJets, all emulating Toshiba, Epson, NEC 24-pin dot matrix	All	Yes	Yes	Yes	Both	Yes	Yes	Yes	Enlarging, reduction, resizing, cropping, flipping, rotating	$495
Intergraph Corp. (800) 763-0900	DP/Publisher	Clipper-based workstations	6M	NP	Proprietary, graphics translated via IGES[2]	All Postscript	Intergraph ILScan, Imagitex, Optronics 4040	Yes	Yes	Both	Yes	Yes	Yes	Zoom in and out, center, define area, move, scale, fit, layer, selective edit, resolution locks	$2,000 per workstation
Interleaf, Inc. (617) 577-9500	Interleaf Technical Publishing Software	Sun, Apollo, DEC, IBM workstations	4M	Any ASCII-based	Built-in, Metafonts, Interpics	Interleaf lasers, Apple LaserWriters, monotypesetters; Compugraphic, Autologic typesetters	Imagitex, Datacopy	Yes	Yes	Both	Yes	Yes	Yes	Cropping, enlargement, resizing, scaling, airbrushing	From $6,000
	Interleaf Publisher	Macintosh II	4M	Built-in, Microsoft, Microsoft Word	Built-in, Metafonts, Interpics, Pict II, TIFF, EPS	Apple LaserWriter, Linotronic	All supporting TIFF	Yes	Yes	Both	Yes	Yes	Yes	Cropping, enlargement, resizing	$2,495
Inset Graphics Corp. (800) 828-1400	Personal Typesetting Workstation	IBM XT, AT and compatibles	512K	Wordstar, all ASCII-based	GEM Desktop	Digitek 5000, IGX 7000 typesetters; Digitek IGX 400 lasers	Panasonic FX	Yes	No	Both	Yes	Yes	Yes	Sizing, positioning	$1,000 (lasers), $4,000 (typesetters)
[illegible] (800) 000-0000	Jamboree	All Macintosh	512K	Built-in	Postscript	Postscript	None	No	Yes	Both	Yes	Yes	Yes	Cropping	$195
Letraset, Inc. (818) 843-1000	Highstyle	IBM PC, XT, AT, PS/2 and compatibles	512K	Any ASCII-based	PC Paintbrush	HP Laserjet and compatibles	None	No	Yes	Both	Yes	Yes	Yes	Cropping, enlargement	$300
Letraset USA (800) 343-8336	Ready, Set, Go	Macintosh 512K and up	512K	Any ASCII-based	TIFF, EPSF, Macpaint, EPS	All Postscript-compatible; Linotronics	Any supporting TIFF, EPSF, Macpaint, EPS	Yes	Yes	Both	Yes	Yes	Yes	Enlargement, scaling, cropping, reduction	$495
Magna Computer Systems, Inc. (818) 998-8833	Magnatype	All IBM PC-DOS compatibles, including PS/2	640K	Wordstar, Multimate, Microsoft Word, Wordperfect, IBM Displaywrite, Xywrite; all ASCII-based	Microcheck, PC Paint, PC Paintbrush, Publishers Paintbrush	Postscript, all Linotype, Compugraphic Varityper, Autologic, Monotype, Berthold, IBM typesetters	Microtek, Datacopy, Imagitex	Yes	Yes	Both	Yes	Yes	Yes	None	$7,500
	Magnalit	All IBM PC-DOS compatibles, including PS/2; must run on a LAN	640K	Wordstar, Multimate, Microsoft Word, Wordperfect, IBM Displaywrite, Xywrite; all ASCII-based	Microcheck, PC Paint, PC Paintbrush, Publishers Paintbrush	Postscript, all Linotype, Compugraphic Varityper, Autologic, Monotype, Berthold, IBM typesetters	Microtek, Datacopy, Imagitex	Yes	Yes	Both	Yes	Yes	Yes	None	$13,500
Media Cybernetics, Inc. (301) [illegible]	Halo Desktop Publishing Editor	IBM PC, XT, AT, PS/2 and compatibles	512K	Any ASCII-based	Any Halo-based	Dot matrix, ink-jet, all Canon, Hitachi, HP lasers	Canon, Hitachi, IBM, HP, Dest, Datacopy, Compuscan, Microtek, Panasonic, Princeton	Yes	Yes	Neither	No	Yes	No	Full painting, resizing, editing	$195
Megahouse Corp. (619) 480-1250	First Impressions 1286	IBM PC AT	640K	Wordstar, Microsoft Word, Multimate, Wordperfect, Displaywrite	Versacad, Autocad, PC Paintbrush, Lotus PIC, Cadkey	All HP Laserjets and compatibles, Postscript, Imagen	Dest, HP Scanjet, Microtek, Datacopy	Yes	Yes	Both	Yes	Yes	Yes	Cropping, enlargement, creation	$695
Microsoft Corp. (800) 426-9400	Pagemaker	IBM PC and compatibles, PS/2	640K	Microsoft Word	Microsoft Windows, Windows/286	HP Laserjet	NP	Yes	Yes	NP	NP	Yes	Yes	Resizing	$49.95
Omnigraph Corp. (716) 385-6000	Omnipage Electronic Publishing Software	Sun-3, HP Series 9000 Models 330, 350	4M	Any	All supporting HPGL, Calcomp 960	All Postscript, Imagen, Xerox 9700; Compugraphics Autologic APS-5, Linotype typesetters	Datacopy, Microtek, HP Scanjet	Yes	Yes	Both	Yes	Yes	Yes	Sizing, placement, rotation, annotation	$14,500 (first copy)
Panasonic Graphics Systems (800) 272-1800	Paperwork	IBM AT and compatibles	512K	Any ASCII-based	Shutterwerks	Matrix PCR, QCR, Postscript	Hostek	Yes	Yes	Justification	No	Yes	Yes	Cropping, enlarging	NP
Penta Systems International, Inc. (800) 63-PENTA	Makeup Master	Data General DS7500 workstation	6M	NP	Any supporting TIFF, IMG, PCX	All Postscript lasers, Tegra, QMS, Linotronic 300, other phototypesetters	Datacopy, Abaton, Microtek, HP, AST, Canon, Dest, Imagitex	Yes	Yes	Both	Yes	Yes	Yes	Positioning, cropping, scaling, rotating	$50,000
Pronett, Inc. (818) 709-6444	Pentasy	IBM PC and compatibles	512K	None	None	Dot matrix, HP Laserjet, Laser Plus	None	Yes	Yes	Both	Yes	Yes	Yes	Cropping, resizing, rotating, mirroring, negative, move, save, combining	$89.95
Quark, Inc. (303) 934-2211	Xpress 2.0	Macintosh Plus	1M	Microsoft Word, Microsoft Works, Macwrite, Writenow, all ASCII-based	TIFF, EPSF, Pict, RIFF, bit-map	Postscript	All supporting TIFF, EPSF	Yes	Yes	Both	Yes	Yes	Yes	Scaling, cropping, enlargement	$795
Quble Graphic Systems, Inc. (408) 288-6000	Quble Designer: Professional Illustration Software	Sun-3/50, 3/60, 3/140, 3/150, 3/160, 3/180 series	4M	All ASCII-based	Supports IGES I/O	Canon CX, SX; Datasouth LZR-3000; Postscript; Autologic APS-5, APS-105, APS-6; Monotype	Datacopy 730	Yes	No	Both	Yes	Yes	Yes	Cropping	NP
Sawtek Corp. (617) 891-0630	Easy Text and Graphics Plus	IBM PC, PS/2 and compatibles	384K	Proprietary	Proprietary	Daisywheel, dot matrix, laser	None	Yes	No	Neither	No	Yes	Yes	Enlargement, reduction	$89.95
Seecolor, Inc. (800) 422-8804	Seecolor/Pro	IBM PC and compatibles	384K	Any ASCII-based	All Postscript, EPS, TIFF, PCX, IFF[3], Macpaint	All Postscript printers and typesetters, all QMS, PCL[4]	Panasonic, Dest, Datacopy, Microtek	No	Yes	Justification	Manual	Yes	Yes	No	$995
Softcraft, Inc. (800) 351-0600	Fancy Font	IBM PCs and compatibles	256K	Any ASCII-based	All TIFF, PCX	All lasers, dot matrix	All TIFF scanners	No	Yes	Both	Yes	Yes	No	Cropping, scaling	$100
Software Publishing Corp. (415) 962-8910	PFS: First Publisher	IBM PC, XT, AT, PS/2 Models 30, 50, 60 and compatibles	512K	PFS: First Choice, PFS: Professional Write, PFS: Write	Microsoft Windows Paint, Macpaint, PC Paint Plus, PC Paintbrush, Publishers Paintbrush	Laserjet, Laserjet Plus, Laserjet Series II, Apple LaserWriter, LaserWriter Plus	NP	Yes	Yes	Justification	Yes	Yes	Yes	Enlargement, flipping	$99
Spellbinder Software Products, Inc. (914) 788-3630	Spellbinder Desktop Publishing	IBM PC	384K	Proprietary, all ASCII-based	PC Paintbrush, Publishers Paintbrush, Lotus 1-2-3, Doctor Halo, Autocad	HP Laserjet, Laserjet Series II and compatibles	All outputting PCX files	Yes	Yes	Both	Yes	Yes	Yes	Enlargement, shrinking	$695

COMPANY	PRODUCT	HARDWARE	MEMORY REQUIRED (IN BYTES)	WORD PROCESSORS SUPPORTED	GRAPHICS PACKAGES SUPPORTED	OUTPUT DEVICES SUPPORTED	SCANNERS SUPPORTED	WYSIWYG!	AUTOMATIC COLUMN CREATION	AUTOMATIC HYPHENATION/ JUSTIFICATION	AUTOMATIC KERNING	INTEGRATION OF TEXT, GRAPHICS	CREATION/STORAGE OF FORMS	IMAGE MANIPULATION OPTIONS	PRICE
Xyvision Corp. (800) 737-6400	Crystal Document Management System	AT&T 3B series; Altos 586, 686, 3068, 8086; Sperry 5000, 2000; NCR Decmate; Unisys 5000 series; IBM Series PCs; IBM RT, IBM Unix PCs; Pyramid; TI 5500	8M	Any ASCII-, DCA-based	Microsoft, Autograph, Cadkeys	HP	No	No	Yes	Both	Yes	Yes	Yes	None	$75K
Talaris Systems, Inc. (619) 587-0787	Transport	All running VAX/VMS, IBM PC and compatibles	HP	Any ASCII-based	Supported through Qdrive	All Talaris lasers except Postscript	HP	No	Yes	Both	Yes	Yes	Yes	Through Qdrive	$800
	Qdrive	All running VAX/VMS, IBM PC and compatibles	HP	All supported by Talaris Qdrive	All Computer Associates, SPSS, SAS Institute	Talaris Qdrive	HP	No	No	Yes	HP	Yes	Yes	Reduction	$5,000
Texet Corp. (617) 643-2000	Elite Image Electronic Publishing System	Sun-3	8M	Any ASCII-based	Microsoft, Mentor, Autocad, Autocad, Cadvance, Cadkey	Postscript, Interpress, CCI/300, 300R, LS40	SCSI, Polaroid, Truvelon	Yes	Yes	Both	Yes	Yes	Yes	Cropping, resizing, rotating	$50,000
Unicom World (818) 848-8000	Newsmaster II	IBM PC, XT, AT and compatibles	512K	Any ASCII-based	Screen capture utility for Lotus, PC Paint, most other graphics running MS-DOS	Dot matrix, lasers with 1.5M bytes or more with Epson emulation	None	Yes	Yes	Justification	No	Yes	No	Cropping, enlargement, resizing, flipping	$79
Pelco Sciences, Inc. (800) 937-3726	Pagemaker	IBM PC and compatibles	640K	Any ASCII-based	All PBP1, HP	Hewlett-Packard	CamerAID	Yes	No	Justification	Yes	Yes	Yes	HP	$495
Xerox Corp. (213) 533-7000	Ventura Publisher	IBM PC and compatibles	512K	Any ASCII-based	Autocad, GEM Draw, GEM Graph, Doctor Halo DPE, DXF, PCX	Lasers, ink-jets, including Apple, AST, Cordata, HP, Xerox, IBM, Epson	All supporting PCX, EPS, GEM Image	Yes	Yes	Both	Yes	Yes	Yes	Cropping, enlargement, resizing, reduction	$995

VENDOR VIEWPOINT
Why not publish on a mainframe?

BY P. C. McGREW AND W. D. McDANIEL

If you have invested in an IBM mainframe system or are planning to do so, why not investigate ways to meet your document publishing requirements within that environment?

Performing in-house publishing on the corporate mainframe allows quick and efficient updating of a document's form and content. Data stored on the mainframe can be integrated with documents as they are being prepared for printing, and such printing can be performed on demand.

Furthermore, for an organization that usually jobs out its printing, mainframe-based in-house publishing means a substantial reduction in outside and in-house labor costs.

As with any major change in corporate direction, evaluating your needs and potential impact on the company is a necessary prelude to action.

The first question to address is, how many changes in business procedure will it entail? The list of potentially affected procedures is a long one, covering everything from job descriptions to work flow. You must determine what can change before you make plans.

Next on the list of questions is the impact on your existing data center. What will happen if you increase the number of people attached to your system and change their storage requirements? Consider the cost savings gained by automating the publishing process. You may even find you can expand your computing capacity and still realize major cost benefits.

If you do not already have text composition, graphics and print-handling software installed, find out what is available and what will best serve your needs.

Look at your documents

This brings us to a third evaluative task — determining your publishing requirements.

Publishing comes in many flavors. Some organizations create documents that contain only text; others add graphics such as business charts and halftones. Some businesses use the same documents and formats year after year; others vary their output frequently.

Another consideration is the look and feel of the documents you produce. As you look at your current document inventory, determine how many variations in design there are. Use this knowledge to question potential systems vendors about their ability to support your requirements.

Another issue, both related to and separate from publishing considerations, is laser printing requirements. It is important to decide whether you need high-speed or high-quality printing. These are not mutually exclusive, but usually only one is the driving factor in choosing the printer.

Whether you already own a mainframe-attached laser printer and are trying to decide whether it can handle your printing needs or are starting from scratch, the functional considerations are the same — print speeds, uptime averages and environmental requirements.

For example, if you are looking for a laser printer to operate within a production environment, you need to choose one that operates in the 50 to 100 page/min speed. Graphics and other enhancements will make the printer run slower. Compatibility with host-based composition and graphics packages is also an important consideration.

Keeping up

The addition of printer hardware and software is also a major cost consideration, but there are long-term benefits associated with gaining control of your publishing environment. The challenge is to keep up with what is available so that the appropriate pieces are chosen.

IBM's mainframe Document Composition Facility (DCF) is an excellent way to create well-designed documents for printing on IBM host-attached laser printers. IBM has also announced features of DCF 3.2, scheduled to be available May 20, to permit Adobe Systems, Inc. Postscript output and connection to IBM's office-based systems.

Office Document Feature is a part of DCF 3.2 that allows the transfer and translation of documents between DCF and Displaywrite, the IBM stand-alone word processing system. Software to permit use of DCF with printers from other vendors is also available.

> CONSIDER the cost savings gained by automating publishing. You may even find you can expand your computing capacity and still realize major cost benefits.

Mainframe-based graphics packages are also available. In IBM shops, the usual tool is Graphical Data Display Manager (GDDM), often supplemented with a variety of utilities. GDDM graphics can be called from DCF source files but maintained separately.

Hardware technology changes almost as quickly as software does. IBM recently introduced two Advanced Function Printing laser printers rated at 88 and 92 page/min, fueling the high-speed printer wars between itself and Xerox Corp. Small printers, however, are becoming both more prevalent and more sophisticated. Many of these can be attached to the mainframe to permit proof printing for document production areas. Many desktop duplex printers have fallen below $10,000.

Another emerging technology is low-cost, high-quality document image systems. Both scanning and optical disk technologies fall into this group.

Scanners are capable of imaging documents and graphics at 240 or 300 dot/in., at a cost of less than $3,000. Optical write-once, read-many drives can store hundreds of thousands of documents for a fraction of the cost of magnetic disks.

Departmental computing with processors like the IBM 9370 offers in-house publishers the opportunity to continue using the mainframe tools they have grown used to but with a freedom previously reserved for personal computer users.

Recently, affordable desktop printers and scanners have proliferated, coupled with the ability to compose documents on mainframes for output on printers traditionally associated with PCs. The opportunity already exists to establish a truly versatile in-house publishing system that supports mainframe-based demand printing in both draft and final quality and quantity.

It is safe to say, however, that we will see an increased level of software and hardware functionality, lower costs, integration between the diverse architectures and an improvement in software tools. These changes will provide more organizations with enhanced access to mainframe-based demand publishing within their price ranges. ●

McGrew and McDaniel, authors of *In-House Publishing in a Mainframe Environment*, are with Image Sciences, Inc. in Dallas.

Big picture

FROM PAGE S3

committed to "mainstream software platforms" and emerging software standards such as Unix.

Some users are unconcerned about the potential disadvantages of proprietary hardware.

For them, specific publishing functionality, whether available on proprietary or standard equipment, may be the key. Larger corporations seem less concerned with the differences between the two types of electronic publishing systems.

While acknowledging the advantages of mainstream equipment, consultant Romano says, "Unfortunately, standardized hardware often becomes obsolete faster than proprietary hardware." He notes the numerous models introduced by several general hardware manufacturers.

Leading force

While this debate continues, advances in peripheral hardware are helping to both push electronic publishing and steer it in new, unexplored directions. High-speed laser printers have made on-demand printing a major application that will likely continue to attract companies to in-house publishing.

Rather than print employee handbooks, user documentation, forms, policy and procedure manuals and other publications in advance, companies like First Boston can now wait until the last minute.

"That way, we always have the latest version in circulation, we avoid storage charges and we can schedule work over a long period of time instead of doing a big job all at once," says Jack Dunn, the firm's manager of reprographics.

A tie-in to electronic distribution and the maintenance of document data bases is optical disk technology. Apple's compact disk-style external drive and implementations of optical disk technology by other manufacturers have a lot of people intrigued by the medium's possibilities as a low-cost, comparatively dense storage and transfer device.

By far, the most talked about new technology, however, is color. Some companies have installed stand-alone film slide-output devices, which are generally not integrated within the electronic publishing loop.

This situation will probably change in the future. But the major future topics in color are laser-generated spot color for presentation graphics and the ability to manipulate color electronically to obtain higher quality outputs.

> "Unfortunately, standardized hardware often becomes obsolete faster than proprietary hardware."
>
> FRANK ROMANO
> *TYPEWORLD*

The fine print

With so many rosy possibilities for electronic publishing's future, it is not surprising that one or two notes of caution have been spoken by users and consultants alike.

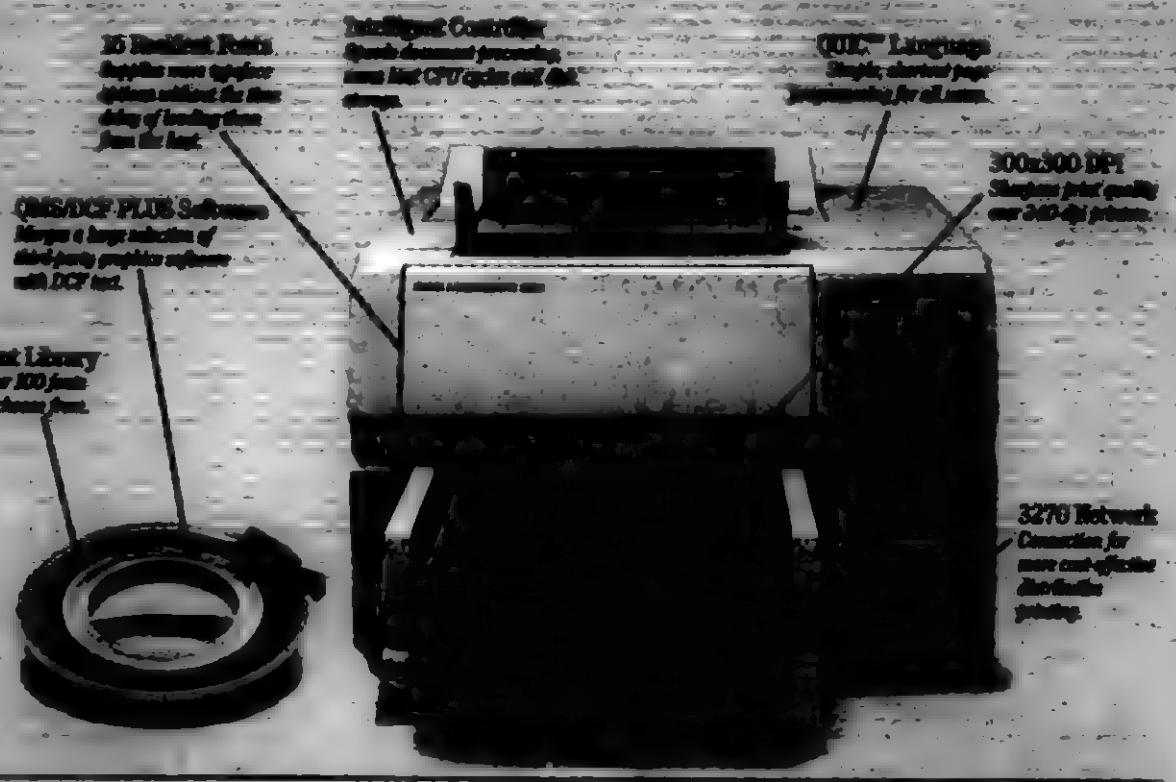
Corporate managers are concerned about finding, training and keeping employees who can learn to operate the equipment, understand the company's business and work in the graphic designer's environment imposed by the software.

They must address internal questions about pay scale and career paths for what amounts to a whole new type of employee.

Another caveat concerns the sheer complexity of the technical issues involved in making all aspects of an electronic publishing system work in a particular environment.

According to First Boston's Ervin, who also teaches various computer subjects as a professor at New York University's Business School, "Electronic publishing is probably the most complex manifestation of applied computer science around. You are dealing with networking, naked operating systems and a surfeit of file formats. Nothing quite meshes yet." •

Introducing a fast way to improve your composition skills.



The new QMS/DCF PLUS 1510 solution set offers new ways to make your IBM® Advanced Function Printing (AFP) software more useful.

It speeds document processing. Relieves mainframe overhead. Lets users print AFP documents in their work groups. Makes it easier to use graphics software like SAS/GRAPH® and CA-DISSPLA™. And it works transparently with AFP without interfering with IBM functionality or software maintenance support.

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From anarchy to architecture

Even a strict methodology can't bring real coherence to applications development like a good architecture can

BY FRED VISKOVICH

Anarchy: "Absence of any coherering principle, as a common standard or purpose."
The American Heritage Dictionary

Much of commercial application systems development is anarchy. There is no coherent unifying principle, deplorably few standards and little or no common purpose. Application systems built on a development methodology represent progress, but we need more.

Ultimately, users will move into architecture-based systems development — that is, building generic software specifications that also provide an application-specific business solution. IBM's Systems Application Architecture (SAA) reflects this transition. But most MIS shops have a long way to go before architecture is not the exception but the rule.

JUDY FILIPPO

The end result

In the most extreme case, MIS organizations responsible for mission-critical information systems do not follow a standard development method and do not use structured analysis techniques. What are the consequences?

The first and foremost consequence of development without methodology is failure. It may come at once: The project may miss its deadline, overrun its budget and destroy the careers of its participants. But it may also come slowly, lying dormant in the nerve centers of an application and then inexorably eating away at it.

Second, these systems tend to neglect the human interface. In the absence of a methodology, design is left to analysts and programmers who, understandably, tend to equate a system with its collection of jobs, programs and files.

Furthermore, without a methodological framework, even the automated side of a system is often not viewed as an organic whole. Any documentation above the program level is either perfunctory or nonexistent. The overall impact of changes to one piece of a system cannot be assessed or communicated clearly. The risk here is that the next ostensibly isolated last-minute, must-have modification will result in the collapse of the application.

A systems development methodology represents one step forward. It brings order, even if it is stolid, bureaucratic order. At minimum, it provides an administrative framework in which some form of project management can be performed.

Methodologies also possess a good logical inventory of proven work steps, described in terms of phases, activities and tasks. In a methodology, we know what to do. And if we are late, at least we can retrace our steps to determine why.

However, no sooner does an organization develop a methodology — any methodology —

Viskovich is a manager in the information systems group at Coopers & Lybrand in Philadelphia.

- **A frame for mission-critical systems**
- **Getting beyond 'slobware'**
- **Why you're not really *building* software**

than it begins to invent excuses for not using it. Some popular excuses are "It's too long," "It involves too much paperwork" and "It doesn't address application software packages or new technologies."

Next, the cry goes out to tailor the methodology. Some methodologies, especially those employing route mapping, can be selectively implemented, but this is not to be entrusted to the ill-advised or the reluctant.

A METHODOLOGY improves the chances of a system being implemented correctly the first time.

All in all, a methodology provides a positive, even somewhat instructive, step away from anarchy. It reduces the risk of project failure by virtue of its work breakdown structure, required documentation and management checkpoints and reviews. Through its discipline, a methodology improves the chances of a system being implemented correctly the first time and surviving any changes. However, methodologies do not vanquish anarchy.

No guarantees

For one thing, methodology-run projects are successful only to the extent that someone on the other end of the three-ring methodology binder understands something about software development. While a methodology can educate those who follow it, this effect is undependable at best. As a result, systems development still lacks the coherence gained from the shared vision of peers.

Second, methodology and its techniques meet frequently with resistance. The methodology itself is, after all, a system for creating new systems, and new systems are immediately at war with the status quo.

Most of all, a methodology dictates specific new techniques — namely, information- and process-modeling techniques. So if you are not employing structured techniques — and tools to support them — then to say you have a methodology is kind of an empty statement.

Ed Yourdon, vice-president of planning at Devry, Inc., says only about 10% of the MIS organizations in North America practice structured techniques in a disciplined fashion. By implication, methodologies that mandate their use lose as well.

Not a brick wall

However, there is a more profound reason behind the failure of methodologies and the neglect of structured techniques. The classic approach contains a flaw — one that subverts design, the most important part of system development.

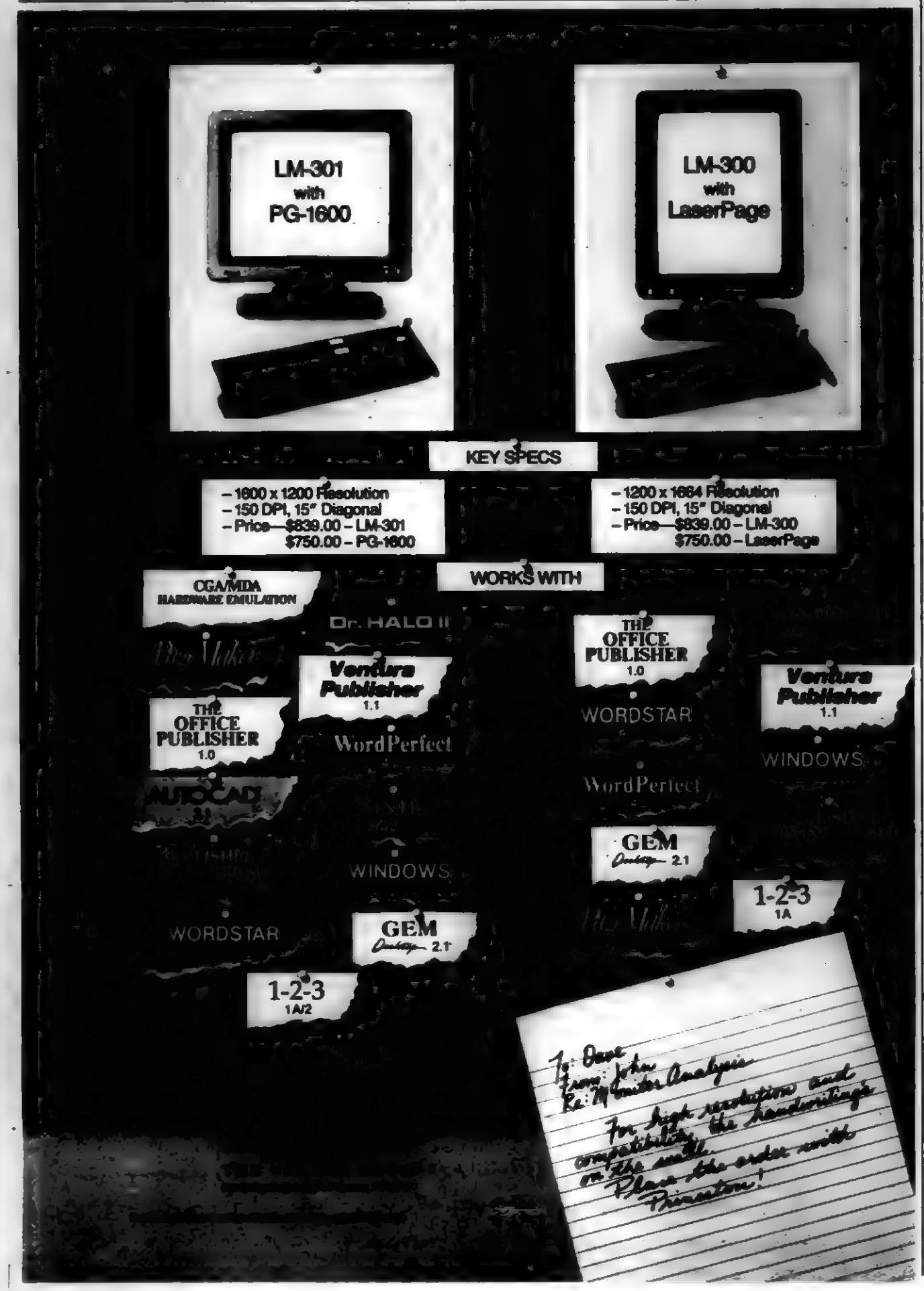
The flaw is this: All methodologies ultimately portray the systems development life cycle, including the design phase, as if it were a construction project. This is known as the construction metaphor, and it has been the Achilles' heel of systems building for the past 30 years.

What happens is that each completed task is tallied as another brick in the wall, and you can't lay the bricks for Row 8 until Rows 1 through 7 are finished. The development of the system proceeds in serial fashion, from end-user requirements at the beginning to the inevitably underestimated steps of system conversion at the end.

The metaphor fails because it attempts to describe the entire life cycle, including design, as if it were a continuous series of brick-in-the-wall activities. Construction work on a real building presumes that the architecture and engineering design stages are complete. Yet these tasks do not unfold in the same manner during system building.

The design of architecturally rich and functionally robust software does not result from collecting the products of individually complete, bottom-up analytical requirements-definition tasks. A design is not constructed from end-user requirements in a serial manner.

Requirements are the best statement of a system's goals



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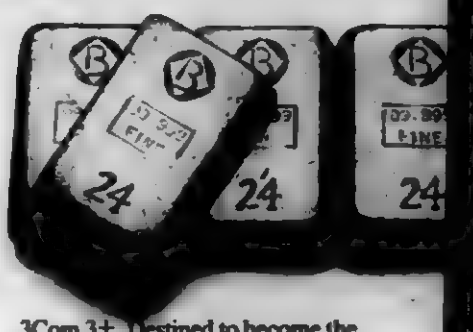

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and objectives and the best measure of application success, but they are technically ambiguous, incomplete, fluid and — in essence — the wrong source for determining the best way to adapt available technology for competitive advantage.

What is design?

The degree to which a business can plan to locate computations, decisions and deductions on the machine side of automation can be determined only if its managers know the constraints of the technology. It is these constraints that define system design.

Knowing these constraints means settling on a standard set of design problems — data base design, display station presentation protocol and program-to-program communications — and recognizing the forces that have to be overcome to achieve their solution.

In addition, these constraints are a direct function of the state of the art in information technology and are constant across all industries. The problem of a major metropolitan hospital getting rapid access to a data base of patients is, at its root, the same problem as that of the manufacturing concern wishing to query a parts-inventory data base.

When possible, these constraints need to be expressed empirically in a "constraint metric," because they will materially affect alternative performance profiles and project costing. But a constraint can also be, for example, whether or not an SQL-style relational data base is available on a particular processor.

Nip it in the bud

To accelerate systems development, it is important to identify and analyze constraints as soon as possible, because these will dictate the design. At the beginning of the systems development life cycle, classical internal design and end-user requirements should proceed in parallel — not in tandem — to accelerate applications development, reduce cost and improve quality.

This deserialization is what compels developers to prototype. (As Yourdon points out, this is also why they abjure structured analysis.) It causes developers to recognize that one can and should address technical design issues immediately. Prototyping helps express end-user requirements, bleeding them out through the joint observation of system behavior by end users and developers.

In fact, first-cut user requirements can be transformed by exposing them to a sample implementation of relevant information technology. And prototypes can actually disclose competitive opportunities that may have strategic significance for the enterprise.

Design focuses on capturing a

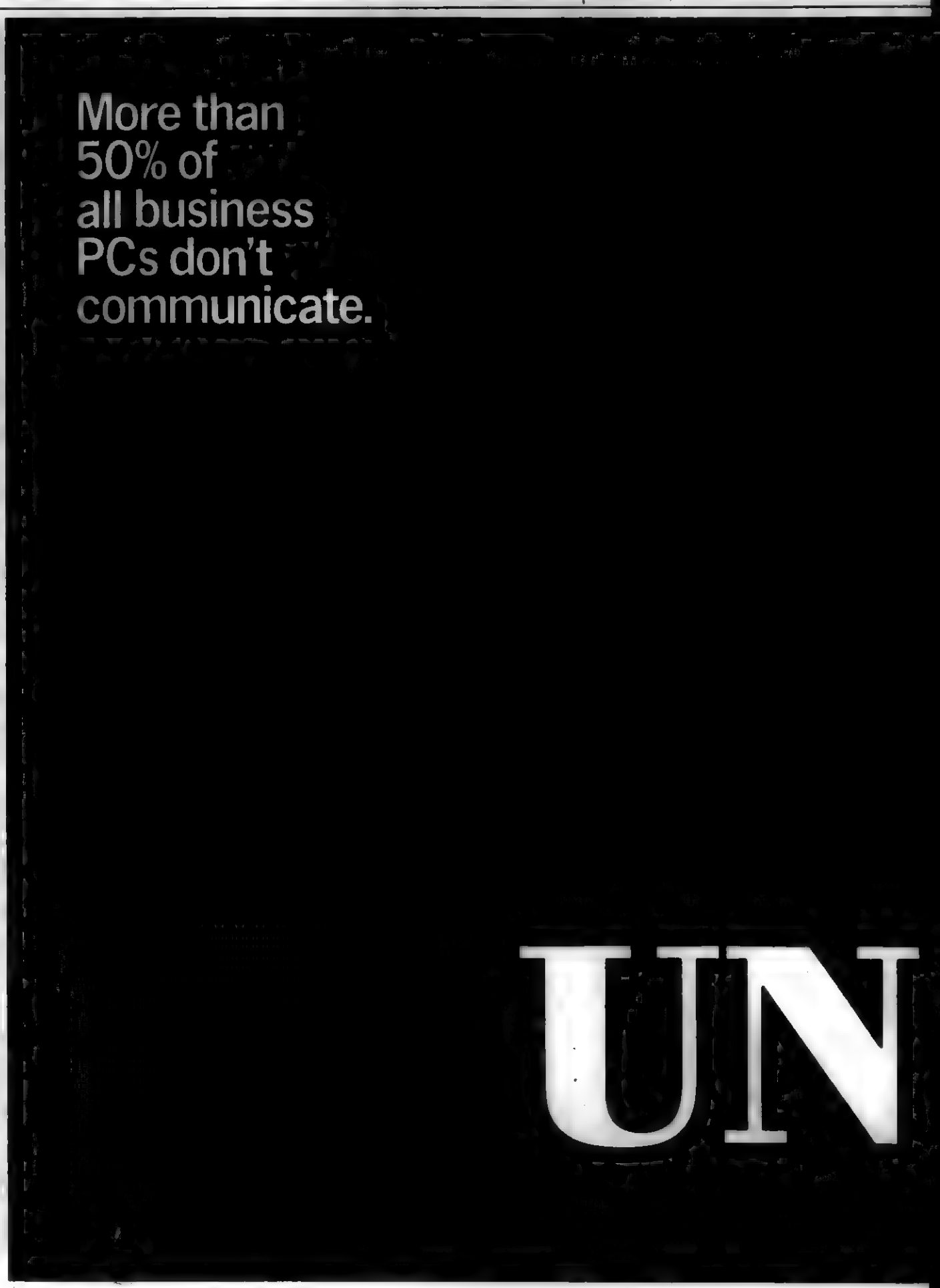
PROTOTYPES can actually disclose competitive opportunities that may have strategic significance.

solution in the form of standard engineering design problems.

The application's blueprint is incrementally completed through the successive refinement of an evolving specification model or prototype. Design proceeds through interaction among the designer, the system owner, end users and the technical team that will finally implement the system. It is not the process portrayed in the construction metaphor.

The resulting design is a generic set of software specifications. The designer who prescribes these is defining an architecture and, thus, is referred to as an architect. It follows that "architecture" refers to generic software specifications that provide a unique, application-specific solution by solving a relevant set of standard MIS design problems.

This definition closely parallels the more conventional meaning of architecture: the art of building. Here, human requirements and construction constraints are brought together. The solution is both practical and aesthetic, thus differing



from the pure utility of engineering construction.

At the outset of the systems development life cycle, the architecture should relate human requirements with the application software and these two with the corporate landscape. The process involves both engineering and aesthetics.

The user interface explains the success of software forms such as the Apple Computer, Inc. Macintosh and Microsoft Corp.'s Windows. Conversely, "slobware" produced without attention to user interface design can repel end users.

Early knowledge

Another example is SAA, which outlines a presentation management interface that is both standard and attractive. It stipulates common user access by specifying software constraints in application design.

SAA permits the systems architect to bring knowledge about the technology's constraints to his first meeting with a client. Identifying these constraints so early enables systems architects to create tremendously advanced second-generation systems within a framework that is clearly defined.

However, there are important differences between what the conventional and the information systems architect can do. Unlike building construction, in which the architect cannot convert plans into the actual building, computer-aided software engineering (CASE) tools permit the simultaneous design, engineering and building of a system. The prototype or specification model can be created during design and literally converted into actual code.

Using CASE to create a system describes a metaphor that is more like writing a book or creating a symphony than "constructing something." CASE closely resembles the actual process an architect follows when devising a building. It is a human undertaking that combines both analytical and intuitive talents.

Bring in the artist

If this sounds like it is making systems design into an art form, it's not. Architecture, as defined above, involves the practical, not the theoretical; there is no architecture without function.

MANY systems projects would be a lot better off under the direction of a successful Broadway choreographer than a methodless, confused DP designer.

Nevertheless, art forms are often accompanied by a prodigious amount of formal technique and painstaking attention to both practice and execution. Many systems projects would be a lot better off under the direction of a successful Broadway choreographer than a methodless, confused DP designer.

The division of labor sought by disciples of methodology should be rethought. Architecture is not the work of the newcomer. It demands broad vision, experience and formal training. Translated, architects will, in the future, dominate application systems development and will leverage their talents through paraprofessionals and apprentices. Information systems organizations and consultancies that rely on the construction metaphor will continue to fail at an increasing rate.

This failure will precipitate demand for the professional training, testing, certification and licensing of architects and designers. It will spur the overall professionalization of MIS practitioners.

The problem with systems development is not that programming is still an art and not a science. Artistic projects have been commissioned for centuries, producing impressive results that are on time and within budget. Science has not always been so punctual.

The problem lies in the anarchy of applications development. Its solution will come with the institutionalization of solid architectural and software engineering principles in the information systems industry. ●

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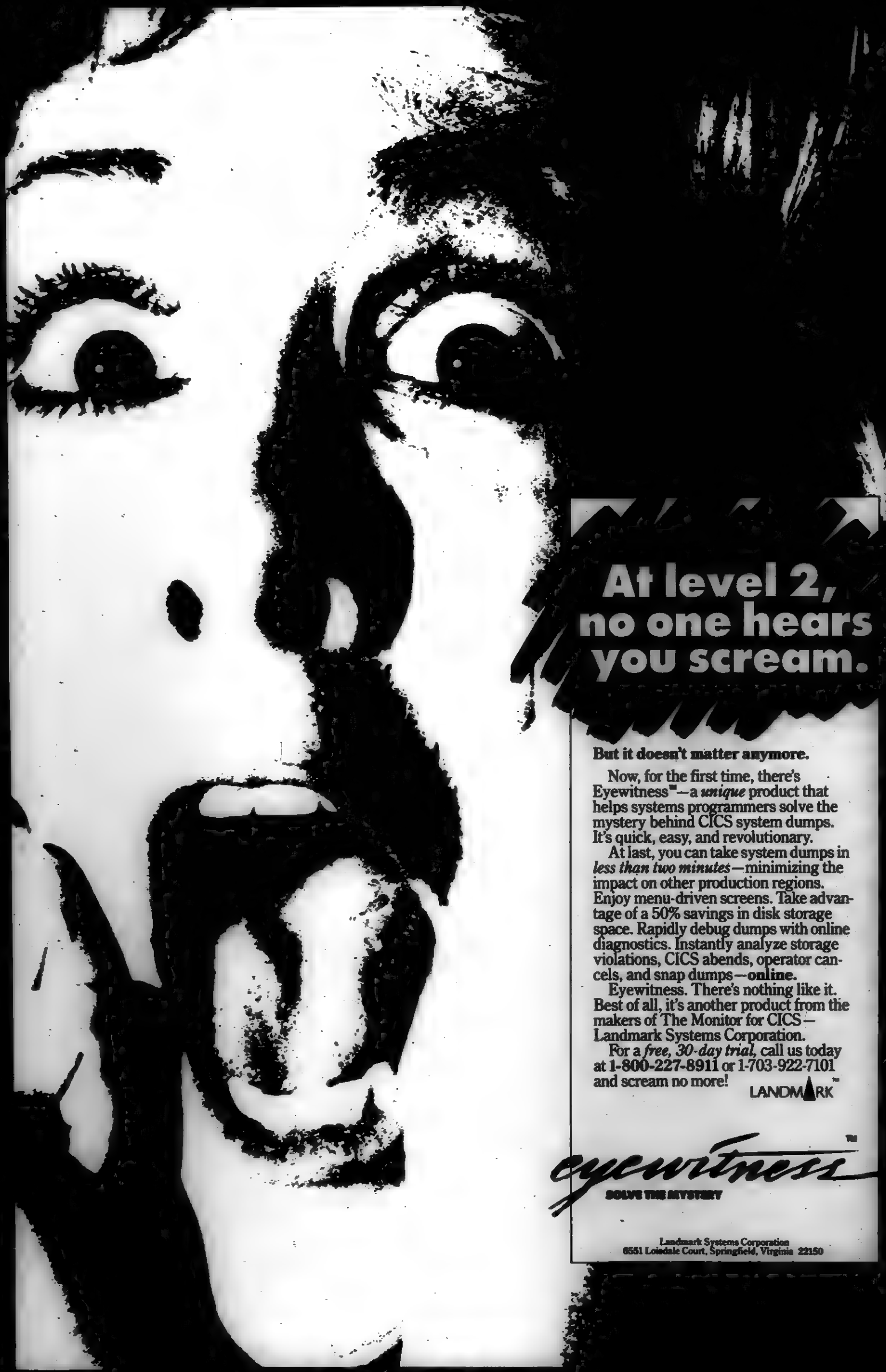

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Anthony Reed

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The next day, I dragged myself out of bed and drove to the doctor's office — despite the warning labels about driving while under medication. My blood pressure and pulse were high. My chest was congested. Breathing was difficult. I was dehydrated. I almost passed out from the aspirin and flu, throat, cold and muscle-ache medicines.

Only the multivitamins kept me awake. My system held every legal over-the-counter medication known to mankind.

After having me touch my toes to test my flexibility — I guess they wanted to be sure I could pick up printouts from the floor without bending my knees — the doctor gave me a paper to sign. They wanted me to take a urine drug test! Needless to say, I was surprised. Now I knew what it's like to be guilty until proven innocent: I was so full of medication that my urine probably glowed in the dark.

Continued on page 82

Pros, users air woes: each other

MIS, users agree they need to talk more, but there the consensus ends

BY ALAN ALPER
CW STAFF

NEW YORK — Allow two demanding MIS professionals to discuss the state of data processing with two savvy heads of end-user organizations, and the conversation soon resembles a congressional debate split along party lines: Both sides agree that they disagree because of ideological differences.

That's what emerged from a spirited panel discussion on end user-MIS relations — simulating such relations in a typical company — at The Conference Board's sixth annual conference on information management, held here last week. Both sides agreed that there is not enough communication and coordination on the strategic use of information technology. Beyond that, there was little else they agreed on.

The MIS management representatives contended that end users are unable to state their DP requirements, are unwilling to take ownership of projects, shy away from cost-justification questions and do not understand technology.

The end-user camp countered that even when they can state their requirements, MIS is unable to deliver usable systems in a timely fashion, is unwilling to let them play an equal role in project management, is incapable of providing accurate expense assessments and spouts jargon when plain English would suffice.

"The problem is, [MIS] is always trying to get us to put our square pegs in their round holes," noted John Kelly, executive director of human resources at Tenneco, Inc., who represented end users.

"They don't seem to under-

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Integration fuels rising service need

BY JAMES CONNOLLY
CW STAFF

MOUNTAIN VIEW, Calif. — Demand for professional services in large-scale computing organizations — fueled in part by the growing use of systems integrators in the commercial world — will soar at an average annual growth rate of 18% between now and 1992, according to a recent study.

Users of large-scale systems are looking outside with increasing frequency for systems integration services and contract services such as software development, facilities management, consulting, education and training, according to research company Input, based here.

Input found that the applications backlog in most organizations is not being reduced and that major resources are needed to maintain existing systems. The company said internal staffs tend to have limited skill sets and experience, so outside services become more appealing.

The study predicted that the professional services market will grow from $14.6 billion in 1987 to $33.9 billion in 1992.

Key growth areas are expected to be systems integration and, within contract services, software development.

Input noted that while the federal government is already a heavy user of systems integration services, spending $2.3 bil-

Continued on page 85

Boom years

Systems integration projected to outgain other professional services by averaging 30% growth per year

INFORMATION PROVIDED BY INPUT

Laser disk rates high in training

BY ALAN J. RYAN
CW STAFF

MIS organizations that are struggling with the escalating costs of training may have a solution in their own backyard.

Interactive laser disk technology is coming on as a cheaper and more flexible alternative to the labor-intensive process of classroom training. And recent research by a manager who sought to quantify the results of such laser disk-based training indicates that users actually retain information better when they learn it from the interactive medium.

According to Mahmoud Elsayess, manager for data base systems services at Hughes Space & Communications Group in Los Angeles, laser disk training combines sight, sound and hands-on contact in a format that lets the student proceed at his own pace. Elsayess predicted that within two or three years laser disk technology will be a major force in most industries.

Flying high

The technology is already in use in such varied settings as the U.S. Air Force, which employs some laser disk technology to train its pilots, and hospitals, which teach emergency-room personnel how to deal with stab-wound victims.

Elsayess said users trained with this method retain 25% to 45% more than those taught using traditional methods. The key is flexibility. In a classroom setting, some teachers might be too slow for some students, too

Continued on page 80

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Airing woes

CONTINUED FROM PAGE 79

stand that they have to serve the customer — the end user," added Robert Lockerd, vice-president of Texas Instruments, Inc.'s Defense Systems & Electronics Group, who also represented end users. "You can't transform [the end-user] to deal on MIS's terms."

J'accuse

Each side pointed accusatory fingers at the other about systems development backlogs. Development delays occur because end-user departments rarely reach a consensus on what they want, asserted Raymond Perry, Avon Products, Inc.'s vice-president of information services, who represented MIS management.

"We spend 50% of [the development] cycle time acting as an arbitrator helping [end-user] staffs decide what they want," he maintained.

"Sure, our requirements change, but we still haven't gotten the systems we asked for, either," TI's Lockerd shot back.

Development cycles and budgets get stretched because end users prefer custom-developed applications when less expensive packaged software will do, Perry said. "Users will say, 'This package is not good for us; we're not like the thousands of other companies using it,' " he added.

John Diesem, senior manager and director of financial services strategic systems planning at Peat, Marwick, Main & Co., who also represented MIS, stressed that end-user executives do not attempt to participate in project planning. "It's hard to get them to participate in steering committee meetings," he asserted.

End users charged that while MIS claims to want end users to participate in systems development, many DP managers are fearful of losing control over the projects they have nurtured. And when end users are invited to planning sessions, they said, they feel as if they've participated in a United Nations General Assembly meeting without a translator.

"Nothing is worse than hearing technology terms bandied about and knowing that MIS is waiting for you to ask what it means so you look inferior," Tenneco's Kelly noted.

Avon's Perry pleaded guilty to feeling threatened by end users for control of DP projects but asked that users become more knowledgeable of technology.

Cost justification caught the ire of both sides. End-user departments are squeamish about making cost-justification presentations to upper management because chargeback figures quoted by MIS always increase, Kelly said. Prices increase because of ever-changing user requirements and technology advances, Peat Marwick's Diesem countered.

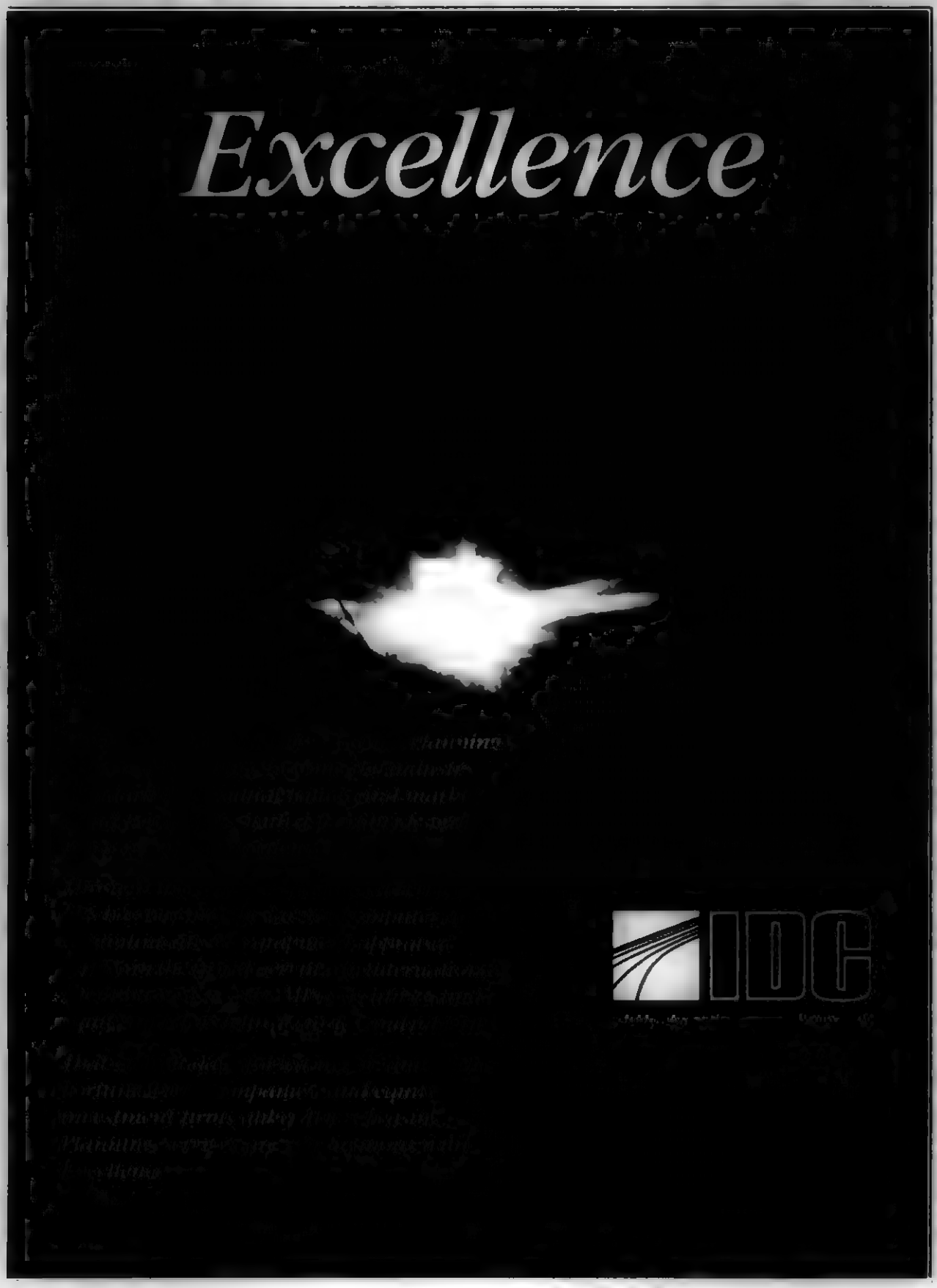
"Sure, we're careful, because we pay for it," Kelly noted. "When [MIS] blows it, the project still gets charged to us."

Talking the talk

As departmental computing becomes more accepted, end users should employ information systems professionals who speak and understand MIS lingo, Kelly said. Continued use of prototyping can also help forge better ties between end users and MIS, he added.

"The question of requirement definition is critical," Kelly acknowledged. "Users don't know what they want until they see some of it."

Overall, both sides agreed that they need to stay in close contact with each other if they hope to overcome their ideological differences. "Dialogue, not monologue, is the solution," Lockerd concluded.



Laser disk

CONTINUED FROM PAGE 79

quick for others. Furthermore, if a class size does not reach a certain number, the class could be canceled. Class hours also tend to be rigid, taking employees away from work.

With laser disk training, each student has the materials at his disposal, and no classroom or teacher is needed. "The student can learn at his own convenient time and his own pace," Elsayeas said. The training is more useful because if the student makes a mistake or does not understand, he can go back to the trouble spot until he learns it.

For companies with multinational operations, bilingual training can be made available. If the student is trying to learn the course in English but fails to understand something, he can switch over to his native language on the disk.

One of the first ambitious undertakings of laser disk training is the U.S. Army's Electronic Information Delivery System project. The hardware for the project alone cost an estimated $224 million; 47,000 personal computers and laser disk players were purchased. Software costs, however, are expected to reach $1 billion.

Laser disk training could also make a dent in the coming shortage of information systems professionals, Elsayeas believes. "By 1995, we need around 600,000 DP professionals. Right now, we have approximately 350,000," he says.

When DP professionals need information on IBM's MVS/XA, Cobol or other operating systems, most are taught within the department by an experienced user or sent to training school. "If there were a laser disk course for MVS/XA, you could rent it and try it," Elsayeas says. "The people learning won't fall asleep, because the system asks questions, and it will tell you if you're making mistakes."

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Issue Date	Closing Date	Topic	Show Distribution
Jan. 6*	Dec. 4	Communications/ Connectivity	Communication Networks
Feb. 3	Dec. 31	Software Operating Systems & Languages	Uniforum
Mar. 2*	Jan. 29	Departmental Computing	Interface/ WCC
Apr. 6	Mar. 4	Data Security	
May 4	Apr. 1	Communications/ Connectivity	Comdex Spring/ ICA
June 1*	Apr. 29	PC End User Productivity	PC Expo
July 6	June 3	Software	
Aug. 3	July 1	Departmental Computing	
Sept. 7	Aug. 5	Communications	TCA
Oct. 5	Sept. 2	Software Productivity	Info '88/ Dexpo West
Nov. 2	Sept. 30	PC/Connectivity	Comdex Fall
Dec. 7	Nov. 4	Departmental Computing	

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Micro strategies unfold

Reed

FROM PAGE 79

But no urine test, no job.

Taking this test wasn't as simple as it sounds. I had to list all of the medication that I had taken during the past two weeks. (I merely referred them to Aisle Three of the drugstore.) Then I was escorted to a small restroom. As I began to close the door, the doctor informed me that he had to watch. I guess the drug-free urine vendors have really had an impact on the testing procedures. Now I knew how my 3-year-old son feels when I take him to the restroom, only with the pressure of realizing that a $30,000 to $40,000 job depends on it.

Then I had to wait a week for the results.

The hardest part

The week seemed like a year. I began to wonder what would happen if I failed the test. Would the company label me a junkie? Would insurance companies or other companies ask me if I'd ever failed a drug test, and then reject me if I said yes? Would another employer learn through the grapevine that I might have failed a drug test? What would happen if the testing lab got my sample mixed up? What would've happened if I'd attended a rock concert the night before and had sat near someone smoking a "hand-rolled Colombian special"? Or if I'd been on the West Coast when the air-pollution detectors picked up the heavy concentration of marijuana during the pollen season?

THE WEEK seemed like a year. I began to wonder what would happen if I failed the drug test.

By the time the results arrived, I was at my wit's end. I began to wonder about the credibility of the drug lab that processed the sample. Put yourself in its place for a second.

You realize that if you misread or mixed up the samples, you might find yourself in a lawsuit. So what would happen if you threw the samples away and indicated that everyone passed the tests? Everyone is happy. The company believes it will get a drug-free employee. The employee gets a job. And you don't have to worry about legal fees or increased insurance rates. If it's later discovered that the employee is a junkie, you merely indicate that that was the 1% error that's normal for your industry. This made me wonder how many firms "test" the drug labs to be sure they're really doing their job?

If you're curious about the test results, so am I. I sent the unopened letter back to the company and rejected its offer. I found out that it didn't have a no-smoking policy.

Reed is director of business systems at a Dallas-area institution.

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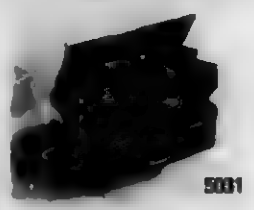
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MAY 1-7

IRIS/Cobol Users Group. Clearwater Beach, Fla., May 1-4 — Contact: IRIS/Cobol Users Group, P.O. Box 2156, Altamonte Springs, Fla. 32715.

ICI 1988 Annual Conference, Management of Change and Innovation Supporting the Explosion of End-User Computing. Dallas, May 1-4 — Contact: Information Center Institute, 3230 Commander Drive, Carrollton, Texas 75006.

International Association of Systems Users Conference. Houston, May 1-4 — Contact: Gary K. Carnes, P.O. Box 1320, Sugar Land, Texas 77487.

Spring Conference on Disaster Recovery and Computer Security. Marco Island, Fla., May 1-4 — Contact: Harris Devlin Associates, Corporate Offices, 2715 Tuller Parkway Drive, Dublin, Ohio 43017.

International Symposium on Information Resources Management. Toronto, May 1-5 — Contact: Business Forms Management Association, Inc., Suite 712, 519 S.W. Third Ave., Portland, Ore. 97204.

The Elusive Payoff in Information Technology Conferences. New York, May 2-3 — Contact: Aida Rivera, Business Week Executive Programs, 1221 Avenue of the Americas, Suite 4049, New York, N.Y. 10020.

Guidelines Macintosh Forum '88. Chicago, May 2-3 — Contact: Guidelines — Mac Forum '88, Box 454, Orinda, Calif. 94563.

DBMS User Group Meeting. Chicago, May 2-4 — Contact: Beverley Van Kirk, Conference Coordinator, DBMS, Inc., 600 Olympian Office Center, 4343 Commerce Court, Lisle, Ill. 60532.

Eastern Communications Forum88. Rye Brook, N.Y., May 2-4 — Contact: Eastern Communications Forum88, Suite 4000, 505 N. Lake Shore Drive, Chicago, Ill. 60611.

Westinghouse National User Group Meeting. Pittsburgh, May 2-4 — Contact: Westinghouse Electric Corp. Management Systems Software, P.O. Box 2728, Pittsburgh, Pa. 15230.

A/E/C SYSTEMS '88. Chicago, May 2-5 — Contact: Sharon Price, A/E/C Systems '88, P.O. Box 11318, Newington, Conn. 06111.

Autocad Expo '88, For the Drafting and Design Professional. Chicago, May 2-5 — Contact: Autodesk, Inc., 2320 Marinship Way, Sausalito, Calif. 94965.

International Forum for Air Cargo, Air Cargo Tomorrow — Intermodal, Automated, Data-based. Miami Beach, May 2-5 — Contact: Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, Pa. 15096.

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Banking

CONTINUED FROM PAGE 1

on the first automated teller machine (ATM), filled his bank's coffers by offering DP services to a variety of non-banking entities and led pioneering, but ultimately failed, efforts into videotex-based home banking and point-of-sale (POS) data capture. He has recently helped drive a unique collaboration between Electronic Data Systems Corp., Norwest Corp. and Banc One to create an integrated banking software product for sale to the industry.

Fisher is considered a visionary in the industry. "He's a pioneer," says Don Long, a financial services industry consultant at IBM. "He understands how technology can make things more efficient to better serve the customer, and that's the real name of the game."

"He knew that using [DP] systems was 'mission-critical' long before the cute phrases were in vogue," adds David Gilbert, president of Banking Decision Systems in Waltham, Mass.

"We've debated for countless hours whether he is too far out front," says Jim Brewer, executive vice-president at Wachovia Bank & Trust Co. in Winston-Salem, N.C., and a longtime associate of Fisher's. "Time has proven that he is way ahead of his time on ideas like POS terminals. But even with things that he's too far out front on, he still stretches minds better than anyone in the industry."

Adding it up

The numbers tell the story: In Fisher's tenure, Banc One — a name Fisher created to polish up City National's image — grew into the third most profitable bank holding company in the U.S. Operating in five states, soon to be six, Banc One now ranks 28th in the country, boasting $23 billion in assets with 61 banks, 18,000 employees and profits of $231 million in 1987. The DP organization, now a separate unit called Banc One Services Corp., has more than 4,000 employees.

"The bank wouldn't be where it is today without Johnny Fisher," states John G. McCoy, the retired president of Banc One who oversaw Fisher's sometimes wacky, mostly brilliant maneuvers for 22 years before retiring in 1982.

"Banking is boring," Fisher says simply. "You have to constantly work on something new, something that will stimulate you. Too much of banking is working on yesterday's projects."

Fisher was no banker, nor was he a technologist when he came to Banc One after a nine-year stint as a disc jockey and ad man at a tiny radio station in Newark, Ohio. But he somehow envisioned, within the staid world of banking, that technology could drive a little bank into the big time. It would just take some creativity, innovative use of the data processing department and a bank management willing to let him have his way.

McCoy told Fisher upon hiring him, "I don't want you to ever learn how to open an account or make a loan. We've got 20 guys to do that. I want you to always be thinking about what the customer wants." Fisher credits McCoy as that perfect boss: always willing to say, "Let's try it," but with the unspoken caveat, "It better work."

Indeed, McCoy was more than a trusting benefactor. A legendary figure in his own right in banking circles, McCoy's reign as chairman of Banc One was characterized by his belief that a bank must serve its stockholders, employees and customers equally in order to prosper.

He trusted Fisher to find and expand markets, and he consistently backed his unorthodox protege against the bank's conservative board. When Fisher left the bank in the early 1970s to try his hand at another job in the financial industry, McCoy was disappointed but wished him well. Two years later, Fisher called asking to return; the new job was simply not stimulating.

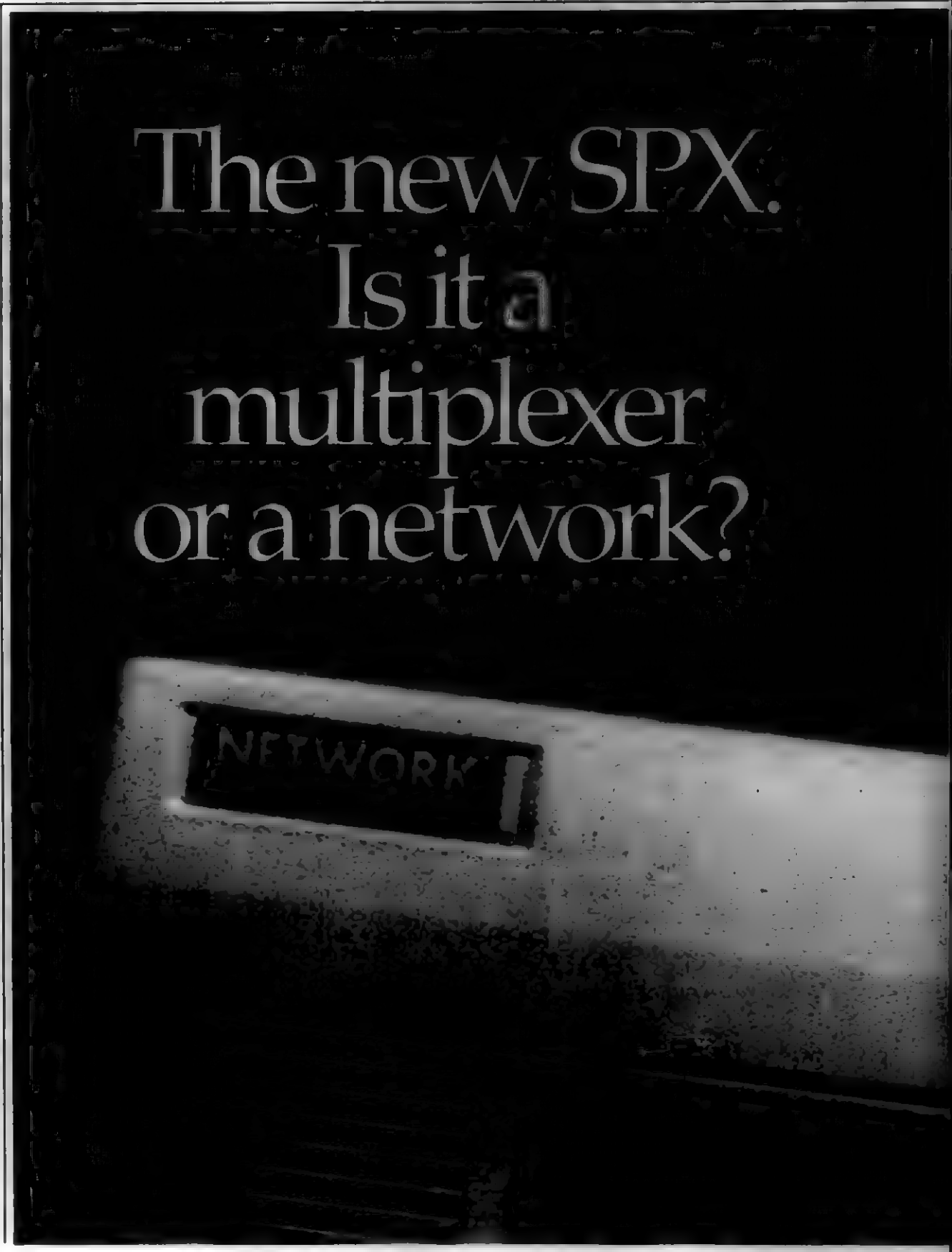
McCoy told Fisher that he never should have left but welcomed him back in the position of vice-president of research. "The trouble was that Johnny had to answer to the board of directors at his new job, and he can't work with people telling him what to do."

McCoy viewed Fisher as a creative artist. "You can't tell them how to express themselves," McCoy says. "And the key to our relationship was I was dumb enough not to try to tell him how to do it."

Led by McCoy, the bank had in 1966 convinced giant Bank of America in San Francisco to take its Bankamericard credit card out on a national basis. Banc One would act as the interchange bank, handling all the back-room DP activities to make Bankamericard — subsequently renamed Visa — the first nationally accepted credit card. This innovative maneuver not only poured revenue and credibility into Banc One but helped change Americans' buying and spending habits. The age of plastic had begun.

Fisher saw the infinite possibilities the credit card could provide. But he also had to oversee the back-room innovation for the bank. He worked closely with the DP department to invent the processes necessary to handle this massive accounting problem. This need precipitated the requirement for on-line capabilities, so Banc One put up the first NCR Corp. card random-access memory, or CRAM, on-line authorization services.

Fisher was not intimidated by technology. "Back in the '60s and early '70s, DP was not nearly as complex as it is today," he says. "You could quickly learn the language, so it was no time at all before I could talk to them and they could talk to me. And that marriage of technology and



marketing allowed us to move rapidly out across Ohio."

The early entry into the credit card business gave Banc One a strategic advantage it has never relinquished. "Because you are early in a marketplace, you have an opportunity to exploit the capability. It's given us a unique earnings opportunity for 25 years," Fisher says.

This early embrace of technology provided another, unexpected benefit. "We quickly began to build some notoriety around this unique product," Fisher explains. "We found bright young people coming out of college and DP people in other banks who said, 'Hey, that's the kind of organization I want to work for.' "

Once the bank had its DP foundation in place for servicing the credit cards, Fisher found the potential for enhancements unlimited. He quickly tied the credit card together with the checking account, providing an early example of overdraft protection.

By 1969, working with Polaroid Corp., he had introduced the first full-color picture credit card. That same year, Fisher initiated the 24-hour banking machine for use with a Bankamericard. It was the forerunner of the ATM, which Fisher also shepherded into existence two years later, working closely with Docutel.

Driving the bank's burgeoning interest in electronic delivery systems, Fisher pushed into other arenas. In 1977, Merrill Lynch & Co. turned to Banc One to help initiate its Cash Management Account program, an unprecedented step into electronic funds transfer capability for brokerage houses. That success attracted other brokers, and Banc One developed a significant business in processing central asset accounts for brokerages.

"If Merrill Lynch can issue credit cards, why not others?" Fisher asked. He approached the national association of credit unions in Madison, Wis., and today has 1,500 credit unions across the country using Banc One to process its credit cards. This year, Banc One will announce a similar deal with the American Association of Retired Persons in Washington, a 27-million-member organization.

Fisher's forays into technology were not always smooth or successful. He clashed with the DP organization, which ran a strong IBM shop, when he insisted on bringing in Tandem Computers, Inc. machines for handling the nascent ATM network. The Tandem-based ATM network was successfully implemented but has remained a separate unit within Banc One Services.

Two other Fisher-driven ideas simply didn't work. In 1971, he became a vocal proponent of POS plastic card programs in which consumers could use a single credit card to pay for groceries or any other item and have it debited directly from their checking accounts. An attempt in 1977 to establish a POS network survived for two years before Fisher concluded that profits were not forthcoming and closed it down. Customers were simply not ready to change their purchasing habits. "It was an idea whose time had not yet come, and still hasn't," he laments.

Fisher was also an early proponent of video home banking in 1979. He set up a consortium of seven large banks around the country to attempt to build a national data processing capability to deliver home banking services via videotex. Each bank kicked in $2 million in 1983 to investigate the potential. But by 1985, the seed money was gone, and another idea died at the hands of an apathetic marketplace.

Still stomping

Fisher is undaunted by failure. At 60, he has become an industry leader, speaking 100 nights per year around the country on the need for banks, rather than taking the traditional insular view, to work together to fend off competitors such as Ford Motor Co., General Motors Acceptance Corp. and Merrill Lynch, which have made giant inroads into banking's traditional markets. Banks must view the fight as banks vs. new financial service providers, not banks vs. banks, he says.

But Fisher knows he has made his mark and is contemplating retirement in two or three years. Then he will spend more time hunting and fishing in his Canadian cabin or touring the Southwest in a new motor home with his wife.

There is a last little tug, however. Banking, he believes, is finally getting exciting, and that makes it harder to leave. "I'm like an artist in that I like to finish something, number it, sign it and then stand back and look at it. I like the process, but it's the finished product that matters."

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Integration

CONTINUED FROM PAGE 79

lion in 1987, much of the demand for those services in the future will come from commercial systems users.

Input estimated that the commercial systems integration market will rise from $1.8 billion in 1987 to $8.9 billion in 1992, with an average annual growth rate of 38%. The firm cited a $300 million IBM contract to implement office automation systems for Ford Motor Co. as an example of how systems integration can boom.

The largest segment of the professional services market remains software development, which will grow from $7.6 billion in 1987 to $14.5 billion in 1992, Input predicted.

Input officials noted that software development's 14% average annual growth rate is deceptive because that figure does not include the software development segment of systems integration.

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COMPUTER INDUSTRY

INDUSTRY INSIGHT

Clinton Wilder

Ah, spring . . . time for lists

Spring again. Time for leading computer vendors like DEC to unveil major new products, for other leading vendors like IBM to hold annual meetings (today, in fact), and for the list makers of the U.S. business press to unveil their new products: the Fortune 500, the Forbes 500 and the Business Week 1,000.

Stacked up together, these three volumes resemble the bulk of a typical IBM systems software manual. But in perusing the lists of America's corporate biggest and brightest ranked 60 ways to Sunday, one can find some choice tidbits that point out trends among major computer vendors in the past year.

We'll take it from the top of the Fortune 500, which of course means IBM. Despite all its negative press — and stock drops — in recent months, Big Blue remains the world's most profitable corporation by a healthy $400 million over No. 2 Exxon. IBM held its spot as No. 4 on the Fortune 500 list in sales, although Mobil closed to within $3 billion in 1987. AT&T, with a slight drop in revenue in 1987, traded places with Texaco and fell to No. 8.

Joining the titans in the Fortune 50 were Unisys at No. 36, up from No. 46 and leapfrogging DEC; DEC at No. 38, up from No. 44; and Hewlett-Packard at No. 49, up two places.

IBM's net profit margin of 9.7% was only 66th on the 500 list, but Big Blue still ranked better than all but four of the top 50 companies in sales. One of those four was — you guessed it — DEC, at 12.1%, good for 34th place in the profit margin sweepstakes.

But the big winner among computer firms in this category was Cray Research, whose whopping 21.4% margin easily topped the industry and was seventh on the overall 500 list. Cray, No. 397 in sales, came in fifth overall with its 10-year annual growth rate of 48%; it also ranked fifth in total return to its investors over the same period.

Continued on page 88

Quarterly profits look healthy

Mainframes get warmer; micros stay hot; mini vendors may feel a chill

BY NELL MARGOLIS
CW STAFF

The prophets of doom and gloom were confounded by the profits of bits and bytes once again, as first-quarter earnings reports from companies across the computer industry last week continued to show overall robust health.

"Isn't that a surprise, considering what everyone was predicting?" said Laura Lederman, an analyst at Duff & Phelps Selected Utilities, Inc. in Chicago. Revenue and earnings news was upbeat for the most part, according to Lederman, who said market analysts had set the groundwork for positive reaction by pegging expectations low.

Cautious market observers were in for no rude shocks last week, as the numbers that emerged continued to evidence already noted industry trends. Financial results reflected renewed interest in mainframes, a continuing boom for leading microcomputer vendors and an impending chill in the minicomputer sector. Mini vendor Wang Laboratories, Inc. posted a disappointing 3% revenue growth but had warned analysts earlier about weakness in the quarter.

Amdahl Corp.'s 71% surge in profits "is not necessarily indicative of a resurgence in the mainframe market," said Jeffrey Canin, an analyst with Montgomery Securities in San Francisco. "Market capture is the story here. What you're seeing is Amdahl's price/performance advantage [over IBM] on a very strong product line."

Amdahl, which reported $367.7 million in first-quarter sales, a 15% rise over last year, is poised for new mainframe announcements in the near future, said Canin, who forecast "a progressive year with comfortable gains" for the Sunnyvale, Calif., company.

MCI Communications, Inc.'s stunning 180% jump in net earnings and 18% advance in revenue justified early 1988 market observations that communications would prove a strong industry niche in the coming year.

Other companies reporting results last week included:

Apple Computer, Inc. The Macintosh maker's second fiscal

Continued on page 89

1988 first-quarter earnings

Vendors of mainframes and micro products boom, but business slows at Wang, Altos, VM Software and Storage Technology

Altos Computer Systems	$0.4	(71)	$43.8	6
Amdahl	$43.2	71	$367.7	15
Apple	$79.7	135	$867.2	51
Electronic Data Systems	$69.1	28	$1.12B	8
Hayes	$34.7	13	$334.7	9
Lotus	$18.3	34	$117.3	36
MCI Communications	$66	180	$1.13B	18
Microsoft	$37.3	95	$161.6	65
NCR	$74.1	20	$1.36B	14
Prime Computer Systems	$1.1	33	$14.2	89
Storage Technology	$8.6	(11)	$188.3	7
Tandy	$64.3	27	$830.1	8
VM Software	$0.6	(22)	$0	37
Wang	$32.3	285	$767.9	3

' Parentheses indicate decrease

CW CHART

IBM puts Metaphor on the map

BY KATHY CHIN LEONG
CW STAFF

MOUNTAIN VIEW, Calif. — IBM announced last week that it has invested approximately $15 million in Metaphor Computer Systems, a small developer of sophisticated decision-support and marketing analysis software tools for Fortune 500 users.

IBM will have exclusive marketing rights to sell Metaphor software developed for Intel Corp. 80386-based Personal System/2s and IBM mainframes running MVS. IBM will also have the exclusive right to sell any products that emerge from the relationship, for which Metaphor will receive royalties.

The deal is IBM's most significant venture with an independent applications vendor since its 20-year marketing agreement with Hogan Systems, Inc. in 1986 and the first of its kind since the formation of IBM's Application Systems Division (ASD) last year.

According to ASD President Joseph Guglielmi, the selection of Metaphor technology follows in lockstep with his division's intention to design new software or acquire technology outside IBM. While IBM sells sales and support tools, "what Metaphor has is a much richer set of tools and applications," Guglielmi

Continued on page 89

Cullinet shuffles executive deck again

BY NELL MARGOLIS
CW STAFF

WESTWOOD, Mass. — Further executive changes at Cullinet Software, Inc. last week paved the way for a strategic realignment and probable layoffs, according to John B. Landry III, Cullinet's executive vice-president of development.

David A. Litwack, executive vice-president of systems products, resigned from Cullinet last week after an 11-year tenure. Litwack was instrumental in developing ADS/Online, the company's fourth-generation programming language, as well as IDMS/SQL, the relational data base management system whose introduction three weeks ago gave Cullinet ammunition in the Digital Equipment Corp. market [CW, April 11].

Ron Zambonini, who joined Cullinet as a result of the company's 1987 acquisition of Applied Development Corp. and led the development team for the Knowledgebuild application generator, became vice-president of tools product development. Zambonini will report to Landry.

Redundancy imminent

Consolidation of tools operations under Zambonini, Landry said, will cure "some degree of redundancy in the tools area." When asked if that consolidation would lead to layoffs, Landry said, "I think it's pretty safe to assume that any time you find redundancies, you have to take the appropriate actions."

The changes at Cullinet are far from over, Landry indicated.

Cullinet's Landry

"John Cullinane's return [as vice-chairman in March and as chairman earlier this month] has caused a shift in vision at this company," he said. "After a two-year-long dramatic research and development and acquisition period, our objective now is to focus on what we've created and acquired and put it into a framework consistent with the future as we see it."

Exactly how Cullinet sees the future during the second Cullinane administration will emerge in forthcoming announcements, Landry said.

In another appointment announced last week, Donald F. Heitmann, also an 11-year Cullinet veteran, was named vice-president of data base and data communications products.

The two new appointments, Landry said, "are consistent with our three-by-three architecture. Our objective is to bring both data base lines [the IBM-based IDMS/R and the new DEC VAX-based IDMS/SQL] together under Heitmann to share their resources, with a fully distributed environment across multiple hardware platforms still the goal."

INDUSTRY WEEK IN BRIEF

The UK's largest computer vendor, International Computers Ltd., said it will base its new computers on the Scalable Processor Architecture, or Sparc, chip and the Unix System V operating system specified by the recent agreement between Sun Microsystems, Inc. and AT&T. International Computers' announcement is the first by a European vendor and follows a similar commitment by Unisys Corp.

A key Prime Computer, Inc. executive, Stephen Kiely, vice-president of systems marketing and development, has resigned to lead Prisma, Inc., a 1-year-old Colorado Springs-based start-up founded by former Cray Research, Inc. engineers. Kiely, who reported directly to Prime Chief Executive Officer Joe Henson, was replaced by Richard Snyder, former vice-president of software development.

IBM took a big step toward exiting the copier business, announcing an agreement under which Eastman Kodak Co. will market, sell and service IBM copiers. IBM will continue to manufacture copiers, but the deal represents another IBM move away from noncomputer businesses. IBM has been transferring the marketing of its typewriters to dealers, and it left the analytical instruments business in 1986.

In an ironic footnote to the current Apple Computer, Inc. graphical interface lawsuit controversy, Xerox Corp. last week completed the spin-off of its former Palo Alto Research Center unit into an independent, venture capital-funded company called Pensplace Systems, Inc. Original development work at the Palo Alto Research Center served as the basis for Apple's Macintosh user interface, which Apple charges has been infringed by Microsoft Corp. and Hewlett-Packard Co.

A recent American Electronics Association survey found that 38% of high-tech firms would manufacture or buy components and products anywhere in the world, despite trade or political implications. Mexico was the leading preferred offshore product location, followed by Japan, Singapore, Great Britain, Puerto Rico, South Korea, Ireland, West Germany and Hong Kong.

As an indirect result of its ongoing microcode copyright dispute with Intel Corp., NEC Electronics, Inc. has announced a new Intel-compatible microprocessor designed solely with hard-wired logic instead of microcode. "Perhaps it will help us around the legal questions," said Henry Eng, NEC's product line manager for microprocessors and peripherals. "If you don't have microcode, you don't have microcode infringement."

Wilder

CONTINUED FROM PAGE 87

Apple jumped 38 places in the Fortune sales rankings to No. 152, and Compaq, nearly doubling its revenue, flew up 127 places to No. 282. Other impressive movers were Advanced Micro Devices (AMD), aided by the acquisition of Monolithic Memories, up to No. 328 (and just shy of the $1 billion club) and Seagate Technology, up 146 places to No. 335.

Speaking of movers, what about Sun Microsystems? Sun debuted on the Fortune 500 at No. 463, but hold on to your workstation: Sun's 156% revenue gain was the fourth-best growth figure on the elite list. Only three chemicals manufacturers outpaced Sun's sales jump, and one of them, Hoechst Celanese, got most of the growth through a merger.

Sun, however, did not bring home top honors for profit growth among Fortune 500 computer systems vendors. That distinction — excluding AT&T and Texas Instruments, which both took significant restructuring charges in 1986 — went to Amdahl, with a 249% earnings surge. Compaq was second at 218%, and Sun was third at 204%.

Joining Sun as Fortune 500 rookies were archrival Apollo, turnkey systems vendor Reynolds & Reynolds, fun-and-games specialist Atari and surging chip, board and micro maker Western Digital, which just made the cut at No. 499.

Among *Forbes'* four different 500 lists, the computer industry claimed three of the top five largest gainers in market valuation. Leading the pack with a staggering 269% market value increase was Computer Associates, which acquired Uccel during the year. Computer Associates, not even ranked among the top 500 in the category in 1986, vaulted to No. 185.

In *Business Week's* ranking of the top 200 business deals of 1987, Computer Associates' $823 million pickup of Uccel came in 35th. AMD's $367 million buyout of Monolithic Memories, at No. 95, was the only other computer-related transaction in the top 100.

Wilder is Computerworld's senior editor, computer industry.

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PC EXPO KEYNOTE 9:00 a.m.
Ned C. Lautenbach, IBM Vice President, and President, National Distribution Division, kicks off the industry's best Seminar Series.

- □ Selecting a Desktop Publishing System
- □ Legal Developments in the Technology Field
- ■ A LAN Primer: Basic Terms and Technologies
- □ Optical Storage
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- □ What to do While the 80386 Takes Over the World
- □ Costs and Benefits of Microcomputers
- ■ Making the VAX Connection
- □ Software 1989: What Corporations Can Expect, What Users Want
- □ Security Decisions in a Microcomputer Environment
- □ Qualifying for Corporate Account Selling

Wednesday, June 22

- ■ Network Management — Keeping your Network Running
- ■ Groupware: Connectivity for Workgroups
- □ In Graphic Detail
- □ Expert Systems: Real Applications of AI
- □ Portables: A Roundtable Forum
- □ Desktop Publishing: What Corporations are Doing
- ■ LAN Backbones and Bridges
- ■ The Macintosh in the Corporate Environment
- □ Dealing with the Inevitable: Departmental Systems
- □ Discounting: The Return Engagement
- □ Softline: Candid Comments from Industry Leaders
- □ Promoting Responsible End-User Computing
- ■ OS/2 and Networking
- □ Latest Developments in Spreadsheet Software
- ■ Micro-to-Mini Connectivity: Issues and Answers

Thursday, June 23

- ■ How to Grow Your Net
- □ Software Support and Upgrades
- □ Micro-Channel Architecture
- □ What's New in Training?
- □ Establishing a Backup Strategy
- □ Executive Information Systems
- ■ Local Area Network Issues
- ■ Micro to Mainframe Connections
- ■ LANs and Alternatives
- □ Project Management Software
- □ New Lives for Old — What to do with Out-Dated Equipment
- ■ Workgroup Computing
- □ Information Centers: Changes and Challenges
- □ End User Support
- □ Microcomputer Maintenance

■ *Connections '88 Sessions*

Schedule subject to change without notice

Profits

CONTINUED FROM PAGE 87

quarter results came roaring in with better than doubled revenue and a net income increase of 135% above the comparable quarter last year, marking Apple's third consecutive quarter of more than 50% growth. "Their numbers are great, and there's one simple reason: open Mac, which was really their entry ticket to the business market," said Richard Edwards, an analyst at San Francisco-based Robertson, Colman & Stephens.

Edwards also credited Apple's team-selling strategy, "which is going full steam ahead," with contributing to the company's continuing high ride. Moreover, he added, "international operations were very, very strong," accounting for 38% of overall revenue, up from 29% at the end of second-quarter 1987. Apple's reseller system and specialized dealer base, as well as the weakened dollar, should keep the international contribution rising, Edwards said.

The main question raised by Apple's impressive performance is, predictably, how long this kind of growth can continue. "For a while, at least," Edwards said. "They're more focused than anyone else, they're pushing harder than anyone else, and they've got what the world wants."

Lotus Development Corp. Record revenue and solid earnings racked up by Lotus Development Corp. in its first quarter were overshadowed by archrival Microsoft Corp.'s even more dramatic showing and the resignation of Lotus Vice-President Michael Kolowich.

Both events apparently caused Lotus stock to close down 1¼ points at 23½ on the day it announced otherwise impressive gains. Kolowich, who resigned less than a month after the departure of Charles Digate, Lotus's former head of business software development, will become publisher of a new microcomputer magazine.

Microsoft. The Redmond, Wash., firm's 95% profit leap to $37.3 million, or 67 cents per share, was coupled with revenue of $161.8 million, a 65% increase from last year's third quarter.

"Lotus and Microsoft both came in ahead of the Street's projections," said Paine Webber, Inc. analyst Bob Therrien, indicating the sustained strength of the microcomputer sector, which shows no sign of waning. To explain the disparity between Lotus's growth rate and Microsoft's, analysts said, is as easy as 1-2-3. Lotus's efforts to outgrow its one-product identity, analysts noted, have met with scant success, while Microsoft has launched itself into new product markets.

Wang. In striking contrast to the generally good news, Wang reported disappointing third-quarter numbers that may, according to analysts, augur increasingly hard times ahead for the Lowell, Mass.-based minicomputer company. Wang revenue for the quarter ended March 31 showed a meager 3% increase to $767.9 million. Significantly more impressive was the company's net income growth from 1987's weak third-quarter earnings figure of $5.9 million to $22.7 million.

Nevertheless, third-quarter numbers from Wang come as a letdown after the firm's considerably stronger first- and second-quarter showings. Dale Kutnick, executive vice-president of Gartner Securities, Inc. in Stamford, Conn., was not optimistic about which of the contrasting pictures is more revealing.

"I'm not a believer in the Wang comeback scenario," Kutnick said. "I think that the previous two quarters were more of a flash in the pan than a turnaround."

The minicomputer industry as a whole, Kutnick noted, is currently being hit high and low.

"The encroachment of powerful Unix-based workstations — RISC machines, for example — will only increase and will keep taking away from all minicomputer makers who don't offer a good Unix alternative," Kutnick said. Simultaneously, personal computer/local-area network server architecture "is taking a big chunk out of the departmental computing market," he said.

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III

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II

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Metaphor

CONTINUED FROM PAGE 87

said. "This technology would find great use among our large and mid-size customers."

Six-year-old Metaphor has developed a set of marketing and sales data analysis software programs designed to make interpreting raw data easier for sales and product managers who must intelligently collate massive amounts of information.

Metaphor has earned the reputation of selling an expensive tool that makes accessing other data bases rather simple. Its data base tools support IBM's DB2, data base management systems based on SQL and Oracle Corp. data bases.

The products run on a network of Metaphor-manufactured communication servers and Motorola, Inc. 68000-based workstations. Users, which include Pepsico, Inc. and Johnson & Johnson, can extract data from IBM hosts via a Metaphor gateway and integrate the information into another Metaphor application.

"Our biggest complaint was that we were not IBM compatible," Metaphor President Donald Massaro said. "Now, that will no longer be an issue on Metaphor systems. We will be able to go into accounts that have IBM hardware and our systems, and our software will be completely compatible." The IBM investment is valued at less than 10% of the company, Metaphor officials said.

Making it in manufacturing

Employers seek knowledge of the processes, interpersonal skills

BY SHERYL KAY
SPECIAL TO CW

As the U.S. dollar falls in value against foreign currencies, American goods become more attractively priced for overseas buyers. Meanwhile, managers of manufacturing companies continue to focus on how information systems will help keep them competitive in today's global environment.

"Japanese competition woke all of us up," says Nancy Johnson, new application design manager at Mepco Centralab, Inc. in Milwaukee, a capacitor manufacturer. [The Japanese] devised a system called Just-in-Time, and we've come back with Manufacturing Resource Planning [MRP]. The important thing is that both provide the manufacturer with audit reports and true accountability, so now the systems department is really depended upon to give management the reports it needs to react to any immediate market or workplace changes."

For the MIS professional who wants to become an important player in helping his company maximize its bottom line, the manufacturing systems that actually support production are a good place to be today, according to Jim Barcus, senior vice-president of Worldwide Information Services for The Black & Decker Corp. in Towson, Md. He stresses that markets are captured by a company's products, not by the automation of paperwork.

"It's hard to imagine a more rewarding area for information systems professionals to be involved with today," Barcus says. "Here you can see actual results from the systems you've developed — real reduction in product development cycles and improved product cost."

Specialists in demand

According to Barcus, the weaker dollar together with this realization of the role of information systems has translated into more jobs for manufacturing applications specialists.

"You have to market and sell, but at the end of the day you must have a product that works, that people want and [that] has a reasonable cost, and that's exactly what MIS can give to the manufacturer."

Those systems professionals with specific manufacturing applications experience might earn salaries 10% greater than average in their field.

According to Steven Joffe, vice-president of San Francisco-based recruiting firm Source EDP, programmers in manufacturing may average $27,000 to $38,000 per year, while systems analysts are in the $35,000 to $45,000 range and project leaders average $45,000 to $55,000 annually.

Although salaries may be attractive, companies find it difficult to locate qualified technical professionals with manufacturing experience, particularly at the analyst level.

"Our systems analysts don't code, so user interface is most important," Johnson says. "They have to know how the bill of materials is structured, how the inventory is controlled and costed. The industry knowledge is critical."

Personality is also important. "You need a fair amount of patience," Joffe explains. "Manufacturing people are not computer people, so companies look to hire systems professionals who can adapt easily to whomever they are talking to, including warehouse employees."

At Black & Decker, numerous projects are under way for the coming year, including integration of computer-aided design with computer-aided manufacturing, creation of worldwide design and production centers and development of a new worldwide purchasing system. All projects will require employees with a good technical background. But, Black & Decker's Barcus says, "we are now looking a lot more carefully at an individual's interpersonal skills and analytic business abilities."

Corporate crossover

Another attraction of working in manufacturing systems is the potential for crossing over to corporate operations. Systems designers who have acquired an in-depth knowledge of how the manufacturing cycle works could move into production, inventory and other related areas.

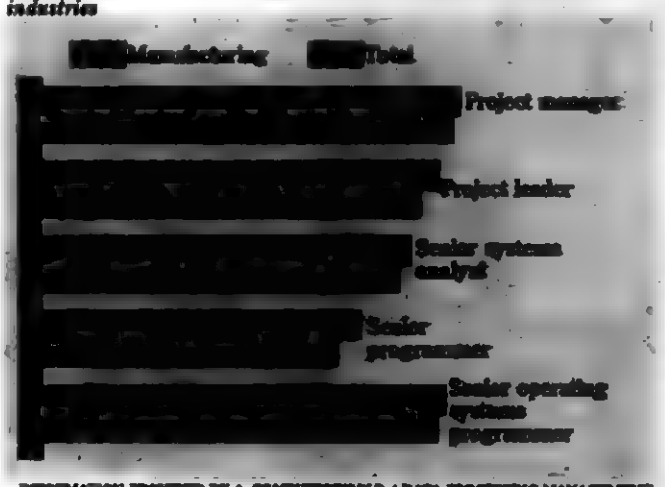
Barcus is an example. After spending years in information systems at Black & Decker, he moved on to several executive positions in manufacturing operations before switching to his current role overseeing all worldwide manufacturing systems.

Programmers in nonrelated industries may find that a transition to manufacturing is not too difficult. "Especially coming from banking," Mepco Centralab's Johnson says. "They do a lot of on-line processing, and that's a good talent for a manufacturing company to have." Systems analysts and project leaders, on the other hand, need the industry experience.

Kay is an MIS human resources consultant based in Tampa, Fla.

Making it

Salaries in manufacturing compared with average earnings for all industries



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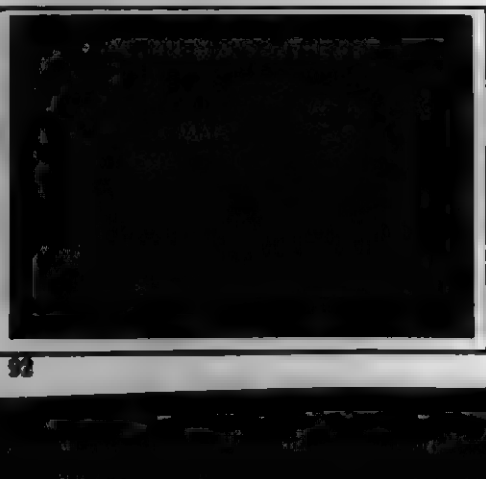

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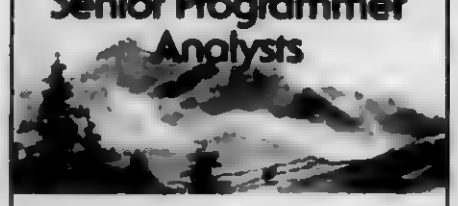

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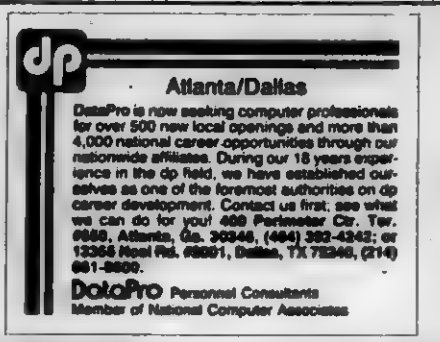

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Minimum Requirements: ● Bachelor's degree in computer science, math, information systems or a related engineering field. ● Two years hands-on, comprehensive experience in the development and support of major administrative software under state-of-the-art data base management system. ● One year experience must be in a VAX VMS environment in the scale of 11/780 or higher. ● Master's degree, as specified above, and Oracle data base development experience preferred.

Salary: Mid 40's, commensurate with skill level and qualifications.

Closing date for applications is May 20, 1988.

Submit letter of application and current resume to:

Search Committee Chairperson
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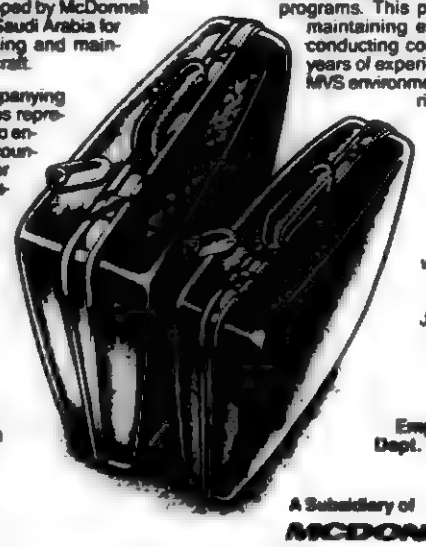

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Salary: Mid to high 20's, dependent on skill level and qualifications.

Closing date for applications is May 20, 1988.

Submit letter of application and current resume to:

Chairperson for Assistant Director for Computer Operations
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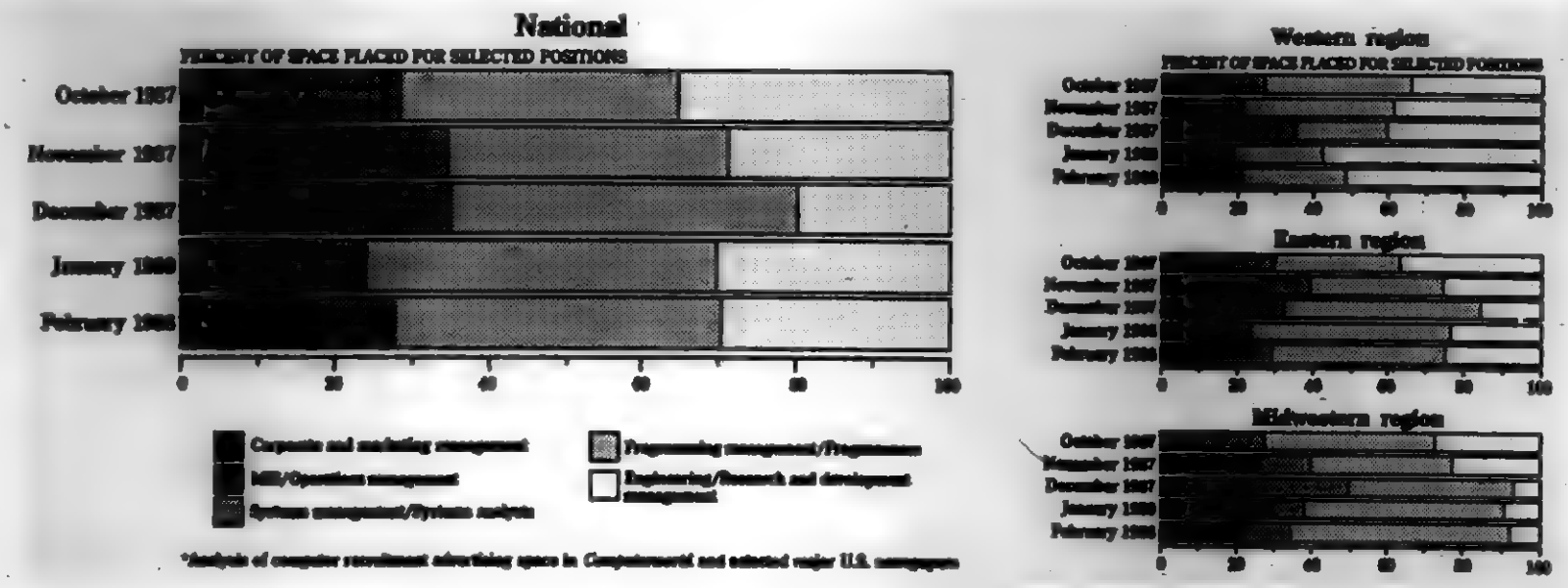

*Analysis of computer recruitment advertising space in Computerworld and selected major U.S. newspapers

INFORMATION PROVIDED BY CW PUBLISHING, INC.'S RECRUITMENT MARKET RESEARCH DATA BASE
CW CHART

MARKETPLACE

Invisible hand pushing IBM?

Market shows clear preference for older technology, but reason unclear

BY CAMERON HALL
BOSTON COMPUTER EXCHANGE CORP.

In a month during which the Boston Computer Exchange Big Board closed on April Fool's Day and April 15, some interesting percentages emerged from the secondary computer market.

Just as the U.S. government collects its revenue as a percentage of income, most computer resellers sell as a percentage of list price. The rule of thumb is that discounts for new equipment range from zero to 30%; for used equipment, the average discount ranges from 35% to 55%. Used equipment also sells for 10% to 20% less than identical or comparable new equipment, and a buyer will also generally prefer the latest technology over earlier models.

Observing the IBM market, one can see that these rules do not apply to the recently discontinued IBM Personal Computer AT Model 339 and the current technology, the Personal System/2. One look at advertised prices shows the PS/2 selling at steep discounts of up to 43% with many retailers saying, "I'll sell as low as 48% if I need to. I've got to keep my volume up to get the discounts." In contrast, the discount on a used PC AT 339 was only 28% below the retail price of $5,120 — when it was discontinued.

If the PC AT 339 and the PS/2 Model 60 are "substitutable goods," then our rule of thumb should have a used AT selling 10% to 20% below the new Model 60. The BoCoEx Index shows this is not the case.

> A COMPUTER is not a house, to be kept forever.

Used ATs are selling for $3,700, while the advertised price for the new PS/2 Model 60 is as low as $3,160.

If you consider that the larger storage capacity, greater speed and improved graphics make the PS/2 an enhanced good, then this contrast is even more striking. The market is showing a clear preference for the older technology. Is this a separate market, or is the "invisible hand" forcing IBM's hand?

The most recent and most popular IBM PC XT and AT models closed up during the week ended April 15. The PC XT Model 089 was up $25 to $1,700, and large leasing companies were the most frequent buyers of the machine. PS/2 models experienced sluggish trading under good supply conditions. Early XT and AT models traded at the previous week's prices, and the IBM PC was up $25 in active trading.

Discounting takes toll

The Apple Computer, Inc. market held steady during the week after a drop in prices compared with recent weeks. Used Macintosh Plus prices were down $25 under pressure from heavy discounting at the retail level. Macintosh SE and Mac II models remained at the previous week's closing prices. The Macintosh IIE closed at $725, remaining popular with buyers and showing constant market demand.

The Compaq Computer Corp. Portable II and III models were popular all week, with the Portable II down $50 to $2,150 with good volume. The Portable Plus suffered as buyers passed up the 10-MHz hard disks for smaller laptops with 10-MHz or larger hard disks. The Deskpro 386 model continued to be the preferred machine for those upgrading from the 286 models.

Buyers and sellers are reminded that for taxes, price/performance or simple cash value, computers should be purchased with a clear idea that they will eventually be sold. A computer is not a house, to be kept forever. There will come a day when a return is maximized on the investment, and this should be calculated into what one buys and when one sells.

The Boston Computer Exchange can be reached at 800-BOCOEXX or 617-542-4414 in Massachusetts.

The BoCoEx Index

Closing prices report for the week ending April 15, 1988

	Closing price	Recent high	Recent low
IBM PC Model 076	$825	$900	$600
XT Model 086	$1,225	$1,350	$950
XT Model 089	$1,700	$1,700	$1,175
AT Model 099	$2,400	$2,450	$1,950
AT Model 239	$2,750	$2,750	$2,200
AT Model 339	$3,700	$3,850	$2,900
PS/2 Model 50	$2,475	$2,650	$2,400
PS/2 Model 60	$2,650	$2,800	$2,475
Compaq Portable I	$800	$825	$600
Portable II	$2,150	$2,225	$1,850
Portable III	$2,700	$2,750	$2,375
Plus	$1,175	$1,275	$850
Deskpro Model 2	$1,500	$1,600	$1,250
Deskpro 286	$2,425	$2,475	$1,975
Deskpro 386	$4,075	$4,000	$3,475
Apple Macintosh 512	$650	$750	$650
512E	$850	$1,075	$725
Plus	$1,150	$1,350	$950
SE	$1,925	$2,200	$1,600
SE 20 MHz	$2,400	$2,400	$2,100
II	$3,800	$4,200	$3,250
AT&T 6312	$4,200	$4,500	$3,500
Apple Laserwriter Plus	$3,100	$3,500	$2,500
Hewlett-Packard Laserjet	$900	$900	$775

INFORMATION PROVIDED BY THE BOSTON COMPUTER EXCHANGE CORP.

Declines plague used IBM terminal market

BY CINDY SANTISARIO
IDC FINANCIAL SERVICES CORP.

The IBM 3178 display family has fallen dramatically on the used market since the beginning of the year. Current IDC Financial Services Corp. secondary market quotes indicate retail values have dropped approximately 18% since January.

This pronounced decline in the 3178's used market value is the result of the expiration of three-year leases during late fourth-quarter 1987 and early first-quarter 1988. As a result, end users have begun to dump their 3178 monochrome displays into the secondary market. Thus, used market prices for IBM's entry-level display family have fallen dramatically.

IDC Financial Services says values for the 3178 family of displays will continue to decline throughout this year. However, the company says it does not expect prices to fall as quickly as they have during the previous four months.

Like the 3178 family, the secondary market value for the 3180 Model 100/110 has dropped significantly since the start of the year; in fact, the Model 100/110's used value has fallen approximately $300 since January.

Reasons for decline

According to third-party market dealers, the recent fall in the 3180 Model 100/110 used market may be attributed to the following three factors:

- The 3192 Model D replacement product.
- The expiration of three-year leases.
- Aggressive third-party market pricing.

IBM terminal products

Current retail fair market value

	Date shipped	IBM list price	Percent of list price
3179 Model 1	1Q 1984	$2,095	31%
Model 200	4Q 1985	$1,335	86%

* Not available

INFORMATION PROVIDED BY IDC FINANCIAL SERVICES CORP.
CW CHART

According to experts, each of these three factors contributed to the significant loss in value of the Model 100/110 during the past four months.

The 3179 Model 1 used market has taken a nosedive as of late. Current market quotes indicate the 3179 has fallen approximately 18%, or $240, in three months.

IDC Financial Services says it expects this deterioration in used value to last as end users continue to swap their older 3179 Model 1 color terminals for the 3192 Model C replacement display.

In general, twinaxial terminals' used values do not drop as quickly as coaxial terminals on the secondary market.

For example, the 3180 Model 200 twinaxial terminal has not yet fallen as quickly as its counterpart, the 3180 Model 100. IDC Financial Services' April fair market values indicate a 9%, or $90, drop in 3180 Model 200 secondary market value since January as compared with a $300 fall in 3180 Model 1 used prices in that same period of time.

Long drop

IDC Financial Services says it expects this decline in the 3180 Model 200 to persist as users continue to dump their older Model 200s into the secondary market and replace them with 3197 Model Ds.

Contrary to the 3179 Model 1's used market, which has dropped 18% since the start of the year, the twinaxial 3179 Model 2 has experienced only minimal decline during the past few months. For example, IDC Financial Services' April fair market values show the 3179 Model 2 trading used for $1,160 retail, down only 4% since January.

For more information, contact IDC Financial Services Corp.'s Terri LeBlanc at 617-872-8200.

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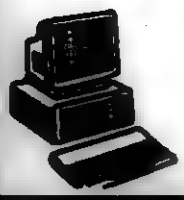

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Request for Proposal No. 1348, due Monday, May 9, 1988 at 3:30 p.m. for the acquisition of maintenance on microcomputer equipment and peripherals for the Procurement Division of the CENTRAL DATA PROCESSING AUTHORITY. No charge.

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4331-2	0.50	1 to 4
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S/38-400	0.75	8 to 8
9375-60	0.76	8 to 16
4341-1	0.88	2 to 4
S/38-600	0.99	8 to 16
S/38-700	1.1	16 to 32
4381-11	1.4	4 to 16
4361-5	1.45	2 to 12
4341-2	1.5	2 to 16
9377-80	1.8	8 to 16
4341-12	1.85	2 to 16
†4381-21	2.1	8 to 16
4381-1	2.1	4 to 16
4361-2	2.7	4 to 32
4381-12	2.7	8 to 32
†4381-22	3.1	16 to 32
4381-13	3.6	8 to 32
3083EX	4.4	8 to 32
4381-3	4.5	8 to 32
†4323-23	4.7	16 to 64

SYSTEMS	MIPS (Millions of Instructions Processed Per Second)	MEGABYTES
*4381-91E	4.7	16 to 64
3033UP	5.0	4 to 24
4381-14	5.5	16 to 32
3083BX	5.5	8 to 32
#3090-120E	7.5	32 to 64
†4381-24	7.5	16 to 64
*4381-92E	7.5	16 to 64
3083JX	8.0	8 to 32
3090-150	8.2	16 to 64
3081D	8.3	16 to 32
3090-[illegible]E	10.0	32 to 64
3081GX	11.0	16 to 64
3090-1[illegible]	15.5	32 to 64
3083JXX	15.5	16 to 64
3090-[illegible]	15.5	32 to 64
3090-[illegible]	27.0	64 to 128
3084QX	27.0	32 to 128
3090-2[illegible]	31.0	64 to 128
3090-[illegible]E	44.0	64 to 128
3090-400	50.0	128 to 256
3090-400E	56.0	128 to 256
3090-500E	67.0	128 to 256
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5840	8.2	32 to 128
5850	11.6	32 to 128
5860	14.0	16 to 128
5867	20.0	24 to 128
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5870	21.7	32 to 128
5880	22.0	32 to 256
5890-190E	22.0	64 to 256
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Effectively marketing advanced user training

BY NAOMI KARTEN
SPECIAL TO CW

Advanced training can be a more complex undertaking than introductory training. Trainers can focus more on content and less on relieving anxiety. Course material is more sophisticated, and students are at a level at which they ask tougher questions. To market advanced training effectively, it is important to take these distinctions into account.

Promotion is important for all levels of training, but it is only one component of a marketing effort. Marketing includes three other broad groups of activities: identifying customer needs, formulating products to meet the needs and evaluating the products' success.

With introductory training, marketing that focuses strictly on getting the word out may be adequate. But people who have attended introductory classes often do not perceive the need for more advanced training. Therefore, it is important to identify users' specific needs.

The key is to work both with and through user management. This approach ensures that training meets real business needs, rather than assumed needs, and increases user management's commitment to training.

It may also provide some insight into ways in which introductory training can be improved or targeted more precisely to business needs. Identifying user needs should be an ongoing activity.

An important aspect of formulating courses and training material is assessing the "look and feel" of training that will work best with advanced users. The pacing of classes should allow students to move along at a comfortable speed. Advanced students are usually eager to "give it a try" and course material should give them ample opportunity to do so. Trainers should consider the feasibility of training in which students work at their own pace, seeking help from trainers when needed.

By the time students are ready for advanced training, they do not need help in learning so much as they need management-sanctioned time to learn. Therefore, their training may be more loosely structured and more student-driven than novice training.

Measuring the success of advanced training is as important as measuring the success of introductory training — and it is as rarely done. Evaluation forms may adequately describe students' level of satisfaction with a course, but the evaluations are not a measure of whether the material will be retained and, more importantly, used.

Following up with students 30 to 60 days after a class almost always yields useful information. It may be that students are applying the material in unforeseen ways; knowing this fact can help trainers sell their successes to management. It may be that students are faltering in applying the material and that adjustments need to be made in course content or delivery. It may be that students have not been given time to use what they have learned, suggesting a failure to sell the value of the class to user management. Or it may be that the class was not presented well.

Since word of mouth is the most effective marketing technique, news of a poorly delivered class will spread quickly. And the most well-designed class will be of little value if no one shows up.

Karten is president of Karten Associates in Randolph, Mass.

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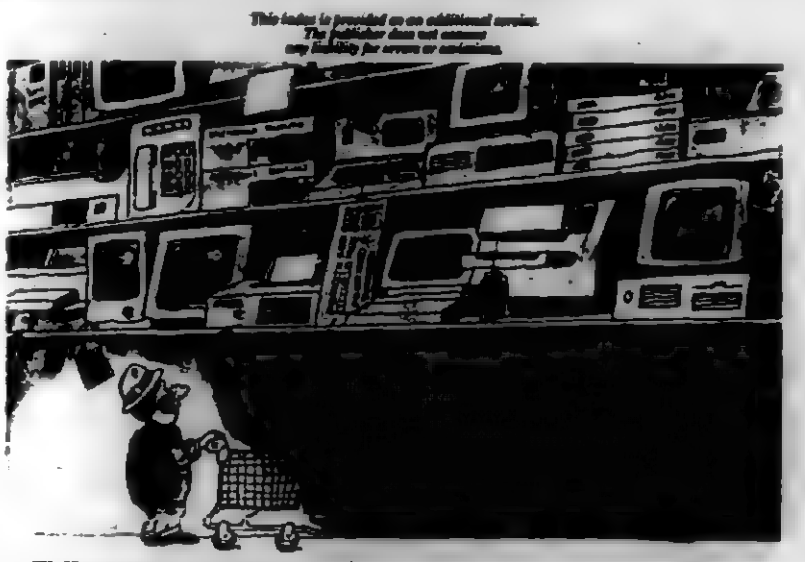

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Aug. 29	DB2 Market	Aug. 12
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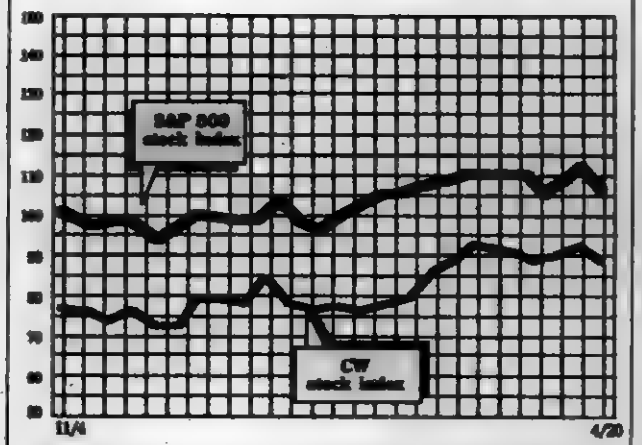
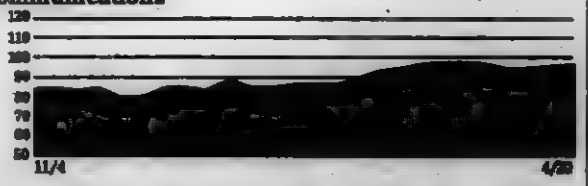
Sept. 26	Hardware Roundup: Small Scale Systems	Sept. 9
Oct. 3	Hardware Roundup: Personal Computers and Workstations	Sept. 16
Oct. 17	AI/Expert Systems	Sept. 30
Oct. 31	Unix	Oct. 14

STOCK TRADING INDEX

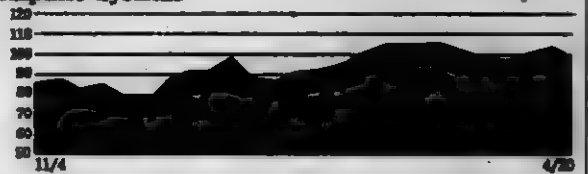


Indexes	Last Week	This Week
Communications	96.6	92.7
Computer Systems	104.5	99.3
Software & DP Services	103.0	98.3
Semiconductors	69.5	65.7
Peripherals & Subsystems	93.8	89.7
Leasing Companies	122.2	116.9
Composite Index	93.5	89.2
S&P 500 Index	113.0	107.0

Communications



Computer Systems

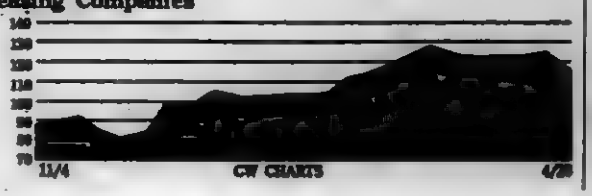


Software and DP Services

Semiconductors

Peripherals and Subsystems

Leasing Companies



CW CHARTS

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, APRIL 20, 1988

EXCH		52-WEEK RANGE (1)		PRICE CLOSE APRIL 20 1988	WEEK NET CHANGE	WEEK PCT CHANGE
	Communications and Network Services					
N	AMERICAN INFO TECHN CORP	100	74	88.13	-5.9	-6.5
N	ANDREW CORP	16	11	13.25	-0.5	-3.6
O	ARTEL COMM CORP	3	2	2.13	0.1	5.3
N	AT&T	38	29	36.50	-1.5	-5.4
O	AVANT GARDE COMP INC	3	2	1.50	-0.1	-7.7
O	AVANTEK INC	17	8	8.63	-0.8	-10.2
N	AYDIN CORP	26	16	22.38	-1.9	-7.7
N	BELL ATLANTIC CORP	60	51	54.63	-4.4	-8.3
N	BELLSOUTH CORP	44	35	37.88	-1.9	-4.7
O	COMPRESSION LABS INC	7	2	3.13	-0.3	-7.4
O	COMPUTER NETWORK TECH	6	1	1.38	-0.1	-4.8
O	CONTEL CORP	40	25	33.50	-1.8	-4.8
O	DATA SWITCH CORP	10	4	7.88	-0.9	-10.0
O	DIGITAL COMM ASSOC	40	20	30.88	-1.8	-5.0
O	DYNATECH CORP	22	14	22.00	0.5	2.2
O	FIBRONICS INTERNATIONAL INC	6	2	3.88	-0.3	-8.1
O	GANDALF TECHNOLOGIES	10	5	7.38	0.0	0.0
O	GENERAL DATACOMM INDS	14	3	3.63	0.1	2.8
N	GTE CORP	46	29	34.88	-1.9	-5.1
N	INFOTRON SYS CORP	12	5	9.50	-0.8	-7.3
N	ITT CORP	66	42	46.38	-2.4	-5.0
N	M A COM INC	16	7	9.75	-0.9	-8.2
O	MCI COMMUNICATIONS CORP	13	6	13.00	0.1	1.0
N	MICOM SYS INC	17	7	13.50	0.4	2.9
O	NETWORK SYS CORP	14	7	8.88	-1.1	-11.3
N	NORTHERN TELECOM LTD	24	14	18.00	-0.9	-4.8
O	NOVELL INC	30	12	19.75	-1.5	-7.1
N	NYNEX CORP	78	58	62.38	-3.5	-5.3
N	PACIFIC TELESIS GROUP	34	22	27.38	-1.8	-6.0
N	PARADYNE CORP	9	4	4.63	-0.1	-2.6
A	PENRIL CORP	5	1	4.13	0.0	0.0
N	PLESSEY PLC	40	23	30.00	1.5	5.3
N	SCIENTIFIC ATLANTA INC	28	8	15.00	-0.3	-1.8
N	SOUTHWESTERN BELL CORP	46	32	34.88	-1.8	-4.8
O	3 COM CORP	28	13	18.63	-0.9	-4.5
O	TIMEPLEX INC	40	17	22.30	0.0	0.0
N	UNGERMANN BASS INC	16	5	12.00	-0.1	-1.0
N	U S WEST INC	63	43	51.00	-2.1	-4.8
	Computer Systems					
O	ALLIANT COMPUTER SYS	38	8	7.50	-0.3	-3.2
O	ALPHA MICROSYSTEMS	6	3	5.25	-0.1	-2.3
O	ALTOS COMPUTER SYS	15	9	9.38	-0.9	-8.5
A	AMDAHL CORP	58	19	36.38	-0.5	-1.4
O	APOLLO COMPUTER INC	28	9	14.38	-1.4	-8.7
O	APPLE COMPUTER INC	60	36	39.75	-1.5	-3.6
N	BOLT BERANEK & NEWMAN	35	12	18.63	0.0	0.0
O	BRITTON LEE INC	5	1	1.88	-0.3	-11.8
N	COMPAQ COMPUTER CORP	79	31	51.25	-2.9	-5.3
O	COMPUTER AUTOMATION INC	17	6	11.88	-0.6	-4.8
O	COMPUTER CONSOLES INC	11	2	7.38	-0.3	-3.3
O	CONCURRENT COMP CORP	24	11	17.50	-0.5	-2.8
N	CONTROL DATA CORP DEL	36	16	23.75	-2.8	-10.4
O	CONVERGENT TECH	9	3	3.19	0.1	4.1
O	CONVEX COMPUTER CORP	20	6	7.25	-0.5	-6.5
N	CRAY RESH INC	135	47	79.38	-4.6	-5.5
O	DAISY SYS CORP	16	5	8.13	-0.3	-3.6
N	DATA GEN CORP	37	16	23.25	-1.1	-4.5
N	DATAPOINT CORP	9	3	5.25	-0.3	-4.5
N	DIGITAL EQUIP CORP	200	98	101.00	-7.4	-6.8
N	FLOATING POINT SYS INC	13	3	4.25	-0.3	-6.6
N	GOULD INC	24	8	11.00	-0.9	-7.4
N	HARRIS CORP	43	22	29.63	-1.5	-4.8
N	HEWLETT PACKARD CO	74	38	61.63	-2.9	-4.5
N	HONEYWELL INC	91	48	69.00	-0.3	-0.4
N	IBM	178	102	112.88	-3.3	-2.8
O	INFORMATION INTL INC	14	8	12.75	-0.3	-1.9
O	IPL SYS INC	3	1	1.63	-0.6	-27.8
O	MASS COMPUTER CORP	14	4	4.88	-0.1	-1.3
N	MATSUSHITA ELEC INDL LTD	228	103	221.75	-5.0	-2.2
O	MEGADATA CORP	6	3	3.00	-0.1	-4.0
O	MENTOR GRAPHICS CORP	30	14	28.13	-1.8	-6.8
N	NBI INC	14	4	5.38	-0.8	-12.2
N	NCR CORP	97	60	88.75	-3.8	-4.0
N	PRIME COMPUTER INC	31	12	16.63	-1.4	-7.8
O	PYRAMID TECHNOLOGY	12	5	12.00	0.5	4.3
O	STRATUS COMPUTER	41	15	28.00	-2.0	-7.4
O	SUN MICROSYSTEMS INC	48	14	27.13	-1.1	-2.9
O	SYMBOLICS INC	5	1	1.75	0.0	0.0
N	TANDEM COMPUTERS INC	37	16	18.75	-1.1	-5.3
N	TANDY CORP	57	28	43.13	-1.0	-2.3
N	ULTIMATE CORP	37	13	13.50	-0.9	-6.1
N	UNISYS CORP	48	24	32.38	-2.6	-7.8
A	WANG LABS INC	16	10	11.50	-0.4	-3.2
	Software & DP Services					
O	ADVANCED COMP TECH	8	1	1.50	-0.1	-4.0
N	ADVANCED SYS INC	36	18	18.00	0.0	0.0
N	AGS COMPUTERS INC	30	11	17.38	0.1	0.7
O	AMERICAN MGMT SYS INC	20	9	16.38	0.5	3.4
O	AMERICAN SOFTWARE INC	20	6	13.00	-0.8	-5.5
N	AMACOMP INC	11	4	9.50	-0.5	-5.0
O	ANALYSTS INTL CORP	10	4	7.25	0.0	0.0
O	ASHTON TATE	33	13	27.25	-2.5	-8.4
O	ASK COMPUTER SYS INC	16	6	13.75	0.3	1.9
O	AUTODESK INC	34	12	25.75	-2.1	-7.5
N	AUTO DATA PROCESSING	65	16	40.88	-3.5	-7.9
O	BOOLE & BABBAGE INC	12	5	7.75	0.0	0.0
N	COMPUTER ASSOC INTL INC	37	16	26.75	-2.9	-9.7
O	COMPUTER HORIZONS CORP	15	7	11.13	0.6	6.0
N	COMPUTER SCIENCES CORP	73	42	42.50	-3.5	-7.6
N	COMPUTER TASK GROUP INC	17	9	11.50	0.6	5.7
O	COGNOS INC.	17	4	7.13	0.1	1.8
O	COMSHARE INC	30	12	17.50	0.3	1.4
N	CULLINET SOFTWARE INC	14	4	7.00	-0.8	-8.7
O	DUQUESNE SYS INC	32	10	19.50	0.5	2.6
A	DATA ARCHITECTS INC.	16	7	13.75	0.0	0.0
N	GENERAL MTRS (CL E)	81	30	41.25	-1.5	-3.5
O	HOGAN SYS INC	17	4	4.25	-0.4	-8.1
O	INFORMIX CORP	31	12	19.63	0.6	3.3
O	INTELLICORP INC	11	2	3.00	-0.1	-4.0
O	KEANE INC	10	6	9.50	1.0	11.8
O	LOTUS DEV CORP	40	19	23.00	-2.3	-9.9
O	MANAGEMENT SCI AMER	18	6	7.38	-0.3	-3.3
O	MICRO PRO INTL CORP	8	3	2.63	-0.2	-6.7
O	MICROSOFT CORP	79	37	64.50	-2.5	-4.4
O	MORINO ASSOCIATES INC	24	7	16	0.4	2.8
O	NATIONAL DATA CORP	34	19	38.88	-1.1	-3.8
O	ON LINE SOFTWARE INTL INC	22	9	9.88	-0.1	-1.3
O	ORACLE SYS CORP	19	8	15.50	-1.5	-8.8
N	PANSOPHIC SYS INC	26	11	16.88	-0.5	-2.9
O	POLICY MGMT SYS CORP	30	15	23.25	-2.0	-7.9
O	PROGRAMMING & SYS INC	14	7	12.00	-1.8	-12.7
O	REYNOLDS & REYNOLDS CO	38	14	20.38	-1.8	-7.4
O	SEI CORP	19	10	18.25	0.8	4.3
O	SHARED MED SYS CORP	31	19	23.75	-1.5	-5.9
O	SOFTWARE AG SYSTEMS INC	14	7	0.00	-7.0	-100.0
O	SOFTWARE PUBG CORP	17	8	16.25	-0.3	-1.5
A	STERLING SOFTWARE INC	12	6	9.00	-0.4	-4.0
O	SUNGARD DATA SYS INC	21	10	17.25	0.0	0.0
O	SYSTEMATICS INC	32	19	20.75	0.5	1.7
N	SYS. SOFT INC.	24	7	16	0.0	0.0
O	VM SOFTWARE INC	42	7	13.78	0.0	0.0
	Semiconductors					
N	ADV MICRO DEVICES INC	26	8	12.50	-0.6	-4.6
N	ANALOG DEVICES INC	24	8	13.13	-1.3	-8.7
O	ANALOGIC CORP	12	5	7.38	0.1	1.7
O	INTEL CORP	42	16	31.38	-1.3	-3.8
O	LSI LOGIC CORP	17	7	9.75	-0.5	-4.9
N	MOTOROLA INC	74	35	46.63	-1.5	-3.1
N	NATL SEMICONDUCTOR	22	10	12.13	-1.0	-7.6
N	TEXAS INSTRS INC	60	36	40.25	-1.9	-4.5
A	WESTERN DIGITAL CORP	30	11	14.50	-1.5	-9.4
	Peripherals					
O	ALLOY COMP.	13	3	3.75	-0.5	-11.8
N	AM INTL INC	6	3	3.88	-0.1	-2.1
O	AST RESH INC	21	8	15.88	-0.8	-4.5
O	AUTO TROL TECH CORP	8	3	4.63	-0.1	-2.6
O	BANCTEC INC	14	6	8.25	-0.5	-5.7
O	CIPHER DATA PRODS INC	14	4	9.88	-0.1	-1.3
A	COGNITRONICS CORP	5	2	3.38	0.0	0.0
N	COMPUGRAPHIC CORP	38	19	25.75	-0.5	-1.9
A	DATAPRODUCTS CORP	24	7	9.13	-0.5	-5.2
A	DATARAM CORP	8	5	7.88	0.0	0.0
N	DECISION INDS CORP	13	4	10.75	0.1	1.1
N	EASTMAN KODAK CO	71	39	49.00	-2.6	-5.2
O	E M C CORP MASS	29	10	13.75	-0.5	-3.5
O	EMULEX CORP	9	4	8.13	-0.3	-3.6
O	EVANS & SUTHERLAND	25	16	18.38	-2.5	-12.0
O	IDOT CORP	8	3	3.80	-0.4	-9.7
O	INTERLEAF INC	24	11	18.25	-0.1	-0.7
O	IOMEGA CORP	9	1	3.88	-0.3	-8.0
O	LEE DATA CORP	8	3	3.63	-0.3	-8.6
O	MASSTOR SYS CORP	8	1	2.88	-0.4	-11.5
O	MAXTOR CORP	23	6	14.63	-0.6	-4.1
O	MICROPOLIS CORP	44	18	23.75	-1.5	-5.9
O	MINISCRIBE CORP	16	5	11.50	-0.5	-4.2
N	MINNESOTA MNG & MFG CO	84	46	68.88	-2.1	-2.9
A	MSI DATA CORP	19	9	16.50	-0.5	-2.9
Q	PERSONAL COMPUTER PRODUCTS INC.	7	4	6.13	0.1	2.1
O	PRIAM CORP	5	1	2.00	0.0	0.0
N	PRINTRONIX INC	12	7	8.88	0.0	0.0
N	QMS INC	27	8	10.13	-0.1	-1.2
O	QUANTUM CORP	28	8	11.00	-0.5	-4.3
O	RAMTEK CORP	8	4	1.38	0.0	0.0
N	RECOGNITION EQUIP INC	22	7	8.75	-0.5	-5.4
O	REXON INC	14	5	8.13	-0.3	-3.6
O	SCAN TRON CORP	17	7	14.38	-0.1	-0.6
O	SEAGATE TECHNOLOGY	46	10	18.38	-3.6	-16.5
N	STORAGE TECH CORP	5	1	1.63	-0.3	-13.3
O	TANDON CORP	7	1	2.25	-0.3	-12.2
A	TEC INC	7	3	4.75	-0.1	-2.6
N	TEKTRONIX INC	41	21	28.13	-1.9	-6.9
O	TELEVIDEO SYS INC	3	1	1.25	0.0	0.0
O	TELEX CORP	88	39	48.63	-0.8	-1.8
N	WYSE TECH	40	11	19.13	-1.0	-5.0
N	XEROX CORP	85	60	62.13	-2.9	-4.1
O	XIDEX CORP	16	6	8.13	-0.6	-7.5
	Leasing Companies					
O	CAPITAL ASSOCIATES INTER-NATIONAL INC	11	4	4.88	-0.1	-1.3
N	COMDISCO INC	37	12	21.25	-0.1	-0.1
O	CONTINENTAL INFO SYS	14	6	7.75	-0.1	-1.8
O	PHOENIX AMERN INC	6	2	2.88	-0.1	-4.2
O	SELECTERM INC	8	3	4.25	-0.3	-6.6

EXCH: N—NEW YORK; A—AMERICAN; O—NATIONAL; O—OVER-THE-COUNTER; S—SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. ON LAST MD

Mixed bag

Futures trading turbulent; Tandy thrives, DEC in dumps

A late-week round of futures-related trading canceled out earlier gains and later losses, causing the market to close mixed on Thursday and raining on the parade of technology industry stocks that got early boosts from generally strong first-quarter earnings.

Tandy Corp. walked away from the week a winner, up 2⅝ points to 45¾ on the strength of introductions of an IBM Personal System/2 clone and a read-write optical storage technology product. IBM, riding the wave of its surprising first quarter started the week at 114⅛ points but dropped to 112⅛ by Thursday's close.

Apparently unaided by the well-received rollout of a new line of VAXs and the long-awaited enhancements of its VMS operating system, Digital Equipment Corp. dropped to below $100 per share at Thursday's close to 99⅜ — almost 10Q points below its 52-week high of 199½.

Robust quarterly reports notwithstanding, Sun Microsystems, Inc. closed down ⅝ of a point; Apollo Computer, Inc. was down 1⅜; Lotus Development Corp. dropped 1¼; and Apple Computer, Inc. closed at 39½ — exactly where it opened.

NELL MARGOLIS

DB2

FROM PAGE 1

He said IMS Full Function and IMS Fast Path should be reserved for the heaviest transaction processing loads, those requiring several hundred to 1,000 transaction/sec.

At the same time, IBM officials announced that the ESA operating system will be the focus of future development for both IMS and DB2, giving a broad segment of the IBM customer base a shove toward its highest powered, highest priced products — the ESA operating system and the E series of the 3090 mainframe line.

"All future enhancements to IMS 2.2 will be done in the ESA environment only," said Bill Wilson, group director of IBM's large systems management in Rye Brook, N.Y.

MVS/ESA was announced in February as Version 3.0 of MVS/SP, the core MVS operating system (Version 2.0 was MVS/XA). The first part of ESA will become available in August, with the Data Facility Product piece becoming available at the end of the year. Its benefits were only superficially glimpsed at the time, but it is now evident that ESA and DB2 are developing in lockstep, one observer said.

Twin killing

ESA expands the virtual memory available by a factor of 8,000; it also reduces the importance to a DB2 programmer of knowing where data is located.

"If you have an ESA system in operation 24 hours a day with uninterruptible power, DB2 could load a data base into main memory at the start of the week, unload it at the end of the week, and nobody would be the wiser," said Per O. Flaatten, a technology researcher at Arthur Andersen & Co. in Chicago.

IBM tagged the performance gain with Version 2.0 at 51% over its predecessor, Release 1.3, announced a year ago. But the increase is likely to be viewed as much greater by most customers, if they can come within hailing distance of the 186 transaction/sec. cited by IBM.

Most DB2 users have found their applications stay below the 47 to 52 transaction/sec. benchmarked by IBM when Release 1.3 was first announced in May 1987. More recently, IBM engineers under lab conditions boosted DB2 Version 1.3 throughput up to 123 transaction/sec. by using almost all the capacity of a 3090 Model 600E.

The claim of a 51% increase for Version 2.0 is thus a conservative one based on a comparison with the highest lab test figure for its predecessor. To users currently in the 40 to 45 transaction/sec. range, the increase, if approximated in their applications, would appear closer to 300% or 400%.

The 186 transaction/sec. figure met both praise and skepticism from users. "It appears to be a very significant performance improvement," said Ed McDonald, information processing division manager of Texaco, Inc.

The announcement, in fact, provided a much larger transaction figure. The 186 transaction/sec. figure was cited for a "typical" transaction environment. The typical transaction consisted of 12 SQL calls and seven physical I/Os. Version 2.0 also executed up to 438 transaction/sec. for the simpler credit authorization transaction consisting of one SQL call, one or two updates and a write, said Gary J. Ferdinand, IBM's manager of advanced data base products.

"There are too few large applications in use today to tell whether a lab benchmark is representative," Arthur Andersen's Flaatten said.

Speed levels

Russell Donovan, IBM's data base products marketing manager, said the largest IMS Full Function customers process 75 to 80 transaction/sec. and that the largest IMS Fast Path customers, such as money center banks, process 178 transaction/sec. IBM has obtained much higher rates in its own laboratory benchmarks.

The efficiencies of the ESA operating system account for about 13% of the DB2 performance gain. Other changes to DB2 include the following:

- Referential integrity in the form of support for foreign and null keys is provided. The data manager now enforces primary and secondary data relationships between records in separate tables rather than leaving the task to the application programmer.
- The DB2 optimizer has been improved to allow more sophisticated access-path selection and reduced need for I/Os.
- The DB2 sort utility has been improved to lower the number of merge passes required on a sort and reduce CPU cycles.
- Batch processing and load utilities have been improved.
- The audit facility can provide an audit trail of DB2 activities and a record of attempted security violations.
- Groups, rather than individuals, can be defined in IBM's security software, RACF, and the definitions passed into DB2.
- A resource limit facility, or governor, is added; it limits the CPU resources taken by a dynamic SQL query. A data base administrator may specify a maximum for all queries or how long one user's queries may run.

Version 2.0 is expected to be available in October for a monthly license charge of $3,600.

Midwest correspondent Jean S. Bozman contributed to this report.

Zenith adds 386-based laptop

BY ALAN J. RYAN
CW STAFF

NEW YORK — A battery-powered laptop based on Intel Corp.'s 80386 processor highlighted Zenith Data Systems' announcement of three portables last week.

Zenith, along with NEC Corp. and Toshiba Corp., has captured a large share of the laptop market by packing desktop power into increasingly small machines.

Although laptop sales are surprisingly low when compared with conventional desktop personal computers, their numbers are growing, according to Bruce Stephen, an analyst with International Data Corp. (IDC) in Framingham, Mass. IDC estimates that 370,000 IBM and compatible laptops shipped in 1987, a figure that was sizable compared with the previous year, Stephen said. "It's not a huge market yet, but [1987] was a healthy year for laptops, and we expect this year to be the same," he said.

The Zenith laptops are the Turbosport 386, the Intel 80286-based Supersport 286 and the Intel 8088-based Supersport.

The Turbosport 386, set to be available in June for $7,999, features Zenith's high-contrast Page White display.

Additionally, the 12.5-MHz Turbosport offers a battery-operable 40M-byte hard disk drive. The machine also sports a 1.44M-byte 3½-in. floppy disk drive. The Power-Miser hard disk, developed by Zenith and Conner Peripherals, Inc. in San Jose, Calif., consumes approximately one-third less power than previous drives, according to Zenith President John Frank.

The 386-based portable, with a battery life of more than two hours, weighs less than 15 pounds without the battery, comes with 2M bytes of memory and is expandable to 3M bytes, Zenith said. Turbosport will also be available with an internal 2,400 bit/sec. modem for $8,499.

The features

All three portables have serial and parallel ports, external video output, a numeric keypad port, an external disk drive port, an expansion chassis connector, an internal modem slot and a math coprocessor socket. The 12-MHz Supersport 286 will be available with a 40M- or 20M-byte hard disk drive, selling for $5,599 and $4,999, respectively. Both versions will be available in May, the company said.

The 286-based model offers one 1.44M-byte 3½-in. floppy disk drive and 1M byte of random-access memory expandable to 2M bytes with both Lotus/Intel/Microsoft Expanded Memory Specification and extended memory capabilities.

The third offering, available in an 8- or 4.77-MHz 8088-based version, is the Supersport. A dual 720K-byte 3½-in. floppy disk drive model is available for $2,399, and a 20M-byte model will sell for $3,599.

Lapping it up

In 1987, Zenith was the second largest supplier in the still relatively small market for IBM-compatible laptops

INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

The changing face of MVS

IBM is making sweeping upgrades on its major MVS subsystems, including IMS, TSO, JES2, JES3 and Data Facility Hierarchical Storage Manager (DFHSM), to make greater use of virtual memory and automatic memory management under its MVS/ESA operating system, company officials said last week.

In addition to actual subsystem functions, said Jim Henderson, IBM director of Application Enabling Software, the upgrades also provide large MVS users with virtual memory constraint relief by taking advantage of ESA's data space virtual memory.

IMS/VS Version 2.2 uses ESA hiperspaces — virtual memory data spaces reserved for specific functions — as extensions on the current VSAM buffer pool. Hiperspaces may be located in internal expanded storage, where their swift response time and elimination of the need for I/O speeds system operation.

The new version is planned for general availability in December at no change in price, according to IBM.

TSO/E has been given support for Rexx, a procedural language that is easier to code than Clist.

TSO/E has also been given the capability to use the Virtual Lookaside Facility to reduce data set I/O and direct-access storage device contention.

TSO/E Version 2.0 is scheduled to be available in the fourth quarter of this year at a monthly license charge of $700 or a one-time charge of $21,000 to $33,600, depending on processor size.

DFHSM Version 2.4 allows a storage administrator to logically manage data at the smaller data set level rather than the file or volume level, Henderson said.

DFHSM is scheduled to be available Dec. 30 at a monthly license charge of $800 or a one-time charge of $24,000 to $38,400.

JES2 Version 3 Release 1.1 and JES3 Version 3 Release 1.1 and 1.2 will be given the capability to be dynamically reconfigured rather than shut down for new configuration parameters, Henderson said.

JES2 and JES3 are set to be available in December at monthly license charges of $4,800 and $5,400, respectively. Their one-time charges will range from $163,200 to $259,200 for JES2 and $183,000 to $291,600 for JES3.

CHARLES BABCOCK

Hungry users drive RISC demand

BY JULIE PITTA
and ED SCANNELL
CW STAFF

NEW YORK — RISC technology took another leap forward in its bid to become an alternative processor technology with the announcement of Motorola, Inc.'s 88000 series of reduced instruction set computing chips.

More than 20 vendors have signed up to use Motorola's RISC microprocessors, including Data General Corp. (see story below). The insatiable appetites of workstation and supermini users for powerful systems has spurred the growth of RISC technology.

"RISC is tailored for high-speed operations," said Alice Leeper, an industry analyst at Dataquest, Inc. "We're seeing an ever growing demand for more megahertz and MIPS."

Fulfilling potential?

Although more expensive than Motorola's current line of microprocessors and Intel Corp.'s microchip sets, RISC can offer system designers the possibility of better value because of its performance potential and the relatively simple architecture.

Last week's announcement places Motorola in competition with one of its largest customers, Sun Microsystems, Inc., which is promoting its own version of RISC called Scalable Processor Architecture (Sparc).

Sun released Sparc last year and has since licensed its technology to such vendors as Xerox Corp., Unisys Corp. and AT&T. Apollo Computer, Inc., Hewlett-Packard Co. and IBM use internally developed RISC microprocessors in their workstations.

"On the surface, there are an awful lot of players right now," said Rich Edwards, senior industry analyst at Robertson, Colman & Stephens. "But it should shake out to two or three players." He predicted that Motorola's RISC processors and Sun's Sparc will dominate the market.

Will Apple bite?

Motorola's largest customer, Apple Computer, Inc., has not committed to RISC technology. However, industry observers say Apple will eventually offer a RISC system to compete against vendors like Sun in the higher end workstation market.

Motorola's 88000 series, which performs at between 14 and 17 million instructions per second (MIPS), includes the 88100 and 88200 Cache/Memory Unit. The latter product offers a single-chip approach to cache memory design, a critical element in RISC-based systems, a spokesman said.

Along with the 88000 chip, Motorola also introduced Hypermodules, a series of 88000 multiprocessor boards that provide up to 50 MIPS on a single board.

DG earnings do about-face

WESTBORO, Mass. — Data General Corp. reported net income last week of $17.2 million for its second quarter ended March 26, a marked contrast to the $42.6 million net loss for the comparable quarter last year. Sales were up 10.9% from last year's $315.2 million to $349.7 million.

"The only problem with the picture is that [profit] includes a $5.9 million nonrecurring gain from the sale of a company building — so it's not as good as it looks," said Joseph Payne, who follows DG at Alex Brown & Sons, Inc. in Baltimore.

In a prepared statement, DG President Edson de Castro emphasized improved operating income — $20.1 million, or 5.7% of revenue, compared with a $9 million operating loss in the second quarter of 1987.

De Castro noted that "operating income has improved for the third consecutive quarter, primarily as a result of increased shipments and the benefits of cost-cutting measures" implemented last year.

"Another bumpy quarter for Data General," Payne said.

However, he added, "recent indications from the Data General sales force are that better days are coming."

DG in Motorola fold

BY ALAN ALPER
CW STAFF

NEW YORK — Data General Corp. last week disclosed that it will use a reduced instruction set computing (RISC) chip set designed by Motorola, Inc. in a broad series of Unix-based systems it expects to roll out beginning in mid-1989.

The Westboro, Mass.-based firm also said it and Motorola are co-developing an implementation of Motorola's 88000 chip set in emitter-coupled logic (ECL) technology. The ECL chip set would let DG build systems providing more than 100 million instructions per second of raw performance, DG claimed. The set is slated to come out in 1991.

DG declined to sketch out its RISC-based series beyond saying the systems will run DG/UX, its implementation of the AT&T Unix System V and will likely consist of workstations and single- and multiprocessor systems.

DG went to great lengths to emphasize its commitment to the MV/Eclipse hardware platform and the AOS/VS proprietary operating system and said the company is currently developing the next two generations of its MV/Family systems.

MV/Eclipse systems will appeal to many DG customers in the near term because of their functionality and breadth of applications, DG officials said.

But the company is preparing for the day when RISC-based systems fulfill most customer needs. DG is planning to build bridges that would enable MV/Eclipse users to migrate to its RISC-based systems. "That would include common data base management systems and high-level languages," said DG Vice-President of Corporate Marketing Ward MacKenzie.

"Forgetting about the new business opportunities it will provide, we realize that if we don't offer [RISC-based systems], we will lose customers," MacKenzie concluded.

Mistrial

FROM PAGE 1

able using optical technology.

"We discovered that attorneys would come to court with many copies of different documents, because that's what they are used to in preparing for court," explained Warren Slocum, San Mateo County Clerk-Recorder and Administrative Clerk of the Superior Court. As a result, the attorneys were bypassing the optical system and continuing to rely on traditional paper documents.

Most significant, however, was the refusal by many witnesses to testify under oath that the documents shown to them on a display screen were in fact the documents in question, Slocum said. Several witnesses said they were uncomfortable identifying a digital image as a legal document and preferred to see the paper document before testifying to its validity.

Let down

San Mateo County officials and optical storage analysts alike said they were surprised at the disappointing results in this pioneering case.

"It's too bad it didn't work out, because this was a magnificent pioneering effort, well worth the experiment and a little sad that the human aspects of it were not paid a little more attention to," said Dick Zech, president of Zech Tech International, an optical storage consulting firm in San Mateo.

"Most of the controversy surrounding optical has had to do with the validity of evidence once it's been changed from its original medium and stored into a digital medium," Zech said. "This situation moves more to the core of the matter, however: Are people willing to swear under oath that the information they see on the screen is the same information they once saw in the form of paper?"

Shell's lawsuit against dozens of its insurance carriers promised to be an enormous undertaking from the start. With damage claims from toxic waste incidents between 1947 and 1982 involved, the paperwork was overwhelming. San Mateo County converted a closed high school into a courthouse and spent some $314,000 derived from a state automation fund to acquire the system.

Earlier this month, the Filenet system was moved from the courthouse in San Bruno to the San Mateo County Clerk-Recorder offices in Redwood City, where it will begin to take over where microfiche storage left off. Eventually, Slocum said, the system will be integrated into a state-of-the-art courtroom, complete with video and on-line terminals, now under construction.

Documents related to the Shell trial will still be stored on the system, he said. The Filenet system operated in stand-alone mode in the courtroom, as it will in the clerk-recorder offices.

Tandy adds erasable CD

NEW YORK — Tandy Corp. showcased an erasable optical disk last week that is compatible with current compact disk/read-only memory (CD-ROM) and compact audio disk formats and is expected to be available within 18 to 24 months.

The disk will initially be aimed at the consumer audio market, although it is also expected to be used as an erasable mass storage medium for computers.

Like CD-ROMs, digital information is stored on the Thor-CD using a laser beam to create microscopic pits in a light-reflecting surface. Unlike CD-ROMs, the pits can be erased, allowing editing and re-recording on the same disk, the Fort Worth, Texas, company claimed. Tandy could not say how many record and erase cycles Thor-CD would accommodate before its performance would degrade.

Thor-CD is expected to store "hundreds" of megabytes of data by the time storage devices are available early in the 1990s. Thor-CD players and recorders are likely to offer an average access time and data transfer rate comparable to CD-ROMs. Tandy said it was premature to say how much the disk will cost in volume production but claimed it will be less expensive than existing digital audio formats.

ALAN ALPER

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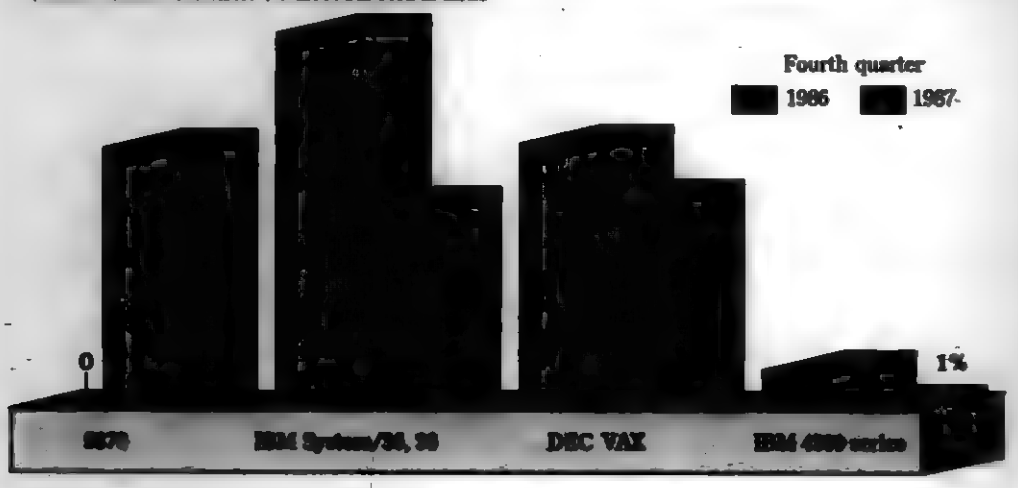
TRENDS

IBM's 9370

IBM's newest mini takes its biggest bite from System/36, 38

PLANNED MARKET SHARE AT U.S. IBM MAINFRAME SITES



Once perceived as IBM's strategic mid-range machine and defender of IBM's accounts against encroachments by Digital Equipment Corp.'s VAX processors, a recent study shows the IBM 9370 to be generating little enthusiasm and winning virtually no market share against DEC.

Recent statistics compiled by Focus Research Systems, Inc. in West Hartford, Conn., support the conclusion that IBM's 9370 is off to a rocky start.

Focus Research followed up on interviews it did a year ago to determine 9370 buying intentions and found that 35% of those sites had reconsidered and decided not to purchase the 9370.

Historically, the fulfillment rate for planned hardware purchases is more than 80%, according to Focus Research.

Educational institutions, software vendors and state and local governments make up 40% of the total number of 9370 sites, and many of these sites are being given special trial arrangements by IBM, Focus Research said.

Only one site interviewed by the research firm had purchased more than one system.

In addition, 85% of all sites have not distributed the processor outside of the MIS department.

This runs counter to the kind of use for which IBM has said the machine is best suited — departmental computing.

Two-thirds of the sites said the 9370 was a stand-alone machine and was not networked to another machine. On the plus side, however, most 9370 users said they were satisfied with the machine.

STANLEY GIBSON

Businesses hedge on buying plans

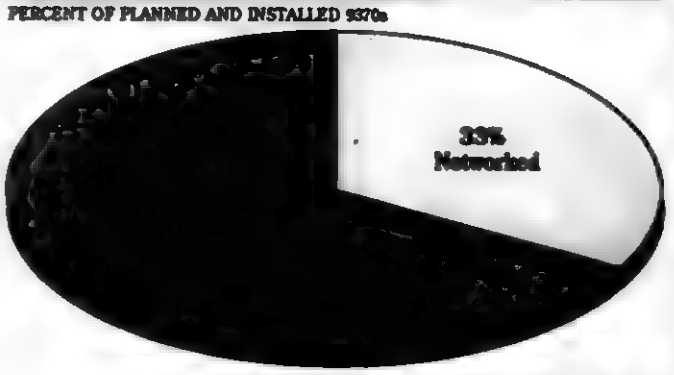
PERCENT OF USERS WHO PLANNED PURCHASE

DOS reigns as primary operating system

PERCENT OF PLANNED AND INSTALLED 9370s

Stand-alone use preferred

PERCENT OF PLANNED AND INSTALLED 9370s



INFORMATION PROVIDED BY FOCUS RESEARCH SYSTEMS, INC.
CW CHARTS

INSIDE LINES

Mansi makes Lotus numero uno — in compensation. Microsoft may have eclipsed Lotus as the biggest independent microcomputer software firm, but that didn't keep Lotus President Jim Mansi from climbing to the top spot in *Business Week*'s annual survey of executive compensation, as reported in that magazine's May 2 issue. With a total of $26.3 million from salary, bonuses and stock options in 1987, Mansi's take for the year was equal to 36% of the company's total profit for 1987 and good enough to bump the irrepressible Lee Iacocca, chairman of $26.3 billion Chrysler Corp., into second place.

The employees haven't given up. Computer Corporation of America (CCA) reached a preliminary agreement late Friday with its parent company, Crowntek, Inc. in Toronto, that would allow CCA employees to buy majority ownership of the company. Under terms of the agreement, which has not been finalized, Crowntek would continue to hold a minority position in CCA.

The lawyers must be busy elsewhere. Hewlett-Packard will unveil microcomputer systems at Comdex/Spring '88 in Atlanta, the company confirmed last week. Sources say the HP Vectra line could be extended with a 25-MHz Intel 80386-based desktop and possibly a lower priced Intel 80286-based model. Some users are hoping for a new HP laptop as well. At any rate, the Comdex micro announcements are not expected to involve IBM Micro Channel compatibility. "We have a Micro Channel project in the labs, but we're not positioned to show anything yet," said Bill Johnson, HP's PC marketing manager.

A packet-switching PAC. The Federal Election Commission gave Telenet Communications, the data networking unit of U.S. Sprint, permission to form its own political action committee (PAC). However, according to the "PACs & Lobbies" newsletter, the very complex ruling says Telenet must coordinate its gifts with Sprint's parents, GTE and United Telecom, so that neither parent exceeds the $5,000 limit on PAC contributions. Got that?

Who really has it now? In what could be a preemptive strike against DEC, its much larger rival, Stratus Computer will announce today what it claims is a high-performance relational data base product for on-line transaction processing (OLTP). The product will be based on Sybase technology. Stratus said it will also unveil its strategy for integrating personal computers and workstations into OLTP environments. DEC has been talking lately about its upcoming enhanced OLTP capabilities but has yet to produce anything.

And they say this industry is colorless. A book that attempts to detail the birth of IBM's Systems Application Architecture (SAA), written by Michael Killen, a Palo Alto, Calif., market analyst, is scheduled to be published in mid-June by Harcourt Brace Jovanovich. While attempting to shed light on the conceptualization of SAA, it reads something like the software version of *Raiders of the Lost Ark*. Protagonists' movements are cited in detail as they fly from one IBM installation to another. The author seems smitten by color, as in the original green, red, blue and yellow color scheme for SAA: "Olive-complexioned Mike Saranga — jacket off and looking sharp in his powder-blue shirt — got up and stood by the projector. [Don] Casey may have liked yellow, but Mike apparently liked red. It was on every one of his transparencies."

No standardization here. Amdahl may finally announce its version of IBM's 3380 K Model direct-access storage device (DASD) disk drive. Like National Advanced Systems, which announced that its K Model-type DASD will feature 9½-in. platters — in contrast to IBM's 14-in. ones — Amdahl is likely to announce a 10½-in. platter, according to sources. Sounding like the State Department, Amdahl would not "confirm or deny" the product's introduction in early May or its use of 10½-in. platters.

You could help make News Editor Pete Bartolik as valuable to us as Jim Mansi is to Lotus. Call 800-343-6474 or 617-879-0700 with your tips, or we'll consider his options.

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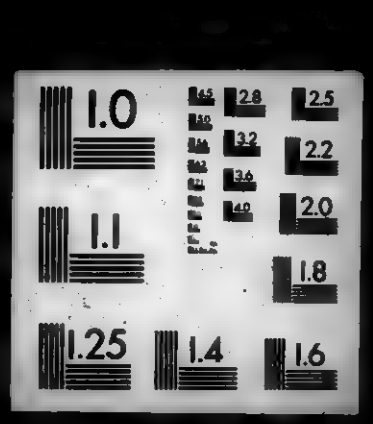
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Dual-bus clone built

Support for both PS/2 and AT cards pledged

BY JAMES A. MARTIN
CW STAFF

EVERETT, Mass. — Microdirect, Inc., a little-known PC vendor, is hoping to make a big splash at Comdex/Spring '88 with an industry first — an Intel Corp. 80386-based microcomputer compatible with both IBM PS/2 Micro Channel and Personal Computer AT buses.

Microdirect's 386 system, slated to be formally unveiled at Comdex next week and shipped in July, was designed to bridge the gap between the PC AT and the PS/2 as well as significantly increase I/O speeds through an

Continued on page 97

Cullinet layoff wave imminent

BY ROSEMARY HAMILTON and NELL MARGOLIS
CW STAFF

WESTWOOD, Mass. — The guillotine is set to fall today at Cullinet Software, Inc.

Although the company offered an official "no comment" and officers declined to return phone calls, a reliable source within Cullinet confirmed that a major layoff of hundreds of employees and several executive departures will be announced this morning along with other belt-tightening measures.

And while industry analysts said this is a necessary move that Cullinet must make to return to profitability, it appears not to be the only problem Cullinet must address. The Cullinet source confirmed last week that a number of products scheduled for release this year have been delayed. However, the delays are believed to involve new releases of existing applications and do not represent serious problems.

The Cullinet source said the company will notify analysts today of a "major restructuring within the company, including some new key vice-presidents." He said at least two executives will resign, including James Fitts, an appointee of former Chairman David Chapman who served as executive vice-president of finance and administration, and David Ireland, senior vice-president of customer support.

The announcement will also include a description of the personnel cutback, which is expected to affect between 400 and 500 people, observers said.

Long time coming

"This is what should have been done in 1985 or 1986," said Charlotte Walker, a vice-president at County Securities Corp. "They tried to maintain capacity while redoing their product line. They should have immediately cut back."

Industry observers said Cullinet may also sell off smaller segments that are not central to the company's business and postpone some development efforts.

Company officials have long maintained Cullinet's high-profile new business segments, such as its banking software and its still-undefined relationship with Digital Equipment Corp., would not be axed. Industry speculation has pointed to at least two segments that may be sliced out of the picture — the Computer

Continued on page 8

Adding it up

Expenses that continue to outpace sales are expected to prompt drastic action by Cullinet

CW CHART

Gene Amdahl returns

Leads third mainframe start-up, targets 3090

BY J. A. SAVAGE
CW STAFF

CUPERTINO, Calif. — Gene Amdahl says his golf game is not good enough to keep him away from the computer business. So by next year, he says, he will be ready to take another swing at IBM's mainframe market with a start-up, Andor Systems, Inc.

Amdahl, associated with one of the greatest successes as well as one of the most spectacular failures in mainframe computing, has been working nights and weekends with his eight-person staff to design a machine to compete most directly with IBM's 3090 Model 150.

This is the third attempt by Amdahl, who was one of the key architects of IBM's 360 system in the 1960s, to wrest IBM's vise grip off some of the mainframe market. He hopes to emulate the success he experienced founding mainframe manufacturer Amdahl Corp. in the 1970s rather than the fiasco of the later Trilogy Systems Corp.

Gene Amdahl

Amdahl said the as-yet-nameless computer will run between 7.5 and 10 million instructions per second using IBM's MVS, will cost very little to manufacture and will be priced about 15% less than the 3090.

The computer, which Amdahl jokingly refers to as "K2" (a mountainous allusion to the "Summit" code name of IBM's next mainframe generation), will be only about 24 by 24 in. and shallow.

"You want the base to be broad enough so it won't tip over, of course," Amdahl said.

Continued on page 16

True compatibility

BY KATHY CHIN LEONG
CW STAFF

He was the director of information systems at Morton Thiokol, Inc. She, the director of systems development at Avon Products, Inc.

And, building on a common love of technology and systems strategy, an MIS romance was ignited — nearly eight years ago in Palm Springs, Calif., at a Diebold, Inc. conference for information systems directors.

"We met over dinner with a group of people from the seminar, and we found that we had a lot of similar interests," recalls John Hammitt, now vice-president of information systems management at Pillsbury Co.

"There was just that immediate rapport, a sense of feeling at ease and comfortable," concurs his wife, Joanne Pisani. During the next three years, Hammitt and Pisani, now an MIS consultant at Coopers & Lybrand, courted and corresponded from their respective homes in Chicago and New York. They were married in 1983 and now live in Minneapolis.

Who says love and technology don't mix? It is fairly common for people in the same profession to meet each other

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Quotable

"We will be a mosquito on the side of IBM. But we hope to be one that's satiated with blood."

GENE AMDAHL
ANDOR CORP.

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NEWS

Glasnost eases high-tech move into Soviet Union

BY CLINTON WILDER
CW STAFF

FRAMINGHAM, Mass. — The world's largest nation has never been noted for computer use, but this is rapidly changing under Soviet Union leader Mikhail Gorbachev's *glasnost* economic policies.

The easing of government control under *glasnost* has allowed computers to gain some momentum in the USSR, according to Eugene N. Salnicov, director of Moscow-based Radio I Sviaz Publishers. Last week, Salnicov signed an agreement here with IDG Communications, Inc. to jointly publish the USSR's first computer magazine, *PC World USSR*.

IDG Communications is a publishing group that includes *Computerworld*, *PC World*, *Infoworld* and more than 100 computer-related publications in 36 countries.

'Indirect consequence'

"When we didn't have *glasnost*, we still had new technology," Salnicov said through an interpreter. "But the new economic theory means easier introduction of new technology. It has been an indirect consequence."

In addition to sparking interest in personal computers, *glasnost* paved the way for *PC World USSR* by granting Soviet publishing houses autonomy over what they can report.

Soviet government representatives are members of Radio I Sviaz's editorial group, and Salnicov was accompanied on his U.S. tour by a representative of the USSR State Committee for Publishing. But Radio I Sviaz does not rely solely on government information. "We can collect information from all over society," Salnicov said. "The main thing is that it should be reliable and interesting information. We must assure the accuracy of the information."

Salnicov said the Gorbachev government has been emphasizing the increasing use of computers. There are about 100,000 PCs in the USSR, about 20,000 of those in Moscow, according to the Soviet Embassy in Washington, D.C. Many are IBM machines, and IBM maintains a Moscow office.

Starting as a quarterly publication and debuting next month, *PC World USSR* will cover the use of microcomputers in education, government and trade. Articles will focus on new technology developments in the USSR and overseas.

IBM devises U.S., Europe data transfer

BY PATRICIA KEEFE
CW STAFF

RYE BROOK, N.Y. — IBM said last week it is now offering international network services said to enable customers in the U.S. and 12 European countries to exchange interactive data for the first time with their trading partners.

The services are part of the Intercontinental Information Services product family and will be made available via IBM's Information Network, a commercial value-added network. IBM already offers electronic messaging and batch data transferring to more than 50 countries.

Reportedly, the services allow Information Network users to exchange business information, such as electronic mail, and electronic data interchange-based forms, such as orders, invoices and shipping notices. In addition, users gain access to online data bases and applications, IBM said.

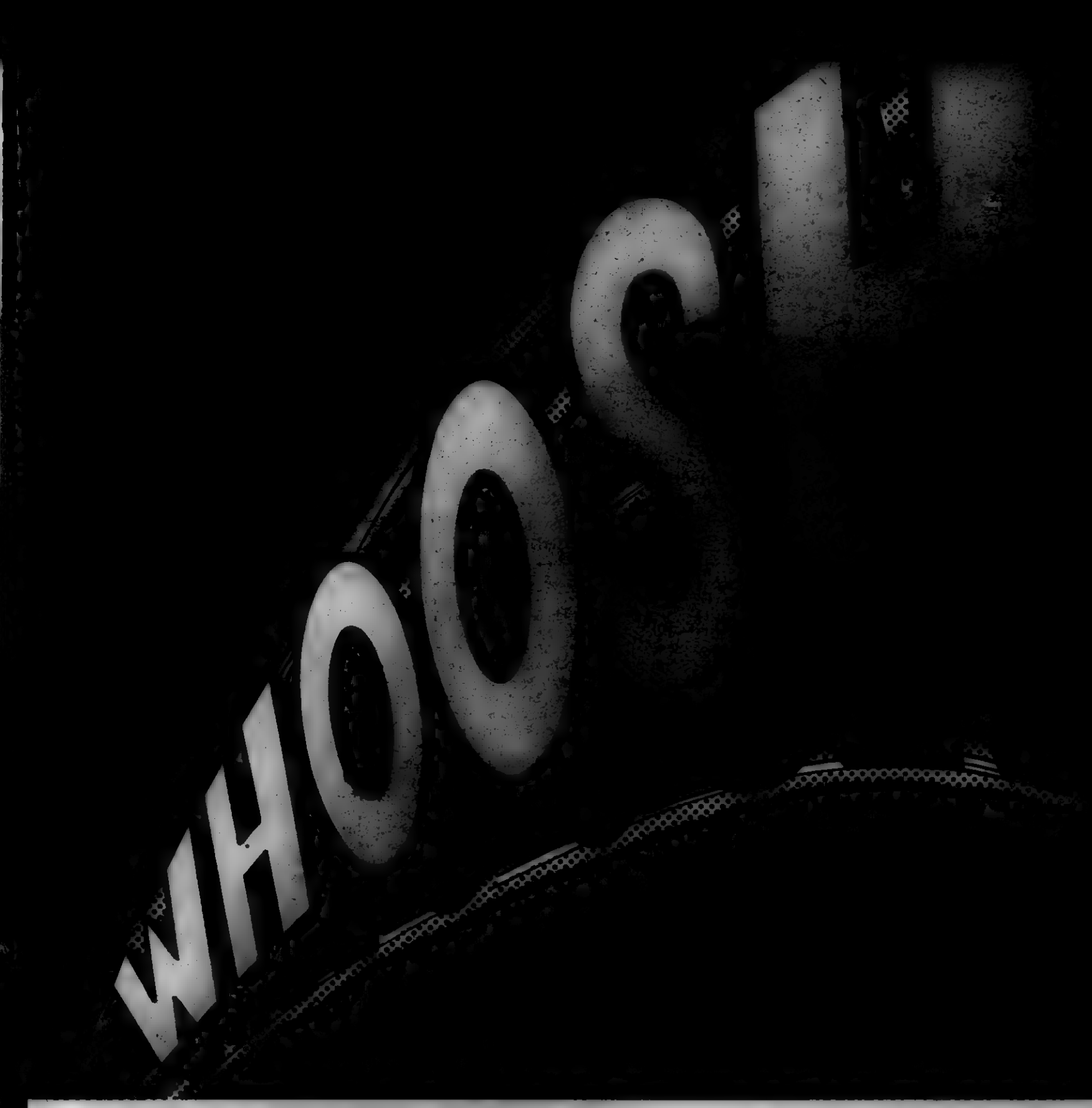
U.S. customers will be able to access the services via Information Network's 276 domestic connection points. Overseas users will gain access via attachment to local connection points planned for appropriately equipped host computers and terminal devices.

It's a small world

In addition to the U.S., these services will be made available in Austria, Belgium, Canada, Denmark, France, Italy, the Netherlands, Norway, Spain, Switzerland, the UK and West Germany.

The services include Virtual Storage Personal Computing (VSPC), Application Systems, TSO, MVS, batch via TSO, RJE and VSPC submits, as well as Professional Office System (Profs)-to-Profs messaging, International Business Service Data Transfer and screen mail, a spokesman said.

Pricing per processing unit includes $1.04 each for VSPC and TSO and 97 cents for MVS batch. On-line storage costs per megabyte per day utilized are $3.76 for VSPC, and per M byte per day utilized, $1.56 each for TSO and MVS batch. Initial registration is $71 per mailbox, while the monthly mailbox charge is $24.71 per box.



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Frank King issues Lotus decrees

Says vaporware era over, development and delivery take front seat

BY DOUGLAS BARNEY
CW STAFF

CAMBRIDGE, Mass. — Newly appointed Vice-President Frank King intends to crack the whip at Lotus Development Corp., bringing discipline to an unwieldly group of some 700 software developers that has so far failed to ship a raft of critical new products.

"I am here to develop application systems and bring more development discipline," King said last week in his first interview since joining Lotus.

But one thing King will decline to work at is preannouncing products, a Lotus practice that has drawn much criticism and given the firm 11 products on the vaporware list. "I want us to talk about development activities when they are done," King explained.

Unlike a new U.S. president, King has not enjoyed a honeymoon period since he joined the firm as senior vice-president of Lotus's Software Products Group in March, just a week after the company announced a near six-month delay of 1-2-3 Release 3. This next version of 1-2-3, arguably Lotus's most important product ever, works but is simply too big for today's Microsoft Corp. MS-DOS.

The problem with 1-2-3 Release 3 illustrates why Lotus hired King to head up its software development efforts. A lack of discipline and communication among the various Release 3 development teams created a product too big for MS-DOS's britches, analysts said.

> "I AM HERE TO develop application systems and bring more development discipline."
>
> FRANK KING
> LOTUS DEVELOPMENT CORP.

But Release 3 is only one of King's worries. He has also inherited the task of getting 10 other announced products to market: Modern Jazz, Agenda, Notes, Symphony Release 3.0, 1-2-3 for Unix, 1-2-3/M, 1-2-3/G, 1-2-3/Mac, Blueprint and Lotus/DBMS. The bulk of these products were announced long before hitting the beta-test circuit, building user expectations and frustration because of the long development time frames.

In light of its large number of developers, Lotus has been surprisingly short on deliveries, analysts said. "Look at the number of people they have in research and development and you say, 'Where are the products?' The company is long on promises and short on delivery," said Rick Sherlund, a software analyst at Goldman, Sachs & Co.

That could change as King, the former vice-president of IBM's Entry Systems Division and key developer of DB2 and SQL/DS, tackles the development problems.

Despite heat from users and Wall Street, King says he believes Lotus needs little more than a tune-up. "We need to tune, and we need to be more formal in some areas, but in no sense do we need to fundamentally change the development process," he said.

King has already held a tighter rein on the development process with daily code error reports and has taken a hard look at current projects.

On his IBM Personal System/2, King uses an internal electronic mail system that runs under OS/2 to get data on code errors and development status — a system that was up and running during the exclusive *Computerworld* interview.

"I can't exist unless I know the details. Every day I get reports on the number of errors that were found the previous day in various pieces of code," King said.

Besides daily error reports, King is expected to step up overall code reviews and has modified the development structure at Lotus. Now, certain individuals are responsible for particular functions, such as external communications, across the entire product line.

It is not enough, however, for Lotus products to hit dealers' shelves. The firm has the added burden of making those products work together and share data effectively — a goal the company hopes to achieve with its shifts in management.

Based largely on a reputation established at IBM, analysts said they believe King is up for the job. "He brings the ability to manage lots of programmers, knows how to set up timetables, keep tabs on things and make sure development projects are on schedule. That is what he is there for," said Scott Smith, a software analyst at Donaldson, Lufkin & Jenrette, Inc.

The last thing King intends is to disappoint Lotus customers by not delivering on its promises. "We will get it done," he stated.

Wang teams with Banyan, targets PC LAN market

BY JAMES DALY
CW STAFF

NEW YORK — Wang Laboratories, Inc. has decided that if you can't beat 'em, you may as well join 'em and last week launched a broad foray into the PC LAN market that has been nibbling away at the low end of its departmental computer sales.

Leading the charge of a multipronged line of local-area network products and services is the Wang PC LAN, a set of software and hardware products that link the Wang PC 200 and 300 series and IBM Personal Computer compatibles into work group and departmental computing systems.

At the heart of the line is a series of network servers — the LS-10, LS-20 and LS-100 — supporting the Banyan Systems, Inc. Virtual Networking Software (Vines). Wang said it will also sell, service and support Vines/286 and Vines/386 as well as Banyan's high-end CNS LAN server.

"Every minicomputer vendor has been severely hurt by the influx of PC LANs, and this arrangement immediately gives Wang something they've needed: an inroad into the LAN marketplace with a company that is well established in that field," said Doug Gold, an analyst at Framingham, Mass.-based International Data Corp.

Last year, Hewlett-Packard Co. teamed with Microsoft Corp. for the LAN Manager with Unix, and analysts predict similar arrangements will emerge down the road.

The LS-10 and LS-50 servers will be priced at $8,625 and $11,035, respectively.

Vines/286 for the LS-10 is priced at $1,895, and Vines/386 for the LS-50 will cost $4,995. The price for the LS-100 server, which includes Vines and the CNS server, will range from $21,995 to $27,395. All will be available this month.

The Lowell, Mass.-based firm said that their Wang PC LAN does not supercede Wangnet, its current network offering. "It's a completely different product," said Gerry Paul, Wang's vice-president of systems for research and development. "Wangnet is a cabling system that provides multiple services, like running traditional Wang workstation protocols, as well as Ethernet. The Wang PC LAN can run on top of Wangnet."

Wang also announced PC LAN/VS Access, a set of communications software products that give PC LAN users access to applications and services on Wang's VS minicomputers.

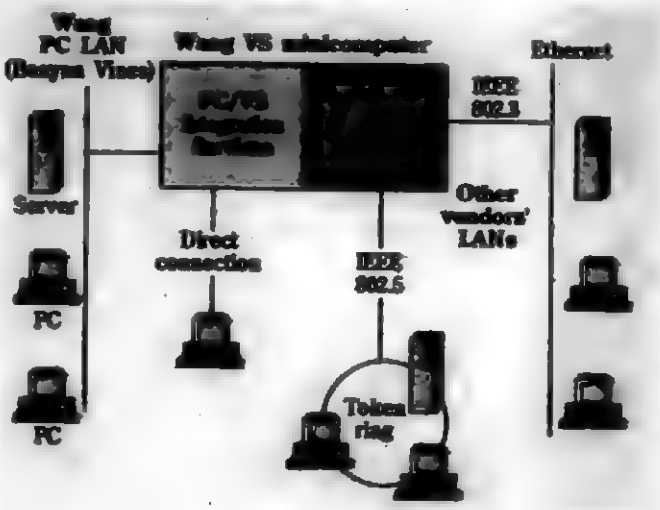
PC LAN/VS Access provides a VS connection to both Ethernet and token-ring transports running Vines, 3Com Corp.'s 3+, Novell, Inc.'s Netware and the IBM PC LAN network operating systems. PC LAN/VS Access will be priced from $2,000 to $5,500 and will reportedly be available in the third quarter.

Additionally, Wang announced PC/VS Integration Services, a set of four core software products that give users access to VS applications over Ethernet and token-ring.

All are scheduled to be available between July and the third quarter of this year.

Tying it together

Wang's latest products provide VS access and services to personal computers on its own and alternate LANs



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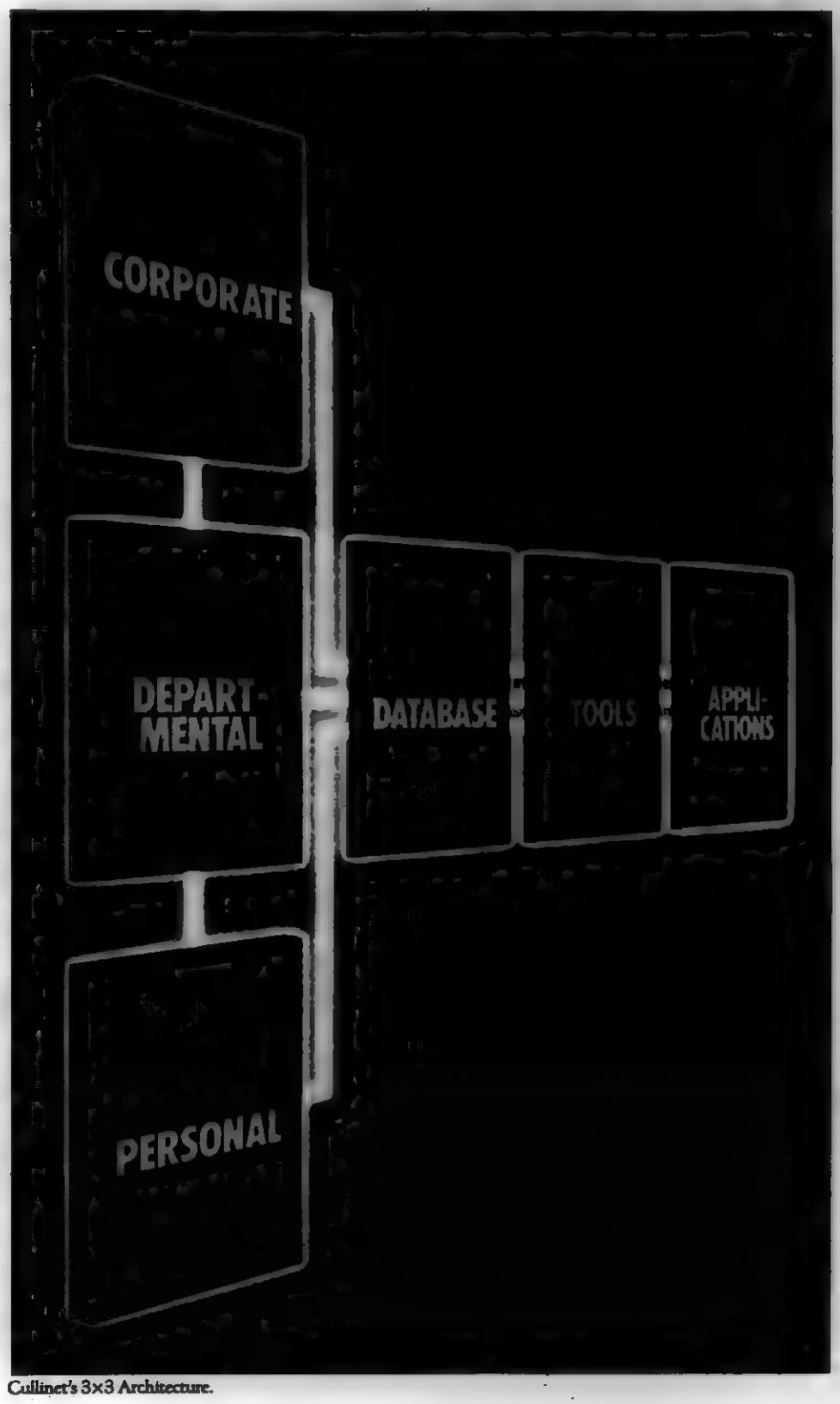

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GM fits in low-cost MAP before MAP/TOP expo

BY JEAN S. BOZMAN
CW STAFF

DETROIT — As the manufacturing industry gears up for the early-summer debut of the full-dress version of Manufacturing Automation Protocol (MAP), the standard's champion is hard at work equipping its factories with a low-cost alternative.

The full-function MAP 3.0 may be, as IBM recently called it, "the solution for plant automation communications," but General Motors Corp.'s current strategy is to implement an earlier, less elaborate — and less expensive — version.

It may seem ironic that this is happening as anticipation builds for The Enterprise Networking Event '88 International, a June exposition sponsored by the U.S. MAP/TOP (Technical Office Protocol) Users Group and the Corporation for Open Systems.

As the leader in the eight-year struggle to forge a standard for integrated communications products for the factory floor, GM might be expected to revel in this culmination of its efforts to bend automation suppliers to the will of their customers.

"We know that MAP 3.0 is around the corner," explained William Riker, senior project engineer at GM's Tech Center, "but we want to introduce carrier-band MAP to all plants, whether or not MAP 3.0 is installed there."

Take the bridge

Carrier-band MAP, technology based on MAP 2.2, is designed to bridge the gap between full MAP 3.0 implementation and no MAP at all. It will be installed at all 28 GM plants in the U.S. and Canada; many of those plants will ultimately feature some implementation of MAP 3.0.

The cost benefits will propel carrier-band to nearly every corner of GM's auto empire — even when MAP 3.0 comes along. "We feel that 95% of GM's plant equipment will use carrier-band technology," Riker predicted. "All our plants will be using carrier-band segments in some way."

Plants can easily add the carrier-band loops to a MAP 3.0 backbone network by swapping two interface boards on the carrier-bend loops, Riker said. But, for now, planning and design for all MAP installations at GM begin at the Tech Center, where GM plant managers test all factory-specific MAP equipment and software.

So far, eight of GM's 28 plants have carrier-band installed. By year's end, 12 plants will be using it, Riker said.

Carrier-band is catching on because, unlike MAP 3.0, it requires no multiplexing of signals or amplification repeaters. It is a single-channel, data-only use of standard RJ11 broadband cable. But factories that use it need to consider its limitations: Carrier-band segments must be shorter than 700 meters and can support no more than 50 nodes.

Because of its significantly lower installation and maintenance costs, carrier-band allows MAP to extend to areas of a factory that require only simple instructions — such as scheduling changes for an assembly area — but do not need to receive frequent network messages. "Carrier-band is easy to install and to maintain, and it uses passive media components, so it's less complex," Riker said. The primary difference between MAP 2.1 and MAP 2.2 specifications, he said, is support for carrier-band segments. Carrier-band users will be able to migrate to full MAP 3.0 as it comes on-line at their plants, he added.

Eventually MAP 3.0

GM's Saturn plant in Tennessee will support full MAP 3.0 when factory operations begin in 1990. But even there a MAP 3.0 backbone network will be linked to multiple carrier-band segments through IEEE 802.4 carrier-band interface bridges. The bridges are programmed to recognize the tokens used on different carrier-band segments. In this way, segment-specific messages broadcast over the backbone MAP 3.0 network will reach remote carrier-band loops.

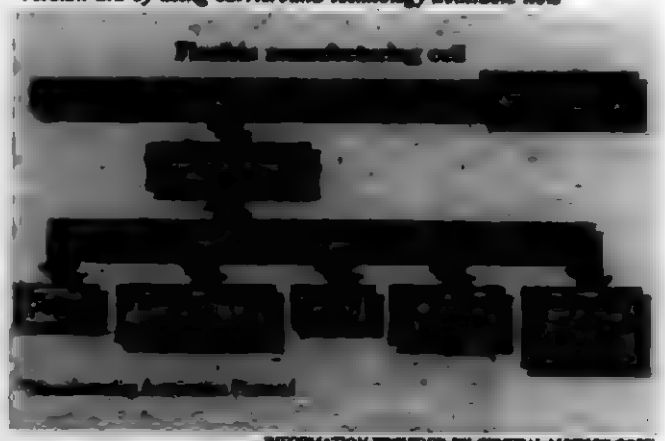
GM's engineering group has designed software specifically to support MAP 3.0's Manufacturing Message Service on carrier-band segments, Riker said. In doing this, GM is rejecting as inadequate a MAP 2.1 application layer called the Manufacturing Message Format Standard now used at the company's Pontiac, Mich., truck and bus plant. GM has no plans, however, to retrofit the Pontiac plant, which opened MAP 2.1 operations last year.

"Pontiac has all the functionality of MAP 2.1," Riker explains. "The expense in going to MAP 3.0 is not the expense of swapping the interface boards; it's the expense of rewriting all the applications."

But observers should not mistake GM's embrace of carrier-band for a rejection of MAP 3.0, Riker cautioned. "Carrier-band is not meant to replace broadband," he said. "It allows you to off-load the data traffic onto these carrier-band segments, and it gives you flexibility in designing a factory."

Setting the mold

General Motors is preparing for the full implementation of MAP in Version 3.0 by using carrierband technology available now*



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Stratus and Sybase team up

Point double-barreled guns at Tandem, DEC

BY NELL MARGOLIS
CW STAFF

BOSTON — Stratus Computer, Inc. has harnessed the relational data base capabilities of Sybase, Inc. to create a double-barreled force in the on-line transaction processor (OLTP) market that could generate headaches for Tandem today and DEC tomorrow, according to market analysts.

Announced last week, Stratus's SQL/2000 is a Sybase-based relational data base management system designed specifically to run on Stratus's XA2000 Continuous Processing Systems family of fault-tolerant multiprocessing computers.

The combination is the fruition of a two-year joint development project between the Marlboro, Mass.-based hardware manufacturer and the Berkeley, Calif., software maker. It is positioned to unite technologies that were geared for OLTP from the ground up rather than re-engineered to compete in the $17 billion OLTP arena, according to David Wu, an analyst at S. G. Warburg & Co.

"If you design your car from the bottom up to be a Porsche, it's a Porsche," Wu said. "A BMW, no matter how versatile it may be, is still a BMW; it isn't a Porsche."

The fault-tolerant XA2000 platform provides a multiprocessing architecture combined with VOS, a Stratus operating system designed to handle the rigors of transaction processing, said William E. Foster, president and founder of Stratus.

Offers architecture

Sybase brings to the party its requester-server architecture, increasingly seen as the model to beat — or join — in the OLTP-oriented data base market, according to market analysts. Under the Sybase system, user applications are segregated from data management functions, yielding gains in speed, efficiency, ease of application development and data integrity, according to Sybase Executive Vice-President Robert S. Epstein.

A significant portion of SQL/2000 is packaged directly into the VOS operating system, Foster said. So tight is the integration between the new data base product and the Stratus operating system, he claimed, that a single interface is used to query both VOS and SQL/2000 files.

Such integration, Wu said, is one of the SQL/2000 features that further suits up Stratus for commercial battle with archrival Tandem Computers, Inc., against whose Nonstop SQL product Stratus is directly positioning its new offering.

Tandem is not the only company likely to feel the competitive pressure of SQL/2000. Down the road, Foster said, "I think DEC is going to become our biggest competitor." Digital Equipment Corp. has announced its intent to enter the OLTP market in the near future.

In addition to SQL/2000, Stratus announced its commitment to integrating its OLTP offerings with a variety of workstations and personal computers through a number of interfaces scheduled to be announced during the next 18 months.

Available this month, the SQL Server component of SQL/2000 will be priced starting at $14,000. The SQL/2000 Dst workbench tool kit will start at $12,500, and the SQL/2000 VOS Server will be included in VOS Release 7.0 at no extra charge. Expected in the fourth quarter, the SQL/2000 C, PL/1 and Cobol precompilers are set to be priced from $3,000.

DEC pact for Intact?

BY STANLEY GIBSON
CW STAFF

When Digital Equipment Corp. makes a major transaction processing announcement in the near future, it will likely include a transaction processing monitor called Decintact.

The product is reportedly an adaptation of a package called Intact, designed by Advanced Systems Concepts, Inc. in Hoboken, N.J.

One major bank with a large installation of DEC VAXs that has been using Intact for five years acknowledged that it has been beta-testing the version of Intact that DEC plans to sell.

An MIS official at that bank said the DEC version will be tied more closely to the operating system that the bank has been using in order to offer increased efficiency.

The bank has not beta-tested Version 5 of DEC's VMS operating system. That version brought symmetrical multiprocessing, considered a key to efficient transaction processing, to the VAX architecture for the first time.

DEC has said for several months that a transaction processing announcement is waiting in the wings. But a DEC spokesman said that a transaction processing announcement will not be made until after May 9, when an announcement is expected.

Home shopping

Decintact was recently described on DEC's Electronic Store, an on-line electronic shopping and information facility.

However, only announced products are normally put in that videotex service, and the description of Decintact was withdrawn after DEC became aware that the product had been posted, a DEC spokesman said.

According to that description, Decintact "provides a foundation for building simple and complex transaction processing applications on one or more VAX systems under the VAX/VMS operating system" and "can support either single-threaded or multithreaded design methodologies. Multiple versions of Decintact can execute at the same time, share physical memory and be completely independent."

The program provides terminal, queue, network and file management and restart/recovery, security and menu dispatching, according to the description.

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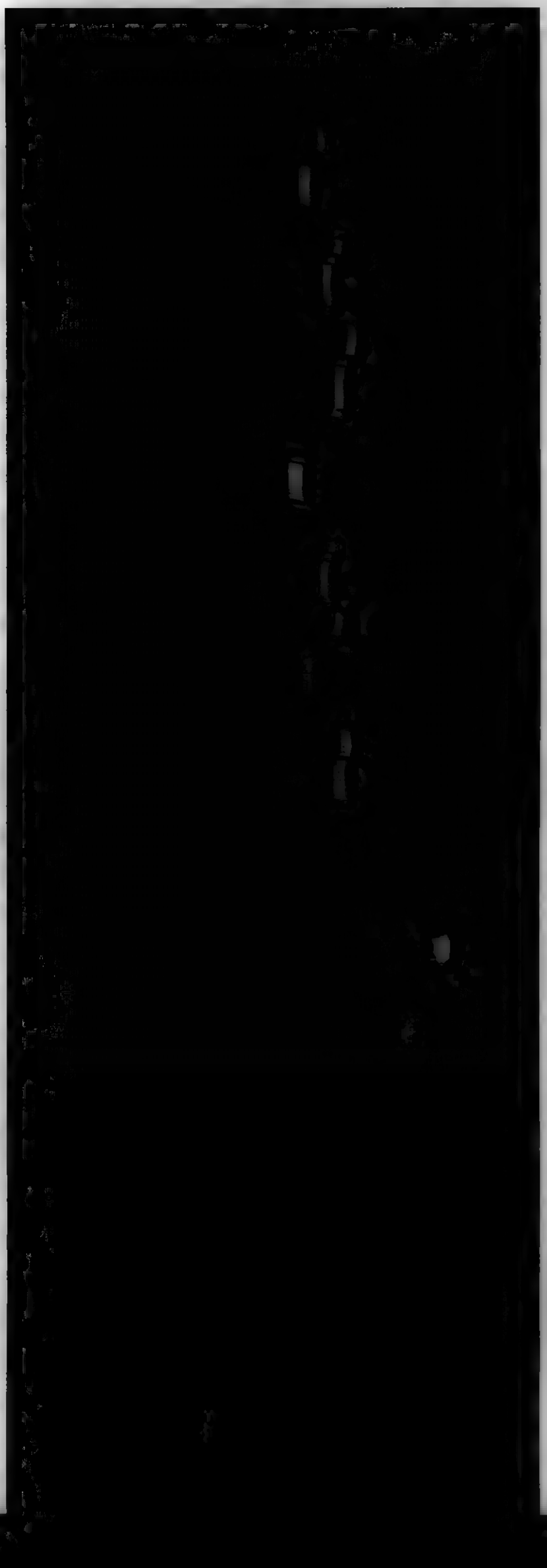

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DB2 upgrade tied to top CPUs

BY CHARLES BABCOCK
CW STAFF

IBM opened new horizons of data management with its announcement of the ESA operating system and DB2 Version 2. At the same time, IBM has cranked up the pressure on its mainframe customers to upgrade to a 3090E processor.

Despite the greater number of millions of instructions per second in the E series and 16 terabytes of virtual memory in ESA, some observers questioned whether the upgrades are necessary for all customers.

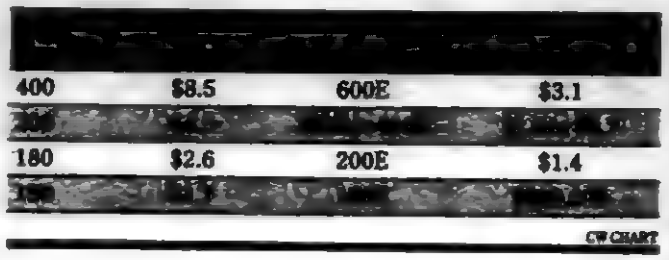
Many of IBM's largest customers said they do need the upgrades, however. Even though users have yet to write an application that taxes the 2G bytes of virtual memory offered by ESA's predecessor, MVS/XA, they said they like the 16 terabytes of virtual memory for data offered by ESA.

"It's obvious with DB2 you will be able to get much higher transaction rates. . . . We're willing to pay for performance," said Howard Fosdick, project leader for relational data base at Amoco Corp. in Chicago.

Another Midwestern DB2 user who had planned to move to ESA said it is geared toward large shops with massive amounts of data. "I bet there are a lot of unhappy smaller shops that don't want to pay the price," he said.

A price differential of $1,300 per month separates ESA base components from MVS/XA. In a similar vein, a $1,300 price differential separates DB2 Version 1.3 from Version 2.0. But the heaviest hit occurs in hardware:

No easy way up
IBM's MVS/ESA requires an E series 3090, and users of older 3090s must move upscale when converting to the newer line



CW CHART

A 3090 Model 200 customer will not have the option of upgrading to a 3090 Model 200E; instead, he will have to go to a Model 300E at an upgrade cost of $1.6 million or a Model 400E at an upgrade cost of $3.7 million (see chart).

In addition to satisfying the large customer demand for more performance, IBM appears to have grown impatient with the continuing large base of users who have not yet made their move to a 3090E. According to Computer Intelligence, a market research firm in La Jolla, Calif., a total of 2,392 IBM 3090s have been installed in the U.S. As of Jan. 1, half of them were Model E processors.

Perhaps more significant is that an additional 3,582 older 3080 mainframes are still in service and are not candidates to run the ESA operating system.

A DB2 user who wishes to take advantage of DB2 under ESA's 186 transaction/sec. capability must move to IBM's ESA operating system and its top-of-the-line processor.

IBM sent a message to its non-3090E users April 19 when it stated that future enhancements to both IMS and DB2 will be made primarily for the ESA environment, observed Tony Deakins, vice-president of Amoco Consulting in Orlando, Fla.

IBM's statement of direction indicated that those who do not migrate to ESA will eventually be stuck with an outmoded data base management system. In addition, IBM did not name MVS/SP Version 1 as an operating environment of DB2. Instead, it listed only Version 2, which is MVS/XA, and Version 3, MVS/ESA.

'Final cut'

"IBM has finally made the final cut. The minimum now is MVS/XA," noted Stephen Gerrard, vice-president of marketing at Applied Data Research, Inc. in Princeton, N.J.

"This is the beginning of a series of typical IBM moves where DB2 users will get the feeling they are being left behind if they don't move up to ESA," Gerrard said.

But there are likely to be many users who will drag their feet rather than take the plunge, industry observers predicted. "Right now, only 10% of DB2 users will immediately go to ESA," said Paul Hessinger, chief technical officer at Computer Task Group, Inc., a Buffalo, N.Y., consulting firm.

Novell focus on OS/2, SQL

BY PATRICIA KEEFE
CW STAFF

AUSTIN, Texas — Novell, Inc. is gearing up to add SQL data base capability to its bag of OS/2 connectivity products, according to sources close to the networking vendor.

The capability will be supplied by local subsidiary Softcraft, Inc., which is poised to announce a version of its Btrieve data base utility said to feature full ANSI-standard SQL. Novell is readying a multiple coprocessor, probably an Intel Corp. 80386-based very high-performance server, according to a Novell value-added reseller. The sources confirmed plans to introduce the server, along with the SQL data base — to be packaged with Novell's network operating system, SFT Netware Version 2.1 — at the June PC Expo in New York.

Novell is expected to ship this month Version 2.1.1, which contains the first release of OS/2-compatible Btrieve.

The offering is expected to counter SQL server capabilities offered by Microsoft Corp. under an alliance with Sybase, Inc. and the server version of the Data Base Manager feature of IBM's OS/2 Extended Edition.

Cullinet layoff

FROM PAGE 1

Strategies, Inc. acquisition, which landed Cullinet a repetitive manufacturing system that runs under the Pick Systems Pick operating system on DEC hardware, and Planning Control International, Inc., which provided Cullinet with a moderately successful performance management system.

A source close to Cullinet said employees were nervous and confused at week's end as they waited for today's news. The source claimed the company was planning to meet with employees this morning to notify those who have lost their jobs. In the afternoon, those employees who will remain will meet with supervisors to discuss the company's new direction.

Since the return of company founder John Cullinane in late March, Cullinet has been sending out signals that it would soon be trimming fat in order to return to profitability.

Shortly after Cullinane's return, top executives were reassembled into a cast that no longer included Chairman David Chapman and had starring roles for President George Tamke and John Landry, who was promoted to executive vice-president of development, which was a newly created position.

The new executive team indicated that a leaner Cullinet would now carry out the strategy of the so-called "3X3 architecture" that had been implemented by Chapman. The 3X3 strategy refers to data base, application and development tools offered across mainframes, minicomputers and microcomputers.

'More effectiveness'

In March, when Cullinane was asked if a layoff was imminent, he said, "I'd say there'd be a restructuring of certain operations that will result in more effectiveness."

Within a few weeks, President and Chief Operating Officer Tamke, in discussing which areas of the company could possibly be trimmed, said "nothing is sacred."

Landry, meanwhile, said at that time that a major announcement would soon be made that would not "alter the goals of 3X3 but what it would change is the way in which we go about attaining them."

Cullinet's far-reaching strategy for expansion into new markets is just becoming reality.

But the company has given no assurances that its earlier intentions to be profitable by the end of this fiscal year, which concluded last week, will be met.

As a result, the company has been under intense pressure lately to wash off the red ink and return to profitability.

Analysts, therefore, applauded the expected cost-cutting measures.

"I think they're going to end up a stronger company," said Robert Therrien, an analyst at Paine Webber, Inc.

One IDMS/SQL user, Gus Chicola, a data base administrator at the County of Metro Dade Office of Computer Services in Miami, said he had not been informed by Cullinet that cost-cutting measures were under way. "It makes you wonder what's going on with the company," Chicola said, "but if the company is undergoing some reevaluation, that might not be so bad."

"What has to be done now at Cullinet has to be very drastic," said Rob Anderson, a vice-president and senior technology analyst at Sutro & Co. in San Francisco. "They don't have much in the bank for a rainy day, and it's raining now."

Jerry Peters, senior vice-president of information services at the Exchange National Bank in Chicago, which is a beta-test site for the Cullinet Banking System, said he applauds any move to cut fat at Cullinet. "Layoffs, per se, are no source of concern to us," he said. "If they're cutting into the meat, then I'm going to be concerned."

Microsoft, Mac still item

BY STEPHEN JONES
CW STAFF

REDMOND, Wash. — Microsoft Corp. made it clear last week that its legal battle with Apple Computer, Inc. will not prompt it to halt Macintosh software development. Despite earlier hints by Microsoft Chairman Bill Gates that the company might cut off Macintosh development in the event of an Apple lawsuit, Microsoft announced a version of its Powerpoint desktop presentation package.

Powerpoint 2.0, the first Macintosh software from Microsoft since Apple charged last March that the developer stole the Macintosh's "look and feel," will reportedly ship later this month.

Enhanced color options

The program was designed to take advantage of the Macintosh II's color capabilities and will sell for $395 — the same price as Powerpoint 1.0.

While Microsoft was promoting Macintosh software last week, Apple showed no signs of letting up on its charges against the developer.

In a filing with the U.S. District Court in San Jose, Calif., Apple refuted Microsoft's countersuit. The countersuit claimed a right to the Macintosh interface look and feel and alleged that Apple is seeking to hurt Microsoft's business.

Industry watchers said Microsoft had little choice but to continue its development for the Macintosh, with analysts estimating that Mac sales will net Microsoft $100 million in revenue for this year.

"Microsoft can't stop development for the Mac — it's too important a platform for them to ignore," said Rick Sherlund, an analyst at Goldman, Sachs & Co. in New York.

But Microsoft claims it will upgrade all of its Macintosh products, including Word, and continue with new product development.

"We've made it clear that we're going straight ahead with the Macintosh. Everything is leading toward an upgrade," said Lewis Levin, group product manager for Microsoft's graphics business unit.

Powerpoint 2.0 requires a Macintosh Plus, Macintosh SE or Macintosh II with 1M byte of random-access memory and two 800K-byte floppy disk drives or a hard disk.

Powerpoint 1.0 users can upgrade for $40.

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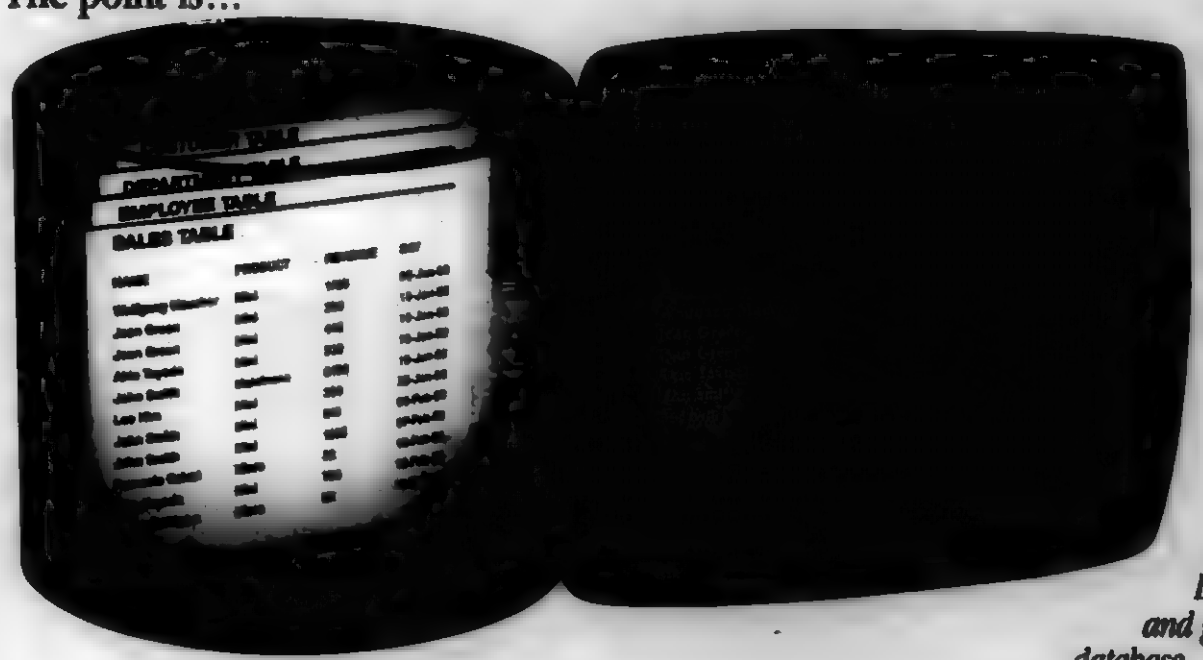

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Insurance firms seek paperless office

Look to scanning devices, expert systems to help increase efficiency

BY KATHY CHIN LEONG
CW STAFF

PALM SPRINGS, Calif. — More than 600 major users flocked to the IBM Insurance Executive Conference here last week, anxious to make progress toward the goal of a paperless office.

At the 12th annual meeting of domestic and international MIS directors, electronic imaging and expert systems took center stage. Compared with past years, these two technologies now seem to offer relief for the truckloads of documents plaguing the $4 billion insurance industry.

Skyrocketing medical costs, legislative reforms and increased pressure to offer new products all add to the job complexities in insurance, noted David Griffin, vice-president of underwriting at Fireman's Fund Insurance Co.

Kathy Wilson, IBM's director of insurance industry marketing, added, "There is already tremendous diversity in insurance. You have life, property, casualty and health, and if you start breaking this down, you are hard-pressed to find a similar set of solutions."

Common to insurance companies, however, is the need to decrease paperwork. Unlike other industries that focus on manufacturing goods, the product for these firms is the paper document: the insurance policy.

For that reason, users are hungry for information that would eventually lead to a paperless office. They see an immediate use for image scanning devices, which scan insurance policies and case photographs and diagrams.

"That's why I came here," said one user from Physician Mutual. "It gets really expensive to store files."

Adding to the excitement was a briefing on IBM's joint-development image scanning project with United Services Automobile Association, which will blaze a trail for others to follow. The San Antonio-based organization has installed IBM workstations in a network of optical storage devices, image scanners and IBM 370 mainframes. Users at the company will store mail on optical disks, eventually reducing the need to save original documents.

Another user offered his solution to reduce the paperwork load. Provident Life & Accident Insurance Co. in Chattanooga, Tenn., has developed a personal computer software package that enables staff secretaries to create more accurate documents through the use of boilerplate features.

Before, the staff was generating reams of wasted paperwork. Since the software package was added, the cost of generating a letter has dropped from $2 to 28 cents, said John Germann, vice-president of MIS applications at Provident.

IBM's Wilson

Leader of the pack

For many years, the insurance sector has been a leader in automation because of the need for quick turnaround.

In such an industry, getting a policy to the client quickly may mean the difference between clinching or losing the contract, according to MIS directors. And if customers fail to receive reimbursement checks in a timely fashion, they may not sign up for services the following year.

This is why CNA Insurance Co. in Chicago urged MIS professionals to adopt expert system software as a means of accelerating the work of claims adjusters and examiners.

Danielle Barcilon, senior manager of life and health systems at CNA, said she expects her claims adjusters will be 30% to 40% more productive with the use of an expert system the company co-developed with Policy Management Systems Corp. in Columbia, S.C.

CNA is currently testing the expert system package, which operates on an IBM Token-Ring network. Among other things, the system is expected to alleviate the hassle for claims adjusters of poring through manuals to determine whether an accident or medical treatment is covered.

"We want to increase the productivity of our examiners and, at the same time, make our claims payment consistent," Barcilon said.

"The ACS 4030 dramatically cut our communication costs and maintained reliability – at a quarter the price of other Ethernet bridges." Charles Fischer
Director of Operations, Dalcomp, Inc.

Dalcomp, a supplier of online information for the financial industry, needed a better way to connect offices on both sides of the Hudson. Dalcomp had five point-to-point connections using expensive dedicated lines. Dalcomp needed to cut network costs, but couldn't afford to sacrifice network performance. Dalcomp chose the ACS 4030 to connect Ethernets already in place.

Dalcomp saved on equipment costs and cut network charges by 60%. Dalcomp looked into another remote bridge; it was four times as expensive. Dalcomp saved by choosing the ACS 4030 and saved again by reducing the number of dedicated lines from five to two. The ACS 4030 can save you money too.

Saving money doesn't mean sacrificing reliability. Says Fischer, "In our business, we deal directly with major financial institutions. Our service transmits crucial information and we cannot have a down time." Because the ACS 4030 provides load-leveling, if one critical line goes out, the others automatically pick up the slack.

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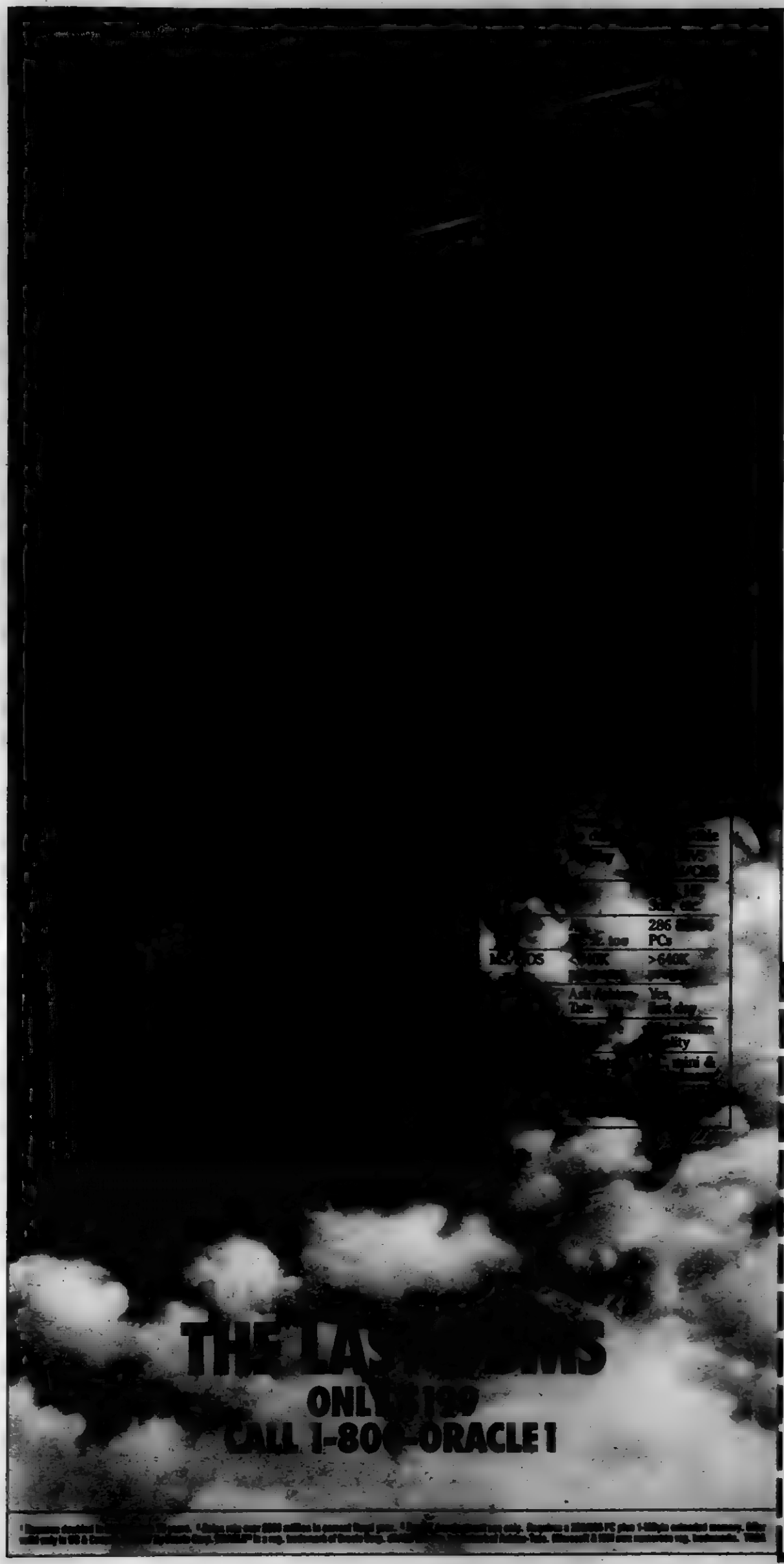

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Unisys ups R&D budget 20%

1988 spending will focus on creation of network manager

BY JEAN S. BOZMAN
CW STAFF

DETROIT — Unisys Corp. is devoting much of its 1988 research and development budget to the creation of a comprehensive network manager that would monitor the flow of voice and data throughout a customer enterprise, Chief Executive Officer W. Michael Blumenthal said last week.

Addressing the second annual meeting of the combined Burroughs Corp. and Sperry Corp. here, Blumenthal said R&D spending this year would increase by 20% over last year's $597 million budget.

"Much of our R&D spending this year will be focused on building a well-developed network manager," Blumenthal told more than 250 stockholders. He did not compare the Unisys product with other network managers, such as IBM's Netview, but it was described as having a similar function. Unisys's 1987 acquisition of Timeplex, Inc. is expected to boost overall sales of computer and networking products. "We expect that networking alone will be a $1 billion business by 1990," Blumenthal said.

Another area of R&D spending will involve co-developing a reduced instruction set computing-based computing platform for distributed applications with Sun Microsystems, Inc. "This underlies our plan to develop fast, low-cost Unix systems that will rival the power of mainframes," Blumenthal said.

Unisys's Blumenthal

He said Open Systems Architecture represents one key product area in which the $9.7 billion corporation could realize revenue potential in the 1990s. "The closed shop is becoming a rarity," Blumenthal said. "No one vendor and no one family of systems can meet all the information needs of a changing [end-user] organization."

Unisys has been positioning its Unix products as a window on mixed-vendor shops. Last year, the firm sold more than $500 million in Unix systems and expanded its base to 10,000 installed Unix-based machines.

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3Com provides 3+ network with host access

BY PATRICIA KEEFE
CW STAFF

SANTA CLARA, Calif. — 3Com Corp. last week announced and began shipping 3+SNA, said to provide a gateway between users of IBM Personal Computers, Personal System/2s and compatibles on a 3Com 3+ network and host systems operating in an IBM Systems Network Architecture (SNA) environment.

This capability is critical in larger companies, where users need to manipulate data located across a local-area network as well as gain access to systems and applications residing in a mainframe, said Bruce Backa, a 3Com user and director of micro and technical services at American International Group's New Hampshire-based Domestic Brokerage Division.

The turnkey product, which includes an intelligent microprocessor-based adapter and software licensed from Rabbit Software Corp., is an extension of 3Com's 3+ network operating system.

Backa, who heads a regional 3Forum users group, currently uses Rabbit's SNA gateway and gave it high marks. Just 1½ years ago, Backa's installation, which sought terminal sessions, the ability to send and receive file transfers and access to high-level application programming interfaces, could only find one product with that level of functionality — Rabbit's gateway. Since then, IBM, Digital Communications Associates, Inc. and other vendors have introduced similar products.

3+SNA provides each PC user with concurrent access to up to eight host sessions, one Microsoft Corp. MS-DOS session and one notepad session. 3+SNA also provides a choice of file transfer capabilities and host access at speeds of up to 56K bit/sec., the vendor said.

A replacement for 3Com's 3+3270, 3+SNA offers display and other 3270 features, including emulation of IBM remote communications devices such as 3270 control units, displays and printers.

Pricing for 3+SNA is $4,995 per gateway with 32 concurrent sessions. An application programming interface option costs $395. Both are available now.

Two other add-on features are slated to be available late this summer.

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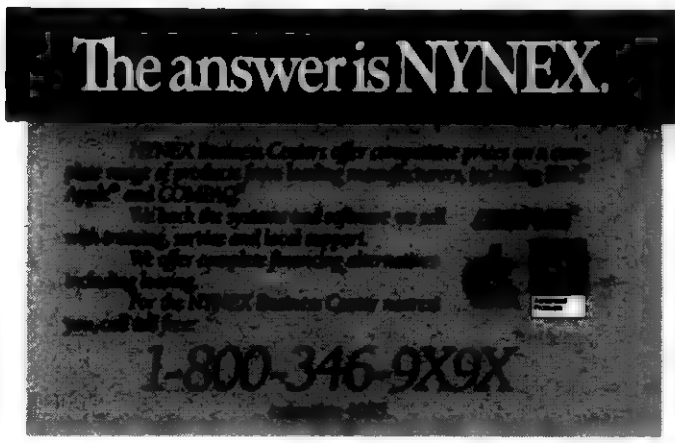

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Prime solid, but high end dips

NATICK, Mass. — Prime Computer, Inc. reported solid first-quarter earnings and revenue gains last week but said it experienced a slowdown in U.S. sales of high-end systems.

Prime's financial report reflected the downturn in domestic minicomputer demand felt by competitors Digital Equipment Corp. and Wang Laboratories, Inc. "Our U.S. order rate remained sluggish as we experienced delays in closing high-end system sales," Prime President Joe M. Henson said in a statement.

But overall, Prime earned analysts' praise for the efficient consolidation of Computervision Corp. Prime took a $4.5 million, or 9 cents per share, charge from restructuring, but that was more than offset by a $6 million onetime gain from accounting changes.

Profits, including a onetime net gain of $1.5 million, rose 22% from year-earlier results to $14.5 million. Revenue, including Computervision results for the first time, was $363.7 million, compared with $221.7 million in first-quarter 1987.

"Revenues were a little light, but they did more on the expense side than I estimated, so the bottom line looked good," said First Boston Corp. minicomputer analyst Susie Peterson.

CLINTON WILDER

Lautenberg tries for second term

JERSEY CITY, N.J. — Sen. Frank Lautenberg (D-N.J.), cofounder of Automatic Data Processing, Inc., last week announced his bid for election to a second term.

Lautenberg is expected to easily outdistance two relatively unknown opponents in the Democratic party primary June 7. He will face stiff competition from expected Republican nominee Pete Dawkins, a retired U.S. Army general who recently moved to New Jersey.

In a speech kicking off his campaign, the former ADAPSO chairman enumerated his accomplishments in his first term, including contributions made to the information technology industry.

The senator spoke of his legislative actions to protect American-made technology from infringement by foreign concerns and a bill, currently awaiting the president's signature, to provide computer training in schools.

"Protecting our ideas, our inventions and our patents means protecting our jobs and our workers, our scientists and their families — everyone whose future is tied to American ingenuity," the senator said.

"The law I wrote to protect those inventions has helped, but I want to do more," he said.

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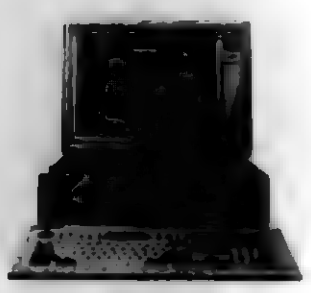

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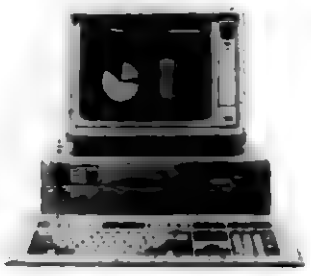

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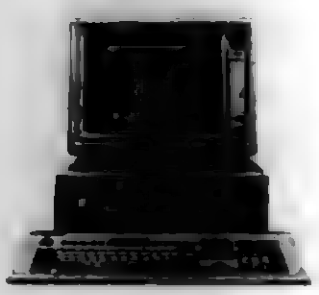

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Gene Amdahl

CONTINUED FROM PAGE 1

The machine will be based on very large-scale integration technology and incorporate high-density CMOS chips. "What we're trying to do here is use a technology that is extremely inexpensive compared with what IBM uses," said Bob Nuckolls, a former Trilogy engineer and now vice-president of systems development at Andor.

"We're going for the low end [of the mainframe market] because that's where we can build a machine that has the highest margins. IBM has its highest margin on that machine, too," Nuckolls said. "It's the most lucrative part of the market."

Safe bet

This argument has lured a first round of investors, despite Amdahl's economic disaster with Trilogy in the early 1980s. That company squandered nearly $100 million trying to develop wafer-scale integrated circuits and mainframes designed to outpower IBM. After scrapping those projects, it was absorbed by San Jose, Calif.-based Elxsi, Ltd. in 1987.

Amdahl said he raised $2 million in the first 18 months for Andor, which was formed last June. The money came from an India-based holding company, a U.S.-based holding company and "all sorts of businesses," he said.

Amdahl said he has yet to begin tempting investors into a second round of funding. Referring to potential venture capitalists, Amdahl would only say, "I haven't heard any disinterest from anybody."

The lack of early commitment may not be a major hurdle, according to Jay P. Stevens, an analyst at Dean Witter Reynolds, Inc. in New York. "He's not looking for all that much money," he said. "I think he's got a chance."

Amdahl said Andor's relationship with IBM is cordial, despite the fact that he is looking for an inroad into IBM's market share. He said he sticks to plug-compatible machines, "because if you want to mine gold, you mine the mother lode."

Amdahl is shying away from direct competition with Amdahl Corp. by supporting a computer below the power levels of that company's mainframe line.

Andor will stay out of trouble with IBM by working out a cross-licensing deal, Amdahl said. "It's easier to pay whatever royalties are required, even if you don't infringe on them.

"We will be a mosquito on the side of IBM. But we hope to be one that's satisfied with blood."

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   - DB2 Address Spaces
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   - Update and Delete Anomalies
   - First, Second, and Third Normal Form
   - When to Consider denormalization
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   - Creating Tablespaces & the Impact of Parameters on Performance
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EDITORIAL

Age of integration

NEWS FLASH: The electronic publishing industry declared its commitment last month to design products targeted at improving information management and integrating them with existing corporate information systems.

Surprised? Probably not.

As every information systems executive knows, the long-term success of new technologies relies mainly on the ability to coexist with and improve upon the corporate information infrastructure. Although revolutionary technologies can produce quick fortunes for entrepreneurs, Fortune 500-type success comes only to those vendors able to go beyond a focus on individual users and concentrate on serving corporate structures. That's why personal computer vendors are increasingly allying themselves with networking technologies, LISP workstations are facing a stagnant market and optical products vendors still await the breakthrough that will bring customer commitment.

As indicated in our Spotlight report on electronic publishings systems [CW, April 25] and observations at the recent Corporate Electronic Publishing Systems show in Chicago, the electronic publishing industry appears to be waking up to those real-world realities. As David Henry Goodstein, CEPS chairman and president of Interconsult, Inc., put it so well, the industry wants "to get beyond the shimmering goal of WYSIWYG" — that tongue-tripping acronym conveying that What You See on your monitor Is What You Get on your printout — "and decide that electronic publishing is all about information management."

Information systems executives, therefore, have reason to rejoice. Rather than focusing solely on desktop presentation products, successful purveyors of publishing systems will focus mostly on what American businesses need and want. In business today, rapid change and cutthroat competition demands that more and more individual employees and work groups be tied into cohesive networks of compatible computer products.

The publishing industry has come to this battleground along two flanks: the PC-based standalone solution on the one hand and the minicomputer-based, proprietary multiuser solution on the other. Presumably, they will meet somewhere in the middle, using standard hardware platforms and standardized connectivity protocols to allow printing to join the information management mainstream.

So the marketing focus — and none too soon — now moves away from selling individual users on the latest wonders of a new font cartridge and toward the crucial issues of networking, distributed data base management systems and, somewhat ironically, the pros and cons of tying into centralized corporate data bases, the mainstay of the much-maligned mainframe.

LETTERS TO THE EDITOR

Recruiters defend their profession

Anthony Reed's article, "When the headhunter calls" [CW, April 4] began with some dime-store advice and ended with a stab in the back to headhunters.

Reed is not a recruiter. Nor was there any mention that he had any special qualifications for his "expert advice." If Reed had an ax to grind, why allow him to use *Computerworld* to spread his innuendos about "unscrupulous" headhunters? There are numerous professional search firms that could offer more appropriate and experienced advice.

Has the headhunter become the new whipping boy? I have no guilt in helping qualified data processing professionals better their careers. Do I get paid a commission for placements? You bet I do. I earn those fees and do my job with care and conscience. As the same issue pointed out in a survey of 370 systems organizations, search firms were found to have the highest degree of success for recruiting staff.

John Malinoski
Data Processing Recruitment
Gilbert Lane Personnel Service
Hartford, Conn.

Anthony Reed's article contained some practical advice about working with recruiters.

The author also revealed a number of unscrupulous tactics that have been used by unethical recruiters and by equally unethical employers.

The problem with his article was that in trying to differentiate between the good and the bad, examples of recruiter behavior were given that could be confusingly attributed to any recruiter. The use of generalized illustrations painted an unfair picture.

Professional recruiters are competent people who act with honesty and integrity and are dedicated to providing a valuable service to client companies and candidates. They are committed to establishing long-term business relationships, and this can only occur by adherence to sound ethics. Unfortunately, there are some less-than-desirable recruiters, just as there are ill-mannered and untrustworthy members in all occupations. It is, however, unprofessional to negatively stereotype every individual within an occupational group.

Marc L. Blessing
Director
Compusearch
Cleveland

Anthony Reed immediately set a prejudicial tone in his article by calling executive search consultants "headhunters." Yes, the slang name has been used, but it is no more accurate than calling Reed a "hacker."

Good executive search consultants are in their profession for the long run. Many are not paid commission, as Reed stated, but receive salaries and year-end bonuses. Whether or not they place a specific candidate, therefore, is not nearly as important as making the correct match.

The most cogent point Reed made was that there must be mutual trust between the candidate and search consultant. Yet Reed also advised the systems professional to do everything but trust the search profession.

If Reed wanted his audience to trust his arguments, he should have proved his points with tangible evidence. Instead, his article read like one that comes from someone who may have a personal gripe with one person but no real substantial proof to make any of the unfair and erroneous allegations that he made.

Sheryl Kay
Director of Technologies
Criterion Executive Search, Inc.
Tampa, Fla.

Anthony Reed's article advising what to do when the headhunter calls made a few good suggestions but spent more time promoting an adversarial relationship between systems professionals and recruiters.

Does it make sense to be abrupt to someone who is calling to offer you an opportunity to earn several thousand dollars a year more and be trained in and work with new technology just because they initiated the telephone call?

Does it make sense to talk about the few circumstances where someone from your own shop will pretend to be a recruiter in order to trap an employee without saying that if management is crazy enough to do that you should consider changing jobs?

Recruiters help staff a number of programming, systems and management positions every day. Perpetuating mistrust, as this article did, is a disservice.

Jeff Altman
Jeff Altman & Co.
New York

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

Getting in on standards

Users will help shift the focus to testing for product compliance

JOHN L. BERG

Don't take your eyes off computer standards. They face changes as dramatic as those happening in other areas of the information industry. The changes will affect corporate expenditures amounting to billions annually and will make or break many new (and old) products.

Yet judging from the discussions at the IEEE's biennial Computer Standards Conference in Washington, D.C., those closest to making standards may be the least aware of the changes or their importance.

At one time, the process that led to formal national and international standards involved gathering the interested parties that argued, politicked and compromised until they produced a document. Then they published the standard so the world could implement it. Other than periodic reviews, this publication ended standardization.

No more. Open Systems Interconnect now leads the new wave with its requirement for certification. Simply stated, specific products must prove they comply with the standard specifications.

The demand for certification, led by major users, is so beneficial to smaller users and niche vendors that their combined support has resulted in the mushrooming of third-party testing groups around the world. This demand will shift attention away from making the specification to testing a product's compliance.

Howard Yudkin, chief executive officer of the new Software Productivity Consortium and keynote speaker at the recent Compstan 88, states that future software productivity will depend on widespread availability of software modules.

These modules, as listed in parts catalogs, will permit off-the-shelf software pieces to be readily assembled into systems. Yudkin adds that certification of each module's interface was essential to the acceptance and use of this approach. Yet he also noted that it was irrelevant whether the specification was produced by formal standards groups.

I see two possible futures for standardization. In one, standard specifications will come from many — now unlikely — sources. In the other, the testing and certification of a standard will become the important, operative step.

Bull by the horns

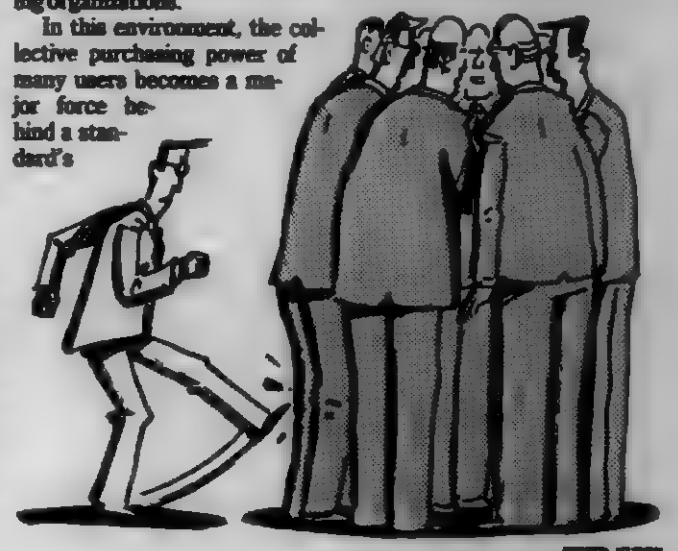
The first scenario is already upon us in some ways: Users dissatisfied with the slow progress of today's standards are working around the process. The IEEE produced Posix as a publicly owned equivalent of the proprietary Unix operating system. It is also trying to standardize the IBM Personal Computer bus. We will see other groups taking similar action.

ANSI's inflexible thinking about the current standardization process may be the major problem for these groups to overcome. Foremost among user criticism of standardization today is the interminable duration of the process.

In the second scenario, certification will become the working edge of standardization. Consider the intermediate steps:

- Validation asserts that a product has been found to comply with all or specific subsets of the standard. This service is now provided for certain compilers in the U.S., Europe and Japan.
- Certification puts the tester's reputation behind the testing and reflects some degree of liability for the certification claims.
- User procurements habitually specify certified products. Like the Underwriters Laboratory "UL" tag, a certification mark will enhance a product's value and obliterate competitive vapor standards.
- The insurance industry offers new policies to share certification liability and guides certifying organizations.

In this environment, the collective purchasing power of many users becomes a major force behind a standard's acceptance and enforcement. Testing becomes the concrete embodiment of the standard specification, and its reproducible results can be used at any time to demonstrate compliance.



PETER HAPAK

IBM and others have long considered standards a business, not a technical, decision. Compstan 88 speakers from DEC and Wang note the benefits of supporting global standards in their companies and to their users.

It is high time that users also see standards as a critical business decision. Vendors and users should grasp the current opportunities to manage, not simply accept, the standards that could directly determine their present and future systems costs.

Berg consults in strategic, technological and competitive edge planning from Long Lake, Minn. He is editor in chief of *Computer Standards & Interfaces* and serves on the planning committee of the 1989 International Conference on Standardization.

Are top execs drowning in data? SIC it to 'em

Strategic centers transform information into a lifeline to reach corporate objectives

JOHN KIRKLEY

MIS managers take heed: Your company's senior executives are drowning in a sea of data.

And where are you? Are you ready to throw them a life preserver? Or are you down in the bowels of the ship shoveling coal into an IBM 3090, deaf to their frantic cries?

One of the people examining the strategic use of information is Michael Gauthier, a principal at management consultant firm Temple, Barker & Sloane, Inc. in Lexington, Mass.

"MIS is almost never involved," Gauthier says, when asked about the collection and presentation of strategic competitive information.

MIS managers seem to be comfortable dealing with quantitative information, but they shy away from the more ambiguous world of qualitative data — the world of images, abstractions, opinions, ideas, suppositions and conjecture.

The trouble is that, once again, technology has presented MIS with new challenges. Advances in optical media, communications, the speed and power of personal computers, as well as the rapid spread of end-user literacy, have unleashed a wave of creative information consumerism among the user community.

The power and bandwidth is there to handle this flood of unstructured data. But somebody has to pull it all together into digestible form.

What these decision makers need, Gauthier says, are systems that integrate external qualitative data and internal data processing information. How to go about this integration leads Temple Barker to contribute yet another acronym to the industry's lexicon: the SIC, or strategic information center.

These centers coordinate research efforts with corporate objectives. As specialized units, they perform specific in-depth research and provide analytic services that prepare the data they gather for their top-management clients. Often, the SIC works in conjunction with existing corporate library services, which provide data from standard reference sources.

Not just a pipe dream

Gauthier says several SICs already exist. E. F. Hutton has put together a corporate war room, where executives gather comprehensive information on their clients, such as demographics, product lines and management changes. Just one of the many uses of this data is to alert Hutton's sales force to opportunities to sell new products to their existing customer base.

The war room also keeps tabs on Hutton's competitors by tracking Securities and Exchange Commission filings and using information purchased from outside research services to scan the top corporations on their target account lists.

"Technology has made it possible to collect new categories of information, particularly nontextual, qualitative information," Gauthier says. For example, using optical technology, data bases of images can now be gathered, a capability already being exploited by advertising agencies.

Suppose your agency needed a picture of 10 typical yuppies for an ad layout. It's there in the data base: Ten yuppies at the push of a button.

Another service some SICs provide is to coordinate the purchase of research materials. You know what I'm talking about: those bulging three-ring binders (and the plastic-covered update pages that nobody ever gets around to inserting), the newsletters, the bulletins, the handsomely bound reports.

These services are not cheap, and although the information provided may be very useful, it is often not used properly.

Gauthier cites the example of one client who spent $7 million a year on research materials. In a fit of cost-consciousness, management checked through the company and failed to uncover the massive investment — most of the materials had disappeared into some corporate black hole.

Such research contains a wealth of data that a SIC can transform into concise, fertile information — information that a senior executive can use to make critical decisions.

However, before cobbling together a SIC for your company, Gauthier recommends you find out first just how smart your company wants to be. How much data does top management want and need about its competition or its marketplace? It could be that your managers are quite happy with the present corporate IQ and will cast a cold eye on any attempt by MIS to raise it.

But if the need is there, the opportunity exists for MIS directors to add a new dimension to their traditional role of processing quantitative information for the corporation. It doesn't matter what it is called — strategic information center, war room, competitive analysis center.

Like new glasses

The point is that the SIC concept focuses yours and your management's attention on gathering, analyzing and presenting key strategic information in ways that MIS has never been involved with before.

Within your own organization, there probably exist rich pockets of information just waiting to be coordinated by an MIS department that views its function as something much more broad than being an adjunct to the accounting department.

So, when you next hear your top management's faint cries for help as another sea of data washes over them, rush to the rail and heave that life preserver. In the last analysis, the life you save may be your own.

Kirkley is a computer industry writer, editor and consultant based in Warwick, N.Y.

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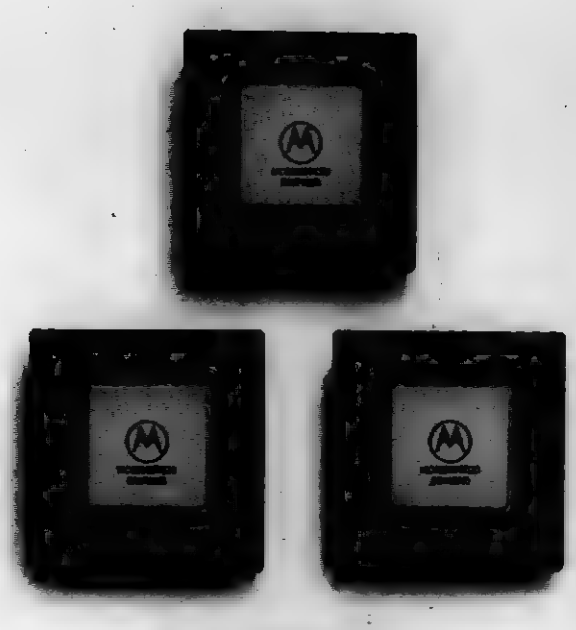

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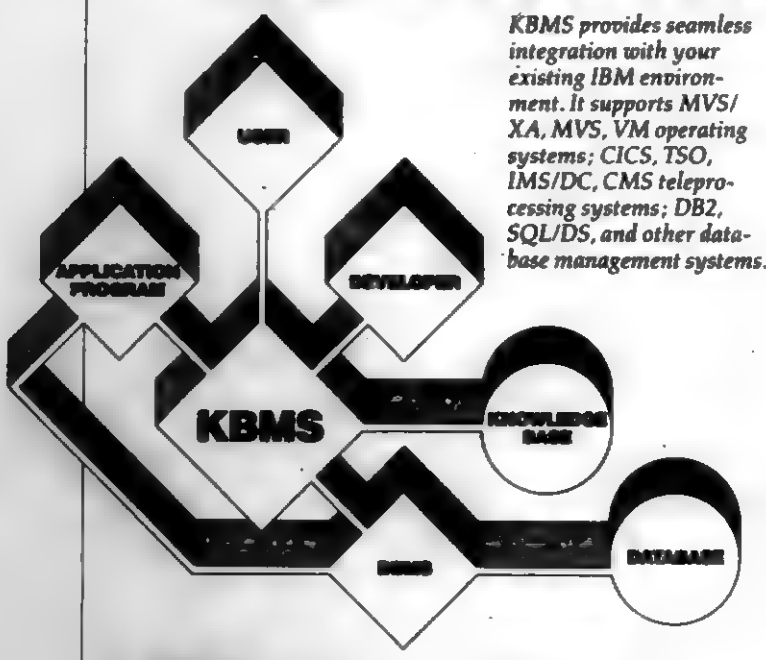

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A major computer company is saving over $25 million a year on product ordering and configuration, thanks to expert systems they developed in-house.

A leading financial services company has substantially reduced bad credit losses with a computerized system they developed based on artificial intelligence.

These are true stories. Yet expert systems still have not taken a serious place in the business world.

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SOFTWARE & SERVICES

SOFT TALK

Jean S. Bozman

Learning to live with DB2

Around BUG, the BMC Corp. users group that met in Houston two weeks ago, an IBM shop earned the title "robust" when it had successfully applied IBM's DB2 relational DBMS to production applications.

"Out of every 10 users, one is a robust shop," says Jack Olson, a manager of DB2 product development at BMC, which writes DB2 system software utilities in Austin, Texas. "It takes about 18 months to become a truly robust shop. The learning curves are very steep, and there's no way to buy the experience. You have to develop it in-house."

Olson should know. A former IBMer, he has been working with DB2 customers ever since IBM shipped DB2 Release 1.0 in 1985. So far, there have been relatively few "robust" shops nationwide, BMC managers say. Among the few are Amoco in Chicago, Flying Tigers air freight in Los Angeles and Texaco — which has more than 400 production DB2 tables. But most of the DB2 shops Olson sees are still learning — and roughly half of those have less

Continued on page 26

Harrison leaves sturdy Workbench

BY CHARLES BABCOCK
CW STAFF

FALLS CHURCH, Va. — Richard G. Harrison, organizer of the federal Programmers Workbench, has stepped down, and Rand Information Systems, Inc., which supplies the underlying platform for tying together the workbench tools, has filed for bankruptcy.

Some say it is fitting testimony to Harrison's organizing ability that the two events will have little impact on the workbench. Thirty-six federal agencies purchased the workbench or components of it in its first year of existence at an average price of $150,000, and another 11 have purchased it so far this year.

Recent buyers include the Defense Logistics Agency, the Office of Personnel Management, the Air Force Logistics

GSA's Harrison

Command and the Social Security Administration. An estimated 5,500 programmers in the federal government are now workbench users.

When he became director of the General Services Administration's Federal Software Management Support Center four years ago, Harrison seized on a tentative, pilot workbench in use in part of the center and filled it out. Formerly in the tools business himself, he talked to private vendors and urged them to submit bids on their products for a workbench tied together by a common menu and user interface.

It was a move that someone speaking for the federal government could execute, but one that the vendors were unlikely to collaborate to make on their own.

"It was hard to dampen the competitive spirit. We would have meetings in which no one would want to say anything. They didn't want to talk about their products in the same room with their competitors," Harrison recalled.

The 10 products on the workbench represent a Cobol mainte-

Continued on page 24

Data View

Opening packages

Japanese MIS managers, who used to turn up their noses at everything but in-house development, plan to spend more on packaged software by 1991

INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

Expert system offers advice on MVS events

PRINCETON, N.J. — A continuously running system that is now available on a personal computer is said to offer human expert-style assistance in analyzing MVS and recommending appropriate responses to problems.

Mindover MVS from Applied Data Research, Inc. is not a replacement for in-house MVS expertise, but it can assist MVS

Continued on page 26

MSA refines product lines

Users applaud sharper manufacturing focus

BY ROSEMARY HAMILTON
CW STAFF

ATLANTA — Management Science America, Inc. (MSA) recently presented its manufacturing subsidiary with a clear agenda for the first time in two years.

While the picture has a sharper focus, it will also take years before the plans become products available in the marketplace. Nonetheless, MSA won approval last week from users, who say what counts is that MSA is on the right track.

"I sense they are taking the bull by the horns in the manufacturing area," said Matt Perri, director of MIS at BASF Corp. "I've been watching what they're doing, and it doesn't make me nervous."

Representing 40% of revenue, manufacturing software is a critical piece of MSA's business. During the past two years, the company has reshaped and rede-

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Inside

- Computer Associates designs graphics tool said to link devices. Page 24.
- Object-oriented pioneers introduce DBMSs for commercial market. Page 25.
- V. I. Corp. enhances Dataviews graphic software products. Page 27.

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Computer Associates graphics translator links varied systems

GARDEN CITY, N.Y. — Computer Associates International, Inc. recently introduced a graphics software tool that it said will link mainframe, mid-range and microcomputer graphics and software devices.

CA-Graphics Connection is another step taken by Computer Associates to position graphics as an integral part of everyday business, the company said.

The new product serves as a graphics translator and is said to allow users to move graphics data from a variety of graphics-producing applications to a number of graphics output devices, electronic publishing systems and graphics editors.

Supports common formats

The product supports four common formats: Hewlett-Packard Co.'s HP-GL, IBM's ADMGDF, ANSI-standard CGM and Computer Associates' own Disspop. The company said it covers nearly all graphics-producing applications by supporting these formats.

With this support, CA-Graphics Connection can support such mainframe and minicomputer products as CA-Tellagraf, CA-Disspla, SAS Institute, Inc.'s SAS/Graph, SPSS, Inc.'s SPSS Graphics and Panaphic Systems, Inc.'s D-Pict.

It also allows access to such microcomputer applications as Lotus Development Corp.'s Freelance Plus, Ashton-Tate Corp.'s Draw Applause and Computer Associates' Superimage and Superchart.

CA-Graphics Connection will begin shipping this month. Initial versions were designed for the IBM MVS and VM operating environments as well as for the Digital Equipment Corp. VMS platform. Prices for the DEC platform range from $6,000 to $21,000. The IBM versions range from $11,000 to $26,000.

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CONTROL DATA

Adpac analyzer gives blueprint of source code

SAN FRANCISCO — A $60,000 source code analyzer and documenter is now available for PL/I programs from Adpac Corp.

Adpac has adapted its PM/SS system for Cobol source code analysis to work with the IBM-originated PL/I language. The system analyzes the structure and content of a PL/I system and documents the relationships among its components, such as data elements, data sets, copy or include books and source programs, company spokesmen said.

The PL/I analyzer, also used to perform data name rationalization, automates the cleanup of redundant data used in the population of data dictionaries. It also enforces control over naming and other programming standards.

Tells you what to do

The product tells the user "how a system is structured, what design principles were employed and the availability of documentation," said Al Vickers, sales manager.

PM/SS also interfaces to Adpac's line of computer-aided software engineering tools, DFDP and Design. It was designed to run under either MVS/SP or MVS/XA.

Adpac is a 25-year-old company that provides tools for MVS. Company spokesmen said PM/SS is in use at 120 businesses.

Harrison

CONTINUED FROM PAGE 23

nance programmer's tool kit. They include Data-Xpert from XA Systems Corp., Via/Insight from Viasoft, Inc. and Cobol restructurer Retrofit from Peat, Marwick, Main & Co.

Changed some minds

The Programmers Workbench "is a product that has changed the way we think about the maintenance programmer's task," said Richard K. Ball, director of the Software Management Institute.

"Richard [Harrison] is a man of immense intelligence, imagination and will to get things done," said Nicholas Zvegintov, publisher of *Software Maintenance News*. "The mere availability and promotion of the Programmers Workbench has changed the way the software profession looks at maintenance tools," Zvegintov wrote in the latest issue of his newsletter. Harrison was named Newsmaker of the Year at the Software Maintenance Association's conference in Toronto last year.

Harrison resigned Friday to establish a printing business with his wife in the hotel-studded suburb of Arlington, Va. After incessantly promoting the workbench, Harrison is leaving it in the hands of Diane Herdt, the center's workbench manager.

Rand Information Systems will continue to make the base configuration available as Chapter 11 reorganization begins. Center officials said the platform is an ongoing asset of the company, and Rand officials have indicated they expect to return to normal operation after creditors are satisfied.

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Ontologic clears way for VAX-based Vbase this month

BY CHARLES BABCOCK
CW STAFF

An object-oriented data base management system, Vbase, is now available from Ontologic, Inc., and the Gemstone object-oriented system from Servio Logic Corp. is now available on Sun Microsystems, Inc. workstations.

Object-oriented systems are capable of handling data in more complex forms than other DBMSs and have been used heavily in computer-assisted design functions in which text, designs and images are frequently stored in the same file.

Vbase runs on Sun workstations and is scheduled to be available for the Digital Equipment Corp. VAX this month at prices starting at $14,900.

In Vbase, objects have three elements. "Properties" model such attributes as the size, color or cost of an object; "relationships" link objects together; and "operations" model the activity of the object — what it does. These elements can be combined in a Vbase file, according to Robert P. Berkowitz, president of Ontologic.

Vbase is written in C and supports C and SQL in applications. It includes type-definition language, which serves as an object specification compiler, and extensions to ANSI C in a C language compiler that provides access to data base objects.

The product also includes development tools debugging at the model level.

The 45-employee company, based in Billerica, Mass., said it plans to provide a version for Apollo Computer, Inc. workstations in the third quarter.

Gemstone valuable to Sun

Servio Logic in Beaverton, Ore., introduced Gemstone for the Digital Equipment Corp. VAX in January and is now offering it for Sun-3 and Sun-4 workstations. It is priced between $19,950 and $85,270.

Gemstone uses a client/server approach. The data base server operates on a VAX or a Sun workstation and includes Opal, an object-oriented programming language for data definition and manipulation.

Clients may reside on either the host VAX or another VAX, the host Sun or a Sun-3 workstation, an IBM Personal Computer or a Tektronix, Inc. workstation. The company plans to add the Apple Computer, Inc. Macintosh to the list this year, said Michael Connell, general manager of data management systems.

The client software includes the Opal Programming Environment, which features windows, high-resolution bit-mapped graphics and a mouse. Applications may be written in C or Smalltalk and can run on either the workstation or the host, Connell said.

Gemstone stores data structure, behavior and value in the data base rather than in the application, making it a general-purpose system for dealing with large volumes of complex data, he said.

The Gemstone system also provides multiuser access to data with concurrency control, access through value-keyed indexes, authorization and security, clustering for efficient retrieval and recovery features, according to the vendor.

Objects are members of different classes that determine what procedures may be used for performing operations on them.

DB2 tool gets upgrade

Now application builder can order from catalog

BY CHARLES BABCOCK
CW STAFF

FORT LEE, N.J. — On-Line Software International, Inc. is slated to announce today that it has added the ability to populate the dictionary of its DB2 application building tool, Casepac, with data from the DB2 catalog.

The Population Facility added to Casepac in Release 2.0 eliminates the need to re-enter information from the DB2 catalog into the product dictionary, as earlier releases had required.

The Population Facility, which previously read IBM IMS file structures, can now also read Cobol programs and copy libraries. This feature allows Casepac to locate data items used in the application.

Compare and save

The Casepac dictionary can also compare its contents with those of the DB2 catalog, allowing it to capture any changes made to the data base from outside the dictionary. The comparison facility also lets Casepac detect discrepancies and alert those involved in the development process to possible infringements on integrity, according to Jeffrey Weinberger, Casepac product marketing manager.

Casepac also includes an Impact Analysis facility to identify all elements of an application that will be affected by a proposed change and the effort required to implement those changes across the board, Weinberger said.

The Impact Analysis component documents the results of changes to a system. "Where used" reports identify programs that have been affected by a modification. "How used" reports distinguish between inquiry and update processes, according to Weinberger.

The new release also supports key-based modeling. Primary and secondary keys are defined to aid data base design. Key-based modeling helps users ensure referential integrity of the data model, Weinberger said.

Casepac 2.0, a joint venture of On-Line Software and Tata Consultancy Services in Bombay, India, is available immediately for $200,000 under MVS/XA.

MSA

FROM PAGE 23

fined the software. First, MSA purchased two manufacturing software companies, Conserv and RTS Ltd., to fortify its manufacturing applications lineup.

Then it spun off the manufacturing business as a separate subsidiary, Advanced Manufacturing, Inc. Recently, however, the company pulled the subsidiary back into the corporate fold. While it will remain a subsidiary, it will no longer have its own separate sales or research and development effort. Company executives said this is an attempt to make the operation more efficient by cutting additional layers of management.

The acquisitions had left MSA with a collection of applications, including two competing systems for IBM mainframes, an application suite for Hewlett-Packard Co. minicomputers and applications for the IBM System/36 and 38 platforms.

In an interview at the Interact MSA users group meeting recently, Michael Hunt, president of Advanced Manufacturing, said development work is under way to merge the two mainframe offerings: Amapa-M, the original MSA software; and Amapa-Q, the Conserv product. "We recognise we can't keep up with the support of two," Hunt said.

Hunt said it will take four or five years to merge the two Amapa in a phased process of releasing software updates as common modules that will run in both the Amapa-M and Amapa-Q environments.

Meanwhile, a second development effort is under way to integrate the RTS software, which includes both manufacturing and financial applications, with the mainframe applications. This would eventually allow a user to run remote System/36 or 38 applications that tie into the mainframe manufacturing system.

Like the plans to merge the mainframe packages, this effort has a way to go before it becomes reality. Scheduled deliveries begin later this year, according to Maurice Spillane, an MSA vice-president. MSA plans to integrate the two environments in phases, adding modules to the integrated environment in the next two years, he added.

Plans for manufacturing software that runs on the HP Series 3000 platform are behind schedule. The company had announced last year that a version of this software would be available for the new HP Spectrum series by the end of 1987. MSA has not yet shipped this version, Hunt said, because HP was late in shipping MSA the Spectrum hardware.

When MSA purchased Conserv, "there was a lot of confusion. I think they ate a bigger fish than they thought they did," said Thomas Sullivan, manager of logistic systems at Miles, Inc. in Elkhart, Ind. "Now it seems pretty steady."

Ramis 4GL DBMS retains IBM focus

BY ALAN ALPER
CW STAFF

FORT LEE, N.J. — On-Line Software International, Inc. recently brought out a new release of its Ramis fourth-generation language and data base management system said to support IBM's MVS/XA operating system and offer read/write interfaces to IBM's DB2 and SQL/DS.

In its first release since acquiring Ramis 18 months ago, On-Line is seeking to improve the system's performance and provide ease-of-use features to increase its competitiveness, according to Jonathan Smith, product marketing manager.

Rather than expand the number of platforms Ramis runs on, as its primary competitor Information Builders, Inc. has done with Focus, On-Line has concentrated on the IBM mainframe environment and connectivity to Microsoft Corp. MS-DOS-based microcomputers, Smith noted.

Staunch support

"We believe a lot of users will remain on the mainframe, and we're not going to leave them," he asserted.

Users queried last week said the major improvement in Ramis Release 7.1 is that all of its functionality is now bundled in a single package, in contrast to the separate components offered in previous versions.

"There's more continuity with this release than ever before," noted Paul Tinnirello, assistant vice-president of programming at A. M. Best Co., an Oldwick, N.J., provider of insurance industry information.

There are approximately 1,300 Ramis installations, Smith said, adding that the number has increased by about 10% since the product's acquisition from Martin Marietta Data Systems. He noted that the company has sold in excess of 3,500 Ramis personal computer workstation licenses, the system's micro implementation, in its first year on the market.

High-powered answer

By supporting MVS/XA, Ramis Release 7.1 provides improved systems resource utilization, Smith said. Significant portions of Ramis applications will now run above the 16M-byte line in the MVS/XA environment, easing resource contention problems that result from Ramis use during the production cycle, he said.

Additionally, a new CICS interface is said to enable multiple copies of Ramis to run in multiple CICS address spaces as started tasks. This should relieve overhead currently imposed on CICS users, Smith noted.

The new release is also said to enable users to automatically extract or maintain DB2 or SQL/DS tables from the appropriate catalog without using SQL commands via Ramis's integrated data dictionary.

Users enter the full creator, table and column name in the interface main menu and a corresponding Ramis file description is generated. Once extracted, the user is able to access the file through Ramis's retrieval and reporting facilities. "This extends ease of use, since data from other data bases can be easily extracted without having to spend time and money on support costs," Smith emphasized.

Ramis's menu-based architecture provides access to all reporting, screen design, data maintenance, dictionary and applications development tools. A new facility, called Menu Expert, enables users to build applications without using Ramis syntax. The user is guided through the development process by a series of context-sensitive menus to generate compiled code and screen formats, Smith said.

Another feature, File Expert, is a full-screen editor for Ramis, IBM's IMS, VSAM, QSAM and ISAM file descriptions. Using File Expert, data can be assembled to and from flat, hierarchical or relational files for reports. A file description editor for Cullinet Software, Inc.'s IDMS/R, based on File Expert, is also offered with the new release.

Bozman

CONTINUED FROM PAGE 23

than six months' DB2 experience.

Concerned about DB2 sales, IBM took its own snapshot of the DB2 user base last year. The survey's results were reported to the BMC conference by Marilyn Bohl, the former DB2 product manager who resigned last August to become vice-president of development at Digital Research in Monterey, Calif.

IBM's survey of those who bought DB2 last year, Bohl said, showed that 51% still run IMS, IBM's traditional transaction-processing DBMS. About 25% had no other DBMS installed, Bohl reported, while another 12% owned a competing relational DBMS.

When DB2 Version 2.0 becomes available for shipment in October, it will contain referential integrity, auditing features and improved recovery features — all of which were lacking in DB2 Release 1.3 [CW, April 25].

In view of these changes, it would be reasonable to expect that DB2 will be pressed into increasing production use, at least in those large shops that are planning to convert to the MVS/ESA operating system and produce transaction-oriented relational applications.

A case in point is Flying Tigers, a DB2 site that has 10 production tables, each with 300,000 or more records. Steve Kwan, a DB2 data base administrator who attended the BMC conference, reported that his IBM 4381 required CPU minutes — instead of CPU seconds — to generate certain inventory reports. As slow as that seems, Kwan says, DB2 still saved Flying Tigers time.

What does the future hold for DB2 users? Well, IBM has done quite enough arranging for now, BMC's Olson believes. He says he expects some enhancements in 1989 — but nothing on the order of what happened two weeks ago.

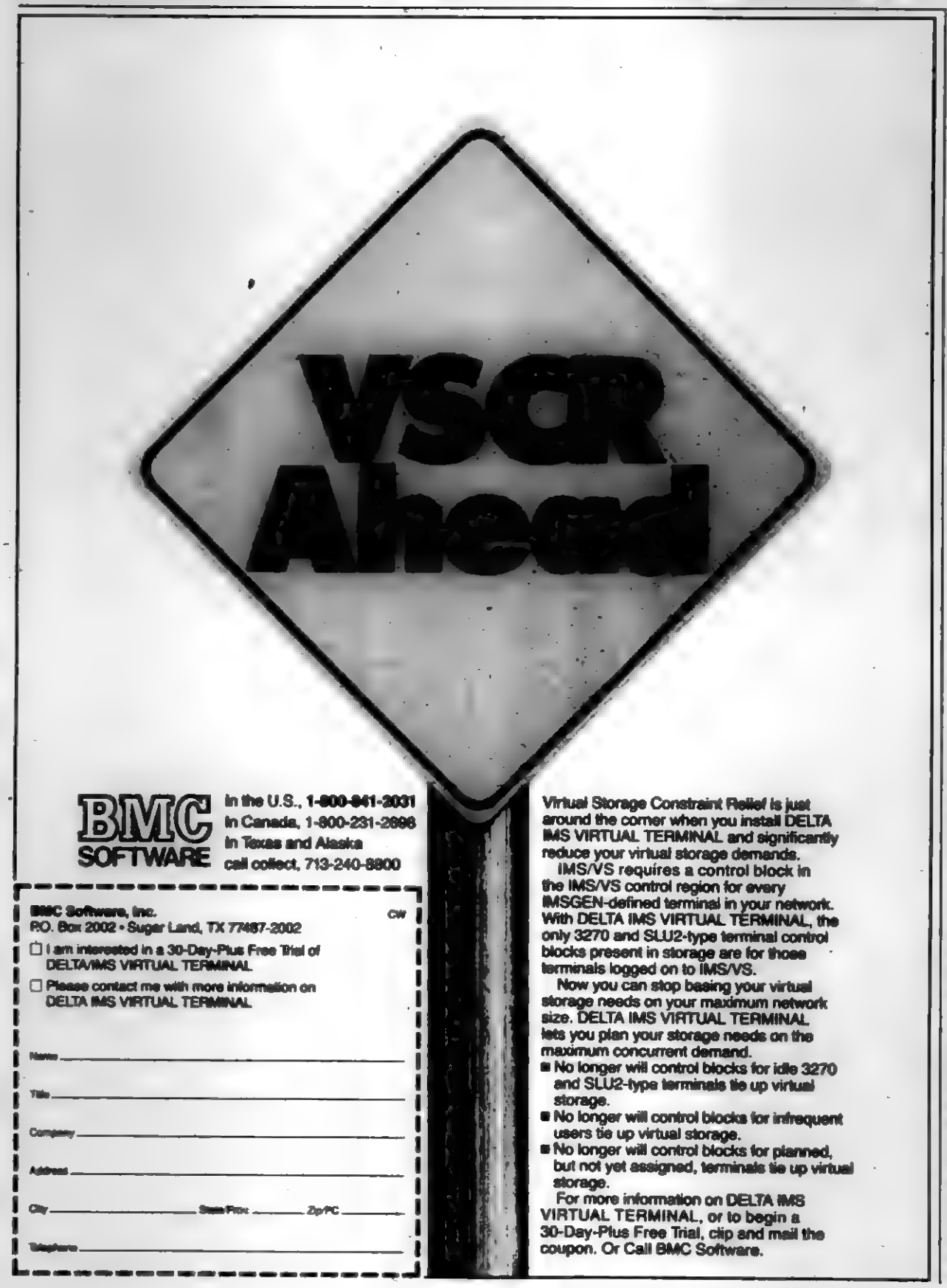
Looking behind and ahead

Behind the scenes, IBM is said to be working on adding distributed data base technology to the DB2 product line. To do this, IBM will be applying artificial-intelligence features to help PC users ask remote DB2 data bases for answers to their queries.

And that's not all. "IBM's intent is to provide a high-level programming product using LU 6.2 and APPC as a call interface to [remote] applications," says Bohl, who worked at IBM for 19 years.

Now that IBM is listening closely to users, ease of use will be the goal of future DB2 systems, Bohl says. And yet a lot of work remains to be done. "It's a great world when anybody can update a data base from anywhere," Bohl says. "But it will be some years from now before that happens." Users may infer that, like a time-release capsule, DB2 features will be delivered in measured doses.

Bozman is Computerworld's Chicago-based Midwest correspondent.



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Expert system

CONTINUED FROM PAGE 23

troubleshooters by saving them hours of poring over MVS performance data, according to Bruce Ketchledge, a developer of the product at ADR.

Mindover MVS scans the mainframe with the same procedures used by ADR's Look MVS operating system performance monitor. Look MVS is not a prerequisite for Mindover MVS, however.

A communications link tied to the monitor transmits information to the expert system on a PC. The PC must be an IBM Personal Computer AT or Personal System/2 Model 50, 60, 70 or 80 running IBM PC-DOS 3.0 or higher with a 2M-byte hard disk.

Minding metrics

Mindover MVS measures about 400 metrics — such as the number of jobs in a wait state or system-task paging as a percentage of the total paging rate — across 12 areas of MVS performance, including CPU throughput, I/Os, paging and swapping.

By operating 24 hours a day, it can spot problems in system use and make recommendations on what to do about them while they are still small, according to Michael Anthony, director of systems product marketing.

Data collected from the operating system is fed into an analysis module on the PC, where exceptions or problems trigger a forward- or backward-chaining reasoning process through the rules of the system's knowledge base. The rules represent the combined expertise of ADR's performance analysts, Ketchledge said.

Users may recreate the reasoning chains behind Mindover MVS recommendations, providing an explanatory process to a junior system programmer learning MVS tuning, Anthony said. References to appropriate IBM documentation are also provided, he said.

As an example of the product's use, Anthony described a system operator using it to troubleshoot poor response time. Mindover MVS responds that excessive paging is slowing the system down and recommends that operators consider isolating the frequently accessed data set in storage to reduce paging. It would take the product 20 to 40 minutes to analyze such a situation and make recommendations, Anthony said.

The vendor has been shipping the first release of Mindover MVS at a price of $42,500 since March 31, with 16 licenses so far.

NEW PRODUCTS

Systems software

A cross-reference and documentation software package for IBM MVS-based systems has been announced by Computer Concepts, Inc.

Called QXR-19, the software is said to allow users to build a data base of cross-reference information to manage MVS libraries. According to the vendor, it can access and research libraries containing source code, object modules, procedures, IBM JCL, load modules and user-defined records. The data is output to a data base that can be accessed either on-line or by batch processing.

QXR-19 can be run interactively under IBM's TSO, ISPF or Roscoe. It licenses for $295 per month for a one-year lease and $8,850 for a 99-year lease.

Computer Concepts, Suite 150, 9900 S.W. Greenburg Road, Tigard, Ore. 97223. 503-639-1450.

Applications packages

An enhanced version of Dataviews, a line of graphics software products for displaying data in real-time graphics, has been announced by V. I. Corp.

Dataviews 6.0 allows users to design their own interface and control application programs, the vendor said. Other features include enhanced cut-and-paste capabilities and 39 graphics options.

Dataviews includes DV-Tools, a subroutine library that incorporates input and graphics output capabilities, and DV-Draw, a drawing editor.

Dataviews runs on engineering workstations under Unix or IBM's MVS. Prices start at $7,700 for DV-Draw and $17,700 for DV-Tools and DV-Draw. Run-time licenses start at $3,000.

V. I. Corp., Amherst Research Park, Amherst, Mass. 01002. 413-253-3482.

A business planning and control and financial modeling software package for Digital Equipment Corp. VAX systems has been announced by Holistic Systems, Inc.

Holos features a personal computer-like user interface, multidimensional modeling and links to SQL-based data bases, according to the vendor. It provides both tabular and graphical reports, which can be used for input and modification of information as well as for output, the vendor said.

Holos is priced from $40,000.

Holistic Systems, Suite 2500, 7400 E. Orchard Road, Englewood, Colo. 80111. 303-721-0276.

Utilities

Davis, Thomas & Associates, Inc. recently released Version 3.0 of its remote print software, DTA/Print.

DTA/Print 3.0 was designed for IBM VM Spool queues as well as for IBM DOS/VSE Power queues. The software is a report distribution and viewing system that reportedly allows any report in any Power or VM Spool queue to be routed to any attached CICS printer or CRT. Security features allow any Power or VM Spool file protection as well as system and printer control.

DTA/Print 3.0 costs $5,000 for access to Power queues and $7,000 for access to both Power and VM Spool queues.

Davis, Thomas & Associates, 550 Waterford Park, 505 N. Country Road 18, Minneapolis, Minn. 55441. 612-591-6100.

A utility for validating IBM JCL syntax and standards has been announced by Consumer Systems Corp.

Called JCL Audit, the software is said to allow users to determine if their OS/MVS JCL is free of errors before the production run. It also reduces job reruns due to JCL errors, the vendor said, and helps ensure compliance with corporate JCL naming conventions.

JCL Audit costs $8,250.

Consumer Systems, 2 E. 22nd St., Lombard, Ill. 60148. 312-495-8822.

Development tools

Softech, Inc. has announced an improved pricing structure for its Ada-86 Ada cross-development system for the Intel Corp. line of microprocessors.

One object code license for the full line of Intel microprocessor cross-development systems hosted on a Digital Equipment Corp. Microvax 2000 is now priced at $4,000. Licenses for more powerful DEC processors are priced as follows: Microvax II, $8,000; Microvax 3500, $9,000; VAX 8250, $10,000; VAX 8600 series, $18,000; VAX 8700, $21,000; and VAX 8800, $25,000.

Softech, 460 Totten Pond Road, Waltham, Mass. 02254. 617-890-6900.

Sybase, Inc. has ported its Sybase Datatoolset line of application tools to Sun Microsystems, Inc.'s Sun386I workstation.

The Datatoolset is a component of the Sybase system, an SQL-based relational data base management system for on-line applications.

A development version of the Sybase Datatoolset for the Sun386I workstation costs from $3,000 to $4,000. The run-time software system, when purchased with the development system, is priced at $1,000.

Sybase, 2910 Seventh St., Berkeley, Calif. 94710. 415-548-4500.

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MICROCOMPUTING

MICRO BITS

Ed Scannell

Microsoft snubs Unix?

A vested interest? Microsoft may be soft-pedaling its commitment to the Unix market in the face of recently lost momentum. Late last month the company put out a backgrounder discussing and explaining binary standards (defined as a group of applications compatible with a hardware base), and questioned whether Unix would ever become such a standard.

This is a curious development, considering that Microsoft was once a major advocate of Unix and has long promoted the fact that Xenix outsold all other derivatives of Unix. Adding to the irony is that Microsoft signed a deal with AT&T to develop a Unix version for the 80386.

However, in the highly political Unix wars, Microsoft may have come out on the losing end with the recent Unix announcements from AT&T and Sun Microsystems — Microsoft didn't even attend the AT&T/Sun press conference. And Microsoft has been hesitant to discuss the Presentation Manager-style interface it hinted about delivering for Unix.

Continued on page 34

Lotus spices up corporate CD

BY DOUGLAS BARNEY
CW STAFF

CAMBRIDGE, Mass. — Lotus Development Corp., which continues to plug away at the nascent market for CD-ROM data, today announced the second release of CD/Corporate, a product that delivers data on 12,000 public U.S. corporations.

Primary users have been in banking, investment, consulting, accounting and schools of management, Lotus officials said.

The system, acquired last year from Datext, Inc., consists of a compact disk/read-only memory (CD-ROM) player and a set of CD-ROM data disks containing the information. Users query the system in a variety of ways via menus and can print the results. According to David Roux, vice-president of Information Services Group at Lotus, the system is intended to provide pertinent information in a useful form.

Although highly beneficial for particular organizations, CD/Corporate is not inexpensive. Users get the player and 600M bytes of compressed data at prices ranging from $13,000 to $18,500.

Access improved

The latest release boasts a host of new features, primarily aimed at providing users with more sophisticated data base querying and screening capabilities. Now, users can employ the menus to screen and access information based on some 150 descriptive and financial variables.

CD/Corporate consists of seven different data bases: Disclosure II, Investext, Promt, ABI/Inform, Who's Who in Finance and Industry, Media General and Market Guide.

From these data bases, users can get financial statements, 10K excerpts, investment analysis reports, trade-press abstracts, executive biographies and stock prices and trading data.

The system even includes esoteric bits of information, such as Digital Equipment Corp. President Ken Olsen's resume.

The system also features access to Dow Jones News/Retrieval and CD/Newaline.

CD/Corporate is considered to be part of Lotus's One Source product line, which includes a variety of numeric and reference data bases, all accessed via CD-ROM.

One Source includes data bases on international companies, commercial banks and sav-

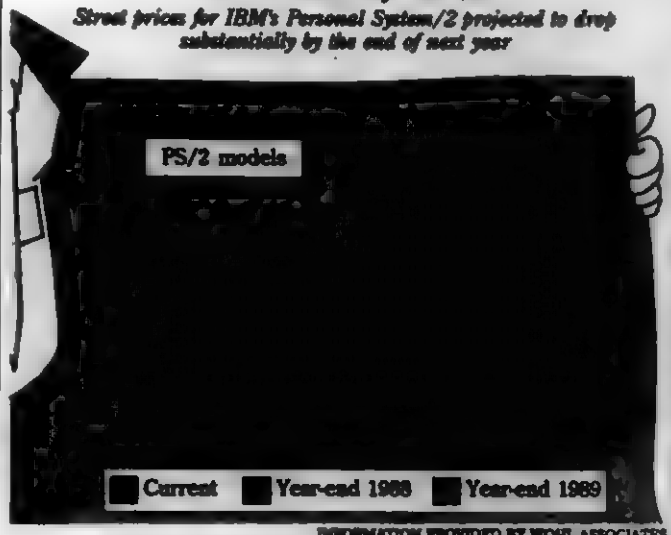
Continued on page 35

Inside
- Page preview latest feature in Santas word processing software. Page 35.
- Ovonic announces electronic filing and imaging system for IBM PC XT, AT and compatible users. Page 37.

Data View

Psst! Wanna buy a PS/2?

Street prices for IBM's Personal System/2 projected to drop substantially by the end of next year



INFORMATION PROVIDED BY WOHL ASSOCIATES
CW CHART: AMY J. SWANSON

Firm pushes laptop package over piecemeal purchases

BY DOUGLAS BARNEY
CW STAFF

EVERETT, Mass. — Laptop computers are frequently bought like furniture: The customer often picks out one main piece and then loads up on accessories until the room is filled. The machine itself may be bought; then things like modems and printers are laboriously added.

A firm called Microdirect, Inc. says this is the wrong way to buy a laptop. Instead of piece-by-piece purchasing, the firm is offering an entire system: the laptop, an inkjet printer and an optional battery-powered portable

Continued on page 35

Microdirect's laptop system

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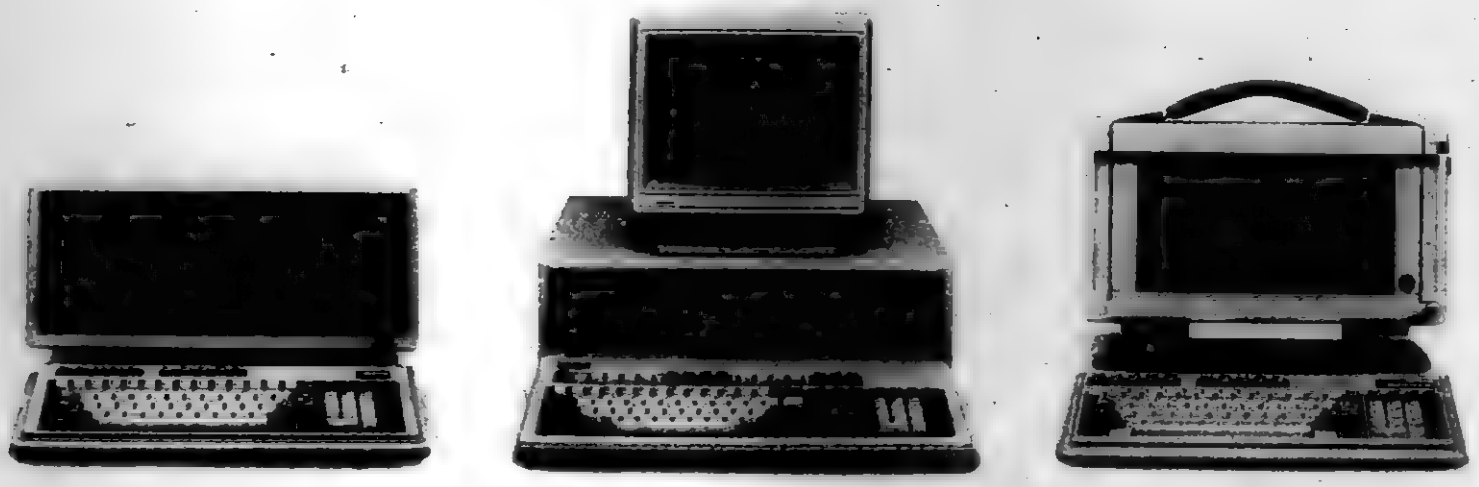

If you want the best there's only

Whether you want the best portable or desktop, the best 80286- or 80386-based personal computer, there is only one choice: Compaq. Because COMPAQ personal computers are consistently rated the best in each class by both industry experts and sophisticated users.

For instance, the COMPAQ DESKPRO 386/20 and the COMPAQ PORTABLE 386 are the most powerful personal computers in the world. Both are based on the 32-bit Intel® 80386 microprocessor, running at a blazing 20 MHz. Both offer the most storage and memory in their classes. And both feature performance enhancements such as concurrent bus architecture, disk caching, and high-speed coprocessor options. All of these features work together to deliver system performance that rivals minicomputers'.

The groundwork for these innovations was laid by the industry's first 80386-based personal computer, the 16-MHz COMPAQ DESKPRO 386. Still outperforming most 80386 machines, it offers high-performance capabilities to users moving up to this class.

In the arena of 80286-based personal computers, the 12-MHz COMPAQ DESKPRO 286 runs your software up to 20% faster than most of its 10-MHz competitors.

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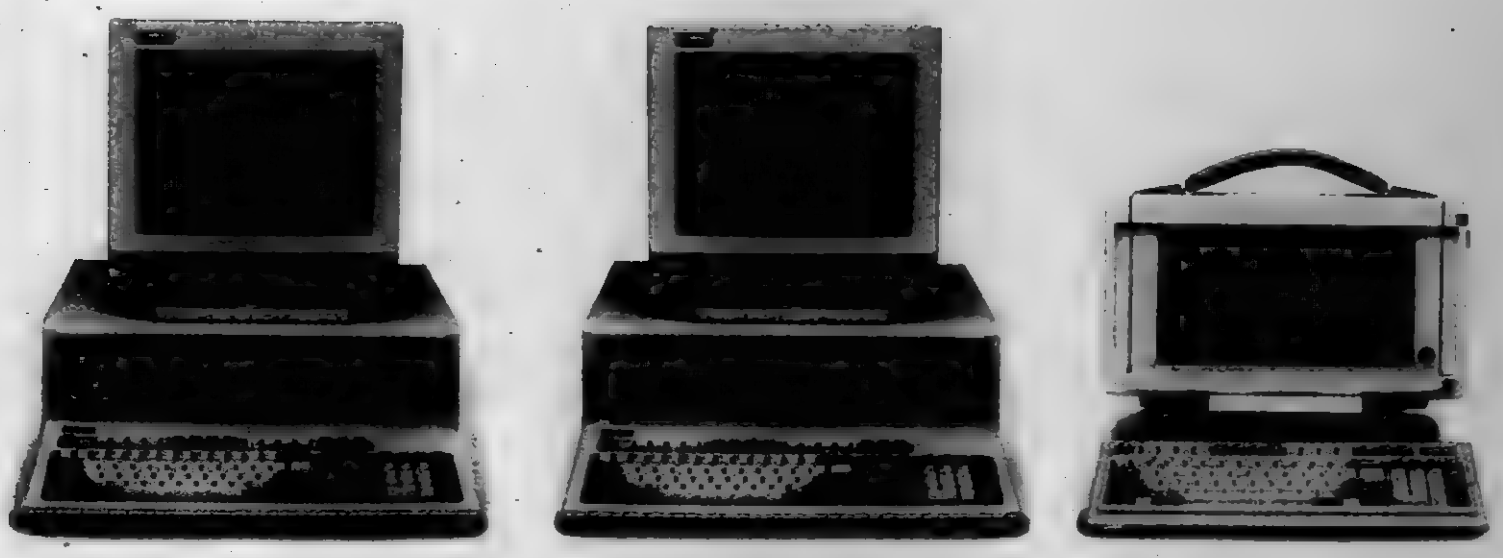
*Based on an independent survey of major brands. †Based on an independent survey of 209 FORTUNE 1000 companies.



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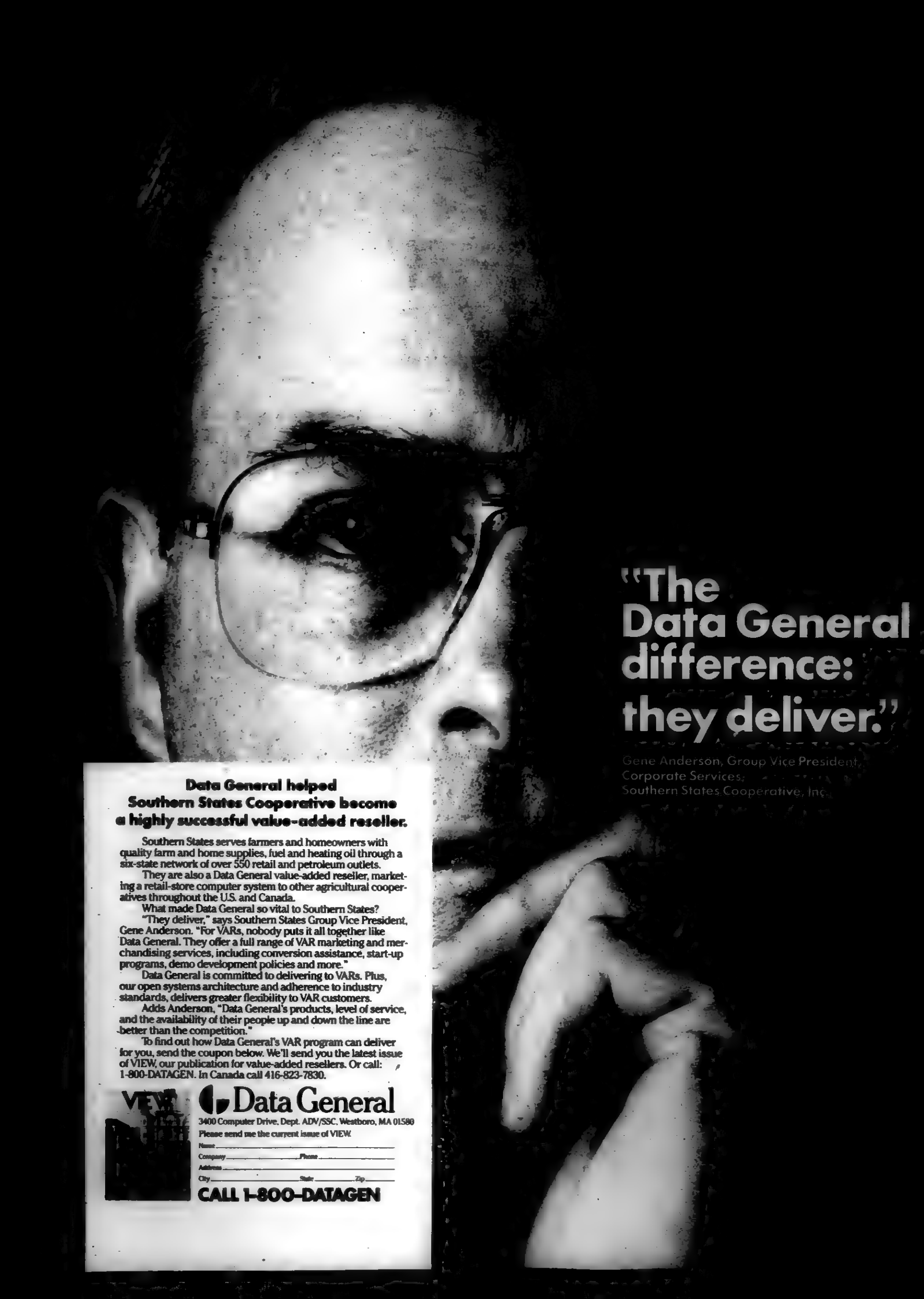

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Gene Anderson, Group Vice President, Corporate Services; Southern States Cooperative, Inc.

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Southern States serves farmers and homeowners with quality farm and home supplies, fuel and heating oil through a six-state network of over 550 retail and petroleum outlets.

They are also a Data General value-added reseller, marketing a retail-store computer system to other agricultural cooperatives throughout the U.S. and Canada.

What made Data General so vital to Southern States?

"They deliver," says Southern States Group Vice President, Gene Anderson. "For VARs, nobody puts it all together like Data General. They offer a full range of VAR marketing and merchandising services, including conversion assistance, start-up programs, demo development policies and more."

Data General is committed to delivering to VARs. Plus, our open systems architecture and adherence to industry standards, delivers greater flexibility to VAR customers.

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SMALL TALK

Jeffrey Tarter

Apple cramps buyers' style

Thanks to Apple's look-and-feel lawsuit against Microsoft and Hewlett-Packard, corporate buyers these days seem to be full of doom and gloom. "Just when we were about to achieve an industry standard graphical interface," they complain, "Apple kicks us back to the bad old days of the A Prompt. . . . Now we've lost our best chance to make computers easy to use."

Well, maybe. But I suspect that much of the knee-jerk reaction to the Apple suit reflects profound misconceptions about the Macintosh interface concepts that Apple successfully popularized. Especially among traditional personal computer users, there is a growing respect for the value of graphical interfaces and for the standardization that Apple managed to impose on Macintosh-based software.

However, there's also a widespread belief that graphical interfaces work like pixie dust — sprinkle a handful of icons over a PC, and it suddenly becomes intuitively easy to use.

Much of what PC users believe about Macintosh-like interfaces is a collection of myths:

Myth I: The Macintosh's interface makes all applications look alike.

For the last four years, Apple has gone to a good deal of trouble to persuade Macintosh developers to follow detailed interface design guidelines. These guidelines define visual elements, including menu styles, dialogue boxes and icons.

The result of this is a framework of consistency that helps novice users learn the rudiments of an application much

Continued on page 35

Clone maker's prosperity tied to success of its PS/2-compatible chip sets

To clone or not to clone has never been a question for Chips and Technologies, Inc., which was formed to create chip sets for vendors seeking to replicate the IBM Personal Computer AT. The firm achieved swift success — net income rose from $1.9 million in fiscal 1986 to $24.7 million in fiscal 1987 — and was instrumental in creating competition in the clone market that ultimately drove prices down and pushed quality up.

Recently, Dell Computer Corp., a Chips and Technologies customer, became the first systems vendor to formally announce an IBM Personal System/2, Micro Channel compatible, followed closely by Tandy Corp.'s PS/2 Model 80-compatible using Intel Corp.'s chip set.

These machines have demonstrated how the future of Chips and Technologies is tied to the success of its PS/2-compatible chip sets.

Chips and Technologies' *Campbell*

But, is corporate America going to buy Micro Channel machines from compatible vendors when it is not even certain that it will convert to Micro Channel machines from IBM?

Even Gordon A. Campbell, president and chief executive officer of Chips and Technologies, said he would have trouble justifying a Micro Channel machine for some members of his staff.

West Coast correspondent James A. Martin and Senior Editor Ed Scannell questioned Campbell recently on key issues surrounding IBM's Micro Channel bus.

Besides Dell, how many OEM vendors have you signed up so far?

Originally, we visited 55 vendors, and at least 30 to 35 of them have been actively pursuing Micro Channel projects.

Most of those, I assume, will turn into Micro Channel machines at some point.

How long after a firm receives the chip sets will a machine be ready for market?

It varies. We've had people who would show a product and make an announcement literally within two weeks of first getting the chip sets. But it's much more typical for them to take two to three months.

Will we see a rush of Micro Channel machines by mid-year?

I think you'll see a number of different Micro Channel-compatible products, as well as systems being shown at Comdex/Spring '88.

I think this year, the show will have a little more significance than normal because of the PS/2 compatibles that will appear for the first time.

Concerning IBM's threat to sue over the Micro Channel, how much of that has

Continued on page 35

Macintosh tool fails to dig niche in market

BY JULIE PITTA
CW STAFF

CUPERTINO, Calif. — Apple Computer, Inc.'s personal tool kit for the Macintosh, Hypercard, has proven to be something of a disappointment. Despite a celebrated launch last August, Hypercard has failed to capture the imaginations of corporate users and large third-party software developers.

"Apple had very lofty goals for it [Hypercard], and they haven't been met yet," said Bill Higgs, an industry analyst for Infocorp, Inc. "They had hoped to create a whole new class of software based on Hypercard, but the major software developers and publishers haven't used it."

Touted as a tool that would allow the average user to create personalized applications, Hypercard appears to have gained only lukewarm acceptance among corporate users. Like a new toy, Hypercard received a lot of attention at the beginning, but it was then set aside like so many other gadgets.

Hypercard

Price: $49 stand-alone, but currently bundled with every new Mac

Requires:
- Mac Plus, SE or II
- 2MB bytes of RAM for use with other applications under Multifinder
- Two 800K-byte flexible disk drives or one hard disk drive and an 800K-byte flexible disk drive
- Two expansion slots

"It's dangerous to assume that users will take advantage of a feature just because it is available to them," Higgs maintained, noting that few users will spend the time necessary to develop Hypercard applications. "The way Hypercard is receiving more widespread use is by diligent users passing along Hypercard 'stacks' they have written to co-workers," he added.

Michael Cromar, director of information resources for American President Companies Ltd. (APC), a shipping firm based in Oakland, Calif., said Hypercard has yet to be "institutionalized" at his company.

"It hasn't taken off," Cromar admitted. "It needs to be multiuser and be able to work in a multitasking environment to really take off so that information can be shared with other users."

For his own use, Cromar has built personalized data bases

Continued on page 34

Defense network mimics human brain

BY ALAN J. RYAN
CW STAFF

SAN DIEGO — Centuries ago, brain power and human logic helped advance combat weapons from hands and rocks to guns and cannons. But in the near future, sophisticated defense systems may incorporate computers that actually mimic the human brain.

To achieve this goal, the Army's Laboratory Command, Electronics Technology and Devices Laboratory has recently awarded a multiphased contract to Hecht-Nielsen Neurocomputer Corp. (HNC), to identify 10 Army battlefield areas that could be improved using neural networks.

'Learning by example'

Neural networks provide a computer with the ability to learn by example. The most significant difference between neural networks and traditional computers, including artificial intelligence systems, is their self-organizing ability.

This is a technology that could prove critical in defense applications in which human error could cost lives.

The systems, which are based on models of how the human brain encodes and processes information, have not been previously used in defense systems, according to Robert North, president and chief executive officer of HNC.

North said the HNC neural network architecture provides many of the capabilities needed to solve critical defense problems. According to North, even simple neural networks exhibit complex behaviors such as learning, pattern recognition and associative memory.

These capabilities, difficult or

Continued on page 35

Top sellers

Software: April 25-29

1	Lotus's 1-2-3
2	
3	Fifth Generation Systems' Fastback
4	
5	IBM's Displaywrite 4
6	
7	Ashton-Tate's Dbase III Plus
8	
9	IBM's Fixed Disk Organizer
10	

INFORMATION PROVIDED BY COMPUTER SOFTWARE, INC.
CW CHART

Scannell

CONTINUED FROM PAGE 29

Microsoft can't wriggle out of its commitment to Unix altogether, but we think people will be watching a little more carefully what Microsoft does in that market.

Such a deal. If I were one of the folks over at Ashton-Tate, I'd be feeling a little like someone who just bought swampland in Florida.

In an editorial in its monthly newsletter, Worldtech said its experience in working with Dbase IV SQL technology led the company to reject it. Worldtech, if you remember, sold its SQL technology to Ashton-Tate last year.

Under Wordtech's development approach, an SQL query is translated into the equivalent Dbase query, which is then executed by the Dbase engine.

Wordtech said this process is slow and memory-intensive, but the most limiting factor is that it doesn't allow Dbase to talk with larger systems. Dbase IV's "one-way" communication capability only lets mainframes query micros, according to the editorial.

According to Worldtech, a better approach to SQL is to bring together a Dbase front end with an SQL engine. This approach allows greater interoperating system communications and improved performance.

But Ashton-Tate plans to do exactly this, based on its SQL Server agreement with Microsoft, so the Wordtech criticisms apply only to Dbase IV as a standalone system.

Wordtech said it is committed to this same approach in developing SQL support for its products.

It won't be long now. At a recent press conference, Phillip White, Wyse Technology's president, said that the patents on IBM's Micro Channel architecture could be available in Europe as early as September.

White said he doesn't expect them to be available in this country, however, until next April. While Wyse is interested in Micro Channel technology, White said his company probably wouldn't deliver a clone until all the legal ambiguities were clarified.

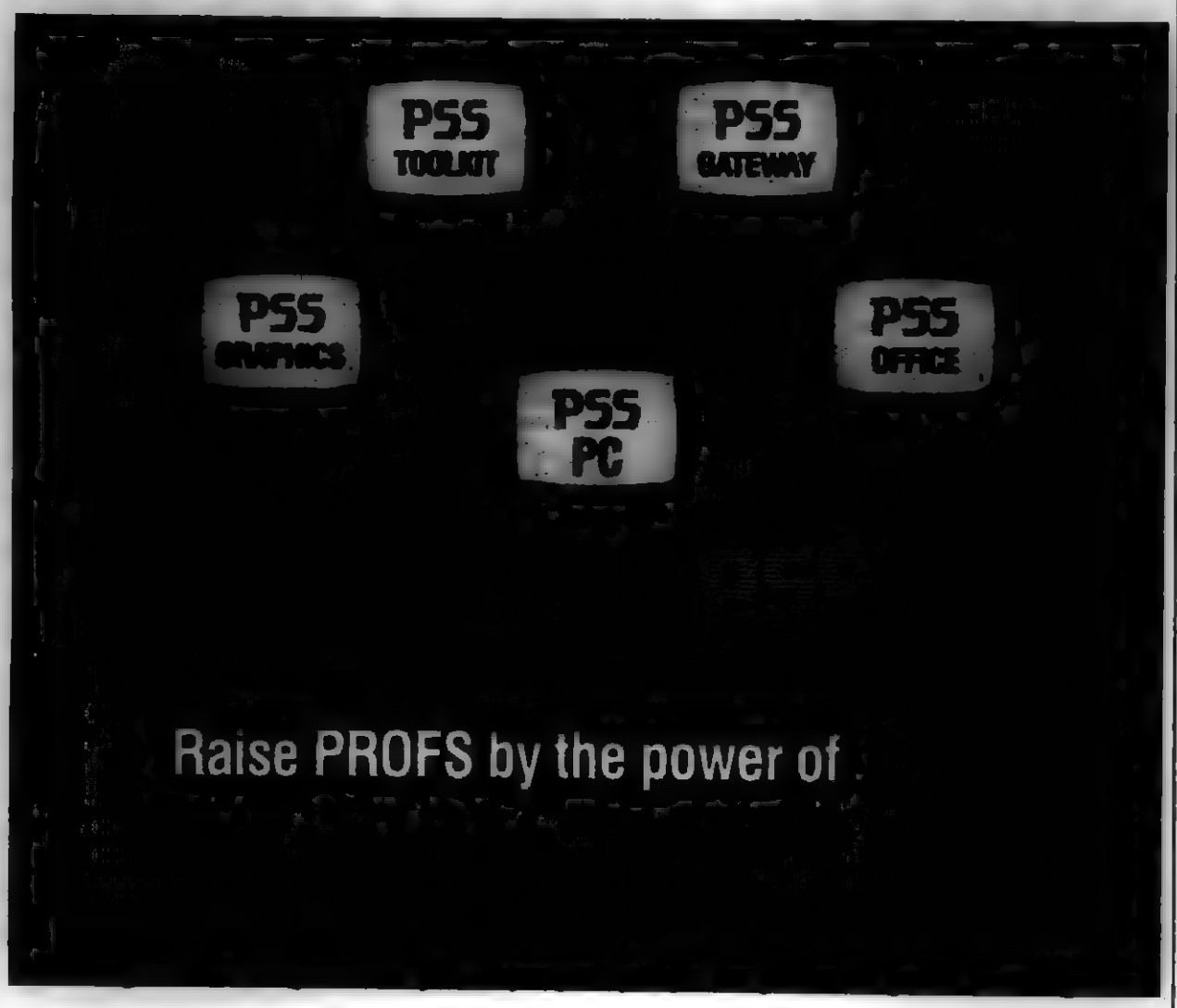
Commenting on the recent Micro Channel architecture clones introduced by Tandy and Dell, White made an interesting point about why the two, in part, were early to announce. Because both companies have control of their own distribution channels, they don't need to indemnify third-party dealers, which could prove costly if IBM eventually decides to bring suit.

While this isn't the main reason Compaq and other vendors that rely on dealers are hesitant to deliver Micro Channel architecture clones, it is another thing to think about.

Aside from the usual talk of Micro Channel, White said he expects the demand for Presentation Manager to be slow because of the ongoing shortage of memory chips and their prices (which are expected to continue to rise).

He added that he doesn't think companies with large numbers of 512K- and 640K-byte IBM Personal Computers will want to dish out major bucks to get the necessary 3M to 4M bytes to run both Presentation Manager and the versions of OS/2.

Scannell is a *Computerworld* senior editor, microcomputing.



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Macintosh

CONTINUED FROM PAGE 33

such as phone lists and calendars through the use of Hypercard. "I entered my Rolodex," he explained, "by using it. I can remember someone's first name and his company, and with a key word, I can find his full name, title and phone number from a list of 2,000 in a matter of minutes. On an individual basis, it is very handy."

Currently, Cromar is building a specialized data base using Hypercard to list all the publications and documents produced in his department. He hopes to share that data base with other Macintosh users at APC.

Third-party support sought

Steven Morelli, a general manager of financial planning and control at H. J. Heinz Co., said he would like to see major third-party Macintosh software developers support Hypercard so that it could be linked to widely used data base, word processing and spreadsheet packages.

"I would like to have access to [Microsoft Corp.'s] Excel from Hypercard," he said. "If there were linkages to packages like Excel, it could become a real executive tool."

Hypercard has been used to build a part-graphics part-text data base detailing certain processes within Heinz, such as the creation of certain food products.

Jim Hayes, vice-president of Seafirst Corp., a Bankamerica Corp. subsidiary, and general manager of its electronics services division, said Hypercard has received only limited use within Seafirst because of memory constraints.

Most of Seafirst's Macintoshes have either 512K bytes or 1M byte of random-access memory, Hayes said. For optimal use, Hypercard requires at least 2M bytes of RAM.

Hayes said a memory upgrade for Hypercard would not be justified because of the cost. "I don't detect a lot of general enthusiasm for it," he said.

Product protects files from MS-DOS wipeout

BY ED SCANNELL
CW STAFF

MANCHESTER, N.H. — Softlogic Solutions, Inc. has announced a data protection program that ensures the recovery of erased information.

The Data Guardian does not let random chance decide whether file recovery is possible. It blocks Microsoft Corp.'s MS-DOS from writing over an area where a deleted file is located.

The program is actually a series of interrelated programs that guarantee file recovery by taking advantage of the way MS-DOS works.

When MS-DOS deletes a file, a Softlogic spokesman explained, the file name is removed from the directory. The physical data, however, is left on the disk until the space occupied by that file is reused. So the more someone uses a disk following the erasure of a file, the less recoverable a complete file becomes.

Resurrect method chancy

Other file recovery systems recover files by resurrecting the physical data before DOS reallocates the data space and before the directory is reused. Users can recover a complete file only if the space has not been altered and the directory entry is still unused.

When a file is deleted, Data Guardian automatically stores the date, time and file name in a separate directory and saves the data space where the file is located for a period of time specified by the user, which can be up to 99 days.

A visual display and pattern of musical tones lets users know if the Data Guardian system is active or not when a file is deleted.

Programs unique to the Data Guardian include an optional track saver function that protects the hard disk surface by repositioning the drive head every 14 seconds when the drive is inactive.

Softlogic will incorporate Data Guardian into its Disk Optimizer 4.0 product, which will be priced at $69.95. Users of earlier versions of Disk Optimizer can upgrade for $22.50 direct from the company. The product is available immediately.

Samna's page view shows up

ATLANTA — Microsoft Corp. added it to its popular word processor. Now Samna Corp. has followed suit by adding a page preview feature to its high-end word processing software.

According to the company, its latest releases, called Samna Word IV and Samna Plus IV, now allow users to view a document as it will appear when printed.

The feature is useful as documents become increasingly complex, taking on many of the elements pioneered by many desktop publishing packages.

Users can see how fonts, graphs, text and scanned images will look on the page, which can be fine-tuned prior to printing. This saves the time spent printing awkward-looking documents that must be reworked, and saves on paper and toner cartridges as well. The packages provide three levels of magnification, allowing users to hone in on a particular image.

The packages also include a thesaurus based on *The Proximity/Merriam-Webster Thesaurus*, a table of authorities generator and added support for scanned documents and images.

Samna word processing software has been particularly successful in high-end markets such as legal document processing.

Samna Word IV is priced at $595, and Samna Plus IV sells for $695. UNIX versions range from $745 to $11,900, depending on the particular system and hardware configuration.

Defense

FROM PAGE 33

impossible to achieve with conventional computers, can help deliver advanced defense systems for applications such as radar, sonar and image processing, data fusion and data compression, opposing force modeling (war games) and weapons aiming and steering, according to North.

The three areas where the neural network technology will likely impact defense computing are knowledge processing, sensor processing and control, North said.

In knowledge processing, the neural network is able to tolerate contradictory and imprecise data and can process large amounts of information quickly.

"Neural networks can make sense of incomplete or imperfect data, such as an imperfect photograph or an imperfect drawing," explained Jacqueline Townsend, a spokeswoman at HNC.

Sensor processing is aimed at tuning modern sensor systems that already require exceedingly complex algorithms for interpretation.

The neural networks develop their own algorithms based on experience, which may help overcome the complexity barrier while delivering defense systems capable of human-like discrimination.

According to Townsend, "Neural networks, being trained by example, cut down on the software development time."

In control applications, the neural network's self-programming capabilities could lead to robots that can learn to perform tasks by "watching" humans perform them or by feedback from a trial and error approach.

Robots could be used to perform dangerous or repetitive tasks.

Tarter

FROM PAGE 33

more quickly than they do with Microsoft MS-DOS applications.

But, as soon as you move beyond the basics and deal with advanced applications features, all bets are off. A user who expects to migrate easily from Ashton-Tate's Dbase Mac to Acius' Fourth Dimension or Nashoba Systems' Filemaker Plus — or from Microsoft's Microsoft Word to Wordperfect Corp.'s Wordperfect — learns that each application has special quirks that require a serious time investment in learning.

In fact, Macintosh software is occasionally harder to learn than comparable PC applications, because the bit-mapped display allows developers to create screens that are almost as complicated as airplane cockpits.

Myth II: Macintosh-like interfaces will eliminate most of the confusion that MS-DOS users now face.

Graphics environments, such as Microsoft's Windows and the Presentation Manager, may provide a superficial imitation of the Mac interface, but they don't confront the real problem — the MS-DOS world's underlying lack of hardware and software standards.

Sending a file to a printer is an uncomplicated task in the Mac environment, not because of the graphical interface, but because Apple designed its computers, printers, networks and operating system from the ground up to work as a tightly integrated system.

Even with a graphical interface, PC users still face a bewildering permutation of peripherals, network protocols, file formats and software kludges that are often necessary to make the PC handle tasks it was never designed to perform.

Worse, the Windows and Presentation Manager graphical environment falls considerably short of the Mac original in key ergonomic areas. Rather than insulate the user from nuts-and-bolts problems at the operating system level, Microsoft has mysteriously chosen to retain some of the least intuitive features of the traditional DOS environment, including cryptic eight-character file names, an obscure command language and navigation by way of directories and paths.

Myth III: Without a common graphical user interface, the software industry will never settle on any meaningful software standards.

Microsoft and IBM would like users to believe that Windows and the Presentation Manager represent the only possible standard for graphical interfaces. In reality, there are a growing number of competing environments — such as Tandy's Deskmate and the Sun-AT&T Open Look which developers have used to create graphical applications that are Mac-like and legal.

Moreover, the ruckus over graphical interfaces obscures the fact that there are already some significant interface designs that have quietly become de facto industry standards. Lotus's moving-bar menus, Software Publishing, Inc.'s PFS interface and Ashton-Tate's Framework format are familiar to literally millions of users and continue to serve as models for software developers.

Jeffrey Tarter is editor and publisher of "The Soft-Letter," a Cambridge, Mass.-based newsletter for software developers and publishers.

Laptop

FROM PAGE 29

cellular telephone and modem/cellular interface.

In addition to sending and receiving data, the cellular phone can be used for more mundane tasks such as calling the boss, a spouse or a customer. Total cost is $4,995 to $5,500, depending on configuration.

And while many laptops include a modem, these devices require access to a telephone. But Microdirect's cellular capability allows users to communicate with host systems from almost wherever they happen to be, the company claimed.

The laptop, based on the Intel Corp. 80C88 processor, comes standard with 1M byte of random-access memory, two 720K-byte 3½-in. floppy disk drives and a built-in 1,200-bit/sec. Hayes Microcomputer Products, Inc.-compatible modem. A 20M-byte hard disk drive is optional. Systems are also available without a printer or telephone.

The systems, which come with a one-year warranty, are serviced through Bunker Ramo in more than 80 U.S. cities.

Lotus CD

FROM PAGE 29

ings and loan institutions, high technology businesses and U.S. public and private companies.

CD/Corporate will be sold through the Lotus direct sales force, and requires an IBM or IBM-compatible Personal Computer with a hard disk drive and 640K bytes of memory, according to the company.

Users requiring access to CD/Newsline need a 1,200- or 2,400-bit/sec. Hayes Microcomputer Products, Inc.-compatible modem.

HP to sell Laserjet accessory

BY JAMES A. MARTIN
CW STAFF

PALO ALTO, Calif. — Hewlett-Packard Co. has recently announced that it will support and distribute the QMS, Inc. Jetscript accessory kit, which reportedly provides the HP Laserjet Series II printer with Adobe Systems, Inc. Postscript page-description language capabilities.

The $2,795 Jetscript accessory kit, released by QMS earlier this year, includes a full-sized add-in board with 3M bytes of random-access memory that plugs into any IBM Personal Computer AT, XT and compatible and the Personal System/2 Model 30. Also included is another circuit card for the Laserjet I/O slot, Postscript interpreter code and soft fonts to be installed on the IBM PC board and connecting cable.

According to the company, the Jetscript kit is available immediately.

A match made in heaven

The marriage between Postscript and Laserjet was inevitable and much anticipated, analysts said.

Postscript's popularity began in the Apple Computer, Inc. laser printer market and has recently been adopted by many IBM PC-compatible printer manufacturers.

While the HP Laserjet is a top seller among IBM PC and compatibles users, its proprietary printer command language, PCL, does not support Postscript.

Clone maker

FROM PAGE 33

been just plain intimidation to gain time in the market?
I thought IBM was reasonably clear in what it said as far back as six to nine months ago. The message was that IBM certainly intended to protect trade secrets, trademarks, etc. but that it has a standard policy of licensing a patent portfolio.

Too many people asked the wrong question, which was, "Will you license the Micro Channel?" IBM said no. The right question would have been, "Will you license the patent portfolio, which includes potentially some Micro Channel patents?" IBM's answer to that has always been consistent: Yes.

Now that Micro Channel clones are coming out, is it possible IBM might make some changes to the Micro Channel to throw the clone makers off?
We visited IBM during the first year of Chips' existence and said, "Look at the wonderful job we've done with a chip set that allows you to build an AT with one-fifth the amount of chips. Why don't you throw out your old design, use our design and have great cost savings?" They looked at us, chuckled and said, "You just don't understand."

It turns out that when IBM brings out a model like the AT, they have to fill the distribution channel and support it with spare parts and service manuals. This pipeline is so large that a single change in something in that pipeline would wipe out the savings from a new chip set.

What that illustrates is that it's very difficult for IBM to continually make changes when they introduce a machine. What we will see, I think, are new models being introduced more rapidly and the possibility of tying IBM hardware to its software.

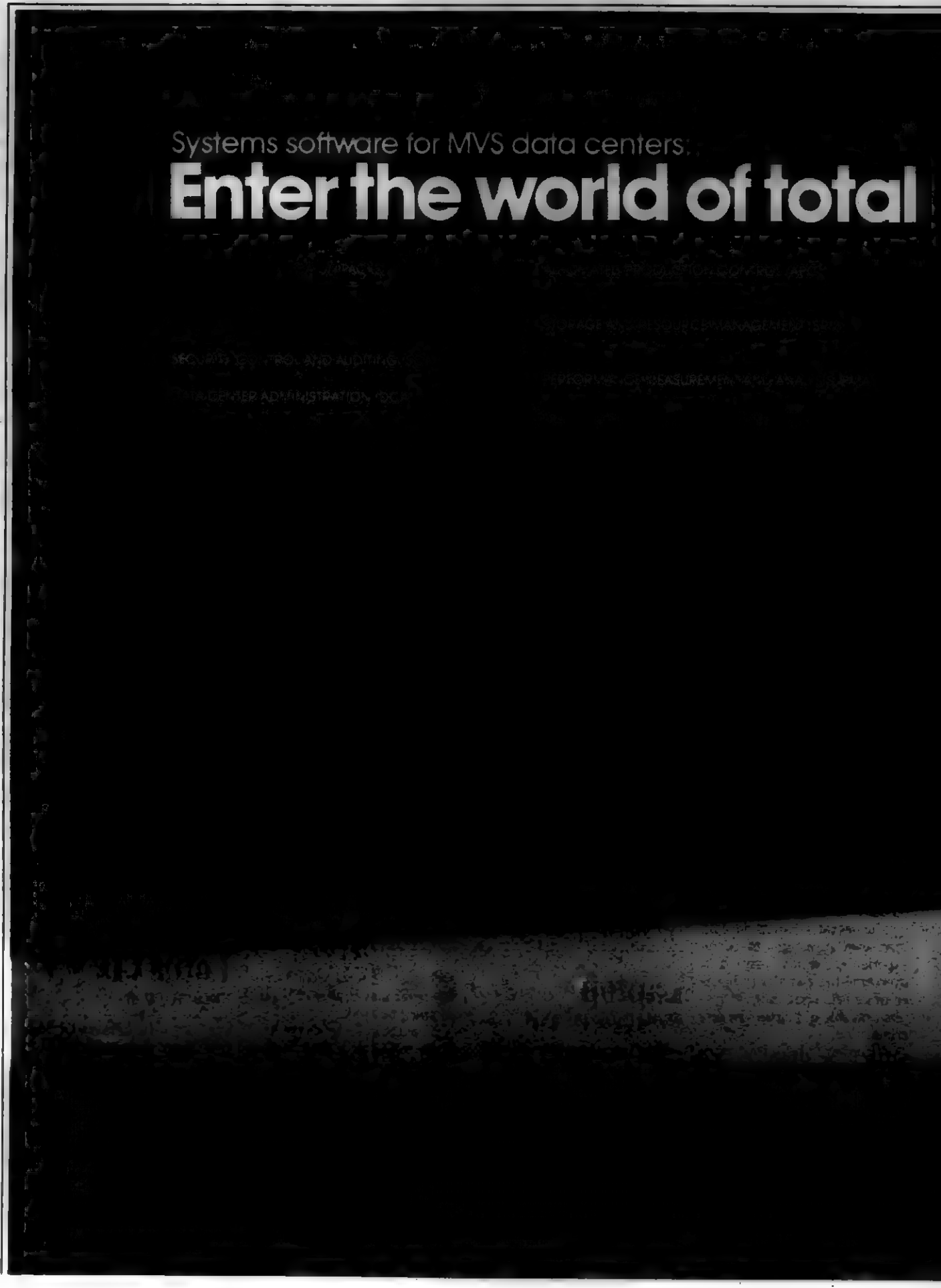
Can you successfully have Micro Channel features — like the multiple master arbitration scheme on an AT bus — that allow multiple processors to act in unison?
To try and change the AT bus you would end up with no add-in cards. If you try to add additional control signals or diagnostic signals, which are in the Micro Channel, you wind up with a nonstandard AT bus and cards that won't work except with a standard AT bus. The two standards will have to coexist for some time, but until we get some software or some reasons to use it, I wouldn't buy a PS/2 for my secretary. If there was an application she could use, I would.

Are you seeing much interest in the Model 30 chip set now, or are most vendors interested in the Micro Channel?
There doesn't appear to be an overwhelming interest by compatible manufacturers to do that machine. The compatible guys will probably go for an Intel 80286-based Model 30, which would be a much more successful machine. IBM has said that almost all its PCs in the future will be 80386-based, with some 286 stuff at the bottom. So, I don't think we'll see a lot more 8088- or 8086-based machines.

The dynamic RAM shortage is doing a lot to kill the low end, too. It turns out that the first machine vendors kill is the one that doesn't have enough margin.

There have been reports that Chips and Technologies is designing a 386-compatible microprocessor using hard-wired logic, instead of microcode, as a way of skirting around microcode copyright patent issues. Is there any truth to those reports?
There's been a lot more speculation about that than is merited.

What do you think might happen with the Intel 80486 microprocessor?
If IBM really wants to outdistance the competition, it would change or modify the Intel microprocessor used in its machines. It's not clear that it's in their best interest to continue with a standard processor. So with the 486, I'm not sure IBM will standardize on it. It might be used just in specialty niches.



NEW PRODUCTS

Systems

An electronic filing and imaging system has been announced by Ovonic Imaging Systems, Inc.

For users of IBM Personal Computer XTs, PC ATs and compatibles, the system's key components are **Paperchase Software** and the **Paperchase Interface Card**, which allow personal computers to function as personal imaging systems.

The interface card currently operates with Canon U.S.A., Inc. sheet-fed desktop scanners and Canon or Hewlett-Packard Co. desktop laser printers.

Paperchase Software carries a single-copy price of $695. The Paperchase Interface Card is priced from $595 to $1,195.

Ovonic Imaging Systems, Inc., 1896 Barrett St., Troy, Mich. 48084. 313-362-3140.

CPT Corp. has announced an addition to the CPT 9000 series of IBM Personal Computer AT-compatible workstations.

The **CPT 9286**, based on the Intel Corp. 80286 processor, has a clock speed of 8 or 12.5 MHz and includes 1M byte of memory. The system supports as many as two floppy disk drives and three half-height internal hard disk drives. A standard configuration includes one 5¼-in. 1.2M-byte floppy drive, with additional 5¼- and 3½-in. floppy disks available. Users may select either a 20M- or a 40M-byte hard drive.

The CPT 9286 offers a standard half-page, 12-in. amber monitor and a full-page, high-resolution, black-on-white 14-in. monitor.

Prices for the base-level CPT 9286 with a half-page monitor, one 5¼-in. disk drive and an AT-style keyboard start at $2,695.

CPT Corp., 8100 Mitchell Road, Minneapolis, Minn. 55440. 612-937-8000.

Software applications packages

TAP Development Corp. has announced **Advanced Lotus 1-2-3**, a teaching assistance package and continuation of its Spreadsheet Module.

Using 112 multicolor slides to expand on the information the module provides, the package includes a review of Lotus Development Corp.'s basic Lotus 1-2-3, Global Commands, Advanced Functions, Range Commands and Macros.

The one-day course costs $990.

TAP Development, Suite 200, 1820 E. Sahara Ave., Las Vegas, Nev. 89014. 800-231-5455.

Software languages

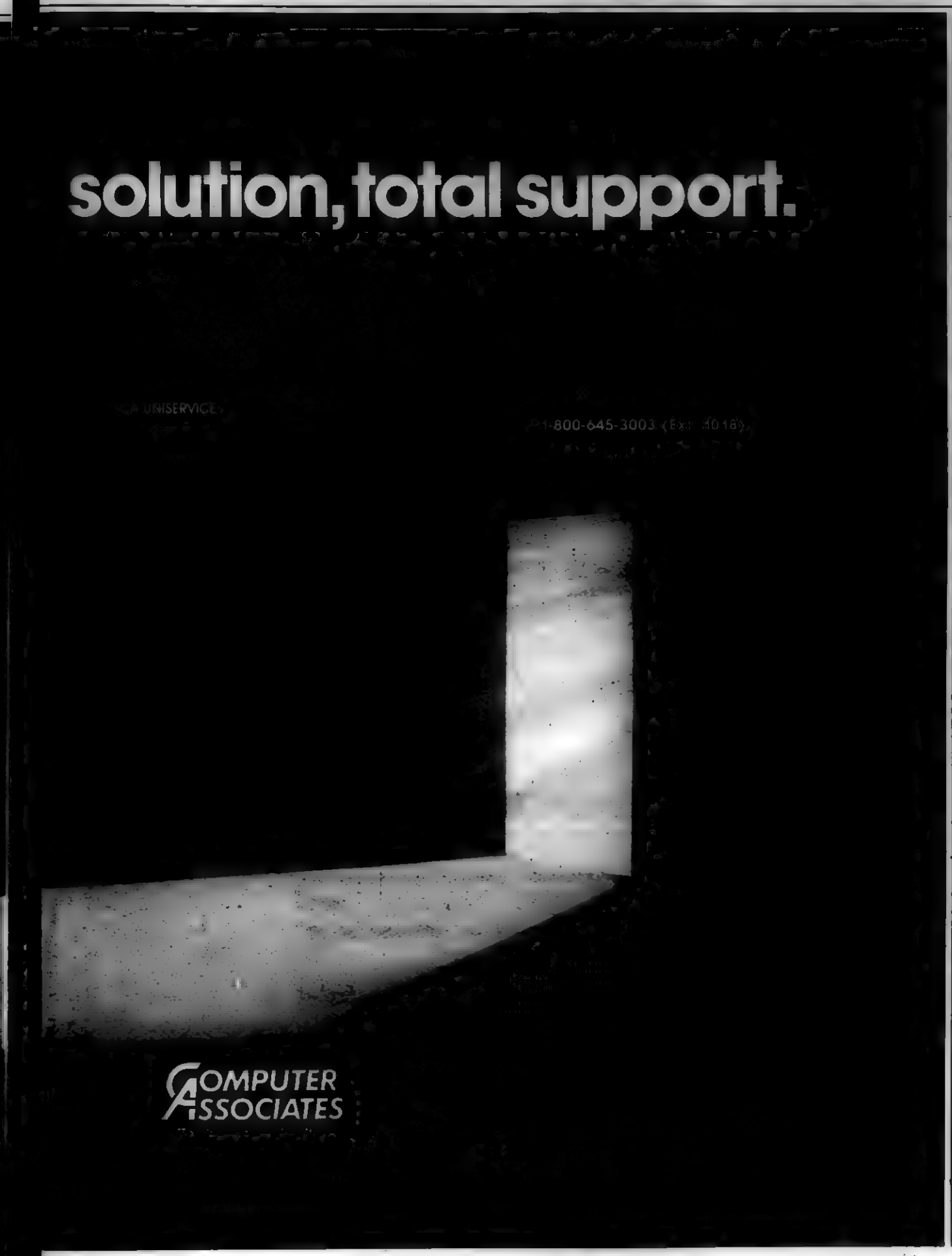
Key LISP, an implementation of LISP for Apple Computer, Inc.'s Apple II, has been released by **Xprime Corp.**

The product runs under ProDOS with a minimum of 64K bytes on Apple's Apple II, II Plus, IIE, IIC and IIGS. An 80-col. display is recommended for the Apple II, II Plus and IIE.

Key LISP offers more than 220 features, including floating-point calculations, identifier names of unlimited length, automatic type conversion and user-definable macro characters. LISP macros are fully supported.

Key LISP is priced at $149.

Xprime, 10835 Santa Monica Blvd., Los Angeles, Calif. 90025. 213-470-4663.



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DATA STREAM

Merv Adrian

Common idiom needed

Why can't our applications talk to one another? You use a Compaq and I use a Mac — so what?

We want the ability to move data easily between spreadsheets or data bases, even to move graphics files across the operating system barrier, without losing the rich meaning encapsulated in the application formatting. This is the latest connectivity frontier, one that vendors are just starting to cross.

A lot of attention has been given to networking protocols like Transmission Control Protocol/Internet Protocol (TCP/IP) and the Open Systems Interconnect (OSI) model, which were designed to standardize information movement from one system to another.

You would think that when we finally have mature, industry-wide networking standards, the desktop user will be able to move comfortably to the correct desktop environment for a particular task.

For example, install an Ethernet network running TCP/IP or the upper layers of OSI. Keep a couple of Apple Macintoshes for the publishing applications, a Sun workstation or two for the really high-powered scientific and engineering programming tasks, add an IBM Personal System/2, and you've built the working environment of your dreams.

Continued on page 42

Customer service tops the list

Tymnet's Fenn steers firm through shifting waters of user environment

The explosion of mergers and acquisitions in the business world, coupled with the need to utilize technology for competitive advantages — for example, to increase product and service delivery — is pressuring corporate network users to find even more cost-effective alternatives.

Tymnet, McDonnell Douglas Network Systems Co.'s new president, Al Fenn, formerly vice-president of network technology development, shared his views with *Computerworld's* West Coast Bureau Chief Kathy Chin Leong during a recent interview. His vision for the packet-switch vendor includes migrating Tymnet's business strategy to accommodate the changing nature of the corporate user environment.

Tymnet's Fenn

Can you respond to reports that Tymnet has been losing money?

We can't give out levels of detail, but I can tell you this: We are expanding our sales efforts. For 1987 and 1988, we have been increasing expenditures in R&D as a percent of sales. This makes a statement about Tymnet investing in its own business. We think the business is healthy and growing. It is an attractive marketplace. The negative viewpoints of the packet-switch business are wrong.

What are Tymnet's top priorities right now?

At the top of the list is customer service — ensuring that we have the kinds of products and services customers need, and that we deliver quality products that are reliable. My No. 2 goal is to broaden our general business structure. Instead of focusing only on packet switching, we need to include support for T1, voice and so on.

Packet switching is clearly competing with other technologies. Is that why Tymnet decided to become a systems integrator?

Continued on page 41

Users look inward for net service

BY PATRICIA KEEFE
CW STAFF

LEXINGTON, Mass. — Finding network management that supports a range of systems and software is not the only issue frustrating users today. Those concerns extend to network maintenance and support — and who specifically should provide it.

Fortune 1,000 network and MIS managers who participated in two recent focus groups said they preferred to utilize in-house network support staff rather than contract with outside vendor services for maintaining their communications facilities.

However, many of these same users added that they would be glad to turn these responsibilities over to a third party, providing it could demonstrate reliable and professional network service support capabilities.

A long way to go

The results of the focus groups made it clear that these managers think vendors have a long way to go.

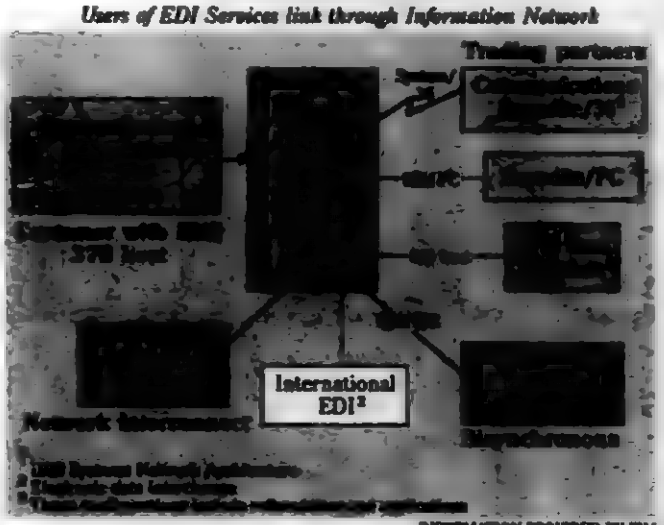
Two focus groups, sponsored in March by The Ledgeway Group, Inc., a research and con-

Continued on page 44

Data View

IBM's view of EDI

Users of EDI Services link through Information Network



INFORMATION PROVIDED BY IBM
CW CHART

EDI gets users' OK

BY KATHY CHIN LEONG
and PATRICIA KEEFE
CW STAFF

SAN FRANCISCO — Electronic data interchange (EDI) is a sleeper technology and the antithesis of Integrated Services Digital Networks (ISDN), according to Thomas Nolle, a consultant and president of CIMI Corp.

Characterizing ISDN as a "product technology in search of interested users," Nolle claimed EDI is just the opposite. "Users are really interested and willing

Continued on page 42

Inside

- Spectrum Concepts, CDC join forces to provide EDI to users. Page 40.
- Telebyte Technology designs controller to simplify wiring between VAX, Microvax systems. Page 45.

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Users file ONA grievances with FCC

BY MITCH BETTS
CW STAFF

Business network users groups, as part of their attack on the Open Network Architecture (ONA) plans of the regional Bell holding companies, have drawn up a list of complaints covering pricing, usage restrictions and the protection of confidential information.

Comments filed with the Federal Communications Commission April 18 showed that some groups — such as the Association of Data Communications Users and the International Communications Association (ICA) — opposed the ONA plans, mostly because they lack national uniformity and fail to unbundle local network services [CW, April 25].

Also, according to the association, the ONA plans offer very few features that are not already currently available.

In addition to those concerns, the users groups identified the following problems:

- Only Ameritech's plan has a strong commitment to cost-base pricing of ONA services. The other plans hinted that ONA prices will be what the market will bear.
- Many basic service elements are treated differently in each of the seven ONA plans, causing confusion.
- Bellsouth Corp. and Southwestern Bell Corp. plan to restrict the ONA services available to end users, as distinguished from enhanced service providers.
- The ONA plans do not adequately protect users' proprietary network information from disclosure or abuse.

BIT BLAST

EDI users get LU6.2

Spectrum Concepts, Inc. and **Control Data Corp.** (CDC) have inked a pact that reportedly will provide electronic data interchange users with access to Spectrum's Xcom 6.2 LU6.2-based data transmission software when they are connected to CDC's Rednet public data network. LU6.2 provides an alternative to traditional bisynchronous communications networks.

Xcom 6.2 can boost data throughput by compressing both character and binary data, a difficult feat in a bisynchronous environment, Spectrum said. LU6.2 allows software to be written independently of the computer and operating system.

GE Information Services, a division of General Electric Co., recently enhanced the All-In-1 Connector Software Package, software said to interface its Quick-Comm electronic mailbox service with Digital Equipment Corp.'s All-In-1 Mail system. Version 3.1 interfaces an additional DEC mail capability, VMS Mail, with Quick-Comm.

Electronic Data Systems Corp. (EDS) has agreed to purchase **M&SD Corp.** in Lyndhurst, N.J., a privately held telecommunications services supplier that also serves a consortium of 50 companies. Terms of the acquisition were not disclosed. M&SD will be organised as a division of EDS Communications Corp. EDS bought M&SD to get a crack at its customer base, which includes more than 200 Fortune 1,000 companies.

Octel Communications Corp. has announced that **Southwestern Bell Corp.** will be using several Octel Aspen Maxum voice processing systems for certain voice-messaging field market trials slated to begin this summer under the telephone company's recently filed Comparably Efficient Interconnection Plan. The trials involve limited voice mail and telephone answering services in selected wire centers within Southwestern Bell's five-state service area.

Most OLTP isn't.

Fenn

FROM PAGE 39

We are not getting into systems integration [for that reason]. The competition between packet switching and other alternatives is not the main factor — maybe the third one. We are doing it in order to meet customer requirements. Packet switching doesn't serve all user needs.

Is there a new type of user being drawn to packet switching?
There are some things happening out there that are different now. I call them multicorporate users. Corporation A wants to talk to Corporation B, which wants to communicate with Corporation C. Packet switching clearly has advantages for that. Customers are also deciding they need to connect internal computer systems in a safe and efficient way. Merging two large [IBM Systems Network Architecture] networks is not a trivial thing to do. But we have had experience helping customers do that.

What are the differences between private network and public network users?
There is a wide spectrum between the two. The important reason for private is cost-related or control-related. They want to control it fully or absolutely minimize cost in highest traffic areas. People with public network solutions are targeting locations with lower density traffic, a wide geographic arena or third parties. The argument for these users is that they don't want to control the network and prefer to let the vendor deal with it.

Will these camps merge?
It is happening in almost every case. In places where we install private networks, we find growing use of the public Tymnet packet-switching network. We can offer a private network gateway into our public network.

Where is packet-switching technology headed?
[The technology is moving toward] building switches that are bigger and faster, [as well as] smaller and faster. As people have more traffic, the switches must get bigger and faster and be able to provide the performance required. At the same time, you must get switches smaller and faster to spread the technology to lower density locations. You must go in both directions. There is a third-direction functionality. We see the packet-switching arena expanding to pick up integrated protocol conversion and other functions. The cost will vary on traffic load.

How do you stay in touch with your users?
We survey them several times a year. We have multiple users groups: one in Europe, one in the U.S. focused on the public network and another in the U.S. concentrated on private network activities. I visited three customers my first month on the job. We encourage customers to visit us here in San Jose. Executive management participates in the visits. As a matter of priority, we are increasing the executive visibility with users beyond the simple sales calls.

Any comment on the recent Open Network Architecture (ONA) filings from the divested Bell operating companies?
We are very disappointed. There is a wide range in the quality of the filings, and we have a long way to go before key ONA issues are resolved to anyone's satisfaction. The filings put vendors like us at a disadvantage. It is not a surprise. Just think about the major communications users in the U.S. who will have to deal with all the differences in these filings.

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Adrian

CONTINUED FROM PAGE 39

There is, however, one thorny problem with this scenario that OSI and the like do not solve — data exchange at the applications level that preserves content. It can be done, increasingly with very sophisticated extraction capabilities. The trouble is, the facilities for making intelligent use of that data are primitive.

It's not the software products themselves that are the problem, it's their data-capture functions. For most products, bringing in data is a chore for which you program an input routine, or translate the file at the sending end into an accepted exchange format (like the U.S. Navy's Data Interchange Format or Lotus Development's WKS, WK1 and so on, for spreadsheets or ASCII for text) and then retranslate it when it arrives at the other end.

In the process, a lot of semantics are lost and, more to the point, so is much of the valuable time and effort put in by creative people. You can't carry formatting information with text, or formulas with spreadsheets, and you may as well forget about the intelligent communication of graphics information. You could work with bit maps, but that requires a great deal of bandwidth. Moreover, structures based on graphics primitives, like the widely used meta files in the DOS world, don't translate from one architecture to the other easily, if at all.

So, a call to vendors: There is a critical mass, there are examples and there is the need for rich application-level information exchange. Call it "data interoperability," call it "platform transparency," but give it to us!

The critical mass results from one simple fact: Corporate America is buying Macintoshes. A lot of Macintoshes. And, as noted above, they are able to hook them up, in a variety of ways, with the DOS-based machines that are the staple desktop tool in business today. They can easily copy files back and forth.

Yet, to make use of those files, they often have to reduce the content to a stripped-down subset of the original document.

Examples of a better way? Start with Microsoft Word from Microsoft. A staple word processing package in both the Mac and IBM Personal Computer environments, it is one of the few products that offers support in each version for the other machine's format. If you can handle the physical access question (not trivial, because of differing disk standards, but solvable with networking), Mac Word can read Microsoft's MS-DOS Word files, and vice versa.

Clearly, it is time for vendors to provide, and promote, applications interoperability. More to the point, those who don't will be in danger of being left behind.

Adrian is editor of NYPC and FOCUS Systems Journal, and author of The Workstation Data Link, published by McGraw-Hill, Inc.

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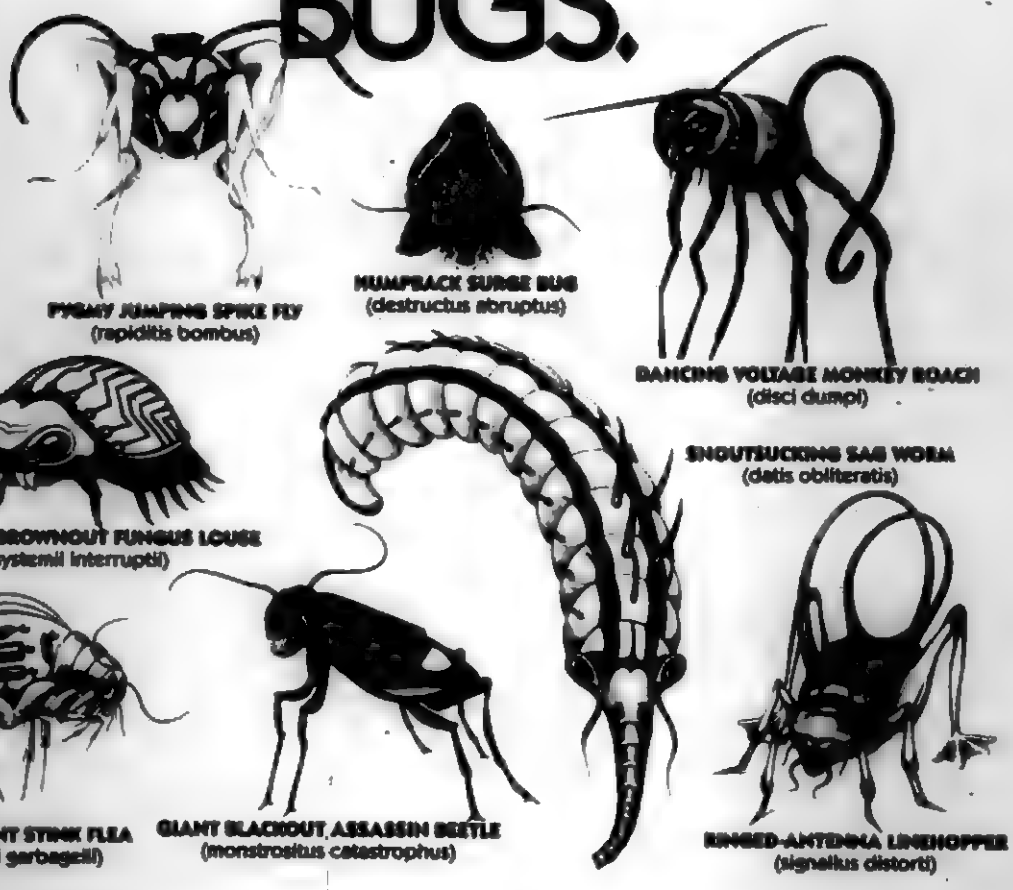

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EDI users

CONTINUED FROM PAGE 39

to grapple with the technology."

He said the standard user response to ISDN has been, "I don't know what this is, I don't believe in it, and I don't need it." Conversely, Nolle, who attended the recent ANSI X12 EDI conference here, summed up the attitude of 1,100 attendees as "Despite the fact that I don't know what these people are talking about, I need this."

At least one user company, Burlington Northern, is so determined to enact an EDI system, that it rented a booth on the exhibit floor, solely for the purpose of promoting its ability to trade electronically, as though it were a service it was offering its business partners, Nolle said.

A hot two-pronged issue came out in a lot of the sessions: There are a series of technical issues that are attached to EDI that business and financial personnel are not equipped to deal with; and, there are a series of organizational and business issues that technical staff cannot handle.

This is important because unlike the implementation of some other technologies, designing a successful EDI system really has to be a joint venture between the technical and business sides of the house.

Conference attendees also got an update on ANSI X12. The completed portion of the X12 standard has been in use since 1983, when the first documents were approved for purchase ordering and invoicing. Since then, more than 14 documents have been approved, covering generic aspects of the supplier-customer business.

"Many people are not really aware that X12 is a body of standards, only parts of which have been completed," Nolle said. This fall, ANSI will make all 50 documents, including early drafts, available for review. Afterward, ANSI will vote.

Approximately 20 working drafts have yet to be approved for a variety of features, said Harriet Rusk, executive director of Data Interchange Standards Association, Inc.

Standards setting has created some level of polarization between users and vendors, Nolle said. Each industry has a council that pretty much controls the EDI standard for that market. These councils are reluctant to hand over their standard-making authority to ANSI because they believe the organization's review process for moving X12 forward takes too long, he said.

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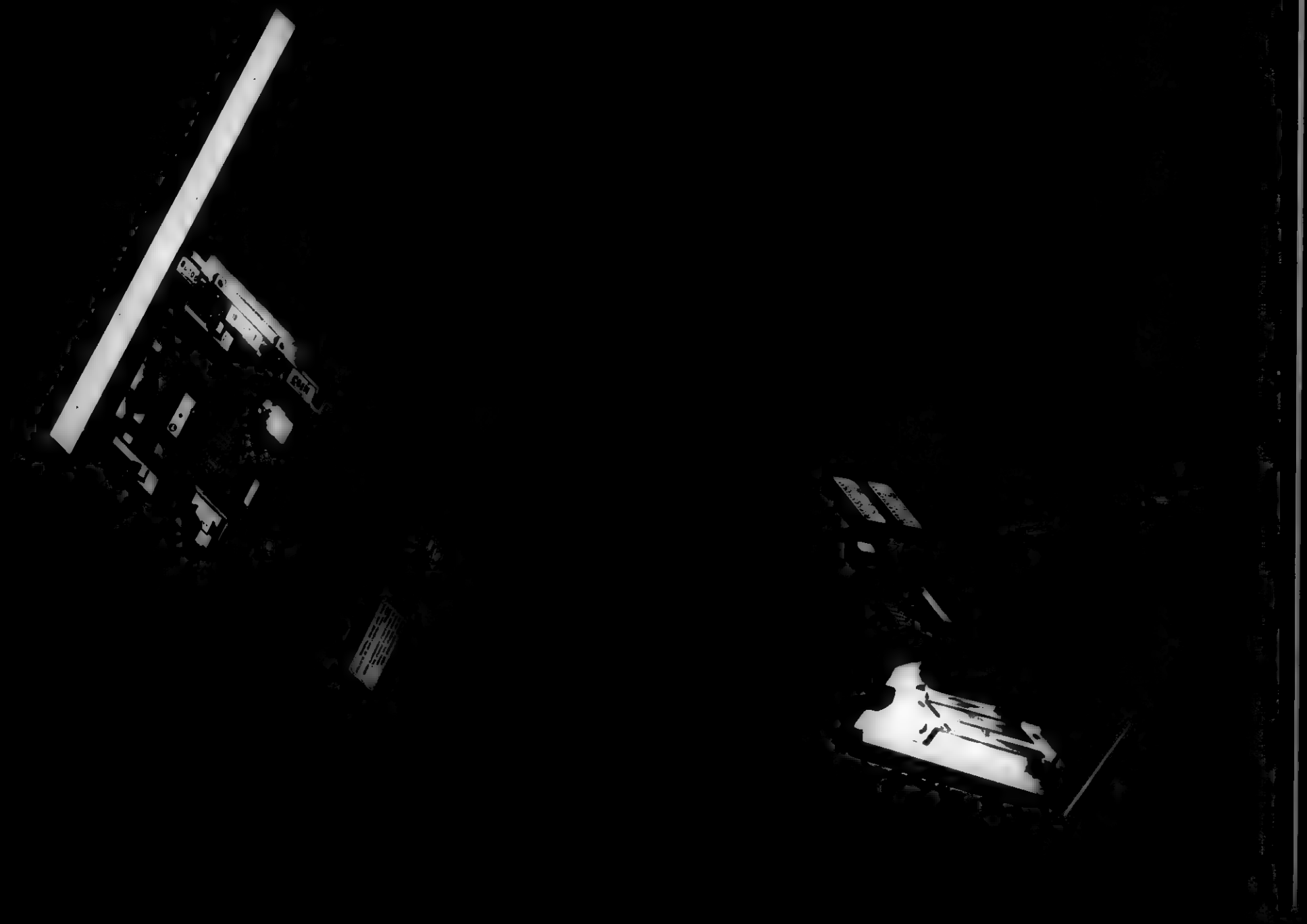
Standard TelOAS Configurations Matrix

Product	Model	CPU/ Speed	Standard RAM	No. of Slots	Floppy	Hard Disk	Keyboard	Video Board	Monitor	Power Supply
TelOAS I	NH	88/8	512K	4	360K	Optional	AT	MD/Her/CGA	Optional	80W
TelOAS II	NH	286/12	1M	8	1.2M	Optional	Enh. AT	Optional	Optional	155W
TelOAS II	20	286/12	1M	8	1.2M	20M	Enh. AT	Optional	Optional	155W
TelOAS III	NH	386/16	1M	12	1.2M	Optional	Enh. AT	Optional	Optional	240W
TelOAS III	40	386/16	1M	12	1.2M	40M	Enh. AT	Optional	Optional	240W
TelOAS III	70	386/16	1M	12	1.2M	70M	Enh. AT	Optional	Optional	240W
TelOAS III/20	NH	386/20	1M	12	1.2M	Optional	Enh. AT	Optional	Optional	240W
TelOAS III/20	70	386/20	1M	12	1.2M	70M	Enh. AT	Optional	Optional	240W



TelOAS I: Flexibility Is The Heart Of The System.

The key to the new TelOAS Open Architecture Solutions is being able to build the computer that's right for your applications. Our modular design lets you choose the TelOAS CPU you want: an 8 MHz 8088, a 12 MHz 80286, or your choice of a 16 or 20 MHz 80386. Now choose the drives you want, the monitor, keyboard, and the footprint you want. Then combine them in the configuration that gives you the solution you need. When your needs change, the TelOAS system changes right along with you.

We didn't forget that even the most flexible system has to work in the real world, so we made sure the TelOAS system is compatible with industry-leading software to give you access to the most versatile and powerful programs.

TelOAS I packs a lot of power and versatility into a very compact 4" high package. Its open-architecture passive backplane design gives it great flexi-

bility. The passive backplane has four full slots (three 16-bit and one 8-bit) and room for two half-height drives. To make your connections, there's one serial and one parallel port.

To keep everything safe and sound from unauthorized use, there's a convenient front-mounted security lock with removable key.

There's also a LED On-Off power switch/reset key that falls right at hand. A small point, but an indication of the care TeleVideo engineers took designing our most advanced system ever.

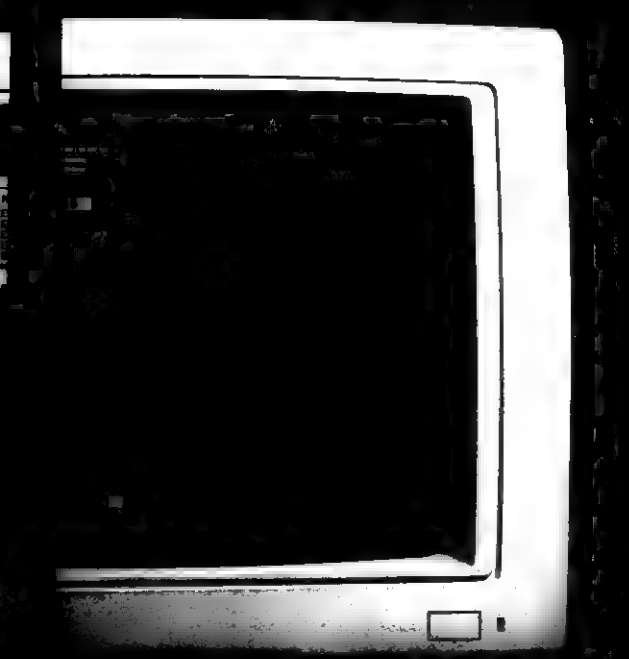
The standard TeleOAS I configuration includes an 8088 CPU, 512K RAM, 360KB floppy disk drive, floppy disk controller, Hercules®/CGA graphics controller and 84-key AT compatible keyboard. It's shown here with the optional high-resolution 14" amber screen monitor.

TelOAS II. Advanced Technology Is The Brain Of The System.

The TelOAS Open Architecture Solutions use some of the most advanced design and assembly technologies to deliver computers that are as dependable as they are powerful.

TelOAS advanced passive backplane technology makes it easy to upgrade your system as your needs change. Increasing memory can be as easy as plugging in a new TelOAS Single Inline Memory Module (SIMM). Slip out your half-height drives, slip in full-height hard disks and you can have to up 300 MB storage capacity, enough to run sophisticated System Fault Tolerant backup systems and LAN configurations.

Our Surface Mount Technology (SMT) increases the functionality and reliability of TelOAS computers, and decreases their



power consumption.

And that's enough to make even a power user smile.

TelOAS II increases your flexibility with a choice of TelOAS 12 MHz 80286 or 16 MHz 80386 CPUs, plus a socket for an 80287 or 80387 coprocessor. The passive backplane has eight full slots (seven 16-bit and one 8-bit), and room for four half-height drives. There are two serial and one parallel port, a security lock with removable key, and a LED On-Off power switch/reset key.

The TelOAS II standard configuration includes a 12 MHz 80286 CPU, 1 MB RAM, 1.2 MB floppy disk drive, floppy and hard disk controllers, and 101-key Enhanced AT keyboard. We've shown it here with an optional 13" color monitor.

While TeleVideo's engineers were designing our most powerful and most flexible computer system ever, they made sure it was also the most reliable.

TelOAS Open Architecture Solutions use the most advanced design and production technologies to reduce the number of parts in each system, and to make sure each of those parts maintains our stringent quality control requirements.

To make sure our computers remain very reliable and trouble-free, each TelOAS system has complete diagnostic features that give you extensive hardware tests.

TelOAS III is the top of the line, perfect for users who expect a lot from their computers. Unique for TeleVideo, TelOAS III can be configured to support up to 600 MB, giving users the capability to run large disk storage programs, LAN configurations and System Fault Tolerant back-

TelOAS III. The Best Solutions Are The Most Reliable Solutions.

up systems, as well as powerful CAD/CAM engineering workstations.

TelOAS III accepts TelOAS 12 MHz 80286 and both 16 MHz and 20 MHz 80386 CPUs. There's a socket for a 32-bit memory expansion connector, and an 80387 coprocessor. The 20 MHz 80386 CPU also accepts a Weitek™ 1167 floating-point processor. The passive backplane has eight full-size and four half-size slots (ten 16-bit and two 8-bit), and room for two full-height and two half-height drives.

There are two serial and one parallel port, and a LED On-Off power switch/reset key.

The TelOAS III standard configuration includes a 16 MHz 80386 CPU, 1 MB RAM, 1.2 MB floppy disk drive, floppy and hard disk controllers, and 101-key Enhanced AT keyboard. It's shown here with an optional 19" high-resolution color monitor.

TeleVideo has the perfect terminals to go with our TelOAS Open Architecture Solutions.

The affordable 905 is a very reliable ASCII terminal with all the basic features you look for in a data-entry terminal, priced with maximum economy in mind.

The bright new 900C color terminal lets you bring all the benefits of color to your monochrome applications. Just plug it in to take advantage of its 64-color palette and 14" non-glare screen.

The powerful 965 is perfect for just about everything. With an Enhanced PC keyboard, it's a low-cost workstation for your TelOAS system running DOS. As an ASCII or ANSI terminal with the corresponding keyboard, you can use it on your TelOAS system in a UNIX® multi-user configuration.

The 965 uses an ultra-reliable single board design with a 16-bit

TeleVideo Terminals. The Perfect Additions To A TelOAS System.

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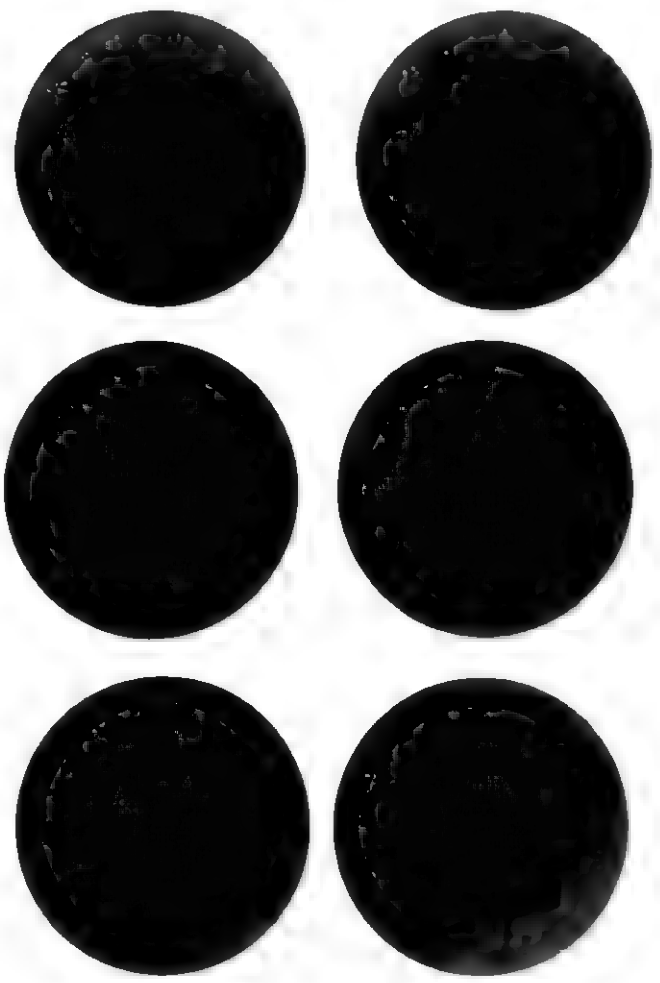
Be sure to look for these buttons at upcoming trade shows and conferences — the 1988 buttons will debut at Comdex Spring, May 9-12, so stop by the Computerworld booth and pick up yours.

Congratulations to the winners and many thanks to all who entered. We'll see you again next year!

COMPUTERWORLD

An IDG Communications Publication

The Winning Slogans of the 1988 Computerworld Button Contest:



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Net service

FROM PAGE 39

sulting firm based in Lexington, were designed to examine the concerns of Fortune 1,000 firms. The results of those sessions are covered in a report titled, "Focus Groups with Users: Network/Communications Support."

The participants manage networks ranging from 25 to 3,000 nodes that support anywhere from 10 to 3,000 users. The majority said they have multiple local-area networks, adding that they felt the support issues facing them were the same on both the corporate and the departmental LANs.

The importance of network support is commiserate with the growth of networks themselves.

House staff fattened

This complexity has forced most of the participants to increase their in-house service and support staffs. And, the report notes, despite vendor claims to the contrary, the more sophisticated "intelligent" network management tools actually require better trained technicians to operate them and are not the cost-efficient systems they promise to be.

Because none of the new network management products address more than a specific vendor's segment of a user's network, the trend today is toward customer self-service, according to The Ledgeway Group. More than ever, users believe that in-house services will ensure greater network reliability and efficiency.

The managers cited a number of factors in support of in-house staffs. Perhaps among the most compelling is economics. "Because budgetary constraints continue to be network managers' greatest impediment to doing their jobs, in-house staff is perceived as a more cost-effective method of serving a company's network," the report said.

Just as important is the issue of multivendor integration. Other incentives include quick response to problems, familiarity with network requirements and the ability to design solutions to more fully meet applications needs.

Fear of outsiders

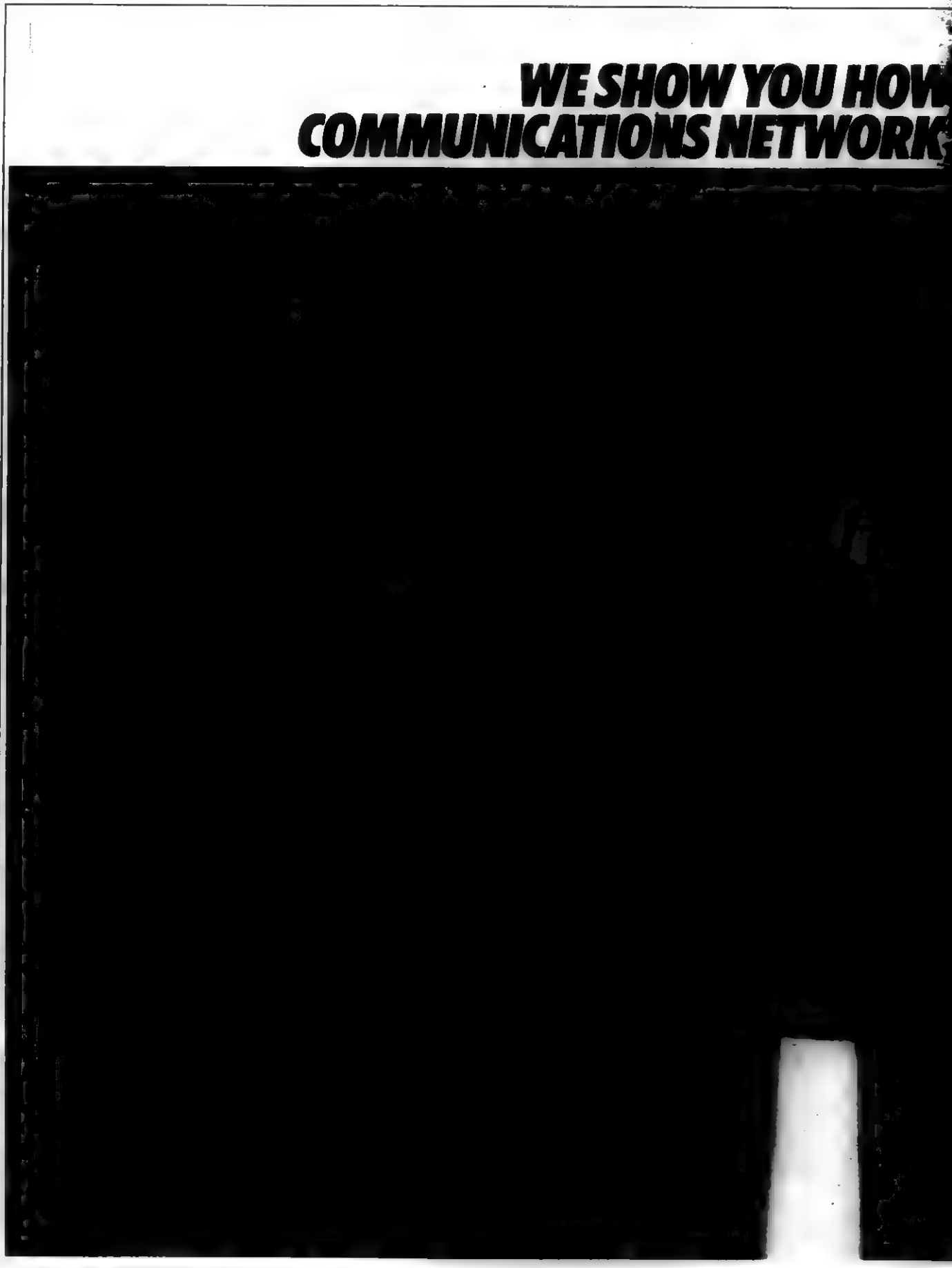
Many customers are hesitant to relinquish power over their networks to outside vendors, and for good reason, according to the managers who were interviewed.

Vendors lack reliable service and support organizations capable of responding quickly and thoroughly to user problems, the managers complained. They griped further that vendor service representatives tend to be unfamiliar with the customer's network applications and unable to deal with multivendor integration issues — a thorn in the side of many user systems today.

Among the recommendations offered by the focus group participants were that vendors must invest greater resources into their service and support functions, specifically the following:

- Work to better understand their customers' unique communications needs.
- Build a partnership with the customer by demonstrating this understanding and offering realistic solutions to meet their needs.
- Be proactive. Call on customers between emergencies to build a closer working relationship with the users.
- Sell and service two levels of the organization: the network manager and the senior staff. Educating senior staff about the real costs of networks will help the network manager justify the operating costs inherent in building and maintaining a network.
- Help users determine the true costs of maintaining the network, so they can decide whether using in-house staff or turning to an outside vendor makes economic sense.
- Make service and support more accessible. Many users are unaware of the service available to them. Still others believe that most service programs are geared toward ensuring rapid response.

Those who do so will see a return on investment in the form of loyal customers, add-on business and a willingness among customers to pay extra for premium service, the report said.



NEW PRODUCTS

Modems/ Multiplexers

A multiplexing controller designed to simplify wiring between remote terminal clusters and Digital Equipment Corp. VAX and Microvax systems has been introduced by **Telebyte Technology, Inc.**

Model 572 allows as many as eight terminals or printers to communicate with the CPU over a single twisted-pair cable. In addition, the terminal cluster can be located as far as 5,000 ft from the CPU.

The Model 572 supports eight full-duplex terminals operating simultaneously at up to 19.2K bit/sec. Each of the eight ports also includes a full-duplex handshake link.

The controller is packaged on a DEC dual-PC board that installs in the CPU. A system, consisting of the Model 572 with ribbon cable and a composite-link cable bracket, costs $395.

Telebyte Technology, 270 E. Pulaski Road, Greenlawn, N.Y. 11740. 516-423-3232.

Raycom Systems, Inc. has added the **RS-422 Asynchronous I/O Module** to its 5100 series fiber-optic multiplexer product line.

Each RS-422 module provides 16 full-duplex channels, handles data rates to 19.2K bit/sec. and is configured with 16 sub-mini DB-25 connectors. The modules can be used with computer systems such as the Hewlett-Packard Co. HP 3000 and the IBM Series/1.

The RS-422 I/O Module costs $1,600.

Raycom Systems, 6395 Gunpark Drive, Boulder, Colo. 80301. 303-530-1620.

Diagnostic equipment

Verilink Corp. has unveiled an extended superframe channel service unit that features modem support, which allows the unit to automatically report alarm conditions to a remote network control center.

The **551VST L2** can report locally to a personal computer running Verilink's Verinet 2 transmission management software or to a Verilink extended superframe diagnostic system. Using an external 1,200 bit/sec. modem, it can report directly to Verinet 2.

The unit costs $3,250.

Verilink, 145 Baytech Drive, San Jose, Calif. 95134. 408-945-1199.

A mid-range protocol tester that supports color displays has been announced by **Atlantic Research Corp.**

The **Interview 6600** protocol tester can be used to monitor and emulate protocols for troubleshooting circuits at speeds up to 72K bit/sec. Features include an upgrade path to other Interview models, bar charts displaying critical relationships between events and IBM Color Graphics Adapter compatibility.

The Interview 6600 protocol tester costs $9,995.

Atlantic Research, 5390 Cherokee Ave., Alexandria, Va. 22312. 703-642-4000.

Cabling

A miniature Ethernet expander that provides an extended twisted-pair interconnection between the transceivers and controllers of any Ethernet local-area network has been introduced by **RAD Data Communications, Inc.**

The **LE-6** replaces AUI cable with two shielded twisted pairs, allowing Ethernet V1.0, V2.0 and IEEE 802.3 to run on a universal cabling system such as IBM's. Features include 10M bit/sec. transmission, SQE testing, AC/DC coupling, back-to-back frames and signal compatibility with all Ethernet standards.

The LE-6 extends the distance of data transmission between the controller and transceiver up to 820 ft.

A pair costs $445.

RAD Data Communications, 151 W. Passaic St., Rochelle Park, N.J. 07662. 201-587-8822.

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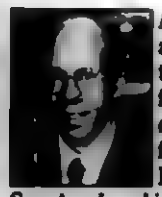

A tremendous amount of attention has been focused recently on the poor performance of Sun Microsystems' Sun-4 reduced instruction set computing (RISC)-based workstation on the Neal Nelson & Associates commercial benchmark set. It's time to set the record straight.

Based on those benchmarks, *Computerworld* Senior Editor Stanley Gibson's recent column [CW, April 11] declared: "A bucket of cold water was dumped on a hyperventilating group of RISC enthusiasts." The results of these tests have been used to proclaim the unsuitability of the Sun-4 for commercial data processing (a correct conclusion), the unsuitability of the Sun Scalable Processor Architecture (Sparc) chip for commercial DP (not a reasonable conclusion from the results) and the unsuitability of RISC in general for commercial DP (totally absurd).

Suppose I wanted to design a boat with a newfangled diesel engine. I call up the diesel engine folks. They tell me they don't have any diesels in boats right now, but there's one on a dump truck a few miles up the coast that I am welcome to look at. I put the engine to my standard boat test and drive the dump truck off the end of the pier. It sinks like a rock. Conclusion: Diesel engines are no

Continued on page 48

'Unix University' relies on MVS

University of California at Berkeley, home of Unix version, is IBM shop

BY J. A. SAVAGE
CW STAFF

OAKLAND, Calif. — Despite a "great flurry of discussion" about the role of Unix in data processing for the nine-campus University of California at Berkeley, the institution's operating system remains IBM's MVS.

Unix "is not as sophisticated as MVS," said Jim Dolgonas, director of information and computer systems for the university. The University of California at Berkeley's Unix 4.2 "was developed because certain features were unavailable in AT&T's Unix. Now Unix has many of those features. But using [the operating system] is not like having vendor support.

"The IBM MVS environment is best suited for administrative computing — a high volume of reliable, secure processing needs," Dolgonas added.

Dolgonas's shop runs both MVS/XA and MVS/SP as well as VM/CMS. His shop also runs two Digital Equipment Corp. Microvaxes on VMS and Ultrix for communication protocol conversion.

A big adventure

While Dolgonas observes academic systems in each campus, his charge is to run all of their administrative processing along with that of the university's regents office. Additionally, he presides over one of 13 major computer centers for the university system. The centers are hooked up with what Dolgonas calls "a big SNA [IBM Systems Network Architecture] network."

His 1½-year-old IBM 3090 Model 180 mainframe batch processes payrolls for the university's 100,000 employees. In addition, the mainframe handles online transaction registration of the university's 130,000 students — who add and drop classes faster than you can say "surf's up." Other tasks include general ledger accounting, facilities management, keeping track of contracts and grants and personnel information.

Last month, the data center was moved from a small building next to the Berkeley campus, to a roomier area in neighboring Oakland. In Berkeley, Dolgonas had two rooms with a total of about 4,000 square feet packed with equipment. He now has room to stretch into a computer center three times that size.

He said the move went smoothly with "great cooperation from the vendors and suppliers." As many as six IBM support personnel were on hand to assist with the location change.

While the need for computing ability is constantly growing, the larger room and the shrinking

Continued on page 49

Masscomp revs up processors

BY STANLEY GIBSON
CW STAFF

BOSTON — Cutting response time to less than 1 msec in some applications, Massachusetts Computer Corp. (Masscomp) recently replaced its product line with four systems based on the Motorola, Inc. 68030 microprocessor.

The systems, like previous Masscomp processors, are intended to perform real-time acquisition, analysis and display of data. Masscomp computers are typically used in testing automobile, airplane and rocket engines; medical imaging; speech translation; and process control.

Masscomp said the submillisecond response time, which it claimed is a first for a Unix-based

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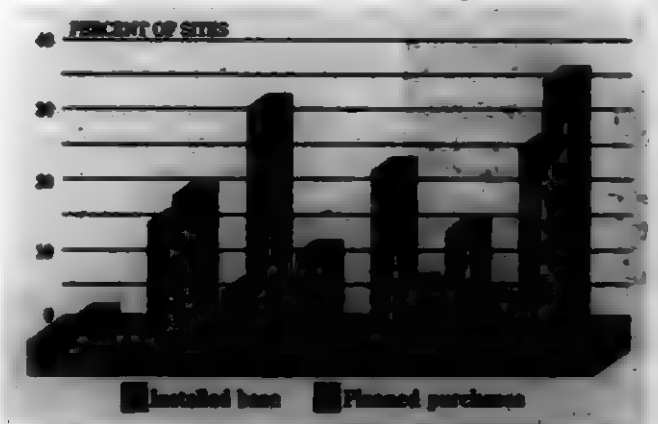
Data View

IBM mainframe users move to 3090

Plan to purchase an increasing number of high-end machines



INFORMATION PROVIDED BY FOCUS RESEARCH SYSTEMS, INC.
CW CHART

Prime's 386-based EXLs pack 4 to 5 MIPS punch

BY NELL MARGOLIS
CW STAFF

NATICK, Mass. — Further straining the line between personal computers and minicomputers, Prime Computer, Inc. is planning a June shipment for two higher powered variants of its EXL 316 multiuser supermicrocomputer, which is based on the Intel Corp. 80386 microprocessor.

Like the EXL 316, the new EXL 320 and EXL 325 were built around Intel's 80386 chip and run in Unix, Microsoft Corp.'s MS-DOS and Pick Systems' Pick environments. Both, however, pack a greater wallop than the 3.2 million instructions

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- Silicon Graphics rolls out low-priced Iris workstations. Page 48.
- Tandem aims dot matrix printer at shop floor applications. Page 49.
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Mallach

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good for boats. Absurd? Of course. It's absurd because what I was testing — flotation — is unrelated to the engine. The dump truck sank because it was a dump truck, not because it had a diesel engine.

Distant relatives

Yet those who criticize RISC architecture or the Sparc chip on the basis of the Nelson benchmark results are falling into the same trap. The processor of a computer is like the engine of a boat or a dump truck. The benchmark tested primarily I/O capacity, not processing power, and the two are nearly unrelated.

What determines I/O capacity? The list begins with the design of the operating system and how it balances responsiveness with throughput, flexibility with optimization for a particular environment and ease of use with performance. It continues with the coding of device drivers and the sophistication of their access optimization algorithms.

I/O is further affected by the buses that connect the processor, the memory and the I/O subsystems. It includes the device controllers and their ability to operate independently of the processor and to overlap data transfers with other activities. Processor performance is down the list in about 12th place, just ahead of the phase of the moon and the color of paint on the computer room walls.

The logic content of channels, controllers, multiplexers and their cousins in a typical mainframe far exceeds that of the central processor. That's one reason why mainframes score poorly in "price per MIPS." Channels don't add millions of instructions per second, or MIPS. They just add throughput. What so-called experts sometimes forget is that users don't need MIPS, they need throughput.

A workstation like the Sun-4 was designed for a different environment. It was designed for users who perform enormous amounts of computing on relatively small quantities of data. Spending money on faster data transfer would be a poor decision on Sun's part. Sun knows what its customers need and has historically done a good job of providing it.

The Nelson benchmarks, then, test things that have little or nothing to do with the processor used in a system. When Gibson wrote, "It may be too early to tell if the test was a fair one for Sun's Sparc chip," he was missing the point. The test was neither fair nor unfair to the Sparc chip. It did not test the Sparc chip. The best reaction to it, in regards to Sparc's suitability for commercial applications, is a yawn.

This is not to criticize the Nelson folks. They knew what they were doing. They took a dump truck to see if it could float. It did, after a fashion. The problem is with the landlubbers who watched it from the dock and expected something magical to happen. There is no magic. To see if diesel engines are good in boats — they are, by the way — we have to put one in a boat. To see if the Sparc chip is good in commercial systems — and it might be — we have to put one in a commercial system. Until somebody does that, any statement is, at best, a guess.

Mallach teaches at the Boston College School of Management and is a consultant to user and vendor executives.

Low-priced RISC workstation bows

BY J. A. SAVAGE
CW STAFF

MOUNTAIN VIEW, Calif. — Hoping to reach a larger number of users, Silicon Graphics, Inc. recently announced a reduced instruction set computing (RISC), three-dimensional graphics workstation priced less than $50,000.

Silicon Graphics introduced the Iris 4D/50 Model for $49,500 as a precursor to a $15,000 entry-level graphics computer that the company said will be announced at the end of this year. The 4D/50 replaces the year-old $64,900 Iris 4D/60. The next most powerful model in Silicon Graphics' line, the 4D/70, also costs $64,900.

The 4D/50 is based on an 8-MHz RISC processor made by Sunnyvale, Calif.-based Mips Computer Systems, Inc. The CPU delivers 7 million instructions per second, according to Silicon Graphics. The firm's other systems are based on Motorola, Inc.'s 68000 series chips.

"Silicon Graphics wants to get a bigger piece of the market pie and do what Sun [Microsystems, Inc.] did by getting into the mass market," said Vicki Brown, a workstation analyst at International Data Corp. in Framingham, Mass.

"The risk is they are getting into the mass market too late," Brown said, adding that Silicon Graphics will have a good chance of success against better established low-end competitors because the company's products offer superior performance.

Silicon Graphics' move to offer less expensive systems follows earlier statements that the company would offer high-end systems to compete with the graphics superworkstations of Stellar Computer, Inc. and Ardent Computer Corp.

The Iris 4D/50 basic configuration includes 8M bytes of main memory, an eight-bit color plane, a 170M-byte disk drive, Ethernet, a keyboard, a mouse and a 19-in. color monitor. The machine can be upgraded to a 4D/70 CPU for $15,000, according to the company.

VaporCASE

VaporCASE

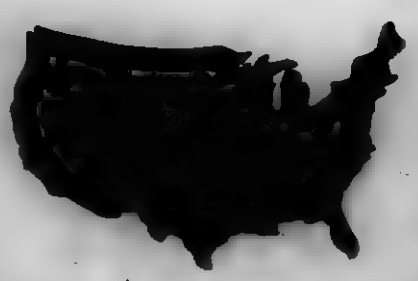
The wishful promises of vendors who are trying to jump on the CASE bandwagon. They demonstrate part of the CASE solution, and hope you'll wait until they develop the rest of their system which they promise will be ready "any day now." Meanwhile, even if they could help you develop a brilliant applications strategy, you have no clear way to implement it.

Piece Parts

Some CASE suppliers offer a small piece or two of the puzzle. A front-end here. A back-end there. Integration? No problem! Just as soon as they can make Company A's front-end work with Company B's repository, and tie everything into Company C's code generators.

Projections

One way to evaluate a CASE system is to simply visit the installations where the product is up and running. Most CASE vendors will tell you where their product might be installed in the future...if you don't mind waiting.



University

CONTINUED FROM PAGE 47

footprint of the machines may make this the system's final move. "Over time, we won't ever need to expand the computer room," Dolgonas said, crossing his fingers.

Shrinking direct-access storage devices (DASD) offered Dolgonas an immediate gain in floor space. With the new building came 10 IBM 3380 Model J DASDs.

These replaced "a sea" of Control Data Corp. 3350s, "with a tremendous savings in floor space," Dolgonas said.

On the microcomputing front, Dolgonas is cheering the proliferation of desktop terminals, but only if they are dumb terminals, IBM Personal Computers or IBM PC clones.

He estimates there are 700 to 800 terminals for the statewide, 100,000-person staff, including everyone from maintenance workers to analysts. Dolgonas estimates that half of those terminals are personal computers used primarily by analysts.

IBM PCs preferred

"We encourage users to get PCs [IBM PCs or clones] rather than Apple Macintoshes. We set up training and give them advice," Dolgonas said.

Now that the move is over and the dust is settling, Dolgonas has embarked on a dozen new projects, including putting the university's retirement system information on a data base so that pension information will no longer be calculated by hand and entering the personnel policies of the 20 unions that work at the university on a data base.

"We let the users decide what projects we're going to work on, and they ask us for recommendations as to the timeliness or sequence of the projects," Dolgonas said.

The projects are then sent to a steering committee with representatives from the university president's office, treasury and legal departments.

"Right now, all our enhancements are oriented toward two goals: on-line transactions and the ability to interface," Dolgonas said.

Tandem offers printer family

BY J. A. SAVAGE
CW STAFF

CUPERTINO, Calif. — Tandem Computers, Inc. recently unveiled a low-end, 14,000 page a month dot matrix printer aimed for distributed applications on the shop floor or in the office.

In addition to sharing a control language with other Tandem peripherals allowing users to run applications for any printer in the Tandem family, the 5512 printer has a paper tractor that the vendor claims can reduce waste by advancing paper or invoices automatically.

The printer is for use with Tandem's Nonstop on-line transaction processing (OLTP) computers using Tandem's Guardian 90 operating system or with its LXN OLTP computers using a Unix operating system. It can be connected to a host computer and can run in a local-area network, according to Rich Ghiossi, printer product manager at Tandem.

The 5512 prints 160 char./sec. in letter quality mode and 400 char./sec. in draft mode. The high-speed draft rate is 480 char./sec.

The printer's graphics resolution is up to 360 by 360 dot/in. It offers two fonts, Gothic and Courier, and costs $3,495.

The three other printers in the same Tandem line range from the 5515 model, which can perform 50,000 pages a month at a price of $6,450, to the 5518, capable of 350,000 pages a month and priced at $32,000. In between those models, the 5516 handles 100,000 pages a month at a price of $11,950.

The 5512 has two paper handling modes, a continuous form load and unload, which performs automatic paper alignment, and a demand-document feature that allows a page to be removed without advancing an additional form. According to Ghiossi, the feature is not available on Tandem's other printers.

Three interfaces are supported by the printer: RS-232C, current loop and a Centronics Data Computer Corp. parallel interface.

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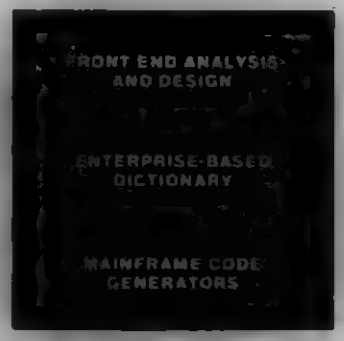

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Masscomp

CONTINUED FROM PAGE 47

real-time system, spans the receipt of an external interrupt through the execution of a high-level user process.

The new models, dubbed the MC6300, MC6400, MC6600 and MC6700, come in configurations ranging from a seven-slot pedestal to a 30-slot cabinet. The systems run Masscomp's real-time Unix operating system, RTU.

The MC6300 is a seven-slot pedestal system, configured with one or two 25-MHz 68030 microprocessors that share a 64K-byte direct-mapped physical cache. The system is available with one or two Motorola 68882 floating-point coprocessors and one or two Masscomp Super Lightning floating-point accelerators.

The system also comes with 8M bytes of parity memory, a small computer systems interface (SCSI), an Ethernet controller and four RS-232C serial communications ports.

The system features add-on error-checking and correcting memory to support up to 120M bytes of system memory, a 14 million floating-point operations per second (MFLOPS) vector accelerator, one or two graphics subsystems and Masscomp's STD+ Bus data-acquisition system.

Storage subsystems include a 150M-byte cartridge tape, a ½-in. reel tape drive and two enhanced small device interface disk drives, each of which has 318M bytes of capacity. MC6300 pricing begins at $24,900.

The MC6400 system comes in a rack-mount configuration with six slots. Like the MC6300, it also supports two CPUs with shared cache and has two floating-point coprocessors, two optional floating-point coprocessors, parity memory, an SCSI interface, an Ethernet controller and serial communications ports, all on a single board. Prices for the MC6400 start at $28,900.

Available either in pedestal or rack-mount configurations, the MC6600 offers 15 slots and can contain up to three 68030-based CPUs. The system supports one 14-MFLOPS vector accelerator per CPU.

Up to 120M bytes of error-checking and correcting system memory is available for the MC6600 in 8M- and 16M-byte increments. The system reportedly can support up to 568M bytes of disk, cartridge or reel tape. Prices for the MC6600 range from $42,500 to $77,900.

The high-end member of the family, the MC6700, is packaged in a 30-slot enclosure and can contain up to five 68030-based CPUs, each with 64K bytes of cache, a 68882 floating-point coprocessor and an optional Super Lightning floating-point accelerator.

The MC6700 performs up to 56 MFLOPS using four vector accelerators and supports up to four Intel Corp. Multibus I/O subsystems, two VMEbus I/O subsystems and two STD+ Bus data acquisition subsystems. Pricing ranges from $59,000 to $120,000.

The Super Lightning floating-point accelerator is a very large-scale integration chip set consisting of a proprietary floating-point interconnect chip and a Weitek Corp. 3164 computational chip.

Integrated on the Masscomp 6000 family of CPU boards, the chip set performs more than 7 Whetstone MIPS, according to the vendor. The chip set is priced at $3,000.

All models in the MC6000 series will be available in 60 days, except the MC6400, which will be available this fall.

Prime's EXLs

CONTINUED FROM PAGE 47

per second (MIPS) performance of the EXL 316, according to Prime.

The EXL 320, using the 20-MHz 80386 chip, will deliver 4 MIPS to as many as 48 users working on typical Unix applications, a Prime spokesman said.

The 5-MIPS EXL 325 relies on a 25-MHz Intel Corp. chip to better the EXL 316's performance by 56%, according to the company.

"Prime's latest EXL models are right in line with an industry trend to keep pushing the performance of 386-based platforms while keeping prices at a personal point," said Bruce Jenkins, vice-president of Daratech, Inc., a market research firm in Cambridge, Mass.

EXL 320 pricing starts at $25,900, with maintenance from $137 a month; the EXL 325 is priced from $45,900, with maintenance from $174 a month.

The move, Jenkins said, is a smart one on Prime's part. "As soon as there's adequate hardware performance to run an application, someone's going to move that application to the machine in question," he said. "PC users tend to be less finicky about the technical fine points of how the power got into the box. PC CAD [computer-aided design] users will just want to know, can the box do the job?"

In addition to the new EXL models, Prime announced software based on IBM's Systems Network Architecture (SNA) that provides communication links between the EXL series and IBM systems using IBM 3270 applications. The software is available immediately.

The EXL family can also communicate with Prime 50 series minicomputers, IBM Personal Computers and compatibles and other third-party systems across Ethernet cabling running Transmission Control Protocol/Internet Protocol software, SNA and Prime proprietary communications tools.

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NEW PRODUCTS

Processors

A family of real-time image processing boards for use with its Series 150/151 product line has been announced by **Imaging Technology, Inc.**

The **RTMP-150/151** real-time modular processor consists of a motherboard with up to three position-independent plug-on computational modules. According to the vendor, each module performs an image processing function that previously required up to three boards to perform. The processor is compatible with the Series 150 family of Motorola, Inc. VMEbus boards and the Series 151 image processor.

Four computation modules are available for performing real-time operations, binary correlations, rank value filtering and look-up tables.

The RTMP-150/151 real-time modular processor costs $995. The computational modules cost from 1,295 to $5,495.

Imaging Technology, 600 W. Cummings Park, Woburn, Mass. 01801. 617-938-8444.

An integrated vector/scalar processor for its I/O Computer has been announced by **Aptec Computer Systems, Inc.**

The I/O Computer feeds data to array processors and other high-speed devices at data rates up to 12M byte/sec. The **VSP-1** processor plugs directly into the I/O Computer's internal bus, performing signal-processing algorithms.

The VSP-1 contains a scalar processor and a 20 million floating point operations per second vector processor, both of which share 1M byte of static memory on an 80M byte/sec. bus.

A single VSP-1 costs $24,900. An IOC/VSP-1 system, including an I/O Computer-24, a VSP-1, 16M bytes of memory and development tools, costs $99,500.

Aptec Computer, 9605 S.W. Nimbus Ave., Beaverton, Ore. 97005. 503-626-9000.

Graphics systems

An electronic slide presentation system said to allow users to create and display images in true-color on a large-format or red-green-blue monitor has been announced by **Autographix, Inc.** and **Compugraphic Corp.**

The **Electronic Slide Presenter**, or ESP, offers 680- and 1,024-line resolution capabilities and a 16-million-color palette. A pop-up picture directory lets users preview the presentation by showing nine thumbnail images at a single view. Other features include a screenwriter and a remote-control device.

The hardware components include an Intel Corp. 80286-based computer, a menu-display monitor and a graphics controller.

ESP is priced at $19,900 for a typically configured system.

Autographix, P.O. Box 9031, Waltham, Mass. 02154. 617-890-8558.

Printers/Plotters

Office Automation Systems, Inc. has updated its line of laser printers and controllers.

The **Laserpro Express** now comes standard with 512K bytes of random-access memory and six emulations, including Epson America, Inc.'s FX-80, IBM's Proprinter, NEC Corp.'s Spinwriter and Qume Corp.'s Sprint. It costs $1,995.

The **Laserpro Series II Express** now comes with 1M byte of RAM and includes Hewlett-Packard Co. Laserjet Plus emulation in addition to the emulations of the Laserpro Express. It is priced at $2,495.

Office Automation Systems, 9940 Barnes Canyon Road, San Diego, Calif. 92121. 619-452-9400.

Qume Corp. has reduced the prices on its **Qume Scripten** and **Qume Laserten Plus** laser pritners.

The Scripten, featuring Adobe Systems, Inc. Postscript compatibility, desktop publishing capabilities and a resolution of 300 dot/in., has been reduced to $4,995. Additional features include 3M bytes of memory, 11 type families and 35 resident fonts.

The Laserten Plus includes an interface module said to provide compatibility with most computers, word processing applications and word processing systems. It offers resolution from 75 to 300 dot/in. It now costs $2,795.

Qume, 500 Yosemite Drive, Milpitas, Calif. 95035. 408-942-4000.

Auxiliary equipment

AST Research, Inc. recently introduced the **AST 5250 Splice Box**, which it said allows IBM System/34, 36 and 38 users to substitute twisted-pair for twinaxial cable.

By using the twinaxial ports or RJ11 ports on each side of the splice box and cabling through, up to seven devices can be accommodated. The splice boxes reportedly will be included in all AST 5251/11 product packaging, the AST 5250 workstation and the AST 5250 personal computer.

The AST 5250 Splice Box will be available to end users as a separate product at a cost of $100.

AST Research, 2121 Alton Ave., Irvine, Calif., 92714. 714-651-8489.

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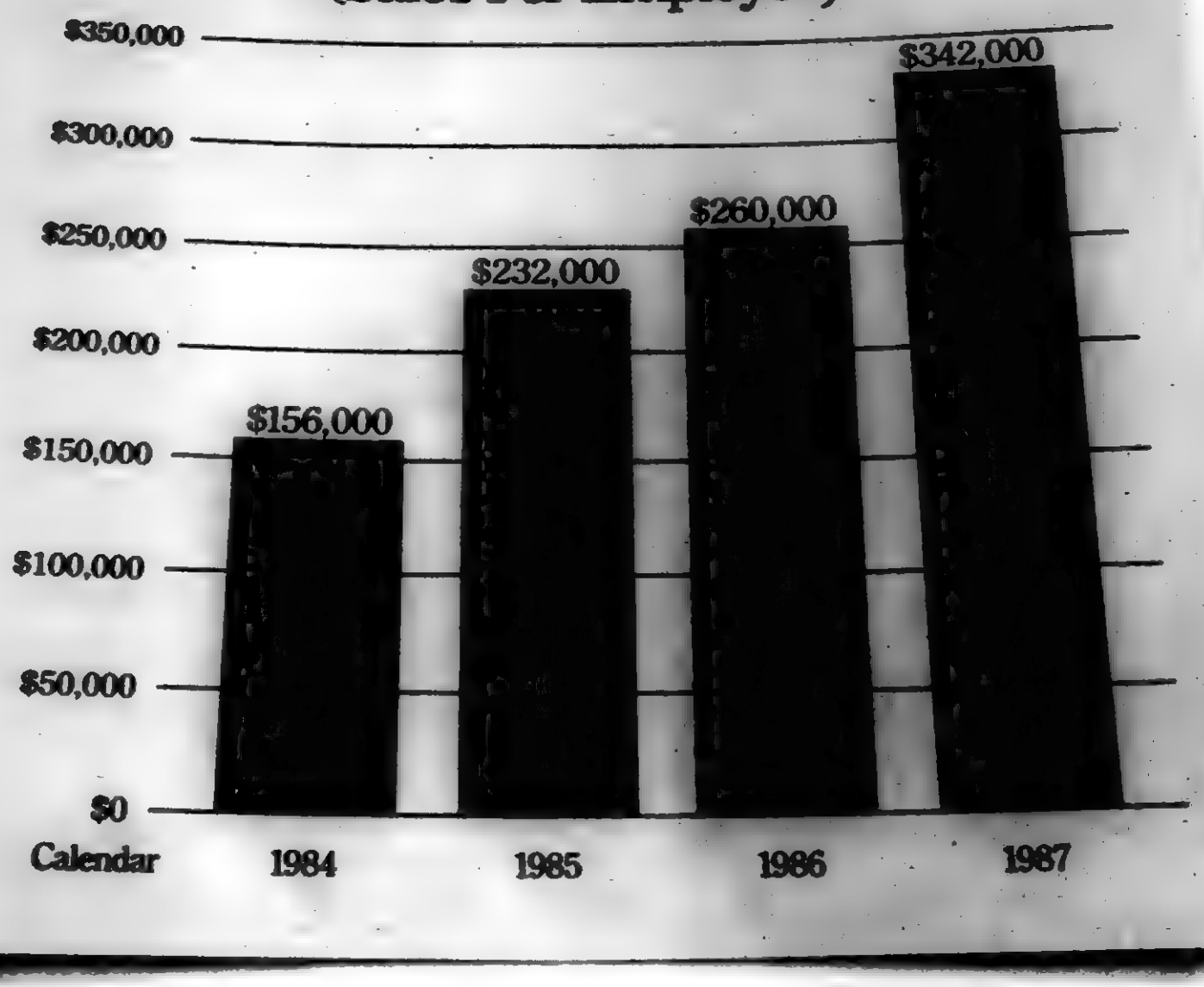

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Users say EDI cuts inventory costs, speeds product delivery

BY LAWRENCE STEVENS

BRAD HAMANN

Rick Wakeland discovered electronic data interchange (EDI) in 1985 while he was trying to invent it.

"We didn't know anything about standards or EDI vendors," says Wakeland, manager of purchasing operations at PMI Food Equipment Group, a Troy, Ohio-based large manufacturer of equipment for the food industry. "All we knew was that it was strange that we would generate a purchase order using our software, print it and mail it to our supplier, who would then have to enter it into his computer."

While trying to plan his own communications system, Wakeland was tipped off to EDI standards and the EDI third-party market by one of his suppliers, Joseph T. Ryerson & Son, Inc. in Chicago, a steel distributor that had used EDI to facilitate sales to Ford Motor Co. and General Motors Corp.

Using Tracs, EDI software from Sterling Software, Inc. formatted to the ANSI X12 standard, PMI and Ryerson developed a pilot project in which 200 to 300 purchase orders were transmitted per month.

"We figured that preparing and sending a paper purchase order cost us about $25," Wakeland says. "With EDI, it costs about $5." The savings on that pilot project came to more than $60,000 annually.

Today, PMI, one of Premark International, Inc.'s four product groups, uses EDI to transmit 18,000 purchase orders annually to 13 suppliers. Even though that number represents only 15% of the company's total purchase order volume, Wakeland estimates that his firm is saving more than $360,000 a year.

EDI saves money and time by enabling purchase orders, invoices, bills of lading and the like to be electronically transmitted. It eliminates the printing and handling of paper at one end and the inputting of data at the other.

First implemented more than a decade ago by the trucking industry, EDI was eventually picked up as an efficiency measure by vertical markets, such as the automotive, textile and apparel industries, under pressure from foreign competition.

But today, no market is unaffected by it. Victor Wheatman, manager of EDI planning and services at Mountain View, Calif.-based Input, a market research and management consulting firm, estimates that 1987 EDI revenue reached between $70 million and $90 million. And, he says, he sees an average annual growth of 88% until 1992 (see chart page 54).

Electronic staff

The most obvious and measurable advantage of EDI is that it saves money. "It's very expensive to hire people to do the redundant input that telephone and letter communications require," says George Klima, director of accounting systems and procedures at Super Valu Stores, Inc., a Minneapolis food wholesaler. Klima estimates that in invoicing alone, eliminating matching invoices and remittances and other clerical functions saves his company more than $600,000 annually.

Many companies find they are saving money not only by cutting staff but also by being able to better organize the workday. Jim Bridges, vice-president of MIS at United Refrigerated Services, Inc. in Atlanta, says he finds that receiving invoices and purchase orders in real-time eliminates the peaks and valleys that result from companies sending documents daily or weekly.

"With EDI, we don't have the

Stevens is a free-lance writer based in Springfield, Mass.

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Third-party firms provide around-the-clock communications
Page 55

Banks worry that they'll lose valuable float in funds transfer
Page 58

EDI

FROM PRECEDING PAGE

panic afternoons when the mail room drops a ton of release orders on us at four o'clock and suddenly everyone is working time and a half," Bridges says. "We get orders in all day, and we can pace ourselves."

Staying efficient

Many users point to EDI advantages that are not directly related to postage and handling of paper documents.

For example, what Bridges says he likes most about EDI is that it cuts down on the inevitable errors that occur when data is entered and printed out so many times. United Refrigerated is a public warehouse for the grocery industry. It receives more than 1,000 release orders a day to ship products to outlets throughout the country. That leaves a lot of room for error, and, as Bridges says, "when we make a mistake, we pay freight both ways: We have to restock the product, but most importantly, we lose some goodwill."

While Bridges does not have an exact figure on how less often errors occur now that his company uses EDI, he says that the 850 release orders his firm receives electronically each day are processed practically error-free.

When used for transmitting price lists and promotional announcements, EDI can also better organize the buying process. "When we had to depend on salespeople to deliver price lists and promotional announcements," says Dave Toebbe, systems specialist at The Kroger Co. in Cincinnati, "we were never sure of getting current information. We would miss some promotions because a salesperson couldn't get in on time."

The ability to immediately receive and act on purchase orders and invoices provides a level of service that non-EDI users will be unable to compete with.

PMI's Wakeland

Bruce Bennett, data processing manager at Eber International, an apparel company in San Francisco, says that when his company first tested EDI with Mervin Kurtzman, Inc., a Los Angeles men's clothing store, 10 months ago, he knew it would be quicker than regular mail, but he was surprised at how much quicker.

Eber's first EDI transmissions were done in tandem with paper. "It was a week after I received my first EDI purchase order that I saw the paper version of that order," Bennett recounts. "The customer may have received the shipment before then. Suddenly, our level of service to Mervin's increased significantly."

Real-time transmission of purchase orders also allows companies to lower their inventories, since they will be able to replace stock more quickly. Gary Sweetapple, senior director of corporate system development at K Mart Corp. in Troy, Mich., says that now that his company is handling 80% of its general merchandise orders through EDI, he is able to delay ordering most stock by three to four days.

"When you multiply three days by our entire stock, the cost savings in interest is substantial," Sweetapple says.

Hourly inventory

Lowering inventory by three or four days is an impressive savings for retailers, but manufacturers plagued by tough foreign competition often have to do even better. Each of the big three U.S. auto makers has instituted some form of just-in-time (JIT) inventory, which requires, in some cases, only an hour's supply. According to Charles Richards, system development supervisor of the purchasing and supply staff at Ford in Dearborn, Mich., JIT is impossible without EDI.

"We have to schedule our assembly plants and docks hour by hour," he points out. "You can't do that with paper, since its timing is too inexact. You never know when the paper will arrive." Ford uses EDI to send purchase orders and receive information as to when parts will arrive, both for production and nonproduction items such as machine parts.

While JIT is considered the leading edge in plant organization, Richards says he sees EDI as a technology whose ramifications have not yet been fully explored.

He says he feels that once the age of paperless business transactions is reached, industries will be able to explore efficiencies and techniques of which JIT will be only one example.

"I compare EDI to a superhighway system," Richards explains. "By itself, it has little meaning. But it has made a lot of things possible. I expect that in the future, we will depend on EDI as much as we depend on our highway system today."

Electronic funds transfer

Many experts say that aside from JIT, the most revolutionary change EDI will bring in the near future will be cash management. Some companies are already taking into account the more exact knowledge of when cash will arrive and the quicker and more accurate collection procedures afforded by EDI.

Better cash management has

Continued on page 56

Exponential U.S. EDI market growth

A $1.9 billion market by 1992[1]

[1]Including software and processing revenue, software and professional services.

[2]Various factors will contribute to EDI's growth at different levels, including the acceptance of telecommunications and standards, large companies requiring suppliers to use EDI, knowledge of communications costs and the need to cut costs in general.

INFORMATION PROVIDED BY INPUT
CW CHART

IBM: Late to the beach but a pretty big splash

BY PATRICIA KEEFE

IBM has caught the fever, if not the wave, of electronic data interchange (EDI). This is one surfin' safari the computer giant appears determined to lead, even at the cost of supporting open systems.

Under the sunny skies of Tampa, Fla., in the midst of a small office park beats the heart of IBM's EDI commitment — its worldwide, value-added Information Network.

In the U.S., the Information Network ties together 20 primary-node cities, 226 dial-in locations and three operations centers. International support is extended to 16 countries via IBM's Systems Network Architecture (SNA) and another 36 via CCITT X.25.

This modern operations center is the most overt example of IBM's newly charged commitment to EDI. More subtle is the computing giant's embrace of the interorganizational system concept, defined as any network or networks shared by two or more companies.

Putting teeth in IBM's commitment is the recognition that "we have to support the business patterns of our customers — regardless of equipment type," says Michael Ribet, the Information Network's manager of interorganizational systems/EDI marketing. He notes it would be unrealistic to expect users of IBM's EDI Services to communicate with only those trading partners that use IBM systems.

Given the wisdom of the adage, "Whoever owns the network controls the account," it is not hard to see why IBM views control of the interorganizational system as paramount. Such a system clearly increases the potential number of accounts to be won. And EDI is perhaps the most prominent example of an interorganizational system.

"By the end of the century, doing business without EDI may well be like trying to do business today without a telephone," IBM marketing literature optimistically predicts.

Advantages of the newcomer

Nevertheless, IBM's zest for EDI is relatively new. Launched in 1979, the SNA-based Information Network was initially targeted at IBM's 2,000 largest suppliers — 80% of its production — and 37 plants worldwide, including the Communications Products Division.

Announced in 1985, EDI Services, an offering under Information Network, came relatively late to the commercial market, claims Eric Arnum, editor of "EMMS," a New Canaan, Conn.-based newsletter that covers the electronic mail industry.

Such foot-dragging has effectively shut IBM out of some markets that have already standardized on one system, Arnum adds. For example, Sterling Software, Inc. can claim the lion's share of the pharmaceutical EDI segment.

Not too shy

Yet IBM is no EDI wallflower. It boasts a competitive toehold in the insurance market as the value-added network provider at the hub of the Insurance Value-Added Network Services consortium's EDI system. IBM's customer list also includes Texas Instruments, Inc., Pennzoil Co., Marshall Industries and San Francisco's Federal Home Loan Bank.

And lagging behind leading EDI innovators, such as the automobile, grocery and airline industries, are scores of other businesses waiting to be plundered.

"IBM obviously has an enormous advantage over any other company on the planet when it comes to computer, semiconductor and office equipment and telecom gear suppliers," Arnum says, noting that these industries have been surprisingly slow to implement EDI.

Moreover, there is something to be said for arriving fashionably late in a new market — IBM's standard modus operandi. In this case, the company's tardiness has allowed it to wait out the standards controversy.

IBM's EDI strategy breaks down in the following ways:

- Develop specific industry interorganizational system solutions and alliances to increase marketplace participation and develop significant presence in key industries. One example of this is IBM's connection with The Corporate Alliance, an association of companies that provides goods and services to hospitals.
- Capitalize on host attachment strengths and E-mail to drive EDI.
- Elevate interorganizational system awareness.
- Facilitate electronic handshaking within 24 hours of initiation.

EDI Services reportedly enables computers to transmit formatted messages into an E-mail box attached to Information Network for retrieval by authorized recipients. Users maintain a single connection to Information Network, regardless of the number of trading partners. This saves the expense and support associated with multiple point-to-point connections, IBM claims. •

Keefe is a *Computerworld* senior editor, networking.

Will users welcome third-party vendors?

In chaotic world of EDI, they provide extras, 24-hour assistance, help with standards

BY JUDITH FEDER

If you're wary about setting up electronic data interchange (EDI) in your MIS shop, there are plenty of EDI service vendors out there that can do it for you.

And judging by the entrance of new players into the marketplace, the role of third-party service providers in connecting customers and their trading partners in EDI relationships has become more important than ever to MIS managers.

In recent months, Western Union Corp., U.S. Sprint Communications Co./Telenet Communications Corp. and Compuserve, Inc. have joined McDonnell Douglas EDI Systems Co., GE Information Services, Sterling Software, Inc's Ordernet Services Division and others as third-party vendors of EDI services.

In addition, banks are exploring their potential role in EDI (see story page 58).

Third-party advantage

Why do certain corporations choose to use EDI third-party services rather than linking directly with their trading partners?

According to Lee Foote, EDI manager of Du Pont Co.'s Information Systems Department and chairman of the Chemical Industry Data Exchange Committee, it is because these services offer communications capability operating around the clock, which is crucial to many companies.

"That's what a third-party provider can do better than an individual player," Foote says. High network performance standards are also among the benefits users see in third-party networking.

In addition, both new and veteran third-party players are stressing a full-service approach to EDI that goes beyond providing network capacity. Those companies enrich their EDI offerings with services such as translation capabilities, electronic mail, third-party network interconnections, training, hard-copy delivery options and data base access.

Vendors also help sell the EDI concept to trading partners that may be resistant to or simply ignorant about what EDI can offer. One major vendor is reported to spend up to 40 hours converting each trading partner of its EDI customers.

Seeing clear

Perhaps the most important element, users look to third-party vendors to establish order in what one MIS executive recently described as the "rat's nest" that is EDI.

Competing standards are what continue to characterize the overall EDI environment, largely because of adherence to incompatible data formats. Public standards such as ANSI X12, industry standards such as Ordernet for the pharmaceutical market and private or proprietary standards — including those developed by many mass merchandisers — continue to be used today.

Therefore, users requiring translation between incompatible EDI formats look to third-party vendors to provide or recommend translation software that resides on customer computers or to perform "in-network" translation.

THIRD-PARTY emphasis on full service is a virtual necessity, simply to meet the varied needs of today's EDI community.

Third-party emphasis on full service is, thus, a virtual necessity, simply to meet the varied needs of today's EDI community. E-mail, for example, is a value-added service that has assumed greater importance in the EDI market, especially as EDI customers seek nonstructured electronic links with their trading partners and E-mail customers become interested in using EDI.

That is why Control Data Corp.'s Redinet is now bundling Redi-Mail E-mail software into its micro-based turnkey EDI package. The three new players in the field, Western Union, Compuserve and U.S. Sprint/Telenet Communications, are leveraging their experience as E-mail providers to bring both current and new customers into the EDI fold.

Leading contenders

GE Information Services, Ordernet and McDonnell Douglas hold the top three spots in EDI revenue and market share (see chart above).

McDonnell Douglas adheres to its strategy of generating revenue primarily from network traffic; the company certifies translation software that customers install on their own machines.

GE Information Services, a division of General Electric Co., takes a more full-service approach, stressing in-network translation and mailbox capabilities.

Ordernet is perhaps most closely identified with the successful pursuit of vertical industries — pharmaceuticals, hardware and household product manufacturers.

Seeking to bridge the gap between themselves and the market leaders, several third-party vendors are raising their EDI profiles.

Undoubtedly the most formidable is IBM's Information Network, which the company says can woo users with its Systems Network Architecture (see story page 54).

CDC's Redinet, which is bringing a number of EDI pilots into full-scale implementation this year, has added value to its network through a range of new services while maintaining its reputation as a low-cost provider.

Everyone's a prospect

Among the new players, Compuserve is aggressively pursuing the EDI business of its current customers — and its customers' customers.

Elizabeth Sibbring, marketing manager of Compuserve's EDI, says, "We look at all trading partners as Compuserve prospects and EDI as just one of several services we can offer customers."

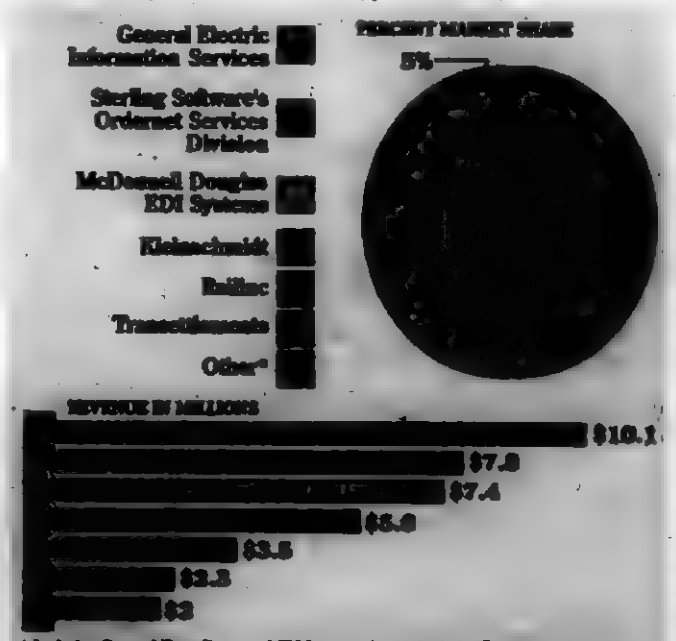
Western Union has adopted a similar stance, positioning EDI as one of a growing number of options on its Easylink E-mail network.

U.S. Sprint/Telenet jumped into the middle of the EDI market through resale agreements with Ordernet and Transettlements, Inc. and can now count Digital Equipment Corp., Tandem Computers, Inc. and Ball Corp. among its base of customers.

U.S. Sprint/Telenet's approach to EDI is in keeping with its emphasis on providing a full range of network services via the acquisition of a range of applications capabilities. ●

The middlemen

U.S. third-party EDI network vendors, year-end 1987



* Includes Control Data Corp. and IBM; new players include Western Union and U.S. Sprint/Telenet

INFORMATION PROVIDED BY LINK RESOURCES CORP.
CW CHART

Foote is a free-lance writer and consultant at Link Resources Corp. in New York.

Getting started

Experts advise that the first step to adopting electronic data interchange (EDI) is to develop an implementation plan. This plan should include the following tasks:

- ✔A cost/benefit analysis as to whether translation software should be licensed or written in-house.
- ✔A study of the company's existing paper flow and how it can be improved.
- ✔A determination of which departments could benefit from EDI.
- ✔Decisions about which trading partners should participate — usually starting with the largest ones.
- ✔A timetable for full implementation.

Second, hardware communications protocol requirements have to be considered. This involves studying distance of transmission, delivery time frame, volume of transactions, number of trading partners and security issues. Next, software requirements must be determined.

Finally, there should be face-to-face meetings with trading partners to hammer out issues of security, format and organizational matters, such as who initiates the call and how often transmissions will be sent.

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EDI

FROM PAGE 54

resulted in organizations receiving discounts and better terms by making more timely payments. But this revolution in cash management will be more dramatic with the increased use of electronic funds transfer, a type of EDI in which payments are electronically transferred from the purchaser's to the vendor's account.

Currently, the largest electronic funds transfer project has been undertaken by GM and a number of its vendors. James J. Hopes, vice-president of Chase Manhattan Bank NA in New York, is involved with the GM project.

That extra 10%

Hopes points out that electronic funds transfer is a natural progression from EDI. "With EDI, you transfer information about the funds you will be sending. But if the actual funds are sent through the mail," he says, "there will still be some matching and inputting of work as well as some delay."

He adds that once a company sends data electronically, there is only an additional 10% effort required for it to send funds as well. He says banks will increasingly transmit both funds and business data and will, in that sense, act as third-party EDI vendors.

Hopes says that in the near future, banks will be able to offer contracts even to smaller businesses so that electronic funds transfer may be the main means of funds transmission.

"We don't yet have nearly the volume to determine how much this is going to cost," he says. "But we've put [together] a large effort to create the software to be able to do this on a wide scale, and prices will definitely drop."

What about the float?

But Hopes says he can see why some businesses might resist implementing electronic funds transfer. He points out that companies are used to sending checks by mail and that cash management systems are based on the fact that checks will not clear for a week or longer after they are sent.

"Electronic funds transfer means more than changing the way we send funds," Hopes says. "It also means we'll have to change the way we manage them."

Determining when the money changes hands was what prevented Ford from using electronic funds transfer. The problem lay in what happens to the lost float — the use of money between the time a company sends a check and the time it is cashed.

Ford's Richards says, "When we were discussing electronic funds transfer, our purchasing people wanted to give the float away and not negotiate it into the price. The treasurer's office wanted to keep it. We had a Mexican standoff."

Super Valu's Klima

While Ford was trying to solve that problem, it conducted a survey of 10 to 12 suppliers. What it found, Richards says, is that suppliers "were more concerned with receiving the check stubs electronically than [receiving] the funds themselves."

Ford is now involved in a pilot project with two suppliers in which the auto company electronically sends information formerly found on the stubs of the check. This transmission relieves the supplier of having to match the stubs with invoices. The check is mailed directly to the supplier or the supplier's bank, as always, and the bank then advises when the funds are available for use.

"Until organizations work out the problems of float," Richards says, "electronic funds transfer will be a tough issue" (see story page 58).

Other companies that have worked hard to institute good cash management procedures worry about what electronic funds transfer will do to their competitive advantage.

"We have a good cash management program, and we get a 2% discount if we pay in 10 days," Super Valu's Klima says. "We don't want electronic funds transfer to level it out, so all purchasers get the same terms and we lose our edge."

EDI is now feasible for most companies because it is based on the accepted cross-industry standard ANSI X12. This acceptance has made it easier for many vendors to develop software that translates flat files into standard formats. Therefore, implementation of EDI can be relatively simple for many users, since they will only have to buy

How many people will use EDI?

Projected U.S. EDI user community growth, 1987 to 1991

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Users can implement EDI in two ways. They can develop independent EDI communications directly, or point-to-point, with their vendors or suppliers or they can communicate with their business partners via a third-party network.

A little or a lot?

There are also different levels of EDI implementation. If a company wants to get its feet wet, it can begin by purchasing a personal computer-based system for between $15,000 and $20,000 — including a modem, software and PC — and simply send and receive documents. It is not necessary even to own another in-house computer. The savings is in the cost of postage and preparing the paper mail. The software takes care of formatting the data, so there is no need to have specific knowledge of standards.

But the real benefits of EDI are seen when the system is integrated with the organization's payables, receivables and other files. In this fully integrated scheme, when invoices are received, they automatically go into the payables files, and when purchase orders are received, they automatically go into the shipping files.

The cost of setting up this kind of a system varies, depending on whether the company will need more hardware and the level of development effort it requires. The amount of in-house programming depends on how tightly EDI is to be integrated into the current system.

K Mart's Sweetapple

In general, the cost of high-end software runs about $25,000, but that estimate is assuming the company does not need to buy any more additional computer power.

To cite an example of a complex system, United Refrigerated communicates with customers and with 31 locations from three IBM System/38s. When a release order comes in, it has to be sent to the appropriate location and assigned to the correct truck. Bridges bought translation software but also had to have software written in-house to transfer the release to the order-entry area, which, in turn, controls communications that signal the EDI interpreter to begin and also interfaces with the company's data base.

While cost is a major factor in deciding when and how to implement EDI, most experts warn that once the decision is made, an organization must make the necessary commitment to see it all the way through.

"At the very least," Toebbe says, "you need a committee made up of finance and MIS people who can devote whatever the required time is to develop and oversee the project. EDI demands changes in the way a company does business, and serious effort is needed to realize that."

Third-party vendors

A growing number of EDI third-party vendors offer mailbox store-and-forward services (see story page 55). One such service frees users from having to keep up with minor changes made to standards every six months.

Some EDI users prefer to send and receive transmissions in batch rather than real time. Input's Wheatman says, "It's a question of whether you're set up to receive transmissions at any time during the day or if you want to receive them when you're ready."

While companies can choose whether they want to receive data from third-party vendors, all have to be willing to send data to those vendors when a customer is using the service. Since sending through a third party is about the same as sending direct, most organizations do not mind.

A small number of firms, however, have experienced problems with third-party services and encourage their partners not to use them.

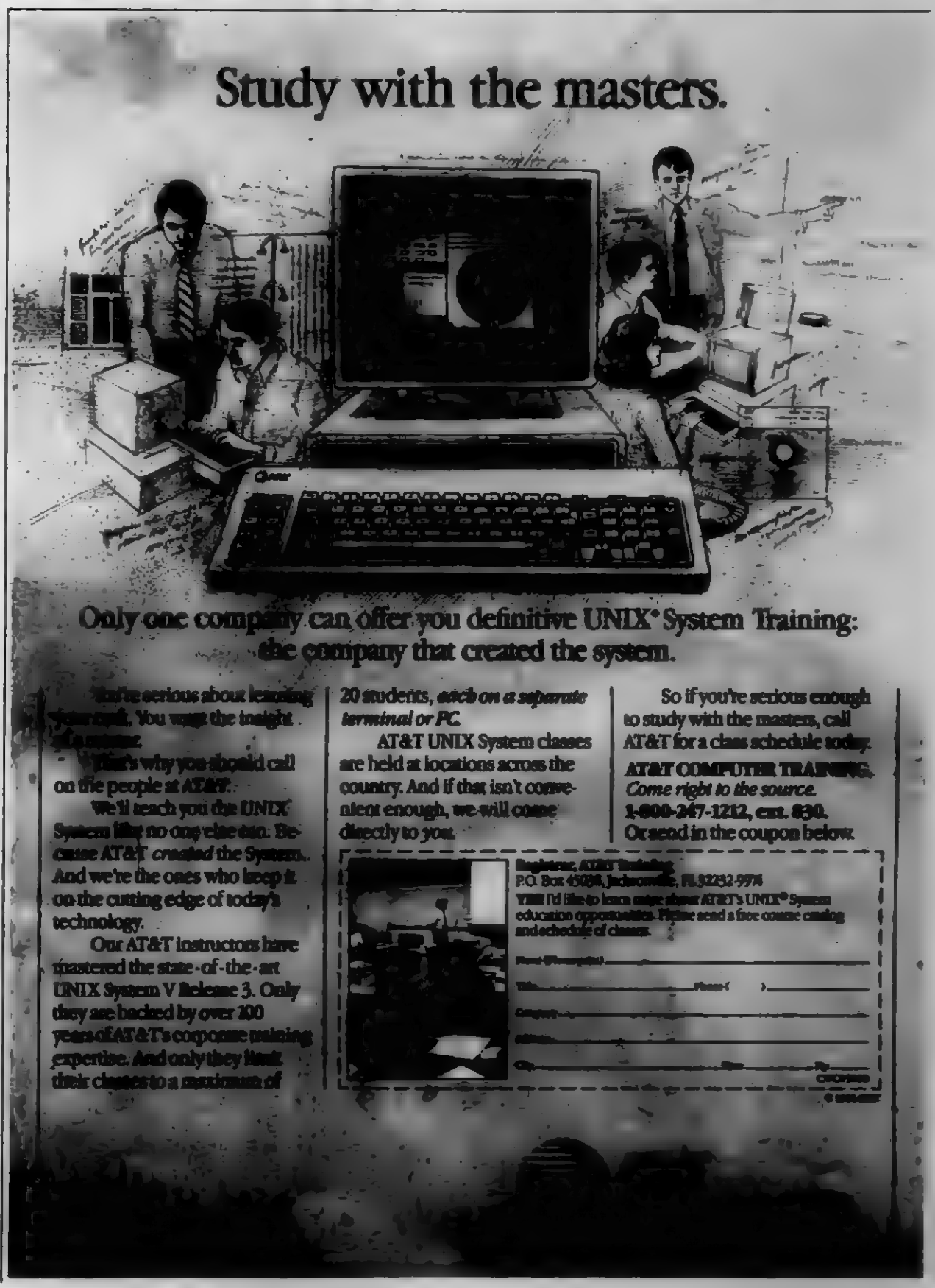
United Refrigerated is one such company. "There is always the potential for problems in computer transmissions," Bridges says, "but when you go through a third-party vendor, the problems are more out of your control."

Ford's Richards

The latest development in EDI is that overseas links are becoming stronger. For example, in London last February, International Network Services Ltd. linked its network to the worldwide EDI services provided by GE Information Services. This event created the largest EDI community in the world with more than 2,500 users worldwide.

Also in February, U.S. Customs Service Commissioner William von Raab announced in Brussels that U.S. Customs will actively participate in EDI. Von Raab also said that the Customs Service will adopt Edifact, the newly developed series of international standards for EDI.

U.S. Customs will move forward in this area by establishing its data requirements in international standards and will accept Edifact messages for the current Automated Broker Interface requirements during 1988. To make this transition, Customs will institute a pilot project working with major importers in the U.S. and with European community and Edifact rapporteurs. •



Banks look before leaping into EDI

BY ERIC ARNUM

Banks have the potential to play an enormous role in providing electronic data interchange (EDI) — but they're taking their time about it.

Today, banks primarily perform the electronic funds transfer portion of an EDI transaction for large corporations and their trading partners. However, many institutions are cautious about rushing into more activity.

A survey taken late last year by *American Banker* found that only 26 of the 100 largest banks that supply comprehensive cash management services are making a significant investment in EDI. Most surprisingly, 43 banks said they had no plans to do so.

Filling the wires

Banks are at the forefront of both data processing and data communications, especially when it comes to electronic payments. Between banks, more than $425 billion travels daily on an electronic funds transfer network called the Clearing House Interbank Payment System.

The Federal Reserve Bank runs a payment system called Fedwire, which is regularly overwhelmed by the volumes sent by U.S. Department of the Treasury bond traders and federally chartered banks.

Even though almost all transactions between banks are accomplished electronically, the use of electronic funds transfer systems by payers and payees remains light. Only about 2% of corporate trade payments travel electronically end-to-end from payer to payee on any Automated Clearing House (ACH) network.

Waiting and watching

While an identifiable and measurable benefit can be derived from cash management systems — as well as from EDI for purchase order and invoice management — bankers seem to be waiting to measure the benefit of EDI and electronic funds transfer systems. Initial projections are not encouraging.

For example, even though direct deposit and other direct government payments account for about 45% of the ACH's total volume, the federal government's new Vendor Express system is forecast to save only about $25 million in operating costs, a fraction of its daily operating budget.

Paul Mayland, vice-president of corporate payment services at Manufacturers Hanover Trust Co. in New York, says he is waiting to see what form the integration of electronic funds transfer and EDI will take.

There are three possibilities, he says. Banks could carry both the payment and the supporting reference data; they could carry the payment with a reference number and pass off the actual reference data to an EDI network; or an EDI network could pick up both the payment order and the reference data from customers and pass off the payment order to the appropriate bank.

All three alternatives are technically possible, but the last choice raises significant questions about liability. Communications carriers such as telex networks are usually not liable beyond the cost of a message. Banks are liable for the full value of a payment mistake. But who will be liable when a communications carrier acts as an intermediary between a bank and its customers?

What makes more sense is to appoint a single bank to be the EDI link for an entire network. A partnership of this kind takes advantage of the strengths of both EDI vendors and banks. The banks already have the payment systems in place. EDI vendors have the network links to customers.

For instance, Chemical Bank in New York already relies on

Arnum is editor of "EDMS," a New Canaan, Conn.-based newsletter that covers the E-mail industry.

It will take two years for the average DP department to catch up with demand for new applications.

UN

EXECUTIVE REPORT

GE Information Services as the network carrier for its Chemlink cash management service. Would it be unreasonable to give Chemical a mailbox on GE's EDI-Express system? Chemical could then pick up its electronic mail, make the payments and use EDI-Express to send a message to the recipient's mailbox.

The bankers that control the payment systems are anxious to find new sources of fee-based income to replace the money they used to earn on the interest rate spread.

For instance, a bank can derive several hundred thousand dollars each year in fee income from a client that uses its cash management system. This is possible because business-checking clients can, in turn, derive as much or more money from putting their surplus capital to work. But neither a bank nor its clients will find the same cost justification in an EDI system that helps them pay their bills more quickly.

Why? An EDI user will automate the processing and preparation of payment checks as much as possible. This automation will extend as far as the stuffing and stamping of envelopes and possibly even to sorting, to take advantage of lower postal rates.

But from that point, time is on the side of the company paying the bill, because the longer it takes for the payment to make it through the mail, the longer the payer has use of the money. It's a sad fact that the slow and inefficient movement of paper through the mail sometimes has a positive effect.

When the check arrives and is deposited by the supplier, his bank can take advantage of some of those same inefficiencies of paper. The day the check is deposited — or at worst, the next day — the supplier's bank can use one of several electronic networks to clear the check. But the depositor's bank may not credit his account for several days, allegedly because the check takes that long to clear. During those two or three days, the bank can derive income from use of those funds as they "float" through the payment system.

In other words, a paper check system benefits the payer and the payee's bank at the expense of the payee. A fully electronic system will benefit the payee by wiping out the float. The payer, who can reduce costs in the processing of a payment, takes a loss from its more rapid communication.

IT'S A sad fact that the slow and inefficient movement of paper through the mail sometimes has a positive effect.

Banks will gain nothing from float reduction, because chances are they'll be winners half the time, losers the other. It is no surprise that banks are cautious about extending this capability to their customers.

Funds transfer standards

Various formats have been suggested for company-to-company electronic funds transfer systems that use banks as intermediaries.

The Cash Concentration or Disbursement format is usually used for cash management systems. It is sometimes used for payments, even though it cannot carry much information on what the electronic check is paying for. The Corporate Trade Payment format can carry both the payment and related information, such as the invoice number.

The more elaborate Corporate Trade Exchange (CTX) format is actually part of the ANSI X12 standards currently used in EDI. Last month, the ACH network processed its first CTX payments on behalf of the General Motors Corp. EDI network.

The question is whether either the banks or the EDI vendors are willing to settle for half the market. Once the format questions are settled, the banks can easily push their existing private networks into new applications such as EDI. And once the Glass-Steagal Act restrictions on financial institutions are repealed, virtually any company may be able to accept deposits and make loans. ●

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BY ALAN RADDING

Do you pity the poor desktop publishing guy in the recent Macintosh television ad? Here is an urgent gathering of top executives trying to develop a proposal for a major piece of business, and nobody but the guy with a few Macintoshes in his department can manage to get anything done. He starts out enthusiastically volunteering to take on some responsibilities, and 30 seconds later, everything is being dumped in his lap.

Though obviously slanted toward Apple Computer, Inc.'s views on desktop publishing, this ad dramatizes the chaotic situation in corporate electronic publishing today. "Leadership is lacking now," says David Goodstein, president of Interconsult, Inc. in Cambridge, Mass.

"Local heroes arise to champion local solutions to problems. But who represents the needs and concerns of the corporation as a whole?" he asks. Often, it seems that no one is in charge of corporate electronic publishing.

"You have islands of people at the vice-president level or under doing their own things," says Patricia Seybold of Seybold Office Computing in Boston.

Who will manage and protect the growing data base of text and graphics created for electronic publication? Who should control purchasing decisions about software, laser printers, scanners and workstations?

The investment in corporate electronic publishing is already substantial. According to Goodstein, approximately 200,000 packages were sold in 1987, and shipments of small laser printers are projected to reach one million units annually by 1989.

Money hungry

The bill for corporate publishing of all types is "huge," says Ted Freiser, president of John Diebold & Associates. In its survey of firms with $400 million or more in annual revenue, Diebold turned up the following expenditures:

- A technical division of a major manufacturer spends more than $3 million annually to produce and update its catalogs.
- A software vendor spends nearly $4 million annually to provide manuals for its clients.
- A large utility that publishes direct mail, brochures and billing inserts spends $1.5 million annually.
- A pharmaceuticals company spends more than $3 million on published marketing materials.
- An insurance company spends $3.5 million on rate cards, business forms and manuals.

Goodstein sees some individual departments discovering excellent solutions for specific problems, but nobody is coordinating the overall effort.

While some departments are deeply into electronic publishing, others may be just getting past the era of Linotype machines.

From a hardware perspective, corporate electronic publishing cries out for centralized management. Despite the promise of distributed desktop publishing, some equipment is

ERIC YORKE

Radding is a Boston-based author specializing in business and technology.

- **Islands of automation all over again**
- **Publishing's sponsors are *local* heroes**
- **Text and graphics: New assets to protect**

too expensive for departmental solutions. This hardware must be networked and shared.

Furthermore, the technology yields valuable electronic data bases of text and graphics that must be secured with the same care given the organization's central MIS data bases, says Woodrow Vandever Jr., executive vice-president at Interconsult.

Analysts offer a wide range of views as to how companies might manage corporate electronic publishing. Goodstein recommends perhaps the boldest solution — that companies create a new position, chief publishing officer, or CPO.

"Unlike the previous information technology czars, the CPO's role will be neither to centralise nor to restrict. It will be, rather, to encourage, coordinate and facilitate," he says.

The reason a CPO could not enjoy great centralised power is because corporate publishing is already decentralised. There are different groups to handle publishing for corporate communications, marketing, technical support, design and engineering. Instead of being "a checkbook dictator, enforcing adherence to standards or demanding that all equipment come from one supplier or another," Goodstein says, the CPO would act more as an expert liaison between the office automation, MIS, computer-aided design and reprographics departments.

Not a dictator

Seybold says she does not see a CPO emerging as such to manage the publishing process. Instead, she predicts that control will split along the lines currently in place. "I see no corporate publishing czar. The logical person to run it now would be the CIO: He has the tools, but someone else is actually responsible for the data," she says.

This sharing of responsibility is not very different from the situation in MIS today in which the chief financial officer ultimately controls the organization's financial data, but the director of MIS controls the tools for crunching that data.

Changes in technology are transforming the nature of publishing itself, Seybold maintains. In the past, a document was published when someone sent it to the printer. With electronic technology, some documents may never make it to a printer yet still be widely distributed — "published," but in an electronic sense.

"When we publish something, we really are saying that we're releasing this view to a broader audience. The document is ready for other people to see it in whatever form we're going to use," Seybold says. The document may go to a printer, but it might instead be distributed on compact-disk/read-only memory or through electronic mail.

Diebold's Freiser says he approaches corporate electronic publishing from the standpoint of how the organization is handling its conventional publishing now and exactly what kind of documents it needs. His view is the most conventional in terms of traditional printing and publishing.

Minnesota Mutual's Schultz

"We look at what organizations are producing in-house and what they are producing outside," Freiser says. The goal of the technology, in his view, is to automate a mechanical process to "improve quality at a lower cost."

To manage its investment in corporate electronic publishing, an organization should "allocate responsibility in the same way that it does for other areas," Freiser recommends.

In companies where conventional printing and publishing are already centralized, Freiser says he expects some sort of CPO will emerge. Where printing and publishing are already decentralized, it will be hard to centralise electronic publishing, he warns.

Some level of centralized control, however, is necessary to ensure compatibility and avoid wasteful duplication.

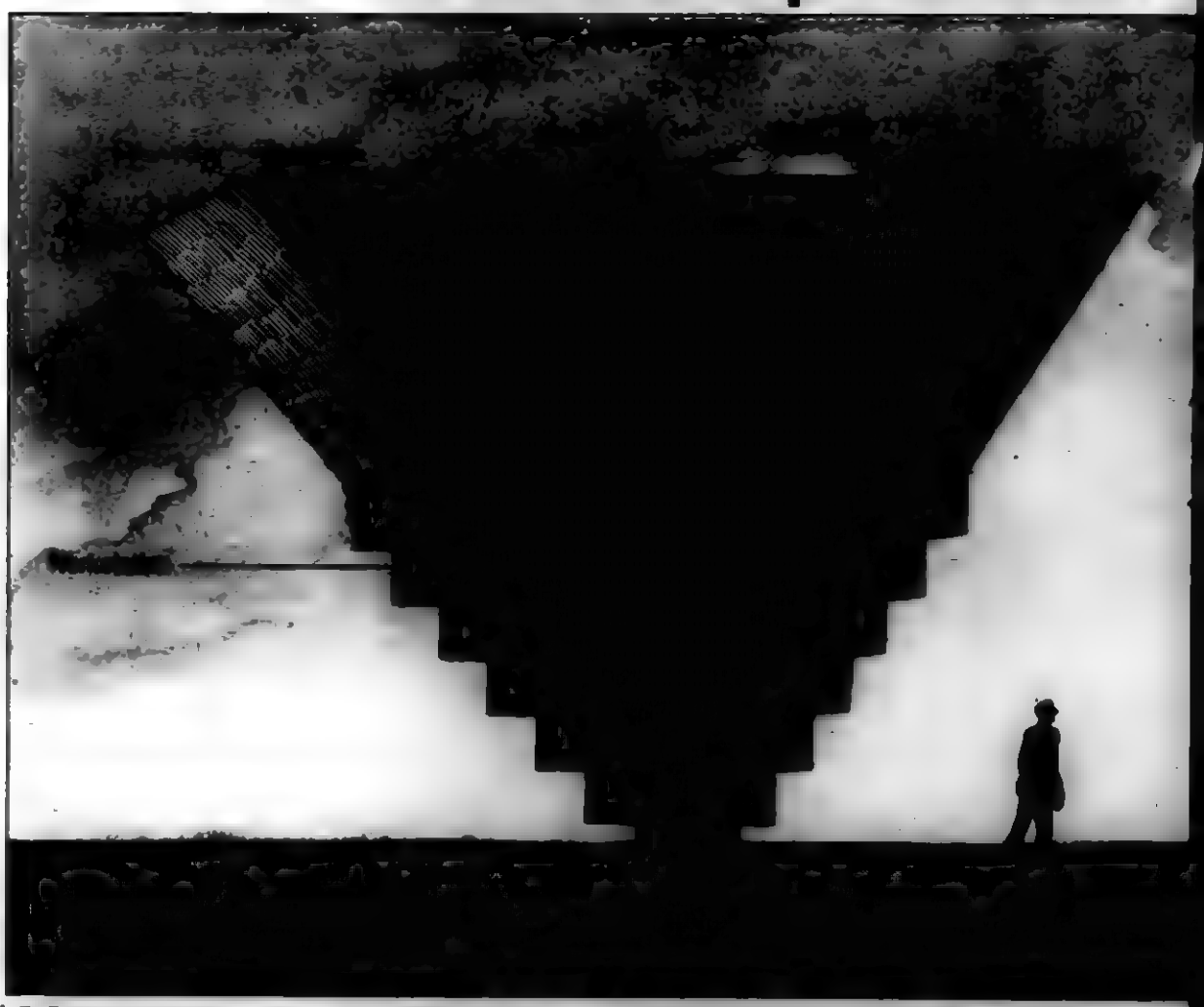
"We recommend some kind of central clearinghouse of information," Freiser says.

He says he has not found any organization yet that has effectively resolved the question of whether to put a single person in control. Corporatewide publishing "is a big mess," he says.

Freiser recommends that, eventually, either a corporate communications or administrative department provide the central direction. He says publishing is not an area that should fall under MIS control. MIS has "a lot of expertise to contribute to a high-expense area," he says, "but there's a much broader issue, which companies have not looked at. The issue is how the company is communicating.

"Computers are an important part of it, so you shouldn't keep MIS out of the decisions. But you shouldn't let them make the decisions either," Freiser continues. He recommends that interested buyers look at the total

Nixdorf. The alternative to the upside-down



Nixdorf builds its system on a solid base from the ground up. Because the alternative is mighty unstable.

Most computer companies start with the host, then attempt to bring the awesome power of the mainframe down towards the workstation level.

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From forms to documentation to marketing

Different sites are at varying levels of sophistication and volume when it comes to electronic publishing:

• Minnesota Mutual Life Insurance Co. began its publishing efforts with an electronic forms application. To keep up with the volume of paper, Minnesota Mutual was having 90,000 cubic feet of warehouse space filled with preprinted forms. Using electronic-form design software, the company began converting certificates and policies into an electronic counterpart stored on an IBM 3090. Now Minnesota Mutual handles up to 4,000 forms per day.

• At Prime Computer, Inc., documentation is the main focus of corporate electronic publishing. More than 60 writers work on technical documentation, entering their text into a central Prime 50 series computer. Illustrations are handled electronically on another system.

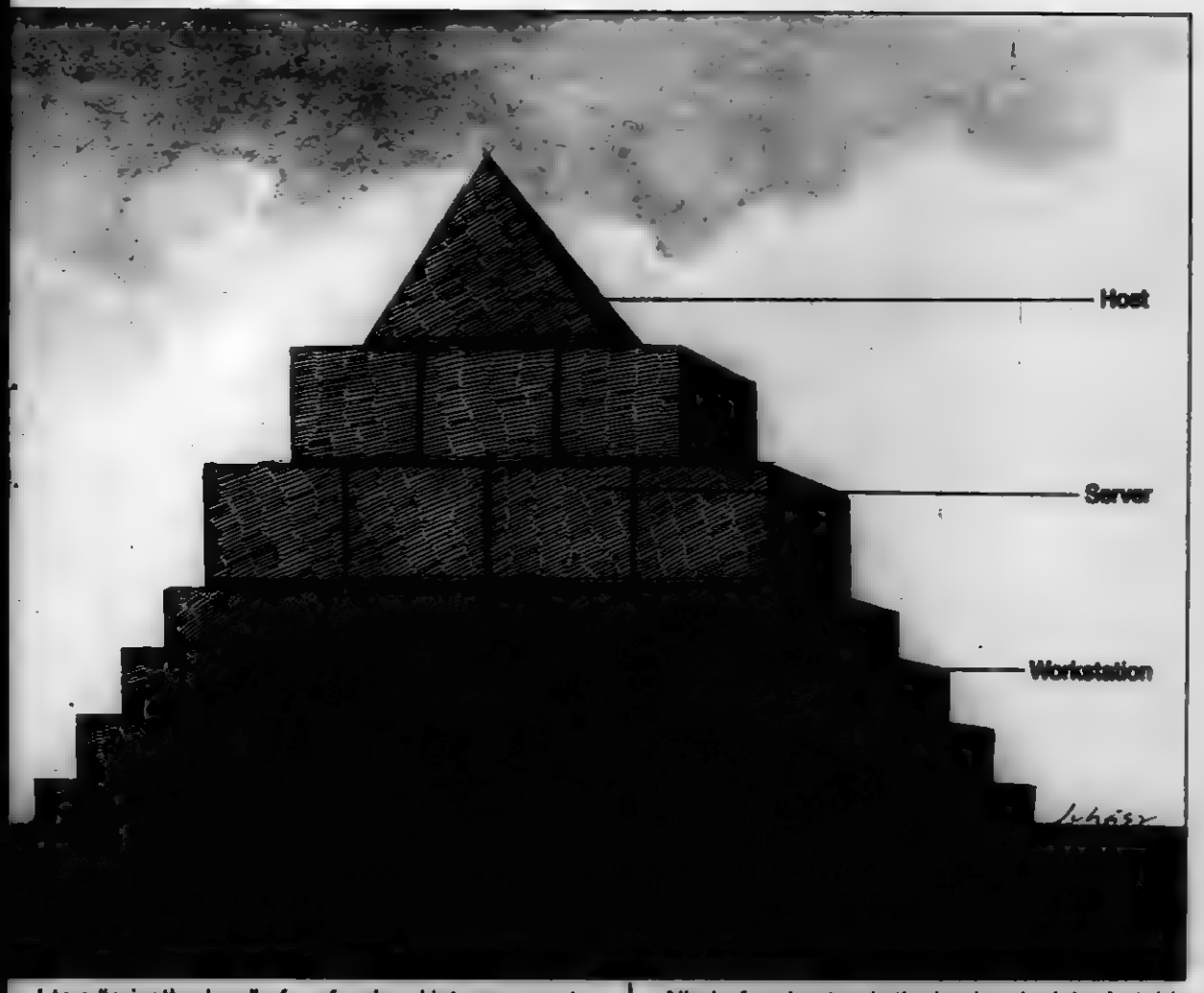
Prime's system is an electronic version of what the technical publishing department had been doing mechanically and is in the initial stages of automation.

• In the 1970s, Caterpillar, Inc., under a rapidly increasing burden of documentation, turned to automated publishing to create and manage text and data, create and manage line art and manage photographs. The Caterpillar system evolved steadily. In 1977, the company installed an Atex, Inc. publishing system to develop an on-line product-support informational data base. Beginning in 1980, Caterpillar built an informational data base for extensive parts catalogs.

In 1985, the company began evaluating personal computer-based graphics workstations. By late 1987, the department started using Apple Computer, Inc. Macintoshes as a graphics design tool. With the Macintoshes, the group is starting to move beyond technical documentation and into marketing areas.

ALAN RADDING

solution.



to a "priestly class" of professional intercessors to decide how isolated company executives may use the system. Data need be entered only once, and the system is fully accessible to all workers, allowing them to be creative, and to share their work product, when appropriate, with every other member of the organization, providing maximum synergy.

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printing and publishing requirements and "make decisions in light of new technologies."

Beginning stages

Companies currently looked upon as models in the implementation of corporate electronic publishing still fall far short of what consultants envision. The reason is that the concept is still in its infancy.

"There are two stages to development," Interconsult's Goodstein says. "First, there is the automation of what you are doing mechanically. Then there is true automation, end-to-end flow and management."

Right now, even most of the leading corporate electronic publishing organizations are still in the first stage, automating the publishing activities they previously accomplished through non-automated means to realize productivity gains. Once that process is complete, they can move on, producing a system that has more inherent value because it opens new areas of productivity. One such area is a corporate electronic publishing data base, in which all the organization's published information is stored and able to be retrieved.

In 1984, Minnesota Mutual Life Insurance Co. in St. Paul implemented an electronic administrative forms publishing system. In March 1987, the company expanded that system to include policies and certificates. Managing the system is the responsibility of Beatta Schultz, senior office automation analyst, but she expects electronic publishing to grow beyond her and the coordinator who reports to her.

A team of staff members from the particular departments involved manage the current system. The forms management department handles forms design, and information services provides the applicant data. Automation services, which is Schultz's department, coordinates the entire process. Schultz's laser printing coordinator oversees day-to-day operations.

Through corporate electronic publishing, Minnesota Mutual is seeing both a productivity gain

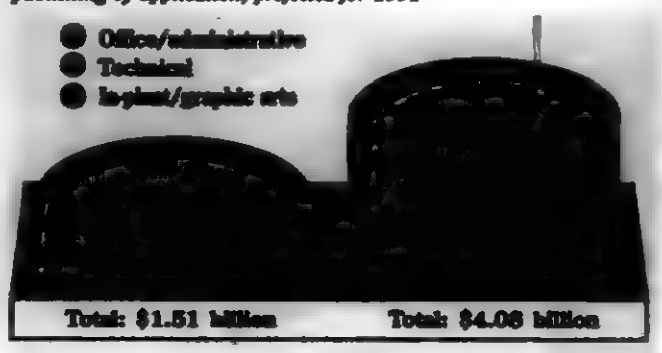
and an improvement in quality. The company saves one cent per page before even administrative savings.

On the administrative side, Minnesota Mutual was able to eliminate seven clerical positions. "The payback for the project is less than two years," Schultz says.

Through the forms library, Minnesota Mutual now owns what will someday be a massive corporate data base of all of its products. With the direct-mail and public relations departments expressing interest, the system is poised to expand, Schultz says.

Corporate consumers

Percentage breakdown of corporate expenditures on electronic publishing by application, projected for 1991



INFORMATION PROVIDED BY CAP INTERNATIONAL, INC.
CW CHART

Not surprisingly, corporate electronic publishing has made its biggest inroads in the technical publishing area. Technical publishing departments have a systems orientation by nature, and technical documentation is often regarded as a major component of an organization's manufactured products. The detailed proposals, parts catalogs and service manuals readily lend themselves to automation.

Ron Bergman, senior manager of technical publications at Prime Computer, Inc. in Natick, Mass., regards himself as a publishing person, not a computer person. He has watched automation grow in the past 25 years from typewriters to corporate electronic publishing.

Bergman's department creates the technical manuals that accompany Prime's products. Five years ago, the department was split off from corporate communications and moved to engineering. The change allowed Bergman's writers to focus better on the products, he claims.

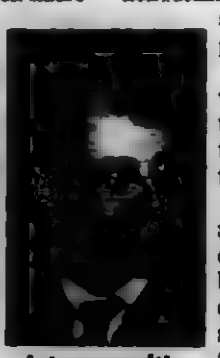
Bergman's technical publishing system remains an island within the organization. Two years ago, the company initiated a corporatewide review of all its publications and established a comprehensive standard that governs the layout and design elements of every document that bears Prime's name, be it a marketing brochure or a specification sheet. Bergman follows that standard, but otherwise, his department remains "fairly independent."

Once the initial automation is complete, Bergman says he wants to pursue some alternative forms of corporate electronic publishing. He is intrigued by technologies such as CD-ROM. "Eventually, I'd like to see us ship in electronic form," he says.

A winner

In 1985, the technical documentation department of Caterpillar, Inc. in Peoria, Ill., produced more than 150,000 new and revised pages, created 10,000 technical illustrations and edited 40,000 photographs.

In addition, the department managed a graphics library containing more than 100,000 line drawings of 200,000 photographs. It produced documents in more than six languages and distributed 23 million microfiche worldwide, according to Lynn Swigart, manager of communications services at Caterpillar's marketing support department.



Interconsult's Goodstein

"If this were my company, I'd establish an independent CPO," he says. Swigart is the closest Caterpillar comes to having a CPO, but his job is not the position championed by Interconsult's Goodstein. Still, Caterpillar is the organization most frequently cited by experts pointing to successful examples of corporate electronic publishing. The company established its initial publishing systems more than 15 years ago. Today, it uses a variety of them to produce technical documentation, publish extensive parts catalogs and price sheets and produce marketing materials. At the same time, other Caterpillar departments ignore the systems altogether and continue to handle their publishing needs in nonautomated ways.

The key to Caterpillar's successful evolution into corporate electronic publishing, Swigart says, lies in the creation of a publishing systems group within his department. The group has expertise in traditional publishing and in computer systems technology. Established in 1978, it is responsible for strategic planning, research, development and implementation of new publishing technologies.

The publishing group works closely with corporate MIS, according to Swigart. In particular, the two departments are jointly developing host-based graphics and data base publishing systems.

Still, Swigart insists that management of corporate electronic publishing should reside outside of MIS. "Companies that only see [corporate electronic publishing] as computer-related and put it into MIS are making a serious mistake," he says.

Needs a boss

The question of who will manage corporate electronic publishing is taking on greater urgency with the proliferation of relatively low-cost desktop publishing throughout the organization. The situation recalls the debates over whether MIS should manage end-user computing.

In the end, the question of who manages corporate electronic publishing comes down to this: Do you manage the technology or the application?

To Swigart and others, the answer is clear: MIS can lay claim to hardware expertise, but the real issue is communication, and, ultimately, "communication is not a DP function." According to this view, MIS has or soon will have the technical expertise to do corporate electronic publishing, but it is up to business managers to figure out how to use these tools in corporate communication. All MIS can do is make them available.

In some ways, the technology parallels spreadsheets: MIS can provide good software, but without anyone managing its use, bad financial models can proliferate.

As Interconsult's Goodstein sees it, the current lack of strong corporate electronic publishing management will not go on indefinitely. "Anything that corporations spend a lot of money on sooner or later has its own manager." •

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Plead case to new jury

The exhortations from consultants and successful managers have become a steady background drone for MIS managers in the last few years: Make information a corporate asset, form strategic partnerships with business units, let information systems stand as a peer with sales and manufacturing and so on.

It all makes sense and appears to be sound business advice that everyone in MIS should heed. But there remains one gap those well-intentioned speakers should be filling. They have to pitch their messages to someone outside of MIS. The message has to reach the company president and the non-MIS groups with which MIS wants to work. And the words of advice may ring truest if they come from outside the company, rather than from the president's own MIS group.

Part of the problem, however, is that too many of the management consultants and high-profile MIS managers who speak about their success stories have been preaching to people who agree with them.

Sounds great

Those people in the audience are already trying their hardest to carry out the advice and integrate MIS with the rest of the business world. The speakers

Continued on page 68

MIS in with Schwinn

Walsh wheels and deals to update bike maker

BY NELL MARGOLIS
CW STAFF

CHICAGO — When the photographer arrived at Schwinn Bicycle Co. to take a portrait of MIS Director Robert C. Walsh, he found his subject sporting a blue sweatshirt with "Schwinn" emblazoned in red across the front. "I did have a second thought about it," Walsh says, but his first thought won out.

The sweatshirt says it all: Walsh is a company man.

The 93-year-old company is booming today, in no small part because of the efficiencies brought about when Walsh took its computer operations from a state of decay to state of the art. He supervised the renovation of the warehouse in Chicago's West Loop area, which serves as Schwinn's headquarters, and takes a proprietary interest in the antique bicycles that adorn its halls. But Walsh is no less excited by a modern exercise bike, which he points to, reveling in its space-age technology. It was designed with computer-aided design (CAD) technology that he was instrumental in bringing to the company.

Before joining Schwinn, Walsh headed up systems operations for a small hospital and then for a community college. "He threw himself into them, too, but I think he's really found his niche in business," says Paul Kristofek, Walsh's long-time friend and, until the Walshes moved last summer, his neighbor.

Wheels turning

"When I drive away from work in the evening, I leave it at the company," Kristofek says. "Not Bob. Give him an opportunity, and he'll get up on the Schwinn soapbox any time."

Given half a chance at work, he'll talk about his wife and three teen-age sons, their summer house on the shore of Michigan's Sister Lakes and his latest hobby — flying.

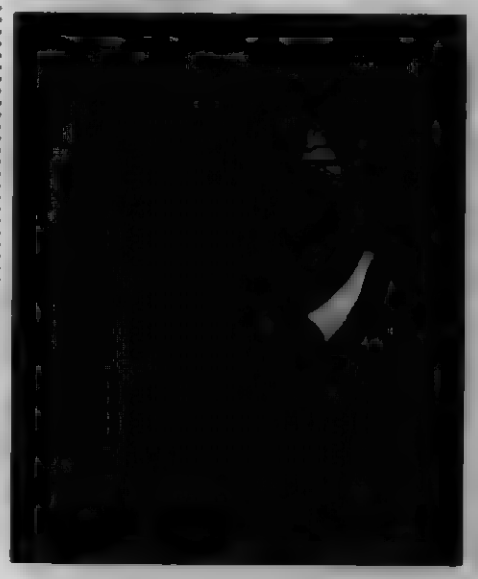
"Bob always has had a very complete outlook on life," Kristofek adds. "He's got a brilliant, calculating mind, and he's also very friendly and outgoing. Bob relates everything to everything."

Walsh brings his holistic view

Continued on page 68

PROFILE

Robert C. Walsh



Position: Director of MIS, Schwinn Bicycle Co. in Chicago. Mission: To achieve productivity and profitability through technology. "We're here for the business, not vice-versa."

PHOTO BY STEVE HAGAN

Data View

Special skills pay

Electronic data processing auditors and specialists edge to the top in median salary, while operators lag well behind

INFORMATION PROVIDED BY SOURCE EDP
CW CHART

California smog fuels telecommuting plans

BY J. A. SAVAGE
CW STAFF

SACRAMENTO, Calif. — Oppressive smog and congested highways in Southern California are two reasons a seemingly old concept, telecommuting, is finding new energy. Though it was hailed as a panacea for everything from traffic to boredom in the early 1980s, forecasts of empty office buildings have not yet become a reality.

If there is a future for telecommuting — which some researchers doubt, citing cultural barriers — it is riding in large part on the biggest pilot program to date, sponsored by the state of California.

By this summer, pilot project director David Fleming said he expects to have 250 telecommuters from 11 state agencies, only one-third of who are at a management level. However, those management personnel, particularly middle management, may be the same ones to sabotage the program if they resist the necessary changes in management style.

Continued on page 66

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Telecommuting

CONTINUED FROM PAGE 65

The pilot program includes surprisingly few data processing personnel, Fleming said. He said the bulk of telecommuters are those who write or number-crunch as part of their jobs — lawyers, engineers and program analysts.

Telecommuting is becoming easier and cheaper, according to Fleming. The cost is dropping 25% per year, he said. This is partially because of the lower cost and wider availability of the technology needed to hook up a telecommuter to the main office, and it is partially a trade-off for the higher cost of office space needed in a downtown building to house workers, he said.

Fleming stressed that circumstances have changed in the past 10 years to make telecommuting a more viable option. "Now we're dealing with information more in proportion to the manufacture of widgets. Additionally, it is a solution to business problems, specifically that of retaining employees." For instance, there are more two-income families today, with one member unwilling to move to a new location. Telecommuting is an option that would allow that employee to keep a job.

Savings estimated at $25 million

Fleming's hope is that 10% of the state's work force can spend two to four days a week working out of their homes. "A back-of-the-envelope estimate is that the state can save $25 million a year in the cost of leasing office space," he said.

A law going into effect July 1 will require employers in the smog capital of Southern California, known as the South Coast Air Basin, to encourage employees to stay off the freeways and offer the option of telecommuting.

Pacific Bell is one of the first private companies to jump on the telecommuting bandwagon. It began a pilot program in 1985 with 100 employees. Now, it has an official telecommuting program with between 500 and 1,000 employees, according to a company spokeswoman. However, its program is open only to management-level employees, of which Pacific Bell has 17,000 in California.

The underlying promotion for telecommuting is for Pacific Bell clients, not its employees. Clients in Southern California are expected to need the company's services in order to set up telecommuting to cooperate with this summer's smog legislation.

'Insignificant phenomenon'

While telecommunications companies see telecommuting as a pot of gold, some academics, like Margrethe Olson, associate professor at the graduate school of business administration at New York University, call it an "insignificant phenomenon."

"It's all been 'about to happen' for eight years," Olson said. In a report to the National Science Foundation, she found that "in none of the cases [studied] did management see telecommuting as a significant benefit to the employee or organization. In all cases, supervisors would have preferred the employee on-site if they had the choice."

Fleming acknowledged that, in part,

Project director Fleming

Olson is right: Management is the problem. "It boils down to trust. There must be a shift in management from a passer of information to one of being a leader and coach," he said. "One of the biggest barriers is that middle managers are threatened."

Fleming hopes his pilot project will curb those fears through training and a careful selection of participants who show a predilection for working alone. "The training allows management's worst fears to be let out. It gets them to start thinking." To underscore management's fright, Fleming said some supervisors did not want telecommuters to attend training classes.

Training includes how to set up a home office and how to overcome compulsions, like excessive jogging or excessive eating. "In one case, a telecommuter gained 30 pounds. That person went back to the office," he said.

Coast-to-coast effort

Telecommuting is not a California-only phenomenon, although the smog legislation may be giving it its biggest push.

J. C. Penney Co.'s catalog sales, Montgomery Ward & Co.'s Signature Group in Chicago and Travelers Insurance Co. in Hartford, Conn., are a few companies that use telecommuting, according to Gil Gordon, editor of "Telecommuting Review" in Monmouth, N.J.

"It is more concentrated in California," Gordon said. "There is a high proportion of new businesses where there is no tradition to buck against, and the commuting situation is such that people may be willing to drive two days a week into the office, but not five."

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☐ 2. Agriculture, mining, construction, oil
☐ 3. Business consulting (noncomputer-related)
☐ 4. College/university
☐ 5. Elementary/high school
☐ 6. Engineering/architecture
☐ 7. Finance, banking, accounting, insurance, real estate
☐ 8. Government
☐ 9. Health/medical services
☐ 10. Legal services
☐ 11. Manufacturing
☐ 12. Military
☐ 13. Other business services
☐ 14. Publishing/advertising/public relations
☐ 15. Research and development
☐ 16. Retail/wholesale
☐ 17. Transportation, communications, utilities
☐ 98. Other (specify) _____

Computer-related businesses

☐ 18. Computer consultant
☐ 19. Computer retail
☐ 20. Distributor/wholesaler
☐ 21. Manufacturer (computers, software, peripherals)
☐ 22. Service bureau
☐ 23. VAR/systems house/integrator
☐ 99. Other (specify) _____

2. Title (check only one)

☐ A. Chairman/president/owner/partner
☐ B. Vice president
☐ C. Controller/treasurer/accountant
☐ D. Director/supervisor/manager
☐ E. Project manager/chief/group leader
☐ F. Art director/writer/chief/group leader
☐ G. Engineer/scientist
☐ H. Administrator
☐ I. Consultant/advisor
☐ J. Microcomputer specialist/manager/analyst
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☐ L. Educator
☐ M. Professional (lawyer, doctor, etc.)
☐ Z. Other (specify) _____

3. Department or function (check only one)

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☐ C. Consulting
☐ D. Education/training
☐ E. Engineering/R&D
☐ F. Manufacturing/production
☐ G. Microcomputer center/office automation
☐ H. MIS/DP
☐ I. Purchasing
☐ J. Sales/marketing/distribution
☐ Z. Other (specify) _____

4a. Does your company own or lease any mainframe computers at this location?

☐ Yes (indicate quantity below) ☐ No

	Existing (quantity)	Plan to buy (quantity)
☐ 1. IBM		
☐ 99. Other (specify)		

4b. Does your company own or lease any minicomputers at this location?

☐ Yes (indicate quantity below) ☐ No

	Existing (quantity)	Plan to buy (quantity)
☐ 1. IBM		
☐ 2. DEC VAX		
☐ 3. Sun/Apollo		
☐ 99. Other (specify)		

5. Does your firm have or plan to buy any of the following types of personal computers or microcomputer systems at your location?

☐ Yes (indicate quantity below) ☐ No

	Currently own	Plan to buy within 1-12 mos.
1. Macintosh 128/512		
2. Macintosh Plus		
3. Macintosh SE		
4. Macintosh II		
5. IBM or compatible		
6. Sun/Apollo workstation		
99. Other (specify)		

6. Please indicate your involvement with each of the following types of personal computers or microcomputer systems (check all that apply)

	Macintosh	Software	Networks & Peripherals
A. Approve purchase	A. ___	A. ___	A ___
B. Develop/manufacture	B. ___	B. ___	B ___
C. Evaluate/select vendor	C. ___	C. ___	C ___
D. Own one	D. ___	D. ___	D ___
E. Own two or more	E. ___	E. ___	E. ___
F. Purchase or acquire	F. ___	F. ___	F. ___
G. Establish specifications	G. ___	G. ___	G. ___
H. Recommend to others	H. ___	H. ___	H. ___
I. Sell	I ___	I. ___	I. ___
J. Train people to use/or provide support	J. ___	J. ___	J. ___
K. Use	K. ___	K. ___	K. ___
L. No involvement	L. ___	L. ___	L. ___
Z. Other (specify by name and quantity)	Z. ___	Z. ___	Z. ___

_____

If you have no involvement with any of the above, skip to question 8.

7. Do you recommend, buy, specify or approve microcomputers, software, and/or peripherals?

☐ Yes ☐ No

If yes, please indicate for how many Macintosh personal computers you have this involvement. (check only one)

☐ A. 1-3 ☐ E. 50-99
☐ B. 4-9 ☐ F. 100-499
☐ C. 10-19 ☐ G. 500+
☐ D. 20-49 ☐ H. None of the above

8. How many people are employed by your entire company? (check only one)

☐ A. 1-9 ☐ D. 100-499 ☐ G. 2500-4999
☐ B. 10-24 ☐ E. 500-999 ☐ H. 5000-9999
☐ C. 25-99 ☐ F. 1000-2499 ☐ I. 10,000 or more

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1. Industry (check only one)

Noncomputer-related businesses

☐ 1. Aerospace
☐ 2. Agriculture, mining, construction, oil
☐ 3. Business consulting (noncomputer-related)
☐ 4. College/university
☐ 5. Elementary/high school
☐ 6. Engineering/architecture
☐ 7. Finance, banking, accounting, insurance, real estate
☐ 8. Government
☐ 9. Health/medical services
☐ 10. Legal services
☐ 11. Manufacturing
☐ 12. Military
☐ 13. Other business services
☐ 14. Publishing/advertising/public relations
☐ 15. Research and development
☐ 16. Retail/wholesale
☐ 17. Transportation, communications, utilities
☐ 98. Other (specify) _____

Computer-related businesses

☐ 18. Computer consultant
☐ 19. Computer retail
☐ 20. Distributor/wholesaler
☐ 21. Manufacturer (computers, software, peripherals)
☐ 22. Service bureau
☐ 23. VAR/systems house/integrator
☐ 99. Other (specify) _____

2. Title (check only one)

☐ A. Chairman/president/owner/partner
☐ B. Vice president
☐ C. Controller/treasurer/accountant
☐ D. Director/supervisor/manager
☐ E. Project manager/chief/group leader
☐ F. Art director/writer/chief/group leader
☐ G. Engineer/scientist
☐ H. Administrator
☐ I. Consultant/advisor
☐ J. Microcomputer specialist/manager/analyst
☐ K. Programmer
☐ L. Educator
☐ M. Professional (lawyer, doctor, etc.)
☐ Z. Other (specify) _____

3. Department or function (check only one)

☐ A. Accounting/finance
☐ B. Administration/management/personnel
☐ C. Consulting
☐ D. Education/training
☐ E. Engineering/R&D
☐ F. Manufacturing/production
☐ G. Microcomputer center/office automation
☐ H. MIS/DP
☐ I. Purchasing
☐ J. Sales/marketing/distribution
☐ Z. Other (specify) _____

4a. Does your company own or lease any mainframe computers at this location?

☐ Yes (indicate quantity below) ☐ No

	Existing (quantity)	Plan to buy (quantity)
☐ 1. IBM		
☐ 99. Other (specify)		

4b. Does your company own or lease any minicomputers at this location?

☐ Yes (indicate quantity below) ☐ No

	Existing (quantity)	Plan to buy (quantity)
☐ 1. IBM		
☐ 2. DEC VAX		
☐ 3. Sun/Apollo		
☐ 99. Other (specify)		

5. Does your firm have or plan to buy any of the following types of personal computers or microcomputer systems at your location?

☐ Yes (indicate quantity below) ☐ No

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3. Macintosh SE		
4. Macintosh II		
5. IBM or compatible		
6. Sun/Apollo workstation		
99. Other (specify)		

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C. Evaluate/select vendor	C. ___	C. ___	C ___
D. Own one	D. ___	D. ___	D. ___
E. Own two or more	E. ___	E. ___	E. ___
F. Purchase or acquire	F. ___	F. ___	F. ___
G. Establish specifications	G. ___	G. ___	G. ___
H. Recommend to others	H. ___	H. ___	H. ___
I. Sell	I. ___	I. ___	I ___
J. Train people to use/or provide support	J. ___	J. ___	J. ___
K. Use	K. ___	K. ___	K. ___
L. No involvement	L. ___	L. ___	L. ___
Z. Other (specify by name and quantity)	Z. ___	Z. ___	Z. ___

_____

If you have no involvement with any of the above, skip to question 8.

7. Do you recommend, buy, specify or approve microcomputers, software, and/or peripherals?

☐ Yes ☐ No

If yes, please indicate for how many Macintosh personal computers you have this involvement. (check only one)

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☐ B. 4-9 ☐ F. 100-499
☐ C. 10-19 ☐ G. 500+
☐ D. 20-49 ☐ H. None of the above

8. How many people are employed by your entire company? (check only one)

☐ A. 1-9 ☐ D. 100-499 ☐ G. 2500-4999
☐ B. 10-24 ☐ E. 500-999 ☐ H. 5000-9999
☐ C. 25-99 ☐ F. 1000-2499 ☐ I. 10,000 or more

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Schwinn

FROM PAGE 65

of life to work.

"You can't look at a company's technology structure as separate from the company's business function: what it makes, what it sells, how it's organized," Walsh says. "To believe in tech for tech's sake, as existing outside the business, is to court catastrophe."

Walsh describes himself as "Peter Principled into MIS — I failed at being a programmer, so I got put in charge of systems." He first worked in MIS at Little Company of Mary Hospital in Chicago, and recalls meeting with constant frustration.

"People would come to MIS with legitimate needs and get told, 'I'll have it for you in a year.' That is answering in an MIS time frame, not in a business time frame," Walsh says.

When he left the hospital for Moraine Valley Community College in Palos Hills, Ill., where he headed systems operations for eight years, his philosophy was in place: "Ask, What does the business need?"

Shared philosophy

Walsh brought that philosophy to Schwinn in 1980, when he arrived with a mandate to turn a 20-year-old system into a lean, mean, competing machine "preferably yesterday," he recalls.

Walsh walked into a computer department that was writing in assembler. Five years and more than $600,000 later, Schwinn had gone through a series of system upgrades, replacing Singer Co. System 10 minicomputers with IBM System/34s and, subsequently, System/36s and installing a payroll software system from Management Science America, Inc. and the Adabas data base management system and Natural fourth-generation language from Software AG of North America, Inc.

"Software like Adabas and Natural," Walsh says, "allows the systems folks to have a great amount of empathy with the end users. For example, because you can add data elements so easily, you don't find yourself saying, 'What's your two-year plan?' to an employee who's thinking, 'If I don't get this inventory in order in four months, I'm not gonna *be* here in two years.' "

Wheelin' and dealin'

"Bob's great strength is being able to work within a company structure to get things taken care of for both the MIS department and the corporate guys," says Steve Arnold, systems programmer at Schwinn. "He's good at wheelin' and dealin'— he really gets into the game."

Both Arnold and Schwinn's Ruth Bartelt, systems and programming manager, are second-time teammates of Walsh's: The three worked together at Moraine Valley where first Bartelt and then, after Bartelt left for Schwinn, Arnold succeeded Walsh as MIS director.

"That tells you something right there," says Bob Van Raes, Moraine Valley's vice-president of planning and external affairs. "It's a chancy enough proposition just to go back to work for your old boss in a new setting; Ruth and Steve gave up titles and control to work with Bob again."

At Moraine Valley, Van Raes recalls, Walsh's wheeling-and-dealing instincts were complemented by "his eagerness to help people and his likable qualities. Bob could somehow make suggestions to people in a very nonthreatening way and get them to cooperate when other people had just gotten their backs up."

Mike Fritz knows just what Van Raes is talking about. Two years ago, Fritz, newly arrived at Schwinn as director of engineering, set out to automate the bicycle design department.

As a new guy in town trying to sell an IBM-loyal administration on costly CAD workstations, Fritz turned somewhat reluctantly to the MIS director.

"My initial feeling was that Bob would be a problem. He was an IBM loyalist, and design was in his territory," Fritz says. "But I couldn't have been more wrong."

Walsh "went to bat and did a great job for us," Fritz says. Not only did he deploy his negotiating skills on Fritz's behalf, both in dealing with Apollo Computer, Inc. and in selling Schwinn's "True Blue" front office on the CAD workstation concept, but he also suggested that Fritz double the number of Apollo systems he was requesting.

Is it Christmas?

"The key to the company's real benefit is getting one of these babies on every designer's desk," Fritz remembers Walsh saying. "All I could think was, this guy's got to be Santa Claus."

Today, Fritz oversees a $500,000 Apollo-based CAD operation; Schwinn Bicycle ranks as the leading independent U.S. bicycle maker; and Walsh has a $3 million MIS budget to play Santa Claus with — a far cry from the $700,000 budgeted for MIS in 1979.

Walsh's negotiating skills and passion for immersing himself in the company have taken him further afield of MIS than the bicycle design department.

When the building renovation began in 1986, all he had to do was lay out the computer room, but he made so many suggestions that "Ed Schwinn basically said, 'Good. If you're so smart, you can do the whole thing.' " Walsh recalls. The hard hat he wore while moonlighting as Schwinn construction manager sits on his office windowsill.

These days, Walsh is wearing his MIS hat again: In late March, he plunged into what promises to be the "long, hard but worth it" task of installing a new management software system made by Atlanta-based American Software, Inc. and training Schwinn distributors to use it.

"We could raise our level of service to dealers," he says, "lower inventory costs, increase information supply; we'll get smarter, better dealers. . . ."

There he goes again. Spokesman. Wheeler-dealer. Company man.

Connolly

FROM PAGE 65

are telling a friendly crowd just what it wants to hear. Too often, the speeches are being met with enthusiastic applause from MIS managers and followed with an over-coffee comment like, "Great, I just wish my company would let me do it."

A perky cheerleader-consultant comeback to that observation is, "But you have to make it happen." That's right, and that consultant probably used to be one of those financial advisers who tell people they can be rich if they save 25% of their income. It sounds nice, but reality hits like a ton of bricks.

Suspicion

In the case of MIS/business relationships, reality is that many people are suspicious of anything their own MIS department suggests. That might be called the what-do-you-really-want syndrome or the you-do-computers-and-I-do-sales complex.

Another rule of reality is that when you buy an idea from an outsider — whether through a consulting service or through the registration fee at a conference — it sounds a lot better than something you get for free via an aide's memo. Don't ask why; it's just human nature.

Some consulting groups say they have turned their attention toward company presidents and other non-MIS executives. But there should be a more concentrated effort to reach those people who think a spooler is just something used in a textile shop.

Whoever pitches the strategic systems concepts to non-MIS people — whether they are consultants or MIS success stories doing the talking — should work extra hard to keep their speech nontechnical and their proposals in business terms.

The most important of those business terms is "impact on the bottom line."

In addition, MIS managers — or anyone else making such a presentation — should keep in mind that changes to make use of the information for which MIS is the caretaker, moves such as realigning the reporting lines on the organization chart, for example, may be no better than conflicting changes that make better use of manufacturing's capabilities or the distribution network.

> IN THE case of MIS/business relationships, reality is that many people are suspicious of anything their own MIS department suggests.

Even when information is an asset, it is not necessarily the most important asset.

The information age/strategic systems message may have found a sympathetic ear in the MIS department, but there remains a large part of the world that has not heard it or at least has not welcomed it. Those are the people who need to be targeted next.

Connolly is *Computerworld*'s senior editor, management.

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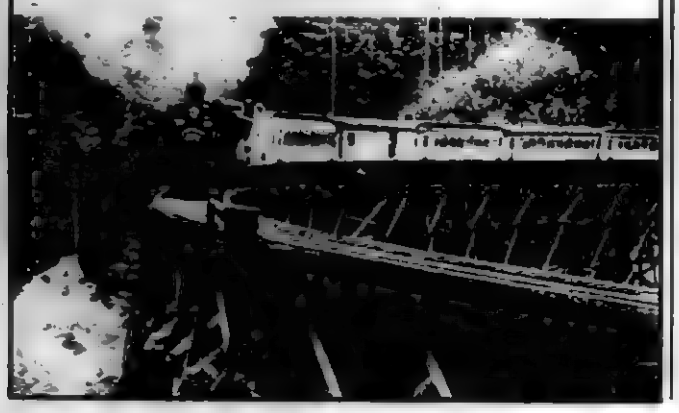

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INDUSTRY INSIGHT

Clinton Wilder

What's next for lessors?

Now may be the best time in years to lease a computer rather than buy it. And that has the computer leasing industry worried.

In the IBM equipment marketplace, unprecedented competition from IBM Credit Corp., the regional Bell holding companies and large and small independent lessors has brought the leasing industry to a crossroads. Lease rates and profit margins on IBM deals have dropped, resulting in a boon for lessees and a search for new markets by the leasing industry.

The sense of an industry about to turn a corner was palpably evident at the biannual meeting of the Computer Dealers and Lessors Association (CDLA) 10 days ago in Palm Desert, Calif. Held just six weeks after the sudden death of CDLA President Jim Benton, the meeting was dominated by official and informal tributes to Benton's dynamic leadership and lobbying victories. But the association moved quickly to ensure a smooth transition at the top, naming Econocom Chairman Ken Bouldin as Benton's successor.

Benton's gregarious style was perfect for advancing CDLA interests on Capitol Hill, where tennis with senators and cabinet members counts for a lot in the high-stakes game of lobbying. Bouldin's challenges will come on a variety of other fronts, but the low-key Southerner's successful business career should be a solid base from which to lead his colleagues and competitors.

In a sense, the leasing companies are feeling pressure brought about by their own success. With profits there for the taking through the years, more and more entrepreneurs have entered the business and are now competing aggressively.

Then there are the deep pockets, like Bell Atlantic and Bellsouth, which have both acquired major lessors and can afford to squeeze margins to gain market share. And the deepest pocketed player of all is still playing hardball. At the recent

Continued on page 72

Foreign sales buoy first quarter

Growth abroad aids boomers like Compaq, does little for mini makers

BY JAMES DALY
CW STAFF

Strong sales in the international market added luster to the good financial performance of some companies and saved others from dipping into red ink, according to first-quarter results posted last week.

"The international market tends to lag our market in terms of development and evolution by anywhere from a year to four years, and the growth overseas right now is very strong," said Charles R. Wolf, vice-president of equity research at First Boston Corp. "We believe this growth will be sustained for the rest of the year."

Overseas sales buoyed the results of firms like Compaq Computer Corp. but were able to offer only slight gains to those firms caught on the slippery footing of the minicomputer market, which has been pinched at both ends by brisk mainframe and personal computer sales.

The quarter was particularly tough on Alliant Computer Systems Corp. Despite revenue growth of nearly 13% from year-earlier results, the Littleton, Mass., minisupercomputer maker was not able to hold onto the extra cash. Income from operations plummeted 97% from $2.3 million a year earlier to a meager $71,000.

Fellow minisupercomputer maker Convex Computer Corp. was not as badly hit as Alliant, but "their results are nothing to write home about," said John L. Rutledge, an analyst at Dillon Read & Co.

Although revenue for the Richardson, Texas, company rose a significant 53% from year-earlier figures, profits dropped nearly 47%, to $1.1 million.

No room to grow

"Convex and Alliant have chosen to remain in a very competitive niche market that has simply absorbed about all it can," Rutledge added. "They've both chosen to compete in the engineering and scientific area and not go into the commercial market. Their area was saturated more quickly than the commercial

Continued on page 72

1988 first-quarter earnings

Profits slide at Alliant, Convex and Hogan; but Stratus is strong, and Compaq soars

Alliant	$0.9[a]	(63)	$13.6	13
Ask Computer Systems	$2.6	56	$37	46
Bolt Beranek & Newman	$4.5	22	$79.5	35
Cascade	$30[b]	43	$310	1
Compaq	$46.8	132	$439.5	106
Control Data	$7.7[c]	7	$902.2	10
Convex Computer	$1.1[d]	(47)	$22.1	83
Hogan Systems	$1.1	(66)	$12.8	(12)
Informix Software	$2.4	14	$25.8	98
Management Science America	$2.4	—[e]	$62.9	18
Stratus	$5.9	66	$54.2	45
Tandem	$23.3[f]	4	$309.4[g]	26

[a] Parentheses indicate decrease.
[b] Includes $733,000 in extraordinary credits
[c] Includes $5 million from discontinued risk arbitrage business
[d] Includes $3.1 million in extraordinary credits
[e] Includes $270,000 in extraordinary credits
[f] Reported $2.3 million operating loss in 1987
[g] Includes $9.4 million pretax charge
[h] Includes $13.5 million from companies acquired during quarter

CW CHART

Micom eyes offers for acquisition

BY PATRICIA KEEFE
CW STAFF

SIMI VALLEY, Calif. — Micom Systems, Inc. revealed last week that it is considering several acquisition offers, adding that those proposals led it to cancel plans for a stock buy-back offer of nine million shares.

The announcement triggered speculation that even if Micom itself was not sold, any or all of its three subsidiaries — Micom-Interlan, Inc., Spectrum Digital Corp. and Black Box Corp. — might be.

The announcement of a possible Micom sale comes on the heels of the recent merger between Network Equipment Technologies, Inc. (NET) and Excelan, Inc., and a sale would continue the year-long trend of major consolidation in the communications market.

If the entire company were to be sold, it would likely constitute the largest sale during this period of consolidation. For the fiscal year ended April 3, Micom's revenue was $223 million. In contrast, 3Com Corp. and Bridge Communications, Inc. today have combined revenues of $180 million, and NET and Excelan together have revenues of about $101.7 million.

Micom sells local- and wide-area networking products. Inter-

Continued on page 71

AT&T taps Kavner; Cassoni departs

BY ALAN ALPER
CW STAFF

NEW YORK — Just when it appeared that AT&T's long-suffering computer business was beginning to turn around, the chief architect of that comeback is returning to his native Italy.

Vittorio Cassoni, the Ing. C. Olivetti & Co. executive recruited 18 months ago to revitalize AT&T's ill-fated foray into the computer business, has decided to return to Olivetti as chief executive officer. Robert Kavner, 44, AT&T's chief financial officer, will succeed Cassoni as president of AT&T's Data Systems Group (DSG), effective May 15.

The departure of Cassoni, a dynamic leader and strategist, comes at an inopportune time for the telecommunications giant. After three disastrous years, Cassoni has considerably cut DSG's losses, appears to have implemented an effective strategy based on data networking and Unix and has persuaded AT&T executives to provide DSG with a sales force to deal directly with MIS management.

Cassoni was also the driving force behind the firm's fledgling alliance with Sun Microsystems, Inc.

"This is part of a major [AT&T] shift away from Olivetti and toward Sun," explained Ken Leon, an analyst with Bear, Stearns & Co. He cited Sun's recent entry into the Microsoft Corp. MS-DOS-compatible microcomputer business as evidence of another potential tie between the two companies.

Both Cassoni and Kavner denied that strained relations between AT&T and Olivetti had anything to do with Cassoni's departure. "Olivetti wanted [me] earlier, and AT&T wanted it to occur at a later time," Cassoni said. "We did it at a time that balances both corporations' needs." AT&T owns 22% of Olivetti, and the two firms have various cross-marketing agreements.

AT&T's Kavner

Cassoni said it was he who recommended Kavner as a successor. Kavner, who joined AT&T in 1984 from Coopers & Lybrand, where he headed the Information Industry Practice, is considered one of the up-and-coming executives at AT&T. Although he lacks direct experience within the computer industry, analysts contend that his financial orientation could accelerate DSG's efforts to become profitable by 1989.

Kavner claims a strong background at Coopers & Lybrand in systems design and integration. As AT&T's chief financial officer, he presided over an internal data processing operation of some 17,000 employees. End users, he contends, are driving the acceptance of tech-

Continued on page 72

INDUSTRY WEEK IN BRIEF

Less than one month after he was named chief scientist at Borland International, Inc., Rob Shostak, cofounder of Ansa Corp. and co-developer of its Paradox data base product, resigned last week. He will be cofounding another software start-up, as yet unnamed, funded by venture capital firms. "My work is complete at Borland, and I'd rather put my talents to use at an emerging company," Shostak said. Scotts Valley, Calif.-based Borland acquired Ansa last fall.

MAI Basic Four, Inc. Chairman and principal owner Bennett S. LeBow, along with board member William Weisel, have decided to sell their stake in the Tustin, Calif., turnkey systems vendor. Together they control about 60% of MAI stock, including 17% in trusts for the benefit of LeBow's family. MAI stock soared on the news, gaining 3¾ points to a new yearly high of 19 in active trading Wednesday.

General Electric Co. announced the sale of its Calma Co. integrated-circuit computer-aided design (CAD) business to San Jose, Calif.-based Valid Logic Systems for an undisclosed amount of stock, cash and royalty payments. With an estimated 2,700 users, Calma's integrated-circuit CAD business had revenue of about $40 million in 1987.

Gambling that its bus architecture will become the graphics supercomputer industry standard, Ardent Computer Corp. will be the first supercomputer company to license its bus. The system bus used in Ardent's newest graphics supercomputer, Titan, will be available for licensing in September. It will cost only $250 for universities or research institutions — but $15,000 for commercial entities. A spokesman said Ardent hopes the licensing arrangement will encourage the development of peripherals that plug into the Ardent bus.

The computer and component revenue of Zenith Electronics Corp. easily surpassed Zenith's revenue from its ailing consumer electronics business for the third straight quarter in the three months ended April 2. Sales of computer systems and components reached $360 million, up 29% from the year-earlier quarter and accounting for 61% of Zenith's total sales. Revenue from the consumer electronics unit, which is rumored to be for sale, dropped 18% to $224 million.

Financial woes continued for artificial intelligence software developers Intellicorp and Teknowledge, Inc. In the third fiscal quarter ended March 31, Intellicorp lost $269,000 on sales of $5 million, and Teknowledge lost $1.1 million on revenue of $3.6 million.

IBM in fighting form, Akers tells group of shareholders

BY MITCH BETTS
CW STAFF

RICHMOND, Va. — IBM Chairman John Akers last week said IBM is becoming a leaner and more aggressive company in response to competitors who are "fast on their feet, listening to their customers [and] impressive in technological innovation."

Akers, addressing shareholders at IBM's annual meeting here, said IBM began a turnaround in mid-1987, and since then, earnings have grown faster than revenue. He called it "a bottom-line confirmation of efficiency and competitiveness."

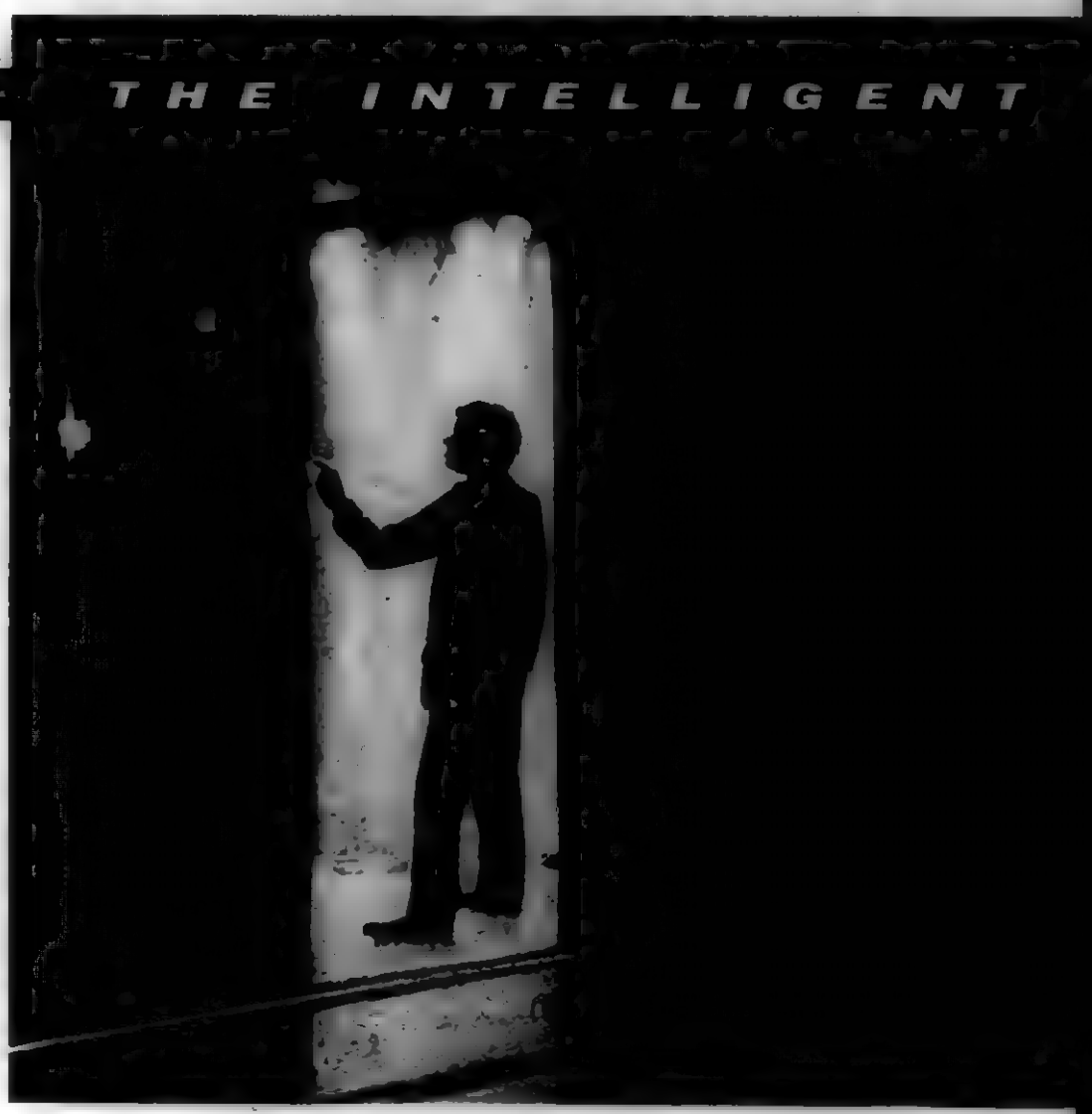
IBM is a stronger competitor, Akers said, because of such recent moves as the major reorganization of U.S. business units, cuts in overhead and recently announced investments in Metaphor Computer Systems and Steve Chen's Supercomputer Systems, Inc.

In response to a stockholder's question, Akers said MCI Communications Corp. executives plan to buy back IBM's 16% stake in MCI, and Akers said he expects that buy-back "will come to pass over the next few years."

Abandon right to sue directors

In a shareholder resolution presented at the meeting, IBM stockholders voted to give company directors some protection from personal financial losses imposed by stockholder lawsuits. By approving the amendment, IBM shareholders gave up the ability to sue directors for negligence in performing their fiduciary duties.

IBM said the amendment to its certificate of incorporation in New York state is necessary because of an increasing num-



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ber of shareholder lawsuits that could be financially devastating to outside directors.

A real liability

IBM management argued that the prospect of personal liability makes it hard to attract and retain qualified directors. Compounding the problem is the increasing difficulty and expense of obtaining directors' liability insurance, the company added.

IBM's proxy statement noted that the action was not prompted by any specific lawsuit or complaint against IBM. The liability amendment was approved by the overwhelming vote of 458 million to 16 million.

In other business, shareholders defeated an anti-apartheid resolution sponsored by church and civil rights groups that would have stopped all sales and service of IBM products in South Africa.

> AKERS SAID IBM no longer has assets, equity or employees in South Africa.

Proponents said that IBM products are used primarily by that country's ruling white minority.

Although it was defeated, the proposal gained almost 10% of the shareholders' votes — about twice the amount of support expressed for a similar measure in 1987.

Last year, IBM sold its South African subsidiary to an independent company that sells and services IBM and other computer products. Consequently, Akers said, IBM no longer has assets, equity or employees in South Africa.

It would have been an "empty gesture" to sell the company and then stop supplying it with IBM products and services, Akers said.

Resolutions defeated

In addition, the shareholders soundly defeated the following special-interest resolutions:

- A proposal that would have banned all corporate payments, such as employee health benefits, that subsidize abortions.
- A proposal requiring IBM to provide details about its use of live animals for research and product testing.
- A proposal forcing IBM to publish details about any political campaign contributions.

A regular quarterly dividend of $1.10 per share was announced at the annual meeting, which was attended by 1,444 stockholders.

IBM also announced the promotion of Carl J. Conti to IBM senior vice-president.

Conti will continue to manage the IBM Enterprise Systems Division. James A. Cannavino was named an IBM vice-president; he will continue to head the Data Systems Division.

Micom

CONTINUED FROM PAGE 69

lan is an Ethernet-based LAN company with some Transmission Control Protocol/Internet Protocol expertise. Black Box is a catalog mail-order business for data communications equipment. Spectrum Digital manufactures T1 multiplexers.

The canceled buy-back bid, which attracted the proposals now under consideration, was for 4.8 million shares of Micom stock at $16 per share. Micom had already agreed to purchase about 4.2 million more shares owned by its three major stockholders, who are also dissident board members, for the same price. That agreement is now void.

Micom, which declined to identify its would-be buyers, said it was offered prices in excess of the current market value of the company. Micom was trading at around $13.50 per share at the time of its announcement, but jumped 2⅝ points to the buy-back offer price of $16 in heavy trading on the day of the announcement.

Micom's investment bankers, Volpe & Covington, had told Micom's board it considered the $16-per-share offer "fair to Micom from a financial point of view." But one financial analyst who follows the company termed the offer "outrageous."

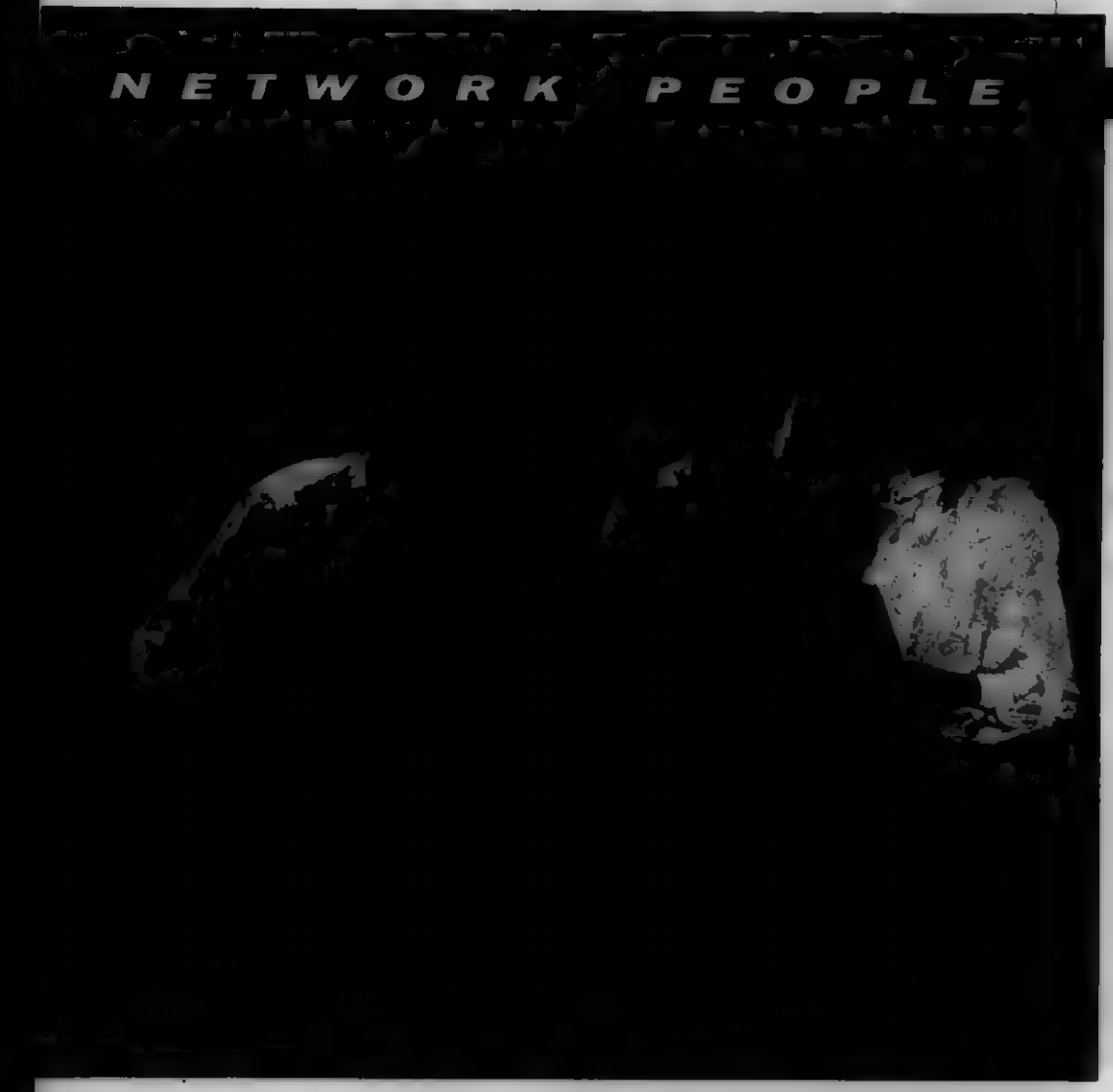
Analysts said Micom's management wanted to remove board member and founder William Norred and board members Sally and John Thornton because of their outspoken criticism of the firm, and was willing to pay $16 per share to do so.

Stockholders unhappy

Although Micom's earnings more than tripled in fiscal 1988 to $9.8 million, the firm's stock price has not responded accordingly. "I know a number of heavy stockholders are unhappy with the performance of the firm," a source close to Micom said. "Thornton was [upset] at the company's performance. He's watching his millions go down the drain, and he can't do anything about it," the source said.

Micom has retained the investment banking firm of Goldman, Sachs & Co. to help the board of directors evaluate the current acquisition offers and any others that may be received. The company said a special board committee has been formed to "explore alternatives for maximizing stockholder values."

Analysts and a source close to Interlan said Interlan has been available for purchase for some time but has failed to attract any takers.



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Wilder

CONTINUED FROM PAGE 69

meeting, IBM's Chick Hayden reaffirmed Big Blue's year-old practice of returning some of IBM Credit's used inventory to the IBM sales force rather than to the third-party market.

"Our traditional markets are becoming so crowded," said CDLA Chairman Bob Gullo, head of Unicom Computer in Sausalito, Calif. "Companies have to look at non-IBM business in a much more aggressive way."

What are the options? Leasing and brokering DEC equipment is the most obvious, and the DEC boom of the past two years has a lot of lessors eyeing the possibilities. But panelists at a CDLA session on the profit potential of DEC equipment described a mine field of a marketplace, thanks to DEC's aggressive posture against the secondary market.

"Not only do they have it now, but they want it all," said C. D. Smith, president of the 73-member DEC Dealers Association, which is not affiliated with the CDLA. "Initially, DEC needed help in the marketplace, but they have changed from open arms to total control."

Essentially, Smith observed, DEC's get-tough signal to add-on hardware makers in the form of closing the VAXBI bus has been paralleled by DEC's sales force offering deeply discounted VAXs to keep new accounts away from third-party used equipment dealers.

The going gets tough

Dave Harmon, chairman of the CDLA's fledgling DEC Relations Committee, was equally discouraging. Harmon's company, Sherman Oaks, Calif.-based El Camino Resources, has found rough sledding in its forays into the DEC market. "I've seen [DEC] cost themselves a million dollars going against one used CPU," he said.

Harmon is now seeking a high-level CDLA contact within DEC, an effort that began with a letter from Benton to DEC President Ken Olsen earlier this year. The CDLA is not happy with the level of contact DEC has offered so far, but will continue to push harder, Bouldin said.

Another major market CDLA hopes to unlock is the federal government, which currently operates under procurement guidelines that prohibit systems integrators from including used computers in their bids.

Although profit margins in leasing are getting tighter, the business itself is growing, and very few lessors are headed for the poorhouse. It's just a much tougher business to compete in now, and with increasingly sophisticated lessees willing to shop for bargains, that competition can only get more intense. The CDLA faces crossroads not only in finding new markets, but also in diligent self-policing of the business practices of fierce competitors. The industry could ill afford another OPM or Itel-like scandal now.

Wilder is Computerworld's senior editor, computer industry.

Kavner

CONTINUED FROM PAGE 69

nology within many corporations.

"More and more, it is end users who are deciding what applications should be run," he said. "MIS managers — at least the good ones — are acting as a conduit for this."

Kavner said he intends to begin visiting customers and value-added resellers next week to reassure them of his commitment to the computer industry. He faces a skeptical reception by those who have seen a parade of four executives before him — Archie McGill, Jack Scanlon, James Edwards and Casoni — making similar promises. Moreover, new AT&T Chairman Robert Allen is not believed to have the same emotional tie to the computer business as his predecessor, the late James Olson.

AT&T recently said it would not increase its stake in Olivetti and is believed to be unhappy with the Italian company's progress in marketing its telecommunications gear in Europe.

Olivetti, on the other hand, is thought to be miffed by AT&T's inability to sell its microcomputers effectively in this country, outside of its Intel Corp. 80386-based machine.

Moreover, Olivetti Chairman Carlo DeBenedetti is involved in a variety of business ventures and reportedly needed Casoni back at Olivetti to tend to daily operations at the $6 billion company.

Bart Stuck, an analyst with telecommunications market research firm Probe Research, Inc., said the odds on AT&T's remaining in the computer business are still 50-50.

"There's no amazing technology to make them successful; there's no pulling a rabbit out of a hat to prevent them from failing," Stuck said.

"Kavner's made a strong commitment to the business; I don't see why he can't break even by the 1989 to 1990 time frame, based on the strategy that is already in place," he said.

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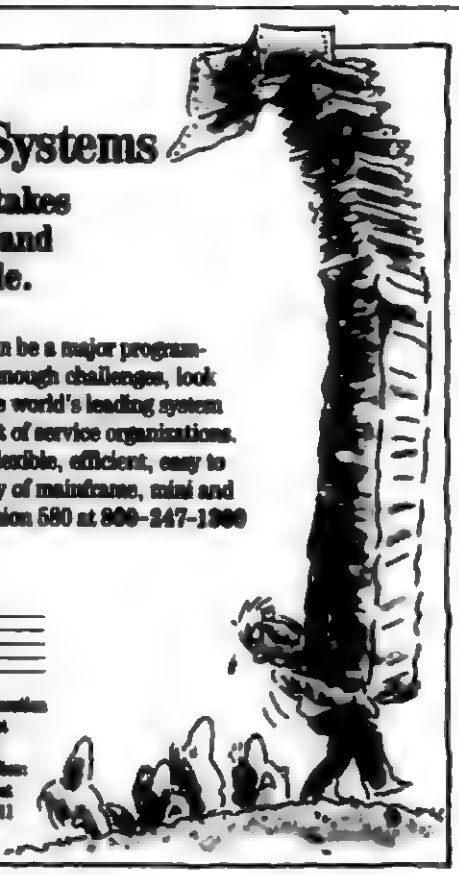

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Foreign sales

CONTINUED FROM PAGE 69

market, which still offers room for expansion."

Other companies reporting results included the following:

Compaq. Continued acclaim and purchases of its line of Intel Corp. 80386-based PCs helped the Houston-based company continue its astronomical growth rate. Both revenue and net income more than doubled over year-earlier results.

"They simply blew away my estimates," First Boston's Wolf said. "Their international sales continued very strong, and I feel they can sustain a 30% to 40% international growth rate over the next year. IBM's high-end Personal System/2 Model 80 still has not hurt Compaq. I'd say they have a good shot at reaching $2 billion in sales this year."

Stratus Computer, Inc. The introduction of low-cost entries to its line of fault-tolerant computer systems helped the Marlboro, Mass., vendor continue its recent strong growth with healthy gains in both revenue and net income over year-earlier results.

In addition, the company benefited from the Big Blue shadow across its doors. "Their OEM relationship with IBM is building, and I think that's what we're seeing here," said Melinda Reach, vice-president of research at Merrill Lynch & Co. "IBM is a big customer that has increased their shipments sharply. That's a lot to get for a small company such as Stratus."

Tandem Computers, Inc. A healthy sales clip in Tandem's international sector helped shine up lackluster domestic figures and keep profits growing at a respectable 26% over the year-earlier quarter.

"Tandem has seen a slowdown in the spending for high-end systems by big U.S. customers like the brokerage houses, but their international sales have been extremely strong, growing more than 50% in the quarter. I think this is the area they'll be concentrating on," said Lawrence M. Harris of Bateman, Eichler, Hill Richards, Inc.

Revenue growth for the Cupertino, Calif., maker of on-line transaction processing systems was also bolstered by sales from the recently acquired Integrated Technologies, Inc. and Ungermann-Bass, Inc. The two companies together contributed more than $13.5 million to quarterly revenue.

Control Data Corp. The Minneapolis-based company continued to experience problems — a slackening of sales in the Computer Systems and Services Group helped create only modest revenue growth — and Chairman and Chief Executive Officer Robert M. Price promised more of the same.

"With stronger selling efforts in 1988, Control Data should achieve improved revenue growth and earnings, but we do not anticipate significant profit growth, however, until the latter half of 1988," he said in a statement.

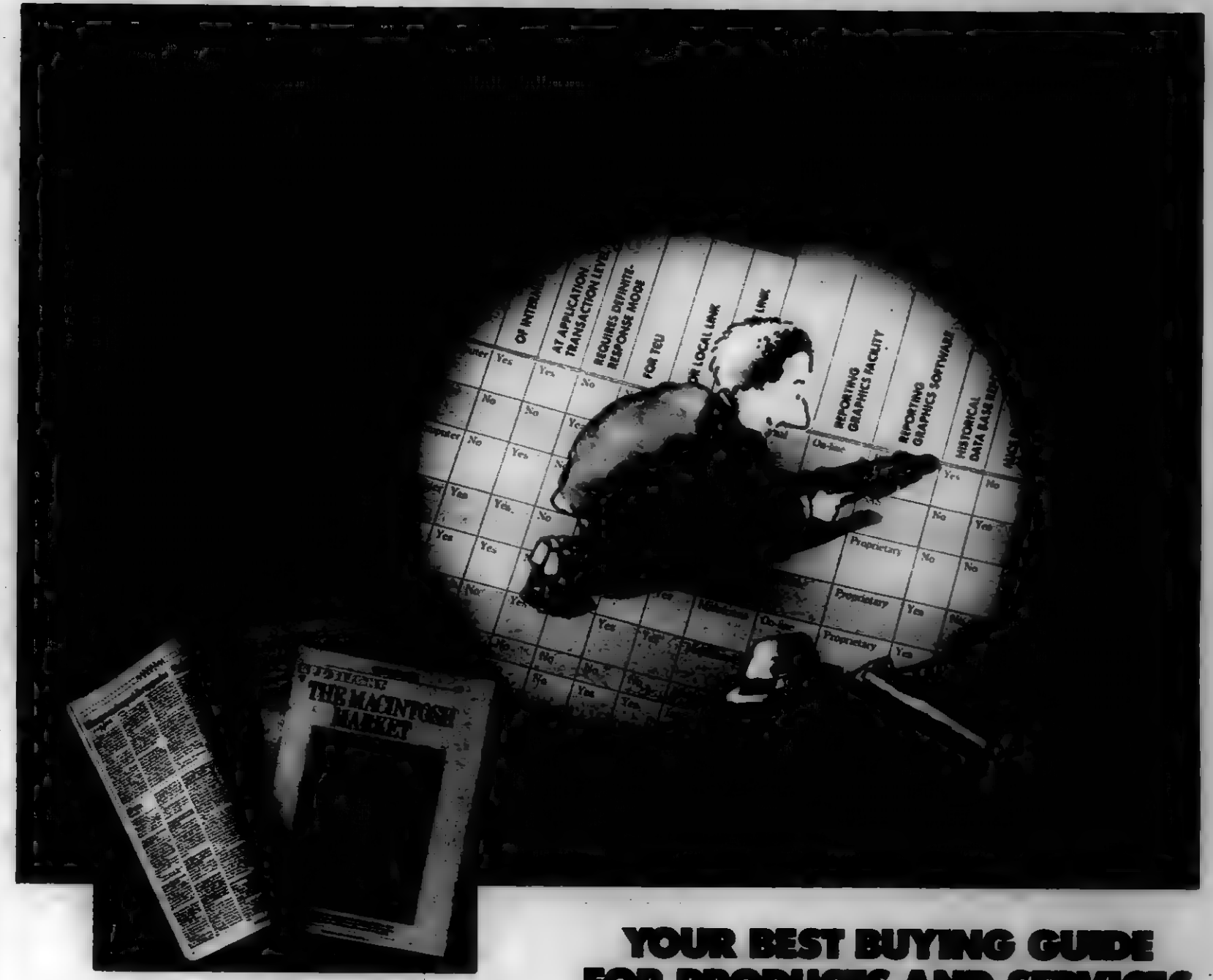
But some analysts were more optimistic about CDC. "Their ETA supercomputer will start to ship in volume this year, and when it picks up steam, we'll begin to see a lot more revenue for the company," said Gerard F. Hallaren, vice-president at Smith Barney, Harris Upham & Co.

Hogan Systems, Inc. Chairman and Chief Executive Officer Gary W. Fiedler blamed accounting changes and an increase in expenses related to software development as contributing to a 66% drop in net income and a 12% drop in revenue over year-earlier results.

For the fiscal year ended March 31, Hogan's earnings before extraordinary credits plunged 81% from $5.2 million to $1 million. Total revenue fell from $48.3 million to $46.7 million, but revenue from new software licenses fell significantly by 19% to $15.4 million.

Management Science America, Inc. After completing a difficult 1987 that included staggering losses due to accounting changes, MSA posted a small rebound in the first quarter. The Atlanta-based mainframe applications vendor earned $2.4 million, or 14 cents per share, on revenue that climbed 18% to $62.9 million. Revenue from new software licenses also rose 18% to $28.6 million. In the year-earlier quarter, MSA lost $2.3 million from operations but added a $69.9 million loss from accounting changes.

Computer Sciences Corp. The systems integrator reported a successful fourth quarter and fiscal year. For the year, profits rose 35% to $43.5 million on a 12% revenue gain to $1.15 billion. Fourth-quarter earnings were up 28% on a 6% gain in sales to $309.1 million.



1988 Computerworld SPOTLIGHT Sections

Issue Date	Spotlight Topic	Ad Closing	Trade Show Distribution
Jan. 11	Terminals & Terminal Emulation Products	Dec. 24	
Jan. 25	LANs	Jan. 8	Communications Networks
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Mar. 14	DBMS	Feb. 26	
Mar. 28	Micro-to-Host Links	Mar. 11	WCC/Interface
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Apr. 25	Electronic Publishing	Apr. 8	
May 9	Printers	Apr. 22	Comdex Spring
May 23	Data Communications	May 6	
June 6	CASE	May 20	
June 20	The SNA Market	June 3	PC Expo
July 11	Disaster Prevention & Recovery Products & Services	June 24	
July 25	Productivity Software	July 8	
Aug. 8	TBA	July 22	
Aug. 29	DB2 Market	Aug. 12	
Sept. 19	Hardware Roundup: Large, Medium Scale & Special Purpose Systems	Sept. 2	
Sept. 26	Hardware Roundup: Small-Scale Systems	Sept. 9	TCA
Oct. 3	Hardware Roundup: Personal Computers & Workstations	Sept. 16	
Oct. 17	AI/Expert Systems	Sept. 30	Demo West
Oct. 31	Unix	Oct. 14	
Nov. 14	TBA	Oct. 28	Comdex Fall
Dec. 5	LANs	Nov. 18	
Dec. 19	IBM-compatible PCs/PS2 Market Products/Monitors	Dec. 2	

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COMPUTERWORLD

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COMPUTER CAREERS

The education of an expert

Four examples show the path to guru status can be unpredictable

BY ALAN RADDING
SPECIAL TO CW

There is a joke that describes a computer consultant as any professional in the industry who has been out of work for three months.

That may be an exaggerated characterization, but circumstance seems to have played a role in the career paths of some leading authorities on the use of information technology, particularly in the microcomputer arena. Some experts offset a lack of extensive technical training by taking advantage of their general analytical ability.

Computer consultants can be divided into four categories: analysts, implementers, researchers and commentators.

In general, analysts study new technologies and develop strategic implementation plans. Implementers help launch new technologies. Researchers track and analyze market data. Commentators develop a broad overview and provide insights into directions and trends.

Patricia Seybold, president of Patricia Seybold's Office Computing Group in Boston, is an analyst. "I got my start through nepotism," she quips. Seybold went to work for her father and brother, both industry analysts. As office automation emerged as a distinct field, she decided to follow it. "I started with word processing, which evolved into office automation," she says.

Liberal arts valuable

Except for a brief stint shuffling data processing punch cards at a bank, Seybold lacks a technical background. "I got my degree in comparative literature. It taught me how to analyze," she says.

Becoming a top consultant was not difficult, because the field was moving rapidly. "You didn't have to have a lot of background. You had to be able to ask intelligent questions," Seybold says.

Shaku Atre is an implementer. After 14 years in a variety of technical areas at IBM, she left to establish Atre International Consultants in Rye, N.Y., now known as Atre Computer Assistance.

Atre believes the key to her success is her hands-on IBM technical experience, which she says gave her a good grasp of the technical details. "I reached the stage where I could solve [technical] problems over the phone," Atre recalls. "You cannot talk about a product unless you work with it."

But IBM experience alone does not account for achievement as a consultant. "You must go beyond your job. You must create opportunities," she says.

While at IBM, Atre published a book on data base design that attracted her first client, AT&T, and she taught at local universities.

Her published works and teaching experiences are the foundation for the 50 courses and seminars she now leads.

JoeAnn Stabel is a researcher. A founder and principal of Storeboard, Inc., a Dallas-based research firm that tracks computer sales through specialty stores, she says she cannot quite believe she is a frequently cited authority.

In 1981, when she received a master's in education after raising several children, she set off to pursue a career in education. She focused on educational testing and measurement, which provided her with the statistical skills she now applies to her computer industry research.

The personal computer explosion in 1983 got her hooked on computers, and she landed a job at Future Computing, Inc., a large computer industry research firm. When the PC industry slumped in 1985, she left Future Computing and helped set up Storeboard.

When people think of the ideal systems consulting job, John Connell's probably is what they imagine. Connell serves as a commentator as executive director of the Office Technology Research Group (OTRG) in Pasadena, Calif., which he founded 11 years ago. Prior to that, he spent 15 years at Atlantic Richfield Co. He got started in the computer industry at Burroughs Corp. in 1955.

OTRG is a computer systems think tank. Through it, the top computer managers of member companies meet twice a year to discuss future trends and directions. Connell sets the agenda, leads discussions, writes extensively and publishes OTRG's newsletter.

He believes there are great opportunities for new consultants in mastering new technologies and helping companies develop and implement OA programs. "I think there is a marvelous opportunity in the integration of image processing with DP," he suggests.

Seybold agrees. "The field is far from saturated," she says. "There is a big need for implementation consultants. There are millions of PCs, and there is a lack of infrastructure to manage them. Companies don't have the manpower for project planning."

Top dollars for top talent

These opportunities can provide good money for top prospects. Large consulting firms pay new recruits with an MBA from a leading school salaries of up to $70,000. Salaries for experienced management consultants regularly top $100,000. Of course, a lone consultant, starting out on his own, probably will not earn that kind of money.

There are other rewards, a "personal return," as Connell says. "I enjoy operating in a much broader arena than I did when working for one firm."

So you want to be a consultant? Here are some tips from the experts. Focus on a specific area, preferably an emerging technology. Pick the type of role suited to your abilities (implementers and analysts are in the greatest demand). Gain exposure by getting published and cited in publications. And be willing to take risks.

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Radding is a Boston-based author specializing in business and technology.

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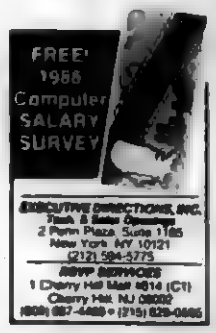

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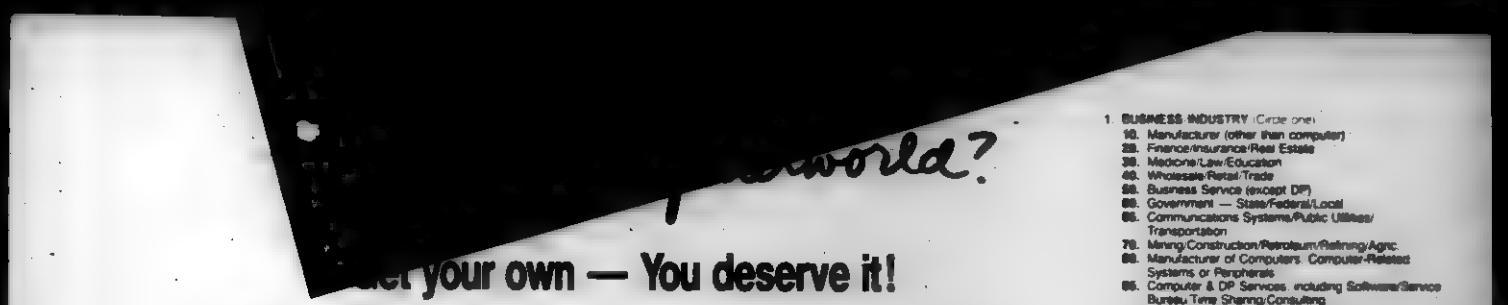

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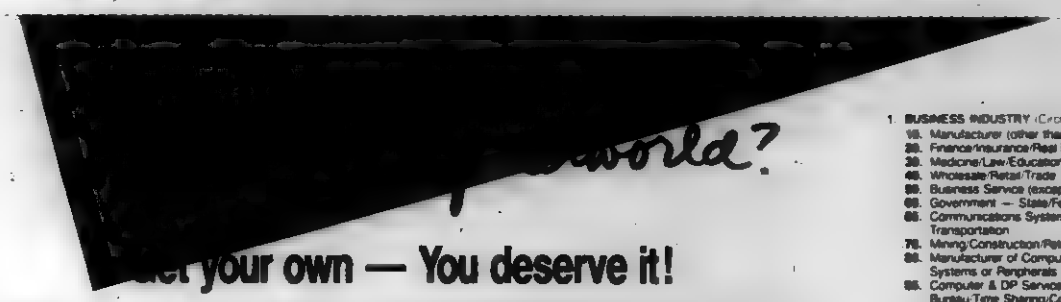

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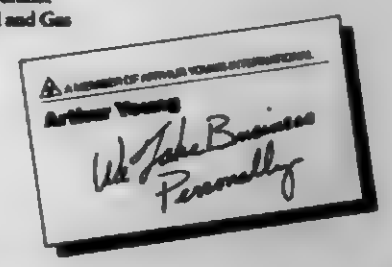

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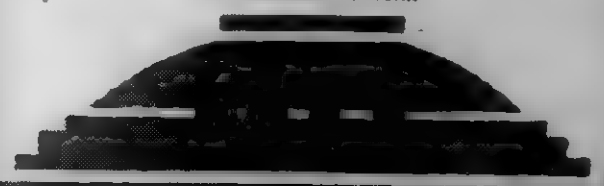

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INFOTRON SYSTEMS

Worldly personal computers

Demand for IBM PC AT, Compaq Deskpro 286 spans the globe

BY CAMERON HALL
BOSTON COMPUTER EXCHANGE CORP.

Contacts from the other side of the world indicate that the Soviets are getting ready for glasnost to assimilate the information revolution. Despite the lack of hard currency, an increasing number of Eastern bloc buyers are expressing interest in buying older model personal computers from the secondary market.

Although the U.S. Department of Commerce still requires an export license to take an antique 1981-model PC out of the U.S., Soviet buyers are willing to wade through the red tape to get a "thought appliance" into their country.

"I really want an IBM, but I'd take any chip off the Eastern bloc," one Czechoslovakian buyer said. What could be better for America than to export this technology? It is like seeding the world with a technology that fosters the freedoms of the First Amendment.

Where are those ATs?

The velocity of trade on the Boston Computer Exchange Big Board took another leap during the week ended April 22, as buyers and sellers could view the exchange's data base on Compuserve. More than 400,000 Compuserve users are now able to search for bargains and post their equipment for sale. Among the first questions over the electronic mail lines was "Where are the IBM Personal Computer AT Model 339s?"

IBM demand was met with supply, as the last of the PC XT and AT lots from IBM began to filter through the market, and prices were down as a result. The XT Model 089 fell $50 to close at $1,650, and the ATs were also down across the board.

The early PC and PC XT models and the Personal System/2s continued to trade at last week's prices. Volume lots of IBM hardware also became available from corporate and government offices, and they quickly found new homes in large corporate installations with custom hardware and software that require true Blue AT equipment.

The Compaq Computer Corp. market was quiet. Compaq saw one gainer and two losers as all other models held steady at the previous week's close.

The ever-popular Compaq Portable I was up $25 to close at $825, remaining in the trading range of last month as it matched the IBM PC competition virtually machine for machine in sales.

The Compaq Portable II 20-MHz machine was down $50 to close at $2,100. There were bargains to be had, as the 20-MHz Deskpro provided great value selling down $100 at $1,400.

THE END OF THE college year is approaching, and the Macintoshes purchased for term papers suddenly look like an opportunity for cash.

Summer supply

Apple Computer, Inc. Macintosh market prices were stable under poor supply conditions all week, with buyers hoping student Macintoshes will come to market in volume in the next few weeks. The end of the college year is approaching, and the Macintoshes purchased for term papers suddenly look like an opportunity for cash.

Constrained by supply, the Apple Macintosh 512 was up $75, the 512E sold at the previous week's close, and the Mac Plus held its own just below new discounts. The Mac SE dropped slightly from last week's high to close down, at $2,375.

The Mac IIs are getting popular in the leasing market, as those with whole Macintosh departments lease high-end equipment, and prices were up $100 for the machines, which sold at $3,900.

The Boston Computer Exchange can be reached at 800-BOCOEXX or 617-542-4414 in Massachusetts.

The BoCoEx Index

Closing prices report for the week ending April 22, 1988

IBM PC Model 076	$825	$900	$600
XT Model 086	$1,225	$1,350	$900
XT Model 089	$1,650	$1,700	$1,125
AT Model 099	$2,350	$2,400	$1,875
AT Model 239	$2,650	$2,750	$2,150
AT Model 339	$3,650	$3,700	$2,750
PS/2 Model 50	$2,475	$2,650	$2,400
PS/2 Model 60	$2,650	$2,800	$2,475
Apple Macintosh 512	$725	$750	$575
512E	$850	$1,075	$675
Plus	$1,150	$1,350	$900
SE	$1,925	$2,200	$1,600
SE 20-MHz	$2,375	$2,400	$2,100
II	$3,900	$4,200	$3,500
Hewlett-Packard Laserjet	$925	$925	$725

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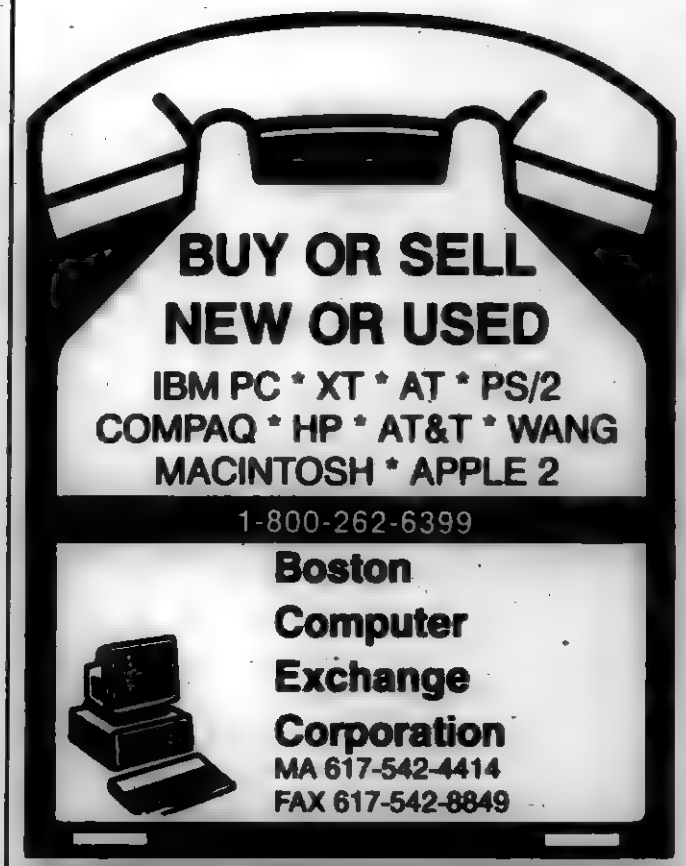

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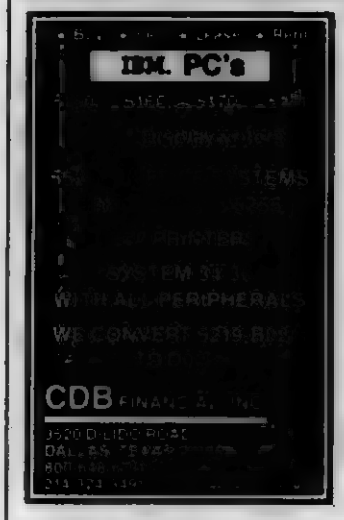

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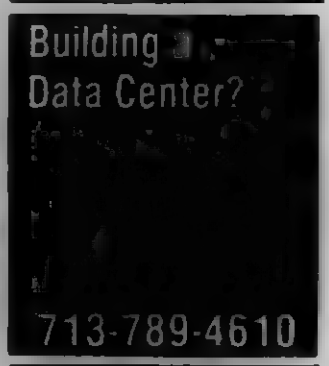

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Request for Proposal No. 1345, due Monday, May 22, 1989 at 2:30 p.m. for the acquisition of a new or refurbished replacement processor for the IBM System/38 in administration at COAHOMA JUNIOR COLLEGE. No charge.

Request for Proposal No. 1346, due Thursday, May 25, 1989 at 2:30 p.m. for the acquisition of 60 MS-DOS/OS2-based microcomputers, related peripherals and software for the MISSISSIPPI STATE HIGHWAY DEPARTMENT. Charge $10.00.

Request for Proposal No. 1347, due Thursday, May 25, 1989 at 2:30 p.m. for the acquisition of an upgrade to an NCR Tower XP for MISSISSIPPI LEGISLATIVE PERFORMANCE EVALUATION EXPENDITURE REVIEW COMMITTEE. Charge $10.00.

Request for Proposal No. 1348, due Tuesday, May 24, 1989 at 2:30 p.m. for the acquisition of a MS/DOS-based animation system with two-dimensional and three-dimensional capabilities for HINDS COMMUNITY COLLEGE. No charge.

Request for Proposal No. 1349, due Tuesday, May 31, 1989 at 2:30 p.m. for the acquisition of an upgrade and replacement for an existing Hewlett-Packard data acquisition and control system for the Magnetohydrodynamics Energy Center at MISSISSIPPI STATE UNIVERSITY. No charge.

Request for Proposal No. 1350, due Friday, May 19, 1989 at 2:30 p.m. for the acquisition of a departmental minicomputer or microcomputer-based local area network with full SNA communications for the MISSISSIPPI ETHICS COMMISSION. Charge $10.00.

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INQUIRY NO.	DATE	TIME
4-01-88139-0	May 20, 1988	2PM

ITEMS: Communications Equipment:
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INQUIRY NO.	DATE	TIME
4-01-88139-0	May 19, 1988	2PM

ITEMS: Two IBM 3705-K04 and three 3705-K04 each with an assorted complement of added IBM features

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Mar. 2*	Jan. 29	Departmental Computing	Interface/ WCC
Apr. 6	Mar. 4	Data Security	
May 4	Apr. 1	Communications/ Connectivity	Comdex Spring/ ICA
June 1*	Apr. 29	PC End User Productivity	PC Expo
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Sept. 7	Aug. 5	Communications	TCA
Oct. 5	Sept. 2	Software Productivity	Info '88/ Dexpo West
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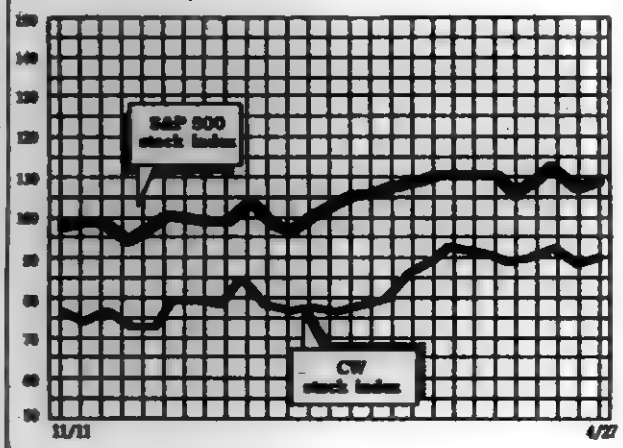

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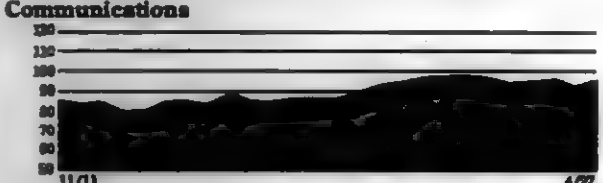
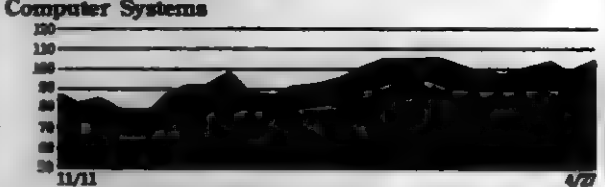
S&P 500 Index	107.0	110.2

Communications

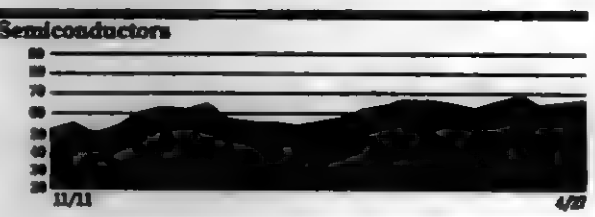


Computer Systems



Software and DP Services

Semiconductors



Peripherals and Subsystems

Leasing Companies

CW CHARTS

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, APRIL 27, 1988

EXCH		52-WEEK RANGE (1)		PRICE CLOSE APRIL 27 1988	WEEK NET CHANGE	WEEK PCT CHANGE

Communications and Network Services

N	AMERICAN INFO TECHS CORP	100	74	89.50	4.4	5.1
O	ANDREW CORP	18	11	14.38	1.1	8.5
O	ARTEL COMM CORP	3	2	1.88	-0.3	-11.8
N	AT&T	36	30	36.63	0.1	0.5
O	AVANT GARDE COMP INC	6	2	2.00	-0.6	-33.3
O	AVANTEK INC	17	6	7.00	0.4	5.7
N	AYDIN CORP	26	16	21.38	-1.0	-4.5
N	BELL ATLANTIC CORP	69	61	67.13	2.5	3.9
N	BELLSOUTH CORP	44	39	39.50	1.8	4.3
O	COMPRESSION LABS INC	6	2	3.13	0.0	0.0
O	COMPUTER NETWORK TECH	6	1	1.38	0.0	0.0
O	CONTEL CORP	46	25	33.38	-0.1	-0.4
O	DATA SWITCH CORP	10	4	7.88	0.0	0.0
O	DIGITAL COMM ASSOC	48	20	32.88	2.0	6.5
O	DYNATECH CORP	33	14	22.75	-0.3	-1.1
O	FIBRONICS INTERNATIONAL INC	8	2	4.38	0.5	12.9
O	GANDALF TECHNOLOGIES	10	5	7.25	-0.1	-1.7
O	GENERAL DATACOMM INDS	14	3	4.00	0.4	10.3
N	GTE CORP	40	29	38.88	1.0	2.9
O	INFOTRON SYS CORP	12	5	11.25	1.8	18.4
N	ITT CORP	66	42	48.63	1.3	2.8
N	M A COM INC	16	7	10.13	0.4	3.8
O	MCI COMMUNICATIONS CORP	14	6	13.63	0.6	4.8
O	MICOM SYS INC	17	7	16.75	3.3	24.1
O	NETWORK SYS CORP	13	7	9.88	1.0	11.3
N	NORTHERN TELECOM LTD	24	14	17.88	-0.1	-0.7
O	NOVELL INC	30	12	19.75	0.0	0.0
N	NYNEX CORP	78	68	64.50	2.1	3.4
N	PACIFIC TELESIS GROUP	34	28	28.88	1.5	5.5
N	PARADYNE CORP	9	4	4.50	-0.1	-2.7
A	PENRIL CORP	5	1	4.75	0.8	15.2
N	PLESSEY PLC	40	28	29.75	-0.3	-0.8
N	SCIENTIFIC ATLANTA INC	20	8	14.63	-0.4	-2.5
N	SOUTHWESTERN BELL CORP	48	22	38.75	0.9	2.5
O	3 COM CORP	26	12	19.63	1.0	5.4
O	TIMEPLEX INC	40	17	32.50	0.0	0.0
O	UNGERMANN BASS INC	16	5	12.00	0.0	0.0
N	U S WEST INC	60	43	53.38	2.4	4.7

Computer Systems

O	ALLIANT COMPUTER SYS	26	6	7.00	-0.5	-6.7
O	ALPHA MICROSYSTEMS	6	3	5.75	0.5	8.5
O	ALTOS COMPUTER SYS	15	9	9.50	0.1	1.3
A	AMDAHL CORP	50	16	38.75	3.4	9.3
O	APOLLO COMPUTER INC	26	9	16.00	0.6	4.3
O	APPLE COMPUTER INC	60	26	41.75	2.0	5.0
O	BOLT BERANEK & NEWMAN	26	12	17.50	-1.1	-6.0
O	BRITTON LEE INC	6	1	2.13	0.3	13.3
N	COMPAQ COMPUTER CORP	76	34	52.88	1.8	3.2
O	COMPUTER AUTOMATION INC	17	6	10.75	-1.1	-9.5
A	COMPUTER CONSOLES INC	11	2	7.00	-0.4	-5.1
O	CONCURRENT COMP CORP	24	11	17.00	-0.5	-2.9
N	CONTROL DATA CORP DEL	38	18	24.75	1.0	4.2
O	CONVERGENT TECH	9	3	3.19	0.0	0.0
O	CONVEX COMPUTER CORP	20	6	8.50	1.3	17.2
N	CRAY RESH INC	126	47	86.50	7.1	9.0
O	DAISY SYS CORP	10	5	9.25	1.1	13.8
N	DATA GEN CORP	37	16	23.25	0.0	0.0
N	DATAPOINT CORP	9	3	5.38	0.1	2.4
N	DIGITAL EQUIP CORP	209	98	108.75	5.6	5.7
N	FLOATING POINT SYS INC	13	3	4.13	-0.1	-2.9
N	GOULD INC	24	8	11.13	0.1	1.1
N	HARRIS CORP	43	22	30.00	0.4	1.3
N	HEWLETT PACKARD CO	74	38	62.63	1.0	1.6
N	HONEYWELL INC	91	49	70.88	1.9	2.7
N	IBM	176	102	114.00	1.1	1.0
O	INFORMATION INTL INC	15	9	12.63	-0.1	-1.0
O	IPL SYS INC	3	1	2.00	0.4	28.1
O	MASS COMPUTER CORP	14	4	5.00	0.4	8.6
N	MATSUSHITA ELEC INDL LTD	228	109	221.00	-0.6	-0.3
O	MEGADATA CORP	6	3	3.13	0.1	4.2
O	MENTOR GRAPHICS CORP	28	14	20.75	2.6	9.3
N	MSI INC	14	4	5.13	-0.3	-4.7
N	NCR CORP	87	50	62.38	3.6	6.2
N	PRIME COMPUTER INC	31	12	17.38	0.8	4.8
O	PYRAMID TECHNOLOGY	14	6	13.25	1.3	10.4
O	STRATUS COMPUTER	41	15	28.00	3.0	12.0
O	SUN MICROSYSTEM INC	46	14	38.25	-0.9	-2.4
O	SYMBOLICS INC	5	1	1.75	0.0	0.0
N	TANDEM COMPUTERS INC	37	14	18.88	2.1	12.7
N	TANDY CORP	57	38	46.75	2.8	6.1
N	ULTIMATE CORP	37	12	12.88	-0.6	-4.6
N	UNISYS CORP	48	24	34.50	2.1	6.5
A	WANG LABS INC	19	10	11.38	-0.1	-1.1

Software & DP Services

O	ADVANCED COMP TECH	6	1	1.50	0.0	0.0
N	ADS COMPUTERS INC	20	11	17.00	-0.4	-2.2
O	AMERICAN MGMT SYS INC	20	9	16.75	0.4	2.4
O	AMERICAN SOFTWARE INC	20	6	13.38	0.4	2.9
N	ANACOMP INC	11	4	9.63	0.1	1.3
O	ANALYSTS INTL CORP	10	4	8.00	0.8	10.3
O	ASHTON TATE	33	13	27.75	0.5	1.8
O	ASK COMPUTER SYS INC	16	6	14.00	0.3	1.8
O	AUTODESK INC	34	12	28.25	3.5	12.8
N	AUTO DATA PROCESSING	55	38	40.88	0.0	0.0
O	BOOLE & BABBAGE INC	12	5	7.75	0.0	0.0
N	COMPUTER ASSOC INTL INC	37	16	27.13	0.4	1.4
O	COMPUTER HORIZONS CORP	16	7	10.88	-0.3	-2.2
N	COMPUTER SCIENCES CORP	73	42	43.75	1.3	2.9
N	COMPUTER TASK GROUP INC	17	9	11.50	0.0	0.0
O	COGNOS INC.	17	4	7.13	0.0	0.0
O	COMSHARE INC	28	12	16.75	-0.8	-4.3
N	CULLINET SOFTWARE INC	14	4	7.88	0.9	12.5
O	DUQUESNE SYS INC	30	10	20.00	0.5	2.6
A	DATA ARCHITECTS INC	16	7	13.75	0.0	0.0
N	GENERAL MTRS (CLS E)	51	30	43.00	1.8	4.2
O	HOGAN SYS INC	17	4	4.25	0.0	0.0
O	INFORMIX CORP	31	12	21.00	1.4	7.0
O	INTELLICORP INC	11	2	3.00	0.0	0.0
O	KEANE INC	11	6	10.50	1.0	10.5
O	LOTUS DEV CORP	40	19	22.75	-0.3	-1.1
O	MANAGEMENT SCI AMER	15	6	9.13	0.8	10.2
O	MICRO PRO INTL CORP	8	3	2.88	0.3	9.5
O	MICROSOFT CORP	79	37	85.50	1.5	1.8
O	MORINO ASSOCIATES INC	24	7	16	0.4	2.4
O	NATIONAL DATA CORP	34	16	28.13	-0.8	-2.8
O	ON LINE SOFTWARE INTL INC	22	9	9.88	0.0	0.0
O	ORACLE SYS CORP	19	8	16.75	0.3	1.8
N	PANSOPHIC SYS INC	28	11	16.50	-0.4	-2.2
O	POLICY MGMT SYS CORP	30	16	24.13	0.6	2.6
O	PROGRAMMING & SYS INC	14	7	12.25	0.3	2.1
O	REYNOLDS & REYNOLDS CO	28	14	17.63	-2.5	-13.5
O	SEI CORP	19	10	16.00	-0.3	-1.4
O	SHARED MED SYS CORP	31	18	23.63	-0.1	-0.4
O	SOFTWARE AG SYSTEMS INC	14	7	7.00	0.0	0.0
O	SOFTWARE PUBG CORP	17	8	16.38	-0.9	-5.4
A	STERLING SOFTWARE INC	12	6	8.00	0.0	0.0
O	SUNGARD DATA SYS INC	21	10	17.75	0.5	2.9
O	SYSTEMATICS INC	22	10	20.75	0.0	0.0
N	SYS. SOFT INC.	24	7	10	-1.5	-9.4
O	VIA SOFTWARE INC	40	7	13.50	-0.5	-1.8

Semiconductors

N	ADV MICRO DEVICES INC	25	8	14.25	1.8	14.0
N	ANALOG DEVICES INC	24	8	14.00	0.9	6.7
O	ANALOGIC CORP	13	5	7.25	-0.1	-1.7
O	INTEL CORP	42	18	22.25	1.0	3.2
O	LSI LOGIC CORP	17	7	8.88	0.1	1.3
N	MOTOROLA INC	74	35	49.13	2.5	5.4
N	NATL SEMICONDUCTOR	22	10	13.50	1.4	11.3
N	TEXAS INSTRS INC	65	35	48.50	-0.8	-1.5
A	WESTERN DIGITAL CORP	33	11	15.50	1.0	6.9

Peripherals

O	ALLOY COMP.	13	3	4.13	0.4	10.0
N	AM INTL INC	9	3	3.63	-0.3	-4.5
O	AST RESH INC	31	6	15.00	-0.9	-5.8
O	AUTO TROL TECH CORP	9	3	4.75	0.1	2.7
O	BANCTEC INC	10	6	8.25	0.0	0.0
O	CIPHER DATA PRODS INC	14	4	5.25	-0.6	-4.3
A	COGNITRONICS CORP	5	2	3.88	0.6	18.2
N	COMPUGRAPHIC CORP	28	15	26.00	0.3	1.0
A	DATAPRODUCTS CORP	24	7	10.00	0.0	0.0
A	DATARAM CORP	8	5	7.75	-0.1	-1.8
N	DECISION INDS CORP	13	4	10.75	0.0	0.0
N	EASTMAN KODAK CO	71	38	41.00	1.0	2.5
O	E M C CORP MASS	29	7	7.50	-4.3	-36.5
O	EMULEX CORP	9	4	8.00	-0.1	-1.5
O	EVANS & SUTHERLAND	35	17	17.75	-0.8	-3.4
O	ICOT CORP	8	3	3.31	-0.2	-5.3
O	INTERLEAF INC	24	11	17.38	-0.9	-4.8
O	OMEGA CORP	5	1	3.38	-0.2	-5.3
O	LEE DATA CORP	8	3	3.75	0.1	3.4
O	MASSTOR SYS CORP	6	1	3.13	0.3	8.7
O	MAXTOR CORP	33	6	15.50	0.8	5.0
O	MICROPOLIS CORP	44	13	25.00	1.3	5.3
O	MINISCRIBE CORP	18	5	12.00	0.5	4.3
N	MINNESOTA MINE & MFG CO	84	46	80.13	1.3	2.1
A	MSI DATA CORP	19	8	16.25	-0.3	-1.5
O	PERSONAL COMPUTER PRODUCTS INC.	7	4	6.13	0.0	0.0
O	PRIAM CORP	6	1	2.13	0.1	5.3
O	PRINTRONIX INC	13	7	8.63	-0.2	-2.8
O	QMS INC	27	8	11.00	0.9	8.9
O	QUANTUM CORP	28	8	11.00	0.0	0.0
O	WANGTEK CORP	6	1	1.25	0.0	0.0
N	RECOGNITION EQUIP INC	22	7	9.13	0.4	4.3
O	REXON INC	14	6	8.50	0.4	4.6
O	SCAN TRON CORP	17	7	16.38	0.0	0.0
O	SEAGATE TECHNOLOGY	46	10	20.50	2.1	11.5
N	STORAGE TECH CORP	5	1	1.75	0.1	7.7
O	TANDON CORP	7	1	2.63	0.4	16.7
A	TEC INC	7	3	4.75	0.0	0.0
N	TEKTRONIX INC	41	21	24.63	-0.5	-2.0
O	TELEVIDEO SYS INC	3	1	1.31	0.1	5.0
N	TELEX CORP	83	30	46.25	-0.4	-0.8
O	WYSE TECH	40	11	20.00	0.9	4.6
N	XEROX CORP	65	50	54.13	1.0	1.8
O	XIDEX CORP	16	6	6.25	0.1	2.0

Leasing Companies

O	CAPITAL ASSOCIATES INTERNATIONAL INC	11	4	4.50	-0.4	-7.7
N	COMDISCO INC	37	12	21.38	0.1	0.6
N	CONTINENTAL INFO SYS	14	5	7.63	-0.1	-1.8
O	PHOENIX AMERN INC	6	2	3.00	0.1	4.3
O	SELECTERM INC	6	1	4.25	0.0	0.0

EXCH: N—NEW YORK; A—AMERICAN; O—NATIONAL; O—OVER-THE-COUNTER; S—SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Get set, go!

DEC out in front as high-tech stocks take market lead

Computer stocks were up and running last week, outpacing a steadily favorable market that ended curiously Thursday with the slowest trading session this year. Digital Equipment Corp. posted the most significant gain of the week among leading issues. DEC's stock caught fire following news that the firm will market software on a laser disk, ending the four days of trading up 6¼ points to 106.

Healthy gains were also posted by Micom Systems, Inc., up 3¾ points to 17 following news that it has received takeover offers it plans to pursue (see story page 69), and MAI Basic Four, Inc., which gained 3½ points to 18½ following an announcement that two principal shareholders will sell their shares.

Other top gainers for the week included Stratus Computer, Inc., up 2¾ points to 27¾; Cray Research, Inc., up 2¼ points to 84⅜; Tandem Computers, Inc., up 2⅛ points to 18¾; and Amdahl Corp., up 2 points to 39⅜. The few losers on the Street included Computer Associates International, Inc., down 1½ points to 25⅛; Sun Microsystems, Inc., off 1 point to 35⅛; and IBM, down ⅝ of a point to 113¼.

JAMES DALY

Compatibility

FROM PAGE 1

and marry. For couples in MIS, job stress, erratic travel schedules and management frustrations are all just a part of daily living.

"There are more of us than you think," stresses one systems analyst at AT&T. "Really, there are."

At one time, the Chevron Information Services Group was getting so large, former MIS director Charles Oldenburg recalls, that top management was worried about what to do with the proliferation of romances that were springing up in the department.

"We never allowed one person to work for his or her spouse," he says. "These relationships made our decisions to transfer one person to another state very complex."

Carl and Janice Coulter

Aside from user companies, MIS marriages can also be found in professional MIS groups such as the Data Processing Managers Association (DPMA).

"If I were to call up all of our chapters, I bet I could find at least six couples in each one, and then they would know of others," says John Venator, DPMA executive director.

Keeping it at the office

Couples in the field admit they have to shake off some stereotypes. To outsiders, "MIS romance" evokes visions of two extremely unemotional beings who come home only to log on to the computer in the den. Conversations in the household would focus on the merits of VTAM and VMS.

When people find out that Hammitt and Pisani are both in MIS, "they must think our lives must be boring," Hammitt says. "But we rarely talk about technology at home. And we don't have a computer."

In fact, couples interviewed find it a relief that their spouses can understand what they do.

"My first husband just couldn't relate to my problems," one MIS director confides. "My second is in MIS, and we get along just fine."

When husbands or wives are familiar with the intimate details of a job, they find it easier to comfort the other person.

Larry and Dorothy Deran both work in Palo Alto, Calif., as MIS directors. Larry heads the operations at office supplier Tab Products Co., and his wife works as the director of resource information systems at Syntex Laboratories, Inc.

"You tend to be more sympathetic about each other's pressures," Dorothy notes.

Others agree. "You know, there are some jobs that are just not universally understood," says Janice Coulter, information management specialist for AT&T's MIS operations. "Being in MIS is both technical and, therefore, somewhat confusing for people."

Janice often shares ideas with her husband, Carl, a systems analyst at McGraw-Hill, Inc.

In his job, he helps the company select and maintain IBM mainframe-based financial software.

"This is my first time in a large MIS shop," she says. "Being at McGraw-Hill, he's used to it. So Carl is helping me understand how to move around in a huge shop."

Not always rosy

While a natural compatibility exists, there is plenty of room for tension. Years ago, Bev Madron taught MIS at Western Kentucky University, and her husband, Tom, worked there as the director of academic computing.

"She looked at how technology should be implemented from a philosophical viewpoint, while I looked at technology from a practical one because I had control over operations," he recalls. "Yes, we've had some pretty strong arguments over technology issues and issues relating to the direction of the industry."

Carole and David Benbassat

And now their roles have changed. She is the associate director of information services at the Newark, N.J., campus of Rutgers University. He is president of the New Jersey Educational Computing Network, Inc., a company that provides computer and consulting services to schools.

Experience has taught them to share technical expertise only when asked. "We tend not to get overbearing," Tom says. "One is very cautious about offering gratuitous advice to the other."

Staying independent

For many couples, the question of whether either would like to work for the other spouse sets heads shaking.

"No," Pisani says flatly. "We respect each other professionally, but I would not want to work for John. I'd be willing to work on a project for a little while with him, but not for him."

Her husband immediately concurs. Their management styles are different, he explains. "I focus on the long term, how Pillsbury can influence the rest of the industry, how we are to stay competitive," Hammitt says. "She looks at the present, what must be done now to make things happen. She sets high standards, but I'm more comfortable with flexibility. I doubt we would ever be able to work together."

Joanne Pisani and John Hammitt

With first-hand knowledge of what MIS management entails, one spouse can share the joy when the other has successfully implemented a new IBM 9370 or when he or she receives a congratulatory letter for building a strong MIS department. They can respect each other as professionals and help solve technical and managerial problems without a spirit of competition.

On the road again

Yet, with long hours coupled with rigorous travel schedules, the stresses of MIS can be overwhelming. Last year, Hammitt and his wife traveled so much for their jobs that they often arranged to meet each other in midpoint cities on the weekends.

Nancy Bradley, former president of her local DPMA chapter, and her husband, Gary, can attest to radical work schedules. Nancy trains data processing teachers in Las Vegas. Gary works in Denver at Covia, Inc., the United Airlines technology subsidiary, as a systems programmer analyst. They are rapidly racking up frequent-flyer miles as they fly to meet each other every week.

"I rather enjoy this schedule," Nancy says. "A lot of people in this field don't get to see a lot of each other on the weeknights anyway. We've been married 29 years, and now every weekend is like a honeymoon."

For some, being married to an MIS spouse can be socially limiting. Meeting each other's work friends also means meeting another colleague in the business.

"We find that we tend to meet fewer people in other fields," notes David Benbassat, an MIS consultant whose wife, Carole, trains other MIS managers. "Most of our friends are in the computer field in one way or another."

Many of the couples say they probably talk more about work at home than they should. They must make a conscious effort to draw the line between business and pleasure. But, for some, technology is a hobby. "Yes," Bev Madron admits. "We do talk about VAXs and IBMs at home."

Having similar jobs does not strike these couples as strange or even as an issue that comes up very often. For Hammitt and Pisani, their other shared interests — exercise, cultural activities, cooking and travel — make for balanced and well-rounded lives.

"We don't consider ourselves technologists," Hammitt stresses. "We are business people in the business of managing technology. We would have a lot in common with executives in other industries."

For love's sake

When both husband and wife are highly successful, moving to another MIS position in another part of the country is commonplace. And, in many cases, both people's careers will not move in parallel when one relocates for the other. That means sacrifice.

Joanne Pisani was at the top of the MIS totem pole at Avon Products, Inc. in New York. But when she married Chicago-based John Hammitt, she made the decision to relocate and work at an Avon branch in an MIS capacity as a line manager. It was a move down, not up, the corporate ladder — not an easy transition.

"You have to understand the consequences of your actions before you do something like this, because a lot of resentment can build up afterward," she warns. "It was more important for me to live in the same house with my husband than to live apart and commute to see each other. It all boils down to your value system."

Pisani also emphasizes that her husband said he would be willing to move for her if she ever got an irresistible job offer out of state.

For couples who are wedded to their jobs, maintaining a marriage while living apart is an alternative.

"I never told him not to go," says Nancy Bradley, a data processing trainer in Las Vegas. "But I love my job." So when her husband, Gary, got a job as a programmer/analyst at Covia, Inc. in Denver, Nancy stayed put. She says she likes the lifestyle of Las Vegas and does not care much for Denver's cold winters.

So far, their marriage of 29 years has fared well, but it was rough at the start, she acknowledges. Before his job relocation, they had never been apart for more than three days at a time. She was not used to being alone at night or taking care of all the household responsibilities. On top of that, they must now pay to live in two places.

"We talk on the phone every day and see each other on weekends," she says. "Now that I have gotten used to it, I rather enjoy this schedule."

KATHY CHIN LEONG

No surprises expected this time around

BY ALAN J. RYAN
CW STAFF

ATLANTA — Dealers heading to the Peachtree State next week for Comdex/Spring '88 are expecting little in the way of product announcements and look forward to a relatively relaxed atmosphere.

When the spring version of The Interface Group's trade show opens its doors Monday, few hot announcements are anticipated.

Recent interesting rollouts, like the IBM Personal System/2 compatibles from Texas-based Tandy Corp. and Dell Computers/PCs Limited, will likely draw crowds, but it is unlikely that anything announced at the show itself will top them.

Dennis Scarfile, owner of Computerworks, Inc. in Annapolis, Md., said his store will not be represented at the show because he has not heard of any interesting products.

"When there is a giant step forward in the industry, like 386 machines or laser printers, we go," Scarfile said. "But a lot of the Comdex shows now are flat."

In search of a printer

Three members of the Upgrade for Computrements staff in North Olmsted, Ohio, will be attending the show, according to Upgrade owner Jim Madigan.

They will be looking for a second laser printer line to carry — the stores now have Hewlett-Packard Co. machines on their shelves — and a cost-effective laptop.

Mostly, though, Madigan conceded, the trip to Atlanta is an "R&R" perk for his workers. "They don't learn that much at the show. We just use it for the guys to get out, have fun and see a lot of products. It's hard to prove that it pays off," he added.

For Glenn Paul of Clancy-Paul & Associates in Cranbury, N.J., there are other reasons to attend. "I've long since stopped going to Comdex to look for products," he said. "I mostly go to meet people I don't get to see in the course of business and to think about my product strategy."

Hobnobbing

Paul said the show offers the ability "to focus on products for a week, rather than one product at a time as you do in the normal course of a day." He added that the show is a place for establishing and maintaining relationships with vendors.

Paul said the size of the spring show, which is considerably smaller than its Las Vegas sister that takes place in the fall, creates an easier atmosphere in which to conduct business.

But to some Comdex diehards, the spring show isn't the real thing. "Las Vegas is where it's at," said Tom Jacobs, chairman of Computer Town in Nashua, N.H. "That's where it got started, and the better introductions are there."

Some 850 vendors are expected to fill 4,000 10-by-10-foot booth units, an Interface spokeswoman said. Attendance is projected at 52,000.

March on Atlanta

Comdex/Spring '88 organizers project the number of exhibitors will reach the peak attained in 1984 and that attendance will remain the same as last year's high

INFORMATION PROVIDED BY THE INTERFACE GROUP, INC.
CW CHART

The Tandy/Dell show

PS/2 at center stage; PC compatibles pull up rear

ATLANTA — IBM's Personal System/2 family and Micro Channel architecture-compatible systems from Tandy Corp. and Dell Computers/PCs Limited are expected to be drawing cards at Comdex/Spring '88 here next week. However, systems compatible with IBM's Personal Computer line are also among the rollouts expected at the show.

Some systems, cards and terminals users can expect to see next week include the following:

• San Jose, Calif.-based Chips and Technologies, Inc.'s 20-MHz New Enhanced AT, or Neat chip set. The company currently offers 16- and 12-MHz versions. The speedier version is shipping now and is included in the recently announced Zenith Data Systems Supersport 286 laptop and the 220 Delta from Dell. The chip sets run IBM's and Microsoft Corp.'s OS/2 and Microsoft's MS-DOS operating systems and application software.

• Acer Technologies Corp.'s venture into the lower end of the PS/2-compatible market. The Acer 1030 is said to be compatible with the PS/2 Model 30 and supports both 3½- and 5¼-in. floppy disk drives. It comes with 640K bytes of on-board random-access memory, four open eight-bit IBM PC XT-compatible expansion slots and multigraphics display capability. It will be priced at less than $1,400.

Acer will also announce the Acer 915, an IBM PC AT-compatible machine running at 12.5 MHz and selling for less than $2,300, and the Acerserver 5200, an Intel Corp. 80386-based server configured with Novell, Inc. Netware Version 2.11 software. The server will be available in either 70M- or 130M-byte hard-disk versions and will sell for less than $9,000.

• Vendex Technologies, Inc.'s line of Headstart computers. The Headstart II is a 9.54-MHz, 640K-byte PC XT compatible featuring one 5¼-in., 360K-byte floppy and one 3½-in., 1.44M-byte floppy disk drive. Its price is $1,195.

Headstart II Plus adds a 32M-byte hard disk drive, a 2,400 bit/sec. modem and a mouse to the Headstart II; it will sell for $2,195.

Also from Vendex, Headstart III is based on Intel's 80286 processor and features 1M-byte built-in RAM, expandable to 2M bytes. It will sell for $2,595. The company's 16-MHz 80286-based Headstart Pro features bundled OS/2. With the addition of two chips, it can be transformed to a 20-MHz 80386-based machine. It will sell for $3,995. All units are scheduled to begin shipping in August.

• Tandon Computer Corp.'s Tandon 286 is set to make its debut at Comdex. The computer offers a 12-MHz 80286 microprocessor, eight expansion slots, a fixed 60M- or 110M-byte Winchester disk drive and a 1.2M-byte floppy. The Tandon 286's Personal Data Pac allows the Winchester drive to be removed and ported. Pricing was not available at press time.

• Sunnyvale, Calif.-based Advanced Transducer Devices, Inc.'s 80386 accelerator board, the 386 ATD, which will reportedly allow users to turn any computer based on Intel's 80286 microprocessor into an 80386 machine. The board is compatible with OS/2, the company said. The system's price is $1,295, and an 80-pin connector lets the user add up to 4M bytes of expansion memory.

• The AOX PS/2 processor upgrade card from AOX, Inc. in Waltham, Mass. The card is designed to work with the PS/2 line to upgrade it to the 80386 microprocessor. The card for the 80286-based PS/2 models will be available in 16-, 20- and 25-MHz versions, providing two to four times the performance of the PS/2 Models 50 and 60. Prices have not been set.

• Norcross, Ga.-based Quadram Corp.'s JT Fax PS/Q, a PC facsimile board reportedly compatible with the PS/2 Micro Channel. The board is said to turn a PS/2 Model 50, 60 or 80 or fully Micro Channel-compatible computer into a Group III-compatible facsimile machine. It is scheduled to be available in the third quarter and will be priced at less than $600.

• Graphics terminals from C. Itoh Electronics, Inc. in Irvine, Calif. Digital Equipment Corp.-compatible graphics terminals, the CIT334 and CIT344, are monochrome and color graphics terminals compatible with DEC's VT330 and VT340. The units include emulation of DEC's Sessions Support Utility features, which allow two separate sessions from one VAX to communicate over one port.

Users' choice in networking

ATLANTA — Users at next week's Comdex/Spring '88 can expect to find communications products that run the gamut from modems and communications links to desktop messaging systems and 10M-bit Ethernet over twisted-pair wire.

Among the scheduled introductions are the following:

• Localnet Communications will announce its D-Link local-area network twisted-pair and Ethernet communications line. D-Link Ethernet, an adapter card for IBM Personal Computers, PC XTs, ATs, Personal System/2s and compatibles, will reportedly provide connection to an Ethernet IEEE 802.3 industry-standard, 10M bit/sec. baseband LAN. The product uses very large-scale integration technology and will provide 100% compatibility with the Novell, Inc. Ethernet card. D-Link Ethernet costs $369.

A D-Link Ethernet DE-001 card for IBM PC XTs and ATs will also be introduced. The card reportedly shows an I/O throughput of 248.45K bit/sec. and is also available in a configuration for the PS/2. Prices will be $369 for the DE-001 and $469 for the D-001/2.

• A PC-based desktop messaging product will be introduced by Hyundai Electronics America. The Super-16CS is based on Hyundai's Super-16T XT-Turbo and bundled with voice-messaging functions and an integrated software package, Office Works from Alpha Software. The software requires 192K bytes of random-access memory. The half-size system card will operate in the PC terminal diskless workstation called PC Terminal and the Hyundai Super-286C AT-compatible. Total system price, including software, is less than $1,400 for a dual-floppy system.

• White Crane Systems, Inc. is slated to release Version 2.0 of Brooklyn Bridge, a utility for moving data between IBM and compatible microcomputers. It offers a dual-directory display file manager and includes four DOS utilities, as well as device drivers said to require one-tenth the memory needed in other file-transfer systems. The product can access printers, plotters, tape backup systems and other peripheral devices. Version 2.0 costs $139.95 for IBM PC compatibles and the Data General Corp. One Laptop. A special version for the Victor 9000 costs $199.

• An internal 9.6K bit/sec. V.32 modem card for the IBM PC is slated to be announced by Universal Data Systems. The Sync-Up V.32 promises full-duplex 9.6K bit/sec. operation through the use of an echo cancellation technique as well as a trellis-coded error-correction scheme. Both asynchronous and synchronous autodialers are available, and the product includes built-in diagnostics and software-selectable configuration settings. Single-unit prices begin at $1,295.

• Triton Technologies, Inc. will announce Co/Session Version 3.0, which allows two PCs to work together as one or one PC to control another remotely. The list price for a two-user license is $249.

Check desk top for printers

ATLANTA — Desktop publishing capabilities are heating up the competition in the laser and impact printer fields. This year's Comdex/Spring '88 show, being held here next week, will showcase a slew of impact and nonimpact printers as well as image scanners.

• C. Itoh Electronics, Inc. will announce several additions to its current product line. Through a joint OEM agreement, Talaris Systems, Inc. and C. Itoh will offer Digital Equipment Corp. LN03 emulation capabilities on C. Itoh's Megaserve ion-deposition printers. The nonimpact 30 and 45 page/min printers will be marketed directly against the DEC Printserver 40 and will be available in the fourth quarter. Prices will range from $21,995 to $29,995.

C. Itoh's 5 page/min Jet-Setter II laser printer offers Hewlett-Packard Co. Laserjet II emulation and improved font handling and manipulation. The product will include six resident fonts and cost $2,195, excluding options.

The Prowriter C-310 and the wide-carriage C-315XP 300 dot/in. matrix printers have been upgraded to include Epson America, Inc.'s FX-86E or FX-286E, respectively. Both products will offer IBM Proprinter XL emulation. The C-310 and the C-315XP will cost $699 and $899, respectively.

• Ricoh Corp. will introduce the RS320 desktop scanner, which will be targeted at desktop publishing, PC and facsimile communications, computer-aided design and optical character recognition (OCR). The flatbed model is said to be capable of scanning at resolutions ranging from 60 to 360 dot/in. The unit has a bidirectional Centronics Data Computer Corp. interface and will have a suggested retail price of $1,100.

• Chinon America, Inc.'s Information Equipment Division will introduce the Deskscan 2000 overhead image scanner. It will be available in three desktop publishing versions and will include an OCR configuration. It will also come with a new Chinon facsimile package, called Scanfax. Prices range from $659 to $995.

• Acer Technologies Corp.'s LP-76 will debut. The laser printer is an HP Laserjet II series compatible, prints 6 page/min and delivers up to 300 by 300 dot/in. graphics resolution with optional memory, the company said. The LP-76 will come standard with 512K bytes of memory, expandable to 4.5M bytes. The Acer LP-76 costs $2,000.

• Data Technology Corp. reconfigured its Crystalprint Series II page printer to include HP Laserjet II emulation. The Crystalprint Series II was designed for single-user desktop printing and high-resolution graphics applications. It prints at 6 page/min, features 300 by 300 dot/in. resolution and costs $1,999.

• Amstrad, Inc. will add three PC-compatible dot matrix printers to its product line. All three are industry standard, with dual parallel and serial interfaces.

The Amstrad, Inc. LQ5000DI 24-pin printer offers a 15-in. cartridge and prints at speeds of up to 289 char./sec. The LQ3500DI 24-pin printer will offer draft-quality output at 160 char./sec. and letter-quality text and graphics at 54 char./sec. A front-loading flatbed printer, the LQ3000DI, was designed specifically for labels, card stock and envelopes at speeds of up to 160 char./sec. Pricing information was not available.

Who'll be there

Comdex/Spring attendance is still dominated by those involved in resale channels, according to a breakdown of last year's attendee

INFORMATION PROVIDED BY THE INTERFACE GROUP, INC.
CW CHART

No need to look here for OS/2

ATLANTA — Users at next week's Comdex/Spring '88 will see plenty of DOS packages that will run in the compatibility box of IBM and Microsoft Corp.'s OS/2 but will be hard-pressed to find anything that is written specifically for the new operating system.

Most software vendors were tight-lipped last week about products they will be announcing at the show. Products scheduled to be introduced include the following:

• Toltran Ltd. in Barrington, Ill., is readying an artificial intelligence-based language translator and conversion software package for microcomputer users.

The Toltran System was designed so that vocabulary can be adapted to any specialized field, including the medicine, engineering, education, technical and military professions. Information is translated from English into a required language and back into English, and the developers maintain that words are analyzed singly and in context to determine the appropriate meaning.

The system runs on any dual-floppy IBM Personal Computer or compatible, and a version is slated to be available for Apple Computer, Inc. products. Pricing has not yet been made available.

• Micro Services, Inc. in Washington, D.C., will be introducing an add-on report writer for the Service Trac Productivity Management System. The report writer is said to allow users to export files to other data formats and to design their own custom reports.

The software runs under IBM's PC-DOS or Microsoft's MS-DOS and costs $1,295 for the single-user version. A network version is available for $2,595.

• Harvey is expected to announce two products for use with Hewlett-Packard Co. Laserjet and compatible printers. Hot Lead, a soft-font generator and editor, retails at a price of $195.

Harvey Type is a set of soft fonts that can be loaded on any HP or compatible laser printer. Both portrait and landscape orientations are provided. The package has a price tag of $149.95.

Comdex/Spring '88 product preview was reported by senior writer Alan J. Ryan and new products writer Sally Cusack.

Clone

FROM PAGE 1

additional, proprietary Microdirect I/O bus. Microdirect is currently negotiating with IBM for Micro Channel patent licenses, said Jon H. Hardie, chairman and chief executive officer.

"With the AT and the Micro Channel on the same motherboard, the user doesn't have to choose between the two," Hardie said. "This offers a bridge between existing and next-generation technologies, without sacrificing either one."

In addition to running Microsoft Corp. MS-DOS and OS/2, the Microdirect 386 I/O Express will offer two full-size Micro Channel add-in slots and six AT bus expansion slots. It will come standard with 16M bytes of random-access memory.

"It sounds like the ultimate clone," said Peter Tiege, an industry analyst at Dataquest, Inc. in San Jose, Calif. "It's a way of straddling both standards in one machine."

In addition to being the first micro to claim compatibility with both architectures, the Microdirect 386 I/O Express incorporates discrete semiconductor logic; other compatible vendors build systems around PC AT- or Micro Channel-compatible chip sets from vendors, such as Chips and Technologies, Inc.

Microdirect developed its own discrete logic because the company wanted to ensure full compatibility in the future with IBM's OS/2 Extended Edition, according to Hardie.

"We want to be as responsive to the market as we can, and discrete logic is much more flexible than chip sets," Hardie said. "We don't yet know what compatibility to OS/2 Extended Edition will be, so it seemed foolish to freeze an emerging technology into a chip set that might be off the mark."

IBM's own logic

IBM used the more expensive discrete logic in its PC line, then switched to custom circuitry for the PS/2 series as a way of competing on price with compatible makers, according to Andrew Rappaport, president of Technology Research Group, Inc., a consulting firm in Boston. The vast majority of compatible manufacturers, however, have stuck with using chip sets to keep system costs down.

Retail prices for the Microdirect 386 will begin around $6,000 and go up to $15,000 depending on the configuration, Hardie said. The firm is doing most of its own manufacturing.

Based on a 20-MHz 386, the Microdirect I/O Express bus handles only the I/O functions on the AT and Micro Channel pathways, upping throughput speed 10 times, Hardie said.

"The I/O on the PC today is the roadblock on the data freeway," Hardie said. "The CPU is fast now and capable of directly addressing CD-ROM, optical and 760M-byte hard disks in real time as random-access memory, but the I/O can only access them at about 512K byte/sec." Microdirect's proprietary I/O bus, Hardie said, offers I/O access at 5M byte/sec. via the use of a small computer systems interface.

It is unclear how users will react to a split-personality microcomputer, analysts said, especially if it does not offer strong price advantages over IBM.

"It sounds like a nice idea, but I don't really see the need for a PC with both the AT and Micro Channel bus," said Philip Gordon, manager of office systems at Charles Schwab & Co. in San Francisco.

The Microdirect 386 comes standard with the Intel 80387 and Weitek Corp. 1167 coprocessors and interleaved memory. The system was designed to run with the 25-MHz 386 and can be upgraded by switching the CPU, Hardie said.

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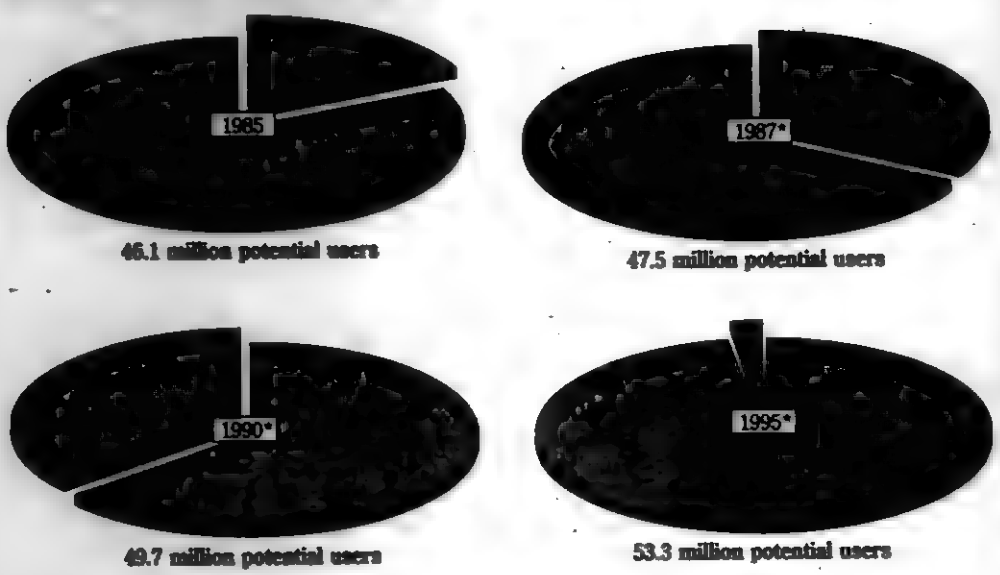
TRENDS

Electronic mail

By 1995, business use could approach the saturation point

ACTUAL USERS AS PERCENT OF POTENTIAL USERS



*Estimated

The number of people using electronic mail as a business tool will continue to grow at a rate of about 30% a year for the rest of the decade, according to "Electronic Mail & Micro Systems," published by International Resource Development, Inc. in New Canaan, Conn.

But only four of every 10 workers will have a real business need on the job for telex, facsimile, voice mail or any other computer-based messaging system, according to the newsletter's editor, Eric Arnum.

Based on recent U.S Department of Commerce statistics covering population and employment, Arnum estimates that only 46.1 million of the 107.1 million workers counted in 1985 are ever likely to use electronic mail on the job.

By 1995, assuming employment continues to grow, he predicts that about 44% of an estimated 122 million workers will use E-mail.

The newsletter also took a look at the use of various types of electronic messaging systems. Computer-based messaging systems, the most popular method today, will probably lose favor by 1995, dropping to third place.

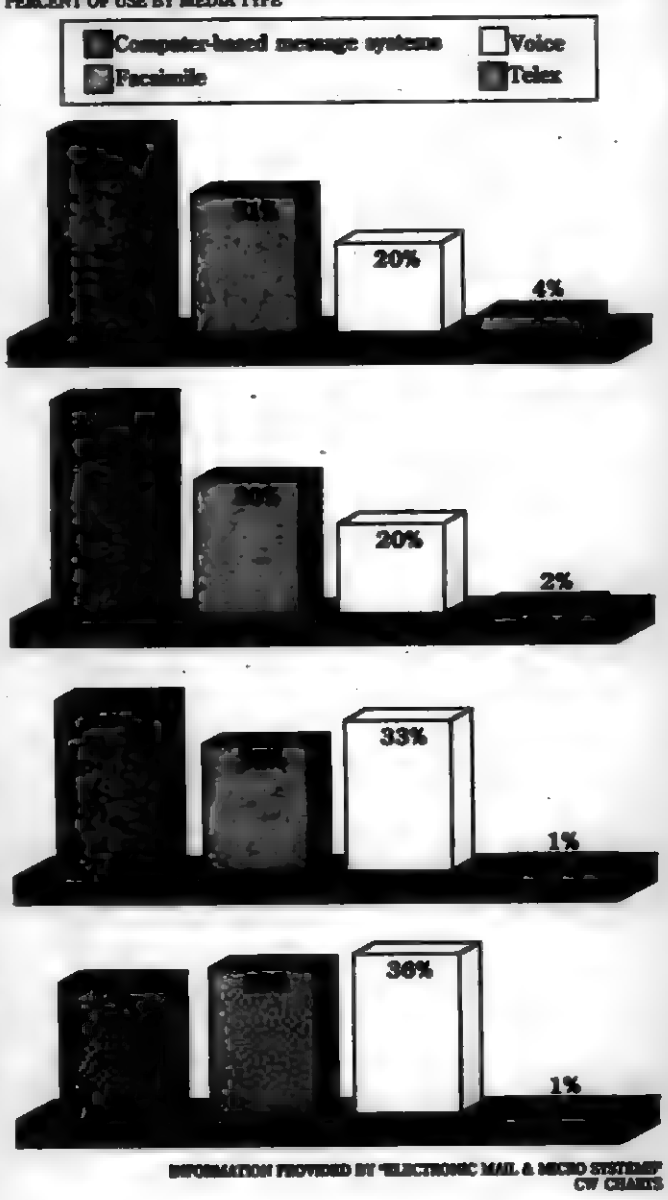
The 4.5 million facsimile users in 1987 could easily jump to 17 million by 1995, the newsletter claimed. Facsimile use is expected to pull ahead of telex and voice mail for a period, losing out to voice mail by 1990.

The voice mail market is expected to remain in the several-million-user range.

PATRICIA KEEFE

Users' media preferences should shift

PERCENT OF USE BY MEDIA TYPE



INFORMATION PROVIDED BY "ELECTRONIC MAIL & MICRO SYSTEMS"
CW CHARTS

INSIDE LINES

Step right up . . . Amdahl's three-ring circus is set for tomorrow. "In the center ring, we have a water-cooled CPU capable of 45 million instructions per second! Behind the juggling elephants awaits a universal controller ready for its own disk toss! And finally, below the trapeze artists, a humming box looking like a smaller version of IBM's 3380 J and K direct-access storage devices!" The company may not have its own big top, but that's what sources say the closely guarded Amdahl product rollout is expected to look like when the company finally lifts the canvas off its products Tuesday.

Precision me, let me code. Lotus's 1-2-3 Release 3 may not ship until the end of this year, but that will not stop third parties from preannouncing add-ons. At a press conference hosted by Lotus today, a number of third parties are expected to explain their planned wares, which were written using Leaf, a proprietary Lotus language that gives programs broader access to 1-2-3. And for those of you who are still confused about why Lotus is introducing a new language, the company will explain the benefits, in addition to the details.

What did Fred tell the doctor, and when did he tell him? Wang has notified selected users that it will phase out its slow-selling Professional Computer, Advanced Professional Computer and Professional Image Computer. Wang will no longer sell the three micros as stand-alone systems after June 30; they will only be available as workstations in a larger system configuration.

Way to go, Ollie! In the 14 days following Col. Oliver North's testimony on his role in the Iran-Contra hearings, IBM received its largest number of orders ever for its Professional Office System, or Profs, according to Paul Heesinger, chief technical officer at Computer Task Group in Buffalo, N.Y. Profs played a role in the hearing when it was revealed that the office automation system had created copies of North's communications even while he attempted to shred the paper trail that led to his door.

Cleaning their Windows. Microsoft will announce a version of its Windows operating environment this month, sources close to the company said last week. The software will not support Intel 8088-based personal computers and will be designed to work primarily with Intel 80286-based machines. Sources said the Windows upgrade will feature a variety of new drivers, including one for the 8514 graphics chip, and enhancements for existing drivers. The new version also has a memory management scheme to better accommodate large-memory applications. Apple Computer's attempts to block the sale of Windows apparently won't slow the new package's release.

Reds on the bleeding edge. Our mole in the Kremlin tells us that not only does IBM have an office in the city of golden onion domes, but sales reps there are busily taking orders — just for Personal System/2s. Old technology just will not do for Soviet users. Actually, we're probably talking back orders, since the PS/2 may not yet be approved for shipment behind the Iron Curtain.

Although Cullinet sources dismissed it as a continually occurring rumor, the CW hot line's hottest source on that company's shake-ups of the past two months insists that $5 prevented the company from being acquired by Computer Associates. The source, who's batted 1.000 on recent management departures, says Cullinet wanted $15 a share to sell out, but Computer Associates could only justify spending $10 per share because of the expense to be incurred in paying off golden parachutes and other compensation provisions that stretch far deeper into the company than usual. Computer Associates declined to confirm or deny such a bid, but the source said Computer Associates wants to make an acquisition quickly, and Cullinet is one of three candidates. Is J. R. Ewing behind it all? Will Bobby wake up in the shower? Is Pam hiding out in the Cullinet tower? Call the hot line at 800-343O-6474, or 617-879-0700, and help News Editor Pete Bartolik unravel these cliff-hangers.

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On April 7, Sun Microsystems* introduced the world's first workstation that uses the full power of the Intel386™ computing engine.

The Sun386i.*

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The 386™ microprocessor was specifically designed to support workstations like this. With its advanced architecture, the 386 chip lets the Sun system run UNIX* and DOS applications at the same time. At full speed.

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Of course, the business benefits that Sun's workstation delivers are just as impressive. It lets users take advantage of applications running under SunOS as well as thousands of other standard UNIX and DOS software programs. As a result, Sun can offer its customers all the benefits of cutting-edge technology. With none of the risk.

So if you'd like to know how the 386 microprocessor can make the performance of your next design even more impressive, just call (800) 548-4725 and ask for Literature Dept. W447.

And we'll help you get the full power out of our Intel386™ architecture. By showing you how much we've put into it.

intel

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Based in Minneapolis, The Pillsbury Company is a diversified, international food company with a well-respected name and a distinct corporate goal: to be the best food company in the world. To achieve that goal, Pillsbury's production must respond quickly to the demands of a rapidly changing market. AMAPS software from Management Science America, Inc. helps them do that for their Totino's® brand pizzas.

"We were first attracted to AMAPS by the caliber of companies we found using the software," said Carl Wilson, Vice President of MIS for Pillsbury's U.S. Foods Division. "AMAPS had the flexibility and functionality we needed to run our plants. It also had the technological capability to interface into our overall computer-integrated manufacturing strategy."

With AMAPS, Pillsbury has achieved improvements in overall inventory reduction, management reporting, production flexibility and plant-corporate communications. Most importantly, the system has enabled Pillsbury to be more responsive to market changes.

According to Jim Shadle, Vice President-Operations, "Our information strategy is integral to our plan to be the best food company in the world. We have the systems in place now to help us achieve that."

To find out how MSA can keep your company rolling along smoothly, call Robert Carpenter at (404) 239-2000.

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Getting the message across

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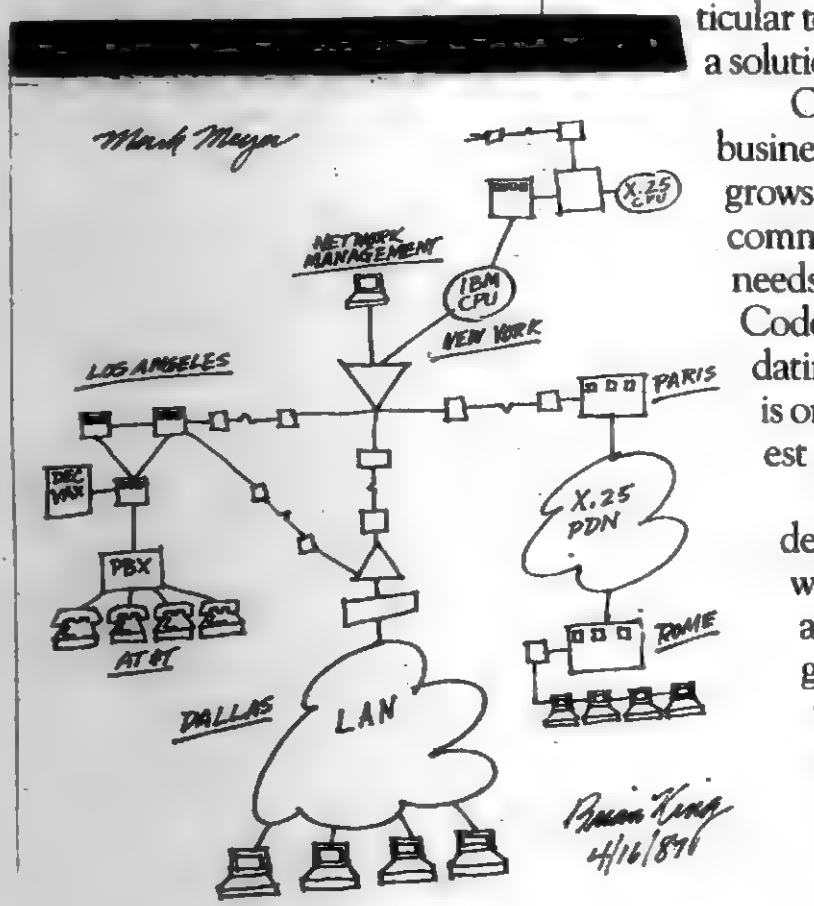
We're the largest independent networking company. Which is surprising since we've spent the past 25 years merging with AT&T, IBM and DEC.

For over 25 years, Codex has been dedicated to doing one thing well – providing networking solutions to meet any communications need.

We're not a computer company. We're not a phone company. Data communications is, and always has been, our only business. So we can maximize the performance and functionality of all the pieces of your

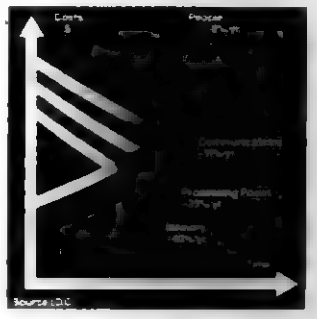


At Codex, we don't have set solutions – we work with your current environment. Which is why we spend a lot of time drawing diagrams like this.

network, regardless of which vendors they come from.

As a result, our communications solutions are perfect for multi-vendor environments.

And since our capabilities include everything from all types of transmission devices to gateways to network management systems, we're never trying to force fit a particular technology into a solution.



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in focus

THE AGONY OF EXPENSE Picture this: You have your dream network in place and running smoothly, and everyone is pleased, from top management to users. Just when you can see that bonus check in the bank, your worst fears are realized; unexpected, unbudgeted costs turn up. Read about how to avoid the hidden costs of networking. By Helen Pike. *Page 16.*

HOT ON THE HEELS OF CORPORATE SUCCESS Through its recent strategic alliances with DEC and IBM, Apple is using connectivity with the large-system vendors as its ticket to corporate MIS environments. Learn how Apple's partnerships and its third-party developers are giving the vendor credibility in the big-business world. By David Kosiur. *Page 29.*

DIPLOMATIC TIES Setting up a global network that connects a firm's headquarters in the U.S. to an outpost in another country goes beyond choosing the right equipment. Not knowing foreign customs, languages and laws can be as detrimental to a network project as installing incompatible systems. Heed this advice for international systems management. By John Highbarger. *Page 45.*

Forum or against 'em?
By Michael Tucker. The author explores whether Apollo Computer's Network Computing Forum is as selfless in its objective to combine computing and communications as it says it is. *Page 21.*

The sub-LAN subculture
By Stan Kolodziej. If 10M bit/sec. LANs are not your speed, then maybe sub-LANs are for you — small low-cost networks used primarily for peripheral sharing. *Page 27.*

Converging at a data center
By Helen Pike. The private sector is racing ahead of the federal government and its FTS 2000 system modernization plans to unite voice, data and imaging. See how. *Page 39.*

OSI's coming of age
By Harold C. Folta. With OSI celebrating its 10th anniversary, this article analyzes the standard's past and its future. *Page 47.*

Project management tips
By Ronald Kopitowsky. Having trouble keeping projects in line and under budget? Use these telecom project management techniques to help you. *Page 51.*

Go west, young companies
By Ronald Bosco and Larry Stolz. Read about a commissioned study for the state of Wyoming that holds a valuable lesson for MIS managers everywhere. *Page 55.*

Corporate clash
IBM and AT&T have made moves that point to a future battle between the two for networking dominance in U.S. corporations. Both vendors have been busy with reorganizations, product development pacts and product debuts designed to raise the stakes in the network arena. Senior Editor Stan Kolodziej scrutinizes this activity and what it means for MIS communications strategies. Page 35.

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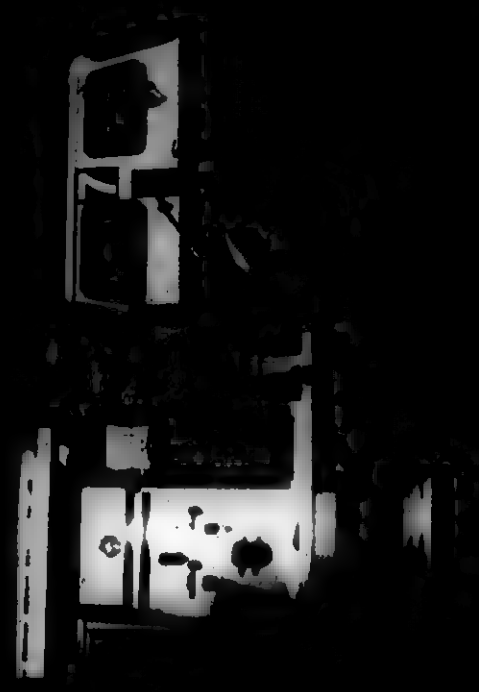
COVER BY JAMES BENNETT



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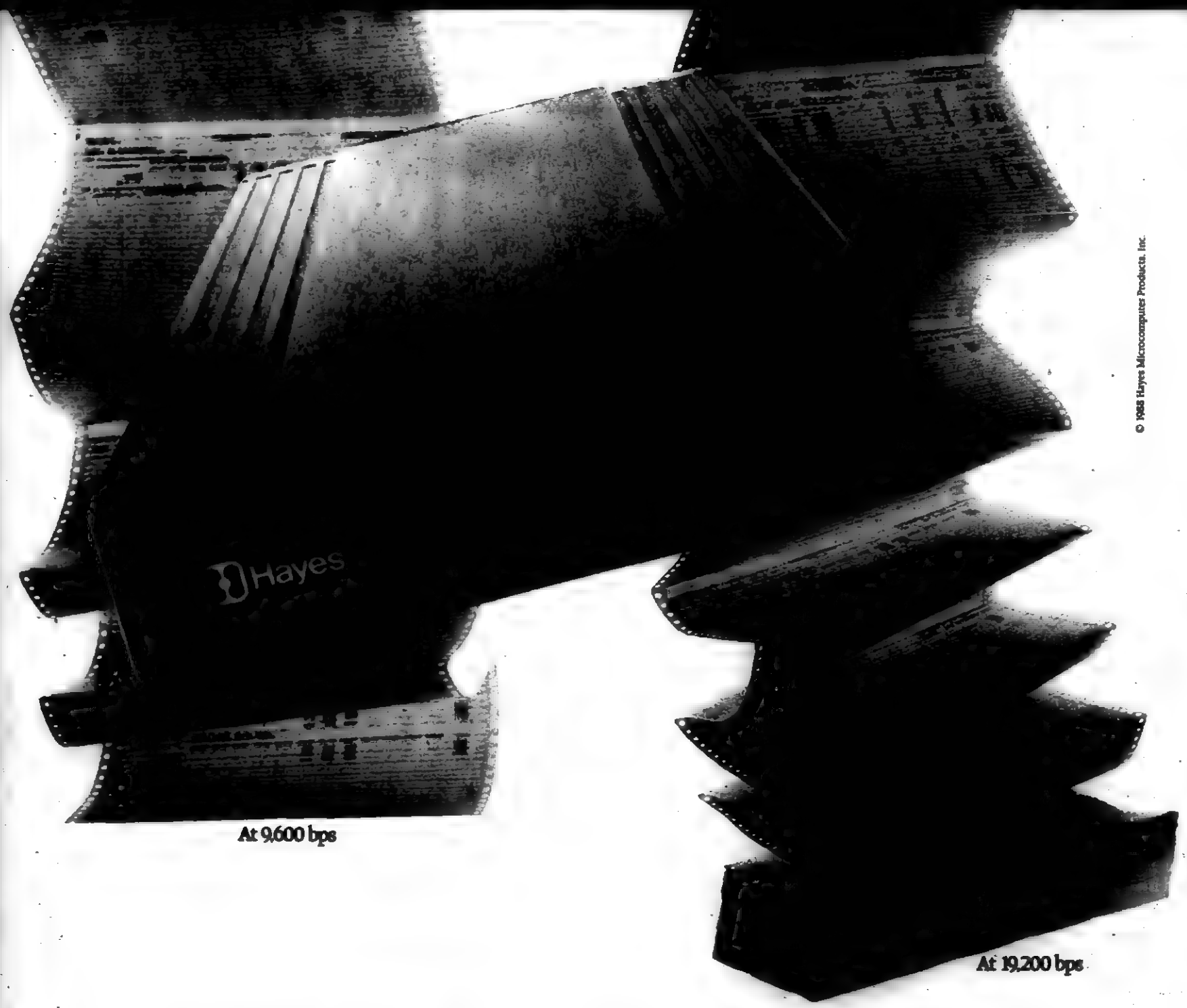

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FROM THE EDITOR

An issue of survival

Call this the Darwinian issue of *Focus*. Each time we do an issue on communications and connectivity, the writers vanish. They are overwhelmed by an immense mob of press releases from a thousand different competing vendors, each with a rival communications solution. They yammer, they slice at one another, they propose themselves as the one true answer and they portray their enemies as fit only for extinction.

There's something desperate about it, even terrible. The whole business is like evolution, but speeded up and made even more fearsome than it normally is. Here, competition is so fierce that creatures begin competing early, say, the way that some embryo spiders consume their weaker siblings while still in the egg sac. (And thus it is that today I received a press release saying that a new consortium has formed to produce a communications protocol that will be even faster than the International Standards Organization's Open Systems Interconnect, which is itself only now aborning.)

Below the mounds of press releases is the reason for the "violence." Dig a trench through the incoming mail and you'll find a layer of letters from outraged readers who've tried and tried and tried to get their suppliers to provide connectivity only to be given kludge solutions and vague assurances of a commitment to open systems at some indefinite time in the unspecified future.

Primal forces are at work. MIS managers, that is to say, you the reader, have decided that communications and connectivity are what you want. You've further decided that the supplier who cannot produce them will not be your supplier much longer.

Enter, then, into this issue of *Focus* with a certain caution. There will be *disturbing* things between its pages. You will see shadowy, nameless forms dart away into the darkness, then peer back at you with red glowing eyes. You will hear behind you the sound of the piercing cries of some hunted thing captured and eaten in the night.

Fear not. It is only natural selection at work.

Michael Tucker

FEATURES EDITOR

LAN products available to make a formidable task less daunting

While many computer users are convinced that connectivity can increase productivity dramatically, networking personal computers is a formidable task for most end users. Fortunately, there are many price-competitive local-area networks today that can provide users with considerable value.

Two critical issues need to be addressed for any network system purchase: first, the hardware and software that will perform the required tasks; and second, the cost of maintenance and training because a new set of rules has to be followed.

The cost of a system usually includes not only the original purchase price but also the costs of software and installation. Networking software, compared with single-user software, is in very limited supply in most application areas. It is also difficult to project future needs when planning for purchases. For example, what size network should be purchased? And what are the needs one year or two years from now?

However, the greatest surprise could be the unpredictable costs of training and maintenance. A very sophisticated network security system has both pros and cons. Forgetting a password could be very costly. Proper maintenance could require a costly specialist.

Yet another issue could haunt a lot of users of small networks (three to 15 users). If the network does not perform as desired, it may be impossible to go back to the original PC configuration prior to the network because of the cost involved.

Fortunately, there are several excellent low-cost LANs on the market that can make networking a pleasure. They are easily expandable, can be reversed, require little or no training and are very affordable.

Christopher Leong
President
Trans-M Corp.
Medfield, Mass.

CASE tools: They're not just for programmers anymore

I write to correct the statement of who best uses computer-aided software engineering (CASE) in George Schussel's "Application Development: Tools of the Trade" in the Feb. 3 issue of *Computerworld Focus*.

Mr. Schussel writes, "CASE tools were designed to be used by the professional programmer. . . ."

Our experience with implementing CASE in data processing suggests that *analyst*/programmers use the tool best. Some of our best CASE users have had little or no first-, second- or third-generation programming experience.

Provided that one restricts the definition of CASE to those tools that provide significant automation throughout the "waterfall" systems development life cycle, the skills required of a user are as much or more those of representing the structure of a customer's business policies than those of specifying the procedures by which they are implemented.

Susanne Niedzielski
CASE Project Manager
The Travelers Cos.
Hartford, Conn.
Continued on page 10

news & analysis

UPDATE

DEC's OLTP strategy unfolds

Like the rising hemlines in the fashion industry, Digital Equipment Corp. is showing more of its on-line transaction processing (OLTP) strategy.

First there was the project code-named Polar Star in March, a four-processor configuration and the first citing of the company's symmetrical processing direction.

Then in April came Project Calypso, a new VAX line numbered 6200. It is a four-box family, graded from one to four processors and covering from 3 to 12 million instructions per second. It comes with VMS 5.0, a VMS version with built-in hooks that will further accommodate transactional processing. VMS 5.0 comes with a new contract under which customers can get a VMS cluster license instead of a per-machine license.

And later this month or in June, DEC is expected to unveil a high-end transaction processing monitor that will act as a front-end for OLTP applications. The company is also expected to announce a package that combines for the first time its forms and terminal management features.

DEC offers WORM-based optical disk storage system

To help handle fast-growing bits of financial information and other data, Digital Equipment in April introduced an optical disk storage system designed in a joint development. The system uses a 2G-byte write-once read-many, or WORM, disk drive. Among Digital's competitors in this area are Wang Laboratories, Inc., with its Wang Integrated Image System, also known as WIIS, that uses digital scanners and optical storage devices.

A funny thing happened on the way to ISDN

On the way to getting greater acceptance for the Integrated Services Digital Network (ISDN), the National Bureau of Standards (NBS) and seven other organizations signed a charter in February forming the North American ISDN Users (NIU) Forum. The group will promote the development and implementation of standard interoperable products for ISDN.

The NIU-Forum will work with established standards and testing organizations and with the NBS Workshop for Implementors of International Standards Organization (ISO) Open Systems Interconnect (OSI) to develop implementation agreements.

The other founding organizations are Ameritech, the Association of Data Communications Users (ADCU), Bell Atlantic Corp. (BAC), Bell Communications Research Corp. (Bellcore), International Computers Ltd. (ICL), New York-New England Corp. (Nynex) and Southwestern Bell Telephone (SWBT).

How's that for alphabet soup?

Memory chip shortage expected to ease by summer

Wondering how much longer before the wait is over for those new micros and workstations you ordered?

The Computer and Business Equipment Manufacturers Association (CBEMA) in Washington, D.C., is hopeful that by early summer memory chips will once again be plentiful and computer makers will be able to ramp up their production lines to fill orders, according to Charlotte LeGates, CBEMA's communications director.

"It's a slowdown, though not a stoppage, of manufacturing various product lines," LeGates observed in March. Hardest hit during the last two quarters were makers of self-contained workstations, like those from Sun Microsystems, Inc., and memory-heavy personal computers, like the Macintosh II from Apple Computer, Inc., she said. Right now, "delays between purchase and installation are manageable but not ideal."

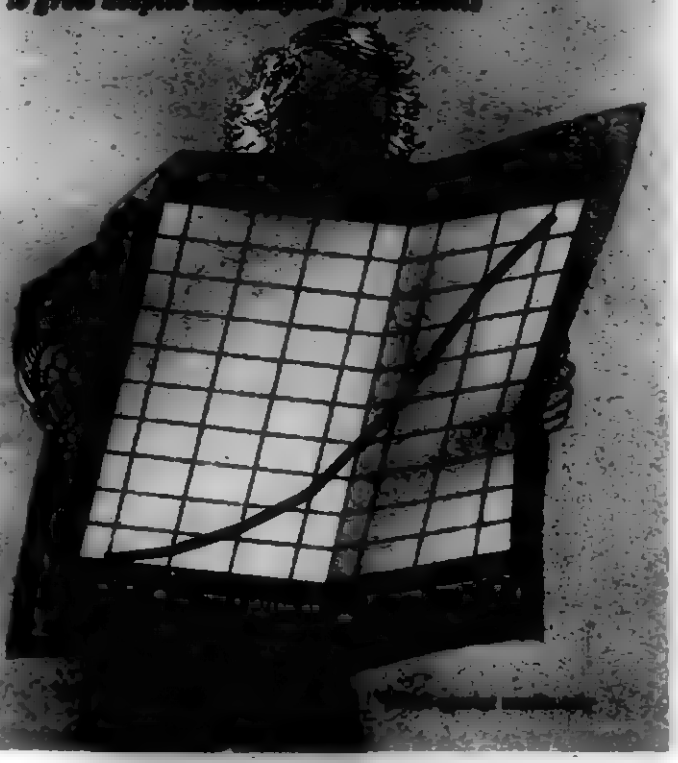
PC and workstation manufacturers also have noticed a trend by their customers to overorder as compensation for fewer computers, she said. "The market's a little confused."

Some of the blame for the memory chip shortage is laid on a

Continued on page 13

'The reports of my death are greatly exaggerated'

The number of U.S. TCP/IP vendors continues to grow despite doomsayers' predictions



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GRAPHIC BY BRUCE SANDERS

Apple suit may be a covert strike at rivals

On March 17, Apple Computer, Inc. served up a very unwelcome St. Patrick's Day gift to Microsoft Corp. and Hewlett-Packard Co. In a suit claiming unfair business practices, Apple said that Microsoft's Windows 2.03 and HP's New Wave interface, which is based on Windows, improperly reproduce the look and feel of the Apple Macintosh interface.

The suit may be important in the history of commercial software on several levels, including that of connectivity.

At its simplest, the suit continues the ongoing legal controversy regarding the look-and-feel issue. Increasingly, the courts are being asked to decide whether the appearance of a program can be copyrighted. Apple's suit describes the Mac interface as a literary work, subject to the same copyright protection afforded a novel or a play.

The defendants in the case have not exactly rejected that argument — they, too, have software products that may someday have to be protected on the same grounds. However, they have disputed the idea that the Macintosh's interface is unique enough to be defended as such.

They say that the use of icons, words, pictures and the like is public domain, either because they are naturally part of the

Continued on page 10

User input in the standards-making process is not what it should be. Page 10.

The reasons may vary, but the choice is the same.

Users cry for standards but don't get involved

For years, users have been screaming at vendors and standards groups to sit down, unravel the mess that a decade of incompatible, proprietary networking products has wrought and agree on standards that will help get multivendor computer networking into full gear.

Plenty of standards committees and work groups have been formed, well-represented by network vendors but sparsely attended by users. It seems that the people who have been pressing the most for standards do not sit down and help iron out differences that will directly affect their own networking.

Take the recent deliberations of the IEEE 802.3 work group on 10M bit/sec. Ethernet over twisted-pair wire, also known as the 10BaseT group. 10BaseT, which has just passed one of its standards proposals through the scrutiny of the Institute of Electrical and Electronics Engineers, Inc. (IEEE) and received the go-ahead to form a task force to push through an agreeable standard as soon as possible, has almost 30 companies represented in its membership.

Of that group, there are no members present that could be classified as true users. All are companies with "vested product interests," says Fred Sammartino, headquarters marketing manager at David Systems, Inc., a Sunnyvale, Calif., network vendor and member of 10BaseT.

"We were disappointed that there weren't more users on board," Sammartino says. "It would have given more balance to the proceedings."

And it is not that users cannot attend such standards meetings.

"We [the IEEE] don't have any organizational policies that bar individual users from attending and participating in these standards meetings," explains Don Loughry, the standards manager for the Information Networks Group at Hewlett-Packard Co. and the chairman of 802.3 proceedings at IEEE. "There are just not enough users who want to attend."

Too many out there

Part of the problem may be that there are too many standards groups working in too many areas, according to Pat Thaler, a development engineer for local-area network standards at HP and chairwoman of the 10BaseT task force.

"Users seem to become more involved in National Bureau of Standards-type forums, where the issues are broader based. What we're dealing with here [10BaseT] is one of the sublayers of the seven-layer [International Standards Organization (ISO) Open Systems Interconnect] networking model. Another problem is that such committee work is probably not advertised enough," she says.

A result of most committees being vendor-heavy, Loughry says, is that many standards groups wind up dwelling on small connectivity concerns instead of the big picture.

"The big issues are not part of it," Loughry says. "These types of groups would have to be able to take many such details and broaden them into how they will affect their networking overall in the future. That's very difficult."

Even so, the lack of such participation by users is considered regrettable by Loughry and Sammartino.

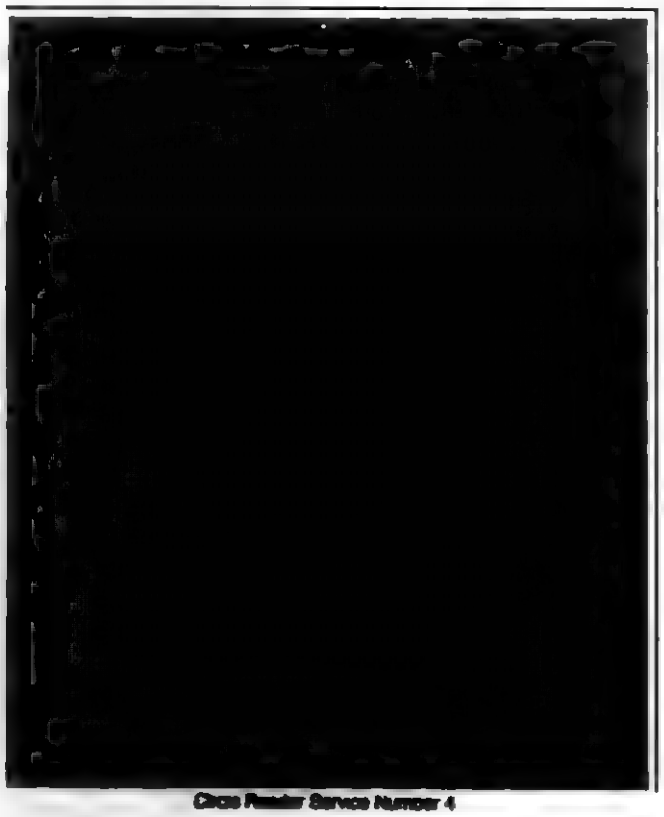
"The 10BaseT work is at the bottom of ISO layer considerations, but it is very important because it will pave the way for users to handle high-volume high-speed Ethernet networking using their on-site unshielded twisted-pair wiring," Sammartino explains. "It will make networking more flexible and cut costs. That's a big impact."

The absence of user input also lets important standards deliberations fall victim to the political maneuverings of contending vendors, whose jockeying for strength using products designed on their own standards proposals can delay the entire process, in turn delaying the benefits such standards would bring to end users.

For example, despite suspicions from some 10BaseT members that Digital Equipment Corp. intentionally delayed the presentation of its 10BaseT proposal (which was ultimately rejected), Thaler says that 10BaseT work goes through much faster and without the kinds of stall tactics that can plague other groups.

"I've seen attendees [at other groups] wait until the last minute to make suggestions, knowing it would be too late to counter," Thaler explains. "I've seen members introduce bogus items into objection lists, and I've heard people delay by talking about politics or about anything but the business at hand. There are a million ways to slow things down."

A case in point is the current IEEE work on creating a fiber optics/Ethernet standard. Several vendors are so deadlocked on this standards issue that it has delayed any meaningful work for more than two years, insiders say. And apparently, there is no letup in sight. — SK



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Apple suit

Continued from page 6

way people relate to computers or because all computer vendors have been using similar approaches to graphically based interfaces for so long that no one can claim ownership of the idea.

Indeed, one of the more curious aspects of Apple's suit is that the concepts being defended have been around awhile. The official complaint lists 13 "audiovisual works" that the defendants may have infringed upon. Of these, six are described as being derived from the ill-fated Apple Lisa computer, the machine that predated the Mac in the early 1980s and on which most of the original Mac interface was developed.

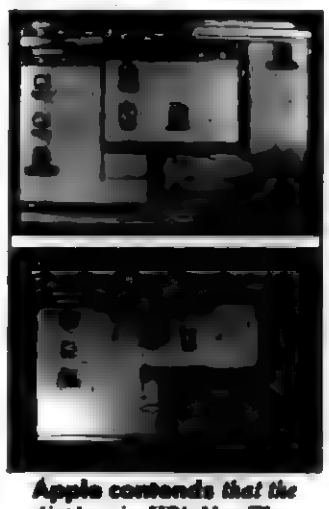
Moreover, Apple's own interface products can be traced directly back to older technologies such as those developed by Xerox Corp. during the late 1970s.

Deeper into the problem, though, is the suit's relationship to the rivalry between Apple and its competitors. After it was announced, the suit was widely interpreted as being basically unrelated to the look-and-feel controversy. Rather, it was seen as a covert strike at IBM, which has long been known to include Microsoft's Windows as a key part of its plans for personal computing. In fact, it has been said that Windows is part of IBM's larger goal to link its Personal Computers and Personal System/2s to larger IBM systems. If Apple could somehow make it difficult to use Windows as the desktop extension of IBM's Systems Application Architecture, then IBM might have to rethink part of its connectivity strategy.

Other observers have, however, suggested that the real target may be Microsoft. One Apple software developer, who asked not to be named, claimed, "I'm not worried about [the suit] affecting me. I think this is between Apple and Microsoft. You have to remember, there's been bad blood between those two for years. It used to be that they [Microsoft] could jerk Apple around, because they were the only people who wrote stuff for the Mac. Now that's not true. And Apple's looking to settle up."

Whatever the underlying motivation for the suit, it fits in with a larger pattern of Apple's history. The company has a cyclical history of swinging in and out of proprietary architectures and software.

For instance, in its early days, Apple was a very open company. Its Apple IIe was an almost completely open box, just as the IBM Personal Computer was to be later on. And just as the PC would be, the IIe became widely copied. Apple learned what IBM was to discover later — that it is not easy to make a profit with completely open systems.



Apple contends *that the displays in HP's New Wave program (top) are substantially similar to Apple's copyrighted Mac displays (bottom).*

Then, beginning with the Lisa and finishing with the first Macintoshes in the middle 1980s, Apple swung into a completely closed architecture and watched the world adopt Microsoft MS-DOS machines as a standard.

Now, perhaps, Apple is taking a middle course. Last year, Apple introduced a new generation of Macintoshes that are fairly open in terms of hardware and applications software. But with this suit, Apple may be serving notice that there are still areas in the systems' software that the company plans to keep for its own. — MT

Letters

Continued from page 5

A dark horse in PC operating system race

Michael Tucker displays a great deal of insight when he writes in the February issue: "Unix isn't alone. There are a lot of other multiuser, multitasking operating systems out there." However, the field of competitors that "now have a shot at riding micros into MIS" is wider than he appears to be aware.

In particular, the QNX operating system from Quantum Software Systems Ltd., with more than 35,000 installations worldwide, cannot be overlooked as a strong contender.

QNX is a multiuser, multitasking system, providing 150 concurrent tasks in protected mode and 64 concurrent tasks in real mode. It also supports up to 32 serial ports and files up to one terabyte in size.

QNX may be the dark horse in the current race to set an operating system standard for personal computers.

Jan Schouten
Quantum Software Systems, Ltd.
Kanata, Ont., Canada

You *can* judge a book by its cover

I am a dedicated reader of *Computerworld Focus*. I find your magazine to be a valuable source of information. Upon receiving the Feb. 3 issue, I found the front cover to be very original. My compliments to all at *Focus*.

Jose E. Mawis
One Pace Plaza
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The long arm of the law

New breed of lawyer specializes in telecom

Slowly but surely and for better or worse, the rule of law is coming to the telecom and datacom worlds.

Today, the most powerful jurist in the U.S. may be District Judge Harold Greene, the federal judge whose role in interpreting the Modified Final Judgment concerning the activities of the regional Bell holding companies makes him a regulatory commission in his own right. He has the power to tell the holding companies what they can and cannot do. In his most recent decision on March 7, Greene allowed the holding companies to market voice mail and gateways to information services.

He barred them, however, from directly offering information services themselves. They cannot, for instance, acquire on-line data bases and sell them. They also cannot offer on-line Yellow Pages-type directories.

Greene's power over the regional Bell holding companies has become the subject of considerable debate in the industry. Analysts and industry insiders ask whether it is fair or just to turn over such power to an individual who is not a technologist. (See "Greene in Judgment," *Computerworld Focus*, Jan. 6.)

Defenders of the current system, however, say there are few alternatives. The whole communications industry is so new that more traditional legal mechanisms are not well equipped to deal with it. Few lawyers are familiar with the issues within telecom and datacom, and few precedents exist to assist judges in making decisions.

The situation is, however, beginning to change. A few pioneering schools have established programs expressly for lawyers in the communications field. California Western School of Law in San Diego is one of the first. Its communications program was established nearly two years ago as a result of a grant from the Al Simon Foundation. (The late Al Simon was deeply involved in the communications industry. He frequently found that, although he was not a lawyer, he had to argue his own cases in court because no lawyers had the training to do it for him.)

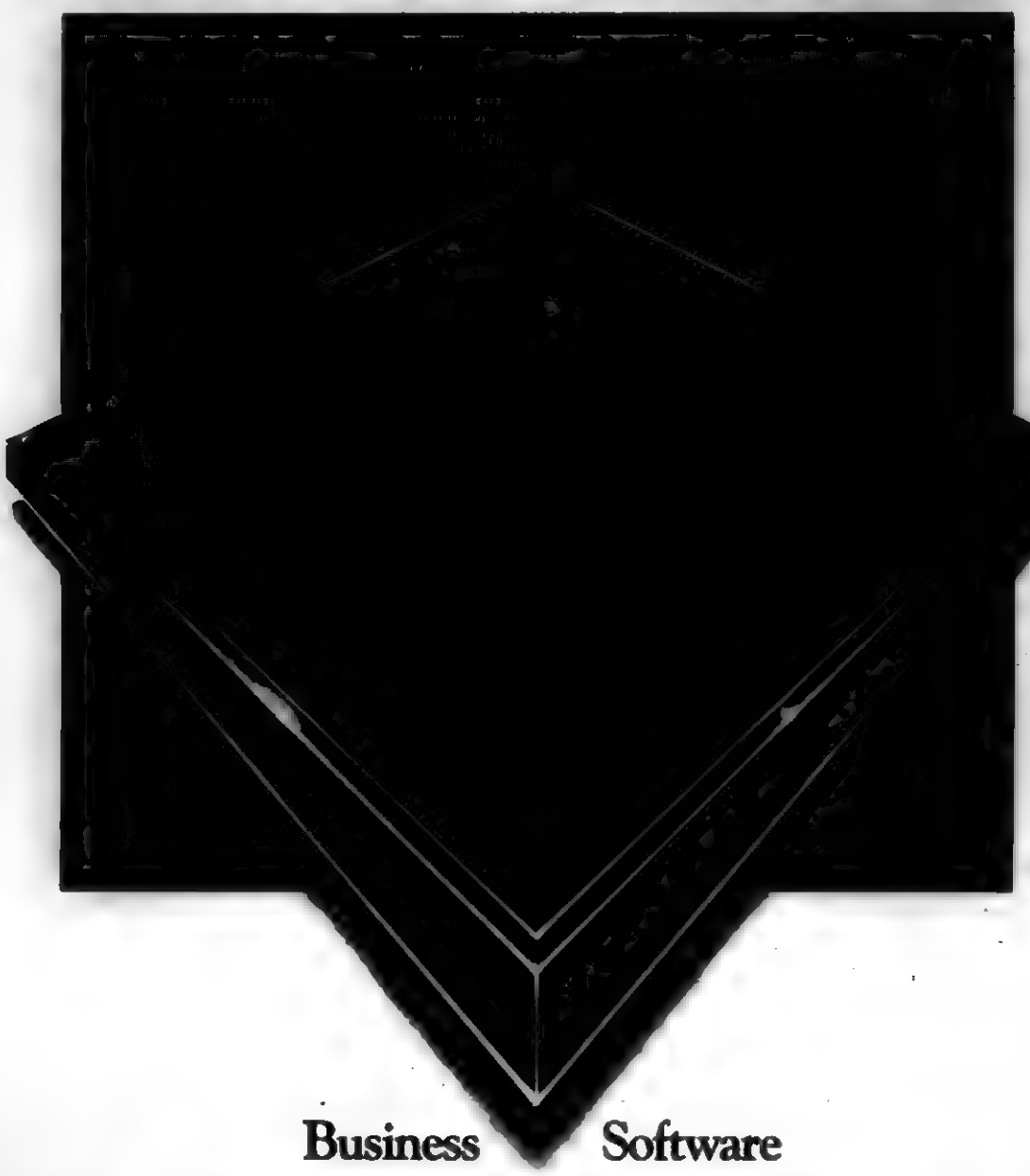
Similar programs exist at Wayne State University in Detroit and Georgetown University in Washington, D.C., among others.

From exotic to standard

While it may be some time before graduates of these programs will be in a position to significantly impact the course of telecom regulation in the U.S., at least the existence of a trained body of specialists in the field means that communications law will eventually be more standardized. Exotic situations in which a single jurist is asked to chart as-yet-unexplored legal territory will be less common.

Indeed, Greene himself participated in this process in March when he acted as a judge at the first-ever National Telecommunications Moot Court, sponsored by California Western and won by a Wayne State team. A moot court is a competition in which teams of law students are presented with a hypothetical case and are asked to argue it before a panel of real judges. The winning team is the one with the most convincing argument.

Moot courts are a common fixture of law schools, but there have been none specifically targeted at the communications industry until California Western's competition. In it, the moot court presented students with a situation in which a regional telephone company wished to introduce certain technological innovations that would improve service for its customers but that also violated restrictions on the company's ability to compete in certain markets. — MT



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dB

By Rich Tennant

June event to showcase OSI-based solutions

Don't jump to the next story. Don't turn the page. The companies involved in pushing the Manufacturing Automation Protocol (MAP) and the Technical and Office Protocol (TOP) insist that next month, you will finally see the first standardized products that open up the way for communications compatibility within the International Standards Organization's (ISO) Open Systems Interconnect (OSI). The debut for these products is set for the Enterprise Networking Event '88 International conference June 5 to 9 at the Baltimore Convention Center.

But if you are in MIS, why should you care?

Because of the cost-effectiveness that can be gained from integrating voice and data, according to Anthony Materna, director of data integration systems in the Technical Services Operations of TRW, Inc.'s Information Systems Group in Long Beach, Calif. Traditionally, users have been sensitive to costs, Materna observes, while MIS has served as an overhead organization that distributes costs.

But the argument that relates integrated data and voice communications to better cost management is one that is gaining momentum, particularly in industrial companies. Fortuitously, this trend coincides with the OSI standard looming on the horizon.

Final approval for MAP 3.0 is expected in July from the ISO. Among Release 3.0's features are support for network management and directory services, file transfer and access management capabilities, manufacturing messaging services and an enhanced-performance architecture.

As Materna sees it, the MAP/TOP push will make communications interfaces a standard installation in much the same way that modems are for workstations. So far, the drive for MAP Release 3.0 has produced test tools and a few applications that meet the OSI criteria. To see is to believe, and users can see for themselves in Baltimore.

The conference is sponsored by the Corporation for Open Systems and the U.S. MAP/TOP Users Group and is produced and managed by the Society of Manufacturing Engineers. — HP

Update

Continued from page 6

1986 U.S.-Japan trade pact aimed at getting Japanese chip makers to stop dumping their excess semiconductors on the American market at below-market prices.

Now, according to U.S computer manufacturers, there aren't enough chips to go around. The Semiconductor Industry Association, however, contends the shortage is caused by a rising demand for chips and a changeover to a new generation of technology.

According to CBEMA's LeGates, if the shortage of memory chips continues, then "customers could switch to other vendors, to a foreign company instead of an American one. [However], we are opposed to a move to further sanction the Japanese."

In a related move, IBM confirmed last month it has supplied some of its competitors with state-of-the-art computer chips during the last two years. Big Blue maintains it did so to test its own semiconductor designs against those of its Japanese counterparts.

Digital Equipment Corp., Unisys Corp. and NCR Corp. are among the organizations that IBM approached. Clyde Prestowitz, the former chief trade negotiator for the U.S. Department of Commerce, wrote that IBM had offered to supply semiconductors to Digital in order to prevent the U.S. "from falling even further into Japanese hands."

Prestowitz penned his point of view in his recently released book, *Trading Place: How We Allowed Japan to Take the Lead.*

IBM disputes Prestowitz's comments regarding the company's motives.

Token-ring shipments to catch Ethernet by 1990

More American-made token rings are finding their way into the world. Estimates from International Data Corp. (IDC) in Framingham, Mass., project that worldwide token-ring shipments from U.S. vendors should even up the score with Ethernet shipments by 1990 with a 45%-45% split. (The remaining 10% falls under the category of "other.")

This year, IDC expects worldwide shipments to be 15% for token rings and 75% for Ethernet; but by 1993, those percentages are expected to flip-flop.

It will take a little while for token-ring shipments to impact the installed base of networks though, according to Doug Gold, a senior analyst for local-area networks at IDC. Of the 1.5 million networks in existence, 90% of them are Ethernet, 8% of them are Arcnet and 2% are token ring, he says.

IBM, which introduced its Token-Ring in 1986, has an installed base of 12,000 Token-Ring networks so far, according to Gold. As the company starts to sell more of its Token-Ring networks, the overall market for the technology will increase, he adds.

AT&T, IBM appear to be switching computer roles

IBM plunked down spare change to buy the Pactel Spectrum Services unit of Pacific Telesis Group in San Francisco. Pactel Spectrum provides equipment and diagnostic services used to manage the voice and data transmissions of non-IBM Systems Network Architecture devices.

IBM says it plans to integrate Pactel Spectrum's diagnostic capabilities into its Netview software.

The acquisition represents the second telecommunications-related purchase made by Big Blue in its bid to remain competitive against AT&T, which, conversely, has been moving into the computer business in a big way. In 1984, IBM bought Rolm Corp.

AT&T, meanwhile, opened its wallet to buy Tridom Corp., a maker of satellite-based data communications equipment located in Marietta, Ga. The purchase of Tridom by AT&T requires the approval of the Federal Communications Commission.

DEC readies integrated voice/data wares for the fall

Digital Equipment Corp. is readying its first computer-integrated telephony (CIT) products for later this fall, likely to be unveiled at Decworld '88 in early September.

CIT technology promises to provide common interfaces for the exchange of information between computer hosts and telecommunications equipment, particularly private branch exchanges.

"We're looking at voice and computer integration as a solution, not as another technology," explains Jim Cox, CIT marketing manager of DEC's Network Communications Group in Merrimack, N.H. Digital's solution is essentially a link between, for example, a DEC VAX terminal using the company's menu-driven All-In-1 office software package and a digital switch.

According to Cox, the integration will take place in the seventh level of the International Standards Organization's Open Systems Interconnect (OSI) standard.

Layer 7 of OSI is known as the applications layer and it contains functions for such services such as file transfer, remote file access and virtual terminals.

The CIT program represents a four-year effort in which Digital involved British Telecommunications PLC and Northern Telecom, Inc., among others, in its strategy to come up with a total network management facility that uses voice and data switches to local-area networks.

Products are expected to be compatible with local- and wide-area networks and eventually should accommodate the Integrated Services Digital Network (ISDN). Cox, who has been involved in the telecommunications industry since 1965, sees ISDN opening the way for video applications sometime in the mid-1990s.

The integration of voice, data and video "is strongly linked to the global availability of ISDN," he adds.

Worldwide summit of stock execs under consideration

A possible worldwide summit of stock exchange executives, including MIS and telecommunications managers, is under consideration by U.S. Rep. Edward Markey (D-Mass.), the congressman who chairs the increasingly important House Subcommittee on Telecommunications and Finance.

Markey had already chaired hearings on the globalization of the securities market before the October stock market plunge.

Markey continues to take testimony on general issues involving stock market reform and telecommunications technology and is expected to launch a hearing devoted just to global issues. — HP

MANAGER'S CORNER

Backlogs brought to the forefront

Jim Young

One of the nice things about new technology is that, occasionally, it can eliminate outdated ideas and break the logjam of outmoded tradition. For instance, fourth-generation languages finally obviated the need for program flow charts long after many felt this practice had outlived its usefulness. In a similar nudge, personal computers, departmental computing and other alternate computing methods have happily eclipsed the long-standing MIS obsession with the applications backlog.

For years, the amount of pending MIS development work (always expressed as the number of years of continual work it would take by the existing staff to finish all approved projects) was meticulously calculated and brandished about by the MIS cognoscenti with a mixture of egocentric awe and self-indulgent martyrdom. Figures were compared from shop to shop in a "Can you top this?" spirit. Learned arguments raged about what was the "optimum" backlog level and what was the most meaningful way to calculate this significant statistic.

As a self-confessed backlog fanatic, I can tell you now that there is little about the figure that is significant. The fact that there are two or three years of work outstanding indicates nothing about the worthiness of the awaiting tasks. At best, the calculation may reveal a natural and even healthy phenomenon endemic to growing support organizations. In any event, publicizing the imposing amount of work rarely achieves the undisguised purpose of inducing management to authorize more resources. Sadly, many DP shops spend more time estimating the required effort for projects that they will never get to than devoting this time to completing some of these requests.

The concept of the backlog has had derogatory effects. First, it pointed out that MIS was the only game in town for technical services; the backlog was a visible reminder of everything MIS could *not* do.

Secondly, functioning on the premise that all "valid" work should be approved (this made the numbers even more impressive), the concept encouraged authorization of requests that immediately went to the bottom of the priority list. It was easy to OK all requests, because official MIS approval was not a commitment to the task's completion. Even for important requests, some subsequent demand always seemed to divert MIS's attention. As a result of this fringe strategy, valid but neglected work languished.

Ultimately, what did happen was the introduction of technologies that allowed fresh, creative approaches to many disenfranchised problems. In some cases, these developments meant that users stopped waiting for MIS to get to their problems and solved them themselves. No longer would much of their work be held hostage in an MIS queue. In progressive environments, MIS saw that using these technologies was a quicker way to address ancient ills. This fresh approach not only made the old common denominator of "years of work" meaningless by using efficiency techniques, but it also introduced productivity tools to users.

These tools made many of the old requests for canned reports and analyses meaningless. Because not all work was going to MIS, because there was little advantage in calling attention to how much was not getting done and because the standard unit measure of work was being devalued, the MIS backlog ceased to be a meaningful management barometer.

While the demise of this pretentious calculation frees MIS to focus on more realistic and encouraging measures, not all of the trappings of the backlog should be discarded as valueless. Some of the supporting activity is like the baby that must not be thrown out with the bath water. Indeed, the instinct to identify all potential work serves several useful purposes:

- **Productivity.** If analysts are given some insight into potential upcoming work, the designs they create have a better chance of not becoming obsolete immediately. Interrelated changes can be verified against one another. More importantly, similar or neighboring changes can be bundled together to permit the maximum number of improvements to be completed with the least amount of effort.
- **Planning.** With some understanding of the work that lies ahead, tasks can be scheduled in the ideal sequence. This ordering allows for the obvious technical priorities, such as performing upcoming data base changes before creating dependent report programs, and lets MIS anticipate evolving skill requirements, which may result in more beneficial staff schedules. If this anticipation is early enough and certain enough, MIS can even infer training and hiring plans.
- **Prioritization.** Unless an organization knows what work could be done, how can it wisely choose the best possible project for completion? Companies quickly discover that it is impossible to do all worthy projects, so they wisely attempt to do as many as limited resources will allow, in order of importance. Project precedence is usually determined by return on investment, expected return or some other quantifiable measure. With the work identified and objective evaluation tools in place, firms can ensure that they get maximum benefits from finite MIS resources.
- **Strategic direction.** It is often valuable for MIS to survey the needs of an organization so it can implement suitable programs. Rather than attacking many projects one at a time or even in optimally grouped sequences, the body of needs may suggest a fundamentally different direction. An overwhelming need for new reports might imply the need for end-user report generation tools, not more Cobol programs. A preponderance of problems in one area could hint at the need for either more training, a new system or even a dedicated, distributed solution. It is necessary to see the big picture if MIS is expected to contribute to the big picture.

While the absolute backlog measurements may have little direct usefulness, the process of computing that figure can reveal meaningful information. Of course, this requires not only objective and consistent measurements but a healthy comprehension of what is being analyzed. This information can show the following:

- **Changes in backlog.** Like business revenue, the backlog number by itself is enigmatic, but, over time, its changes can reveal significant events and suggest management action. A growing backlog might point to either lower MIS productivity or accelerating user needs. When the backlog is compartmentalized by function or by system, the same trends can be deduced for user groups, such as marketing, or for application systems, such as general ledger. This examination can assist in tracking major system life cycles and new system effectiveness.
- **Quality of the backlog.** MIS should evaluate the importance of the work awaiting attention to determine if useless tasks are inadvertently placed in a queue or if essential work is being ignored. If so, the gating and prioritization mechanisms may be in need of a tune-up. Furthermore, a periodic assessment of the changing nature of the backlog might give insights similar to those reached by observing changes in volume.
- **Staffing implications.** By evaluating the value of projects under way vs. those awaiting attention, adjustments to staffing levels can be quantified and justified. Though understaffed situations are often obvious to MIS, it has traditionally been very difficult to justify this need to top management because no single project of the numerous changing requests in the backlog can justify increasing staffing levels. Tracking the outstanding work properly permits the resource adjustment.

In fairness, the pejorative reputation of the applications development backlog is caused by how it is used. The backlog, when deployed only as a tool to gain sympathy for how much work MIS has or to focus on all that is not getting done, has no place in modern MIS management methods. If, on the other hand, similar processes are creatively applied to increasing productivity, department performance and the quality of support, then the practice of managing requested work will be a welcome addition to MIS's arsenal. It is the actions of the MIS manager that determine whether backlog management is an asset or a disadvantage.

Young is managing director of MIS for the Wheeler Group, a division of Pitney Bowes, Inc. in Hartford, Conn.

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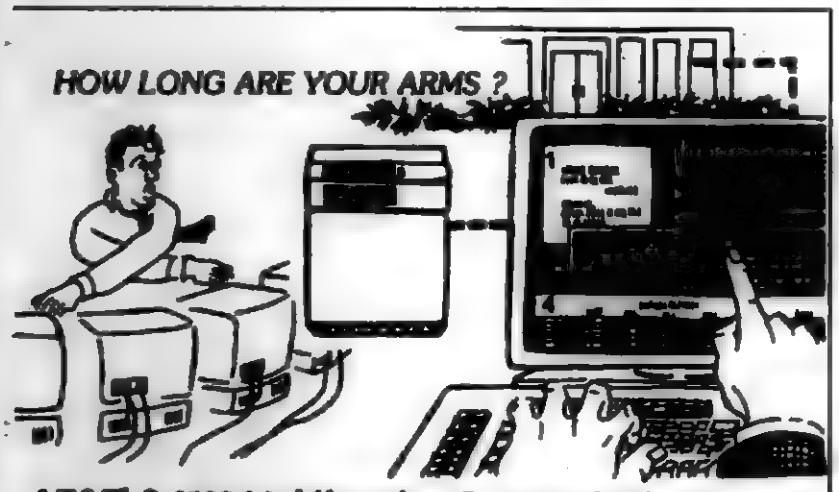

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Q AND A

Fernando Flores

Software executive stirs up the AI ranks with his controversial philosophy

Fernando Flores is chairman of Action Technologies, Inc., an Emeryville, Calif., software company. He is also the co-author, with Terry Winograd, associate professor of Computer Science at Stanford (Calif.) University, of *Understanding Computers and Cognition*. The book has become something of a cause celebre within the ranks of the artificial intelligence community for its gloves-off approach to many of the supposedly untouchable underpinnings of AI thought. In fact, "Artificial Intelligence," considered the industry's most prestigious journal on the subject, recently dedicated four reviews to the book in a single issue. The reviews ranged from condemnatory to laudatory, perhaps accurately reflecting the same sort of polarization that Flores's book and theories have engendered in the AI community.

Flores, however, is not new to controversy. Chile's Minister of Finance in the ill-fated regime of Salvadore Allende, Flores spent almost three years in a Chilean prison until pressure exerted by the U.S. State Department and Amnesty International helped secure his release. Flores then made his way to the U.S. and the University of California at Berkeley, where he earned a Ph.D. in philosophy and developed the theories on cognition and communication that he is now channeling into the computer marketplace.

Flores spoke with *Computerworld Focus*'s Senior Editor Stan Kolodziej about the state of AI, about communications and about The Coordinator, Action Technologies' communications product based on Flores's theories.

What is the problem with artificial intelligence?

Artificial intelligence [as a study] is so concerned with trying to duplicate humans with machines that [researchers in the field] don't realize the more interesting phenomenon of computers in networking. AI's approach is to focus solely on the transportation of data, but we, as designers, want to design machines that will initiate action in networks. All networks are really a way of communicating and coordinating action, not just moving data. The real problem is in designing machines in networks of human beings that amplify the possibilities of human beings.

The press talks too much about information and messages, but they don't talk about what people really do. They fail to see the obvious.

Could you elaborate?

Language is not all symbols and signs as AI would like us to think. Language is not principally a phenomenon described in relation, because language itself constitutes reality, and language is life itself. Within language and, therefore, within communication, there are certain conditions that hold true regardless of whether communication is conducted in Spanish, French or whatever language. These conditions are generic, if you like.

All communication is action, in the sense that any communication, written, oral, whatever, will result in some request for a reply and a promise to do so. It doesn't matter what the language is. If you take the time to look at all communication, you will see this is true.

The trick is in designing machines that will better coordinate such action in communication, especially now in offices, and that will really have the result of letting people be better at what they do. A network machine designed on these principles will be a breakthrough because it will not be forced on people, will not force people to change. It will be an extension of the way people already work.

But artificial intelligence is mostly a failure in this regard, because it is based on bad theory — that people are basically information processing systems and that both machines and people simply process data.

From there comes the assumption that the more data there is, the better. The data itself is not important; it's the things that make a difference with that data that are important.

How does The Coordinator make a difference?

It keeps track of people's communication and makes sure that actions and responses are being coordinated within appropriate times. It is not just electronic mail, it is not just voice messaging. It is in the software, and it is based on the theory of communication we have explained in our book.

You get a much different result than just sending information back and forth. It is an important first step that will change the way we work.

How do you see your theories and The Coordinator fitting into data and voice communications in the next few years?

Our theories will have a major impact in years to come, and I think The Coordinator will represent a generic technology in this area. It will take advantage of some good, related technology such as the [Apple Computer, Inc.] Macintosh graphics interface, which will give Coordinator users great flexibility in defining their screens.

I see the next generation of Coordinators being tailored for various uses — for example, to keep track of management projects, of cash flow and so on. Or you may want to combine The Coordinator with specific rules that have been in use in a particular organization. I think that's going to create a whole dimension of Coordinators that are going to be designed for different purposes.

How close are we to getting office communications on the right track?

The wall that we face now is a space of conversations, and no one knows how to theoretically assess these conversations. We built our theory in this direction: We said this is not about sending data, it's about completion in action. If you look at it in this different way, you're going to make a big difference.

The problem with The Coordinator right now is that sales representatives and others within companies see the business benefits of The Coordinator right away, but business leaders have not yet realized how big the revolution is. Their interest will increase, however, and then things will change rapidly.

You make what appears to be an interesting reversal in your book. You say that "rationalistic" researchers, those who follow the traditional tenets on which AI is based, are being idealistic. On the surface, that seems a contradiction.

Not at all. We believe we have a different notion of rationality. AI believes that language has nothing to do with rationality, that it's a pure question of mind. They had this idealistic notion and transformed it into a mechanical language.

A good theory is also very pragmatic. For example, the field of thermodynamics is a good metaphor for The Coordinator. The first important thermodynamic machine was the steam engine, invented in the 18th century and developed in the 19th century. The general science of thermodynamics, the principles, are independent of a particular machine.

The Coordinator is a product sold through Action Technologies, but it's also a set of principles. It's going to be the source to begin network design work, and I don't think anything like that has ever happened before in the history of computers. Computers until now were built for one application. They are still one-application machines.

What happens, however, when the network *is* the application in which you are going to have the coordination of people and machines at the same time? How do you operate something like that? With a new dynamic. Single-application machines and the design for single applications are no longer valid. Our theory is useful for designing the next stage.

You mentioned that journalists have not understood what you and Winograd are really trying to do. Do you consider that a fair assessment?

Mostly. Journalists are important in this situation because journalists, whether aware of it or not, participate in the inventing of the future through their continual shaping of language. If journalists begin to see what is really taking place here — that there is also a social phenomenon under way, not just moving data — then everything will be better assimilated.

If journalists continue to describe The Coordinator as a type of electronic mail, however, it will just take more time to make it happen.

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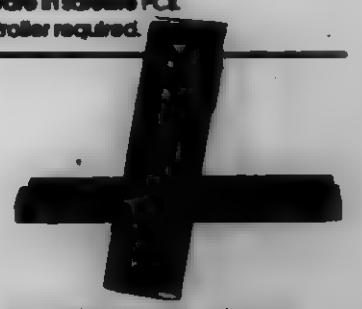

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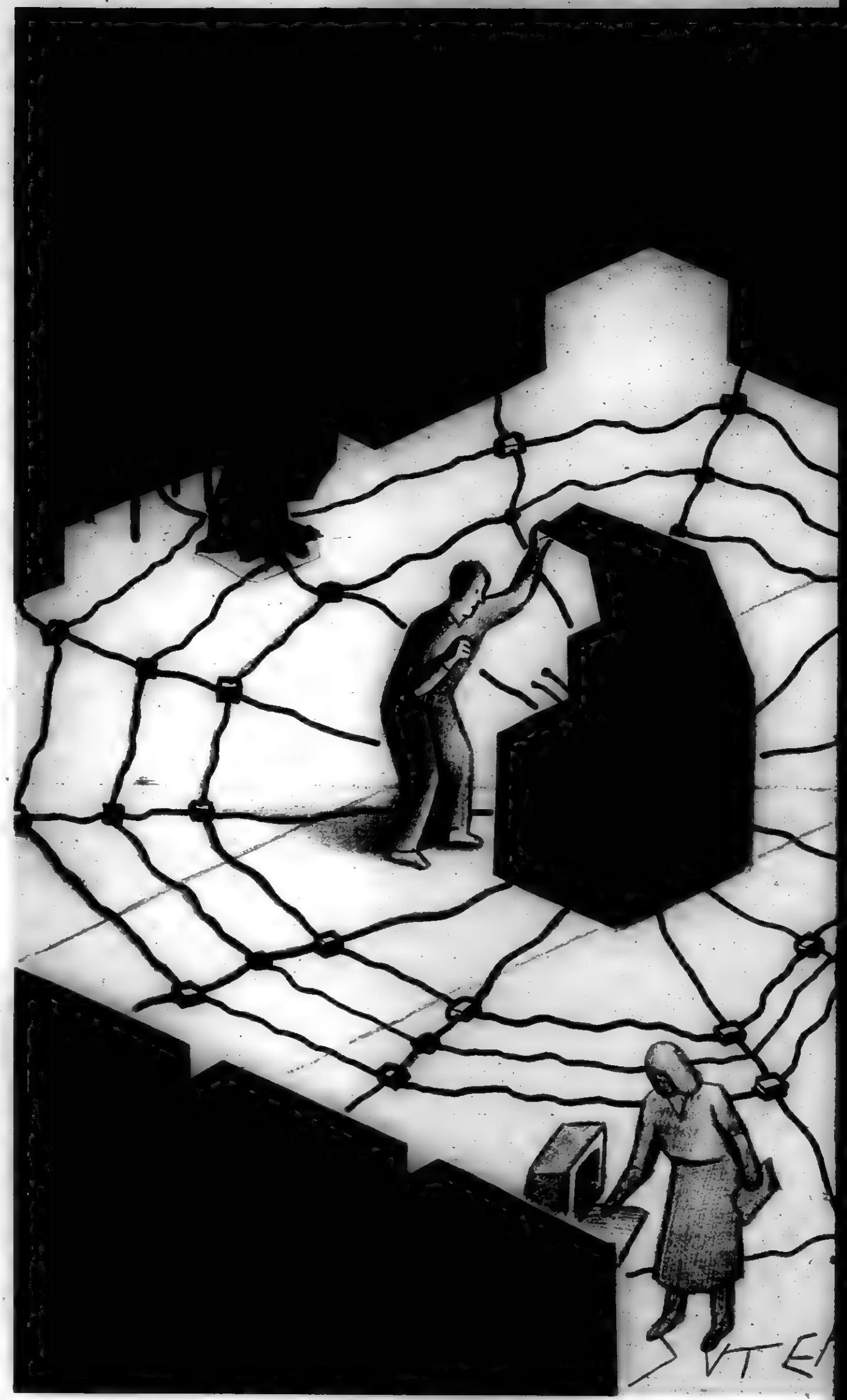

The thrill of technology, the agony of expense

Networks can sap budgets in no time

BY HELEN PIKE

Welcome to the Wide World of Networking. We take you to the far reaches of technology to bring you the best in the marketplace. We promise you ease of use. Standard protocols. A simple cabling system. Distributed data. Interoperability. Homogeneity. Interconnectivity. Seamless connections in a heterogeneous computing environment. We promise you . . . we promise you . . . we promise . . .

Ah, yes. But do you deliver?

The promise of local-area network technology and the promises from salesmen are hard to separate. Too often, it seems, they get broken. Which is worse: when the technology doesn't live up to its hype, or when a company fails to supply the goods?

Any answer is small consolation when you're faced with justifying unexpected costs in a project gone over budget. Just listen to Chuck McCallar, a computer specialist/programmer analyst for the U.S. Army at Fort Stewart, Ga.

"There's always something missing," McCallar says, ticking off protocols, topologies, maintenance software and the availability of products. Even if "you count everything down to the penny," he continues, "you count your number of personal computers, their add-in cards, Fred's communications software, Joe's modem and someone's homemade cable. You have them all networked together just like the vendor says to do. . . . Then you find out they don't work together. There's a connector that doesn't work, or a glitch on a diskette, or a faulty cable or a power failure.

"The only thing you have left to do is pray," he says, only half in jest.

If hidden costs turned up in the operation of the purchasing department that James Winsness oversees for General Electric Co.'s turbine division, he admits, "I would be out in the street."

Because of uncertainty in the turbine market overall, "we really have to run a lean operation," says Winsness, a system support specialist in Schenectady, N.Y.

Winsness's mandate goes beyond merely controlling inventory. He must keep a tight rein on all costs associated with the purchases of gas and steam turbines, installation of turnkey operations and maintenance of electric power generators. His responsibility encompasses five plants on the East Coast that generate millions of dollars a month in purchase orders.

"Users are not gurus in computers," he observes about the more than 150 PC operators in the purchasing department. "You can't just buy [equipment] because it is 'nice' for the system. It has to be functional."

As Martin A. Smith, who manages information for the University of Massachusetts (UMass), Amherst, set about deciding which comes first — a network's form or its function — he visited a lot of academic institutions. The visits were to competitive schools, ones comparable to his university in size and capacity. But perhaps most importantly, the institutions were ones *he* chose — not ones chosen for him by vendors

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Pike is *Computerworld Focus*'s senior writer.

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eager to win the UMass contract, which could go as high as $42 million for networking the university's three campuses.

At stake are the voice, data and video communications needs of a burgeoning academic institution; at minimum, UMass requires a 31,300-line network and wiring for 266 buildings. The network will be used by 25,000 students and a combined faculty and administrative staff of nearly 2,800.

By their very nature, "vendors oversell their products," Smith comments. And most MIS managers are not prepared to do the kind of evaluation necessary to come up with the right network, he adds, explaining that his telecommunications background came from on-the-job exposure. Smith, who has been at UMass for 17 years, is director of administrative data processing for the universitywide system and also is assistant vice-president of information management.

"Telecommunications is just a utility. It's got the potential to be great, but it's still in its infancy. There are a lot of software and hardware problems that have to be ironed out," Smith says. "Networking is not an easy, workable product."

Angelo Guadagno, North American sales and marketing vice-president of Apollo Computer, Inc. in Chelmsford, Mass., agrees with Smith's assessment

> **"Start thinking about the future the day you start thinking about installing or upgrading a system."**
>
> MARTIN A. SMITH
> UNIVERSITY OF MASSACHUSETTS, AMHERST

about the promises made about and results expected from networks.

"Most salesmen are not well trained in selling networks," he observes. Apollo's sales force is trying to make the crossover in selling its technically advanced distributed networking scheme to MIS from its original client base of engineers and scientists. Two of the six days that Apollo's sales staff spends annually in training sessions are devoted to understanding the intricacies of networks and how to sell them, according to Guadagno.

Apollo feels the education effort is necessary, because at the other end of a waiting cable "even the most sophisticated MIS manager [can be] relatively naive in the networking arena," Guadagno says.

Expressing further empathy for the MIS manager facing networking's tribulations, one-time Digital Equipment Corp. executive Guadagno draws the parallel that installing a telephone "is like noise compared to the complexity of putting in a network."

As for all the hype about networks bringing interconnectivity or interoperability among competing vendors, Guadagno says, "For the most part, they're still homogeneous and vendor-specific."

Somewhere amid the cross fire between end users looking at LANs as natural extensions of their PCs and MIS looking at them as systems that have to be maintained are solutions, according to Mark L. Freund, a former IBM communications designer who is now design and engineering vice-president of Interconnect Network Consulting Group, Inc. in Pasadena, Calif.

But first, "LANs should not be treated as a commodity. They're as complex as mainframes. Vendors should price them higher because they have the functions and horsepower of minicomputers," Freund says. Unfortunately, "the hype is that LANs will replace mainframes for the price of a PC.

"Stop thinking they can just be plugged in. . . . LANs are strategic ways to regain resources and control over PCs," he adds. Freund recommends phasing in a LAN, starting first with a small configuration with five nodes as a pilot approach. The LAN can then be upgraded to 10, then 15 nodes, for example.

Another aspect to consider is buying products that adhere to standards, according to Dan E. Ladermann, vice-president of advanced programs for The Wollongong Group, Inc. in Palo Alto, Calif., a software supplier of network products and co-resident operating systems that is championing Unix and the International Standards Organization's Open Systems Interconnect (OSI) standard.

"You should start thinking about OSI now. Otherwise, the hardware is going to be expensive to replace and user training is going to go down the tubes," Ladermann says, referencing 1987 estimates from Dataquest, Inc., a market research concern based in Palo Alto, Calif. Those estimates claim that hardware and software installations that do not have migration paths could cost a company up to $500 million to replace. "Three to five years from now the realities are going to hit," he says.

"Don't make short-sighted decisions," he warns. "If you have 10 users, ask what will happen when you add an 11th node. Or ask when you should go from local-area to wide-area networks and what you should do when you do it. Ask yourself how you're going to get to OSI.

"There is a real need for networks to grow in technology and performance," adds Ladermann, pointing out that customers' performance needs are already changing. "Everyone is going to want to go faster."

Smith at UMass is emphatic about foresight. "Start thinking about the

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future the day you start thinking about installing or upgrading a system," he says. Smith began to lay the groundwork for the UMass project four years ago.

"Remember, telecommunications is still in its infancy. The switching components you use today will be outdated probably in five years," he explains. "Recognize the voice and data mix of your users. . . . How flexible do you want the network to be? What will be the capacity for future buildings? Installing a network is largely a construction project."

And it could turn out to be a costly one, Apollo's Guadagno says. "It might cost you $2 million to string $400,000 worth of cable for a $1.5 million computing project because of utility ordinances."

In addition, a corporate user could spend almost $3 million in diagnostic tools for network maintenance when it could be cheaper to buy the diagnostic services from a vendor, Guadagno continues.

Another way to keep the surprise out of connection costs in a multivendor environment, according to Guadagno, is to find out ahead of time if your inside networks from one vendor are to be connected to outside networks from another.

When it comes to figuring out a system's overhead, you need to know the number of lines of code to be written or, at least, what is projected, and the number of lines to be run, he says. I/O speeds and the time it will take programmers to write code are also necessary criteria, he adds.

No less important in getting a network up and running are personnel. As for Apollo, it has a 2,400-node network linking its operations in the northeastern U.S. to counterparts in Europe. Two high-level technicians operate the network, Guadagno says.

But with all the talk about the hidden costs of installing a network, what about the hidden savings?

"Why should I spend between $8,000 to $13,000 for a dedicated file server to handle 20 people? It's silly. I can spend $2,000 for a PC AT [as a file server] for more than 30 people," GE's Winaness says. He oversees a system of six LANs with eight IBM Personal Computer AT-class file servers supporting 150 PC users. The system includes a star LAN configuration carrying seven IBM Systems Network Architecture gateways.

"We keep looking for new technology so as not to get passed by. And we do look for alternatives," he says. But little has come close to what Winaness found by chance — "somewhere between a lark and intelligence," in his words — at Info '84, the Information Management Exposition & Conference in New York. At that time, "people were just starting to talk about LANs. We bought three nodes just to try them out," he says about the purchase of 10Net Communications' 10-Net.

Four years later, Winaness uses 10-Net in a star LAN twisted-pair configuration, which avoids the higher expense of coaxial cable or Ethernet, and a 10Net 10-Gate communications package, which obviates the need for a $10,000 to $13,000 IBM controller card to access the mainframe. "It was physically impossible to put any more cards in our machines," he says.

With the implementation of low networking costs, Winaness uncovered other savings that could be had in the area of software upgrades and new packages. For example, a telecom setup using Enable, a multiapplications package from The Software Group in Ballston Lake, N.Y., is placed on the six file servers to make updated data readily and immediately accessible to all users rather than on a machine-by-machine basis, he says.

Furthermore, "Our file server is there to conduct information, not store it. Back-up responsibilities are up to the end user," he says, pointing out that the PCs used by the purchasing department have no hard drives; the users are given floppies for any storage needs they may have.

Go to the Army for answers

Feeling a bit overwhelmed at this point? Not sure you can promise yourself, let alone your boss, that you will remember to do all of what you've read? Take heart from the experience of the U.S. Army's McCallar.

"It's impossible to know everything. How many [MIS managers] are going to know they need a pseudohomogeneous interface to someone else's proprietary network?"

McCallar recommends putting together a team: a program analyst, a systems analyst and someone representing management or the administration. Select a few good people who possess experience and special talents. Limiting the team members is important because "there's fussin' and cussin' if there's too many," McCallar observes.

"Hire people who've worked at universities at which vendors have given away their equipment for exposure," he advises. Failing that, "go to the outside and hire a consultant . . . then come up with three to five good options to satisfy the majority."

Determine how the network will be used: heavy-duty accounting; marketing, which needs high-resolution graphics and uses artificial intelligence for product strategies; or engineering, which is highly computational intensive.

"So, do you want to build around a mainframe, around a node or around some far-out animal?" McCallar asks, summing up the range of possibilities to be mastered. "Sometimes I think it would be easiest if we all went back to Sanskrit and papyrus." ◆

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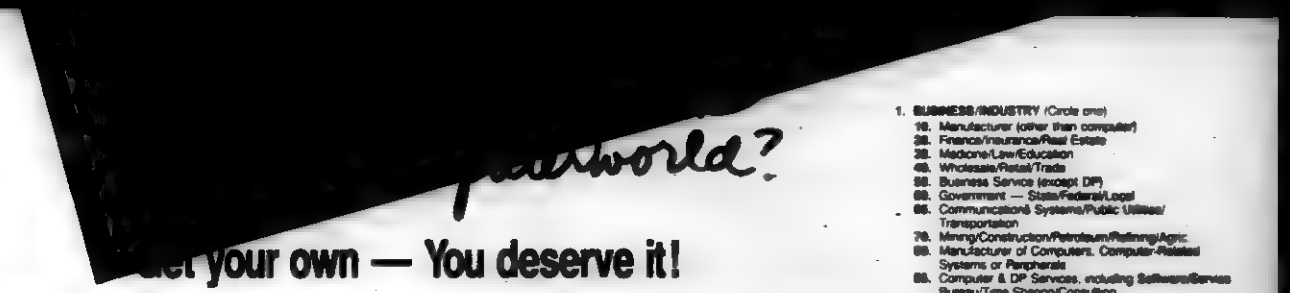

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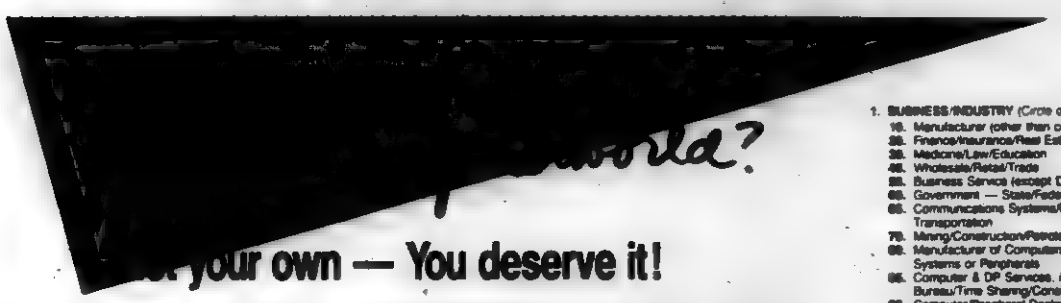

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COLLABORATIVE EFFORT

Forum or against 'em?

BY MICHAEL TUCKER

It is the Network Computing Forum. Its aim is nothing less than to blend computing and communications into a single discipline. Its membership includes some of the most important vendors in the industry and many of their biggest customers. The forum is important to MIS because if it succeeds in its stated goals, it could chart the course of commercial computing for years to come.

It is also something of a mystery in that exact definitions of the forum's goals and methods remain a little elusive. Its members, even the most eloquent of them, tend to describe the organization in terms of negatives — it isn't a standards group, it isn't a research and development operation, it isn't a joint venture, it isn't an academic effort, it isn't even a debating society for technologists.

If not, then what is it?

To find out, *Computerworld Focus* recently interviewed several members of the forum and some of its critics. What we found, after several interviews, could best be described as complete and, most of all, *happy* chaos.

The Network Computing Forum's (NCF) origin is — in theory — fairly simple. In 1986, Chelmsford, Mass.-based Apollo Computer Corp. announced that it and several associates were forming the NCF to promote intervendor awareness of the concept of network computing.

Network computing, in turn, was defined as the business of making entire networks of dissimilar machines from different vendors act together as if they were a single device. The idea was to make it possible for computer users to run distributed applications on the network exactly as they would run them on a single processor today.

The applications themselves would be divided among the devices within the network so that each task would go to the optimum processor for the job. A numerically intensive operation, for instance, would get flipped to the resident supercomputer. A massive data base problem within the same program, meanwhile, would be routed to a dedicated data base engine. Mainstream data processing would be allocated to the mainframes in the system, while special load-balancing mechanisms would ensure that no one mainframe did more than its share.

And all this activity would be transparent to the user.

None of this concept, naturally, is new. MIS, among other computer-using groups, has dreamed of this kind of distributed processing capability for years. The vision was that network administrators would someday be able to slip individual machines in and out of the network as easily as today's personal computer users slap boards in and out of their boxes.

But just as naturally, the technology to make distributed processing happen is still largely unavailable. Even so, the lack of R&D necessary to produce results is relatively trivial compared with the task of getting vendors to agree on some method to enable their machines to work together in single systems. Such an agreement would require cooperation between competing computer vendors on a level never matched in the history of the industry. "Unprecedented," says John Robotham, the NCF's managing director as well as the manager of strategic ventures at Apollo, "that's the term I've come up with. It would require unprecedented levels of cooperation."

The need for this kind of cooperation, Apollo says, is precisely the reason that the NCF came into being. The company claims the NCF is a place where all the world's vendors, including direct competitors, may gather and discuss (and *just* discuss) network computing.

"The forum has two functions," Robotham explains. "First, it acts as a lightning rod to attract those who are interested in network computing. Second, it provides a setting in which those people may clarify the issues that need to be addressed to make network computing a reality."

It will not, however, become a standards group, because, Robotham says, "standards organizations tend to deal with what is rather well known. We're right at the state of the art of what can be done. Talking about standards now

BRAD HAMANN

Real motives for Apollo's NCF sought

Tucker is *Computerworld Focus*'s features editor.

would be very premature."

It sounds ideal, even utopian. The NCF is envisioned as a kind of intellectual free-trade zone in which vendors can put aside their rivalries and strive for the common good of vendors and users alike without fear that their own individual good might be at risk.

Marvelous. Terrific. Great.

But is it real?

When Apollo announced the NCF, it was almost uniformly dismissed as an Apollo users group with a curious name. One vendor *Focus* spoke to on the subject actually thought it was a company-sponsored exhibition. "Isn't it kind of like Apollo's Dexpo?" he asked.

This purely cynical view of the NCF has largely faded, mostly because of Apollo's steadfast efforts to present itself as genuinely committed to an open operation.

> **"Apollo knew that if it came out with this technology by itself, Sun would tag them as yet again coming out with a proprietary technology . . . so Apollo's people realized they had to create at least the illusion of an open forum."**
>
> NATHAN BROOKWOOD
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"Naturally enough," Robotham says, "people came to the first meeting with a healthy dose of skepticism. But that was almost totally eliminated by the end of that meeting."

But even among Apollo's admirers, there are lingering questions about the forum and its real purpose and function. "This [the NCF] all came up a little over a year ago," notes Nathan Brookwood, an analyst with D. H. Brown Associates in Tarrytown, N.Y. "At that time, Apollo was being beaten about the head and shoulders by Sun Microsystems, Inc. Apollo still had several proprietary technologies at that time, and Sun was attacking them while riding the white horse of open systems."

At about that time, too, Apollo was putting the finishing touches on its own distributed computing technology, which, Brookwood claims, was better than what anybody else in the industry could manage. "Apollo knew that if it came out with this technology by itself, Sun would tag them as yet again coming out with a proprietary technology . . . so Apollo's people realized they had to create at least the illusion of an open forum," he explains.

Brookwood isn't convinced, however, that the NCF is an open group. "At least in Apollo's mind, it's open," he says.

Currently, there are more than 100 forum members. Even among the staunchest of these participants, it is possible to find similar reservations about the NCF's openness.

Software vendor Oracle Corp., for instance, was a charter member of the organization. Yet Bruce Cleveland, Oracle's director of Unix product marketing and the company's representative to the forum, finds only faint praise for the NCF's multivendor status. "It's multivendor from a software standpoint, certainly," he notes.

Cleveland also has concerns about the technical value of the forum. "Oracle introduced a distributed data base product last year," he explains, "so, of course, we're interested. But frankly, the NCF is only now starting to talk about things that Oracle is already doing." He feels that membership in the forum is worth the effort (currently, membership is free) but chiefly for the nontechnical reason that it provides a conduit to major workstation users. "In terms of product direction," Cleveland concludes, "the forum has no effect on us. It mostly just provides us with some interesting food for thought."

The pivotal case for the NCF was Sun Microsystems. Because Sun is Apollo's chief rival, its presence or absence would do much to determine whether the forum would be perceived as a legitimate technical effort or just another marketing association.

Sun rises to the occasion

At first it seemed that Sun would remain aloof from its rival's foray into the open systems game. But under pressure from its customers and business partners, Sun soon got involved in a big way — it even sponsored the second major meeting of the forum in 1987. Notes Gordon Short, Sun's manager of strategic alliant marketing and the company's representative to the forum, "We got involved with the NCF because we were approached by several of the firms with which we do business, and their view was that if the NCF lived up to its charter, then it would have great merit."

For Sun, the operative phrase is "if it lived up to its charter." It is an expression charged with more meaning than might meet the eye, because the phrase seems to be Sun's way of saying that the forum must never attempt to force any one technology (particularly Apollo's) on the industry (particularly Sun). In fact, Short describes the NCF as a kind of benevolent anarchy. "It's a place where technical people can exchange ideas. It's a place that provides a pressureless environment

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for the exchange of technical data — and that's rather unique."

But, Short says, the NCF is not a standards body and has no power to impose anything on anybody.

Is Apollo trying to do exactly that with the forum? Is the NCF simply a Trojan horse that will lure the rest of the industry to accept Apollo's proprietary technology? Short answers those questions with great delicacy: "Well, it has been *interesting* that we've had to work so hard to make certain that the NCF lives up to its charter."

You can argue about whether the NCF is Apollo's show, but it is beyond question that the NCF is a vendors' show. Few of its members are users. As explained by Del Kunert, Concurrent Computer Corp.'s senior manager for data communications and NCF representative, "It is a group of vendors. I have to be frank, it isn't users. They're not the ones driving this."

Why are vendors, traditionally loath to cooperate with one another, willing to back the forum? "I guess it was the realization on their part that they can either take the initiative and provide the technology for distributed computing now or they can wait and have the users force it on them later," Kunert explains.

There are, however, forum members that don't exactly fall into the vendor category, and these may reveal much about the NCF and its effect. Take, for instance, one of its founding organizations, the Software Productivity Consortium (SPC) in Reston, Va.

> **"It's a place where technical people can exchange ideas. It's a place that provides a pressureless environment for the exchange of technical data — and that's rather unique."**
>
> GORDON SHORT
> SUN MICROSYSTEMS, INC.

The SPC is a curious beast. It is an R&D consortium founded in the early 1980s by an association of advanced computer users — chiefly aerospace firms. These firms had discovered that their computing needs were beginning to exceed what existing technology could do. In particular, they needed reusable code, extremely advanced computer-aided software engineering systems, new methods of networking and so on. They decided to pool their resources, and the result was the SPC, an organization devoted to the creation of extremely sophisticated software engineering tools and technologies.

From the beginning, the SPC had a strong commitment to what the forum would call network computing. It also had long-term associations with Apollo; some of its first investments included Apollo workstations and the Apollo network. So it was no surprise that the consortium became a member of the NCF.

What is interesting is the degree of seriousness with which the SPC regards the forum. First, the SPC's representative to the forum, Dennis Gaughn, who is also the consortium's general manager of the development environment division, flatly rejects the notion that the NCF is in any way a single-vendor show. "I emphatically don't want to be associated with *any* vendor's hustle."

Second, the SPC is actively using the forum as a device within which to develop and distribute certain experimental software. Gaughn hastens to explain that this is only test code, not an attempt to create a standard in the way that the X Windows model, for example, is a standard. But still, some rather significant code is now available to NCF members via the SPC. Gaughn notes, "We have a real-time network monitor, a network probe, and something we call Dynabase, which is a high-level abstraction that permits administrators to provide network-level services across a heterogeneous network."

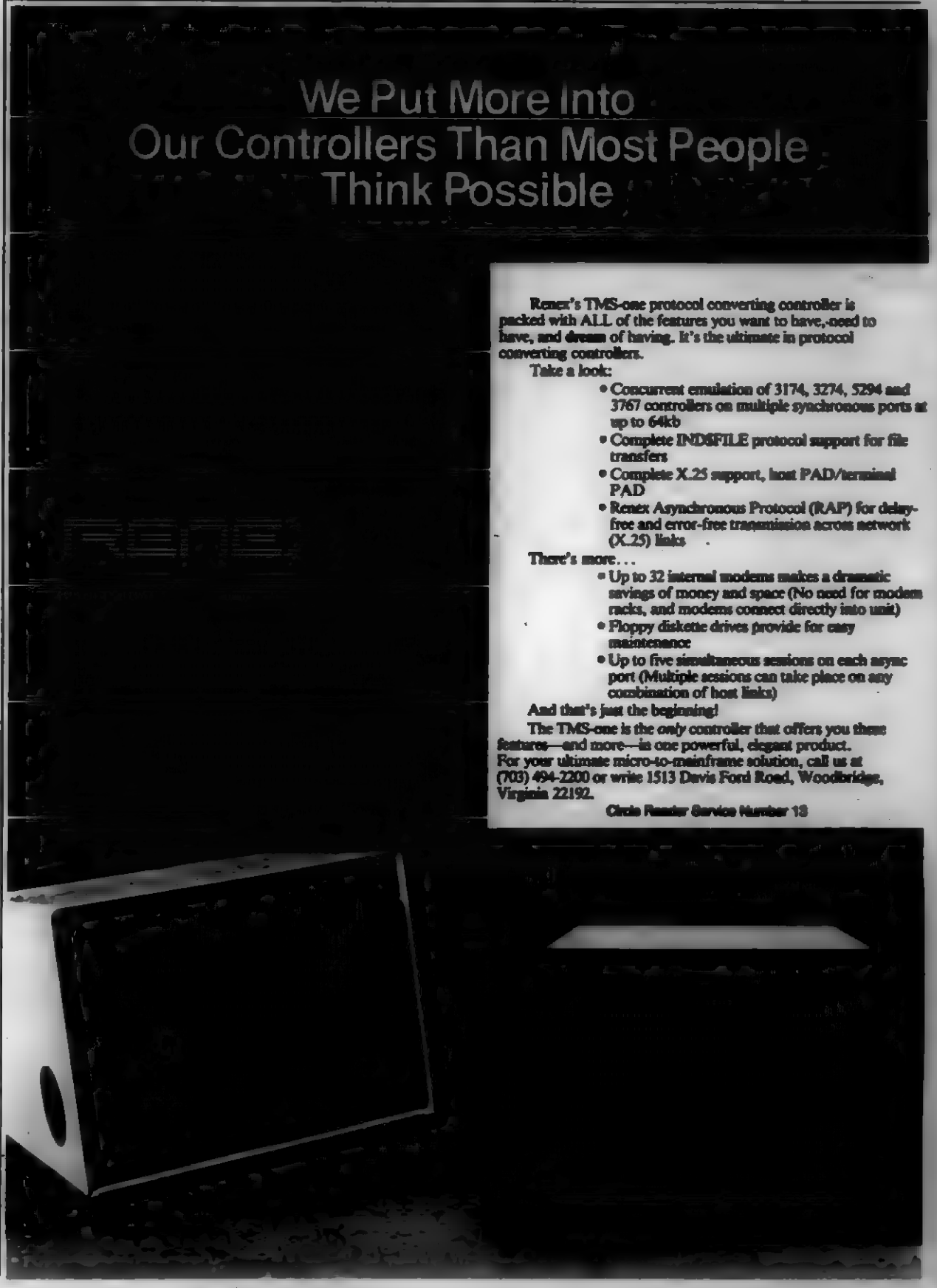
Third, the SPC seems to envision the forum's charter in much broader terms than does Apollo. "Apollo, of course, talks a lot about network computing," Gaughn says. "But for me, personally, it is only a subset of a much bigger issue, which is programming in the large."

Break the mold

Gaughn says that if MIS is ever to be able to really take advantage of distributed computing, then new models of how data processing is done must be developed. "If you are going to run applications on distributed systems, and unsexy systems at that," he claims, "then you cannot do so with conventional DP models. Those just don't stand up. . . . What we want to do is provide highly distributed systems that still exhibit centralized command and control."

And Gaughn says these new models — which may be as political and organizational as they are technological — may be needed in a hurry, because the technology of network computing will soon be upon us. "The future isn't far away," he says. "I'd say 18 months or so. We can already do most of it."

The question then may be whether the forum has taken on a life of its own, quite independent of the organizations that created it, in response to the necessities of the market. As MIS and other users begin the push for distributed computing technology, the NCF could become more of an



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influence on vendors than they themselves perhaps would like.

"There is no question the industry needs a forum on network computing. And from what we've seen, the NCF is the only game in town," explains Tony Affuso, division manager of technology and strategy for Electronic Data Systems Corp. (EDS) in Bloomfield Hills, Mich. EDS is the giant systems integrator that is both part of and a supplier to General Motors Corp.

Affuso says he thinks that vendors got into the NCF in the first place because "they each tried their proprietary approaches, and they found [that they] didn't sell. So now they'll be trying to be the first to set the de facto standard."

In the process, though, vendors may have made themselves a bit vulnerable. While the NCF may not claim to be a standards organization, it still seems to have become a place where customers can effectively pressure their suppliers. Affuso says, "We're pushing Sun and Apollo, as well as others, to cooperate and develop compatible RPCs [remote procedure calls] and the like, . . . and there's been some progress."

The forum's future

So the real question for the NCF may not be what it is today but what it will become in the future. Its founders steadfastly insist that the NCF is simply what its name suggests — a free and open forum where technical specialists may debate the right methods of providing the distributed computing technology that the industry clearly wants.

Its members have good, if sometimes conflicting, reasons for that to be so. No one of them wishes to give the power of dictating terms to any other. None of them wishes to give any similar power to their customers. Each has every reason to want to keep its industry open, but not so open that it becomes a commodity market in which buyers choose products strictly on price/performance criteria.

Yet there is a real possibility that the NCF could escape its founders' best intentions. Some of its members already seem to be suggesting that the debate within the NCF is powerful in its own right — powerful enough, in fact, to influence vendors in the design of their products. Already, the NCF is shaping up as a vehicle by which customers may force suppliers to listen to their wants and needs.

The NCF could also become powerful on what might be called

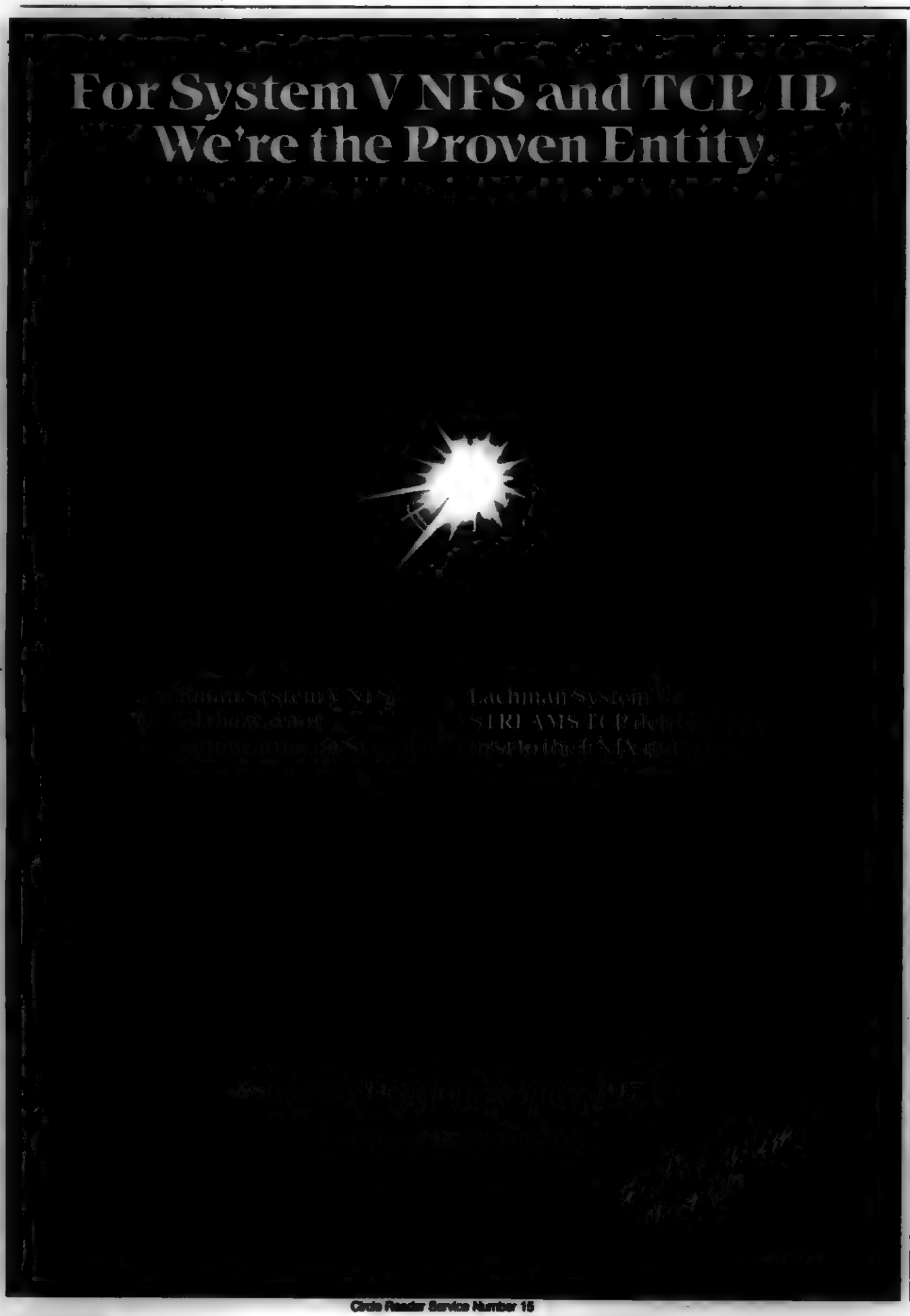
> **"I emphatically don't want to be associated with *any* vender's hustle."**
>
> DENNIS GAUGHN
> SOFTWARE PRODUCTIVITY CONSORTIUM

an unconscious level. As an assembly of technologists dealing with technological issues, the forum cannot help but promote common ideas (even if they are competing ideas) among its members. It may be that ideas will be the really important product of the NCF and that they may outlive it.

In fact, the forum has taken a rare step for such an organization and has planned for its own demise. Managing director Robotham says that the NCF may become a "two-year renewable project" in which, at regular two-year intervals, NCF members will decide whether the forum has completed its mission and should be disbanded or given a new mission.

The new mission "would be some other topic that will be hot then, in the future. It's premature to say what it might be," Robotham says.

Sun's Short says something similar about the forum's future, but couches it in darker terms. "I think the real issue for the NCF is the factor of people's interest," he warns. "As long as it attracts technical people and keeps them interested, then it will have a healthy life. When and if those technologists get disenchanted and disinterested, then the NCF has a problem." ◆



Circle Reader Service Number 15

The sub-LAN subculture

BY STAN KOLODZIEJ

Hold on. Wait until the salesman has finished talking, then sit back and think carefully. Do you really need the deluxe networking model? Do you need full 10M bit/sec. speed to send data across the network? Do you need to send data to other people at all? Maybe not.

Ah, but the network salesman is talking again, this time about the future, about having room for growth in your network, about how your department, your company, is bound to grow faster than you or any of your coworkers imagined it would. The salesman has conjured up an inspiring image of your network growing in tandem with the prosperity of the company, of playing a conspicuous part, in fact, in its profits. It's an impressive image.

Pull back. You run a small insurance agency, or a medium-size law office or a small graphics department within a large conglomerate. You expect to grow, all right, but maybe not into the kind of mover and shaker that the salesman seems to think.

Fine, but the salesman has taken another tack: You can have your small network, the one that runs at an excruciatingly painful 3M bit/sec., that does not have a dedicated file server and that basically exists to share printers and disk storage for your four brave users. Go ahead, save money, the salesman says, but you'll be frozen within your network like a fly in amber, unable to grow as competitors and other farseeing departments within your company expand and prosper, plug into large corporate and global networks and find themselves in synch with the future.

This scenario might suffer from a little writer's license, but it captures the essence of many local-area network sales pitches. Many customers of local-area networks are still being sold on big network trappings when they could easily make do with a small network.

"A lot of my friends were sold on larger LANs, but I didn't find any of them happy with them," explains Rob Edgerton, manager of project scheduling at the Edmonds School District in Edmonds, Wash. "They started running up extra costs, the networks were expensive to service and, in many cases, they were overkill for the work load the networks handled."

Edgerton resisted the pitches of salesmen from the larger LAN vendors and decided to opt for a small four-user storage and printer sharing network called Handshake from Sundance Software, Inc. in Redmond, Wash. (Handshake has since been purchased and renamed Manylink by Net-

Small networks may fit the bill

line, Inc., a Provo, Utah, network company.)

"What we came up with is a network tying together one Compaq Computer Corp. Compaq 386, three IBM Personal Computer AT-compatible computers and a Hewlett-Packard Co. plotter and Laserjet printer," Edgerton explains. The Manylink software program resides on each node, or PC, in the network and enables the users to share files at a speed of 19.2K bit/sec.

The reason behind the slow pace is that Manylink is categorized as a serial port local-area link, or LAL, a very easy, inexpensive alternative to regular LANs. Along with the network software, the company provides a cable that attaches between the standard serial ports of the micros, basically transmitting shareable data at regular serial printer port speeds.

Edgerton admits his network does not compare with networks from the likes of Novell, Inc. or 3Com Corp., but his network only cost $350, compared with the lowest quote given him of $7,000 for a full-fledged, four-user LAN.

"We knew we would be doing minimal file sharing and that the emphasis would be on sharing printers," Edgerton says, "so the slow transfer speed doesn't bother us. We know we will be growing slowly, but we can always run cable or use the twisted-pair wiring we already have to expand the network in the future. I think the important thing is that we're happy with it. Others I know are not so fortunate with their more expensive networks."

Sue Scott, project leader in administrative data processing at the University of San Diego, says she also resisted the seductions of large networks to settle on something that was more in line with what she and her colleagues needed.

"We had a significant investment in printers, plotters and other peripherals," Scott explains, "and we share them a lot. We also do a fair amount of word processing but found

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Kolodziej is *Computerworld Focus*'s senior editor.

that we didn't do nearly as much file transfer and sharing of data that some of the other network vendors, such as 3Com, tried to convince us we did."

Scott elected to go with some small two- to 14-node networks from Dayton, Ohio-based 10Net Communications, a division of Digital Communications Associates, Inc. One of the big factors in the decision was price, but she also says 10-Net did not force her, like some other networks do, to centralise all network resources. Just as important was the ability for Scott and others to install the networks themselves.

"One three-node network took us all of an hour and a half to set up and get running," she claims. "With larger networks, I feel much more at the mercy of vendors and consultants."

Robert Nix, president of Rann Labs, Inc., a Tacoma, Wash., consulting firm, says his three-node sub-LAN from Simple-Net Systems in Brea, Calif., cost $1,725. The network replaces a Data General Corp. Desktop 20 system with three terminals. "That DG system cost us $2,400 a year just for a programmer to be on-line for servicing," Nix claims.

Welcome to the club

Scott, Edgerton and Nix probably do not know it, but they are part of a fast-growing area of the LAN industry called the sub-LAN market. The sub-LAN industry has been given a boost from many quarters. In part, it is a reaction to the high costs and complexities of most present-day LAN products; in part, it is a reaction to the poor network software and broken promises from LAN vendors; and in part, it is a result of customers taking a hard look at their networking needs and realizing that, contrary to what vendors seem to say, networking can be handled gradually, one step at a time, instead of from zero to 60.

Sub-LANs are probably not taking anything away from the larger LAN systems market, which experienced healthy growth in 1986 and 1987. It is more a case of the LAN market splintering into a section of larger, more powerful LANs that focus primarily on data sharing and into one of smaller sub-LANs that concentrate foremost on printers and other peripherals.

According to Creative Strategies Research International in Santa Clara, Calif., peripheral sharing is the top priority given by almost 80% of corporate PC users, while only 15% of users list file transfer as their main reason for wanting to be networked. A mere 5% of PC work cluster users gave data base and software sharing as their No. 1 priority, principally because in most large firms these functions are already served through micro or terminal-to-mainframe links.

Other research indicates that fully two-thirds of typical PC department work clusters have from two to 10 PCs, with only a few having more than 10. Watertown, Mass.-based sub-LAN vendor Digital Products, Inc., for example, says its findings reveal that most PC users are clustered in small contained work group units, the majority of which have fewer than 30 users. It is such consistency in work group operating numbers that has helped make the sub-LAN market a hot one. It is also why many of the large-network vendors have stumbled in trying to sell the "bigger is better" pitch.

Peripheral sharing is not just a concern for the smaller, less sophisticated network customer, however. Most companies want their users to improve their ability to share peripherals, especially expensive laser printers, hundreds of thousands of which are now being bought by U.S. corporations annually.

The cost of laser printers, which can run in the thousands of dollars, can be defrayed by printer sharing over networks, which also provides a method to gradually move users away from slower dot matrix printers. The same holds true for high-speed modems, whose costs can also be offset by the use of sub-LANs.

"What I see happening is a split in the LAN market," explains Doug Gold, senior LAN research analyst for International Data Corp., a Framingham, Mass.-based research group. "The main LAN market now consists of Novell, 3Com, IBM and some other vendors that are trying to provide the backbone networking ingredients for large customers. Underneath all this are the sub-LAN vendors.

"The backbone network vendors are trying to establish their territory as providers of everything from LANs to links into large wide-area and value-added networks," Gold says. "Being known simply as a LAN vendor now is not enough. Becoming enterprisewide network providers is important. That gives vendors heavier marketing leverage with customers."

Gold does not place much faith in the future of sub-LANs, believing they will settle into catering to a niche market of small mom-and-pop shops. He says the market is destined to grow slowly, soon to become saturated with too many vendors chasing too few customers.

"What you have is a ready-made market of small customer sales that will never need to expand into full-fledged networks," Gold says. "That market is being abandoned by the larger [LAN] vendors."

Gold might have a point. Even established low-end LAN network technologies such as Arcnet and AT&T's Starlan are undergoing changes brought on by market pressures. As LAN speeds increase faster than the rise in their costs, 10M bit/sec. is becoming the accepted industry standard. Although Arcnet, and especially Starlan, have built their reputations on providing smaller, lower cost LANs that can interface with larger high-speed networks, they might be losing ground in the shifting LAN market Gold describes.

As the market divides more clearly into two segments, Arcnet and Starlan have found themselves more isolated in the middle, unable to satisfy either the high-end or sub-LAN markets. At a painfully slow 1M bit/sec. and 2.5M bit/sec., respectively, basic Starlan and Arcnet have been unable to effectively compete in past years against the speedier Ethernet, IBM Token-Ring or Novell networks.

As network customers began concentrating on the installation of smaller networks, Novell and IBM made inroads into departments of large corporate accounts, which were originally the target markets of Arcnet and Starlan, taking away much of their potential business. Arcnet and Starlan vendors could not retreat, however, for behind them was a big drop to the smaller companies that Gold mentions, a market that holds less chance for the kind of spectacular future network growth the larger accounts promised.

> **"With most sub-LANs, you get quick payback because they're so cheap. You can scrap a sub-LAN and start again without suffering much in the wallet. Or you can build with what you have."**
>
> ALAN LISHENSKY
> COMPUNET COMMUNICATIONS CO.

While Starlan and Arcnet have been garnering their share of support from third-party vendors, the emphasis recently has been on increasing the speed and functionality of the basic Arcnet and Starlan technologies. HP, for example, has boosted Starlan's speed to 10M bit/sec., and a growing coterie of companies, like Mountain View, Calif.-based Tiara Computer Systems, Inc., has been producing such add-ons as adapter cards to plug IBM Personal System/2s and IBM's Micro Channel architecture into Arcnet, trying to keep the network in step with the times.

Datapoint, the developer of Arcnet, on the one hand has increased the capability of Arcnet but on the other hand has recently adopted a more open network scheme around official standards such as Unix in an effort to win back large corporate accounts.

Under market and user pressure, AT&T has announced that it will also introduce a 10M bit/sec. version of Starlan this year. AT&T's push to enterprisewide networking is reaching fever pitch, and it is clearly pushing Starlan ahead as an important component of its corporate networking strategy. If there were any doubts about Starlan truly cutting away from the small-LAN market, they probably ended with the 10M bit/sec. announcement.

Despite such refurbishing of Arcnet and Starlan, Gold thinks sales will slow in the coming years. It is now possible, for example, to supply stable, advanced 10M bit/sec. Ethernet over the basic unshielded twisted-pair wiring found in most offices. Arcnet also has not found the kind of support at the official standards committee level that Datapoint and other Arcnet adherents had hoped.

"I wouldn't count Starlan and Arcnet out just yet, however," cautions Andrea McCurdy, a research analyst at the Yankee Group in Boston. "The LAN market is changing, and I think the target markets of Arcnet, and especially Starlan, are also changing. I think AT&T is aiming Starlan at backbone [network] applications, and Arcnet vendors might continue targeting smaller installations with success. It really depends now on how they are marketed."

In the meantime, Novell, probably to be followed by other LAN vendors, has entered the sub-LAN market. Novell has targeted small corporate work groups with its Entry Level System Netware 286 Level 1 network, which the company says gives four users file, printer and storage sharing for about $595 a node, well within the price range of many sub-LAN systems.

Novell thinks there is a strategic element to be derived from tapping into the entry-level networking in large corporations. Such small beginnings could pan out later as the sub-LANs grow into more enterprisewide concerns — with Novell's assistance.

This sort of market thinking doesn't surprise Alan Lishensky, president of Compunet Communications Co., an Austin, Texas, network consulting firm. Lishensky says he has installed sub-LANs in several large companies that have been enthralled with the networkin' capabilities and low cost per node. The difference today, he says, are the options available in the under-10-user, or sub-LAN, arena.

"I tell clients not to get swept away by LAN salesmen," Lishensky explains. "The big thinking is to meet [networking] objectives. I've found the break point in networking to be 10 users. Under 10 users and over 10 users are different worlds requiring different file and peripheral sharing schemes and network goals."

Keep it simple

As for Starlan, Lishensky says there will continue to be a definite market for the product on the basis of ease of use alone. "A Starlan adapter card is designed so that you can simply plug a wire from your wall phone jack into your computer, and, after a few more basic steps, boom, you're cabled and ready to go," he explains. "Very easy. There will always be a place for easy-to-install networks."

For an average cost per node of between $300 and $500, compared with larger LAN node costs of up to $2,000, sub-LANs can no doubt buy a lot of faith on price alone.

But what about the oft-cited bugaboo that users of sub-LANs will be locked out of future expansion or merger with larger networks?

"Expansion is not an issue," McCurdy says, adding that users can keep reconfiguring and growing with sub-LANs as with any other networks.

"I don't think people quite know how much is available and how much flexibility they have," Lishensky says. "I can start with a Knowledgenet network [from Applied Knowledge Groups, Inc.] at $150 a PC, then move up to a Western Digital Corp. Starlan [licensed from AT&T] running Western Digital's Vianet operating system for about $400 to $500 a PC, and then up to an Ethernet, IBM Token-Ring or Arcnet network running Vianet or Novell Netware. If it's convenient for the client, I could plug in a network half of which is Arcnet, half Starlan and throw in a gateway to the mainframe.

"With most sub-LANs, you get quick payback because they're so cheap. You can scrap a sub-LAN and start again without suffering much in the wallet. Or you can build with what you have," he says.

Others urge caution, however. Diane Zytniak, a consultant with Steiner & Associates, a Bothell, Wash.-based computer consulting firm, says she would be reluctant to recommend using a sub-LAN for, say, a 20-user network. "There are definite expansion limitations with these systems," she declares.

For Lishensky, the biggest trade-off with small LANs is speed. "But a lack of good file lockout facilities can also be a problem," he adds. "The thing to remember is that sub-LANs are a good way to get a feel for networks before you go on to bigger network projects. That's important in itself." ◆

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Hot on the heels of corporate success

Apple allies itself with DEC, IBM

BY DAVID KOSIUR

During the past year, Apple Computer, Inc. has been making strong moves into the connectivity arena in an effort to prove that its Macintosh computer can coexist with other business machines. Recognizing that the Mac cannot function in corporate MIS environments as an isolated processor, Apple has chosen to provide a range of solutions for departments that use Digital Equipment Corp. or IBM computers. These solutions begin with simple connectivity and move on to the more sophisticated

concept of cooperative processing, or the ability for two different machines to work on the same problem in concert. Apple Computer, along with its cadre of third-party developers, has become one of the first to display applications that bring the power of cooperative processing to desktops.

Most DEC VAX users will admit that there's a commonality of attitude between themselves and Mac users. Repeated surveys point out that a large percentage of VAX installations also have Macintoshes (although they probably also have IBM Personal Computers and compatibles). The ease of using a VAX's VMS operating system likely encourages users to look for easy and straightforward ways of computing at their desks, which is typified by the Macintosh's desktop and menu interface. This commonality goes beyond an easy-to-use operating system, for both types of computers include a heavy emphasis on networking. VAXs come from the company that, thanks to Digital's Decnet, "has it now" in terms of connectivity. Every Macintosh comes with Apple's Appletalk network protocols built in.

Much has been written about the recent DEC-Apple strategic development alliance, which is expected to bear fruit in about nine months to a year. The joint effort will focus on distributed applications methodology, network management, networking, file sharing, document interchange, data base access and terminal emulation.

In the meantime, both Apple and others have produced connectivity solutions that can link VAXs and Macintoshes together in an effective manner.

A VAX shop can easily progress beyond simple emulation of DEC VT100 and VT220 terminals with a Macintosh by utilizing either Decnet or Appletalk. Current hardware lets MIS install either a gateway between an Appletalk network and Ethernet with Fastpath from Walnut Creek, Calif.-based Kinetics, Inc. or use one-on-one connections with boxes, such as Kinetics' EtherSC and Wilmington, N.C.-based Dove Computer Corp.'s Fastnet, or boards, such as Kinetics' Etherport SE, Etherport II or Apple's own Ethertalk. Twisted-pair Ethernet is not far away either, with Kinetics employing Synoptics

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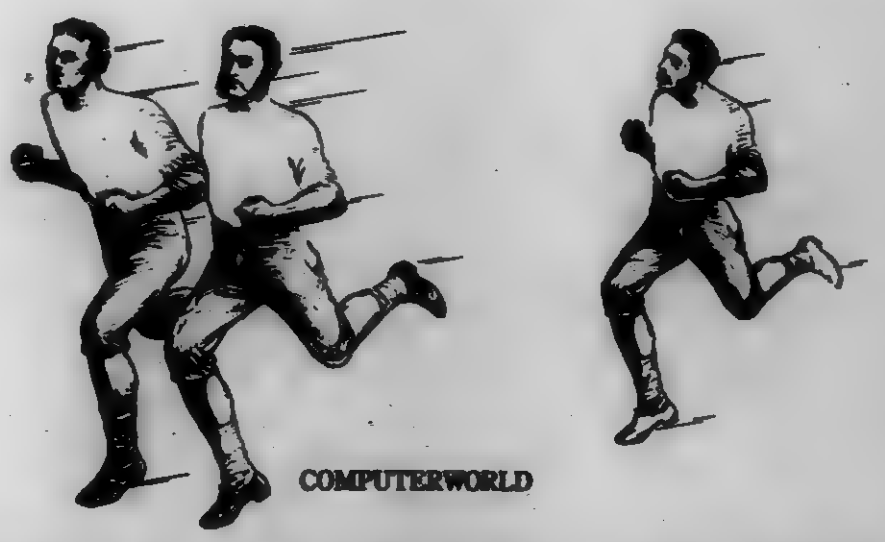
Kosiur is the publisher of "Connections," a newsletter based in Fullerton, Calif., on Apple Computer, Inc. Macintosh-based networking.



GLENN HERTZ

Communications, Inc.'s transceiver on a card for the Apple Macintosh SE.

If MIS wishes to use a Macintosh as a Decnet node, both Arlington, Texas-based Thursby Software Systems' TSSnet and Community Mac from Technology Concepts, Inc. in Sudbury, Mass., should fill the bill. Both products allow a Mac to become a full-fledged end node on Decnet, and the user, who needs to know a little bit about Decnet, can approach it from the familiar angle of the Macintosh interface. Both products offer such utilities as background file transfers and task-to-task communications.

On the other hand, Apple has also seen fit to implement its Appletalk protocols for VMS so that a VAX can become a participant in existing Appletalk networks over Ethernet. Appletalk for VMS has already served as the foundation for two products — the Alisatalk file- and print-server system from Alisa Systems, Inc. in Pasadena, Calif., and Northbrook, Ill.-based Odesta Corp.'s Helix VMS, a VMS data base that uses the Macintosh as a front end. (Another series of products, Pacershare and Pacerlink from Pacer Software, Inc. in La Jolla, Calif., use the firm's custom drivers but may soon use Appletalk for VMS.)

With these products, Mac users can view VAX disk partitions as normal Macintosh volumes and can exchange certain files with VAX users. Helix VMS, in particular, displays the power of this concept. It allows Mac users to utilize the normal Helix data base interface while VT220 users can access the same data base, resident on the VAX, with their own custom screens.

This concept of allowing the Mac to act as a front end for other computers and applications is where the newest products in cooperative processing and connectivity are likely to show their power. The Mac's interface has finally achieved acceptance in various markets; if nothing else, IBM and Microsoft Corp.'s efforts at producing Macintosh-like interfaces in their newest microcomputer operating systems have lent credibility to this interface. Apple and its co-developers have seen to it that their connectivity products will provide a Macintosh interface to users of distributed processes.

In the DEC arena, Helix VMS has been joined by Alisa Systems' Sequelink and Cupertino, Calif.-based Network Innovations Corp.'s CL/1. Sequelink was designed to allow a Macintosh user to use familiar Macintosh applications, like Apple's Hypercard and Cupertino-based Acius, Inc.'s 4th Dimension, to extract data from VAX-based SQL data bases, such as Oracle Corp.'s Oracle. The user does not need to know SQL, and the VAX does not need to transmit all of the data base over the network to the user; only the necessary data is extracted and sent.

CL/1 goes a bit further by providing access to a variety of IBM SQL and non-SQL data bases and can be programmed to deal with DEC's VAX RMS files and applications. But throughout this activity, the Mac user sees only the familiar interface and, therefore, can remain more productive than if he were struggling with SQL commands or the vagaries of a mainframe's operating system commands.

MIS control

The data base stays on the VAX where it belongs so that MIS departments can control it and archive it, but the user can more easily extract what is important to him, namely, the data. Training resources can be better utilized, because the Mac user can extend his knowledge gained from Mac-based applications to obtaining data from the mainframe. In addition, system resources are taxed to a lesser degree than if each user were using a terminal to communicate with a VAX data base.

Admittedly, not everyone is going to rush out and purchase these products for cooperative processing between Macintoshes and VAXs. However, for those willing to admit that the Mac interface can be more effective for the end-user than standard text-based screens, Apple has yet another product that should appeal to MIS departments and users alike: the Macworkstation.

The Macworkstation was designed to provide a Macintosh interface to existing mainframe applications with a minimum of recoding. The package can act as the middleman by accepting an existing program's I/O commands and sending mnemonics to an attached Mac, which in turn generates the customary windows, menus and dialogue boxes found in Macintosh applications. By using mnemonics, which the Mac program can understand, Macworkstation keeps the traffic down to a minimum. The Mac and the host can be connected via either a network or an asynchronous link.

What can users expect next in the Apple-DEC market? When Appletalk was first developed, its creators did not expect to see large networks of hundreds of workstations using Appletalk. That has changed, and Appletalk's protocols and tools are continually being enriched. The protocols can be run over just about any media, including twisted-pair, Ethernet coaxial and fiber-optic cable.

Let me see the manager

However, if there is anything that Appletalk is lacking, it is network management. The Apple-DEC alliance should address that deficiency, at least for those users linked into Decnet. First, Appletalk will be integrated into DEC's own wide-area network systems. Then, as both companies blend their products into the International Standards Organization's Open Systems Interconnect model, management of Appletalk and Decnet will become more unified.

One other shortcoming that is common to the personal computer world — and the Macintosh is no exception — is that of integrating electronic mail systems. Local-area networks are leading to the proliferation of E-mail, but corporations are justifiably more

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comfortable with mainframe-based E-mail systems. Communications between Macintosh mail applications and similar DEC services, such as DEC's All-In-1 and Mailbus, should come out of the DEC-Apple pact. (Other developers of mail applications are now looking to the developers of mail gateways as the next step in linking disparate systems.)

DEC's All-In-1 office automation system should become more tightly coupled to the Mac. Telos Corp. in Santa Monica, Calif., has already provided a step in this direction by creating Macnow, an All-In-1 interface for the Mac, and Keyword Office Technologies, Ltd. in Calgary, Alta., Canada, now offers an All-In-1 interface as an addition to its document translation facilities.

IBM not ignored

While courting DEC technology, Apple has not ignored IBM and its bevy of computers. In fact, Apple promises that its new connectivity products this year will be largely devoted to IBM systems. Again, standard terminal emulation capabilities are available, mainly from third parties, whether they be for IBM 3278, 3279 or 5150 terminals. Either protocol converter boxes for the older "closed" Macintoshes or boards for the newer "open" Macintosh SEs and Macintosh IIs can be used. Some products have advanced to providing multiple session support. It is surprising, however, that the Macintosh, which admittedly excels in graphics, has yet to provide support for IBM distributed function terminal, or DFT, style terminals or IBM mainframe graphics protocols.

Ottawa-based Simware, Inc. has also extended its support of dial-in access to IBM mainframes to the Macintosh, providing another level of connectivity to remote users. The emulation scripts written using Simware's Sim3278 software can be exchanged between Microsoft MS-DOS and Macintosh machines, making it easier to support the two computers.

Apple's MacAPPC debut at the Infonetics Desktop Communications Conference sheds some light on where Apple is headed in the IBM arena. By using a coprocessor board in a Mac II as a gateway, Apple provides an implementation of LU6.2 and PU2.1 that can be used by a series of Macintoshes connected via Appletalk.

However, Apple provides only the basic platform and expects third-party developers to build their applications atop it; thus the wait for useful products will be longer. In the interim, Apple appears to be committed to move beyond its initial support of IBM Synchronous Data Link Control and support IBM Token-Ring and other links.

Both Apple's MacAPPC and Richardson, Texas-based Northern Telecom, Inc.'s Lanstar for the Macintosh are front-runners in what will most likely be the prevalent approach to connectivity in the Apple camp, namely, the use of a coprocessor board in a Mac II. Designed to allow the Macintosh II to function as a regular workstation, these products are a convenient marriage between the simplicity of Appletalk networks for locally restricted networks and the power and range of other systems, such as private branch exchanges and token-ring networks, that may already be a part of the corporate infrastructure.

Apple is letting its Macintosh computers do what they do best while linked to the mainframes and superminis that usually contain the data of greatest importance to corporations.

Bringing the ease-of-use features found in the Macintosh interface to desktop computers has admittedly strained developers' resources, and extending these features to networking and cooperative processing might not be any different. However, Apple is looking to change even those rules.

Despite the great deal of hype about Hypercard, there is much good to be said about its programming language, Hypertalk, which possesses many of the attributes of Smalltalk, which was originally developed by Xerox Corp., and object-oriented languages. Many of the developers of the latest products in Macintosh connectivity have turned the Hypercard environment into an excellent prototyping tool for working with their products. Such systems as MacAPPC, CL/1, Sequelink and Scotts Valley, Calif.-based Touch Communications, Inc.'s Touch OSI have shown the ease of prototyping with Hypercard. Given the proper connectivity libraries, those organizations now using Hypercard to create information and training stacks are sure to devote some effort to extending Hypercard to cooperative processing tasks. Customization could not get much easier.

Apple has decided to become a major participant in connectivity and cooperative processing, letting its Macintosh computers do what they do best while linked to the mainframes and superminis that usually contain the data of greatest importance to corporations. The alliance between Apple and DEC may yield a networking system that could rival IBM's Systems Application Architecture (SAA).

On the other hand, Apple is not ignoring SAA and will become a participant in that architecture as the year progresses.

Once a company settles on a networking architecture, MIS can implement it with fewer problems than before regarding which desktop computers to use — Apple Macintoshes or IBM Personal Computers or Personal System/2s. At the same time, the user benefits because he can effectively get at corporate data with the system he finds to be most productive. ◆

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CORPORATE CLASH

CHUCK LADOUCEUR, TOM MONAHAN

The battle for network dominance

BY STAN KOLODZIEJ
SENIOR EDITOR

Its drama might not be as sweeping as a clash of armies, but the behind-the-scenes maneuvering of IBM and AT&T points to a future battle royal in networking between these two major corporations. The outcome could decide who gets the lion's share of U.S. corporate computing.

The scale of the conflict is changing significantly. Both IBM and AT&T have recently been busy with reorganizations, joint product development strategies and new product introductions that have raised the breadth of both companies' overall influence in corporate computing. All this movement has also opened the crack a bit, revealing to observers where corporate computing might now be headed.

First IBM. After what seemed a long pause between significant announcements, IBM made two moves recently that caught many industry watchers by surprise.

The first move, a large internal reorganization, created five new divisions and put IBM's official stamp on the increasingly important role telecommunications will play in the company's product and marketing strategy. The general managers in charge of these new divisions apparently have been given great freedom in developing the kinds of products they see fit for their own marketing purposes. The new IBM telecommunications division is no exception.

"Historically, communications products at IBM, which included Systems Network Architecture [SNA], data communications and Rolm Corp.'s voice systems, were under separate supervision," explains Dick Sullivan, IBM's director of telecommunications systems marketing. "By combining these elements and bringing them under one executive, we hope to accelerate voice and data integrated systems solutions."

Ellen Hancock, the executive in charge of the new telecom division and a career IBM staff member, has stated that IBM's Systems Application Architecture (SAA) will be given top priority in IBM's future communications strategy. SAA is the proposed set of IBM software architectures that will form a transparent bridge across IBM's main hardware systems, operating systems and programming languages. SAA is important because it will finally end the need for IBM to create awkward software layers between users and IBM's diverse system architectures. Although SAA is a major software push that will have repercussions across the other IBM divisions, the architecture has particular relevance for Hancock's communications concerns.

Two of the most important elements of SAA, creating single-user and single communications interfaces, are vital if IBM's communications strategy is to break free from that of other vendors, especially from main competitors Digital Equipment Corp. and AT&T. What SAA promises to do is help IBM get its internal communications house in order and shore up the difficulties in communicating across IBM systems, shortcomings that have been exploited effectively in the past by the homogeneity of DEC systems and now by AT&T and the resurgence of Unix.

Sullivan reacts, however, to the criticism that SAA is still predominantly a proprietary set of architectures that locks IBM customers into IBM systems.

"The communications interface in SAA is SNA, an architecture that includes a set of international communications standards such as CCITT X.25 and, eventually, ISDN [Integrated Services Digital Network]," Sullivan explains. "Most of our larger customers are global in nature, and they want international systems solutions. Our implementation of global standards is important to them as well as to IBM."

Sullivan presents SAA not as an end in itself but as another platform from which customers will eventually be able to plug into global communications via international standards and, by extension, IBM global networks.

IBM's entire emphasis suddenly — though the company argues that it has always been so — is toward adopting open standards. To drive the point home, IBM recently announced surprise No. 2: AIX, its forgotten Unix version, will now be available for its linchpin 370 system architecture. IBM has even intimated that Unix will play a big part in future IBM mainframe programming for IBM commercial systems customers.

At the same time, IBM reiterated its pledge of open systems and standards and berated any attempt to try and close Unix from the majority of the marketplace, a barb aimed at AT&T and its apparent reluctance to commit Unix's future solely to official Unix standards bodies such as Posix.

IBM's Unix announcement should not come as a complete surprise, however. C, one of the three programming languages supported within SAA, is an integral part of Unix programming and has become something of a celebrity in the

IBM, AT&T raise the networking stakes to a global level. Story page 37.

CORPORATE CLASH

eyes of many programmers. IBM's latest Unix announcement highlighted the importance of IBM's inclusion of C in SAA a few years ago.

Perhaps as importantly, the Unix and C tie has also brought into focus the fact that IBM seems to be better now at combining elements of its overall strategy together than it perhaps has been in the past. IBM has had an annoying tendency of missing opportunities to bridge products together across diverse operating environments, a prime example being the initial lack of a working link between its Distributed Office Support System and Professional Office System office automation software. Lately, however, product announcements are fitting into a coherent scheme, and IBM's new divisional managers will most likely continue that trend.

IBM's embrace of Unix, however, is as much a marketing imperative aimed at blunting some of the sudden momentum AT&T has gained with Unix as it is an altruistic act on IBM's part to offer more standards options for its systems and communications. This observation is especially significant in light of AT&T's synergy with Sun Microsystems, Inc., whose impact on the marketplace goes beyond the high-powered engineering workstations the company produces.

IBM's SAA, which will be rife with open communications standards hooks such as ISDN and X.25, is still years away. In any case, such standards will be aimed, for the most part, at long-range voice and data communications.

This situation leaves a gap in terms of open standards at the local-area network, multiuser systems and mainframe levels, which AT&T is attempting to remedy with Unix. The battle for global network supremacy might be years away, but the struggle for strategically important local and enterprisewide networking is very much in the here and now.

Worry lines

AT&T's relationship with Sun has AT&T's competitors worried on several fronts. First of all, Sun's founders are well-versed in Unix development, with co-founder William Joy having been instrumental in shaping the influential University of California at Berkeley Unix versions. From a fairly obscure background, Berkeley Unix has ridden Sun's meteoric success into the forefront of Unix standards issues.

As Unix becomes more of a factor in commercial computing and communications, AT&T's competitors, such as Hewlett-Packard Co., DEC and IBM, have been maneuvering behind the scenes, making clear their concern that AT&T and Sun follow the dictates of the IEEE Posix standards committee in adhering to a truly open Unix standard.

What has competitors like IBM worried is AT&T's declaration that its Unix System V Release 4.0 will include important elements from Sun Microsystems' SunOS operating system and Berkeley Unix 4.2 and 4.3, both of which are closely associated with the principals at Sun. Furthermore, Release 4.0 is slated to take advantage of Sun's Scalable Processor Architecture (Sparc) chip, which is based on reduced instruction set computing (RISC) technology. Though other companies, including IBM, offer machines based on RISC technology, never has RISC been part of such a clear directional strategy in a vendor's networking goals (with the possible exception of HP).

In the words of Bill O'Shea, director of information technology development at AT&T, "We look at [Sun's] Sparc technology as the CPU engine for our next generation of mid-range machines — in other words, our future minicomputers and servers, those systems supporting up to several hundred users. Sun Microsystems will be providing the computing nodes on our network structure."

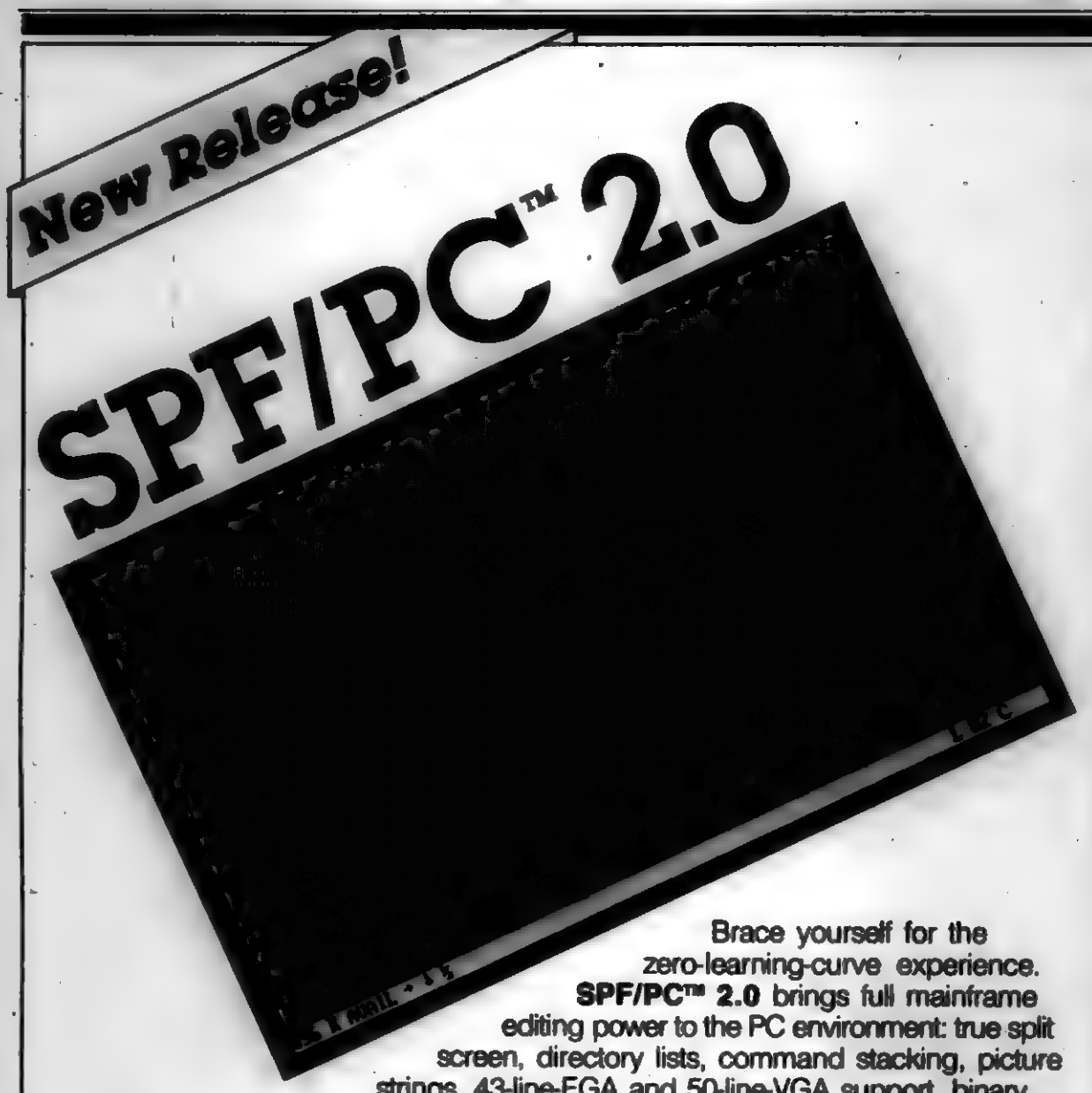
No beating around the bush

O'Shea's statement is unequivocal: AT&T's major decision to build networking around RISC and, more specifically, Sun's Sparc technology, and wrapping Unix around it is leading IBM and others to be naturally suspicious of AT&T's intentions to abide by its call for an open Unix, an operating system whose fate AT&T still controls to a large extent. The specter of powerful, low-cost network servers, based on innovative Sparc technology and driven by optimized Unix, is daunting enough for competitors in the engineering workstation market. The thought of this combination applied to the mainstream commercial market could cause ulcers.

IBM's Sullivan, however, reflects IBM's tactful approach to the sensitive standards issue. "If there's one thing that our customers are pressuring us for, it's the need for communications between IBM systems and between IBM systems and other vendors' systems. There are certain selected areas in our [system] architectures that IBM believes need to be opened. Our customers, and I'm sure other vendors' customers, want interoperability as soon as possible. If certain architectures are not left open, then it will have a negative impact on industry growth. Closing Unix is not in the right direction," he says.

AT&T's O'Shea, however, insists that his company's intentions for Unix are honorable. He says AT&T will come into compliance with Posix when Posix becomes a final standard.

To drive home his point, O'Shea says



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out AT&T's three-pronged agenda: to continue to support its Unix System V Interface Definition; to make modifications to System V to allow it to be compatible with the Posix standard; and, beyond Posix, to incorporate a few other key Berkeley Unix features that he says Sun has pointed out to AT&T. When asked to be more specific about the latter point, O'Shea replies that the Berkeley elements in discussion with Sun Microsystems concern "suboptions of suboptions, down to the basic levels. Not the big issues."

Even with the apparent momentum AT&T has been getting behind Unix, the company still might not carry as much weight if it had not been for the recent restructuring at AT&T that placed Vittorio Cassoni, erstwhile Ing. C. Olivetti & Co. mover and shaker, at the head of a newly independent and apparently robust Data Systems Division (DSD). Cassoni's placement and AT&T's underwriting of a dedicated marketing and product development team at DSD has been hailed as a positive move for AT&T by industry observers and a presage of its possible surge in the computer market.

Also significant is the keen awareness Cassoni seems to have of merging current and future computer products with networking features.

Perhaps more importantly, Cassoni has shown from his days at Olivetti the importance of marketing in getting a product across.

This belief is apparent in his comments on how AT&T will market its recently introduced 6386 Workgroup System, a multiuser system based on Intel Corp.'s 80386 microprocessor. Historically, multiuser systems and LANs have been marketed separately by separate vendors, but both products have come into more direct competition with each other, chasing the same departmental, vertical markets.

To date, AT&T's multiuser systems have not sold briskly, and the fact that AT&T also actively markets its own LANs might, on the surface, seem a poor marketing move, a duplication of effort. Not according to Cassoni.

"Apart from a few exceptions, there is not a customer that has nothing, no computer systems, already installed," Cassoni explains. "The 6386 system runs Microsoft Corp. MS-DOS, IBM OS/2 and Unix System V independent of one another.

"On top of that, the 6386 gives IBM SQL [relational data base management] and, on the network side, a full sweep of SNA support from IBM LU6.2 to 3270 emulation, TCP/IP [Transmission Control Protocol/Internet Protocol] and X.25. So, the 6386 can manage a personal computer LAN but also [handle], in the same Intel 80386 system, a number of workstations in a typical minicomputer environment so that you're able to consolidate the old environment with the new LAN-based environment, which most customers are driving toward. The ability to combine a multiuser sort of functionality with the typical MS-DOS OS/2 LAN kind of approach is helpful."

Cassoni

Cassoni adds that one of the keys to the 6386 and future AT&T systems is the Application Operating Environment (AOE), a set of software services based on Unix System V and containing fourth-generation language software development facilities. Cassoni describes AOE as being closer to DEC's kind of cohesive operating environment across all systems than to IBM's multilayered SAA.

"The important thing is that this environment is stable across all our product lines," Cassoni says. "You have exactly the same application operating environment on a 386-based machine that you have in our [Unix-based] 3B minicomputer line."

Importantly, for future networking applications, Cassoni has made sure that AOE will be migrated to Sun's RISC-based machines.

O'Shea says he believes AT&T's emphasis on networking at the local level will pay dividends later as AT&T tries to provide all the elements of the strategically important concept of enterprisewide networks. These networks will form the backbone layer of corporate data and voice communications between LANs and sub-LANs and in global communications.

"We want to focus on work groups with multiuser systems and then leverage our networking integration strategies against those work groups," O'Shea explains. "The LAN we're going to base our leveraging on is AT&T Starlan. In those network configurations, we see the 6386 as a desktop machine for power users, but for other users, we're really going to be pushing it as a network server. Starlan is going to be the mechanism."

Getting networks up to speed

To help that vision along, Cassoni announced that AT&T will soon introduce a 10M bit/sec. Starlan, a version whose rate is 10 times the current base Starlan speed. Though O'Shea downplays the emphasis on speed in today's LANs, 10M bit/sec. is fast becoming the standard in many network applications and in the market perception of what a vendor should carry.

"Network media is not the problem, it's getting good work group software to take advantage of the media," O'Shea says. "That's where open Unix is going to be another big leverage for us."

Some are not so sure. Howard Gilbert, a systems programmer at the Yale University Computer Center in New Haven, Conn., says IBM's Token-Ring LAN has big networking advantages in being "almost indestructible and easy to diagnose. You can't say either about Ethernet." As for Starlan, Gilbert says it simply hasn't made an impact and probably still won't, even at 10M bit/sec.

"It's not the media, it's the software that's going to be the big networking issue, and I don't think AT&T is going to cut it," Gilbert says. "In fact, I don't think AT&T will be IBM's biggest competitor in the future. I think Microsoft might have that honor."

The big battle between AT&T and IBM, Gilbert suggests, could be overshadowed by an even bigger conflict.

"I think the big battle in the future will be the one between micros and mainframes controlling networks. Microsoft is trying to make OS/2 the optimum architecture for PCs to replace mainframes, while IBM is optimizing OS/2 to enable PCs to talk to mainframes and retain mainframes as the big component in future computing and communications." ◆

AT&T, IBM attempt to give you the world

BOTH IBM AND AT&T are slowly pushing the network stakes into the global marketplace.

Many analysts say they believe it is only a matter of time before IBM's current marketing and product development relationship with Network Equipment Technologies, Inc. (NET), a Redwood City, Calif., maker of T1 multiplexers, becomes a deeper equity partnership. Through NET, IBM is entering the hot T1 market with products that it could soon channel into spin-off services from its own global corporate network composed of satellites and private leased lines.

IBM, in fact, is already selling space to companies on the network, and some observers say the company could accelerate that service in the face of increasing telecommunications competition from AT&T and computer companies Digital Equipment Corp. and Unisys Corp., which are also beginning to eye such global services.

Dick Sullivan, IBM's director of Telecommunications Systems Marketing, even sees District Judge Harold Greene's most recent judgment in favor of the regional Bell holding companies as a business boost for IBM. In that decision, Greene opened the way for the regional companies to provide some computerised information services such as electronic mail and voice storage and retrieval.

"We look at the ruling as an opportunity for the telephone companies [to be] gateway providers. It gives us [IBM] the opportunity to sell messaging applications, electronic mail applications and other solutions to these telephone companies and, ultimately, to end users, using the telephone companies as gateways," Sullivan explains.

"There are areas where we'll be competing directly with the telephone companies," he adds, "but there are also areas where we are customers of theirs and vice versa."

Both IBM and AT&T are working extensively in fiber-optic technology, with AT&T apparently making strides in improving its long-haul private network offerings. A step in that direction is TAT-8, AT&T's fiber-optic cable that will link Europe and North America.

As for IBM, Sullivan says that it is just a matter of time before the company's fiber-optic research, which he says IBM uses extensively for its own internal purposes, will be channeled into the private sector.

Both AT&T and IBM have also recently made some firsts in telecommunications.

AT&T has purchased its first satellite communications company, Atlanta-based Tridom Corp., while IBM replied with the acquisition of Pactel Spectrum Services, a division of the Pacific Telesis Group and the first major corporate purchase since its buyout of Rolm Corp. some years back.

Spectrum promises to extend IBM's important network management capabilities beyond its backbone Systems Network Architecture network into larger data and voice networks.

AT&T has raised the stakes considerably, however, with its recent announcement of Integrated Services Digital Network (ISDN) services. ISDN is important because it represents a worldwide attempt to upgrade international phone and data communications networks through official standards. One of the two ISDN services that AT&T plans on having in place across the U.S. next year, pending Federal Communications Commission approval, will enable AT&T clients leasing digital communications lines to automatically switch to a less contested channel to increase efficiency and cut line costs.

AT&T is also expected to introduce more extensive ISDN data communications services sometime during the latter half of this year. Though ISDN is based on international standards open to all companies, AT&T no doubt will be in an influential position to control much of the future marketing direction of ISDN and, therefore, much of global communications through its early pull on ISDN third-party hardware and component makers.

The big communications puzzle might be slowly coming together. — STAN KOLODNY

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Firms unite voice, data and imaging

BY HELEN PIKE

Imagine a telephone system used by 1.3 million employees in 3,500 locations, averaging 1.5 billion call minutes per year through 1,655 private branch exchanges. This is the Federal Telecommunications System (FTS), the largest telephone network in the world. But its users don't transmit information by voice alone anymore. They are facing an ever-growing backlog of data that some day could make the Library of Congress look like a manual for plugging in 3Com Corp.'s 3stations, so Uncle Sam wants to upgrade the 25-year-old system.

The engineering plan calls for nothing less than integrating voice with data and the emerging use of imaging and to transmit all that information back and forth on the same cable. The contract is referred to as the FTS 2000 because its intent is to take care of the federal government's communications needs into the 21st century.

"The FTS was a leading system in the 1960s when it was first designed," said Bernard J. Bennington, the General Services Administration's (GSA) deputy commissioner for telecommunications services, in a 1985 interview. "We want the FTS 2000 to put us back into the leadership role."

But that is Washington, D.C. Outside the nation's capitol, far away from antitrust policies and charges of government impropriety (see story page 42) and far away from the spirit of public service, the private sector is racing ahead of the federal government to unite voice, data and imaging.

"If we can't have pie in the sky, we'll have cake on the table," is how Michael Dortch, an independent consultant, characterizes emerging uses of the FTS 2000's technical proposal. Dortch, who works in San Francisco, has analyzed the telecommunications industry for about 10 years, listing AT&T, U.S. Sprint Communications Co., MCI Communications Corp. and the regional Bell holding companies as some of the clients for whom he has done research.

Cost-conscious MIS and telecommunications managers have budgets to maintain and personnel numbers to keep low, Dortch observes. These managers "have no idea when [the FTS 2000 technology] will come, but they are under pressure to design more efficient networks now. They will save the Buck Rogers stuff for later."

As Dortch continues, he points out

Pike is *Computerworld Focus*'s senior writer.

① The CEO wants a completely overhauled customer information system in 9 months.

② marketing needs external research information in their database to keep ahead of the competition.

③ Accounting needs changes to the old system by the next close.

FOUNDATION

that the telecommunications industry has been trying for years to get diverse traffic pumped down one line, and the only way to do that is with digital signals. Dortch is wary about the claims of the Integrated Services Digital Network (ISDN). In his estimation, ISDN is nothing more than a way for telephone carriers to justify their accelerated investment in new switching and transmission equipment.

ISDN downplayed

"They want to pump as much data down their lines as possible, and that requires digital lines. ISDN is nothing more than a transmission medium," Dortch says.

On the other hand, "FTS 2000 is a telecommunications management strategy," he says about the federal contract's practical value to information managers.

Telecom vendors know a lot about data because they have been helping users push data down voice pipes for years, according to Dortch. "Politically, MIS directors in user companies should make friends with their counterparts on the voice side of the house, because right now, MIS often hasn't the foggiest clue about how voice works."

Video, frequently grouped under the label of imaging, will eventually be integrated with voice and data, he says, but it will need a lot of power and memory. It may be useful for product modeling and for engineering designs, he explains, but for text-based electronic mail, facsimile machines will be cheaper than building videoconference centers.

On another level, FTS 2000 is also a form of market validation that will help the carriers sell ISDN capability in the private arena, Dortch says.

Dortch likens the GSA's futuristic phone plan to a user-as-reseller strategy in which the GSA would resell its telecommunications services to other government agencies and departments. The Boston-based Yankee Group, a market-research concern, calls this the "BYOB," or Be Your Own Bell, strategy. And Dortch notes it is gaining popularity among large users.

Large organizations are typically the early adopters of technology. In the case of building a Bell system, customers can work with AT&T to implement Tariff 12, also known as the Virtual Telecommunications Network Service.

Custom networks

Tariff 12 allows AT&T to create custom networks for voice and data using a flexible mix of services under long-term contract at packaged rates. In exchange for providing this service, AT&T is taxed with a tariff by the government. Among the customers who have lined up so far to use Tariff 12 are Du Pont Co. and General Electric Co.

"We might add video, but the

FTS 2000 generates more controversy than kudos

"MANY OFFICIALS in the government . . . appear to be comfortable with processing information the same ways they have been doing it for the last 20 years. This is not what I would call an innovative, forward-thinking position — nor does it serve the best interest of the taxpayers."

Rep. Jack Brooks (D-Texas)

The federal government's contract to upgrade its 25-year-old telephone system has made a lot of headlines — and not for the reasons originally hoped. Government officials had expected the contract's technical prospectus to receive front-page coverage crediting Uncle Sam with taking a visible leadership role in promoting low-cost integration and transmission. Instead, news accounts on the Federal Telecommunications System (FTS) 2000 have unraveled stories swirling more with politics and alleged government impropriety than with the integration of voice, data and imaging — the three key information technologies.

The plan for the world's largest telephone system, private or public, calls for the integration of voice mail, high-speed data transfer and full-motion teleconferencing video services for sending over a single transmission medium or a combination of media. The conduits could be either copper wires or fiber-optic cables, microwaves or satellites. The services include controlled service access, encryption and mass calling. A clause in the contract also calls for a continuously upgradable design so that new features can be accommodated at the lowest cost.

"We're making the telecommunications industry rethink itself. It's a legacy we leave to all the other users," says Bernard J. Bennington, deputy commissioner for telecommunications services at the General Services Administration (GSA).

The contract underscores an emphasis on data transmission over voice communications as federal surveys point to a 6% annual rate of decline in the use of voice traffic by the government. Government projections show that by 1990, data communications will make up 50% of all transmissions while voice will make up about 42%.

Then there is the advent of teleconferencing. "Digital technology makes video available," Bennington says. Using one of his oft-cited examples, Bennington says the Veterans Administration would take advantage of video as a means to link its hospitals together. Teleconferencing is an alternative to travel in which, for example, doctors could observe each other in operations, he explains.

Teleconferencing also is one of the future capabilities that will be made easier with the advent of Integrated Services Digital Network (ISDN), the information transmission service under development by the regional Bell holding companies and a service that the federal government says it would like to implement as part of its FTS 2000 modernization.

"We've got two forces going here. This is a push-pull market," Bennington says about the FTS 2000's far-reaching intent. "The government has pushed the companies to state what they will provide in the next 10 years, and we [the government] will buy it."

Integrating voice, data and imaging isn't the only goal of the FTS 2000. A second one is to wring excess out of the federal phone bill — as much as $100 million annually, according to Bennington. The FTS system in place today delivers approximately 1.5 billion call minutes per year in long-distance traffic; in 1985, for example, the federal government paid $424 million for long-distance calls; in 1987, that figure rose to $462 million.

But the news of these goals in recent months has been overshadowed by headlines about alleged government wrongdoings and Washington's continued free-market sentiments that are driving the telecom industry.

As of this writing, the contract awards for upgrading to digital the analog switches used to route telephone calls are in dispute. AT&T alleges that a GSA employee leaked its proprietary information to competitors, and there are countercharges that AT&T itself may have received confidential data by the same means.

A GSA employee has been charged with leaking information from sealed bids dealing with upgrading the switches. Speculation centers on the possibility that the employee was fanning a price war in order to lower the federal government's overall telephone costs.

But the digital switches, as 12 separate contracts valued at $55 million, are only a part of the total FTS 2000 specification.

As initially drawn up, the FTS 2000 proposal called for the switches as well as transmission circuits, a control system and data bases all to be awarded to a single company over a 10-year period. (The first FTS contract for telephones only had gone to AT&T in February 1963.) The administration estimates the value of the new contract at $4.2 billion.

After the specifications were made public, the contract made headlines. But not for the forward-thinking design. This time, Rep. Brooks, chairman of the Government Operations Committee and a champion of competition in federal contracts, leaned on the GSA to break apart the FTS 2000 contract and make various sections competitive, awarding bids to different companies, not just one. Furthermore, Brooks estimated the FTS 2000's total value at closer to $25 billion with the addition of data and video applications to the voice communications load.

Bowing to pressure, the GSA decided to follow similar methods used by other government agencies, such as the Department of Defense, in awarding contracts to teams of commercial companies. It divided the FTS 2000 plan into two separate phone systems to be maintained by two separate groups of vendors. In some cities, both networks will serve federal employees. In other cities, there will only be one network.

AT&T and Boeing Computer Services Co. make up one of the two leading teams. The other group consists of Martin Marietta Corp. with MCI Communications Corp., the seven regional Bell holding companies and Northern Telecom, Inc. For undisclosed reasons, U.S. Sprint Communications Co. broke with partner Electronic Data Systems Corp. (EDS), a General Motors Corp. subsidiary, and is expected to be part of a new bidding team with parent company GTE Corp.

The deadline for bids on the rest of the FTS 2000 components has been most recently extended from March 31 to April 29. Awarding of the contract to the winning team is still set for September. A year later than initially scheduled. One year away from the original implementation date. Seven years after the GSA started thinking and planning how to upgrade its aging analog system. — HELEN PAIK

need is not that pervasive," comments Stanley M. Welland, corporate telecommunications manager for GE, which has 100,000 users on the corporate network.

While there is not a great demand for it at the corporate level, Welland does acknowledge there is a use for full-motion or compressed video among engineers and scientists whose work is design-intensive. Such a technology would also save a lot of travel, he adds.

At the very least, all companies should be looking at simultaneous voice and data transmission, he says. "Anyone who's not looking at it is leaving money on the table."

Picking up requests for help in integrating voice, data and imaging is Electronic Data Systems Corp. (EDS), which integrated voice, data and imaging for the company that acquired it, General Motors Corp. EDS now sells that capability out of house.

"You have the choice to do it yourself or the choice to hire someone like EDS to do it for you," says Harmut W. Burger, manager for the last four years of the network engineering group at EDS in Southfield, Mich.

The integration for GM took place because data had become much more strategically important than voice for the company, according to Burger, who had previously managed GM's MIS needs for 24 years. GM started looking into the future in the early 1980s when it saw it had to integrate its manufacturing, ordering and delivery operations in order to remain globally competitive.

GM needed help

"General Motors had to be much more responsive to the market environment," Burger explains. "[It] had to shorten its product development cycles, to shorten the delivery cycles. It became obvious that communications, especially data communications, was going to be of extremely strategic importance for that integration process."

The company invested roughly $500 million in creating a digital infrastructure with switched digital circuits from such vendors as AT&T, MCI and U.S. Sprint — all selected based on economics, according to Burger.

"We are only in the business of building networks in order to meet customer requirements," Burger explains, saying EDS's clients are located at 70,000 sites in 25 countries. In 1984, EDS bought 500 PBXs — to gain control over the networks, according to Burger — and the switches had to be digital and migratable to the ISDN environment. "We are not vendor dependent. We pick whatever vendor best meets our customer requirements. Therefore, we mix and match all kinds of vendors and keep competition alive.

"Right now, the major challenge in our particular environment is to get control over the diversified technologies and the mix-and-match vendor environment," he continues. The EDS network is made up of 300,000 phones, 250,000 data terminals and hundreds of large-scale computers and front-end processors.

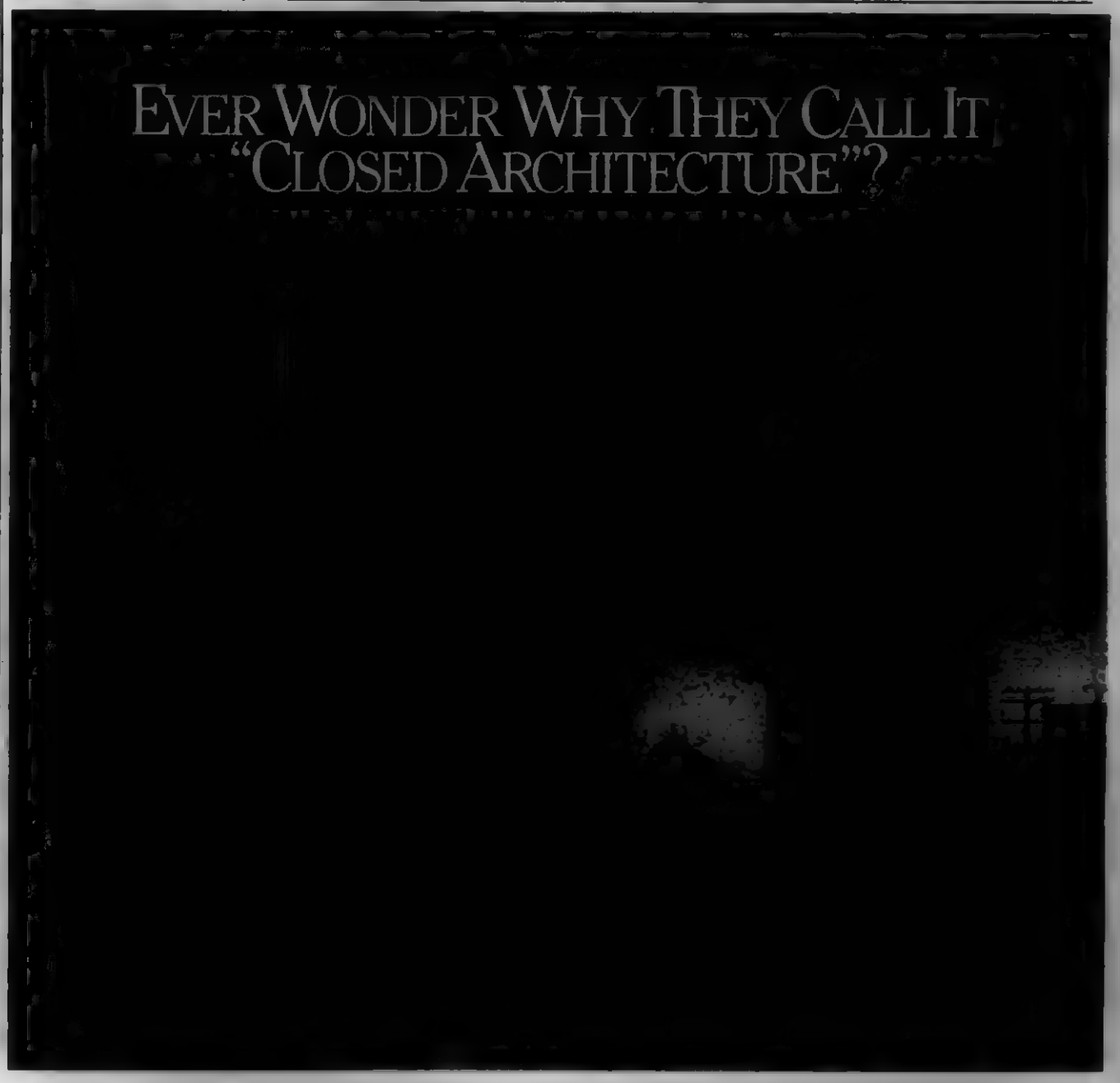
"Network management is the biggest hot button that we have at this point in time," Burger says.

MIS's challenge

According to Burger, MIS has to realize that the challenge no longer lies in making data centers operational. Rather, it lies in interconnecting data centers and voice users, he says, adding that this information can have any form, be it voice, data or video.

"We are heavily in the video environment," Burger says. At EDS, that means roughly 2,000 receive-only video-oriented microwave earth stations. Major hubs are co-located with the company's information processing terminals, he says, from which EDS can up-link broadcast information throughout the country. In addition, there is a mobile up-link truck that is dispatched to any location from which EDS wants to start a broadcast.

In the convergence of data, voice and imaging, "the issue is to bring the information to the end user of the information,"



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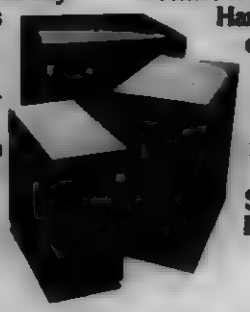

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Burger says.

EDS is not the only early adopter of technology trying to meet an internal, corporate need for sending integrated information. For the last 10 years, Robert S. Dines, IBM's U.S. internal telecommunications director, has been bringing his work closer together with that of Big Blue's internal MIS department.

"The most dramatic changes have taken place in the last 10 years," he notes.

Today, IBM has a global network to offices in 145 countries through a combination of satellites and fiber optics. In the U.S., Dines estimates voice takes up 55% of the communications load, while data takes up 35% and video 10%. IBM's own users in this country add up to 275,000 for voice and 300,000 for data.

"Our plan is to integrate these for high-speed transmission," Dines says about the possibility of coming down from satellites and using T1 or T3 multiplexers or fiber-optic networks. "But we have to choose the right technology so we don't have any false starts."

Video is used internally by IBM in two different ways. Sales and marketing personnel can hold meetings in any of 150 two-way teleconference centers located around the world. For education seminars, there are 15 one-way conference sites that have sound as well as a video delivery capability in half-a-minute slow scan for color. There are plans for 10 more centers by year's end. In addition, IBM, like EDS, uses facsimile for rapid transmission of documents that are not, in Dines' words, "in machine form."

"What we do is provide the best facilities for ourselves so we can be more competitive," he says, explaining IBM's internal viewpoint. There is no notion of providing these facilities as a means of measuring IBM against its competitors, he adds.

"Our users are very creative in how they want to use their networks," Dines says. One of his examples is of the service department's choice of linking terminals into a data base to keep track of equipment and parts for more efficient maintenance.

"The new technology is more reliable," Dines observes. "It's a lot of fun integrating new technology in a way that's breaking new ground."

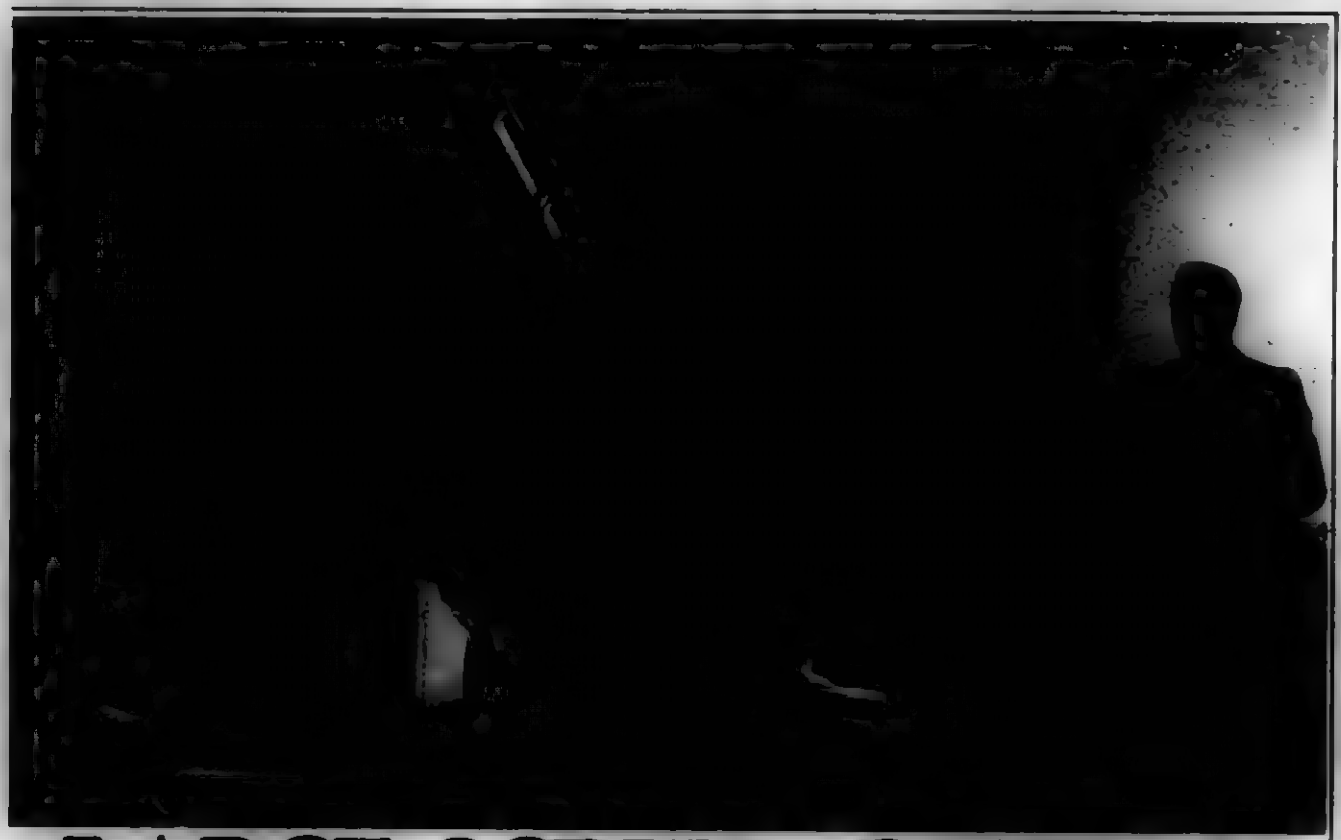
> **As competition escalates, prices will become elastic; the economics during the next five years should make network integration more attractive.**
>
> BRICE CLARK
> HEWLETT-PACKARD CO.

But to break that new ground of implementing integrated information, will orders come from the top down or from the bottom up?

Brice Clark, an electrical engineer who has done research in microwave technology for Hewlett-Packard Co., sees a split between top down and bottom up in the adoption of communications technology. At one end of a network are the front-office needs that are phone-intensive and, therefore, more complex to integrate. At the other end is the factory floor, where manufacturing users find data and video a more appropriate means to send and receive information.

However, as competition escalates, prices will become elastic; the economics during the next five years should make network integration more attractive, says Clark, now computer-integrated manufacturing solutions manager within HP's Information Networks Group in Roseville, Calif.

The integration of voice and data will benefit from applications that take advantage of both, he adds. There are a few technologies that will provide standards and higher bandwidths, and that, Clark believes, "is what's truly going to be needed to integrate voice and data." ◆



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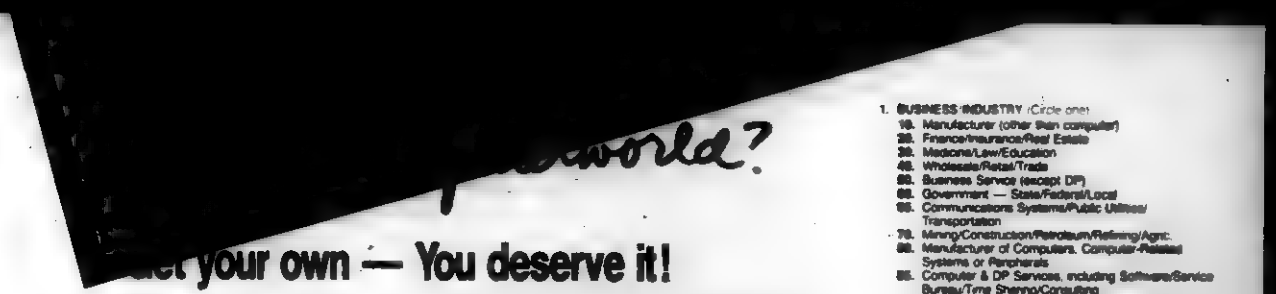

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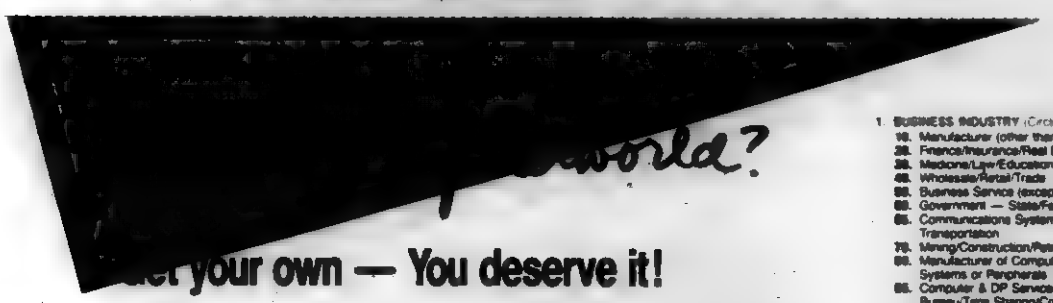

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   - 23. Dir., Mgr., Supvr., Analyst, of Systems
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Diplomatic ties: Managing a global network

BY JOHN HIGHBARGER

After a meal of spicy Indian food, the boss's stomach was just uneasy enough to keep him up all night. Not one to waste an opportunity, he used the time to address an issue that had concerned him for a while — manufacturing costs.

For several years, competitors had been unable to match his costs, giving his company a strong foothold in the marketplace. Recently, though, competitors' costs had become much more in line with his, and a few rivals had even surpassed his organization as low-cost producers. The time had come to seriously consider offshore manufacturing. The next morning, the boss launched a program, and offshore manufacturing soon became a reality for his firm. The program worked well, making the company again the low-cost producer in its field.

As a result of the offshore manufacturing effort, the company realized a substantial foreign market for its producers. Soon, the company had established five marketing offices scattered around the world, all needing information systems and communications support. And so, nine months after the chief executive officer had a spicy meal, the MIS officer got indigestion.

U.S. companies of all sizes are doing more international business. For MIS and communications executives at major corporations, this trend is nothing new. They have been on the international scene for years and have large staffs capable of solving diverse problems in international business. But for smaller companies, the information systems and communications support that they employ domestically are often inadequate for undertaking even relatively minor international endeavors.

When problems are encountered, some companies typically ignore them and let the international branches function without the communications and information systems support that the domestic office has grown to rely upon. However, many organizations are discovering that their real competitive advantage is in their use of technology and that the loss of MIS support can hurt them competitively in the international marketplace. Therefore, the only acceptable course of action may be the successful integration of systems and communications in the foreign offices. To accomplish this goal, MIS faces three areas of concern: technological difficulties, legal issues and management problems. The success of international systems implementation is directly dependent on the MIS executive's ability to manage these issues.

CRUZ MING

Technological problems encountered in an international systems implementation can run the gauntlet from simple to extremely complex. For example, I have seen information systems executives ship personal computers to European offices without first accounting for electrical differences. They were quite disappointed to discover they could not plug in their new personal computers.

Even something as relatively simple as installing telecommunications capabilities can become difficult in the global environment.

In Europe, digital telephone systems use an encoding structure different from the one used in the U.S., making the two systems incompatible. A U.S. digital system cannot properly decode a voice or data signal from a European encoded system. Complex technological problems like these cannot be easily remedied.

Highberger is director of information management consulting for Coopers & Lybrand, headquartered in New York. His areas of specialization include strategic information systems planning and expenditure assessment and technology support.

In many countries, such as Saudi Arabia, the importation of computers and computer peripherals is highly restricted. The availability of specific products may vary substantially from country to country.

In addition, some countries' computer industries are protected by law to guarantee their market. It is not uncommon to find that the technology a company designates for international use is not available in certain countries. This discovery may then mean that the firm would have to use totally different systems that may not meet U.S. specifications.

Communicating in a foreign market also differs vastly. Most foreign telephone services operate as part of the government postal service. In setting up systems in various countries, MIS will encounter differing services, cost structures and bureaucracies that have to be dealt with in order to achieve the desired results. An organization can usually reach its desired technology goal, but this requires advance planning, rapid response and flexibility in its methods.

U.S. standards are not always the benchmark by which to measure foreign management practices. In many foreign local economies, rules of thumb that are generally accepted in the U.S. may be totally out of sync with the business realities.

Another area that MIS must confront is the legal issues inherent in global computing environments. In the U.S., businesses can freely communicate information electronically both in and out of the country and import technology hardware and software as desired. Outside of the U.S., this is not always the case. Many countries restrict the use of electronically encoded data, particularly when it relates to the transport of data beyond borders.

In a few countries, such as Indonesia, transborder telecommunication of data is prohibited. In other instances, information communicated in and out of the country may be subject to review. The typical American MIS executive has not encountered these concepts in the past. To him, these restrictions may seem like silly bureaucracy, but many countries are extremely serious about these laws; companies and persons found in violation of the laws are subject to substantial sanctions and criminal penalties.

Freedom of the press is not a global doctrine, even though it may seem odd to compare freedom of the press with communiques issued within multiple locations of the same company. However, foreign laws can be used to prosecute individuals for illegal transmission of data between countries.

Foreign regulations are not the only laws with which MIS must contend. The U.S. also has its own regulations overseeing international business. Legal exportation of personal computers or other technological devices from the U.S. requires an export license.

This export regulation applies even if the exported item is going to another part of the same corporation. The primary purpose of this law is to enforce the U.S. government's ban on the export of technology to certain foreign governments.

Managing an international network of computers and handling the sundry regulatory issues is a daunting endeavor for any business, large or small. For a small company, the logistics of installing hardware, software and communications support in remote locations are even more complex and difficult to master.

Without local MIS personnel who know the local market, vendors, language and traditions, the job of purchasing and installing hardware, software and telecommunications facilities can overwhelm a company. And yet, for the smaller organization, the option to have a dedicated technological resource on-site is not usually viable.

Therefore, for a smaller remote location to implement a system successfully, it is very important to establish local contacts who can negotiate the maze of local vendors and legalities. These contacts should be made early in the process and should be involved in the entire planning and implementation procedure for a project to succeed.

In larger foreign facilities, it may be possible to have local information systems management on staff. This has some clear advantages, such as the establishment of permanent knowledge for the company and the acquisition of local market knowledge. However, there can be problems with hiring local management. Training and experience levels are not uniform throughout the world. It may be difficult to identify nationals with the experience and education necessary to satisfy the company's objectives.

Another factor to consider is that the U.S. employment model is not uniform throughout the world. Once a person is hired overseas, it may be virtually impossible to disengage him for any reason. Thus, it is extremely important that personnel be selected carefully and correctly.

Once the staff is selected and on board, communication matters within the organization become critical. Do not assume that even an experienced manager from another country will have the command of English that a domestic executive has. Communication with foreign nationals has to be precise and specific to ensure that messages are not misunderstood or interpreted improperly.

U.S. standards are not always the benchmark by which to measure foreign management practices. In many foreign local economies, rules of thumb that are generally accepted in the U.S. may be totally out of sync with the business realities.

A human lawn mower

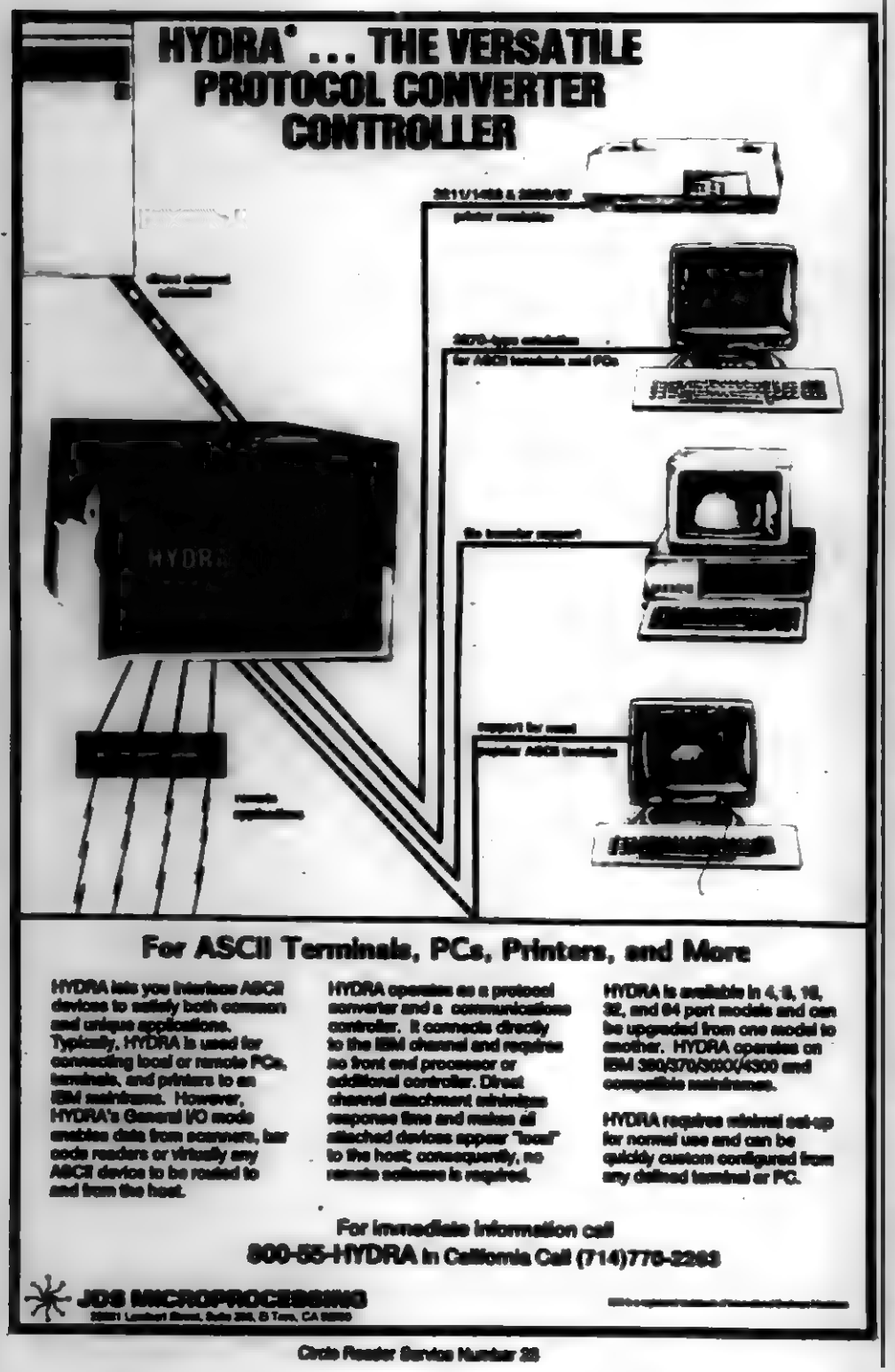
For example, in one foreign office I saw a worker sit down on the grass and begin to clip it with scissors. I restrained myself long enough to have someone check what the person was doing before I proceeded to chew out local management.

To my surprise, I discovered that the person earned wages equivalent to seven cents an hour. It did not take long to figure out that it was virtually impossible to recoup the cost of a lawn mower at that wage and that the local management made the correct decision in manually trimming the lawn. The message is clear: Managers must be careful about coming to hasty conclusions when operating in a different economy.

Global information systems can work. They can give an organization a tremendous advantage in the business world. But to be successful, MIS should observe the following:

- Local expertise must be included in the planning and implementation of systems in the foreign environment.
- All aspects of the project's implementation must be planned and all details verified prior to beginning the implementation.
- Each implementation in a foreign environment must account for local differences, which must then be reflected in the plan before it is started.

By following these general guidelines, a company, no matter what size, should be able to successfully implement systems in an international environment. And MIS officers will be spared a great deal of indigestion. ◆



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OSI's coming of age

From concept to products

BY HAROLD C. FOLTS

Happy 10th anniversary OSI. A new direction in establishing standards for information technology applications started 10 years ago in March with the first meeting of the International Organization for Standardization (ISO) Subcommittee for Open Systems Interconnection (OSI). The ISO returned to Washington, D.C., during February and March as a giant of standards making activities to celebrate a decade of OSI development.

From the first meeting of a handful of experts from a few countries, this committee is now made up of six active working groups with several hundred experts representing manufacturers, users, telecommunications providers and government interests from major nations around the world. OSI represents a major revolution of standards for the information technology industry.

Industry has shown its general support for the concept of OSI by contributing significantly to the development of the large family of specifications. Several industrial confederations have been formed, enabling companies to cooperate and ensure the widespread, consistent introduction of OSI products into an international, multivendor marketplace.

Among these confederations is the Corporation for Open Systems (COS), which was formed in the U.S. in January 1986 and now represents more than 60 prominent business and government organizations. There are also the Standards Promotion and Application Group of 12 manufacturers in Europe, the Japanese Promoting Conference for OSI, representing industry in Japan, and the National Protocol Support Center in Australia. In addition, the European Common Market and the governments of many nations have endorsed the introduction of OSI into the information technology industry.

It all sounds interesting, but is this frenzy leading anywhere?

The analysis by the ISO that led to the establishment of OSI work in 1978 found that if each manufacturer was left to independently design an implementation for information technology applications, either one highly dominant force would emerge in the marketplace or there would be a proliferation of incompatible solutions that could severely constrain the user community.

Therefore, the concept of OSI emerged to lay a sound foundation that would enable free interchange of information among networked computer resources that could be assembled from a multivendor marketplace.

The ISO proceeded with this work in close coordination with the Consultative Committee on International Telephony and Telegraphy (CCITT) to ensure that telecommunications interests were appropriately considered.

OSI will have an effect on the many applications that are known and the many more that will emerge in the future as technology evolves. Such applications include electronic mail, funds transfer, manufacturing production line control, just-in-time arrival of supplies, point-of-sale for the retail trade, data processing systems, data base applications and numerous others.

OSI does not dictate how these particular applications are implemented but rather provides a common thread of interoperability so that system components from different manufacturers can be assembled to serve specific user applications. Each manufacturer is a specialist in its particular product area but may not be expert in all the areas that are necessary

STEVE DORIGNO

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to meet specific operational requirements. As a result, the common thread of OSI that is also included in a product implementation opens a much more expansive marketplace to all of industry and gives the user freedom and flexibility to satisfy a wide variety of requirements.

The many benefits of OSI include the following:

- Freedom to implement any technology.
- A generic and flexible architecture.
- Compatibility among products.
- Unconstrained evolution of technology.
- Sharing of networking resources for integration of applications.
- Efficiency of operation and reduced costs in avoiding complex adaptations.
- Integrated system management.
- Freedom of choice in the marketplace.
- Stimulated marketplace competition.

OSI provides a generic architecture that structures the functions for systems to exchange information. It takes a modular, or layered, approach. Functions have been separated into groups that support specific tasks for facilitating the communications process.

Although the division is rather arbitrary, it has been agreed worldwide that there will be seven layers, each performing its unique mission in the overall open systems environment. The OSI layering, which has also been called the "onion skin architecture," provides for the logical grouping of associated tasks within a manageable structure.

The seven layers operate cooperatively as a system but are independently separable. As a result, OSI provides a great deal of flexibility in meeting a large variety of configurations.

The OSI family

The family of OSI standards consists of the Basic Reference Model, which is published as ISO 7498 and CCITT Recommendation X.200. The functions and services provided by each of the seven layers are described in the layer service definitions. Each layer also has a specification for one or more protocols that execute the functions.

Another important aspect is covered by the OSI network and systems management aspects, which are now under intense development by the standards organizations. This work includes Directory Services, an electronic directory that keeps track of users and resources within a system, which is soon to be approved by the CCITT as the X.500 series and by the ISO as International Standards 9594. In addition, drafts are being produced for various system and network management issues.

As a brief explanation of the OSI functions, the following descriptions start from the top of the seven-layer structure. The upper three layers are closely associated with supporting the user's communicating applications processes, which function independently of the underlying "bit pipe," or telecommunications media. Accordingly, the lower four layers deal with the transfer of the data between systems and are collectively identified as the Transport Service. Within the four layers of the Transport Service, the lower three represent the actual telecommunications function of the OSI environment.

- **Layer 7.** The Application Layer provides the window, or interface, between the local systems environment of the specific implementation and the common thread of the OSI environment. It establishes and maintains the associations between communicating applications processes. In addition, it contains the Application Service Elements, which support particular communications functions such as file transfer, virtual terminal, message handling, management services, transaction processing and distributed processing applications.

> **The OSI layering, which has also been called the "onion skin architecture," provides for the logical grouping of associated tasks within a manageable structure.**

- **Layer 6.** The Presentation Layer negotiates, selects and maintains the syntax of the information being transferred between applications processes. It does not perform any syntax translation but only identifies the common transfer syntax. If any translation is required, it is accomplished with the local system.
- **Layer 5.** The Session Layer assists with the dialogue management of the communication. In coordination with the Application Layer, the Session Layer assists in selecting the turn of sending and receiving information, synchronization recovery and orderly termination of the communication.
- **Layer 4.** The Transport Layer provides integrity between communicating end systems and ensures that the required quality of service from the telecommunications resources is consistent.
- **Layer 3.** The Network Layer provides the routing and switching functions that select the paths through distributed telecommunications resources, such as circuit and packet switching as well as collections of internetworked resources.
- **Layer 2.** The Data Link Layer provides for the transfer of information over each leg of a transmission path between end systems and intermediate systems, or transit nodes, en route. For example, a

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local-area network is a multipoint data link that serves a group of end systems within a geographically confined area. A data link may also represent the physical path between a subscriber and the access switch of a telecommunications resource.

• **Layer 1.** The Physical Layer provides the functions that enable passing the bit stream from the OSI environment to the connecting transmission media.

It is very important to understand that OSI does not just provide a rigid architecture as one way to support information technology applications. It is generic and has a great deal of flexibility to meet a wide variety of configurations.

Choices have been carefully incorporated into the family of standards so that specific applications can select a configuration that best meets operational requirements.

Individual profiles of configurations tailored to fulfill specific applications are emerging. For example, General Motors Corp. has pioneered the Manufacturing Automation Protocol (MAP) for the manufacturing community of interest. The MAP subset of OSI will support manufacturing production line applications. Much of the MAP configuration uses the same elements that will apply to many other configurations. Therefore, MAP will share a great deal of commonality with other configurations while still being able to optimize its particular applications.

Adopting OSI

While there is economy of scale to be realized through the use of common OSI protocols, a second economy of scale is further realized through the varied and large number of profiles of the communities of interest adopting OSI standards. For example, Boeing Computer Services Co. supports and sponsors the Technical and Office Protocol (TOP) configuration. In fact, because of considerable commonality, the MAP and TOP users groups have merged into a single organization to generate a set of OSI profiles.

The U.S. government has also jumped on the bandwagon with its Government OSI Procurement profile for federal applications. As other specific communities of interest around the world enter the OSI arena, such as the British government, they adopt a similar program.

Many more communities of interest will be emerging during the next few years.

The National Bureau of Standards (NBS) also has contributed significantly to the establishment of OSI by sponsoring the OSI Implementors Workshops. These workshops serve as neutral forums in which implementors assemble and agree upon protocol options and subset configurations to be included in their products.

The implementation specifications that have come from the NBS workshops have contributed significantly to the profiles of the communities of interest and to consistent implementation of the standards by industry.

While the communities of interest have recognized and accepted OSI as the foundation of their applications, there are still many questions about how industry is going to support implementations. The first positive signs include the intensive support that manufacturers have given the standards development activities and the establishment of cooperative organizations to promote the implementation of the standards in the marketplace.

It is interesting to note IBM's involvement in OSI development. The company has participated actively and constructively in the development of OSI from the beginning. It was also an early member of the Corporation for Open Systems. It has certainly not been expending its resources without purpose.

IBM's Systems Network Architecture (SNA), for example, has a similar structure to OSI. While the SNA protocols are quite different from OSI's for the most part, a functional mapping between the two architectures is a practical matter. Whether there is ever going to be a convergence between the two is yet to be seen; they may just continue to coexist.

There were items in the press last year about IBM encouraging the work on OSI Transaction Processing to adopt SNA LU6.2. While such a proposal had been introduced into the work, a much broader and more flexible solution was worked out by the committee, which has now produced the ISO Draft Proposals on the OSI Transaction Processing Service Definition and Protocol Specification. The proposals have gone to formal ballot as Draft Proposals.

Don't forget DEC

Digital Equipment Corp. also has been an active and constructive participant in the OSI work during the past years. The DEC architecture is very similar to that of OSI, and the company has been rapidly implementing OSI protocols into its products for some time.

Even with this activity, it will still be a while before any vendor can claim full OSI conformance. No vendor should yet be criticized for not having a full product line available — in most cases this does not mean that the company opposes OSI.

Another factor of confusion that has been of considerable debate is the Technical Control Protocol/Internet Protocol (TCP/IP). These protocols provide similar operational functionality to the Network and Transport Layers of OSI but are not a complete OSI-equivalent solution. The Department of Defense has officially proclaimed that it intends to migrate from TCP/IP to OSI standards within the next

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couple of years.

Some companies in industry that currently have TCP/IP implementations are touting that they have a better solution for migration in the future. Users should be aware that there are a number of true OSI implementations ready now to satisfy their operational needs from such vendors as Scotts Valley, Calif.-based Touch Communications, Inc. and Retix in Santa Monica, Calif. While TCP/IP can, in fact, offer an immediate short-term solution, it may not be appropriate for long-term applications.

What's next?

What can the computer industry expect for the long term? The COS and the MAP/TOP Users Group are sponsoring in Baltimore June 5-9 the Enterprise Networking Event '88 International, a large-scale demonstration of the interworking of OSI products from many manufacturers of industry.

The event, representing the birth of the OSI multivendor marketplace, will demonstrate a variety of implementations available to customers. Although the OSI demonstration at the National Computer Conference several years ago turned out to be a superficial pasteup demonstration, the Enterprise Networking Event should represent real products that have gone through the full development cycle and conformance and interoperability testing, which will certify that the offerings comply with OSI.

The Enterprise Networking demonstration does not mean that OSI is complete and that a full family of products is now available. It represents only the next milestone along OSI's migration trail.

The introduction of OSI will be done in stages during a long period of time. Users with operational systems in place will have to follow carefully constructed migration plans. Likewise, manufacturers will need considerable time to integrate OSI into their existing product lines. Products under development will already have OSI in their plan, but it will take time to go from concept to production.

The initial migration to OSI will involve gateway adaptations that will enable product lines and user systems to evolve gracefully. Another approach to be taken involves the implementation of some OSI layers with OSI protocols while using either older proprietary or nonstandard protocols for other layers.

For example, an SNA application could use the lower five layers of OSI with the LU6.2 transaction processing capability on top. When the OSI transaction processing standards are approved, a transition can be made at the upper two layers.

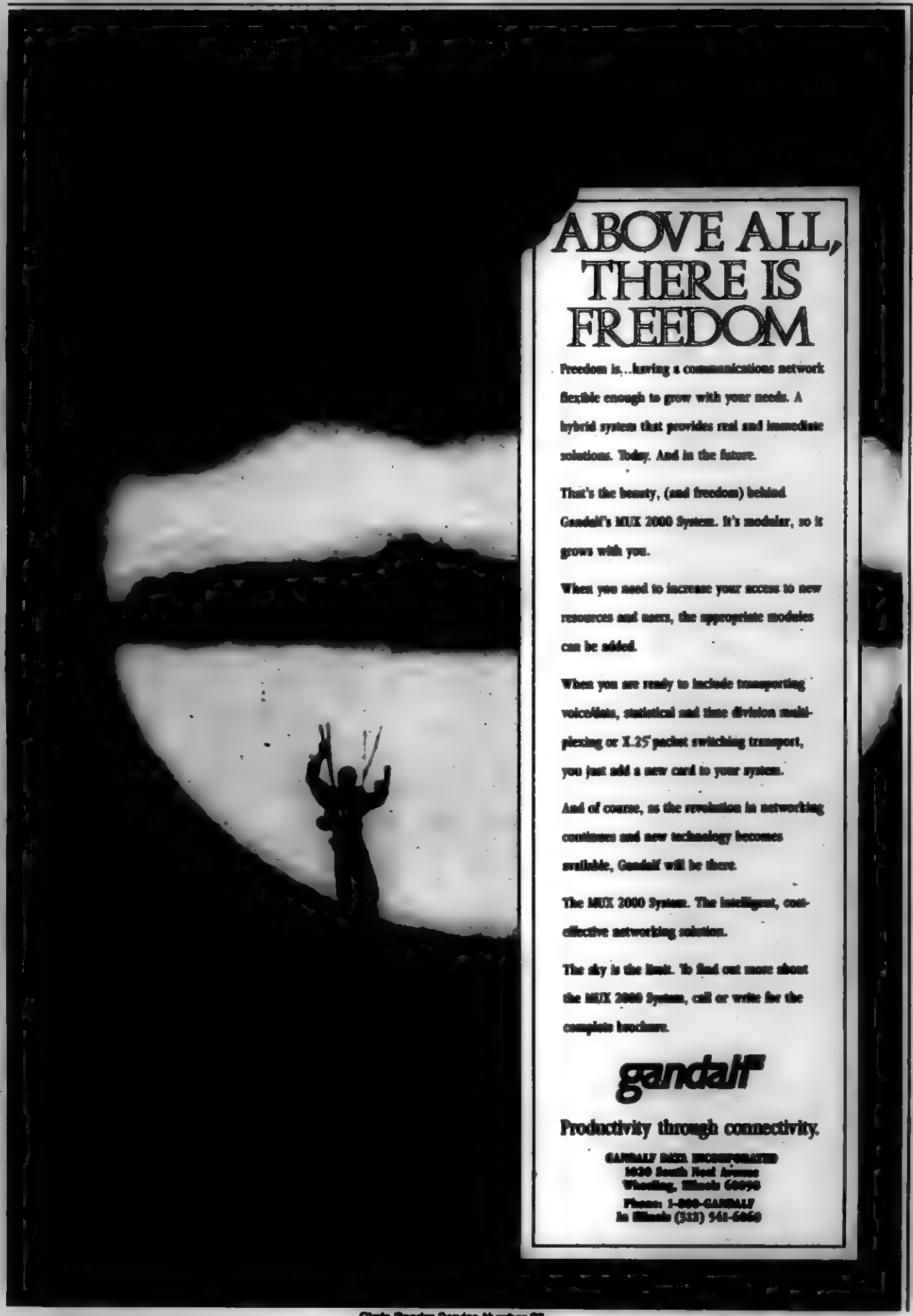
Planning is paramount

There are many approaches and combinations of approaches that can be taken to evolve into OSI over a planned migration period. If manufacturers or users are going to realize a transition in the near and distant future, they must take action now to construct migration plans that lead the way toward a full OSI environment.

Once the basic OSI structure is in place, evolution of products with new innovations and technology will be greatly facilitated. As a result, the information technology marketplace will be significantly strengthened.

The answer to the question of whether OSI is fact or fancy seems to be very clear. OSI has widespread acceptance in industry with the many efforts that are under way to bring products to the marketplace over time. OSI also has widespread acceptance by the major nations around the world as a foundation for the information technology industry.

The final proof of OSI will be the effectiveness and the performance of the products that enter the marketplace. The first glimpse of that important stage will be at the Enterprise Networking Event in Baltimore. If the products are more than just vaporware and meet user application needs on a timely basis, the OSI revolution will be in full force and will secure its place in the future. ◆



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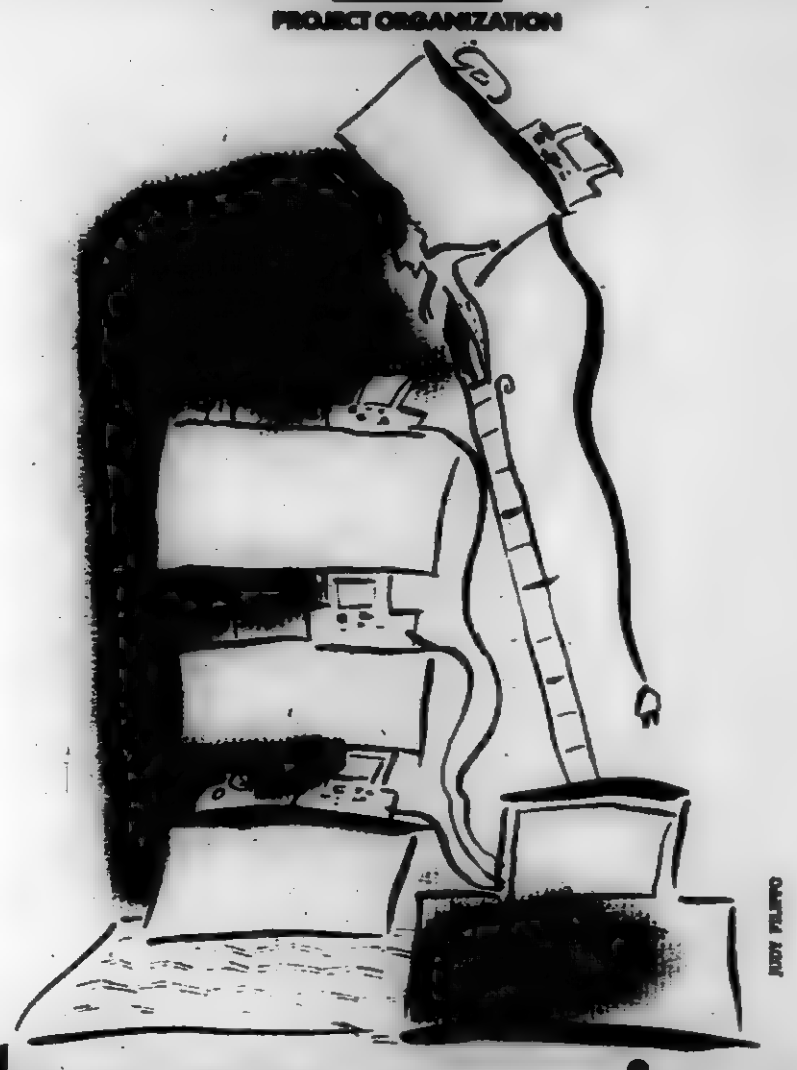

Telecom project management tips

BY RONALD KOPITOWSKY

Recently a group of telecommunications professionals were asked, "What are the problems in managing telecom projects?" Without hesitation, the responses began.

The problems telecom managers encounter cover the entire spectrum of a project and most often are the result of poor communications, perceived confusion and a lack of appreciation for each other's traditional way of doing business. While tricky projects are familiar to almost any kind of business manager, there are certain project problems and solutions that are unique to those in the communications industry.

Common problems in telecom project management include:

- Top management allots less time than the project will take to complete.
- There is a lack of resources — not enough staff, money, facilities and so on.
- User needs are not clear and are constantly changing.
- There is a fear of initiating change within the organization.
- There is a lack of ownership when tackling a problem.
- It is difficult to plan for the future.
- It is difficult to forecast technology trends.
- Vendor management can be hard to deal with.
- Managing people is demanding.
- Communication among all levels in an organization is frequently poor.
- Turf issues need to be considered.

Today, more than half of telecommunications managers report to the MIS area. While there are strong reasons to structure an organization in this way, there are problems involved with such a setup. These problems often take root in the differences between addressing the two somewhat similar technologies.

Because many data center projects are solved using one or two key strategic vendors, such as IBM and Digital Equipment Corp., time is saved. But a telecommunications network project often involves transmission media, modems, multiplexers and packet-switching products. While a telecom manager can choose a single solution by using AT&T, this route often is not the best possible one.

Each of these network components are

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offered by several vendors. The number of combinations from which to choose can approach the hundreds. When a telecom project is done correctly, each of these options is evaluated carefully. Mistakes can be costly, time consuming and not follow the strategic direction of the company.

Limited access to top execs

Data processing vendors are different from communications vendors. It is rare to see a communications vendor have the same sort of access to senior management that, say, an IBM has. When there is a telecom problem, it might take a communications company days before it can discuss its solution with a customer's management. And unfortunately, in many cases, it is the ability of the telecom manager that is in question while the vendor-management meeting is being set up.

A telecommunications project has many components and phases. A telecom professional must properly manage each component if he is to achieve success. Most projects begin with a needs analysis and end with such concerns as documentation and maintenance. In between are the issues of project management techniques to help control the project and the resources dedicated to the project.

A key aspect of telecom project management is having the proper staff. Telecom managers must hire carefully. Hiring the wrong people can be a big mistake. If a telecom manager, or any manager for that matter, makes a mistake in hiring, he must quickly do something about the situation. It might be easier to move forward with little staff than with poor staff. Telecom managers must sharpen their hiring skills to avoid hiring weak performers, because time lost interviewing can be very valuable indeed when trying to manage a telecom project.

One of the early steps in a telecom project is the determination of needs. No solution can be effective unless it meets a specific need. If managers do not address the specifics, then the solutions may not be what they want. Users will request changes at the end of a project, causing delays.

Telecom professionals can determine needs by conducting interviews with users and top management.

Not all needs are the same, and telecom managers must learn to judge the differences. Some needs are absolutely necessary, others might be nice and still others might have little or no significance. This "fluff" may be pleasing, but no one will pay for it or use it for the next three to five years.

Checking to see what the competition is doing is also helpful at the needs analysis stage of a project; it may help crystallize thinking.

But where do needs come from? Sometimes they start with with the telecom management itself. It might see something wrong. Sometimes it becomes obvious that systems are obsolete or just old and hard to maintain. Other times, new vendor offerings may make sense for an organization. There will be times when existing solutions will not permit fast servicing or installation.

But the biggest source of needs comes from users. Even if change is motivated by other sources, such as vendors, telecom managers should go to users who, in most cases, provide new thinking.

Telecom managers may hear from users directly about what they want or don't have. These needs may also come from management. Wherever the need originates, telecom managers must get close to the source of the issues. In the search to provide the right solutions, they must make certain they are dealing with the correct problem.

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To find out the details of these needs, telecom professionals must interview users and take notes documenting these interviews. Next, they must send users a copy of the interview. This way, there will be no misunderstandings. Junior staff should not be used to accomplish this task. While it is time consuming, senior staff will have a better grasp of the issues. These senior staff members have a clear understanding of the business; not just a technical comprehension but also an insight into what each area does to make money for the organization.

Another source of needs information is through personal contact within the industry. Getting to know peers in other organizations can enable a computer professional to obtain information on what others are doing. This networking can be enhanced by active involvement in local communications associations.

A document should be prepared after the needs analysis to state clearly what was found. The document should be shared with all involved in the potential project.

A shared, concise statement of needs can take care of some of the previously mentioned problems telecom managers encounter in project planning. The document lets everyone know what the users

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want and prevents users from constantly changing their needs. The documentation also addresses the issues of communicating with all involved — both management and peers. It even creates an awareness of turf issues early in the project life cycle. If there are questions of who has to take charge and provide ownership, there is now a foundation for discussion.

Request for proposals

Once the needs analysis is finished, the telecom manager can pursue a solution from a vendor. Telecommunications solutions rely on many different vendors; therefore, a request for proposal (RFP) is necessary to establish a sense of fairness and uniformity among the various vendors.

If the manager has to deal with multiple vendors for the same solution, then the RFP becomes the starting point in the discussion. A refined RFP can even become part of a contract.

There are two ways to write an RFP. It can state the need and leave it to the vendor to provide a solution. This method sometimes provides for the most innovative solutions.

The more traditional RFP suggests a solution. It might ask specifically for a packet-switching network rather than ask for a method of moving information between locations. The benefit of this approach is greater control over the responses from vendors.

However, while the RFP is taking place, the project time clock is moving forward. Telecom managers could possibly save months on a project if only they could sidestep this portion of the process, because a carefully prepared, well-thought-out RFP can take months to arrange and months to get a proper vendor response.

Although there are some potential shortcuts in the RFP and RFP response stage, telecom managers will pay the price later if they take one. If the RFP is not clear, managers will have to meet again with the vendors and allow them to revise their proposals. They will also need more time to evaluate proposals, many of which may differ dramatically.

Selecting equipment

Eventually, telecom management must select systems. The more difficult the comparison among these systems, the longer it will take to review the proposals.

There are a number of ways to select equipment during an evaluation. Depending on the total impact of the system, telecom managers may wish to devote more or less time to the analysis.

If in the preliminary overview of the evaluation a manager determines grounds for removing a vendor, he should do it. This "shoot them dead" technique can save time, especially when everyone knows there is a serious flaw with one of the vendor solutions. But remember, this flaw must be the type to completely disqualify the vendor. Hopefully, there will be survivors to choose among when this process is finished.

If there is time, a detailed analysis of the solutions is needed. One method is to determine the relative importance of every item evaluated and assess a numeric value to that category. Telecom managers should then evaluate each proposed system a piece at a time and compare them against each other. Hence, to achieve the maximum numeric value, a system must clearly be among the best, while systems with less functionality should get low scores.

The evaluation will winnow out the strongest choice among the various proposed systems. Telecom managers must not forget to consider the cost of the system, however, because the strongest system might also be the most expensive. The final recommendation might not be the system with the most points but rather the one that is the best value when considering cost and functionality.

Once the system has been chosen, the project enters the contract stage. During the contract negotiation, telecom managers should decide exactly what is to be delivered. Previous discussions no longer have any meaning if they are not part of the contract. All the terms — system performance and so on — must be spelled out. If there are penalties, this is the time to deal with them. If there is an acceptance test plan, it must be part of the contract.

The contract negotiation can be divided into two categories, with the telecommunications staff deciding on the business issues and the lawyers deciding on the legal ones. Not knowing which issues are on the table can add months to the contract negotiation timetable.

During the system selection and installation, telecom managers must make sure that project documentation exists. Documentation is a written history. Managers cannot rely on knowledge kept by individuals to support complex systems. These systems operate 24 hours a day, every day. Qualified staff is needed to maintain these systems, and this staff relies on good documentation to do their jobs. If the documentation is inadequate, it will be impossible to meet the needs of users. If users are not satisfied, the project will continue to eat up time, money and other resources.

Maintenance is another area that telecom managers should address long before their systems are up and running. They must plan and coordinate the necessary spare parts, staff and training from the start of any undertaking, not at the end of the project or the planning cycle or as an afterthought.

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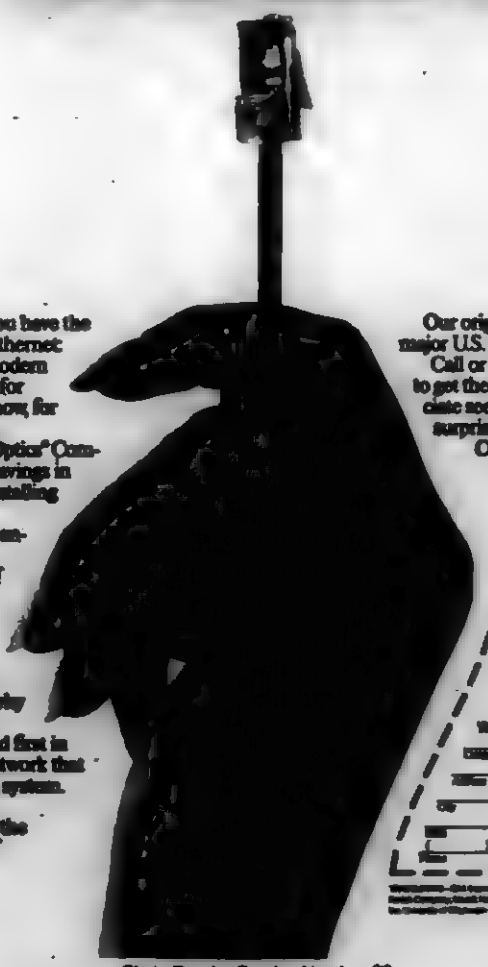

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Maintenance issues, while implemented near the end, start in the needs analysis phase. Managers must address the needs of the maintenance group, just as they take into account the needs of users. Maintenance issues should become part of the contract for the project. These issues cover the availability of spare parts for years to come as well as issues on availability and support.

Maintenance is not a place to save money. If a company cannot afford to maintain a system, it should not buy and install the system. Firms cannot afford to have their systems inoperable.

During the entire project life cycle, managers must keep a corporate objective in mind — to complete the project at a preselected time while using budgeted resources. These resources include both staff time and dollars.

Maintenance is not a place to save money. If a company cannot afford to maintain a system, it should not buy and install the system. Firms cannot afford to have their systems inoperable.

To help them coordinate this often difficult task, there are powerful tools available today — project management software operating on microcomputers. Personal computer-based programs automate proven project management techniques for managers.

One technique is to slice the project into as many small individual tasks as possible, managing these small tasks as small projects. Big projects move with their own momentum, while small, short projects most often are more successful because there is greater momentary visibility with more clearly defined and deliverable goals.

If all these smaller tasks are strung together, the project manager can see the total project. Some tasks may be sequential, while others concurrent. A flow chart of these activities can be made to display the entire project. One form of flow chart often used by project managers is a Program Evaluation Review Technique, or PERT, chart.

A PERT chart not only shows the graphic representation of the task but also computes a critical path, that is, the path of those tasks that directly affects the project outcome. While all the tasks need to be accomplished, there are some that can be done on a priority basis. The tasks along the critical path will extend the project by one day for each day these tasks take.

If telecom managers need to shorten a project, they should find a critical path and look at the associated tasks.

In cases in which management can affect the outcome of these tasks, then telecom managers should identify where management attention is needed. This attention can shorten the task time or assure completion on schedule.

If telecom managers can manage the time each task takes on the critical path, then the entire project will be successful.

Such flow charts should also show milestones along the way. Milestones are completed major events, good indicators of where the project is at any time. Many companies often tie vendor payment schedules to milestones.

The software operating on PCs does all the computations for critical path analysis. Whenever times are changed for one task, the PC does the calculations. The software enables managers to look at the project and know exactly what to do on a priority basis. It also lets them know what can drift for some time without having any impact on the project life cycle.

Top management can view "what-ifs" and see exactly what is happening on each portion of the project. By viewing the graphs and reports, it can participate in the planning. When there is a problem, telecom management can bring it to everyone's attention immediately.

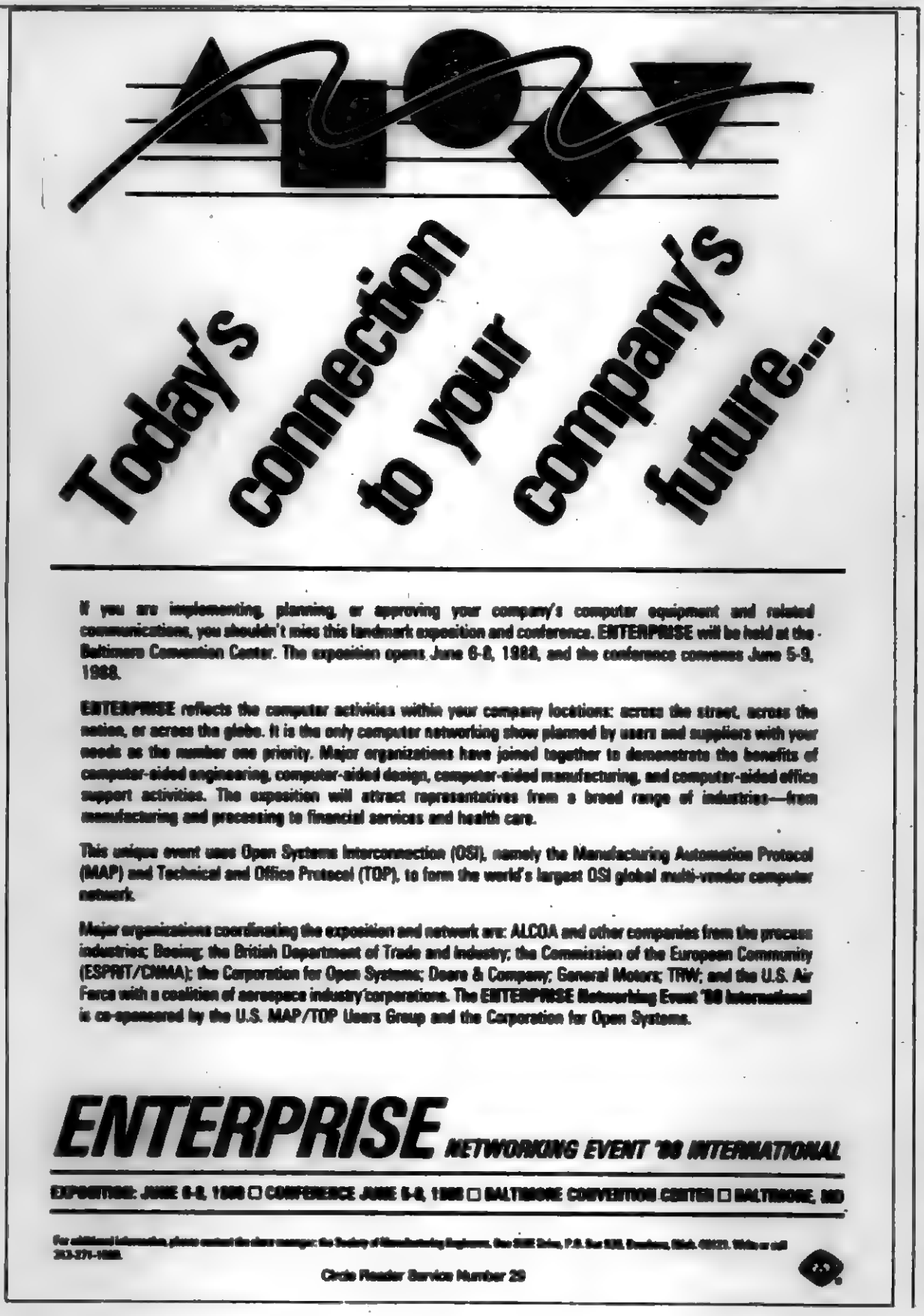
Without these visual tools; all too often management cannot grasp the implication of a single task's delay. If the delay is on the critical path but early in the project, it is often hard to generate interest.

Manual labor

Before the use of PERT charts on microcomputers, all calculations were done manually. These computations were time consuming, and some people also considered manual reports not to be as credible as those generated on the computer. "What-if" analyses were not done.

There exists a growing market of project management software. Some of these tools for the IBM Personal Computer line include Mountain View, Calif.-based Software Publishing Corp.'s Harvard Total Project Manager II; Novato, Calif.-based Breakthrough Software's Timeline; and Superproject Plus by Computer Associates International, Inc. in Andover, Mass. There is also Apple Computer, Inc.'s Macproject for the Macintosh.

While all the various parts of a telecom project need to be done and done well, project managers need constant pressure "to do." All the problems and all the techniques to provide solutions keep a project on course. But someone must exert the pressure to move forward. It is easy to become engrossed in events and then begin to overanalyze activities. Someone (a telecom professional, perhaps?) must provide constant motivation to create movement.‡



If you are implementing, planning, or approving your company's computer equipment and related communications, you shouldn't miss this landmark exposition and conference. ENTERPRISE will be held at the Baltimore Convention Center. The exposition opens June 6-8, 1988, and the conference convenes June 5-9, 1988.

ENTERPRISE reflects the computer activities within your company locations: across the street, across the nation, or across the globe. It is the only computer networking show planned by users and suppliers with your needs as the number one priority. Major organizations have joined together to demonstrate the benefits of computer-aided engineering, computer-aided design, computer-aided manufacturing, and computer-aided office support activities. The exposition will attract representatives from a broad range of industries—from manufacturing and processing to financial services and health care.

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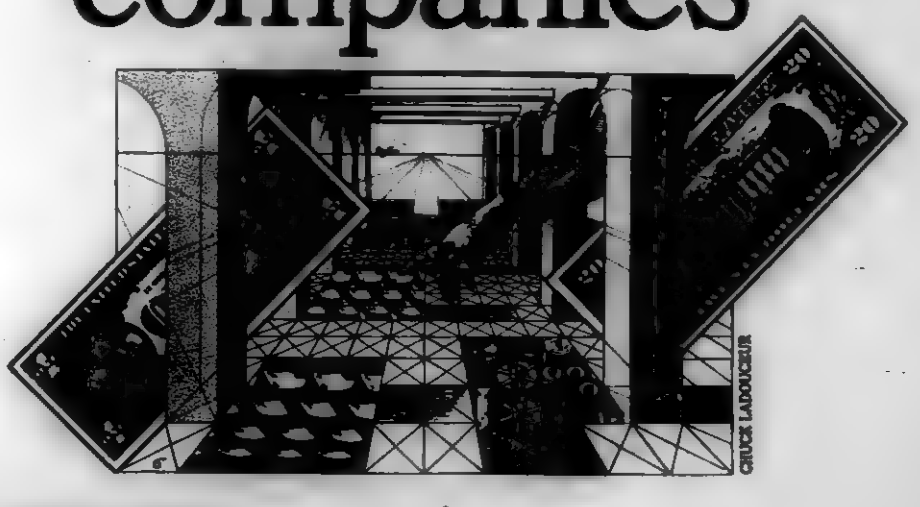
Wyoming's telecom lesson for MIS

Go west, young companies



CHUCK LABOUCHEUR

BY RONALD BOSCO
& LARRY STOLZ

Today it is no longer possible to run a large or small organization efficiently without the use of advanced telecommunications and sophisticated computers. That is true whether the organization in question is a Fortune 1,000 firm, a state government, a federal agency or any of the other myriad groups whose data MIS officers are called upon to manage.

Telecommunications holds great potential as a tool for fostering economic development and diversification for all major organizations, private or public. To illustrate that fact, we have summarized a study performed for the state of Wyoming by Federal Engineering, Inc., a communications systems engineering firm in Fairfax, Va. The objectives of this study were to identify those industries that rely heavily upon telecommunications and to highlight as many businesses as possible that Wyoming could seek to attract, capitalizing on its unique competitive advantage.

Admittedly, only a fraction of the MIS community is employed in state and local government, but the data within the Wyoming study is information that all MIS officers may find valuable.

The results of the study show that a well-financed well-developed communications infrastructure is as vital to the economic development of a large company as it is to that of a large state. Ultimately, economic productivity has become a function of communications power, and economic innovation (whether carried out by a state's entrepreneurs or a company's entrepreneurs) is increasingly a product of that power.

Information technology — electronics, computers, telecommunications and the software that makes them function — is one of the fastest growing industry segments in the U.S. Advances in microelectronics, fiber optics and lasers have been the fundamental driving forces

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Bosco is president and chief executive officer of Federal Engineering, Inc., an independent communications systems engineering firm located in Fairfax, Va. Stolz is the state telecommunications coordinator in the governor's State Planning Coordinator's Office for the state of Wyoming.

behind the growth.

Digital storage, which has been consistently doubling in capacity every year since 1960 while simultaneously dropping about 40% annually in unit price, adds further impetus, according to figures from the book *To Inform or to Control* by O. & G. Ganley. Processing speeds have also been doubling annually. Mainframes capable of processing 50 billion instructions per second will soon be commercially available; and personal computers priced at less than $1,000 will become both more powerful and ubiquitous. As a result of these factors, the number of general-purpose computers in the U.S. has been growing at an astronomical rate.

Consider that in 1953, only 50 computers existed worldwide. By 1975, this number had grown to about 155,000, a figure that doubled in 1980, according to the O. & G. Ganley book. The book's figures estimate that with the advent of the PC, some 12 million computers overall

The primary factors in site selection are the availability and quality of the work force and, most importantly, the availability of reasonably low-cost state-of-the-art communications facilities.

were in use in the U.S. at the end of 1987 and that 59 million PCs will be sold worldwide by 1990. The significance of this proliferation is truly monumental, especially when one considers that many of today's PCs are equivalent in computing power to an IBM 360 of the 1970s.

Telecommunications technology is also advancing at an astounding pace. Transmitting tens of thousands of telephone conversations among cities over hair-thin optical fibers is already routine. Sending and receiving tens of millions of characters per second may be possible from the home by the 1990s using advanced communications techniques. The importance of advanced digital communications networking is becoming more apparent as the computer industry accelerates its migration toward fully distributed architectures.

Even IBM, once a staunch advocate of centralized host-based architectures, is now promoting distributed systems in the form of peer-to-peer communications, via its latest release of LU6.2, and the integration of PC and host processes.

Critical to these distributed systems are the communications links that connect them. Hence, along with the astounding rise of computer resources, there has been a corresponding rise in the use of data communications.

Between 1978 and 1987, for example, the installed base of data communications hardware grew at a rate of 21% per annum, from $3 billion to about $16 billion. Data communications circuit revenues have been keeping pace, growing from $4 billion in 1973 to about $28 billion in 1987, the Ganley book claims. These figures clearly demonstrate our national dependency on remote computer access and communications networking.

Sales projections compiled by the Computer and Business Equipment Manufacturers Association in December 1987 summarize industry growth trends in both computers and telecommunications. Computer industry revenues will jump from $217 billion in 1988 to $443 billion in 1996, while telecom industry revenues will increase from $201 billion to $311 billion during that same period.

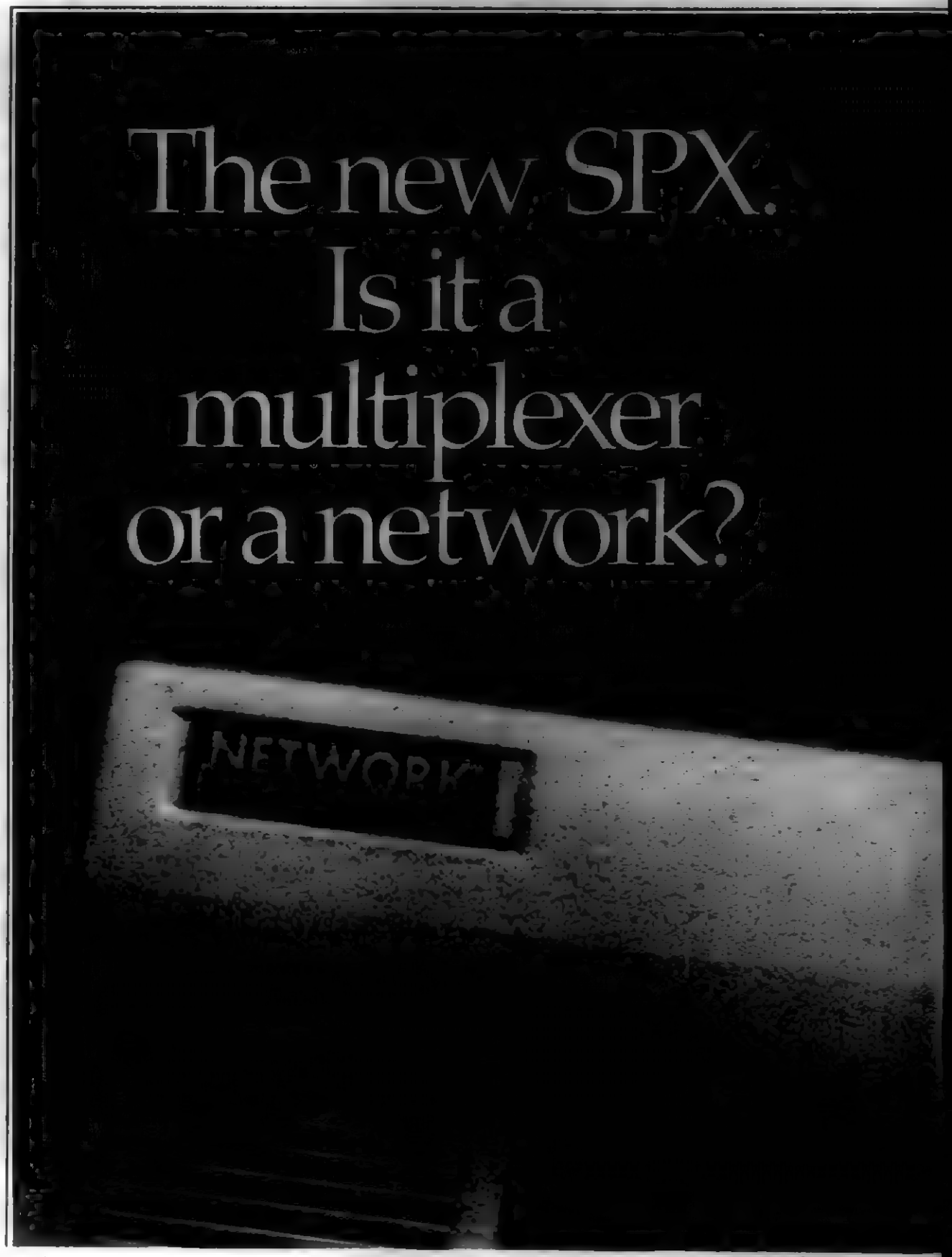
The pervasive growth of these information technologies has significantly reduced the geographic restrictions historically placed on a work force. No longer must labor be located near the input material or customer base. Information can be moved electronically at low cost and virtually instantaneously. In principle, therefore, information-based industries or information-based divisions of industries can be located anywhere, and the cost to relocate their fixed assets is relatively low.

The cost of acquiring and training knowledge-based workers, however, can be significant and must be taken into account. The primary factors in site selection are the availability and quality of the work force and, most important, the availability of reasonably low-cost state-of-the-art communications facilities.

Investing in communications

How does one judge, or even understand, the benefits of having an organization-wide communications system? That can be a difficult call, because networks operate in the background of daily business, speeding up and assisting the processes that result in profits but not themselves easily identified as part of those processes. We can see some of the benefits of an intelligent investment in communications through the example of the state of Wyoming.

For Wyoming, the most obvious category of direct benefit is significantly lower overall communications costs that can be realized via access to multiple long-haul networks. These savings are the direct result of competition among the common carrier providers in a deregulated environment. Because other business costs also tend to be low in Wyoming, the overall cost of doing business will drop for certain firms that locate there.



For this effect to be a strong motivator, however, these organizations must also be communications intensive, that is, their communications costs must make up a major portion of their total expenses.

U.S. businesses historically budget about 1% of their total expenses for telecommunications. As such, telecommunications clearly does not play a primary role in locating many organizations.

Exceptions to this general rule, however, are growing, according to a 1983 International Communications Association member survey. The survey found that high-technology firms, particularly in the computer and electronics fields, as well as service organizations, such as banks and information bureaus, spend a much higher proportion of their budgets on telecommunications. Even more important, as a 1986 study by the magazine *Telecommunications Product & Technology* found, is the fact that the largest proportion of high-tech firms' telecommunications costs is allocated to line charges.

Needs vary by divisions

Not to be forgotten, however, is that while more traditional industries may have only marginal needs for very sophisticated communications abilities, individual divisions within them may regard such facilities as crucial.

While a large manufacturing firm, for instance, may need physical proximity to raw materials more than it needs communications, its service department, on the other hand, which must be linked instantly to customers across the nation if not the globe, relies heavily on such technology. It may be that it would be useful to spin off that particular office and locate it remotely from the corporate headquarters.

For such organizations, the availability of reliable, low-cost communications on demand is critical and, to most, a strategic asset. Because, in many cases, they are forced to pay premium prices for their communications services today, they should be excellent candidates for relocation to Wyoming.

Advanced communications infrastructures inherent to certain industries are a good indication of potential candidates for relocation to or expansion in Wyoming. The heavy use of interactive mainframe computers or the proliferation of low-cost personal computers has created a growing need for low-cost, reliable data communications facilities.

Many traditional industrial areas within the U.S. cannot effectively accommodate this datacom growth trend. These locations still rely on old copper wire communications plants that were installed decades ago and were originally designed and optimized for analog voice traffic.

As the business environment in current growth areas such as the Sun Belt begins to mature, industry is once again looking for a more favorable setting for relocation and expansion. The same factors that motivated businesses to migrate from the Northeast to the Sun Belt are emerging once again in new locales such as Wyoming.

Because of its geographic location, Wyoming enjoys the presence of four facilities-based nationwide common carrier networks. This high density of communications services is not typically found in the West but is more usual in the heavily populated East Coast states where land, building, personnel and other operating costs are inherently higher.

Besides AT&T's existing interstate network, U.S. Sprint Communications Co., Williams Telecommunications and Western Tele-Communications, Inc. are currently in the process of constructing long-haul digital networks through Wyoming. With local points of presence, these carriers will provide advanced interstate telecommunications services at very competitive prices.

Natural crossroads

Wyoming is situated at a natural crossroads for both transportation and telecommunications. Certain types of businesses can benefit from this geographically central location within the lower 48 states. In particular, such positioning minimizes total communications costs for distance-sensitive services.

Traditional business incentives must, of course, be available in addition to advanced telecommunications facilities. In the case of Wyoming, economic vitality revolves around its industrial private sector. More than 97% of the work force is involved in nonagricultural employment, with the industrial sector accounting for approximately 85% of the $9.1 billion 1984 Gross State Product, according to Federal Engineering Press's book entitled *Pioneering the Information Frontier.*

The availability and quality of the work force is of primary concern whenever industry executives are considering a new plant location or when MIS is considering an outlying installation. Personnel training is especially important for those information-based industries that tend to be far more people intensive than capital intensive.

Federal Engineering Press's figures indicate that Wyoming has the second highest literacy rate in the nation, with an average of 12.1 years of education attained by the adult population. In addition, data from *Pioneering the Information Frontier* shows that Wyoming continues to invest in future generations with the highest per capita expenditures for schooling in the lower 48 states.

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The cost and availability of suitable physical facilities are also of paramount interest when evaluating sites. Wyoming provides an inviting opportunity with a low average cost per acre for improved commercial land.

Long-haul advantages

Certain businesses are likely to be attracted to Wyoming because of its position at the confluence of several nationwide long-haul networks. Such businesses include the following:

- Businesses that tie together these nationwide networks and provide services to the common carriers that own them as well as to major customers who use them.
- Organizations that, by the nature of their services, require the extremely high reliability that multiple networks can deliver.
- Businesses that can take advantage of the immense customer concentration that multiple long-haul networks can provide. Because this concentration can enable the sharing of a relatively high-cost facility among a large number of users, the economics of the situation are favorable.

Using the criteria above, Federal Engineering categorized candidate organizations into three primary segments: existing communications-intensive industries; newly emerging industries that will rely heavily on communications; and future industries that Wyoming can help create.

To remain profitable in this highly competitive world economy, existing corporations are constantly looking for methods to improve. This need for improved efficiency also applies to government. Thus, the following existing industries could accrue significant benefits by relocating or expanding in a state with the qualities of Wyoming:

Financial institutions. Access to competitively priced data communications is paramount to these newly deregulated entities.

Reservations processing. Firms that handle travel and other types of reservations on a nationwide basis can take advantage of Wyoming's central location by homing toll-free 800 calls here.

The federal government. The primary factor that could motivate the federal government, a $15 billion teleprocessing consumer, to locate certain of its more critical communications-intensive facilities in Wyoming is increased reliability via alternate routing.

Point-of-sale processing. Through the use of point-of-sale terminals, a customer's credit card is verified for retail transactions. Future growth into electronic funds transfer is expected in the short term. A solid communications infrastructure could help attract such a verification center to Wyoming.

Back-office processing. Low-cost data communications will enable Wyoming to offer the stock exchanges in Denver, Salt Lake City and elsewhere a favorable environment in which to process some of the overflow transactions that cannot be processed locally because of personnel shortages. This situation could, in turn, lead to additional back-office assignments from insurance companies, inventory specialists and others.

This example can be particularly instructive for MIS officers, whose business is increasingly dependent on finding some way, any way, of reducing costs. If much of the MIS function can be removed from the expensive real estate of company headquarters, then it can be made vastly cheaper. (However, such a move requires a company to make as strong a commitment to communications as Wyoming has demonstrated.)

Teleports. A teleport facility that provides domestic video up-linking and down-linking would complement the advanced voice and data services available via terrestrial networks.

Directory assistance. The southeastern part of Wyoming would be an ideal site for a directory assistance facility. This would enable various carriers to reap the associated service charges without requiring them to establish and manage proprietary facilities.

Learn by example

But what has all this to do with the average MIS officer? That Wyoming is a natural target for teleports and back-office processing is terrific, but why should that be of any particular interest to MIS as a profession? The answer is that the state of Wyoming is an organization like any other. The steps it is taking to encourage innovation and productivity can be copied by any organization.

Indeed, one lesson learned by business managers in the last few years is that businesses can be like states (and vice versa) and that their productivity and effectiveness is dependent on their ability to encourage their subdivisions to act aggressively and independently. Moreover, they must allow individual employees to act as if they were entrepreneurs.

Thus, if a corporation wishes to be innovative and productive, it must learn to think of itself differently. An organization can examine its setup and services almost as if it were a state government, providing such functions as merchant banking, managerial consulting, general strategic direction and, above all, communications for its people.

We can see the sort of innovative industries that might result from this kind of thinking and this kind of investment in communications in the emerging businesses that Wyoming has already set out to woo. In particular, the state is looking at the following:

Teleretailing. Employing telecommunications technology to display merchandise, accept orders, verify credit and transfer funds, teleretailing is projected to grow from $20 million in 1985 to $7.2 billion in 1991.

A Wyoming location would lower telecommunications costs by optimizing WATS to conform to the population distribution of the country as a whole.

International communications. Wyoming would provide a suitable location for an international satellite earth station, providing voice, data and video circuits to overseas locations, especially in the rapidly growing Pacific Rim.

Enhanced translation. Advanced 800 services will be the first in-WATS service offering that lets other long-distance companies compete on a par with AT&T. This factor enables other vendors to share equitably in the $4 billion per year toll-free calling industry, according to a study, "Telecommunications and Economic Development in Wyoming," published by Federal Engineering Press in 1987. Wyoming would provide meaningful benefits as the site of the translation facility necessary to implement such a service.

In addition to attracting businesses that are communications intensive, Wyoming is also in a position to create new industries — a philosophy MIS officers ought to consider.

The proximity of major independent long-haul networks makes Wyoming ideally suited to solve several problems that had been otherwise not economic enough to address.

Electronic clearinghouse. Value-added teleprocessing functions, including format conversions to effect intersystem compatibility, should ideally be centralized.

Network control facility. Wyoming would be an excellent location for an independently owned network control facility, which could monitor and route traffic from one digital network to another on a routine basis for traffic exchange, in case of a temporary traffic overload and in case of a transmission failure.

Voice mail. Such a relatively expensive resource as a voice mail facility, if located here, could enjoy both economy of scale benefits as well as trunking efficiency benefits.

Nationwide enhanced 911 data base. Wyoming would also be an excellent site for a nationwide intelligent data base system to administer enhanced 911 programs.

The Federal Engineering study concludes that Wyoming should diversify into knowledge-based industries. Establishing an information-based economic sector in Wyoming will occur more readily once the suitably advanced communications infrastructure has been fully deployed.

In particular, the need for economical high-speed digital communications facilities is paramount, not only for attracting information and software professionals, but also for attracting the next generation of hardware assembly plants, which are being built around remote process control and telemetry.

This requirement is complemented by the need for effective vocational training and retraining and for widespread access to university-level and postgraduate course material.

Likely candidates

The best potential for Wyoming lies in attracting firms in the identified target industries whose basic business is largely dependent on communications and not on the transportation of goods. These are firms that can take advantage of the quality of life, skilled personnel resources, favorable tax treatment and low-interest start-up loans that Wyoming offers.

The general methodology and approach employed in this study are equally applicable to other states. However, it should be recognized that identifying target industries is merely the first step toward realizing the potential of telecommunications as an economic development tool.

The state and its investment in communications show MIS how all major organizations can and should benefit from communications technology.‡

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TECH TALK

Connectivity stars, AI gets second billing in DEC debut

By Michael Tucker

You find connectivity in the darnedest places.

This issue of *Computerworld Focus* is devoted to the single topic of communications/connectivity. Yet it becomes apparent that these two are not so much a topic as a requirement of modern computing. Increasingly, the ability of machines and applications to talk to one another is taken as a given.

Thus, it has become difficult to talk about "communications" as if it were a separate entity. Instead, you must tack it on as part of other subjects.

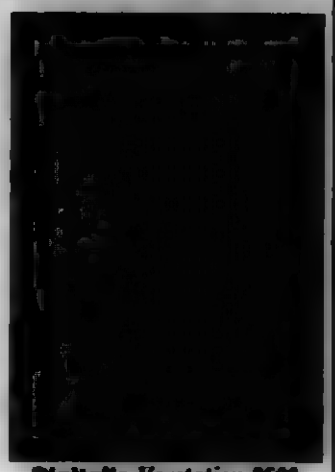
For example, in March, Digital announced yet another upgrade of its AI Vaxstation. This offering is a workstation based on the Vaxstation Models 3500, 3200 and 2000, which is a desktop machine. The artificial intelligence version differs from standard Vaxstations in that it has been specially configured for use in AI-related applications.

The modifications are significant but actually less exotic than you might think. The main upgrades are in the amount of available memory and in the language software. The AI Vaxstation runs, for instance, the DEC VAX LISP language and OPS5, an expert system building tool. The microprocessor and the system software, among other things, are essentially the same as in any VAX.

The DEC rollout surprised analysts; AI has been rather out of fashion lately.

DEC has been in the AI market before. In fact, you can make a fairly good argument that more AI-related software has been designed on VAXs and, before that, DEC PDP-11s, than on any other machine. In fact, DEC has been selling a dedicated AI machine based on its Microvax II for some years.

But the fact that DEC decided to display a new AI Vaxstation this year was something of a surprise to some analysts. AI has been rather out of fashion lately. After failing to live up to the expectations of the late 1970s and early '80s, AI has come to be seen in some quarters as an obsolete technology.



Digital's Vaxstation 3500 gets AI functionality update

AI's image problems haven't been helped by the fact that the most well-known vendors of symbolic processing machines, which are tightly associated with AI, have experienced severe financial trouble in recent months. Lisp Machine, Inc., formerly in Cambridge, Mass., went out of business. Its rival and close relative, Symbolics, Inc., also in Cambridge, has had to lay off significant factions of its work force — up to and including the firm's founder and chairman, Russell Noftsker.

Ironically, though, as AI's stock with the public has crashed, it has begun to find real applications in the commercial world. In particular, expert systems, running on standard microprocessors, have actually turned into an industry. Ergo, the AI Vaxstation.

But the kicker for the new Vaxstation is in the way it is being sold. Look at its press release or marketing information, and you notice a curious fact. The AI aspects of the announcement have been played down. In the literature, the term "artificial intelligence" appears only in the bottom of the headline. What gets first billing is that the new Vaxstation offers all the traditional networking capabilities of a DEC machine.

Specifically, DEC intends the AI Vaxstations to be development platforms for MIS professionals in those fields that already use expert systems the most — finance, insurance and

Continued on page 60

Tucker is *Computerworld Focus*'s features editor.

PRODUCT CLOSE-UP

HP net management tool

Hewlett-Packard Co. has taken dead aim at IBM, Cincom Systems, Inc. and others in the network management market with HP Openview, a system designed to manage wide-area and local-area multivendor communications.

At the core of Openview is HP Openview Windows, a graphical user interface running on HP's Vectra PC, an IBM Personal Computer AT compatible that reportedly provides a central point from which a network manager can monitor and troubleshoot local and remote networks. The Windows user interface for the HP Vectra PC, which includes a Vectra PC, costs $6,000 to $8,000.

Openview consists of four products for wide-area networks management: Status and Diagnostic Monitor software, which monitors the status of remote HP 3000 systems; Performance Monitor software, which collects network performance information; Network Command Interpreter software, which enables a manager to execute commands and programs remotely; and the In-Service Transmission Impairment Measurement Set (ITIMS) software, which allows managers to perform centralised line analysis and fault isolation.

New language said to link Apple Hypercard, DEC VAX. Story page 62.

According to Willem P. Roelandts, vice-president and general manager of HP's Information Networks Group, Openview complies with the existing International Standards Organization's Open Systems Interconnect (OSI) network management standard. Roelandts said that

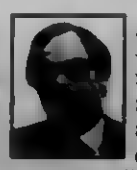
Continued on page 62

BLUE BEAT

Tailor-made IBM

Brian Jeffery

IBM management gave it a green light at a conference in 1985 that brought together the company's top executives worldwide. John Akers cites it as one of the bright spots for fiscal 1987. More than 6,000 IBM staff members do it in the U.S., and IBM Japan has declared that it has attached a high priority to doing it. Management in the U.S. Marketing and Services Group, IBM's U.S. marketing organization, regards doing it as a key strategic priority, because at the least it significantly improves the odds of winning competitive procurements. Some IBM personnel describe it as IBM's secret weapon against Digital and other interlopers. IBM is increasingly proposing to do it for its large customers.



"It" is systems integration. In theory, IBM's systems integration is "the business of adding value by assuming responsibility for combining information, products and services into a defined customer business solution."

In practice, it translates into IBM or a designated third party assuming responsibility for implementing a complex customer solution that may include a wide range of non-IBM systems, custom-developed products, custom programming and extensive service and support components.

Normally, all this activity is done on the basis of a formalized proposal. IBM brings in its third-party systems integrator to set up and manage a project that may last up to five years. En route, IBM works with any number of third-party suppliers and

Continued on page 63

Apple courts execs, MIS

Tries to undercut IBM with low-cost communications tools

Apple Computer, Inc.'s headlong charge into MIS got a bit more accelerated early this year with the introduction of several mainframe-oriented communications tools.

The first of these was Macapple, a software implementation of IBM's LU6.2 and PU2.1 communications protocols, which, at a price of $2,500 for a site license, allows the Macintosh computer to function in an IBM Systems Network Architecture environment.

At the same time, Apple introduced the Macworkstation, a software tool that allows developers (MIS-oriented developers, in particular) to link the Mac interface with mainframe and minicomputer programs. Programmers can continue to work in their familiar mainframe-oriented languages and still link their applications to the Macintosh without ever having to learn Mac programming. Macworkstation is priced at $5,000 for commercial resale but sports only a $2,000 license fee for firms using the product internally.

A Mac for the boss

That pricing split is significant. Apple's target is the MIS department, pure and simple. The Macintosh is seemingly being slowly positioned as the end-user "terminal" of an executive information system.

This is, of course, the role that many analysts projected for the IBM's Personal System/2 running under OS/2. In effect, Apple appears to be making a bid for that spot before IBM can solidify the PS/2 market. And Apple is willing to take significant cuts in its profit margins to make that happen.

All of this is significant in light of Apple's recent alliance with yet another IBM rival, Maynard, Mass.-based Digital Equipment Corp. Together, DEC and Apple might present an entirely non-Blue MIS option, with DEC VAXs or Vaxclusters taking the role of mainframe and Macintoshes running as personal computers.

In addition, at last February's Uniforum, a Unix /usr/group trade show, Apple introduced A/UX, its version of Unix. At that time, Apple spokesmen — including Apple Chairman John Scully — openly talked about A/UX as part of a larger plan to introduce the Mac to MIS. The argument was that the robust Unix environment would give the Mac additional power to enter the DP world.

The question remains, however, whether the Mac can be the Apple of MIS officers' eyes. While the Mac has gone far to overcome its noncommercial image, its user base is still mostly among end users. MIS officers have not been noted for their love of the box, just as they have hesitated about DEC and, for that matter, about Unix. — MICHAEL TUCKER

Circle Reader Service Number 111

Tech Talk

Continued from page 59

banking, among others. Applications can be put together on the Vaxstation — say, a decision support package for a currency trader — and then dropped to Microvaxes or standard Vaxstations on executives' desks. One possibility is that those applications might be made available to the Apple Macintosh, given the machine's newly announced links to DEC.

The point, though, is that the application can be delivered. While the Vaxstation can function as a stand-alone system, it's not meant to be sold as one. It is meant and marketed as a highly connectable device for the remote development of a certain kind of software. That the software in question happens to be AI related or, rather, expert system related, is almost a secondary consideration.

AI VAX facts

The AI Vaxstation 2000 sports 6M bytes of memory, a 19-in. monochrome monitor and a 71M-byte disk drive. The 3200 version has a CMOS version of the VAX microprocessor that performs at 3½ times the speed of the Microvax II processor. The 3200 has 16M bytes of memory, a 19-in. monitor, a 159M-byte disk drive and a 95M-byte tape drive. The 3500 also boasts a CMOS processor. In addition, it has 16M bytes of memory, a 19-in. color monitor, a 280M-byte disk drive and a 296M-byte tape drive. Memory is expandable to 32M bytes.

Prices for the systems vary according to the configuration.

PRODUCT CHECKLIST

While IBM's Systems Application Architecture is a standard that is only now taking shape, its Systems Network Architecture (SNA) is very mature. SNA is even an industry, as seen in Communications Solutions, Inc.'s recently introduced Maxnet SNA Gateway for personal computers and PC local-area networks.

The Maxnet product is a board that fits into a standard IBM Personal Computer, PC compatible or IBM Personal System/2 machine. According to the vendor, the PC can then communicate with an IBM mainframe as though it were an SNA device.

There are two kickers. First, Maxnet supports both IBM's Advanced Program-to-Program Communication and 3270 protocols. Second, while the dedicated PC can communicate with SNA networks, it can also fit into LANs of other, non-dedicated PCs. In the process, it provides a gateway into the SNA world for every device in that PC network.

In effect, it means that MIS officers can make entire PC LANs SNA compatible for the cost of a single board, or $4,995.

Communications Solutions, 2125 Hamilton Ave., San Jose, Calif. 95125.

Circle Reader Service Number 112

At some time in the near future, IBM says, it wants to tie all its systems to one another and to other companies' systems via its Systems Application Architecture (SAA). But some analysts have said that SAA has a long way to go before it can be called a blueprint.

Now, however, Network Software Associates, Inc. has released Version 4.0 of its AdaptSNA group of personal computer-to-host communications software products, which is already SAA compatible. These products run on IBM Personal Computers, PC XTs, ATs, Personal System/2s and compatibles and provide Systems Network Architecture facilities.

The firm said AdaptSNA is SAA compatible because it is now "link independent," which means the same AdaptSNA package can be used over any physical link from coaxial cable to modems.

Some observers question whether this makes AdaptSNA truly SAA compatible or whether SAA is well enough defined for any product to be categorized as SAA compatible. However, AdaptSNA may be significant if only because it shows that SAA is now sufficiently firmed up enough for vendors to make rational arguments about their conformity to it.

Prices for AdaptSNA range from $585 to $785, depending on the host.

Network Software Associates, 22962 Mill Creek, Laguna Hills, Calif. 92653.

Circle Reader Service Number 113

Optical fiber communications and personal computing seem to be linking up, at least in theory. Black Box Corp. has introduced its Fiber Optic PC Board, which allows personal computers and compatibles to communicate via optical fiber just as easily as they do with twisted-pair. The half-height cards are available with either one port at a price of $255 or two ports for $320.

Meanwhile, the advantages of linking PCs with fiber optics have recently been examined in the Corning Glass Works internal publication, "Guidelines." In its Volume 4, Number 1, GL-13 issue, "Guidelines" presents interviews with futurists and industry insiders on the potential uses of fiber-optic cabling in the home and the home office.

The experts' conclusion is that optical cable's extremely broad bandwidth would make it possible for the average home to support everything from videophones to supertelevisions to PCs.

Black Box, P.O. Box 12800, Pittsburgh, Pa. 15241.

Corning Glass Works, Corning, N.Y. 14831.

Circle Reader Service Number 114

Compact disk/read-only memory (CD-ROM) disks have the power to contain vast amounts of data. A jukebox CD-ROM player can provide a personal computer with large amounts of data, rivaling mainframe-style data storage devices.

Now, Meridian Data, Inc. has unveiled two communications servers that allow multiple CD-ROM drives and data bases to fit into local-area networks. CD Net is the smaller of these servers and supports three half-height 5¼-in. slots, a network board with an Intel Corp. 8088 processor and a power supply. It costs $2,995.

CD Server, meanwhile, is meant for large LANs. It has up to six half-height 5¼-in. slots, a network board with either an Intel 80286 or 80386 processor and a power supply. It costs $5,995.

Meridian Data, Suite 101, 4450 Capitola Road, Capitola, Calif. 95010.

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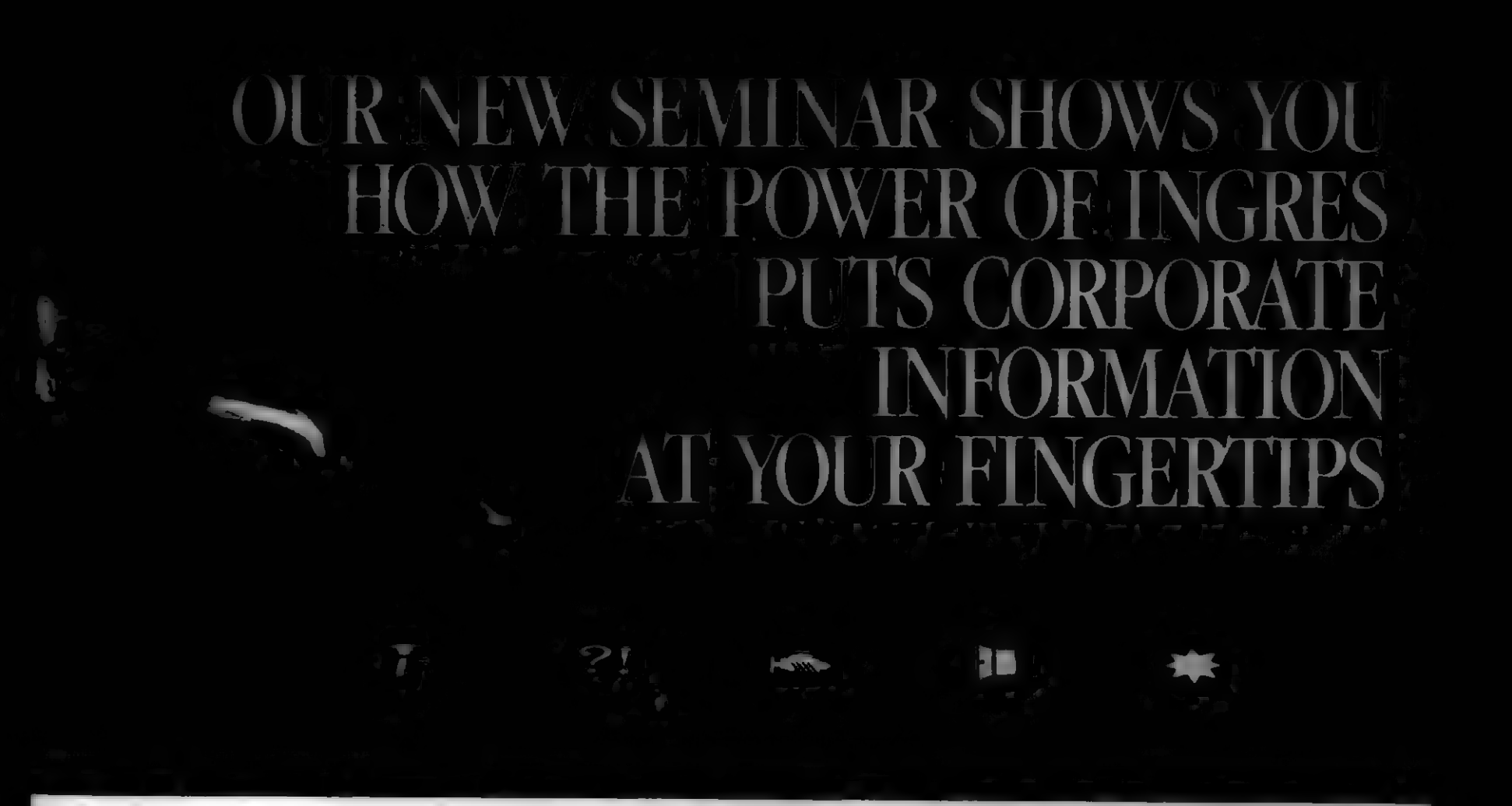

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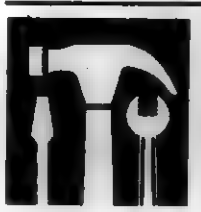

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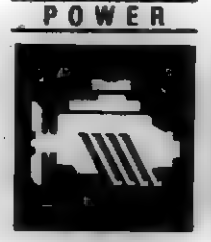

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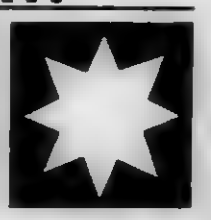

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CALENDAR

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The 1988 National Conference on Managing DEC-IBM Integration. Chicago, May 3-4 — Contact: Gregg Martin, DeBoever & Associates, Inc., Suite 220, 179 Great Road, Acton, Mass. 01720.

May 8-14

Downsizing Corporate Information Systems: How Far Should You Go? Boca Raton, Fla., May 8-11 — Contact: Paula Zinck, International Data Corp., 5 Speen St., Framingham, Mass. 01701.

Upgrade, Repair, Maintenance, Troubleshooting of the IBM PC, XT, AT, PS/2 & Compatibles. Boston, May 9-11 — Contact: Personal Computer Group, The American Institute, 55 Main St., Madison, N.J. 07940. Also being held May 11-13 in Chicago.

Comdex/Spring '88. Atlanta, May 9-12 — Contact: The Interface Group, Inc., 300 First Ave., Needham, Mass. 02194.

Data Communications I: Basic Concepts. Chicago, May 10-11 — Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

Zero Defect Software — Dream or Reality? New York, May 11 — Contact: Nordic Business Development Corp., Suite 400, 3 Landmark Sq., Stamford, Conn. 06901.

Toward Total Integration. Twinsburg, Ohio, May 11-12 — Contact: Allen-Bradley Co., 1201 South Second St., Milwaukee, Wis. 53204.

Software Contracts. Boston, May 12-13 — Contact: Battelle Seminars Program, P.O. Box C-5395, 4000 N.E. 41st St., Seattle, Wash. 98105.

Data Communications II: Systems & Applications. Chicago, May 12-13 — Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

May 15-21

The 1988 Annual Meeting and Conference of the Software Maintenance Association. Chicago, May 15-18 — Contact: SMA 1988 Chicago, P.O. Box 391432, Mountain View, Calif. 94039.

41st Annual International Communications Association (ICA) Conference & Exposition. Anaheim, Calif., May 15-20 — Contact: ICA, Suite 710, LB-89, 12750 Merit Drive, Dallas, Texas 75251.

Crimson Tech Annual Trade Show. Boston, May 16-17 — Contact: Diana Musto, Crimson Tech, 325 Vassar St., Cambridge, Mass. 02139.

The New England Business Conference. Boston, May 16-18 — Contact: Danieli & O'Keefe Associates, Inc., New England Business Conference Management, 75 Union Ave., Sudbury, Mass. 01776.

The Hammer Information Systems Conference. White Plains, N.Y., May 16-18 — Contact: Forum 88, Hammer and Co., 5 Cambridge Center, Cambridge, Mass. 02142.

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May 22-28

Essential Systems Development: A Fourth-Generation Methodology. Los Angeles, May 23-25 — Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

Document Management Systems Conference. Stockholm, May 25-27 — Contact: Information Management Congress, 345 Woodcliff Drive, Fairport, N.Y. 14450.

Third Annual Lotus Developer Conference '88. Boston, May 25-27 — Contact: Lotus, 55 Cambridge Pkwy., Cambridge, Mass. 02142.

California Computer & Graphics Show. Palo Alto, Calif., May 26 — Contact: Norm De Nardi Enterprises, Suite 204, 289 South San Antonio Road, Los Altos, Calif. 94022.

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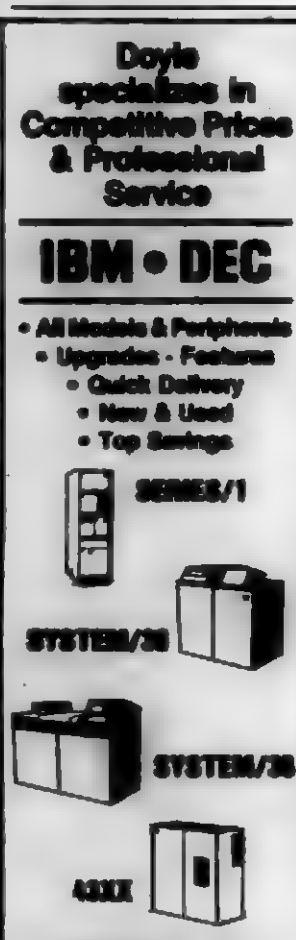

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Software developers get Mac, VAX language link

Apple Computer, Inc. Macintosh developers have a new connectivity language from Network Innovations Corp., headquartered in Cupertino, Calif., that can talk to a Digital Equipment Corp. VAX data base. Based on IBM SQL, the language is called CL/1, and it serves as a link between Apple's Hypercard applications and DEC VAX minicomputers.

With CL/1, software developers reportedly can build VAX-connected applications without writing VAX software. Network Innovations said that CL/1 supports RDB, which is DEC's relational data base management system, Oracle Corp.'s Oracle, Relational Technology, Inc.'s Ingres, Sybase, Inc.'s data bases and DEC's VAX RMS data files generated by Cobol and Fortran.

Companies that have demonstrated CL/1 capabilities in their Macintosh applications include Acius, Inc., Ashton-Tate Corp., Blyth Software, Inc. and Lotus Development Corp.

The CL/1 developer's tool kit includes an application program interface (API), developer tools for the Macintosh and a copy of the CL/1 server for DEC's VAX/VMS.

According to the vendor, there is also a redistribution license for the CL/1 API that allows developers to distribute CL/1 as a standard part of their Macintosh applications without charge. The tool kit is priced at $35,000 and includes one year of technical support.

The CL/1 server for VAX/VMS is installed on each VAX system that has a CL/1 connection. Prices for the CL/1 server begin at $3,000 for a DEC Microvax II and go up to $23,975 for a DEC Vaxcluster 8978. — HELEN PIKE

Circle Reader Service Number 116

Openview

Continued from page 59

Openview will continue to incorporate future OSI modifications to enable the integration of multivendor systems into the network management system.

OSI is integral to Openview and to HP's overall network management strategy. HP abandoned its proprietary approach to networking a few years ago and declared OSI the way of the future, placing the standard at the center of its subsequent network product development.

"Openview, to me, represents a different approach [from IBM's Netview] to network management," declared Jack Freeman, senior analyst of data communications at the Yankee Group in Boston. "Openview stresses the selection of data culled from various networking data bases, then massaged in the PC Windows environment, then presented to chief information officers to analyze overall network efficiency and justification. It doesn't emphasize the kind of nuts-and-bolts performance and response time monitoring that other network management systems, such as Netview, stress."

Freeman said that HP might also be assuming a sort of elder statesman role, whereby the vendor can become an influential and high-profile U.S. promoter of OSI in network management.

"Once OSI becomes widespread, people will scramble looking for good network management software for OSI systems," Freeman explained. "HP is aiming to be in the position of providing it."

Along the way, HP will likely try to garner third-party network vendor support. By gathering backing, HP hopes to produce enough enhancements and extensions to Openview to eventually put it in a position to go to OSI standards committees and declare that "we have a few [network management] suggestions, and we also have some support for them," Freeman said.

OSI comes first

"Down the road, HP could be in a very good position with regard to network management," Freeman added. "IBM and Digital Equipment Corp. support OSI, but as an adjunct to their product development. For instance, when DEC introduces a network enhancement, they do it first to [their own] Decnet network, then to OSI. HP does everything for OSI first, however, and that will be a strength later on."

For the short term, Freeman said that Openview could even win support outside HP's user base from those firms seeking the broad network reporting features Openview offers that IBM and other vendors do not.

Actually, these features are not yet fully available. The Openview Windows user interface, the Status and Diagnostic Monitor software, the Performance Monitor software and the ITDMS manager software will not be available until the end of 1988. Only the Network Command Interpreter software is available now. — STAN KOLODNY

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Blue Beat

Continued from page 59

supports and provides maintenance service for non-IBM equipment.

There is, as always with IBM, a catch: The company will only do this in cases in which the customer's business solution is predominantly IBM based (the IBM rule of thumb is up to 25% third-party content by value). Still, IBM's process has proved attractive to a number of large end users who are putting in major IBM installations and who want some degree of customization and third-party product content. The list of customers for whom IBM has performed systems integration projects makes up an impressive roster: Ford, United Airlines, Mobil, Sears, Hospital Corporation of America, Equitable Life Insurance Co., Lockheed, Wells Fargo and so on.

At the low end of the spectrum, IBM is performing smaller systems integration projects routinely, and now has approximately 1,300 people in 47 locations nationwide to handle these projects through an organization called IBM Information Services Systems Integration and Professional Services (abbreviated as IIS-SI/PS, which is not much of an improvement).

Supporting the systems integration effort is a custom products infrastructure. There is an organization called the IBM Custom Workstation Laboratory that will cheerfully modify RT Personal Computers, Personal Computer ATs and Personal System/2s per customer requirements. There are IBM product lines available on a custom basis with names like Image Application Systems and Integrated Diagnostics. Moreover, all of IBM's Industry Marketing functions now have custom design teams in place, while the Application Systems Division has almost 600 engineers and programmers available. The Systems Division prides itself on the 500 or so people available for commercial projects.

Not to be left out, the new IBM Communications Systems unit is setting up its own group to handle private network systems integration projects. Communications Systems has 400 or so systems engineers just dying to custom-design networks for end users. It has also been putting together a new structure that includes bits of the Federal Systems Division, the Rolm Corp. organization, the Information Network, the National Service Division and IBM international units for a total of a couple of thousand more custom network people. Communications Systems has also taken to using its petty cash (it has a lot of petty cash) to buy up outfits like Pactel Spectrum Services, which gives the division further network management expertise.

Soup to nuts

The whole thing is obviously being taken seriously by IBM. The company is turning itself, as far as large end users are concerned, into a turnkey solutions supplier. IBM, in short, will sell you products, implement them, drown you in programmers and support people and, with a little notice, put in a cradle-to-grave, soup-to-nuts, integrated data/text/graphics/image/voice, multivendor, industry-specific, global enterprise solution serviced 24 hours a day, seven days a week from here to Bangladesh.

The tendency is to pooh-pooh this. Large MIS shop managers say they are not impressed. ("What, me be systems integrated? Never!") Competitors tend to sniff and regard it as another IBM aberration. Even ADAPSO hasn't got upset about it, which isn't entirely unjustified: IBM has made more than a few mistakes in its pursuit of systems integration business.

Still, it may be unwise to assume that IBM is off base. The firm is responding to real market demands for customization, complex solutions and multivendor integration, and so far, it is the only major systems vendor to offer project-based systems integration to commercial users.

IBM also has an edge that many (including MIS) may tend to forget: the sheer size of the IBM base of systems and software. It would be impossible for many end users to handle any large-scale systems project without involving IBM in some form, and where a project involves a high level of IBM content, IBM's willingness to help has a certain insidious charm.

Then there is the sheer weight of resources IBM is putting behind its systems integration drive. They are not small, even by IBM standards. Anything that is being targeted that seriously by so powerful a company deserves a little thought. A 600-lb gorilla is, after all, still a 600-lb gorilla.

Jeffery is managing director of the International Technology Group, a management consulting and market research firm in Los Altos, Calif.

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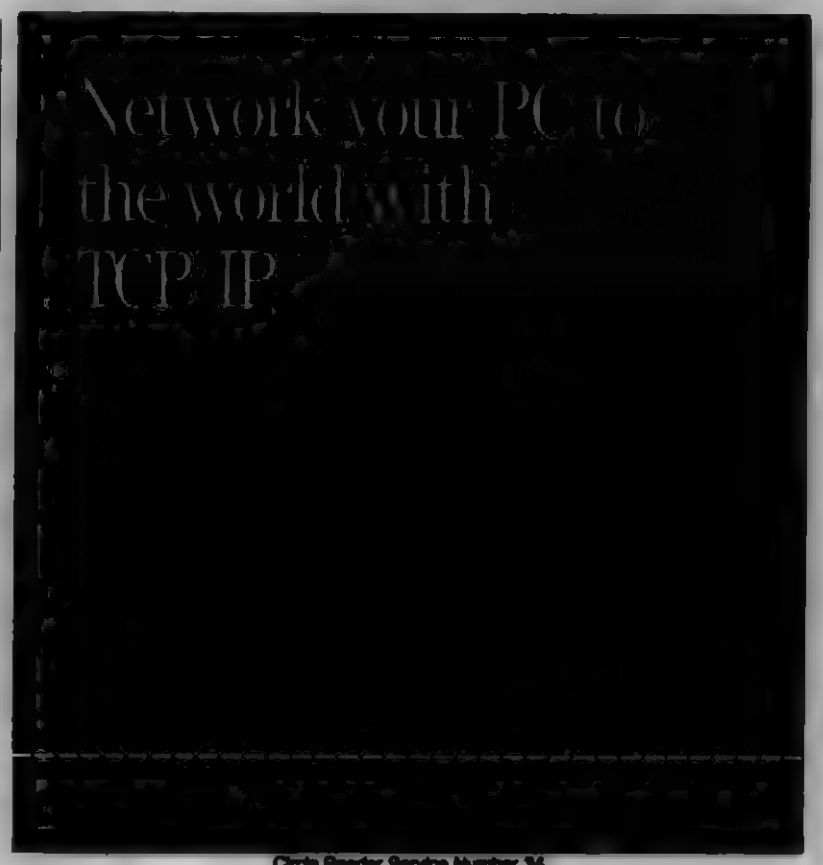

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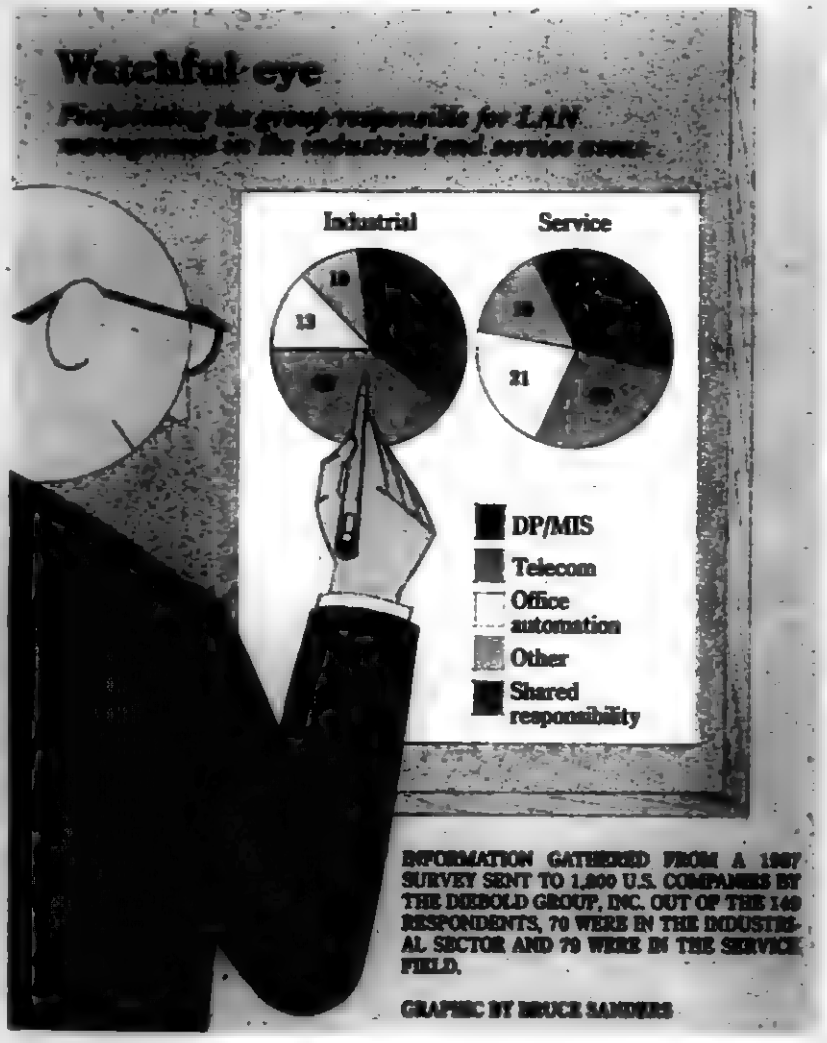

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See story page 16

next issue

Personal computing and MIS are finally managing to coexist peacefully. June's *Computerworld Focus* looks at this delicate detente. We'll check out how executive information systems are gaining corporate influence and discover whether workstations stand to depose the boss's personal computer. Meanwhile, another struggle is ensuing as IBM and DEC try for a piece of Apple's action in the educational market. In addition, follow the rise, fall and regrouping of artificial intelligence applications in our Special Section. Stay on top of the latest PC news on graphical interfaces, X Windows, CD-ROM technology and more in next month's *Focus*.

IBM's great leap forward

Michael D. Millikin

The move to distributed network computing is the next architectural Great Leap Forward. Much of the impetus comes from the increasing power on our desktops. Desktop processors already are pushing toward and breaking double-digit million instructions per second performance. In the next few years, the entry-level price for these brawny boxes will drop. Distributed network processing will help exploit the aggregation of cycles across the network that otherwise would lie dormant.

Distributed network computing transparently distributes computational and data management across a heterogeneous group of computers. The best known model of this, perhaps, is Apollo Computer's Network Computing System (NCS). Digital Equipment, too, has a scheme for this, as seen in its Local Area Vaxcluster.

Another vendor has just jumped into this particular development ring — IBM. In conjunction with its recent set of announcements on AIX, its implementation of Unix, Big Blue also announced the Transparent Computing Facility (TCF).

TCF reportedly allows the distribution of data and processes among up to 31 different TCF nodes. Currently, a TCF node is an AIX/370 virtual machine or an IBM Personal System/2 Model 80 with an AIX PS/2 TCF program.

Location of data and processes is transparent to application programs and end users. Log on to one node, and the entire collection of 31 nodes can appear as a virtual local resource. Dynamic reconfiguration permits the addition or removal of nodes without affecting the cluster's operation. The cluster will also dynamically reallocate cycles across the network based upon resource constraints at a given time.

IBM's Systems Application Architecture (SAA) sets up a blueprint for creating a distributed computing architecture across the IBM product lines. Given the different operating systems, this is an Augean task, but one IBM will achieve.

Now that IBM has recognized the potential of Unix, it is pouring resources into this business area. But it does not plan just to tag along with the pack of minimum conformers to Unix standards. Nor is it constrained by jumping through SAA hoops. (There are well-defined points of intersection, however. IBM no longer is in the business of creating isolated systems solutions.)

Hence, IBM can blast ahead with something like TCF, without worrying about how to implement it on a variety of operating systems.

Many current implementations of distributed network computing are in scientific and engineering environments. IBM's AIX and TCF, while targeted at those markets, are also directed squarely at the commercial side of business. Not only has IBM's bolstered AIX given yet another shove to the fast-moving Unix movement, but TCF has a good chance of hastening distributed network computing on the commercial side.

Millikin is vice president and senior analyst with Patricia Seybold's Office Computing Group in Boston.

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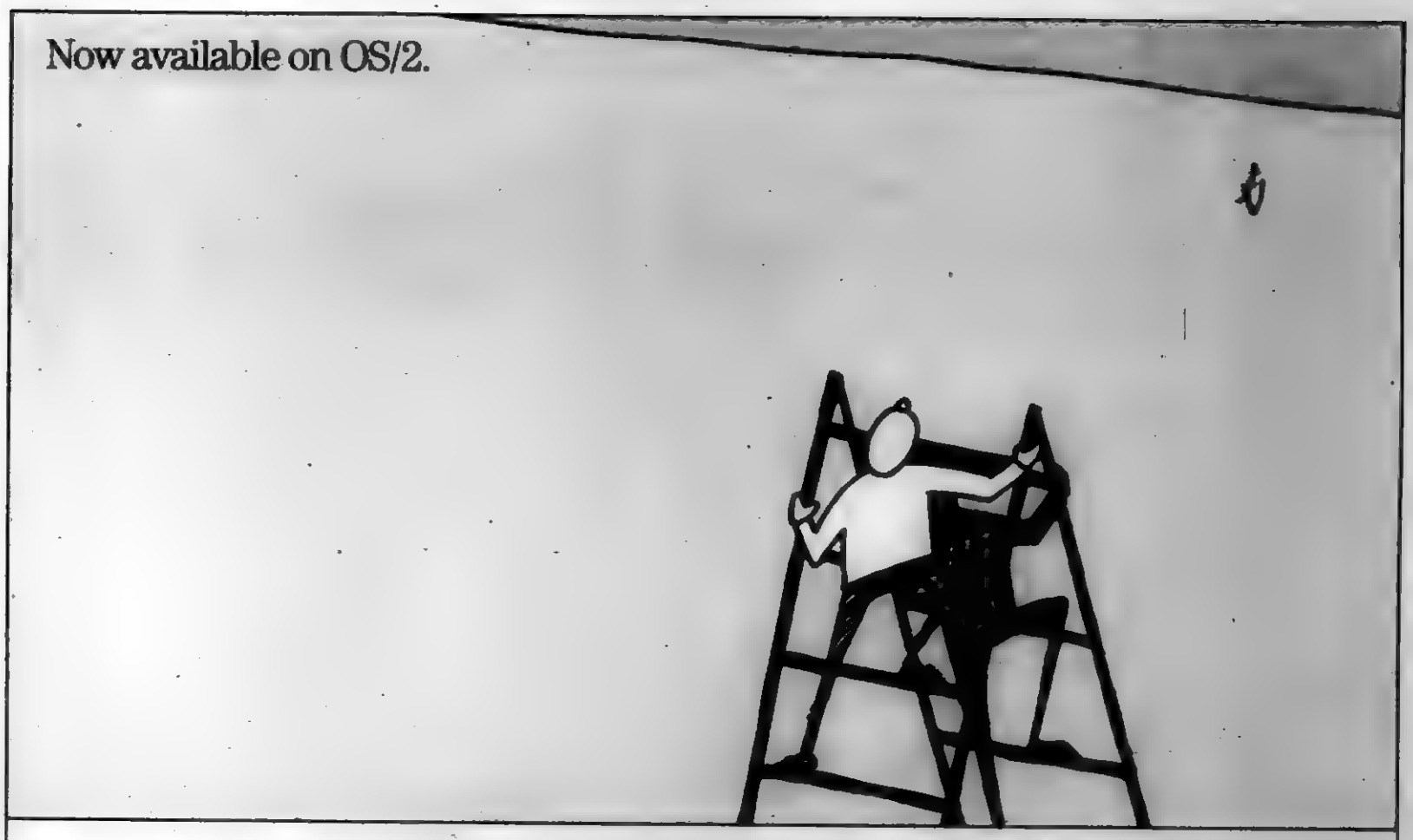

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COMPUTERWORLD

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In Depth — Bill Inmon shines a cold, hard light on DBMS efficiency. **Page 81.**

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Business as usual for CDC clients as company wards off takeover threat. Page 125.

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Lotus lines up add-in support for 1-2-3 Release 3's eventual delivery. Page 39.

Computer industry mulls trade bill veto options. Page 95.

Vendors skewing DBMS tests

BY CHARLES BABCOCK
CW STAFF

Recent relational data base management system benchmarks have yielded surprisingly dissimilar results for tests purporting to measure the same thing. A closer look reveals that some results have less to do with the software's merits than with how the vendor arranged the test.

How else can one explain why Sybase, Inc. reports 29.3 transaction/sec., Relational Technology, Inc. claims it has crashed the 100 transaction/sec. barrier and Cullinet Software, Inc. — a company not given to understatement — weighs in at a paltry 13.4 transaction/sec.?

As if these disparities were not enough, IBM has further roiled the waters by announcing that DB2 Version 2 can handle between 300 and 438 transaction/sec. in a test that uses a transaction resembling minicomputer supplier benchmarks.

Eye of the beholder

Characteristics of "standard" debit/credit benchmarks used by data base vendors often vary

	[illegible]	Sybase	[illegible]	Cullinet
Independently audited	✔	✔	✔	
Transaction type	ET1	TP1	TP1	TP1
Mirror logging	✔		✔	
Subsecond response time		✔	✔	✔

CW CHART

You had to be there

In fact, the transactions involved — TP1, or a sequence of instructions that imitates activity at a bank branch — were highly similar from test to test. But the circumstances under which the transactions ran varied widely. The differences were significant enough that users will have a tough time drawing any conclusions from the tests.

Relational, for example, ran its benchmark on Sequent Computer Systems, Inc. processors, even though the largest slice of its customer base uses the Digital Equipment Corp. VAX.

When asked why Sequent was selected, Aaron Zornes, director

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Amdahl tops IBM MIPS

BY J. A. SAVAGE
CW STAFF

SUNNYVALE, Calif. — A supremely confident Amdahl Corp. said last week that it will ship its next-generation mainframe, a dual processor said to be capable of more than 50 million instructions per second, next month — even though there were no beta-test sites and no orders as of the day of the announcement.

A quad-processor machine capable of more than 100 MIPS will be available by the end of the year, the company claimed. The Amdahl 5990 Model 1400 will start at $13 million, and the smaller Amdahl 5990 Model 700 will be priced at about $7 million. Both are said to run at 10 nsec per cycle. The company also announced a multiprocessor version of its earlier 5890 Model 390E.

This is the first time an IBM plug-compatible vendor has announced a new generation of mainframes before IBM. "IBM made us more bullish when it announced ESA," said Eugene White, Amdahl's vice-chairman. "It allows you to do more things because you know what the architecture will look like in five years. The specs are close to the

Continued on page 8

Hype headaches for MIS

BY DOUGLAS BARNEY
CW STAFF

A recent television commercial for Wang Laboratories, Inc. described an unnamed MIS manager with a problem. He had an IBM mainframe, a DEC workstation and an IBM PC, none of which were communicating effectively. The solution was simple enough: Just add another computer — in this case, a Wang VS — and some communications components to tie it all together.

Just after the commercial ran, George Perera began to get inquiries from people at Ryder Truck Rental, Inc., where he serves as director of operations.

"Everybody came around and said, 'You got rid of this Wang system, and look what it could have done for me,' " Perera recalled. "But what I had was a Wang WP 30 — a word processor from the Year 2."

Overly simplistic advertising, vendor hype, simple word

Continued on page 15

Seven famous unshipped products:

Silverlake: IBM's System/36 and 38 replacement.

Micro Channel-compatible systems: Neither Tandy Corp.'s nor Dell Computer Corp.'s has shipped. Tandy's will cost more than the street price of an IBM PS/2.

ISDN: Do everything from your phone. It's being tested, but practicality and cost are unknown.

OSI/Decnet Phase V: Announced for 1990.

Presentation Manager: An interface to make PS/2s compatible for the rest of us.

1-2-3 Release 3: Lotus Development Corp. devotees are still waiting.

Skepticism over PS/2 clone label

Compatibility claims, cost benefit in doubt

BY JULIE PITTA
and ALAN J. RYAN
CW STAFF

Corporate America is not yet ready to take third-party vendor claims of compatibility with the Micro Channel architecture of IBM's Personal System/2 at face value. And they are not about to invest in clones until competing vendors can offer the same cost savings that built the Personal Computer clone business in the first place.

"If there isn't a price advantage to taking a risk, why do it?" asked Cheryl Currid, manager of departmental computing services at Coca-Cola Foods in Houston.

So far, Tandy Corp. and Dell Computer Corp. are the only two vendors to have announced PS/2 compatibles, but others are expected to follow in short order.

Dell has yet to disclose how it will price its systems, while Tandy's machine will be priced from $5,000 to $7,000 — significantly higher than the available retail price of IBM's PS/2 Model 80. Neither vendor is likely to deliver before IBM cuts its official list prices (see story page 6).

Intrigued, but cautious

Currid and other information systems managers interviewed last week admitted they are intrigued by the possibility of a new clone industry undercutting IBM's PS/2 line. But they also made it clear that they are not going to buy anything until they are absolutely certain such compatibility really does exist.

"I would want it to be 100% compatible," said Samuel Leming, manager of data processing in the central marketing area of The Kroger Co. in Indianapolis. "We are faced with too much hardware to say, 'You can't run everything on that piece of equipment.' "

Proving compatibility is a major concern, and one that cannot be easily resolved.

"If somebody said, 'Our [clone] is 100% compatible,' I

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Moving up. Honeywell Bull adds the three-processor DPS 8000 Model 83 and the four-processor Model 84 to its small mainframe series and claims performance between IBM's 3090 Model 180E and 200E. Page 6.

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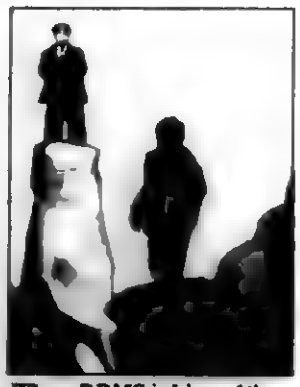

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"If there isn't a price advantage to taking a risk, why do it?"

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EDITOR'S NOTE

In the "IBM-compatible acquisitions" chart in the Special Report this week, the bars labeled Intel 8088-, 80286- and 80386-based PCs should be labeled IBM Personal Computer XT and compatibles, PC AT and compatibles and PS/2.

NEWS

Fighting city hall

Computer cooling system aggravates drought

BY J. A. SAVAGE
CW STAFF

SAN FRANCISCO — Plumbing installed a quarter of a century ago to cool San Francisco's first computer has been cited as the biggest squanderer of city water, which is currently being rationed because of California's drought.

Water used by the city's original IBM 1401 Model 120 cooling system and now used for a two-processor 3084-Q — a total of about 98,000 gallons of drinking water per day — is dumped into the sewer after one pass.

The computer, located in City Hall, is used to process payroll, tax assessments, welfare rolls and medical information, according to Henry Nanjo, director of information services for the city. Nanjo said his office called attention to the water wasting this winter "because we were expecting the drought."

But until the drought became officially recognized — with an initial 10% water-usage cut required by May 1 — little was done.

Nickels and domes

A major obstacle to recycling the water that cools the 7,500-square-foot computer room is the French Renaissance architecture of City Hall. To recycle the water, its temperature must be lowered after the first pass, and the usual method is to run it through a cooling tower. Such towers, however, are big, boxy projections usually set on top of a building. There is little space for a cooling tower atop the ornate dome of City Hall.

Another reason for putting off recycling efforts is that City Hall does not have to pay for city water. The first time water waste at the computer room came up was during the drought from 1976 to 1977. Then, the city tapped into an underground stream, according to city engineer Dennis Huey. Unfortunately, the stream water was full of minerals that clogged and corroded pipes. The city soon switched back to its drinking water system fed from Hetch Hetchy reservoir in Yosemite National Park.

Currently, the city is studying the most economical place to locate a cooling tower with minimal visual impact. The cost of recycling computer room water is estimated at $200,000 — an amount difficult to find this year in a city with a nearly $200 million deficit.

"It's not so much a bottom-line issue as a conservation and image problem," the mayor's press secretary said. He would not speculate on the odds of such a project being funded.

Another alternative is to cut back the flow to the computer room by 10%, but that would mean eliminating processing for some city departments. If the recycling project is funded, Huey said, it could be finished this summer, before the worst effects of the drought are felt.

IBM joins networking forum

BY NELL MARGOLIS
CW STAFF

CHELMSFORD, Mass. — IBM last week added its name to the roster of the Network Computing Forum, a year-old gathering of manufacturers, users and academicians who have put their heads together to air ideas for computing across multivendor networks.

Spearheaded by Apollo Computer, Inc., the forum — affiliated with the Corporation for Open Systems (COS) — was established in March 1987 with 31 charter members. Membership now stands at approximately 110.

"IBM's joining the forum is clearly an important event; their presence will lend credibility to the forum's efforts," said David Nelson, the forum's cofounder and chief technical officer.

When the forum holds its third semiannual meeting later this month at the University of Michigan, Nelson said, the only "major company in the industry that won't be on the membership list is DEC." However, he added, "while DEC is still absent from formal membership, they do attend some of the meetings."

Nelson was quick to point out that IBM's forum membership "clearly does not mean an endorsement of [Apollo's] Network Computing System, which motivated the creation of the forum."

While the forum is not a standards-making organization, Nelson explained, the exchange of ideas that it fosters will speed the evolution of standard technical approaches to the use and administration of networks. For instance, Nelson said, "We have had a healthy exchange with regard to remote procedure call protocols, and have agreed to support the ISO [International Standards Organization] standard efforts in this area."

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Cray replaces X-MP line

New series brings extended architecture to users

BY STANLEY GIBSON
CW STAFF

MINNEAPOLIS — Cray Research, Inc. replaced its best-selling X-MP product line last week with an extended-architecture version called the Cray X-MP EA.

The new line offers up to four times the memory of Cray's X-MP systems and implements the 32-bit architecture announced with the Cray Y-MP, which was introduced in February. The X-MP features a 24-bit architecture.

The X-MP EA series, priced from $2.5 million to $14 million, can operate in either the 24-bit mode of the X-MP or the 32-bit mode of the Y-MP, according to Cray. The systems contain one to four CPUs.

Y-MP models, priced at about $20 million, use eight processors. In addition, they operate at a 6-nsec clock speed.

The X-MP EA models run at a clock speed of 8.5 nsec. Entry-level X-MP EA models run at 10 nsec.

More for less

"This brings more power to X-MP users who don't want to spend the money on the Y-MP," said Marcia Brooks, a supercomputing analyst at International Data Corp. in Framingham, Mass.

Brooks noted that the growth path offered by the X-MP EA should be welcomed by X-MP users, who represent two-thirds of the Cray installed base.

The prices of the extended architecture systems are generally the same as or less than those of the X-MP series, but the new models' memory capacity is up to four times greater.

Flexibility

"They allow users to migrate from Cray X-MP systems to the Cray Y-MP architecture while preserving their investment in applications software," said Cray Chairman and Chief Executive Officer John Rollwagen in a prepared statement.

The 64-million-word maximum memory on the new models is twice the 32-million-word maximum available on the Y-MP. A word is equal to eight bytes.

A Cray spokesman suggested that the Y-MP maximum memory could be increased in the future.

Storage device added

Cray also introduced a solid-state storage device, the SSD-5I, a 128-million-word subsystem located within the cabinet of the Cray I/O subsystem.

The SSD-5I is priced at $1.5 million.

In addition, Cray reduced the price of its SSD-7, a 512-million-word model, from $6 million to $5 million.

Cray also announced that it discontinued the SSD-4, a 64-million-word model.

Lesser bite for memory

Cray's X-MP Extended Architecture systems feature four times the memory of comparably priced models in the discontinued X-MP series, except at the entry level

X-MP EA/14SE	One	Four	$2.5
X-MP/14SE	One	Four	$2.5*
X-MP EA/116SE	One	16	$4
X-MP/116SE	One	16	$4*
X-MP EA/116	One	16	$5.75
X-MP/14	One	Four	$5.5*
X-MP EA/164	One	64	$8
X-MP/116	One	16	$8.5*
X-MP EA/264	Two	64	$10
X-MP/216	Two	16	$10.5*
X-MP EA/464	Four	64	$14
X-MP/416	Four	16	$16*

* Discontinued

INFORMATION PROVIDED BY CRAY RESEARCH, INC.
CW CHART

CORRECTIONS

The vendor of the Vision object-oriented data base is Innovative Systems Techniques, Inc. in Newton, Mass. [In Depth, CW, Feb. 22].

Last week's Page 1 sketch, which accompanied the "True compatibility" story [CW, May 2], was the work of artist Les Kanturek.

Planning averts disaster at L.A. bond trading firm

BY JAMES A. MARTIN
CW STAFF

LOS ANGELES — The earthquakes that rocked Southern California in October 1987 may have been a blessing in disguise for First Interstate Bancorp.

Around 10:30 p.m. last Wednesday, a fire swept through the 12th to 16th floors of the bank's 62-story downtown headquarters. Temperatures up to 2,000 degrees Fahrenheit raged through the bond trading division — the main occupant of those five floors — destroying a Digital Equipment Corp. VAX, along with Data General Corp. and Prime Computer, Inc. minicomputers and 50 to 70 IBM and compatible microcomputers.

But thanks to a disaster recovery program that had been bolstered following the fall tremblers, the bond trading division lost little data, and interruptions to its operations were minimal.

"The earthquakes last October, in a perverse way, helped us out last week. They raised our consciousness about the importance of disaster recovery," said Mark Barmann, president and chief executive officer for First Interstate Services Co., a subsidiary providing data processing and telecommunications services to First Interstate Bankcorp. "We had tested our business resumption plan just 1½ weeks ago, simulating exercises in the advent of an outage. The exercise proved very timely."

The backup savior

Data from the bond trading division's minicomputers was backed up daily at First Interstate's data center, located seven blocks away at 1200 W. Seventh St. The day's transactions had been transmitted hours earlier, as usual, to Warrington Associates, Inc. — which is a bond trading time-sharing service in Hopkins, Minn. — for overnight processing.

The bank's main processors, two IBM 3090s, are housed in the W. Seventh St. data center and handle the bank's major applications and data bases — savings and checking accounts and customer loans, to name a few. None of those applications were affected by the fire. Also housed in the center are repetitive DEC VAXs, with Prime, DG and other systems acting as backup.

"There was some loss of intellectual property, but not operational data," Barmann said. Many of the bank's bond traders wrote their own trading analysis software programs on microcomputers, which were destroyed in the disaster.

However, Barmann said, most of the traders kept backup copies of their programs at home. Although the traders' individual records and documents residing on floppy disks did not survive, departmental information remained safe in the off-site data center.

Operations in the bond trading department were disrupted by the fire, but several traders Thursday morning purchased microcomputers and worked from their homes with their software programs, while others set up temporarily at the downtown data center.

First Interstate bond trading offices in London and Tokyo remained open for extended hours late last week to continue the bank's trading activities, Barmann said.

The Warrington time-sharing service normally processes the bond trading division's daily transactions by 4 a.m. and transmits them back to the department's VAX system at headquarters. Because of the fire, the data was downloaded onto magnetic tape and sent by air courier to First Interstate's Los Angeles data center.

> **MOST OF THE bond traders kept backup copies of their programs at home and worked from there in the aftermath of the fire.**

The VAX at the data center has taken over the role as the bond department's CPU until a replacement system can be brought on-line in the downtown tower. There was no estimate late last week on when operations in the building would return to normal.

The cause of the fire was under investigation at press time, but fire officials estimated the damage at $450 million, making it the most costly high-rise fire in the city's history.

Ironically, First Interstate and the building's co-owner and other major tenant, Equitable Life Assurance Society of the United States, were in the process of installing an internal sprinkler system before the fire broke out. The tower was built in 1974, two years before internal sprinkler systems became a legal requirement. Officials estimated that installation of the sprinklers was about two weeks from completion.

Staff writer James Daly contributed to this report.

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Model 70 to key PS/2 changes

386-based micro coming in June; IBM seen carving niche with price cuts

BY ED SCANNELL
CW STAFF

IBM's mythical Personal System/2 Model 70 will finally become flesh and blood early next month.

IBM will announce the system along with several other enhanced versions of the PS/2 family, according to a source who has seen a floor plan for an exhibition IBM is putting together.

The desktop Intel Corp. 80386-based system, long seen as the missing link in IBM's microcomputer lineup, was promised by William C. Lowe, president of IBM's Entry Systems Division, at a technical seminar in Boca Raton, Fla., in February.

At that seminar, Lowe said his firm would deliver a 386-based system "both above and below the desktop."

The box to beat?

The Model 70 is a key component in IBM's strategy because with its 80386 chip, it is positioned to be the preferred hardware platform for running OS/2, OS/2 Extended Edition and the Presentation Manager operating environment.

Almost every major hardware vendor has announced a 386-based desktop system, with Compaq Computer Corp. having established a sizable lead in that market.

According to Framingham, Mass.-based International Data Corp. figures, Compaq shipped about 70,000 systems by the end of last year, with Zenith Data Systems shipping 22,000.

IBM shipped 40,000 80386-based PS/2 Model 80s last year, but that system is a floor-mount model. Some analysts think IBM will have to run hard uphill to catch Compaq in the desktop 80386 market.

IBM will also unveil an enhanced version of its PS/2 Model 80 that features higher disk capacities, the source said.

The question many observers have posed during the last few months is, How will IBM price the PS/2 Model 70 relative to the PS/2 Models 60 and 80 as well as desktop systems from competitors such as Compaq?

The suggested retail prices of the PS/2 Models 60 and 80 with 44M bytes of memory are $5,295 and $6,995, respectively. Dealers have been discounting both systems heavily, however, recently selling them as low as $2,995 and $5,150, respectively.

Analysts said they expect IBM to lower the prices of the Models 60 and 80 by 10% to 15% next month, making it possible to price a 44M-byte version of the Model 70 between $4,000 and $4,500.

Michael Dell, founder of Dell Computer Corp., recently said he plans to price his IBM Micro Channel-compatible 386-based desktop machine, the System 500, about 30% higher than his IBM Personal Computer AT-bus compatible, which costs about $3,600.

However, some analysts warned that the street price of a Model 70 after a few months on the market will be lower than those of machines from Dell and Tandy Corp.

While most analysts agreed that IBM will increase the new Model 70 and 80s' internal memory capacity to at least 2M bytes, some said the company will not put that many chips on the board for fear it will price the systems out of the market.

"These machines are going to be the primary OS/2 platforms. They have to have at least 3M bytes," said John McCarthy, an analyst with Forrester Research, Inc. in Cambridge, Mass. "I think IBM will have one to two megabytes, with room to expand. They don't want to raise the price too much."

DPS 8000 series gets two multiprocessors

BY STANLEY GIBSON
CW STAFF

MINNEAPOLIS — Honeywell Bull, Inc. added to its DPS 8000 series of small mainframes last week, introducing the three-processor DPS 8000 Model 83 and the four-processor Model 84.

The new systems are extensions of the single-processor Model 81 and dual-processor Model 82, which were first shipped in the third quarter of 1987. The DPS 8000 series was designed to run Honeywell Bull's GCOS 8 operating system.

The new systems are intended to compete with high-end IBM 4381 models and low-end IBM 3090 models. A Honeywell Bull spokesman said performance of the DPS 8000 Model 84 is between that of the IBM 3090 Model 180E and Model 200E.

Although the vendor declined to name performance figures in millions of instructions per second (MIPS), comparisons with the Models 81 and 82, based on information supplied by the vendor, indicate that the Models 83 and 84 are capable of approximately 7.7 and 8.9 MIPS, respectively.

The systems perform symmetrical multiprocessing, in which several processors share memory and one copy of the operating system. Processors can be upgraded to more powerful models within the family by adding CPU cabinets, according to John Undiano, marketing director of Honeywell Bull's large systems.

More to come

Undiano said Honeywell Bull will probably announce more DPS 8000 models this year, most likely at the low end of the product family. Undiano explained that the DPS 8000 series was conceived as a growth path for users of Honeywell Bull DPS 8 mid-range systems.

The DPS Model 83 is priced at less than $1.84 million and is equipped with a 32M-byte main memory that can be expanded to 256M bytes, three CPUs, two System Control Units and three I/O processors.

The Model 84 is priced at approximately $2.4 million and is equipped with a 32M-byte main memory, which also can be expanded to 256M bytes, four CPUs, two System Control Units and four I/O processors. Both systems will be available in July, according to the vendor.

Honeywell Bull also announced several mass storage systems. The MSU3390 and MSU3392 can store 2.5G bytes per unit, and the MSU3391 and MSU3393 can store 7.5G bytes. The disk drives are made by IBM and are the same as those sold as the IBM 3380 J and K disk drives.

The Honeywell Bull versions are intended for use with the IBM 3990-type controller at transfer speeds of 3M byte/sec. Honeywell Bull is evaluating whether or not to offer a speed of 4.5M byte/sec. along with advanced cache features promised on a yet-to-be shipped 3990 version.

The disk drives will be available in July. The 2.5G-byte models are priced at $151,700, and the 7.5G-byte versions are priced at $198,000.

Honeywell Bull also announced the MSS8080 storage subsystem, which can hold up to 760M bytes. The subsystem, made by Magnetic Peripherals, Inc., is also slated to be available in July, priced from $78,900.

Skepticism

FROM PAGE 1

don't know if I could challenge him or not," said Thomas O'Leary Jr., director of MIS at North American Philips Corp. in New York.

The cloners' claim

The clone vendors are eager to convince users that compatibility is not an issue but merely a marketing cloud raised by IBM to protect its sales. "This is the ninth compatible machine that we've done," said John Patterson, senior vice-president of technology at Tandy. "It's not a whole new technology — that's what an IBM salesman would have you believe; it's just a new bus."

Chips and Technologies, Inc. and Intel Corp., manufacturers of what they call Micro Channel-compatible chip sets, said they have conducted board-level tests for compatibility. Both Chips and Technologies and Intel conceded that their chip sets are not duplicates of IBM's technology.

"In the process of designing our chip set, we did extensive evaluations of IBM's components," said Paul Odolini, general manager of Intel's Microcomputer Division in Folsom, Calif. "But none of the vendors out there has done it the exact way IBM has. There are technologies we have that are better than IBM's, or just different. It doesn't matter how you do it, as long as it's compatible."

> "THE ONLY WAY to be positive that [a clone] is 100% Micro Channel compatible is to buy all the boards and test them all out."
>
> PETER MOULTON
> MOULTON, MINASI & CO.

Acid test

With IBM's original Personal Computer, Microsoft Corp.'s Flight Simulator software emerged as a leading test for compatibility: If you could boot up and take off, the system was compatible. But with no original software yet developed specifically for the PS/2, there is no comparable basis for easy evaluation by users.

Users and analysts said they expect that, ultimately, an add-in board exploiting the Micro Channel will fill that need. "The only way to be positive that [a clone] is 100% Micro Channel compatible is to buy all the boards and test them all out," said Peter Moulton, a partner at Moulton, Minasi & Co. in Columbia, Md.

Technology analysts urged caution and skepticism in dealing with compatibility claims. There is more to the PS/2 bus than meets the eye, said Clare Fleig, an analyst with the International Technology Group in Los Altos, Calif.

> "IF I HAD to make a decision, I would wait to let the market clear itself out."
>
> RICH GONZALEZ
> GREAT-WEST LIFE ASSURANCE CO.

"The Micro Channel is only one part of the bus," Fleig explained. "The other part is a set of controllers and other micro controller chips designed to do specific tasks."

The data's there

Clone vendors argued that IBM has made plenty of information available for compatibility testing. "For a change, IBM has fully specified this system," Tandy's Patterson maintained. "I'm more confident that I know what a Micro Channel is than I ever was with the AT bus."

IBM, which has acknowledged that it has held discussions with clone makers about licensing its PS/2 technologies, seems unwilling to clear the air of compatibility questions. It is still running advertisements proclaiming that anyone can take a Micro Channel PS/2 apart, while inferring that only IBM knows how to truly put it back together.

And Leland Reiswig, director of IBM's Entry Systems Division laboratory in Austin, Texas, said last week that IBM will not become involved in the compatibility issue. PS/2 clones will be tested by IBM for patent infringement but not compatibility, he said.

"If a vendor is making broad public claims about compatibility, and IBM knows they're false, we might pay them a visit and discourage them," Reiswig said. "But a vendor's claim is just that — a vendor's claim. It's really caveat emptor."

IBM's position leaves it up to the buyers to issue the stamp of compatibility, and that is not a comfortable task. "If I had to make a decision, I would wait to let the market clear itself out," said Rich Gonzalez, manager of new business administration at Great-West Life Assurance Co. in Englewood, Colo. But if he could not wait, he added, he would try to minimize the risk by selecting a vendor he feels comfortable in dealing with.

West Coast correspondent Stephen Jones and Senior Editor Ed Scannell contributed to this report.

Cullinet's survival strategy under evaluation

BY NELL MARGOLIS
and ROSEMARY HAMILTON
CW STAFF

WESTWOOD, Mass. — All was quiet on the Westwood front at Cullinet Software, Inc. late last week after the company dismissed more than 15% of its work force in its first major layoff.

Although the number of employees slashed from the Cullinet payroll surprised him, "this was part of an absolute necessity to let [the company] survive," said Robert Anderson, an analyst at Sutro & Co. in San Francisco.

Anderson, who said he anticipates black ink on the Cullinet balance sheet in the second quarter of fiscal 1989, noted that "everything that could be done has been done. Now the question is whether the new products can move out into their target markets and be strong competitors."

Mixed reactions

The customers who will ultimately answer that question expressed mixed reactions to last week's layoffs and corporate restructuring. "I think [the layoffs and the reorganization] are a plus for our decision making," said Tony Grybowski, MIS director at Cincinnati-based Emery Chemicals Division, which is currently evaluating a commitment to Cullinet's IDMS/R data base. "They will be in a narrower area now rather than spread out all over the place. That should mean better support."

David Clark, data base administrator at New Mexico State University, noted that founder and Chairman John J. Cullinane's resumption of his old post after a mini-retirement "indicates that [Cullinet is] on the road back." However, he said, the company's recent volatility is causing him to hold back his final decision on a possible IDMS/R buy.

Dewey Berry, systems manager at the State of South Carolina Educational Department, was similarly stalled by last week's news from Westwood.

The reorganization "does concern me, and I'm being hit with it cold now, so it sets me back," said Berry, whose department recently migrated to IDMS/R 10.2 and is interested in the possibilities of Digital Equipment Corp.'s VAX and IDMS/SQL. "If they're laying off, it sounds like they could be having problems peddling their software. That could cause me to consider another direction more strongly. It could be real good or real bad."

"The new team is in place; the structure is culled of redundancy and ambiguity. We're pulling together and are ready to go forward," said Robert K. Weiler, who emerged from Cullinet's latest corporate reconfiguration as head of a newly defined sales, marketing and support structure, reporting directly to Cullinane.

The overall structural reorganization announced last Monday aligns all development forces under executive vice-president John B. Landry III and all North American customer, marketing and sales support under Weiler, who moved into the newly created position of executive vice-president of North American operations and client services.

The net effect of the streamlining, said Cullinet President George Tamke, will be a $25 million reduction in expenses for fiscal 1989, started May 1.

AT&T armed for march on Atlanta

ATLANTA — AT&T's Data Systems Group will uncork a product blowout featuring the 3B2/700 minicomputer and a 10M bit/sec. Starlan at Comdex/Spring '88 here today.

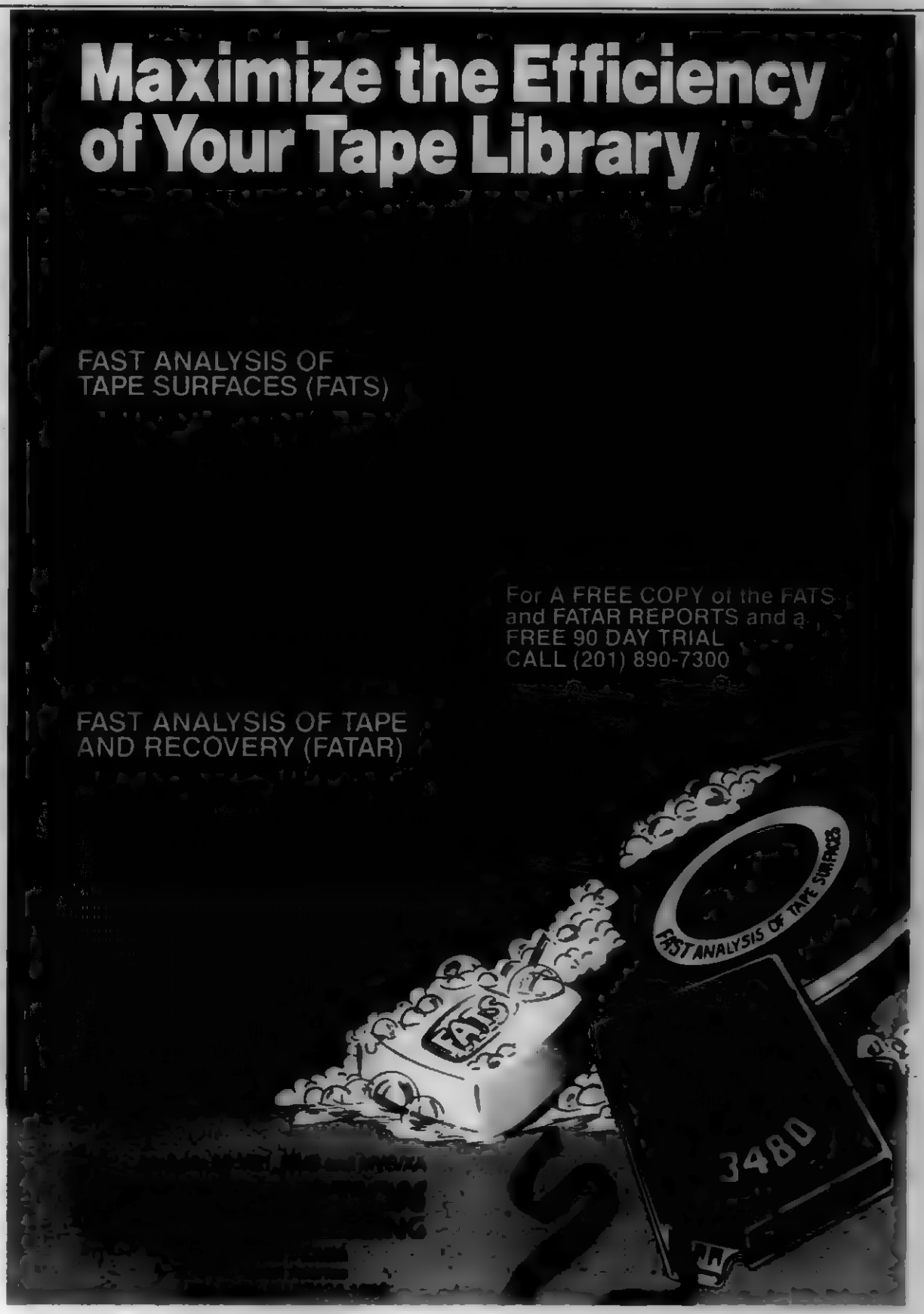
An AT&T spokesman confirmed plans to introduce a personal computer, a 3B2 model and the higher-speed Starlan as well as software enhancements to its current Starlan offering; he denied recent reports of a token-ring offering. The 3B2/700 is AT&T's top-of-the-line 3B2 in power and performance, according to specification sheets provided by a source. The 3B2/700 reportedly provides 64 to 80 concurrent users with direct access to 22-MHz Western Electric 32200-based processing speed, math acceleration and 8M to 64M bytes of main memory.

Other features include a range of 5 million instructions per second (MIPS) to 9 MIPS; 600M bytes of small computer systems interface (SCSI) hard-disk capacity; a 120M-byte SCSI cartridge tape drive; a 720K-byte floppy drive; 12 I/O slots; eight serial ports per card with up to 90 connections; and seven parallel connections.

Users will be able to upgrade their 3B2/500s — but not the 600s — to a 700, according to an AT&T value-added reseller.

AT&T is also expected to announce the following at Comdex:

- A software enhancement to its current 1M bit/sec. Starlan offering, reported to increase performance by as much as 30%.
- At least one addition to its PC line.
- IBM 3270 emulation cards with AT&T's Escort connectivity software.
- Enhancements to other products such as Information Systems Network.



COS to referee gripes

BY PATRICIA KEEFE
CW STAFF

MCLEAN, Va. — The Corporation for Open Systems (COS) is planning to unveil a mediation service for users at the Enterprise Networking Event, according to COS sources, which will be held in Baltimore next month.

At least one COS member, Hewlett-Packard Co., thinks the service will be crucial to getting users to accept the Open Systems Interconnect (OSI) communications standard.

OSI supposedly lends itself to interoperability, but users can still expect to encounter some incompatibilities in an OSI-standard environment, conceded Willem Roelandts, vice-president and general manager of HP's Networked Systems Group. The mediation service is expected to ease resolution of those problems.

COS is a research and development consortium consisting of more than 60 vendor and user organizations focused on the development, service and support of systems that test conformance of products to international standards.

Managers at multivendor sites have complained they have difficulty pinpointing trouble spots on their integrated systems and getting help from the vendors involved, which tend to blame each other for problems.

The service would come into play when a user has purchased two COS-certified products from two different vendors and the products do not quite work together, Roelandts said.

Pricing for the service has yet to be resolved.

Some doubts undermine OSI pep rally

BY PATRICIA KEEFE
CW STAFF

NEW YORK — This year will be a pivotal one for the Open Systems Interconnect (OSI) model, which is expected to move out of the laboratory and into commercial implemention, according to representatives of 12 of the largest systems and communications vendors during a show of support for OSI last week.

But despite what the organizers called an unprecedented show of unity and the emphasis on the importance of standards to U.S. businesses, executives from many of the companies conceded that OSI will see only gradual acceptance during the next five years.

Moreover, executives from IBM, Digital Equipment Corp. and Hewlett-Packard Co. cast some shadow of doubt on the vision of OSI as a panacea to all interoperability problems. They conceded that there will be some compatibility issues, not only between parts of their own proprietary architectures and OSI but between some of the different OSI implementations themselves.

Giants involved

The industry heavyweights that joined hands at the lavish press briefing were IBM, AT&T, DEC, HP, Unisys Corp., Wang Laboratories, Inc., Xerox Corp., Sun Microsystems, Inc., Data General Corp., Control Data Corp., Honeywell-Bull, Inc. and Telenet Communications Corp. The dozen vendors claimed to represent more than 80% of the computer and communications products and services sold in the U.S. today.

The gathering was intended as an appetizer to the main event, known as the Enterprise Networking Event '88 International, which will showcase a live, multivendor demonstration of the OSI and Manufacturing Automation Protocol/Technical and Office Protocol standards in action in Baltimore June 5-9.

"Nineteen eighty-eight is the knee of the curve [of OSI acceptance and awareness]; it is not a year of big sales," said Willem Roelandts, vice-president and general manager of HP's Networked Systems Group. He explained that the 15 to 20 pioneer user companies that have been testing pilots were expected to make a big commitment to OSI implementations this year.

In addition, vendors said to watch for better OSI products and network management tools as well as lower pricing on their current offerings. This is expected to tempt smaller, less adventurous users who are watching from the sidelines to jump in.

Users currently committed to the Transmission Control Protocol/Internet Protocol (TCP/IP), which competes with Layers 3 and 4 of the OSI model, will move to embrace OSI in the next five to 10 years, the vendors maintained.

As proof, the companies said that all U.S. government procurements will be OSI-based by 1990.

Also, vendor research and development dollars have shifted from TCP/IP to OSI, Roelandts said. And as business moves toward a global economy, users will be more involved with interorganizational systems spanning international boundaries. Standards are a must for successful interaction.

Power play

Amdahl seeks features edge over IBM's 3090E systems with introduction of 5990 line and multiprocessing 5890

Model	System	MIPS	MFLOPS	Memory	Expanded memory	Price	Availability
Amdahl 5890 Model 390E[2]	Two	15	41	256M to 512M	None	$7	4Q 1988
IBM 3090 Model 300E	Three	18.5	46.9	64M to 128M	64M to 1,024M	$5.6	1987
Amdahl 5990 Model 700	Two	10	50	64M to 256M	128M to 1,024M	$7	June 1988
IBM 3090 Model 400E	Four	18.5	61.5	128M to 256M	128M to 2,048M	$8.4	1987
IBM 3090 Model 500E	Five	18.5	70.4	128M to 256M	128M to 2,048M	$9.7	3Q 1988
IBM 3090 Model 600E	Six	18.5	79	128M to 256M	128M to 2,048M	$10.3	1987
Amdahl 5990 Model 1400	Four	10	100	128M to 512M	128M to 2,048M	$13.1	4Q 1988

[1] Millions of instructions per second based on CW estimates
[2] A multiprocessing version of the earlier 5890 Model 300E

CW CHART

Amdahl

FROM PAGE 1

rumored specs of Summit."

Amdahl will support the ESA operating system after the specifications are made public by IBM, but the company decided not to delay the new series while waiting for its competitor because there were few customers who were immediately interested in ESA.

In addition to IBM's MVS operating system, the machines will be available with UTS, Amdahl's version of Unix.

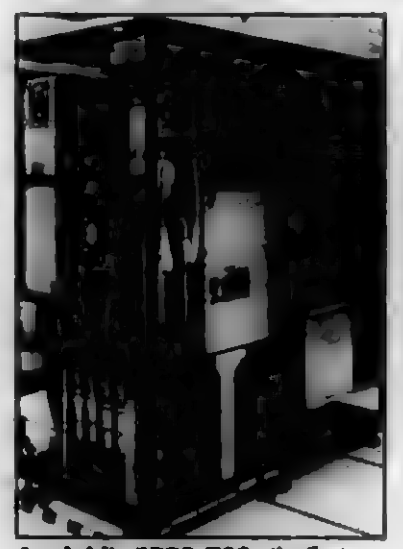
Power hungry

The lack of beta-test sites will not deter those few companies craving the maximum computing power available, analysts said. "There is absolute demand at the low end" for the 5990-700, said John Jones, a senior analyst at San Francisco's Montgomery Securities, who estimated the machine's performance to be similar to IBM's 3090 Model 600.

Amdahl's Model 1400, Jones said, has the potential to out-perform IBM's Summit series, expected in September. "The issue is not whether you could use [Amdahl or IBM], but whether you could use 115 MIPS," Jones said.

Amdahl is able to reach 100 MIPS and 10 nsec through the use of several innovations, including one borrowed from IBM.

The CPUs are water cooled, like IBM's, but instead of requiring subfloor plumbing, the 5990s have self-contained cooling. The cooling cabinets take up about one-fourth of the 477 square feet of floor space needed for the largest model, yet the entire footprint is about the same size as the company's earlier 5890 series. Other innovations include a CPU on a board. One 42-layer board can support 336 very large-scale integration chips on both sides.



Amdahl's 5990-700, the first computer with self-contained cooling

The other mainframe announced last week, a 40-MIPS two-way multiprocessor 5890 Model 390E, has about the power of the earlier dual processor but adds storage and channels, the firm said.

Another advantage of the Model 390E is financial: The computer can be partitioned into two environments, but the user only has to pay license fees on one processor. This can save between $5,000 and $30,000 a month, according to Dennis Stein, manager of processor systems marketing.

The 5890-390E starts at around $7 million. Its predecessor, the 5890-190E, starts at $2.6 million and can be field-upgraded to the 390E.

Amdahl controller gets smart

Amdahl Corp. broke a long silence last week with the expected introduction of an intelligent storage controller and two types of direct-access storage devices (DASD).

Amdahl called its 6100 series a storage processor rather than a controller because of its distributed processor design. Storage analysts agreed that the controller/processor has been enhanced compared with IBM's comparable controller, the 3880.

"But it's hard to say what they've done," said Jim Porter, president of Los Altos, Calif.-based Disk/Trend, Inc. Porter said the most apparent drawback to the controller is that it can only be coupled with Amdahl's new DASDs; he called this a short-term limitation.

Four 6100 models will be available by the end of the year. Amdahl said the models will be priced from $99,000 to $264,000 and have 32M to 512M bytes of shared storage. All have a 4.5M byte/sec. transfer rate.

Amdahl's time line for the next generation of controller, to be pitted against the IBM 3990, is surprising. IBM recently delayed its delivery from August to the first quarter of 1989. Amdahl said it will match that controller with another 6100 model by second-quarter 1989, a short lead time for a plug-compatible company.

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IN	Indianapolis	Apr 12, May 10, Jun 23
KS	Wichita	Jun 22
KY	Lexington	Jun 08
	Louisville	Apr 14, Jun 09
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MA	Boston	Jun 15
	Springfield	Apr 12
MD	Baltimore	May 03
	Bethesda (Federal)	Apr 07, May 31, Jun 30
	Bethesda (Commercial)	May 19
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	Princeton	Apr 19, May 24, Jun 21
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NY	Albany	Jun 07
	Buffalo	Apr 13
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	New York City	Apr 20
	Rochester	Apr 20, Jun 08
OH	Cincinnati	Jun 15
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OR	Portland	Jun 09
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Net security, ISDN top show agenda

BY KATHY CHIN LEONG
CW STAFF

ANAHEIM, Calif. — Nearly 10,000 of the nation's largest users will convene here next week for the 41st annual International Communications Association (ICA) conference, an event that has grown to embrace voice, imaging and computer products.

Approximately half of the 310 vendors at this year's conference manufacture computer gear, and nearly half of all ICA members are people with MIS responsibilities, according to Robert Eilers, an ICA spokesman.

However, noticeably absent from the vendor roster will be Tandem Computers, Inc., Digital Equipment Corp. and Amdahl Corp. — all previous participants. Those companies said they needed to limit the number of trade shows they attend, and some even noted that the foot traffic was slim last year because users packed the seminars instead of the exhibits.

Many vendors will be touting wares promoting network security, T1 multiplexing and Integrated Services Digital Network (ISDN), including the following companies:

• Popular T1 multiplexer vendor Network Equipment Technologies, Inc. (NET) in Redwood City, Calif., is set to announce a joint-development agreement with a commercial software vendor to create a network management package with expert systems features. The new product will be demonstrated at ICA. According to spokeswoman Sheila Sandow, NET will announce that it is extending its sales and marketing presence overseas and will be providing a new add-on product for its Integrated Digital Network Exchange to provide global T1 connections.

• Timeplex, Inc. in Woodcliff Lake, N.J., is expected to unveil its Link/Design software service, which creates a network layout for corporate customers. Announced in New York last week, the service is a host computer-based network planning tool intended to help users calculate network performance and estimate return on investment for their equipment.

• AT&T intends to roll out three products: a microwave radio system, a voice terminal and an enhanced microcomputer-to-private branch exchange (PBX) interface for users of AT&T System 75 and System 85 PBXs. During the show, the company will demonstrate ISDN Primary Rate Interface and Basic Rate Interface lines on its System 85. A live demonstration between ISDN trial site American Transtech and the booth will show users integrated voice and data capabilities such as automatic caller identification.

• Packet switching vendor Tymnet/McDonnell Douglas Network Systems Co. in San Jose, Calif., will reportedly unveil a network security option for its public network aimed at letting users change their passwords without operator intervention. In addition, the company is set to introduce a software interface that supports another computer vendor's network management architecture. Tymnet refused to discuss which network management package it will support.

• Intecom, Inc. in Allen, Texas, will reportedly announce a major software upgrade that will affect its entire IBX PBX line. The eighth version of the PBX software will upgrade the majority of the features, including automatic call distribution. In addition, the company is slated to introduce network security software on its Lannark Ethernet network that will let network operators partition segments of the local-area network apart from other users.

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MCI expands T1 line service

WASHINGTON, D.C. — Customers of MCI Communications Corp.'s T1 private line service will be able to get real-time performance monitoring of the MCI portion of their digital transmissions, MCI announced last week.

T1 circuits ordered after today will automatically be equipped with Extended Superframe Format (ESF) monitoring units at each end. Existing T1 circuits will be converted to ESF technology by year's end, MCI said.

The ESF monitoring units collect real-time performance data in a data base, enabling MCI network management and operations personnel to quickly identify and fix circuit troubles, the long-distance carrier reported. ESF is a framing format for T1 circuits that allows for quality checking of digital traffic and the ability to pass error counts to collecting equipment.

In addition to MCI's monitoring capability, customers may perform their own end-to-end ESF performance monitoring by using ESF-capable channel service units, MCI reported.

Later this year, MCI said, T1 customers using IBM's Netview will be able to directly monitor MCI ESF performance data through the forthcoming MCI View interface. MCI View will be commercially available this summer, the company said.

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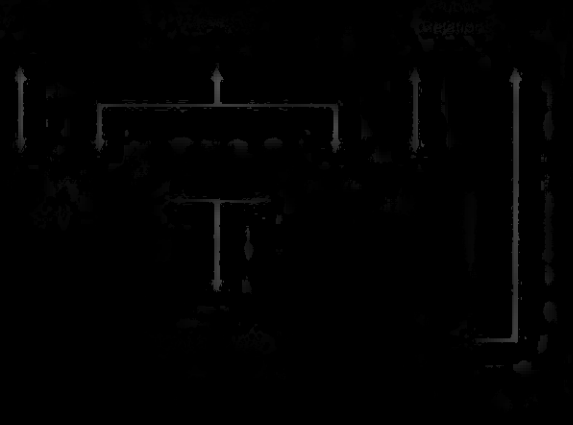
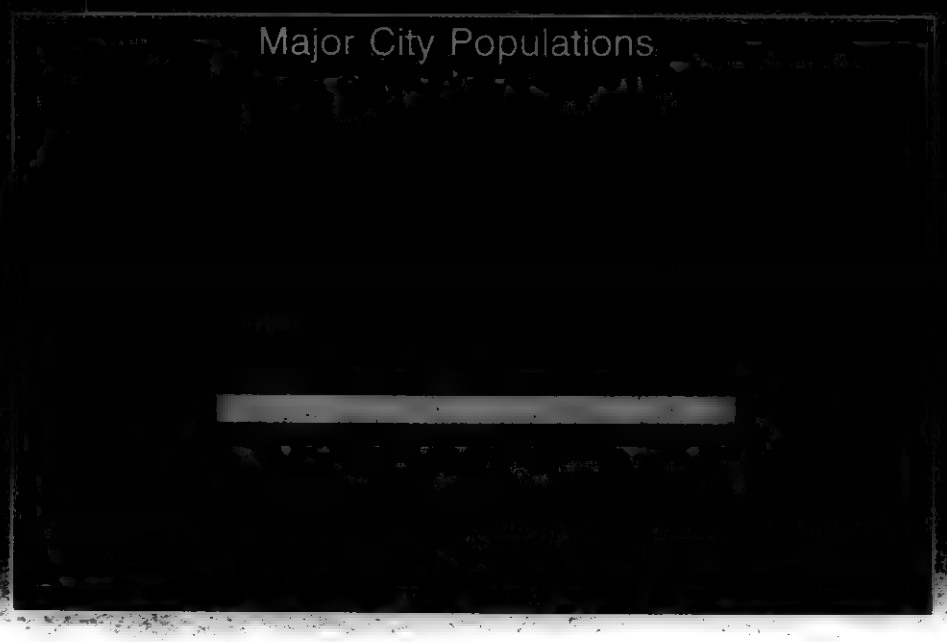


Productive.



The SAS System runs on the IBM PC AT, XT, and PS/2; IBM 370/30xx/43xx and compatible mainframes; Digital Equipment Corporation's VAX™ series minicomputers and workstations; Data General Corporation's ECLIPSE® MV series; and Prime Computer, Inc.'s 50 series. Not all products are available for all operating systems.

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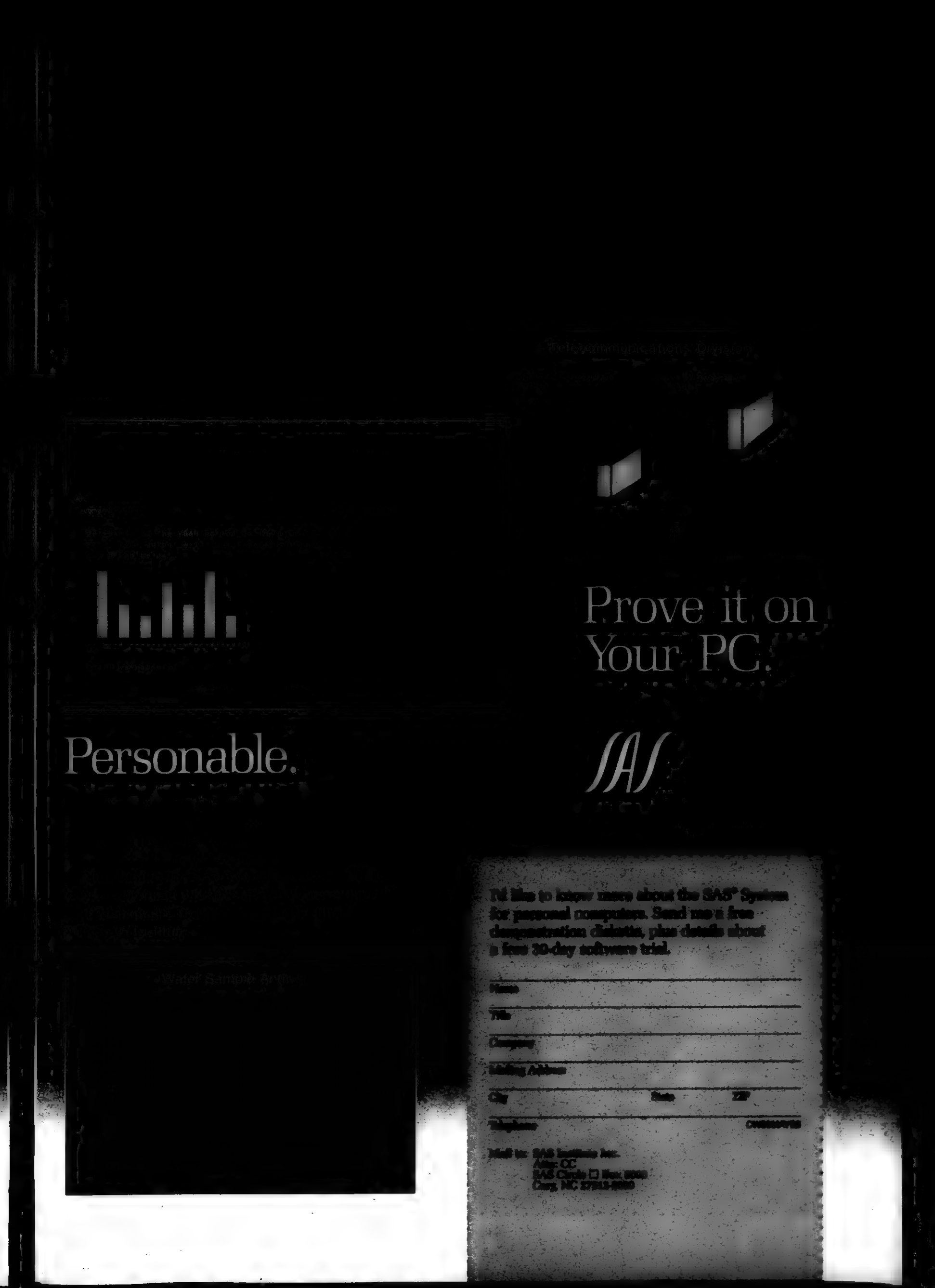
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Allegis sends Apollo into unfamiliar skies

Half of United Airlines' reservation system to be sold to other airlines in asset sell-off

BY JAMES CONNOLLY
CW STAFF

CHICAGO — The parent company of United Airlines last week raised cash and moved to expand its penetration into U.S. and international market segments by selling half of its Apollo computerized airline reservation system to five other airlines.

Allegis Corp. will receive $500 million under an agreement in which United subsidiary Covia Corp., Alitalia Airlines, British Airways, KLM Royal Dutch Airlines, Swissair and USair will form the Covia Partnership. The partnership will run the Apollo system, which is the world's second largest computerized reservation system behind AMR Corp.'s Sabre network. United subsidiary Covia will act as managing general partner.

The sale is part of a 10-month-old sell-off of Allegis assets that has seen Allegis divest itself of Hilton International Co., The Hertz Corp., Westin Hotel Co. and half of Covia for an estimated $4.2 billion.

In addition to raising cash for Allegis, the Covia deal should help Apollo reach new markets and could mean technical improvements for the reservation system, according to airline industry observers.

"It's a pretty good deal for everybody. It's important for cost-saving reasons and revenue-generating reasons to be tied into a major reservations system, and this is heading for being the major system in the world," said analyst David G. Sylvester of New York investment firm Kidder, Peabody & Co.

Analyst Thomas Longman of Bear, Stearns & Co. noted that one key benefit for Apollo is USair's participation. He said USair's strong regional presence in areas such as Pittsburgh and the airline's recent expansion could bring a new set of travel agents into the Apollo network.

The analysts also said the participation of the European airlines will make it easier to carry out the 1987 pact in which Allegis and those carriers agreed to build an Apollo-like European network known as Galileo.

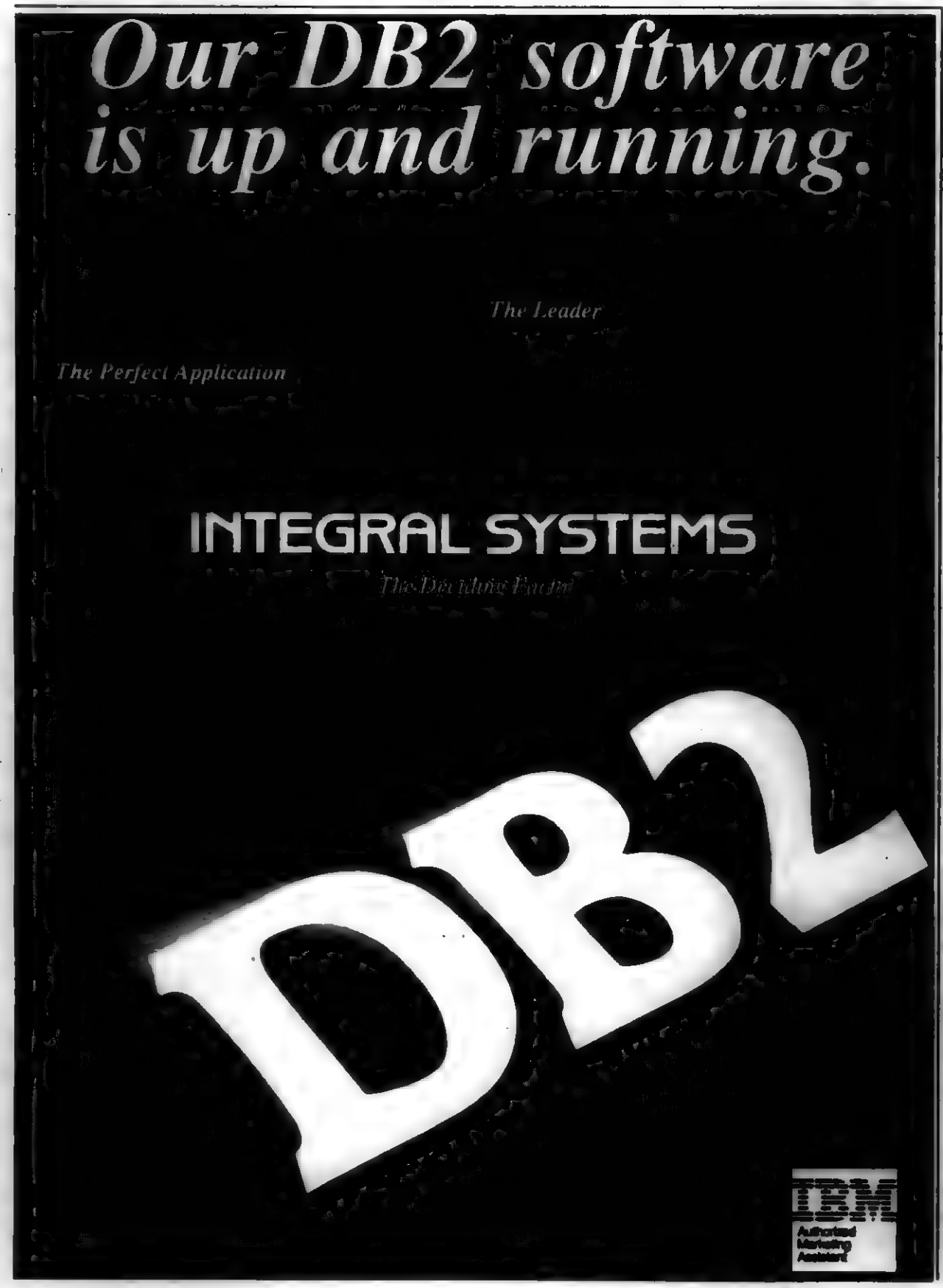
Longman added that the Covia deal could mean additional investments in Apollo. "I think they are going to build on it. There is no question that out of $500 million, some is going to go into Covia," he said.

Welcome to the real world

Analyst Jeffrey R. Perry of C. J. Lawrence, Morgan Grenfell, Inc. in New York said the participation of USair and the European carriers is part of a consolidation in the electronic reservations market but, because of competitive factors, a participation that might not have been possible if Allegis had not been recapitalizing its assets. "It's something Allegis probably would have chosen not to do in an ideal world, but unfortunately, it's not an ideal world," Perry said.

He said Allegis receives $500 million without losing any business and also gains the chance to add marketing capability.

Under the agreement, the Covia Partnership will operate the United reservation system, its telecommunications network and associated data processing services and will own the Apollo software and the computer center in Denver.



Enertronics plugs in high resolution

ATLANTA — With claims that its product is up to 50 times faster than IBM's 8514/A graphics adapter, Enertronics Research, Inc. is expected to announce its Aurora 1024 here today at Comdex/Spring '88.

The adapter, which St. Louis-based Enertronics said is the first compatible with the 8514/A, will debut May 31.

The company also said the unit is 20 times faster than a video graphics array or enhanced graphics adapter card. It was jointly developed by Enertronics and Acer Technologies, Inc.

The add-on board is intended to give IBM Personal Computer, PC AT and XT users IBM Personal System/2 graphics capabilities with additional enhanced features for applications in desktop publishing, presentation graphics and computer-aided design.

The company said the graphics board is compatible with Enertronics' Energraphics software and with all software written for IBM's 8514/A on the PS/2 through IBM's Adapter Interface. Other drivers can be software-loaded onto the Aurora 1024.

Aurora 1024 features a resolution of 1,024 by 768 pixels and displays 256 colors simultaneously from a palette of 256,000.

The board uses the Texas Instruments, Inc. TMS34010 graphics coprocessor and supports both analog and multisync monitors.

The introductory price will be $999 until Sept. 1, when it will rise to $1,295.

Hype

CONTINUED FROM PAGE 1

of mouth and the scoop-happy nature of the computer trade and general business press are all to blame for the dramatic rise in the number of end-user misconceptions, MIS professionals said. End users "are basing their thoughts on hearsay, and it just gets passed around," said Jon Seebach, director of microcomputer resources at McGladrey, Hendrickson & Pullen, an accounting firm.

For Ryder's Perera, correcting misconceptions is not only frustrating but time-consuming. "It takes so much time out of DP managers, trying to explain this stuff to the user community," he said. It also puts an added burden on MIS to educate a user base that has learned enough about technology to be both computer literate and computer dumb.

It's there in black-and-white

Misconceptions are also on the rise because of an increasingly complex computing environment that many end users find both intriguing and difficult to comprehend. But the biggest cause is simply believing what is read or said. "Our users don't apply a healthy dose of skepticism," noted David Renaud, vice-president of technical services at Grinnell Infosystems, Inc.

Just two weeks ago, Julian Horwich got a call from an overly anxious end user looking to buy Ashton-Tate Corp.'s Dbase IV. The only problem is that Dbase IV will not ship for at least three months, said Horwich, a micro manager with a Fortune 100 firm. Ashton-Tate has been advertising "How to buy Dbase IV for $30" but explains in smaller print that the technique is to buy the current version and then upgrade.

For G. Jeffrey Knepper, the problems started last year, when IBM heralded its Video Graphics Array as the new microcomputer graphics standard and a slew of third parties announced and began advertising so-called compatible products. That is when end users began calling Knepper at Touche Ross & Co., looking to buy the new boards. "When we went to look at them, [the vendors said] 'Uh, they're not quite done yet,' " said Knepper, who serves as director of advanced technology-tax at the Big Eight accounting firm.

Misconceptions can sometimes hit a company where it hurts most — right in the wallet. MIS is often called in to fix the problems that emerge when reality does not match the market image. "They might go get a small DEC VAX mini with a software package that looks like the cat's meow. All of a sudden they realize it isn't and come banging on our door," said Michael Heschel, corporate vice-president of information resources at Baxter Healthcare Corp.

Advertising that tells only part of the story is often the culprit, users said. "A user will hear how a DEC box can easily communicate with an IBM box. All you have to do is buy the DEC box and, all of a sudden, all the products that DEC uses can just transfer the data over to IBM," Ryder's Perera said.

Digital Equipment Corp.'s "Digital has it now" ad campaign has put pressure on Frank Disparra, vice-president of the advanced technology group at Fidelity Investments. "People think, 'Gee whiz, I've been trying to solve this problem for a year with my MIS people.' Then they ask, 'Why aren't we using that technology?' " Disparra said, adding that few users understand that switching host system suppliers is not an overnight process.

The most common misconceptions concern PCs, PC software and local-area networks, MIS professionals said. Over a business lunch one day, a sales manager asked Perera if he could automate a sales force and tie it to a mainframe, simply by buying 300 laptops. The manager did not know that the process required software and a modem. Why did it sound so simple? "That is exactly what the advertising said," Perera explained.

Another common misconception involves when a user needs to run a piece of software. "Some of our people are a little surprised to learn that not only do you need to do something to the software, but you may well have to change the hardware," Knepper said.

Treat them like mushrooms

Vendor-generated misconceptions are all too common. Often, vendors advertise products long before they will be available but give the impression that the product is ready to go. Tandy Corp. did just that when it recently began to advertise its Thor/CD erasable optical drive. The ads failed to mention that the product is not scheduled to ship for a year and a half.

Some shops try to nip misconceptions in the bud. For Continental Grain Co., a newsletter for PC users helps put things into perspective.

Manufacturers Hanover Trust Co. has less of a problem than most shops. It is loading up users' PCs with, among other things, Microsoft Corp.'s Windows/386, which provides a whole new interface and multitasking. "We've overwhelmed them. They are too busy digesting what we have given them already," said Robert F. Petrie, a vice-president within the corporate banking sector workstation project at Manufacturers Hanover.

There are some things vendors can do to help solve the problem. One is to be candid about when a product will ship. But Perera has another suggestion. "Like with prescription drugs, where they say check with your pharmacist, the computer ads should say something like, 'Before you think you fully understand this, check with your data processing person.' "

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Timeplex package cuts net design cost

BY PATRICIA KEEFE
CW STAFF

NEW YORK — Timeplex, Inc. introduced an automated network design tool last week said to enable its users to customize network planning while reducing operational costs.

Offered free as an additional Timeplex service for planning and verifying the efficiency of networks, Link/Design will both increase network uptime and enable users to more quickly revise network plans and implement schedules, the Woodcliff Lake, N.J.-based company claimed.

MIS and network managers are looking for as many tools as they can to help them get a better handle on network costs, said Jeff Kaplan, a senior analyst with The Ledgeway Group, Inc., a consulting firm in Lexington, Mass.

Proprietary problems

He lauded the expert system-based Link/Design as an excellent sales and marketing tool that will help Timeplex sell networks while also helping network managers pitch cost estimates to upper management. But Kaplan conceded that the proprietary nature of Link/Design is a "very serious constraint.

"It only helps with Timeplex networks; for users who have multivendor networks, that's a serious problem," he said.

Nonetheless, network design and cost estimate products are a need that T1 and wide-area networking vendors are beginning to address. BBN Communications Corp. has a similar product called Designet that utilizes artificial intelligence to configure voice and data networks. It is also proprietary.

The need for these products is rising as networks become more sophisticated. Many networks are no longer limited to just voice or data or image, and more and more, users want to manage those elements together, Timeplex said.

Link/Design can reportedly produce an optimal plan for such complex networks within minutes to a few hours.

Users upload network design and configuration data to a Timeplex mainframe, which enacts the various calculations and scenarios.

The end result is a packet of documentation complete with cost graphs, according to a Timeplex spokesman.

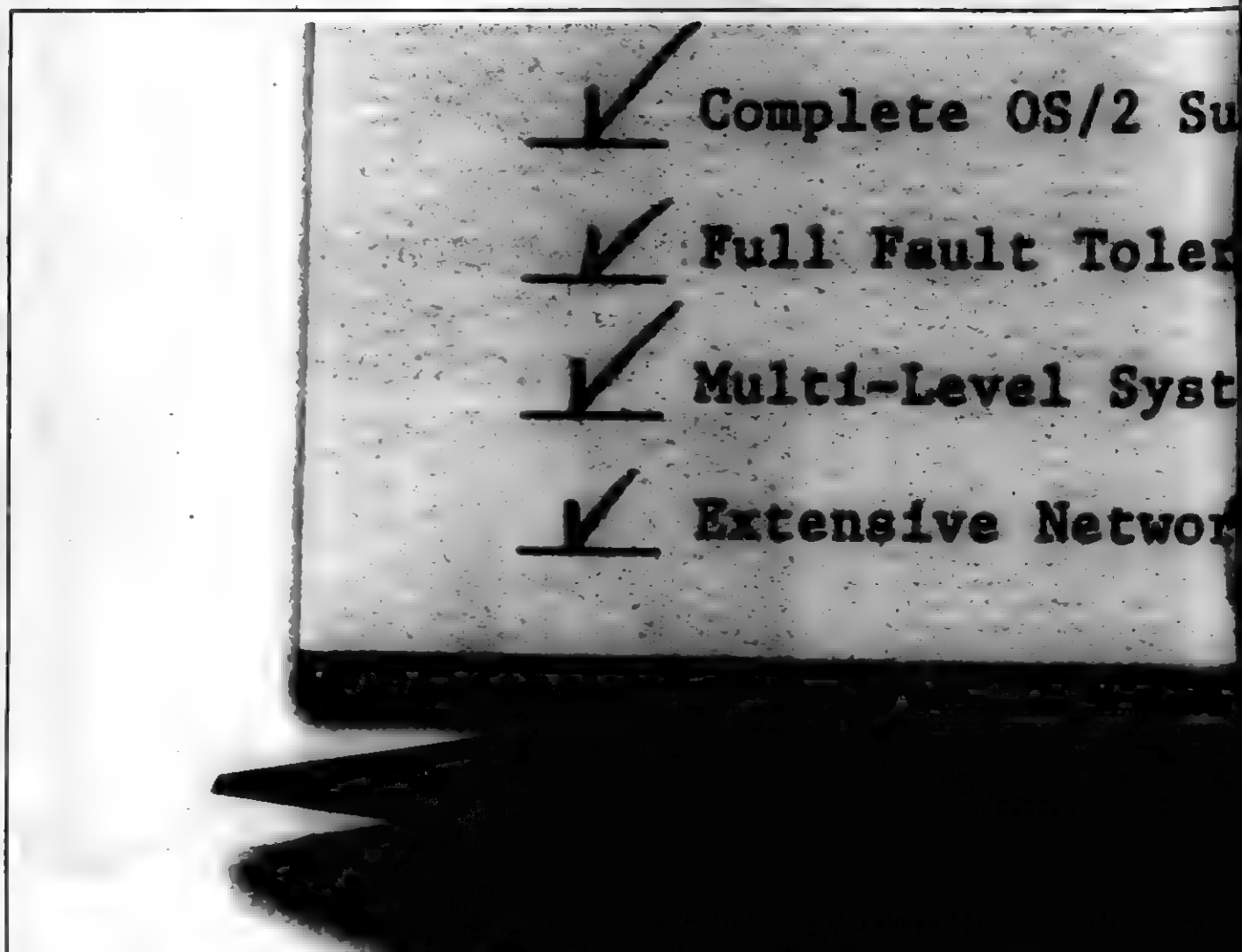
Link/Design provides this information by generating or modifying network topology, finding a minimum-cost network that is tailored to the user's requirements and calculating the payback period or return on investment. In addition, it configures node hardware.

Multiple "what-if" scenarios are utilized to provide planners with a range of alternatives by altering variables and conducting simulations to determine, for example, least-cost routing, the cost of upgrades and what constitutes adequate bandwidth requirements in case of failures, Timeplex said.

In addition, Link/Design incorporates extensive tariff information for different carriers and has the ability to accept cost data for special tariffs and customer-owned facilities.

This flexibility ensures the least-cost routing of any network solution based on the user's real requirements and conditions, Timeplex claimed. In addition, by producing detailed cost and use information before the network is installed, Link/Design reportedly provides communications and MIS staffs with financial information in graphical form that they can take to management to show cost calculations.

Link/Design's capabilities are now available for U.S. and Canadian networks. Next year, the service will be available for international networks.



SFT NetWare v2.1

MIS-conceptions about

Traditionally, the MIS world has viewed PC-based local area networks with a healthy dose of skepticism. A "prove it to me" attitude. And in an arena ruled by powerful mainframes, that approach has given rise to a few misconceptions and doubts about LAN performance.

Well, doubt no more. Because with the industry standard SFT NetWare v2.1, Novell offers the LAN software powerful enough to convince even the toughest MIS skeptic.

SFT NetWare v2.1 gives you the features and functionality of mini/mainframe systems at a fraction of the cost. With extensive fault tolerance, security and LAN-to-mainframe connectivity, it makes LANs advanced enough for major corporate, government and education installations.

No other LAN software even approaches the level of fault protection and data security built into SFT NetWare v2.1. Novell has pioneered LAN fault tolerance, and provides protection from failures in server hardware. In addition, enhanced security locks and passwords give you complete control of the information stored on your LAN.

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Interlink package ties Decnet, 9370

BY PATRICIA KEEFE
CW STAFF

FREMONT, Calif. — Software linking IBM's 9370 to Digital Equipment Corp.'s Decnet was introduced by Interlink Computer Sciences, Inc. last week.

Interlink resells the 9370 as an IBM Authorized Marketing Assistant.

Interlink's Software Network Solution/937X, or SNS/937X, is said to extend the company's VM/Decnet Connectivity software to the 9370 environment.

The SNS/937X package provides a high-speed communications link between the 9370 and systems on Decnet. The software resides on a 9370 connected to Ethernet. Decnet is DEC's implementation of Ethernet.

The software enables 9370 VM users to transfer files, send messages and share hardware resources and applications software between the two environments, Interlink claimed.

Standard features of the SNS/937X include IEEE 802.3 support, 128 simultaneous sessions, an operator interface for monitoring network activity and IBM- or DEC-initiated file transfer.

The standard package costs $30,000 and is set to be available in the third quarter.

Optional features include bi-directional file transfer; full-screen terminal emulation across systems; user application-level program-to-program communications; Mail Bridge for VM Note; and IBM Professional Office Systems to VAX Mail, Decmail and DEC All-In-1 functionality.

Interlink also revealed future product directions for SNS/937X, saying it will add the following capabilities to the software: an interface to IBM's Netview, an LU6.2 interface for DEC's VAX/VMS, network management enhancements and multiple Decnet interconnections.

Serial port out for PS/2

NASHVILLE — Joining the growing list of vendors selling boards for IBM's Personal System/2 line, Arnet Corp. announced Friday that it has started shipping a serial port board engineered to take advantage of IBM's Micro Channel architecture.

The product, called Multiport/2, provides eight serial ports that allow the connection of terminals, printers, modems and other personal computers to the PS/2 Models 50, 60 and 80.

Multiport/2, which sells for $995, will be important for multiuser systems built around the PS/2 Model 80, according to Arnet President Mike Wells.

"Because up to four Multiport/2 boards can be installed in a single system, 32 users can exploit the multiuser power of one 80386-based microprocessor," Wells said.

The board is targeted at multiuser systems used in vertical markets, small businesses and departments within larger corporations.

Multiport/2 is compatible with multiuser operating systems, including Pick from Pick Systems, PC-MOS/386 from The Software Link and Theos from Theos Software Corp.

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MIS benefits prove tough to measure

Top execs say bottom-line contribution is undeniable but often ephemeral

BY JAMES CONNOLLY
CW STAFF

NEW YORK — Yes, measuring the payoff from information systems remains a challenge. But it can be done in some cases, while in other situations all management really needs to know is that a system makes sense.

Leading MIS executives met in New York last week to discuss maximizing the benefits of strategic information systems. They outlined contributions that systems projects have made to profits but noted that sometimes, the unmeasurable benefits are just keeping the company competitive and making workers more efficient.

"I measure my success on my job very simply: Have I contributed to the wealth of the shareholders?" said John M. Hammitt, vice-president of information management at Pillsbury Co. He said his MIS organization can prove what he conservatively estimates as a $60 million contribution to profits.

"I don't know how you can question the payoff," added Elaine R. Bond, senior vice-president at Chase Manhattan Bank NA, who noted that business computing has gone from "zilch" to a multibillion dollar industry in 40 years. "There is no way it could have grown the way it did if there was no payoff from the technology."

They were among a dozen MIS directors who addressed a *Business Week* magazine conference titled, "The Elusive Payoff in Information Technology."

Laurance T. Burden, corporate vice-president of MIS at Firestone Tire & Rubber Co., said most companies are unclear about the business value achieved from MIS, although top executives realize technology can make or break their company. He said his firm has measured some specific benefits, such as the reductions of inventory and scrap through use of manufacturing automation.

But he warned that strict use of measurements such as return on investment can be a mistake. "I think misuse of financial controls can help you to miss strategic opportunities," Burden said. He added, "One way of measuring the benefits of a new system is to look at the cost of not doing it, the cost of lost business."

Michael J. McLaughlin, senior vice-president for information systems at New York Life Insurance Co., warned, "Estimates for people savings must be practical. It's very hard to save a half or a third of a person."

> "I MEASURE my success on my job very simply: Have I contributed to the wealth of the shareholders?"
>
> JOHN M. HAMMITT
> PILLSBURY CO.

Darwin A. John, corporate vice-president for information systems at Scott Paper Co., added that the most enduring benefits from systems are human based and build on relationships between MIS and business groups. But he added that those human benefits are more difficult to measure than operational benefits like improved response times.

John P. Singleton, chairman of Security Pacific Automation Corp., said one key step his company took toward quantifying MIS performance was to negotiate detailed contracts with users. He also said he rates his information systems managers as general managers, not as information systems personnel.

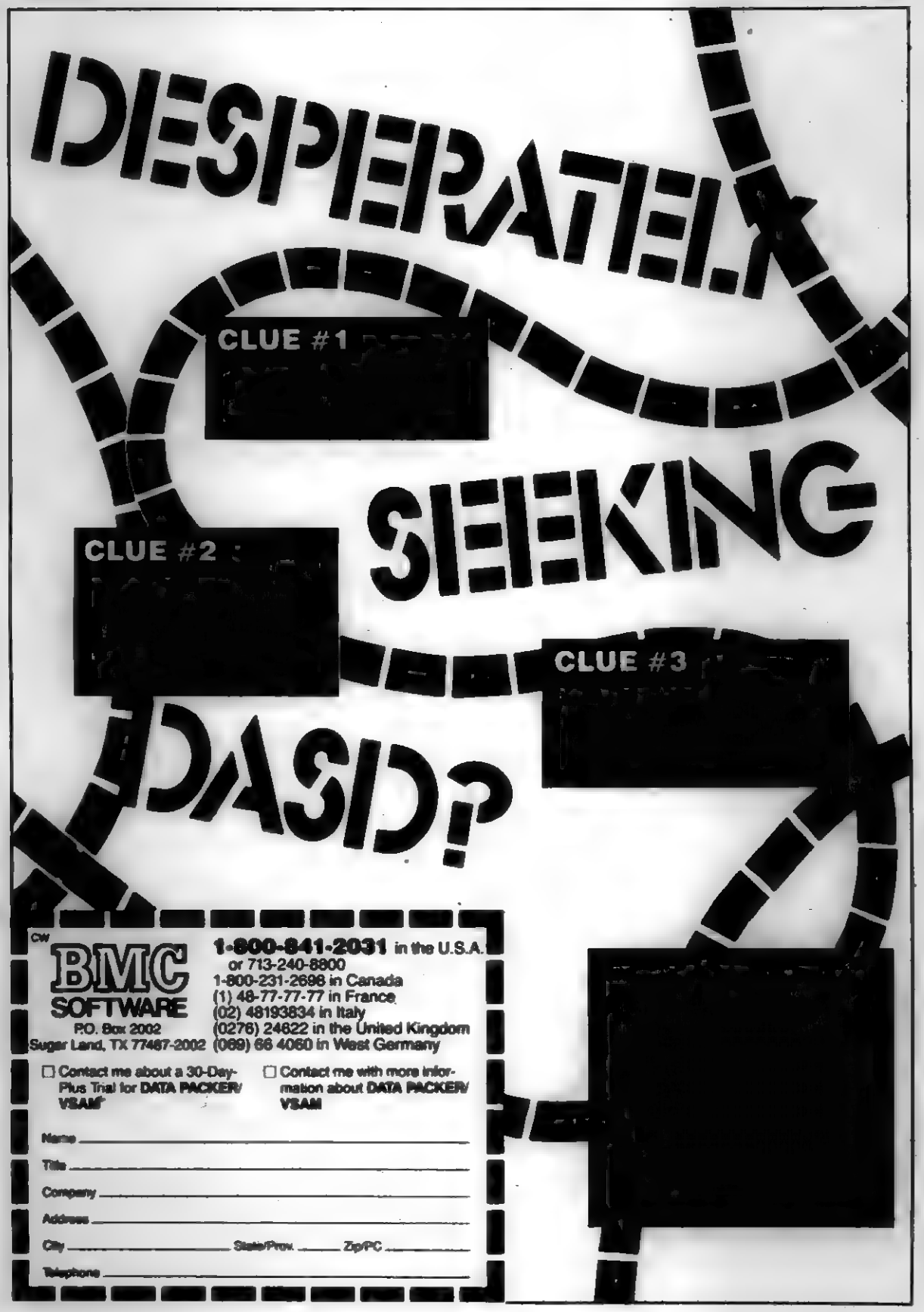
Lawrence Bacon, senior vice-president at The Travelers Co., urged senior management involvement in strategic systems, noting that too many such projects are delegated to low-level managers. He also said a key to gaining benefits from a project is to have advocates on both sides of the business-MIS partnership.

Among the executives citing specific benefits was Michael S. Heschel, corporate vice-president of information resources at Baxter Healthcare Corp.

Heschel described his company's ASAP purchasing system and said, "If you take two customers, one on ASAP and one not on ASAP, we can show that the customer who is on ASAP purchases 20% more than the customer who is not." Other benefits include locking in customers, quick delivery, one-stop shopping and better service. He said ASAP allows Baxter to stay a step ahead of its competition.

Heschel noted that not all strategic systems provide long-term competitive advantages, and James R. Kinney, vice-president for information management at General Foods U.S.A., agreed.

"Merely establishing links to a customer doesn't translate into a sustained competitive advantage," Kinney said. Rather, sometimes new systems projects are needed to stay competitive in a market.



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EDITORIAL

Anxiety aside

YOU DON'T REJECT a new car because it has a scratch on the fender. It's better to weigh all the features and decide if the deal is a bargain.

Similarly, the Computer and Business Equipment Manufacturers Association should reconsider the U.S. Congress' omnibus trade bill before it decides to reject it because of a single blemish. The trade bill, which has been more than three years in the making, provides for a sweeping overhaul of the country's trade policy. The bill is now on the president's desk, and a veto is expected. That will set up what may be a close battle for an override in Congress.

Among the provisions in the legislation that stand to benefit the computer industry are:

- Requirements that the president get tougher with our trading partners on opening their telecommunications markets to U.S. companies.
- A reduction in export controls on technology sold to Europe and Japan.
- A harmonized tariff system that should reduce record-keeping requirements.
- Strengthening intellectual property rights to fight foreign piracy of computer software.

CBEMA has joined with other business associations in opposing the bill for one reason: It contains a provision that requires large employers to give workers a 60-day advance notice before closing a plant or laying off more than 33% of the work force. Opponents argue that the provision ties management's hands in competitive situations. But the number of companies that will be affected is minuscule. Supporters of the bill say its benefits to the industry far outweigh its restrictions.

The Reagan administration's lackadaisical approach to trade policy has been a thorn in the side of computer manufacturers for years. Trade problems have been blamed for everything from IBM's earnings slump to shipment delays. The bill now before Reagan is what a large and vocal segment of the industry has wanted: a mandate from Congress to get tough on trade issues and to ensure a government role in strengthening U.S. industry.

But the bill is an omnibus measure and can be discarded over a single unpopular item. The plant closing provision doesn't sit well with rustbelt industries faced with intense competition and declining markets. That's understandable. But the computer field, with its historic double-digit growth, has been far less susceptible to such austere measures. It is ironic that the industry that has lobbied for tougher trade policies in the past should now be ready to reject those policies for the sake of a provision that affects only a fraction of its members.

ADAPSO, the computer software and services organization and a voice for another major segment of the industry, has decided that plant closing restrictions should not derail the legislation and has thrown its support behind the bill. CBEMA should review its decision to be sure its opposition is not out of step with the wishes of many of its members.

LETTERS TO THE EDITOR

Avoid sexism

I have long maintained that a careful writer can avoid sexist pronouns without substituting awkward constructions. I have always attempted to do so in my own writing. I was thus most disturbed to find that one of your editors changed "rather than blame the boss" to "rather than blame his boss" in my column "Projects from the ground up" [CW, March 7].

William R. Duncan
President
Duncan Associates
Lexington, Ma.

Data base data

In "Micro data base servers are here to stay" [CW, March 7], Richard Finkelstein mistakenly suggested that data base server development began only two years ago.

MDBS III from MDBS, Inc. was introduced in 1981 as the successor to MDBS I, which was available in 1979. MDBS III has had the ability to have a common data base accessed simultaneously by different applications since 1983. In fact, applications can be written in C, Basic, Pascal and several other languages.

Users would be wise to inspect the facilities available to the developer building applications for data base servers. Certainly, data integrity, security and performance tuning abilities will be near the top of the list. Efficient modeling of data relationships eliminates redundancy and dummy-record processing, saving huge amounts of storage space and increasing performance dramatically. Other issues of concern include a vendor's support for various operating environments and its SQL strategy.

As the array of SQL servers are brought to market, users are reminded that mission-critical systems often involve applications whose data base structure requirements do not lend themselves to relational technology.

David R. Leisinger
Projects Manager
MDBS, Inc.
Lafayette, Ind.

Security strategy

I am writing in regards to "Voice, finger and retina scans: Can biometrics secure your shop?" [CW, Feb. 15]. Security is not as simple as some automated security companies would like us to believe. Take the case of standard automated teller machine (ATM) transactions.

Entrance to a bank lobby after hours seldom requires more than a credit-card-shaped object. Any object will work — it does not need to be a credit card. What kind of security is this? Banks might as well leave the door open.

Once inside, the standard ATM is slow. To ask for a balance often takes 10 to 15 seconds. It should be displayed in the window immediately, along with other pertinent data. It could be color-coded by industry standards — red is a negative balance, and green means cash is available.

And if a customer does not want other people to see this information, the bank could provide cross-polarized screen filters aimed directly at his eye with computer-controlled tracking that allows only him to see the information.

If a typical ATM transaction is reduced from even 40 seconds to 10 seconds, it would mean one-fourth the vulnerability for the ATM user. This reduced transaction time is an important safety feature that appears to be highly overlooked.

Security is a far more complex issue than just scanning a fingerprint. Ability to track stolen goods is as much a part of security as is guarding the goods in the first place. If a company makes its products totally trackable, they might have no criminal market value.

Russell Hoffman
PII Enterprises
Bridgeport, Conn.

Copyright craze

I was interested to see the somewhat cavalier corporate reaction to the Apple Computer, Inc. and Microsoft Corp. litigation on the same page as an article titled "Duquesne raided for Ucccl files" [CW, March 21].

While it is a good question about how Microsoft Windows can be copyrighted, it is obvious that software companies are becoming much more proprietary about their software, and corporate America should take notice.

Of course, there is a tried and tested method of protecting the rights of both parties in a license agreement — source code escrow.

Dwight L. Stocker
Vice-President
Data Securities International, Inc.
New York

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

Careful now — it's catching

There's got to be a better cure for piracy than to inflict users with a virus

BUCK BLOOMBECKER

In his novel *Bugs*, Theodore Roszak raises issues that most users would rather ignore. He suggests that the only thing that might quench the world's seemingly insatiable thirst for computer power would be an intrinsic vulnerability that spread through all systems and made computing more dangerous than it was worth.

Mixing some fanciful allusions to extra-sensory perception with an inspired bit of wordplay, he creates a fictional world in which a child's imperfect understanding of computer jargon leads to an infestation that spreads through computerdom.

With the spate of virus stories appearing in the trade and popular presses, Roszak's book makes for even more compelling reading today, going from horrific science fiction to frightening allegory — or worse.

Spreading the word

The latest virus story is perhaps the best example of how computer security is being called on to react to the changing nature of our industry. Richard Brandow, editor of Montreal's *Macmag* magazine, deliberately placed a virus program on a computer system that was maintained at the magazine's editorial headquarters.

Office procedures prohibit copying any of the system's contents, but Brandow has been involved in computing long enough to know knew that many people would ignore the prohibition. How many would violate it, directly or indirectly, was a matter of curiosity.

Between November 1987, when the virus was planted at *Macmag*, and this past March, when the virus was activated, the copying proceeded at a fantastic clip.

On March 2, 1988, the first anniversary of the Macintosh II, 350,000 Macintoshes from Montreal to Australia and from New York to San Francisco displayed a simple message: "Richard Brandow, publisher of *Macmag*, and its entire staff would like to take this opportunity to convey their universal Message of Peace to all Macintosh users around the world."

On March 20, the Canadian Software Association gave Brandow an award for his work in fighting computer piracy. The group reported a 13% increase in sales after the results of his "experiment" became public, inferring a cause-and-effect relationship.

Brandow characterises his work as a strong measure against piracy. "If people are afraid of picking up a virus when they copy software, they will copy less software," he says. The president of the Canadian Software Association obviously agrees.

Computing quarantine

Am I the only one experiencing deja vu? Is computing about to enter an era comparable to that which dating entered in response to the threat of acquired immune deficiency syndrome?

Consider the parallels:

- **An identified group of scapegoats.** Brandow suggests that viruses will finally give software pirates their just rewards.
- **An impossible strategy as the solution.** If we could get people to practice "safe sex" and use clean needles, the incidence of AIDS could be reduced dramatically. Similarly, pundits at the National Security Agency have opined that if users just followed appropriate software development and acquisition strategies, viruses would present no threat.

Both strategies fly in the face of human nature. Just watch any television program asking teenagers whether they are practicing "safe sex." Readers need only ask themselves how likely it is that their companies, agencies or other employers will install truly effective prohibitions to keep their systems safe from viral infection.

- **A return to basics as a long-term solution.** The shocking thing about AIDS is how dismally our society has failed to communicate the importance of responsibility for one's own life. Why, in the waning years of the 20th century, do we find ourselves unable to learn enough to protect ourselves from a killing disease? What have we been taught since we were in kindergarten?

In the same vein but on the subject of computers, it is truly pathetic that we have installed a new revolution without teaching its participants that property is to be respected, not to be taken at will.

The solution to these problems comes back to teaching responsibility — the responsibility of each individual to his or her own body and of each computer user to the computers he or she owns or operates.

I suspect that the prophecy in Roszak's *Bugs* will not become reality but that short-term solutions to the most pressing of virus problems will begin to appear in those systems that most fear them.

Is there a pill?

In the long run, however, the message of the current virus scare should be clear to all computer users, from Apple users to Crays. Computers are part of human organizations and will never be safer than the people who operate them.

As AIDS forces us to confront the thorny problems of human nature, so do computer viruses. Some scientists must continue to look for the technological cure, the biological fix, the ultimate inoculation.

As they do, managers and security professionals must deal with the more immediate and more difficult problem of fashioning interim solutions that people will follow until the cure is at hand.

BILL RUSSELL

Bloombecker is director of the National Center for Computer Crime Data in Los Angeles.

Learning to do what hasn't been done before

JOHN BARNES

Stories have appeared recently in the news about a sort of binational inventions fair for students in upper grade school and junior high. Children from the U.S. and Japan competed in designing and building various original devices.

Most of the Japanese kids built toys — for example, a skiing robot that could slalom. Most of the American kids built consumer products — for example, a diaper with a self-sealing disposable bag.

The newspapers saw these results as a reversal of common stereotypes: "Everyone knows" that American kids just want to have a good time and that Japanese kids are driven achievers. Here was something that flew in the face of what "everyone knows."

I think the American press missed the point — and it is a point that anyone in a high-tech, innovation-oriented environment needs to think about.

Let's first ask two questions: What does it take to make an interesting toy? And what does it take to make a good consumer product?

Among the great consumer products of all time are the safety pin, the staple, the paper clip and the coat hanger — all clever ways of bending a piece of wire.

Now think about a popular toy. It's got to compete with a kid's imagination, do something you didn't think a mechanical device could do.

Which do you suppose took more development time — the robot or the self-sealing diaper?

I hope this analysis will not be taken as slighting the American kids' efforts. Improved consumer products are a good thing from both a business and a creative standpoint. Industrial empires have been founded on identifying one simple need and satisfying it better than anyone else.

These simple innovations require real flashes of genius. There was wire and a real need for small fasteners many millenia before anyone conceived of safety pins.

Progress through toys

But with all that said, let's consider what building the skiing robot did for the Japanese child.

I suggest that the project was a deeper kind of engineering creativity — the kind that, instead of answering a simple demand, makes a demand on you. It is the kind of idea that you have to grow to meet.

Think about what must have gone into it. The newspaper didn't give any diagrams or explanations, but for a robot to ski a slalom, it has to, among other things, move skis in and out of parallel, stay upright, lean into turns and — if it covers any distance — adjust for increasing velocity.

To make his idea work, the Japanese boy had to solve probably half a dozen genuinely interesting problems. While this requirement does not guarantee that he learned more than the American child as she came up with the improved diaper, it does mean that he had many more opportunities to learn.

There is undoubtedly a bigger market for better diapers than for skiing robots, but what does that matter in an educational setting? When you see that something is possible — but you can't quite see how just now — you are on the brink of some kind of an advance. The things you do to get there may well be as valuable as the goal itself — or even more so.

To the moon

Recent econometric studies of history indicate that the economic surge of the '60s was not the "Vietnam boom," as has commonly been supposed. In fact, the war, with its accompanying inflation and increasing interest rates, probably cut into the boom.

The upsurge came from the Apollo program. In the process of getting to the moon, thousands of U.S. firms had to learn, overnight, how to do things that had never been done before. Engineers had to be trained in such profusion that for a brief period after the moon landing, there were actually a large number of technically trained people in search of new problems.

A wealth of new technologies entered the public domain, free for anyone to play with, and the range of the doable expanded faster than people could move in to do it.

As long as you keep the orientation toward "Can I eat it for lunch?" you will produce only things with short-run, predictable payoffs. These inventions pay the bills, but in the long run, the competitive edge comes from rolling back the frontiers of the possible.

In schools, industry and government today, not nearly enough attention is being paid to the kind of innovation that demands something of us.

Barnes is the Pacific Northwest area manager for ADG, a high-tech marketing organization based in San Pedro, Calif. His second novel is *Sins of Origin*, published by Congdon & Weed.

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Paperback, $21.95, 244 pages, ISBN 0471-63503-0, by John Wiley & Sons, Inc., New York.

Understanding Hypercard
By Greg Harvey
A guide to using stacks, producing applications and scripting with the programming language Hypertalk. Assumes no programming experience.

Paperback, $24.95, 493 pages, ISBN 0-89588-506-9, by Sybex, Inc., Alameda, Calif.

Software Evolution: The Software Maintenance Challenge
By Lowell Jay Arthur
A methodical approach to software maintenance, with instructions on how to implement and manage the process.

Hardcover, $36.95, 247 pages, ISBN 0-471-62871-9, by John Wiley & Sons, Inc., New York.

Protecting Information on Local-Area Networks
By James Schweitzer
Minimizing information loss, damage and misuse.

Hardcover, $24.95, 138 pages, ISBN 0-409-90138-5, by Butterworth Publishers, Stoneham, Mass.

Encyclopedia of Information Systems and Services
Edited by Gale Research Co.
U.S. and international listings of organizations, systems houses and service organizations, including training companies and software producers.

Hardcover, three volumes, $400, 1,492 pages, ISBN 0-8103-2532-2, by Gale Research Co., Detroit, Mich.

Keeping up with change

The Information Imperative
By Cyrus F. Gibson and Barbara Bund Jackson
As the title implies, the authors warn that companies and careers could be doomed if they fail to respond to the changes that have reshaped information processing in recent years.

The book represents the outlook of The Index Group, Inc., a consulting firm specializing in information systems planning. Gibson is vice-president there, and Jackson, an independent consultant, used to be.

This well-paced, up-to-date primer on the information technology landscape is directed at two audiences: general business executives and information systems managers, although it is most valuable to general managers. If not particularly colorful, the book is free of both technical jargon and academic constructions.

For the MIS manager, the book's chief value may be in laying out a framework in which to view the field. The authors address the ways information systems can affect a company — by changing products, internal processes and external relationships. They also discuss executive computing, the impact of systems on workers and the implications of MIS organizations.

In the latter discussion, Gibson and Jackson declare that, after gradual centralization followed by a spasm of decentralization, information systems have entered a new age in which the nature of control will vary from industry to industry, company to company and function to function, depending on what approach managers consider best.

They argue that the concept of the MIS organization as a business within a business is no longer appropriate. Rather, the goal should be "seamless integration" of MIS with the business.

The fundamental advice the authors give to MIS executives is to provide leadership of systems while giving up ownership of them.

Hardcover, $24.00, 153 pages, ISBN 0-669-12338-2, by Lexington Books, Lexington, Mass.

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SOFT TALK

William Inmon

Set-at-a-time ups, downs

The advocates of relational technology cite set-at-a-time processing as one of the chief arguments in favor of relational data base management systems — without acknowledging that this approach can also hinder transaction performance.

If set-at-a-time processing is to be used in the high-performance environment, then changes at the language and/or data base level must be made. Incantations shrouded in the jargon of theoretical relational algebra, waiting for the day when all data bases are put in main memory in a cost-effective manner and relying upon the tooth fairy, just aren't going to cut the mustard.

There is a strong intellectual appeal to the set-at-a-time access of data. When data is accessed one set at a time rather then one record at a time, the programmer is freed from such onerous coding tasks as navigating from one record to the next, checking to see if the record accessed is the latest record and so forth.

The negative performance implications of set-at-a-time pro-

Continued on page 31

Users take their Pick of versions

So far, little success in search for business operating system standard

BY ROSEMARY HAMILTON
CW STAFF

To those waiting for a Pick operating system standard to emerge: Sit tight.

The Pick market offers a sharp contrast to many other industry segments, in which users and vendors alike are currently mobilizing to establish standards. In the Pick world, users have expressed little interest in standard-setting efforts, and vendors have made what some observers said is only a half-hearted attempt to provide a Pick standard.

As a result, there remain a number of variations of Pick; this limits portability among the hundreds of Pick applications that exist today.

"There are so many damn versions. Everyone has their own little world," said Ernest Loyer, director of data processing at Gruss & Co., a gas and oil exploration company in New York.

Pick, a business-oriented system with built-in data base management capabilities, was developed by Dick Pick, who founded Pick Systems in Irvine, Calif.

Pick Systems has licensed the operating system to about 30 vendors, many of which package it with hardware and software applications. The sale of Pick systems is expected to generate $2 billion in revenue this year, according to Spectrum Manufacturers Association (SMA).

Disagreements between Dick Pick and the vendors have been frequent. The vendors have said the operating system could be promoted better than Pick has done, while Pick has sued several vendors in the belief that they were gaining revenue from the system in products not covered by their licenses. The disputes have not aided standard-setting efforts.

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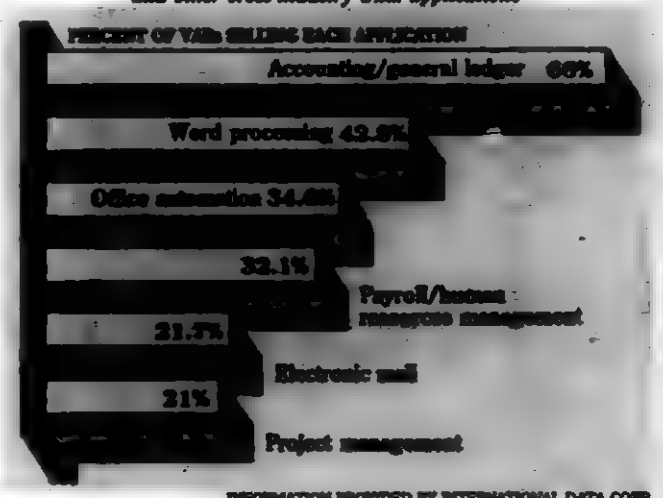
Data View

Accounting tops Unix applications

Sales by 806 value-added resellers show popularity of accounting and other cross-industry Unix applications



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

DEC expands CASE library

BY NELL MARGOLIS
CW STAFF

MAYNARD, Mass. — Digital Equipment Corp. sharpened one of the tools in its computer-aided software engineering (CASE) tool kit late last month, giving software developers and maintenance programmers an enhanced file library system.

Programs in a system under development are stored in the library, with changes recorded each time a program is modified.

VAX DEC/CMS, or Code Management System, one of the six components of DEC's Vaxset

Continued on page 26

Expert systems for end users

BY CHARLES BABCOCK
CW STAFF

NEW YORK — Information Builders, Inc. would like to see expert systems permeate an organization the same way its Focus fourth-generation language and data base management system have spread among end users in its customer base.

To further that goal, it is planning to bring out versions of its Level5 expert system-building shell for the Apple Computer, Inc. Macintosh and IBM mainframe. The Macintosh system is scheduled to debut in June, and the mainframe system is slated for fourth-quarter introduction.

Versions already exist for the IBM Personal Computer and the Digital Equipment Corp. VAX, and last December Information Builders announced a production compiler that allows a Level5 expert system to be disseminated among PC users by binding the expert system to individual desktop knowledge bases, spoke-

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Inside

- Impending nuptials between Cognos' 4GL and Interbase's relational DBMS. Page 27.
- Holland Systems extends 4Front Strategy series. Page 38.

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Users take Pick

CONTINUED FROM PAGE 25

Loyer and other users contacted last week said that while a standard Pick operating system would be helpful, it is not a big factor in their day-to-day business concerns.

As a result, there has been little user initiative to drive a standards effort.

"Right now, portability means nothing," according to Kevin Shaw, MIS director at the Deerskin Trading Post, based in Peabody, Mass. "Maybe it would be if I worked for a third-party software house, but it's not that important to me at all."

Omri Serfin, president of consulting firm Itom International Co. in Los Altos, Calif., described Pick users as "typically small businesses or first-time users that simply want to automate their business."

"These end users are not demanding standards," Serfin said. "They don't have the clout that a large user site might have."

Common good

Meanwhile, Pick vendors have been working toward a common Pick environment, but a single Pick version is far from reality. The SMA was formed two years ago by a number of these Pick vendors to aid in establishing a standard operating system.

The SMA strongly objects to the notion that there is not a Pick standard. Since its formation, six specification documents have been released to establish standard methods of addressing basic components of the operating system.

Some observers have argued that this amounts to setting a standard.

"I don't think [the SMA's] heart was ever in a standards effort," Serfin said. "I don't think the appeal was portability. I think SMA was an effort against Dick Pick."

Standardization a bust?

When asked about the SMA's standardization effort, Ron Mandelik, data processing manager at Statonat-Globe, Inc., said, "I really don't see it."

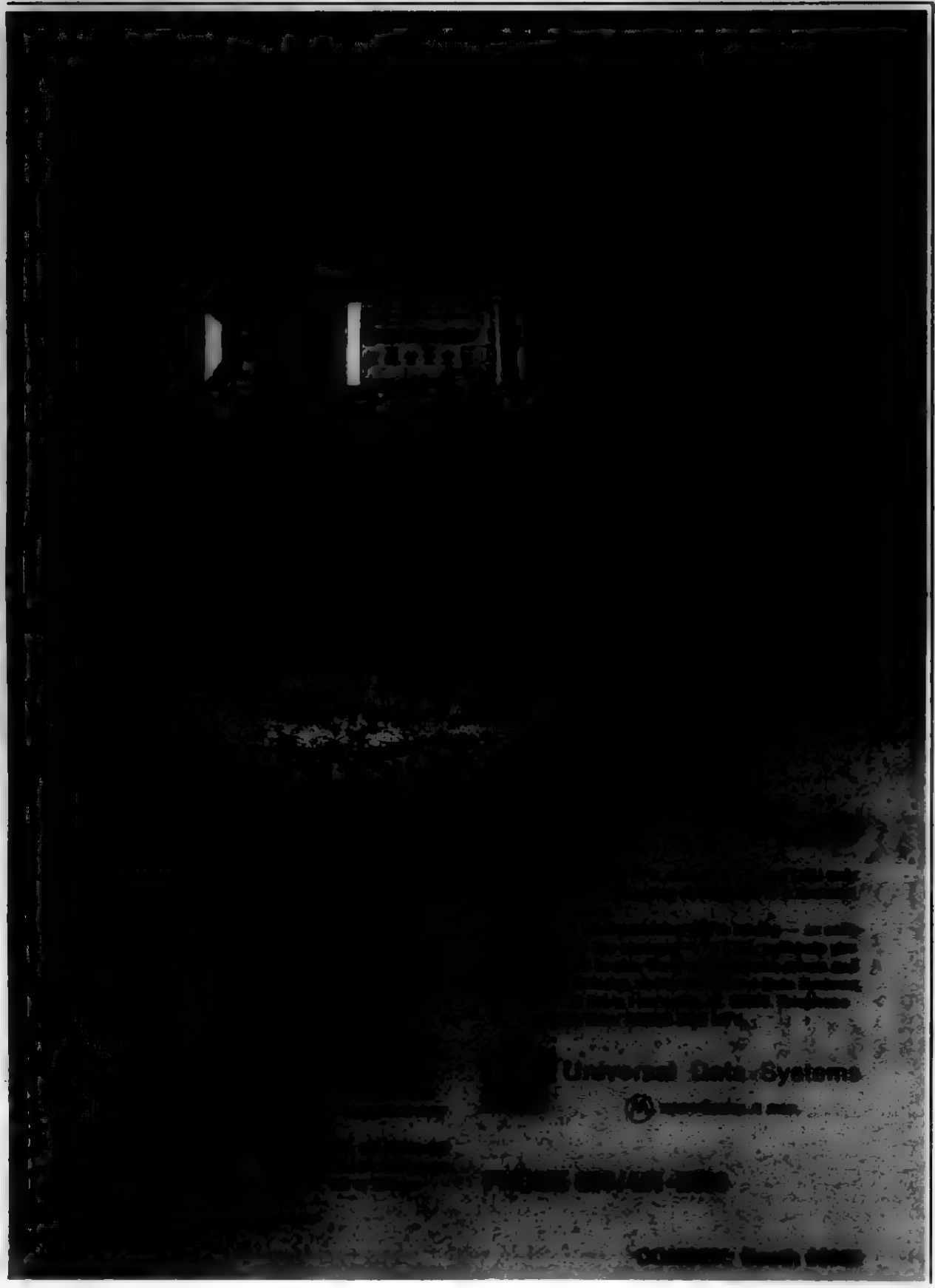
The SMA has acknowledged that a number of Pick vendors have added their own features to the basic Pick operating system but asserted that a high level of portability does remain between versions.

Observers, however, disputed the claim.

"By my understanding, it would require too much work to move my applications to another system," Gruss & Co.'s Loyer said.

According to Serfin, "The vendors have added features to give themselves competitive edges. So you can't assume applications will run on different platforms."

Gus Giobbi, executive director of the SMA, challenged that claim. "You may have to take a day's effort to port an application, but to me, that's portability."



Expert system

CONTINUED FROM PAGE 25

man Verne I. Sheidler noted.

"Many organizations have chosen to implement small, manageable tasks as expert systems," and Information Builders sees that effort as "a very key part of our future," Sheidler said.

The Macintosh version will take advantage of the simultaneous windowing offered on that machine, and the system consultation will run in more of a real-time flow than it does on other platforms, he said. It will also be able to access data in Microsoft Corp.'s Excel DBMS.

Information Builders said it is making an effort to provide an expert system sharing capability across the hardware platforms in hopes of becoming the vendor that distributes artificial intelligence to users. Focus users are not automatically prepared to work with Level5, however, as it relies on its PRL language.

Level5 was acquired by the company one year ago. To date, 6,000 licenses have been sold for the $685 PC product. The Macintosh product will be priced between $400 and $700, Sheidler said. The VAX product is priced between $4,000 and $36,000. No pricing has been set yet for the mainframe version.

DEC CASE

CONTINUED FROM PAGE 25

integrated CASE tool offering, stores project files, tracks changes to them and monitors library access, all of which helps manage files not only when software is under development, but also when it is being maintained.

CMS Version 3.0, which is available this month, expands the user's control over what goes into the library and how it can be manipulated once it is filed there, according to a DEC spokesman. For the first time, for instance, binary or non-ASCII files are eligible for CMS storage. In addition, the library system now supports multiple project libraries.

The latest CMS also lets users access control lists on VAX DEC/CMS commands and specify elements for review before acceptance. As with Version 3.0, according to DEC, CMS users will automatically be notified of any event that occurs in the library. CMS now supports deletions, purging and collapsing of library generations.

CMS license prices range from $1,365 to $43,271, depending on CPU.

Pact signed to wed Cognos 4GL with Interbase DBMS

BY CHARLES BABCOCK
CW STAFF

Cognos, Inc. will tie its minicomputer fourth-generation language, Powerhouse, to a relational data base management system from Interbase Software Corp. under an agreement announced at the end of last month.

Ottawa-based Cognos is seeking to branch out beyond its Hewlett-Packard Co. HP 3000, Digital Equipment Corp. VAX and Data General Corp. Eclipse/MV minicomputer base and allow programmers to develop distributed, relational applications that can be used up and down the scale of corporate computing, spokesmen for the two companies said recently.

Interbase currently supports access to the DEC relational DBMS, RDB, and DEC RMS files.

Interbase will develop interfaces to other DBMSs, and Cognos will gain the benefit of them once it is interfaced to Interbase, according to company spokesmen.

Cognos's Powerhouse language is able to support DG/SQL, an ANSI standard-compatible product. Cognos calls to the data base can be translated into DG/SQL commands, according to J. Gary Puckering, DBMS product manager at Cognos.

Access locking

However, Cognos has not developed a remote data base access protocol that would allow users to develop distributed applications.

The Interbase tie provides Cognos with such a protocol, the Open Systems Relational Interface, which it will build into its product line to open the door to distributed functionality.

According to Puckering, the Open Systems Relational Interface "will enable us to interface to many different relational systems," including a possible interface to a mainframe system such as IBM's DB2.

Keeping up to date

In addition, Interbase employs a two-phase commit mechanism for distributed updating functions, Puckering noted.

Interbase is the Tyngsboro, Mass.-based company that recently signed a technology agreement with Ashton-Tate Corp., based in Torrance, Calif.

Interbase will be licensed for development on Ashton-Tate's upcoming workstation data base products, according to the company.

Passport offers accounting suite

BY NELL MARGOLIS
CW STAFF

CHICAGO — A trend toward more business applications on Unix platforms continued this month as Passport Software, Inc. unveiled a 10-module integrated accounting and business suite for the Convergent Technologies, Inc. S series, Hewlett-Packard Co. 9000 series and Honeywell Bull, Inc. XPS-100 series computers.

Available immediately, the accounting modules include accounts payable, accounts receivable, payroll and general ledger.

Aimed at wholesale and retail distribution are purchasing, inventory control, order processing, point of sale and sales analysis modules.

The 10th package is a job-costing module aimed at users in the construction industry.

All 10 packages, according to Passport President John Miller, function on a stand-alone basis. The packages can also be used as an integrated applications system.

In addition, Miller said, each package is built on files that can be transported among all the disparate Unix machines supported by Passport.

The transportation capability is built-in to the software, Miller said, so the only cost to the user is setup time.

The business software suite is already widely installed on the AT&T 3B series, the NCR Corp. Tower, the Unisys Corp. 5000 and IBM Personal Computer compatibles.

Written in structured Cobol, the packages are highly tailorable to the user's particular business environment, Miller said.

About 18 months ago, according to Miller, a Big Eight accounting firm did a controls review of the business applications suite.

All of the firm's suggestions were implemented, resulting, for instance, in a general ledger module that allows users to keep a complete, detailed audit trail and an order entry and billing capacity that gives the user up to eight ways to reflect pricing.

The Passport business applications modules on their latest platform are priced from $895 to $3,000, depending on the module selected and CPU.

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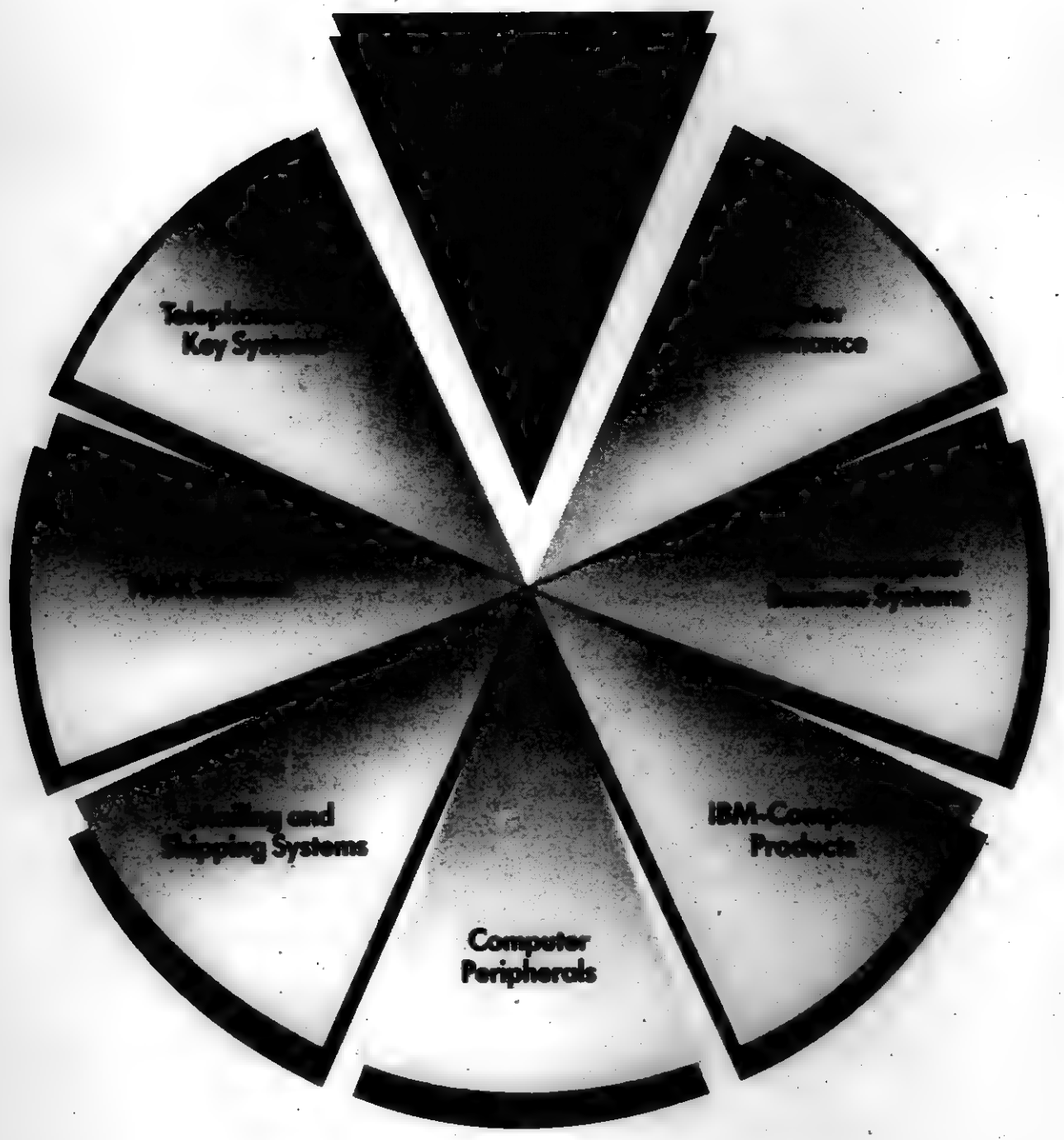

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Datatalker comes to RDB

BY NELL MARGOLIS
CW STAFF

BERKELEY, Calif. — With the advent of the NLI Datatalker for Digital Equipment Corp.'s RDB, Natural Language, Inc. can claim to have brought a new language to the leading VAX-based relational data base management systems: English.

Introduced in 1986, Datatalker is a natural language interface that employs rules-based reasoning to "understand" the structure and content of colloquial English statements, according to the company.

Relying on such artificial intelligence techniques, the software is able to translate English into SQL, allowing users to access SQL-based relational data bases without having to learn any query language, a Natural Language spokesman said.

Tailor-made applications

In addition, the package includes the NLI Connector, a tool that lets data base administrators tailor Datatalker to a specific application.

In addition to preparing an application-specific dictionary customizing an SQL interface, the Connector carries on a "dialogue" with the data base administrator to record the definitions of the data base domain.

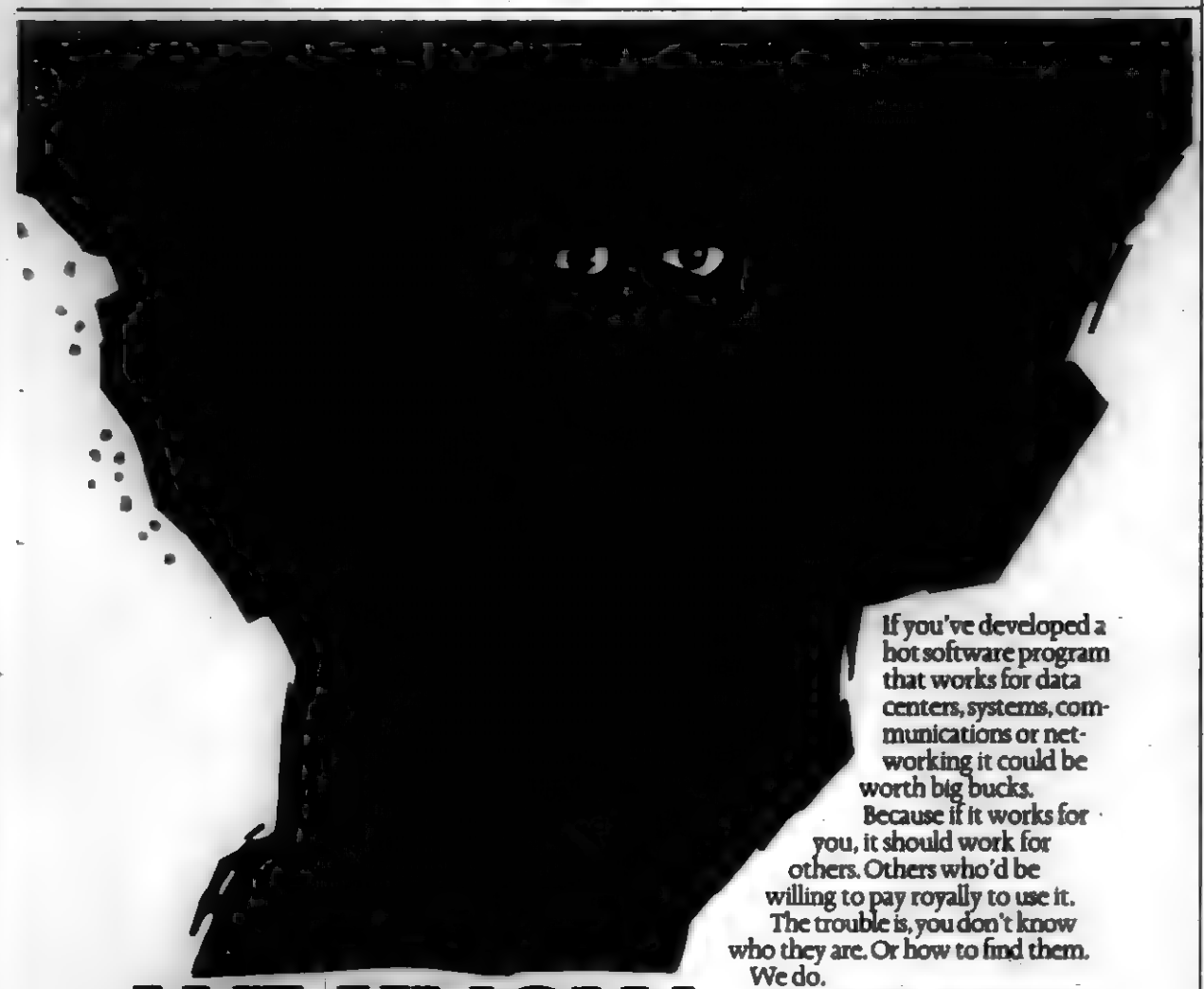
Previous Datatalker implementations support systems from Oracle Corp. and Sybase, Inc. in addition to Relational Technology, Inc.'s Ingres.

Good connections

The Datatalker and Connector software system is now also available for DEC's RDB.

Data bases running in clustered or networked systems, said Allen Joseph, the company's sales and marketing vice-president, can take particular advantage of English as a universal language.

Datatalker, with the NLI Connector included, is priced from $4,500 to $80,000, depending on the CPU.



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Cincom enhances Control facility

CINCINNATI — Cincom Systems, Inc. recently made available a facility to manage engineering change-order data within its manufacturing software package.

The addition to Control:Manufacturing Version 6.1 runs on both Digital Equipment Corp. VAXs and all IBM 370 hardware. It will be offered at no extra cost to existing users.

The engineering change-order facility will enable manufacturers to stay more up to date on design revisions, according to Cincom. "This is the first step in helping to coordinate the design aspect with the manufacturing aspect," said Eric Lange, computer-integrated manufacturing program manager at Cincom.

Cincom, in conjunction with Intergraph Corp., has developed a prototype interface that will allow engineers to directly send engineering data, including change-order information, to a manufacturing application.

With last week's release, users will be required to manually input the engineering data into the engineering change-order facility of Control:Manufacturing.

The facility manages the engineering change data for the manufacturing process. It allows users to account for information such as title of design, status, origination, priority, planned implementation date and estimated product cost. Users can also cross-reference the affected parts and revision levels.

Release 6.1 ranges in price from $100,000 to $400,000.

Global ships sales package

RALEIGH, N.C. — Global Software, Inc. recently began shipping an applications package for the IBM System/38 that combines sales, purchasing, distribution and financial modules.

Integrated Sales-Distribution-Purchasing (ISDP) system ranges in price from $80,000 to $110,000, depending on the configuration.

An order processing and billing component allows users to split orders into shippable units and prints order documentation, such as invoices and shipping bills, spokesmen said.

An inventory module is best suited for companies that have multiple warehousing operations, Global said. It offers management of inventoried items and items on order, in transit or damaged stock.

The sales analysis component allows users to maintain a sales history that includes a compilation of up to 99 months of invoice history, a 24-month summary that links a customer to items ordered and sales by product line and by customer and commission calculations.

The purchasing application allows users to keep track of orders and the performances of vendors, Global spokesmen said. An accounts receivable module is also included in the ISDP package.

Global has provided an ISDP package for IBM mainframes. The System/38 version is interactive and is built on a data base structure, the company said.

Inmon

CONTINUED FROM PAGE 25

cessing stem from the fact that transactions that do set-at-a-time processing inevitably use an indeterminate number of resources.

One transaction specifies a set size that requires only a modest amount of I/O.

The next transaction executes the same code but specifies a set that requires an enormous amount of I/O.

Consider the following simple pseudocode:

```
SELECT NAME ADDRESS
FROM PERSONNEL_FILE
WHERE YEARS_OF_SCHOOL>n
```

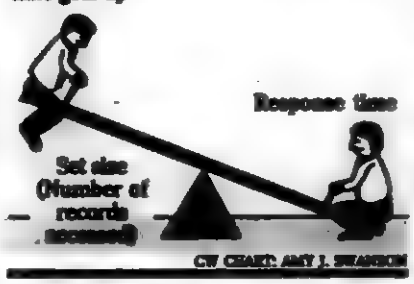
Where n equals 17, there are only a few people who have graduate or post-graduate degrees, and the resultant set size is small.

But where n equals 11, there are many people who have gone to high school, and the resultant set size factors out as large.

Note that the code did not change, but the work done by the system to service the code changed dramatically because of the different parameters that were passed to the code.

How important, then, is controlling a system that contains transactions that consume an indeterminate amount of resources, as is typical of set-at-a-time processing? The control of resource utilization of such a system is vital to on-line performance.

Performance seesaw
When set size goes up, response time goes down; when set size goes down, response time goes up



CW CHART: AMY J. SHARON

The essence of on-line performance is consistency, and consistency of performance cannot be achieved when there is a mixture of transactions that use indeterminate amounts of resources.

A major roadblock

Just how important an impediment to performance is a transaction that uses many resources? Very important. Transactions that use many resources in and of themselves consume lots of I/O. In addition, those transactions are slow, even if they are the only transactions running in the system.

In addition, upon the occasion of locking data, long-running transactions freeze a lot of data, and they freeze it for a long period of time, and they also get in the way of fast-running transactions that are queued behind the long-running transactions.

In short, not only do long-running transactions run slowly, but they also prevent fast-running transactions from ever having a chance to go into the execution phase.

There is, of course, the argument that with enough machine resources, there can be a smoothing out of the differences between long- and short-running transactions.

To some extent, it is possible to smooth performance with a large amount of machine resources. But such a smoothing requires the availability of many slack machine resources idly waiting for the spike in resource utilization to occur.

It is not cost effective for organizations to hold massive amounts of machine resources in an idle state just waiting to smooth out the differences between long- and short-running transactions.

Action, reaction

There is another way to view the relationship between transaction throughput and the set size accessed by a transaction.

The chart at left shows a teeter-totter with transaction throughput on one end and set size on the other.

When the amount of processing required to handle set sizes goes up — as when a long-running transaction goes into execution — transaction throughput goes down.

When set sizes are small — as when the system is running transactions that require few resources — transaction throughput goes up. To achieve consistent high response time, then, requires that all set sizes accessed be small and consistent.

The necessity of keeping the access and manipulation of set size small in a high-performance environment is reinforced by the examples of widely publicized relational systems that have previously been used in high-performance environments.

Across the board, when relational systems have achieved high performance, it has been because the application had a natural limitation on set size.

Consider three applications in which relational technology has been touted as a high-performance DBMS: debit and credit processing; bank teller processing; and credit verification processing.

In each case, the calls done by the application access sets of data populated by one row or, at most, only a few rows. In debit and credit processing and bank teller processing, the set accessed is the account being accessed. In credit verification processing, the referencing of only one customer is questioned at a time.

In short, the applications naturally limit the set size being accessed, and the indeterminate resource utilization that is characteristic of set-at-a-time processing does not appear.

Setting limits has consequences

The implications of limiting set sizes are subtle. For example, typical activities such as relational joins, ad hoc queries using the dynamic interconnectability of relational data and free-form end-user access of data are not done when high performance is being achieved.

The instant the system begins to use the natural set processing capability of relational technology — exploiting the flexibility of dynamic relationships — set sizes begin to be unpredictable and performance suffers.

If its advocates are serious about using relational technology for high-performance systems in general rather than the limited examples that have been publicly aired, then some modification to set-at-a-time processing languages must be done.

For example, there could be a limitation on the number of occurrences of data accessed in a set, even if the entire set of data specified in the call was not accessed.

On the other hand, some amount of record-at-a-time processing could be incorporated with set-at-a-time processing, when performance is critical.

When one gets creative, there are many solutions to the performance inadequacies of set-at-a-time processing.

Inmon is a senior principal with American Management Systems in Lakewood, Colo., and an author on the subject of data base design.

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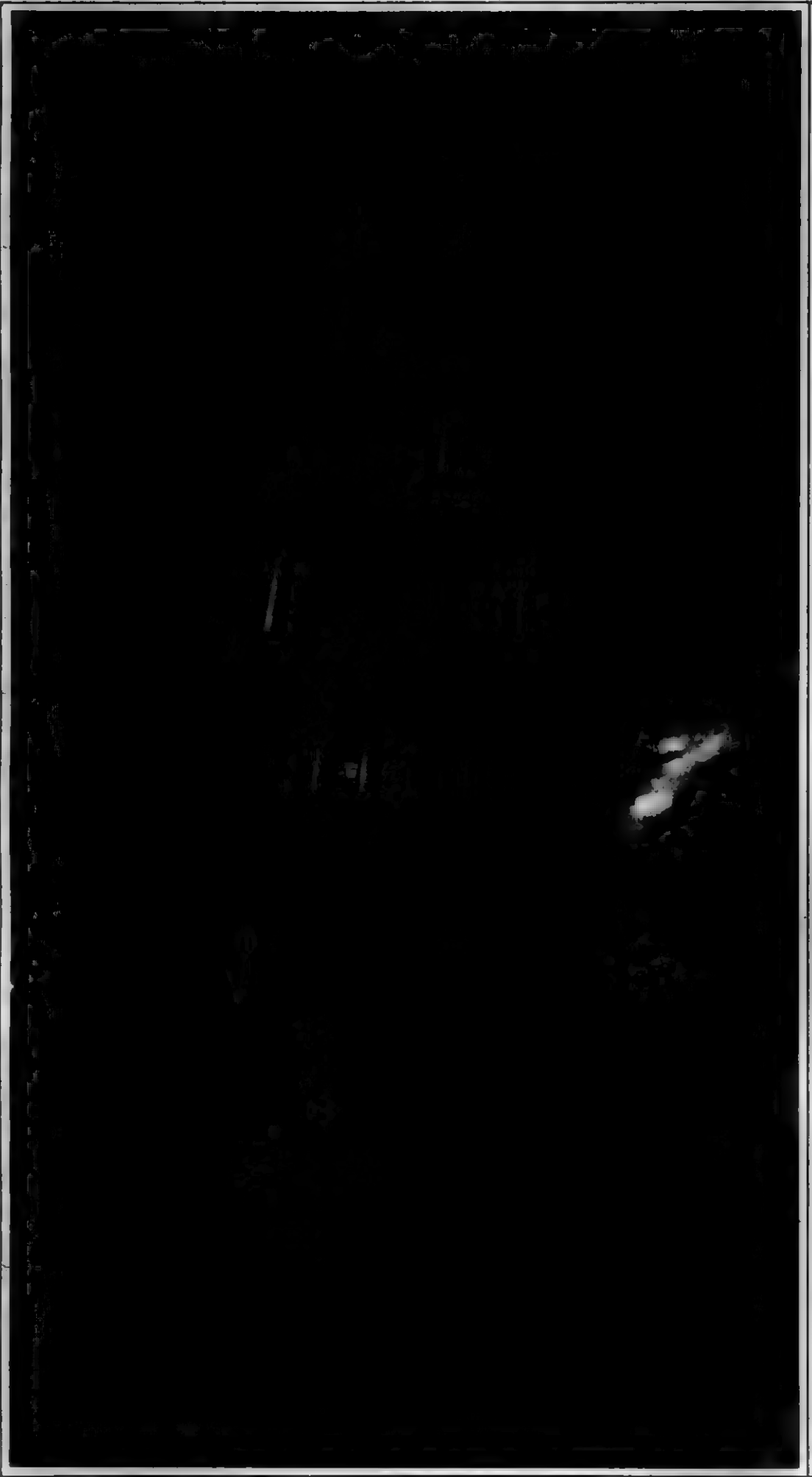

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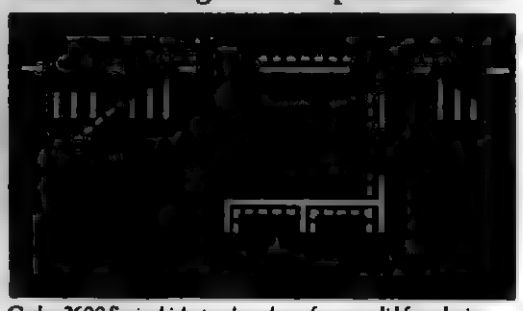

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NEW PRODUCTS

Systems software

A program for automatically compressing IBM VSAM disk files on that firm's DOS/VSE systems is available from **B. I. Moyle Associates, Inc.**

Bim-Pack affects system and application performance by allowing faster I/O and reduced I/O contention.

The vendor estimated compression results in file disk space at 35% to 70%.

The product is transparent to programs accessing files.

Bim-Pack is priced at $8,000 for a permanent license or $4,000 per year.

B.I. Moyle, 5788 Lincoln Drive, Minneapolis, Minn. 55436. 612-933-2885.

Applications packages

Unipress Software, Inc. has ported its **Unipress Emacs** multiwindow text editor and its **Unipress Q-Calc Standard** spreadsheet to Sun Microsystems, Inc.'s Sun386I workstation.

Unipress Emacs is said to provide a range of Unix program development and editing facilities, including the ability to view and edit several files simultaneously.

Unipress Q-Calc Standard is a Unix spreadsheet that features a Lotus Development Corp. 1-2-3 work-alike interface, according to the vendor, and is 100% compatible with 1-2-3 files.

Unipress Emacs binary code costs $395 on the Sun386I; Emacs source code costs $995. Q-Calc Standard costs $595.

Unipress, 2025 Lincoln Highway, Edison, N.J. 08817. 201-985-8000.

Version 1.3 of **Anvil-1000MD**, which the vendor calls a "2½-dimensional" mechanical computer-aided design (CAD) package, is available from **Manufacturing and Consulting Services, Inc.**

For use with IBM Personal Computer ATs, AT compatibles and most Intel Corp. 80386-based systems, Anvil-1000MD lets users create designs and transfer them with the Anvil translator to workstations, superminicomputers and mainframes running Anvil-5000 3-D CAD packages.

Six preprogrammed sets of drafting standards have been added. The program supports IBM Video Graphics Array and Enhanced Graphics Adapter standards, the vendor said.

Anvil-1000MD 1.3 carries a price of $2,995.

Manufacturing and Consulting Services, 9500 Toledo Way, Irvine, Calif. 92718. 714-951-8858.

An updated release of graphics software for engineering workstations has been introduced by **V. I. Corp.**

Dataviews 6.0 creates interactive computer graphics for depicting, analyzing and regulating applications.

The package runs under Unix or Digital Equipment Corp.'s VMS and supports workstation architectures from Sun Microsystems, Inc., Apollo Computer, Inc., Hewlett-Packard Co. and others.

A subroutine library incorporates I/O capabilities, and the package also provides graphical control of layout, interaction management and event synchronization.

Targeted uses include real-time financial analysis, process control, instrumentation, simulation, command and control and network monitoring.

Dataviews 6.0 is priced beginning at $7,700.

V. I., Amherst Research Park, Amherst, Mass. 01002. 413-253-3482.

Thorn EMI Computer Software, Inc. has released another version of its Time Intelligence package for organizations running IBM's MVS/TSO.

Time Intelligence MVS/TSO enables users to store and manipulate business data using their fiscal year and reporting cycles, the vendor said.

The package supports sales analysis, forecasting, profitability reporting, strategic planning and market research applications. In addition to MVS/TSO, the product is available in versions for the IBM Personal Computer AT, the MVS/CMS environment, the Digital Equipment Corp. VAX, Hewlett-Packard Co. machines and the Wang Laboratories, Inc. VS series.

Time Intelligence costs $2,000 to $70,000, depending on the operating environment.

Thorn EMI, 285 Mill Road, Chelmsford, Mass. 01824. 617-256-3900.

National Business Systems, Inc. has announced a version of its Total Office Support System (TOSS) that supports IBM's VM/CMS environment.

VM/TOSS integrates data processing, word processing and all communications facilities into one system and was designed to operate within an organization's existing IBM hardware and software environment.

Office automation capabilities include electronic file folders, a user directory, bulletin boards and distribution lists.

VM/TOSS costs between $9,000 and $36,000, depending on configuration.

National Business Systems, 30 Tower Lane, Avon Park S., Avon, Conn. 06001. 203-677-8396.

Libra Corp. has announced **Release 2.0** of its **Payroll System** for IBM Personal Computers and compatibles as well as multiuser versions for Novell, Inc.'s Networks and Digital Equipment Corp.'s VAX series.

New features include one to 99 companies and 20 to 999 expense codes. Also, 99 transaction files have been added to proofing, posting and tax calculation.

Payroll can be set to run with or without security, and Release 2.0 has a report formatter with a "what-you-see-is-what-you-get" style.

The Libra Payroll System 2.0 price begins at $1,800 for a single-user system.

Libra, 1954 E. 7000 South, Salt Lake City, Utah 84121. 801-943-2084.

Cognition, Inc. has announced **Mechanical Advantage 2.0**, a mechanical computer-aided engineering system for the design, optimization and analysis of product designs.

Version 2.0 includes geometric modeling, a design library, team design, automatic tolerance and sensitivity analysis.

The package performs automatic calculation of complex physical properties and enables the user to model, analyze and animate both kinematic and rigid body motion.

The platform supports Sun Microsystems, Inc. Sun-3 workstations and Apollo Computer, Inc.'s 3000 and 4000 series.

Pricing for Mechanical Advantage 2.0

Continued on page 34

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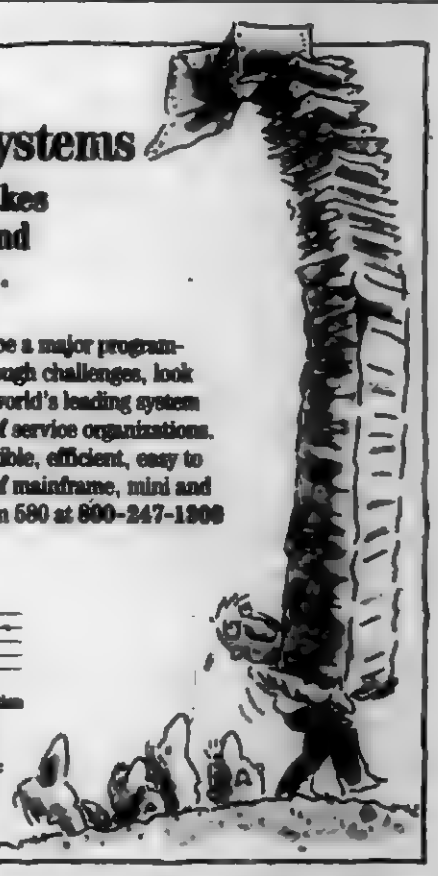

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Continued from page 33

starts at $16,500 per workstation.

Cognition, 900 Tech Park Drive, Billerica, Mass. 01821. 617-667-4800.

Datalogix Formula Systems, Inc. has enhanced its Process System software, designed for formula-based manufacturing companies.

Process System 3.0 offers several new modules, including Process Manufacturing Resource Planning, Master Production Scheduling and Process Capacity Requirements Planning.

The package consists of 1,500 integrated programs for process manufacturing, distribution, financial and accounting functions in addition to regulatory compliance.

Process System 3.0 costs from $50,000 to $350,000, depending on hardware and application requirements.

Datalogix, Suite 200, 200 Central Park Ave., Hartsdale, N.Y. 10530. 914-997-1627.

Languages

Statistical Data Research, Inc. has announced Rfile, an RPG-II-to-information file-transfer program and language emulator. Rfile converts RPG source code, screens, procedures and data files into Prime Information and Info/Basic.

The product converts most RPG commands directly into equivalent Info/Basic statements, maintaining the original RPG flow of control. Screen formats are translated into separate Info/Basic programs that emulate the functions of the IBM System/34 and 36 screen handler, duplicating the passing of fields to and from the program.

A license costs $10,000 and includes four weeks of conversion assistance.

Statistical Data, 4434 Carver Woods Drive, Cincinnati, Ohio 45242. 513-984-5355.

SCIENCE/SCOPE®

A new cabin control system for Boeing's 747-400 jumbo jetliner uses all-digital technology to perform a wide range of passenger service functions previously unavailable. The Advanced Cabin Entertainment and Service System (ACESS), designated the APAX-140, extends the application of digital multiplexed techniques to such functions as cabin interphone, lighting, and advisory signs. Other features include an interactive, two-way capability that allows passengers to communicate back to a central computer for in-flight ordering of specific goods and services, and a self-test function that monitors and records faults while in flight. Hughes Aircraft Company, supplying multiplexed passenger entertainment and service systems since 1970, designed and built ACESS for Boeing.

A radar mapping mission to Venus will provide pictures sharper than any previous spacecraft sent to the planet. NASA's Magellan Mission will carry a Hughes synthetic aperture radar (SAR) and altimeter antenna to photograph and transmit Venusian geological data which was previously unobtainable. From its polar orbit, SAR will be able to detect an area as small as Dodger Stadium in Los Angeles, California, depicting it as a single dot. As the SAR antenna illuminates a 15 mile-wide area with rapid radar pulses and records the returning signals, the altimeter antenna will be used to construct a topographic profile of the planet. The Magellan Mission is scheduled for launch in 1989.

Hughes has designed and built a common set of core modules to reduce cost and increase reliability in U.S. military aircraft radar systems. Instead of using unique modules for each aircraft, a Standard Avionic Module (SAM) format is used, permitting the core modules to be interchanged in Programmable Signal Processors (PSPs) for the U.S. Air Force F-15's APG-70 radar and the Navy F-14D's APG-71. A SAM consists of two printed circuit boards mounted on both sides of a flow-through heat exchanger, with VHSIC-level integrated circuits in rows on either side of the SAM. Significantly fewer module types need be created and debugged, resulting in a more mature design and production base.

A new advanced launch system (ALS) design for the U.S. Air Force will use off-the-shelf engines combined with modular configurations to reduce current launch costs. Hughes' ALS design will use a modified version of the Pratt & Whitney RL-10 liquid hydrogen/liquid oxygen rocket engine, with different numbers of modules tied together, depending on payload weight. The Department of Defense and NASA will require payloads ranging from 40,000–250,000 pounds to be placed in low Earth orbit. Aiding in cost reduction, the new design also features recovery of much of the booster. Hughes expects to meet the requirements for the ALS with its modular design by the mid-1990s.

A broad spectrum of technologies, many of which grew up within the past five years, are represented in the products of Hughes' Industrial Electronics Group. Six divisions and two subsidiaries, each operated like a small high-tech company but backed by resources of its multibillion-dollar parent, offer career benefits to qualified engineers and scientists. Advancing technologies such as microwave and millimeter-wave communications, silicon and GaAs solid-state circuitry, fiber optics, and image processing equipment are pursued in facilities located in many of Southern California's most desirable coastal communities. Send your resume to A.T. Moyer, Hughes Industrial Electronics Group, Dept. S3, P.O. Box 2999, Torrance, CA 90509. Equal opportunity employer. U.S. citizenship required.

For more information write to: P.O. Box 45066, Los Angeles, CA 90045-0066

HUGHES

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Utilities

Computer Associates International, Inc. has announced **CA-Spoolman Release 1.3**, a spool management facility for the IBM VM environment.

Release 1.3 provides real-time monitoring and extensive viewing capabilities of VM spool activity. It lets users view open or closed console and reader files and define multiple secondary operators for any number of virtual machines.

CA-Spoolman also provides real-time monitoring of total spool space use. Full-screen capabilities include scrolling, forward and backward searching and sorting.

CA-Spoolman Release 1.3 costs $3,510 to $8,190, depending on CPU model.

Computer Associates International, 711 Stewart Ave., Garden City, N.Y. 11530. 516-227-3300.

Advanced Software Products Group, Inc. has released **Version 2.0 of DASD Trak**, a utility for monitoring direct-access storage device use. DASD Trak provides precise measurement and logical DASD space allocation, prohibiting users from exceeding their DASD limit, the vendor said.

Designed to complement existing tools, DASD Trak uses the DASD monitor table in main memory.

DASD Trak costs $9,500 for the first CPU and $6,650 for each subsequent CPU.

Advanced Software Products, Suite 401, 2335 Tamiami Trail N., Naples, Fla. 33940. 813-649-1548.

A library utility program for the IBM System/36 has been announced by **Mid-States Computer Corp.**

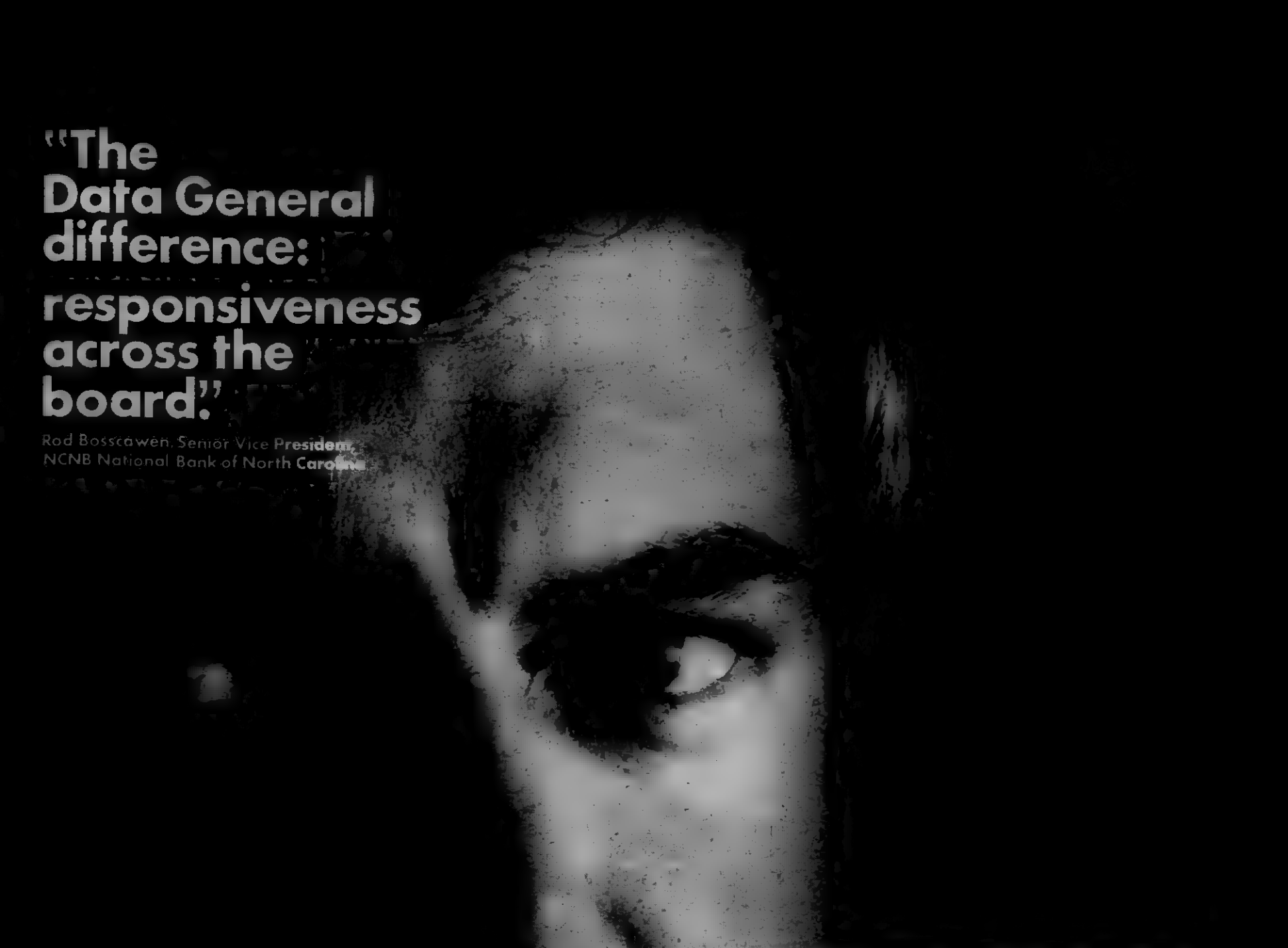
The Libdir package has the ability to display or print a library directory of all or date-selected members by most recent change in date and time, according to the vendor.

In addition, the product reportedly will copy to a target library all members that have been changed from a designated time or date.

Libdir also may be incorporated into an existing library backup plan.

Libdir carries a price of $99.

Mid-States Computer, P.O. Box 1564, Grand Island, Neb. 68802. 308-381-0737.



In less than 30 days from date of order, Data General computers were processing 10,000 loans for NCNB National Bank of North Carolina.

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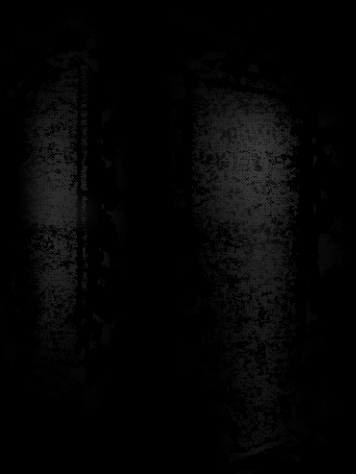

UNISYS
The power of 2

A troubleshooting software system for diagnosing and repairing machine failures and processing problems has been jointly developed by **Carnegie Group, Inc.** and **Texas Instruments, Inc.**

Testbench captures information from repair documentation to guide technicians through diagnostic and repair sessions. The system runs on the TI Explorer symbolic processing workstation and IBM Personal Computer ATs and compatibles. It is jointly marketed by Carnegie Group and TI.

The first-copy price for Testbench will start at less than $42,000.

Carnegie Group, Five PPG Place, Pittsburgh, Pa. 15222. 412-642-6900.

TI, MS 2240, 1250 Research Blvd., Austin, Texas 78769. 800-527-3500.

Data base management systems

Compuserv Data Technologies has announced a fourth-generation language and data base management system for supporting applications that integrate heterogeneous Digital Equipment Corp. VAX software and data.

The **System 1032 End-User Facility** is an add-on module to the company's System 1032 fourth-generation language/DBMS; it permits users to execute relational joins across any grouping of heterogeneous data. The product links 1032 and RMS data files into views to create a consistent interface.

Licenses for the basic System 1032 cost from $3,000 on a DEC Vaxstation to $120,000 on a DEC VAX 8800. The System 1032 End-User Facility costs an additional 10%.

Compuserv, 1000 Massachusetts Ave., Cambridge, Mass. 02138. 617-661-9440.

Development tools

NCR Corp. has introduced **NCR Union**, a development platform that allows NCR 9800 programmers to use Unix-based tools to create applications. The product also offers gateways into local- and wide-area networks.

NCR Union connects the NCR Tower 32/600 to the 9800 interprocessor bus and has software and hardware components designed to operate within the 9800's modular, open-ended architecture.

The software offers a variety of Unix-based tools and program applications, including office automation, spreadsheets, extended languages and decision-support tools.

NCR Union costs $13,000.

NCR, Dayton, Ohio 45479. 513-445-4169.

Holland Systems Corp. has extended its 4Front Strategy series of information tools with the addition of the **Insurance Prototype Model**.

The vendor claimed the product provides a starting point for the systems planning process and contains application representations most common to an insurance company, including claims processing, human resources, life and health, actuarial, underwriting and policy issuance.

Activities contained in the Insurance Prototype Model can be tailored to the individual company, and the product will identify areas requiring better information support.

An optional supplement to the 4Front Strategy series, the Insurance Prototype Model is priced at $29,500.

Holland Systems, Suite 303, 3131 S. State St., Ann Arbor, Mich. 48108. 313-995-9595.

Softool Corp. is now marketing the **Computer-Aided Compliance** turnkey for DOD-STD-2167A, a tool for automating compliance with the Department of Defense's 2167A standard for development and maintenance of mission-critical computer software.

The product provides support for complete life cycle and project control, requirements management and tracking, synchronized activities, status accounting and auditing.

The tool costs from $38,000 to $75,000.

Softool, 340 Kellogg Ave., Goleta, Calif. 93117. 805-683-5777.

Teradata Corp. has announced the **Transparency series**, a release of software products allowing the vendor's DBC/1012 to process SQL requests from applications originally written for other data base management systems, such as IBM's SQL/DS and DB2.

The software maps the Application Program Interface provided by other DBMSs to that used by DBC/1012, eliminating the need for a custom interface program.

Pricing for the Transparency series starts at $25,000.

Teradata, 12945 Jefferson Blvd., Los Angeles, Calif. 90066. 213-827-8777.

A cross-reference utility for NCR Corp. VRX/Boss3 programmers is being offered by Ivan Software, Inc.

Ivan/Xref Release 1.0 produces a three-part report.

The first part of the report is an INTL/6 program listing. The second part is a cross-referenced list of all defined labels; the third is an alphabetical list of all procedure names and their location in the INTL/6 directory.

Ivan/Xref costs $1,500.

Ivan Software, 973 E. Congress Park Drive, Dayton, Ohio 45459. 513-436-4826.

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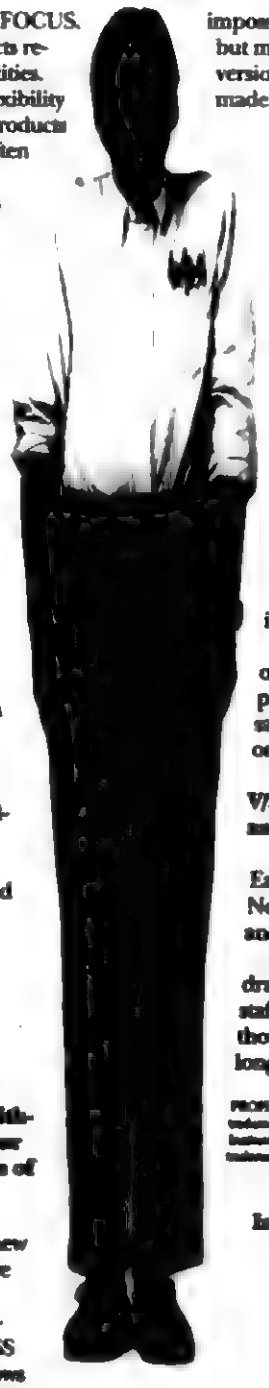

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Install DCSS-resident software in as little as 15 minutes with no service outages.

Tired of having your programming staff spend hours on each DCSS product installation or update?

V/SEG's Dynamic Update feature not only simplifies the installation and maintenance of DCSS-resident software, it also lets you update on the fly with no IPLs and no need to schedule weekend service outages.

ALIAS ASSIGNMENT

Test new software releases without having to shut down your current production version of the product.

Have you ever compromised new software testing because DCSS are so uncompromising?

V/SEG's Alias Assignment feature provides a DCSS renaming capability that allows you to thoroughly test new software releases in parallel with your full production versions—something that is normally impossible with DCSS-resident programs. Not only that, but most testing is transparent to the users and faulty versions can be easily backed out while corrections are made.

AUTOFIT

Prevent an overlapping of DCSS in virtual memory.

Would you like to decrease the time spent planning and managing DCSS definitions while increasing user satisfaction?

V/SEG's Autofit feature automatically scans multiple copies of a DCSS program to find a copy that won't destroy another DCSS in a user's virtual machine. This greatly reduces the planning and management normally associated with DCSS definition and maintenance.

In addition, V/SEG creates a visual display of DCSS by virtual storage. This improved mapping utility cuts the time needed to allocate new saved systems and to adjust the location of existing ones.

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Not only will it save time and money by dramatically improving your VM programming staff's productivity, it will totally change what you thought you could do with DCSS. And over the long stretch, that's good for your entire company.

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MICROCOMPUTING

MICRO BITS

Douglas Barney

Copy a plea for 1-2-3

Lotus's head software honcho listens to CW. A couple of weeks ago, we pleaded with Lotus to drop its copy protection on existing versions of 1-2-3 in anticipation of the tardy Release 3, which will be unprotected. We also asked any users who agreed to call Lotus and tell 'em CW sent you. Well, Frank King, the new head of all software development at Lotus, read the item and promises to work on the problem.

If King can dump protection pronto, and if the company announces a cheap upgrade to Release 3 for existing customers, and if the firm throw in an add-in or two, then Lotus stands an excellent chance of keeping Borland's Quattro and Microsoft's Excel at bay.

Ouch! Random-access memory-resident software is notorious for interfering with the more mundane elements of computing, such as creating a document, working with a spreadsheet or sorting a data base.

Now come reports that a new highfalutin' RAM-resident package may wreak havoc with disk caching software. Accord-

Continued on page 49

1-2-3 add-in binge

Lotus racks up applications support

BY DOUGLAS BARNEY
CW STAFF

CAMBRIDGE, Mass. — Lotus Development Corp.'s 1-2-3 Release 3 may be months away, but that did not stop 10 add-in makers from staging a pep rally for the product and its new programming language last week.

While current add-in products are written using Lotus macros or assembly language, the next generation will use the Lotus Extended Application Facility (LEAF), a combined programming language and applications programming interface.

Although LEAF is a language, developers can write add-in programs in C or assembler as well as in the LEAF language. As a result, users and developers will not have to learn the LEAF language to write applications that tie in to 1-2-3.

A familiar crowd

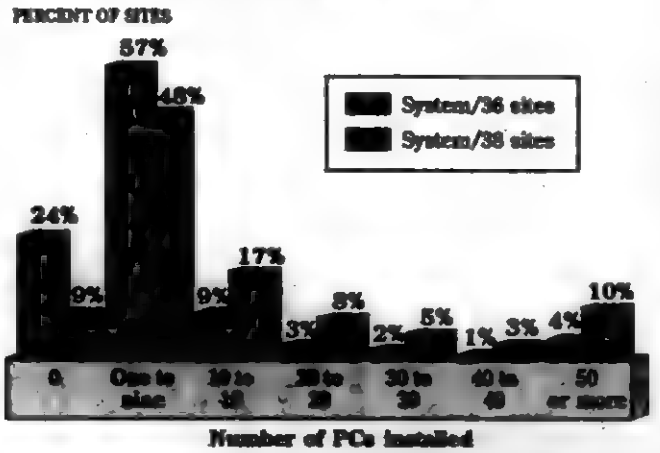
The Who's Who of Lotus add-in makers that converged in Cambridge included Funk Software, Inc.; Intex Solutions, Inc.; Turner Hall Publishing; Frontline Systems, Inc.; Macropac International; Manusoft Corp.; PC Publishing, Inc.; Personics Corp.; General Optimization, Inc.; and Goldata Computer Services, Inc.

Continued on page 56

Data View

IBM mid-range shops sport few PCs

Most IBM System/36 and 38 sites run fewer than 10 personal computers



INFORMATION PROVIDED BY COMPUTER INTELLIGENCE

Mitsubishi laptop offers big picture to business

BY ED SCANNELL
CW STAFF

TORRANCE, Calif. — Taking a page from IBM's recent advertising campaign, Mitsubishi Electronics America, Inc. will be asking users to take a look at "the bigger picture."

Last week, the company announced a laptop system with an 11-in. diagonal black-on-white screen that boasts a 12-MHz version of Intel Corp.'s 80286 processor with one wait state. Users can also operate the machine at 8 MHz with zero wait states, Mitsubishi said.

Christened the MP286L, the 15-pound system's standard memory configuration is 640K bytes but can be expanded to 2.6M bytes through one of four proprietary expansion slots.

The system is bundled with Microsoft Corp.'s MS-DOS 3.3 and will run Microsoft and IBM's OS/2, although the company warned that users will require

Continued on page 56

Micrografx, IBM team up against Apple

BY ED SCANNELL
CW STAFF

RICHARDSON, Texas — Micrografx, Inc. is set to announce a souped-up version of Designer next week that will make IBM's Personal Computers more serious competitors to Apple Computer, Inc.'s Macintosh in the graphics workstation market, according to the company.

Version 1.2 of Designer, which is intended for both technical draftsmen and commercial graphics users, is expected to compete against Illustrator, a Macintosh-compatible program from Adobe Systems, Inc. Designer 1.2 has some features not yet available on the Macintosh.

"Not only does it have the same capabilities [as the Macintosh] from the standpoint of doing high-quality art work, it also brings the same ease of use which is the whole motivation for using the Macintosh," said Micrografx President George Grayson.

For example, company officials said, Designer offers on-screen what-you-see-is-what-you-get text editing. Both Illustrator and Aldus Corp.'s Freehand require users to enter

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Inside

- Ex-IBMer King faces new challenges at Lotus. Page 41.
- Planning tool lightens paperwork load. Page 90.
- Epson enhances AT compatible. Page 59.

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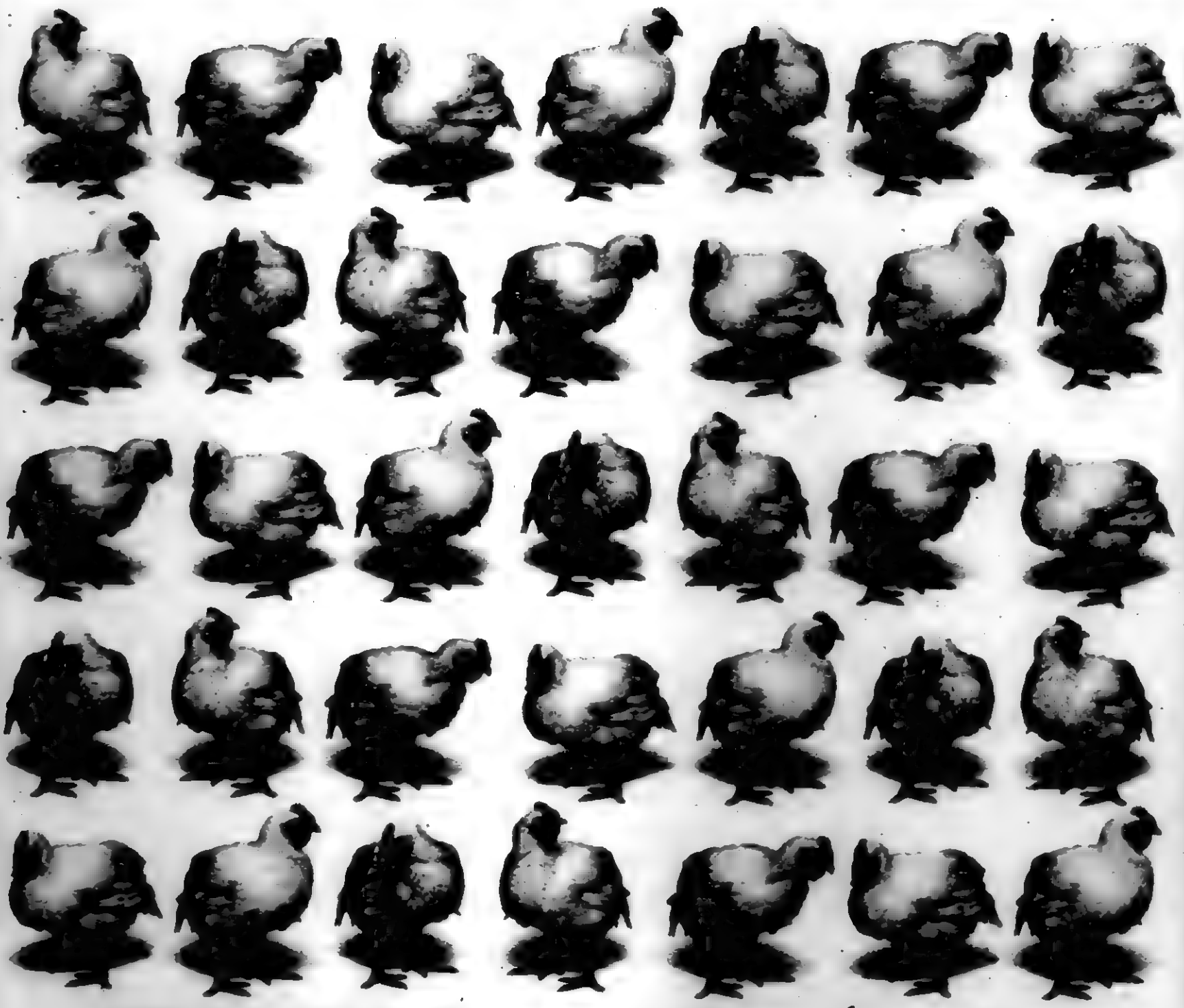

CINCOM Boosts Production At Holly Farms.

***PROBLEM:** Improving programmer productivity in order to reduce a large applications backlog*

***CINCOM SOLVED IT:** With MANTIS Application Development System*

Mr. Bill Clontz
Director of Computer Services
Holly Farms Foods

During a period of explosive growth, Holly Farms found itself with two problems: a large applications backlog and a short supply of programmers able to step in and produce immediate results. The solution was MANTIS,® the application development system from Cincom®

"MANTIS was ideal for us because you don't need 2-3 years of experience to use it," explained Bill Clontz, Director of Computer Services at Holly Farms. "It lets us take new graduates, quickly train them and, in a matter of weeks, turn them into valuable programmers."

As a result, programmer productivity at Holly Farms has reached an all-time high. "We've seen substantial improvement ratios," Clontz said. "In the time a programmer might turn out one CICS command-level program, he can turn out from six to eight programs on MANTIS."

Most of the 500-plus MANTIS applications now in production at Holly Farms are aimed at streamlining costs. For example, Data Processing used MANTIS to develop a model of how chickens consume feed over the course of their lives, allowing Holly Farms to cut production at one of its feed mills by 1½ days a week.

"We've got key users who are picking up on the term 'MANTIS,'" Clontz noted. "Around here, MANTIS has become a synonym for 'get it done quickly.'"

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SMALL TALK

Julie Pitta

No doubt what's Next

One of the worst-kept secrets in the computer industry is Next, Inc.'s first product introduction. Industry watchers have been tracking Apple cofounder Steve Jobs' new venture with vigor. In fact, it seems that the only thing that remains a mystery is when the Next machine will finally make its bow.

Next has kept its audience waiting. The product was expected to debut in April 1987 but has been held back to allow Next engineers to tinker with it further. In the interim, financing from Electronic Data Systems founder H. Ross Perot has kept Next afloat.

Industry watchers believe the Next system will be introduced sometime this summer; some predict it will be launched as early as next month.

Educated guess

Speculation has it that Next will launch a Motorola 68030-based system with high-resolution graphics running the Unix operating system. Although Jobs initially indicated he would target higher education, few believe he will limit his marketing efforts to universities.

"He'll be forced to sell to a more general-purpose market," says Bill Lempesis, an industry analyst at Dataquest. "The volumes just aren't there in the education market to sustain a company like Next. He'll have to market it to business, govern-

Continued on page 56

'Developer's developer' Frank King cranking up code for Lotus

IBM has rarely been noted for blockbuster software, but don't tell that to Frank King. While at IBM, King spearheaded the development of two critical and surprisingly successful mainframe products, DB2 and SQL/DS, and is generally regarded as the father of the IBM RT Personal Computer.

Most recently, King served as vice-president of IBM's Entry Systems Division. There, he helped devise OS/2 Extended Edition, a set of data base and communications components that may well be the first major application written specifically for OS/2, beating a host of microcomputer vendors at their own game. King proved one thing while at IBM, analysts say: He can get the job done.

King's reign *at Lotus heavy on discipline, development*

As newly appointed senior vice-president of Lotus's Software Products Group, King faces a familiar challenge: getting key products to market in a timely fashion. A self-described "developer's developer," King intends to crank out promised products while also serving as an advocate for Lotus programmers.

King spoke with *Computerworld* Senior Editor Douglas Barney about Lotus's approach to software development.

Why did you join Lotus?

I'll tell you how [Lotus Chairman Jim] Manzi recruited me. It was totally out of the blue. I had a really good job at IBM and was enjoying life. I came up here to see some of the new products, some that are announced and some that aren't.

That is the way to get me interested; I am basically a technology-driven person. It was also being in an environment where I could have more impact than an IBM environment, which is much bigger.

Why did Manzi come after you?

Lotus needs a developer for the developers. I speak their language. My background is software, and I am a computer scientist by training. Being a champion of technology is another role.

Also, Lotus is moving into an environment where a lot of the things we are doing are application systems. I have experience in that. That means the development teams tend to get larger, have more interdependencies and require more process.

What do you mean by applications systems?

Instead of just having point products, we are developing a set of products that work across a set of platforms and work together along with a set of extension fa-

Continued on page 56

Typing tutor teaches, sings and burns rubber

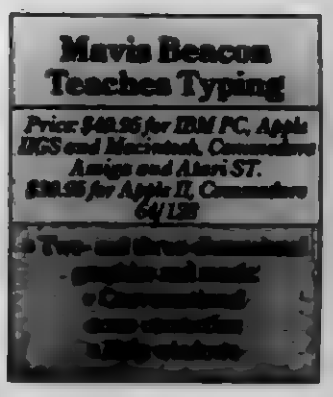
BY JAMES A. MARTIN
CW STAFF

Need to learn how to type? Call Mavis.

Mavis Beacon Teaches Typing, from The Software Toolworks in Sherman Oaks, Calif., is a popular software package that uses artificial intelligence techniques to help users improve, or acquire, typing skills. Although the program is promoted as an entertaining tutorial, users said Mavis has proven invaluable in giving previously inexperienced office personnel and middle managers alike better typing and microcomputer skills.

The Software Toolworks' typing tutor differs from others in that it uses glitzy two- and three-dimensional graphics, music and an arcade "road racer" game to keep the user interested. Traditional yawn-inducing drills and tedious typing repetitions are replaced by tidbits from, among other sources, the *Guinness Book of World Records*.

Mistakes are gently pointed out with conversational sentences as opposed to humiliating bleeps and bells. Guide hands type along with the user to illustrate technique — and also to point out Help windows for each



stage of a lesson.

Although Mavis likes to show students a good time, corporate MIS management should not dismiss the program as idle entertainment, users said. Most corporations have a variety of workers, all the way up to senior management, who could benefit from improved microcomputer keyboard skills.

"I went out looking for a typing tutor that was educational but also fun, and this hit the spot," said Kathy McClimans, assistant vice-president and manager of The Community State Bank in Point Roberts, Wash.

At the bank, Mavis is teaching tellers how to improve typing skills and, at the same time, initiating those without micro experience into the PC environment, McClimans said.

"By using the program during slow periods, like Saturday mornings, tellers are learning how to increase their words-per-minute speed and accuracy and learn a little about MS-DOS commands as well," McClimans said.

The biggest advantage of Mavis is that a student can learn typing skills without having to

Continued on page 50

American Indian tribe reserves Dac, Dbase and 1-2-3

BY ALAN J. RYAN
CW STAFF

SANTA YSABEL, Calif. — Samuel L. Brown has to drive 70 miles over mountain roads to buy computer equipment. A poor choice can mean a great deal of wasted time.

As a data technician, Brown oversees the computing equipment of the Santa Ysabel Band of Mission Indians, a reservation set on 15,000 acres here and one of 18 reservations located within San Diego County's borders.

Part of Brown's job is the selection of software packages to aid in tribe business. Key packages include Dac Easy Accounting from Dac Software, Inc.; 1-2-3 from Lotus Development Corp.; Dbase from Ashton-Tate Corp.; Wordstar 4.0 from Micropro International Corp.; and First Publisher for desktop publishing from Software Publishing Corp.

Accounting obstacles

Clearly one of the most important applications is accounting. That is where Dac and 1-2-3 step in. "There are some custom accounting packages for Indian tribes," Brown said, "but they cost about $5,000." The steep price has kept the Mission Indians away from customized software; they have chosen instead to use off-the-shelf accounting packages to keep tabs on the tribe's finances.

Handling accounting for the tribe differs dramatically from corporate accounting. "We have to show a zero balance at the end of the year," Brown said. The tribe is funded through government grants, but because the grants expire in different quarters, the bookkeeper must keep a watchful eye on all accounts at all times.

"We're running each grant program with a separate Dac subsystem," he continued. "We can run them independently, close them out individually, and by porting them over to Lotus 1-2-3, we can derive a balance sheet."

Currently, the tribe has eight grants running under Dac subdirectories.

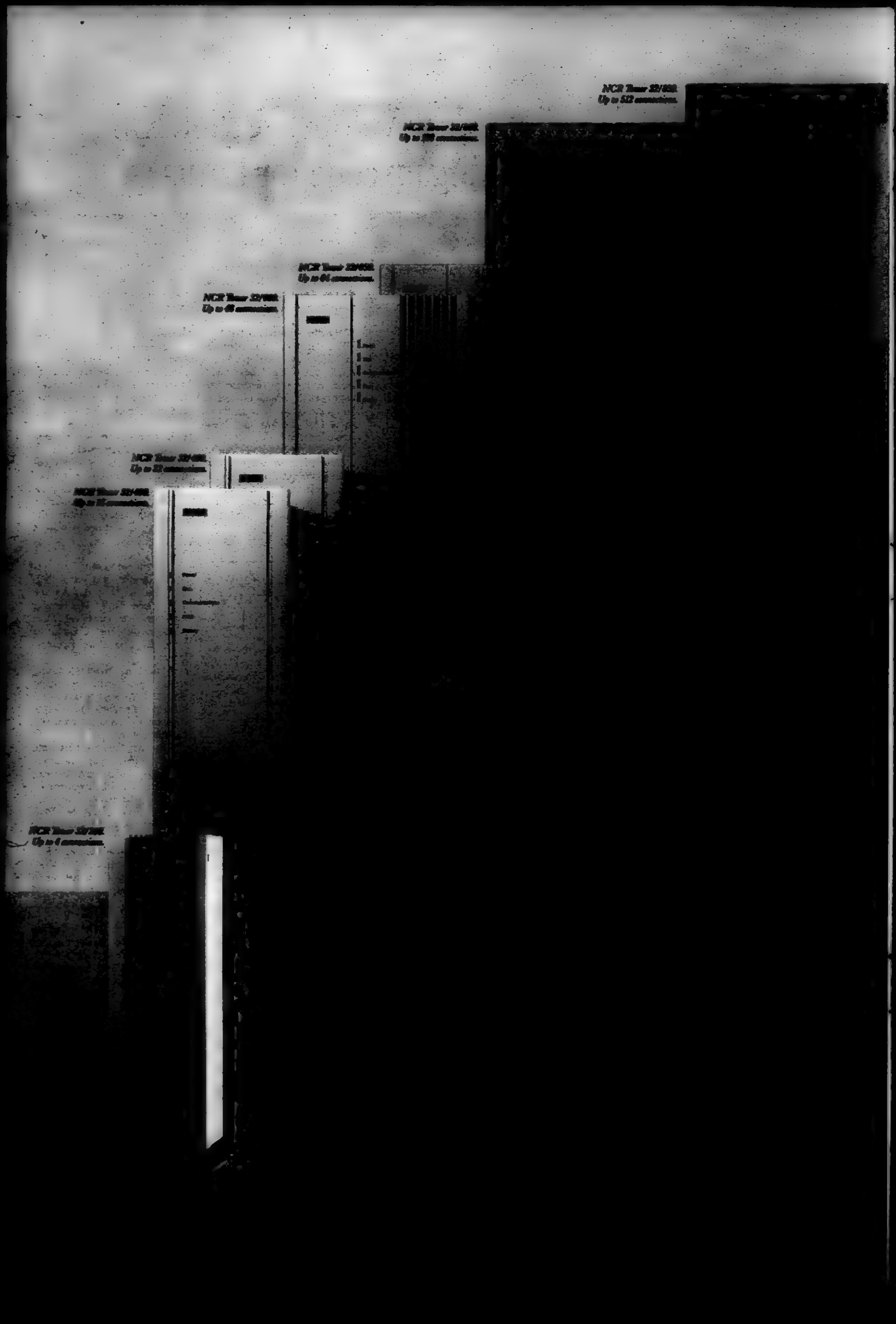
In addition to handling the finances, the on-site computers are used to keep the Mission Indians' 950 members informed of the latest happenings. Using Wordstar and First Publisher, Brown's office publishes newsletters and flyers.

Hookup sought

To keep himself informed, Brown said, he hopes to buy a modem to link his computers with other Indian data bases across the country. Such a link, he said, would help keep the tribe updated on available grants for health care and other needs, and would make it easier to determine whether the tribe qualified for a particular grant.

A data base link would also be useful for keeping up with the U.S. Bureau for Indian Affairs and issues related to that office, such as Indian water rights.

Because of Santa Ysabel's remote location, most phone calls are toll calls, Brown said, so computer support can be expensive. "Luckily, I'm pretty well versed in computers. I do all the repairs and programming of Dbase and Lotus," he commented. The tribe currently has two Compaq Computer Corp. Deskpro computers and a custom-built IBM clone.



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NCR

Must's Nomad turns memory mogul

BY ALAN ALPER
CW STAFF

NORWALK, Conn. — Must Software International recently released Version 2.0 of PC Nomad, an IBM Personal Computer-compatible implementation of its Nomad fourth-generation language and data base management system for IBM mainframes. The upgrade is said to overcome the memory management shortcomings of the original release.

As with the latest release of Nomad for the mainframe [CW, March 28], the microcomputer implementation supports cooperative processing and referential integrity, the company said. Must, which acquired Nomad from D&B Computing Services last summer, said approximately 1,800 PC Nomad copies have been sold since the product was released one year ago.

Version 2.0 was entirely rewritten to make the product more stable and to improve its memory management capabilities, noted Frank Fish, Must's executive vice-president. Still written in C, the new version employs a virtual memory concept to enable users to develop applications that require address space exceeding the 640K-byte barrier supported by Microsoft Corp.'s MS-DOS, he explained.

Don Weimann, staff systems analyst at Chevron Information Technology Co., said Release 2.0 is much faster and seems to have fewer bugs than the original version. "The memory management facility adapts so that if you are using extended memory — beyond 640K bytes — you still get excellent performance," Weimann said.

Nomad's land

Chevron has developed two applications with PC Nomad, starting with Version 1.0 and recently segueing to the beta release of Version 2.0.

One application is virtually completed: It is an accounting reconciliation system that merges internal company data with supplier and customer information. All relevant data is merged on the micro and then uploaded to the mainframe where the data base resides, Weimann said.

Chevron has decided to leave the system, which handles 20,000 records a month, on the PC rather than move it to a mainframe.

"It now makes sense to leave this on the PC and upload the data to the mainframe rather than process it all on the mainframe," Weimann said.

Speeding cycles

Nomad's cooperative processing facility allows users to develop applications that run concurrently on the PC and the mainframe with record-to-record communication. With cooperative processing, the mainframe is used to house large data bases while the PC handles data entry and editing, Fish explained.

"This allows users to reduce mainframe computing cycles by 65% to 75%," Fish claimed.

Referential integrity is provided through the rules stored in PC Nomad's integrated data dictionary. Rules stored in the repository ensure referential integrity by defining relationships between data elements in the tables and actions to be taken when elements are changed or deleted, Fish noted.

Must has also enhanced PC Nomad's windowing facilities. Version 2.0 supports textual windows, enabling developers to customize output windows. New options — Autopick and Autotab — provide single-command facilities for implementing first-character menu selections and field-to-field movement. Previously, these options required repetitive coding, the company said.

Currently available, PC Nomad Version 2.0 operates on IBM PC XT- or AT-class machines running MS-DOS 3.0 or IBM PC-DOS 3.0 or higher with at least 10M bytes of hard disk and 640K bytes of memory. Release 2.0's price remains at $795 for a single copy.

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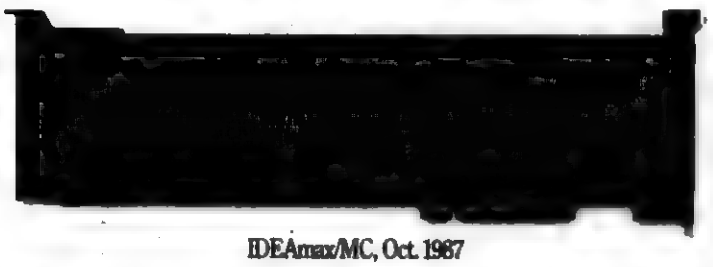
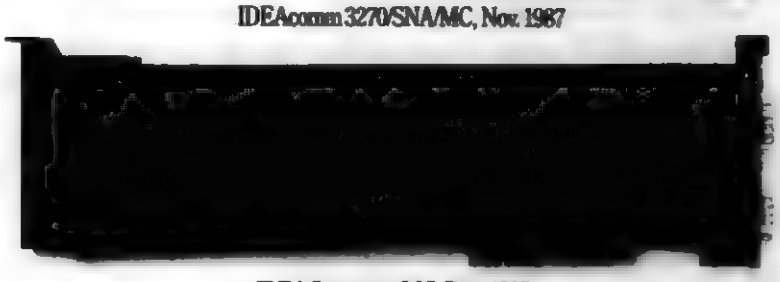
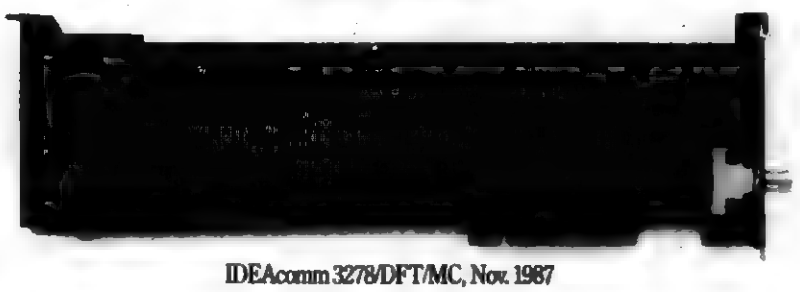


IDEAmax/MC, Oct. 1987



IDEA Supermax/MC, Dec. 1987



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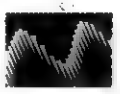

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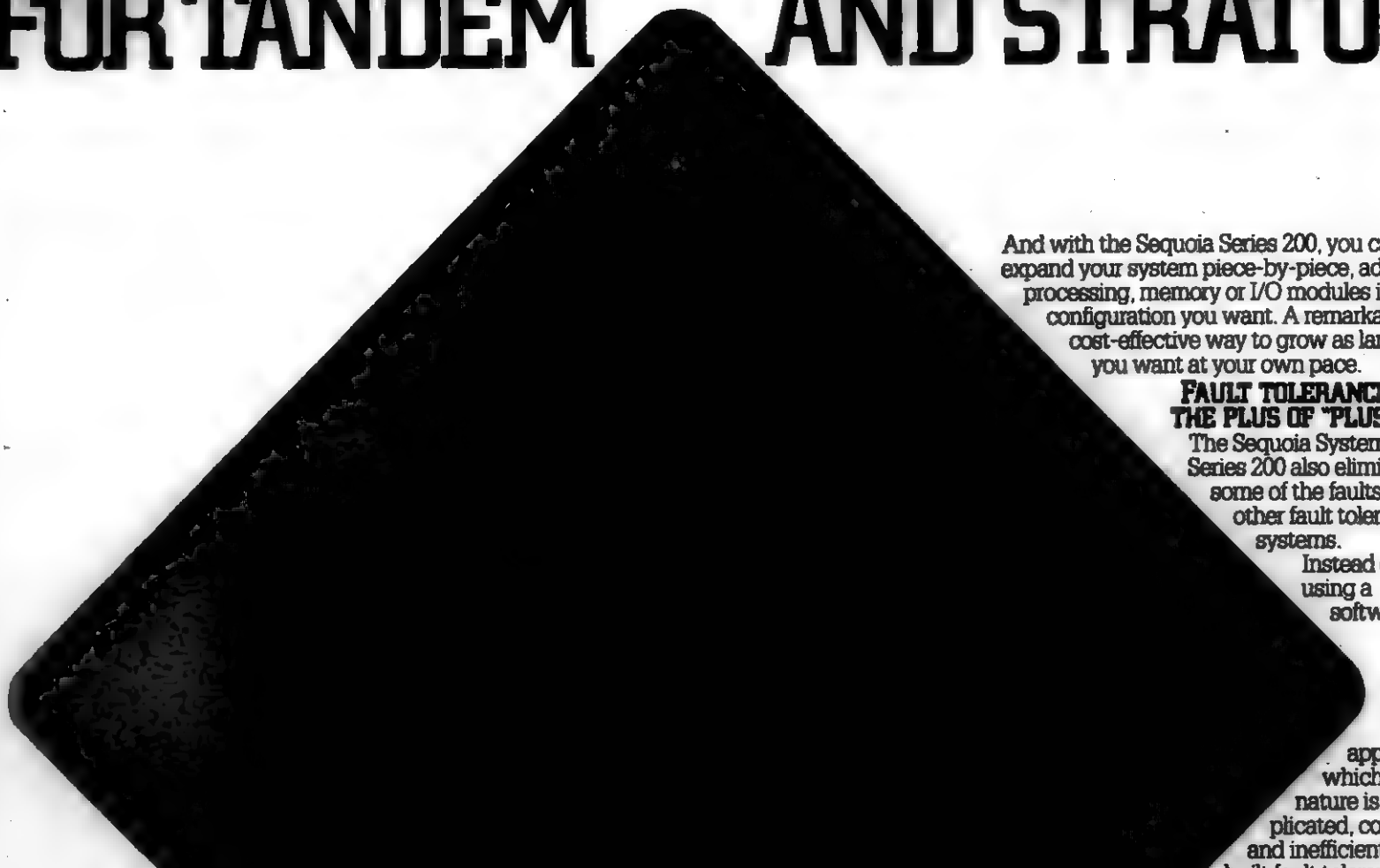

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SEQUOIA

Barney

FROM PAGE 39

ing to T. A. Elkins, a disk caching expert and computer consultant, Borland 's Sidekick Plus, when used with disk caching software, can trash files on a hard disk. The problem is largely due to the disk caching software itself, which has tricky ways of dealing with the Lotus/Intel/Microsoft Expanded Memory Specification.

Care for a rumor? It has come to our attention that many micro software firms are doing what they should be — working hard on a bunch of new stuff. Wordperfect is said to be warding off competition by building electronic mail capabilities into its word processing software. Aldus, which rules the desktop publishing roost, is apparently looking to get a foothold in the growing market for presentation graphics.

You can't be serious. OK, I'm not. In past days, IBM was considered a staid blue giant. And getting information from the beast was like pulling teeth.

But with its new *glasnost* policy, IBM has not only changed its style but has moved its headquarters to Los Angeles.

To show off the new IBM, the firm invited a group of *Computerworld* writers to spend a day with IBM Chairman John Akers. Below are my recollections of the tumultuous day. But beware. As is often the case, I may have been sleeping.

The first thing I saw was Akers waltzing into the office mid-morning, sporting a tank top and two days' worth of stubble.

"Yo, Barn, you made it. Care for some alfalfa juice? It really grows on you."

"Gee, John, as a journalist, I usually don't drink liquids 'cept coffee till noon, but what the hey."

Grasping the frosty green beverage, I listened in on a conversation between Akers and Compaq Chairman Rod Canion. "OK, dude, here's the deal. We're going to have two new systems this month, both using the 386 but selling for less than our current 286 models. But don't worry — they won't be as fast as your new boxes. How's that sound, guy? Yeah, got to go. Hey, let's do the lunch thing, eh pal?"

Akers turned to me, grinning. "Ah, Doug, those wacky Texans. Him and Roach, man, they crack me up. They always talk with their mouths full of baby back ribs. And that high cholesterol slows their speech to a crawl."

Just then, Aker's distinguished secretary, Cooky, poked her head in. "Johnny, it's that Gates guy on Line 1. Should I tell him you're at aerobics again?"

Akers took the call. "Hey, Bill, you called on the party line. So where's the party?" Shifting from laughter to dead seriousness, Akers seemed to listen intently. After furrowing his brow, he responded.

"Sorry, Bill, but we need to go proprietary on the OS, 'cause, like, we need the dough. But listen: We'll give you the info to get you started on a work-alike for Rod and the guys, and we'll kick in a couple thousand cases of Jolt cola so you can get your stuff done on time. OK? Check you later."

I soon found myself staring at a group of well-dressed MIS directors in town to get the latest poop from IBM.

Akers briefed them quickly. "OK, we got the 4090, and the PS/2 Models 55, 70, 90 and 100.1 on the way. And we got Silverlake. But look, the DEC and HP minis and the Compaq desk-bangers work a lot better. Now, if you buy these babies from us, we'll cut you a great deal. Just put those IBM bumper stickers over those other guys' labels and put 'em to work."

Later events are little more than a fog. I vaguely remember an OS/2 disk-crashing party, a Micro Channel Swim and a Mac being dumped into a hot tub.

When I woke up in front of my terminal at work, Akers and the MIS guys were gone and there was no sign of Cooky. But there was a half-full glass of a thick, ugly green liquid.

Barney is a Computerworld senior editor, microcomputing.

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Planning tool gets LAN upgrade

BY ALAN J. RYAN
CW STAFF

ONTARIO, Calif. — The proposal documentation for National Aeronautics and Space Administration projects is so large, it could fill a C-5 plane, which is larger than a Boeing 747.

Documentation weighing tons is common in the aerospace and defense industry because the U.S. government requires the proposals to be highly detailed, often asking that the work structure be described to the most minute levels.

Now, according to Micro-Frame Technologies, Inc., much of that volume can be eliminated. The company recently released a networked multiuser version of its MPM project planning software called MPM LAN, which is said to allow companies to move major management programs off mainframe computers and into the less expensive microcomputer environment. Instead of filling a C-5, documentation can now be stored on disks.

The software package reportedly helps in the preparation of proposals and the creation of monthly cost reports along with reports for managers and engineers.

MPM LAN is said to support up to 100 simultaneous users on PC-based workstations, supplying them with a mirror image of the single-user project management capabilities of MPM software.

"We're going to be using MPM LAN as a complete project manager to do scheduling, estimating, performance measurement and reporting," said John Kocon, supervisor of MIS engineering at The Garrett Corp. in Tucson, Ariz. Garrett was used as a beta site for MPM LAN and has been working with the single-user version since last July.

MPM incorporates a Work Breakdown Structure (WBS), rather than the Critical Path Method and networking systems common to other planning software, according to John O'Neil, president and chief executive officer at Micro-Frame.

The WBS is a tree-like data organization hierarchy resembling an organizational chart that handles proposal pricing, reporting of cost and schedule performance and project scheduling.

According to O'Neil, the aerospace and defense markets are larger than they may appear. He said that 8% to 10% of the nation's gross national product is spent on aerospace and defense and that there are in excess of 30,000 companies working in those industries.

Scheduling is critical

"Companies can lose contracts if the documents aren't ready on time," O'Neil said, "but there are often a lot of oversights when contracts are completed too quickly." Because of that, the program incorporates criteria to verify that the numbers from the management system are accurate.

Kocon said his company evaluated project management software about nine months ago, including mainframe and microcomputer-based systems.

"We looked at some of the larger mainframe packages. . . . A lot of them focus on a specific project management concept," Kocon said. "What we found from Micro-Frame was very good estimating and very good performance, and their scheduling system met our minimum requirements. But their proposed [scheduling] enhancements would meet our needs exactly."

Kocon estimated that his company has saved between $100,000 and $150,000 in software costs alone compared with mainframe applications. "Additionally, many of the mainframe packages did not meet our requirements and would have required some customization," he said.

"The functional capabilities of this package exceed mainframe packages that run [from] $300,000 to $400,000," said Larry Brewer, group-earned value manager at the Government Electronics Group of Motorola, Inc. in Scottsdale, Ariz. "Nothing ever fits my exact requirements to a T," he said, "but Micro-Frame fits about 75% of my expectations. Some of the mainframe packages fit only 35% to 40%, and other PC packages fall only in the 15% to 20% range."

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Tutor

CONTINUED FROM PAGE 41

leave the office, users said.

"We ordered the program for someone who doesn't know how to type — a development officer, in fact," said Carol Nottingham, office manager at the Smithsonian Institution's Department of Membership and Development in Washington, D.C. "The officer was able to stay in the office and work on the program when it was convenient, and not be away from the desk and miss calls."

At ITT Corp. subsidiary ITT Gilfillan in Van Nuys, Calif., Mavis was called in to help mid-level managers cope with the loss of their secretaries.

"We recently had some budgetary problems that called for cutbacks on secretarial help," said Matthew Gastaldo, an information center specialist. "Managers and supervisors had to start typing up their own memos on a PC, and most of them had to have their skills enhanced."

Programs like Mavis are becoming popular in corporate America because they address a fundamental problem and teach the skills needed to solve that problem, users and analysts said.

Finally, a software company that realizes it takes more than a computer to run business applications.

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Digital has it now

Equifax is the leading source for underwriting, claims and marketing information for insurance companies. They depend on Equifax to provide that information accurately, reliably and above all, quickly. "As 'The Information Source,'" we have to deliver it more efficiently than anyone else," explains Don Walsh, President of Equifax Services Inc. "To do this, we needed to create a uniform computing environment internally. The choice was Digital, due largely to its single architecture and networking."

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Micrografx

CONTINUED FROM PAGE 39

text through a separate window.

"With Illustrator and other Mac programs, you are always toggling in and out of Preview mode," Grayson said. "There is no Preview mode in Designer. You are always working in a mode where the final output is going to look like what you see on screen."

Designer lets users create 16 million colors and load and save customized color palettes. Users can customize their own color palettes or use color models such as Pantone PMS, a spokesman said. Designer 1.2 is being shipped with CMYK, RGB and HLS color models, as well as the Crayola Crayon color palette. Pantone PMS color support is optional and has a suggested retail price of $99.95.

The program has a new Microsoft Corp. Windows-compatible Postscript driver that improves printer output and supports color printers. It can also save the print file from any Windows application as an Encapsulated Postscript file.

Boosts compatibility

Support of Encapsulated Postscript improves the compatibility of Designer files with page-composition programs such as Xerox Corp.'s Ventura Publisher. Encapsulated Postscript is supported by most popular programs in both the Macintosh and the PC-compatible worlds.

Images created with Designer files are compatible with Aldus's PC Pagemaker, Micrografx's Graph Plus and Windows Draw. Charts from Graph Plus and drawings from Windows Draw can be opened in Designer. Designer supports all I/O devices supported by Windows, including the most popular graphics cards and displays, mice, laser and dot matrix printers.

Hardware requirements for the package include an IBM PC- or Intel Corp. 80386-compatible system with 640K bytes of memory and a hard disk, an IBM Enhanced Graphics Adapter or Video Graphics Array card, a graphics monitor, a mouse and a printer.

Registered users can upgrade to Designer 1.2 for $99. Those purchasing Designer after May 1 get upgrades free of charge. Version 1.2 costs $695.

Pitta

CONTINUED FROM PAGE 41

ment and a number of different places."

When the Next system finally gets to market, it is expected to compete with Apple's Macintosh II, which added Unix in January. Jobs will likely relish competing with Apple. However, industry watchers say they believe that Next, although better known than the average start-up because of its colorful founder, will have a rough time competing with $2 billion Apple.

"Initially, I don't expect Next to have a tremendous impact on Apple," Dataquest's Lempesis maintains. "Although Steve Jobs is running it, Next is still a start-up, while Apple's a very large computer company." It will take time for Next to establish a marketing force, he adds, and the company's size will make it difficult to compete on price.

Apple won't be the only force that Next will contend with. It must also compete with formidable Sun Microsystems.

"I think it's going to be very difficult," says Esther Dyson, editor of the "Release 1.0" newsletter. "Steve is obviously going to go on everyone's short list, but he won't have the economies of scale that Apple and Sun will have."

More from Apple. At the recent Apple software developers' conference, Hypercard creator Bill Atkinson said a new version of the "personal tool kit" for the Mac will support compact disk/read-only memory. No launch date has been set, but sources said Hypercard 2.0 should be released shortly.

Introduced amid much hoopla last August, Hypercard didn't make the splash Apple had expected. An estimated 1,600 third-party developers attended the conference, up from 800 last year. Sources say Apple is adding about 200 certified developers each month.

Pitta is Computerworld's West Coast senior correspondent.

Symantec Time Line extended

CUPERTINO, Calif. — Symantec Corp. wedged its Time Line personal computer project management software into the world of mini and mainframe computers recently, announcing a plan to link Time Line with high-end products from Metier Management Systems.

Symantec and Metier teamed up to develop hooks between Time Line and Metier's Artemis project management software that allow users of either product to share data.

Time Line 3.0 users can transfer data to and from Artemis software by running a utility add-in disk with Time Line that Symantec will ship as a free upgrade during the second quarter. Metier is currently shipping Artemis Project, which can import and export data from Time Line and starts at $3,500.

The link to Artemis gives Time Line PC users a connection to project management software running on high-end workstations, Digital Equipment Corp. VAXs, Hewlett-Packard Co. 1000 series minicomputers and IBM mainframes.

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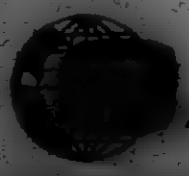

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King

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cilities so people can add things. Tying them all together and allowing them to be extended is the systems part of the application environment we are trying to produce.

What do you need to do in terms of discipline?
There are small steps we need to take in terms of improving the process. We are developing a mechanism right now that we are getting the developers to buy into. We want to have individual people — typically two-person teams, a marketing and a development person — responsible for certain things across all of our products.

For example, we may have a czar for bug tracking who will work across all development groups, ensuring uniformity and focusing on inconsistencies. Those are things we need to do, and we are doing them. And these ideas are coming from the developers.

A big slice of my time is working with developers. We have a lunch program where every day, 10 of us sit in a room and talk for two hours. I am doing that across the whole organization so that everybody tells me what they want me to do and tells me what the problems are. Out of that process, the tunings of the development process are under way.

How is software developed at Lotus, and how large is the development infrastructure?
There are two development modes. One is for brand-new programs that are embryonic. With these, a few people design a prototype and show it to their peers — a sort of skunk works.

The other mode is for programs like Release 3. Those kinds of programs require more structure; they tend to have larger teams — a formal development team, a formal documentation team, a formal QA team and a marketing team driving the function design decisions. The teams here tend to be smaller to do a piece of work than I have seen at IBM, but the structure is essentially the same.

Do you foresee major structural or organizational changes?
The development process is very healthy. We just have to leverage the changes we are making, mainly in the area of consistency across the set of development environments. It is extensions, not major changes.

Does Lotus need more developers to crank out the promised products, or does it just need to be more efficient?
I think it is highly efficient now.

What are your thoughts on preannouncements?
We need to move away from talking about futures. We need to tell our customers enough about what we are doing so they can plan. That is mandatory.

But I want to talk about products when we are ready to ship them or when we beta-release them.

What happens when you talk too much about products that have not arrived?
You get to participate in the vaporware lists.

How do you develop products for platforms such as the OS/2 Presentation Manager, which is not yet stable?
The initial part of the development process is writing a spec, so a lot of it is pure thought process. The tool you need is a good editor, not a code base. Now we do have Presentation Manager code and have been able to experiment with our ideas, but in the beginning, you are writing your spec.

Are you at the coding point?
Yes, and we have been showing the code to selected people.

How long does it take to develop for the Presentation Manager, and can you get an early start with Windows?
Knowing what Windows is and how applications exploit it helps the spec part. It is hard to do any software development is less than a year. The test process itself is four to five months minimum. A year is probably the lower bound.

If an MIS director is thinking about the Presentation Manager and has to come up with a plan to implement it, what is the time frame if he wants to have a 1-2-3/G and Lotus/DBMS shop?
I do not want to speculate on dates for our products. To get a feel for the industry, that is really an IBM and Microsoft question.

Why?
They, more than anyone else, have their finger on the pulse of who is doing what with the Presentation Manager. But there will be significant applications in early 1989.

How much space will you leave in Release 3 for worksheets?
As much as I can. It will be competitive and appropriate.

What will Lotus's image be a year or two from now?
I want us to continue to be known as developers and technical innovators.

Borland revs Turbo Prolog, hopes to win programmers

BY STEPHEN JONES
CW STAFF

SCOTTS VALLEY, Calif. — Borland International set its sights on data base programmers recently with a new version of its Turbo Prolog application development tool that includes external data base support.

Turbo Prolog 2.0, which costs $149.95, features a data base system with development and maintenance tools for large data bases. By setting up its data bases in groups of chains, the program was designed to provide quick data sorting and retrieval. The package can also handle large data bases through its expanded memory support, according to Borland.

In addition, Turbo Prolog allows programmers to develop user interfaces, customized knowledge bases, expert systems, natural language interfaces and smart information systems.

BORLAND claimed applications written in Turbo Prolog require one-tenth as many lines of code as those written with procedural tools.

Because it is a nonprocedural fifth-generation language, Borland claimed applications written in Turbo Prolog require one-tenth as many lines of code as those written with procedural tools.

With the code more compact, maintenance is easier, a Borland official said.

Graphics cards read
Turbo Prolog's interpreter can be modified to handle a different logic-programming language, inference engine, expert-system shell or program interface. Graphics support includes monochrome, IBM's Enhanced Graphics Adapter and Hercules Computer Technology, Inc. graphics cards, according to the vendor.

The upgrade requires an IBM Personal Computer, PC XT, AT, Personal System /2 or compatible and 384K bytes of random-access memory, but Borland recommends 640K bytes.

The package runs with Microsoft Corp. MS-DOS and requires two floppy disks, although a hard disk is recommended.

1-2-3

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All the above vendors pledged to port most existing add-ins to LEAF and to develop a new generation using the LEAF tools.

As a result, Release 3 users can look forward to a variety of add-ins, including printing utilities, data bases, word processing programs, compilers and graphics packages.

LEAF structure
Lotus took the opportunity to detail the LEAF language, which will debut shortly after the shipment of 1-2-3 Release 3 later this year.

According to Lotus, Release 3 and future Lotus applications will include the ability to use LEAF applications. To generate the applications, however, users must buy the $250 LEAF tool kit, which includes the language, code libraries, an editor, a compiler, a linker and a debugger.

Because Lotus will include LEAF support in a host of new products, LEAF applications will be portable to a variety of packages. LEAF support is planned for the Unix version of 1-2-3, but the company has not committed to LEAF support for 1-2-3/M, an IBM mainframe version of the ubiquitous spreadsheet.

Back to Basic
The Lotus approach with LEAF differs dramatically from that of Microsoft Corp., which plans to position Basic as a cross-application macro and batch-file generator.

According to Microsoft, a key advantage of using Basic is that many users are already comfortable with the language. Lotus officials counter that LEAF, unlike Basic, is a high-level language optimized for the Lotus environment.

Some observers question whether Release 3 will leave add-in makers as much room for applications as Release 2, which left nearly 400K bytes of random-access memory for data or add-ins.

Release 3 is currently being shrunk to fit within the 640K-byte limit of Microsoft's MS-DOS, but it is not expected to be as small as Release 2, which has been noted for its compactness.

Mitsubishi

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"substantial free memory space." The obvious reason users have delayed buying laptops, according to Mitsubishi officials, is the poor quality of their displays. Mitsubishi said the MP286L's page-white, backlit, cold CRT screen will help overcome those reservations.

In addition to cold CRT, the new screen uses neutral twisted-pneumatic technology, which the firm said makes its LCD readable under any lighting.

The machine's base configuration, priced at $3,195, features dual 3½-in. 1.44M-byte disk drives. Users can also buy a version that has a 20M-byte hard disk drive. Both versions will run an external 5½-in. 1.2M-byte floppy disk drive and have one parallel and two serial ports.

Initially, the systems will be shipped with Mitsubishi's Color Graphics Controller, which supports both the built-in display and an external monochrome or color monitor. Support for IBM's Enhanced Graphics Adapter and Video Graphics Array is promised by the end of the year.

MITSUBISHI OFFICIALS are calling the system a "desktop-laptop."

Mitsubishi officials are calling the system a "desktop-laptop" because it can be used as an office computer and can eventually be hooked up to local-area networks. The company is currently working on developing LAN cards, although a spokesman did not say when they would be available.

"There's a large universe of business professionals who have a need to use powerful computers in the home and office or even in a hotel room but have little desire to use them on airplanes or the field," said Jerry Grimson, Mitsubishi's vice-president of sales.

Options for the MP286L include an Intel 80287-8 math coprocessor, a built-in 2,400, 1,200 or 300 bit/sec. Hayes Microcomputer Products, Inc.-compatible modem card and a 17-key keypad. The 12- by 14- by 3½-in. system also features a real-time clock and a battery backup. Evaluation units of the MP286L are available immediately, although full production units will not be available until July, according to the company.

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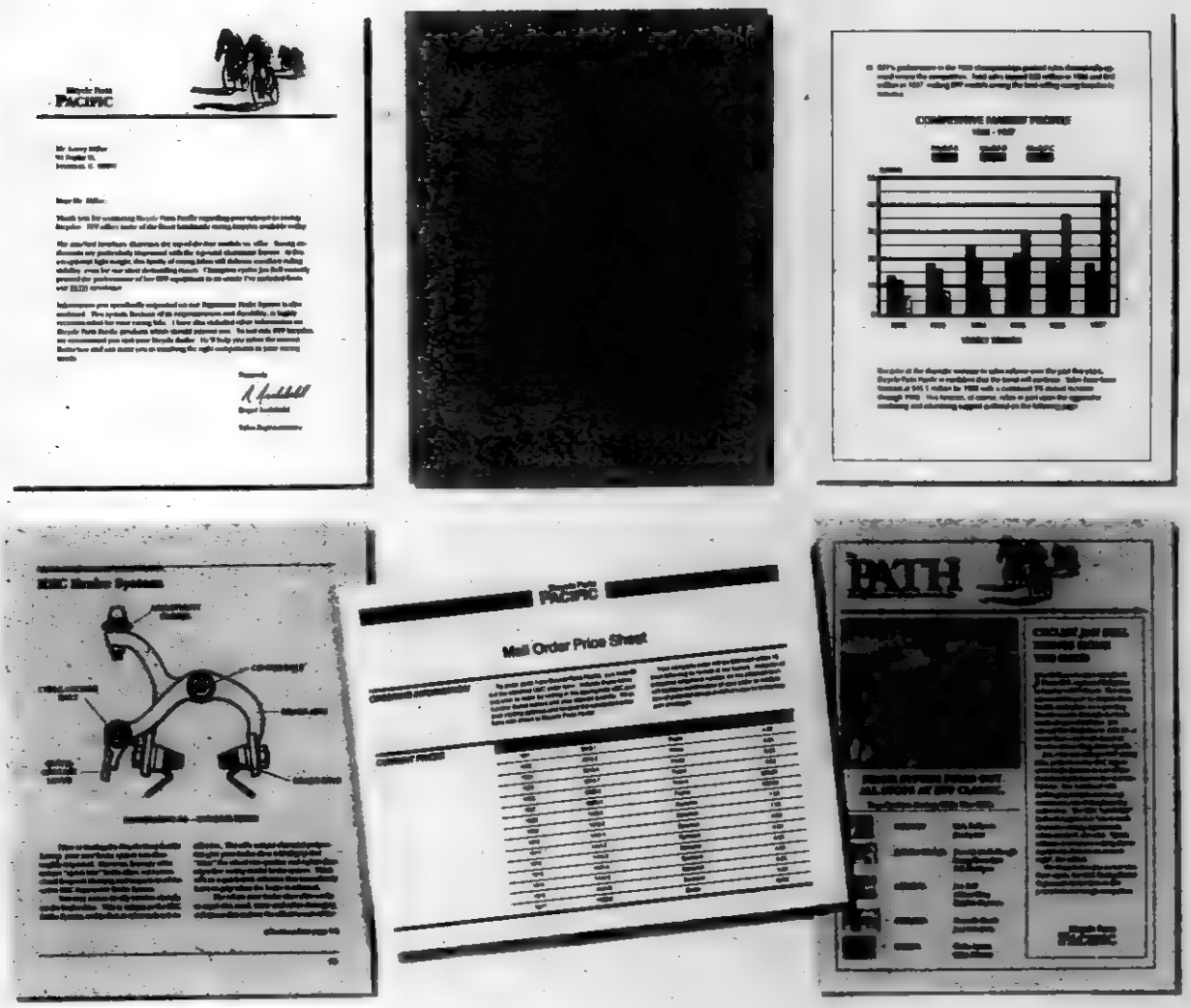

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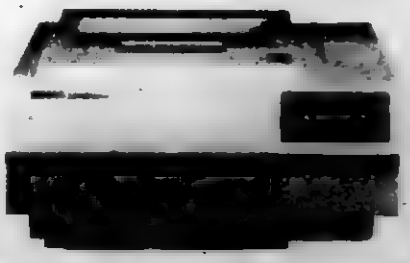

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Print samples were created using Microsoft Word, Microsoft Excel, and Aldus PageMaker.

NEW PRODUCTS

Systems

Epson America, Inc. has enhanced **Equity II Plus**, its entry in the small-footprint IBM Personal Computer AT-compatible market. Equity II Plus now has an Intel Corp. 80286 microprocessor and switchable clock speeds of 8 and 12 MHz.

A 40M-byte hard disk is standard, and the system is bundled with Microsoft Corp.'s MS-DOS Version 3.03 operating system. It also includes six expansion slots and 640K bytes of random-access memory.

The enhanced Equity II Plus is priced starting at $1,899.

Epson America, 2780 Lomita Blvd., Torrance, Calif. 90505. 213-539-9140.

Massachusetts Computer Corp. (Masscomp) has announced several additions to its line of standards-based real-time computers for scientific and engineering applications.

The Unix-based **Masscomp 6000 family**, available in configurations ranging from seven-slot pedestals to 30-slot cabinets, uses a binary-compatible multiple-processor architecture based on the Motorola, Inc. MC68030 microprocessor. The four new systems reportedly perform up to 35 million Whetstone instructions per second.

The series can be configured with up to five MC68030-based CPUs, each with its own 64K-byte cache and floating-point processor.

Pricing for the Masscomp 6000 family ranges from $24,900 to $120,000.

Masscomp, One Technology Way, Westford, Mass. 01886. 800-451-1824.

Valid Logic Systems has announced **Realchip II**, the company's second-generation hardware modeling system.

Used with Valid Logic's electronic design automation systems, Realchip II supports the simulation of designs containing complex, very large-scale integration devices. The system allows any number of users on a design team to access the hardware modeler simultaneously. Realchip II can be accessed from any of Valid Logic's electronic design automation platforms, including the Digital Equipment Corp. Vaxstation and Sun Microsystems, Inc. workstations.

Realchip II costs $65,000.

Valid Logic, 2820 Orchard Pkwy., San Jose, Calif. 95134. 408-432-9400.

The **Rabbit 286**, a portable IBM Personal Computer AT compatible, has been announced by **Chicony America, Inc.**

The system comes with one or two 1.44M-byte 3½-in. floppy disk drives or one floppy and one 20M-byte 3½-in. hard disk drive. Ports are available for an external 5¼-in. disk and an IBM Monochrome Graphics Adapter and Color Graphics Adapter card.

Based on a one-wait state, 6- or 12-MHz Intel Corp. 80286 microprocessor, the system includes 1M byte of random-access memory, expandable to 4M bytes. The 640- by 400-pixel supertwist backlit LCD provides an 11-in. diagonal screen with 80 char. by 25 lines.

Prices range from $2,150 to $2,450, depending on configuration.

Chicony America, 1641 W. Collins Ave., Orange, Calif. 92667. 714-771-6151.

Chicony's *Rabbit 286*

Software applications packages

Symantec Corp. has announced Version 1.01 of its **Q&A Write** word processing software.

The package includes layered menus, a 100,000-word spelling checker and soft-hyphenation support. It also offers foot and laser printer support for as many as nine fonts per document, an advanced search-and-replace function, multicolumn printing and mail merge via an integrated 1,000-record card file. It can be fully integrated with Lotus Development Corp.'s 1-2-3.

Q&A Write costs $199. A thesaurus is available seperately for $49.95.

Symantec, 10201 Torre Ave., Cupertino, Calif. 95014. 408-253-9600.

A text-styling tool for Apple Computer, Inc's Macintosh is now being published by **Broderbund Software, Inc.**

The program, **Postermaker Plus**, allows desktop publishers to create logos, mastheads and other applications. The package can reportedly stretch, wrap, bend, reduce, expand or squeeze text. Shadows, shades and patterns may be added, and colors may be assigned when printing on an Apple Imagewriter II.

Users can import paint files and export paint, scaled paint and encapsulated Adobe Systems, Inc. Postscript files.

The package is priced at $59.95.

Broderbund, 17 Paul Drive, San Rafael, Calif. 94903. 415-492-3200.

Reliable Software has introduced **PC Keyrack**, a key inventory control and building security system. Through on-line reports, the system monitors key distribution to employees for access to buildings, lockers or equipment. A Vulnerable Facilities Report function allows managers to determine which facilities are vulnerable to theft or vandalism by monitoring employee keys that have been lost or stolen.

The program runs on the IBM Personal Computer, PC XT and compatible systems and requires 128K bytes of memory and a hard disk.

Keyrack costs $350.

Reliable Software, Suite 2, 3049 Doris Court, Lake Oswego, Ore. 97035. 503-635-3939.

NBI, Inc. has announced **Legend**, a document processing program that merges advanced word processing, desktop publishing and graphics capabilities.

Running on Microsoft Corp.'s MS-DOS 3.2 and using the Microsoft Windows interface, Legend offers a "what-you-see-is-what-you-get" environment.

The product accepts imported text, data and graphics files from ASCII, IBM's Display Information Facility and other formats, and product files can be exported in ASCII.

Legend supports the Adobe Systems, Inc. Postscript page description language and any scanner using Tagged Image File Format or Zsoft Corp.'s PC Paintbrush Format. The product also requires an Intel Corp. 80286 or 80386-based IBM Personal Computer or compatible, a minimum of 640K bytes and a 20M-byte hard drive.

Legend costs $695.

NBI, P.O. Box 9001, Boulder, Colo. 80301. 303-444-5710.

A personal computer-based mapping package was recently announced by **Mapping Information Systems Corp.**

Mapinfo is said to allow users to analyse information in existing data bases and display the results in a variety of map formats.

The software can automatically create pin maps that display points on the screen, depending on the street address, along with thematic maps, which highlight defined regions using color, shading, borders or other graphic devices.

Mapinfo runs on the IBM Personal Computer XT, PC AT and compatibles and requires 640K bytes of memory as well as a hard disk.

Mapinfo costs $750.

Mapping Information Systems, Hendrick Hudson Building, 200 Broadway, Troy, N.Y. 12180. 518-274-9673.

A package supporting simultaneous multiple document processing on personal computers has been introduced by **Turbosoft/Turbo Law Laboratories, Inc.**

Overdrive for Wordperfect automatically creates Wordperfect Corp.'s Wordperfect macros for printing multiple documents in one keystroke and includes a library manager for organizing up to 1,250 documents.

Written in C language, the package is compatible with all versions of Wordperfect 4.0 and higher and incorporates multiple integrated document assembly system, or Midas, technology.

Overdrive for Wordperfect costs $99.95.

Turbosoft/Turbo Law, Suite 101, 2135 112th Ave. N.E., Bellevue, Wash. 98004. 206-454-7675.

Coddbarrett Associates, Inc. has introduced **Bitfolio Special Edition**, a computer arts and symbols library designed for Lotus Development Corp.'s Freelance and Freelance Plus and Zenographic Co. users.

Each picture file is optimized for color-thermal printing or 35mm output and can be used with pen plotters. Categories include borders, backgrounds, business, common objects, communications, human forms, nature, sports and transportation.

Bitfolio Special Edition costs $250.

Coddbarrett Associates, 65 Ashburton St., Providence, R.I. 02904. 401-273-9898.

E/Step Software, Inc. has released the **Finished Goods Series**, a statistical forecasting and inventory management system that runs on Microsoft Corp. MS-DOS-compatible microcomputers.

Forecasting at multiple levels is supported with automatic distribution to higher or lower levels, and the inventory management module determines the safety stock levels required to achieve any desired customer service level. The system includes a user-customizable data base, an on-line screen forms generator and an ad hoc report writer.

The Finished Goods System costs $25,000, which includes installation, training, custom interfaces and consulting on specific forecasting needs.

E/Step Software, 12 Hill St., Hopkinton, Mass. 01748. 617-435-3043.

Palladian Software, Inc. has announced the **Operations Planner**, designed to assist industrial and manufacturing engineers in operational change analysis.

The software uses menus, windows and tables for data entry and model building and points out omissions and inconsistencies. Users may analyse the completed model to determine trade-offs among capacity, utilization, product costs and lead times.

The product runs on the IBM Personal Computer, PC XT, AT or compatibles and requires 640K bytes of random-access memory and 2M bytes of free hard-disk space.

The Operations Planner costs $3,500 for a single license.

Palladian, Four Cambridge Center, Cambridge, Mass. 02142. 617-661-7171.

Evolution Computing has released **Easycad2** for the IBM Personal Computer, PC AT, Personal System/2 and compatibles along with Compaq Computer Corp.'s Compaq 386.

The product has associative pattern fill and allows line styles to be selected from dialogue boxes. Easycad2 allows 16 colors on 256 layers that can be hidden, shown or frozen independently. Bidirectional drawing exchange can be performed with Versacad Corp.'s Versacad and Fastcad. The product also has floating-point accuracy with near-infinite zoom.

Easycad2 costs $169.95.

Evolution Computing, 437 S. 48th St., Tempe, Ariz. 85281. 602-967-8633.

Software Publishing Corp. has announced **Professional Write 2.0**, an enhanced version of its managerial word processing program.

The package offers direct connections to secretarial word processing, data base and spreadsheet programs and support for multiple fonts. It includes file management capabilities and requires 512K bytes of random-access memory, Microsoft Corp. MS-DOS 2.0 or higher and a dual-drive IBM Personal Computer, PC XT, AT, Personal System/2 or compatible system. A hard disk is recommended when using fonts.

Professional Write 2.0 costs $199.

Software Publishing, 1901 Landings Drive, Mountain View, Calif. 94093. 415-962-8910.

A real-time multiuser accounting package has been introduced by **Champion Business Systems, Inc.**

A module of Champion III, the **Multi-User Module** permits one or more users to access and process information in the same file, with data protection in the event of a crash.

Champion III is written in Ashton-Tate Corp.'s Dbase III. Single- and multiuser versions require an IBM Personal Computer or compatible, a hard disk and a minimum of 640K bytes of random-access memory.

The Multi-User Module costs $695.

Champion Business Systems, P.O. Box 4008, Golden, Colo. 80401. 800-243-2626.

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18110 S.E. 34th Street
Camas, WA 98607

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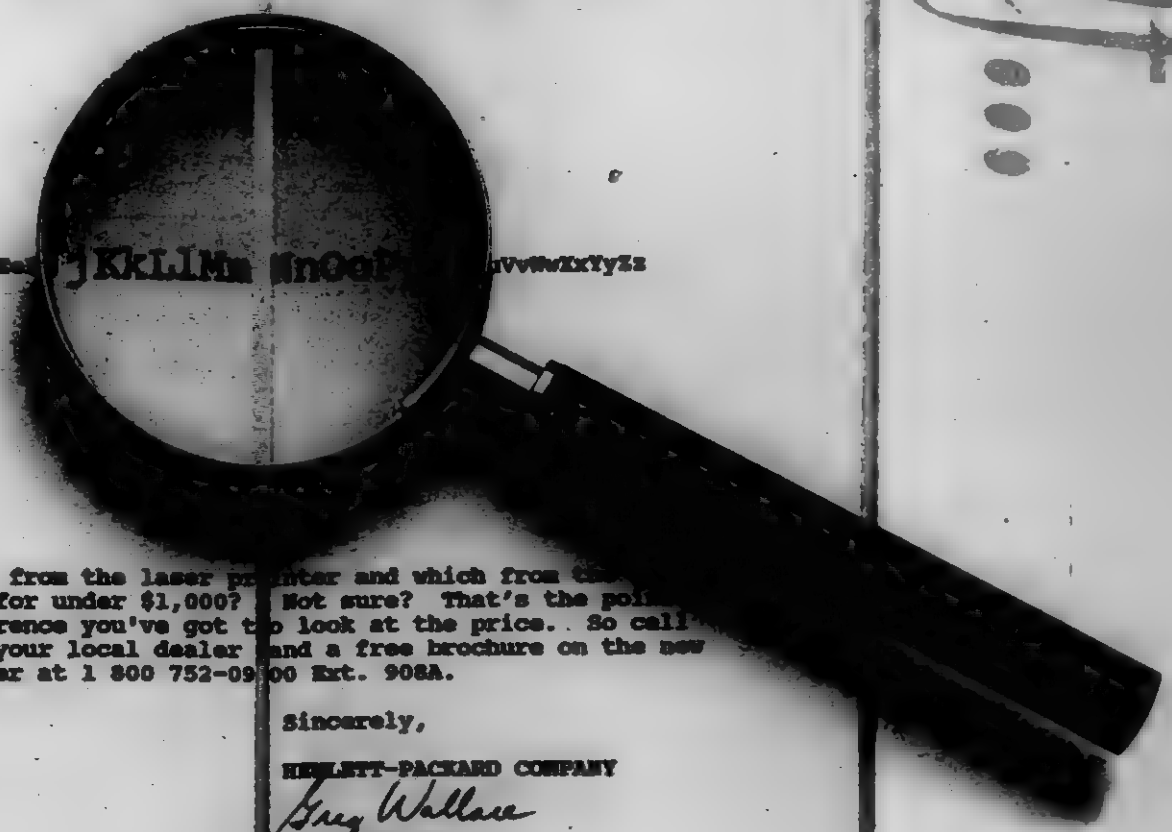

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Greg Wallace
Greg Wallace

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A graphics package for IBM Personal Computers and compatibles has been introduced by Systemetics, Inc.

Visionmicro Graphics is an add-on module for the company's project management software that allows users to design their own network.

The module offers plots of Gantt Bars, X and Y charts and networks and is recommended for use with Hewlett-Packard Co. or Zeta Industrial Co. plotters.

The Visionmicro Graphics System costs $995.

Systemetics, 1561 E. Orangethorpe Ave., Fullerton, Calif. 92631. 714-680-0910.

A sales support software package, The Maximiser, has been introduced by Pinetree Software Canada, Ltd.

Designed for use on IBM and compatible desktop, portable and laptop computers, the product is menu-driven and provides multiple levels of help and overlay windows. Using seven interlinked segments, the package assists sales staffs in lead generation, account development and account management.

The Maximiser costs $495 per package.

Pinetree Software Canada, 9th Floor, 8100 Granville Ave., Richmond, B.C. V6Y 1P3. 800-663-0375.

Software languages

DCM Data Products has announced Mactran Plus Version 3.0, an integrated Fortran development system for the Apple Computer, Inc. Macintosh 512E, Mac Plus, Mac SE and Macintosh II.

The product includes a text editor, a native code compiler with optional in-line code generation and an on-line system debugger. Mactran Plus has optimized code generation, generation of stand-alone applications and double-precision real and complex numbers.

Mactran Plus Version 3.0 costs $399.

DCM Data Products, 1710 Two Tandy Center, Fort Worth, Texas 76102. 817-870-2202.

Data storage

A 5¼-in. write-once read-many (WORM) disk drive for the Apple Computer, Inc. Macintosh series and IBM Personal Computers and compatibles is available from Panasonic Industrial Co.

The LF-5000 WORM drive with small computer systems interface offers removable write-once cartridges with a capability of up to 200M bytes of storage. Data transfer rate is 2.5M bit/sec. from the optical media to the active memory.

The unit reportedly has a media life of 10 years and measures 8¼ in. wide by about 5 in. high by 15¼ in. long.

The LF-5000 costs $2,595.

Panasonic, Two Panasonic Way, Secaucus, N.J. 07094. 201-348-7000.

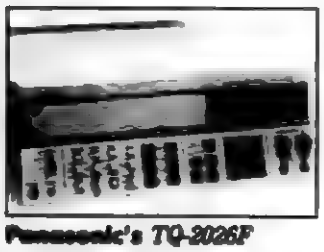
With the announcement of application software for its optical memory disk recorder and disk player, Panasonic Industrial Co. now offers an optical disk turnkey system.

The TQ-2026F Disc Recorder and the TQ-2027F Optical Disc Player, coupled with the visual data base application software, are part of a complete desktop system.

The TQ-2026F, a laser-based optical FM recording and playback system, can record up to 24,000 still picture frames or 13 minutes and 20 seconds of full-motion video on a single videodisk. The TQ-2027F was designed for specialized videodisk applications such as training and education, point-of-purchase sales and computer graphics systems.

The TQ-2026F costs $14,995. The TQ-2027F costs $3,995.

Panasonic, Two Panasonic Way, Secaucus, N.J. 07094. 201-348-7000.



Panasonic's TQ-2026F

Storage Dimensions has introduced a high-capacity disk-drive subsystem available for IBM Personal Computers and PC ATs with standard modified frequency modulation hard-disk controllers.

Called Speedstor AT160, the subsystem has a storage capacity of 159M bytes.

Speedstor AT160 runs with the industry-standard WD1003 series and compatible modified frequency modulation controllers supplied with most Intel Corp. 80286 and 80386 computers, and it supports DOS Versions 2.1 through 3.3.

The Speedstor AT160 Hard Disk Subsystem costs $2,620.

Storage Dimensions, 981 University Ave., Los Gatos, Calif. 95030. 408-395-2688.

The IB40F, a high-capacity hard-disk card, has been announced by Origo International. The IB40F is Intel Corp. 80286 compatible, uses an ST412/506 interface and operates in both eight- and 16-bit slots.

The card has a capacity of 40M bytes and an average access time of 40 msec. Using four disks, it rotates at 3,600 rpm, with six data heads recording on eight surfaces. The disks employ 17 sectors per track on 615 cylinders with a transfer rate of 5M bit/sec.

The IB40F is priced at $769.

Origo International, 20675 Bahama St., Chatsworth, Calif. 91311. 818-340-7552.

Printers/Plotters/Peripherals

A series of dot matrix printers is now available from Alps America.

The Allegro 24 has a 180 by 360 dot/in. resolution, and the 24-pin printer drafts at 180 char./sec.

A nine-pin model, the ASP1000, drafts at 120 char./sec. in 10-pitch mode and offers front-panel controls, according to the vendor. Each has a straight paper path for routing paper directly from the tractor to the print head.

The flatbed printers come bundled with Alpamate, a random-access memory-resident software utility program with pop-up menus.

The Allegro 24 costs $499.

The ASP1000 costs $299.

Alps America, 3553 N. First St., San Jose, Calif. 95134. 408-432-6000.

Microvitec, Inc. has introduced a 19-in. Apple Computer, Inc. Macintosh II compatible monitor.

Auto-Sync, a variable-frequency monitor, offers Macintosh II, Commodore Business Machines, Inc. Amiga and IBM Personal System/2 compatibility.

The product has a 1,024- by 768-pixel resolution interlaced or a 800- by 600-pixel resolution noninterlaced and supports color and enhanced graphics adapter standards. Auto-Sync was designed for desktop publishing, computer-aided design and manufacturing, industrial control systems and presentation graphics environments.

Auto-Sync costs $2,395.

Microvitec, Airport Perimeter Business Center, 1943 Providence Court, College Park, Ga. 30337. 404-991-2246.

A product that transforms Epson America, Inc. dot matrix printers into image scanners has been introduced by Computer Aided Technology, Inc.

Called the Cat Image Scanner, the product has dual scanning modes: a line art mode for technical drawing, logos, cartoons and graphs and a halftone mode for photographs.

The Cat Image Scanner provides 128 gray levels with contrast control, 300 by 261 dot/in. resolution and conversion capabilities for PCX, TIFF and PFF output formats.

The Cat Image Scanner costs $195.00

Computer Aided Technology, Suite 212, 7411 Hines Place, Dallas, Texas 75235. 214-631-6688.

Micro Display Systems, Inc. has extended its Genius product line with the introduction of a 15-in. monochrome display monitor for the IBM Personal System/2 Models 50, 60 and 80.

The Genius MC has a noninterlaced, black-on-white reverse video image with 736- by 1,008-pixel resolution at 100 dot/in.

The monitor incorporates gate array semiconductor technology and is said to provide 50% faster screen drawing than the current controller board for the Genius.

The Genius MC costs $1,995.

Micro Display Systems, 1310 Vermillion St., Hastings, Minn. 55033. 612-437-2233.

GTCO Corp. has introduced the GT Mouse for the IBM Personal Computer, PC XT, AT and compatibles.

The three-button mouse requires no pad or external power supply and has multiple bit per second rate settings to fit all applications. The product comes with a diskette containing both testing and demonstration programs.

The GT Mouse costs $109.

GTCO, 7125 Riverwood Drive, Columbia, Md. 21046. 301-381-6688.

Board-level devices

A graphics board for Apple Computer, Inc.'s Macintosh II has been announced by Rasterops Corp.

The Colorboard 100 comes with National Television System Committee and Phase Alternating Line capabilities, allowing users to output graphic images from a Macintosh II personal computer onto a television or a videocassette tape.

The product has 1,024- by 768-pixel resolution with a pixel frequency of 64 MHz. A 15- or 19-in. monitor may be used for full-page display.

The Colorboard 100 costs $1,495.

Rasterops, 10161 Bubb Road, Cupertino, Calif. 95014. 408-446-4090.

An IBM Micro Channel architecture memory board for Microsoft Corp. MS OS/2 and MS-DOS applications has been announced by Boca Research, Inc. The Bocaram 50/60 board for IBM Personal System/2s offers up to 4M bytes of memory per board and dual in-line package chip technology.

A menu-driven installation program and a diagnostics package are included, and the board comes with a two-year warranty.

The Bocaram 50/60 costs from $645 to $1,695, depending on memory configuration.

Boca Research, 6401 Congress Ave., Boca Raton, Fla. 33487. 305-997-6227.

Imaging Technology, Inc. has introduced a real-time modular image processor for the IBM Personal System/2.

The Series 151 enables users to perform image processing on the IBM Micro Channel bus and comes in a chassis with seven or 12 board slots. The product captures images from both RS-170 and nonstandard video

The Series 151 processor

sensors, including line and area-scan cameras. Capabilities include real-time averaging, subtraction and convolutions.

The base configuration of the Series 151 is $11,495.

Imaging Technology, 600 W. Cummings Park, Woburn, Mass. 01801. 617-938-8444.

Orchid Technology has introduced two multifunction boards for the IBM Personal System/2.

Ramquest Extra provides up to 8M bytes of memory for the PS/2 Models 50, 60 and 80. It offers two serial ports, and the user can install up to four boards, totaling 32M bytes of memory. Designed for word processing and spreadsheet applications, Ramquest II is available with 1M or 2M bytes of memory.

Ramquest Extra with 1M byte of memory costs $1,199. Ramquest II costs $849.

Orchid Technology, 45365 Northport Loop W., Fremont, Calif. 94538. 415-683-0300.

Auxiliary equipment

A power control center for the Macintosh II is available from Kensington Microware, Ltd. Called Master Piece Mac II, the product organizes system power with a continuously powered computer outlet and four peripheral outlets with individual and master switching.

Modem protection is provided through two RJ11 modular phone jacks located on the back of Master Piece Mac II, preventing electrical disturbances on the telephone line from interfering with modem activity.

Master Piece Mac II costs $159.95.

Kensington Microware, 251 Park Ave. S., New York, N.Y. 10010. 800-535-4242.

Every presenter wants to make a compelling, persuasive case. And color, you'll agree, makes all the difference. It's more eye-catching. More readily understood. More memorable. In short, color makes any desktop presentation more effective. And research proves it.

All you need is a Hewlett-Packard ColorPro Plotter like we used here, or the HP PaintJet Color Graphics Printer. Together with a PC—IBM compatible or Apple Macintosh—you can use all the popular graphics software like Lotus Freelance Plus, Cricket Presents, HP's Graphics Gallery (used below), Microsoft Chart and Harvard Graphics.

At under $1,300, the HP ColorPro Plotter may be just where you want to start. It will turn your ideas into colorful, easy-to-grasp visuals. Or, if you need to combine near-letter quality text with color graphics, you can rely on the HP PaintJet Color Graphics Printer for under $1,400. Whichever you choose, you'll create desktop presentations with startling color and greater impact.

For a colorful sample overhead and the name of your nearest dealer, call 1 800 752-0900, Ext. 903A.

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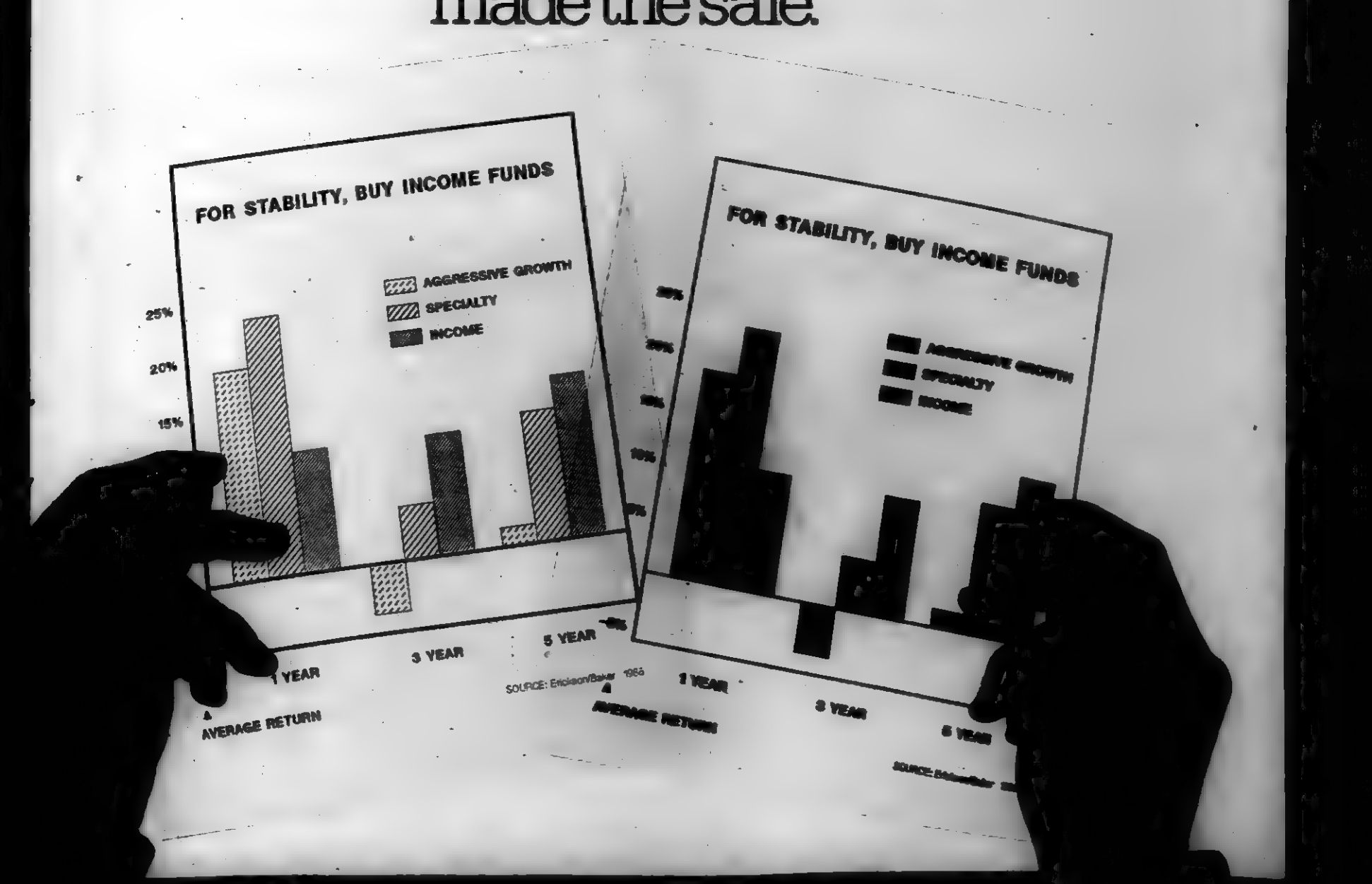
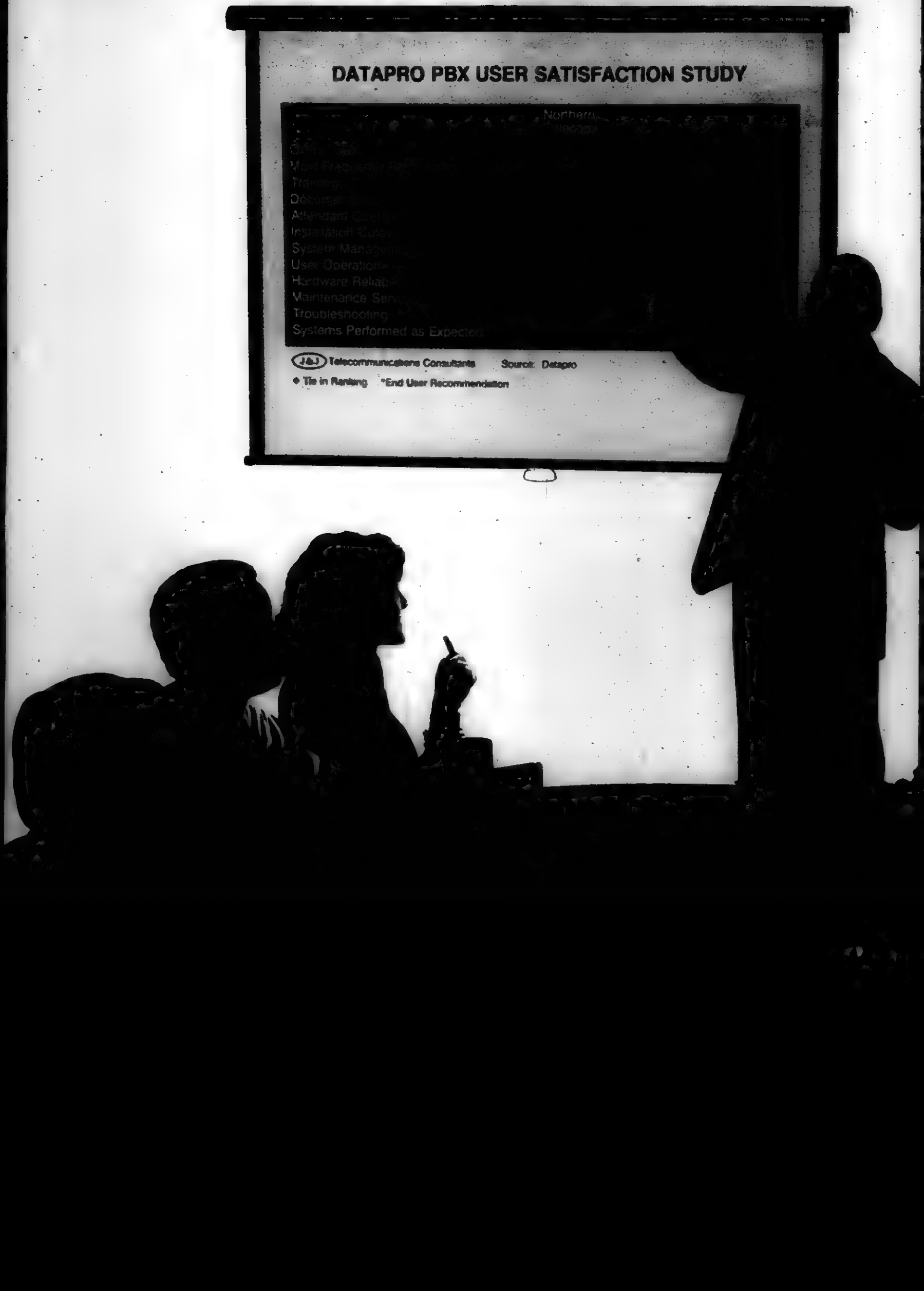
Guess which presentation made the sale.

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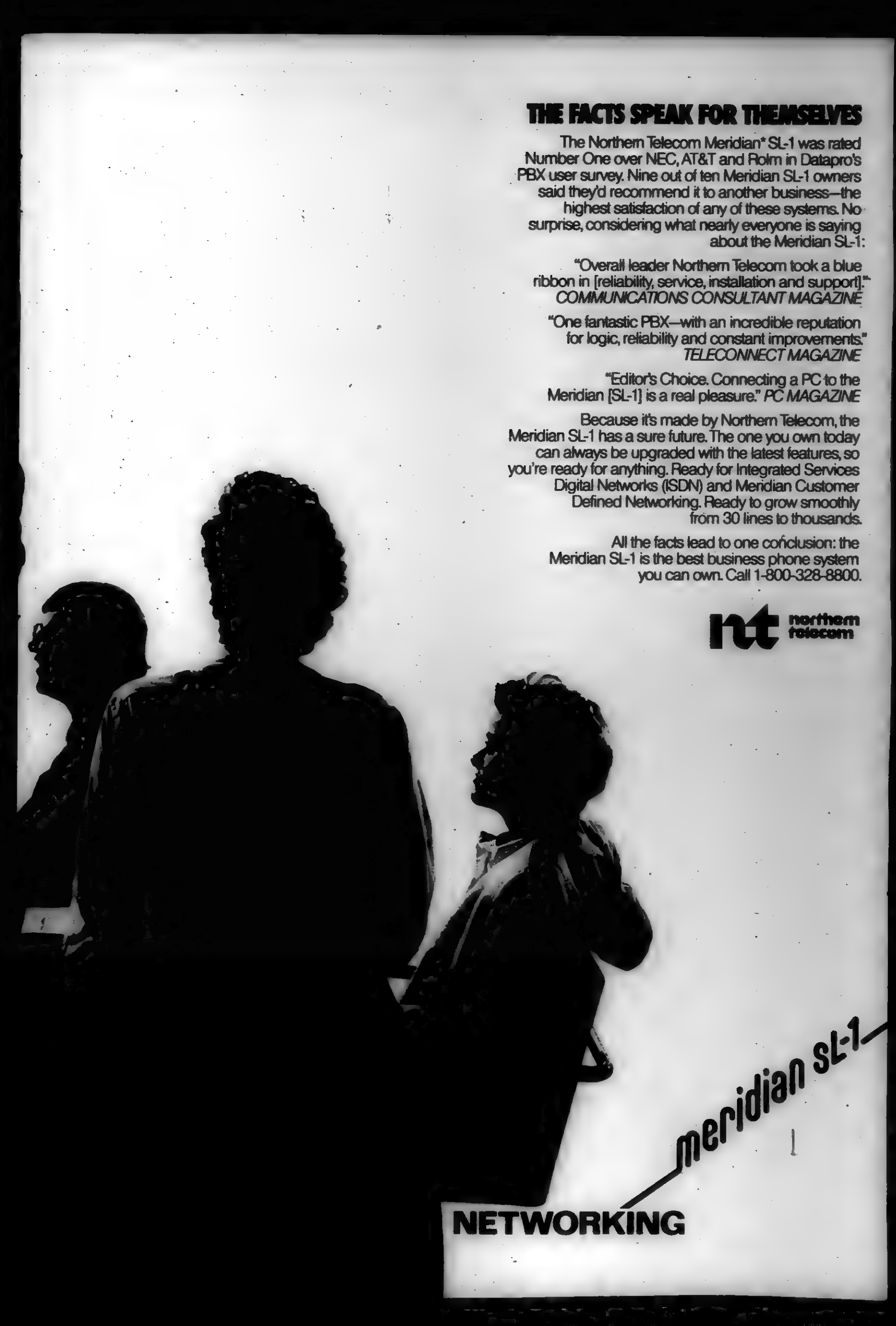

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NETWORKING

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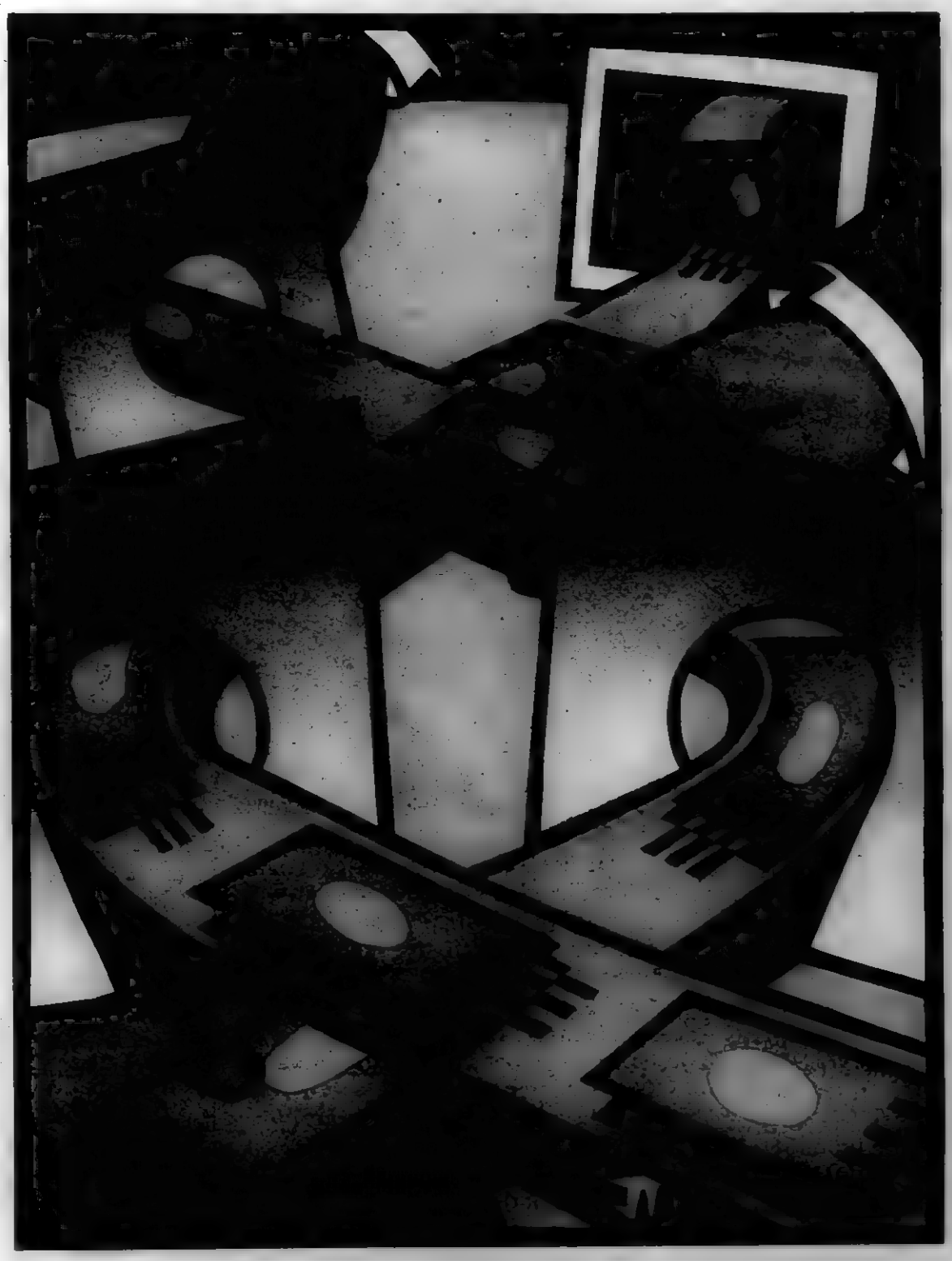
PC PURCHASING

ON THE FAST TRACK TO SMART PC BUYS



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- **MIS roundtable: Keeping pace with a complex market**
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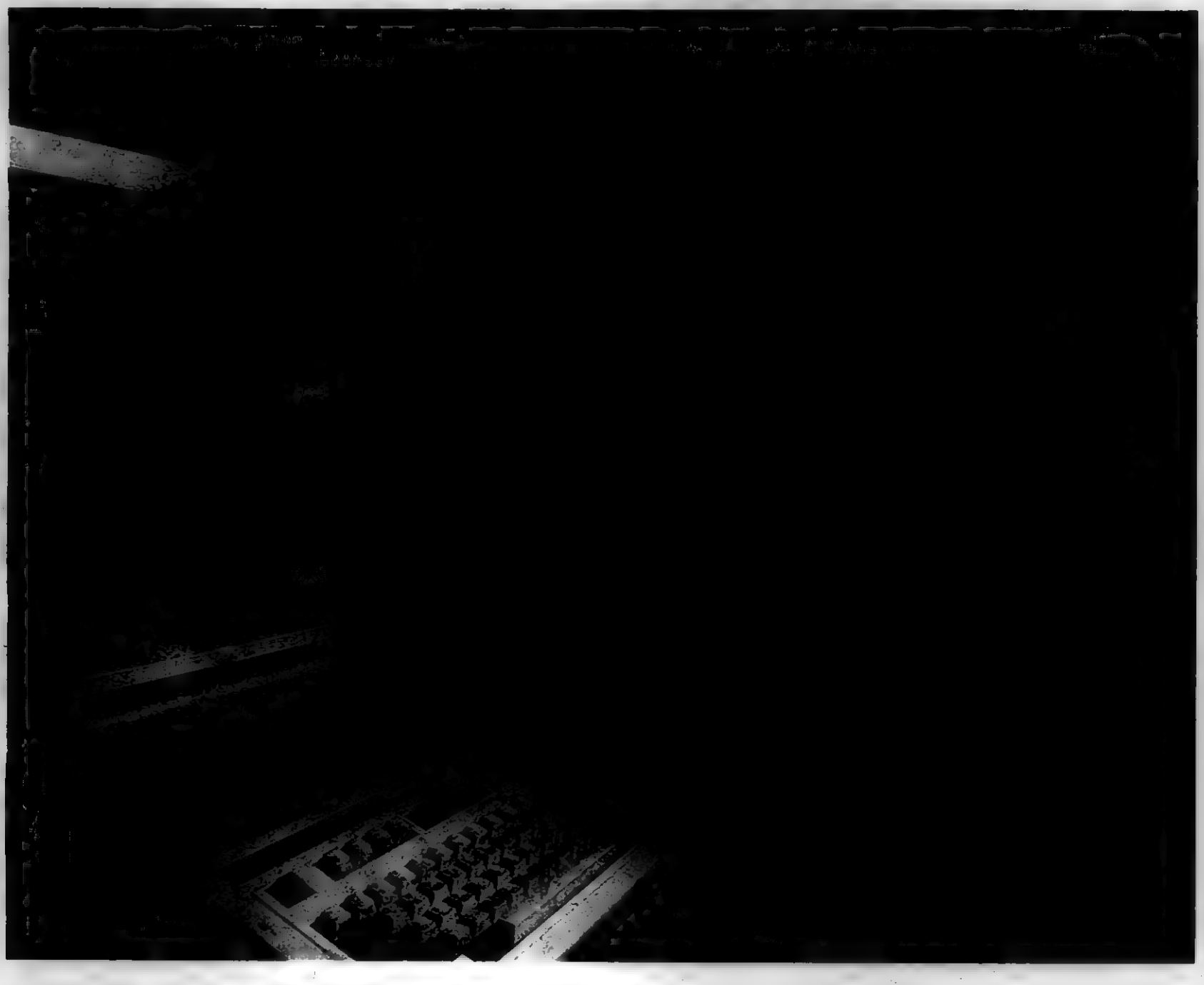

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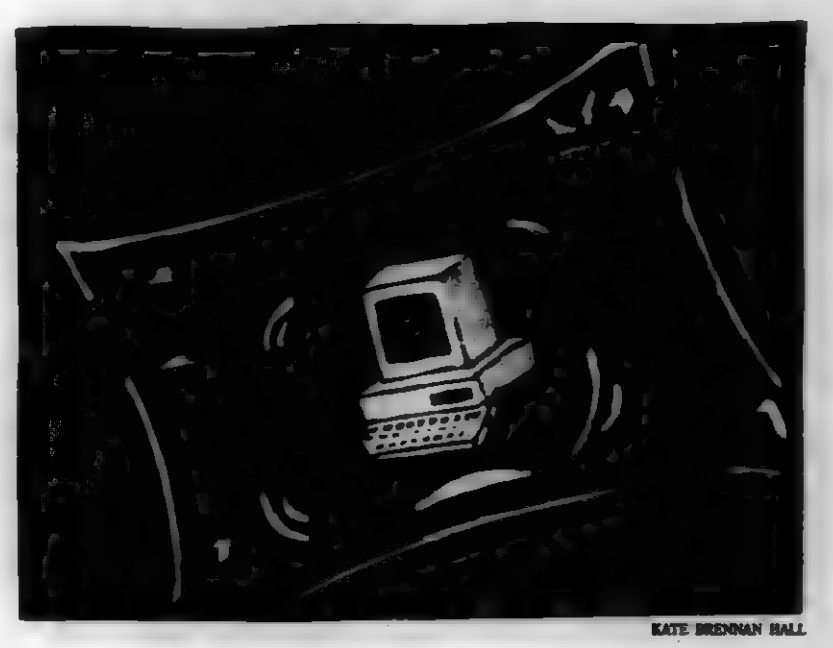
"Avenues for the PC Purchase"
Julia Talcott

LET'S MAKE A DEAL: STRETCHING YOUR PC DOLLAR

BY JAMES A. MARTIN



KATE BRENNAN HALL

When it comes to negotiating a microcomputer hardware purchase, the old axiom "knowledge is power" certainly holds true.

The most effective resource available to a corporation or business for securing a sweetheart deal with a personal computer supplier, users say, is an understanding of the microcomputer market in general and the supplier's competition in particular.

Although pricing is a crucial issue in negotiations, being well versed in a variety of other topics — support, product life span, a supplier's fiscal strength and market share — can often help a company maneuver the best deal on the bottom line.

"You need to know what kind of customer you are to the retailer or manufacturer," advises Kevin Farrell, manager of microcomputing and management services at Firestone Tire & Rubber Co. in Chicago. "Have a sense of the volume you purchased last year, especially if you are a large customer. Refresh their memory as to any problems that may have occurred in previous years."

Be aware that the other party will be prepared to negotiate for its best interests, Farrell adds. "The dealer will try to add value in a way that will reduce your discount, such as offering on-site maintenance or some other creative marketing proposal," he says. "Some of these suggestions might be good, but it's important to remember that, as the customer, you are on the better end of the deal."

Most users agree that competitive price bids from a variety of vendors is the best ammunition for negotiating. But the ultimate goal, they say, should be to use that information to weed out all but the most qualified vendor and then develop a solid relationship with that vendor.

At Continental Illinois National Bank & Trust Co. of Chicago, for example, the micro purchasing philosophy is to send out requests for proposals to every major IBM and Compaq Computer Corp. dealer each year, invite all interested dealers to one meeting and say, "May the best man win."

"We make it clear in a gentleman's agreement that the vendor we pick will get our business for the next year," says Jim Ross, systems officer at the bank. "After some supply shortage problems last year, we will go with two different dealers from now on."

The bank plans to start off ordering evenly between the two and after a couple of months make one company the primary supplier and the other the secondary supplier, basing the

Continued on page SR/4

Martin is a *Computerworld* West Coast correspondent.

Deal

FROM PAGE SR/3

choice on service and price.

Continental believes in maintaining close ties with its PC suppliers. For example, the dealer is networked with Continental's own micro-based electronic-mail system in order to "integrate our purchasing process closely with their operations," Rose says. It's all a part of developing a close relationship between supplier and buyer. "We didn't take the lowest bidders on price, because they didn't offer the same services," he says.

Some companies do not subscribe at all to the method of playing one vendor's bid against another. "We just tell them to give us their best shot," says Tim Hensley, director of information technologies at Clorox Co. in Oakland, Calif.

Hensley says corporate buyers must remember that they are buying not just hardware but the retailer's ability to keep an inventory, deliver in a timely manner, integrate the new systems and test them out. "So if you go into negotiation with price being the main issue," Hensley says, "you are doing yourself a disservice."

Preferred treatment is often a benefit of such a relationship. For example, Clorox asked its retailer for a loan of five different laptops for a one-month evaluation, and the dealer complied.

"It cost them money to give us five laptops for a month, which we ultimately returned to them used," Henley says. "That's worth something to us. And to get that kind of service, it's not worth chiseling them down to the last dime."

Some companies prefer to deal directly — and closely — with one microcomputer manufacturer for product supplies and support rather than rely on a retailer. Before Wells Fargo Bank NA selected Tandy Corp. as its standard microcomputer supplier, officials from the California bank flew to Tandy's home base in Fort Worth, Texas, to interview senior officials and discuss at length the bank's needs and goals.

"We wanted more of a corporate philosophy than a retail philosophy," says Tom Egan, vice-president of the commercial banking group office systems.

"This way, we are kept up-to-date on Tandy's plans under non-disclosure," he explains, "and we can truly hold one party, the manufacturer, accountable for uptimes as well as downtimes."

The firm's commercial banking group eventually contracted for about 600 Tandy 3000 HLs, the Intel Corp. 80286-based model.

For Wells Fargo, support — not deep discounting — was the issue in negotiations. While Tandy offered volume discounts on its products, it could have purchased micros at greater price cuts from other vendors or retailers. The up-front costs, however, are often only a fraction of the long-term costs, Egan says.

Because the bank's microcomputers are dispersed throughout California at 24 regional operating centers, maintaining equipment through one central facility did not seem feasible. Thus, support became a major negotiating point between Wells Fargo and Tandy.

In acquiring microcomputer hardware, the PC buyer can choose between four separate distribution channels: retailers, such as Computerland Corp. or Businessland, Inc.; direct purchases from the manufacturer or a direct sales company; mail-order houses, such as 800 Software or 47th Street Photo; or value-added resellers (VAR).

In general, corporate America prefers retailers as its primary channel, according to recent studies. A February Computer Intelligence survey shows that among Fortune 1,000 companies, 43% acquire equipment through retailers, 28% from the manufacturer, 21% from VARs and mail-order and 8% from in-house company stores.

A recent International Data Corp. questionnaire asked PC executives to rate, on a scale of 1 to 4, the distribution channels preferred, with 4 being the highest. Retailers rated 3, with manufacturers following at 2 and mail-order and VARs vying for third place.

Know your retailer

When negotiating with retailers, users say the best way to get a good deal is to know what the competition is charging, decide exactly how much support will be needed and buy in volume if possible. Maintenance and support can usually be bundled into a hardware purchase.

In addition, they advise taking a hard look at the retailer's maintenance staff if support is part of the package. "Look at a retailer's support staff as people who will need to know your business and make sure they can add value," Wells Fargo's Egan says.

The retailer can offer numerous benefits: attractive discounts, fairly fast product delivery and the ability to mix-and-match systems for a customer. An IBM sales agent, for example, is not likely to preinstall an AST Research, Inc. memory board on a Personal System/2 or provide a Hewlett-Packard Co. Laserjet Series II printer.

Retailers also offer maintenance, training and support — attractive options for corporations with overworked support staffs. But the pitfalls of dealing with retailers can be plentiful.

"Many of the retail stores hire inexperienced people to work on computers as a way of saving money, and those workers can do more harm than good," says Kevin Green, business administrator at Purdue University in West Lafayette, Ill. "Often the store will call us to ask how to solve a problem," he says, "and I think that's frightening."

Some corporations consider it a drawback for a retailer to sell a variety of products. "A retailer is deluged with the number of items they sell, and with all the changes that occur in technology, they have to try and equate all that with our business needs," Egan says.

Some see the retailer as an unnecessary third party that cannot offer the discounts, technical support and understanding of a particular business like a manufacturer can.

'Deep-pocket support'

"By dealing directly with the people who manufacture a product, you're more likely to get the deep-pocket support you need," Firestone's Farrell says.

"When you have a tough nut to crack, the retailer just has to turn around and go to the manufacturer," he continues. "That adds an extra delay, and it introduces an additional filter through which information about the problem can get confused in either direction."

Those who prefer to deal directly with the manufacturer say that, while the 25%, 30% or higher discounts offered for volume shipments are a bonus, the real benefit is being kept informed of the company's plans and having some input in future technology directions.

"We want to know what upgrades, enhancements or new products are coming from the manufacturer so we can plan accordingly," Egan says.

Again, to get the best deal, buy in volume whenever possible, keep abreast of what the competition is offering and, above all, assert your position clearly. Sherry Ryan, director of end-user computing at Levi Strauss, Inc. in San Francisco, says she insists on extremely aggressive discounts on any volume PC purchase. Stating a strong position like that up front weeds out the uncommitted dealers, she points out.

Depending on a company's needs, it might be wise to negotiate a maintenance contract in which a fee is charged only when actual repairs are needed.

"I negotiated with Tandy a predetermined fixed rate on how much it will cost to repair a PC,"

Continued on page SR/8

The price of negotiation

Negotiating hardware and software contracts at the same time is not as common as one might suspect.

"We do enough volume that it makes sense to negotiate the big picture rather than just the pieces," says Kevin Farrell, manager of microcomputing and management services at Firestone Tire & Rubber Co. in Chicago.

In most cases, however, a company goes directly to the software vendor for volume purchases or to a retailer or a reputable mail-order house for discounts and quick turnaround, independent of hardware acquisitions.

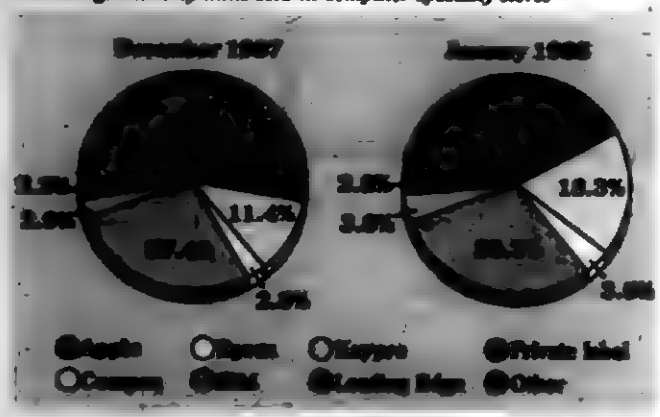
"If we needed 500 copies of Lotus 1-2-3, we would go ahead and get a site license," says Rick Pemberton, senior design analyst for Covia Corp., a travel industry services provider and division of United Airlines. "But if we just needed four or five copies of something, then we'd call Computerland."

Negotiating follow-up support and maintenance with the hardware is far more important than bundling software, users add, because software is more easily supported by a firm's own staff or by the manufacturer, via hot lines.

JAMES A. MARTIN

Total microcomputer market share by manufacturer

Percentage share by units sold in computer specialty stores



INFORMATION PROVIDED BY STOREBOARD, INC.
CW CHART

Top 10 microcomputers

Reflected by shipments to computer specialty stores, July 1987 to December 1987

IBM Personal System/2 Model 30	11.8
Apple Macintosh SE	8.2
Apple IIGS	8.1
PS/2 Model 50	6.6
Leading Edge Model D	4.7
PS/2 Model 60	4.7
PS/2 Model 25	4.7
Compaq Deskpro 286	4.7
IBM PC AT	4.6
Apple IIC	4.1

Macintosh SE	10.6
PS/2 Model 60	9.2
PS/2 Model 30	9.2
PS/2 Model 50	8.8
PC AT	7.7
Compaq Portable II	6.4
Deskpro 286	5.7
Deskpro 386	4.7
Apple IIGS	3.1
PS/2 Model 80	2.9

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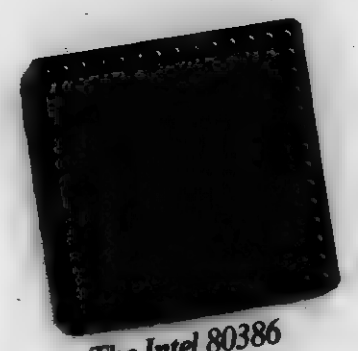
This chip is too smart to be in a personal computer.



The Intel 80386 microprocessor

Introducing the corporate 386.

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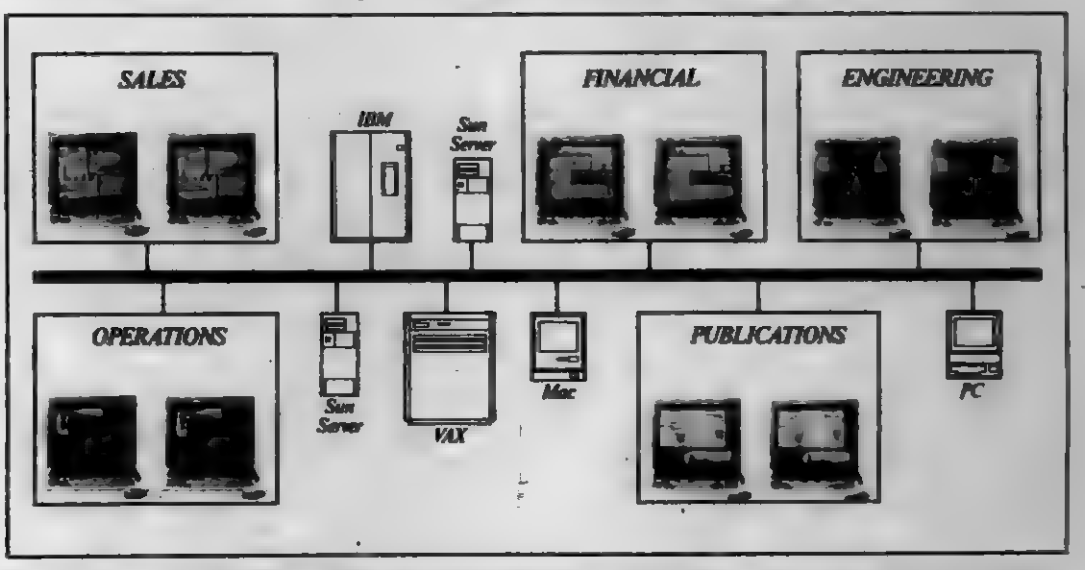
The 386-based personal computers offer the individual raw power.

But, in most corporations, the real work is done by many people, all trying to work together. Computers should aid this process, by giving individuals the personal power they need, and by helping groups of people work together productively.

Different groups need to share and work with the same information, even though they may be using different computers, or their data is kept on remote mainframes.



In real-world corporate applications, PC users need access to a large variety of computing resources. So the Sun386i runs Sun's open distributed computing environment, built around the UNIX® operating system. Which lets it become part of a powerful open network that can include every computer in your company.

Personal 386s fall short of meeting these needs. Because they use underpowered and primitive operating systems.

So they can't handle the really demanding applications. And they only talk to themselves, with some difficulty, rather than to all of your computers.

That's why we're introducing the corporate 386. The Sun386*i*™ workstation. It has the same high-performance Intel® 80386 chip as the PCs.

But not their personal limitations.

Because it runs Sun's open, distributed computing environment, built around the UNIX® operating system.

So, you have transparent access to every computer in your company. No matter which vendor's name is on the box.

Unlike the PCs, the Sun386*i* lets you take full advantage of the thousands of powerful applications designed around the UNIX operating system. But it also lets you run all of the PC DOS applications that millions of users have developed so much expertise in.

And with its 5-MIPS power, UNIX and DOS applications can run simultaneously and at full speed.

But with all this power and sophistication, isn't a Sun386*i* harder to use than a PC?

Not at all. In fact, it's easier.

Because we've given it a friendly, icon-oriented user interface with an integrated help facility. And a file organizer, to easily find, open, and keep track of files all over the network.

There's even an automated network administrator, that lets you personally install the Sun386*i* in minutes. Instead of hours.

So look to Sun for total networking solutions that help pull a company together.

If you'd like to know more, call 1-800-223-6736. In CA 1-800-322-6736. And we'll show you the difference between a personal machine.

And the right corporate choice.

sun microsystems

The Network *Is* The Computer™

Deal

FROM PAGE SR/4

Egan says, "and then I pay that rate when I have to, instead of signing a blanket contract and paying for service before I even need it."

An alternative to buying directly from the manufacturer is to deal with a direct sales vendor. Companies such as Corporate Software, Inc. in Canton, Mass., hire trained salesmen to deal directly with the corporate buyer. The companies offer more in-depth support than mail-order firms do, and they give buyers access to technical specialists trained in various application or hardware areas.

Purdue University's Green

Meanwhile, mail-order houses are gaining popularity as a distribution channel, although their reputation as quick-buck Charlies who might not be around after the sale still lingers in the minds of some users.

"Our purchasing department has certain requirements for a company, and they don't like dealing with anyone that might not be fiscally sound," says Rick Pemberton, senior design analyst at Covia Corp.

Others often call on mail-order companies for quick turnaround and good prices.

"We can't afford to stock any inventory, so we rely on mail-order firms to give us cheap prices and instantaneous delivery," Purdue's Green says. "Their technical service phone lines have been helpful, and if they can't solve a problem right away, they get back to us quickly with an answer."

Buying mail-order software is becoming more common among large firms, especially when only a few copies are needed.

"If we need something quick, we call up someone like 800 Software," Clorox's Hensley says. "Their prices are pretty close to Computerland's or Businessland's, they have a large inventory, and we don't need to worry about support — our users can get that through the software manufacturer directly or through our own Help line."

Because most mail-order houses already offer substantial discounts, price is less negotiable than with retailers and manufacturers.

VARs are not a major route for procuring new equipment, large PC buyers say. Many of the top U.S. companies now piece together their own microcomputer turnkey packages through in-house end-user computing services groups, which essentially perform the same services as a VAR.

But VARs are used by large corporations for specialized or vertical-market applications.

"In one case, we needed a complex airplane maintenance system for our small-aircraft division, so we went to a VAR for a specialized system and integrated software package," says Barbara Myers, director of finance and administration for MIS at Champion International, Inc. in Hamilton, Ohio.

Alternate routes

For most organizations, the best way to purchase microcomputers is to take several roads. Purdue University, for example, routinely purchases name-brand micros in bulk directly from the manufacturer at discounts of 40% to 45%, according to Green.

But when it comes to bringing an inexperienced user on-line with a new PC, he adds, a retailer that offers "hand-holding" services is the most appropriate channel, and the discounts are still strong — 30% to 35%.

One final option some corporations prefer is to skip all four purchasing channels and lease instead.

"In these times of rapidly changing technology, leasing is the best position to be in," says Terry Flanagan, hardware and software administrator at Airborne Express in Seattle. "That way, we're not stuck with trying to sell obsolete equipment. And the lease price vs. the purchase price runs about $150 per machine less over a three-year period." ●

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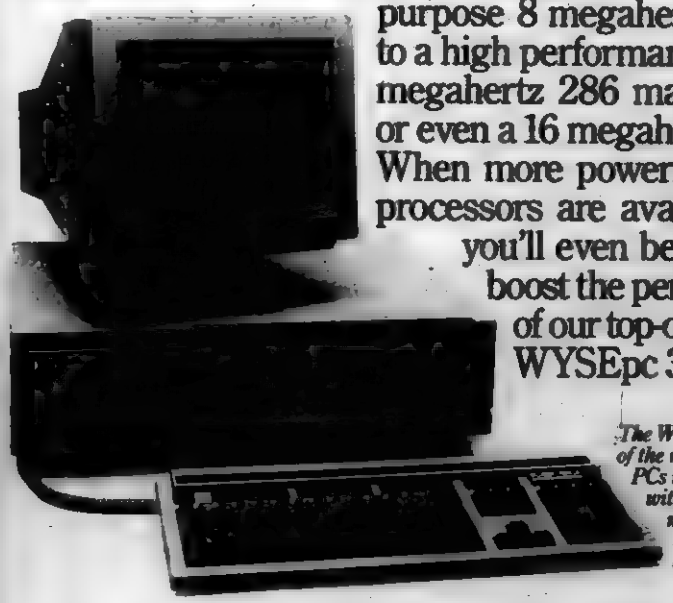
It's so simple: a building block approach that makes upgrading our new computers a snap. Literally. It's the PC design for the '80s. *And* the '90s. Because it protects your PC investment against obsolescence. Wyse calls it Modular Systems Architecture.™

We've incorporated all computing functions—including the heart of the computer, the CPU and its microprocessor—on plug-in boards. So as your computing needs grow, you can upgrade our general purpose 8 megahertz model to a high performance 12.5 megahertz 286 machine—or even a 16 megahertz 386. When more powerful microprocessors are available, you'll even be able to boost the performance of our top-of-the-line WYSEpc 386.



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ROUNDTABLE

P. CHARLES LADOUCEUR

THREE MEN AND A MICROCOMPUTER PURCHASING DECISION

MIS professionals are well known for spending millions on big iron. But these same people often spend more money on the microcomputer.

In fact, a new breed of MIS is keeping pace with the intricacies of buying hundreds or thousands of personal computers and related equipment. Not only are today's MIS professionals skillful in managing a staff, but they are well versed in hammering out a deal. No matter how many bargains you may have struck, there are always a couple of more points to be taken off a price and a few more elements that can be tossed in.

To get to the bottom of the PC buying process, *Computerworld* Editor in Chief Bill Laberis and Senior Editor Douglas Barney recently spoke with three MIS pros from three distinctly different organizations. Read on to find out how these gentlemen choose products and get the most bang for the corporate buck.

How are PC purchases handled in your organizations?

Cavanagh: I'm sure that some micros are bought at lunches and dinners [at Met Life], but most PCs are bought through my organization. We don't second-guess the people who want to purchase a PC; rather, we just facilitate the ordering.

That is, unless it's a very large program. When you get into the negotiation side with a vendor, you want to come from a position of strength. I know how many PCs we will be ordering, what they will look like and what the delivery schedules are going to be, so we can go out and negotiate.

We also have standards and recommendations as to what PCs users are going to buy. If it is OS/2, we recommend not touching anything below an IBM [Personal System/2] Model 60 because of the limitations of storage. We also know the Model 50 is not upgradable, so people should be aware of those things.

Faistl: We bring in PCs one by one, not dozens at a time. And I have been able to negotiate deals as high as 30% and make no commitments at all. But I'd much rather give up a couple of percentage points on price to find a dealer who has his act together on the integration issue.

Does the user decide the model and style of PC to be purchased or does someone in MIS?

Cavanagh: We'll make the recommendation. We have an information center store with a whole variety of PCs. Understand, there are two different cases. One is a program in which you are going to be installing, say, 1,000 or 2,000 PCs, and there, there is a very careful selection.

But if someone is, say, an investment analyst and wants a PC, often he has no idea which one he wants. Then we recommend that he go to the store, go to the information center and try out their applications. What [the user] thinks is a good application for a PC might not be. They might need a VM system, so we also have terminals connected to the mainframe.

Perera: At Ryder, we are responsible for any orders that are computer related. It must carry our signature or it won't be paid. Individuals who used to go around the system can't do that anymore. We have also created a bible that says, "Here are the standard products that we will support."

A user said to me one day, "When we buy through you, it's like when you used to buy from IBM 10 years ago. How can anyone blame you for making the wrong decision?"

How does your approach to buying PC equipment today differ from, say, three years ago?

Faistl: Three years ago, we put out a worldwide guideline that said you can buy any kind

of machine you want. But if you buy an IBM PC and use products like Lotus, Multimate and Dbase II, you will be supported out of our information centers in the U.S. and Europe. We didn't want to tell them no but wanted to influence their decision to stay in the fold, and that worked very well.

Cavanagh: We did the same things. The guy in charge of the information center invented a motto: Whenever someone would say, "Well, my friend in college said this is really good, and it's my money, so order it," he would say, "Fine, we'll put our stamp on it, and if it breaks, you own both halves."

Faistl: The hardest job you have is when a user has made up his mind about what he wants, and you have to tell him that it doesn't fit into your strategy or doesn't tie into your LAN. Now you have to defuse this user, and sometimes you can't do it.

So you need centralized planning because of moving away from stand-alone systems?

Faistl: Yes. At International Flavors, we have a workstation strategy that states that users will get an IBM 3270-type terminal or an IBM PC of some ilk. A PC to us is just an intelligent workstation.

We used to say to the users, "You need an IBM PC for the future," and that user would say, "Well, that will cost an extra $1,500, and I am never going to have to connect to anybody else." You had a tough sell at that stage of the game and had to use some political leverage.

Now the discounts you can negotiate are going up, and the prices are coming down. When I joined in 1983, we were getting a discount of 12% from a computer store. The second day I was there, I called the sales rep, introduced myself and told him that if he didn't up the discount, he was going to lose the business. Right before my eyes, he upped it about four points.

Each of your organizations uses "short lists" to govern PC purchases. Just how were they established?

Perera: I have an advanced technology supervisor whose purpose in life is to stay ahead of us by a year or two. This individual also calls on the information center and says, "What are your users needing; what should we do?" They work with vendors, bring equipment and software in and prototype.

At the advanced technology center, we bring in users and say, "Here is a box. Is it a usable product?" After it has been accepted as a box that we can use, we test it for integration, communications issues and all the rest. Then the information center and the advanced technology people meet and talk about problems, support and limiting issues.

We may have three to four boxes that do the same thing, but we have a criteria chart, which includes support, cost and so on. When a new model comes out that is better, we replace the older technology. We have things in that bible such as "Let's not order Model 25s and 30s; let's go with the 60 or 80s," or we may put in a little note like "A 70 is coming." It serves as a catalog.

How critical is it for the advanced technology folks to be in touch with users?

Perera: Very, but they also have to be closely involved with the manufacturer. They get [a lot of information under nondisclosure agreements].

Cavanagh: We put out an RFI [request for information], which says, "This is the problem we are trying to solve; here is the use; what do you want to propose?" The vendors will generally propose their advanced technology, not what is on the shelf now.

We ask them just how they are going to do the whole job: how they're going to package them, box them, burn them in, deliver them and maintain them. We ask, "If we screen some [support] calls, will you reduce your maintenance price?"

Faistl: We have two information center specialists and an information center manager who do everything. They evaluate new products. We also capitalize on evaluations of companies like Ryder and Met Life. We might evaluate a laptop by having the information center manager take it for a couple of weeks. We also have some key users who function as information center consultants. .

We know what you look for in a PC purchase. Now how do you select a channel of distribution?

Cavanagh: For special corporate programs — such as our laptop program, which has a potential for 6,000 units — we go through an RFI process.

What if the company does not sell direct?

Cavanagh: Most of the companies we deal with would be systems integrators. The company we are dealing with on the laptop project is Honeywell. When companies like that bid, it might not be their own product, but they will take care of the packaging, delivery and maintenance, which is really what you are after.

Usually on those large programs we will go directly to the major vendors, [like DG, Wang, Honeywell and IBM]. We also tend to run our own help desks. Users can't call the vendor directly, and we can negotiate a lower maintenance contract. You eliminate the "no trouble found" calls.

Perera: Do you do Level 2 support?

Cavanagh: Sometimes we send people out who fix the box. We also have the [problems of the] onesies and twosies, and for those we go through Businessland. We are in the financial services business, not the computer business. If Businessland can do it, let them.

Is there a cutoff point above which you deal directly with the vendor?

Cavanagh: If users want 10 PCs, we go to Businessland. If we want 50 or 100, this involves putting a special bid together.

For software, we will say to our dealers, "Hey, we are going to have 1,000 copies. What kind of an arrangement can you make?" We will become the first-level support for software, given that some of [the users'] pricing funds our help desk. We tell the users, "We are saving you money; you save us money, and we will both come out winning."

Do you ever use mail order?

Cavanagh: No. I guess it [the problem] is the reliability. We are in the financial services business, and we want to be good at supporting that business. If the mail order is going to save us $100, it isn't worth it. It's not worth all the stuff you have to do to make sure our internal customer is happy.

Perera: It is difficult to deal with an invisible vendor, and typically [mail-order transactions] are not reliable. There is not a great deal of credibility in what they can provide you. I don't believe you save any dollars after adding all the special handling and all the other activity that you have negotiated. Also, they have a bad reputation.

Faistl: I remember a discussion with someone from 47th Street Photo. We met, and he proceeded to put the catalog on the table, and quizzed me about the possibility of doing business in the future. I told him I thought they would sell anything for a price. He said, "Yeah, absolutely right, we would."

I said, "You call somebody on your hot line, and you would be lucky to get the guy who knows PCs that day. You might get the guy that knows the Nikons."

Do you deal directly with the vendor on software purchases?

Cavanagh: It depends on the size of the order. If you're going to buy an accounting package to run at 1,000 sites, you should deal direct with the manufacturer.

Perera: That is how we do it.

You're all IBM mainframe shops. What's it been like dealing with IBM vis-a-vis PC purchases?

Perera: I think it was true a few years ago [that IBM was not interested in PCs]. But

Continued on page SR/14

The participants

Daniel Cavanagh

Senior Vice-President
Electronic Installations
METROPOLITAN LIFE INSURANCE CO.

Metropolitan's Dan Cavanagh speaks softly but buys a lot of PCs — 4,000 so far. As vice-president of MIS at the insurance giant, Cavanagh must make sure no mistakes are made when choosing PC-based systems. But with 20 years of experience, he is not likely to be hornswoggled.

Cavanagh's low-key appearance does little to hide the fact that he's a shrewd negotiator who covers all the bases when cutting a deal. If you sell to him, you better package, deliver, install and service those PCs. Do it right, and you may sell thousands of PCs or PC packages. Do it wrong, and someone else will get the business.

One of Cavanagh's most interesting projects involved equipping Metropolitan's field sales agents with laptop computers and software. As a result of his and his cohorts' work at Metropolitan, the sales force walks proudly with Zenith Data Systems laptops that are delivered, serviced and supported by Honeywell-Bull, Inc.

George Perera

Management Information Systems
Director of Operations, Technology & Administration
RYDER TRUCK RENTAL, INC.

When Ryder Truck needs to shift its computing gears, it looks to the man behind the wheel, George Perera. The Cuban-born director of operations and administration steers his company's personal computer purchasing and standard-setting decisions with a firm hand, making sure that microcomputers also fit into the big iron picture.

For Perera, absolute compatibility with the communications boards and software of today and tomorrow is not a goal but a mandate. As a result, most of Perera's PCs are from IBM, the same firm that sold him a 3090 mainframe and more than 100 System/36 minicomputers.

Perera is an absolute believer in knowing where the company's PCs are and establishing a relationship with computer retailers that will go out of the way to service a client. He is also a believer in PCs, having helped father the firm's PC population explosion from eight in 1982 to more than 1,000 today.

Donald Faistl

Manager
Information Resource Planning
INTERNATIONAL FLAVORS & FRAGRANCES, INC.

Creating aromas used to be the job of a craftsman, who would gracefully mix ingredients until the perfect odor emerged. At International Flavors these same craftsmen do much the same work. The only difference is that much of the mixing is done by robot arms controlled by workstations.

Microcomputers do more than make things smell and taste good at International Flavors. They also do the jobs that nearly every business requires, like creating documents, managing numbers and keeping a handle on data.

As manager of information planning, Don Faistl's job is to make sure these microcomputers are the right ones for the job, that they talk effectively to the host computers and that they get fixed when they break. But he also makes sure these machines are bought at the right price. Under his regime, typical microcomputer discounts have been upped from 12% in 1983 to some 30% today, leaving Faistl smelling like a rose.

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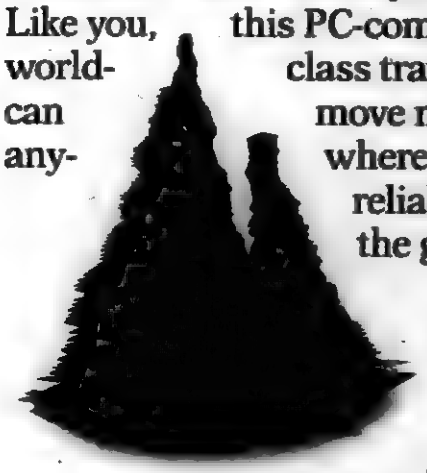
To make it in business, you've always had to go the distance.

But taking the office with you is something new. You can handle all this added responsibility, however, with complete confidence. If your data is safe within the world's first portable, fast-access Winchester: the Personal Data Pac. Only from Tandon.



Like you, this PC-compatible drive is a world-class traveller. With it, you can move mountains of data anywhere, with complete reliability. Even when the going gets rough.

The secret to the Personal Data Pac's portability is a unique head locking and shock absorption system, which suspends the drive in a metal casing, housed in a rugged ABS case.

So it's ready for just about anything. The red-eye to Rangoon. A trip through the mail. Even an unintended fall off your desk. It will keep on working.

And wherever the Personal Data Pac goes, it gets along splendidly. With a single, low-cost receptacle, the Tandon Ad-PAC, you can up-grade your current PC system.

Just plug it in and you are set to share an entire library of software.

Better yet, you no longer need dedicated workstations for everyone in the office and you are no longer restricted by your computer's hard disk. You'll have an unlimited capacity for hard work.

And there's one more thing you can do with the Personal Data Pac that you can't do with other hard disks. Simply lock it away. Where only you can get at it.

The Tandon Personal Data Pac. Perfectly secure. Completely reliable. And totally portable. However you look at it, it's a definition for personal freedom. And peace of mind.

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Tandon

We're redefining personal computing.

Three men

FROM PAGE SR/11

with the new commission policy, whereby the IBM branch office gets credit for the PCs placed in an organization regardless of where you get them from, that has changed that picture.

Feistl: But if the IBM marketing rep is going to get a commission whether I buy from him or not, what is his incentive to help me out?

Perera: That is a different story. I personally do get a lot of help from IBM, but I use a retailer in Miami. I bring the retailer into my organization for two reasons.

No. 1 is they provide two individuals on-site at all times to prepare the boxes. We ship everything into the Miami organization, prepare the boxes and ship them out. They also do the training.

The second reason is that I negotiate very large discounts, but to them I am the customer No. 1. When I call, 300 people get on the line. That is not the case with IBM.

The issue is not how much they know about VTAM, but how much do they know about your environment and business applications.

On a scale of 1 to 5, with 5 being very aggressive, how would you rate IBM's aggressiveness in this second year of the Year of the Customer?

Feistl: They are much more aggressive than they were three years ago. But they are still close to the zero mark, which means they were minus five before that. The problem is that they are lazy.

First, there is not a big margin that they make on a PC, so there is not much incentive for the salespeople to push PCs. The salespeople still haven't recognized the PC as part of a bigger picture. They don't realize that an increase in PCs eventually has an impact on your mainframe potentially needing another upgrade.

It would be nice for them to not only be aggressive, but also aggressive from the support standpoint.

Cavanagh: I think they are more aggressive. They realize that when you start dealing with other vendors, or other accounts with PCs, why would you stop with PCs? It is account control: They realize PCs are a key part.

Right now, from a timing standpoint, the OS/2 software is not there. They can't go out and say they've got something that no one else has.

Feistl: It has been typical of IBM to try to intimidate the customer into waiting. They have done it on the mainframe side; they have done it on DASD. What happens if you have the IBM guy say, "Hey, if you buy that equipment over there, is it going to be OS/2 compatible? What if you want to download the Nynex yellow pages? You need a faster chip."

A lot of it is so much hype. If you have somebody who is not knowledgeable about what the requirement is from the standpoint of the business, you can get snowed and become paralyzed.

How do you avoid that?

Feistl: Just because somebody tells you something, you can't assume it's genuinely true.

Perera: You also have to try it in your business.

It seems like the software vendors have jumped into this game.

Perera: We in information systems management have a responsibility to educate our users. I think we have to establish orientation programs that say, "What you read in the magazine on the airline is just advertising. Here is the truth behind it."

Users are becoming a lot more intelligent when it comes to the computer world. You have to act as a mentor so they understand the meaning of the recommendations made by IBM.

Feistl: You see companies coming out with announcements of products that will be delivered three years later. That just adds confusion to the situation. We have to diffuse that confusion. People have been talking about OS/2 for how long? It is like two people sitting on the bed talking about sex, but when it is ready to go, you want to get up and leave.

From your experience, how can companies negotiate the best deal in PC equipment today?

Perera: The key is to deal with more than one supplier. Play one against the other. Select the top ones for your organization based on your needs. Then play one against the other, including a third one: the manufacturer. But you know right away that the manufacturer's price won't likely be the best price.

Feistl: Yeah, play one against the other, then sign deals with both of them. Negotiate as best as you can and then do business with both of them at the same time. I've done that just to try to find out what was fact and what was fiction. That's saying, "Look, we'll give you a shot at it, but recognize that I've got my eyes on you and I'm going to see how you perform."

Hang a carrot out in front of them. We take a six-month worldwide inventory of PCs and word processing equipment. Then we track growth by geographic area, and I have this all charted. You find that everyone wants to know how many PCs you're going to buy this year, how many you're going to use. And I say, "Beats the hell out of me, but what I can tell you is the growth here over a period of 13 or 14 months," and I say, "I have no reason to believe this isn't going to continue."

Cavanagh: Do comparison shopping. Don't be afraid to ask questions. Also, be precise: We try to know exactly what we want; let the vendor know exactly what we'll do and put it on the table. We'll take it from here to there and don't charge us for any of these items.

Perera: Another thing you can do is to say to the vendor, "We are very large in the [market] area we are in, and we'll serve as your showplace." I've said to the vendor that you can bring in customers and potential customers, and you can use me as a reference. That will give you percentage points [off].

Feistl: Above all, you have to know what your objective is, and you also have to know the objective of the guy walking in the door. If he's there to sell to you and to get his foot in the door for the first time, he's going to be a lot hungrier than someone else. You have to be an educated consumer. If you're not, you're not going to get the best deal. Three or four years ago, my focus was price. It's not today.

Today, it's support — not screwing up the installation, getting the vendor to help me best leverage my resources and manpower. If the user has to pay 1% more for a PC, that's acceptable if the support is there. •

Milk, bread and a floppy

BY LAWRENCE STEVENS

An old-fashioned price war erupted in St. Louis last month. It started when Egghead Discount Software launched a three-store grand opening in a market that had been dominated by Babbages, Inc., a retailer that was already discounting too heavily to suit some local dealers.

LES KAUFFMAN

Egghead Discount plastered newspapers with advertisements listing very low prices to commemorate its opening. Babbages followed suit with ads promising even lower prices. Before things settled down, a St. Louis consumer could buy Lotus Development Corp.'s 1-2-3 for $297, compared with $350 before the price war, and Microsoft Corp.'s Word for $219, compared with $360.

Representatives from Babbages and Egghead Discount decline to comment on the price war. But it is clear from that event that microcomputer software retailing has entered a new phase.

Microcomputer software has traditionally been sold in specialty stores that tend to have small inventories and few, if any, demonstration disks. But more retail outlets are selling software in ways that most consumers are used to buying everyday products.

They feature inviting decors and displays, spacious aisles that encourage browsing, large inventories, an opportunity to try out programs before purchasing and even return privileges.

Want a book with that?

New entries in this revolution of sorts include three firms that have wide experience in mass merchandising. B. Dalton's Software Etc. division has 130 stores, Babbages has 59, and even K Mart Corp.'s Waldenbooks now has a Waldensoftware division with 11 stores. Egghead Discount started from scratch and has been able to build a chain of more than 100 stores in four years.

The philosophy of all these chains is to sell software the same way other companies sell shoes or books — as a commodity rather than a high-tech specialty.

"Most computer stores are not really equipped to handle software," says Jack Ford, president of B. Dalton. "They keep small inventories, there are few demonstration versions available and the stock of home-type software — such as games and educational packages — is usually short." As a result, Ford says, customers have to buy products out of a catalog or, at best, after reading a blurb on the back of a package. "It's not the way most of us are used to shopping," he admits.

The primary target of these outlets is the home computer user. Stores in malls are a good place for the weekend impulse buyer to stumble on Microsoft's Flight Simulator, for example, but Waldensoftware, for one, plans to try reaching the corporate market by having sales clerks telephone local corporate accounts. And Egghead Discount has an outbound sales division through which it has been able to reach corporate customers.

Most purchasing agents, however, contend that browsing in mall-based stores is simply not the way they are used to acquiring software.

"Things like nicely decorated stores, friendly clerks and return privileges don't really appeal to us," says Joe Coresky, director of microcomputer development at The Travelers Corp. in Hartford, Conn. "We're more concerned with service, and we need reps who can let us know about new releases."

According to Coresky, MIS wants to deal with suppliers that are experienced with large corporations. Merchants have to be prepared to meet with buyers, deal with a company's accounts payable department and submit bids when necessary.

"We also like companies that can hold products that we purchase frequently in local stock in order to free up our warehousing requirement," Coresky says. "Price is, of course, also important, but it's not the uppermost concern."

Three-dimensional catalog

However, David Culley, Egghead Discount's senior vice-president, says his firm's major accounts sales force provides all the services corporations need. He says there are advantages for the corporate buyer in having a software supplier that offers both a direct-sales force and a local retail store.

"We encourage our corporate customers to use the local store as a 'live catalog,' where they can browse and then order products with the appropriate discounts from their direct salesperson," he says.

The issue of price is more important in these consumer outlets than it is in computer specialty stores, which seldom give prices over the telephone. Still, none of the chains want to be viewed primarily as a discount house or have its prices compared with mail-order dealers.

Glenn Ochsenreiter, director of Waldensoftware, says, "We sell at about 10% to 30% below list price. But we're a retailer, not a factory outlet."

Stevens is a free-lance writer based in Springfield, Mass.

Unleash the full power of the 80386 chip.

NO OTHER PC CAN DO MORE FOR YOUR BUSINESS THAN THE AT&T 6386 WORKGROUP SYSTEM.

Compare the AT&T 6386 WorkGroup System to alternative PCs; you'll find it unleashes the full power of the 80386 chip.

In fact, it's one of the most powerful personal computers on the market today.

Its true 32-bit architecture lets you perform real multi-tasking *and* it supports multiple users with simultaneous data access.

But there's much more to the AT&T 6386 WGS than the powerful features that make it a superior computer today.

The 6386 WGS is part of a family of AT&T computers that share an open architecture and interface called the AT&T Application Operating Environment.

It's a simple, powerful idea.

The AOE embraces AT&T's approach to industry-standard operating systems, languages, database management, graphics, networking, and more.

Through AOE, AT&T is committed to openness and true connectivity.

So, no matter what exciting new opportunities the software industry provides, the AT&T 6386 WGS is ready for them.

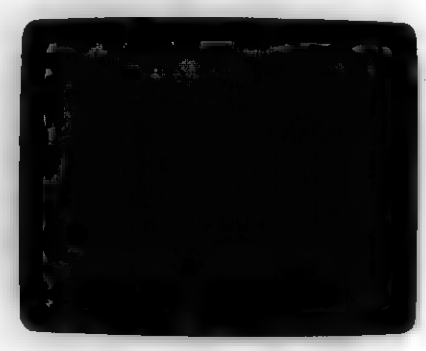
And your investment in AT&T computer equipment will remain safe and sound.

Read on.

To help protect your current software investment we offer a machine that can run in all major operating environments including MS*-DOS, Windows/386, OS/2, UNIX System V, and Simul-Task 386.

Rapid changes in today's software world mean your computer must be ready for anything that comes along.

And it must be able to run all of your existing DOS software: word processing, spreadsheets, databases, forecasting packages, and so on.



The powerful 80386 chip in the AT&T 6386 WorkGroup System works with Windows/386 so you can multi-task DOS applications simultaneously – the number of applications is limited only by your expandable RAM capacity.

As OS/2 applications emerge, your 6386 WGS will be ready to run them.

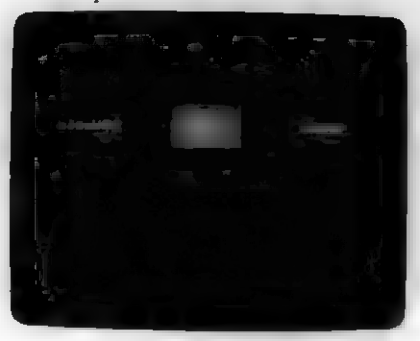
Plus you get the power of UNIX* System V, make the 80386 chip fly as you run powerful multi-tasking UNIX System applications, while Simul-Task 386 lets you concurrently run your DOS applications in their own windows.

And your 6386 WGS can serve up to 32 connected terminals in a multi-user environment.

Take advantage of PC enhancements when opportunities arise.

Running out of expansion slots in your computer is a major headache.

And since the industry promises even more exciting and powerful plug-in boards tomorrow, the problem is just going to get worse.



So, in addition to providing for more memory, the 32-bit path lets you plan ahead now for high-performance boards in the future.

The 6386E WGS has an unprecedented 10 expansion slots: four 32-bit paths, four 16-bit slots, and two 8-bit slots. (8 and 16-bit boards can be used in the 32-bit slots.)

The 6386 WGS offers seven slots: three 32-bit, two 16-bit, and two 8-bit.

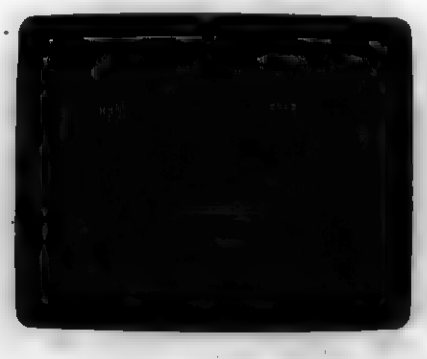
No other 386 computer series gives you more expandability.

Add up to 5 magnetic peripherals inside the machine.

The AT&T 6386 WGS lets you add up to five mass-storage peripherals including tape drive – *right in the machine*. Why clutter up your desk with outboard units?

Keep on using your current media by choosing inboard 3½-inch with a 5¼-inch disk drive option.

Why waste time converting all of your 5¼-inch diskettes just to accommodate a machine that forces you to use 3½-inch diskettes?



Run at up to 20-megahertz clock speed.

The 6386E WGS flies with its 20-megahertz clock speed (16 or 20 megahertz for the 6386 WGS).

Choose from four industry-standard graphics protocols: EGA, CGA, MDA, and AT&T.

The 6386 WGS series supports virtually every graphics display device on the market.

Get total compatibility with existing XT and AT computers.

The AT&T 6386 WorkGroup System is totally hardware-compatible with the IBM** XT and AT.

Virtually all the plug-in boards designed for earlier 8086 and 80286 machines will work in the AT&T 6386 machines.

Expand RAM as needed.

As new operating systems emerge, you need all the RAM you can get.

Today's new operating systems and applications are significantly more memory-hungry.

FEATURE	AT&T 6386 WGS	AT&T 6386E WGS
PROCESSOR	80386	80386
CLOCK SPEED	16/20MHz	20MHz
RAM (STANDARD)	1MB	2MB
5.25" DISKETTE	1.2MB 360KB	1.2MB 360KB
3.5" DISKETTE	1.44MB	1.44MB
TOTAL INTERNAL DEVICES	3 1/2HT +1 FULL	3 1/2HT +2 FULL
TOTAL HARD DISK CAPACITY	435MB	600MB
STREAMING TAPE BACKUP	40, 60 OR 125MB	40, 60 OR 125MB
EXPANSION SLOTS	7	10

More RAM lets you run multi-tasking and multi-user applications much more quickly. You avoid wasting time in unnecessary disk access, because the 6386 WGS lets you expand RAM as your needs increase.

Plan for the future by entering the AT&T Application Operating Environment.

If you're running PC applications today and find that you need to enlarge your workgroup sometime in the future, you won't have to build an applications library from scratch.

The AT&T AOE lets you port your UNIX System V software essentially unchanged to departmental size minis (including AT&T's 3B computer family & RISC based machines) and mainframes, so you can start running powerful 386-based applications now, without fear for tomorrow.

At the same time you can build a fully networked PC workgroup.

The 6386 WGS is compatible with a wide range of peripherals, including AT&T's laser, letter-quality, dot-matrix, and line printers; plotters; and high-performance display terminals.

A single AT&T STARLAN Network can link from 2 to over 100 PCs, which means individuals in your workgroup can share printers, access the same data, and send messages.

AT&T's modular architecture and twisted-pair wiring make it easy for you to add stations as needed.

How to protect your freedom of choice.

To avoid buying the wrong machine, take a close look at the AT&T 6386 WorkGroup System. For more information on the 6386 WGS, the AT&T STARLAN Network, AT&T printers and terminals, and the Applications Operating Environment, call your AT&T Account Executive, Authorized AT&T Reseller, or dial 1 800 247-1212. AT&T can arrange for you to examine the 6386 WorkGroup System, the STARLAN Network, and other components you'll need to build a productive workgroup. Either at a facility near you or by special arrangement at your business location.

From equipment to networking, from computers to communication, AT&T is the right choice.

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Lotus is a registered trademark of the Lotus Development Corporation
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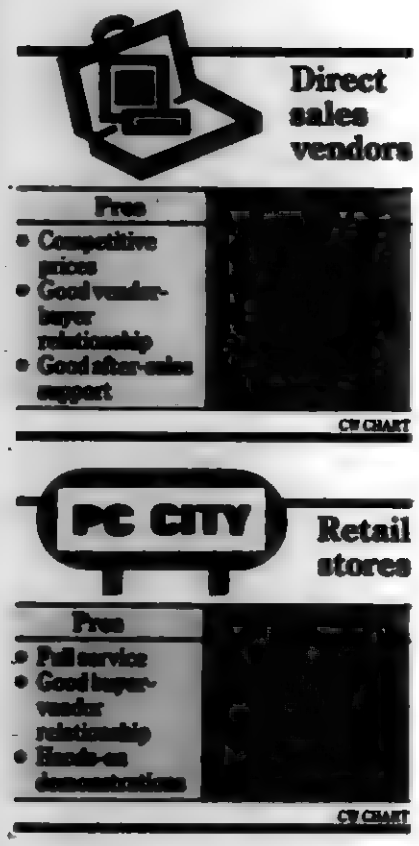
AT&T
The right choice.

DAVE FLAHERTY

YOU DO THINGS YOUR WAY; I'LL DO THINGS MY WAY

BY WERYL JENKINS



— RETAIL STORES —

There are four ways to buy personal computers, add-on cards, hard disks and software: through a local retail store, a mail-order firm, a value-added reseller (VAR) or a direct-sales vendor or manufacturer. Each approach has its pros and cons.

Second only to volume purchase agreements with manufacturers, the traditional means of buying a PC is through local retail stores. In addition to providing volume discounts similar to those available directly, retailers have proven to be a valuable source of information and support for corporations and consumers.

"When I first started buying PCs for people, retail was really the only game in town," says Theresa Carey, president of Alta Business Systems, a San Francisco-based consultancy. Because PC knowledge was not yet widespread and other distribution channels were limited, the traditional retail approach of full service with full price worked.

Today, despite a more savvy customer base and a few lean years, retailers are still successful. In addition to after-sales support, the retail-store showroom offers a place where you can "kick the tires" of the machines, says consultant Todd Reidel, president of First Micro Group in Boston.

A second advantage is that the customer can develop a working relationship with the sales agent. However, warns Kevin Green, business administrator at Purdue University, turnover is high, and the person with whom the purchasing agent has developed a relationship today may be gone tomorrow. "A lot of these places are revolving doors," Green says.

Jenkins is a Cambridge, Mass.-based free-lance writer.

In the beginning, retailers were the heart of the PC distribution chain. While many companies arranged volume purchase agreements directly with PC manufacturers, it was often the retail firm that stepped in with the software, peripherals and support that such agreements did not provide.

But the retailer has ridden a rocky road in the past few years. The tough economics of computer retailing have gotten tougher, weeding out weaker companies.

A survivor

One of the survivors is Businessland, Inc., a San Jose, Calif.-based chain. The number of Businessland stores is up from 60 in 1985 to 94 this year, and the company has increased its sales force from 540 in 1985 to 700 this year. During the same period, sales have almost tripled, from $267 million in 1985 to $718 million in 1987.

"We are fairly happy with our current penetration in the U.S. market," says Enzo Torresi, Businessland's vice-chairman. Although he says he plans to open three more stores this year, "we are covered in those top markets where we wanted to be."

But Businessland has survived by shedding the retail image as fast as possible. When describing the company's strategy, Torresi avoids using the term "retailer."

"Think of Businessland as a very specialized VAR," he says, "a national VAR — we have a lot of purchasing power."

The company-owned stores, into which Businessland has poured about $1 million each, are no longer considered "stores" in the corporate strategy. "Our computer center is not a retail store," Torresi says. "It is a demo facility."

And all of Businessland's employees are employees of the corporation — not of a local franchisee.

This technique has permitted Businessland to avoid some typical retail pitfalls. A classic complaint of the retail customer is that today's computer salesman is yesterday's shoe salesman; many customers feel they know more about the product than the sales agent does.

Businessland combats this problem with an emphasis on training that begins the first two weeks a salesperson is hired. As sales representatives progress to become marketing representatives, they are again brought back to headquarters for advanced training.

"We invest more money than any company we know of in sales training and technical training," Torresi says. In total, Businessland spent $4 million on training in 1987. That includes training for the company's technical support personnel, whose number now nearly equals the sales staff's. Businessland's 600 technical specialists receive more frequent training to keep up with the changing technology, Torresi says.

A second problem that plagues most retail operations is the high turnover of sales staff. But Torresi says turnover at Businessland is "not as bad as you might find in traditional retail." While retail turnover often runs as high as 40% to 50% annually, Torresi says Businessland's runs between 20% and 25%.

Torresi foresees an increasing specialization of Businessland's staff. There are "very big and very important sectors of technology where we will have to specialize our people," he says. Even the sales staff may become a diversity of specialists rather than a collection of generalists.

"We are not doing that now" through strategic direction or policy moves, Torresi says, but "that is happening de facto." Specialization will come to the sales force, he says, "as a natural fact of life." ●

WITH FOUR PATHS TO LEAD YOU, THERE'S MORE THAN ONE WAY TO BUY A PC

VALUE-ADDED RESELLERS

The undisputed king of the support hill is the VAR.

Buying from a value-added reseller (VAR) is not unlike being driven by a chauffeur. You don't need maps to chart your way through unfamiliar territory, and if you have a favorite drink, you can make sure the car's bar has been stocked with it.

According to Kevin Green, business administrator at Purdue University, a VAR is useful when an organization has a special need that cannot be met by off-the-shelf software.

Buying from a VAR is a "much less headache-inducing process," adds Todd Reidel, president of First Micro Group in Boston, because the VAR puts all the pieces together for the buyer, and the software is designed to match the specific application — requiring no homespun programming by the user.

But VARs, like limousines, don't come cheap. The software, if custom designed, is often much more expensive than generic packages. It may use proprietary technology, which can also drive the cost up. And while a good VAR may also provide extensive support, the use of proprietary software and technology can create an uncomfortable dependence on that single vendor.

Centel: A PC 'general contractor'

Just as Businessland, Inc.'s Enzo Torresi prefers to call his retail business a "national VAR," Edward Sharp, senior vice-president at Centel Business Information Systems, a leading VAR, sees his company as more of a retailer.

Whatever you might call it, Centel performs many of the same functions as a VAR — perhaps, in this company's case, the term "general contractor" makes more sense.

Centel is a division of Centel Corp., a Chicago-based telecommunications firm with $1.4 billion in revenue in 1987.

The Business Information Systems unit had revenue of about $140 million last year, Sharp says, adding that the income was split almost equally between commercial and government sales.

While the company operates only three retail centers, it has more than 70 service locations throughout the country, staffed with about 300 people.

And, Sharp admits, Centel does offer the customized software, implementation and ongoing support that are the hallmarks of a VAR.

Going horizontal

Centel differs from the traditional VAR definition in that it does not restrict itself to a single vertical-market application.

Instead, Sharp says, the company focuses on customers with dispersed geographic locations who need to integrate personal computers into operational applications throughout those offices.

This is where the general contractor function comes in.

Centel at one time offered custom software developed in-house. But, Sharp says, "we were doing a lot more of that three to four years ago than now."

Centel's current strategy is to use outside software developers with expertise in the application required by Centel's customer. Such a company is hired as a subcontractor, working under Centel's direction to develop the specific application. In the process, Sharp adds, Centel employees learn enough about the system to provide thorough support.

Sharp says Centel's customers are companies faced with a "make or buy" decision. A company folding PCs into its corporate data processing environment, he explains, is faced with the choice of either designing, implementing and supporting PC integration or buying the service from a company such as Centel.

Sharp claims that buying the service is often cheaper because the company would otherwise have to create a support staff from scratch or extend its existing PC group.

Centel offers what it calls program management, which completely off-loads the struggles of implementation and support.

For example, Chrysler Corp. has asked Centel to install micros and implement their use and support at Chrysler's recently formed Jeep/Eagle dealers.

Sharp says Centel is strongest in the heavy truck and farm equipment industry and includes customers such as Ford Motor Co.'s New Holland subsidiary. Other corporate clients include Aetna Life and Casualty Co. and Chase Manhattan Bank NA.

In addition to providing 24-hour hot line support for its clients, Centel also offers management tracking reports. These monthly reports tell clients what problems have been encountered with their PCs, which ones were resolved and which remain. Centel also maintains all information about each installation, including the number of PCs and how they are configured.

Through its customized software services, planning and after-sales support, Centel's objective is to off-load the problems of implementing PCs at scattered corporate offices and plants.

And while these companies "tend to be the architects of their own systems," Sharp says, "they call on us to be the general contractor." •

VAR — Value-added resellers

Pros	Cons
• Meet specialized demands • Extensive service • Turnkey systems	• Single-vendor dependence • Proprietary technology • High costs

CW CHART

Mail-order firms

Pros	Cons
• Low cost • Fast service	• Little after-sales support • Hardware must be installed by purchaser • Caveat emptor

CW CHART

Good news: Your tech's in the mail

MAIL-ORDER SALES

From the depths of hackers' magazines, mail-order houses have risen to become a valued purchasing method for software, add-on cards and peripherals.

Mail-order distribution often holds the twin keys to success — speed and price. While in many cases retailers have cut back on their inventories, mail-order houses often promise overnight delivery.

Since overhead is low for these companies — they have lower or nonexistent sales commissions and no showroom to support — mail-order firms sell at rock-bottom prices.

But this industry is notorious for its fly-by-night companies and an absence of after-sales support. Hardware installation is left entirely in the hands of the buyer. Often, the only support provided is the toll-free number of the equipment manufacturer or software developer.

However, "if you know what you're buying and you're buying from a reputable dealer," says Todd Reidel, president of the First Micro Group in Boston, "you can achieve tremendous price advantages over retail."

Micros by mail

Top five mail-order firms by amount spent on advertising in 1987

PC Connection/Mac Connection Marlow, N.H. 603-446-3383 or 800-622-5472	$5	IBM PC and compatible, Apple software and peripherals, Toshiba laptops
Compudd/PC Source Austin, Texas 512-250-1489 or 512-331-0700	$3.5	IBM PC-compatible hardware, software and supplies
Logicraft Farmingdale, N.Y. 516-249-9700	$2.7	IBM PC and compatible hardware, software and supplies
PC Network Chicago 312-280-0002	$1.9	IBM PC and compatible hardware, software and supplies
CMO/Computer Mail Order Williamsport, Pa. 717-327-9575	$1.8	IBM PC and compatible and Apple hardware, software and supplies

INFORMATION PROVIDED BY ADSCOPE, INC.
CW CHART

Mail-order mogul

The intersection of rural two-lane roads sandwiched in the foothills of the White Mountains, Marlow, N.H., is not the ideal location from which to get the world to beat a path to your door.

Unless you are a mail-order company.

Marlow is the home of PC Connection, one of the most successful mail-order firms in the industry. Since its founding in 1982, PC Connection has succeeded in becoming a favored supplier of software and peripherals for many organizations.

Starting with just a few employees four years ago and growing to 175 now, the company's annual revenue exceeds $100 million.

As director of customer affairs, Peter Haas is the company's roving troubleshooter. He says the company's success with corporate buyers results from the careful attention PC Connection pays to its image.

To woo individual customers away from other mail-order firms, PC Connection does not add a credit card surcharge, a technique many such companies use to boost their margins.

"The industry as a whole is worried about its reputation. There have been some outstanding scams," he says, adding that "some [mail-order] companies are not really illegal but do provide what people feel is unsatisfactory service."

Service is part of what PC Connection promises, especially to its corporate customers. It has about 18,000 such accounts, although Haas notes that a large company might have separate accounts for each of its divisions.

Haas says many firms now have purchasing agents who specialize in buying PC equipment. It is the PC analyst or information center manager who may decide whether to buy a software package or peripheral, but it is the purchasing agent who decides where to buy it.

Price is important to the purchasing agent, but support remains the priority for users. As a result, PC Connection dedicates 12 employees to act as technical support specialists for the software and hardware that the firm sells. •

AVERY L. JENKINS

Direct sales occupy halfway point

DIRECT SALES

Sitting at the crossroads between mail order and retail are direct sales companies.

These vendors might best be described as either retailers without the store or mail-order houses with salesmen.

With an emphasis on corporate rather than individual or small-business accounts, as well as a better reputation, direct sales firms provide "a nice halfway point for folks who don't want to go out on a limb and buy mail order," says Todd Reidel, president of the First Micro Group in Boston.

Direct sales often come close to or match the prices of mail-order firms and also provide the personal relationship and support of a retail operation.

At the crossroads

Corporate Software is a successful combination of a retail firm and mail-order house

1983	0	($79,000)*
1984	$1.7M	($821,000)
1985	$14.7M	$1M
1986	$32M	$1.5M
1987	$59.8M	$1.9M

* Parentheses indicate loss

CW CHART

And while the usual retail salesperson is a generalist — adept at holding the hand of the novice user but lacking the knowledge to solve more complex problems — the successful direct sales companies offer more in-depth technical support by specialists in different application or hardware areas.

A success story

The most successful of these firms is Corporate Software, Inc. in Westwood, Mass. This company embodies the cross between retail and mail order. Founded in 1983, Corporate Software claims that 80% of the Fortune 1,000 are currently among its 2,000 customers. Its net sales in 1987 were $59.8 million, almost double the company's previous year's sales.

Like a mail-order firm, Corporate Software's headquarters houses no demonstration rooms but does include a warehouse and shipping department with a $7 million inventory.

Like a computer retailer, it maintains a direct sales force to provide personal contacts with its corporate clients, and the company has 11 offices scattered across the U.S.

But that is where the similarities stop. From its founding, Corporate Software has based its strategy on direct sales to large accounts, some discounting and after-sales support.

According to founder and Chief Executive Officer Morton Rosenthal, Corporate Software's strategy is simply to provide its customers with the services necessary to "better manage this massive installed base" of personal computers found in most large companies.

While Corporate Software also tries to keep its prices competitive, "we aren't always the lowest price," Rosenthal says. On the average, customers will pay 5% more than they would through a mail-order house.

The main thrust of the company's strategy is to provide services that take some of the burden of PC management off the information manager's shoulders. Corporate Software does this through several avenues.

Like most other PC distributors, the firm provides technical support for its customers. One-half of the firm's 60 support personnel provide telephone support in areas of specific expertise, such as spreadsheets and word processing.

While the company faced tough times in 1984 when it was forced to lay off some of its employees, the problem was not strategy but pricing, Rosenthal says. By dropping prices without dropping support, the company rapidly turned around.

"Companies that are opportunistic and do everything for everybody have not done well," Rosenthal says. He adds that the increasing complexity of the PC market will make that strategy even more difficult in the future.

Rosenthal predicts that the addition of connectivity, IBM's OS/2 and other factors to the marketplace will play into his strategy.

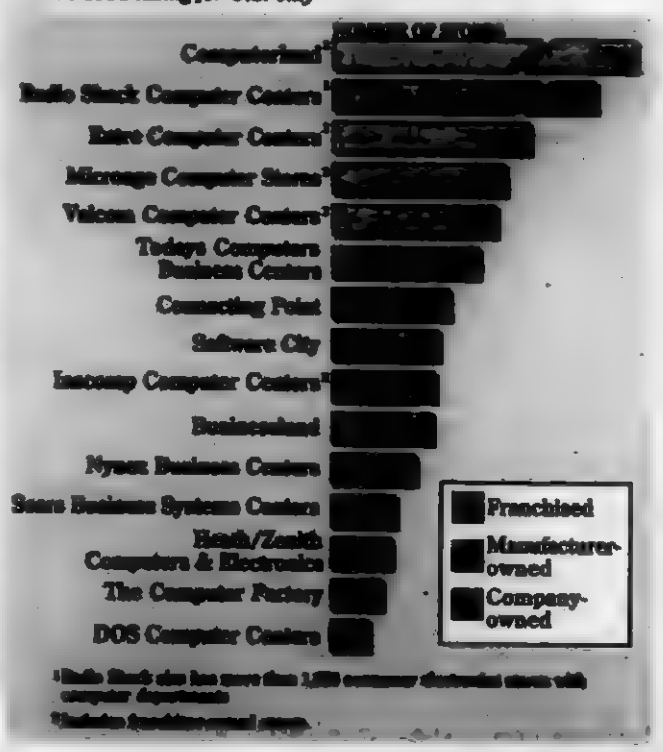
For example, Rosenthal says that in spite of the recent release of OS/2, "nobody cares about the operating system. Will people start to care? In a big way," he says. "As soon as some of today's software is available under OS/2, it will make a difference."

Corporations will be converting to OS/2, he says. And they "will use us as a resource when they do." •

AVERY L. JENKINS

Leading computer specialty store chains

March 1988 listing for U.S. only



INFORMATION PROVIDED BY STOREBOARD, INC.
CW CHART

How Macintosh II came to be one of the safest decisions in business.

First, we met your standards.

Compatibility. *Digests data from—and even runs—MS-DOS programs. Works with mainframes, too.*

Display. *Choose from all shapes and sizes, including color and large-screen.*

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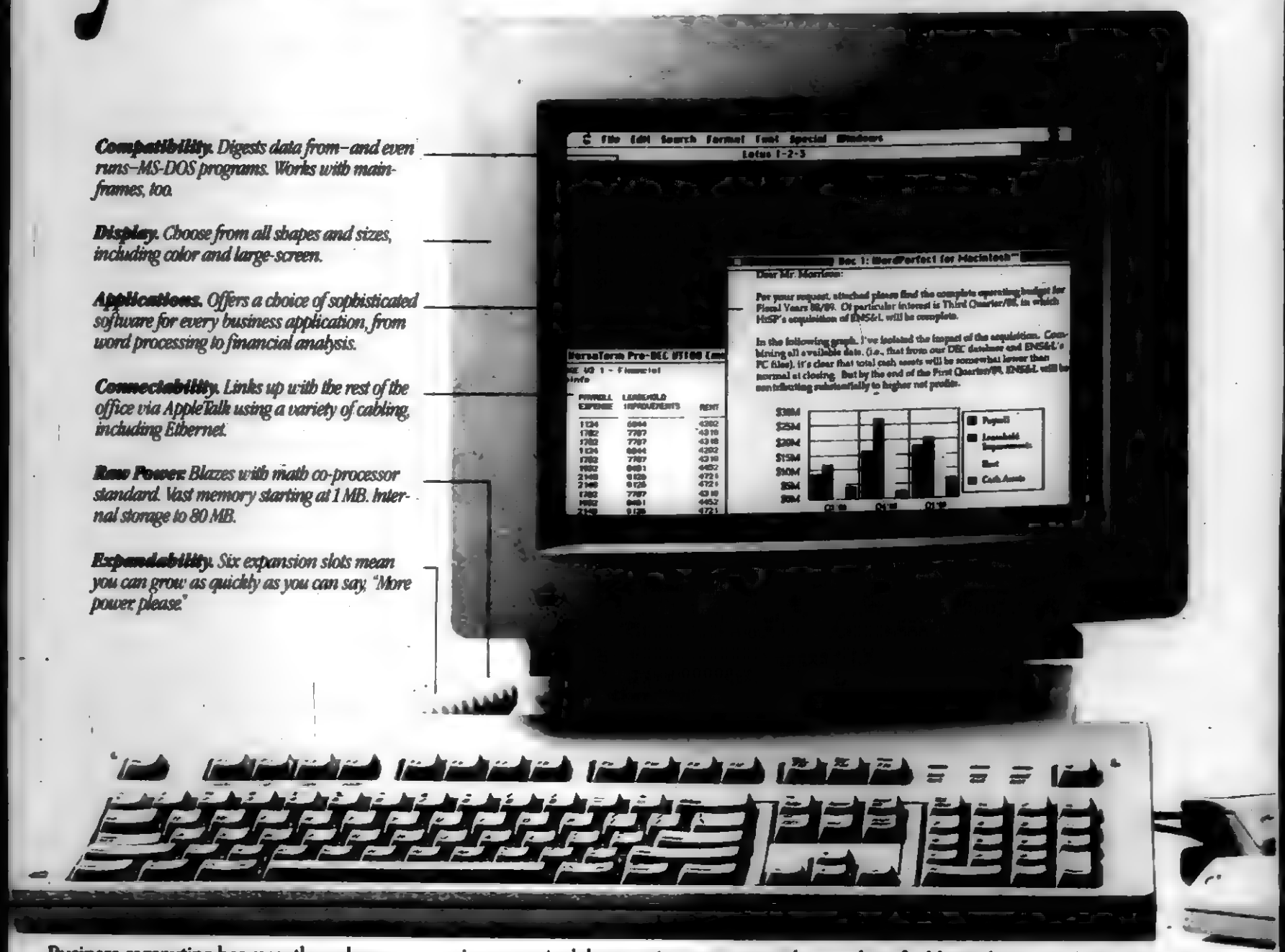

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But we hasten to add that there's more to business than simply meeting standards. Which is why we've put so much effort into exceeding them.

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click interface we pioneered with Macintosh. It allows you to switch effortlessly between applications, or do a number of things at once.

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You'll find that Macintosh II makes a very good place to start, since it lets you add so many options down the road.

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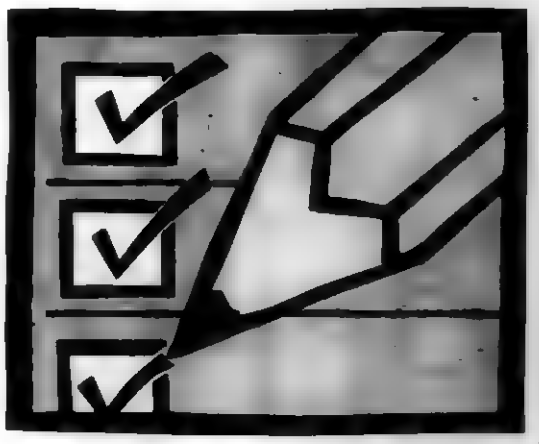


IF THE PRICE IS RIGHT

BY ED SCANNELL

The bottom line on what drives corporate purchasing decisions continues to be the bottom line.

While reliability and level of compatibility are the top considerations, pricing is often the determining factor in whether both Fortune 1,000 corporations and non-Fortune companies buy hardware or software, according to a study of 443 sites conducted by Focus Research Systems, Inc. for *Computerworld*. All participants had at least 100 microcomputers at their locations.

According to the survey, 180 respondents from Fortune 1,000 companies expected to pay no more than 65% of the retail price for hardware products and 63.5% for software products. Non-Fortune companies felt about the same; they expected to pay no more than 64% of list price for hardware and 63.1% for software products.

"We are influenced mostly [in a purchasing decision] by cost and reliability," says Richard Pence, manager of information systems for General Electric Co. in Salem, Va., summing up the attitude of several other respondents interviewed. "The name of the vendor rarely thrills us."

Not even if that vendor's name is IBM?

"Especially that one," quips Pence, who actually has about 120 IBM Personal Computer ATs among the 350 or so microcomputers at his site.

With an average of 416 PCs per site, the Fortune companies, overall, spent 13.8% of their information systems budgets on microcomputers. These percentages jumped among non-Fortune respondents. The average number of PCs installed at those sites was 494; 20.7% of the non-Fortune group's information systems budgets was spent on micros.

Surprisingly, both categories of companies planned to buy fewer PCs this year than last. On the average, Fortune companies planned to buy 111 PCs in 1988, compared with 144 last year; non-Fortune companies planned to buy 105 PCs this year, compared with 134 in 1987.

Proof's in the price

Though they are concerned with price, many more Fortune 1,000 respondents purchased their PC products through retail stores and direct from vendors rather than from traditionally less expensive mail-order houses. Retailers were the preferred supplier of 44.6% of the Fortune respondents, while about 28% of the group preferred to buy direct from the vendor.

About 43% of the non-Fortune respondents preferred buying primarily from the manufacturer, with only 30.7% of that group preferring to buy from retailers.

While mail-order companies tend to offer significantly lower prices, the study showed that only 2.8% of the Fortune respondents said they bought products primarily from these sources. Note, however, that 15% said they do use mail order for some hardware purchases, and 23.3% did so for software purchases. These numbers rose by a fraction among non-Fortune companies.

Value-added resellers (VAR), on the other hand, are the predominant PC product supplier for 16.9% of the Fortune group, but only 13.2% of non-Fortune groups preferred to buy their products from VARs.

Corporate buyers purchasing most products through dealers said they did so because they received attractive volume discounts. A bit surprisingly, however, they said they didn't do so

Continued on page SR/28

Scannell is a *Computerworld* senior editor, microcomputing.

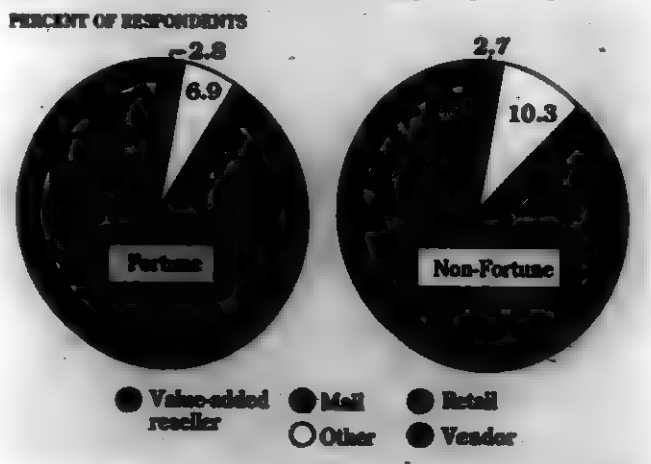
How much is enough?

PC budget as percent of overall information systems budget

INFORMATION PROVIDED BY FOCUS RESEARCH SYSTEMS, INC.

Where corporations buy

The major channels for personal computer product purchases



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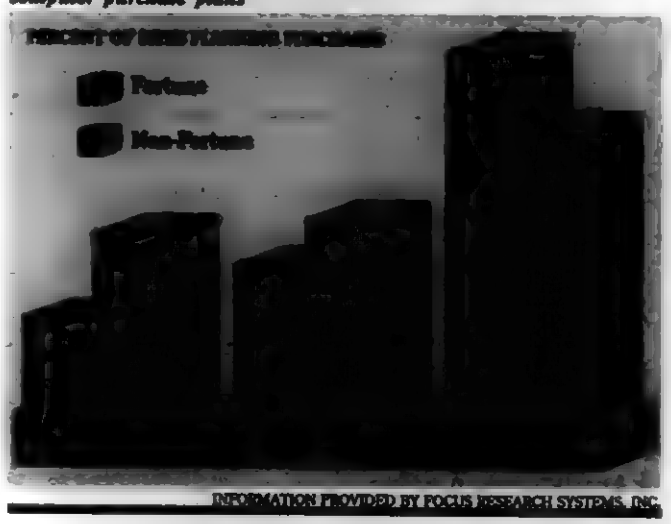
CW CHART

IBM-compatible acquisitions

Machines based on the 80386 processor top personal computer purchase plans



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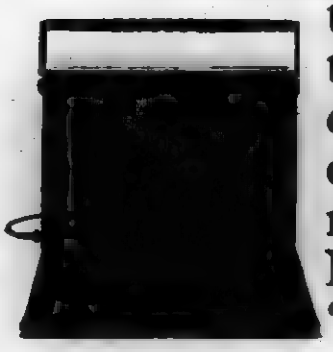

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NEC

For the name of the dealer nearest you, call 1-800-343-4418. In Canada, call 1-800-387-4313. NEC Information Systems, Dept. 1610, 1414 Massachusetts Ave., Boxborough, MA 01719.

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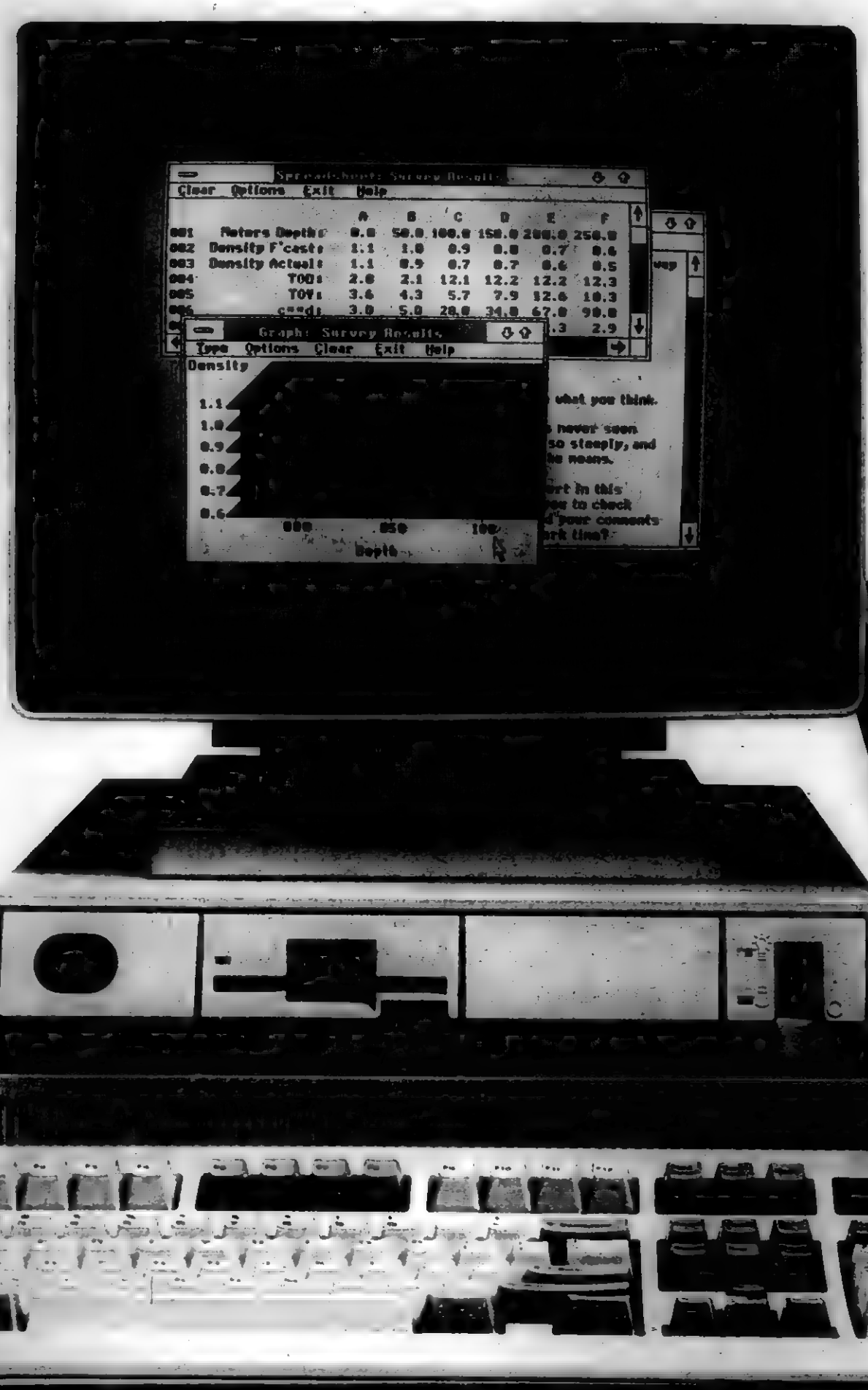
The best way to leap through next Monday



IBM OS/2 will bring superb graphic and multi-tasking capabilities to the PS/2 as shown here.†

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And it runs them faster—from 117% to more than 850% faster, in tested applications,* depending on the model you choose.

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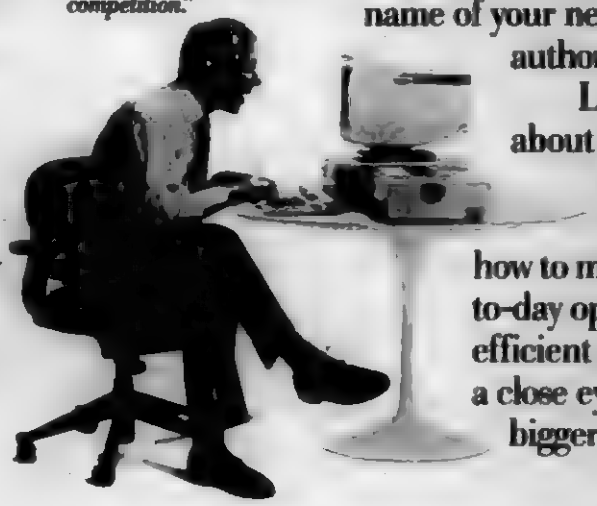
And learn how to make your day-to-day operation more efficient while keeping a close eye on the bigger picture.

"Now I've got a jump on my competition."



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*Based on performance test results published in the April, 1987 and January, 1988 issues of *PC Digest*, comparing the PS/2 Models 30, 50, 60 and 80 to the IBM PC XT, running Lotus 1-2-3 and DisplayWrite 4. †This simulated screen shown was developed using the IBM Storyboard Plus program. IBM, Personal System/2 and PS/2 are registered trademarks; PC XT, Operating System/2, OS/2, Micro Channel and DisplayWrite are trademarks, of IBM Corporation. Lotus and 1-2-3 are registered trademarks of Lotus Development Corporation. © IBM 1988

Price

FROM PAGE SR/24

to receive support.

Many believed they could better support users through their own MIS departments than any other channel, including dealers.

"We buy through local retailers such as Computerland and Entre, but we don't depend on them for support," says Miles Ashley, information center manager for Bank One Corp. in Indianapolis. "In my mainframe days," he adds, "I remember when IBM gave great technical support. But in the PC world, it just isn't there. I don't care who the vendor is."

One manager insists that his users refer all problems to MIS and not to vendors, because he can better distribute information about a particular problem to all users.

"If [users] call us, then we can get the word out to all users," says Greg Bryant, manager of information systems at Signet Bank Corp. in Baltimore. "Individual users getting an answer from the vendor may not tell everyone else."

Lack of support is one reason Ashley and two other MIS executives interviewed were somewhat reluctant to purchase large numbers of IBM's Personal System/2 series, which contains the semi-mysterious Micro Channel architecture. Most say they are unwilling to experiment with a product they cannot adequately support.

Waiting game

Although 45.9% of the Fortune respondents and 34.6% of the non-Fortune group said they were satisfied with the PS/2's technical capabilities, some will put off large purchases until a rich selection of OS/2-compatible applications appears.

"I'm still sitting on the fence," Signet Bank's Bryant says. "The software developers will decide whether OS/2 works or not. It was the same thing with CP/M and DOS."

Fortune accounts had a clear preference for superior processing power. Of that group, 55% said they planned to buy Intel Corp. 80386-based systems, while only 14.4% said they would buy Intel 8088-based machines.

Non-Fortune companies also preferred 80386s over 8088s, with 43% saying they planned to buy the high-end machine and 27% planning to buy the 8088s in the upcoming year.

Almost two-thirds of the Fortune respondents said they would replace an old PC with a new one; 38% said they would rather upgrade with add-in boards. Of the non-Fortune companies, 57% indicated they would replace their old systems with a new one, while 42% said they would use upgrade boards to accomplish the task.

Under the influence

Factors influencing personal computer product purchases

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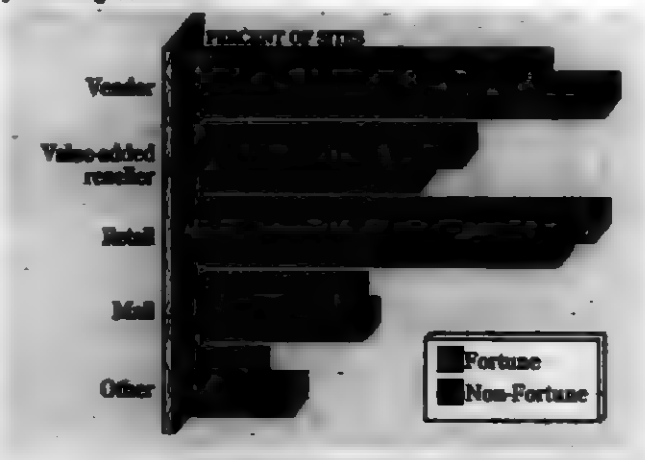
Where they buy

Respondents use multiple microcomputer software purchasing channels



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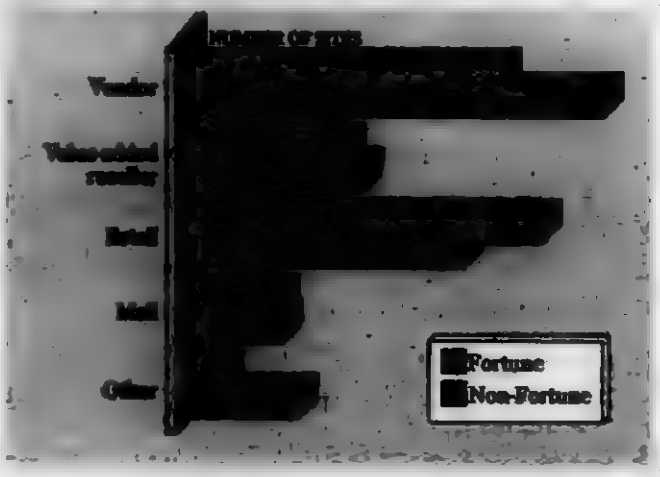
Going shopping

Microcomputer hardware purchasing channels



INFORMATION PROVIDED BY FOCUS RESEARCH SYSTEMS, INC.

Dell snips away at its mail-order roots

BY BARBARA SEHR

Asking Michael Dell when he started in the mail-order business is like asking George Bush when he coined the term "voodoo economics." Both got noticed, but neither wants to be remembered by his roots.

Selling computers by mail put Michael Dell of Dell Computer Corp. on the map in 1984. His company, then named PC's Limited, sold hardware manufactured by others and eventually began to assemble its own brand of machines.

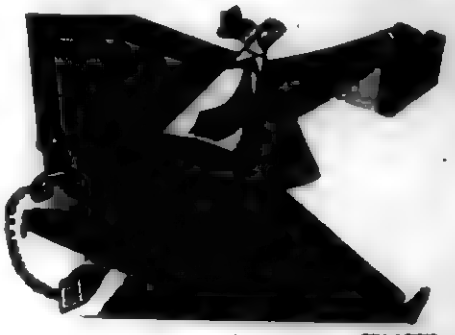
"We'd sell to anyone who would buy through our magazine ads," recalls Dell, the company's founder and chief executive officer.

In its brief life span, Dell became the "pre-eminent personal computer mail-order distributor in the U.S." says Bruce Stephen, senior PC analyst at International Data Corp. (IDC), a Framingham, Mass., market research firm. But Dell squirms at the term "mail-order," sensing its frequent association with reduced or nonexistent support and low prices.

And it would be very hard to describe today's Dell as a mail-order house. Computers are still shipped from a central warehouse at the company's headquarters in Austin, Texas, in response to customer orders, but the similarity begins to diminish from there.

The company offers a 30-day money-back guarantee of total satisfaction to its customers. It has arranged for a national network of service through Honeywell-Bull, Inc., including a one-year on-site service contract included in the purchase price.

More important, in the past year, the company has begun to turn its focus away from sales to individuals in order to stake a claim to the crowded but profitable direct sales and value-added reseller (VAR) markets that serve educational institutions and Fortune 500 clients.



TIM LEWIS

Dell has brought in new corporate management and PC industry veterans to enhance its image, as well. Bobby Inman, former head of Microelectronics and Computer Technology Corp., now sits on the company's board of directors, and the former vice-president of Tandy Corp.'s Radio Shack Business Products Division, Graham Beachum, is now Dell's senior vice-president of sales and marketing.

In addition, the company's advertisements have come a long way from the typical price-cluttered mail-order ad to image advertising prepared by the likes of Hal Riney & Partners, who created the Bartles & James wine cooler campaign for Gallo.

The moves are apparently paying off. The firm ranked 11th among manufacturers of IBM-compatible PCs, a 1987 IDC survey showed. Its sales have doubled each year that it has been in business.

Dell reported fiscal year 1988 sales at $159 million, up from $69 million in 1987. However, "last year was a particularly good year for all IBM-compatible manufacturers," IDC's Stephen says. "While 1988 will show increases, they won't be near the levels of 1987." Despite such predictions, Dell says he is confident that the company's spectacular growth will continue.

Among its expanded areas of distribution is the VAR market, for which Dell has created its own division. Stephen calls the move "a necessary step" if Dell wants to move into such a class as cross-Texas rivals Compaq Computer Corp. and Tandy.

A key factor in Dell's profitability has been its assembly-to-order manufacturing process, in which systems are not assembled until they are ordered. This also means customers get a system specific to their needs.

Dell's future focus will be on enhancing the capabilities of the PC's Limited line in its continuing competition against IBM and other clone makers. Dell says he remembers a time when he considered becoming a VAR for the IBM Personal Computer itself, but he rejected the opportunity.

"The growth potential and the profit potential was not nearly as large as the one we're involved in," he says. •

Sehr is a free-lance writer based in Seattle.

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intel

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CAROL O'MALIA

THE MAINTENANCE BLUES

BY MICHAEL BALL

What three words strike fear into the information center manager's heart? Personal computer maintenance.

From coffee spilled on the keyboard to blown hard drives and chips, PC hardware support is a fact of life in corporate America. But not all companies maintain their PC hardware in the same manner. While some firms swear by all-encompassing PC service contracts, others make do with in-house support and pay-as-you-go repairs.

Computerworld talked with administrators at several companies to examine the ins and outs of PC hardware maintenance.

Going with a contract

Having to administer a large number of PCs is perhaps the most compelling reason for purchasing a maintenance contract.

For example, Continental Illinois National Bank & Trust Co. in Chicago contracts for its 1,200 units, which are mostly Compaq Computer Corp. machines and IBM Personal Computers.

"We've never seriously considered doing it in-house," says Peg Delaney, information center manager. She adds that self-service maintenance would be impractical financially. The bank views the extra staff and inventory as prohibitively wasteful.

In search of the best possible situation, the bank reconsiders its service contracts annually. In 1986, it paid a third-party service company a per-machine retainer, plus time and materials up to an annual corporate cap. In its latest contract, it pays a flat quarterly fee per machine. The bank is reassessing its current service contract.

Continental Illinois is very mindful of the cost/benefit analysis of maintenance. The company's annual review of PC service led it to drop IBM as its service supplier nearly four years ago.

Since going to third parties, Continental has not been tempted back to any vendor. "We receive bids every year," Delaney says. "So far, no vendor has been close to the third-party prices."

A bigger company with a smaller number of PCs has a similar attitude — but with different effect. In Purchase, N.Y., Pepsico, Inc. turns to a vendor for a service contract. Businessland, Inc. maintains the 300 PCs located at Pepsico's corporate headquarters.

Pepsico is a large, steady customer and uses its volume business to help ensure that the vendor gives prompt service at a good price, says Liz Menten, manager of the company's information center. Pepsico's departments are not required to buy PCs from Businessland, but many do. Under the contract, the retailer must service all of Pepsico's Microsoft Corp. MS-DOS PCs, even those bought elsewhere.

Like virtually all users contacted, Menten says her company takes advantage of any manufacturer or vendor warranty but does not accept the added cost of bundled service contracts. Still, she adds that the corporate attitude is similar in its effect. "We

Ball is a free-lance writer based in Boston.

tend to think of the service as bundled with" the PCs, she says.

Pepsico once used a different service company but shopped around because it was too expensive. And the company continues to evaluate its service options. "We haven't rejected in-house support," Menten says, "but we would have to find the right service and price."

Currently, however, Pepsico sees no economic reason to bring service in-house. "We don't want to do our own," Menten says. "The turnover [in maintenance staff] is terrible, and the cost of training is very high."

In addition, the recent improvements in chip and board densities reinforce her view that outside service is necessary. She cites the Intel Corp. 8080-based machines, which "have run through their life cycle. They had numerous small, inexpensive parts that could be identified and replaced. . . . But with the PS/2 Model 50s — it's scary," she says. "It's like a car. You used to be able to do your own tune-up, but now you open the hood and can't even find the spark plugs."

These new products' high-performance boards are hard to troubleshoot and expensive. Pepsico's conviction is that replacing a major component in a PC or laser printer often costs nearly as much as buying a new unit. While the day of the disposable PC is not here yet, that may be the effect in individual cases.

Continental's Delaney

Pay as you go

Do-it-yourselfers have similarly compelling reasons for their choice. They also perform cost/benefit analyses, but they ultimately decide against contracting for service. Even in companies that would not dream of having minis or mainframes without maintenance and service, the time-and-materials-only credo seems to hold.

In Branford, Conn., Echlin, Inc. has 53 PCs, one in-house diagnostician and a deal with a local Computerland. The manufacturer of turbochargers and other automotive parts sees its setup as the most cost-effective arrangement.

"We look at this as a time and materials issue; we've done studies on this and found we paid $9,600 for maintenance last year," says Richard Hock, Echlin's director of MIS. "We can't come close to that on a contract."

For PCs, the staff troubleshooter, Al Guimares — who is also operations supervisor for Echlin's PC network — diagnoses problems and fixes those he can. Board and drive swaps are typically performed in the computer room. Computerland handles those problems that Guimares is unable to diagnose or fix.

Like Pepsico, Echlin has examined numerous vendor and third-party service sources and expects to continue to do so. In the five years the company has had PCs, it has looked for contractors at least three times. Last year, it considered Control Data Corp. and GE Information Services, a division of General Electric Co. Echlin found both to be too expensive. "Every time we have checked, we [found we] can do it more efficiently for less," Hock says.

As its system grew, the company augmented its original IBM PCs with Compaq machines and eight Intel 80386-based machines. As did other PC users, Echlin examined and passed over IBM's service. The vendor's attitude, Hock says, seems to be that it does not want to service a mixed-vendor environment, particularly of PCs. IBM "doesn't want to get involved. Since they heard we were going to a [multivendor] PC system, they haven't called."

A similar cost-consciousness led the Federal Reserve Bank in Chicago to use third-party service for its IBM Personal System/2 and older MS-DOS machines, says Dave Smith, consultant for the information resource center. He adds that Federal Reserve has a policy of not necessarily buying maintenance contracts and encourages shopping around for pay-as-you-go service.

Pepsico's Menten

Smith notes that as PC prices have dropped, their reliability has increased dramatically. "We find that most maintenance is minimal," he says. "We will replace a hard drive ourselves, but we do not fix it.

"We do time and materials strictly," Smith adds. "It does not cost anywhere near what a contract would."

His group looked at all the costs associated with pay-as-you-go service and maintenance and did not find real differences between vendors and independents. So, as much as any factor, the speed with which a company responds and the length of time it takes to do the job make the decision for Smith. Federal Reserve uses two companies in Chicago, both of which do nearly same-day service.

Indeed, the cost of service is not always the top concern. "Time is the No. 1 consideration, not price," says Cindy Thames, vice-president of The Technology Research Group in Boston. Her company has a rather sophisticated Apple Computer, Inc. Macintosh-MS-DOS microcomputer network with shared peripherals. It has only a dozen PCs, however, and can't afford to lose one during a business day.

Like many small users, the firm relies on staffers with a mechanical or electronic bent to perform routine maintenance and repairs. "We have several people willing to mess with them," Thames says. "If something is obviously broken, like a Mac disk drive that ate disks or the Laserwriter doing something funny, we get someone in to fix it."

That someone is sometimes a local vendor of PCs or peripherals. At other times, particularly with something in short supply like Mac parts, "I call companies from the yellow pages and hire the one who can do it the fastest," Thames says. "I found one who for $50 or $100 will make a house call and fix it the same day."

Even with such a small, mixed shop, the company gets calls and letters from service contractors. "A lot come around, but they are all too expensive," Thames says.

Vendors seeking The Technology Research Group's business would have to offer more than a low price, though, Thames adds. "First, we would consider a contract if things broke down a lot," she says. "But it would have to be with a company that has fast turnaround or loaners. We would pay for someone who could take the whole headache out of maintenance and repair."

Contracts — who needs 'em?

Those same concerns have been approached from another angle by a user who has only a handful of PCs. Cox Cable Greater Hartford, Inc. has long used contracts for its large systems and started out with a similar service for the few PCs in its main office.

"It wasn't worthwhile to keep [those contracts]," says Gary Perrelli, company controller and systems aficionado.

Perrelli says that he, too, finds the reliability of new MS-DOS equipment so high that contracts are unnecessary. During the warranty period for Cox's equipment, there were no problems that required service calls.

"At this point, we don't see any need to look at third-party support, and we wouldn't unless we got hundreds of PCs," Perrelli says.

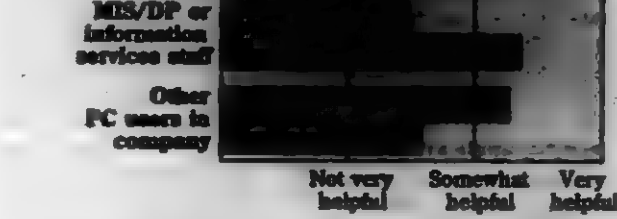
At some point, the PC aftermarket may well catch up to the users, as it did in disk quality and price and as it has with consumer electronics. Until then, many customers who do not have armadas of PCs seem content to gamble a little to save a lot. Particularly when repair costs approach replacement costs, service contracts seem prohibitive to many.

Whether companies go with contracts or not, it seems everyone is keeping an eye on the service industry. Most companies report constant reviews of their options and the players. No one reports finding the optimal permanent solution to PC maintenance.

"Sure, there are things we don't know about maintenance," Hock says, "but it hasn't been a problem. We get by quite well." ●

Who do they turn to?

Helpfulness of selected information sources in PC purchase decisions according to company revenue



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CW CHART

It's mostly a family affair

When it comes to solving [illegible] questions, most users are content to consult in-house advisers or make a toll-free call. Even so, complex questions do arise, and companies find their answers in different ways.

Perhaps the most elaborate type of internal service is the call-a-center, like the PC store at Chicago-based Continental Illinois National Bank. Since 1984, the staff has undertaken [illegible] or telephone troubleshooting for the company's micros. Today, there are 1,500 PCs and more than twice that number of users. A rotating group of three people from the end-user support department staffs the store.

"We do have corporate arrangements with some software vendors," says Peg Delaney, the bank's information center manager, "but mostly everything else we can handle ourselves."

Another set of considerations comes into play at automotive parts manufacturer Echlin, Inc. in Branford, Conn. The company writes all of its PC applications in PC/Focus from Information Builders, Inc. It also has a full complement of purchased productivity tools.

According to Richard Hock, Echlin's director of MIS, virtually all of the applications maintenance and troubleshooting falls to internal MIS staff. Purchased programs do present extra problems, but, Hock says, company policy has minimized them. "We didn't proliferate PCs," he explains, so there are few beginners. In addition, Echlin mandates the use of standard software products.

The problems of learning the advanced features of standard packages generate most of the service calls at Pepsico, Inc. in Purchase, N.Y. There, says Liz Menten, manager of the information center, it is typically painter software that creates queries. "It is understanding how to use the features, not task problems," Menten says.

Pepsico prefers its PC users to have access to the full range of telephone support. Like Echlin, it continues [illegible] but [illegible] of standard packages, [illegible] hotline [illegible], [illegible] and [illegible] support [illegible].

Advocates of corporate [illegible] PC support is to designate a PC guru. The problem is that the guru often turns to [illegible] — sometimes there aren't enough calls to keep the support [illegible], and other [illegible] unemployed.

MICHAEL BALL

TIPS FOR THE LAN WEARY

BY JAMES BRYCE

MIS, be warned: Step gingerly and carry a big list if you're about to power up a new personal computer network. While PC-based local-area networks have much to offer, they should be installed with care to avoid costly and unnecessary mistakes.

Computerworld recently interviewed PC network administrators and experts, each of whom offered their observations on practical, working networks. Armed with the following valuable tips, you, too, can boldly go where many have gone before.

Set up thorough training. A well-implemented training program will save the PC network administrator from being deluged with service calls; it will also help users gain optimum performance by making clear the network's capabilities.

CRS Sirrine's Spain

Training can be accomplished either in-house, by the vendor or both. Del Poss, administrator of the Apple Computer, Inc. Macintosh network for the Department of Data Processing at the University of Texas at Austin, says, "Make sure your vendor can give you the training when you need it; build training into your specifications along with the other support."

In addition, the experts say, ongoing training for each employee is essential for a smooth-flowing network. Howie McCausland provides a multilevel approach to training. As Harvard University's network operations manager for arts and sciences, McCausland oversees the campuswide backbone network.

"We have short talks for the users, and this summer we'll have seminars on what we have, what we do and how to use it," McCausland explains.

Design a simple user interface. Once users understand the basics, the nuts and bolts of network manipulation should be hidden from day-to-day operation.

Syd Spain, research specialist and network administrator at Houston-based international architectural firm CRS Sirrine, Inc., says he advocates using menus to make network functions more visible.

Ideally, a user should simply be able to turn on the machine, enter a logon name and password and immediately be able to see and select from a menu of applications.

"The user interface is important, particularly in an IBM Personal Computer environment, where there is no consistency like that of a Macintosh," says the University of Texas's Poss.

Assign a network administrator. Network administrators should be able to devote a significant amount of time to making sure the network is running properly.

For Harvard's large network, McCausland explains, the university "needs a central administrator to hand out addresses. Someone has to keep track of what's where."

In CRS Sirrine's network, administration becomes a full-time job, Spain points out. "We have divisional administrators and an overall administrator in MIS," he says.

In a small network of 10 to 20 workstations, network administration may be only a part-time job. In any case, the position requires coordinating equipment purchasing, maintenance, training, system configuration, application selection and day-to-day needs.

Set up continued maintenance. No matter what else happens, sometimes the hardware will fail, the cable system will have problems and the software will not do what it is supposed to.

Polytechnical's Frisch

Three maintenance alternatives are available, depending on the size of your network:

- **Do it yourself.** "Send your people to the technical schools and seminars and have them maintain it all," says Norm Vogel, director of communications research at the Department of Computer Science at the University of North Carolina at Chapel Hill and director of its PC network.

Chapel Hill's Vogel

- **Use service contracts.** "One of the dominant constraints in planning a system is a uniform service agreement for the whole thing," says Ivan Frisch, professor of computer communications at the Polytechnical University of New York.
- **Pay as you go.** "Maintenance contracts are good, but the systems have proven so reliable that the cost-effectiveness of such contracts is questionable," CRS Sirrine's Spain says. You may want to try a combination of maintenance methods.

Select and monitor application software. "Selection of the application software should be one of the first things you do," Frisch says.

Application software must be compatible with the network operating system. In addition, experts say, be sure the applications are used effectively on the network. Policies should be set for software that must be used cooperatively to be effective. But beware of de facto standards in software; the product that is most widely accepted may not always be the best. In such cases, the University of Texas's Poss points out, "We support both the best and the standard."

Prepare complete documentation. "Document the cabling system, label the ends and maintain an on-line data base of the system," UNC's Vogel says. The need for documentation extends to every element — the cables, the software and the hardware. In addition to requiring full documentation for every vendor and installer, Poss augments what he gets. "We create our own documentation for applications so the users are not overburdened by the original vendor's documentation," he says.

Plan for cabling costs. If anything is overlooked in planning a LAN, it is cabling costs. While planning is important, Harvard's McCausland emphasizes that a cable purchasing budget that is too strict can cost more in the long run. "Resist the temptation to cut corners on things that will help later, such as patch panels and labeling," he stresses. "What looks like gold-plating can have substantial payoffs down the line."

Coordinate backup. "Backup has been the most difficult part of our system," says Melissa Freeman, network administrator at Baker & Price, PC, a law firm in Austin, Texas. "Be very sure that the backup equipment is 100% compatible with the network." In a LAN, backup responsibility must be carefully enforced. Some vendors, such as Novell, Inc., 3Com Corp. and Banyan Systems, Inc., have products that will back up remote and even mirror file servers so that a failure of one may be covered by its twin.

Monitor and protect power levels. "We protect against power failures with UPS equipment on the server, the administrator's workstation and the backup tape system," Freeman says. Monitoring products can even sense the loss of main power, advise all users that the system is switching to batteries, record everything in random-access memory and shut down the entire system. In a larger network, the integrity of the network system should be protected. The University of Texas's Poss says, "We are planning a token-ring backbone network. We'll probably use battery backups on the ring repeaters." •

Bryce lectures, conducts seminars and writes on computing, high technology and the effects of technology on society.

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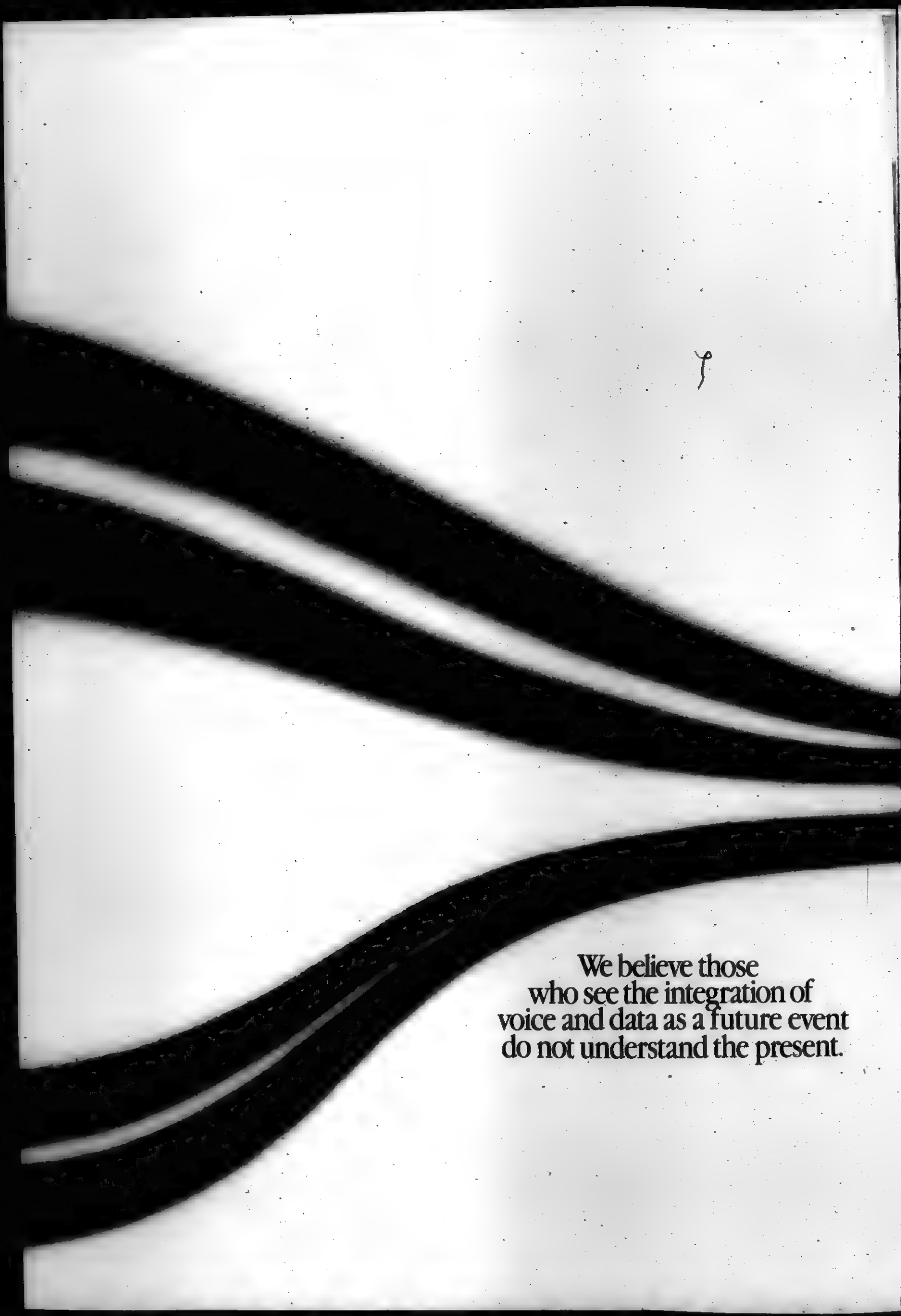

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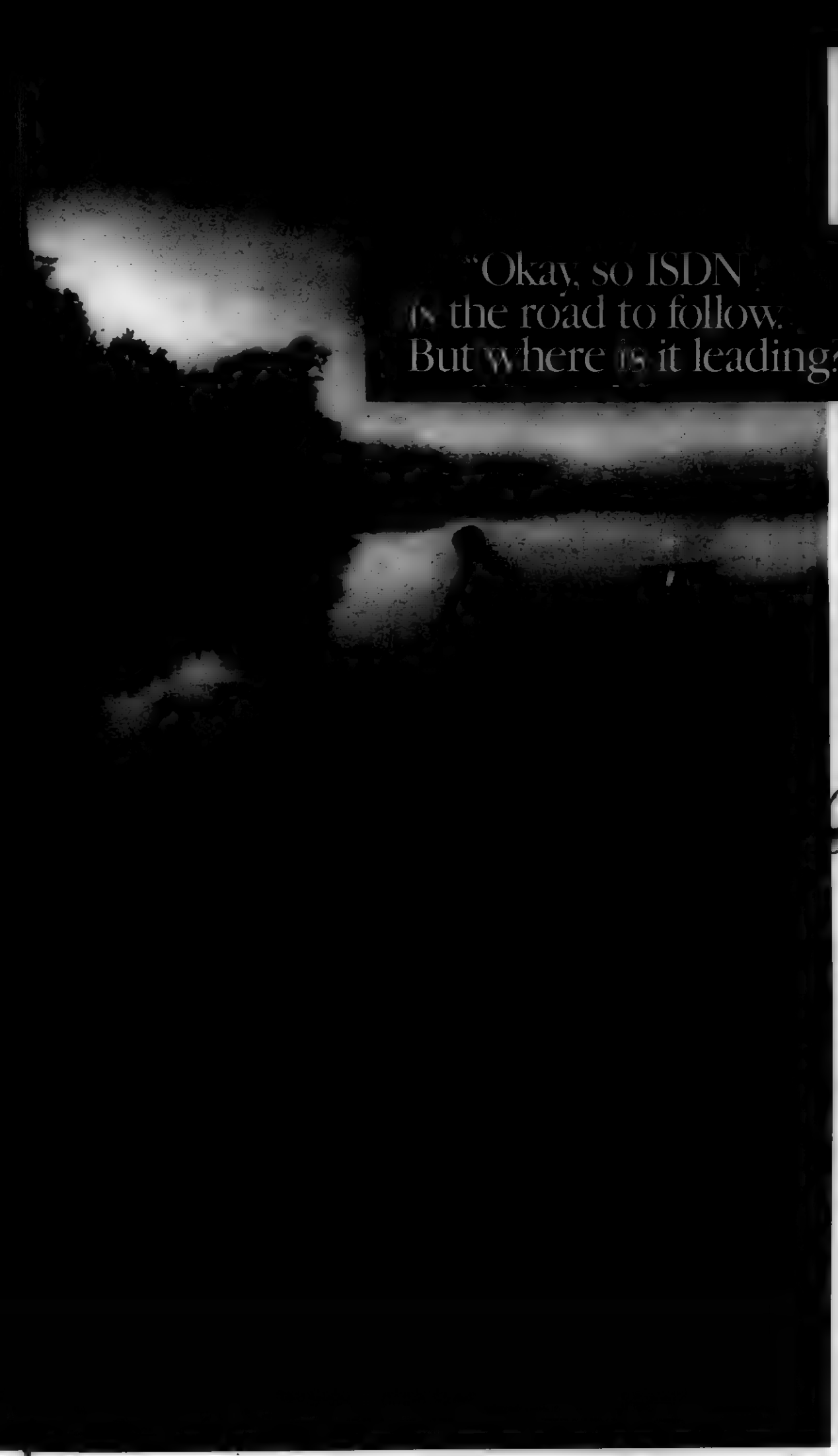

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From AT&T

DATA STREAM

Clare Fleig

IBM strategy ups the ante

IBM has launched an all-out attack on the telecommunications market segment with a three-pronged strategy focusing on acquisition, alliance and accommodation.

The strategy, which has been actively touted by IBM only recently, is a marked change from its earlier efforts to internally develop and market telecommunications-oriented equipment and applications.

But unlike many of those earlier efforts — including partnerships with MCI Communications and Satellite Business Systems, IBM's failed European-based private branch exchange (PBX) Carnation line and initial losses stemming from the Rolm acquisition — IBM has a real chance of succeeding this time around. This is because both the environment and IBM's way of addressing it have changed.

Full plate

IBM has shifted its view of telecommunications from something seen as a separate business opportunity that would be nice to have a piece of to a platform for

Continued on page 68

DCA sketches out 10Net plans

Aims to use division as vehicle for drive into networking market

During the past year, local-area network companies have become hotter than a ticket to a Bruce Springsteen concert. With research firms like International Data Corp. predicting that LAN installations will increase by 125% by 1992, the purchase of a LAN firm may seem like a quick and easy entry into a gold mine.

10Net's Goodall

DCA's Ottinger

Last August, communications products maker Digital Communications Associates, Inc. (DCA) scored when it merged with Fox Research, Inc., a low-end LAN gear maker it subsequently renamed 10Net Communications. Recently, *Computerworld* staff writer James Daly talked with 10Net President Gregg Goodall and DCA President Jim Ottinger about the changes that have occurred at the two firms during the past eight months.

Eight months after your merger, what changes should users be seeing?

Goodall: We've increased our [efforts] in the domestic marketplace ... determining where our products best fit in penetrating those market opportunities. We've created quite a bit of awareness and sales for 10Net products.

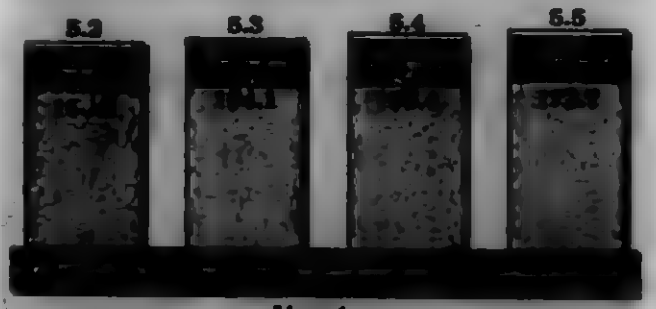
Ottinger: In the past, we've always had a lot of questions about what we are doing about local-

Continued on page 67

Data View

PBXs keep climbing

While the U.S. market for private branch exchanges continues its ascent, the smallest systems will be taking the biggest steps



INFORMATION PROVIDED BY THE MARKET INFORMATION CENTER, INC.
CW CHART

Btrieve revs SQL engine

BY PATRICIA KEEFE
CW STAFF

Novell, Inc.'s plans to introduce an SQL data base product this summer via its Softcraft, Inc. subsidiary will not necessarily deter users of its Netware network operating system from using competitive products.

Austin, Texas-based Softcraft is readying a new version of its Btrieve data base utility that is said to feature full ANSI-standard SQL. In addition, Novell is reportedly working on a multiple coprocessor high-performance

Continued on page 73

Versatile Netmaster ousts IBM

BY PATRICIA KEEFE
CW STAFF

GREENVILLE, S.C. — A countywide medical network here was able to achieve significant savings and greater functionality by cutting out IBM's host-based Netview network management system and transplanting Netmaster, a competitive product from Cincom Systems, Inc.

"In three years, the money we'll have saved from Netview costs will have paid for Netmaster," said Jerry Madden, senior software analyst at the privately run countywide organization.

Admittedly "true Blue" when it comes to hardware and major medical applications, Greenville Hospital System (GHS) is a little more adventurous when it comes to systems software, Madden conceded.

For example, the computer center recently went through a data base evaluation process and chose the Ideal fourth-genera-

Continued on page 72

Inside

- Telebit, Hayes add modems. Page 72.
- Banyan users rally for DEC support. Page 73.
- Dataspace hardware device allows remote access to Appletalk network via phone lines. Page 74.

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Other Unix database vendors

1) Don't address the problem
2) Sacrifice performance
3) Use complex raw devices

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DCA

CONTINUED FROM PAGE 65

area networks. Now we have a very tangible answer.

10Net has traditionally received 70% of its revenue from overseas; the reverse is now true. How did you do it?

Goodall: We've branched out into the government sector and small- and medium-size business markets. We've also leveraged the reseller and distribution base DCA already has in place to give us a great opportunity not only to crack new markets but deepen our penetration of markets we're already in.

10Net's fiber sales have increased considerably because of your push into the government sector. Will this continue?

Goodall: Definitely. We'll be introducing some add-on fiber products very shortly that will allow us to get involved with large-bid opportunities. Now that we've got our foot in the door, it's opening up additional governmental opportunities for our standard twisted-pair product.

> "IN THE PAST, we've always had a lot of questions about what we are doing about local-area networks. Now we have a very tangible answer."
>
> JIM OTTINGER
> DIGITAL COMMUNICATIONS ASSOCIATES, INC.

Can you map out 10Net's OS/2 strategy?

Goodall: With the release of 10Net Plus, we have full [IBM] Netbios and full Server Message Block [SMB] protocol support. Part of Microsoft's LAN Manager was the support of the SMB protocols within the LAN Manager. So, we fit into that very nicely. We also have a 10Net Plus operational in the DOS environment, interoperating via a Sytek Netbios bridge to a LAN Manager OS/2 environment with full file and printer sharing. So, we're offering a migration path.

Does DCA have the resources to pull off its Communications Manager alternative, or will it have to subcontract the work out?

Ottinger: We're going to do that 100% in-house. We have 30 to 40 engineers working on it now, and we have up to 300 engineers if we need them. We are fully confident that we can complete the project with no problem.

10Net's recent unbundling of its software puts it in direct competition with Novell, Inc.'s Netware. With Netware so entrenched, aren't you swimming against the tide?

Goodall: It wasn't done to be directly competitive with Netware in an MIS department in a Fortune 100 company. It's really [targeted more at] an IBM Personal Computer LAN program environment. Users who have a token-ring hardware environment now have a couple different products to choose from, but not many.

Perhaps a medium-sized or small company wishes to implement token-ring hardware. Now, they can get the advantages of 10Net software, as opposed to a more complex and expensive offering, such as Netware.

Can you give an update on a couple of projects announced after the merger? One was a bridge linking 10Net to IBM's Token-Ring network.

Goodall: We'll shortly be releasing a Netbios bridge, which we have in beta test, and an [Apple Computer, Inc.] Macintosh-level bridge. The Nethios bridge will allow us to bridge from a 10Net Plus twist-

> "WE'VE CREATED quite a bit of awareness and sales for 10Net products."
>
> GREGG GOODALL
> 10NET COMMUNICATIONS

ed-pair or fiber-optic LAN cluster installation into a token-ring or Ethernet cluster.

What about an intelligent 10Net card with an on-board processor and random-access memory?

Goodall: We have de-emphasized that product in lieu of some more advanced fiber-optic offerings. There's more opportunity there.

What's ahead for your companies, both separately and together?

Ottinger: We're going to use 10Net as our main technical vehicle for LAN products. They've got a very solid and well-rounded product line that's been very profitable, and their sales have increased threefold since the merger. We [may] help them with some direction, [but] essentially they've got free rein.

Goodall: Now, we must concentrate on leveraging the distribution strength DCA has to help pump as much of our products into the market as we can.

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FROM PAGE 65

selling everything from processors to software applications to network management programs to voice/data customer-premise equipment.

By using telecommunications for competitive leverage, IBM effectively ups the marketing ante, not only for traditional telecommunications suppliers, but also for data processing and data communications vendors and the minicomputer and personal computer suppliers that see communications offerings as a key part of their system sale.

IBM is raising the stakes with three primary tactics: acquisition, alliance and accommodation. So far, its most visible moves have been via acquisition: most notably, its cornerstone 1985 acquisition of Rolm.

Rolm, of course, gave IBM access to vital computerized branch exchange technology, as well as an established group of experienced telecommunication marketing representatives and system engineers to sell and service the equipment. IBM used a similar, albeit less drastic, tactic with Network Equipment Technologies (NET). Although IBM did not actually acquire NET, the joint-development agreement signed between the two vendors has essentially given IBM the right to acquire NET's T1 protocol technology.

The company's most recent acquisition is Pactel Spectrum Services, the ailing customer service and troubleshooting unit of Pacific Telesis Group. Left to its own devices, Spectrum Services is potentially as insignificant to IBM's bottom line — except in terms of losses — as it proved to be to Pactel's. But, rolled into the IBM National Services Division to support Netview and telecommunications-specific systems integration projects and to establish a niche service for facilities management programs, Spectrum Services should add a strong value-added offering to IBM's telecommunications arsenal.

Phases 2 and 3

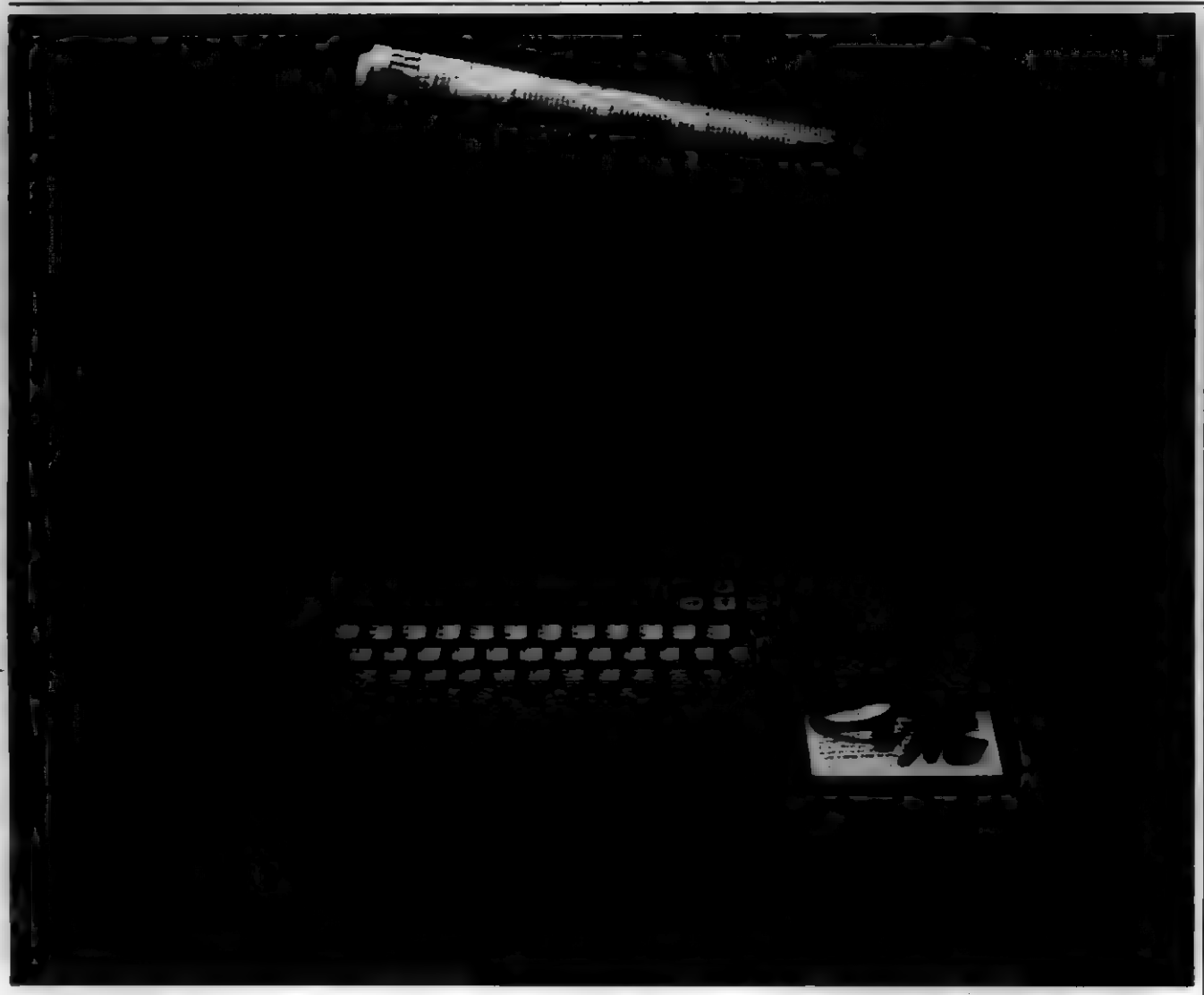
Alliances are the second key component to IBM's competitive telecommunications edge. IBM has formed joint-development and technology cross-licensing agreements with firms worldwide, including United Technology, Ericsson in Sweden, Siemens AG in West Germany and Nippon Telephone and Telegraph in Japan. In addition, IBM's concentrated efforts to solicit third-party product development under Netview have resulted in nearly 30 vendors' participation.

And, during the last 18 months, particularly since the introduction of Netview/PC and Open Communications Architecture, IBM has shown a strong tendency to accommodate its telecommunications offerings to the customer's installation. In IBM lexicon, accommodate means to provide an interface into or a method of managing non-IBM products, services and transmissions.

These types of interfaces currently include the following: Business Communication System, designed as the interface into IBM's Systems Network Architecture (SNA) for voice and non-IBM data traffic; and Netview/PC, designed to manage voice, IBM's Token-Ring network and non-SNA data traffic within the SNA environment. The Netview/PC-based Rolm Alert Manager, for example, currently accepts alerts from Northern Telecom and AT&T PBXs. That same kind of accommodation is also likely to occur for European PBX makers.

Given the growth potential of telecommunications projects in the government, commercial and system integration market segments, as well as the increasing importance of communications integration at all levels of the business market, it is a virtual certainty that IBM will acquire, align, accommodate and leverage its way into a leadership role as a telecommunications provider.

Fleig is director of systems research specializing in local-area networking and IBM communications for International Technology Group in Los Altos, Calif.



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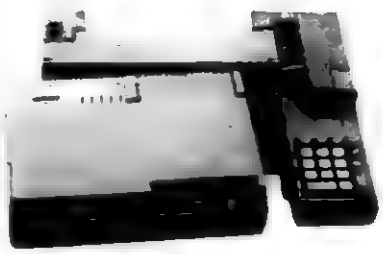

Like its Silent 700™ predecessors, the LT220 sets new standards for portability, durability and reliability. All of which makes it the perfect tool for anyone who's ever wished for a VAX in their briefcase. In short, this may be the best little terminal in the world.

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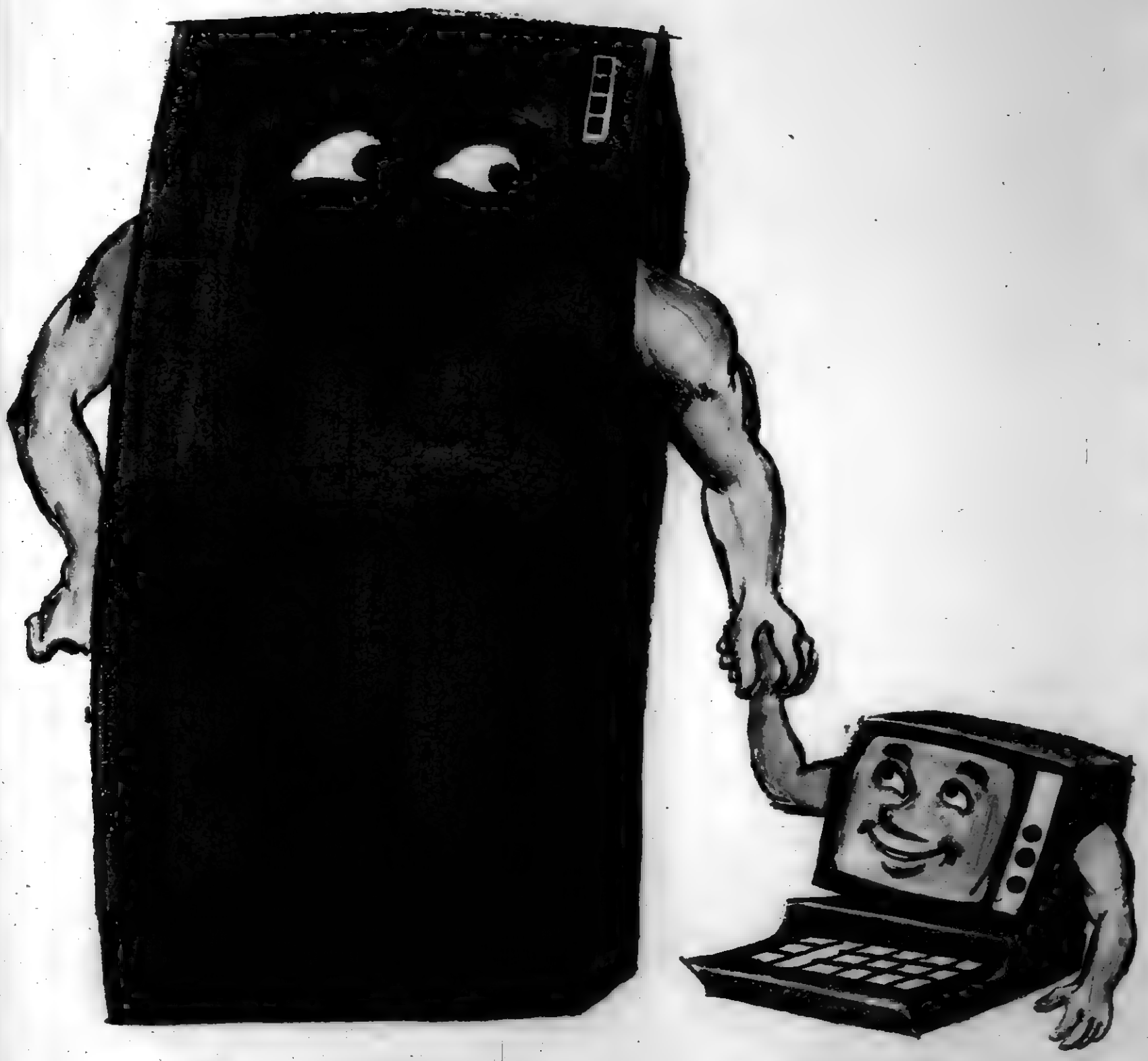
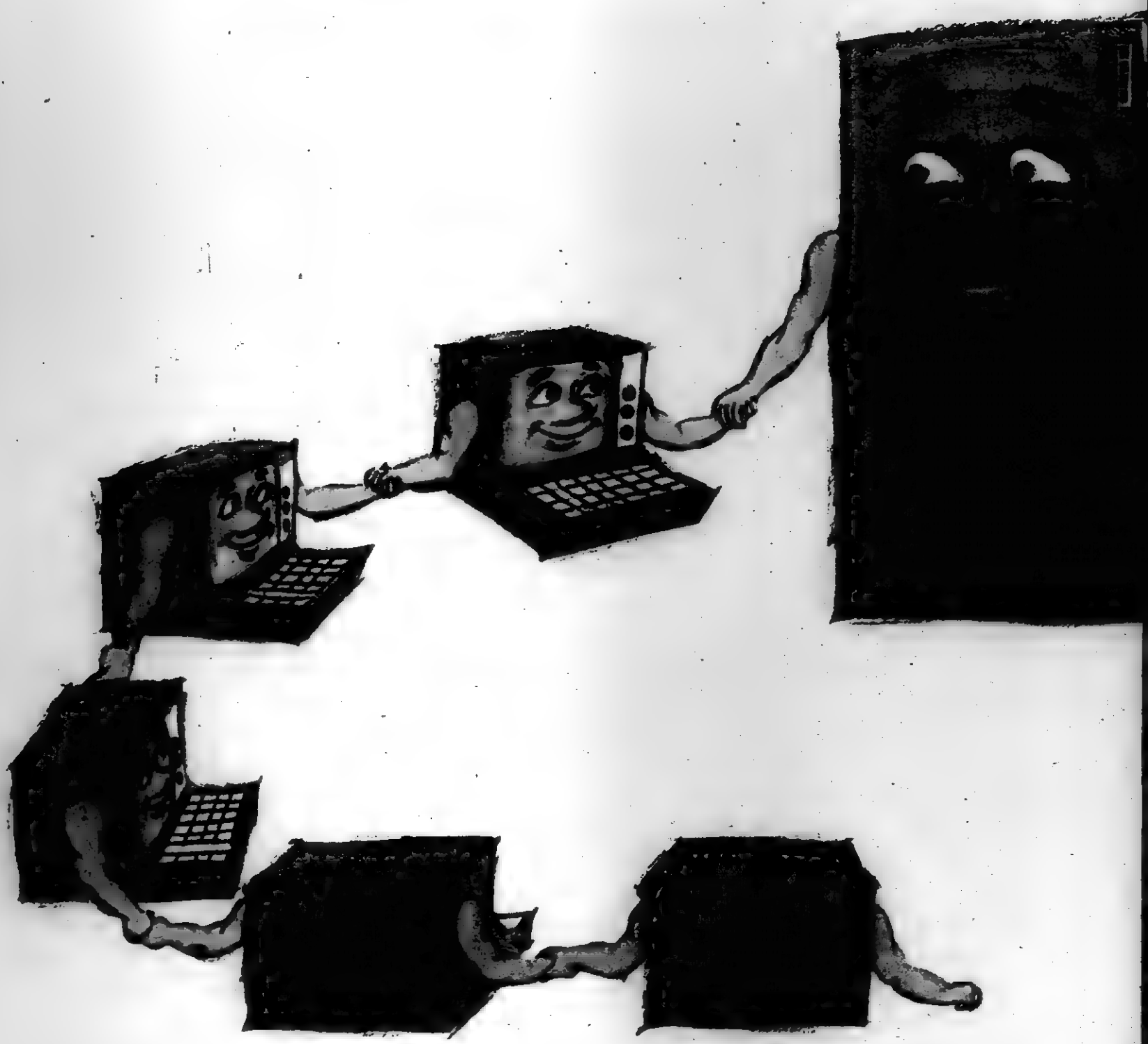
The PC war is over.



The mainframe.

The PC.

PC Integration: the world of



Hottest topic in computers.

The PC war is over, and the computer professionals have won.

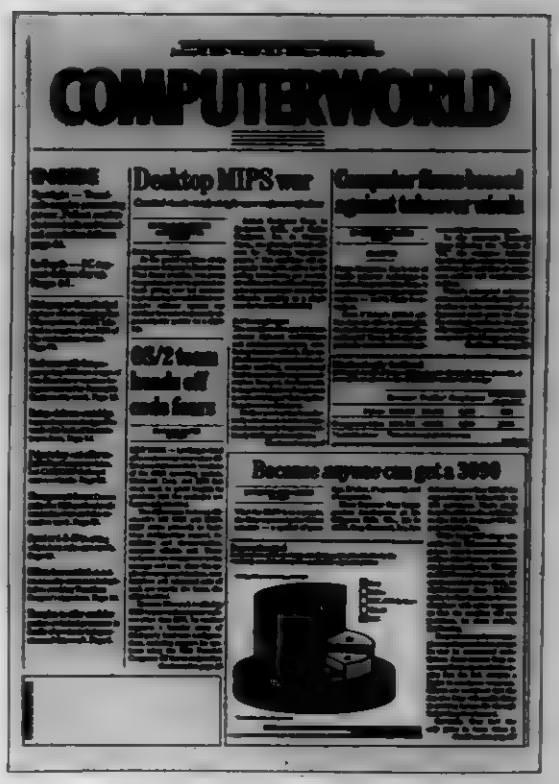
Almost overnight, the market for personal computers has changed. The individual user no longer runs out and buys whatever strikes his or her fancy.

PC's have grown up, and MIS has taken over responsibility for their role in the corporate information system. "During the past three years, everything has become integration," says Leon Jackson, senior research analyst at Arthur D. Little. "The only computer force that can provide integration is MIS."

The standalone personal computer has become part of a network. And MIS departments are working to set PC standards so that their organizations can benefit from sharing of information, including databases and software.

The stakes are huge. This year, companies will spend more dollars buying PC's than they will spend on mainframes.

And who will control this spending? The readers of Computerworld, of course. It's the newspaper of record for information systems management. Put your money where your market is. In Computerworld.


COMPUTERWORLD

Desktop MIPS war

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Telebit, Hayes fill modem gap

BY PATRICIA KEEFE
CW STAFF

Introductions last week from two major players in the modem market put yet another notch on their standards belts.

Telebit Corp. in Mountain View, Calif., entered the synchronous market with what it claimed is the industry's fastest dial-up modem. The Telebit T2000, which operates at 19.2K bit/sec., supports IBM's Systems Network Architecture and Synchronous Data Link Control (SDLC) communications.

Telebit claimed it provides the cost efficiencies of a dial-up modem network without sacrificing performance.

Telebit's Packetised Ensemble Protocol reportedly enables the Telebit T2000 to intelligently divide telephone bandwidth into hundreds of independent data channels and transmit data across the entire bandwidth. When faced with deteriorating line conditions, T2000 modems adjust their data transmission rates in small increments, maintaining high speeds while ensuring data integrity vs. dropping data transmission by up to one-half, Telebit said.

T2000 modems also provide built-in processing power, asynchronous communications, guaranteed error-free data delivery and local acknowledgment of host-generated SDLC Supervisory Frames and Information Frames.

Hayes throws in support

Continuing its support for international standards, Hayes Microcomputer Products, Inc. said it will provide products implementing the new CCITT Recommendation V.42, which ensures point-to-point modem error control.

Establishment of this standard enables the communications industry to shift its focus to the future of point-to-multipoint communications through public data networks, the CCITT X.25 standard and Integrated Services Digital Network, the Atlanta-based firm said.

Hayes said it will offer a firmware upgrade for current and past V series system products to ensure compatibility with the new V.42 standard.

Netmaster

FROM PAGE 65

tion language and Datacom data base from Princeton, N.J.-based Applied Data Research, Inc., bypassing IBM's DB2.

Similarly, when searching for a network management package that could meet several objectives outlined by a GHS vice-president, Madden said his department chose Netmaster. "We went through a 30-day trial in January and never took the product [off-line]."

Cincom claimed Netmaster could do everything IBM's Netview could do and more, Madden said. This is important because Netmaster has to support a vast and mountainous array of IBM equipment at GHS, which has "just about one of everything IBM makes," Madden noted.

That translates into 600 terminals, including 150 to 200 IBM Personal Computers and some Personal System/2s; one System/38; four or five System/36s; two 5520s; and two mainframes — a 3081 and a 4381 that run MVS/XA and VM, spread out across a 2½-mile campus and beyond, into nine hospitals and several clinics and mental health centers throughout the county.

In addition, the GHS is in the process of implementing an IBM Token-Ring network. The largest on-campus facility is Memorial Hospital, which uses coaxial cable-based direct attach for connectivity. Other on-campus buildings are attached remotely through either telephone lines or a Rolm Corp. switch.

Looking out for users

Beyond supporting this IBM environment, GHS had other network management requirements: provide one front-end user sign-on screen, avoid forcing users to sign on twice under a new security package and provide support for multiple sessions for users via software vs. hardware.

Madden said when he went to his IBM representative, he was told Netview could not meet those demands — a statement later refuted by an IBM Netview specialist, but too late.

So Madden and his manager did not look at Netview. They looked instead at Netmaster, V Man from Computer Associates International, Inc., Super Session from Candle Corp. and TPX from Duquesne Systems, Inc.

"Netmaster could meet our requirements immediately, and it was also the full equivalent of Netview plus [more]," according to Madden.

Several key Netmaster enhancements included a session capture facility, which allows the help desk attendant to view a user's screen, and the ability to record problems in an application in order to view them later.

Netmaster is up and running everywhere but is not yet fully implemented. The single-user interface should be on-line by the end of this month.

Madden pressed Cincom on future directions. One area of concern was IBM's central site customization feature, which allows MIS to customize at one site and transmit to a remote site via Netview. Cincom promised similar support.

"In all fairness to IBM, we were using Netview Version 1, which, as I remember, is packaged differently than a later, improved version of Netview," Madden said. When GHS bought Netview, back in the fourth quarter of 1986, "there was really nothing else."

Even so, comparing Netmaster with Netview today, Madden questions how anyone could be willing to pay for the latter after seeing the former. Even the IBM Netview specialist, who flew in to see Netmaster, admitted the product was "slick," Madden concluded.

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ADOBE SYSTEMS INCORPORATED

Users rally Banyan for DEC support

BY JAMES DALY
CW STAFF

At a recent meeting of the Association of Banyan Users International (ABUI), a Banyan Systems, Inc. representative asked how many would be interested in a version of Banyan's Virtual Networking Software, or Vines, operating system for the Digital Equipment Corp. environment. Dozens of hands went up.

"Then I'm afraid the news I have to report won't be encouraging," confessed David Williams, Banyan's director of product planning, "as our DEC compatibility plans have been pushed down the pike a little."

The resultant audience grumble as Williams explained that Apple Computer, Inc. Macintosh and IBM and Microsoft Corp. OS/2 compatibility had "been pushed higher into the queue," spoke volumes about how important DEC connectivity is to many Banyan users. According to analysts, many Banyan users employ DEC VAXs for number-crunching duties.

"The delay was expected because they had gotten so wrapped up in finishing up Vines Version 3.0, but we still wanted specifics," ABUI Vice-President Derek Flickinger said. Within a few hours of Williams' unsettling news, ABUI members launched a DEC special interest group.

Nearly 50 companies responded to a hastily arranged meeting between Banyan and the fledgling group during the waning hours of the conference. Some participants rearranged or canceled flights to attend.

The group asked for better integration of terminal emulation, servers running on DEC's VMS and for Banyan's response to Novell, Inc.'s Netware on VMS, a spokesman said.

The group is confident that Banyan will give them more than lip service. Banyan management recently stated that the firm gets 80% of its ideas from users.

Although Williams assured users that their plans for a higher level of DEC connectivity will certainly not be abandoned, "we also have to stress our longer range strategic objectives," he said. "While it's clear our users are very serious about DEC, we have to look at both ends of the market."

Btrieve

FROM PAGE 65

server [CW, May 2].

The SQL Btrieve was to be unveiled at the June PC Expo in New York.

Softcraft has referred all questions to Novell, which declined to comment beyond saying it was not announcing a product at this time.

Where Softcraft reportedly is taking a back-end approach, other SQL products will include a front end. Needs and expertise will determine which way Novell users go, according to Lloyd Caldwell, a data base administrator at the Utah College of Business Computer Center in Salt Lake City.

A back-end engine only holds the data, responds to queries and sends off data. Users seeking speed, fault tolerance and transaction processing capabilities might stick with SQL Btrieve under Netware, as might users willing to write applications that enable them to manipulate the data they have accessed, Caldwell said.

"The Btrieve stuff really screams — it's a lot faster than anything else I've seen," Caldwell added. Conversely, other users may prefer a full-blown SQL data base, or one that includes a front end — specifically, report generation, input generation and other applications.

SQL Btrieve is expected to counter SQL server capabilities offered by Microsoft Corp. and Sybase, Inc., IBM, Ashton-Tate Corp. and Lotus Development Corp. It also helps Novell to round out its suite of OS/2 connectivity offerings.

Sock it to 'em

"Once again, part of Novell's strategy is centered on counterpunching both the strategy and tactics of Microsoft, while also providing a performance edge over the [Microsoft and Sybase] data base," commented David Terrie, president of Newport Consulting, Inc. in Scituate, Mass.

Part of Novell's challenge will be to get third parties to write front ends to its back end, Terrie added. "IBM and Microsoft have a whole lineup of third parties that will introduce important applications for their end users," said Richard Finkelstein, a senior consultant with Codd & Date Consulting Group.

The potential buyers of Novell's SQL offering include its very large installed base, estimated by Dataquest, Inc. to be 50% of the personal computer local-area network market. Btrieve, too, has a huge installed base, Finkelstein said.

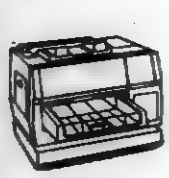
"My customers are very interested," said Tyrone Pike, president of LAN Systems, Inc., a Novell reseller and Btrieve developer in New York and Los Angeles. Many of his accounts use Digital Equipment Corp. VAXs, IBM MVS, TSO and DB2 and Oracle Corp.'s Oracle data base.

The SQL engine would provide Netware users with access to DB2 or Oracle Corp. servers off the network environment, Finkelstein said.

The current SQL-based Btrieve can run as a back-end data base process on the server and lacks ad hoc programmatic interfaces to let users make quick tabular reports, for example, Pike said. "To make SQL a full ANSI-standard SQL is not a radical departure from what they have today."

To effectively compete with these products, the updated Btrieve will have to offer an open application programming interface that is third-generation oriented for procedural languages; object-oriented tools; complete data integrity; commit and rollback; recovery and security facilities; a cooperative mode operation with other SQL servers; and remote access, Finkelstein said.

And choose.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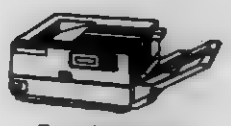
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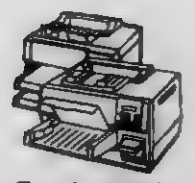
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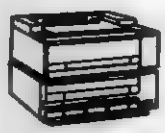
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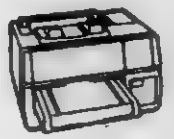
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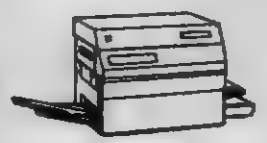
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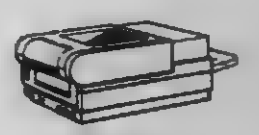
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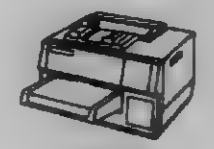
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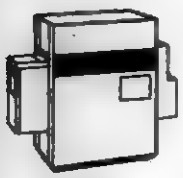
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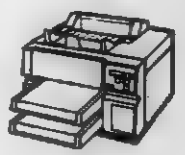
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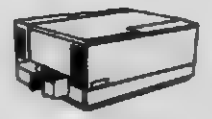
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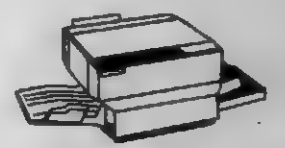
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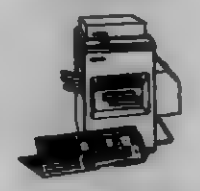
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NEW PRODUCTS

Local-area network hardware

A hardware device that allows remote access to an Apple Computer, Inc. Appletalk network via telephone lines is available from Dataspace Corp.

The Telenode is a node on an Appletalk network connected to any intelligent modem, which is then attached to an external telephone line. Hardware configuration may take two forms: asynchronous connection via modems and asynchronous connection via a public branch exchange.

The Telenode is compatible with modem speeds between 1,200 and 19.2K bit/sec. on the asynchronous side and standard 230.4K bit/sec. Appletalk on the other side.

The Telenode costs $595.

Dataspace, Unit 9, 185 Riviera Drive, Markham, Ont., Canada L3R 5J6. 416-474-0113.

Local-area network software

Meridian Technology Corp. has announced Outlat/DOS, a software implementation of Digital Equipment Corp.'s Local Area Transport protocols for Microsoft Corp. MS-DOS. The product permits IBM Personal Computers and compatibles to connect as Local Area Transport terminals to DEC VAX/VMS systems.

Included is a device driver for 3Com Corp.'s 3C501 and Micom-Interlan, Inc.'s N15010 Ethernet interfaces. The product does not require Decnet.

Outlat/DOS is priced at $150.

Meridian Technology, P.O. Box 2006, St. Louis, Mo. 63011. 314-394-1600.

Links

Data Design Associates has announced a new version of DD-Link, its micro-to-mainframe link that supports the IBM Personal System/2 series. DD-Link allows users to store mainframe data on the microcomputer without programmer assistance, enabling the user to manipulate data at any time without the delays associated with mainframe batch processing.

The product is available for the IBM 3270 Emulation board and supports IBM's High Level Language/Application Program Interface.

Pricing starts at $10,000 for the initial machine and $2,500 for each additional PC. Site licensing is available.

Data Design, 1279 Oakmead Pkwy., Sunnyvale, Calif. 94086. 408-730-0100.

Modems/Multiplexers

A speech data multiplexer that allows one voice channel and one data channel to be combined over the same tie line or analog leased line has been announced by Advanced Compression Technology, Inc.

The SDM-1 uses a proprietary voice-compression algorithm to provide communications-grade voice quality at 9.6K bit/sec.

Other features include built-in adaptive echo cancellation and suppression for use with two- or four-wire circuits.

An integral off-premise exchange option permits use with key telephone systems.

Dynamic bandwidth allocation automatically shifts unused voice bandwidth to the data channel or vice versa.

The SDM-1 carries a price tag of $1,990.

Advanced Compression, Suite 104, 31368 Via Colinas, Westlake Village, Calif. 91362. 818-889-3618.

Diagnostic equipment

A personal computer-based protocol analyzer said to provide decode analysis for IBM's Systems Network Architecture, CCITT X.25, V.35 and Integrated Services Digital Network protocols has been introduced by Atronix, Inc.

The Atronix LM1 Protocol Analyzer with Version 4.0 Software features Level 3 decode protocol analysis as well as autoconfiguration, time stamping, a soft breakout box, a built-in asynchronous terminal and interactive Basic simulation. Character, hex and mnemonic data is displayed in real time, with IBM Synchronous Data Link Control frame data available during buffer display.

The analyzer fits in a half-card slot in an IBM Personal Computer or compatible. It is priced from $1,595.

Atronix, 780 Boston Road, Billerica, Mass. 01821. 617-663-5100.

Cabling

The Plexit twisted-pair Ethernet driver designed to replace Ethernet transceiver cables has been unveiled by Plexcom, Inc.

The Plexit driver can be used in pairs or with a concentrator, the vendor said, and it permits data transmission over existing telephone wire to a remote peripheral. It is available with an optional external power supply. Up to 250 ft of horizontal unshielded twisted-pair cable between the wiring closet and the work area is supported.

The Plexit costs $95 or $135 with the power supply.

Plexcom, 65 Moreland Road, Simi Valley, Calif. 93065. 805-522-3333.

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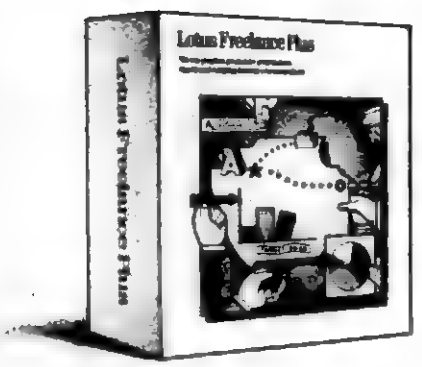

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SYSTEMS & PERIPHERALS

HARD TALK

Stanley Gibson

Silverlake advent nigh?

What began as heresy only one year ago is now orthodoxy: Silverlake is the real VAX killer.

This is the new consensus of industry analysts and observers, many of whom took as dogma in 1987 that the IBM 9370 was to be IBM's mid-range messiah.

But the 9370's disappointing first year and the willingness of consultants to believe in the ill-defined and mysterious — despite their rational instincts — has led to a coalescing of belief around Silverlake.

Thus it has come to pass that a product that is still technically a rumor now carries the ball for IBM in its most contested market. The world's largest computer company is fighting off DEC's dreaded VAX with an unannounced product.

Many users, petitioning universal powers for guidance, have had revealed to them out of the Blue that there will indeed be a Wonderful Processor, and should they believe in It, they will be saved. Indeed, angels from Armonk have been visiting many doubting souls and revealing all to them. The humble users must not, however, dis-

Continued on page 78

WORMs to enjoy storage reign

BY J. A. SAVAGE
and STANLEY GIBSON
CW STAFF

There are as many recording standards for 12-in. write-once read-many (WORM) optical disk drives as there are earthworms in a spring garden, and the number is not likely to decrease. However, for the 3½- and 5¼-in. WORM varieties, the laws of natural selection will settle disk writing standards, probably by the next harvest moon.

The standards will make it possible for one manufacturer's disks to be read by another maker's drives. The result will likely be an increasing number of optical storage devices creeping into data centers nationwide.

The American National Standards Institute (ANSI) technical committee, X3B11, voted Continuous Servo the standard for 5¼-in. media in late March. A final vote is expected in July.

Continuous Servo was approved over Sampled Servo and Sampled Servo with a variable track pitch, which allows for track compression and, therefore, room for technological growth, supporters said. However, these standards may yet gain separate approval, according to Ken Hallam, president of ENDL Associates in San Juan Capistrano, Calif., a consulting firm specializing in standards. Hallam sits on the ANSI technical committee.

The Continuous Servo standard continually looks at a track, such as a Winchester drive, whereas Sampled Servo samples a track at timed intervals. Continuous Servo is claimed to be faster, and Sampled Servo is supposedly cheaper. The committee is currently deciding whether or not the advantages of both are distinct enough to warrant establishing two separate standards, according to Hallam.

Continued on page 77

Can PC LANs succeed where 9370 failed?

Cutting deeper inroads

Compared with IBM users, larger percentages of Wang and DEC customers plan to increase mid-range expenditures this year

INFORMATION PROVIDED BY THE SIERRA GROUP
CW CHART

BY STANLEY GIBSON
CW STAFF

TEMPE, Ariz. — Digital Equipment Corp. will continue to make inroads into the mid-range computing heartland of American financial and banking institutions, according to a recent study by The Sierra Group. And IBM's best hope in curtailing further loss of mid-range turf to DEC lies not in its own minicomputers but in personal computer-based local-area networks, the study found.

"IBM has been unable to leverage its presence as the mainframe vendor of choice to the minicomputer arena and, in fact, has seen its account control erode as respondents reported DEC departmental systems in-

Continued on page 78

Minisuper unveiled

Floating Point adds low-cost low-end unit

BY J. A. SAVAGE
CW STAFF

BEAVERTON, Ore. — Taking little time for breath between product announcements, Floating Point Systems, Inc. recently unveiled a low-end minisupercomputer for technical applications that runs 30% faster and costs 30% less than its predecessor.

The company is trying to reestablish itself after more than a year of enormous losses — $35 million since January 1987.

The M64/35 MCAE Superserver, which is said to process as many as 40 simultaneous compute-intensive jobs off-loaded from engineering workstations, was unveiled less than a month after the company introduced the M64/145, a high-end addition to the same M64 series.

Applications such as fluid dynamics analysis using FIDAP software from Fluid Dynamics International run up to 12 times faster on the Floating Point system than on a Digital Equipment

Continued on page 76

Inside

- HP tape subsystem compresses data. Page 76.
- Emulex reins in disk controller. Page 79.
- Megatape adds backup drives, subsystems. Page 79.

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HP drive offers data compression

BY JAMES A. MARTIN
CW STAFF

GREELEY, Colo. — Hewlett-Packard Co. announced last week what it claimed is an industry first: A ½-in. reel-to-reel streaming tape drive featuring data compression built in to the drive.

The HP 7980XC tape drive is said to use a data compression algorithm that was designed in to the electronics of the tape drive, producing compression ratios of up to 5-to-1. Those ratios are reportedly higher than what is possible with software compression, allowing more information to be stored on a tape.

The benefit of hardware data compression is that it enables the compression to be accomplished independently of the host system, according to Robert C. Abraham, vice-president of Freeman Associates, a Santa Barbara, Calif.-based storage consulting firm.

Currently, only one IBM-compatible tape drive on the market — Hitachi Ltd.'s MT300X — offers data compression, according to Abraham. The HP 7980XC reads and writes data in industry-standard 1,600 and 6,250 character/in. densities. Both formats are IBM and ANSI compatible.

The 7980XC is available now for $32,200. An upgrade kit that converts an existing 7980A autoload tape drive to a 7980XC is available for $11,000.

Minisuper

FROM PAGE 75

Corp. Microvax II and up to seven times quicker than on a Sun Microsystems, Inc. Sun-3/160, a Floating Point spokesman said. The M64/35 replaces the M64/30, which is not upgradeable.

The M64/35 has a base price of $79,900, which includes 8M bytes of memory and a 300M-byte internal disk drive. Also included is software to connect to a host computer, which can be either a DEC VAX or Sun workstation. Software to connect the M64/35 to Ethernet networks with Decnet, Transmission Control Protocol/Internet Protocol or Sun's Network File System protocol is extra.

The system is slated to be available in 90 days.

The M64/35 has a 64-bit word length and 64,000 vector registers. It is expandable to 128M bytes of memory and up to 7.8G bytes of disk storage.

Massively parallel system unveiled

BY STANLEY GIBSON
CW STAFF

IRVINE, Calif. — Active Memory Technology, Inc. (AMT) announced a low-price massively parallel computer system for number crunching applications last week.

The DAP — for distributed array of processors — 510 is intended to operate with a Digital Equipment Corp. VAX or Sun Microsystems, Inc. workstation as a front-end processor. The DAP 510 was designed to handle numerically intensive applications for the host system.

Typical applications are signal processing, medical diagnostic imaging and genetic modeling in biotechnology, according to the vendor.

The DAP 510, which is priced starting at $120,000, can perform from 6 million floating-point operations per second (MFLOPS) to 60 MFLOPS.

The base model includes 1,024 one-bit processors with 5M bytes of memory and interfaces to VAX and Sun systems.

AMT provides software for application development that runs on Sun Microsystems workstations and DEC VAX minicomputers.

The DAP 510 is available 30 days after receipt of order.

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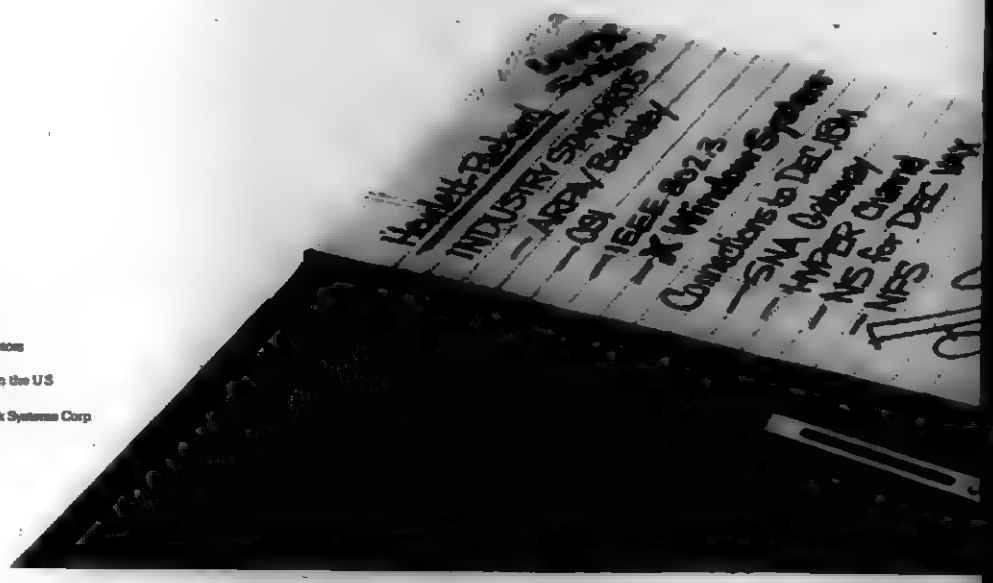

Body-assembly data courtesy of SDRC
Automobile data courtesy of Chrysler Motors

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NFS is a trademark of Sun Microsystems

WORMs

FROM PAGE 75

"You'll see the Continuous Servo standard be the one to emerge," predicted Jay Bretzmann, an optical storage analyst at International Data Corp. (IDC) in Framingham, Mass. Vendors supporting Continuous Servo outnumber the others four to one, he added.

The optical storage industry is expected to grow tenfold in the next five years, according to analysts at San Jose, Calif.-based Dataquest, Inc. Optical storage technology is cheaper per megabyte than other storage methods and allows for generally faster access than tape storage. The ability to store large amounts of data in a small space is also a great benefit of optical storage. Analysts said optical storage will catch on fastest in systems geared toward storing images.

Approval of the Continuous Servo standard paves the way for erasable disk standards, which are identical to WORM standards, according to ENDL's Hallam.

He said he expects the prices of erasable disk media to decline tremendously in the near future. Currently, there are engineering samples of erasable media available at about $1,000 per 400M bytes. Hallam also said he anticipates that price to plummet to $80 once the media is in mass production.

The next standard expected to be set is for 3½-in. media. In late March, a Japanese standards committee offered ANSI a standard for 3½-in. media that incorporates both Continuous and Sampled Servo. That proposal is being studied by the X3B11 committee.

However, the 12-in. market is likely to remain heterogeneous during the foreseeable future. "In the 12-in. arena, there is no hope for standards," IDC's Bretzmann said.

The use of 12-in. optical devices grew out of the effort to make videodisks. When the rise of videocassette recorders superseded that of videodisks, people looked for ways to make use of videodisk technology, Bretzmann recounted. A number of firms developed and marketed distinct technologies at about the same time. All gained some installed base, which made the vendors hesitant to change their systems for the sake of standards, according to Bretzmann.

> "IN THE 12-in. arena, there is no hope for standards."
>
> JAY BRETZMANN
> INTERNATIONAL
> DATA CORP.

Beyond recording standards for the physical disks, there is talk of establishing standards for the logic used in formatting the data so that optical drives can be plugged interchangeably into any host. But the chances for such standards appear slim.

Indeed, no manufacturers will interchange logic with each other, according to Hallam. "No one is terribly unhappy about it except for a few of their customers, but most are special systems where users don't care about interchange," he said.

As a nonvendor, Hallam said he hopes logic standards will be set so that optical devices will be truly interchangeable.

Standards schmandards

Ricoh Corp., which manufactures 5¼-in. WORM disks, is not really interested in interchangeability standards, however. "All the manufacturers have committed money to developing their own standards," said Chet Mackentire, Ricoh's optical disk business manager in San Jose. "Tell me, who's going to throw that away and support a standard?"

Bretzmann said, however, that such standards could benefit vendors. "It's in all their interest in that it would jump start the industry more."

But with standards for 3½- and 5¼-in. media solidifying, Hallam said he does not think users will have to wait much longer for optical storage products to blossom. "Now, people who don't have real specialty needs can start thinking about optical."

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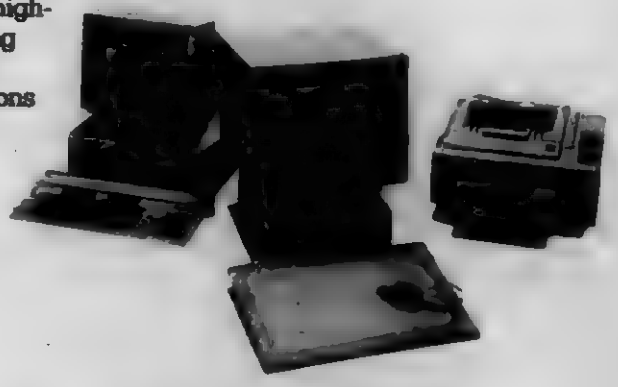

HEWLETT PACKARD

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PC LANs

CONTINUED FROM PAGE 75

stalled in 24% of IBM's mainframe accounts," the report said. A typical subject of the survey was a large financial institution in the northeast with more than 5,000 employees.

Meanwhile, Wang Laboratories, Inc. is positioned firmly in third place with little prospect of changing its standing. And though many DEC sales were penetrating IBM mainframe accounts, Wang sales were less prevalent among those users. Nonetheless, the study found that Wang users are planning to increase Wang equipment purchases, even though overall Wang customer satisfaction trailed that of IBM and DEC. Wang's installed base in banking and financial accounts is considerably smaller than that of either DEC or IBM.

According to Nancy Kirk, the Sierra Group analyst who compiled the report, a logical conclusion of the study is that DEC's VAX has weathered the IBM 9370 challenge. Many mid-range customers looked at the 9370 while considering the purchase of IBM or DEC equipment, but a small percentage passed up the VAX for what was once called the VAX killer.

And a gloomier note for IBM is that the recently announced VAX 6200 series, code-named "Calypso," could spur an even greater defection of IBM users to DEC, according to Kirk. She said financial and banking users have expressed strong interest in the machines because of their symmetrical multiprocessing feature, which is geared toward improving performance in transaction processing, an important application for those customers.

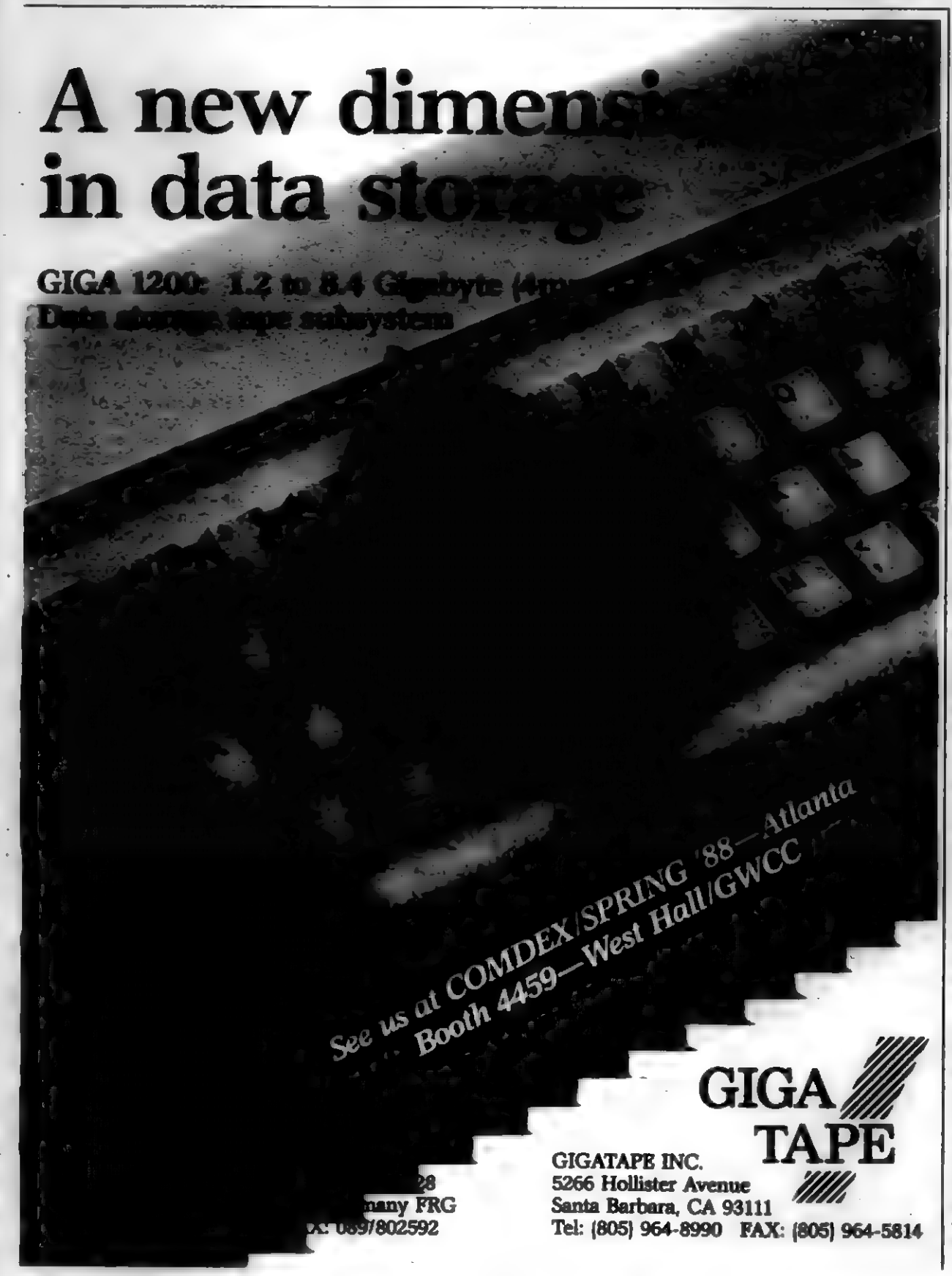
PS/2 to the rescue

The silver lining in IBM's cloud seems to be the Personal System/2's healthy acceptance among financial and banking customers despite some user frustration with the computer's operating system, OS/2. The PS/2's use as a departmental system in a LAN appears to be an antidote to unlimited VAX growth in IBM shops, Kirk said.

The Sierra Group study reported what has previously been noted by other observers: Spending on departmental minicomputers is beginning to slow down, while spending on PCs is increasing. Along with the sales of PCs, sales of LANs and servers are on the rise as well.

Banking and financial users said their No. 1 connectivity requirement is PC-to-PC communications; the No. 2 requirement was PC-to-mainframe links. PC-to-minicomputer networking ranked third. Kirk cautioned, however, that this result may indicate that PCs are already connected to minicomputers and the requirement is no longer outstanding.

Despite the threat on the PC front, the report concluded: "Based on the planned number of installations, [DEC] could exceed IBM as the preferred supplier within the financial markets in the coming years."



Gibson

CONTINUED FROM PAGE 75

close these things but must ponder them in their hearts until the proper time. Surely the willingness of many to believe in a miracle is a greater force than any machine that merely exists.

By and large, the worldly consultant community was slow to awaken. Early on, when most consultants were lost in idolatry for the 9370, a lone voice could be heard crying in the wilderness. David Andrews, president of ADM in Cheshire, Conn., was playing the part of John the Baptist, preparing the way for Silverlake and making straight the path for the true mid-range savior.

Alone and scorned by many, Andrews boldly asserted more than one year before Silverlake's announcement that it would outsell the 9370 by a wide margin. Truly, it would be the machine that would deliver the wandering, often feuding, tribes of IBM minicomputer users from bondage under a "VAX Romana."

But the consultant community would not be lost forever in darkness. Having believed wholeheartedly in the 9370 at first, they abandoned it in droves soon after it began to ship. By then, it was clear that there would be a follow-on for the IBM System/36 and 38. Word came that these two distinct user tribes would one day be united as a single "System/3X" nation.

Untimely demise?

Even though a new product had been conceived, doubt remained among some that the machine would come into the world and grow to maturity. It could just as easily be killed in infancy, as a lot of research and development projects are.

But no benign father could overlook the 200,000 souls committed to System/34, 36 and 38 processors. Such a father would, like a shepherd, lead his users safely through the valley of the shadow of DEC.

At last, the consultant community has abandoned its false beliefs. Now, having discarded the 9370 as the chaff that bloweth away, consultants and users have been eager for stories relating to the coming One.

As for us humble scribes, it will no doubt fall to our lot to chronicle the doings of this Processor, so that its good jobs may be known throughout the world. It is in such readiness that we wait.

Gibson is *Computerworld*'s senior editor, systems & peripherals.

NEW PRODUCTS

Data storage

The **UD23** disk controller, which is said to connect industry-standard enhanced small device interface disk drives to Digital Equipment Corp.'s Unibus, has been announced by **Emulex Corp.**

The quad-size UD23 implements DEC's Mass Storage Control Protocol to provide a software-transparent interface to the computer. The controller relieves the host of such file maintenance tasks as bad block replacement, seek optimization, command prioritization and ordering and data mapping.

The UD23 supports up to four physical or eight logical disk drives with clocks up to 15 MHz. Other features include a 32K-byte buffer, data-transfer rates of 2M byte/sec. and block mode direct memory access.

The UD23 costs $2,800.

Emulex, P.O. Box 6725, 3545 Harbor Blvd., Costa Mesa, Calif. 92626. 714-662-5600.

Two backup drives and subsystems have been introduced by **Megatape Corp.** and are available in versions for Digital Equipment Corp., Data General Corp., Apollo Computer, Inc., Sun Microsystems, Inc. and other computers.

The **MT-1500** provides a formatted

Megatape's subsystems

capacity of 1.2G bytes and a sustained data transfer rate of 764K byte/sec. The 8mm GT-88 cartridge drive has a capacity of 2G bytes and a sustained data transfer rate of 246K byte/sec.

The MT-1500 high-performance drive costs $19,500; a medium-performance version costs $16,500. The GT-88 drive with a Pertec Computer Corp. interface costs $7,950.

Megatape, 1041 Hamilton Road, Duarte, Calif. 91010. 818-357-9921.

A small computer systems interface (SCSI)-compatible VMEbus interface board that provides sustained asynchronous data transfers up to 4M byte/sec. is currently available from **Plessey Microsystems.**

The **PME SCSI-1A** is compatible with the ANSI X3T9.2 SCSI specification for applications requiring intensive real-time disk I/O activity with a minimum of VMEbus loading. The product handles up to 16 concurrent tasks, simultaneous VME/SCSI transfers and direct memory access transfers up to 32 bits wide over the VMEbus.

The PME SCSI-1A interface board is priced at $1,495.

Plessey Microsystems, One Blue Hill Plaza, Pearl River, N.Y. 10965. 800-368-2738.

Power supplies

Para Systems, Inc. has introduced the **Minuteman 1600** uninterruptible power supply. The unit is said to protect computer systems and other sensitive electronic equipment from interruptions such as blackouts, brownouts, overvoltages, overloads, surges, spikes and noise.

For systems with a maximum power load of 1,600W, the Minuteman 1600 includes a synchronized sine wave output that switches to inverter operation in less than 1 msec.

All operations are automatic, with sound and LED indicators.

The Minuteman 1600 costs $1,999.

Para Systems, P.O. Box 815188, Dallas, Texas 75381. 800-238-7272.

Computer Power Products has introduced a status and diagnostic monitoring system compatible with RS-232, RS-422 and RS-485 as a plug-in option for its line of rotary uninterruptable power systems and power line conditioners.

The Digital Information System is IBM Personal Computer AT compatible and, through the addition of optically coupled data modules, is capable of accepting 64 analog and 24 digital inputs.

The Digital Information System is priced from $1,900.

Computer Power Products, 227 E. Compton Blvd., Gardena, Calif. 90248. 800-421-6102.

Input devices

Document Technologies, Inc. has introduced the **DP-200** and **DP-400 series Document Image Processor** workstations to add document image functionality to the numeric-, text- and graphics-based capabilities of data processing systems.

The DP-200 offers a 200 dot/in. resolution display. The DP-400 offers a 400 dot/in. resolution display. Prices range from $6,000 to $20,000.

Document Technologies, 2465 E. Bayshore, Palo Alto, Calif. 94303. 415-858-0372.

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COMPUTERWORLD *Extra*

An IDG Communications Publication

Rating the vendors: Whose DBMS runs the fastest?

An expert ranks 13 data base systems for speed, I/O traffic and request handling

BY WILLIAM INMON

Two years ago, an article appeared in *Computerworld* discussing data base performance measurement by means of a standard metric — the maximum transaction arrival rate (MTAR). Since then, the world of data bases and the hardware that data bases run on have undergone significant change.

The speed and capacity of processors has increased, and data base vendors continue to improve the efficiency of their products. The world of performance measurement is significantly changed as well.

So once again, the popular data base management systems have been benchmarked — this time with a three-part metric that gives users a fuller, more accurate picture.

First, the results: From 1986 to 1988, the performance these data base systems can achieve has pushed upward fairly substantially. Increased hardware capability, more efficient software and a focus on the production environment have all influenced hardware and software vendors toward this end.

In terms of raw performance, hierarchical systems continue to dominate. Indeed, if anything, IBM's TPF and IMS Fast Path have increased their performance lead over what they were capable of in 1986.

Some users ask, Why use the maximum transaction arrival rate as a criterion for selecting a DBMS when few MIS shops ever need the full transaction performance capabilities of a DBMS? In other words, a shop that is going to do, at most, five transactions per second will not necessarily choose a DBMS capable of 100 over a DBMS that can do 25.

This argument is valid. But the MTAR rating of a DBMS is similar to the Environmental Protection Agency's mileage rating of a car: No one expects to actually achieve the mileage the EPA says is possible.

By the same token, no one expects a subcompact Toyota to use more gas than a four-wheel-drive Jeep or a Volkswagen bug to use more gas than a Cadillac.

In other words, the MTAR rating is relevant to every data base user because it describes the DBMS's efficiency of processing — even if the user is not worried about stretching the system beyond its capacity.

ROBERT WISNIEWSKI

Hierarchy of needs

The fact is, there is a hierarchy of needs for an on-line system, and performance ranks first. As customers list their needs in an attempt to find DBMSs that meet them, their choices narrow. The order of these needs might go this way:

1. Is there a system that can execute my on-line processing?
2. Of the systems that can execute my on-line processing, which costs the least money?
3. For the system that has been chosen, how long does it take to develop that system?
4. For the system and development environment that has been chosen, how much is required in the way of resources?
5. What about availability, distributed processing and modularity (or graceful expandability)?
6. How user friendly is the system? How friendly is the development environment?

Looking at individual DBMS products, then, if a manager must execute on-line processing with very high volumes, the overriding concern is to be able to make the system work regardless of other operational or development costs. For managers facing the fear of not knowing just how high their processing needs will be, Tandem Computers, Inc.'s Nonstop SQL is a very attractive alternative.

If a manager has several hardware and software alternatives that can fulfill his on-line processing needs, he will select the one that entails the lowest long-term costs. For very high-performance systems, IMS Fast Path or TPF are attractive. For less high-performance systems, Software AG of North America, Inc.'s Adabas, Cullinet Software, Inc.'s IDMS/R, Applied Data Research, Inc.'s DatacomDB and Computer Corporation of America's Model 204 are very attractive.

If a manager has alternatives that satisfy his processing needs, and long-term operational costs are not excessive, then he can focus on the speed of development. IBM's DB2, Cincom Systems, Inc.'s Supra and others are very attractive to the manager at this level of the hierarchy.

If a manager has selected an environment and if the length of time it takes to develop the system is not excessive, then he can

Inmon is a senior principal at American Management Systems, Inc., a consultancy in Lakewood, Colo.

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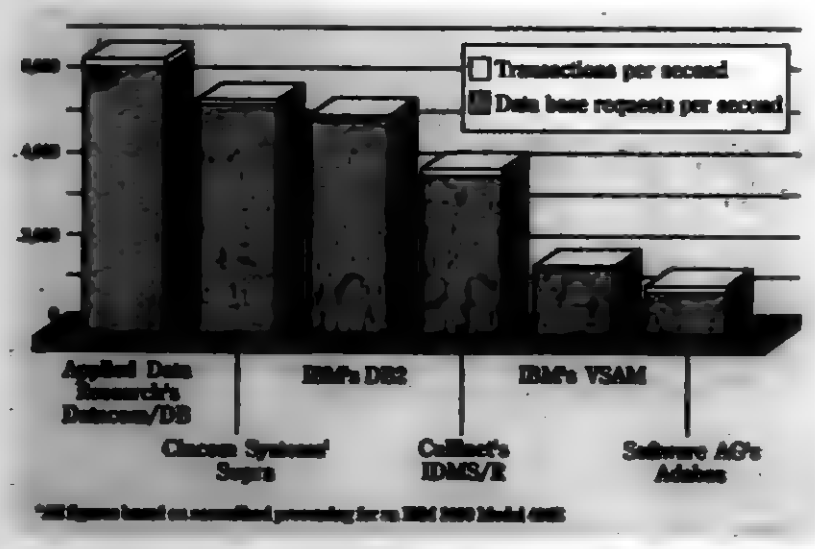

*All figures based on unmodified processing for an IBM 3090 Model 400E

INFORMATION PROVIDED BY AMERICAN MANAGEMENT SYSTEMS, INC.
CW CHART

focus on how efficient the development process is. Most DBMSs are quite attractive at this level.

How study was done

To determine the performance standings for 1988, a study was conducted by first contacting the top DBMS vendors. Laboratory observations were collected either through publicly available studies, such as those distributed at the Guide and Share users groups, or through studies conducted by the vendors themselves. In addition, some vendors supplied references of customers willing to share their performance results.

Unfortunately, it was not possible to run exactly the same application across all systems as a basis for comparison. One of the criticisms of using standard metrics for data bases is that they do not account for the unique processing of applications. Some applications simply run faster than others: Credit verification universally runs quickly, and bill of materials processing traditionally does not.

In fact, during the research for this article, an application turned up for which each data base request resulted in an I/O. The net result was that only 40 transaction/sec. were able to be run, even though the processor was an IBM 3090 Model 400E. But for another application, one in which the buffer was able to be used effectively, the same DBMS ran a significantly higher number of transactions per second.

However, it is generally safe to assume that the DBMS vendors that participated in the study did not choose a slow-running or poorly designed application to represent their products.

This study does not purport to be scientifically perfect or settle the issue of differences in applications and transactions. But in light of the paucity of information available, it is useful as a rough guideline to data base performance.

Saturation point

As in the previously reported MTAR analysis, "maximum" means the highest number of transactions that the software can sustain on the largest processor it runs on. A transaction is defined as the interaction between a terminal and the computer — the user at the terminal initiates a transaction, the transaction is passed to the computer, data base access ensues, and transaction output is sent back to the terminal.

In the ideal transaction profile, the ratio of update processing to inquiry processing is about 1-to-6 — that is, 15% of the work load is update, 85% is inquiry.

The MTAR is simply the point at which the processor and the DBMS can no longer accept transactions to execute because hardware or software facilities are saturated. The incoming transaction is then queued and must wait for machine and DBMS resources to be free.

But the MTAR addresses only one aspect of performance: transaction processing. Two other measures are equally important:

- The on-line data base requests that the DBMS is handling at the high-water mark of transaction processing.
- The ratio of data base requests to physical I/O that is required to satisfy the language request.

A data base request, for the purposes of this article, is the number of times the data base — either on a direct-access storage device or in the buffer — must be accessed to satisfy a request from an on-line application program, including index and overflow access.

For example, in a record-at-a-time DBMS such as IMS, in which randomization of data is used, there is usually a close correlation between a user's request for data and a data base request. In IMS, when a user wants an accounting record, the data base request is satisfied with one entry into the data base.

In contrast, in a set-processing DBMS, the user issues a single data base call for a set of data that may require many entries

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into the data base. For example, in IBM's DB2, the user might wish to find out how many employees have college degrees. To satisfy this single SQL request, an indeterminate number of data base requests would be made, including index access.

So the rate at which data base requests for on-line processing can be satisfied at peak periods of transaction processing serves as a good measure of data base performance, along with the MTAR. Note that data base requests do not distinguish between READs, WRITEs and so forth. Instead, if a WRITE causes four accesses to be made to the data base, four data base requests will be counted.

Role of the buffer

The other measure of data base performance is the ratio of data base requests to physical I/O that is required to satisfy the language request. High-performance data base applications often satisfy many data base requests in the buffer area and require very few physical I/Os.

One caveat: the ratio of I/O requests satisfied in the buffer is usually a function of system tuning, volume of processing being run and the nature of the application itself, as well as being a function of the DBMS's efficiency.

Looking at all three of these measures in a balanced way eliminates the bias of an application that does practically no data base processing and, consequently, appears to run very quickly, and the bias of a transaction that does little transaction processing but massive data base processing. So whether the MTAR is very high and the data base requests serviced remain low, or vice versa, users can evaluate DBMS performance on a fair scale.

So, who won?

The results of the research are shown in tables (see charts pages 84 and 85). The tables reflect the current release of each DBMS, and they list the following information about the benchmarked case:

- Whether it was a laboratory case or an actual production application.
- The processor the measurement was taken on or estimated for.
- The published MIPS rating for the processor.
- The percentage of system resources used to run IBM's MVS at the time the observation was taken, including DBMS and other utilization.
- The percentage of system resources used to run the DBMS and teleprocessing monitor.
- The number of transactions per second observed at the high-water mark.
- The total number of data base requests being serviced per second at the high-water mark.
- The amount of physical I/O being generated per second at the high-water mark.

Some columns show "normalized" processing. This is calculated by adjusting all processing rates up to a 3090 Model 400E running at 61.5 million instructions per second (MIPS). A simple linear extrapolation is used.

So if a benchmark is run for a 30.75 MIPS machine, the rates are merely doubled to reflect processing on a 3090 Model 400E. This, of course, in practice may be an incorrect calculation. For example, it would be inaccurate if the DBMS could not take advantage of single-image processing when the upgrade in processing power involves a change from a uniprocessor to a dyadic processor.

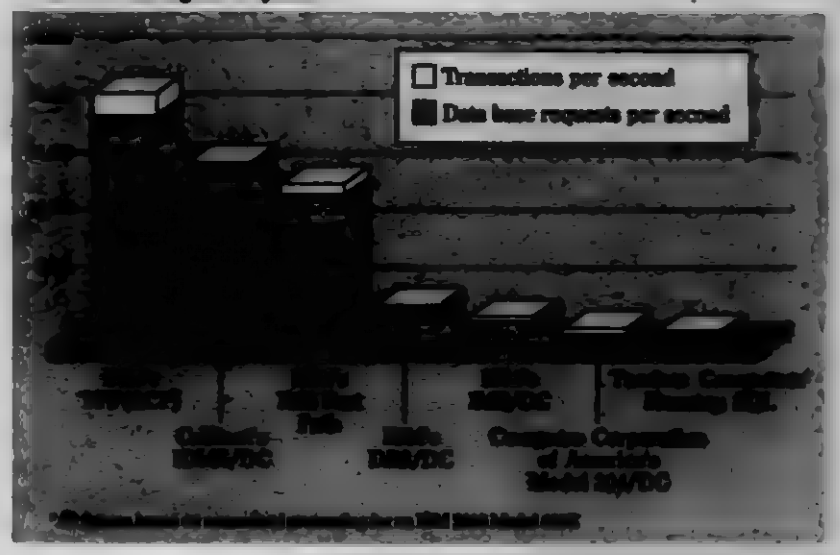
Another inequity occurs when only a fraction of the MIPS is being used by the actual application. When only 25% of a processor is being consumed, it may not be realistic to multiply the processing rates by a factor of four to project results for the 3090 Model 400E architecture.

In other words, it is not possible to extrapolate performance upward based on an observation that shows only a fraction of usage of a 3090 Model 400E when the observation was made on another machine that does not share the same

Continued on next page

IBM's TPF still fastest

Cullinet's IDMS runs a close second for high performance among non-CICS data base management systems



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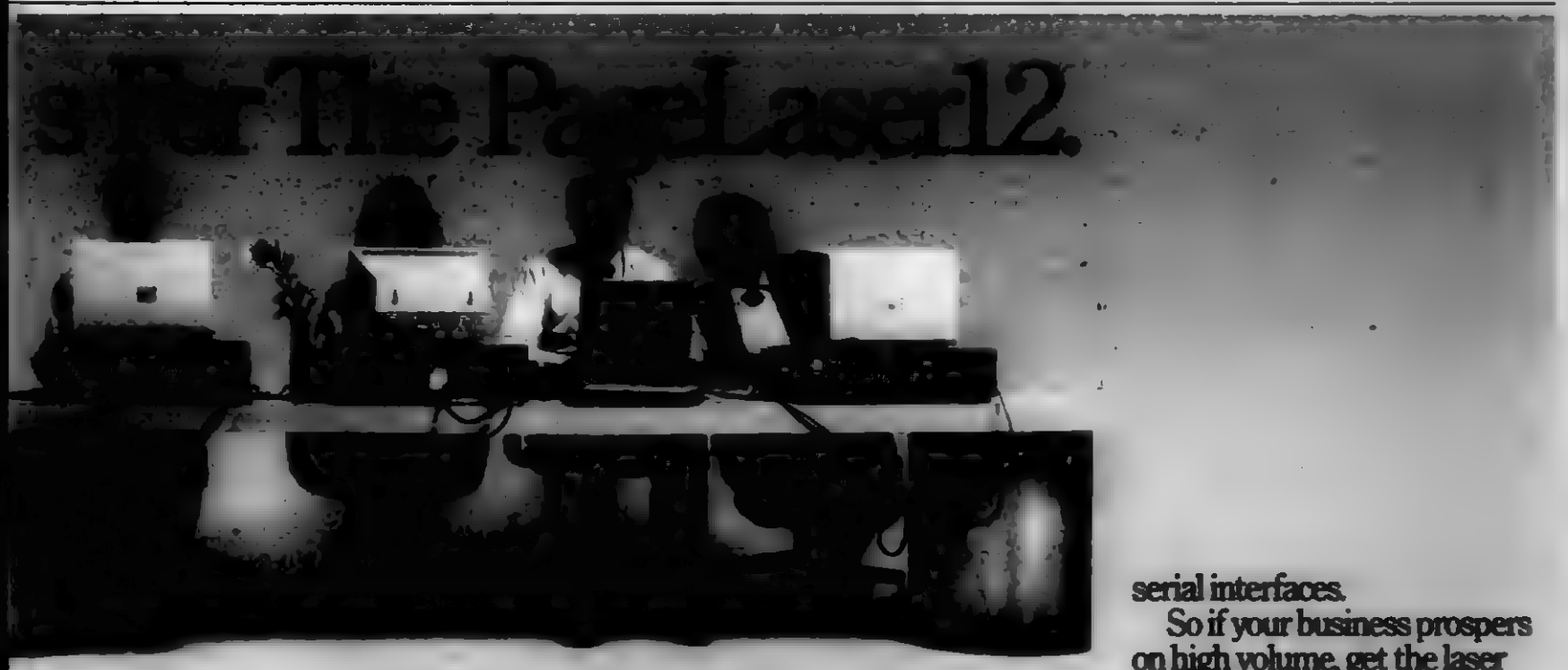
CW CHART



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Data bases under CICS — how fast will they run?

Results from observed benchmarks are normalized so readers can compare apples to apples

Adabas[4]	Software AG									187	1,059[3]	212
Datacom/DB[5]	Applied Data Research	A	IBM 3090 Model 400E	61.5	10%	40%	100	3,200	800	200	6,400	1,600
DB2[2,3]	IBM									126	3,440	1,162
DB2[5]	IBM	L	IBM 3090 Model 200	27.7	19%	75%	47	2,208[2]	368	111	5,211[2]	816
IDMS/R[4]	Cullinet									150	3,879	980
Supra[4]	Cincom Systems	A	IBM 3090 Model 400E	61.5	5%	20%	16	694	174	128	5,551	1,388
Supra[5]	Cincom Systems									120	1,613	381
VSAM[5]	IBM	L	Amdahl 5890 Model 200	33.6	20%	80%	44	883	530	82	1,617	971

[1] Millions of instructions per second
[2] Estimated
[3] Shows some characteristics of a laboratory example
[4] Benchmarks showing less than 50% utilization were extrapolated up to 80% total (including MVS) utilization
[5] Benchmarks showing 50% or more utilization were extrapolated up to 100% total (including MVS) utilization

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CW CHART

Have you locked your data today?

There are many reasons that performance suffers in some data base management system environments. The locking of data is one major reason.

Some industry literature claims that IBM's DB2 has the same levels of locking as the company's IMS Fast Path. In the sense that Fast Path locks data at the data base record level and that DB2 locks data at the page level, this is true. But this perspective misses a much more important point: DB2 still requires many more resources than Fast Path to lock the same amount of data.

Consider the following example: a simple data base design in which groups of Data A, B, C and D are related (see chart at right). Fast Path's hierarchical nature is reflected in the organization of data in the same data base record. To lock all of A, B, C and D in IMS Fast Path requires that only one block of data be locked. If there is a lot of data in the four groups and overflow is required, then perhaps two or three physical blocks are locked.

In DB2, when the data has been normalized, A, B, C and D exist in separate tables, assuming the data base is the size of a production data base, not a "toy" data base. Each table requires an index to get into the data efficiently. In short, the physical separation of DB2 data — the key to DB2's flexibility — requires that at least four pages of data be locked to Fast Path's one block. Both examples are best-case scenarios.

But there is no guarantee that when occurrences of B, C and D are related to the same A that they will be stored in the same physical page. Suppose A is related to B_1, B_2 and B_3. Unless B is clustered properly, there is a good chance that B_1 will be in Page N, B_2 will be in Page M and B_3 will be in Page O. The same holds true for the physical placement of C and D. If there are many occurrences of B, C and D, it is probable that many pages will be locked in DB2. Furthermore, when a page is locked, all rows in that page are also locked, thus tying up data that has no relation to A. The result is a lot of awkward locking.

Of course B, C and D could be clustered to optimise the access of data in conjunction with the accesses of A. But B, C and D can be clustered only once. The flexibility of the relational model depends on the ability to create relationships dynamically.

If B, C and D are clustered to optimise their relationships with A, then B, C and D will not be optimized for E, F or G. You could say the same thing about Fast Path, but it does not advertise flexibility as one of its primary selling points.

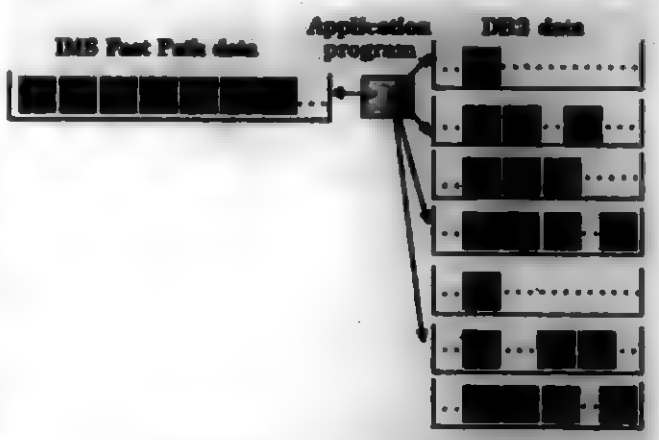
DB2 is based on the relational model, but it is DB2's fidelity to that model that reduces its performance in the case of data locking. Of course, it can be argued that the DB2 application design could be bastardized to achieve higher levels of performance. But that implies that the relational model, to which DB2 conforms, be significantly modified to achieve good performance.

Ultimately, this type of performance degradation is not limited to DB2. Other products that adopt the same approaches as DB2 face the same fundamental impediments to performance.

WILLIAM INMON

Locking slows down DB2

Physical separation of DB2 data requires that four pages of data be locked – to IMS Fast Path's one block – in this unsequenced example



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Rating

FROM PRECEDING PAGE

characteristics as a 3090 Model 400E. The purpose of the extrapolation is merely to provide a basis for common comparison.

No surprise at all

Across the board, laboratory observations outperformed real-life applications. In previous studies, laboratory examples outpaced real applications by a ratio of up to 5-to-1. We must be careful to distinguish between the two because, for better or worse, there is an air of unreality in all laboratory benchmarks.

Also for greater accuracy, IBM's CICS was separated from other teleprocessing monitors when possible, because strict CICS comparison is perhaps the fairest measurement of data base performance.

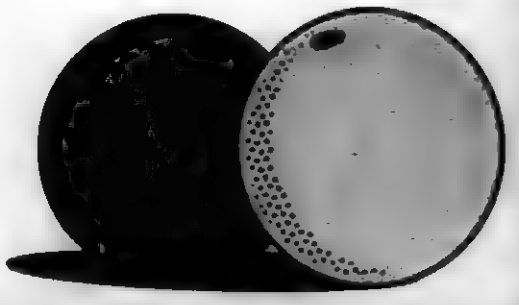
One interesting entry in the transaction processing arena is Tandem, which has a very different architecture than the IBM 370. The company has performed a benchmark that hit 208 transaction/sec. in a standard transaction operating environment using Nonstop SQL distributed relational DBMS.

For MIS managers who worry about exceeding the MTAR, Tandem is an attractive choice because the DBMS's transaction rate is so high and because Tandem can increase the rate by adding more processors in a networked manner.

But excessive volume is only a manager's first concern. Robustness is another. To make a comparison between data base systems running on Tandem architecture and those running on IBM architecture, the processing capability per MIPS is "normalized." Now, there is an inequity in this comparison: It is very likely that Tandem's 1 MIPS does not equal IBM's 1 MIPS. In fact, 1 MIPS on a Tandem machine is probably somewhat less robust

Non-CICS data bases — how fast do they run?

Results from observed benchmarks are normalized so readers can compare oranges to oranges



										Transactions per second	Data base requests per second	Physical I/O per second
DB2/DC[3]	IBM	L	IBM 3090 Model 200E	31.2	20%	80%	53	1,590[2]	398[2]	106	3,180[2]	795[2]
IDMS/DC[3]	Cullinet									373	15,218	820
IMS/DC[3]	IBM	L	Amdahl 5890 Model 200	33.6	20%	80%	106	1,198	1,390	194	2,192	2,543
IMS Fast Path[3]	IBM									1,062	12,744[2]	5,841[2]
Model 204/DC[4]	Computer Corporation of America	A	Hitachi M780H	30	4%	18%	60	87	66	547	793	601
Model 204/DC[5]	Computer Corporation of America									—	—	—
Nonstop SQL[2,5]	Tandem Computers	L	Tandem Nonstop VLX[6]	96	—[3]	93%	229	1,603	1,040	147	1,027[2]	662[2]
TPF (ACP)[3]	IBM									1,970	19,700[2]	9,850[2]

[1] Millions of instructions per second
[2] Estimated
[3] Not MVS-based; different hardware architecture
[4] Benchmarks showing less than 50% utilization were extrapolated up to 80% total (including MVS) utilization
[5] Benchmarks showing 50% or more utilization were extrapolated up to 100% total (including MVS) utilization
[6] 32-processor configuration

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CW CHART

than 1 MIPS on an IBM machine, but exactly how much less?

Also biasing the comparison is Tandem's approach to managing data, which is markedly different from the approach IBM has traditionally taken. So in general, making a comparison based on MIPS is a difficult one.

However, if the Tandem environment is normalized — that is, converted to the 61.5 MIPS equivalent, as the other products are — the result is still illuminating, if imprecise. Tandem uses more processing power than IBM, which is not surprising, given Tandem's architecture.

What about Oracle?

Oracle Corp.'s DBMS product was not included in the study. There is a paucity of information about Oracle's performance in the MVS environment, perhaps because in that arena, it is a new product with only a limited customer base. The only publicly available performance information was a benchmark comparison from Monsanto (CW, Nov. 23, 1987). In it, Monsanto stated that Oracle proved to be very marginally less of a performer than DB2 in all of its transaction processing tests.

One of the most interesting benchmarks encountered in the course of the study was a laboratory benchmark run on an IBM 3090 Model 200 in which DB2 was run up to 100 transaction/sec. doing one data base request and one physical I/O per transaction. In some ways, the best measurement of performance is exactly this case: in which the transaction rate is run as high as possible and only one I/O is done.

This measurement, which was not encountered for other vendors, is a good basis for a best-case analysis of a DBMS's transaction performance.

Across the board, the difference between the high-performance software packages and the lower performance packages lies in these factors:

- Integrity — both transaction and data base integrity.
- Flexibility. In terms of performance, this feature is not cheap: The higher the performance, the less the flexibility.
- Record-at-a-time processing vs. set-at-a-time processing. The indeterminate resources used by set-at-a-time processing hamper the consistency of performance.
- Teleprocessing monitor interface. Obviously, some are faster than others.
- Basic access and the physical organization of data. Here, direct access of data through a randomizer is faster than indexing data.
- The ability to do processing in main memory. For small data bases, avoiding I/O completely can enhance the speed of transaction processing.

Don't judge by the cover

Of course, performance is only one aspect of data base systems. It is unquestionably one of the most important aspects, but there is more to any purchase decision than performance.

DBMSs compete for buyers' attention on a number of other counts, including the suite of development tools that surround the DBMS, data dictionary support, flexibility, security, portability and the long-term prospects for the vendor.

As software continues to mature, it will be interesting to see whether the gains DBMSs have made in transaction processing performance can be sustained. •

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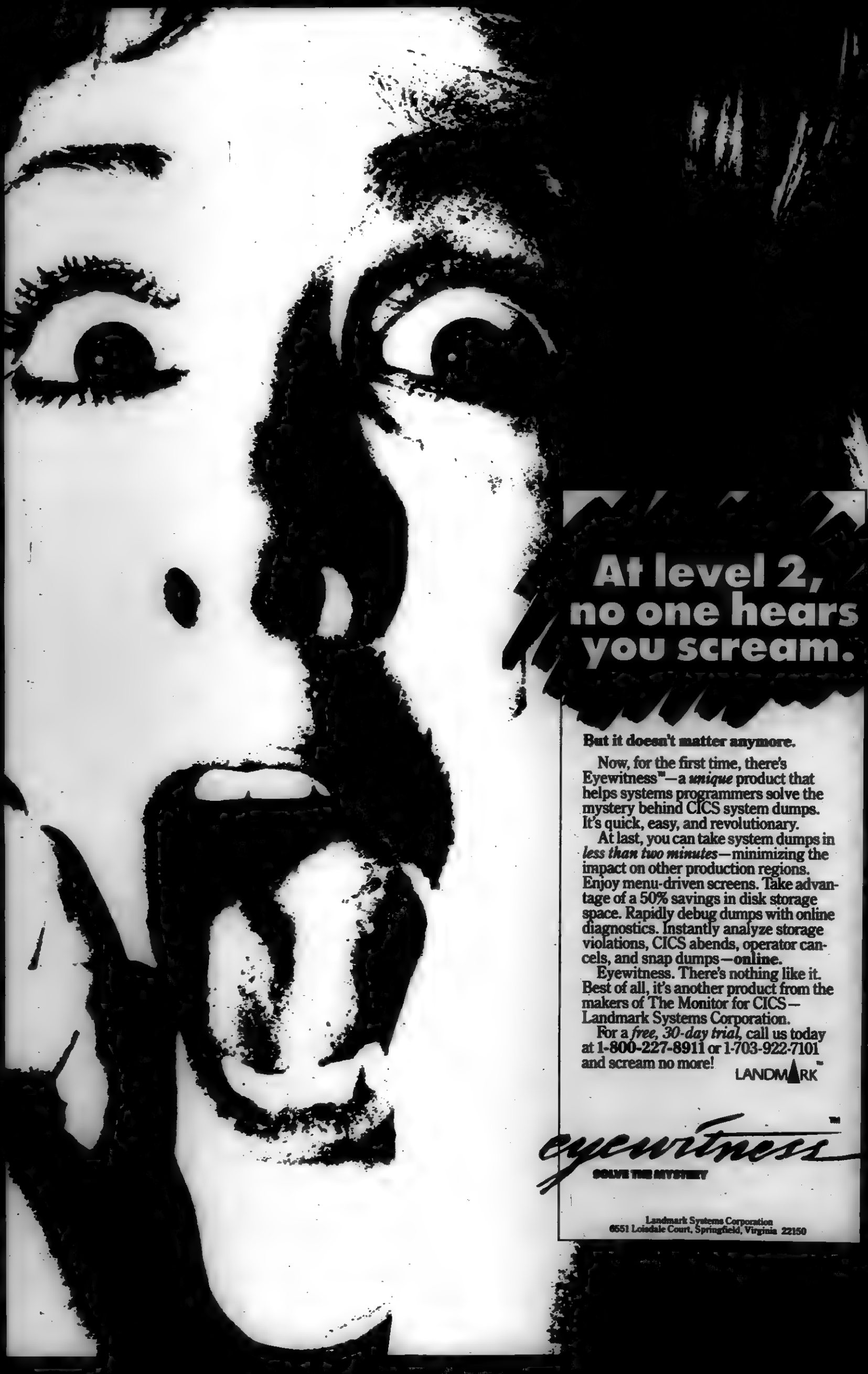

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Les Gilliam

Survey says: Use a survey

If a survey were taken today of the primary problems encountered by the information systems manager, what would the response be?

Perhaps topping the list would be the lack of direction from upper management or, more likely, a lack of understanding or appreciation. Next might be the difficulty in meeting application development schedules. Somewhere else on the list would be high turnover and low morale. Constant stress and pressure would no doubt be mentioned. And always present on such a list would be the inability to satisfy the users.

Had such a survey been taken last year, or any time over the past 30 years, the answers would have been essentially the same.

Why does the information systems manager continue to fight these problems? Are there root causes? How can the systems group increase productivity, improve morale, decrease turnover and earn a gold star from both the users and top management?

Space does not allow a discussion of all the possible causes or solutions. But there seems to be one common denominator that most MIS shops have been unable to conquer. It can be identified, in general, as a lack of communication.

Continued on page 93

Garber offers know-how

BY ELISABETH HORWITT
CW STAFF

Jack Garber firmly believes in the value of learning from experience — particularly harrowing sink-or-swim experiences that force people to develop new skills and make hard decisions in a hurry.

When he took over Fidelity Investments, Inc.'s telecommunications services group last spring, Garber brought to the job the know-how gleaned from some 18 years of challenging work in the data processing and communications fields. He has set himself the goal of instilling in his staff some of the lessons he gained from his experiences.

With lean, sharply defined features and a no-nonsense haircut, Garber at first comes across

Continued on page 94

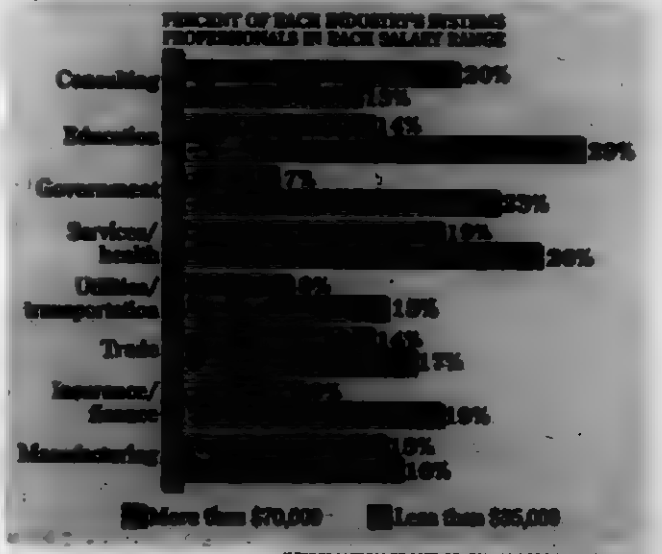
PROFILE
Jack Garber

Position: *Director of Fidelity Investments, Inc.'s telecommunications services group.*
Mission: *To instill in Fidelity's telecommunications staff a sense of responsiveness to the 19 divisions they service.*

Data View

Go consulting, young man

Systems personnel in consulting companies draw some of the highest salaries, and those in education, some of the lowest



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CW CHART

MANAGING TECHNOLOGY

Ready or not, here comes AI

BY SUSAN MESSENHEIMER
SPECIAL TO CW

"But it wasn't my idea," might be an all-too-familiar MIS manager's retort to a probing question about an artificial intelligence project. In fact, AI specialist Dave Linegar says, less than 25% of the 1,000 corporate AI projects he researched were generated by MIS.

But no matter who plants the AI seed — a bigwig at the top or a technically oriented middle manager in need of an expert system — AI *is* high technology, and MIS will have to become involved in one way or another.

Before letting your company run blindly into an AI project, make sure that it's truly necessary. Are highly technical skills involved? Is information subject to constant revision and update? Do experts spend a great deal of time giving consultations and advice?

Let's say you answer yes to enough of these questions so that you decide to launch an expert system development project. Now what?

Follow the leader

Linegar, co-author of *How Corporate America is Changing: The Inside Story on Expert Systems*, points out that the successful implementation of expert systems in many large organizations follows a particular scenario.

"There must be top-down support for the introduction of advanced technology," he explains. "This translates into money, people and corporate culture information."

Linegar has observed AI endeavors at such firms as American Express Co., Federal Express Corp., Digital

MARK BRAUGHT

Equipment Corp., The Boeing Co., United Airlines and Security Pacific Corp.

"Most successful groups form around a core person, a champion — he or she becomes the AI manager or the tech center director," he adds.

"This person is someone who's familiar with the company and its culture, who may have held a number of positions and who can create an old-boy network," Linegar points out. The core AI person should also identify others in the firm who may be interested in the technology.

Continued on page 90

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Arming the data center for corporate warfare

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Now that many business information systems are seen as competitive weapons, MIS managers need to evaluate their projects in militaristic terms to see if they will win the battle, according to a University of Dallas professor and MIS consultant.

At a conference late last month, Robert H. Dunikoski said there are five questions MIS managers should ask about information systems that are intended to boost the business's competitive situation:

- Is it an offensive or defensive weapon?
- Is it an effective or ineffective weapon?
- Do the MIS department's foot soldiers have the skills needed to carry out the engagements?
- Is the commander in chief committed to the use of information systems to fight the competition?
- Is the company engaged in guerrilla warfare or strategic strikes?

"YOU MIGHT be dragged into competitive warfare whether you like it or not."

ROBERT H. DUNIKOSKI
MIS CONSULTANT

DP enlistment

Competitive information systems need top management commitment because they can be very expensive, and they need an experienced army of foot soldiers, Dunikoski said. "There is a danger of putting weapons into inexperienced hands . . . they could backfire," he said.

Dunikoski spoke at a joint meeting of the Institute of Management Sciences and the Operations Research Society of America, held in Washington, D.C. He is an MIS consultant to several Dallas-area corporations and an assistant professor at the University of Dallas Graduate School of Management in Irving, Texas.

"You might be dragged into competitive warfare whether you like it or not," the speaker warned.

For example, when American Airlines developed its computerized reservation system, competitors such as Delta Air Lines were forced to develop their own systems in order to catch up. "They had to respond in a very defensive posture," Dunikoski recalled.

The next competitive step for the airlines may be to use technology to bypass travel agents and deal directly with large corporate customers, predicted another speaker, William J. Doll, a professor of MIS and strategic management at the University of Toledo in Ohio.

The technology involves so-called satellite ticket printers, which would allow the airlines to transmit ticket information via modem to printers at customer offices, Doll explained. "Even if this bypass approach is used for only a few hundred major corporate accounts, it would have a major impact on many travel agencies," he said.

In addition, expert systems may someday be used in the travel agency business to make reservations, prepare itineraries and perform corporate travel audits, Doll said. If these developments occur, he said, the result will be that only the large travel agencies, which have enough business volume to afford the technology and training, will survive.

"As the industry becomes increasingly complex, it will become difficult for small mom and pop agencies to compete effectively," Doll concluded in a paper he presented at last month's conference.

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Weighing the managerial pay scale

Broad salary discrepancies found in nationwide System/38 sites

BY JAMES CONNOLLY
CW STAFF

DES MOINES, Iowa — They deal with the same technology and are paid with the same U.S. dollars, but MIS managers at IBM System/38 sites report salary discrepancies of up to 96% based on their education, location, industry and how well they do their jobs.

Even with an average salary of $44,250 and a median salary of $42,900 for managers of System/38 shops, a recent survey of 132 managers responsible for the minicomputers uncovered broad discrepancies. The widest gaps lay between the upper 20% of the pay scale — at which the average salary reached $62,120 — and the lower 20%, at which managers earned an average of $31,645 in 1987.

The survey was conducted by Des Moines-based personnel recruiter Nate Viall & Associates, which specializes in the System/38 arena.

According to company owner Nate Viall, the difference between the highest and lowest salaries reflects a maturation in the System/38 environment during the past two or three years, with companies competing for quality personnel — in particular, candidates with broad views of business.

Talent show

"The talents in the System/38 world are being separated now," he said. "The ones who are making a contribution are being taken care of, while those who are just doing a job aren't."

Viall speculated that managers with System/38 experience will be in demand after IBM announces its System/36 and 38 follow-on, Silverlake. He said Silverlake could mean good job prospects for new college graduates familiar with the SQL-type data base access language expected in Silverlake.

Viall said almost all of the responding managers had more than five years' experience in the systems field and generally came from companies located east of the Rocky Mountains.

On a geographical basis, the highest salaries were reported in the Northeast, with an average of $64,499. In what Viall called the Rust Belt of Michigan, Indiana and Ohio, salaries averaged $40,227.

Advanced education tends to help managers earn more — $55,640 for respondents with MBAs — but not always. Graduates of technical schools — perhaps building on a broader skill base, according to Viall — averaged $42,362 and out-earned many college graduates, including those with bachelor's degrees in computer science. In addition, the lowest paid managers, at an average of $37,333, were those with Ph.Ds.

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Ready or not

FROM PAGE 87

The company AI champion should create a task group of enthusiastic employees, including at least one or two from MIS. This group will serve as the source of information about knowledge-based systems for the entire organization. The task group should maintain a library of information — newsletters, magazines and books — on AI and expert system vendors, consultants, products and users groups.

The group should also conduct in-house seminars to educate those with an interest in the technology and generate interest among the rest. Most importantly, the task group's mandate should be to assure that the organization's AI/expert system development efforts are focused and directed; to that end, the group should be prepared to identify problems requiring expert systems and select appropriate software and hardware tools.

Business sense

Du Pont Co., for example, has an AI focus group that is composed of experienced business professionals competent with expert systems technology rather than technical specialists, according to Robert Keller, president of Harvard, Mass., AI consulting firm Renaissance International Corp. and a consultant who has worked with Du Pont.

Notably, this approach implies that before a corporate-mandated AI endeavor began, the organization conducted various low-level, ad hoc efforts, producing business professionals familiar with expert system techniques. Keller confirms this, pointing out that Du Pont does much of its AI work with personal computer-based software tools.

"The AI focus group," Keller says, "is the equivalent of the information center."

Others say that more formal, extensive AI training is necessary for effective corporate expert system development.

GTE's Worrest

Michael Mushet is manager of technology research in the information services department of Southern California Edison Co. He says his organization knew it would be developing large, mainframe-based applications, so it conducted an internal search for employees with solid analytical skills who dealt well with high levels of abstraction and had "a high degree of intimacy with various AI models and ways of approaching AI problems."

At GTE Laboratories, Inc. in Waltham, Mass., the approach is similar, according to Ralph Worrest, a senior technical staff member. At GTE, AI is used in research projects that tend to be expensive, expensive and long-term. Like Southern California Edison, GTE employs a wide range of AI hardware and software; its AI development efforts are focused on large, complex systems, and the company's people are technically knowledgeable in AI.

Training

Whatever the level of technical expertise, the entire AI task group must be educated, which very often will occur at seminars conducted internally or outside by vendors, consultants or universities.

Functional competence with a PC-based expert system tool often can be achieved in a few days; learning to knowledge-engineer high-end tools, like Intellicorp's KEE or Inference Corp.'s ART, takes longer — anywhere from four months to a year. At Boeing, Linegar explains, the company trains interested AI proponents in what it calls its Associate Program — following a year of intensive training, employees are sent back to their groups to implement a particular system.

Mushet points out that Southern California Edison apprenticed several employees to Texas Instruments, Inc., where they learned how to build an expert system.

Picking a project

Your organization's first foray into expert system development should be modest — if it fails, the cost should be cheap.

"Look for a pilot application that is appropriate to the flavor of the technology you will use," Mushet advises. "If the problem selected is highly graphical, don't attempt to use a mainframe-based AI tool."

One source of pilot applications is your corporation's business units. Ideas should surface at seminars conducted internally by the AI task group. Contrary to popular belief, MIS may not be involved in any way in the application chosen for an AI project.

What constitutes the best expert system development tool or environment depends, of course, on the problem.

With the low-end, PC-based expert system tools, it's pretty straightforward, according to consultant Keller. "Most of the PC tools are about the same," he says.

It's a bit more complicated at the high end. According to Linegar, "If you're beginning work on a big project, send out invitations to a vendor roundtable. Have the vendors come in and discuss how they'll solve your problem, how long it'll take and how much it'll cost."

But there can be danger in thinking too big. "It's folly to think that corporate America is out searching for knowledge engineers," Linegar says. "The majority of expert systems are not being built by knowledge engineers." For most AI projects, it's someone in MIS who actually does the coding.

"I wouldn't suggest running out and buying really expensive equipment," Southern California Edison's Mushet adds. "I'd cut my teeth on something less expensive. You can get into expert systems with a personal computer and a $100 software package. It's like any new technology: You do not spend the money until you know what it is you're buying."

Picking an expert

Some development projects — often the larger and more complex undertakings — require human expertise to be knowledge-engineered into the expert system. This in turn requires a patient expert who is willing to work with the knowledge engineers.

"You need a good relationship with these people," GTE's Worrest stresses. "They must be articulate and have the support of their management. In our experience, the experts had to give us one-quarter of their working time."

And just how do you find such an expert? "Look for the person who has the least amount of time to give you — that's probably who you want," Worrest suggests.

Mesenbrinner is the president of Natick, Mass.-based AIM Consulting & Publications, Inc.

Both sides of AI coin

Setting up an artificial intelligence project could be the best thing your company ever did. But there can be corresponding pitfalls, so watch your step and pay special attention to the following issues:

- **The wrong people.** It is tempting to populate an AI task group with techies, but, notes Michael Mushet, manager of technology research at Southern California Edison Co.'s information services department, "a technical person or an AI researcher might lose sight of the fact that what they are supposed to do is solve business problems. Also, if they're too technical, they could turn off potential end users."
- **The right application.** First, beware of choosing an application that is not appropriate for the tools you have; second, beware that the human expert you turn to might perceive the expert system as a threat to his job; and third, beware of the urge to build a really important expert system, because if it fails, you could bring down the house.
- **Bad systems development.** Personal computer-based development tools are so easy to use that sometimes developers neglect good system development practices. The resulting seat-of-the-pants programming can be a nightmare. "Make sure the individuals developing the system are made aware of the issues of good systems methods," says Robert Keller, president of Harvard, Mass.-based AI consulting firm Renaissance International Corp.
- **Realistic client expectations.** Expert system development requires more involvement by the end user or client, and the process of building an expert system is, by nature, iterative; the developer is frequently returning to the client for more understanding of how the problem is solved and why. This breeds client expectations that may far exceed the capability of the finished expert system. "You must manage the expectations of the client," Mushet says.

SUSAN MESSENHEIMER

Getting into AI

Estimates of the time and cost required to develop expert systems

Very small (prototype)	50 to 100	Approximately 0.2 man-years	$20,000
Small	150 to 400	Approximately 0.5 man-years	$40,000 to $80,000
Medium	500 to 3,000	One to two man-years	$500,000 to $1M
Large	More than 5,000	Three to five man-years	$2M to $5M

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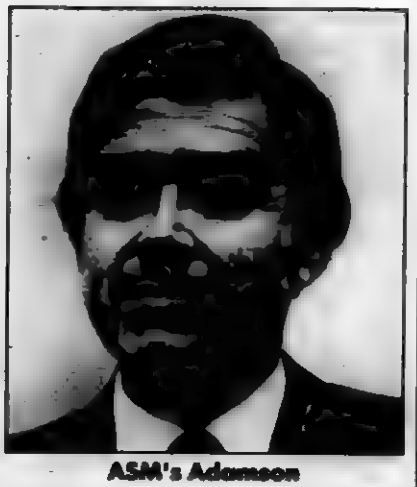
ASM goes back to school for program expansions

BY JAMES CONNOLLY
CW STAFF

SAN DIEGO — The time has come for the 8,000-member Association for Systems Management (ASM) to build on the organizational foundation established in recent years by expanding and improving its educational programs, according to ASM's outgoing president.

ASM's challenge is to use that base to educate members on the rapid changes in information technology in an era during which businesses stress the need for strategic information systems, ASM President Steve Adamson said at the recent ASM annual conference here.

Adamson said ASM's charter — to educate its members — has not changed in the 40 years since it was founded as the Systems and Procedures Association,



ASM's Adamson

which focused on noncomputer issues such as paper forms and office work flow. He said that what may change is the focus of the education and how it is delivered as the importance of strategic systems is stressed.

Most ASM members are involved with computers today, although the group has a broadly based membership. Those attending the conference here were mainly system designers and analysts.

Contrasting his organization with groups such as the Data Processing Management Association, Adamson said, "We tend to be systems professionals more than data processing professionals. We tend to be more involved with end users of an organization than some of the other associations — less involved in operating the DP equipment."

He said businesses' demand for competitive systems could help ASM members. "If our members are doing their jobs well, they will have a better understanding of the business than a person who is in a more purely technical job. I think that should give them a leg up," Adamson said.

Adamson, a Fullerton, Calif.-based management consultant, will complete his one-year term as president next month.

For those planning a career in information systems, he said, "I'd advise someone to be as well-grounded as possible in business fundamentals that are unlikely to change, in systems concepts, mathematics and psychology."

Expanding on psychology, he said, "Understanding people is the most important part of our job. We achieve things in some cases in spite of those people and in other cases by building on the positive in them."

Adamson said changing technology presents a challenge to ASM. "We are trying to do several things in education. One is that we are trying to do a better job of keeping our members abreast of, and giving our members an opportunity to keep up with, the application of the latest technological advances," he said, citing a "fairly intensive" desktop publishing seminar offered in conjunction with the recent conference.

He said one key educational effort is the promotion of certification, in particular the certified systems professional program that ASM originated in 1984 and passed along to the Institute for Certification of Computer Professionals.

"One of the things we are working on is having all educational programs be useful, applicable and taught in a hands-on environment," Adamson said. To meet that goal, ASM is negotiating with an outside organization for a series of ASM courses to be offered in laboratory-type settings. In such courses, attendees can work with the equipment, software and techniques rather than just hearing lectures.

Adamson said ASM now offers 150 educational programs through its international headquarters, and the headquarters staff is trying to work more closely with local chapters on organization, education and membership programs, he noted. He cited as recent accomplishments the addition of professional staff workers, more direct contact with the membership through features such as a monthly newsletter and the installation of a computerized association management system.

Asked about the possibilities of joint efforts or mergers with other associations, Adamson said ASM has had exploratory discussions with other groups about joint programs but that there have been no merger talks.

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Comdex/Spring '88. May 9-12, Atlanta. Contact: The Interface Group, 300 First Ave., Needham, Mass. 02194.

NRMA Seminar On POS and In-Store Systems. Dallas, May 11-13 — Contact: National Retail Merchants Association, 100 W. 31st St., New York, N.Y. 10001.

Brandon Managing Information Programs Forum, "Managing Information Services Today." New York, May 12 — Contact: Carl Spru, Brandon Managing Information Programs, 1775 Broadway, New York, N.Y. 10019.

Electronic Networking Association Conference Beyond Electronic Mail. Philadelphia, May 12-15 — Contact: Nan Hanlon, c/o Electronic Technologies, Inc., ENA Conference, 2744 Washington St., Allentown, Pa. 18104.

MAY 15-20

Conference on Network Publishing. Buford, Mass., May 15-17 — Contact: Institute for Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

Annual Meeting and Conference of the Software Maintenance Association. Chicago, May 15-18 — Contact: Suzanne Granchie, SMA 1988 Chicago, Box 391422, Mountain View, Calif. 94039.

ICS 88 Third International Conference on Supercomputing. Boston, May 15-20 — Contact: Program Committee: Suite B-300, 3000 34th St. S., St. Petersburg, Fla. 33711

National PDES Meeting. Orlando, Fla., May 15-20 — Contact: Pune, Inc., Suite 4302, 450 7th Ave., New York, N.Y. 10123.

Interop Computer Industry Conference. Burlington, Mass., May 16 — Contact: Interop, P.O. Box 1054, 102 Hells Road, Old Lyme, Conn. 06371.

Frost & Sullivan Conference, Computers & Communications in the Healthcare Industry Strategic Implications. Chicago, May 16-17 — Contact: Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

Information Technology and Securities Markets Under Stress. New York, May 16-17 — Contact: Center for Research on Information Systems, Graduate School of Business Administration, New York University, 90 Trinity Place, New York, N.Y. 10006.

Hammer Forum 88: Electronic Marketing. White Plains, N. Y., May 16-18 — Contact: Hammer and Co., 5 Cambridge Center, Cambridge, Mass. 02142.

Optical Storage 88, International Optical Storage Forum. Denver, May 16-18 — Contact: Cartridge & Associates, Inc., Suite 202, 3007 Moorpark Ave., San Jose, Calif. 95128.

International Communications Association Conference and Exposition. Anheim, Calif. May 16-19. Contact: ICA, Suite 710, 12750 Merit Drive, LB-60, Dallas, Texas, 75251.

Annual Office Systems and Networks Dialogue. Boston, May 17-19 — Contact: May Giacalone, Weld Associates, 555 E. City Line Ave., Bala Cynwyd, Pa. 19004.

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Digital Doctors Association Spring Meeting. Cincinnati. May 18 — Contact: DDA Headquarters, Suite 302, 107 S. Main St., Chelsea, Mich. 48118.

Hard Copy Supplies Conference. Boston, May 18-20 — Contact: Cap International, Inc., One Snow Road, Marshfield, Mass. 02050.

1988 Information Management Conference. Toronto, May 18-20 — Contact: John Hobin, Suite 311, 55 McCaul St., Toronto. M5T 2W7.

CD-ROMs in Office Automation and Business Seminar. Arlington, Va., May 19 — Contact: Office Automation Society International, P.O. Box 374, 6340 Munsell Court, McLean, Va. 22101.

Capitalizing On Technology Transfer. Cambridge, Mass., May 19-20 — Contact: Susan Morgan, 627 National Press Building, Washington, D.C. 20045.

Information Services: The Regional Bell Operating Company Era. Washington, D.C., May 19-20 — Contact: Telestrategies, 1205 Beverly Road, McLean, Va. 22101.

Prism User Conference. Boston, May 19-20 — Contact: Marcam Corp., 19 Crosby St., Needham, Mass. 02194.

MAY 22-25

AIA 1988 National Operations and Automation Conference. Atlanta, Ga., May 22-25 — Contact: American Bankers Association, 1120 Connecticut Ave. N.W., Washington, D.C. 20036.

Electronic Shopping '88. Boston, May 22-25 — Contact: Touche Ross & Company, Suite 1900, Alcoa Building, One Maritime Plaza, San Francisco, Calif. 94111.

VP '88. Duquesne Systems' International User Group Conference. New Orleans, May 22-25 — Contact: Mark Power, Duquesne Systems, Two Allegheny Center, Pittsburgh, Pa. 15212.

Expert Systems and Artificial Intelligence Symposium. Washington, D.C., May 23-25 — Contact: Digital Consulting, Inc., 6 Windsor St., Andover, Mass. 01810.

Cross Section Ninth Annual Conference on Applications of Computer-Aided Software Engineering Tools. Ann Arbor, Mich. May 23-27 — Contact: Rebecca Simmons, Meta Systems, Suite 200, 315 E. Eisenhower, Ann Arbor, Mich. 48108.

Contrasting Perspectives on Information Technology. Wellesley, Mass., May 24 — Contact: Center for Information Management Studies, Babson Park, Wellesley, Mass. 02157.

Ordernet Services' User Group Meeting. Columbus, Ohio., May 24-25 — Contact: Sterling Software, Ordernet Services Division, 1651 N.W. Professional Plaza, Columbus, Ohio. 43220.

Testing for Conformance to Information Technology Standards. Gaithersburg, Md., May 24-25 — Contact: U.S. Department of Commerce, National Bureau of Standards (800), Gaithersburg, Md. 20899.

Aerospace and Defense Project/2 Group Conference. Newport Beach, Calif., May 24-26 — Contact: Bob Bloom, Project Software & Development, Inc., 20 University Road, Cambridge, Mass. 02138.

Mark Up '88, International Conference and Showcase on The Standard Generalized Markup Language. Ottawa May 24-26 — Contact: Graphic Communications Association, Suite 604, 1730 N. Lynn St., Arlington, Va. 22209.

Computer Marketing Symposium. New York, May 25 — Contact: ACS Communications, Suite 306, 55 Northern Boulevard, Great Neck, N.Y. 11021.

Document Management Systems Conference. Washington, D.C., May 25-27 — Contact: International Information Management Congress (IMC), 345 Woodcliff Drive, Fairport, N.Y. 14450.

Document Management Systems Conference. Stockholm, May 25-27 — Contact IMC, 345 Woodcliff Drive, Fairport, N.Y. 14450.

SERVCON4. Boston, May 25-27 — Contact: United Publications, Inc., P.O. Box 605, Yarmouth, Maine 04096.

California Computer & Graphics Show. Palo Alto, Calif., May 26 — Contact: Dana DeNardi, Suite 204, 388 S. San Antonio Road, Los Altos, Calif. 94022.

Electronic Data Interchanges: Bringing It Together in Government. Gaithersburg, Md., May 26 — Contact: Dorothy Weinman, National Bureau of Standards, Room B166, Building 225, Gaithersburg, Md. 20899.

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Gilliam

FROM PAGE 87

It seems that the computing field is filled with individuals who are proud of their independence and are suffering from a superiority complex. However, in a business in which no one person is indispensable and teamwork is a necessity, strong egos can be a real roadblock to progress.

But why, then, do managers seem so reluctant to ask for the opinions of their own employees? What about the knowledge and insight available from users, vendors, consultants and even auditors?

No one wants to be criticized or have their mistakes and weaknesses revealed. But the manager who puts pride aside and asks for constructive suggestions can open the door to great accomplishments by the MIS department and improve the relations with executives and users alike.

Cast a critical eye

To formalize such communications, the systems manager might initiate an annual MIS appraisal. With such a step, the manager invites others to critique the information systems unit. These people can note the unit's strengths and offer suggestions on how the organization can improve its products and services.

The manager should realize that no person or organization can do everything perfectly. There are always areas that need improvement. The real issue is where to place the priority or emphasis. The appraisal will result in a prioritized list of steps that should be included in the work plans and budget for the following year.

The appraisal could be accomplished in a variety of ways. Of course, a survey form could ask specific questions or request a rating of the various services and products. Discussion groups or quality circles could promote an interactive brainstorming process leading to a prioritized list of suggestions. Another approach is to ask for a written response that points out where performance is good, describes problems and proposes solutions.

From whom should the manager seek such constructive criticism?

Start with the customer, which in this case is the user. Since the primary reason for the existence of the systems function is to serve the user, this is the group whose opinions matter most.

But just to allow the users to air their complaints is not worthwhile. Responses must be specific and offer solutions. An acknowledgment to users of the receipt of their information will confirm the importance of their participation.

Even a session to review each item for clarification will go far in improving communication with the user. But the MIS manager and the staff definitely must not go into any such discussion ready to do battle, debating the complaints in a defensive fashion.

SINCE THE PRIMARY reason for the existence of the systems function is to serve the user, this is the group whose opinions matter most.

Drop your guard

For the time being, both parties should not try to defend or explain why a situation exists. The response to the user comes later — in a written explanation along with the proposed steps to be taken in solving the problem.

Another major source for the appraisal is the employee. Many managers are reluctant to ask their own people how things can be done in a more effective manner. Yet these are the people who are most likely to point out weaknesses and offer practical solutions.

In addition, if the employees feel their opinions are respected, they tend to put forth extra effort to ensure success for the organization.

Other participants in the appraisal could include the vendor representatives, consultants and auditors.

What should be done with the information gathered from the appraisal process? First, the systems staff should categorize the responses into groups for review. Next, the problems and suggestions should be ranked by priority, according to the number of times listed and according to value to the user and the company.

Then each major problem should be labeled "urgent," "important" or "reconsider later." The urgent items should be addressed right away. The important ones should be a part of the next year's work plans. The reconsider later items should be held in abeyance until the following year.

Plan your strategy

The next step is to develop a general approach and a time frame to pursue a solution for the urgent and important problems.

Finally, a summary of the annual appraisal should be submitted to executive management, with emphasis on the planned steps for solving problems. It would be appropriate to include a summary of the strengths of the organization as observed by the respondents. Copies would be passed out to the respondent groups.

By allowing MIS to be critiqued, the manager is able to pinpoint specific weaknesses, develop solutions and move forward in upgrading the professional image and performance of the systems group.

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Garber

CONTINUED FROM PAGE 87

as the classic take-charge executive who comes into a new operation with his game plan mapped out and ready to go. In fact, his management style seems characterized by a strong willingness to hear out the other side before he goes ahead.

Instilling change

One of his favorite words is "instill," which *Webster's Ninth New Collegiate Dictionary* defines as "to impart gradually." Garber does not blindly assume that his way is best but checks out why things are done a certain way before changing them.

He learned this lesson the hard way at Wells Fargo Bank NA, at which he directed the telecommunications aspects of that company's acquisition of Crocker Bank. From a technical angle, Garber's job consisted mainly of linking Crocker's facilities with the Wells Fargo network and then analyzing user demographics in order to consolidate network resources and take advantage of economies of scale.

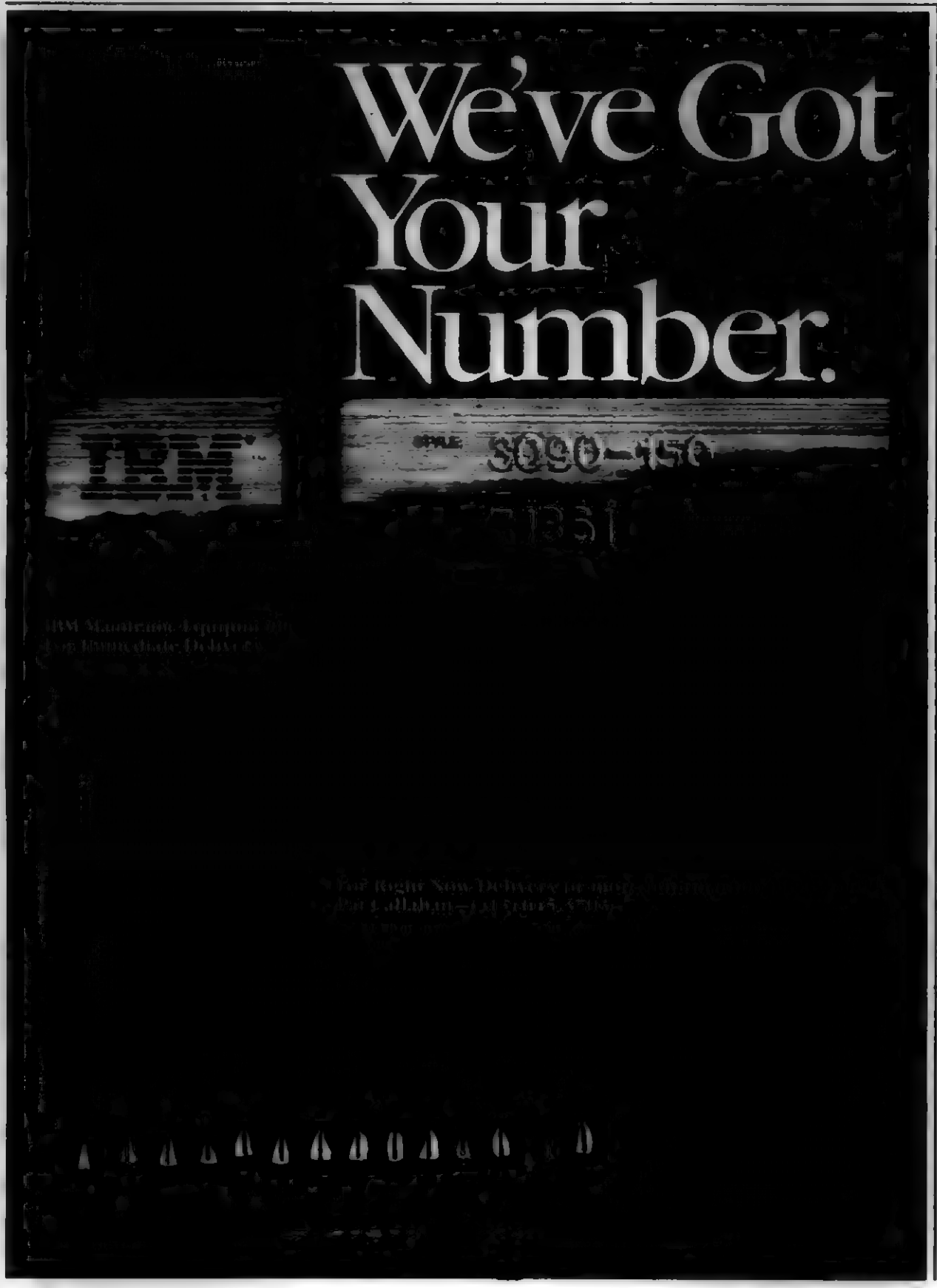
Garber learned that even two technically compatible networks can be difficult to mesh because "configuration and design can be so drastically different." He brought that knowledge to Fidelity. "The technology here is also similar to what I have worked with," Garber explains, "but I had the sense to step back and say, 'Educate me; tell me how you designed and installed this and how you use it.' "

But the biggest job at Wells Fargo was "integrating the cultures of the two groups," Garber recalls. "Just saying, 'You'll all work together' didn't work."

The Crocker people had to accept the fact that they had to become Wells Fargo people. "We were not willing to change the way we did things, so they had to change," Garber explains.

But there were problems. "The way they approached design, for example, was 180 degrees different from us," Garber notes. "They said, 'We just don't do it that way.' There were battles — personalities."

Garber says his trial by fire at Wells Fargo stood him in good stead when he took over telecommunications at Fidelity.



"I think I was brought in because I have spent a lot of time in the financial industry managing network costs and resources, making value judgments on what to buy and fitting the network plan with the organization's financial and strategic goals." When he arrived, Garber took a hard look at Fidelity's corporate culture as well as its top priorities — "what areas the company has no problem spending money on."

A major priority, he found, is customer service. Garber saw Fidelity spending more money than he was accustomed to on excess networking capacity and redundancy. "At first I thought this was waste," Garber says. But he changed his mind after realizing that the extra outlay helped ensure high levels of availability and response time for Fidelity's customer services. In this area, at least, he has decided not to make changes.

Costly technical gurus?

Initially, Garber found that many users saw his group as "technical gurus spending all the profits" without providing high-quality, reliable service. Garber has been trying to make telecommunications people at Fidelity more responsive to the needs of the users they serve in Fidelity's 19 companies — including software and systems people whose services are delivered over the telecommunications network. "I'm trying to instill the idea that we are not necessarily users' sole source; that they are allowed to get the same service elsewhere if it's cheaper and more reliable."

Garber says he feels the department has become more user-oriented since he came on board, but still has a way to go before he is satisfied. He now spends half of his time meeting with users, obtaining feedback about their needs. "I think it's one of the key things I was brought here to do."

"Greater responsiveness to user needs is something we started focusing on two years back; [Garber] has taken it to the next plateau," says Michael Simmons, president of Fidelity Information Services Co.

Simmons says he hired Garber "because of his reputation and because I liked his management style. He's continually looking for other, better ways to do things and testing to make sure the parameters we're using are the right ones." Simmons says Fidelity needs someone who is "continually changing the way we do business, to ensure we're not getting fat, dumb and happy."

Garber was brought into a newly created position "as a necessary piece" of Fidelity's reorganized voice and data communications division, Simmons said. The group began as an 18-person office in 1983 and now contains more than 100 people.

"He came in and took a growing operating division, realigned responsibilities and put people in different jobs. He's generally up, with a bounce in his step. I see him as a positive influence," Simmons says.

Garber's hobbies are "snow skiing and snow skiing," which offers both the personal challenge of conquering the mountain and the interaction of a family activity. "There aren't too many sports left where each member can exert to their own capacity," he laments. Garber has three children, including a daughter in college "who is in preveterinary medicine, not DP."

COMPUTER INDUSTRY

INDUSTRY INSIGHT

William Zachmann

Demise of proprietaries

The accelerating flight from proprietary architecture by traditional vendors is one of the most significant recent developments in the computer industry. It is an early indication of the eventual demise of proprietary architectures and the rise of standards.

For the past 40 years, proprietary architectures from individual system vendors have dominated computer use. In choosing a computer vendor's product, users have implicitly chosen to commit to a unique, proprietary architecture specific to that vendor.

This has meant that users, once the initial choice of vendor was made, normally continued to buy from that vendor as upgrades and replacements for the original system were needed. The investment in training and software specific to the system architecture, operating system and network architecture of the original vendor prevented users from easily changing from one vendor to another.

Normally, unless there was something seriously wrong with the vendor or the vendor's products, users stayed with the one they already had. The direct and indirect costs of converting from one proprietary

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CBEMA backs trade bill veto

Plant-closing measure reverses industry group's support

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The competitive pressures of the computer industry and giving employees advance notice of plant closings do not mix, according to the hardware vendors' leading trade association.

As a result, the Computer and Business Equipment Manufacturers Association (CBEMA) is supporting President Ronald Reagan's expected veto of the omnibus trade bill. Although the bill contains reduced export controls and other provisions supported by the computer industry, CBEMA will lobby Congress to sustain the veto because of the plant-closing provision.

The provision would require large employers to give workers 60 days' notice before closing a plant or laying off more than 33% of the work force. CBEMA and other business groups argue that advance notice would reduce the flexibility of firms trying to become more competitive, hasten the demise of companies trying to negotiate with creditors and suppliers and permit sabotage by departing workers.

There is a slim chance that congressional leaders will try to resurrect the bill by stripping away the controversial provision. "That would be our ideal scenario," said CBEMA spokeswoman Charlotte LeGates.

The American Electronics Association also believes the plant closing measure justifies supporting a veto of the bill, but representatives of the software industry disagree.

ADAPSO, the computer software and services industry association, opposes the provision but nevertheless supports the trade bill, especially the provisions to combat foreign piracy of software, according to Alice Denson, ADAPSO's manager of

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Dynamic RAM void hurts industry

Dynamic RAM chip shortage continues

Supply and demand estimates show 1M-bit dynamic random-access memory production will not match order rates until March 1989

INFORMATION PROVIDED BY S. G. WARBURG & CO.
CW CHART

BY J. A. SAVAGE
CW STAFF

ALAMEDA, Calif. — Putting its faith in the technology it espouses, Dataquest, Inc. predicted strong computer industry growth but warned of potential problems from the dynamic random-access memory chip shortage at a press teleconference late last month.

"Big firms will [have enough chips] because they have contracts with suppliers which will let them ship products," said Manny Fernandez, president of Dataquest, a San Jose, Calif., research firm. "But [the dynamic RAM supply] will be a significant problem for small guys."

Fernandez added that systems may even be shipped with no memory with promises of

Continued on page 97

IBM Credit saddled by profit drop

BY CLINTON WILDER
CW STAFF

OLD GREENWICH, Conn. — The effect of tax reform, a continued decline in profit margins and several ill-fated forays into noncomputer leasing in 1987 combined to saddle IBM Credit Corp. with its first yearly profit decline since its 1987 formation.

IBM's leasing unit profits fell 27% from $118.1 million in 1986 to $85.8 million last year, according to the unit's recent Securities and Exchange Commission filing. But $18.5 million of the decline was attributable to a one-time charge for a loss incurred in an offshore drilling rig lease deal.

Even without the extra charge, however, the Tax Reform Act of 1986 took its toll on IBM Credit. The elimination of the investment tax credit removed incentive for independent investors to fund leasing companies' purchases of computers, and IBM Credit's results dramatically reflected that elimination.

In 1986, investor partner-

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- Siemens consolidates business operations. Page 98.
- Parent gets preliminary offer for Encore/Perkin Systems. Page 101.

CONFERENCE NOTEBOOK

Compaq, Apple forecasts elevate conference

BY KATHY CHIN LEONG
CW STAFF

SAN FRANCISCO — With investment spending in the computer industry up this year, the outlook for 1989 will be strong, said William Welty, director of research at Hambrecht & Quist, Inc. With that note of assurance, Welty kicked off the 16th Annual Hambrecht & Quist Technology Conference here.

More than 170 public and private technology companies peddled their wares during the three-day affair. Company highlights included the following:

Compaq Computer Corp. Chairman and Chief Executive Rod Canion announced that international sales constituted 30% to 33% of last year's revenue. Overall, product demand peaked late last year. The Deskpro 286 remains the highest volume product in Compaq's line, although Canion said he believes the market is moving toward the Deskpro 386.

Apple Computer, Inc. While Compaq figures proved strong, so did Apple's outlook. Del Yocam, Apple's chief operating officer, commented that sales of the Macintosh II proved to be "one of the most pleasing things" about Apple's recently ended second quarter.

While the Macintosh has a strong foothold in many market segments, Apple also cut the price of its Macintosh Plus. According to Yocam, "It wasn't done to shore up a dying product line, but to gain ground in new markets like the home office and small business and to create a strategic anchor at the low end of the Mac line."

Ashton-Tate Corp. For the rest of this year, Ashton-Tate, which raked in $267 million in the past fiscal year, will concentrate on developing products that support IBM's PC-DOS and OS/2, Apple's Mac Finder, Unix

Compaq's Canion

and Digital Equipment Corp.'s VMS.

With an emphasis on a new Macintosh software division to be created in Sunnyvale, Calif., the company will be placing much of its research and development effort into Macintosh products, including Full Impact, its spreadsheet for the Mac, which is slated to be released in June instead of July.

Tandem Computers, Inc. The vendor that offers fault-tolerant on-line transaction processing systems expects continued growth this year after hitting the $1 billion revenue mark in 1987, said David Rynne, vice-president and chief financial officer.

Rynne said Tandem's agreement with AT&T and Plano, Texas-based Integrated Technology, Inc. is driving development into the Integrated Services Digital Network market.

West Coast correspondents Julie Pitta and J. A. Savage contributed to this report.

INDUSTRY WEEK IN BRIEF

AT&T announced its first round of investment in Sun Microsystems, Inc., a $40.6 million stock purchase that will give AT&T a 2.45% stake in the Mountain View, Calif., workstation maker. Under the landmark agreement announced in January, AT&T can purchase up to 15% of Sun.

The board of directors of **Apple Computer, Inc.** elected Cray Research, Inc. Chairman John Rollwagen to the Apple board. Rollwagen is the first executive from another computer vendor to join the board. Apple is a Cray customer.

A deal to acquire **TIE/Communications, Inc.**, a Shelton, Conn.-based private branch exchange vendor, was canceled last week. Would-be acquirer **ABI American Businessphones, Inc.** in Irvine, Calif., said its investment banker, Bateman Eichler, Hill Richards, Inc., withdrew its fairness opinion to ABI shareholders. The two companies had reached an agreement in principle in December 1987. ABI is a seller of telephone systems to small and medium-size businesses.

Network Equipment Technologies, Inc. reported robust quarterly and yearly earnings growth. Yearly revenue increased to $90.6 million, a 91% increase over the $47.4 million reported for the 1987 fiscal year. Net income for the year was $15 million, or $1.69 a share, compared with $6.1 million, or 41 cents a share, logged a year earlier. Fourth-quarter revenue for the Redwood City, Calif., communications products company was up to $27.9 million, a 70% increase over the same quarter a year earlier. Net income was $5.3 million, or 58 cents a share.

Interleaf, Inc. posted the $50 million revenue mark for its fiscal year ended March 31. The Cambridge, Mass., vendor of computer-aided publishing systems said sales grew 57% to $50.4 million. Net income rebounded from a $410,000 loss in the previous year to a profit of $7 million, or 59 cents per share. The fourth quarter was particularly strong as earnings reached $2.8 million, compared with just $642,000 last year. Quarterly revenue increased 84% from year-earlier results to $15.1 million.

Businessland, Inc. President Michael L. Nelson will take over the chief executive officer's post of the Memphis-based lower end distributor from Chairman Kenneth Rothfeld, effective June 1. Rothfeld will become president of the Computer Dealers and Leasing Association. Nelson, an Businessland cofounder, also spent three years at Sheldahl, Minn.-based lower Peripherals Multilayer Association, Inc.

Symbolics to resell Sony gear

BY STANLEY GIBSON
CW STAFF

CAMBRIDGE, Mass. — Troubled artificial intelligence systems maker Symbolics, Inc. last week announced a new tactic to bolster its business. It will become an OEM channel for Sony Microsystems Co. Unix-based technical workstations.

Under the terms of what both companies called a strategic partnership, Sony and Symbolics will share new product plans, technical and sales training and cooperative marketing programs for Sony's News family of workstations.

In addition, Symbolics will offer systems based on Sony workstations integrated with Symbolics hardware, software and peripherals. The systems, in which a Symbolics LISP-based Ivory processor will be embedded, will be sold and serviced by Symbolics.

Deal worth $60M

The agreement is valued at $60 million over a three-year period. The U.S.-manufactured News workstations were introduced in the U.S. in February and began shipping recently. "This will enable us to move beyond our software engineering and electronic publishing markets and extend into symbolic processing as well," Sony Microsystems President Masahiro Morimoto said in a prepared statement.

Symbolics customers can use News workstations as software development tools, as general-purpose workstations to run Unix applications and as network nodes to knowledge servers for symbolic processing applications, according to Symbolics. Symbolics will also provide a version of its Common Lisp Operating Environment software for use with Sony News workstations.

Palo Alto, Calif.-based Sony Microsystems is a wholly owned subsidiary of Sony Corp. of America, a subsidiary of Tokyo-based electronics giant Sony Corp.

Separately, Symbolics announced that it is dividing its operations into a systems division and a software division.

Dynamic RAM

CONTINUED FROM PAGE 95

later delivery.

The highest growth market sector, Fernandez predicted, will be in the computer storage market. He expects storage to double in market size, to $38 billion by 1992.

Winner by a mile

In the computer market itself, Fernandez claimed that technical computers will be the "clear winner," while business computer sales will be stable.

Technical computers will almost double in sales, from $9.4 billion in 1987 to $17.2 billion in 1992, Fernandez estimated. He also predicted that IBM will begin to introduce products aimed at Digital Equipment Corp.'s core of technical wares.

The IBM vs. DEC battle continues "and is starting to heat up" in the business computer market, Fernandez said. He predicted only moderate growth in this sector, from $20.5 billion last year to $27 billion in 1992.

Fernandez said his crystal ball got a little cloudy when he tried to predict the personal computing market. On paper, he expects the market to grow from $20.4 billion last year to $29 billion in 1992. "However, the availability of dynamic RAMs can play havoc with this whole forecast," he cautioned.

Four issues that Fernandez called "megatrends" affect all sectors of the computer industry: standards, alliances, intellectual properties and competitiveness.

According to Fernandez, companies have been forced to cooperate on standards across the board. "Users went out to the polls and voted. They said, 'No standards, no product,' " he said.

Alliances include traditional mergers, consortiums to pool capital for common research and development and "virtual vertical integration" — a term Dataquest uses to mean alliances between users and vendors for mutual advantage.

Alliances are important in today's market, Fernandez explained, "because people cannot do it all alone anymore."

The issue of intellectual property will affect future products, he said. While the protection of intellectual property is suddenly a hot item, according to Fernandez, it should have been expected.

"Why spend time on this? The development costs are so high that industry must protect itself and charge for it," he said. Fernandez claimed that it now costs about $80 million to develop a new microprocessor, whereas it cost only $2 million a few years back. "At the same time, product life cycles are shrinking," he commented.

Finally, competitiveness will drive automation, according to Fernandez. He said automation can enhance not only productivity but the quality and consistency of U.S.-made products.

The Dataquest teleconference was beamed via satellite uplink from the town of Alameda to sites in Boston and New York. The event marked Dataquest's first attempt at employing teleconferencing, but the Boston and New York sites had trouble with the audio. In Boston, only one microphone worked properly, and journalists had to play musical chairs in order to ask questions.

IBM Credit

CONTINUED FROM PAGE 95

ships contributed $887 million to IBM Credit's business volumes, but in 1987 the amount plunged to $162.9 million. That decline contributed to an overall 16% drop in the firm's business volumes in 1987.

Although IBM Credit is the largest computer leasing firm, it is only a tiny part of IBM's more than $50 billion annual business. "I don't think IBM executives are losing any sleep over IBM Credit's results," said Bob Djurdjevic, president of Annex Research in Phoenix.

"IBM Credit is still fulfilling its strategic role — providing an alternative way of [customer] renting while IBM itself gets out of the renting business," Djurdjevic added.

Djurdjevic also noted a 23% increase in IBM Credit's expenses in 1987. That drove IBM Credit's net profit margin down for the fifth consecutive year to 11.8%. Its net margin in 1983, by contrast, was 21.5%.

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Note: The third annual Computer Press Awards competition was held April 12, 1988, in New York. Co-sponsors of the competition are Citizen America Corp. and Computer Press Association.

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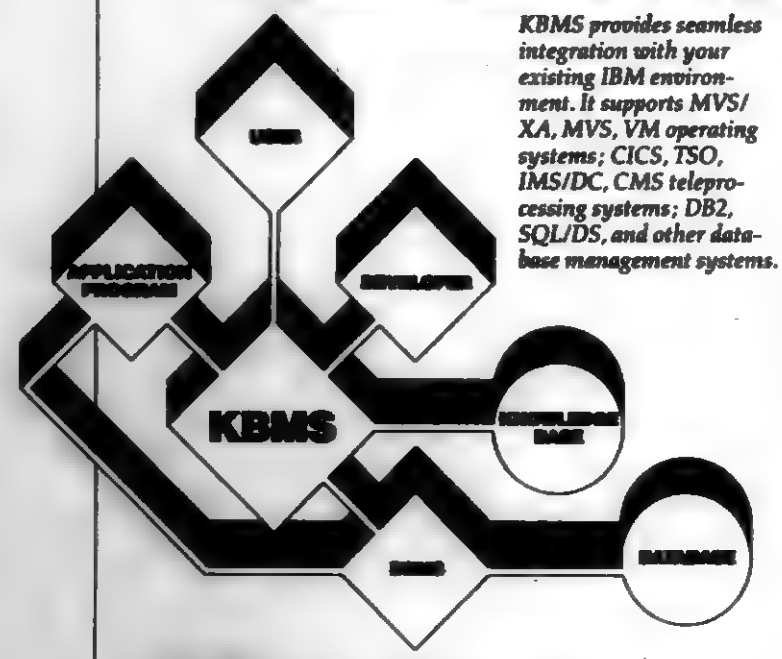

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CBEMA

CONTINUED FROM PAGE 95

international affairs.

"In an ideal world we would love to have the plant closing provision removed," Denson said. ADAPSO spokesman Chris Carleton noted that the association believes passage of the trade bill could prevent more protectionist measures in the future. The software and services industry generally opposes protectionism because of potential retaliation by foreign markets, he said.

After three years of legislative work, the 983-page trade bill was approved by the House of Representatives and the Senate last month, but the Senate tally was three votes shy of the two-thirds majority needed to override a veto. Reagan is expected to veto the bill sometime this week.

"For all those who think we will automatically have a new bill [after the veto], that is not the way it is," warned Sen. Lloyd Bentsen (D-Texas), who led the Senate's conference committee on the trade bill.

But Stephen D. Cohen, trade analyst for Washington Analysis Corp., suggested there may be a last-minute compromise to revive the bill, although it may take several weeks to work out. "The trade bill is wounded, but not dead, since all domestic interests have more to lose than to gain by its demise," he said.

Provisions supported

While the plant closing provision has attracted the most attention in the last few weeks, the omnibus trade bill has a variety of provisions that the computer industry supports:

- A reduction in export controls on technology sold to Europe and Japan. Overall, the bill cuts by roughly 40% the number of export licenses required, so that more attention would be focused on protecting the most sensitive technology from diversion to the Soviet Union, according to Sen. William Proxmire (D-Wis.).
- A section requiring the president to negotiate for greater U.S. access to telecommunications markets in Japan, Canada, France, West Germany and other countries. If the negotiations fail, then the president would be required to impose trade sanctions [CW, April 7, 1986].
- Implementation in 1989 of the harmonized tariff system, a standard classification system for imports and exports [CW, Dec. 21, 1987].
- Many provisions intended to strengthen the protection of intellectual property rights such as software copyrights.

One controversial part of the trade bill would impose sanctions against Toshiba Corp. to punish the Japanese conglomerate for a subsidiary's sale of high-technology gear to the Soviet Union [CW, July 6, 1987]. The sanctions include a three-year ban on federal government contracts with Toshiba Corp. and a three-year ban on all imports from Toshiba Machine Co., the guilty subsidiary.

If the trade bill dies, Sen. Jake Garn (R-Utah) has vowed to push for stronger import bans against all Toshiba subsidiaries, including the U.S. unit that sells a popular line of laptop computers.

The bill also has a variety of little-known provisions that may affect the computer industry, including the creation of a 12-member advisory group called the Competitiveness Policy Council.

Siemens integrates tech groups

BY CLAUDIA MARWEDE-DENGG
IDG NEWS SERVICE

MUNICH, West Germany — Siemens AG, the giant West German electronics and telecommunications supplier, is undergoing a major reorganization of its information technology activities.

Confronted with the progressive merger of data processing and communications technologies, the industrial group last month started transforming four divisions into two. A Siemens spokesman said the reorganization is "nothing spectacular, but it is a step towards more integration."

Units for data systems and for private communications systems and networks are to be combined into a single systems division. Divisions responsible for communications terminals and peripherals will be merged into an equipment division.

The systems division will be responsible for joint systems planning and marketing for all products, including software. The division has three production plants: two in Augsburg, West Germany, for mainframes and departmental computers, and one in Witten, West Germany, for private branch exchanges and software development. Marketing will continue to be largely industry oriented.

In contrast, the new equipment division will remain product oriented. It will focus on distributing communications terminals and peripheral systems. The division will manufacture telex and teletex terminals in Berlin, West Germany, telephone terminals in Bocholt and Gladbeck, West Germany, and laser printers and disk storage systems at a Munich-based plant.

Information technologies account for more than one-third of the diversified industrial group's revenue. According to a Siemens spokesman, telecommunications networks and security systems represented 18%, or about $6.1 billion, of total sales of $30.7 billion last year. Communications and information systems were 19%, or about $6.14 billion.

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Zachmann

CONTINUED FROM PAGE 95

architecture to another were just too high.

In both the original mainframe environment of the 1950s and 1960s and the emerging world of minicomputer use in the 1970s, proprietary architectures unique to individual vendors dominated.

More recently, however, that has begun to change. In personal computers, the de facto standard that IBM unintentionally created with the IBM Personal Computer, PC XT and AT established, for the first time, widespread commercial use of what amounted to a nonproprietary system available from hundreds of different vendors.

IBM-compatible micros running Microsoft's MS-DOS have set a precedent that is starting to spread to larger and more capable systems. OS/2, developed by Microsoft and IBM, will provide an even more capable operating system environment for desktop systems and network servers based on Intel 80286 and 80386 microprocessors.

At the same time, Unix, the standard operating system developed and sponsored by AT&T, is maturing and offering a real alternative to proprietary architectures and operating systems for larger multiuser systems. Unix is now poised on the brink of much more rapid penetration of business markets.

Together, DOS, OS/2 and Unix offer partially competitive but largely complementary options to the proprietary environments that have traditionally dominated computer use. They are becoming the rallying points for a growing number of vendors as well.

The battle is shaping up as a three-way struggle. IBM's proprietary system environments, historically dominant in the industry and still dominant in large mainframe systems, are the first contenders.

DEC's VAX/VMS is the second. DEC's tremendous success over the past few years has made it the only other proprietary architecture, besides IBM's, with reasonable prospects for continued success. With few exceptions, all the other proprietary architectures and operating systems, ranging from traditional mainframe and minicomputer vendors, are no longer long-term contenders. Instead, it is Unix in larger multiuser systems and MS-DOS and OS/2 on the desktop that offer the real alternative for vendors as well as for users.

What's more, it is these newer, standardized architectures that constitute the most rapidly growing sector of the market for information systems.

Viable alternatives

As a growing list of system vendors start to replace their traditional, proprietary architectures with systems running Unix or OS/2, these nonproprietary standard environments are rapidly approaching the critical mass required to initiate a chain reaction creating a viable alternative for users.

The greater competition these standards create is combining with less expensive yet increasingly powerful microprocessor-based systems to offer a far more cost-effective option for users. Even very large applications can now be built with the lower-priced hardware that uses these standards.

Newer microprocessor-based products running Unix or OS/2 from traditional vendors like Unisys, Honeywell-Bull, Prime and others are just the beginning. Even IBM and DEC are starting to take their own Unix-based product offerings more seriously.

Information systems professionals concerned about providing the best capabilities for their organizations at the lowest cost cannot afford to overlook these newer, nonproprietary alternatives to traditional systems. The march toward standards is under way. Those who fail to join it in the next few years will be left behind.

Zachmann is vice-president of research at International Data Corp.

"Obviously, these people never considered the advantages of incorporating planned rentals into their capital equipment acquisition strategy."

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West Germany invests in CIM

BY WOLF-DIETRICH LORENZ
IDG NEWS SERVICE

BONN — Hoping to boost the use of computer-integrated manufacturing (CIM) technology by small and medium-size companies, the West German government plans to invest $300 million during the next five years in a recently launched CIM program.

In a recent announcement here, Research Minister Heinz Riesenhuber said the CIM program is aimed at spurring West German manufacturers to "make use of the best technologies as fast as possible." He said wider use of CIM techniques would strengthen West German companies against rivals from newly industrialized countries in the Far East, as well as in the U.S. and Japan.

A recent study by market researchers RKW, based in Eschborn, West Germany, found that only 10% to 17% of West German companies use computers for production applications, compared with 19% that use them for commercial ones. Complex computer-controlled manufacturing accounts for only 3% of the companies using CIM, and automated material flow systems represent less than 1%.

Preliminary deal reached on Execucom sale

BY ALAN ALPER
CW STAFF

AUSTIN, Texas — After a nine-month search, Travelers/Diebold Technology Co. has reached a preliminary agreement to sell its Execucom Systems Corp. subsidiary to MPSI Systems, Inc., a Tulsa, Okla., developer of retail planning software for the petroleum industry.

If the deal is consummated, it will be the third time in the last four years that the once high-flying developer of IBM mainframe decision-support software has been sold.

Under terms of the agreement, MPSI would pay a minimum of $9.5 million for 14-year-old Execucom, which last year had revenue of about $19 million. The final purchase price could go as high as $15 million, depending on Execucom's revenue performance and MPSI's consolidated profits during the next three years. The deal is expected to close late this month or in early June, both companies said.

Bumpy ride

Execucom's growth has stagnated during the last several years as company ownership has changed hands and financial planners at user companies have moved their decision-support applications from mainframes to a host of microcomputer-based packages, such as Lotus Development Corp.'s 1-2-3.

The company continues to hold roughly 40% of the mainframe decision-support market, although use of such products is on a steady decline, according to Focus Research Systems, Inc. in West Hartford, Conn.

Quentin Mantooth, MPSI's chief financial officer, said acquiring Execucom would enable his $28 million company to expand its product line and customer base. He said the fact that Execucom has been bought and sold so many times does not concern him. "We studied it carefully and found that the company's reputation has not been tarnished with customers," Mantooth maintained.

Mantooth noted that Execucom would operate as a separate company. Current management and 170 employees in 13 offices worldwide, would be retained, he added.

Travelers/Diebold Chief Executive Dick Beckendorf said the search for a buyer was complicated by a desire to find someone suitable to Execucom's management. "We spent an excessive amount of time doing due diligence," he claimed.

Industry analysts, however, said buyers were wary of Execucom for a number of reasons, including its tough market position and ownership changes.

"It's getting harder and harder to find people willing to purchase companies in the under-$20 million range," said Charles Varga, president of The Cerberus Group, a Frenchtown, N.J., firm that tracks acquisitions and mergers in the information processing business.

Execucom was both the first and the last chapter in the Travelers/Diebold joint venture. The company acquired Execucom in May 1986 from Continental Telecom, now Contel Corp., as its first move in creating a technology development company.

The joint venture between the insurance giant and the consulting firm was dissolved last year after differences of strategy and financial constraints developed, analysts have said.

Thirsty circuit makers marooned

BY J. A. SAVAGE
CW STAFF

SAN FRANCISCO — It could be a dry and expensive year for semiconductor manufacturers in San Jose and Santa Clara, Calif.

California's current drought recently caused the city of San Francisco to threaten to cut off its contribution to the two cities' water supplies, and the manufacturing primarily affected would be integrated circuits.

Chip manufacturing requires not only vast quantities of water but that the water be highly purified. Manufacturers tend to prefer the clean water supplied by San Francisco's Hetch Hetchy dam in Yosemite National Park because it needs less purification than water from other sources.

The other supplies available in the area are largely from groundwater. That water contains more minerals; therefore, it costs more to clean and deionize in preparation for use in semiconductor production.

Santa Clara receives only 17% of its supply from San Francisco, but in one area heavily populated by computer companies, that supply accounts for 90%.

Santa Clara is home to such companies as Intel Corp., National Semiconductor Corp., the Monolithic Memories, Inc. operation of Advanced Micro Devices, Inc., Siliconix, Inc. and Rohm Corp.

Major semiconductor makers headquartered in San Jose include Hitachi America Ltd., Cypress Semiconductor Corp., Sierra Semiconductor Corp. and Silicon General, Inc.

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Finessing the job interview

Skills and expertise are crucial, but how you handle yourself can help, too

BY ANTHONY REED
SPECIAL TO CW

The face-to-face job interview is where you can move to the top of an employer's list of candidates or get scratched from it altogether.

Unfortunately, it's very difficult to learn how to improve your interviewing technique. Interviewers rarely provide direct, constructive feedback, in part because doing so might result in legal action against them. However, several data processing managers identified the following considerations.

Set a career goal

In today's tight job market, many overzealous applicants have become DP chameleons. As the name implies, the chameleon drastically changes his personality and/or career objectives to meet the needs of interviewers.

This changeability becomes apparent when the person interviews with several departments in the same company. One "chameleon" was so convincing that during a postinterview meeting, managers thought they had interviewed different people. The applicant failed to get the job because his career goals appeared to be inconsistent.

The popularity of low-cost word processors and letter-quality printers has led to the "chameleon resume." One manager reported that an applicant sent his company several versions of a resume with different job objectives. Although the company had several openings, the applicant didn't get an interview because her career objectives were unclear.

Just be yourself

Some DP professionals have realized the importance of a professionally prepared resume and interview coaching. However, these techniques may backfire when they overshadow an applicant's own personality.

One manager described a "prerecorded" interview. The applicant rattled off prepared answers like a tape-recorded message.

The manager began to wonder whether the applicant pressed a "smile button" at a predetermined time to show he was human.

The applicant was so well rehearsed that the manager eventually asked for his "study questions and answers." The interviewer wanted someone who was human, spontaneous and self-confident. She believed that if this candidate had to rely on a script during the interview, he could have problems responding to users while under pressure.

Honesty is still the best policy during interviews. If you don't know the answer to a question, just say you don't know it.

Trying to bluff your way through a technical interview insults the interviewer's intelligence — and makes him wonder about the reliability of your resume.

Make a mental note of the interviewer's unanswered questions and learn the answers before your next interview. You would be surprised at the number of companies that use the same technical questions during interviews.

The benefit beggar

Dwelling on company benefits during the initial interview is another taboo. Inquiring about benefits prolongs the interview and makes the interviewer wonder if you're more interested in being sick and taking a vacation than in working.

Most interviewers only want to discuss benefits with the person to whom they'll extend an offer. If you're interested in the benefits, contact the company's personnel department.

Most interviewers ask you if you have any questions. If you don't ask questions about the company, business or technology, the interviewer may get the impression that you're more interested in just getting a job rather than a position with his company.

> **HONESTY IS STILL the best policy during interviews. If you don't know the answer to a question, just say you don't know it. Trying to bluff your way through a technical interview insults the interviewer's intelligence.**

When you're able to tell him about some of the articles you've read about him company or industry or ask specific questions about the company's operations, it implies that you have developed a strong interest in the position.

Most large libraries carry information about publicly held companies listed on the major stock exchanges. You can learn about a company's subsidiaries, major acquisitions, financial position and even future plans.

You can also visit its personnel or public information office and get a copy of its annual report and other documents.

Do your homework

Before interviewing with a major financial software company, I learned about its product line and also that it had had three presidents in two years, lost money in three of the past five years and released a software package without a beta test, which led to layoffs, reorganizations and financial losses.

It took only 15 minutes of work to acquire this information in the public library's business section.

I followed up by making a couple of telephone calls to some professional contacts to add to what I had learned.

During one of the silent periods of the interview, I was able to describe the problems in detail, ask how they were resolving them and recommend solutions.

It is almost impossible to identify all of the things that you should do in an interview because not all of the interviewers are looking for the same characteristics.

However, if you are comfortable with your skills, focus your intentions, show an interest in the work to be done and demonstrate a knowledge of the company and industry, you can greatly increase your chances of getting a job.

Reed is director of business systems at a Dallas-area educational institution.

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IDMS DBA
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St. Louis based manufacturing firm has an immediate opening for an experienced systems professional who has 3+ years of DOS/VSE support background. Any additional support background with IMS or CICS would be a definite plus, but not required. Call for further details regarding this excellent opportunity. Salary to $40,000

SR APPLICATIONS ANALYST
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PROGRAMMER/ANALYSTS
Progressive shop in the Midwest seeks 3+ years COBOL programmer analysts with heavy structured design skills. Experience with command level CICS and IMS would be a definite plus. The basic responsibilities will be to recommend software/hardware solutions, systems design and oversee all phases of system development and implementation. Tremendous benefits. Salary to upper $30's

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Senior Consultant—Big 8 (301-05) Phoenix office of national accounting firm is expanding its MIS consulting practice and seeks a professional to assist clients with evaluation, selection, development and implementation of computer systems. Excellent communication and analysis skills required. Experience utilizing interactive systems in a healthcare environment is desired. *To $40,000.*

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Software Engineers (301-07) Multiple openings exist for BSEEs with a minimum of two years experience as Software Engineers. Openings in signal processing, microwave, radar, satellite communications, electro-optics, power supply, inertial navigation and image processing. Experience with VAX 11/7XX, PDP 11/7XX, FORTRAN, ADA, PASCAL and/or ASSEMBLER sought. Phoenix. *To $70,000.*

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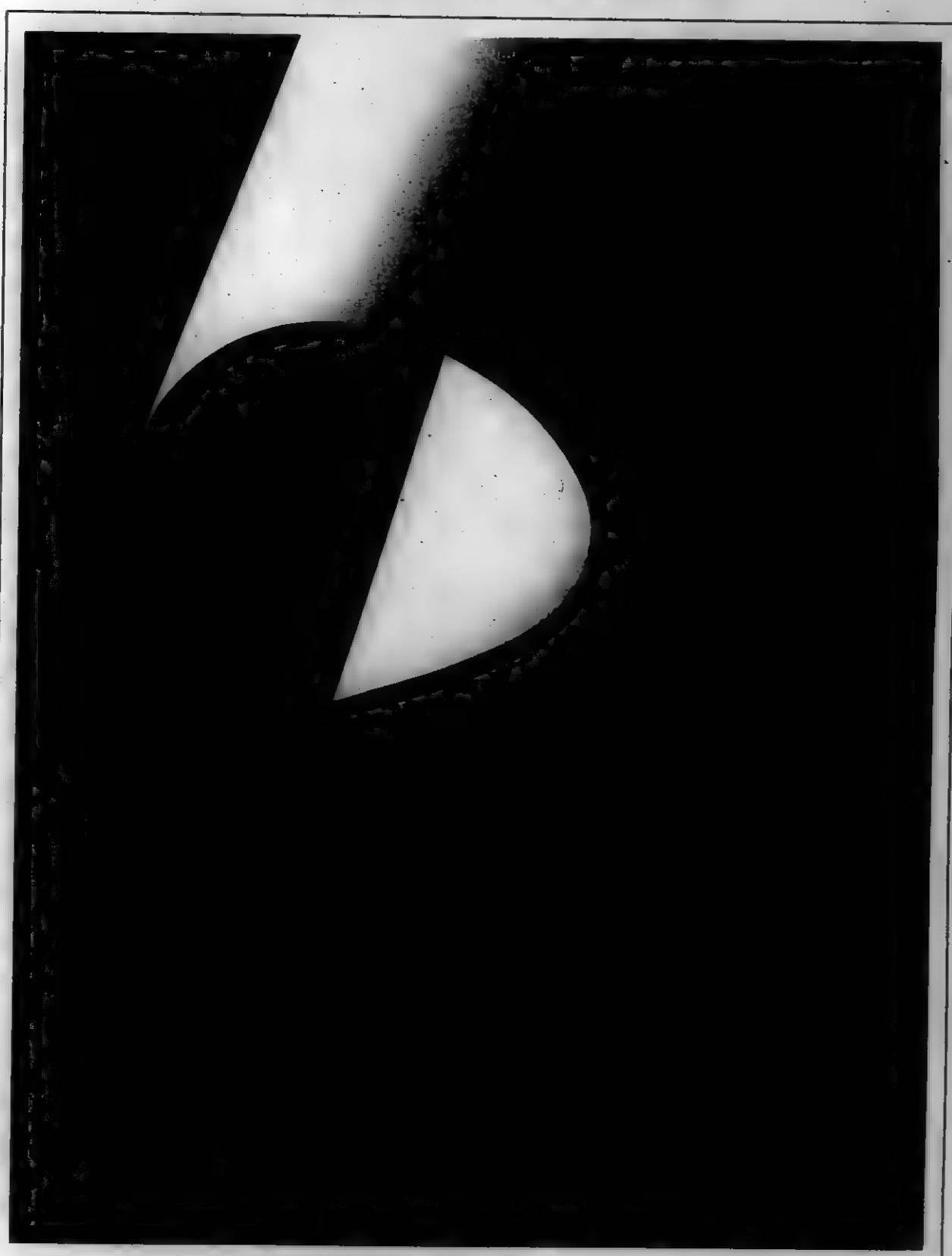

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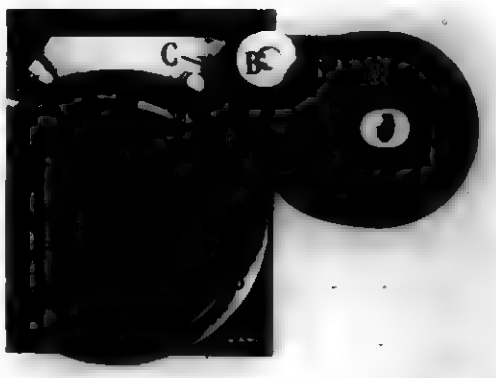

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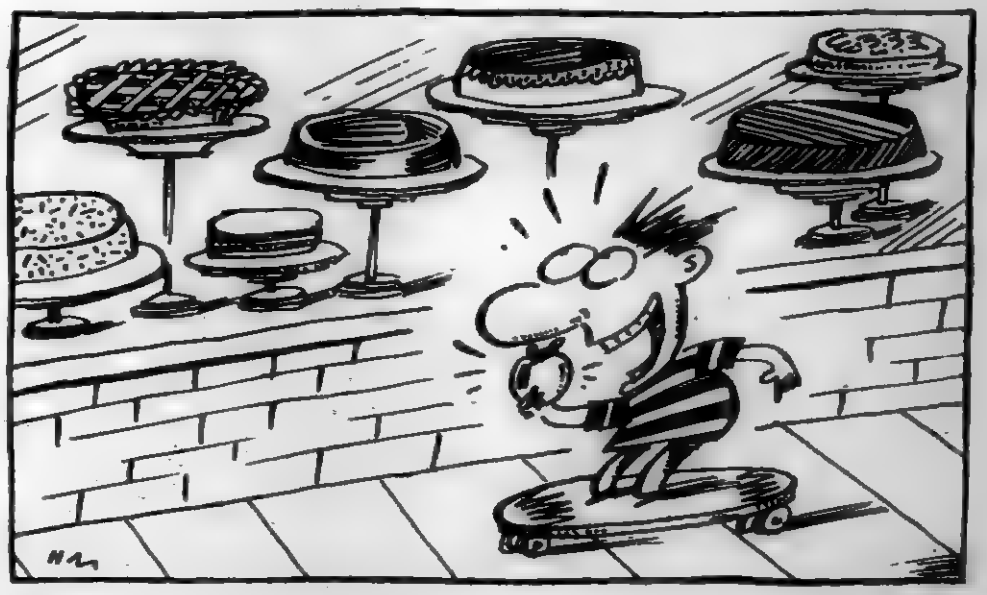
Price sensitivity and resistance to exotic features among current users cause laser printer vendors to eye untapped markets

USERS FAVOR BASIC FARE

BY MICHAEL BALL



HAL MAYFORTH

Infiltrating the data processing environment is becoming a high priority for laser printer vendors. So far, only a relatively small number of organizations have opened the door of this sanctum; most prefer to stick to the known and trusted area of impact line printers. But vendors are gearing up to make stronger appeals to high-volume users, such as MIS managers, design engineers and architects. Initially distracted by the flurry of interest in desktop publishing and preoccupied with establishing a beachhead in the office, laser manufacturers have only recently begun to concentrate on the special needs and interests of this big-ticket market.

Breaking into DP and other high-end applications such as computer-aided design (CAD) will not be easy, especially given the current price levels for laser printers equipped to operate at the speeds and resolutions most data centers require. These machines, which may print more than one million pages per month, cost approximately $200,000.

Price by itself is not considered to be as much an issue at this level as it is in the office market, which, according to estimates from Dataquest, Inc., currently accounts for approximately 90% of laser sales.

Cost sensitivity declines as throughput requirements increase, according to Joe Ryan, laser products marketing manager at Dataproducts Corp. in Woodland Hills, Calif.

Cathy Dingman, associate director of the Intelligent Copier/Printer Market Requirements Service at CAP International, Inc., a market research firm in Marshfield, Mass., says that while most users want their ideal printer to cost less than $10,000, 40% of large-site users say they are prepared to pay more than $75,000 for a machine that meets their requirements.

Ball is a free-lance writer based in Boston.

MIS shops need to be convinced, however, that high-speed laser printers can replace the traditional line printer and that they exhibit the reliability and flexibility to perform in the data center. As one laser convert puts it, "Our margins are very close, and we don't buy a printer just because it looks nice." Lou Amadio, operations manager at Big Bear Stores Co. in Columbus, Ohio, adds, "Most data centers I know think the same way."

Running the workhorse

Reliability and duty cycles are key considerations and ones for which lasers will be hard-pressed to compete with line printers. As Corinne Kody, manager of the Printer Market Program at market research firm International Data Corp. in Framingham, Mass., notes, "Line printers are still the workhorse in many companies. They have an untouchable mean-time-between-failure rate. Those things don't ever die."

Other features likely to be considered important by high-end users are variable-size paper feeding systems and multiple-part forms capability. While lasers can often print more than one copy of a form as fast as other printers can print one multiple-part form, some such applications still demand impact printing.

Eric Gaer, director of marketing at Personal Computer Products, Inc., a laser printer vendor

Basic fare

FROM PRECEDING PAGE

in San Diego, says he has heard enough requests from MIS shoppers to convince him that "it is becoming more and more important to offer VAX and mainframe links."

New features geared to satisfy the requirements of this target group are already beginning to appear. For example, many medium- and high-speed lasers have begun to feature line printer emulation.

In addition, some early converts are finding that laser vendors are willing to listen to and act on their suggestions.

Gave it a try

Despite his reservations, Amadio introduced laser printers at Big Bear, not as a replacement for line printers but rather as a special-purpose addition.

Amadio says the grocery chain turned to Storage Technology Corp.'s 103 page/min machines when it needed to begin printing shelf price tags in-house but could not get the varying type sizes on a line printer. The weekly rush to get special and changed prices to a service house for printing and lamination was expensive and slow.

The search for a printer that could provide the necessary speed, a variety of typefaces, graphics and cold process brought Big Bear to laser printers.

With the power of an IBM 3090 mainframe and a bank of line printers in-house, the company had only part of the system; Storage Technology took care of finding the rest.

"They said they could do what we needed, including finding the right software, but we weren't sure," Amadio says. "So we told them to go ahead, and we'd pay them if it worked. Much to our surprise, they said OK."

What with debugging the system and fiddling with a custom laminating machine that Big Bear added, Storage Technology wound up subsidizing the experiment for the better part of a year. "They didn't get a penny for about nine months," Amadio says.

The vendor's flexibility has produced a satisfied customer and partial convert. Amadio says the laser has worked better than anyone had hoped: It paid for itself within a year and gave the company the ability to respond to competitive pressures.

To everyone's surprise, "there was tremendous latent demand once the laser printer was installed," Amadio says. The tag printing now takes less than 12 hours per week.

Other members of the MIS staff found the laser printer's graphics and multiple typeface capabilities what they had been waiting for.

EARLY converts are finding that laser vendors are willing to listen to and act on their suggestions.

Now demand has increased so much that a second printer of the same type has been ordered. Big Bear is also looking at other applications, such as printing its roughly 18,000 W2 forms — all originals — on lasers, at a higher speed and without the bother of carbons.

As for its line printers, the firm got rid of one but kept two IBM 4245s. Amadio says if he had been leasing those printers, he might have dropped another. But because the company owns them, Big Bear keeps the printers for jobs that require impact printing.

Another pleasant shock to the company was that supplies and maintenance for the laser printer cost a little less per line compared with the impact printer.

Amadio says the $15 for ribbon vs. the $13 for toner is about equal, and the $400 vs. $500 per month for maintenance is acceptable, because line printers are six times slower.

Red-carpet treatment

Another early adopter, who asked for and received special treatment from a vendor, is a large Midwestern office furniture manufacturer.

The manager of business systems at that firm already has 100 Xerox Corp. 4045 10 page/min machines hooked by network to 2,000 IBM Personal Computers, compatibles and terminals through an IBM 3081K. He has already started a pilot project to output CAD drawings, which are crucial to custom orders.

The company shopped around 3½ years ago and convinced Xerox to sell it pre-beta-test models and help produce custom interfaces. The aim was to leapfrog typewriters and get equipment that could print letterhead and forms overlays on demand.

Having done that, the furniture maker is looking ahead to future capabilities — faster speeds, additional paper feeds, greater graphics capability and more intelligence.

Need dominates

Some organizations are even willing to purchase on the basis of promise and potential need. One DP manager for a project team at a large financial services and credit card firm admits that his laser purchasing decisions are driven by expectation as well as need.

"Right now, I have to have two font cartridges at a time and a printer that accepts additional memory, 'sharability' and the ability to take a variety of large and small paper sizes," the manager says.

He has already added 2M to 4M bytes of memory to printers and is looking to vendor improvements for the rest. "I expect a lot more capability a year from now," he notes.

That does not seem to be an unrealistic expectation, given the rate at which laser vendors have added features to their printers in the last year. It must be noted, however, that while the majority of current users seem to be satisfied with present offerings, vendors do not always seem to have anticipated feature demands accurately.

For example, while laser manufacturers are fleshing out their catalogs with models capable of duplex, or two-sided, and color printing, duplexing is still a rare demand, even among users who are used to sending out two-sided reports to printing firms. Most users perceive color to be an overpriced frill.

In a recent survey of 1,111 sites, CAP International found that users were generally not interested in paying a premium for advanced features such as three or more colors or electronic forms storage. Very few considered them worth even a 10% increase in price.

Get down to basics

The company found that the majority of current users were interested in the basics — quality, reliability, speed and cost.

Not surprisingly, definitions of adequate speed and cost vary by site size and usage. For the time being, "small sites have fairly low speed requirements," CAP's Dingman says.

"More than 50% find speeds under 22 page/min to be appropriate for their needs," she adds. "The median speed is 35 page/min for medium-size sites and about 75 page/min for large sites. More than 35% of large sites require speeds of more than 120 page/min."

Personal Computer's Gaer notes that his firm's 6 page/min machines are the big sellers. Law firms and insurance companies tend to require 15 page/min.

"We think eight pages per minute is fine," says David Lazor, systems analyst at Sheppard, Mullin, Richter & Hampton, a law firm based in Los Angeles.

The organization's main printing concerns are correspondence and document processing, so print quality places first, second and third in a list of priorities, with price falling further down the list.

Lazor's firm has 85 Hewlett-Packard Co. Laserjet IIs, each dedicated to a PC. Networking is not a solution, Lazor says. "Time is far more important than cost to us," he says. "We can't be paralyzed if a server goes."

In other contexts, laser printers may seem pricey, but in terms of billable hours for attorneys, "these things are almost throwaways," he says. In fact, the firm keeps a few extra printers tucked away as insurance. "It's nothing to pull one in from another room," Lazor says.

Price considerations follow reasonably predictable patterns. In CAP International's study, small companies were three times as likely as big companies to have a choke point of $1,500 for a laser printer. They were more than twice as likely to need something less than $5,000.

Furthermore, according to Dick Weaver, group vice-president at C. Itoh Electronics, Inc., low-end printers dedicated to a single user are the most price-sensitive category.

When it comes to other features, CAP International found that print quality and reliability were universally considered critical. In fact, these considerations were No. 1 and 2 on everyone's lists.

The majority of users seem relatively satisfied with the current market standard of 300 dot/in., according to CAP International.

However, 40% of the medium-size sites and 45% of the large companies surveyed listed 500 dot/in. as ideal.

Reliability can, of course, bear different interpretations for users, depending on their output requirements. But generally speaking, users of both high- and low-speed models say that reliability is crucial, and neither group seems dissatisfied at this point.

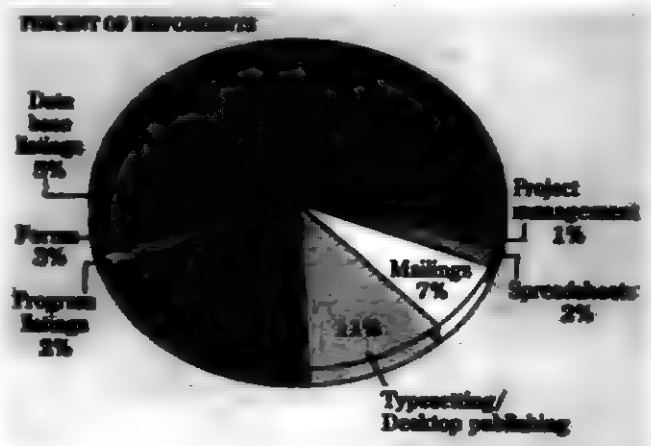
At the high end of the speed spectrum, for example, Reader's Digest Association, Inc. in Pleasantville, N.Y., which runs its 206 page/min Siemens Information Systems, Inc. printers on a nonstop schedule for direct mail, reports that routine preventive maintenance has been sufficient to ward off any disruptive problems.

Better than expected

Meanwhile, at Worrell Enterprises, Inc. in Charlottesville, Va., a newspaper publishing company that uses Apple Computer, Inc.'s 8 page/min, 300 dot/in. Laserwriters in place of typesetters, reliability has exceeded expectations, according

Fitting the buy to the application

Text-based applications are a major motivating force behind the decision to buy a laser printer



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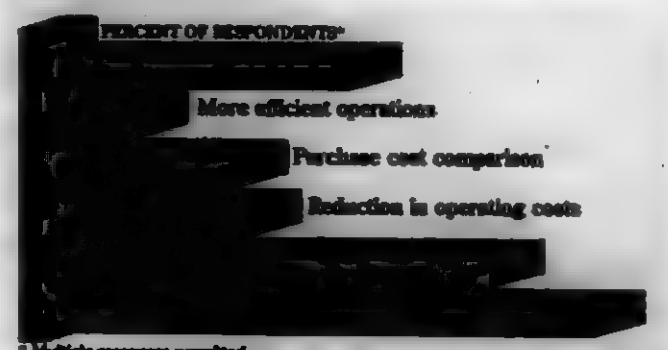
User need is the best justification

Almost half the respondents of a survey indicated they bought a laser printer because their users needed one or they were running an application that required one



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INFORMATION PROVIDED BY A SURVEY OF 100 USERS CONDUCTED BY DATEK INFORMATION SERVICES FOR ITS 1987 REPORT, "LASER PRINTER PURCHASE DYNAMICS: A USER SURVEY"
CW CHART

to Herbert Smith, president of the firm's Electric Knowledge, Inc. division.

Smith, whose division oversees the laser printer systems, says daily newspapers cannot accept unreliable equipment, adding that the 20 company papers using the laser printers often push the equipment beyond the rated pages per month without any problem.

Smith and his company also share the typical laser printer user's concern for service. In this case, with newspapers scattered throughout the country, the company chose a common printer from a major manufacturer to help ensure easy availability of service.

As an extra precaution, the company also offers individual newspapers the option of express-shipping malfunctioning printers to Electric Knowledge in exchange for a loaner machine. This option was offered not because of service problems at any of the locations but because next-day use of a printer is an absolute necessity for a daily publication, Smith says.

WHILE THE promise of desktop publishing has sold a lot of laser printers . . . the average laser printer has a pretty mundane existence.

Another issue frequently raised by the users surveyed by CAP International was compatibility.. Like service, however, this issue seems more a preventive concern than an actual problem.

Laser printers run standard interfaces to common computers ranging from micros to mainframes, and users tend either to buy printers that are compatible with their existing hardware and software or to purchase the software and printer at the same time.

In cases in which specific, specialized emulation is required — for example, Worrell's emulation of typesetting equipment — companies usually plan to write their own interfaces.

Not much flavor

If laser users seem, at the moment, to be concerned primarily with basic issues and features, that is because the majority of applications are currently of a plain-vanilla variety, with standard office word processing topping the list.

This may seem hard to believe, given the amount of attention lavished on desktop publishing recently. But the truth is that, while the promise of desktop publishing has sold a lot of laser printers and software and driven many vendors to offer compatibility with Adobe Systems, Inc.'s Postscript graphics, the average laser printer has a pretty mundane existence.

While a few users routinely turn out promotional materials and newsletters that could be called publishing, most rarely or never do.

Among the vendors, HP reports that standard office applications are the norm. "Since we started in 1984, the major applications have remained word processing, spreadsheets and short reports," says Cathy Lyons, an HP product marketing manager.

Both Idaho Power Co. in Boise and Sheppard Mullin are primarily in the text and numbers business. As typical laser users, both occasionally merge text and graphics for a short report, but neither claims to run the printers to their full capabilities.

"We will probably do desktop publishing later," Sheppard's Lazor says, "but we do mainly document word processing."

Always prepared

"Later" is the operative word for many purchasers, according to Datagroducts' Ryan. He sees customers buying Postscript capability in the same way they request font and memory upgradability: Even if they do not expect to use it immediately, they want to be ready for anything.

Big Bear's Amadio makes the point that some advanced capabilities are latent freebies, available to be used at some point in the future.

"We can put a negative on a drum and run a logo on each piece of paper," he says. "We haven't done that before and didn't buy the printers with that in mind, but we know the capability is there."

Whether applications and feature requirements will remain static is still a matter of conjecture. Many vendors and some market observers believe change is in the air.

"Expectations of the user are changing rapidly," Personal Computer's Gaer says. He adds that although users currently want performance and not features, this will change.

Gaer says he sees users already shifting from a focus on purchase price to cost of ownership — money spent on consumables like toner and paper — and demanding more sophisticated features, including multiple emulations and networking capability.

Looking for more

Angele Boyd, senior market analyst at International Data Corp., also detects a growing interest in certain features. For one, she finds users eager for greater intelligence in networked printers. "They will soon want printers that will inform the users on the

Continued on page S4

The wide world of nonimpact

BY SUZANNE WEIXEL

So, you're looking for a high-quality printer — something less noisy than a 24-pin dot matrix but faster and cheaper than a laser — but you aren't sure such an animal exists? Stop worrying. Laser printers aren't the only nonimpact game in town.

Consider, for instance, ion deposition printing. Ion deposition is a page printing technology based on electrostatic image creation: Negatively charged ions are shot onto a dielectric cylinder that attracts magnetic toner to the charged areas; the toner then transfers charge onto the paper.

Jack Gittleman, operations manager at Neuberger & Berman, a New York investment banking firm, switched about 1½ years ago from laser printing to two Delphax Systems, Inc. ion deposition printers. He liked their faster speed, high reliability and lower price; a 30 page/min printer starts at $15,000.

Unlike laser, ion deposition technology does not use heat; as a result, it requires less maintenance and support, has fewer moving parts, reduces energy consumption and is cleaner and safer, Gittleman says. "We had five laser printers. With two ion printers, we do about four times as much work in the same amount of time," he says.

Walter Schell, director of MIS at Rivkin, Radler, Dunne & Bayh, a Uniondale, N.Y.-based law firm, opted for a Delphax ion printer because it offered IBM impact compatibility at 30 page/min, something he says he could not find in a laser printer.

Other qualities Schell was looking for in a nonimpact printer were quiet operation and font management.

"In a professional environment, you need the quietness of a nonimpact printer. Both laser and ion printers would have given us the quiet; the ion has the added advantage of speed," he says. "Both also offer capabilities that allow us to put fonts in and customize our letterhead, thereby avoiding the expense of buying preprinted forms. Once again, the ion's speed won us over."

Thomas Clark, vice-president and computer operations manager at Liberty National Bank & Trust Co. of Louisville in Louisville, Ky., was looking for something very specific when he went shopping for a printer about a year ago: a continuous-form, laser-quality printer that could operate at high speeds yet fall into his price range. He found what he was looking for in a Honeywell-Bull, Inc. magnetographic printer.

Although new to the printer market, magnetographic technology has been used in other types of electronic devices for years, such as magnetic storage media. The technology is similar to ion deposition: After the page is written magnetically onto a rotating drum, the images are toned onto the drum with magnetic ink, transferred to paper and then fixed. A Honeywell-Bull 60 page/min printer costs about $78,000; a 90 page/min costs a little more than $97,000.

"DESKJET IS "less expensive than a laser without the noise and the paper hassles of dot matrix printers."

GEORGE ROTH
UMPQUA COMMUNITY COLLEGE

'Perfect fit'

"I had just avoided buying a laser printer that only took cut-sheets when I heard about magnetographic printers," Clark says. "Magnetography turned out to be a perfect fit."

The bank uses the printer to generate 12-page, complex statements for its portfolio accounts. Eventually, Liberty National hopes to use the printer for forms generation to avoid the expense of purchasing forms.

"We get 90 page/min print speed, good quality, continuous-feed operation and forms design capabilities — all at a price range we can afford," Clark explains. "The big laser printers can cost up to $350,000."

Liquid crystal shutter (LCS) technology is becoming less expensive than ion deposition or magnetography. It uses fixed optics, which allow dot size, light source and drum clearance to be kept uniform across each line.

Price was not the only factor that led Dave Williams, vice-president of engineering at Storage Dimensions, Inc. in Los Gatos, Calif., to consider an LCS printer as a companion to his laser printer. Not completely satisfied with the laser he had been using for correspondence and marketing cover letters, Williams decided to try an LCS printer. He purchased a Data Technology Corp. Crystalprint VIII for $2,500 about six months ago. "The main thing is that it offers a higher speed than the standard laser type of printer, and it's cheaper," Williams explains. "I also think the quality of the printed material is better."

Williams also liked the Diablo Systems, Inc. Diablo 630 emulation that the Crystalprint VIII offers. It allows him to use the printer with a wider variety of software packages than is available with the laser printer he continues to use. He is also able to compare the technologies in terms of reliability.

Won them over

With the February introduction of the Deskjet drop-on-demand thermal inkjet printer for $995, Hewlett-Packard Co. won the hearts of users trying to achieve laser-quality output with minimum impact on their budgets. Drop-on-demand inkjet printers utilize ink-filled cartridges. Inside each cartridge, a heating element raises the temperature of the ink, causing it to expand through nozzles onto the page.

"For the little bit of money the Deskjet costs, why not get a printer that can do a clean, quality job?" asks Harry Potter, vice-president at Industrial Control Development, Inc., a four-man manufacturing company based in Vancouver, B.C. He had been using an IBM 24-pin dot matrix printer for technical data sheets and correspondence. But when Potter heard about the Deskjet, he went out and bought one to replace the dot matrix.

George Roth, director of computer services at Umpqua Community College in Roseburg, Ore., says he sees the Deskjet as filling the gap between dot matrix and laser printers. He claims HP will lose laser printer business to its own Deskjet. "It's less expensive than a laser without the noise and the paper hassles of dot matrix printers," he says.

Roth says he chose the Deskjet primarily for its print quality.. "In all honesty, I was surprised at the excellent quality," he says. "I used to believe that unless you had a laser or a 24-pin dot matrix printer, you were never going to achieve letter quality at your workstation with any kind of speed."

"The laser printers are good, and you can't be too picky," Williams says. But when it came to the bottom line, these users found other technologies that, for them, satisfied the promises made by lasers more quickly and at less expense. ●

Weixel is a free-lance writer based in Framingham, Mass.

Basic fare

CONTINUED FROM PAGE S3

screen when a printer is down — maybe that it sent the job to another printer."

The seeming disparity in what users are beginning to say they want and the price they are still willing to pay is typical of a relatively new technology. The promise of the most sophisticated features is alluring, but a feature also becomes a take-it-or-leave-it option if it is too highly priced.

It can only get better

HP's Lyons agrees, likening the technology to color television in its early stages. "In the future, we expect color to be a big feature and [laser printers] to have greater intelligence, including status readbacks and the ability to query printers [with questions like] 'Do you have this font?' " she says. As with television, improved technologies and lower costs will make these features acceptable.

Marc Liebesman, C. Itoh's vice-president of marketing, notes that early users were kept out by low functionality and high cost.

"The secretary said, 'Laser! Laser! Laser!' and the manager used to say, 'I don't have $10,000.' Now they are cheap, and you don't have to call in five people and a forklift truck to service them," he says.

These may be reasons enough to bring laser printers into the office environment, but the jury is still out on whether these machines can lure large numbers of MIS managers away from their trusted impact printers.

Bhanu Bhattasali, director of the electronic printer industry service at Dataquest in San Jose, Calif., says he expects that MIS will eventually make up a large portion of the laser printer market, even though office word processing will remain the major application.

Still wondering

Still, for many MIS shops such as the one at Idaho Power, the technology remains more intriguing than practical.

Idaho Power went through a careful evaluation process before deciding that laser printers were appropriate for other departments. It then selected QMS, Inc. printers with a variety of speeds to match throughput requirements.

The utility carefully evaluated its printing needs and cost-justified each purchase, according to Glenn Lake, who manages hardware and software for the company. It demanded other features, such as multiple fonts that could be downloaded from the mainframe as needed, and matched those to departmental needs as well.

But the same evaluation process that helped Idaho Power justify lasers for office use has, so far, ruled them out for its MIS operations. The price/performance ratio has not yet improved to the point at which MIS would consider committing itself to the technology, Lake says. But the utility continues to look at the question on an annual basis. •

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Reading past Postscript

BY CHRISTINE RIVERA

Page description languages (PDLs) are programming languages that give users ultimate control over laser printer output and access to a standard command language that many different printers can use. PDLs supply powerful commands that enable users to size, scale and rotate fonts and create, edit and manipulate graphics images.

The most popular PDL is Adobe Systems, Inc.'s Postscript. Establishing an early lead in the market with Apple Computer, Inc.'s Laserwriter, Postscript has effectively become the industry standard.

Two PDLs that lost their challenges to Postscript yet remain popular with large-system users are Imagen Corp.'s Document Description Language (DDL) and Xerox Corp.'s Interpress. DDL, which Imagen uses in its high-speed lasers, is supported by many document processing and computer-aided design applications in the Unix and Digital Equipment Corp. VMS environments.

Interpress, built into Xerox's high-end laser printers, is used by applications in Ethernet networking systems and will probably continue to be a standard in that environment for some time.

Right now, there is a great deal of activity in the area of Postscript clones — Postscript-compatible interpreters being offered for a variety of operating systems and environments. Although there are, as yet, no printers on the market utilizing these clones, they have garnered a significant amount of attention and may soon become a real factor.

> **UNLESS Postscript fails to deliver in the network and multi-user environments, it will remain the favorite in desktop publishing.**

These languages claim compatibility with Postscript commands, higher speeds and lower licensing fees than Postscript. Some even offer compatibility with more than one PDL. Control-C Software, Inc.'s CCS-Page interpreter, for example, supports Interpress as well as Postscript commands.

The most popular Postscript clone is provided by Phoenix Technologies Ltd. Both Canon U.S.A., Inc. and Toshiba Corp. have licensed the Phoenix interpreter, which claims speed advantages over Postscript and will initially incorporate the interpreter into upgrade controller kits for their existing laser printers.

The only hitch with the clones may be compatibility. Until some clone interpreters have been tested in actual use, these questions will remain unanswered. Also, while Postscript's syntax has been device-independent, the possibility exists that Adobe will devise a way to prevent others from successfully cloning new releases.

Staying on top

Whether or not Adobe takes preventive action, there are several reasons to believe that Postscript will continue to be the dominant PDL. First, it already has a strong foothold in the market. Virtually all of the desktop publishing packages for both the Apple Macintosh and IBM Personal Computer support Postscript, and popular word processing software packages, such as Wordperfect Corp.'s Wordperfect and Microsoft Corp.'s Word, provide drivers for it as well.

Because of this software support, printer manufacturers are eager to provide Postscript interpreters with their models. Imagen and Xerox are starting to offer Postscript support in their systems. Furthermore, IBM's endorsement of the current standard will certainly increase application support for Postscript.

Another consideration is the fact that typesetting systems now offer Postscript-compatible output. What this means is that users can proofread their documents on a laser printer and then run them through a typeset-quality printer for final output.

One promising new development is the adoption of Postscript for graphics display devices. With Display Postscript, users will be able to see on-screen the same fonts that will be produced by the printer.

This capability will also allow the development of more flexible user interfaces. For example, by combining Sun Microsystems, Inc.'s Network Extensible Window Systems, a Postscript-compatible graphics interpreter, with X Windows, a public-domain programming environment, AT&T and Sun hope to create a standard look and feel for the Unix environment as well as provide networking support.

There are still a lot of questions surrounding this area of development, however. The current Apple "look and feel" lawsuit, in which Apple claims that Microsoft Corp.'s Windows 2.0 and HP's New Views interfaces violate Apple's copyright, may slow development in this area.

Another reason to believe in Postscript's continuing strength is Adobe's demonstrated commitment to keeping up with market developments. Heeding the clamor for color within the industry, Adobe has recently announced the addition of color commands to its Postscript interpreter.

One of the main complaints vendors have about Postscript is that it is slow. However, the fault here seems to lie not with Postscript itself but with printer controller design. In fact, newer controller designs have all but eliminated performance problems.

Unless Postscript fails to deliver in the network and multiuser environments, it will remain the favorite in desktop publishing. The fact that it is now being cloned is evidence of the stability of its position as the standard PDL.

Chances are that even more clones will emerge before too long, helping to push the development of network and multiuser support, improved speed and, yes, color. •

Rivera is a New York-based microcomputer consultant whose specialties include testing laser printers with various applications software.

The effect of yen on engines

BY ROBERT MURRAY

The fluctuating value of the Japanese yen, combined with political and technological challenges, has forced Japanese laser printer vendors to look hard at their manufacturing and marketing strategies. Japanese companies have had to re-evaluate plans to keep laser printer production entirely within their nation.

Most laser printers today are based on print engines manufactured in Japan. According to a recent study published by Waltham, Mass.-based Datek Information Services, Japanese manufacturing has become less competitive because of the yen's rise.

The combination of manufacturing print engines in Japan and importing them to the U.S. for sale has become very expensive because of the yen/dollar imbalance. This is coupled by reverberations from other East/West trade tensions that influence export pricing and by today's international political and economic climate.

In 1985, when a large number of engines from Japan reached the U.S., the average exchange rate of the Japanese yen against the U.S. dollar was 238. This favorable circumstance fostered tremendous interest in laser printers. It was then that Hewlett-Packard Co., Apple Computer, Inc. and Digital Equipment Corp., among others, first introduced laser printers based on Japanese engines.

Since then, the value of the yen has risen steeply against the value of the dollar, recently hitting 123.75 yen to the dollar. While there is much speculation regarding the long-term implications of the yen's rise, one immediate difficulty faced by Japanese manufacturers is the relative cost increase of Japanese printer engines to U.S. and Western European vendors.

To complicate things, protectionist sentiment and actions from countries trading with Japan are affecting trade. The U.S. and Western European countries have imposed tariffs against Japan in hopes of coercing that nation to open its domestic market to the rest of the world and to control pricing on exports.

End-user prices for laser printers have risen recently, particularly in the workstation and office cluster environments. The average list price increase has been about $225.

Responding to the rise

Predictions that increased competition would precipitate lower prices and that sub-$1,000 laser printers were imminent have changed or been modified drastically. Many vendors have either raised prices, taken losses or withdrawn nonimpact printers from the market.

Since laser printer engines are manufactured almost exclusively in Japan by companies such as Canon U.S.A., Inc. and Ricoh Corp., all vendors of Japanese laser technology selling in the U.S. have had to face waning profits.

While major vendors with established laser product lines continue to find success through sheer volume and name recognition, less established players are struggling to find a price/performance balance for their products that will allow them to compete successfully.

CAP International, Inc. in Marshfield, Mass., expects the U.S. market for nonimpact printers to continue to grow through 1992.

For 1988, CAP projects that 963,000 nonimpact printers will be placed, 99.37% of which will be for the workstation and office cluster environments. In 1986, 371,000 nonimpact printers were placed, and 98.65% of those were for the workstation and office cluster environments.

The U.S. and Western Europe represent the largest potential markets for nonimpact printers.

Not surprisingly, international manufacturing firms are concerned with delivering price-competitive products to capitalize on that growth potential. For that reason, some Japanese firms have considered manufacturing nonimpact printers in these markets.

Many have chosen to gradually migrate manufacturing to the U.S. In some cases, these companies are already producing dot matrix printers, copiers and other office equipment here. At least one Japanese vendor, Canon, has announced it is building laser printer engines in the U.S. However, this will reportedly not affect pricing this year.

In general, low-end nonimpact printer prices are not expected to drop in the near future. Although some prices may stay the same, vendors that have resisted price hikes to date may have to raise them.

HP's Deskjet represents one alternative nonimpact technology that carries a lower price tag. The Deskjet is manufactured in the U.S. by HP and is not subject to currency pressures. In a period of five to 10 years, the prices of other printing technologies will also drop as the technologies mature.

While large-scale production of laser printers remains in Japan, if the currency situation continues, the idea of domestically manufactured printers — either laser or another technology — may become a real and practical alternative. ●

Changing times, higher prices

Some printer vendors have raised prices in response to fluctuations in the value of the yen vs. the dollar

Toshiba	Pagelaser 12	Toshiba A739	2%
[illegible]	[illegible]	[illegible]	[illegible]
Ricoh	PC Laser 6000	Ricoh LP1060I	4%
[illegible]	[illegible]	[illegible]	[illegible]
Panasonic	Laser Partner	Panasonic KX-P4450	29.8%
[illegible]	[illegible]	[illegible]	[illegible]
Hewlett-Packard	Laserjet Series II	Canon LBP-SX	4%

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Murray is a market analyst for CAP International, Inc.'s Intelligent Copier/Printer Market Requirements Service.

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VENDOR VIEWPOINT
Tightening the lid on maintenance cost

BY JOHN RADCLIFFE

With each new release, the laser printer is becoming more sophisticated — and more trouble resistant. Improved internal error detection provides more information for operator intervention, thus reducing downtime.

In addition, users can be more involved in the installation and initial setup of the printer. User understanding of which consumables, such as toner and print drums, must be replaced — and how and when to do it — reduces service calls.

Service organizations remain an important part of the maintenance process. Calling in a team of product support specialists is the simplest way to fix complex laser printer problems, such as engine failure, particularly since these printers are more mechanical in nature than most other types of office printers.

Still, much of the mystique has disappeared from servicing laser printers. The biggest obstacle for users to overcome is terminology. New phrases such as drum charge corona and transfer and separator charge have been added to their vocabularies. One simple but important factor in laser printer maintenance is keeping the equipment clean. When this is done, especially in conjunction with regularly scheduled preventive maintenance, one-third of all service calls may be eliminated.

Most operator manuals provide excellent instructions to guide informed users through the cleaning process. The only tools required are a special toner vacuum, alcohol, Q-Tips and a soft cloth. Some of the more common service calls involve the setup or configuration of a specific host computer, emulation differences, print quality and paper handling problems.

MUCH OF the mystique has disappeared from servicing laser printers. The biggest obstacle for users to overcome is terminology.

For instance, users may find an interface program such as Convergent Technologies, Inc.'s Generic Print Service can cause frustration when trying to coordinate all software and hardware and ensure that all available fonts perform properly. Incorporating graphics and/or pictures only adds to the challenge.

One significant source of difficulty is, "Which machine do I have a problem with?" A laser printer may be purchased from one vendor but have the name of a second vendor on it and require the interface logic of a third. This can cause a great deal of confusion in choosing the correct manual to use in diagnosing the problem. Many vendors do not include all the necessary status information related to each part of their product.

Users are becoming more informed about their systems — both hardware and software. They are able to give better information to the service representative, which minimizes the time and expense of a service call. But even better, informed users and improved printers are making the maintenance process an easier inside job. ●

Radcliffe is a senior product specialist at Momentum Service Corp. in Fremont, Calif.

VENDOR VIEWPOINT
Keep the paper; get rid of the paperwork

BY RONALD CAMPBELL

People like paper — it is paperwork they don't like.

Paper, with its high-resolution, nonglare surface, is easier to read than a monitor screen and more convenient to annotate and pass on to a colleague. It has substance and dimension. Most people can probably pull a letter out of a pile on their desk or recognize a memo in a file in a matter of seconds. Paper, however, is a static medium and a poor interface for conveying dynamic information.

So rather than offer users a paperless office, future document processing systems will be designed to support a "paperwork-less" environment.

As laser technology develops, demanding executives who want to gain a competitive advantage will require document processing systems capable of exploiting information in both document and electronic form. These systems will convert paper to electronic files to be processed in an office that has eliminated much of its paperwork and then convert those electronic files back to paper as requested.

AS PRINTING and scanning technologies develop, advanced printers will combine intelligent document-recognition scanners, facsimile and duplicating capabilities.

In a paperwork-less office, paper documents will be integrated into the system, but the paperwork will be processed electronically. An insurance company, for example, might scan policy applications into the system for evaluation and completion by underwriters, who would then review and process the documents on their workstations. New policies could then be produced on laser printers to be mailed to clients, and the completed applications could be stored electronically.

Scanning the situation

From paper to electronic processing to paper: The ability of advanced document processing systems to enhance individual effectiveness by streamlining information handling in this manner will depend on two things. First, and most important, is the continuing evolution of low-cost printers capable of producing high-quality and varied output at high speeds.

The second element is the development of intelligent document-recognition scanners capable of digitizing virtually all kinds of type, graphics, halftones and forms. Once scanned, the document could be enlarged or reduced, merged with other files, revised or reproduced.

As printing and scanning technologies develop, advanced printers will combine intelligent document-recognition scanners, facsimile and duplicating capabilities. A typical scenario might progress as follows:

A colleague walks into your office with a research survey that includes important findings for a projections report you are drafting. Placing the document on the desktop printer/scanner attached to your workstation, you automatically scan the document into your system and print an extra copy to use as notes.

Later, as you edit the report, you pull the survey data into a window on your screen and incorporate it into the document without keying any of the information. Then you print a draft and make a few copies. Having made the final revisions, you send an electronic master to the company's networked printer in the centralized data processing department.

Since your boss is on a business trip in Europe, you also transmit the electronic master to a printer in the office he is visiting. It is printed there, and he is able to review the report before meeting with corporate officials the next day.

Printers tied to document processing systems such as these will allow users to decide when and where they want to access documents. In the future, anyone will be able to send you a memo, but you will determine if you generate it on your desktop in the office, on your home printer or on a multifeatured, centralized printer.

With these systems, the control of information and decisions about distribution will be brought closer to users. ●

Campbell is corporate vice-president and general manager of product and systems architecture at Xerox Corp. in Webster, N.Y.

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But do you *want* color on your desk?

BY SUZANNE WEIXEL

Ready or not, color printing has come to the desk top. But who is going to use it? And for what?

To combine Adobe Systems, Inc.'s Postscript with color, are users willing to spend $30,000 for output that, in the words of one industry observer, looks like it was done with a crayon? Does Hewlett-Packard Co.'s Paintjet offer enough appeal over, say, HP's own Deskjet?

"I suppose I could print out letters in different colors. But that doesn't really justify the cost," one Deskjet owner says.

Color is obviously more suited for certain applications, explains Angele Boyd, senior market analyst at International Data Corp. (IDC), a Framingham, Mass.-based market research firm. But the fact that it has yet to reach the typical, everyday user is also a reflection of both its cost and a general lack of user understanding.

"The typical user is not widely educated in the use of color and, therefore, does not require color on a typical basis," Boyd says, adding that this type of user is often inexperienced when it comes to thinking in terms of color and design.

Some users who give a lot of thought to color printers still find they come up short in both the number of practical applications the printers support and their cost.

"We currently don't have a need for a color system," says Walter Schell, director of MIS at Rivkin, Radler, Dunne & Bayh, a Uniondale, N.Y., law firm.

"I can see it coming — graphics presentations are becoming part of the legal industry. But right now, it would take me more than a year in billable time to make back the $5,000 or $6,000 it would cost for just a cheap but decent plotter," he says.

Special of the day

According to IDC's Boyd, color printing appeals more to niche markets than to the average user. And within those niches, two user groups appear to be emerging: professional business users generating intensive graphics output and high-end users in the engineering or graphic arts fields.

Price is one factor in the slow diversification of high-end color printing systems. For example, prices for high-end color systems from Iris Graphics, Inc. start at $75,000.

However, Jim Smith, the company's marketing manager, says, "For someone who has just spent $1.1 million on a computer system, it's hardly an unreasonable cost."

Even QMS, Inc.'s Postscript-compatible Colorscript 100 thermal transfer printer, at $25,000, is beyond the price range of the average desktop publishing user. QMS is targeting its printer at graphics design and electronic publishing environments.

Seeing black-and-white

"It's the people who take computer imaging for granted who take color for granted," claims Dave Kay, president of Novachrome, Inc., which provides computer graphics system integration for organizations such as law enforcement agencies, industrial development firms and sportswear designers.

Kay compares users' attitudes toward color printing to the difference between black-and-white and color photography. "When you want a color photograph, you don't settle for black-and-white, and you don't mind paying a little more," he says.

But Kay says he also sees the cost of quality color printing coming down from the current six-figure price tags of high-end systems.

"Depending on your needs, there's HP's Paintjet. It's not going to give you an image from a raster frame buffer with deep color, but for $1,400, its quality is astronomical.

"In the $6,000 to $7,000 price range, you can now get Howtek's Pixelmaster," Kay continues. "Its output looks more like the color photographic printing people are used to seeing. Also, the cost per print is very, very low."

Mass appeal

One area that could potentially form a bridge between the office and engineering markets is presentation graphics, which would include overhead transparencies. Boyd says she sees that area as one of the few applications with mass market appeal.

In presentation graphics, "users are asking, 'Can I do it cheaply?' " Boyd says. "They don't want to spend the money on a printer that's going to sit around gathering dust waiting to do the occasional overhead. They want something they can use for general business applications as well."

In Boyd's view, Paintjet, because of its ability to print in both color and black-and-white quickly and cleanly, meets the requirements demanded of a mass market system.

"It's not superexpensive, it's a desktop, and it's not just limited to graphics applications," she says.

Deborah Berke, technical services analyst at American Mutual Insurance Co. of Boston in Wakefield, Mass., recently began using Paintjet in place of an HP plotter. She uses it for presentation graphics, transparencies and to supplement reports with graphics.

Berke says 85% to 90% of the work is done in color. Her company also uses Paintjet for black-and-white text.

> "WE CURRENTLY don't have a need for a color system. . . . It would take me more than a year in billable time to make back the $5,000 or $6,000 it would cost for just a cheap but decent plotter."
>
> WALTER SCHELL
> RIVKIN, RADLER, DUNNE & BAYH

Not all users are sold on Paintjet's all-around usefulness. George Roth, director of computer services at Umpqua Community College in Roseburg, Ore., reserves his Paintjet — which requires special paper — for when he needs color. He purchased it at the same time that he bought 15 HP Deskjet printers.

"Although Paintjet does good-quality general business applications," he explains, "the paper is expensive. We have the Deskjets for general work."

Marching on

Despite the price and quality discrepancies between high- and low-end color printing, Iris Graphics' Smith sees the color market expanding in all directions.

"Color is a vanguard," he says. "Users are growing up, learning what to ask for, and technology is providing more alternatives. The marketplace is going to ask the vendors to accommodate different types of applications.

"From a practical standpoint, we will have to become device- and size-independent. That's what users are going to require." •

Top-selling nonimpact printers

A listing of top sellers of selected nonimpact technologies other than laser

Ink-jet printers

Canon U.S.A., Inc.
(516) 488-6700
BJ-130
Serial bubble-jet printer. Prints at 110 to 220 char./sec. at a resolution of 360 dot/in. Includes a built-in automatic sheet feeder and uni- and bidirectional printing. Wide-carriage printing for spreadsheet and data base use.

Diconix, Inc.
(800) DICONIX
Diconix 150
Fully functional portable printer runs on rechargeable batteries or electricity. Creates graphics and prints on transparencies. Prints 50 to 140 char./sec. Up to 235 different characters are supported. Offers Epson America, Inc. and IBM compatibility.

Diconix 300W
Prints 40 to 310 char./sec. Supports 262 characters and up to 256 additional downloadable font characters. Prints at resolutions of 96 by 96, 192 by 96 or 192 by 192 dot/in. Emulations include Epson FX-80/100 and IBM Proprinter. Includes continuous form and transparencies.

Dijit 1
Prints at 20 page/min with a resolution of 300 dot/in. Duty cycle is 70,000 page/month. Emulations include Xerox Corp. 2700, Diablo Systems, Inc. 630 and IBM Graphics Printer and Proprinter. Paper handling features include duplex and label printing, transparencies and 500-sheet input capacity.

Hewlett-Packard Co.
Contact local sales office
Deskjet
Drop-on-demand laser-quality printing. Prints text in multiple fonts and full-page graphics at 300 dot/in. Prints at speeds of 120 (letter quality) and 240 (draft quality) char./sec. Includes resident fonts. Two accessory cartridge ports extend font capability and provide for Epson America, Inc. FX-8 emulation.

Thinkjet
Portable ink-jet dot matrix printer. Prints 150 char./sec. at resolutions of 96 by 96 dot/in. for graphics or 192 by 96 dot/in. for text. Prints 200 pages between recharges. Offers Epson MX-80 compatibility.

Quietjet
Wide-carriage, letter-size series of personal printers. Prints at 40 char./sec. in near-letter-quality mode and 160 char./sec. in draft mode.

Ion deposition printers

C. Itoh Electronics, Inc.
(714) 660-1421
Megaseries
Three models featuring 300 dot/in. resolution and speeds of 30 or 45 page/min. Offered with line printer emulation, a Motorola, Inc. 68000-based graphics controller or with a controller offering Digital Equipment Corp. LN03, Hewlett-Packard Co. Laserjet II, Tektronix, Inc. 4014 and Diablo Systems, Inc. 630 emulations and optional Adobe Systems, Inc. Postscript compatibility.

Delphax Systems, Inc.
(617) 961-2312
S3000G
Operates at 30 page/min with a resolution of 300 dot/in. Emulates Hewlett-Packard Co.'s Laserjet Plus and Diablo Systems, Inc.'s 630. Typical duty cycle of 250,000 page/month. Includes 256 characters per font, prints 16 fonts per page and downloads additional fonts from host or floppy disk. Features dual 500-sheet feeders.

Honeywell-Bull, Inc.
(800) 328-6111
4180D
A duplex printer with Honeywell-Bull DPS 6/70 controller and multiple Motorola, Inc. 68020-based microprocessors. Prints at 180 (duplex) or 90 page/min (simplex) with a resolution of 240 dot/in. Includes an Ethernet interface, electronic forms and fonts and optional image processing.

Page Processing System III
Printer controller is a Honeywell-Bull DPS-6 minicomputer. Offers printing speed of 90 page/min and resolution of 240 dot/in. Includes loadable fonts.

Miltope Business Products, Inc.
(516) 756-7650
Model 3802
A channel-attached printer with a Delphax Systems, Inc. S-6000 engine. Prints at 90 page/min, with a duty cycle of 1 million page/month. Resolution of 240 dot/in., with two hard and two soft fonts and up to two resident macros.

Series 75
A channel-attached printer with Delphax S-6000 engine. Offers 75 page/min with a duty cycle of 1 million page/month. Includes 240 dot/in. resolution. Maximum input capacity of 1,500 sheets.

Series 37
A channel-attached or Dataproducts Corp. I/O printer with Delphax S-3000 engine. Offers 37 page/min, 300 dot/in. resolution and 250,000 page/month duty cycle. Hewlett-Packard Co. Laserjet emulation. Up to 16M bytes of on-board memory.

Series 30M
Delphax S-3000 engine-driven printer for communication channel applications or Dataproducts I/O. Offers 30 page/min and HP Laserjet, HP-GL and HASP emulation. Standard 1,000 sheet input capacity with

Continued on page S12

Laser printers: 10 page/min and up

COMPANY	PRODUCT	ENGINE	PRINT SPEED (PAGE/MIN)	DUTY CYCLE (PAGE/MONTH)	ON-BOARD MEMORY	RESOLUTION (DOT/IN.)	EMULATIONS	PAGE DESCRIPTION LANGUAGES SUPPORTED	NUMBER OF FONTS AVAILABLE (HARD/SOFT)	NUMBER OF FONTS PER PAGE	MAXIMUM INPUT SHEET CAPACITY	COLLATING CAPABILITY	HANDLES ENVELOPES/LABELS	MOST TYPICAL USE	PRICE
Anam Computer, Inc. (800) 848-9826	LX3045+	CE 3045 S	45	300,000	NP	300 x 300	IBM 5219	None	8/32	32	2,500	Yes	No	High-volume DP	$30,495
	LX3030+	CE 3030 S	30	150,000	NP	300 x 300	IBM 5219	None	8/32	32	2,500	Yes	No	High-volume DP from IBM System/34, 36, 38	$18,495
	LX3020	Canon LBP-20	20	70,000	1.5M	300 x 300	IBM 5219, HP Laserjet Plus	None	24/35+	NP	2,500	Yes	No	High-volume word processing	$28,495
	LX3015	Ricoh LP4153	15	30,000	1.5M	300 x 300	IBM 5219, HP Laserjet Plus	None	11/35+	30	500	Yes	Labels	IBM System/34, 36, 38 word processing, DP	$8,995
	LX3215E	Toshiba Page Laser 12	12	30,000	512K	300 x 300	IBM 5219, HP Laserjet Plus, Diablo 630	None	12/35+	NP	700	Yes	Both	Envelope printing from IBM System/34, 36, 38	$5,995
Advanced Technologies International, Inc. (408) 748-1688	3670 with DW-2	Datagroducts 3600	20	60,000	768K	300 x 300	Diablo 630, Qume Sprint II, NEC Spinwriter, Epson FX/MX-30, HP Laserjet, ANSI 3.64, DEC LNO1	Laserdrive	12/ Unlmt.	Unlmt.	500	Yes	Labels	Office automation	$17,995
	3670 with DW-3	Datagroducts 3600	25	60,000	2M	300 x 300	Diablo 630, Epson FX/MX-80, HP Laserjet Plus, HP-GL 7470/7475A plotter, Tektronix 4014	Laserdrive	16/ Unlmt.	Unlmt.	500	Yes	Labels	Office automation	$17,995
	3670 with GR-2	Datagroducts 3600	20	60,000	2M	300 x 300	Versatec V-80	None	None	None	500	No	Labels	CAD/CAM*	$17,995
	1570 with DW-2	Ricoh LP4153	15	15,000	768K	300 x 300	Diablo 630, Qume Sprint II, NEC Spinwriter, Epson FX/MX-80, HP Laserjet, ANSI X3.64, DEC LNO1	Laserdrive	12/ Unlmt.	Unlmt.	500	Yes	NP	Office automation	$7,495
	1570 with DW-3	Ricoh LP4153	15	15,000	2M	300 x 300	Diablo 630, Epson FX/MX-80, HP Laserjet Plus, HP-GL 7470/7475A plotter, Tektronix 4014	Laserdrive	16/ Unlmt.	Unlmt.	500	Yes	NP	Office automation	$7,495
AT&T (800)247-1212	605 Laser Printer	Canon	10	5,000	512K	300 x 300	HP Laserjet, Qume Sprint II, IBM Graphics Printer	None	3/4	7	200	Yes	Labels	Office automation	$2,995
BGL Technology Corp. (800) 967-7305	Mach Series	Data products LZR 1300 or 2600	12, 20 or 26	10,000 or 40,000	2.5M-5M	300 x 300	HP-GL, HP Laserjet, Tektronix 4010, 4014, Versatec, Diablo 630, DEC LNO3	Bigrint	8/97	Unlmt.	2,000	Yes	Both	High-speed graphics output	$6,495-$15,495
Chinon America Corp. (213) 533-0614	Overture 110 Laser Printer	Mita	10	5,000+	512K	300 x 300 or 240 x 216	Epson FX-800, IBM Proprinter, Diablo 635	None	0/1	16	300	Yes	Both	Office automation	$1,995
C. Itoh Electronics, Inc. (714) 660-1421	LIPS 10 Plus	Canon	10	15,000	512K	300 x 300	HP Laserjet Plus, Laserjet; Diablo 630; Epson FX-80	None	8/12	16	250	Yes	Labels	Office automation	$3,295-$4,495
CPT Corp. (612) 937-8000	LP-35	Ricoh LP4120	15	15,000-35,000	2.5M	300 x 300	HP Laserjet Plus, Epson, Diablo, Qume	ANSI X3.64	27/0	27	250	Yes	No	Shared office automation	$6,000
Data General Corp. (617) 366-8911	6479	Toshiba A740	20	80,000	0.5M	300 x 300	Diablo 630	None	6/0	Unlmt.	2,000	Yes	No	Heavy-duty text applications	$15,855
	6475 Tabletop Laser	Toshiba A720	12	10,000	2M	300 x 300	HP Laserjet Plus, Diablo 630, Epson FX-80	None	6/0	Unlmt.	850	No	Envelopes	Time-sensitive documents, high-volume mailings	$4,195
	6474 Tabletop Laser	Toshiba A720	12	10,000	0.5M	300 x 300	HP Laserjet, Diablo 630, Epson FX-80	None	6/0	Unlmt.	850	No	Envelopes	Time-sensitive documents, high-volume mailings	$3,895
Intergroducts Corp. (818) 887-8000	2030	Toshiba A740	20	100,000	64K	300 x 300	Datagroducts B series	None	0/0	1	2,000	Yes	Labels	Electronic DP	$13,000
	2020	Toshiba A740	20	100,000	1.5M	300 x 300	Tektronix 4010, Datagroducts B series	None	0/0	0	2,000	Yes	Labels	Bar code label applications	$14,500
	2020	Toshiba A740	20	100,000	32K	300 x 300	Diablo 630	None	64/0	Unlmt.	2,000	Yes	Labels	Office automation	$15,000
	2025	Toshiba A740	25	100,000	2M	300 x 300	Diablo 630, Tektronix 4010	Bigrint	2/ Unlmt.	Unlmt.	2,000	Yes	Labels	Technical document publishing	$20,000
	2035	Toshiba A740	35	100,000	2.5M	300 x 300	NA	Postscript	13/3	Unlmt.	2,000	Yes	Labels	Desktop publishing	$18,700
	1520	Toshiba A720	12	25,000	512K	300 x 300	HP Laserjet Plus, Diablo 630, Epson FX-80	None	12/ Unlmt.	Varies by emulation	750	No	Both	Office automation	$3,695
	1360	Toshiba A720	15	25,000	4M	300 x 300	HP Laserjet Plus	Postscript	36/ Unlmt.	Unlmt.	750	No	Both	Desktop publishing	$7,995
Data Systems Hardware (703) 478-0900	VX012	Proprietary	12	25,000	512K	300 x 300	HP Laserjet Plus, Epson FX-80, Diablo 630 ISC, DEC LNO3	Postscript proprietary	16/50	Unlmt.	750	No	Both	Shared office automation	$3,695
	VX020	Olympus P30/45	30-45	150,000	4M or 8M	300 x 300	HP Laserjet, Diablo 630, DEC LNO3 Plus, line printer	Postscript clone	32/100	32	2,000	Yes	Labels	Office automation	$16,000-$25,000
Data Terminal Mart Ltd. (416) 677-6184	DTM Letterwriter 30	Ricoh R30	30	5,000	512K	300 x 300	DEC LQP03	None	14/84	200	200	Yes	Labels	DEC word processing	$3,200
Decision Data Computer Corp. (215) 674-3300	6415	Ricoh LP4150	15	25,000	1M	300 x 300	IBM 5219, 3812, 5224, 5225, 5256, 4214	None	8/14	Unlmt.	500	No	Labels	Letter-quality printing	$7,995
Dicon, Inc. (800) 345-7266	DRL 30	Kyocera F3000	30	5,000	512K	300 x 300	HP Laserjet Plus, Diablo 630, Qume Sprint II, NEC Spinwriter, IBM Graphics Printer, Epson FX-80	Postscript available 2nd quarter	62/ 100+	32	200	Yes	Both	Desktop publishing	$2,495
	DRL 30+	Kyocera F3000	30	5000	1.5M	300 x 300	HP Laserjet Plus, Diablo 630, Qume Sprint II, NEC Spinwriter, IBM Graphics Printer, Epson FX-80	Postscript available 2nd quarter	62/ 100+	32	500	Yes	Both	Office automation	$4,695
	DRL 20	Kyocera F2000	20	15,000	1.5M	300 x 300	HP Laserjet Plus, Diablo 630, Qume Sprint II, NEC Spinwriter, IBM Graphics Printer, Epson FX-80	Postscript available 2nd quarter	62/ 100+	32	500	Yes	Both	Office automation	$3,295

*Computer-aided design and manufacturing †Forms generation language ‡Intelligent printer data stream §Document description language ¶Printer control language #Advanced function printing **Page description language

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. When a vendor is unable to provide specific information about its product, this is designated NP (not provided). When a question does not apply to a vendor's product, this is designated NA (not applicable). Further product information is available from the vendors.

COMPANY	PRODUCT	ENGINE	PRINT SPEED (PAGE/MIN)	DUTY CYCLE (PAGE/MONTH)	ON-BOARD MEMORY	RESOLUTION (DOT/IN.)	EMULATIONS	PAGE DESCRIPTION LANGUAGES SUPPORTED	NUMBER OF FONTS AVAILABLE (HARD/SOFT)	NUMBER OF FONTS PER PAGE	MAXIMUM INPUT SHEET CAPACITY	COLLATING CAPABILITY	HANDLES ENVELOPES/LABELS	MOST TYPICAL USE	PRICE
Digital Equipment Corp. (617) 493-5111	Printserver 40 (LPS 40)	Rush	40	100,000	7.5MB	300 x 300	DEC LN03, Ingr, Tektronix 4014	Postscript	35/NP	Unlim.	2,500	Yes	Labels	Departmental printing	$40,500
Electronic Form Systems (314) 230-7900	Formwriter 10 series	Canon LBP-8	20	30,000	MP	300 x 300	Epson FX	PGL²	30/0	35	2,000 (500 for Model 10)	No	Both	Distributed, production printing	$15,995- $34,995
	Formwriter 8	Ricoh LP4160	15	25,000	MP	300 x 300	Epson FX	PGL	30/0	35	500	No	Both	Medium-volume production runs	$8,995
Fujitsu America, Inc. (408) 432-1300	7760	Fujitsu	15	50,000	640K	300 x 300	HP Laserjet Plus, Diablo 630, Epson FX-86, IBM Proprinter, HP-GL	PCL	32/NP	Unlim.	500	No	Labels	Word processing	$6,795
	7760	Fujitsu	15	50,000	1M	300 x 300	HP Laserjet Plus, Diablo 630, Epson FX-86, HP-GL	PCL	42	Unlim.	1,500	No	Labels	Shared word processing	$7,995
	7460	Fujitsu	22	50,000	MP	300 x 300	HP Laserjet Plus, Diablo 630, Epson FX-86, HP-GL	PCL	42	Unlim.	1,500	No	Labels	Shared word processing	MP
General Business Technology, Inc. (714) 261-1801	6020XP	HP 2000	20	70,000	1.5M	300 x 300	IBM 5225, 5256, 5219	None	37/0	34	500	No	Labels	Word processing	$21,995
	6030XP	HP 2000	20	70,000	1.5M	300 x 300	IBM 5225, 5256, 5219	None	37/0	34	500	No	Labels	Word processing	$23,995
	6037XP	HP 2000	20	70,000	1.5M	300 x 300	IBM 5225, 5256, 5219	None	37/0	34	500	No	Labels	Word processing	$27,495
Graphon Corp. (916) 635-3600	3310 Laser Page Printer	Ricoh SL- 300	10	60,000	1.5M	300 x 300	Epson FX-80; Diablo 630; HP Laserjet Plus; IBM Graphics Printer, Proprinter	Ross	MP	30	300	No	Labels	Word processing	$3,495
Hetra Computer & Communications Industries, Inc. (800) 888-7201	3036	Xerox XP-34	36	70,000	12M	300 x 300	Xerox 3700 with Hetra Font System, Diablo 630, Tektronix 4010/4014, HP 7475	None	50/0	50	2,000	No	No	Remote receive-only printing	$21,500
	36065	Xerox XP-34	36	70,000	4M	300 x 300	Xerox 3700 with Hetra Font System, Diablo 630, Tektronix 4010/4014, HP 7475	None	50/0	50	2,000	No	No	Remote receive-only printing	$19,000
Houston Technical Co. (800) 950-0000	Laserjet 2000	Canon LBP-8	20	70,000	1.5M	300 x 300	HP	PCL	35/35	Unlim.	2,000	Yes	No	Word processing	$10,000- $25,000
The Hohenzen Corp. (201) 540-0000	The Hohenzen 20/DP-100	Hohenzen 20	20	20,000-60,000	512K	300 x 300	Proprietary	None	3/0	1	2,250	Yes	Labels	Line printer	$14,500- $20,000
	The Hohenzen 20/WP-300	Hohenzen 20	20	20,000-60,000	1.2M	300 x 300	Line printer, ANSI X3.64, Diablo 630, Qume Sprint II, NEC Spinwriter, Epson FX-80, HP Laserjet Plus, IBM Proprinter	None	250/250	25	2,250	Yes	Labels	Office automation	$14,500- $22,000
	The Hohenzen 20/E- 800	Hohenzen 20	20	20,000-60,000	1M-4M	300 x 300	Tektronix 4014/4010, Versatec V80, Diablo 600, HP Laserjet Plus	None	60/60	60	2,250	Yes	Labels	Scientific, engineering	$14,500- $25,000
IBM Contact local sales office	IBM 3800 Models 2, 6	IBM 2, 6	Upto 216	12000-6.5M	8M	240 x 240	IBM 3811, 3900-1	IPDS²	1/250+	30²	4,000	No	Labels	High-speed, large-volume printing	$175,000- $600,000
	IBM 3820	IBM	20	100,000	4M	240 x 240	None	IPDS	1/250+	30²	1,000 (optional)	No	Labels	Distributed printing	$31,775
	IBM 3827	Kodak	27	250	4M	240 x 240	None	IPDS	1/250+	30²	1,000 (optional)	No	Labels	High-function duplex system applications or publishing	$105,000
	IBM 3812 Models 1,2	Kodak K-5	12	50,000	1M	240 x 240	IBM 3219, 5256, 3287	IPDS	60	60	500 (pull-away)	No	Labels	Word processing	$9,995
	IBM 3820	HP	20	1.8M	4M	240 x 240	None	IPDS	1/250+	30²	4,000	No	HP	System applications	$135,000
Imagen Corp. (408) 986-9400	3320 Imagenetwork XP Series	Canon LBP-3	20	35,000	3M	300 x 300	Diablo 630 ECS; Epson FX-80, 100; Tektronix 4014; IBM 5152, 1403	Impress, Ultrascript	NP	Unlim.	500 or 2,000	Yes	Both	Text, graphics printing	$19,950- $32,950
Interleaf, Inc. (617) 577-9300	1250-400	Canon LBP-8	20	35,000	NP	300 x 300	Line printer	Epsilon	30	NP	2,000	Yes	No	Duplex printing	$50,000
Kentek Information Systems, Inc. (301) 000-0000	K-2+	Kentek K-2+	15	40,000	2.5M	300 x 300	Diablo 630, HP Laserjet Plus, Tektronix Plot 10	None	Unlim.	Unlim.	800	Yes	Both	Distributed DP, publishing applications	NP
	K-3	Kentek K-3	24	80,000	4M	300 x 300	Diablo 630, Tektronix Plot 10, HP Laserjet Plus	Optional Postscript interpreter	Unlim.	Unlim.	800	Yes	Both	Distributed DP, publishing applications	NP
	K-4 Page printer	Kentek K-4	24	80,000	7M	300 x 300	Diablo 630, Tektronix Plot 10, HP Laserjet Plus	Optional Postscript interpreter	Unlim.	Unlim.	800	Yes	Both	Distributed DP, publishing applications	NP
Kyocera Unison, Inc. (619) 000-0000	F-1000A	Kyocera	10	30,000	512K	300 x 300	Diablo 630, Qume Sprint II, NEC Spinwriter, HP Laserjet Series II, Epson FX-80, line printer	Prescribe	45/NP	NP	250	Yes	Both	HP	$2,695
	F2000	Kyocera	10	30,000	1.5M	300 x 300	Diablo 630, Qume Sprint II, NEC Spinwriter, HP Laserjet Series II, Epson FX-80	HP	45/NP	NP	850	Optional	Both	HP	$4,695
	F2000	Kyocera	10	30,000	2M	300 x 300	Diablo 630, Qume Sprint II, NEC Spinwriter, HP Laserjet Series II, Epson FX-80	HP	45/NP	NP	850	Yes	HP	HP	$6,395
Lexi Computer Systems, Inc. (617) 661-1118	Lexi 3037 coaxial	Kyocera	18	30,000	1.5M	300 x 300	IBM 3287, 3268, 4214 Models 2,3,4,5	Prescribe	0/75	35	500	Optional	Both	Displaywrite 36	$10,995
	Lexi 3812 twinaxial	Kyocera	18	30,000	1.5M	300 x 300	IBM 5219, 5224, 5225, 4214, 3812	Prescribe	0/75	30	500	Optional	Both	Displaywrite 36	$10,595
	Lexi 3037 coaxial	Kyocera	10	30,000	1.5M	300 x 300	IBM 3268, 3287, 4214	Prescribe	0/35	18	500	Optional	Both	Displaywrite 36	$6,995
	Lexi 3019 twinaxial	Kyocera	10	30,000	1.5M	300 x 300	IBM 5219, 3812, 5224, 5225, 4214	Prescribe	0/35	18	500	Optional	Both	Displaywrite 36	$6,995
	Lexi 3037-2 coaxial	Kyocera	10	30,000	0.5M	300 x 300	IBM 3287, 4214 Models 2,3,4,5	Prescribe	0/35	18	250	Optional	Both	Displaywrite 36	$4,995
	Lexi 3019-2 twinaxial	Kyocera	10	30,000	0.5M	300 x 300	IBM 5219, 5224, 5225, 5226, 4214	Prescribe	0/75	35	250	Optional	Both	Displaywrite 36	$4,995
Microcomputer Utility Corp. (800) 000-0000	Universal Publishing System	Kyocera	10	30,000	4.5M	300 x 300	HP Laserjet	Postscript, IGL²	Unlim.	35	800	Yes	Both	Desktop publishing	$5,495
	MP900	Kyocera	10	5,000-10,000	512K	300 x 300	Diablo 630, Epson FX-80, IBM Proprinter, HP Laserjet Plus, Qume Sprint II	None	0/Unlim.	NP	800	Optional	Both	Word processing	$3,695
Monarch Talos (408) 867-1000	21150	Ricoh LP4150	15	25,000	1.2M	300 x 300	HP Laserjet Plus, Epson FX-80, Diablo 630, NEC 3550, line printer, Qume, IBM Proprinter	PCL²	34/60	Unlim.	500	Yes	Labels	Cluster printer	NP

COMPANY	PRODUCT	ENGINE	PRINT SPEED (PAGE/MIN)	DUTY CYCLE (PAGE/MONTH)	ON-BOARD MEMORY	RESOLUTION (DOT/IN.)	EMULATIONS	PAGE DESCRIPTION LANGUAGES SUPPORTED	NUMBER OF FONTS AVAILABLE (HARD/SOFT)	NUMBER OF FONTS PER PAGE	MAXIMUM INPUT SHEET CAPACITY	COLLATING CAPABILITY	HANDLES ENVELOPES/LABELS	MOST TYPICAL USE	PRICE
[illegible]	Model 2680 Desktop Laser Printer	Ricoh LP4160	15	[illegible]	[illegible]	300 x 300	Epson FX-80; Diablo 630; IBM Lanmjet 800 Plus, 7-475A HP-GL	None	10/97	16	500	Yes	Labels	HP	[illegible]
[illegible]	Model 1305T Transport Laser Printer	Ricoh LP4150	15	30,000	1.5M	300 x 300	Epson FX-80; Diablo 630; HP 7-475A HP-GL, HP Lanmjet 800 Plus	None	10/97	16	500	Yes	Labels	HP	[illegible]
NBI, Inc. (303) 444-5710	NBI Omyx Model 10	Xerox XP-10	10	10,000	512K	300 x 300	None	None	1/34	4	250	No	No	Word processing printing in shared NBI Omyx configurations	$6,495
	NBI Omyx Model 24	Xerox XP-24	24	60,000	512K	300 x 300	None	None	1/35	4	2,000	No	No	Word processing printing in shared NBI Omyx configurations	$33,000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	6M	300 x 300 or 240 x 240	IBM Proprinter, 4201, 5152, 5202; Diablo 630	PCL	5,000/ 5,000	300+	1,500	No	Labels	Single-line HP print server	[illegible]
[illegible]	[illegible]	Ricoh LP4151	15	30,000	512K-6M	300 x 300	Diablo 630; TI 855; HP 7-475; Lanmjet Plus; IBM 4019, 5202	Postscript	13/ Unlmt.	13	500	No	Labels	Multipurpose workstation, Postscript printing	$6,500-$7,500
Office Automation Systems, Inc. (813) 653-0400	Laserpro 1530	Ricoh LP4150	15	25,000	768K	300 x 300	HP Lanmjet Plus, Diablo 630, IBM Proprinter, Epson FX-80, NEC Spinwriter, Qume Sprint II, line printer	Express command language	14/11	Unlmt.	250	Yes	No	Industrial bar-code printing	$5,495
	Laserpro 2300	Minolta	22	60,000	1.5M	300 x 300	HP Lanmjet Plus, Diablo 630, IBM Proprinter, Epson FX-80, NEC Spinwriter, Qume Sprint II, line printer	Express command language	17/0	Unlmt.	250	Yes	Yes	High-speed DP	$10,500
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Personal Computer Products, Inc. (619) 488-8411	Laserimage 3000	Ricoh LP4150	15	25,000	1.5M	300 x 300	HP Lanmjet Plus, IBM Proprinter, Epson FX-80, Diablo 630	Imagescript	31/0	Unlmt.	500	HP	Labels	Network presentation	$6,395
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
QMS, Inc. (205) 633-4300	QMS-PS 1500	Ricoh LP4150	15	15,000	4M	300 x 300	None	Postscript	35/ Unlmt.	HP	500	Yes	No	Desktop publishing	$9,995
	Laserquik 2400	Xerox XP-24	24	36,000-60,000	HP	300 x 300	Qume Sprint II, Diablo 630, Tektronix 4010/4014	Quic	16/ Unlmt.	HP	2,000	Yes	Labels	Scientific/engineering applications	$24,995
	Laserquik 1510	Ricoh LP4150	15	18,000	4M	300 x 300	Qume Sprint II, Diablo 630, Tektronix 4010/4014	Quic	16/ Unlmt.	NA	500	Yes	Labels	Scientific/engineering applications	$11,995
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Siemens Information Systems, Inc. (714) 891-9700	2300-2	Siemens PDS	103	1.5M ft/month	6M	240 x 240	IBM 3800-3/6	Line printer mode	20/ Unlmt.	64	3,000	No	Labels	DP	$165,000
	2300-3	Siemens PDS	300	1.5M ft/month	7M	240 x 240	IBM 3800-3/6	AFP	NP/ Unlmt.	Unlmt.	3,000	No	Labels	DP	$380,000
	2300-2	Siemens PDS	300	3M ft/month	8M	240 x 240	IBM 3800-3/6	Line printer mode	20/ Unlmt.	64	3,000	No	Labels	DP	$305,000
	2300-3	Siemens PDS	300	3M ft/month	7M	240 x 240	IBM 3800-3/6	AFP	NP/ Unlmt.	Unlmt.	3,000	No	Labels	DP	$363,000
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Talaris Systems, Inc. (619) 587-0787	1500 Printstation	Ricoh LP4150	15	35,000	256-6M	300 x 300	HP Lanmjet Series II, DEC LN03 Plus, Diablo 630 ECS, Tektronix 4014	Optional Postscript emulation	42/1,000	1,000	500	Yes	No	Document production in multi-user or networked environments	$8,490-$11,490
	1502	Ricoh LP4150	15	35,000	6M	300 x 300	Tektronix 4214, Diablo 630 ECS, Qume Sprint	Quic	21/1,000	1,000	500	Yes	No	Document preparation/ production	$11,990
	2400	Xerox XP-24	24	60,000	2.5M	300 x 300	Tektronix 4214, Diablo 630 ECS, Qume Sprint	Quic	21/1,000	1,000	2,000	Yes	No	Document preparation/ production	$24,990
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Quadlaser Model 2005	Ricoh	15	35,000	3MB	300 x 300	TI 810, 855 DP/WP; IBM Proprinter; HP Lanmjet, Lanmjet Plus; Diablo 630	None	1/HP	HP	500	Yes	Labels	Word processing	$6,995
	Quadlaser Model 2115	Ricoh	15	35,000	3M	300 x 300	Diablo 630; HP Lanmjet Plus, HP 7475; TI 855	Postscript	13/HP	Unlmt.	500	Yes	Labels	Desktop publishing	$7,995
Toshiba America, Inc. (714) 583-3000	Pagelaser 12	Toshiba	12	25,000	512K-1M	300 x 300	HP Lanmjet 500 Plus, Toshiba P351, Diablo 630, Qume Sprint II	None	6/NP	HP	250	Yes	Both	Word processing	$3,799
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	[illegible]	Xpress	10	[illegible]	1M	300 x 300	Diablo 630, HP Lanmjet Plus, Epson FX-80, IBM Graphics Printer, NEC Spinwriter, Qume Sprint II	Express	48	Unlmt.	200	No	Both	Office automation	$6,795
	[illegible]	Ricoh	15	35,000	6M	300 x 300	Diablo 630, HP Lanmjet Plus, Epson FX-80, IBM Proprinter	GCI Graphics	60+	Unlmt.	500	Yes	Labels	Office automation	$8,495
	[illegible]	Ricoh	15	35,000	6M	300 x 300	Diablo 630, HP Lanmjet Plus, HP 7475; TI 855; Qume, Epson	Postscript	35	Unlmt.	500	Yes	Labels	Publishing	$8,995
	[illegible]	Delphax	75	[illegible]	2M	300 x 300	None	None	10/35	1	1,500	No	Labels	Line printer emulation with forms overlay	From $60,995
Varityper (201) 807-0600	VT600	HP	10	3,000	6M	600 x 600	Postscript	Postscript	13/150	Unlmt.	200	No	Labels	Publishing	$13,500
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	[illegible]	Xerox	24	60,000	None	300 x 300	None	None	HP	HP	250-1,000	Yes	No	HP	$24,000
	LC915	Ricoh	15	30,000	4M	300 x 300	Diablo 630; HP Lanmjet, Lanmjet Plus	Postscript	HP	HP	500	Yes	No	HP	$8,000-$11,000
Xerox Corp. (800) 833-6979	4045	Xerox	10	20,000	512K	300 x 300	IBM 3287, 5219, 5152, 5225, 5224, 5256; Epson FX-80/100; HP Lanmjet Plus	Interpress	2M cartridge slots	HP	250	No	Both	IBM mainframe environment	$3,995-$6,495
	2700 II	Xerox	12	30,000	256K	300 x 300	HP	Interpress	2/Optional	HP	500	No	No	Word processing	$14,495
	3700	Xerox	24	60,000	16M	300 x 300	HP	Interpress	2/300+	HP	2,000	No	Labels	Distributed processing environments	$22,995
	4050	Xerox	50	700,000	512K	300 x 300	IBM 3211/3811	Interpress	NP/ 250+	HP	1,500	Yes	Labels	Entry-level electronic printer for medium, large DP centers	$140,500
	8790	Xerox	70	Up to 1.5M	128K	300 x 300	HP	PDL*	NP/ 200+	HP	3,000	Yes	Labels	DP centers	$191,000
	9790	Xerox	120	Up to 3M	128K	300 x 300	HP	PDL	NP/ 200+	HP	3,000	Yes	Labels	Large in-house DP, publishing departments	$376,125

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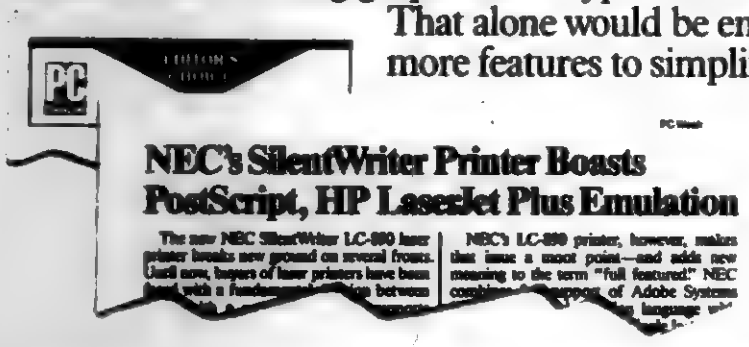

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These newly created positions are located at Corporate Headquarters in Kansas City, Missouri. Our home base is a thriving midwestern metropolis with a fair share of cultural, educational and recreational attractions, beautiful park-lined boulevards, plentiful housing options and the pleasures of a 4-season climate.

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Our choice will be a visionary architect who thinks in long-range terms, knows how to get there and how to communicate their plans to decision-making management. This technical leader will be involved in networking, computer configurations and DASD Management capacity planning for a total mix of systems software and multi-location minicomputers and mainframes. Compensation for this position includes Bonus eligibility.

Minimum B.S. degree in Computer Science is required, preferably with a Master's in Computer Science. Minimum 8 years of hands-on experience is also required in MVS/SP, MVS/XA and other systems including VTAM, NCP, JES2 and CICS. Strong interpersonal skills, capacity and budgetary planning skills are essential. A retail industry background with IBM 3090 or Amdah 5890 experience would be ideal.

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Staff Director
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Westmont, IL

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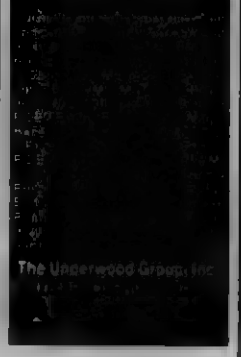

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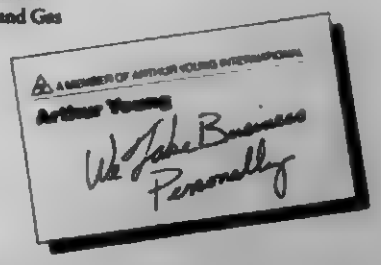

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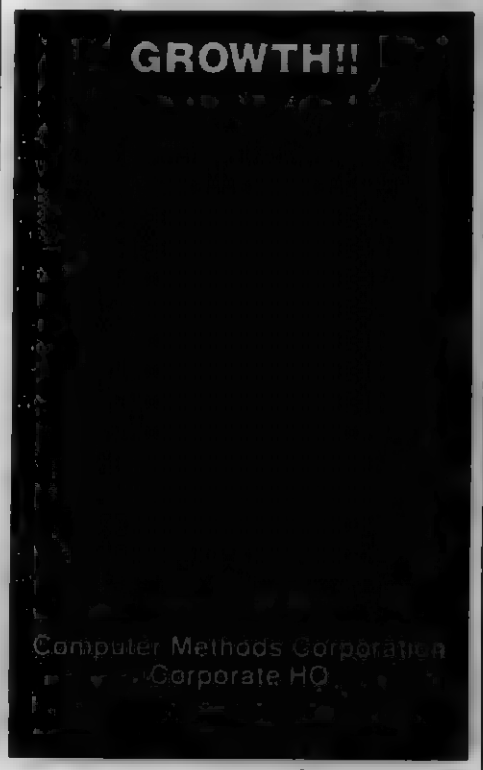

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"Not only does Computerworld reach our market, but it reaches a market that's actively interested in computing and fostering their career growth. Conservatively, over the years, we have helped many thousands of Computerworld readers find new positions within the computer profession; many times more than those readers of other technology or trade publications. How do we know? We have an elaborate tracking system that helps us verify from which media respondents see our ads. Typically, Computerworld generates over four times more respondents who eventually are placed in new positions by Source than the next nearest computer industry publication."

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Position requires: Bachelor's degree; minimum 5 years systems analysis experience using structured techniques, or some equivalent training experience; strong teaching, personnel, and communication skills. Experience with formal development methodology highly desirable.

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Position requires: Bachelor's degree in a relevant discipline; minimum 5 years DP experience; minimum 2 years 'C' programming experience; experience with application systems design and development in a LAN/Microprocessor environment utilizing structured methodology. Experience in an MS DOS environment and with BTRIEVE database and utilities desirable.

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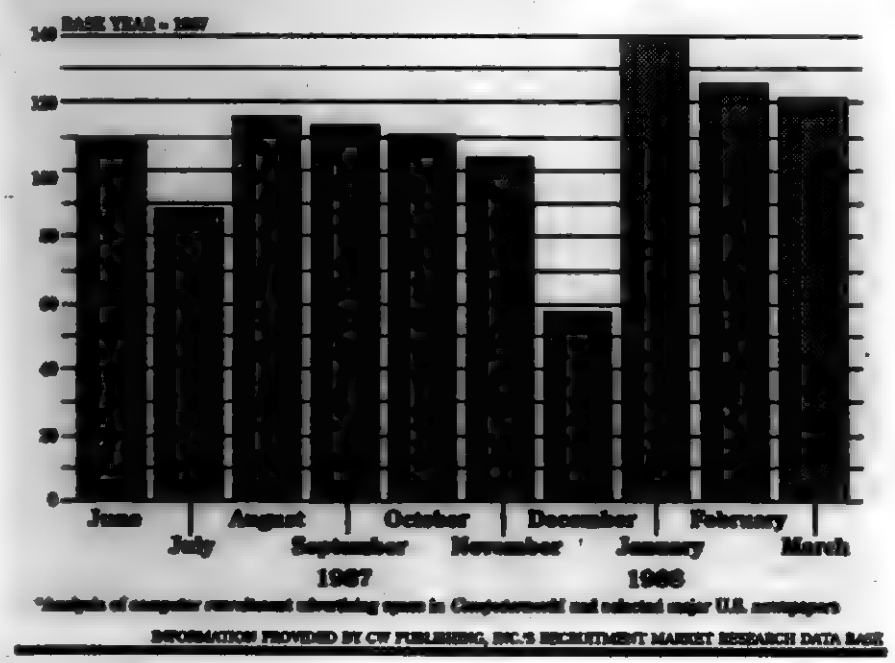
CAREER INDEX

Computer recruitment advertising index*



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JES3	0	1 2 3 4 5 6 7	8 9 10	
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MARKETPLACE

No end in sight to RAM craze

Large-volume and small users sell chips in light of price pressures

BY CAMERON HALL
BOSTON COMPUTER EXCHANGE CORP.

"The chips are down, and their price is high" was the cry of the market-wise callers who had valuable reserves of dynamic random-access memory to sell last week.

For buyers in the RAM market, spot prices were up. Everyone is scrambling to buy, and there seems to be no end to current price pressures on the horizon. Buyers had to pony up and pay full fare for memory in a market that has been tight for weeks and that market traders say is getting even tighter.

The Boston Computer Exchange usually sees only large-volume traders in the chip market, but last week saw the news of a tight chip market filtering down to the end-user level, with individuals calling to offer their old RAM upgrade boards. One astute seller of chips said, "I never believed I'd be taking old 64K RAM chips off my boards to help fight the dynamic RAM war with the Japanese."

Callers from IBM warmed the wires last week as they called to verify that one of their own was looking for Personal Computer AT Model 339s. No one at IBM seems to have gotten the word that the best seller of the DOS era is a great seller in the Personal System/2 era.

Meanwhile, the market for IBM PC ATs sizzled; and brokers and buyers around the country quickly grabbed all available machines. The 20-MHz AT had upward price pressure during the week but finished off at the previous week's close of $2,350. Good news of a plentiful supply of AT Models 239 and 339 resulted in descending prices, with a price drop of $100 to $3,550 for the Model 339.

Rumor mills buzzing

In the wake of rumors from IBM of low-priced PS/2 models, IBM sellers were calling to list early models for sale. They were concerned that a drop in resale value of early IBM equipment would occur when these early models are competing with the rumored Intel Corp. 80286-based PS/2 for $1,100 and an Intel 80386 machine for $1,500.

The loser of the week, in the wake of the PS/2 price drop rumor, was the PS/2 Model 50, which was off $175 to $2,300. At the same time, the PS/2 Model 80 closed at a stable $5,800.

Eagerness to sell resulted in some PC XT bargains for buyers, with the most actively traded machine being the 10-MHz XT Model 086, which closed at $1,185, down $40 from the previous week's close. The market also saw good activity for PCs, which closed April 29 at $800, down $25 from the previous week. The IBM 20-MHz PC XTs remained at April 22's lower close.

The most heavily traded machine in the Compaq Computer Corp. market was the Compaq Portable I. It remains the toaster of the computer industry because of its compactness. The Portable I traded at $800 and the Compaq Plus at $1,125 in volume, down $25 and $50, respectively, under pressure from lighter weight laptops that offer the same capabilities with greater storage on 3½-in. drives. The Compaq Portable II, III and 286 sold in the previous week's range, as did the quietly traded Deskpro models.

The Apple Computer, Inc. Macintosh market picked up, and buyers moved back into it as they felt the price drops of the recent weeks had ended. During the week ended April 29, four of the seven Macintosh models showed price gains (see chart at right).

Macintosh II buyers were looking for machines as word of the Mac II's superior performance spread. Prices for the machine were bid up to $4,325 and closed up $75 over the previous week. Latest model Mac SE and early Macintosh 512 and 512E models were also up. The Mac Plus models and the Mac SE held steady as traders settled for mid-April prices.

The BoCoEx Index
Closing prices report for the week ending April 29, 1988

	Closing price	Recent high	Recent low
IBM PC Model 076	$800	$900	$500
XT Model 086	$1,185	$1,350	$925
XT Model 089	$1,650	$1,750	$1,175
AT Model 099	$2,350	$2,425	$1,875
AT Model 239	$2,600	$2,650	$2,150
AT Model 339	$3,550	$3,700	$2,750
PS/2 Model 50	$2,300	$2,475	$2,275
PS/2 Model 80	$5,800	$6,100	$5,475
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	$2,100	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
Plus	$1,125	$1,275	$775
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[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
Apple Macintosh 512	$750	$800	$575
512E	$875	$1,025	$675
Plus	$1,150	$1,350	$900
Plus 20-MHz	$1,750	$1,800	$1,550
SE	$1,925	$2,200	$1,600
SE 20-MHz	$2,400	$2,400	$2,100
II	$3,975	$4,325	$3,500
[illegible]	[illegible]	[illegible]	[illegible]
HP Laserjet Series 2	$1,400	$1,425	$1,375
[illegible]	[illegible]	[illegible]	[illegible]

INFORMATION PROVIDED BY THE BOSTON COMPUTER EXCHANGE CORP.

The Boston Computer Exchange can be reached at 800-BOCOEXX or 617-542-4414 in Massachusetts.

Market forces rule IBM printer supply, demand

BY NANCY DIPALMA
IDC FINANCIAL SERVICES CORP.

IBM has announced a limited-offer price reduction for the IBM 3800 Model 1 to 3800 Model 3 upgrade. Orders for this offer must be placed with IBM between April 19 and Oct. 21 and must be installed by Dec. 31, 1988. The new upgrade cost is $62,500, reduced from $95,090. As of Oct. 22, 1988, this offer will be withdrawn.

This limited offer has caused a drop in the used value of the 3800 Model 1. Since end users are primarily interested in the 3800 Model 3, dealers that have acquired Model 1s have been upgrading and remarketing them as Model 3s. By eliminating the upgrade, there will be no demand for the Model 1, causing further declines.

Secondary market activity for the 3800 Model 3 printer has slowed down recently. This lack of used trading is partially the result of the saturation of the high-end laser printer market and end users' anticipation of a replacement product, which IDC Financial Services Corp. expects by the first half of 1989.

There have been no reports of the IBM 3800 Model 6 trading on the secondary market, and interest in this printer is very limited. Many users are still waiting for IBM to make the upgrade from a 3800 Model 6 to a 3800 Model 3 available. This upgrade path was promised by IBM when it announced the 3800 Model 6 in January 1987.

The IBM 3287 Models 1 and 2, which leveled off during fourth-quarter 1987, have once again begun to decline on the used market.

Used values for the 3287 Models 1 and 2 have fallen approximately 18% in the retail market since the beginning of this year. Essentially, supply outstrips whatever remaining demand there is for these printers.

It's black and white

Sources indicate that very few users are interested in the color capabilities offered by the IBM 3287 Models C1 and C2 because of the extra cost and print quality associated with these printers. Thus, these printers are not very popular on the secondary market.

The secondary market for the IBM 3268 Models 2 and C2 serial matrix printers has begun to stabilize after a huge decline in value — more than 50% — during 1987. Reports from secondary market sources indicate that activity has slowed and values remain constant in the 3268 area.

IBM printers

INFORMATION PROVIDED BY IDC FINANCIAL SERVICES CORP.
CW CHART

The IBM 4245 Model 12 engraved-band printer recently experienced a decline in used value. This decline is the result of a combination of three different market forces:

- The announcement of IBM's 6262 band printer family.
- The ample supply of 4245 Model 12s on the used market.
- Users' migration to higher speed printers.

Currently, demand for the IBM 4245 Model 20 is strong, as there are limited numbers of these printers available on the used market and, as a result, used values are holding steady. This stable market value may be attributed to the Model 20's attractive price/performance.

The IBM 3262 used market has been uneventful recently. This printer family has been experiencing normal market declines as a result of end users moving out of the 3262 printer family and into higher speed band printers.

For more information, contact IDC Financial Services' Terri LeBlanc at 617-872-8200.

Used Equipment

LEGAL NOTICE
UNITED STATES BANKRUPTCY COURT
SOUTHERN DISTRICT OF NEW YORK
In re: CHARLES GREENBERG & SONS, INC., Debtor.
CHAPTER 11 CASE No. 87B12007 (TLB)
NOTICE OF HEARING TO CONSIDER SALE OF IBM COMPUTER SUBJECT TO HIGHER AND BETTER OFFERS

NOTICE IS HEREBY GIVEN, that a hearing will be held before the Honorable Tina L. Brozman, United States Bankruptcy Judge, in Room 621-1 of the United States Customs House, One Bowling Green, 6th Floor, New York, New York on the 17th day of May, 1988, at 11:00 a.m. or as soon thereafter as counsel may be heard, at which time and place the Court will consider the application of the above-captioned Debtors (the "Application") for an order authorizing and empowering the Debtor to sell, transfer and convey of its right, title and interest in an IBM System 38 Central Processing Unit and related computer software and hardware located at 1250 Broadway, New York, New York and in Georgia (the "IBM Computer") to COMPUTER GENERATED SOLUTIONS, INC. ("CGS") in consideration of $88,226.80 including non-cash consideration in services valued by CGS at $38,226.80, upon the terms and conditions of an offer annexed to the Application (the "Offer"), or such higher and better offer as may be made at the hearing scheduled herein (the "Proposed Sale"), free and clear of all liens, claims, encumbrances, security interests, and other charges, if any, with any such liens, claims, encumbrances, security interests, and other charges to attach to the proceeds of such sale, upon the terms and conditions set forth in the Offer, subject to higher or better offers, which may be received at the hearing; provided, however, that such high bid to purchase the IBM Computer is greater than $88,226.80, including non-cash consideration in services valued by CGS at $38,226.80, net, twenty five percent (25%) thereof (a non-refundable deposit) to be paid to Greenberg by certified check by not later than the close of business on the day following such hearing and the balance payable by cash, certified or official bank check to the order of Greenberg at the closing of title, and shall be in accordance with the procedures set forth herein and substantially on the same terms and conditions set forth in the Offer, and upon such other terms and conditions as may ultimately be determined herein. The failure by the successful bidder to make the aforesaid deposit or to close and take title to the premises within five (5) business days after the entry of an Order by the Court approving the sale becomes final in all respects shall be deemed a default. In the event of a default, the aforesaid deposit shall constitute liquidated damages, and the Debtor shall then have the right to offer the IBM Computer for sale to the next highest bidder upon the terms herein. Unless extended by the mutual consent of the debtor and successful bidder, transfer of the IBM Computer and payment of the balance of the consideration therefore shall occur at a closing to be held at the offices of Debtors' counsel on the fifth business day after the order of the Court approving the sale becomes final in all respects.

DESCRIPTION OF IBM COMPUTER

System 38 Central Processing Unit, and related software and hardware including disk drives, tape drive, modems, printers, peripherals, and one IBM Personal Computer with a 5251 emulation board.

PLEASE TAKE FURTHER NOTICE, that said hearing will be held pursuant to a Notice of Proposed Order dated April 27, 1988, which notice is based upon the Application. A copy of said Notice, Proposed Order, Application and the exhibits annexed thereto are on file with the Clerk of the U.S. Bankruptcy Court, United States Customs House, One Bowling Green, 6th Floor, New York, New York 10004 and at the offices of counsel for the Debtors herein, and may be examined by any interested party at any time during regular business hours.

PLEASE TAKE FURTHER NOTICE, that objections, if any, to the Proposed Sale shall be in writing and shall set forth in detail the basis of the object and the relationship of the objectant to the Debtor(s). Objections must be filed with the Bankruptcy Court at the address set forth above with a copy thereof served upon the undersigned counsel for the Debtors prior to May 12, 1988.

PLEASE TAKE FURTHER NOTICE, that the Debtors reserve the right to alter any and all terms and conditions of sale up to the conclusion of the hearing.

PLEASE TAKE FURTHER NOTICE, that the IBM Computer may only be inspected by appointment made with the Debtors.

PLEASE TAKE FURTHER NOTICE, that the IBM Computer is being sold "AS IS" and "WHERE IS" without any representation or warranty of any kind, except as may be expressly stated herein.

PLEASE TAKE FURTHER NOTICE, that the hearing described above may be adjourned from time to time without further notice to creditors or interested parties or those at the said hearing.

PLEASE TAKE FURTHER NOTICE, that the Court shall retain jurisdiction to determine all matters arising out of or relating to the proposed transaction and all persons or entities by submitting a bid at the hearing shall be governed by the conditions set by the court herein, and such persons or entities shall, upon becoming an offeror at the hearing, subject himself or itself to the jurisdiction of the Court in reference to all matters arising out of their offer and the consummation thereof and all matters related thereto.

Dated: New York, New York
May 9, 1988

Yours, etc.
SHEA & GOULD
Attorneys for the Debtor
and Debtor-in-Possession
1251 Avenue of the Americas
New York, New York 10020-1100
Att: Gloria E. Siegel, Esq.
(212) 827-4074

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Sealed proposals will be received by the CDPA, 301 N. Lamar St., 301 Building, Suite 508, Jackson, MS 39201 for the following equipment and services:

Request for Proposal No. 1092, due Tuesday May 24, 1988 at 2:30 p.m. for the acquisition of approximately 90 microcomputer systems and associated software for the MISSISSIPPI DEPARTMENT OF REHABILITATION SERVICES, Vocational Rehabilitation Division. Charge $10.00

Request for Proposal No. 1093, due Thursday, May 26, 1988 at 2:30 p.m. for the acquisition of twenty microcomputers and peripherals for ALLIED ENTERPRISES. Charge $10.00.

Request for Proposal No. 1094, due Friday, May 27, 1988 at 2:30 p.m. for the acquisition of peripheral upgrades to an existing Texas Instruments minicomputer at MATTY HERBERT HOSPITAL. No charge.

Request for Proposal No. 1095, due Tuesday, May 24, 1988 at 2:30 p.m. for the acquisition of an upgrade for a Sperry 80/30 minicomputer system for the MISSISSIPPI LIBRARY COMMISSION. No charge.

Request for Proposal No. 1096, due Friday, May 20, 1988 at 2:30 p.m. for the acquisition of a disk upgrade for a Wang VS-100 minicomputer system for the MISSISSIPPI STATE DEPARTMENT OF HEALTH. No charge.

Request for Proposal No. 1097, due Thursday, May 26, 1988 at 2:30 p.m. for the acquisition of a departmental minicomputer with full SNA communications for the OFFICE OF THE CLERK OF THE MISSISSIPPI SUPREME COURT. No charge.

Detailed specifications may be obtained free of charge from the CDPA office or at the specified cost by submitting a written request accompanied by the appropriate payment. NOTE: Valid forms of payment are cashier check as a Mississippi bank, certified check or POSTAL money order. NO CASH OR OUT-OF-STATE CHECKS. The CDPA reserves the right to reject any and all bids and proposals and to waive informalities.

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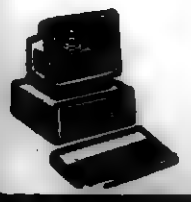

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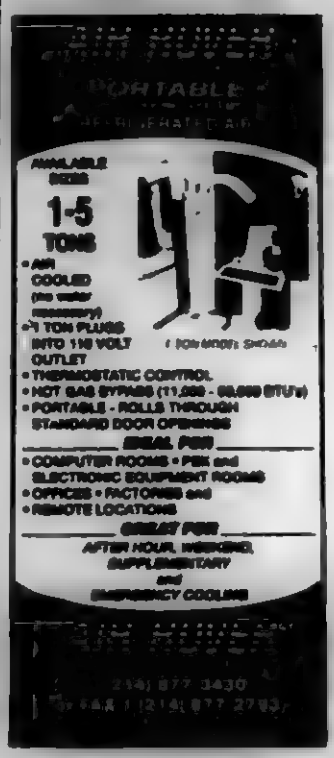

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Training

Micro vs. mainframe: pros and cons for CBT

BY DENA ALLMAN
SPECIAL TO CW

The forces of creativity and control are apt to clash in weighing the pros and cons of mainframe and microcomputer-based training (CBT) systems.

Sometimes accessibility will dictate the choice. "If you are training an audience who only has accessibility to a mainframe, use it," says Ron Munger, manager of computer-assisted instruction at Nationwide Insurance Co. in Columbus, Ohio.

When a choice is possible, however, the training department should always conduct an audience analysis to determine which CBT route to take.

Mainframe systems offer several advantages in the degree of control over program content and users that they provide.

The biggest one is the ease of changing the training program, according to Travis Piper, president of Creative Approaches, Inc., a vendor of mainframe and microcomputer-based CBT systems in East Bloomfield, N.Y. The instructor simply goes into the system to update it, while with micros, students must send in their disks to have them revised — a more time-consuming and expensive task.

According to Piper, other advantages of mainframe systems are greater ease in the following:

- Monitoring students. In some cases, students can also inform the trainer of problems by electronic message.
- Analyzing programs. The trainer simply calls up students' work, again avoiding the need to send in disks.
- Charging users. Microcomputer disks can be copied without payment.
- Detecting bugs. The mainframe can capture every keystroke, allowing the trainer to determine what is wrong with the training tools.

With a mainframe, scheduling training sessions might be easier, thereby avoiding backlogs, Piper says.

The hardware and software are in one place, while with microcomputers, the student, hardware and disks have to be brought together.

On the other hand, using a microcomputer system can be preferable from the creative standpoint, according to Nationwide's Munger. "It's a more powerful, flexible tool," he explains. "The capability to design lessons with all the bells and whistles are on the personal computer — not on the mainframe."

With microcomputers, Munger adds, there are more effective authoring tools than with the mainframe. "There are 100 good authoring tools available for the micro, and they all have their own features and characteristics." The mainframe, on the other hand, has only two or three "decent" authoring tools, Munger says.

Another advantage of microcomputer-based training is its audio and video capability, according to Gloria Gery, an independent consultant based in East Otis, Mass. and author of *Making CBT Happen*. "If people want to use interactive video, there's only one option — the PC," Gery says.

Allman is a free-lance writer based in Chicago.

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Feb. 3	Dec. 31	Software Operating Systems & Languages	Uniforum
Mar. 2*	Jan. 29	Departmental Computing	Interface/ WCC
Apr. 6	Mar. 4	Data Security	
May 4	Apr. 1	Communications/ Connectivity	Comdex Spring/ ICA
June 1*	Apr. 29	PC End User Productivity	PC Expo
July 6	June 3	Software	
Aug. 3	July 1	Departmental Computing	
Sept. 7	Aug. 5	Communications	TCA
Oct. 5	Sept. 2	Software Productivity	Info '88/ Dexpo West
Nov. 2	Sept. 30	PC/Connectivity	Comdex Fall
Dec. 7	Nov. 4	Departmental Computing	

* Starch Ad Study Issue

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Micro strategies unfold

COMPUTERWORLD

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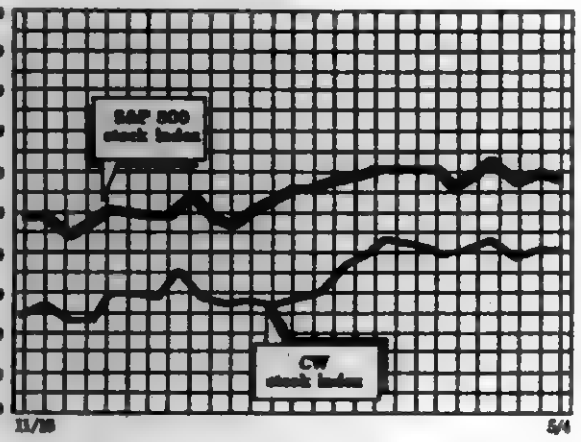

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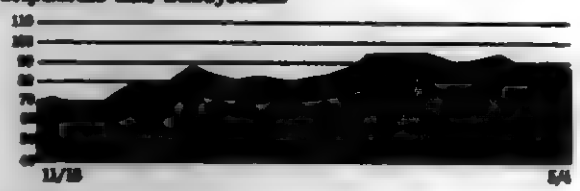
Communications

Computer Systems

Software and DP Services

Semiconductors

Peripherals and Subsystems



Leasing Companies

CW CHARTS

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CLOSING PRICES WEDNESDAY, MAY 4, 1988

EXCH		52-WEEK RANGE (1)		CLOSE MAY 4 1988	WEEK NET CHANGE	WEEK PCT CHANGE
	Communications and Network Services					
N	AMERICAN INFO TECHS CORP	100	74	99.63	-2.9	-3.2
O	ANDREW CORP	16	11	14.75	0.4	2.8
O	ARTEL COMM CORP	3	2	1.75	-0.1	-5.7
N	AT&T	36	29	29.38	-0.3	-0.9
O	AVANT GARDE COMP INC	6	2	2.25	0.3	12.5
O	AVANTEK INC	17	6	7.00	0.0	0.0
N	AYDIN CORP	25	16	20.75	-0.6	-2.9
N	BELL ATLANTIC CORP	80	61	66.50	-0.6	-0.9
N	BELLSOUTH CORP	44	29	38.63	-0.9	-2.2
O	COMPRESSION LABS INC	6	2	4.13	1.0	32.0
O	COMPUTER NETWORK TECH	6	1	1.31	0.0	2.4
O	CONTEL CORP	40	35	39.50	0.0	0.0
O	DATA SWITCH CORP	10	4	7.75	-0.1	-1.8
O	DIGITAL COMM ASSOC	40	29	33.63	0.8	2.3
O	DYNATECH CORP	69	14	22.25	-0.5	-2.2
O	FIBRONICS INTERNATIONAL INC	8	2	4.25	-0.1	-2.9
O	GANDALF TECHNOLOGIES	10	6	7.00	-0.3	-3.4
O	GENERAL DATACOMM INDS	14	3	3.88	-0.1	-3.1
N	GTE CORP	46	36	38.75	-0.1	-0.3
O	INFOTRON SYS CORP	12	5	11.25	0.0	0.0
N	ITT CORP	65	42	48.75	2.1	4.6
O	M/A COM INC	16	7	9.13	-1.0	-9.9
O	MCI COMMUNICATIONS CORP	15	6	14.50	0.9	6.4
O	MICOM SYS INC	17	7	16.13	-0.6	-3.7
O	NETWORK SYS CORP	13	7	10.00	0.1	1.3
O	NORTHERN TELECOM LTD	24	14	18.00	0.1	0.7
O	NOVELL INC	30	12	21.25	1.5	7.6
N	NYNEX CORP	78	58	62.75	-1.8	-2.7
N	PACIFIC TELESIS GROUP	34	28	27.88	-1.0	-3.5
O	PARADYNE CORP	6	4	4.38	-0.1	-2.8
A	PENRIL CORP	5	1	5.13	0.4	7.9
N	PLESSEY PLC	46	23	30.13	0.4	1.3
N	SCIENTIFIC ATLANTA INC	23	8	14.25	-0.4	-2.8
N	SOUTHWESTERN BELL CORP	46	22	34.75	-1.0	-2.8
O	3 COM CORP	26	12	19.75	0.1	0.6
O	TIMEPLEX INC	40	17	32.30	0.0	0.0
N	UNGERMANN BASS INC	16	5	12.13	0.1	1.0
N	US WEST INC	80	43	82.25	-1.1	-2.1
	Computer Systems					
O	ALLIANT COMPUTER SYS	38	5	6.25	-0.8	-10.7
O	ALPHA MICROSYSTEMS	6	3	6.13	0.4	6.8
O	ALTOS COMPUTER SYS	15	6	8.38	-0.1	-1.3
O	AMDAHL CORP	50	19	42.25	2.5	6.3
O	APOLLO COMPUTER INC	28	9	18.63	0.6	4.2
O	APPLE COMPUTER INC	60	26	42.00	0.3	0.8
N	BOLT BERANEK & NEWMAN	25	12	16.50	-1.0	-5.7
N	BRITTON LEE INC	5	1	2.13	0.0	0.0
N	COMPAQ COMPUTER CORP	79	34	53.75	0.9	1.7
O	COMPUTER AUTOMATION INC	17	6	9.88	-0.9	-8.1
O	COMPUTER CONSOLES INC	11	2	7.50	0.5	7.1
O	CONCURRENT COMP CORP	24	11	18.50	1.5	8.8
O	CONTROL DATA CORP DEL	38	16	27.25	2.5	10.1
O	CONVERGENT TECH	9	3	3.69	0.5	15.7
O	CONVEX COMPUTER CORP	20	6	8.38	-0.1	-1.5
N	CRAY RESH INC	122	47	86.38	-0.1	-0.1
O	DAISY SYS CORP	10	5	9.00	-0.3	-2.7
N	DATA GEN CORP	37	16	22.25	-1.0	-4.3
N	DATAPOINT CORP	9	3	5.25	-0.1	-2.3
N	DIGITAL EQUIP CORP	200	86	107.13	0.4	0.4
N	FLOATING POINT SYS INC	12	3	4.00	-0.1	-3.0
N	GOULD INC	24	8	13.50	2.4	21.3
N	HARRIS CORP	43	22	28.25	-0.8	-2.8
N	HEWLETT PACKARD CO	74	36	61.75	-0.9	-1.4
N	HONEYWELL INC	91	48	69.75	-1.1	-1.6
N	IBM	176	102	113.25	-0.8	-0.7
O	INFORMATION INTL INC	15	9	13.00	0.4	3.0
O	IPL SYS INC	3	1	1.63	-0.4	-18.8
O	MASS COMPUTER CORP	14	4	4.50	-0.5	-10.0
N	MATSUSHITA ELEC INDL LTD	228	108	223.13	2.1	1.0
O	MEGADATA CORP	6	3	3.13	0.0	0.0
O	MENTOR GRAPHICS CORP	38	14	32.00	1.3	4.1
N	NBI INC	14	4	4.00	-1.1	-22.0
N	NCR CORP	87	50	81.25	-1.1	-1.3
N	PRIME COMPUTER INC	31	12	17.00	-0.4	-2.2
O	PYRAMID TECHNOLOGY	14	5	13.75	0.5	3.8
O	STRATUS COMPUTER	41	15	28.50	0.5	1.8
O	SUN MICROSYSTEM INC	48	14	35.25	-1.0	-2.8
O	SYMBOLICS INC	5	1	1.75	0.0	0.0
N	TANDEM COMPUTERS INC	27	16	18.63	-0.3	-1.5
N	TANDY CORP	57	36	44.25	-1.5	-3.3
N	ULTIMATE CORP	37	12	14.38	1.5	11.7
N	UNISYS CORP	48	24	34.75	0.3	0.7
A	WANG LABS INC	18	10	11.00	-0.4	-3.3
	Software & DP Services					
O	ADVANCED COMP TECH	6	1	1.25	-0.3	-16.7
N	AGS COMPUTERS INC	30	11	18.00	1.0	5.9
O	AMERICAN MGMT SYS INC	20	9	15.38	-0.4	-2.4
O	AMERICAN SOFTWARE INC	19	6	13.88	0.5	3.7
N	ANACOMP INC	11	4	10.00	0.4	3.9
O	ANALYSTS INTL CORP	10	4	8.25	0.2	2.1
O	ASHTON TATE	38	13	25.50	-1.3	-4.8
O	ASK COMPUTER SYS INC	16	6	14.38	0.4	2.7
O	AUTODESK INC	34	12	29.75	0.5	1.7
N	AUTO DATA PROCESSING	66	46	48.38	-0.6	-1.2
O	BOOLE & BABBAGE INC	12	5	8.75	1.0	12.9
N	COMPUTER ASSOC INTL INC	37	18	28.50	-0.6	-2.3
O	COMPUTER HORIZONS CORP	15	7	11.38	0.5	4.6
N	COMPUTER SCIENCES CORP	73	42	42.88	-0.9	-2.0
N	COMPUTER TASK GROUP INC	17	8	11.50	0.0	0.0
O	COGNOS INC	17	4	7.00	-0.1	-1.8
O	COMSHARE INC	28	12	16.75	0.0	0.0
N	CULLINET SOFTWARE INC	14	4	7.88	0.0	0.0
A	DUQUESNE SYS INC	28	10	21.00	1.5	8.0
O	DATA ARCHITECTS INC	18	7	13.75	0.0	0.0
N	GENERAL MTRS (CLS E)	51	30	44.25	1.3	2.9
O	HOGAN SYS INC	17	4	4.50	0.3	5.9
O	INFORMIX CORP	31	12	21.00	0.0	0.0
O	INTELLICORP INC	11	2	2.88	-0.1	-4.2
O	KEANE INC	18	6	13.00	2.5	22.8
O	LOTUS DEV CORP	40	19	22.75	0.0	0.0
O	MANAGEMENT SCIENCES	15	6	8.38	0.3	3.1
O	MICRO PRO INTL CORP	8	3	3.19	0.3	10.9
O	MICROSOFT CORP	79	37	57.13	1.6	2.9
O	MORINO ASSOCIATES INC	24	7	18	1.5	9.4
O	NATIONAL DATA CORP	34	20	26.00	-3.1	-11.1
O	ON LINE SOFTWARE INTL INC	22	8	9.50	-0.4	-3.8
O	ORACLE SYS CORP	19	8	17.50	1.8	11.1
N	PANSOPHIC SYS INC	38	11	18.13	-0.4	-2.3
O	POLICY MGMT SYS CORP	30	19	24.75	0.6	2.6
O	PROGRAMMING & SYS INC	14	7	11.38	-0.9	-7.1
O	REYNOLDS & REYNOLDS CO	38	14	17.50	-0.1	-0.7
O	SEI CORP	19	10	17.38	-0.8	-4.2
O	SHARED MED SYS CORP	31	19	23.25	-0.4	-1.8
O	SOFTWARE PUBG CORP	17	5	16.25	0.9	5.7
A	STERLING SOFTWARE INC	12	6	9.13	0.1	1.4
O	SUNGARD DATA SYS INC	21	10	17.50	-0.3	-1.4
O	SYSTEMATICS INC	32	19	31.00	0.3	0.8
O	SYS. SOFT INC.	24	7	15	0.8	5.2
O	VMI SOFTWARE INC	37	7	14.00	0.8	5.7
	Semiconductors					
N	ADV MICRO DEVICES INC	28	8	14.50	0.3	1.8
N	ANALOG DEVICES INC	34	8	14.00	0.0	0.0
O	ANALOGIC CORP	13	5	7.13	-0.1	-1.7
O	INTEL CORP	42	16	32.25	0.0	0.0
N	LSI LOGIC CORP	16	7	11.75	1.9	19.0
N	MOTOROLA INC	74	35	48.50	-0.6	-1.3
N	NATL SEMICONDUCTOR	22	10	13.00	-0.5	-3.7
N	TEXAS INSTRS INC	69	38	48.50	0.0	0.0
A	WESTERN DIGITAL CORP	33	11	16.00	0.5	3.2
	Peripherals					
O	ALLOY COMP.	13	3	4.25	0.1	2.0
N	AMI INTL INC	9	3	3.88	0.3	8.9
O	AST RESH INC	21	6	14.88	-0.1	-0.8
O	AUTO TROL TECH CORP	9	3	6.00	0.3	5.3
O	BANCTEC INC	16	5	8.38	0.1	1.5
O	CIPHER DATA PRODS INC	14	4	9.25	0.0	0.0
A	COGNITRONICS CORP	5	2	3.63	-0.3	-4.5
N	COMPUGRAPHIC CORP	28	19	26.25	0.3	1.0
A	DATAPRODUCTS CORP	24	7	9.13	-0.6	-6.8
A	DATARAM CORP	8	5	7.63	-0.1	-1.6
N	EASTMAN KODAK CO	71	38	41.88	0.8	2.1
O	E M C CORP MASS	20	7	7.50	0.0	0.0
O	EMULEX CORP	9	4	8.00	0.0	0.0
O	EVANS & SUTHERLAND	25	17	17.88	0.1	0.7
O	ICOT CORP	8	3	3.50	0.2	5.6
O	INTERLEAF INC	24	11	16.00	-1.4	-7.9
O	IOMEGA CORP	6	1	3.13	-0.3	-7.4
O	LEE DATA CORP	6	3	3.50	-0.3	-8.7
O	MASSTOR SYS CORP	6	1	3.19	0.1	2.0
O	MAXTOR CORP	20	6	13.75	-1.8	-11.3
O	MICROPOLIS CORP	44	13	22.75	-2.3	-9.0
O	MINISCRIBE CORP	12	5	11.00	-1.0	-8.3
N	MINNESOTA MNG & MFG CO	84	45	58.88	-1.3	-2.1
A	MSI DATA CORP	19	8	16.75	0.5	3.1
O	PERSONAL COMPUTER PRODUCTS INC.	7	4	6.00	-0.1	-2.0
O	PRIAM CORP	6	1	2.00	-0.1	-5.9
O	PRINTRONIX INC	13	7	9.50	0.9	10.1
O	QMS INC	27	8	10.88	-0.1	-1.1
O	QUANTUM CORP	28	8	10.63	-0.4	-3.4
O	RAMTEK CORP	5	1	1.63	0.4	30.0
O	RECOGNITION EQUIP INC	22	7	8.50	-0.6	-6.8
O	REXON INC	14	6	8.34	0.4	5.2
O	SCAN TRON CORP	17	7	15.50	-0.9	-5.5
O	SEAGATE TECHNOLOGY	48	10	17.88	-2.6	-12.8
O	STORAGE TECH CORP	8	1	1.88	0.1	7.1
O	TANDON CORP	7	1	2.63	0.0	0.0
A	TDC INC	7	3	4.75	0.0	0.0
N	TEKTRONIX INC	41	21	24.88	0.3	1.0
O	TELEVIDEO SYS INC	3	1	1.44	0.1	9.5
O	TELEX CORP	51	30	47.50	-0.6	-1.9
O	WYSE TECH	40	11	19.63	-0.4	-1.9
N	XEROX CORP	69	50	64.38	0.3	0.5
O	XIDEX CORP	16	6	8.00	-0.3	-4.0
	Leasing Companies					
O	CAPITAL ASSOCIATES INTER-NATIONAL INC	11	4	4.63	0.1	2.8
N	COMDISCO INC	37	12	21.13	-0.3	-1.2
O	CONTINENTAL INFO SYS	14	5	7.50	-0.1	-1.8
O	PHOENIX AMERN INC	8	2	3.06	0.1	2.1
O	SELECTERM INC	6	3	4.38	0.0	0.0

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May flowers

Amdahl blossoms; CDC's buds open amid Belzberg report

Spring arrived on Wall Street last week as several leading computer issues bloomed amid a generally stormy and down market. Leading the gainers as of Thursday's close was Amdahl Corp., which rose 3¼ points from a week earlier to 42⅜ on news that it will unveil a series of high-speed mainframes. Control Data Corp. also scored big in the four days of trading; its stock rose 2½ points to 26⅛ after reports circulated that the Belzberg family of Canada has a stake in the disk-drive maker and could be considering a take-over bid.

Other top gainers included Microsoft Corp., up 2½ points to 57; Compaq Computer Corp., up 2¼ points to 53¾; Cray Research, Inc., up 2 points to 86; Computer Associates International, Inc., up 1⅛ points to 26¼; Digital Equipment Corp., up ⅜ of a point to 105¼; Apollo Computer, Inc., up ⅜ of a point to 15½; and Apple Computer, Inc., up ⅜ of a point to 41¾ amid increased analyst revenue expectations. The few industry stocks that fell included IBM, which lost the momentum it had been gaining in the past few weeks and slid 2⅛ points to 111¼, and Ashton-Tate Corp., off 1½ points to 25¾.

JAMES DALY

CDC users overlook takeover threat

BY JEAN S. BOZMAN
CW STAFF

IRVINE, Calif. — As stories of a possible takeover of Control Data Corp. by the Canadian Belzberg family swirled about the firm's Minneapolis headquarters last week, CDC's largest customers — who attended the 48th meeting of the VIM users group here — did not flinch. The Belzbergs, who also tried to take over Ashland Oil, Inc., had amassed about 5% of all CDC shares just in time for the firm's annual meeting Wednesday.

Even as CDC Chairman Robert Price said at the annual meeting, some 2,000 miles away, that his firm "will fight to remain independent," the talk here was of software migrations and product enhancements. The 500 attendees at the VIM meeting were more interested in migrating from CDC's older NOS operating system to NOS/VE.

"We're happy with what we have," said one MIS manager from TRW, Inc., which owns some CDC Cyber 850 and 860 machines that have been running NOS for years.

Even users concerned about CDC's future take a pragmatic approach to CDC's troubles. "We have CDC, Digital Equipment Corp., Cray and IBM," said one manager from an oil company. "If CDC were to go away, we'd still have the other three."

Not fickle

"Most users are incredibly loyal," said Michael L. Dech, director of Tactical Marketing at CDC's Computer Systems Division. "Our challenge now is to reach out to new users for our Cyber 900 series," something that is working well in Europe, South America and Asia, he said.

Last week, though, the focus was on VIM's users, who represent 80% of the CDC mainframe user base in North America. VIM's 300-plus user sites include national research laboratories, universities, utility companies and Fortune 500 engineering divisions.

For the last several years, CDC's mainframe user base has been stable, according to newly elected VIM President Abraham S. Levine, manager of Scientific Computing Center Software Systems at Rockwell International Corp. Utility users are a good example of the trend.

But now, even utility users are feeling pressure to upgrade to the new generation of Cyber 990s, just as Levine's Rockwell MIS group did in late 1986. "The thinking at that time was that if CDC's financial troubles were going to overwhelm it, then we might as well have the latest product," Levine said. "That way, we knew we would get supported on the system, no matter what happened."

VIM's new officers said they are confident that CDC's new management, including emigres from IBM's 3090 mainframe research labs, will be able to grow the customer base and sustain a viable product strategy.

Evenly divided loyalties

CDC's base of Cyber mainframes as of September 1987 indicates a rough parity among government, education and industry segments

INFORMATION PROVIDED BY CONTROL DATA CORP.
CW CHART

Cyber line to reach out

Control Data Corp. previewed a number of additions to its Cyber 930, 960 and 990 mainframe and ETA-10 supercomputer product lines at the VIM users group meeting last week. Among the additions were the following:

- A software tool kit intended to let users of Digital Equipment Corp. VAX systems migrate to Cybers. The NOS/VE Migration Toolkit, priced from $21,500 to $52,500, not including a $3,500 license fee, automatically converts DEC VAX/VMS Fortran programs to NOS/VE Fortran. It also identifies code that cannot be translated to NOS/VE statements. The tool kit supports CDC's interface for Apple Computer, Inc.'s Macintosh.
- The expected porting of the X Window environment to NOS/VE. The addition of X Window to CDC's workstations would open them to dozens of off-the-shelf applications supporting the X Window standard. Introduction is planned for the fourth quarter of this year or the first quarter of 1989, when CDC reportedly will announce Release 1.4.1 of NOS/VE.
- The porting of AT&T's Unix System V to the ETA-10 line of supercomputers. This move, slated for announcement in September, would bring Unix support to the entire range of CDC mainframes and workstations, according to Thomas W. Jones Jr., marketing manager at CDC's ETA Systems, Inc. subsidiary.

JEAN S. BOZMAN

Skewing

FROM PAGE 1

of strategic marketing, acknowledged that the 16 closely coupled Sequent Symmetry S81 processors with 80M bytes of memory yielded the best results: "We established our on-line transaction processing credentials in a big way. More than 100 transactions per second was a breakthrough."

Relational has no results yet for customers wondering what transaction rate they might expect on their VAXs.

Sybase, a vendor that did turn to the popular DEC mid-range machine, actually used two VAXs to conduct its benchmark. Sybase simulated TP-1 transactions with a program running on a VAX 8800, leaving a VAX 8700 free to run only the data base management system.

Marq N. Elliott, director of development for IDMS/SQL, said Cullinet ran both IDMS/SQL and the transaction generator program on a VAX 8550. "We felt it was important to run them on the same machine, more like what our customers are doing," Elliott said.

Benchmark history

Sybase, Relational and Cullinet all based their tests on a transaction established by Tandem Computers, Inc., which published a benchmark of VLX Nonstop SQL a year ago. Widely hailed for its accuracy, the Tandem benchmark refined the only industry standard at the time, a debit/credit benchmark described in an April 1985 *Datamation* article.

As a hardware manufacturer, Tandem wanted to measure an entire system, deriving a hardware-plus-software cost per transaction. Its benchmark was the source of the ET-1 transaction.

Mid-range DBMS vendors were interested only in measuring the performance of their software, so they created a spin-off of the Tandem benchmark, the TP-1 transaction. This was separated from the TP monitor and other subsystem costs foreign to the minicomputer world, Relational's Zornes said.

Weighing in

A key element used by Tandem was scaling — an in-scale reflection of conditions the software would encounter if pressed into service in the real world. For that reason, each transaction per second was supposed to be based on a data base of 100,000 customer accounts.

Cullinet and Relational said they honored that requirement and ran their TP-1 transactions against data bases of one million and 10 million account records, respectively.

Sybase officials said they benchmarked at both 100,000 and one million account records, but their documentation indicates that the VAX 8700 was tested with only the 100,000 accounts. The smaller number would allow a much greater percentage of records to be held in main memory, reducing I/Os.

When Sybase tested one million records on the DEC MicroVax II, throughput was off about 5%. "The more records you use, the slower you'll run," acknowledged Berl Hartman, director of product marketing at Sybase.

"When we loaded 100,000 records into memory, it was bam, bam, bam — we did 500 transactions per second," Zornes said.

Sybase's documentation also indicates that its sustainable transaction rate was lower than the peak 29.3 reported. The steady-state rate was closer to 28 transaction/sec.

Another element of the Tandem benchmark was mirror journaling, or creating two images of the transaction in hardware devices to provide full recovery capability. The mid-range software vendors prefer to drop this standard as well because of its heavy I/O requirement.

When Relational imposed mirror journaling on its benchmark, transaction throughput dropped from 104 to 91. The Tandem Nonstop SQL system processed 208 transaction/sec. with mirror journaling.

Oracle Corp., which is notoriously shy about benchmarking, has yet to make public a TP-1 benchmark. But that did not stop it from casting stones at Sybase.

The Sybase benchmark was conducted using its proprietary Transact SQL, which is not ANSI SQL compatible and "locks you into Sybase forever," said Oracle Chairman Larry Ellison in an April letter to his sales force. Hartman said Sybase's SQL is ANSI-standard compatible in its individual statements.

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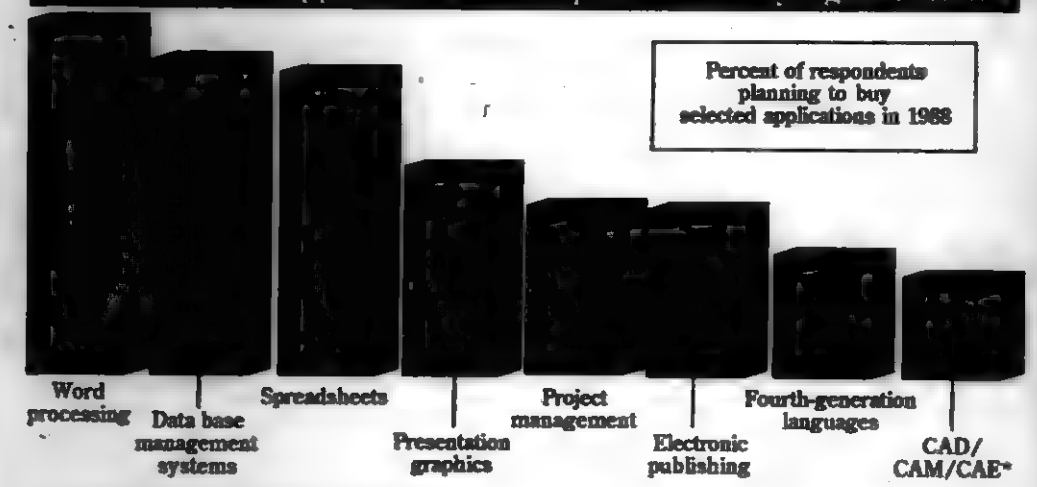
TRENDS

Software applications

Traditional PC applications still top software buying intentions



* Computer-aided design, manufacturing and engineering

When it comes to running today's newest software programs, many MIS managers are embracing personal computers and all but turning their backs on mainframes and departmental systems.

According to figures compiled by The Sierra Group, a Tempe, Ariz., research firm, an overwhelming majority of the software applications purchased this year will have been designed to operate on PCs.

The Sierra Group polled 1,588 users from such vertical markets as finance, insurance, manufacturing and education. Seventy percent of the respondents were MIS managers.

Applications showing the most lopsided PC favoritism included word processing, electronic publishing, project management and graphics presentation software. Of the MIS sites planning to purchase spreadsheets this year, 88% will implement them on PCs, only 19% will have any on departmental systems and just 7% will run them on mainframes.

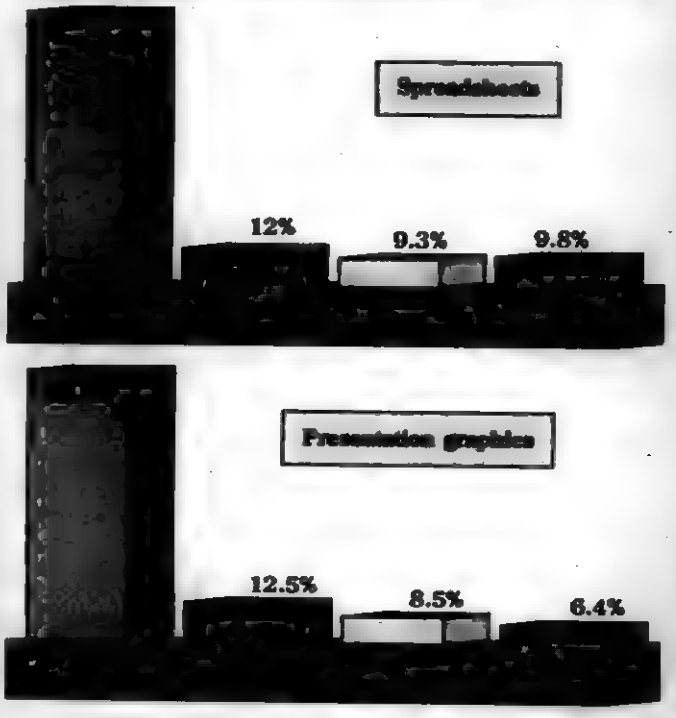
The contrast is even sharper for applications that seem designed more for a PC than a large system. The poll showed that 85% of the sites plan to use graphics presentation software on PCs, while only 13% plan departmental system installations, and only 9% will be plugged into mainframes.

But this does not mean that non-PC hardware is out for the count. Mainframes and departmental systems will be used at least as much as micros for fourth-generation languages, electronic mail and accounting packages.

STEPHEN JONES

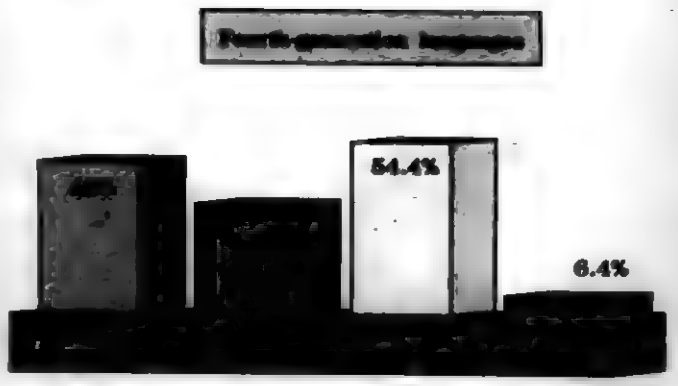
PCs preferred for spreadsheets, graphics

PERCENT OF BUYERS INSTALLING ON EACH PLATFORM



But big systems for development

PERCENT OF BUYERS INSTALLING ON EACH PLATFORM



INFORMATION PROVIDED BY THE SIERRA GROUP
CW CHARTS

INSIDE LINES

Software arts. A preliminary agreement by Tulsa, Okla., software developer MPSI Systems to purchase decision support systems vendor Execucom Systems (see story page 101) has revealed assets that extend beyond the usual hodgepodge of facilities, equipment and installed base. Execucom, based in Austin, Texas, has a collection of Southwest American Indian artifacts purchased by Jerry Wagner, the firm's founder, that is said to be valued at roughly a quarter of a million dollars. The prospective owners are unsure about whether they would keep the collection if the acquisition were concluded.

Now you store it; now you don't. Erasable optical storage — actually, the vendors would now like us to refer to it as "rewritable" — takes one more step toward affordability this week when San Jose, Calif.-based Maxtor Corp. unveils new products. Sources say erasable disk drives will be made commercially available at about half the common sample price of $10,000.

Looking for a few good clone-busters. With its big help-wanted ad in *The Wall Street Journal* last week, it's apparent that IBM wants to hire a slew of patent attorneys for assignments in Burlington, Vt., Raleigh, N.C., Tucson, Ariz., Boca Raton, Fla., and Upstate New York. There's no mention about whether the legal troops will work on protecting the PS/2 patents, but the ad indicates the jobs involve signal processing, computer hardware and software, digital electronic circuits, semiconductors and communications.

Announce and ship the same year? Wow! Lotus is prepping The Application Connection 5.0 for release in the middle of this month. The micro-to-mainframe communications software has been rewritten in C, boasts greater performance and makes individual end users more self-sufficient through a new menu-based feature called The Selection. But do not expect to get the software all at once: It will ship in two sets, one in the third quarter with support for SQL/DS, and the complete system by year's end, a Lotus source said.

Watch out, Manni . . . On *Washingtonian Magazine*'s list of the top salaries in the Washington, D.C., area, Richard L. Earnest, president and CEO of VM Software in nearby Reston, Va., garners 16th spot. His 1987 income was listed as $1,851,843 — not enough to bump Lotus's Jim Manni off the top of *Business Week*'s recent list, but sufficient to place him in the same league as media celebrities Willard Scott, Ted Koppel and Bob Woodward — and well above Bell Atlantic's Thomas Bolger, at $1,267,202, and MCI's Bill McGowan, at $733,653. The magazine also revealed that columnist George Will, who earned $968,167, made a cool $276,000 in 1986 from stock investments in Microsoft, Autodesk, Computer Associates and Sun.

A CASE in point. IBM demonstrated what appeared to be the forerunner of its application development environment at the CASE Expo in Dallas last Thursday, with a repository as its core component. The system employed development software, currently in use in West Germany, emphasized methodology as much as tools and will cover the development life cycle, said Vaughan Merlyn, chairman of CASE Research. Third-party computer-aided software engineering tools, particularly front-end tools, can be integrated into the system.

Zero-percent interest. The hot line was ablaze last week with John Cullinane's vehement denial of a report here earlier that Computer Associates and Cullinet were in takeover talks. Not true, declared Cullinane: The company received only one feeler from Computer Associates and rejected it out of hand. That was one more contact than anybody else was willing to 'fess up to when the story was being pursued a week earlier.

So take heed, industrial giants — when the phone rings, answer it! Better yet, take your message right to the people! Call the hot line at 800-343-6474 or 617-879-0700, and make sure News Editor Pete Bartolik gets the facts out.

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COMPUTERWORLD

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Prime plans to lay off 700 as a work force adjustment after Computervision acquisition. Page 14.

AT&T, MCI resume trading blows with AT&T's latest special rate request. Page 10.

Modern Jazz hits sour note and is delayed indefinitely; meanwhile, Lotus offers utility to eliminate copy protection from existing 1-2-3 versions, the last refuge of the micro software practice. Page 5.

It's inevitable! That's the tag hung on OS/2 at Comdex. Conference coverage on pages 6 and 8.

Floating Point lays off 20% of its work force as losses continue. Page 91.

DEC provides a real-time accelerator for its BI bus systems. Page 15.

Khanna resigns as American Express MIS restructures, jumps to Manufacturers Hanover. Page 2.

RAM chip drought taking toll

BY JAMES A. MARTIN
CW STAFF

ATLANTA — Hewlett-Packard Co. had planned to introduce a desktop Vectra based on the Intel Corp. 80386 chip at Comdex/Spring '88. But the unveiling was postponed indefinitely because of an ongoing concern in the otherwise booming microcomputer industry — the drought in dynamic random-access memory chips.

"We found that we had to use all the dynamic RAMs we could get for our existing products and, as a result, had to hold off on bringing out new ones," explained Michael Fournell, an HP spokesman.

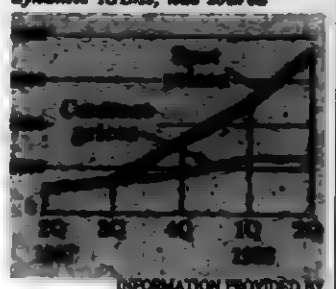
HP is not alone. Apple Computer, Inc. has postponed a rollout of an updated Macintosh SE because of the shortage (see story page 6). Also, Wyse Technology announced that its microcomputer prices must rise 6% to keep up with increased dynamic RAM costs caused by supply-and-demand imbalances.

In addition, end users will likely be affected by the current chip pinch. With the advent of Microsoft Corp. and IBM's OS/2

Continued on page 6

A bit steep

The price of 1M byte of memory, based on top prices for 256K-bit dynamic RAMs, has soared



INFORMATION PROVIDED BY DONALDSON, LUFKIN & JENRETTE, INC.
CW CHART

Unix rebellion leaves users cold

BY ROSEMARY HAMILTON
CW STAFF

When the latest in a series of Unix controversies broke last week, users expressed the following sentiment to their vendors: Knock it off.

The MIS executives were irritated by reports that a group of rebel Unix vendors, including IBM, Digital Equipment Corp., Hewlett-Packard Co. and Apollo Computer, Inc., will announce an alternative to the AT&T-developed operating system this week.

The vendors would neither confirm nor deny that they are involved in such a project. Industry observers said they will present their alternative Tuesday.

Get closer to Posix

Users reacted strongly, suggesting that the vendor rivalries have hurt the market by confusing and distorting the issues. Users said the key issue is for vendors to move toward the emerging IEEE Posix standards, a set of specifications for Unix expected to be released within a month. The other activities — including who controls Unix and who will offer alternatives — are superfluous, users said.

Many Unix vendors, including those fingered as the rebels, said they intend to support Posix.

"When vendors are in this mode — let's call it negotiations — large users like ourselves can have influence," said Jeffrey Alperin, assistant vice-president of corporate technology planning at Aetna Life and Casualty Co.

"If they say 'To hell with AT&T,' then I'm very opposed. I want one standard. We will, in the future, specify standards for our procurement. We vote with our pocketbooks."

Similarly, a General Motors Corp. representative said his company is concerned more with the Posix standard than with the vendors fighting for control. "Posix is where we're headed," said John Williams, a senior manufacturing project engineer at GM and chief of the company's Unix Task Force. "I don't care if they are fighting. We will have our specs, and if they are not going to comply, that's fine."

Williams and other users said they see little gain in establishing an alternative to Unix.

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Fire KOs Chicago networks

Blackened phone lines bring businesses down

BY JEAN S. BOZMAN
CW STAFF

HINSDALE, Ill. — It began on a Sunday afternoon as a small electrical fire in an unattended Illinois Bell central telephone office and switching station in this Chicago suburb. But the fire, which blazed out of control for an hour May 8 — and was not put out for another five — started a chain reaction of telephone and computer breakdowns that crippled telecommunications throughout northern Illinois last week.

Once the smoke had cleared, salvage workers discovered that 35,000 local telephone lines were out of service and 118,000 long-distance fiber circuits had been destroyed. Another 13,000 special circuits, most of them carrying computer-to-computer connections, were also destroyed.

As phone lines went dead, so did terminals tied to computers in business sections throughout the western Chicago suburbs. Hundreds of automated teller

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RITE OF SPRING

Dear diary: A job-seeker's journal

Vivienne Arnold, a second-year MBA candidate at New York University's Graduate School of Business Administration, is looking for a job in MIS. One of the top students in her class, Arnold, 23, has already worked for two years as a programmer/analyst. As she finishes her graduate work, Arnold has jumped into the frenetic world of job hunting, an experience she recorded in a diary for Computerworld.

Of all my first-round interviews, I remember the one with the utility company as the worst.

Upon arriving, I was given a form to fill out. Although I was applying for a management position in MIS, the form included the question, "Can you climb poles?" I got the feeling that this wasn't the place for me.

The question is, Where is that perfect place? How can I get through this lineup of interviews not only impressing the recruiters but finding the job I want? The process is long and sometimes grueling. With a calendar already jammed with classes, my part-time job and schoolwork, fitting in interviews is tough. Often, instead of studying, I have headed to the Career Resource desk to get the annual reports of companies with which I planned to interview.

My own recruiting experience has been somewhat unusual. I already had a bachelor's degree in computer science from Queens College of the City University of New York, and I thought an MBA in MIS would help round out my knowledge, expanding it beyond machines and languages

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New galaxy. Comdex stars included Network Innovations, which showed a pair of diskless workstations; Alpha Software, which demonstrated a program that accepts Dbase III and 1-2-3 formats; and 10Net's 10Net Plus operating system upgrade. Page 6.
Blast-off. Novell enters the next generation with Advanced Netware 2.11 with built-in OS/2 support, slated to ship next week, and promises of an upgraded OS/2 Developers Toolkit. Page 8.

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"If they say 'To hell with AT&T,' then I'm very opposed. I want one standard. We will, in the future, specify standards for our procurement. We vote with our pocketbooks."

JEFFREY ALPERIN
AETNA LIFE AND CASUALTY CO.

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NEWS

Khanna joins CIT

Former American Express exec 'seeks challenge'

BY GLENN RIFKIN
CW STAFF

Kailash Khanna, vice-president of corporate systems and technology at American Express Co. since 1979, has resigned to take on the chief information officer role at Manufacturers Hanover Trust Co. subsidiary The CIT Group, Inc. in Livingston, N.J.

Khanna's departure from American Express, at which he oversaw a huge worldwide information systems operation, was amicable, according to both Khanna and John Laird, American Express senior vice-president and treasurer. Laird said Khanna's position will not be filled.

Observers said American Express is in the midst of a major restructuring of its MIS headquarters operation, a decentralization process that involves giving increasingly more responsibility to the company's individual business units. Khanna said he decided it was time to seek a new challenge.

The power of computers

According to First Boston Corp. analyst Dave Seifer, the restructuring of MIS at American Express reflects increasing pressure on computer services within the company. The data and servicing needs are probably four or five times what they were five years ago, Seifer said, and billings have increased 17% in the past few years as well.

"Simply the size of the problem could be leading to decentralization," Seifer said. "In terms of hardware and software related to the travel and financial services areas, they are way ahead of the competition, but they keep adding new services, such as insurance and warranties, which create additional pressure. . . . So decentralizing makes a lot of sense."

Prior to the decision to decentralize, Khanna coordinated 16 information processing centers,

CIT's Khanna

10 worldwide data and time-sharing networks, more than 85 mainframe systems and more than 400 minicomputer systems supporting 30,000 terminals. American Express is a $17.8 billion company with 85,000 employees worldwide.

Khanna will join CIT, an asset-based financial company with $9 billion in assets and 2,600 employees nationwide. It was acquired by Manufacturers Hanover more than three years ago as a wholly owned subsidiary. Khanna will be responsible for all systems and technology for the CIT group and its business units.

Khanna spent a total of 15 years with Trans World Airlines and American Airlines in a variety of systems and operations research positions prior to joining American Express nine years ago. He said the decision to leave American Express was "wrenching, but this opportunity was too excellent to pass up."

Lottery ware hits jackpot of problems

BY ALAN J. RYAN
CW STAFF

HARTFORD, Conn. — What started out as a smooth transition to its new computer system on Sunday, May 8, turned out to be a jackpot of problems for the Connecticut State Lottery.

The on-line lottery system under contract with General Instrument Corp. in Hunt Valley, Md., was found to have two serious software problems as well as troubles with the reliability of some of its terminals last week.

The problems came to a head when two Hartford businessmen discovered they had a faulty terminal. When they tried to play numbers for a Tuesday drawing after the Monday drawing had taken place, the terminal recorded the transactions as Monday sales, and the men found they were able to buy tickets that had already been picked as winners.

Tuesday, the men, Gilberto Pardo and Jose Rodriguez, went to the lottery office to cash their winning tickets. They then turned their winnings over to lottery officials to alert them to the problem.

The system was shut down after the Tuesday drawing at 8:05 p.m. but went online again at 7 p.m. Wednesday. General Instruments was called in and diagnosed and corrected the faulty software, according to Connecticut State Lottery chief J. Blaine Lewis Jr.

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The Fortune 50 — April 1988*

1. General Motors	18. Atlantic Richfield	35. Goodyear Tire
2. Exxon	19. RJR Nabisco	36. Unisys
3. Ford Motor	20. Boeing	37. 3M
4. IBM	21. Tenneco	38. Digital Equipment
5. Mobil	22. BP America	39. General Dynamics
6. General Electric	23. USX	40. Sara Lee
7. Texaco	24. Dow Chemical	41. Conagra
8. AT&T	25. Eastman Kodak	42. Beatrice
9. E.I. DuPont	26. McDonnell Douglas	43. Sun
10. Chrysler	27. Rockwell International	44. Georgia-Pacific
11. Chevron	28. Allied-Signal	45. ITT
12. Philip Morris	29. Pepsico	46. Unocal
13. Shell Oil	30. Lockheed	47. Anheuser-Busch
14. Amoco	31. Kraft	48. Caterpillar
15. United Technologies	32. Phillips Petroleum	49. Hewlett-Packard
16. Occidental Petroleum	33. Westinghouse Electric	50. Johnson & Johnson
17. Procter & Gamble	34. Xerox	

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Trio vows erasable CDs on the way

BY J. A. SAVAGE
CW STAFF

A technological milepost that has always seemed to be just out of reach may finally be passed this fall when two Japanese companies make erasable optical storage products commercially available.

Last week, Maxtor Corp. announced 5¼- and 3½-in. erasable optical systems with an average 30- and 100-msec seek time, respectively. Write-once read-many optical disks average between 100 and 200 msec.

Sony Corp. has not formally announced its 5¼-in. product but has scheduled shipment of samples to beta-test sites this month. Information distributed to OEMs says average seek time is "less than 90 msec."

Tandy goes public

Last month, Tandy Corp. announced it had developed low-cost erasable compact disk technology that will be made available initially for audio products; a data storage device is not likely until 1991.

Analysts have some reservations about Maxtor's ability to actually produce the sensitive components — the media and heads — on time, but there is confidence in the product. With Sony's entry, analysts said it is more a matter of speeding up its average seek time.

Maxtor's drive has "reportedly the fastest performance in optical drives available," said analyst Bob Katzive at Mountain View, Calif.-based Disk/Trend, Inc. "If they can get into production without hiccups, they will have a good market. If not, it allows an opportunity for other companies to play catch-up," Katzive said.

Sony's 5¼-in. erasable drive, called the SMO-D501, has been out in engineering samples for OEM evaluation since January 1987 and is expected to debut by the fall. While the speed of the optical storage disks allow for rapid retrieval, "the real difference will be in graphics [imaging] use," said Ken Hallam, president of ENDL Associates in San Juan Capistrano, Calif., a consulting firm that specializes in optical storage.

Maxtor was able to reach faster seek times by modifying the algorithms used in Winchester drives, said Gordon Knight, director of Maxtor's optical programs.

One of the reasons the company was able to bring a product to market in such a short time is its incorporation of magneto-optical material, a medium that has been available for a few years combining the erasability of magnetic devices and the capacity of optical.

Tandy's product, however, is delayed far into the future because the company is still developing a polymer material.

"This is not a breakthrough technology," Hallam said. The breakthrough, he explained, will be in transferring the technology to production. "It's switching from the Ph.D.s in white smocks over to the manufacturing guys."

The same magneto-optical material is incorporated in Sony's disks.

A glass substrate will be offered by Maxtor in addition to plastic, apparently aimed at the military market, in which easy destruction of sensitive information is a key concern. "Glass can be destroyed quickly," Hallam said. "You have to do a lot to [destroy] plastic."

In single end-user pricing, Maxtor's 5¼-in. product, dubbed Tahiti, will cost $5,995 for the drive and $250 for the disks. Maxtor's 3½-in. model, known as Fiji, is priced at $1,995 for the drive and $85 for the disk. Sony declined to provide any pricing information.

Lighting up
Erasable optical storage is about to become a commercial reality

Tandy	Laser	5¼ in.	[illegible]	[illegible]	May 1991
Maxtor Tahiti	Magneto-optic	5¼ in.	650M	$5,995	October 1988
Fiji	Magneto-optic	3½ in.	160M	$1,995	October 1988
Sony	Magneto-optic	5¼ in.	600M	NA²	September/ October 1988

¹ Estimated
² Not available

CW CHART

VDT safety bill clears first hurdle

BY JAMES CONNOLLY
CW STAFF

HAUPPAUGE, N.Y. — A bill that could break ground as the nation's first VDT worker-safety law cleared the Suffolk County Legislature here last week.

Supporters of the bill, which was opposed by businesses operating in this eastern N.Y. county, claimed the legislation could serve as a model for municipalities and states throughout the U.S. The bill will become law if it is signed by Suffolk County Executive Patrick G. Halpin, who has supported VDT safety proposals in the past.

The proposal calls for private businesses with 20 or more terminals to provide ergonomic furniture, special lighting, detachable keyboards and eye care for workers who spend more than 26 hours per week using a VDT.

"I think it's an excellent first step. There are a few other things we would like to see in it, but I think it is an excellent place to begin," said Sharon Danann, research director for Cleveland-based 9-to-5, the National Association of Working Women.

But Mitchell Pally, director of legislative and economic affairs for the business organization known as the Long Island Association, said his group opposed the bill as being "antibusiness." He said it is inflexible because it requires use of what is now considered ergonomic equipment in favor of what might be better equipment that could be introduced at any time. He had proposed a business-sponsored educational program as an alternative.

Assumed guilt?

Pally added, "No connection had to be shown between the use of VDTs and the need for eye exams or glasses. It assumes that if someone needs an eye exam or glasses, that it is because they work on a VDT." He also said the law could cause labor problems for companies that are unable to give exempt workers — those using VDTs for less than 26 hours — the same benefits as those covered by the law.

Danann said her organization would have liked to have seen the law include protection of jobs or transfers for workers with proven VDT-type injuries or strains in addition to transfer protection for pregnant workers.

The bill was sponsored by legislator John J. Foley. A spokesman for Foley said the ergonomic portion of the law could take effect Jan. 1, 1990, with eye care and educational portions becoming effective 60 days after the law is enacted.

The bill calls for use of adjustable chairs and antiglare shields for VDT screens and parabolic louvers or polarizing filters for overhead lights. The eye care provision requires employers to cover 80% of the cost of an employee's annual eye examination and any necessary corrective lenses and frames. The legislation includes a provision that the standards be reviewed every two years.

MAP support in pipeline

BY JEAN S. BOZMAN
CW STAFF

SEATTLE — The large corporate users that pushed the MAP standard — General Motors Corp., The Boeing Co. and Deere & Co. — were rewarded last week with the promise of Manufacturing Automation Protocol 3.0 support in at least some vendors' products within six months of the Enterprise Networking Event (ENE), to be held next month in Baltimore.

That promise was delivered last week by Michael Canepa, director of distributed systems marketing at Honeywell Bull, Inc., during a national videoconference linking Seattle, San Francisco, Washington, D.C., and Moline, Ill., site of Deere's headquarters.

"We expect to be installing MAP 3.0 products in the late fall," said Canepa, who represented ENE computer vendors at the MAP/TOP Users Group videoconference. The MAP/TOP group is sponsoring ENE to focus on strategies for enterprisewide reporting, with an emphasis on the state of the art of MAP.

Canepa said he could not speak directly for other ENE vendors, such as Digital Equipment Corp., IBM and AT&T, but added: "Some of the vendors would like to tweak their MAP 3.0 products some more, because they haven't reached their top levels of performance." Still, he predicted that MAP 3.0 products will be widely available by the end of the year.

The MAP 3.0 standard, which became stable in April 1987, will be frozen for six years so that vendors can standardize on it, according to Mike Kaminski, manager of GM's MAP program. But Kaminski did not rule out changes or extensions to MAP 3.0. "We did not say that we would prevent upward and downward compatibility features from being added to it."

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Modern Jazz delayed again

Holdup threatens Lotus's re-entry into Mac market

BY DOUGLAS BARNEY
CW STAFF

CAMBRIDGE, Mass. — The development delays that have plagued a number of Lotus Development Corp. products now threaten the firm's re-entry into the Macintosh market. The latest casualty is Modern Jazz, which had been scheduled to ship later this month.

Modern Jazz, the successor to the firm's earlier Jazz integrated package, which hit a sour note with customers, has been beset by a series of delays. It was announced in March 1987 and was originally scheduled to ship last summer. The holdups have hurt Lotus's efforts to gain market share in the Apple Computer, Inc. Macintosh arena, which is dominated by Microsoft Corp.'s Excel.

Recently, the Modern Jazz project received a stern review from Frank King, senior vice-president of Lotus's Software Products Group. As a result, a number of bugs were detected, and Lotus decided to postpone shipment.

The firm has not yet decided on a revised schedule, Lotus spokeswoman Pam Cay said.

The original Jazz package was overshadowed by Excel, which included macros allowing for automation of commonly used procedures.

List of characteristics

Modern Jazz is supposed to feature its own macro language, a faster spreadsheet and an added-forms module. In addition, spreadsheets will be linked, a feature also planned for Lotus's 1-2-3 Release 3.0 for the IBM Personal Computer.

The product's communications module will reportedly also be able to directly import both 1-2-3 and Symphony files, avoiding the file translation required for the existing version of Jazz.

According to one user, there is not a lot of pent-up demand for Modern Jazz, even from current Jazz users. "I haven't seen any requests," said C. Thomas Hendrix, manager of information services at Aluminum Company of America.

That nonchalance may change if Modern Jazz lives up to Lotus's promises, as many users say they will at least give the product a shot.

"We will take a look at Modern Jazz, but it will have to have a 2-to-1 price/performance advantage over Excel," said Tim Turnpaugh, executive vice-president and manager of the operations group at Seafirst Corp.

Seafirst opted for Excel over Jazz because of Excel's macros, price, graphics, keystroke recorder and intelligent recalculation capability, Turnpaugh said.

Lotus removes 1-2-3 protection

BY DOUGLAS BARNEY
CW STAFF

CAMBRIDGE, Mass. — The last major vestige of software copy protection vanished last week when Lotus Development Corp. announced a utility disk that will remove the dreaded protection from its popular 1-2-3 spreadsheet.

In addition to stripping protection, Lotus has tossed in utilities that speed calculations, record macros and provide support for Adobe Systems, Inc.'s Postscript page description language and high-resolution graphics. Lotus will also offer six months of free software support.

The disk, dubbed Value Pack, costs $15 and is available directly from the company or through Lotus dealers later this month.

A single disk, however, can remove protection from multiple copies of 1-2-3 and can also upgrade a number of users to the new features of Value Pack, said Chris Randles, senior product marketing manager for 1-2-3. "They are allowed to copy it internally. It is not restricted," Randles said. Value Pack is only available for the current product release and not for the original 1-2-3 Release 1.

Copy protection has been the bane of many MIS professionals who were commonly forced to go back to the vendor to replace software lost because of disk crashes, spilled coffee or wear and tear.

Most often, the backup disk provided by firms such as Lotus would allow the user to get back up and running. But frequently, the backup would refuse to function. Meanwhile, frustrated users were suspended in a sort of software limbo.

"I have seen cases where the backup just doesn't work," explained C. Thomas Hendrix, manager of information services at Aluminum Company of America. Hendrix applauded Lotus's decision to strip protection from its current release of 1-2-3, allowing users to create multiple backups. Prior to last week's announcement, Lotus had detailed plans to dump copy protection when 1-2-3 Release 3.0 shipped, an event originally slated for early this year. The firm had not announced plans to remove protection from its current version of 1-2-3.

Lotus was the last holdout among the major software vendors. Last year, Microsoft Corp. and Ashton-Tate Corp. completed the phaseout of protection.

OS/2 push steals Comdex show

BY ED SCANNELL
CW STAFF

ATLANTA — In what was the center of attention for many of the 50,000 attendees at last week's Comdex/Spring '88 show here, IBM and Microsoft Corp. had more than 70 developers showing off their OS/2-compatible applications.

While 130 applications were demonstrated at the show, only 60 are currently shipping. But the key applications that figure to entrench OS/2 in corporate America are not scheduled to be available until late this year or early 1989.

Many vendors in the IBM-Microsoft booth were optimistic about their chances in the OS/2-compatible market as corporate customers at the show told them that migrating from DOS to OS/2 was an inevitability.

Booth, taxes and OS/2

"Customers have been telling us it's inevitable that they'll go to OS/2," said Kevin Crenshaw, director of OS/2 development at Wordperfect Corp. "OS/2 is flexible; it was written to be easily changed."

But Wordperfect will not have a compatible version of its best-selling word processor available until late this year, according to Crenshaw. Likewise, Lotus Development Corp.'s 1-2-3 Release 3.0 also will not be available until the fourth quarter.

"Application tools like [1-2-3 Release 3.0] should create demand for OS/2," said Chuck Sullivan, a marketing support specialist at Lotus.

ALAN S. WEINER/GAMMA-LIAISON

Curious users *flocked to OS/2 booth.*

Most developers last week said they expected only about 10% to 15% of their existing customers to move to an OS/2 version one year after those products become available.

One reason movement toward OS/2 and compatible applications will be slow is the ongoing scarcity of memory chips and their skyrocketing cost during the last few months (see story page 1). Microsoft Chairman Bill Gates, however, said he does not think the shortage will severely affect OS/2 applications development.

"It might have a minor impact over this calendar year, but eventually [chip manufacturers] will catch up in early 1989. I don't think it will have a measurable impact on OS/2 development," Gates said.

And though there were 70 developers showing OS/2-compatible applications at Comdex, only two were showing works-in-progress that ran under Microsoft's Presentation Manager. Those developers, Aldus and Micrografx, Inc., are not expected to have compatible applications available until very late this year, at the earliest.

Rollout sleigh chock-full

ATLANTA — While there was a lack of blockbuster announcements from major players at last week's Comdex/Spring '88, the 700 or so vendors attending announced hundreds of new products and enhancements to existing ones.

Alpha Software Corp. demonstrated a five-function program that directly accepts Ashton-Tate Corp. Dbase III and Lotus Development Corp. 1-2-3 data formats. Called Alphaworks, the $195 program integrates word processing, data base, spreadsheet, graphics and communications functions. The program also contains a spell-checker and thesaurus.

The program works with **Hyundai Electronics America's** desktop messaging product, The Intelligent Phone System, also formally announced at last week's show [CW, May 2]. The system will be bundled with Alphaworks.

10Net Communications upgraded the performance and capabilities of its network operating system with the introduction of 10Net Plus, which integrates **Consumers Software, Inc.'s** Network Courier electronic mail package. An IBM Personal System/2 version will sell for $695 per node, and a fiber-optic configuration will go for $895 per node.

Universal Data Systems, Inc. enhanced its line of modems with the Sync-Up V.32, an internal plug-in modem for the IBM Personal Computer, capable of full-duplex 9.6K bit/sec. on two-wire dial-up lines, and the Sync-Up V.22 bis/2, an IBM PS/2-compatible plug-in modem that allows full autodialing in both asynchronous and synchronous modes.

Brighton Development announced that its Netmanager and Netremote products will support **Banyan Systems, Inc.'s** Virtual Networking Software, or Vines, networks. Netremote allows network users to access any PC on a local-area network, and Netmanager expands the capabilities of Netremote to include data base management functions. Both versions are scheduled to ship by July 1.

Networking manufacturer **Gateway Communications, Inc.** announced a high-speed G/X25 Gateway wide-area networking product for any LAN using Novell, Inc.'s Netware. The product is an enhanced version of the gateway portion of the G/X25 Gateway and Bridge and will sell for $1,695.

RAM chips

FROM PAGE 1

comes the need for more RAM. Some said that at least 3M or 4M bytes are needed to take full advantage of the new operating system. With too few mainstream applications available for OS/2, end-user memory costs of $750 to $1,000 per megabyte are difficult to justify, according to analysts.

Dynamic RAM prices have skyrocketed in recent months. During the second quarter of 1987, for example, spot pricing per chip for 256K-bit dynamic RAM was less than $2, but rose to $4 to $5 by the fourth quarter and is now running from $8 to $12, according to Drew Peck, a semiconductor analyst at Donaldson, Lufkin & Jenrette, Inc. in New York.

Spot pricing is the price paid for quantities usually less than 100 and is typical of the cost smaller computer makers must pay when unable to negotiate a contract in advance with a dynamic RAM supplier.

Spot prices for 1M-bit dynamic RAM chips have ballooned as well. Currently, prices per chip range anywhere from $20 to $60 and, in some cases, up to $80 to $90, according to a spokesman for Micron Technology, Inc.

Efforts are under way to ease the situation, however. Dynamic RAM manufacturers are beginning to ramp up manufacturing capabilities to meet demand as well as to refocus efforts on 1M-bit chips.

"We are at the peak of the shortage now, and the results of production increases will probably start showing up at any time," said Howard Dicken, president of DM Data, Inc., a semiconductor consulting firm in Scottsdale, Ariz. There will not be any dynamic RAM surplus by year's end, and market prices will still be inflated, Dicken added, but the chips will at least be more plentiful.

The problem lies in manufacturing, observers said. Dynamic RAM makers are in a transition, with most moving away from manufacturing the current generation of 256K-bit chips in favor of 1M-bit silicon. Meanwhile, demand for microcomputers has increased dramatically in the last year.

Less than two years ago, offshore manufacturers were flooding American shores with low-cost dynamic RAM chips. The flow dried to a trickle once the Reagan administration blasted Japan for pricing American manufacturers out of the market and forced an anti-dumping agreement on Japan chip makers.

'Ill-conceived'

"That agreement was ill-conceived," Peck said. "Instead of Japanese chip makers supplying the U.S. market with dynamic RAMs at reasonable prices, they cut their supply down, and prices rose." It was the semiconductor industry that pressured the Reagan administration to take protectionist action, however.

Prior to the agreement, many American chip manufacturers abandoned the dynamic RAM market to the Japanese, unable to compete on price. Currently, Texas Instruments, Inc. and Micron are the only American dynamic RAM manufacturers.

Despite some glum forecasts for the months to come, there are signs of encouragement. Beginning later this year, some makers will begin shipping 4M-bit dynamic RAM chips in production quantities. Toshiba Corp., TI, Hitachi Ltd., Micron and others are developing 4M-bit production capabilities for the open market, while IBM is readying a 4M-bit supply for its own Personal Computers and Personal System/2 line.

Chip shortage waylays Mac SE

BY JULIE PITTA
CW STAFF

A new version of the Macintosh personal computer has been delayed indefinitely as Apple Computer, Inc. struggles with a shortage of memory chips.

According to sources, an upgraded model of the Motorola, Inc. 68000-based Apple Macintosh SE, with more memory and a 40M-byte hard disk drive, was to be unveiled earlier this year. The Macintosh SE was introduced slightly more than a year ago. However, a widespread shortage of dynamic random-access memory chips postponed its debut.

Apple officials declined to comment on the postponement but conceded that the dynamic RAM scarcity is serious. Last week, Apple raised prices of its memory expansion kits for the Macintosh and its Laserwriter II NTX printer as a consequence of significant increases in memory costs.

The price of the Mac 2M-byte memory expansion kit was hiked from $599 to $849, while the 1M-byte kit's cost was increased from $249 to $349. Apple also raised the price of the 4M-byte memory expansion kit for the Laserwriter II NTX from $1,199 to $1,699.

Several corporate buyers expressed frustration with the shortage. "No matter how much RAM we ask for on the Macintoshes we order, we get 1M byte," said Jim Hayes, a vice-president at Seafirst Corp., a Bankamerica Corp. subsidiary.

Richard Webb, a partner at Peat Marwick, Main & Co., said his firm has been unable to buy Macintoshes with the 2.5M bytes of RAM it desires.

Michael Cromar, director of information resources at American President Companies Ltd., said he has been requesting Motorola 68020-based Mac IIs with 5M bytes of RAM and Mac SEs with 3M bytes of RAM but has been unable to acquire them.

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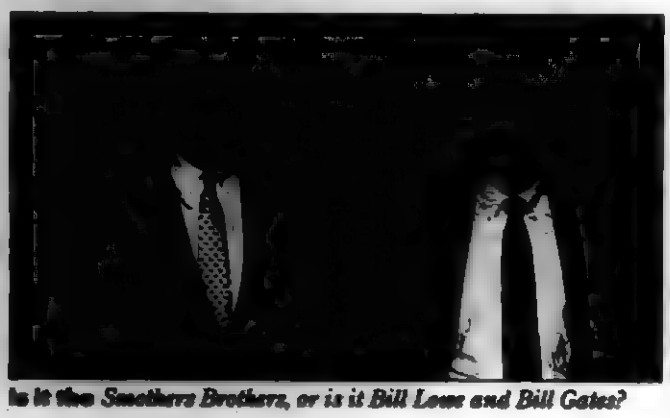
COMDEX NOTEBOOK

Debuts and plans made down in the sunny South

The inability of the World Congress Center (WCC) and Atlanta Apparel Mart to accommodate the ever-swelling number of Comdex/Spring '88 exhibitors and attendees means that next year's show will relocate to Chicago, according to Sheldon Adelson, head of the Interface Group, Inc., which is sponsoring the show. But Adelson also expressed "the utmost confidence" that plans for the WCC's expansion will be met and that the show will return to the capital of sunny Georgia by the spring of 1990.



Is it the Smothers Brothers, or is it Bill Lowe and Bill Gates?

IBM staged a flashy party at the WCC to honor 52 developers that have shipped OS/2 applications. The bash was iced by a spirited performance by Gladys Knight and the Pips. Before the funk, however, partiers sat through a hokey routine by ex-*M*A*S*H* actors as well as some wooden joke-telling between Microsoft Corp. Chairman Bill Gates and Bill Lowe, the head of IBM's Entry Systems Division.

Although Novell, Inc. insists that Netware compatibility for Apple Computer, Inc.'s Macintosh still tops its "to do" list, Vice-President of Marketing Mark Calkins revealed that support for Sun Microsystems, Inc.'s Network File System will be announced "within a year."

Waterloo Microsystems, Inc.'s plan to introduce a set of local-area network productivity tools fell through when final details between Waterloo and an unnamed partner suddenly hit rough sledding. A spokesman said the firm will try to have the products ready in time for the upcoming PC Expo, to be held late next month in New York.

Fiber-optic transmission speeds and reduced instruction set computing may be mind bogglers, but they pale compared with a tall blond woman dressed as an Amazon. Computer graphics software maker Sphere, Inc. drew loose-jawed MIS executives to its corner of the show floor with Dondra, a flesh-and-blood rendition of the scantly clad sword-bearing character from one of the company's computer games. But Dondra's appeal was decidedly not universal. "Some people will do anything for money," one show-goer said.

While Zenith Data Systems and Mitsubishi Electronics America, Inc. were showing off black-on-white screen technology for laptops, Hitachi America Ltd. was quietly showing a prototype of a 16-color LCD. The display offers 640- by 200-pixel resolution in a 6.3-in. screen but is not slated to be available for 12 to 18 months, according to a spokesman. The color screen was attached to Hitachi's B16 LX, an Intel Corp. 80286-based laptop currently sold only in Japan.

Also on the laptop front, Comdex attendees speculated that IBM will unveil its 286 Convertible June 2. The 286 will be virtually identical to the 286 laptop that IBM sells in Japan, which features a black-on-white screen and 10-MHz speed. The price is expected to be slightly more than the $4,600 Japanese model.

IBM's Mike Maples noted that Named Pipes is high on the company's priority list, although IBM is not ready to say which ones it will support. In the recent past, Maples has been quoted as saying the subject was relatively unimportant in comparison with other issues. Lee Reiswig, who oversees IBM's OS/2 Extended Edition project, said Named Pipes is not a critical issue, but it is one he places in a category of things the company could do that "could potentially enhance OS/2 [Extended Edition]." Reiswig also said there is a long list of things in that category. IBM is carefully examining its options there and only then will make its decision, he said.

Contributions by James Daly, Ed Scannell and James Martin.

Starlan revved, but too late?

BY JAMES DALY
CW STAFF

ATLANTA — Speedier versions of AT&T's Starlan local-area network and its network operating software created a wave of more than 50 product introductions and enhancements unleashed by the telecommunications giant last week at Comdex/Spring '88.

At the core of the additions to the firm's hardware, software and data networking products was the Starlan 10 network, a 10M bit/sec. Ethernet network that offers users a choice of unshielded twisted-pair wiring, coaxial cable or fiber optics.

AT&T will aim Starlan 10 at companies with a need for high-speed networking — such as users with intensive data base management requirements — when the system becomes available in September.

AT&T also took the wraps off an enhanced version of its Starlan operating system software. Starlan Network 3.0 improves LAN performance up to 50%, an AT&T executive claimed.

But the introductions have already drawn fire from some industry analysts who said AT&T's efforts to beef up Starlan are a case of too little too late.

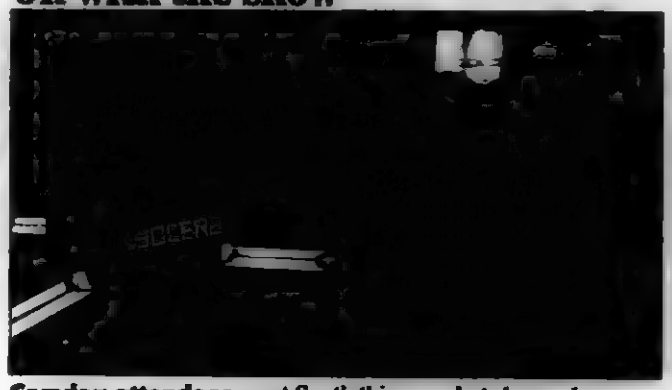
Watching the world go by

"The market has passed them by," said Thomas White, president of Infonetics, a market research firm in Santa Clara, Calif. He said that AT&T lost its only real advantage — networks that use telephone cabling.

White said that token-ring technology, which was introduced after Starlan, holds 30% of today's LAN market. High-speed Ethernet has a 50% share, followed by Arcnet, which still enjoys a large following. "So why [does AT&T] bother? Who cares?" White added.

Also announced at the show was Information Systems Network Release 5.0, which reportedly allows users to bridge geographically dispersed Starlan and Starlan 10 nets.

On with the show



Comdex attendees went South this year, but sheer volume will force the show to move to the Windy City next spring.

Novell fills in OS/2 support

BY JAMES DALY
CW STAFF

ATLANTA — Novell, Inc. unveiled its largest array yet of OS/2 transition support for its Netware network operating system users last week at Comdex/Spring '88.

The firm announced that Advanced Netware Version 2.11 — a local-area network operating system designed for up to 100 concurrent users — will ship next week with built-in OS/2 support.

Additionally, the Provo, Utah, firm said its OS/2 support base will be further expanded by the fourth quarter, when Nondedicated Netware for OS/2 will be included in Advanced Netware and the entry-level ELS Netware Level II.

Also planned are two upgrades to its OS/2 Developer's Toolkit, which shipped in February with the Netware Requester, a device that allows OS/2 to run on Netware LANs.

Novell also released the AT-terminal, which marks the firm's first diskless workstation for Netware Ethernet networks. It is said to autoboot DOS from the shared file server and is slated to be available in June for $1,595.

In addition, the firm unveiled the NE2000 LAN adapter, a 16-bit Ethernet adapter designed as a high-performance file server card for Netware Version 2.0A and higher. It will be available in July for $495.

Compaq, Apple clinch honors in CW awards

Compaq Computer Corp.'s 386/20 captured Best Microcomputer honors, and Apple Computer, Inc.'s Hypercard walked away with Most Innovative New Software Product last week in *Computerworld*'s Annual Microcomputer Awards.

The 386/20 was the choice of 37% of the nearly 1,000 readers who voted, handily besting out Apple's Macintosh II and IBM's Personal System/2 Model 80. Hypercard rolled up 21% of the votes, besting Microsoft Corp.'s PC Excel and OS/2 in second and third place, respectively.

Other winners included the following:

- Best Laptop/Portable Computer: Toshiba America, Inc.'s T5100.
- Best Local-Area Network Product: Novell, Inc.'s Netware 386A File Server.
- Most Useful Micro-to-Mainframe Link Product: Digital Communications Associates, Inc.'s Irma 2.
- Best PC Expansion Board: Plus Development Corp.'s Hardcard 40M-byte version and Intel Corp.'s Inboard 386.

Michael Martin of Westfork Consulting in Bedford, Texas, won a copy of Lotus Development Corp.'s 1-2-3 Release 3.

PHOTO BY ALAN B. WEINER/GAMMA-LIAISON

Recipients of Computerworld's Annual Microcomputer Awards (left to right): Compaq's Rose Cooley, Plus Development's Ray Woodcock, Apple's Joe Schoendorf, Toshiba America's John Rakfeld, Toshiba Corp.'s Tetsuya Misaguchi, Digital Communications' Douglas Lifton, Intel's Suzanne Seigneur, Novell's Fred Garcia.

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AT&T hung up on MCI discounts

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — AT&T and MCI Communications Corp. resumed their bitter rivalry last week when AT&T asked federal regulators for permission to fight MCI's pricing tactics with its own discount plans for specific business customers.

AT&T said the proposal, filed with the Federal Communications Commission as Tariff 15, would give it the flexibility to offer special rate plans to individual customers who have been offered discounts by competing long-distance carriers. A spokeswoman said Tariff 15 could apply to voice or data services.

"If other carriers have the freedom to offer special discounts, AT&T must have the same freedom," said Larry Garfinkel, AT&T's vice-president of marketing services, in a statement accompanying the filing.

The proposal is a dramatic departure from ordinary AT&T tariffs, which establish standard rates for all customers to prevent discrimination. It will give the FCC a new opportunity to decide how much freedom it is willing to give AT&T in competing for business contracts.

Also pending before the FCC is an investigation of AT&T's controversial Tariff 12, which allows the carrier to offer custom-designed networks to specific customers such as Du Pont Co., General Electric Co. and Ford Motor Co.

"If Tariff 12 had to be investigated by the FCC due to concerns about discrimination, then this scheme, which is even worse, has to be rejected," MCI said.

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FCC opens lid on price caps

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The Federal Communications Commission last week put some meat on the bare bones of its proposal for using price caps instead of profit ceilings to regulate AT&T and local exchange carriers.

The proposed regulatory scheme would start with carrier rates at current levels and then place an annual cap on rate increases. The price cap would be based on a formula of the inflation rate minus 3%.

In other words, inflation-adjusted rates would be cut 3% a year to reflect the FCC's expectation that the carriers will boost productivity and cut costs under the new regime.

Different calculation

Brian R. Moir, counsel to the International Communications Association, expressed concern that the baseline will be existing rates, because business users consider the telephone companies' so-called strategic pricing plans grossly inflated above costs. He argued that the price-cap formula for local carriers should be inflation minus 7%.

The FCC proposal will be subjected to 60 days of public comments as well as scrutiny by the U.S. Congress, which has been skeptical of the plan since it was first sketched out last August.

The search for an alternative to rate-of-return regulation is based on the contention that the approach gives carriers an incentive to inflate costs and subsidize unregulated ventures.

Other details of the price cap proposal include the following:

- One price cap index would be calculated for a basket of switched network services, and a separate index would be calculated for private-line services. The FCC envisions the price caps beginning April 1, 1989.
- Individual services would be subject to a price band, allowing them to fluctuate no more than 5%.
- AT&T's controversial Tariff 12, offering custom-designed networks for big business customers, would not be included in the price caps.

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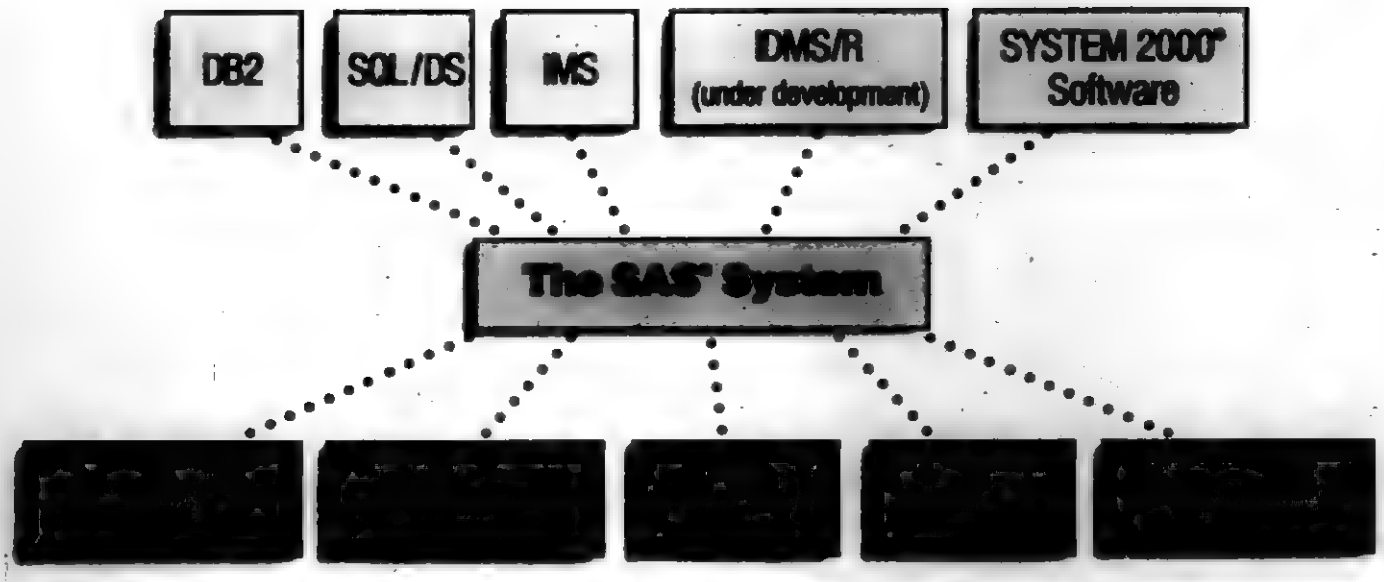

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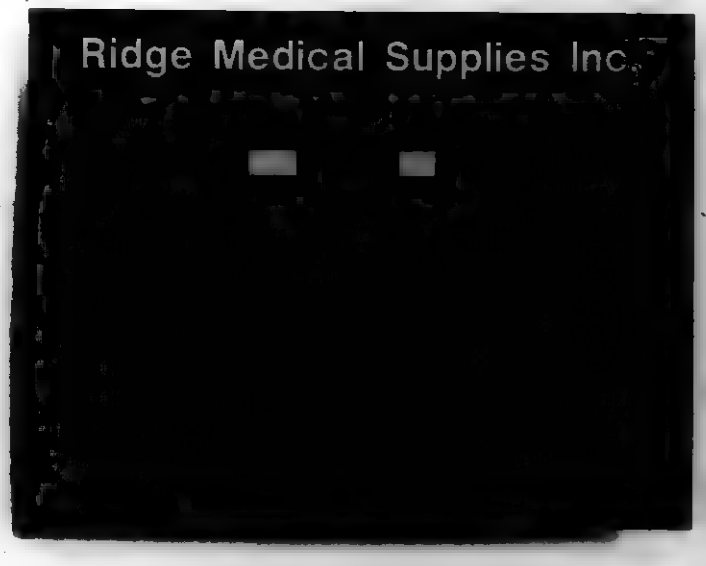

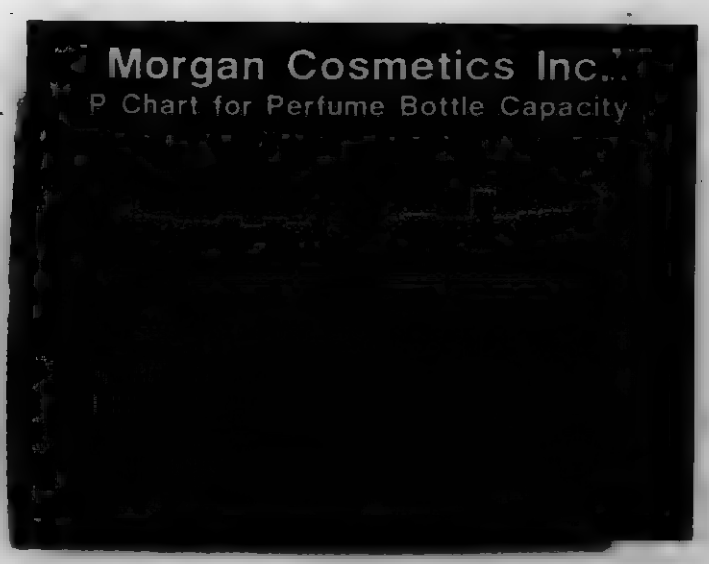

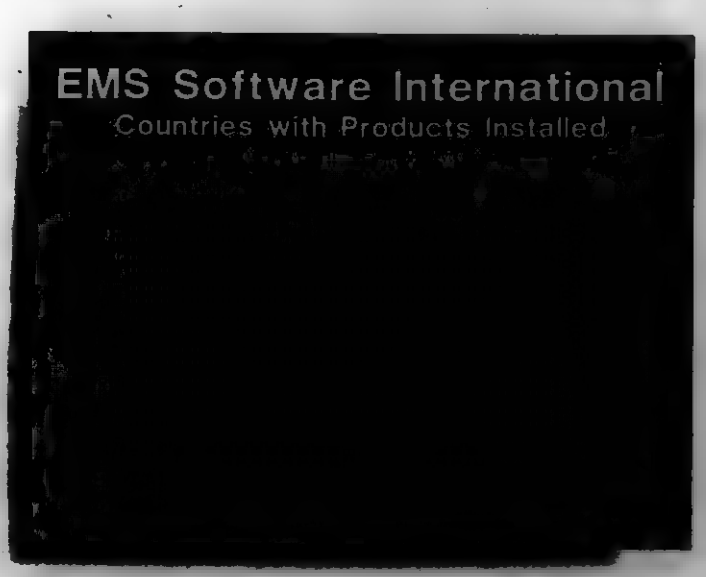

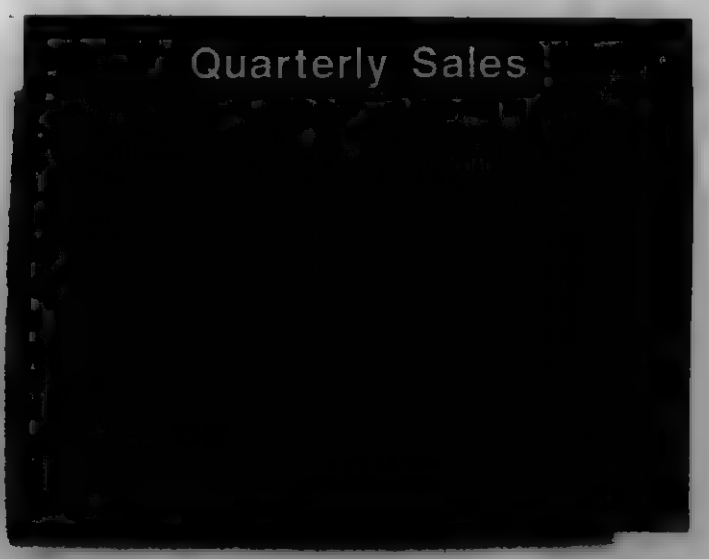

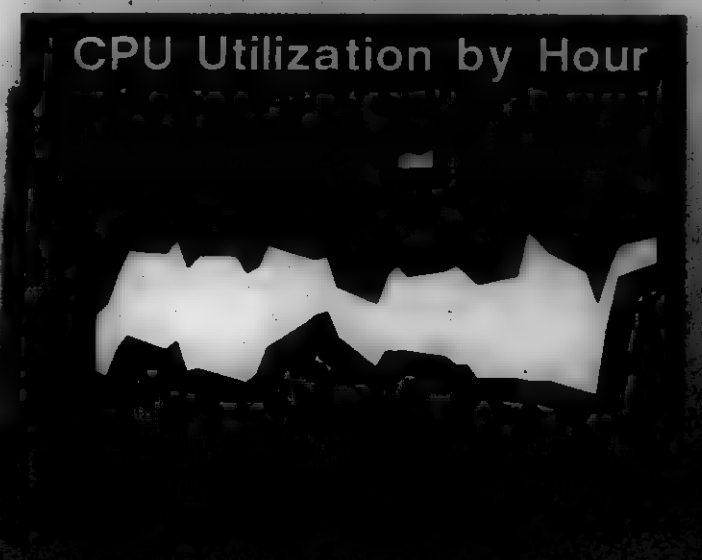

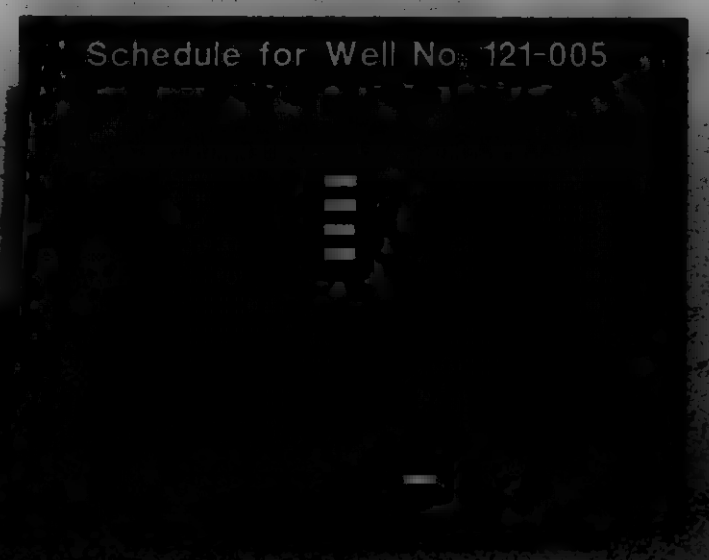

Prime to slash work force by 700

BY NELL MARGOLIS
CW STAFF

NATICK, Mass. — Rumors of an impending massive layoff at Prime Computer, Inc. jelled into fact last week as the company announced the elimination of 700 positions, largely in the manufacturing area.

The Prime cuts, which will reduce the company's approximately 13,500-employee work force by 5%, will cure operational and manufacturing redundancies resulting from Prime's merger last winter with Computervision Corp., the Bedford, Mass.-based computer-aided design and manufacturing player, according to a Prime spokesman.

Direct sales jobs are not among the 700 cuts, he said. "If anything, we may even increase direct sales." Research and development is also expected to remain unaffected.

Market analysts viewed the move as a healthy one in terms of Prime's cost structure and called it inevitable in the wake of the merger with Computervision, a hostile takeover that cost Prime $435 million.

While the dispensable positions have been targeted, no one has been laid off yet, the Prime spokesman said. The actual elimination, scheduled to take place during the balance of the year, will affect both the Prime and Computervision divisions. "There isn't any victor-and-vanquished mentality governing this," he said.

Several analysts, however, speculated that the reduction will take its greatest toll from the Computervision ranks, "which were pretty manufacturing-heavy even before the acquisition," according to Martin Reisinger, an analyst at Duff & Phelps, Inc. in Chicago.

Prime said it will relocate employees to other posts within the company wherever possible and provide counseling, outplacement services and severance packages.

TI unveils VT220 unit

BY STANLEY GIBSON
CW STAFF

TEMPLE, Texas — Texas Instruments, Inc. announced last week what it claimed to be the first laptop terminal that is plug-compatible with the Digital Equipment Corp. VT220 terminal.

The Travelmate LT220 terminal uses a 25-line LCD screen, weighs less than five pounds and can be powered by batteries or by connecting to an electrical outlet.

Laptop portables from several manufacturers currently offer VT220 emulation, but the Travelmate LT220 will be less expensive and easier to operate for users requiring only the terminal function, according to Randy Bustos, TI marketing manager.

The Travelmate LT220 is priced at $899. Built-in modems, operating at either 1,200K bit/sec. or 2,400K bit/sec., are priced at $299 and $399, respectively. A backlighting option costs $200.

The laptop can attach to a printer "cradle," an optional portable assembly that can also include a numerical keypad. Either a thermal or ink-jet printer is offered, each costing $549. The cradle with a printer and a keypad is priced at $599.

The laptop can be changed to offer emulation for different kinds of terminals by changing an erasable programmable read-only memory chip, according to Bustos.

Thus, a large user, buying a number of terminals, might want to customize them, he said.

The terminal can contain up to 64K bytes of internal random-access memory in 32K-byte units, priced at $49 each. Additional memory is available on credit-card-size plug-in cards.

The Travelmate LT220 is scheduled to ship at the end of June.

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Enhanced AST-5251/11 Plus™ has captured the attention of the industry with its emphasis on features. Features like: seven concurrent display/printer sessions,

DEC fleshes out real-time line

BY STANLEY GIBSON
CW STAFF

MARLBORO, Mass. — Digital Equipment Corp. bolstered its real-time computing offerings last week, introducing a real-time accelerator for its VAXBI-based systems and three real-time versions of its Microvax 3000 series processors.

The VAX Realtime Accelerator, also known as VAX RTA, for systems using the VAXBI bus can turn BI systems, including the recently introduced VAX 8800 and 6200 series of symmetrical multiprocessing systems, into real-time systems.

"Originally, you had to develop a real-time application on a separate VAX system, then you would have to port that over to a real-time system running VAX-ELN to communicate with shop floor devices. Now, with a BI-based system, you can do it all on one system," explained Stephen Widen, a DEC analyst at International Data Corp. in Framingham, Mass.

The previous DEC real-time offerings were Q-bus-based and ran only real-time applications under VAXELN, DEC's real-time operating environment. They did not run VMS as well, as will BI-based systems with a VAX RTA coprocessor.

DEC cut prices on its previous systems — the RT VAX 1000, the IVAX 620 system for industrial applications and the KA620 single-board computer — by up to 40%. Those systems are all based on the Microvax II.

DEC also introduced VAX-ELN Version 3.1, which allows memory to be addressed as a virtual disk.

The VAX RTA hardware is priced at $7,500. Up to five optional 2M-byte memory boards are priced at $2,500 each. The VAXELN Version 3.1 license is priced from $4,920 to $14,760, depending on the system in which the RTA is used.

RT VAX 3000 series machines — the RT VAX 3200, 3500 and 3600 — come bundled with VAXELN. All systems come standard with 8M bytes of main memory. The RT VAX 3200 can be expanded to 16M bytes, and the RT VAX 3500 and 3600 can be expanded to 32M bytes.

The RT VAX 3200 is priced at $18,950, the RT VAX 3500 at $24,000 and the RT VAX 3600 at $65,000. All the products are slated to be available in June.

DEC, Compaq agree to deal

MAYNARD, Mass. — Digital Equipment Corp. signed a technology exchange and support agreement with Compaq Computer Corp. last week.

While acknowledging that Compaq computers already work in the Decnet environment, DEC asserted that it will complete a certification program for Compaq equipment within 30 days.

In addition, DEC pledged to provide nonwarranty service for Compaq products within DEC-based networks.

Beyond formalizing DEC support for the large and growing Compaq population at DEC user sites, the agreement also allows the two vendors to exchange product specifications and commit development resources to ensure the integration of future Compaq personal computers into DEC networked systems.

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advanced file transfers, a new cable connection that uses inexpensive telephone wire (RJ11) and an on-board 80186 CPU for maximum performance. All of this for the PC and the PS/2, too.

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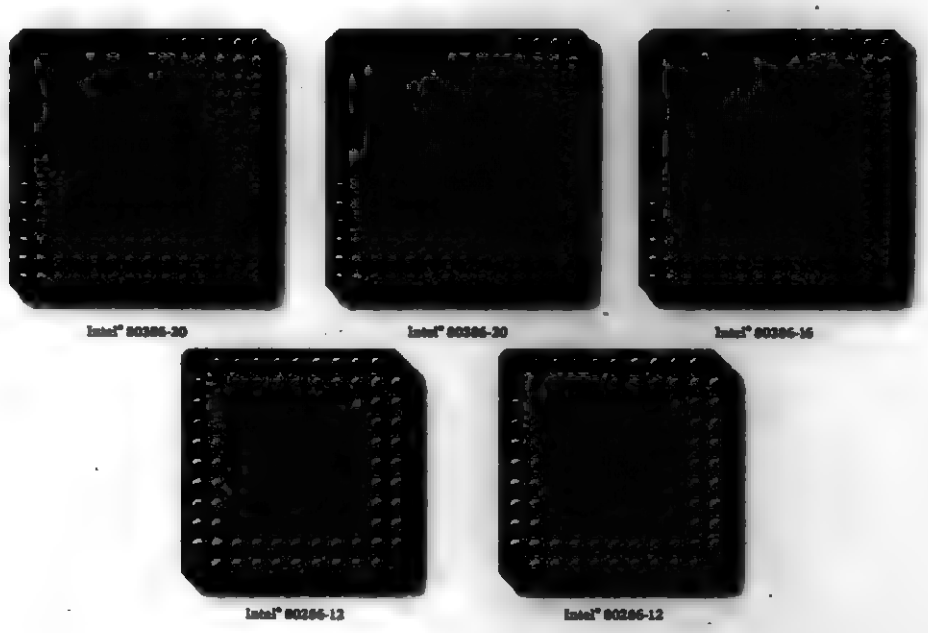

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Take system architecture, for example. The COMPAQ DESKPRO 386/20 and COMPAQ PORTABLE 386 are built around an advanced 32-bit concurrent bus architecture which exploits the speed of the computers' 20-MHz 80386 microprocessors. Two buses—one for memory and one for peripherals—eliminate information bottlenecks, allowing each component to run at its maximum speed. This ensures the highest system performance without sacrificing compatibility with industry-standard hardware and the world's largest library of business productivity software.

Similar performance enhancements are engineered into each subsystem of every COMPAQ personal computer. Each component is then optimized individually, yet designed to work as part of the total system.

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EDITORIAL

On the contrary

CONSIDER THE FOLLOWING editorial page excerpt:

"The individuals [micro managers] who championed PCs seem to be losing the war for influence inside the corporation. . . . In most companies, PC managers are inching along the slowest track."

Now consider this one:

"The influence of micro managers and information center managers has grown — not diminished — since 1986."

It's not unusual for the editorial pages of different trade publications to present opposing views on the same issue. But the quotes above appeared in the same widely read publication — *PC Week* — just a year apart.

Aside from the obvious contradictions — each editorial page was supported by other stories in the paper — the most recent selection that outlined a declining role of MIS in certain personal computer acquisition policies is nothing short of an outrageous flight of fancy. And this particular flight is contrary to one of the most apparent trends in information management today.

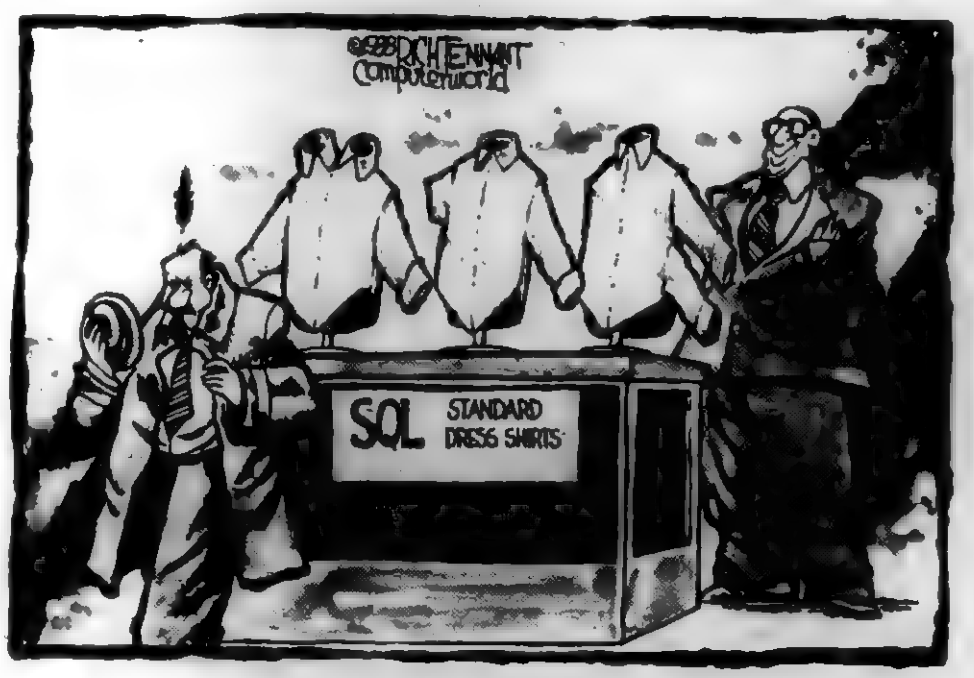
For example, consider the following:

- The most comprehensive study on PC acquisition and usage patterns, completed by International Data Corp. and Stat Resources, Inc. late last year, found MIS to be the dominant force in the planning and acquisition process in medium-size and large companies.
- In a comprehensive 1988 Gallup Poll of the Fortune 1,000, sponsored by *Computer Reseller News*, two-thirds of the respondents cited as having the greatest influence in the PC acquisition process were from data processing. When respondents were asked who else was involved in that process, 67% named senior MIS managers.
- In two studies conducted by *Computerworld* last year, MIS/DP was cited as the primary determinant in PC purchases in 60% to 70% of medium-size and large companies.

Why are the results in these studies so consistent? Because they reflect the reality of an information environment in which PC equipment is rapidly becoming an intrinsic part of an integrated information system, not another stand-alone appendage. As such, MIS plays a key role in crafting the components of that system.

With the one notable exception cited above, publications have generally echoed one message loud and clear: PCs are a major player in the increasingly integrated information systems schemes being crafted by corporations and are no longer the single-user phenomenon that has long been cast as a romantic outlaw.

The reality is that equipment purchase decisions must reflect the interests of several parties, from end users to department managers to senior MIS, with someone having the "right of last refusal." Whatever the case, information professionals need, want and deserve nothing short of consistent, reliable data. One simply cannot ignore the dynamics of that or wish it to be something other than what it is.



LETTERS TO THE EDITOR

Step backward?

I missed the point of the In Depth article on three women who gained power in the industry [CW, March 28], unless you were simply looking to fill space with excerpts from a book.

I respect, and certainly commend, these women. But in these times, and certainly in this industry, singling out women is a step backward.

Paula J. Brooks
President
Unitech Software, Inc.
Reston, Va.

The last word

Up until March 7, your coverage of Section 1706 had been fairly evenhanded. You gave both proponents and those against Section 1706 equal time. Granted, this is a highly charged issue with possibly severe adverse effects on the parties involved. As such, one could expect the emotional rhetoric exhibited in the Letters to the Editor section.

As an independent consultant, however, I resent two back-to-back issues being devoted to those who advocate keeping Section 1706 in its present state [CW, Feb. 29 and March 7]. An examination of the sources of the letters supporting Section 1706 clearly showed that the majority were written by those who stand to gain the most from it — large consulting companies. It is beyond comprehension to see such a blatent attempt to limit competition in the consulting field. In the final analysis, however, the ultimate losers as a result of Section 1706 will be companies that utilize the services of large consulting companies. History has shown that any time competition is restricted, prices tend to rise.

In order to balance your coverage of Section 1706, I suggest you find experts not affiliated with large consulting companies or independent consultants and let them express their opinion on the merits for or arguments against Section 1706.

Robert A. Ulwin
President
Computer Programming Resources
Des Plaines, Ill.

Not all roses

In reference to Charles Lecht's column "The doggonedest computer ever seen" [CW, March 21], I must take issue with his uncritical raves for the K9.

Though I am the proud owner of two Japanese K9s, all is not throughput and roses. While the intelligence of the system cannot be denied, this has a downside: The system often has its own way of doing things, and the operator either fights or goes along for the ride. . .

There are also hardware problems. New models tend to leak fluid, and it can be six to eight months before this glitch is completely overcome. It is also true that new models tend to consume bytes without being so ordered; the damage to other, unrelated systems can only be imagined. Repairs tend to be expensive and time consuming — these days, there is almost no such thing as on-site K9 repair.

However, I must admit that the affection an operator will develop for a K9 is unmatched; let Apple Computer, Inc. challenge that.

Bernie Jacobs
Computer Operations
The Markham Co.
New York

Due credit

I read with interest the Spotlight on data base management systems [CW, March 14]. However, I would like to point out omissions or errors in two articles.

In "Data dispersal starts as trickle," the author stated that no true distributed DBMS exists today. Nonstop SQL, Tandem Computers, Inc.'s implementation of the SQL data language, supports a fully distributed relational DBMS for Nonstop systems. Users can read, write and update data anywhere in a network, including distributed updates within a single transaction, with data base integrity and consistency protected.

A second article, "Hierarchical model keeps loyal following," quoted sources who said the performance of relational DBMSs is inferior to hierarchical data bases and not capable of high-volume processing.

Relational systems have had a reputation for poor performance. But Nonstop SQL, introduced in March 1987, performs comparably to traditional non-relational systems. In a Debit/Credit benchmark audited and verified by the Codd and Date Consulting Group, Nonstop SQL ran at more than 200 transaction/sec. with 90% ending in two seconds or less.

Patricia A. Ridgway
Director of Marketing Support
Tandem Computers, Inc.
Cupertino, Calif.

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

Let your fingers do the voting via telephone

Computers could better tally the people's will

CHARLES P. LECHT

In November, Americans will elect a president once again. And once again, the massive U.S. governmental resources invested in computer technology will play little or no role in the voting process.

The world's most technologically advanced governments continue to ignore the obvious role computer systems, linked together in a national network, could play during elections.

If used at all, most computers are relegated to the role of adding, sorting and listing. Is it too much to ask that this technology also collect, convey and tally the votes of citizens untouched by — perish the thought — morally weak human hands?

Computerized voting that takes advantage of in-place communications networks and the telephone could overcome many defects in the archaic manual processes currently used. To a critical degree, these defects are the same ones that inspired the creation of America's electoral college in the 18th century.

To continue to use surrogate voting to deliver the collective will of a community is anachronistic in a time when the individual votes of its citizens are so easily delivered.

Computerized voting via telephone for the president on down could go a long way toward reviving the dwindling interest in voting among Americans.

Whom do you trust?

Today, people have little choice but to trust computer and communications technologies to help control their most vital life functions. Banking, credit, air traffic control, weather prediction, defense — you name it — all rely on these technologies. So why not voting too?

When these technologies were underused, we experienced the likes of the Chernobyl and Three Mile Island catastrophes. We have grown beyond relying on human control of the processes with which we must deal in this world, and we may as well face up to it. That includes voting, too.

As seen from the perspective of the average citizen, the most sophisticated use of computer and communications technologies in American elections is made by television and radio stations. The picture of a government unable to carry out an election using the same technology that the broadcast studios do to forecast results is neither complimentary nor convincing.

There are benefits to be gained by mussing the forecasters during the voting. According to one ABC New York newsman, predictions on voting day can change a candidate's vote by as much as 30%. Though Americans are often for the underdog, they are never for the dead dog.

TO CONTINUE to use surrogate voting to deliver the collective will of a community is anachronistic in a time when the individual votes of its citizens are so easily delivered.

All this presents a bleak picture of bureaucrats tolerating the use of computers to possibly influence an election and accepting the nonuse of computers when they could facilitate elections being run more fairly.

Needless to say, implementing a system to carry out voting via telephones interconnected with computers is no trivial task. But it's not impossible, considering the Integrated Services Digital Networks now being developed to span most developed countries.

Of course, there are the usual arguments against electronic voting. Some suggest that getting to a telephone may be more difficult than getting to a polling station. Others point out real problems, such as how voters can be identified over the telephone, or how we can protect ourselves from some hacker's computer penetrating the system and using an electronic telephone book to cast several million votes for a candidate.

But if you think about it, the chances for mischief are far greater in today's decentralized, archaic voting systems, and detection is less automatic in the old system than we may expect it to be in centralized electronic voting.

Whatever the case, it is difficult to contest the fact that current technology can be used to ensure that the will of the people — all of the people — can be carried out in a fully computerized election.

Lecht is an IDG News Service foreign correspondent based in Tokyo.

Speak softly and just fit in

You can start acting like a CIO long before you actually become one

HERB HALBRECHT

Twelve years ago, Richard Nolan's "Business Needs a New Breed of EDP Manager" appeared in the *Harvard Business Review*. To this day, MIS executives quote from it. Sometimes I wonder if they have read any other articles since 1976.

Consider this statement, which sums up not only the article's thesis but the way many MIS directors still perceive themselves: "... he must have the perception of a general manager, be ready not only to sell EDP but also to develop and sell the logic and discipline of how one does business in a particular technological environment.

"He must be able to develop in other top executives an appreciation of the value of the systems function and a perception of the requirements for implementation."

This statement was true in the late 1970s and early '80s, but top management no longer needs to be sold on electronic data processing (EDP) or the logic and discipline of technology. What separates the chief information officer (CIO) of today from the "new-breed" information executive of the mid-'70s is the recognition by general managers of the potential for leveraging information technologies for competitive advantage.

We recently conducted two informal surveys, the first directed at highest ranking information executives drawn from the 1,000 largest U.S. corporations and the second questioning chief executive officers of the same companies.

Many of the top information executives who responded — true CIOs by whatever definition — suggested that much of the clamor from MIS professionals is self-serving hype.

The respondents questioned whether the majority of the current MIS executives would ever be able to step up to a CIO-level position at the same strategic level as vice-president of finance, manufacturing or research and development.

Many say that MIS directors would end up reporting to a CIO who was promoted to the position not from the information technology side but from a senior business management capacity.

On the other hand, the CEOs who responded were mostly indifferent to questions about the role of a CIO. They were more concerned with determining how much is the "right amount" to spend on information systems.

As any professional field grows up, going from stage to stage through the maturation process requires different skills

Continued on page 23

TOM LIEVITCH

Halbrecht is president of Halbrecht Associates, Inc. in Stamford, Conn.

It might be a Mac minister at your door

JAMES A. MARTIN

Once upon a time, the evangelist had a narrow career path — preach in church and, if blessed, progress to the vast kingdom of television.

In the ambitious 1980s, however, even the evangelist has a variety of career options from which to choose.

He can, for example, preside over a cable television network (Jim and Tammy Bakker) or run a university (Oral Roberts). Hostile corporate takeovers can be fun (Jerry Falwell), and frequenting back-street Louisiana motels (Jimmy Swaggart) can generate some hot publicity. And why not take a shot at the presidency of the United States (Pat Robertson)?

If the evangelist still feels in need of occupational therapy, there's always the computer industry.

Apple started the trend toward technology evangelists in 1984. Today, the Cupertino, Calif., company employs a staff of some 30 full-time "priests," whose mission is to spread the gospel to existing and potential third-party developers. They are, in essence, Apple's ambassadors to the development community.

Each evangelist has a specialty — a vertical application. There is a K-12 software evangelist, a consumer software evangelist and an entire subgroup of hardware evangelists, to name a few.

The very idea of evangelists at large in Silicon Valley, preaching solutions instead of salvation, is a bit jolting at first. The imagination runs wild. For example, what kind of frock does the evangelist wear to a power lunch? From which Bible does the evangelist quote — the King James version or the John Sculley remake, *Odyssey*?

Apple first rallied its righteous brothers about the time it introduced the Macintosh. The Mac ministry had quite a selling job to do to convince corporate America that this machine was indeed more useful than a hula hoop.

They succeeded. The Macintosh today is a viable alternative to IBM and, like Jim and Tammy, boasts a devoted following. As a result of Apple's success, evangelists are now all the rage at technology companies struggling to sell untried and mostly unsupported products. Microsoft, for example, has a CD-ROM evangelist, while Hewlett-Packard is evangelizing about its New Wave application environment.

What started as another example of dreaded Applespeak is now threatening to become a mainstream marketing buzzword. But where will it end? Are there Atari evangelists in our future? Will the term spread to nontechnology companies as well, creating such aberrations as Chief Evangelist, Firestone Tire & Rubber Co.? Director of Religious Experiences, Sara Lee Corp.? Department of Miracles and Makeovers, Mary Kay Cosmetics, Inc.?

The possibilities are endless. As Jim Bakker might say, "Stay tuned."

Martin is a *Computerworld* West Coast correspondent.

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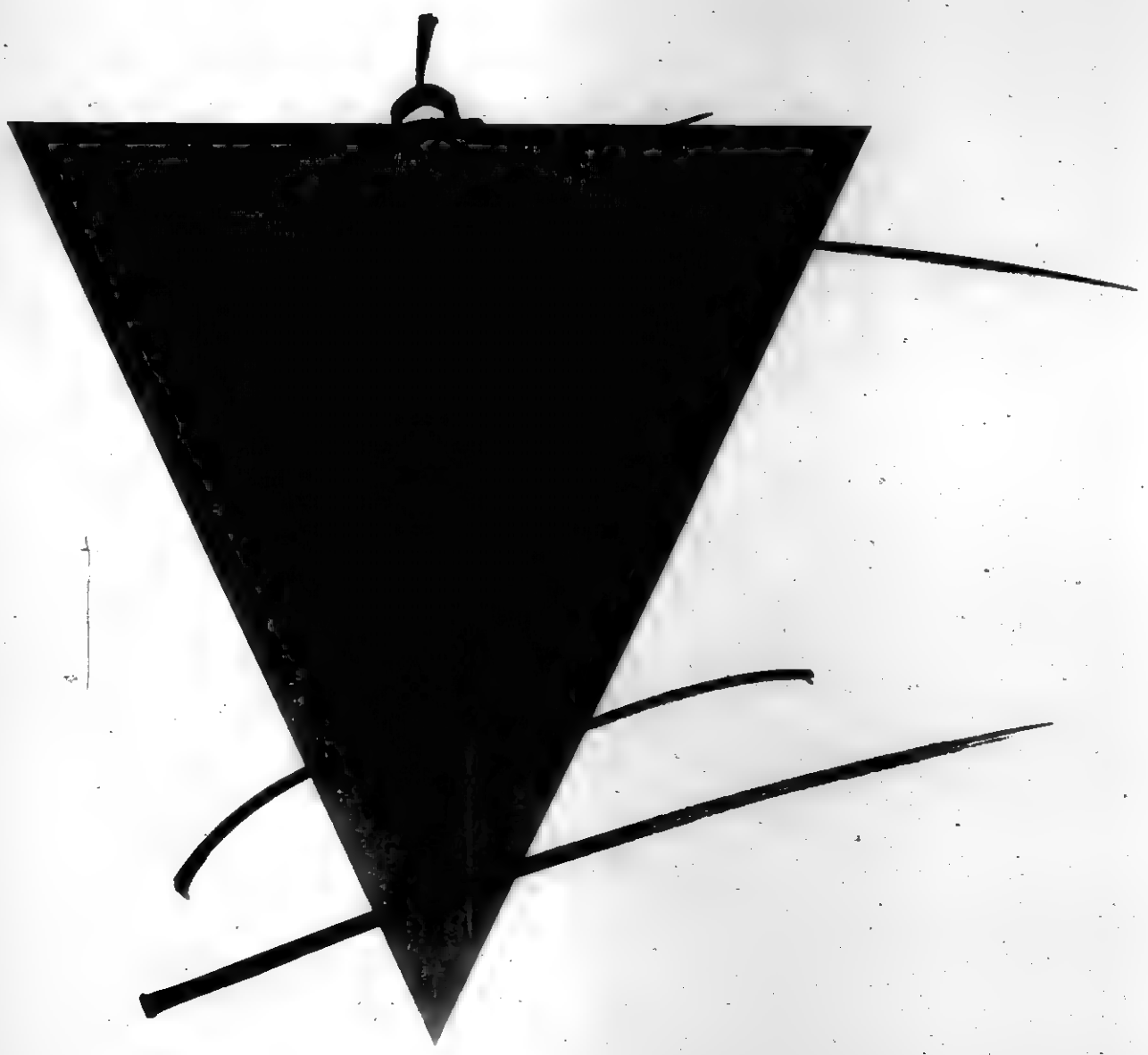

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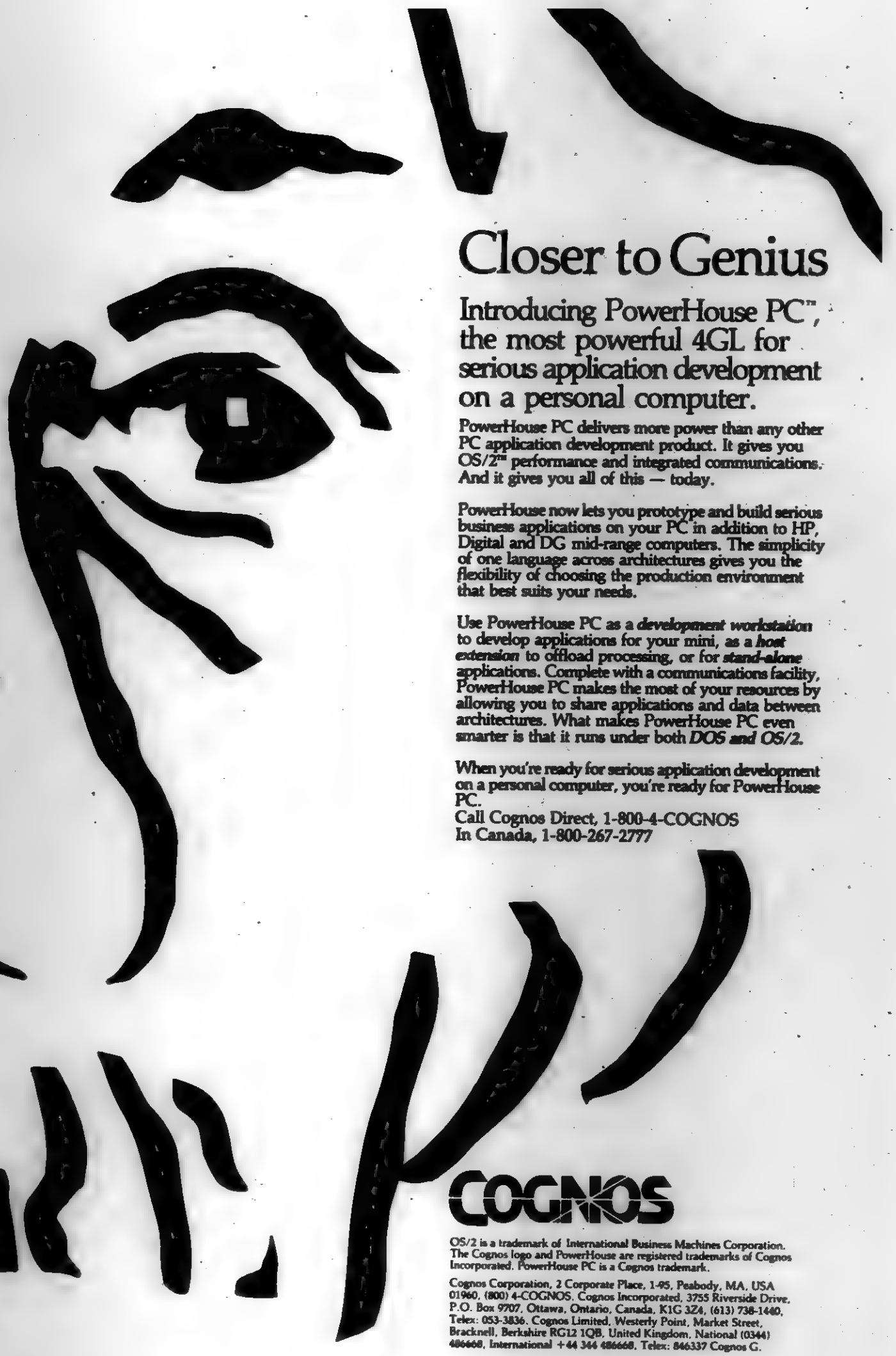

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CIO

FROM PAGE 19

and mind-sets. MIS executives are technicians first and foremost. They lack the training and flexibility to move into business planning and the analytical faculties that would lead to a CIO-type position.

I would warn most MIS executives that unless they are able to discuss the information function from an investment point of view, unless they can use new approaches to encourage an understanding of the value of the information function and unless they develop credibility as a business person, they will not be called when the CEO decides the company needs a CIO.

I WOULD warn most MIS executives that unless they . . . develop credibility as a business person, they will not be called when the CEO decides the company needs a CIO.

The decision to name a top-level information executive must originate and come down from the top. For example, DuWayne Peterson is clearly part of top management at Merrill Lynch & Co. As executive vice-president of systems and operations, Peterson oversees a budget of about $1 billion.

The critical issue, Peterson says, is that the "perception of and desire for a CIO must come down from the CEO or COO, not pushed up by self-serving hype from MIS types."

He says the firm must come to the decision that the top information executive, with whatever title, must get more involved in planning and management.

Darwin John, vice-president of information services at Scott Paper Co., suggests that "what is essential is that information and related technology be aligned with the purpose and mission of the enterprise as a critical factor in fulfilling that mission and realizing the purpose."

Darwin adds, "If information and related technology, as a critical factor, are appropriately positioned, then the structure and associated reporting relationship should follow naturally."

We received comparable comments deploring the CIO title and emphasizing the need for a working relationship from Dudley Cooke, general manager of the information systems division of Sun Co.

Cooke goes so far as to advise measuring the "noise level" regarding a company's information systems function: "A high noise level generally would indicate excessive conflict and lack of the necessary partnerships and working relationships. Naturally, the bottom-line criteria is always results. If the organization is not achieving the business results desired, then they are failing."

A candidate for a CIO position, whether from within the organization or from the outside, is assumed to be competent not just in technology and management but in overall knowledge of the given business. The qualities being sought are difficult to define, but the best description of them is "fit."

Does the candidate understand the style of the company? Will he or she pick up on signals and be able to work within the bounds of a particular political environment? Is the candidate a team player or is he likely to claim turf within the corporation? Does the candidate mix in at the senior level?

There are other lessons to be drawn from these survey responses. The vice-president of MIS who seeks to become a CIO should seek to function like an investment banker rather than someone who needs to control his kingdom.

For instance, instead of equipping the company's data center to handle the organization's maximum load, farm out routine tasks and let the supplier cope with fluctuations in activity.

In effect, the vice-president of MIS should start behaving like a CIO but avoid the aspiration to be one.

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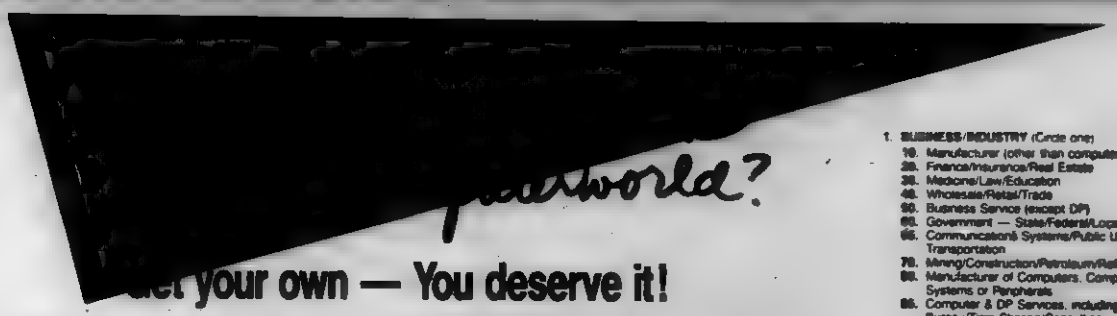

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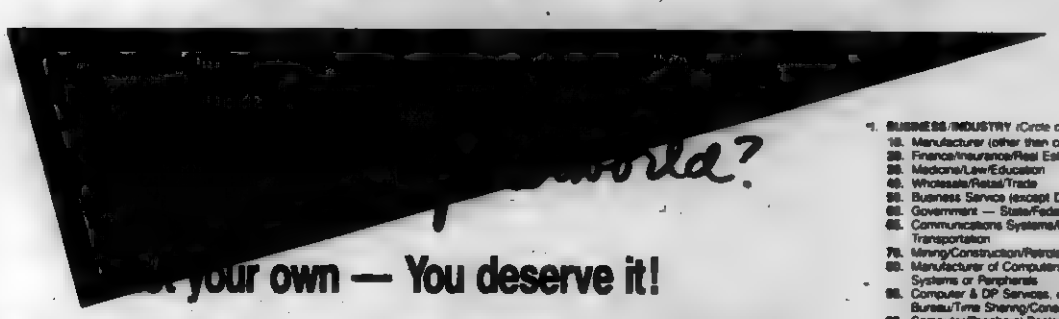

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SOFT TALK

Charles Babcock

DB2 speed documented

IBM has put on display figures for DB2 Version 2 that show geometric increases in transaction throughput.

It claimed rates of 186 per second for complex transactions, and 300 to 438 for simple transactions, compared with the maximum 123 transaction/sec. of DB2 Release 1.3.

What do these figures mean, particularly since IBM had previously hung its hat on transaction throughput in the neighborhood of 50 transaction/sec. with Release 1.3?

As Russell Donovan, IBM data base products marketing manager, explains, the 123 figure came from the maximum rate achieved with Release 1.3 on an IBM 3090 Model 600 running MVS/XA. The rate was achieved with 91.4% CPU utilization, a figure that reflects a laboratory benchmark rather than a production process in which systems in addition to DB2 would be making demands on the CPU. The figure of 52 transaction/sec. cited earlier for Release 1.3 reflected a benchmark on a smaller CPU, the 3090 Model 200.

The transaction involved was more complex than the debit/credit transaction that was used in the Tandem Computers Nonstop SQL benchmark, which was announced in March 1987. The IBM transac-

Continued on page 28

Joint CASE standard issued

'Third-generation' protocol integrates in-house, off-the-shelf software

BY NELL MARGOLIS
CW STAFF

Digital Equipment Corp. and Sunnyvale, Calif.-based Atherton Technology have joined forces to forge a standard for the integration of CASE tools, particularly in large-scale scientific and engineering projects.

The proposed standard is based on 2-year-old Atherton's flagship product, Software Backplane — possibly the first U.S.-based commercial implementation of a so-called integrated project support environment. It is a set of software capabilities that link off-the-shelf and in-house tools in addition to automating many of the control and coordination functions called into play in the larger software development projects.

The concept "is founded on some solid technology," said Vaughan Merlyn, chairman of Bellevue, Wash.-based CASE Research Corp., "and the fact that DEC has signed on signifies merit. I expect that others will climb aboard the bandwagon."

The proposed standard, according to Atherton Marketing Vice-President Alan Codkind, ushers in third-generation computer-aided software engineering.

High-level integration

This level of integration, Codkind said, reaches beyond first-generation CASE, in which isolated tools first automated structured analysis and design, and second-generation CASE, which addresses tool-to-tool interfacing and the integration of front-end CASE design functions with back-end code generation and maintenance.

As a first step toward establishing the Software Backplane standard, DEC and Atherton announced at CASE Expo, held in Dallas earlier this month, that DEC will support Atherton's integration of the DEC Vaxset CASE tool kit and the VAX Ada compiler into the Software Backplane.

Simultaneously, Atherton will port the Software Backplane, which already runs under DEC's VMS, to Ultrix, DEC's version of the Unix operating system.

Pro-standard sentiment runs strong in an area otherwise faced with a plethora of incompatible tools shunned by buyers and unavailable to users — so much so that the rise in CASE standards proposals is beginning to mimic the rise in CASE product introductions.

In fact, several of the ranking standard-bearers are set to meet at the CASE '88 conference in Cambridge, Mass., in July to coordinate their efforts.

The DEC-Atherton integrated project standard, according to Codkind, complements rather than contradicts two current standardization efforts that are garnering increasing support: the electronic design interchange format standard and the Information Resource Dictionary System proposal, which is still hovering on the brink of official ANSI standard status.

Early indications are that the DEC-Atherton proposal, whether or not it eventually takes shape as a standard, will receive serious attention.

The list of CASE users, vendors and research organizations that sent representatives to hear and discuss the proposal in Dallas and who now have DEC-Atherton white papers under review include the following companies: Cadre Technologies, Inc., Hewlett-Packard Co., IBM, Index Technology Corp., Interleaf, Inc., RCA Corp., Rockwell International Corp., the Software Engineering Institute and the Software Productivity Consortium.

Both Apollo Computer, Inc. and Interactive Development Environments were unable to attend the Dallas conference but are members of the review group, according to Codkind. Sun Microsystems, Inc. has subsequently joined the effort.

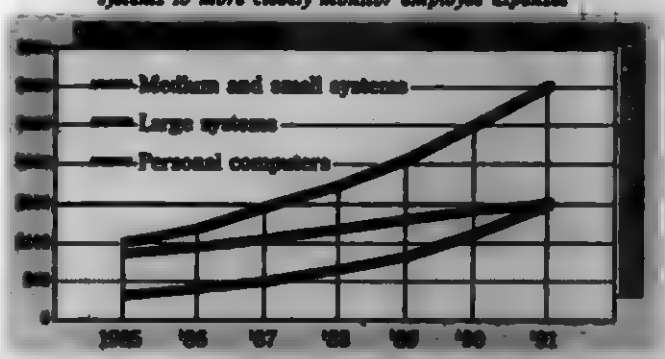
Inside

- Aion change control features enhance ADS expert system shell. Page 28.
- Pecos introduces job accounting software for IBM MVS and DOS/VSE environments. Page 30.

Data View

Small systems grab human resource jobs

Users are pushing payroll and personnel software onto smaller systems to more closely monitor employee expenses



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CW CHART

Cincom embraces Fujitsu

CINCINNATI — Cincom Systems, Inc. and Fujitsu Ltd. of Japan have teamed up to tailor Cincom's data base management system and related products to the Fujitsu environment, the companies announced last week.

The technical cooperation agreement will cover Supra, Cincom's DBMS; Mantis, its application development system; and Net/Master, its network management product.

Those products currently run on Fujitsu hardware in certain overseas markets. The agreement is intended to provide future cooperation between the companies.

For instance, Fujitsu will work more closely with Cincom in releasing new versions of its operating system so that Cincom can make any necessary modifications to its software products in a timely fashion, the Cincom spokesman said.

Fujitsu, in turn, has the option of pitching IBM alternative software to its customers.

The agreement specifically covers four overseas markets: Japan, Australia, New Zealand and Hong Kong.

VAX retrieval system eases searches

BY NELL MARGOLIS
CW STAFF

ROCKVILLE, Md. — CC Software, Inc. is seeking to lower human I/O barriers with a Digital Equipment Corp. VAX-based text retrieval system that lets users search a wide variety of texts quickly, easily and relatively inexpensively, according to company claims.

Available immediately, CC Search is a software tool that can be used to index — and, thereafter, search for and retrieve —not only documents but program source code, electronic mail messages and technical documentation, according to Vice-President Paul Rosenbaum.

Such flexibility, he said, suits the software to tasks as varied as finding the applicable law on a given issue and tracking clients or competitors.

CC Search goes easy on both users' abilities and system resources, said Richard Marino, company founder, president and product developer. "Comparable products such as [Information Dimensions, Inc.'s] Basis were designed for professional users and rely on their knowledge of commands," Marino claimed. Not so CC Search, which was designed for many occasional users rather than a small group of constant ones. The product has about a dozen commands altogether, although the company said a typical user will need about six.

The CC package takes up less than 8M bytes of disk space and does not require either installation of special images or multiple processes, Rosenbaum said. Because the software reads many DEC VMS file types directly, the need for translating files and, consequently, indexing time and disk space requirements, are greatly reduced, he pointed out.

CC Search now reads variable and fixed-length RMS sequential files and Technical Information Systems, Inc. LEX-11 or Wordperfect Corp. Wordperfect documents. Support for DECDX, Microsystems Engineering Corp.'s Mass-11 and Data Processing Design, Inc.'s Word-11 documents is promised during the next several months, Rosenbaum said.

Because the software lets users create indexes with pointers to original source files, from which text is then displayed or printed, he added, disk space requirements are further minimized.

Initial license prices for CC Search range from $3,000 to $29,500, depending on CPU; the vendor said discounts for secondary licenses, clusters and government and educational organizations are available.

Goal ships VM security package

COLUMBUS, Ohio — Goal Systems International, Inc. recently began shipping an upgraded version of its security software for the IBM VM operating system.

Alert/VM Version 2.03 is said to combine security maintenance functions with the VM operating system's directory maintenance functions. With this integration, separate updates are no longer required, the company said.

The directory maintenance functions now folded into Version 2.03 include integrity checking during minidisk allocation, which was designed to prevent accidental overlays; synchronization between Alert/VM security definitions and VM directory entries; a mass-update function that allows for the addition or update of a large number of users; and a full-screen, menu-driven directory of management functions that eliminates the use of directory maintenance command syntax.

Version 2.03's new security features include processing restrictions based on an account identification as well as user and group identification.

Alert/VM is priced at $16,000 and supports VM/SP or VM SP High Performance Option Release 3 or higher, the vendor said.

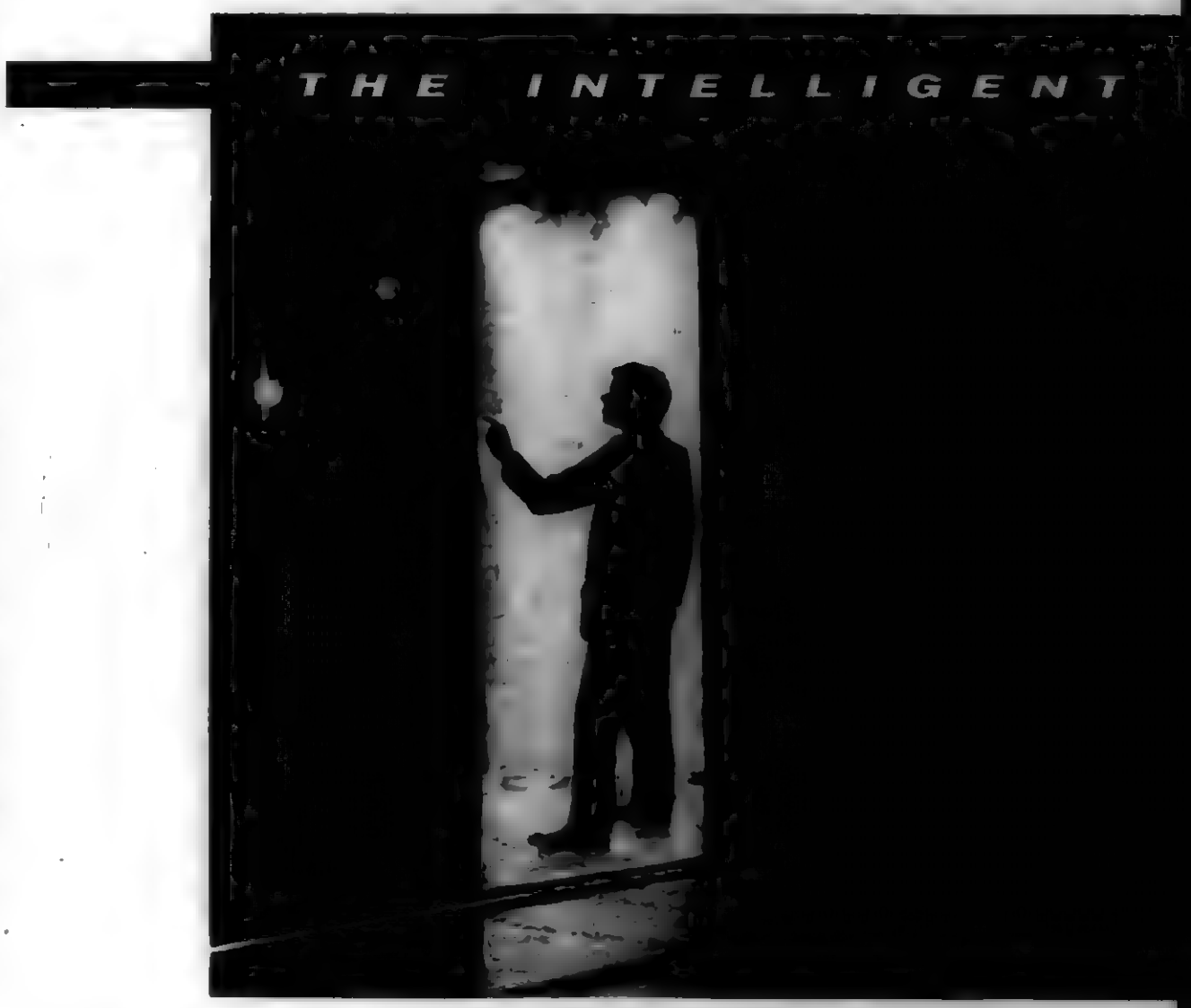
Kit simulates System/38

WOODBURY, N.Y. — Triangle Computing Corp. recently released a programmer's kit for the IBM System/36 that it said enables users to simulate an IBM System/38 environment.

Q-Pgmr was designed for System/36 users preparing to upgrade to either the System/38 platform or to the expected IBM follow-on known as Silverlake, the company said. IBM has said its follow-on mid-range system will combine features from the System/36 and 38.

The tool allows programmers to write code in the traditional System/36 mode using the RPG-II language. However, Q-Pgmr provides System/38 Data Definition Specification file descriptions. A programmer can use these to create externally described files on the System/36, the company said.

The tool has a license fee of $750.



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SOFTWARE NOTES

Computer Data to acquire Group Operations

Group Operations, Inc. in Washington, D.C., has signed a letter of intent to be acquired for $3.5 million by **Computer Data Systems, Inc.**, a data processing consulting firm in Rockville, Md. Group Operations is a 90-employee, $5.5 million-a-year supplier of Cobol maintenance and restructuring tools, including Scan Cobol and Superstructure. It is privately held, according to Barry T. Murphy, vice-president.

Although structured Cobol is a widely advocated goal and a feature of ANSI-standard Cobol 85, the Cobol structuring products have been in the marketplace for about three years. They have yet to catch on in a widespread fashion. Group Operations' chief competitors include IBM's Cobol Structure Facility, Language Technology, Inc.'s Recoder and the Catalyst Group of Peat, Marwick, Main & Co.'s Retrofit.

The score is five to four. **Bachman Information Systems, Inc.**, a young firm that provides tools for re-engineering existing systems, announced April 14 that it has opened four regional sales and support offices "in response to a widespread demand for its products." As it turns out, however, Bachman announced the existence of the offices three months ago, just as its product line was announced. It also said at the time there was a fifth office in Los Angeles that apparantly didn't survive to see the "widespread demand."

Frank Dodge, chairman of **McCormack & Dodge Corp.** in Natick, Mass., tacitly combatting any lingering notions that his company might be on the auction block, notes that M&D revenue was up 24% in 1987. He cannot say what they were, since parent Dun & Bradstreet Co. does not break down revenues by division, but the figure would represent a nearly $30 million increase over 1986's $123 million to $152 million.

Gold Hill Computers, Inc. in Cambridge, Mass., said it will port its expert system development tool to Sun Microsystems, Inc. workstations that are based on the Intel Corp. 80386 microprocessor. Goldworks is a menu-driven development and delivery tool for expert systems that has been offered on microcomputer platforms.

Joining Gold Hill in the move to the new Sun platform is **Cadre Technologies, Inc.** in Providence, R.I. The company will offer its Teamwork systems development tool in July at a cost of $7,500.

Focus accesses DEC VAX data

CINCINNATI — Information Builders, Inc. celebrated Dexpo East in February by announcing its Focus fourth-generation language data base management system's ability to write to Digital Equipment Corp.'s RMS files and VAX/VMS RDB relational data base.

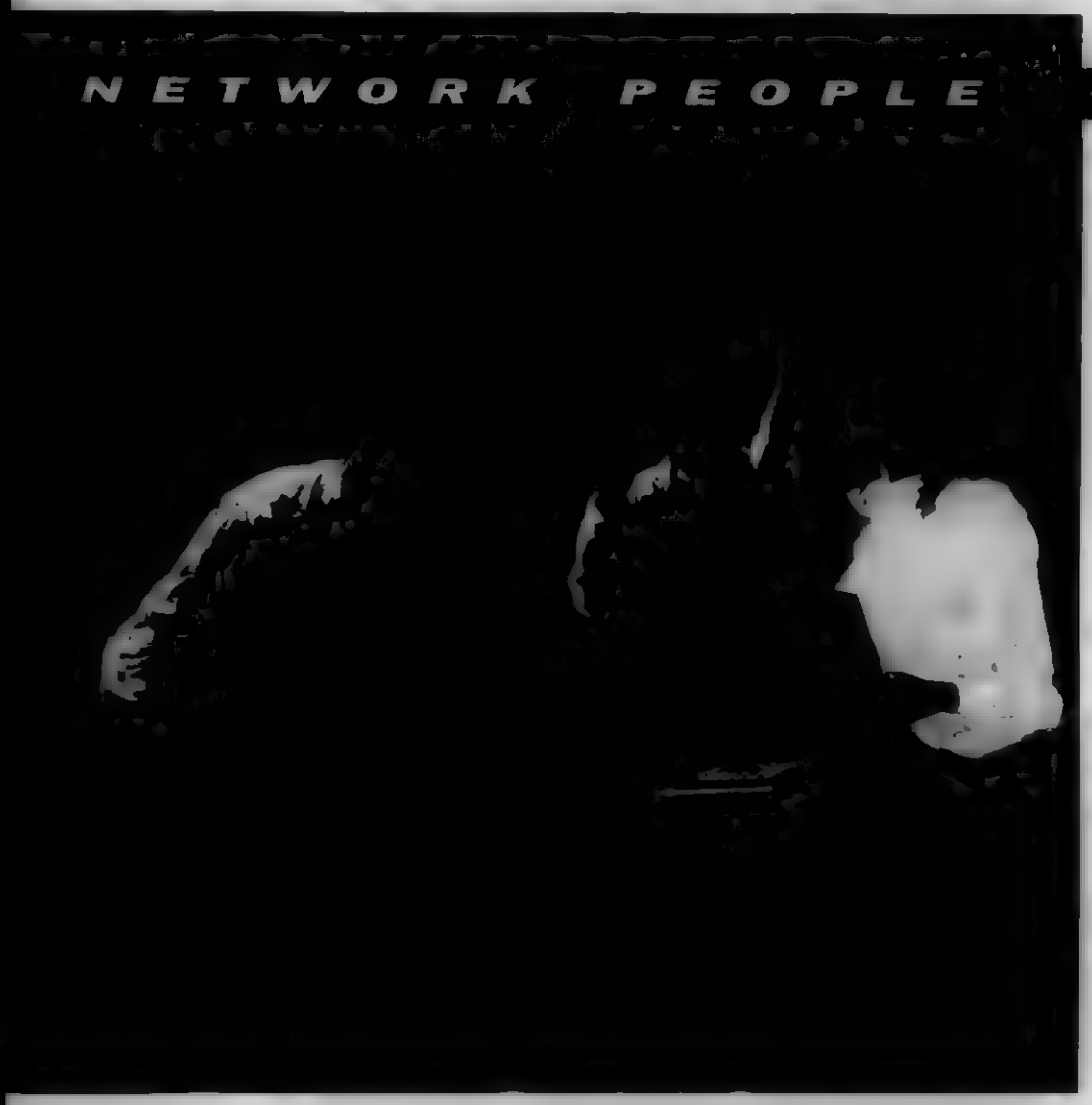
Tomorrow at Dexpo East, Information builders plans to go itself one better by announcing complete read/write interfaces to the three leading third-party VAX-based relational data bases: Oracle Corp.'s Oracle, Relational Technology, Inc.'s Ingres and Sybase, Inc.'s Sybase.

While the new interfaces allow the user developing applications in Focus to go against a wide range of data files without regard to proprietary data base engines, Albert D'Andrea, Information Builders' VAX systems marketing manager, pointed out, a dictionary utility that is already part of the package links the accessed data to the Focus language, protecting the user's software investment.

The Oracle interface is available immediately, Sybase will be on board within the month and Ingres is coming in June, D'Andrea said.

A Unix interface that will give Focus users access to Informix Software, Inc.'s Informix is said to be under development.

The vendor said Focus Release 5.2 is priced from $6,800 to $155,700; read/write interfaces are priced from $1,695 to $18,925; and read-only interfaces, from $900 to $10,000, depending in all cases on CPU.



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Aion shell gains new facets

Expert system builder offers change control, cooperation

BY CHARLES BABCOCK
CW STAFF

PALO ALTO, Calif. — Aion Corp. has integrated change control features into Version 5.0 of its expert system-building shell, Aion Development System (ADS), and has provided a cooperative processing feature through an LU6.2 link.

The LU6.2 IBM Advanced Program-to-Program Communications link allows an expert system on an IBM Personal Computer to retrieve mainframe data and interact with an ADS knowledge base on the mainframe, according to Harry Reinstein, Aion president. Users of the previous release of ADS were able to develop systems on PCs for use on mainframes, but they were not able to cooperatively work with a PC expert system.

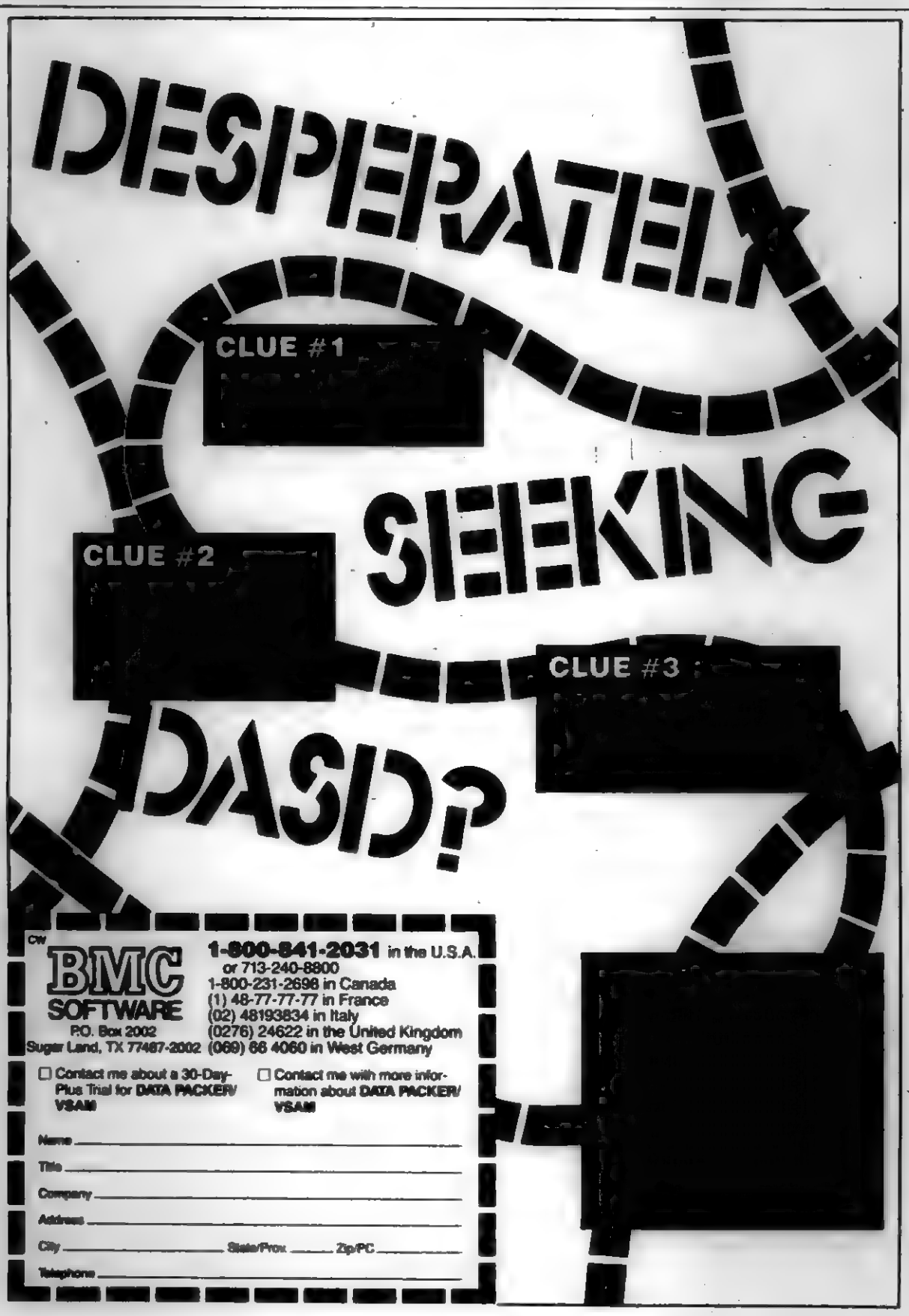
In addition to an IBM PC-DOS version, an OS/2 version of ADS is now available, Reinstein said.

ADS can work in the traditional mainframe environment with existing applications. ADS can access and make use of IBM DL/1, DB2, SQL/DS, QSAM and VSAM files. It also runs under IBM's VM/CMS or MVS with the TSO, CICS or IMS/DC teleprocessing monitors.

Set to be available in the fourth quarter, mainframe Version 5.0 will offer a change-auditing capability to track program changes in a team development environment or to existing, large applications, Reinstein said.

A programmer must still document why he made changes, but an automatic facility within ADS tracks which programmer made changes to which version of the application.

ADS is available at a price of $70,000 for MVS, $60,000 for VM and $7,000 on the IBM PC. An additional charge of $15,000 is levied for the CICS teleprocessing monitor or $25,000 for the IMS/DB DC monitor.



Babcock

CONTINUED FROM PAGE 25

tion was derived from a survey of IMS customers; it uses a series of five transactions typical of inventory tracking and stock-control applications, according to a 205-page "Performance Report" on DB2 Release 1.2 from IBM's Santa Teresa, Calif., development lab.

With its mix of retrievals, insertions, deletions and updates, the IBM transaction more closely resembles the work load expected from a relational system than from the speed-oriented debit/credit transactions.

The same transaction set has been used to test subsequent releases of DB2, including Release 1.3 and Version 2, IBM officials said.

The 300 to 438 transaction/sec. range reflects testing with TP-1-type transactions — the debit/credit activity of tellers at a group of bank branches. The highest rates reflect very simple transactions, like a credit authorization, or those executed by an automatic teller machine, with a complete transaction consisting of two reads and an update.

It is interesting to note that in no instance does IBM refer to a particular result beingachieved with a TP-1 transaction, and therefore, the IBM results do not lend themselves to direct comparison with those of any other vendor.

It should also be noted that the benchmark was conducted on IBM's most powerful processor, the 3090 Model 600E, with the ESA operating system and 256M bytes of expanded storage — the maximum available. While no benchmark of Version 2 was conducted under MVS/XA, the ESA results are thought to be 12% to 13% higher than could be achieved under MVS/XA, IBM said.

While actual applications will invariably have slower transaction throughput than laboratory tests, both sets of results are significant because they represent IBM's attempt to put mainframe relational data base performance out in front of the crowd.

IBM is not being pressured by competitors to do this. Demonstrating a grasp of the intricacies of the mainframe environment will take time, and IBM isn't leaving a lot of time for dust to collect on its heels as it pushes relational data base forward.

Instead, IBM is trying to get in front of the demand for performance of its largest customers. Right now the customers' standard is IMS, and large, full-function IMS users tend to push 75 to 80 transaction/sec. through their systems. And thelargest IMS Fast Path customers, the money center banks, tend to require 178 transaction/sec., according to Jim Henderson, IBM director of application enabling software.

To be sure, IBM is solving the performance problem by shoveling hardware and software resources at it, and such performance will come with a hefty price tag. Instead of just looking at transactions per second, IBM customers might want to ask for the price per transaction per second. Nevertheless, IBM's method of measuring performance appears to be consistent across releases of DB2 since 1.2, and that means Version 2 represents a giant step forward.

Babcock is *Computerworld's* senior editor, software & services.

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NEW PRODUCTS

Applications packages

Trajectory Software, Inc. recently announced Lex PDQ, an updated version of the Lex series what-you-see-is-what-you-get word processing software with data base capabilities.

The latest release includes multiple font support, expanded Help screens, menus and horizontal scrolling. The product is said to run under Unix, Xenix, UTX/32, OS/32, DOS and other operating systems. Documents are saved as straight ASCII files, and Lex PDQ includes a calculator and a mass-mailing system, the vendor said.

Lex PDQ costs from $395 to $10,000, depending on operating system environment.

Trajectory Software, Suite 108, 555 Goffle Road, Ridgewood, N.J. 07450. 800-445-9292.

Adra Systems, Inc. has released Cadra-II 5.0, an upgraded version of its mechanical computer-aided design and drafting software.

Release 5.0 runs on the Adra 1000 and 3000 computer-aided design and drafting systems and has added flat-pattern development for sheet metal applications. The drawing overlay facility has been expanded to allow up to 200 drawings associated on a list. The package now supports the Ethernet Transmission Control Protocol/Internet Protocol networking standard.

Cadra-II 5.0 is free to existing users and will be shipped with all new systems.

Adra Systems, 59 Technology Drive, Lowell, Mass. 01851. 617-937-3700.

Computer Systems Development, Inc. is integrating its Cimplan package into its Impcon manufacturing software.

The Cimplan option extends Impcon capabilities into the design engineering phase, enabling transition from product design to manufacturing. The Cimplan integration allows users to manage engineering data, perform process planning and directly link to sales order processing and production control.

Impcon system capabilities include asset management, contract costing, bar coding, warehouse management and time and attendance tracking. Links to computer-aided design and business environments are also provided.

Impcon is priced from $30,000, depending on software configuration and CPU.

Computer Systems Development, 910 Boston Post Road, Marlboro, Mass. 01752. 617-460-0330.

Utilities

A job accounting package for the IBM MVS and DOS/VSE operating environments has been introduced by **Pecan Software Corp.**

Smart/JA uses bar charts, displays and calendars to display bottlenecks, CPU use and device work load. The product was designed to help systems personnel and upper management determine the work load balance between shifts and the average runtime per program.

A perpetual license for Smart/JA costs $7,500 for MVS and $4,500 for DOS/VSE.

Pecan Software, Suite 107, 419 Crossville Road, Roswell, Ga. 30075. 404-594-9707.

A productivity enhancement package for IBM TSO and CICS users has been announced by **Fischer International Systems Corp.**

Interactive Output Facility 6.0 allows users to review the status of batch jobs and sort job lists based on menu-selectable fields. The upgraded version reportedly analyzes job queue and spool-space use and includes display and track group analysis facilities. The product addresses data areas above the 24-bit line to provide 31-bit virtual storage relief.

Interactive Output Facility 6.0 costs from $3,600 for an annual lease.

Fischer International Systems, P.O. Box 9107, Naples, Fla. 33942. 800-237-4510.

Syncsort, Inc. has released Version 3.2 of its sort, merge and copy utility, Syncsort OS. The program was designed for IBM MVS and MVS/XA operating systems.

The upgrade reportedly has achieved significant performance improvements in both sort and copy applications.

Syncsort OS 3.2 costs $3,400 per year for a three-year lease, which includes all maintenance and future upgrades.

Syncsort, CN18, 50 Tice Blvd., Woodcliff Lake, N.J. 07675. 201-930-9700.

Services

Unisys Corp. has introduced the U Series Starter Plan, an extension of its Customcare service said to enhance productivity on Unisys U 5000 and 6000 hardware running the Unisys System V operating system.

The integrated service package gives customers access to Unisys technical expertise throughout the hardware and system software installation process. The plan includes an initial customer review of the actual order, software levels, system hardware, operating system software and a post-installation session.

Unisys, P.O. Box 500, Blue Bell, Pa. 19424. 215-542-2244.

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MICROCOMPUTING

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Douglas Barney

Lotus, IBM guard 'secret'

Lotus and IBM: What gives, anyway? It was more than a year ago that Lotus and IBM announced a 10-year joint development agreement that called for an IBM 370 version of Lotus's 1-2-3 as well as a joint exploration of SQL data base management system technology. The vaguely worded agreement was hailed as a turning point for Lotus; a sort of end to software puberty.

On a regular basis, ever since that announcement, we have asked executives and spokesmen from both companies exactly what the agreement calls for besides a mainframe spreadsheet. What is going on with this DBMS stuff, a market Lotus and IBM seem to be attacking separately? Does the agreement mean Lotus will support OS/2 Extended Edition's Database Manager, or will IBM support Lotus/DBMS?

Well, the questions have been asked and answered with a resounding "No comment," "Stay tuned" or "Ask IBM."

The uncertainty has gone on for so long that you may be asking yourself, What agreement?

So what is the big secret?

Continued on page 41

Putting OS/2 in the big picture

IBM plans for Extended Edition evolution; users still won't commit

BY DOUGLAS BARNEY
CW STAFF

OS/2 Extended Edition may be the cornerstone of IBM's distributed data base and Systems Application Architecture (SAA) strategies, but so far, few users are set to embrace it and only one software vendor has pledged application support.

But the apparent lack of vendor support and user implementation plans has not curtailed IBM's own ambitions for the sophisticated product, which sells for $725 and is being prepped to ship this summer.

For IBM, OS/2 Extended Edition's relational DB2 syntax-compatible data base management system and broad communications capability is where both SAA and distributed data base begin.

Although the first release of OS/2 Extended Edition will include only a stand-alone data base, during the next four years, the system will evolve into a full-fledged distributed data base environment that cuts across microcomputer, minicomputer and mainframe architectures, according to an IBM official.

In addition, the system will eventually support nonrelational DBMSs as part of its distributed data base architecture, said Dick Kamerer, OS/2 Extended Edition senior planner at IBM's Entry Systems Division.

Development path

That evolution, based on SAA, will occur in four steps, according to Kamerer. The initial step will be the single-user system set to ship in two months. But by next year, IBM will have added so-called remote data services to provide two capabilities: data base server features and the ability to distribute data across workstations and servers on a local-area network.

And within two years, IBM will have added the ability to mix and match data from relational DBMSs on mid-range and host systems. However, to obtain true multisite read and update capability, the individual application vendors must support the IBM approach, Kamerer said.

The final step, which will not be realized for four years, is bringing nonrelational data base systems into the distributed data base equation. For this to succeed, software vendors must fully conform to SAA guidelines. "Bear in mind this is an SAA solution. If you don't participate in

Continued on page 46

Rest in peace, 3270 PC

BY ALAN J. RYAN
CW STAFF

IBM did not rattle any cages when it announced it had stopped building its 3270 Personal Computer line; some even labeled the announcement a cause for celebration.

The product line's history was marred by lackluster sales and questionable advantages, especially the G model graphics terminals. By year-end 1987, there were only about 40,000 3270s installed worldwide, according to Brian Jeffery, managing director of the International Technology Group in Los Altos, Calif.

Continued on page 43

Data View

DOS vs. underdog

Although DOS still dominates, Apple's Macintosh environment is gaining ground in scientific and technical markets

INFORMATION PROVIDED BY DATAQUEST, INC.
CW CHART

Delay plagues Wordstar

BY STEPHEN JONES
CW STAFF

SAN RAFAEL, Calif. — Just when Micropro International Corp. seemed to be getting a leg up on a few of its problems, something came along to knock it right back down again. The most recent trouble involves its flagship word processing package, Wordstar.

Shipment of Wordstar Professional Release 5, the company's long-awaited Wordstar upgrade, was delayed from mid-May to early summer because of development problems, according to company officials. Analysts have said Micropro needs to score soon with a new Word-

Continued on page 43

Inside

- Reviews of Turbo Basic, Pertmaster, 4Views. Page 33.
- Lanar develops PC XT-compatible data acquisition computer. Page 35.

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REVIEWS/NEW PRODUCTS

Souped-up Turbo Basic quick off the line

Borland International's Turbo Basic Version 1.1 is typical of what we have come to expect from the company's languages. It is a compact, fast, easy-to-use programming environment that lets you produce programs quickly and compile them for immediate use.

Features: Turbo Basic 1.1's top-line menu offers file, edit, compile, run, debug, window and environment options. You can create your program in the Edit window using commands similar to those in early versions of Micropro International Corp.'s Wordstar. The editor works strictly on text; it does not check syntax or the spelling of command statements. Lines are limited to 250 characters including the carriage return.

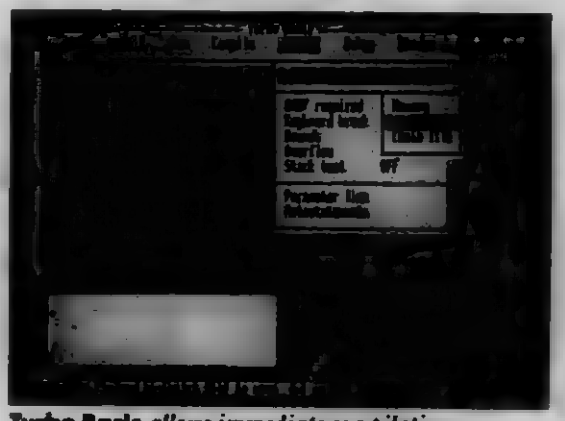
Other features include a search and replace function; the capability to see what your program will look like when it is run as a free-standing, full-screen program; and the capability to view the current program's line number or label, procedure and function name as it executes. You can also choose to compile your program to memory, or to an .EXE or chain file.

Turbo Basic provides many extensions to the Basic language, including an assembly language interface. However, experienced Basic programmers will find that some of Turbo Basic's statements and commands work differently from the way they do in interpreted Basic.

Performance: Very good. Turbo Basic requires 320K bytes of random-access memory, IBM PC-DOS or Microsoft Corp. MS-DOS 2.0 or higher and one floppy disk drive. The 27K-byte, 924-line program we used contained almost every Basic command and statement except those relating to music and graphics.

Overall, we have no complaints. We were especially pleased with Turbo Basic's superior control structures and its many extensions.

Turbo Basic's handicaps are not critical. You cannot continue a program after stopping it during the run process. Also, the compile operation stops at the first error it finds. After editing, you have to recompile the program from the beginning.



Turbo Basic allows immediate compilation

Turbo Basic Version 1.1

Price: $99.95

- Performance: Very good
- Documentation: Very good
- Ease of learning: Very good
- Ease of use: Excellent
- Error handling: Good
- Support: Very good
- Value: Very good

Documentation: Very good. Borland's reference manuals are easy to follow and provide excellent examples.

The Turbo Basic manual is dominated by a reference section explaining each command and statement. The table of contents is comprehensive, and the index is extensive. Appendixes include a DOS primer, data on the assembly language interface and a comparison of Turbo Basic and interpreted Basic.

Ease of learning: Very good. No programming language is easy to learn if it is your first, but if you already know something about Basic, Turbo Basic should not give you too much trouble.

The context-sensitive Help screens are focused on the use of Turbo Basic rather than on programming, but the sample programs provide a solid basis for play and practice.

Ease of use: Excellent. At any moment all of Turbo Basic's capabilities are just a few keystrokes away. Also, the menu command line is implemented logically and simply. The multiple windows for editing, running, tracing and debugging are a boon to productivity.

Error handling: Good. Turbo Basic's error handling during compilation falls short. The fact that changes to the program require recompilation and that only the first error detected is reported to the programmer during compiling can lead to time-consuming edit-compile-edit-recompile sequences. However, the compiler did find every deliberate syntax error entered.

Support: Very good. Turbo Basic comes with a 60-day warranty. Borland's technical support number is not given in the manual, but a phone call to the main number gets you through to support. The technical staff members were friendly, responsive and knowledgeable.

Value: Very good. Turbo Basic and Microsoft's Quick Basic are head-to-head and toe-to-toe competitors. Choosing an outright winner in this battle is impossible.

Contrasting them, we would say that Quick Basic has a slight edge in performance; however, Turbo Basic's simpler structure makes it slightly easier to use.

Note

Reviews are provided by the IDG News Service.

Pertmaster helps in the real world

Pertmaster International, Inc.'s Pertmaster Advance Version 2.0 goes beyond simple scheduling and deals head-on with real project management issues, such as getting commitment from a project's sponsors and team members and improving resource allocations throughout a project.

Features. Pertmaster Advance 2.0 is a rewrite in the C language of the original Pertmaster. This version also includes a Lotus Development Corp.-like user interface, an interface for data base I/O, a built-in report writer and plotting capabilities.

Ironically, Pertmaster Advance does not use Program Evaluation and Review Techniques, or Pert, but requires multiple estimates and performs risk analysis. Nor does the program do complete resource-driven scheduling.

To plan a project in Pertmaster Advance, you can use a task list, a bar chart or a network diagram as the background for entering new tasks.

The new data base interface lets you import and export data from other project management software, and it can be programmed to upload and download data in ASCII form from mainframe programs.

Performance: Good. We

tested Pertmaster Advance 2.0 on an IBM Personal Computer XT-based AT&T semiclone under DOS 2.1 with a hard disk and a Hewlett-Packard Co. HP 7470A plotter.

On our minimum configuration system, Pertmaster Advance ran amazingly fast, with the type-ahead capability precluding any waiting time.

Continued on page 34

4Views fleshes out 1-2-3 capabilities

Turner Hall Publishing's 4Views is another contender in the Lotus Development Corp. 1-2-3 data base add-in fray. Although the package does not increase the data capacity of 1-2-3, it does offer extensions to 1-2-3's native data management capabilities. In particular, 4Views adds indexing, relational functions and computed fields to 1-2-3's data base.

Features: 4Views can import data directly from Ashton-Tate Corp.'s Dbase, or it can use existing 1-2-3 files. It does not store data to disk to increase capacity; rather, it works with data stored entirely in the 1-2-3 worksheet.

As its name implies, 4Views provides four views into the data base. The first is the traditional table view; the second displays records one at a time, with the fields arranged vertically; the third is the report view, which lists the data base page by page, exactly as it would print; and finally, 4Views offers a cross-tab view, which shows the relationships across data base fields. This feature is powerful but complex; it requires careful planning to get good results.

Turner Hall's 4Views

When using the table view, you can select data that you wish to display on-screen in any order. You can also create computed fields, which contain mathematical results based on the values of other fields in the data base. Selected records can be filtered out of the displays.

4Views can index in up to five

fields. Unlike sorting, indexing changes the apparent order of the data but not the actual order. Changing the view or selecting records also does not change the underlying data file, although you can save selected or viewed data to a separate file for later use. You can also edit data in the table or form view, which changes the spreadsheet immediately.

4Views has a relational capability that allows you to view work sheet data from more than one data range at the same time. Data can be related by key or common fields. The view that you create from related ranges can be exported to a Dbase-compatible file or can be extracted to a new 1-2-3 range in the same work sheet.

Performance: Good. 4Views indexes faster than 1-2-3 can sort and allows sorting on five fields compared with 1-2-3's two. It also indexes about 50% faster than Ashton-Tate's Dbase III.

The ease with which you can change the arrangement and

Continued on page 34

Pertmaster

CONTINUED FROM PAGE 33

One complaint: In Pertmaster Advance 2.0, completed milestones stretch to the end of the project no matter when they start, and milestones and subprojects are always shown as 0% complete.

Documentation: Very good. The combined user's guide and reference manual is first-rate. Its strength lies in its authors' thorough knowledge of project management. The illustrated explanation of screens and windows is very valuable, and the reference section includes six detailed appendixes on file structures and error messages. Installation instructions, a quick-reference guide and a tutorial round out the documentation.

Ease of learning: Excellent. Learning aids include the menu-driven interface, on-line Help, documentation and the tutorial manual.

Ease of use: Very good. Version 2.0 incorporates Lotus-like menus with main selections on the top line and submenus or explanations below. It also makes use of both built-in and user-designed windows and screens. Other useful features include context- and window-sensitive on-line Help and well-defined function keys.

Error handling: Satisfactory. Pertmaster Advance 2.0 is a perfect example of a project that was released on time but not completely up to specification. The program failed more than once, resulting in unrecoverable errors. In each case, the error messages that appeared were not explained, or even listed, in the manual. Fortunately, the program's ungraceful failures are offset by thoughtful handling of human errors.

Support: Poor. Pertmaster International provides 90 days of non-toll-free technical support and program updates. After that, telephone technical support costs $20 per hour. A phone-support-plus-upgrades package is $200 per year if bought with the program.

We phoned technical support 12 times. Five of those times, no one was available. Seven times, we talked to an intelligent, friendly technician who encouraged us to keep calling. Unfortunately, you cannot solve problems with a good attitude alone.

Value: Good. PC-based project management programs fall into three categories: personal budget-priced programs; mid-priced packages, such as Software Publishing Corp.'s Harvard Total Project Manager; and Rolls-Royces, which support full graphics and plotting and can be used by all the members of a project planning team.

Pertmaster Advance is squarely in the middle. Its network scheduling and multiproject resourcing capabilities clearly justify its higher price, but despite its speed, plotter interface and report writer, we are not sure it is worth $900 more than the Harvard Total Project Manager.

On the other hand, Advance 2.0 can compete well with the sophisticated Computer Aided Management's Viewpoint.

4Views

CONTINUED FROM PAGE 33

views of your data is a plus, and the data filtering capabilities are also nice.

4Views' report-generating utilities are disappointing. Except for the cross-tab report, the supplied automatic report format is unsatisfactory. In order to get good reports, you have to program using the print functions. The major performance drawback, however, is the random-access memory limitation of 4Views' data files.

Documentation: Poor. The 4Views manual is about two-thirds reference and one-third tutorial. Although it is a good example of what desktop publishing can produce, the content does not live up to the form. Also, the index is incomplete — there is no listing of error messages and sections of the tutorial and reporting reference are just plain wrong.

Ease of learning: Good. The experienced 1-2-3 user, who also has a data base background, will be able to get up to speed quickly. 4Views uses standard Lotus 1-2-3-based moving-bar menus, and context-sensitive Help is just a keystroke away. Because 4Views combines data base and spreadsheet concepts, a good tutorial would be helpful.

Ease of use: Very good. 4Views' capability to save report, view, index, filter and relation criteria separately from the data makes daily operations a breeze. On-screen data entry and editing is also easy. Unfortunately, the 4Views standard report is not very useful and custom report generation is a difficult task.

Error handling: Good. 4Views provides comprehensive prompted menus and error messages for every conceivable operation. It is too bad that the documentation for the error messages is vague.

Support: Very good. Not copy protected, 4Views is covered by a 30-day money-back guarantee. Unlimited support calls are free, although they are not toll free. Technical support is available weekdays from 8 a.m. to 5 p.m. Pacific Standard Time.

If you call Turner Hall's technical support line without a Touch-Tone phone, its automatic routing system is likely to drop you. If you have a Touch-Tone phone, eventually you will reach a knowledgeable support person.

Value: Satisfactory. If you want to extend the data capacity of 1-2-3 to store data, look elsewhere. But if you can fit the data on your 1-2-3 work sheet and just need a better way to manipulate it, you should consider 4Views. Its relational facilities are quite impressive.

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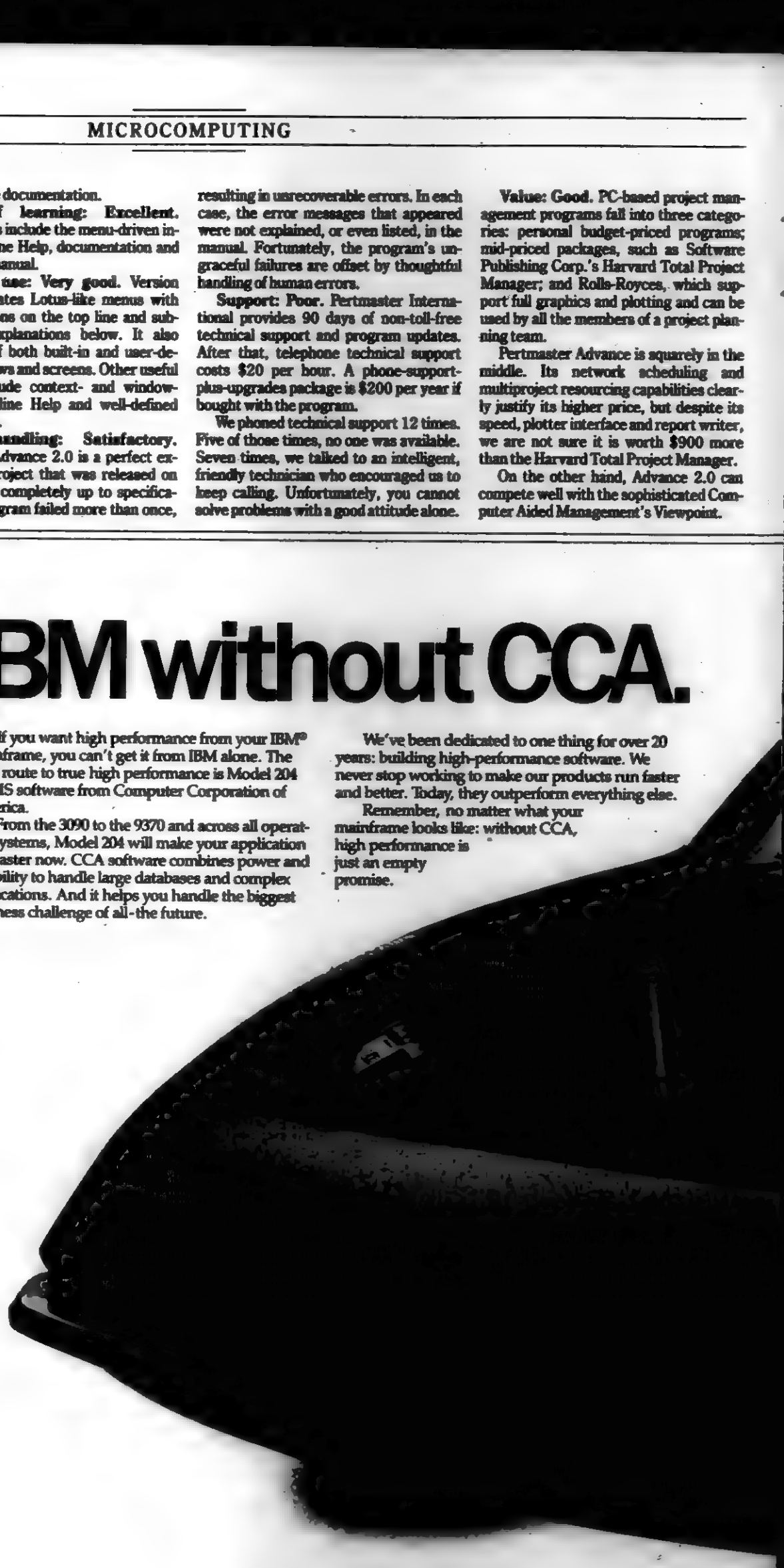


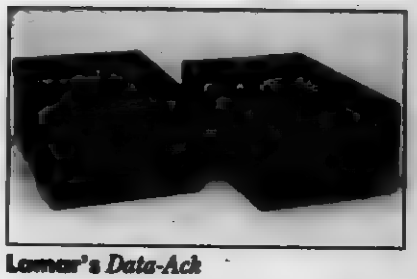
NEW PRODUCTS

Systems

An IBM Personal Computer XT-compatible data acquisition computer has been developed by **Lamar Instruments.**

Data-Ack is powered by a 12V battery and uses 3½-in. disk drives. A 110V AC converter is not required.

Weighing 12 pounds, the system has seven full-length card slots and runs all Microsoft Corp. MS-DOS-compatible programs, including word processing applications. A 10-MHz processor with Intel Corp. 80286 and 80386 microprocessors is standard and has up to 20 MHz optional.



Lamar's *Data-Ack*

The computer is compatible with all IBM battery-powered portable printers.

Data-Ack costs $995, which includes 640K bytes of random-access memory and a 3½-in. floppy drive.

Lamar Instruments, 2107 Artesia Blvd., Redondo Beach, Calif. 90278. 213-374-1673.

A media-independent system that incorporates optical disk storage, microfilm and magnetic storage has been introduced by **Imnet Corp.**

The **Imageview** system relies on IBM Personal Computer AT-compatible hardware and can be expanded, if necessary, through industry-standard networking products such as Ethernet. An entry-level system with a 5¼-in. optical disk includes a high-resolution display workstation, an image input and indexing workstation, a document scanner or microfilm camera, a data base management server and an output station with a laser printer.

Imageview is priced from $39,000.

Imnet, 34 Maple Ave., Pine Brook, N.J. 07058. 201-882-2777.

Advanced Graphic Applications, Inc. has announced a personal computer-based work flow management system, the **Discus 2001.**

The system is said to allow users to store, access and share data, images and sound in a Microsoft Corp. MS-DOS environment. The product integrates into existing microcomputer-, minicomputer- or mainframe-based organizations with support offered for token-ring and Ethernet.

Each workstation is based on an IBM Personal Computer AT or a Personal System/2 platform with varying combinations of a scanner, a high-resolution monitor, a laser printer, a mouse and a telephone. The product includes an MS-DOS driver for optical disk subsystems and proprietary applications. Development software is also available.

The Discus 2001 is individually priced, based on user configuration requirements.

Advanced Graphic Applications, 90 5th Ave., New York, N.Y. 10011. 212-337-4200.

Software applications packages

Intex Solutions, Inc. has released a companion product for Lotus Development Corp.'s 1-2-3 and Symphony.

Trans 1-2-3 converts ASCII files into .WKS format for 1-2-3 or Symphony spreadsheets. The package formats columns by interpreting patterns of the source file and can distinguish numeric entries from labels. It also creates four spreadsheet formats: .WKS, .WK1, .WRK and .WR1.

The product runs on the IBM Personal Computer, PC XT, AT, Personal System/2 and compatibles and operates under IBM PC-DOS or Microsoft Corp. MS-DOS Versions 2.0 or higher. The size of the ASCII file determines memory requirements: 200K bytes for a 100-line source file; 500K bytes for the maximum 1,000-line file. It runs on all versions of 1-2-3 and Symphony.

Trans 1-2-3 costs $95 plus shipping.

Intex Solutions, 568 Washington St., Wellesley, Mass. 02181. 617-431-1063.

Personal computer-based software that combines data acquisition and instrument control into one interface has been announced by **Capital Equipment Corp.**

The **Acquisition Engine** can be used to gather and record information, control processes and regulate instruments. The engine reportedly works with any analysis software, including Lotus Development Corp.'s 1-2-3. The package offers multiprocessing, time-based data acquisi-

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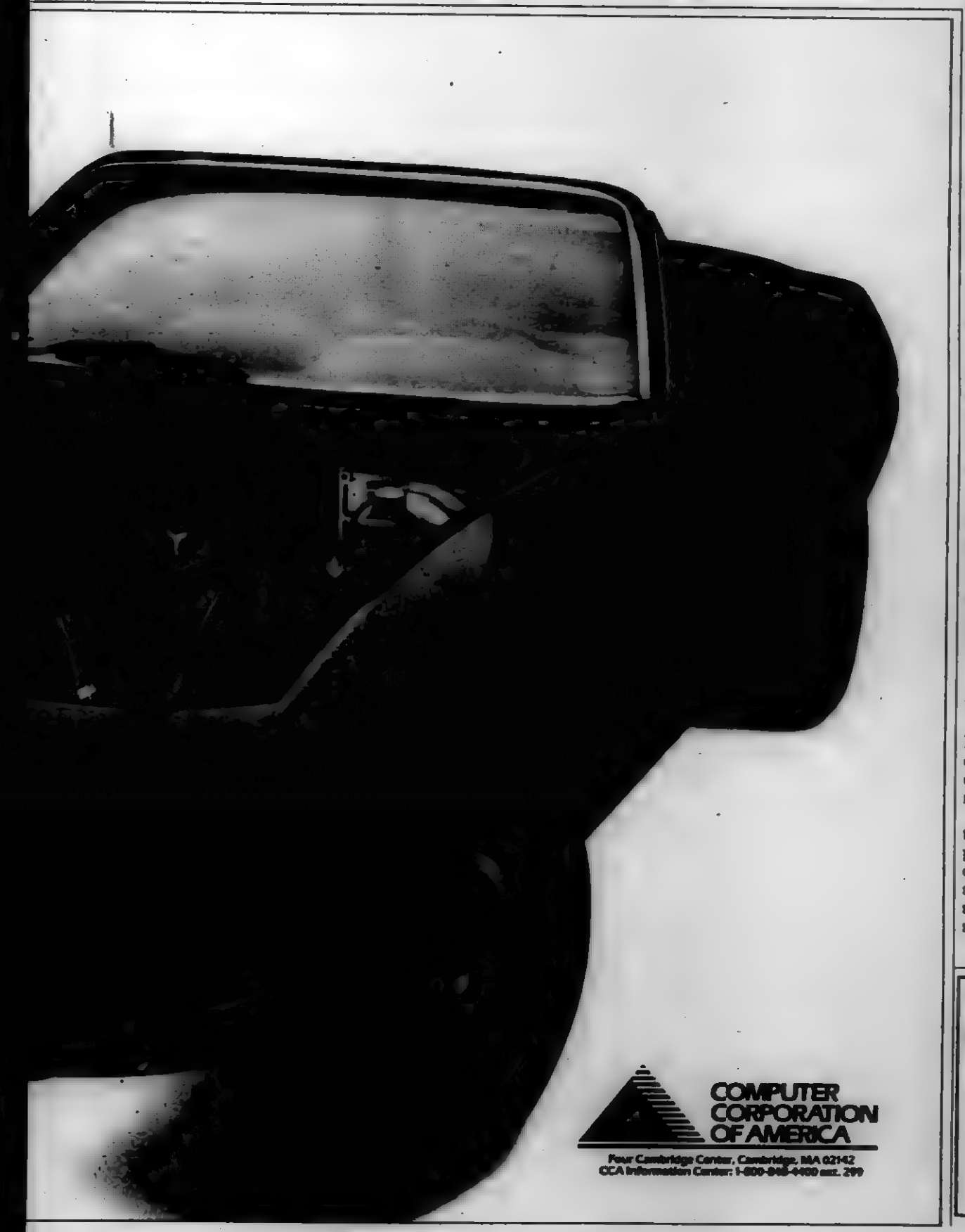

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Continued from page 35

tion, trigger events and high-speed direct memory.

Interfaces supported include IEEE-488 and RS-232. The system runs on the IBM Personal Computer, PC XT, AT and compatibles.

The Acquisition Engine costs $349.

Capital Equipment, Suite 107, 99 S. Bedford St., Burlington, Mass. 01803. 617-273-1818.

A menu-driven bookkeeping system for the IBM Personal Computer, PC XT, AT and compatibles has been introduced by **Hooper International.**

Finance Manager II consists of five integrated modules: General Ledger, Account Reconciliation, Financial Utilities, Accounts Payable and Accounts Receivable. Except for Account Reconciliation, which requires General Ledger, all modules can run independently.

The system requires Microsoft Corp.'s MS- or IBM's PC-DOS 2.0 or higher, 256K bytes of random-access memory and two floppy disk drives or one floppy and one hard drive.

Modules are priced separately from $15 to $40, with a 15% discount for the entire system.

Hooper International, P.O. Box 62219, Colorado Springs, Colo. 80962. 719-528-8989.

Saba Technologies, Inc. has announced **Page Reader 2.0,** an optical-character recognition device that scans single- or multipage documents into personal computer applications for revision and updating.

With the new product, the vendor has reportedly increased data entry speed by 25% over the previous version and has added the Tag Image File Format to its graphics formatting capability.

Page Reader 2.0 supports draft dot matrix fonts produced from most Epson America, Inc., Okidata Corp. and Toshiba Corp. printers. The product runs on IBM Personal Computers, PC XTs, ATs and compatible systems with IBM's PC-DOS 2.1 or higher.

Page Reader 2.0 costs $1,299.

Saba Technologies, 9300 S.W. Gemini Drive, Beaverton, Ore. 97005. 503-626-7050.

Zylab Corp. has upgraded its text search and retrieval program with the announcement of **Zyindex 3.0.**

Version 3.0 reportedly searches 10M bytes of information in five seconds on an IBM Personal Computer AT for a single-word request. The product also searches the native format of most word processors and ASCII files, eliminating the need for end-user conversion of documents to ASCII. Binary file indexing prevents a search of unwanted information.

The program is offered in three configurations and costs from $95 to $695.

Zylab, 3105-T N. Frontage Road, Arlington Heights, Ill. 60004. 312-632-1100.

A project management tool for IBM Personal Computers and compatibles has been announced by **Micro Planning International.**

Called **Micro Planner for Windows,** the graphics-based package allows users to draw logic diagrams, calculate and display deadline and resource information and view potential project bottlenecks.

The mouse- and menu-driven user interface permits users to work without having to learn new routines, and the product provides multitasking capabilities.

Micro Planner for Windows costs $595.

Micro Planning, Suite 840, 235 Montgomery St., San Francisco, Calif. 94104. 415-788-3324.

Software utilities

A software utility for the IBM Personal Computer, PC XT, AT and compatible computers has been released by **R. J. Swantek and Associates.**

Soft-Xplore, a disassembler and patcher, uses four algorithms to separate code from data at a rate of 10,000 line/min on a hard disk.

The product will disassemble anything in files or random-access memory and can process the Intel Corp. 80386 and 80387 instruction set. Patches are kept in a separate file for documentation purposes. Soft-Xplore requires two floppy drives or a hard disk and a floppy drive with a minimum of 256K bytes of memory for Microsoft Corp. MS- or IBM PC-DOS 2.0 and higher.

Soft-Xplore is priced at $79.95.

R. J. Swantek, P.O. Box 1032, Hartford, Conn. 06111. 203-560-0236.

Sterling Castle Software has introduced **Forget-Me-Not,** a random-access memory-resident utility package for executing unattended batch files or applications. The program runs on IBM Personal Computers and compatibles and works in either a single workstation or a local-area network environment.

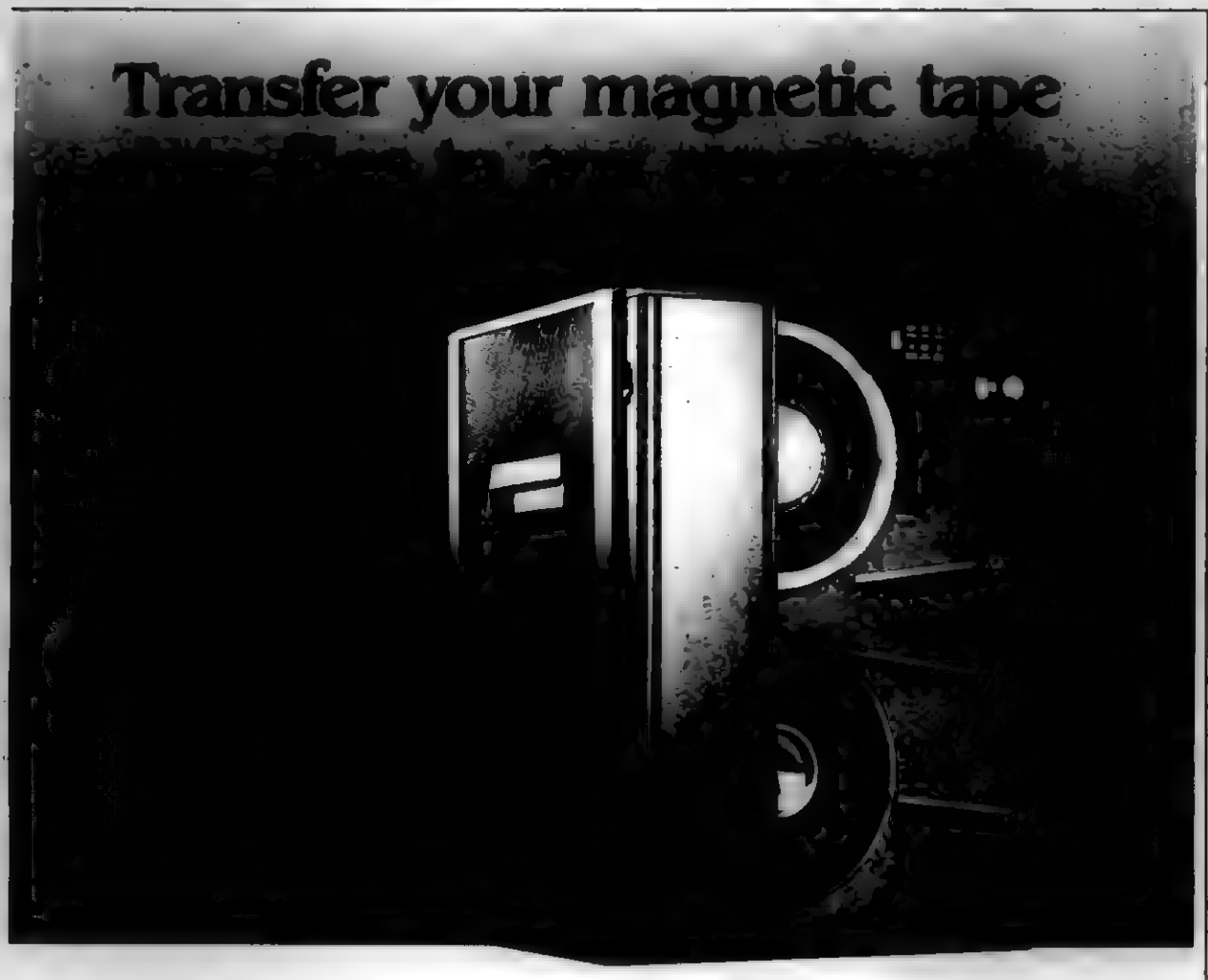
Forget-Me-Not can send a reminder message to the sender or to another network node as electronic mail. The user can designate messages to be delivered immediately or at a specific time or can program the system to replay a message on a daily, weekly or monthly basis.

Forget-Me-Not costs $79.95.

Sterling Castle, Suite 174, 702 Washington St., Marina Del Ray, Calif. 90292. 800-722-7853.

A text retrieval utility that allows files, paragraphs and other blocks of text to be treated as records is available from

Continued on page 38



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Continued from page 36

O'Neill Software.

Text Collector works with ordinary word processing files to collect and organize scattered blocks of text, prepare reports and track information.

The program includes several application packs that demonstrate how to use the program in specific areas, such analyzing questionnaires or searching legal documents.

The product operates on IBM's Personal Computer, PC XT, AT, Personal System/2 or compatible computers, the vendor said.

Text Collector costs $69.

O'Neill Software, Suite 1822, 440 Davis Court, San Francisco, Calif. 94111. 415-398-2255.

Micrographix, Inc., has announced the **Postscript Driver**, intended to enhance Adobe Systems, Inc. Postscript printer support of Micrographix's Designer, Aldus Corp.'s Pagemaker, Microsoft Corp.'s Excel and other Microsoft Windows-compatible applications.

Improvements include support for Adobe color extensions, encapsulated postscript and rotated text. The driver is one third as large as the previous model.

Postscript Driver costs $199.

Micrographix, 1820 N. Greenville Ave., Richardson, Texas 75081. 800-272-3729.

Development tools

Clarion Software has released **Version 2.0 of the Clarion Professional Developer**, a package that creates personal computer application programs.

The product allows the user to create applications with point-and-shoot menus, scrollable tables and pop-up forms without writing any code. The source code generated can be modified with the integrated editor. Prewritten code in Clarion, assembler and C can be used in the application. A DOS shell is also included.

The Clarion Professional Developer costs $695.

Clarion, 150 E. Sample Road, Pompano Beach, Fla. 33064. 305-785-4555.

Boston Software Systems, Inc. has released **Version 3.4** of its **Boston Access** interface development package. The software has been updated to allow nontechnical users to create interfaces for moving data between micro, mini and mainframe computers.

The package reads data directly from the screen buffers of one application and then inserts the data into the keyboard buffers of another application. Boston Access will interface applications running on an IBM Personal Computer or applications that can be accessed on the PC using terminal emulation. The product requires an IBM PC, Personal System/2 or compatible and 128K bytes of random-access memory.

Boston Access 3.4 costs $550.

Boston Software, 76 Whitney St., Sherborn, Mass. 01770. 617-653-5105.

A microcomputer-based development tool for analysts who need to define screens for IBM's CICS or IMS/DC applications has been announced by **Integrated Systems Technology, Inc.** No knowledge of CICS or IMS/DC programming is required, the vendor said.

The product combines prototyping applications and map-definition functions to allow screen presentation without access to CICS, IMS/DC or an IBM 370 mainframe. **Quick Screen 3270** runs on IBM Personal Computers or Personal System/2s and requires less than 400K bytes of memory.

Quick Screen 3270 costs $295 per license.

Integrated Systems, 5 Chapel Hill Road, Short Hills, N.J. 07078. 201-376-3722.

Software enhancements

An enhanced version of the **Summasketch Professional** tablet is now available from **Summagraphics Corp.**

Now offering up to 1,016 line/in. resolution, the product comes with a mouse emulator, a Microsoft Corp. Windows driver, interface cables, a four-button cursor, a two-button stylus and a two-year limited warranty.

The tablet was designed for high-end workstations using computer-aided design with high-performance software such as Autodesk, Inc.'s Autocad, Micro Control Systems' Cadkey and Versacad Corp.'s Versacad. Summasketch Professional is priced at $999.

Summagraphics, 777 State St. Extension, Fairfield, Conn. 06430. 203-384-1344.

Data storage

A 1.2M-byte floppy disk drive for the IBM Personal System/2 is available from **Pacific Rim Systems, Inc.**

The external 5¼-in. floppy drive allows users of high density IBM Personal Computer AT-compatible diskettes direct access to the PS/2 system, the vendor said.

The **PRS-2** 1.2M-byte drive reads and writes all standard disk formats and can be used with the PS/2 Models 25, 30, 50, 60 and 80.

The unit measures 1¾ in. high by 6 in. wide by 10 in. deep and weighs 3.5 pounds.

No external power supply is necessary for operation.

The PRS2 costs $350.

Pacific Rim Systems, 2570 Barrington Court, Hayward, Calif. 94545. 415-782-1013.

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Siemens Memory Products Division has introduced two 380M-byte Winchester disk drives.

The **Megafile 4410 Extended Small Disk Interface** drive and the **Megafile 4420 Small Computer Systems Interface** drive reportedly maintain data transfer rates of 15M bit/sec.

The 4420 operates in synchronous

A Siemens *Winchester drive*

mode with burst rates up to 4M byte/sec., and both drives have an average access time of 18 msec. The drives are available to OEMs for immediate delivery.

The 4410 and 4420 cost $1,895 each in OEM quantities of 100 per year.

Siemens, Suite 325, 5655 Lindero Canyon Road, Westlake Village, Calif. 818-706-8872.

Emerald Systems has introduced enhanced small device interface (ESDI) hard-disk subsystems for Novell, Inc.'s Netware 2.1. The series contains seven models and is said to have a data transfer rate of 10M bit/sec.

Available in internal and external configurations, the basic ESDI hard drives have capacities of 150M and 300M bytes. The 600M-byte versions of the drive, the **LAN 600-3122** and the **LAN 600-5122**, each combine two 300M-byte drives to form one logical unit. The **3120** series is designed for internal installation in the IBM Personal Computer AT, the Compaq Computer Corp. Deskpro and other Intel Corp. 80286- and 80386-compatible systems running Netware 286 2.1.

Pricing on the seven-drive series ranges from $3,995 for the 150M-byte **LAN 150-3122** to $15,995 for the LAN 600-5122.

Emerald, 4757 Morena Blvd., San Diego, Calif. 92117. 619-270-1994.

Printers/Plotters/ Peripherals

Tegra, Inc. has announced a **Postscript-Compatible Interpreter (PCI)** option for its line of image setters.

PCI is an option for the Tegra image controller, the basic Tegra system unit that drives both film recorders and plain-paper output devices. The product consists of proprietary hardware and software modules that interpret the Adobe Systems, Inc. Postscript page description language.

The PCI option offers an RS-232 interface for use with workstations, IBM Personal Computers and clones and an Apple Computer, Inc. Appletalk network interface for use with Macintoshes.

The PCI option costs $19,500.

Tegra, 900 Middlesex Tnpk., Billerica, Mass. 01821. 800-228-3471.

AST Research, Inc. has unveiled the **Turboscan/Flatbed Scanner**, which reportedly allows documents of any shape to be scanned in 10 to 40 sec.

Designed for desktop publishing and office automation applications, the scanner converts color or black-and-white text, handwriting, artwork and photographs into binary code for processing.

Images up to 8½ by 14 in. are digitized into the computer at 300 by 300 dot/in. resolution. A line-art mode is available for black-and-white materials, and a half-tone mode for documents with continuous shading is an option.

The Turboscan/Flatbed Scanner costs $1,995 for IBM-compatible systems and $1,899 for use with Apple Computer, Inc. Macintoshes.

AST, 2121 Alton Ave., Irvine, Calif. 92714. 714-863-1333.

A biometric security product that identifies users by fingerprint has been introduced by **Indentix, Inc.** The **Touchsafe** finger scanning system stores a mathematic characterization of the fingerprint in memory and can be linked to a computer system or a terminal.

The system is slightly larger than a computer mouse and connects by cable to the desired system. Two hardware versions are available: the internal module is a printed-circuit board that plugs into an IBM Personal Computer bus or a compatible, and the external module is contained within a metal enclosure that connects via an RS-232 interface to the computer.

The cost of Touchsafe with an internal module is $1,795. A system with the external module costs $1,895.

Indentix, 2452 Watson Court, Palo Alto, Calif. 94303. 415-858-1001.

Several **device drivers** for Freelance Plus and Graphwriter II are now available from **Lotus Development Corp.**

The drivers support a variety of output devices, including the Canon U.S.A., Inc. LBP-8II laser printer, the Epson America, Inc. JX-80 color dot matrix printer, the Hewlett-Packard Co. Deskjet ink-jet printer and the IBM Video Graphics Array card. Support is also available for various Toshiba Corp., NEC Corp. and Xerox Corp. printer products. The device drivers are available in 5¼- and 3½-in. media.

The disk costs $20 for registered Freelance Plus and Graphwriter II users.

Lotus, 55 Cambridge Pkwy., Cambridge, Mass. 02142. 617-577-8500.

Texas Instruments, Inc. has announced an additional postscript printer for its Omnilaser 2000 series. The **Omnilaser 2106**, designed for workstation use, offers 35 resident typefaces and expanded paper-handling functions.

Interfaces are available for the Apple Computer, Inc. Macintosh, the IBM Personal Computer and compatibles. The 2106 will emulate several output devices, including the Xerox Corp. Diablo 630, the Hewlett-Packard Co. Laserjet Plus and the HP 7475A plotter. The product prints six page/min.

The Omnilaser 2106 costs $4,595.

TI, P.O. Box 655012, Dallas, Texas 75265. 800-527-3500.

Board-level devices

PC Technologies, Inc. has introduced two versions of an accelerator that give users the option of a 12- or 16-MHz Intel Corp. 80286 microprocessor speed on the IBM Personal System/2 Model 30 and other compatible Intel 8086-based microcomputers.

Called the **286 Express/30-12** and the **286 Express/30-16**, both versions of the full-slot board include a software-programmable system configuration and keyboard-selectable 80286 and 8086 processing with 16K bytes of cache memory. Support for an optional Intel 8087 coprocessor in the system and an optional 80287 on the board are also provided.

The 286 Expressway/30-12 costs $575. The 286 Expressway/30-16 costs $695.

PC Technologies, P.O. Box 2090, Ann Arbor, Mich. 48106. 800-821-3086.

A 32-bit memory expansion board for the Compaq Computer Corp. Deskpro 386 has been introduced by **Computer Peripherals, Inc.**, an OEM of enhancement products for IBM and compatible computers.

The **386 Memoire** supports up to 2M bytes of parity-checked memory and was designed to fit the 32-bit memory expansion slot on the Compaq machines.

The 386 Memoire costs $695 for a 1M-byte version and $1,145 for a 2M-byte version.

Computer Peripherals, 667 Rancho Conejo Blvd., Newbury Park, Calif. 91320. 805-499-5751.

Procom Technology, Inc. has introduced a 1.2M-byte external 5¼-in. floppy disk drive for use with all models of IBM Personal System/2 computers.

The **PXF1200**, with a data transfer rate of up to 500K bit/sec. and a 3-msec access time, lets users transport and share information between PS/2s and the older generation of IBM Personal Computers, PC XTs, ATs and compatibles. The disk has its own internal controller and can read, write and format 360K- and 1.2M-byte diskettes. It has a mean-time-between-failure rate of 12,000 hours.

The PXF1200 costs $450.

Procom Technology, Suite 128, 3100 Airway Drive, Costa Mesa, Calif. 92626. 714-549-9449.

IGC has announced **VM/386 1.10**, a multitasking control program for IBM, Compaq Computer Corp. and other microcomputers that is now available for the IBM Personal System/2 Model 80.

New features include improved hard-disk I/O support and support for IBM's Video Graphics Array and a shared random-access memory disk.

VM/386 uses the virtual Intel Corp. 8086 mode of the Intel 80386 to create a series of guest virtual machines and provides a separate copy of DOS for each. The product supports the Compaq Deskpro series, the Kaypro Corp. 386, the Acer Technologies Corp. 1100 and other compatibles. Both 3½- and 5¼-in. media are included.

The VM/386 1.10 costs $245 and is distributed through Lifeboat Associates.

IGC, 4800 Great America Pkwy., Santa Clara, Calif. 95054. 408-986-8373.

The **Mitac Paragon 286V** personal computer is now available for U.S. delivery from Taiwan-based Mitac International Corp.'s American division, **American Mitac Corp.**

The small-footprint, Intel Corp. 80286-based IBM Video Graphics Array (VGA)-compatible PC was designed for office, engineering and scientific applications. The system has a VGA-compatible video adapter built into the main board and can also emulate IBM Enhanced

Mitac's Paragon 286V

Graphics Adapter, Color Graphics Adapter and Hercules Computer Technology, Inc. standards.

The Paragon 286V also includes 3½-in. floppy disk drives, an Intel 80286-12 CPU, a floppy-disk controller, Phoenix Technologies, Inc. Bios and 1M byte of random-access memory.

The Paragon 286V is priced from $2,195.

American Mitac, 410 E. Plumeria Drive, San Jose, Calif. 95134. 408-432-1160.

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IBM gave dynamic allocation to CICS…but you need Netec's CAFC to make non-stop CICS a reality. CAFC allows a single command to OPEN or CLOSE 5 or 50 files. CAFC establishes two way communication between your CICS regions and your batch jobs. Your batch jobs will always have the files they need for processing without operator intervention.

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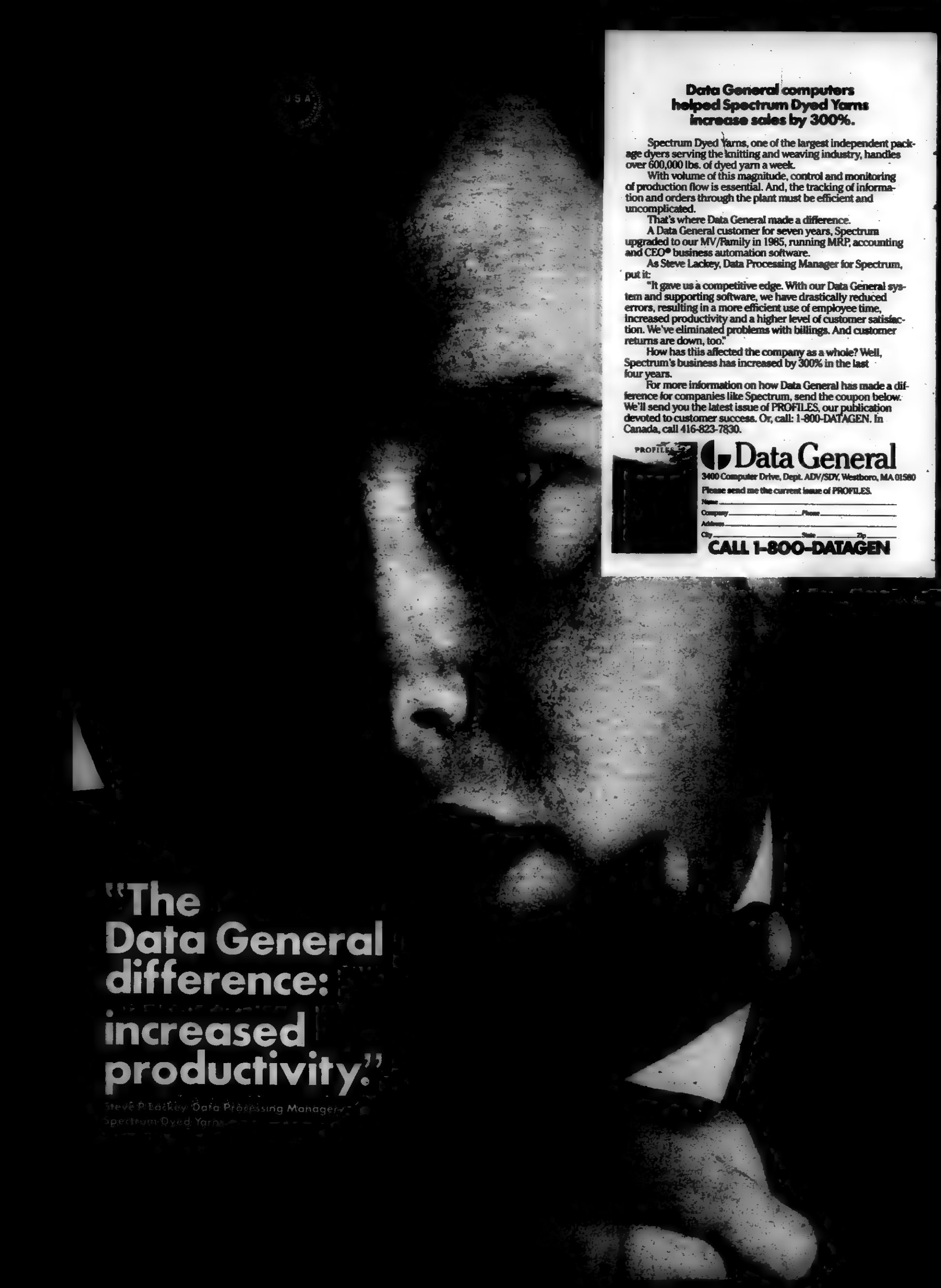
P.O. Box 180549 • Dallas, Texas 75218
Telex: 314419 TELECOM UD (214) 343-8744



Data General computers helped Spectrum Dyed Yarns increase sales by 300%.

Spectrum Dyed Yarns, one of the largest independent package dyers serving the knitting and weaving industry, handles over 600,000 lbs. of dyed yarn a week.

With volume of this magnitude, control and monitoring of production flow is essential. And, the tracking of information and orders through the plant must be efficient and uncomplicated.

That's where Data General made a difference.

A Data General customer for seven years, Spectrum upgraded to our MV/Family in 1985, running MRP, accounting and CEO® business automation software.

As Steve Lackey, Data Processing Manager for Spectrum, put it:

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DBMS targeted at tyros

BY SALLY CUSACK
CW STAFF

DALLAS — Novice and casual microcomputer data base users can take heart. At least that is the promise of a relational data base management system, aimed at nonpower users, recently introduced by Caltex Software, Inc.

The program, called D, was written in its own language and uses a bare-bones command set structure that makes it less intimidating than other data base packages, such as Ashton-Tate Corp.'s Dbase III, the vendor claimed.

While the more seasoned and technically oriented user may object to learning a new language, the product could prove a boon for those who lack hardcore personal computer expertise and have carefully avoided data base systems in the past. For these folks, an easy-to-learn language may be just the ticket.

"We wanted a package that allows a user to access data, as opposed to a product designed for a programmer to manipulate data," said Jules Brenner, president of Caltex. "We are trying to establish our 'thinnest layer' philosophy, that is, to put the thinnest possible layer between the user and the data."

The product currently has an installed base of 200 and is primarily targeted for shipment to the value-added reseller market. The package runs on IBM Personal Computers, PC XTs, ATs or compatibles with DOS 2.0 or higher.

D carries a price of $395.

Barney

FROM PAGE 31

They still want it all. Microsoft almost has it all. They've got multiple operating systems, most languages except English, mice, accelerator and memory boards and applications in almost every important or even semi-important category.

And when a competitor pioneers a market, it is not long before Microsoft jumps in somehow, some way. It seems the firm wants much more than to plunder Lotus's sacred spreadsheet market. In fact, it looks like the next target may be strategic partner Ashton-Tate, which has an agreement to resell Microsoft's SQL Server.

According to industry know-it-alls, Microsoft coders are cranking out a single-user data base software package that by its very definition will compete with Ashton-Tate's Dbase. The product, which is still tightly under wraps, could serve as a front end for the server product or as a stand-alone system.

Well maybe fair's fair. After all, Ashton-Tate did announce plans to use an SQL engine from Interbase that by its very definition will compete with SQL Server.

Foul language? We recently received a copy of a letter sent to Microsoft Chairman Bill Gates from an irate user of Microsoft's Cobol.

It seems that Heywood G. Klebenov, president of Resolution Data, was planning to use the Cobol to develop a system that could run under either Microsoft's MS-DOS or Xenix and eventually OS/2. Promises of a single language that works in all three environments led Klebenov to go for Microsoft's Cobol in the first place.

But Klebenov says Microsoft may be moving away from single Cobol support for all three environments. Instead, the company is planning to market Micro Focus's Cobol for OS/2 and possibly freeze development of its own Cobol. Try as he might, Klebenov has not yet determined what the firm's Cobol strategy is.

SQL Server goes naked? Speaking of SQL Server, it appears that this anxiously awaited product, which runs on servers and provides data to multiple users, will lack one thing when released later this year: a broad array of front-end tools.

Right now, Microsoft is overly dependent on partner Ashton-Tate to move the still-unshipped Dbase IV over to the server and on Ansa Software to ante up with a version of Paradox. According to our source, the Microsoft folks are a bit worried about the timing of Dbase IV, a product that is desperately needed if SQL Server is to take off.

Lotus TACs out. Lotus was prepping The Application Connection (TAC) 5.0 for a mid-May release, but new software honcho Frank King doesn't much like preannouncements, so look for a June debut instead. The micro-to-mainframe file transfer and translation software package has been rewritten in C, and the company boasts of its greater performance and ability to make end users more self-sufficient through a menu-based feature called The Selection.

The system is also said to include Blueprint, an unshipped Lotus interface that allows Lotus applications to connect to a variety of supported DBMSs.

But don't expect to get TAC 5.0 all at once. It will ship in two sets, one in the third quarter — with support for IBM's SQL/DS — and the complete system by year's end, a Lotus source said.

Mathsoft to add high-end? According to a source briefed by the firm, Mathsoft is set to move from low-end PC-based equation solving to high-end mathematic software, priced from $5,000 to $8,000, for Sun workstations. How much is that per equation?

Barney is a Computerworld senior editor, microcomputing.

NCR offers Intel board trade-in

BY JAMES A. MARTIN
CW STAFF

DAYTON, Ohio — NCR Corp. recently announced a program in which users of the NCR PC810 microcomputer receive an allowance when trading in that micro's Intel Corp. 80286-based processor board for an Intel 80386-based board.

In exchange for the trade-in, the user can choose between a cash rebate or a Microsoft Corp. Windows 386 software package and an NCR mouse, the company said.

NCR's PC810 is based on the company's passive back-plane architecture, with the CPU on an add-in board instead of the motherboard, as with most microcomputers. This "split-card" architecture enables users to replace CPUs through the use of add-in cards.

Faster than AT?

"When upgraded, the PC810 will have the same functionality as the 80386-based NCR PC916, which processes information 2½ to three times faster than 80286-based AT compatibles," said Vernon Yates, vice-president and general manager of NCR's Personal Computer Division.

For a 1-year-old board, the trade-in allowance is $225; 2- and 3-year-old boards earn rebates of $150 and $75, respectively. To upgrade the PC810, NCR is offering a $2,295 upgrade kit that includes a 386 upgrade card, a companion memory board and a bus extended to connect the two components.

The program lets users who previously did not have a need for 386 micros upgrade without losing their initial hardware investment, Yates said.

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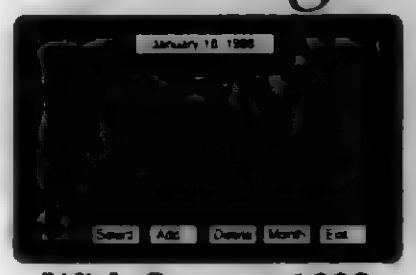

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Fed PC buys tripled in '87; total near 500,000

BY ALAN J. RYAN
CW STAFF

WASHINGTON, D.C. — Federal agencies stepped up their microcomputer purchasing rate last year, buying nearly 200,000 personal computers. That brings the total number of PCs in operation in the federal government to nearly half a million.

Those statistics, gathered in a study by the U.S. General Services Administration (GSA), show that the pace of computer acquisition by federal agencies is increasing as the agencies turn to automation, according to Frank J. Carr, commissioner of GSA's Information Resources Management Service.

Carr said the study revealed that agencies bought almost three times as many microcomputers in fiscal 1987 as in fiscal 1985, during which 67,502 PCs were purchased. No survey was conducted on 1986 purchases.

The buying trend bodes well for Zenith Data Systems, which supplied more than half the PCs acquired by the government in fiscal 1987. Zenith provided 116,984 units, or 59% of total federal purchases. The Zenith purchases cost the government $249 million.

Placing a distant second in microcomputer sales to the government was IBM, with 9.6% of the total in fiscal 1987. Wyse Technology, NCR Corp. and Compaq Computer Corp. also broke into the list of the 10 largest government PC suppliers. Wyse, NCR, Compaq, Wang Laboratories, Inc., AT&T, Apple Computer, Inc., Unisys Corp. and Epson America, Inc. shared 16% of the federal market. The remainder was supplied by 647 vendors.

Your tax dollars at work

Last year, the government spent a total of $614.1 million on microcomputers, the survey showed. As of October 1987, there were 490,400 microcomputers in use in federal offices; the total cost of the units was reported to be $1.8 billion.

The largest PC user within the government is the Department of Defense, which owns 68% of the micros in use. The departments of the Air Force and the Army each have 22% of the DOD total, followed by the Navy with 19%.

The largest civilian agency user is the Department of the Treasury, with 7%, followed by the National Aeronautics and Space Administration with 4% and the departments of Agriculture and Transportation with 3% and 2%, respectively, according to the study.

"If this rate of acquisition continues, more than a million microcomputers will be in use in the government by the early 1990s," Carr said.

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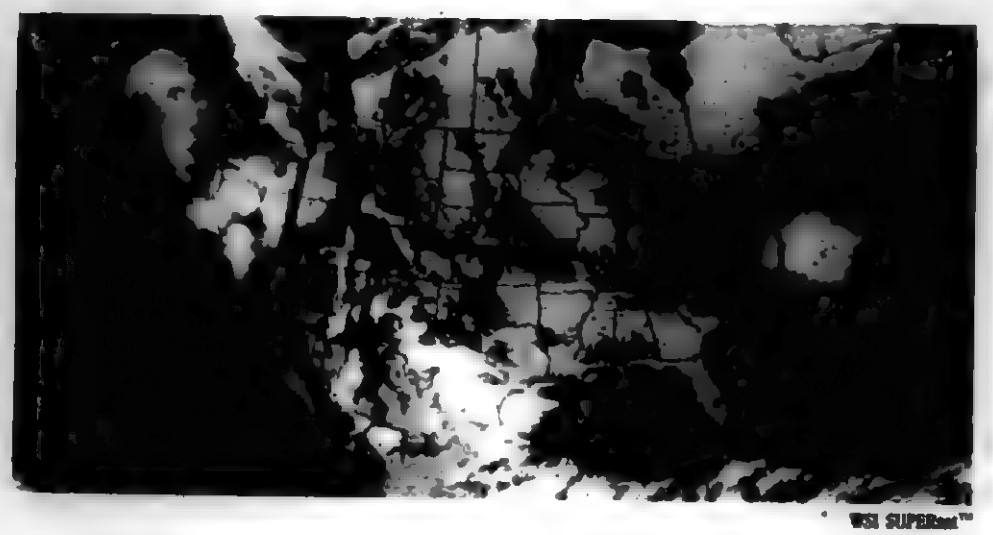

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Director of Computer Services, WSI

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WSI saved money by choosing the ACS 4030. Bayer checked into other remote bridges but chose the ACS 4030. "It had all the features we needed and was priced considerably less than the others."

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Mac to receive Autocad version

BY JULIE PITTA
CW STAFF

SAUSALITO, Calif. — Autodesk, Inc. is porting Autocad, its widely used computer-aided design (CAD) and drafting software package, to Apple Computer, Inc.'s Macintosh II.

The decision to introduce a Mac version of Autocad marks the first time Autodesk has used an Apple system as a platform for its software. The version is set to ship sometime during the third quarter.

Autodesk sells versions of Autocad for Microsoft Corp. MS-DOS-based personal computers, Sun Microsystems, Inc.'s Motorola, Inc.-based Sun-3 workstations running the Unix operating system and Apollo Computer, Inc.'s Motorola-powered DN 3000 and 4000 workstations running the proprietary Aegis operating system in addition to Digital Equipment Corp.'s Microvax workstations running VMS.

Malcolm Davies, Autodesk's vice-president of marketing and sales, said before last year's introduction of the Motorola 68020-based Macintosh II that Apple did not have a suitable platform for Autocad. "Apple didn't have a serious workstation until the Mac II," he said. "None of its previous systems had the power and performance needed for CAD."

Davies said Autocad for the Mac II employs the same code as earlier versions of the software. "It's not a rewrite or a subset," he noted. "But it runs under Mac Windows and has some Macintosh features."

Dave Burdick, an analyst at Dataquest, Inc., said the introduction of CAD software packages for the Macintosh will add steam to Apple's efforts to penetrate the engineering market. Apple's joint development agreement with DEC — which has a strong presence in engineering environments — has also added to Apple's appeal to technical users, Burdick added.

At the recent AEC Systems Show in Chicago, Autocad for the Mac II received significant attention from attendees, he continued. "It was pretty remarkable to see a line of engineers waiting to see Autocad running on the Mac," Burdick said, noting that he expects to see more CAD applications running on the Mac II. "Apple is giving people in that market a warm, cozy feeling that they're in this market to stay."

Wordstar

FROM PAGE 31

star package if it hopes to hold on to a huge installed base of defecting users.

Wordstar Release 5 reportedly contains 300 new features, including page preview capabilities, outlining, mail merge and an updated interface. The package costs $495. But the firm's troubles run deeper than one late product upgrade. Much of Micropro's current fiscal malaise stems from its traditional one-product approach to the market.

Branching out

Leon Williams, Micropro's president and chief executive, has tried to diversify the company to avoid dependency on one product, but preannounced programs have yet to hit dealers' shelves. Williams could not be reached for comment.

"Micropro hasn't introduced the new products needed to build new customers," said Bill Higgs, director of software research at Infocorp in Cupertino, Calif. "If they're going to leverage their current end users, they're going to have to broaden their product line."

Most notably absent from Micropro's product list is a word processor for Apple Computer, Inc.'s Macintosh and a desktop publishing package. The Mac package has already missed its shipment deadline and the desktop publishing program is still under development.

New product sales could inject some much-needed life into Micropro's bottom line. Although Williams was supposed to spark a turnaround at the one-time word processor king, Micropro lost $2.3 million on revenue of $10 million for the quarter ended Feb. 29, 1988. For the same period one year ago, Micropro posted a profit of $500,000 on revenue of $9.2 million.

Higgs, however, said the late shipment of Wordstar Release 5 does not necessarily mean the company is down for the count. "It's never surprising to hear that software is late — three months late might not make that much of a difference," Higgs said.

IBM's VGA inspires subsystem, monitor

BY JAMES A. MARTIN
CW STAFF

ATLANTA — IBM's Video Graphics Array (VGA) gained additional support at Comdex/Spring '88 here last week with compatible product introductions from Hewlett-Packard Co. and AST Research, Inc.

HP unveiled its Video Graphics Subsystem, which includes a VGA adapter card said to be register- and IBM BIOS-level compatible with IBM's VGA, with the choice of either a color monitor capable of displaying up to 256 colors simultaneously, or a monochrome monitor. The subsystem is designed for the HP Vectra line as well as IBM Personal Computers.

The adapter card comes standard with 256K bytes of random-access memory, with an option for 512K bytes, and an 800- by 600- pixel resolution.

HP's subsystem reportedly will be available June 1, at a cost of $445. The Video Graphics Color Display will be priced at $695 and the monochrome display will be priced at $250.

AST unveiled its Premium Display/VGA color monitor, said to provide up to 720- by 480-pixel resolution on a 14-in. diagonal, noninterlaced screen; it is slated for June availability for $696. The company said it will also release the AST-VGA Plus, a 16-bit graphics adapter said to run 400 times faster than IBM's VGA; it is scheduled to ship in late May for $599.

Symantec, Metier link project tools

BY STEPHEN JONES
CW STAFF

CUPERTINO, Calif. — Symantec Corp. wedged its Time Line personal computer project management software into the world of minicomputers and mainframes recently, announcing a plan to link Time Line with high-end products from Metier Management Systems, Inc.

Symantec and Metier teamed up to develop hooks between Time Line and Artemis Project, Metier's project management software, that allow users of either product to share data. The agreement also calls for a joint sales and marketing push and plans to link future products from both companies.

Time Line 3.0 users can transfer data to and from Artemis software by running a utility add-in disk that Symantec said it will ship as a free upgrade during the second quarter. Metier is currently shipping Artemis, which can import and export data from Time Line and starts at $3,500.

High-end links

The link to Artemis gives Time Line PC users a connection to project management software running on high-end workstations, Digital Equipment Corp. VAXs, Hewlett-Packard Co. 1000 series minicomputers and IBM mainframes, according to Rod Turner, Symantec's executive vice-president.

Time Line users can take advantage of that connection and send schedule data to high-end systems for project consolidation.

Turner said the partnership is aimed at taking advantage of the need to pass project information between high-end and low-end computers as PCs continue to be integrated into corporate mainframe environments.

"An end user can now transfer data down to the PC level so that others can manage part of a large project," Turner said.

Symantec is not the first software company to try marrying its PC project management program to another company's high-end software. Microsoft Corp., developer of Microsoft Project, already has a similar relationship with Primavera Systems, Inc.

3270 PC

FROM PAGE 31

"No one will miss the 3270," Jeffery said. "The thing was a dog from day one."

He said the G models of the 3270 line were "too limited to be general-purpose graphics workstations and too expensive to be general-purpose workstations. No one really bought them."

IBM credits the 3270's demise to the birth of its Personal System/2 line with the 3270 Connection Adaptor and supporting programs that offer 3270 functionality. IBM will continue to sell the three remaining 3270 models until June, according to IBM spokeswoman Linda Dezan.

User Art Skopec said the announcement was more than welcome. A senior PC analyst in the information center at Memorial Sloan-Kettering Cancer Center in New York, Skopec said he had not bought a 3270 for a year and a half. The center has approximately 50 of the units.

"We were one of the people to buy into them and learn that they were virtually a useless workstation," Skopec said. "They couldn't run DOS sessions of any consequence, especially with RAM-intensive applications like Paradox."

Ed Ginorio, manager of customer computing support at Dun & Bradstreet Corp. in Basking Ridge, N.J., said the fact that IBM will not be manufacturing the 3270 is not distressing. "The key is that the functionality is not being lost. That will just continue on in any of the new machines," he said. "We hadn't invested too much development time in terms of thinking that the hardware would last that long."

Skopec said the cancer center has used the systems for electronic mail with IBM's Professional Office System and as personal computer workstations for word processing and light spreadsheet and data base applications.

The center connected the machines via IBM's Host Connect to the mainframe.

"At every step of the way, the 3270s presented us with difficulties," Skopec said. For him, the death was long overdue. "They keep the turkeys around, then precipitiously, they get rid of two products that are adequately filling their niche — the XT and AT."

Skopec said his shop has nearly 800 PCs, and 50% are well connected to the host via Digital Communications Associates, Inc.'s Irma adapter.

IBM's Dezan said the 3270 hardware's maintenance and service support will continue indefinitely.

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OS/2

FROM PAGE 31

SAA, you don't participate in this evolution," Kamerer said.

The lack of highly detailed information concerning OS/2 Extended Edition, including unanswered questions about compatibility with non-IBM Personal Computers, has held back planning by some organizations that otherwise buy into the concepts.

Despite the questions, many corporations are including the application-strewn operating system into their sometimes vague plans for future systems. "For OS/2 Extended Edition, this is a year to understand and position it. But there will not be a lot of real implementation," said Julian Horwich, a PC manager at a Fortune 100 firm.

Others have a firmer handle on its use, if the product stands up to scrutiny. "If it does what they say it will do, it will play a big role in our shop. We have DB2, so we are hoping OS/2 Extended Edition fits in well for turning mainframe data into PC data and vice versa," said Howard Fosdick, relational data base project leader at Amoco Corp.

Although the lack of third-party support has tempered Extended Edition excitement, Kamerer promised that will change. "It will start at Comdex, and there will be more and more [support] by year's end," Kamerer said. He did not give specifics. Comdex/Spring '88 was held last week in Atlanta.

Datacease International, Inc. has been rumored to be prepping a front end for the IBM system, sources said. OS/2 Extended Edition will provide a variety of front-end tools, but observers believe the tools will lack the sophistication of those provided by third parties.

And though many users and vendors have focused on the DBMS portion, OS/2's host-oriented Communications Manager may hold the real allure. "When you are talking about real strategic systems with a high level of integration between a PC and a mainframe, it is really nice to have just one vendor," Fosdick said. "With multiple vendors, when you have a problem, they all point at each other and say it is the other guy's fault."

Overactive imagination

Because IBM has avoided direct answers up to now, the issue of whether Extended Edition will run on non-IBM PCs has loomed large. But the issue may be overblown. "If they are truly 100% compatible, sure it will run. In fact, a PC bus-based AT-like machine can make an excellent workstation," Kamerer said.

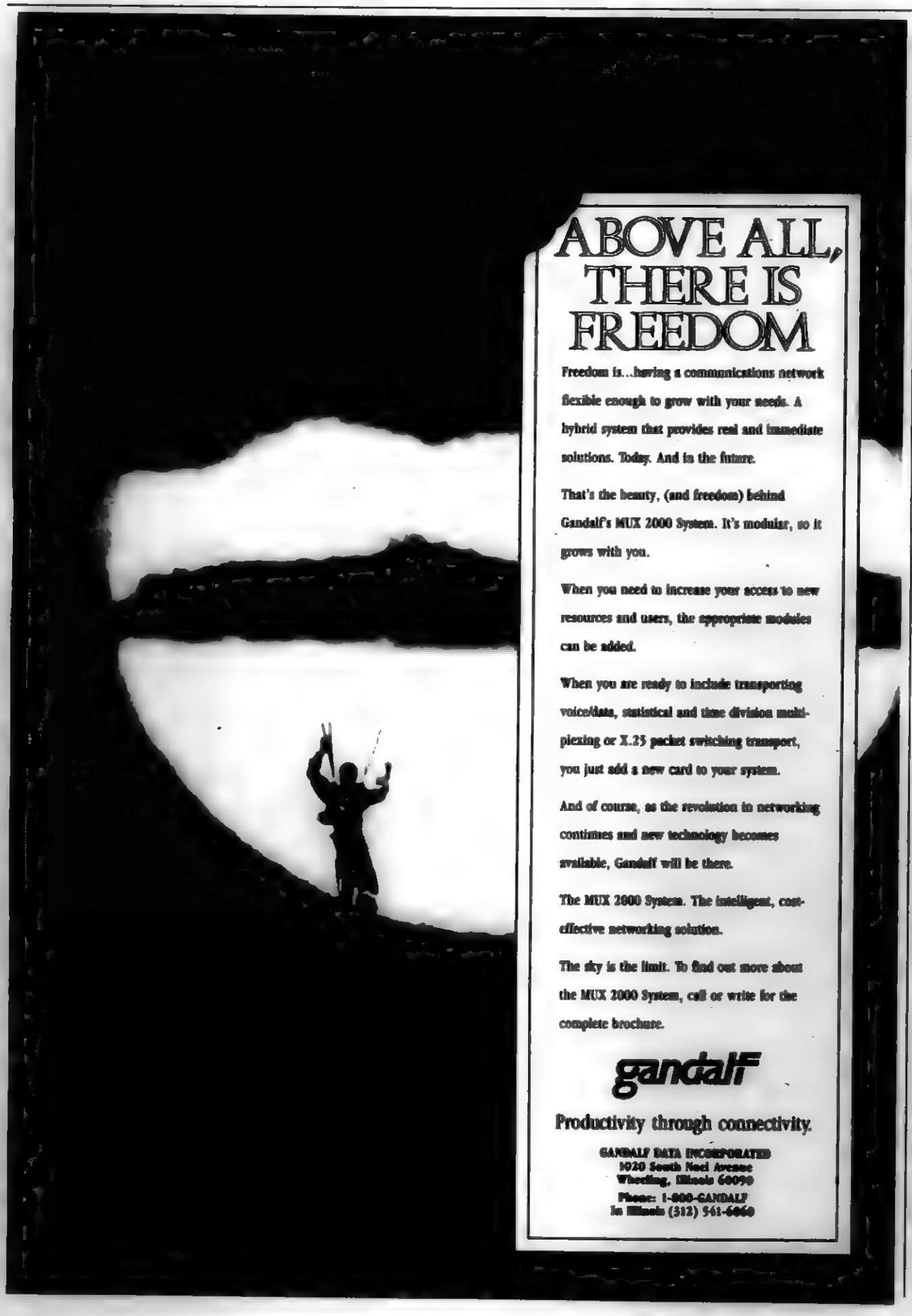
IBM has not tested OS/2 Extended Edition on competitors' machines, but one beta-test site has. According to the site, the software ran well on a Compaq Computer Corp. machine.

In addition, Phoenix Technologies Ltd. is confident that machines using the firm's A BIOS, a style of BIOS designed for OS/2 that also conforms to known hardware standards, will run the software as well. However, if a clone vendor's system is not hardware-compatible enough to run IBM's version of OS/2 , it is doubtful that the system will run the Extended Edition.

The initial markets for OS/2 Extended Edition are a set of customers interested in laying the groundwork for real-time access to data distributed across local-area networks, workstations, minis and hosts, Kamerer said. "The first people that utilize it and relate to it will be large mechandisers, large petrochemical firms and large banking institutions. And if you look at IBM's largest 100 customers, I would be surprised if any of them don't have it installed and are using it in a real-time environment by the end of this year."

For users unwilling to wait for more advanced links between Extended Edition and DB2, there are two alternatives. "You can use the query manager on the host, or you can create the query on OS/2 Extended Edition, use file transfer to go to the host, run the query on the host, take the results and file transfer them back down," Kamerer said.

Users looking to boot up Extended Edition had better look for a deal on hard disks and memory, as Kamerer recommends 6M bytes of random-access memory and at least a 30M-byte hard disk drive.



NETWORKING

DATA STREAM

Patricia Keefe

Take the bull by its horns

The first of a two-part series dealing with EDI planning issues.

The promise of electronic data interchange (EDI) is so seductive and the potential rewards so sweet that it's easy to forget that the planning and execution is no piece of cake.

Restructuring the way an organization does business, no matter how small a change you start with, is bound to have repercussions — a few of them nasty. So you might as well be prepared.

Proponents of EDI will find themselves having to convince a much larger audience than usual. User departments, finance, MIS, telecommunications, upper management and outside trading partners must all be persuaded.

Possibly the easiest approach is to form a task force with representatives from all affected groups — especially the executive office. Without it, you'll be hard-pressed to make EDI happen in your firm, warns David Taylor, a program director at the Gartner Group in Stamford, Conn.

Just as important, you've got to have somebody take responsibility for EDI as it moves across the organization, Taylor adds. One way to do that is to make sure the project has the full backing of MIS and other key

Continued on page 52

X.25 market seen on upswing

Low cost, smooth integration get credit for healthy condition

BY PATRICIA KEEFE
CW STAFF

Despite any rumors to the contrary, the market for private packet-switching networks is healthy, vigorous and expanding, according to two recent reports on CCITT-standard X.25 technology.

Both users and vendors are increasingly turning to packet switching to resolve cost and internetworking issues, according to "The X.25 Private Packet Network," a report from The Yankee Group, based in Boston.

The report included the results of a survey of 34 users with large private packet networks, representing about 24% of the domestic installed base, the market research firm estimated. The primary reason given for using this technology was cost, followed closely by integration with the organization's existing facilities (see chart page 49).

Also high on the list of user selection criteria was interconnectivity, which The Yankee Group said will be a major factor in market growth. Users surveyed had extensive packet network links between their IBM Systems Network Architecture environments and with their local-area networks.

Budget bulge

Also, users said they are allocating large blocks of their data communications budgets to packet-switching networks. In 1987, that meant 38.1% of the average user's datacom budget, which is expected to rise to 43.1% next year. Of the users surveyed, 69% reported communications budgets greater than $15 million.

The larger the network, the greater the percentage of a user's communications budget committed to packet-switching technology, the report concluded. Given the higher financial stake in seeing the network perform, vendors can expect users to place increasing demands on suppliers, it added.

The Yankee Group projected that private and hybrid packet networks will experience a compound annual growth rate of 25% domestically. Total revenues from the building of private and hybrid packet-switched networks by both vendors and users are estimated at approximately $984 million in the domestic market.

A second report, "The X.25 Industry," projected domestic sales of X.25 network equipment to grow at an average compound rate of 28% annually through 1991, as industry revenues grow from $320 million in 1987 to $780 million. The report is published by Able Telecommunications, Inc., a telecommunications consulting and research

Continued on page 49

CSI tool supports IBM DDM

BY KATHY CHIN LEONG
CW STAFF

SAN JOSE, Calif. — Communications Solutions, Inc. (CSI) has introduced a file access package said to allow AT&T Unix System V-based workstations to support Distributed Data Management (DDM), IBM's architecture for remote file access.

CSI, which is known as a purveyor of IBM Systems Network Architecture (SNA)-compatible software and services, claimed its Access/DDM enables users to tap record-based files that reside on IBM and non-IBM computers on an SNA network.

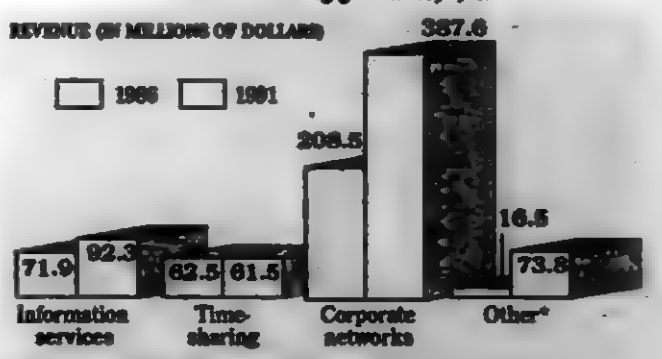
Prior to CSI's answer to remote access, IBM offered DDM/PC, a software product that runs only on Microsoft

Continued on page 48

Data View

Value-added network segments forecast

Corporate nets will gain steam in revenue while time-sharing growth stays flat



* Includes emerging services such as billing, electronic data interchange, credit authorization and data base services

INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

Pacific Bell to furnish LAN

BY KATHY CHIN LEONG
CW STAFF

SAN FRANCISCO — After a successful one-year test at the California Department of Water Resources, Pacific Bell will begin offering its central office-based local-area network to business users in California this month.

The network service is based on Centrex and will integrate voice and data over standard telephone wire leading up to a Pacific Bell central office.

Pacific Bell, a subsidiary of regional holding company Pacific Telesis Group, also recently announced plans to offer vendor licenses for its Project Victoria technology following beta testing.

Known as the poor man's Integrated Services Digital Network, Project Victoria allows users to run voice and data over standard telephone lines from a single multiplexing device. The

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Inside

- Ungermann-Bass adds VAX support to Net/One. Page 49.
- Tiara card links PS/2, Ethernet LANs. Page 53.
- Western Digital adds net analyzer. Page 53.

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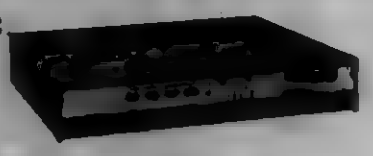

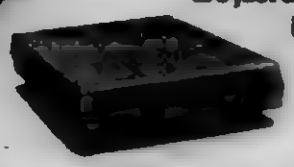

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Pacific Bell

FROM PAGE 47

patented device provides seven channels — two for voice and five for data — and allows access to one 9.6K bit/sec. data channel and four 1,200 bit/sec. channels, a Pacific Bell spokesman said.

Although Project Victoria has encountered some resistance from the Federal Communications Commission, Pacific Bell's networking service was recently approved by the California Public Utilities Commission, which will allow the telephone company to charge $22 per month per workstation at a speed of 9.6K bit/sec. A $24 charge per workstation will give users faster speeds of 19.2K bit/sec. There are additional charges for users who want to interface the network to T1 links or to other transmission media.

The Pacific Bell LAN will support users located in several buildings over a maximum of 3½ miles, from the customer premises to the central office.

Catching on

As a result of deregulation, the Centrex-based LAN service is one of the hottest trends among the phone companies, which have been anxiously awaiting the opportunity to offer data services to a captive user base.

Pacific Bell will be pitching the network to users who prefer not to hassle with network maintenance and support. The network reportedly does not require new cabling and will have 24-hour, seven-day-a-week maintenance. A Gandalf Data, Inc. voice/data multiplexer is the only piece of hardware required at each workstation.

Bruce McCaleb, Pacific Bell's LAN product manager, explained that any asynchronous terminal or microcomputer emulating an asynchronous terminal can be networked. The user does not need to use a file server but does need to have a communications package for each PC.

Project Victoria has been under fire because of its requirement for a multiplexing box that the FCC considers customer-premise equipment (CPE). Telephone firms are not allowed to manufacture or sell CPE.

Awaiting a response to its appeal to the FCC, Pacific Bell said it cannot wait any longer and will sell licenses to vendors that want to make and sell the multiplexing box and related hardware located at the central office.

If the FCC approves, Pacific Bell said it will offer Project Victoria as a service. Business applications will include data base searches, bulletin board services, file and burglar alarm monitoring and remote banking. Currently, the only licensee of the technology is CWA Communications Products, Inc. in Saratoga, Calif.

CSI

FROM PAGE 47

Corp. MS-DOS machines.

Access/DDM essentially performs a global search for a record or file and brings the data down to the user workstation, according to the vendor. Written in C, the remote access software reportedly can be configured by the user or vendor to support MS-DOS and OS/2 or any other operating system.

Access/DDM follows IBM's DDM application programming interface so users can create applications for sharing these files across mainframes, minicomputers and personal computers, the vendor said.

The product is also said to support the specifications outlined by IBM for either the request-originating workstation or the receiving node.

To date, IBM has brought support for DDM under the IBM System/36 and 38, with the IBM CICS/VS environment serving as the only target node.

Access/DDM features bidirectional file transfer and record access and contains a DDM network resource directory that lists where each file resides.

John Pickens, CSI's director of communications architecture, said IBM is placing a high priority on the success of DDM. The DDM file transfer protocol is used in IBM's NetView/PC, he added.

Available now, CSI's Access/DDM is sold as a source-code product and is licensed to users and vendors.

SQL Performance for OLTP.

Tandem challenges anyone.

Ungermann-Bass to support VAX on Net/One

BY JAMES DALY
CW STAFF

SANTA CLARA, Calif. — Ungermann-Bass, Inc. recently added support for Digital Equipment Corp.'s VAX environment to its Net/One network family.

Ungermann-Bass's new network interface card is said to integrate personal computer network services into a VAX.

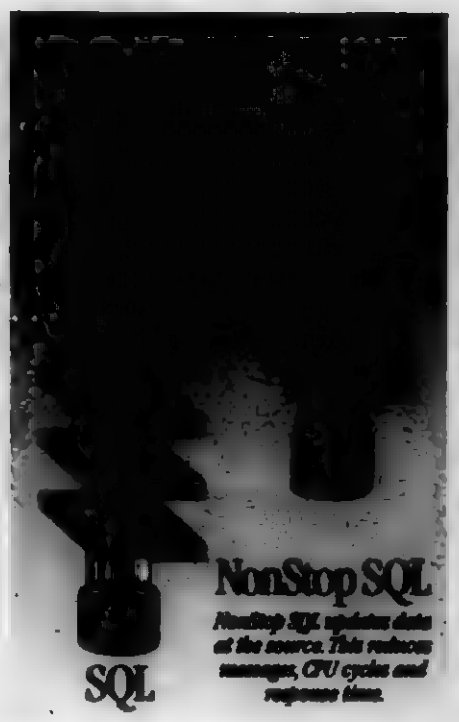
The Net/One NIU-DHA does double duty by giving users the ability to access the VAX either asynchronously or as Microsoft Corp. MS-Net disk and print servers, the vendor said.

In turn, the NIU-DHA reportedly allows a VAX host to act as a Net/One print and disk server, enabling PC users to access applications and data bases on the VAX using Microsoft MS-DOS commands. PC files are stored on VAX disks as virtual MS-DOS disks.

PCs emulating DEC VT100-, VT200- and VT300-class terminals connected through Ungermann-Bass terminal servers such as the Access/One, NIU-180 or NIU-130 can gain access to the DEC VAX/VMS environment, the vendor said. Access to VMS-based applications can be made with both Q-bus and Unibus-based VAXs.

Up to 26 32M-byte disks can be shared. Data base file sharing is supported via standard MS-DOS and MS-Net features for multiuser applications, such as Ashton-Tate Corp.'s Dbase III.

The NIU-DHA is available immediately and ranges in price from $6,000 to $24,500, depending on configuration.



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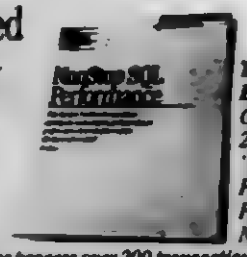

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X.25 market

FROM PAGE 47

firm located in Milpitas, Calif.

Able tagged network management as the fastest growing segment in the X.25 equipment market. Sales are expected to increase from the $45 million in 1987 to $70 million this year — and to $200 million in 1991.

The largest sector of the market is still packet switching, according to the Able report, and 1988 sales are expected to hit

How users justify private packet nets
Cost and integration have replaced control as leading factors

INFORMATION PROVIDED BY THE YANKEE GROUP
CW CHART

$260 million, up from $200 million last year. By 1991, the research firm expects sales to increase to $380 million.

Growth factors

The Yankee Group attributed some of the anticipated market growth to three issues:

- Internetworking. Packet switching is emerging as a cost-effective linking medium between disparate networks, the report said. "We see this process gaining momentum."
- T1 and T3 backbones. The Yankee Group predicts a major trend will evolve in which packet switching will develop a cooperative modus operandi with T1 networking. New technologies reportedly will allow these technologies to merge in many applications.
- Integrated Services Digital Network (ISDN). Acceptance and implementation of ISDN will exert a strong, positive, but currently unquantifiable impact on the private packet-switched network market, the report said.

Packet-switching networks will continue to show strong growth even in the presence of these technologies, the report predicted.

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Why a New Concept?

In today's multi-technology environments, even the best of today's traditional schemes can't keep pace with user demands for comprehensive network reliability, serviceability, and growth. That's because no single system has ever been able to address universal network management requirements.

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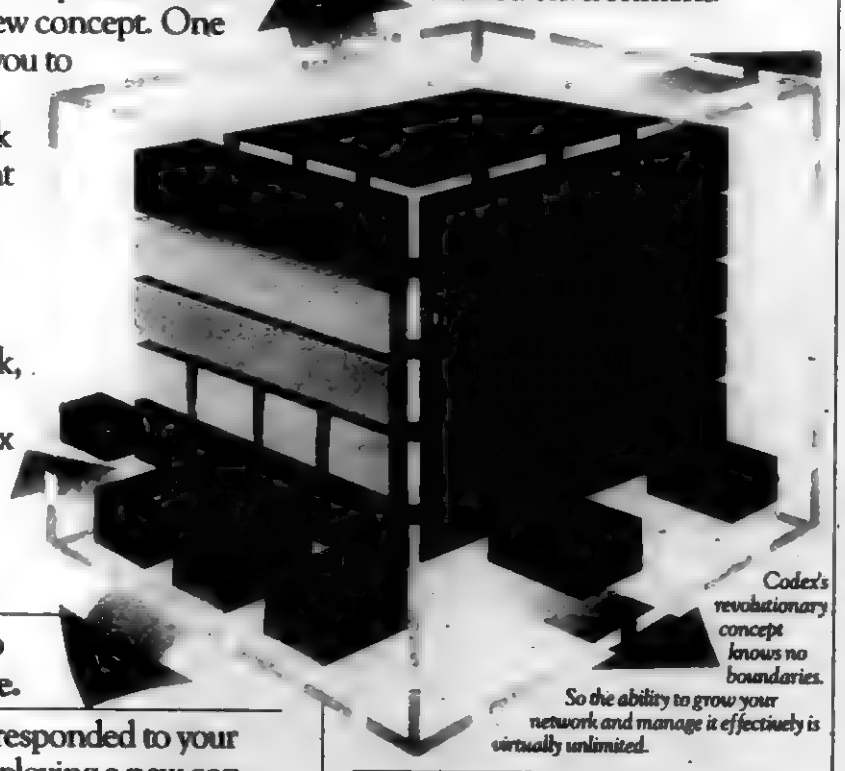
To accomplish this, we've moved from today's proprietary era to our new direction for the entire network management industry. By creating a system based on user demands for open architecture in a standardized environment.



Codex's revolutionary concept knows no boundaries. So the ability to grow your network and manage it effectively is virtually unlimited.

A System Architected for Growth.

Our new system is designed to incorporate the future, accommodating new networking applications as they are developed. That's because it's based on open architecture technology, consistent with emerging OSI standards. Which provides unmatched user flexibility, and unmatched potential for growth.

Within our new network

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management concept, all network devices are treated consistently. In fact, it defines a relationship between all network devices and the management system – a relationship never before established. So one system will handle all architected devices, as well as give you the structure to manage unarchitected devices.

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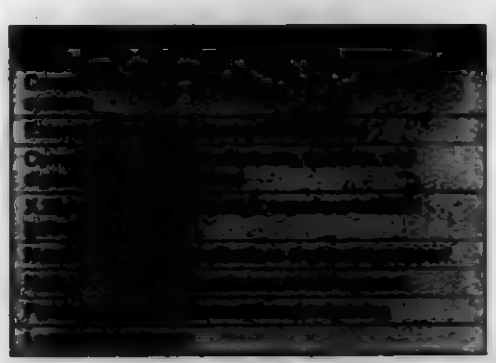
As protocols and applications proliferate, the demand for standardization is greater than ever before. Everyone is talking about standards – they're critical to the future because they facilitate integration, choice and flexibility.

As the leading proponent of vendor-independent networking, Codex has always been an active

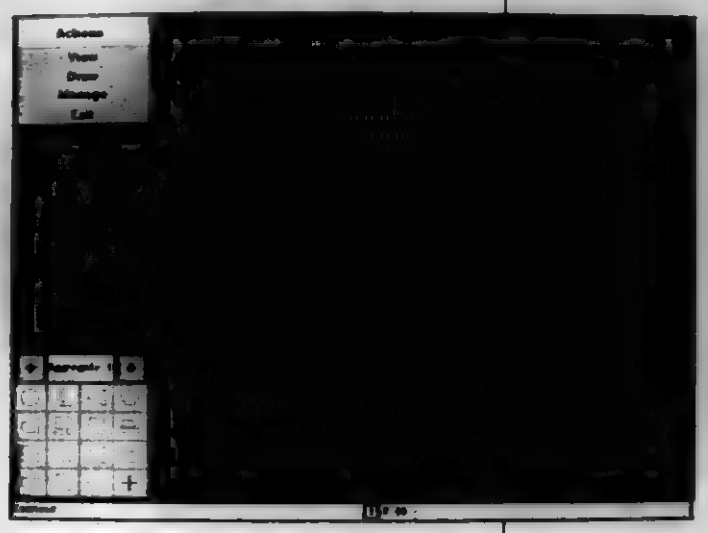


No matter what your networking needs, Codex has the solutions.

contributor to the evolution of network management standards. So naturally, we designed our integrated network management system to be fully consistent with emerging OSI standards.

True Integration Is Here.

With our new concept, you'll be able to get one consistent view of the entire network topology. With a single management system you'll have the potential to manage and control your entire network – statistical and time division multiplexers, T1 muxes, modems, X.25 concentrators – and other network devices. And that includes access to your computing equipment.



Our new network management concept allows you to control your network no matter how far it reaches.

And we've engineered a non-proprietary technology that can work with other systems – in conjunction with IBM's NetView, for example – to give users truly integrated control of their network.

This level of control allows you to *take decisive corrective action* to optimize network performance. Because the information and the management commands for your entire network are integrated and provide a unified database, one system provides full problem, fault, event and performance management – with extensive diagnostic, restoral, reconfiguration and reporting capabilities to maximize overall network availability.

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Keefe

FROM PAGE 47

company executives.

Without the involvement of MIS, you run the risk of reliving the early days of the personal computer and local-area network juggernauts, forced to cope with user departments that are willy-nilly installing whatever suits their fancy.

The incompatibility nightmare between EDI systems — never mind the already-installed corporate computer architecture — cannot be tolerated. "Wouldn't you like to have the same interfaces to EDI, the same subsets of the ANSI-standard X12 and the same software vendors companywide?" Taylor asks.

EDI proponents will have to convince a much larger audience than usual.

If these appeals to reason fail, Taylor recommends bypassing MIS, going straight to the executive office and laying it on the line: "Look, we'll lose this business if we don't do this." EDI can function as a strategic tool. Customers will migrate to whatever supplier can meet orders and accommodate changes the fastest. Time is money.

"We tell MIS to take the bull by the horns; view EDI as a chance to demonstrate some bottom-line value to headquarters. There is no one else in the company who is in a better position to turn this kind of technology into a competitive advantage," Taylor says. The alternative is to have an EDI mandate attached to an unrealistic schedule that threatens MIS jobs. "So why not use this opportunity to become a hero?"

Top-down help

Also crucial is upper management support. "Without a corporate approach, EDI basically becomes a department manager's toy," Taylor adds.

The best way to ensure management's support is to talk bottom line — money, of course.

But the proper way to cost justify EDI is to do pre- and post-EDI implementation analyses. Taylor says he is constantly amazed at the number of large EDI installations that have no idea how much money their systems are saving — or costing — them. "How can you know how much you've saved if you didn't know what the paper system was costing you?" he asks.

But to achieve payback, EDI has to do more than just electronically emulate your current order processing system. True cost savings are realized through elimination of personnel, reductions in the number of steps or documents in a cycle and faster turnaround time in meeting orders and changes. These changes are the reason user departments absolutely must be involved in EDI planning, according to Taylor.

To be cost-effective, the EDI technology chosen must also fit in with the current and planned corporate architecture. Taylor predicts EDI vendors will begin shipping products that are compatible with IBM's Systems Application Architecture and the Open Systems Interconnect model in two years. And he urges users to query vendors on their plans to support these and any other standards considered key to the company's computer plans.

Obviously, this list only scratches the surface of potential EDI obstacles. The primary point to remember is that EDI issues tend to be more organizational than technological.

Don't forget, you've got to basically change the way user organizations go about their particular procedure, and that involves a lot more than than just substituting an electronic version of paper.

But with careful planning and a little foresight, there's no reason EDI proponents can't navigate their way past internal politics and budget battles to a successful implementation.

Keefe is a *Computerworld* senior editor, networking.

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NEW PRODUCTS

Local-area network hardware

An adapter card connecting IBM Personal System/2 Models 50, 60 and 80 to 10M bit/sec. Ethernet local-area networks is available from Tiara Computer Systems, Inc. Lancard E-II is compatible with Novell, Inc. Netware and offers I/O mapping capability.

An optional boot programmable read-only memory allows any workstation to boot from a network hard disk located at another computer on the network. According to the company, Lancard E-II runs 15% faster than Ethernet cards using other technologies.

Lancard E-II sells for $725.

Tiara Computer Systems, 2700 Garcia Ave., Mountain View, Calif. 94043. 415-965-1700.

Data Race, Inc. has announced its **Office Communication System,** a combination of five connectivity functions on an expansion card for the IBM Personal Computer AT, XT, Personal System/2 Models 20 and 30 and compatibles.

Functions of the product include IBM Systems Network Architecture micro-to-mainframe communications, high-speed dial-up asynchronous communications on a Digital Equipment Corp. VAX, file transfer between CPU's, sending and receiving facsimile transmissions and linkup with The Source, Newsnet, or Western Union Corp.'s Easylink.

Pricing for Office Communication System starts at $595.

Data Race, Suite 108, 12758 Cimarron Path, San Antonio, Texas 78249. 512-692-3909.

Local-area network software

Brightwork Development has introduced a product that provides local-area network users peer-to-peer access to other personal computers on the LAN for modem sharing.

In addition to modem sharing, **Single Server Netremote** reportedly can access files stored on a local hard disk, run a plotter and control a LAN-based facsimile gateway from any point on a LAN.

Single Server Netremote can be licensed for use on a PC LAN with one server for $295.

Brightwork Development, P.O. Box 8728, Red Bank, N.J. 07701. 201-530-0440.

Open Systems has released a local-area network version of its Harmony Combined Accounting and Business Software for IBM Personal Computers, 100% compatibles and Tandy Corp. 1000, 3000 and 4000 systems.

Harmony Version 2.1 offers multiuser data sharing and provides multiple levels of passwords, record directories and file locking.

The product consists of 12 modules, including general ledger, accounts payable, accounts receivable, payroll, order entry and inventory. Workstations for LANs require DOS 3.1 or higher and 640K bytes of memory.

Harmony modules are priced from $99 to $999.

Open Systems, 6477 City West Pkwy., Eden Prairie, Minn. 55344. 612-829-0011.

Network management

Western Digital Corp. has announced a network analyzer program, **Lanwatch,** for its Ethernet and Starlan adapters.

Operating with Western Digital's local-area network cards, Lanwatch converts a personal computer into a network analyser for monitoring networks and debugging protocols. A filtering option lets users preselect criteria for packets to be analyzed. Lanwatch can be customized to understand any protocol. It runs on the IBM Personal Computer, PC XT, AT and Personal System/2 Models 25 and 30.

Lanwatch costs $1,195.

Western Digital, 2445 McCabe Way, Irvine, Calif. 92714. 714-863-0102.

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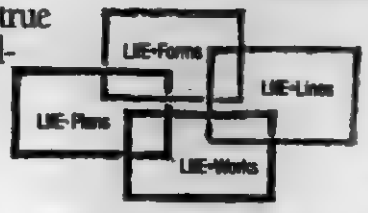

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EXIDE ELECTRONICS Raleigh, North Carolina

HARD TALK

Stanley Gibson

Will desk top stop DEC?

At DEC product rollouts these days, company President and Chief Executive Officer Kenneth Olsen has taken to mentioning that DEC got its start by putting computing power in the hands of the users — by fostering interactive computing.

He then elaborates that what was initially — and still is in the vast majority of cases — the best way to do this was with time-sharing systems, namely mid-range or departmental systems such as those DEC sells.

Olsen implies that microcomputers are more difficult to use than they are cracked up to be. (Probably true.) In the past, he has also criticized the computers as less reliable than larger systems. What the user wants, Olsen says, is a time-shared terminal on his desk that he doesn't have to think about.

No doubt Olsen is right in a lot of instances.

Listen closer

But what about that phrase — "putting computer power in the hands of the user"? Doesn't that sound like he is talking about personal computers? After all, what puts computing power more directly in the hands of a single user than a PC?

Even though DEC's time-shared networked solutions may be excellent, many users want power on *their* desks. That is why PC sales and local-area networks have been seeing steady increases while minicomputer sales have seemed comparatively stagnant.

But PCs have not been DEC's strong suit. Its weakness in that area forced the company into an alliance with Apple. Its Network Application Support strategy, announced several months ago, will be a good corporate glue when all the pieces are present.

With this strategy, DEC says, "Whatever's on the desk top, we will support." It is as if to say "We are everything but what's on the desk top. What's there, whether it's MS-DOS, OS/2 or the Macintosh, we will

Continued on page 58

Hospital cures paper plague

Community medical center chooses optical system to organize work flow

BY ALAN ALPER
CW STAFF

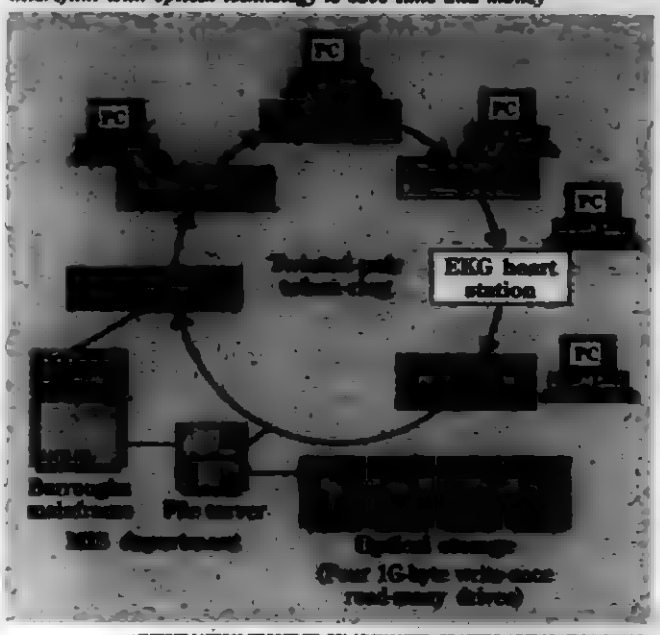
NEW YORK — A community hospital here is installing an optical disk-based storage and retrieval system that provides instantaneous access to patient admission, billing information and medical records from networked workstations.

Maimonides Medical Center, a 700-bed, nonprofit hospital serving the Borough Park section of Brooklyn, is counting on the storage and retrieval system to make its operations more efficient by reducing reliance on paper. Microfilm was initially used to relieve the hospital's paper glut, but it has proven too tedious and inefficient to work with, hospital officials said.

"We're just inundated with paper," noted Bill Dipple, Maimonides' assistant director of finance, pointing to New York state laws that mandate the retention of patient financial records for six years and health records indefinitely. "We just plain ran out of space to put it all."

Hospital goes optical

Maimonides Medical Center is replacing paper files and microfilm with optical technology to save time and money



INFORMATION PROVIDED BY ADVANCED GRAPHIC APPLICATIONS, INC.
CW CHART: FRANK C. O'CONNELL

Cost comparison

Without the optical-based storage and retrieval system, the hospital would have had to rent warehouse space — costing at least $18 per square foot — to store the mountains of paper it generates, Dipple maintained. "We're investing $400,000 in this system," he said. "That's not expensive if you measure it against the cost of warehouse space over time."

Maimonides contracted with Advanced Graphic Applications, Inc. (AGA), a New York-based systems integration firm, to build the system. AGA has developed software that manages the flow of information throughout an organization — be it data, image or voice — using write-once read-many optical devices as the primary storage medium.

AGA installed an Ungermann-Bass, Inc. token-ring network at the hospital to provide shared access to admission records from IBM Personal Computer AT or Personal System/2-class machines over twisted-pair wiring. The network will eventually be used to facilitate voice messaging of test results from the radiology laboratory to attending physicians, Dipple said.

Already, 28 of the expected 132 nodes of the network have been installed, AGA Executive Vice-President Stanley Marder said. In operation since Nov. 1, the network currently links five locations: administration, cashiers, financial services, patient accounting and the computer room. About 16,000 patient records have been created with the system.

The hospital intends to link its radiology and cardiology depart-

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Insight

• DEC cuts disk drive prices by up to 61%. Page 56.

• Intel memory modules allow processor board stuffed to 64 system memory. Page 58.

Mips multiuser machine targets commercial market

BY J. A. SAVAGE
CW STAFF

SUNNYVALE, Calif. — Instead of flirting with business applications for reduced instruction set computing (RISC) architectures, Mips Computer Systems, Inc. is attempting a serious relationship by introducing a 12 million instructions per second (MIPS) multiuser system aimed at the commercial marketplace.

Mips is counting on its compiler technology to allow its OEMs to bring their general-purpose business applications to its RISC-based system. The Mips system uses the vendor's 18-month-old R2000 chip.

"The key part of RISC is optimizing Unix for RISC and optimizing the compilers," said William Jobe, Mips' executive vice-president.

The system, set for shipment next month, is called the M/120 and will be available in 9- and 12-MIPS versions. According to the company, a 12-MIPS machine — with 24M bytes of main memory, 320M bytes of disk storage, an Ethernet controller port and software, a small computer systems interface bus and four card slots that accept IBM Personal Computer AT bus controllers — carries a retail price of $43,500.

A system with 32M bytes of memory and 1G byte of disk storage is priced at $66,000, the vendor said.

'A better RISC chip'

Sandra Gant, an analyst at Cupertino, Calif.-based Infocorp, said the Mips microprocessor used in the systems is superior to others on the market, including the Sun Microsystems, Inc. Sparc chip.

"From an engineering standpoint, it's a better RISC chip," she said.

Gant added that Mips is migrating away from the merchant semiconductor business. "They want to be a systems company."

DG brings new power to low end

BY STANLEY GIBSON
CW STAFF

WESTBORO, Mass. — Data General Corp. recently added a follow-on to its Desktop Generation of low-end multiuser systems. The 16-bit DG/500, housed in a personal computer-type chassis, is said to be software-compatible with DG's RDOS-based Desktop Generation MV/1400 and MV/2000 systems.

The DG/500 uses a proprietary CPU chip and runs the RDOS operating system. The system can support up to 2M bytes of memory and 160M bytes of disk storage. The speed of the CPU chip was increased from the Desktop Generation's previous 500 nsec to 380 nsec in the new system.

The DG/500, priced at $4,995, offers a savings of 30% compared with its predecessor, according to Stan Dolberg, manager of DG's integrated systems group.

Subsystem announced

In addition, DG introduced a storage expansion cabinet called the Combined Storage Subsystem for its MV/1400 and MV/2000 systems running the vendor's AOS/VS operating system.

Priced from $11,100, the subsystem consists of a 234M-byte Winchester disk drive and a 130M-byte cartridge tape drive. The subsystem can contain up to four disk or tape units, according to the vendor.

Dolberg said the expansion cabinet allows the MV/2000 to support up to 64 users, compared with a previous maximum of 24.

DG also announced an 8M-byte memory expansion board for the MV/1400 that allows memory growth to 12M bytes. The memory board is priced at $5,500.

All the products will be available in 30 days, according to the company.

DEC drops disk drive prices

MAYNARD, Mass. — Digital Equipment Corp. recently cut the prices of several of its disk drives by amounts ranging from 19% to 51%.

DEC reduced the price of the 5¼-in. RD54, which offers 159M bytes of formatted storage capacity, by 38%. It now costs $4,500. DEC also reduced the price of the 5¼-in. RD32 drive with a formatted capacity of 42M bytes by 33%. The RD32 now costs $1,615.

The RX33 flexible diskette drive with a formatted capacity of 1.2M bytes has been reduced by 51% to $388.

In addition, DEC reduced its SA482 and RA82 products by 19% to 28%.

DEC's four-spindle SA482-AA/DD drive, which offers a formatted capacity of 2.49G bytes, is now available for $66,000. The three-drive SA482-LA/LD, which offers 1.87G bytes of formatted storage, is now available for $51,000. The two-spindle SA482-HA with 1.24G bytes of formatted storage capacity is now priced at $34,000.

The RA82-EA/DE is now available for $51,000. It has 1.86M bytes of formatted capacity. The RA82-DA/DD with 1.24G bytes of formatted storage is available for $34,000, and the RA82-CA/CD, which offers 622M bytes of formatted capacity, is priced at $17,000.

Point 4 puts RISC in deskside arena

TUSTIN, Calif. — Point 4 Data Corp. has unveiled a deskside, 128-user, 15.6 million instructions per second (MIPS) minicomputer. Point 4 also released a 6.25 MIPS model in the same deskside form.

Both models, to be sold through Point 4's value-added resellers, are aimed at business users, the vendor said.

The new computer has a smaller footprint than previous models and supports 5¼-in. disk drives. Earlier models support 8-in. peripherals.

The new models are based on a proprietary reduced instruction set computing (RISC) architecture and are supported by Point 4's Iris operating system.

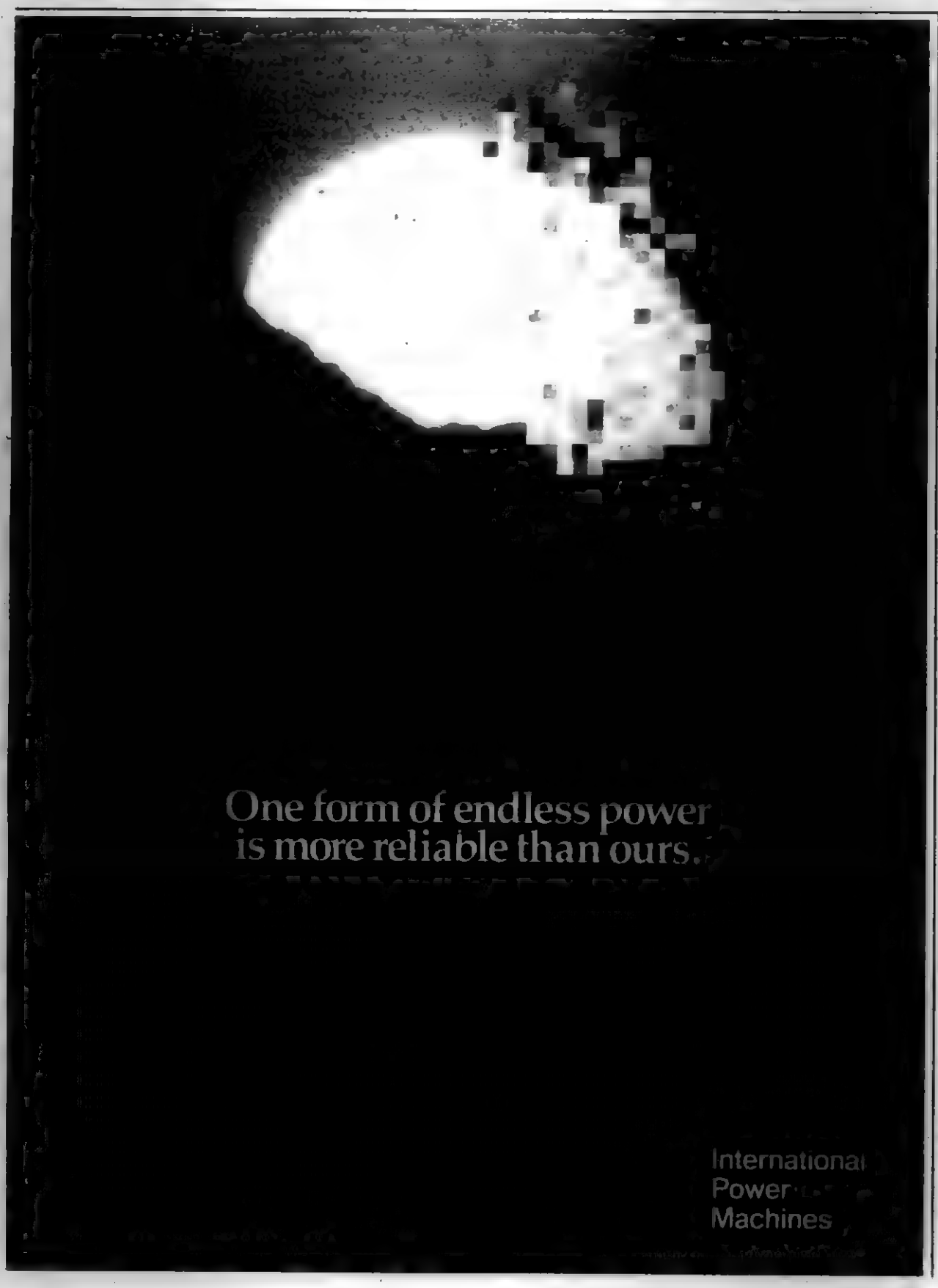
The more powerful machines in the company's line of multiuser systems use Point 4's RISC architecture. However, they can run software written for the non-RISC-based low-end systems in Point 4's product family, a Point 4 spokesman said.

The Mark 6E, at 6.25 MIPS, has 2M bytes of memory and a 170M-byte Winchester disk drive; it can operate at 160 nsec.

The suggested retail price for a typically configured base model of the 6E is $29,000.

The 15.6-MIPS computer, the Mark 12E, has 2M bytes of memory, a 170M-byte Winchester disk drive and operates at 64 nsec.

The suggested retail price for a typically configured base model 12E is $39,900.



Storage Tech brings tape to Unisys users

LOUISVILLE, Colo. — Storage Technology Corp. recently brought an IBM 3480-type cartridge tape subsystem to Unisys users by announcing the 4780 subsystem.

The 18-track 4780 was designed to run with Unisys 1100 series mainframes and operating systems, but it is also compatible with IBM mainframes. The 4780 can be shared by multiple 1100 processors, the vendor claimed.

Storage Technology had previously offered a nine-track tape drive, the 4770, for Unisys 1100 users.

Each of the 4780's drive frames contains either two or four transports, which minimizes the subsystem's footprint, the vendor said.

A subsystem consisting of two control units and two drive units containing four drives each lists for $292,000. General availability is slated for the third quarter.

Storage Technology said it will jointly market the 4780 with Systems Leasing Corp., a leading Unisys lessor.

Low-end Zebra now on the loose

ANAHEIM, Calif. — General Automation, Inc. recently added to the low end of its Zebra line of multiuser systems, announcing the Zebra 1620.

Designed for eight to 16 users, the Pick Systems-based machine brings a CPU using the 12-MHz Motorola, Inc. 68020 microprocessor to entry-level Zebra users.

The Zebra 1620 is software-compatible with all other Zebra models. In addition, it is field upgradable to the more powerful Zebra 1820.

The system is available with 1M to 2M bytes of memory, 40M or 67M bytes of disk capacity and a 45M- or 67M-byte streaming tape drive.

The suggested retail price for the Zebra 1620 is $12,500.

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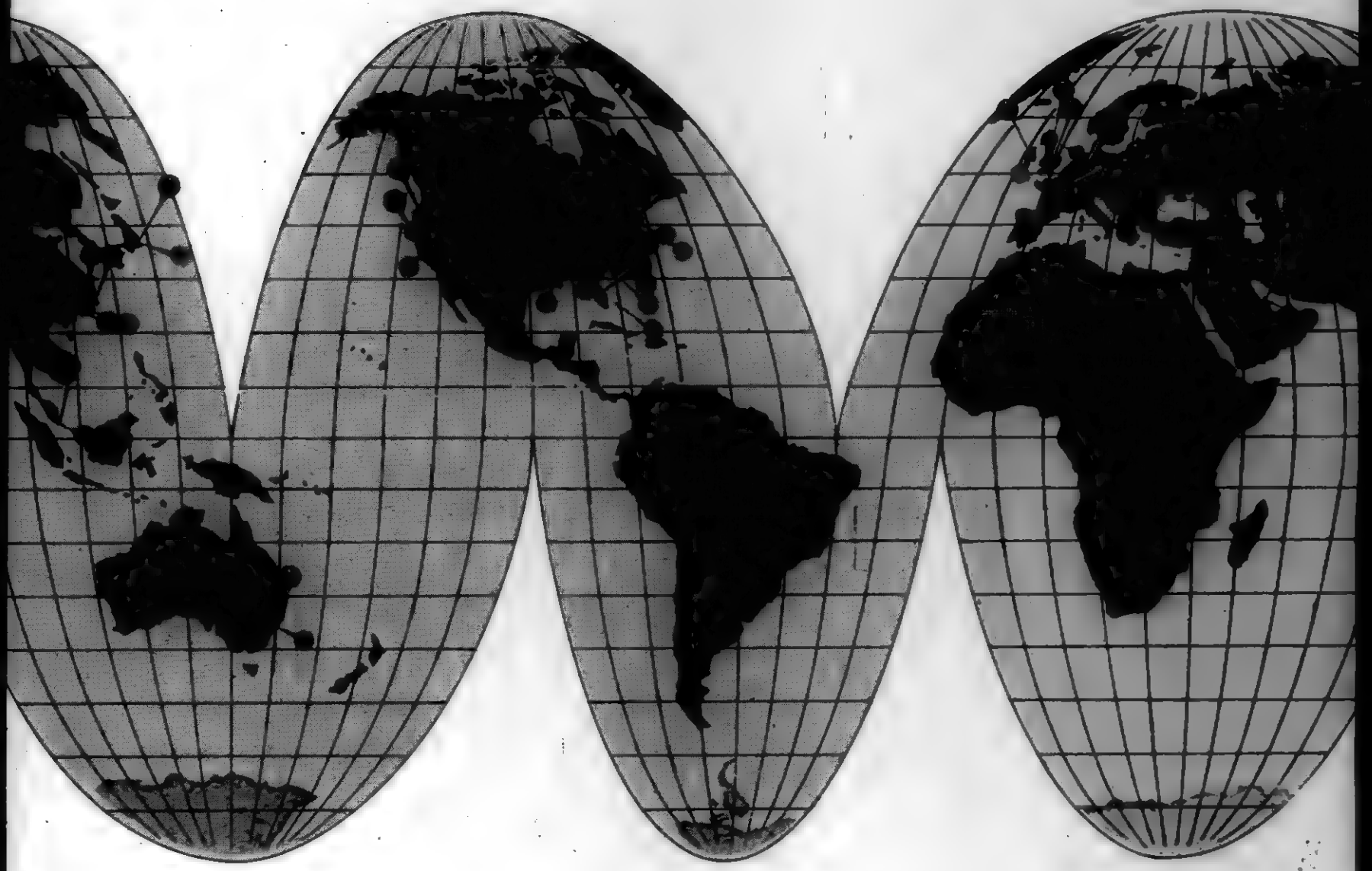

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Hospital

CONTINUED FROM PAGE 55

ments, located within a two-block campus, to the network using modems and existing twisted-pair telephone wiring. "We need to be able to see everything from a single point," Dipple explained. "We need to see where a patient has been during his stay in the hospital. This eliminates all the hunting" for records.

Upon admission, all of a patient's vital information, including medical history and insurance, is entered into a Burroughs Corp. Model 3955 mainframe. Each evening, after midnight, the information from the mainframe is downloaded onto tape in batch mode and into the network's file server via a tape-to-tape transfer.

Patient information written on paper can also be entered into the optical disk-based storage and retrieval system from various locations throughout the network using scanners attached to workstations. AGA created a data base management system using Ashton-Tate Corp.'s Dbase III Plus and Nantucket Corp.'s Clipper that groups related data and documents in patient files.

Optical prescription

Ultimately, the hospital hopes to create an interface that would enable data to be automatically transferred from its mainframe to the optical system. In addition, it is considering using optical storage as a primary medium for image as well as for data processing, noted Akiba Keehn, Maimonides' MIS director.

The interface will not be used until the hospital finishes upgrading its current mainframe to a Unisys Corp. A 12E, a process that is expected to take another two years, Keehn pointed out. At that time, he added, the hospital also expects voice messaging for the radiology lab to become operational.

The new system is already proving its worth to the hospital's administration, Maimonides' Dipple declared.

"When an outside organization such as Medicaid or Medicare seeks information, it used to take a week to 10 days. It now takes a half a day," Dipple said.

"At first, I was skeptical of optical systems, particularly the networking part," Dipple recalled. "But this system is so soft, it takes about 20 minutes to train someone to learn how to use it."

Encore adds another Annex

MARLBORO, Mass. — Encore Computer Corp. recently announced the Annex II, a successor to its current line of Annex servers designed for Ethernet and Transmission Control Protocol/Internet Protocol-based networks. The server is intended for Encore's own systems as well as those of other vendors.

Originally designed as a front end to Encore's Unix-based parallel processing systems, the Annex server is well-suited to any Unix-based system, according to the vendor.

The Annex II is offered in a 16-port version that is capable of supporting up to 128 concurrent sessions and a 32-port version that is said to handle up to 256 concurrent sessions.

The Annex II features a larger memory space than its predecessor, which had 16 ports and could handle 64 concurrent sessions, according to an Encore spokesman.

The Annex II uses a National Semiconductor Corp. 32016 processor and an Intel Corp. 82586 Ethernet controller.

Priced at $8,500, the 32-port version offers a price per port of $265. The 16-port version is priced at $5,500.

The Annex II replaces the Annex server and is available immediately, Encore said.

Gibson

CONTINUED FROM PAGE 55

connect with."

But that is a weak response, probably too weak for DEC to be comfortable with in the long run. It is, in effect, putting a Band-Aid on DEC's Achilles' heel — the desk top.

All this evidence supports the belief that DEC will announce another desktop system, probably a desktop VAX, most likely at Decworld this fall. DEC watcher Terry Shannon, a technical consultant at VMS software house Computer Information Systems in Braintree, Mass., voices the opinion that the desktop machine has been nicknamed the "PVAX" and will use the Microvax 3000 CMOS processor. As a result, it will put 3 million instructions per second (MIPS) on the desk top in place of the 1 MIPS currently available with the Vaxstation 2000, he says.

DEC is pouring huge amounts of time and effort into expanding its large systems to compete more and more with IBM. In doing so, it is going head-to-head with an immovable object in a market that is not growing that fast. At the same time, DEC has virtually no presence in the fastest growing personal computer market. That does not sound like a formula for long-term success.

Without a growth strategy for desktop computing, Olsen, who has basked in the glow of favorable publicity for several years, could be headed for another period of bashing such as he endured during the Rainbow's fall from grace in 1983.

Gibson is *Computerworld*'s senior editor, systems & peripherals.

What do we call an organization that insists on hard network comparisons and live evaluations before buying?

NEW PRODUCTS

Data storage

Intel Corp. has announced the availability of two user-installable memory modules that allow users of Intel ISBC 286/1X Multibus I processor boards to upgrade their system memory.

The **ISBC 322** memory module contains 2M bytes of zero-wait state dynamic random-access memory and allows an upgrade of an ISBC 286/12 board to an ISBC 286/14 board. The **ISBC 324** contains 4M bytes of dynamic RAM and can upgrade ISBC 286/12 and 286/14 boards to an ISBC 286/16.

The ISBC 322 costs $1,750, and the ISBC 324 costs $3,250.

Intel, P.O. Box 58065, Santa Clara, Calif. 95052. 800-548-4725.

Emulex Corp. has introduced the **UD23** disk controller for connecting enhanced small device interface disk drives to Digital Equipment Corp.'s Unibus.

The quad-size product implements DEC's mass storage control protocol to provide a software-transparent interface to the computer. The disk controller can then perform maintenance tasks, including bad block replacement, seek optimization, command ordering and data mapping. The product includes a 32K-byte buffer, data transfer rates up to 2M byte/sec. and block-mode direct memory access.

The UD23 costs $2,800.

Emulex, 3545 Harbor Blvd., Costa Mesa, Calif. 92626. 714-662-5600.

Terminals

Kimtron Corp. has introduced an option for its KT-70/PC terminals. The RS-232 serial port terminal now has an adapter providing parallel printer connection off the auxiliary port.

The KT-70/PC is self-detecting, depending on which printer type is selected, and requires no special hardware or software to use either serial or parallel printer ports. The product includes a built-in, on-line calculator mode, and the monochrome terminal is available in green, amber or paper-white.

The KT-70/PC costs $599. The option is priced at $50.

Kimton, Building 380, 1709 Junction Court, San Jose, Calif. 95112. 408-436-6550.

Link Plus, a subsidiary of Link Technologies, Inc., has announced the **MC 27**, an alphanumeric terminal designed for use with Unisys Corp. and former Burroughs Corp. mainframe computer systems.

In addition to Unisys T 27 and ET 1100 compatibility, the product can emulate a Digital Equipment Corp. VT220 to allow simultaneous connection between Unisys and DEC computer systems. Users can access each system through separate windows on the display screen. The product is suited for data entry, data inquiry and text processing applications. Displays are available in amber, green, or white.

The MC 27 costs $895.

Link Technologies, 47339 Warm Springs Blvd., Fremont, Calif. 94539. 415-651-8000.

Printers/Plotters

A wide-format laser plotter has been introduced by **Versatec, Inc.**

The **Versatec 8836** offers fast plotting speed, unattended operation and plain paper output and is targeted for architecture, mapping, mechanical and electrical computer-aided design markets.

Drawing with the laser xerographic process at 400 point/in. resolution, the product produces reports at a constant speed of 1 in./sec. Standard interfaces for the 8836 include RS-232C serial, Versatec parallel and Genicom Corp.'s Centronics parallel interface.

The Versatec 8836 laser plotter costs $28,000.

Versatec, 2710 Walsh Ave., Santa Clara, Calif. 95051. 800-538-6477.

Harris Corp.'s Data Communications Division has added bar-code capabilities as options for two printers in its Challenger series of IBM 3270 interactive communication products.

The **H224** is a tabletop device that supports up to 19 types of bar code and is plug-compatible with the IBM 4224, 3287 and 3286 printers.

The **H162** shuttle matrix line printer is a floor model and is directly compatible with the IBM 3262 device and is available in either 300 or 600 line/min. configurations.

The H224 is priced from $3,985 to $5,600. The H162 costs from $11,500 to $13,500.

Harris Data Communications Division, 16001 Dallas Pkwy., Dallas, Texas 75248. 214-386-2000.

Minolta Corp. and **JRL Systems, Inc.** have jointly developed the **340G Highres Laser System.** The product is said to provide a high-resolution, plug-compatible alternative to electrostatic plotters. It has 400 dot/in. resolution in either 8½- by 11-in. or 11- by 17-in. formats, prints up to 20 page/min and has 4M bytes of raster memory.

The 340G Highres Laser System costs $14,600 excluding options.

JRL Systems, 8311 Highway 71 W., Austin, Texas 78735. 512-288-0242.

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The schooling of MIS: Are you meeting the need?

BY GLENN RIFKIN

Michael Hammer, a popular MIS management consultant, plays to his audience — 70 MIS professionals from a large bank in Buffalo, N.Y., — like a comedian handling a Saturday night crowd in the Catskills. He displays a graphic on an overhead projector of what he calls the traditional DP shop: stick figures representing MIS and, beyond a high stone wall, the end users. "You remember," he yells, pointing to the figures inside the wall. "This was US! And that was THEM!"

Amid the laughter, there is serious business. The bank has invested $1,500 per person for this seminar and has flown MIS people from other regions in to Buffalo to attend. The bank expects this three-day seminar run by Cambridge, Mass.-based Index Group, Inc. to deliver what its MIS executives increasingly need: continuing education.

"MIS education has never been as critical as it is today," says Jack Ahlin, director of management development for information and telecommunications systems at IBM.

David Kearns, chairman of Xerox Corp., adds, "Education is a bigger factor in productivity growth than increased capital, economies of scale or better allocation of resources. Information and knowledge are the foundation of our economy."

Such lofty statements may reflect the importance of education, but, unfortunately, they do not mirror corporate reality. Continuing MIS education is a well-financed priority in large, cash-laden corporations (see story page 65), but for the majority of MIS departments, education is more a luxury than a necessity.

And in the midst of economic uncertainty, the first casualty of belt-tightening is often education and training. Thus, the largest Fortune 500 companies with the largest caldrons tend to enjoy the benefits of MIS education. "It's a case of 'the rich get richer,' " one educator says.

"The leading companies are willing to spend the money. Others are not," adds Ephraim McLean, professor of information systems at Georgia State University in Atlanta. "The top 2% of the corporate world is enlightened; the rest of the world is far behind."

The key words for most shops are time and money: There isn't enough of either to make serious commitments to education and training. The Riggs National Bank of Washington, D.C., for example, budgeted $40,000 for the training of its 134-person MIS staff this year, down from $60,000 in 1987.

According to Jerry Cavanaugh, Riggs' vice-president of MIS operations and technical support, the money allotted is keyed to the economic climate. "There's been a general effort to contain costs," he says.

"We're not a leading-edge environment," says James Taylor, senior vice-president and director of DP for United Missouri Bank of Kansas City NA. "We're lucky if we get one or two days [of training] per year. There's not enough time, and it is a source of frustration."

According to Applied Learning International (formerly Deltak), a video courseware provider in Napier, Ill., the average MIS shop spends just 2.5% of its budget on training and education. And as Cavanaugh points out, when there is training, it tends to focus on getting a particular person up to date on a specific product rather than on broadening his career.

Yet here is where the rich get richer. A commitment to education draws the best and the brightest in any field, particularly in information systems.

Young MIS professionals understand the importance of adding business skills to their technical strengths. And MIS managers know how critical it is for staff to stay technically up to date — if not at the leading edge.

Once out of school, an MIS professional depends on his employer or his own pocketbook to further his education. Big corporations with deep pockets not only provide sabbaticals but often pay tuition as well.

But most MIS professionals can expect far less in the way of educational opportunities. And if the employer does not provide continuing education, it is unlikely employees will pursue it on their own.

A recent study by the American Society for Training and Development in Alexandria, Va.,

Rifkin is a senior editor at *Computerworld*.

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IBM spares no expense for training
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MIS pros must drive own development
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Sampling of MIS education flavors
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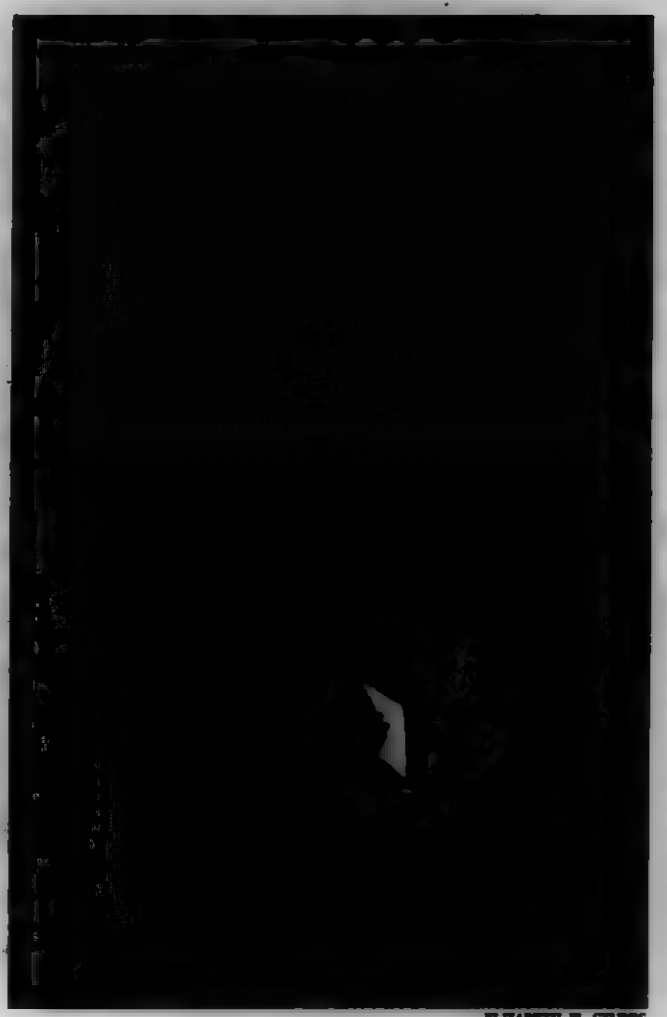

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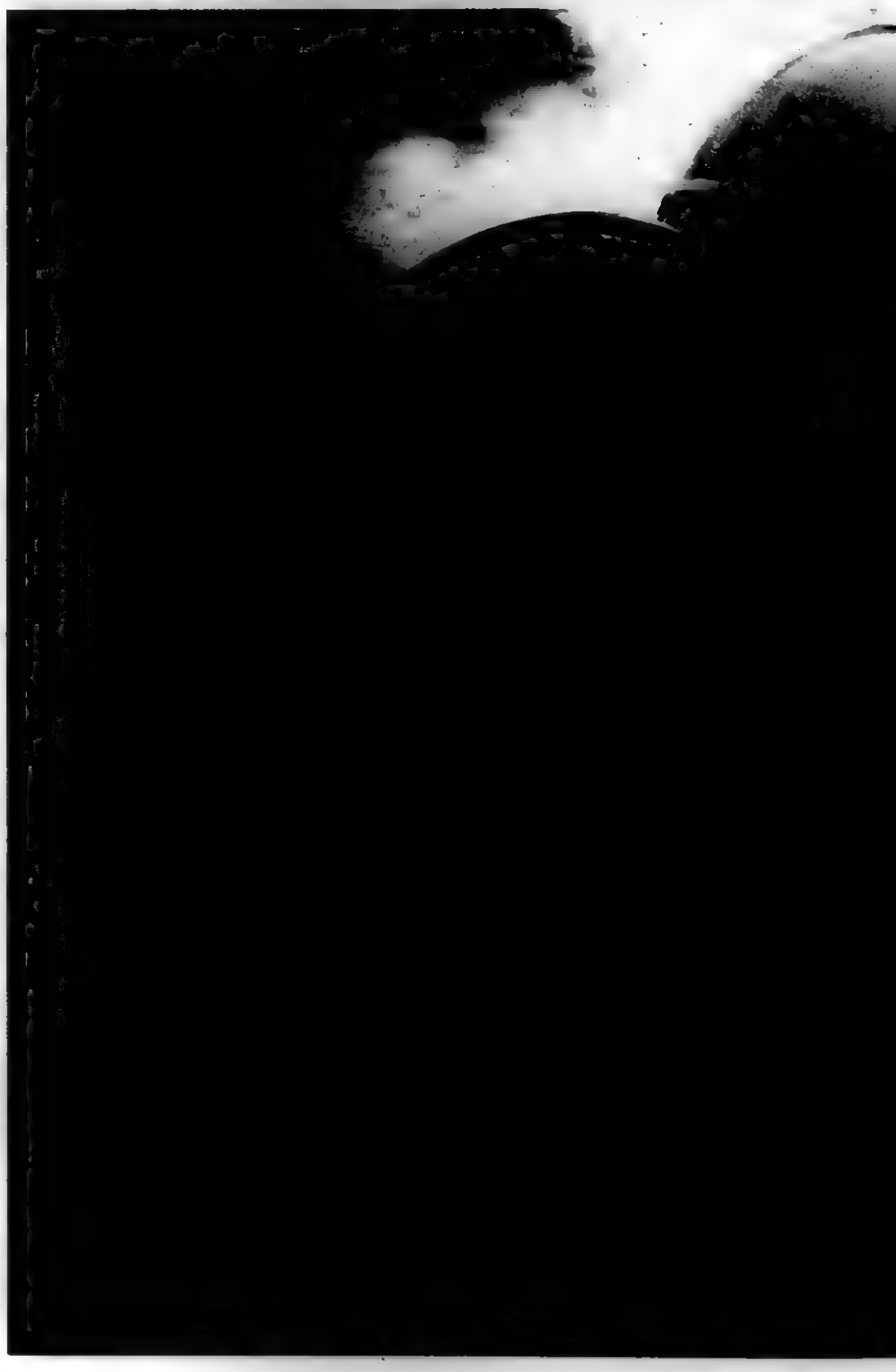

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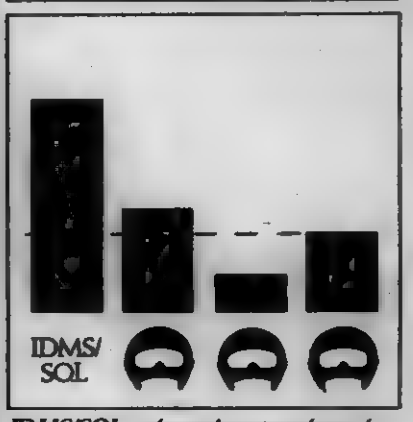

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Schooling

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reveals the following:

- Most skills acquired after the age of 25 and all skills for two out of three jobs are acquired in the workplace.
- Workplace learning accounts for an 85% variation in lifetime earnings, compared with only 15% for formal education.
- By the year 2000, 75% of all workers currently employed will need retraining.

The heat is on

Whatever the commitment to education, the need for it is clear. Jim Wetherbe recently spoke to 280 MIS professionals at a seminar held at the Management Information Systems Research Center at the University of Minnesota's graduate school of business, where he is director.

"How many of you feel overwhelmed by increasing developments in the field that you know less and less about?" Wetherbe asked the group. Every hand went up in response.

According to Wetherbe, the dearth of understanding about fourth-generation languages, data base packages, personal computers and PC software in the early 1980s cost MIS a great deal of credibility within the corporation.

"Users knew the tools better than MIS," Wetherbe says. "My sense is that MIS is trying to stay on top of things better now, but it is difficult. The average information systems person should allocate 25% of his work time to staying current; otherwise, he will be using an intellectual hoe."

Unfortunately, time is not an abundant commodity within MIS. Educators agree that getting an MIS professional, particularly a senior-level person, away from work and into a classroom for more than a few hours is difficult, if not impossible. Firms offering educational courses for MIS often insist on off-site locations because this is the only way to guarantee participation.

"You do well to hold them for one day," says Dottie Scates, training manager for information management at GTE Data Services, a leading DP supplier in Tampa, Fla.

"Trying to do anything in-house never works," adds Catherine Ditamore, manager of technical services at ARA Services, Inc. in Philadelphia. "The senior people are always getting pulled back to their offices for something; their secretaries will come after them, or they'll get on the phone at the break, and you won't see them again."

The irony is that while most professionals cannot afford spending more than two days at a course, two-day courses provide little more than a detailed overview. Complex technical topics and management issues require weeks and sometimes months to fully grasp.

Large corporations might be willing to send senior people to several weeks of courses at schools like Harvard University, the University of California at Los Angeles (UCLA) or Stanford University during the summer, but such training is expensive. A three-day summer session at MIT — offered by the Center for Information Systems Research at the Sloan School of Management — costs more than $2,000 per student.

> "THE TOP 2% of the corporate world is enlightened; the rest of the world is far behind."
>
> EPHRAIM MCLEAN
> GEORGIA STATE UNIVERSITY

When he taught MIS at UCLA in 1978, Georgia State's McLean developed a week-long summer course for MIS executives. By the second year, the course filled up with 60 executives; it has been offered to a capacity audience ever since. But even McLean admits that the $2,150 fee for the week is "pretty steep."

And it is difficult to draw new companies. The same firms tend to send people each year, McLean says. "Most companies are not in a position to worry about tomorrow," he says. "The successful ones recognize that people are their most important asset and are willing and able to spend the money on them. The others fall farther behind."

MIS education generally divides into two categories: technical training and business and management education. A professional schooled in both environments is a rare gem for MIS shops. More and more graduate schools of business are preparing students with a profile fitting these two requirements, and programs in computer science are recognizing the need for better business and communications skills in its graduates.

Unfortunately, such awareness now does not help those already in the MIS profession — specifically technicians with virtually no exposure to management training.

Taming the wolves

Many longtime DP employees have no interest in taking business courses. They tend to perpetuate the "lone wolf" image of programmers whose lack of interpersonal skills keeps them, quite contentedly, where they are in the organization.

"I'm not hearing a clamoring for help," one MIS manager at a national service organization says. "Some people, frankly, aren't smart enough or aware enough to ask for help. They just don't have the ambition to do more. And there will always be a place for them in big corporate [worlds] doing standard Cobol."

"We have to remind ourselves not to get carried away

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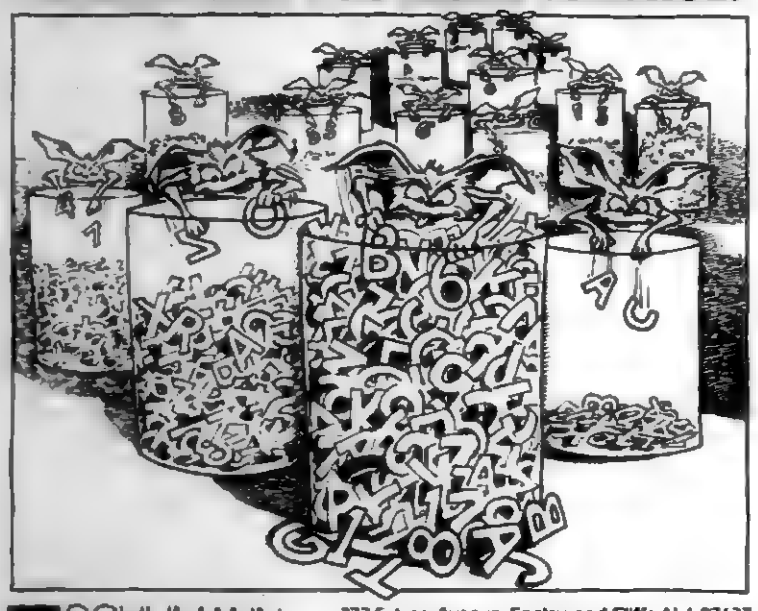

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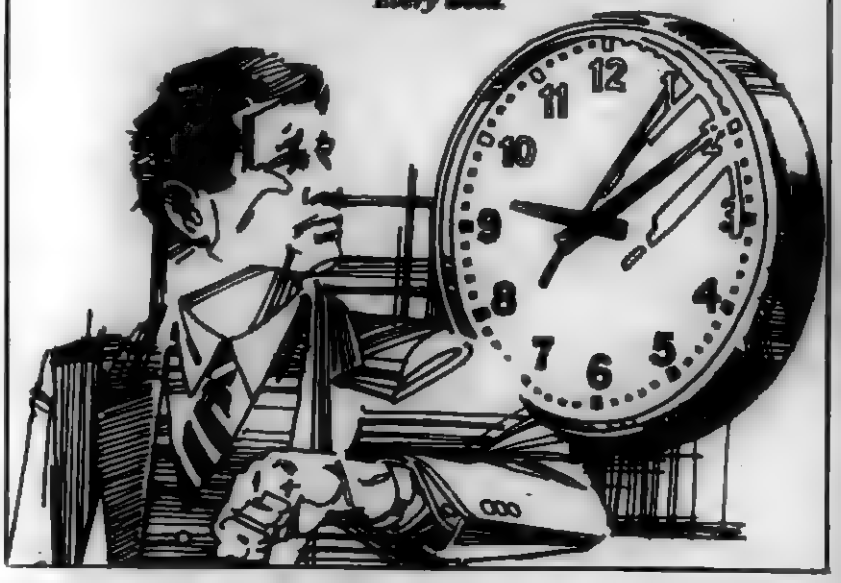

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with having everyone knowing the business and lose our technical edge," adds Belford Cross, corporate manager of information systems at Digital Equipment Corp.

Nonetheless, the demand on MIS to perform more than a backroom function for the corporation requires a new kind of thinking for most in the field.

"The role of MIS is changing, and people can't think about automating the business the way it has been," says Walter Popper, director of the Index Institute, an educational arm of the Index Group. "They must create new ways of doing business to gain advantage over the competition."

Unfortunately, most companies — if they offer anything at all — provide broad management courses to the whole organization, and these courses rarely delve into specific MIS issues.

Establishing a structure

Some professional groups recognize the need for education and are instituting programs and courses for members. The Data Processing Managers Association (DPMA), for example, realized that the plethora of one-, two- and three-day courses available throughout the country provided a patchwork quilt rather than a cohesive, structured educational opportunity.

In late 1986, the DPMA unveiled a curriculum model intended to put structure into professional development and at the same time offer specific credentials to those completing the training. Both DPMA- and non-DPMA-sponsored courses can apply to this certification.

John Cargill, coordinator of

Continued on page 67

IBM goes to the head of the class

IBM is often a tough act to follow, but when it comes to MIS education, the industry leader is certainly a model worth considering.

Always noted for its commitment to education, IBM has paid particular attention to educating its systems people. This year, the Armonk, N.Y.-based corporation will spend nearly $75 million on educational offerings for its 16,000 MIS professionals around the world, according to Jack Ahlin, director of management development for information and telecommunications systems at IBM.

Even factoring in cutbacks brought about by IBM's financial slowdown in the past two years, Ahlin says the company supported 50,000 student days for MIS education last year, an average of 1,000 students per week. That will increase to 1,200 per week this year, the same level as in 1986 before the industry slump set in.

"Are we spending enough?" Ahlin asks. "The answer is no. We should be doing more to get our people up to speed. MIS education has never been as critical as it is today."

Most MIS organizations, able to provide only minimal educational opportunities, would blanch at the idea that $75 million is not enough. But Ahlin is seeking ways to provide more courses for less money.

IBM's formal education programs, he says, come in a variety of flavors. For technical education, the company relies principally on its MIS educational facility in Dallas. This 12-year-old center has 60 full-time faculty members and offers courses in virtually all technologies.

The courses cover a wide spectrum, from computer operations, office systems, networking, debugging and applications to proprietary IBM architectural activities such as Systems Network Architecture and Systems Application Architecture.

Beyond central classroom instruction in Dallas, the center sends instructors out to remote sites for courses, and IBM's own corporate satellite network provides educational television for IBM facilities around the world.

HAL MAYFORTH

"By the end of this year, 60% of all education will be provided over satellites," Ahlin says. "Studies show that the quality of this education is high. Plus, it is available at 40% of the cost of classroom training, and it cuts travel expenses significantly."

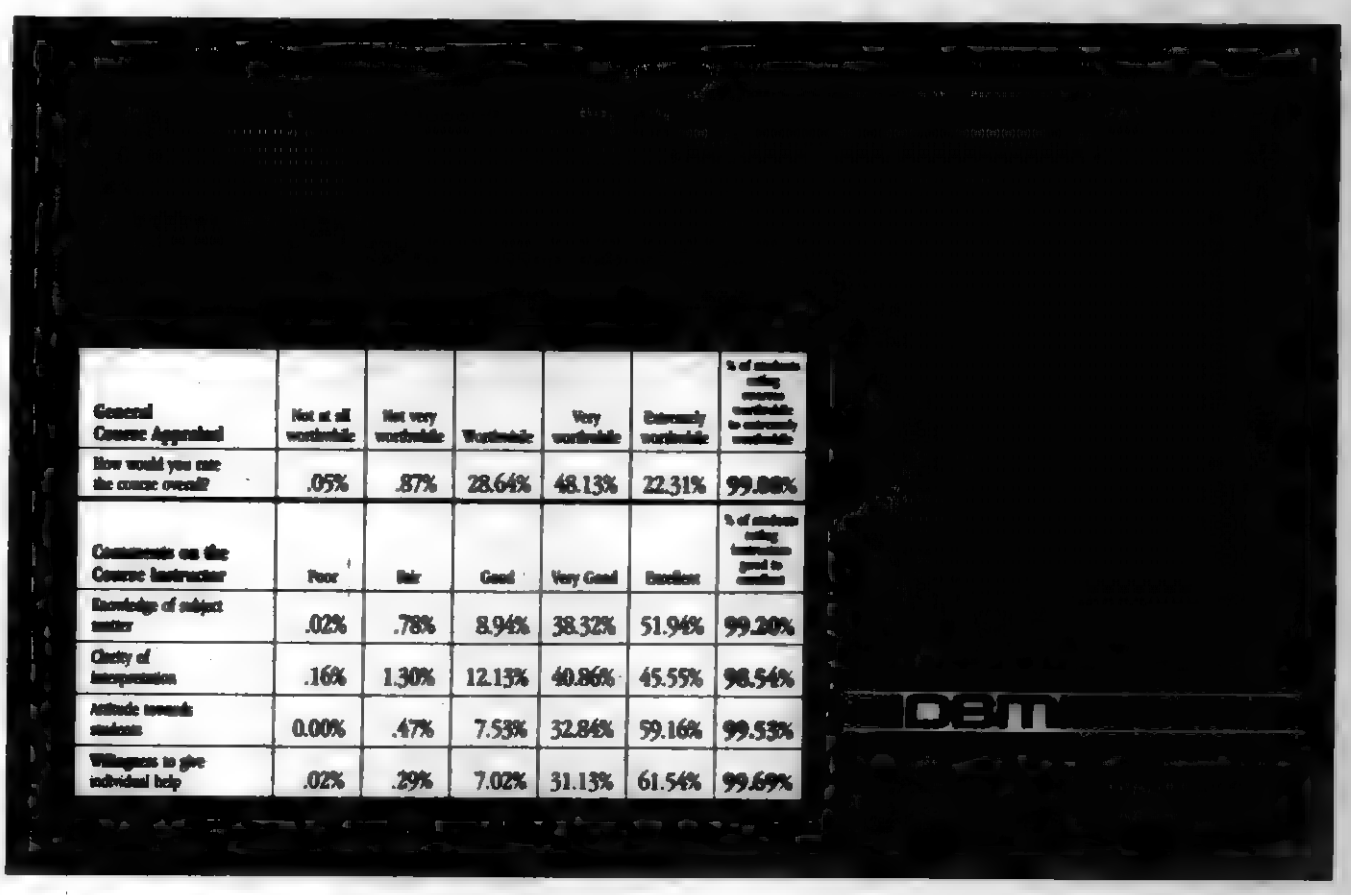
IBM also offers extensive management education at its Westchester County educational facility in Rye Brook, N.Y. According to Ahlin, a recent IBM study of MIS needs for the 1990s concluded that MIS people need in-depth general management skills, and IBM is offering courses to address that need.

For example, it offers a one-week course on information systems business directions. In the first two days, Ahlin says, MIS is never mentioned; the discussion centers on the business directions of IBM. By the third day, the course turns to the question of MIS strategy and its ability to aid the corporate strategy. "Our key managers get a fairly good dose of where MIS fits in to the corporation," Ahlin says.

In addition, MIS executives now have a version of IBM's President's Seminar, a week-long course for the company's top executives. In the MIS edition, the discussion covers global MIS issues and their impact on IBM and the company's business.

For the MIS rank and file at IBM, a steady stream of MIS courses are available, and Ahlin estimates that 98% of worldwide MIS takes part in one course or another each year. In fact, new MIS employees at IBM face five to 15 weeks of classes when first hired, depending on their educational backgrounds, and can then expect five to eight days per year of courses thereafter.

GLENN RIFKIN



General Course Appraisal	Not at all worthwhile	Not very worthwhile	Worthwhile	Very worthwhile	Extremely worthwhile	% of students rating course worthwhile or extremely worthwhile
How would you rate the course overall?	.05%	.87%	28.64%	48.13%	22.31%	99.08%
Comments on the Course Instructor	Poor	Fair	Good	Very Good	Excellent	% of students rating instructor good to excellent
Knowledge of subject matter	.02%	.78%	8.94%	38.32%	51.94%	99.20%
Clarity of interpretation	.16%	1.30%	12.13%	40.86%	45.55%	98.54%
Attitude towards students	0.00%	.47%	7.53%	32.84%	59.16%	99.53%
Willingness to give individual help	.02%	.29%	7.02%	31.13%	61.54%	99.69%

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Feeding the professional mind

BY STEWART STOKES

Professional development is a random process for most senior MIS people. There is still a significant need for a disciplined approach to the matter — especially in light of today's shrinking MIS departmental structures, expanding end-user computing and radically changing corporate cultures.

And while MIS might expect more professional development activities to be institutionalized, supported by training personnel and driven by corporate commitment — as is the case with professional development programs for other senior-level executives — this is often not the case. Today, many MIS professionals are motivated to seek out their own educational avenues.

Wolly Morin, vice-president of information systems at Allied Stores Corp. in Auburndale, Mass., is aggressive about his own professional development and is every bit as concerned about the personal growth and development of those who work for him.

"The only reason I'm at this level in general information systems management is because I pushed harder and harder," Morin says. "You need to be aggressive so as not to become [pigeonholed]." If systems professionals concentrate only on short-run learning requirements, they will plateau early in their careers; there is too much going on, Morin says.

"Will yesterday's skills help you deal successfully with tomorrow's requirements? Certainly not," Morin points out. "If systems professionals concentrate only on things of importance today, they will lose tomorrow."

Among his self-imposed educational efforts, Morin reads publications from other industries. "I try to find ideas that I can transport across industry lines and bring to Allied from, say, the grocery industry or even from banking. We in information systems need to take ideas from other industries and ask, 'Will these [ideas] work here?' " Morin says.

Professional volunteer

Jim Slusser, corporate director of MIS at the Shipley Co. in Newton, Mass., says the most important part of his continuing education is relating systems to the company's business. He takes the extra step to learn all he can.

"I volunteer for all kinds of non-MIS projects and commit time and energy to them," Slusser says. "This helps give me the visibility I need to function effectively with senior line managers."

For senior MIS managers who seek them out, professional society activities are a significant strategy for networking and personal growth. For Paul Palmisciano, director of advanced systems and planning at Codex Corp. in Canton, Mass., the Boston chapter of the Society for Information Management (SIM) is a prime vehicle for his professional development and networking.

Slusser and Morin take advantage of SIM opportunities, as well. Morin is also active in the National Retail Merchants Association, often attending — and conducting — seminars.

Unfortunately, these MIS professionals are exceptions. Too few systems people are active in professional associations, and this lack of involvement can hinder professional growth. The excuse "I have no time" may cut off these professionals from possible career challenges and potential advancement.

> "IF SYSTEMS professionals concentrate only on things of importance today, they will lose tomorrow."
>
> WOLLY MORIN
> ALLIED STORES CORP.

One of the problems with MIS education today is that it lacks a frame of reference for professional development.

True, there are university management development programs, and a few senior MIS executives are nominated to attend. But managers need to learn how to learn, and our human resources professionals are not doing all that well helping them.

There appear to be two reasons for this situation: First, organizations tend to view training and education as lower level activities with a short-run focus, and human resource personnel are expected to abide by that perspective.

Second, because of this focus, human resource departments often have difficulty communicating with upper level managers and are out of the loop when it comes to influencing professional development.

Get the company to help

Organizations need to see themselves as resources for learning, and senior executives in all functional areas — MIS included — need to be open and explicit about creating innovative and challenging learning environments.

Corporations are among the prime economic and social organizations of the 20th century, and they are rich resources for learning; indeed, learning is a prerequisite for survival — for organizations as well as people. Companies need to become more outspoken in their support of professional development.

Finally, systems professionals on all levels — senior executives especially — need to think in more creative terms when it comes to professional development. "We don't like to accept the fact that experiences outside MIS can be valid inside as well. We like to believe we're different," Morin says.

Senior systems people are working in extremely complex and stressful surroundings and could benefit from educational opportunities that would expose them to people and ideas from other fields.

Such programs would enrich their understanding of the dynamics that influence their organizations and would also encourage them to think creatively as they help to solve business problems. •

Stokes is vice-president of QED Information Sciences, Inc., an education and training provider based in Wellesley, Mass.

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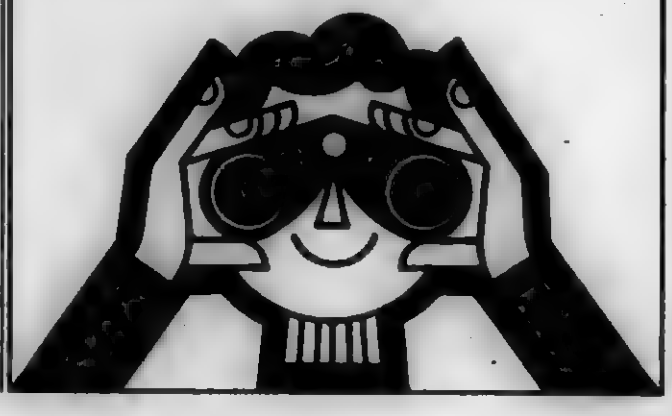

Schooling

FROM PAGE 65

Management in Computer Information Systems Curriculum at the DPMA, points out that the program is intended to be flexible enough for MIS professionals to gain benefit at any point in their careers.

"People in upper level management will obviously focus more on management skills as an asset to the corporation," he says. "Those in mid-career are trying to develop an expertise in a niche, but they also need to gear up on management issues, such as financial planning and return on investment. Those just entering the field focus more on technical issues, but they need to have a sense of where high technology is going as an industry as well as how to become effective managers."

Human resource help

A priority on education tends to flourish in companies with strong human resource functions. The emphasis on individual development is corporatewide and filters into MIS. But this has not always been the case, ARA's Ditamore says. Human resource professionals have, until now, known little about information systems, often leaving personal development issues to MIS itself, which, in turn, let these concerns slip through the cracks. "This should be a human resources function," Ditamore says. "We need to find people in human resources with a minor in computer science."

DEC's Cross

Companies like DEC, IBM and GTE, all with strong human resources cultures, invest heavily in educating and training MIS. DEC, with 6,000 MIS employees worldwide, provides a wide range of educational opportunities for its people.

Getting technical people to absorb interpersonal and communications skills is no longer just a nicety, according to Cross. MIS and its relationship to the rest of the corporation has changed dramatically in the past five years, he says.

"We measured how much computing capacity is in the end-user area and the data center," he says. "For every 100 MIPS in the data center, there are 1,000 MIPS out with the users. Three years ago, that figure was 1-to-1, and five years ago, there were less MIPS outside than inside the data center."

In order to keep MIS educated, DEC has formalized a number of programs. It offers a two-year internship program for 25 handpicked information systems hires. Each intern is moved to a new discipline every six months until he gets a solid grounding in all functions within MIS, including networking, programming, telecommunications and operations.

The company also offers programs in systems management, project management, languages and software development for internal MIS.

According to Cross, the average MIS professional receives a minimum of two weeks' training per year, and someone changing roles within the organization gets double that amount.

The key technical questions that DEC faces are the same that challenge most MIS shops, Cross points out. The hot topics today are data base technology, optical storage, fourth-generation languages, computer-aided software engineering tools and new applications. But the question is, Cross says, "Is it hot and critical or just hot and fun?"

Most important is connectivity, specifically from a business perspective. "As we achieve connectivity, how do we take advantage of it? What does integration really do for you? Who should be connected to whom? These are management questions, because they change organizational design and work flow," Cross says.

DEC sends people outside for education as well. Cross has sponsored MIS people for Stanford and Harvard courses

Continued on page 69

What do you need?

What kind of career assistance should you look for? The following questions can help formulate educational and professional development needs.

- How has your organization's MIS activity changed in the past three years?
- In what ways is your job changing?
- What is or will be the most important knowledge requirement for success in MIS — or in MIS management?
- What is or will be the most important skill for success in MIS or MIS management in your organization?
- What important trends do you see developing that will affect MIS, your organization and your career?
- What sources of professional development will help you meet the above challenges and further your career?

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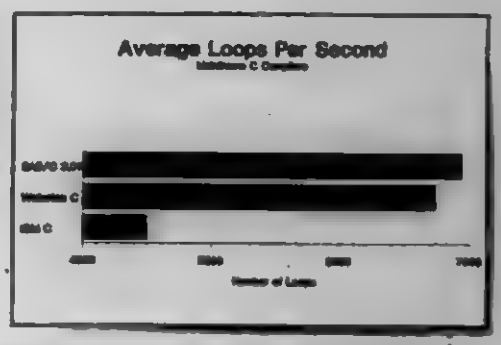

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A time and a place to learn

A mix of professional societies and private organizations offer MIS courses and seminars. The following is a sampling:

✔ Technology Transfer Institute, Santa Monica, Calif., 213-394-8305. Sample course: "Experts on Networks," four days, $1,095 per person. Designed for technical managers, data communications planners, information resource managers and managers of local and global data networks.

✔ Index Group, Inc., Cambridge, Mass., 617-492-1500. Sample course: "Systems Leadership," three days, $1,500 per person. Designed for upper level MIS and business managers.

✔ American Management Association, Saranac Lake, N.Y., 518-891-0065. Sample course: "Long-Range Information Systems Planning," three days, $825 per person for members, $950 per person for nonmembers. Designed for directors of DP, MIS or information systems departments, as well as for managers of systems, managers of operations and directors of corporate planning.

✔ QED Information Sciences, Inc., Wellesley, Mass., 800-343-4848 (617-237-5656 in Mass.). Sample course: "Managing Change in Systems and User Environments," three days, $850 per person. Designed for high-level information systems professionals, including project leaders, project managers and DP directors.

✔ Applied Learning International (formerly Deltak), Naperville, Ill., 800-323-0377 (800-346-6079 in Ill.). Sample course (video-based): "Strategic Information and Mission Critical Systems: Creating a Competitive Edge," 2½ hours, price withheld. Designed for information systems managers and executives, chief information officers, end-user managers and executives and corporate planners.

✔ Society for Information Management, Chicago, 312-644-6610. Sample course: "Breaking Out of the Mold: Challenging the Norm in Creating Solutions for Today's Economic Business Environment," three days, fees range from $250 to $1,000 per person; members and nonmembers invited. Designed for senior-level MIS managers and executives.

Schooling

FROM PAGE 67

as well as 20 other seminars. "Education is critical for keeping a technical edge," Cross says.

GTE Data Services has set up internal education programs aimed at serving its seven data centers throughout the U.S. and offers these services to outside organizations as a profit-making venture. Donald Peeples, president of GTE Data Services, says, "Anyone who has not been to a course in the last two years is growing obsolete."

This emphasis on both technical and managerial training is intended to bring in a "multiple-fold increase in productivity," GTE's Scates says. The company's DP professionals average about two days of training per month, both internally and from outside vendor offerings. "We don't even attempt to meet the need ourselves," Scates says. "It can't be done."

Getting something out of it

Scates admits that two-day courses on complex issues are not sufficient. "But adults will learn if they have a need to know," she says.

Scates points out that employees are provided with manuals and other materials from courses, and outside customers receive a hot line number that they can use to call for help. Internal students can follow up at the company's information centers. Scates' staff also does internal consulting to tailor training to specific needs of individual business units.

Jean Moore, who heads GTE's management development programs, adds that the most effective courses are not stand-alone offerings but companywide projects that encompass directors, managers, supervisors and the rest of the staff all working toward the same end.

"People in this industry are overwhelmed today because things are changing so rapidly," Moore says. "The ideal person is someone who can deal with that ambiguity, and you can't teach that in one- or two-day classes. You need a concerted company effort, functional areas working toward one goal, and you need role models for people, a profile that is rewarded for this kind of skill. You need to

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find them and nurture them."

The Index Institute's Popper also suggests rotating high-potential MIS people into other positions — moving a programmer to work with end users, for example — so they understand the total business function. High-potential systems people can also be paired with senior sales people to expose them to a side of the business they would otherwise never see. "You should invest heavily in the top 20%, the people who see the future," Popper says.

Moore advises that education cannot be forced. GTE avoids using the word "mandatory." "We soft-pedal it and issue gentle reminders, keeping records of how many courses people have taken," he says.

Scates is aware that some "old-timers" in DP are wary of new technology, but resistance, she says, is tantamount to obsolescence. "Those who have survived have a learning mentality. People who don't have that mentality aren't there anymore. It's very competitive and getting worse."

> "WE NEED to find people in human resources with a minor in computer science."
>
> CATHERINE DITAMORE
> ARA SERVICES, INC.

Added to the burden is finding people who can teach the courses; instructors must stay one step ahead of the people they are teaching. "We're constantly challenged to provide leading-edge information," Scates says. "Our frustration is keeping our materials current. Things change all the time. We spend 15% of our time just staying ahead.

"Finding teachers is extremely difficult. I need practical experience in my instructors," she adds. "I won't hire anyone without practical experience. We get 1,000 applicants per month, but we need excellent communication skills along with the technical qualifications, and that's not easy to find."

Teaching without teachers

Some organizations have found a way to circumvent the teachers and the classroom altogether. At McDonnell Douglas Helicopters, Inc. in Mesa, Ariz., Steve Reese, administrator of training information resource management, realizes that the 365-member MIS department runs in a crisis management mode. Getting people into a classroom for three days, or even eight hours, is tough. So Reese sets up all training on video or computer-based training (CBT), tailored to meet individual needs within MIS.

This modular approach provides an MIS employee with the option of doing the course on a Saturday or off-hours during the week. "I'll find the training to fit your style of working," Reese says to MIS. "It's the only way MIS can get trained. Very few go outside for courses!"

Reese admits that such packaged courseware does present drawbacks. Improving skills of project leaders, for example, is difficult to do in that fashion. But Reese and his staff have started giving a battery of tests to project leaders in order to isolate the individual's needs. From these tests, a course is custom-designed for that person.

McDonnell Douglas's Reese

Beyond the cost savings of video and computer-based training (CBT), Reese says he believes there is added value in the speed with which training is made available. "In the real world, when someone has a need, say, to take an effective writing course, they would need company approval and time to register, and the whole process could take eight months. With a CBT course, we can get training to someone within 24 hours, and they can do the course on their own."

Securing a budget

Convincing senior management to finance MIS education is tough in firms faced with a difficult economic forecast. The tendency is to push MIS to participate in companywide training efforts rather than seek its own education programs. At Riggs National Bank, Cavanaugh admits that concern has been expressed by some MIS professionals about the tight education budget. But there has been no increase in turnover, nor has it stopped the bank from attracting qualified people.

"It's a constraint, but it doesn't chase people out of here," Cavanaugh says. "I think some of this is overblown, people just getting trained to broaden themselves rather than focusing on the benefit to the company."

Nonetheless, education represents another opportunity to gain a competitive edge, and that makes it a necessity to some.

"The key challenge today is keeping people technically sound and increasing their business skills," DEC's Cross says. "Even at the most basic levels, if you don't know where the business is going, what's the sense of having technology at all?" ●

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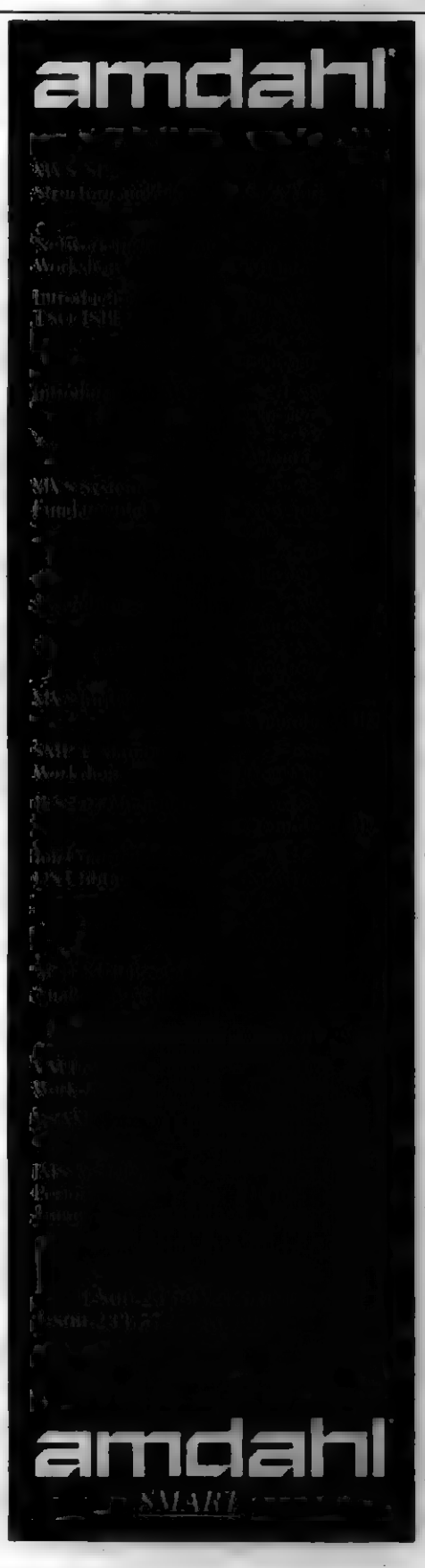

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BIDS & PROPOSALS

R. F. P.

Project AIMS
(Advanced Information Management System)

Computing System Proposal
for
State Government

Dave-
This is my first pass at responding to the RFP. This is a great fit for our products and services. (These responses will apply to our local government RFPs too.)
-Your reactions?
Rob 5/6

ROB -

GOOD THOUGHTS. I'VE ADDED SOME COMMENTS. FOCUS ON WANG'S COMMITMENT, SOLUTIONS, AND SUCCESSES IN STATE AND LOCAL GOVERNMENT.

DAVE 5/9

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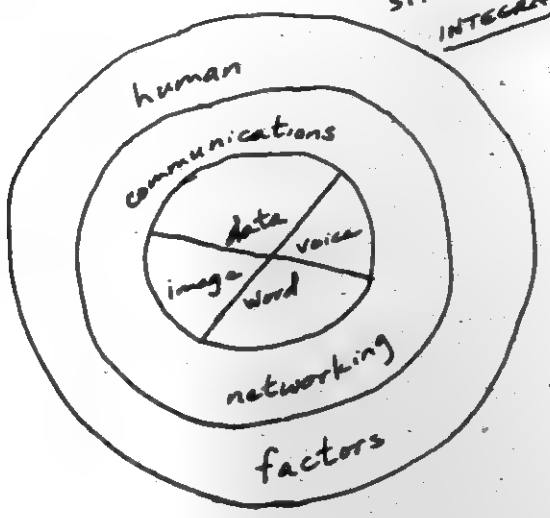


This is a representation, not an actual Request for Proposal. It is designed to demonstrate Wang's ability to meet the challenges that face state and local government. It is intended to provide summary information for data processing and state and local government professionals.

We welcome your comments and invite your input.

Background

This government is committed to providing the highest level of constituent service possible. In order to accomplish this, this government intends to procure an advanced information processing system designed to achieve the following:

- o effectively and efficiently manage resources
- o adhere to budgetary constraints
- o improve constituent service
- o increase effective and timely communication among agencies and departments
- o provide managers the ability to retrieve and use a wide variety of information to support decisions.

SHOW HOW WANG'S TOTAL COST OF OWNERSHIP (TCO) IS LOWER THAN OTHERS BECAUSE OF:
- SEAMLESS UPGRADE
- CONSISTENT USER INTERFACE
- MINIMAL ADMINISTRATION COST (NO SYSTEMS PROGRAMMERS)...ETC.

Vendor must have sufficient government information processing experience to respond effectively to government's specific needs, including:

- o government's rigid safety and security requirements
- o departmental software solutions.

Wang Response

Wang Laboratories, Inc. has a tremendous amount of experience with all levels and sizes of government. Wang is currently meeting the application processing needs of thousands of customers in the state, local and federal government. Fifty state governments have installed Wang computers, including more than 35% of the Governors' offices, 35% of the Legislatures, 26% of the Supreme Courts, 45% of the Attorneys' General Offices, 25% of the Finance and Budget Offices, 22% of the Health Departments, 20% of the MIS Departments, plus many others. Hundreds of small to large local and county governments are using Wang systems, from the finance and administration areas to the schools and police departments. Many federal departments and agencies have awarded large contracts to Wang in the areas of defense, national security, health, human services and others.

Using the Wang VS minicomputer, departments and agencies can provide access to other government and nongovernment users while ensuring adequate security measures to prevent access to confidential data.

The family of Wang VS 32-bit processors with extended security access control option provides:

- *event logging and violations*
- *scheduled user access time*
- *last logon notification*
- *password encryption and suppression*
- *user time out*
- *single or multiple logon.*

MENTION THAT WE LEAD ALL VENDORS IN SECURED PRODUCTS FOR THE FEDERAL GOVERNMENT (APPEND PREFERRED PRODUCT LIST DATA).

Wang has a wide range of applications software developed and implemented through specialized third-party software providers. Wang also can identify numerous public-domain solutions developed by our governmental customers. Solutions are easy to modify and fit the needs of both large and small government customers. Most systems are designed to adapt to various statutory requirements through the use of table-driven parameters. These applications are currently available, but are not limited to the following government departments/agencies/functions:

- *Chief executive & elected official*
- *Legislative/policy development*
- *Civil and criminal justice*
- *Integrated financial services and administration*
- *Human services*
- *Mental and public health*
- *Environmental services*
- *Public works*
- *Education*
- *Economic development*
- *Public safety.*

DESCRIBE CASES WHERE WANG SYSTEMS SAVED GOVERNMENTS HUNDREDS OF THOUSANDS AND ALLOWED OTHERS TO ABSORB INCREASED WORKLOADS (E.G, DDS, PORT AUTHORITY, ETC.)

Integration Requirement

The project requires multi-vendor networking capabilities, data access and inquiry, and integrated DP/WP capability using electronic mail. Vendor must demonstrate seamless bridges into industry standard protocols, which will enable the managers and professional staff to use and analyze appropriate information, regardless of where that information resides. Vendor must also allow users to integrate information from spreadsheets, word processing, data processing, etc. into a meaningful report or other format and send and exchange that information among appropriate users and departments.

Wang Response

EMPHASIZE THIS POINT

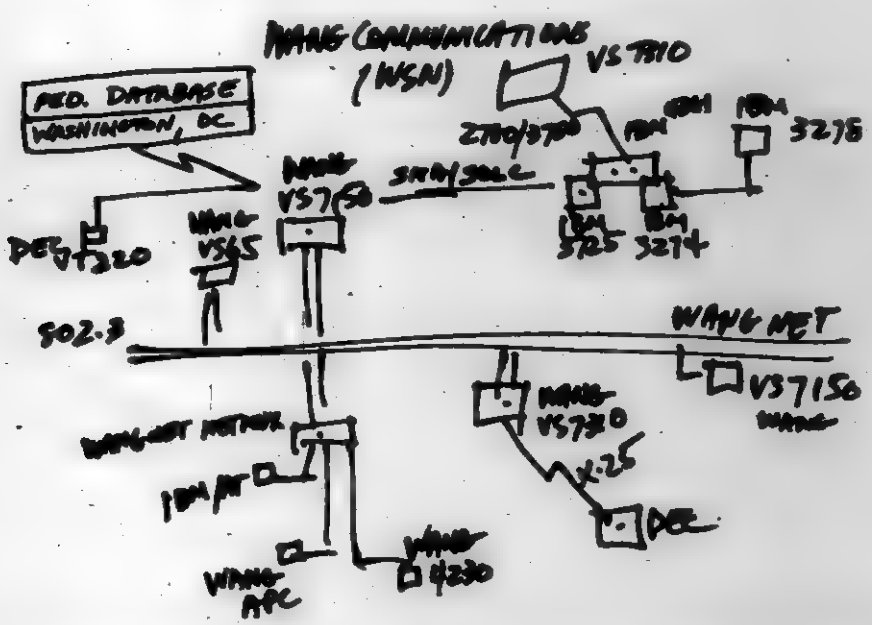
Wang's systems are designed to enable you to maximize your past investments in existing Wang and non-Wang systems. The Wang solution employs an integrated strategy for large-scale systems networking. Wang Systems Networking makes transparent the differences in the local and wide area networking protocols, therefore providing seamless communications across the entire organization. Wang not only connects the government's network through multi-vendor integration, but also provides the ability to manage and administer the network as well.

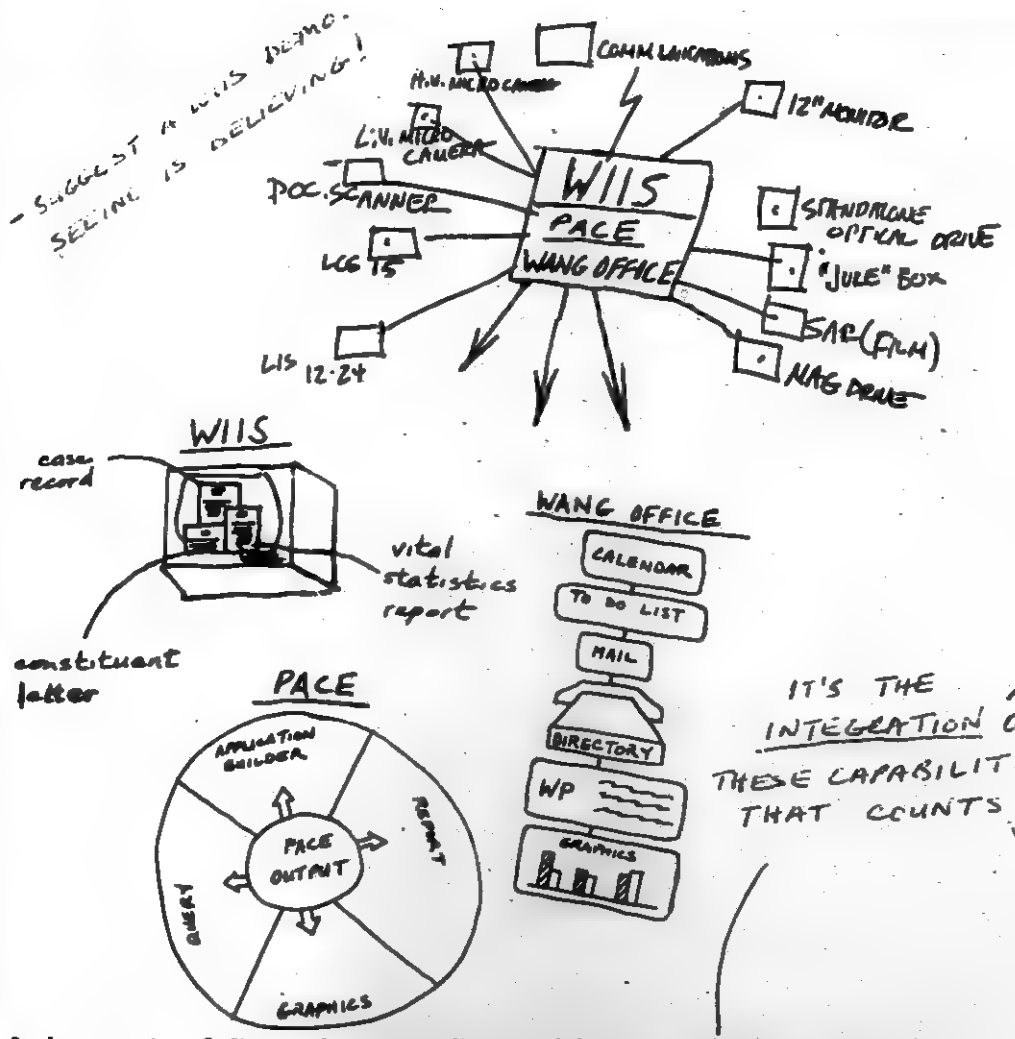
Warg's solution accomplishes this by means of the Distributed Management Facility, which manages both the Wang implementation within the building and the wide area network. All network management can be centralized at the system operator's console or decentralized as required, from host level to terminal. The operators can run backups and download new versions of code, all from the network control center.

WE HAVE STATES WITH UP TO 35 VS'S AND OVER 250 USERS TIED TOGETHER REQUIRING ONLY 1 TO 2 OPERATIONS SUPPORT PEOPLE.

As to standards, Wang solutions conform to de facto and generally accepted industry standards, including:

- *SNA/SDLC*
- *RJE 3777*
- *2780/3780*
- *CCITT X.25*
- *IEEE 802.3*
- *TTY*
- *VT100*
- *LU6.2.*





A key set of Wang Systems Networking ~~applications~~ to be provided as part of this solution is **Wang OFFICE.** *Applications include:*

- *Electronic mail*
- *Event scheduling*
- *Document filing and retrieval*
- *Cross-library summary and words-in-text searching capabilities*
- *Computer-based training for all features.*

TOO BLAND! MAKE THE POINT THAT WE INTERFACE WITH PROFS, DISOSS, ALL IN ONE, ETC.

All document files created on the syster can be transmitted to other Wang and non-Wang systems by means of commonly available network transport products, including multipoint, point-to-point, X.25 and Wang Band.

Vendor must provide application development tools, productivity tools and the ability to effectively manage databases, and an easy-to-use and powerful inquiry tool and ad hoc report generator. Non-technical users must be able to use and access them. This government considers it essential to eliminate current applications backlog and to be responsive to departmental requests for system enhancements and new applications. An important goal is to reduce input redundancy and streamline management of databases. Vendors should present their capability in the area of imaging and image processing, especially as it applies to the wide variety of forms and documents typically stored in paper form or on microfilm.

Wang Response

Wang's fourth-generation language, PACE, uses a relational DBMS which allows the entire government user community to share select data pertinent to their work as elected officials, agency managers, professional staff, etc.

PACE is unique in its ability to manipulate data, text, voice, and image files. PACE also allows users to develop complete applications without needing the skills of a professional programmer.

Wang, as part of the strategic relationship we propose, will provide a comprehensive needs analysis in order to best apply PACE in the environment.

When compared to traditional development methods, PACE provides significant reductions in application development lead times. PACE is an effective tool to allow government to reduce, if not eliminate, its applications backlog and respond quickly to departmental data processing needs.

WIIS, Wang's Integrated Image System, is a comprehensive system for managing, processing, and communicating text, data, and imaging information. The government can capture documents in image form, such as constituent correspondence, case and client information, tax and revenue documents, land, auto, and other registrations, vital statistics records, etc. that are currently stored in paper form.

These digitized images or "photocopies" are quickly and easily retrieved by the user as part of an integrated information system through a single workstation. Along with access to a mainframe window, a Wang VS window provides the government professional all the documentation necessary to provide service or make a decision or recommendation.

As government anticipates that information processing requirements will significantly increase over time, vendor must describe growth path for CPU's, peripherals, and software.

AND WE HAVE WORKED HARD TO MAINTAIN AN INTERNALLY CONSISTENT ARCHITECTURE FOR OUR CUSTOMERS - WE HAVE LISTENED TO THEM!

Wang Response

Wang's family of VS 32-bit processors provides you a seamless upgrade path, allowing you to use the same workstations and peripherals as you upgrade CPU's.

For more than a decade, Wang has maintained a consistent user interface. Additionally, because of our architecture and corporate commitment to preserving our customers' investment in applications software, only minor changes are required to run programs that may be ten years old.

Wang's design strategy has also historically been sensitive to human factors. Therefore, Wang will offer a solution which does not require replacement of familiar systems or complicated retraining as the system grows.

Government wishes to employ state-of-the-art voice response capability. Vendor should describe their offerings in this technology.

Wang's Response → GIVE ACTUAL EXAMPLES OF REAL USES OF STEP.

Wang's solutions incorporate leading-edge constituent access capabilities. Wang STEP (Speech and Telephony Environment for Programmers) transforms a constituent's telephone into a vehicle to access database information. Constituents, through their touch-tone telephones, are able to access information relevant only to their particular needs, such as case status information, pension fund information, bill status, schedule of events, forms ordering, etc. In addition, Wang is ready to work with government to develop a broad range of public information systems, public input mechanisms on a variety of governmental issues, and increase first-hand constituent-government communications.

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BY DANIEL LALONDE and A. DUANE DONNELLY

It is 10 o'clock on a Thursday evening. An eager investor wants to retrieve several stock quotations, financial news and associated reports even though it is after business hours. He dials a special telephone number provided by his brokerage firm and is answered by a computer-synthesized voice. He asks for the information he requires, and the system responds to his queries with yes/no answers. Satisfied with the response he gets, he will invest tomorrow. Using voice technology, the broker has improved customer service and access to information.

Teddy bears, operating rooms and automobile production lines as well as brokerage firms are being fitted with the latest twist in computer technology — devices that understand and simulate human speech.

The market for voice recognition and voice synthesis in North America in 1987 was between $50 million and $70 million, according to Larry Dome at the Gartner Group, Inc. in Stamford, Conn. If it grows at the expected compound annual rate of 50%, Dome says, sales of voice recognition and voice synthesis devices will near $400 million by 1991 (see chart page 74).

Cost-effective voice technology applications are being implemented in numerous business areas, including marketing, telecommunications, inventory control, quality control, paperwork automation and security.

Voice recognition converts the spoken word into a digital form that computers can recognize and respond to. The computer understands the words by matching the digital translation to a vocabulary data base stored in its memory. Voice synthesis works the opposite way: It converts digitized computer text or data into analog speech.

The voice recognition vocabulary data base consists of phrases, words or phonemes — units of sound — depending on the sophistication of the system. Voice recognition systems direct the computer to sample this digitized speech at specified intervals to obtain an accurate picture of what is being said.

Vocabularies for voice synthesis systems are initially constructed by storing basic units of sound such as phonemes and allophones in the memory of the computer.

An algorithm puts these sound units together as words or sentences. As a result, voice synthesis systems theoretically have an unlimited vocabulary. They can output any type of information.

The good news is that the voice market holds great promise. Voice recognition and voice synthesis are facilitating traditional processes such as report generation and device control. Both are also creating new uses for computers, such as personal computer-based telemarketing and production-line control.

The bad news is that most voice applications currently exist only in niche markets, primarily manufacturing, since the technology has a long way to go before it can enjoy widespread business use.

LARRY ASHTON

On the voice synthesis side, several major difficulties plague today's technology. First, the voice output still sounds unnatural enough that some end users have compared it with robot speech.

Second, the information voice synthesis systems are required to output has increased dramatically in the past few years, thereby increasing the complexity of the algorithms used to identify words and sentences. Some systems continue to mispronounce new words, misspelled words and proper names.

Negative side

Today's voice recognition systems also have a number of drawbacks. Most systems have only a small vocabulary so that installations in office information systems are relatively rare. Additional shortcomings include problems with background noise and contextual interpretation — mistaking "two" for "too," for example.

The vocabulary size of recognition systems is a problem from two perspectives. First, to input large vocabularies takes a great deal of the users' time. For a speaker-dependent system, each end user must speak each word into the system several times. Second, because digitally stored words occupy a large portion of computer memory, the potential size of a vocabulary is directly related to the amount of memory available. And just adding more memory to the system does not do the trick: It may slow the system down to an unacceptable pace.

Voice recognition systems

Lalonde is a consultant at Touche Ross & Co. in North York, Ontario. Donnelly is a former Touche Ross consultant.

- **Automating paperwork at a Boston hospital**
- **A splashy telemarketing system for a utility**
- **Inventory control for textile mills**

How Would You Deal W

① The CEO wants a completely overhauled customer information system in 9 months.

② marketing needs external research information in their database to keep ahead of the competition.

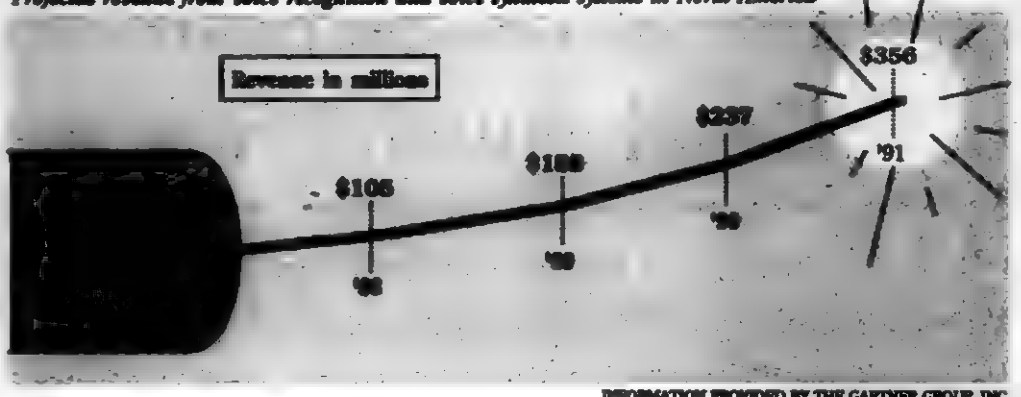
③ Accounting needs changes to the old system by the next close.

FOUNDATION

that provide speaker independence and continuous speech are currently being tested in the laboratories. However, the numerous variations of each word that must be stored severely limits vocabulary size, since each digitally recorded word occupies a substantial portion of memory. As technology progresses, such systems will be able to handle much larger vocabularies, but speaker-dependent systems are now more common.

Voice makes a big bang

Projected revenue from voice recognition and voice synthesis systems in North America



INFORMATION PROVIDED BY THE GARTNER GROUP, INC.
CW CHART: AMY J. SWANSON

Background noise that causes voice commands to be misinterpreted is another problem associated with voice recognition. If a system is operated in a noisy area or over a poor telephone connection, background sounds are sometimes misinterpreted as data to be input. A high-fidelity microphone in a quiet area solves this problem, but it is clearly not an ideal solution, as it effectively eliminates many high-payoff applications.

Finally, voice recognition's most serious limitation lies in coming to terms with the English language. When interpreting sounds, many systems have difficulty distinguishing between homonyms or phrases that sound similar. Consider the following sentences: "A new display can recognize speech" and "A nudist play can wreck a nice beach."

A new approach to voice recognition is statistical prediction of the next word in a sentence based on the words preceding it — sometimes called a "context expert" because it uses artificial intelligence techniques. This approach has been integrated into some voice systems, but the technology has not yet been perfected to the point of eliminating all errors.

Success stories

Despite the drawbacks, cost-effective voice technology applications have been successfully implemented in numerous business areas.

Marketing and telecommunications. Jersey Central Power & Light Co. (JCP&L), a public utility, has been trying to involve the general public in energy conservation. In search of a proactive marketing technique, it experimented with a voice synthesis system. Customers answered yes-or-no questions by pressing their Touch-Tone phone buttons.

JCP&L used the system until a survey indicated that 47% of its customer base used rotary-dial telephones. To handle this situation, JCP&L brought in the Teleclerk voice recognition system from Valor Telecom Ltd.

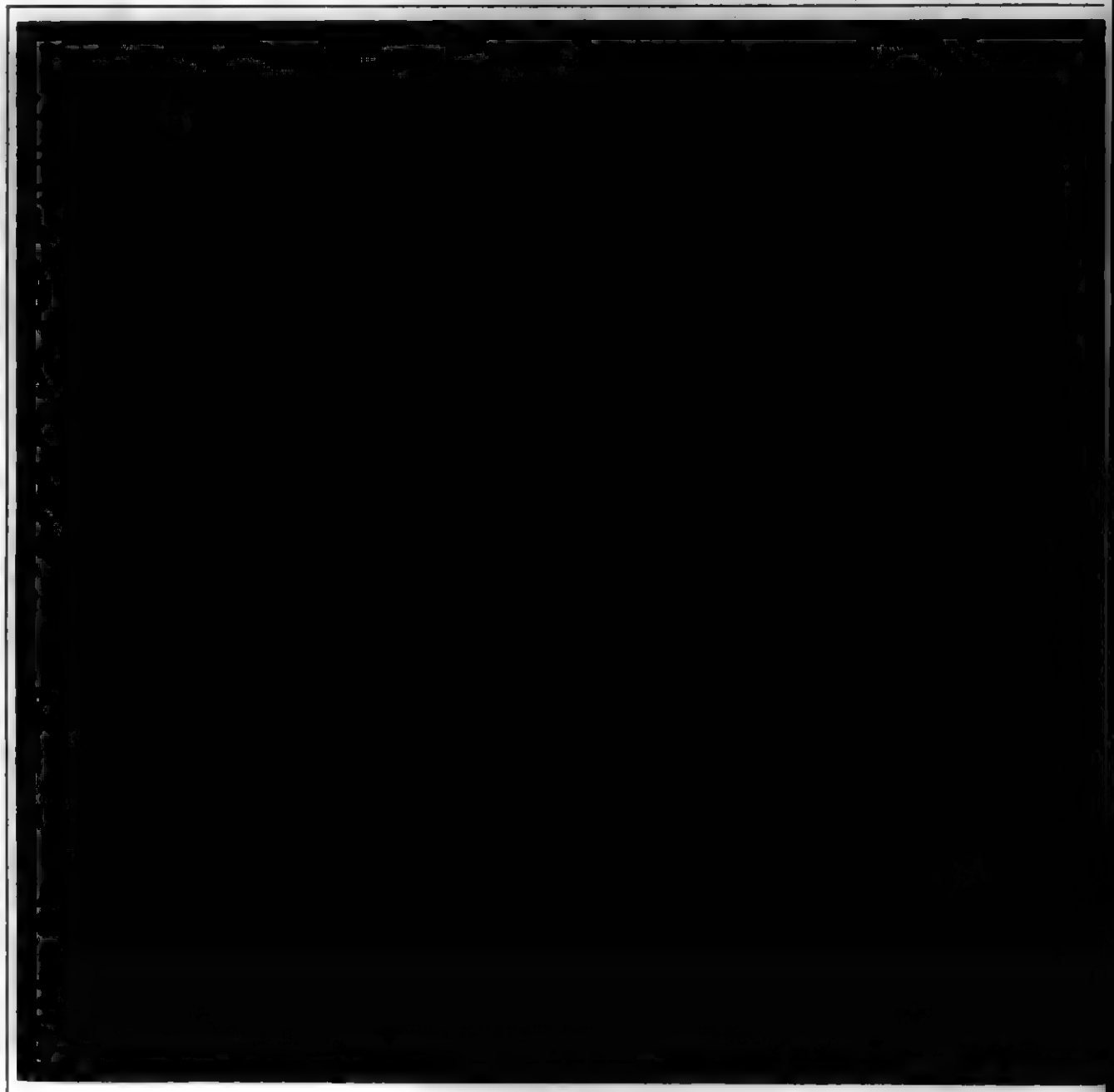
The system consists of PCs that use modems to dial numbers from a list of prospective customers. When a connection is made, the system asks the same yes-or-no questions, but it recognizes the responses and records them in a data base.

Valor's system can also pursue a line of questions based on previous customer responses. For example, if the customer answers that he had an energy audit within the last six months, the system inquires if a follow-up appointment is desired.

JCP&L put the Teleclerk voice system to the test by loading it with a list of 4,500 customers to call between 5 p.m. and 8 p.m. In that time, Teleclerk called about 3,156 customers, offering each one a $15 energy audit package.

From those calls, JCP&L received a 5.4% affirmative response, compared with a direct-mail campaign that produced a 1.5% response. At hourly rates of $5 for telemarketers, JCP&L saved more than $500 on salary costs alone in the three-hour campaign.

Inventory control. A large U.S.-based textile mill recently implemented a voice application to aid inventory control. One of the mill's many warehouses stores rolls of carpet that have not yet been cut and dyed. Previously, when a customer placed an order, a forklift operator would retrieve a roll of carpet from a specified location, bring it to the cutting station and



return it to its original location after cutting.

This system caused two problems. First, there would often be several more convenient places to store the roll after cutting it, but the forklift operator was required to return it to its original location to ensure that inventory was being tracked accurately.

Second, all orders placed on a given day were collected and entered into the PC-based inventory control system the following day. As a result, inventory information was never current during the day, and customer inquiries could not be answered with confidence.

These problems were resolved by combining an existing PC with a voice recognition and synthesis system supplied by Votan. Forklift operators, now equipped with headsets and microphones, receive information from the computer about the type of carpet desired and its location. There is no longer a one-day lag before stock levels are updated, and rolls of carpet can now be placed in the first available location. The system recognizes the operator's commands and keeps all inventory and location records current.

Quality control. Burlington Industries, Inc. is the largest manufacturer of fabrics in the world. Before shipping its products to customers, inspectors must scrutinize the entire fabric and record the number of defects on the computer. If the number of defects exceeds a defined level, the fabric must be reworked. In addition, many defects in a textile could indicate that a particular machine is faulty and needs to be replaced.

Burlington now uses a Texas Instruments, Inc. Voice Board to complement the work of the textile inspectors. When a defect is found, the inspector registers the information by talking into a PC with a headset microphone, while a yardage meter device automatically reports the exact location of the defect to the computer.

Since Burlington implemented the voice recognition system, it has identified defective machines sooner and has consequently seen defects decline by 20%. Costs, in turn, have gone down, and customer satisfaction has gone up. The new technology has also enabled Burlington to reduce its labor staff. Management has calculated the payback period to be less than two years.

Data entry. Administrators at University Hospital in London, Ontario, realized that a large amount of time was being spent entering repetitive data. Data entry alone required two employees to process about 4,000 transactions per day.

These tasks are now accomplished more efficiently with a voice recognition system supplied by Roar Technologies. Voice recognition vocabularies have been assembled to allow administrative personnel to enter data with voice commands, a method that has saved time and reduced entry errors.

The hospital has reduced its staff by two data entry operators, which translates into a $30,000 recurring annual savings. As an additional benefit, job satisfaction increased with the elimination of cumbersome keyboard data entry. The productivity of the hospital administrative staff has also risen.

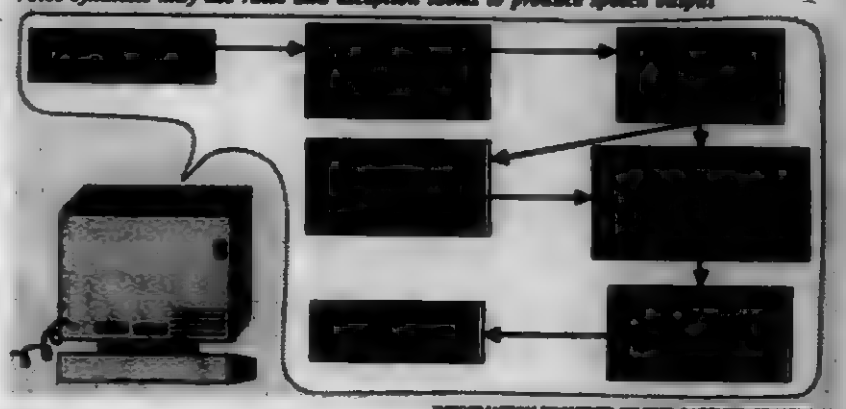
Paperwork automation. The radiology department of a New England hospital derives a large part of its revenue from helping insurance companies verify that patients have legitimate reasons for submitting insurance claims. Staff radiologists spend much of their time making diagnoses based on X-ray films from patient examinations and are reimbursed for this service by the insurance companies upon receipt of a typed report.

In the past, turnaround time for typing these reports was slow, delaying the collection of revenues from insurance companies.

The typing bottleneck was removed by implementing a PC-based voice recognition system from Kurzweil Applied Intelligence, Inc. (see story page 79). As a radiologist examines X-ray films, he now dictates his diagnosis directly into a headset. The report appears on the monitor of the PC as it is dictated, and any mistakes are corrected immediately. Once a report

How a computer talks

Voice synthesis may use rules and exception tables to produce speech output



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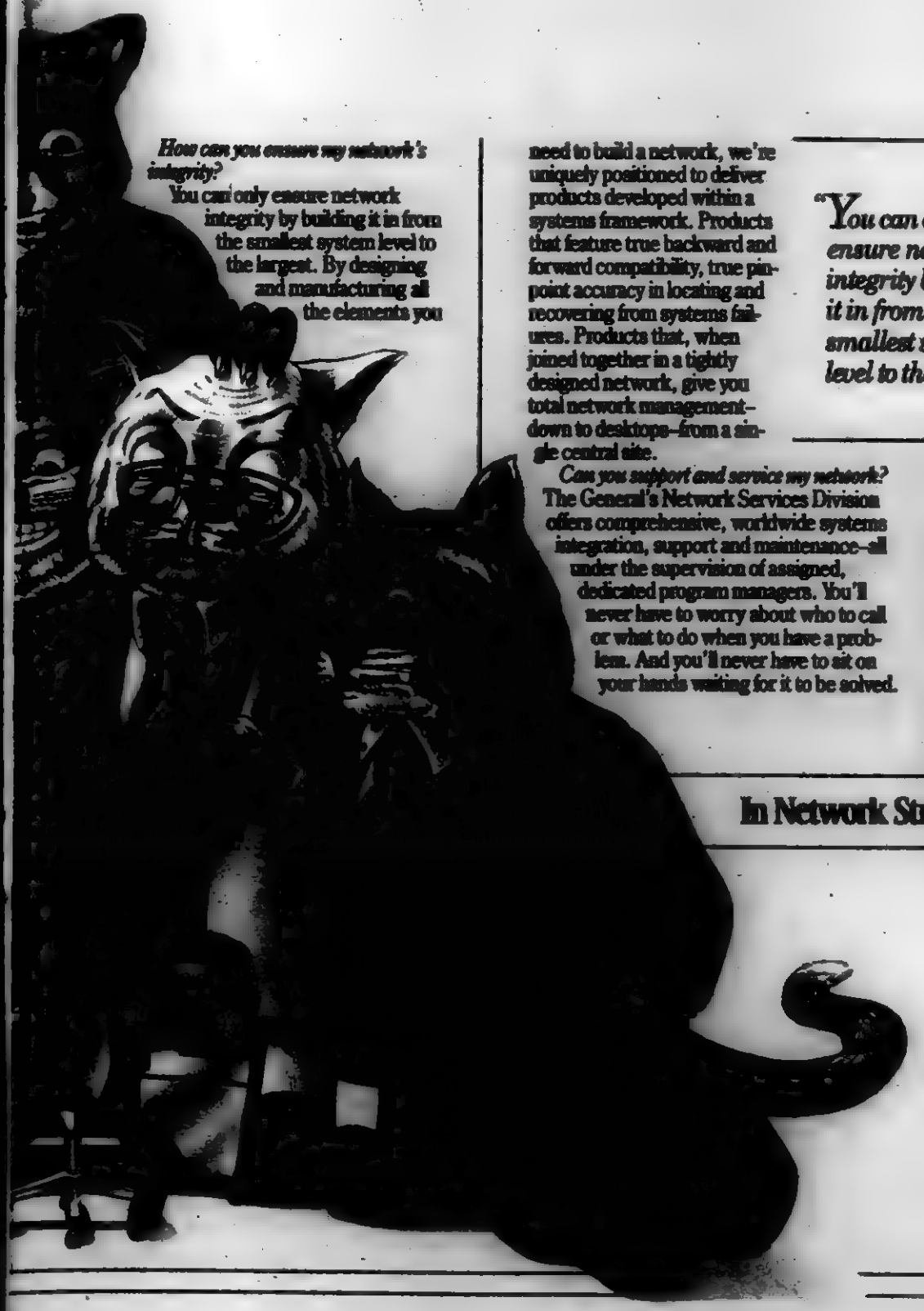

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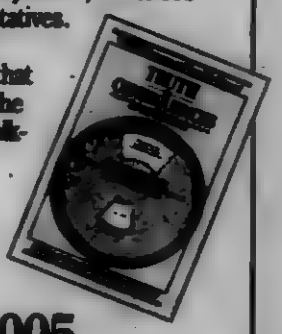

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is ready to be sent to an insurance company, the radiologist issues an oral print command, and the report is printed.

The time spent filling out and printing a report has been reduced from 15 minutes to 30 seconds. Reports issued to insurance companies are processed faster and the associated revenues are collected sooner, strengthening the hospital's cash-flow position.

Feasibility framework

Voice technology systems are relatively inexpensive. Small-vocabulary — less than 1,000 words — voice recognition hardware and software components, including a microphone, typically cost between $2,000 and $6,000. Voice synthesis systems, including a speaker, are also in the $2,000 to $6,000 range.

With such a low-cost investment, determining whether voice technologies are a feasible solution does not need to be a costly, lengthy task.

Nevertheless, care should be taken to ensure that voice technology will pay off in both the short and long term and that the organizational implications of the technology are properly addressed. The following framework presents five basic steps of conducting a feasibility study for voice technology.

Step 1: Identify and examine potential voice technology applications. Examples of high-potential units to be considered are production, marketing, distribution and finance. Key indicators of potential include the following:

- Repetitive tasks.
- Data entry functions.
- Processes requiring workers to use their hands while simultaneously recording observations, such as finished-goods inspection.
- Processes that are performed by disabled personnel.
- Multiple processes performed simultaneously by a single employee.
- Stock quotations or telephone directory assistance.
- Expert information retrieval.

Step 2: Identify and prioritize potential benefits and drawbacks of voice technology. Possible benefits include the following:

- Increased security.
- Job enrichment and improved morale.
- Reduced training costs.
- Increased productivity.
- Reduced labor costs.
- Greater data accuracy.
- Competitive advantage.
- Increased customer satisfaction.

Obviously, not all benefits will apply in all cases. Among the possible drawbacks are:

- Initial costs.
- Employee resistance.
- Malfunctioning newer products.

Step 3: Quantify benefits and drawbacks. The benefits and drawbacks identified in Step 2 should be quantified to aid in calculating an investment payback period.

For example, in a large textile firm, finished-goods inspection currently identifies five defects per 100 yards of textile, on average. With voice technology in place, the company expects to detect defects more quickly and hence locate and repair the source of the defects — such as a defective machine — sooner.

The firm expects to reduce the number of defects by 20%, or one defect per 100 yards, which will in turn reduce the labor and machine costs that are incurred to rework defective material.

The reduction in defects will lower the cost per yard of non-defective textiles for the firm, and the company projects a significant increase in gross profit as a result. If the company's sales remain the same, this favorable impact on gross profit is expected to translate into a $12,000 increase in net annual profit.

Step 4: Determine the payback period.

Research shows that many voice applications have a technology payback period of less than two years. Assuming that the textile firm in the previous example purchased a $6,000 voice technology system and receives $12,000 in recurring annual benefits, its payback period would be six months.

Step 5: Make feasibility decisions.

Based on the payback period and intangible factors, such as company image and employee morale, a final decision can be made on whether it makes sense to acquire voice technology.

The voice technology industry is still in its infancy. Voice recognition systems providing speaker independence and continuous speech are under development; they are predicted to become a usable application in the near future.

Meanwhile, as the output quality of voice synthesis systems improves, the number of applications will also expand, particularly in combination with other voice processing systems. •

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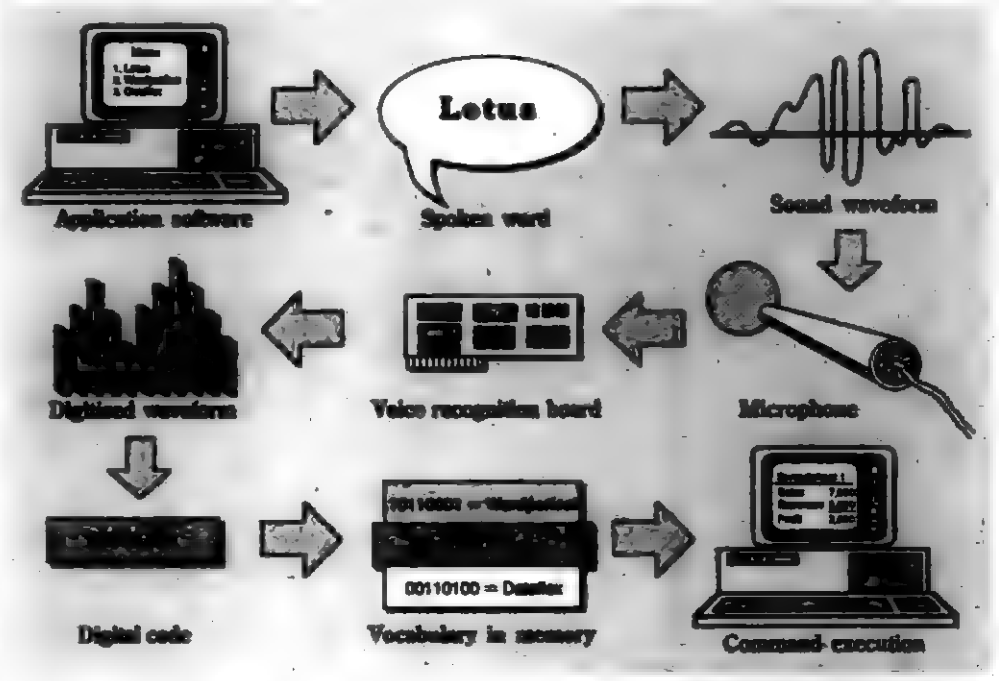

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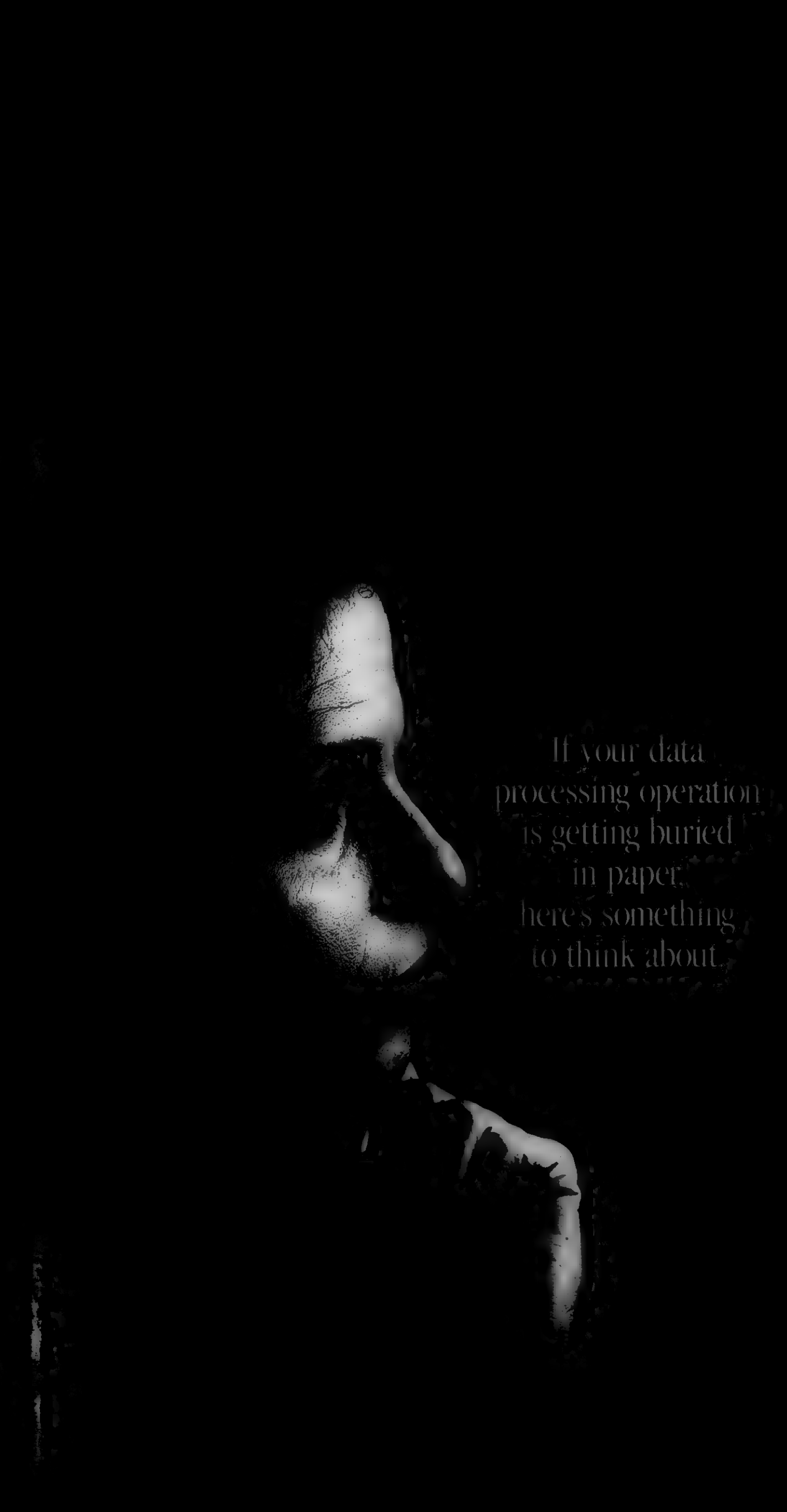

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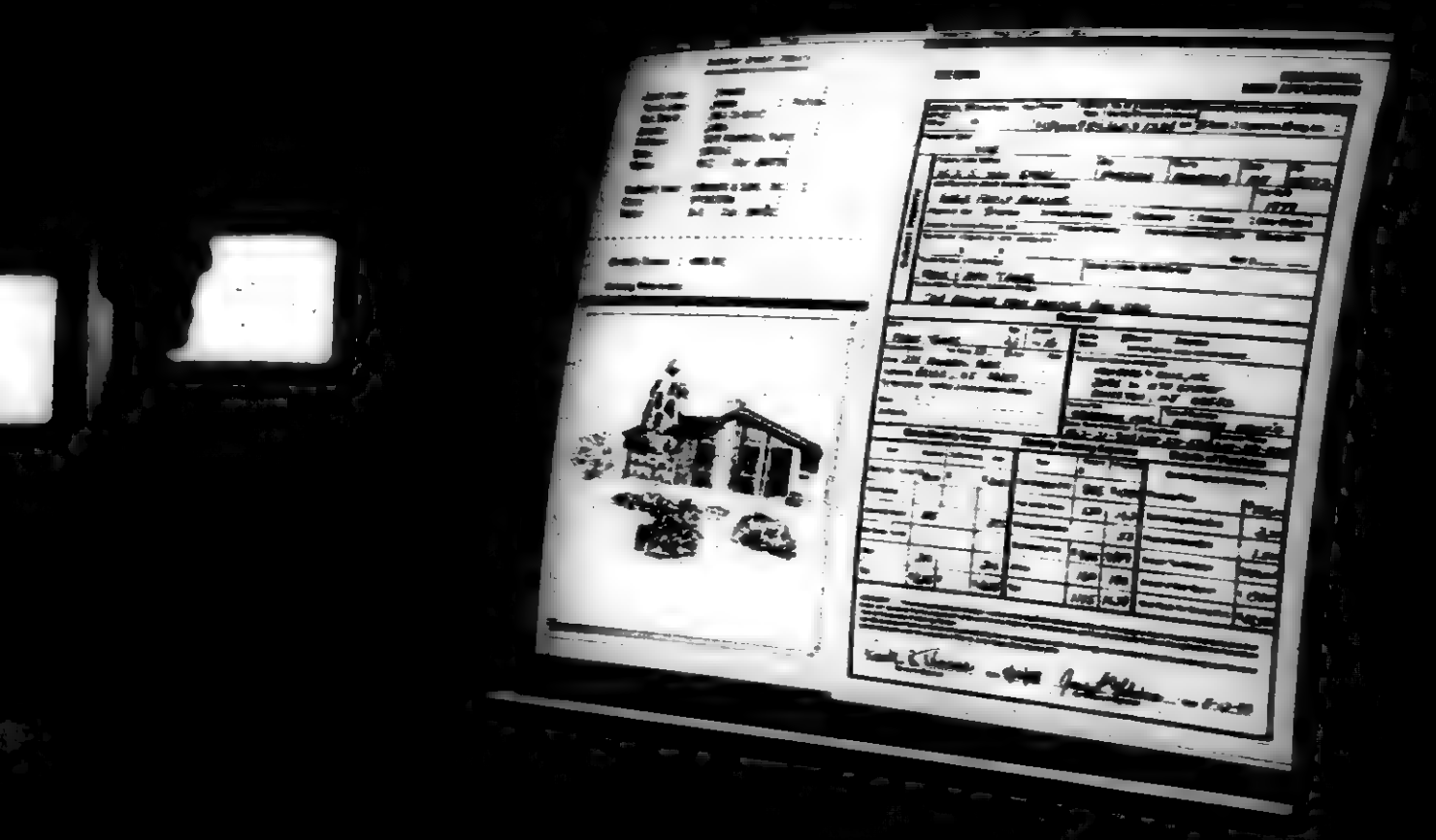

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Pros and cons of voice systems

Kurzweil Applied Intelligence, Inc. was the first voice recognition vendor to offer a large vocabulary system, one with more than 5,000 words. The Waltham, Mass.-based company is also one of the few voice vendors to offer customers full applications such as report generation.

Voice Rad and Voice Em — applications for radiologists and emergency medicine physicians, respectively — prompt doctors through a report on each patient's visit. The doctor is freed from scribbling the report; the hospital is freed from paying for transcriptions; and administrators gain immediate access to digitized data on patient care.

Kurzweil also sells the voice system itself, KVW, and a report shell called Voice Report. Bob Steingart, manager of product marketing for Kurzweil, recently spoke with *Computerworld* Senior Editor Amy Fiore about how a customer might implement a voice system.

What is the payback period for a voice system?
Most of the doctors we're working with say the system can pay for itself perhaps in a year, just based on salary savings, not even factoring in the benefits of getting the report done more quickly. Doctors nationally spend $10,000 a year for transcription, but in radiology, the cost of transcription is much higher than that — $20,000 to $30,000 a year just in salary for a trained, technical transcriptionist. Our system costs in the range of $20,000 to $25,000.

That's specifically for Voice Rad, but in most cases we look at a one- to two-year payback.

Is it the doctors or the hospital administrators who are the advocates for installing a voice recognition system?
In many cases, the administrator is more excited than the doctors, because administrators have costs on their minds, and they're the ones who always get beat up about how long transcription takes, how much it costs, how it threatens a hospital's accreditation if it can't get reports done on time and how billing can't be done without the reports.

What other applications will you offer?
We see a lot of areas in the medical field: internal medicine, pathology, surgical notes, ophthalmology. That is driven by proven need and cost justification. In some areas, even when a large vocabulary voice system solves a problem, it's not cost justifiable.

In all of these areas, are you still targeting professionals, not clerical staff?
Right. I wouldn't rule out anything, but we've found that in the clerical area the problems and the cost justification just aren't the same. If you have someone who makes $50,000 a year, increasing their productivity significantly means more.

What about hands-free order entry?
Some of our customers are doing voice data entry, but I have yet to see any of those applications really take off. It's not because it didn't work — it really relates to cost justification.

Would a speaker-independent continuous-speech system be so much faster than typing that it would be cost justifiable?
It would help. The other thing we've found with order entry is mirrored by some of the other areas. The typical installation is a $200,000 installation, of which the voice part costs between $2,000 and $5,000.

The so-called simple data entry application would always start off simple, but it turned out that the application really had to be tied into an MIS system and a material requirements planning system and so forth.

Probably the next general area that fits into the model that we're working in is the legal field. Some of the attributes are (that) it's got professionals who have transcription problems, and there are lots of words.

We will also make the Voice Report system more robust and supply a bigger suite of development tools with it.

What kinds of companies are developing their own voice systems using Kurzweil's development tools?
There's a large insurance company with a very large MIS staff, which is an integral part of their business. They are evaluating the technology for report generation from their agents out in the field. That's being driven by the MIS group's advanced technology section working with their own end-user clients.

As far as a profile of good applications goes, if you're doing reports that are somewhat repetitive in nature and particularly if there's a high volume of these reports and they're time-critical, then you may have an application that is not just interesting but also cost justifiable.

How can you integrate the data from your personal computer-based system into a host data base or host-based network?
We're doing a project right now with the Veterans Administration in a number of sites across the country. In that approach, we bring patient demographics in from the mainframe.

The doctor enters the patient number and then a file is brought down with the patient's name and other relevant information right into the report. The doctor speaks the report as he does the exam, and when he's done, instead of saying "print this," he says "send this" and sends it back to the mainframe. From there, it's accessible throughout the hospital.

Bob Steingart

JOHN OWENS

Do you sell software that will retrieve information from the host data base?
We have some of that. That really gets more into traditional PC issues — it has nothing to do with voice recognition. So the way I answer that is, in a hospital, if you have a PC that hooks up to the mainframe and you can get information and send it back, then adding voice to it isn't a big deal.

What sort of physical security or data security is there for systems that upload to a host?
In terms of access, right now you have to identify yourself to the system, and it has your voice profile stored on it. In terms of security, I go back to the same answer: Whatever security is available right now is what you can have. Just think of it as another terminal out there.

Which takes longer: training the end user to use the voice system or training the machine to the user's voice?
The voice training takes about two hours in doctor applications, and we're finding that's much less of an obstacle than we even imagined. Most doctors within a day can start generating reports.

Since end users have to read words into the system to train it, does a list of words come along with the application?
Yes. In fact, the biggest thing we found out in the past year or so is what it takes to build a successful application: We had to build a knowledge base.

We started off thinking it was a list of words and quickly found out the list of words is the easy part. What we added then are two things. One is what we call "trigger phrases," which are like voice macros. The system knows about the application, so if you're in a head CAT exam and you say "normal," a whole sentence comes up on the screen. This way, a doctor can get a report done very quickly.

But they have to learn the trigger phrases.
Right, but most of them really mirror what the doctors do right now. Most radiologists dictate today, and a lot of them have really developed a kind of verbal shorthand with their transcriptionists anyway.

The other piece of the knowledge base is the structure of the report. We found that everyone has to specify the date, then they always say the name of the exam, then they usually give a certain kind of diagnostic, and they always seem to end up with an impression at the end, and they all need a signature. That structure is really the guts of the knowledge base.

Two years ago, Kurzweil was describing KVW as a 10,000-word system. Why is it now called a 5,000-word system?
Technically speaking, it's a 5,000- to 10,000-word system. The reason we're now calling it 5,000 has to do with the applications we're working on. We've found that at 10,000 words, the response time fell off. It still works, but it didn't work as fast as we thought it had to work.

Without getting down to the details of an algorithm, when you say a word, it does a kind of comparison against everything you've said before. At 5,000 words, it provides what we consider a reasonable response time with reasonable accuracy.

How close is the industry to producing the dreamed-of executive information system: natural-language queries, a powerful data base and a voice interface?
The voice part is probably farther along than the other elements. I don't mean that as a cop-out, but we were working with AI Corp. to interface our system with theirs, and it really worked out just fine.

What tended to be the bigger issue was this: We've got this chief executive sitting there, saying, "OK, tell me what's happening in such and such a division," and the system would come back and say, "Information not found" or "Sorry, the link is down." It's only as good as the data base. There are a lot of things we could do with AI, and we've just scratched the surface. One is developing the knowledge base further — that whole process could benefit from AI-type tools.

Another is the recognition process. We've put in the first context-sensitive experts to help the system recognize words, but we're looking at making those more sophisticated. There's a lot of room for the AI tools to improve the accuracy and usability beyond what it is today. ●

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A simple barometer forecasts software trouble

Use this formula to preview how much trouble your new system will give you later on

BY MARK DUNCAN

Forgive the systems development professional who can't get excited about software maintenance. With looming corporate expectations to "get the job done" — and quickly — it's tough for maintenance considerations to really be anything more than just an afterthought.

And while computer-aided software engineering (CASE) automates more and more of the development life cycle, until CASE technology fully matures and is affordable to even modest-size data processing departments, MIS must find alternative ways of ensuring the quality of software during the development stage.

Which brings us back to square one and the systems developer. It should come as no shock to rational DP professionals that the best time to consider the maintainability of application software is during its development.

To address the future maintenance of their software, MIS managers must ask themselves three fundamental questions:

- Can I correct the software when it fails?
- Can I modify the software to reflect changing requirements and technology?
- Can I test the software fixes and software modifications?

One could proceed simply by using this checklist, but no single list can cover all applications development and maintenance situations.

Furthermore, repeated use of the same checklist does not lend to self-refinement. And while answers to questions on a checklist are meaningful individually, the checklist as a whole really does not guarantee that the application has been checked over thoroughly.

Checklists are designed to yield the "right" answers. Half-right or half-wrong checklists or any combination of "yeses" and "nos" in the same checklist are difficult to evaluate.

Complex application software requires something more sophisticated than a check mark on a checklist to attest to its maintainability. It requires actual measurement.

The traditional checklist must be transformed into a precise metric. The check marks and crosses on the list must be quantified into numeric values that are meaningful not only on an individual basis but provide summary data as well.

Available in some form

Checklists of some kind undoubtedly already exist in most MIS departments. With some creative customization and simple arithmetic, these can be converted into advantageous maintenance metrics.

Managers may then answer the question, "How maintainable is your software?" knowing that they can back up their answers with specifics.

In the same way that a checklist is made up of many questions, a metric consists of elements. Thanks to the work that has been done to date on software quality factors, two types of elements exist: binary and relative.

A binary element yields one of two answers to a particular question: yes or no. These answers may be quantified as 1 and 0, respectively.

The sum of these answers provides a measurement of an action or a deliverable. For example, say we were attempting to ensure the correctness of a piece of design documentation. A list of possible questions that constitutes the "correctness metric" might proceed as follows:

- Does the design agree with the requirements?
- Are all defined functions referenced?
- Are all conditions and processes defined for each decision point?

If the answer is yes to all three questions, then the metric value would be 3. Expressing this value as a ratio (the sum of the answers to the total number of questions) will always give an answer between 0 and 1. The above metric value would be a 3-to-3 or a perfect 1.

If there are one, two or three "no" answers, the metric value would be 0.67, 0.33 or 0, respectively.

The other type of element is a relative element, which is less subjective than a binary one. It measures the number of violations of a specific rule or coding standard.

For example, there may be a Cobol coding standard in your shop that says IF-statement nesting may not exceed three levels. The metric value for the IF-statement coding would, therefore, be the number of violations of the rule divided by the total number of IF statements in the module.

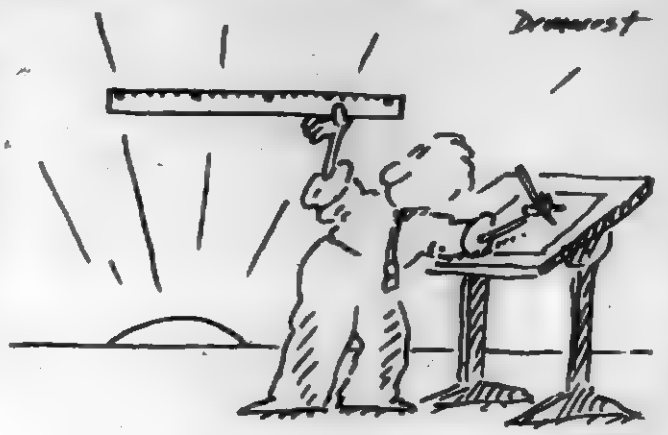
Then, to normalize the element, subtract the metric value from 1. This will always yield a value between 0 and 1.

Consistency

If there are several such measurements related to one aspect of the software, the metric value is their sum divided by the number of measurements, so the final value is still between 0 and 1 — consistent with binary metrics.

For example, in addition to the above IF-statement rule, your shop might have two other rules for standard coding: error-handling conventions and naming conventions.

The corresponding metric elements would be 1 minus the number of violations of error-handling convention, divided by the total number of error-handling instances in the module;



CHRIS DEMAREST

Duncan is a quality assurance consultant at a major Dallas bank.

- **A basic maintenance metric**
- **Ask: Can I correct and update this software?**
- **Measure how often coders break the rules**

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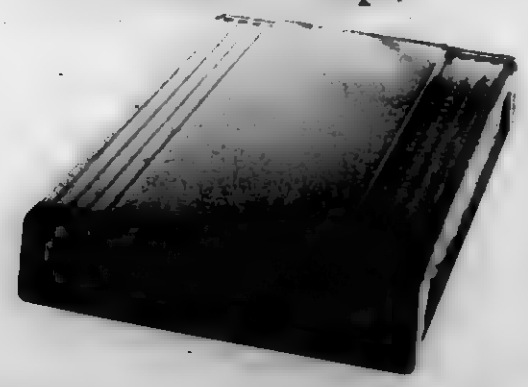

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How correctable is your software?

Write your own questionnaire like this one to determine the 'correctness metric' of your system

1. Is all documentation current? ☐
2. Is documentation according to standards? ☐
3. If the software fails with a user abnormal ending, does the error message indicate the fix required? ☐
4. Are recovery and restart instructions documented? ☐
5. Is code self-documenting enough to facilitate correction? ☐

likewise with naming conventions.

If you calculated each of these three metrics to determine coding correctness for that piece of software, then an absence of violations would yield a metric value of 1 plus 1 plus 1 divided by 3 — or 1.

But suppose there were violations of each rule. If there were two IF-statement violations out of 10, one error-handling violation out of four and five procedure-naming violations out of 10, then the metric value would be 0.7 — less than 1.

Within any multiple-element metric, binary and relative elements may be mixed freely. Binary elements yield a value of 0 or 1; relative elements yield a value between 0 and 1.

Therefore, adding the elements of one or both types within a metric and expressing the result as a ratio of the total number of elements will always yield a value between 0 and 1.

This result quickly indicates how closely the actual metric value approaches any target value you may have set, with 0 typically representing the worst case and 1 the best.

Nothing stays the same

Metrics are useful in quantifying the maintainability of application software while it is still being developed. However, they are not static. They must continually be refined by examining the type of maintenance performed on the application software.

Trends and high frequencies of specific maintenance tasks may indicate that the metric is in need of modification. It may even signal the need for an entirely new metric to address the problem and provide error prevention.

For example, if programmers find that the most time-consuming part of retesting a program is locating or recreating the test data, then, obviously, the metrics addressing test planning, test data creation and test documentation need to be scrutinized and modified.

Metrics are simple to develop and may be customized to reflect any hardware and software environment. They may be applied to documentation, source code and test data and appear at the individual program module level or system level.

The number of elements in a given metric will vary, depending on the particular environment and the degree to which a particular deliverable is being measured.

Moreover, an element or an entire metric may be common to different aspects of the software. For example, "simplicity" is a software attribute that is desirable for both system maintainability and testability.

Consideration should be given to automating the selection and completion of maintenance metrics. A systems developer may then be able to identify the particular phase and attributes in which he is interested and, thus, be presented with the appropriate metrics to complete interactively.

Three basic principles

Keeping in mind the three fundamental elements of software maintainability — its ability to be corrected, modifiability and testability — you might construct your own metrics as follows:

- Ability to be corrected: Can the software be corrected when it fails? Elements of this metric should highlight the attributes of the software that facilitate the correction of errors with the appropriate speed and safety (see chart left).
- Modifiability: Can the software be modified when requirements change or when technological advances necessitate it?

Elements of this metric should address aspects of the software that enable system changes to be made easily and safely. For example, if the deliverable is source code for a program in IBM's IMS, metric elements might be similar to those shown (see chart above).

- Testability: Can software fixes and modifications be tested? Elements of this metric should emphasize attributes of the software that facilitate effective testing and retesting of the software.

Maintenance is an afterthought in most systems development situations. During development — time being of the essence — MIS's efforts focus on implementation dates and budgets. The difficulties of system maintenance are accepted as a fact of life, with little credence given to the idea that simple considerations during development might actually lessen or eliminate them.

But viable and effective maintenance metrics, applicable during software construction, must become part of the systems development process.

Far from being a threat to budgets and an impediment to speed, maintenance metrics can produce high-quality application software that yields high returns via low maintenance costs. ●

How modifiable is your software?

A questionnaire like this one can help pinpoint how easy it will be to change or enhance your system

1. IMS call statements conform to standard format

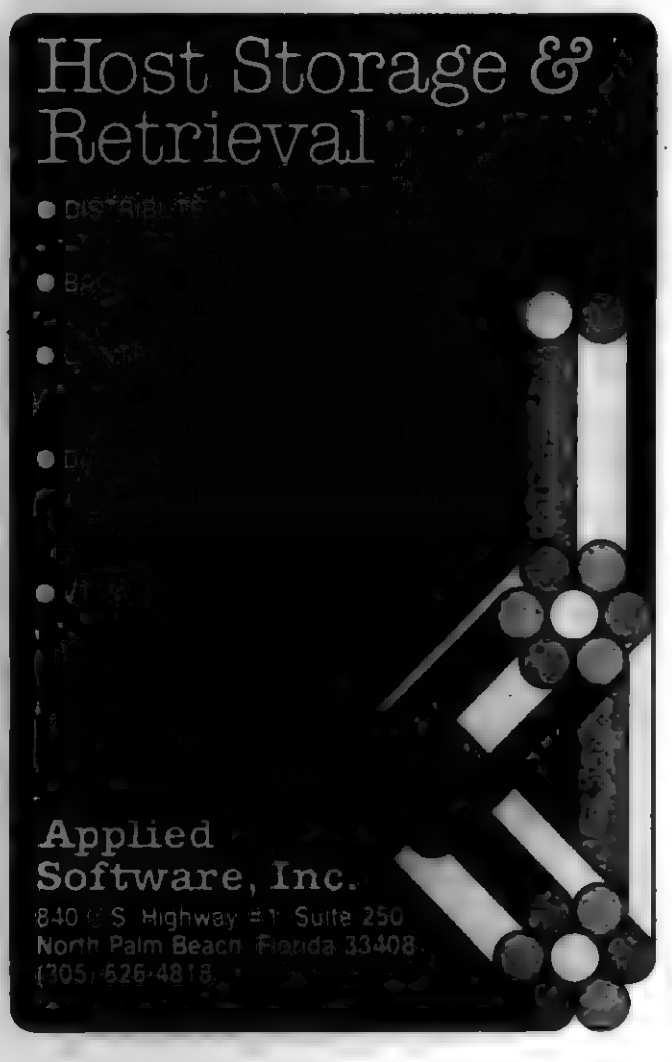
$$1 - \frac{\text{Number of nonstandard IMS call statements}}{\text{Total number of IMS call statements}}$$ ☐

2. IMS status codes checked in consistent fashion

$$1 - \frac{\text{Number of nonstandards status code checks}}{\text{Total number of status code checks}}$$ ☐

3. SSA construction is consistent

$$1 - \frac{\text{Number of nonstandard SSAs}}{\text{Total number of SSAs}}$$ ☐



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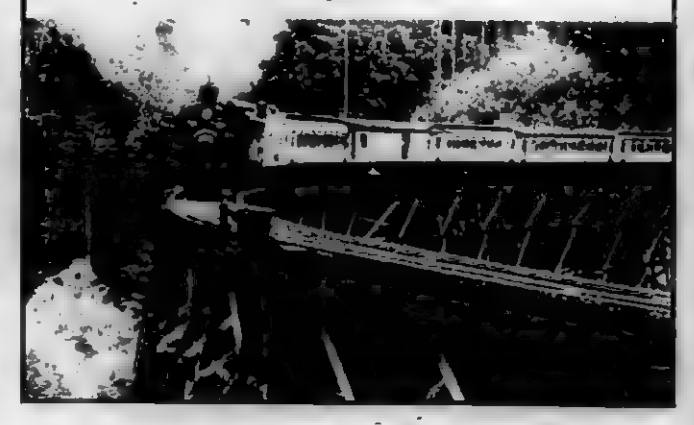


TAKING CHARGE

James Connolly

People hold systems key

The rewards are there for the managers and companies who come up with the next superstar strategic system in the tradition of AMR's Sabre and Baxter Health Care's ASAP.

There are promotions, awards and raises for the managers. There is the chance for corporate profitability. There is the opportunity for everyone to see their success written up in journals such as the *Harvard Business Review*. Reaping the benefits might be the easy part. The tough part is figuring out how to come up with that honored system.

A dozen leading MIS executives recently gathered at a *Business Week* conference in New York to share their thoughts on how to develop strategic systems and how to weigh the benefits and costs of such projects.

These executives offered a variety of suggestions and observations that may not fit together to form a model but, in a bit-by-bit manner, do provide an overview of the concerns their peers must address.

As varied as the suggestions were, most of the speakers raised a common theme centered on people.

Managers such as Darwin John, vice-president of information systems at Scott Paper,

Continued on page 86

Keeping up with CDC

VIM guides users in coping with changes

BY JEAN S. BOZMAN
CW STAFF

Control Data Corp. is shifting gears — moving toward open standards and a transparent architecture under the firm's NOS/VE operating system that links workstations and mainframes. For CDC users, the strategy means that they, too, must shift gears or be left behind with aging hardware and outdated software.

Being left behind is an uncomfortable prospect for the 350 sites represented by the VIM users group, which was founded two decades ago and named with the Roman numerals standing for then-current CDC 6000 mainframe.

Unlike larger users groups such as Common, Guide International Corp. and Share, Inc., which represent IBM users, VIM is relatively small and informal. Many users have been attending the meetings for 10 years or more and know other VIM users by their first names.

One reason users attend VIM, according to newly elected VIM Vice-President Bob Kirkman, a 12-year VIM veteran, is to give CDC executives direct feedback on products and user concerns. "I'm convinced that I've been able to change a few things," Kirkman said.

Despite the company's annual shareholders' meeting — held the same week — when the semiannual VIM gathering was held in Irvine, Calif., earlier this month, CDC executives flew in from Minneapolis to meet with prominent CDC shop managers for a one-day session on managing change.

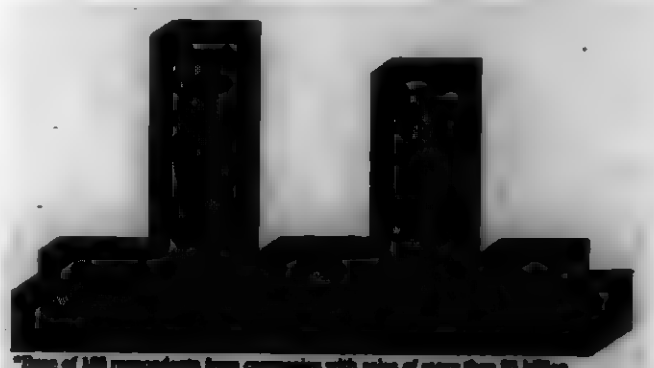
"CDC feels their executives can talk to us fairly openly," said newly elected VIM President

Continued on page 88

Data View

Sharpening the edge

MIS wastes time and resources maintaining existing systems while not improving competitive advantage: Execs say no



*Base of 169 respondents from companies with sales of more than $1 billion

INFORMATION PROVIDED BY UNITED RESEARCH CO.
CW CHART

MIS chief walks point on decentralization

BY JAMES CONNOLLY
CW STAFF

GREENWICH, Conn. — Tom Gaughan has seen changes and overseen changes in his six years at Primerica Corp.

For instance, Primerica was called American Can Co. and drew 85% of its $4.8 billion in revenue from manufacturing when the ruggedly built, easy-smiling Thomas R. Gaughan joined the firm as vice-president of corporate information systems and services in 1982. He took over a centralized MIS operation with multiple IBM mainframes and 300 MIS employees in that shop.

Today, the cans and the rest of the manufacturing business are gone from Primerica, which has turned itself into a diversified services company focusing on financial and retail businesses. The centralized mainframe operation is gone, too, with the hardware and the day-to-day decision-making shifted out to operating units.

Trimming the staff

As a result, the former 300-employee central MIS group is down to 30 people. The headquarters staff is supported by a 200-node IBM Token-Ring personal computer network with gateways to host systems in subsidiaries for those times when mainframe applications are needed.

Gaughan was brought in to change the structure of the information systems group in order to keep it consistent with the structure of the evolving company. Today, his focus is to ensure that information systems maximizes its contribution to business objectives.

The easy smile fades when Gaughan talks about the staff cutbacks and transfers. "The toughest part of this job has to be reacting to changes that impact on people," he says.

He has had to tell people they must relocate and tell others that the projects they had devoted their time to were being shifted to spin-off companies — he had to talk to those people and rationalise the moves.

The Primerica MIS strategy is not one of gutting the systems group but one of decentralization and reaction to strategic reorientation of business.

"I think our change is one of the most dramatic in American industry in terms of changing the focus of the business as well as

Continued on page 87

PROFILE

Thomas R. Gaughan

Position: *Vice-president of corporate information systems and services, Primerica Corp.*

Mission: *To ensure that MIS maximizes its contribution to business objectives and structures the group to meet the needs of the evolving company.*

APC's Seaton honored for MIS leadership

BY JAMES CONNOLLY
CW STAFF

OAKLAND, Calif. — The chairman of a $1.2 billion shipping company that computerized its international cargo and container operations will be honored this week for exceptional leadership in managing information technology.

Bruce Seaton, chairman and chief executive officer of American President Companies Ltd. (APC) in Oakland, will receive the fourth annual Gartner Group, Inc. Excellence in Technology Award during ceremonies in Vienna, Va.

Seaton is being honored for driving APC's automation in an industry that the selectors noted had been lagging in technological innovation.

The key network and information system innovations cited by the awards committee include APC's Cargo and Container Management System (CCMS), which was designed to track customers' freight, APC's equipment and the paper and financial information associated with international cargo moves.

The company has used CCMS to reduce the amount of paperwork associated with shipping and has also developed one of the first computerized cargo clearance systems to expedite the preinspection and clearance of imports through the U.S. Customs Service.

One of the tools that is used with CCMS is APC's Computer-Aided Logistics Systems, which provides decision support that allows managers and logistics analysts to plot potential shipping routes, identify potential stress problems and plan the most efficient logistics possible for ship, rail and truck moves within the APC transportation network.

APC's Seaton

APC is also using electronic data interchange to provide customers with on-line access to the CCMS data base and is using financial systems to analyze the profit potential for any container move between two points on the globe.

Earlier winners of the Gartner Group award were AMR Corp. Chairman and CEO Robert L. Crandall, Federal Express Corp. Chairman and CEO Frederick W. Smith and Aetna Life & Casualty Co. Vice-Chairman William O. Bailey.

The award committee was composed of nine information systems executives, including APC Chief Information Officer James S. Marston.

CALENDAR

AIIA 1988 National Operations and Automation Conference. Atlanta, May 23-25 — Contact: American Bankers Association, 1120 Connecticut Ave. N.W., Washington, D.C. 20036.

Electronic Shopping '88. Boston, May 23-25 — Contact: Touche Ross & Co., Suite 1900, Alcoa Building, One Maritime Plaza, San Francisco, Calif. 94111.

VIP '88. Duquesne Systems' International User Group Conference. New Orleans, May 23-25 — Contact: Mark Power, Duquesne Systems, Two Allegheny Center, Pittsburgh, Pa. 15212.

Expert Systems and Artificial Intelligence Symposium. Washington, D.C., May 23-25 — Contact: Digital Consulting, Inc., 6 Windsor St., Andover, Mass. 01810.

Case Studies Ninth Annual Conference on Applications of Computer-Aided Software Engineering Tools. Ann Arbor, Mich., May 23-27 — Contact: Rebecca Steinmore, Meta Systems, Suite 200, 315 E. Eisenhower, Ann Arbor, Mich. 48108.

Contrasting Perspectives on Information Technology. Wellesley, Mass., May 24 — Contact: Center for Information Management Studies, Babson Park, Wellesley, Mass. 02157.

Ordernet Services' User Group Meeting. Columbus, Ohio, May 24-25 — Contact: Sterling Software, Ordernet Services Division, 1651 N.W. Professional Plaza, Columbus, Ohio 43220.

Testing for Conformance to Information Technology Standards. Gaithersburg, Md., May 24-25 — Contact: U.S. Department of Commerce, National Bureau of Standards (690), Gaithersburg, Md. 20899.

Aerospace and Defense Project/2 Group Conference. Newport Beach, Calif., May 24-26 — Contact: Rob Bloom, Project Software & Development, Inc., 20 University Road, Cambridge, Mass. 02138.

Mark Up '88, International Conference and Showcase on the Standard Generalized Markup Language. Ottawa, May 24-26 — Contact: Graphic Communications Association, Suite 604, 1730 N. Lynn St., Arlington, Va. 22209.

Computer Marketing Symposium. New York, May 25 — Contact: ACS Communications, Suite 306, 55 Northern Blvd., Great Neck, N.Y. 11021.

Electronic Data Interchange: Bringing It Together in Government. Gaithersburg, Md., May 26 — Contact: Dorothy Walrman, National Bureau of Standards, Room B166, Building 225, Gaithersburg, Md. 20899.

Connolly

FROM PAGE 85

told how important it is to leverage human relationships and to find excellent leaders.

Michael J. McLaughlin, vice-president of information systems at New York Life Insurance, explained that a key system at his firm was developed when the company wanted to think of its customers as people, not as six million policy numbers.

The system let New York Life look at a customer as an individual holding a variety of policies, not as three numbers buying three different types of insurance.

People skills

Laurance T. Burden, vice-president of MIS at Firestone Tire & Rubber, noted that a computer is only one-fifth, or maybe one-twentieth of a strategic initiative. Much of the rest is people-related — how people do their jobs, how they adapt to change and how they interact. He added that people also need to see new deliverables from their systems every six months or they lose interest.

Pillsbury Vice-President for Information Management John M. Hammitt said systems designers who impose changes on their users need to avoid causing fear of change among users.

John H. Rogers, director of corporate information and technology at Bank of Boston, told of how his company formed cross-organizational committees to address information systems issues. A key to staffing those committees was bringing in 17 nontechnicians to work with the 27 technical experts.

Not everyone can implement strategic, ultrasuccessful systems. Sometimes the best a company can hope for is to come up with one that lets it stay competitive. But it was apparent that successful systems are developed with consideration for the human element.

Connolly is Computerworld's senior editor, management.

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MIS chief

FROM PAGE 85

the centralization/decentralization issue," he says.

"We had to dramatically change the way information services were provided in the organization. Basically, we've changed from a centralized operation to where we provide — I hate to call it consulting — value-added support to our companies," he adds.

Those companies include the Smith Barney, Inc. brokerage; insurance companies; investment and asset management companies; a mortgage banker; direct-mail marketers, including Fingerhut Corp.; and retailers, including Musicland Group, Inc.

The man who hired Gaughan from Standard Brands, Inc., former American Can Vice-President and Chief Administrative Officer Jerry N. Mathis, recalls, "Tom turned out to be a terrific performer. He has fine interpersonal skills and is very user oriented, which is very important in the systems business.

"He reorganized the entire department and reduced staff, but at the same time he maintained high morale."

Gaughan's responsibilities have included providing transitional support to manufacturing groups as they were divested and evaluating the MIS operations of companies considered for acquisition. In at least one case, Gaughan's negative evaluation played a role in Primerica's decision to not acquire a company.

In his post as the top information executive at Primerica, Gaughan manages a group that sets direction for the subsidiary companies' MIS operations. That direction-setting includes doing research on leading-edge technology for individual business units and then ensuring that the other business groups benefit from that technology whenever possible.

Some of the technologies the group has researched are artificial intelligence and image processing. Gaughan also coordinates volume-purchase discounts, deals with vendors on national accounts and sets telecommunications strategies.

When in Rome . . .

In addition to managing the different technologies used at the company's various subsidiaries, Gaughan is responsible for managing different cultures. "One thing that became clear early on was that as we acquired companies, we acquired those different cultures," he notes.

He describes himself as "results oriented but also somewhat flexible" and stresses that one of his key objectives is to motivate his people. That means being driven by project management and looking for opportunities and challenges.

He has had to change his approach from that of hands-on operations. "There you plan and execute. Now I plan and facilitate," he says.

He says his transition from an operations person to a businessman came two jobs ago, when he was director of systems at Celanese Corp. It was then that he had to become aware of how an entire factory operated, not just the MIS organization. He says today's age of specialization may make it harder for younger people to make such a transition, because they focus so much more tightly on a single technology or application.

Background

Gaughan, 50, has been in the computer field for most of his career. Born in Pennsylvania and raised in New Jersey, he majored in engineering and business at Philadelphia's Drexel University, at which he received an MBA in 1962.

He did some computer programming while working in Drexel's cooperative education program. After graduation, he participated in General Electric Co.'s management training program, during which he spent much of his time working in systems and programming.

"I was interested in how information systems are used to support the business function. Another thing that interested me was the constant change in technology. And it has never stopped changing," he says of the magnet that drew him to computers.

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CDC

FROM PAGE 85

Abraham S. Levine. "They feel we won't misuse the information if they tell us about their future product plans."

Many of the approximately 500 VIM members who met said they depend on CDC's Cyber systems for engineering simulations or seismic and structural analyses at dozens of national laboratories, corporations and universities.

Yet most signs point to a turnover in the installed base of approximately 1,300 Cyber mainframes worldwide. "If you've got a strategy to stay with Control Data products, then you've got to migrate to the new NOS/VE environment," said Levine, who is manager of Scientific Computing Center Software Systems at Rockwell International Corp. in Seal Beach, Calif.

The problem is that many VIM users, particularly those in the electric utility business, are comfortable running custom NOS applications on older Cyber 700 and 800 machines. "NOS is a very comfortable system," noted Kirkman, a senior consulting engineer at Combustion Engineering, Inc. "NOS performs very well because it's been optimized for years."

Moving to NOS/VE was one of the hottest issues discussed at the VIM meeting. NOS/VE gives users special features that optimize CDC's 64-bit Cyber architecture for higher performance and better connectivity. But conversion can take months or years.

CDC is aware of users' concerns and has just opened a user liaison office at its Minneapolis headquarters to advise users on NOS/VE migration, Levine said.

A sign of the times

One sign that things are changing at CDC is the company's support for AT&T's Unix System V on all of its systems.

Levine said he sees the advent of Unix as an opportunity for CDC and its users to gain access to off-the-shelf Unix software. "Unix is a mine field for the big players like IBM and DEC," he added. "But it's an opportunity for the smaller players like CDC. Users are now going to be able to make procurement decisions based purely on price-/performance, and I think CDC will compete very nicely on that basis."

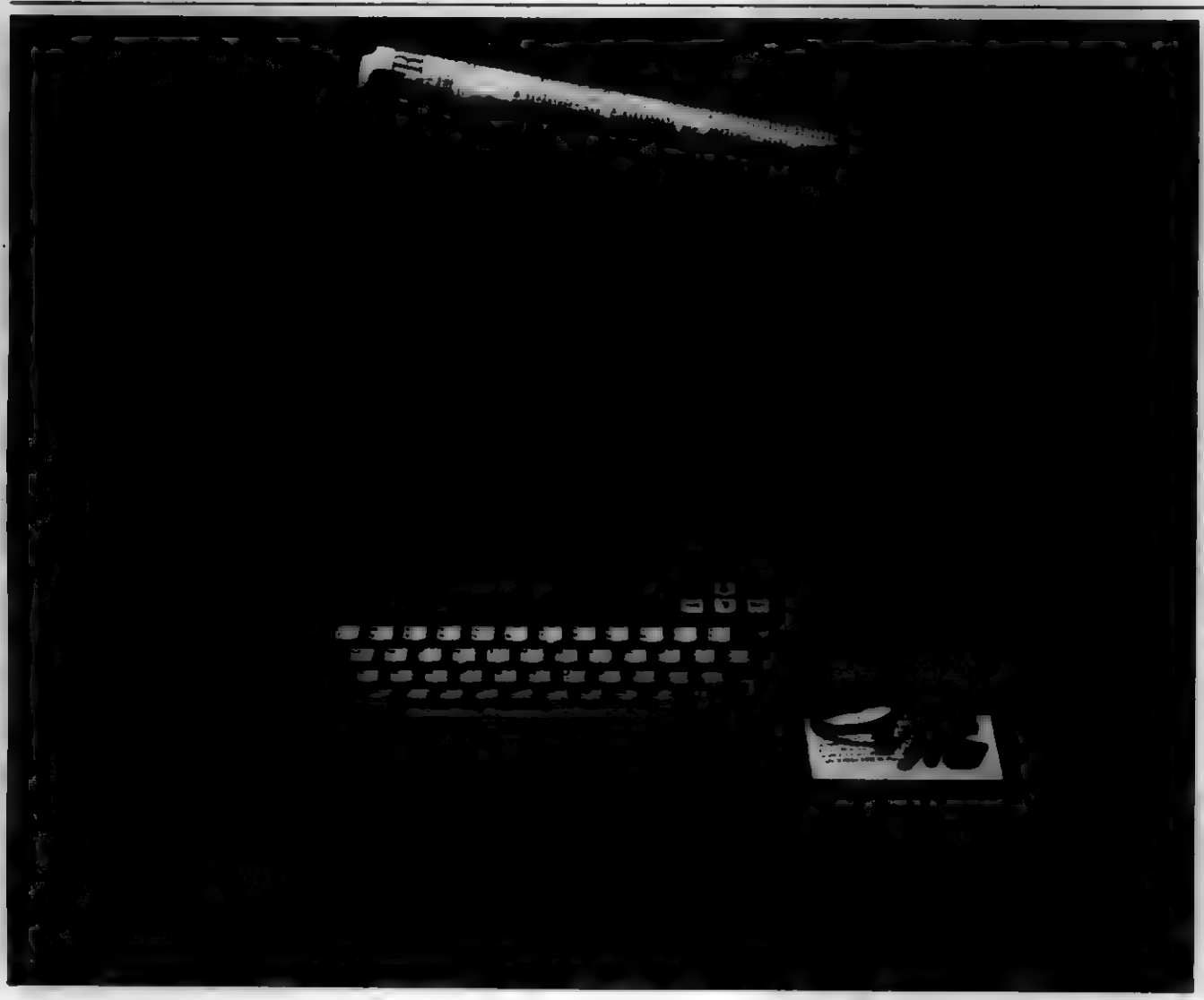
For an end-user group like Levine's Scientific Computing Center at Rockwell, Unix will make for greater compatibility between different vendors' systems. But at some companies, the advent of Unix on CDC machines may start a migration toward other vendors, users say. Large oil companies, for example, typically maintain machines from IBM and Digital Equipment Corp. as well as a supercomputer from CDC or Cray Research, Inc. for seismic analysis.

Although VIM membership has remained relatively steady in recent years, Levine and Kirkman said they are looking for new members. A likely source, they said, would be a site that "went out and bought DEC machines and came back when the users became dissatisfied with DEC service." But more users will be found among the dozens of new Cyber 900 sites abroad and the growing number of ETA Systems, Inc. supercomputer sites worldwide. ETA is a CDC subsidiary.

"Any CDC site can be a member of VIM," Levine explained. "We have some members from South America, Mexico, Israel — and even one site in the Soviet Union." But generally, European users join the European Control Data Organization of Users, and those in Australia and the Pacific Rim join the Austral-Asian CDC users group.

VIM's new board believes that CDC's revised management structure will play a role in growing the CDC user base.

"In some respects, the results of bringing on the new CDC management team have been immediate," Levine said. "The Cyber 930 program, for example, was floundering when new executives came on board 18 months ago. They told us last year that the 930 was going to come out on time, and they made it happen." The Cyber 930, financed by a special partnership, debuted in 1987 and new models were added this year.



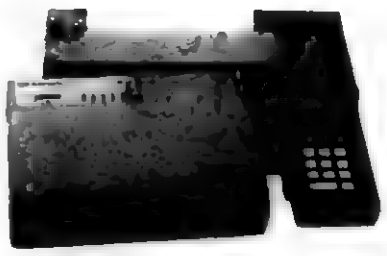
TI's new TravelMate™ LT220.
It's the closest thing to carrying a VAX™ in your briefcase.

Texas Instruments introduces the LT220 lap-top terminal — the next best thing to being there when you need remote access to your company's VAX.

The LT220 provides full VT220 emulation in a 4.8-lb. package, without sacrificing functionality. It features a 25-line screen that's easy to read. It even has a full-function keyboard like the one on a VT220.

The terminal communicates at 1,200 or 2,400 bps through one of its optional internal modems. For hard copy, just slide the LT220 into one of its optional cradles to add an ink-jet or thermal printer.

New credit-card-sized memory cards let you create, update and store files. They're also handy for programming the LT220 to your specific application.



Like its Silent 700™ predecessors, the LT220 sets new standards for portability, durability and reliability. All of which makes it the perfect tool for anyone who's ever wished for a VAX in their briefcase. In short, this may be the best little terminal in the world.

So go ahead. Take the first step toward improving your productivity today. Call Texas Instruments for more information or to arrange a demonstration of the LT220. Phone toll-free, 1-800-527-3500.

TEXAS INSTRUMENTS

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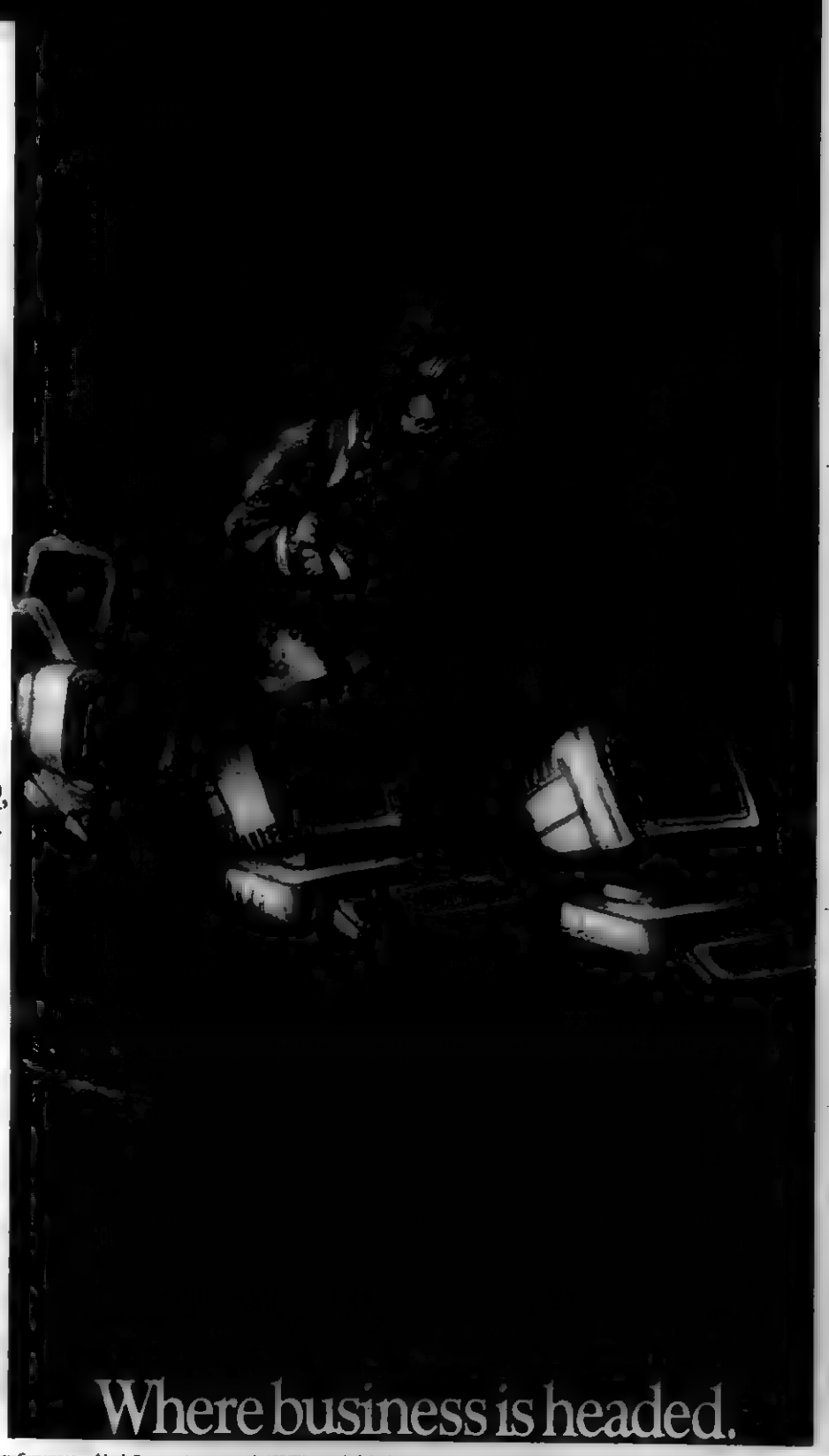

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COMPUTER INDUSTRY

INDUSTRY INSIGHT

Clinton Wilder

Users lose in Unix war

It's my Unix, and you can't play with it. One of the most common one-liners peppering speech openings in the industry these days is, "The great thing about standards is that there are so many of them."

To the MIS professional trying to sort out compatibility issues for long-range planning, this is known as black humor. But if the current situation is an indication of the way vendors are going to behave, progress toward the goal of seamless interconnection among disparate systems may actually be moving backward.

Unix, which once seemed in danger of death by inattention, is now becoming the industry's most incendiary battleground. In the latest turf war, a faction that reportedly includes IBM, DEC, Hewlett-Packard and Apollo is planning to collaborate on a Unix version to counter the AT&T and Sun Microsystems alliance, which has enlisted the support of Unisys, Xerox, ICL and others. What is this? The Allied nations and the Axis powers preparing for World War III?

The phrase "rival industry standards" sounds like an oxymoron, but that is the logical outcome if the current trend runs its course. The inherent

Continued on page 100

Floating Point lays off 160

BY J. A. SAVAGE
CW STAFF

BEAVERTON, Ore. — Recent attempts to increase revenue by introducing products and cutting embryonic research and development projects have failed in the short term, so Floating Point Systems, Inc. decreased its costs last week by slashing 160 jobs, or 20% of its 800-person work force.

In a related announcement, the scientific computer vendor said it expects its second-quarter results will show a 10% decrease in revenue from the meager $19.2 million reported last quarter.

Floating Point has lost approximately $35 million in the last five quarters.

The layoffs were not concentrated in any particular area but ranged across the board, according to a spokesman from the company.

Howard Thrailkill, the company's president of just three months, is carrying the ax. A Floating Point spokesman would not say whether the layoff direction came from Thrailkill or from the company's board of directors.

Time to shape up

Jeffry Canin, an analyst at San Francisco-based Hambrecht & Quist, Inc., said Thrailkill had been "given a clear directive to get expenses in line."

Sources say Thrailkill has been ineffective in making his last four companies — including Four-Phase Systems, Inc., now Motorola Computer Systems — profitable.

The source also said Thrailkill has been involved with layoffs at the other companies at which he worked, although not at his own initiative.

"The problems at Floating Point are not specific to them," Canin said.

"There's increasing pressure in the array processor market. It's not exactly growing at a stellar pace."

Treading water

Canin said he expects to see the company's losses drop this year and expects it to break even in 1989.

Since the beginning of the year, Floating Point has introduced two major products: the Superserver minicomputer and five models of its M64 minisupercomputer.

Floating Point also announced it is abandoning R&D efforts on its FPS T series, a massively parallel supercomputer.

DEC takes aim at HP in Europe

PARIS — Digital Equipment Corp., concerned about mounting competitive pressure from Hewlett-Packard Co., has set up a European-level program targeting HP. DEC described the program in a secret internal publication, titled "Winning from HP," that was recently acquired by an IDG Communications, Inc. reporter.

DEC's European Competitive Analysis Team (ECAT) is the driving force behind the program. Located in Evry, France, ECAT is chartered to provide DEC country and area marketing units in Europe with analysis and strategic sales support data concerning HP, Honeywell Bull, Inc., NEC Corp. and Honeywell, Inc.

In the internal document, the DEC team described what it sees as HP's strengths and weaknesses, as well as the method by which DEC can take advantage of them. According to the report, HP is currently dissatisfied with its position in the industry. It is losing market opportunities as well as people; its reputation is waning and its growth stagnating, the ECAT analysts said.

But HP now views itself as having weathered the worst and

Continued on page 92

Data View

Giant dominates leasing

IBM commands the computer leasing industry, with followers far behind

INFORMATION PROVIDED BY A 1988 GARTNER GROUP, INC./CDLA SURVEY
CW CHART

Nastec boss Sprinzen resigns

Leaves CASE vendor, returns to Relational fold

BY NELL MARGOLIS
CW STAFF

ALAMEDA, Calif. — When Martin Sprinzen arrives at his office this morning, he is bound to be hit with a sense of deja vu.

The 39-year-old executive, who left his job as vice-president of technical services at Relational Technology, Inc. in September 1986 to become president of Nastec Corp., left Nastec recently, returning to Relational as vice-president of engineering and customer services.

Relational's Sprinzen

At the time of his departure from Relational Technology, Sprinzen indicated to the press that his move was fueled by the challenge of pursuing a potentially exploding market. Precisely the same challenge motivates Sprinzen's return, he commented last week.

"Nastec has a real decent shot at the CASE market, which is up-and-coming," Sprinzen said, referring to computer-

Continued on page 96

Inside

- U.S. semiconductor industry hits four-year bookings high. Page 92.
- Industry mergers, acquisitions up 16% last year. Page 96.

Software 2000 hopes Silverlake runs deep

BY PETER BARTOLIK
CW STAFF

HYANNIS, Mass. — Its name hearkens to the advent of the next millennium, but executives at Software 2000, Inc. are confident they will find their riches by the dawn of the next decade.

Each new generation of IBM hardware has brought vast wealth and dominant market share to the handful of independent software firms savvy or lucky enough to be in the right place at the right time with the right product.

Executives at this small, Cape Cod-based company believe they have met the criteria for moving into that elite rank with the advent of IBM's long-awaited Silverlake line.

To hear company president Robert A. Pemberton tell it, Silverlake represents the golden age of computing: an opportunity to sell the logical third generation of applications software, borrowing the best attributes of mainframe and microcomputer applications and discarding the inconveniences of each.

If he is right, the firm stands to make a bundle selling software that is manufactured and packaged in the microcomputer shrink-wrap mold but with functionality more in line with the mainframe environment — at a price that straddles the two worlds.

But Software 2000 will have to plunge into Silverlake quickly, before the waters are full. Analysts say that any software developed for IBM's System/36 and 38 will have to be Silverlake or be unnoticed.

Hyannis's seaside atmosphere has helped 6-year-old Software 2000 retain all but two people in the headquarters and research and development staff in the past two years.

The firm was formed in 1982 with one purpose in mind: to capitalize on a new market represented by the introduction of the System/38.

"I looked at the operating

Continued on page 100

Up & Coming: *Software 2000*

Location: Hyannis, Mass.
Year founded: 1982
President: Robert A. Pemberton
Employees: 76
Product line: Business management software for the IBM System/38.
Of note: Sales have reportedly doubled each year since 1984 to achieve $7 million in annual revenue; company sees major opportunity in converting applications to forthcoming IBM Silverlake.

DEC, HP

CONTINUED FROM PAGE 91

is engineering a comeback, according to DEC analysts, who compared this difficult period for HP with the one that DEC experienced before the first major VAX announcement in 1978.

HP's recovery strategies, according to ECAT, included the following:

- Emphasize peripherals business.
- Focus on commercial business with Unix.
- Emphasize indirect sales channels, such as value-added resellers and dealers.
- Be aggressive on price/performance issues.
- Maintain its current No. 1 position in customer satisfaction.

HP believes, according to DEC's team, that the market — especially in Europe — is standardizing on Unix, and it hopes to influence this move by having its entire sales force sell Unix.

The first results of this new strategy were apparent in early April with HP's announcement of nine systems that offered very strong price/performance. At the time of the announcement, HP officials made it clear that the products competed with similar offerings from DEC.

According to ECAT, HP is positioning itself as a technological innovator by designing a mainstream product — Spectrum — based on its reduced instruction set computing (RISC) precision architecture.

With its HP 1000 products, HP continues to be strong in the real-time marketplace, offering a low-end dedicated processing system for OEMs. DEC cited the scientific area, which HP is attacking with its high-end HP 9000, as a market in which its rival is demonstrating strength and aggressiveness — and often winning against DEC.

According to ECAT, HP's product weaknesses in the commercial environment are particularly significant in two areas. First, with the HP 250 being phased out, the firm has failed to provide a simple migration path for its user base, according to DEC. Second, the HP 3000 user base has stagnated and faces a difficult growth path, depending on the design of customer applications, according to ECAT.

INDUSTRY WEEK IN BRIEF

The U.S. semiconductor industry ended April with a bang by recording a four-year high in bookings, according to figures released by the Semiconductor Industry Association. Last month's $1.21 billion in bookings was the highest since May 1984, while the $884 million recorded in shipments last month represented a nearly 20% growth over year-earlier figures.

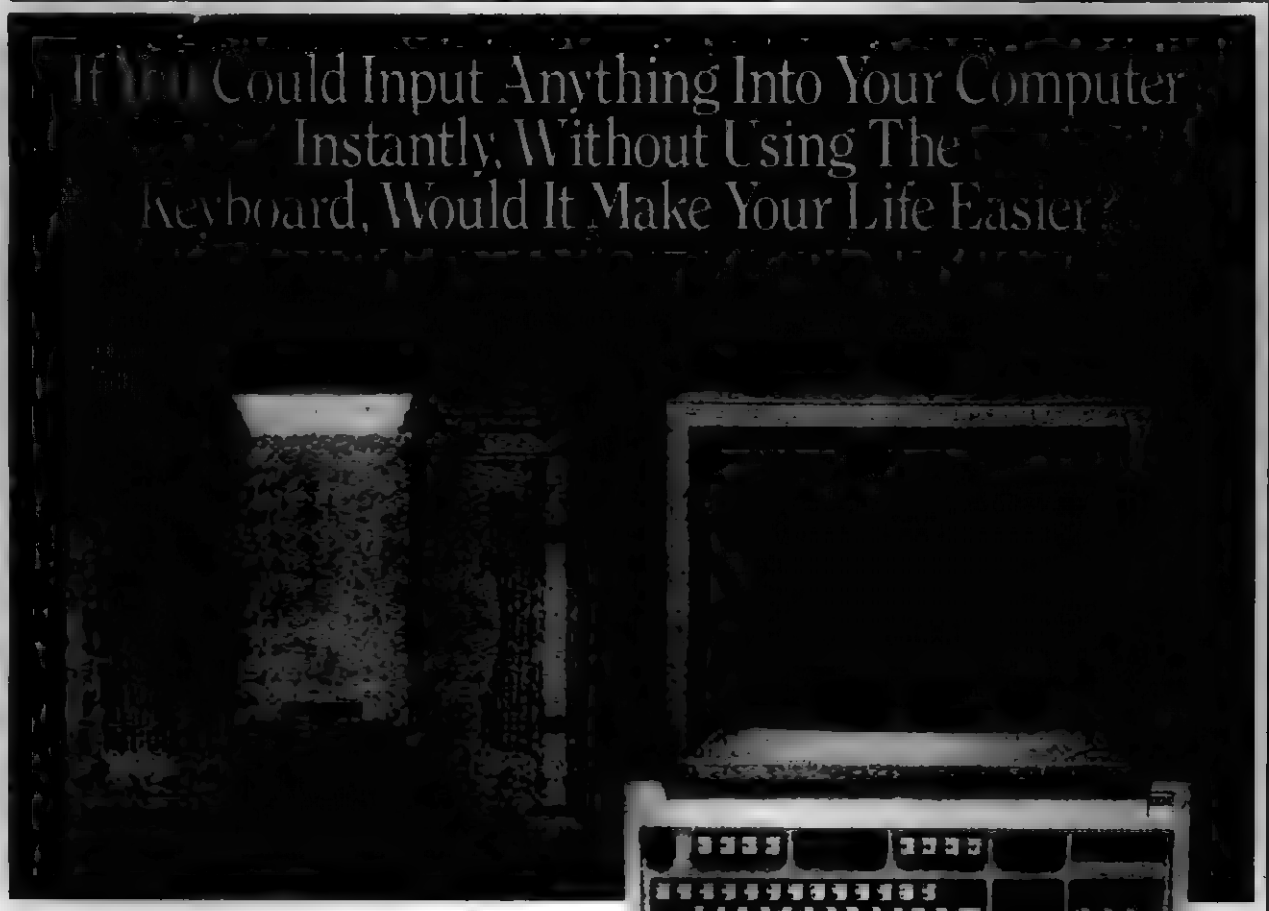
The book-to-bill ratio for the quarter also hit an 11-month high of 1.19, meaning that $119 worth of new chip orders came in for every $100 worth of chips shipped.

Once again, Jack has killed the giant. An appeals court in Cincinnati has ruled that Hewlett-Packard Co. must abide by a lower court's injunction ordering it to provide service calls to Hypoint Technology Co., a small computer maintenance firm in Cleveland.

For years, HP provided Hypoint with four-hour response time on service calls, enabling that firm to compete with HP. When HP cut off the service last August, Hypoint sued, charging monopolization and other anticompetitive practices [CW, Sept. 28, 1987]. In February, a federal judge issued an injunction preventing HP from denying the service to Hypoint.

VLSI Technology, Inc. has signed a long-term technology exchange with Hitachi Ltd. to provide its application-specific integrated circuit design technology for Hitachi to use in its semiconductor and integrated circuits work. In exchange, Hitachi will make advanced CMOS technology available to San Jose, Calif.-based VLSI, the companies said.

Data Switch Corp. has continued its expansion into Europe. With the [illegible] Data Switch [illegible] Europe, Ltd. in Slough, England, [illegible]



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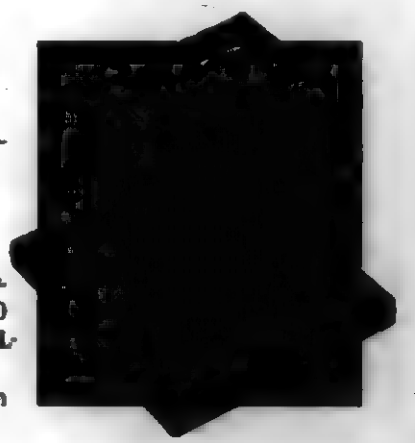
DeskScan 2000 also scans images, so that you can input graphics too. Then you can manipulate these images with desktop publishing or graphics software.

Best of all, DeskScan 2000 is much lower priced than most effective scanners. That means it's finally cost-effective to put a scanner on every PC user's desk.

DeskScan's unique overhead scanning design means that you no longer have to separate pages from documents to feed them through a scanner. The document stays still while the scanning head "reads" the page. And the unit automatically adjusts for room lighting levels.

Scanners aren't just for desktop publishing any more. DeskScan 2000 becomes an economical FAX, with the simple addition of an inexpensive add-in board. Chinon sells this exciting option and others in package combinations of bundled hardware and software—so that you have an affordable way of getting started with your scanner right away.

So see for yourself what DeskScan 2000 can do for you. Call TOLL-FREE 1-800-441-0222 TODAY for the DeskScan 2000 dealer nearest you.



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- ☐ 3. Business consulting (noncomputer-related)
- ☐ 4. College/university
- ☐ 5. Elementary/high school
- ☐ 6. Engineering/architecture
- ☐ 7. Finance, banking, accounting, insurance, real estate
- ☐ 8. Government
- ☐ 9. Health/medical services
- ☐ 10. Legal services
- ☐ 11. Manufacturing
- ☐ 12. Military
- ☐ 13. Other business services
- ☐ 14. Publishing/advertising/public relations
- ☐ 15. Research and development
- ☐ 16. Retail/wholesale
- ☐ 17. Transportation, communications, utilities
- ☐ 98. Other (specify) _____

Computer-related businesses

- ☐ 18. Computer consultant
- ☐ 19. Computer retail
- ☐ 20. Distributor/wholesaler
- ☐ 21. Manufacturer (computers, software, peripherals)
- ☐ 22. Service bureau
- ☐ 23. VAR/systems house/integrator
- ☐ 99. Other (specify) _____

2. Title (check only one)

- ☐ A. Chairman/president/owner/partner
- ☐ B. Vice president
- ☐ C. Controller/treasurer/accountant
- ☐ D. Director/supervisor/manager
- ☐ E. Project manager/chief/group leader
- ☐ F. Art director/writer/chief/group leader
- ☐ G. Engineer/scientist
- ☐ H. Administrator
- ☐ I. Consultant/advisor
- ☐ J. Microcomputer specialist/manager/analyst
- ☐ K. Programmer
- ☐ L. Educator
- ☐ M. Professional (lawyer, doctor, etc.)
- ☐ Z. Other (specify) _____

3. Department or function (check only one)

- ☐ A. Accounting/finance
- ☐ B. Administration/management/personnel
- ☐ C. Consulting
- ☐ D. Education/training
- ☐ E. Engineering/R&D
- ☐ F. Manufacturing/production
- ☐ G. Microcomputer center/office automation
- ☐ H. MIS/DP
- ☐ I. Purchasing
- ☐ J. Sales/marketing/distribution
- ☐ Z. Other (specify) _____

4a. Does your company own or lease any mainframe computers at this location?

☐ Yes (indicate quantity below) ☐ No

	Existing (quantity)	Plan to buy (quantity)
☐ 1. IBM		
☐ 99. Other (specify)		

4b. Does your company own or lease any minicomputers at this location?

☐ Yes (indicate quantity below) ☐ No

	Existing (quantity)	Plan to buy (quantity)
☐ 1. IBM		
☐ 2. DEC VAX		
☐ 3. Sun/Apollo		
☐ 99. Other (specify)		

5. Does your firm have or plan to buy any of the following types of personal computers or microcomputer systems at your location?

☐ Yes (indicate quantity below) ☐ No

	Currently own	Plan to buy within 1-12 mos.
1. Macintosh 128/512		
2. Macintosh Plus		
3. Macintosh SE		
4. Macintosh II		
5. IBM or compatible		
6. Sun/Apollo workstation		
99. Other (specify)		

6. Please indicate your involvement with each of the following types of personal computers or microcomputer systems (check all that apply)

	Macintosh	Software	Networks & Peripherals
A. Approve purchase	A. __	A. __	A. __
B. Develop/manufacture	B. __	B. __	B. __
C. Evaluate/select vendor	C. __	C. __	C. __
D. Own one	D. __	D. __	D. __
E. Own two or more	E. __	E. __	E. __
F. Purchase or acquire	F. __	F. __	F. __
G. Establish specifications	G. __	G. __	G. __
H. Recommend to others	H. __	H. __	H. __
I. Sell	I. __	I. __	I. __
J. Train people to use/or provide support	J. __	J. __	J. __
K. Use	K. __	K. __	K. __
L. No involvement	L. __	L. __	L. __
Z. Other (specify by name and quantity)	Z. __	Z. __	Z. __

If you have no involvement with any of the above, skip to question 8.

7. Do you recommend, buy, specify or approve microcomputers, software, and/or peripherals?

☐ Yes ☐ No

If yes, please indicate for how many Macintosh personal computers you have this involvement. (check only one)

- ☐ A. 1-3
- ☐ B. 4-9
- ☐ C. 10-19
- ☐ D. 20-49
- ☐ E. 50-99
- ☐ F. 100-499
- ☐ G. 500+
- ☐ H. None of the above

8. How many people are employed by your entire company? (check only one)

- ☐ A. 1-9
- ☐ B. 10-24
- ☐ C. 25-99
- ☐ D. 100-499
- ☐ E. 500-999
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- ☐ 9. Health/medical services
- ☐ 10. Legal services
- ☐ 11. Manufacturing
- ☐ 12. Military
- ☐ 13. Other business services
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- ☐ J. Microcomputer specialist/manager/analyst
- ☐ K. Programmer
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- ☐ Z. Other (specify) _____

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☐ Yes (indicate quantity below) ☐ No

	Existing (quantity)	Plan to buy (quantity)
☐ 1. IBM		
☐ 99. Other (specify)		

4b. Does your company own or lease any minicomputers at this location?

☐ Yes (indicate quantity below) ☐ No

	Existing (quantity)	Plan to buy (quantity)
☐ 1. IBM		
☐ 2. DEC VAX		
☐ 3. Sun/Apollo		
☐ 99. Other (specify)		

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99. Other (specify)		

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C. Evaluate/select vendor	C. __	C. __	C. __
D. Own one	D. __	D. __	D. __
E. Own two or more	E. __	E. __	E. __
F. Purchase or acquire	F. __	F. __	F. __
G. Establish specifications	G. __	G. __	G. __
H. Recommend to others	H. __	H. __	H. __
I. Sell	I. __	I. __	I. __
J. Train people to use/or provide support	J. __	J. __	J. __
K. Use	K. __	K. __	K. __
L. No involvement	L. __	L. __	L. __
Z. Other (specify by name and quantity)	Z. __	Z. __	Z. __

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- ☐ D. 100-499
- ☐ E. 500-999
- ☐ F. 1000-2499
- ☐ G. 2500-4999
- ☐ H. 5000-9999
- ☐ I. 10,000 or more

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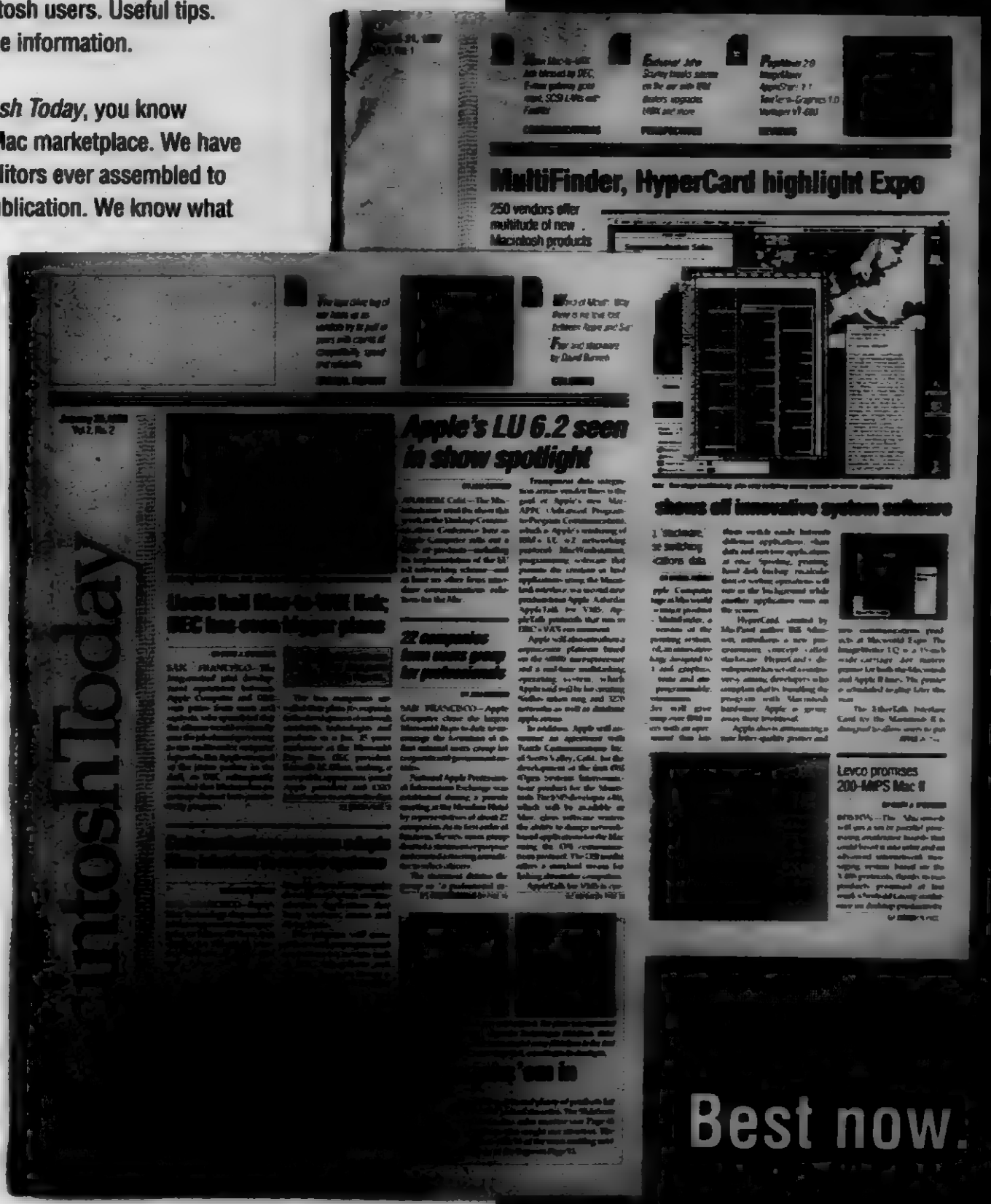

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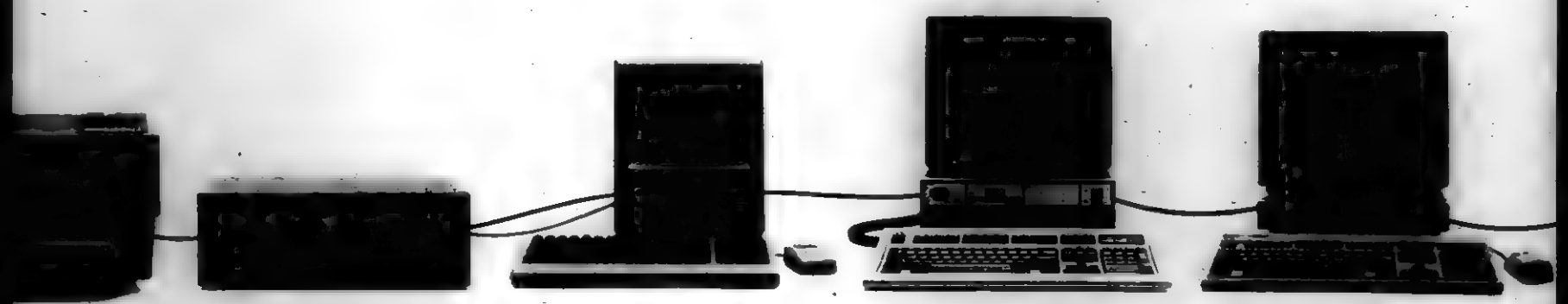

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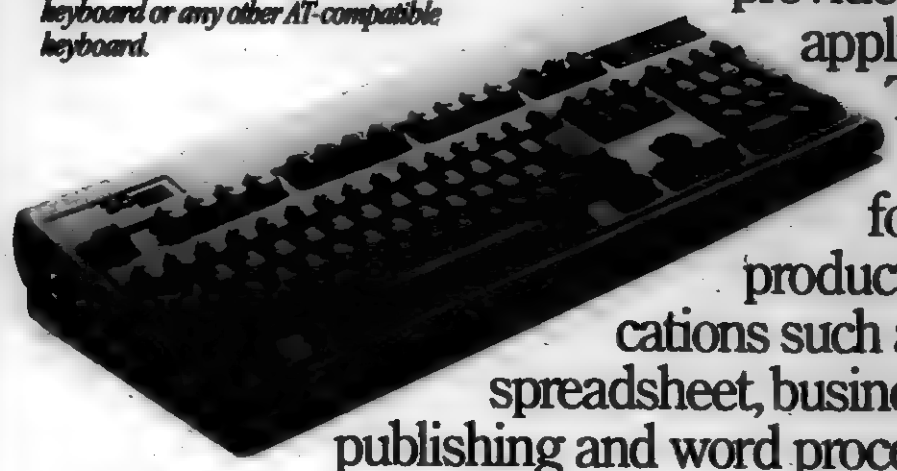

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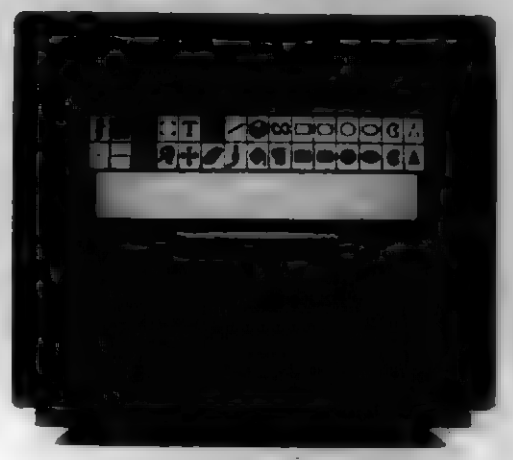

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Mergers swell as valuations deflate

BY ALAN ALPER
CW STAFF

FORT LEE, N.J. — The number of acquisitions and mergers in all segments of the computer industry rose by 16% in 1987, according to a recent study by investment banking firm Broadview Associates.

Merger and acquisition activity also picked up in the first half of this year as market valuations of information technology companies remained well below the bloated levels of the past few years, said Broadview partner Harvey Poppel. Moreover, small, privately held companies that have been unable to float initial public offerings have instead sought to be acquired, he said.

"Based on informal statistics, we're running well ahead of last year," Poppel noted. "We see an increase of 25% to 30%." Broadview tracked a record 574 deals valued at nearly $10 billion in 1987. October's stock market crash slowed acquisition activity in the fourth quarter but did not have a material effect on the results, according to Poppel.

The study suggests that companies outside the industry were attracted to firms that could provide technology to enhance their traditional products and services, Poppel said. Companies in this category included Eastman Kodak Co., British Airways, Emhart Corp. and American Express Co.

Some hardware vendors acquired application software, development tools, proprietary data bases and marketing services firms to enhance their return on equity. Some 47 computer systems, publishing and telecommunications firms bought information services companies in 1987, the report stated.

Telecom draws big bucks

Telecommunications acquisitions dominated the largest computer-related deals in 1987

Alcatel	ITT unit	$1.3B
Memorex	Telex	$911
Computer Associates	Uccel	$830
Unisys	Timeplex	$350
Memotec Data	Teleglobe Canada	$325

INFORMATION PROVIDED BY BROADVIEW ASSOCIATES
CW CHART

A vast majority of sellers last year were information services and software companies. Computer and communications hardware companies accounted for 141 of the sellers, and telecommunications companies represented 46 of the sellers, the study said.

Telecom tallies high

Eleven deals last year were valued at more than $200 million and involved a mix of telecommunications, hardware and computer services companies. Most of last year's large deals were telecommunications-related, Poppel said, led by Alcatel's $1.3 billion purchase of ITT Corp.'s telecommunications operations and Unisys Corp.'s $350 million acquisition of Timeplex, Inc.

Much of the activity this year continues to be in the communications industry — for instance, Tandem Computers, Inc.'s acquisition of Ungermann-Bass, Inc., Poppel said. Broadview said it expects more acquisitions in the communications arena this year and of systems integration firms and companies serving vertical markets such as financial services and computer-integrated manufacturing.

Another trend on the horizon is interest on the part of Asian companies, particularly those based in Japan, in acquiring U.S. information technology firms, according to Broadview.

"While there have been some alliances built, it now seems that there is general interest [in acquisitions] from Japanese firms with a penchant for technology," Poppel said.

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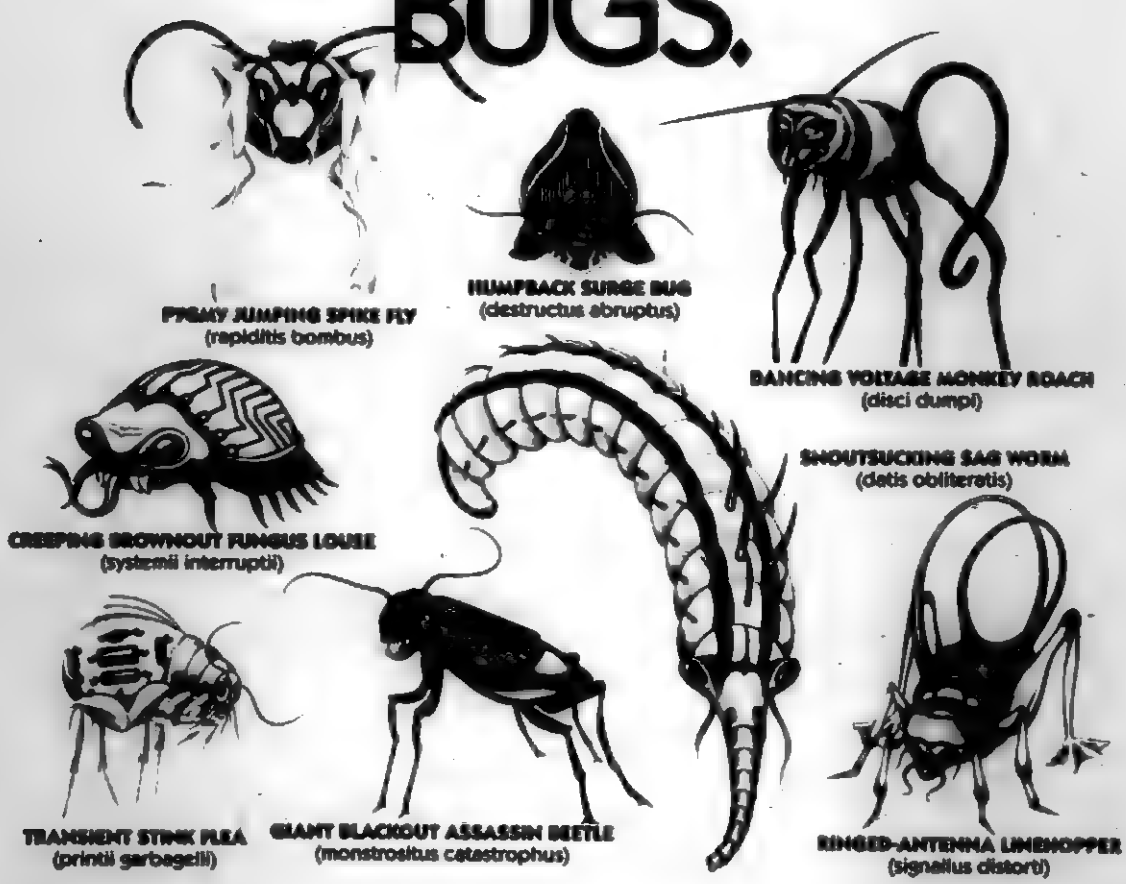

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Sprinzen

CONTINUED FROM PAGE 91

aided software engineering. "You can believe that I went through a lot of soul-searching before leaving."

Sprinzen said that Relational Technology, developer of the Ingres data base management system, approached him with "a very attractive opportunity. After hearing the details, there wasn't any way that I could say no," he said.

Although unable to comment on its nature, Sprinzen was emphatic in his belief that the company's strategy will succeed. "I have confidence and faith in Relational Technology," he said. "I've been there before."

While Sprinzen's new post is substantially similar to his old one, changes in the industry and growth at Relational Technology have expanded its scope. For starters, Sprinzen said, "I'll have more than twice as many people reporting to me."

The company's work force, as well as its revenue, has more than doubled between Sprinzen's exit and his return.

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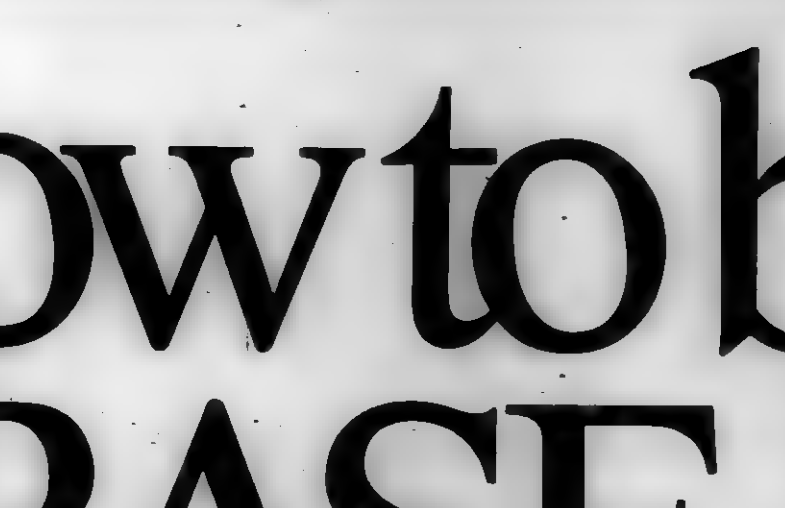

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Software 2000

CONTINUED FROM PAGE 91

system of the System/38 and said it is not a minicomputer operating system," recalled Pemberton, a former MIS executive at State Street Bank & Trust Co. and Boston Safe Deposit and Trust Co. "I felt that if IBM could deliver on this promise, this is a future."

A privately held firm, Software 2000 claims to have doubled sales each year since 1984, achieving $7 million in revenue for its most recent fiscal year. That growth has been entirely generated by sales, Pemberton claimed, leaving the firm with no debt and no venture capitalists calling the shots.

What it has produced is a series of System/38 financial and human resource applications that work with its Domain 2000 application platform. Pemberton said the firm now has about 275 users, including its first customers, Diamond Shamrock R&M, Inc. and Shell Oil Co.

Accountants at Gilbane Building Co. in Providence, R.I., are using the General Ledger 2000 package. Steve Medeiros, manager of systems administration, said that although the company is currently working with System/36s, he will look at the Silverlake products when they are available.

Software 2000's Pemberton

"From our experience, Software 2000 would probably be one of the first places we would look for Silverlake software," he said.

Dave Schmiedicke, a systems analyst for the data processing department of the city of Santa Fe, N.M., concurred. The city is using Human Resources 2000, and Schmiedicke said the service and support from Software 2000 is excellent.

Although not ready to disclose pricing plans for Silverlake software, Pemberton said the firm will offer free conversion to existing customers in the first year.

According to Peter A. Morgan, vice-president of marketing, the company is planning for a minimum of 120 new customers with the advent of Silverlake. With the IBM line predicted to range in price from $800,000 at introduction to $1.8 million in 1990 for high-end configurations, "that opens up a software gap of $1 million," Morgan said.

Software 2000 sees IBM's apparent new-found respect for mid-range computing as a gold mine or perhaps, more aptly, a Silver mine. "There is a role reversal in the mid-range, where Digital Equipment Corp. has been dominant; suddenly, there is a need for a new [IBM] mid-range," Pemberton said. "We are in the right place at the right time."

Senior writer Alan J. Ryan contributed to this report.

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Wilder

CONTINUED FROM PAGE 91

conflict between competitive advantage in the marketplace and offering true connectivity with other vendors' products is rearing its ugly head. As usual, it's the users who are being ignored.

The MIS director of one Fortune 50 firm, interviewed recently by *Computerworld*, said his firm has steadfastly refused to jump on the Unix bandwagon until the dust settles. The company had joined the Corporation for Open Systems (COS) in the hope of seeing some progress on connectivity standards, only to become disillusioned when COS became, in his words, "much too vendor-driven."

Whether they realize it or not, the leading vendors are sending out a signal to their current and prospective customers that says, "Watch what we do, not what we say." It's easy for systems makers to pay lip service to supporting industry standards; it's a lot harder to make a business decision that might cede some of the advantages of a proprietary operating system to the competition.

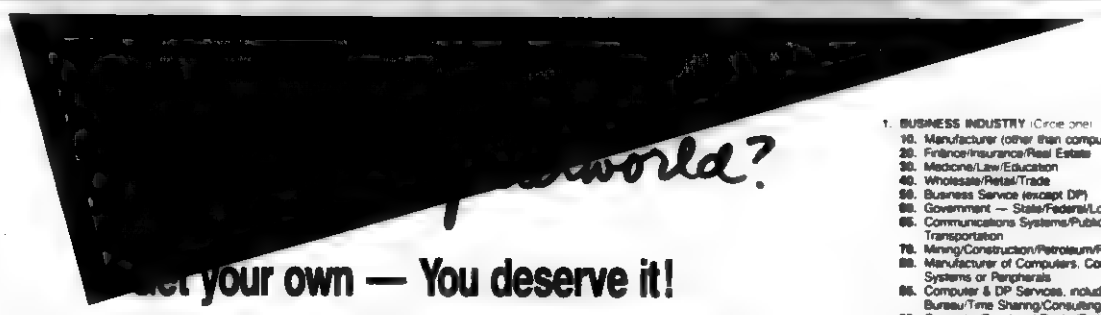
The best thing about Unix was not supposed to be its functionality and certainly not its user-friendliness, but its ability to run on a wide range of systems, varying in both size and architecture. If the battle lines are drawn between two or more Unixes that can't talk to each other, what will have been accomplished?

Running scared. It's former CDC Chairman Bill Norris's worst nightmare — CDC as a rumored takeover candidate. Since the Belzberg family's 5% stake in CDC was revealed two weeks ago, Wall Street has been wondering if the Canadian investors will put the company into play.

Norris was the first and most vocal computer industry top executive to decry the takeover mania spawned in the bull market of the early 1980s, and CDC stockholders voted one of the first anti-takeover defenses. But the CDC defense has become fairly standard and is not considered a major deterrent if the fiscal stakes are high enough for the raider.

CDC certainly has more than its share of problems, and a case can be made that the company is still not run as efficiently as it could be. But a takeover and a piecemeal sale of CDC assets would be a tragedy for users. Just ask the customers of Datapoint.

Wilder is *Computerworld*'s senior editor, computer industry.



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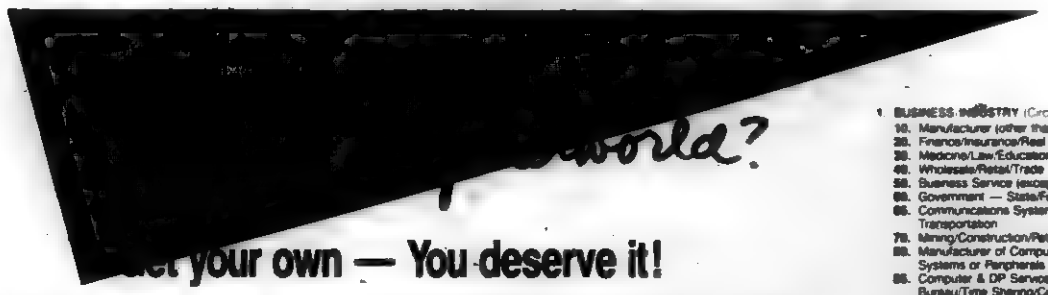

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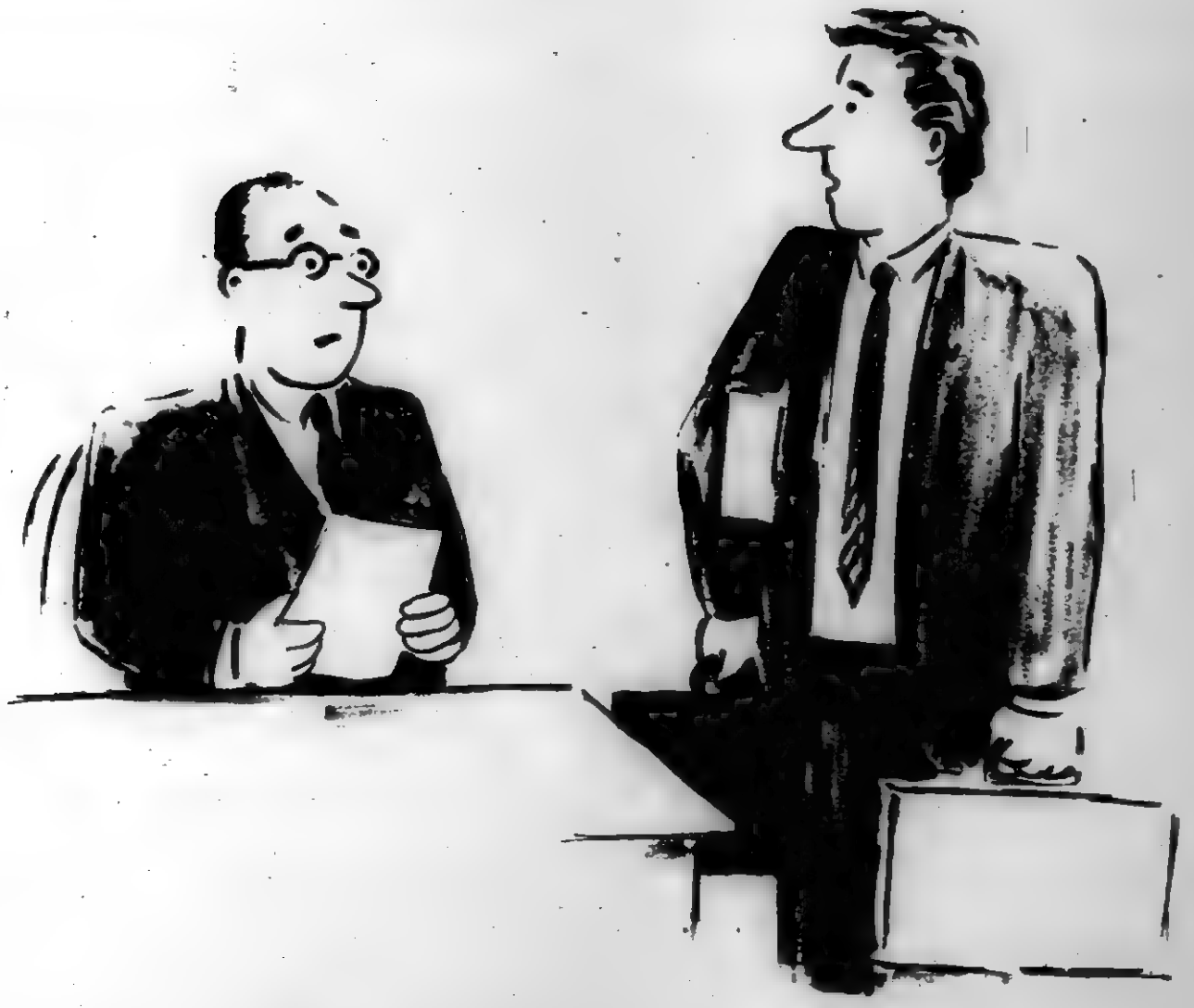

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THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Academia has its own allure

For some, university life-style and perquisites win out over top pay

BY BONNIE MACKELL
CW STAFF

Although the educational field is known for some of the lowest salaries in the MIS world, it does offer some attractions for those willing to forego higher pay. Ease of entry and a speedier rise to positions of responsibility are attractive to recent graduates. More experienced data processing professionals are drawn by such offerings as teaching part-time, working with new technology, taking free or discounted classes and using school facilities.

For data processing professionals, opportunities are as readily available in education as in other fields, according to Steven Joffe, a vice-president at recruiting firm Source EDP in Paramus, N.J. "There are some universities doing active hiring; there are some universities having problems," Joffe says.

While schools often find their entry-level DP personnel among their own graduates, for more experienced professionals "there are opportunities there as the universities need more sophisticated systems," he says.

Mike Stack, systems programming manager at Northern Illinois University, sees a strong demand for qualified people.

Demand is particularly strong in technical support, he says; Northern Illinois has been unable to compete with private industry in hiring qualified candidates for that field. "There is a definite shortage of good technical support people, so most universities end up having to train them," Stack says.

Back to school

Phil Williams is an example of one who got his start in academia. As a captain coming out of the Marine Corps with no experience in DP, he found that most companies required at least two years of work experience.

After numerous interviews and rejections, Williams finally landed a job as an entry-level programmer at Georgia State University.

Williams, now manager of applications programming, sees many advantages to this move. "I was able to come in to the university with just classroom knowledge of coding," he says.

But unlike many others, Williams has not moved out of education. He says the benefits are worth staying for.

Attending classes at the same Georgia State facility where he worked made it easier for him to earn his master's degree in information systems. He also feels he can work with a more varied array of equipment than he would in many industry jobs. "Right now, we're running IBM, Amdahl Corp. and Sperry Corp. mainframes, which makes for a diverse environment," he says.

As a manager, Williams tries to be flexible about letting his people off during the day to attend classes. He asks only that they maintain a 40-hour work week by coming in early or working late to make up for lost time.

For Ronald Schonair, it is the stimulation of a university environment that makes a career in academic DP satisfying. He initially took a job as a computer operator at the University of Florida to earn money so he could resume studies for a master's degree. But Schonair never went back to school and is now the director of the university's Northeast Regional Data Center.

"The satisfaction of working on a university campus and being around bright, young minds helps me keep a fresh perspective," Schonair says. "The environment, with its culture and sports, eliminates the feeling that I'm working in the same pressure-cooker environment as many of my friends in private industry."

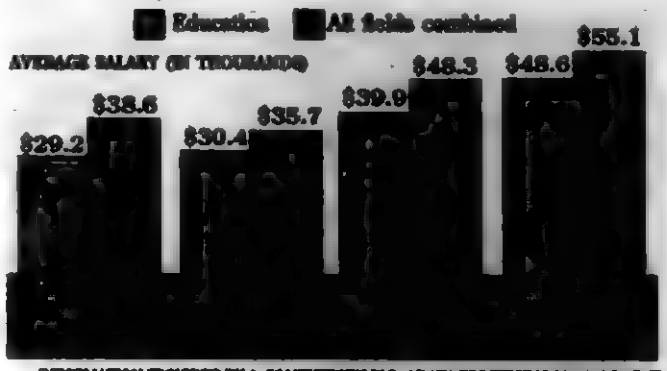
Chuck Kensicki, a project manager for Business Management Systems at California State University, entered academic DP for different reasons.

"My master's was hurting because I wasn't pursuing it fast enough. The company I was working for at the time wasn't as geared toward my educational endeavors as they were toward their own work requirements," Kensicki says.

In private industry, he found restrictive guidelines for educational reimbursements, such as required grade-point averages and restrictions on fields of study.

Academic earnings

MIS salaries in education are considerably lower than average MIS salaries industrywide



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CW CHART

Meet the challenge

However, DP at an educational institution is just as stiff a challenge as it is in private industry, says Kensicki, who has worked at California State for nine years and occasionally teaches courses there.

With such teaching responsibilities, DP professionals need to keep abreast of new technology in order to train students to go into the business world, Kensicki says. "In private industry, you can wait until the trend has been established and follow suit, vs. having to be a trend setter in the education field," he says.

But Kensicki agrees that there are a few other side benefits to alleviate some of these demands. "We have access to all the university facilities: eating facilities, gymnasiums, entertainment . . . all types of facilities your normal company wouldn't have. If you look at the cost of all that stuff, it begins to add up," he says.

MacKell is a *Computerworld* researcher.

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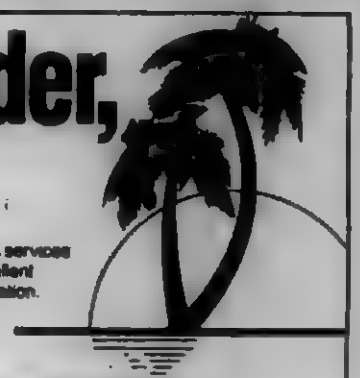

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As an application programmer analyst II, you'll participate in the analysis, design, development and implementation of modifications and enhancements of the customer accounting system and programs. Occasionally, you'll be required to serve as a project leader on small-to-moderate size projects dealing directly with the customer accounting users or interfacing with other application systems.

APPLICATION PROGRAMMER ANALYST I — Administration

To qualify, you should have a bachelor's degree with two years' relevant programming experience. You'll need a working knowledge of ANS COBOL, IBM OS/JCL, TSO/ISPF and structured programming techniques. Human Resources application experience is highly desirable. You must also demonstrate strong oral and written communication skills.

You'll participate in the analysis, development, implementation and support of business-oriented computer information systems — with emphasis on Human Resources applications.

APPLICATION PROGRAMMER ANALYST I — Operations

For this position, you'll need a bachelor's degree and two years of relevant computer systems design and programming experience. You must have detailed knowledge in ANS COBOL, CICS, IDMS DATABASE, VSAM, IBM OS/VS JCL, TSO/ISPF and structured programming techniques. A working knowledge of VS COBOL II, IDD, ADS/O, OLM and personal computer (PC) software is highly desirable. Certification in computer programming (CCP) or data processing (CDP) is a definite plus. And you must demonstrate strong oral and written communication skills.

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Staffing Representative
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CAREER INDEX

March 1988 computer recruitment advertising activity*

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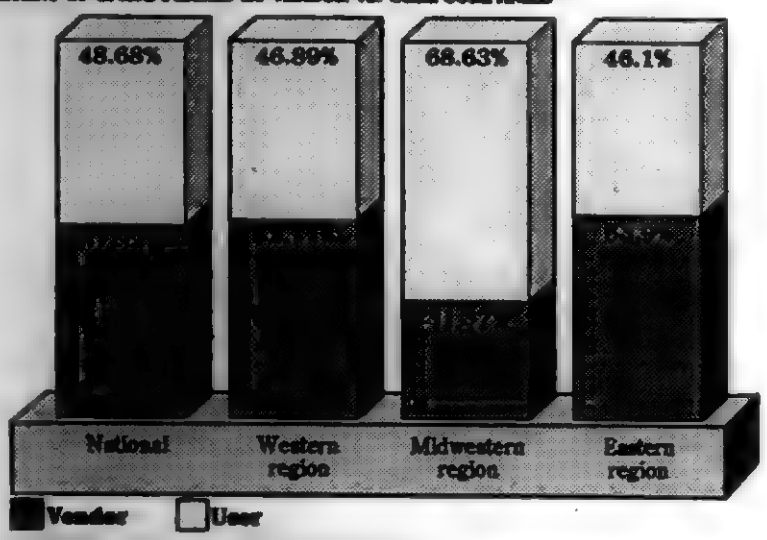

*Analysis of computer recruitment advertising space in Computerworld and selected major U.S. newspapers

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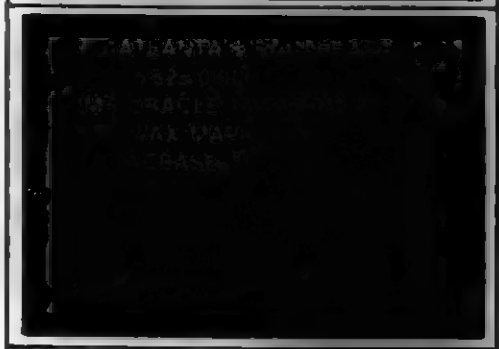

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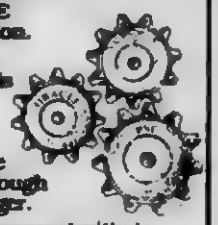

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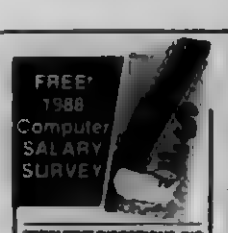

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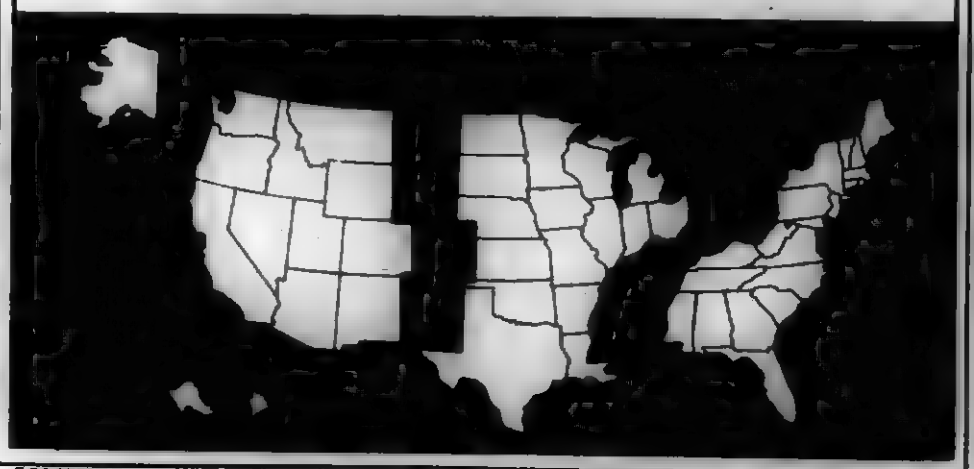

MARKETPLACE

Comdex: Christmas in May

IBM, Apple users scour exhibition floors for hardware, software news

BY CAMERON HALL
BOSTON COMPUTER EXCHANGE CORP.

The market was like a roller coaster during the week ended May 6, with traders frantic on the telephones and hectic trading dominating the Big Board. Concerns about releases at Comdex/Spring '88 were present for sellers; their machines might lose value in the face of new competition presented at the show.

Buyers normally active in the IBM Personal Computer XT- and PC AT-based market put off purchases during the week. Some were waiting for announcements of upgraded Intel Corp. 80286 and 80386 boards and hoping new releases will result in increased performance for their machines or in price drops on the DOS 3.4 features. This DOS upgrade would extend the productive life of first-generation machines for users who need expanded and extended memory and high-capacity hard-disk access.

The upgrade is particularly valuable to companies with a large installed base of XTs and ATs that have yet to plan a transition to IBM's Personal System/2. PS/2 buyers also seemed excited by anticipated expansion boards for their machines and by IBM's showcase of OS/2 applications.

Apple Computer, Inc. Macintosh buyers looked forward to new and enhanced hardware and software at Comdex, with Mac SE buyers confident that they were in line for all new products, and Macintosh Plus buyers hoping that items on their wish lists would be applicable in the Mac Plus environment.

Computer-aided design and manufacturing users currently using minicomputers and PCs sought Mac II prices to have in hand as they shopped the floors of Comdex for better graphics and color.

IBM: Ups and downs

On the IBM floor, the PC AT Model 339 held steady at the previous week's price of $3,550, and the AT Model 239 was up $50 to close at $2,650. The PC XT Model 089 was down $25 to $1,625 as Comdex fever brought sellers to the market, the XT Model 086 closed at $1,225, up $40 under favorable conditions. The standard IBM PC held at $800, and PS/2s traded at last week's close.

The Compaq Computer Corp. market was up, with the most active Compaq Portable I trading up $25 to $825, the Compaq Plus up $25 to $1,150, still a bargain when compared with a 10-MHz IBM PC XT trading at $1,225. The Portable II was up $100 to $2,200 as buyers sought bargains in the 286 market, and the Portable 286 also up $25 to $2,175.

In the desktop market, the 20-MHz Deskpro drew buyers in price wars with the IBM XT Model 089 and closed up $50 at $1,450. The Deskpro 286 and 386 sold at last week's prices.

The volume trader in the Apple Macintosh market was the Macintosh 512, keeping its place in the market at last week's close of $750, and the active Mac 512E was up $50 to $925. Mac Plus and SE buyers traded with unchanged price levels. Mac II buyers, confident of their direction, bid up the Mac II prices $50 to $4,025.

Going to Oz

One savvy market participant noted, "The Mac II is the machine of the future, and I'm on its yellow brick road."

With the PS/2 about to come into its first major price break, the older machines — particularly the XTs — are two generations away from the leading edge of the market. The old wisdom in the secondary market is that the best time to sell is when a second generation has replaced the earlier equipment.

While there is probably a floor for every era of microcomputer under which it will not fall — like the proverbial $500 Volkswagen — there is also a time when it is ripe to dispose of old hardware; a time when it is optimal to sell.

The Boston Computer Exchange can be reached at 800-BOCOEXX or 617-542-4414 in Massachusetts.

The BoCoEx Index

Closing prices report for the week ending May 6, 1988

	Closing price	Recent high	Recent low
IBM PC Model 076	$800	$900	$525
XT Model 086	$1,225	$1,350	$900
XT Model 089	$1,625	$1,725	$1,125
AT Model 099	$2,350	$2,425	$1,750
AT Model 239	$2,650	$2,650	$2,125
AT Model 339	$3,550	$3,700	$2,675
PS/2 Model 50	$2,300	$2,475	$2,225
PS/2 Model 60	$5,800	$6,100	$5,275
Compaq Portable I	$825	$900	$525
Portable II	$2,200	$2,200	$1,600
Portable III	$3,200	$3,250	$2,700
Portable 286	$2,175	$2,250	$1,675
Plus	$1,150	$1,175	$750
Deskpro 20-MHz	$1,450	$1,500	$975
Deskpro 286	$2,425	$2,475	$1,825
Deskpro 386	$4,075	$4,000	$3,475
Apple Macintosh 512	$750	$800	$575
512E	$925	$1,025	$650
Plus	$1,150	$1,350	$850
Plus 20-MHz	$1,750	$1,800	$1,450
SE	$1,925	$2,200	$1,600
SE 20-MHz	$2,400	$2,450	$2,050
II	$4,025	$4,325	$3,500
Apple Laserwriter Plus	$3,125	$3,400	$2,450
HP Laserjet Series 2	$1,400	$1,425	$1,300
NEC Multispeed EL	$950	$950	$575

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Request for Proposal No. 1988, due Tuesday, May 31, 1988 at 3:30 p.m. for the acquisition of laboratory software to run on a Data General MV/5080 for the UNIVERSITY OF MISSISSIPPI MEDICAL CENTER. No charge.

Request for Proposal No. 1989, due Wednesday, June 1, 1988 at 3:30 p.m. for the acquisition of four local area networks for the OFFICE OF THE STATE AUDITOR. Charge $10.00.

Detailed specifications may be obtained free of charge from the CDPA office or at the specified cost by submitting a written request accompanied by the appropriate payment. NOTE: Valid forms of payment are corporate check on a Mississippi bank, certified check or POSTAL money order. NO CASH OR OUT-OF-STATE CHECKS. The CDPA reserves the right to reject any and all bids and proposals and to waive informalities.

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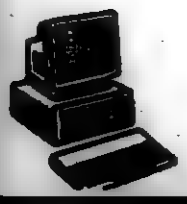

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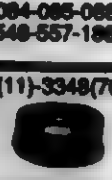

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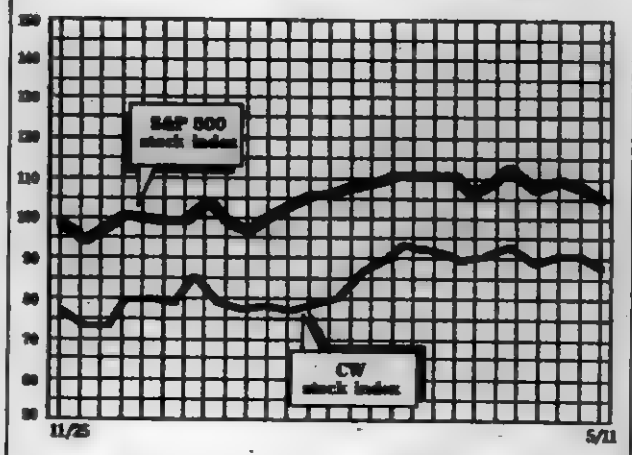

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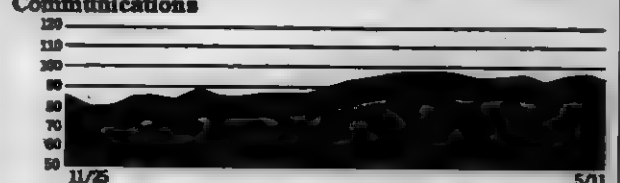
Communications



Computer Systems

Software and DP Services

Semiconductors

Peripherals and Subsystems

Leasing Companies

CW CHARTS

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CLOSING PRICES WEDNESDAY, MAY 11, 1988

EXCH		52-WEEK RANGE (1)		CLOSE MAY 11 1988	WEEK NET CHANGE	WEEK PCT CHANGE

Communications and Network Services

N	AMERICAN INFO TECHS CORP	100	74	85.75	-0.9	-1.0
O	ANDREW CORP	18	11	16.00	0.3	1.7
O	ARTEL COMM CORP	3	2	1.75	0.0	0.0
N	AT&T	36	25	28.88	0.5	1.9
O	AVANT GARDE COMP INC	6	2	1.75	-0.5	-22.2
O	AVANTEK INC	17	6	7.00	0.0	0.0
O	AYDIN CORP	36	16	20.00	-0.5	-2.5
N	BELL ATLANTIC CORP	80	61	65.63	-0.9	-1.3
N	BELLSOUTH CORP	44	29	39.63	0.0	0.0
O	COMPRESSION LABS INC	6	2	3.63	-0.5	-12.1
O	COMPUTER NETWORK TECH	6	1	1.22	-0.1	-7.2
O	CONTEL CORP	40	25	31.88	-1.5	-4.5
O	DATA SWITCH CORP	10	4	7.50	-0.3	-3.2
O	DIGITAL COMM ASSOC	40	20	31.50	-2.1	-6.3
O	DYNATECH CORP	33	14	21.25	-1.0	-4.5
O	FIBRONICS INTERNATIONAL INC	7	2	3.00	-1.3	-39.4
O	GANDALF TECHNOLOGIES	10	5	6.88	-0.1	-1.8
O	GENERAL DATACOMM INDS	14	3	3.38	-0.5	-12.9
N	GTE CORP	45	29	35.25	-0.5	-1.4
O	HAYES MICROCOMPUTER PRODS	12	5	11.50	0.3	2.2
N	ITT CORP	68	42	48.38	-2.4	-4.8
O	M/A COM INC	16	7	9.38	0.3	2.7
O	MCI COMMUNICATIONS CORP	15	6	13.75	-0.6	-4.2
O	MICOM SYS INC	17	7	15.13	-1.0	-6.2
O	NETWORK SYS CORP	13	7	9.75	-0.3	-2.5
N	NORTHERN TELECOM LTD	24	14	17.63	-0.4	-2.1
O	NOVELL INC	35	12	21.50	0.3	1.2
N	NYNEX CORP	78	58	61.63	-1.1	-1.8
N	PACIFIC TELESIS GROUP	34	25	27.88	0.0	0.0
O	PARADYNE CORP	9	4	4.13	-0.3	-6.7
O	PENRIL CORP	5	1	4.63	-0.5	-9.8
N	PLESSEY PLC	40	28	29.00	-1.1	-3.7
N	SCIENTIFIC ATLANTA INC	20	8	13.75	-0.5	-3.5
N	SOUTHWESTERN BELL CORP	46	32	34.00	-0.8	-2.2
O	3 COM CORP	26	13	19.25	-0.8	-3.8
O	TIMEPLEX INC	30	17	22.30	0.0	0.0
N	UNGERMANN BASS INC	16	8	12.00	-0.1	-1.0
N	US WEST INC	60	43	50.88	-1.4	-2.8

Computer Systems

O	ALLIANT COMPUTER SYS	35	5	6.50	0.3	4.0
O	ALPHA MICROSYSTEMS	6	3	5.75	-0.4	-6.1
O	ALTOS COMPUTER SYS	15	9	8.88	-0.5	-5.3
A	AMDAHL CORP	80	19	44.88	2.8	6.7
O	APOLLO COMPUTER INC	25	9	15.50	-0.1	-0.8
O	APPLE COMPUTER INC	60	25	39.50	-2.5	-6.0
O	BOLT BERANEK & NEWMAN	25	12	15.88	-0.6	-3.8
O	BRITTON LEE INC	5	1	2.13	0.0	0.0
O	COMPAQ COMPUTER CORP	70	34	51.50	-2.3	-4.2
O	COMPUTER AUTOMATION INC	16	6	9.25	-0.6	-6.3
O	COMPUTER CONSOLES INC	11	2	7.13	-0.4	-5.0
O	CONCURRENT COMP CORP	34	11	18.50	-2.0	-10.8
O	CONTROL DATA CORP DEL	36	18	25.00	-2.3	-8.3
O	CONVERGENT TECH	9	3	3.31	-0.4	-10.2
O	CONVEX COMPUTER CORP	20	6	7.88	-0.5	-6.0
N	CRAY RESH INC	119	47	82.13	-4.3	-4.9
O	DAISY SYS CORP	10	5	8.75	-0.3	-2.8
N	DATA GEN CORP	37	16	21.25	-1.0	-4.5
O	DATAPOINT CORP	9	3	6.38	0.1	2.4
N	DIGITAL EQUIP CORP	200	89	102.38	-4.8	-4.4
N	FLOATING POINT SYS INC	12	3	3.50	-0.5	-12.5
N	GOULD INC	24	8	14.00	0.5	3.7
N	HARRIS CORP	43	22	28.50	-0.8	-2.8
N	HEWLETT PACKARD CO	74	38	60.75	-1.0	-1.6
N	HONEYWELL INC	91	48	67.38	-2.4	-3.4
N	IBM	176	102	108.75	-4.5	-4.0
O	INFORMATION INTL INC	15	9	13.00	0.0	0.0
O	IPL SYS INC	3	1	1.75	0.1	7.7
O	MASS COMPUTER CORP	14	4	4.25	-0.3	-5.8
N	MATSUSHITA ELEC INDL LTD	228	168	212.00	-11.1	-5.0
O	MEGADATA CORP	6	3	3.00	-0.1	-4.0
O	MENTOR GRAPHICS CORP	30	14	26.25	-3.8	-11.7
N	NBI INC	14	4	4.00	0.0	0.0
N	NCR CORP	97	50	58.50	-2.8	-4.5
N	PRIME COMPUTER INC	31	12	16.00	-1.0	-5.9
O	PYRAMID TECHNOLOGY	14	5	12.00	-1.8	-12.7
O	STRATUS COMPUTER	41	15	28.00	-0.5	-1.8
O	SUN MICROSYSTEM INC	46	14	34.50	-0.8	-2.1
O	SYMBOLICS INC	5	1	1.69	-0.1	-7.1
N	TANDEM COMPUTERS INC	37	18	17.75	-0.9	-4.7
N	TANDY CORP	57	28	44.75	0.5	1.1
N	ULTIMATE CORP	37	12	13.13	-1.3	-8.7
N	UNISYS CORP	48	24	32.50	-2.1	-6.5
A	WANG LABS INC	19	10	10.88	-0.1	-1.1

Software & DP Services

O	ADVANCED COMP TECH	6	1	1.25	0.0	0.0
N	AGS COMPUTERS INC	20	11	18.38	0.4	2.1
O	AMERICAN MGMT SYS INC	20	9	15.25	-0.1	-0.8
O	AMERICAN SOFTWARE INC	18	6	13.13	-0.8	-5.4
N	ANACOMP INC	11	4	9.38	-0.8	-8.3
O	ANALYSTS INTL CORP	10	4	8.00	-0.3	-3.0
O	ASHTON TATE	33	12	26.75	-0.8	-2.8
O	ASK COMPUTER SYS INC	16	6	12.50	-1.9	-13.0
O	AUTODESK INC	34	12	28.50	-3.3	-10.9
N	AUTO DATA PROCESSING	65	39	38.75	-1.6	-4.0
O	BOOLE & BABBAGE INC	12	6	8.50	-0.3	-2.9
N	COMPUTER ASSOC INTL INC	37	15	26.25	-1.3	-4.7
O	COMPUTER HORIZONS CORP	15	7	10.75	-0.8	-6.8
N	COMPUTER SCIENCES CORP	73	36	38.88	-4.0	-9.3
N	COMPUTER TASK GROUP INC	17	9	11.13	-0.4	-3.3
O	COGNOS INC.	17	4	6.63	-0.4	-5.4
O	COMSHARE INC	28	12	15.25	-1.5	-9.0
N	CULLINET SOFTWARE INC	14	4	7.63	-0.3	-3.2
O	DUQUESNE SYS INC	39	16	20.00	-1.0	-4.8
A	DATA ARCHITECTS INC	16	7	12.75	0.0	0.0
N	GENERAL MTRS (CLS E)	51	30	43.00	-1.3	-2.8
O	HOGAN SYS INC	17	4	4.50	0.0	0.0
O	INFORMIX CORP	21	12	20.00	-1.0	-4.8
O	INTELLICORP INC	11	2	3.00	0.1	4.3
O	KEANE INC	16	6	11.50	-1.5	-11.5
O	LOTUS DEV CORP	40	19	22.38	-0.4	-1.8
O	MANAGEMENT SCIENCES	15	6	8.50	0.1	1.5
O	MICRO PRO INTL CORP	8	3	2.81	-0.4	-11.8
O	MICROSOFT CORP	73	37	55.75	-1.4	-2.4
O	MORINO ASSOCIATES INC	24	7	17	-1.0	-5.7
O	NATIONAL DATA CORP	34	20	23.75	-1.3	-5.0
O	ON LINE SOFTWARE INTL INC	22	8	8.00	-0.5	-5.3
O	ORACLE SYS CORP	19	8	15.75	-1.9	-10.0
N	PANSOPHIC SYS INC	28	11	14.75	-1.4	-8.7
O	POLICY MGMT SYS CORP	30	16	22.75	-2.0	-8.1
O	PROGRAMMING & SYS INC	14	7	10.75	-0.6	-5.5
O	REYNOLDS & REYNOLDS CO	28	14	18.88	1.4	7.9
O	SEI CORP	19	10	17.25	0.0	0.0
O	SHARED MED SYS CORP	30	19	22.13	-1.1	-4.8
O	SAGE SOFTWARE INC.	20	6	6.25	-0.8	-10.7
O	SOFTWARE PUBG CORP	17	8	15.88	-0.4	-2.3
A	STERLING SOFTWARE INC	12	6	8.88	-0.3	-2.7
O	SUNGARD DATA SYS INC	21	10	16.50	-1.0	-5.7
O	SYSTEMATICS INC	33	19	32.38	1.4	4.4
N	SYS. SOFT INC.	24	7	14	-1.3	-8.3
O	VM SOFTWARE INC	28	7	13.00	-0.4	-2.7

Semiconductors

N	ADV MICRO DEVICES INC	25	8	13.88	-0.6	-4.3
N	ANALOG DEVICES INC	33	8	13.63	-0.4	-2.7
O	ANALOGIC CORP	13	6	6.75	-0.4	-5.3
O	INTEL CORP	42	18	30.63	-1.6	-5.0
O	LSI LOGIC CORP	15	7	10.50	-1.3	-10.6
N	MOTOROLA INC	74	36	46.25	-2.3	-4.8
N	NATL SEMICONDUCTOR	22	10	12.50	-0.5	-3.8
N	TEXAS INSTRS INC	60	36	44.75	-3.5	-7.7
A	WESTERN DIGITAL CORP	35	11	16.38	-0.5	-3.0

Peripherals

O	ALLOY COMP.	13	3	3.50	-0.5	-17.6
O	AM INTL INC	9	3	3.75	-0.1	-3.2
O	AST RESH INC	21	6	14.00	-0.3	-4.8
O	AUTO TROL TECH CORP	9	3	8.00	0.0	0.0
O	BIANCTEC INC	16	6	8.00	-0.4	-4.8
O	CIPHER DATA PRODS INC	14	4	6.75	-0.3	-4.4
O	COGNITRONICS CORP	5	2	3.63	0.0	0.0
O	COMPUGRAPHIC CORP	28	10	26.38	0.1	0.5
O	DATAPRODUCTS CORP	24	7	8.00	-0.1	-1.4
O	DATARAM CORP	9	5	7.50	-0.1	-1.6
O	DECISION INDS CORP	10	4	4.00	0.0	0.0
N	EASTMAN KODAK CO	72	39	40.87	-1.6	-3.8
O	E M C CORP MASS	20	7	8.88	-0.6	-6.3
O	EMULEX CORP	9	4	7.88	-0.1	-1.6
O	EVANS & SUTHERLAND	35	17	17.00	-0.9	-4.9
O	ICOT CORP	9	3	3.25	-0.3	-7.1
O	INTERLEAF INC	24	11	16.50	0.5	3.1
O	IOMEGA CORP	4	1	2.75	-0.4	-12.0
O	LEE DATA CORP	6	3	3.38	-0.3	-7.1
O	MASSTOR SYS CORP	6	1	2.81	-0.4	-11.8
O	MAXTOR CORP	22	8	14.25	0.5	3.6
O	MICROPOLIS CORP	44	13	22.75	0.0	0.0
O	MINISCRIBE CORP	16	5	10.13	0.0	0.0
N	MINNESOTA MNG & MFG CO	60	45	58.25	-0.6	-1.1
A	MSI DATA CORP	19	8	15.13	-1.0	-6.7
O	PERSONAL COMPUTER PRODUCTS INC.	7	4	6.00	0.0	0.0
O	PRIAM CORP	6	1	1.88	-0.1	-5.1
O	PRINTRONIX INC	13	7	9.50	0.0	0.0
O	QMS INC	27	8	10.38	-0.5	-4.6
O	QUANTUM CORP	25	9	10.50	-0.1	-1.2
O	WANTEK CORP	8	1	1.50	-0.1	-7.7
O	RECOGNITION EQUIP INC	22	7	7.75	-0.5	-6.8
O	REXON INC	13	6	7.38	-1.6	-17.5
O	SCAN TRON CORP	17	7	14.50	-1.0	-6.5
O	SEAGATE TECHNOLOGY	48	30	36.75	-1.1	-2.9
O	STORAGE TECH CORP	5	1	1.75	-0.1	-5.7
O	TANDON CORP	7	1	2.31	-0.3	-11.9
O	TEC INC	7	3	4.69	-0.1	-2.6
N	TEKTRONIX INC	41	21	28.75	0.9	3.5
O	TELEVIDEO SYS INC	3	1	1.25	-0.2	-13.1
N	TELEX CORP	51	30	46.00	-1.5	-3.2
N	WYSE TECH	40	11	19.25	-0.4	-1.9
N	XEROX CORP	85	50	52.13	-2.3	-4.1
O	XIDEX CORP	15	6	6.38	-0.6	-10.4

Leasing Companies

O	CAPITAL ASSOCIATES INTERNATIONAL INC	11	4	4.38	-0.3	-6.4
N	COMDISCO INC	37	12	18.38	-1.6	-8.3
N	CONTINENTAL INFO SYS	14	5	6.50	-1.0	-13.3
O	PHOENIX AMERN INC	6	2	3.00	-0.1	-2.1
O	SELECTERM INC	6	3	5.00	0.8	17.8

EXCH: N—NEW YORK; A—AMERICAN; O—NATIONAL; O—OVER-THE-COUNTER; S—SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

No traction

Interest rates, faltering market trip DEC, Cray, IBM

Slippery footing caused by a generally falling market and rising interest rates caused many computer stocks to tumble in action on Wall Street last week. The biggest decliner among leading computer issues as of Thursday's market close was Digital Equipment Corp., which could not translate an announced technology-sharing agreement with Compaq Computer Corp. into a stock gain. DEC's stock dropped 3⅜ points for the four days of trading and finished at 101½. Compaq was also off; its shares slipped 1½ points to 51⅜.

Other stocks hit last week included Cray Research, Inc., down 3⅜ points to 81½; NCR Corp., off 2⅛ points to 59; IBM, down 1¼ points to 108¾; Control Data Corp., down 1⅝ points to 24⅜; Unisys Corp., down 1⅛ points to 32½; Apple Computer, Inc., down 1½ points to 39¾; and Microsoft Corp., off 1¼ points to 56. But all was not doom and gloom on the Street. Amdahl Corp. benefited from an increased earnings forecast from investment house Dean Witter Reynolds, Inc. to finish up 1⅜ points at 46¼, while Ashton-Tate Corp. closed up ⅛ of a point to to 26¼.

JAMES DALY

Journal

FROM PAGE 1

to the wider realm of information systems in the business world.

Having spent two years working full-time as a programmer/analyst for a bank while attending classes at NYU at night, I left my job in September 1987 and switched to being a full-time MBA student. The advantage of being a full-time student is that I can concentrate on my studies and also take advantage of the recruiting process, which part-time students usually don't get to participate in.

The recruiting process is fiercely competitive. Many of the companies that come to campus are looking to fill only one or two positions, but they interview at least 13 students and sometimes as many as 40 at the GBA, as well as students at other schools. Getting a "callback" to a second interview requires really impressing the recruiter. I try to impress recruiters by researching the firm thoroughly.

I want a job with end-user contact and the ability to manage people and projects. Eventually, I want a project manager's slot, ideally in a financial services firm.

Here's my diary.

JAN 4

The spring semester, and the new recruiting season, began today with the publication of the *Company Schedule Book*, a calendar of recruiters coming to campus. Being an MIS major narrows my choices. At the GBA, most of the students are finance majors, and that is what most of the recruiters are looking for.

I am very focused on the type of position I want. I select nine firms to interview with: two banks, three Big Eight accounting firms, two smaller consulting firms, one computer company and one utility. I feel confident going into this process. My grades are strong — a 3.8 grade-point average — though most recruiters don't seem to care about grades.

JAN 27

Today's my first on-campus interview, and it's with a computer company. They have an excellent professional reputation. However, whether I want to work for them will depend on the location, position and salary they offer.

Wearing my best interview suit, I arrive 15 minutes early, anxious to make a good impression. The recruiter shakes my hand and smiles. I instantly feel comfortable with him. There is no denying the importance of a first impression on both sides. If the interviewer is not pleasant to talk with, I quickly lose interest in working for the company.

The recruiter, because of time constraints, must make a decision based on 30 minutes of interaction. I find that this recruiter has prepared. The questions are mostly related to my work experience and course work.

I don't feel pressured. Since this is my first interview, I admit I am a little nervous walking in. The recruiter shows me an occasional smile, which puts me at ease. His tone of voice makes me sense he is interested in hearing what I have to say.

There are others waiting to be seen. Although I know he is judging me and comparing me to the other students he has seen during the day, he does not emphasize that aspect of the interview. Instead, he seems interested in getting to know me and telling me about his company.

I walk out feeling much more relaxed and confident.

JAN 28

Today is my visit to the utility company. I am annoyed when given an application form to fill out. What tops it off is the question asking whether I can climb poles.

The recruiter is from Personnel, not MIS, and doesn't really know anything about the position I am interviewing for. She asks me questions from a standard interview form, and I don't feel like I have the opportunity to really present my qualifications. She makes no eye contact but rather fires questions at me and writes while I answer them.

The worst part is that almost all the questions are asked from a negative angle. For example, she wants to know what I don't like about my last job, which course at school I am not satisfied with, what I would not like to see on my next job. The interviewer makes it clear from the outset that she is not enjoying the interview. I consider trying to win her over, but I don't really want the job, so I don't bother.

JAN 29

I interviewed at a bank today for a job with the title Account Manager. At first it sounds like I'd be handling loan portfolios. But as the recruiter describes the position, I find myself getting more excited. Had I been asked to describe the position I want, I would have used almost the exact words I am hearing. I would be acting as a liaison between the MIS people developing a new information system and the end users. I would be responsible for defining the requirements and writing up a contract between the two departments.

I want this job badly, and that makes me nervous on the interview. But it gets my adrenaline flowing. I want to convey my enthusiasm without seeming desperate. This recruiter has also gone to NYU's GBA and has a very clear picture of the curriculum, so the questions about school center on his knowledge of the courses.

I emphasize that my experience makes me a good fit for the position and that I am very interested in the job. Apparently I succeed, because I am asked back for a full day of interviews, set for February 19. I tell a friend later that day, "That job has my name on it."

FEB 8

Today I talk to a Big Eight accounting firm. The division I am interviewing with does MIS consulting for financial services, a field that I am especially interested in.

Our discussion revolves mostly around what I've done in the past and what my next job should be. It seems to fit well with the position he is filling. I am impressed with the description he gives of the firm and the position and try to impress him with my qualifications for it.

FEB 12

This first-round bank interview, done at the bank's offices, gives me the advantage of being able to look at the environment and gain a sense of their working styles and the organizational culture. This is an opportunity I usually only get on callbacks.

In fact, although it is a first-round interview, the bank handles it almost like a callback. They have scheduled four people to speak with me, and we all meet for about an hour. The interviewers are all young MBAs, so I feel reasonably comfortable talking to them. In particular, I remember one question: "How do you handle failure?" Good question! Failure is something that MIS managers have to be able to handle.

The job title is Senior Systems Analyst, and the group that I would be joining at this bank numbers only 15. The job focuses on design and documentation of end-user PC applications. I am pleased when they ask me back for a second interview March 1.

FEB 17

It turns out that I made a good impression at the computer company on my first interview. They call me back today to interview for an opening in Danbury, Connecticut. Since I am not interested in moving there, I do not follow up with the second interview. I also receive a letter from the Big Eight accounting firm inviting me for a second round at their offices March 8.

YVONNE BRADY

Arnold discusses her qualifications *for an MIS management position with an on-campus recruiter.*

FEB 19

Today is my first callback interview, for the position of Account Manager at the bank. I am scheduled to speak with five people. The first interview is with the person I would be reporting to. I focus less on impressing him — after all, I have been called back — and more on finding out what he is looking for and what the company has to offer.

I find, as the interviewing process unfolds, that in general I am asked very few technical questions. When a technical question does come up, the assumption from the recruiter is that if I don't know the answer, I can probably pick up what I am missing on the job.

The companies I interview with are looking for MBAs. The average starting salaries are in the mid-$40,000 range, and the positions which they want to fill and which I am most interested in are not technical in nature. Rather than specific knowledge of hardware or software, these jobs require the ability to understand a business, to analyze business needs and formulate technical solutions to meet them.

Most important is the need to communicate those solutions to management. Therefore, the recruiters care more about my analytical and communication skills than the particular systems I've worked with in the past. In fact, if a recruiter is especially interested in knowing what programming languages I know, the job is probably more programming-oriented than I care for anyway.

The interviews today seem to go well, but I am not given any indication of whether or not they are seriously interested. They say I will hear from them soon.

MAR 1

Today I go for a callback at the other bank. The position is titled Senior Systems Analyst. I've already been on-site for the first interview and have spoken to four people. This time, I am scheduled for only two interviews: the person in charge of the PC group and the vice-president to whom I'd report.

The main focus this time seems to be on selling me the job, rather than the other way around. Both the people I speak to spend a lot of time telling me about what the group does and its relationship to the rest of the bank. They also emphasize that the job involves a lot of pressure, hard work and long hours.

Since I will not be graduating until the end of the summer, the people who interview me bring up the possibility of my working part-time until graduation.

MAR 8

Today I have a second interview at the Big Eight accounting firm for the Financial Information Systems consulting group.

The first person I speak with is the senior manager I had spoken to on campus. He schedules me to meet with three of his senior consultants and then to have lunch with a recent MBA grad who joined his group in October. He spends most of the half-hour describing the consulting practice and what the available position involves. He then turns me over to the senior consultants, who make it clear that each will focus on a different area of my resume, asking specific questions about what I have done on that job and what I would like to be doing in my next job. I am pleased, since in the past, I have often found myself repeating the same things to everyone.

This is the only interview in which salary is mentioned. It is not considered wise for an interviewee to bring up the question of compensation. However, MBA graduates vary in their backgrounds and previous experience, so there is no "typical" MBA starting salary. The average salary for NYU GBA grads in 1987 was $46,000; MIS majors averaged slightly less. It's a good idea for a company and a prospective employee to have some idea of each other's expectations before extending an offer.

After the first four interviews, I go to lunch with a consultant who joined the firm recently after getting her MBA. The informality of lunch gives

Unix

FROM PAGE 1

"This is a very negative thing," said Gary Handler, vice-president of market decision systems at Shearson Lehman Hutton, Inc. "The Unix industry is poised on the brink of incredible growth. I sincerely hope the vendors can see past this and not destroy what is perhaps the best opportunity they've ever had."

As of late last week, however, all indications were that a rebel action will proceed as planned. IBM spokesmen would confirm nothing. DEC confirmed it has been in discussions with other vendors. HP and Apollo grew increasingly coy. At the end of last week, they were promising big news for this week.

Unix speculation

What the big news will be was the subject of a wide variety of speculation. It is clear that it will be a Unix alternative. One option immediately put forth by industry observers was that the group will turn to the University of California at Berkeley's Unix as a way to be independent of AT&T. But Berkeley's Unix is a derivative whose original license goes back to AT&T.

A second theory put forth was that each member of the group will put in pieces of its own Unix implementations — such as AIX, Ultrix, HP-UX and Domain/OS — to form a sort of merged Unix. But this could prove a time-consuming endeavor, since each vendor would likely promote its own approach.

Paul Cubbage, an analyst at market researcher Dataquest, Inc., suggested that the group will re-engineer the Unix operating system and settle for a Unix look-alike. By week's end, the most commonly heard theory was that the group will set up an independent consortium that will establish the specifications for a Unix-like operating system.

Some sources said the group's efforts will center on IBM's AIX.

All theories seemed to boggle the minds of users and observers alike, since the group itself is composed of competitors. With the exception of IBM, the companies belonged to the so-called Hamilton Group, an unofficial team of vendors that confronted AT&T earlier this year and expressed concerns that it was ruining Unix's chances of being a truly open operating system.

The Hamilton Group complaints centered on two major issues: AT&T's alliance with Sun Microsystems, Inc., which they claimed would give a top competitor unfair access to future Unix releases, and the AT&T licensing policies, which they claimed are becoming more restrictive.

AT&T met with Hamilton Group members collectively and individually during the winter. However, most members said they were unhappy with the results and publicly expressed concern that AT&T was not being as cooperative as they would like. Privately, according to industry observers, the group then set plans in motion to free itself from AT&T's control. To do so, they would need to establish their own alternative.

"If they are just approaching it as a closed group that's got yet another version, then they won't go anywhere," said Robert Borochoff, a senior research computer scientist at the Federal Judiciary Center in Washington, D.C. "They'll be compared with Unix and viewed as a proprietary operating system."

Chicago fire

FROM PAGE 1

machines in Chicago, served by suburban DP centers, went blank, as did scores of Illinois Lottery terminals.

O'Hare Airport suffered a temporary loss of flight information sent from a west suburban Federal Aviation Administration (FAA) tracking station over 28 data circuits. "We had to slow things down," FAA spokesman Mort Edelstein said. "We had to separate all planes by 20 miles, instead of three miles, just for safety." O'Hare's radar scopes, he added, never went black, and the FAA switched to 16 backup lines within hours.

BRIAN BART PHOTOGRAPHY

A salvage worker *sorts through the switching station rubble.*

Telephone on wheels

Some businesses in the 30-mile-wide area served by the damaged switching hub had to resort to cellular phones to get their business done. "One of our vendors called us from her car phone," said Tim O'Neill, a computer operations supervisor at Unocal Corp.'s Refining and Marketing Division in Schaumburg, Ill. "She could call us, but we couldn't call her."

Unocal was able to switch faulty phone lines to the company's national private network, which is powered by microwave links. But other firms faced the grim prospect of shutting down suburban operations.

Sears, Roebuck & Co.'s telemarketing division in Downers Grove, Ill., sent dozens of phone sales personnel home on indefinite leave, according to Sears spokesman Gordon Jones.

Flower outage

Some operations were paralyzed by the phone shutdown. "Right now, we're totally out of business," said Dennis Blondell, assistant director of operations at the Floral Network, Inc., a subsidiary of the Floral Transworld Delivery Association of Florists, late Thursday evening.

Blondell said the outage, which hit on Mother's Day, stopped all phone traffic and halted the computer system that connects 12,000 of the association's 23,000 florists.

Blondell, among others who suffered with the phone blackout last week, wondered how a single fire was able to knock out so much of Illinois Bell's network. The answer, according to Illinois Bell Vice-President of Operations James Eibel, is that the system only has 25% redundancy at gateways like Hinsdale. Chicago hubs, in contrast, have 50% redundancy.

The Hinsdale switching center, located just off the small village's main street, was unattended when fire broke out at about 4:00 p.m. As a matter of policy, the alarm did not ring through to the local fire department. According to Illinois Bell spokesman Tim Bannon, the company feared that without guidance from Illinois Bell technicians, local firemen would damage sensitive phone equipment with sprayed water.

Aftermath

Last week, a task force of 150, including disaster specialists from Northern Telecom, Inc., AT&T and Bell Communications Research Corp. (Bellcore), worked to remove humidity in the building that was combining with soot to form corrosive acid.

At first, the team tried to salvage the local phone switch, a 1970s-vintage analog 1A ESS. "Replacing the components is a trivial problem," scoffed one Bellcore adviser on the scene. "But replacing the 40,000 circuit connections is a long and tedious chore. What we had here was a complete disaster."

Late last week — after a failed effort to link trunk lines to temporary microwave dishes atop the Hinsdale center — the company abandoned the idea of salvaging the frames. Instead, they will be replaced with a new, fully digital switch during the next two to four weeks. Long-distance service was expected to resume this week, with the replacement of 60 Northern Telecom bays of multiplexing equipment that route long-distance toll calls over fiber-optic lines.

Meanwhile, Floral Network said it plans to erect a satellite dish to bypass the local switching office in the event of another phone line emergency.

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me a chance to ask some questions I might have hesitated to bring up in a more formal setting.

MAR 17

Today I receive a letter from the first bank stating that they are not interested in hiring me. I am very disappointed — the job seemed a perfect fit — but I am learning not to take rejections personally.

But the second bank is very interested in hiring me. We enter the negotiation process.

My feeling that I impressed the Big Eight firm is confirmed when I receive a written offer for a job. Now things are looking better.

MAR 24

What to do? Accept the bank's offer, the Big Eight firm's or return to my former employer, who is anxious to have me back? The deciding factors:

1. **The position.** I am anxious to be in a job where I will have the opportunity to learn about the business. I like to code, but I don't want to be a programmer. The ideal position would include a lot of people contact and very little machine contact.

2. **The corporate culture.** I am the type of person who thrives on pressure, so the prospect of difficult work does not turn me off. Although I am willing to work hard, I need a friendly atmosphere and a degree of recognition.

3. **The manager.** The managers I have worked with most effectively were competent and well-informed. They were around when I needed them but allowed me the freedom to work without interference. Most importantly, they were willing to listen to my ideas and suggestions and encouraged me to be creative. This is what I am seeking in a boss.

4. **Job title and compensation.** I have worked very hard on my MBA, and I believe it adds significantly to my value as an employee. The advantage of an MBA in MIS vs. a graduate degree in computer science is the combination of technical awareness with general management and business skills. My title and compensation should adequately reflect my value to the company.

Even if I don't land a dream job, recruiting has been worthwhile as an experience. It gave me a chance to see what is out there and to gain confidence in the hunt. The toughest task remains: I must now make a decision.

Postscript: For Vivienne Arnold, it was a busy spring. She finished the semester, got married in April and in early May decided to join a large New York bank as a senior systems analyst.

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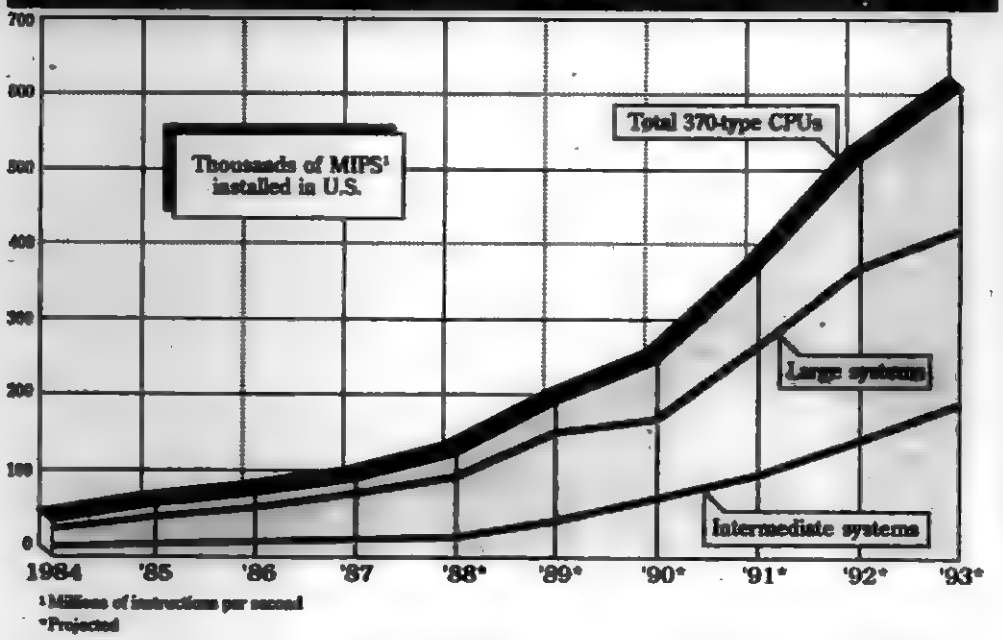
TRENDS

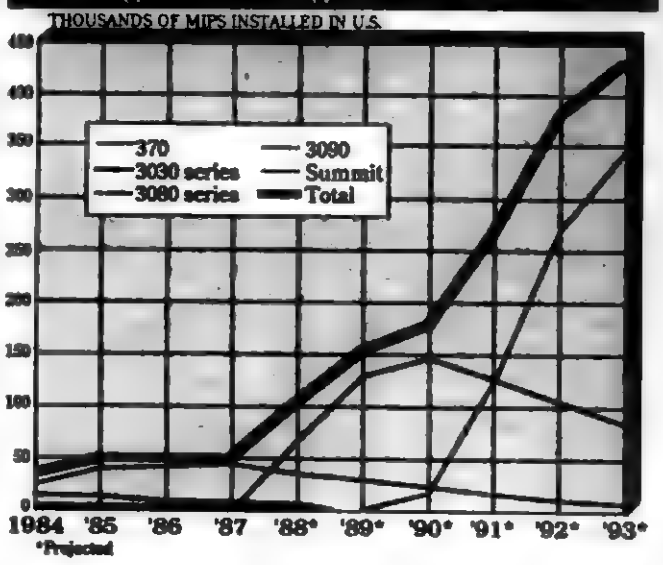
IBM mainframe growth

Overall, users will devour five times more MIPS in five years



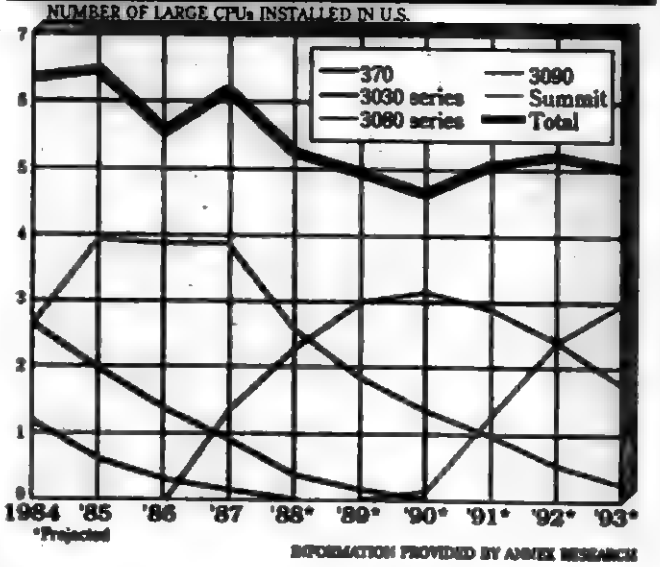
¹Millions of instructions per second
*Projected

MIPS growth on big CPUs will be faster



*Projected

But big system purchases will taper off



*Projected

INFORMATION PROVIDED BY ANNEX RESEARCH

The boom in personal computers and local-area networks is continuing the erosion of mainframe computing that was begun by minicomputers, according to many experts.

But that does not spell doom for mainframes, judging by a recent study by Annex Research in Phoenix. In fact, the report shows that mainframe MIPS are approaching the start of a five-year growth spurt.

Although the number of millions of instructions per second (MIPS) running on mainframes will increase, the number of mainframes will diminish as more processing power is crammed into a box. Such has been the trend since the mid-1970s, said Bob Djurdjevic, president of Annex Research.

"Multiprocessing contributes to this trend," Djurdjevic said, explaining that putting more than one CPU into one box increases computing power and the number of applications that can be processed but does not increase the population of mainframes. "High-end MIPS growth had been in the single digits. It will increase to a double-digit growth rate," he said.

Although IBM's Summit series, which is expected in late 1989, will contribute to mainframe growth, Djurdjevic said, "I'm not particularly bullish about Summit, but about the mainframe market in general."

STANLEY GIBSON

INSIDE LINES

Whaddaya gonna do with all those MIPS? Alliant Computer Systems will unveil a high-end parallel processing minisupercomputer today that will double the performance of Alliant's FX/80, currently the vendor's most powerful system, according to a source close to the company. Dubbed the FX/82, the processor will provide 378M floating-point operations per second at peak performance and 235 million instructions per second, running the Whetstone benchmark. The 16-processor system, a cluster of two eight-processor FX/80s, will run current Alliant applications, carry a price tag of about $1.25 million and ship this quarter, a source said.

Granted, that's a lot of money. Sematech, the semiconductor manufacturing research consortium in Austin, Texas, passed another milestone last week when it signed an agreement with the U.S. government that releases a $100 million federal grant. The agreement makes the Defense Advanced Research Projects Agency (DARPA) a regular member of the consortium, giving it access to the tools and techniques developed at the Austin center. DARPA may then pass the research on to defense contractors.

Get the Pepto-Bismol. For some users, Friday the 13th may have been a nightmare on Elm Street. A triggering mechanism on the Jerusalem personal computer virus, which has been spreading across the country, was set to go off on Friday. When triggered, the virus scrambles the index to the hard disk.

A burner for Turner. Big league data processing is finally catching up with media mogul Ted Turner. For years, Turner's Atlanta-based operations have relied on a Basic Four system for its corporate computing. This summer, however, Turner is moving the processing for his Turner Broadcasting, Turner Entertainment and Cable News Network operations onto an IBM 4381. Meanwhile, CNN's roving reporters just received Datavue Spark laptops to file scripts and stories from such global hot spots as the Gaza Strip and the Persian Gulf. Who says glamour is dead?

"I'm in charge here." When Econocom-USA Chairman Ken Bouldin officially takes over as president of the Computer Dealers and Lessors Association June 1, he will be uniquely qualified to whip the troops into shape. At a ceremony in Memphis next Saturday, Bouldin will be recognized for his promotion to brigadier general in the U.S. Army Reserve. Dress blues and whites or mess blues and whites are required for military personnel attending.

OS/2 Extended Extended: While Microsoft has rallied for support of its OS/2 LAN Manager, IBM has been quietly signing people up to support its proprietary OS/2 Extended Edition. While it was not exactly a watershed, nine vendors announced products that require the IBM-specific operating systems. A quick check, however, revealed that at least one vendor, Micrografx, mistook Extended Edition to mean OS/2 with the Presentation Manager, not OS/2 with a proprietary IBM data base and communications capability. None of the industry biggies pledged to write for the operating system that is set to ship this summer.

OK, I'll take the bridesmaid. Behind the happy faces at last week's unveiling of a joint networking design and support venture between Hewlett-Packard and Northern Telecom lurked the shadow of DEC. HP wasn't exactly Northern Telecom's first choice, according to one source. He reports that the private branch exchange maker "worked real hard to do this with DEC" but was not able to reach an agreement.

Your (pink) slip is showing. With its fiscal year ending in two weeks, On-line Software International has invoked a little belt-tightening. The company recently laid off about 4% of its 850-member worldwide work force as it attempts to get expenses in line with the zero-based budget planned for fiscal 1989. The layoffs, which cut across the company, were aimed specifically at reducing head counts in support areas bloated by the firm's acquisitions over the last few years.

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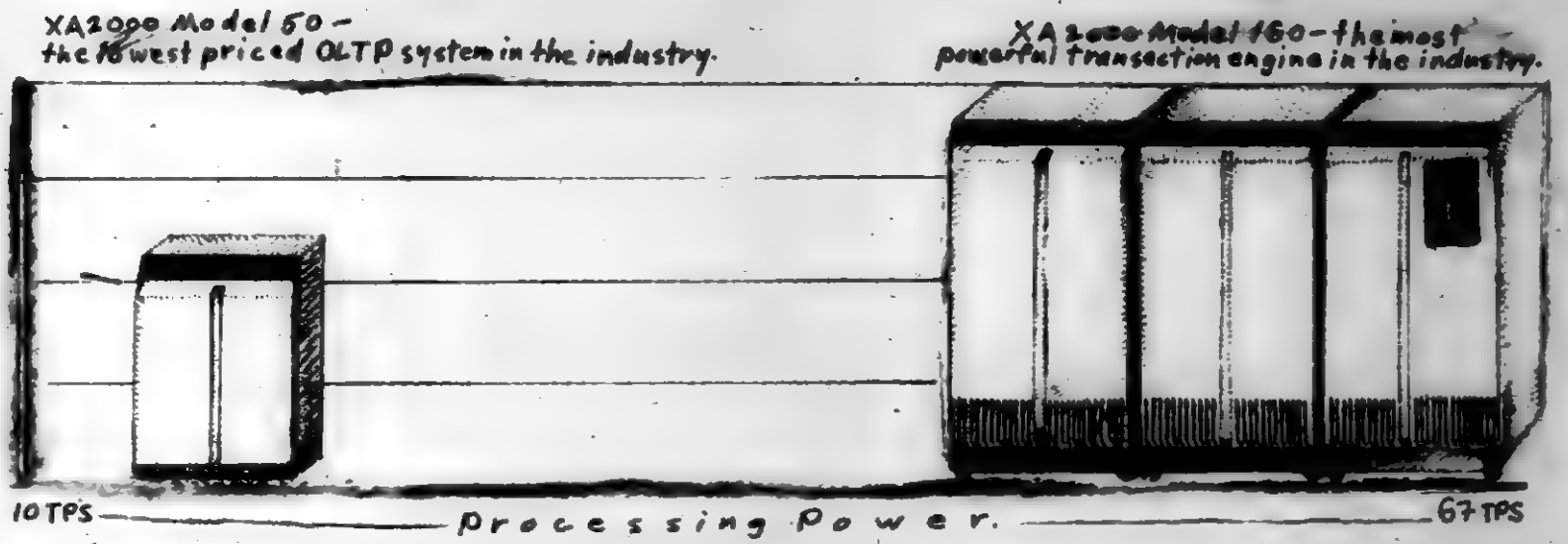

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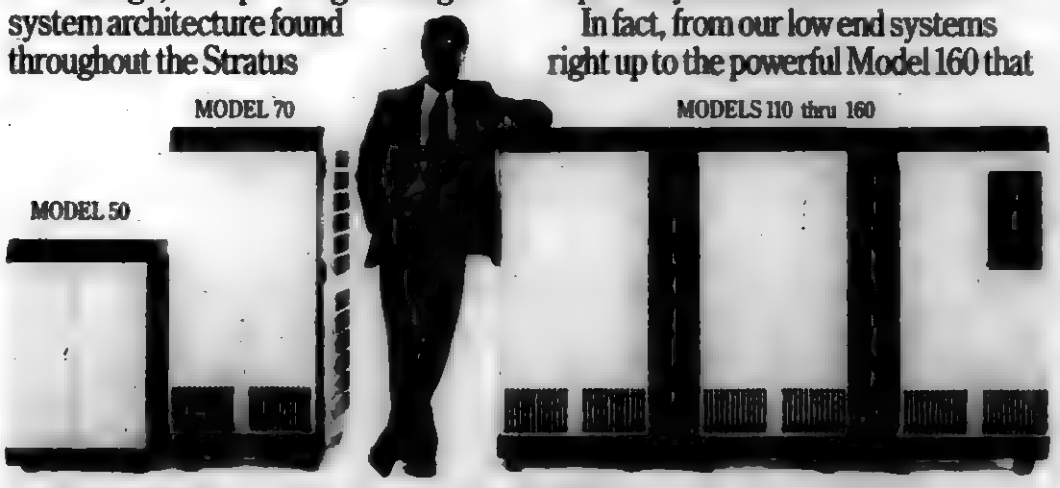

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AFTER A THOROUGH EXAMINATION, JEWISH HOSPITAL CHOSE MSA.

Some of the finest physicians in the Midwest practice at Jewish Hospital in St. Louis. It's an excellent hospital with an excellent reputation. But it *is* a business, and recently, due to a desire for better information access and control, Jewish Hospital found a need to convert from a shared computer system to a private one.

So after very careful consideration, Jewish Hospital converted to Financial, Human Resource and Materials Management software systems from Management Science America, Inc.

"Initially, we looked at 15 software companies," said John McGuire, executive vice president of the hospital. "In making our evaluation, we considered solicitations and talked with the users of various systems. We then considered five finalists who gave presentations. Then we narrowed our choice down to two, and ultimately went with MSA."

Why MSA over all the other software companies?

"User satisfaction with their products," was one of the reasons McGuire cited. "Also, MSA's customer service reputation was very good. We feel we made the right choice by going with MSA."

Now that MSA and Jewish Hospital are working together, the hospital is integrating its operational and financial information. According to McGuire, "MSA is helping us take better care of the business side of our hospital...and that lets us take better care of our patients."

If you would like to know more about what we're doing for Jewish Hospital, or what we can do for your business, contact Robert Carpenter in Atlanta at (404) 239-2000.

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COMPUTERWORLD

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Spotlight — Tying up loose ends in corporate networks. Pullout section on data communications follows page 52.

IBM's PS/2 Model 70 will pack 20- and 25-MHz versions of the 80386 chip in an effort to race ahead in the desktop wars. Page 8.

Chicago-area businesses struggle to regain control of data networks as switching station repairs focus on voice lines. Page 101.

Chip shortage to last another year as semiconductor firms avoid pitfalls of past cyclical disruptions. Page 4.

Control of who can clone seen as goal of IBM patent licensing claims. Page 100.

In person: Manager of departmental computing at Coca-Cola Foods gauges the impact of clones on PS/2 acceptance. Page 37.

Mixing Japanese style with MIS in the U.S. produces competitive edge. Page 67.

Chalking up another first, Computer Associates piles up annual profits of $100 million. Page 75.

Wang customers angered by company decision to price operating system separately. Page 15.

Battle lines drawn for control over Unix

Unlikely alliance reveals open systems agenda

BY ROSEMARY HAMILTON
CW STAFF

NEW YORK — IBM and Digital Equipment Corp., never known for their love of Unix, teamed up with five other computer companies last week to launch the Open Software Foundation, an attempt to provide an open system standard and, in the process, take control of Unix away from AT&T.

The announcement was immediately met with skepticism, as observers questioned both the group's motives and its ability to carry out its stated intentions. At best, observers said, the group will stay true to its stated goal — but will find it nearly impossible to achieve. At worst, the group's motive is to slow down the growth of Unix by dividing the market and dragging its feet on a Unix standard, they added.

In addition to IBM nd DEC, the group's sponsors are Apollo Computer, Inc., Hewlett-Packard Co., Nixdorf Computer AG, Siemens AG and Groupe Bull. The founding sponsors will each give OSF nearly $14 million during the next three years.

OSF plans to operate as a nonprofit organization that will create an open system environment based on industry standards as well as emerging standards, such as the IEEE Posix specifications.

International flavor

The three initial OSF members — Apollo, DEC and HP — were vocal constituents of the so-called Hamilton Group, which first expressed its concerns about AT&T's handling of Unix and its alliance with Sun Microsystems, Inc. earlier this year. They won over IBM a month ago and got the three European-based companies to join just a

Continued on page 6

Open systems war

The Open Software Foundation has divided industry leaders over the direction of Unix

PRO:

- "Open systems are part of the public trust." *Ken Olsen, president of DEC*
- "We've made a significant investment in Unix and are totally committed." *John Akers, chairman and president of IBM*
- Customer "demands have been put ahead of our proprietary interests." *John Young, president and chief executive officer of Hewlett-Packard*

CON:

- "...an untested consortium composed of members with inherently conflicting motives." *Robert Kavner, president of AT&T Data Systems Group*
- "...nothing more than an argument among vendors, which will only serve to confuse..." *Fred Wang, president of Wang*
- "AT&T as the creator of the Unix system, has handled its obligations to the industry appropriately." *W. Michael Blumenthal, chairman and CEO of Unisys*

CW CHART

IBM drafts distributed DBMS plan

BY CHARLES BABCOCK
CW STAFF

IBM is expected to announce its first products and overall approach for distributed data base management within the next 60 days, finally entering the realm in which users can share and manipulate data between mainframes and microcomputers.

Last week, numerous industry sources said they expect the announcement this summer — much sooner than most IBM customers had anticipated.

Among other things, IBM is expected to reveal the capability of its DB2 to work with SQL/DS. Although both are relational data base management systems and both run on mainframes, they use different versions of SQL and function with different internal procedures.

Continued on page 100

AT&T scoffs at power play

BY JULIE PITTA
CW STAFF

SAN FRANCISCO — AT&T's top computer executive last week questioned whether a product will ever result from the unlikely alliance of IBM, Digital Equipment Corp., Hewlett-Packard Co. and four other vendors.

"It's too easy to have a press conference and garner all the attention," commented Robert Kavner, the recently named president of AT&T's Data Systems Group. "We'll have to give them time [in order] to determine their motives."

Kavner raised doubts as to the purity of the Open Software Foundation's motives. "Right now, they say their motives are motherhood," Kavner quipped. "I seriously question that."

Continued on page 6

IN DEPTH: MIS STRATEGIES

Information on a global scale

BY CLINTON WILDER and NELL MARGOLIS
CW STAFF

In the early days of E. I. du Pont de Nemours & Co., the family owners sometimes worked alongside their blue-collar employees, purposely facing the greatest hazards of 19th century factories. Such risk taking helped establish Du Pont's leadership in worker safety and other management issues in the chemicals industry.

During the 1980s, the Wilmington, Del.-based company has earned a reputation as a leader of a different sort — in its use of information technology as a corporate resource.

The head missionary in raising the information technology consciousness of Du Pont's upper management is Raymond E. Cairns Jr., vice-president of the Information Services Department. "If you asked me to name one thing my job is, I would say it's a marketing job," Cairns says. "My job is to sell [information systems] to upper management."

Cairns assumes final responsibility for what he calls the infrastructure, that is, Du Pont's corporatewide hardware and networking standards.

On that foundation, Du Pont has implemented industry-leading systems, which include a 46,000-user international electronic mail network, the world's largest Digital Equipment Corp. Vaxcluster, two Cray Research, Inc. supercomputers, about 20 IBM 3090-class mainframes and hundreds of expert systems that are running on gen-

Continued on page 59

Du Pont's *Raymond E. Cairns Jr.*

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Memory hungry. Chips play too important a role in PC memory board expansion to be the object of scrimping and saving, MIS says, but skyrocketing prices could affect long-range purchase plans. Page 4.

Attention starved. IBM cuts in on Compaq's PC performance lead with 20- and 25-MHz PS/2 Model 70s, claiming the 80386-based systems are faster than Compaq's Deskpro 386/20. Page 8.

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Quotable

"If you asked me to name one thing my job is, I would say it's a marketing job."

RAYMOND E. CAIRNS JR.
VICE-PRESIDENT
INFORMATION SERVICES
DEPARTMENT
DU PONT CO.

See story page 1.

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REPORTER'S NOTEBOOK

Press day at DECUS

CINCINNATI — As more than 5,000 members gathered last week to attend DECUS Spring '88, the semiannual national symposium of the Digital Equipment Computer Users Society, one message was clear: It isn't just for techies anymore.

Now in its 27th year, DECUS — which claims to be the largest computer user organization dedicated to a single vendor — has been gradually changing to accommodate the new breed of Digital Equipment Corp. users ushered in by the company's assault on the commercial market, DECUS spokeswoman Mary B. Oskirko said.

"Traditionally, you equate DECUS with exclusively technical users," said longtime DECUS member and speaker Terry Shannon. "But it's expanding to also be more MIS-oriented. Now that DEC is trying to address upper management users, so does DECUS."

The "new DECUS" was much in evidence at last week's event. For instance, in the DEC exhibit hall, for the first time at a DECUS symposium, the Maynard, Mass.-based manufacturer's wares were shown in an integrated, application-oriented format rather than on a product-by-product basis.

In the catalog of sessions, the likes of "CASE for commercial software," "VAX novice software clinic" and "A manager's guide to Digital" popped up among the host of more predictable technical esoterica.

While DECUS might be changing its face, the heart of the organization remains the same.

Technical or commercial, first-timer or veteran, members pledge their allegiance, their symposium attendance fees and a considerable number of volunteer hours each year to gain the three principal benefits of the organization: information, more information and a lot more information.

The informal exchange of information that takes place at DECUS is definitely the symposium's big draw. "People talking in the corridor — that's where the action is" said a DEC spokesman and DECUS member of many years. "That's where you save six months' worth of work."

"I'm here to enlarge my knowledge — and I'm picking up a lot of valuable information," said Rene Bertrand, line support section manager for Quebec region controllers at Bell Canada in Montreal. Experienced in IBM computing, Bertrand is five months into a new job that requires him to become VAX-worthy as well. "I've been to many professional seminars, but the information exchange within DECUS is so much broader and deeper," he said.

Jerry Carpenter, operations supervisor at Southern Utah State College in Cedar City, Utah, agreed. "If you hang out at seminars that address the problems you're interested in," he said, "the talks you get into out in the hall afterward can end up helping you even more than the seminar did."

NELL MARGOLIS

PC clones penetrate Soviet Union

BY JAMES A. MARTIN
CW STAFF

SUNNYVALE, Calif. — Thanks to Soviet Premier Mikhail Gorbachev's *glasnost* economic policies, an American microcomputer company is joining forces for the first time with a USSR firm to sell U.S.-designed micros in the Soviet Union.

Advanced Transducer Devices, Inc. (ATD) is scheduled to announce next week a joint venture in which IBM Personal Computer AT compatibles made by ATD will be sold and distributed to the Soviet market by a company cooperatively owned by ATD and V/O Electronorgtechnica (Elorg), a Soviet electronics firm.

Selling American computers in the Soviet Union is nothing new; IBM has had a sales office in Moscow for years and just recently sold approximately 50 Personal System/2 Model 30s to a Soviet tractor manufacturer.

But ATD's agreement with Elorg marks the first time the two countries have banded together to produce and sell microcomputers.

"We're planting, in effect, an embryonic personal computer company," ATD President Matthew Zuckerman said.

A ribbon-cutting ceremony is planned next month in Moscow to officially announce the joint venture and the opening of a service, training and distribution center in the Soviet Union.

Apple Computer, Inc. is reportedly negotiating to sell computers in the Soviet Union, and other U.S.-based micro companies will be looking to enter the Soviet market in the future. "A joint venture is really the way to do it, and that requires a lot of time, patience and money," said Cliff Lindsey, an analyst at Dataquest, Inc. "If you have all that, you can get an adequate return on your investment."

No one had ever clocked 200 mph around [illegible] so that car, [illegible] make the turns. Then on May 14, 1977, the 200 mph barrier was broken. Technology made the difference. Aerodynamic "ground effects" had improved the car's handling. Technology enhances performance.

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High cost of memory

RAM drought leads to long waits, rising prices

BY JAMES DALY
CW STAFF

Although dynamic random-access memory chips continue to be eagerly sopped up by memory-starved users, MIS executives have discovered a new wrinkle they will be forced to contend with: soaring chip prices and little recourse but to grin and bear it.

"If you've got to have them, you've got to have them, no matter what they charge," said Joe Vincent, director of technology planning at Humana, Inc. in Louisville, Ky. Vincent said his memory expenditures have gone up fourfold in the past year.

"We can't have the weight of our business resting on the price of chips. We don't like it, but we grit our teeth and pay. It's better than not having them," he said.

Vincent's words echo the sentiments of several users caught in the wake of the increases who said the chips needed for personal computer memory board expansion play too important a role in their businesses to be the object of scrimping or purchasing cutbacks.

"Even if the cost of a system is $200 or $1,000 more, it's still peanuts compared with how much we need them," said Ron Goldfarb, manager of office automation at Pratt & Whitney Administration, a subsidiary of United Technologies Corp.

While finagling for chips has become common since the shortage left the industry in a stranglehold last year, users contend the higher prices add insult to injury. "We're used to three months of high-level screaming to get memory boards for our PS/2s, but tripling the prices to boot still amazes me," said Harry Zupnick, vice-president of technology planning at Merrill Lynch & Co. in New York.

Far-reaching effects

Although users have begrudgingly learned to live with the chip drought and skyrocketing prices, some said a worsening situation could affect longer range decision making.

"If prices keep going up the way they are, it would add another notch in the minus column for going to [memory-hungry] OS/2," said Phil Gordon, manager of office systems at Charles Schwab & Co. in San Francisco.

Spot-pricing per chip for 256K-byte dynamic RAM chips — the price paid for quantities of usually less than 100 — has gone from less than $2 in the second quarter of 1987 to $8 to $12 today, according to Drew Peck, a semiconductor analyst at Donaldson, Lufkin & Jenrette, Inc. in New York.

And there appears to be no end in sight. Sun Microsystems, Inc. said last week that a "memory surcharge" of up to $250 would be tacked on to much of the add-on capacity of its workstation product line. Wyse Technology also succumbed recently, admitting that its personal computer prices would rise 6% to keep up with the increased cost of chips [CW, May 16].

The price increase stems from both a cutback in the alleged Japanese practice of dumping low-cost dynamic RAM chips in the U.S. market and the transition in chip manufacturing from the current generation of 256K-byte chips to 1M-byte silicon, said Stan Victor, corporate media relations director at chip maker Texas Instruments, Inc.

"Chip buyers are caught in a double whammy," Victor said. "Many firms didn't invest in new dynamic RAM facilities because they got burned so badly the last time chip prices fell. They converted old 256K-byte manufacturing plants to 1M-byte plants rather than invest in new facilities. So we're losing 256K-byte production while not putting out as many 1M bytes as we'd like."

Senior Editor Ed Scannell contributed to this report.

IBM wins Dutch suit

BY JAMES DALY
CW STAFF

The European Community (EC) Commission has quietly cleared IBM of antitrust charges brought against it by three Dutch rivals and has dropped its inquiry into the matter.

"We came to the position that IBM hadn't abused its dominant position" in violation of EC competition law, said H. Colin Overbury, a director in the EC's Brussels-based competition branch, in closing the case.

IBM received the decision in a letter last month. The investigation began in March 1987, when leasing companies Atlantic Computers, IBL and Econocom International N.V. charged that IBM's Dutch subsidiary was pushing them out of the market with predatory leasing rates [CW, March 23, 1987].

The case posed dangerous political ramifications for IBM. Because the company controls nearly 30% of the European hardware market, it has long been a target of barbs from government and local computer officials, and a loss would have made it harder for IBM to sell its computers to European markets.

Semiconductor chip pinch: No end in sight

BY CLINTON WILDER
CW STAFF

Believing that those who do not learn from the past are condemned to repeat it, U.S. and Japanese memory chip manufacturers are not rushing to invest in additional plant capacity. And that will cause the current dynamic random-access memory shortage and high prices felt by systems vendors to last for about a year, analysts said.

Shortages borne of demand outpacing supply are nothing new in the semiconductor business. The industry has experienced at least two previous boom-and-bust cycles in this decade.

Once burned, twice shy

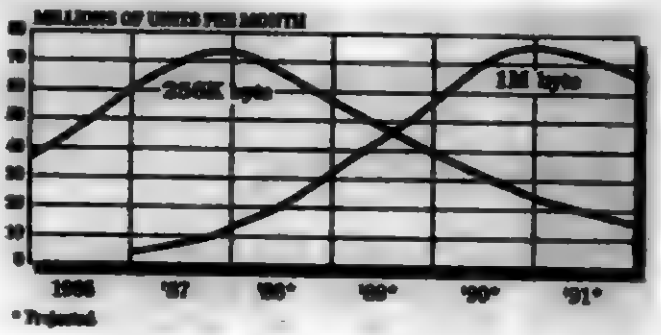
The most recent downturn of 1985 to 1986 was so devastating — slicing profit margins to nothing and driving five U.S. manufacturers out of the memory business — that chip makers are now wary of ramping up to meet the current high demand.

"They were so badly burned then," said Daniel Kiesken, semiconductor industry analyst at Montgomery Securities in San Francisco. "I think the Japanese manufacturers now are holding back a little, producing maybe 10% less than they could be. Prices would have to hold at current levels through 1990 for the industry to break even in this decade, so they want to enjoy the high prices as long as they can."

"I'm always surprised at the amount of memory people need," said Gautam Gupta, president of Ideassociates, Inc., a communications and memory board vendor in Billerica, Mass.

Behind the times

Demand for 256K-byte dynamic random-access memory chips may actually have peaked late last year, but the shortage has only recently begun to make an impact



INFORMATION PROVIDED BY MITSUBISHI ELECTRIC CORP. AND DATAQUEST, INC.
CW CHART

Demand for additional memory has far outpaced the chip industry's transition from 256K- to 1M-byte dynamic RAM production. Personal computers and workstations, running on increasingly powerful microprocessors and memory-gobbling operating systems, simply require more and more memory capacity.

"Who the heck uses a 16M-byte board? I don't know, but we took 10 or 12 orders for them at Comdex for $10,000 each."

Producing 1M-byte dynamic RAM chips is much more complicated than manufacturing their 256K-byte counterparts. This results in lower wafer yields at this early stage of the 1M-byte product life cycle. And demand has thrown a spotlight on those production bugs.

"Those are really just normal start-up problems," said Victor de Dios, a senior industry analyst following the memory chip market for San Jose, Calif.-based Dataquest, Inc. "If the market wasn't as strong, people wouldn't even notice."

The real McCoy

Although analysts said double-ordering, hoarding and gray-market speculating have exacerbated the shortage somewhat, no one thinks the shortage is artificial.

"I think most suppliers are trying to be responsible about that, taking only those orders they honestly feel they can deliver," Montgomery Securities' Kiesken said.

Is there any hope that chip producers and buyers can ever smooth out the recurring industry cycles of shortage and oversupply? Perhaps not, but some observers wonder if there could be more attempts made to synchronize the supply and demand structure.

"There's no structure for users and vendors to communicate," de Dios said. "The two industries are heavily dependent on one another, yet the technologies and the people are very distinct, and each one looks at its own area."

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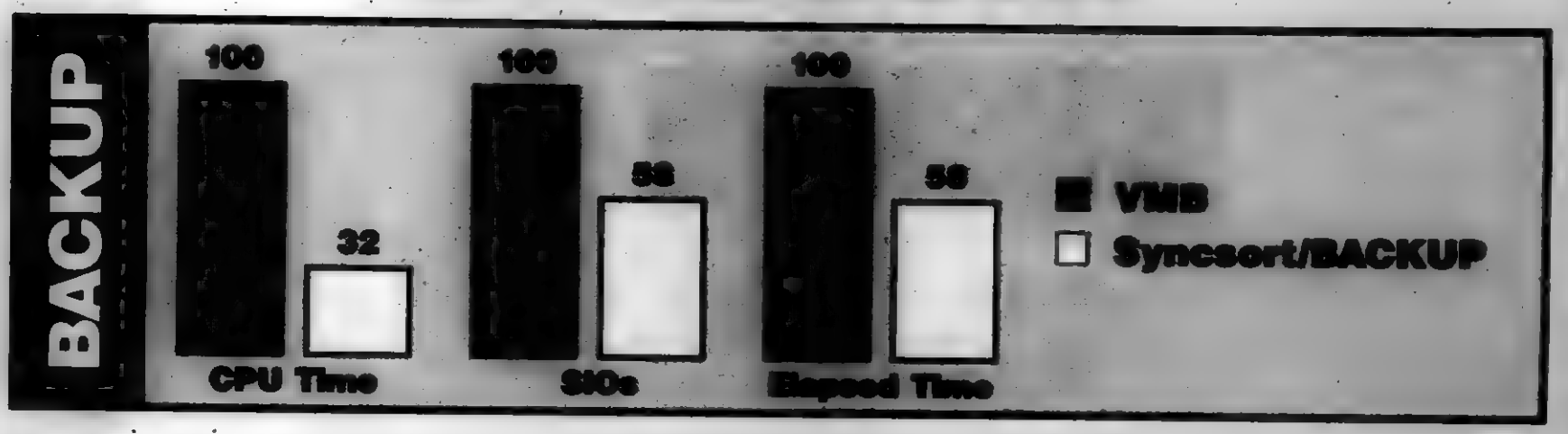

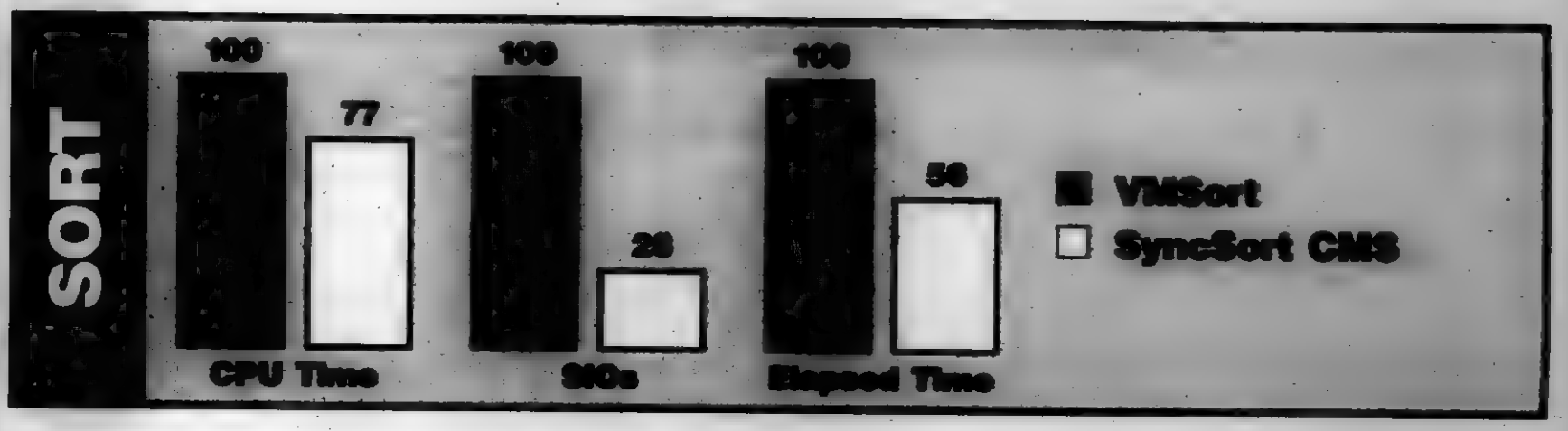

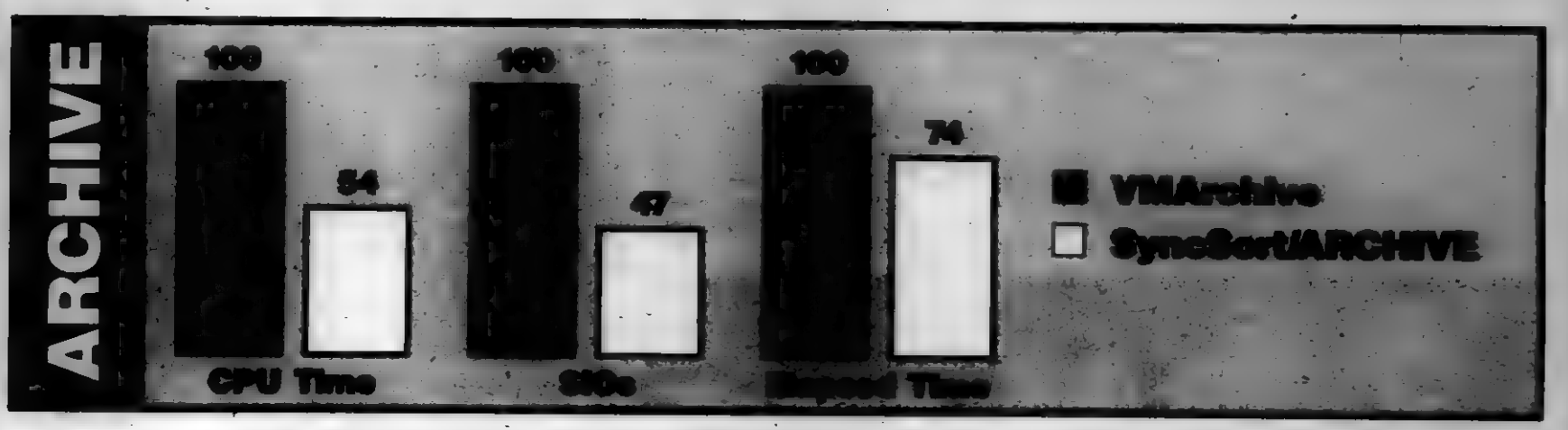

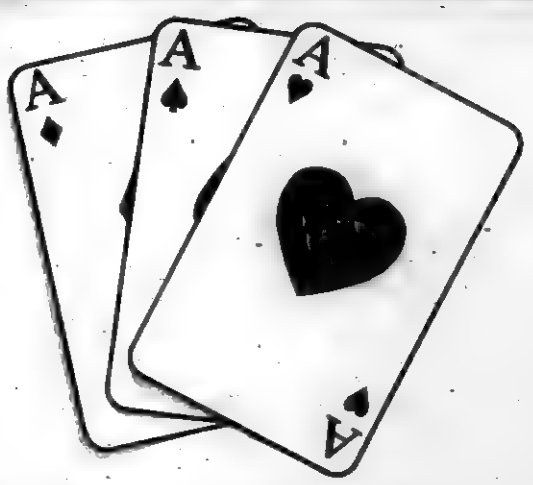

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Battle lines

FROM PAGE 1

week before the announcement, in part to give the group an international flavor.

AT&T was asked to join as a sponsor company; it declined. Sun was not invited as a sponsor.

Although OSF representatives stressed that they hope to unify, not divide, the Unix market, the battle lines were being drawn last week as vendors began to side with one camp or another.

For example, Control Data Corp., Wang Laboratories, Inc. and Prime Computer, Inc. came out in favor of AT&T, while Concurrent Computer Corp., Gould Inc., Encore Computer Corp., Sperry Corp., Sun Microsystems, Inc. and Computer Consoles, Inc. sided with the new group.

The core of the OSF environment will be a yet-to-be-announced version of IBM's AIX — an ironic twist, since IBM has long been accused by observers of being the vendor most strongly opposed to Unix.

AIX requirement

Some observers suggested that the AIX selection was a requirement for IBM's membership in OSF. Michael Gutman, Apollo's OSF representative, said IBM did not demand that AIX be selected but "strongly recommended we take a look at it."

"Either way, it's win-win for IBM," said Omri Serlin, president of Itom International, Inc., a consulting firm based in Los Altos, Calif. "If OSF takes off, they control Unix. If OSF fails, that's fine for IBM, too."

OSF will select other technologies to assemble around AIX, such as a user interface, to complete the open operating environment. All sponsor vendors have submitted products to be selected for the operating environment. Selections will be made independent of sponsors' proprietary interests, representatives said.

The OSF environment has been tentatively scheduled for release in 18 months.

Observers, however, said they doubt such a product will be out by that time. "This group will end up like most committees: not accomplishing much," predicted Dick Shaffer, editor and publisher of "The Technologic Computer Letter."

"Democracy is for electing presidents, not building products," added Esther Dyson, editor and publisher of "Release 1.0," an industry newsletter.

John Doyle, chairman of the OSF board, said comparisons with other consortia or committees, such as Microelectronics and Computer Technology Corp. or the Corporation for Open Systems, are unfair, because OSF has specific product goals.

He stressed that the group will be run like a software company, with the president and his team making the decisions.

Some observers suggested that slowing down the development of this open system standard is OSF's real motive.

"Until Sun, none of them really took AT&T seriously," Shaffer said. "Those companies are paranoid about Sun, a little come-from-nowhere company that was able to come into the workstation market and beat out not only the founder of the workstation market but the second biggest computer company in the world."

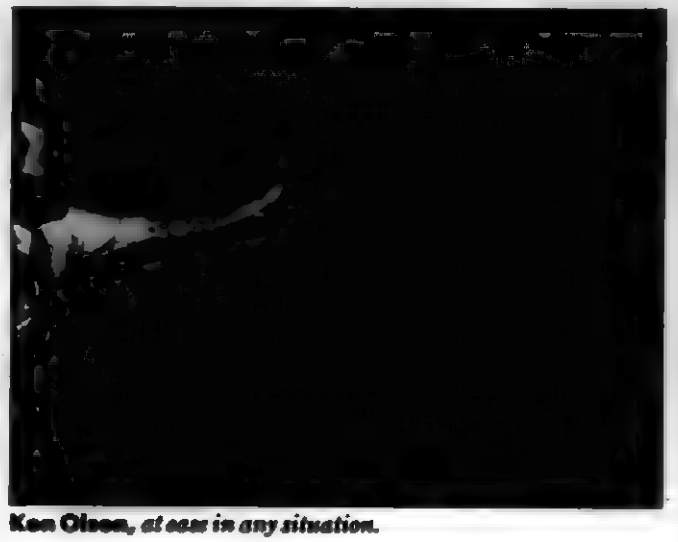
Sincerity pledged

OSF members insisted that competitive motives are not in their hearts. Apollo's Gutman said, "We think this is where our customers want to go, and we have really listened to that open message."

Other vendors that will stay, for now, in the AT&T camp said OSF's efforts could harm the Unix market more than help it. "That this group really subscribes to the idea of open systems can certainly be called into question," said Gil Williams, a vice-president and general manager of systems at CDC.

"These vendors have customers that they've held because of proprietary operating systems. It's not in their best interest to promote an open system architecture," Williams said.

Added Joe Henson, Prime's chief executive officer, "This group serves to weaken the development of a single standard, which is in direct conflict to what users want."



Ken Olsen, *at ease in any situation.*

PHOTOS BY STEVE FINEY

Executives representing the OSF's founding firms *are, from left to right, Claus Kessler, executive vice-president, Siemens AG; Jacques Stern, chairman, Groupe Bull; Kenneth Olsen, chairman, Digital Equipment Corp.; John Akers, chairman, IBM; Thomas Vanderslice, chairman, Apollo Computer, Inc.; John Young, president and CEO, Hewlett-Packard Co.; Klaus Luft, chairman, Nixdorf Computer AG; John Doyle, chairman of the OSF board.*

The making of OSF

At the same time that executives from Hewlett-Packard Co., Apollo Computer, Inc. and Digital Equipment Corp. were publicly complaining earlier this year about what they saw as AT&T's intent to tighten its control over Unix, they were privately hatching an alternative.

Two months ago, the three assembled about 10 staff members from each company at an Apollo facility in Chelmsford, Mass. The group began to toil away on two projects — sketching out what the alternative Unix would be and finding other companies to join its cause.

One month later, the companies captured the biggest prize of all: IBM. Now a group of four Unix rebels — representing some of the greatest rivalries in the industry — ironed out details of the Open Software Foundation (OSF), with help from attorneys.

OSF staff were given an Apollo guest badge and were located down the street from Apollo corporate headquarters. The doorway to the temporary OSF office area had a five-digit combination lock, preventing any non-OSF members from entering. Initially, three phones were set up, one designated for each company. If a caller dialed the HP phone, a secretary would answer saying, "Hello, Hewlett-Packard Conference Center."

One week before announcing OSF, the four won commitments from three European companies — Siemens AG, Groupe Bull and Nixdorf Computer AG — which gave the group the international flavor it desired.

Just how the original three selected the four add-ons is up for debate. The IBM coup gives OSF clout and credibility, observers said. Glaringly omitted from the party list was Sun Microsystems, Inc., which has played a central role in the Unix marketplace. OSF representatives said Sun was overlooked because they had to establish a cutoff point. Otherwise, the new group would have become too big to control.

"Apparently, the board didn't feel [Sun] would move in our direction," said James Barclay, a DEC product manager who served as a consultant to OSF in its development stage.

A second obvious omission was a user company, which can be seen as an important element in an effort that is, after all, aimed at users. "It either didn't occur to anyone or maybe one couldn't be selected," DEC's Barclay said.

ROSEMARY HAMILTON

AT&T scoffs

FROM PAGE 1

Kavner speculated the allies in the group may have banded together as a result of "paranoia" and fears that Sun Microsystems, Inc. may gain a competitive edge in the Unix market because of its alliance with AT&T and as an attempt to slow down Sun and AT&T's progress.

AT&T may borrow

Nonetheless, Kavner said AT&T may incorporate features of the OSF's future version of the Unix operating system into its own if it deems the product worthwhile.

"It doesn't need to be AT&T technology to be Unix," he said. "If they produce something good, then we have to join the two together and forget everyone's pride. I'm not looking to make a bundle out of Unix."

Sun, AT&T's partner in the development of the future Unix System V, Release 4, chose not to publicly interpret OSF as a threat. Bernard Lacroute, Sun's executive vice-president, called the group's formation an important endorsement for Unix, which until recently was considered an operating system embraced almost exclusively by technical users.

"It's a recognition that Unix is a lot more important than it was in the past," Lacroute said. "It's also a recognition of the importance of standards," he continued. "From that standpoint, it's a validation of our strategy."

Lacroute indicated that he believes two implementations of Unix based on the same standard will result.

"As long as the user interface remains the same, the user will be the winner," he continued, maintaining that Unix's acceptance will continue to grow into mainstream environments. "I doubt that users will allow them to slow down the development of Unix."

Some AT&T licensees have charged that AT&T has not been forthcoming on what will be the terms for licensing the new version of Unix. But Kavner responded, "We haven't changed our licensing in 18 months. My job is to make sure that Unix remains open forever."

Users support AT&T's computer strategy

BY JULIE PITTA
and KATHY CHIN LEONG
CW STAFF

SAN FRANCISCO — Meeting for the first time with Robert Kavner, recently appointed president of AT&T's Data Systems Group, users welcomed the company's renewed commitment to the computer market.

Users invited to a three-day meeting with company officials here last week agreed that AT&T has been more open about its computer strategy than ever before. Joe Mahoney, president of the AT&T PC Users Group, based here, said AT&T is shedding a negative image of being a poor service and support supplier.

"We are seeing that AT&T is turning around and that they plan to stay for the long haul," Mahoney said.

AT&T Data Systems' Kavner

He continued, saying that AT&T's commitment to Unix is an excellent strategy, particularly since the operating system is gaining a bigger user following.

"Two years ago, we didn't have the customer base," Kavner said during a briefing following meetings with AT&T customers. "In fact, two years ago, all of you were questioning AT&T's commitment to this business and criticizing the lack of a clear strategy. And two years ago, one of our fundamental building blocks, the Unix operating system, was the source of confusion and debate over which version was the real standard."

Kavner emphasized AT&T's support for a single Unix standard based on AT&T's Release 3, merging Microsoft Corp.'s Xenix and the University of California at Berkeley's platform and adding the Open Look interface, licensed from Xerox Corp.'s Palo Alto Research Center. That version is being co-developed with Sun Microsystems, Inc.

Support strong amid debate

Although the debate over Unix continues, both users and industry watchers appeared heartened by AT&T's recent efforts in the computer industry. AT&T produced an impressive list of customers, including American Express Co., General Motors Corp., Anheuser-Busch, Inc. and McDonald's Corp.

"I have started to take them more seriously in the last few months," said Clare Fleig, an industry analyst at International Technology Group. "They've put the pieces together in terms of their product line, and they're building a structure to market those products more effectively."

Although users expressed satisfaction with AT&T's quality, the firm still faces difficulty in penetrating IBM shops. Travelers Insurance Co. in Hartford, Conn., uses AT&T's 3B computers as applications processors for its voice mail system.

"The 3Bs work fine," said Trav Waltrip, director of telecommunications at Travelers. "But we are not using that equipment in data processing. I don't expect that to change."

Customers only, please

The customer meeting was closed to the press. However, AT&T hosted analysts and the press at a subsequent gathering.

An estimated 600 end users and value-added resellers attended the national meeting, an event that would have been a flop in past years, Kavner said.

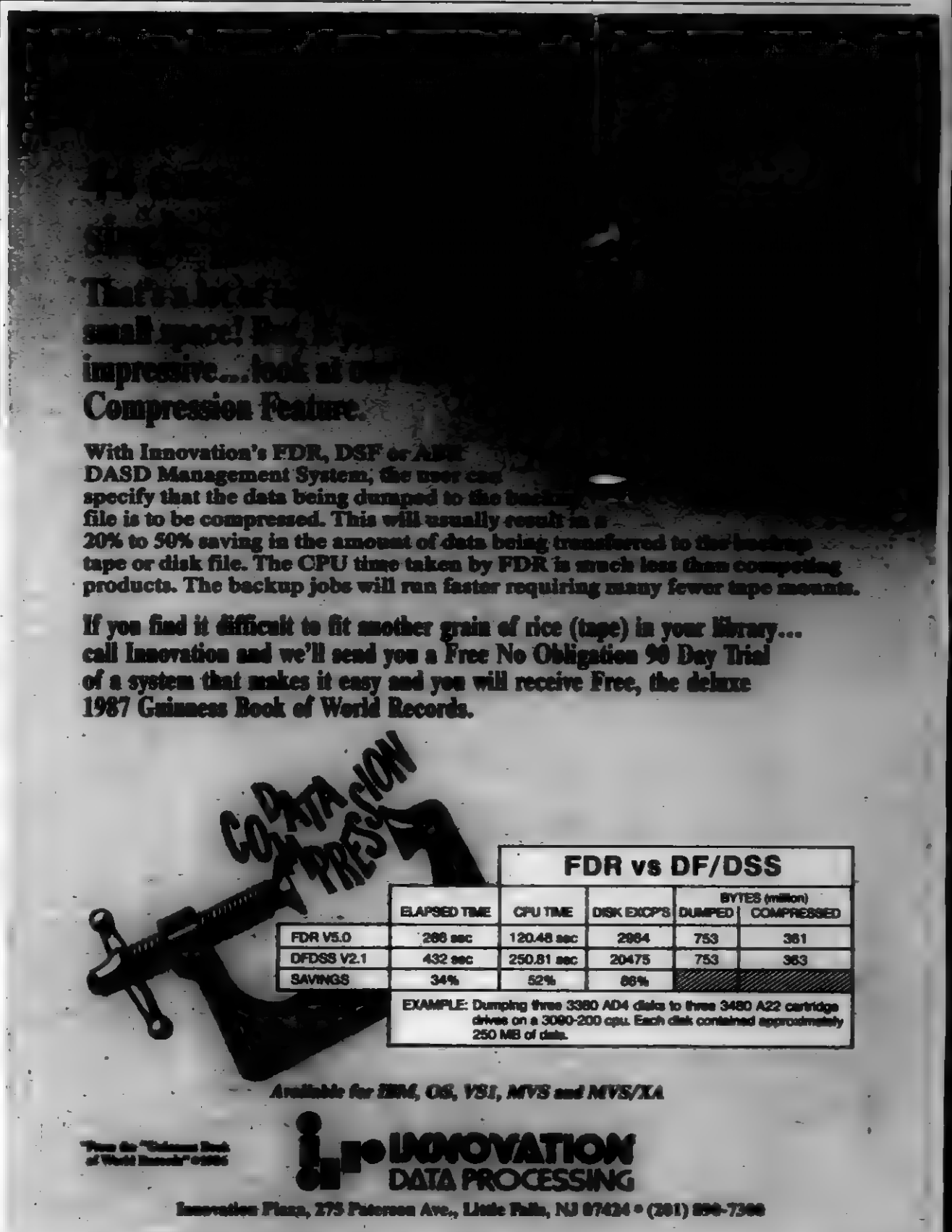
Most of the attendees represented MIS departments in large corporations, universities and government agencies.

CORRECTIONS

Maxtor Corp. is not, as previously identified [CW, May 16], a Japanese company. In the editing of the story about optical disk drives, a quote by Ken Hallam, president of ENDL Associates, that said, "This is not a breakthrough technology," was inadvertently located after a paragraph about Tandy Corp.'s product; Hallam was actually discussing Maxtor's magneto-optical technology.

The Palo Alto Research Center, or PARC, remains one of three research centers in Xerox Corp.'s corporate research group [CW, April 25]. Parcplace Systems, Inc. is a venture-funded software company based on technology developed at PARC, in which Xerox retains a minority interest.

In the Spotlight article, "The wide world of nonimpact" [CW, May 9], the manufacturer of the magneto-graphic printer is Bull Peripherals.



Managing MIS: Handle with care

BY JAMES CONNOLLY
CW STAFF

The project manager — who shall remain nameless — walked into his new assignment armed with such technical expertise as quality control but shy on experience in handling people.

He tried to run a 40-person

Merrill Lynch's Hunt

development staff by imposing a system of checkpoints on programmers who needed leadership, not mandates, according to a peer. Productivity slipped, and the staff rebelled, not by shouting but through passive resistance. They worked, though not too hard and sometimes on the wrong tasks.

Eventually, the manager moved on, and his successor put the project back on track. It was not a case of the successor being more skilled, "he just put a little common sense in place," the friend recalls.

Should one pity the MIS manager for the headaches of handling a force of self-motivated, creative and autonomous people?

Or could it be that managing MIS employees is slightly different — but no more difficult — than handling attorneys, sales clerks, factory workers or anyone else on the corporate payroll?

Interviews with MIS executives indicate that they lean toward the latter: MIS types, particularly analysts and programmers, are their own breed and require unique management approaches, but they are not the only workers who need special treatment.

Also, there is general agreement on the type of worker MIS managers deal with and on some key considerations, such as employee egos and the paradox of programmers being creative people who like to work under strictures.

Public accolades

"The big thing is recognition of the sweat. It isn't wet sweat but the dry sweat of the brain," said Daniel J. Hunt, vice-president and senior systems manager at Merrill Lynch & Co. in New York.

Such recognition has to be more than a pat on the back and a cash reward. It must be public recognition by MIS management and by the user community that a particular worker did the coding for a new system, according to Hunt.

"My theory is that many people who go into MIS do so partly because it is perceived in the academic world as being hard. Therefore, you end up with a lot of people who have big egos, which is good. I've come to the conclusion that if you deal with the egos, you can accomplish a lot," he said.

Such characterization of programmers and analysts as egocentrics runs throughout the comments of managers.

"To be a success in this business, you have to have a strong ego, be very sensitive and very service oriented," said Thomas S. Loane, senior director of data processing at Alamo Rent A Car, Inc. in Fort Lauderdale, Fla. "They want recognition. The generic rah-rah isn't important to them."

Structured creativity

Two apparently contradictory characteristics that set MIS workers, particularly programmers, apart from other workers are their creativity and their need to work with walls around them, according to Loane.

He cites the example of a programmer who must be innovative but also must work within the tight rules of a programming language. They live their lives expecting system responses that are as blunt as "syntax error."

One executive who called it a "cop-out" to say that managing

Alamo's Loane

MIS workers is harder than managing other employees was Charles Siegman, information systems director at First Maryland Bancorp in Baltimore.

"Managing is managing, and motivating is motivating," said Siegman, adding that he has found it tougher to manage employees in foreign countries throughout his work experience.

Siegman pointed out that there is one change that presents a challenge to MIS managers, although it is not new to other parts of the industry. That challenge is to solicit nontechnical people for projects, which he compared to the aerospace industry's technique of pairing business and technical people on projects in the early 1960s.

Challenge is on

An educator who has studied MIS employment issues for a decade is J. Daniel Couger, distinguished professor of computer and management science at the University of Colorado at Colorado Springs. "I don't think they are any tougher to manage, but they have different characteristics that have to be taken into consideration," Couger said. "They have the highest need for achievement of 500 occupations, which means you have to have a continual challenge for them."

A manager who suggested companies use the work of behavioral psychologists such as Abraham Maslow and Douglas McGregor to help solve human problems is William D. Harrison, engineering manager for the Siemens AG subsidiary Siemens Information Systems, Inc. in Boca Raton, Fla.

"You have to remember that you are managing the elite of creative people. These people have extremely high intelligence, so they can't be sandbagged by the management," Harrison said.

He also pointed out the importance of managers dealing with the sensitivity of programmers and software engineers. "I've seen managers say good morning the wrong way and software people go to pieces."

HP targets integration with OSI release

BY PATRICIA KEEFE
CW STAFF

PALO ALTO, Calif. — Hewlett-Packard Co. last week introduced seven major additions to its Open Systems Interconnect (OSI) program, including a first-of-its-kind OSI processor.

The unveiling was targeted at Fortune 1,000 firms facing multivendor integration issues and upstages the June Enterprise Networking Event. Five of the seven products are based on Manufacturing Automation Protocol (MAP) Version 3.0.

The other two OSI offerings utilize Technical Office Protocol and CCITT X.400 electronic message handling standards to provide a mechanism for multivendor distributed applications development as well as electronic mail transmission capabilities.

HP OSI Express is a very large-scale integration processor card said to support the seven OSI layers, facilitating multivendor networking. What is innovative is the card's ability to off-load as much as 30% of the communications processing overhead from the main CPU processor to the personal computer, said Bernard Guidon, marketing manager at HP's Information Networks Group. The first implementation is the OSI Express MAP 3.0 interface card.

The card reportedly aids network performance by implementing the OSI model outside of the host system. It is also said to eliminate bottlenecks at external processors via a direct connection into the host.

The five MAP 3.0 services and link products reportedly facilitate hierarchical communications from the mainframe to the personal computer. HP said the products address the top priorities identified by the MAP/TOP Users Group. Initial releases will support the entry-level HP 9000 Series 800 systems:

- OSI Express MAP 3.0 is an interface card that provides HP computers with direct network attachment via broadband or carrier-band cabling. Pricing will not exceed $6,500 and $5,000, respectively, for broadband and carrier-band.
- MAP 3.0 Manufacturing Message Specification (MMS) is said to provide HP users with an international standards-based command language for programming MAP-compatible devices. Pricing for MMS, cited as the highest priority by MAP users for multivendor communications, will not exceed $2,500.
- MAP 3.0 File Transfer, Access and Management (FTAM) software reportedly enables the transfer and access of remote files across multivendor systems. Prices range up to $1,500.
- Device interface system said to connect HP machines to any non-MAP RS-232C factory floor device. Not to exceed $11,500, pricing includes a runtime license per system.
- MAP 3.0 protocol analyzer, said to decode the seven-layer MAP protocol stack and monitor IEEE 802.4 traffic. Pricing will not exceed $50,000.

MMS software, OSI Express interface and device interface system will be available by year's end, HP said. The protocol analyzer is slated to ship in first-quarter 1989, the FTAM software in the second half.

25 MHz for next PS/2

BY ED SCANNELL
CW STAFF

DALLAS — In a bold move to steal the personal computer performance lead of Compaq Computer Corp., IBM will unveil 20- and 25-MHz versions of its long-awaited 80386-based Personal System/2 Model 70 here on June 2, according to a source within IBM.

IBM will attempt to cut into the beachhead Compaq has established with its Deskpro 386/20 by promoting the 25-MHz version of the system as the fastest in the Intel Corp. 80386-based desktop market, the source said.

The PS/2 Model 70's chassis is the same size as that of the PS/2 Model 50 and, like that model, will have three expansion slots. The base configuration will feature a 40M-byte hard disk drive. IBM has yet to determine a base price, the source said.

IBM will also announce a version of its PS/2 Model 50 that will support higher disk capacities and speedier disk drives.

Meets FCC standards

IBM says the PS/2 Model 70's position as the fastest 80386 is assured because the shielding used in the Micro Channel architecture allows it to use a 25-MHz version of the 80386 that meets the Federal Communications Commission's radio certification standards, the source said. He said 25-MHz versions of the 80386 used in industry-standard architecture would have trouble meeting FCC limitations on emission of radio waves.

It is essential that IBM establish a successful desktop 80386-based system, because with the 80386 chip, it would be the preferred hardware platform for running the OS/2 and OS/2 Extended Edition operating systems and Presentation Manager operating environment.

Users said last week they would have to take a hard look at the PS/2 Model 70's price/performance values before making any decision; however, most said they were certainly interested.

"I'd have to benchmark it against the Compaq, but if we could get an IBM as fast as a Compaq and the price was down where it made sense, we would think seriously about buying it," said Ron Goldfarb, manager of office automation at Pratt & Whitney Administration, a subsidiary of United Technologies Corp.

"We would be interested in a faster machine, but a lot depends on price and what happens to the rest of the line," said Otto Eisele, manager of office technology at Union Carbide Corp.

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COMPUTERWORLD

VAX/VMS enters new realm

BY ALAN J. RYAN
CW STAFF

MAYNARD, Mass. — Digital Equipment Corp. recently rolled out Version 2 of its VAX/VMS Services for MS-DOS, which will reportedly let certain Microsoft Corp. MS-DOS-based personal computers take advantage of DEC's Network Applications Support to access information and services on the Decnet-Open Systems Interconnect network.

Version 2 of VAX/VMS Services for MS-DOS will be licensed with Decnet VAX as a VAX/VMS layered application.

In the latest version, file server performance is 30% faster than previous versions, the vendor said. Other features include enhanced security access control, expanded third-party Ethernet controller support and a remote boot capability, according to John Rose, manager of DEC's Personal Computing Systems Group.

In addition, a high-performance virtual disk service offering performance equivalent to or better than an IBM Personal Computer AT with a hard disk has been added, Rose said. "The Microvax 2000 with VAX/VMS Services displays performance faster than a stand-alone PC AT with a hard disk at loads of one to 21 active users," he said.

In performance testing between VAX/VMS Services for MS-DOS Version 2 on a Microvax 2000 and Novell, Inc.'s System Fault Tolerant Netware on a T386, a Novell server based on Intel Corp.'s 80386, Rose said the DEC system was 30% faster for 15 active personal computer users on the network and 12% faster with 32 active PC users.

Rose said the tests simulated a PC operating environment running a mix of applications, including Micropro International Corp. Wordstar word processing, a Lotus Development Corp. 1-2-3 spreadsheet and terminal emulation.

The license for Version 2 of VAX/VMS Services for MS-DOS is included with Decnet VAX. Media and documentation can be purchased separately for $650.

U.S. West to bring ISDN to major cities

BY PATRICIA KEEFE
CW STAFF

DENVER — U.S. West announced last week that it will offer services based on the Integrated Services Digital Network (ISDN) standard to customers in seven cities beginning Sept. 21.

U.S. West, the first to launch a commercial trial, is considered one of the front-runners in the ISDN arena. Its ISDN offering follows one by Illinois Bell, which announced an ISDN tariff last month and is offering a service now, according to Steve Sasegari, an analyst at Dataquest, Inc. in San Jose, Calif.

These locales include Denver, Phoenix, Seattle, Minneapolis/St. Paul, Portland, Ore., and Omaha. The services are the result of two years of successful trials.

ISDN is said to provide faster data transmission speeds and the ability to send voice, data, video and facsimile messages on the same line at the same time.

Servicing network needs

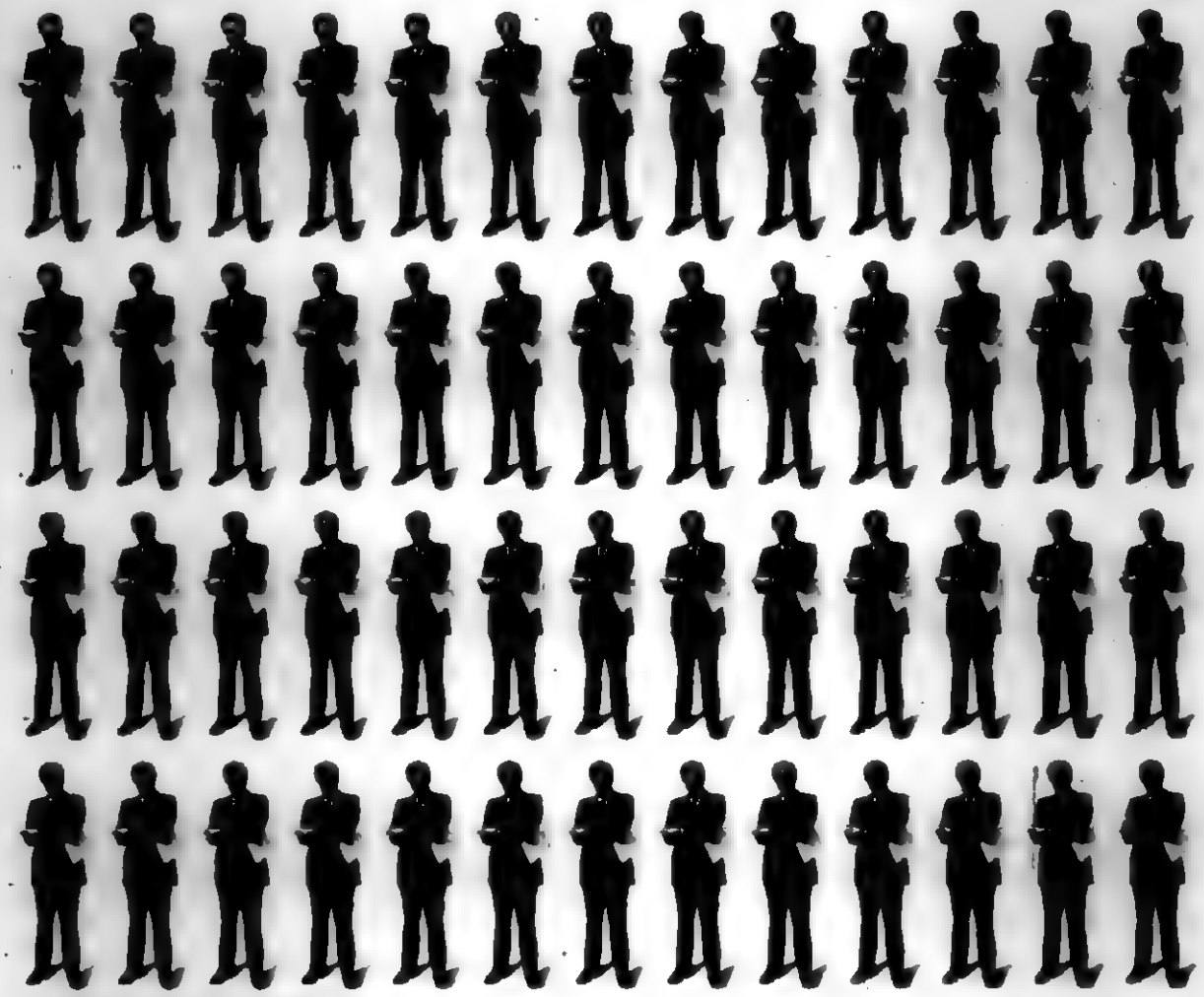
A variety of new features will be introduced as part of a 2B+D basic-access or transport service and a 23B+D primary-access or high-capacity transport service. These reportedly will enable customers to streamline their communications systems with services such as remote security monitoring, IBM Systems Network Architecture (SNA) emulation, private-line replacement, disaster recovery and other uses of integrated voice, data and image.

Pricing for these services will be competitive with current U.S. West offerings, according to the regional holding company. However, initial individual case pricing will be higher than Centrex lines, a spokesman said.

U.S. West launched what it said is North America's first ISDN customer trial in November 1986, with the Arizona State Department of Transportation and Administration, Northern Telecom, Inc. and NCR Comten. During the last 18 months, six more trials were added in Phoenix, Denver, Portland and Minneapolis/St. Paul.

The six multisite trials demonstrated some clear customer benefits, according to U.S. West, including the following:

- At Intel Corp. and Mountain Bell, the trial supported applications such as video conferencing, coaxial cable elimination, access to Digital Equipment Corp. VAXs, IBM 3274 emulation, basic voice modem pooling and integration of PCs, local- and wide-area networks (WAN).
- At the U.S. National Bank of Oregon and Pacific Northwest Bell, the trial resulted in successful voice, high-speed facsimile, WAN, SNA and other applications.
- At the Arizona Department of Transportation and Administration, Honeywell Bull, Inc. and Mountain Bell, U.S West said users were able to replicate integrated transport, voice, data, telemetry, private lines and digital transport as standalone or integrated products.
- At Mountain Bell, the trial successfully established voice/data calls between ISDN islands, resulting in integration of voice, data and packet switching.



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Mr. George MacDonald, VTAM Specialist
Northwestern Mutual Life Insurance Co.

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Driven by a powerful Network Control Language, NETMASTER not only helps decrease downtime, it helps cut costs at Northwestern Mutual. As VTAM Specialist George MacDonald points out, the system's multiple sessions capabilities have allowed his company to delay hardware purchases and, in many cases, hardware upgrades as well as improve productivity. "I wouldn't want to have to manage a network like ours without something as high quality as NETMASTER," said MacDonald, whose company also utilizes SUPRA™ and MANTIS® from Cincom. "There's just no way in the world to do it."

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Few rave reviews for Paradox OS/2

BY STEPHEN JONES
CW STAFF

NEW YORK — Borland International made good on its promise to release an OS/2 version of its Paradox data base last week, but the new application may be little more than a basic port of existing DOS-based programs.

Although Paradox OS/2 was written to take advantage of IBM OS/2 Standard Edition 1.0's extended memory and multitasking capability, observers said the program offers little more than the same functionality found in current versions of Paradox running under DOS.

"This is what I ordinarily describe as a straight port," said Bill Higgs, director of software research at Infocorp in Cupertino, Calif. "It does the same thing under either DOS or OS/2, with no added functionality."

Paradox OS/2 costs $725 and is scheduled to ship by the end of this month.

The program addresses up to 16M bytes of random-access memory and features multitasking of applications running under OS/2 protected mode, according to the company.

Borland's most immediate competition will come from Microrim, Inc., which is selling its product R:Base for OS/2 at a price of $895.

Users can expect to see delivery of basic ports from other data base vendors that have recently announced similar development plans for Standard Edition 1.0 applications.

Philippe Kahn, Borland's president and chief executive officer, claimed that Paradox OS/2 is more than a simple port of a DOS application because it was rewritten especially for Standard Edition 1.0.

Kahn said the program was designed for large data base applications, allowing a user to simultaneously query a data table, print a lengthy report and enter data in another table.

The program also allows users of current Paradox packages to migrate their DOS-based tables, forms and reports to OS/2 without rewriting each item.

At last week's product introduction, Paradox OS/2 received votes of support from IBM and 3Com Corp. The nod from 3Com made it clear that Borland will be supporting both Microsoft Corp.'s SQL Server and 3Com's 3Plus Open LAN Manager.

Amdahl says 4725 heir 20% faster

BY J. A. SAVAGE
CW STAFF

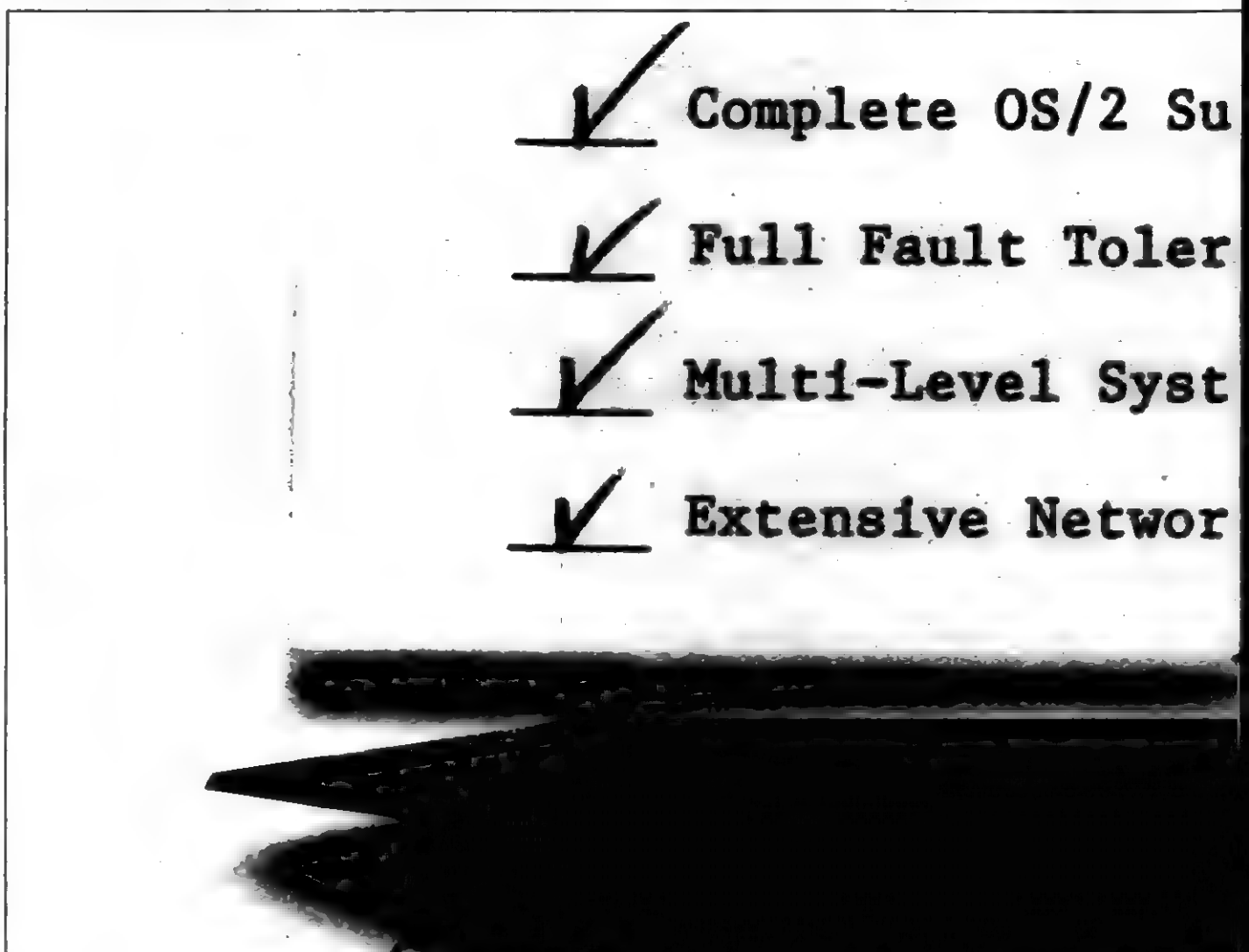
SUNNYVALE, Calif. — Replacing its year-old 4725 series front-end communications processor, Amdahl Corp. introduced the 4745 series with 20% greater throughput. The new series reportedly will be available next month.

An Amdahl spokesman claimed the short product life of the earlier model was not caused by reliability problems but by the fact that the new model competes more closely with IBM's 3745 communications processor. The processors will be able to support multiple versions of software, initially with IBM's Advanced Communications Function/Network Control Program (ACF/NCP) Version 3 or Version 4, the company claimed.

By the first quarter of next year, Amdahl said, the 4745 will be able to support ACF/NCP Version 5.

Token-ring local-area network support and high-speed scanner capability, which will allow the new models to support multiple T1 or CEPT links internally, will be available within two years, according to the company.

The 4725 series was priced beginning at $71,500. The 4745 Model 110 pricing begins at $91,500; the Model 210 starts at $120,000.



SFT NetWare v2.1

MIS-conceptions about

Traditionally, the MIS world has viewed PC-based local area networks with a healthy dose of skepticism. A "prove it to me" attitude. And in an arena ruled by powerful mainframes, that approach has given rise to a few misconceptions and doubts about LAN performance.

Well, doubt no more. Because with the industry standard SFT NetWare v2.1, Novell offers the LAN software powerful enough to convince even the toughest MIS skeptic.

SFT NetWare v2.1 gives you the features and functionality of mini/mainframe systems at a fraction of the cost. With extensive fault tolerance, security and LAN-to-mainframe connectivity, it makes LANs advanced enough for major corporate, government and education installations.

No other LAN software even approaches the level of fault protection and data security built into SFT NetWare v2.1. Novell has pioneered LAN fault tolerance, and provides protection from failures in server hardware. In addition, enhanced security locks and passwords give you complete control of the information stored on your LAN.

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Wang to charge fee for VS OS

Users blanch at paying for previously bundled operating system

BY STANLEY GIBSON
CW STAFF

LOWELL, Mass. — In a move that is grating on its users, Wang Laboratories, Inc. said it will begin to charge separately for its VS OS operating system. The operating system had previously been bundled with Wang VS minicomputers.

Wang sent letters out to its customers in March describing the change, which will become effective July 1. A Wang spokesman said his firm has been listening to user reaction for several weeks and is considering changes to the new program. He said meetings currently taking place may come up with some new wrinkles for the policy, including other VS pricing changes.

Although Wang has not announced what it will charge, Wang users turned thumbs-down to what they perceived as a price hike.

"It's a very blatant attempt to make more money," asserted Don Dierath, vice-president at Life Investors, Inc. in Cedar Rapids, Iowa.

"It's not a good scene, but we are at risk on only one machine," he added, explaining that he expects most Wang VS systems in his shop will not be affected because they have already been purchased or ordered.

In addition to being liable for additional expenses, Dierath complained that the licensing fee will lower the value of a VS CPU on the used market because the operating system cannot be sold with it. Whoever purchases the used system will also have to pay an operating system licensing fee.

However, a Wang spokesman defended the practice, claiming that all other major vendors price their operating systems separately.

But, Dierath responded, "The other vendors that do this, their software is of better quality," complaining of shipping delays for VS OS Release 7.

The spokesman asserted Wang's interest in the separate pricing was to reflect the fact that Wang incurs development costs for which it is entitled to compensation. He said the license rates will not be set until mid-June.

Affects competitiveness?

"Generally, I think I view it negatively, because I think it will degrade their cost competitiveness," said Neil O'Brien, director of corporate office systems at The Mutual Life Insurance Company of New York in Syracuse.

O'Brien is in the process of a major upgrade of his firm's VS systems, which will take care of his company's needs for two years.

Having already ordered most of the CPUs involved in the upgrade, he said he would not be sharply affected by the separate operating system charges, at least for a while.

But when considering future systems for his firm, O'Brien said, "This has to weigh against Wang."

The policy states that for a new VS CPU purchased after June 30, a user must purchase a license on an annual basis or purchase a license on a one-time perpetual basis.

For customers choosing the annual fee, Wang is waiving the fee for the program's first year. Subsequent fees will be billed annually and must be fully paid in advance of the license period, according to the letter.

In addition, VS users who have current licenses or who receive a CPU and license before July 1 will not be charged an additional license fee. Those users may upgrade their systems once before July 1, 1989 without paying an additional fee, the letter said.

pport

ant Capabilities

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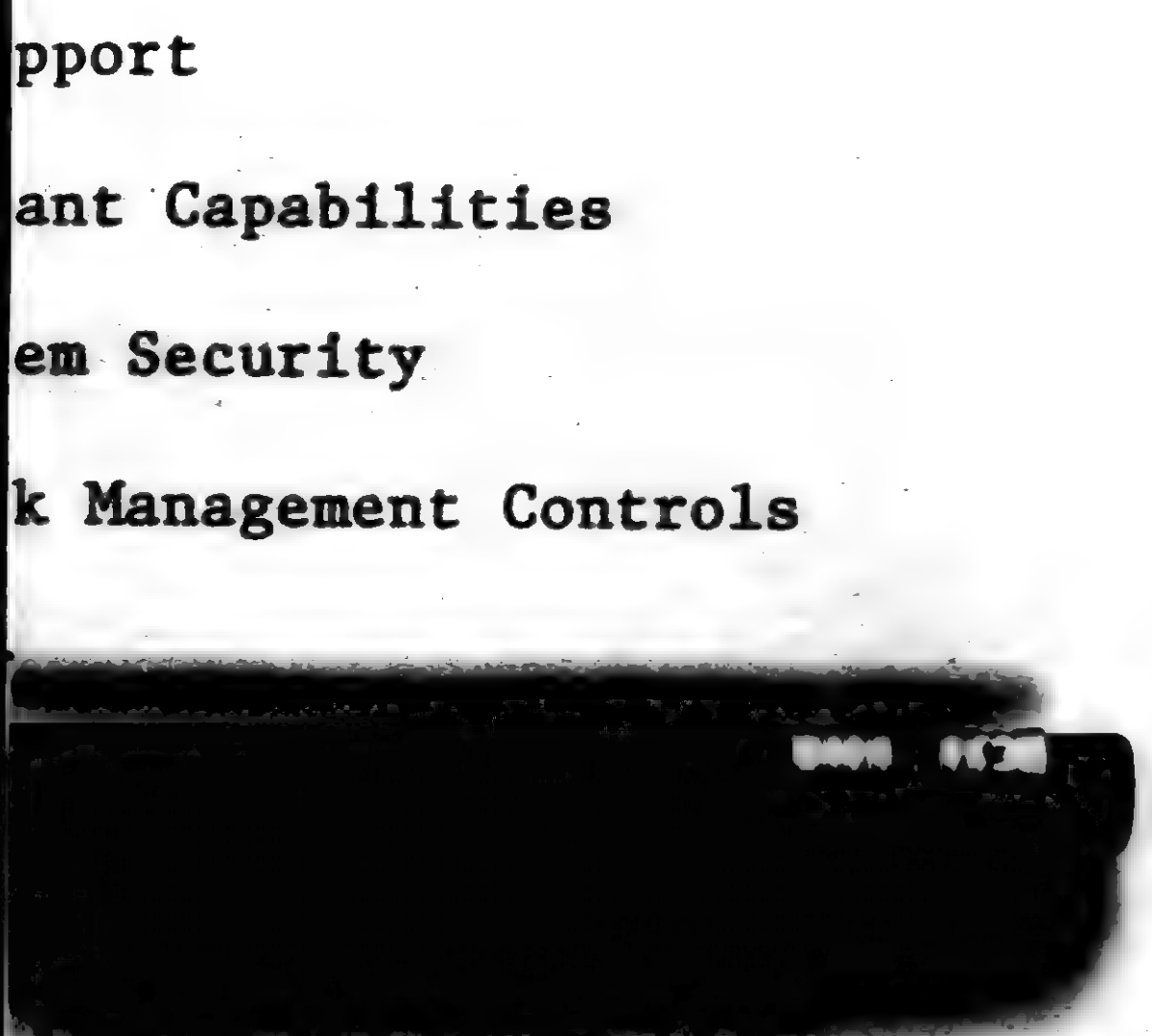

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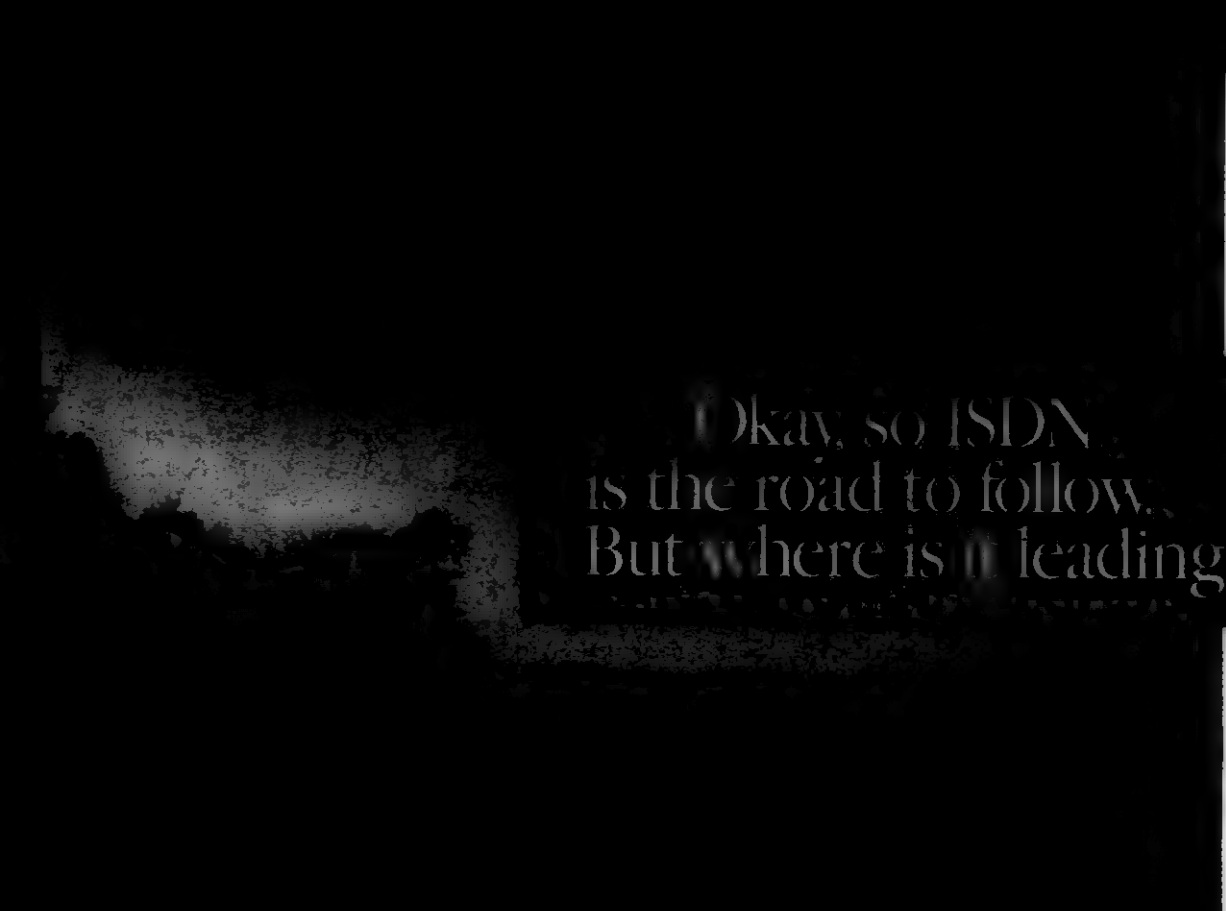
For more information, call from your modem 1-800-444-4472 (8 bit, no parity, 1 stop bit) and enter the access code NV217.

For network solutions, you should be seeing red.



When you're driving alone in unfamiliar territory, it's hard to watch the road and read the map at the same time. That's how it feels as you travel the various roads to ISDN. You'd like to pull over and take the time to figure out just where it's all leading. But if you do, the world just might pass you by.

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The right choice.

'Dumpster divers' have access to data

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — A ruling by the U.S. Supreme Court last week underscored the need for MIS managers to have an information security policy that extends all the way to the corporate trash Dumpster.

The high court's ruling in *California v. Greenwood* rejected claims that Americans have a reasonable expectation of privacy involving their garbage. Consequently, "anything put into the trash becomes fair game" for computer hackers or corporate spies, according to Robert P. Campbell, president of Advanced Information Management, Inc., a Woodbridge, Va.-based computer security consulting firm.

Campbell said the so-called "Dumpster divers" look for competitive intelligence, private information on employees, system documentation, logic designs, flowcharts, passwords and even poorly disguised production data used for test purposes.

"A well-designed information security policy makes sure that sensitive data does not end up in the trash," he said, suggesting that companies consider paper shredders or compactors and the destruction of magnetic media.

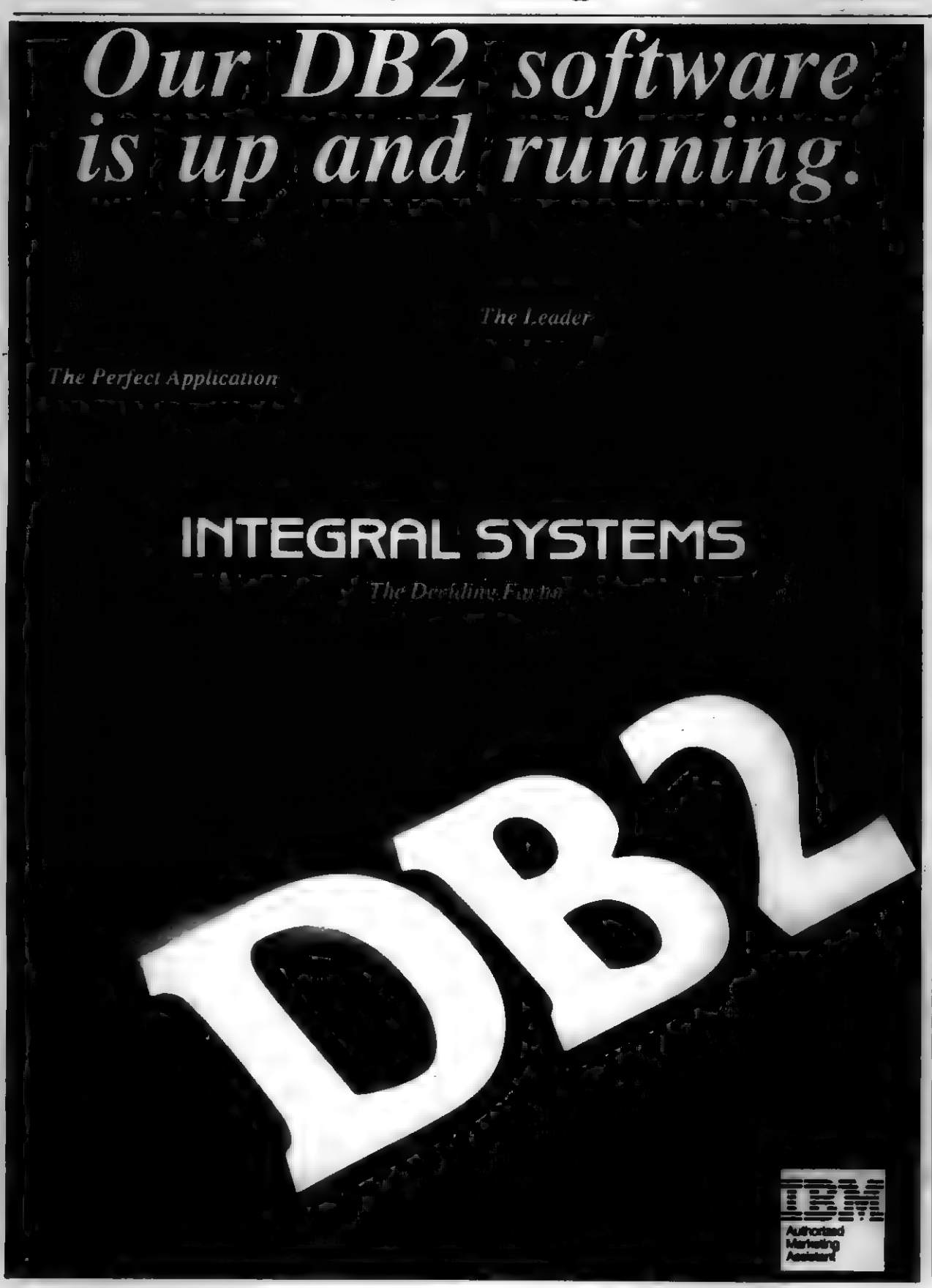
The specific case before the Supreme Court involved a police search of the trash of two suspected drug dealers. Writing the court's majority opinion, Justice Byron R. White said a search warrant was unnecessary because it was "common knowledge that plastic garbage bags left on or at the side of a public street are readily accessible to animals, children, scavengers, snoops and other members of the public."

In the 6-to-2 court decision, the dissenters suggested that picking through another's trash is revolting and uncivilized behavior.

> "ANYTHING put into the trash becomes fair game."
>
> ROBERT P. CAMPBELL
> ADVANCED INFORMATION MANAGEMENT, INC.

Consultant Campbell said the ruling may be a boon for the growing "information underground" in personal credit and character information.

In addition, he contended that there is a high street value for private information that helps financial institutions determine a person's credit worthiness or helps employers gauge the character of job applicants.



Wang adds PC group, wants slice of the pie

LOWELL, Mass. — Wang Laboratories, Inc. intends to seek a larger chunk of the microcomputer market by aggressively expanding its sales beyond its base of minicomputer customers.

As part of the strategy, the company will shift the development and manufacturing of the microcomputer products to a new division called Wang Microsystems, which the company recently said will begin operations in August in Chelmsford, Mass.

"We have set up a dedicated division to ensure that Wang can quickly react to marketplace influences," said Frederick A. Wang, president and chief operating officer of the company. He said the new division will afford Wang a chance to become a major player in the microcomputer market.

Broadening line

During the past two months, Wang has added local-area network products and established a new desktop integration strategy. The results will reportedly allow Wang products to connect to many other minicomputers, microcomputers and LANs, Wang said.

H. P. (Bob) Ano, 39, former senior vice-president of Wang's corporate marketing, has been named general manager of Wang Microsystems. He will report directly to Frederick Wang.

Ano said the company estimates that the demand for microcomputer products will continue to grow at a compound annual rate of 20% through 1992. To try to grab a portion of that, the division will develop and manufacture a line of micros and will evaluate direct and indirect distribution approaches, including the recruitment of additional sales agents, he said.

The micro systems division will have its own hardware and software research and development, manufacturing engineering, manufacturing planning and product marketing personnel. Eventually, it will include its own manufacturing operations, the company said.

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Benchmarks prove that SYBASE delivers exceptional transaction throughput with subsecond response time for large numbers of users. Its unique and advanced multi-threaded architecture eliminates operating system overhead, and handles peak load requirements with the leading cost efficiency of any RDBMS.

2 [illegible] INTEGRITY

SYBASE enforces data integrity rules, including *referential integrity*, in the database rather than in each application. This reduces application development and maintenance time while dramatically improving protection and control of data consistency.

3 [illegible] AVAILABILITY

SYBASE applications remain up and running during on-line backups, integrity rule changes, database design changes, and performance tuning. And SYBASE is the first RDBMS to provide software-based fault tolerance for continuous operation in spite of hardware failures.

4 [illegible] DISTRIBUTED [illegible]

The SYBASE *client/server* architecture lets you transparently distribute applications and databases *over multiple heterogeneous machines*. SYBASE is first to provide a *two phase commit* protocol for distributed update transactions in a SQL-based RDBMS.

5 [illegible] TOOLS

SYBASE's pull-down menus, overlapping windows, icons, and point-and-pick interfaces increase both programmer and end-user productivity. SYBASE's integrated *client* tools have a consistent look and feel across application development, forms management, data entry, query and reporting, and data administration. SYBASE applications fully exploit character terminals AND bit-mapped workstations without programming changes.

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My hardware is: ☐ VAX/VMS ☐ SUN ☐ Pyramid ☐ Other _____

Other systems [illegible]

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EDITORIAL

Behind the scenes

THE SCENARIO: Vendors representing more than 40% of the computer industry's worldwide sales, most of which have made their mark through iron-clad control of proprietary systems, will cooperatively develop a standardized operating system that will make it easier for customers to switch vendors without losing massive investments in applications code.

The historical truce: IBM and DEC, archenemies in the battle for the hearts and minds of corporate America's information resources, have forgone their traditional commitment to internally developed technology in favor of the concept of a standardized operating system. Signed on is Hewlett-Packard, which has its eye on cutting into the soft underbelly of DEC.

On the surface, the alliance represents the fulfillment of everything computer customers have been demanding during the past few years. These three companies — and four other less significant partners — have apparently managed to set aside their differences and agree to develop the ultimate operating system for which users have long pined.

In reality, the vendors may have pulled off the marketing coup of all time. Wrapping themselves in a punch list of warm and fuzzy coexistence buzzwords, they may have managed to derail an apparent growing movement among computer users to embrace Unix as a standardized operating system. The coming sales pitch is obvious: "Don't switch to Unix yet. We've got something better coming just down the road."

But first, consider how successful this alliance is likely to be.

The Open Software Foundation moniker has a nice ring to it, but the commitment of $90 million in funding during three years by these vendors is a relative pittance compared with what they are putting into the ongoing development of their proprietary technology. That might be more than enough money for an aggressive start-up to dig in and come up with a revolutionary product, but seven hotly competitive companies boxed up in one room does not a start-up make.

Partnerships among competitors are tough enough to pull off when there are only two involved. When a venture proposes to include the two biggest and most combative players in an industry, along with five others, one has to wonder what they'll be able to accomplish.

IBM and DEC are totally committed to proprietary networking topologies. In the past, DEC has seemed unable to resist reneging on its open systems commitment with continual jabs at the MAP/TOP Users Group's rejection of Ethernet. IBM has often been willing to sit down at the standards poker table, but generally only when it has a Blue ace to trump the other players.

Information systems executives would be wise not to expect nirvana to arrive in the promised 18 months. They might do well to ponder the following questions: Is Unix so good that IBM and DEC are this threatened? Is the potential of the AT&T-Sun alliance so rich?

LETTERS TO THE EDITOR

Listen and learn

I am proud to be a data processing recruiter with a large network of satisfied clients to attest to the fact that my associates and I are ethical. I am sure that there are some clients that I inadvertently crossed in my 10 years of experience, but never once have I — or anyone else I know in the industry — practiced the underhanded tricks Anthony Reed expressed in his article "When the headhunter calls" [CW, April 4].

The next time a recruiter calls, *listen*. You might just hear the best opportunity of your career, and it won't cost you one cent. And, should you not want to listen, at least be pleasant. Recruiters are people, too.

Michele Popp
Employment Consultant
Davison Associates, Inc.
Silver Spring, Md.

Beyond taxes

I found it interesting that the majority of letters — nine out of 13 — printed criticizing the article on Section 1706 [CW, Feb. 29 and March 1] were written by officers of large service organizations that are members of ADAPSO. These companies are the ones who benefit the most under 1706 by using congressional law to, in essence, outlaw some of their competition.

Section 1706 is a concern to all independent consultants. The unclear nature of the law has resulted in many corporations refusing to contract any jobs with independents, regardless of status. There is no way for an independent to prove his independence, and corporations do not want to take a chance on an Internal Revenue Service challenge, as the author of "Independents' backs to the barricade" [CW, Feb. 1] accurately stated.

As in independent, I would like to state that the issue is more than tax benefits. Also involved is the freedom to work as we choose for whom we choose and to do the jobs we want to do. There may be tax cheaters among independent technical workers, as there are in any profession. However, the majority of us pay as much or more in taxes as do employees and have the IRS audit experience to prove it.

Mary L. Rich
President
PFS, Inc.
El Segundo, Calif.

What a pity

Thank you for your support of the independent consultant. The pity is that with so much damage caused by this law, people will not be sued for damages.

Fred H. Greenblatt
Data Design

Why not say 'her'?

I think it is high time you stop assuming that all computer professionals and their customers are men. Your lack of inclusive language is offensive, short-sighted and archaic.

I do not take the time to document every case I read, but here is one example. In the story "Strategic systems plans gone awry" [CW, March 14], the second sentence of the second paragraph read: "A few highly publicized fiascoes have sent shivers down many an MIS manager's back as he whispers to himself. . ."

The times are gone that the masculine pronoun is used for both male and female. The above sentence means MIS managers are men, not women.

Such blatant exclusion is offensive. The computer profession has had to work hard to overcome some negative images. Such a disregard of societal changes not only perpetuates such images but makes change even harder.

Jill Meyer
Minneapolis

Don't forget users

When one picks up *Computerworld* and reads about Apple Computer, Inc.'s suit, one nearly roars with laughter that intelligent men are involved in such tactics. But maybe we should cheer Apple on. I have recently been rudely awakened to the scheme of Microsoft Corp.'s Windows. We users have feared the day when IBM got someone else to play the role of bad guy — namely, Microsoft.

I agreed with the editorial "For shame" [CW, April 25]. For all appearances, the corporate folk are a little deaf, and if they are not careful, they are going to be in the same position as American car manufacturers, who refused to hear what the American car buyer was interested in.

Go ahead, Apple, blow Windows away. I would love to have your environment on my computer, but I'm not willing to suffer the corporate mentality that obviates the user.

Al Perkins
Palm Coast, Fla.

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor, Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.*

A calendar full of conferences

If nothing else, at least there's money being made talking ***about security***

JOHN BRUCE

"This is a closed session," the brochure says. "No recording will be allowed, and handouts will be limited. We reserve the right to refuse admittance. Attendees may be required to sign a nondisclosure security statement."

Thus begins the sales pitch for yet another computer security conference, which stops only this short of advising participants to bring their Captain Marvel decoder rings.

Ten years ago, data security was the unwanted stepchild of the industry. Now, free-lance consultants and Big Eight accounting firms alike have discovered its lucrative potential.

What is peculiar is that the money is not so much in computer security itself as it is in conferences, conventions, seminars, courses, meetings, newsletters, journals and guides about computer security: It's in the pat, not the butter.

The granddaddy of national conventions is run by the Computer Security Institute (CSI). A second conference is sponsored by the Information Systems Security Association. The National Bureau of Standards hosts a third. A fourth targets auditors and security administrators of IBM systems, which should not be confused with a fifth meeting for users of IBM's mainframe access control product, RACF.

CSI is now in its second year of putting on still another annual conference, this one for IBM and DEC users, billed as "2 Computer Security Conferences in 1." And users of Computer Associates International's access control systems hold separate conventions as well, bringing the total of annual national security conventions to at least eight.

This list omits the conferences and conventions for the related field of disaster recovery. People in computer security frequently double in that field, and in fact, the meetings cover overlapping material.

"Chart your course for better planning" urges the brochure of the Association of Contingency Planners, announcing its Annual Conference. The graphics suggest a nautical theme, and the sessions have fetching titles like "Ahoy Mates" and "All Hands on Deck." A few weeks earlier I could have attended one of the American Management Association's annual series of disaster planning classes.

This rundown doesn't even include Share and Guide meetings, both of which host full schedules of security- and disaster-related sessions. As if that's not enough, Big Eight firms and major vendors are covering the country with their own traveling shows: "How to Plan It," "How to Implement It" and "How to Audit It."

How many hats?

I began to notice this trend because of the volume of security conference junk mail that has been crossing my desk. During the peak spring/summer convention season, it is now possible to spend weeks at a time going from one to the next, and it appears likely that some people do just that. The same faces turn up again and again in the little photos above the thumbnail biographies in the brochures.

Quite a number of vendor and consulting firm representatives work this circuit — for obvious commercial reasons — but I am always puzzled at the speakers who seem almost permanently seconded from their positions at other companies.

Joe B. Smith, manager of accountability and planning control at Monolithic Diversified, speaks here on "Developing an Effective Security Management Technique"; in the next city he addresses the intricacies of "A Structured Approach to Security Classification." And soon, he must dash off to the Coast to cover "Auditability in the Networked Relational Data Base Environment" for yet a third audience.

Does Monolithic Diversified ever miss Joe B. Smith? Do they ever feel the need for his expertise at home? Or do they think it's just as well that he's always out spreading the security word in Atlanta or Las Vegas? Eventually, someone at Monolithic may even ask why they still have Smith on the payroll.

When I get home, I hear from the telemarketers. "Hi, this is Steve Smooth in Chicago. Have you heard of the latest addition to the Hidebound Loose-Leaf Management Guide? It covers computer security and disaster planning from A to Z, we offer monthly updates, the newest in our series . . ."

I let him send me the free trial introductory volume, just to get him off the phone. This book turns out to be a stack of public-domain material at least half a dozen years out of date, and I'd better hustle it down to the mailroom, because if I don't get it back soon my boss will be after me about the $425 invoice.

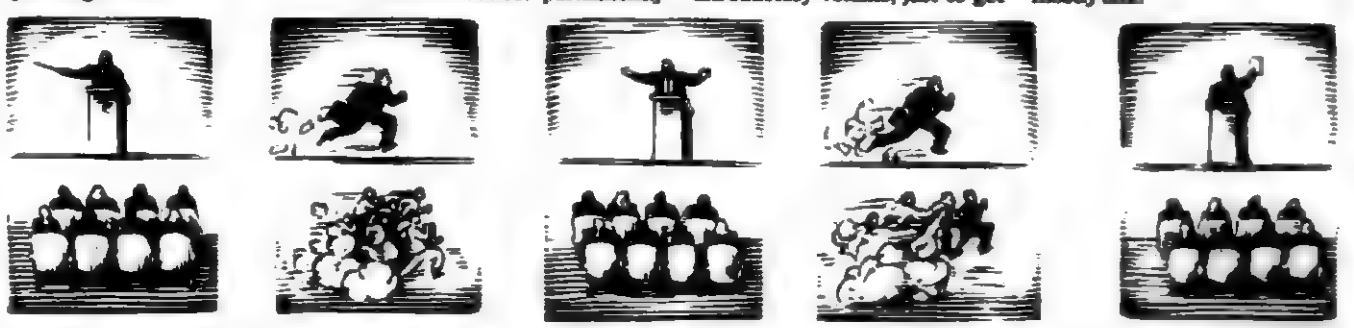
The fact is that some of the most visible people and groups in the computer security and disaster planning fields are not in those fields so much as they are in the convention business, the publishing business, the consulting business or the (self-) publicity business.

The big money in the field, to judge from the junk mail, is actually being made in talk or, in the terms the brochures prefer, "networking." I suspect as well that a heavy percentage of this big money is going to the Hilton and the Marriott and to American and Delta.

Now and then, my company will send me to a conference. I appreciate it, and I'm frequently surprised at what can be learned in a well-planned meeting.

But I'm beginning to wonder whether things are getting out of hand. I'm looking forward, and I think others are as well, to the day when a useful field outgrows its adolescent phase of being mostly talk.

Bruce oversees computer security and disaster recovery at a California aerospace firm.



BOB DAIR

It's time to rethink ANSI role in standards

JOHN BERG

At the March IEEE Computer Standards conference, held in Washington, D.C., Hugh Thuerk, a speaker from the American National Standards Institute (ANSI), was asked from the audience how an organization could vote on a proposed standard without participating in the committee developing that standard.

Thuerk skirted a direct answer, but the query prompted considerable discussion from the audience that underscores the question of the suitability of ANSI's current procedures for developing computer and communications standards.

The simple answer to the opening question is that any company affected by the standard can request a ballot and vote during the balloting period.

Curiously, casting a 'no' vote might result in a challenge to the voter's legitimate interest in the product. On the other hand, I cannot recall any time a 'yes' vote was challenged by ANSI.

An animated debate centered on how ANSI tested an organization's legitimate interest in the standard. Soon the discussion turned to the more basic point that no one can vote without knowing the standard is being balloted.

Being informed on standards takes on added importance when you realize that computer and communications standards are fast being globalized, along with the rest of the industry.

Filling in for the U.S.

At one time, the U.S. so dominated the computer industry that its standards were accepted throughout the world. Its technology and business decisions provided direction for everyone.

You don't need me to tell you that that's no longer true. What I will say is that this diminishing leadership role is creating a vacuum that ANSI, under its current rules, seems unable to fill.

Once, the equivalent International Standards Organization (ISO) technical committees deferred to the American Cobol, data base and data dictionary technical efforts. Now, only the U.S.'s leadership in Cobol continues.

Recently, the ISO formed a strategic planning group, a move that was mirrored by ANSI. Characteristic of bureaucracies, these new groups add on to existing ones, making additional demands on time and money.

ANSI's basic problem arises from its proudest boast: It is unique among the world's standards groups as a nongovernmental body granted the sole vote for the U.S. in the ISO. But exactly because of its status, ANSI shows an inordinate fear of its liability risks. It bends over backward to reduce itself to the role of facilitator, a mere catalyst in the production of standards.

The liability risk is certainly real. If the price of ANSI's boast is to leave the U.S. industry without direction and leadership in the growing global competition, then I think it is time to reconsider the organization's constitution and role.

Another sacred cow of ANSI procedures is the notion of voluntary standards. You can divide this idea into two parts: First, U.S. industry is not compelled to implement or use ANSI or ISO standards; second, ANSI standards are developed by volunteers representing those affected by the standards proposal.

I immediately agree that the first — to the extent that it is true — should continue unchanged. But the second is arguable under current competitive pressures. It simply makes no sense to structure a strategic plan, lay out the project and then find no volunteers for the critical path. Or worse, give a mission and objectives only to find that a significant number of the volunteers are there only to monitor progress or to prevent success.

Any successful chairperson of a standards group deserves accolades for being the epitome of the participative manager. Any unsuccessful chairperson who produces either no standards or flaccid, futile ones is more to be pitied than scorned.

Ray Walker, director of the British Information Technology User Standards Association, has proposed putting standards development on a more business-like basis by contracting specialists to develop specifications.

ANSI's role in many industrial areas is laudable. But now we need leadership in computer and communications standards. It is time to do some zero-based thinking about ANSI's role.

Berg consults in strategic, technological and competitive-edge planning from Long Lake, Minn. He is editor in chief of *Computer Standards & Interfaces* and serves on the planning committee of the 1989 International Conference on Standardization.

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SOFTWARE & SERVICES

SOFT TALK

Rosemary Hamilton

Unix users' call to arms

It's time for Unix users to get more vocal. Downright loud, in fact.

With the introduction last week of the Open Software Foundation (OSF), a group of vendors that includes the two most powerful in the computer industry — IBM and Digital Equipment Corp.— set forth a plan to provide an open environment for Unix users in which they could easily move from one vendor's hardware platform to another.

Sounds wonderful. In reality, the picture behind this very pretty one is unclear and confusing. The OSF, intending to simplify life for users, has unleashed a slew of new questions and made an already complicated market even more so. With many details of the OSF still being fine-tuned, it would seem that those questions will not be answered for some time.

Given the recent months of controversy surrounding Unix, it sounds strange to be calling for yet another voice in this market. There are too many voices already. But now it is the users who can step in and give vendors the answers to all the ques-

Continued on page 29

BST speeds DB2 in batch mode

Source code change control system tracks 'footprints' of application pieces

BY CHARLES BABCOCK
CW STAFF

A change control system is available for IBM DB2 applications that reportedly tracks the sometimes disjointed process of assembling an application and allows it to run in batch mode without IBM's resource-hungry TSO teleprocessing monitor.

Endevor-DB2 from Business Software Technology, Inc. (BST) in Westboro, Mass., interfaces with the Call Attach facility of DB2, which allows DB2 applications to run directly in batch mode.

"It makes for much more efficient use of DB2 in batch," said James R. Williams, manager of data base administration at Empire Blue Cross Blue Shield in New York, an Endevor-DB2 beta-test site.

BST's John Burton

"We were having severe performance problems. . . . We have a saying that when things slow down around here, we're 'DB2ing' the system," he noted.

In his most dramatic example, Williams said a major batch application that had previously required 15 hours to run under TSO was able to finish in two hours and 20 minutes after being compiled and bound by Endevor-DB2.

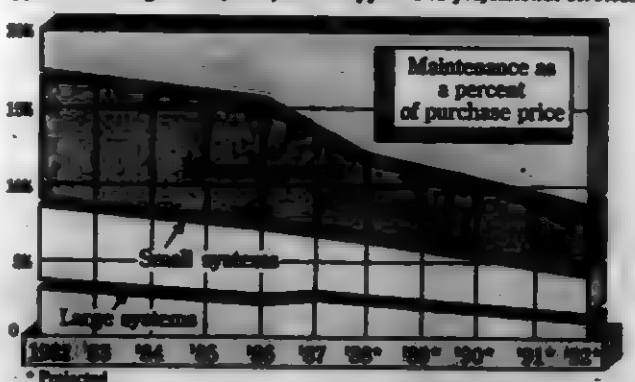
Empire Blue Cross Blue Shield uses DB2 in a large claims application that accesses records spread across 40 IBM 3380K disk drives. The application is executed on IBM's largest

Continued on page 31

Software services latest profit maker

Service fee mix changes

Hardware maintenance fees decline across all three tiers, prompting suppliers to charge more for software support and professional services



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BY CHARLES BABCOCK
CW STAFF

Hardware maintenance will increasingly become a price leader or nonprofit item for service providers, which will be forced to emphasize software support, training and other professional services to earn profits, according to a recent Input study titled Customer Service Pricing.

The Mountain View, Calif., market research firm examined last year's impact of IBM's Corporate Service Amendment (CSA) and Mid-Range System Amendment that shifted some of the hardware service burden onto the user in exchange for

Continued on page 32

Brokerage seeks to trade on AI

BY ALAN ALPER
CW STAFF

NEW YORK — Manufacturers Hanover Trust Co. is in the final stages of an 18-month project to gauge the feasibility of using an expert system to assist its currency traders.

Using an expert system to recommend trading positions is considered one of the more ambitious applications of artificial intelligence, industry analysts have said. Building an expert system for trading is extremely difficult because most traders rely on a mixture of hunch, instinct and fundamental indicators rather than on a set of fixed rules, observers have noted.

In currency trading, for example, rising interest rates one week may influence traders to buy dollars and suggest selling greenbacks another week, noted Thomas Campfield, the vice-president in charge of the expert system project at the bank hold-

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Inside

- Sterling Software releases interactive query and report system for DB2, IMS, VSAM. Page 29.
- Uniplex offers multiuser office system for DEC VAX, Microvax. Page 30.

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Tandem adds system analyzer

BY CHARLES BABCOCK
CW STAFF

CUPERTINO, Calif. — A system that analyzes performance information from a fault-tolerant system and assists in capacity planning has been introduced by Tandem Computers, Inc.

Surveyor, slated to be available in the third quarter, was designed to provide access to performance data through preformatted reports. The product digests the stream of statistics on system operations and summarizes them for a user-designated time period.

Surveyor can sum up processor use on a daily, weekly or monthly basis, Tandem spokesmen said.

The system defines specific work loads for tracking to help determine resource requirements of particular tasks, according to the vendor.

In addition, Surveyor provides exception reports to simplify the identification of potential problems and monitor the conditions that produce them. The reports can be generated by a preset schedule or ordered on command, spokesmen said.

The information captured by Surveyor can be analyzed for capacity planning purposes. Projections of how a system work load is growing provide a means of forecasting future system requirements, the spokesmen related.

Surveyor works in conjunction with other Tandem performance measurement software and manages the storage of information from several performance monitors. It is built around Tandem's relational data base management system, Nonstop SQL.

Surveyor can be geared to a particular Tandem environment, the company said.

Surveyor carries a $5,000 initial license fee plus a $500 monthly license charge for Tandem's largest TXP and VLX systems. There is a $2,500 initial license fee and a $250 monthly charge for Nonstop EXT10, EXT25 and CLX systems.

CCA Model 204 ups transaction throughput

BY CHARLES BABCOCK
CW STAFF

CAMBRIDGE, Mass. — The Computer Corporation of America (CCA) is offering Version 2 of its Model 204 as a high transaction-processing throughput and reasonably priced system in an implicit comparison with IBM's DB2.

IBM recently upped the ante on data base transaction processing speed when it said Version 2 of DB2 could process up to 186 complex transaction/sec. CCA officials translated that rate into millions of instructions per second (MIPS) and concluded that DB2 can process 3.8 transaction/sec. per MIPS on a 3090 Model 600E. Model 204, in comparison, can process up to 17 transaction/sec. per MIPS, claimed Richard Winter, CCA vice-president of technology.

CCA did not offer any audited benchmark results for its claims, but cited a study by William Inmon at American Management Systems, Inc. [CW, May 9] as supporting its claims. That study, extrapolating results from different machines, showed the Model 204 processing 547 transaction/sec. on a 3090 Model 400E compared with 106 transaction/sec. for a release of DB2 that preceded Vertsion 2.

Model 204 is an inverted list-based data base management system compared with DB2, an SQL-based relational system.

Fit the budget

CCA officials pointed out that Model 204 runs comfortably on an IBM 9370 or 4381, the low end of the 370 mainframe line, while DB2 Version 2 runs only under IBM's MVS/XA or MVS/ESA on the hefty E Models of the 3090 series.

Winter attributed Model 204's transaction processing speed to its ability to bit map multiple indexes to its data bases for its query processor.

According to Winter, a bit-mapped index is able to compress a higher number of pointers per page of memory than competing systems and can deliver query responses much more quickly.

In an example provided by CCA, Model 204 is able to include 49,152 pointers per page of memory, compared with 1,000 for a single-indexed system.

The higher number of pointers has the effect of reducing the need for doing I/Os and reading pages of data to determine data locations, Winter said.

Version 2 of 204 is due out in the fourth quarter at a price ranging from $30,000 to $200,000, depending on the operating system, CCA said.

Other enhancements include the following:

- A new dictionary-to-dictionary migration utility that aids the movement of application and data base entities and relationships from the development and test environment to production.
- New debugging tools for testing programs and complex subsystems under development by several programmers.
- A look ahead read feature for improving the performance of sequential record retrieval in batch processing.

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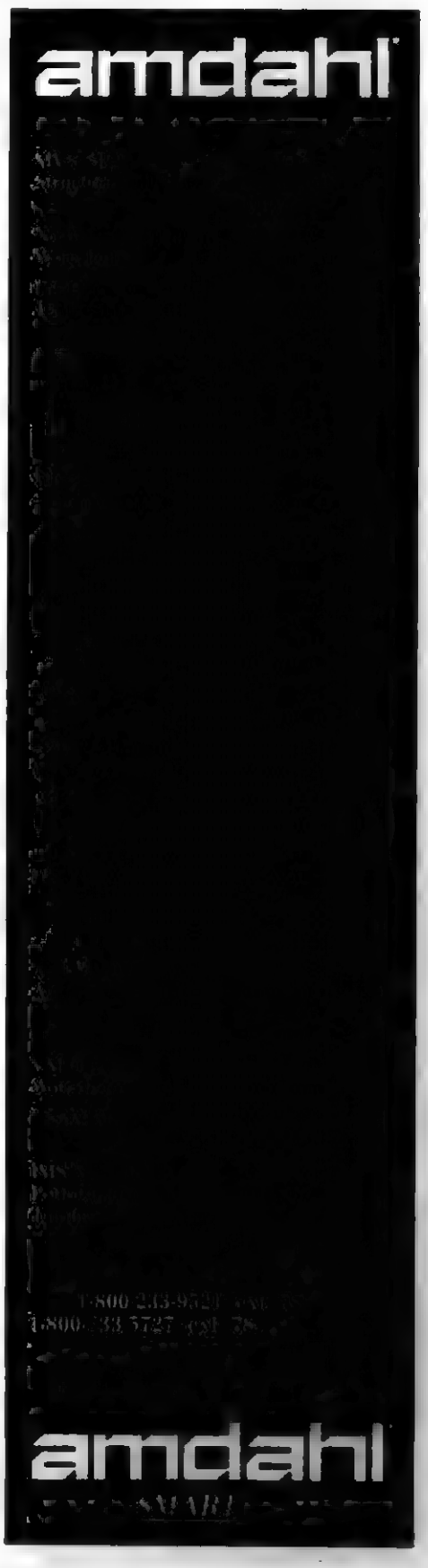

Hamilton

CONTINUED FROM PAGE 25

tions they've asked.

Some of the questions behind the OSF front are: How can the industry really achieve this notion of a single-standard operating environment if the originator of Unix doesn't participate?

If AT&T and its ally, Sun Microsystems, remain separate from the OSF, how will a user decide between two standards?

What impact will the OSF have on those users with a commitment to AT&T's Unix?

The OSF alluded to migration tools that would help users move to the OSF environment. What if users don't want to make such a move?

Should those users intending to make new Unix purchases consider the OSF because of the big names involved? Or should they stay with the originator of Unix?

If seven top Unix systems providers — those that launched the OSF — are going to one day offer a Unix based on IBM's AIX, what will happen to the Unix versions they now offer?

Do users want to standardize on IBM's AIX?

One is better than many

As many users explained in interviews earlier this month, a standard Unix is critical to their business. Many large commercial user sites have made recent commitments to Unix and see Unix playing a much bigger role in the future. But they can't afford to or don't want to support the necessary programming staff required to run multiple Unix systems. They want one Unix.

During these interviews, users also expressed a strong dislike for the controversies that now mark the Unix marketplace.

Such feelings are similar to the factory networking market in the early 1980s.

The multitude of vendor solutions and market confusion sparked one of the strongest user movements seen to date — when General Motors and other companies launched the Manufacturing Automation Protocol (MAP) users group.

It was interesting to watch MAP group meetings following GM's bold initiative. Vendors were flocking to users, and all were promising support of their standard.

Supply and demand

As was the case then and is the case now in the Unix market, users vote with their pocketbooks, and therein lies the ability to make a difference.

One of the many curious aspects to last week's introduction of the OSF was the absence of users. Here we had what was dubbed a major standards initiative and the very people that it was designed to help were not involved.

At the announcement, an OSF representative said invitations to join the organization had just been sent out to hundreds of companies, including other vendor companies and user sites.

Whether users want to officially participate in the OSF or not, they should certainly let the organization know what's on their minds.

Hamilton is a senior writer for Computerworld.

Query system grants access to three major data base and file systems

BY CHARLES BABCOCK
CW STAFF

CHATSWORTH, Calif. — An interactive query and reporting system for accessing information in IBM's DB2, IMS and VSAM data structures is available from Sterling Software, Inc.'s Dylakor Co. division.

The Dyl-IQ Express system provides four querying methods: a menu-driven, automatic query generator that uses a fill-in-the-blanks approach to specifying data and report layout; a natural language facility that allows end users to specify their own terminology; and a stored query facility to allow reuse of commonly used queries, according to Carole Morton, Dylakor president.

The system reportedly will be available in June for use under three teleprocessing monitors: IBM's CICS, TSO or IMS/DC. The IMS/DC and TSO versions access IMS and DB2 data bases. The CICS version accesses IMS (DL/1) and VSAM records. The system can also run in batch mode.

When composing a query, a user must specify field and field-value names or look them up through the system's Help facility.

System administrators may control resources accessed by Dyl-IQ Express to restrict data access.

Data base administrators can predefine for a user what he can access. Designating the data base to be accessed prompts the field names associated with it to be displayed on the screen, and the user can then designate those he wishes to access.

"We want to put SQL syntax into it in the first quarter of 1989," Morton said.

The product will be priced from $20,000 to $60,000.

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BST

CONTINUED FROM PAGE 25

processor, the 3090 Model 600E.

Empire Blue Cross Blue Shield does not allow the use of on-line ad hoc queries against DB2 because their resource use is too unpredictable. Instead, the programming staff builds static SQL queries that appear to be the most efficient for batch applications, and Endevor-DB monitors their status.

So when a programmer modifies an SQL query, Williams wants to know who did what, where and when. "Endevor-DB2 will monitor the changes. No program modifications will occur without an audit trail," he said. Empire Blue Cross Blue Shield has been a beta-test site for the $28,500 product since last fall.

The DB2 application building process includes steps that are not found in constructing an application for CICS Cobol.

While most third-generation languages go through a compile and link-edit process, the DB2 application must be precompiled, compiled, link-edited and bound.

The end result of the binding process is a DB2 application plan, or a combination of program logic, data access information and data base request modules formed from the SQL statements during the precompile process.

According to John Burton, executive vice-president of BST, these changes require several steps in which program components, if changes are occurring to them during development, can get out of sync.

When a development team is working on an application, there will be constant changes to the SQL source code, the data base request modules or the application plan, Burton said. A mistake will occur in some phase of the process, and the components will get out of step about 50% of the time, which will prevent the program from running, Burton claimed.

When a program refuses to run, a data base administrator can either try to track down the offending element or order all the most recently modified elements rebound. The rebind process — without Endevor — typically takes place under TSO, consumes CPU cycles and does not guarantee the program will run if the most recently modified components are not also the properly aligned components, Burton said.

Endevor-DB2 can use a DB2 table to store "footprints" for each component at each step of the process. When used with an earlier BST product, Endevor-C1, a source management system for IBM's MVS, Endevor-DB2 can reconstruct an application as it existed at any point in time from the footprints, according to Burton.

The two products together, both immediately available, are priced from $64,500 to $87,000.

Endevor-DB2 includes the following three modules:

- Access Facility permits the execution of DB2 programs in batch mode without TSO.
- Plan Finder determines the correct application plan that will allow a designated DB2 program to execute.
- Migration Facilities provides a cross-referencing mechanism to identify which application plans and program levels need to be rebound to move a program into production.

Accelerator puts VAX tape drives in fast lane, stops I/O bottlenecks

SAN DIEGO — Touch Technologies, Inc. (TTI), a relative newcomer dedicated to wringing the max from the VAX, recently introduced a software utility that promises quantum reductions in tape I/O bottlenecks.

Dubbed Dynamic Tape Accelerator, the TTI offering relies on a proprietary I/O intercept routine to cache data and speed it on its way to any tape drive compatible with Digital Equipment Corp.'s VMS, according to company founder and President Daniel Esbensen.

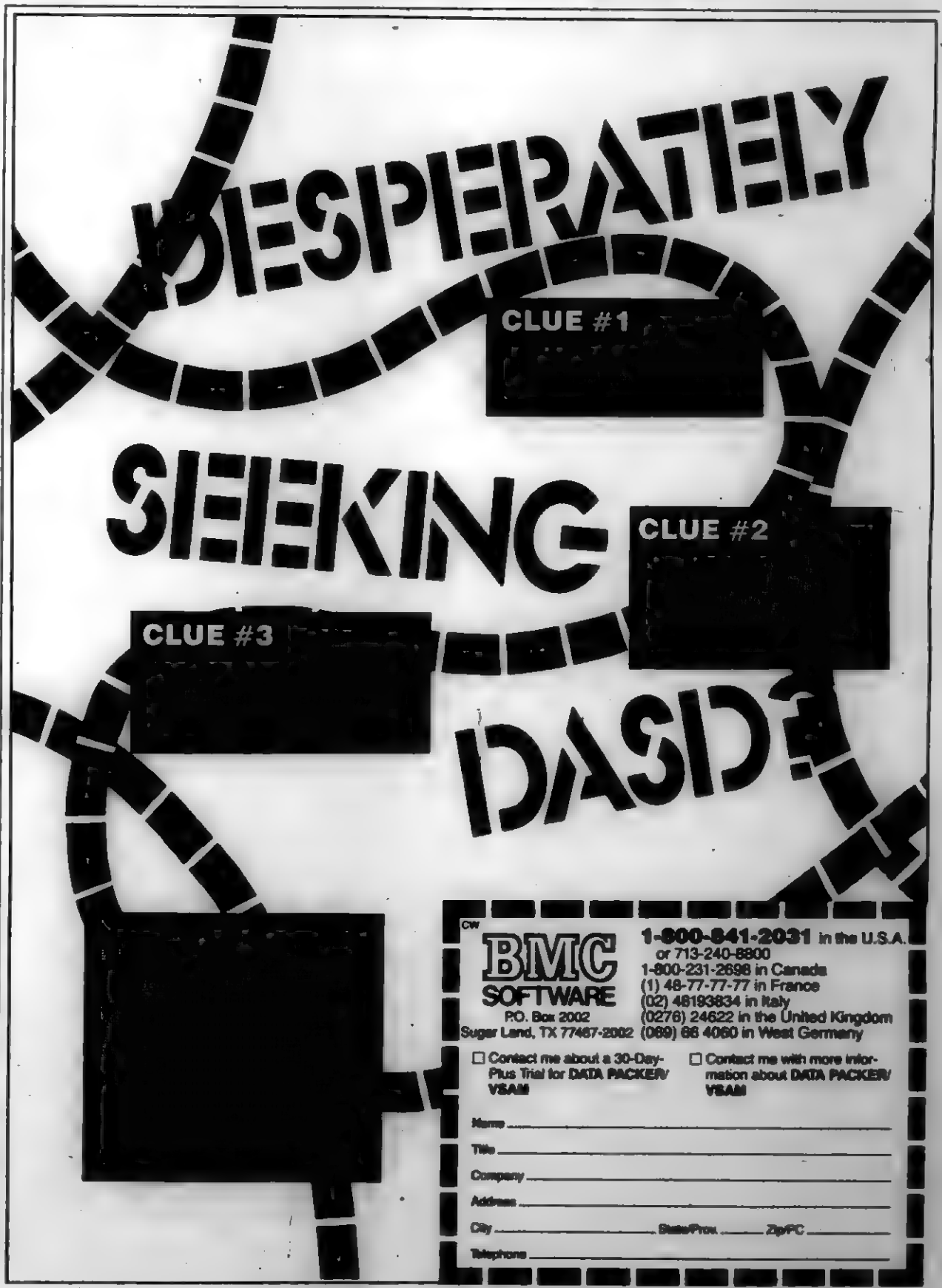
By bypassing the speed limit that VMS imposes on tape drives, Esbensen said, Dynamic Tape Accelerator can log performance improvements of 2-to-1 for most tape utilities. The product is written in the same languages as VMS itself, minimizing system overhead, he added.

Included is a function for backups, widely considered among a system operator's most important and time-consuming activities. The product's reduction of backup time by as much as 50% frees up the system and the operator for other tasks, according to Esbensen.

In addition to saving significant amounts of time, Dynamic Tape Accelerator is said to prolong the lives of tape drives.

Available immediately, the Dynamic Tape Accelerator is priced at $1,795 for any VAX; the price includes 90 days of technical support, with extended support available for $500 a year.

TTI also offers several special pricing arrangements: a package including the Dynamic Tape Accelerator and the company's Dynamic Load Balancer is available at a price of $2,995; existing customers can buy the new tape accelerator for $1,595 until September 1; and special cluster, corporate and distributor licenses are available.



Services

CONTINUED FROM PAGE 25

lower maintenance fees.

"Third-party organizations had to follow suit, cutting deeply into their profit margins in order to keep pace," the study noted.

Leveling off

Service on mainframes has tended to stabilise in the 2%- to 6%-of-purchase-price range. The cost of service is not expected to go lower without utilizing the CSA-like agreement.

According to the study, users are now expressing preference for this type of agreement, however, because the reliability of hardware has increased dramatically.

Mid-range systems maintenance fees have, in the past, tended to run at 7% to 15% of the purchase price, but such recent offerings as the IBM 9370, Digital Equipment Corp.'s Series 8000 VAXs and Data General Corp.'s MV/20,000 have had service fees of only 3% to 5% of purchase price.

Supply up, costs down

According to the study, "Increased competition as well as increased use of remote support technology should continue to drive down small systems service pricing."

In accordance with this trend, the service provider has changed from an organization whose functions were offered for free in the 1970s to an unbundled and hardware maintenance-oriented organization in the early 1980s.

The service provider's latest evolution is one that now increasingly emphasises nonhardware services.

Both hardware manufacturers and third-party service providers, such as TRW, Inc. and Control Data Corp., are currently being pushed into de-emphasizing hardware maintenance and emphasizing software support, consulting services, training and other implementation services.

The service field itself is thus evolving from "reactive" remedial service toward "proactive" performance support, the study said.

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Brokerage

CONTINUED FROM PAGE 25

ing company's investment banking sector.

Manufacturers Hanover is betting it can overcome that difficulty by mixing real-world experience from its best currency traders with financial market data massaged by proprietary financial models.

According to the bank, the expert system will help its currency traders make better decisions more quickly, creating efficiencies that should translate into lower costs and larger profits.

Big risk, big reward

"The profitability we could gain even if we were only moderately successful is quite large," Campfield said, declining to quantify the dollars and cents that are involved. "The risk/reward is favorable; it's worth attempting," he said.

The bank spent the first half of 1987 interviewing seven traders to create a knowledge base. Manufacturers Hanover's expert systems experts — its Systems Technology and Research group — did the knowledge engineering. The group used Intellicorp, Inc.'s Knowledge Engineering Environment shell and did their development work on a Symbolics, Inc. Model 3650 processor using the LISP language.

The knowledge base, which consists of 350 rules — approximately 175 of which relate to currency trading — looks at both technical and economic factors.

Technical factors — the dos and don'ts of trading — are run through one module, while currency and other financial market data run through a modeling algorithm.

A trading recommendation is made after the technical and economic reasons are rationalised.

The system uses forward and backward chaining to allow traders to view the rationale of its recommendation.

A trade is only instituted if the trader agrees with the recommendation, Campfield emphasised.

"The system functions as an aid. It's still the dealer's decision to make," he said.

Manufacturers Hanover set up a separate portfolio earlier this month on which the system is making trade recommendations.

If the system proves successful — as determined by the amount of profit made and trader feedback — the bank will implement it throughout its foreign exchange department in the September or October timeframe, Campfield said.

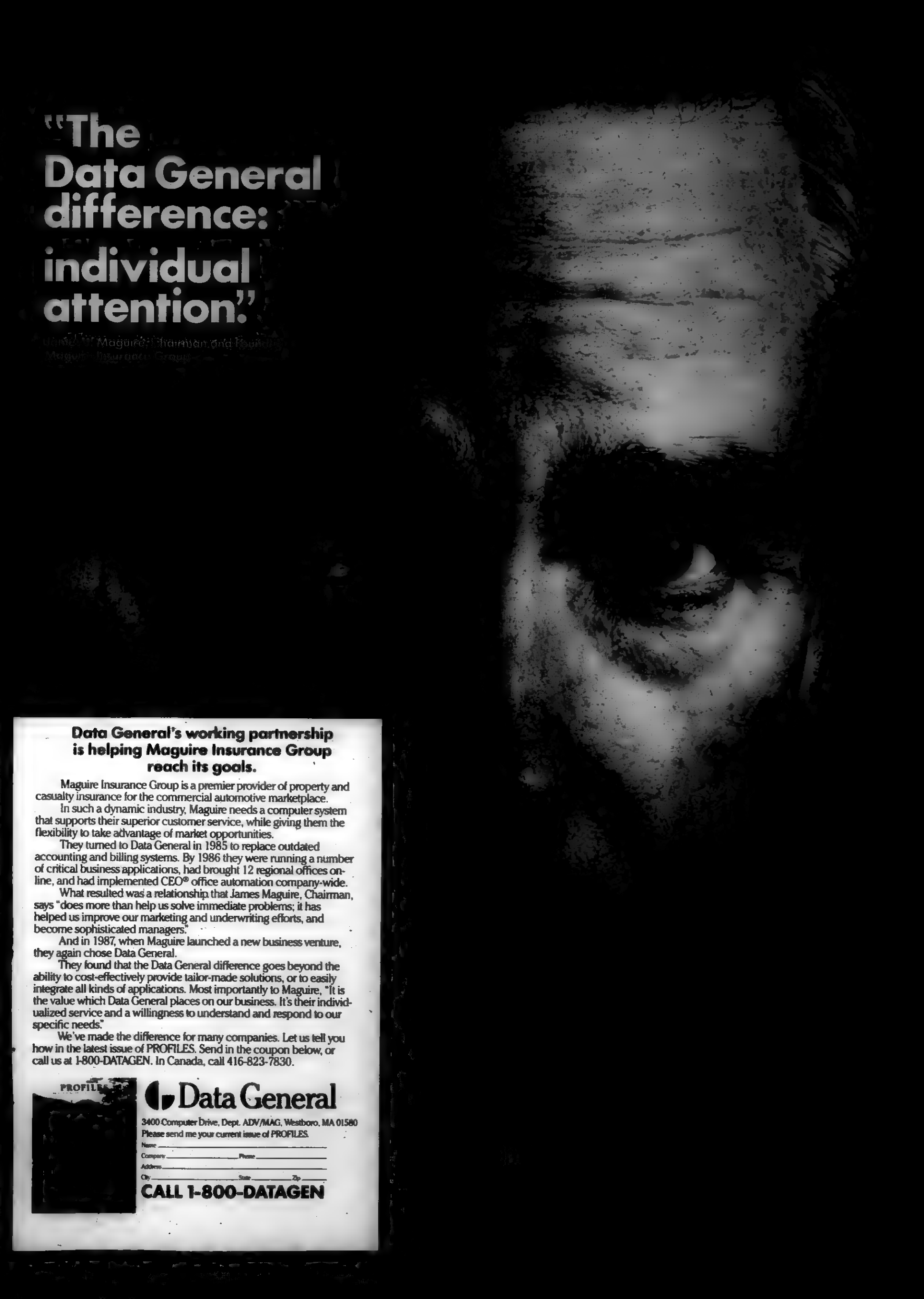
A delivery platform has not been chosen, he noted, although the firm is leaning toward multitasking workstations such as those made by Symbolics and Sun Microsystems, Inc.

A technical workstation is appealing because it allows traders to use the expert system in one window while viewing market data information or running their own financial model in another window.

The workstation would thus replace several terminals and micros on the trader's desktop, Campfield explained.

Campfield has not decided how many of the 30 foreign exchange traders in the firm's New York office will receive workstations.

That number will depend on how many traders react favorably to the expert system during the test phase.



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What resulted was a relationship that James Maguire, Chairman, says "does more than help us solve immediate problems; it has helped us improve our marketing and underwriting efforts, and become sophisticated managers."

And in 1987, when Maguire launched a new business venture, they again chose Data General.

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NEW PRODUCTS

Applications packages

Uniplex Business Software is now available for Digital Equipment Corp. VAX and Microvax computers running under the Ultrix and University of California at Berkeley Unix 4.3 operating systems.

The multiuser office system from **Uniplex Integration Systems, Inc.** integrates word processing, spreadsheet and relational data base functions into a single package for Unix-based computers. The product is composed of the Uniplex Advanced Office System, Uniplex II Plus 6.0 and the Uniplex Advanced Graphics System.

Uniplex Business Software costs from $2,495 to $61,185, depending on VAX and software configuration.

Uniplex Integration Systems, Suite 1300, Glen Lakes Tower, 9400 N. Central Expwy., Dallas, Texas 75231. 214-373-4971.

Languages

Signal Technology, Inc. has announced an optional decision-support component for Smartstar, its fourth-generation language application development product for the Digital Equipment Corp. VAX/VMS environment.

Called **Smartdecision**, the product offers Lotus Development Corp.-compatible interfaces for graphics and spreadsheet applications and also employs ANSI-compliant SQL capabilities. It integrates with Smartstar and allows for read and write distributed data base operations from DEC's RDB/VMS and RMS file structures. The product will also interface with Britton Lee, Inc. file servers over Ethernet lines, according to the vendor.

Smartdecision costs from $1,050 to $8,000, depending on machine size and configuration.

Signal Technology, 5951 Encino Road, Goleta, Calif. 93117. 800-235-5787.

Development tools

A real-time expert system for the development of small and mid-range expert system applications in a Vaxstation environment has been introduced by **Gensym Corp.**

G2 for the Digital Equipment Corp. Vaxstation 2000 is functionally identical to previously released G2 versions and knowledge — compiled in the form of application-specific knowledge bases — can be transferred between machines as the user wishes.

The product uses schematics, dynamic models and heuristics to represent the

Gensym's G2 expert system

professional's knowledge of the application. Explanations of reasoning can be requested or automatically generated, and dynamic simulation permits the user to test knowledge before on-line use.

G2 for the Vaxstation 2000 costs $18,000.

Gensym, 125 Cambridge Park Drive, Cambridge, Mass. 02140. 617-547-9606.

Pansophic Systems, Inc. has extended its Systems Development Life Cycle line with the release of **Panapt**, a product developed for automated production turnover management in an IBM 370 environment.

Panapt automates the program production turnover process required to identify and approve applications and move them into production libraries. The software is said to manage the migration of application entities from Test to Quality Assurance to Production and to provide an on-line history of the production process. The system runs under IBM's MVS/SP, MVS/XA and TSO/ISPF.

Panapt costs from $20,000 to $40,000, depending on the terms of agreement and number of processors.

Pansophic Systems, 709 Enterprise Drive, Oak Brook, Ill. 60521. 312-572-6000.

Control Data Corp. has introduced a series of products that enable Digital Equipment Corp. VAX users to migrate to its Cyber mainframe systems.

The **NOS/VE Migration Toolkit** for VMS users includes six software applications and provides an interface for users working with VAX and Cyber systems.

The software components allow users to migrate data files, convert programs, test and debug applications and monitor performance. A tutorial is also included.

NOS/VE Migration Toolkit programs cost from $21,500 to $52,000, based on performance.

CDC, P.O. Box 0, Minneapolis, Minn., 55440. 800-553-2215.

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MICROCOMPUTING

MICRO BITS

Ed Scannell

Wordperfect gets graphic

Oh, no, we *like* graphical interfaces. After years of listening to Wordperfect yak about how it didn't see the need for porting its applications to a graphical interface (except for the Mac, of course), guess who recently revealed that it will write for IBM's Presentation Manager? You guessed it. It seems the Wordperfect gang has put aside its long-standing philosophical differences with Microsoft over graphical interfaces and will do a version of its best-selling Wordperfect for the Presentation Manager.

Maybe IBM's involvement in the Presentation Manager project has proved enough of a rationale for Wordperfect to finally break down. The company has always felt uncomfortable about the fact that Microsoft was competing tooth and nail against them in the word processing market. One high-level Wordperfect executive once said, "We'll write for Windows when they get out of the operating systems business."

The company doesn't appear to be in any rush to bring a Presentation Manager-com-

Continued on page 39

Extended aid sought

Support modest for IBM operating system

BY ED SCANNELL
CW STAFF

ATLANTA — While more than 70 developers demonstrated 130 programs for IBM's OS/2 operating system at Comdex/Spring '88 here earlier this month, fewer than 10 developers have promised versions for OS/2 Extended Edition.

Those that have promised delivery are hardly the giants of the industry: Lifetree Software, Inc., PCC Systems, Inc., Alloy Computer Products, Inc., Decision Systems Support, Inc., ESCA, Inc. and Netwise, Inc. are among those that have made a commitment so far.

Even this handful will not deliver products any earlier than this year's fourth quarter, with some not doing so until the second or third quarter of next year.

Many of the companies that figure to entrench OS/2 Extended Edition as a de facto standard in corporate America, such as Lotus Development Corp., Microsoft Corp. and Ashton-Tate Corp., have been cagey. In fact, none of these firms have said when, if ever, they would ship versions of their best-selling packages that take advantage of Extended Edition.

Despite this early lack of commitment, IBM remains confident the program will be a major factor in corporate accounts.

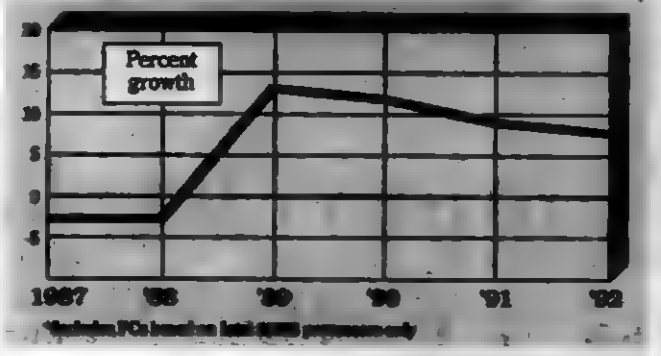
"I think [Extended Edition 1.0] will be an excellent performer. The data base manager and communications manager will be

Continued on page 38

Data View

Japanese PCs gain foothold

Exports of 16- and 32-bit personal computers predicted to enjoy a growth surge this year, then level off



INFORMATION PROVIDED BY IDC JAPAN
CW CHART

Card lets Macintosh run MS-DOS applications

BY ALAN J. RYAN
CW STAFF

MILPITAS, Calif. — Most people buy the Apple Computer, Inc. Macintosh because they like the software. But some of those same folks still need access to IBM Personal Computer software, which has been the mainstay of American business for the bulk of this decade.

A variety of vendors, including Dayna Communications, Inc. and AST Research, Inc., have tried to fill the void between the Macintosh and the PC with mixed success.

Now a new player has jumped into the game. Perfectek Corp. has just begun shipping a coprocessor card that it claimed allows the Macintosh SE line to run Microsoft Corp. MS-DOS-compatible applications while running Macintosh applications simultaneously.

Once plugged into the SE expansion slot, Perfectek's Mac Plus PC SE allows users to configure up to 640K bytes of memory for MS-DOS and compatible applications that can be run under both the Multifinder and Switcher modes, a company spokesman said. Multifinder and Switcher are extensions of the Macintosh operating system.

Mac Plus PC SE borrows memory from the Macintosh when needed but does not require SE memory expansion, according to G. S. Satya, president and chief executive officer of Perfectek. It also reportedly allows data transfer between the MS-DOS and Macintosh applications using the cut-and-paste features of the Macintosh.

Satya said that using the card, Macintosh users can run MS-DOS applications while enhancing that software with Macintosh features, including font styles, font sizes and most of the Macintosh desk accessories.

The card, which is available immediately at a price of $1,195, uses Intel Corp.'s 8086 microprocessor and comes with an IBM-compatible printer and communication ports. The printer port supports IBM PC-compatible letter-quality printers and laser printers. The RS-232 port works on Appleshare networks as well, Satya said.

The Mac Plus PC SE comes with disk transfer and conversion utilities via Perfect Cable, which eliminates the need for an external 5¼-in. disk drive. For users desiring the external drive, the card works with both the Daynafile and Peripheral Land, Inc. Infinity disk drives.

The card is also said to work with some Macintosh-compatible hard disk drives that can be partitioned for DOS applications.

Inside

- Coca-Cola's Carrid plans for future. Page 37.
- Powerpoint eases presentation preparation. Page 37.
- Convergent adds to 80386-based line. Page 42.

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SMALL TALK

William Zachmann

Fizzle, not sizzle

Imagine that you are a venture capitalist with lots of money to invest. Now, pretend that a would-be entrepreneur comes to you with a proposal for a new company that will develop and market an integrated software package for personal computers. He proposes bundling communications and data base programs together.

Let's assume, however, that the proposed data base program has less real functional capability than a good basic product like Symantec's Q&A. And that it doesn't even come close to the functional capabilities of a product like Borland's Paradox.

Imagine, too, that the communications program offers less local-area network functionality than current software from vendors like Novell or 3Com. And let's say that its function doesn't even match that of standard packages like Crosstalk Communications' Crosstalk or Smartcom or host connectivity products like the stuff from Digital Communications Associates.

On top of that, let's suppose that the business plan for the product calls for it to carry a pretty stiff price tag and that it's going to require a system with at least 3M or 4M bytes of memory and use upward of 10M bytes of disk space.

Continued on page 41

Coca-Cola's Cheryl Currid looks ahead; 386, SQL all part of the plan

Ten years ago, Cheryl Currid bought a $599 Radio Shack TRS-80 Model 1 microcomputer. "That was the worst thing I could have done with my money," because there was no software available for the computer, she said.

Back then — in 1978 — Currid was a saleswoman for M&M/Mars candies and worked out of her home. Rather than let the software-starved computer go unused, she formed a group of hackers who together wrote what she claimed to be the first word processing program for the TRS-80 Model 1 that did not require a hardware modification to do uppercase and lowercase. Alas, the early days of micros were full of such quirks.

Today, with years of microcomputer experience behind her, Currid is the manager of departmental computing at Coca-Cola Foods in Houston. And she is no longer buying TRS-80s.

Currid predicts chip shortage will be a problem

Currid recently spoke with *Computerworld* senior writer Alan J. Ryan about today's technology, the value of networking, SQL and the IBM Micro Channel architecture.

What hardware platform have you standardized on?

It's mostly been Compaq Deskpro 386s. However, with the shortage of Compaq memory right now, we're looking at other people's 386s. We will also look at the new IBM 20-MHz unit that's just now shipping.

What will happen to the personal computer marketplace during the next two years?

I think PS/2 types [of machines] with Micro Channel will emerge, but I just don't know how quickly. I think that there will be broader acceptance now that there are some clones. That's probably the best thing in the world that could have happened to IBM, because now it's OK to buy them, and there will be probably more third-party support for the boards.

But for now, does the rest of your MIS organization share your skepticism of the PS/2?

No. There are those within the main part of [Coca-Cola Foods] in Atlanta that are very pro-PS/2, and there are those who aren't. I think we're almost a subset of what the whole industry is doing.

How many PCs are you supporting at Coca-Cola?

We don't release actual numbers. However, I will say that we're not at a 1-to-1 ratio. I

Continued on page 40

Powerpoint outperforms patchwork graphics tools

BY DOUGLAS BARNEY
CW STAFF

Before microcomputers, putting together presentations was a tedious process. The presenter would often cobble together some graphs and laboriously rework them when they were wrong or just looked stupid. Many times, the presenter would turn over much of the work to professional artists, who, despite their image as starving, rarely work for free.

Microcomputer tools made the job easier, but it was still an awkward process of switching between programs, each completing a part of the job.

Turning user frustration into market opportunity, Forethought, Inc. introduced Powerpoint, a software tool specifically designed for generating presentations with slides, overheads or handouts with the help of an Apple Computer, Inc. Macintosh. Microsoft Corp., which itself used the product, liked it so much it shelled out $14 million last summer to buy the company.

While not perfect, users from all walks of life have painted a rosy picture of life with Powerpoint.

Powerpoint

Price: $395

- Runs on Apple Macintosh
- Creates presentations including text and graphics
- Can generate hard copy with reduced images and text to help guide the presenter

For Lt. Col. Jim Hopson, Powerpoint automates one of the most important and demanding of military tasks. "The Army lives and breathes off of slide presentations," explained Hopson, who, working at the Pentagon, serves as the Army's legislative liaison. For Hopson, Powerpoint is easy to use and easy to teach.

But for Jean Bishop, a secretary with the congressional inquiry division who works with Hopson, Powerpoint is less than straightforward. When one of Hopson's predecessors was transferred, he left Bishop a Macintosh with Hypercard and a trail of icons leading to Powerpoint. That trail was somehow disconnected, and Bishop has had trouble getting to Powerpoint.

Once she located Powerpoint, it still did not suit her style of computing. "I am a secretary, and I have to get things done. With Powerpoint, it takes me a bunch of steps. With Microsoft Word, I just click."

According to users, Power-

Continued on page 41

SOFT TIPS

Dbase helper

Although Ashton-Tate Corp.'s Dbase Assistant does not allow you to change directories, you can work around this problem by assigning each directory its own drive letter with the DOS Substitute command. Users can then easily switch between different drive letters with Dbase Assistant.

From DOS or from a batch file that loads Dbase, enter the following commands:

```
LASTDRIVE = G
SUBST F: C:/DBASE/DATA1
SUBST G: C:/DBASE/DATA2
```

This command sequence substitutes the drive letters F and G for the subdirectories Data1 and Data2.

You can enter any letter up to that which was specified with the DOS LASTDRIVE command. LASTDRIVE can be any letter — A through Z — as long as it does not interfere with any network drives.

Information provided by Corporate Software, Inc., a Westwood, Mass.-based software reseller.

Stop thief! PC automates mug shots

BY DOUGLAS BARNEY
CW STAFF

ANAHEIM, Calif. — Watch out criminals. Microcomputers not only know who you are, but they now know exactly what you look like.

A vendor with a fiduciary interest in law enforcement originally helped pioneer automated fingerprint identification systems. Now the company, De La Rue Printrak, Inc., has moved into automating mug shots.

With the Phototrak system, a law enforcement organization can have a lineup of suspects on computers to help arrest, identify and possibly convict a suspect.

Phototrak provides an on-line data base of mug shots that an officer or detective can retrieve in seconds, the company claimed.

The PC *crime-stopper*

The system is more efficient than manual photo filing, so criminals can be indentified and crimes solved more quickly.

The system works in a variety of ways. For example, when a suspect is booked, his photo can be taken with a video camera and entered into the system along with pertinent data, including his rap sheet, gender and physical characteristics.

The lineup feature allows a detective, witness or victim to view up to six suspects at a time. Photos can also be retrieved based on physical description, modus operandi, identification number or crime type.

A jail ID system retrieves photos of prisoners about to be released to ensure that the right person is actually released.

Phototrak allows remote terminals to access the central photo files, said Lionel Grove, product manager for Phototrak.

Prices for Phototrak start at $60,000.

1776 touts revolutionary drive

SHERMAN OAKS, Calif. — For some users, a 10M-byte hard disk drive is enough. More demanding users have moved up to 20M-, 30M- and 40M-byte systems.

But 1776, Inc. wants users to forget all that and move up to 12G bytes of storage on a conventional microcomputer.

The disk drive firm is not foolish enough to assume that a typical Lotus Development Corp. 1-2-3 user needs multiple gigabytes. The firm does believe, however, that there is a growing market for micro-based file servers, expert systems and computer-aided design and manufacturing systems that demand more storage than conventional drives provide.

Dubbed Patrick Henry II, the caching external-disk subsystem offers 2-msec access time and fault tolerance, the firm claimed. The drives come in 600M-byte increments, but individual partitions can reach 1G byte and can span a number of subsystems, the vendor said.

In order to get the full 12G bytes, users must link five individual cabinets. The product begins at $12,200 for 148M bytes and goes up to around $400,000.

In addition to storage, fault tolerance and caching, the Patrick Henry II comes with its own built-in Intel Corp. 8088-based microcomputer. This computer drives a color monitor on the subsystem that monitors the drive's performance and allows for fine-tuning of the system. The system also has removable components, such as disk and tape drives, for easy servicing.

1776 is still offering the original Patrick Henry, which sells for $4,000 less than the new version but does not include fault tolerance or removable components.

OS/2

FROM PAGE 35

leadership subsystems when they ship on 1.0," said Lee Reiswig, director of IBM's Austin, Texas, Entry Systems Division laboratory.

Observers who have peeked at early versions of the program seem evenly split on its capabilities and performance: Some say the program's data base and communications managers are winners; others say those portions of the program have no more functionality than existing programs like Borland International's Paradox relational data base and a slew of communications software packages.

Reiswig disagreed with the critics. "I think the data base manager is the most complete implementation of SQL in the industry, and we expect its performance to be exceptionally good," he said.

Clean up those clones

Some observers had speculated in recent months that the Extended Edition would not run on IBM Personal Computer compatibles. Reiswig said, however, that if manufacturers have done a clean job in cloning IBM's PC AT, they should have no trouble running OS/2 Extended.

Reiswig also said he does not see any problem with developers writing data base and communications modules that will compete against the IBM product by offering similar capabilities.

Already, Digital Communications Associates, Inc. and AST Research, Inc. have promised communications programs that will compete against the Extended Edition's communications portion. Others are expected to make similar announcements during the next few months.

"I think it is certainly possible to build a clone of the Communications Manager. There isn't anything we have done that would prevent anyone from doing it," Reiswig said. "It's just a matter of how well they will perform."

In fact, competitive products for Extended Edition are welcomed by IBM, according to Reiswig, because they offer customers a wider range of solutions on a variety of machines.

Everybody talks OLTP.

Tandem does it.

Scannell

FROM PAGE 35

patible application to market, however. A spokesman said it won't deliver a graphical version of Wordperfect until very late in 1989.

The sue-me sue-you blues. IBM looks like it's getting even more serious about defending its patents. In an recent ad appearing in a major metropolitan newspaper, the company was looking for intellectual property attorneys for assignments in eight different areas of the country.

Requirements include admission to the bar and the U.S. Patent and Trademark Office and experience in signal processing, computer systems and programming, digital electronic circuits, semiconductor devices and communications.

IBM already has more lawyers than most clone makers have employees. If you're a clone maker today, I guess you better make sure you are putting as much money into the development of lawyers as you are into chip technology.

Anything you can do, I can do faster. In yet another series of benchmarks, Compaq's Deskpro 386/20 proved 33% faster than a similarly configured 20-MHz IBM Personal System/2 Model 80. This particular benchmark, conducted by Workstation Laboratories, measured the systems' respective CPU, I/O and floating-point performance.

So Compaq's the king of benchmarks this week. But its reign will last until the next series comes out. By the way, Altos's 16-MHz Intel 80386-based Series 2000 finished third, and Apollo's 25-MHz Motorola 68020-based DN4000 finished fourth.

More to life than SQL. Richard Rabins, president of Alpha Software, recently raised a good point about the industry's preoccupation with SQL and other relatively obscure data base technologies. His point is that instead, the next generation of data base products needs to deliver powerful features — he suggests customized menus and data entry screens — that nonprogrammers can readily understand and use.

This will allow data base users to discover that they can exert the same control over data bases that they have had over word processors and spreadsheets. "It's time for democracy to finally come to the data base world," he says. Good point.

Welcome aboard. Data base jockey Rod Zimmerman has given up Data Base Derby, an application-specific test of data base management system vendors that Zimmerman founded in 1985.

The Derby gathered a host of DBMSs and ranked their ability to develop a complete business application. This test served to raise issues of SQL vs. non-SQL data base effectiveness, with SQL-based systems taking a clear lead in many categories. Instead of helping to run the SQL race, Zimmerman has picked his favorite horse, Gupta Technologies, at which he now serves as product manager for SQL Base. Ride 'em, cowboy!

Let's get tall. A version of DOS for the visually impaired has been developed that displays letters from ½- to 5-in. tall. Called LP (Large Print) DOS, the program was developed by the manager of data communications at Northeastern University in Boston. The program should eliminate the need for enlarging hardware that restricts access to a single, specially adapted machine.

Let's get small. Mechanical Enterprises introduced an interesting little keyboard recently that takes up about 60% of the desk space used by the standard 101 key units. The vendor has rearranged the keys with the number, cursor and function clusters in front of and elevated from the normal alphanumeric section. Eye scan, head and hand movements are greatly reduced. The keyboard sells for $150.

Scannell is a Computerworld senior editor, microcomputing.

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Currid

CONTINUED FROM PAGE 37

should think that we will get to a 1-1 ratio within the next two to three years, depending on the way management really sees some of the benefits coming back off of these early networked systems.

What sorts of problems does MIS face on a daily basis?
If you look at the average company, the people supporting micros or local-area networks or the micro-to-mainframe connection run around with fire drills all day: Sally Sue's printer isn't working. That could consume a number of people in an organization to the point where all they do is put out those kinds of fires, and they never get ahead of the wave.

How are you getting ahead?
Networks are helping a lot. We only have one copy of [Wordperfect Corp.'s] Wordperfect per file server to deal with, so when we go to upgrade, or change, or put a new printer driver out or whatever, we only have to go to one place per file server. And because we try to keep ourselves somewhat consistent in our application, we can make it right on one file server and then replicate it to the others in the building. The best example I can give is that it took our company a full year to go from Lotus [Development Corp.'s 1-2-3] 1A to Version 2.01, and it took us an hour to go from Wordperfect 4.1 to 4.2.

Will you lean toward OS/2?
Not yet, but we're trying to get ourselves ready for OS/2. I don't want the hardware platform to get in the way. We don't have any OS/2 applications running, but the minute we see one that makes sense, we will.

What is your strategy for hooking up micros and larger systems?
We've got one of those Labtech installations, and it is just a connection on the network. It's very high speed and has worked out nicely for us, but we don't have several thousand units on it yet, so I don't know what's going to happen after a while — what kind of performance loss that we may see.

Do you have a mixed mainframe environment?
No, we're mostly IBM. We have several data centers around the country, and there may be a Prime [Computer, Inc.] in there somewhere as a minicomputer, but as a mainframe, we're pretty Blue, with different operating systems on different boxes. [We have] one VM, and I think the rest are MVS.

Has the memory chip shortage limited what you have been able to buy the last few months?
It's about to. We're just about to open up a new project that is going to be multiple unit purchase, and we've got a deadline to meet for management. If we can't put the file servers together or some of the advanced workstations, we are going to have to look outside of Compaq. That is unfortunate, because the platform is right, the architecture is right, and we know how to slap the boards in. We know how to make this happen, and now the chip shortage is going to get in the way.

What are some of the emerging technologies you are keeping your eye on?
The big deal for us right now is the connectivity platform. Perhaps the thing that can impact corporations the most today is properly outfitting the professional or mid-level manager with the right workstation. The technology I'm looking at to get us there is the interconnected local-area networks and whatever you hang off the network.

We stopped buying anything but 386s at the end of last year. We're quickly trying to get everybody up on a good platform. And also, we're going to be looking at some of the WORM [write-once read-many] technology for special applications.

What LAN are you using?
We're running on IBM Token-Ring hardware and Novell software. We have some Arcnet [networks] and some Proteon in the building, and that's all interbridged to the Token-Ring, with Novell running the layer on top. It's very clean. You don't know when you're passing over a bridge from the Token-Ring side of the network to the Proteon, for example. Just about all of our networks are bridged together, and then everything is bridged into the mainframe.

Where does SQL fit in?
It's fitting into the future. Right now we're using [Advanced Data Research, Inc.'s] Datacomp/DB on the mainframe, and they're coming out with an SQL version. The micro software we look at for data bases is [Microrim, Inc.] R:Base System V, and that has come out with some SQL support. Ultimately, all this stuff is going to meet together in SQL, but that's more a part of the future than it is the present.

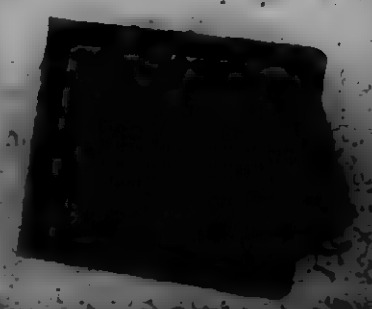
Also, I'm not crazy about the syntax of SQL as being a user-oriented language. That stuff is not easy. There's got to be some front ends to SQL. My feeling is whoever develops the nicest, neatest package will probably win.

But it's really turning the data base industry upside down. We've had the day of the spreadsheet, the day of the word processor, but the day of the data base just hasn't come yet. Yet that's really when you can develop the applications that start paying for themselves.

ShowCASE

Smoke Screens

Today, everybody seems to be offering PC-based front-end analysis and design tools. Their makers credit them with providing screens that can drive Computer Aided Software Engineering. We credit them with providing smoke screens. Because once you've created a diagram on the PC screen with one of these, it just sits there—it isn't integrated with any of the other tools you need to get the job done.



Data Bucket

This is some folks' idea of a Central Repository. It doesn't have any particular organization, and it will probably hold most of the data you come to turn into it. But that's about all it will do.

All we can say is, if you're considering a CASE system with a dictionary that looks like this, dump it.

Promises, Promises

Since the makers of ShowCASE products rarely have proven applications to fall back on, they will happily tell you which companies may use their product in the future, show you what your system could look like, or even guess at what your savings might be. Promises, promises.

Powerpoint

CONTINUED FROM PAGE 37

point is best suited for accomplished Macintosh users. But even these users can get stuck. "We get exasperated sometimes. It doesn't quite follow the Mac interface. And there are some slight idiosyncrasies," said Wayne Wilkerson, a computer-aided design site manager at Hughes Aircraft Co.

Twist my arm

Despite the problems, you could not pry Powerpoint away from Wilkerson. Hughes does a large number of presentations to management and customers, and Powerpoint has eased the presentation burden a great deal, he argued.

Some of the product's glitches crop up when working with images that have been reduced. "When you are working in smaller sizes — say 50% reduction — if you enter a correction or you line up objects, it never comes out right," said Don Gerue, a programs manager at a large electronics and defense firm.

Nearly all users interviewed followed the same progression. In the past, they used Apple's own Macdraw and Macpaint — now produced by Claris Corp. — to generate slides and overheads. Then they moved on to Powerpoint.

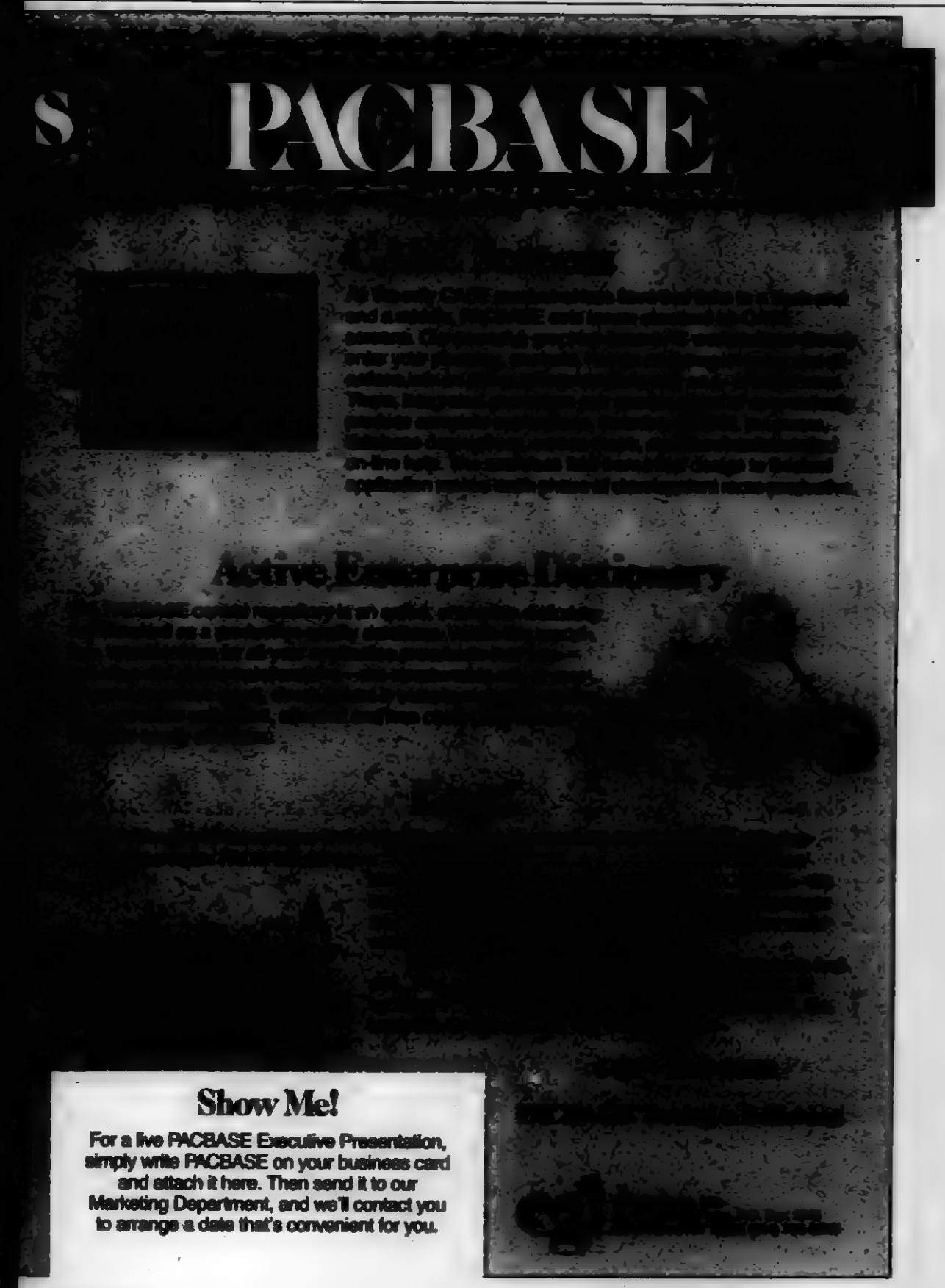
"We used [Macdraw] a lot. But if you do a multiple-page thing with [Macdraw], it is tedious. With Powerpoint, you can scroll through the slides and reorder them by names or whatever," said Morris Hermann, project manager with a major electronics and defense firm.

Some of the product's problems will be rectified with Powerpoint 2.0, a version of the package that is currently in beta test.

If users had their way, Powerpoint would be enhanced in a number of ways, many of which are taken care of with Powerpoint 2.0.

"It would be nice to have dynamic data exchange, so you could link presentations to data files. If the data changes, the presentation would be changed automatically," said Frank Agee, a systems engineer at a large West Coast bank.

Other users said they look forward to the planned color support.



Zachmann

CONTINUED FROM PAGE 37

Under those conditions, how likely would you be to invest serious money in the company? How likely do you think most users would be to buy the product? And, how likely would you be to buy it?

Well, if you haven't already caught on to my little joke, the product I've been describing is IBM's OS/2 Extended Edition. Yup, that's it, we're talking about IBM's strategic software product for corporate computing here. This little beauty, mind you, is what your friendly IBM salesperson wants you to buy, so you won't be left out on all of the great new technology IBM's got in store for you.

Monstrous undertaking

If anyone other than IBM tried to propose this resource-hungry limited-function monster, he would absolutely be laughed out of the room. It reminds me of an old monster 1963 Ford Galaxy I once owned with a pathetic little six cylinder engine that looked mighty big and impressive from the outside but took nearly half a minute to get up to 60 mph.

OS/2 Extended Edition, even in the initial version (minus the OS/2 Presentation Manager), which is due out in July, will be such a resource hog that you won't be able to run it on an IBM Personal System/2 Model 50.

The Model 50's glacially slow 80-msec, 20M-byte hard disk just doesn't have enough room to put much else on it once OS/2 Extended Edition Version 1.0 arrives. Even if it did, it would run so slowly, that you'd fall asleep waiting for it to do something.

Once the Presentation Manager is added — IBM says in November — you aren't likely to be very happy with OS/2 Extended Edition's performance on a PS/2 Model 60, either. Practically speaking, you'd better get a 20-MHz Model 80-111 if you really want to make use of OS/2 Extended Edition for any but the most trivial tasks.

Of course, once you've spent well over $10,000 (maybe closer to $15,000) for the hardware and software to run OS/2 Extended Edition with a performance level that a normal person would accept, you've still got to deal with a level of functionality that nearly every competing product already on the Microsoft MS-DOS systems market has exceeded for months. Great deal, huh?

Clearly, the experiment with how far people would go in buying a product, just because it has an IBM logo, isn't going to stop with the PC. IBM is going to try again with OS/2 Extended Edition.

Whenever somebody who is trying to sell me something starts directing my attention to the bigger picture, I begin to wonder what's wrong with their products. In the case of OS/2 Extended Edition, it isn't hard to see what's wrong: It is big, expensive, resource intensive and doesn't do much compared with competitive alternatives.

OS/2 Extened Edition will be a real test of whether the IBM logo alone can make a success of a product that otherwise wouldn't stand a chance in its market. It appears to me that IBM is determined to find out whether there is any truth in that claim.

Zachmann is vice-president of research at International Data Corp.

NEW PRODUCTS

Systems

Data Voice Solutions Corp. has enhanced the **Centaur Graphics Terminal**, a graphics display unit for use with the Centaur II series of Microsoft Corp. MS-DOS multiuser computer systems.

The terminal is said to allow users to take advantage of the graphics capabilities of MS-DOS programs such as Lotus Development Corp.'s 1-2-3 and Symphony.

The product incorporates a 7.6-MHz graphics coprocessor and 32K bytes of random-access memory. It has a 14-in. amber screen.

The Centaur Graphics Terminal costs $699.

Data Voice Solutions, One Newport Place, Newport Beach, Calif. 92660. 714-752-8181.

Convergent Technologies, Inc. has made several additions to its Intel Corp. 80386-based product line.

The Server PC Model 100, an entry-level extension of the 80386-based Server PC series, was designed to support work groups of four to 16 terminal or personal computer users in a Unix environment while also running Microsoft Corp. MS- or IBM PC-DOS applications.

Four models of the Series 386I workstation are the latest additions to Convergent's New Generation series of departmental computing products. All units operate in both CTOS, Convergent's multitasking distributed processing network operating system environment, and in PC- and MS-DOS. Each model is available with 145M- or 325M-byte disk-storage capacity and can support up to 24M bytes of random-access memory.

All products will be sold directly from resellers.

Convergent Technologies, P.O. Box 6685, 2700 N. First St., San Jose, Calif. 95150. 408-434-2848.

Development tools

Intellicorp, Inc. has announced a development version of its artificial intelligence-based **Knowledge Engineering Environment** (KEE) software for Intel Corp. 80386-based personal computers. The software is a complete implementation of the existing KEE system and will allow user development of knowledge-based systems in the 80386 environment.

The KEE development system for the 386 has an introductory price of $9,900. The list price will be $15,000.

Intellicorp, 1975 El Camino Real W., Mountain View, Calif. 94040. 415-965-5500.

TLB, Inc. has upgraded its integrated accounting software package, **Solomon III**. Version 5.0 has been structured to support a windowing interface, a graphic command bar, menus and enhanced reporting options.

The package consists of 15 integrated modules, including General Ledger, Accounts Payable, Accounts Receivable and Payroll components. The software runs under Microsoft Corp.'s MS-DOS operating system on the IBM Personal Computer, PC XT, AT, Personal System/2 and compatibles. It requires at least 512K bytes of random-access memory and a 10M-byte hard disk drive.

Individual Solomon III Version 5.0 modules cost from $195 to $995.

TLB, P.O. Box 414, 1218 Commerce Pkwy., Findlay, Ohio 45839. 419-424-0422.

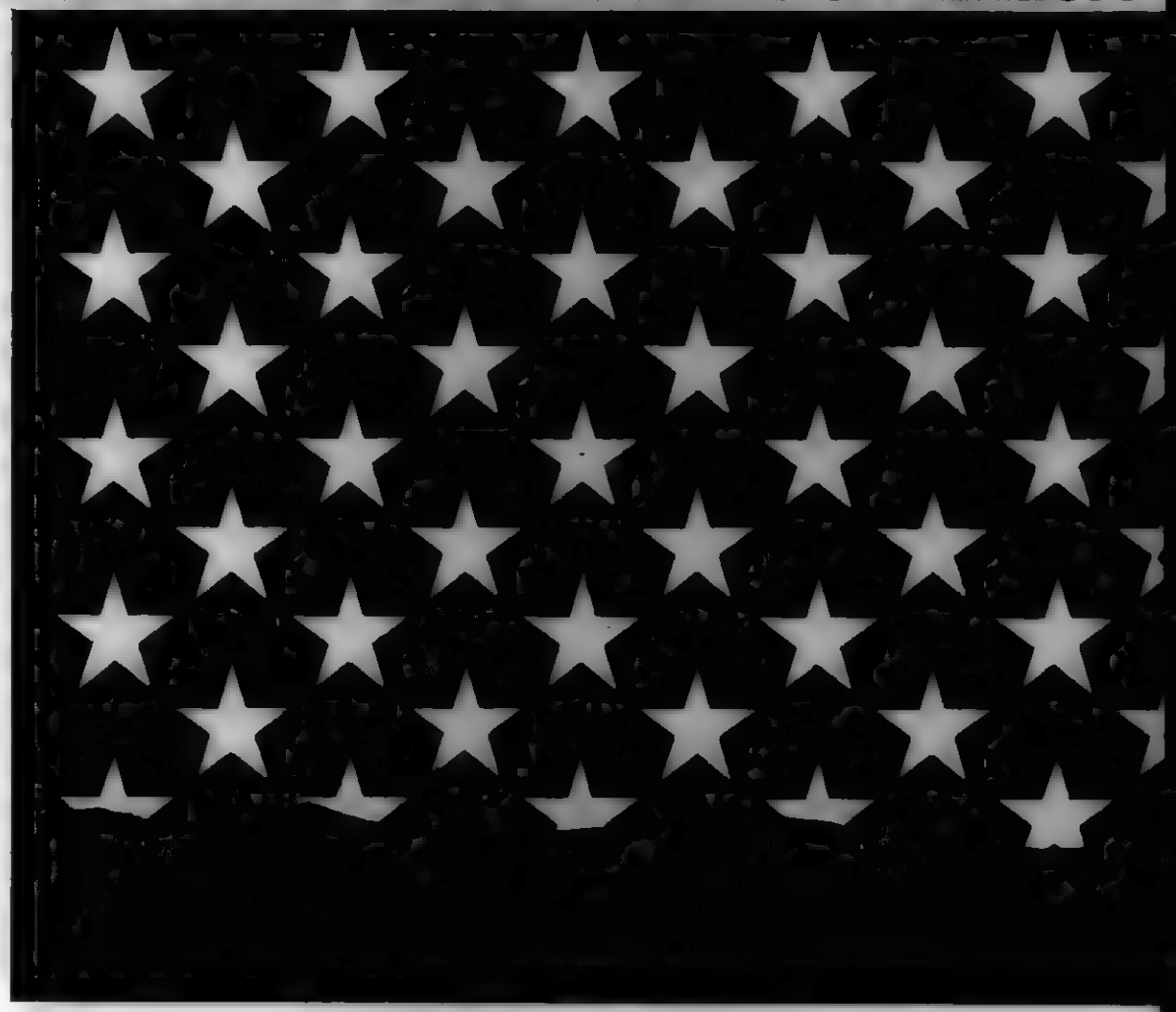
Software utilities

An image decompression package for IBM and Microsoft Corp.'s OS/2 operating system has been introduced by **Advanced Graphics Applications, Inc.**

Called **Agaview**, the product allows users to simultaneously view, retrieve, size, scale or expand any number of stored bit-mapped images, such as business forms or graphic illustrations.

The software can run on any OS/2 machine in stand-alone mode or can be integrated with Microsoft MS-DOS-based local-

The U.S. Government counts on Nixdorf



The U.S. Census is so vital to our system of government that our Founding Fathers enshrined it in Article I, Section 2 of the Constitution. To be sure, the members of the Convention never envisioned a nation of 245,000,000. The Census of 1790 enumerated only 3,929,214 of us – fewer than the current population of the State of Washington.

Today, the Census Bureau employs Nixdorf systems to help with the count. The Social Security Administration also uses Nixdorf systems, as do state and county governments in Florida, Texas, New Hampshire, Illinois, and Utah.

Nixdorf systems help to run City Hall, to clear court calenders, and run state lotteries.

In an effort to speed-up emergency services, cities around the world now rely on Nixdorf computer automated systems to dispatch ambulances, police, and firefighters, to automatically locate the available equipment and crew for the specific emergency, determine the most expeditious routes, and alert the dispatchers to known hazards, pre-plans, and routing directions. Nixdorf systems buy precious time and allocate manpower and equipment with maximum effectiveness, saving countless lives.

area networks.

Agaview costs $500.

Advanced Graphics, 90 5th Ave., New York, N.Y. 10011. 212-337-4200.

Data storage

Archive Corp., a manufacturer of quarter-inch cartridge tape drives, has announced a 20M-byte version of its Archive XL product line.

Archive XL 20 is compatible with the industry-standard QIC-40 format.

The product is available in an internal 5¼-in. form factor or a 3½-in. unit for IBM Personal Computers, PC ATs, XTs and compatibles and for Compaq Computer Corp. computers. Backup and restore functions are said to be performed at a speed of up to 2.4M byte/min.

The Archive XL 20 costs $329.

Archive, 1650 Sunflower Ave., Costa Mesa, Calif. 92626. 714-641-0279.

A fault-resistant add-on storage array subsystem designed for the IBM Personal Computer AT, Personal System/2 and compatibles has been announced by Pacstor, Inc.

The product was designed for high-volume transaction-oriented applications and high-speed access to large data bases and as add-on memory for network file servers.

The Integra I incorporates as many as six 3½-in. fixed disk drives that operate independently. It is housed in a single AT-size cabinet. Maximum storage capacity is 600M bytes. Disk drives used in the subsystem can have either 40M- or 100M-byte capacities. Tape cartridge back-up is available on all models.

The Integra I costs $2,850 for a 120M-byte configuration.

Pacstor, 983-B University Ave., Los Gatos, Calif. 95030. 408-395-8804.

Storage Concepts, Inc. has developed a disk system with a reported transfer rate of 18.6M byte/sec.

The Concept 41 Winchester Disk Drive Subsystem offers a 16-bit data bus with burst capacity of 20M byte/sec. Other features include error detection and data correction on headers.

The system is linked to a host processor by single-card host adapters. Buses supported include the Q-bus, Unibus, VME-bus and Multibus. Driver support is available for the Digital Equipment Corp. VMS, MicroVMS, Unix and IBM PC-DOS operating systems.

Storage Concepts, 1622 Deere Ave., Irvine, Calif. 92714. 714-852-8511.

Printers/Plotters Peripherals

QMS, Inc. has introduced a desktop laser printer for electronic publishing environments that requires a multiuser, networked output device.

The QMS-PS 1500 combines a 15 page/min Ricoh Corp. 4150 print engine with an internal Adobe Systems, Inc. Postscript controller.

The controller is driven by a 16.7-MHz Motorola, Inc. 68020 multiprocessing unit and comes standard with 4M bytes of random-access memory, 1M byte of read-only memory and 35 Postscript typefaces.

The QMS-PS 1500 costs $9,995.

QMS, One Magnum Pass, Mobile, Ala. 36618. 205-633-4300.

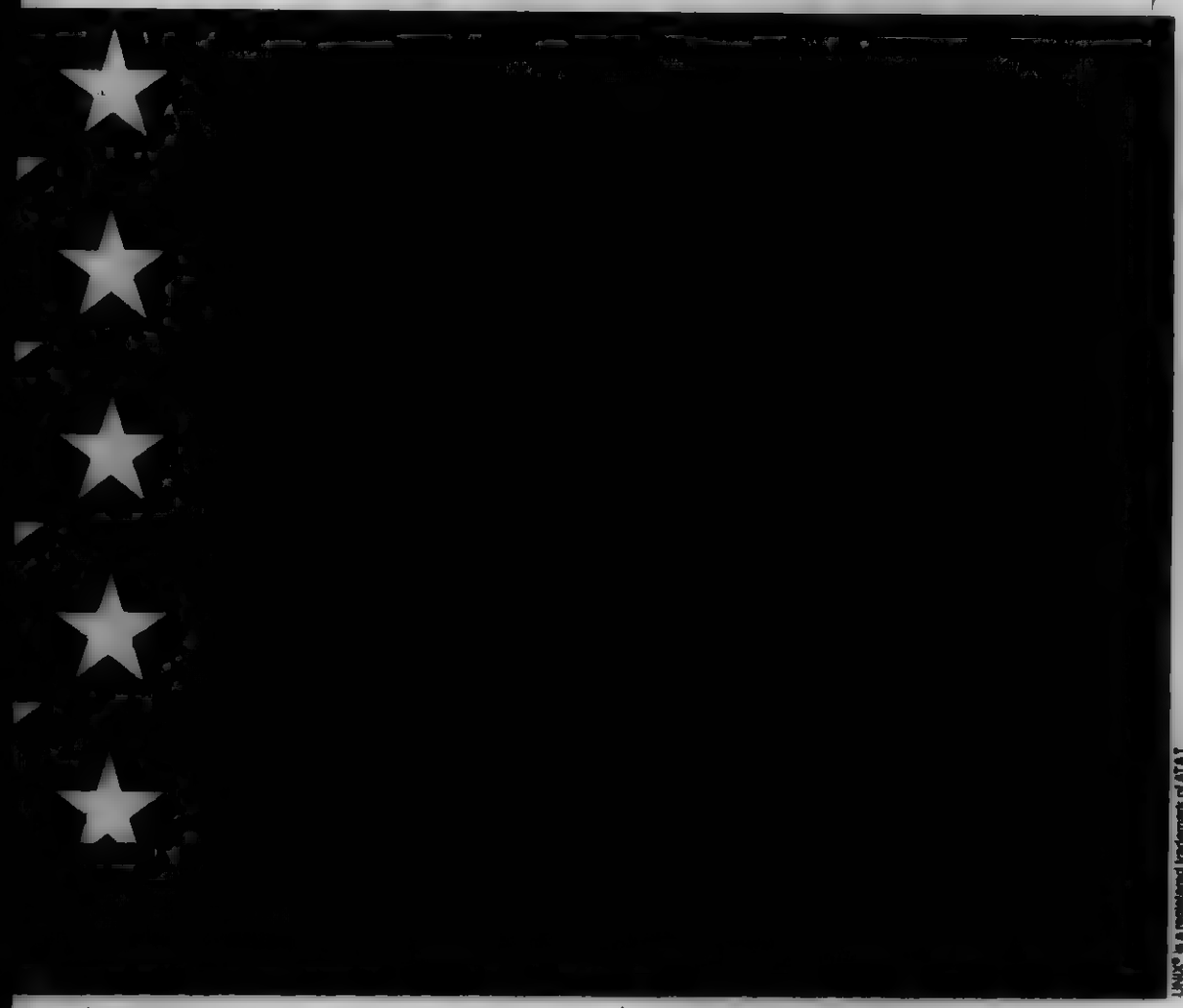
An Adobe Systems, Inc. Postscript upgrade kit, now available from Qume Corp., reportedly provides full Postscript desktop publishing capabilities for Qume Laserten and Laserten Plus printers.

Scripten includes a 10 page/min speed, 300 dot/in. resolution, 11 type families and 35 resident fonts. The upgrade has 3M bytes of memory and a 5,000 page/month duty cycle.

Interface compatibility extends to the Apple Computer, Inc. Macintosh, the IBM Personal Computer through Appletalk, RS-232 serial ports and Genicom Corp. Centronics parallel ports. Hewlett-Packard Co. Laserjet Plus emulation is also available.

Scripten costs $2,995.

Qume, 500 Yosemite Drive, Milpitas, Calif. 95035. 408-942-4000.



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Nixdorf Computer Corporation
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Telephone (617) 890-3600

The Best of Both Worlds

NIXDORF COMPUTER

DATA STREAM

Patricia Keefe

EDI: Handle with care

Final installment in a two-part series on EDI planning issues.

All those who have so far embraced electronic data interchange (EDI), with the exception of a few large pioneering suppliers, have either done so with reluctance or have been dragged kicking and screaming to the party by key accounts. But the times, they are a changin'.

There's a change in attitude sweeping leading-edge companies — and even a few on the blunt verge are beginning to approach EDI with the belief that if they can implement it *this* year, instead of *next* year, they'll be in a better competitive position. If they can cut the cost of goods sold and reduce order turnaround, then customers will want to deal with them.

In short, the sooner the switch to EDI, the better. That's good news, because it eliminates at least one major hurdle to launching an EDI system — gaining internal support. But you'll need a lot more than enthusiasm to reap EDI's rewards.

Once you've organized your task force, determined your needs, standardized on a specific technology and selected your vendor(s) [CW, May 16] — think small.

Even with the support of senior management, MIS and the affected departments, no one is

Continued on page 50

AT&T rollouts get big yawn

Inept marketing reportedly fails to take advantage of Starlan strengths

BY PATRICIA KEEFE
CW STAFF

ANALYSIS

AT&T's voluminous outpouring of products at Comdex/Spring '88 two weeks ago has so far failed to impress. The network-oriented cascade is depicted as catch-up, ho-hum products that will do little more than expand AT&T's capabilities in the proper, predictable directions.

Among the products announced were speedier versions of AT&T's Starlan network hardware and network software, bridges between local and geographically dispersed 1M- and 10M-bit Starlans, ISO Open Systems Interconnect compatibility, network management capabilities, a network hub, links to competitive office systems and enhanced 3B2 connectivity.

Not only is there a consensus of "too little too late," but many AT&T watchers seem almost more interested in the telecommunications monolith's ability, or lack thereof, to sell data connectivity.

Gotta move the product

AT&T needs a sales force dedicated to local-area networks to make a serious dent in that market, according to Marty Gruhn, a principal with Tempe, Ariz.-based Sierra Group. She said AT&T has considered attacking networks as a separate, distinct market.

But AT&T is stymied by its lingering telephony mind-set and does not understand data networks, claimed Clare Fleig, director of research at the International Technology Group in Los Altos, Calif. "They have an inability to get their act together." Gruhn agreed, adding that AT&T "is a profile of a company that can't get out of its primary market."

Long a criticism directed at AT&T's computer group, concerns about inept marketing are not helped by the departure of Data Systems Group head Vittorio Cassoni, who left AT&T to rejoin Ing. C. Olivetti & Co. Cassoni was replaced by former AT&T Chief Financial Officer Robert Kavner.

Despite Kavner's and Cassoni's efforts to assuage concerns about AT&T's continued participation in the computer market, a number of analysts and former AT&T employees maintain that Kavner knows very little about computers. More important, he is seen as a "green shade" who is not likely to look favorably on AT&T's thus far unspectacular network showing.

Despite being first to market with the 1M-bit Starlan in 1985,

Continued on page 46

Soviets link with local seller

BY PATRICIA KEEFE
CW STAFF

WASHINGTON, D.C. — A local reseller, armed with assistance from an international carrier and a local-area network, has developed a worldwide messaging system for the Soviet Embassy's information office that not only cut costs but also improved transmission reliability.

For the past 20 years, Ing. C. Olivetti & Co. has had a lock on a worldwide account with Novsti, the Soviet Press agency, according to David Pales, president of Ansat, Inc., an Olivetti dealer here. But locally, Novsti is serviced by area Olivetti dealerships like Ansat.

Pales was called in to link the information departments — mainly press and public relations — of the Soviet Embassy here with similar Soviet offices in New York and Canada.

The embassy faced a number of significant problems with its international communications system, both from a processing point of view and in terms of the quality of communications.

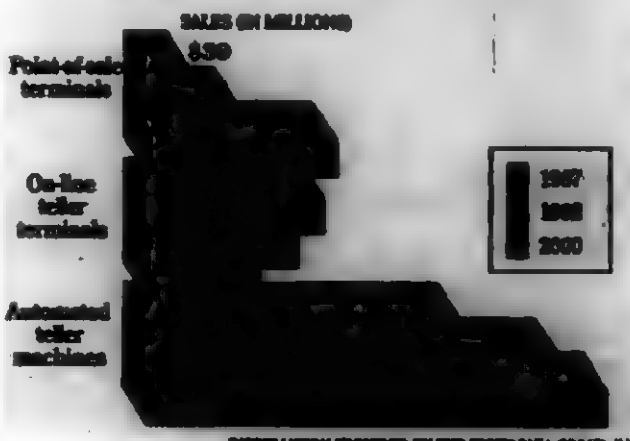
Messages sent between Moscow and Washington tend to consist of long articles. "It is not uncommon in this type of situation to experience substantial breaks in the communications," Pales said, adding that telex systems

Continued on page 50

Data View

Mixed future for electronic banking

By the turn of the century, on-line teller terminal sales are predicted to dip, while POS terminals take on upswing



INFORMATION PROVIDED BY THE FREEDONIA GROUP, INC.
CW CHART

MIS eclipses telecom star

BY PATRICIA KEEFE
CW STAFF

MARLBORO, Mass. — Although a major budget item and an area of strategic significance, communications appears not to have achieved a corresponding status within the organization.

Even given the separation of communications and data processing in many organizations, budget control still rests largely in the hands of the MIS department, according to the results of a recent study.

Published by The Market In

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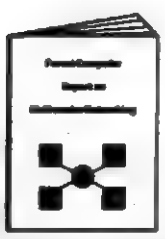
Inside

- Tandem to unveil supermini switch. Page 46.
- MCI links into X.400. Page 48.

Advice on Integrating IBM, DEC, HP, & Unisys Networks



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This report published by Forest Computer discusses networking solutions for multiple vendor environments. In it you will learn about:

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- Methods for using a multivendor network to reduce networking and computer costs.
- Each vendor's network architecture and connectivity solutions.
- Total solutions for developing a multivendor network.

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Tandem to unveil supernode switch

BY J. A. SAVAGE
CW STAFF

CUPERTINO, Calif. — Tandem Computers, Inc. plans to make inroads into the "virtual" phone number market with new switching technology slated to debut this summer.

The switches are said to use Tandem's high-end fault-tolerant hardware in combination with software supplied by Tandem Telecommunications Systems, Inc., formerly Integrated Technology, Inc., a Plano, Texas, firm recently acquired by Tandem. The software is called Service Control Point (SCP), a network interface, and Service Management System (SMS), a master data base.

The technology is referred to as "supernodes," which aim to off-load processing from phone company switches, allowing customer services to be available on demand.

Telecommunications is the fastest growing sector of Tandem's on-line transaction processing business, the vendor said. Bruce Dougherty, Tandem's telecommunications director, said he does not expect to see an impact from the phone service products until 1990, when production ramps up.

Stiff competition

But by that time, Tandem will be competing with IBM and Digital Equipment Corp. in the supernodes market, according to Steve Saxegari, an analyst with San Jose, Calif.-based Dataquest, Inc.

He said he expects the phone companies to install "one or two" of these types of systems in about 10% of the 19,000 central offices nationwide.

Tandem's telecommunications system should have its first SMS customer this summer. Tandem declined to identify the user.

Tandem's Dougherty

Tandem's Nonstop VLX mainframe supports the SCP software. The computer starts with two processors and can be expanded to 16.

An entry-level, short-term front-end processor, called a PMX, is now available to process 100 transaction/sec. for simple information access such as credit card authorization.

A processor featuring a DEC VME bus capable of 400 transaction/sec. is scheduled to be available this summer.

Yet a third processor in the planning stages, informally called the Signaling Terminal, is expected to double or triple that throughput.

"Once the [SCP] is in place, on top of it you can put in a virtual private-line network, billing validation, voice store-and-forwarding and/or electronic mail," Dougherty said. However, the telephone companies will have to write their own applications for these functions.

These applications and others will run on turnkey systems that off-load the intelligence from phone company switches, transferring it into the SCP software, Dougherty said. "The switch is then optimized to protect itself — making sure it's up all the time."

Pricing will be determined on a per-processor charge. The software platform will also be available in incremental charges.

Rabbit adds IBM link, board

BY PATRICIA KEEFE
CW STAFF

ATLANTA — Rabbit Software Corp. recently announced a coaxial link to IBM mainframes and an add-in board set for IBM Personal Computers, PC XTs, ATs and Personal System/2 Models 25 and 30.

Release 5.0 of Rabbitstation Coax, a control unit terminal-mode coaxial host connection, reportedly adds various levels of IBM 3278 and 3279 emulation support.

Rabbit already provides distribution function terminal-mode access.

Bundled options

The following options come bundled: IBM's IND$FILE file-transfer program, IBM-compatible high-level Language Applications Program Interface (API) 1.0, a low-level API interface support and Rabbitscript.

Other features include a coaxial communications adapter, complete documentation and either three 5¼-in. floppy disks or two 3½-in. floppies for the PS/2s, according to the company.

Release 5.0 costs $1,095. Current users of Rabbitstation Coax and Micro Plus, Inc.'s MP01 Coax can purchase an upgrade for $250.

The Rabbitcluster add-in board set reportedly combines the capabilities of a 3270 coaxial cluster controller and an ASCII protocol converter into one two-board add-in set.

This enables a micro to provide both coaxial and ASCII cluster controller functions without any impact on performance, according to the company.

Other features include an in-board processor and memory, support for up to 16 attached devices, including 3270-type devices, 3270/ASCII protocol conversions, 3299 terminal multiplexer support and a passive coaxial demultiplexer.

Future plans

Rabbit said future enhancements will include local-area network gateway support, distributed controller functionality across PCs on local-area networks, support for IBM's LU6.2 protocol and CCITT X.25 capabilities.

Pricing starts at $2,390 for the two-board set.

Users can purchase separately the host interface processor board or the coaxial interface board for $1,195 each, according to the company.

Hyperchannel series connects cross-vendor networks

BY JAMES DALY
CW STAFF

MINNEAPOLIS — Network Systems Corp. firmly planted its feet in the multivendor connectivity world recently with the introduction of an array of cross-vendor networking products.

The company's Hyperchannel-DX offering includes the new N130, which reportedly connects a Cray Research, Inc. supercomputer to a Hyperchannel-DX network using Cray's full-duplex 100M bit/sec. channel.

Network Systems also announced the N220, said to support any IBM or plug-compatible processor with a Federal Information Processing Standard channel, and the N400, which supports any minicomputer or workstation with a direct memory access channel. The new N700 connects one host computer or four networks with up to two high-speed T1 telephone lines.

Network Systems Chairman James E. Thornton said the introductions represent a new strategic direction for the data communications products maker.

"Network Systems has [spent] the past decade connecting a wide variety of computer and operating systems at high speed, mainly for large computer users," he said. Meanwhile, lower speed, single-purpose networks have proliferated, using different protocols and media, he added. It is precisely this market that the additions to the Hyperchannel series will address.

The Hyperchannel-DX products are built around a central nucleus consisting of a 16-MHz Motorola, Inc. processor, a central shared memory of between 1M and 16M bytes and a backplane bus operating at 400M bit/sec. that can accommodate up to 15 processor boards, the vendor said.

This hardware base is complemented by dedicated host and media interfaces, each of which has its own bit-slice processor and program memory. Multiple hosts and multiple networks reportedly can be connected to a single Hyperchannel-DX unit.

The company claimed the Hyperchannel-DX line allows networked computers to move data at up to 100M bit/sec.

In addition, Network Systems claimed the units can handle up to eight concurrent sessions, even between different networks using different protocols or mediums.

The products support traffic over twisted-pair, coaxial and fiber-optic cable, as well as industry standards such as Ethernet, Transmission Control Protocol/Internet Protocol and the emerging Fiber Distributed Data Interface, the vendor said.

The units are fully compatible with existing Hyperchannel-50 and Hyperchannel-10 products, as well as with Network Systems' IP Router, which connects Ethernet-based networks with a mainframe or supercomputer.

Prices for Hyperchannel-DX units range from $30,000 to $100,000 and will be available in the fourth quarter.

EDI book goes international

DALLAS — EDI, Spread the Word, publisher of the *EDI Yellow Pages*, has reached an exclusive agreement with Euromatica SA to provide the first international directory for electronic data interchange (EDI).

Brussels-based Euromatica currently publishes *Who's Who and What's What in Electronic Data Interchange*. The two publishers plan to merge their directories and provide free distribution to all listed companies.

Set for late August availability, the combined Edition III will contain 5,000 to 6,000 listings, a glossary, implementation tips and an international EDI calendar, the publishers claimed. Edition IV is slated for early 1989.

A joint proposal for consulting is under way. The firms also agreed in principle to cooperate on other EDI products.

More information is available from the U.S. publisher at Suite 100, 13805 Wooded Creek Drive, Dallas, Texas 75244. 214-243-3456.

AT&T rollouts

FROM PAGE 45

AT&T has never really capitalised on what was then the only network of consequence that ran over unshielded twisted-pair cabling. Starlan's impact was quickly blunted by a triple whammy consisting of a muddy marketing campaign; the announcement of IBM's Token-Ring network, which also runs over telephone cable; and a rash of cheaper Starlans.

There have been rumors off and on for two years about a 10M-bit Starlan running over ordinary telephone cable, but by the time AT&T delivered, it was already late to the party. Gruhn said "10M-bit Starlan [technology] hasn't been news for some time." Ethernet pioneers 3Com Corp., Digital Equipment Corp., Synoptics Communications, Inc. and Hewlett-Packard Co., among a number of other firms, have already released similar products or indicated plans to do so once IEEE's 10BaseT study group settles on the specifics of the standard.

Still, the picture is not totally black, according to Brad Baldwin, an analyst at Dataquest, Inc. He said 10M-bit Starlan is just gaining momentum due to greater user awareness and the emergence of a standard, adding that "AT&T should be able to step in as a major player." But others have wondered whether AT&T will miss this boat, too.

As for IBM's Token-Ring, AT&T seems to have finally confirmed a 4M-bit token-ring offering slated for delivery early next year. By then, IBM is expected to have shipped its 16M-bit Token-Ring hub and will be busy readying the release of a 100M-bit version. Don't forget that AT&T is the company that allegedly had a competing patent on token-ring technology and had the foresight to sell its rights to the current sole patent owner, Willemijn Holding BV of Rotterdam, the Netherlands.

The bottom line today for AT&T watchers, ever mindful of past disappointments, is whether AT&T networking will play in the Fortune 1,000.

If you can see the difference, you must be looking at the price.

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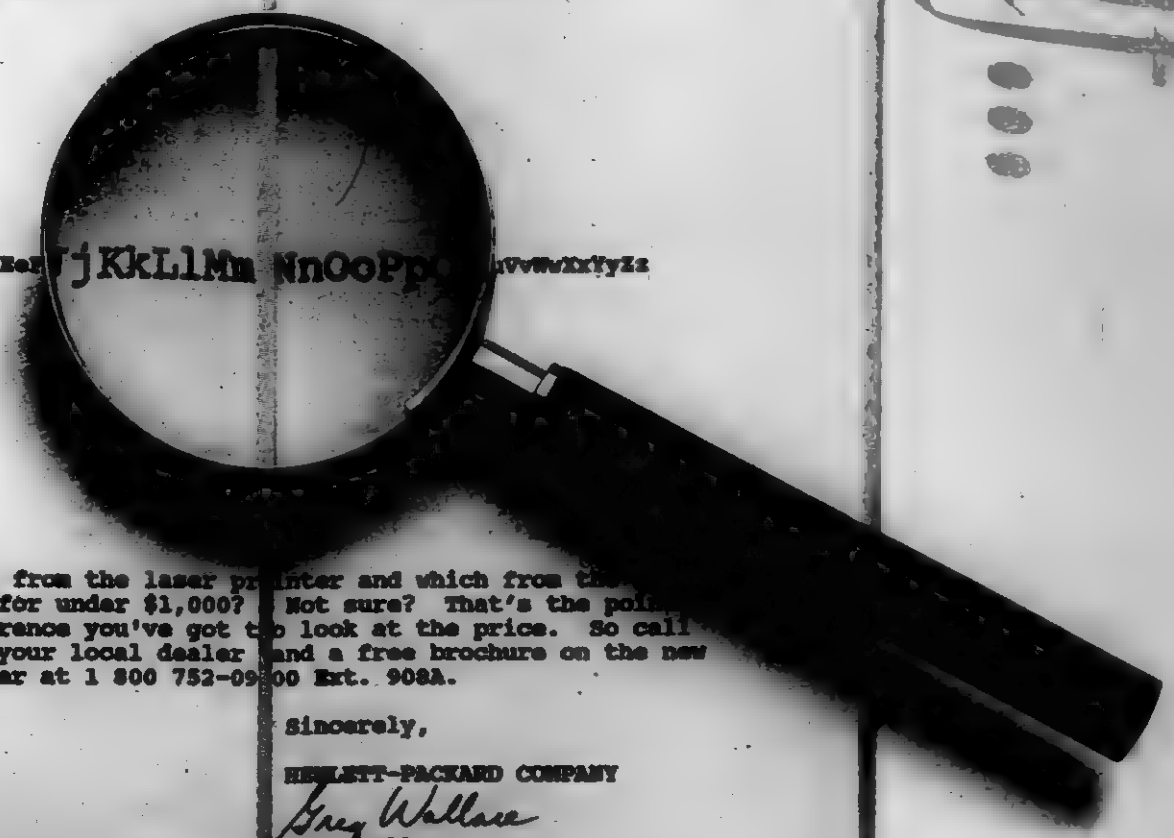

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BIT BLAST

ACC tool networks MVS, TCP/IP

Santa Barbara, Calif.-based **Advanced Computer Communications** (ACC) recently unveiled Version 2.1 of its Acces/MVS software said to link IBM mainframes running MVS to Transmission Control Protocol/Internet Protocol (TCP/IP) networks. Enhancements include operation with IBM security facilities, such as MVS System Authorization Facility, and with the IBM Continuously Executing Transfer Interface (CETI) protocol to provide higher throughput between IBM hosts and TCP/IP environments. Version 2.1 costs $17,000 for the basic software and $22,000 for Acces/MVS with CETI support. Also, ACC announced that **Intel Corp.** will resell Acces/MVS with its Fastpath control unit to users who want to link IBM mainframes to an Ethernet network.

Willemijn Holding BV in Rotterdam, Netherlands, has granted three licenses for its patented token-ring technology to **L. M. Ericsson** in Stockholm, **Proteon, Inc.** in Natick, Mass., and **Micom Systems, Inc.** in Simi Valley, Calif. Thirty licenses have already been granted.

On June 6, **Southwestern Bell Corp.** said it will flip the switch on the first domestic large-scale Integrated Services Digital Network (ISDN) service. Houston-based **Tenneco, Inc.** will put the first of 5,000 ISDN lines into service next week, cutting over 900 lines by the end of June and another 3,500 by year's end.

ACS Network Systems has joined IBM's Industry Marketing Assistance Program and will supply **IBM Information Services Network** customers with electronic data interchange (EDI) software for the IBM System/36 and 38 computers. ACS also announced a joint-marketing deal with **Control Data Corp.** System/36 and 38 users will gain access to Control Data's Rednet services via ACS's EDI/36 and EDI/38 software.

Tandem Computers, Inc. in Cupertino, Calif., has agreed to resell **Netlink, Inc.'s** SNA Hub to Tandem users. The pact enables Tandem to connect its Nonstop systems with IBM's Systems Network Architecture. Tandem owns an equity interest in Netlink, which is located in Raleigh N.C.

Cincom Systems, Inc. in Cincinnati and Japan-based **Fujitsu Ltd.** have signed a technical cooperation agreement that reportedly will ease conversion of Cincom's Supra relational data base management system, Mantis application development software and Netmaster network management package to the Fujitsu environment.

Dallas-based **International Communications Association** (ICA) is offering T1 network training at its third-annual summer program June 19-24. The University of Colorado at Boulder seminar costs $900 for ICA members and $1,000 for nonmembers. Registration deadline is today.

The **Federal Communications Commission** last month formally withdrew its highly controversial proposal to raise the access charges for value-added networks by about $4.50 per hour. The FCC said it has abandoned the idea because the higher charges would disrupt the enhanced-services industry, which already faces substantial regulatory changes under the Open Network Architecture scheme and modifications to the AT&T divestiture order.

AT&T will waive nonrecurring charges for installation of AT&T international 800 telephone service for orders placed through Sept. 30 and for services installed between April 4 and Dec. 31, 1988. Waived charges include the standard $99 service-order charge, which covers AT&T international 800 service from one country; the $99 access capability charge for each additional country; and the $175 installation charge for each access line.

Two guides are available for users eager to fathom host connectivity. *A Guide to Advanced 3270 Micro-Mainframe Connectivity* is available free from **Attachmate Corp.** The booklet explains how to use the extended features that are available under the current generation of micro-to-mainframe software. Topics include CUT vs. DFT protocols, multiple mainframe sessions, file transfer alternatives and printer emulation, a glossary and a checklist of product evaluations.

A second booklet, *IBM Mainframe Connectivity for PC LANs*, is offered free by **Data Interface Systems Corp.** The guide is "heavy on buzzwords and practical definitions and light on formal definition and precise shadings of technical esoterica." The focus is not on asynchronous terminal emulations or links to minicomputers. It addresses, instead, IBM's Systems Network Architecture and Synchronous Data Link Control, 3270 systems and IBM's Systems Application Architecture.

Gateway Communications, Inc. said it has released a high-speed gateway for Novell, Inc. Netware-based local-area networks. The $1,695 G/X25 gateway is said to allow connections into mainframes, minicomputers and personal computers through public and private packet networks.

Responding to the "double-charging" problem faced by EDI users, **McDonnell Douglas Network Systems Co.** said it will offer its customers a no-cost gateway service into other public EDI networks as of Aug. 1. A McDonnell Douglas EDI Net user can internetwork with a user of another EDI network for exactly the same fee it costs to communicate with another EDI Net mailbox. Also, the new policy for EDI Net customers will discount the delivery of EDI messages via another public network by 33% and will discount the receipt of similar messages by 50%.

MCI latches onto X.400 bandwagon

RYE BROOK, N.Y. — MCI Communications Corp. jumped aboard the X.400 bandwagon last week with its announcement of MCI Mail Xchange 400, an X.400 gateway for MCI Mail.

Scheduled to be available in July, the product was demonstrated at last week's International Communications Association conference, which was held in Anaheim, Calif.

Xchange 400 reportedly offers MCI Mail customers the ability to exchange messages with interconnected private and public electronic mail systems conforming to CCITT X.400 recommendations.

The gateway reportedly provides users implementing private X.400 systems with access to all MCI Mail delivery services, including electronic, telex, postal and courier deliveries worldwide.

Xchange 400 is also fully integrated with MCI's links to personal computers, local-area networks and office automation systems.

Xchange 400 is based on Digital Equipment Corp.'s Message Router X.400 and Open Systems Interconnect-based networking technology.

MCI said it will price the service based on standard messaging rates and the basic packet-switched transport charges required for access to Xchange 400.

MIS eclipses

FROM PAGE 45

formation Center, Inc., the study is based on responses from public and private-sector organizations in which the average communications budget approaches $12 million corporatewide vs. about $2.5 million for individual sites.

Responses to budgeting questions depicted a strong role for MIS. In a little over one-third of the 584 sites surveyed, the communications function reports to the MIS department. Nearly 60% said that their budgets were either partially or fully administered to by the MIS department. The remaining 41% have more autonomy in handling their own budgets.

The study, called "Telecommunications Organizational Structures," also found that the larger the organization, the less likely the person responsible for communications would sport an executive-level title.

Almost half the local, or individual site, communications department heads, along with 40% of their companywide compatriots, carry a title that is a variant of coordinator, supervisor or manager.

This does not compare favorably with typical MIS titles, such as vice-president or director.

Staffs linked

In addition, a number of firms, including some with very large communications budgets, said they do not have a separate communications staff, distinct from MIS/DP. Of 36 firms that do not separate staff by function, 10 are spending upward of $1 million in all U.S. locations, and four of those are spending in excess of $5 million, the report said.

At companies in which dedicated communications staffs exist, they tend to be small. Overall, these employees represent a mere 1.6% of the total technical staff at the sites surveyed. The average number of communications staff employees is 21 at the site level and 125 at all U.S. locations, although the medians are considerably smaller, at four and six, respectively.

Despite these patterns — which might lead some to conclude that the communications function is not valued within the Fortune 1,000 — study respondents thought senior management has a high regard for communications.

On a scale of 1 to 5, with 5 being the highest, the average communications manager placed the value of connectivity to upper management at 3.4, with the most common score being 4.

Even so, there seems little doubt that MIS remains closer to the heart of the executive office.

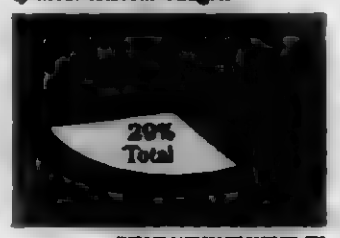
When comparing the communications function with MIS/DP, only 10% of the sample suggested communications was of more value to senior management. The majority, 47%, said the two capabilities were valued equally, while 43% claimed MIS/DP is more highly regarded.

More than two-thirds of the study's respondents had multisite environments linked by expansive corporate voice/data networks.

The study also examined reporting structures, staffing levels, budgeting practices and service and maintenance issues.

In control

A survey of 600 firms shows that MIS oversees at least some part of most telecom budgets



INFORMATION PROVIDED BY THE MARKET INFORMATION CENTER, INC.
CW CHART

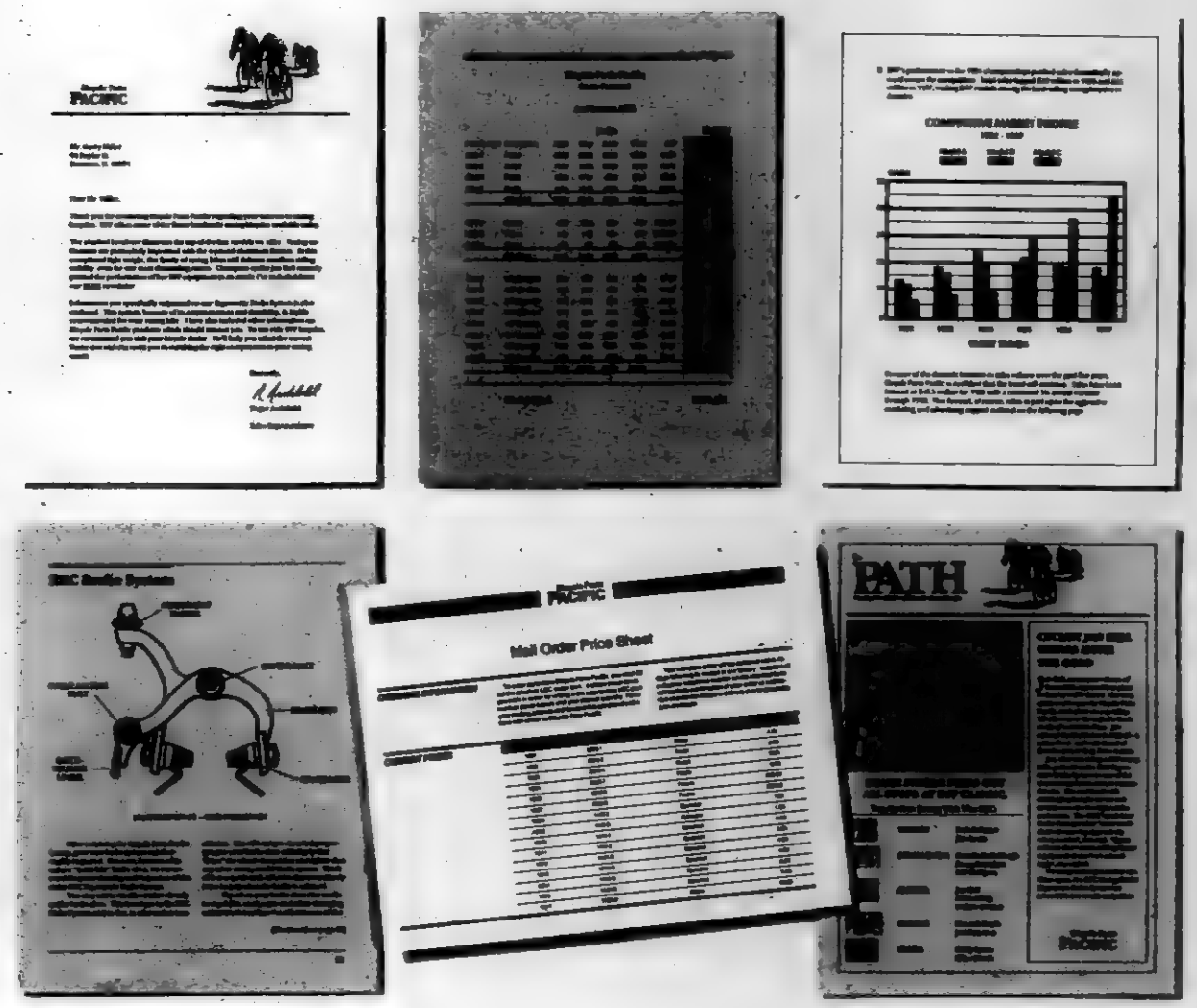
About 85% of the respondents said their communications function was handled centrally by senior-level management, making major decisions concerning enterprisewide networking strategy.

Not surprisingly, the report found that both service and network management expenditures are expected to increase as a percentage of the communications budget in the next three to five years. Network management consumes, on average, 17% of the budget, with 22% of the sample indicating those expenses form more than 25% of the communications allowance.

Despite difficulties in finding skilled personnel, 37% of the respondents said they expect to meet their increasing service needs by adding staff. A roughly similar number want to increase the support they get from product and service vendors, with the rest looking to third-party suppliers. However, a recent report focusing on user service and maintenance concerns [CW, May 2] indicated that it is difficult to obtain reliable service and support outside the company.

Perhaps due in part to these concerns, the survey respondents overwhelmingly predicted that managing communications will become more difficult during the next three to five years. Increasing technological complexity topped a long list of reasons, followed by network growth and organizational issues. User demand was not a major factor, nor were deregulation or divestiture seen as sources of future difficulty.

How to look good from start...



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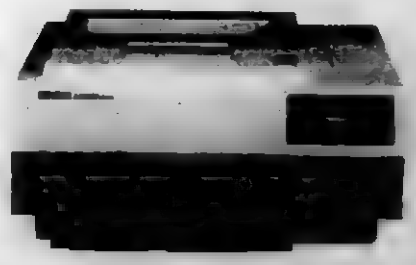

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Keefe

FROM PAGE 45

going to back a cold-turkey, gut-wrenching overthrow of the current paper transaction system. So most consultants recommend picking one activity or department as a pilot site. Microcomputer-based EDI systems can be had for $3,000.

The EDI task force can then go to upper management and document how and where they were able to save thousands of dollars.

Think long-term when evaluating that pilot. Which EDI solution can be most easily integrated into your enterprisewide system? Most EDI today is done bisynchronously, according to David Taylor, a program director at the Gartner Group in Stamford, Conn. Conversely, 70% of corporate networks are IBM Systems Network Architecture (SNA), which is synchronous. "So the real issue is, How quickly can the EDI vendor support SNA?" Taylor says.

Further easing integration are a number of application software vendors, among them McCormack & Dodge and Management Science America, that are building EDI translators and communications software into their products, Taylor adds.

Whether you're dealing with a pilot or a full-blown implementation, there are number of technical issues lurking below the surface.

Until an EDI system demonstrates 100% reliability, Taylor strongly advises running the electronic system in parallel with manual procedures. "This is not some kind of electronic mail system; you are messing with the fundamentals of the business." His point is well taken.

What if?

While EDI consultants such as Thomas Nolle, president of Haddonfield, N.J.-based CIMI Corp., see few if any problems with receipt of EDI messages, what if there was a problem?

Many on-line transaction processing systems include some form of store-and-forward processing. Taylor points to the X.400 standard or IBM's SNA Distribution Services, or SNADS, as two examples. But Nolle estimates less than 10% of EDI users are capable of receiving X.400 messages. He also doubts whether most inventory or accounting systems have any reason to interface with a document exchange system such as SNADS. Nevertheless, Taylor notes that fault-tolerant system vendors are beginning to appear at EDI shows.

Security is another issue. Financial institutions use verification, a form of encryption. This not only protects the message from alteration but also makes sure that no one intercepting the transmission can read it. Another route is authentication, which is essentially an electronic signature.

Finally, both Nolle and Taylor agree that the biggest problem likely to face EDI users is neither message transmission nor receipt, but rather responsibility issues.

Trading partners need to hammer out who is responsible for inadvertent mistakes in orders. If you mistakenly order 100 cases of grapefruit vs. the 10 you need, are you stuck with the order?

This is by no means an exhaustive list of EDI pitfalls, but it should provide some food for thought.

Keefe is a Computerworld senior editor, networking.

Soviets

FROM PAGE 45

were not designed to handle long messages.

The embassy experienced problems with its packet network-based MCI Mail service from MCI Communications Corp. "It just did not work, because lines went down in the middle of the message, resulting in a considerable amount of revenue generated by the customer in order to retransmit."

Ansat designed a telex network working closely with international carriers such as MCI International.

Ansat's replacement for MCI Mail uses MCI International's mix of hard-wire cable, transatlantic cable and satellite service. "Traffic [on this network] is a more reliable service [than a packet network], which basically provides an automatic transmission of several thousand messages at once to hub locations for redistribution," Pales explained, referring to MCI Mail.

To reduce costs and improve the quality of data transmission, Ansat built a personal computer-based telex network, using 10Net Communications, Inc.'s 10Net network. Unlike most telex approaches, an attendant is not required, and messages are accessible on the LAN.

Messages sent via satellite are captured on the communications server, or telex, and are transferred to the network file server. Ansat wrote the necessary programming instructions for this as part of an overall network program it designed.

The 15-node network consists of Olivetti's Intel Corp. 8086-based processor as the file server, featuring two large disk drives for redundant processing, and another Intel 80286-based communications server.

Ansat considered Novell, Inc.'s Netware network operating system but rejected it for two reasons: distribution and simplicity. Since Olivetti resells 10Net, it can provide good support for the network worldwide, Pales reasoned.

"Considering that the system will be installed worldwide [at other embassy press offices], we wanted to use something simple," Pales said. 10Net is Microsoft Corp. MS-DOS transparent, he said, claiming that Novell is not. Also, a Novell network installed in another country reportedly does not work as well as the system Pales installed.

Pales said he expects local Olivetti dealerships around the world will tend to the local embassy's network. "Our primary coverage is Washington, D.C., although we provide Moscow directly with software support, design assistance and communications procedures."

For example, during last year's summit between the U.S. and the Soviet Union, Ansat's network interacted with Moscow on an almost hourly basis in terms of worldwide communication. It also helped produce several publications on the summit. And in December 1987, the network sent out several thousand messages daily over MCI International. "We were in constant touch with different embassy offices around the world, verifying what they had received or transmitted," Pales recalled.

NEW PRODUCTS

Local-area network hardware

A series of intelligent data switch products that provide connection for RS-232 devices has been announced by **Quanitronics, Inc.**

The **Q-8000** has eight bidirectional, individually addressable asynchronous ports and up to 1M byte of memory. The switch allows computers to share a laser printer, a plotter, a modem or other asynchronous peripherals.

The **Q-8010** and the **Q-8020** include two synchronous RS-232 ports in addition to the eight asynchronous ports and 256K bytes of memory. The Q-8020 performs all necessary protocol conversion.

The Q-8000, Q-8010 and Q-8020 cost $795, $1,295 and $995, respectively.

Quanitronics, 211 Vandale Drive, Houston, Pa. 15342. 800-245-4192.

Datagram Corp. has reportedly enhanced its DM408 Steamer, a product that enables users to configure local-area networks in a triangular topology.

The company defines triangular topology as having three different sites interconnected via three different circuits. In the event that one network goes down, the user can choose an alternate path on either of the remaining two, the vendor said.

Datagram's *DM408/T*

The **DM408/T**, which is currently shipping, uses a proprietary compression algorithm for traffic load reduction on data circuits.

The DM408/T costs $1,100.

Datagram, 11 Main St., East Greenwich, R.I. 02818. 401-885-4840.

Local-area network software

A communications software package that features network modem pool management, CCITT X.25 access, user-defined terminal emulations and installable protocols has been released by **Quantum Software Systems, Ltd.**

The **Qterm Communications Package** includes an interpreter for the QNX language that allows programmers to write scripts that can automatically perform operations on a remote system.

The Qterm Communications Package costs $150 for a non-networked version.

Quantum, 175 Terrence Matthews Crescent, Kanata, Ont. K2M 1W8. 613-591-0931.

Network management

ADC Telecommunications, Inc. has announced **NUMARC**, a network utilization monitoring, alerting, reporting and control console. The product is said to be especially suited to multivendor environments.

The system includes a Microsoft Corp. MS-DOS-based color control console and rack-mounted hardware for reporting and storing statistics. NUMARC interfaces with the network on the physical level and is transparent to speed and protocol.

NUMARC costs $28,000 for a 1,000-line system and is available in different configurations.

ADC, 4900 W. 78th St., Minneapolis, Minn. 55435. 612-835-6800.

Links

CF Software, Inc. has announced **PC Mainframe 3.0**, an intelligent micro-to-mainframe link. New features include a scripting facility for terminal emulation, conditional logic and automated operation of all IBM 3270 functions.

PC Mainframe 3.0 is available at no charge to customers who have paid current maintenance fees. The package is priced at $7,500 for IBM DOS/VSE sites and $10,000 for IBM MVS sites.

CF Software, Suite 201, 2454 E. Dempster, Des Plaines, Iowa 60016. 312-824-7180.

White Crane Systems, Inc. has announced **Version 2.0** of the **Brooklyn Bridge** file transfer utility. The upgrade adds a dual directory display file manager and a menu system to the product, and it includes four DOS utilities.

The Brooklyn Bridge allows users to transfer data between IBM Personal Computers and compatibles and permits access to printers, plotters and tape backup systems. A version is available that supports the Data General Corp. DG One laptop, the vendor said.

Version 2.0 costs $139.95 for the IBM or DG versions and $199 for the Victor 9000.

White Crane, Suite 151, 6889 Peachtree Industrial Blvd., Norcross, Ga. 30092. 404-394-3119.

Security

Pulse Data Systems, Inc. has announced two software products for ensuring data communication privacy in the personal computer environment.

Secom was designed for point-to-point communications and allows file transfer and remote operation. Based on the Data Encryption Standard (DES), the package is menu-driven and provides Digital Equipment Corp., IBM or Televideo Systems, Inc. terminal emulation. Secom runs on the IBM Personal Computer, PC XT, AT or compatibles.

Secom costs $295.

PC-Cipher 2400 also runs on the IBM PC, PC XT, AT and compatible systems and includes a single-slot board with a Hayes Microcomputer Products, Inc.-compatible modem and a DES 64-bit algorithm encryption. The full-duplex modem offers 300, 600, 1,200 or 2,400 bit/sec. transmission.

PC-Cipher costs $695.

Pulse Data Systems, 12101 Indian Creek Court, Beltsville, Md. 20705. 301-725-4445.

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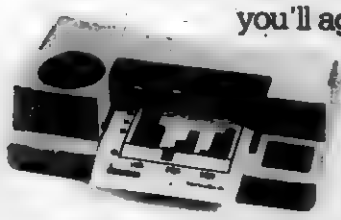

All you need is a Hewlett-Packard ColorPro Plotter like we used here, or the HP PaintJet Color Graphics Printer. Together with a PC—IBM compatible or Apple Macintosh—you can use all the popular graphics software like Lotus Freelance Plus, Cricket Presents, HP's Graphics Gallery (used below), Microsoft Chart and Harvard Graphics.

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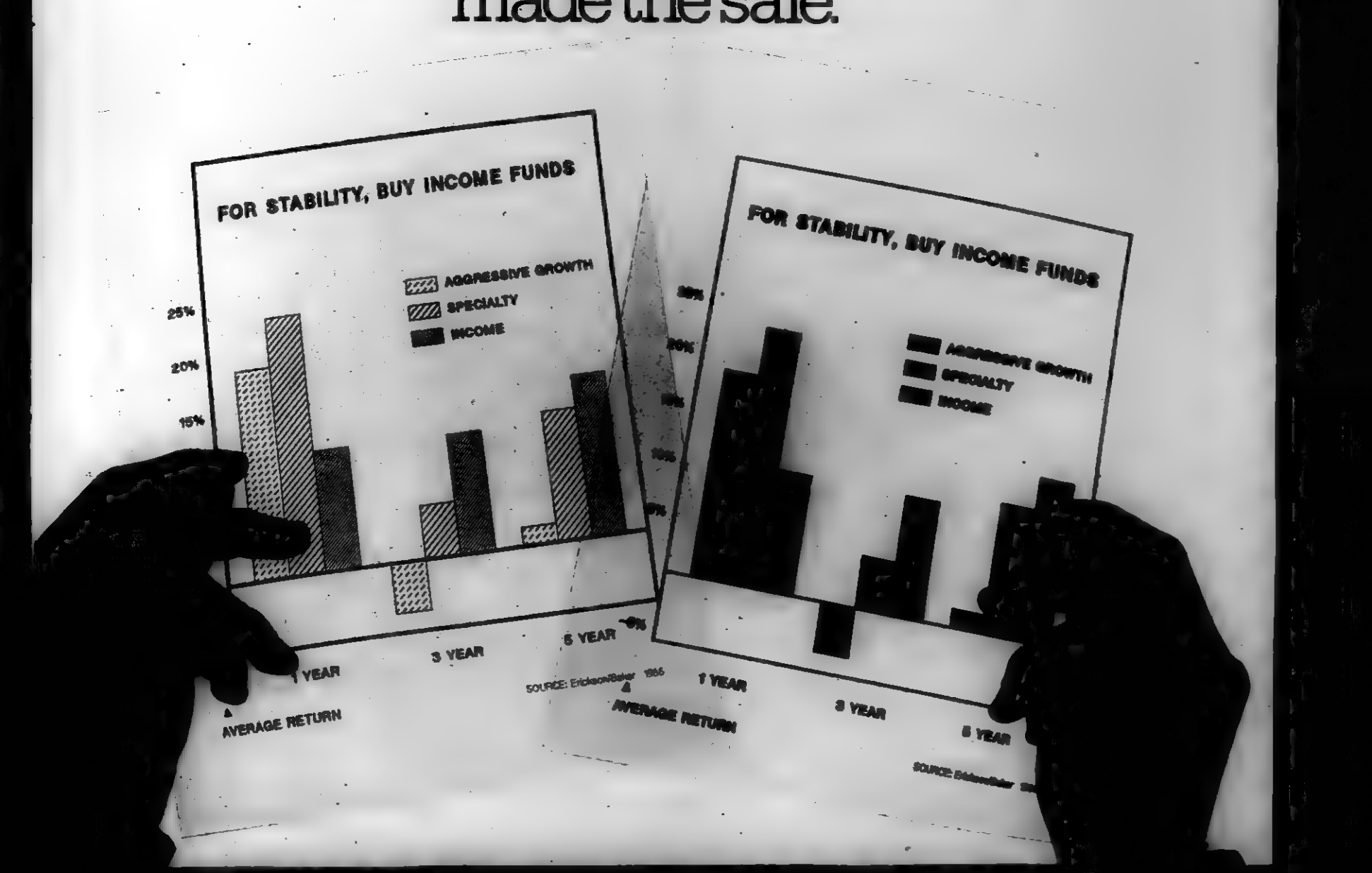

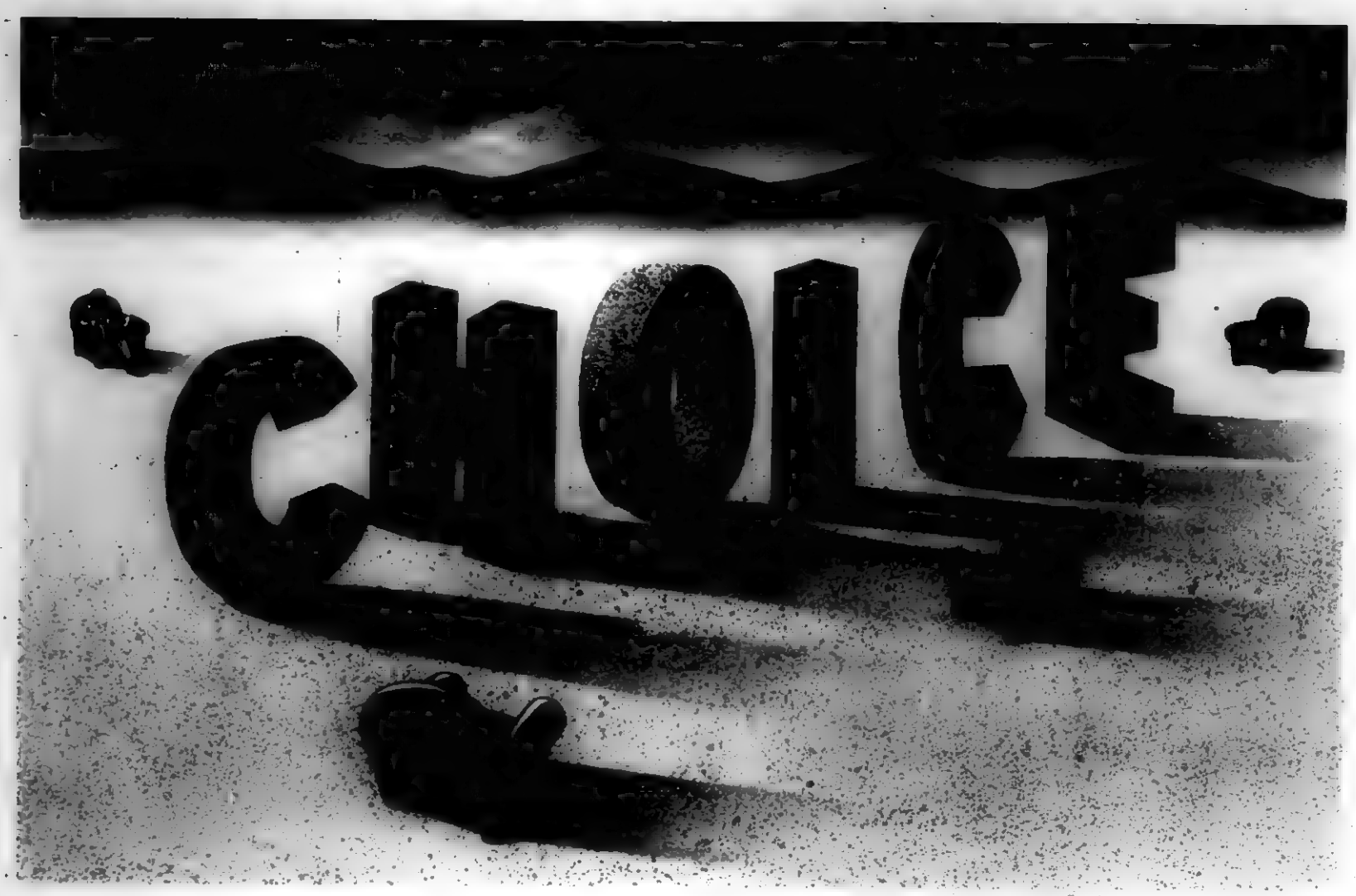

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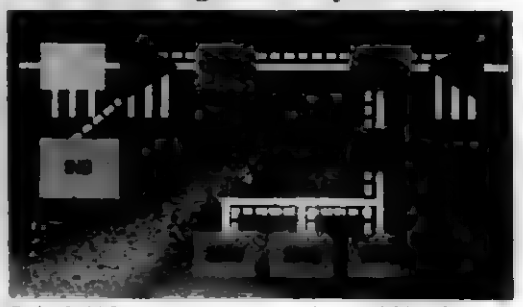

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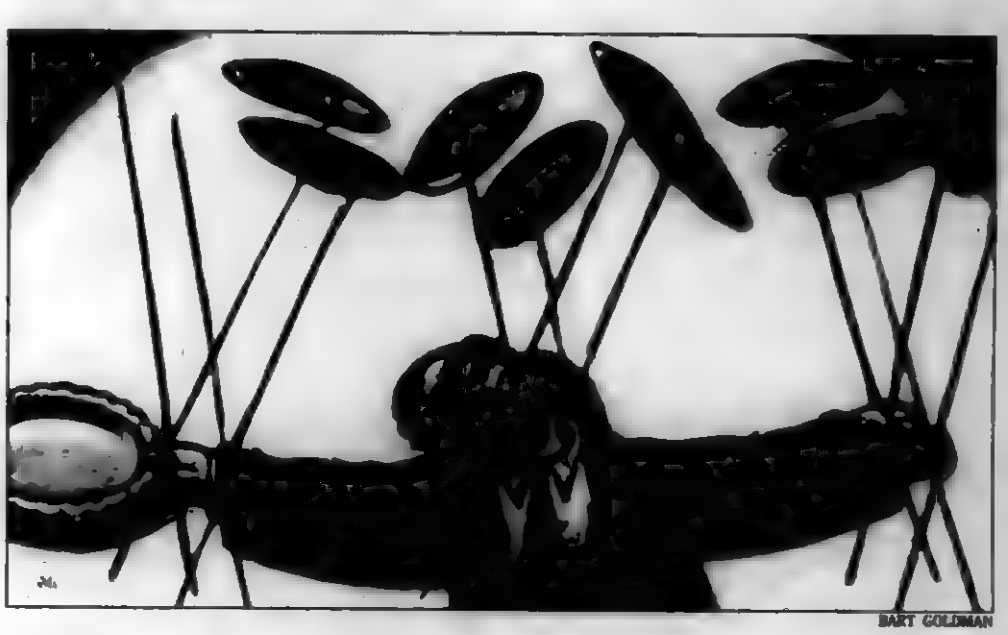
Organizations are groping for tools and techniques to help them bring local-area networks into the backbone orbit

PULLING LANS INTO THE ACT

BY LEE SUSTAR



BART GOLDMAN

Pfizer, Inc. is about to stage a roundup. After several years of unchecked local-area network development, the New York-based pharmaceuticals company has decided the time has come to impose some accountability on its scattered LAN installations. The way to do this, the company has determined, is to tie the LANs into a larger network configuration — specifically, the corporate Systems Network Architecture (SNA) backbone.

"We don't have one entity that knows where all the LANs are right now," says John Mraich, manager of technical services. "At this point, we recognize that there is a requirement to link our LANs to some kind of backbone."

The effort is still in its earliest stages. According to Vincent Costa, data communications manager, the firm is only now entering a pilot stage to integrate LANs with its backbone wide-area network. Initially, he says, the project will be based in the New York headquarters, which contains one of the 64 data centers that the company maintains throughout the world.

Pfizer's objective in pursuing this integration effort is more than just census taking. It also hopes that physical connection will help raise the standards of information handling at the local level. As Pfizer's MIS staff asserts control over the company's LANs using IBM's Netview network management facility to monitor traffic and the points at which the LANs interface to the backbone, personal computer users will have to adopt a more professional attitude toward their computers, Mraich says. LANs carry with them the "implication of a certain informality that begins to go away when you decide to install a gateway" to the corporate backbone network, he says.

Like Pfizer, most U.S. organizations acquired their current LAN populations without design or plan as relatively autonomous groups of users snapped up PC LANs on an as-needed basis.

In the 1980s, PCs boosted office productivity and became cornerstones for mini information systems outside large companies' MIS departments. By the middle of the decade, emerging work groups had spawned a technically competent cadre outside of MIS. It was these outsiders who pushed LAN development. And as LANs got cheaper and easier to use, they began to surround mainframe-based wide-area computer networks like vines on an aging building. But vines, while attractive, can also obstruct the view.

Many companies are now reaching the conclusion that these strays must be gathered back into the mainstream of corporate computing, not only for the sake of accountability but also for improved efficiency for locally networked users, some of whom are beginning to suffer from the limitations inherent in their independent status. LANs, these users are discovering, are no help when you need fast access to information residing in a data base on the corporate mainframe.

What companies are coming to realize, says Mark Leary, director of communications market research at International Data Corp., is that some form of LAN-to-wide-area network interaction is critical in order to make effective use of distributed computing power. "I'd say most people are at least thinking about it now," he says. "You can't

Sustar is a New York-based free-lance writer.

LAN act

FROM PRECEDING PAGE

really have a well-planned networking strategy unless you do."

The problem is that unification is not always a straightforward process. Until recently, most corporate LANs were installed with little regard to how they might be interconnected or linked to established data networks. Users who wished to tie PCs to wide-area networks found few vendors available to help them.

Although several vendors offered bridges and gateways between incompatible LANs in the same environment and Banyan Systems, Inc. provided a Unix-based LAN server designed for wide-area communications, Vitalink Communications Corp. in Fremont, Calif., was one of the few companies specializing in building high-speed links between geographically diverse work group LANs and other processors.

The company's 802 WAN was perhaps the industry's first comprehensive effort to solve the problem, and its Translan product, announced in January, strengthened the network management facilities of the Vitalink product line.

Vitalink is no longer playing alone, however. A number of companies have spotted potential in a market that analyst George Colony calls network "spans" — routers, repeaters, bridges and gateways that span the gap between scattered LANs and corporate backbone networks. Colony, president of Forrester Research, Inc. in Cambridge, Mass., predicts that shipments of network spans will rise to $92 million this year, a $34 million increase over last year, and will hit $550 million by 1991. Indeed, there is nowhere to go but up. Colony estimates that no more than 3% of LANs are genuinely integrated with wide-area networks.

Merger mania

Eager to assimilate this technology, computer vendors are snapping up LAN vendors: Tandem Computer, Inc. purchased LAN pioneer Ungermann-Bass, Inc.; 3Com Corp. merged with Bridge Communications, Inc. and allied itself with Microsoft Corp.; Hewlett-Packard Co. launched its own X.25 packet-switching network; T1 vendor Network Equipment Technologies, Inc. (NET) bought Excelan, Inc.; Digital Communications Associates, Inc. acquired Fox Research, Inc.; and Unisys Corp. purchased Timeplex, Inc. Many analysts doubt that any independent LAN vendors will survive this consolidation.

Furthermore, the growing demand for LAN and wide-area network links has attracted several other firms — including San Jose, Calif.-based Halley Systems, Inc., Wellfleet Communications, Inc. in Bedford, Mass., and Advanced Computer Communications in Santa Barbara, Calif. — to the LAN interconnect market.

> "T1 IS becoming more cost-effective, and you can put voice over it as well."
>
> WILLIAM CARRICO
> 3COM CORP.

Ed Moura, a spokesman for Halley Systems, says most companies go through three phases on the way to linking LANs and wide-area networks. First, he says, users who have experienced a productive work group environment "start building more and more applications and want to expand out of workgroup-centric systems."

When that happens, organizations typically construct some sort of gateway into the main host system, along with access to asynchronous communications such as MCI Communications Corp.'s MCI Mail. The third step, he says, is bridging and routing of LANs for the transparent interconnection of work groups.

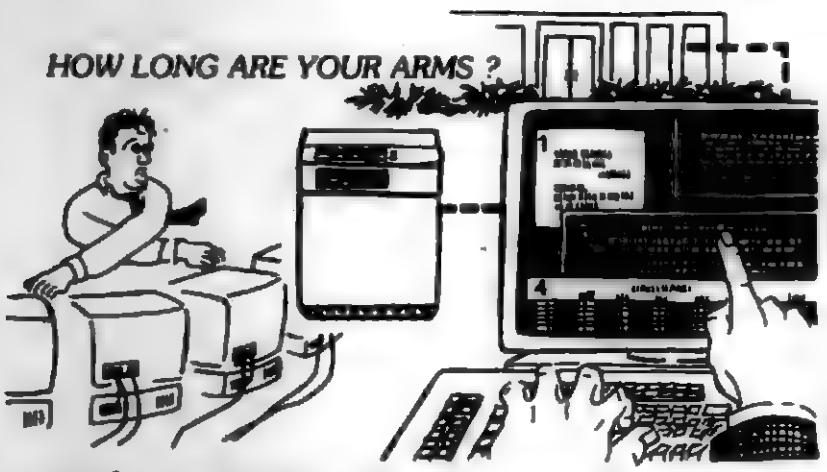
Like Vitalink, Halley Systems chose to bring wide-area technology to the local environment, Moura says. The company's Connect LAN, announced in March, is built on hybrid bridges and routers, or "brouters," which connect multiple Ethernet LANs. It also features modems for asynchronous and synchronous transmissions up to 64K bit/sec. over T1 and satellite links. These brouters are managed by Connect LAN/View, a network management product.

Wellfleet Communications, which bills itself as a specialist in networking networks, features a product line similar to Halley Systems' and Vitalink's.

Its communications servers include a concentrator node, which attaches up to 26 LANs directly to up to 52 wide-area networks, including T1 circuits. A link node performs similar functions for smaller networks. A processor module, known as the Advanced Communications Engine, provides Technical Control Protocol/Internet Protocol (TCP/IP) and Digital Equipment Corp. Decnet routers as well as a learning bridge.

These products were originally developed for university and scientific and technical users of DEC workstations and minicomputers, says Mark Strangio, director of marketing at Wellfleet. But with powerful, graphics-oriented workstations supplanting PCs on the desktop, Wellfleet identified an opportunity for its high-bandwidth solutions.

Gary Krall, director of marketing at Advanced Computer Communications, says his company is targeting a somewhat different market with its ACS 4030 Remote Ethernet Bridge. This protocol-independent device links separate Ethernet LANs through either asynchronous lines or CCITT X.25 public packet-switched networks. But it does not have the routing intelligence of either the Vitalink or



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Halley Systems products.

"We think the direction things are taking is to dedicated servers," Krall says. "They will provide the LAN-to-wide-area network interconnectivity. The bridge market will remain protocol independent, sending and receiving packets or using X.25 to provide connectivity."

The emergence of companies specializing in LAN-to-wide-area network integration will also force today's LAN vendors to rethink their businesses, says William Carrico, president of 3Com. Carrico, who ran Bridge Communications prior to its purchase by 3Com, says the merged company is pushing beyond the purchasers of work group LANs in an effort to get the attention of executives who design and purchase telecommunications equipment — those whose budgets for communications equipment run into the millions of dollars, he says.

EVEN IF the products for LAN-to-wide-area network integration are out there, the expertise required to install them is in short supply.

Carrico is among those who expect T1 circuits to play an increasingly important role in internetworking LANs. "It's becoming more cost-effective, and you can put voice over it as well," he says. T3 technology and Integrated Services Digital Network (ISDN) will also be in demand in the future, because high-end users "can never get enough bandwidth," he says.

Test of skills

Even if the products for LAN-to-wide-area network integration are out there, the expertise required to install them is in short supply. David McMaster, president and chief executive officer of Gateway Communications, Inc., warns that since no single vendor will be able to provide comprehensive network management, users will have to become more skillful at systems integration than they are today. "Most networks today are poorly managed," he says.

The necessity of developing complex hybrid networks of public and private facilities, along with uncertainty about future deregulation, has made it difficult for large corporations to map out a long-term strategy for wide-area networks, let alone develop the seamless integration of PC LANs.

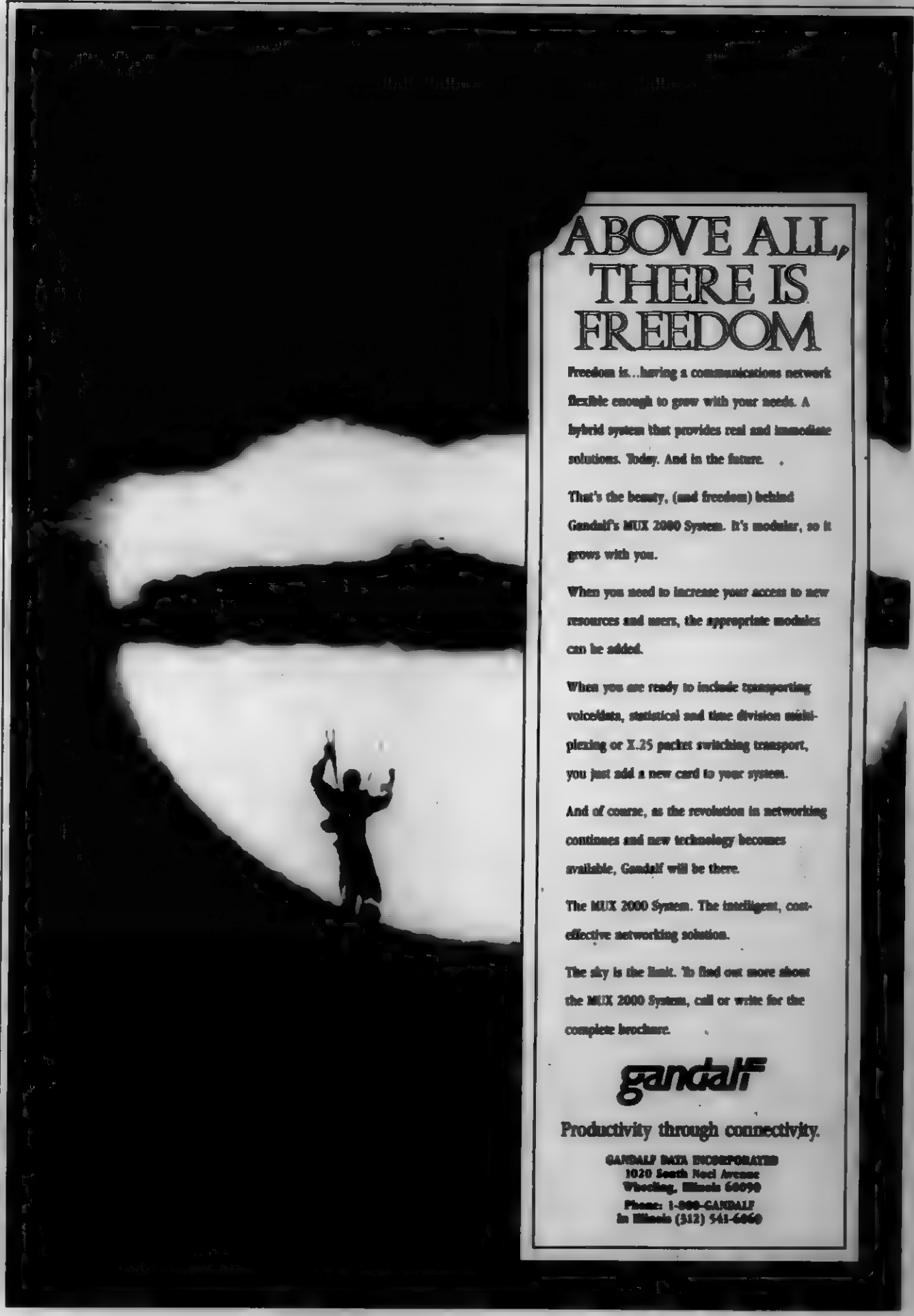
Whereas companies could once turn to the Bell system to solve the bulk of their needs, firms must now piece together services from each of the regional Bell holding companies, as well as from AT&T and other common carriers. For example, many of the regional holding companies offer leased lines and packet networks as well as the so-called central office LANs, which provide Centrex-type services to PC users. Within a few years, ISDN will pipe 56K and 64K bit/sec. circuits over ordinary telephone wire.

Furthermore, IBM has exploited the fears of MIS and telecommunications managers by touting its mainframe-based Netview products as the only de facto standard means of extending centralized network management to dispersed PC LANs.

In fact, other companies, particularly T1 equipment vendors, have their own network management systems that accommodate other vendors as well. These vendors, as well as those of other telecommunications products, have pledged to support the Netview/PC interface that provides diagnostic information to IBM hosts.

Furthermore, IBM understands that despite its market share, its own computer network design will have to be overhauled to accommodate the dispersion of processing power. In recent years, the company has made its mainframe-centered SNA more amenable to peer-oriented transaction processing through LU6.2 protocols.

In addition, IBM has redesigned its Rolm Corp. subsidiary's Computerized Branch Exchange switch. Last year, IBM announced an agreement with



T1 vendor NET to make NET's communications processors more accessible to high-speed links.

Feeling distinctions

Bruce Smith, president of NET, says the era of one-stop shopping for telecommunications is over. But, he says, providers of communications equipment and services will increasingly be called on to support and manage a variety of data networks — so much so that the distinction between wide-area networks and LANs will disappear.

"My view of this is that a few years from now, we will not hear about local- and wide-area networks as separate things," Smith says. That was the reason, he says, that NET decided to purchase Excelan, a leader in TCP/IP LANs.

Although Smith says he expects Netview to play an important role, he thinks the highly competitive workstation industry will prevent IBM from pushing SNA down to the desktop.

"There are a lot of manufacturers making excellent workstations, and the applications that drive them will come from a variety of different sources," he says. As a result, "there is a real need for a systems-type approach from a noncomputer company," Smith adds.

Such an effort will require the orientation to serve their customers. But he says he believes the acquisition of a LAN vendor would impede such efforts.

Because most LANs are purchased on an ad-hoc basis for specific work group applications, Botwinick contends that rather than sell customers a competitive product, systems integrators must be prepared to handle the incompatible LANs already implemented on customer premises.

A big game

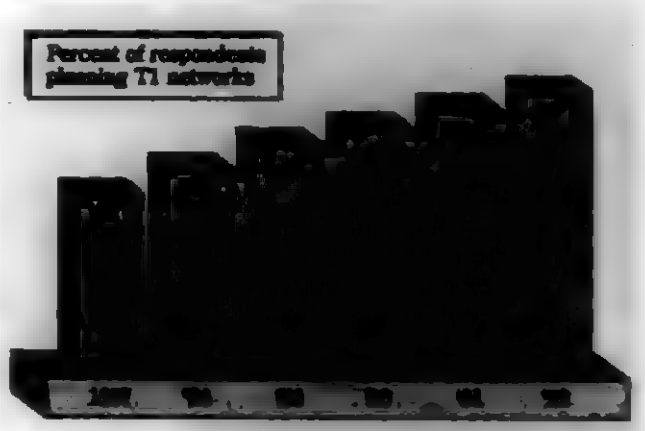
Tom Nolle, president of CIMI Corp., a Haddonfield, N.J., consultancy, says there is no question that a new type of systems-oriented data communications vendor will play a crucial role in filling the gaps between LANs and wide-area networks — such as the limitations inherent in SNA access and in LAN-type servers' ability to access high-speed data links — and grappling with network management.

"People are realizing now that data communications is too complicated to be put together from Lego sets," Nolle says. "Vendors have to encompass a broad range of needs. You can look around and see that there aren't many old-line datacom companies left."

Nolle identifies two main tiers of data network users today: those with high connectivity and

T1 gains ground

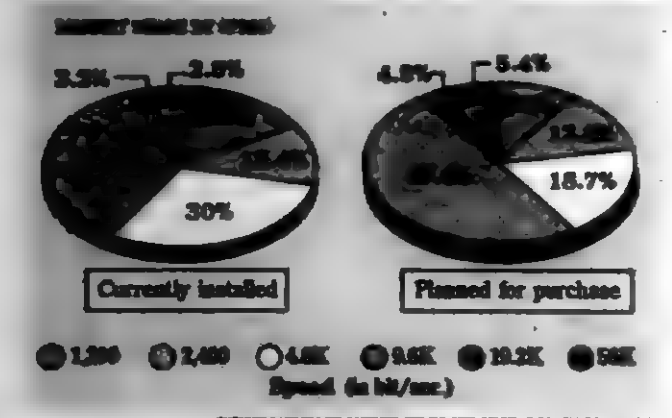
Use of T1 networks expected to surge almost 30% by 1992, based on information from 1,750 U.S. organizations



INFORMATION PROVIDED BY VERTICAL SYSTEMS GROUP FROM ITS "T1 MULTIPLEXER INDUSTRY ANALYSIS: 1988"

Speed counts

Most modems currently installed at mainframe sites offer transmission rates of 4.8K bit/sec. or higher, but 60% of sites planning purchases will buy modems offering at least 9.6K bit/sec.



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CW CHART

blend of expertise typically found in three types of firms — LAN companies, T1 companies and the bridge and gateway providers. "You need all three of those to play," Smith says.

It is also Smith's contention that the advent of IBM and Microsoft's OS/2 and other multitasking LAN and desktop environments will swamp, with an overload of technology, what he considers to be a relatively simple matter of LAN-to-wide-area-network connectivity.

Ed Botwinick, president of Unisys Networks, of which NET's archrival Timeplex is now a part, agrees with Smith's view that data communications vendors must adopt a systems

low performance needs, such as corporatewide electronic mail; and leading-edge firms whose move toward distributed processing mandates "naked, high-performance connections," which focus on bandwidth and speed rather than the seamless integration of LANs and wide-area networks.

In between are the majority of users who need dependable, regular host access but have no special requirements. For these middle-level users, "anybody's Netbios is as good as anybody else's," Nolle says. Typically, these users can employ a LAN-to-SNA gateway available from virtually any LAN vendor.

As with many other leading technologies, the advance guard in LAN-to-wide-area network integration is the U.S. government.

Paul Ticknor, long-haul communications manager for the Numerical Aerodynamics Simulation (NAS) project at the National Aeronautics and Space Administration's Ames, Calif., facility, says that within the last two years, 22 government and industrial sites were linked to two Cray Research, Inc. Cray II supercomputers through a combination of leased 56K bit/sec. lines linked through Vitalink's bridging devices. This was done in an effort to give the outside sites access to the power of a supercomputer.

When aerospace companies across the country upload work to the Cray computers, they gain access to all workstations and other unrestricted resources on the TCP/IP Ethernet LAN at Ames, Ticknor says.

Workstation users at other NASA sites gain access to the LAN via a T1 link, he says. Each of the 22 users at the outside sites has anywhere from one to 30 workstations capable of accessing the Cray computers.

"Typically, they will ship large files over to the NAS project, load it onto the supercomputers and have all the heavy number crunching done here. Industrial sites ship an average of 100M bytes of data per month," he says.

Having access to the Cray machines benefits both NASA and the outside companies, since the latter can run their government-commissioned jobs on the supercomputer faster than on their own computers.

NASA selected Vitalink to bridge the LANs because of its security features, Ticknor says. "Their equipment allows access only to those workstations designated NAS-accessible," he says. "It also prevents them from passing through the network to access a computer at another site."

Cashing in

In the private sector, most of the innovators in connecting LANs and wide-area networks are found in the financial industry, where fast-changing data — such as prices, interest rates and currency exchanges — have driven MIS departments to push as much data onto the desktop as quickly as possible.

Anthony Flora, manager of data communications at Sovran Bank NA in Norfolk, Va., says he does not care which LAN the bank's departments use, as long as it has the necessary interfaces to the bank's SNA backbone data network.

> "PEOPLE are realizing now that data communications is too complicated to be put together from Lego sets."
>
> TOM NOLLE
> CIMI CORP.

In most cases, Flora says, the choice of LAN vendors depends on the type of file transfer mechanism available with the product. Nevertheless, Flora is concerned that in the long term, the proliferation of LANs will frustrate his efforts to build a comprehensive network management scheme. Although Sovran uses Netview, Flora does not believe it will be able to "see all, know all.

"Maybe you will have a third-party X.25 packet-switched network with a translation in the [IBM] front-end processor," he says. "I don't think any good vendor has a handle on network management for PCs on any large-scale basis. I think there will have to be some fundamental changes in connecting not only to the mainframe but to other PCs and third-party networks."

Flora notes that LU6.2, the peer-oriented SNA protocol positions the company to make the necessary adjustments.

Furthermore, Flora says he looks forward to the day when IBM's Advanced Peer-to-Peer Networking, a dynamic routing facility for IBM's System/36, is generalized throughout SNA. This would ease communications, via T1 lines, among Sovran's six data centers as well as enable PCs on multiple LANs to communicate at megabit speeds without the intervention of an IBM host.

Until such technology is available, Flora says he sees no need to link Sovran's LANs independently of the SNA backbone. "Ninety-six hundred bits per second isn't good enough for file transfers between LANs," he says.

Wait and see

Right now, many organizations are proceeding slowly — doing only what they need to do and waiting to see what comes of all the promises they hear and the new affiliations they see developing.

Pfizer's Costa, for example, is stepping slowly along the integration route, waiting until he can find out whether IBM's OS/2 Extended Edition will simplify the job.

"A lot of issues we are up against will supposedly be resolved in that," he says.

At Gifford Hill & Co., a Dallas-based building materials supplier, Frank Garber, manager of data communications, is confident that when the company reaches a stage at which fuller integration is necessary, the means will be there.

Right now, Gifford Hill has three LANs, with about seven PCs on each, running Novell, Inc.'s Netware software. Two of the LANs are being used to dispatch trucks to and from the company's two plants; a third is used in the insurance department at the corporation's headquarters.

The dispatching networks are tied to the company's Unisys mainframe, while the third is geared to departmental use.

Garber says the company has no immediate plans to tie the LANs together, although he is confident that it would be reasonably easy to do so, using features included in Novell's System Fault Tolerant (SFT) 2.1 Netware.

"The LAN market has been around long enough that there really aren't that many pitfalls any more," he says. "There are people who know what they are doing. But when we got involved a few years ago, we didn't know what we were doing, and a lot of vendors didn't either." ●

PBXs come back down to earth

BY MICHAEL FINNERAN

One of the early contenders professing to bridge the gap between local- and wide-area networks was the voice/data private branch exchange (PBX). Not only would this marvelous machine connect local users to long-haul facilities, proponents claimed, but it would also merge voice, data and possibly other communications services into one integrated system.

These promises were too good to be true. What users were presented with was an overpriced solution to a problem that had already been solved. The best news forthcoming from the PBX front is that reality has set in and users are in for a duller — but clearly far more productive — phase.

The voice/data PBX idea first surfaced in the mid-1970s with the introduction of the first PBX systems to use a digital switching network. PBX vendors — a well-intentioned group of engineers — figured users should switch data as well as voice in the PBX.

The idea was that one system should be less expensive than two. Voice/data switching did not really matter too much back in the late '70s, because while the PBX vendors were gearing up the public-relations machinery, most of the systems did not have the capability to support data terminals at all.

By the early 1980s, data switching capabilities were being built into voice PBXs. But once it became clear that voice/data PBXs could not be sold on the basis of cost savings, determined PBX vendors set out to construct new purchase incentives. From this source sprang the idea of four distinct generations of PBX systems.

> BUILDING a reasonable case to justify the cost of using a voice/data PBX for data switching is extremely difficult.

While the trade press grabbed hold of this fourth-generation PBX idea, most of the industry was having trouble coming up with a definition of what it meant to be a fourth-generation PBX. Truth be told, the only really workable definition of a fourth-generation PBX was offered by consultant Dick Keuhn, who identified the essential characteristic of this generation as "undeliverability."

Unfortunately, PBX vendors proceeded to send out voice professionals to sell these ill-defined capabilities. The ugly truth was that building a reasonable case to justify the cost of using a voice/data PBX for data switching is extremely difficult.

The technology provided two basic types of circuit-switched connections: asynchronous terminals, which were used most often, and IBM 3270 Category A devices. Users quickly discovered that a data PBX from Gandalf Data, Inc. or Micom Systems, Inc. could do virtually the same thing for about one-fifth the cost.

The only fourth-generation PBX products that ever seemed to fit in that category were Ztel, Inc.'s PNX and CXC Corp.'s The Rose. Ztel, however, invested its research and development budget in public relations and went bankrupt, and CXC is currently pushing its Automatic Call Distribution capability because the company could not compete in the PBX market.

Back to basics

Now, after a few years of losses following divestiture, PBX vendors are finally starting to talk about such mundane issues as service, upgradability and support in providing basic voice services. Data switching is still part of the package, but nobody talks too much about it.

Playing their strong suit, PBX vendors have introduced some interesting capabilities in voice. Digital trunk interfaces are available for terminating T1 facilities. Software packages can operate large-scale private voice networks, integrated directory systems and user station equipment. An exciting capability is integrated voice mail systems.

The PBX business seems to be breathing a sigh of relief now that it is out of the high-tech spotlight. We don't hear anything about generations, and the three major suppliers — AT&T, Northern Telecom, Inc. and IBM/Rolm Corp. — are in the same positions they were before all of this got started.

But the PBX guys have caught sight of something that bears all the markings of confusion: Integrated Services Digital Network, or ISDN. They're probably figuring, "If we keep using this ISDN term to mean different things at different phases of the moon, then we can get them going on a fifth-generation PBX."

We'll cross that bridge when we come to it. ●

Finneran is president of dBrn Associates, Inc. in Woodmere, N.Y.

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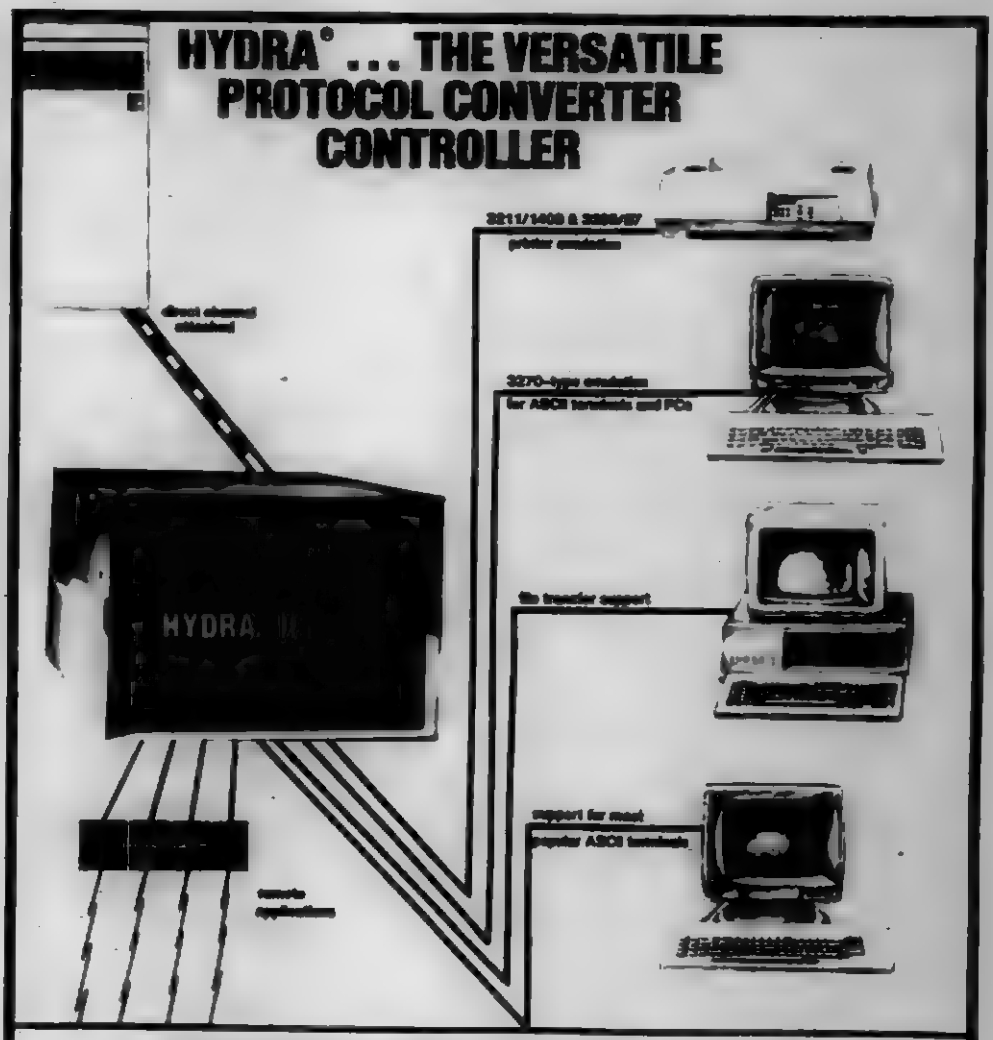

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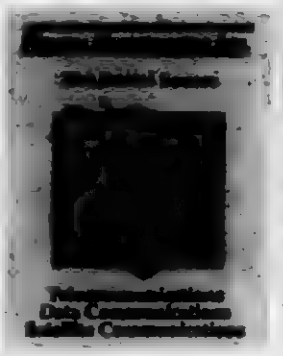

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VENDOR VIEWPOINT
Packet switching here to stay

BY ROY ROSNER

Architects of Integrated Services Digital Network (ISDN) are trumpeting the embryonic technology as the sends-everything communications pipeline of the future.

If the promises of these visionaries come true, telephone customers of the 1990s will be treated to a candy store of services delivered on an all-fiber, all-digital worldwide telephone network. Flowing through this network will be data, voice and electronic mail, videotex, alarm services, desktop teleconferencing, call previewing, facsimile, radio paging and others.

According to ISDN technologists, both packet switching and copper twisted-pair wiring will become anachronisms as fiber-optic networks spread. Businesses will scrap plans for private packet networks, they say, as rates for circuit-switching transmission undercut packet-switching tariffs.

Fortunately for the packet industry, this theory has some large holes. Chief among the gaps is the assumption that lower cost is the primary attraction of packet switching.

In fact, one of the most important advantages of packet switching is its translation capability. Packet networks allow different vendors' computers to communicate with each other in their own languages, with the network serving as an interpreter. As a result, data can be exchanged among many types of computers, regardless of their internal architectures.

The packet-switching industry is rooted in the widely accepted CCITT X.25 interface standard, which defines the user-to-packet-network interface. At least 100 countries now offer packet-network services.

Packet networks shoulder the communications processing tasks that would otherwise tie up expensive mainframes. They perform code and speed conversion between dissimilar computers, reduce the number of physical ports and lines and add levels of security within the network.

MANY businesses would continue to use private or public packet networks even if long-distance transmissions were free.

Packets travel from switch to switch, with each switch retaining a copy, until the next switch or the final destination signals that its twin has arrived. If the transmission is interrupted, the twin is released.

Using this hold-and-forward pattern, switches can respond instantly to traffic tie-ups or outages by rerouting packets along alternate paths. This fail-safe mechanism is not found in voice-tailored circuit-switched networks, which require long setup times to establish a dedicated path for data transfer.

For all of these reasons, many businesses would continue to use private or public packet networks even if long-distance transmissions were free. In all likelihood, they will be anything but that on an all-fiber network. Stringing fiber to every household and business in the U.S. could cost billions of dollars.

The technologists' preoccupation with building ever wider data highways to carry bandwidth-devouring services, such as on-demand video and large-scale data transfers, may not be endorsed by user companies that would have to pay for all that horsepower.

Many users will be content with a packet-switching network that provides kilobit- or megabit-per-second speeds over copper wire. In fact, it is conceivable that future jumps to gigabit-per-second or even terabit-per-second speeds might actually impede communications by tying up on-premises equipment with unwieldy bulk data transfers.

Furthermore, those who insist on writing a premature epitaph for the packet-switching industry overlook the vital role packet switching will play in the D channel of ISDN.

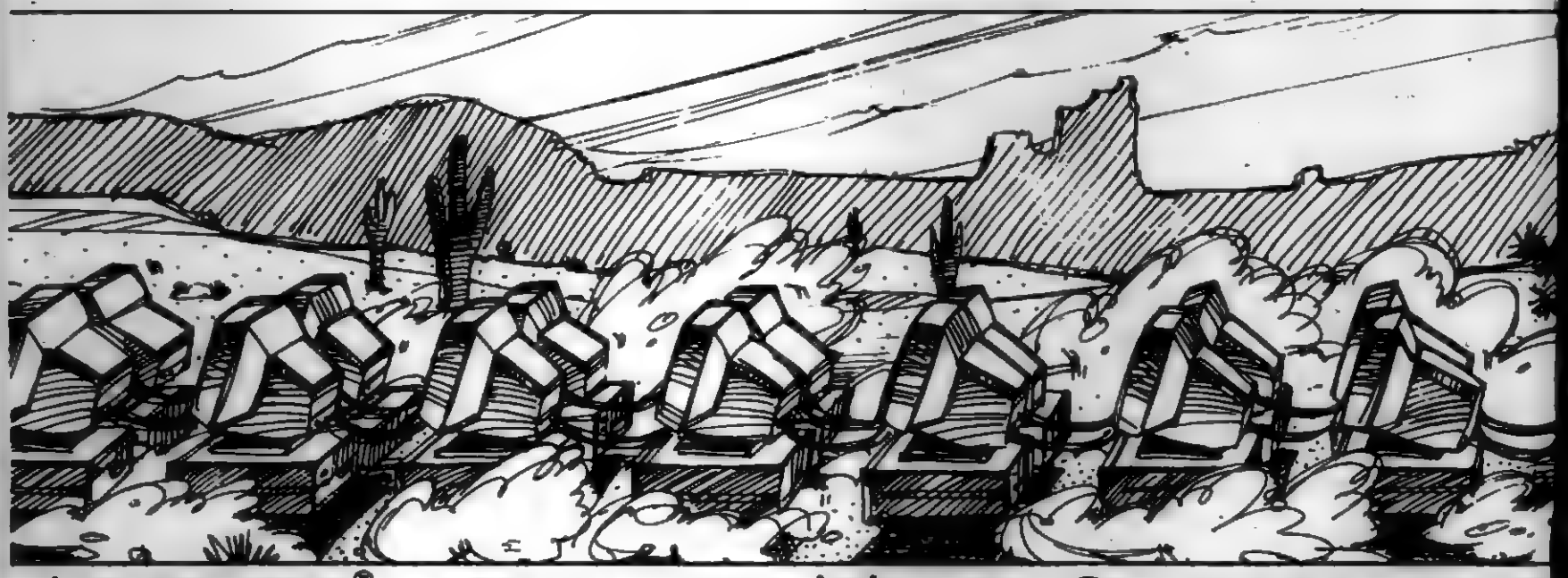
When ISDN or a variant of it emerges, an enormous market will open up for ISDN-compatible packet-switching equipment, including high-speed, programmable packet switches and network-access computers. This will happen regardless of whether the transmission is through fiber or copper wire.

It will be up to today's packet-switching suppliers to develop new equipment interfaces compatible with the ISDN recommendations currently under review by international standards bodies.

With an undertaking as vast as ISDN, the process of standardization and industry acceptance could easily last until the next century. During this period, businesses will be forced to rely on private or public data communications networks or on some form of pre-ISDN Centrex services.

And when ISDN finally arrives, the technically astute will be there to supply a new family of compatible, high-performance, programmable packet-switching products. ●

Rosner is vice-president and general manager of network products at Telematics International, Inc. in Fort Lauderdale, Fla.



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VENDOR VIEWPOINT
ISDN shows promise as a LAN booster

BY MARTIN SINNOTT

Integrated Services Digital Network (ISDN) technology — which will gradually become available this year and into the 1990s — promises to provide companies with one of the least expensive ways of setting up local-area networks. Instead of the dedicated wiring required by other LAN schemes, ISDN will allow companies to piggyback their networks onto their telephone systems.

ISDN is the term for all-digital communications as specified by emerging standards of the Consultative Committee on International Telephone and Telegraph (CCITT). It allows end users to simultaneously transmit voice, data, video and facsimile over a single communications line. Because a LAN based on ISDN technology can handle both voice and data simultaneously, two network users can, for example, talk on the telephone, review the same article on their respective personal computers and make corrections, all at the same time.

ISDN technology may also make PC networks more common, because it will make it relatively easy to connect PCs both locally and in wide-area networks. Although the communications software used to operate LANs and wide-area networks is different, there would be only one set of hardware and one wiring scheme under ISDN.

Despite the apparent benefits of ISDN-based LANs, the technology does present limitations. Most significant is that transmission speeds are limited to only 64K bit/sec. Since most LANs transmit in megabits per second, an ISDN-based LAN will seem very slow if large data transfers are required. However, higher speed ISDN transmissions may someday become possible. One technique, now in the experimental stage, groups multiple 64K bit/sec. channels to create higher speeds.

Another technique, the so-called broadband ISDN, creates transmissions of about 1.4M bit/sec., which is equivalent to the transmission rate of low-speed LANs, such as AT&T's Starlan. However, the broadband definition of ISDN cannot become standard for at least four years because of the CCITT time cycle.

> ISDN-BASED LANs could gain a foothold in situations where the network will not be used for large data file transfers or require fast transmission speeds.

Even with the current speed limit, ISDN-based LANs could gain a foothold in situations where the network will not be used for large data file transfers or require fast transmission speeds. For example, an ISDN-based LAN will likely be used for electronic mail, which, when utilized with users at several locations, can also take advantage of ISDN's ability to use a wide-area network while still working through a single interface.

The ability to work through a single interface means that ISDN-based systems can use one board to service the LAN, wide-area network and telephone system. In contrast, most networks require two — an adapter board for the LAN and another board to connect the LAN to the wide-area network.

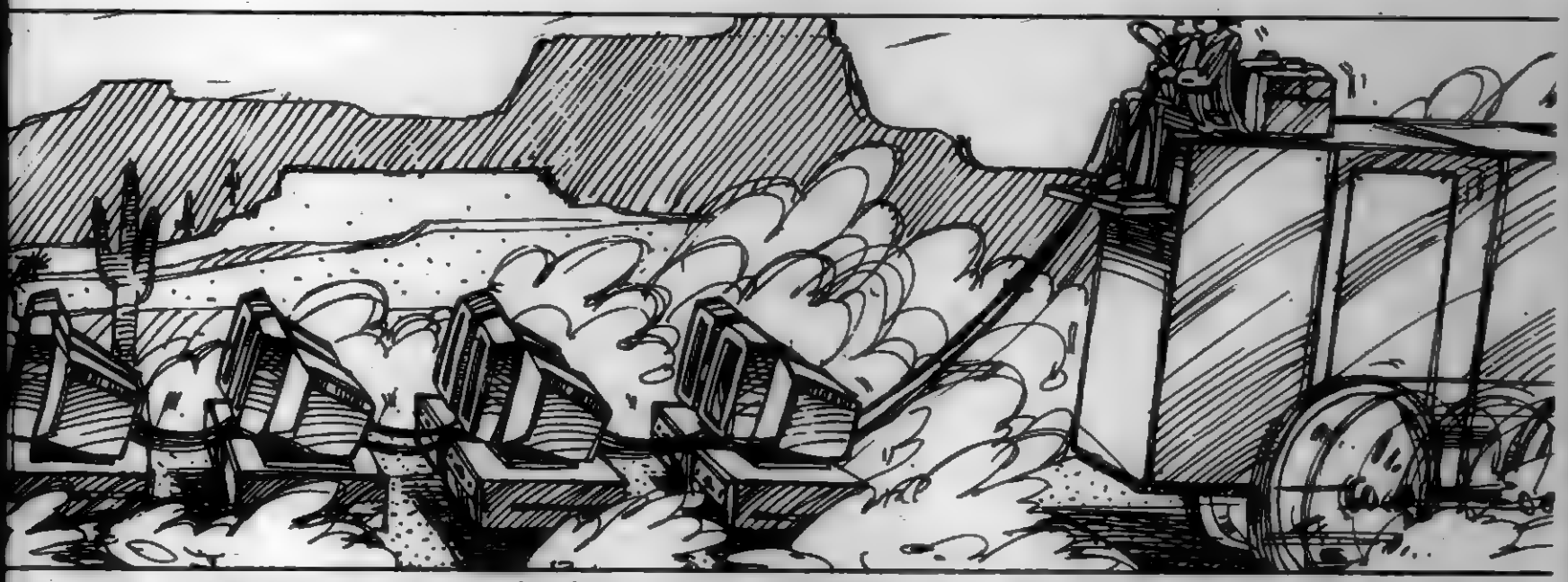
Large corporations and state governments will be the first to take advantage of ISDN-based LANs, since private branch exchanges (PBX) are now being installed with ISDN functionality to control telephone and data services. The first one in the U.S. was installed by Northern Telecom, Inc. at the Arizona Department of Transportation in November 1986.

Companies that do not have their own in-house PBXs will also be able to employ ISDN-based LANs by using their local Bell operating companies' Centrex switches when these switches gain ISDN functionality. Centrex switches with ISDN functionality are expected to be brought on-line gradually in the coming years by the local Bell operating companies. The first one was installed by Illinois Bell to service McDonald's Corp. in December 1986.

For all companies, the use of ISDN-based LANs may create a conflict within traditional organizational structures. Typically, telephone network and MIS functions are managed by different groups. By merging the two, ISDN necessitates a restructuring of traditional responsibilities. The ISDN network may be managed by one of the two groups, or both may report to the same manager.

Ultimately, ISDN will present many corporations with the opportunity to create LANs without having to implement separate wiring schemes. It will increase LANs' capability by adding the capacity for simultaneous voice and data communications and will enhance the availability of companywide communications systems. ●

Sinnott is director of the Dayton Development Center at NCR Corp.'s Personal Computer Division in Dayton, Ohio.



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Catch-22 in the X.400 market

BY MICHAEL HURWICZ

IBM does not offer software compatible with X.400, the international standard for electronic messaging, in the U.S. The reason it gives is weak demand. An informal sampling of users, however, suggests that IBM's analysis may be a self-fulfilling prophecy; in other words, demand is weak here because IBM doesn't provide products, and IBM doesn't provide products here because demand is weak.

As one might expect, corporations voice a range of opinions about X.400. Some do not currently use electronic mail and find consideration of X.400 premature. Some are straining at the bit, waiting for the day when IBM will offer it. Many see X.400 as a long-term direction but feel that without mature products, the standard will not play a major role in their messaging systems for several years.

Ron Skelton, director of corporate technology planning at Aetna Life and Casualty Co. in Hartford, Conn., says IBM's current position on X.400 can impede but not stop the marketplace from moving away from proprietary systems.

"There's no debate about that," he says. "The only debate is how fast. To some extent, IBM controls the rate because of its dominant position."

In search of standards

3M Corp. in St. Paul, Minn., is a heavy E-mail user and very concerned with the issue of standards. Phil Hayes, 3M's director of information systems, data processing and telecommunications, estimates that the company has 10,000 to 12,000 potential E-mail users in the U.S. and close to 20,000 worldwide.

3M uses IBM's Professional Office System (Profs), Hewlett-Packard Co.'s HP Desk, Digital Equipment Corp.'s All-In-1 and General Electric Co.'s QuikComm. To connect these systems, 3M currently uses an E-mail gateway from Soft-Switch, Inc. in Wayne, Pa.

"We need an international messaging standard that's implemented in the same way by all vendors," Hayes says. "I see that as being a practical reality in the 1990s. Meanwhile, we're getting temporary relief from products such as Soft-Switch in order to have messaging compatibility across a multivendor environment."

Bill Lawrence, a network engineer at the San Onofre Nuclear Generating Station in San Clemente, Calif., is in a similar position, although on a smaller scale.

"We've thought about X.400 as a means of connecting our Profs system and the CC:Mail application on our Netware local-area networks," Lawrence says. "PCC/Systems is telling us they will support X.400. We're looking for a standard solution that would work in the whole SNADS environment," he adds, referring to IBM's Systems Network Architecture Distributing Services.

However, with IBM not yet supporting X.400 in the U.S., Lawrence says, "it looks like we're on our own, as usual."

Since it is the lack of mature products — and IBM products in particular — that keeps 3M and Southern California Edison Co., the operator of the San Onofre plant, from jumping into X.400, it could be argued that by refusing to offer products in this country, IBM is depressing demand.

> "THE FLY in the ointment is IBM's insistence that there is no market for X.400 in the U.S. From our perspective, there is a demand."
>
> RON SKELTON, AETNA LIFE AND CASUALTY CO.

Aetna's Skelton is certainly willing to make that argument. "The fly in the ointment is IBM's insistence that there is no market for X.400 in the U.S. From our perspective, there is a demand. We've planned our migration strategy around X.400. We want to make it easy to do business with Aetna. We can't have any control over what E-mail systems others use, so we have to admit a multivendor environment."

For Aetna, the net result of IBM's nonsupport for X.400 is a holding pattern. "If IBM announces an X.400 Profs interface this year, there is more than a good chance that we would be using it a year from that point," Skelton says.

Taking their own steps

Some users are going ahead without IBM. For instance, the U.S. Forest Service has been planning an X.400 system for years, is already doing limited testing and plans to procure X.400 software from Data General Corp. within months.

Government agencies can be expected to turn increasingly to Open Systems Interconnect (OSI) software, including X.400, because of the Government Open Systems Interconnect Profile (GOSIP) procurement requirement. This profile, drafted in September 1986 by the National Bureau of Standards, outlines functional specifications for communications systems based

Continued on page S12

Hurwicz is president of The MTI Group, a data communications consulting firm in Nashville.

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Modem makers flee commodity market

BY RICK VILLARS

The emphasis in modem advertising these days is on differentiation. Ad copy stresses special capabilities such as data compression, data encryption, high-speed transmission, micro-to-mainframe interfaces, network management, synchronous dial sets and CCITT X.25 conversion.

There is a good reason for this shift in emphasis. Unadorned, modems are now commodity products. The chip sets are identical, and the prices hardly vary.

In an effort to distance themselves from the commodity label and price tag, modem vendors are currently pursuing one of two strategies — either using new technologies to build a better modem or leaving the basic technology untouched and developing add-on features that address special needs.

The best example of the first approach is the recent introduction of very high-speed (9.6K to 19.2K bit/sec.) dial-up modems.

The first high-speed solution to emerge was the asymmetrical modem, which simulates full-duplex communications at high speeds either through a method of rapid direction shifting called ping-pong or by combining high-speed transmission in one direction with very low-speed transmission — 300 bit/sec. — in the opposite direction.

The use of simulated full-duplex technology requires minimal alterations, and developers are able to offer these high-speed solutions at relatively low prices. However, the effectiveness of these devices is limited to applications such as large, one-way file transfers and facsimile-type services.

A second high-speed solution introduced more recently requires the entire modem to be significantly redesigned. An advanced echo-cancellation feature and a forward error-correction technique called Trellis had to be developed to ensure full-speed communications in both directions simultaneously. The result of these developments was the CCITT V.32 modem standard.

Development of V.32 modems represents a good short-term strategy for vendors, but in the longer term, these providers are going to face a conflict with their goal of differentiation. While use of a standardized high-speed modulation technique should guarantee that modems developed by different vendors can communicate at full capacity, only development of a standard implementation can really guarantee compatibility.

VENDORS ARE directing more and more attention to . . . adding value without altering basic technology.

Not surprisingly, vendors are directing more and more attention to the second strategy for avoiding the commodity market — adding value without altering basic technology.

One popular value-added feature is data compression. Target users for data compression devices include those who require greater throughput than 2,400 bit/sec. for certain applications but do not want to replace their installed network.

Currently, vendors can choose one of three data compression methods, each of which involves tying software and/or adjunct hardware into the modem package. The first data compression method is the use of Level V of the Microcom Networking Protocol (MNP), which offers compression rates of more than 2-to-1 for 2,400 and 9.6K bit/sec. modems.

The second method is an alternative data compression technology, Commpressor, developed by Adaptive Computer Technologies. Commpressor offers higher levels of data compression in certain environments but does not have the wide-scale acceptance enjoyed by MNP.

A final data compression option is to develop a proprietary compression scheme. The most recent examples of this approach, which enables a vendor to lock in network users with compression requirements, are products from Hayes Microcomputer Products, Inc. and Telcor Systems Corp.

A second value-added feature that vendors are flirting with is security, which includes encryption, automatic callback and controlled access. Security features on modems are not new, but until recently only users with national security-oriented networks required them. The increasing use of dial-up communications in the financial market has altered this, however, and modem vendors are rushing to supply this vertical market.

Built-in protocol processing is the most widely anticipated value-added feature. Vendors plan to use the processing capabilities built into basic modem chips to provide specific protocol conversion features.

Currently, the most commonly available protocol conversion feature is built-in X.25 packet assembler/disassembler.

What is the importance of the value-added strategy to users? The development of application-specific features that can be installed on basic modem sets will provide users with increasingly focused products — in some cases even custom ones — while calling for minimal sacrifices in overall connectivity. •

Villars is senior marketing analyst of data communications at International Data Corp. in Framingham, Mass.

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T1 multiplexers

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(416) 683-6200
Omniplexer
Operates as stand-alone or drop-and-insert. Handles voice, synchronous and asynchronous data, audio and specialty services. Thirty to 120 CCITT and 24 to 96 ECSA channels.

Ameinhl Corp.
(408) 746-6000
Multistar III
Byte-interleaved time-division multiplexer (TDM). Combines up to 92 voice, asynchronous and synchronous data and video channels into single or dual T1 trunks.

Multistar IV
Terminates up to 15 T1 data lines and allows configuration of more than 900 data channels per node.

AT&T
(201) 898-8000
Dataphone II 745 Acculink
Used in conjunction with the 740 Acculink multiplexer as a nodal processor to control capacity of 16 T1 circuits.

AT&T DCM32000 Solitaire Multiplexer
Bit-compression multiplexer that combines two T1.5 service circuits into one.

Avanti Communications Corp.
(401) 849-4660

Open Network Exchange 5000
A T1 nodal processor for networks of more than 100 nodes. Permits more than 7,600 cross-connected channels per node.

Open Network Exchange 3000
Similar to above but for smaller network applications or single-ended multiplexing.

Open Network Concentrator 10
Allows one or two channels to connect to T1. Input speeds from 56K to 1.5M bit/sec.

Aydin Monitor Systems
(215) 657-7450
6223 N-Channel
Interfaces up to 48 voice channels or 120 data channels. Variable aggregate output up to 1.5M bit/sec.

6296
Up to 96 voice channels on a single T1 line. Digital data rates from 1.2K to 768K bit/sec.

6248
Provides up to 48 voice channels as well as digital data at rates from 1.2K to 768K bit/sec. on a single T1 line.

Canoga-Perkins Corp.
(818) 718-6300
3124 T1 Voice/Data Multiplexer
Connects up to 192 channels to either private or public T1 spans.

Cisco Systems, Inc.
(415) 326-1941

AGS T1 Multiplexer/Gateway Server
Supports up to eight T1 lines. Dynamic load balancing and line-reliability testing. Concurrently supports Transmission Control Protocol/Internet Protocol, X.25, Digital Equipment Corp.'s Decnet and International Standards Organization protocols.

Coastcom
(415) 825-7500
Stepnet
Voice/data system offering subrate data multiplexing and digital cross-connecting capabilities for up to 16 T1 lines. Drop-and-insert channel/bypass functions.

T1M
Combines up to four high-speed data channels on one T1 line. Permits drop-and-insert.

D/I Mux II
Drop-and-insert multiplexer or channel bank for voice/data. Eight- and 24-channel shelves and either unidirectional or bidirectional drop-and-insert.

D/I Mux-E
Combines voice, data, program audio and compressed video over standard T1 line. Drop-and-insert permitted.

Codex Corp
(617) 364-2000
6240 Digital Transmission Multiplexer
Bit-interleaved TDM. Combines up to 95 synchronous data and 95 voice channels over a single digital T1 facility.

Datatel, Inc.
(609) 424-4451
DCP 9100
Supports point-to-point data, voice and video. Accommodates up to 96 data channels and 48 voice channels.

DCP 9900 T1 Nodal Processor
Nodal processor for up to 1,728 voice/data channels and up to 18 links. Drop-and-insert, hub, mesh and point-to-point configurations.

Digital Communications Associates, Inc.
(404) 442-4000
System 9000
Handles voice, data and video. Manages up to 36 T1 trunks and more than 10,000 active channels in nonblocking configuration. Permits T3 connections with full drop-and-insert capabilities.

Emulex Corp.
(714) 662-5600
CS41
Connects up to 144 asynchronous terminals to Digital Equipment Corp.'s Unibus. When used with a drop-and-insert multiplexer, can combine voice, synchronous data, audio and video with asynchronous data over a single line.

Equinox Systems, Inc.
(305) 255-3500
LM-48 T1 Local Multiplexer
Supports up to 48 data channels over high-speed T1-compatible links with full simultaneous transmission at up to 19.2K bit/sec.

Fibermux Corp.
(818) 709-6000
FX812
Multiplexing of as many as eight T1s from private branch exchanges, T3 multiplexers, satellites, microwaves, channel banks or other data multiplexers up to several miles.

Gandalf Technologies, Inc.
(312) 459-6630
Line Miser GLM 528
Transparent data transmission over standard T1 carrier facilities or privately owned two-wire twisted-pair shielded cables to as many as 128 attached devices. Supports synchronous and/or asynchronous channels. Includes auto-equalized T1 modems.

General Datacomm, Inc.
(203) 574-1118
Megamux TDM 1257/1258
Bit-interleaving multiplexing of as many as 54 synchronous, asynchronous, isochronous or voice channels over one high-capacity transmission facility. Aggregate rate of up to 256K and 2M bit/sec. for the 1257 and 1258, respectively.

Megamux Plus
Software-controlled, single-aggregate TDM with a 54-channel capacity. Supports same mix of transmission types as above, plus video. Aggregate rates of 4.8K to 2M bit/sec.

Megaswitch
Bit- and byte-interleaved TDM that handles up to 512 channels with same mix as previous. Aggregate rate is 2M bit/sec.

Megaswitch Compact
Bit- and byte-interleaved TDM handles up to 58 channels. Integrates synchronous, asynchronous and isochronous data in any combination. Aggregate rate up to 2.M bit/sec.

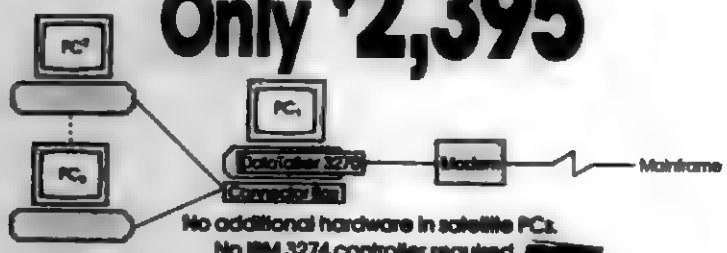
Infinet, Inc.
(617) 681-0600
ITM 1500 series
Combines asynchronous and synchronous terminals, facsimile, voice and video devices onto as many as 36 T1 links.

Infotron Systems Corp.
(800) 257-8352
NX3200
Up to eight high-speed links per node, or as many as 250 local channels. Permits simultaneous multiple-link speeds and access to private and public networks. Point-to-point, drop-and-insert and pass-through.

Continued on page S16

3270 MICRO-TO-MAINFRAME 3270

Link 8 PCs to Your Mainframe Only $2,395



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IBM 3274 Controller, 51C . . .	$4,885
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Catch-22

FROM PAGE S10

on OSI standards.

Because of GOSIP, it is a virtual certainty that most government agencies will eventually follow the lead of the Forest Service and adopt X.400.

According to Steve Werner, the service's branch chief for telecommunications, the Forest Service has a private mail network implemented on 850 DG MV superminis. The agency uses two products, both of which support X.400, to handle its E-mail traffic.

DG's Comprehensive Electronic Office handles intraservice E-mail, while Telemail, from Reston, Va.-based Telenet Communications Corp., is used for communications with other U.S. Department of Agriculture agencies, other federal departments, state forestry departments and the International Forestry division of the Forest Service.

Because both systems conform to X.400, Forest Service users can send messages within the Forest Service network and Telemail using Comprehensive Electronic Office. X.400 will also be used for the Incident Command System, a multiagency management system for responding to natural disasters such as fires, earthquakes and volcanic eruptions.

"Other government agencies are interested and are starting to test X.400 software," Werner says. "In the private sector, there may be more of a wait-and-see attitude. Sometimes, the federal government has to take the lead." •

ASK THE VENDOR

The following questions were solicited from users and conveyed to the vendors for responses.

What is the status of Infinet's plans to link with IBM's Netview via Netview/PC?

David Herndon
Vice-president, communications
Southern National Bank
Charlotte, N.C.

INFINET, INC.: This year, we will offer an interface to IBM's Netview and Netview/PC that will use the capabilities of our NIS Series 90 network management systems. The interface will use a single Netview/PC interconnection between the host and the NIS Series 90, regardless of how many domains are connected.

What network management tools will Tellabs be making available to manage its Crossnet product?

Thomas Ho
Executive director
Intelenet Commission
Indianapolis

TELLABS, INC.: We recently introduced Telemark, a comprehensive network management and control system for Digital Equipment Corp. VAX minicomputers designed to provide single-point control and maintenance of hybrid voice/data networks. Specific functions include customer-controlled reconfiguration, circuit provisioning and alarm-message processing.

Cermetek has introduced a 9600E with an upgrade. What will the upgrade accomplish? Are you coming out with a higher speed modem?

Woody Shafer
DP manager
Dana Corp., Spicem Transmission Division
Knoxville, Tenn.

CERMETEK MICROELECTRONICS, INC.: We introduced a data compression upgrade for our V.32 modem product line, including the 9600E. The upgrade is specifically designed for high-speed, full-duplex communications. The effective throughput is 19.2K bit/sec., twice that of a V.32.

We do not currently plan to come out with a higher speed modem.

We have a 50-station Novell network with three file servers connected via an Elcon Access/X.25 gateway to a Sequent minicomputer running Unix. How would we do color graphics and can Access support this?

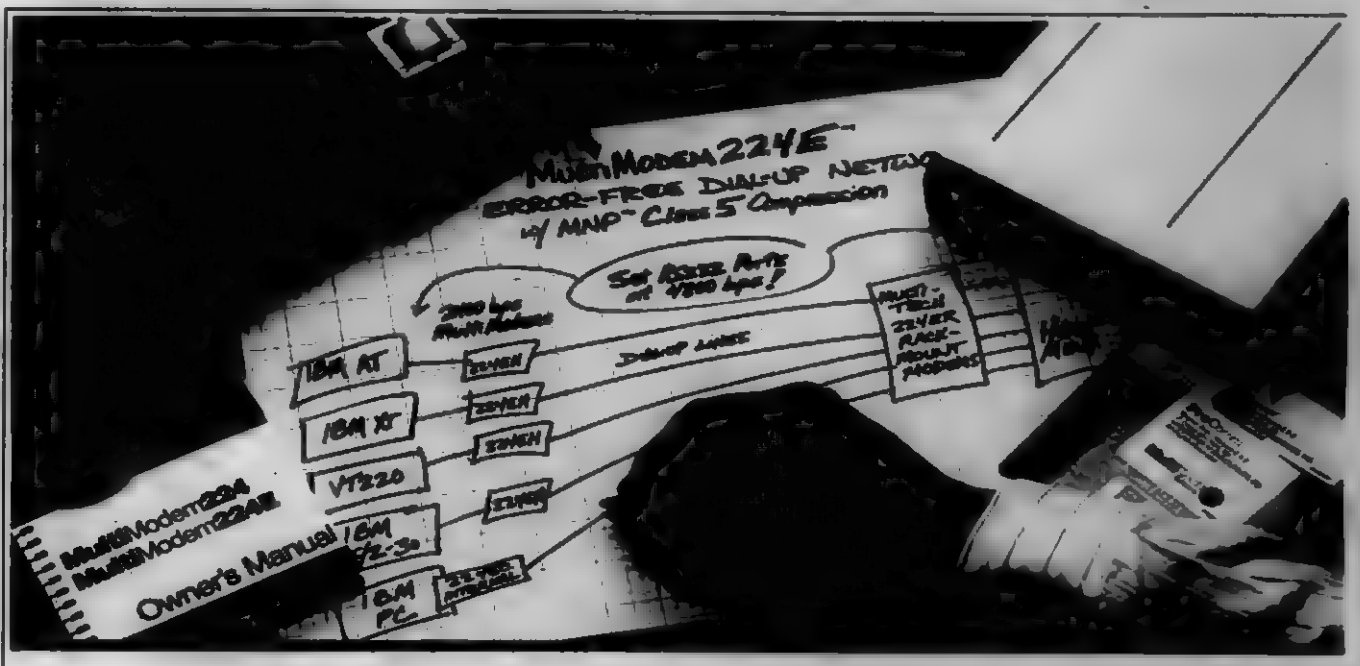
Jerry McLaughlin
MIS director
Clark Bartis, Inc.
Dallas

ELCON TECHNOLOGY CORP.: We currently support graphics only for IBM 3270 emulation. However, with Access/X.25, it is possible to do color graphics with the addition of our third-party support option and a terminal emulation package from another vendor.

When using Virtual Microsystems' Network Coprocessor, we have noticed an unusual delay in the initial logon procedure for DEC VAX emulation. Are there plans to speed up this process?

Lance McCutchen
Information systems programmer
Texaco
Denver

VIRTUAL MICROSYSTEMS, INC.: The delay in the initial logon procedure is because of the Netbios Name Server. The delay is inherent in the way Netbios works and is, unfortunately, beyond our ability to control. However, we do expect the situation to improve. Netbios was originally written to serve the limited needs of IBM's original PC Network. Since Netbios now become the standard network interface for LAN applications, there is reason to believe that this standard will be enhanced to support the sophisticated applications being developed in the OS/2 environment. ●



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- In the dial-up modem world, Class 3 MNP is the hands-down choice for hardware-based error correction. With its 100% error-free transmission, the MNP protocol is used in dozens of manufacturers' 1200 & 2400 bps modems, and our MultiModem224E modems have been recognized as the best of their kind (see box).
- Well, the best just got better. Multi-Tech modems now offer MNP Class 5 data compression along with error-correction. Class 5's 2-to-1 compression and serial port speed conversion means that you can buy a 2400 bps modem from Multi-Tech and run it at speeds of up to 4800 bps*. Error free!
- Multi-Tech Class 5 modems will communicate automatically with MNP Class 4 and Class 3 modems, as well as non-MNP modems. And if you wish, you can even upgrade your present Multi-Tech Class 3 & 4 modems to Class 5 (call us for details).

PC MAGAZINE EDITOR'S CHOICE

In the May 12, 1987 edition of PC Magazine where 87 modems were reviewed, only three were awarded *Editors Choice*: "For a high-performing 2,400-bps modem with a slew of extras, check out Multi-Tech Systems' MultiModem224E…with [its] high immunity to line noise and the extra advantage of MNP error correction, [this modem] should do a fine job of managing fast, error-free data communications."

- Our Class 5 modems incorporate all of the features of our Class 3 versions. Features like phone number & configuration memory, auto-repeat dial and "AT" command compatibility. And Multi-Tech's seventeen years of modem manufacturing experience.
- Please call us toll-free at 1-800-328-9717, for additional information…get a modem that's as fast as it is good!

* The compression throughput of MNP Class 5 is, like all compression schemes, dependent on the type of data being sent. The more "compressible" the data, the greater the throughput. For example, a typical text file transfer at 2400 bps should yield a throughput of between 4400 and 4900 bps. And the MultiModem224E's speed conversion and flow control features let you set your modem's RS232C port at 4800 or even 9600 bps, to take full advantage of the Class 5 compression.

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Modems: 9.6K bit/sec.

COMPANY	PRODUCT	MODEM STANDARD	SYNCHRONOUS/ ASYNCHRONOUS	HALF/DUPLEX	DIAL BACKUP	SYNCHRONOUS DIAL COMMAND	FALLBACK SPEEDS (BIT/SEC.)	ERROR CORRECTION	LINE-QUALITY ADJUSTMENTS	BUILT-IN MULTIPLEXER	SECURITY FEATURES	NETWORK MANAGEMENT FEATURES	PRICE
Anderson Jacobson, Inc. (408) 435-8520	AJ 9681-86	V.29	Both	Full	Yes	Yes	4.8K	Trellis	NP	Yes	Password, callback	V.54 loopback	$8,995
	AJ 9681-86MD, AJ 9681-FDD	V.29	Synch	Both	Yes	No	7.2K, 4.8K	None	Yes	No	None	V.54 loopback	$1,895
	AJ 9681-ST/STF	V.29	Synch	Both	No	No	7.2K, 4.8K	None	Yes	No	None	V.54 loopback	$1,595
	AJ 9641-1/00, AJ 9641-FDD	V.29	Both	Both	Yes	No	7.2K, 4.8K	None	Yes	No	None	V.54 loopback	$1,645
Ark Electronic Products, Inc. (800) 228-0314 (407) 724-5260 (Fla.)	Ark 9.6K A/B Modem	V.29	Synch	Both	NP	Yes	7.2K, 4.8K	None	No	No	None	None	$1,595
AT&T (800) 247-1212	Dataphone II 2296A	V.32, Hayes	Both	Both	Yes	No	4.8K	MNP*, Trellis	Yes	No	None	Self-test, diagnostics, user-requested testing and reporting	$1,695-$2,595
	Dataphone II 2096	Proprietary, Hayes	Synch	Full	No	No	None	None	Yes	Yes	None	Dataphone II Levels 1 - 4	$2,500-$4,000
BCH Equipment Corp. (813) 641-6464	Motel 9600/29	V.29	Synch	Either	No	No	7.2K, 4.8K	None	Yes	No	None	Line-quality display	$1,295
	Modem 9600 Fast Full Fully Featured	NA (Fast Full)	Synch	Either	No	No	7.2K, 4.8K	None	Yes	No	None	Line-quality display	$1,495-$1,595
Black Box Corp. (412) 746-5500	Modem 9600 Asynch Plus	V.29	Asynch	Full	No	No	7.2K, 4.8K, 2.4K, 1.2K, 300	EDP*	No	No	None	None	$999
	Modem 9600 Asynch Turbo	V.29	Asynch	Full	No	No	7.2K, 4.8K, 2.4K, 1.2K, 300	EDP	No	No	None	None	$1,099
	Modem 9600 Synch	V.29	Synch	Both	No	No	7.2K, 4.8K	None	Yes	No	None	None	$1,695
	Modem 9600 A/B	V.29	Synch	Both	No	No	7.2K, 4.8K	None	Yes	No	None	None	$1,995
	Modem 9600P	V.29	Synch	Both	No	No	7.2K, 4.8K	None	Yes	No	None	None	$1,995
	V.32 Modem	V.32	Both	Full	No	Yes	4.8K	Trellis	No	No	None	None	$1,595
Bytcom, Inc. (415) 485-0700	9.6 Trellis/V.32 Modem	V.32, V.22, Bell 212	Both	Full	Yes	No	4.8K, 2.4K, 1.2K, 300	X.25 LAPB*, MNP, Trellis	Yes	No	Callback with password	None	$1,595
Case Communications, Inc. (301) 258-9750	4602 BC, 4602 ADB	V.32	Both	Full	Yes (ADB only)	Yes	4.8K	Trellis (both), MNP (BC only)	Yes	No	None	V.32, V.54 diagnostics	$1,795 (BC)-$2,495 (ADB)
	4696 VS	V.29	Both	Full	No	Yes	7.2K, 4.8K, 2.4K	None	Yes	No	None	Self-testing, local and remote loopback	$1,395
	4144+	V.29, V.32	Synch	Full	Yes	No	None	Trellis	NP	Optional	None	Compatible with CASE Stakon 800 network management	$4,995
	4696+	V.29	Synch	Full	Yes	NP	7.2K, 4.8K	Trellis	NP	No	None	Compatible with CASE Stakon 800 network management	$2,695
Carnatech Microelectronics, Inc. (408) 752-8000	Spectrum 9600 Full Range	V.32, V.22 bis*, Bell 212A, 103	Both	Full	Yes	Yes	4.8K, 2.4K	Trellis, MNP, LAP*	Yes	No	None	None	$1,795
Codex Corp. (617) 364-2000	Model 2265	V.29	Synch	Both	No	No	7.2K, 4.8K	None	Yes	No	None	None	$1,695
	Model 2260	V.32	Both	Both	Yes	No	4.8K	Trellis	Yes	No	None	None	$1,995
	Model 2180	V.54	Both	Both	No	No	None	None	No	No	None	None	$335-$1,380
	Model 2240	V.29	Both	Full	No	No	7.2K, 4.8K	None	No	No	None	None	$1,850
	Model 2241	V.29	Synch	Full	No	No	7.2K, 4.8K	None	Yes	No	None	None	$1,995
	Model 2262	V.33	Synch	Full	No	No	7.2K, 4.8K, 1.8K	Trellis	Yes	No	Password	None	$3,195
	Model 2562	V.33	Synch	Full	Yes	No	None	Trellis	Yes	Yes	Password	None	$7,250
	Model 2660	V.29, proprietary	Both	Both	Yes	No	7.2K, 4.8K	None	No	No	Password, encryption	Self-test diagnostics, loopback tests, line-quality tests	$6,500
	Model 2680	Proprietary	Both	Both	Yes	No	7.2K, 4.8K	Trellis	Yes	No	Password, encryption	Self-test diagnostics, loopback and line-quality tests	$6,000
	Model 2680	V.29, proprietary	Both	Both	Yes	No	None	Trellis	Yes	No	Password, encryption	Self-test diagnostics, loopback and line-quality tests	$9,000
	Model 2680	Proprietary	Both	Both	Yes	NP	None	Trellis	Yes	Yes	Password, encryption	Self-test diagnostics, loopback and line-quality tests	$12,000
Combinet, Inc. (800) 230-6030	CM-9600	V.29	Synch	Full (four-wire), half (two-wire)	No	No	7.2K, 4.8K	None	Yes	No	None	None	$1,395
Concord Data Systems, Inc. (800) CDS-8400	V.32 Trellis	V.32	Both	Full	Yes	Yes	4.8K	Trellis	Yes	No	None	None	$2,495
	396 Trellis	V.32	Both	Full	Yes	Yes	4.8K	MNP, Trellis	Yes	No	Password	None	$1,795
CTS Fisbri-Tek, Inc. Datacomm Division (800) 238-6164	CTS 9629 MX	V.29	Synch	Both	No	No	7.2K, 4.8K	Trellis	Yes	Yes	None	None	$1,995
	CTS 9629	V.29	Synch	Both	No	No	7.2K, 4.8K	Trellis	Yes	No	None	None	$1,495
	CTS 9629 Fast Full	V.29	Synch	Both	No	No	7.2K, 4.8K	Trellis	Yes	No	None	None	$1,995
Data Race, Inc. (513) 658-2340	RC-Race 96	Proprietary	Both	Both	No	Yes	7.2K, 4.8K	LAPB	Yes	No	None	None	$795
	Race VM Models I and II	Proprietary	Asynch	Full	No	No	2.4K	LAPB	Yes	Yes (Model II)	None	None	$1,499-$1,595
	Race RMX-VM 1	Proprietary	Asynch	Half	No	No	4.8K	LAPB	Yes	No	None	None	$995
	Ruby 9600 series	V.29, V.27	Synch	Full or half, depending on model	Yes	Yes	7.2K, 4.8K, 2.4K	None	Yes	No	Password, callback	None	$1,195-$2,795
DCB, Inc. (800) 637-1237	FL 9.6	V.29	Synch	Full	No	No	7.2K, 4.8K, 2.4K	None	Yes	No	None	None	$1,400
	FL 9.6 Plus	V.29	Synch	Full	No	No	7.2K, 4.8K, 2.4K	None	Yes	No	None	Diagnostics to check phone line, phone equipment	$1,900
	FL 9.6 FP Plus	NA (Fast Full)	Synch	Full	No	No	7.2K, 4.8K, 2.4K	None	Yes	No	None	None	$2,300
Digital Communications Associates, Inc. (800) 241-4080	DCA 680	V.29	Synch	Full	No	No	None	None	NP	Yes	None	Optional	$6,400

*MNP: Microcom Networking Protocol *EDI: Electronic data interchange *LAPB: Bit-oriented link access procedure *bis: Bisynchronous *LAP: Link access procedure *EIA: Electronic Industrial Association *HDLC: High-level data link control *PEP: Packetized Ensemble Protocol *CRC: Cyclic redundancy check *BERT: Bit error rate testing

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. When a vendor is unable to provide specific information about its product, this is designated NP (not provided). When a question does not apply to a vendor's product, this is designated NA (not applicable). Further product information is available from the vendors.

COMPANY	PRODUCT	MODEM STANDARD	SYNCHRONOUS/ ASYNCHRONOUS	HALF/DUPLEX	DIAL BACKUP	SYNCHRONOUS DIAL COMMAND	FALLBACK SPEEDS (BIT/SEC.)	ERROR CORRECTION	LINE-QUALITY ADJUSTMENTS	BUILT-IN MULTIPLEXER	SECURITY FEATURES	NETWORK MANAGEMENT FEATURES	PRICE
Digital Equipment Corp. (800) 832-6277	DF129	V.29	Synch	Full	No	No	7.2K, 4.8K, 2.4K	None	Yes	No	None	None	$2,330-$2,975
Esmiles Corp. (714) 662-5600	Performance 1000/9.6	V.29	Synch	Full	Yes	No	4.8K, 7.2K	None	Yes	No	None	Downline configuration loading	$1,195
Fastcomm Communications Corp. (800) 821-0486	FDX 9696	V.32, V.22 bis, Bell 103, 212A	Both	Full	HP	Yes	4.8K, 2.4K, 1.2K, 300	MNP, Trellis	Yes	No	None	None	$1,579-$1,999
	FDX 9694	V.32, V.22 bis, Bell 103, 212A	Both	Full	No	Yes	4.8K, 2.4K, 1.2K, 300	MNP, Trellis	Yes	No	None	None	$1,279-$1,299
	FDX 9600	V.32	Asynch	Full	No	No	4.8K	MNP, Trellis	Yes	No	None	None	$1,179-$1,199
	FDX 9600 FP	V.29	Synch	Half	Yes	Yes	4.8K	None	Yes	No	None	None	$1,779-$1,799
	9600 Turbo	V.29	Asynch	Half	No	Yes	7.2K, 4.8K	EDI	Yes	No	None	None	$1,019
Fujitsu America, Inc. (408) 432-1300	EZ series	V.29	Synch	Full	No	No	7.2K, 4.8K	Trellis	MP	No	None	Remote diagnostics and configuration	$995-$1,795
	M1921 series	V.29	Synch	Full	No	No	7.2K, 4.8K	None	Yes	No	Password	Remote diagnostics and configuration	$1,339-$1,495
	M1923 series	V.29	Synch	Full	No	No	7.2K, 4.8K	None	Yes	No	Password	Remote diagnostics and configuration	$1,739-$1,895
	M1926 CMOS	V.29	Synch	Full	No	No	None	None	Yes	Yes	Password	Remote diagnostics and configuration	$2,139
	M1927 series	V.29, V.33	Synch	Full	No	No	None	Trellis	Yes	Yes	Password	Remote diagnostics and configuration	$2,139-$2,295
	M1928L	MP	Synch	Full	Yes	MP	None	Trellis	Yes	Yes	Password	Remote diagnostics and configuration	$4,495
Gammalink (415) 969-9040	Gammastation	V.29	Synch	Half	Yes	Yes	7.2K, 4.8K, 2.4K	None	Yes	No	Password	Information on calls, duration, speed, line quality	$1,695
	Gammastation 9600 MC	V.29	Synch	Half	Yes	Yes	7.2K, 4.8K, 2.4K	None	Yes	No	Password	Information on calls, duration, speed, line quality	$1,595
	Gammastation II	V.29	Synch	Half	Yes	Yes	7.2K, 4.8K, 2.4K	None	Yes	No	Password	Information on calls, duration, speed, line quality	$1,595
Gandalf Data, Inc. (800) GANDALF (312) 541-6060 (Ill.)	LDM 400	Proprietary, EIA* RS-232C, V.24, V.28	Synch	Full	No	No	4.8K	None	Yes	Yes	Leased-line modem	V.54 compatibility, test pattern generator, error comparator	$895
	LDM 419	Proprietary	Both	Full	No	No	4.8K	None	Yes	Yes	Leased-line modem	V.54 compatibility, test pattern generator, error comparator	$1,695
	Access Series V.32	V.32, V.22 bis, Bell 212	Both	Full	Yes	Yes	4.8K, 2.4K, 1.2K	HDLC/	Yes	No	None	V.54 compatible	$1,900
	Pastrak 96FP	V.29	Synch	Full	No	No	7.2K, 4.8K	None	Yes	No	Leased-line modem	Test pattern generator, error comparator	$1,995
	Pastrak 96LH	V.29	Synch	Full	No	No	7.2K, 4.8K	None	Yes	No	Leased-line modem	Test pattern generator, error comparator	$1,695
General Datacomm, Inc. (203) 574-1118	GDC Dual Modem	Proprietary	Asynch	Full	No	No	1.2K to 9.6K	None	No	No	None	None	$695
	Datacomm 2020	Proprietary	Synch	Full	No	No	2.4K to 9.6K	None	Yes	No	None	None	$695
	DATX 2000 series	Proprietary	Asynch	Full	No	No	1.2K to 9.6K	MNP, compression, X.25	No	No	None	None	From $295
	Datacomm 290	V.32	Both	Full	Yes	Yes	4.8K	MNP, LAP, Trellis	Yes	No	Port security	None	$1,725
	LCM 1000 series	Proprietary	Asynch	Full	No	No	1.2K to 9.6K	None	Yes	No	None	None	$249-$279
	Datacomm 9000 series	V.29	Both	Full	No	No	7.2K, 4.8K	None	Yes	No	None	Digital, analog loopback diagnostics, self-test	$1,595-$1,595
	Desktop 9600	V.29	Both	Full	No	No	7.2K, 4.8K	None	Yes	No	None	None	$1,599
	Multiport 9600	V.29	Both	Full	No	No	7.2K, 4.8K	None	Yes	Yes	None	Digital, analog loopback diagnostics, self-test	$2,395
	DC 600 series	AT&T Dataphone Digital Service	Asynch	Full	No	No	4.8K, 2.4K	None	No	No	None	Digital, analog loopback diagnostics, self-test	$649-$1,249
Hayes Microcomputer Products, Inc. (404) 441-1617	V-Series Smartmodem 9600, 9600B	V.32, Bell 103, 212A, V.22 bis	Both	Both	No	No	None	LAPB	Yes	No	None	None	$1,199-$1,299
IBM (800) IBM-2468	IBM 5865	V.29, V.27	Synch	Full	Yes	Yes	4.8K, 7.2K	LPDA 2	Yes	No	None	Network diagnostics, modem and line status and testing, line analysis, transmit and receive test	$4,650
Intecom Data Systems, Inc. (312) 459-0841	Superlink 9600	V.29	Synch	Full	No	Yes	7.2K, 4.8K	Trellis	Yes	No	None	None	$1,495
Infinet, Inc. (617) 661-9600	V.32 Trellis	V.32	Both	Full	Yes	No	4.8K	Trellis	Yes	No	None	None	$2,575-$2,695
	IDM 9600	V.29	Synch	Both	Yes	No	7.2K, 4.8K	None	Yes	Optional	Front-panel lockout	Remote configuration, diagnostics, restoral, line performance, loop tests	$4,000-$4,100
	IDM HPP (Fast Poll)	V.29	Synch	Both	Yes	No	4.8K	Trellis	Yes	No	Front-panel lockout	Remote configuration, diagnostics, restoral, line performance, loop tests	$6,000-$6,000
Micom Systems, Inc. (800) MICOM-US	144096/V.29+	V.29	Synch	Full	No	No	7.2K, 4.8K	None	No	No	None	None	$2,450
Microgate Corp. (512) 346-7701	Synclink 96K	V.29	Synch	Both	Yes	Yes	7.2K, 4.8K, 2.4K	Software-controlled	Yes	No	None	None	$1,495
Mux Lab (800) 361-1965	Fastware	V.29, V.22, V.22 bis, Bell 103, 212A	Asynch	Full	Yes	No	7.2K, 4.8K	MNP	Yes	No	None	None	$995
Multi-Tech Systems, Inc. (612) 631-3550	Multimodem2400	Bell 208A, 201B, V.26 bis	Both	Both	No	Yes	2.4K	None	Yes	No	None	None	$1,195
	Multimodem V.32	V.32, V.22 bis, V.22, Bell 212A, 103	Both	Both	No	Yes	4.8K	MNP	Yes	No	None	None	$1,495
	Multimodem96E	V.22 bis, V.22, Bell 212A, 103	Both	Both	No	Yes	None	MNP	Yes	No	None	None	$1,295
	Multimodem V29	V.29, V.27	Both	Both	No	No	None	None	Yes	No	None	None	$1,395
NEC America, Inc. (408) 433-1250	SPN 9600	Proprietary	Synch	Full	No	No	7.2K, 4.8K, 2.4K	None	Yes	No	Password	Networking monitoring, automatic alarm reporting	$4,195
	DSP9600	V.32	Both	Full	Yes	No	4.8K	Trellis	Yes	No	Password	Modem status indication, EIA interface display, local and remote loopback test	$1,895
	SPN 9600M	Proprietary	Synch	Full	No	No	7.2K, 4.8K	None	Yes	Yes	Password	Network monitoring, automatic alarm reporting	$4,795
Network Systems, Inc. (617) 859-8500	Ready-Link	V.34, RS-530	Both	Full	No	No	Assignable from 0 to 9.6K	None	Yes	No	HP	None	$295
Paradyne Corp. (800) 482-3333 (800) 342-1140 (Fla.)	3440 series	V.29, proprietary	Both	Full	Yes	No	7.2K, 4.8K	None	Yes	Yes	Key sequences	Diagnostic monitoring, testing, control	$3,450
Racal Datacomm (800) 638-8660	Datalink 9600	V.29, V.27	Both	Both	Yes	No	7.2K, 4.8K, 2.4K	MNP	Yes	No	Front-panel lock	None	$1,795-$1,795
	9600 FT	V.29, V.27	Both	Both	Yes	No	7.2K, 4.8K, 2.4K	MNP	Yes	No	Front-panel lock	None	$1,995-$1,995
	Alliance V.32	V.32, V.22 bis, Bell 212, 103	Both	Full	Yes	No	4.8K	MNP	Yes	No	Front-panel lock	None	$1,395

COMPANY	PRODUCT	MODEM STANDARD	SYNCHRONOUS/ ASYNCHRONOUS	HALF/DUPLEX	DIAL BACKUP	SYNCHRONOUS DIAL COMMAND	FALLBACK SPEEDS (BIT/SEC.)	ERROR CORRECTION	LINE-QUALITY ADJUSTMENTS	BUILT-IN MULTIPLEXER	SECURITY FEATURES	NETWORK MANAGEMENT FEATURES	PRICE
Philips Information Systems, Inc. (800) 448-0464	V.32 PC Card	V.32	Both	Full	No	Yes	4.8K	Trellis	Yes	No	None	None	$1,595
	V.32 Continental	V.32	Both	Full	Yes	Yes	4.8K	Trellis	Yes	No	None	None	$1,595
	Sometrom 9606	V.32	Both	Full	Yes	Yes	4.8K, 2.4K	MNP	Yes	No	None	None	$1,795
	Sometrom 9631	V.29	Both	Full	No	No	7.2K, 4.8K	MNP	Yes	Yes	None	Download configuration, diagnose analog lines	$1,495
	Sometrom 14431	V.32	Both	Full	No	No	7.2K, 4.8K	MNP	Yes	Yes	None	Download configuration, diagnose analog lines	$2,595
Racal-Milgo (305) 475-1601	RM-9632	V.32	Both	Full	Yes	Yes	4.8K	Trellis	Yes	No	None	Statistical reporting, continuous unattended polling of installed modems, continuous status display of modems	$1,595
	RM-9629	V.29	Both	Full	Yes	No	7.8K, 4.8K	None	Yes	Yes	Password, encryption	None	$1,850
	Omnimux 96	V.29	Both	Full	Yes	No	7.2K, 4.8K	None	Yes	Yes	Password, encryption	Compatible with Racal-Milgo Communication Management System	$3,250
Racal-Vadic (800) 482-2427	VM8012	V.29, Bell 212, 103	Both	Both	Yes	Yes	7.2K, 4.8K, 1.2K, 300	MNP	Yes	No	None	Built-in diagnostics	$995
	9606W	V.29	Synch	Full	Yes	Yes	7.2K, 4.8K	None	Yes	No	None	Local reconfiguration, diagnostics, remote testing	$1,695
	9609T	V.29, proprietary	Both	Both	No	No	7.2K, 4.8K, 1.2K, 300	MNP	Yes	No	Prestored, automatic dialing	Full range of diagnostic tests	$995
Symplex Communications Corp. (313) 996-1555	Quantum Plus 19.2, 28.8	V.29, V.27, proprietary	Both	Full	Yes	No	7.2K, 4.8K	Trellis	Yes	Yes	None	Localized hardware failures, identify trends, anticipate and correct impending response-time slowdowns	$7,450-$8,950
Telebit Corp. (800) TELE-BIT	Accelerator 2020	V.29	Asynch	Both	Yes	No	4.8K, 2.4K, 1.2K, 300	MNP, Telebit CRC-16	Yes	No	Password, callback, encryption	Audit trail, remote configuration	$1,195
	Trailblazer Plus	V.22 bis, V.22, Bell 212A, 103], proprietary	Asynch	Full	No	No	Increments of 100	MNP, PEP*	Yes	No	None	Remote diagnostics and control, central site management	$1,545
	T2000	V.22 bis, V.22, Bell 212A, 103], proprietary	Both	Full	No	Yes	Increments of 100	MNP, PEP	Yes	No	None	Remote diagnostics and control, central site management	$1,495
Telesystems Corp. (714) 779-2766	TC 9215R	V.32, V.22 bis, V.22, Bell 103	Both	Full	Yes	No	4.8K	MNP	Yes	No	Optional callback	None	$1,495
	ED9.6	V.29	Synch	Full	No	No	7.2K, 4.8K	None	Yes	No	None	None	$1,495
	ED9.6 FP	V.29	Synch	Full	No	No	7.2K, 4.8K	None	Yes	No	None	None	$1,895
Universal Data Systems, Inc. (205) 721-8000	9600S	V.29	Asynch	Full	No	No	50 to 9.6K	None	Yes	Yes	None	Remote, local and digital loopbacks, self-test parameters	$2,695
	Model V.32	V.32	Both	Full	No	No	4.8K	Trellis	Yes	No	None	Remote, local and digital loopback, self-test	$1,595
	Model 9624T	V.29	Both	Full	No	No	4.8K, 2.4K	None	Yes	Yes	None	Remote, local and digital loopback, self-test	$2,495
	Sync-Up T9628B	V.29, proprietary	Synch	Half	No	Yes	7.2K, 4.8K	Trellis	Yes	No	None	Self-test	$1,540
	Model 9648T	V.29	Both	Both	No	Yes	Selectable to any rate	Trellis	No	No	Front-panel lockout	Remote, local and digital loopback, self-test	$1,995
	Model 9600PP/RS	V.29	Both	Full	No	No	7.2K, 4.8K	None	Yes	No	None	Remote, local and digital loopback, self-test	$1,995
	9600 Trellis A/B	V.29, proprietary	Synch	Both	No	No	4.8K	Trellis	Yes	No	None	Remote, local and digital loopback, self-test	$1,995
U.S. Robotics, Inc. (312) 982-5001	Courier HST	Proprietary	Asynch	Full	No	No	7.2K, 4.8K	Trellis, HST error control protocol (proprietary)	Yes	No	None	None	$995
Van-Tel, Inc. (800) 538-5121	PathBinder 14K	PEP* (proprietary)	Asynch	Half	No	No	Increments of 100 bit/sec.	MNP, CRC*	Yes	No	None	Remote configuration	$1,399
Western Datacom (800) 289-5311 (214) 680-1510 (Texas)	432 Line Builder (mod. 7/88)	V.32	Both	Full	Yes	No	7.2K, 4.8K, 2.4K	MNP	Yes	No	Password, callback	Remote diagnostics, configuration, BERT* testing	$1,995
	432 Network Node (mod. 7/88)	V.32	Both	Full	No	No	7.2K, 4.8K, 2.4K	MNP	Yes	No	None	Remote diagnostics, configuration, BERT testing	$995

T1

FROM PAGE S12

Infostream 1500
Byte-interleaved TDM supports 128 voice/data channels with a maximum data rate of 1M bit/sec. Automatic alternate routing. Point-to-point, drop-and-insert, bypass, dual-link and ring configurations.

Intraplex, Inc.
(617) 486-3722
TDM-150 Series T1 Multiplexer
Available as full-duplex or two-way drop-and-insert multiplexer. Combines voice/data and high-fidelity digital audio in a single T1 carrier using 24 digital time slots.

Megaring Corp.
(516) 438-4666
CMX-T
Fault-tolerant T1 ring architecture with up to eight nodes per ring; drop-and-insert capabilities; up to eight channel asynchronous data circuits per card, allowing up to 192 lines per ring; synchronous data rates up to 64K bit/sec.; integration of voice, asynchronous and synchronous data interfaces.

Micom Systems, Inc.
(805) 583-8600
Digital Wideband Exchange
Resource-management system for voice, synchronous and asynchronous data and other high-speed digital applications. Eight T1-trunk capacity.

Network Equipment Technologies, Inc.
(415) 366-4400
IDNX/70
Connects voice/data and video equipment among multiple locations. Supports up to 96 T1 trunk modules, 768 active voice calls and 400 active data calls.

IDNX/40
Functionally similar to and compatible with IDNX/70. For connecting lower volume locations to IDNX backbone network. Supports up to 15 T1 trunk modules.

IDNX/20
Connects voice/data and video equipment among multiple locations. Supports up to eight T1 trunk modules.

Paradyne Corp.
(813) 530-2000
3210 series
Bit- or byte-interleaved TDM with point-to-point operation. Combines a 96-circuit T1 channel capacity with networking capabilities for transmission of voice/data, facsimile and video. Mixed input speeds up to 1.5M bit/sec.

3230 Nodal Processor
Software-driven intelligent bit-interleaved T1 multiplexer supports 508 voice/data and video channels per node.

Pulsecom
(800) 841-1005

PD4 T1 Multiplexer
Handles up to 48 channels of analog voice and analog or digital data. Toll-grade performance suitable for all types of trunks.

Racal-Milgo
(305) 475-1601
Omnimux 8010
Nibble-interleaved, point-to-point TDM for voice, synchronous data and digitized video communications. Up to 48 channels per node.

Omnimux 9000
Networking T1 multiplexer for integrated voice/data and video networking supports up to 36 T1s per node.

Omnimux CBI
Voice/data TDM for up to 96 channels available in 24- or 48-channel increments.

Omnimux T1
Bit-interleaved TDM with up to 44-channel capacity for voice and synchronous and asynchronous data.

Teilabs, Inc.
(312) 969-8800
Crossnet System
Time-division multiplexing of input from up to 128 voice/data or compressed video channels into T1 facilities.

Teltone Corp.
(800) 426-3926
Max 1
Handles voice and data. Supports 144 asynchronous data channels at 9.6K bit/sec. and 24 synchronous channels at 64K or 56K bit/sec. per T1 line. Full redundancy, drop-and-insert capabilities and four levels of password security.

Timeplex, Inc.
(201) 391-1111
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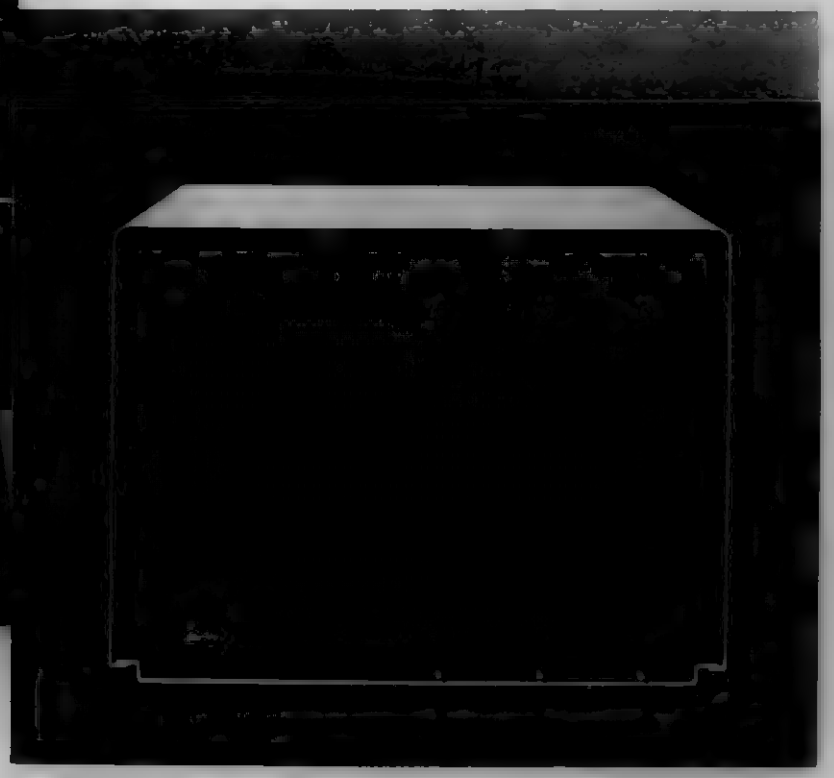

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SYSTEMS & PERIPHERALS

HARD TALK

Stanley Gibson

Software cushions DEC

Is DEC cooling off? Even if it is, it doesn't matter.

If DEC is headed for a flat period, or is in one now, what it has accomplished during the past several years has put it in a position to avert the negative effects of even a sharp downturn. DEC's strong performance has convinced major software vendors to commit large amounts of resources to developing important new software products for VAX hardware.

Some of these packages, such as Cullinet's IDMS/SQL, have been released; others are still on the drawing board. But as these products come into use in the months and years ahead, they will provide an afterburner effect on DEC's growth that will tend to compensate for any slowdown that may now be taking place.

In the past, IBM has reaped the benefits of the availability of a wide variety of outstanding software applications. Software availability has often sold hardware for IBM when the hardware could not sell itself. DEC now stands ready to gain in a similar way. What DEC has

Continued on page 56

Conversion all in a day's work

TRW executes rapid switch from AT&T to Unix-based Sequent systems

BY JEAN S. BOZMAN
CW STAFF

CLEVELAND — Score one for Unix.

Record Data, Inc., a subsidiary of TRW, Inc., found that AT&T Unix System V portability made possible a nearly instant hardware conversion during a recent installation of order entry systems.

The portability of applications written under the Unix operating system has been widely touted as a distinct advantage by Unix-based systems vendors. But that portability has been equally scorned as snake oil, or essentially misleading, by Digital

Record Data's Schrader

Equipment Corp. President and Chief Executive Officer Ken Olsen, whose interest is primarily in selling the proprietary VMS operating system.

The experience of Record Data, one of the nation's largest title insurance agencies and real estate appraisal companies, runs counter to Olsen's assertion, which is shared by others in the industry.

The conversion from AT&T 3B15 computers to Sequent Computer Systems, Inc. Balance 8 (B8) machines took little more than a day, according to Richard Schrader, senior vice-president of Record Data's MIS group. "We brought the 3B15 machines down on a Friday and had everything working smoothly by Monday morning."

Continued on page 55

XPS-100s replaced

BY STANLEY GIBSON
CW STAFF

MINNEAPOLIS — Honeywell Bull, Inc. recently replaced the three models of its Unix-based XPS-100 family of multiuser computers intended for small business and departmental computing. The company's new systems support from four to 96 users; the previous systems supported up to 64 users.

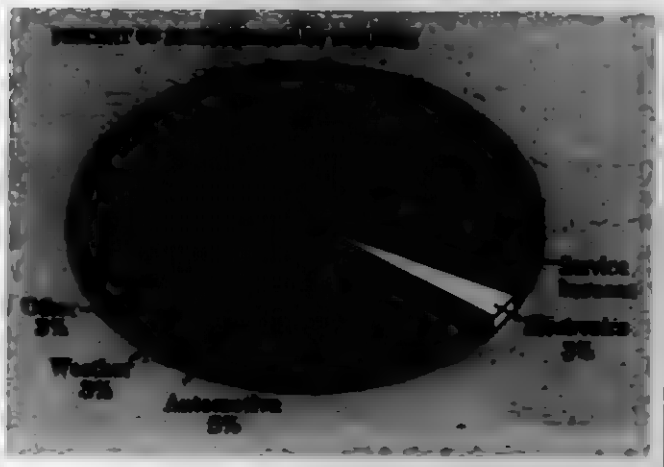
The single-processor XPS-100 Series Models X-15 and X-22, together with the dual-processor X-42, run Honeywell Bull's version of AT&T's Unix

Continued on page 56

Data View

U.S. of Cray?

Government agencies account for one-third of Cray's installed base



INFORMATION PROVIDED BY CRAY RESEARCH, INC.

Convergent offers mix

BY J. A. SAVAGE
CW STAFF

SAN JOSE, Calif. — As part of a deluge of products unveiled at a recent rollout, Convergent Technologies, Inc. introduced terminals, printers and servers.

The vendor, whose fortunes have ridden a roller coaster of ups and downs in the past few years, made the announcements with the aim of reversing a two-year, $65 million losing streak.

Convergent's S/80 adds a new entry level to the company's Unix-based "S" series. The S/80 supports 16 users; earlier models support up to 128 users. The S/80, as well as the rest of the S series, can use new random-access memory cards in either 8M- or 16M-byte versions.

The base S/80 configuration includes eight RS-232 ports, a cartridge tape drive, 2M bytes of memory and a 40M-byte disk drive that can be expanded to 320M bytes. The server is based

Continued on page 54

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Fully integrated (no box!), the ISI 7224 connects directly to IBM 3174/3274/3276 controllers or S/3X twinaxial cable.

Forms-handling advantages include automatic paper parking, no-waste demand-document tear-off, and a straight path for stiff forms. No extra-cost gadgets are required.

Extra features and all, the ISI 7224 costs much less than its IBM counterpart.

For more information, call 1-800-544-4672 (in Michigan, 313/769-5900). Or write.

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5855 Interface Drive, Ann Arbor, MI 48103
Telex: 810-223-6058

▶ The ISI 7224 prints at 53.7 dBA — quieter than the IBM 4224. And since it's only seven inches tall, it fits tighter spaces.

Memorex Telex displays terminals

TULSA, Okla. — Adding to the variety of peripherals it offers for IBM System/36 and 38 processors, Memorex Telex, Inc. recently announced three display terminals.

Currently shipping, the Memorex Telex 1196 A/B is a 12-in. monochrome display for System/36 and 38 users. Available with a green or amber screen, the system can operate with either 102- or 122-key keyboards.

The terminal offers a host-addressable print function, which the vendor said allows several users to share one printer, such as the Memorex Telex 1201 display printer.

The 1196 A/B is available with a choice of a 90-day, one-year or three-year warranty. List price for the unit with a 90-day warranty is $1,185.

The 1197/C color display is slated to be available late this month. The 14-in. terminal offers dual display sessions or one display session and one host-addressable print session, along with screen printing capability.

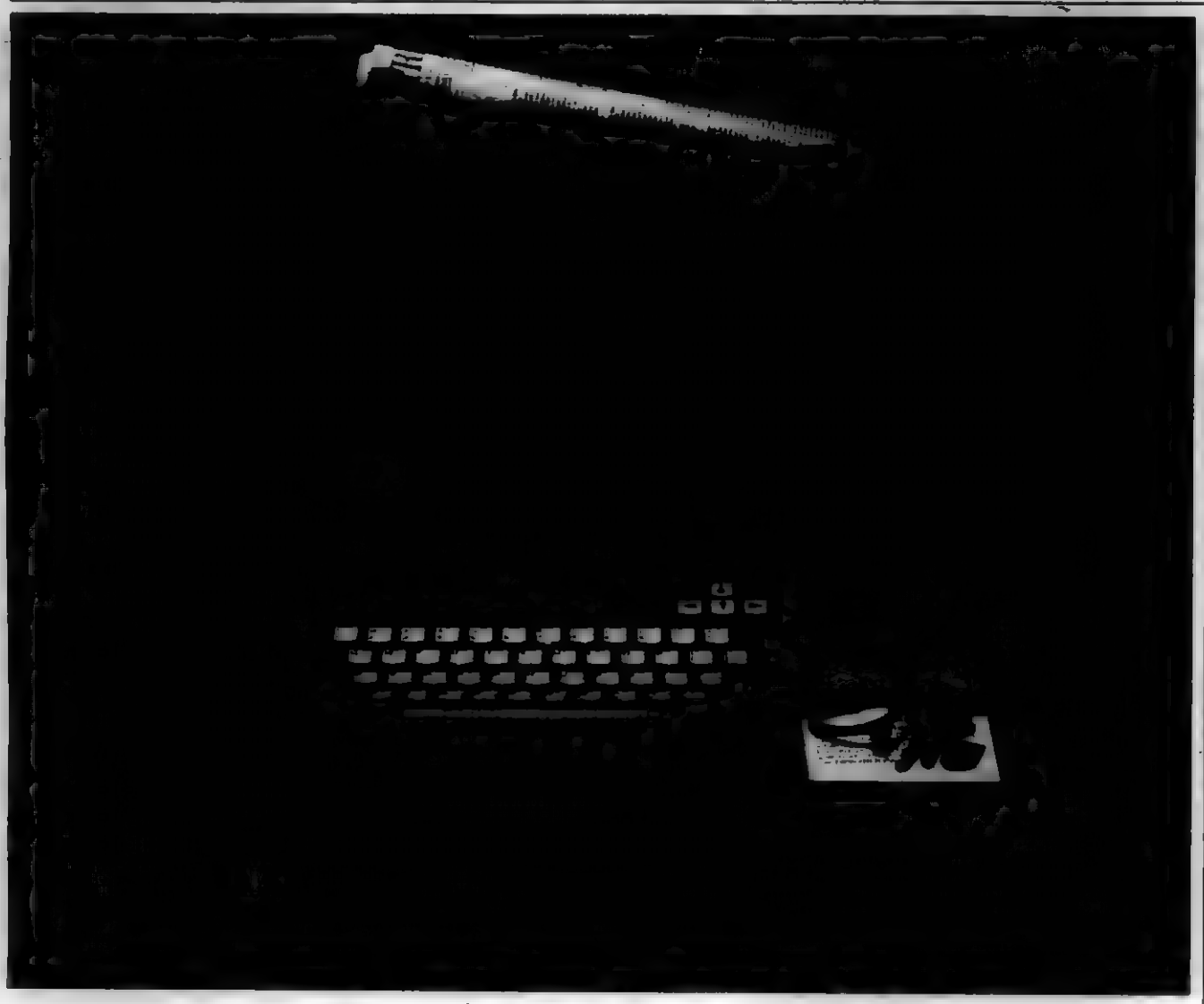
The 1197/C supports both 102- and 122-key keyboards. The screen displays 24 lines by 80 characters in either seven- or two-color mode.

The display supports all IBM 3197C features, according to the vendor. The list price for a single unit with a 90-day warranty is $1,845.

The Memorex Telex 1197D/E is a 14-in. monochrome display that supports dual sessions and host-addressable printing. The terminal's command keys may be customized.

The terminal supports both display sizes of 24 lines by 80 characters and 27 lines by 132 characters. The 1197D/E also features split-screen mode, with 24 lines in one session and 17 lines in the other.

Memorex Telex said the 1197D/E will be available in midsummer. A single unit with a 90-day warranty is priced at $1,635.



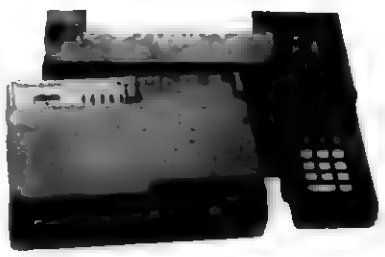
TI's new TravelMate™ LT220.
It's the closest thing to carrying a VAX™ in your briefcase.

Texas Instruments introduces the LT220 lap-top terminal — the next best thing to being there when you need remote access to your company's VAX.

The LT220 provides full VT220 emulation in a 4.8-lb. package, without sacrificing functionality. It features a 25-line screen that's easy to read. It even has a full-function keyboard like the one on a VT220.

The terminal communicates at 1,200 or 2,400 bps through one of its optional internal modems. For hard copy, just slide the LT220 into one of its optional cradles to add an ink-jet or thermal printer.

New credit-card-sized memory cards let you create, update and store files. They're also handy for programming the LT220 to your specific application.



Like its Silent 700™ predecessors, the LT220 sets new standards for portability, durability and reliability. All of which makes it the perfect tool for anyone who's ever wished for a VAX in their briefcase. In short, this may be the best little terminal in the world.

So go ahead. Take the first step toward improving your productivity today. Call Texas Instruments for more information or to arrange a demonstration of the LT220. Phone toll-free, 1-800-527-3500.

TEXAS INSTRUMENTS

3654
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VAX is a trademark of Digital Equipment Corporation.

Convergent

FROM PAGE 53

on Motorola, Inc.'s 68020 microprocessor running at 16.7 MHz. It operates on Convergent's port of AT&T's Unix System V, CTIX.

Shipments of the server, including the memory cards and the company's remote I/O processor, will begin in July, according to the company. The server will cost between $7,000 and $10,000, depending on configuration.

The new ServerPC Model 100 will support four to 16 personal computer or terminal users in a Unix environment while also running DOS applications. Previous models support eight to 32 users.

Based on Intel Corp.'s 80386 processor, the Model 100 can be configured with 2M to 12M bytes of memory, four to 28 ports and from 40M to 400M bytes of internal storage. The system also includes a 150M-byte cartridge tape drive and Convergent's CTIX operating system. The ServerPC will list for about $7,500, depending on configuration.

Printers inked

Convergent is also offering matrix printers — a new product line for the company.

Three printers, the CT-2475, the CT-2450 and the CT-2425, are aimed at applications such as demand-document preparation and office automation. All have 24-wire printheads and support any of Convergent's products.

The printers range from the 2475 with 486 char./sec. to 288 char./sec. in draft mode. The high-end printer can handle eight-part forms, while the low-end printer is geared toward word processing and single-sheet printing. Convergent would not give prices for these models.

A new terminal, the TO-250, was designed to be used with the S series Unix System or the ServerPC. Convergent did not give a price for the new terminal.

Conversion

CONTINUED FROM PAGE 53

Sequent's Dynix operating system provides support for Unix System V but has functional extensions, Schrader said.

Only two problems marred the February conversion: one CPU within a single Sequent machine malfunctioned and had to be replaced, and one tape drive broke down. "We were able to continue processing by turning off the malfunctioning CPU board," explained Mohamed S. Osman, manager of office automation.

The conversion followed a seven-month testing period on a Sequent Balance 21 (B21) machine, which has 12 internal CPUs and 32M bytes of memory. Since then, three more B8 machines have been installed at Record Data sites, bringing the total number of Sequent machines installed to 11. That is only one-third as many as Schrader said he would like to have in place by next year.

The replacement of the older 3B15 Unix machines with the Sequent units is part of a larger automation effort. The goal of the program is to bring on-line order entry to 40 of Record Data's 65 offices nationwide. "Each machine will be able to dial up every other machine so that we can transfer information quickly across the country," Osman said. Software applications will allow computers to automatically update data bases in other machines, he added.

Record Data launched its office automation project early last year, using 3B15 machines running Unix System V. Each hosted a data base from Unify Corp. All applications were written by Record Data's four staff programmers in the Cleveland office, Schrader said.

But the automation effort bogged down when response times lagged, Schrader recalled. When 15 to 20 people were actively using each 3B15 system, response times surged to between six and 10 seconds.

Last summer, Record Data began evaluating faster Unix machines that had the capability to offer better response times. Under the Sequent systems, response time is two to three seconds or better, Schrader noted.

Response times are critical to Record Data's business. Large numbers of transactions involving real estate appraisals and credit authorizations must be processed each day.

Computers in various states are connected to each other and to a central host in Cleveland. The data bases on the various systems around the country will update the host data base periodically, using a nationwide network.

Record Data's offices are now located in Baltimore, Boston, Cherry Hill, N.J., Mineola, N.Y., Miramar, Fla., Philadelphia, Rochester, N.Y., and Wheaton, Ill.

Research turned up Sequent

After a thorough search of Unix offerings from Hewlett-Packard Co., Digital Equipment Corp. and Sun Microsystems, Inc., Record Data decided on Beaverton, Ore.-based Sequent's Balance machines.

Record Data purchased one B21 and seven B8 systems for a total of $1.3 million. Each B8 system has eight CPUs and is configured with 16M bytes of memory and 32 to 64 I/O ports. The B8s are rated at approximately 4 million instructions per second (MIPS), Schrader said, while the B21 is reportedly capable of 32 MIPS.

Two primary reasons for choosing the Sequent systems were their support for Unix V applications and their parallel processing architecture, which Record Data has not yet exploited. "We think our REX Plus custom application, which has 250,000 lines of code, would run much faster if we ran the machines in a parallel-processing mode," Osman said.

Another consideration is the ease with which the Sequent machines can be restarted after a power failure. "We don't have any uninterruptible power systems right now," Schrader said, "and in some states, there are frequent power failures — as many as one to two power hits a day during the summer. The beauty of the Sequent system is that it only takes five minutes to boot."

EMC designs IBM storage subsystem

BY STANLEY GIBSON
CW STAFF

HOPKINTON, Mass. — EMC Corp. recently announced a solid-state storage subsystem designed to work with IBM and plug-compatible mainframes.

The EMC Quantum provides 16M to 544M bytes of storage and is ideally suited to users of IBM 4300-type systems, according to Dan Maga, vice-president of marketing for mainframe products at EMC.

The device can perform either IBM 3370 or 3380 emulation and can operate at a transfer rate of 4.5M byte/sec. as well as at 1, 1.5, 2 or 4M byte/sec., according to EMC. The device has an access time of 0.1 msec, which the vendor claimed is the fastest for solid-state devices intended to connect to IBM channels.

Although the maximum capacity for one unit is 544M bytes, units can be daisy-chained together for up to 2.72G bytes of capacity. Memory may be added in 16M- or 64M-byte units.

The device attaches to an IBM or plug-compatible computer block multiplexer channel using standard cables.

Currently shipping, the price for a 16M-byte unit is $27,400. A 128M-byte subsystem is priced at $184,200.

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XPS-100s

FROM PAGE 53

System V, Release 3.

The systems, which Honeywell Bull said will be sold directly to end users as well as through OEMs, take the place of the 2-year-old XPS-100 Series Models 10, 20 and 40.

The older systems used the Motorola, Inc. 68010 microprocessor. The new systems are based on Motorola's 68020 chip.

The entry-level Model X-15 supports from four to 32 users. Main memory can be increased from 2M to 16M bytes, and the vendor said the system is field-upgradable to the dual-processor Model X-42.

High-end options

The Models X-22 and X-42 can support from eight to 96 users, and the X-22 can be upgraded to the X-42.

The X-22 and the X-42 include an integrated tape and disk controller, a 1.2M-byte Microsoft Corp. MS-DOS and OS/2-compatible diskette drive and an integrated 60M-byte streaming tape drive.

Memory on the Model X-22 may be expanded from 4M to 16M bytes. Memory on the X-42 can be expanded from 8M to 32M bytes, according to Honeywell Bull.

Disk space on the X-22 can be expanded to 807M bytes with a 325M-byte fixed-disk unit, and the X-42 can be expanded up to 1.8G bytes.

The Model X-15 is priced from $12,074 for a four-user configuration, including a 16.7-MHz 68020 microprocessor, 2M bytes of memory and 72M bytes of fixed-disk storage. The system is available immediately.

The Model X-22 is priced from $20,495. That price includes a 16-user system with 4M bytes of memory and 157M bytes of disk storage.

The Model X-42 starts at $41,495 for 32 users. The system includes dual processors, 8M bytes of memory and 157M bytes of fixed-disk storage.

Honeywell Bull also announced the availability of a software porting tool, RPG-II/36, that is intended to convert applications written for the IBM System/34 and 36 to the XPS-100 Series models.

Power play

In addition, Honeywell Bull announced an optional high-performance package for the Models X-22 and X-42 that upgrades the new models from the standard 16.7-MHz 68020 microprocessor to a 68020 running at 25 MHz.

According to the company, the X-22 and X-42 will be available in July. The 25-MHz high-performance upgrade package is expected to be available in the fourth quarter.

Gibson

FROM PAGE 53

done in the past several years is to go from a company fighting it out with archrival minicomputer makers Data General, Wang Laboratories and Hewlett-Packard, to competing largely with IBM. Historically a thorn in DEC's side, DG has fallen further and farther behind. DEC has attained the status of a company that is secure for users and developers to invest in.

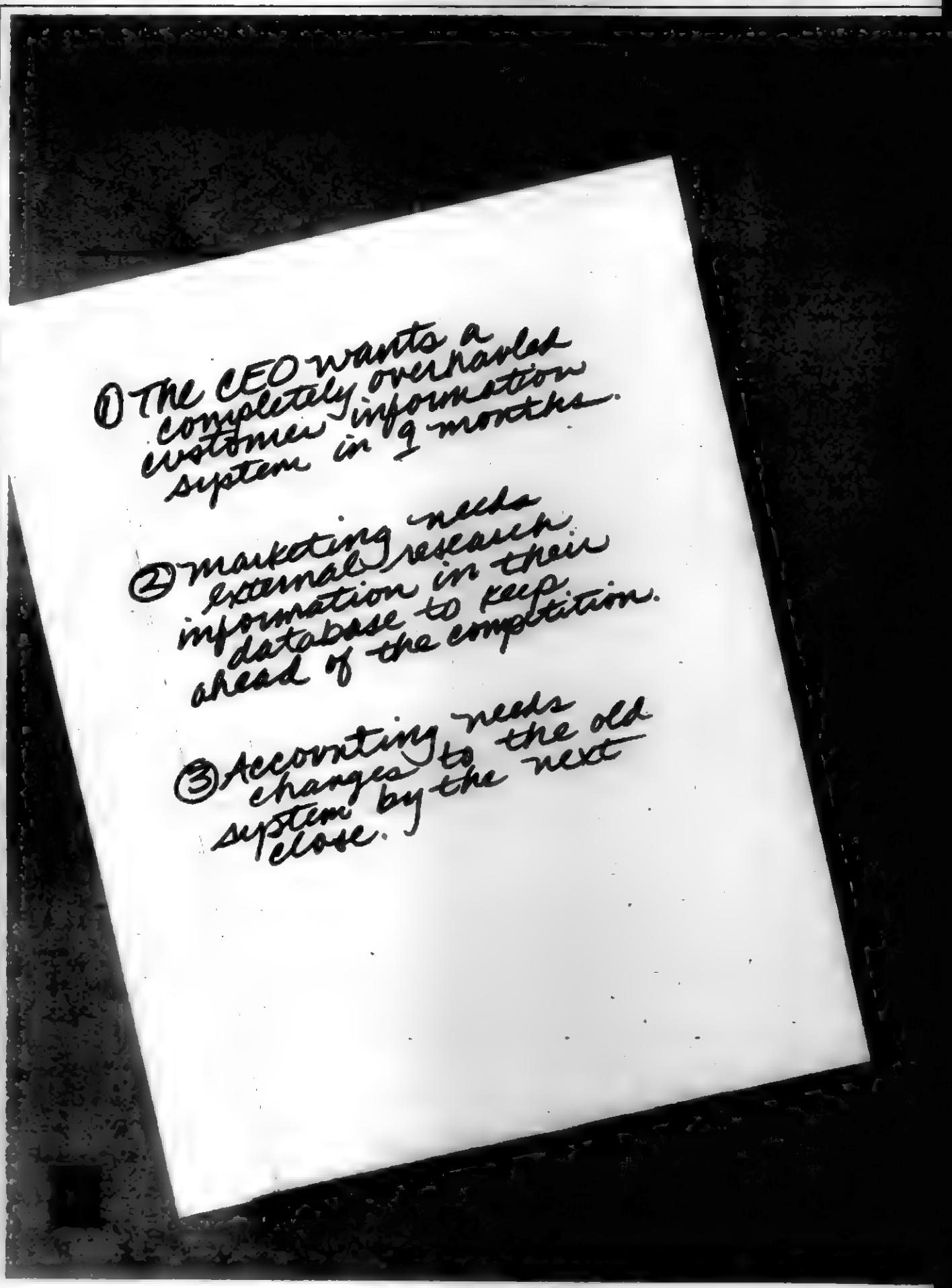
When DEC issued its most recent quarterly results, which showed a lowering rate of profit growth, it spawned articles that predicted a DEC slowdown and said such a slowdown had already arrived. Some consultants got the jump on the press, having begun their Cassandra act several months ago.

In reality, DEC's long-term stability is not going to be greatly affected by relatively minor fluctuations distorted by the looking glass of Wall Street.

The trend in software development for the VAX assures that DEC will cement its position in the computing industry and that it will, in all probability, stay there for many years to come.

Its software base will make it very difficult to dislodge from that slot, despite the renewed efforts of HP and others to do so. Those competitors will find themselves facing the kind of immovable object that IBM has become to so many.

Gibson is Computerworld's senior editor, systems & peripherals.



NEW PRODUCTS

Turnkey systems

A turnkey Intel Corp. 80386-based **data acquisition and analysis system** has been added by **Cyber Research, Inc.**

The fully configured system reportedly acquires data on up to 16 channels at up to 1-MHz samples per second and is especially suited for research and testing laboratory environments.

The product is said to be capable of storing 90,000 samples per second continually to disk. Menu-driven software is included with the unit to allow data conditioning, real-time signal averaging and spectrum analysis.

A 44M-byte high-speed disk, a 1.2M-byte floppy disk and 2M bytes of random-access memory are also included.

The 16-MHz 80386 CPU costs $13,995.

Cyber Research, P.O. Box 9565, 5 Science Park Center, New Haven, Conn. 06536. 203-786-5151.

Processors

A memory and simulation logic accelerator has been introduced by **Aida Corp.**

The **Aida Cosim/ML** processor has a reported capacity of up to eight million gates and is said to operate at speeds of up to 10 million evolution/sec. Physical memory modeling is accomplished via plug-in boards, and the product is constructed around a gate array implementation for use as a network resource. The processor is housed in a stand-alone 26- by 14- by 24-in. cabinet.

The Aida Cosim/ML costs from $135,000 to $275,000, depending on configuration.

Aida, 5155 Old Ironsides Drive, Santa Clara, Calif. 95054. 408-980-5200.

Graphics systems

A series of document image processor workstations has been added by **Document Technologies, Inc.** for sale to OEMs and value-added resellers.

The **DP-200** and **DP-400**, which convert paper documents into electronic images, run under a proprietary extended modem multitasking operating system, XMOS.

Available in configurations for IBM Personal Computers running Microsoft Corp. MS-DOS and Digital Equipment Corp. VAX/VMS environments, the workstations operate in stand-alone, terminal emulation or local-area network environments.

The DP-200 and DP-400 cost from $6,000 to $20,000, depending on configuration.

Document Technologies, 2465 E. Bayshore Road, Palo Alto, Calif. 94303. 415-858-0372.

Data storage

Unisys Corp. has lowered prices on three disk drive subsystems by an average of 24%.

The **B 9399-E** dual-string controller now costs $99,400, down from $129,150. The prod-

Continued on page 58

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Continued from page 57

uct has one fixed inbuilt disk with 5G bytes of unformatted disk. The B 9494-24 double-density thin-film disk also has 5G bytes of unformatted fixed disk. It has been reduced from $96,140 to $70,000. Both controllers are available for Unisys medium and large-scale A and V series mainframe computers.

The 8494 multidisk subsystem has 616M bytes of inbuilt disk and has been reduced from $40,000 to $36,000. The 8494 is available on System 80 Models 8, 10 and 20 computers.

Monthly maintenance charges on all three products have been reduced 36%.

Unisys, P.O. Box 500, Blue Bell, Pa. 19424. 215-542-4011.

Tab Products Co. has enhanced its software for writing image and index information to optical disk storage. The updated package is included with the company's Laser-Optic Filing System series.

Users can reportedly write the index to the document onto both the hard and optical disks simultaneously under Release 5.2 of the software. Once archived, the index information on each optical disk can be searched without using the entire data base.

The Laser-Optic Filing System costs from $49,995 to $69,995.

Tab Products, 1400 Page Mill Road, Palo Alto, Calif. 94304. 415-852-2500.

An 8mm tape-storage subsystem that reportedly offers 9.2G bytes of unattended backup in one cabinet is available from **Sunsmus Computer Systems.**

The Gigatape 9.2 is said to be compatible with Q-bus and Unibus architectures and provides a maximum data throughput of 984K byte/sec. Rates for unattended backup range from 24M to 60M byte/min, depending on system configuration.

The Gigatape 9.2 costs $18,175 for a Q-bus, rack-mount model.

Sunmus, P.O. Box 820549, Houston, Texas 77282. 800-255-9638.

Terminals

An intelligent data collection terminal that also functions as an IBM 3278-2 and IBM 3178-C2 display station has been announced by **Epic Data.**

When in IBM emulation mode, the **Model 1647-531 Full Screen Terminal** allows users to access host applications and enter data with a variety of input devices, including a bar-code wand, a bar-code slot, a magnetic stripe slot or a laser scanner. Up to 30 transaction definitions can be stored in battery-backed memory, and the screen displays up to 1,920 characters plus a status line.

The 1647-531 Full Screen Terminal costs $3,995.

Epic Data, 7280 River Road, Richmond, B.C. V6X 1X5. 604-273-9146.

A composite viewing terminal for Digital Equipment Corp. VAX/VMS sites using the Tex typesetting language has been announced by **Talaris Systems, Inc.**

The **Talaris 7600** provides bit-mapped display with 1,024- by 780-pixel resolution. The product is configured with 512K bytes of random-access memory and 28 proportional fonts in a 196K-byte read-only memory.

Emulation capabilities include the Tektronix, Inc. 4014 and the DEC VT220, the vendor said.

The Talaris 7600 is priced at $1,995.

Talaris, 6059 Cornerstone Court W., San Diego, Calif. 92126. 619-587-0787.

Power supplies

A family of power protection peripherals has been introduced by **Deltron, Inc.** The Tri-Port series of uninterruptible power supply systems pass AC input through a switch to a hold-up transformer, which regulates and filters voltage to the output and load.

There are five models in the series, providing 750-, 1,000-, 1,500-, 3,000- and 5,000-VA output power. The emergency running time is up to 45 min at half load and up to 25 min at full load.

The Tri-Port series costs from $2,025 to $6,995.

Deltron, P.O. Box 1369, North Wales, Pa. 19454. 215-699-9261.

International Computer Power, Inc. has released the **Rotoplus** line of frequency converters, load and line isolators and uninterruptible power systems designed specifically for Tempest Technologies, Inc. applications.

In addition to providing protection from electrical disturbances, the product offers load-to-line isolation in excess of 120db, ensuring against unauthorized access to classified or confidential information.

Units start at 1 kVA single-phase for minicomputers and microcomputers and go through 250 kVA three-phase for mainframe systems.

The product line does not require maintenance or air-conditioning.

Prices for the Rotoplus line range from $3,000 to $75,000.

International Computer Power, 501 S. Michillinda Ave., Pasadena, Calif. 91107. 818-793-8656.

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Du Pont: An information leader

With one eye always focused on the pragmatic, Du Pont computerizes its scientific research

"We set out to be the best at what we do," says John H. Taylor, manager of Du Pont Co.'s Scientific Computing Division. "Right now, we know we're good, but we're still trying to be the best."

Taylor's group is trying in characteristic Du Pont manner: with an emphasis on pragmatism. If technology for technology's sake were to rear its head anywhere, it might be in a department that deals with scientific computing and boasts the largest production Digital Equipment Corp. Vaxcluster in the world. But there, as elsewhere in the company, the reigning philosophy is achieving better business through technology.

"I don't see ours as a 'scientific computing story' so much as an 'end-user story,'" says Taylor, a 26-year Du Pont veteran who was chosen in 1983 to head the then-new Scientific Computing Division. His mission is to find, evaluate and implement computer technologies that bring competitive advantage to scientific users, whose numbers have grown from 1,000 in 1984 to more than 6,400 in January.

Not an easy task

Setting up the division "was a politically difficult situation," Taylor recalls, "so we called in a consultant." IBM was selected from among eight candidates for the job and worked with Du Pont's task force for seven weeks to come up with the recommendations that ultimately became the foundation for the division as it exists today: an amalgam of operations, technology support, analysis and modeling, training and consulting services.

These services are available to end users in the company on a fee basis and are governed by a board of directors made up of the highest ranking resident managers of each of the intra-Du Pont clients.

The division's early work was accomplished on an IBM platform, Taylor says. "The IBM 3081 had gotten scientists accustomed to doing work on computers and paying for high-end computing," he says. But the founding consultant lost its franchise as the result of two convergent developments. First, DEC learned how to build big computers and cluster them. Then, Cray Research, Inc.'s Cray-1A arrived and wiped out IBM's number-crunching advantage.

In early 1986, Taylor says, "Cray approached us with a good lease on a used Cray-1A. They wanted to create a success model in the chemical industry." Cray got what it wanted, and Du Pont got the only supercomputer in the chemical industry, according to Taylor. Currently, some 1,700 scientists run nearly 1,000 experiments a day.

Moreover, Taylor says, "the supercomputer lets you run experiments that would not only be too time consuming or expensive but too unsafe to run otherwise." Cray-based hazardous

Continued on page 64

Global

FROM PAGE 1

eral-purpose workstations.

But what impresses observers even more than those highlights is the integral role that information systems plays within Du Pont's management fabric.

"The way they have forged the link between business management and technology management, for a corporation of their size and diversity, is truly impressive," says David G. Robinson, president of Cambridge, Mass.-based MIS consulting firm The Index Group, Inc. The Index Group helped Du Pont organize a technology training program for managers in the early 1980s.

Cairns' organization encourages risk-taking but within a rigidly enforced set of guidelines anchored by just three approved systems vendors — IBM, DEC and Hewlett-Packard Co.

The risk-taking can generate exceptions that overwhelm the rules, as typified by the presence of more than 10,000 Macintosh desktop computers from alternate supplier Apple Computer, Inc.

The guidelines form the backbone of Cairns' central MIS operations in a decentralized company that boasts no less than eight billion-dollar units in businesses ranging from oil to biomedical products. Cairns controls a worldwide systems budget of more than $750 million.

"If management wants to do something [with information technology], you better be capable of doing it," Cairns says. "That's why the infrastructure is so important. If the managers perceive that the [MIS] function is out of control, whether it is or it isn't, you cannot lead this effort."

Top of the line

Du Pont has harnessed technology as a business resource in ways that have earned the firm high marks from competitors and peers. In a recent *High Technology Business* magazine survey of chief executives and analysts in 10 industries, Du Pont earned the top spot among the 20 largest oil and chemical companies for its use of technology.

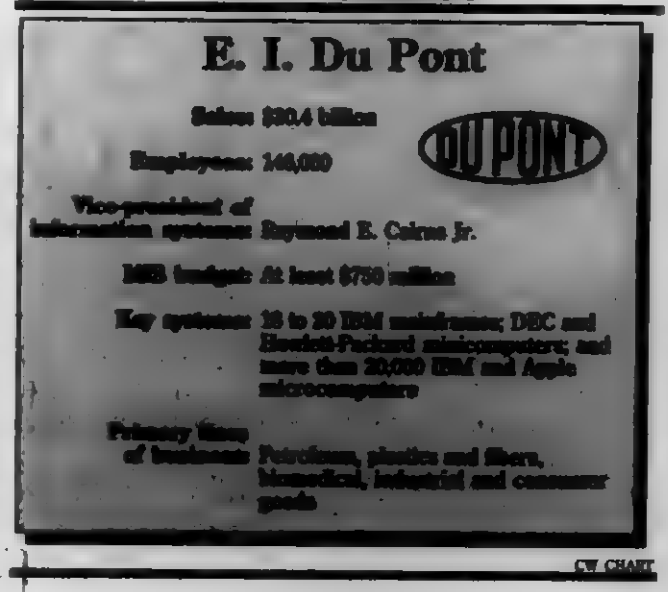
"We're trying to establish with people the importance of seeing their [MIS] activity used in the business," Cairns says, "and they get a lot of kicks out of that — being not just an MVS expert, but seeing how that [expertise] is being used to be more responsive to our businesses."

Highlights of the ways that Du Pont uses MIS resources in its businesses include the following:

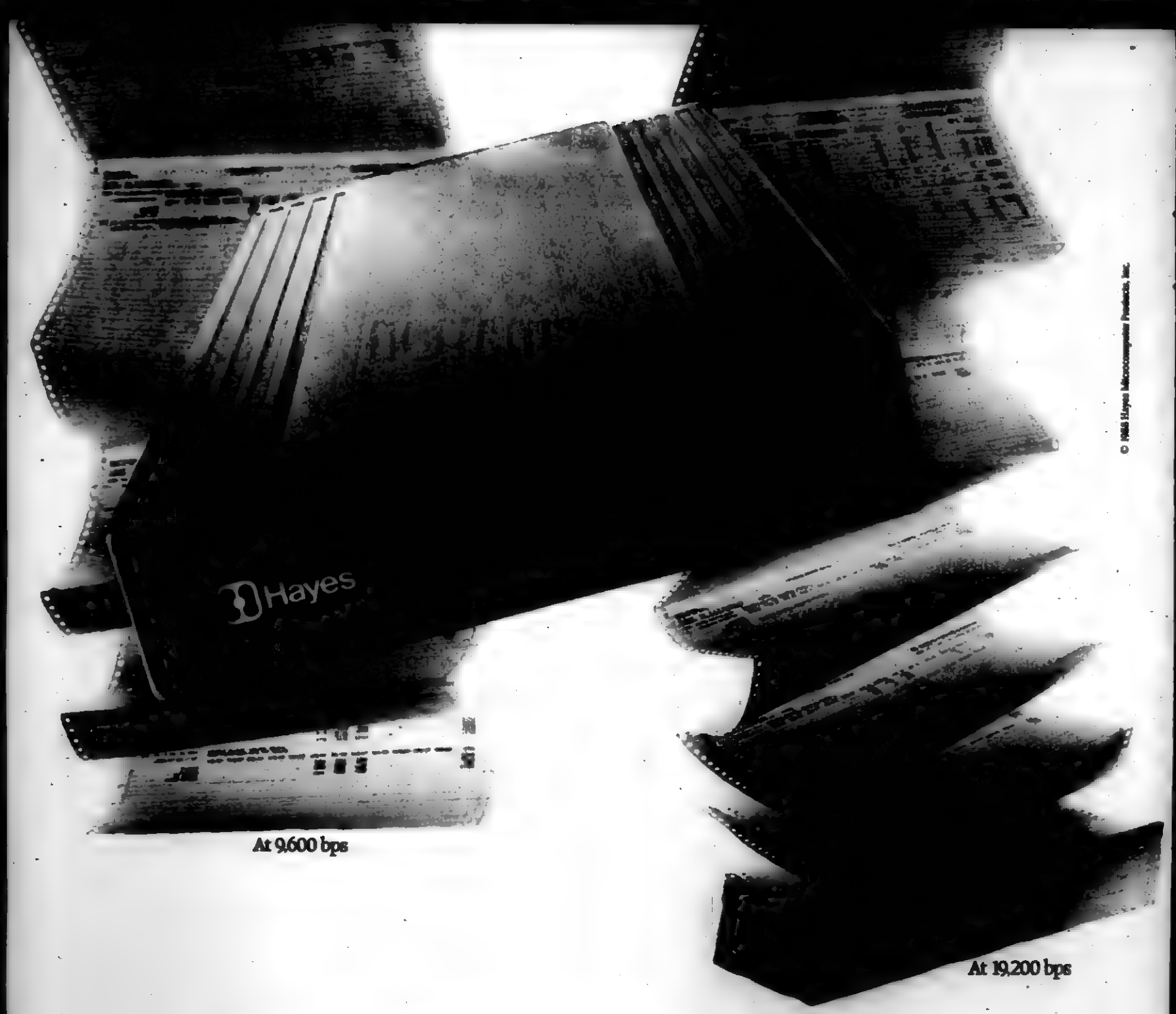
- An internally developed E-mail network system, possibly the largest in the world, on which 46,000 users can communicate worldwide via IBM, DEC, HP and Apple computers (see story page 61).
- Several hundred expert systems, used in applications ranging from optimal food-carton design to crafting confidentiality documents for the legal department (see story page 61).

Continued on page 61

At A Glance



- **Connecting 46,000 E-mail users**
- **Du Pont leadership in artificial intelligence**
- **In the market for technical grads**



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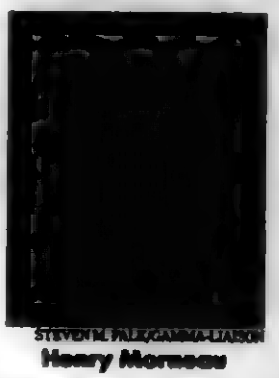
Global

FROM PAGE 59

- The chemical industry's only Cray supercomputer, which gives Du Pont researchers unprecedented power and speed for designing products such as fibers and chemicals.
- A computer-aided software engineering methodology that Du Pont is now marketing outside the company for profit [CW, Feb. 15].
- Forty worldwide teleconferencing sites.
- By the end of this year, an all-digital network allowing 20 Du Pont sites in northern Delaware to exchange voice, data and video traffic.



STEVEN M. FALK/GAMMA-LIAISON

Henry Morneau

As impressive as this list may be, Du Pont's leadership in the corporate role of MIS goes beyond leading-edge technology or even beyond marketplace advantages gained through computing.

To some observers, the greatest information technology achievement of the No. 9 company in the Fortune 500 is a psychological one.

"I view their strength not as an inventory of things they've done but their capability to mobilize their information resources very quickly against changing business conditions," the Index Group's Robinson says.

Cairns says Du Pont's culture and structure gives the Information Services Department some hidden advantages in the crusade to integrate business strategy and technology. With up to three-quarters of Du Pont's executive committee boasting Ph.D. degrees, there is no lack of technology awareness among top managers.

The company encourages cross-fertilization between business and technology backgrounds. For example, the field program encourages a management growth path that winds through several disciplines within the company (see story page 64).

"Three quarters of the people we send out [of MIS] never come back," Cairns says, "which I think is great."

Cairns' 25-year Du Pont career is a classic model of what the company fosters. Hired as a researcher, Cairns cut his management teeth in manufacturing, engineering design and corporate plans before joining the information systems department nine years ago.

Steering clear

This business orientation lends a touch of irony to Du Pont's reputation in information systems. Although considered leading-edge in its use of technology, Du Pont has in most cases studiously avoided the leading edge of the technology itself. Too often, the bits-and-bytes state of the art brings with it the two things Cairns most abhors — cost and incompatibility.

"It's not that we'll go with obsolete technology, but we're going to manage that introduction of technology to take optimum value of the price/performance," he says. "Some years ago [in buying decisions], it was nine parts for functionality and one part for cost. Now I'd say it's five and five."

Examples of hot technology receiving a cool reception in Wilmington include Unix and high-end graphics workstations. Neither has been written off, but both are still considered premature in terms of probable contribution to the Du Pont bottom line.

John H. Taylor, manager of Du Pont's Scientific Computing Division, recently concluded that the time was not yet ripe for implementing top-of-the-line workstations for modeling of compound chemicals. Among the major barriers, he says, are the absence of clear graphical standards and uncertainty as to who will be the ascendent vendors in the coming bit-mapped graphical workstation market.

Du Pont's philosophy vindicates skeptics who doubt the value of technology itself and zealots who champion its use as a competitive weapon. The most innovative system in the world will not help Du Pont's businesses be more competitive if it cannot talk to the systems already in place.

Alongside its top-down, centrally managed infrastructure, MIS encourages and rewards creativity at the business-unit level.

"We believe strategic uses of information within a business stand a greater chance of being implemented if they originate within that business," says Henry Morneau, director of planning and development.

Some recent examples include the medical products department's development of a PC-based clinical chemistry analyzer and the fibers department's investment in additional data storage to save process-control information for research engineers to consult in the development of new products.

As the corporate information systems infrastructure grows in both size and business importance, Cairns says he sees a huge challenge for MIS.

"The infrastructure and network will have to be managed by highly sophisticated, talented people who have to be customer- and cost-oriented," he says. "Just to have that is necessary . . . but completely insufficient. You've got to get out there to the users and stimulate them in *how* it can be used — and then help them manage that." ●

AI at bargain basement prices

Back in the mid-'80s, when Ed Mahler, Du Pont Co.'s artificial intelligence program director, became intrigued by expert systems, AI was regarded by the pragmatic business world as techno-sizzle with a questionable amount of steak — and at filet mignon prices.

"The myth was that if you didn't spend $2 million to $3.5 million building an expert system, you weren't going to end up with anything worthwhile," says Robert Keller, president of Harvard, Mass.-based Renaissance International Corp., an AI consulting firm that has worked with Du Pont. Mahler said, "Nonsense."

Convinced there were savings to be made for Du Pont by strategically dispersing nuts-and-bolts expertise throughout the company's huge and scattered operations, Mahler's group proceeded to take the "artificial" out of artificial intelligence and the cost out of the stratosphere.

To do so, Mahler eschewed LISP machines, large-scale projects and multicredentialed specialists. He targeted mundane problems with applications-oriented software written in conventional languages and supported by IBM Personal Computers and Digital Equipment Corp. VAXs.

Today, the grass-roots approach — decentralized, integrated expert systems written by users — returns an average of 15 times Du Pont's investment, Mahler says. The department "is making tens of millions of dollars a year for this company," he says.

Mahler's group trains about 40 Du Pont employees a week in expert systems. The idea, Mahler says, is to supply them with tools they can target at problems as diverse as designing the optimal food carton and crafting confidentiality documents for the legal department.

A user support group, now about 1,000 strong, meets five times a year and otherwise communicates via an electronic network. This team, Mahler says, "is very unusual at Du Pont, but in our case it's critical. Our success hinges on the ownership of each expert system by the end users."

NELL MARGOLIS

No need for stamps

A good example of the way information technology can help a company be more efficient and competitive can be found on the desks of 46,000 Du Pont Co. employees.

Each user is hooked into a homegrown worldwide electronic mail system from which any desktop system can send a message to any other. The E-mail network supports users of IBM's Professional Office System, Digital Equipment Corp.'s All-In-1 and Hewlett-Packard Co.'s Desk office information systems running on personal computers and workstations from IBM, DEC, HP and Apple Computer, Inc.

The design and implementation of the system illustrates the type of partnership between MIS and Du Pont's business units that the company espouses.

Several years ago, when two business units felt they required the E-mail network, the information systems department got involved. It hired third-party developers and designed the single system for corporatewide use.

"We think it is very important to leverage something like electronic mail," says Henry Morneau, Du Pont's director of planning and development. "The more mail systems you have, the greater the cost."

Saving money is the obvious first benefit, but the more intangible benefits to Du Pont's business are even greater.

"Geography and time are barriers to competitiveness," says John H. Taylor, manager of the scientific computing division. "Worldwide telecommunications helps us overcome those barriers."

CLINTON WILDER

Information systems department reporting structure

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CW CHART

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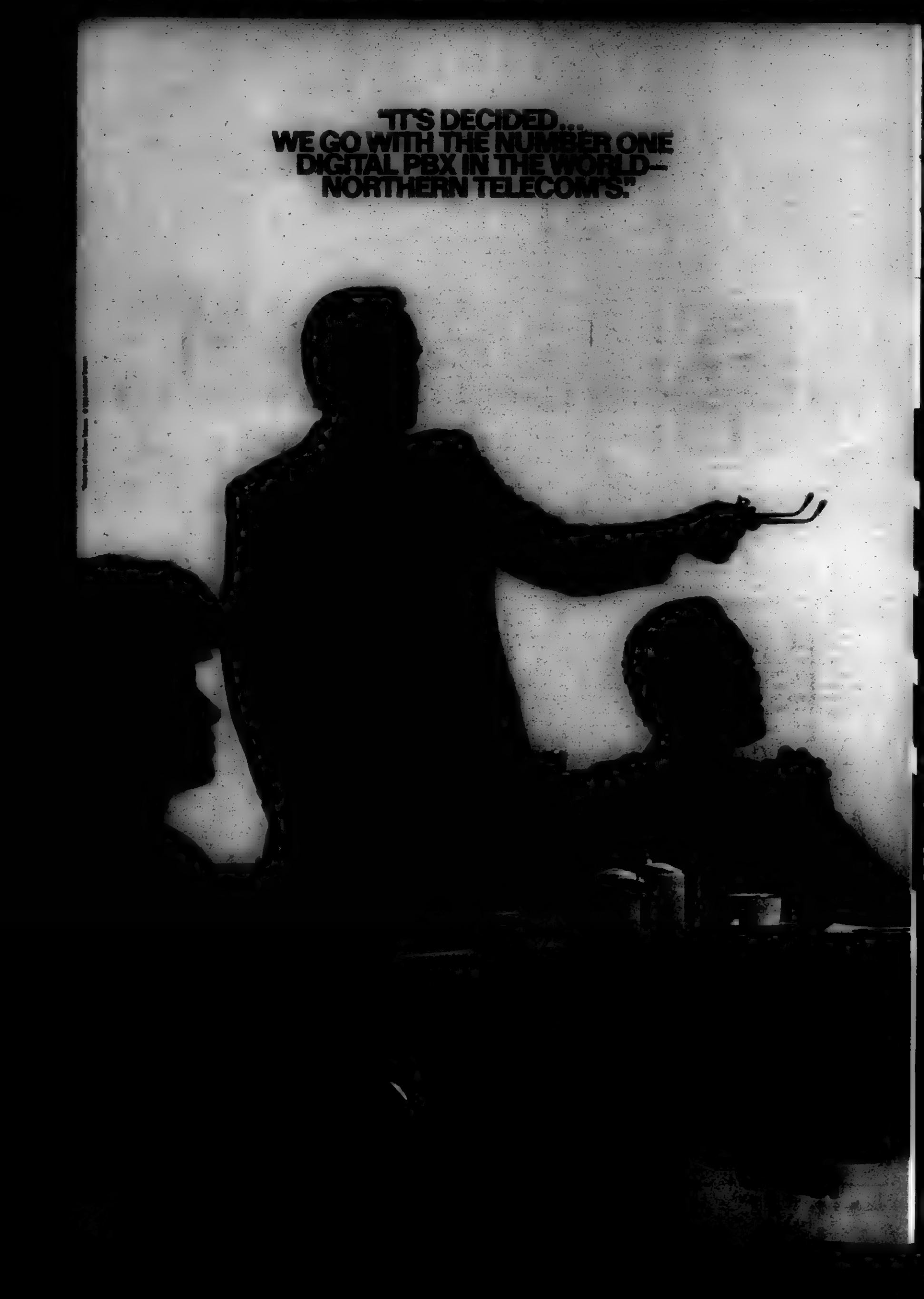

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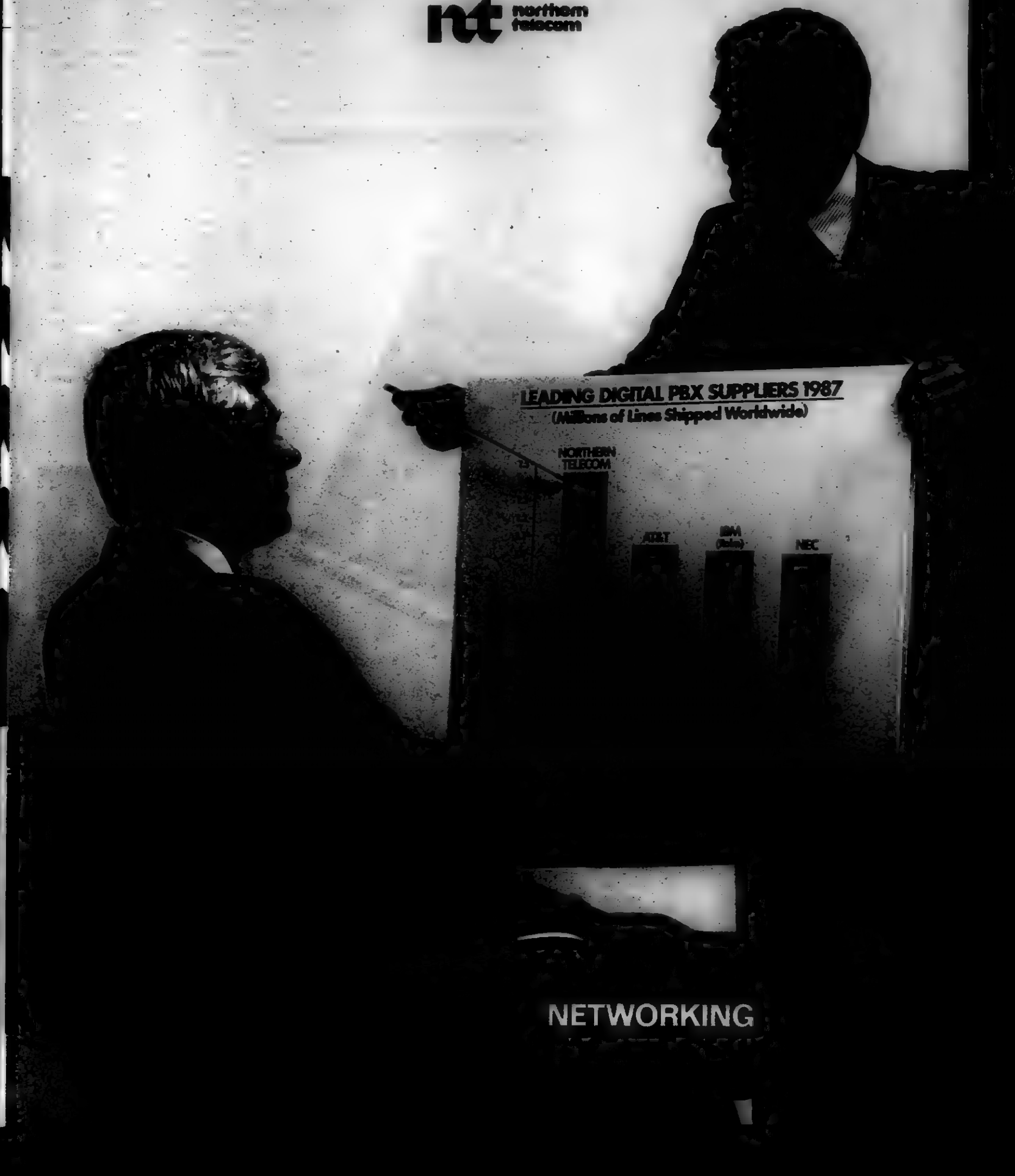

Taming of the techie

BY STEVEN M. ULFELDER
CW STAFF

Relax, techies: Although it is back in vogue for MIS to hire liberal arts majors and teach them data processing, Du Pont Co. is committed to actually hiring more technically oriented college graduates and teaching them business skills.

"It's easier to teach a technically oriented person business skills than a business-oriented person technical skills," says Raymond E. Cairns Jr., vice-president of Du Pont's Information Services Department (ISD).

Bill Carter, director of Du Pont's Computer Technology and Operations Division, agrees, but he stresses that the firm is aware of the need to expand both the ISD worker's and the group's roles.

"Anyone can be of greater value with a broader portfolio of experiences," he says. To that end, the ISD recently hired a former marketer to help the department understand end users' needs.

A Du Pont spokesman says the ISD's turnover rate stays between 6% and 7% per year. Achieving this enviable figure begins with recruitment, he points out. To attract college students, the division offers the Field Program, which is aimed at exposing young employees to a broad range of areas.

Under the program, new hires take on three two-year assignments in fields such as the ISD, telecommunications, marketing and engineering to find out which fields interest them. After the employees put in their six years, Du Pont guarantees they will be offered positions in at least two of the three fields.

"Word [about the program] gets around campuses," Carter says. "After four years, these kids are saying, 'I'm tired of studying; I want to go to work.'"

Carter says the Field Program — an idea that the ISD borrowed from Du Pont's Engineering Division in 1981 — has provided an enormous boost for campus recruiting.

Cairns says three quarters of the Field Program recruits who assay fields outside the ISD never return — and that is fine by him. He says he prefers employees who know from experience that MIS is their field of choice.

Good reputation

Employees who stick with the ISD are joining a division whose stature within Du Pont has skyrocketed in the past 10 years. Henry Morneau, Du Pont's director of planning and development, says top management's MIS consciousness was first raised through a week-long, off-site Computer Management Program tailored by a third party for Du Pont.

This educational program, which all high-level managers completed, became a turning point in the corporation's attitude toward computing. As a result, Morneau says, ISD employees face "greater demand but a lot more challenge; there's a lot more reward in the job."

To further reward MIS workers, the ISD implemented in 1986 the Vice-President's Customer Excellence Award, a quarterly prize given to systems employees for outstanding service to customers — that is, end users.

A Du Pont spokesman says the award sometimes carries a cash prize, the amount of which the company declined to make public. Through such programs, the ISD maintains its low turnover rate, despite paying no more — and perhaps less — than its competitors, Carter says. •

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Pragmatic

FROM PAGE 59

STEVEN M. FALCIGLIA/IDG

John H. Taylor

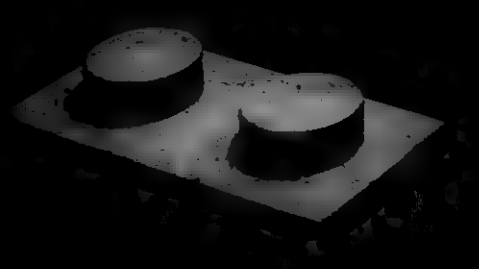
waste disposal models created at Du Pont, for instance, have become the Environmental Protection Agency's standards for granting permits.

That, Taylor says, is competitive advantage. And it doesn't just make sense — it also makes dollars. The technical computing division is now making a profit — "which we rebate," Taylor says — on its supercomputing operations.

In addition to the Cray machine, scientific computing resources at Du Pont's Wilmington-based Experimental Station include a 16-node Vaxcluster, in which five VAX 8800s and five 8650s combine to kick out about 90 million instructions per second. That cluster uses multiple network links to a second Vaxcluster, the Cray-1A, numerous remote VAXs and corporate IBM mainframes.

Ironically, however, as of last month, "the 3081 is packaged for return to the leasing company; today, this division is a non-Blue shop," Taylor says. "IBM put up no fight with regard to the 3081. We felt that we had worked rigorously to try to make them successful here, and they agreed."

NELL MARGOLIS



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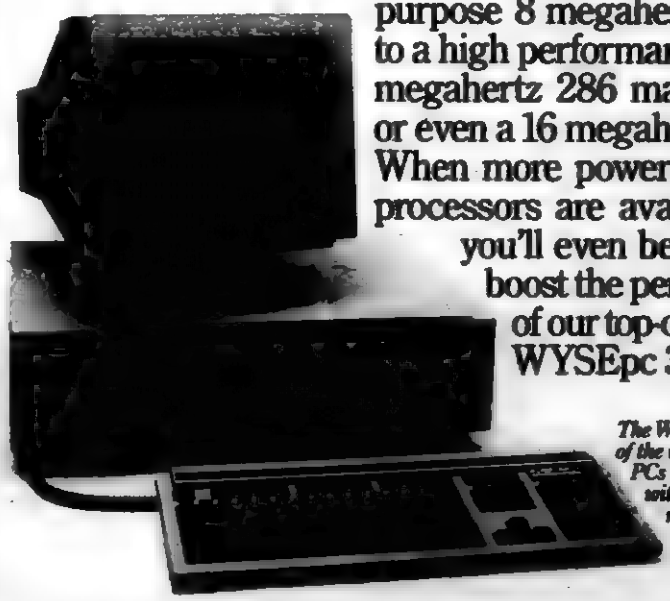

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Developing development

"The users are never satisfied. All they do is complain. If I didn't lose all my time in meetings and status reporting, I could get some work done. As it is, I'm already working too much overtime, and the projects are way behind."

If your programmers sound like this and users are complaining about delays and poor quality deliverables, and if no one ever seems to know the status of their projects, don't fire the data processing personnel — it may just be that your development process needs improvement.

Most DP development problems stem from the incompleteness of the development process. Unless a person has worked as a lead technician, project manager or quality assurance analyst in a structured development environment with a good development process, the person probably has not had much of an opportunity to learn the basics of such a process.

Phase out

Any development process is separated into phases. The worst is the two-phase method in which programmers write the code in Phase 1 and implement it in Phase 2. Thankfully, this pattern seems to be an exception — most development groups attempt to produce quality products. It just seems that they run out of time to test them properly and to correct them.

Most development processes are composed of five main

Continued on page 71

Making his mark

Well-traveled veteran takes giant steps

BY ALAN J. RYAN
CW STAFF

CHICAGO — Charles Mallet wants his data center to be clean, and he has the artwork to prove it.

When the senior vice-president of information management at Heller Financial, Inc. complained to his employees that they were tracking dirt into the halls of the data center, they responded by presenting him with a sheet soiled with their footprints.

Now the footprints reside in a drawer in Mallet's office, but are conspicuously absent in the data center. Through his still-thick native Brooklyn accent, Mallet gets his point across.

A 30-year veteran of the data processing field, Mallet has had a career marked by his climb from computer operator to his current post. In doing so, he has crisscrossed the country and the hemisphere, with a three-year stint in Brazil in between. His list of his previous employers in-

Continued on page 68

PROFILE
Charles Mallet

Position: *Senior vice-president of information management, Heller Financial, Inc.*

Mission: *To leverage converging information technologies to provide a competitive edge for Heller International business.*

Data View

Information systems reduce corporate resource needs

Most chief executives and MIS managers in the distribution and manufacturing industries agree

INFORMATION PROVIDED BY UNITED RESEARCH CO.
CW CHART

IMPORTING TECHNOLOGY

Living the Japanese way of MIS

BY DAVID A. LUDLUM
CW STAFF

It's not an issue for protectionists or free market forces, but the U.S. is importing Japanese methods of information systems management, and the development could affect the way companies here run their systems.

As Japanese firms have set up subsidiaries in the U.S., they have brought with them general management principles and techniques that numerous American companies imitated as the Japanese gobbled up global market share.

At the U.S. subsidiaries, many of these elements are evident in the management of information systems. They include loyalty between employer and employee, job rotation, an emphasis on quality and devotion to productivity.

MIS managers at some of the subsidiaries say that blending Eastern approaches with traditional Western ways gives their departments an unusual hybrid style — and a competitive edge.

"The combination of the two approaches is stronger than either separately," says Robert Trenchard, vice-president of MIS at Sony Corporation of America in Park Ridge, N.J. He characterizes the Japanese approach as efficient and the American style as more aggressive but lacking control over costs.

But don't expect an easily implemented method for applying Japanese management to information systems. Japanese culture often confronts the Western observer with a raft of contradictions, and Japanese management principles can tug MIS in different directions.

Furthermore, Japanese companies, like American ones, vary in their cultures and management styles. Some

DAVID FLAHERTY

take a highly centralized approach to information management, for example, while others are decentralized. And while companies in Japan tend to rely heavily on contract labor and internally developed software, their U.S. subsidiaries differ in the extent to which they have maintained these tendencies.

Teamwork

A fundamental theme running through Japanese approaches to information management is the notion of the company as a team or family. The concept is rooted in a mutual respect between employer and employee, according to Trenchard.

Continued on page 73

Goldman Sachs to open Brooklyn center

BY ALAN ALPER
CW STAFF

NEW YORK — After mulling a move for two years, Goldman, Sachs & Co. has decided to keep its data processing operations here by opening a second corporate data center in Brooklyn early next year.

The decision, however, reflects a trend within the financial services industry of moving DP operations away from the heart of Wall Street to the outer boroughs and suburbs, where operating costs are lower [CW, Sept. 28, 1987].

The investment banking house said it had run out of room at its current location in the financial district and needed a second data center for contingency planning reasons. "Our growth required more raised floor space," noted Rick Adam, partner in charge of the firm's Information Systems Division. "We'll now have a two-data-center configuration — each center mutually backing up the other — which will solve our capacity, disaster recovery and assurance problems."

Goldman intends to tie the two data centers together with either multiple T1 lines or a T3 line. The firm expects to make use of fiber-optic links provided by one of two common carriers. "We also have a clean microwave shot across the East River for backup, if need be," Adam explained.

The Brooklyn data center, a 100,000-sq-ft facility, will go online in a staged manner, Adam said. The firm said it expects to have an IBM 3090-class machine up and running by next March. A second 3090 and affiliated direct-access storage devices, a network control center and backup Digital Equipment Corp. and Wang Laboratories, Inc. minicomputers will be added as the year progresses, he noted.

The data center will employ 200 operations and technical support personnel. Some new jobs will be created, Adam said, but most of the positions will be filled by existing employees.

The data center will be located at One Pierrepont Plaza, the same new office building where Morgan Stanley Group, Inc. recently relocated its data center.

Adam said the firm chose Brooklyn because it wanted to stay in New York. "Most of the employees come from that direction [east of Manhattan]," he said. "Besides, it's only one subway stop away from our headquarters."

Making mark

FROM PAGE 67

cludes Southern California Gas Co., Western Development Laboratories, General Electric Co.'s Plastics Division and General Electric Credit Corp.

Heller Financial is a company that recognizes the importance of information services, Mallet says, and has made his position one of the highest in the company. Mallet reports directly to the chairman and chief executive officer. He is also on the board of directors of Heller International, a wholly owned subsidiary of The Fuji Bank Ltd. Fuji is Japan's most profitable bank and the third largest bank in the world in terms of assets and deposits.

Live and learn

Mallet, 51, admits that throughout his MIS career, he has "probably made every mistake known to man, but hopefully not twice." He has learned that one way to avoid mistakes is to listen, and has such high regard for the opinions of end users within the company that he insists they are included in all development efforts.

"One of the things Chuck demands of our projects is that there is a full-fledged involvement of the user community in the development of systems," says Chip Kyle, vice-president of commercial financial services support. "He'll refuse to engage in development unless there is user input."

For his workers, Mallet provides a comfortable atmosphere; one in which they say they can flourish, learn and have fun working for a down-to-earth boss.

Dianna Bourke, vice-president of information systems support and administrative systems, says recent performance reviews with her staff turned up positive comments about the company's atmosphere. "Chuck creates an environment that pushes people beyond where they thought they could perform," Bourke says.

"We have a lot of thoroughbreds here, and in that kind of an environment, it's sometimes hard to keep a sense of teamwork," she adds. "But we work very hard and enjoy each other's company."

Daring do

Part of that hard work stems from Mallet's risk-taking personality.

"Chuck has allowed me to go to plug-compatible vendors where they made sense, were cost effective and were reliable," says Dennis Wenk, vice-president of information processing. Heller is basically an Amdahl Corp. shop now, Mallet says.

Wenk adds that while some managers are wary of risks, "We have a very successful risk taker here."

Bourke agrees. "You don't go to Chuck with an idea unless you already have it worked out, and know how much it will cost to implement, because he is liable to say yes or no on the spot," she says. "The people who work around here have to be risk takers as well."

One of Mallet's major accomplishments at Heller was the company's migration to IBM technology in just 13 months. Previously, Heller was mainly a Burroughs Corp. shop, with some Digital Equipment Corp. and Wang Laboratories, Inc. minicomputers. Now, with the Amdahl computers, the company is running Cullinet Software, Inc.'s IDMS/R relational data base management system and Cullinet's ADS/Online and ADS/Batch fourth-generation languages. Also in use is IBM's MVS/XA.

There are 550 IBM Personal Computers and compatibles and approximately 1,000 terminals throughout the company. Mallet says Heller boasts a 1-to-1 workstation-to-employee ratio; his budget this year is $15.7 million.

"We went from a three-decades-old approach to systems in a lot of areas and turned the organization completely around to where we feel that we're very well positioned in using current technology," Mallet says. What helps, he adds, is that the company's chief executive officer, Norman Blake, is very much into the technology.

Also of note is Mallet's work on the design of the company's

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data center. "Every time we brought a new piece of equipment into our old building, we had to reinforce the floor," he says. The expense and time consumption were unacceptable.

When Heller moved to its current location, Mallet located the data center in the building's basement to avoid the need for floor reinforcement whenever equipment was added. Flooding, however, was a concern — Heller is located near the Chicago River. But when the river spilled its banks last year, leaving many MIS managers with horror stories to tell, the Heller building remained watertight. The data center is equipped with water sensing devices and pumps, however, just in case.

Mallet is protective of the data center, thus his complaint about the footprints. In designing it, he and his team tried to eliminate all the annoyances of the old center. "We did little things like environmentally isolating the print room from the rest of the data center."

The center's mainframe room is called the quiet room, because there is seldom anyone in it. Workers have their terminals in the central service room, in which the bulk of the operations take place.

Mallet spends a great deal of time supporting and encouraging his workers. "I've got a sign in my conference room that says 'Attitude, not aptitude, determines altitude,'" Mallet says, as an example of how an employee can climb in the organization. "If you don't like coming to work, there's a problem."

Outside of Heller, Mallet reduces the number of risks he takes by staying involved with his community.

Outside interests

Although his typical workday begins when he leaves his house at 6 a.m. and ends when he arrives home at 7 or 8 p.m., Mallet makes time for some of his other skills. He is on the advisory board of the University of Illinois in Chicago, and he and his wife are active in charity work for two homes for emotionally disturbed children.

In his office overlooking Chicago's North LaSalle Street financial district, the walls are alive with enlargements of Mallet's photographs of flowers, one of his many hobbies.

An avid golfer and former marathon runner, Mallet also lists theater as a favorite pastime. He and his wife spent their vacation last fall in London attending plays, and they also keep tabs on the Chicago theater scene as well.

Traveling is another of Mallet's passions. He has traveled extensively in South America and Europe and has been to the Orient and Australia. He will add Italy to his itinerary this fall.

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Avignon 88, Workshop on Expert Systems. Avignon, France, May 30-June 3 — Contact: Jean-Claude Rault, workshop chairman, EC2, 269-287, rue de la Garenne, 92000 Nanterre, France.

Independent Computer Consultants Association National Conference. Cleveland, June 1-3 — Contact: The ICCA, 933 Gardenview Office Pkwy., St. Louis, Mo. 63141.

International Trade and Computerization Conference and Exhibition. New York, N.Y., June 1-3 — Contact: The National Council on International Trade Documentation, Suite 208, 350 Broadway, New York, N.Y. 10013.

Microworld Technology and Issues Conference. San Francisco, June 1-3 — Contact: PCW Communications, Inc., 501 Second St., San Francisco, Calif., 94107.

GNIX '88, International GNIX Users Group Meeting. Ottawa, June 1-3 — Contact: Susan Tippett, Quantum Software Systems Ltd., 175 Terrence Matthews Crescent, Kanata, Ont., Canada K2M 1W8.

Corporate Venturing Conference '88. Boston, June 2-3 — Contact: Lindsay Jones, Venture Economics, Inc., P.O. Box 81340, Wellesley Hills, Mass. 02181.

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Hummel

CONTINUED FROM PAGE 67

phases: user requirement gathering, design, code, test and implementation. Often, each of these phases is subdivided. For example, the design phase can in many cases be split into high- and low-level design phases.

Different companies may use similar development processes, yet one seems to achieve much higher quality and productivity because it understands the basics of a good development process.

Back to basics

The basics are simple. The number and granularity of the phases should be based on the most complex product that will be created by the development process. If a particular product is not complex, then a conscious decision can be made to combine — rather than eliminate — certain phases.

For example, if the development process has three design phases, such as high-, medium- and low-level design, a decision may be made on a simple development effort to combine the medium- and low-level design.

Each phase is then detail-defined as to entrance criteria, or what is needed before starting; the scope of activities, what is to be done in this phase; and exit criteria, how to know when the phase is complete and how to show it.

Each phase should be a natural progression of the previous one, and therefore, they must be integrated. The entrance criteria for one phase should specify that the previous one's exit criteria must be met. Such specification, along with a quality review between phases, ensures the necessary integration.

To improve the process, postmortems should be done at project completion. Metrics and logs must be kept to better predict future schedules and resource requirements.

Draft a test team

User representatives should be part of the test team. They should also be included in each quality review. The test team should be an independent test tool, a knowledgeable group that has been developing the test plan and test cases while the developers have been designing and coding.

Test-plan and test-case development are phases as well and are also subject to the entrance and exit criteria, defined scope of activities and quality reviews.

A definition of the development process that includes the above components must be written, reviewed, approved, distributed and designated as a requirement.

Most importantly, once there is a defined process that works in the environment, the staff must be trained and provisions made for periodic review and training of new personnel.

Hummel is a consultant at Computer Assistance, Inc. He has more than 20 years of experience in data processing.

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Japanese

CONTINUED FROM PAGE 67

Robert Schwartz, director of systems and programming at Sony, says, "There is a genuine concern in terms of how employees are treated and the things companies are willing to do for employees."

One manifestation of the notion of the company as a team or family at the parent companies in Japan is a traditional — but fading — commitment to providing workers with lifelong employment. One of the benefits the companies reap from this commitment is a loyalty on the part of workers that results in low turnover, a situation that stands in sharp contrast to DP at U.S. firms.

American subsidiaries have not adopted the commitment of lifelong employment, but some of them reflect the principles of loyalty and teamwork and stress the value of long-term employment. "You have that kind of flavor," says Schwartz, who claims his department's turnover rate was 5% last year and has been zero this year.

Several MIS managers say such low turnover, among both staff members and users, is a boon to the development of systems. The "corporate memory" of long-term employees has been undervalued by American management, Trenchard says.

Robert A. Best, vice-president of planning, systems and business development at Toyota Motor Sales U.S.A. in Torrance, Calif., says low turnover saves on training expenses. "Because we have virtually no turnover, we are probably able to design systems reasonably more efficiently than an American company with high turnover," he says; Best claims a 2% annual rate for his DP department.

The Japanese practice of rotating workers among functions also lends an advantage in systems development, managers say. The practice has been only partially transplanted to the U.S.

In MIS departments in Japan, "a manager must have broad experience in business rather than technical knowledge," says Yoji Izumi, manager of EDP Systems at Bank of Tokyo Trust Co. in New York. MIS managers there play a relatively active role in designing systems rather than relying on users, he adds.

Sony's Trenchard says the two staff members he has hired from Japan have held positions similar to those of the users they work with. He is beginning a job rotation program at the U.S. subsidiary, at which, he says, there is an attitude that "if the company makes an investment in the employees, they'll make an investment in the company."

Quality and productivity

In systems development, the emphasis on quality characteristic of Japanese management can work at cross purposes with the drive for productivity, resulting in different strategies regarding the pace of development.

"Our philosophy is to test it enough to make sure it's going to work when you go live — taking your time and doing it right," Toyota's Best says. "We avoid the more entrepreneurial style of trying to put it in fast. We get a very good consensus from users before we go live. The users are willing to wait until it's certified."

The approach is different at Bank of Tokyo, where the strategy is to plan carefully, then execute aggressively. "We think time is more than money," Izumi says. "We are always in a hurry and implement a system more quickly than Americans, although we know we might have some small bugs."

Last year, the bank completed an operating system conversion — from IBM's DOS/VSE to its MVS — in six months, half the time IBM officials had expected, Izumi says. "Usually, our schedule is very aggressive compared to some Americans'. Once we set a schedule, we try our best to meet it."

An IBM official, who asked that his name not be used, said "it was indeed a surprise" how quickly the bank completed the conversion. "To a large extent, it was the Japanese cultural commitment to carefully laying out a plan or strategy and overcoming anything that gets in the way," he said. "When you get right down to it, it's the work ethic."

Equipment

The emphasis on productivity also leads some Japanese companies to impose relatively stringent requirements for utilizing hardware capacity. "We have to work a little harder to justify equipment," Best says. "They make sure you're utilizing everything you have fully."

At the same time, the tradition of long-term employment can provide a stimulus to spending for systems. Japanese firms often view such investments as a means of avoiding the need for more employees.

"They very much advocate computerization. We are the largest department here at Toyota U.S.A," Best says. "A lot of that is from the traditional cultural desire of Japanese companies to hold down head count."

The proclivities for efficiency and quality among Japanese companies also influence the type of hardware and software some of the U.S. subsidiaries buy.

"When they look at software, they're looking not only at functionality, but at efficiency too," Sony's Schwartz notes.

And in keeping with its concern for quality, Toyota U.S.A. is more apt than many American companies to turn to proven equipment, Best says. "We might be a little bit more conservative in the acquisition of technology. We try to be close to the front, but try not to be point man."

Ludlum is a *Computerworld* senior writer.

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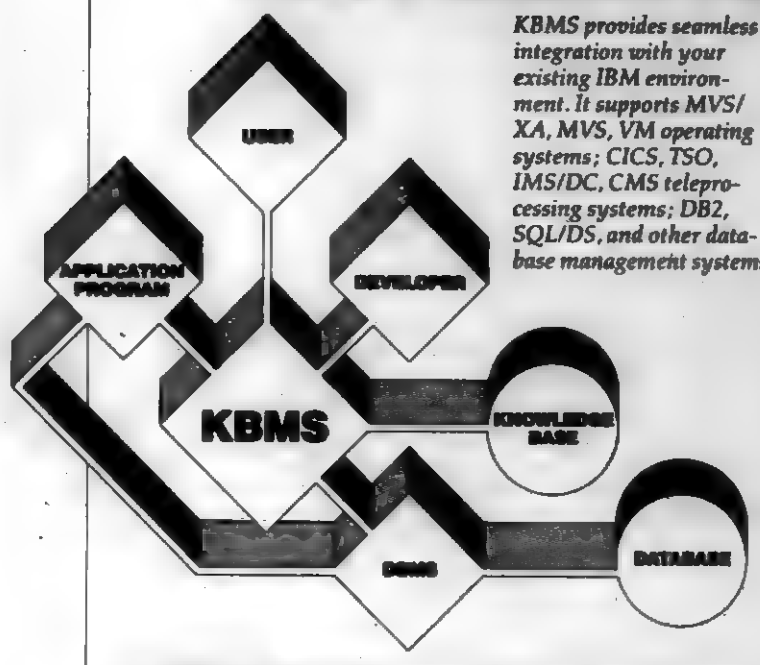

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Another fine mess

"The U.S. government has driven a wedge between domestic chip makers and chip users that may prove very hard to remove."

"Panic grips chip buyers," CW, Oct. 6, 1986

DRAMs, DRAMs, who's got DRAMs? Not Hewlett-Packard and Apple, which have delayed new products because of the current memory shortage. Not Dell Computer, which won't price its IBM Personal System/2 clone until it has a better idea of memory prices. Sun Microsystems has 'em, but it will make you pay $250 extra for its add-on memory products because of their inflated cost.

What got us into this mess? Well, a lot of things, not the least of which is the consistently robust health of U.S. corporate demand for microcomputers. Other factors have to do with innocuous issues like production cycles, fabrication capacity ramp-up times and semicon-

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Excelan-NET merger imperiled

BY PATRICIA KEEFE
CW STAFF

A dispute over the value of Excelan, Inc. stock is credited by industry sources with seriously jeopardizing the proposed merger between Network Equipment Technologies, Inc. (NET) and Excelan.

Excelan shareholders, with the numbers necessary to block the merger, feel they are being shortchanged and have protested vigorously to Excelan's board, sources said. If a vote were held today, the deal would be killed, said Mary McCaffrey, a vice-president at C. J. Lawrence, Inc.

Last week, NET and Excelan officials denied the deal was off, but few observers believe the duo can move beyond their current standoff to patch their differences. It boils down to NET's unwillingness to pay more for Excelan, according to Richard Kimball, an analyst at Montgomery Sequrities, Inc.

"As of [May 13], the deal was dead," a source close to NET said, adding he would not be surprised if the quarrel wound up in court. A source close to Excelan suggested the deal had been rocky from the start.

A flurry of terse releases flew back and forth last week, as NET first charged Excelan with breach of contract, threatened to exercise its stock option and then complained that Excelan's response contained an inaccurate statement — specifically that NET declined to go forward with the merger.

"That's not true," said Pamela Federman, NET's general counsel. She added NET has given Excelan a list of contract breaches. "We asked them to promptly and completely cure the breaches so that we may continue" with the merger, she said.

Neither Excelan nor NET will detail the alleged breaches.

Analysts have suggested that two vendors that really want to merge would work together to surmount any obstacles. Not only do they see little evidence of that happening, but the threat of litigation is seen as the real death knell for the Excelan-NET marriage.

"I can't imagine the two com-

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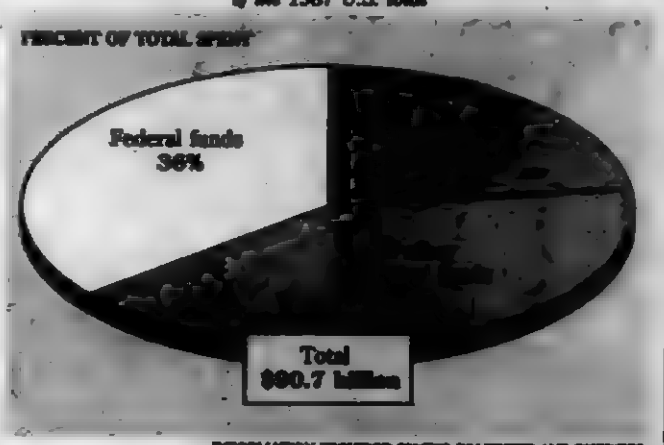
Data View

A big piece of the R&D pie

Information technology firms spent $20.7 billion on research and development last year to account for almost one-fourth of the 1987 U.S. total



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CW CHART

Profit barrier cracked

Computer Associates tops $100M software mark

BY JAMES DALY
CW STAFF

Computer Associates International, Inc. became the first software company to chalk up $100 million in yearly profits in financial results announced last week.

While Computer Associates' doubling of annual earnings dazzled the financial world, other vendors, including Ashton-Tate Corp. and Hewlett-Packard Co., posted solid quarterly gains. Wyse Technology, Autodesk, Inc. and Continental Information Systems Corp. (CIS) also showed impressive results for the quarter ended April 30.

Although analysts expect Microsoft Corp. to become the second member of software's $100 million profit club when its fiscal year ends this summer, Computer Associates coupled expansion in domestic and foreign markets with strong results from its August 1987 purchase of Uccel Corp. to become the first such firm to reach the milestone.

While the company has drawn

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Inside

- HP, Northern Telecom promote open nets. Page 76.
- Hard times for third-party maintenance firms. Page 80.

Ailing Symbolics lays off 225

BY JAMES DALY
CW STAFF

CAMBRIDGE, Mass. — Symbolics, Inc. sliced deeply into its ranks last week, announcing that it would eliminate 225 jobs at all levels, or more than one-third of its work force.

A spokesman for the troubled artificial intelligence workstation maker said the cutback to 415 employees was necessitated by the company's current downsizing plan and would save the firm an estimated $15 million per year.

"We simply needed a more streamlined company," said Francis J. Fenney Jr., the assistant general counsel for Symbolics. "This allows us to fund operations with internal cash flow through the next several quarters and will assist us in obtaining the financing we will need for our longer term goals. We certainly hope this is the last action we need to take."

Company cofounder Howard I. Cannon added that funds saved with the cutbacks will be thrown behind the continued development of a new line of Symbolics products, which will be based on the so-called Ivory chip, a microprocessor containing all of the Common LISP language.

The company will also concentrate on selling Sony Microsystems Co. workstations through a recently signed three-year OEM agreement.

Up until about two years ago, when the firm stumbled after the AI workstation market became saturated, Symbolics was one of the high-flying companies in the AI workstation market.

Under the direction of Chairman and cofounder Russell Noftsker, Symbolics quickly cleared the $100 million revenue level with a line of dedicated LISP workstations for AI software development.

Akers lambastes U.S. pols for lack of trade leadership

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — IBM Chairman John F. Akers, in a private speech to Washington economists on May 11, lashed out at U.S. politicians for engaging in "trivial pursuits" while failing to take the steps necessary to make U.S. businesses more competitive in world markets.

He faulted the Congress, the executive branch and the presidential candidates for their "inefficiency" in addressing such critical issues as improving productivity, education, tax and trade policies.

Akers compared Japan's successful economic strategy with Congress's on-again, off-again support for the research and development tax credit and the three-year delay in producing a

IBM's Akers

trade policy bill, which is now jeopardized by a presidential veto over the plant-closing issue [CW, May 9].

"Not exactly a convincing demonstration that we support innovation," Akers said.

While political candidates are spending roughly $1 billion to get elected this year, the campaigns have digressed into debates over subjects like adultery, plagiarism and star-gazing, Akers complained. "Let's get out of trivial pursuits and into key questions of national competitiveness and survival," he urged.

Decline and fall?

The critique was delivered at a dinner meeting of the Washington Economic Club that was not open to the press. A copy of the speech, titled "Is the U.S. in Decline?," was provided to the press by IBM.

Akers said the only way the U.S. can raise its standard of living is by boosting productivity, or output per hour of work. Part of the solution, he said, is to invest in new tools of production at the same rate as are Taiwan and Japan — those countries each invest 16% of their gross national product — rather than at the 10% level of the U.S.

The IBM chairman suggested

Continued on page 81

HP, Northern Telecom promote open nets

BY PATRICIA KEEFE
CW STAFF

NEW YORK — Hewlett-Packard Co. and Northern Telecom, Inc. recently launched a joint venture designed to address the demand for integrated enterprisewide networking.

Initially, the duo will focus on 13 large accounts thought capable of generating $1 billion in incremental sales during a five-year period, according to Michael Kennedy, a vice-president at the Gartner Group, Inc. in Stamford, Conn.

Based in Santa Clara, Calif., the new venture, called Corporate Networks Operation, will be equally funded and staffed and will supplement marketing and distribution activities at the two companies.

Although analysts credited HP and Northern Telecom as quick to capitalize on a growing user concern, they are not the first out of the chute. IBM and AT&T reportedly provide similar services through internal organizations.

The agreement also continues the current trend of partnerships between major systems manufacturers and communications providers, whether by acquisition or joint venture.

Others include Data General Corp. with Nippon Telephone and Telegraph and Unisys Corp. with Timeplex, Inc.

The nonexclusive HP-Northern Telecom alliance will assist selected customers seeking to combine voice/data technology from HP, Northern Telecom and third parties. It is intended to function as a single source for the analysis, design, implementation and support of standards-based integrated corporate networks.

As of now, it is unclear how that "openness" extends beyond compatibility between HP and Northern Telecom equipment, analysts said. "There's nothing 'open' about a Northern Telecom PBX," the Gartner Group's Kennedy added.

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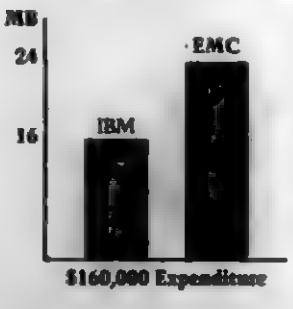

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Excelan

FROM PAGE 75

panies would want to merge after one accused the other of breach of contract — that's human nature," said Brad Baldwin, a senior analyst at Dataquest, Inc. in San Jose, Calif. "This whole issue has surfaced like some kind of loophole to provide an out."

The buy-out was announced barely five weeks ago [CW, April 18], the same day the Dow Jones industrial average dropped 100 points and former Excelan President C. Richard Moore resigned.

Thought it would work

Despite such inauspicious beginnings, the proposal was widely hailed as a perfect fit for NET, a supplier of T1 and wide-area network products based in Redwood City, Calif., and San Jose-based Excelan, a maker of Ethernet and Transmission Control Protocol/Internet Protocol-based networks.

Under the purchase agreement, each share of Excelan common stock was to be traded for two-thirds of a share of NET common stock. The merger was to be completed in June, when Excelan would become a wholly owned subsidiary of NET.

After the close of business Friday, May 13, NET issued its release charging Excelan with breach of its obligations.

NET had advised Excelan that it had "the right to exercise its option to purchase up to 21% of Excelan stock at $12 per common share as a result of Excelan's conduct in connection with the proposed merger."

Excelan fired off a response the following Monday, denying any breach of agreement. The network vendor detailed a scenario under which it acted as a go-between for disgruntled Excelan shareholders and NET.

NET has offered to raise the minimum price it will pay for each share of Excelan common stock from $12 to $14, Federman said.

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And what can be done to make MIS itself more productive? In programming, systems development and even systems maintenance?

Don't miss this important "white paper" for a thorough and useful exploration of the meaning of productivity in information systems management today. This *Computerworld Extra* on productivity will be delivered as a lift-out supplement in *Computerworld* and distributed at PC Expo in New York City.

COMPUTERWORLD *Extra*

An IDG Communications Publication

Wilder

FROM PAGE 75

ductor product yields.

Even an earthquake near Mobara, Japan, which caused a three-week shutdown of a Hitachi chip plant reduced the dynamic random-access memory (DRAM) supply by 500,000 units, according to one analyst.

In other words, it's hard to assess blame for the cause of the DRAM shortage. But it is appropriate to accuse one factor that has certainly not helped the current situation — the "historic" U.S.-Japan semiconductor agreement of 1986.

Business vs. politics

The sticky situation in which computer makers and their customers now find themselves should serve as a case study for why business decisions should never be made for political reasons.

If one looked at the 1986 U.S.-Japan pact in a business vacuum, it made sense. The Japanese chip vendors, rightfully accused of selling memory chips below cost in the U.S., were required to firm up their prices and open their own markets.

But the agreement, lobbied for, conceived and signed in a time of semiconductor overcapacity, slackening demand and plummeting prices, looked backward to punish sins already committed.

Nearly two years later, that agreement is just one more factor aggravating an expensive and frustrating situation for systems vendors and buyers. Memory chip prices, raised artificially by the agreement, are now skyrocketing for the very real reason that demand exceeds supply.

It's one thing to lock the barn door after the horses have gone, but the U.S. government has made it even harder for the U.S. computer industry to clean up the barn floor.

The government may have achieved redress for one segment of U.S. industry, but at what cost to the Compaqs, Apples, HPs and small entrepreneurial companies in the U.S.? In what possible way did the 1986 chip agreement help the U.S. become more competitive?

The U.S. computer industry has become far too complicated, and far too global, for any overall good to come out of stopgap, punitive trade actions. If the government would look to the future — and its support of Sematech is not a bad example — instead of the past, and consider the big picture instead of just a piece of it, computer vendors and their customers would be a lot better off.

Wilder is Computerworld's senior editor, computer industry.

CCA cuts staff, preps for employee buy-out

CAMBRIDGE, Mass. — Computer Corporation of America (CCA), slimming down before completing its transfer to employee ownership, announced an 11% work force reduction last week affecting 45 employees.

The mainframe data base management software developer cut 15 field sales representatives and 30 corporate headquarters jobs in finance, administration and marketing. No product development or customer support positions were eliminated, and a spokeswoman said CCA is still hiring in those areas.

The cuts reduced CCA's worldwide employment to 350.

CCA is currently negotiating terms of a leveraged buy-out agreement for CCA management to buy the firm from its Canadian parent, Crowntek, Inc. The spokeswoman said it is more important for CCA to reduce its cost structure to achieve profitability as a soon-to-be independent company.

CCA is also reorganizing its sales and marketing management responsibilities to take advantage of the work force reductions, but the firm declined to provide details.

The buy-out agreement is expected to be finalized sometime next month.

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IBM price cuts, competition hit third-party maintainers

BY CLINTON WILDER
CW STAFF

Unprecedented competition in the marketplace and IBM's price cutting have combined to take their toll on third-party computer maintenance vendors. Two key players, Dataserv Computer Maintenance, Inc. and Technical Support Services, Inc. (TSSI), were recently forced to lay off workers as a cost-cutting measure.

Hopkins, Minn.-based Dataserv quietly trimmed 66 employees, or 5% of its work force, last month, a company spokesman confirmed last week. It was the first layoff in seven years at Dataserv, a successful computer service, refurbishment and leasing firm that was acquired by Bell South Corp. in 1986 for $96.5 million.

The spokesman said the reductions affected both corporate office and field personnel.

TSSI, a servicer of primarily IBM terminals and automated teller machines, reduced its staff by 60 employees earlier this year. The cuts affected 48 of 280 full-time staff members and 12 part-time employees. Thomas McLaughlin, president of the Ossining, N.Y.-based firm, said that falling maintenance prices hurt TSSI's profit margins and forced it to streamline operations.

McLaughlin also acknowledged that the firm has lost some business to IBM.

IBM's Corporate Services Amendment price cuts last summer, which have succeeded in squeezing margins for third-party maintenance firms, have affected IBM's bottom line as well.

IBM's U.S. revenue from maintenance dropped 8% in 1987, from $4.02 billion to $3.69 billion.

INDUSTRY WEEK IN BRIEF

Tandem Computers, Inc. has hooked up with **Motorola, Inc.** to market Tandem Nonstop computer systems as part of Motorola's data communications systems. Under the agreement, Motorola's communications unit will market the Resource Management System, an automated dispatch system that uses the Nonstop as its backbone.

IBM trumpeted the technical achievements of 56 of its employees last week by doling out $1.55 million in $10,000 to $80,000 corporate awards and naming three employees as IBM Fellows. The Fellows and their development areas are Bernard R. Aken Jr., operating system software; Michael Hatzakis, semiconductor fabrication; and James L. Walsh, high-performance switching.

The technical developments recognized at ceremonies in San Francisco included the Micro Channel architecture for the Personal System/2, submicron integrated circuit densities and token-ring computer network design.

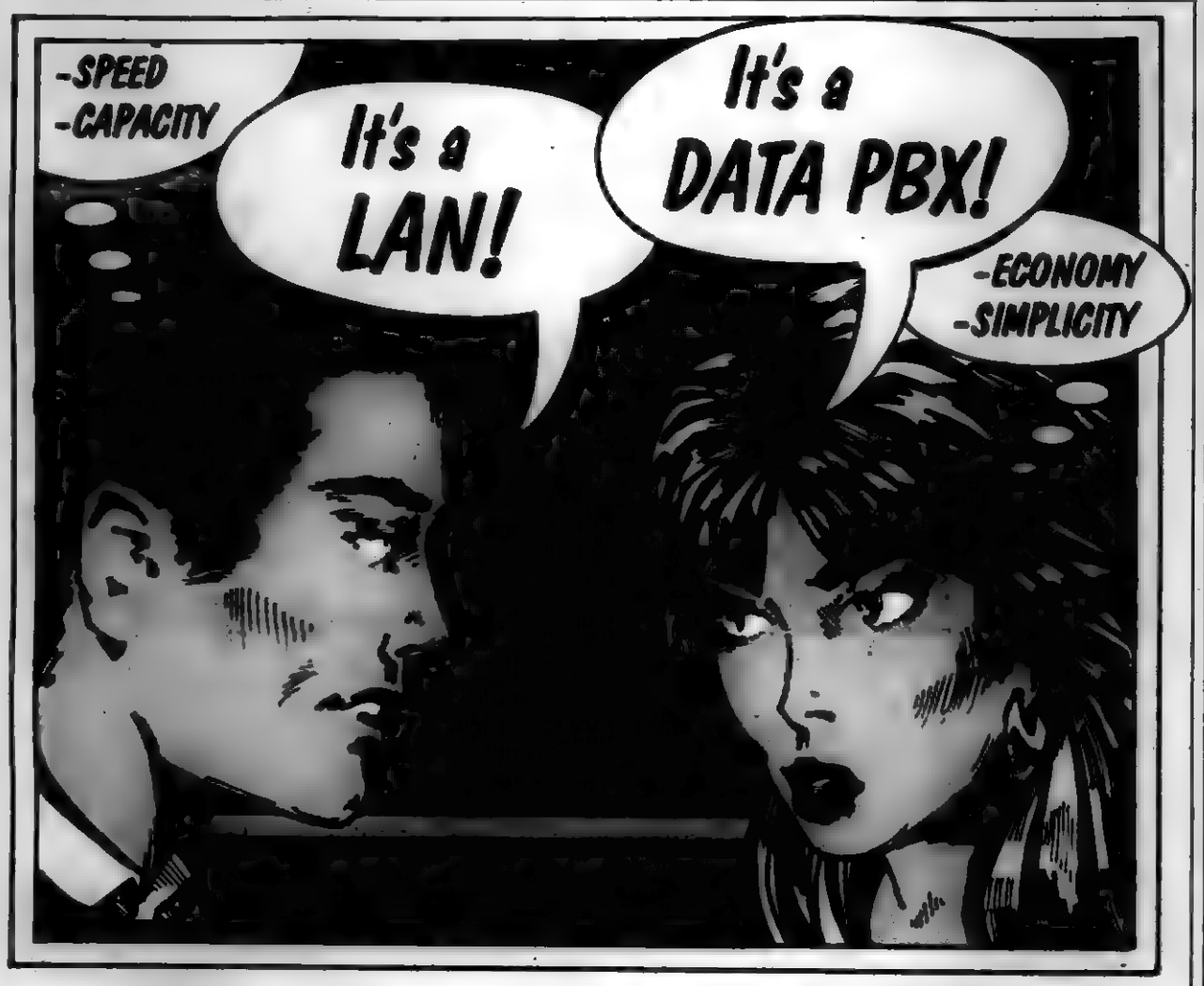
Symantec Corp. President and Chief Executive Officer Gordon Eubanks said the Cupertino, Calif.-based software developer plans to go public early next month and has filed a registration statement relating to an underwritten offering of its common stock with the Securities and Exchange Commission.

High-powered graphics workstation maker **Stellar Computer, Inc.** announced its third multimillion dollar Japanese distribution pact in the past two months with the unveiling of a major OEM contract with Argo Graphics, Inc. in Tokyo. Under the agreement, Argo will package the Stellar Graphics Supercomputer with Argo's Clinks software, as well as with various I/O devices and third-party application packages, for resale.

Separately, Newton, Mass.-based Stellar announced it has raised $18 million in its third round of venture capital financing. The round included $10 million from first-time investors, including Morgan Capital Corp. and New York Life Insurance Co.

Bachman Information Systems, Inc. has elected Charlie Bachman, the company's founder, as chairman of the board of the Cambridge, Mass., maintenance software manufacturer. Bachman's post as president and CEO will be filled by Arnold Kraft, the current executive vice-president and chief operating officer.

Control Data Corp. will stake up the lines in its manufacture of thin-film rigid disk recording heads when it opens a 100,000-sq-ft assembly and test plant off the west coast of Malaysia in September.



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Barrier

FROM PAGE 75

industry criticism for its rapid series of company buy-outs in the past few years, some analysts see a much more symbiotic relationship in Computer Associates' proclivity to spend bucks for bytes.

"Computer Associates is not simply a mergers-and-acquisitions machine," said David Bayer, an analyst at Montgomery Securities, Inc. in San Francisco. "They are a very well-run company with a lot of depth in their R&D and marketing programs.

"The assimilation of new companies exposes their products to a whole new customer base and helps the companies that are bought. Computer Associates is a strong firm; their basic growth is still in the 40% to 50% range."

For the quarter ended March 31, Computer Associates posted revenue of $206.4 million, a 41% increase over revenue of $146.1 million for the same period last year. Net income was $33.8 million, or 41 cents a share, a 94% growth over the $17.4 million, or 22 cents per share, posted for the same period in 1987.

Yearly revenue logged in at $709.1 million, a 57% increase over the $452.3 million recorded last year. Net income hit $101.8 million, or $1.25 per share, a 103% increase over the $50.2 million, or 64 cents a share, garnered in 1987.

Other companies reporting financial results last week included the following:

Ashton-Tate. A flood of product announcements helped the micro data base software maker maintain a steady increase in net income and revenue for the quarter. Quarterly revenue for the Torrance, Calif., firm was $72.4 million, a 20% increase over the $60.2 million reported for the first quarter last year. Net income was $11.1 million, or 43 cents a share, a 22% increase.

HP. The Palo Alto, Calif., firm reported revenue of $2.49 billion, a 24% increase over the $2.01 billion reported for the same quarter last year. Net income was $202 million, or 82 cents a share, a 25% increase over $162 million; or 63 cents per share, reported for the same quarter a year earlier.

Wyse. Quarterly revenue for the San Jose, Calif., maker of microcomputers and terminals reached $141.7 million, a 74% increase over the $81.3 million registered in the same period a year earlier. Net income logged in at $7.7 million, or 49 cents a share, a 48% increase over the $5.2 million, or 37 cents per share, recorded for the same period last year.

Yearly revenue was $456.6 million, an increase of 68% over the $272.3 million in 1987. Net income came in at $28 million, or $1.80 per share, a 51% increase over the prior year.

Autodesk. The computer-aided design software vendor announced that revenue for its first quarter was $25.8 million, a 49% increase over the $17.3 million reported for the same quarter a year earlier. The Sausalito, Calif., firm recorded net income of $7.2 million, or 30 cents per share, an 85% increase over the year earlier.

CIS. The Syracuse, N.Y.-based computer and equipment leasing company credited the acquisition of three companies — CMI Corp., Aviron Computer Technologies, Inc. and Com-Pro — for its healthy revenue gains.

For the fiscal year ended Feb. 29, CIS broke the $500 million revenue mark with $547.5 million, an 82% increase over the $300.5 million reported for a year earlier. Net earnings were $16.1 million, or $1.05 a share, a 19% increase over the $13 million, or 87 cents a share, reported for 1987.

Akers

FROM PAGE 75

that time is running out for the U.S., which he pointed out is already in its 19th consecutive year of budget deficits, 13th consecutive year of trade deficits and fourth consecutive year as a debtor nation.

"With every tick of that clock, every one of us should become increasingly apprehensive about the future of this country," Akers said.

Characterizing the upcoming presidential election as one of the most critical in the nation's history, Akers urged political leaders to make some real progress in 1988 toward a "vigorous, roused and resurgent" America.

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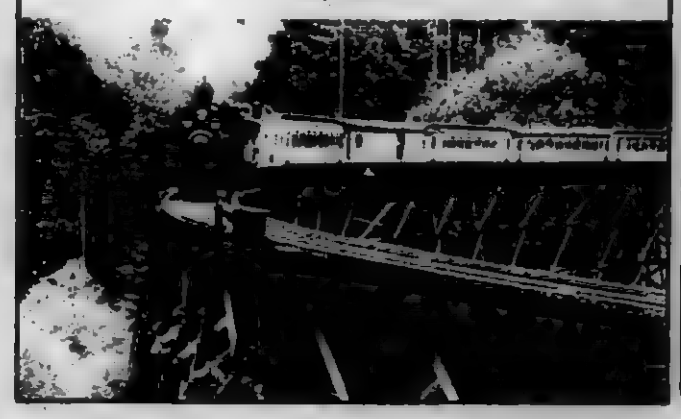

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COMPUTER CAREERS

Moving up to management

Promotion from within requires technical expertise, interpersonal skills

BY SALLY CUSACK
CW STAFF

For systems professionals aspiring to management, project leadership is the likely place to start building a career. Most MIS managers view the role of project leader as a proving ground for future managerial talent.

The responsibilities of project leaders may include defining system requirements, designing systems, programming, testing, implementing and user training.

Salaries for the position typically range from about $35,000 to $55,000 depending on the size of the organization.

Most new project leaders are promoted from within an organization — four out of five follow this route, according to Robert Tannura at Wood/Sprau/Tannura, Inc., an executive search and MIS consulting firm in Chicago.

"Companies would much rather promote on the first level to maintain morale," says Larry Grannis, senior consultant at Computer Staffing Consultants in Fountain Valley, Calif. "An astute manager looks for someone familiar with the project at hand, who can pitch in and help in a panic situation. Usually the project leader position goes to someone in the existing group who is actively giving suggestions and answering questions."

Hiring outside help

When a company hires a project leader from the outside, it is usually because expansion has created a new area where there is no in-house expertise, or to staff a short-term, time sensitive project. Dominion Bank Shares Corp. in Roanoke, Va., for example, currently uses temporary outside project leaders for the immense and critical task of replacing its loan system.

At Atlas Powder Co. in Dallas, the ability to communicate, particularly with users, is an important criteria in the promotion or hiring of project leaders, says Darwin Wolfe, director of information services. Department managers assess an applicant's technical ability while Wolfe himself judges communications skills.

Wolfe credits his project leaders with enhancing his organization's relations with users. "These people, when brought in as project leaders, turned around the attitude of our users," he says. "When I came to work here, MIS had no support from the user community. No positive relationship existed. Through continual, positive, direct interaction with the project leaders, this changed. MIS is now looked upon as a user service center responding to the user needs."

Wolfe, who says he promotes from within whenever possible, notes that two of the five project leaders he promoted have continued to move up; one is now a manager of application systems, the other a data base administrator.

Bob Cook, assistant vice-president at Dominion Bank Shares, says he looks for the same combination of technical expertise and interpersonal skills as Wolfe when appointing a project leader.

Along with the interpersonal skills, he looks for an understanding of project management, critical path concepts and project life cycle methodologies and abilities at planning, organizing, staffing, directing and controlling a project, including a mastery of delegation.

Bank deregulation has brought about a demand for project leaders with refined skills, Cook says. "A project leader must recognize an elegant solution when he or she sees one," he says. "These are solutions that meet not only the requirement of the user, but interfacing and integration requirements as well."

Cook — who started at the banking company 11 years ago as a systems analyst supporting a project leader before leading several projects himself — says he also stresses an understanding of organizational and political aspects of a project.

Tannura concurs with this emphasis, noting that it is important for employees to understand their positions in relation to the entire corporate structure.

Sharpen up those skills

He also recommends that aspiring project leaders master online data base programming and working with users and hone their communications skills.

While a prospective project leader should be a contributor in his present work, technically competent and able to get along with others, educational background also plays a role in the selection.

Among recent college graduates, Dominion's Cook looks for "a demonstrated predictor of future performance," such as better-than-average grades.

Education becomes more important further down the road, Grannis says. "Once a person gets a shot at management, he will move further faster depending on his academic skills," he says. "If someone in a project leader position has not completed their degree requirements, they should do it now. A degree is not important at the first level of management, but for promotion it becomes increasingly critical."

Couch is *Computerworld*'s new products writer.

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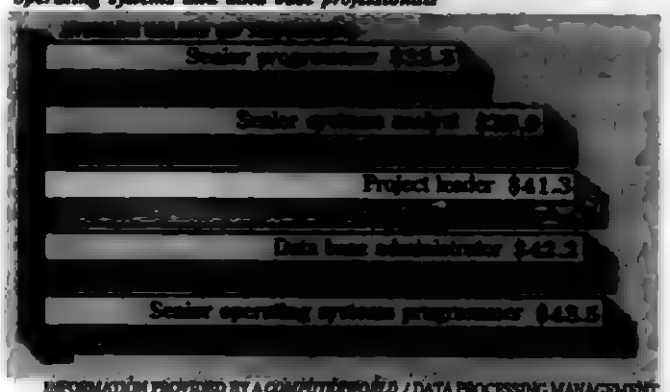

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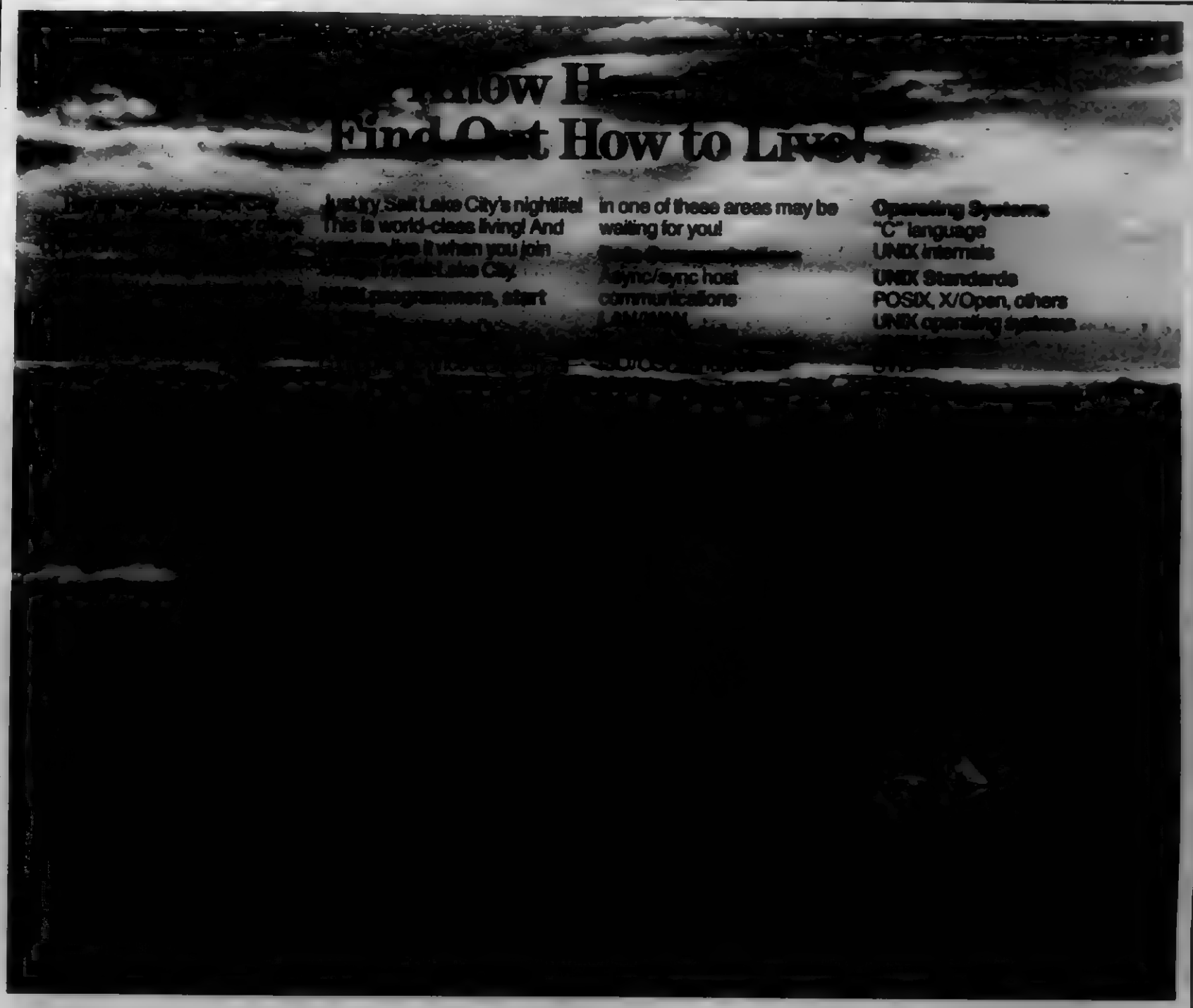

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COMSAT Video Enterprises, a Satellite Television broadcast operation and a wholly-owned subsidiary of COMSAT, has an immediate opening in its Software and Control Systems Department for a Manager of Business Software Development.

The successful candidate will provide leadership and technical expertise to CVE by managing the Business Software Development group which is responsible for development and implementation of hardware and software solutions that address business needs, problems and operational deficiencies.

Position requires a BS in Computer Science or Administration with strong coursework background in MIS/MSCS, or MBA desirable with technical expertise in SQL relational databases, DBASE III + for micros on-line billing systems, on-line database inquiry/MS-DOS operating system, VAX VMS operating system, and at least 3 years' managerial experience.

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COMSAT
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Interested applicants may send their resumes to: **Hewlett-Packard Company, Systems Technology Division Human Resources, 19447 Pruneridge Avenue, MS: 42U4, ATTN: DP, Cupertino, CA 95014.** Hewlett-Packard is an Equal Opportunity/Affirmative Action Employer.

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Duties include the analysis, design, writing, testing and implementation of manufacturing, information applications on a Hewlett-Packard HP 3000 system. The position requires a B.S. in Computer Science, Industrial Engineering, Mathematics or the recognized equivalent. A minimum of 3 years programming experience is required.

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Western Zirconium Division
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Westinghouse

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This individual plans, organizes and controls all data processing related activities, including hardware acquisition, system development programming and computer operations of an IBM Mainframe computer system. Will be responsible for maintaining an overview of system development activity and computer hardware procurement to ensure compatibility with corporate objectives and directives. Responsibilities include the management of a staff of 67 employees, an annual budget of approximately $7M, and capital equipment valued at $8.9M.

The successful candidate's qualifications should include a minimum of 10 years successful and progressive experience in the management of large-scale, diverse information systems development, and major computer related, geographically separated, hardware installations. The ideal candidate should also have strong organizational/planning skills and be able to take responsibility for corporate service costs and objectives. The ability to acquire desired results as well as maintain a proper balance between user requirements and management direction, is essential. Must be familiar with elements of information processing budgets, cost allocation methods and labor agreements.

Qualified applicants may submit a resume to: E. M. Akre, Dept. T14-J4. Supply System, PO. Box 968, Richland, WA 99352. An equal opportunity employer.

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The Data Group
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INFORMATION SERVICES MANAGER

The City of Lubbock, Texas (population 186,000) is seeking a skilled individual with a proven track record to direct the operations of municipal computer information systems. The successful applicant should possess a Bachelor's degree in Computer Science, Management Information Systems or closely related field and seven years increasingly responsible experience in the planning, design, and implementation of computer system including significant supervisory experience. Salary commensurate with education and experience. Resumes must be postmarked no later than June 27, 1988.

Submit salary history, minimum salary requirement, and resume to:

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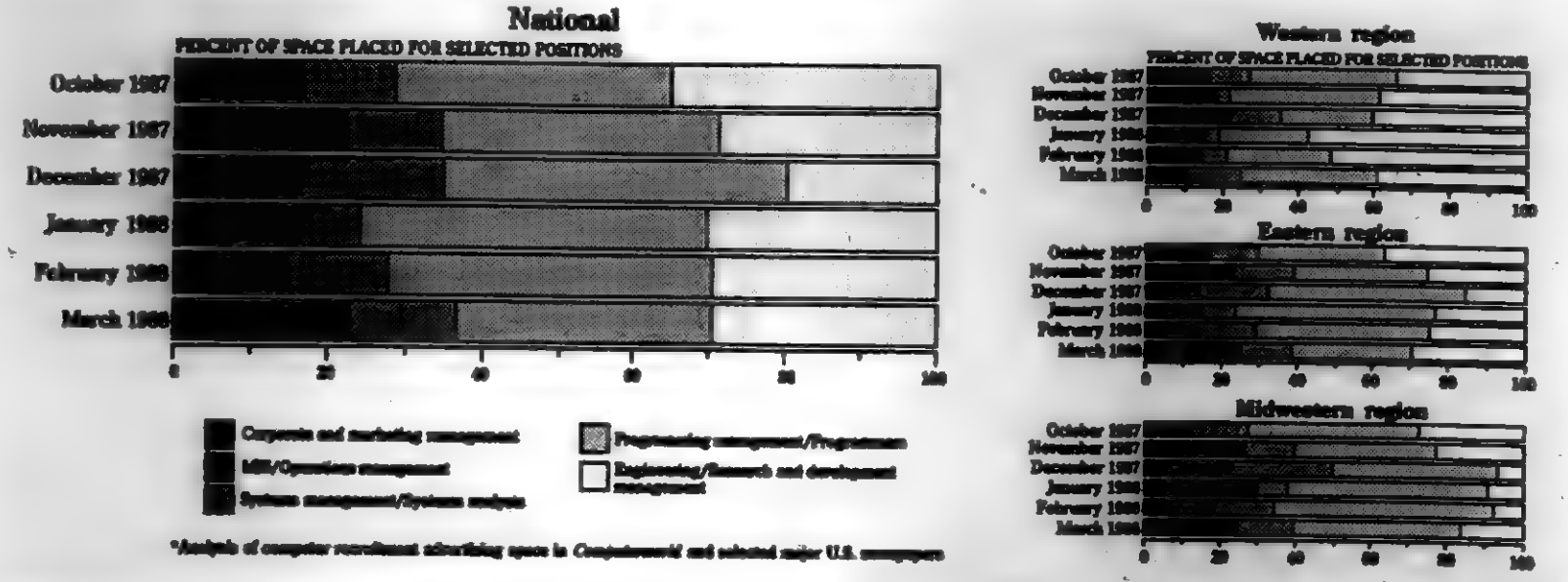
CAREER INDEX

Computer recruitment advertising activity*



*Analysis of computer recruitment advertising space in *Computerworld* and selected major U.S. newspapers

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(Refer to Job #JG-1)

Requirements are ten or more years software specification, design, development and test experience in a military-STD environment with emphasis on embedded threat adaptive countermeasures. Strong leadership, administrative and communication skills are required. Familiarity with ADA or PASCAL, "C", and Assembler. MIL-STD 2167, 1750A Architecture, and VAX/VMS would be a plus. BSEE/CS or equivalent is required. Opportunity to manage as Section Head.

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(Refer to Job #JG-2)

Requirements are seven to ten years experience in real time, embedded software system integration and test. Familiarity with HP64000, PC, VAX/VMS software and electrical engineering development and test process, ADA or PASCAL, "C", Assembler, and MIL-STD 2167 development environment. Strong leadership and excellent communication skills are required. BSEE/CS or equivalent is required.

LEAD SOFTWARE DEVELOPMENT ENGINEER
(Refer to Job #JG-3)

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For immediate consideration, please send your resume and salary history in confidence to: **Tracor Aerospace, Human Resources Dept., 6500 Tracor Lane, Attn: Staffing 3126, Austin, TX 78725-2070.** We are an equal opportunity employer. Candidates must be legally authorized to work in the US. Principals only, please.

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Secondary markets work for all

Users, manufacturers can benefit from equipment on the used market

BY THOMAS J. DONOVAN
IDC FINANCIAL SERVICES CORP.

At the recent Computer Dealers and Lessors Association (CDLA) spring convention, IBM reviewed its Feb. 26, 1988 announcement of maintenance qualification for used equipment.

The announcement rescinded IBM's earlier policy, which required a Maintenance Agreement Acceptability Letter (MAAL) in order for equipment that was deinstalled, modified or reinstalled by anyone other than IBM to be eligible for free repairs.

This earlier policy was announced Nov. 3, 1987 and then deferred to March 1, 1988. The fee for obtaining a MAAL had been set at an amount equal to one month's maintenance.

Obviously, dealers in used equipment, especially independent installers and refurbishing centers, anticipated a severe impact on their business. As a result of the CDLA's and other groups' negotiations with IBM, IBM rescinded the fee policy for a MAAL.

It is important to note that had the Nov. 3 policy not been rescinded, sellers would receive less value for their equipment if a MAAL were required. Thus, the CDLA and others, by convincing IBM to rescind, in effect protected the users' investment in existing equipment.

As far as can be determined, there was no uproar from the user community regarding the earlier announcement, which could have taken money out of their pockets.

Attitude adjustment

The above is just a small example of a manufacturer's ability to modify its existing policies that has an impact on the residual value of its installed base.

In many cases, the initial user of equipment has the attitude that such policy changes only affect subsequent users. That attitude is absolutely wrong. An adverse change in residual value as a result of a manufacturer's policy change will, dollar for dollar, be taken out of the sale value of an asset.

Other examples of manufacturers' policies that adversely impact users' investments in equipment include the following:

- Lack of maintenance support for used equipment.
- Higher maintenance costs for used equipment.
- Unreasonable or unnecessary fees for recertification.
- Heavy relicensing fees for system software.
- Burdensome fees or procedures for installing and using used equipment.
- An attitude by the manufacturer that its product, which you bought used from someone else, is just junk.

The original user must take a much more active role in protecting his investment. The user must provide for the marketability of his equipment on the secondary market by ensuring that a subsequent user can obtain maintenance coverage and system software on reasonable terms and at reasonable prices.

This objective is accomplished by adding clauses to the purchase contract, or the lessor's purchase contract in the case of a lease, which assures the transferability of system software and maintenance rights. It would be nice to know that the $500,000 purchase you made two years ago, which no longer meets your needs, can be sold for $250,000 hassle-free and not junked.

Pros and cons

Some manufacturers view a secondary market for their equipment as negative, because equipment on the used market competes with its new products. That fact is true from an individual-transaction point of view. Just ask any salesman who lost a deal to a competing piece of used equipment.

However, from a macro point of view, a secondary market creates a user perception that his residual value will be protected, that he will be able to dispose of the equipment that no longer meets his needs, and that he will be able to obtain add-on features at a reasonable price, especially in the later years of a product's life.

The existence of a secondary market for equipment has a beneficial impact for leased equipment.

If such a market exists, the lessor can anticipate some residual value for the equipment at the termination of the lease. This fact will translate into a lower rate for the lessee which, in turn, will support a desirable operating lease classification for accounting purposes, according to the Financial Accounting Standards Board's Statement 13 accounting for leases.

A manufacturer whose equipment can support an operating lease will have an advantage over a manufacturer whose equipment generally qualifies for only capital lease classification. All the great technology in the world will not convince a finance person who needs to have leases classified as operating to acquire equipment with no secondary market.

Market support

Needless to say, IBM is the biggest in the industry for a number of reasons. One of those reasons is because it has allowed a secondary marketplace to exist for its equipment.

Digital Equipment Corp. is another example of a growth company in which a viable secondary marketplace has existed for many years.

Other manufacturers should note that support for a secondary market may not necessarily make them grow, but an attitude that their own used equipment is somehow second-class will most surely limit their market share in the long run.

For more information, contact IDC Financial Services' Terri LeBlanc at 617-872-8200.

IBM waxes 3745 board for high-end market

BY BENJAMIN GALE
IDC FINANCIAL SERVICES CORP.

On Jan. 26, IBM introduced the 3745 high-end communication processor. This processor offers two to four times the performance and up to four times the bandwidth of the 3725. The 3745 is available in two models, the Model 210 and the Model 410, which offer up to 50% better price/performance than the previous high-end 3725 front-end processor.

The 3745 processor is based on three application-specific integrated circuit (ASIC) chips. Each chip can hold up to 40,000 circuits, which is three times the capacity of previous IBM ASIC logic chips.

The 3745 Model 210 began shipping in March, and the Model 410 is expected to ship in September.

Price overlap

While the base price of the 3725 is significantly lower than that of the 3745, prices appear to cross over at medium to large configurations. This comparison excludes the fact that the 3745 also offers greater growth, better performance, hot pluggability, a smaller footprint and reduced operating costs.

Currently, the 3725 is positioned in the middle of IBM's communication controller product line, with the recently announced 3745 coming in at the high end and the 3720 positioned at the low end. However, IDC Financial Services Corp. said the 3725 will be replaced sometime within the next 12 to 18 months, when IBM announces a new mid-range communication processor model that will use the existing 3745 technology.

IBM communication processors
Current retail fair market value

	Date shipped	IBM base list price	Percent of list price
[illegible]	[illegible]	[illegible]	[illegible]
Model 2	1Q 1984	$60,500	63%
[illegible]	[illegible]	[illegible]	[illegible]
Model 410	Sept. 1988	$188,000	*

* Currently not available on the secondary market

INFORMATION PROVIDED BY IDC FINANCIAL SERVICES CORP.
CW CHART

THE 3725 will be replaced sometime within the next 12 to 18 months, when IBM announces a new mid-range communication processor model that will use the existing 3745 technology.

The IBM 3725 communication controller has fallen 23% on the used market since the beginning of this year. This drop can be attributed to a combination of factors, such as the following:

- The announcement of the 3745.
- The expiration of three- and four-year leases, which has caused increased volumes of 3725s on the secondary market.

Secondary market sources indicate that activity is brisk within the 3725 marketplace. Currently, the supply of 3725 Model 2s has loosened on the used market because three- and four-year leases are expiring. However, some 3725 Model 2 shops are opting to upgrade to a 3725 Model 1. Since used values for the 3725s have dropped significantly, they have become bargains on the used market.

Secondary market sources have reported conflicting views as to the future of the 3725. Some say that 3725 customers have ample capacity with their existing 3725s for both current and future communications processing needs. Thus, these dealers say the supply of 3725s will soon tighten up and values will hold.

On the other side, some secondary market sources say the 3725 values will continue to plunge as customers continue to move from 3725s to 3745s.

Generally, customers who have reached maximum capacity with their 3725s or have multiple 3725s are moving to the 3745.

Fortune telling

What lies ahead for the 3725? IDC Financial Services says the announcement of the 3745 represents the first step in the effective replacement of the 3725. The second and final step will be the eventual rippling down of the 3745 technology into a lower priced unit.

The shipment of the 3745 Model 410 and additional features in September could be a further blow to the 3725's life. Many customers who have already purchased Model 210s have orders in for the upgrades to the Model 410 when it becomes available. The next several months will prove the fate of the 3725s further on the secondary market.

For more information, contact IDC Financial Services' Terri LeBlanc at 617-872-8200.

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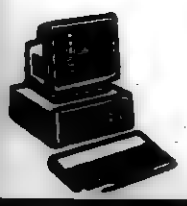

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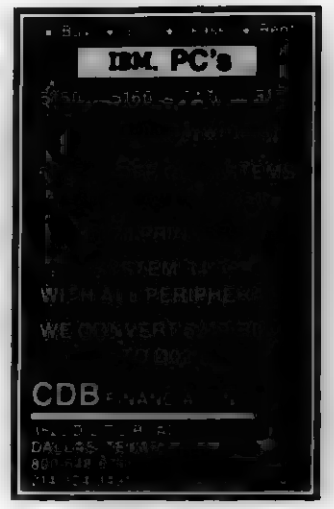

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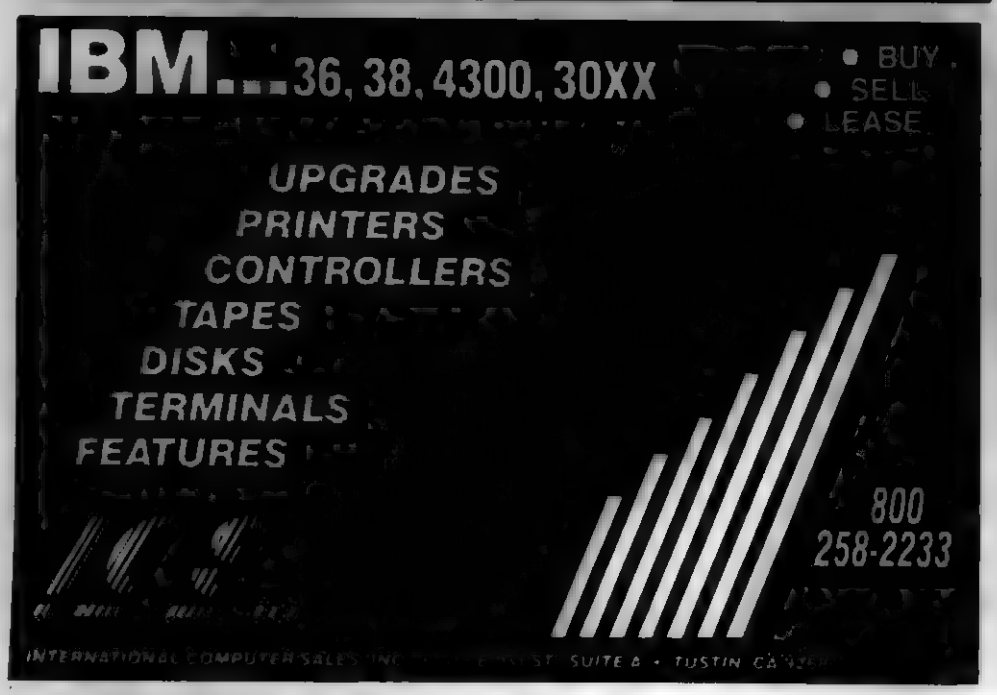

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9-38-400	0.75	8 to 8
9375-60	0.75	8 to 16
4341-1	0.88	2 to 4
9-38-600	0.99	8 to 16
9-38-700	1.1	16 to 32
4381-11	1.4	4 to 16
4361-5	1.45	2 to 12
4341-2	1.5	2 to 16
9377-90	1.6	8 to 16
4341-12	1.65	2 to 16
†4381-21	2.1	8 to 16
4381-1	2.1	4 to 16
4381-2	2.7	4 to 32
4381-12	2.7	8 to 32
†4381-22	3.1	16 to 32
4381-13	3.6	8 to 32
308SEX	4.4	8 to 32
4381-3	4.5	8 to 64
†4381-23	4.7	16 to 64

SYSTEMS	MIPS (Millions of Instructions Processed Per Second)	MEGABYTES
*4381-91E	4.7	16 to 64
3033UP	5.0	4 to 24
4381-14	5.0	16 to 32
308SEX	5.5	8 to 32
‡3090-120E	7.5	32 to 64
†4381-24	7.5	16 to 64
*4381-92E	7.5	16 to 64
308SJDI	8.5	8 to 32
3090-150	9.0	32 to 64
3081K	9.5	16 to 32
3090-180E	10.5	32 to 64
3081G	11.5	16 to 64
3090-150	15.5	32 to 64
308JHX	15.5	16 to 64
3090-[illegible]	17.5	32 to 64
3090-[illegible]	24.5	64 to 128
3090-200E	31.0	64 to 128
3090-300E	44.0	64 to 128
3090-400	50.0	128 to 256
3090-400E	56.0	128 to 256
3090-500E	67.0	128 to 256
3090-600E	78.0	128 to 256

*1st Installation 11/88
#1st Installation 3Q/88

‡1st Installation 2Q/88
†1st Installation 1Q/88

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SYSTEMS	MIPS	MEGABYTES
5840	8.6	up to 128
5850	11.6	up to 128
5860	[illegible]	16 to 128
5867	[illegible]	24 to 128
5868	[illegible]	32 to 256
5870	21.7	32 to 128
5880	32.0	32 to 256
5880-190E	22.0	64 to 256
5880-200E	31.0	64 to 256
5880-300E	40.0	64 to 256
5880-400E	58.0	128 to 512
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AS/XL-50	15.0	32 to 64
AS9070	16.0	16 to 64
AS/VL-80	17.1	32 to 256
AS9080	20.0	16 to 64
AS/XL-60	28.0	64 to 256
AS/XL-80	50.0	64 to 256
AS/XL-90	67.0	128 to 512
AS/XL-100	80.0	128 to 512

The above information is intended as a guideline for computer users on relative computer systems instruction cycle times. All data have been derived from published documentation and represent reasonable estimates of average MIPS ratings. However, Randolph is not responsible for the accuracy of the MIPS data. Cycle times will vary based on hardware/software configurations, and systems manufacturers continually modify computer models as design improvements in hardware and software arise.

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REQUEST FOR PROPOSALS FOR COMPUTER CENTER TECHNICAL SUPPORT SERVICES

The City of New York through the Department of Housing Preservation and Development is interested in obtaining proposals from qualified business entities to supply technical expertise to review the operations of and develop and document procedures for the mainframe computer center; provide hardware and software installation support, including the conversion of systems from the OS/VS1 operating environment to the MVS/XA operating environment; provide systems programming and related professional services; and train the Department's MIS technical personnel to function effectively in the upgraded data processing environment.

Copies of the Request for Proposals may be obtained in person or by mail from the Department's Division of Management Information Systems (Attention: Ms. Lorraine Kelly), 280 Broadway, Room 821, New York, N.Y. 10007. Proposals must be submitted at this address no later than 4:00 p.m. on June 30, 1988.

A Proposers' conference will be held on June 3, 1988, at 10:00 a.m. at 100 Gold Street, 9th Floor (Room 9169), New York, N.Y. 10038.

NEW YORK CITY HOUSING AUTHORITY REQUEST FOR PROPOSALS

The New York City Housing Authority is soliciting proposals from computer systems vendors with demonstrated experience in legal software applications to furnish and install an office automation system in its Legal Department that will provide advanced word processing capabilities, a fully comprehensive case management/docketing system, and a variety of data base applications in support of its practice specialties. The system will be installed in new offices at 75 Park Place in Manhattan to be occupied by the legal Department later this year.

Copies of the RFP will be available for distribution on May 24, 1988, in Rm. 510, 250 Broadway, New York, N.Y. 10007. Proposals must be submitted to the Authority in the form specified in the RFP, by 4:00 P.M. on June 21, 1988.

Inquiries should be directed to Mr. Robert Dixon, Esq., Deputy General Counsel, Rm. 553, 250 Broadway, New York, New York 10007, (212) 306-4884.

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Training

Training costs add up

Factors include facilities, staff and equipment

BY MARY GROVER
CW STAFF

There's no doubt about it: Implementing in-house MIS training is expensive. It can cost anywhere from $2,500 to $7,000 a year to train one staff member, according to MIS managers in the field.

Whatever the budget for a training program, managers who will foot the bill must consider certain basics that may involve up-front costs, including facilities, personnel and equipment.

The first consideration is finding a place to conduct classes. One option is to find room inside a company building. "I imagine in most companies, space is at a premium," says John Black, manager of information systems support services at Quaker Oats Co.

Real money

More than likely, a company will need to budget for this space as for any other. "It's as real as paying someone on the outside, because it must go into the budget," Black says.

Renting classroom space outside the company is an alternative, although often an expensive one.

Springfield, Mass.-based Massachusetts Mutual Life Insurance Co. rented half a floor of a downtown office building four years ago, but it became too expensive.

"Rental of an office building is horrendous," says Judy Brainerd, a senior project manager at Massachusetts Mutual. "And lugging people and materials there — not to mention parking — these are all additional costs. For us, it was just not cost effective."

Build your own

Although it is the most expensive method, building a center can be the smart choice for some large companies with heavy training needs.

At accounting and consulting firm Arthur Andersen & Co., renting outside facilities was fine until the demand for training became too great.

"Building our own center became much more economic," says Mel Bergstein, managing partner of technical competence. "What you must keep in mind is that this requires large volumes because of the significant capital involved."

Arthur Andersen's training center is a converted 140-acre school campus that can accommodate approximately 1,400 trainees.

Staffing considerations include teachers and administrators. For a company with no experience in training, outside vendors can be of assistance. In addition to materials, some training companies provide staff on a lease basis.

WHATEVER THE BUDGET for a training program, managers who will foot the bill must consider certain basics that may involve up-front costs, including facilities, personnel and equipment.

Massachusetts Mutual's Brainerd suggests using such a vendor when launching a new course. "Sometimes it's effective to bring in [a vendor like this] for a year while you get your act together, and then, using their methods, develop your own training," Brainerd says.

Massachusetts Mutual brought in a training vendor at a cost ranging from $5,000 to $15,000 a week, Brainerd says. The company finds the method to be the cost-effective for short-term, specific or sporadic needs or when training volume is low.

On the other hand, Black says he is not sure Quaker Oats will ever hire full-time trainers. The company tried using information center staff members as trainers, but "they worked out better as consultants," he says.

Black says he found outside vendors provided the correct mix of expertise and training know-how. "You can find experts in specific subjects instead of having one or two people on your staff who are experts in everything, which is impossible."

At Arthur Andersen, a full-time administrative staff develops curricula, prepares materials and evaluates the effectiveness of classes and training techniques.

Field professionals do the actual training, spending an extensive amount of time absorbing prepared materials. "This is an expensive way of doing it," Bergstein says; he points out that it involves identifying the appropriate instructor and interrupting his schedule to fly him to the training center.

There is also the option of training without teachers, by implementing a self-study program. Quaker Oats makes extensive use of self-study for MIS.

Equipment costs

The nature of MIS training demands a hands-on approach. "These days, it's hard to do MIS training without the equipment," Bergstein says. A major cost lies in procuring an adequate number of workstations, personal computers or terminals and in wiring classrooms.

In its two 12-person classrooms, Quaker uses six microcomputers for students and one for the instructor. The company's self-study classrooms make use of $10,000 workstations.

Additional costs lie in securing desks, audio equipment, video players and projectors, screens and other accoutrements. Black suggests looking for locations that are already wired in order to cut costs.

Because training is expensive, and it is so difficult to assess the payback on it, Brainerd suggests finding a champion in top management to support your efforts. "Whatever you come up with is going to cost more than the immediate payback," she says. "You need someone who instinctively feels it's a good thing to do."

Grover is a *Computerworld* copy editor.

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The BoCoEx Index

Closing prices report for the week ending May 13, 1988

IBM PC Model 078	$850	$900	$550
XT Model 086	$1,175	$1,250	$875
XT Model 089	$1,600	$1,700	$1,100
AT Model 099	$2,300	$2,425	$1,750
AT Model 239	$2,650	$2,650	$2,125
AT Model 339	$3,500	$3,700	$2,625
PS/2 Model 50	$2,300	$2,475	$2,225
PS/2 Model 80	$5,525	$6,100	$5,275
Apple Macintosh 512	$725	$775	$575
512E	$925	$1,025	$650
Plus	$1,100	$1,150	$810
Plus 20-MEx	$1,750	$1,800	$1,450
SE	$1,925	$2,200	$1,600
SE 20-MEx	$2,450	$2,450	$2,050
II	$4,025	$4,325	$3,500
NEC Multispeed EL	$1,000	$1,000	$675

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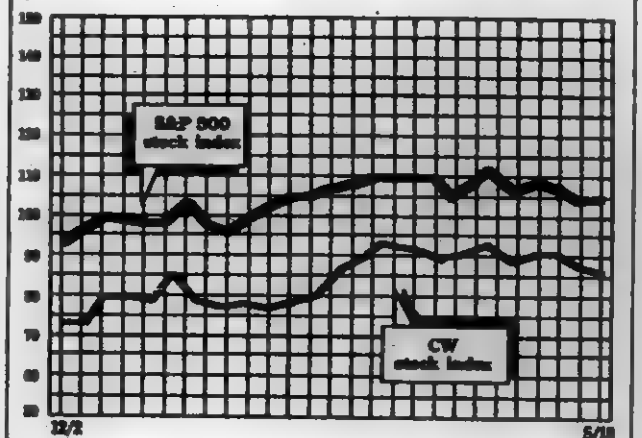

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Computer Systems	99.0	97.4
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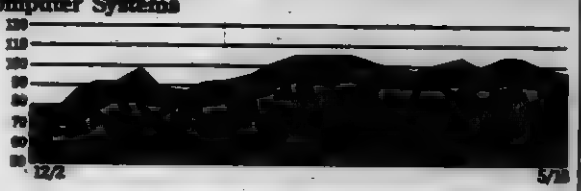
Peripherals & Subsystems	84.0	79.5
Leasing Companies	113.7	117.8
Composite Index	87.6	86.9
S&P 500 Index	105.8	105.0

Communications

Computer Systems



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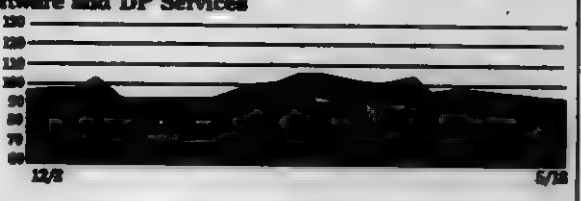

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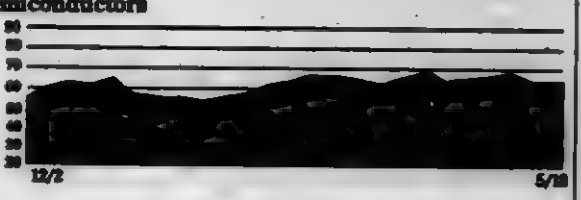


Peripherals and Subsystems

Leasing Companies

CW CHARTS

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, MAY 18, 1988

EXCH		52-WEEK RANGE (1)		PRICE CLOSE MAY 18 1988	WEEK NET CHANGE	WEEK PCT CHANGE

Communications and Network Services

N	AMERICAN INFO TECHS CORP	100	74	86.25	0.5	0.6
N	ANDREW CORP	18	11	14.50	-0.5	-3.3
O	ARTEL COMM CORP	3	1	1.63	-0.1	-7.1
N	AT&T	36	29	26.00	-0.9	-3.3
O	AVANT GARDE COMP INC	6	2	2.06	0.3	17.9
O	AVANTEK INC	17	6	7.25	0.3	3.6
N	AYDIN CORP	25	16	20.38	0.4	1.9
N	BELL ATLANTIC CORP	80	61	65.38	-0.3	-0.4
N	BELLSOUTH CORP	44	29	38.75	0.1	0.3
O	COMPRESSION LABS INC	6	2	3.75	0.1	3.4
O	COMPUTER NETWORK TECH	6	1	1.31	0.1	7.7
O	CONTEL CORP	40	28	31.38	-0.5	-1.6
O	DATA SWITCH CORP	10	4	7.00	-0.5	-6.7
O	DIGITAL COMM ASSOC	49	28	31.75	0.3	0.9
O	DYNATECH CORP	23	14	20.25	-1.0	-4.7
O	FIBRONICS INTERNATIONAL INC	7	2	3.13	0.1	4.2
O	GANDALF TECHNOLOGIES	10	5	6.50	-0.4	-5.5
O	GENERAL DATACOMM INDS	13	3	3.38	0.0	0.0
N	GTE CORP	45	29	33.88	-1.4	-3.9
O	INFOTRON SYS CORP	14	8	13.00	1.5	13.0
N	ITT CORP	66	42	46.13	-1.3	-2.7
N	M A COM INC	18	7	9.50	0.1	1.3
O	MCI COMMUNICATIONS CORP	15	6	13.63	-0.1	-0.9
O	MICOM SYS INC	17	7	15.13	0.0	0.0
O	NETWORK SYS CORP	13	7	9.50	-0.3	-2.6
N	NORTHERN TELECOM LTD	34	14	16.75	-0.9	-5.0
O	NOVELL INC	30	12	22.50	1.0	4.7
N	NYNEX CORP	78	58	61.38	-0.3	-0.4
N	PACIFIC TELESIS GROUP	34	23	28.25	0.4	1.3
O	PARADYNE CORP	9	4	4.13	0.0	0.0
A	PENRIL CORP	5	1	4.50	-0.1	-2.7
N	PLESSEY PLC	40	22	39.00	0.7	2.4
N	SCIENTIFIC ATLANTA INC	20	8	13.25	-0.5	-3.6
N	SOUTHWESTERN BELL CORP	48	32	38.50	1.5	4.1
O	3 COM CORP	28	13	20.13	0.9	4.5
O	TIMEPLEX INC	37	17	32.50	0.0	0.0
N	UNGERMANN BASS INC	15	8	12.00	0.0	0.0
N	U S WEST INC	60	43	51.63	0.8	1.5

Computer Systems

O	ALLIANT COMPUTER SYS	24	5	6.00	-0.5	-7.7
O	ALPHA MICROSYSTEMS	6	3	5.63	-0.1	-2.2
O	ALTOS COMPUTER SYS	15	9	9.88	0.0	0.0
A	AMDAHL CORP	60	18	44.25	-0.6	-1.4
O	APOLLO COMPUTER INC	28	9	15.00	-0.5	-3.2
O	APPLE COMPUTER INC	60	36	39.75	0.3	0.8
N	BOLT BERANEK & NEWMAN	36	12	15.50	-0.4	-2.4
N	BRITTON LEE INC	4	1	2.13	0.0	0.0
N	COMPAQ COMPUTER CORP	79	34	49.50	-2.0	-3.9
O	COMPUTER AUTOMATION INC	16	6	9.13	-0.1	-1.4
O	COMPUTER CONSOLES INC	11	2	7.13	0.0	0.0
O	CONCURRENT COMP CORP	24	11	17.75	1.3	7.8
N	CONTROL DATA CORP DEL	36	16	26.25	0.3	1.0
O	CONVERGENT TECH	8	3	3.13	-0.2	-6.7
O	CONVEX COMPUTER CORP	19	6	7.50	-0.4	-4.8
O	CRAY RESH INC	110	47	75.75	-4.4	-7.8
O	DAISY SYS CORP	10	5	9.00	0.3	2.9
O	DATA GEN CORP	37	16	20.25	-1.0	-4.7
O	DATAPOINT CORP	9	3	5.38	0.0	0.0
N	DIGITAL EQUIP CORP	200	86	101.75	-0.8	-0.8
N	FLOATING POINT SYS INC	12	3	3.25	-0.3	-7.1
N	GOULD INC	36	8	13.38	-0.6	-4.5
N	HARRIS CORP	41	22	27.88	-0.6	-2.2
N	HEWLETT PACKARD CO	74	38	57.00	-1.5	-2.7
N	HONEYWELL INC	91	49	69.00	1.5	2.4
N	IBM	129	102	109.88	0.1	0.1
O	INFORMATION INTL INC	15	9	12.25	-0.5	-3.8
O	IPL SYS INC	2	1	1.69	-0.1	-3.5
O	MASS COMPUTER CORP	14	4	4.38	0.1	2.9
N	MATSUSHITA ELEC INDL LTD	228	169	211.00	-1.0	-0.5
O	MEGADATA CORP	6	3	3.13	0.1	4.2
O	MENTOR GRAPHICS CORP	39	14	26.50	0.3	0.9
N	NBI INC	14	4	4.00	0.0	0.0
N	NCR CORP	97	59	58.75	0.3	0.4
N	PRIME COMPUTER INC	31	12	15.50	-0.4	-2.3
O	PYRAMID TECHNOLOGY	14	5	12.50	0.5	4.2
O	STRATUS COMPUTER	48	15	27.75	-0.3	-0.9
O	SUN MICROSYSTEMS INC	48	14	34.50	0.0	0.0
O	SYMBOLICS INC	8	1	1.38	-0.3	-18.4
N	TANDEM COMPUTERS INC	37	16	17.63	-0.1	-0.7
N	TANDY CORP	57	38	44.25	-0.5	-1.1
N	ULTIMATE CORP	37	12	13.00	-0.1	-1.0
N	UNISYS CORP	48	24	32.63	0.1	0.4
A	WANG LABS INC	15	10	10.63	-0.3	-2.3

Software & DP Services

O	ADVANCED COMP TECH	6	1	1.25	0.0	0.0
N	AGS COMPUTERS INC	30	11	16.00	-0.4	-2.0
O	AMERICAN MGMT SYS INC	20	9	14.50	-0.8	-4.9
O	AMERICAN SOFTWARE INC	18	6	13.13	0.0	0.0
N	ANACOMP INC	11	4	8.13	-0.3	-2.7
O	ANALYSTS INTL CORP	10	4	7.88	-0.1	-1.6
O	ASHTON TATE	28	13	24.50	-1.3	-4.9
O	ASK COMPUTER SYS INC	16	6	13.50	1.0	8.0
O	AUTODESK INC	34	12	27.25	0.5	2.8
N	AUTO DATA PROCESSING	55	36	37.75	-1.0	-2.6
O	BOOLE & BABBAGE INC	12	5	8.50	0.0	0.0
N	COMPUTER ASSOC INTL INC	37	15	25.00	-0.3	-1.0
O	COMPUTER HORIZONS CORP	15	7	10.38	-0.4	-3.5
N	COMPUTER SCIENCES CORP	73	36	39.88	1.0	2.6
N	COMPUTER TASK GROUP INC	17	9	10.75	-0.4	-3.4
O	COGNOS INC.	17	4	8.25	-0.4	-4.7
O	COMPUTER INC	20	12	15.75	0.5	3.3
N	CULLINET SOFTWARE INC	14	4	7.00	-0.6	-8.2
O	DUQUESNE SYS INC	28	10	19.00	-1.0	-5.0
A	DATA ARCHITECTS INC	16	7	13.75	0.0	0.0
N	GENERAL MTRS (CL B S)	51	30	42.00	-1.0	-2.3
O	HOGAN SYS INC	16	4	4.25	-0.3	-5.6
O	INFORMIX CORP	31	12	18.50	-1.5	-7.5
O	INTELLICORP INC	11	2	2.75	-0.3	-9.3
O	KEANE INC	16	6	11.50	0.0	0.0
O	LOTUS DEV CORP	45	16	22.25	-0.1	-0.6
O	MANAGEMENT SCI AMER	15	6	8.00	-0.5	-5.9
O	MICRO PRO INTL CORP	6	3	2.88	0.1	2.2
O	MICROSOFT CORP	70	37	56.75	1.0	1.8
O	MORINO ASSOCIATES INC	33	7	16	-0.8	-4.5
O	NATIONAL DATA CORP	34	20	22.88	-0.9	-3.7
O	ON LINE SOFTWARE INTL INC	22	9	8.88	-0.1	-1.4
O	ORACLE SYS CORP	19	8	16.00	0.3	1.8
O	RANSOPHIC SYS INC	28	11	14.38	-0.8	-5.4
O	POLICY MGMT SYS CORP	36	16	23.25	0.5	2.2
O	PROGRAMMING & SYS INC	14	7	11.00	0.3	2.3
O	REYNOLDS & REYNOLDS CO	30	14	18.25	-0.6	-3.3
O	SEI CORP	19	10	17.50	0.3	1.4
O	SHARED MED SYS CORP	30	19	20.75	-1.4	-6.2
O	SAGE SOFTWARE INC.	20	8	8.25	0.0	0.0
O	SOFTWARE PUBG CORP	19	5	17.38	1.5	9.4
A	STERLING SOFTWARE INC	12	6	8.25	-0.6	-7.0
O	SUNGARD DATA SYS INC	20	10	16.75	0.3	1.5
O	SYSTEMATICS INC	28	19	21.50	-0.6	-2.7
N	SYS. SOFT INC.	24	7	15	0.5	3.6
O	VM SOFTWARE INC	31	7	13.00	-0.6	-4.6

Semiconductors

N	ADV MICRO DEVICES INC	25	9	14.25	0.4	2.7
N	ANALOG DEVICES INC	24	8	13.88	-0.2	-1.8
O	ANALOGIC CORP	12	5	6.13	-0.0	-0.3
O	INTEL CORP	42	18	30.38	-0.2	-0.8
N	LSI LOGIC CORP	15	7	10.63	0.1	1.2
N	MOTOROLA INC	74	35	46.63	0.4	0.8
O	NATL SEMICONDUCTOR	22	10	12.88	0.4	3.0
N	TEXAS INSTRS INC	53	36	42.63	-1.1	-2.5
A	WESTERN DIGITAL CORP	25	11	16.00	0.6	4.1

Peripherals

O	ALLOY COMP.	13	3	3.25	-0.3	-7.1
O	AM INTL INC	6	3	3.63	-0.1	-3.3
O	AST RESH INC	21	6	13.00	-1.0	-7.1
O	AUTO TROL TECH COMP	7	3	4.81	-0.2	-3.7
O	BANCTEC INC	16	5	7.88	-0.1	-1.6
O	CIPHER DATA PRODS INC	13	4	8.38	-0.4	-4.3
O	COGNITRONICS CORP	6	2	3.00	-0.6	-17.2
O	COMPUGRAPHIC CORP	28	10	26.38	0.0	0.0
A	DATAPRODUCTS CORP	24	7	9.00	0.0	0.0
A	DATARAM CORP	8	5	7.00	-0.5	-6.7
N	EASTMAN KODAK CO	71	38	41.13	0.3	0.8
O	E M C CORP MASS	28	6	6.63	-0.3	-4.5
O	EMULEX CORP	9	4	7.50	-0.4	-4.8
O	EVANS & SUTHERLAND	25	17	17.25	0.3	1.5
O	ICOT CORP	8	3	3.13	-0.1	-3.8
O	INTERLEAF INC	24	11	15.75	-0.8	-4.5
O	IOMEGA CORP	4	1	2.94	0.2	6.8
O	LEE DATA CORP	6	3	3.38	0.1	2.9
O	MASSTOR SYS CORP	6	1	2.88	0.1	2.3
O	MAXTOR CORP	25	9	12.88	-1.5	-11.4
O	MICROPOLIS CORP	42	13	22.00	-0.8	-3.3
O	MINISCRIBE CORP	18	5	10.88	0.5	4.8
N	MINNESOTA MNG & MFG CO	91	64	88.25	0.0	0.0
A	MSI DATA CORP	19	6	14.00	-1.1	-7.4
O	PERSONAL COMPUTER PRODUCTS INC.	7	4	5.75	0.2	4.2
O	PRIAM CORP	8	1	1.88	0.0	0.0
O	PRINTRONIX INC	13	7	8.38	-0.1	-1.5
O	QMS INC	27	8	10.63	0.2	2.4
O	QUANTUM CORP	24	8	10.13	-0.4	-3.8
O	RAMTEX CORP	6	1	1.38	-0.1	-6.3
O	RECOGNITION EQUIP INC	22	7	7.63	-0.1	-1.6
O	REXON INC	13	5	7.38	0.0	0.0
O	SCAN TRON CORP	17	7	14.00	0.0	0.0
O	SEAGATE TECHNOLOGY	45	10	16.63	-0.1	-0.7
O	STORAGE TECH CORP	9	1	1.63	-0.1	-7.1
O	TAMDON CORP	4	1	2.31	0.0	0.0
O	TEC INC	7	3	4.38	-0.3	-6.4
N	TEKTRONIX INC	41	21	24.88	-0.9	-3.4
O	TELEVIDEO SYS INC	3	1	1.06	-0.2	-15.0
O	TELEX CORP	40	20	20.75	0.0	1.6
O	WYSE TECH	40	11	17.25	-2.0	-10.4
N	XEROX CORP	65	50	51.50	-0.6	-1.2
O	XIDEX CORP	15	6	5.88	-0.4	-7.0

Leasing Companies

O	CAPITAL ASSOCIATED INTER-NATIONAL INC	11	4	4.75	0.4	9.5
N	COMDISCO INC	27	12	20.50	1.1	5.7
O	CONTINENTAL INFO SYS	14	6	6.75	0.1	1.5
O	PHOENIX AMERN INC	6	2	3.00	0.0	0.0
O	SELECTERM INC	6	3	5.00	0.0	0.0

EXCH: N—NEW YORK; A—AMERICAN; O—NATIONAL; O—OVER-THE-COUNTER; S—SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Make a wish

Deficit trim no help to HP, Cray as inflation fear takes course

Wall Street learned an old lesson last week: Be careful what you wish for, because you may get it. Investors translated a reduced trade deficit into the promise of higher inflation rates and sent the Dow Jones industrial average into a 56-point mid-week plunge that took several computer issues with it.

Hewlett-Packard Co. felt the pinch from analysts' fears that margins and domestic orders were off, falling 6 points from a week earlier to finish Thursday at 56½. Supercomputer maker Cray Research, Inc. was dealt a double whammy; Shearson Lehman Hutton, Inc. cut Cray's earnings estimates and investment rating, while IBM announced plans to develop a supercomputer. Cray's stock fell 5¾ points to 76¼ late in the week.

In other action, Compaq Computer Corp. lost 2¾ points to 49¼, Amdahl Corp. slid 2½ points to 44½, NCR Corp. dropped 1½ points to 59, Ashton-Tate Corp. retreated 1¼ points to 39¼, Apple Computer, Inc. dipped 1¼ points to 39¼, Stratus Computer, Inc. fell 1 point to 27¾ and Digital Equipment Corp. lost ⅛ of a point to 102⅛. The few gainers included 3Com Corp., up ⅜ of a point to 20⅛, and IBM, up ⅛ to 110½.

JAMES DALY

IBM turning screws on cloners

Retroactive patent tariff seen as tool forcing PS/2 copiers to toe the line

BY DOUGLAS BARNEY, ALAN J. RYAN and ED SCANNELL
CW STAFF

IBM's threat to collect retroactive royalties from firms that have for years copied its Personal Computer line is broadly viewed as a way of controlling and limiting the cloning of its newer Personal System/2 series.

The disclosure, which IBM confirmed last week, cast a pall over a user base that has become accustomed to an industry marked by intense competition and ever-falling prices. If IBM is serious about collecting 1% to 5% royalties on sales of copies of its older and out-of-production PC line, today's plethora of cloners may be radically diminished.

Although IBM is initially targeting firms that approach it for PS/2 licenses, it has also left the door open to go after the entire clone market for patent infringement.

Shooting own foot?

But the biggest threat is to PS/2 clones and the IBM PS/2 itself. Users have said all along that they will not completely accept the PS/2 line until there are clones available in that market as well. While IBM is apparently encouraging the competition, the company could use back royalties to hand-pick its competitors.

For IBM, the rules of the game are simple. "We will not sign new PS/2 licensing agreements with companies that refuse to recognize the past liabilities for previous-generation machines," IBM spokesman Jim Monahan explained. IBM is offering to cloners that sign up a 1% royalty rate on all PC sales prior to April 1, 1988. "That is through the end of this year," warned Monahan, who added that after April, royalties could go as high as 5%.

He said the threat from IBM is not new, however. "IBM all along has been pursuing manufacturers whose compatibles use IBM's patents and haven't licensed those patents."

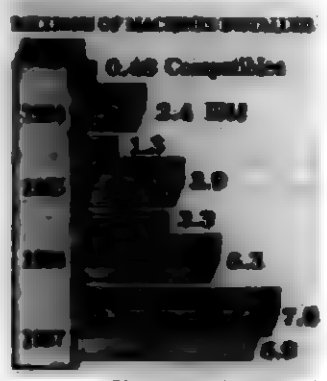
Despite the threat, few users or analysts have a firm handle on exactly what IBM intends to do. It is clear, however, that the royalties are an extension of IBM's long-term goal of increased market control.

"They are trying to make the cost of entry [into the PS/2 market] very significant. In effect, they have control over who gets in," argued Bruce Stephens, a PC analyst with International Data Corp., a Framingham, Mass., market research firm.

Whatever the possibilities, few expect the result to be pretty, with higher prices on clones and potential catastrophe for smaller cloners. "It will make it harder for people to develop cheap clones. We would expect the cheaper alternatives to disappear," said Dave Karney, vice-president of MIS at Southland Corp.

Money in the bank?

The PC-compatible industry — target of IBM's patent fee demands — has surpassed IBM in installed base



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

Art Skopec, a senior PC analyst at Memorial Sloan-Kettering Cancer Center in New York, concurred. "They're trying to kill the clone and make money on it," he said.

The issue of prior patents arose with the influx of clone vendors that have approached IBM in search of PS/2 patents. The situation was capped by the near simultaneous announcements by the Texas twosome, Dell Computer Corp. and Tandy Corp., of PS/2 clones late last month.

In fact, some larger firms are more fortunate and are able to work out cross-licensing agreements with IBM because they have technology that IBM may be interested in. Tandy has had such a cross-licensing deal for eight to 10 years, according to Ed Juge, director of market planning at Tandy.

In its first-quarter report to users, which will be released this week, Compaq Computer Corp. President Rod Canion says his firm is now negotiating a cross-licensing agreement with IBM on patents.

"While the outcome of the negotiations is uncertain, the company is accruing for net payments in the costs of negotiating the licensing agreement with IBM," Canion writes.

IBM may be entering dangerous waters, with a user backlash possible if the firm presses its cases too aggressively. "If anything, their attempt to hurt their competitors who are producing good quality equipment would make me look at IBM twice," Memorial Sloan-Kettering's Skopec said.

For some, increased prices on clones would bring about more dramatic results. "If it were to increase the price too much, we would look into building our own PCs," said Matthew Meldon, micro manager at the Claridge Casino Hotel in Atlantic City. So far, most organizations that are building PCs for internal use are educational institutions.

Others said the absence of the low-cost clones in the PS/2 marketplace would not have been surprising even without the royalty announcements from IBM. "You wonder why those folks would want to build PS/2 compatibles anyway. If their marketplace is a $500 PC, why build [IBM's Micro Channel architecture] anyway, the benefit of which is supposed to be for corporate environments?" said Thomas O'Leary, director of MIS at North American Philips Corp. in New York.

Pure timing was one of the most intriguing aspects of the disclosure from IBM. "They waited to do this 'You are going to pay for your past sins announcement' until they had Micro Channel established as a true standard" said Andrew M. Seybold, publisher of "Andrew Seybold's Outlook on Professional Computing."

At sea

The clone vendors seemed as confused as anybody. "We are still trying to understand IBM's licensing and patents position for future products. We have not discussed any retroactive payments with IBM," said Glen Nelson, a spokesman for Zenith Data Systems. According to Nelson, Zenith has yet to sign any licensing agreements covering any of IBM's PC products.

In addition to market risks, experts cautioned that IBM is taking certain legal risks with its royalty strategy. "If they really want to drive the low-cost clone makers out of business, they could ask for a higher royalty" or could simply reject the offer, according to Steve Kahn, a patent attorney wth Davis Hoxie Faithfull & Hapgood in New York.

In what is perhaps the most unusual and shocking possibility, IBM has the right, if its patent claims ring true, to sue *users* of infringing microcomputers. "Theoretically, any of us who have a clone on our desks could get sued by IBM and enjoined from using," Kahn said. While it is an interesting theoretical point, none of the many lawyers interviewed last week deemed it a practical possibility.

IBM DBMS

FROM PAGE 1

The first phase of IBM's distributed data base, therefore, is expected to include compatible SQL for the two data base managers, which would allow a user to draft a query and run it against both DB2 under IBM's MVS operating system and SQL/DS under the firm's VM or DOS/VSE, according to a West Coast source knowledgeable of IBM's work in its Santa Teresa, Calif., development lab.

Pleasant surprise

IBM officials acknowledged that they have been surprised by customer interest in distributed data base. At a Washington, D.C., conference last year, Norris van den Berg, IBM's director of advanced data base products, said his colleagues were impressed with a survey showing that DB2 customers were nearly as concerned about distributed capability as about referential integrity. He said the issue had popped up as an unanticipated customer demand during the previous year.

The distributed data base announcement is expected to come close to the time that OS/2 Extended Edition, IBM's Personal System/2 operating system with a data base manager built in to it, goes into delivery in July. The SQL-based DBMS will be given a tie to the mainframe DBMS as part of IBM's overall strategy, said Richard Finkelstein, president of Performance Computing, a relational data base consulting firm in Chicago.

Other sources pointed out that IBM already has Host Data Base View software and Enhanced Connectivity Facility for linking PCs into mainframe environments, but ties to the data base managers have yet to be announced.

IBM's existing Distributed Data Management is expected to serve as the temporary receptacle and translator for data in transit between operating systems in an IBM distributed scheme, noted Paul Hessinger, vice-president of Computer Task Group, Inc. in Buffalo, N.Y.

In addition to continuing its success with DB2 and SQL/DS along broader lines, IBM wants to launch distributed data base products in the same time frame as Oracle Corp. Oracle is scheduled to announce its Transaction Processing System with limited distributed capability June 12, said Anthony Deakins, vice-president of Asuco Consulting in Orlando, Fla.

Industry sources said the distributed product set is expected to unfold over a three-year period and feature the following:

- In phase one, an "atomic," or single-user, SQL query will be executed by a single remote data base server, with no echoing or recovery features — an approach that is "not really usable for production purposes," said George Schussel, president of Digital Consulting, Inc. in Andover, Mass.
- In phase two, an SQL query will be launched against multiple remote data bases and will receive data without the user knowing where the data was located. Multisite updates will still be off-limits.
- In phase three, multiple-user SQL queries will find their way through the network to many DBMSs. A two-phase commit procedure will permit remote updates to the data base with minimal danger of data integrity loss due to system failure. The ability to execute updates will be tied to security procedures, observers said.

Referential integrity for SQL/DS, another step toward allowing it to catch up with DB2, is expected to be announced along with the distributed capability, the West Coast observer said.

DB2 users pointed out that IBM's Data Extract Facility, which allows SQL queries to retrieve data from both IMS and DB2 relational data bases and deal with it as a relational set, along with LU6.2 program-to-program communications, are likely to be major components of a distributed DB2 system.

In addition, IBM's TSAF is expected to serve as an avenue for attaching users to SQL/DS, said Joseph D. Jackson, a DB2 manager at Amoco Corp. in Chicago.

Silverlake too?

Industry sources said there is also a possibility that IBM will unveil an SQL-based relational system for its unannounced mid-range machine, code-named Silverlake.

Several users, however, expressed surprise that IBM would come out with distributed data base components on the heels of its April 19 DB2 Version 2 announcement.

Distributed data base "is an area where I haven't seen IBM show a lot of leadership. We would be most pleasantly surprised if IBM was able to say how it plans to manage distribution issues," said the MIS director of a New York-based user of DB2 and IBM Personal Computers.

A participant in the Society for Information Management chapter in northern New Jersey who requested anonymity said he and several other representatives of Fortune 500 firms spend much of their time talking about the issues of distributed data management. "If we're typical, perhaps a quarter of the industry has dug in and begun dealing with distributed issues," he said.

The announcement, if it materializes, will be the result of work by Juan Dash, IBM's director of distributed data base strategy, and van den Berg.

ICA show tall on boasts

Multiplexers lead parade, but details are scant

BY KATHY CHIN LEONG
CW STAFF

ANAHEIM, Calif. — At last week's International Communications Association (ICA) conference, communications managers found T1 multiplexers, Bob Hope, network management products and Rosemary Clooney all under the same roof.

Though promises of multivendor connectivity were pervasive, many vendors announcing products were unable to provide pricing and delivery dates.

T1 multiplexers, from the very large to the small, led the product parade. Boasting that it has the largest entry on the market, Newbridge Networks, Inc. in Herndon, Va., unveiled 3645L Mainstreet, a T1 multiplexer that can handle up to 256 T1 circuits. According to product manager Brian NeSmith, the multiplexer consists of eight of Newbridge's smallest 3645S Mainstreet nodes joined in one unit.

For Avanti Communications Corp. in Newport, R.I., smaller means better. The company unveiled the ONX 3000, a T1 multiplexer that can handle up to 24 voice and data channels. Although designed for a small network of about four nodes, the device is compatible with the larger T1 multiplexer, ONX 5000.

During the next few years, an emerging fad among data communications equipment vendors will be to offer custom network planning services.

High-end T1 multiplexer maker Network Equipment Technology, Inc. (NET) in Redwood City, Calif., said it will offer a Unix-based Network Design and Analysis System that will create a network topology for users, forecast network growth and analyse node or line failures. The service, due out by September, will be offered throughout the company's regional offices.

As expected, NET competitor Timeplex, Inc. in Woodcliff Lake, N.J., demonstrated Link/Design, a similar network design tool. Timeplex officials said the product will give users a variety of what-if scenarios to determine the solution that would make the most sense.

High priority

For many users, high on the wish list at ICA were network management products. Among the vendors demonstrating product-specific management systems, MCI Communications Corp. and Tymnet, McDonnell Douglas Network Systems Co. both introduced network management products that will support IBM's Netview environment.

MCI President Bert Roberts Jr. said the company will bring Integrated Network Management Services (INMS) to the market to allow users to monitor, analyze and control their MCI lines remotely. INMS will be phased in during an 18-month period.

INMS will help users track both voice and data services, Roberts stressed. An IBM Personal System/2 Model 80 serves as the user workstation that allows customers to view the MCI INMS host computer.

Seven charged in $70 million wire fraud

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — FBI agents two weeks ago arrested seven people in Chicago and Detroit, charging them with wire fraud in connection with a Friday the 13th electronic bank heist that diverted nearly $70 million in deposits at the First National Bank of Chicago to Vienna.

The plot was foiled Monday when executives at United Airlines and Merrill Lynch & Co. refused to sign off on separate transfers from their First Chicago corporate accounts. Both of the transfers showed up as overdrafts of more than $24 million.

Two of those arrested, Otis Wilson, 30, and Gabriel Taylor, 27, both of Chicago, were employees at First Chicago, said Federal Bureau of Investigations spokesman Bob Long. Taylor was said to be one of two employees who operated the bank's international wire transfer system; Wilson worked in the cash disbursement department. Both Wilson and Taylor earned less than $20,000 a year.

Impersonations

The other five people were arrested for allegedly planning the attempted theft and for impersonating bank executives granting verbal approval. The arrests were based on tape recordings of false verbal authorizations allegedly given by the suspects.

Ironically, verbal authorization has long been used as a check on wire transfer security, said Donn Parker, senior management consultant at SRI International in Menlo Park, Calif. "Fifteen to 20 years ago, bankers were able to verify each other's identities over the phone," Parker explained. "Now, these same bankers sit in their offices as managers of 30 funds-transfer clerks who are capable of zapping billions of dollars around the world."

About $49 million was transferred from First Chicago to Citibank NA in New York, which is a correspondent for Creditanstalt, an Austrian bank. The money, $25 million from the United Airlines account and $24 million from the Merrill Lynch account, was returned last week after having been deposited in Vienna.

Another $19.8 million had been transferred from the First Chicago account of Brown-Forman Corp. in Louisville, Ky., and sent to Vienna's Focobank through Chase Manhattan Bank NA in New York.

Had the theft been successful, according to the FBI, the money would have been moved out of the international bank system and converted into some form of cash or goods, such as diamonds.

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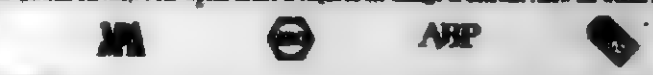

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Illinois phone effort puts data links last

BY JEAN S. BOZMAN
CW STAFF

As the western suburbs of Chicago struggled through their second week of telephone-service disruption caused by a switching-station fire, large corporations scrambled to regain control of their telecommunications networks.

Illinois Bell continued to repair its damaged Hinsdale, Ill., switching station, where a May 8 fire destroyed 118,000 long-distance lines and 30,000 data lines and damaged 35,000 local voice lines (CW, May 16). But corporate users complained that the work was progressing too slowly to save them from costly disruptions of their computer-to-computer links.

A team of 200 workers from AT&T, Ameritech and Illinois Bell has been working around the clock since May 11 to install a new switch. Moving at a pace of 7,000 lines a day, Illinois Bell revised its projection for resumption of voice and data service from June 15 to June 1.

Even that improvement was little comfort to users who have been unable to establish IBM Systems Network Architecture connections since the fire. "People from Illinois Bell came around and asked us what we would like to see restored first," said Greg Pinkowski, VTAM systems manager at J. I. Case, a Tenneco, Inc. subsidiary that manufactures farming and construction vehicles.

"Our priority was to get the T1 line up so we could reconnect our IBM 3090 with the IBM 3090s at company headquarters in Racine, Wis.," Pinkowski said. "Now, it looks like the T1 line will be the last thing to come back up."

Meanwhile, Pinkowski is considering the purchase of several 9.6K bit/sec. modems that would send mainframe data over the three long-distance lines so far restored between Case offices in Chicago and Racine.

One at a time

Illinois Bell spokesman Tim Bannon explained that dedicated data lines, such as Case's T1 line, were being connected after local and long-distance voice lines. "Our priority was to re-establish emergency services, including police and fire departments," Bannon said. By last Monday, most long-distance lines routed through the Hinsdale gateway had been reconnected.

In many cases, Illinois Bell said, the reconnection order was based on the availability of electrical contacts on the damaged 1A ESS analog switch. "When we could find a block of good numbers, we restored them," Bannon said. "By next week, we'll have 21,000 of the 35,000 voice lines on a new switch."

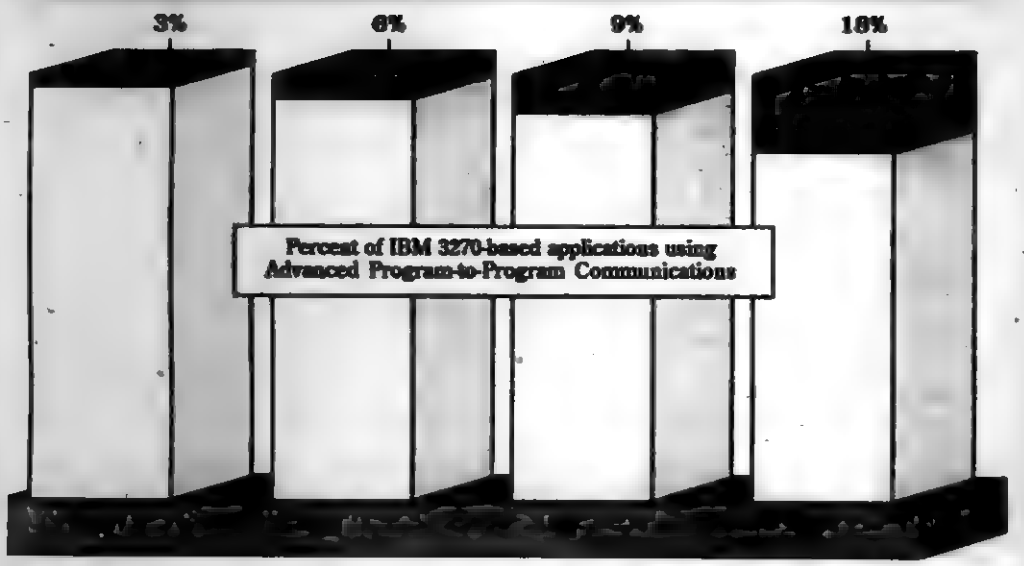
However, unreliable quality and difficulty in establishing long-distance links continued to create large-scale computer disasters throughout the Chicago area. Many sites with reconnected lines reported having to try long-distance numbers several times before connecting. Among the major computer disruptions in the area were the following:

- Three corporations — United Stationers, Inc., A.M. Castle & Co., a metal-parts distributor, and the Jewel Companies, Inc. supermarket chain — were operating out of Comdisco, Inc.'s disaster recovery services hot sites. With all three Comdisco hot sites in Chicago filled, United Stationers was forced to resume operations from Comdisco's Carlstadt, N.J., hot site.
- Comdisco's disaster recovery services was at first unable to provide telecommunications support from its Wood Dale, Ill., hot site, AT&T said. AT&T Network Services sent 20 technicians to establish a link between an AT&T System 85 switch at the isolated hot site and another System 85 at Comdisco headquarters in Rosemont, Ill.
- Eli Lilly and Co., an Indianapolis pharmaceuticals firm, was unable to route its data traffic to a Lisle, Ill., earth station for satellite transmission to a data processing center in Puerto Rico. Early last week, AT&T trucked a spare earth station overnight to Indianapolis to make the direct transmission to Puerto Rico possible.
- Dominicks Finer Foods, Inc., another Chicago-based supermarket chain, was unable to connect remote terminals at 43 of its 89 stores to host computers in Northlake, Ill. "They couldn't order any Cheerios," said Dennis Farley, manager of DP at Dominicks, "and we couldn't tell them the price of Cheerios." Cellular phones re-established voice communications, but 20 stores were cut off from host computers until last Thursday.
- MCI Communications Corp. dispatched portable microwave dishes to large end-user organizations isolated from Illinois Bell's local telephone network by the fire. Among those patched into MCI's national phone network were the Chicago offices of Dun & Bradstreet Corp., Prime Computer, Inc., the Hartford Insurance Group, Nalco Chemical Co. and Bekins Van Lines Co.

TRENDS

Systems Network Architecture

APPC catches attention, but older environments hold sway



Despite all the pomp and circumstance surrounding the ISO's Open Systems Interconnect (OSI) model, it is still an SNA world.

Estimates on the installed base of IBM's Systems Network Architecture (SNA) range as high as 70% of corporate networks. And though some of these sites will migrate to OSI, they will not do so overnight.

The staying power of 14-year-old SNA extends even to older forms of the technology, according to the International Technology Group, a Los Altos, Calif.-based consulting and research firm.

IBM has spent the last year evangelizing the virtues of Advanced Program-to-Program Communications (APPC), also known as LU6.2, to users and developers alike. APPC is a key component of IBM's plans for top-to-bottom connectivity.

Although APPC-based applications have grown steadily since the protocol's 1985 introduction, they continue to trail as a percentage of the entrenched IBM 3270, or LU2, environment, according to International Technology Group.

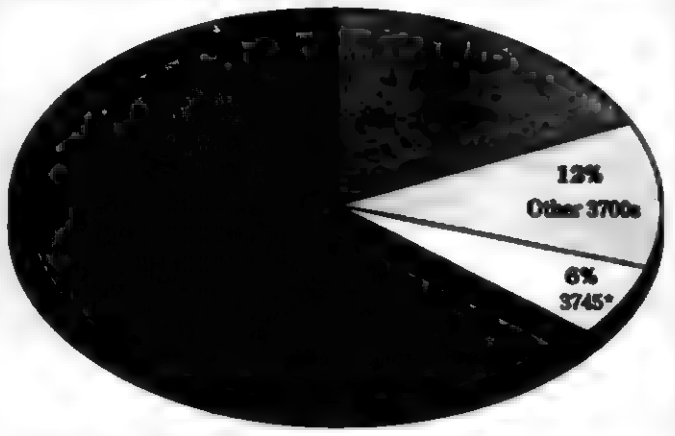
Also hanging tough are the older IBM controllers. While the 3725 maintains a grip on 64% of the installed base, International Technology Group predicts IBM's newest addition, the 3745, will slowly begin to eat away at that market share.

More recently, IBM continues to lead in turnkey network management systems, securing a 21% market segment in 1987 due in large part to sales of its Netview product family.

PATRICIA KEEFE

Tiny now, 3745 share will eat at 3725's

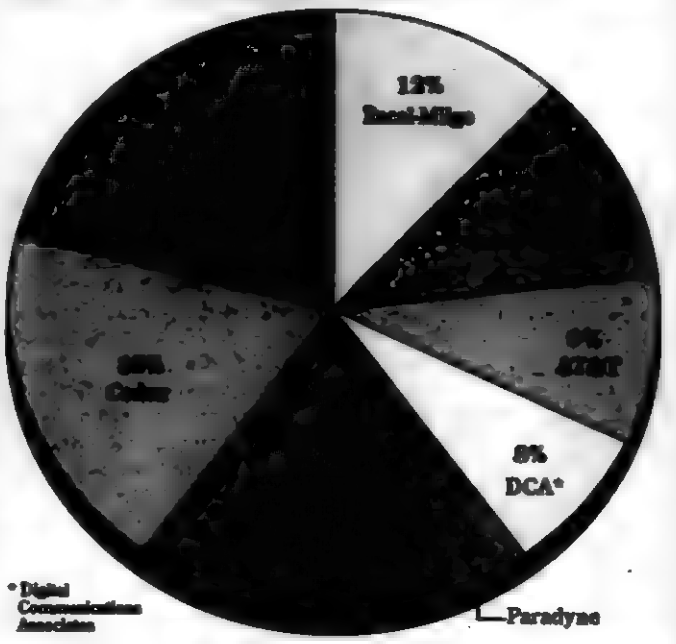
PERCENT WORLDWIDE INSTALLED BASE OF IBM 3700 CONTROLLERS



* Based on orders placed before May 1, 1988

IBM keeps lead in network

PERCENT U.S. MARKET SHARE BY INSTALLED BASE



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CW CHARTS

INSIDE LINES

Here's Microsoft's sequel. The much-anticipated single-user data base program is looming for a summer announcement, with shipping scheduled for the first half of 1989. Developers at Microsoft are tightly focused on the emerging OS/2 relational data base management system market, according to sources familiar with the development effort. Microsoft will use a version of its Basic language tool as the data base programming language at the heart of the front-end program. With SQL hooks embedded in the language, the data base will have an SQL implementation and use SQL Server as the back-end SQL engine needed to drive the program, sources said. That could spark a firefight with Ashton-Tate, which has a stake in SQL Server and apparently has a noncompete deal with Microsoft in certain data base workstation markets.

Speaking of Ashton-Tate, guess what? At its annual shareholders' meeting this week, Ashton-Tate is expected to sidestep the July 31 deadline for Dbase IV's shipment because of development delays, sources close to the company said. The Taters are expected to announce they will meet the July deadline by shipping a bare-bones 1.0 version of the product that will be missing an all-important SQL implementation. The SQL version will reportedly appear as a 1.1 release that will ship sometime in the fourth quarter.

Crash hits home. MIS executives are feeling the effects of the Oct. 19 stock market crash in their wallets, according to a salary survey by compensation specialists Edward Perlin Associates in New York. The survey shows that the crash and intensified competition among companies caused average salary increases to drop from 7.9% in 1987 to 3.6% this year.

Server you right. Oracle's data base server for Intel chip-based micros is a little late, but it still beats the top three micro firms, which all promise servers, to market. Dubbed LAN Server Oracle, the product runs under Xenix and recently began shipping to some key accounts, such as Chrysler, which is using the product to manage engine and building parts inventories. For those awaiting the firm's OS/2 version, it reportedly will ship this summer.

Huddling in the Hub. Representatives from most of the major hardware users groups will be meeting today in Boston to discuss common interests and a possible plan to launch a coalition. Attendees will include a representative from Guide International, the IBM large systems users group, as well as users of hardware from Honeywell, Xerox, NCR, Wang and Data General.

DEC didn't have it this time. Behind the happy faces at the recent unveiling of a joint networking design and support venture between HP and Northern Telecom lurked the ornery shadow of DEC. HP wasn't exactly Northern Telecom's first choice, one pundit said. He reported that the private branch exchange maker "worked real hard to do this with DEC" but was not able to reach an agreement.

Playing it loose in Rio. ADAPSO, the software trade association, is not too thrilled with Brazil's new regulations on imported software. The rules were supposed to curb Brazil's protectionist policy of blocking software imports and thus avert U.S. trade sanctions. But Ron Palenski, ADAPSO's general counsel, said that at first glance, the regulations appear "looney-goosey . . . they still have a lot of room for mischief."

Dubious distinction of the week award goes to Computer Consoles, which last week jumped uninvited on the Open Software Foundation bandwagon by announcing that its Officepower software will run under the OSF operating system. Of course, that operating system is not scheduled to be available for at least 18 months and is to be based on an as-yet-unreleased version of IBM's AIX. So unless IBM is giving Computer Consoles the inside track, we'll put that announcement in the "tell us another one" category. If you're clued in to the future of AIX, call into the CW hot line at 800-343-6474 or 617-879-0700 and tip off News Editor Pete Bartolik.

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COMPUTERWORLD

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Plot twist in 9370 story

Mini finds unexpected fans in stand-alone role

BY STANLEY GIBSON
and ROSEMARY HAMILTON
CW STAFF

IBM's 9370, having stumbled in its charge against Digital Equipment Corp.'s VAX mid-range series, is taking on an identity different from that originally planned by IBM.

Conceived as a corporate departmental processor in accounts with IBM 370-architecture mainframes, the 9370 appears to be having more success as a stand-alone host system for smaller business users. Even IBM has admitted surprise at the uses to which the slow-selling processor has been put.

"There are areas of business opportunity we would not have anticipated in October 1986, when we announced the 9370," said J. F. Skeen, IBM's director of 9370 marketing. Among them are new applications for computer-aided design and manufacturing as well as Pick Systems' Pick and MUMPS, both operating systems.

Although Skeen stopped short of revealing actual numbers of shipped or installed machines, he said 40% of the installed 9370s were the first computers ever installed at those sites.

"We weren't looking for a 9370 but for something to run CAD," said Steve Weage, marketing manager at Buckeye Custom Products in Troy, Mich.

Support costs for an IBM 4341 would have been beyond his small firm's budget, Weage said. The company is currently running two IBM 5080

Continued on page 8

9370 finds its niche

Contrary to its projected function as a distributed system, IBM's 9370 often surfaces in a centralized role

Centralized

- Parts design at a Michigan automotive supplier
- Electronic mail at a New York business school
- File server for Toronto reporters using IBM Personal System/2s
- Automated teller machine hub at a Virginia savings bank
- Bridge and highway design at a Missouri agency

Distributed

- Field operations and support for the U.S. Postal Service

CW CHART

Pressure mounts as Dbase wait goes on

BY STEPHEN JONES
CW STAFF

TORRANCE, Calif. — Users of Ashton-Tate Corp.'s Dbase who thought their 2½-year wait for a souped-up data base management system was about to end found out last week that the upgrade waiting game is going into extra innings.

Ashton-Tate said Dbase IV Version 1.0, which is considered to be the cornerstone of the company's future, could ship as much as two months later than its original July 31 target date.

A holdup of Dbase IV 1.0 could also delay the release of Version 1.1, which includes a critical SQL implementation that links the program to the upcoming SQL Server being developed by Microsoft Corp. and Sybase, Inc. Observers said Version 1.1 will take a minimum of six extra months to develop once Dbase

Continued on page 6

"We will stop short of a product announcement until we're ready to ship it. . . . All you're doing is telling the consumer to hold off for a product that isn't available."
ED ESBER, CHAIRMAN, ASHTON-TATE, OCTOBER 1987

"Project timetables are estimates [and] subject to some variability."
LUTHER NORDHAUS, PRESIDENT, ASHTON-TATE, LAST WEEK

Patenting the MIS strategic edge

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Leading firms in the financial services industry are arming themselves with an unusual new weapon in the battle to gain competitive advantage with their information systems. Just as computer vendors have protected hardware technologies by patenting proprietary developments, these computer users are discovering that a U.S. patent can prevent their competitors from using the same automated process for 17 years.

For example, The Advest Group, Inc., a Hartford, Conn.-based financial services firm, obtained a patent last year for an MIS system called Bank Link, which moves money from investors' bank accounts to make stock transactions. U.S. Patent No. 4,694,397 calls it the "Banking/Brokerage Computer Interface System."

Advest Group Vice-President and Director of MIS John Reynolds said the firm sought the patent to protect its competitive advantage. "We use it every day, and we certainly would not want it patented by anybody else and lock our-

Continued on page 10

End of the line for high-tech whiz

BY NELL MARGOLIS
CW STAFF

Last month, 24-year-old computer entrepreneur Tex Zachary Hildreth told a reporter that he never read fiction. Last week, it appeared that he may have been living it instead, as a bizarre series of events unfolding in a three-day period left his 5-year-old company in ruins and Hildreth hospitalized following an apparent suicide attempt.

Hildreth, the founder and chief executive officer of Braintree, Mass.-based Masadata Corp., apparently fled across the state line last Tuesday after, in quick succession, a bank foreclosed on Masadata, a warrant went out for Hildreth's arrest on felony larceny charges and Hildreth collapsed in his office. He and his mother, Rose, were picked up by Manchester, N.H., police at a Manchester motel, after both apparently tried to take their lives.

The week's events, said R. Charles Gilfix, president of a networking services company that was involved in Masadata's first joint venture, left most Masadata employees shocked and bitter. A large percent of Masadata employees, Gilfix said, were also Masadata stockholders.

It now appears that Hildreth's lavish personal and business lifestyle was funded not by booming revenue and personal wealth, as he claimed, but by the funds that employees and outsiders advanced to him in exchange for stock.

"Tex lied to [his employees] about the company, he lied about money, and they're all angry as hell," Gilfix said. "Especially the ones who are owed money by Tex — and there's a lot of money owed."

Ultimate revenge

Self-described on many occasions as formerly a fat and lonely high school computer jockey who regarded entrepreneurial success as the ultimate *Revenge of the Nerds*, Hildreth was variously referred to by business acquaintances last week as "charismatic to the point of being hypnotic," "a computer whiz kid" and "a genuine wacko." He founded Masadata while still

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"Assuming it will lower the price points for systems built around it, [the P9] basically blows the 8086 market away and pushes the 80286 market down to sub-$1,000."

MICHAEL GOULDE
CAP INTERNATIONAL, INC.

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1-2-3 peekaboo

Users view 1-2-3/G, Lotus/DBMS demos

BY DOUGLAS BARNEY
CW STAFF

BOSTON — Despite a veil of secrecy that continued to shroud many products announced a year ago, Lotus Development Corp. provided selective eatly peeks at two key programs, 1-2-3/G and Lotus/DBMS, to some of the hundreds of customers attending the firm's annual user gathering last week.

Users who saw demos of 1-2-3/G described a product that, by following the dictates of Microsoft Corp.'s OS/2 Presentation Manager interface, looked remarkably like Microsoft's Excel.

Lotus, however, pledges to maintain the familiar look and feel of 1-2-3 while moving 1-2-3/G into the new graphical user interface environment, company officials have said.

Lotus has given no time frame for a 1-2-3/G shipment. The product is, to a large extent, held hostage by the schedule for the Presentation Manager, which will not ship until late this year.

Sneak peek

Lotus also gave some users an early look at Lotus/DBMS, the server-based product that includes an array of graphical tools for ad hoc queries, application development, screen painting and report generation.

Also based on the Presentation Manager, the front ends provide query capability via pull-down menus as well as application development and more complex queries via a graphical front end to the Lotus Extended Application Facility (LEAF), a high-level language specific to Lotus products that is set to ship later this year.

The graphical front end to LEAF was described by one user as object-oriented. "You are treating things as an object, as opposed to individual components," the user said. The front ends will also eventually mix elements of hypertext and hypermedia. "You can take advantage of powerful graphics and hypertext- and hypermedia-type facilities, such as blending pictures with text," he said.

The hypertext approach was recently popularized by Apple Computer, Inc.'s Hypercard, which links pieces of data via a number of relationships and includes graphical representations of items relevant to the data.

But as with 1-2-3/G and several other products, Lotus has provided no delivery dates for Lotus/DBMS.

This year's Lotus Week was a bit marred by the delay of 1-2-3 Release 3.0, which the firm had hoped to ship just prior to the event. At the opening speech, Lotus President Jim P. Manzi "confessed" that the firm had hoped to have shipped Release 3.0 by now.

'Check is in the E-mail'

"I'm sure there are some who think this is the software industry's version of 'the check is in the E-mail,' " Manzi quipped.

But Manzi argued that Release 3.0, which he called a megarelease, was worth the wait. The product, which is supposed to include improved graphics, three-dimensional and linked spreadsheets and will eliminate a lot of awkward procedures that characterize today's 1-2-3, also has a higher purpose.

Lotus's Manzi

"We intend to maintain our advantage by providing a level of compatibility across systems between not just character-based products and graphical-based products, but across multiple platforms on Unix workstations, the Macintosh, and mainframes," Manzi said. Release 3.0 is the starting point of this strategy, Lotus officials have said.

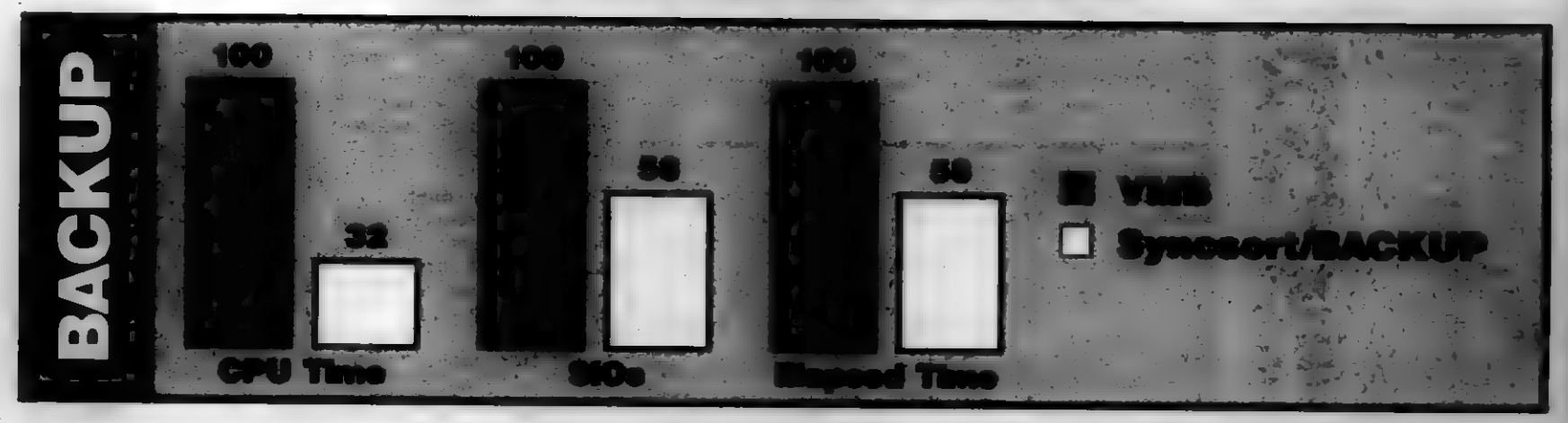
Despite the delay of Release 3.0 to the end of this year, the product was clearly the center of attention. Most users, in fact, preferred not to worry about products such as Lotus/DBMS, which are not expected to ship until next year.

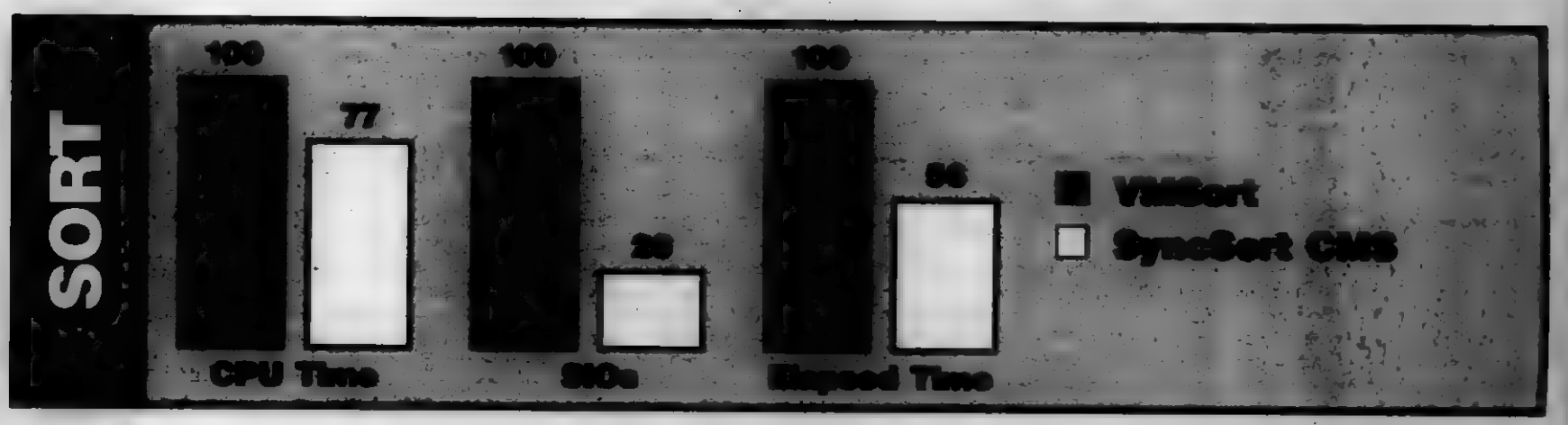
Release 3.0 moves one step up the networking power curve, according to Robert Perry, associate product marketing manager at Lotus's personal computer spreadsheet division. One key feature allows users to determine the type of file recalled. Users can call up a read-only file that can be modified, but is stored under another file name.

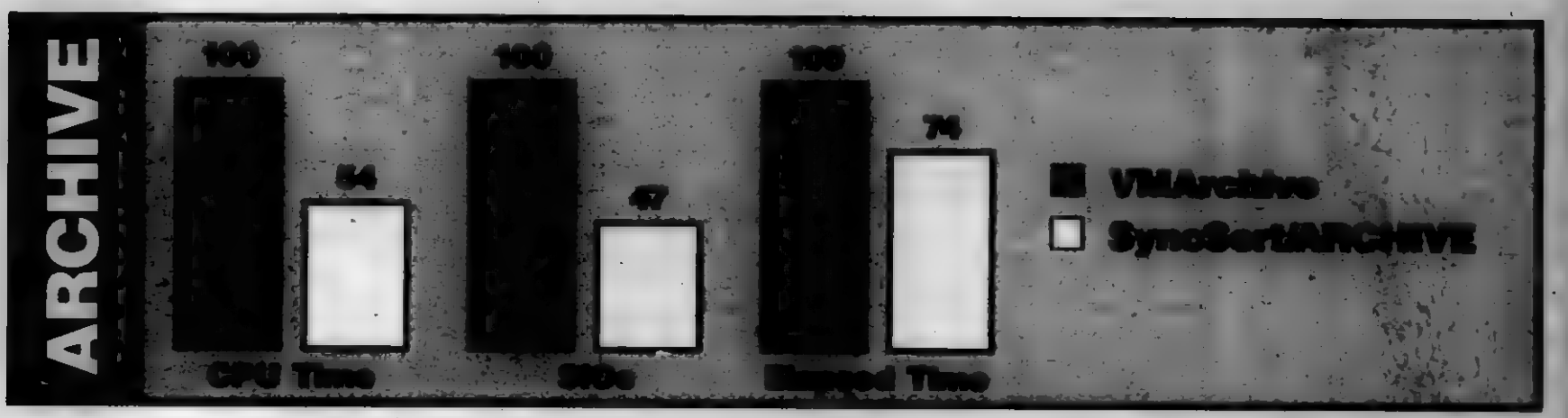
There are still nagging questions about the Release 3.0 networking strategy, issues made more complex by the fact that the product will run under both Microsoft's MS-DOS and OS/2.

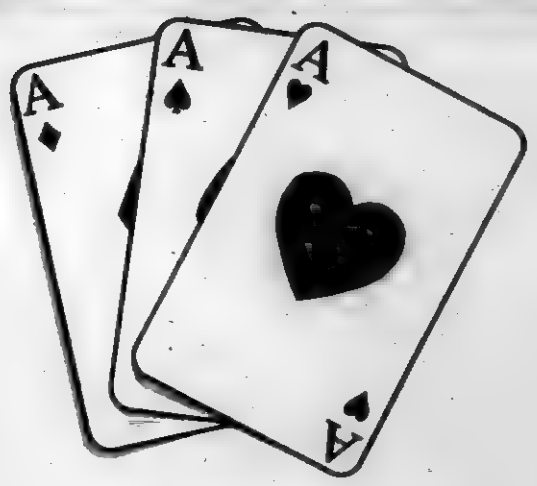
Specifically, Lotus has yet to lay out which OS/2 networking operating systems Release 3.0 will support.

VM PERFORMANCE FROM SYNCSORT









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DB2 sparks demand for 4GLs

BY CHARLES BABCOCK
CW STAFF

Fourth-generation languages, lately viewed as growing long in the tooth, are getting a mid-life kicker through their ability to work with IBM's DB2.

From Information Builders, Inc.'s Focus and On-Line Software International, Inc.'s Ramis to Applied Data Research, Inc.'s Ideal, Software AG of North America's Natural 2, Must Software International's Nomad2 and others, the fourth-generation languages are showing amazing agility and grace for their age. What were once candidates for the old folks' home are now runners on the relational fast track, accessing data in a variety of files and performing technical feats, such as outer joins, that cannot otherwise be done with DB2.

"A key strategic factor for Focus is its ability to access not only DB2 tables but also [IBM's] IMS, VSAM and sequential files," said Terry Mason, data base specialist with the Bank of Montreal and a supervisor of Focus use with DB2.

'A strong card'

That multiple access capability, along with their standard development framework, "is going to be a strong card" for the fourth-generation languages, noted Ed Acley, market researcher with International Data Corp. in Framingham, Mass.

It is difficult to say by how much the fourth-generation languages are being helped by DB2. The languages are entrenched in 19% of the mainframe sites in the U.S. Figures from Focus Research Systems, Inc. indicate that 3.3% growth is anticipated in 1988, based on user-buying plans — a reversal from the last six months, which had seen declining sales for several of them.

Many observers attributed the reversal exclusively to the follow-on demand created by DB2. "Everything that works with DB2 is going to be carried along with it," predicted Jim Russo, marketing manager at Focus Research. Although, he added, some of the new sales may be related to increasing fourth-generation language use on the Digital Equipment Corp. VAX.

Some 60% to 70% of new Nomad2 sales go into sites with relational data base management systems such as DB2, IBM's SQL/DS and Teradata Corp.'s data base machines, said Nicholas Rawlings, vice-president of research and development at Must Software International in Norwalk, Conn.

The fourth-generation languages have been rapidly enhanced over the last 12 to 18 months to perform new functions with DB2. Some users have found they cannot get the same capability elsewhere.

The ability of Ideal to supply both dynamic and static SQL in an application, along with change control over its development, makes the language highly useful with DB2, said Philip J. Gray, manager of systems services at Datasolve in Sunbury, England.

"Static SQL was one of the things that impressed our technical people. No other product has that," said Bob Harrison, product marketing manager for Datacrown Corp., a Toronto service bureau that now offers Ideal for DB2.

An IBM offering, Cross System Product (CSP), also incorporates dynamic and static SQL. But it is a procedural, programmer's environment that has difficulty sharing files for team development efforts, according to CSP users.

Several observers say that CSP, which IBM terms a strategic product, is benefiting less from DB2's success than the established fourth-generation languages.

CSP is good for building online transaction processor applications, said one Focus and CSP user who requested anonymity, "but I don't know what else you would want to do with it."

Focus is useful for working with statistics and turning out complex reports, he added. "I wouldn't even attempt to do that with CSP," he said.

Compatibility counts

In addition to superior reporting, the fourth-generation languages frequently offer greater compatibility between their dictionaries and DB2's catalog than does CSP.

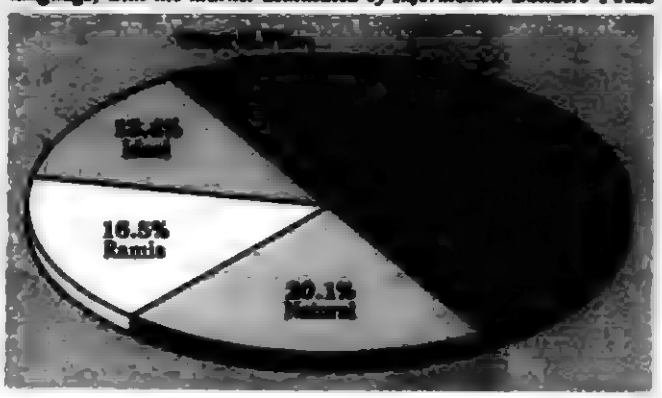
The dictionaries of Ideal and Natural 2, for example, are capable of using the same 18-character data names as DB2, while CSP is restricted to eight-character names.

The dictionaries for Nomad2, Natural 2 and other fourth-generation languages offer greater functionality than does the DB2 catalog. They store headers for standard reports, data integrity rules and definitions of routine, calculated values. The DB2 catalog does not, noted users and spokesmen for the fourth-generation language suppliers.

Robert Montero, data base analyst at Chevron Information Technology in San Ramon, Calif., said his firm used Nomad 2 to execute outer joins against Chevron's parts inventory data base. The outer joins tell the firm which parts it has in stock with no outstanding orders. The information helps the company plan inventory levels, Montero said.

Generation gap

Almost one in five IBM mainframe sites use a fourth-generation language, with the market dominated by Information Builders' Focus



INFORMATION PROVIDED BY FOCUS RESEARCH SYSTEMS, INC.

Import rules nettle software group

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — ADAPSO, a software industry association, last week declared that Brazil's new software import regulations are unfair to U.S. vendors and urged the Reagan administration to retaliate with trade sanctions.

"The only way to get this thing resolved is to keep the pressure on," said ADAPSO spokesman Christopher Carleton at a caucus held here jointly with the Information Industry Association.

The regulations, issued May 12, give Brazil's Secretariat for Informatica "wide latitude for subjective, rather than objective, decisions" to prevent the sale of U.S. software in that country, ADAPSO officials said.

Under Brazil's current software law, foreign suppliers of software can obtain commercialization licenses if there is no "similar" product offered by a domestic supplier.

But ADAPSO charged that the definition of "similar" is so vague that many non-Brazilian products will be excluded.

For example, the regulations would consider any two programs performing the same application — such as word processing — in the same hardware and operating system environment to be functionally equivalent, ADAPSO said.

The Reagan administration last year threatened to impose $105 million in punitive tariffs on Brazilian imports, but postponed the sanctions while Brazil drafted its software regulations [CW, March 7].

The Reagan administration is collecting industry and agency comments on the regulations before developing a response, said Alan F. Holmer, a deputy U.S. trade representative.

"Regrettably, after years of frustration, retaliation may be the only way to resolve this matter," said ADAPSO Chairman Jack Courtney, president of Computer Task Group, Inc., in a statement.

Reagan vetos trade bill

WASHINGTON, D.C. — President Reagan vetoed the omnibus trade bill last week but said he hopes Congress will pass a pared-down version of the bill that would preserve many of the features sought by the computer industry.

The legislation would reform U.S. trade policy and includes provisions to liberalize export controls, seek greater access to foreign telecommunications markets and strengthen intellectual property rights [CW, May 9].

Reagan vetoed the bill primarily because of a provision requiring businesses to give 60 days of advance notice for plant closings and major layoffs.

The U.S. House of Representatives pounced on the veto, voting 308-113 to override it, but the Senate is expected to be a few votes short of the two-thirds majority needed for an override on the presidential veto.

MITCH BETTS

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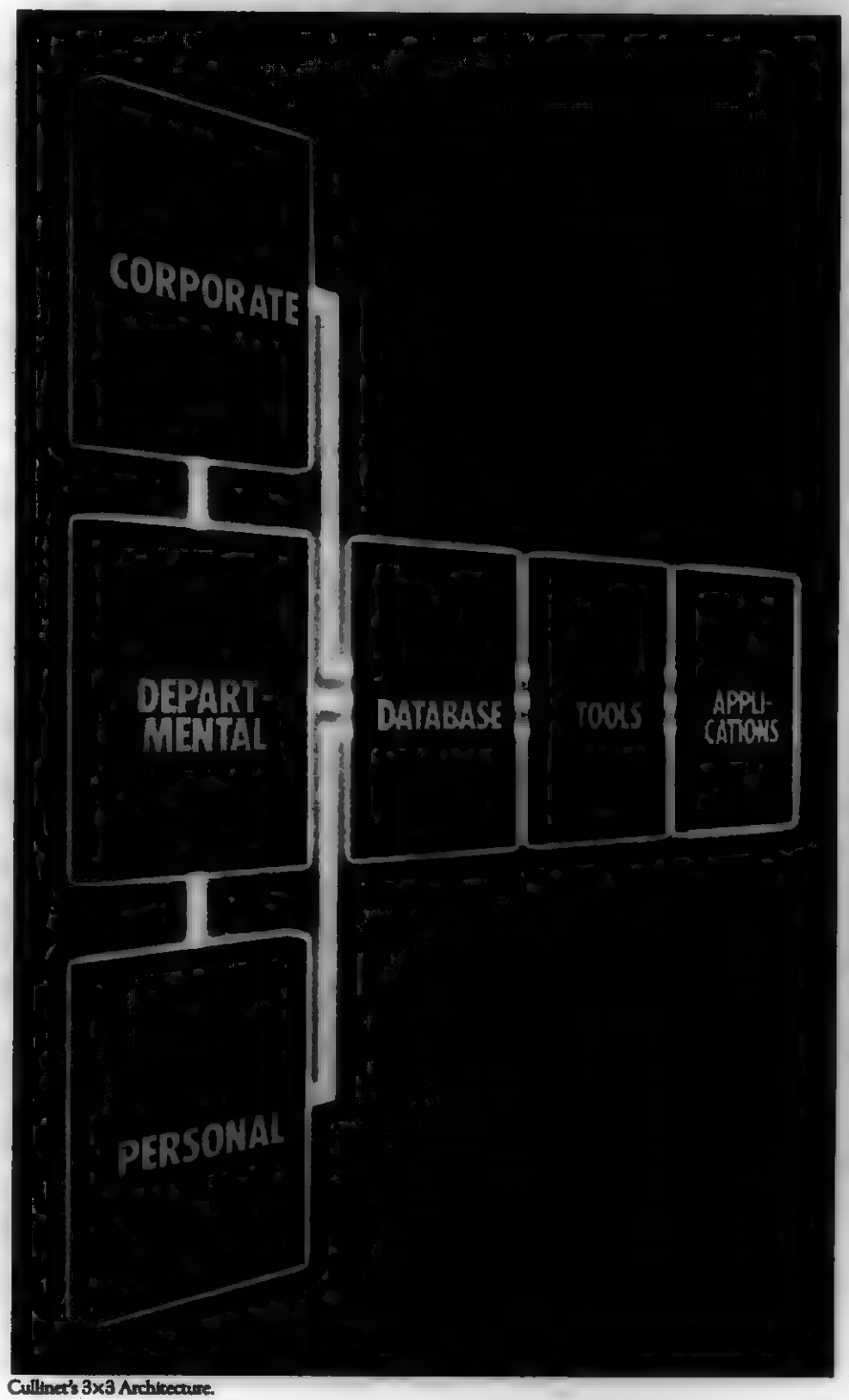

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Elkay recovers fast from fire

Planning puts firm back in business hours after disaster

BY JEAN S. BOZMAN
CW STAFF

OAK BROOK, Ill. — Sometimes the best way to do something is to do it yourself.

That was the lesson learned by Elkay Manufacturing Co., headquartered here, which decided four years ago to provide its own backup in case of disaster. While dozens of its larger corporate neighbors in western Chicago suburbs struggled to regain normal operations after they were disrupted by a May 8 fire at an Illinois Bell switching station [CW, May 16], Elkay was able to continue a special sales promotion.

If disaster recovery seems easy for Elkay, it could be because the $140 million stainless-steel sink and plumbing fixture supplier has been practicing since 1984. "We did a good planning job in 1983, and it paid off for us this time," said Jim Scott, director of administrative services. Elkay, which divided its operations into two data centers four years ago, was able to resume normal operations within hours.

The telephone outage severed a vital T1 dedicated data line linking the data centers, but MIS compensated by shuttling data tapes and personnel between the two centers. Just as Elkay resumed normal operations at noon May 9, several nearby corporations were moving to hot-site recovery services and others resorted to buying expensive microwave and satellite links.

By the end of last week, only half of the 35,000 lines destroyed by the fire had been reconnected to a new Illinois Bell 5 ESS digital telephone switch.

Flexibility was built in to Elkay's distributed data environment, which links six factories with the Oak Brook corporate headquarters. "We decided in 1984 that it would be better to move away from a single-system, single-site situation," said Scott, who oversees all corporate data processing and applications development. "That gave us two data centers, each of which was able to back up our critical operations."

The answer to the telephone outage at the Oak Brook facility was simple: Instead of moving the data systems, Elkay's MIS department decided to match the end users to their application. The company shuttled 35 people between the Oak Brook center and a second center in Broadview, Ill., seven miles away. "Our programming staff didn't need to use telephones," said Biagio D'Ugo, manager of DP operations. "But our sales and accounting staff did need to use the telephones as well as our order-entry system."

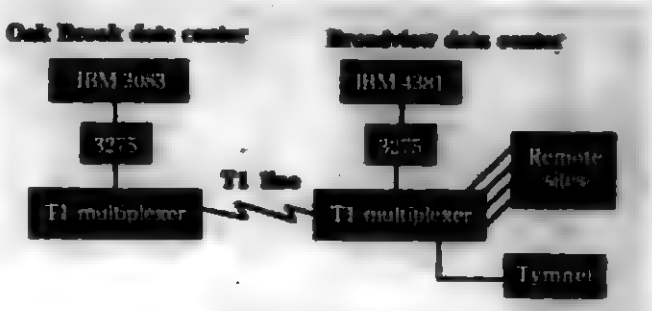
The Oak Brook site, which regained its T1 link last Monday, houses an IBM 3083 that supports end-user inquiries under IBM's VM/SP operating system. An IBM 4381 runs DOS/VSE manufacturing applications and on-line order entry at the Broadview factory location, which never lost telephone service. About 15 programmers moved to phoneless Oak Brook, taking along their data tapes. Meanwhile, terminals were set up around the Broadview conference table so accountants could continue their financial work.

As it happened, Elkay was in the process of switching the order-entry and manufacturing applications to the larger IBM 3083 when the telephone disaster hit on a Sunday night, knocking out Oak Brook's phone lines. "By Monday morning, we had identical production systems up and running on both machines," Scott said. Even without the planned switch over, either machine is capable of taking over the other's function in less than a day, he said.

Regular phone service was restored to the Oak Brook location May 20, and personnel were back at their original locations last Wednesday.

Simple solution

When the phones went dead in Oak Brook, Ill., Elkay transferred personnel needing interactive data use to the Broadview, Ill., center



INFORMATION PROVIDED BY ELKAY MANUFACTURING CO.
CW CHART

3Com execs quit, plan start-up

BY KATHY CHIN LEONG
CW STAFF

SANTA CLARA, Calif. — William Carrico, 3Com Corp. president, and Judy Estrin, general manager of the Bridge Communications division, resigned last week with intentions of starting another data communications company.

Only nine months after the 3Com merger with Bridge Communications, Inc., the married co-founders of Bridge are planning another start-up company in Silicon Valley and will return to the industry in September, Carrico announced.

"I like the comfort of a start-up company, being involved in day-to-day events," he said. While plans for a new company are still in the research stage, Carrico said he is interested in the Fiber Distributed Data Interface market and stressed that he does not intend to erect a 3Com competitor.

On good terms

The parting is an amicable one, Carrico said. "We believe the merger was absolutely the right thing to do. We have no regrets about anything."

Carrico agreed, however, that the two company cultures were quite distinct.

Bridge was operated in a results-oriented fashion in which Carrico and Estrin were closely involved in the company's details.

At 3Com, Chairman Bill Krause held fast to a management style that allowed managers more decision-making power and independence, 3Com sources said.

Krause noted that while company cultures were different, "we had complementary management skills. I'm very disappointed in losing him, but I admire his courage to recognize early on that this is what he wants to do."

'It was frustrating'

According to one 3Com employee, "Bill and Judy were in a completely different environment where things didn't happen as quickly as they did at Bridge. I'm sure it was frustrating for them."

Krause will serve as 3Com president, while Howard Charney, currently vice-president and general manager for hardware products, will replace Estrin as general manager of Bridge.

Bob Metcalfe will take over as general manager of hardware.

Dbase

FROM PAGE 1

IV 1.0 ships.

Ashton-Tate has not given up on its July 31 deadline, but Luther Nussbaum, president and chief operating officer, said that delays in debugging the 400,000-line program could push its release back to Sept. 30.

That could leave Ashton-Tate gasping for air in the relational DBMS market. Until it comes out with a full SQL implementation that ties Dbase into a relational back-end server, analysts have said that Ashton-Tate will not be able to compete in the MIS arena with the likes of IBM and Lotus Development Corp. IBM, for one, expects to ship a rival package, OS/2 Extended Edition, by the end of July.

While Ashton-Tate tried to downplay the chance of a significant delay, others — even those that generally applaud the company — said the announcement points to serious problems for Ashton-Tate and the future of its flagship product.

"Ashton-Tate is in big, big trouble," said Richard Finkelstein, president of Performance Computing, Inc. in Chicago. "The more time corporate users have to rethink sticking with Dbase, the more likely they are to move to something else like IBM's OS/2 Extended."

> "ASHTON-TATE is in big, big trouble. The more time corporate users have to rethink sticking with Dbase, the more likely they are to move to something else."
>
> RICHARD FINKELSTEIN
> PERFORMANCE COMPUTING, INC.

Many users, seemingly jaded by more than two years of waiting for an update, were not as concerned by the additional delay. "I'm a little disappointed, but not surprised," said Gary Oppenhuis, manager for data systems at Touche Ross & Co. in Chicago. "I'd rather have a relatively bug-free product than one that makes a certain target date."

Comes with the territory

With other companies also missing important shipping deadlines — including Lotus's recent six-month delay of a 1-2-3 upgrade — some users said that late deliveries simply come with the territory in MIS. "Late shipments have become a way of life these days," said Kuen Ling, a Dbase user and MIS project manager at Metropolitan Life Insurance Co. in New York.

Despite the company's occasional criticism of competing firms who announce far ahead of product availability, Ashton-Tate's Nussbaum conceded last week that "Project timetables are estimates that are subject to some variability."

Yet, software vendors vying to have their data base packages included in the two- and three-year buying plans of most MIS shops will need to base their products on a stable and proven SQL backbone. Performance Computing's Finkelstein said that development delays and problems integrating SQL with the native Dbase language code could make Dbase IV a shaky alternative at best.

Ashton-Tate defended the technological foundation of Dbase IV, noting that the new product has met all of its performance and memory requirements.

"There are no 100% guarantees, but we're making significant enough progress to ship the product by September," said Lydia Dobyns, Ashton-Tate's vice-president of marketing.

Ashton-Tate rivals, however, were quick to point out that the company has yet to ship beta code to corporate users and that bugs might be the least of the program's problems.

"At this point, Dbase IV is dreamware; the message to me is that they're having trouble delivering on the core technology," said Richard Schwartz, vice-president of data base technology for Paradox developer Borland International.

And with Dbase sales accounting for more than half of its annual revenue, Ashton-Tate cannot afford to let many more Dbase users defect to a gaggle of so-called clone makers such as Wordtech Systems, Inc. "More delay means there is more of a risk of losing market share, with the clones continuing to nibble at their heels," said William Shattuck, a software analyst with Montgomery Securities in San Francisco.

Ashton-Tate also announced last week an update to its Framework integrated decision-support software for DOS-based computers. Framework III is scheduled to ship by July 31 and sell for $695. A five-user network version reportedly will ship by October and sell for $995.

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9370

FROM PAGE 1

graphics terminals with the IBM-marketed computer-graphics-aided three-dimensional interactive application, or Catia, on an IBM 9370 Model 40 running under VM/IS.

Johnson & Johnson Baby Products in Skillman, N.J., runs Cadam, Inc.'s Cadam on a Model 60 under VM/IS. Seven 5080 terminals are connected to the minicomputer, which is not connected to a larger system, said Johnson & Johnson engineering manager Joe Hayek.

More for their life?

Sears, Roebuck and Co. is using about 25 9370 Model 40s and 60s — not as departmental processors, but as distributed print servers for the publication of corporate documents.

At the same time, many other large accounts that were the original target of IBM's 9370-based distributed processing strategy have declined to use it. A number have reportedly expressed more interest in personal computer local-area networks than the 9370.

"Among big users, the negative attitude toward the 9370 has been hardening," commented John Logan, vice-president with the Boston-based Aberdeen Group.

Major software developers, although saying that many of their existing mainframe packages will run on the 9370, are not investing additional energy in optimizing those packages or in developing new packages for the 9370 (see story below).

But while the software world's heavy hitters have turned their backs on the processor, smaller developers with niche products have been more attracted to the 9370. The Ultimate Corp. in East Hanover, N.J., resells the 9370 with its version of the Pick system; Mitrol, Inc., in Woburn, Mass., sells a manufacturing automation package; and Albany, N.Y.-based Chart, Inc. is porting its 4300-based health care package to the 9370.

"The 9370 has not taken off as people had thought, but in the last few months, we have seen an uptick," said Mike Zisman, president of Soft Switch, Inc. in Wayne, Pa. Soft Switch introduced a corporate electronic mail system based on the 9370 last year. Soft Switch became a member of IBM's Industry Marketing Assistance Program in January.

To make installation easier for customers, IBM has offered to preload operating systems, including its VM, VSE and DPPX/370, onto the 9370 before it is shipped from the manufacturing facility in Endicott, N.Y. The option was announced in March and is set to be available July 15.

Such steps could help overcome the ease-of-use roadblock that many report when confronting VM or VSE on the processor. "I came from a System/38 background, so I know ease of use; I don't consider the 9370 to be that. You need a staff to run it," said Donald Zager, director of DP at Bozzutos, Inc., a Cheshire, Conn., food wholesaler.

Bozzutos moved from a 4341 running VM and VSE to a 9370 Model 90 running VSE Release 3.1 in November 1987. "Since it was touted as an end-user machine, I expected the software to be much easier than it is," Zager said.

Upstaged

Ironically, the 9370's unexpected progress in niche markets may be jeopardized by the rollout of Silverlake, IBM's System/36 and 38 follow-on processor that is expected to be announced June 21. As a follow-on to the System/36 and 38 processors, Silverlake is expected to be relatively easy to use and will draw on the wealth of applications for those machines, which are largely for smaller businesses.

Thus, Silverlake could drain interest from the 9370 in one of the areas in which it has been strongest.

And whether the 9370 will be able to rebound in the market it was intended for remains in question. Despite a loaner program in which IBM is giving large accounts free use of 9370s for development, there is little evidence that many firms have big plans for the processor.

"We haven't found any corporations that have large quantities installed," said Ralph Bush, an analyst at Computer Intelligence in La Jolla, Calif. Computer Intelligence has estimated that 3,000 systems are currently installed in the U.S. Three or four systems was the top number at any given location, Bush said.

Special delivery

A portfolio of customer installations recently released by IBM shows 12 installations, only one of which — the much-publicized U.S. Postal Service order for at least 750 systems — is for a large number of machines.

Analyst Logan said the office automation software that will likely be announced with Silverlake will also run on the 9370. This could help get the 9370 over the hump in major corporations, he said. "It will be SAA office automation software for both the 9370 and Silverlake."

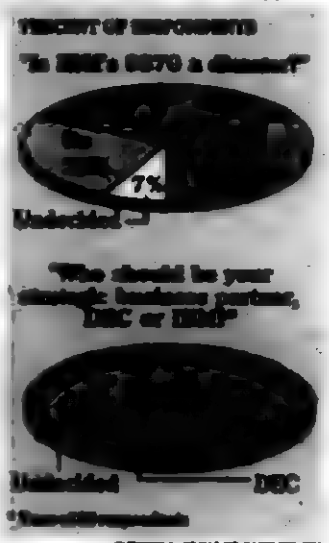
Robert Wilson, vice-president and general manager of information systems at Dataquest, Inc. in San Jose, Calif., said, "What is missing is packaged solutions. This is an office system. Users do not want to run a mainframe package on it."

Wilson took the view that Silverlake will actually help the 9370 by clearing up hazy distinctions between the two machines. "Silverlake's announcement will convince a lot of people that IBM is serious about the mid-range," he said. "By this time next year, you will see enough applications on the 9370 to assure its future."

Midwest correspondent Jean S. Bozman contributed to this report.

Mixed feelings

At a recent seminar on mid-range options, most MIS execs surveyed said the 9370 is a flop but that they still prefer IBM as a supplier



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CW CHART

Chip could cut prices

IBM, Compaq said to be investigating Intel P9

BY JULIE PITTA
and ED SCANNELL
CW STAFF

Recent rumblings about IBM and Compaq Computer Corp. planning to use Intel Corp.'s unannounced P9 chip have created some interesting marketing possibilities for manufacturers of Intel 80286- and 80386-based systems.

The P9, which has many of the processing powers of the 386 but communicates with a system's bus via a 16-bit data path like the 286, would essentially put 80386-based systems in users' hands for less than $4,000, some analysts said.

Such a system would force both companies to push their current 80286-based lines' prices down to less than $2,500. However, some analysts said sales of P9-based systems will more than cover the revenue lost from price reductions on existing 286 lines.

"It is almost a win-win situation. What loses is the full 32-bit, 386-based systems. DOS capability under P9 is going to put a damper on interest in moving to a full 32-bit environment. It will probably tone down demand for a 32-bit 386 version of OS/2," said Michael Goulde, director of CAP International, Inc., a market research firm in Norwell, Mass.

"Assuming it will lower the price points for systems built around it, [the P9] basically blows the 8086 market away and pushes the 80286 market down to sub-$1,000," Goulde said.

Representatives of two corporate accounts briefed by IBM over the last month said the company plans to introduce a system using the P9 chip by year's end. Some industry observers have speculated that Compaq will roll out a similar system by the end of the year.

Interest piqued

Both companies declined to comment on their plans to use the chip, although Compaq spokesman Lynn Parsons said his firm would certainly "be interested in such a product."

"The P9 allows Intel to penetrate the market that the 286 is holding right now and wean the PC arena toward Intel's proprietary 386 technology and away from the commodity 286," said Drew Peck, a technology analyst at Donaldson, Lufkin and Jenrette, Inc. in New York.

The P9 was originally scheduled to be available by now, Peck said, but is not because Intel is focusing its attention on meeting demand for its 80386 chip, which brings higher margins than the P9.

The good news about P9 is that it allows users to run 32-bit protected mode software such as Microsoft Corp.'s Windows/386 and Xenix on less expensive machines. On the downside, they will run those programs more slowly.

"The P9 is a mixed bag," Peck said. "System vendors can tell their customers that it can run all 32-bit software that will be available in the next year, but they'll still have to contend with the 16-bit I/O bottleneck."

IBM reportedly will develop and manufacture its P9-based systems in Austin, Texas. The charter of the company's Austin facility is to turn out systems, including those based on the P9, for less than $3,000. If they fail to produce a system at that price point, they will lose that project to IBM's Boca Raton, Fla., plant, according to one source.

"If a 386 is manufactured in Austin, it has to be $3,000 or under. It's IBM's way of introducing some healthy internal competition," the source said.

An outcast among developers

Large software developers, facing hard choices about where to spend their development dollars, are opting to invest time and energy in IBM's Silverlake or Digital Equipment Corp.'s VAX, saying that they will invest in IBM's 9370 only when it sells in sufficient numbers.

One user reported that developer unwillingness made his search for a 9370 application more difficult.

"There are plenty of 370 applications, but, in reality, if you go to MSA or M&D, they say, 'We won't sell you one for the 9370.' I felt they feared that if you loaded it, it would bring the system down to a crawl," said Stewart Bechler, director of MIS at Odd Lot Trading, Inc. in Elizabeth, N.J.

A McCormack & Dodge Corp. spokesman said his firm is exercising caution in recommending the machine.

Shortly after the 9370 was announced in 1986, Cullinet Software, Inc. said it would develop a data base management system for the machine. However, the 9370 project is now on hold, according to Gene Kaplan, Cullinet's project manager for systems. Cullinet has since put all its marbles behind the VAX for mid-range development, having recently announced IDMS/SQL, a VAX-based DBMS. Kaplan said the firm has no definite plans for Silverlake.

Management Science America, Inc. (MSA) is stressing Silverlake development, said Brian Cohen, the firm's director of technology and research.

"The No. 1 priority is SAA. Silverlake is a big part of that," Cohen said, referring to IBM's Systems Application Architecture. "We have limited resources, and right now the 9370 just doesn't seem fruitful. It doesn't come first on our list."

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AT&T rethinks Olivetti ties

Seesaw teeters as alliance fares poorly, 3B line flounders in Europe

BY ALAN ALPER
CW STAFF

AT&T said last week that it is reassessing its relationships with overseas firms, including an agreement to resell Ing. C. Olivetti & Co. microcomputers.

Speaking to AT&T's board of international advisers in Madrid, AT&T Chairman Robert Allen said the re-evaluation was prompted in part by recent fluctuations in currency exchange rates that have made foreign-made goods more expensive.

Analysts contend the reassessment has more to do with the lack of success of AT&T's overseas partnerships. AT&T, which owns 22% of Olivetti, has had a tough time remarketing the Italian firm's micros in the U.S. for the last four years. Olivetti has not fared any better reselling AT&T's 3B line of minicomputers in Europe.

Just one of the issues

An AT&T spokesman said the reassessment of the Olivetti relationship does not necessarily mean a change of suppliers is imminent. "We have no present plans to change our personal computer purchasing agreement with Olivetti," he said. "It is one of a number of issues under discussion as we reassess our alliance in the best interest of both companies."

The spokesman said discussions between the two companies are focusing on the resale of AT&T's 3B line by Olivetti in Europe.

Although Olivetti recently introduced its own line of minicomputers, according to a company spokesman, it has no intention of halting its purchases of AT&T 3B minis.

Observers contend that AT&T has never made any money selling Olivetti micros and will have to change suppliers if it wants to stay in the business. Sources close to AT&T said the company could be looking at a variety of lower cost micro manufacturers, including those based in Korea.

AT&T is reportedly also interested in having its value-added resellers (VAR) handle Sun Microsystems, Inc.'s new Intel Corp. 80386-based micros, which run Microsoft Corp. MS-DOS applications as tasks under Unix.

Such a move would strengthen the evolving relationship between the two firms. This alliance started with AT&T's agreement to purchase an equity stake in the Mountain View, Calif., company and includes joint efforts to forge Unix standards and AT&T's licensing of Sun's Scalable Processor Architecture reduced instruction set computing architecture.

Impending deal

AT&T VARs said they expect a deal to be concluded between the companies in the near term. "I'm optimistic that my channel will get the 386i from Sun," noted Lynn Roloff, president of Southwest Dataproducts, Inc., a Houston-based AT&T VAR.

Allen's comments follow the recent departure of AT&T's Data Systems Group President Vittorio Cassoni, who returned to Olivetti as chief executive officer amid reports of strained relations between the two firms. AT&T recently declined to increase its stake in Olivetti, while the Italian firm is said to be disenchanted with AT&T's micro sales effort.

"The violent movement on the dollar/lira relationship would have called the [AT&T and Olivetti] alliance into question, if nothing else," noted Bill Coleman, an analyst at James Capel & Co. in London. "AT&T has a lot of problems in data processing and doesn't need a high-cost hardware producer."

Amiel Kornel, a Paris correspondent for IDG News Service, contributed to this report.

Patenting

FROM PAGE 1

selves out," he said.

Eventually, Advest plans to exploit the patent by determining whether other firms are using its process and, if so, to charge them royalties.

"There's no reason why you shouldn't be compensated if you're willing to stick your neck out, put your money up and develop something unique," Reynolds said.

"We may be about to witness a flood of patents" for computer software, including automated methods of doing business, said David Bender, an attorney at the New York law firm of White & Case.

On the rise

In the last two years there has been a sharp increase in the number of patents issued for automated systems, patent attorneys said, and more are on the way.

Robert Greene Sterne, a patent expert at the Washington law firm of Saidman, Sterne, Kessler & Goldstein, said that his firm has filed about a dozen patent applications for specific expert systems developed by Fortune 500 user organizations.

Last month, the U.S. Patent and Trademark Office granted U.S. Patent No. 4,736,294 to the Royal Bank of Canada in Toronto for an MIS system that manages car loans.

In addition, Bender cited the following MIS patents:

- A securities brokerage cash management system, U.S. Patent No. 4,346,442, was assigned to Merrill Lynch & Co. in New York.
- An automated securities trading system, U.S. Patent No. 4,674,044, was assigned to Merrill Lynch.
- An insurance investment program, U.S. Patent No. 4,642,768, was invented by Peter A. Roberts in New York.

Can't catch mice with it

From a legal standpoint, the MIS patents are unusual because they break the conventional wisdom that patents are for inventions such as better mousetraps and zippers, not for computer software or methods of doing business, Bender said at a recent meeting of the Computer Law Association.

The field has already spawned one dispute between competitors. Paine Webber, Inc. challenged the legality of Merrill Lynch's patent for a cash management system, arguing that patents cannot be applied to things such as business systems or services.

But a 1983 court opinion stated that Merrill Lynch's system was indeed patentable because it involved "a method of operation on a computer to effectuate a business activity," Bender reported.

The fact that the patents were obtained in the financial services industry is significant, according to Victor Januskitis, chief executive officer at Positive Support Review, Inc., a Los Angeles-based management consulting firm.

"Because it's an industry that is in a state of revolution . . . the firms are coming up with new instruments and new ways of doing business," he said.

For example, Merrill Lynch's patented Cash Management Account combines a margin brokerage account, money market funds and a credit and checking account.

> **MIS PATENTS are unusual because they break the conventional wisdom that patents are for better mousetraps and zippers, not for computer software.**

Jack Epstein, a vice-president at International Data Corp., a market research firm in Framingham, Mass., said the emergence of these patents highlights the need for MIS executives to develop competitive intelligence programs to find out which competitors are getting patents. "Otherwise, they may find themselves paying royalties to a competitor," he said.

Patent holders, on the other hand, will want to find out who might be violating their patents, Epstein noted.

The trend toward software patents was prompted by the 1981 U.S. Supreme Court ruling in *Diamond v. Diehr*, which opened the floodgates for patenting software-related inventions such as industrial process-control systems, digital telephone switches and robots, Bender said.

Software bugs

Lately, the patents have extended farther into the software field to include automated business processes and the user interface for computer systems.

For example, IBM has obtained at least 10 patents related to word processing software in the last two years and Hewlett-Packard Co. has a patent for its touch-screen interface, Bender said.

However, the software patents may be subject to court challenges because the field is so new and there are few legal precedents or journal articles on the subject. But Bender said that problem will be short-lived because there is an increasing flow of software patents that will stimulate more published material.

Bender noted that the patents have been issued to major players in the computer and financial industries, such as IBM and Merrill Lynch, which are not known for taking "way-out" or extreme positions. This fact gives legitimacy to the notion of obtaining software-related patents, he argued.

Out of the closet

Before the Supreme Court decision, when the patent office frowned on software patents, the patent applications were artfully crafted to downplay their software content, Bender said. Now, the applicants have come out of the closet and explicitly describe the software in flow charts, diagrams and lines of code, he said.

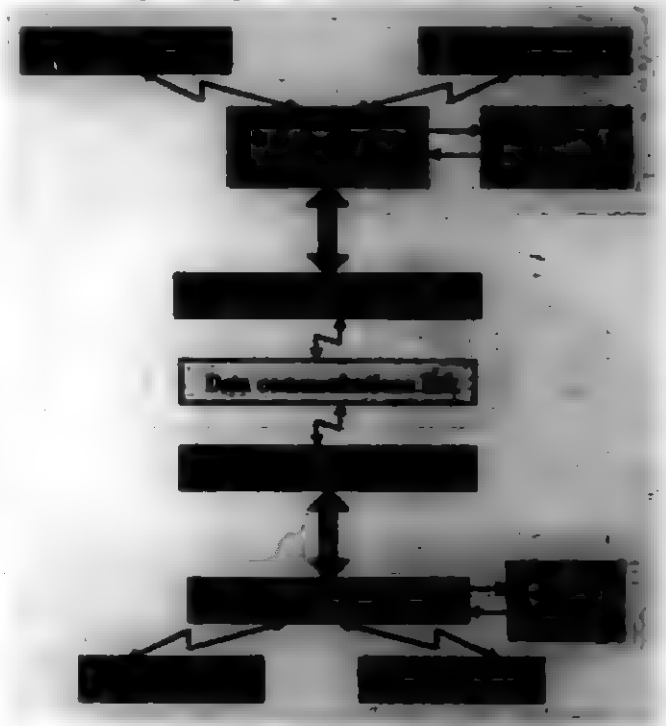
For example, the Royal Bank of Canada's patent has 107 pages of computer programming, including 10,000 Cobol instructions.

Ed Bougard, manager of personal lending services at the Royal Bank of Canada, confirmed that the patent was obtained in the interest of protecting a competitive advantage.

Bougard said the car loan program calculates a guaranteed residual value for the automobile — for example, $5,000 on a $15,000 automobile — and furthermore defers payment of that amount until the end of the loan term.

A patented approach

U.S. Patent No. 4,694,397 was granted last year to The Advest Group for its Banking/Brokerage Computer Interface System



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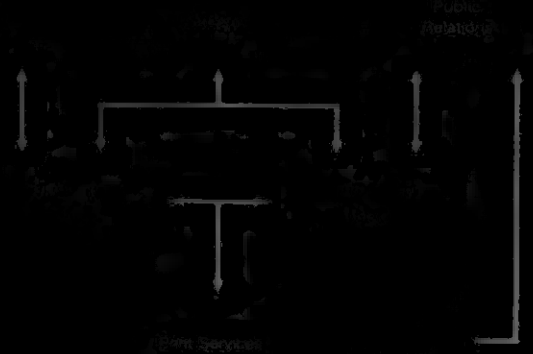

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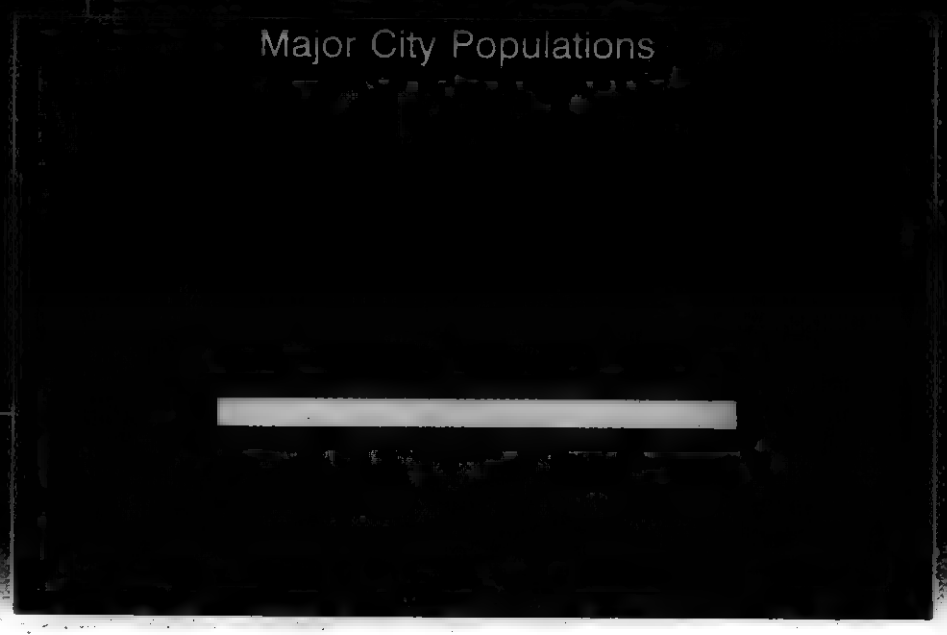

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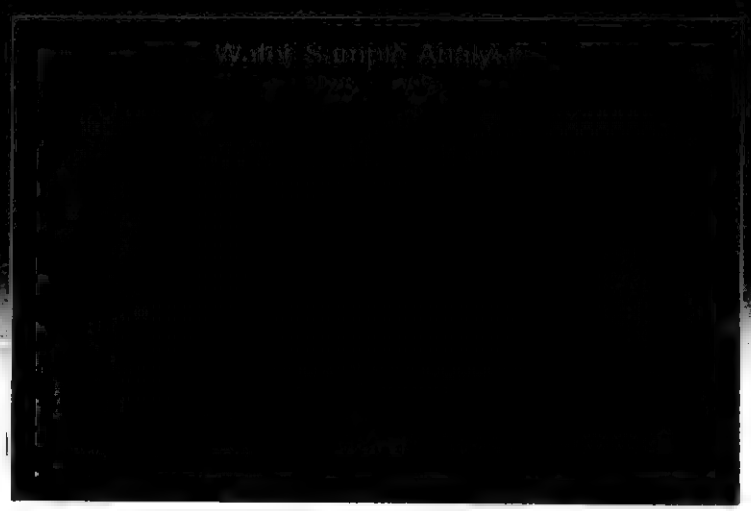

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IBM royalty bid casts high-end doubts

BY ALAN J. RYAN
CW STAFF

Larger systems vendors seem as much in the dark as clone vendors over the likely impact of IBM's demand for 1% royalties on sales of clones of its current and previous microcomputer lines. And IBM seems willing to keep it that way.

Minicomputer and mainframe vendors that were surveyed last week differed on whether their existing cross-licensing agreements with IBM on non-personal computer products will protect them from the royalty fees IBM is demanding from those it says duplicate its patented technologies.

As with the clone vendors, IBM last week was unwilling to provide the larger systems vendors with any type of blanket endorsement.

Unless the defined field of existing cross-licensing agreements includes products in the micro area, they are not immune from the royalty charges, IBM spokesman Michael Starks said.

Most of the major minicomputer and mainframe makers that also market IBM Personal Computer compatibles, including Hewlett-Packard Co., NCR Corp. and Data General Corp., admitted they have existing cross-licensing agreements with IBM on various computing technology levels. HP, NCR and DG would not comment on the nature of these agreements.

Not rattled

However, HP said it is not concerned. "We feel the IBM announcement doesn't have any impact on HP because of our cross-licensing agreements with IBM," company spokeswoman Mona Hayes said.

A source within NCR concurred. The company has various cross-licensing agreements with IBM and believes the royalty announcement will have no impact on it. However, "We're being very cautious," the source said.

Wang Laboratories, Inc. and Unisys Corp. were unable to comment on the issue at press time, although Unisys spokesman Wayne Adams said he is unsure whether the IBM royalty payments would affect Unisys, because the PCs it markets are OEM units.

Digital Equipment Corp. does not have any cross-licensing agreements with IBM, company spokeswoman Elizabeth Slattery said.

With the royalty announcement, analysts said IBM has clearly left the door open to go after PC clone vendors but will not likely do so until those vendors make requests to licensee patents on its Personal System/2 [CW, May 23]. At that time, companies that have technologies IBM is interested in may be able to strike cross-licensing agreements.

HP's Hayes said her firm will consider PS/2 compatibles "if and when there is a demand. We haven't seen that demand."

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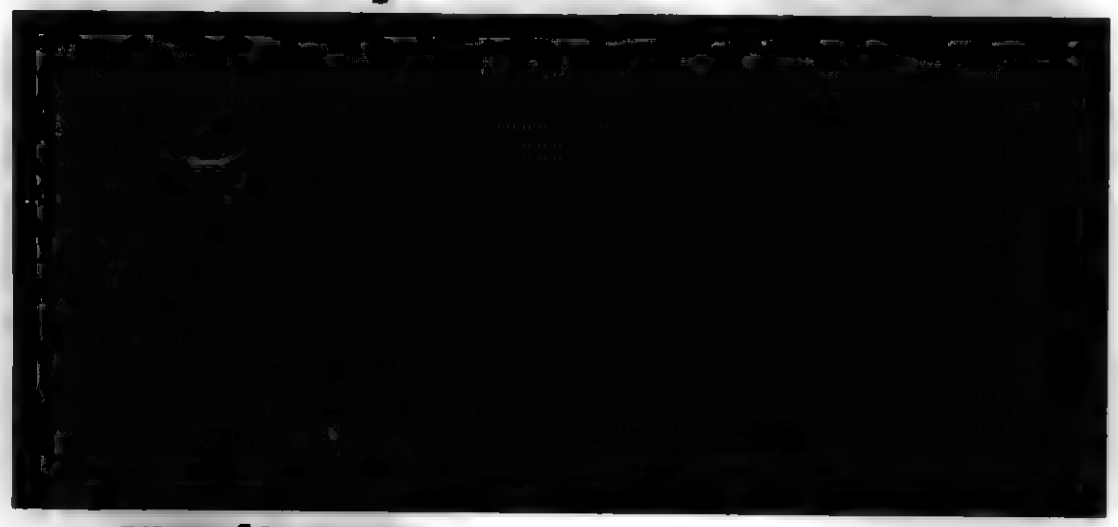

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DEC suit hits third parties

BY NELL MARGOLIS
CW STAFF

MAYNARD, Mass. — Digital Equipment Corp. last week won Round 1 in its legal battle with two small Massachusetts companies accused of defrauding the mighty minicomputer manufacturer.

On May 25, Middlesex County Superior Court issued temporary injunctions prohibiting Framingham-based Clinton Digital, Inc. and Hopkinton-based Sevco, Inc. from "selling, transferring, altering, destroying or otherwise disposing of" certain printed-circuit board modules or components for DEC's VAX 8650 computers, according to a DEC spokesman.

Earlier this month, DEC filed suit against Clinton and Sevco, charging both companies with fraud and deceptive trade practices and, in Clinton's case, breach of repair contracts.

According to the complaint and the account of DEC spokesman Jeffry Gibson, each of the defendant companies removed three gate-array logic chips from VAX 8650 boards, replacing them with considerably less valuable chips from VAX 8600s. According to the complaint, the companies then returned the boards to a DEC repair facility, alleging defects, and got functional 8650 boards — complete with three gate-array chips — as replacements.

"Visually speaking, the chips are pretty much the same," Gibson said. However, he added, "The 8650 module is a $39,000 item and the 8600 is a $17,000 item." He estimated DEC's loss at between $300,000 and $1 million.

DEC was alerted to the problem, Gibson said, when personnel at the repair center noticed an abnormal number of boards being sent in by the same firms.

In addition to barring the companies from tampering with specified VAX parts, the injunction "prevents [Clinton and Sevco] from destroying their records," Gibson said.

Neither Clinton nor Sevco could be reached for comment.

IBM eases chip-set licensing

Compatibility authorized, but cloners still patent-liable

BY JAMES A. MARTIN
CW STAFF

SAN JOSE, Calif. — Chips and Technologies, Inc. breathed a public sigh of relief last week with the announcement that it has reached an understanding with IBM in which it will not be required to license patents for its chip sets that provide compatibility with the Micro Channel architecture of IBM's Personal System/2 line.

Despite the apparent nod from IBM on chip-level compatibility, the announcement did nothing to alleviate industry confusion over patent demands that IBM may levy on vendors that use the chip sets to build PS/2 clones.

Chips and Technologies, which designs and manufactures IBM Personal Computer AT- and PS/2-compatible chip sets, does not currently have any patent licensing agreements with IBM, according to Linda Dezan, an IBM spokeswoman in Montvale, N.J. "They are not using any IBM patents, so they don't need a license," she said.

"The announcement was as expected — that Chips customers have no legal liability in buying chip sets from them," said Dan Kleaken, a technology analyst at Montgomery Securities in San Francisco. "There have been questions as to whether their chips needed licenses or not from IBM, so this clears away the cloud for potential users and investors in their stock."

PS/2-compatible makers that buy chip sets from Chips and Technologies might still be required to obtain licensing from IBM, according to that company.

"What Chips and Technologies is doing doesn't require an IBM patent," Dezan said. "Compatible makers don't necessarily infringe on patents, either. Each company designs and develops products in its own way. It's not known until a product is brought to market if it infringes on patents, unless they come forward in advance."

A compatible maker can supply IBM with information about its product before it is marketed, and IBM will "advise them on whether we think they will be infringing on our patents," Dezan said.

It makes more sense for IBM to go after the compatible makers than to bother pressing for royalties from a handful of chip makers, according to Howard Dicken, president of DM Data, Inc., a semiconductor research firm in Scottsdale, Ariz. In addition, the royalties paid on a microcomputer are going to be greater than those paid on a chip set, Dicken said.

By directly assessing the compatible makers a tariff on each machine sold, IBM will gain not only additional revenue but, more important, valuable market share information on each of its PS/2 competitors, explained Drew Peck, an analyst at Donaldson, Lufkin & Jenrette, Inc. in New York.

"IBM will know exactly where each compatible vendor stands in terms of machines sold," Peck said.

Microsoft takes Apple in Round 1

BY STEPHEN JONES
CW STAFF

SAN JOSE, Calif. — Microsoft Corp. has temporarily sidestepped questions as to its alleged infringement on the look and feel of the Macintosh by focusing initial arguments in its legal battle with Apple Computer, Inc. on the legitimacy of a 1985 contract between the two companies.

U.S. District Judge Robert Aguilar has granted Microsoft's motion to separate the trial into two phases. The issue of copyright infringement cannot be contested until Apple proves that Microsoft violated its 1985 licensing agreement, according to the decision.

Microsoft claims the 1985 agreement allows the developer to use elements of the Macintosh interface's "look and feel" in Windows 2.03. Apple, on the other hand, says Windows 2.03 is not included in the contract and claims it infringes on its copyright of Macintosh technology.

Aguilar ordered that all requests for documents relating to Windows 2.03's alleged copyright infringement be stopped until the current contract dispute is settled.

"Microsoft should not have to defend itself against copyright infringement charges if the allegedly violating work is covered under a licensing agreement," the judge's decision said.

Hewlett-Packard Co., which is a separate defendant in the Apple suit, could stand to gain from Microsoft's action. HP was named in the suit because it licensed Microsoft's Windows technology for use in its New Wave software.

If the court decides that Microsoft has not illegally copied the Mac, then HP's licensing of the Windows technology would also be considered legal, an HP representative said.

If Microsoft cannot prove that Windows 2.03 is covered in the 1985 agreement, then the trial would go to a second phase, in which the issue of copyright infringement would be argued.

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EDITORIAL

Making memories

THE VICE-PRESIDENT of technology planning at Merrill Lynch appropriately summed up the chip shortage situation in *Computerworld* last week: Customers, he said, are used to waiting months for personal computer memory expansion boards, but the recent 300% price increases "still amaze me."

To this point, the only noticeable reaction from chip makers of the well-publicized supply and demand imbalance for dynamic random-access memory chips is an almost comical recognition that yes, Virginia, this is a chip shortage.

Some U.S manufacturers have displayed the unmitigated gall to blame the Japanese for the current problem, claiming the Japanese are holding back on production. Of course, we should mention that these same people got an unwitting U.S. government to limit the Japanese ability to sell RAM chips here in the first place, which is really what the current shortage is all about to begin with.

But for anyone looking for an end to the current imbalance and restoration of fair market pricing — and that includes a lot of MIS managers — we have a suggestion: Don't hold your breath.

The fact of the matter is that there are precious few incentives for anyone to take definitive steps to ramp up production, including the Japanese. And the chip makers themselves are creating a set of expectations about chip demand that may be more of a self-fulfilling prophecy than a barometer of chip demand for the coming years.

At the fourth annual Semiconductor Forum held earlier this month, the consensus reached was that chip sales will plummet in 1989. That's a perfect reason *not* to invest one plug nickel in ramping up production.

But there's a better reason to maintain the current situation. At today's chip prices, semiconductor profits couldn't be better. Somehow, one gets the feeling that the semiconductor firms feel they are owed these profits as a result of the battering the companies took three years ago. At that time, they badly misread the marketplace and ended up with tremendous excess capacity.

When the market picked up later, U.S. vendors had scaled back so far that the door was left wide open for the Japanese to come in — which they did. To make a buck on underutilized plants, the prices of U.S.-made chips were pegged higher than the Japanese-made RAMs. The result was predictable, as was the cause of the situation — misreading the market once again.

At the Semiconductor Forum, the keynote address urged attendees to push for rational trade policies vis a vis the Asian chip makers. While they're at it, they might consider a course in Economics 101, where they can learn about the benefits to their customers and, ultimately, of unimpeded markets.

LETTERS TO THE EDITOR

Welcome change

Usually, I have to wait for Gopal Kapur's next gem, but now you have found another contributor who not only has his head in the open air but is literate and outspoken. I am referring to "Going the way of the whale" by Francis Walnut [CW, March 28].

Coming hard on the heels of the February report of the disaster at Bankamerica Corp. [CW, Feb.1] and a later multidisaster story, this article almost makes me believe that *Computerworld* remembers the working whales who knew your paper when.

On behalf of us whales, thanks for the fantastic article — and the respite from OS/2 and local-area networks.

Bill Hogarth
Systems Manager
Lakeside Information Systems Associates
Marion, Ill.

Don't forget us

I read with interest your coverage of Interface '88, particularly the story regarding Telenet Communications Corp.'s encryption features [CW, April 4]. I applaud Telenet for furthering its network security.

However, the article was misleading when the author stated that Telenet's encryption service "puts Telenet ahead of Tymnet, McDonnell Douglas Network Systems Co., which has no encryption features."

Tymnet, McDonnell Douglas does support data encryption — in fact, the Technical Communications Corp. encryptor, the same one Telenet now uses, was certified on our network more than 18 months ago. We have also certified several other data encryption devices for use on our network. Encryption devices have been used in both Tymnet's public and private networks for several years. The customer can either obtain an encryption device from a vendor or Tymnet will supply it.

Perhaps a more germane point is that we have offered our own form of encryption for 19 years. Tymnet's internal protocol multiplexes multiple users' data into packets, effectively scrambling the data that goes over the line and reassembling it only when it reaches its destination. We have found that this method has provided an effective form of network security.

Clint DeGabriella
Vice-President of Marketing
Tymnet, McDonnell Douglas Network Systems Co.
San Jose, Calif.

This week in history

May 29, 1978
The House Subcommittee on Communications will introduce in Congress a rewritten version of the Communications Act of 1934. Although the subcommittee chief counsel was short on the bill's details, he did describe it as being deregulatory in nature.

May 30, 1983
Digital Equipment Corp. scraps a 2-year-old project to develop high-end upgrade systems for its Decsystem-10 and Decsystem-20 users in favor of a plan to tie those 36-bit computers into its 32-bit VAX-11 superminicomputer line.

Positive step

I am writing regarding the article about efforts to take Datapoint Corp. private [CW, April 11]. This "takeover" is part of a strategy to make Datapoint more flexible in responding to its customers' needs and become even more innovative with its product line. This is just one more positive step in Datapoint's progression to again become one of the premier suppliers of networking technologies. Four profitable quarters in a row and several product introductions is a good indicator that this strategy is working.

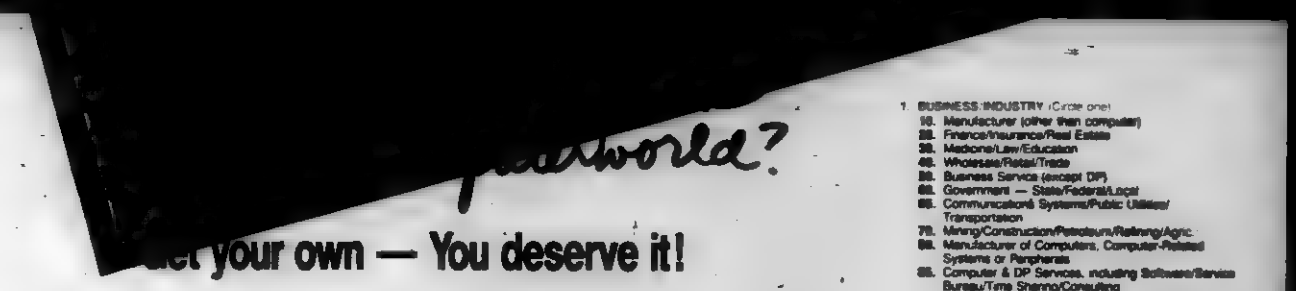
Joe McMonigle
Senior Sales Representative
Datapoint Corp.
San Antonio

Not the first

In "The doggonedest computer ever seen" [CW, March 21], Charles P. Lecht wrote of the originality of the Japanese in announcing K9. I guess he must not watch public broadcasts, because Dr. Who's faithful companion K9 made his debut years ago. In addition to most of the features of the Japanese K9, Dr. Who's K9 can also speak in various languages, has an excellent voice recognition system and has self-recharging batteries.

James P. Egan
President
Longbout Systems, Inc.
Dublin, N.H.

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.



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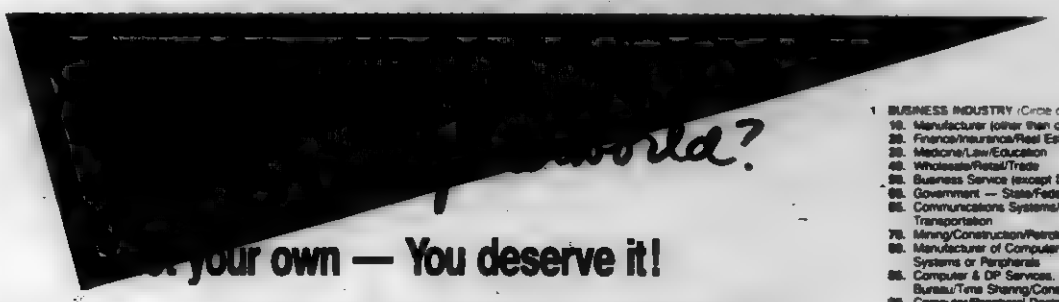

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MIS managers must see themselves honestly

JACKIE REYNOLDS

First there was the shakeout of personal computer vendors. Then last year we saw the giants begin to cut back: IBM, Unisys and AT&T either laid off employees or offered strong retirement incentives.

The software market soon followed. Most recently, we've seen Management Science America significantly cut its work force, as well as Cullinet.

Only a few years ago, hardware and software companies and the MIS functions they supplied had the Midas touch. Even if everything didn't exactly turn to gold, most people believed that it did — or would with the next release.

Layers of management were added in MIS to accommodate the aspirations of the fast-track employees who wanted to have it all sooner, not later. Those who recommended a more thoughtful, conservative and efficient approach to using information systems were branded as naysayers and doomsdayers. Then, one not so bright day, some people saw their little patch of sky fall around them.

What caused the fall? Vaughan Merlyn, consultant and chairman of CASE Research Co. in Bellevue, Wash., recently cited the following statistics at the Atlanta chapter meeting of the Data Processing Management Association:

- Up to 25% of large projects (more than 60,000 lines of code) are canceled before completion.
- Up to 75% of all software projects are canceled.
- An average large system is delivered a year late and costs twice as much as the original estimate.
- A U.S. Army study of nine federal projects found 47% delivered but not used, 29% paid for but not delivered, 19% abandoned or reworked, 3% used after change and 2% used as delivered.

In what other industry would this sort of waste be tolerated? And why has it been accepted in information systems?

Beyond all the justifiable excuses, the industry has been guilty of intolerable arrogance and misrepresentation. Rather than bridge the communications gap with end users, MIS managers abdicated their responsibilities to the vendor or technician implementing the systems. We are now in the throes of the end user awakening with all the pain of the morning after.

What is an industry to do, now that it has been found out? MIS managers are going to have to seize the old bull by the horns and get down to serious business. The manager who endures this decade and the next will have to understand and practice "egoless management."

With no pride

Most of us have finally accepted that the programmer must give up his pride of authorship and submit to standardization. The manager will have to offer up pride of territory at the altar of efficient business practice.

In order to achieve efficiency, each manager will have to relentlessly evaluate his various responsibilities. He must be ruthless in making his unit of work the most efficient possible.

He must be knowledgeable about, and open to, the latest tools available and understand when they apply to his function. He also must understand when they are not applicable.

The MIS manager will need to know the business of his company inside and out. A manager recently told me he found out that many of the reports MIS had produced for years were of little use to his users. The ivory tower has crumbled, and the MIS manager must find his rightful place on the plant floor, figuring out what makes his business run efficiently.

Each manager needs to examine all positions beneath him. He must look at how time is spent and see whether there is significant production from the individual and from the position. In the past, idle chatterers and time wasters have been tolerated in the MIS department. They were, after all, creative individuals, and they had to be treated as such. No more: The geniuses of yesteryear will learn to work while they are at work.

Activities and paperwork should be reviewed for contribution to productivity. There should be fewer meetings, and fewer people should attend those that are held. Work will be done to achieve results, not to build egos.

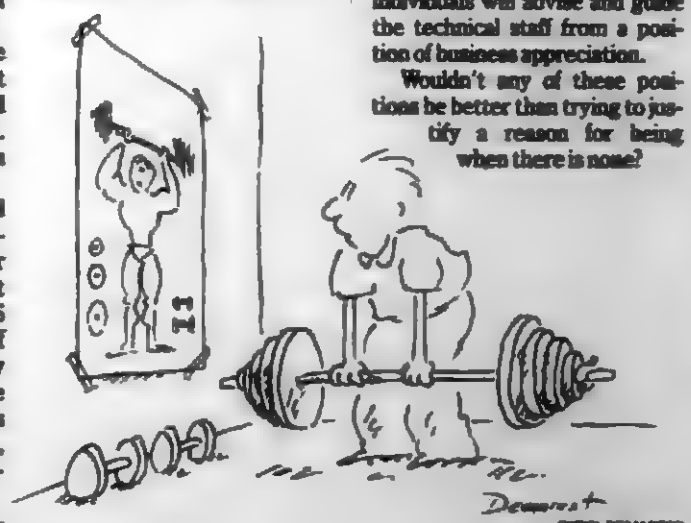
Similarly, MIS managers should review their own functions and consider themselves as candidates for cutback and downsizing. The day of empire-building is over. Managers who are slow to recognize this are targets for layoff.

Managers must also accept and promote the fact that their functions are often better done somewhere else. They should aggressively look for the most efficient points of automation and turn power and money over to the users.

And what will we do with all these MIS managers who work themselves right out of a job? There are at least two paths. The manager who has successfully done all of the above is in an excellent position to move into general management as an executive or more likely as an information specialist.

Those who still prefer the technical can get back to basics as business technicians. These individuals will advise and guide the technical staff from a position of business appreciation.

Wouldn't any of these positions be better than trying to justify a reason for being when there is none?



CHRIS DEMAREST

Reynolds is president and founder of DKI Corp., a consulting firm in Atlanta.

Why the argument over OSF?

It's a little unusual, it may not work, but it probably won't do much harm

ESTHER DYSON

The creation of the Open Software Foundation (OSF) has raised hackles and skepticism throughout the computer industry.

OSF is an alliance of seven hardware companies attempting to create an open standard based on AT&T's Unix. Unix, the group argues, is becoming closed, or proprietary, based on changes in the AT&T license agreement and the recent pact between that company and Sun Microsystems to create a binary Unix standard. In other words, now that AT&T is trying to wrest control of Unix from the marketplace, OSF is countering with a move to take control into its own hands.

Why the strong reactions from press and onlookers? For starters, it's a little unusual, to say the least, for John Akers of IBM and Ken Olsen of DEC to share a platform — especially one in favor of nonproprietary systems. Is this the same Olsen who told *Business Week* just days earlier (perhaps slightly out of context, to give him the benefit of the doubt) that standards are "snake oil" with all the appeal of "a Russian truck?"

Some people say the idea of open Unix is great but that they're not sure OSF will foster it; indeed, it impedes what looked like smooth sailing for AT&T and Sun. But the group is more an acknowledgment of schisms in the Unix world than the creator of such schisms. I see the foundation mostly as a hedging of bets: Let's stop it, but if it happens, let's be there.

Until AT&T moved to unify Unix by asserting control, there was no such thing as a standard. Now there's one firm proposal (the System V Interface Definition from AT&T and Sun) and one group that has agreed to work on one.

While the notion of open standards is philosophically and morally appealing, it does not make much business sense. The OSF companies aren't doing anything wicked; they're just trying to support their self-interest, much as Sun and AT&T are doing. What's new is the perception of how to achieve that self-interest — and an apparent switch in approach from vendors that, by and large, sell proprietary systems.

Why doesn't OSF make sense? It is attempting to turn a dynamic process — the creation, evolution and succession of standards — into something more fixed and controllable.

In the long run, neither side will win. OSF may bless others' products or even build its own, and AT&T may control the evolution of its version of Unix. But neither can force customers to buy products they don't want. Good products are inherently proprietary because they require investment and support; standards come after the fact. They cannot be established by fiat (not in this country, anyway).

In fact, the very notion of standards implies a fundamental contradiction, because standards are static in an unstable world. Like living things, they are destined to die when succeeding generations show up.

As many of the OSF members point out, they are not about to stop their own development efforts. Theoretically, they will license these efforts to competitors through OSF for resale to customers. But I have to wonder how willing any vendor will be to share a product that could confer a competitive advantage.

Business as usual

In the end, OSF is likely to become just one more outfit that endorses products — presumably in as nonpartisan a way as possible. (IBM's competition will take care of that, even though OSF's basic product is IBM's AIX). In fact, probably the best course for Sun and AT&T would be to join OSF — and then conduct business as usual. That's probably what its other members will do (albeit $13.5 million poorer). So far, AT&T has flatly refused to join, and Sun is considering the issue.

Why should a successful vendor sell products through OSF? Why is IBM donating AIX? For how long will these license agreements last, and how much of each product will they cover?

The point is that a single company, even a nonprofit one set up by a group of computing vendors temporarily working in concert, cannot hope to create standards. Or if it can, market forces dictate that it ought to be overthrown.

There is no reason that a committee should be any better at choosing, let alone creating, software than the best of a group of companies could be. That's right: The market lets a number of firms try and then selects the best one rather than determining from the start who should create the standard. To the extent that OSF is content to play the role of endorser rather than creator, fine. It becomes, then, just one more standards body.

In summary, OSF is exactly as serious as the industry and customers care to make it. And until it produces a product some 18 to 24 months from now, there's not much reason to take it too seriously.

That's not stopping anyone (AT&T, say) from doing anything. It's not (yet) selling anything, and it has pledged to support standards. Now who could argue with that?

Dyson is editor and publisher of "Release 1.0," a N.Y.-based leading computer industry newsletter focused on software and technology developments.

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SOFT TALK

Nell Margolis

Market savvy slippery goal

Back in the olden days — about two years ago — when Relational Technology and Oracle appeared not only to rule, but virtually to define the DEC VAX-based relational data base market, the California archrivals got tagged with iconic identities: Oracle had "great marketing" and Relational had "great technology."

It wasn't a case of good vs. bad, right vs. wrong, smart vs. dumb. Rather, like Luke Skywalker and Han Solo or Butch and Sundance, Oracle and Relational stood for alternative ways to be cool.

That lasted until Oracle got hot. The facts are so familiar that to recite them is to belabor them. Relational grew admirably; Oracle boomed spectacularly. Expectations were that Relational would catch up. It didn't. Expectations were that Oracle would slow down. It hasn't. And as the gap between the former gold dust twins grew, so did a perception that great marketing is better magic than great technology.

Therefore, it was no great surprise when Relational started talking about becoming a mar-

Continued on page 22

Unix users wary on compatibility

Express concern about necessity of new implementation by OSF

BY ROSEMARY HAMILTON
CW STAFF

Unix users last week raised concerns that plans to introduce an alternative, Unix-based operating system supported by major vendors will leave them with an incompatible operating environment.

IBM, Digital Equipment Corp. and the five other vendors that make up Open Software Foundation (OSF), however, promised a smooth migration to the new operating system, which is tentatively scheduled for release in 18 months.

The stated goal of the OSF, a nonprofit organization launched earlier this month, is to provide an open systems environment, although observers suggest the group's mission is to also take control of Unix away from AT&T.

The group plans to release its own implementation of Unix based on the yet-to-be announced AIX, IBM's version of Unix. OSF will build on the AIX core by adding such components as a user interface to create a complete operating environment, OSF members said.

"Nobody has really addressed migration yet," said Dean Allen, corporate vice-president of information services at Lockheed Corp.'s manufacturing unit in France. "I still don't know enough about where this thing is going, but I'm assuming that they'll provide some kind of migration."

However, Allen said his facility uses systems from DEC, Apollo Computer, Inc. and Sun Microsystems, Inc. Since Sun and AT&T are currently not part of

Continued on page 22

Report: Users to shape AI's future

BY NELL MARGOLIS
CW STAFF

Direction-setting power in the artificial intelligence market shifted from vendors to users in 1987, and the direction they set pushed AI concepts toward mainstream computing, according to "AI Trends '88" from DM Data, Inc.

Harvey P. Newquist III, editor of the Phoenix-based "AI Trends" newsletter, said the AI market is booming but traditional, "pure-play" AI firms are in danger of losing out to mainstream technology vendors.

Characterizing 1987 as "the AI industry's most wrenching year ever," the report hangs out a laundry list of misfortunes that dogged "pure-play" AI companies between January 1987 and February 1988, prominently including layoffs, executive upheavals, bankruptcies and a sudden rash of litigation.

AI companies will have to turn to new sources of funding in the coming year, including debt and, more importantly, product sales. " 'Sell or die' is not too

Continued on page 23

AI takes off

Expert systems, AI languages and voice recognition will help fuel the artificial intelligence industry's ascent to $4 billion by 1990

INFORMATION PROVIDED BY DM DATA, INC.
CW CHART

Focus 6 to roll out in stages

BY CHARLES BABCOCK
CW STAFF

NEW YORK — Information Builders, Inc. will make new features of Focus Version 6 available in stages for its fourth-generation language, including an SQL Translator and the first production version of Focnet, a VAX-to-IBM mainframe link.

The staged release of new features is meant to supply Focus customers with added functionality without waiting for a complete set of features to be bundled into a new release, said Gerald Cohen, chairman of Information Builders.

The previous release, 5.5, contained 56 new features and took two years to go through coding, quality assurance and beta testing. The intermediate releases of Version 6 will receive full hot-line support from Information Builders, but they will only go to customers who request them. When all features can be bundled into a final Version 6, then it will be shipped all at once to the customer base,

Continued on page 23

Inside

- Informix releases Smartware under Xenix System V. Page 24.
- Infodata expands text manager functions. Page 24.

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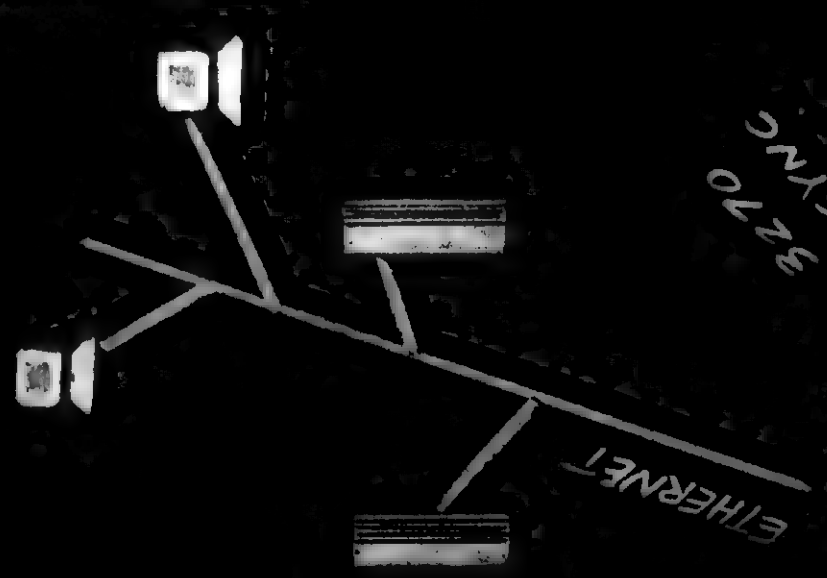
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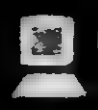

...Tower

NCR

Margolis

CONTINUED FROM PAGE 19

keting company.

Well, why the heck not, right? Cher turned into an Academy Award-winning actress, Sonny turned into the mayor of Palm Springs — why shouldn't Relational turn into a marketeer? No reason at all. The question is, Can they? Or, perhaps more accurately, Do they really want to?

And despite the company's protestations to the contrary, I have to believe the answer to that last one is a resounding no. Have to, because only an indomitable will to fail could explain how a firm so blessed with means — brains, talent and enough money to fund an impressive marketing initiative — could be so woefully ignorant when it comes to ways.

For instance, consider the following:

- When a company sends several key executives on the road for a major press tour to tout new products and strategies during its quiet period — the weeks immediately preceding a public offering when a company is under a Securities and Exchange Commission mandate not to draw public attention to itself, particularly with respect to any future plans — you've got to ask: Does this company really want to be a marketeer?
- When a company's president — chosen, according to the company, to spearhead an all-out attempt to reposition the company as a successful marketeer — spends the better part of an hour giving an "overview" of the corporation to reporters who have been following it for years, leaving them to glean most of their information about new technology from lengthy, highly technical papers, you've got to ask: Does this company really want to become a marketeer?
- When a company — whose customers are overwhelmingly VAX users — benchmarks an eagerly awaited product on a Sequent platform because "that's where we could show really record-breaking numbers," *first* you remember the old grade school joke about the lady who's looking for a lost earring under a lamppost. The nice policeman asks her where she dropped it, and she tells him "Over there in the middle of the street." He says, "Hey, lady, if you lost the earring in the middle of the street, how come you're looking for it under the lamppost?" and she says, "Because here it's light enough for me to see what I'm doing." Then you've got to ask: Does this company really want to become a marketeer?

Last month, after a morning spent with Relational during which I learned, among other things, that a) benchmark numbers that constituted one of the high points of the company's immediate announcement had been audited by an outside expert, but b) the report hadn't been published yet and c) the auditor was out of the country for the next several weeks — as well as that d) Relational was about to become a marketing company — I called up a market analyst to chat.

"I'd rather not be quoted about this product at all," he said. He went on to sing me the same sad ballad that my editor and I had been torturing ourselves with all afternoon: I don't know what I saw, I don't know what's new and what's not, the hot stuff isn't verified and the verified stuff isn't here.

"My instinct tells me that this product is terrific, but I can't honestly back it up from what I was able to get from [Relational]," he concluded. "Who on earth gave you my name on this one?"

"Relational," I said.

"You're kidding," he said.

I wish, I thought. I asked him how he thought Relational was doing in its efforts to become a marketing company.

"You're kidding," he said.

I wish.

Relational is now several months and at least one major road tour into its "Marketing R Us" campaign. If anyone's convinced, the word hasn't drifted back here.

Maybe it's that being a marketeer is like being asleep: If you protest that you are, you reveal that you aren't.

Margolis is a *Computerworld* senior writer

Unretouched Screen Images

Buy The One On The Left And You'll Have To Put It Where The Sun Don't Shine.

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Unix users

CONTINUED FROM PAGE 19

OSF, that could lead to an incompatible mix of operating systems at his facility, he said.

"Why do we need this?" Allen asked. "I think it's just throwing more confusion into this whole business."

OSF said that while the core will be an AIX implementation, the end result will not resemble the AIX that IBM offers today. With the launching of OSF, the group put forth a list of specifications, which it calls Level Zero, based on current or emerging industry standards such as the IEEE Posix specification and the X Windows system standard, on which user interfaces are built.

According to OSF, member companies are currently offering Unix implementations that either already comply with Level Zero specifications or are headed in that direction. The new operating system will be similar to the Unix implementations that are now marketed by members.

"It will be like any other rollover to a new operating system release," said John Doyle, chairman of the OSF board.

OSF has said its new operating system will include features to support current AT&T System V as well as the University of California at Berkeley's Unix 4.2 applications to provide a "clear and easy migration path." OSF has not yet specified what those features will be.

Focus

FROM PAGE 19

he said.

The SQL Translator will allow Focus customers to use ANSI-standard SQL queries against any file accessible by Focus, including Focus's relational data base management system, Cullinet Software, Inc.'s IDMS/R DBMS and traditional IBM file structures, such as IMS and VSAM.

The ANSI-standard SQL has also been extended with Focus formatting options for reports.

The new release will run above the 16M-byte, virtual memory line for the first full implementation of Focus under MVS/XA. It will be structured as a single re-entrant module, which allows multiple users to access a single Focus copy.

Version 6 will also offer support for cache memory, allowing part or all of a Focus data base to be loaded into memory during processing. The greater the use of cache memory, the fewer I/Os incurred as an application runs, Information Builders spokesmen said. When multiple data base access requests are run against the data in cache, additional performance gains are registered, they said.

Commit and Rollback operators have been added to the Focus transaction processing language, Modify. The Commit command specifies when a set of updates are to be executed, ensuring that I/Os are done only when required.

Version 6 will include the first phase of a production link from a VAX to a mainframe running MVS or VM/CMS. The VAX user works within Focus to run reports from mainframe files and data bases, spokesmen said.

In addition, Version 6 will provide a cross-machine interface between VM/CMS and IBM's DB2, using IBM's channel-to-channel adapter connecting VM and MVS systems.

AI future

FROM PAGE 19

harsh a slogan for 1988," the report said.

"Indeed," it stated, "the users of AI technologies — those who have the purchasing power, and thus affect the AI corporate bottom line — will now shape the AI industry's direction."

An estimated 70% to 80% of all hardware and software dollars are being spent in data processing and information services, the report said.

The pure AI companies are not just running out of alternatives; they are running out of time. The past year has seen a surge of mainstream vendors — Cullinet Software, Inc., Management Science America, Inc., Boole & Babbage, Inc., IBM, Digital Equipment Corp., Sun Microsystems, Inc., Apollo Computer, Inc. and, recently, Apple Computer, Inc. — come into an increasingly less esoteric AI market.

Some AI companies, Newquist said, reached out to the mainstream market in 1987, usually across IBM or personal computer platforms, and entered this year at or approaching profitability: Gold Hill Computers, Inc. in AI languages, Natural Language, Inc. in English-like interfaces and Aion Corp. in expert systems, to name a few.

However, Newquist pointed out, these companies and their ilk are in the minority; for the most part, the AI industry — defined in this report as encompassing expert systems, natural language, voice recognition, AI languages, AI hardware, neural networks and machine vision — has ignored, if not scorned, the DP/MIS market.

Whether or not we see a turnaround in this attitude, the report said, will determine whether the AI industry cashes in on the potentially multibillion dollar AI market or becomes a confederation of niche marketers.

Machine vision, expert systems and AI hardware, respectively, accounted for 20.8%, 19.5% and 48.8% of the overall AI market in 1987, according to figures compiled by DM Data. AI programming languages, a 3.2% slice of the AI pie, were put on the back burner this year. Neural networks grabbed the greatest mindshare in pure AI in 1987, spawning start-ups.

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A weather satellite in geosynchronous orbit above the Atlantic seaboard "sees" cloud cover even at night. The Geostationary Operational Environmental Satellite (GOES) H, built by Hughes Aircraft Company, sees through a combination telescope and sensing instrument called a visible-infrared spin scan radiometer atmospheric sounder (VAS). Developed by Hughes, the VAS uses reflected visible light and infrared thermal radiation to gather images of Earth and its atmosphere. The last in a series of five weather satellites, GOES H watches for storms that threaten the East coast.

Millions of watts of electrical power can be controlled using an advanced electronic switch that can turn on and off at a rate of a million times a second. Developed under a Hughes research program, the CROSSATRON® modulator switch combines the features of thyratron and hard-vacuum thermionic devices. Promising a new generation of rugged, high-voltage switching devices, CROSSATRON employs a gas discharge for high closing currents and provides precise current interruption capability without a large forward drop. Expected applications include improving the performance of radar systems or other high-power tasks requiring repetitive openings and closings of large DC currents with assured reliability and long life.

The first of a new generation of high-altitude reconnaissance systems has been installed in a U.S. Air Force TR-1 aircraft. The Advanced Synthetic Aperture Radar System-2 (ASARS-2) provides high-resolution radar ground maps in real time, in all types of weather. It produces long-range images superior to those delivered by photographic techniques. The unit's two side-looking antennas and the rest of the radar system, except for the cockpit displays, are mounted in a removable nose section. This allows the TR-1 aircraft's mission to be easily and rapidly changed by simply replacing the entire nose section. Hughes developed ASARS-2 for the U.S. Air Force.

A new inspection tool can locate breaks and imperfections in optical fibers and visually inspect the continuity of individual fibers. The Hughes Glocater™ fiber-optic fault locator consists of an "enhanced" helium-neon laser, high-efficiency fiber coupler, and power supply. Designed for use during installation, re-arrangement, maintenance, and other procedures, the locator is attached to fibers being tested. In addition to its use in system acceptance testing of cables, jumpers and pigtails, the Glocater can serve as a tool for fiber-optic training centers. It can also be used on both single-mode or multimode fiber of any wavelength to verify continuity and provide positive end-to-end identification.

A broad spectrum of technologies, many of which grew up within the past five years, are represented in the products of Hughes' Industrial Electronics Group. Six divisions and two subsidiaries, each operated like a small high-tech company but backed by resources of its multibillion-dollar parent, offer career benefits to qualified engineers and scientists. Advancing technologies such as microwave and millimeter-wave communications, silicon and GaAs solid-state circuitry, fiber optics, and image processing equipment are pursued in facilities located in many of Southern California's most desirable coastal communities. Send your resume to A.T. Moyer, Hughes Industrial Electronics Group, Dept. S3, P.O. Box 2999, Torrance, CA 90509. Equal opportunity employer. U.S. citizenship required.

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NEW PRODUCTS

Systems software

Informix Software, Inc. has announced the release of Smartware under Xenix System V for Intel Corp. 80386-based microcomputers.

The **Smart Software System for Xenix/386** includes a custom applications development language and provides bit-mapped graphics support. For multiuser operation under Xenix, multiport serial cards are installed in a host computer, permitting personal computers or dumb terminals to function as workstations on the system.

The Smart Software System modules include a word processor, a data base manager and a spreadsheet with business graphics functions.

The Smart Software System for Xenix/386 costs $1,595.

Informix Software, 16011 College Blvd., Lenaxa, Kan. 66219. 913-492-3800.

An MRP II system specifically developed for large corporate users has been introduced by **ASA International, Ltd.**

Called **Max MRP**, the system is suited for large production manufacturing environments that require information on material, labor, scheduling and status. The full, closed-loop system is built on a Digital Equipment Corp. VAX hardware platform and is written entirely in Cobol. Max MRP is available as a turnkey system or a software-only configuration.

Max MRP costs from $100,000 to $350,000, depending on system configuration.

ASA, 1065 Hillsdale Blvd., Foster City, Calif. 94404. 415-345-6000.

Applications packages

An enhanced version of **Infodata Systems, Inc.**'s text management software is now available. **Inquire/Text Release 87** reportedly expands the software's text-searching capabilities and offers increased performance while using fewer memory resources.

The package runs on IBM mainframes with the MVS and VS operating systems. It can be used in applications for litigation support, records management, legislation tracking and on-line documentation.

Inquire/Text Release 87 costs from $45,000.

Infodata Systems, Suite 700, 5205 Leesburg Pike, Falls Church, Va. 22041. 703-578-3430.

Signal Technology, Inc. has announced the **Interactive Laboratory System (ILS)** for Apollo Computer, Inc. Series 3000 and 4000 workstations. The product operates on digitized signal data stored in computer files and was designed for use in scientific and engineering applications that require analysis of time series data via digital signal processing techniques.

ILS operations include frequency analysis, digital filtering and numerical analysis.

ILS for Apollo workstations costs from $5,100 to $12,500.

Signal, 5951 Encina Road, Goleta, Calif. 93117. 800-235-5787.

Gary Brown Associates, Inc. has released **Payroll Management System/On-Line**, written specifically for the IBM System/36 in RPG II.

The package provides for federal, FICA and all 50 state tax jurisdictions, as well as local and disability where applicable. Employee wages can be assigned to the state where a designated job is performed or to the employee's home state. The system will accommodate various pay periods.

The Payroll Management System/On-Line costs $3,500.

Gary Brown Associates, 322-B Edwardia Drive, Greensboro, N.C. 27409. 800-422-3267.

Languages

Koala Development Corp. has released **Version 8.0** of the **Add System**, a fourth-generation language RPG application report generator for the IBM System/34 and 36.

The system reportedly generates RPG source code and documentation for reports, on-line inquiries, bar graphs and file maintenance and batch programs. Roll keys have been added to inquiry programs.

The Add System costs $3,960.

Koala Development, Suite 101, 1700 Sunset Drive, Longwood, Fla. 32750. 407-330-1704.

Utilities

A system software utility developed for IBM System/36 minicomputers has been announced by **Sildensoftware.**

Called **Queueview/36**, the product reportedly gives users the power, speed and familiarity of IBM's Programmer and Operator Productivity Aid utility to view the spool file.

The utility is said to allow users to instantly browse and search any printer entry in the spool file, including IBM Displaywrite/36 and Virtual Printer files.

A one-time site license for Queueview/36 is $365.

Sildensoftware, 5007 Odessa Ave., Encino, Calif. 91436-1220. 818-789-1899.

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- Highly optimized generated code
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- A CMS Rexx/TSO CLIST interface
- Support for signal handling including program checks and terminal interrupts, and non-standard signals such as timer interrupts and stack overflow
- Many built-in functions including string handling
- In-line assembler.

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Mail to: SAS Institute Inc., Attn: CC, SAS Circle, Box 8000, Cary, NC, USA, 27512-8000

MICRO BITS

Douglas Barney

A war of the 'soft' gods

It's gonna be just like Iran and Iraq! Microsoft chief Bill Gates' boyish looks hide a willingness to compete using whatever weapons are at the 32-year-old software prodigy's fingertips. Well, last week the scrappy Gates aimed a new weapon right at the head of Lotus.

First came the announcement of a money-back guarantee on Microsoft Excel for the IBM Personal Computer. The way the deal works is that Excel customers have until Jan. 1, 1990 to decide if they like Excel better than newer releases of 1-2-3. If, for any reason, a user doesn't like the way Excel performs, a full refund is issued.

That's pretty aggressive. But Microsoft got a lot cheekier. The firm then took out a two-page ad in *The Wall Street Journal* touting the guarantee and ranking on Lotus for making customers play the "Lotus 1-2-3 waiting game." But the coup de grace was when Microsoft delivered copies of The Journal to the hotel rooms of attendees of Lotus Week (a mini trade show for customers). The Journal wore a huge ribbon directing the

Continued on page 31

PC-Focus backs SQL

Enhanced tool offers 'universal' applications

BY ED SCANNELL
CW STAFF

ATLANTA — Information Builders, Inc. laid the strategic foundation for its microcomputer SQL strategy recently by unveiling the latest version of its fourth-generation language data base system.

Christened PC-Focus 4.0, the program features expanded import-export capabilities and what-you-see-is-what-you-get report painting features.

The company's SQL strategy centers on offering the product as a "universal" application development and decision support tool, no matter which relational data base engine is running underneath it, according to David Feldstein, vice-president of the company's Micro Products Division.

"When it comes to SQL-based products on the PC, the talk currently outweighs the reality by a large factor," Feldstein said. "However, we recognize that SQL offers a common access method to relational DBMS products on the mainframe and minicomputer level."

SQL translation

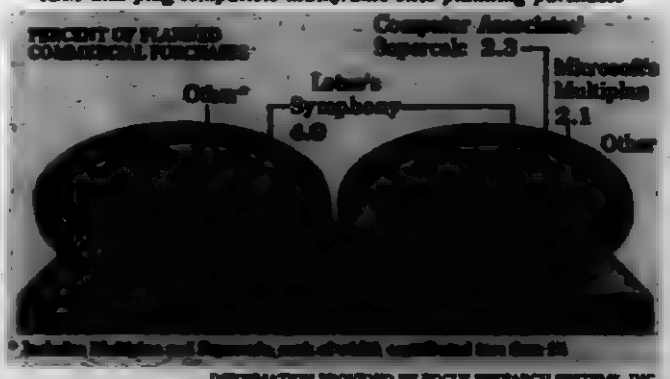
By supporting SQL syntax directly, users can interactively type SQL statements into PC-Focus to query PC-Focus files, a spokesman said. The new version of the program supports ANSI-standard syntax for queries and file joins and will translate SQL statements into Focus

Continued on page 30

Data View

Lotus's 1-2-3 retains big-shop lead

Other PC spreadsheets fail to wrest 1-2-3's stronghold on IBM and plug-compatible mainframe sites planning purchases



INFORMATION PROVIDED BY FOCUS RESEARCH SYSTEMS, INC.
CW CHART

Supercalc 5 to compete for users' attention

BY ALAN J. RYAN
CW STAFF

SAN JOSE, Calif. — Computer Associates International, Inc. will thrust another dagger into the spreadsheet wars when it announces Supercalc 5 next month. The biggest challenge, however, will be getting corporate users to sit up and notice it.

Computer Associates has planned a heavy advertising and marketing schedule to try to establish a larger beachhead in the microcomputer spreadsheet battlefield dominated by Lotus Development Corp.'s 1-2-3, company sources said. Supercalc 5 is scheduled to be announced at PC Expo on June 20.

While Computer Associates' products have traditionally been more entrenched in corporate site licensing and mainframe environments, the company will try to focus more strongly on retail sales, the sources said.

Trying to be No. 1

Supercalc 5 is fully compatible with 1-2-3 and is able to import .WKS and .WK1 files and 1-2-3 macros, the sources said. The product's June announcement and third-quarter shipping date are in response to Lotus's announced delay in shipping 1-2-3 Release 3, they said. The product has been in the works for nine to 12 months.

Other enhancements include the ability to view three spreadsheets simultaneously and expanded cell references supporting edit and copy across spreadsheets. Using data links, users will reportedly be able to retrieve information quickly from other cells with similar names or numeric codes.

Supercalc 5 includes enhanced presentation-quality graphics, built-in auditing and macro debugging and enhanced macro capabilities such as macro sheets and error handling within macros. Users will be able to toggle on and off for minimal recalculation and can also specify ranges to be recalculated, the sources said.

The updated program includes an Undo feature to reverse unwanted commands or data entries and offers a data path to search directly for spreadsheet files.

The Computer Associates spreadsheet, unlike competitors such as Borland International's Quattro, is not graphics-based.

Supercalc 5, which supports the older versions of Supercalc, will likely remain at the $495 price of Supercalc 4, the sources said. An OS/2 version is expected by the first of the year, company sources said.

Inside

- Viruses terrorize PCs nationwide. Page 29.
- SAS System: Users call it a DBMS and an organizational tool. Page 29.
- Datavue rolls out 40Mbyte Spark laptop. Page 32.

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Analyze, design, develop, compile and test mainframe or microcomputer COBOL applications in an integrated workstation environment with our Excelerator Interface.

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New pieces in the puzzle can create plug compatibility headaches and cabling problems. Users can end up with two terminals on their desks because system components don't talk to one another, and there's often no way to "cut and paste" crucial data among applications.

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With the AT&T 6500 System you can instantly transfer data between windows, thereby transferring data between sessions or hosts. By eliminating the communications "Tower of Babel," the 6500 System lets users concentrate on the tasks that really matter.

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- Ability to add up to 32 synchronous devices, including PCs, displays, printer controllers, and printers.
- Ability to add up to 32 asynchronous devices, including minicomputers, PCs with async emulation packages, displays, and modems for dial-in.

- Multi-host, multi-tasking windows. Users can bring data from multiple hosts (or multiple sessions with the same host) into four multi-tasking windows – all regardless of the type of host accessed.
- A choice from nine different types of displays. (Four are plug compatible with IBM 3270 controllers.)
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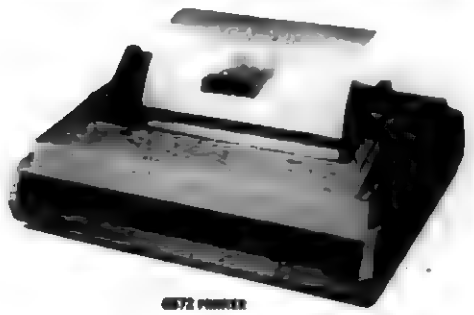

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MOST DASD PERFORMANCE SOFTWARE TELLS YOU WHAT'S GOING WRONG.

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The Performance People

SMALL TALK

Ed Scannell

What's in, out at IBM

IBM steps into the fast lane. It's good to see IBM getting more aggressive. If it turns out to be true — and we think it is — IBM will announce a 25-MHz Intel 80386-based system this week that it will tout as the fastest system on the market. No one can be sure of the system's price until it is announced, but priced reasonably, it should give many corporate accounts pause for thought before they buy more Compaq Deskpro 386/20s.

IBM is also introducing an upgraded Personal System/2 Model 50, but that's bound to get lost in the long shadow of the Model 70.

What is almost as interesting is what IBM won't announce June 2. Several analysts, dealers and corporate accounts have been telling us for the last couple of weeks that IBM had briefed them on several other processors scheduled to make an appearance on that date but now won't. Reportedly, IBM was thinking of introducing Intel 80286-based PS/2 Model 25s and 30s, the former an 8-MHz one-wait state machine and the latter a 10-MHz zero-wait state machine. The company also briefed some folks on a higher

Continued on page 30

Viruses infect corporate MIS

Hundreds of thousands of cases of PC plague could be possible in U.S.

BY ALAN J. RYAN
CW STAFF

"Greetings from Sunnyvale" sounds like another tacky postcard, but if it appears on your computer screen, beware.

The Sunnyvale, Calif., virus is one of many personal computer viruses currently plaguing data administrators nationwide, and it is a nasty one. The majority of viruses, however, tend to be irritating rather than destructive.

Like a disease, a virus gets into the computer when an infected disk is used to boot the system. Each future disk introduced to the infected system will pick up the virus and can pass it along to other systems.

"It's almost like terrorism," said Jim Maginnis, systems manager at Brenult Research Organization in Tucson, Ariz. "We have not located the [Sunnyvale] virus, but have located plenty of code designed for destruction."

Maginnis said his company, which provides engineering workstations for defense contractors, discovered the virus March 5. Since then, the firm has consumed two to three man-months fighting it. He also lost most of his floppies and had to spend approximately $1,000 to replace contaminated software.

But the biggest expense, he said, will come in the future, because the company will have to adjust its computer operations to a completely different set of policies and procedures.

'I'm immune'

Once considered something that "could never happen to me," viruses are popping up everywhere, from the open computer labs of colleges to specialized government agencies, corporations and homes. And they are traveling around the globe, with names like the Jerusalem Virus and the Pakistani Virus.

Companies that make software to fight viruses say it is impossible to say how widespread the problem is in the U.S., but they believe it could range into the hundreds of thousands of cases. Once a virus attacks a location, it may latch on to every system in the building and remain undetected for weeks or months. "We've got one company with 1,000 affected users," said John McAfee, president of Interpath Corp. in Santa Clara, Calif., which distributes an antiviral product called C-4.

Don Parker, a senior management consultant and computer security expert at SRI International in Menlo Park, Calif., said most viruses are not meant to cause harm. Most people who might create a virus as a means of revenge or sabotage could find easier methods of doing so than writing the virus code, he said.

Some skeptics speculate that companies marketing antiviral products are creating virus hysteria to boost sales; others say the media is making much ado about nothing. Either way, corporate MIS directors are concerned.

A group within the MIS department at Metropolitan Life Insurance Co. in New York is constantly looking at the area of security, including viruses, said Dan Cavanagh, a senior vice-president at Metropolitan. "We always have warnings out for our PC users, warning them about free software and the dangers of using bulletin boards," he said.

At Polaroid Corp. in Cambridge, Mass., information technology manager Peter Duray said he has always kept his eyes open for the "Trojan horse" viruses in the mainframe and minicomputer sectors "so we don't install software from vendors we're not familiar with. Now we're becoming more concerned about them in the personal computer world."

Some viruses are time bombs that will flash a message on a particular day and time or, worse, might scramble the index on a hard disk or consume data.

Companies and individuals often spend hours looking for viruses and ways to get rid of them. The authors of the mischievous and sometimes destructive code usually remain anonymous.

Long-distance affair

Peter Scheidler, a systems engineer at the Providence Journal Co. in Providence, R.I., discovered in early May that the PCs used for the newspaper's editorial operations had been infected with the Pakistani Virus.

Oddly, once Scheidler isolated the virus, he found three phone numbers listed in the header field. He dialed one and spoke with the virus's author in Lahore, Pakistan.

The originator of the infection told Scheidler he had written it to see if people were stealing his software. *The Providence Journal* has no software from Pakistan, Scheidler said. The author claimed to have only one copy of the virus and said he had no idea how it had traveled around the world.

Scheidler was lucky, though. The Pakistani Virus infected some 50 of his 350 PCs, 12 or more systems disks and approximately 100 personal disks. Just one disk was lost, but the engineer said he was unsure whether the virus was to blame. "We don't know what it does, and we haven't let it run its course. We have it under control now," he said.

According to Interpath's McAfee, Scheidler and Maginnis are not alone. But, he said, viruses can be avoided.

"We get 50 calls a day from people who are drowning in viruses," he said. But virus detectors cannot rid a computer of a virus; they only warn the user that a virus is trying to get in to the system.

"People have to be told that this can be avoided. The hell with buying antivirals — just stop booting with strange diskettes, or only use one diskette to boot the system," McAfee said.

Learning the hard way

At Bowie State College in Bowie, Md., another strain of the Pakistani virus reared its head in mid-May; rather than affecting only software, it attacked hard disks as well.

After students lost data in their hard disks three times within one week, David Waters, Bowie's director of academic computing services, decided to investigate. Using the Norton Utilities, he was able to find the "Copyright Brain" trademark of the Pakistani Virus at Sector 0 on the hard disk.

"About 98% of the software we investigated was infected, and two out of four hard disks," Waters said. "We cleaned up all

Continued on page 31

SOFT TIPS

1-2-3 helper

Lotus Development Corp.'s 1-2-3 and Symphony should be used on a network in the following manner only. The hidden files from these packages *should not* be loaded on to a network file server. Users should not use the COPY-ON, COPYHARD or INSTALL procedures to transfer the copy-protected files to the file server. Those procedures are to be used on DOS devices only.

If you want to use 1-2-3 or Symphony on a network, copy the program files to the server using the DOS COPY command. Then, all users must have their own copies of the package and can access the program by using the Key Disk in the A drive.

If users have different monitors or printers, separate driver sets can be created for each person. These products do not have a network version and, therefore, do not have network features such as file locking. If two users access the same work sheet file and make changes, the person who saves last will save over the other user's changes.

Information provided by Corporate Software, Inc., a Westwood, Mass-based software reseller.

Suite slow but good

BY JULIE PITTA
CW STAFF

CARY, N.C. — SAS Institute, Inc.'s SAS System, a suite of software packages for data management, analysis and presentation, has found acceptance among users who need to organize large blocks of statistics.

Users appear pleased with the product's capabilities but said the software can be slow on less powerful personal computers and consumes a great deal of disk space.

Juanita Allison, a scientific programmer at PPG Industries, Inc., which manufactures glass as well as paint and other coatings for automobiles, said the SAS System is being used to record experiment results. PCs running the SAS System are connected to an IBM mainframe.

"We're using it for data analysis in the development of new products," she said.

SAS System

Price: $495 for Base SAS $395 for modules other than SAS/IML, SAS/RTERM

- Supports IBM PC AT, XT, 3270 PC, PS/2 and compatibles

Requirements:

- 640K bytes memory
- 20M-byte hard disk drive
- Three expansion slots

Other users have also purchased the SAS System to organize large amounts of statistical data. David Owen, a system analyst for the Fairfax County Health Department in Virginia, said his office is using the SAS System as a data base manager.

"It's not sold as a data base management system, but it works wonderfully as that," Owen said. The health department is using the product to record medical and environmental data like septic systems, well water and air conditions.

Last December, SAS Institute enhanced its SAS System to add SAS/Graph, a data and presentation graphics tool; SAS/PSP, a word processing system; and SAS/AF, an interactive applications development tool for building front-end menus, computer-aided training and on-line Help systems. The prior version included Base SAS, a data management and report writing program; SAS/STAT, a statistical package; and SAS/IML, an interative matrix feature for mathematical, engineering and statistical problems.

Price for Base SAS is $495 for a first-time single-user license. Modules are priced at $395 for first-time users, except for SAS/IML and SAS/RTERM, which are priced at $345.

Users bite into Applelink

BY JULIE PITTA
CW STAFF

CUPERTINO, CALIF. — Apple Computer, Inc. this week extends its 24-hour Applelink information network to end users.

Established in 1985, the Applelink network was originally restricted to Apple sales personnel and authorized dealers. It later encompassed large corporate accounts serviced directly by Apple and by value-added resellers. Apple customers subscribing to the service would receive information regarding products and pricing, and answers to technical questions.

Applelink Personal Edition will cost users $35 for a year's subscription, which includes software, a user manual and "Applelink Update," a monthly publication detailing upcoming network attractions. Network time will cost an additional $15 per hour during "prime time" and $6 hourly during other hours.

Applelink will be initially available for the Apple II personal computer. A version for the Macintosh is scheduled for availability this year through Apple dealers.

The product, co-developed by Apple third-party developer Quantum Computer Services, Inc. in Vienna, Va., will be formally introduced at the Apple Fest show held last week in Boston.

Half of the network is devoted to Apple news, including product and other special interest forums, listings of Apple products and pricing and demonstration versions of third-party software. Additionally, "Apple University," one of the features of Applelink, will offer courses on subjects such as programming in Basic and using Appleworks. The courses will offer real-time classrooms.

PC-Focus

CONTINUED FROM PAGE 25

code and execute the request.

Version 4.0's import-export facilities automatically convert Ashton-Tate Corp. Dbase III, and, when available, Dbase IV, Ansa Software's Paradox, Microrim's R:Base and all Lotus Development Corp. 1-2-3 file formats into PC-Focus files. The company expects to offer support for environments in which multiple data base products reside in the future, Feldstein said.

The Forms Painter offers a full-screen interface to the program's reporting language that should shorten the development time of free-form data base reports, Feldstein said.

Forms Painter will support movable data base fields and free-form text, and users will be able to add fields to a report by choosing them from a pop-up menu. The fields can then be moved to any location on screen and combined with any free text to create more specialised forms such as invoices and checks, a spokesman said.

PC-Focus 4.0 will be available in the fourth quarter and will carry a suggested retail price of $1,295, the vendor said. Users who have purchased the Extended Maintenance and Service Agreement will receive PC-Focus free of charge.

Scannell

CONTINUED FROM PAGE 29

megahertz Model 60 and a 25-MHz Model 80 that could hold up to 300M bytes and would cost $9,995. The company was also going to hold back again on introducing its long-awaited laptops, in part because of the recent Zenith laptop announcements that have some aggressive price-performance values.

Rumorologists say IBM was also considering introducing the P-9 chip — a 32-bit chip that plugs into a 16-bit socket — in a system, but likewise has decided, for reasons unknown, to hold off until a later date.

It's been in the wind that IBM would unveil DOS 3.4 June 2 that would feature an easier to use file system, support for extended memory and pull-down menus. In connection with this announcement, IBM reportedly would introduce some extended memory boards.

A couple of sources also told us that all systems using the 80286 and lower, including the P-9, would now be developed in Austin, Texas, and all 80386-based development would be done in Boca Raton, Fla. Sources called the Austin group the "clone-killer division."

In other IBM gossip, word from an executive at one of the major chip makers is that IBM is a bit behind in developing the intelligent subsystems that are going to show us all why we should believe in the Micro Channel. Our source says not to expect anything until late this year and maybe not even until early next year, which would be disappointing. A few sources speculated that with the release of OS/2 Extended Edition in July, IBM would introduce a graphics or communications subsystem that would go hand-in-glove with OS/2 Extended.

Quote of the week. "I suppose it's our version of 'The check's in the E-mail.' " — Lotus Chairman and Chief Executive Officer Jim Manzi at the company's annual meeting, suggesting that the delayed 1-2-3 Release 3.0 may be late but it would be well worth the wait.

Scannell is a *Computerworld* senior editor, microcomputing.

It takes quite a computer to design a computer.

When IBM design engineers need a workstation to design the future, they turn to the IBM RT™ system for developing everything from circuits to software.

More and more commercial users are also recognizing that the RT's power, enhanced connectivity, extensive application library, outstanding graphics and low price make it the system-of-choice to build on. Medical practices, bridge builders and retail chains are among those that have already put the RT to work.

The IBM RT is a high-performance system based on Reduced Instruction Set Computer (RISC) technology, an innovation pioneered by IBM to execute most instructions in a single cycle. Designed with the UNIX™ environment in mind, the RT can run hundreds of existing programs and

IBM RT™ Specifications
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2MB-16MB
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AIX (native mode)
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C, Advanced C, VS Pascal, Pascal, Basic, VS Fortran, Fortran 77, RM Cobol, Common LISP, Assembler
Data Base
Oracle,* Ingres
Microprocessor
RISC processor, 170 or 100 nanoseconds. 20MHz Motorola 68881 Floating Point unit

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Barney

CONTINUED FROM PAGE 25

Lotus customer to the gem of an ad within.

One motive for these actions is increasing market share. But another may be that Lotus refused to allow Microsoft Excel folks to sit in on certain Lotus sessions for developers, which provided insight into product plans.

We wonder if Microsoft will refund the money for the Intel 80286 processor, the high-end graphics adapter and monitor, extra memory and the mouse needed to efficiently run Excel. For spreadsheet guru Jack McGrath, those costs reached $2,500.

But Lotus is rubber and Microsoft is glue. At least that seemed to be the sentiment when this reporter asked Lotus Chairman Jim Manzi what he thought of the Microsoft ad. "I thought it was two pages and cost about $128,000," the Lotus chief said. Manzi went on to lambaste Microsoft for violating one of the key tenets of Marketing 101 — do not discuss competitors.

An advantage in the summer? It looks like Ashton-Tate is trying to gather steam in the still-profitable word processing software market. The firm, which acquired market-leader Multimate only to see its slice of the pie cut, hopes for a boost with a summer beta test of Multimate Advantage III. Ashton-Tate's goal is the same as other word processor vendors' — to add features that eliminate the need for separate desktop publishing packages. I wonder if it's worried about getting rid of the need for Byline, Ashton-Tate's desktop publishing software.

Towering Japanese? According to a particularly knowledgeable and prolific source, Toshiba has big plans for the U.S. micro market, despite the brouhaha over submarine parts and a certain Communist superpower. The firm, which sells a microcomputer in its Japanese homeland, is apparently planning a fourth-quarter U.S push for the product.

Original spreadsheet wiz pitches in on Release 3.0. Bob Frankston, best known as co-author of the original Visicalc, has been kicking around on a number of projects at Lotus, acting as a sort of ad hoc technologist with a bit of a focus on electronic mail. But when the times got tough for 1-2-3 Release 3.0, Lotus turned to one of the hardest of the hard core. While it is not a full-time role, Frankston is working with old Software Arts crony David Reed to tighten up Release 3.0 code and get that baby to market by year's end. Given that Frankston wrote a good half of what used to be the best spreadsheet on the market, his input may be just the ticket.

We'll get back to you on that! Lotus's compact disk/read-only memory products, while growing in revenue, have not taken over the world. But the firm's One Source information systems may help the Soviet Union take over the world. Tass, the Soviet news agency, recently contacted Lotus looking to buy the product, which provides a variety of financial and news information. The only stumbling block is Lotus's legally clearing the sale with our government.

And we haven't even announced these. Lotus has got a few products up its sleeve that in pre-Frank King (the Lotus official with a beef against preannouncements) days would have been announced by now. An IBM OS/2 version of the Express E-mail package is up and running, a new Manuscript word processor looks primed for announcement next month, and a new Freelance Plus is also ready to roll. It ain't Release 3.0, but we'll take what we can get.

Barney is a Computerworld senior editor, microcomputing.

Viruses

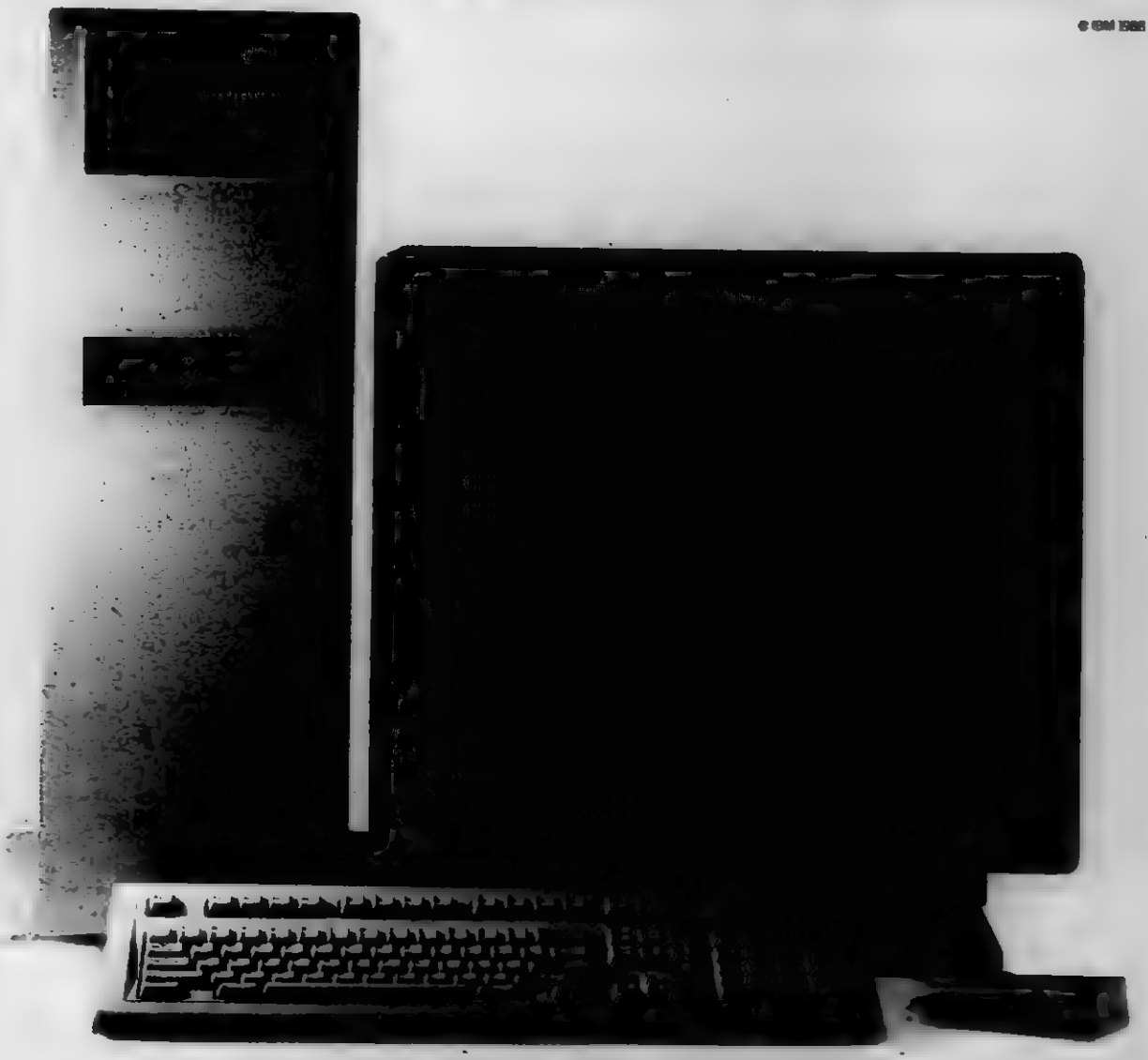
CONTINUED FROM PAGE 29

the disks in the computer room, but the students had data disks that were infected, so one day later, our disks were infected again," Waters said.

Now, Waters said, he will have to set up an inspection for all floppies that come into the computer room.

A similar virus has been discovered at the computer lab at the College of Alameda in California, which is set up for all students on campus to use. The Alameda problem differs from the Pakistani Virus in that its code embodies a counter, which possibly keeps track of how many times the virus has copied itself. According to Aziz East, the computer lab's manager, it is possible the virus's author checks in from time to time to see how many generations have been spawned.

In mid-May, East's workers were still trying to disassemble the code.



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NEW PRODUCTS

Systems

Datavue Corp. has introduced a 40M-byte hard-disk version of its Spark laptop computer.

The Intel Corp. 80C88-compatible hard-disk model is said to have a 25-msec access time and will be offered with 640K bytes and one 3½-in. 720K-byte drive. The system has a supertwist electroluminescent backlit screen, and options include a modem and a math coprocessor. Current Spark floppy-drive owners will be able to upgrade to the hard-drive version for $1,249.

The Datavue Spark with 40M-byte hard drive costs $2,499.

Datavue, One Meca Way, Norcross, Ga. 30093. 404-564-5668.

Software applications packages

Encode, Inc. has announced **Autocam**, graphical part-programming software designed for use with Autodesk, Inc.'s Autocad program.

The product offers several graphical features designed to simplify the part-programming process for the metal working industry. Pull-down menus, dialogue boxes and tables of information provide access to parts description, set-up specifications and tool-path functions.

Autocam costs $6,000.

Encode, 12 Cotton Road, Nashua, N.H. 03063. 603-882-4666.

Layered, Inc. has introduced an inventory module for its Insight Expert Accounting series. For Apple Computer, Inc. Macintosh computers, **Insight Expert Inventory** offers an inventory control system especially suited for small and medium-size businesses.

The product is said to allow managers to perform aging analyses of inventories and create item lists, item valuation, stock status and trial balance reports.

Insight Expert Inventory costs $695.

Layered, The Schrafft Center, 529 Main St., Boston, Mass. 02129. 617-242-7700.

Palisade Corp., formerly Tempus Development Corp., has announced **Risk**, a Lotus Development Corp. 1-2-3 add-on for risk analysis and simulation modeling. The product uses probability distributions and simulation techniques to evaluate uncertain spreadsheet models.

Risk reportedly allows 1-2-3 users to define uncertain cell values in a spreadsheet using functions. The package provides 30 additional functions to the 1-2-3 function set, each of which allows the specification of a different type of probability distribution. Risk requires 50K bytes in memory when resident with 1-2-3 and a graphics adapter card. Additional memory is not required during simulations.

Risk costs $395.

Palisade, 2189 Elmira Road, Newfield, N.Y. 14867. 607-564-9993.

Data storage

Irwin Magnetic Systems, Inc. has introduced several tape backup systems for the IBM Personal Computer, Personal System/2 and the Apple Computer, Inc. Macintosh markets.

The **Model 5080** is an external, self-powered, small computer systems interface (SCSI) minicartridge tape backup system designed for Macintosh computers.

The Model 5080, including software, SCSI interface and 256K bytes of cache memory, costs $1,395.

The **6150** series ¼-in. tape backup systems are said to include error correction capabilities and visual software. The 150M-byte systems were designed for supermicrocomputer, workstation and minicomputer users.

The 6150 series costs from $1,295 to $2,295, depending on configuration.

Irwin Magnetic Systems, 2101 Commonwealth Blvd., Ann Arbor, Mich. 48105. 313-996-3300.

XEROX

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DATA STREAM

Kathy Chin Leong

ENE: It's only a demo

A word to the wise: Map out your plans before pursuing MAP.

If you are a factory networking afficionado, chances are you already made airline reservations to hit Baltimore on June 6.

That's when the MAP/TOP Users Group and the Corporation for Open Systems plan to make networking history at the — drumroll, please — Enterprise Networking Event (ENE).

Don't worry about bringing your pink slip and checkbook, because many of the products won't be on the market for at least another six months. Just keep repeating to yourself: It's only a demonstration, it's only a demonstration.

For the uninitiated, the focus of the ENE will be on a ficticious factory that manufactures pencil and business-card holders. Hence, some 50 vendors will link computers and assembly gadgetry together to show how each phase of the manufacturing process can use Manufacturing Automation Protocol/Technical and Office Protocol (MAP/TOP). A backbone broadband MAP IEEE 802.4 network and a backbone baseband TOP IEEE 802.3 network will highlight the show.

I am sure this product parade will be significant. It will be one of the few times you find competitors such as Hewlett-Packard, DEC, IBM and Sun

Continued on page 34

Telecom users get new message

ICA urges communications execs to control change in complicated era

BY KATHY CHIN LEONG
CW STAFF

ANAHEIM, Calif. — Four years after the breakup of Ma Bell, communications managers' lives are more complicated than ever. But the message issued to the approximately 2,000 communications directors gathered here at a recent trade show was clear: Take hold of the problems in communications; do not let the problems get a hold of you.

That theme was echoed by numerous guest speakers at the 41st International Communications Association (ICA) conference.

"Have passion in leadership," urged Mike Vance, a management consultant at Mike Vance Design in Cleveland. "Set standards and do not compromise. Don't let mistakes happen."

Peter Keene, author of *Competing in Time*, compared the nature of a telecommunications manager's job with a person trying to change a tire on a moving car. "It is difficult, but the benefit of being in communications [is that it] gives you the chance to create big business opportunities for your company."

In financial services, manufacturing, distribution, airlines and publishing, superb communications services are critical to keeping an organization alive, Keene added.

In too many cases, users are constantly reacting to problems, Keene said. "Control change, don't just manage it," he charged. "Technology can give you a competitive advantage as well as an organizational advantage."

As the year 2000 approaches, the regulatory environment, the business world and the technology base will all be decidedly different, he noted. "Set forth a vision and carry the company with you," he said. "Look out on the horizon and get ready for it."

A captivated audience listened intently to Keene's admonitions before heading out to seminars designed to turn them into better technology managers. This year's group of workshops featured topics such as "Managing a Telecommunications Department," "Overcoming Resistance to Change" and "Managing Network Architecture and Technology."

On the lighter side

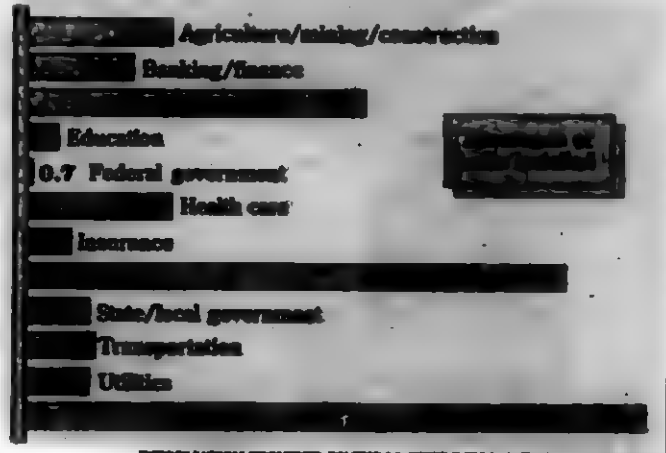
Out on the show floor, vendors entertained booth attendees. Infotron Systems Corp. amused users with U.S. Olympic champion Peter Vidmar, who performed exercises on a pommel horse. Contel Corp. kept attendees happy with an evening of entertainment featuring Bob Hope

Continued on page 34

Data View

PBXs for sales

The wholesale and retail market is the biggest customer of private branch exchanges



INFORMATION PROVIDED BY THE MARKET INFORMATION CENTER, INC.
CW CHART

TCP/IP cost mark broken

BY PATRICIA KEEFE
CW STAFF

OXNARD, Calif. — Network Research Corp. recently introduced a turnkey Transmission Control Protocol/Internet Protocol (TCP/IP)-based networking product that it claims is the first to break the $500 price barrier on TCP/IP products.

Network Research said the bundled offering, Fusion, will sell for $495 when it becomes available next month.

Fusion includes the latest release of Network Research's Fu-

Continued on page 35

Excelan's OSI plans skimpy

BY KATHY CHIN LEONG
CW STAFF

SAN JOSE, Calif. — Excelan, Inc. last week sketched out plans to develop products based on the Open Systems Interconnect (OSI) and Xerox Network Systems (XNS) protocols for its user base.

Once executed, the strategy could serve to expand Excelan's network technology base, which today is focused primarily on Ethernet and Transmission Control Protocol/Internet Protocol (TCP/IP) technology. But it is difficult to tell how broad the base will be, because Excelan officials were very skimpy when it came to product details and shipping dates.

But then, Excelan does have other things on its mind, such as its rapidly disintegrating merger plans with Network Equipment Technologies, Inc. (NET) coupled with the possibility that NET will move forward with its option, as underlined under the agreement, to purchase up to 21% of Excelan stock [CW, May 23].

The Excelan announcement concerned the first product introduced under a new network architecture shell that would encompass TCP/IP and implemen-

Continued on page 35

Inside

- Arnet unveils add-on port for PS/2 models. Page 37.
- Corvus announces asynchronous communications software for PC-NOS nets. Page 37.

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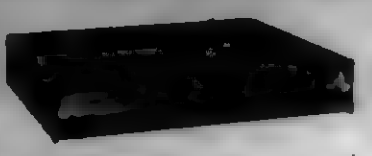

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Telecom users

CONTINUED FROM PAGE 33

and Rosemary Clooney.

Serious business was at hand as well. During an ICA board of directors meeting held here, the members voted to drop the $1 million billing stipulation for membership and open the doors to any company or organization that wants to join.

The ICA, founded 41 years ago, has consisted of some 700 member companies that reach an annual minimum of $1 million in communications billing.

ICA President Bill Koopman said, "Not that I expect the corner Laundromat to join the ICA, but that rule was established in the 1940s when $1 million was a lot of money. Today, it is very easy for a corporation to reach that much in billing."

WAN led the way

In addition to user business, a flurry of vendor announcements were issued at ICA, with special emphasis on wide-area networking (WAN).

Racal-Milgo in Sunrise, Fla., announced a gateway switch, called CMswitch, said to allow users access to several network management products from the Racal-Milgo line as well as other vendor's T1, private branch exchange and CCITT X.25 packet switching products. Slated to be available in August, the unit costs $3,450.

Infotron in Cherry Hill, N.J., said its Integrated Services Digital Network (ISDN) terminal adapter will now support Siemens Information Systems, Inc.'s EWSD, Northern Telecom, Inc.'s DMS 100 and AT&T's 5ESS central office switches. The company claimed it is the only ISDN terminal adapter maker to work with three major central office switching systems. Called Passport, the adapter requires Infotron's Passcom ISDN communications software.

Hands across the water

Several vendors announced efforts to build a greater international presence with their products and services — particularly fitting at a conference of global communications users.

Reston, Va.-based Telenet Communications Corp. announced it is expanding its billing and support services for customers with sites in Austria, Belgium, Canada, Israel, Italy, Korea and the Philippines. It is also forming a company based in Madrid, called Loginet, in a bid to service Spanish corporations.

Network Equipment Technologies, Inc. in Redwood City, Calif., said it will be opening support and training subsidiaries in London and Tokyo. Distribution arrangements have been made to install and maintain NET's T1 IDNX line in Switzerland, France, Taiwan and Korea. By 1989, the firm intends to sell products in 22 countries. The company also said it is offering new trunking modules to support transmission facilities found in France, West Germany and Japan.

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KMW Systems' channel interfaces have a history of reliability, with field-tested MTBFs as high as 19 years.

Our engineers are ready to work with you to ensure proper installation and operation of your channel interface. We also offer training classes, consulting services, and a free technical support hotline. That's the kind of service that's made us number one.

For complete information on KMW channel interfaces, protocol converters and graphics processors, call the toll-free number below. Or write KMW Systems, 6034 W. Courtyard Drive, Austin, TX 78730.

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Leong

CONTINUED FROM PAGE 33

willingly holding hands on a nonproprietary network. Yet, lest you swoon, I feel compelled to remind you once again: It's only a demonstration.

The last time the group said it made history was at the November 1985 Autofact show in Detroit. And if you were there, you might remember that 21 vendors were on hand to establish multivendor interoperability using MAP 2.1.

That demonstration proved two things: First, multivendor factory networking is possible; and second, multivendor factory networking is more complex than it seems. In Detroit, an embarrassing number of glitches and hardware crashes occurred involving notables such as IBM, NCR and Intel.

A first

Engineers witnessed several sunrises while preparing for this upcoming event, which will be devoted to MAP 3.0. Even General Motors MAP spokesman Mike Kaminski said, "If you look for problems with this demonstration, you are going to find them. But remember that nothing like this has ever been tried before."

So when you go to the ENE, prepare yourself with questions aimed at finding out how your corporation can implement MAP in the future. Find out how much a MAP approach will cost compared with a Decnet installation, for example. Take notes and hold the vendors accountable for everything that is said there.

You know, there are fads and then there are trends. Fads consist of products that developers create to see if they endure the spaghetti test — throw it on the wall and see if it sticks.

I suspect MAP will be here for the long term, since the largest computer firms, user organizations and technical standards committees have spent nearly a decade discussing and developing it. And since the Open Systems Interconnect (OSI) model isn't about to go away, MAP and TOP products, OSI zealots say, will reach maturity in five to 10 years.

So, what are you to think if, on June 6, you find that there are countless problems on the networking floor, products won't be out for another six months and there are no factory software applications available yet to cut across the proprietary-protocol mess? Just remember: It's only a demonstration.

Leong is Computerworld's West Coast Bureau Chief.

TCP/IP

FROM PAGE 33

sion network software for Microsoft Corp. MS-DOS-based systems, along with Western Digital Corp.'s Ethercard Plus adapter. It was designed to attach personal computers to a TCP/IP Ethernet network, the vendor said.

Network Research said the on-board buffer memory of Western Digital's cards boosts Fusion's file-transfer speed.

The vendor's TCP/IP local-area network pricing strategy is indicative of the way LAN prices, in general, are heading, said Doug Gold, a communications analyst at International Data Corp. in Framingham, Mass.

"By 1992, I predict that the cost of a [LAN] connection will be down around $250," Gold said. Ethernet pricing already falls right in that range for PC LANs.

Lower pricing for TCP/IP networks comes at a time when vendors and industry observers are predicting that users will begin to turn their attention to the Open Systems Interconnect (OSI) model. TCP/IP consists of Levels 3 and 4 of the OSI model and competes with OSI's TP4 transport standard.

However, few vendors have implemented TP4 on the personal computer side, according to Thomas Nolle, a communications consultant and president of Haddonfield, N.J.-based CIMI Corp. Moreover, there is so little practical difference between TP4 and TCP/IP that there is "precious little reason" for users to go back and reconfigure their nets using TP4, Nolle added.

Vendors and industry observers conceded that user migration to OSI will happen slowly during a five- to 10-year period. They said they do not expect TCP/IP users as a whole to suddenly jump ship for OSI.

The U.S. government, a long-time promoter of TCP/IP, has said all procurements will have to conform to the OSI stack by 1990.

OSI plans

FROM PAGE 33

tations of OSI and XNS along with a new release of its TCP/IP software.

Excelan said it is working on an OSI software product but said it will not release one until the market is ready, perhaps six months from now, according to a company spokeswoman.

OSI capabilities will be provided by the Universal Protocol Platform (UPP), a software architecture that Excelan officials claimed will eventually allow users to mix the network protocols listed above, on a host or front-end processor.

The Export 2000 communications server family is the first implementation of UPP. It is said to provide built-in network management software, featuring named services, configuring and boot servicing. Available now, Export 2000 supports the Microsoft Corp. MS-DOS, Digital Equipment Corp. VMS, MicroVMS and Sun Microsystems, Inc. SunOS operating systems. It also offers terminal services. Export 2000 costs $2,495.

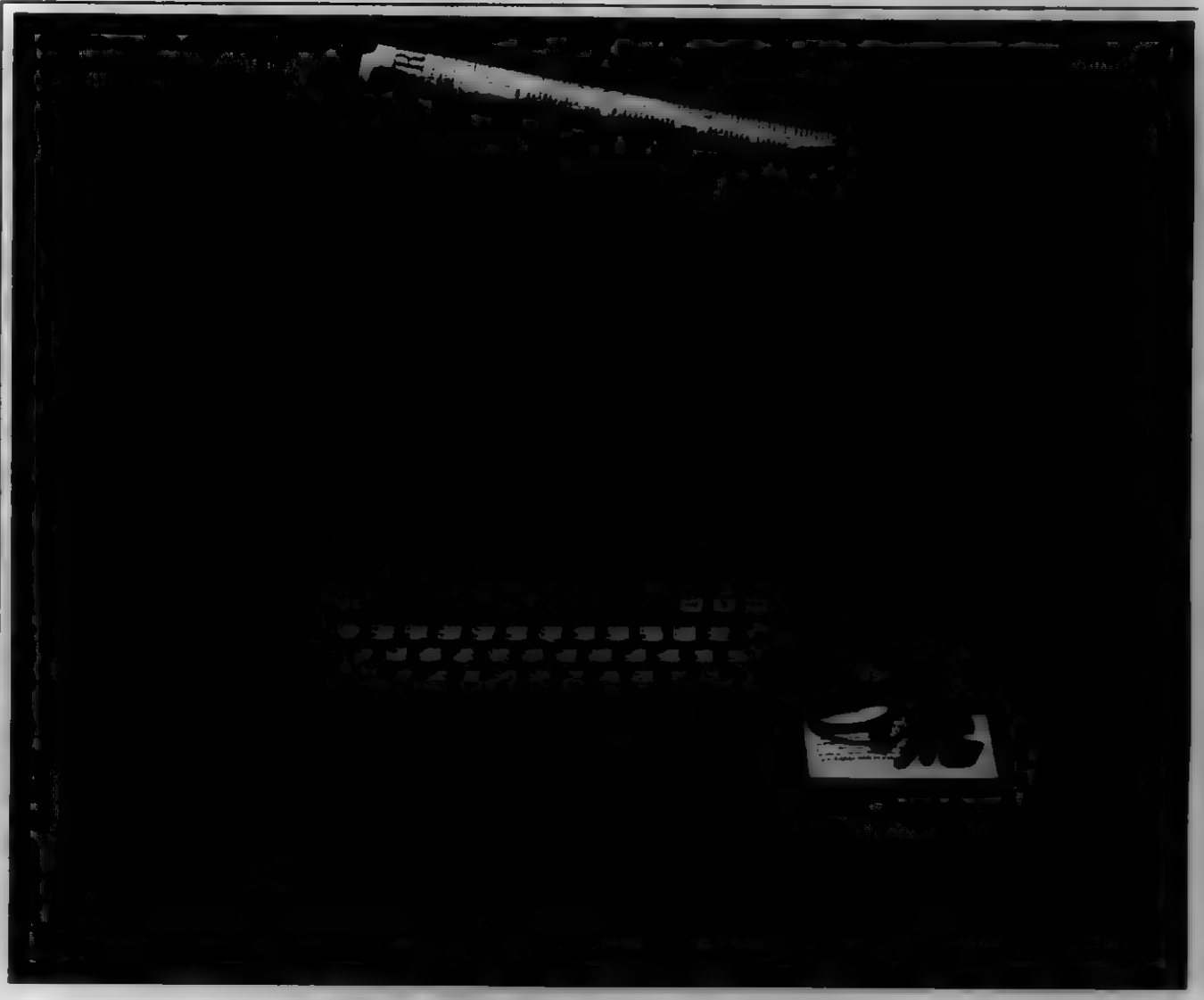
Also unveiled was TCP/IP 4.0, which reportedly highlights features such as security and high-level addressing. For now, UPP will only support Excelan's TCP/IP 4.0.

Will extend support

In a recent interview, Excelan vice-president of marketing Duane Murray assured customers that the UPP architecture will not move the company away from its installed TCP/IP base, but rather extend support to a wider variety of communications protocols.

According to Steve Spanier, Excelan's product line manager for systems products, users today are limited to running Excelan's TCP/IP on an Excelan front-end processor.

Excelan said it will provide the software interface between the as-yet-unidentified network protocols and UPP so that independent software developers do not have to get involved in changing any of their networking applications. UPP will be bundled with Microsoft's OS/2 LAN Manager.



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New credit-card-sized memory cards let you create, update and store files. They're also handy for programming the LT220 to your specific application.

Like its Silent 700™ predecessors, the LT220 sets new standards for portability, durability and reliability. All of which makes it the perfect tool for anyone who's ever wished for a VAX in their briefcase. In short, this may be the best little terminal in the world.

So go ahead. Take the first step toward improving your productivity today. Call Texas Instruments for more information or to arrange a demonstration of the LT220. Phone toll-free, 1-800-527-3500.

TEXAS INSTRUMENTS

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NEW PRODUCTS

Local-area network hardware

An add-on serial port board for IBM Personal System/2 Models 50, 60 and 80 is now being shipped by **Arnet Corp.**

Called **Multiport/2**, the product was designed for multiuser systems in vertical markets, small businesses and departments within larger corporations.

The product provides eight serial ports for connections to printers, modems, terminals and other personal computers. Multiuser operating system support includes The Santa Cruz Operation, Inc.'s Xenix 386 System V, Unix 386 from Microport Systems, Inc. and Pick from Pick Systems.

Multiport/2 costs $995.

Arnet, Suite 6, 618 Grassmere Park Drive, Nashville, Tenn. 37211. 800-366-8844.

A hard-disk management system that works with disks in excess of 50M bytes on a local-area network has been announced by **Gazelle Systems, Inc.**

Q-DOS Network Manager was designed to support all common DOS file management commands, including copying, moving, renaming, viewing and printing files. The package can reportedly accommodate 800 files per directory, with a capacity for 550 directories. An IBM-compatible or Personal System/2 computer, 256K bytes of memory and Microsoft Corp. MS-DOS 2.0 or higher are required for operation.

Q-DOS Network Manager costs $249.95.

Gazelle Systems, Suite 10, 42 N. University Ave., Provo, Utah 84601. 801-377-1288.

Local-area network software

Corvus Systems, Inc. has announced asynchronous communications software for use in networks running the Corvus PC-NOS operating system.

Dubbed the **Nostalk Asynchronous Communications Service**, the product is menu-driven and Hayes Microcomputer Products, Inc.-modem compatible and includes a script language and a learn mode. The product permits any modem on the network to be a shared resource.

Both communications server software and user communications software are included. The package supports Digital Equipment Corp. VT100 terminal emulation.

The Nostalk Asynchronous Communications Service costs $495.

Corvus Systems, 160 Great Oaks Blvd., San Jose, Calif. 95119. 408-281-4100.

Savant Concepts, Inc. has released **Version 2.0** of its **Network DCL Facility**. The facility executes standard DCL commands and procedures on multiple nodes of a Digital Equipment Corp. VAX/VMS network.

In addition to networking capabilities, the product includes list processing and parameter passing to symbols functions. Designed for system managers responsible for distributed VAX/VMS systems, the package reportedly can also be used by operators and end users.

The Network DCL Facility costs $600 to $2,000 per node. A full-function 60-day demonstration kit is available for $250.

Savant Concepts, Suite B, 1336 Willard, San Francisco, Calif. 94117. 415-753-2407.

Links

A terminal for providing simultaneous dual-host display operations has been introduced by the **Display Products Division of Applied Digital Data Systems, Inc.** (ADDS).

Positioned at the high end of the ASCII/ANSI terminal market, the **ADDS 2025** communicates simultaneously with two host computers on a split-screen or alternate-page basis. In dual-host mode, the product uses a 44-line display format and divides the 14-in. screen horizontally into two windows, each of which can be updated continually by its host. The ADDS 2025 is 12½-in. deep and 12.4-in. wide and weighs 24 pounds.

The ADDS 2025 costs $625.

Applied Digital Data Systems, 100 Marcus Blvd., Hauppauge, N.Y. 11788. 516-231-5400.

A recently introduced eight-port resource-sharing device from **Telebyte Technology, Inc.** allows any combination of personal computers and terminals to access a shared peripheral.

The **Model 327 Modem Allocator** employs an automatic polling sequence permitting eight RS-232C devices to access a synchronous modem or laser printer.

Front-panel status indicators reflect both the condition of the data and the control signals of the selected port. Operating power is derived from a wall-mounted transformer. Standard configuration is 110V, 60Hz; 220V, 50Hz is optional.

The Model 327 Modem Allocator costs $495.

Telebyte, 270 E. Pulaski Road, Greenlawn, N.Y. 11740. 516-423-3232.

Ark Electronic Products, Inc. has introduced communications software for IBM microcomputers.

The Datalink Express Series Communication System enables an IBM Personal Computer, PC XT or AT to emulate an IBM 3274/6 cluster controller with up to seven attached IBM 3278/9 or 3180 terminals and an IBM 3287 printer. The product allows the IBM Personal System/2 Models 50, 60 and 80 or the PC, XT or AT to emulate an IBM 3777-1 RJE workstation. Full bidirectional file transfer supports EBCDIC encoding.

The Datalink Express II takes advantage of PS/2 Micro Channel facilities, including Programmable Software Select for software configuration. Both products come with a 4.8K bit/sec. synchronous modem.

The Datalink Express Series costs $1,595; the Datalink Express II costs $1,995.

Ark Electronic Products, P.O. Box 2169, Melbourne, Fla. 32902. 800-228-0914.

A micro-to-mainframe software package that allows an IBM Personal System/2 to display mainframe software has been introduced by **Attachmate Corp.**

The **Hypergraph/8514** 3270 was designed to maximize the capabilities of IBM's 8514 monitor and graphics adapter for the PS/2.

Mainframe graphics are translated into special commands for the 8514/A adapter to produce 1,024- by 768-pixel resolution.

The software, combined with an 8514 display system, reportedly draws complex images in less than one second.

Hypergraph/8514 is an add-on for Attachmate's Extra connectivity software, and will access a mainframe over IBM 3270 coaxial cable, remote modem or local-area network connections.

Hypergraph/8514 costs $895.

Attachmate, 3241 118th Ave, S.E., Bellevue, Wash. 98005. 800-426-6283.

File servers

An Ethernet and TCP/IP-based terminal server product was recently introduced by **Encore Computer Corp.**

Developed for the Unix and Transmission Control Protocol/Internet Protocol (TCP/IP) user, **Annex II** is available in either a 16- or 32-port unit.

The product incorporates a National Semiconductor Corp. 32016 processor and an Intel Corp. 82586 Ethernet controller.

The memory space provides up to 256 sessions. In addition, the Annex II is rack mountable.

The 32-port Annex II is priced at $256 per port.

Encore Computer, 257 Cedar Hill St., Marlboro, Mass. 01752. 617-460-0500.

Modems/Multiplexers

Anderson Jacobson, Inc. has announced a series of compact, eight-port link-level switching statistical multiplexers.

The **AJ2100** series products measure 12.8- by 6½- by 1¾-in. and reportedly can be used as small data private branch exchanges, line concentrators or both.

The composite port can be configured for synchronous operation at up to 72K bit/sec. and asynchronous operation at up to 19.2K bit/sec.

The AJ2100 series costs from $1,295 for a single unit.

Anderson Jacobson, 521 Charcot Ave., San Jose, Calif. 95131. 408-435-8520.

A T1 multiplexer that supports one or two lines and up to 32 nodes has been announced by **Teltone Corp.**

Max1 conforms to all AT&T and Bellcore standards. It provides a gateway to such public T1 networks as Accunet Switched 56, Dataphone Digital Service and Megacom Services. It is also applicable to private point-to-point or multipoint networks.

Features include software-selectable options, a floppy disk drive, an integral Channel Service Unit, a Bell 212A-compatible modem and D4 and ESF framing.

The Max1 costs approximately $39,000, depending on configuration.

Teltone, 10801 120th Ave. N.E., Kirkland, Wash. 98033. 206-827-9626.

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BIMTEXT — Word processing, document composition system. Create formatted documents from free-form input. DOS and OS.
BIMSWAP — Switch local 3270 BTAM terminals between multiple CICS partitions without special hardware or additional ports.
BIMCMPRS — CICS 3270 data compression system. Reduces response time for remote terminals significantly. DOS and OS.
BIM-FMAP — CICS BMS on-line map generation and maintenance. DOS and OS.
BIMECHO — Copies one CRT's output to another or printer for problem determination and demonstration.
BIMP3270 — Comprehensive CRT screen image print facility. Copy to terminal printers or spool queue for system printer.
BIMSERV — On-line display of library directories and entries, VSAM Catalog entries, disk VTOC's, etc.
BIMCNSOL — Multiple/Remote System Console function for CICS. Display-only or full input/display versions available.
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BIMSUBMT — On-line Job Edit and Submission facility.

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HARD TALK

Stanley Gibson

Can Unix save minisupers?

If you look at the number of exhibitors at the World Supercomputer Exhibition held in Boston recently, you would think that supercomputing has never been hotter.

As it turned out, most of the exhibitors were actually vendors of what have come to be known as minisupercomputers, not supercomputers, properly speaking. If only true supercomputer vendors attended, there would have been only three or four exhibitors — hardly enough to put on a show.

But naturally, all the vendors had to refer to themselves as vendors of supercomputers, whether personal supercomputers, departmental supercomputers, affordable supercomputers or some other appellation. If nothing else, the conference called attention once again to how bad a prefix "super" is. What has been a mildly misleading adjective has become almost completely meaningless.

At any rate, the number of minisupercomputer vendors is probably bound to decrease in the next few years, simply because of market overcrowding.

Onri Serlin, a supercomputing and parallel processing analyst at Itom International in Los Altos, Calif., says cuts in government spending are one reason the minisupercomputer market

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IBM exposes image network

Insurer uses scanner monitors, optical disks to conquer paper mountain

BY KATHY CHIN LEONG
CW STAFF

PALM SPRINGS, Calif. — By the end of 1989, the 10,000 pieces of mail the United Services Automobile Association (USAA) policy department receives daily will be viewed on scanner monitors and saved on optical disks. And the original documents will be thrown away, saving the insurance organization 40,000 square feet in office space, which is equivalent to $780,000 annually.

That is the goal for the USAA, a $3 billion auto and life insurance company serving 1.7 million military personnel, alumni and their families. At the IBM Executive Insurance Industry Conference held here recently, Jim Patterson, USAA casualty senior vice-president, revealed that the tremendous undertaking will be the result of an image networking project being co-developed with IBM, which commenced last July.

IBM will be releasing imaging products in a few months based on its work with USAA and other users with which it has co-developed applications, according to Bonnie Digrius, an analyst at Infocorp in Cupertino, Calif.

Robert Wilson, a vice-president at market research firm Dataquest, Inc. in San Jose, Calif., said he believes the imaging products could be announced at the rollout of IBM's System/36 and 38 follow-on, generally referred to as Silverlake.

Image network a reality

This month, USAA will be showing the first implementation of the image network, which consists of image scanners, optical storage units, an IBM 4381 Model 14 running MVS/XA and an IBM Token-Ring local-area network.

USAA is starting with three IBM Personal Computer AT workstations, but soon, 25 will be on-line. By the end of 1989, the company will have 1,000 PC ATs on the network in five cities serving 2,000 users.

An IBM spokesman said that despite the PC ATs' being discontinued in favor of the Personal System/2, IBM will fulfill its obligation to supply USAA with ATs during the next 1½ years, as specified in the contract.

With an essentially conservative corporate culture, the USAA has traditionally avoided rapid changes in its procedures. But with the new image processing system, the company is paving a radical path for other insurance entities that are only toying with the idea. A number of the 800 users at the seminar expressed interest in the USAA application.

"What USAA is doing is on the mark," one conference attendee said. He and several others said they are trying to move their organizations to implement similar systems.

Not only does image processing save paper costs, it also accelerates worker productivity, since documents can be accessed rapidly. By next year, USAA's users will be able to access 3-week-old files in less than one second. Letters that are 6

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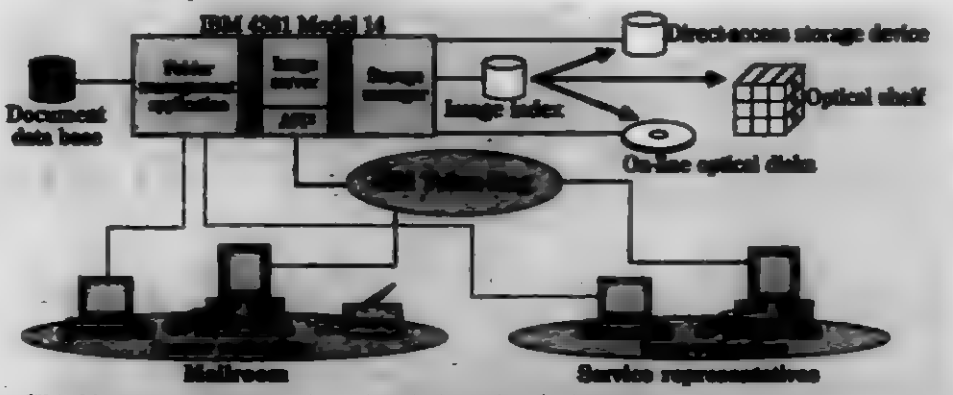
From paper to screen

Scanners enter USAA mail into an image system, which distributes documents and allows service representatives to call up clients' data on-screen



INFORMATION PROVIDED BY IBM

Rollouts pepper conference

BY STANLEY GIBSON
CW STAFF

BOSTON — A sprinkling of announcements, highlighted by a high-end cluster from Alliant Computer Systems Corp., seasoned the Second World Supercomputer Exhibition, held here recently.

Littleton, Mass.-based Alliant introduced a cluster of two eight-processor minisupercomputers. Meanwhile, Digital Equipment Corp. unveiled a user-developed package for writing applications on its VAX processors to run on Cray Research, Inc. supercomputers.

Cydrome, Inc. announced another version of its Cydra 5 departmental minisupercomputer, which was formally announced in January.

Most well-known vendors of supercomputers, minisupercomputers and powerful graphics workstations exhibited their wares at the show, which was held in conjunction with the Third International Conference on Supercomputing, sponsored by the International Supercomputing Institute in St. Petersburg, Fla.

Alliant's two-system cluster, called the FX/82 Computational Center, contains a total of 16

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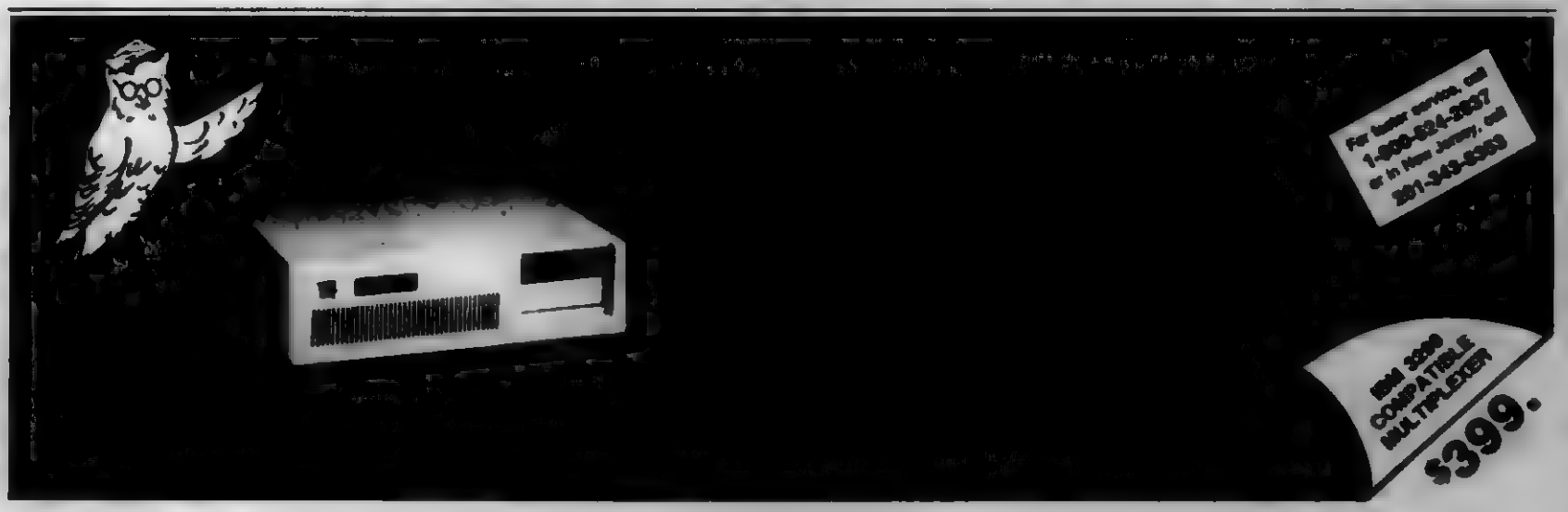
Inside

- Kelly Computer ships first add-in board for HP 3000 Model 950. Page 40.
- Altos expands offerings in Pick Systems market. Page 43.



Kelly springs memory board for HP RISC unit

BY JAMES A. MARTIN
CW STAFF

MOUNTAIN VIEW, Calif. — Kelly Computer Systems, Inc. recently announced it is shipping the first third-party add-in memory board for Hewlett-Packard Co.'s reduced instruction set computing (RISC)-based HP 3000 Model 950.

Kelly's 3950A offers 16M bytes of memory for $25,000 compared with HP's 16M-byte, $40,000 add-in memory board for the Model 950.

HP's Model 950 comes standard with 64K bytes of memory and is expandable to 128K bytes in 16M-byte increments. Additional memory is required to improve the HP 3000 Model 950's performance, the company said.

RISC factors

RISC architecture, by its nature, requires fewer clock cycles than complex instruction set computing environments, but program code requires four to 10 times more memory, a company spokesman said.

Kelly's 3950A is said to be fully compatible with the HP 3000 Model 950. The memory subsystem uses 1M-bit nibble-mode dynamic random-access memory chips that the company said have an average access time of 120 nsec.

Single-bit error correction, double-bit error detection, memory error logging and battery backup are all fully supported.

Other features include an on-line/off-line convenience switch as well as on-line and activity LED indicators.

The board is supported by a lifetime warranty and return program and a two-week cost-free demonstration.

HP unveiled its new round of systems, including the HP 3000 Models 925 and 955, this spring [CW, April 11].

CSP designs VAX boards

BY STANLEY GIBSON
CW STAFF

BILLERICA, Mass. — Claiming to dramatically boost computational performance, CSP, Inc. recently announced an application accelerator for Digital Equipment Corp. Microvax processors.

The MAP-4000 consists of three Q-bus-compatible plug-in boards that are intended for DEC Microvax II and Microvax 3000 systems.

The MAP-4000 is capable of peak performance of 40 million floating-point operations per second (MFLOPS) in single-precision, or 32-bit, calculation. It is capable of 20 MFLOPS in double-precision, or 64-bit, operation.

Running the Linpack benchmark, the accelerator peforms between 5½ and 6 MFLOPS, according to a CSP spokesman.

"You are getting the performance of a Convex or Alliant on three plug-in boards," said CSP President Samuel Ochlis, referring to products from minisupercomputer makers Convex Computer Corp. and Alliant Computer Systems, Inc.

The MAP-4000 can offer 10 times the computing speed of a Microvax II on general compiled code and 100 times the speed in vector and matrix arithmetic that has been optimized using a programmer's tool kit offered by CSP.

The accelerator, with 2M bytes of memory, is priced at $18,995. Containing 8M bytes of memory, it is priced at $22,500. The subsystem's memory is expandable to 256M bytes.

Currently available, the board contains 13 very large-scale integration microprocessors, five of which are CSP's proprietary designs, Ochlis said.

The MAP-4000 is CSP's first product for Microvax processors.

The firm, a member of DEC's Cooperative Marketing Participant program, makes a variety of array processors for other DEC systems. Ochlis promised a similar accelerator for processors using DEC's VAXBI bus later this year.

Plexus ties DP system to CPUs

BY J. A. SAVAGE
CW STAFF

SAN JOSE, Calif. — Plexus Computers, Inc. recently said it is linking its Plexus Extended Data Processing Systems, or XDP, with mainframes in the IBM Systems Network Architecture (SNA) environment so its systems have more to do than just talk to themselves.

Three new products — the 3270/SNA Gateway, the 3270 Terminal Emulator and Link/3270 — are said to allow the Plexus compound data processing system to access mainframe applications and data bases.

The compound system encompasses image, text and alphanumeric processes.

Working parts

The Plexus XDP consists of a Unix-based departmental computer that operates with Microsoft Corp. MS-DOS-based personal computers as workstations using an Ethernet local-area network.

The Plexus XDP system can also include a document scanner, optical character recognition devices, optical disk storage facsimile machines and laser printers.

Link/3270 is communications software running on a workstation and is the link between the Plexus XDP and mainframes. It is listed at $495 per workstation.

The 3270/SNA Gateway with a PC board and software is priced at $15,800.

The 3270 Terminal Emulator is required on each XDP workstation that communicates with the mainframe.

The Terminal Emulator allows a workstation to have one or more on-line sessions with an application running on the mainframe. It operates under Microsoft's Windows and costs $195 per workstation.

All the Plexus products are scheduled to ship at the end of the month.

Gibson

FROM PAGE 39

is cooling down.

All of the vendors say they are approaching high-power computing in a unique way; a way that will make them so distinctive in the market that they will have little competition.

Familiar market

But to what uses will their systems be put? The litany is almost always the same: Molecular modeling, computational fluid dynamics and seismic analysis head the list. In the end, the vendors are aiming for the same customers. Their hope is that their approach is truly better than any others.

Already there have been casualties, and even some apparent survivors have not gone unscathed.

Celerity Computing, verging on bankruptcy, was recently acquired by Floating Point Systems. Floating Point subsequently announced layoffs of its own.

Alliant Computer Systems, although not likely to go out of business, has had layoffs.

The hope for all these firms may lie in Unix, around which most of the vendors have based their software strategy.

The idea is that there will be many applications written under Unix and these will be easily portable to the vendors' machines. Thus, if the firms are going to fail, it will not be for lack of software.

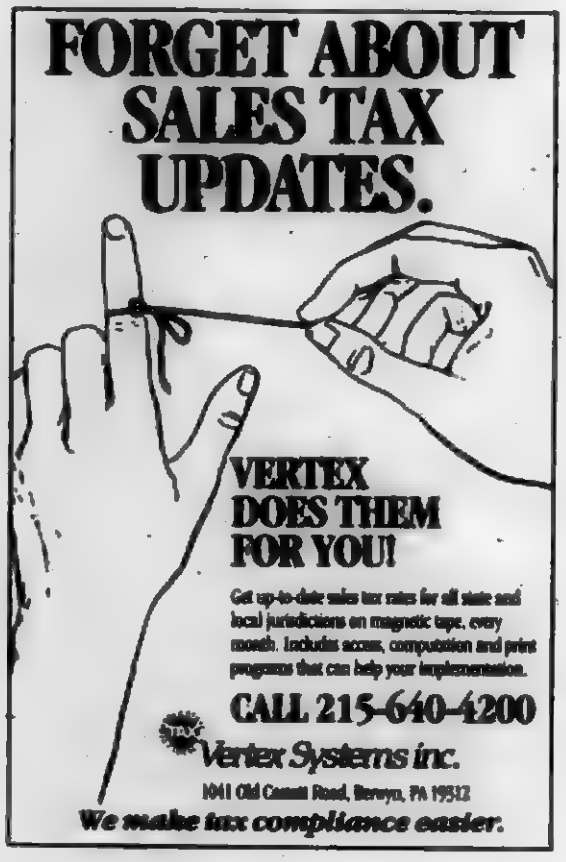
Battleground?

Indeed, this strategy just might work. In previous shakeouts, such as in the personal computer market, the vendors with proprietary operating systems have been whittled down to two or so.

Now all are starting out, in effect, with one operating system. The resulting battle, if all goes according to plan, will be fought on the merits of the hardware, service and support.

And so the future of the market could be a test of the promise of Unix. If Unix does not offer the portability it promises, the bloodletting in the minisupercomputer shakeout will be all the greater.

Gibson is Computerworld's senior editor, systems & peripherals.



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IBM network

FROM PAGE 39

months old will take 15 to 20 seconds to access. Mail that is up to 2 years old will be tapped in less than two minutes.

The project is the final tier of a $100 million automation overhaul that USAA started in 1981. The company has already spent millions in internal software development and application integration.

Since USAA sells via mail and telemarketing and not through agents, a chief priority in the imaging project was reducing the lag time between receiving and delivering mail.

The image system lets mail clerks feed documents into a scanner that transmits the data into USAA's internally developed File Management Folder software. Then the service representative retrieves the file from optical disk and views the document from his IBM PC AT.

The company had begun to store documents on microfilm, but found it could not store pictures of accidents or damaged goods — evidence that is necessary in filing claims.

Currently, 90% of the USAA imaging system is commercially available. The remaining 10% consists of IBM custom-developed products: an imaging card for the PC AT, imaging software and an interface that links the scanner to the workstation.

IBM is also acting as a systems integrator, according to Bob Young, the firm's manager of image technology. The scanner comes from Bell & Howell Co., the optical system from Filenet Corp. Whether IBM will sell the custom pieces of hardware and software is not yet known, he said.

When the project is complete, USAA said, it will allow the company to get rid of 99% of the original paper documents and save thousands of dollars in office space.

Conference

FROM PAGE 39

CPUs, eight in each of its component systems. The cluster is priced at $1.25 million. The eight CPUs of each system in the cluster can be configured in a variety of ways.

The CPUs can be arranged as multiple individual processors working on separate jobs, or they can be grouped into parallel configurations, called "complexes," consisting of two to eight CPUs, the vendor said.

Speedier than VAX?

Alliant claimed the power of the FX/82 is eight times that of DEC's high-end VAX 8840, consisting of four processors.

The cluster consists of two FX/80, each configured with 64M bytes of memory, 1.1G bytes of disk and a triple-density tape drive. Software licenses for the Concentrix operating system and FX/Fortran are also included.

Existing FX/80 systems can be upgraded to the cluster. The FX/82 is available in the current quarter, the vendor said.

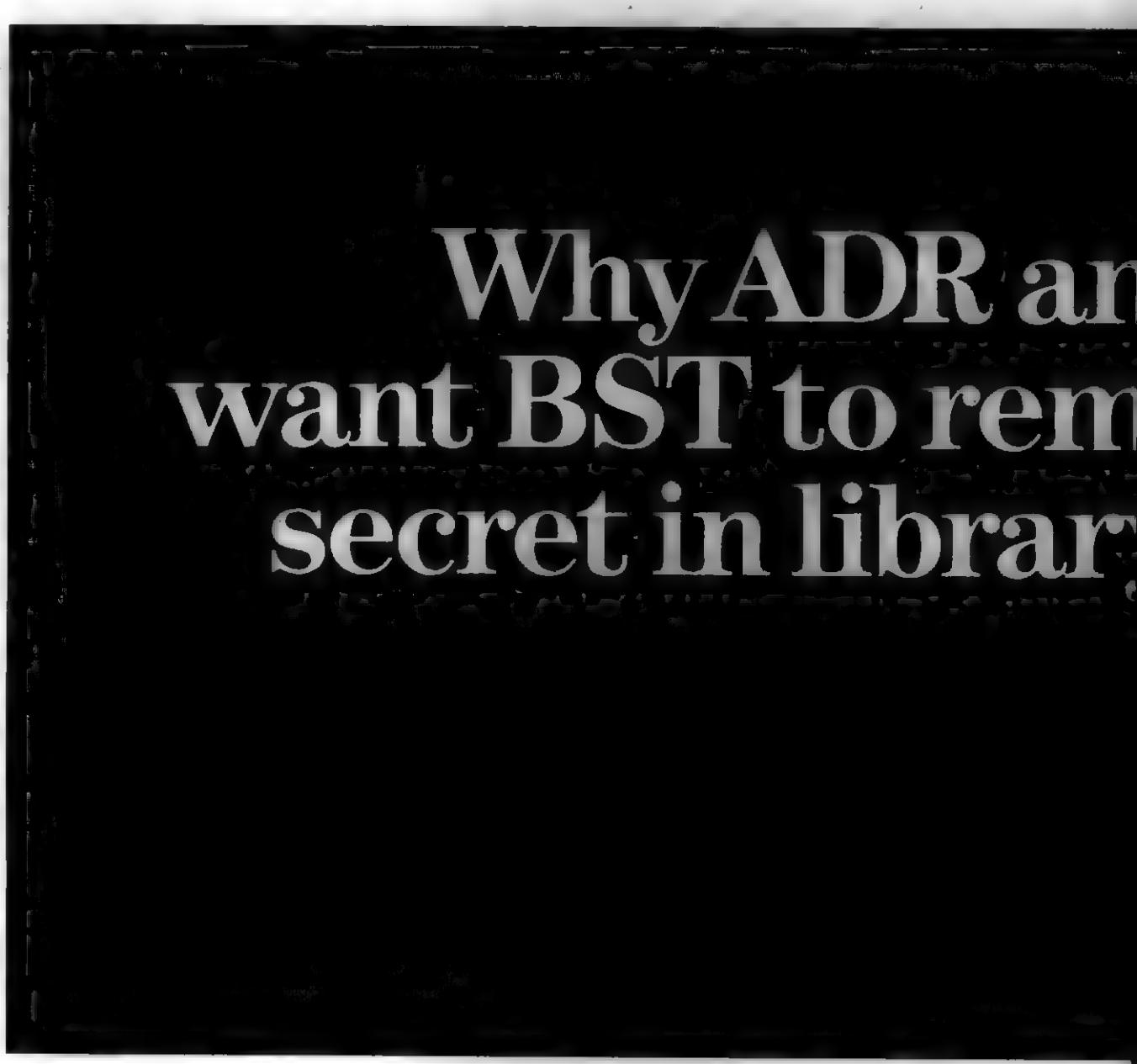
DEC's software, called the VAX SDE/Science Integration Package, is said to ease development of computer applications for seismic analysis, high-energy physics, weather forecasting and molecular modeling.

The package was originally developed at the Pittsburgh Supercomputing Center, a consortium of the University of Pittsburgh, Carnegie-Mellon University and Westinghouse Electric Corp. The VAX/SDE Science Integration Package will be available in the first quarter of fiscal 1989 and cost $15,500.

Milpitas, Calif.-based Cydrome unveiled the Cydra 5 Model 1205 system. Cydra 5 systems are also sold by Prime Computer, Inc. as the MXCL 5. A Prime spokesman said that Prime expects to offer its own version of the Model 1205.

The new model, which sells for $495,000, is priced below the Cydrome's original Cydra 5 Model 1200.

The Model 1205's I/O subsystem is tailored to the needs of entry-level to medium-size users, the vendor said. Memory capacity is 32M bytes and is expandable up to 512M bytes. The Model 1205 is available immediately.



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NEW PRODUCTS

Processors

Altos Computer Systems, Inc. has expanded its offerings in the Pick Systems market.

The **Altos 3068 LE** system is reportedly the first Altos Pick offering designed to retail in the $10,000 to $15,000 range. The system includes a Motorola, Inc. 68020 processor, and its memory and hard-disk storage architecture allow the unit to accommodate from eight to 120 users. The system is said to run with a range of horizontal office automation tools.

Altos Computer Systems, 2641 Orchard Pkwy., San Jose, Calif. 95134. 408-432-6200.

Data storage

A series of memory boards for Digital Equipment Corp.'s Microvax 3000 and Vaxstation 3000 have been announced by **Clearpoint Research Corp.**

Called the **MV/3000**, the boards are available in 8M-, 10M- or 32M-byte configurations. The products use a custom gate array design to deliver 16M or 32M bytes of memory using 1M-bit dynamic random-access memory chips. The boards can also be used by DEC Microvax II customers who upgrade their Microvax II CPU boards to the Microvax 3000.

The MV/3000 costs $3,500 for the 8M-byte version.

Clearpoint Research, 99 South St., Hopkinton, Mass. 01748. 617-435-2000.

Printers/Plotters

Digital Equipment Corp. has added two government-certified models to its line of laser printers and is also offering price reductions on several existing units.

The **RF-LN03** and **RF-LN03S** are DEC's most recent desktop laser printers that are accredited to meet U.S. government Tempest requirements. The RF-LN03 prints at 8 page/min with 300 by 300 dot/in. resolution. It costs $4,995. The RF-LN03S reportedly offers full-page bit-map graphics at 300 by 300 dot/in. The printer costs $7,995.

The **Scriptprinter**, an 8 page/min desktop laser printer, now costs $5,495, a 13% reduction from the original price of $6,610.

DEC, 146 Main St., Maynard, Mass. 01754. 617-897-5111.

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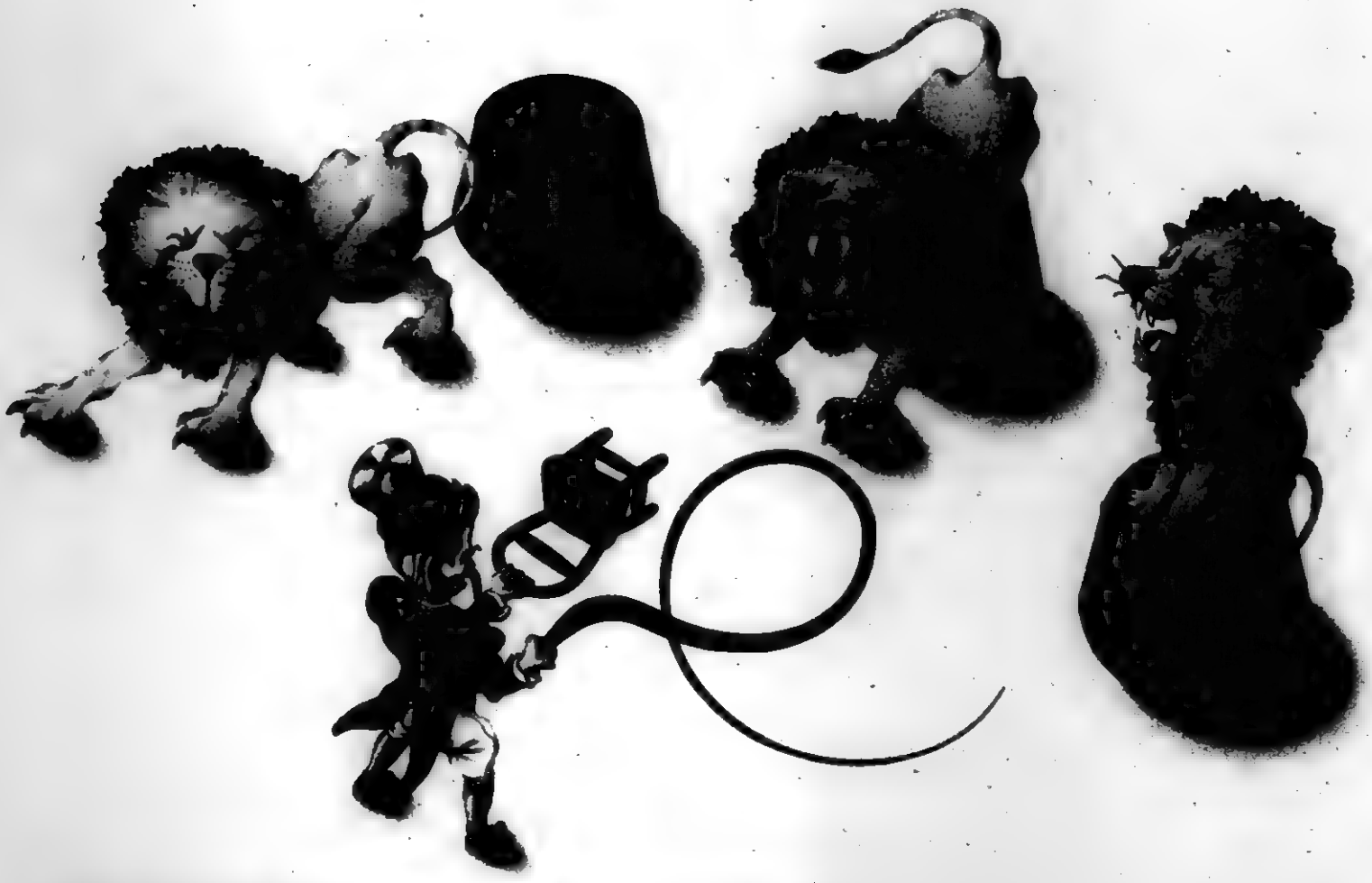

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The CIM connection: Reaching out to the shop floor

BY LARRY STEVENS

Executives at Weyerhaeuser Co.'s giant pulp and paper mill in Longview, Wash., knew they had an untapped resource in the firm's 110 supervisors and operators, and they wanted some way to unleash it.

Alton Loe, the plant's systems manager, explains, "These are the people who know the most about our processes. But because of the limited way information flowed around the plant, it was necessary to give most of the control to schedulers, who knew less about the process and who were only here for one out of the three shifts."

Computer-integrated manufacturing (CIM) changed all that.

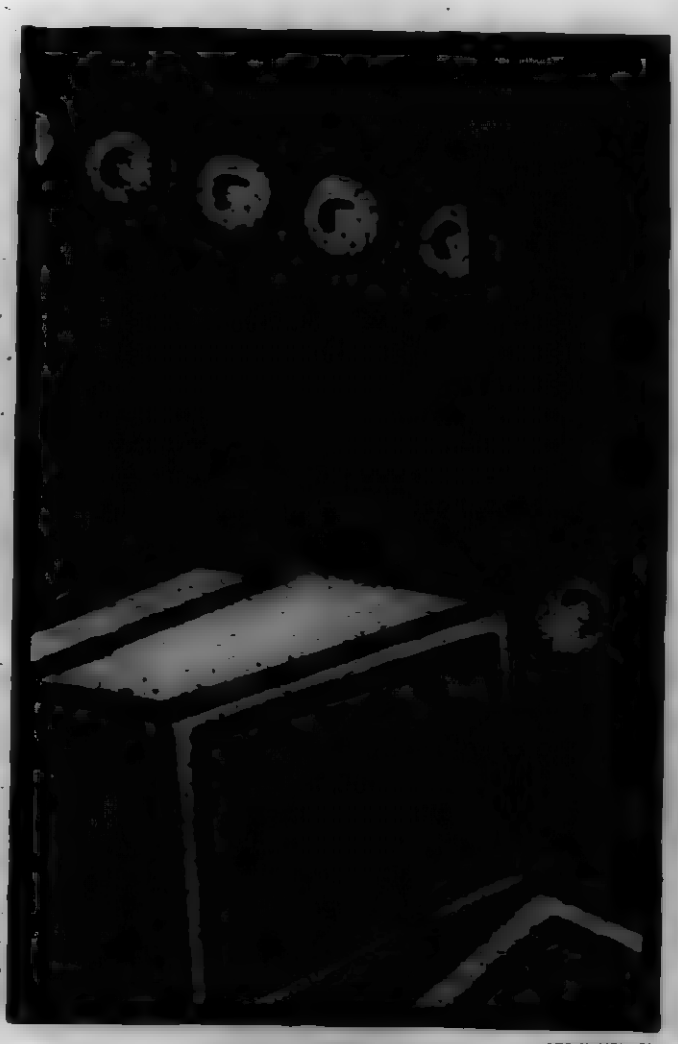
One process over which executives wanted production workers to have more control was chemical proportions. Paper quality is determined mostly by a mix of about six chemicals that are combined with the pulp. The chemicals bear different characteristics, but they can be mixed in a number of ways to achieve the same paper quality. It could save the company a significant amount of money if process staff chose the mix of chemicals based on up-to-the minute information on availability and price.

"If you want to ask operators on the plant floor to make decisions, you can do that anytime. But if you want them to make good decisions, you have to give them good information," Loe says. To do this, Loe headed a team that developed a CIM system for Weyerhaeuser.

Weyerhaeuser's CIM setup, which is built around a Digital Equipment Corp. VAX-11/785 and a VAX 8350, collects information about such things as a chemical's temperature, pressure, consistency, flow and direction rate as well as availability and price. It then makes the data immediately available through terminals to those operating the dryers, digesters, washers and other equipment.

According to Loe, "Before CIM, all the information would have to be gathered on slips of paper and coordinated by schedulers and sent around to the various departments by messengers. The operators — the ones who know our system best — were often the last to receive vital data." Now, with information at their fingertips, operators are better able to make decisions that have substantially increased plant efficiency.

Stevens is a free-lance writer based in Springfield, Mass.



LES KANTUREK

INSIDE

Bottler fills simulated cans first
Page 46

MAP 3.0 follows seven-layer OSI model
Page 52

What is it?

CIM is a means of integrating the plant floor — and often other areas of an organization — through computerized flow of data. According to Dan Cretu, an analyst at Automation Research Corp., a Medfield, Mass.-based market research firm, CIM is a complete, integrated system that may include order entry, parts design, manufacturing and distribution as well as customer feedback.

Using CIM, a manufacturing firm's employees can go to a terminal, look at what has been ordered, check how many pieces are in stock and then track the manufacturing process for that part, the suppliers and, ultimately, the service record for that type of product.

Financial and administrative systems can also be linked to such networks. While getting information to the plant floor is the most important part of the CIM system at Weyerhaeuser, data sent to the financial departments also provides quick reports for forecasting and planning.

Experts expect that within the next 10 years, all large companies and many medium-size and small manufacturing companies will be implementing some level of computer integration.

According to Glen Allmendinger, president of Harbor Research Corp., a Boston-based manufacturing research and consulting firm, the total amount spent in the U.S. CIM market in 1987 was approximately $21.4 billion. Allmendinger estimates a $38.4 billion U.S. market and $89.5 billion worldwide market by 1993. Automation Research's Cretu adds that two-thirds of all CIM expenses are in-house.

While in-house integration expenses may add up, they may also be well worth the cost. The CIM project at Weyerhaeuser was begun in June 1985 and completed in February 1987. Using the financial reports that come directly from the process centers, Loe estimates the company is saving more than $1 million annually in raw materials alone. Weyerhaeuser is so convinced of the concept's viability that it is now selling its CIM system under a subsidiary, Weyerhaeuser Information Services.

One facet of CIM that may catch an MIS manager's eye is

CIM

FROM PREVIOUS PAGE

that it is a new opportunity for development and advancement. According to Marvin Martin, vice-president of information resources at R. J. Reynolds Tobacco Co. in Winston-Salem, N.C., CIM has allowed his information resources group to go beyond the areas normally thought of as MIS.

Follow the leader

Martin sees MIS staff as systems integrators. "We're responsible for implementation and maintenance of all manufacturing and business systems," Martin says. "We are not involved in manufacturing issues such as choosing the exact sensor to use in a workstation, but we would specify the interface for that sensor." A rule of thumb at Reynolds, Martin says, is that "manufacturing specifies the equipment, and we specify the interface."

According to Alan Anderson, partner in charge of manufacturing consulting at Ernst & Whinney in Chicago, CIM leadership is currently being shared in most companies by technology groups other than MIS because of the technology's roots in flexible manufacturing, computer-aided design (CAD) and numerical control. "But as integration gets tighter," Anderson says, "MIS will be needed for networking and data base management."

In addition, he says, as companies mature with CIM, they realize that flow of information is more important than automation of tasks. As that happens, MIS will have greater opportunities for involvement. "MIS won't be able to lead CIM in all companies," Anderson says, "but it should play a very important role."

The successful evolution of the Manufacturing Automation Protocol will also help MIS integrate the shop floor (see story page 52).

One often-expressed advantage of CIM is that it cuts costs by decreasing the use of raw materials, lowering maintenance expenses and even reducing the need for capital expenditures through more efficient use of plant facilities.

Reynolds' Martin says CIM has provided for smaller, more flexible runs, more efficient flow of materials and better control of the factory floor. This has allowed, for example, the replacement of large forklifts by smaller, automatic vehicles.

"Just by eliminating forklifts," Martin says, "we were able to build a smaller facility, increase safety and cut down on maintenance costs." Reynolds has spent almost $2 billion so far in the '80s on modernizing its facilities, including building a 47-acre state-of-the-art facility, called Tobaccoville, which includes an extensive CIM network. At Reynolds, CIM is totally integrated on four levels: shop floor, area, plant and corporate system. The corporate system includes financial planning, variance reporting, performance reporting, distribution requirements planning, material requirements planning, manufacturing resource planning, personnel, payroll, labor reporting, standard costs and inventory tracking.

Workers may express concern that CIM will eliminate jobs, but Martin insists that while the technology will eventually shift the types of jobs at Reynolds, its 10,000-person work force will remain at about the same level. "Our cost savings do not come from layoffs," he says.

Experts agree that a company rarely experiences reduced payroll if CIM is implemented correctly. Rather, cost savings come partly from the added flexibility of shifting production to meet market conditions.

At Reynolds, schedulers use a number of parameters such as demand, availability of equipment and availability of raw materials to determine which product will be manufactured at which station. The operator finds out through terminals which product he will be fabricating, and the system automatically dispatches automatic wire-guided vehicles that contain the wrapping, tobacco, filters and other necessary materials.

Flexibility key

At Allen-Bradley Co., a Milwaukee-based manufacturer of engine parts, the flexibility afforded by CIM is the major factor in the company's impressive growth. The firm's old method of operating made use of long assembly lines to fabricate even simple components. Now machines are able to shift quickly from one part to another. In one example, a machine can make any one of 777 different parts without pausing.

The information for a part might come from the shop floor, from the company's engineering department or even from a sales agent in the field. This flexibility allows the company to make more than 300,000 different parts. Allen-Bradley's sales this year will be $1.2 billion to $1.3 billion, compared with $450 million in 1980.

According to Alan Laduzinsky, technical communications consultant at Allen-Bradley, the company's CIM effort is a cooperative project that includes plant floor personnel, real-time engineers and MIS, and each group is learning to appreciate what the other can do.

Allen-Bradley has four engineering data bases, which will be incorporated into an Oracle Corp. relational data base residing on a DEC Vaxcluster. "We're accessing information from that to build programs for assembly and test," Laduzinsky says. The transformation of different data bases is primarily being done by MIS, but the conversion of CAD and computer-aided engineering to allow for extraction of information for assembly and testing is done by real-time engineers.

The success at Allen-Bradley comes not only from flexible manufacturing but also from such factors as lower inventory and better quality. This has resulted in numbers that are so dramatically different from pre-CIM days that they are hard to compare meaningfully.

"How do you cost an end-of-day inventory that includes only a few bolts, springs and grommets when before we had 180 days' supply on hand?" Laduzinsky asks. "How do you factor 20 defects per million? Can we say we've reduced rejects by a thousandfold? It sounds ridiculous. In some cases, we've reduced setup time to zero. Do we really eliminate setup as a factor when we're costing a job?"

The flexibility and immediacy of information afforded by CIM also helps reduce errors and

Why CIM?

The pluses of computer-integrated manufacturing

Cuts costs:
- Decreases use of raw materials
- Lowers maintenance expenses
- Reduces capital expenditures through more efficient use of plant facilities

Allows for just-in-time manufacturing:
- Enables smaller, more flexible manufacturing runs
- Provides for more efficient flow of materials
- Institutes better control of the factory floor

Improves quality of production:
- Sets up immediate availability of information
- Reduces manufacturing errors
- Adds ability to make late design changes

CW CHART

Steps to a smoother lager

BY JANET FIDERIO

At Adolph Coors Co., bottling beer isn't what it used to be. With a high-tech twist, Coors has used simulation, long a tool in component design, to smooth production-line design.

For the past two years, Coors has been experimenting with a Digital Equipment Corp. Microvax and with customized software that allows engineers to simulate can manufacturing and package-filling production lines before they are constructed.

Through simulation, engineers can experiment with alternative line-design scenarios. They can create a model of equipment and controls and keep refining it in an iterative process as they incorporate new suggestions, add processes or evaluate alternatives.

So far, actual simulations have helped Coors spot potential bottlenecks — areas in production lines where accumulation capacity should be either increased or decreased — as well as other design flaws that would be expensive if implemented.

More important, the simulations provide engineers with data on expected line throughput after construction — information that was difficult to estimate when a static design process was used.

Fiderio is a *Computerworld* senior editor, features.

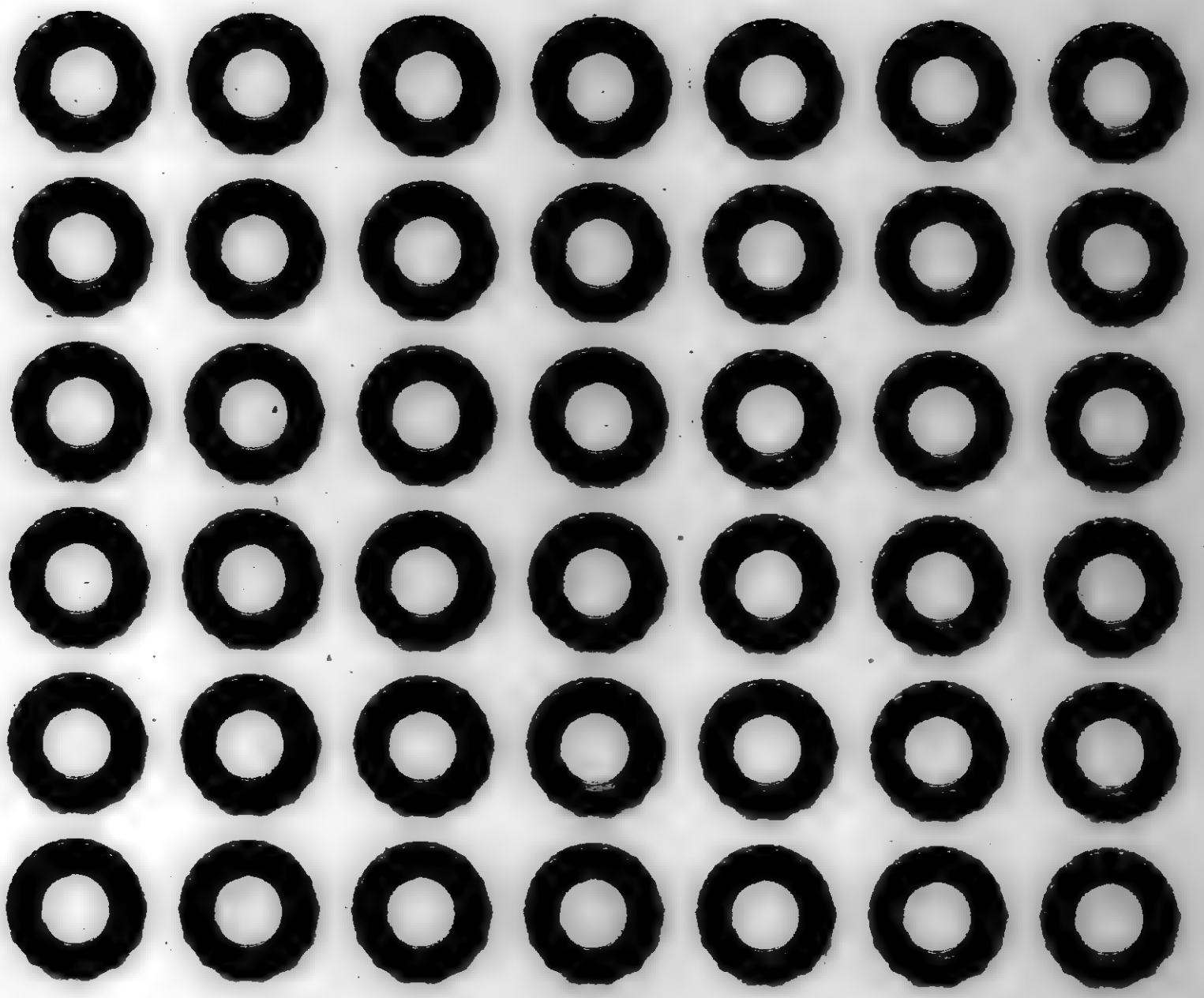
According to Bud Cookson, a principal engineer and advocate for factory integration at Coors, simulation will play an increasingly important role at the company as line efficiency and utilization become more critical.

"What we are really doing," Cookson says, "is optimizing the line prior to construction." According to Cookson, the first project on which simulation was used — a new can manufacturing line that now produces 2,600 cans a minute — brought Coors a 25-to-1 return on investment. "That means that for every dollar we invested in the simulation project [including development of custom software, hardware and consulting], we returned or had the potential of returning $25 to the company," Cookson says.

Coors has used simulation in six design projects. The software consists of a manufacturing simulator tailored to the firm's engineering terminology and needs. It was developed with SLAM II, a Fortran-based language with manufacturing and material handling constructs and Tess, a graphics tool and relational data base. Both products were created by Pritsker and Associates, Inc.

While Coors' MIS group is not involved in the support of the simulation product, it is working with the company's engineering group to further joint factory automation goals. •

Sample graphic *of a high-speed filler line.*



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improve product quality.

For example, at Lockheed Aeronautical Systems Co. in Burbank, Calif., there were times when an operator was incorporating an old design into a part up to two weeks after the design had been changed and other machines had incorporated the new one. According to William Crawford, an industrial engineer at the company, "With our old paper method, it was very difficult for plant managers to remember everyone he had to

Ship Star's Crowder

give change orders to.

"There was often a delay, sometimes a costly one, before everyone was informed," he continues. "Now change orders are sent electronically, and everyone gets them at the same time: immediately."

Crawford also says he notices higher quality, since the operators no longer have to run from station to station to check status on the process. "When everything is available at a screen sitting right in front of you," he says, "you are more inclined to access available data."

Over and over

CIM also saves a company money by providing greater repeatability. Terry Fearn, manager of computer control systems at The Timken Co. steel division in Canton, Ohio, points out, "With the old method, it was hard to have a process done exactly the same way over and over. Now the system remembers how something was done, and it can be repeated automatically."

Timken incorporated CIM technology in its new plant, which was built in 1985. It uses two VAX 8350s and a PDP-11/44 at each station.

While CIM provides advantages by mechanizing tasks formerly done manually, a corporation often has to be willing to institute fundamental changes to take full advantage of it.

Bob Crowder, president of Ship Star Associates, Inc., a Newark, Del., company that works with users to plan and implement CIM, points out that for CIM to be successful, it must have top management support.

"Companies must have a vision of where they want to go and how they want CIM to help them get there," Crowder says. "You can't just say you want to implement CIM and then go out and buy it as you would a new suit. If a company has a problem with CIM, it's related to bad planning or commitment, not with lack of technology."

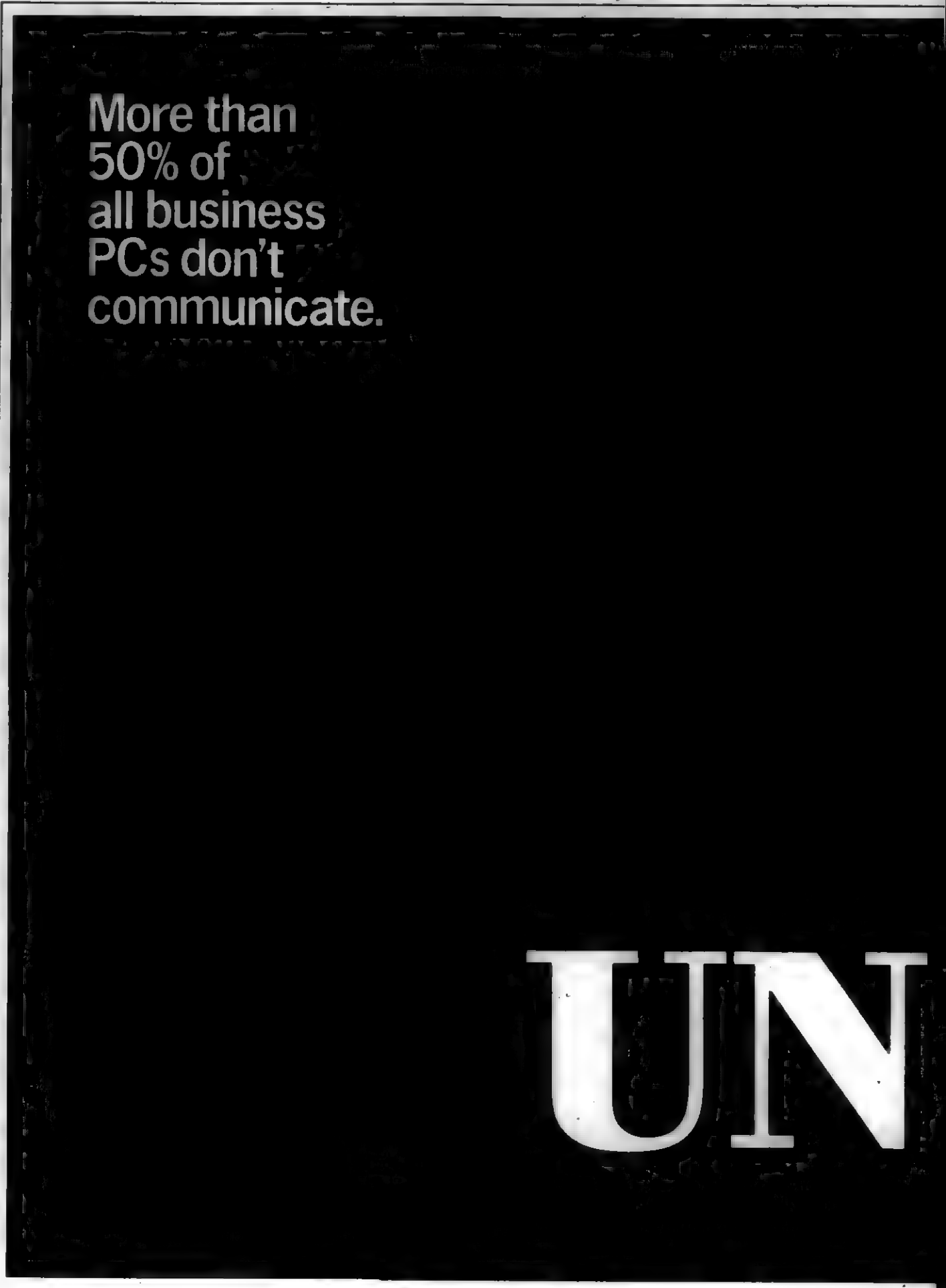
Getting it together

But most people who have been involved in a CIM project say that planning on a global level is tough in the typical organizational structure that tends to separate different functions. Ernst & Whinney's Anderson says, "In the traditional corporate structure, each department is given the challenge of maximizing its functions and profitability even if that is to the detriment of the organization as a whole. Before you talk about integration, there are walls that have to be torn down. And that's a much harder problem than the technology."

Allen-Bradley's experience was typical. "Our biggest difficulties during the planning stage of CIM," Laduzinsky says, "was getting different functions to talk together and come out with a mutually agreeable system. Many people in an organization tend to think only of their specialty — that's how they were trained. Someone may come up with a great solution within their specialty, but it hits a stumbling block down the line, and he is forced to rethink his idea."

Laduzinsky says his firm's four different operating divisions used different data structures to designate information on circuit boards. In order to implement CIM, they needed to agree on a uniform structure.

"Each division head came to



the meeting with a long wish list," Laduzinsky explains. "Finally, it came down to what was the minimum each department could accept. And that was incorporated in a totally new and neutral data structure. Since we didn't standardize on one division's system, everyone had the same degree of pain."

Two divisions that normally have very little contact with each other in most organizations are MIS and production. Yet, in order to create a CIM system, MIS must understand the process and flow of the shop floor; conversely, production workers and supervisors must be able to decide which reports will make their areas more productive. Unfortunately, production workers often do not know the reports they will need, since they have never been given the opportunity to explore the power of CIM.

As a result, after the system is implemented, MIS gets besieged with requests for new reports as workers discover the possibilities of the new system.

Hundreds of programmers

Weyerhaeuser solved this problem by allowing production workers to create custom reports out of any available information. To facilitate this, data is kept in the data base in raw form for three years.

But sophistication came gradually as workers played with the system, Loe explains. "The traditional way of having MIS create reports causes backlog and stifles creativity. By allowing end users to custom-design the system, we've unleashed the creativity of our 300-person production force instead of depending on the creativity of eight or 10 programmers. Some of the people are doing things with their computers that I don't even know how to do."

Loe has gone so far as to eliminate automatic report generation — an MIS service, he says, that results in stacks of unread material. His system is designed to give on-demand reports only.

Timken's Fearn agrees that users should be involved in deci-

General Dynamics' McMahon

sions about data capture and system design. When his company first implemented CIM, it suddenly had a great deal of new information available to it, but it did not have the organizational procedures to make good use of that data.

"We decided to put first things first," Fearn says. "The process people had to have information in order to run their machines, so they were on-line first. Then, as the financial and administrative areas began to determine what information they could use, we designed the data base to suit their needs as well."

No weak links

While the speedy flow of information should expedite all processes, if administrative procedures do not keep up with the new technology, they can throw a monkey wrench into the entire operation.

Andrew Young, director of new products at Northern Telecom, Inc. in Santa Clara, Calif., knows about that type of problem. Northern Telecom, a manufacturer of communications hardware, is two-thirds of the way toward full CIM implementation in its manufacturing environment. But, Young stresses, "any system is as slow as its weakest link. You might have a wonderful CAD/CAM system, but if 10 people have to OK a design change on paper, it won't do you any good."

Young points to a problem that existed at Northern Telecom, in which a new CAD system actually slowed processes, since the blueprints had to be continually printed out each time an engineer signed off on it.

The biggest challenge to MIS in planning a CIM system lies in finding out how a process is

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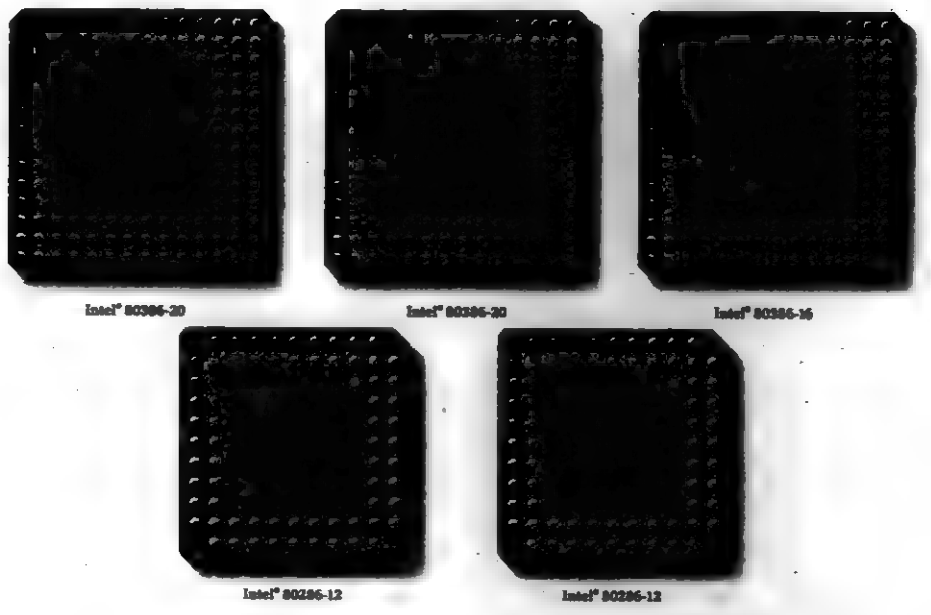

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really done, as opposed to how the documentation says it is done. This is a continuing problem in General Dynamics Corp.'s CIM project.

"People are very good at covering up for system deficiencies," says Robert McMahon, manager of manufacturing systems at General Dynamics' offices in White Settlement, Texas. "The paperwork may say to do it one way, but the process worker quickly discovers that it's wrong. So he does it the right way without telling anyone. Pretty soon, you have a tangled web of undocumented processes. There are a lot of unknowns hidden in the craftsmanship and skill of the production workers. To discover them requires a lot of interviewing." General Dynamics is now in the third year of a 10-year CIM development project.

> "AUTOMATION can be an expensive toy if it is not tied in with a vision of where the company is going."
>
> ALAN ANDERSON
> ERNST & WHINNEY

Even when companies think they have researched CIM thoroughly, Ernst & Whinney's Anderson says, he has found that many fail, because they rush to automate without understanding how that automation will help their processes. "Automation can be an expensive toy if it is not tied in with a vision of where the company is going," he cautions. "If a company has a serious problem, buying a robot or two probably won't help and might make matters worse. Those organizations that fail with CIM are those who look at it as a purely technical issue."

Because CIM requires such fundamental changes in the organization, it is difficult to measure its success with traditional equations. Reynolds' Martin points out, "You can't cost-justify a CIM investment the same way you can a new mainframe or new software. The functional and structural changes that come with integration remain intangible for a long time. And if the company becomes more profitable, it's hard to know where to apply that profit. It requires a new way of thinking about return on investment."

Companies that have been successful with CIM are those willing to make the organizational changes required to take full advantage of integration.

Many organizations actually find CIM implementation to be a painful process requiring a redefinition of responsibilities from top to bottom.

"Before a company embarks on a CIM project," Martin says, "it must have the support of top management. Without that unqualified support, those factions in an organization that are afraid of losing power can destroy the project in the bud."

But for those companies that make the commitment, CIM is radically improving the way they do business. •

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Chart a new MAP

BY GERALD ARCURI

Look out, MAP 3.0 is coming. No kidding.

Manufacturing Automation Protocol (MAP) Version 3.0 promises to cause a big stir when it debuts next week. With 3.0, MIS in manufacturing will get a foundation for future applications and a growth path that ensures compatibility.

The major changes promised include the addition of a presentation layer to the protocol, the implementation of Manufacture Message Service (MMS) and the anticipated implementation of Enhanced Performance Architecture. Enhanced functions include full Open Systems Interconnect (OSI) File Transfer, Access and Management (FTAM) capabilities and Network Management and Directory Services.

• **Presentation layer.** This is a major architectural enhancement, because it completes the protocol's compliance with the International Standards Organization's OSI reference model.

With the presentation layer, MAP now complies fully with the seven-level model. The current version, 2.2, supports only six of the seven levels — application, session, transport, network, data link and physical.

The normal functions of presentation services permit generalized transfer of information between computers or devices whose structural rules might otherwise inhibit exchange. Presentation services permit information elements to be identified by category and for typed information to be correctly structured for the destination device.

Presentation services help users prepare applications that are hardware independent. According to Paul Accampo, Hewlett-Packard Co.'s MAP program manager, if users make a 3.0 implementation with MMS, any future enhancements to MMS would be compatible with existing code.

• **Manufacture Message Service.** Another significant change for MAP is the movement to MMS from Manufacturing Message Format Standard (MMFS). MMFS, seen by many as the heart of MAP, provides a type of standard meaning and message format from which fields are constructed, as well as a syntax for exchanging fields in a manufacturing environment. The significance of MMS is that it is at the draft international standard level within OSI, as opposed to MMFS, an addition to the original specification.

• **Minimap.** The third significant change is the implementation, or Minimap, capability of Enhanced Performance Architecture. Minimap is considered by some to provide faster response times, because it does not go through all the layers — just the physical, data link and applications layers.

Bharat Thacker, president of Universal Computing Applications in Southfield, Mich., and a MAP consultant, says Enhanced Performance Architecture is significant because it supports two implementations of MAP on the same node. It supports full MAP on one side and Minimap on the other.

Thacker says, "Users in the process industries and elsewhere who wanted the ability to have higher throughput at the cost of the functionality of some layers [of the OSI model] can do that now with Minimap."

• **Administrative changes.** Functional changes have also been implemented to facilitate the use and management of the network. Full OSI FTAM capabilities are now available, and Network Management and Directory Services have also been modified.

FTAM permits communicating application pairs to read, write, create and delete files.

Under MAP Version 2.2, only a subset of OSI FTAM capabilities have been implemented, but Version 3.0 will provide full support. With Version 3.0, record access will be provided, as opposed to the previous subset, which only supported the transfer of complete files.

Network Management facilities now support all seven layers and monitor network performance. They are also available to manage the network configuration and monitor fault recovery. Directory Services provide users with the ability to locate other users on the net and give users the capability to retrieve network directory data.

MAP 3.0 products

The vendors providing products for Version 2.2 and other products in the Version 2 category will most likely continue to develop and deliver products for Version 3.0. At a MAP/TOP media briefing held early this month, Mike Kaminski, a longtime champion of MAP and MAP program manager at General Motors Corp., explained that some vendors will need extra time to test their products and ensure compatibility. He added that GM expects to install Version 3.0 products in one of its plants late this fall.

Kaminski also said that the participants in the Corporation for Open Systems booth at next week's Enterprise Networking Event in Baltimore — where MAP 3.0 is scheduled to be announced — will probably offer MAP/Technical Office Protocol products by the end of this year.

Universal Computing's Thacker says many vendors will respond to user requests for MAP products with higher performance. For example, he says that vendors previously provided products using high-level data link control at the Level 2 Data Link layer, with transmission speeds of 56K to 460K bit/sec. Thacker says he anticipates that more vendors will provide bus-level products with higher transmission speeds with Version 3.0.

Arcuri is group managing editor of the "Manufacturing Automation Series" at Datapro Research in Delran, N.J.

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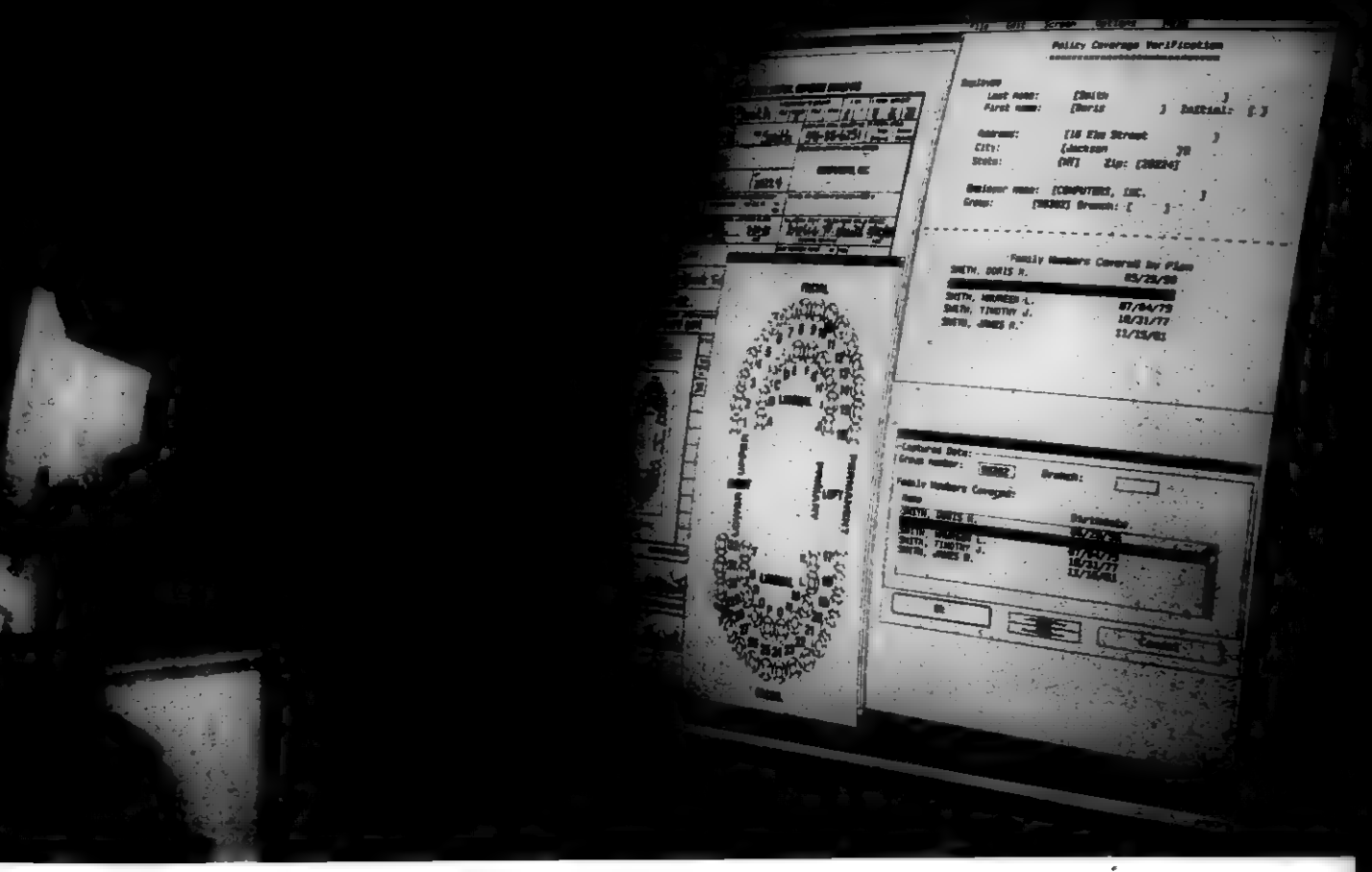

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Bad news for trees

Paperless offices? Not with an empire of report-starved managers and vanity publishers

BY EDWARD TENNER

Information technology was supposed to let us taper off paper. But we emphatically have not. The paperless office, the leafless library, the inkless newspaper, the cashless, checkless society — all have gone the way of the Empire State Building's dirigible mooring, the backyard helipad, the nuclear-powered convertible, the vitamin-pill dinner and the Paperwork Reduction Act of 1980. The micro millennium is turning out to be the cellulose century.

Futurists have never liked paper, except in forms nobody ever asked for, like disposable underwear. As early as 1895, a pair of French satirists were predicting that the record player would bring the end of the book. Around the turn of the century, Jules Verne doubted there would be novels or romances in 50 to 100 years. By the 1960s, Marshall McLuhan was writing as though the Gutenberg Galaxy would collapse into a black hole.

Makers of computer hardware were equally unsympathetic. Not so long ago, they treated printers as boring peripherals. When IBM introduced its original Personal Computer in 1981, it didn't deign to make the printer itself.

But paper, that mere commodity, took its revenge. Paper prices have been rising. So have the shares of paper mills and office supply makers on the stock exchanges. By July 1986, General Binding Corp.'s earnings per share had increased 62.5% over July 1985. IBM's original printer contractor, Epson America, Inc., now successfully makes competing microcomputers.

Truth in numbers

On its way out is the old automated-office fantasy of spotless desks and electronic mail. In its place: an empire of vanity publishers swapping memorandums enhanced by bit-mapped graphics. The statistics speak for themselves. From 1959 to 1986, America's consumption of writing and printing paper increased from 6.83 million to 21.99 million tons, or 320%, while the real gross national product rose 280%. One magazine for records managers estimated that between 1981 and 1984, U.S. business use of paper went from 850 billion to 1.4 trillion pages.

Between 1986 and 1990, printed material may rise from 2.5 trillion to four trillion pages. About 2.17 million tons of form bond were used in 1986. German ships that bring Mercedes and BMWs, Leitz and Zeiss instruments and Heidelberg presses return laden with waste paper for recycling — at last, an export in which America excels.

From 1936 to 1986, the volume of U.S. mail increased from 80 billion to 146 billion pieces a year, and the U.S. Postal Service estimates a total of 170 billion by 1990. In Manhattan, where volume is increasing at the rate of 10% annually, the Postal Service is planning to spend $200 million on a new facility for handling old-fashioned paper mail. Meanwhile, none of the ten-odd American public E-mail networks has more than 300,000 subscribers.

In the summer of 1987, newsprint production was approaching capacity (consumption had increased from 11.9 million metric tons in 1986 to 12.2 million metric tons), with prices rising and a 10% increase of domestic plant capacity planned for the next three years.

A single newsstand in the Pan Am Building in New York stocks 2,500 magazines, and a trade association reports that 265 more magazine titles were published in 1987 than in 1986. Even the Information Industry Association, which includes most of the leading data base services as well as print media, distributes news to its members by a weekly (paper) letter, not an on-line service.

In the money

Bankers may have chilled the passbook savings account, but they have replaced it with quarterly or even monthly statements. Consumers are still avoiding the home computer-based on-line services that some banks and brokerages began to offer with a flourish in the early 1980s.

And old-fashioned checks are thriving. In 1985, American banks processed 40 to 45 billion checks, according to a Federal Reserve Board official — more than 66 times the number of electronic fund transfers.

Credit cards may be plastic, but everything else about them

TED FITTS

Tenner is an executive editor at Princeton University Press.

- **The microchip as paper's best customer**
- **World's largest publisher: IBM**
- **It's too easy to copy, copy, copy**

is paper: a bank copy, a merchant copy, one or two customer copies, three or four sheets of carbon paper, a monthly statement with return envelope — and a check.

Even in that paragon of postpaper planning, the research library, patrons are insisting on hard copy. They love the new electronic catalogs at the Library of Congress and the New York Public Library, where each terminal has its own printer.

The Rush Medical Library in Chicago, one of the few to disclose its paper consumption, used 188.2 linear miles of paper in its photocopy machines in the year 1982 to 1983 alone, the equivalent of more than 8,000 350-page 7- by 10-in. books. In the early 1980s, the library was also using more than 100 linear miles of paper in its thermal and computer printers and in printouts of its serials holdings.

As the library's director observes, "many libraries are now acting as printing presses for electronically stored information and as duplicators of printed materials."

WHY DID ALMOST nobody foresee that the microchip would be the best thing that has happened to paper since governments got people to accept the stuff as money?

Outside the library, academic paper use seems to be increasing even faster. Princeton University's computer center, for example, used 5,765,000 pages of letter-size laser paper in 1986, plus (including administrative use) 3,794 cartons of wide and 936 cartons of narrow green-bar impact printout paper — not to mention the paper used by the computer printers on campus. Harvard University's computer printers use more than 22.5 million pages a year, not counting the personally owned equipment of faculty and students.

It is evident that the more people use computers, the more they want old-fashioned printed information about them. Ten years ago, even before IBM thought of introducing microcomputers, its documentation sales reportedly made it one of the world's largest publishers. Today, two series of 15 to 20 volumes each of documentation are needed for the IBM Personal System/2 operating system alone.

For nearly all software, documentation and packaging account for the bulk of production costs. The inconvenience of photocopying manuals probably does more than any copy-protection software to deter software piracy. According to Communications Trends, Inc. in Larchmont, N.Y., computer magazine revenues will amount to $480 million in 1987, and professional and textbook revenues will be more than $300 million.

In hindsight

What went wrong with the assumption that electronics would take the place of paper? Why did almost nobody foresee that the microchip would be the best thing that has happened to paper since governments got people to accept the stuff as money? One reason may be that Americans have always been more conservative technologically than they have admitted to themselves, as the flop of metric conversion shows.

We have not begun to adopt, for example, any national videotex system like the British Prestel or the French Minitel, with each of its almost three million subscribers averaging nearly four minutes of daily use. (American services combined still have only about 750,000 subscribers). But in Europe, too, there seems to be no trend away from paper. At least some of the prophets of an Information Age made several mistakes.

First, they didn't take their own idea of an information explosion seriously enough. They thought of information as a fixed quantity and of electronic information as a simple replacement for the printed kind. Something different has happened. Computers — and microforms — are capturing much more information than was ever saved before, and they are storing it incredibly compactly.

One of the largest numbers in the world must be the bytes of information stored in all forms. Once, the inconvenience of clay tablets, stone slabs, parchment and even papyrus imposed a certain discipline, but no longer. Much less of our information is on paper than ever before, and much of it may never appear as hard copy.

But since the total is so high, even the occasional reproduction of a small part of it may bring a big jump in the number of pages actually produced. Even Ithiel de Sola Pool, who frowned on paper as a media "luxury" in *Technologies of Freedom* (1983), conceded that "the use of paper for display, reading and current work may grow."

Second, people have good reasons for craving their information on paper. Reading things on computer screens is relatively inefficient, about 20% to 30% slower than print, according to industrial psychologists. Charles Bigelow, who won a MacArthur Fellowship for his work as a computer-based type designer, has pointed out that current screen resolution of 60 to 75 dot/in. would have to be improved tenfold for excellent visual quality. This in turn would demand 64 to 100 times the storage of current office computers.

Even when high-end computer screens become as legible as mediocre print —

which won't be soon — paper will still be more secure. The cheapest newsprint may not fall apart for decades; a power surge from an air conditioner can wipe out a computer's memory in an instant.

This isn't a problem for organizations as such. They back up their accounts receivable and other vital records in bomb-proof vaults. Personal files may have no such protection. As employees do more computing, they will need — or think they need — more hard-copy backup. Nor is this just an American habit. The Japanese, the world's greatest connoisseurs and recyclers of paper, cram their offices with the stuff.

In fact, the security of hard copy isn't just habit. It's law. You can file federal tax forms electronically to get an early refund if your accountant has the proper IRS-approved software, but you'll still have to certify the electronic form with another one in writing.

THE SECURITY of hard copy isn't just habit. It's law. . . . You can't serve an electronic summons or present an electronic birth certificate.

You can't serve an electronic summons or present an electronic birth certificate. Licenses, passports, insurance policies, contracts, securities — the law nearly always demands a paper document, since more than a voltage spike is needed to wipe it out and more than a password to alter it.

Naturally, the more important a government transaction, the more paper the law seems to demand. Norman Augustine, vice-chairman and chief executive officer of Martin Marietta Corp., cites another aircraft maker's estimate that each time a new military airplane flew over the fence at his plant, paper accounted for 27% of its cost.

The federal procurement laws and regulations themselves, he also reports, fill 1,152 linear shelf feet; a single bidder for the C-5A transport aircraft contract submitted 1,466,346 pages weighing 24,927 pounds. Meanwhile, the Internal Revenue Service, charged with administering an 800-page tax simplification bill, employs a professional staff of 40 to do nothing but develop new forms.

Meanwhile, the gains of office work at the expense of manufacturing jobs have increased the number of document-generating people. In the electronics and electrical equipment industries alone, according to one publisher's study, production jobs fell from 1.35 to 1.24 million from 1984 to 1986, while white-collar jobs increased from 854,000 to 919,000. Even if each office worker's use of paper hasn't changed, more positions mean more paper used.

The copier era

But all these new workers are using paper differently, thanks not only to computers but to photocopiers. When Xerox Corp. introduced its 914 dry photocopier in 1959, one of America's leading industrial consulting companies estimated that no more than 5,000 machines would be needed in the whole country. Instead, office workers discovered that they could build up private files to reduce their reliance on others and that they could share their data and opinions with an almost unlimited number of colleagues.

At a community college where I taught in the 1970s, copies of the dean's authorization for my office key went to six other administrators, thanks to the photocopier. And once many people were able to receive information at the same time, they expected to. Collators, automatic document feed, two-sided copying — each advance in photocopying was made because more people expected to get more information, with each technological advance making the information easier to transmit.

The result: In corporate life, and to a greater extent in law and government, access to information means physical distribution of paper. *The Wall Street Journal*, citing a *Personnel Journal* study, reports that up to 70% of office workers' time is spent handling written material. In one growing suburban area, Fairfax County, Va., the monthly agenda distributed to each member of the board of supervisors weighs up to 20 pounds, not including the categories of papers that are not distributed with the main package.

Finally, paper is proliferating because electronics has blurred the distinction between original and copy. Until the mid-1970s, an editor receiving a professionally typed proposal could safely assume that the author had sent it to no more than a few others. It was too much work to type a dozen or more copies on speculation. With each new generation of electronic typewriter and form-letter software program, it became easier to spread letters of inquiry Johnny Appleseed style.

Laser printing may soon make academic the difference between master and duplicate. Already, it isn't always possible to tell a laser-printed original from a photocopy, and vice versa. A few laser printers actually double as photocopiers. And this surely means more "personal" and transparently personalized letters in the future. The cults of the $250 cigar-size fountain pen and the handwritten business note probably reflect the devalued sincerity of executive typewriting.

All these changes have something in

Continued on page 58

55 GOOD REASONS WHY

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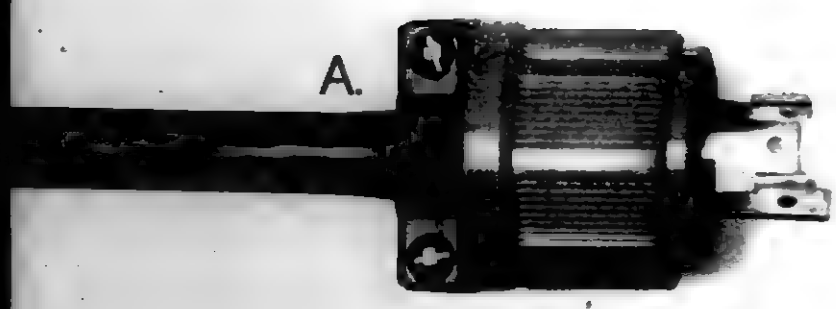

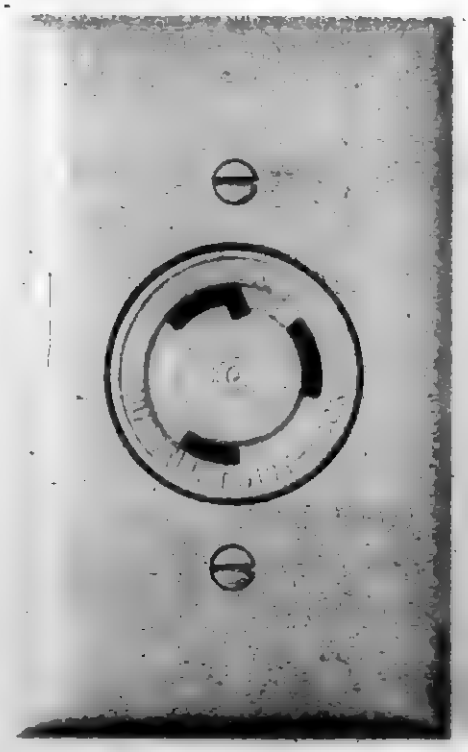

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Users can't escape paper

BY ALAN RADDING

In an informal survey, U.S. companies reported mixed success in their efforts to reduce the use of paper by relying more on computer systems. Paper use has decreased in some instances and increased in others.

In some cases, paper use has simply moved from one type of system to another. For instance, copier use has declined in one office, but there has been an accompanying increase in the use of laser printers, which are being used as copiers as well as printers. In other instances, decentralization of computer systems simply transferred paper consumption from MIS to end users.

• At Levi Strauss & Co.'s data processing center in Henderson, Nev., managers report a drastic reduction in paper use because workers now transmit reports electronically.

"We would print tons of reports here and mail them to the home office or to the field," says Mike McCullough, DP manager. The DP center relies on an IBM 4381 as its host.

Under pressure to get the reports into the hands of end users more quickly, McCullough's department began electronically transmitting the reports directly from the host to end-user offices, where the report would be printed out. "We weren't trying to reduce paper. The decision was based on the speed of delivery," McCullough says.

He adds that paper savings at the DP center are presumably offset by increased paper consumption at end-user sites. He does not know if there is a one-to-one correlation, however.

• "We're using more paper now despite trying not to do that," says William Chelmowski, DP manager at Krueger Ringier in Corinth, Miss. The problem is the company's decentralization. "We're seeing many more reports circulating than we ever saw before," he says. The reports are coming from remote computer sites.

In an effort to reduce paper, the company is adding on-line electronic systems to handle reporting and is moving to microfilm for some reports, Chelmowski says. But despite all this, paper use keeps mounting.

At the Corinth plant, the company supports 16 terminals and was relying on an IBM 3262 line printer. It recently added two dot matrix printers to handle the increased demand for printouts.

• Minnesota Mutual Life Insurance Co. in St. Paul, Minn., purposely set out to reduce paper by developing an in-house electronic forms publishing operation, says Beatta Schultz, senior office automation analyst.

The company handles from 2,500 to 4,000 forms per day electronically. These forms are no longer put on paper except for the final printed policy or invoice, which is sent to the customer.

The electronic system "significantly reduced our use of paper. It was part of the justification for buying the entire system," Schultz says.

Minnesota Mutual currently keeps 600 forms — mostly policies and certificates — on file electronically.

The company still maintains 90,000 cubic feet of storage for paper forms storage, Schultz says. The never-ending paper chase is perpetuated by the new products the company is adding, even as it transfers more and more old forms to the electronic system, she notes.

• United Information Systems, Inc., an office automation management consulting group, has given up the quest for a paperless office.

Minnesota Mutual's Schultz

"We're creating more paper than ever," says Ron Abler, senior associate. With the introduction of desktop publishing and laser printers in the office, Abler finds that he and his staff are buried in iterations.

"My wastebasket is filled with test copies," he says, adding that that is because he can now fiddle with the layout. In addition, he and his colleagues still prefer to read and edit draft reports on paper.

While paper use is up, the company's printing costs are way down. Instead of buying printed letterhead, "we're only using plain bond paper," Abler says.

United Information uses the desktop publishing system to print its letterhead onto the document along with the text itself. •

IN SOME CASES, paper use has moved from one type of system to another. Copier use has declined in one office, but there has been an accompanying increase in the use of laser printers.

Radding is a Boston-based free-lance writer specializing in business and technology.

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Bad news

CONTINUED FROM PAGE 55

common. Paper is flourishing not in spite of but because of electronics. Powerful microprocessors have made high-speed computer printing possible. A new $2,000 laser printer may have more kilobytes of storage than the computer that drives it.

Automated canceling and address recognition have saved the Postal Service from collapse, just as magnetic imprinting has allowed banks to handle oceans of checks. Whereas the original Xerox 914 was electromechanical, a new high-speed autofeeding, collating photocopier — the McCormick reaper of paperwork — is really a hybrid of camera and computer. The vast mailings of organizations from the Moral Majority to the Audubon Society to L. L. Bean would be unmanageable without sophisticated computer support. (In 1986, 44.7 billion pieces of bulk mail were sent in the U.S.)

Here to stay

There is every reason to think that electronics will drive, not drive out, print and paper as forcefully in the next decade as it has in the last. Satellite text transmission, which has made possible eight regional editions of *The Wall Street Journal*, four editions of the *The New York Times* and a national paper, *USA Today*, has brought same-day transmission of the London *Financial Times*. Typeset-quality laser printers may be within the reach of small businesses soon.

Dataquest, Inc., a market research and analysis firm in San Jose, Calif., estimates that close to 250,000 page-makeup software packages were sold in 1987. American offices bought 200,000 facsimile machines in 1986, and the market is expected to increase at an annual rate of 20% to 30% at least for the next several years. What of attempts to suppress paper files in offices? As author Pool observed, "When no paper files are kept because bulk storage of them is too expensive, a new paper copy may be derived from the bulk electronic files every time an item needs to be seen, and then that copy can be thrown away."

Meanwhile, the speed of change in electronic media will continue to make paper more important than it ever was before data storage. As a National Research Council report pointed out in 1985, we cannot assume that electronic records will be readable for a fraction of the 200- to 300-year life expectancy of acid-free paper. Information stored on tapes and floppy disks — and even on laser disks, it seems — degrades slowly but steadily.

As obsolescent hardware is scrapped, reading older computer records becomes a challenge. Some Vietnam-era tapes now can be read only by one or two working computers in the world. Today's laser-disk texts may fare no better.

Paper, by contrast, is robust. Future generations or beings, even if they can't read it at first, can stare at our texts while awaiting their Champollion. When paper starts to crumble, we can just microfilm it or photocopy it onto new paper; xerography, applied to old documents, may be the first information technology in history to yield a copy superior to the original. Even soaking paper, burning it or slicing it into ribbons may not erase its message for the determined, as the reassembled records of the U.S. embassy in Tehran attest.

THE SPEED OF change in electronic media will continue to make paper more important than it ever was before data storage.

What a compliment, then, the shredder is to paper's ubiquity and durability. The U.S. government buys several thousand shredders a year, according to a leading Washington, D.C.-area dealer, and industry spends another $60 million annually. Oliver North's infamous Intimus Model 007-S, a White House favorite, can cross-cut 60 feet of paper a minute into 7,500 pieces a sheet, and the conveyor-belt-fed Intimus 580E can digest a filled 3-in. loose-leaf binder. Yet paper is also more secure than conversation or electronic data bases; the kind of bugs that penetrate it will never tell.

Occasional winner

Sometimes electronic media does win over paper. Ninety percent of securities trades take place as electronic book entries — backed up, of course, by vaults of paper certificates. Recordings and photocopying have overwhelmed sheet-music publishing, already suffering from the piano's long-term decline and the educational computer's recent rise as a bourgeois totem.

Telephones seem to have endangered personal letters but, interestingly, not greeting cards. In offices, banks and libraries, bulky, obsolete, flammable stacks of wood-fiber sheets — including the soothsayers' dire prophecies for them — seem entrenched for a perpetual transitional decade. If the Soviet Union, as rumor has it, relaxes its fierce scrutiny of the photocopier, it will be the most fateful event in paper history since the invention of third-class mail.

We will refine the last barrel of oil — it takes the equivalent of at least 1,500 pounds of petroleum to make a ton of paper — before we cut the last pine. The computer, ironically, has turned us from pencil pushing to printout pumping. ●

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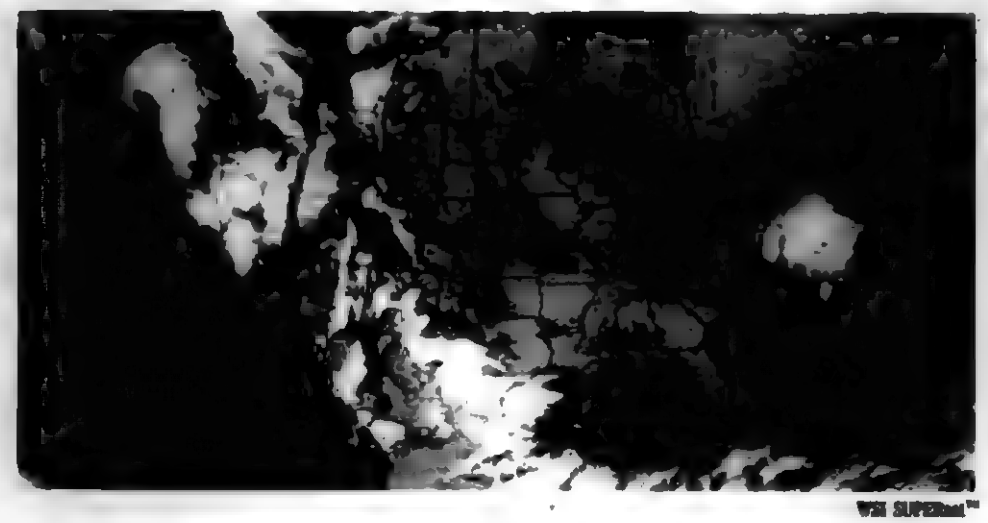

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TAKING CHARGE

James Connolly

Overcoming technophobia

Maybe it's time to go fishing. Maybe it's time for MIS managers and the computer industry to give up on the idea of making people use computers. It just might be easier to learn the ways of the wily trout or — for those who don't like worms and flies — the country club's sand traps or the intricacies of needlepoint.

Some people just don't want to compute. The digital computer has been around for four decades, the typewriter for 120 years and the abacus since sometime after folks began their move from the cave to the condo.

Each generation of machines has had its advocates, and each generation has run into people who won't use them.

Well, it's 1988, and plenty of people still won't use computers. Some won't even use a typewriter. The evidence is in a recent study by Olsten Services, the Westbury, N.Y.-based temporary personnel agency that is a division of Olsten Corp.

Olsten found that despite the proliferation of desktop computers, most Fortune 1,000 executives still write in longhand. The most guilty parties are male executives older than age 40, a group in which only 13% compose letters on word processors. The study showed 29% of male executives younger than age 40 use that equipment.

Continued on page 60

CIO turnover on rise

Corporate rank, exposure seen as factors

BY JAMES CONNOLLY
CW STAFF

CHICAGO — A produce-or-get-out mentality has hit the senior levels of information management as chief information officers (CIO) have moved into more visible positions near the top of major companies.

One third of CIOs recently said their predecessors left their jobs via dismissal or demotion, while only 14% cited retirement as a reason for leaving, according to a survey by the Touche Ross & Co. accounting and management consulting firm.

Meanwhile, the percentage of information systems groups reporting to a chief executive increased from 26% to 34% between 1985 and 1987, reflecting the growing importance of MIS in corporations.

"One of the things we have to focus on is the tremendous turnover at the CIO level. More CIOs are reporting to the [chief executive officer], but they also are being held accountable," said Thaine Lyman, a Touche Ross partner.

Touche Ross surveyed 346 CIOs on human resource issues in major U.S. and Canadian companies.

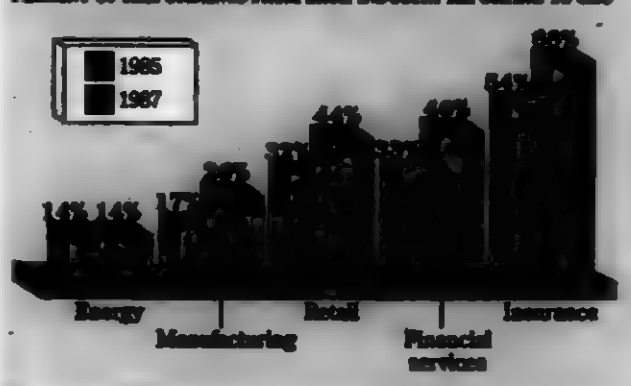
Lyman and Touche Ross partner Raymond Bolek said that while information systems groups report to CEOs in an increasing number of companies, CIOs are in a different situation than their peers, such as chief financial officers. The CIOs are at a high level but are set apart by having to serve those other officers — providing those peers with the information and communications services that they need in order to do their jobs.

Lyman said the importance of information in industries such as insurance and financial services is a key reason CIOs rank so high in those areas. He said one reason relatively few information systems groups report to CEOs in manufacturing may be the ten-

Continued on page 60

Stepping closer to the top

More and more information systems groups are reporting directly to their chief executive officers



INFORMATION PROVIDED BY TOUCHE ROSS & CO.
CW CHART

Success in MIS via a circuitous career route

BY CLINTON WILDER
CW STAFF

PHILADELPHIA — To climb the data processing career mountain and reach the summit of MIS director, many aspiring computer professionals take a straight and narrow route within a company. But James Montgomery, vice-president of home office systems for Reliance Insurance Co., has chosen a wide-ranging path, and has seen much more of the landscape in the process.

Montgomery, 51, has been a vendor, user and manager of information systems in a career that has stretched from Washington's Puget Sound to Pennsylvania's Delaware River. In an age when MIS management in all industries is increasingly a strategic position, Montgomery's diverse career stops are a definite plus at Reliance, an insurance giant with 1987 premiums of $2.5 billion.

"Having that kind of experience brings a new perspective to your management style," said Bruce Wilkinson, Reliance's assistant vice-president for home office systems, who also worked for Montgomery at Reliance subsidiary United Pacific Insurance Co. outside of Seattle. "I think it helps to understand business in general. It really affects the kinds of resource decisions Jim makes, concerning both people and machines."

In Montgomery's career, he has done the following:

- Started, built and sold, not one, but two, software companies — one selling custom reinsurance software and the other a system for gemstone importers.
- Spent two years on the other side of the MIS fence as manager of a United Pacific customer service center.
- Worked in two MIS departments affected by corporate takeovers.
- And most recently, left the former data center he headed at United Pacific to become a somewhat smaller fish in a much bigger pond at Reliance.

That is not a bad record for a guy who never even graduated from college. Montgomery joined the U.S. Marines after high school and then attended night school while working as a software developer for a Los Angeles service bureau.

Montgomery believes his time as the United Pacific service center manager in Federal Way, Wash., in 1984 and 1985 was particularly valuable for his future understanding of the role of MIS in business.

Continued on page 61

PROFILE
James Montgomery

Position: *Vice-president of Home Office Systems, Reliance Insurance Co.*

Philosophy: *To make MIS serve its customers more efficiently by making information available to those who need it.*

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Connolly

FROM PAGE 59

Older female executives use word processors more than younger women by a margin of 26% to 21%.

On the positive side, Olsten, which conducted the study in conjunction with an annual corporate spelling bee competition, found that spelling and writing skills are particularly important to young executives.

But — descendants of Gutenberg and the Websters can cringe at this point — 21% of the male executives older than 40 don't have a dictionary or any other reference book in their office.

If so many executives seem reluctant to crack a book or touch a keyboard — apparently preferring the inefficient route of dictating letters and memos to a busy and expensive executive secretary — is there any reason to think they will get serious about utilizing executive support systems or electronic mail?

Should MIS managers pack their bags and grab their fly rods? Only if they strive for companywide appreciation of their efforts.

MIS managers must recognize that some people won't use the tools they are given. Some of the executives who want their companies to be productive in the 1990s have personal work habits reminiscent of the 1890s.

Therefore, MIS managers must not only humor everyone, but focus on clients who want to grow.

The alternative would be a lifetime of golden sunrises over mountain lakes, rather than the luxury of barking executives, overpriced lunches and airport delays. That sounds like a tough choice.

Connolly is Computerworld's senior editor, management.

CIO turnover

FROM PAGE 59

dency to have both commercial computing groups and manufacturing systems groups report to the chief operating officer.

The turnover figures that showed CIOs being dismissed or demoted, rather than quitting, placed the CIOs in contrast with their own staffs.

"Our survey revealed that offers of higher salary and more responsibility are the most frequently cited reasons for staff turnover. In order to retain quality information systems staff, corporations will have to offer them higher salaries. This means the salary structure may escalate," Bolek said. Lyman added that companies not only have to pay well but must provide MIS professionals with an environment that challenges the workers and makes them feel part of a team.

Lyman and Bolek also pointed out a flaw in salary structures. They found that although most CIOs use formal performance evaluation to rate their employees, raises are not always based on performance. With most raises clustered in the range of 4% to 6%, good performance is not necessarily rewarded, leading CIOs to advocate MIS pay structures that are independent of the rest of the company.

The consultants found that most of the CIOs plan to concentrate on holding on to a small cadre of talented people, rather than hiring hordes of mediocre workers. The CIOs said the skills most in demand now are those designed to integrate disjointed applications, but that during the next five years, their emphasis will be on training for skills related to new projects, such as artificial intelligence, fourth-generation languages and image processing.

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MIS success

FROM PAGE 59

"What I did there had nothing whatsoever to do with information systems or data processing," he said with a smile, "and I enjoyed the hell out of it. I'd recommend that to almost anyone. Most people in MIS really don't understand the significance of the service that [business] gets from MIS."

Montgomery had been an applications planning consultant at United Pacific for two years before making that intracompany career switch, which certainly did not hurt his MIS career. When Montgomery returned to the data center three blocks away in May 1985, it was as United Pacific's vice-president of information systems.

He remained in that position until last year, when Reliance decided to consolidate most of United Pacific's information processing in Philadelphia. The decision was ironic for Montgomery, who ended his first United Pacific stint in 1969 after Reliance, headed by New York financier Saul Steinberg, acquired United Pacific.

"At that time, it looked like they would consolidate, so a lot of us left," he recalled. "I came back in 1982, figuring that since they hadn't consolidated by then, they wouldn't. But they did."

The consolidation brought two immediate challenges for Montgomery: administering the paring down of the United Pacific data center and adjusting to new duties 3,000 miles away.

At Reliance, Montgomery is responsible for all corporate systems, except field processing; his charter includes the information center, financial systems and management information systems.

One of his first orders of business is planning Reliance's transition to IBM's DB2 relational architecture, with which it hopes to gain a nationwide competitive advantage.

To support the software, Reliance has installed a new IBM 3090 Model 200E and plans to add two more Model 200Es or a 3090 Model 400E in the next 18 months.

Information vendors

"There's a lot of data duplication now, and it can be difficult to get to information," Montgomery said. "Our role [in MIS] has changed from developing reports to making information available to those who need it."

In order to set up Reliance's data base architecture to achieve that goal, Montgomery said it is critical to get out of the glass house and learn the business of Reliance firsthand by interviewing senior executives.

"I need to know what they need to manage their part of the business," he said. "If underwriters in the field can ask the system about the performance of independent agents, they can fine-tune the operation as they go. But that information needs to be readily available."

Married, and father of a 13-year-old daughter, Montgomery has found a suburban home in the aptly named Montgomery County. He will miss Puget Sound, but plans to keep his waterfront vacation home there. "It's only eight stairs from the house to the boat," he said.

Montgomery has earned a reputation as a hands-on people-oriented manager, and it stems from something he learned as a technically savvy businessman. "MIS and its customers need to spend more time together," he said. "That's something I've always worked on, but I don't know if it will ever be good enough."

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INDUSTRY INSIGHT

Clinton Wilder

Battling for MIS clientele

When one thinks of "hot" areas in which to make money in the computer industry, thoughts like Unix, multivendor connectivity, expert systems and computer-aided software engineering might come to mind. But none may be hotter than the business of advising MIS executives and their bosses on how to plan a competitive information systems strategy. It's called consulting.

Two weeks ago, one of the largest providers of such information systems advice went through a major upheaval; one that has the potential to change the direction of the firm and possibly its industry. Yet this event may have gone unnoticed by many MIS executives, because the unlikely "vendor" was Big Eight accounting firm Arthur Andersen.

Arthur Andersen's revenue from consulting accounts for 38% of its nearly $1 billion total, and a huge chunk of its consulting fees come from information systems-related consulting. Although exact figures aren't available, there is no question that the Chicago-based firm has become a prominent computer industry player very quickly.

Furthermore, Arthur Andersen's consulting business is growing at a much faster rate

Continued on page 64

VM Software joins buy-out game

Will acquire Systems Center for $16 million to enter networking arena

BY NELL MARGOLIS
CW STAFF

RESTON, Va. — Wedding bells will ring in August for VM Software, Inc. and the Systems Center, Inc., located in Irving, Texas, the companies jointly announced last week.

The $16 million stock-for stock acquisition — VM Software's first — will launch the seven-year-old systems software developer across a widened range of IBM operating systems and into the rapidly growing market for networking software, said company President Richard L. Earnest. At the same time, he said, it will boost the Systems Center into the international market and graft its 300 customer sites to the acquirer's site list of approximately 2,600, with concomitant gains in sales and marketing expertise.

VM Software makes and markets a line of software utilities geared to wring maximum efficiency out of IBM's VM operating system. The System Center's Network Data Mover software line effects bulk transfers of data across hardware platforms and operating systems in an IBM Systems Network Architecture (SNA) network.

Finding MVS and SNA expertise at the Systems Center was tantamount to discovering it in VM Software's own backyard, Earnest said. VM Software Chairman Robert Cook has been a member of the privately held, venture capital funded company's board of directors for several years.

Last week's move positioned VM Software for further acquisitions, said Gary Hromadko, an analyst with Robertson, Colman & Stephens in San Francisco. Until now, he said, "Bob Cook has been defining the company as being in systems administration." If the merger — now pending approval from VM Software shareholders — closes, "they'll be a lot broader than that." Networking and a range of IBM operating systems, said Hromadko, will provide the company with a base from which to strategically spread.

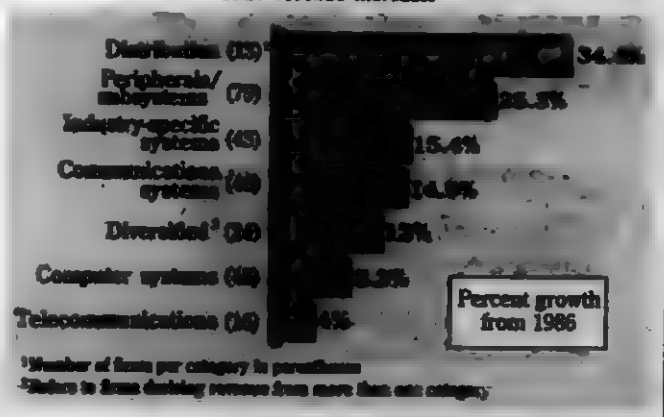
More muscle in a larger market, not disappointing financial results in 1987, spurred VM Software to take its first step down the acquisition road, according to Earnest. "The difficulties that we had last year were a result of the slowing of the mainframe market," he said.

Under the terms of the proposed merger agreement, the Systems Center will become a wholly owned subsidiary of VM software.

Data View

CPU growth lags

Computer systems trail most other hardware segments in 1987 revenue increases



[1]Number of firms per category in parentheses
[2]Refers to firms deriving revenue from more than one category

INFORMATION PROVIDED BY BROADVIEW ASSOCIATES
CW CHART

Plus, Cipher defend patents

BY JAMES A. MARTIN
CW STAFF

SAN FRANCISCO — Two patent infringement lawsuits were filed recently by California-based microcomputer peripheral companies.

Quantum Corp. in Milpitas and its subsidiary, Plus Development Corp., filed suit last week against Irvine-based Western Digital Corp., alleging that Western Digital's hard-disk add-in card infringes on patents covering similar technology developed

Continued on page 66

NEC shifts legal gears in Intel suit

BY JAMES A. MARTIN
CW STAFF

PALO ALTO, Calif. — The critical issue in the long-running NEC Electronics, Inc. vs. Intel Corp. microcode trial is not whether microcode can be copyrighted, but the legal validity of developing microcode in a so-called clean-room environment, NEC attorneys said last week.

"If the judge rules that our clean-room microcode development is a valid way to create microcode, then we'll know this method is safe — something we don't really know now," said NEC attorney Douglas Derwin at a NEC-sponsored press briefing here.

"It would give the industry a set of rules as to what information a developer can have when creating in a clean room and what information the developer cannot have," he added.

Such a ruling would also, in effect, subordinate NEC's claim that a large portion of microcode is generic and, thus, should not be copyrighted. NEC hopes to convince presiding U.S. District Judge William P. Gray that the V series microcode NEC developed in a legal clean-environment closely parallels the original V series microcode, which was not developed in a clean room and is at the center of the Intel-NEC dispute. Intel claims that NEC's original microcode violates Intel's copyrights for its 8088 and 8086 microcode.

In legal terms, the clean room is a heavily controlled area in

Continued on page 66

Corporate users at a crossroads in micro decision-making

BY KATHY CHIN LEONG
CW STAFF

SAN JOSE, Calif. — Unlike in years past, large users are at a serious crossroads in their microcomputer decision-making, a microsystems analyst said at an industry gathering here last week.

"Last year, users were content with MS-DOS. Now you have the OS/2 and a variety of bus architectures. The decision of what to buy is more difficult than ever," said David Carnevale, vice-president of microsystems at Infocorp, a Cupertino, Calif., market research firm.

With hopes of determining what users want and why they want it, more than 200 personal computer executives seemed pleased to hear at the conference that IBM, Apple Computer, Inc. and Compaq Computer Corp. are not the only ones that hold the purse strings when it comes to wooing corporate America.

Although much noise surrounds the IBM Personal System/2, market figures show that IBM Personal Computer success has fallen, indicating that users are willing to go with other alternatives. IBM's share dropped from 44% in 1986 to 33% in 1987, and Apple has held steady at 13%, according to a recent Infocorp survey. "Where the fragmentation [for the remaining percentage] has been is in the IBM PC-compatible market," InfoCorp analyst Stella Kelly said.

Certain micro vendors have had proven success by targeting specific users. Andrew Czernek, a Zenith Data Systems, Inc. vice-president of marketing, said the Glenview, Ill.-based firm has gained a foothold in the micro arena by focusing on such niches as government and education. Zenith makes the official PC product for the Department of Defense and has won large contracts with the Internal Revenue Service, the Department of Health and Human Services and the Department of the Treasury.

Filled the void

Additionally, Zenith made strides with universities because Apple lacked the professional tools and languages such as Cobol and Fortran, Czernek said.

Users want an open computing platform, said Robert Kavner, the new president of AT&T Data Systems. Kavner stressed that users do not want to feel locked in to a dedicated vendor environment but want to focus their creative resources on building applications. "America is spending a ton of money to work around the industry's proprietary platforms," he said.

There are still vendors that are carefully following IBM's tracks and are anxious to get IBM clones, particularly the IBM PS/2 Micro Channel look-alikes, out their doors. Understanding the nature of IBM's patents could help computer makers more easily clone a PS/2 by knowing what legal mine fields to avoid, said Robert E. Patterson, a Palo Alto, Calif.-

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Wilder

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than its traditional audit business — and therein lies the source of the recent upheaval.

According to published reports, Arthur Andersen's top brass believed that Gresham Brebach, the partner in charge of consulting, was planning to bolt from the firm and take part of the consulting practice, along with employees and clients, with him.

Brebach was relieved of his duties as head of consulting and is expected to leave Arthur Andersen, although he has denied planning to siphon off the firm's client base.

But if he does depart — and does indeed start a new consulting firm to woo Arthur Andersen clients — the battle for MIS customers could be a big part of the war.

Arthur Andersen's information systems consulting clients are a Fortune 500 Who's Who. Everything about the firm's MIS consulting is "big": big training budgets and facilities, big staff, big clients, big systems integration and strategic systems consulting projects.

And yes, big profits. Although such matters are kept tightly under wraps, observers unanimously say that Arthur Andersen is making a bundle in MIS consulting — and investing heavily in an effort to make more. This is at a time when the Big Eight audit business is no longer a growth industry.

Late last week, a virtually identical dispute came to light at fellow Big Eight firm Arthur Young — this one in court. Arthur Young sued two recently fired partners from its Chicago office for breach of contract, claiming they planned to leave the firm to solicit employees and clients for a competing venture in — you guessed it — consulting.

When big bucks are at stake, big disputes can arise (just ask Apple and Microsoft). Very big bucks are at stake in information systems consulting, and what's brewing at Arthur Andersen and Arthur Young bears watching.

Wilder is *Computerworld*'s senior editor, computer industry.

INDUSTRY WEEK IN BRIEF

Thirty-seven employees at Corvus Systems, Inc. have been handed a mandatory 30-day leave of absence, the struggling networking firm recently announced. "We deeply regret this action, but it is necessary to balance our work force against our sales and our cash flow resources," said Lewis T. Lipton, president and chief executive officer at the San Jose, Calif., firm in a prepared statement.

Former Management Decision Systems, Inc. head Jay Wurts has been named chief executive officer and chairman of the board at Cambridge, Mass.-based Symbolics, Inc. In February, Symbolics cofounder Russell Noftsker left a similar position at the troubled artificial intelligence workstation maker following a management shakeup, and Vice-President of Operations Ronald Derry has been serving an interim term since then.

Computer-aided software engineering products maker Index Technology Corp. has filed a registration statement with the Securities and Exchange Commission for an initial public offering of 1.5 million shares. The Cambridge, Mass., firm said it plans to sell stock for between $10 and $12 per share.

Past hostilities have apparently ended between IBM System/36 and 38 peripherals maker Decision Industries Corp., parent of Decision Data Computer Corp., and leasing firm Econocom International N.V. The two companies announced a joint marketing agreement last week under which Econocom will offer Decision Data customers lease financing through Decision Data's sales force. Decision Industries fended off a hostile takeover bid from Econocom last year by accepting a white knight offer from Gemet Corp.

Mellon Datacenter, the processing services unit of Pittsburgh's Mellon Bank Corp., has agreed to acquire Backroom Systems Group, a Monroe, N.C.-based maker of bank operations automation software. Backroom Systems Group recorded sales of $3.4 million in 1987.

President Reagan awarded Compaq Computer Corp. President Rod Canion the U.S. Department of Commerce's "E" Award at a ceremony last week in the White House Rose Garden. First established during World War II, the award recognizes companies for continued growth in their volume of exports. Overseas sales made up nearly one-third of Compaq's 1987 revenue.

Another Houston-based firm, Fortran software developer IMSL, Inc., also received the "E" award. IMSL received 41% of its revenue from foreign markets in 1987.

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Other comments/questions

NEC

FROM PAGE 63

which, in this case, NEC's microcode developers were denied access to the Intel microprocessors that they were attempting to reverse-engineer. NEC developed a clean room environment to prove that most microcode is similar by nature and that NEC did not copy Intel's microcode.

Major question

But Intel attorneys have maintained that the clean-room question will not be tried unless NEC loses on the big question still to be determined — whether microcode can be considered intellectual property and, thus, copyrighted.

"The clean-room code may be used as evidence on whether there is only one way to write the code or not," said Tom Dunlap, vice-president and general counsel for Intel. "As far as the infringement issue, that is going to be tried later, around August, after the copyright question."

To further bolster its case, NEC plans to emphasize testimony from Dr. David Patterson, a University of California at Berkeley professor hired by Intel as an expert witness.

Patterson asserted that microroutines — electronic signals that carry out a particular function of the microcode — often can only accomplish a specific task in one way, thus creating inevitable similarities between microcodes designed for like microcomputers.

Not over yet

The NEC-Intel trial is scheduled to resume June 14 in the San Jose, Calif., U.S. District Court. NEC originally filed suit against Intel on Dec. 21, 1984, seeking to have Intel's 8088 and 8086 microcode copyrights declared invalid.

Intel countersued Feb. 25, 1985, claiming NEC's V series microcode infringed on Intel microcode.

On Sept. 22, 1986, then-presiding Judge William A. Ingram ruled that microcode can be copyrighted and that Intel's copyright is valid, but had yet to rule on whether NEC had infringed on Intel copyrights.

Ingram later disqualified himself and nullified his decision, sending the case back to square one. Gray was assigned to the case in January 1988.

Asian firms squabble

In what is considered to be the first public friction between Japanese and South Korean semiconductor makers, Hitachi Ltd. in Tokyo has accused Samsung Semiconductor and Telecommunications Co. of illegally copying Hitachi's patented memory chip technologies.

Hitachi is demanding that Samsung pay royalties on the dynamic random-access memory chips that Samsung exports to the U.S., claiming that the Seoul-based company is unlawfully using Hitachi's patented dynamic RAM manufacturing process.

Analysts said Hitachi's accusations against Samsung are ironic, since Japanese companies have been the target of repeated allegations that they unlawfully use U.S. patents and copyrights on chip technologies. Several Japanese companies have said in the past that the U.S. has unfairly targeted the Japanese.

The two companies are said to be in the process of negotiating a settlement.

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Users

FROM PAGE 63

based attorney specializing in technology.

Still, copying a PS/2 without IBM's consent is easier said than done. "It's easier to take apart the Micro Channel for reverse-engineering purposes than it is to put it back together," Patterson said.

Despite flashy or successful cloning technology, vendors will have to pay closer attention to the business needs of users. The falloff in popularity of certain software applications is a prime example.

> "IT'S EASIER to take apart the Micro Channel . . . than it is to put it back together."
>
> ROBERT E. PATTERSON
> ATTORNEY

Despite recent hoopla over the future of presentation graphics software, the market for such packages is still in a "missionary" phase, according to Bill Higgs, Infocorp's director of software research.

"Since 1981, presentation graphics has been predicted to be the next boom area in applications, but it hasn't happened," Higgs said.

Presentation graphics programs, which are drawing tools and packages used to develop color slides, have yet to catch on because users are not convinced of the need for them.

Staff members Julie Pitta, James A. Martin and Stephen Jones contributed to this report.

Suits

FROM PAGE 63

by Plus.

Separately, Cipher Data Products, Inc. in San Diego has announced it has filed suit against Costa Mesa, Calif.-based Archive Corp., claiming Archive infringed on its patents on ¼-in. cartridge backup tape drives.

The suit, filed in U.S. District Court here, claims Western Digital violated a Quantum patent covering a wedge-servo disk architecture used in its hard disk drives as well as a Plus patent on its Hardcard add-in board.

At press time, Western Digital was preparing a formal response to the lawsuit.

Quantum has successfully defended its wedge-servo patent in the past, suing Chatsworth, Calif.-based Computer Memories, Inc. for $6 million in 1986. The company sued NEC Corp., NEC Information Systems and Mountain Computer, Inc. in 1987 and received a $3 million settlement.

Archive has countersued Cipher, challenging the validity of Cipher's patents.

In 1986, Cipher sued Wangtek, Inc. in a similar patent infringement case, currently in court. Cipher's ¼-in. tape drive patent was issued in February 1986 and reissued in June 1987, according to the company.

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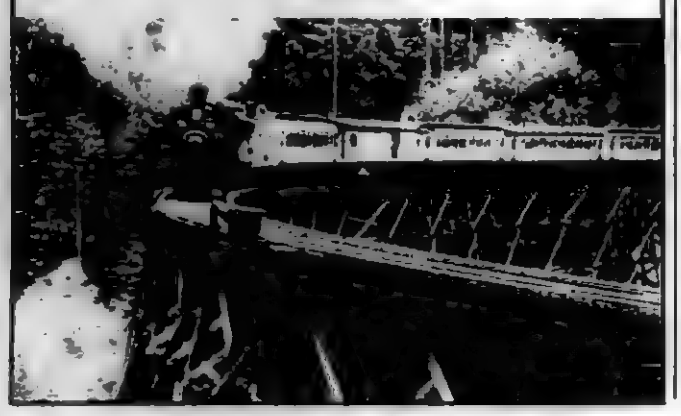

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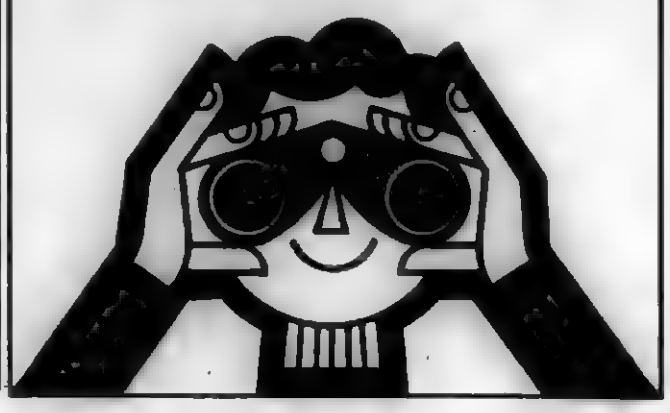

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The view from BUNCH shops

Non-IBM compatible shops have fewer opportunities but less competition

BY JANET MASON
SPECIAL TO CW

Art Heaton, a senior programmer/analyst at Charming Shops, Inc. in Bensalem, Pa., is one MIS professional who has maneuvered himself from a Unisys Corp. environment to his present position in an IBM shop. While most of his colleagues were content with their non-IBM-compatible mainframe skills, Heaton decided to move into the IBM arena to broaden his choice of potential employers.

Like many others with non-IBM-compatible backgrounds, he found the move far from easy, but a boost to his career. He now has four years of IBM experience under his belt. "There is no question that I made the right decision," he says.

Companies will long be using non-IBM-compatible mainframes, most of which carry one of the names collectively formerly referred to as the BUNCH — Burroughs Corp., Univac (Sperry Corp.), NCR Corp., Control Data Corp. and Honeywell, Inc.

But some of the BUNCH manufacturers have been struggling lately, reflected in the mergers of Burroughs with Sperry, forming Unysis, and Honeywell's computer operations with France-based Groupe Bull. Furthermore, many BUNCH users are converting to IBM systems.

Robert Tannura, vice-president of executive search services with Chicago-based Wood/Sprau/Tannura, Inc., cites a major Chicago retailer and financial institution among those converting to IBM to take advantage of the packaged software applications that do not run on BUNCH mainframes.

Decline in popularity

BUNCH systems accounted for a relatively steady 25% of U.S. mainframe installations from 1982 to 1985 but slipped to 24% in the following two years, according to Donald Bellomy, a senior consultant at International Data Corp. in Framingham, Mass.

"The opportunities of IBM over the BUNCH shops are 15 to 1," says Burt Israel, a manager with recruiting firm Robert Half International, Inc. in Hartford, Conn. Israel says the Digital Equipment Corp. environment is second only to IBM in scope of career opportunities, ahead of all BUNCH installations.

The difficulty in moving from a BUNCH background to IBM, according to Israel, lies more in the perception of companies than in retraining workers. "In my point of view, this attitude limits the company, because the individual has unique abilities, talents and skills even if he doesn't have an IBM background," he says.

> THE DIFFICULTY in moving from a BUNCH background to IBM, according to one recruiter, lies more in the perception of companies than in retraining workers.

Both Israel and Tannura suggest that professionals with a BUNCH background become harder to place in an IBM environment as their technical skills become more entrenched, so they advise switching to IBM early — as Heaton did with five years of BUNCH experience — or planning to retire in the BUNCH environment.

BUNCH advantages

This is not to say that people working in BUNCH environments have to switch to IBM. First, pay is generally comparable. Furthermore, there is often less competition for jobs with BUNCH users. Steven Joffe, vice-president of San Mateo, Calif.-based recruiting firm Source EDP says, "Many of the people working for BUNCH users want to get out, so a person who knows a system well and plans to stay in the field has an advantage."

Many BUNCH companies, Joffe adds, hire someone after interviewing only several candidates, compared with the hordes who sometimes pass through the hiring process of IBM shops.

He also points out that the makers of BUNCH computers have certain strongholds, such as Unisys in government and related industries and CDC in scientific and engineering organizations.

But those who work in BUNCH environments and need to change companies are more likely than their IBM counterparts to relocate, Joffe says. "Because there are fewer BUNCH companies, they relocate on a higher percentage basis."

Companies that use BUNCH systems tend to retain their MIS employees longer because of the lack of competition, Tannura says. "These employees have job security in their companies, but they don't have the choice to go elsewhere," he says.

In theory, when someone moves beyond the programming ranks into systems analysis and design, he can more easily transfer his abilities to an IBM environment. However, says EDP's Joffe, "As people move up the ladder, the competition is much heavier, and companies are more likely to stick with people from an IBM background."

Trading skills for training

To avoid facing a limited career path, many people from BUNCH backgrounds position themselves in companies where they can learn IBM systems. Charming Shops' Heaton offered his Unisys skills to a consulting firm in return for eventually being trained on an IBM system.

Others find that expertise with a particular application provides their entry to the IBM world. Israel placed a woman boasting an eight-year NCR background in the banking industry with a large insurance company that needed someone skilled in mortgage and loan applications. "The driving force was her ability to understand the application and the end users," Israel says. "The company sent her to some basic IBM courses and trained her on their system."

Tannura advises BUNCH professionals interested in switching to IBM to find a company planning to convert to IBM and offer it BUNCH skills in return for being trained in IBM systems.

Mason is a Philadelphia-based freelance journalist.

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Applications Engineers should possess a BSEE/CS, with an advanced degree desirable. Working knowledge of LANs down to the protocol level is required. Experience with one or more of UNIX™, DOS, VMS is required; familiarity with TCP/IP or ISO communication protocols is required.

Our sales openings are for people with a strong technical background, keen analytical skills, and the ability to communicate results to a wide range of audiences, from engineers to senior management.

Successful candidates will be self-starters, reliable, with sensitivity to customers' needs, and good interpersonal skills who can keep current with the latest developments and trends in the networking industry.

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To find out more, please send your resume to: Richard Duncan, Human Resources, Excelan, 2180 Fortune Drive, San Jose, CA 95131; or call (408) 432-6739. We are proud to be an equal opportunity employer.

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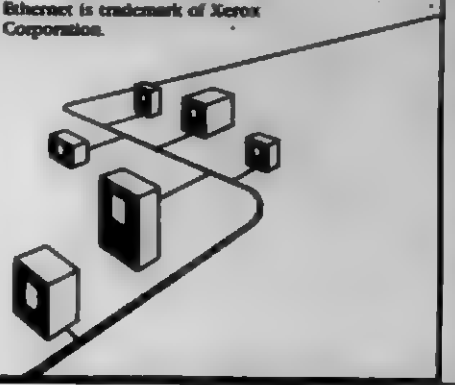

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Roger Fraumann
Staff Director
Lachman Associates, Inc.
Westmont, IL

Roger Fraumann is Staff Director for Lachman Associates, Inc. (LAI) of Westmont, Illinois. It is one of the largest privately held computer systems software consulting and development firms in the United States. And Roger is pleased to report that plans call for continuing the 50% annual growth every year for the next five years.

Roger is also pleased with Computerworld's contributions to the company's growth. When he needs qualified people to fill positions as the company grows, he turns to Computerworld.

"Computerworld is the only national publication that we routinely advertise in," says Roger. *"Last year we determined that we needed consistent national exposure. We chose Computerworld, which gave us exactly that. Simply put, Computerworld delivers just what we're looking for: top-quality job applicants."*

"We get about 20 responses per ad, and what really counts is that those responses yield at least two quality applicants per ad," Roger explains. *"Overall, a higher percentage of quality people respond to our ads in Computerworld, as opposed to what other publications deliver. Computerworld works for us."*

Plus, Roger has found added incentive to advertise in Computerworld: *"The same ad that runs nationally in Computerworld costs twice as much to run in the Chicago Tribune, a local newspaper,"* he notes.

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Requirements: Bachelor's degree or equivalent education and experience. Minimum 3 years experience administering complex, multi-vendor/protocol data communications networks. Excellent verbal and written communications skills and strong supervisory skills essential. Experience in an academic setting preferred. Tulane is a non-smoking environment.

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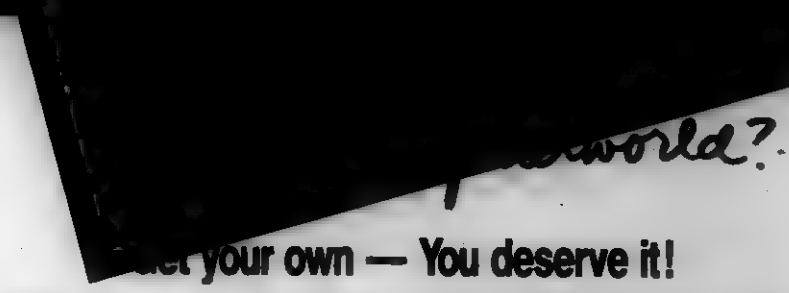

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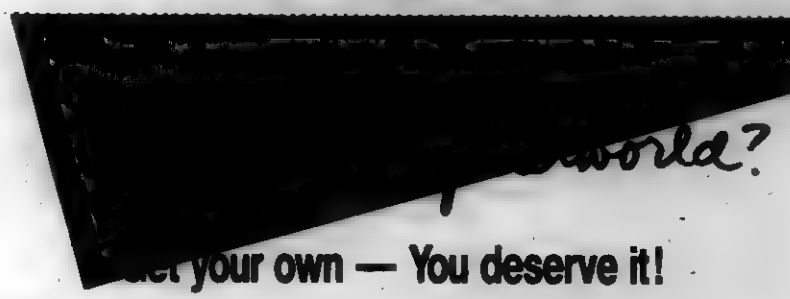

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Applicant must possess a B.S. Degree in C.Sc. Math, or Engr., and at least 4 years experience in ACP/TPF Systems Analysis. Education and experience will be found acceptable if applicant has 8 to 10 years of practical experience in ACP/TPF systems software analysis at increasing levels of responsibility and achievement found to be equivalent to a B.Sci. Degree) including at least 4 years experience as an ACP/TPF technical project leader.

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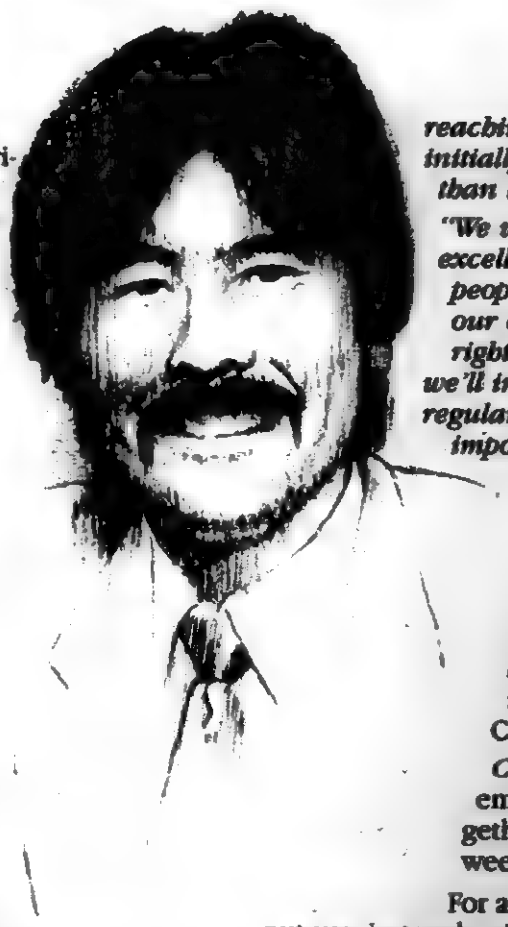

Cesar Namba is Assistant Vice President for MIS Recruitment at Imperial Corporation of America (ICA) in San Diego, California. ICA is a financial services organization that has savings and mortgage institutions in 20 states.

For Cesar, filling important MIS/DP positions is the name of the game. Recently, ICA embarked upon a change in part of its corporate technology, and that meant that Cesar had to go to work finding qualified personnel. And for reaching the best possible candidates, he turned to *Computerworld.*

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New technology, new demand

IBM's OS/2 expected to make dent in DOS-based machine demand

BY CAMERON HALL
BOSTON COMPUTER EXCHANGE CORP.

Although the most requested computers in the IBM and compatible markets on the Boston Computer Exchange are still the DOS-based machines, it is becoming clear that the emerging applications possible under OS/2 are creating demand in both individual and corporate environments for equipment able to run this operating system.

Even these buyers, though, are operating in the "oldies but goodies" market as they request IBM Personal Computer ATs and Compaq Computer Corp. 286s rather than the IBM's Personal System/2.

The market was quiet during the week ending May 20, as the buzz of anticipation over Comdex/Spring '88 announcements settled as buyers and sellers thought about their next moves.

On the IBM floor, the PC AT Model 339 closed down $50, at $3,450. The XT Model 089 was down $50 to $1,550 after the previous week's downward pressure on prices brought sellers to the market for a quick sale. In addition, the PC XT Model 086 closed down $25, at $1,150, under favorable supply conditions.

The IBM PS/2 Models 50 and 60 have been receiving increasing interest from buyers beginning to look for PS/2s. The two models closed at $2,400 and $2,600, respectively.

The Mac SE has taken over as No. 1 in requests in the Apple Computer, Inc. market over the Macintosh Plus, with 20-MHz SE buyers waiting for supply at the recent high of $2,450. Those looking for the Plus found them down slightly at $1,075. The Mac II market is looking for sellers at $4,025.

The Compaq market was strong all week with steady demand. Trading of Deskpro 386 models was thin during the week — the model closed at $3,975 — and Deskpro 286s closed at $2,350, with both models experiencing downward price pressure from new discounted sales.

The Boston Computer Exchange can be reached at 800-BOCOEXX or 617-542-4414 in Massachusetts.

The BoCoEx Index

Closing prices report for the week ending May 20, 1988

	Closing price	Recent high	Recent low
IBM PC Model 076	$850	$850	$550
XT Model 086	$1,150	$1,200	$875
XT Model 089	$1,550	$1,600	$1,100
AT Model 099	$2,300	$2,425	$1,750
AT Model 339	$3,450	$3,500	$2,625
PS/2 Model 50	$2,400	$2,500	$2,225
PS/2 Model 60	$2,600	$2,600	$2,475
Compaq Portable I	$825	$900	$625
Portable II	$2,275	$2,375	$1,650
Deskpro 286	$2,350	$2,425	$1,825
Deskpro 386	$3,975	$4,000	$3,875
Apple Macintosh 512	$725	$775	$575
512E	$925	$1,025	$650
Plus	$1,075	$1,100	$810
SE	$1,925	$2,200	$1,600
II	$4,025	$4,325	$3,500

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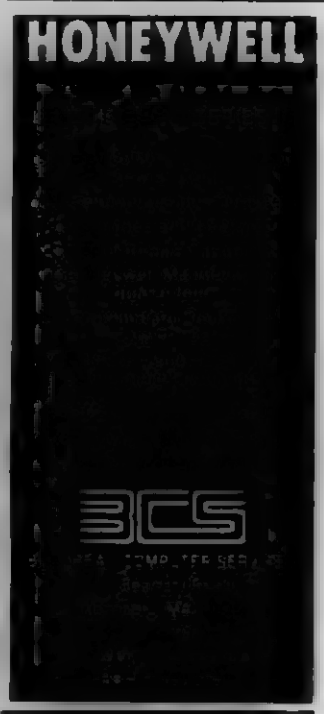

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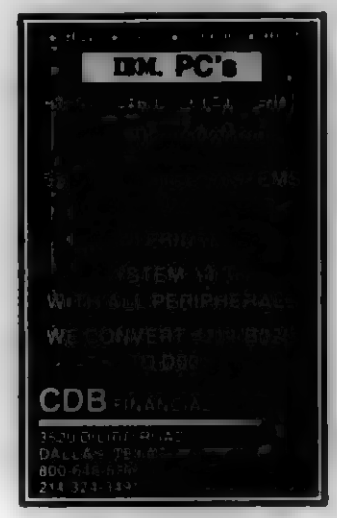

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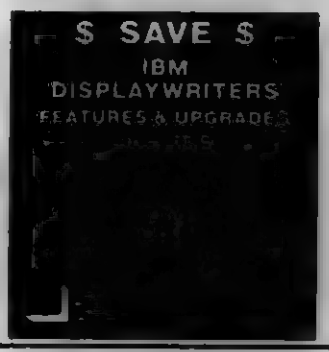

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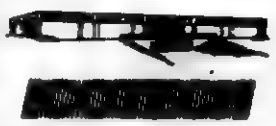

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Bids & Proposals

NEW YORK CITY HOUSING AUTHORITY REQUEST FOR PROPOSALS

The New York City Housing Authority is soliciting proposals from computer systems vendors with demonstrated experience in legal software applications to furnish and install an office automation system in its Legal Department that will provide advanced word processing capabilities, a fully comprehensive case management/docketing system, and a variety of data base applications in support of its practice specialties. The system will be installed in new offices at 75 Park Place in Manhattan to be occupied by the legal Department later this year.

Copies of the RFP will be available for distribution on May 24, 1988, in Rm. 610, 250 Broadway, New York, N.Y. 10007. Proposals must be submitted to the Authority in the form specified in the RFP, by 4:00 P.M. on June 21, 1988.

Inquiries should be directed to Mr. Robert Odom, Esq., Deputy General Counsel, Rm. 623, 250 Broadway, New York, New York 10007, (212) 306-4080.

REQUEST FOR PROPOSAL

The New York City Human Resources Administration is seeking proposals from time to provide the on-line operation of a city-wide Electronic Payment File Transfer (EPFT) system which supports the issuance of food stamp and public assistance benefits through a network of approximately 400 EPFT outside city-wide.

Requests for proposals may be obtained from:

HRA/Income Maintenance
Office of Special Projects
250 Church Street - Room 1018
New York, N.Y. 10013
Attention: Mr. Albert M. Glave
Telephone: (212) 553-5480

A proposers' conference will be held at 10:30 A.M. on Monday, June 20, 1988, in the 8th floor conference room, at 250 Church Street, New York, N.Y.

Proposals will be received by New York City Human Resources Administration/Department of Social Services until 5 P.M. on Monday, July 25, 1988.

MISSISSIPPI CENTRAL DATA PROCESSING AUTHORITY

Sealed proposals will be received by the CDPA, 301 N. Lamar St., 301 Building, Suite 508, Jackson, MS 39201 for the following equipment and services:

Request for Proposal No. 1988, due Tuesday, July 12, 1988 at 3:30 p.m. for the acquisition of a financial management system for implementation within an Amdahl 5860 host and distributed networking environment under MVS/XA to serve the agencies of MISSISSIPPI STATE GOVERNMENT. Vendors are required by the specifications to attend a mandatory bidder's conference prior to submitting bids. BIDS FROM VENDORS NOT ATTENDING THE MANDATORY BIDDER'S CONFERENCE WILL NOT BE CONSIDERED. Charge $10.00.

Request for Proposal No. 1987, due Tuesday, May 31, 1988 at 3:30 p.m. for the acquisition of an IBM System/38 minicomputer or compatible equivalent for MISSISSIPPI VALLEY STATE UNIVERSITY. No Charge.

Request for Proposal No. 1986, due Tuesday, May 31, 1988 at 3:30 p.m. for the acquisition of laboratory software to run on a Data General MV/8000 for the UNIVERSITY OF MISSISSIPPI MEDICAL CENTER. No charge.

Request for Proposal No. 1985, due Wednesday, June 1, 1988 at 3:30 p.m. for the acquisition of four local area networks for the OFFICE OF THE STATE AUDITOR. Charge $10.00.

Detailed specifications may be obtained free of charge from the CDPA office or at the specified cost by submitting a written request accompanied by the appropriate payment. NOTE: Valid forms of payment are corporate check on a Mississippi bank, certified check or POSTAL money order. NO CASH OR OUT-OF-STATE CHECKS. The CDPA reserves the right to reject any and all bids and proposals and to waive informalities.

Patsy Stanley @ (601) 359-3004

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Request for Proposal No. 1975, due Thursday, June 9, 1988 for the acquisition of a turnkey system with widespread acceptance in university law libraries nationally, to automate the public access, cataloging, circulation control, acquisitions and serials control operations for the UNIVERSITY OF MISSISSIPPI LAW LIBRARY. No charge.

Request for Proposal No. 1974, due Wednesday, July 13, 1988 for the acquisition of a distributed processing system to address the departmental needs of the STATE FISCAL MANAGEMENT BOARD and affiliated departments, bureaus and offices. $10.00 charge.

Detailed specifications may be obtained free of charge from the CDPA office or at the specified cost by submitting a written request accompanied by the appropriate payment. NOTE: Valid forms of payment are corporate check on a Mississippi bank, certified check or POSTAL money order. NO CASH OR OUT-OF-STATE CHECKS. The CDPA reserves the right to reject any and all bids and proposals and to waive informalities.

Patsy Stanley @ (601) 359-3004

STATE OF CONNECTICUT
D.A.S. BUREAU OF PURCHASES
REQUEST FOR PROPOSAL

Vendors interested in responding to the following fourth coming RFP:

1.) RFP "88-QA132" - for the sale of two "2" DEC 11/780 computer systems with associated hardware.

Are asked to make reference to the corresponding RFP number and contact:

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Office of Resources and Facilities Planning
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Hartford, Connecticut 06106
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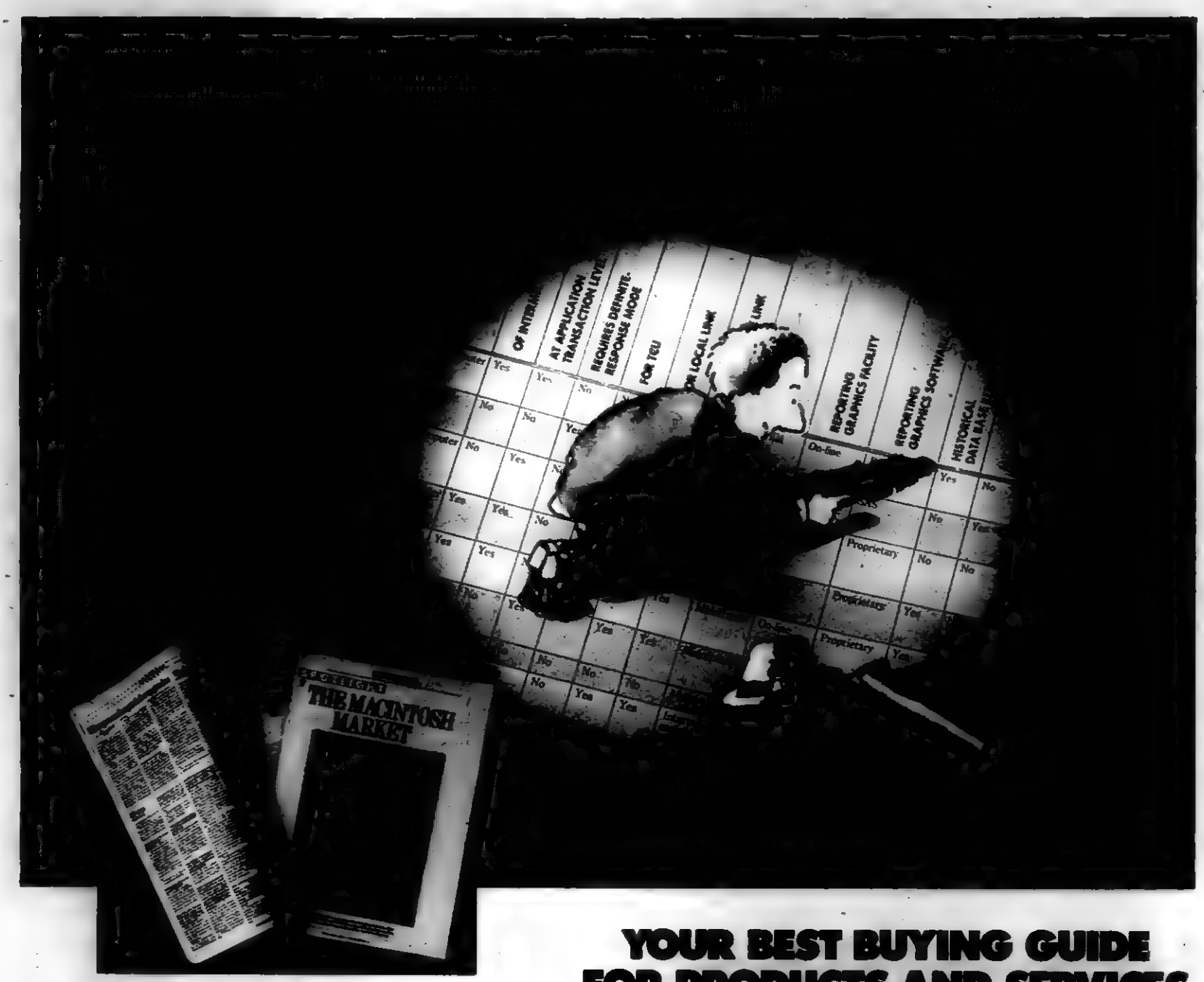

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IN COMPUTERWORLD SPOTLIGHT

Evaluating and specifying products and services for purchase is no easy task. And it's even more difficult when new products and vendors are frequently entering the market. But *Computerworld* makes the buying process easier for you with *Computerworld* Spotlight.

Spotlight is a series of pullout sections within *Computerworld*, each focusing on one product category. With 24 Spotlight sections in 1988, you'll get the purchasing specifics you need for PCs, LANs, printers and productivity software — to name just a few. Each Spotlight contains quick reference specification charts that compare products on a feature-for-feature and dollar-for-dollar basis. Plus related editorial on real-life applications, interviews, vendor viewpoints and market trends. And since it's a pullout section, you'll be able to save and refer to this information as you need it.

If you're involved in buying products, *Computerworld* Spotlight is the section you'll be turning to throughout 1988. And if you're marketing computer products in any of the Spotlight categories covered, you should be putting your message where your market is. Our schedule of 1988 Spotlight topics is listed at the left for your reference.

1988 Computerworld SPOTLIGHT Sections

Issue Date	Spotlight Topic	Ad Closing	Trade Show Distribution
Jan. 11	Terminals & Terminal Emulation Products	Dec. 24	
Jan. 25	LANs	Jan. 8	Communication Networks
Feb. 8	DEC-compatible Software	Jan. 21	Uniforum
Feb. 29	Performance Management/ Capacity Planning	Feb. 12	
Mar. 14	DBMS	Feb. 26	
Mar. 28	Micro-to-Host Links	Mar. 11	WCC/Interface
Apr. 11	PCs (IBM-compatible)/ Portables/Laptops	Mar. 25	
Apr. 25	Electronic Publishing	Apr. 8	
May 9	Printers	Apr. 22	Comdex Spring
May 23	Data Communications	May 6	
June 6	CASE	May 20	
June 20	The SNA Market	June 3	PC Expo
July 11	Disaster Prevention & Recovery Products & Services	June 24	
July 25	Productivity Software	July 8	
Aug. 8	TBA	July 22	
Aug. 29	DB2 Market	Aug. 12	
Sept. 19	Hardware Roundup: Large, Medium Scale & Special Purpose Systems	Sept. 2	
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Nov. 14	TBA	Oct. 28	Comdex Fall
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Dec. 19	IBM-compatible PCs/PS2 Market Products/Monitors	Dec. 2	

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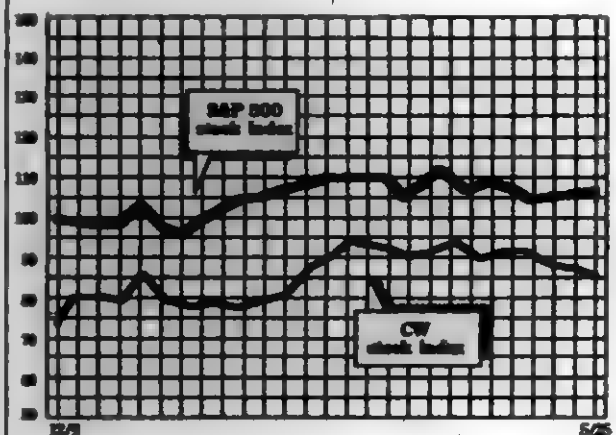

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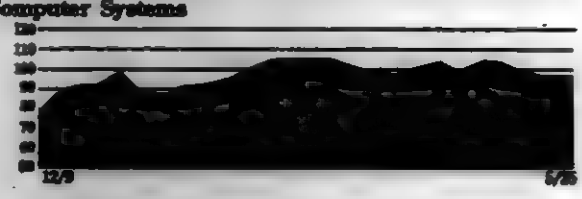

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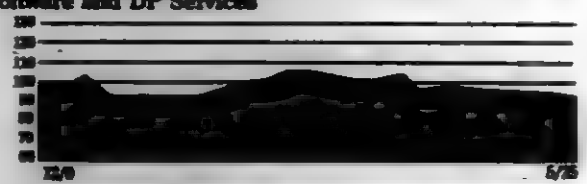

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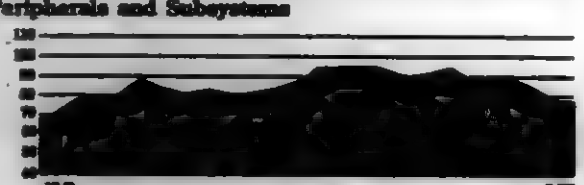

Leasing Companies

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, MAY 25, 1988

E X C H		52-WEEK RANGE (1)		PRICE CLOSE MAY 25 1988	WEEK NET CHANGE	WEEK PCT CHANGE
	Communications and Network Services					
N	AMERICAN INFO TECHS CORP	100	74	87.38	1.1	1.3
O	ANDREW CORP	18	11	15.00	0.5	3.4
O	ARTEL COMM CORP	3	1	1.50	-0.1	-7.7
N	AT&T	36	28	28.13	0.1	0.5
O	AVANT GARDE COMP INC	4	2	2.00	-0.1	-5.1
O	AVANTEK INC	17	6	7.00	-0.3	-3.4
N	AYDIN CORP	20	16	19.63	-0.6	-3.7
N	BELL ATLANTIC CORP	89	81	89.00	2.6	3.0
N	BELLSOUTH CORP	44	36	39.63	0.9	2.3
O	COMPRESSION LABS INC	6	2	3.63	-0.1	-2.3
O	COMPUTER NETWORK TECH	5	1	1.38	0.0	-2.4
N	CONTEL CORP	46	35	31.00	-0.4	-1.2
O	DATA SWITCH CORP	10	4	7.00	0.0	0.0
O	DIGITAL COMM ASSOC	49	28	31.75	0.0	0.0
O	DYNATECH CORP	35	14	19.50	-0.5	-2.7
O	FIBRONICS INTERNATIONAL INC	7	2	3.00	-0.1	-4.0
O	GANDALF TECHNOLOGIES	10	6	7.00	0.5	7.7
O	GENERAL DATACOMM INDS	13	3	3.63	0.3	7.4
N	GTE CORP	45	36	36.25	1.4	4.1
O	INFOTRON SYS CORP	14	6	12.75	-0.3	-1.9
N	ITT CORP	68	42	46.63	1.5	3.3
O	M/A COM INC	16	7	9.63	0.1	1.3
O	MCI COMMUNICATIONS CORP	15	9	13.63	0.0	0.0
O	MICOM SYS INC	17	7	15.25	0.1	0.8
O	NETWORK SYS CORP	13	7	9.63	0.1	1.3
N	NORTHERN TELECOM LTD	24	14	16.50	-0.3	-1.5
O	NOVELL INC	30	12	23.25	0.8	3.3
O	NYNEX CORP	78	58	62.50	1.1	1.8
N	PACIFIC TELESIS GROUP	34	23	29.25	1.0	2.5
O	PARADYNE CORP	9	4	4.25	0.1	3.0
O	PENRIL CORP	9	3	4.38	-0.1	-2.8
N	PLESSEY PLC	36	28	28.75	0.1	0.3
N	SCIENTIFIC ATLANTA INC	20	8	12.38	0.9	8.8
N	SOUTHWESTERN BELL CORP	46	32	36.00	0.5	1.4
O	3 COM CORP	28	12	19.75	-0.4	-1.9
O	TIMEPLEX INC	37	17	32.30	0.0	0.0
N	WIDEBMANN BASS INC	15	6	12.25	0.3	2.1
N	U S WEST INC	65	43	52.75	1.1	2.2
	Computer Systems					
O	ALLIANT COMPUTER SYS	31	5	5.75	-0.3	-4.2
O	ALPHA MICROSYSTEMS	6	3	5.63	0.0	0.0
O	ALTOS COMPUTER SYS	15	6	5.63	-0.3	-2.8
O	AMDAHL CORP	50	19	48.00	0.8	1.7
O	APOLLO COMPUTER INC	25	9	14.38	-0.6	-4.2
O	APPLE COMPUTER INC	60	39	38.50	-1.3	-3.1
O	BOLT BERANEK & NEWMAN	26	12	16.00	0.5	3.2
O	BRITTON LEE INC	4	1	2.00	-0.1	-5.9
N	COMPAQ COMPUTER CORP	79	36	46.13	-1.4	-2.8
O	COMPUTER AUTOMATION INC	16	6	8.50	-0.6	-6.8
O	COMPUTER CONSOLES INC	10	2	7.50	0.4	5.3
O	CONCURRENT COMP CORP	24	11	16.75	-1.0	-5.6
O	CONTROL DATA CORP DEL	36	18	26.00	-0.3	-1.0
O	CONVERGENT TECH	9	3	3.19	0.1	2.0
O	CONVEX COMPUTER CORP	19	6	7.63	0.1	1.7
N	CRAY RESH INC	116	47	75.38	-0.4	-0.5
O	DAISY SYS CORP	10	5	9.25	0.3	2.8
N	DATA GEN CORP	37	16	20.50	0.3	1.2
O	DATAPOINT CORP	9	3	5.63	0.3	4.7
N	DIGITAL EQUIP CORP	280	88	102.38	0.6	0.6
N	FLOATING POINT SYS INC	12	3	3.00	-0.3	-7.7
N	GOULD INC	34	8	14.38	1.0	7.5
N	HARRIS CORP	41	22	27.63	-0.3	-0.9
N	HEWLETT PACKARD CO	74	38	58.00	-1.0	-1.8
N	HONEYWELL INC	91	49	58.38	-0.6	-0.9
N	IBM	176	102	108.50	-0.4	-0.3
O	INFORMATION INTL INC	18	9	12.25	0.0	0.0
O	IPL SYS INC	3	1	1.56	-0.1	-7.4
O	MASS COMPUTER CORP	14	4	4.25	-0.1	-2.9
N	MATSUSHITA ELEC INDL LTD	229	108	209.00	-2.0	-0.9
O	MEGADATA CORP	5	3	3.00	-0.1	-4.0
O	MENTOR GRAPHICS CORP	20	14	20.50	1.0	2.5
N	NBI INC	14	4	5.25	1.3	31.3
N	NCR CORP	87	60	60.25	1.5	2.6
N	PRIME COMPUTER INC	31	12	15.13	-0.5	-3.2
O	PYRAMID TECHNOLOGY	14	5	11.25	-1.3	-10.0
O	STRATUS COMPUTER	46	18	27.50	-0.3	-0.9
O	SUN MICROSYSTEMS INC	46	14	32.63	-1.9	-5.4
O	SYMBOLICS INC	8	1	1.44	0.1	4.8
N	TANDEM COMPUTERS INC	37	16	17.50	-0.1	-0.7
N	TANDY CORP	57	28	44.75	0.5	1.1
O	ULTIMATE CORP	37	12	13.13	0.1	1.0
N	UNISYS CORP	46	24	33.13	0.5	1.5
A	WANG LABS INC	19	10	10.13	-0.5	-4.7
	Software & DP Services					
O	ADVANCED COMP TECH	6	1	1.2	-.1	-.4
N	AGS COMPUTERS INC	30	11	21.13	3.1	17.4
O	AMERICAN MGMT SYS INC	20	9	14.50	0.0	0.0
O	AMERICAN SOFTWARE INC	19	8	13.00	-0.1	-1.0
O	ARACOMP INC	11	4	10.50	1.8	18.2
O	ANALYSTS INTL CORP	10	4	7.75	-0.1	-1.8
O	ASHTON TATE	33	13	24.00	-0.5	-2.0
O	ASK COMPUTER SYS INC	19	6	13.13	-0.4	-2.8
O	AUTODESK INC	34	12	27.00	-0.3	-0.9
N	AUTO DATA PROCESSING	68	36	38.50	-1.3	-3.3
O	BOOLE & BABBAGE INC	12	3	8.75	0.3	2.9
N	COMPUTER ASSOC INTL INC	37	15	28.13	0.1	0.5
O	COMPUTER HORIZONS CORP	15	7	9.50	-0.9	-8.4
N	COMPUTER SCIENCES CORP	73	36	40.75	0.9	2.2
N	COMPUTER TASK GROUP INC	17	9	10.50	-0.3	-2.3
O	COSMOS INC.	17	4	8.50	0.3	4.0
O	COMSHARE INC	28	12	15.25	-0.5	-3.2
N	CULLINET SOFTWARE INC	14	4	7.25	0.3	3.6
O	DUQUESNE SYS INC	20	10	10.00	0.0	0.0
N	GENERAL MTRS (CLS E)	51	30	41.88	-0.1	-0.3
O	HOGAN SYS INC	16	4	4.38	0.1	2.9
O	INFORMIX CORP	31	13	17.50	-1.0	-5.4
O	INTELLICORP INC	11	3	2.88	-0.1	-2.3
O	MEANE INC	16	6	11.50	0.0	0.0
O	LOTUS DEV CORP	40	19	21.00	-1.3	-5.8
O	MANAGEMENT SCI AMER	15	6	8.38	0.4	4.7
O	MICRO PRO INTL CORP	6	3	2.75	-0.1	-4.3
O	MICROSOFT CORP	73	37	68.75	-1.0	-1.8
O	MORINO ASSOCIATES INC	22	7	10	-0.3	-1.8
O	NATIONAL DATA CORP	34	20	22.38	-0.8	-2.7
O	ON LINE SOFTWARE INTL INC	22	9	8.75	-0.1	-1.4
O	ORACLE SYS CORP	19	8	16.00	0.0	0.0
N	PANSOPHIC SYS INC	28	11	14.63	0.4	2.8
O	POLICY MGMT SYS CORP	30	15	23.38	0.0	0.0
O	PROGRAMMING & SYS INC	14	7	11.25	0.3	2.3
O	REYNOLDS & REYNOLDS CO	30	14	18.00	-0.3	-1.4
O	SEI CORP	19	10	17.00	-0.5	-2.9
O	SHARED MED SYS CORP	30	19	20.75	0.0	0.0
O	SAGE SOFTWARE INC.	20	5	5.88	-0.4	-6.0
O	SOFTWARE PUBS CORP	18	5	17.00	-0.4	-2.2
A	STERLING SOFTWARE INC	13	6	8.38	0.1	1.5
O	SUNGARD DATA SYS INC	30	10	17.00	0.3	1.8
O	SYSTEMATICS INC	28	16	21.25	-0.3	-0.8
O	SYS. SOFT INC.	24	7	15	0.8	5.3
O	VMI SOFTWARE INC	30	7	13.75	0.8	5.8
	Semiconductors					
N	ADV MICRO DEVICES INC	25	8	14.25	0.4	2.7
N	ANALOG DEVICES INC	31	8	14.13	0.8	5.9
O	ANALOGIC CORP	11	5	8.63	0.5	5.2
O	INTEL CORP	42	18	28.50	-1.0	-3.3
O	LSI LOGIC CORP	15	7	11.25	0.0	0.0
N	MOTOROLA INC	74	35	48.63	0.0	0.0
N	NATL SEMICONDUCTOR	22	10	12.75	-0.1	-1.0
N	TEXAS INSTRS INC	68	36	43.88	0.3	0.8
A	WESTERN DIGITAL CORP	31	11	14.63	-1.4	-8.8
	Peripherals					
O	ALLOY COMP.	13	3	3.25	.25	-7.1
N	AM INTL INC	9	3	3.75	0.1	3.4
O	AST RESH INC	21	6	12.50	-0.5	-3.8
O	AUTO TROL TECH CORP	7	3	4.75	-0.1	-1.3
O	BANCTEC INC	16	5	8.13	0.3	3.2
O	CIPHER DATA PRODS INC	13	4	7.75	-0.5	-7.5
O	COGNITRONICS CORP	5	2	2.75	-0.3	-9.3
N	COMPUGRAPHIC CORP	28	19	26.50	0.1	0.5
A	DATAPRODUCTS CORP	24	7	9.25	0.3	3.8
A	DATARAM CORP	8	5	6.75	-0.3	-4.6
N	DECISION INDS CORP	13	4	4.00	0.0	0.0
N	EASTMAN KODAK CO	71	38	40.75	-0.4	-0.9
O	E M C CORP MASS	28	6	6.50	-0.1	-1.9
O	EMULEX CORP	9	4	7.63	0.1	1.7
O	EVANS & SUTHERLAND	35	17	17.13	-0.1	-0.7
O	EXIDY CORP	8	3	3.00	-0.1	-4.0
O	INTERLEAF INC	24	11	14.38	-1.5	-9.5
N	KOMEGA CORP	4	1	2.94	0.0	0.0
O	LEE DATA CORP	8	3	3.13	-0.3	-7.4
O	MASSTOR SYS CORP	6	1	2.94	0.1	2.2
O	MAXTOR CORP	23	6	11.63	-1.0	-7.9
O	MICROPOLIS CORP	44	13	21.25	-0.8	-3.4
O	MINISCRIBE CORP	18	5	10.50	-0.1	-1.2
N	MINNESOTA MNG & MFG CO	84	46	59.00	0.8	1.3
A	MSI DATA CORP	19	6	13.38	-0.6	-4.6
O	PERSONAL COMPUTER PRODUCTS INC.	7	4	6.63	-0.1	-2.2
O	PRIAM CORP	5	1	1.88	0.0	0.0
O	PRINTRONIX INC	13	7	9.25	-0.1	-1.3
O	QMS INC	27	8	9.25	-1.4	-12.9
O	QUANTUM CORP	24	8	9.75	-0.4	-3.7
O	QUANTEX CORP	6	1	1.25	-0.1	-9.1
O	RECOGNITION EQUIP INC	22	7	8.88	-0.8	-8.3
N	REXON INC	12	5	7.00	-0.4	-5.1
O	SCAN TRON CORP	17	7	14.38	-0.1	-0.9
O	SEAGATE TECHNOLOGY	48	10	10.50	-0.1	-0.8
O	STORAGE TECH CORP	5	1	1.63	0.0	0.0
O	TANDON CORP	7	1	2.13	-0.2	-8.1
A	TEC INC	7	3	4.00	-0.4	-8.8
N	TEKTRONIX INC	41	21	25.13	0.3	1.0
O	TELEVIDEO SYS INC	3	1	1.13	0.1	5.9
N	TELEX CORP	69	30	49.00	1.3	2.7
O	WYSE TECH	40	11	17.38	0.1	0.7
N	XEROX CORP	85	60	61.88	0.4	0.7
O	XIDEX CORP	16	5	9.13	0.1	2.5
	Leasing Companies					
N	CAPITAL ASSOCIATES INTERNATIONAL INC	11	4	5.50	0.6	15.8
N	COMDISCO INC	37	12	19.50	-1.0	-4.9
N	CONTINENTAL INFO SYS	14	5	7.00	0.3	3.7
O	PHOENIX AMERN INC	5	2	3.00	0.0	0.0
O	SELECTERM INC	8	3	4.88	-0.1	-2.5

EXCH: N—NEW YORK; A—AMERICAN; O—NATIONAL; O—OVER-THE-COUNTER; S—SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Skid marks

Compaq, HP, Cray fail to gain control of earlier slides

Sluggish trading offered little braking power for major computer issues caught in earlier slides, as the big losers of two weeks ago again topped the injured list. Chief among the limping as of Thursday's market close was Hewlett-Packard Co., which dived another 3 points after the previous week's 5⅜-point fall to finish the four days of trading at 54⅛. Compaq Computer Corp. also could not shake its funk and slipped 2 points to 47⅝, while Cray Research, Inc. was off again, dropping 1½ points to 75⅜.

In other activity on Wall Street, Lotus Development Corp. was off 1⅜ points to 21; IBM slipped 1¼ points to 108½; 3Com Corp. lost ½ point to 19¾; and Ashton-Tate Corp. felt the pinch of its announcement that shipments of a revamped Dbase will be two months behind schedule and fell ½ point to 24¼. But all was not bad news. Rumors swirled that AGS Computers, Inc. could be the next target of a buy-out by a Bell operating company; it shot up 5¾ points to 25. Apple Computer, Inc. rose ⅝ of a point to 39⅜, and Digital Equipment Corp. was up ¼ point after Merrill Lynch & Co. boosted its short-term rating.

JAMES DALY

'Lights out' at Du Pont data center

BY NELL MARGOLIS
CW STAFF

WILMINGTON, Del. — An experiment in 100% automation — a so-called "lights out" operation — has been up and running successfully since the middle of this month at Du Pont Co., according to a company executive.

During the past several months, all but six of the more than 40 staff members at a small Du Pont data center have been replaced by internally designed computer software, said William Carter, director of computer technology and operations.

The remaining employees of the center, which serves a mix of accounts within the company, are involved in tape-loading activities that did not readily lend themselves to cost-efficient automation, Carter said.

Just a typical center

Before "lights out," he explained, "this was a typical data center, with people sitting at consoles, responding to customer calls and checking machine operations." Making the machines their own masters, he reported, entailed minimal effort and minimal cost. "All we had to do was duplicate a few of the consoles and run some new lines in," he said. "It was surprisingly quick and easy and cost under $100,000 altogether."

The investment will net an estimated $750,000 in savings for Du Pont, "and that's without calculating in the synergies that are gained," Carter said.

A major concern in the automation of the data center, Carter noted, was the redeployment of the people whose jobs were eliminated — particularly since they were instrumental in effecting the conversion process "and basically eliminated their own jobs." All affected employees are now at work elsewhere within the company, Carter reported.

IBM entertains 600 accounts

'Close to the customer' strategy briefing stresses user partnerships

BY STANLEY GIBSON
CW STAFF

In a week-long display of user-friendliness, IBM entertained approximately 600 of its accounts in Orlando, Fla., last week, offering presentations on the firm's strategic directions.

"There was nothing shocking and no change in direction," offered an MIS director at a major New York-based insurance company who attended the session.

He said IBM confirmed reports that the Personal System/2 Model 70 will be announced this Thursday.

The MIS official, a major System/36 user, had been extensively briefed on IBM's System/36 and 38 follow-on processor, Silverlake, and thus did not attend the Silverlake briefing session. He said, however, that IBM confirmed the announcement date of June 21 for the processor.

"The emphasis was on customer partnership," a spokesman said, describing the extravaganza as a continuation of a series of meetings that started in 1987 as part of the so-called Year of the Customer.

"They're starting the ball rolling on Silverlake," offered one consultant, who said he spoke with several attendees. The IBM spokesman, however, said the agenda covered a gamut of topics, including IBM's Systems Application Architecture, workstations, large and mid-range systems and IBM service.

THE MEETING contained no surprising revelations, and the discussions were not as notable as those held during the 1987 customer meetings.

IBM Chairman John Akers attended the affair, just as he had the first Year of the Customer meeting, which was in Orlando early last year.

One oil industry MIS executive seconded the opinion that the meeting contained no surprising revelations and the discussions were not as notable as those held during the 1987 meetings.

The week's meetings, running from Sunday through Friday, were divided into two parts, with one group of 300 attendees present in the first half of the week and another group attending during the second half of the week. The IBM customers, from both large and small accounts, came from all industries, according to the IBM spokesman.

IBM offered to foot the attendees' hotel bills, but airfare was at the customers' expense, the spokesman said.

Tech whiz

FROM PAGE 1

in his teens and, just a few weeks ago, was profiled by a metropolitan newspaper as the slimmed-down and successful genius behind a rapidly growing software services and consulting firm.

During the past five years, according to sources close to the company, the young entrepreneur wooed a talented staff, usually with promises of huge salaries, flashy cars and other perks of techno-stardom.

He also built a roster of clients, which in "a lot fewer than the 300 or 400 he claims, but a healthy number. The company was definitely growing very well," Gilfix said.

Even as recent press reports lauded Hildreth as a boy wonder and Masedata as a meteor in the Massachusetts computer industry, the company's fall was in the works.

Rockland Trust Co. last Tuesday took possession of Masedata's offices after the company defaulted on a $410,000-plus interest loan and the two high-ranking executives widely known to be in charge of the actual day-to-day business resigned, according to Norman Spector, partner at the Boston law firm representing the bank.

On the same day, a warrant was issued for Hildreth's arrest on a larceny charge, which was "based on a complaint made by a private individual," who was neither an employee of Masedata nor an institution, according to Michael McGorty, spokesman for the Norfolk County District Attorney's office.

In addition, McGorty confirmed that an "ongoing, very active investigation" into Hildreth's affairs by the county's white-collar crime unit is under way.

More on the run

Hildreth first retreated into a Massachusetts hospital after collapsing in his office and then disappeared after reportedly signing himself out of the hospital. The exact cause of his collapse is unknown.

On Wednesday, Hildreth and his mother, reportedly his first mentor, closest friend and Masedata receptionist, were found by police at a Manchester motel, in grave condition after both apparently took drug overdoses and slashed their wrists. Friday afternoon, both were reported in "fair condition" at Elliot Hospital in Manchester, where Hildreth was arraigned at his bedside as a fugitive from justice.

According to Manchester police captain Mark Driscoll, Hildreth applied for publicly subsidized legal assistance to be provided at the hearing scheduled for June 23; the entrepreneur whose cars and condo were his calling card could not, he said, afford a lawyer.

While it may take a long time to unravel the tangle of fantasy and reality in Hildreth's personal dealings, Gilfix said, one line of demarcation should be clearly drawn: the one between the Masedata CEO and Masedata. "We always had a good business relationship," Gilfix said. "To this day, it worked out well for our mutual clients. Just because Tex drove the company into bankruptcy doesn't mean that he wasn't serving his clients extremely well. He was."

Gilfix's was far from a lone voice in describing Masedata as a solid, responsible company with a strange — sometimes frighteningly so — leader.

"When I first met Tex, he had a nice office, a business card, a BMW — he gave the impression of being a computer whiz, another Steve Wozniak," said a Masedata client who requested anonymity. "He convinced us that he could do a great job for us, so we brought him aboard."

Before long, the client said, his initial feelings of confidence in Hildreth turned to unease. He exaggerated with increasing frequency and flamboyance, according to the client.

"At one point, he told me that the Masedata board of directors consisted of Donald Trump, Frank Lorenzo and [celebrity sports lawyer] Bob Woolf. He offered me a job with Masedata, at an astronomical salary that included a Jaguar and a luxury condo in a complex he said he owned." A quick check into "Hildreth Estates on Hildreth Drive in Weston [Mass.]" turned up the fact that only the town of Weston really existed.

"I finally had to sever the business relationship with Tex; his behavior was getting so weird that I began to actually fear him," the client said. Yet, "even now, I can't fault a thing about the work that Masedata did for us. It was spectacular."

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Northwest changes its reservations

ST. PAUL, Minn. — Northwest Airlines last week completed a 15-month conversion effort with the activation of a new worldwide computerized reservation system.

The switch from Northwest's Polaris system to the PARS system was phased in at reservation sites in 135 cities on three continents during a two-day period.

Northwest officials said the airline converted more than 1.7 million passenger reservations to PARS and installed PARS for airline reservations, flight operations and customer service.

The conversion effort began shortly after Northwest's 1986 acquisition of half of the PARS system from Trans World Airlines. Northwest said the acquisition cost $140 million.

Northwest officials said the conversion involved acquisition of hardware and software, programming enhancements to PARS and the training of more than 17,000 airline employees.

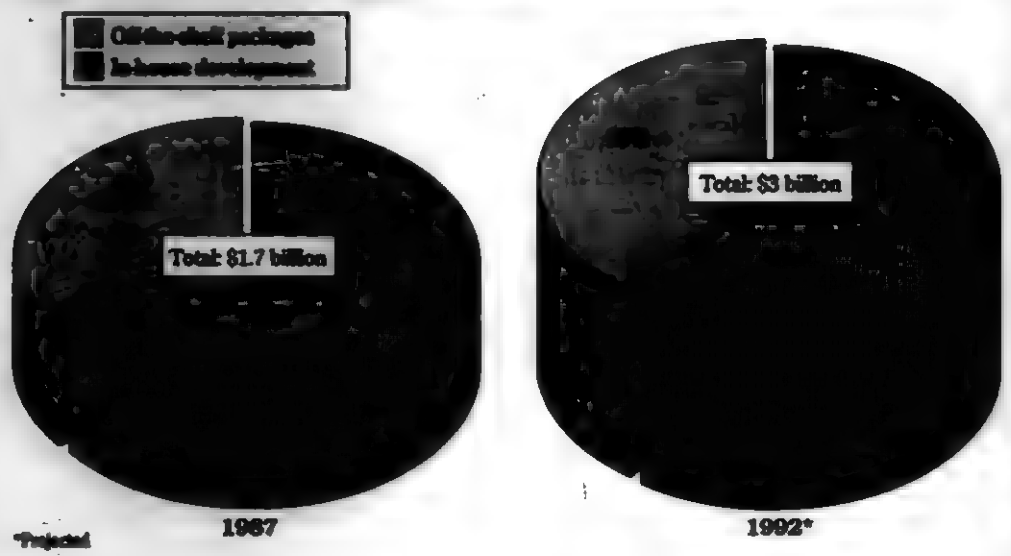
PARS's benefits include faster response times and increased functionality, such as the ability to automatically calculate the lowest fare regardless of the complexity of a passenger's itinerary, according to airline officials.

TRENDS

Government software market

Commercial packages dig into development budgets

PERCENT OF AGENCY SOFTWARE EXPENDITURES



*Projected

For years, the White House Office of Management and Budget (OMB) has urged federal agencies to buy off-the-shelf software packages rather than develop software in-house, on grounds that custom software is costly to write and maintain.

According to Input's office for federal market research in Vienna, Va., the federal agencies are taking the OMB's advice but at a somewhat glacial pace.

"The traditional approach is dying hard," said James F. Kerrigan, director of Input's federal program. "It's not something that the OMB can turn around in a year or two."

Indeed, software development expenditures will continue to exceed software product expenditures through 1992, Input reported. But the average annual growth rate for off-the-shelf software products will be 15%, compared with the 11% rate for software development.

Kerrigan said that budget pressures, better software packages and changing attitudes account for the growing "buy, not build" trend.

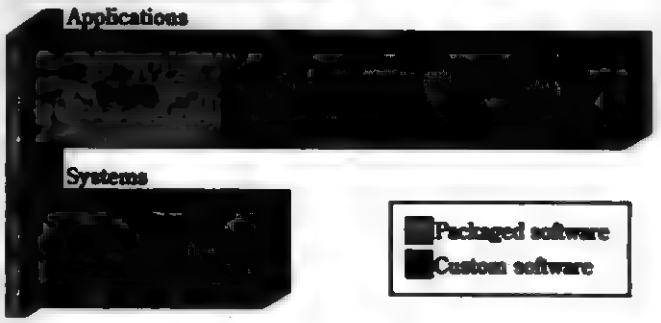
Resistance to the trend comes from managers who see their applications as one-of-a-kind and from the fact that new programmer's workbench tools have cut the cost of in-house programming, Kerrigan added.

Input said that the leading software vendors in the federal market are hardware makers IBM, Unisys Corp. and Digital Equipment Corp. and systems integrators Computer Sciences Corp. and Electronic Data Systems Corp.

MITCH BETTS

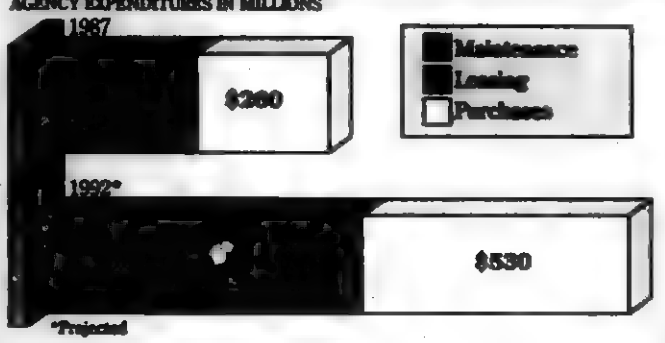
Custom tools popular for applications

AGENCY EXPENDITURES IN MILLIONS, 1987



Purse open widest for leasing, purchases

AGENCY EXPENDITURES IN MILLIONS



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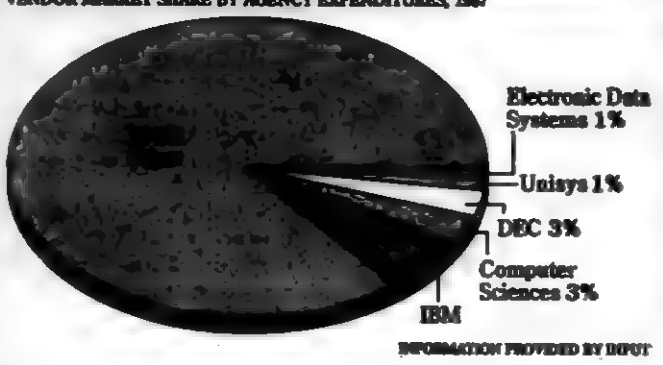
Even top vendors control just tiny share

VENDOR MARKET SHARE BY AGENCY EXPENDITURES, 1987



INFORMATION PROVIDED BY INPUT

INSIDE LINES

Cancel those reservations. Word late last week had it that IBM was canceling its dealer blowout in Dallas, planned for June 2, at which the company was expected to launch its 25-MHz Intel 80386-based Personal System/2 Model 70 line and an enhanced Model 50 before several thousand dealers. IBM still plans to introduce the systems — but in a much more understated fashion in New York on the same date. No reason was given by IBM for the cancellation. However, some speculated that IBM was doing so because it has decided to hold back the introduction of its much-expected laptop systems and its 286-based PS/2 Models 25 and 30. IBM now plans to hold a Dallas affair in late August to introduce those systems, sources said.

Lotus 1-. Lotus is hoping to avoid going to court over charges that 1-2-3 infringed on the copyright of the original Visicalc from Software Arts. Instead of a lengthy trial concerning often esoteric copyright law, Lotus is seeking a ruling that the firm's 1985 acquisition of Software Arts granted rights to the Visicalc product that apply to the period before the acquisition.

Lotus -2. Lotus's Modern Jazz, which is again delayed, is apparently having data base problems. Lotus is trying to do some fancy stuff in that component to differentiate the product some from power spreadsheets that are already out, but the firm hasn't quite got the stuff down.

Lotus -3. According to a Lotus source, Microsoft tried to buy licensing rights to Lotus's Blueprint interface, which allows supporting programs to pump data into 1-2-3 and other Lotus programs, while retaining that swell spreadsheet interface. Microsoft balked, however, at Lotus's asking price, which was way on the steep side.

Anxiety at the altar. Just after ditching its plans to acquire C3, rumors ran rampant on Wall Street last week that AGS Computers, a Mountainside, N.J., professional services provider and microcomputer distributor, is courting acquisition offers. Two regional Bell holding companies, Bell Atlantic and Nynex, have been mentioned as potential suitors. AGS, parent of Micromerica, had revenue of about $500 million in 1987 and would reportedly fetch about $320 million in a takeover. AGS had signed a letter of intent to acquire C3, a Herndon, Va.-based minicomputer and microcomputer systems integrator for government and military applications.

User incompatibility? A suggestion that users groups unite in a coalition to share users group management information and provide a common voice on issues — like the Open Software Foundation standards effort — received a lukewarm reception at a Boston meeting last week. Officials of groups representing customers of IBM, Data General, Unisys, DEC and Tandem asked sponsors of the concept to draft a proposal for the users groups' boards of directors. "I think there is a need here, but it's going to take some time to persuade some of these people," said attorney Peter Marx, who backed the coalition on behalf of the North American Data General Users Group.

Looking under the covers. A federal judge in San Francisco has ordered Hitachi to make its top-secret 1983 agreement with IBM available to an arbitrator in an attempt to establish payment terms in Fujitsu's 1987 arbitration settlement with IBM. An appeals court turned down Hitachi's move to block the order. The 1983 IBM-Hitachi pact, signed to settle Hitachi's alleged theft of IBM's MVS code, has never been made public, but industry sources have estimated Hitachi's license fees to be $300 million.

In a speech last week that surprised users and Lotus officials alike, Lotus founder Mitch Kapor urged listeners to just say no to the Presentation Manager. Kapor indicated — without offering any specifics — that some of the things he and others may pioneer will make the Presentation Manager obsolete. Inquiring minds want to know. Call the CW hot line at 800-343-6474 or 617-879-0700 and help News Editor Pete Bartolik peer through the window on this project.

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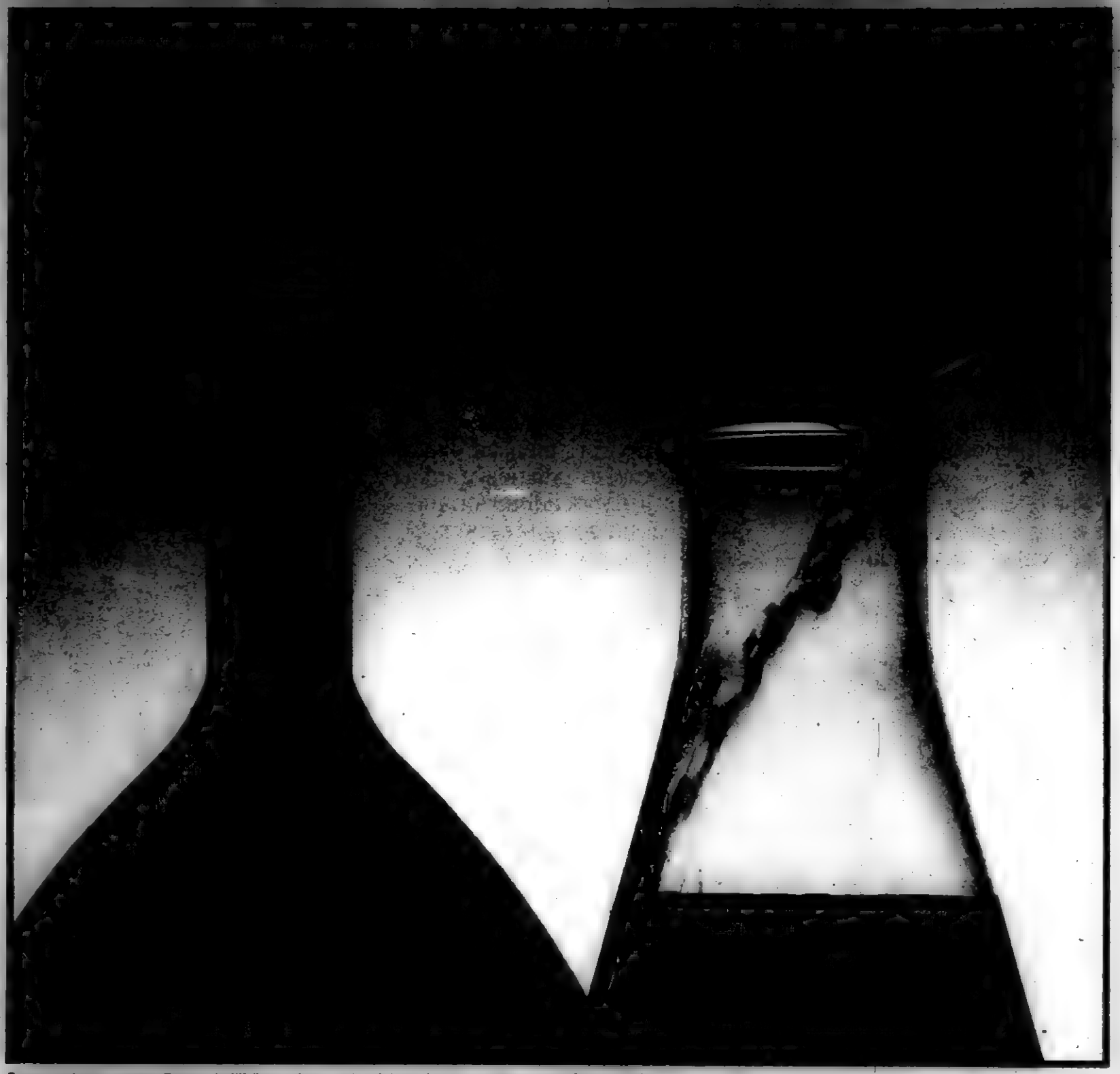

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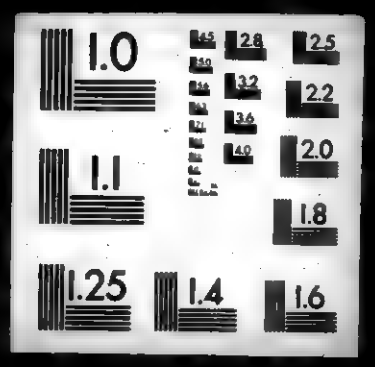
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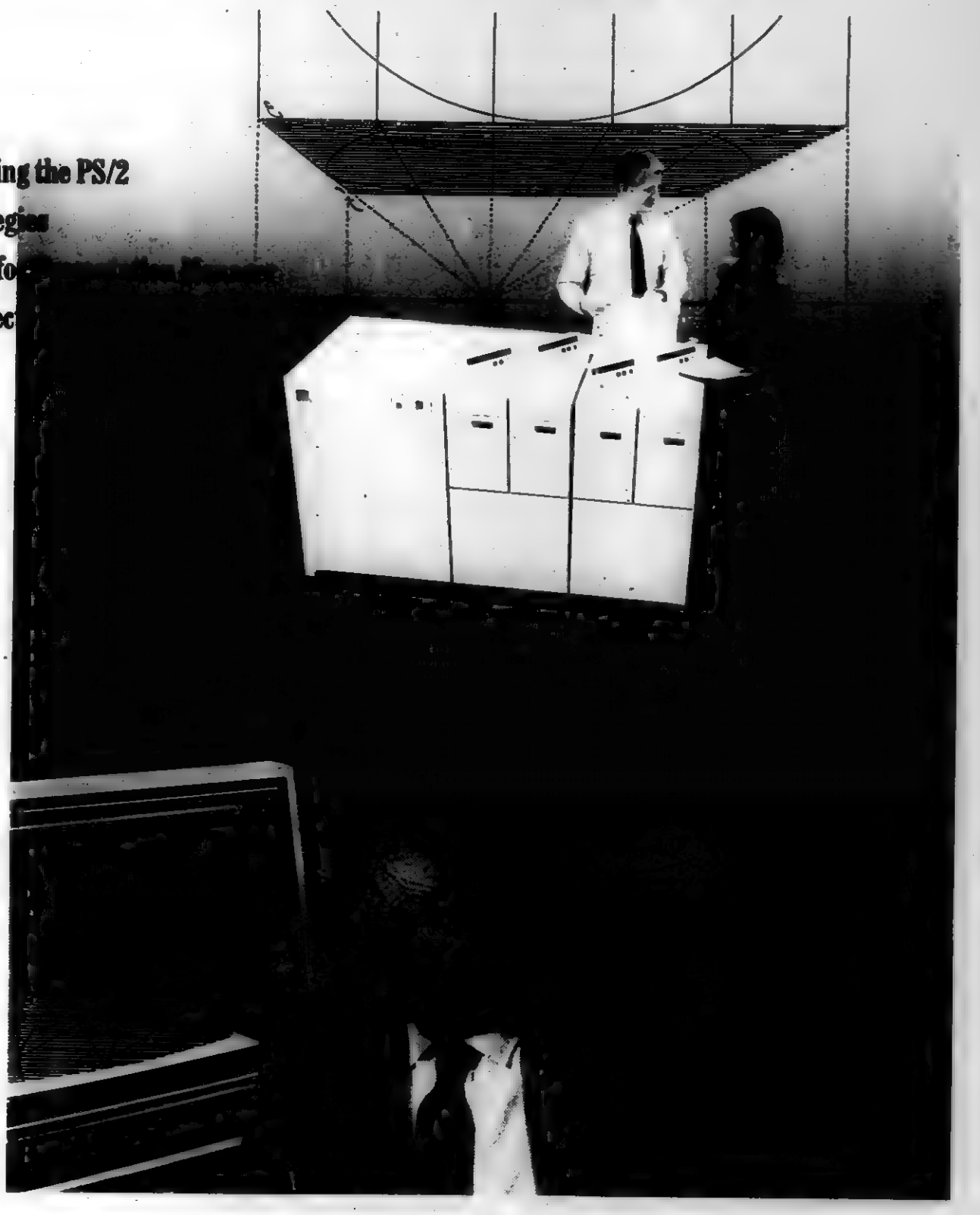

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in focus

SUBSTITUTE TEACHER You're never too young to be a potential client. That thinking may be behind PC vendors' push to sell their wares in the K-12 marketplace. By establishing early brand loyalty, companies are laying the groundwork for product preferences that may carry through to adulthood. After all, the young scholar of today may be the MIS manager of tomorrow. By Stan Kolodziej. *Page 10.*

EXECUTIVES SHIFT THE DATA BALANCE As the pace of the business world has quickened, so, too, have the information demands of executives. With paper becoming passe, executive information systems are becoming the rage. More than just a passing fad, however, these business systems contain the right blend of information and technology to assist top managers in strategic decision making. By Helen Pike. *Page 21.*

Deciphering the PS/2

By Johanna Ambrosio. April marked the first birthday of IBM's Personal System/2. Although the machine set sales records and earned the praise of many, others remain skeptical because its benefits are still promised rather than real. Read about why some MIS managers are holding out for answers and holding back their money. *Page 15.*

Rock 'n ROM

By Daniel Gross. In the right situation — loads of data going to a large number of recipients — CD-ROMs are a hit, offering an alternative to mainframe access, microfiche and paper. MIS is also using the technology in the key area of intracompany data flow, easing the crunch of information bottlenecks. But until standards make the disks economically feasible for small- and medium-size organizations, CD-ROMs will remain out of reach of much of the market. *Page 19.*

Presentation Manager

By Michael Guttman. The rumor mill is churning away with tidbits on IBM and Microsoft's Presentation Manager, no doubt in part due to the well-publicized legal battles occurring in the graphical interface field. But there is much to learn from the available information that can help companies prepare themselves for the Presentation Manager's arrival. This consultant sifts through the reports and reveals the facts you need to know. *Page 31.*

COVER BY MARC YANKUS

Artificial intelligence

The saga of AI is a rise-fall-rise story. The cast of characters includes arrogant science types with imposing systems, investors with deep pockets and technophobic customers expecting robots and getting nothing. Into this hapless situation enters a hero — the PC. Features Editor Michael Tucker examines how the humble micro has breathed life into the faltering AI field. Page 27.

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Including your letters to us. *Page 3.*

Manager's Corner
Jim Young on reviving the users group concept. *Page 4.*

Q&A
Former NCC chairwoman on how PC trends are shaping MIS. *Page 4.*

News & Analysis
Report on PC support costs; custom chips; IBM/Metaphor alliance; Unix interface battle; developments in the EIS field. *Page 5.*

Products
Tech Talk on TI, Apple expedition into AI; aftermarket service; DVI disk; 386-based micro. *Page 34.*

Blue Beat
Brian Jeffery on the PS/2's structural inheritance. *Page 34.*

Calendar
Industry events. *Page 38.*

The Insider
Michael Millikin on why graphical user interfaces don't guarantee productivity. *Page 40.*

Log Off
Figures show how support costs have become the single greatest expense associated with PCs. *Page 40.*

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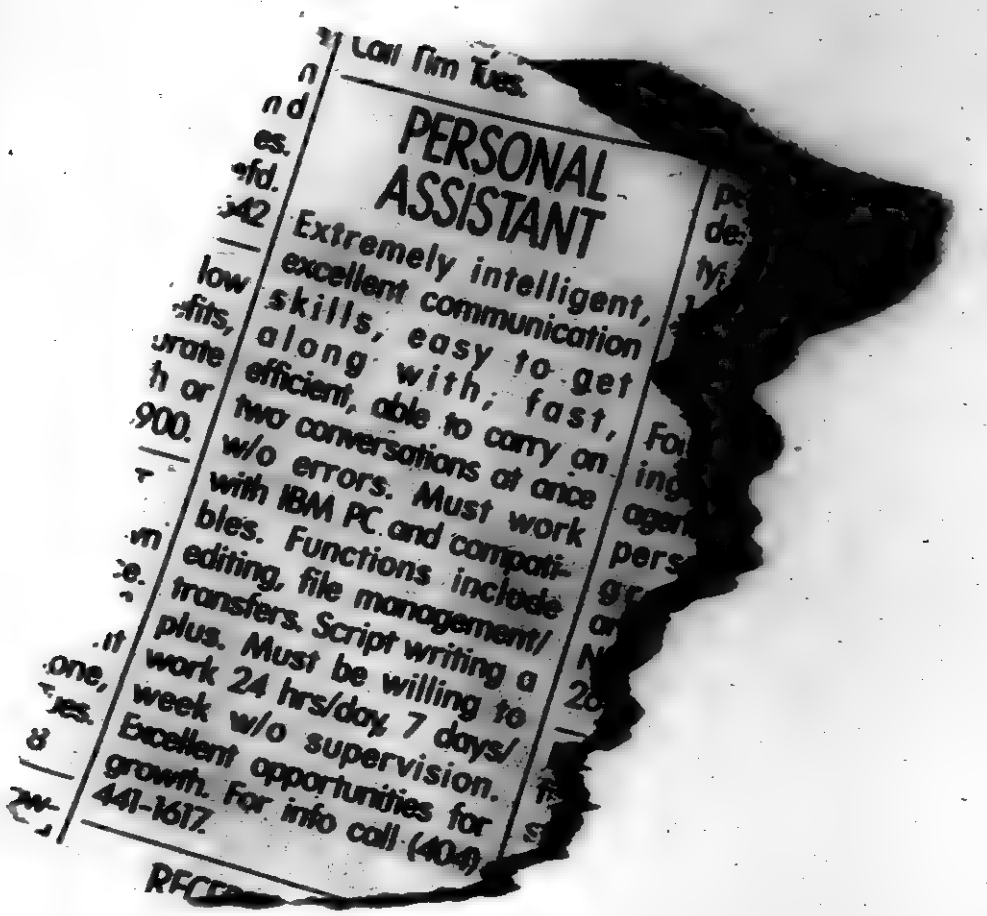

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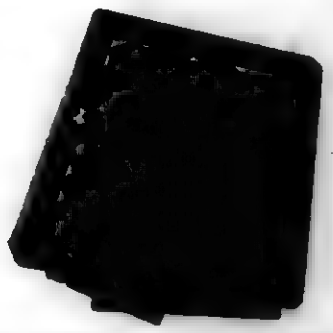

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FROM THE EDITOR

A bad aftertaste

The floodgates for IBM OS/2 software are about to burst. But the customer response may be less than desired for these long-awaited programs.

It has been a little more than a year since IBM and Microsoft announced the OS/2 operating system. Not much has happened since, other than a lot of speculation about the system's eventual impact. At last month's Comdex/Spring '88, IBM and Microsoft were the hosts of a booth featuring several hundred software programs for OS/2. The catch? Most of the software won't be ready until the third or fourth quarter. And then the software may prove to be a bad match for Intel 286-based machines because of speed and memory requirements.

The Presentation Manager, due out in the fourth quarter, is expected to be the juggernaut that will propel OS/2 into the mainstream. But the inadequacy of the 286 remains. Machines using the 286 — including several in the IBM Personal System/2 line — simply don't have the power and memory resources to provide the performance users expect from the operating system. OS/2 will be used commonly on Intel 386-based machines but will still be a power hog. Because of this drawback, OS/2 probably won't come into frequent usage for some time — at least until a 386 version is developed for more powerful PS/2 models.

The wait has resulted in a lot of unhappy PS/2 users who thought IBM would provide them with a working desktop package in a realistic time frame. Users who bought a low-end PS/2 expecting to soon step up to a higher class of computing are going to be particularly upset. Furthermore, although IBM advertises the PS/2 as a family of products, each machine is very different and does not necessarily get users to the same place at the same speed as another model; customers who are unaware of this difference may be more likely to turn to alternative vendors in the future. With IBM already losing some market share to its competition, this is particularly bad news.

Even though OS/2 is probably destined to become the desktop standard into the 1990s, its initial flavor is leaving a bad taste in many customers' mouths.

Ann Dooley

Will the real originator of 4GLs please stand up?

Your article in the Feb. 3 edition of *Computerworld Focus* entitled "The fate of 4GLs" is of special interest to me because I originated a fourth-generation language system in 1964.

Of course, I didn't know then that it was a fourth-generation language. But it did generate Cobol statements from input parameters. In lieu of screen input (because screens didn't exist then), the process was to translate data names according to their location on a report layout sheet and then perform mathematical operations based upon the location of commands on the sheet.

The data names were taken from what I coined as a "dictionary," a set of mnemonics describing each field in what may have been the first data base system, because I originated it in 1963. Because the term "data base" hadn't yet been coined, I called it "the single-file concept" because each data element appeared only once in the file although used by many different application systems.

All this was done while I was a computing sciences specialist with a California aerospace company. We later set up an outside DP service and marketed the fourth-generation language under the trade name of Corol. Regrettably, what I knew about computers I didn't know about marketing and thus left it to others to become millionaires.

The game of who-invented-what-first is a dangerous one and perhaps never ending, but in the 25 years since then, I've never heard of an earlier fourth-generation language or data base system. Perhaps if you publish this letter, those who believe that they thought these techniques up before I did will rush to make themselves known.

Donald D. Irvin
Dallas

Don't be so quick to discount PL/I in IBM's plans for SAA

In Tony Percy's "No blueprint for SAA" story in your Feb. 3 issue, he said, "IBM has to be careful about stating openly what products . . . have been definitely discarded in SAA planning, such as PL/I. . . ." I belatedly hasten to point out that IBM has not "definitely discarded" PL/I.

P. Hessler, IBM Europe vice-president of market development, has written to the European IBM users group Guide about PL/I in Systems Application Architecture. He explains that "we have accepted this requirement" and "that resources have been assigned to develop the implementation plan." Here in the U.S., we are expecting further news in this area before August.

PL/I is doing well and will remain the productive, general-purpose language of choice for applications needing to exploit its environments.

Henk Hamilton
PL/I Project
Shaw, Inc.

Emotions play understated role in departmental decisions

I enjoyed Michael Tucker's March 2 editorial very much. Emotions have been playing a big role in decisions about departmental computing, and it was nice to see *him* address that issue. In addition, the quotes were great, and as always, the writing was wonderful to read.

Irene S. Nesbit
Nesbit Systems, Inc.
Princeton Junction, N.J.

VIEWPOINT

MANAGER'S CORNER

Users group tune-up

Jim Young

At the time that MIS was implementing end-user computing, the technology was working, but the users were not. They needed intellectual help in the form of a practical application of technology that the prescribed training programs did not provide. They needed ideas, motivation, reassurance and reinforcement.

But MIS was not in a position to smother them with assistance. The resources were not there, MIS did not always have the skills and knowledge, and an MIS-dominated program would most certainly have defeated the purpose of end-user computing. Moreover, MIS was frustrated at being out of the communication loop, unaware of whether the end-user computing experiment was working.

Company users groups came to the rescue. They gave the intimidated, isolated user a sense of community and belonging. This peer group helped to germinate new ideas and build on old ones in a positive way. They also provided reluctant users with positive role models that could get them moving in the right direction. The assistance was low-key and nonthreatening. Best of all, the help was informal, inexpensive and efficient.

Alas, many users groups have fallen on hard times. Once users got up and running, they no longer saw the need to invest their time in group activities. The original spontaneity was lost, and without a guiding group structure, the process deteriorated into nonproductive repetition. In some cases, the interests of the many were held hostage by the desires of a few special interest groups.

Even MIS occasionally abandoned users groups when it became clear that the MIS department did not enjoy a dominant status. Lack of resources or shortsighted priorities have also led MIS to neglect yesterday's cause celebre — the users group.

Yet no one is claiming that end-user computing programs have fulfilled their potential. The need for further user creativity, extended use of technology, commonality of direction and sharing of successful ideas is as great as ever. There may be other ways to achieve these goals, but until they are identified and proved, the users group should be retained as one of the few winning ideas in end-user computing.

However, to make it work as it used to, the users group concept needs an overhaul (or at least a tune-up). Users must be enticed to take part and see their participation as a valuable use of their time and energy.

With today's more particular and erudite users, success depends on a more studied approach to users groups. The following are some ideas to put zest back into users groups:

• **Management support.** Users groups used to be as informal and unsanctioned as a pickup game of basketball, in which a wide variety of players contributed openly. However, in an increasingly tense workplace, users need to know that their investment of time in users group activities is encouraged by a management team that supports the concept of end-user computing.

• **Everything in moderation.** Some users groups collapse because of an overly ambitious program. They meet too often and for too long and try to cover too much territory in too much depth. These groups expect substantial contributions by members. This overexuberance drives away both the serious confirmed end-user computing "affectionados" and the casual attendee. The program should be matched to the ability and needs of the average member.

• **Balance of leadership.** Domination by a clique of fanatics can drive rank and file members away. Users group organizers need to make sure (delicately) that the data base users, for example, don't monopolize the agenda and shut out the spreadsheet users. By the same token, elite power users should not be allowed to exclude the less sophisticated user. Meetings, newsletters and other support activity should include something for everyone.

MIS should be especially sensitive to its inadvertent control. It may have to exert some leadership to overcome an absence of direction. MIS just needs to be sure that users are active and free enough to feel that the group is theirs.

• **A spiced-up format.** Most users groups start out on the right foot by finding activities and agenda items that are effective. Then they spoil the success by the monotonous repetition of the same thing. Roundtable solution sharing, for instance, is great but becomes less exciting the umpteenth time it occurs. Users groups should vary the events they undertake.

Meeting formats, newsletter content, events settings and so on should also be creatively modified. Such a fresh approach will not only animate the usual participants but may appeal to an entirely new set of members.

• **Expanding the offerings.** Users groups must realize that the diversity of their potential market is expanding. The novice user and casual user are still candidates for participation. Many of yesterday's beginners are enlarging the boundaries of end-user technical sophistication. Advanced users must be stimulated to continue to attract their interest without diminishing services to other users group members. Thus users groups should not be treated as homogeneous any longer but segmented to focus attention on subgroups. Some things have to be in common, however, so that the subgroups are not totally isolated from one another.

• **Seeking new frontiers.** The quest to satisfy more sophisticated users and offer variety to all group members is not a single person's job. Others can help from within and outside a company. The users group organizer can tie into company activities, such as recognition programs, bulletin boards (electronic and otherwise), success fairs, employee orientation and training programs, even formal processes like planning, budgeting and so on. That person can reach out to users groups of other companies for ideas or even joint efforts and tie in with key vendors for material, support and suggestions on users group activities. Participation in regional or national users groups can also help in the search for contemporary material.

Users groups and similar structures serve as an important avenue for end-user computing, simultaneously nurturing it, promoting it and controlling it. With so much expected from this program, there is bound to be a disappointing period in its development when performance is less than expected. In such an event, organizers must not admit defeat by giving up on the company users group. Fresh ideas, a transfusion of energy and a modified approach can have it working better than ever.

Young is managing director of MIS for the Wheeler Group, a division of Pitney Bowes, Inc. in Hartford, Conn.

Q AND A

Mary Rich

Life after NCC: Show's former chairwoman finds PC trends shaping MIS

Mary Rich owns her own consulting business in El Segundo, Calif., entitled PFS, Inc. But don't confuse her company's name with the package sold by Software Publishing Corp. To Rich, PFS stands for Pays for Sailing and refers to her favorite hobby of sailboat racing and to the original intent of her business — to underwrite her hobby. But the former chairwoman of the National Computer Conference doesn't have much time these days to do any sailing, competitively or otherwise. She is heavily involved in the design of decision support systems using fourth-generation computing languages and consults on computing issues for small businesses on up through departmental-level computing in large corporations.

Involved in the data processing industry for nearly 20 years, Rich today sees a lot of trends that developed from personal computer technology helping shape MIS thought. She recently spoke with Senior Writer Helen Pike.

What do you think of the trend of expert systems and decision support systems on the PC level? Are they going to give fourth-generation languages a boost?

I think they already have — especially in the fourth-generation language area. Products like [Information Builders, Inc.'s] Focus that have successfully migrated down to the PC level are appearing as No. 3 and No. 4 in surveys of what users plan to buy. To me, the whole idea of bringing computing to the user and allowing him the flexibility to do his own thing is probably one of the most exciting trends I've ever seen.

How widespread is that trend?

Well, the trend is actually far more widespread than most people realize. They don't realize it because MIS departments still don't want to let that knowledge out, and that's a terrible thing to say, but I'm afraid it's still true. So a lot of the data base management systems that have a fourth-generation language connected to them are coming in through the back door. Users, especially in major corporations, still have a tremendous amount of purchasing power. The price of products is small enough that the users don't need any signature authority other than knowing their own purchase order.

It becomes widespread because one person does it and he talks to another person who says, "Hey, I can do that" and gets his copy, then he talks to a third person, and it starts to mushroom.

I guess the other part [making it widespread] is that users are getting a lot more comfortable with PC technology. I'm talking about the people in the 30 to 45 years of age bracket who are not so afraid of looking like fools anymore. They're starting to get into it.

How much are MIS managers in major corporations aware of PC data bases?

I think it is very likely [that they are not aware]. I'm going to pick numbers out of the air from my own personal experience: I would say you're looking at more than half. I would not be surprised if somebody did a survey to find out that 75% to 80% of the data bases in major corporations are departmental with very little coordination, if any coordination, with MIS.

What do you see as the future of the PC data base? Is it a time bomb waiting to go off?

What I hope is going to happen is that MIS is going to wake up and find out this underground economy does exist. [MIS] is going to recognize [the PC data base] is a tremendous resource and will put major effort into coordinating [it], getting [it] on local-area networks, getting data dictionaries and getting users groups going so people can share information.

Do you see a possibility that there might be a merging of applications?

What I see happening is a great deal of expansion of applications on the PC. It's been coming along during the last three or four years, but now, all of a sudden, you're starting to hear about it because the big players have legitimized it. With things like [Lotus Development Corp.'s] Agenda, all of a sudden text-based systems are in. Apple Computer, Inc. and its hypercard, [and] all of sudden hypertext-type applications are in. There are systems like picture data bases, which couldn't have even been conceived of on the mainframe. [Now] you could put

Continued on page 9

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12	32	52	72	92	112	132	152	172	192
13	33	53	73	93	113	133	153	173	193
14	34	54	74	94	114	134	154	174	194
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16	36	56	76	96	116	136	156	176	196
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news & analysis

UPDATE

The fascinating facsimile

Fascinating. Believe it or not, the facsimile might be one of the hottest industry products these days. The fascination with faxes, says Marshfield, Mass.-based CAP International, Inc., is rising as the technology continues to become faster, less expensive, more convenient and more of a successful competitor to overnight document delivery.

CAP's Judy Pirani, a senior market analyst, says that faxes are becoming more of a fixture in U.S. businesses along the lines of copiers and phone systems. And one of the most active areas in the fax market is personal computer fax boards, plug-in modules that can turn a PC into a fax for as little as $400.

CAP says computer-based fax placements will reach 33,000 in the U.S. in 1988 and climb to more than 70,000 in 1989.

Laptops shed negative image with '87 turnaround

Laptop computers might finally be shedding their industry lapdog images and biting back.

After years of lukewarm growth and reception, 1988 promises to be the year laptops make up for lost market time, according to Venture Development Corp., a Natick, Mass.-based consultancy. Venture Development says the user chill in response to high laptop prices and display problems is a thing of the past. Mix together some improvements in laptop component technology, some price erosion brought on by increased competition and a strong personal computer market overall, and you have the makings of a laptop resurgence.

Zenith Data Systems, as well as Toshiba Corp. and NEC Corp., are the top trolls of laptop sale makers. Zenith has made the latest market splash by introducing the Turbosport 386, a laptop built around the high-powered Intel Corp. 80386 microprocessor and sporting Zenith's high-contrast Page White display. The lightweight system will also carry the hefty price tag of $7,999.

Bruce Stephen, an analyst at International Data Corp., a research firm in Framingham, Mass., says last year was a turnaround year for laptops, with an estimated 370,000 of the machines shipped worldwide in 1987. Stephen expects bigger things for '88 and beyond.

IBM giveth and taketh away: OKs clones — for a price

De benedictus clonus. IBM has given its blessing to the clone market. The company recently announced that it would license its Personal System/2 Micro Channel patents to prospective PS/2 clone makers. The news came about the same time that two Texas companies, Tandy Corp. and Dell Computer Corp., introduced their own PS/2 clones with much fanfare.

With IBM's announcement, the company dispelled speculation that had been building for the past year about its legalistic response to any clone vendors that infringed on its secretive position on the Micro Channel and other PS/2 patents.

However, IBM's decision is still going to cost PS/2 clone makers. Although the firm is giving the green light to clone vendors, these companies might wind up paying IBM royalties amounting to as much as 5% of their sales revenues for clones that use more than one IBM patent.

Unlike the previous PC clone era, IBM is making sure it has a hand in controlling this new market and that the market plays by its rules. IBM has already made a point by successfully delaying (or scaring away) the introduction of PS/2 clones for more than a year. Funny — now that IBM has given its blessing, it all seems anticlimactic.

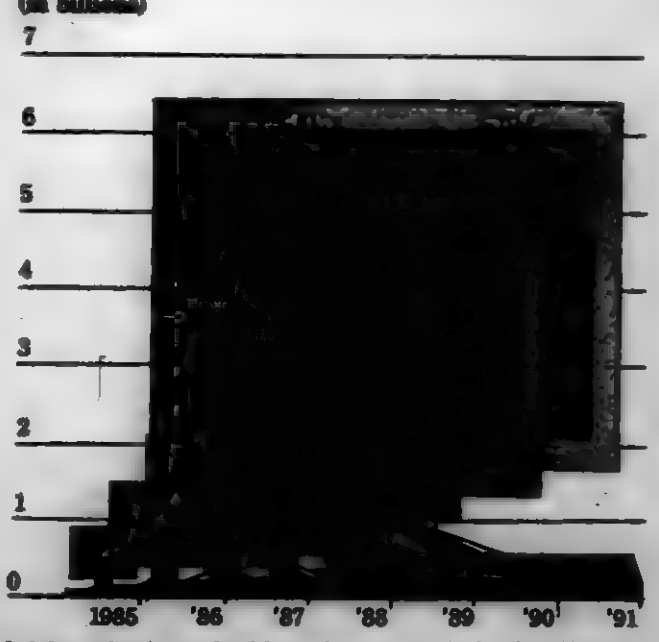
PS/2 software offerings just DOS programs in disguise

IBM Personal System/2 clones might soon have a little more to do than just run old Microsoft Corp. MS-DOS-based software. IBM's traveling Applications Forum show on PS/2s and the IBM OS/2 operating system has been proudly displaying numerous OS/2-based software programs from such heavyweights as Microsoft, Borland International, Inc., Novell, Inc., Ashton-Tate Corp. and Microgro International Corp. In fact,

Continued on page 6

A billion-dollar bonanza

Workstation* revenues are expected to soar



* Includes workstations, reduced instruction set computing-based machines and IBM Personal System/2 Model 80s.

INFORMATION PROVIDED BY DATAQUEST, INC.

GRAPHIC BY BRUCE SANDERS

PC hardware prices fall, but support costs rising

The downward slide in microcomputer hardware prices has been getting its share of attention the past few years. But if you think personal computers are a great buy these days, you might also be unaware of the accompanying rise in hidden PC costs, those costs that do not hit the corporate pocketbook until the machines are in the office.

A recent PC study conducted by Lexington, Mass.-based consultancy Nolan, Norton & Co. paints a startling picture of just how quickly those corporate support costs that buttress PC installations can rise.

The study, conducted with several of Nolan Norton's top corporate clients, claimed that in 1987, hardware and software costs made up less than 30% of the total direct investment in PCs. The major share of PC costs, more than 50%, was eaten up by support activities.

The Nolan Norton study broke PC support costs into a demand side and a supply side. Demand side costs focused on such personnel expenses as training and user development. The supply side included hardware, software, technical support, maintenance support and PC supply costs. When the company totaled these costs, it arrived at some sobering figures: The average corporate PC cost $18,000 in 1987, compared with an average PC cost of $7,500 in 1984.

"The difference [in costs] the past few years is that most large corporations now have people in various business units who do nothing but provide support in various forms for PC users," explains Ron Evans, a manager in the research department at Nolan Norton. "Labor and training costs are high."

Evans says other recent trends that are pushing overall corporate PC costs higher

Continued on page 8

Chip shape: Custom semiconductor design systems come up to speed. Page 6.

NEWS & ANALYSIS

Custom chips pick up speed

The flavor of chips is changing. For several years now, the big market for semiconductors has been in producing generic, finished chips. Such chips, however, leave little flexibility for customizing computer systems to handle more specific applications and can lead to substantial software design overhead in time and money.

Under pressure from electronics and computer companies, semiconductor heavies such as Intel Corp. and National Semiconductor Corp., both in Santa Clara, Calif., have, in recent years, been offering more customized services to chip clients by designing specially commissioned chips following customer specifications. The major drawback to this setup is time. Delays due to customer backlogs can easily run longer than a month and can, in turn, seriously affect the overall competitiveness of clients in the marketplace. In this situation, clients still rely heavily on the big semiconductor companies through the design cycle.

Systems designers, however, might now have an out. Companies such as Sunnyvale, Calif.-based Actel Corp. and fellow start-ups Xilinx, Inc. and Altera Corp., both in Santa Clara, are working on specialized custom chip design systems powerful enough to enable systems designers to program the logic directly into semifinished silicon wafers for only a fraction of the design costs now incurred using standard chip design procedures.

Such systems are based on something called gate-array technology. This technology embeds electronic channels, or gates, into silicon chips. The "logic" part of such gate-array chip design concerns the specific pattern in which the systems designer closes or leaves open these gates or electronic channels. These channels are left open until the final stages of the chip design cycle. The manner in which the numerous gate-array chips are designed determines how a computer system will perform various tasks.

Though such stand-alone design systems will carry price tags of tens of thousands of dollars, their promoters claim the tools will nevertheless open hands-on customized chip design to a greater number of the 400,000 or so systems designers currently working in the U.S.

"It will pave the way for smaller [computer systems] vendors to design specific computer applications right into the silicon," explains Amr Mohsen, president of Actel. "It will make the targeting of even small vertical markets more economical."

However, industry observers, such as Cindy Thomas, vice-president of The Technology Research Group in Boston, caution against viewing these custom chip design systems out of perspective.

"In one form or another, it's been possible to customize chips for at least six years now," Thomas explains. "Actel and these other companies are part of an evolution, not a revolution, in this industry. Also, because of price prohibition, custom chip design is still going to be a game for the big guys."

Mohsen argues, however, that he and others are on the verge of making major changes in the electronics and computer industries. "These systems will allow engineers at desk tops to program [chip] logic, they will allow computer vendors to better optimize products and they will open the creative stimulation of software engineers to produce a new set of software applications," Mohsen says. — SK

IBM, Metaphor ally; cope with financial services deregulation

Big Blue wants you.

Or at least your data. In April, IBM invested $10 million in 3-year-old Metaphor Computer Systems, Inc., a Mountain View, Calif., manufacturer that has carved out a niche designing integrated computer systems used exclusively for data analysis.

The genesis of the alliance came about at Procter & Gamble Co., a diversified personal accessories company, which was getting a lot of mileage from running Metaphor's icon-imaged software and relational data base technology on IBM's Personal Computer and host hardware.

Benefits on both sides

What IBM receives from its 10% ownership of the company is the right to Metaphor's research as it applies to IBM's Personal System/2 and OS/2 Extended Edition.

IBM will then build its own applications on top of the Metaphor layer, according to an IBM spokesman, who declined further details.

Among the benefits to Metaphor is IBM's sizable sales force. Metaphor already has 125 customers, most of whom use IBM host equipment. But the systems are concentrated in the consumer packaged goods, retail, banking and pharmaceutical markets. With IBM's sales backing, Metaphor says it hopes to branch out and sell to data-intensive users in insurance, securities, food retailing, transportation, consumer manufacturing and state government markets.

With this joint arrangement, both companies are better poised to offer software products that can handle the explosion of data that has resulted from the deregulation of the financial services industry, according to David Liddle, Metaphor chairman and a company founder. The new products also are intended for the data that is accumulating from new technological implementations such as automated teller machines and supermarket scanners, he adds.

Wheeling and dealing

In February, Metaphor inked a deal with Nielsen Marketing Research-U.S.A. in Northbrook, Ill., to help custom-design, develop and market a proprietary marketing information delivery system for Nielsen, along with related applications.

Some of Metaphor's other clients include Merrill Lynch & Co., British Telecommunications PLC, Conrad Lauel O' Leimo AG Services, Lever Brothers Co., Pepsico and the U.S. Department of Labor, the U.S. Bureau of Labor Statistics and the Department of Defense.

A day after the Metaphor announcement, IBM further strengthened its marketing focus on computer-based information technology and telecommunications by selling its U.S. copier business to Eastman Kodak Co. in Rochester, N.Y. Financial details were not disclosed. The transfer of sales and service contracts are expected to take place in July. — HP

dB

By Rich Tennant

Update

Continued from page 5

IBM claims that altogether there are some hundred such applications already written for OS/2 Standard Edition and that there will be 1,000 available by the end of this year.

However, the Boston stop of the IBM road show only offered, for the most part, software consisting of existing MS-DOS programs ported to the OS/2 format with little in the way of new and exciting programs built directly around OS/2.

For the really good stuff, that quantum leap ahead, users will have to wait for software modeled on IBM's upcoming OS/2 Extended Edition and Presentation Manager.

And for that, is it possible that IBM could be planning a road show redux in 1989?

Motorola, Sun spur sleepy RISC market through products, pacts

The reduced instruction set computing (RISC) arena has changed from a sleepy little niche market to a raging bull market. Motorola, Inc. and Sun Microsystems, Inc. have been busy introducing RISC-based processors and boasting lists of computer vendors that have joined their respective RISC folds.

Motorola has been crowing about two important catches: Tektronix, Inc. in the graphics workstation market and Data General Corp. in the mainstream computing field, both of which have pledged to build systems around Motorola's 88000 series RISC processors.

Sun Microsystems has been making a lot of its long-term joint development strategies with AT&T, but Sun's light might have dimmed momentarily with the sudden resignation of Vittorio Cassoni from AT&T's Data Systems Group in order to return to Ing. C. Olivetti & Co., his previous employer. Cassoni is credited with being the force behind AT&T's embrace of Sun Microsystems and its RISC-based Scalable Processor Architecture processors, which are slated to become the engines of AT&T's future computer network offerings. What Cassoni's departure will mean to the grand Sun/AT&T plan is not clear at this time.

Sun enters crowded Unix/MS-DOS market with its Sun386i series

Sun Microsystems, Inc. has become emboldened enough to leave the esoteric workstation market and venture into the commercial arena with its Sun386i micro series, systems that can run Microsoft Corp. MS-DOS under Unix. Sun says it is hoping that the Sun386i will be a successful bridge between workstations and personal computers.

And in that regard, Sun will need all the help it can get, because the Sun386i micros are already joining a very crowded Unix/MS-DOS PC market that is getting increasingly harder to crack. — SK

DOS system running Lotus 1-2-3

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Mac, Open Look seek Unix interface honors

Graphically oriented interfaces for the Unix operating system are suddenly hot. While much of the industry has been focused on the commercial (and sometimes legal) rivalry between Microsoft Corp. Windows on the personal computer and the Apple Computer, Inc. Macintosh interface on the Apple machine, a similar competition may be shaping up between Unix on the Mac and Unix under Open Look, a user interface designed for AT&T by Sun Microsystems, Inc.

Both the Mac interface and Open Look simplify Unix by providing an icon-based interactive display. Both can be traced to work done by Xerox Corp. Sun and AT&T, in fact, have announced that they have licensed Open Look technology from Xerox, neatly sidestepping the possibility that Apple will sue them over the "look and feel" issue, a subject that currently has the company in court in a case involving Microsoft Windows. Apple cannot easily sue Sun for licensing technology from Xerox when Apple itself used Xerox-originated technology to produce the Mac interface.

The Unix operating system is famed for its power, but it is infamous for its difficulty of use. After originating at AT&T, it was developed in fits and starts during more than a decade of work, mostly at universities. Because Unix was devised by software developers, it is extremely good for software development. But for the same reason, it is unfriendly to nontechnical users.

Yet during the 1980s, it was exactly those nontechnical users who AT&T targeted as the prime market for Unix. Because the operating system was multitasking and multiuser, the company believed it was a natural for Intel Corp. 80286- and 386-based computers and the best heir to Microsoft's MS-DOS.

Several million dollars in losses later, AT&T's attempt to take Unix to the masses was widely viewed as a disaster. Furthermore, technological leadership of the Unix world had shifted to makers of technical workstations whose users were computer literate enough so that Unix held no terrors. In particular, Sun emerged as the leader of the Unix community and promoted itself as the champion of standards against any attempt to make Unix proprietary.

And at the same time, a market for a PC-based Unix began to look better than ever. After 1986, 386-based systems were being introduced at a considerable clip, forming an installed base of machines that were powerful enough to support Unix. Moreover, continuing delays in the debut of the Microsoft/IBM successor to MS-DOS, OS/2, generated increased interest in Unix, an operating system that was not only multitasking but multiuser as well, which OS/2 currently is not.

But the Unix user interface was still getting in the way.

Then, at February's Uniforum Unix show, Apple took the plunge. It announced A/UX, a Unix implementation for the Macintosh. As an operating system, A/UX is standard Unix, but it includes the Apple Mac interface. With this interface, nontechnical users can exploit powerful Unix-based software yet never know they have left the Macintosh environment.

Unix software vendors scrambled to support A/UX. Oracle Corp., for instance, announced at Uniforum that its Oracle data base management system will run on A/UX.

Open Look, however, was not far behind.

Fruitful alliance

In late 1987, AT&T and Sun announced an alliance between their two companies in which AT&T would adopt Sun's Unix technology and take an equity position in Sun. Open Look is one of the first fruits of that alliance. It provides an icon-driven interface as well as menus and a mouse for Unix-based systems. Software vendors have moved quickly to support it. On April 11, Lotus Development Corp. announced that it is developing a Unix-based version of its 1-2-3 spreadsheet that may run under Open Look.

The Lotus announcement could be particularly significant because the company has long been seen as one of the premier vendors of software for IBM Personal Computers.

And IBM has its own version of Unix, AIX, which is now running on its Personal System/2s. The question now is whether the company will marry AIX to Windows and thus emerge as the third camp of graphical interfaces for Unix. — MT

TO: The executive suite RE: Direct data delivery

If there is anyone who tracks the growing implementation of executive information systems (EIS), it is Alan Paller, who earlier this year launched the "EIS Conference Report," a pastiche of anecdotal information about installing an EIS. He calls the bimonthly publication he edits a cooperative newsletter because of the participation by executives like Apple Computer, Inc. Chairman and Chief Executive Officer John Sculley and Alan Greif, a principal at Booz Allen & Hamilton, a management consulting company.

Based in McLean, Va., Paller is a consultant who is president of AUI Data Graphics/CA, a division of software company Computer Associates International, Inc. He is a high-profile executive who also carries the banner for graphics.

In 1979, he installed a visual on-line currency rate access program, called the Board Room System, for the treasurer of General Motors Corp. An early form of EIS, the program provides access to dozens of financial indicators used by the treasurer's staff to make rapid decisions on management and movement of foreign currency. In the years since, Paller says he has watched similar programs take form under the EIS label and grow in use by occupants of the executive suite.

According to Paller, there are 1,600 EISs in operation in the U.S.; 130 of them are customized on top of EIS software usually purchased from two leading vendors in the field, Comshare, Inc. in Ann Arbor, Mich., and Pilot Executive Software, Inc. in Boston.

Approximately 400 EISs are built by consultants who act as systems integrators and help companies decide how they want to access and analyse data, he states. But the majority of EISs, more than 1,000, are built by companies' internal staffs with off-the-shelf hardware and software as delivery systems for their executives, he says.

EIS appears to be a hot button this year, according to Paller, even though it is a new name applied to an existing information technology. The discovery of a new buzzword gives a vendor visibility, he says. It also fulfills the intent of personal computing, Paller points out, as "the direct delivery of data to people who need it the most." — HP

Piloting into DEC mart

DEC, Pilot sign executive information system marketing pact to link Pilot EIS, All-In-1

Digital Equipment Corp. and Pilot Executive Software, Inc. are joining forces on an executive information system (EIS). In April, the two signed a cooperative agreement to market a comprehensive interface that links Pilot's Pilot EIS to DEC's All-In-1 office automation system.

The move brings both companies closer to senior managers who, in turn, are looking to get closer to business data that will help them make better competitive decisions for their companies. Maynard, Mass.-based DEC and Boston-based Pilot say they intend to target senior managers in vertical markets, such as the government, pharmaceuticals and consumer products.

"You can't build important systems on trivial information," says David Friend, Pilot's chairman and one of its founders. "It has to relate to current business issues." He adds that "EIS fits in there as a feedback mechanism to gauge progress."

According to Friend, EIS's rise is, in part, due to a general awareness that information residing in the data center has not produced much value added for management.

"Information as a resource is becoming more critical to business," he says. The challenge for MIS professionals, he adds, is to think of using information as a competitive weapon, not just to do payroll.

"[EIS's] implementation is more successful from a forward-looking MIS guy if he takes it upon himself to put it in," Friend says.

Friend helped start the privately held Pilot in 1983. Today, the company has an installed base of more than 100 site licenses and competes head on with Comshare, Inc. in Ann Arbor, Mich. Comshare, which is a publicly traded company, has sold more than 150 licenses for its business software. At one time, Comshare had a complementary marketing agreement with IBM. — HP

Support costs

Continued from page 6

include networking and customized software applications for PC users.

"Most of our [study] participants agreed that these costs will increase even more during the next few years as expected improvements in connectivity foster the creation of large end-user data bases and PC-based networks," Evans states.

The study noted, however, that such connectivity-related PC costs will be necessary to companies in the long run. PC technology, according to Evans, will play an increasingly crucial role in companies that wish to move quickly ahead in their businesses.

Going through a stage

Nolan Norton has listed four phases, a series of PC rites of passage, if you will, that U.S. companies will pass through before reaching the point at which businesses will realise the full benefits of PC technology.

The first stage — when PCs began entering businesses — has matured.

Most companies, according to the study, have reached the second stage, namely, task automation. Here, companies aim PCs at automating tasks and improving individual productivity and are guided by some sort of technology-driven vision.

Only a few firms have placed an exploratory foot into stage three, the business process, Evans says. At this stage, existing PC investments come under investigation, and additional PC investments are driven by a tactical business vision.

Stage four, the business transformation, can be considered PC nirvana, a perfect melding of PC technology and business. At such an exalted level, the PC user community will be broad, influential and experienced, PC investments will be motivated by a strategic business vision and organizations will be poised to use PC technology to restructure current business procedures.

"At this [latter] stage, a tenfold return on [PC] investments will be realized," Evans claims. "That's when the technology will become woven into the fabric of the organization."

That stage will also not occur for some time — perhaps not in this century. But Evans says that as more companies realize PCs' long-term benefits, the transition from stage to stage will quicken. It will also spur companies to shell out more for escalating end-user computing costs, costs that Evans estimates may account for as much as 41% of the typical corporate information systems budget by 1990, up from 30% in 1986. — SK

Interview

Continued from page 4

together a system to handle excellent graphics and pictures for less than $10,000.

Now we may be splitting a semantic hair here. I asked the question in terms of a merger of applications, and you answered in terms of an extension of applications. Is that right?
Yes, that's exactly what I did.

So you do see it more of an extension then?
Yes, but we could go back to the merger. Probably the areas in which I expect applications to merge are in things like data bases and text processing as opposed to word processing. Under this whole image management umbrella, there's a merger of documents, letters, research, legal papers and all that type of thing in a data base format.

Is imaging technology creating a new type of data base in the area of optical disks?
That will be coming. Very definitely.

For the PC?
Yes. Probably far more likely for the PC than for the mainframe.

Why do you say that?
Again, to me it's almost a question of mind-set in that the mainframe applications are looking more at how we optimize on-line processing as opposed to how we can add new things into the mainframe area, whereas a PC is far more flexible. You've got a huge body of people whose minds haven't been conditioned to what the computer can do. They look at it as, "This is what I need to do, how can the computer help me?" So it's a much more open mind-set.

Do you think the Intel Corp. 80386-based machines coming out from IBM and Sun Microsystems, Inc. are going to draw the user closer to the technology and make it easier for him to take advantage of the power and capabilities the vendors claim to offer?
Not really. Not until we get a lot of new software for them. Again, you have to say, theoretically, something like the IBM Presentation Manager is going to help. You could not have a Presentation Manager on an Intel 8088-based machine. It's just not there. When you look at what 90% of the users can conceive of doing on a machine, an 8088 is probably overkill.

The 10% of power users are the people out there pushing for the 386. I'd give my right arm for an IBM Personal System/2 Model 80. As for my own development and everything else, I get sort of tired of sitting there watching the screen, but most users are not that sophisticated.

I would have a hard time even introducing running two tasks at the same time to the majority of the people that I've taught. That's not a put-down, that's just the way people are.

Companies in the workstation business, such as Digital Equipment Corp., Sun, Apollo Computer, Inc. and Apple with its Macintosh, are trying to sell their technical workstation capability, power and functionality into the MIS market. Is MIS ready for that? Or is it only specialty applications within MIS that would take advantage of these capabilities?
You're seeing a lot of information coming out in the trade press that says OS/2 is only going to be really effective on a 386 machine, so don't tie yourself into a corner by buying an obsolete machine. Buy this, and you'll be ready for the future. MIS loves to hear that, especially in the Fortune 1,000 environment. If you want to plan for the future, look five years out, [when] the platform is going to be in a 386 machine. So whether the power is fully utilized today is irrelevant, although the vendors would never say that.

How much of PC end-user productivity is a matter of just having better technology available vs. having smarter users?
I don't know how you could separate the two. Users wouldn't be getting smarter if they didn't have the technology to practice on, and if the users weren't there, the technology wouldn't be getting accepted. . . . The PC's power has to be there before the user can see the possibility.

Is there anything else that might be relevant to PC end-user productivity?
I think the end-user community is an extremely great potential for the MIS community if they could learn to work together. MIS's PC users . . . are not users. They're customers, and without customers, MIS isn't going to be in business. It is important [for] MIS to recognize the contributions that users can make to all facets; users should be involved in every single decision with computing power that involves information technology.

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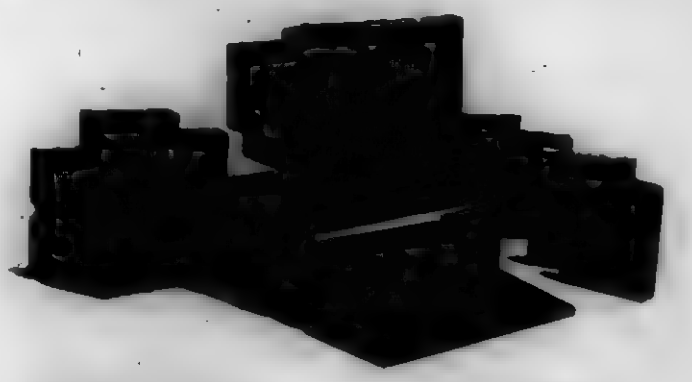

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Substitute teacher

PCs+students=early brand loyalty

BY STAN KOLODZIEJ

Get them while they're young. Though most computer vendors still reserve their top sales guns to pitch to big business, the lure of establishing early brand loyalty and increasing sales in the U.S. educational market is sending companies like Apple and IBM scrambling to bolster their educational sales forces.

Oddly enough, this increased computer vendor activity in the impressionable kindergarten through grade 12, or K-12, market comes at a time when the U.S. education market is stagnating in terms of student population and has seen thousands of its teachers leave their jobs through attrition and frustration.

An aging baby boomer population and a decline in the birth rate have closed or consolidated many U.S. schools in the past five years, creating criticism about an increasing student/teacher ratio, which many say leaves teachers overworked and overburdened and students without adequate instruction.

Add a number of dire predictions about the U.S. educational system, fueled by some well-publicized research reports that point to the decline in student literacy and knowledge in math and science, and you have the sense of a system in a tailspin.

Controversial reports are sending shock waves through the educational establishment and have focused more attention on computers and other technologies as tools that can help stem this supposed downward spiral in U.S. education and get it back on track. (Most recently, a report issued by the National Assessment of Educational Progress, an arm of the Princeton, N.J.-based Educational Testing Service, indicated that computer literacy among U.S. students, especially minorities, is low because of a lack of access to computers.)

Therefore, even though many U.S. school budgets have leveled off, computer vendors are feeling more pressure from educators to provide packaged microcomputer systems and innovative courseware to help teachers and students.

"In the past couple of years, school interest in technology has increased a great deal," explains Wallace Feurzeig, a division scientist at Cambridge, Mass.-based Bolt Beranek & Newman, Inc., a consulting and software and communications development firm. Feurzeig was also instrumental in the development of the Logo educational programming language. "The general feeling is that computers now represent a technology that can be responsive to the problems in U.S. education. The major hope now is to turn such technology toward students."

This is a big role — and a potentially lucrative one — for microcomputer vendors to fill. The educational market is lucrative in short-term revenue for sure. But it is the long-term revenue potential that is truly staggering. Such an opportunity presents a chance to cultivate brand-name loyalty at an early age, a loyalty that, perhaps, will carry into adulthood when kids will assume responsible roles in all walks of life. And in many cases, that responsibility will involve purchasing corporate computers.

"On the one hand, we [IBM] are concerned, as are other U.S. companies, about the capability of the U.S. labor pool 20 years down the road," explains Charles E. Steele, area manager of IBM educational systems in New York. "We're worried because the national dropout rate in high schools is nearly 29%. We feel we can do something about that."

But Steele says there will always be two sides to the educational story. There is a genuine, altruistic concern on the part of the computer vendors to produce hardware and software that will help U.S.

Kolodziej is *Computerworld Focus*'s senior editor.

students and the educational system overall make positive strides forward. There is also the cold business reality of making sales, increasing market share and knowing that if the seeds of brand loyalty are planted early enough, a future harvest of large revenue is almost assured.

"Let's face it, we want to help these teachers and kids," IBM's Steele says, "but we also don't want kids growing up on Apple Computer, Inc. machines."

According to William Gattis, director of the Radio Shack Education Division, a part of Fort Worth, Texas-based Tandy Corp., "It is a very competitive [educational] market that is going to become tougher. You're aiming to carry brand name and recognition as far as possible through the school years and beyond."

Competition in the ranks

It is a tough market for Tandy and for IBM and, for now at least, still a sweet one for Apple. As of June 1987, Link Resources, Inc., a research firm based in New York, placed Apple with a commanding 59% of the U.S. K-12 educational market, with Tandy at 16% and IBM at 11%. That might not sound like a lot for IBM, but an 11% market share represents a big boost from IBM's 7% showing in 1986, with the shares of the other two vendors having basically remained static.

"1986 was a turnaround year for IBM," explains Natasha Thompson, a research analyst at Link. "That's the year IBM started solidifying its position in the K-12 market."

In fact, 1985 was the year that IBM really started concentrating on the promising K-12 area, which has been a virtual Apple fiefdom since the mid-'70s. It was in 1985 that IBM created its Educational Systems Division, revamped its educational sales staff and began pumping a lot of research and development money into the mar-

> **"Let's face it, we want to help these teachers and kids, but we also don't want kids growing up on Apple Computer, Inc. machines."**
>
> CHARLES E. STEELE
> IBM EDUCATIONAL SYSTEMS

ket. The company was reportedly taking dead aim at Apple.

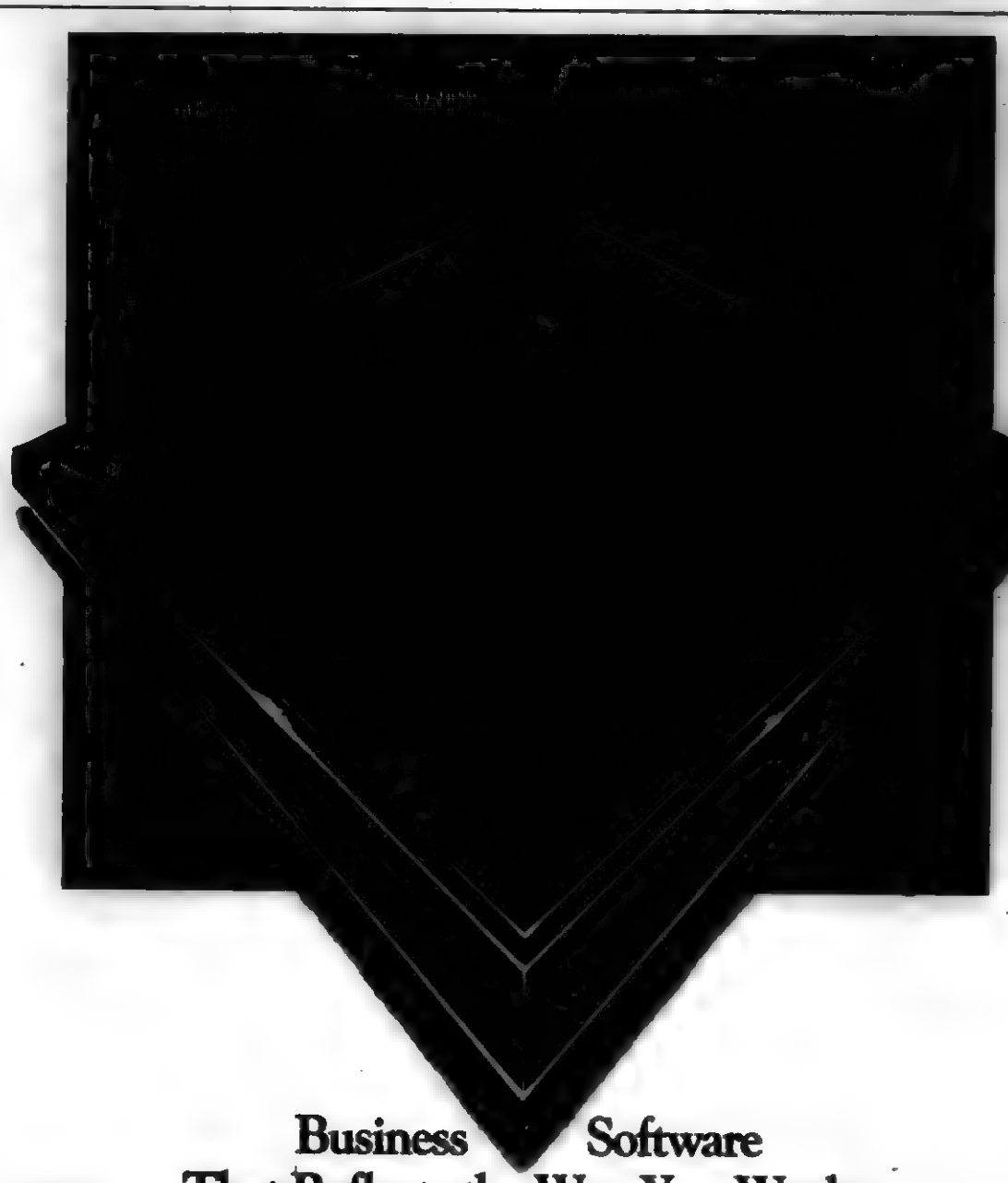
IBM was well aware of the reports that were casting a shadow on the U.S. educational system and used them as starting points in rejuvenating its educational strategy. After pinpointing apparent educational weaknesses, the firm worked both in-house and with third-party software vendors to plug the gap.

At the same time, IBM launched a program in which it hired teachers and top U.S. educators from school districts on both full- and part-time bases to consult with IBM staff about the most needed software in U.S. schools. Recommendations centered on tools to improve proficiency in the basics — writing, reading and the sciences. According to IBM sources, there are apparently up to 300 such educator-consultants currently under contract at IBM.

This strategy has paid off. To answer the growing concerns about student illiteracy, IBM hired well-known educator and consultant John Henry Martin to put together a program for child literacy, called "Writing to Read," and for adult literacy, called "Principle of the Alphabet Literacy System," or "PALS." Both have helped IBM make inroads into Apple installations.

IBM's study of software needs in schools brought about the introduction of a key innovation, initially into the PALS program, called Infowindow.

Infowindow is a system that basically consists of an IBM Personal Computer AT, a videodisk player and a touch screen. It combines graphics, picture and audio from the videodisk player to add more interactivity into the



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learning process. IBM says it plans to carry Infowindow into the high school levels as well.

"So far, it seems that IBM is doing everything right," explains Jon David, a consultant and member of the New York Personal Computer (NYPC) users group, which has an ongoing interest in the educational market. "IBM has identified weaknesses in existing educational software, which is predominantly Apple based. IBM has become aggressive in its sales, and its sales representatives seem to be at every educational get-together. It has also become aggressive in its hardware discounts. IBM means business."

Apparently. Jim Dexell, IBM's general manager of the Educational Systems Division, says the company has been offering up to 40% discounts on Personal System/2 Models 25 and 30, the two offerings IBM is now actively promoting in the K-12 market. IBM also offers software discounts between 20% and 30%. Unwilling to divulge actual figures, Dexell does admit that IBM's educational sales force has been "increased substantially" in the last year or so.

Though Dexell denies that IBM's aggressive discounting has been squeezing sales margins for its dealers and that IBM has initiated a price war in a market that he claims has always seen substantial discounts, it is difficult to conceive that hardware prices can dip beneath an already bedrock low of 40%.

"I know that some [New York City] computer dealers are hard-pressed to match the big discounts that IBM is offering the educational market," explains Steve Levenson, director of marketing at Hertz Computer Corp., an IBM Personal Computer-compatible firm in New York. "One dealer I know went to a 43% discount. There are no margins left. It's squeaky tight."

Little headway by clones

Unlike the commercial business market in general, the educational market has apparently seen little headway made by IBM PC-compatible and clone makers. But there are exceptions. Tandon Corp., a Chatsworth, Calif.-based IBM PC-compatible maker, for example, was recently awarded a large contract to supply Microsoft Corp. MS-DOS-based personal computers to New York City schools.

And then there is Cordata Technologies, Inc., a Newbury Park, Calif., PC maker that was recently taken over by Korea's Daewoo Corp. Cordata is introducing a unique approach to the educational market — a micro that is a built-in clone of both the Apple II and the IBM PC. That way, Cordata figures, it can cover with one fell swoop most of the major educational software now on the market.

"The educational market is a complete-package market," Levenson explains. "You need specialized software and extensive service and support. Not too many players can do that."

While it appears that the top three players in this market for the foreseeable future are Apple, IBM and Tandy, most analysts say they think the big battle will be between Apple and IBM.

"IBM is going straight after Apple," says analyst Thompson of Link. "IBM wants to replace Apple as the major vendor in the K-12 market, and they've set 1990 as the year it will be done."

Though IBM officials deny such a strategy exists and especially deny attaching any significance to the year 1990, that date seems to be making the rounds as the watershed year for IBM in the education market.

The key will be software. Forget about OS/2 in the K-12 market, Dexell says. It is too difficult and expensive to write software running under OS/2 for the K-12 level.

With computer hardware, however, do expect to see dealers plugging IBM's high-end Micro Channel-based PS/2 Model 60s and 80s into networks as file servers supporting Model 25s and 30s, Dexell says. This strategy apparently makes sense because it would counter Apple's plan to migrate many of its high-end Macintosh IIs as servers into Appletalk networks in the K-12 market.

"We're starting to see more Macintoshes in high schools," says Katie Povejsil, manager of Academic Solutions at Apple. "The Macintoshes have built-in Appletalk protocols." Networking Macintoshes together, Povejsil explains, simply requires plugging network cable into their ports. In the meantime, Apple has extended the protocol to Apple IIE and Apple IIGS machines, Apple's K-12 brand-end-better systems, so they can become part of the Appletalk network using Macintoshes as file servers.

Microcomputer hardware, though still important, is becoming little more than a platform from which to launch all-important educational software. In this regard, the educational market is no different from the commercial PC market in which software is now driving hardware sales.

"The [educational] market has changed every few years," explains Tandy's Gattis. "In the late '70s, schools were buying hardware and buying wildly. Then came an emphasis on educational software, but it was piecemeal. By '83 or '84, computer literacy became a big concern, but students wound up using word processing packages and other programs that really only mimicked the way we write.

"The whole emphasis now is toward curriculum-based software, coordinated with print materials — basically, an instructional management approach," Gattis says. "We're a hardware-driven company, but we've long recognized that software is where it's at in this area."

According to Tom Harris, supervising teacher at the Playing to Win Computer Center, which runs a computer literacy program in New York City, the best educational software is a tool that enables greater interaction between students and programs.

"If the students can define their own progress, can help set the parameters of the program, then that's a good learning tool and the best kind of educational software I've found," Harris explains. "I think only about 10% of the current educational software meets those criteria, but the numbers are increasing."

Dexell, in fact, claims that educational software is into its second generation. "Much of the educational software produced in the '70s and '80s was piecemeal, uncoordinated," he says. "Now the aim is to provide total solutions to specific problems such as illiteracy and poor math and science comprehension."

If software is, indeed, the key to the educational market, then IBM might be doing a good job with its homework.

"There are thousands of [educational] programs out there for Apple computers," David of the NYPC users group says, "but I have to tell you that from what I've seen, the IBM software is much better. Even though IBM is facing educational facilities with large investments in existing hardware, software and training from other vendors, IBM is creating educational products that are so far superior that they will be in demand in spite of existing commitments."

A spokesman at the Bronx Technical Assistance Center in New York claims that although Apple systems proliferate in New York City schools, IBM has made headway, "especially with its 'Writing to Read' programs, which now have about 100 labs in New York City."

Apple is hardly standing still, however, in the face of apparent IBM gains.

"We've been ramping up [in education] over since the Mac was introduced," Povejsil claims. She points out that there are increasing numbers of educational programs being produced that are based on Hypercard, Apple's software methodology in which multiple levels of information are available via an icon-based interface and in which software developers and students are encouraged to program. Povejsil adds that Claris Corp., Apple's recently created software division in Mountain View, Calif., is also in the process of producing innovative software for the education market.

Del Yocam, Apple's chief operating officer, has been busy campaigning for Apple in academic circles and demonstrating Apple's new compact disk/read-only memory player that, when teamed with a Mac running Hypercard, can be programmed with a combination of text, images and sounds and is a direct answer to IBM's Infowindow.

"The fact is computers have become powerful enough to produce paradigms of learning, and not just parody systems," Povejsil says. "That's being reflected in our educational software."

The educational market presents a chance to cultivate brand-name loyalty at an early age, a loyalty that, perhaps, will carry into adulthood when kids will assume responsible roles in all walks of life. And in many cases, that responsibility will involve purchasing corporate computers.

And Tandy's Gattis warns vociferously against counting his company out. Tandy, Gattis says, has spent years establishing cooperative software development and marketing efforts with major educational publishing houses such as D. C. Heath & Co., Houghton Mifflin Co., McGraw-Hill, Inc. and South-Western Publishing Co.

"We customize our educational software and handle nationwide workshops for educators," he explains. "We get input from educators and publishers on how to design educational software. It keeps us in touch with the real market, and we've been doing it since 1979. So you could say IBM has been following our lead."

Gattis adds that Tandy has also traditionally been strong in its network products, and networking is assuming an important role in finalizing sales to educational school districts.

"Networks have many benefits in a learning environment," Bolt Beranek's Feurzeig explains. "It changes the behavior of teachers. Instead of always lecturing at kids, teachers can now observe and listen to students. It makes for a much improved engagement between the two."

Although networking computers is becoming essential in schools, Link's Thompson estimates that only about 10% to 13% of U.S. schools currently have networks installed.

With all this computer activity, it might seem that the K-12 computer market in the U.S. is taking off. According to Thompson, however, research indicates that during the past few years, the average amount spent on computer hardware and software by public and private schools at the K-12 level has barely risen. This finding points out that many budgets in U.S. school districts have been static when it comes to monies allotted for computer purchases. And that means that vendors are going to have to fight harder for every education dollar.

This situation also means that the sales ground between Apple and IBM is likely to get bloody. The days when IBM and other vendors could dismiss Apple as a glorified toy maker are long gone. With the Macintosh becoming a success in U.S. business and universities, Apple now stands to solidify a clear line of loyal users from kindergarten right into the Fortune 1,000, a line that IBM would no doubt like to help change to shades of blue.

As Harris of the Playing to Win Computer Center says, "If IBM leaves the 7-year-olds [alone], then 11 years from now, when these kids go out into the business world or into college, they'll just leave IBM alone." ✦

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TECHNOLOGY WATCH

Deciphering the PS/2

MIS holds out for answers

BY JOHANNA AMBROSIO

A first birthday should be a time for happiness over accomplishments achieved and promises of dreams to be fulfilled. But for IBM's new generation of personal computers, April marked a bittersweet first year. Although the Personal System/2 family has set sales records, customers have not adopted the technology as quickly or as completely as the company had hoped.

While many of the largest user organizations have committed to the PS/2 as their strategic desktop workstation of choice, the majority of these companies are only slowly adding the computer to their existing information systems arsenal. Outside the Fortune 100, most companies have a limited number of PS/2s in house to experiment with, and still other firms have decided not to use the PS/2 at all.

Most of the PS/2's drawbacks concern the fact that many of its benefits are promised rather than real: Software that takes advantage of the PS/2's architecture is not yet available; the OS/2 operating system and its piecemeal release schedule is confusing; and cost and conversion factors are keeping users from wholesale commitment to the technology.

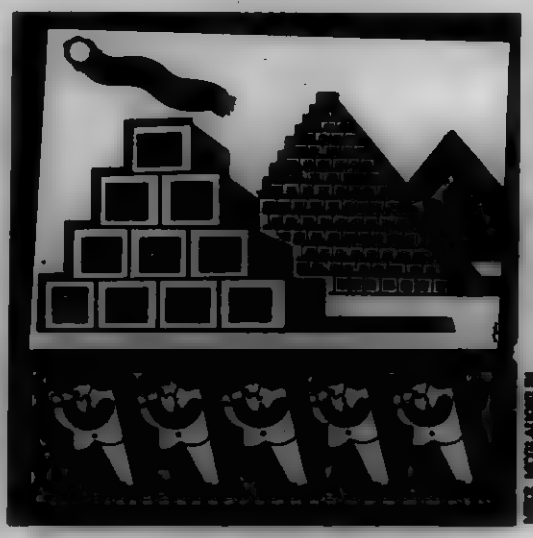
Says David Grossman, financial manager in Ernst & Whinney's New York office, "I don't know too many companies that are adopting the PS/2 en masse. I don't see the revolution." Instead of providing quick fixes to today's problems, the PS/2 and OS/2 are long-term directions for the majority of user organizations and the industry in general.

But by at least one criterion, IBM has already achieved a stunning measure of success — some two million PS/2s were sold the first year, according to its figures. In contrast, 180,000 of the original IBM Personal Computers were sold the first year.

However, at least some observers say that there may be a slowdown ahead. "The first wave of corporate buys is over," says John Murphy, an independent consultant in Cherry Hill, N.J. "Now it's hard-sell time."

Dick Gouth, manager of PC product line evaluation at IBM's Entry Systems Division, disputes that view. "I don't agree the first wave is over. The second million occurred even faster than the first million, and that, to me, says shipments are not slowing down." He further notes that as of late last year, the majority of PS/2s sold were the higher end Models 50 and above.

Another marked difference between the original Personal Computer and the PS/2 is in the strategy IBM now espouses for desktop computers — indeed, that there even is a strategy. Back in 1981, IBM executives have admitted, the company wasn't sure how customers would use the PC, if at all. The whole PC effort was an experiment, and in fact, the company drastically underestimated demand for the original PC. Back then, IBM was almost exclusively focused on mainframes and had little idea of what the PC would mean for users, the industry or its own long-term direction.



MIKE MCKAY/IDG

What a difference six years can make. This time, the strategy has been carefully thought out, and IBM designed the PS/2 architecture to reflect the changes. "There have been enough changes in usage patterns to call for a redesigned bus," Gouth explains.

The original PC was intended for stand-alone personal productivity applications like word processing and spreadsheets, he says, where today's PCs are used for complicated and resource-consuming tasks like communications with other personal computers or with hosts. "Imagine a PC used as a file server for communications to the host. The amount of traffic going on inside the PC is very heavy," Gouth says. The PS/2 was designed to handle the increased activity.

Other new demands on PCs include the ability to run more than one application at a time and to share data, printers and other system resources. "Today's environment is more demanding and requires much more performance, storage and memory," Gouth says.

So IBM developed the PS/2 and its companion operating system, OS/2, to take users into a new generation of performance and applications.

As a response to changing customer requirements, IBM's own view of PCs has changed. The desktop machine is now considered by IBM to be one of three computing tiers inside an organization, the other two being mainframes and minicomputers.

"With the PS/2, IBM is attempting to provide alternative platforms for a certain

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Ambrosio is a New York-based free-lance writer specializing in business and technology.

amount of distributed processing," according to Marc Sokol, executive vice-president of Chicago-based software vendor Realia, Inc. "This will allow customers to choose technology based on their business requirements instead of having to fit their business requirements to the technology. Applications will run across all three platforms."

Three-tier consistency

In fact, the PC has become so important in IBM's view of the world that it is now part of the Systems Application Architecture (SAA), the company's grand scheme for providing portability of applications and a consistent user interface across all three computing tiers. The PS/2 and OS/2 were the first portions of SAA to be released.

To ensure that the PS/2 can handle these new chores, IBM equipped it with much more horsepower and capability than the older generation had. Even the smallest PS/2 member, the Model 25, is twice as fast as the original PC. And although the older generation has an internal memory of 640K bytes maximum, the PS/2s can handle up to 16M bytes. That allows for many more applications to reside in memory. Disk storage, too, has increased from an average of 20M bytes on the older models to a maximum of 628M bytes on the new ones.

New rigid 3½-in. diskettes hold up to 1.44M bytes of data vs. the 360K-byte limit on the older machines' 5¼-in. floppy diskettes. And although a conversion effort is needed to get data from the old format into the new one, the 3½-in. diskettes are said to be longer lasting and less likely to surrender to man-made disaster than the old diskettes, which had parts of their recording surfaces exposed.

Much of the PS/2's advantage comes from its Micro Channel architecture. Not only does the 32-bit bus provide better throughput, IBM says, but other planes include a built-in graphics capability that is more sophisticated than that of the PCs. Also, the PS/2s are reportedly easier to install and more reliable than the older generation. And the PS/2 enables multitasking.

These benefits, however, are only possible in the three PS/2 models that have the Micro Channel — the Models 50, 60 and 80. The two lower end models — the 25 and 30 — are based on the original PC architecture.

Helping the PS/2 provide these benefits is OS/2, developed jointly by IBM and Microsoft Corp. and introduced with the PS/2 in April 1987. OS/2 and PS/2 work hand-in-hand to provide the new generation's speed, performance and memory advantages.

But OS/2 has an even bigger responsibility — to ensure consistency across all applications through a user interface called the Presentation Manager. The interface includes a series of pull-down menus and icons that represent different functions — a trash can to delete a file, for example. The fact that the software that runs under OS/2 must use the Presentation Manager will bring about a new generation of easy-to-learn and easy-to-use software, believers claim.

Most of this first wave of OS/2 software are "quick ports," tools that mimic the functionality and style of Microsoft MS-DOS-based software but that don't take advantage of specific OS/2 benefits like multitasking.

And that's not all. "OS/2 will provide better and faster applications," says Mort Rosenthal, chairman and chief executive officer of Westwood, Mass.-based Corporate Software, Inc. Although OS/2 will not likely become the dominant operating system before the early 1990s, many observers say it will allow for the development of new types of applications that haven't been thought up yet.

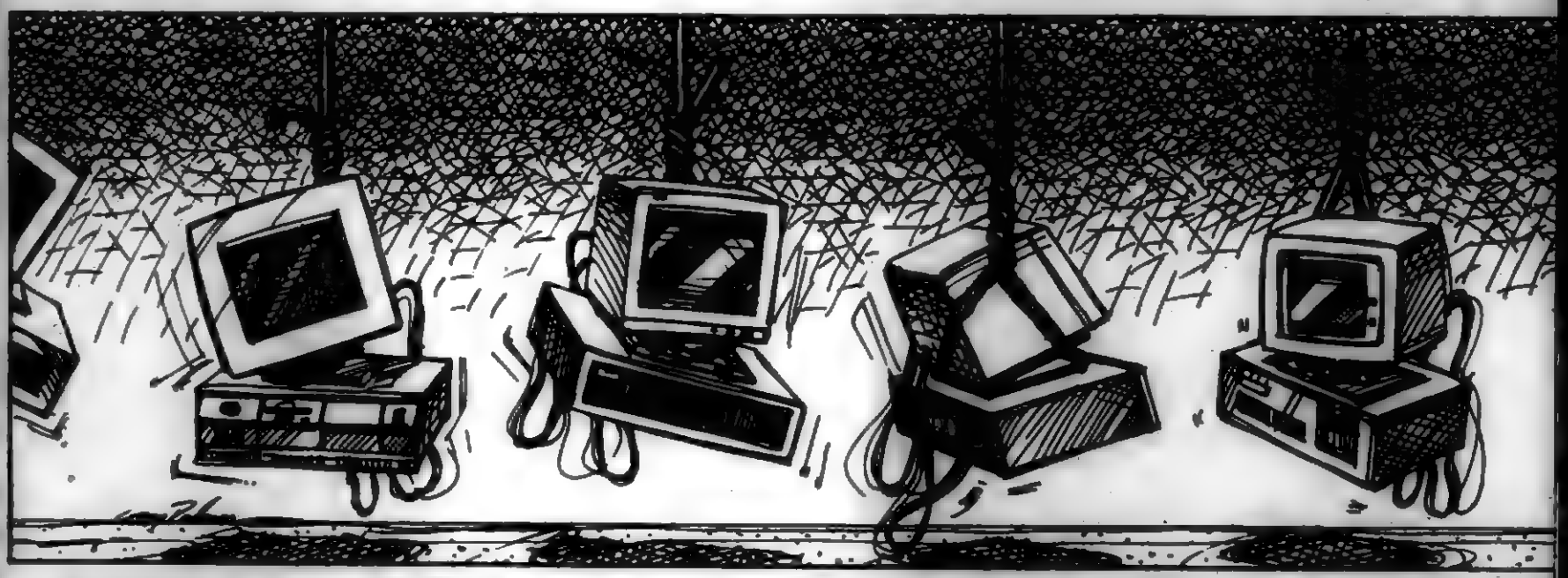
In fact, two classes of software have already begun to appear. One is server software, applications that sit on a PC that acts as a server to other connected PCs. These applications provide services such as document distribution, data base queries, communications routing and so on. The SQL Server, from Microsoft and Sybase, Inc., is one such example.

This new breed of emerging software also includes so-called "groupware," such as Lotus Development Corp.'s Notes program. Notes was one of the very first packages designed from the beginning to work with the PS/2 and OS/2 and is intended for groups of people working together, not individuals working alone. Notes is due in 1989, and more packages like it are expected from Lotus and others.

In fact, many software developers have already committed to OS/2, and there are more than 100 packages already available for the system. These tools include Ashton-Tate Corp.'s Dbase III data base management system, Aldus Corp.'s Pagemaker publishing software, Wordperfect Corp.'s Wordperfect word processing software, Thinktank, an outline-based business productivity program from Symantec Corp. and languages and tools for development work. More OS/2 packages are coming out all the time.

The problem, however, is that most of this first wave of OS/2 software are "quick ports," tools that mimic the functionality and style of Microsoft MS-DOS-based software but that don't take advantage of specific OS/2 benefits like multitasking. True OS/2 software — much of which will be MS-DOS written specifically for OS/2 — isn't expected to appear until late this year or early next year.

The lack of OS/2-specific software, in turn, has kept users



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Arbiter empowers PC users with peer-to-peer communication between their PC and APPC (LU6.2) environments like CICS, S/3x, and token ring LANs.

from switching to the new platform. According to an assistant MIS manager for a Northeast services firm, who asked not to be identified, "I haven't seen enough justification to bring in the PS/2 or OS/2. The value is promised, not delivered."

The reason it is taking a while for enough software to be developed to entice users is because OS/2 has a complicated and drawn-out delivery schedule and possible conflicting versions. Both Microsoft and IBM will introduce versions, which may or may not be similar.

Other manufacturers, including current PC providers, are offering their own OS/2 versions that are as like IBM and Microsoft's OS/2 as Compaq Computer Corp.'s Compaq operating system is to IBM's PC-DOS.

The first version of OS/2, Standard Version 1.0, has been available from IBM and Microsoft since December 1987. IBM's Extended Edition, Version 1.0, is scheduled for availability in July. This version will have all the functionality of the current OS/2, plus IBM's Database Manager and Communications Manager.

IBM says the Database Manager, based on the same technology as IBM's DB2 mainframe data base system, will provide a mechanism for handling requests to and from data bases that either reside on the PC or are on other machines. The Communications Manager will reportedly enable PCs to share data with other PCs or with minicomputers and mainframes.

Indirect competition

In the meantime, Microsoft is already shipping its own LAN Manager to developers, although the firm says it does not plan to introduce a full-blown Extended Edition to compete directly with IBM's. Instead, according to a spokesman, Microsoft will concentrate on providing building blocks to other vendors, which will be free to use them as they wish. How much IBM's Communications Manager and Microsoft's LAN Manager will be alike is anybody's guess.

After IBM's Extended Edition 1.0 hits the streets, Microsoft is expected to announce its Version 1.1 of the Standard Edition in October. This version is said to include the Presentation Manager and is already being sent in beta form to developers. IBM says it will include the Presentation Manager in OS/2 Extended Edition Version 1.1, which will be out in November.

Finally, in 1989, a Microsoft OS/2 version that was specifically developed to work with computers based on Intel Corp. 80386 chip technology will appear. Prior to that point, OS/2 will work on 386-based machines, but it will not exploit their special features, such as the ability to run more than one MS-DOS application at a time or provide really fast speed. It is not clear whether IBM will also provide a 386-based OS/2 version.

Such confusion over the OS/2 delivery schedule is enough to keep even the most technology-prone users away from OS/2. According to Susan Nurse, OS/2 product manager for Informix Software, Inc. in Menlo Park, Calif., "A lot of users will hold off until all the pieces are there. We don't see it becoming the dominant operating system until 1990 or 1991."

There are other problems, which include the cost of adopting OS/2 and converting software. Then, too, as more PS/2 clones appear — and as IBM continues to introduce new PS/2 models — prices will drop. This expectation, as well as the continued improvements promised for the MS-DOS product, might be causing some users to wait awhile before buying.

Cost factors for buyers include memory. OS/2 requires approximately 3M bytes to run — 2M bytes for the operating system and 1M byte for applications. Early indications are that IBM's Extended Edition will need 6M to 8M bytes. This means users will have to add extensive memory to the older generation of PCs for them to run OS/2. Even the PS/2s might not have enough memory in their standard versions to accommodate the operating system; the Models 50 and 60, for example, come standard with only 1M byte of memory.

Conversion pains

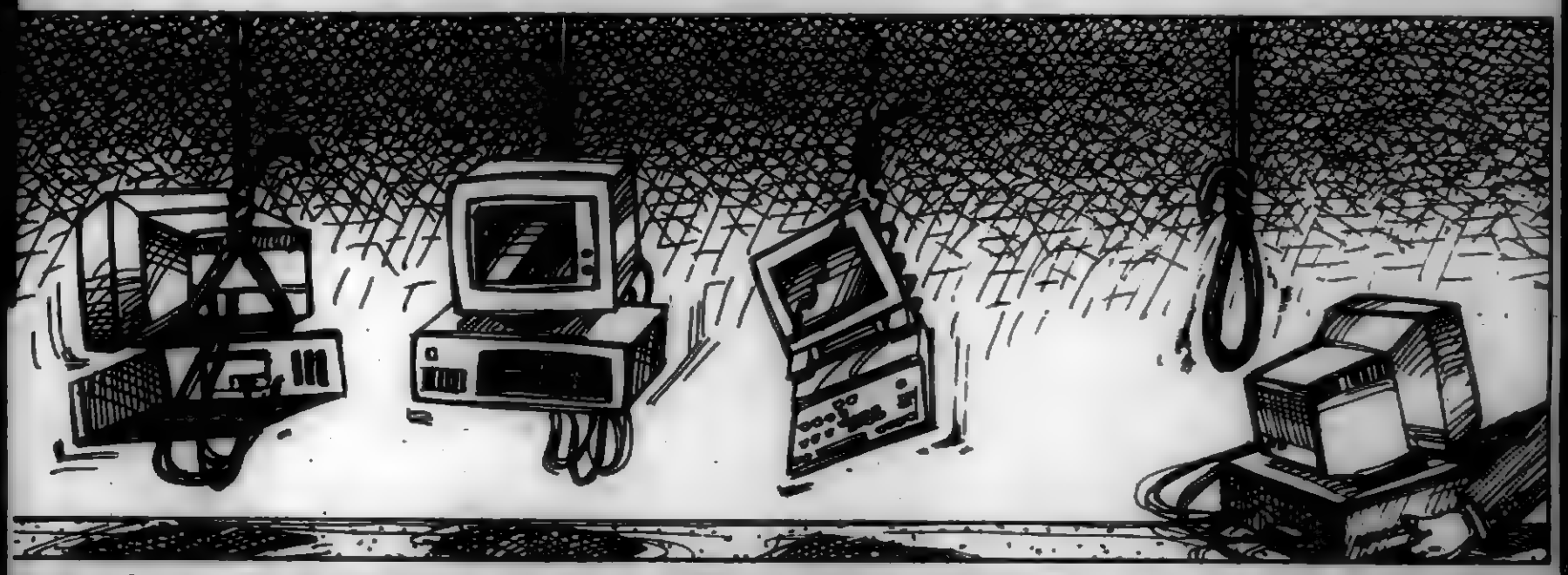
Software conversion from the 5¼-in. to the 3½-in. disk formats is another time and money investment potential buyers will have to keep in mind. The conversion process continues to be "a pain in the ass," according to Corporate Software's Rosenthal. "You really have to be careful when you order software to make sure it's in the format you need." With the mixture of old and new computers that many companies have, the switch can be a problem indeed.

In addition to the software acquisition issue is the problem of converting all the user-generated data that already exists into the new format. Leslie Fiering, assistant vice-president of Banker's Trust in New York, says that "the conversion issue was bumpy, but we did a fair amount of up-front work with products like Laplink from Traveling Software, Inc. in Bothell, Wash., and Brooklyn Bridge from White Crane Systems in Norcross, Ga., and external drives, and we minimized the pain. [But] it's still an inconvenience."

And then there's the cost of the operating system itself. The current Standard Edition 1.0 sells for $325, and IBM's Extended Edition will go for $795.

As far as the clone question goes, PS/2 look-alikes have already been introduced by Dell Computer Corp., Tandy Corp. and Acer Technologies Corp. The machines are scheduled for availability this summer.

And other machines are waiting in the works from vendors such as Chips and Technologies, Inc. in San Jose, Calif. The machines haven't yet been formally introduced, because companies are waiting to see how the legal situation evolves. IBM has applied for patents on the PS/2, but the patents have not been granted, so companies don't know yet



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what parts of the technology are protected. IBM has already served notice that it will come down hard and swiftly on anyone who infringes on the patents and, as an extra disincentive to knockoffs, recently raised its license fees from 1% of revenue to 5%.

Still, when the clones do hit the streets, they will likely put even more price pressure on the PS/2 line. Prices of the IBM machines have already fallen between 15% and 20% since their debut, consultant Murphy says, even though IBM has not formally lowered prices.

Prices for the current crop of PS/2s will take more of a beating when IBM comes out with a second round of processors later this year. IBM Entry Systems Division head William Lowe told a February analysts meeting that IBM plans to introduce 11 PS/2s during the second year of the computer's life. These products will maintain the current PS/2 price points but will add functionality, he said.

"Look and feel" monkey wrench

Still another factor has thrown a monkey wrench into the works. Apple Computer, Inc. in March filed suit against Microsoft and Hewlett-Packard Co. The suit alleges that Microsoft's Windows 2.03 and HP's New Wave interface, which is based on Windows, infringe on the "look and feel" of Apple's Macintosh computer. Because Windows is the forerunner of and basis for the Presentation Manager, many industry watchers suspect Apple's real reason for filing suit is to stop Presentation Manager development work.

That tack does not appear to be working. Both IBM and Microsoft are proceeding with OS/2 and Presentation Manager development work on schedule.

In addition to these stumbling blocks, many users simply don't want to switch to OS/2 because they get all the functionality they need from MS-DOS and the current generation of PCs. "It's a major task to switch over," Ernst & Whinney's Grossman explains. "And quite a number of end users have trouble dealing with what they currently have."

Even shops that have acquired PS/2s, such as Banker's Trust, are proceeding slowly. "We're replacing the old machines as they would naturally be upgraded," Fiering says. "We haven't gone through a major swap." Even so, she adds, it hasn't been easy for the firm. "One of the reasons you have standards is to simplify training, installation and the rest. By including the PS/2 in the standard, you lengthen that process." Nevertheless, the company, which has a large number of PS/2s, says that maintaining compatibility with IBM is important to its long-term direction.

Other organizations, such as UBS Securities, Inc. in New York, a wholly owned subsidiary of Zurich-based Union Bank of Switzerland, have "decided worldwide not to buy PS/2s," says Brian Livingston, UBS Securities' assistant information systems manager. "We have about 2,000 PCs that are or are about to be connected worldwide via X.25 boards that we had some custom work done for. If we go to the PS/2 architecture, none of those boards would work."

Users are finding their own ways through the muddle of OS/2 and PS/2, and it appears they have at least two years in which to figure out their strategies. Helping ease the burden is the knowledge that MS-DOS will continue to be enhanced and supported, according to Microsoft. Future MS-DOS enhancements Microsoft has promised include the ability to handle larger capacity storage drives, high-resolution displays, added speed, ease-of-installation and ease-of-use features. Microsoft will also attempt to provide closer links between MS-DOS and OS/2.

DOS defies death notice

"DOS will not die," Realin's Sokol claims. "It's very much like the mainframe world with DOS and OS. People thought for years DOS would die, but it hasn't." Most applications vendors have promised continued support into the future. And that goes for IBM as well; the same day OS/2 was announced, IBM introduced Version 3.3 of its PC-DOS.

Consultants are advising that the most critical factor is "to just get 386 computers, whether they're PS/2s or not," industry analyst Esther Dyson says. "You'll be taken care of either way."

Another guidepost that users might want to consider is how closely their PCs are tied to IBM's mainframe and minicomputer architectures; the answer may well determine the need for PS/2s or clones. The tighter the integration to IBM's large systems, the more the need for the PS/2 vs. some other 386 machine. IBM, between its Extended Edition of OS/2 and its proprietary PS/2 architecture, will provide its own customers with increased functionality in areas like integration and communications that they will probably not find elsewhere. But if a user is using PCs to communicate only with other PCs in a local-area network or as stand-alone devices, the need for all-IBM gear becomes much less important.

Even more crucial than the PS/2, according to some users, is the long-term question of how to assimilate all the technology. "We're currently studying the question of what kind of PCs to deploy where," says the Northeast services firm's assistant MIS manager. "We're trying to decide where to put the [Intel] 8086 and 8088 machines — they seem to work fine in administrative areas — and where to put the [Intel] 286s and 386s. That's our most pressing issue now." ◆

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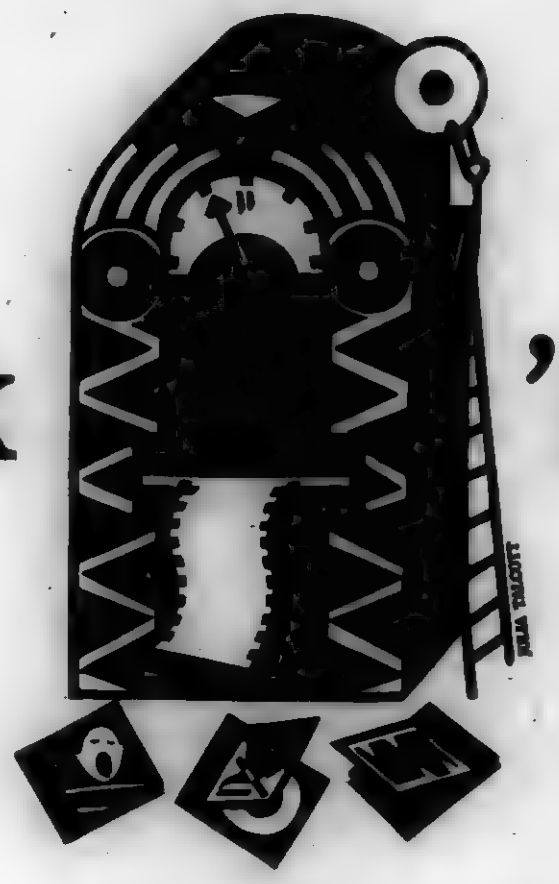

BY DANIEL GROSS

The impact of CD-ROM on information systems cannot hold a candle to the personal computer — yet. PCs have created the philosophy of decentralization and distributed processing that characterizes modern information systems. But compact disk/read-only memory (CD-ROM) technology may hold greater promise. Some industry observers, and a surprising number of MIS executives, go so far as to say that CD-ROM is "a mainframe on a disk."

Microsoft Corp.'s third annual CD-ROM conference in Seattle entitled "The Industry Emerges" was the occasion for a number of significant announcements. Apple Computer, Inc.'s CD-ROM drive was shown there for the first time, and Tandy Corp. announced an agreement to distribute Hitachi Ltd.'s CD-ROM drive through its thousands of Radio Shack retail outlets.

While this news may sound more relevant to the educational and small-business/professional markets, both are telltale signs of the importance CD-ROM vendors are giving the MIS marketplace. Apple's publicly stated strategy is to expand its foothold in the corporate market with its Macintosh microcomputer line. Its CD-ROM drive is as important to this strategy as it is to the company's determination not to lose ground to IBM and others in the education market.

Likewise, Tandy's decision to make the Hitachi drive available through all its outlets, rather than just its specially equipped and staffed computer sales centers, can be viewed as an attempt to give CD-ROM technology the exposure that may lead to volume purchases.

According to a market research survey conducted by Philips and Dupont Optical Co. in Wilmington, Del., 32% of MIS managers are investigating CD-ROM as a possible solution to their internal data distribution problems. While this number sounds high, the survey goes on to point out that fewer than 1% of these managers have actually begun to implement in-house CD-ROM applications.

There are three key variables to consider for cost-justification of CD-ROM technology: the amount of data to be distributed, the frequency of updates and the number of recipients. Although some critics of CD-ROM — especially vendors of dial-up information services — claim that the medium is ill-suited for frequently updated information, the ability to edit existing CD-ROM masters quickly could make this a moot point.

Another important distinction is the three categories that define MIS responsibilities for information management: data coming into an organization, data that leaves the organization and movement of data within the organization. CD-ROM shows promise for all three applications in cases in which many megabytes need to reach many people.

For incoming information, the problems are access and lack of standardization. The variety of media (such as mail, on-line data bases, photographs and so on) and the variety of formats within each medium (such as publication sizes,

Disks a hit with MIS for internal data distribution

Gross is chairman of Magnetic Press, Inc. and a director of the Magnetic Press Editorial Network, a New York-based press service specializing in emerging information technologies.

which can range from tabloid to 9 in. by 12 in. or other dimensions) make any kind of coherent retrieval difficult.

Some managers dream of CD-ROMs turning trade periodicals into easy-to-use reference materials. "I would love to get CD-ROM with copies of all the periodicals I read with a hypertext front end. I could easily produce a Hypercard indexing system, but it would be very expensive for me to enter all the text that interests me," says Michael Coleman, coordinator of technical research development for the Aluminum Company of America (Alcoa), an aluminum products manufacturer in Pittsburgh.

Coleman suggests that the power of indexed retrieval would substantially improve — and accelerate — equipment purchasing decisions. It would be much easier to select anything from a hard disk drive to a long-distance carrier if one could retrieve all press mentions of those goods and services at the touch of a button. CD-ROM fits the bill for high-circulation published material — large amounts of data going to large numbers of people.

Cost-justification for Alcoa

How about information that Alcoa generates for the outside world? Can it cost-justify the use of CD-ROM technology? "We have a lot of customers but only a few big customers," Coleman explains. "We've given our big customers on-line access to their orders, but I don't know if we have the 500M bytes of data we need to send them regularly."

While understandable, Alcoa's lack of need for high-capacity information delivery to customers is specific to the business of selling aluminum. Raw materials businesses don't have the variety and amount of information that demands the kind of storage CD-ROMs provide. In other industries, like retail catalog sales, CD-ROM is a very serious contender for automating catalogs, inventory and the like.

William Seltzer, a project manager at Cummins Engine Co., a diesel engine manufacturer in Columbus, Ind., is one of the 1% who have already committed to CD-ROM. "We publish a master price book of information on parts for the company that our field people use to repair engines. It's 60,000 pages of text and graphics. It's been published on microfilm since 1969. We're converting it to machine-readable form on hard disks, and a prototype on CD-ROM will come up in December," he claims.

CD-ROM came up as a desirable solution for Cummins Engine by the process of elimination. It was the only reasonable-cost way to distribute image data for the firm. "It's not economically feasible to put this on the mainframe because of the graphics. We had to go with PCs in which graphics are more accessible. We didn't want to convert our 8,500 mainframe terminals to graphics," Seltzer says.

> **"MIS will want control over data that is corporatewide, and that's where it will want to control CD-ROM. But I see MIS as the source of CD-ROM long before [it presents] any resistance to it."**
>
> BILL PITLER
> DIGITAL RESEARCH, INC.

While Cummins will continue publishing its price book on paper and microfilm, the use of CD-ROM will "significantly reduce" the number of copies required on the old media, according to Seltzer. Cummins is using CD Publisher, a hardware and software system from Capitola, Calif.-based Meridian Data, Inc., designed for in-house CD-ROM mastering applications, he says.

At first, the CD-ROM version of the price book will only be used by the firm's larger customers. "When CD-ROM equipment gets less expensive so that small garages and so on can afford it, then [economies of scale will improve]. We're not going to force this down anyone's throat. Our primary business is to sell parts," Seltzer says.

There is nothing high-tech or glamorous about Cummins Engine's data distribution problem or the use of CD-ROM to solve it. "When you can find things without wading through 800 film cards, that's an advantage," Seltzer notes. By using in-house mastering equipment, it is now possible to cost-justify a CD-ROM when only a few hundred copies will be pressed.

"I'm formerly from MIS," Seltzer says. "I've been in systems more years than I care to remember. I have [the current MIS department's] blessing."

And MIS's blessing many times hinges on the important issue of intracompany data flows, the movement of information like training materials, documentation, company policies and so on. While CD-ROM can play a role in very large organizations in which various departments and work groups form a virtual subscriber base, its applications are limited without active MIS involvement. Internal company information is arguably the most rapidly changing — and the most strategically important — of all the information flows.

"MIS is involved in the PC level of technology, and CD-ROM is coming on the coattails of that. MIS will want control over data that is corporatewide, and that's where it will want to control CD-ROM. But I see MIS as the source of CD-ROM long before [it presents] any resistance to it," says Bill Pitler, a senior engineer with Digital Research, Inc., a software development firm in Monterey, Calif.

In fact, from the point of view of managing different versions of documents and releases of internal corporate information, the static quality of CD-ROM data may be a plus. The cost and complexity of current CD-ROM mastering facilities means that MIS will have the process of generating and indexing information well in hand — that is to say, centralized.

But this cost also puts CD-ROM out of reach of the bulk of the market — small- to medium-size businesses. Until standards evolve to lower the cost of introducing CD-ROM technology in an organization, there will be reluctance to invest in even off-the-shelf applications of the technology.

However, the CD-ROM industry has an excellent record of establishing standards very quickly. For example, within a few months of early discussions to adopt a file format promoted by the High Sierra Group (HSG), a consortium of vendors, a de facto standard was in place.

While the HSG format has gone on to become the basis for the International Standards Organization's 9660 standard for CD-ROM file formats, different publishers still use widely varying data indexing techniques. As a result, there is still no search-and-retrieval software package separate from the CD-ROM itself. Such an indexing standard would allow a single program to work with a significant number of CD-ROMs from different publishers.

Although by comparison the industry of write-once read-many (WORM) optical disk technology is cursed with a plethora of standards, it is an attractive alternative to CD-ROM for internal data distribution. Because there is no mastering process, WORM can be cost-justified for sharing large data bases between as few as two users.

Alcoa's Coleman sees his company's situation in precisely this light. "Most of our data bases are distributed and the files are relatively small. Certainly for maintenance procedures and so on, CD-ROM could be used to replace manuals," he says. "We have large manuals for safety procedures for different pieces of equipment. It would be very useful to have that on-line. But I question whether, for our particular situation in which manuals differ from one site to another, we can justify CD-ROM. We would be happy to go with WORM."

So CD-ROM may still essentially be a solution in search of problems to solve. In a presentation given at the First Pacific Conference on New Information Technology held in June 1987 in Bangkok, Thailand, William Paisley, executive vice-president at Knowledge Access International, a CD-ROM service organization in Mountain View, Calif., made the distinction between technologies that emerge from market demand and those that come out of laboratories. In his talk, Paisley applied a popular historical model to the development of CD-ROM.

Paisley asserted that the three phases of a new technology's life cycle are feasibility, substitution and new functions.

In the feasibility phase, manufacturers prove the technology can be implemented at a reasonable cost. At this point, the need for such a market may remain a question mark.

The substitution phase involves the first applications of the technology in the outside world, usually to replace older technologies. As far as MIS is concerned, CD-ROM is at this stage, offering an alternative to mainframe access, microfiche and paper.

But there is an element of hype in the "mainframe on a disk" concept being put forth. CD-ROM is, to a certain extent, out of step with the development of PC technology. While the world still waits for a substantial number of IBM OS/2-based applications — not to mention operating systems that fully exploit the Intel Corp. 80386 in top-of-the-line PCs and the Motorola, Inc. 68020 in the Apple Macintosh II — CD-ROM gives a single user access to data bases large enough to tax even mainframes. Microcomputer processing power needs to catch up with the storage power made possible by CD-ROM before MIS can consider the possibilities of the final phase of a technology's life cycle.

> **Thus far, the only users expressing interest in WORM-based jukebox systems, which provide access to several terabytes of data, are those with sanity-threatening records management problems.**

Paisley defined the new functions phase as the emergence of qualitatively new applications from an established technology. With CD-ROM, the possibilities of new applications are raised simply by the disk's ability to store multimedia data bases combining text, data, sound and video. As the competition between Philips' compact disk interactive (CD/I) and General Electric Co.'s digital video interactive (DVI) comes to a showdown within the next two years, MIS may begin to confront user requirements for just this kind of application.

CD-ROMs insufficient

By that time, CD-ROMs may be considered an insufficient storage device. Even with the state-of-the-art compression techniques used in DVI, a 10-minute full-color video sequence requires roughly 100M bytes of disk space. But the problem of storing more than 550M bytes on a CD-ROM disk is a purely technical one, and there is as yet little demand for additional capacity. As interactive full-motion video becomes a more important part of the CD-ROM's contents, the industry can expect to see disks, perhaps double-sided ones, with capacities exceeding 1G byte.

There are already WORM disks that can store as much as 2G bytes, and these are frequently used in jukebox systems providing on-line access to several terabytes (that's trillions of bytes) of data. Thus far, the only users who have expressed interest in these systems are those with sanity-threatening records management problems, such as the U.S. Department of Commerce and the Patents & Trademarks Office.

At the Microsoft conference, flyers circulated by Philips and Sony Corp. described a development termed CD-WO, or compact disk/write once. This technique makes it possible to combine read-only and user-written information on an optical disk the size of a CD-ROM. Unfortunately, the write-once area of the disk uses a different optical method for encoding data and is therefore not compatible with existing CD-ROM players.

This technology will very likely evolve alongside WORM and the new magneto-optical techniques used by 3M Corp. in its erasable optical disk drive recently announced at the Hannover Fair Cebit '88 show in Hannover, West Germany, in March. It is realistic to expect a convergence of these three developments that will lead to intercompatibility of read-only write-once and read/write optical media by the turn of the century.

These technological developments suggest that CD-ROM is an early sign of fundamental changes to come in information management. By the time these changes are widespread, however, the underlying technology will no longer be called CD-ROM. ◆

Executives shift the data balance

BY HELEN PIKE

People find it hard not to make joking references to Old MacDonald when they come across the acronym E-I-S. But the concept and growing implementation of executive information systems are not child's play. From mahogany row to the glass rooms of data processing, professionals are groping with a new way to use data as companies grapple with a better way to do business.

Later this month, the president of Grumman Corp. will conduct his bimonthly resource and technology meeting. Among the agenda items is an EIS designed by Barbara Mencher, information and personal computer center manager for the corporation's data systems division in Bethpage, N.Y. The meeting represents a milestone for Mencher, who was drawn into designing an EIS via a request from the company's marketing department at the start of 1987.

"They wanted to do competitive industry analysis," explains Mencher, who has worked for the aerospace company for 10 years, three of them in her current position. "They didn't want to go through the traditional data processing requirements."

The marketing department wanted what Mencher calls "an industry information system," but just how the department wanted it set up was vague and left to Mencher. In creating a prototype, she chose the relational data base capabilities of Information Builders, Inc.'s Focus, an IBM SQL function, and the graphs-producing feature of Tell-A-Graf from Garden City, N.Y.-based Computer Associates International, Inc., all accessible from a PC-based system. She generated dynamic screens with Builders Easel from Woburn, Mass.-based Interactive Images, Inc. The package is co-marketed by Comshare, Inc. in Ann Arbor, Mich., considered to be the oldest EIS vendor in the country.

"We can always make software dance and sing," Mencher says about customizing System W to meet the marketing department's PC-oriented analysis needs. System W is a Comshare product Grumman had for processing large management accounting applications in its IBM VM-based shop.

System W is a thorough, extremely detailed system, according to Mencher. It was seized upon by the data division's business operations staff to "track everything to the last penny," she says, and that got the attention of Robert Myers, data systems division president.

Pike is *Computerworld Focus*'s senior writer.

Using EIS in strategic decision making

Myers had been casting about for a business operating system that would make the unit's operations more readily accountable and more financial in nature. Myers also wanted to do away with much of the paper used in tracking the operations, but the complexity of the marketing project's design and the detail of System W were a bit intimidating, Meacher recalls.

"So we said, 'Fine. We'll do something else for you,' " Meacher recounts. As she had done with the other design projects, Meacher worked closely with Rose Pastrelli, an information center consultant with a business degree (and currently at work on a master's in computer science), to come up with an approach that was more executive-friendly.

'Real executives don't type'

That "something else" became a NEC Corp. multisynchronous monitor, which responds to touch instead of a mouse. Meacher put it on Myers' desk and then placed an IBM Personal Computer AT's CPU and keyboard in a vestibule outside Myers' office. In addition to the PC AT's placement and the desktop monitor's touch-screen feature, Meacher did some cajoling to help her boss get over his aversion to keyboards. Myers now owns a T-shirt that reads, "Real executives don't type."

The upshot?

"Now he feels comfortable with working in an automated environment. Now he wants a little more detail; he wants more functions added," observes Meacher, choosing as an example the creation of hypothetical situations, or "what-if" analyses.

"I think it's a real eye-opener to the executive to get information in a timely manner. It also means that managers can't wait until the night before to put their budget information together. They really have to put their houses in order," Meacher explains.

At Grumman, the EIS is a visual means by which to track performance indicators and to define critical success factors, Meacher says. These will be two of the points made to corporation President John O'Brien, who is under consideration for having a personal computer installed in his office, and to presidents of Grumman's 10 divisions, most of whom don't yet have desktop computers.

"The president wants an overview: high-level data and a phone number of the employee responsible for more information," observes Meacher about what a company president might expect from an EIS. "It's [also] timely for monthly financial reviews, to see them before going into a meeting, so he won't be hearing about them for the first time."

Just designing the EIS for Grumman's marketing group has prompted the finance department and various facilities to rethink the way they approach customer opportunities, she observes, and that thought process will have to extend to the data processing department as well.

"I think [DP] is going to change. Data centers are going to have to take a whole other look at the way they design their systems," she says. "Three years from now, we're going to be putting expert front ends on these PCs so we can do 'what-ifs,' " she says. "We're not going to stop with EIS."

Just when and how EIS got started as a truly identifiable end-user function, or as an industry or even as a market niche within the larger sphere of office automation is open to interpretation. Many credit John F. Rockart, director of the Center for Information Systems Research (CISR) at MIT's Sloan School of Management in Cambridge, Mass., with coining the EIS acronym in 1982.

At that time, he saw EIS as different from decision support systems (DSS) by its end use and end user. EISs were used by executives to improve managerial planning, monitoring and analysis. DSSs were used by middle management and tended to be more oriented toward models and data analysis.

The birth of ESS

Today, Rockart is promoting Executive Support Systems (ESS), a concept he says is an evolutionary and significant expansion of EIS. According to Rockart, ESS covers any routine use of a computer-based system for conducting any business function by an executive, whether on the corporate rung or at the top of a division. The ESS concept includes communications, such as electronic mail, and office-support applications, such as word processing. ESS also means the presentation of data in flexible formats that combine text, numbers and graphics, highlighting trends that might not be noticed in tabular form.

"The electronic revolution has changed why a staff does its job. Now we can have response time under a second," he observes.

Rockart's vehicle for changing the EIS acronym to reflect more support functions is a newly published book, *Executive Support Systems: The Emergence of Top Management Computer Use*. He wrote the book along with research assistant David W. DeLong.

Published in February by Dow Jones-Irwin, Inc. in Homewood, Ill., the 280-page tome has been through two printings and a third is being contemplated as of this writing.

Rockart singles out five key factors that are influencing a company's top-management level to rethink the way it conducts business:

- A company's globalization. The need to manage subsidiaries, particularly those in foreign countries, as a single organization requires more information.
- Personnel cost-cutting, specifically at the mid-management level, which traditionally generates the company's status reports. "We don't know yet where the borderline is between what you can do vs. what your staff can do for you," he says.
- Worldwide use of communications, especially electronic mail, that brings more and diverse information to headquarters.
- Changes in computer technology that are bringing about new and more efficient ways to access and analyze information.
- The pace of that change.

With regard to the last two factors, Rockart also sees a new designation emerging called "information technology" and a class of users appearing called "knowledge workers."

As a result of the changes being brought about by the ESS/EIS movement, traditional DP and MIS professionals are now under pressure from a new class of PC user — the executive.

MIS is "scared to death about failing in the executive suite. It's a bad place to fail because of your career," adds researcher DeLong, who is also a Cambridge-based consultant. "They think: 'It is a highly unstructured project that doesn't fit our

IBM study: Who uses Profs and how do they use it?

IT WAS ABOUT THREE years ago that executives, managers, secretaries and other professionals at IBM — 153 in all — volunteered for an IBM study at a company development and manufacturing plant in Harrison, N.Y. The study's aim was to track the use of commands accessing mainframe information from personal computers and terminals using IBM's Professional Office System (Profs). The study was conducted randomly for two-week stints during an 18-month period from 1984 to 1985 in conjunction with the University of Colorado.

"The kinds of applications that apply directly to what people do is the value of the program," says IBM's Sam Kaldanow, who authored the study entitled "Measurements of Office Systems." Big Blue chose the Harrison plant and its employees because "we wanted to study a site with a fairly mature consistency of using PCs as naturally as you use your telephone."

IBM then went on to identify four primary uses for Profs that it would follow in the study: time management, communications, data and other, including the operation of a system.

Of the percentage of time used on their computers, executives logged 53% in time-management activities, 43% in communications and the rest in data or other functions.

Managers used computers 35% of the time for time-management duties, 48% for communications and 15% for data.

Secretaries, whom IBM regards as serving the data processing needs of the first two classes of PC users, spent 32% of their time using desktop machines to perform time-management tasks, 41% for communications and 26% for data processing (primarily of text).

The final category of professionals used PCs and terminals 16% for time management, 29% for communications, 42% percent for data processing and 13% for other tasks.

According to A. Donald Rully, IBM's corporate director of information systems, during the course of the study, there was a 9% to 15% drift in use from host applications to stand-alone PC applications. In similar studies at other IBM locations, the findings parallel the Harrison research.

Which applications drove the use of PCs? Spreadsheets and graphics, along with secretarial support work. What was the most influential factor for off-loading from the host? The user-friendly front end of a PC.

Rully himself has had an IBM 3370 Personal Computer in his executive office in Purchase, N.Y., for three years. It has been upgraded for graphics and storage. Now Rully has a Personal System/2 Model 60 on order. Also, under IBM's Home Terminal Program for its employees, Rully has an IBM Personal Computer XT so he can do work at home and transmit data by modem to his office.

But while Rully took up desktop computing easily enough and with a degree of frequency, other executives were not so quick to adopt the technology, as the study at the Harrison plant found out. This discovery prompted two remedies: better interfaces and training those executives with limited knowledge on how to operate a computer. "We put education programs in place to teach them how to use a broad set of commands," Rully explains.

Because IBM is its own largest customer, it also leverages internal applications for commercial profit. In July 1987, based on its internal observations, IBM added a retention management system to Profs. Simply put, this is an automated feature that holds on to data for a predetermined period of time, then gets rid of it.

Rully concludes, "The integration of the PC with the host to perform similar kinds of work puts the power in the PC." — Helen Prez

The PC war is over.

The mainframe.

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PC Integration: the world of

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The PC war is over, and the computer professionals have won.

Almost overnight, the market for personal computers has changed. The individual user no longer runs out and buys whatever strikes his or her fancy.

PC's have grown up, and MIS has taken over responsibility for their role in the corporate information system. "During the past three years, everything has become integration," says Leon Jackson, senior research analyst at Arthur D. Little. "The only computer force that can provide integration is MIS."

The standalone personal computer has become part of a network. And MIS departments are working to set PC standards so that their organizations can benefit from sharing of information, including databases and software.

The stakes are huge. This year, companies will spend more dollars buying PC's than they will spend on mainframes.

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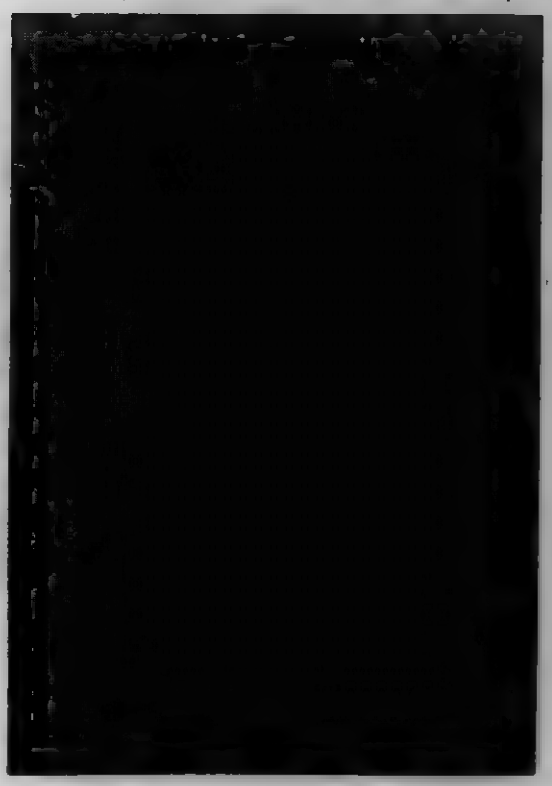

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highly methodological role.' "

Acknowledging that product marketing has already begun to cloud how EIS is perceived and understood, DeLong says, "It's an undefined field without literature or manuals to go about designing these systems. EIS runs counter to the traditional, highly structured application process. It requires minimal planning. It's not cost-justified. There are no systems' specs. And there is rapid prototyping."

And all "from a user you can't say no to," DeLong says. "It means one more application area MIS has to deal with, and MIS is notoriously backlogged anyway.

"The executive suite holds all the cards," he adds, though "often MIS gets caught in the middle between executive demands for information and the resistance of mid-managers who don't want to let go of the data." The result can often put MIS in an awkward position.

No cocktail party

"It's hard finding the horror stories because people aren't going to want to talk about them," says James Tunis, president of Lincoln National Information Services, Inc. in Fort Wayne, Ind. "If it's 10 p.m. and the chief executive officer calls you at home, you know it's not to invite you to a cocktail party. It's because he wants to know where the data is or why you can't manage it more efficiently."

Tunis is one of the more visible proponents of EIS. Featured in the Rockart-DeLong book, Tunis also speaks publicly about his adventures putting in EISs, whether internally at his company or commercially for new customers. In March, he participated in a panel discussion on EIS at the World Congress of Computing in Chicago.

Lincoln National Information Services is a wholly owned subsidiary of Lincoln National Corp., a diversified financial company. The subsidiary's business plan is twofold: to conduct research and development for internal corporate MIS needs and to create and market hardware and software products for the commercial EIS/office systems market. Tunis, who has been with the subsidiary for 10 years, began implementing an EIS there nine years ago.

"Our approach here is to give the real end users the power they can use," Tunis says, citing key EIS use as monthly financial statements — reports that used to be quarterly, he adds. Other features include electronic mail and a calendar to track, among other things, Lincoln National Information Services' three corporate jets.

"Our executives needed data not in the data base," Tunis adds, "so we designed an easy system of new data bases to put new data into."

After prototyping in the DP department, Tunis tried the system out on his company's law department before actually implementing it at the corporate level. "We wanted more experience to iron out the mistakes," he says.

A valuable lesson Lincoln National Information Services learned was to pay attention to training support staff. "We found the best way to train middle managers on up was through their secretaries, because they were the least threatening [to managers]," Tunis observes.

Drop book too and paste

The company also changed its terminal screens to make them more readable and reduced the number of keystrokes needed for easier data entry. In the early days, the group went so far as to have wooden cases built to house the terminals, the extreme being a leather-covered terminal that made it look like an old-fashioned football, Tunis recalls. The group doesn't do decorating anymore, he adds.

In 1983, the firm began selling its EIS tool kit that Tunis describes as "wrapped around an E-mail application." The kit allows a developer to write an EIS for top-level divisional executives and above. The EIS includes system support, an expert systems builder, a relational data base manager, graphics, word processing and financial modeling. So far, the Lincoln National subsidiary has sold 170 software licenses of its Office Productivity Network (OPN) to such customers as the U.S. House of Representatives and Senate, Anheuser-Busch Cos. and the California Public Utilities Commission.

"Collecting and integrating existing PC software is what we do," Tunis says. His group has a valued-added reseller agreement with Prime Computer, Inc. for its minis. Besides running on Prime computers and IBM Personal Computers and compatibles, OPN also has gateways to Apple Computer, Inc. Macintoshes.

"We're aiming at easy-to-use tools," Tunis says again, with emphasis. Of OPN's estimated 25,000 users, 95% of the executives and 70% of the knowledge workers are "not technically interested" in their systems, he continues.

To get through to those users, Tunis is working on prototypes for interfaces that use English language inquiry, graphics and pull-down menus — all to make a data base easier for an end user to build. Tunis also is planning for a mouse device to facilitate easy data access and manipulation.

Tunis calls this kind of information design a "data store" instead of a data base. "There's just a lot of data that floats around. I call it ad-hoc data — data that comes from the *The Wall Street Journal* that you need right then, but six months later, it's old. It's transient data," he says.

With all the new terms that are being crafted from old MIS labels, Tunis admits that the real marketing of the EIS concept is just getting under way. ◆

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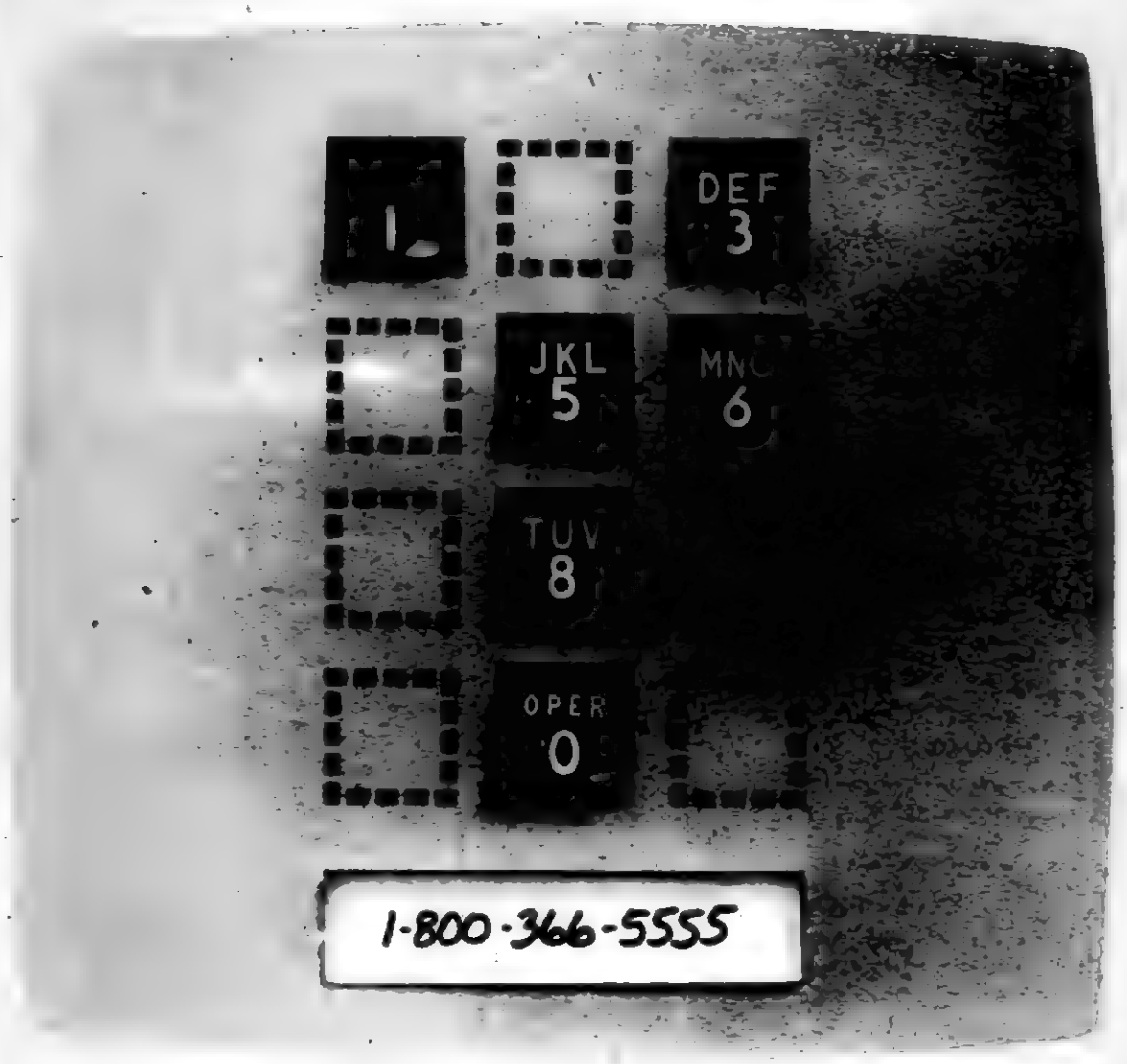

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ARTIFICIAL INTELLIGENCE

AI woos MIS anew

BY MICHAEL TUCKER
FEATURES EDITOR

It has all the makings of a morality play. It is a sort of rise-fall-and-rise story. The tale starts with a local boy, innocent and talented, burning the midnight oil at universities and corporate research and development laboratories. After much labor, he makes good, but is corrupted by his success. He heads for the gutter but, in the final scene, is redeemed through the love of a faithful companion — specifically, a personal computer.

These excerpts could be from the Artificial Intelligence Story. Now playing on a PC near you. Critics hate it. They say the work is full of clichés. But ticket sales are brisk.

Although industry observers are berating AI, and former AI market leaders are in serious financial trouble, artificial intelligence on PCs is suddenly a boom market. For the first time, MIS is beginning to take the technology seriously.

How did this happen?

For the answer, we need to start with the first act.

In the late 1970s and early 1980s, artificial intelligence was the premier hot topic in an age of hot topics. AI was, or so went the hype, the technology that would bring us robots and thinking machines. The leading researchers of the science were generally looked upon as a priesthood whose judgment was not to be questioned and whose companies were to be funded regardless of cost.

So powerful was the AI mystique that AI-related vendors coasted through the computer slump of 1984 and 1985 without missing a dime in venture capital. So dominant were AI concepts among researchers that few remembered that there had been other approaches to automating intelligence.

Then, after 1986, AI went out of fashion.

Critic urges AI redirection due to flaw in traditional theories. Page 30.

ARTIFICIAL INTELLIGENCE

Industry observers began to point out that AI's progress was disappointingly slow. The robots and thinking machines promised years before had failed to materialize.

Worse still, companies whose products were indivisibly (if sometimes unfairly) linked with AI — such as Symbolics, Inc. in Cambridge, Mass., and its near twin, the now-defunct Lisp Machine, Inc., also in Cambridge — suffered devastating financial reverses.

End users, venture capitalists and industry observers began to question the formerly unquestionable AI priesthood.

What accounted for this AI winter? The answer depends on whom you ask. AI's harshest critics argue that AI's problems are deep within the technology itself. Ultimately, they say, AI is based on the underlying premise that reality can be described in terms of logic.

But, critics claim, reality is far too complex to model with logic alone. They say the brain seems to make deliberate use of illogic, dealing with the torrents of information that make up real life by disregarding most of the incoming data and making good but not perfect guesses about the rest.

(One famous example used by these critics is the phrase, "I heard the birds singing outside my window this morning." The brain instantly interprets this statement to mean something like everyday sparrows chirping. But if subjected to rational analysis alone, the sentence could just as easily refer to turkeys doing grand opera. And for most rule-based AI systems, the second interpretation would seem no more outlandish than the first.)

Indeed, as AI's fame has waned, nonrule-based systems have stepped into the limelight. Suddenly, rival methodologies are reaching the point at which AI was a decade ago. Such things as neuromorphic systems, which attempt to model the physical functions of the brain, are becoming fashionable.

Meanwhile, AI's less harsh critics say the problem is not in the technology but in its practitioners. By 1985, the AI fraternity had acquired a reputation for awesome arrogance. Researchers from other areas of computer science told horror stories of their work derailed or zero-budgeted by AI programs that demanded ever more and delivered ever less.

Would-be users, and particularly MIS officers, offered more chilling tales of AI systems that did not work and AI vendors that expected their customers to keep shoveling in the money, no matter what the consequences. Underscoring the technology's declining popularity, there was even a joke, widely told in the industry, that played off humorist Will Rogers' famous line, "I never met a man I didn't like." The punch line? "Will Rogers never met anybody in AI."

Sometimes logic works just fine

But there are those who point out flaws in both theories. The fact that AI is rule based and life is not does not alter that there are a lot of situations, particularly in the corporate world, in which logic works just fine. A lot of business decisions are as much governed by rules and cases as any expert system.

And even if AI partisans are guilty of the sin of pride, the whole history of the computing industry shows that arrogance is not a barrier to business success.

So what really caused AI's problems? Why did the makers of AI hardware and software do well prior to 1986, and then suddenly suffer after that year?

For that answer, we must go to the second act.

In a strange way, AI and MIS have a lot in common. Both came to power via large, dedicated machines. Both were viewed, however unfairly, as removed from end users. And finally, both were seriously troubled by the personal computer.

Tom Schwartz of Tom Schwartz Associates, a consultancy in Mountain View, Calif., explains the phenomenon simply. "What people failed to look at was the increasing power of general-purpose microprocessors. Every year, general-purpose silicon had been roughly doubling in power. You could plot it on a graph. It looked almost like a law of nature," he says. In other words, every year conventional personal computers grew closer and closer in power and performance to dedicated LISP systems.

In a strange way, AI and MIS have a lot in common. Both came to power via large, dedicated machines. Both were viewed, however unfairly, as removed from end users. And finally, both were seriously troubled by the PC.

Then, in 1986, the first personal computers based on the Intel Corp. 80386 processor began to ship. Schwartz says, "Suddenly, the PC-based AI vendors had vastly more room to play in. And remember, these people already had a lot of experience in making fairly significant programs work in small spaces. They were very skilled at squeezing high performance out of the low end. . . . Meanwhile, though, the original AI vendors couldn't even imagine getting AI software to run on a PC."

In turn, people who were interested in developing expert systems or other AI applications had no particularly good reason to purchase either a dedicated symbolic processing machine or the software that was designed to run on one. Why not make use of the micros they already owned to take advantage of it? Makers of PC-based systems found themselves in a boom market. The winter of AI's discontent looked like glorious summer to them.

Cambridge-based Gold Hill Computers, Inc., whose Common LISP is a PC LISP market leader, claims to have tripled its revenue during the period that the high end of the AI industry encountered serious trouble. Gold Hill's president, Carl Wolf, attributes his company's success to the Intel 386 chip. "In the spring of '86, you saw the first 386 machine. It stopped the world. People who'd been planning to buy a symbolic processing system had to rethink things a bit. They had to ask themselves why they wanted a big, expensive symbolic processor when they could get LISP that would run just as fast on a PC."

PC-based expert systems became an overnight industry on a grand scale. "You want numbers? I'll give you numbers," Wolf says. "In 1985, I did a sales call. I went to a big bank in New York. I talked to the senior vice-president there, and I was excited about LISP. I was telling him how he ought to write AI systems for banking and so on. He listened to me for about three minutes, then he said, 'OK, tell me about the products that are already out there for banking.' Now, at the time, I knew of about three expert systems in the whole world, and they didn't relate to banking. Finally, he threw me out. He said it was a strange technology that ran on strange machines and was written in a strange language by strange people from Cambridge."

Today, a bare three years later, there are hundreds of such applications, according to Wolf. Gold Hill maintains a catalog of applications from its own OEMs that is more than 90 pages.

AI had risen, fallen and risen again. The curtain goes up; we find ourselves where we started, in the third act.

And so it is that there is money in AI again. This time, though, the profits are being provided by customers who buy the technology to make expert systems for PC-based applications rather than by investors, venture capitalists and research operations.

There are dozens, maybe hundreds of software vendors. Some of these — such as Gold Hill, American Expertech, Inc. in Incline Village, Nev., Neuron Data, Inc. in Palo Alto, Calif., and Paperback Software International in Berkeley, Calif., (whose inexpensive VP-Expert is one of the most widely installed PC expert system shells) and so on — have developed products on PCs for their entire corporate lifetimes. Others, such as Intellicorp in Mountain View, Calif., got their start in the original, dedicated symbolic processor world, were badly burned there and are making bids in the 386-based systems market. Some, such as Texas Instruments, Inc. in Austin, Texas, span both worlds.

Symbolic gestures

Indeed, what may be the most remarkable trend in AI is that former symbolic processor vendors are now looking at transferring their hardware to the desk top. For instance, TI recently announced a pact with Apple Computer, Inc. under which the companies will jointly market a version of the Apple Macintosh that is equipped with a special symbolic coprocessor based on TI's single-chip LISP machine. By like token, Symbolics, which has Ivory, its own single-chip LISP engine, has announced an intention to produce a similar product.

But what are the buyers doing with the expert systems technology that they buy? "Not surprisingly," says Ellen Stanlin, senior consultant with the technology future service of International Data Corp., a market research firm in Framingham, Mass., "some of the first applications relate to DP."

Thus, maybe the most notable thing about the third act of AI's career and what may say the most about the technology's success is that this time around MIS is supporting it. Where before AI was a strange thing from strange people, now it is in the heartland of computing. In particular, it is being used to create increasingly friendly, intelligent interfaces between MIS and end users.

For example, the Washington, D.C., office of the Big Eight accounting concern

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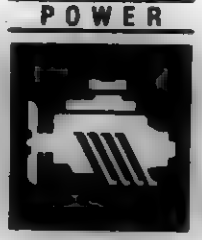

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Circle Reader Service Number 11

Critic breaks the AI mold with "irrational" approach

BY STAN KOLODZIEJ
SENIOR EDITOR

WHILE PARTS OF artificial intelligence are forging ahead with the help of personal computers, AI in general is hardly out of the woods yet. Joseph Weizenbaum, MIT's long-standing defuser of AI hubris, now has a West Coast AI companion critic in Fernando Flores, chairman of Action Technologies, Inc., an Emeryville, Calif., software company. Flores is also a coauthor of *Understanding Computers and Cognition*, a scathing indictment of the entire scaffolding of "rational thought" on which AI is supported.

Flores makes a compelling argument that much AI work has been doomed to fail because it has been forced, through the evolution of rational, scientific thought, to ultimately regard man as a complex data processing machine.

"The problem is that AI is based on bad theory," Flores says. "Designing machines to extend human capabilities, rather than trying to duplicate the human mind, makes more sense. It would prevent a lot of frustration.

"Our commitment," he writes, "is to develop a new ground for rationality — one that is as rigorous as the rationalistic tradition in its aspirations but that does not share the presuppositions behind it."

Flores's company has moved theory into the real world with The Coordinator, a network product that is meant to extend the efficacy of communications within the office. Flores says he will use The Coordinator as a building block to construct more such "action-oriented" communications tools through Action Technologies.

"Our ultimate goal, however," Flores explains, "is not a debunking [of AI] but a redirection. The alternative we pose is not a position in a debate about whether computers will be intelligent, but an attempt to create a new understanding of how to design computer tools suited to human use and human purposes."

Coopers & Lybrand has used Gold Hill's Common LISP to develop Q-Shell. According to Leo Campbell, internal consultant at Coopers & Lybrand, "[Q-Shell] is an expert system shell on which we run a number of applications, specifically Expertax. That, in turn, is an expert system for the corporate tax accrual and planning process."

Among Coopers & Lybrand's clients are large corporations whose tax problems are complex to say the least. Prior to Expertax, Coopers & Lybrand had its clients fill out paper forms by the boatload. "What happened in the past," Campbell explains, "is that an auditor would go out to the client with a rather thick questionnaire and ask all sorts of questions. Lots of them. There could be as many as a thousand questions to be asked."

The auditor would then return to the home office with the completed questionnaire and try to deal with all the possibilities for human error — typos, unreadable responses and so forth.

With Expertax, the questionnaire is put on a PC and made intelligent. It guides the client through the interview, asking appropriate questions and accepting appropriate responses, he says. The result is considerable time savings for everyone concerned.

Expertax is not a commercially available product; Coopers & Lybrand won't sell it. Rather, it is a device to increase the productivity and effectiveness of Coopers & Lybrand and its clients. As such, it can be considered a tactical, and even strategic, weapon. Expertax has been so successful that Coopers & Lybrand is bringing out similar systems for related industries and other branches of their consulting operations.

Lending a hand in loan decisions

Meanwhile, another similar application is currently being prototyped at Manufacturers Hanover Trust Co., a financial institution in New York. There, the goal is to create a system that will be used in decision support by commercial loan officers. It, too, would be an intelligent system that would marshal relevant information at the desktop. Also, like the Expertax application, it is meant to link the desktop with mainframe data.

"We had a mainframe system," says Elizabeth Byrnes, Manufacturers Hanover's vice-president of new technology research, "but it had a number of disadvantages. It was inflexible and growing more complex. Worse, the people who were responsible for the system tended to talk in, shall we say, *system*. Meanwhile, the account officers uptown knew all the details, had all the relevant information, but they couldn't communicate with the systems people."

So working with an expert system development tool from Gold Hill, the bank set out to develop a system that would, Byrnes claims, "bring responsibility and control of data back where it belongs — with the account officers." The result is a prototype that Byrnes describes as "basically an intelligent form, on-line, which replaces some 30 different paper forms we used to use."

Byrnes states that the prototype is now "pretty robust, and we're now trying to integrate it into our existing technical environment."

It is in the requirement of being integrated into existing technical environments that the new forms of AI most differ from the old. Byrnes, for instance, says she intends the system to run on 80386-based machines under Microsoft Corp. Windows. "The decision has already been made to go with the 386," she explains. "This application must fit into that environment. This AI application is going to be a part, only a part, of people's lives."

More exotic machines, dedicated LISP processors, even fancy add-ons for some of the 386 PCs are not options for Manufacturers Hanover. The application, while valuable, is not so important that the company can afford such machines. "This application is going to save us a lot of money," Byrnes affirms. "It's even strategic. But it's not going to make us millions of dollars. It isn't, say, [the same as] looking for oil wells."

That kind of practicality has been rare in AI before. "[AI] kind of got itself separated," Byrnes adds. "It thought it was the center of the world, when, in fact, the workstation was the center."

Now that AI really is in the center on the PC, AI will probably never let itself be detached again. But it may not any longer be called AI per se.

Already, the technology is beginning to blend with other technologies like data bases and user interfaces. A fairly good argument can probably be made that AI is already alive in the interface of every Macintosh and Windows-based PC, both of which make use of the AI-like concept of icons and object-oriented programming and both of which can be traced directly back to the AI-oriented research at Xerox Corp.'s Palo Alto Research Center.

But for the brief period to come when it is still possible to distinguish AI from other computer technologies, where is it headed? What will the fourth act reveal about AI?

For that, we have a little foreshadowing. "All of sudden," consultant Schwartz claims, "AI people have discovered the mainframe. I think that the next battlefront for expert systems will be an entirely different one than any they've been on in the past — the mainframe." ◆

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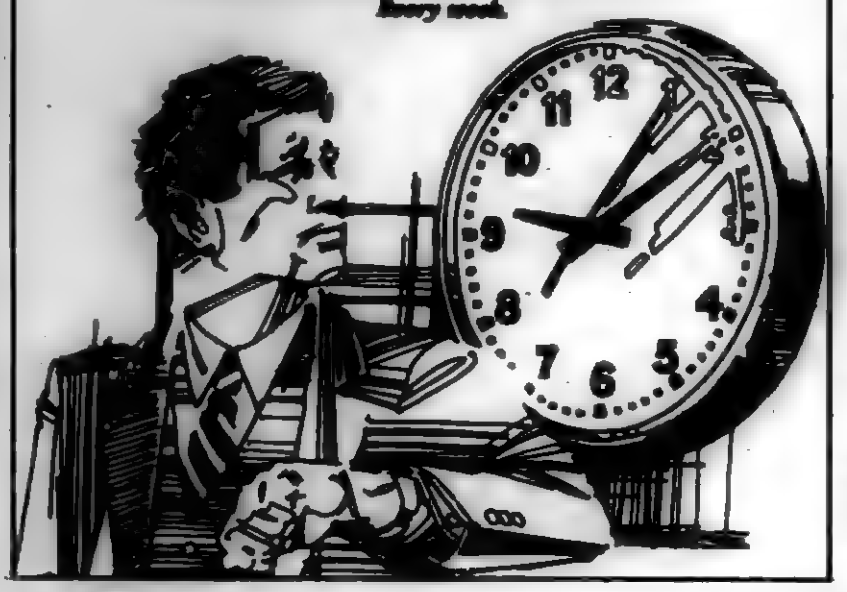


Building a foundation for Presentation Manager

BY MICHAEL GUTTMAN

A juggernaut of easy-to-use graphical interface environments continues to gain momentum despite the much-publicized rash of legal battles between Apple Computer, Inc. and Microsoft Corp. over who owns what rights to Microsoft's Windows presentation graphics program.

Prime among these environments is the long-awaited Presentation Manager currently being developed jointly by IBM and Microsoft and scheduled for release in the fourth quarter of 1988. Well before its release, Presentation Manager is already of major interest to software developers and MIS departments concerned about compatibility with IBM's next generation of systems and application software.

At this time, solid information about the Presentation Manager is rather spotty. On the one hand, IBM is exercising most of its usual reticence about a yet-to-be-released product, not revealing many details about the Presentation Manager to the general public and showing the graphical interface's innards to only a privileged few.

On the other hand, announcements and rumors now appear almost daily about the development of Presentation Manager, with both IBM and Microsoft continually emphasizing its importance and high priority.

Guttman is manager of consulting services for Morrissey Associates, Inc., a software development and consulting firm with offices in Skokie, Ill. and Dallas.

With some careful digging, there is much that can be inferred from publicly available information about the Presentation Manager. The product will be a complete graphical interface front end for personal computer applications similar to Microsoft's Windows. However, unlike Windows, which runs with 640K bytes of random-access memory using plain-vanilla Microsoft MS-DOS or IBM PC-DOS, Presentation Manager will run only under IBM OS/2, thereby requiring an IBM Personal Computer AT or high-end Personal System/2 with 2M bytes of RAM or more. It will run concurrently with other OS/2 applications and will share with them OS/2's multitasking, communications and other services.

This will make Presentation Manager fully compatible with and connectable to other applications running under IBM's much-ballyhooed Systems Application Architecture (SAA).

Like Windows, Presentation Manager will support all the stock graphics devices that have become so popular recently — movable, overlapping windows, pull-down menus, icons, scrollable list boxes, pop-up dialogues, variable text

fonts and sizes and a full range of color graphics. However, Presentation Manager will be a bit more than just Windows for OS/2; it will fully adhere to the complex set of graphics standards defined in the Common User Access portion of SAA. This means that the graphical constructs supported by Presentation Manager should be transferrable to every other piece of IBM equipment and software, at least as soon as SAA is fully implemented.

Despite their differences, Presentation Manager and Windows do share a common structure and philosophy. In fact, Microsoft has claimed on several occasions that applications written for Windows will run under Presentation Manager.

If, as the evidence suggests, Presentation Manager and Microsoft Windows are to be closely related, much can be deduced about the internals of Presentation Manager by examining the well-known, publicly available features of Windows.

Furthermore, Microsoft has now christened its latest version of Windows with the subtitle "Presentation Manager," a clear hint that it intends to position Windows and Presentation Manager as kissing cousins in a close-knit family of presentation graphics products. If, as the evidence suggests, Presentation Manager and Windows are to be closely related, much can be deduced about the internals of Presentation Manager by examining the well-known, publicly available features of Windows.

Unfortunately, Windows has gained the reputation in certain quarters of being merely a windowing utility for existing PC- and MS-DOS applications, and a memory-hogging, persnickety one at that. Indeed, when compared as a simple MS-DOS application swapper with other utilities, such as Quarterdeck Office Systems Co.'s Desqview and Softlogic Solutions, Inc.'s Software Carousel, Windows neither shines nor breaks new ground.

Looked at on its own terms, however, Windows appears in a whole new light. Although Windows will grudgingly tolerate generic MS- and PC-DOS applications (which, in Windows jargon, are somewhat disparagingly referred to as "old apps"), Windows' real strength lies in providing a rich environment of services for programs written expressly to run under its control ("Windows apps").

Applications written to Windows' exacting specifications not only share the same screen real estate but also have the same "look and feel." And Windows offers services beyond mere graphics — Windows applications also have the ability to share code, data and processing power under a complex but powerful multitasking system. All this functionality clearly presages the features of Presentation Manager and OS/2.

The choice to implement applications under Windows is not easily made, however. Windows is not a set of canned subroutines for manipulating screen graphics that "old apps" can be retrofitted to use. No — true "Windows apps" must be programmed to conform precisely to a demanding set of rules that define not only the use of screen graphics but also such internal details as program flow and memory management.

Brave new world

Windows creates and enforces a whole brave new world of programming, a software development paradigm that, once accepted, completely dominates the way an application is designed and programmed.

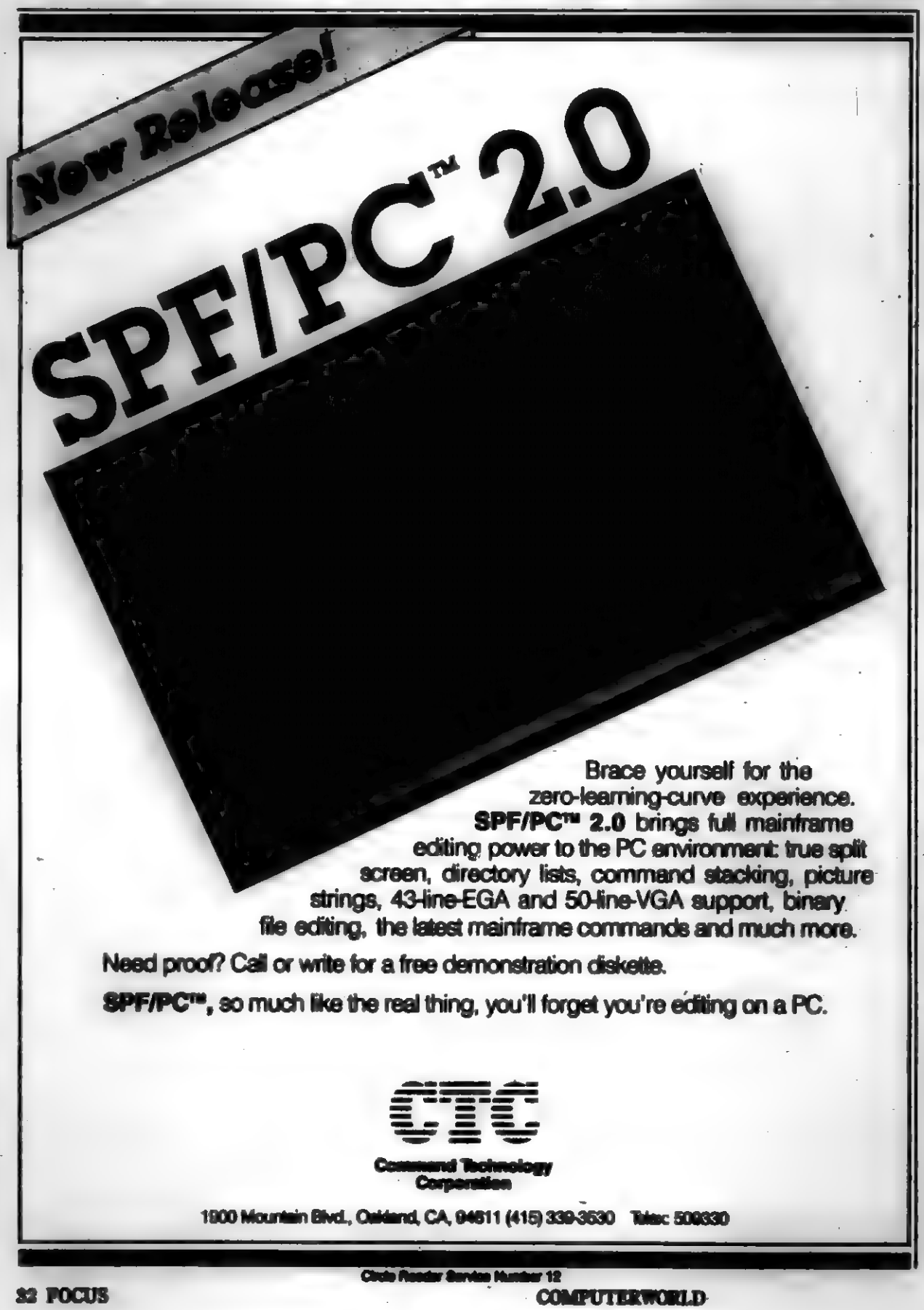
Perhaps it is for this reason that Windows has been rather slow to catch on among developers. While users get little benefit from Windows' perfunctory treatment of "old apps," developers are put off by the substantial investment of time and energy required to understand the Windows environment well enough to create true "Windows apps" that can utilize its many advanced features. Because Windows is not a mainstream product under MS- and PC-DOS and has never had IBM's blessing, it has been far easier for developers to ignore Windows than to tackle its complexities, whatever the possible benefits.

With the coming of Presentation Manager, however, the incentive to cross the software Rubicon that Windows has created will become very powerful. Presentation Manager will enforce a set of software development constraints very similar to Windows.

Therefore, while many "old apps" most likely can be retrofitted to run under generic OS/2, they will almost certainly have to be completely redesigned and reprogrammed to run under Presentation Manager. But unlike Windows, IBM-endorsed Presentation Manager will prove very difficult to ignore.

Moreover, the need to confront the complexities of Presentation Manager will not be limited to commercial developers. IBM-based MIS shops that wish to (or must) participate in the SAA revolution will eventually be forced to come to terms with Presentation Manager, which will rapidly become the standard for user interfaces on all IBM applications.

Both developers and MIS shops have a



Circle Reader Service Number 12

much shorter time to digest Presentation Manager and its implications than might be imagined. Although Presentation Manager won't be released until year's end, users are rapidly coming to expect the sort of friendly interface that Presentation Manager is supposed to provide and that is already a standard feature on Apple machines, IBM's chief rivals in the business workstation market.

Just keeping up with the ever-increasing demands of users for easy-to-use software should force many developers to take a look at Presentation Manager as early as possible.

From the MIS perspective, in which projects often have three- to five-year lead times, the implications that Presentation Manager is likely to have on system design during the next few years are substantial. Ignoring these implications now could prove quite costly in the not-so-distant future when applications may have to be reengineered to be fully compliant with SAA.

The upshot of all this speculation is that developers and MIS shops are now faced with planning for a major development in software technology that few have seen and that won't even be released until at least the end of the year.

Furthermore, the problem of digesting Presentation Manager won't end when it is released — most software designers will face a steep learning and retooling curve before they can figure out how to use IBM's new graphical interface and how it will fit into product implementation plans.

The problem of retooling for Presentation Manager won't be made any easier by the fact that few development tools are likely to be available for the product very soon. As with Windows, the language of choice for Presentation Manager for some time to come will likely be C, which is not yet familiar to many application programmers in the MIS community.

However, even seasoned C programmers will likely face a sizable challenge mastering the relatively complex concepts and techniques required to interface properly with the Presentation Manager environment.

Beyond the sheer mechanics required to work with Presentation Manager, there is another, perhaps more fundamental problem for software designers — figuring out how their applications will look and feel in a high-powered presentation graphics environment like Presentation Manager.

Unlike the rather rigid single-tasking, text-based environments of yore, Presentation Manager will offer an almost limitless palette of design possibilities that will take developers a long time to sort out into a useful framework for their own applications' user interface.

Clues for developers

One way for software developers to get an idea now of what they will be facing when Presentation Manager hits the scene is to take a good look at Microsoft Windows. While IBM won't discuss Windows (it is not, after all, an IBM product), the fact is that Windows is more than similar enough to Presentation Manager to warrant close attention.

By looking at existing commercial Windows applications, such as Microsoft's Excel, examining the Microsoft Windows Software Development Kit and studying some of a growing number of books and articles on Windows programming, developers can gain a head start on Presentation Manager development well before the product's actual release date.

One thing that becomes painfully obvious from looking at Windows is that developing for it is quite unlike programming in almost any other previous environment. This discrepancy is because Windows is essentially an object-oriented environment, and interfacing to it requires at least a basic understanding of this hitherto little-known approach to applications development.

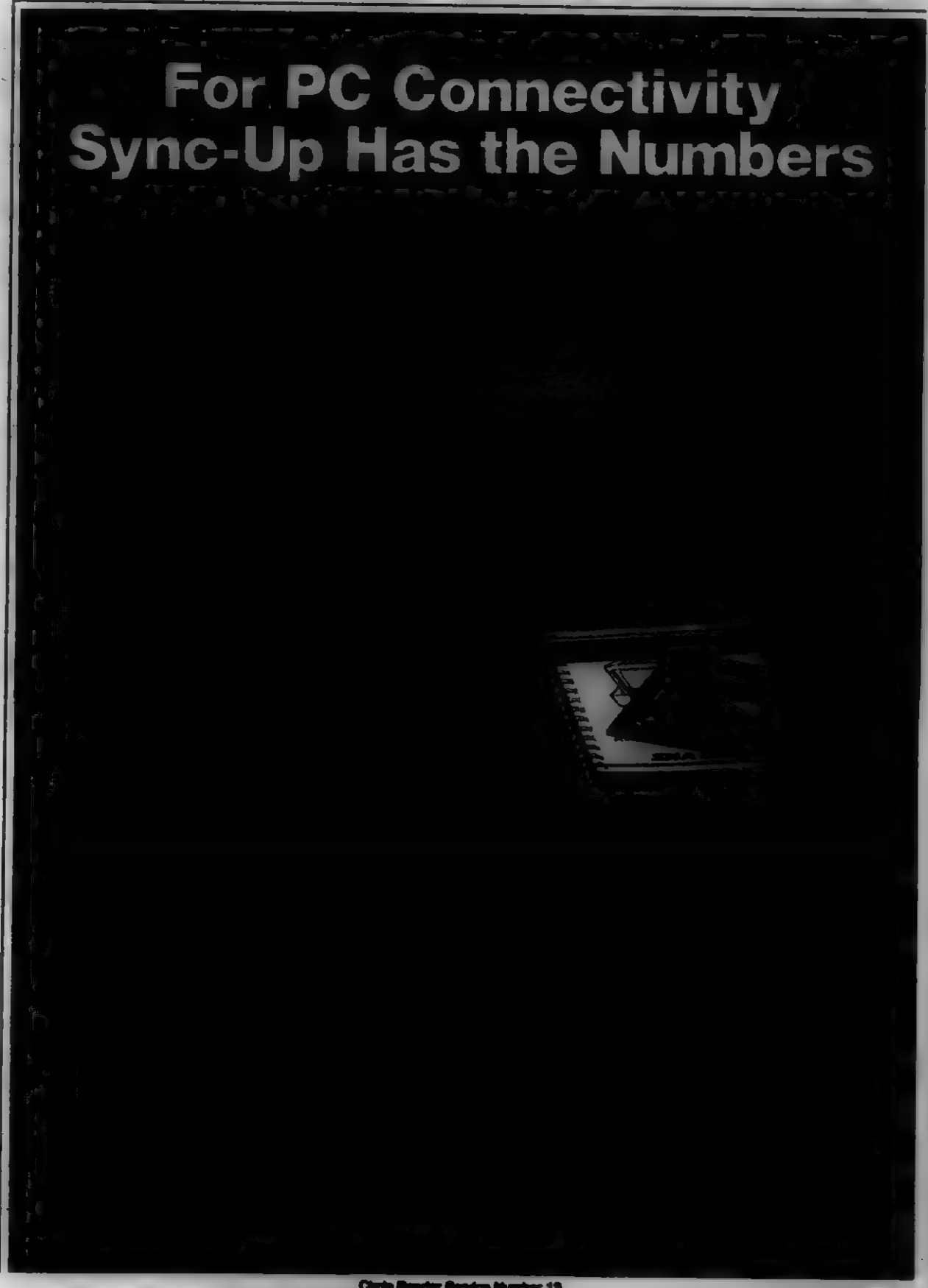
Because Presentation Manager will definitely share the object-oriented structure of Windows, potential users can anticipate some of their retooling requirements for Presentation Manager by conducting a little research into the subject of object-oriented programming.

Object-oriented gap

Unfortunately, neither IBM nor Microsoft currently offers any sort of object-oriented language for personal computers. However, Microsoft has announced that it intends to make efforts in that direction soon, some of which will undoubtedly be aimed specifically at supporting Presentation Manager and Windows. In the meantime, there are a few third-party object-oriented programming language packages available for PCs.

The importance of getting a jump on Presentation Manager cannot be overemphasized. It has taken developers nearly five years to become comfortable with Apple's Macintosh, which sports an interface, internal structure and a learning curve similar to that of Presentation Manager. Even more revealing is that there are relatively few applications currently available for Windows, now well into its third year.

But while the perils of Windows or the Macintosh could be left to the pioneers, Presentation Manager, with its integral place in SAA assured by IBM, will surely receive a lion's share of attention. Those savvy enough to get in on the leading edge of this new software technology should reap outstanding benefits as the Presentation Manager marketplace matures. ◆



Circle Reader Service Number 19

products

TECH TALK

TI, Apple expedition into AI yields LISP chip/Mac hybrid

By Michael Tucker

Recently, the industry's attention has been fixed on whom Apple Computer is feuding with — that is, Microsoft and Hewlett-Packard. Apple is suing both over the "look and feel" of their user interfaces. But less attention has been paid to the vendor with which Apple has become positively chummy — Texas Instruments.

In March, Apple and TI announced a joint product — the first such product in Apple's history — the Microexplorer, which is a standard Apple Macintosh II with a coprocessor board sporting TI's single-chip LISP processor.

To explain how the two companies found themselves married and with a child to boot (and, for that matter, why the union should concern MIS), we have to go back a bit.

In the late 1970s, symbolic processing was done more or less experimentally at MIT, among other places. The technical support staff at the university decided to license the technology from MIT and spin off as a company. Initially, it was thought that only one such firm would be born.

Natural language interface that sits in DOS shell unveiled for PCs. Page 36.

But gradually, the staff-turned-entrepreneurs split up, partly over business issues and partly over personal ones. When the dust settled, there were two companies, both based in Cambridge, Mass. — Lisp Machine, Inc. and Symbolics, Inc. Both were selling into research installations and, as such, were exciting to researchers but not particularly to MIS.

TI entered the game in the early 1980s. The Austin, Texas-based semiconductor giant had a long history with exotic processing, including dedicated LISP engines. In fact, TI was then becoming involved with several government programs that aimed to apply AI to real-world situations, particularly in the military. For instance, the U.S. Department of Defense's Defense Advanced Research Projects Agency (DARPA) was promoting the Strategic Computing Program (SCP).

The SCP was supposed to help U.S. military planners address the distressing fact that in any large war in the future, the U.S. would probably face a numerically superior enemy. To put it bluntly, the Soviet Union was turning out twice as many tanks, planes, ships and soldiers as the U.S. was.

Part of the answer, DARPA reasoned, was to make U.S. tanks, planes, ships and so on more effective than or equal to two or three of the enemy's wares. The SCP was to assist in that effort by producing such things as a pilot's associate, that is, a powerful expert system that could assist aircraft pilots in combat situations.

Future technologies

But the SCP required AI technologies that didn't exist at the time — like symbolic processors that were faster and more powerful than those available but that were, at the same time, much smaller than any yet made. It needed, in fact, entire symbolic processing machines on a single chip.

TI had the semiconductor technology and the military contacts to produce such a chip, but it lacked a commercial presence in symbolic processing.

So TI invested heavily in Lisp Machine and became the firm's first major customer. TI then ventured into the symbolic processing market with the Explorer symbolic processing workstation, a direct rival to the workstations then being sold by Symbolics. Former Lisp Machine employees have said that the first Explorers were, in effect, little more than Lisp Machine systems with TI labels.

But during the next few years, TI began to withdraw from Lisp Machine. Increasingly, the components in the Explorer workstation would tip to the TI side, while TI's single-chip LISP processor program began to show signs of real progress. Finally, TI was able to show the chip in 1986. The new generation of Explorers was, in fact, based on the chip.

Continued on page 37

Tucker is *Computerworld Focus*'s features editor.

PRODUCT CLOSE-UP: PC SOFTWARE SERVICE

Aftermarket reformation

A start-up software publisher and distributor, Strategic Solutions, Inc. in Waltham, Mass., has a service that could challenge the way in which the personal computer software business is done.

Essentially, it provides ultra-vertical aftermarket applications that run on top of industry-standard PC software — spreadsheets, data bases, word processors and so forth. Furthermore, the service reportedly provides close support and consulting to its customers, something that previously has been rare in the aftermarket arena.

Strategic Solutions maintains a catalog of more than 140 applications in 20 vertical areas that enhance 12 base applications: specifically, Ashton-Tate Corp.'s Dbase, Microrim, Inc.'s R:Base and Anan Software's Paradox data bases; Lotus Development Corp.'s 1-2-3 and Symphony and Microsoft Corp.'s Excel spreadsheets; Ashton-Tate's Multimate, Microsoft's Microsoft Word, Wordperfect Corp.'s Wordperfect and Micropro International Corp.'s Wordstar word processors; and Aldus Corp.'s Pagemaker and Xerox Corp.'s Ventura Publisher desktop publishing applications.

If Strategic Solutions succeeds in its venture, it will have cracked a market that few have dented before. Recently, the economics of PC software have resembled those of commercial consumer goods. Vendors, publishers and developers had to back very large volume products to survive. Any one package had to appeal to the broadest possible audience to justify the cost of

Continued on page 35

BLUE BEAT

PS/2 family ties

Brian Jeffery

Exactly what is the IBM Personal System/2? Most people tend to think of the PS/2 as a personal computer. In hardware terms, it looks like a PC. But IBM's OS/2 Extended Edition is not a PC operating system, and its Micro Channel is not exactly the average PC bus.

The fact is that the PS/2 is IBM first and Personal System second. The architecture isn't even new; most of its components have been around and voluminously described in IBM documentation for years. The trouble is IBM hasn't stated, "Well, this is where the PC fits," or, "Now, imagine we did that on a workstation with an Intel chip instead of a processor block." Much of the industry hasn't even been listening to IBM. There are reams of documents available from IBM, cheerfully given, that explain clearly what it is doing.

For example, information on IBM's intentions are available on the following offerings:

- The Micro Channel. Derived from an alternative IBM 370 I/O structure first developed by the company in the 1960s for a federal government project, the Micro Channel is the PS/2 component of a global resource management architecture also being implemented on IBM 3090s under VM/XA and VM/ESP and on 9370s under VM/SP Release 5 and later.
- The Token-Ring network. This is not a PC local-area network in the generally recognized sense. It is a more sophisticated bandwidth management system that is being implemented to

Continued on page 39

PRODUCTS

DVI disk makes a splash

Said to handle data from text to numbers to live-action video

Digital video interactive (DVI), a new method of compact disk/read-only memory (CD-ROM), has been developed by General Electric Co. A DVI disk can combine large data bases of text, data, numbers, still photos and live-action video.

MIS might have particular uses for DVI in cases in which radically different types of data must be stored on small machines. GE has suggested, for instance, that it might be used in personnel departments in which individual files might contain everything from resumes to payroll records to filmed interviews.

GE is attempting to market DVI as a standard in CD-ROM and plans to sell DVI boards to systems integrators. It has also set up a new division, GE DVI Technology Venture, based in Princeton, N.J., specifically to promote the technology.

Several firms have announced an intent to support the technology. Microsoft Corp., for instance, announced support for DVI in March. Microsoft has been trying to promote CD-ROM in some form for more than two years. It has, however, been frustrated by the fact that CD-ROM has been slow to take off in the personal computer world; DVI may finally bring CD-ROM into the limelight.

Also announcing support for DVI in March were Lotus Development Corp. and Intel Corp.

In the process of promoting DVI, however, GE has tripped off what may be a war. DVI is the rival of another technology, compact disk/interactive (CD/I), which is being promoted by a consortium of European and Japanese firms. CD/I can do everything DVI can, except support live-action video. Also, CD/I requires the purchase of a dedicated CD/I player. CD/I's backers seem to envision it as a consumer product sold, like videocassette recorders, to the home market.

So far, CD/I has not been blessed with overwhelming success. Consumers cite the technology's inability to support live-action as a drawback. MIS, meanwhile, has no need for dedicated CD/I players that cannot interface with existing applications. Thus, DVI is more likely to appeal to corporate America as a means of giving mainframe-like data storage capacity to personal computers. Whether DVI can succeed in other markets remains to be seen. — MICHAEL TUCKER

Circle Reader Service Number 118

Aftermarket

Continued from page 34

its distribution.

About the only channel of distribution available to low-volume software has been catalog sales. But it has been difficult for MIS to exploit mail-order purchasing because service and support in that channel have traditionally been minimal.

The irony is that although a channel did not exist to move such software, a market demand did. MIS departments that have to support large numbers of corporate PCs are eager for vertical solutions that can improve end-user productivity but that MIS does not have to write. It makes no sense to take accomplished programmers off major DP assignments to provide income tax templates for 1-2-3 or Clip Art for Ventura Publisher.

Strategic Solutions has developed what it believes to be the best method of reaching that low-volume add-on market. The vendor has combined desktop publishing, low-volume disk duplication and telephone sales and support to produce a low-overhead low-volume approach to software marketing.

How it works

Basically, the arrangement works like this: Software authors or small vendors contact Strategic Solutions and offer their products. If the firm likes what it sees, it signs a nonexclusive publishing or distribution pact with the author. A product write-up is included in the Strategic Solutions' catalog, and the product is stored electronically at the vendor's office.

Customers can use the catalog as a basic reference to decide what sort of software they might want. They phone Strategic Solutions, where consultants are available to help in the decision process.

Once a purchase is made, Strategic Solutions then duplicates as many disks and prints as many copies of the documentation as needed. Company principals call the process "inventory on demand." Effectively, the arrangement is publishing on a level at which runs of only one copy can still be profitable.

Strategic Solutions can thus be useful to MIS by allowing it to off-load part of the microcomputer management function without creating a micro management department. By like token, the company could become significant by proving not only the viability of the aftermarket software industry but also the paradoxical profitability of low-volume products in a mass market. — MICHAEL TUCKER

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Better late: 386 micro bows

If you thought it might be a little late to come out with an Intel Corp. 80386-based microcomputer, think again.

"Our research identified a market need for a high-quality microcomputer," explained Isaac Levanon, director of marketing for the Westwood, Mass.-based retail sales division of Arche Technologies, Inc. "We're going after Compaq Computer Corp. and AST Research, Inc., those that have the high-end [386] machines."

Arche Technologies' Rival 386 comes standard with 2M bytes of memory expandable to 16M bytes; optional 40M-, 65M-, 80M- and 140M-byte fixed disk drives; a 1.2M-byte, 5¼-in. floppy disk drive; and Microsoft Corp. MS-DOS 3.3. It has a base price of $4,395. Levanon said the Rival 386's 20-MHz speed will give users power for multiuser, multitasking networking and computer-aided design and engineering applications.

To further penetrate the high-end micro market, Levanon said the Fremont, Calif.-based company has also introduced the Pro-File 386 Server, a 386-based micro sporting a slim-line housing with a small footprint for use as a file server on local-area networks. The Pro-File 386 Server sells for a base price of $4,995.

Levanon's quest for personal computer power users apparently involves some deep pockets. Arche Technologies is being financed by Human Enterprises, the Taiwan-based parent company of, among other ventures, Pro-Kennex, a manufacturer of tennis rackets.

In the near future, Levanon said, Arche will introduce IBM Personal System/2 clones running IBM's OS/2.

"I think this entire [PC] market has been concentrating too much recently on cheaper technology," Levanon added. "They're missing a big market that's looking for quality." — STAN KOLODNEY

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DOS interface out for PCs

In the war for desktop dominance, the user interface has become the most hotly contested battlefield. Major personal computer vendors are fighting tooth and nail for the high ground of user friendliness. IBM's chief weapon is Microsoft Corp.'s Windows, while Apple Computer, Inc.'s is the Macintosh interface. Even the Unix vendors are getting into the fray, with AT&T and its allies deploying the Open Look interface.

What is common to all of these interfaces is that they are graphically oriented.

However, there is a start-up offering a different approach to providing a user-friendly interface for PCs. SAK Technologies, Inc., in Arlington, Va., announced Doestalk, a natural language interface for Microsoft MS-DOS. Although there are other natural language products in the field, most are either for individual applications (in much the same way that, for instance, Lotus Development Corp.'s HAL was meant for Lotus spreadsheet products) or for much larger machines.

Doestalk, however, comes in an honest-to-goodness MS-DOS shell. It sits directly atop the operating system and provides a fairly articulate interface between the user and the machine, according to SAK. The users that *Focus* contacted said working with the product was a bit like working with a human programmer. You speak to it in English, it attempts to understand what you really want and then it provides the necessary MS-DOS code.

Love-hate relationship

This design is both good and bad. Doestalk, like its graphically oriented cousins Windows and the Mac interface, is right at the center of a dispute. Power users, the people for whom MS-DOS is second nature, say they flatly despise the product. For them, it simply gets in the way of their relationship with the machine.

Yet certain novice users who dislike and distrust MS-DOS in its native mode say they adore Doestalk — just as they prefer the Mac interface. To them, it is a quick, convenient way of dealing with what seems an alien intelligence.

Which side is right? Probably both. There will always be a select corps of people whose interest in the bits and the bytes will lead them deep into the iron of the computer. For them, "user-friendliness" is almost a contradiction in terms.

And the vast majority of computer users will never love programming, just as the vast majority of drivers will never love repairing their own automobiles. For them, Doestalk, and products like it, are clearly what is wanted and needed.

Doestalk presents an interesting irony. Originally, the point of PCs was to give nontechnical end users a way of doing their computing without MIS assistance and, in the process, get end users off MIS's back. Now, to make that happen, the industry finds it must create a tiny MIS department in each desktop system in the form of products like Doestalk.

Doestalk costs $89.95 and requires 256K bytes of random-access memory, with 360K bytes of RAM recommended by the vendor. — MICHAEL TUCKER

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Tech Talk

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The kicker, however, was that while TI had been busy with this remarkable feat of engineering, the AI market was in trouble. Lisp Machine went bankrupt and was ultimately purchased by one of its own distributors, Gigamos Systems, Inc. in Lowell, Mass. Symbolics was in almost as serious trouble, though it managed to avoid bankruptcy and to find rewarding niche markets to get into, such as graphics processing.

But at the time, it looked very much like symbolic processing machines were history. That observation seemed particularly true given the fact that although the high end of the AI world was in trouble, the low end, the personal computer-based AI products, was doing quite nicely. People were asking why a symbolic processor was needed when an Intel 80386-based system running AI programs would do almost as well.

Where did this leave TI? Alone with its brand new single-chip LISP engine?

Actually, TI was sitting pretty. It already had PC-based AI products, so it was happy to see the boom at the low end. As for the LISP chip, TI could still count on sales of the product to people who were interested in working at the high end, even though that market might be smaller than it once was.

But could there be a middle path? Something that would combine the power of dedicated symbolic processors with the appeal of the low-end market?

TI and Apple seem to believe there is. The test of their thesis is the Microexplorer. For $15,000, the Microexplorer provides what is effectively one-half the power of a full-size Explorer workstation plus an Apple Mac II.

In some ways, it is a natural alliance. On the one hand, TI gets a tailor-made entry to the low end for its LISP chips. On the other, Apple has a means of being "AI for the rest of us." Envision, for instance, a Microexplorer on the desktop of a currency trader, with traditional number crunching on the Mac side of the operation and expert systems on the other. The whole of it would be interfaced via the Macintosh's familiar icons and graphics.

Even the engineers are happy. The Mac can be difficult to design for, but it is a relatively friendly platform for AI. With its Nubus, which came out of an academic setting as did symbolic processing, and its icon-driven interface, which came from Xerox's Palo Alto Research Center, the Mac II looks a bit AI-ish around the corners.

But does that feature mean there's a market for the thing?

'The last gasp'

Vendors working with AI applications on 386-based machines don't think so. Carl Wolf, president of Gold Hill Computers, Inc. in Cambridge, flatly calls the Microexplorer "the last gasp of the LISP engines. It's their desperate attempt to make themselves competitive [with PC-based systems]."

That may be the case. Yet symbolic processors have their advocates, even in MIS.

For instance, Eloquent Systems Corp. in Manchester, N.H., markets a group of products for the hotel industry based on the Explorer and a network of Macintoshes. Essentially, these products use the Explorer as an AI server with Macintoshes running at key locations throughout the hotel. Hotel personnel can then use the Explorer to provide decision support in dealing with problems that require unique expertise.

Why go with a support system that requires such exotic machinery? Jules Siburg, vice-president of MIS at Boston-based Sonesta International Hotels Corp., is one of Eloquent's customers, and he says that conventional hardware is not yet up to providing the kind of strategic services that can be had from a symbolic processor. "A lot of people underestimate what it takes," he explains. "I've seen techies turn their noses up at the whole idea [of hotel computer systems]. But a hotel is a complex affair. It's a 24-hour-a-day operation that requires a lot of expertise on the part of its employees — reservationists particularly."

Eloquent is already looking into providing a Microexplorer version of its products. It is also thinking about producing other versions of them for service-intensive industries.

It is these kinds of real-world applications that give symbolic processor partisans hope that their systems may yet have a role to play at the lower end. In fact, the Microexplorer will soon have competition. Symbolics has a single-chip LISP engine, the Ivory, and says it plans to introduce a Mac coprocessor as well.

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PRODUCT CHECKLIST

In April, Sun Microsystems, Inc. introduced its Sun386I workstation. Not only is it one of an emerging class of devices that manages to link the world of Microsoft Corp. MS-DOS to that of Unix, but it is also proof of the relative unimportance of hardware. Sun has pulled off the trick of having a fully compatible product line that spans three microprocessors.

At the top it has its Scalable Processor Architecture machines, in the middle are its older Motorola, Inc.-based products, and now, at the bottom, it has a system based on the Intel Corp. 80386 chip.

An entry-level Sun386I/150 comes with a 15-in. monitor, 4M bytes of memory, a keyboard, an optical mouse and the SunOS operating system. It costs $7,990.

Sun Microsystems, 2550 Garcia Ave., Mountain View, Calif. 94043.

Circle Reader Service Number 122

When IBM rolled out its DB2 product, many of the software vendors that formerly sold data base wares to mainframe accounts found themselves in trouble. Some have tried to compete with DB2, some have tried to take their products to the Digital Equipment Corp. market, and some seem paralyzed.

However, SAS Institute, Inc. has taken a new route — via personal computers. In March, SAS announced that its product line — collectively known as the SAS System — was available on PCs through Release 6.03. According to the vendor, the SAS System is a collection of data display and analysis tools that includes a fourth-generation language-like development language, screen control and graphics software, numerical applications and a data base management facility.

The base product costs $495 for the first year per machine, with an annual renewal fee of $250.

SAS Institute, P.O. Box 8000, SAS Circle, Cary, N.C. 27512.

Circle Reader Service Number 123

Worried about virus software infecting your disks? Foundationware may be able to provide you with some peace of mind. Its Vaccine product is said to reduce the risk of your system coming down with something nasty.

A collection of modules performing different security-related functions, Vaccine reportedly can reduce the probability of infection and data illness by a virus to less than one in 100 billion.

Vaccine is available for Microsoft Corp. MS-DOS systems. It costs $92.

Foundationware, 2135 Renrock Road, Cleveland, Ohio 44118.

Circle Reader Service Number 124

Personal computers are being used increasingly to do sophisticated graphics tasks. Nth Graphics Display Products has unveiled a graphics add-in board that, the company said, can give a PC the graphics manipulation power of a much larger machine. Called the 3D Engine, the board can give a standard PC two-dimensional and three-dimensional graphics in color with wire-frame and shading functions at speeds previously available only on dedicated computer-aided design and manufacturing workstations.

The 3D Engine costs $5,995.

Nth Graphics, 1807-C West Braker Lane, Austin, Texas 78758.

Circle Reader Service Number 125

CALENDAR

June 12-18

The 25th Annual Design Automation Conference. Anaheim, Calif., June 12-15 — Contact: Pat Pistilli, MP Associates, Inc., Suite 102, 7490 Clubhouse Road, Boulder, Colo. 80301.

1988 North American Packbase Users' Conference. White Plains, N.Y., June 12-16 — Contact: Linda Rose, CGI Systems, Inc., One Blue Hill Plaza, Pearl River, N.Y. 10965.

Cinteract '88. Cincinnati, June 12-16 — Contact: Bill Brewer, Cincom Systems, Inc., 2300 Montana Ave., Cincinnati, Ohio 45211.

Relational Data Bases: Practical Applications with Emphasis on DB2, SQL, Oracle and Ingres. Minneapolis, June 13-15 — Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

Voice '88 Conference & Exposition. Dallas, June 14-16 — Contact: Information Publishing Corp., P.O. Box 42371, Houston, Texas 77042.

June 19-25

Expert Systems and Artificial Intelligence Symposium. Chicago, June 20-22 — Contact: Digital Consulting, Inc., 6 Windsor St., Andover, Mass. 01810.

The 6th Annual PC Expo. New York, June 21-23 — Contact: PC Expo, 333 Sylvan Ave., Englewood Cliffs, N.J. 07632.

Systems Application Architecture. Boston, June 23-24 — Contact: Digital Consulting, Inc., 6 Windsor St., Andover, Mass. 01810. Also being held July 25-26 in Chicago and Sept. 15-16 in New York.

June 26-July 2

Syntopican XVI. New York, June 27-30 — Contact: Association of Information Systems Professionals, Suite 201, 104 Wilmot Road, Deerfield, Ill. 60015.

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Blue Beat

Continued from page 34

handle local PS/2 cluster communications and 370 channel-to-channel communications. It is also a core component of IBM architectural strategy for network management and telecom. The Token-Ring network will handle not only PS/2-to-PS/2 links but also channel communications among IBM 9370s and IBM's Silverlake offerings and, on backbone fiber-optic media, IBM 3090-to-3090 channel communications. The network will be merged in due course with IBM T1 and T3 bandwidth management systems.

• **The PS/2.** This is not a personal computer; it is not even a single product line. For example, the PS/2 Models 25 and 30, which do not support OS/2 and the Micro Channel, were designed by IBM Japan. Their motherboards were made by Matsushita Electric in Japan.

Coincidentally, this is the same setup that IBM has for its ASCII terminals. It is interesting to note that the PS/2 Model 30 is virtually the same hardware as the IBM 3161, 3162 and 3164 ASCII CRTs and that the PS/2 Model 25 is really no more than an IBM 3151 ASCII CRT with a PC system unit attached. The structure is set up to merge the ASCII models of the PS/2 with IBM's ASCII CRT line.

In addition, you may have heard rumors about IBM merging the PS/2 with its 3270 CRT line (also known as the 3190 line). Who needs rumors? Break open an IBM 3192 or 3194 terminal and look at the hardware content, level of microcode support and I/O features. Then do the same for a PS/2 Model 50. These are already, in hardware terms, more or less the same products. With a little retooling, IBM could turn them out on the same production line with better than 95% common hardware.

Examine the 3190 line, and you'll also notice that at least 75% of what OS/2 Extended Edition will provide end users with will also be delivered to 3190 terminal users on-line.

• **OS/2 Extended Edition.** Why is everyone having so much trouble understanding this operating system? It is simply a downsized version of VM/IS with a few extra bundled add-ons. It uses an Intel CPU, some proprietary hardware and OS/2 to handle the same kind of real/virtual resource management that VM provides for 370 systems. The IBM approach is the same as that used for the company's Silverlake line and is reminiscent of the way IBM used a PC system unit to manage the I/O on the System/36 PC.

For those interested in knowing more, I recommend breaking open IBM's 5363, the System/36 model that IBM introduced last October. This is a unique box that already contains a PS/2 system unit and some other fun features that IBM won't be announcing for its other PS/2s until June.

• **Coprocessing.** Basically, IBM is implementing a network architecture that treats multiple computers as part of the same operating environment. The resource management functions resident within the network distribute data as required into anything from a PS/2 Winchester disk to a 3090 "DASD farm." The functions also arrange for processing tasks to be routed to and performed at a system designated for this purpose. This process is being done at the departmental level with PS/2s, at the mid-range level with 9370s and PS/2 Model 80s (which are small 9370s waiting for Bill Lowe's people to finish the microcode) and at the mainframe level through VM/ISF, announced in February of last year and available now.

• **Single-level storage.** See Coprocessing.

• **Common user interface.** You're looking at it. OS/2 Presentation Manager windows front for Systems Network Architecture Distributed Function Terminal Mode windows, OS/2 graphics front for the IBM Graphical Data Display Manager environment and so on down the line. OS/2 Presentation Manager is a vehicle for integrating IBM PC-DOS into a user interface that looks and acts almost exactly like the 3270 Personal Computer. For applications software, the interface is pretty well defined in the Profs Application Support Feature.

• **PC dealers.** IBM has a role for these companies; they provide highly cost-effective configuration assistance, installation support, customer education and warranty service. The better dealers will in due course even come and put in departmental systems. The majority will turn into IBM authorized agents and will, relieved of the task of meeting back-breaking quotas, start visiting companies with an IBM rep and will take a commission from IBM for the sale.

• **The mainframe role (or, Is IBM turning mainframes into file servers for PCs?).** IBM is certainly emphasizing the role of the big 3090 machines for large-scale data management jobs, and that is what ESA/370 for the 3090E is all about. But PCs? IBM is not in the PC business any longer. It does, however, sell intelligent 3270-type workstations designed for use in a multilevel 370 coprocessing network. By the time all of those PCs are talking to all those mainframes (the new mainframes that will be necessary to handle the increased data volume), which faction has won out in the process will be a moot point.

All of this enables us to answer the burning question of whether IBM is committed to a two-tier architecture or a three-tier one. The reality is that the design parameters for the entire product line are consistent. This is a one-tier architecture with large mainframes, mid-range mainframes, small mainframes and workstations. The workstations possess an important role in the scenario — they access the mainframes.

Jeffery is managing director of the International Technology Group, a management consulting and market research firm in Los Altos, Calif.

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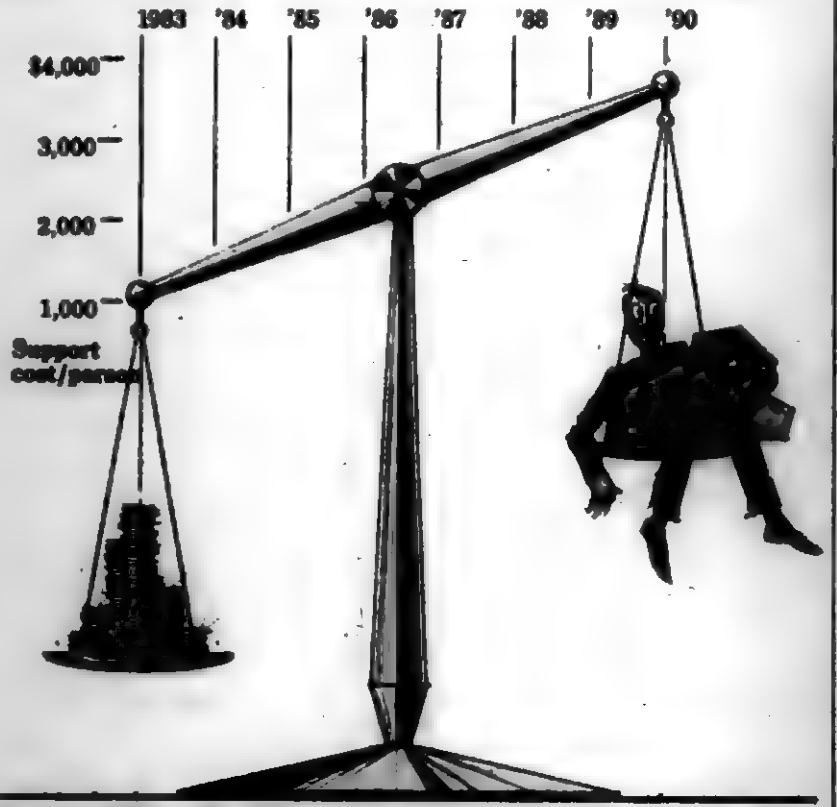

INFORMATION TAKEN FROM A 1987 REPORT FOR LOTUS DEVELOPMENT CORP. BY NOLAN, NORTON & CO. THE DATA CAME FROM A NOLAN NORTON WORKING GROUP ON "PC PAYOFF," WHICH INCLUDED MIS AND OTHER CORPORATE EXECUTIVES, AND FROM NOLAN NORTON'S OWN DATA ON CORPORATE TECHNOLOGY MANAGEMENT.

GRAPHIC BY BRUCE SANDERS

OF
INTEREST

"Finally, he threw me out. He said artificial intelligence was a strange technology that ran on strange machines and was written in a strange language by strange people from Cambridge."

CARL WOLF
GOLD HILL COMPUTERS, INC.

See story page 28

next issue

Pushing software to its limits is the theme for next month's *Computerworld Focus*. Our Special Section digs deep into the stock market and examines how software developers are using technology to cope with the mounting volume of trading. We'll also bring you an update on revitalized Unix and the effect of IBM's Silverlake on programmers and analysts. In addition, you'll discover what's happening in data centers by looking at mainframe software's role in corporate information systems and remote software development on PCs. For a fresh outlook on software's horizons, pick up July's *Focus*.

Superficial productivity

Michael D. Millikin

Bob Metcalfe, 3Com's senior vice-president of technology, calls any bit of information that has gained legitimacy through repetition a "factoid." Factoids are not inherently true or false; rather, they are assumptions or assertions that become self-evident (and without verification, in some cases). As a species, factoids thrive in the hot, moist climate of our industry. (Must be something about all that talking.)

One healthy factoid is that the adoption of a graphics user interface will automatically enhance productivity. Well, maybe.

A graphics user interface (a la Apple Macintosh or a host of others) makes applications easier to use — in some cases. (Just hope the Taylorites, time-motion efficiency experts, weren't around with their stopwatches the afternoon you blew off tinkering with the delicate shading of the graphs in your chart or twiddling with the typefaces in your report.) Studies have shown that Mac users tend to use more applications than Microsoft MS-DOS-based personal computer users. That predilection may stem more from the consistency of the interface than anything else.

I am the first to champion the adoption of a graphics user interface. By itself, however, that interface is not a guarantee of increased productivity. A pretty face is not enough.

With vendors scrambling to adopt, to develop or to protect graphical user interfaces, the real issue of what qualitatively increases productivity, efficiency and effectiveness is being lost, blotted out by the shadow of a looming factoid.

What users need is some underlying smarts in the system. They need agent-like facilities that will automate much of the procedural tedium. They need object-oriented systems that will allow them to focus on the business task rather than the applications tool. Users need facilities that will let them develop their own applications on the fly to meet an immediate, pressing demand. They need transparent connectivity to provide them with distributed network computing — transparent access to the entire data architecture from the window on the desktops.

Currently, there are two major systems vendors that are moving to provide users with that type of functionality. One is Hewlett-Packard with its New Wave. The other is IBM, particularly now that it has finalized its technology sharing pact with Metaphor Computer Systems, Inc.

Will other vendors do similar things? If they don't, if they don't position themselves to provide a competitive solution set, then they'll gradually starve. Much is in the works.

We should be focusing on the functionality and capability underlying the graphics interface in our discussions of increasing end-user productivity. It is what's behind the screen that will give us a better information processing system. The design of the trash can doesn't matter a whit.

Millikin is vice-president and senior analyst with Patricia Seybold's Office Computing Group in Boston.

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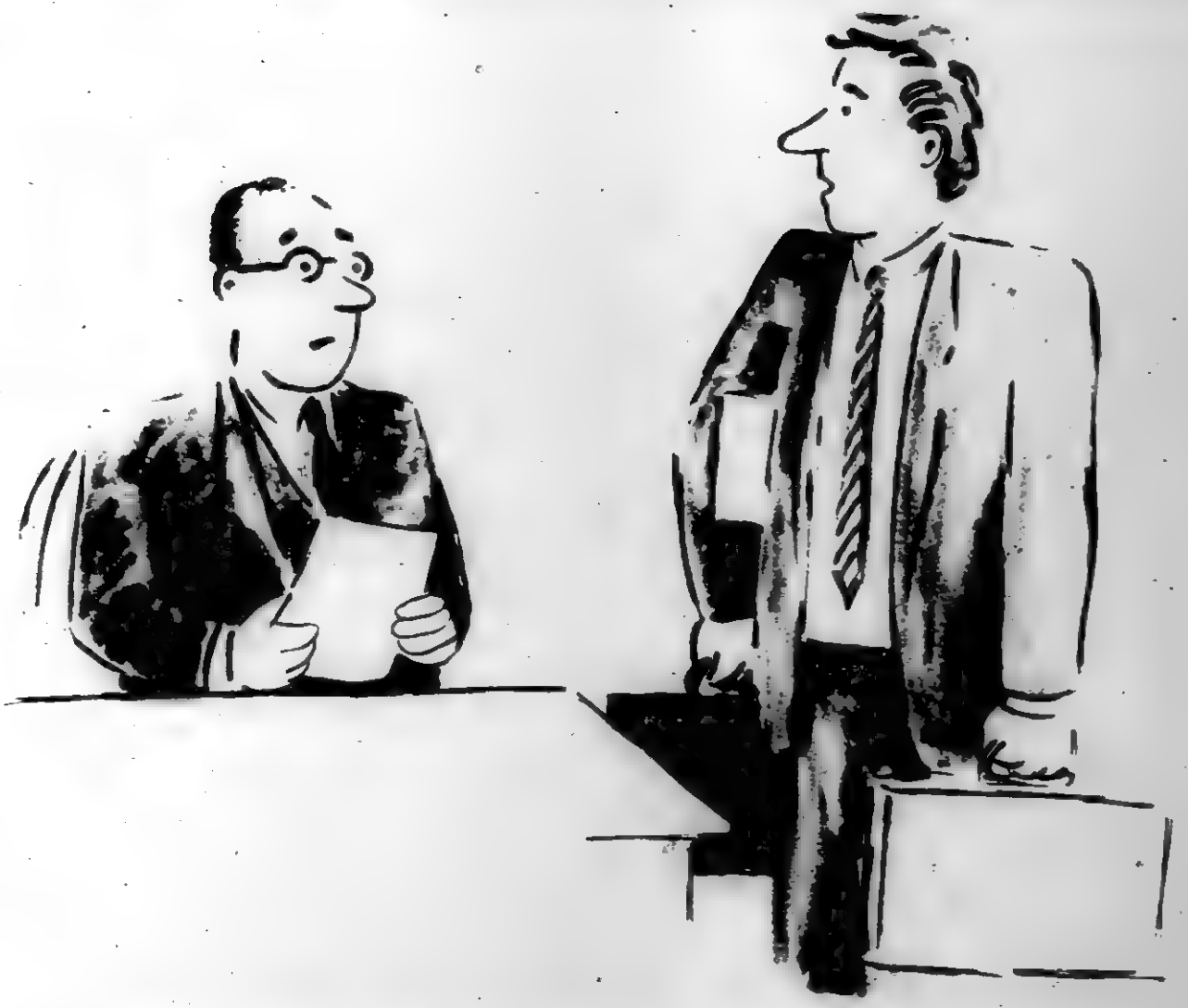

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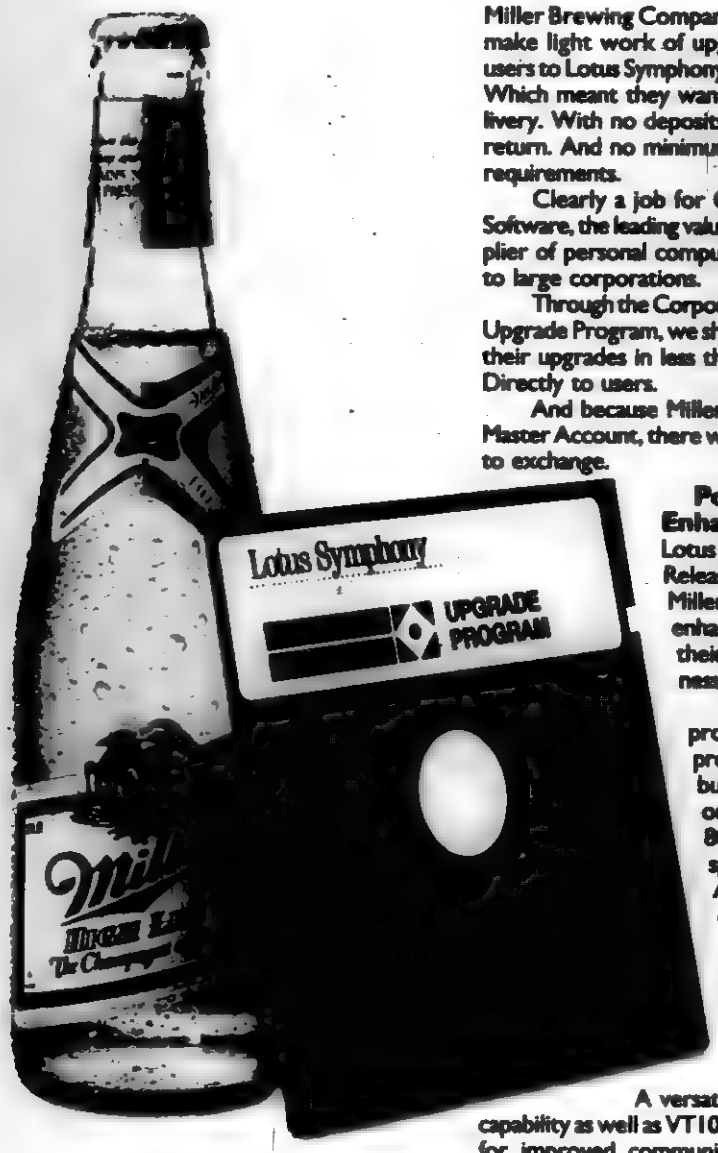

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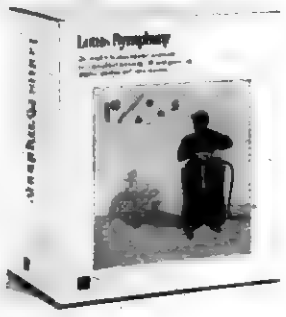

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COMPUTERWORLD

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Borland expands spreadsheet skills with acquisition of Surpass and the team that put it together. Page 16.

Speedy PS/2s: There's the beef

Flashy new machines may not entice wary users into Micro Channel fold

BY ALAN J. RYAN
CW STAFF

NEW YORK — IBM shored up its Personal System/2 line last week with models that turned corporate users' heads but may still not be enough to convince them to embrace IBM's controversial Micro Channel architecture.

In an unveiling here, IBM filled the gaps in its PS/2 family with three versions of the long-rumored Model 70 386, a desktop unit based on Intel Corp. 80386 processors boasting clock speeds of 25, 20 and 16 MHz.

Also announced were two versions of the PS/2 Model 50 Z: a zero-wait-state 10-MHz machine offering standard higher capacity disk drives than the current Model 50 and local-area network versions of the low-end Intel 8086-based Model 25.

Despite the broadened line, the Micro Channel remains "an investment in the future," said Art Skopec, a senior personal computer analyst at the Memorial Sloan-Kettering Cancer Center in New York. "But we don't know what will be out in a year or two. The future might require faster transfer rates than the current machines can accommodate." Skopec said he will delay his purchases until the picture is complete.

"Right now, there is no operating system out there that really takes advantage of what the Micro Channel will eventually offer us," he added.

Inside

• Old Model 50 disk drives go on your shelf. Page 7.
• LAN connection seen as attempt to extend life of 8086-based technology. Page 6.

Prudent approach

IBM's use of the 25-MHz processor made an impression, however. "The Model 80 is already fast; [the Model 70 25-MHz] is going to be a screamer," said Alan Loebel, a staff consultant who makes PC purchase recommendations at Harris Corp.

But Harris has not yet signed on to the Micro Channel architecture for its computing needs, although it is considering doing so, according to Loebel.

Continued on page 6

Silverlake to get SAA infusion

BY J. A. SAVAGE
and ROSEMARY HAMILTON
CW STAFF

Future IBM Silverlake users who want to build portability into their software should consider developing applications in the C programming language or Cobol 85.

According to several IBM mid-range users and analysts, IBM will offer C and Cobol 85 as well as RPG on its mid-range successor to the System/36 and 38, which is expected to be announced later this month.

Those options will give Silverlake users the opportunity to later move up to an IBM 370 mainframe and take their applications with them. IBM's customers have for years faced severe problems moving between or away from the dual mid-range platforms.

At the same time, future Silverlake users will gain the option of distributing applications between mid-range and microcom-

Continued on page 8

Perot's calling card has familiar look

BY CLINTON WILDER
CW STAFF

WASHINGTON, D.C. — H. Ross Perot, the Texas billionaire and founder of Electronic Data Systems Corp., has wasted no time in re-entering the computer services industry he helped create.

Exactly one day after the expiration of his noncompete agreement with General Motors Corp. last week, Perot announced the formation of Perot Systems Corp., a private firm that will seek federal government computer services contracts. He also announced the hiring of eight former EDS executives and a $500,000 contract from the U.S. Postal Service.

"He moves pretty quickly, doesn't he?" said Stephen McClellan, vice-president of securities research at Merrill Lynch Capital Markets. "This could potentially compete with everyone doing systems integration and professional services for the federal government. But that's years down the road, when it's big enough."

Perot is enjoined from making any profits in the data services business until December 1989 — three years after GM's board engineered his stormy departure with a controversial $750 million stock buy-out. But the noncompete clause Perot signed at that

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Grand scheme looming as grand delusion

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — It was back in December 1980, when there were still 52 American hostages in Iran, that President Jimmy Carter launched a bold experiment in information management.

The beleaguered president, in one of his last acts in office, signed a law requiring federal agencies to implement a trend-setting concept called information resources management — the precursor to today's notion of chief information officers.

But seven years later, it appears that the IRM experiment is in danger of fizzling out, according to federal managers and analysts. In fact, federal implementation of the IRM model is said to be woefully incomplete, and some disillusioned agencies have started to dismantle their IRM operations.

"These buzzwords go through a life cycle. Systems integration is at the beginning, and IRM is near the end," said Robert V. Head, a former IRM official at the U.S. Department of Agriculture.

Although all agencies have an IRM officer, as the law requires, IRM has become merely a new name for traditional data processing operations, according to three-quarters of the federal IRM managers surveyed last year by Sharon L. Caudle for the National Academy of Public Administration in

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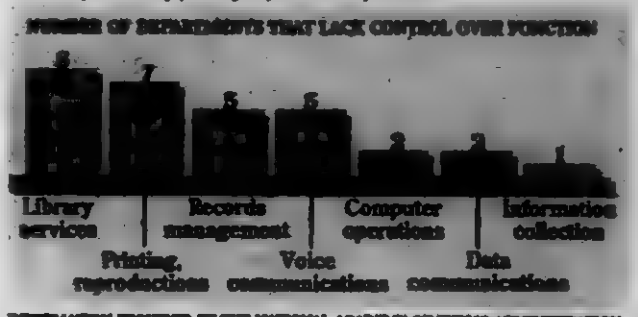
Something missing

A survey of 16 federal departments' IRM groups shows that many lack responsibility for key information functions



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65 Is DP certification worth much today?

Quotable

"All the announcements from computer vendors say they are 'fully committed to the concept of ISDN,' which is the same as saying they are fully committed to the concept of gravity."

MICHAEL FINNERAN
DBRN ASSOCIATES, INC.

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Ex-CEO arraigned

Psychiatric tests ordered for Massdata founder

BY NELL MARGOLIS
CW STAFF

Tex Zachary Hildreth, the 24-year-old computer entrepreneur who attempted suicide late last month after his apparently skyrocketing software company disintegrated into a shambles of debt, is undergoing a court-ordered 10-day psychiatric evaluation at Medfield State Hospital in Massachusetts.

Hildreth last week pleaded not guilty to charges of larceny during arraignment at Massachusetts' Quincy District Court. A hearing on the larceny charge — brought on the basis of a private individual's claim that she was bilked by Hildreth, and thus far the only criminal action pending against the founder and ex-chief executive officer of Braintree, Mass.-based Masedata Corp. — is set for June 10.

The 10-day commitment came as a compromise between the prosecution's alternate request for a 20-day psychiatric evaluation or $200,000 bail and the request of Hildreth's attorney, Gregory Sullivan, that his client be released on his own recognizance in light of his clean past as a hometown boy with no legal record.

Sullivan said he initially opposed the prosecutor's psychiatric evaluation request after a court-appointed psychologist who interviewed Hildreth immediately prior to the hearing reportedly found him rational, intelligent and showing no signs of mental illness.

End of the line

"As far as I know, Masedata is no more," said John Spence, chairman of Rockland Trust Co., which foreclosed against Masedata last month in an effort to collect $416,000 worth of outstanding secured business loans. "The offices are closed up; the assets will be sold as soon as possible. I think that this company is just going to disappear."

Reflecting on the fate of Masedata, Spence struck a note of ironic regret. During the past weeks, he said, he has talked to a number of former Masedata customers — all satisfied.

"When it came to the quality of their work," he noted, "everybody had very nice things to say. It's a shame that they couldn't just keep it together and go on doing what sounds like a fine job."

One source close to Masedata earlier reported a plan among employees to revive the company without Hildreth. The former Masedata employees in question could not be reached for comment.

"They well might get together and form another company," Spence said, "but I don't think they're going to revive Masedata."

California lottery goes bust

BY KATHY CHIN LEONG
CW STAFF

A severed MCI fiber-optic T1 cable brought down the Northern California portion of the state lottery network late last week, frustrating thousands of lottery players anxious to win the state's largest jackpot ever — $26.1 million.

According to MCI Communications Corp. officials, a construction worker accidentally sliced the underground 1¼-in. thick fiber while grading the roadside. The cable represented the line that carried traffic from the terminals in the northern half of the state to a hub MCI switch in nearby Hayward.

When the line was cut at approximately 10 a.m., the 1,538 lottery terminals in San Francisco and surrounding cities went dead. The custom terminals from Providence, R.I.-based Gtech Corp. went back on-line gradually in about four hours.

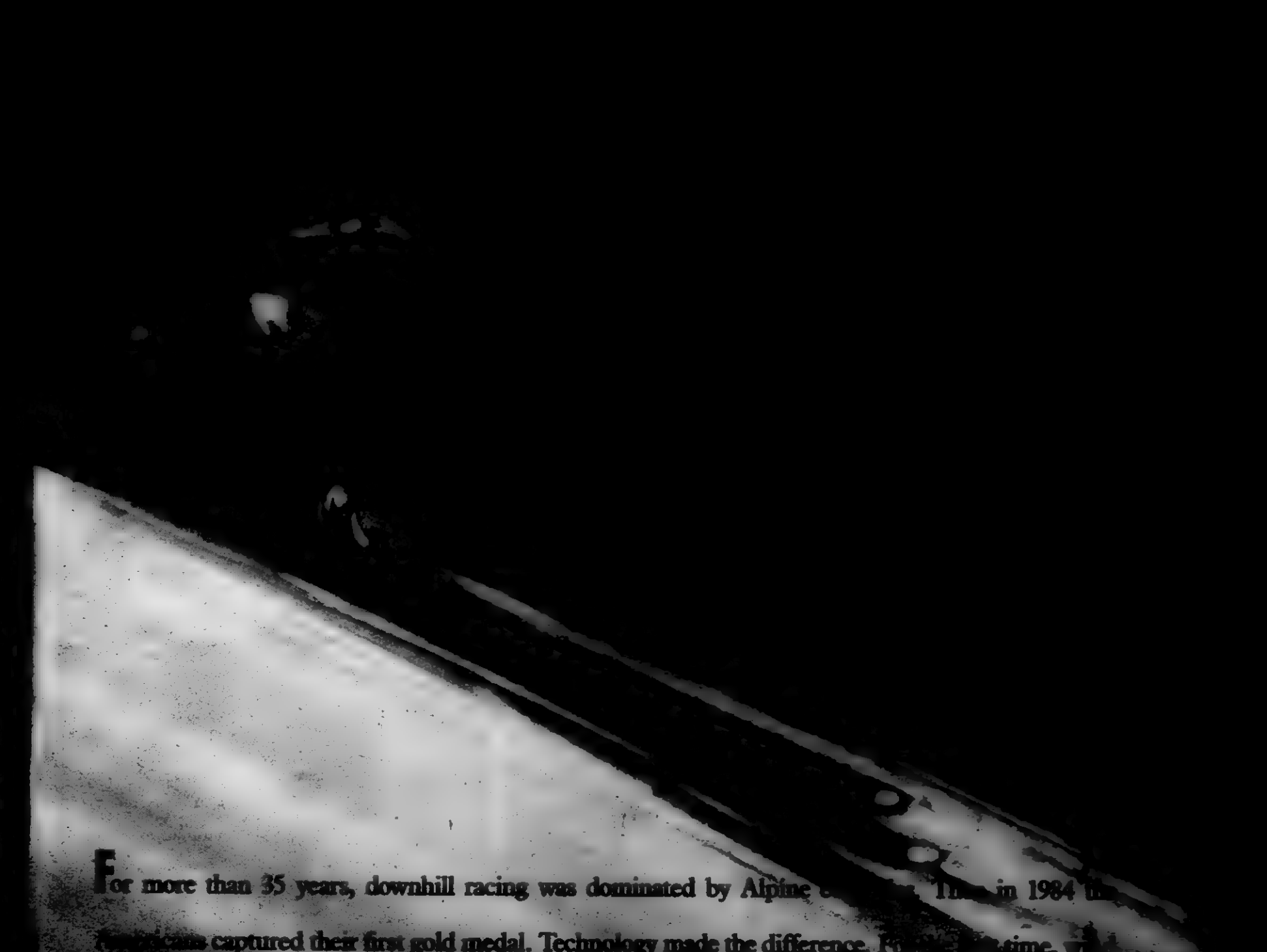
Pacific Bell and AT&T had used AT&T lines to route the lottery data to Sacramento. According to lottery officials, no data was lost.

Place your bets

Meanwhile, anxious bettors, knowing that the pot was worth more than $26 million, waited for hours in long lines to purchase tickets in grocery stores, drug stores and shopping malls. Officials said they could not estimate how much money in lottery sales was lost during that time. However, the spokesman did stress that amid the turmoil, the lottery had its largest sales ever of $19.1 million.

Lottery officials said this was the first such occurrence to the computer network, which is said to handle more than 6 million transactions during a single day of play.

The same MCI fiber-optic line carried voice service for some 200,000 MCI customers, who received a steady stream of busy signals throughout the afternoon of the disruption, according to an MCI spokeswoman.



For more than 35 years, downhill racing was dominated by Alpine [illegible]. Then in 1984 the Americans captured their first gold medal. Technology made the difference. For the first time, [illegible] used to improve the skiers' aerodynamics. Technology enhances [illegible].

[illegible] TECHNOLOGY THAT GIVES PROGRAMMERS AN EDGE.

[illegible] on top of change. It creates a complete history of every program [illegible] and makes it available on line instantly. The LIBRARIAN [illegible] its Change Control Facility helps insure that changes are [illegible] documented and meet auditing requirements. While The LIBRARIAN [illegible] so [illegible]

DEC OLTP almost ready to roll

BY NELL MARGOLIS
CW STAFF

As the industry awaits IBM's assault on the mid-range, the traditional mid-range turf boss is readying itself to take to higher ground.

Digital Equipment Corp.'s imminent "major announcement in [on-line] transaction processing," which was promised by Chief Executive Officer Ken Olsen at an April press conference and originally rumored to be set for mid-May, is now on target for mid-July, according to industry analysts.

"This is a defensive product in that DEC has got to have it; they're not going to release it before it really works, and probably not until they've got it working in a Vaxcluster," said Paul Zorfass, director of computing research at The Yankee Group in Boston.

A source very familiar with the product last week reported no unforeseen delays or major problems with the software, known as the Decintact transaction processing monitor, which he described as "pretty well along."

Reportedly a melding of two existing software products — Intact, a batch and interactive terminal, file and network management system from Advanced Systems Concepts, Inc. in Hoboken, N.J.; and DEC's Application Control and Management System — the software is widely expected to lie at the heart of DEC's forthcoming on-line transaction processing offering.

Bogus bulletin

While not yet officially announced, Decintact was recently listed in — and hastily withdrawn from — the DEC Electronic Store, an on-line product information facility that generally lists only announced offerings.

During its brief shelf life, the product was described by the vendor as providing "a foundation for building simple and complex transaction processing applications on one or more VAX systems under the VAX/VMS operating system."

Calling the software "a really comprehensive transaction processing product," the source familiar with it singled out Decintact's integration with DEC's relational data base, RDB, and the product's security and integrity features for particular praise.

"DEC is going to make a lot of money on this one," he predicted.

Not many ready to catch OSI wave

BY PATRICIA KEEFE
CW STAFF

BALTIMORE — About 8,000 attendees are expected to catch the OSI wave here this week at the Enterprise Networking Event (ENE), at which they will get a first-hand look at open systems connectivity in action.

But behind all the glitz and hype promoting this year as a watershed for user migration to standards-based open systems, few companies beyond a pioneering elite seem ready or inclined to tap its potential.

Users are expected to come away from the much-ballyhooed event with lots of technical information, product migration strategies and a better idea of what international standards can do, but promises and demonstrations are said to be a poor substitute for the touch and feel of off-the-shelf products, few of which will be available.

"I want to meet with the people participating and talk about their software and products to see what's available and what's coming," said Robert Duran, manager of Factory Information Systems at Chrysler Corp.'s Outer Drive Manufacturing Technical Center. However, he had no delusions about what he is going to see. "The feeling I'm getting is that not many products will be available."

But what is unique about this unusual show of vendor camaraderie, cosponsored by the Society of Manufacturing Engineers and the Corporation for Open Systems, is the on-site simulation of factory automation. It gives users an unusual opportunity to see what types of applications are suited to international standards, such as Manufacturing Automation Protocol/Technical and Office Protocol, CCITT's X.400 message-handling system and X.25 wide-area networking protocol support and Open Systems Interconnect (OSI) services.

ENE's targeted audience is the so-called Fortune 900, specifically nonaerospace and -automotive companies.

But a number of industry analysts have exhibited less optimism, claiming a realistic watershed year for OSI might be 1989 but is more likely to occur in 1990 or 1991.

Money does not appear to be a major issue in adopting these standards. Some interested users will be blocked from taking action by fluctuating or incomplete standards and a dearth of products, particularly MAP 3.0, analysts said. Also daunting is the likelihood of incompatibilities between different implementations of standards, a situation that IBM, Hewlett-Packard Co. and Digital Equipment Corp. spokesmen recently readily conceded.

"Although we are committed to MAP and we have followed MAP very closely, we have not implemented either [MAP] Versions 2.0 or 2.1," Chrysler's Duran said. Why not MAP? "We haven't found it stable enough or cost-effective enough to this point in time to plan a production implementation," he said.

Beware

That is precisely why users should approach ENE with healthy skepticism, according to Bruce Richardson, an analyst at Advanced Manufacturing Research in Salem, Mass. He claimed the last demonstration of MAP technology, conducted at Autofact '84, filled users with a sense of false promises. "Users were seduced and abandoned," he said, claiming a lot of promises were made but not kept.

That user ambivalence permeated a recent study of 300 large user organizations. These users paid lip service to OSI migration plans while claiming to be satisfied with alternatives such as Transmission Control Protocol/Internet Protocol (TCP/IP), according to Infonetics, a consulting and market research firm in Santa Clara, Calif., whose survey examined attitudes toward TCP/IP and OSI.

"Our large enterprise users say they are moving to OSI, but their purchasing decisions don't follow. They're confused," said Infonetics President Thomas White.

Standard time in Baltimore

So you're leaning toward open systems architecture, but say you're holding out for real live products that support standards such as X.400, Open Systems Interconnect (OSI) and Manufacturing Automation Protocol? Has the Enterprise Networking Event (ENE) got products for you.

Most of the products slated for unveiling and demonstration at ENE this week will not exactly be available this year — in fact, many are not scheduled to ship for another six months — but at least attendees are guaranteed of a good rundown on what will be available down the road.

Beyond a nine-station demonstration of OSI, MAP and Technical and Office Protocol (TOP) products working in tandem to solve multivendor network problems, ENE is featuring products and migration strategies from 58 vendors and user companies committed to the seven-layer OSI model. A partial listing of scheduled announcements follows.

- **Unisys Corp.** has added X.400 and FTAM support to its BTOS X.25 and IBM Systems Network Architecture products and will detail plans to add support for token-ring 802.5, Unix (via Transmission Control Protocol/Internet Protocol) and OS/2 access under BTOS.
- **Hewlett-Packard Co.** will demonstrate its recently unveiled OSI Express — OSI on a board utilizing proprietary HP very large-scale integration chips; two X.400 software packages; an X.400 interface; standard manufacturing message specification and FTAM software; and a MAP protocol analyzer. The products will be available late this year or early next year.
- **Wang Laboratories, Inc.** will demonstrate several OSI-based products unveiled last week: Office/X.400 Gateway, which runs on Wang VS minicomputers and allows message exchange between Wang and other vendors' X.400-compliant products; VS WOSIS Core, which implements the network and transport OSI layers and provides management facilities; and VS WOSIS Transport and Session Services.
- **Retix Corp.** introduced the PC 300 wide-area network card, which can be used in combination with either Retix's OSI or X.25 protocols to link to networks supporting those standards.
- **Digital Equipment Corp.** will announce MAP 3.0 applications and its intent to support the Fiber Distributed Data Interface standard.
- **Control Data Corp.** will feature an X.400 interface for developing applications.
- **NCR Comten** will demonstrate Comten XC.25 Version 2 software, said to allow NCR Corp. hosts to act as a node on the X.25 network. X.400 capabilities will also be displayed.

PATRICIA KEEFE

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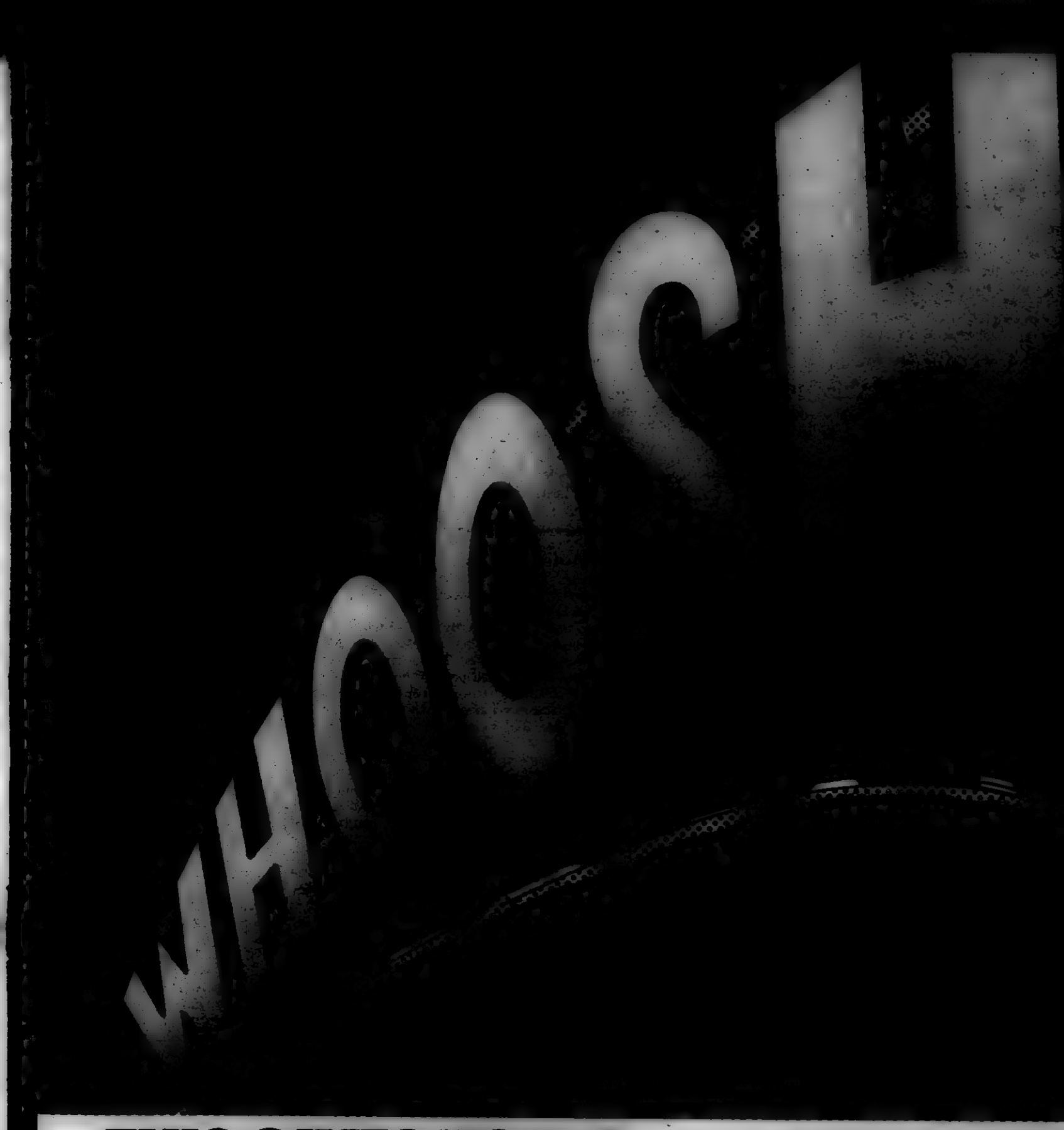

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Speedy PS/2s

FROM PAGE 1

Loebel said he has interest in the PS/2 line and the Micro Channel but will wait for networking standards that come about in the upcoming OS/2 Extended Edition before taking another look.

Something for everyone

Micro Channel or no, the breadth of IBM's offerings from the low-end Model PS/2 25s to the high-end Model 80s is showing a new kind of IBM, according to Cheryl Currid, manager of departmental computing at Coca-Cola Foods in Houston.

"There is something for everybody in the product line; they are becoming a more responsive company," she said.

At the announcement, IBM also rolled out fixed disk drive options, memory expansion options and a math coprocessor and announced price cuts on existing PS/2 Model 80s and 60s.

The price cuts put the Model 80-071 at the same $7,995 price as the Model 70-121. "The price difference between the 16-MHz Model 70 and the 16-MHz Model 80 is not that great, but the expansion is where the difference comes in," said Dennis Andrews, director of the Boca Raton Laboratory at IBM's Entry Systems Division. The PS/2 Model 70 has three expansion slots, while the Model 80 has seven.

Users said IBM's move into the desktop 386 market was overdue, but surprisingly, it has jumped in feetfirst by announcing the first 25-MHz 386-based desktop with memory caching.

"We clearly don't want to let ourselves be disadvantaged again," said Nick Donofrio, vice-president of development at the Entry Systems Division.

However, a faster clock is still limited by the peripherals attached to it, users pointed out.

The only disadvantage to the new IBM systems, users said, could be their pricing. A 25-MHz Model 70-A21 fully populated with 16M bytes of memory would cost $21,660, one IBM spokesman said.

The base Model 70s range in price from $5,995 to $11,295. The Model 50 Zs will cost between $3,995 and $4,595.

"It's about time that a Model 50 would actually join the ranks of acceptable speed, finally competing at the same level as other high-quality entrants in the fast 286 world," Skopec said. "But the pricing is still high — even at our discount, it is high for the base unit." He added that the Model 70 is expensive as well.

IBM's pricing could also mean certain death for its current Model 50, which costs just $400 less than the 30M-byte hard-disk Z model. "I think the Model 50 Z is a better deal, with zero-wait states," Currid said.

Some said the Model 50 upgrade was a necessary one. "I think the old Model 50 would not have really been sufficient to run OS/2," said Howard Fosdick, data base administrator at Amoco Corp.

Costly alternative

While the Model 25 LS's new IBM Token-Ring network PC adapter makes it more viable as a business tool, that is also considered a costly alternative to low-cost nodes on a network, users said.

Priced from $2,139 to $2,484, the PS/2 Model 25 is probably more costly than buying a cheaper diskless unit and adding in the Token-Ring, said Steve Wainwright, a project leader in charge of evaluating new equipment at Empire Blue Cross/Blue Shield in New York.

"If you're really going to go the network path, it doesn't pay you a lot to have duplicate storage," said John Crombe, a consultant at Major Micro Systems Software Development Co. in Huntington Woods, Mich.

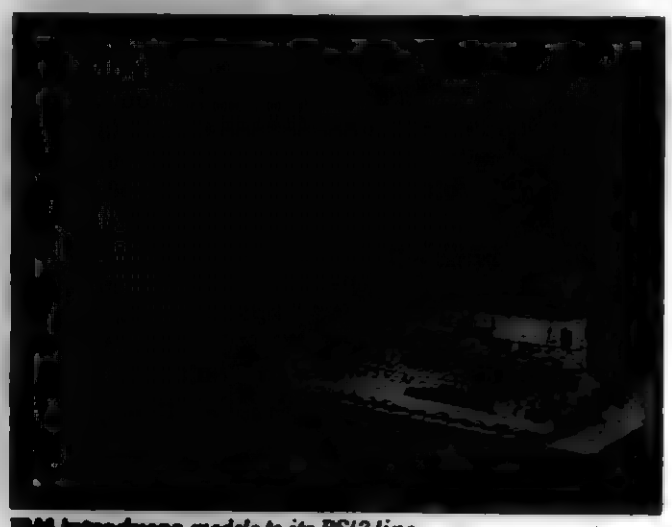
What will it take for IBM to make the PS/2 more attractive? It depends on OS/2, whether its Extended Edition is hooked to the PS/2 and whether developers latch onto it, said G. Jeffrey Knepper, director of advanced technology-tax at Touche Ross & Co.

Expanded lineup

IBM broadened its desktop Personal System/2 series with three Model 70 versions based on Intel's 80386, a faster Model 50 and options for the Model 25

Intel processor	8086	80286	80386	80386	80386
Clock speed	8 MHz	10 MHz	16 MHz	20 MHz	25 MHz
Memory	640K bytes	1M to 16M bytes	1M to 16M bytes	2M to 16M bytes	2M to 16M bytes
Storage	3½-in. 720K-byte diskette (20M-byte fixed-disk option)	3½-in. 1.44M-byte diskette, 30M- or 60M-byte fixed disk	60M-byte fixed disk	120M-byte fixed disk	120M-byte fixed disk
Number of expansion slots	Two	Three	Three	Three	Three
Price	$2,139 to $2,484	$3,995 to $4,595	$5,995	$7,995	$11,295

INFORMATION PROVIDED BY IBM
CW CHART



IBM introduces *models to its PS/2 line.*

IBM picks up pace with PS/2 options

While the new Personal System/2s were hoarding the hype during IBM's microcomputer product rollouts in New York last week, there were announcements of some options and adapters that brought the number of products introduced for that line since last year to more than 100.

For the Intel Corp. 8086-based PS/2 Model 25, IBM announced a 20M-byte fixed disk drive with an adapter, which it said will sell for $795 and will be available in July. It will use the system's 8-in. expansion slot.

Another version of the 20M-byte drive that does not require an expansion slot will be available in the fourth quarter at the same price, IBM said.

Also announced was the zero- to 8M-byte Intel 80286 Expanded Memory Adapter/A, a 16-bit full-length circuit card sold without memory for $600 and expandable to 8M bytes for use with the PS/2 Models 50, 50 Z and 60. IBM said 0.05M-byte Memory Module Kits that will sell for $215 each and 2M-byte Memory Module Kits for $995 are also available. For the PS/2 Models 70 and 80, IBM introduced the $1,695 2M- to 8M-byte Intel 80386 Memory Expansion Option, which comes with 2M bytes of 85-nsec memory. Additional memory in increments of 1M byte is sold for $695; 2M bytes cost from $1,395 to $1,495.

IBM also announced an Intel 80387 math coprocessor to work with the 25-MHz Model 70-A21, which will sell for $2,395 and is slated to be available sometime in the third quarter.

For users seeking to upgrade the current PS/2 Model 50, the original fixed disk drive can be replaced with a 60M-byte drive with a 27-msec access time. It will sell for $1,695 and will be available in September, IBM said.

The New York hardware announcements also brought mention of a new version of a software product, the IBM C/2. Version 1.10, which is a replacement version of an earlier C compiler for the IBM Personal Computer and PS/2 families, will run and generate code under DOS and OS/2, IBM said.

ALAN J. RYAN

Little hope at low end?

BY DOUGLAS BARNEY
CW STAFF

NEW YORK — The old Intel Corp. 8088 and 8086 architecture is dying in the corporate marketplace, and IBM's attempt to salvage it with Personal System/2 Model 25 upgrades will not change the inevitable, users said last week.

Even Model 25 upgrades *may not salvage the 8086.*

The Model 25 is at the very low end of the PS/2 line and is positioned as a low-cost node on a network and as an entry-level micro for homes and businesses. To boost its presence in both markets, IBM announced last week a 20M-byte hard disk drive option, along with the Model 25 LS, which is bundled with an IBM Token-Ring card.

But most large organizations, even those with a predominance of PS/2s, have outgrown the Model 25's aging processor.

"Hooking onto a LAN with a workstation that doesn't have enough horsepower to do the job won't be helpful," said G. Jeffrey Knepper, director of advanced technology-tax at Touche Ross & Co.

Others, however, envision a possible network role for the Model 25.

"For installations with a fairly large number of terminals, that would be an interesting option. I don't think it is a good long-term investment, but it would be a good short-term investment," said Cheryl Currid, manager of departmental computing at Coca-Cola Foods in Houston.

Alan Loebel, a staff consultant at Harris Corp., said he sees potential PS/2 Model 25 customers opting for the lower cost diskless workstations.

"You could have a diskless PC that is 8086-based for $500 to $600 per node and boot from the server," he said.

IBM has offered diskless Personal Computers to key accounts as part of special bids, but the company does not offer any diskless models for sale through its retail channel.

Compaq, IBM 80386 bout heats up

BY JULIE PITTA
and ED SCANNELL
CW STAFF

HOUSTON — In the latest game of catch-the-leader, Compaq Computer Corp. will pull alongside IBM by introducing a 25-MHz 80386. It is expected to pass the industry giant by rolling out a second system based on 80386 technology that could create a new class of less expensive 386 products.

Last week, IBM released its first Intel Corp. 80386-based desktop system, the 25-MHz Model 70, seen by many as an important platform for selling its OS/2 operating system and Presentation Manager operating environment. Compaq is expected to match IBM's Model 70 while pushing its edge with a new microcomputer based on Intel's P9 chip set.

The Compaq P9-based system will be the first microcomputer based on Intel's as-yet-unannounced chip set. Intel's P9 offers the processing power of the 386 on a 16-bit data path like its predecessor, the Intel 80286. Although the chip set will be priced along the lines of a 32-bit 80386, the design costs are cheaper so that systems vendors can offer 80386 power at close to 80286 prices.

P9-based systems will be able to run 32-bit software but at slower rates because of its 16-bit data path.

Look before you leap

Compaq, which also has a line of 80286-based systems, is expected to be cautious with the P9's pricing, however. Company officials fear that a cheap P9-based system could cannibalize the current 80286-based offerings, observers said.

To stay competitive, Compaq had held off on pricing its 25-MHz system until IBM announced its intentions. Beyond introducing a desktop 80386, IBM said it has reduced prices on its floor-mount versions (see story page 1).

Compaq reportedly will price the P9 system in the $3,500 range. Industry observers have said that based on the technology, such systems could be priced at less than $2,500.

Users have little awareness of Intel's P9 technology, something that Intel is expected to clarify when it joins Compaq in the June 20 announcement in New York. However, Compaq users — ever hungry for more power — said they would welcome the 25-MHz system, provided the price is right.

"We sure could use it," said Richard Gonzalez, manager of new business administration at Great-West Life Assurance Co. in Denver. "We need all the processing power that we can get."

Gonzalez said he would be willing to pay from $200 to $300 more than his current 20-MHz 80386 Compaq desktop systems, which range from $6,499 to $12,499, if clock speed is the only benefit. However, if the system offers additional features like improved storage capacity and disk access speeds, Gonzalez said he would spend more.

PS/2 speed contest pits Model 50 against 50 Z

BY DOUGLAS BARNEY
CW STAFF

NEW YORK — Last week, IBM solved the Personal System/2 Model 50's nagging problem of slow, 20M-byte hard disk drives with the release of faster and easily installable 30M- and 60M-byte drives. But with no trade-in policy, IBM created another headache — what to do with the old drives.

The Model 50 has been roundly criticized for its 80-msec, 20M-byte disk drive, considered by many users to be too small and too slow for the new wave of applications under OS/2, IBM and Microsoft Corp.'s operating system for the PS/2.

Both disk drives on the PS/2 Model 50 Z offer average seek times that are approximately three times as fast as the old drives.

But instead of a trade-in policy for users upgrading to the new drives, IBM officials suggested that users store the old drives and use them as backup in case the new ones fail.

That strategy, along with a price tag of almost $800 for the 30M-byte upgrade, did not sit well with Model 50 users. "Those prices are way out of line. I paid $800 for a Seagate 80M-byte hard disk," said Brian Camenker, executive director of the IBM PC Users Group in Boston.

The prospect of a pile of unused 20M-byte drives did not go over well, either. "Once it is pulled out, it is not going to go back into a machine except in the direst emergency, and then it probably won't serve your needs," said G. Jeffrey Knepper, director of advanced technology-tax at Touche Ross & Co.

For buyers of new machines, however, the Model 50 Z may hit the spot. "For general-purpose stuff like running Lotus, it would be nice to have a 50 with a bigger, faster disk," said Howard Fosdick, a data base administrator at Amoco Corp. "It sounds like a good announcement."

Groundwork to pay off for IBM's Silverlake

BY STANLEY GIBSON and ROSEMARY HAMILTON
CW STAFF

For more than a year, IBM has whetted user anticipation for Silverlake, its hybrid follow-on to the System/36 and 38 lines. Now, two weeks before the expected launch of the mid-range line, that carefully laid groundwork has users poised to place early orders.

IBM's painstaking preparation contrasts sharply with other product launches, particularly the 9370's — IBM's other major mid-range offering — 1½ years ago. With the 9370 release, the product came first; the software required to make the product a success has since been struggling to market.

There appears to be little confusion among users about IBM's intentions this time. "We will go with Silverlake, and let's say I don't expect any surprises," said Dennis Klinger, vice-president of MIS at Ryder Systems, Inc.

Although many smaller System/36 and 38 shops said last week that they will put off a Silverlake purchase for at least two years, or until they require the additional functionality (see story this page), larger operations are eagerly awaiting the rollout.

In a series of interviews last week, Klinger and other current users of the System/36 and 38 family indicated their requirements:

- Relatively simple conversion of existing software to the new platform.
- More power and memory.
- The ability to reuse current System/36 and 38 terminals, storage devices and other peripherals.
- Better communications to personal computers and larger systems.
- The ability to migrate applications to IBM's Systems Application Architecture (SAA).

IBM has assured many of its customers through a number of briefings that their existing applications can be easily ported to the system.

The company also provided software houses with development information and access to processors for development [CW, April 11] and, in at least one case, helped complete a user's conversion before the processor's announcement.

The user, who requested anonymity, has been to Rochester, Minn., the Silverlake development location, to convert his software programs. Having completed conversion of most software, his shop expects to take delivery of a Silverlake machine early next month, he said.

The primary benefit for the user's shop will be the ability to support all its applications on one system instead of a System/36 and 38, as it has now. With all users on the same computer, communications between the two processors will no longer be necessary.

The user's shop will run System/36 and 38 programs on Silverlake at first in an applications mode; later they will be converted to Silverlake's reportedly SAA-compatible native mode.

It's sold

Another user is already planning to sell his System/36 and 38 and intends to place his order the day of the announcement. "It will simplify things greatly," he said, explaining that the System/36 has not been able to access jobs on the System/38. "This will make it transparent to the user."

An MIS director at a large retail firm said he has migrated to peripherals that IBM has said will be compatible with the new machine, phasing out 3370 disk drives in favor of 9335 subsystems. He said he believes his current terminals will work with the new systems. With the additional power that Silverlake will reportedly offer, the user said he hopes to reduce the number of systems from four to three.

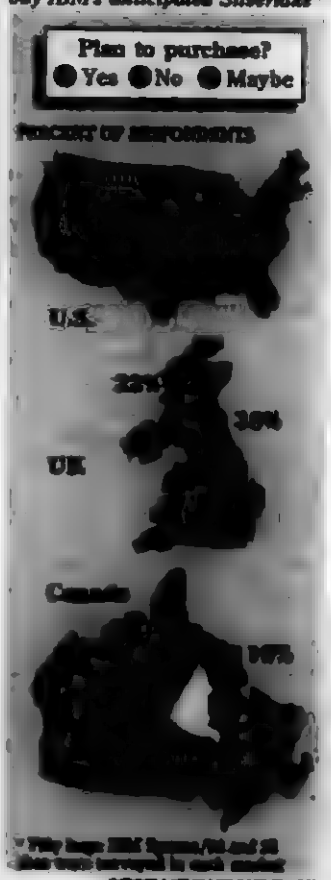
His four System/38s are programmed using RPG III, the manager said, saying he has received assurance that he will be able to continue in a version of RPG with Silverlake. "I'm confident the migration will be smooth," he said.

Meanwhile, a number of developers, including the big software houses in the mainframe business, such as Management Science America, Inc. and McCormack & Dodge Corp., have reportedly been working closely with IBM to gear their mid-range software for the new platform.

With Silverlake, IBM appears to have been uncharacteristically generous in providing advance information. David Funderburke, director of information services at Trammell Crow Co. in Dallas, recalled last week that he accompanied his value-added reseller to a briefing in Rochester last November. Funderburke said IBM made several promises that the move to Silverlake would be a smooth procedure.

Geographical differences

Surveys in the U.S. and two foreign markets show that domestic users are more likely to buy IBM's anticipated Silverlake



INFORMATION PROVIDED BY "THE S/3X INDUSTRY ANALYST"
CW CHART: AMY L. SWANSON

Thanks, but no

Content with their current systems, many smaller IBM System/38 and 36 shops said they will wait two years or more before taking the Silverlake plunge.

Based on a series of interviews last week, smaller System/36 and 38 shops will move to Silverlake either when they hit a capacity wall, which they expect will not be in the near future, or when IBM drops support for their current system.

"In three to five years, when we need an upgrade, then we'll talk to [IBM] about Silverlake," said Brian Gause, a systems programmer in the finance office of Horry County in Conway, S.C. Gause's department, which operates two System/38s, upgraded to Model 700s from Model 400s in the last week of May.

Other users said they cannot justify buying Silverlake simply to have a new system. "Committing to Silverlake now would be trading a known, quality product for an unknown just because IBM says it'll be better," said Clint Griggs, a programmer/analyst at the National Association of Letter Carriers in Washington, D.C.

Another System/38 shop, the Indian River Memorial Hospital in Vero Beach, Fla., said it plans to see how Silverlake performs before committing to it. "We're too dependent on this system," said director of DP Donald Isley of the two Model 700s he oversees. "We'd rather wait two or three years until it's proven."

ROSEMARY HAMILTON

Silverlake

FROM PAGE 1

puter processors if they develop in Cobol or C, the observers said.

"Office applications will be developed in C and business applications and will be developed in Cobol," predicted Mark Webb, principal of New Direxxions, a mid-range consulting firm in Sanford, Fla.

The holder of a beta-test site manual for Silverlake claimed it lists Cobol and RPG as the languages that will be immediately available on Silverlake, along with Fortran, Pascal and PL/I. C is expected to be added soon after Silverlake's debut, according to the source, who requested anonymity. Fortran, Pascal and PL/I are already available on the mid-range machines.

Dennis Klinger, vice-president of MIS at Ryder Systems, Inc. in Miami, Fla., which is planning a project requiring 120 IBM mid-range machines, said his shop already does two-thirds of its development in Cobol for its System/36s. Klinger said his IBM representative has assured him that Cobol would be available as well as RPG on the Silverlake machine.

An IBM spokesman, Doug Griffin, manager of application enabling software marketing in Santa Teresa, Calif., said the languages offered on Silverlake will comply with IBM's Systems Application Architecture (SAA), which, in the case of Cobol, is ANSI-standard Cobol 85.

Big umbrella

Included under the SAA umbrella's designated programming languages thus far are Cobol 85, ANSI standard C and Fortran. By working with SAA-compliant products, IBM is telling its customers they will gain application portability across its hardware platforms.

The addition of Cobol 85 and C are intended to broadly strengthen the role of the System/36 and 38 follow-on as an integral member of IBM's SAA strategy, Griffin said.

IBM's original offering to run on Silverlake is expected to be an office automation package, written in C instead of PLS, a PL/1-like language used in IBM's current office automation system, Personal Services.

The application will not be available at the time of the introduction, since the software is not yet in alpha testing. It is expected by the end of 1989, sources indicated.

Really big

The new office automation package will be "huge," according to George Woodring, director of technical services at ADM, Inc., a mid-range consulting firm in Cheshire, Conn. "It will supersede Personal Services, merging graphics, images and words easily. It will include voice mail as well as electronic mail," he said.

The availability of C and Cobol 85 will have little appeal to many mid-range customers who have invested years of experience in RPG II and RPG III, the most widely used languages on those platforms.

Griffin would not specify what role will be played by RPG, the language used by an estimated 90% of System/36 and 38 users. However, a consultant briefed by IBM said Silverlake will also run two different versions of RPG, one that is SAA-compatible and another that is not.

One of the RPGs will be an extended version of the language that will let existing RPG II and RPG III applications run on the new processors, said David Andrews, president of ADM.

A separate subset of RPG will also be available that is compatible with SAA but will not support all applications.

"In order to get portability you'll have to tie one hand behind your back," Andrews commented, meaning that users will have to sacrifice some of the functions of the advanced RPG.

Sources said that the Silverlake version of RPG will dispense with Roman numeral designations and simply be referred to as "RPG." The subset of RPG that will run under SAA will have a different name. Both versions will support SQL statements within RPG programs.

But large users accustomed to writing in different languages for 370, System/36 and 38 processors may find the new languages present a choice. "[IBM] listened," said Ken Burk, senior vice-president of systems for Continental Insurance Co. in New York, who was briefed by IBM.

Burk's company has 250 System/36s as well as IBM mainframes. The staff writes applications in both RPG and Cobol.

Senior Editor Charles Babcock contributed to this report.

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IBM prepping super net

BY JEAN S. BOZMAN
CW STAFF

YORKTOWN HEIGHTS, N.Y. — IBM is creating a distributed supercomputer network that will further its research into supercomputing, semiconductor technology and parallel processing, spokesmen at the company's Thomas J. Watson Research Center here said last week.

"This network will be used to do very high-speed integrated circuit design," said Michael Connors, director of computing systems at the research center. "It will be used to prototype and experiment with various computer architectures, including supercomputers associated with parallel processors." The complex will also be available to IBM scientists for basic research in chemistry and physics, Connors added.

The IBM network will be built around a core of three IBM 3090 Model 600E computers, each having six Vector Facility processors. Conners said it will be operational by year's end.

Later additions to the network are slated to include a fourth 3090 in nearby Hawthorne, N.Y., as well as one in IBM's Center for Computational Chemistry in Almaden, Calif., and another in Switzerland at IBM's Zurich Research Laboratory.

"Our long-term objective is to design, develop and install a homogeneous supercomputer facility on a worldwide basis," Connors said. "We plan to expand this network substantially to maintain a leading-edge position in the development of IBM prototype products."

Machine for everyone

The network's homogeneous environment would allow remote researchers to access the complex as if it were their own machine, Connors said. Eventually, the supercomputer sites in the network will be linked by T1 lines and a high-speed optical communications network that will dramatically increase bandwidth, IBM said.

Although IBM plans to boost bandwidth to billions of bits per second, researchers will initially dial into the complex over 56K bit/sec. lines.

IBM's efforts seem to be geared toward establishing the 3090 with a Vector Facility as the single solution for enterprisewide computing, said Bob Trier, director of research at the Research Consortium, Inc., a Minneapolis supercomputer research group.

"IBM does not want to change its role as the provider of a total information solution," Trier said. "They would like to provide a general-purpose computer that also serves the need of a corporation's scientific and engineering end users."

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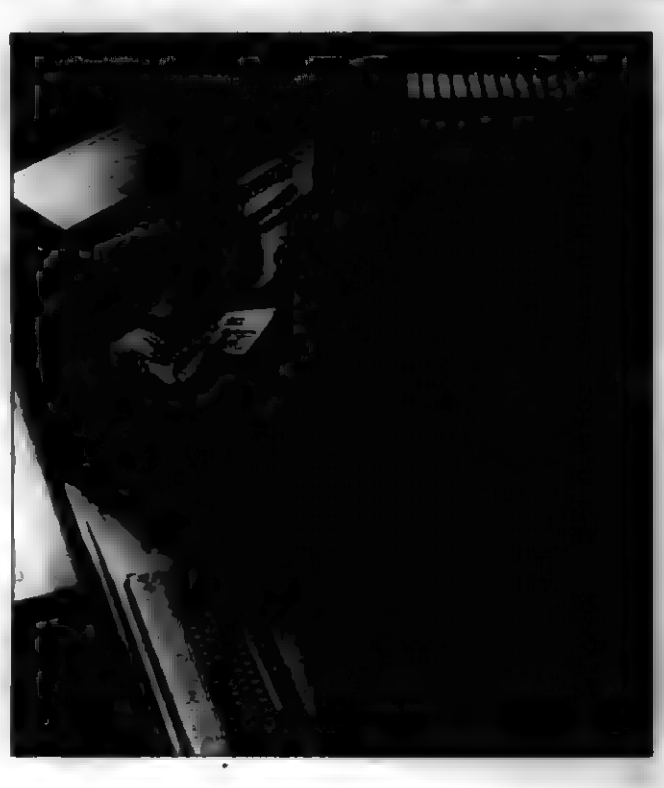

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SCS to unveil 1.4G token-ring

BY JAMES DALY
CW STAFF

SAN DIEGO — Scientific Computer Systems Corp. (SCS) claimed it will drastically raise the networking speed limit in supercomputing environments today with the introduction of a token-ring networking scheme that boasts a data transfer rate of 1.4G bit/sec.

SCS Vice-President of Marketing Stephen Campbell said last week that the fiber-based Vectornet "runs more than 140 times faster than Ethernet and more than 14 times faster than recently announced 100M bit/sec. channels." He said it evolved because of current network communications rates, which are unable to handle the supercomputer's data transfer muscle.

"Vectornet could be very important if it works as promised," said Marcia Brooks, an analyst at International Data Corp., a Framingham, Mass.-based market research firm. "High-performance users are choking on the fact that they've got very powerful computers and yet can't get the data to move fast enough."

Two power sources

Vectornet derives power from the Vectornet Interface Processor (VIP) and the Vectornet Interface Adapter (VIA), which connects to the VIP.

The VIP communications processor allows Vectornet to connect to multivendor local-area networks, the firm said, and the VIA allows slower equipment to communicate with Vectornet, letting the local VIP processor remain dedicated to I/O and external gateway routing.

SCS also said the lower levels of the International Standards Organization communications standard are implemented within the intelligent protocol processor, which relieves the system of communications handshaking.

SCS spokesmen said the SCS-40 supercomputer, fully configured with Vectornet, is priced at $565,000; the VIP using copper wiring costs $50,000, $70,000 using fiber wiring; the VIA using copper wiring costs $20,000, $40,000 using fiber wiring. Peripheral controllers for the VIP cost $5,000 each. SCS said it will offer license rates as well as discounts for volume purchases.

Senior Editor Stanley Gibson contributed to this report.

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And let's say that in the middle of everything you're abruptly called away—God bless you—to that big computer room in the sky.

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And let's say that you just happened to come to rest with your nose firmly resting on the run key. RAMIS will continue to turn out report after report after report.

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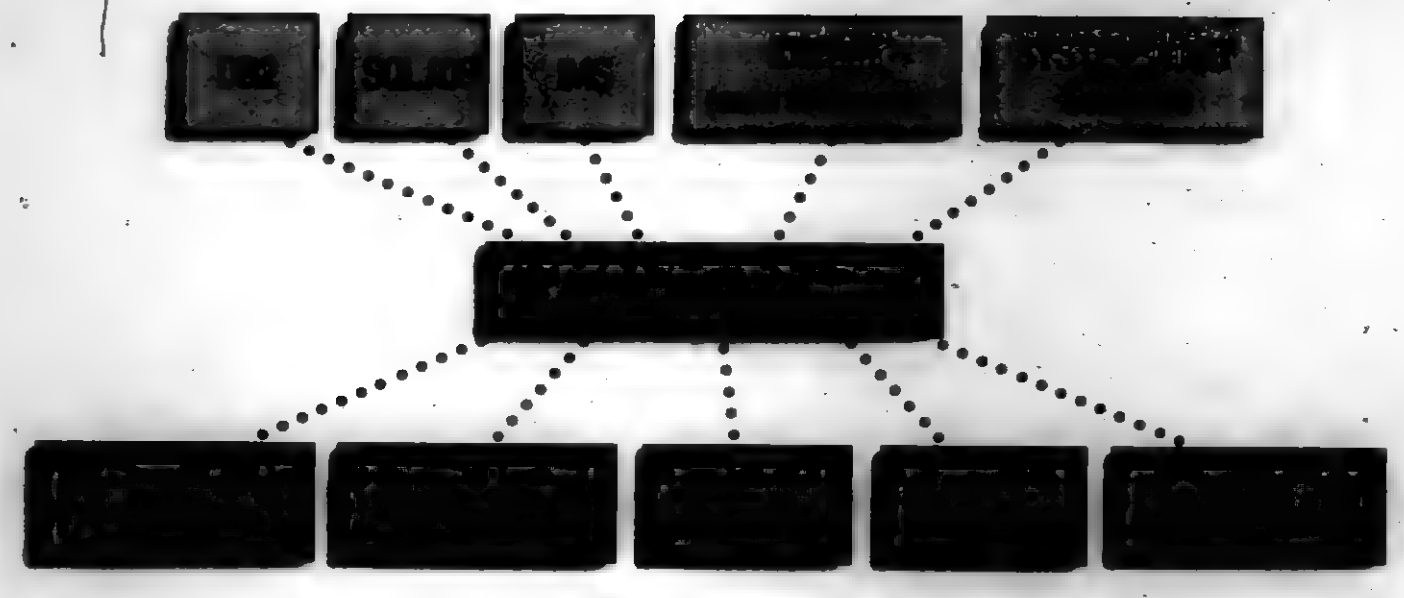

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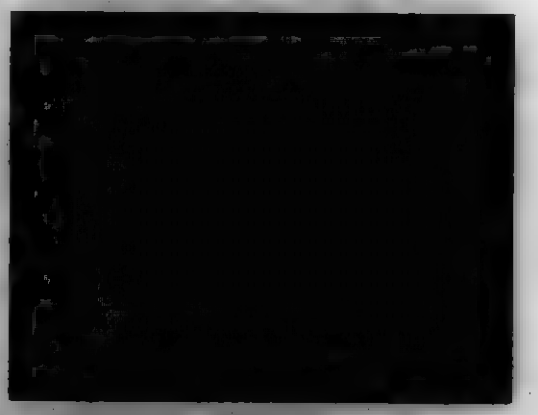
who know nothing about data bases, have immediate access to the data they need. It's as easy as filling in the blanks!



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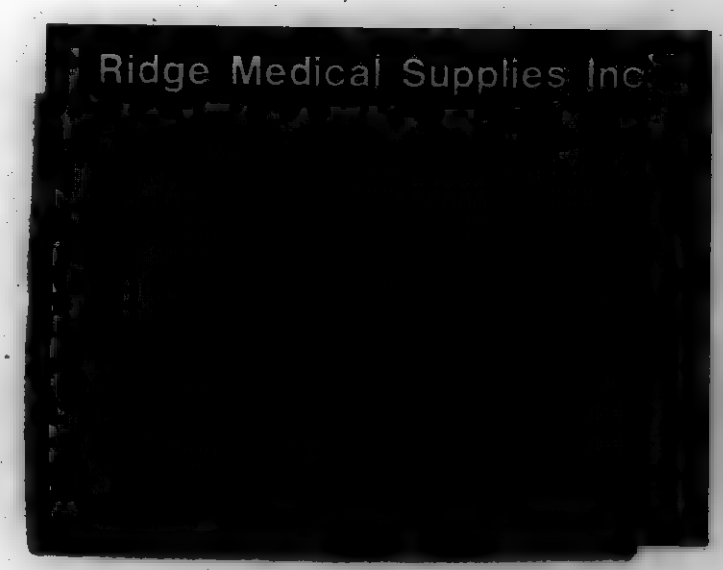

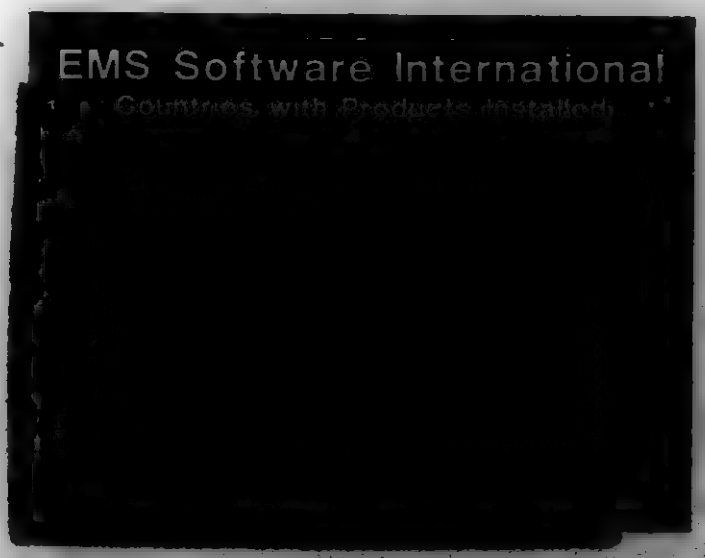

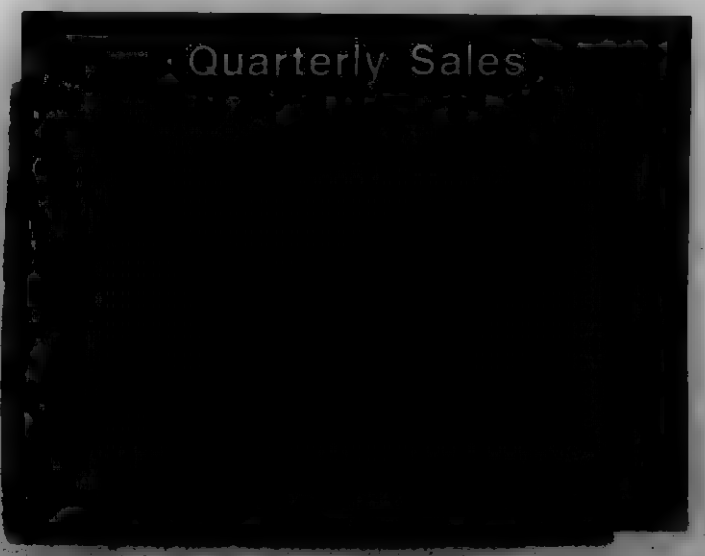

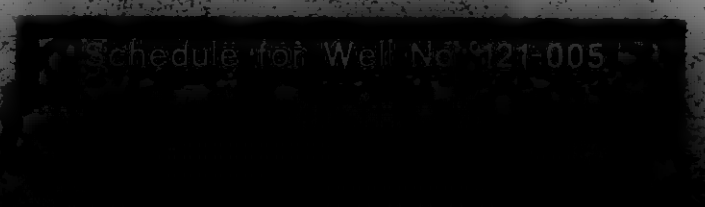

Dell PS/2 clones short on substance

BY JULIE PITTA
CW STAFF

AUSTIN, Texas — Dell Computer Corp. beat the pack last April to introduce the first microcomputers compatible with the Micro Channel architecture of IBM's Personal System/2. However, Dell's PS/2 clones may be long on looks and short on functionality.

One potential obstacle that had been hovering in Dell's marketing path was removed with the announcement that it had reached a licensing agreement with IBM that apparently negates any legal threat to reproducing the PS/2.

Under the pact, Dell will pay royalties to IBM on its PS/2 line and will also make retroactive payments on IBM's Personal Computer line. Both Dell and IBM declined to offer specifics on the arrangement.

But with the legal issue behind Dell, what remains is to remove the technical obstacles blocking shipment of its own versions of the PS/2.

So far, Dell has shown its PS/2 prototypes twice — first at the mid-April launch and more recently at the Comdex/Spring '88 show in Atlanta.

Dell officials acknowledged last week that the two models shown at Comdex lacked completely functional components. "The controller boards are less than 100% functional," conceded David Srager, product manager for the System 400, one of Dell's two PS/2 compatibles. Western Digital Corp., Dell's supplier for PS/2-compatible controller boards, has experienced some technical difficulties in producing the components.

"They were prototype controller boards," Srager said. "Western Digital hasn't worked all the bugs out. We haven't worked all the bugs out."

Srager maintained that it is not unusual for a prototype to be less than perfect. He declined to offer specifics on other problems Dell is having with its new machines. Both systems will be ready to ship on schedule in the fourth quarter, he said.

Interactive backs OSF

BY KATHY CHIN LEONG
CW STAFF

SANTA MONICA, Calif. — Interactive Systems Corp. last week made an early leap to land on the alternate Unix bandwagon with the creation of a center to support the efforts of the Open Software Foundation (OSF).

Interactive, which has collaborated with IBM on its previous Unix offerings, is one of the first companies to take advantage of what it views as a potential gold mine represented by the recent alliance of vendors — including Digital Equipment Corp., IBM and Hewlett-Packard Co. — to develop a future version of Unix independent of AT&T.

"The industry will need to understand [IBM's] AIX and AT&T's Unix Version 3 along with the evolving directions of each system," said John White, Interactive's chief executive officer, in a prepared statement.

Working on AIX

White said Interactive is involved with IBM in developing AIX and has worked with AT&T on Unix System V, Release 3.

Interactive's new division, the Open Systems Technology Center, will be based in Boston and will offer support services to manufacturers and users working to understand the impact of OSF, the company said. It will also provide consulting services to those planning Unix strategies.

Slated to open next month, the division will sell software modules compatible with the future OSF version of Unix. The company already has a technology center focusing on Unix System V, Release 3 in Santa Monica.

Systems software for MVS data centers:
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Microsoft, Apple ignore hatchet

BY STEPHEN JONES
CW STAFF

SAN FRANCISCO — There wasn't a lawyer in sight last week as Microsoft Corp. and Apple Computer, Inc. introduced a spate of Macintosh application upgrades and pledged unyielding support to each other's products.

Both companies reaffirmed the claim that Apple's pending copyright infringement suit against Microsoft for using Mac technology has had no effect on their cooperative development and marketing efforts. However, the legal entanglement that Apple started in March shows no sign of an amicable settlement.

"We obviously have a different point of view on the Mac [technology], but in the meantime, we're going to come out with several applications," Microsoft Chairman Bill Gates said. "Although we disagree with Apple over the lawsuit, we're firmly committed to the Mac."

Gates' comments were backed by announcements that Microsoft will ship upgraded versions of Word, Powerpoint, File and Excel.

The most significant enhancements were seen with Word 4.0 and Powerpoint 2.0.

The new Word package, set to ship in October, will feature a page view capability allowing users to get a full what-you-see-is-what-you-get representation of a document before it is printed. The program will also feature mail-merge capabilities and a user-definable keyboard enabling users to write their own personal types of commands.

Word 4.0 runs on any Macintosh but needs a Mac II to take advantage of color enhancements. It requires 512K bytes of random-access memory and two 800K-byte floppy drives or one hard disk. The price remains unchanged at $395, with an upgrade cost of $75.

Heat is on

Although Microsoft can claim the lion's share of the Macintosh word processor market, the developer is feeling pressure to keep users happy in the face of new competition. Recent entries from Wordperfect Corp. and Ashton-Tate Corp. have a good chance of nibbling away at Microsoft's impressive customer base.

One theme of last week's announcement was the integration of all Microsoft and Macintosh applications. Microsoft Mail, for example, can be accessed from within Word 4.0 without changing programs; Word imports and exports Excel, File and Powerpoint files.

"Microsoft is keeping the products strong and letting everyone know that you can use them all together — that's the best way to sell software," said David Perro, a software analyst at Dataquest, Inc. in San Jose, Calif.

Powerpoint 2.0, a desktop presentation program, is aimed at taking advantage of the Mac II's new color capabilities and costs $395.

A "color intelligence" capability offers built-in color schemes that match a foreground color with a series of background choices, eliminating any unwanted combinations. Powerpoint 2.0 is set to ship this month and will require a Macintosh Plus, SE or II; 1M byte of RAM; and two 800K-byte floppy drives or a hard disk.

Additions to the File 2.0 data base management program include 120 templates for use with preprinted forms, extensive color capabilities with the Mac II and improved merge features with Word. It is scheduled to ship in August for $195, with upgrades priced at $50.

Excel 1.5 received the lightest upgrade, with color support for the Mac II, multitasking under Apple's Multifinder operating environment and enhanced charting functions. The program is available now with no change to its $395 price. Upgrade cost is $25.

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COMPUTER ASSOCIATES

Borland unleashes chameleon word processor

BY STEPHEN JONES
CW STAFF

SCOTTS VALLEY, Calif. — Borland International's Sprint word processor will emerge from the vaporware mists this week after more than a year since the product was first announced.

Sprint will be unveiled at a press conference in New York and will begin shipping in the next two to three weeks for $199, company officials said.

With a chameleon-like interface that can be changed to look like many current word processors, Borland hopes to win over users of industry-leading packages who want better performance but do not want to learn a new program.

That strategy has been a success with Borland's Quattro spreadsheet, which has been well received by users of Lotus Development Corp.'s 1-2-3 because it can be modified to look and feel like that popular program.

In addition to Sprint's interface, Borland said it will offer alternative interfaces that mirror the look of such word processing packages as Micropro International Corp.'s Wordstar, Wordperfect Corp.'s Wordperfect, Microsoft Corp.'s Word and Ashton-Tate Corp.'s Multimate.

After bundling six industry-leading interfaces free of charge with Sprint's initial shipments, Borland said it will sell the word processing package separately for $99.

Aiming to please

"We're not trying to copy the other guys, but we're coming in as a very late player, and we have to provide flexible user interfaces to satisfy current users," said Jonathan Prusky, a product manager for Sprint.

The software requires a minimum of 256K bytes of random-access memory, but Borland recommends 384K bytes. Sprint runs on DOS-based IBM Personal Computers and compatibles and requires two 800K-byte floppy disk drives or a hard disk.

Development delays and marketing plans slowed the release of Sprint while other companies were seizing market share in the character-based word processor arena. But one analyst said Borland still has a chance to make a rush at such industry leaders as Wordperfect and Ashton-Tate.

"It's never too late to come out with a better product, and Borland stands a good chance of doing that," said David Perro, a software analyst at Dataquest, Inc. in San Jose, Calif.

Borland said it plans to ship a Microsoft OS/2 Standard Edition 1.0 version of Sprint in the third quarter for $299.95.

Future of Quattro linked to Surpass

BY DOUGLAS BARNEY
CW STAFF

SCOTTS VALLEY, Calif. — Borland International now knows what the future of its Quattro integrated spreadsheet will be. It will stem at least in part from a spreadsheet package called Surpass that Borland acquired the rights to last week.

Like Quattro, Surpass, from Surpass Software Systems, Inc., has attempted to butt heads with the de facto standard, Lotus Development Corp.'s 1-2-3. Unlike 1-2-3, the innovative Surpass failed to take the market by storm.

But Borland said Surpass not only features good technology but it also resulted from a top-notch five-man development team, which was the real target of Borland's affection, according to Borland Chairman Philippe Kahn.

Head off 1-2-3 Release 3

Despite the acquisition of the Surpass technology, Borland has committed to an upgrade of Quattro within one year that will be based entirely on the current version of the product, a spokesman said. After that, Borland will begin to take advantage of some of the features of Surpass in an attempt to head off corporate users' migration to the still-unshipped 1-2-3 Release 3.

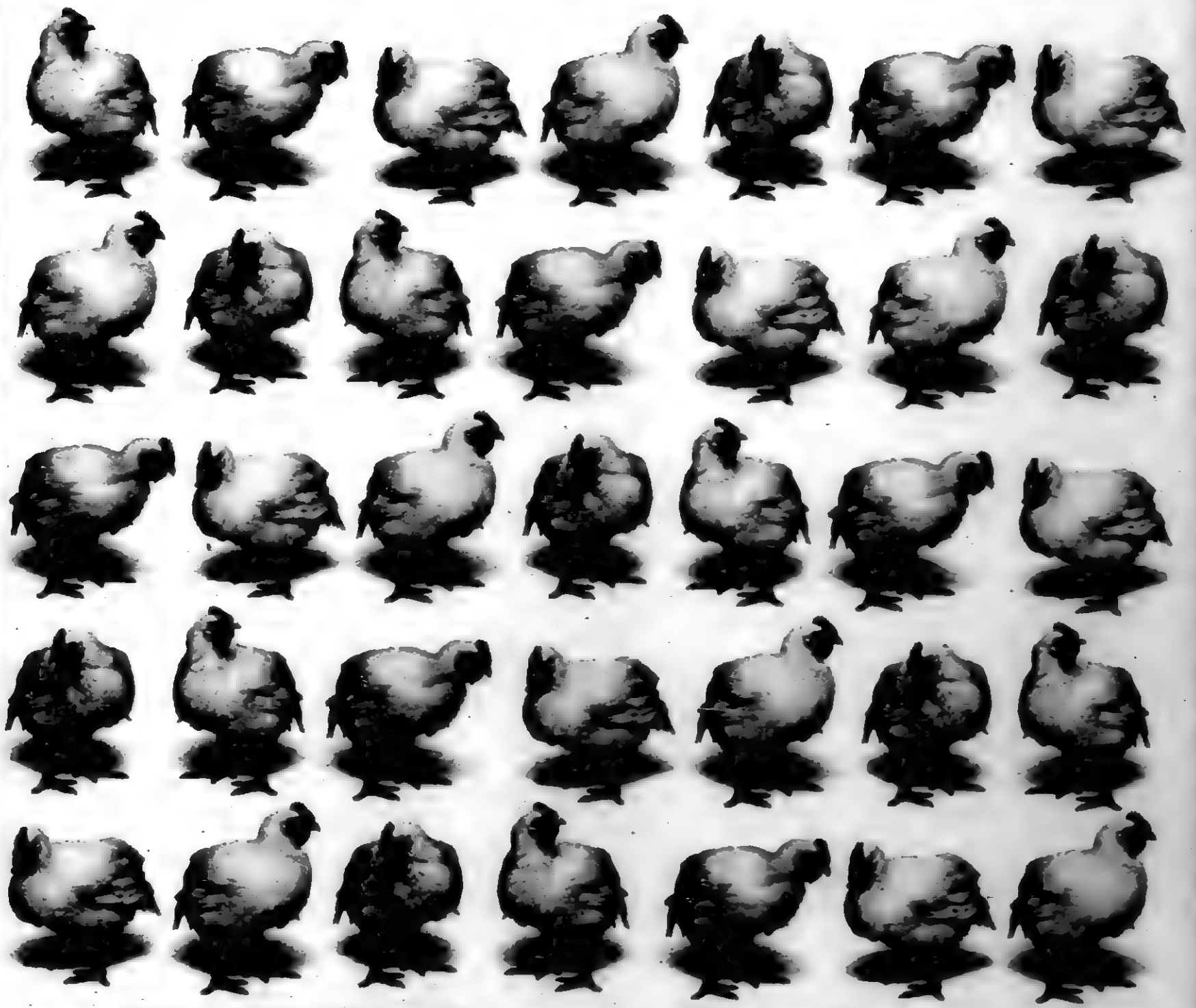
Chief among Release 3's attributes is file linking. "Microsoft Excel has file linking. Release 3 will have file linking and Quattro doesn't have it," a major software reseller explained.

The acquisition touched off a debate between the founders of the firms involved over the role Surpass will play in Quattro's evolution.

According to Surpass founder Seymour Rubinstein, Borland "can take certain features in Quattro and implement them in Surpass to the extent to which the customer base wants them."

Kahn, who calls those shots, dismissed Rubinstein's analysis. "He doesn't have much to do with this anymore," Kahn said. "He is not very technical."

Regardless of which software platform dominates Quattro's future, merging the two products may present some difficulty. Quattro was written in assembler and Surpass in Modula-2. That challenge will be tackled by the two firms' development teams, which will be merged to produce future versions of Quattro.



CINCOM Boosts Production At Holly Farms.

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Mr. Bill Clontz
Director of Computer Services
Holly Farms Foods

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As a result, programmer productivity at Holly Farms has reached an all-time high. "We've seen substantial improvement ratios," Clontz said. "In the time a programmer might turn out one CICS command-level program, he can turn out from six to eight programs on MANTIS."

Most of the 500-plus MANTIS applications now in production at Holly Farms are aimed at streamlining costs. For example, Data Processing used MANTIS to develop a model of how chickens consume feed over the course of their lives, allowing Holly Farms to cut production at one of its feed mills by 1½ days a week.

"We've got key users who are picking up on the term 'MANTIS,'" Clontz noted. "Around here, MANTIS has become a synonym for 'get it done quickly.'"

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Sterling buy-back fails

BY NELL MARGOLIS
CW STAFF

DALLAS — Sterling Software, Inc.'s recently proposed debt exchange and stock buy-back fell through late last month when debt-holders declined the offer, according to a company spokesman.

Under the recapitalization plan — announced several months ago, shortly after the IBM mainframe systems software vendor abandoned a proposed leveraged buy-out — Sterling offered to exchange an existing $106.5 million worth of 8% convertible subordinated debentures due in 2001 for straight debt at a higher rate: 11% notes due in 1998.

The company also offered to repurchase up to three million of its approximately six million common shares outstanding, at a price between $9 and $10.

Due to a restriction written into the current debt instruments, however, the transaction was conditioned on the holders of some $53 million worth of the 8% debentures accepting the invitation to exchange. They did not.

Sterling stock, which shot past 9 in anticipation of the recapitalization, declined after the offer expired May 27 to 6¾ at the middle of last week.

Had it been consummated, said Sterling spokesman Ray Hannon, the scuttled plan would have conferred two benefits on the company: financial flexibility — prominently, the flexibility to deal in its own shares — and freedom from the debentures' convertibility feature.

"We want fewer shares outstanding," Hannon said. "That's clearly our long-term intent." Since January 1987, he said, Sterling, permitted by its bond-holders to buy up to $15 million worth of its own stock on the open market, has been making intermittent but steady purchases. The company reached the $15 million limit in late 1987.

This latest failed bid for increased financial flexibility and decreased exposure to the vicissitudes of the public market will be the company's last for the time being, according to Hannon.

"There isn't any follow-on plan," he said. "Literally, it's just back to business as usual."

On the block

In unrelated news, Sterling last week announced the impending sale of its commercial professional services group, a $34 million programming and systems design business with operations both in the U.S. and abroad.

The 350-employee U.S. division, headquartered in Atlanta, and the 125-employee overseas operation will be sold as discrete units to separate buyers, Hannon said. Neither the terms of the sales nor the identities of the buyers was disclosed.

In a prepared statement, company President Sterling L. Williams tagged the divestiture "a continuation of our strategy to focus our resources on the specific software where we see the greatest long-term potential."

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Korean 4M-bit RAM progress exaggerated

SEOUL, South Korea — An overambitious publicity campaign, designed to secure government funding, is being blamed for misperceptions regarding Korea's efforts to develop a 4M-bit dynamic random-access memory chip.

In February, Samsung Semiconductor & Telecommunications Co., which had been cooperating in a joint research effort sponsored by the Korea Semiconductor Research Consortium, was reported to have completed development of such a chip. However, according to Samsung, its 4M-bit DRAM chip is currently a trial version awaiting extensive testing.

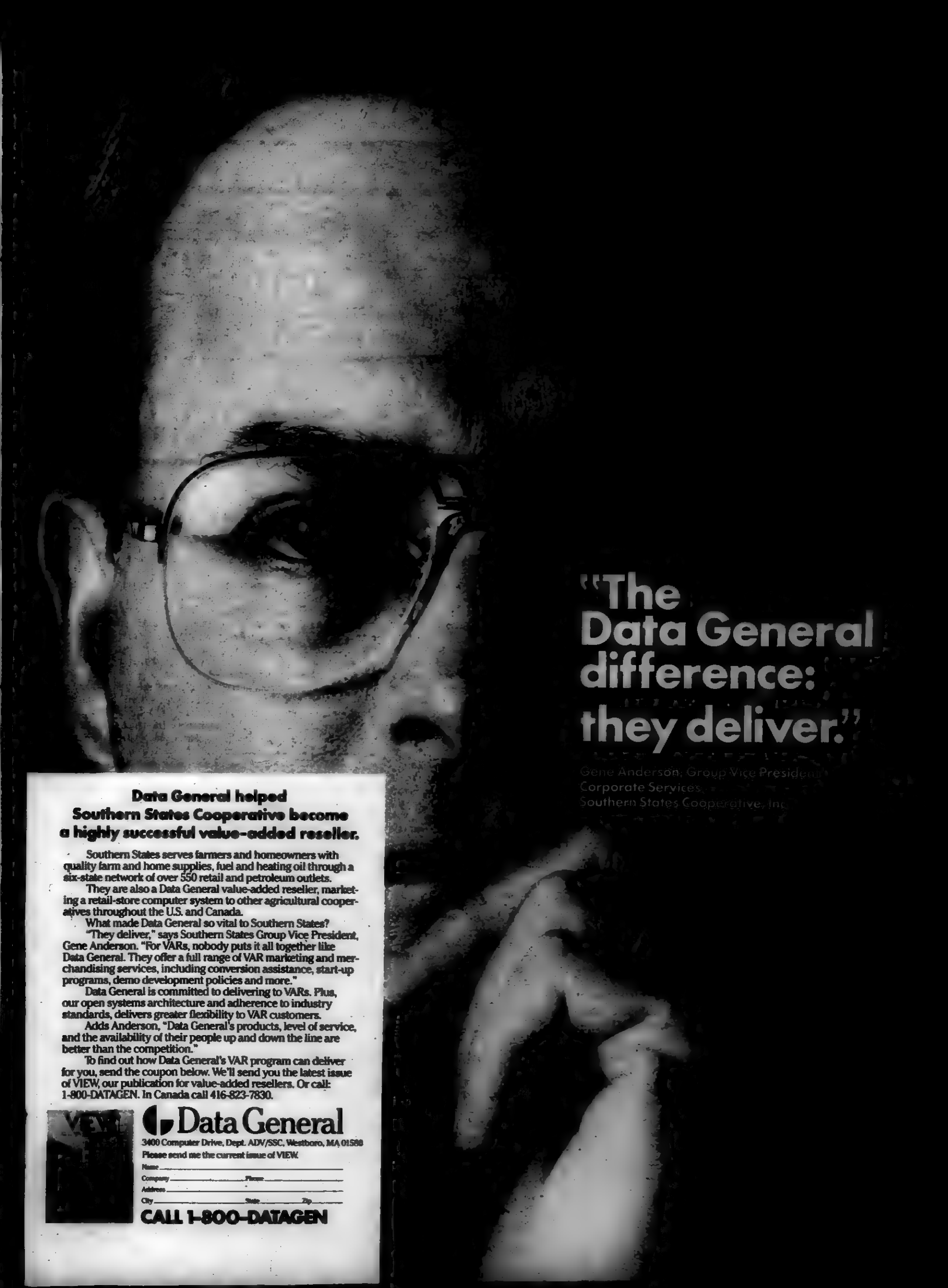
Other members of the joint research team, which has been disbanded, included a government-sponsored institute — the Electronics Telecommunications Research Institute — Goldstar Semiconductor and Hyundai Electronics.

The Korean government has earmarked $40 million for investment in the development effort, which was expected to result in a working product by March 1989. With the demise of the joint project, competition for the funds has heated up among the three companies.

The erroneous claims have prompted close scrutiny of the Korean firms by their U.S. and Japanese rivals, which are concerned that the Korean chip makers may be using proprietary technology fraudulently.

Hitachi Ltd. of Japan has filed a claim against Samsung alleging the latter firm is illegally using its patented DRAM manufacturing technology. Last year, Texas Instruments, Inc. collected $82 million in royalty fees from Samsung, which had illegally duplicated its processing technology for 64K- and 256K-byte dynamic RAM chips.

Several industry sources theorized that the Japanese firm is hoping to prevent Korean chip makers from capitalizing on the semiconductor trade disputes between Japan and the U.S.



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EDITORIAL

Worth the wait

IT'S BEEN A WHILE in coming, and when it arrives, it may fall slightly short of the lofty expectations laid before it.

But the funky new version of Manufacturing Automation Protocol, or MAP to a growing number of devotees, will be unveiled this week at the Enterprise Networking Event in Baltimore.

You just can't help but feel good about MAP 3.0 and the MAP effort in general. It's not necessarily that MAP 3.0 reaches new milestones in enterprisewide communications, which it does. Rather, MAP 3.0 represents the vanguard of a user-driven movement that, perhaps more than any other standards effort, has gotten the vendor community to bend to the will of its customers.

The rewards of this effort even before MAP 3.0 have been richly satisfying. Consider the case of Deere & Co. (see story page 43). The $4 billion manufacturing firm has parlayed a $2.5 million MAP cabling investment into a 50% reduction in its break-even point at its main manufacturing plant. A MAP and computer-integrated manufacturing combination also produced striking economies in other areas of production such as reduction of manpower and capital equipment requirements.

MAP 3.0 holds even greater promise. Enhancements to its presentation layer complete the protocol's compliance with all seven layers of Open Systems Interconnect's reference model. This will help users build applications that are increasingly hardware-independent.

Other elements of the enriched MAP 3.0 will provide faster response times and the ability to have higher throughput at the expense of some layers of the OSI model.

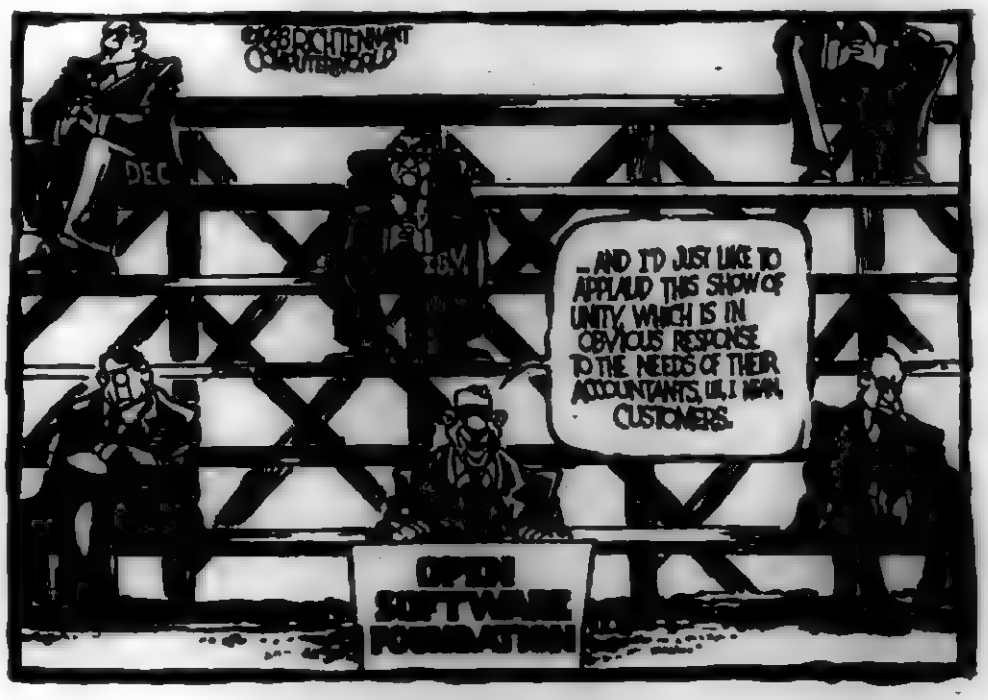
From the vendor community, MAP 3.0 will prompt generally higher performance products as well as quantum increases in data transmission speeds.

All this sounds even better when you realize that MAP was essentially founded as — and remains — a grass roots standards drive that, to this point, has resisted vendors that have attempted to position their products as de facto MAP standards.

Now an even larger battle looms for MAP enthusiasts — gaining the essential support from the upper echelons of management to extend MAP and its benefits in a truly enterprisewide fashion. This is a critical selling job, the success of which will determine whether MAP ever leaves the increasingly narrow confines of the factory floor and permeates the entire company.

Remember that the job of information professionals is to distribute the benefits of information technology throughout their organizations while masking the complexities of the technology.

Similarly, one good starting point in the MAP sell-job would be to mask — or, even better, eliminate — the sea of networking jargon and acronym alphabet soup from the sales pitch and stick to the basic fact: MAP saves.



LETTERS TO THE EDITOR

Open invitation

In Tom Umberg's letter to the editor [CW, April 11], he disagreed with me about the need for IBM DB2 source code. In my article [CW, Feb. 8], I used DB2 as an example of how software vendors are restricted in developing innovative and state-of-the-art software solutions for DB2 in categories such as fourth-generation language performance measurement, data base design and fast data retrieval because they do not have access to the DB2 source code.

Umberg was correct in that IBM has provided internal structures for DB2 data areas, and the company has followed strict naming conventions so that one can identify DB2 tables in the VSAM data sets. However, it is my contention that there are new techniques, such as artificial intelligence technology, where IBM's interfaces are woefully inadequate for building such DB2 complementary products.

I invite software vendors to write to *Computerworld* either supporting Umberg's position or mine.

Martin A. Goetz
Chief Executive Officer
Sybase Corp.
Hackensack, N.J.

Good from the bad

The article "Vendors skewing DBMS tests" [CW, May 9] was an excellent first step in sorting out bogus benchmarks from true performance measurements.

However, a few points need clarification:

• Relational Technology, Inc.'s Silver Bullet benchmarks were based on the same stringent Debit/Credit specifications used by Tandem Computers, Inc. — not the TP1 test mentioned as used by mid-range software vendors.

• Tom Sawyer at Codd and Date Consulting Group was the auditor on Relational's tests. Sawyer is a well-respected expert in both the OLTP and relational data base management systems fields.

• Relational was not "just interested in the measurement of the performance of its software." As this was a joint effort with Sequent Computer Systems, Inc. to implement a full-scale Debit/Credit benchmark, not a subset TP1 test, we very definitely had the auditor measure the entire system overhead.

The Ingres cost per transaction per second as measured included both TP monitor and other subsystem costs as dictated by the Debit/Credit specification.

• Relational selected Sequent as the target system not just because its systems offer excellent price performance. One of the goals of our Debit/Credit benchmark was to demonstrate linear scalability — for example, that Ingres delivers proportionate value as the system is increased in size. This was confirmed by Codd and Date.

Benchmarks are a complex and therefore sometimes misunderstood measurement of hardware and software performance. Still, they have their place in the product profile as one of many factors to consider when choosing a relational DBMS package.

Aaron Zornes
Director of Strategic Marketing
Relational Technology, Inc.
Alameda, Calif.

This week in history

June 5, 1978
Industry prognosticators bring IBM's rumored E computer series into focus. Power will range from about 100,000 to 1 million instructions per second, and the architecture will resemble a bus structure used in the recently announced Magnuson Systems Corp. M80 Models 3 and 4. IBM users will gain at least double the power of their current systems and even greater price/performance.

June 6, 1983
Data processing managers are poised for the reprogramming effort required to comply with the Tax Equity and Fiscal Responsibility Act of 1982. The act calls for financial institutions and corporations to withhold 10% of interest and dividend payments and pay those funds directly to the Internal Revenue Service.

A different tune

Hey William Zachmann, you got the wrong Bob Dylan line in "Toss out big iron" [CW, April 25]. Try again, man, maybe: "Something's happening and you don't know what it is . . ."

You missed the point. To

Continued on page 23

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

Out of the way, Dick Tracy

In a world of computer crime, sometimes the machines are the good guys

HARVEY NEWQUIST

Recent headlines make the computer industry look like it's riddled with crime. The computer itself is portrayed as an efficient replacement for the six-shooter in the hands of the modern-day Jesse James.

But computers can also be used to fight back — not just in tracking crimes but solving them. Expert systems and natural language interfaces are bringing better investigative techniques to police stations and federal agencies in the U.S.

The FBI will admit to but not discuss an expert system known as Big Floyd. This, the newest of the FBI's technological tools, will attack organized crime, particularly labor racketeering. Not to be outdone, the CIA also uses expert systems programming tools for a number of applications, especially personal computer-based programs.

Police in Baltimore developed an application to analyze routine household break-ins and burglaries. Typically, no one witnesses these crimes, and the police have only the clues left at the scene to work with. Baltimore's system required 200 hours of input from the department's veteran investigators regarding technique, gut feelings and hunches. The expert system covers everything from smashing windows to using lock picks on garage doors.

Farther west, the sheriff's department in Comanche County, Okla., uses Texas Instruments' Personal Consultant software to create AREST, the Armed Robbery Eidetic Suspect Typing system. This expert system application helps classify armed robbery suspects as possible or probable in a particular crime.

One of the most comprehensive projects any police department has undertaken to intelligently computerize its crime force occurred in King's County, Wash. The department, headquartered in Seattle, is hunting for the Green River Killer, a mass murderer believed to have killed as many as 46 women in the past five years.

The department's initial task in 1984 appeared insurmountable — sorting through 300,000 pieces of evidence and 2,000 suspects. Clearly some kind of computerized information system was going to be needed.

Judgment day

Investigators installed Judgment Space, or J-Space, from Information Access Systems, a Boulder, Colo.-based software developer. J-Space had been developed as an expert system and natural language tool for use on DEC VAX machines. J-Space's potential impressed police enough that they bought a VAX just for the investigation, despite being an IBM shop.

Most of the Seattle police department had never used computers. Thus, J-Space was designed to respond to natural language queries and associate different but related words.

The homicide investigation application went on-line in February 1985, using a VAX-11/750. The system has simplified storing and accessing an ever-growing mountain of information. More victims have been discovered in just the past few months, and the computerization is helping the Green River task force deal more efficiently with accumulating data.

Granted, tracking burglaries and serial murderers is not an everyday occurrence within corporate America's data processing environment. However, criminal investigation agencies face many of the problems encountered by traditional MIS departments.

Information Access is installing an MIS system for the Colorado Bureau of Investigation (CBI) called the Serious Offense Tracking System. As part of the National Law Enforcement Telecommunications System network, the bureau exchanges information on homicides, kidnappings, aggravated assaults and robberies, rapes and arson.

Via this network, each participating agency receives hundreds of reports per month from various national and regional crime information centers. Because of this huge flow of information in and out of CBI, processing delays have become standard procedure — nothing new to corporate America's DP centers.

Arson or robbery?

Since most information concerning serious offenses is time-critical, crime agencies are becoming bogged down. Information Access's system automatically classifies data from reports based on the offender's mode of operation.

Once stored in this way, the Colorado bureau can retrieve information in the form requested. A conversational phrase can be used as a system query, thereby making full use of natural language capabilities.

The system then identifies and retrieves crime reports in order of similarity to the crime described by the requesting agency. Thus, the program makes a judgment about the type of crime or criminal and identifies those it finds similar.

Certainly, using fancy technology for law enforcement is something that Dick Tracy and his boys thought of many years ago. But it is the implementation of good hardware and advanced programming techniques that make that idea a reality.

As local and national agencies face larger MIS needs, a growing population and shrinking budgets and manpower, intelligent systems may prove to be better than anything Dick Tracy ever dreamed of.

Newquist writes and consults on artificial intelligence and other advanced high-technology topics from his office in Scottsdale, Ariz.

PAUL MEISEL

The time has come for IBM to deliver the goods

Customers are ready to return to the familiar

AMY WOHL

Is the tide turning? Has the pendulum swung back? Is the time right? Industry analysts may yet bold their tongues — and their opinions — waiting for more specific information. But the customers have begun to hum. It is nearly announcement time at IBM, and this time, the customers say, IBM has got the goods.

Remember, folks, the customers buy the goods. They have been miserly with IBM for a good long time, preferring to distribute their money among greater numbers of vendors.

They must have thought decentralizing meant buying from someone other than IBM. That isn't surprising, considering that IBM has been slower and more clumsy at offering appealing mid-range solutions.

Many customers have preferred to buy their departmental processors, scalable solutions and flexible LAN technology from somewhere other than the Big Blue Department Store. IBM solutions were viewed as fragmented, expensive and late.

The singles scene

A significant number of user organizations, particularly larger ones, are buying a lot of Personal System/2s, and quite a few are buying only PS/2s. Of course, many are buying PS/2 Model 30s, which are new personal computers only in terms of manufacturing data and not in terms of processor technology, speed, bus structure or capability.

Everyone is interested in multivendor solutions; that is, they want to be able to hook together many different brands of equipment into a single, transparently interoperable system. At the same time, much of the emphasis is on integrating what people already have rather than on encouraging or permitting the same flexibility of choice in future selections.

In fact, customers seem to be directing themselves toward a smaller, more controllable number of suppliers. But they are tired of acting as their own systems integrators in making such complex solutions happen. They are also frustrated by how much such solutions cost to implement and maintain.

Customers also point out how difficult it is to achieve reasonable levels of integration, with the goal being to send any kind of document in editable form from one workstation to any other workstation, regardless of vendor, software, architecture or location. Some customers are probably ready to swing the pendulum back toward single- or at least fewer-vendor solutions.

Comfort of the familiar

These frustrations are peaking at the same time a number of events are occurring: IBM's impending announcements of new PS/2 models and Silverlake. The PS/2 announcement will make the flavor and direction of IBM's commitments to PCs as workstations and the PS/2 as IBM's PC much more clear. In Silverlake, IBM's mid-range strategy comes to light at last, and this time, we suspect, the market may give it an enthusiastic reception.

What we are really seeing is the natural disillusionment that comes with growing familiarity — the familiarity of longtime IBM customers with other vendors of mid-range systems, especially DEC — coupled with new opportunities to return to the familiar, or IBM's product announcements.

The time seems ripe for rearranging, and some customers are deciding that in the complex dance routines of customer-vendor relations, changing partners one more time looks good.

Silverlake speculations are everywhere. We could add our two cents, but the real point is not the architecture of the new machine or the intimate details of its operating system. The real issue is what the new platform offers and how it relates to IBM's and others' existing products.

When it debuts, Silverlake will look a lot like one more IBM product with one more operating

Continued on page 23

THE TIME seems ripe for rearranging, and some customers are deciding that in the complex dance routines of customer-vendor relations, changing partners one more time looks good.

Wohl is president of Wohl Associates in Bala Cynwyd, Pa., and editor of "The Wohl Report on End-User Computing" newsletter.

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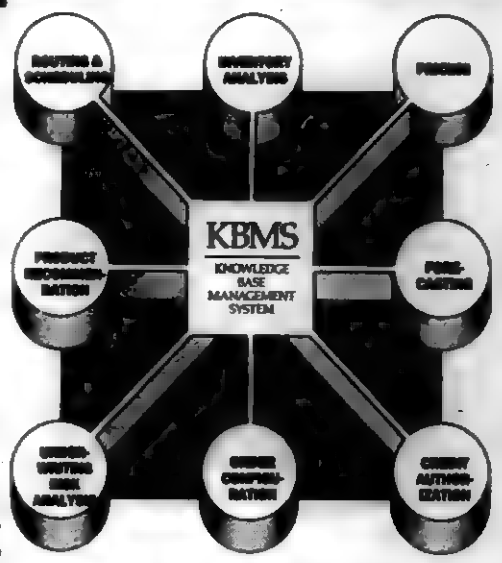

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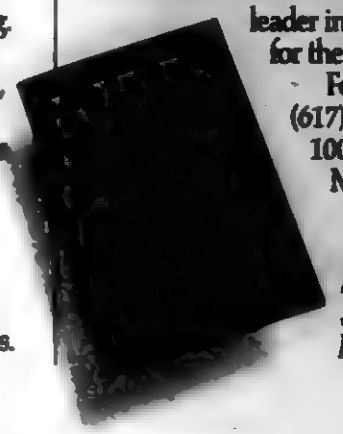

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Different

FROM PAGE 20

start with, the million instructions per second (MIPS) issue is a red herring. The MIPS might look cheaper on the IBM Personal Computer, but can you begin to utilize them when most of the computer's time — as the computer sees it — is spent waiting for some user response? And since OS/2 is a single-user multitasking operating system, that situation is not about to change. The only time your PC is really busy is when it is trying very hard to be a television — for example, processing graphics — which all too often is when it is trying to compensate for its user's poor literacy skills and lack of analytic ability.

But the real issue here — the one that made Zachmann want to trash those *mainframes* — is something else entirely. It is an issue of control, of who calls the shots: the individual — the PC user — or an insensitive bureaucracy — MIS management.

Right now, the individualists may be programming in C on PCs, but there is no magic in the language or the box. Once PC-based systems start taking over the functions of today's mainframes, management will impose the same stultifying middle management-dominated control structures on those systems.

The real issue is that the hierarchical model of corporate management that evolved to control mass production is inadequate for managing intellect-intensive enterprises like software development. This is amply illustrated in the PC world as small, innovation-driven companies run by programmers that used to produce masterpieces are acquired by businessmen who turn them into large marketing-driven companies run by executives who produce vaporware.

Janet Ruhl
Ruhl Computer Services
Windsor, Conn.

IBM goods

FROM PAGE 21

system and one more architecture. It probably will not look like one more interface, because we expect it to be Systems Application Architecture-compliant.

But that picture could be deceiving. Silverlake is the follow-on for an entire family of products (System/36 and 38, of course, but also the long-forgotten System/32 and 34). Therefore, it is likely to be broader in size and higher in price than the usual IBM product line.

HINTS ABOUT properly positioning Silverlake seem unusually thorough, even for IBM

Benefits abound

IBM's mid-range, then, could start to look like a broadly scalable environment with a single operating system that is able to run an entire large population of software across a broad line of hardware.

Add in the fact that IBM clearly intends to facilitate porting System/36 and 38 software to the new processor family. This potential capability would give Silverlake an immediate software population and deftly avoid the usual new system start-up problem of, "Nice hardware, let me know when the software comes."

Hints about properly positioning Silverlake seem unusually thorough, even for IBM: Customers seem well briefed, and developers nod knowingly whenever anyone mentions Silverlake.

What happens now? IBM makes its announcement and we see what the real product and the actual delivery dates look like. Early customer reaction will range from the cautious — "We consider all appropriate new IBM products" — to the cynical — "That's a scalable operating system?" — to the enthusiastic — "We're pinning our new strategy on it."

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SOFTWARE & SERVICES

SOFT TALK

Howard Fosdick

DB2 users can be choosy

On-line DB2 programs can be written in four ways: with CICS, IMS/DC, TSO/ISPF or the DB2 Call Attach Facility. One or more of these monitors may attach to DB2 concurrently; DB2 handles data integrity, regardless.

This leaves programmers with a choice they did not face in the world of third-generation data base environments like IMS/DB or DC and CICS/VSAM. For the first time, developers may choose for which teleprocessing environment to write their applications. Statistics from the Midwest DB2 User Group show that more than 90% of IBM DB2 sites install one of the transaction monitors (CICS and IMS/DC) and TSO/ISPF. How do developers judge which on-line environment is most appropriate?

First, let's discuss the Call Attach Facility. This approach is significantly different from the others — it is rarely used by MIS shops. Call Attach provides a low-level connection to DB2 through a small group of commands. Programs must monitor their DB2 connection themselves, but this level of detail and

Continued on page 27

Curing backup blues

Comdisco, Sungard open electronic vaults to banks

BY ALAN ALPER
CW STAFF

NEW YORK — Electronic vaulting — the transmission of backup data for an executing application — is about to be ushered into existence in New York's competitive banking environment.

Comdisco Disaster Recovery Services, Inc. and Sungard Recovery Services, Inc. have both disclosed plans to offer competing 24-hour, seven-day-a-week vaulting services.

In the event of a disaster, the electronic vaulting service is expected to expedite the entire data recovery process. Vaulting eliminates the need to physically transport backup tapes from a customer's data center to a remote facility, which is usually hours away, and then to a recovery center.

"Electronic vaulting overcomes the logistical problem of having a number of [backup tape] pickups each day," said Jim Bigham, a vice-president at Prudential-Bache Securities, Inc. "This way, at the point a system finishes up, you can send the data to the off-site vault. It reduces your exposure and enables you to restore faster."

The services are expected to initially appeal to financial institutions that process high volumes of on-line transactions each day of the workweek. Those companies are particularly vulnerable if a disaster strikes during the day, said Rick Wargo, Comdisco's vice-president of product development.

Comdisco's approach is software-intensive and involves di-

Continued on page 27

DEC utilities allow Cray programming on VAX

BY NELL MARGOLIS
CW STAFF

MAYNARD, Mass. — A recently introduced set of software tools and services from Digital Equipment Corp. allows programmers to develop Cray Research, Inc.-specific code on a VAX, according to a DEC spokeswoman.

The VAX SDE/Science Integration Package, which debuted in Boston last month at the Second World Supercomputer Exhibition, offers scientific researchers working with computationally intensive applications — the kind that mandate supercomputing clout — the chance to save application development time.

DEC is targeting the new software package at researchers involved in fields such as molecular modeling, high-energy physics, computer simulation and computational fluid dynamics. Such researchers are often found in industrial sectors such as government, aerospace, education and petroleum.

The VAX SDE/Science Integration Package includes templates, or programming guidelines, that let VAX-based users write code in Cray Fortran 77,

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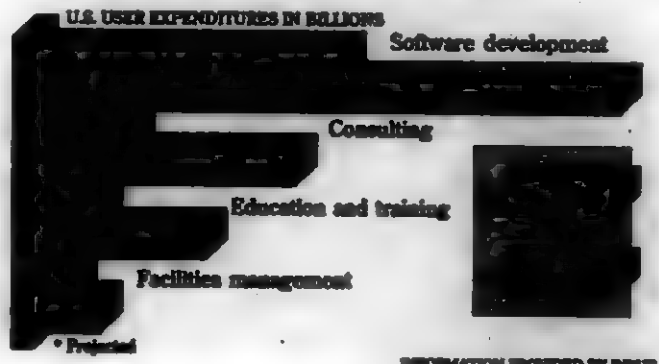
Inside

- Oracle eases complexities of report writing. Page 26.
- ADR promises Cobol users swift development. Page 26.
- CDC's latest NOS/VE lets users cluster up to eight Cyber mainframes. Page 29.

Contract services growing 16% annually

With limited internal skills and increasing application backlogs, many organizations are turning to outside services



INFORMATION PROVIDED BY INPUT
CW CHART

BMC puts DB2 tool out to test

BY JEAN S. BOZMAN
CW STAFF

HOUSTON — BMC Software, Inc. in Sugar Land, Texas, is conducting four-month beta tests of a new utility that it claims will manage disk drive use for sites using IBM's DB2 relational data base.

Called the DB2 DASD Manager, the $20,000 system is slated to be generally available in the fall.

The software package automates critical DB2 management functions, such as the labeling of direct-access storage device volumes for DB2 table spaces. It also collects data on DB2 transactions, allowing users to determine whether their DB2 system is functioning efficiently, company spokesmen said.

The DASD Manager estimates disk space requirements, allocates VSAM files, enforces DB2 naming conventions and automatically generates job streams for DB2 utilities.

"We let the user define which

Continued on page 28

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Oracle report writer bypasses programming

BY NELL MARGOLIS
CW STAFF

BELMONT, Calif. — Oracle Corp. is currently offering a report writer that lets users quickly create complex reports from information stored in relational data bases without resorting to any programming, according to the company.

The SQLstar Reportwriter builds reports from data base objects, leveraging off the advantages of SQL constructs to ease and speed data manipulation, according to Oracle's director of new products, Larry Stevens.

Meanwhile, he said, a nonprocedural visual interface shields users from the complexities of the software's function.

The result, Stevens said, is a software package that delivers the likes of multicolumn labels and form letters, cross-tabulation/matrix reports and multisection reports that present data from more than one SQL query with a sizable savings in development time.

Helper

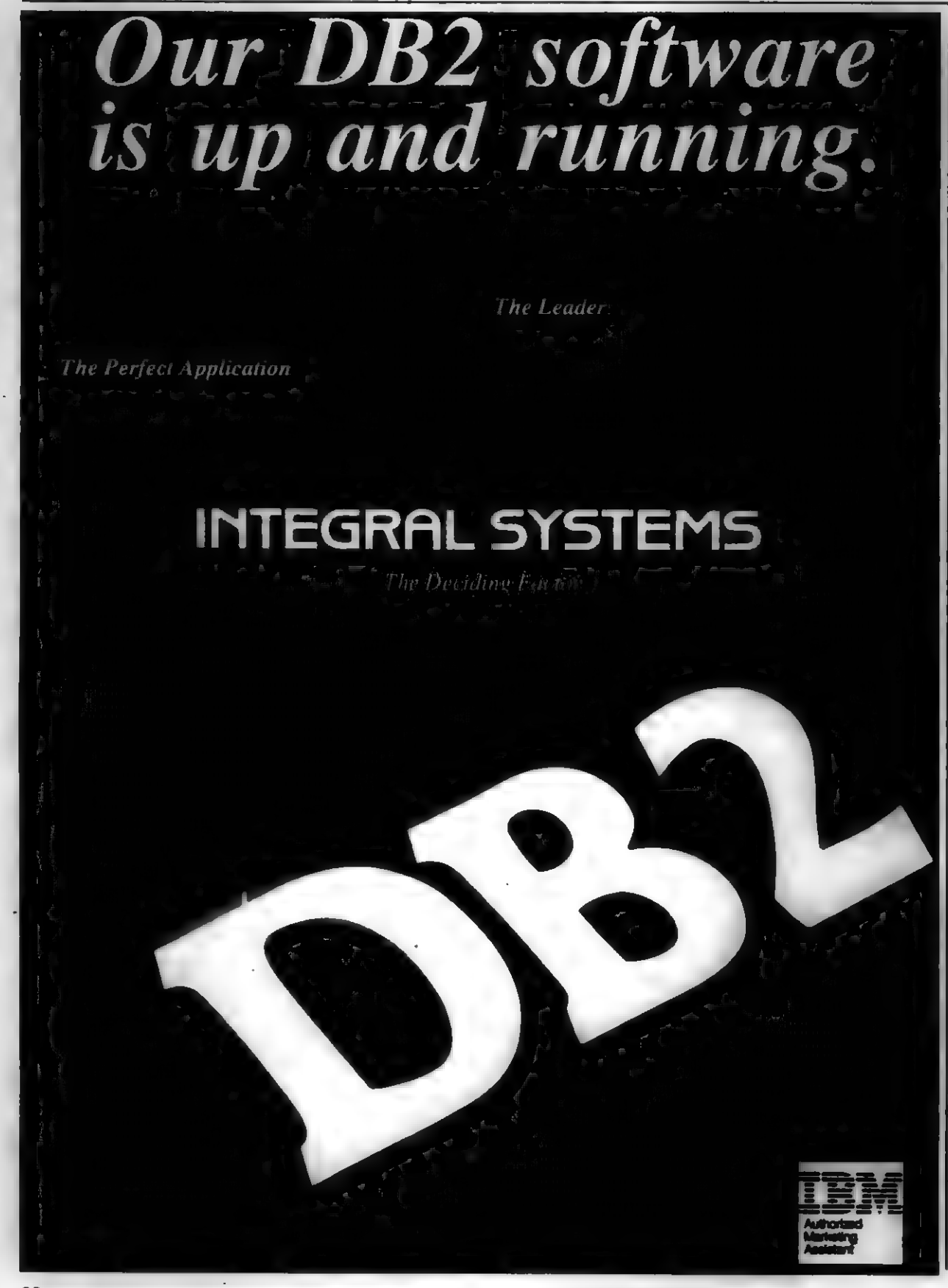
Prominent among the features that distinguish the new reporter is Hyperhelp, a context-sensitive Help facility that lets users access a Help screen by identifying a puzzling word or phrase with the cursor. Each successive layer of help needed can also be reached with a keystroke. Hyperhelp, which debuts with SQLstar Reportwriter, will become a standard Oracle feature, according to Stevens.

In addition, SQLstar Reportwriter offers a series of built-in functions to aid the user in a series of calculations, such as rank, total, running percent of total and average. A special layout feature offers the possibility of integrating the results of multiple queries into a single report, and a forward-reference facility provides advance totals and other often-delayed information throughout the report.

When coupled with the SQLstar Connect component of Oracle's SQLstar distributed data base management system, SQLstar Reportwriter users can reach beyond Oracle into other SQL-standard data bases, an Oracle spokesman said.

The report writer need not reside on the same system as the data bases to be used, the vendor said. Through Oracle's networking product, SQLstar Net, users can access data bases across systems connected via communications protocols, including IBM's Systems Network Architecture, Digital Equipment Corp.'s Decnet and Transmission Control Protocol/Internet Protocol.

The SQLstar Reportwriter is available on DEC VAX/VMS and Sun Microsystems, Inc. workstations. Prices range from $200 to $64,000.



ADR revamps Cobol aids

PRINCETON, N.J. — Two releases from Applied Data Research, Inc. (ADR) promise Cobol users a swifter, surer trip through the application development and maintenance life cycle.

For Metacobol Release 10.0, ADR revamped the architecture of its batch Cobol preprocessor to reduce execution time by as much as 50%, according to the company.

While enhanced macroprocessing capabilities, virtual storage usage and addressing techniques speed execution, newly expanded 16M-byte internal tables allow users increased developmental flexibility, according to a company spokesman.

Emmx code conversion

Metacobol Release 10.0, the spokesman said, handles code conversions between Cobol dialects with greater facilities than formerly, and it includes strengthened quality assurance aids and structured program development capabilities.

In addition, the latest Metacobol fully supports ANSI Cobol 85 as implemented in IBM's VS Cobol II, according to ADR.

Such support includes recognition and expansion of nested copy procedures as well as all VS Cobol II-specific syntax forms, including new language elements, extended data item sizes and new key words.

Continued support

Also newly available, Release 3.1 of ADR/DL, the company's interactive Cobol application development and maintenance system, continues the already-seeded integration with ADR's Datadictionary product with the implementation of 30-character name support as well as test-status data-view support.

In addition, reliance on Datadictionary facilities yields 30% to 80% improvements in precompile time, according to an ADR spokesman. Such enhancements increase ADR/DL's data manipulation language support for the company's Datacom/DB data base management system, the company claimed.

Permanent license prices for Metacobol range from $9,700 to $12,800; ADR/DL permanent license prices range from $23,500 to $31,500. Six-, three- and five-year leases are available.

DEC

CONTINUED FROM PAGE 25

Cray Fortran 1.15 and Cray C to be compiled on a Cray supercomputer, the spokeswoman said.

The DEC software also includes interfaces to Cray compilers as well as to Cray communications software and a number of third-party scientific subroutine libraries already popular among scientific users. Thus equipped, developers can skip several steps in writing, editing, compiling and debugging Cray applications, the spokeswoman said.

In addition, DEC has expanded two VAX tools to coordinate with the new software package in working with Cray languages. The VAX Language Sensitive Editor now contains templates to help users get Cray syntax correct and transfer Cray code to the supercomputer for compilation in a single step without mastering the Cray.

The editor also makes templates and Help screens available to the user.

The DEC/VAX Module Management System streamlines the maintenance of Cray applications by simplifying management of module changes and relationships, the spokeswoman said.

VAX SDE/Science Integration Package, which requires a Decnet connection to a Cray system as well as the appropriate Cray software, is slated to be available in the first quarter of fiscal 1989 at a license price of $15,503.

Fosdick

CONTINUED FROM PAGE 25

control may be desirable in certain circumstances.

For example, concurrent attachment to more than a single DB2 subsystem is possible. Application developers usually prefer the wide range of application services supplied by monitors such as IBM's TSO/ISPF, CICS and IMS/DC to the Call Attach Facility.

The TSO/ISPF environment offers higher programmer productivity, greater ease of use and greater flexibility than either the Call Attach Facility or the transactional monitors. As the "dialogue manager" of IBM's Systems Application Architecture, ISPF also provides various cross-systems advantages.

These include transferability of programmer and end-user skills, a consistent user interface and a high degree of code transportability. ISPF's companion product, ISPF/PDF, extends these cross-system advantages to the programmer's development environment.

More interesting than these general characteristics, however, are the benefits of TSO/ISPF that are specific to DB2 programming. A whole new kind of programming is evolving, distinguished from the transactional applications traditionally written by MIS departments. These new applications offer very high function per logical transaction and

Continued on page 28

Curing

CONTINUED FROM PAGE 25

rect communications under IBM's Systems Network Architecture and VTAM between a customer's mainframe and a dedicated host at the firm's hot site in Carlstadt, N.J.

Data is transmitted at speeds ranging from 9.6K bit/sec. on T1 lines to 6M bit/sec. over T3 fiber-optic lines and is stored on IBM 3480 cartridge tapes. The company is remarketing System Center, Inc.'s Network Datamover bulk-transfer software, which allows users to transmit data either in batch or interactive modes or by designated times of the day.

Comdisco will also offer remote transaction-logging software developed by E-Net Corp., which provides journaling capabilities. E-Net, in which Comdisco has acquired a one-third interest, is also developing software to provide data base shadowing capabilities, Comdisco said. The company is also remarketing NTX Communications Corp.'s 3800 communications processor to provide channel speed communications.

Comdisco prices range from $2,500 to $20,000 per month and include one shift of use and all the technical support required to store backup data on IBM 3480 tape cartridges. The company is conducting beta tests at its Chicago data center and at a New York bank, believed to be Manufacturers Hanover Trust Co. An early support program will begin this month with six customers, Wargo said.

Comdisco is establishing a separate subsidiary to operate its vaulting service, Comdisco Computing Services Corp., which will be located at its Carlstadt recovery site. To form the subsidiary, the company is acquiring the majority of the assets of Manufacturers Hanover Data Services Corp., a unit of Manufacturers Hanover Trust.

Sunvalt security

Sungard's service, called Sunvalt, is based on a channel extension approach using Data Switch Corp. high-speed data switches, both at the customer's data center and at Sungard's Philadelphia hot site.

To maintain a high level of security, each customer will receive a dedicated vault within the hot site with a capacity to store 15,000 IBM 3480 cartridge tapes. Each vault is walled off and can only be accessed by card keys, Sungard said.

Pricing on the Sunvalt service, which is set to be launched at the end of the month, will range from $3,500 to $15,000 per month.

Fosdick

CONTINUED FROM PAGE 27

promise great value to the business enterprise. However, these programs also have a high cost in terms of CPU and I/O requirements.

This new kind of programming might be called interactive or conversational programming. It represents the combination of the TSO environment, the relational data base management and the ISPF application extensions to the TSO monitor.

A TSO/ISPF DB2 application requires compatibility with older TSO-based applications. It also requires integration with several language options for DB2 programming, as well as end-user access to data through ad hoc queries. This last need is met through tools like IBM's QMF and DBEDIT or through DB/PRO-EDIT, from Updata Software in Holmdel, N.J.

All these tools are accessible through the TSO/ISPF interface. TSO/ISPF is the preferred monitor for this application because it provides the flexibility, end-user access and compatibility desired.

The CICS and IMS/DC monitors support the traditional, transactional programming required in so many MIS applications. These transactional monitors optimize the use of computer resources and result in more efficient systems than does TSO/ISPF.

For example, transactional teleprocessing networks often support several thousand on-line concurrent users, whereas equivalent hardware can only support a couple hundred TSO/ISPF DB2 users.

Transaction-based applications — requiring best response time, supporting a large number of users, handling multiple concurrent updates and needing transaction management facilities — are good applications for CICS or IMS/DC environments.

The bottom line is that there are valid reasons for the use of the DB2 Call Attach Facility, the TSO/ISPF environment and the CICS and IMS/DC monitors for DB2 on-line programming.

Application developers now face a choice of teleprocessing monitors for on-line DB2 programming. Developers should not merely implement under the system of their past experience. For best use of DB2, programmers must recognize the characteristics of the different on-line environments. Users face a richer range of options and must intelligently choose among them.

Fosdick is president of the Midwest DB2 Users Group and has written *Using IBM's ISPF Dialog Manager* and *VM/CMS Handbook*.

BMC

FROM PAGE 25

DB2 utilities he wants to run and against which applications they should run," said Jack Olson, a senior developer at BMC. "Then, we generate all of the job commands through our program."

The DASD Manager allows users to restart a DB2 application, giving DB2 data base administrators greater control, Olson said.

Freedom

"Right now, you have data base administrators spending much of their time writing miles and miles of JCL code," Olson explained. "We are trying to free them from the most repetitive parts of their job."

Olson demonstrated the DASD Manager at a recent BMC conference, showing how the product can cut set-up time from several hours down to several minutes.

The DASD Manager may ease the migration of data from one DB2 system to another, Olson said.

He said the DASD Manager's import function will take in the existing object definitions from the first DB2 system and then allow users to edit the object definitions.

Finally, the DASD Manager will build and execute a work list that will create objects in the new DB2 system, according to company claims.

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NEW PRODUCTS

Systems software

Control Data Corp. has introduced a version of its NOS/VE Cyber operating system, which allows users to cluster up to eight CDC Cyber mainframes for transparent file sharing, according to the vendor.

NOS/VE Version 1.3.1 is also said to include improved validation and resource management capabilities, job scheduling enhancements and greater disk fault tolerance. Software application development capabilities have also been enhanced.

NOS/VE Version 1.3.1 costs from $15,994 to $278,198, depending on Cyber mainframe size.

CDC, 8100 34th Ave. S., Minneapolis, Minn. 55420. 612-853-6137.

Applications packages

Symbolics, Inc. has announced **Statice**, an object-oriented data base system for its line of symbolic processing systems.

The product is said to provide permanence, sharing and consistency of objects within the processor's programming system. The system was designed to ensure accurate and orderly maintenance of data objects, including those utilized by multiple users.

Statice costs $10,000 per site license.

Symbolics, 11 Cambridge Center, Cambridge, Mass. 02142. 617-621-7500.

Languages

Applied Dynamics International has announced the availability of Fortran for use on the company's scientific computer, the System 100.

Called **Fortran/AD**, the product can reportedly be used to run both real-time and non-real-time continuous system simulations. The software is targeted at general engineering applications, including those that are computationally intensive, involve high numerical precision and need to access large function generation tables in an on-line environment.

Fortran/AD costs $15,000.

Applied Dynamics, 3800 Stone School Road, Ann Arbor, Mich. 48108. 313-973-1300.

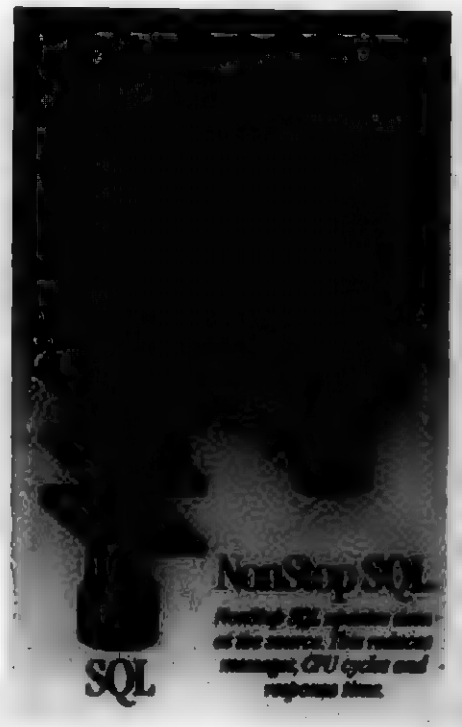
Utilities

Software Translation Corp. has repriced **Cequal**, its Fortran-to-C converter utility.

Now offered at $495, the product reportedly translates 100% of Digital Equipment Corp. VAX Fortran and its extensions to ANSI C with a set of I/O and mathematical runtime libraries that emulate Fortran functions on the DEC VMS operating system.

A demonstration version of Cequal costs $75, which the vendor said will applied toward the future purchase of the Cequal utility.

Software Translations, 1223 Peoples Ave., Troy, N.Y. 12180. 518-271-1222.



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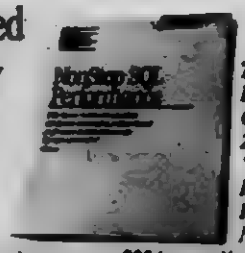

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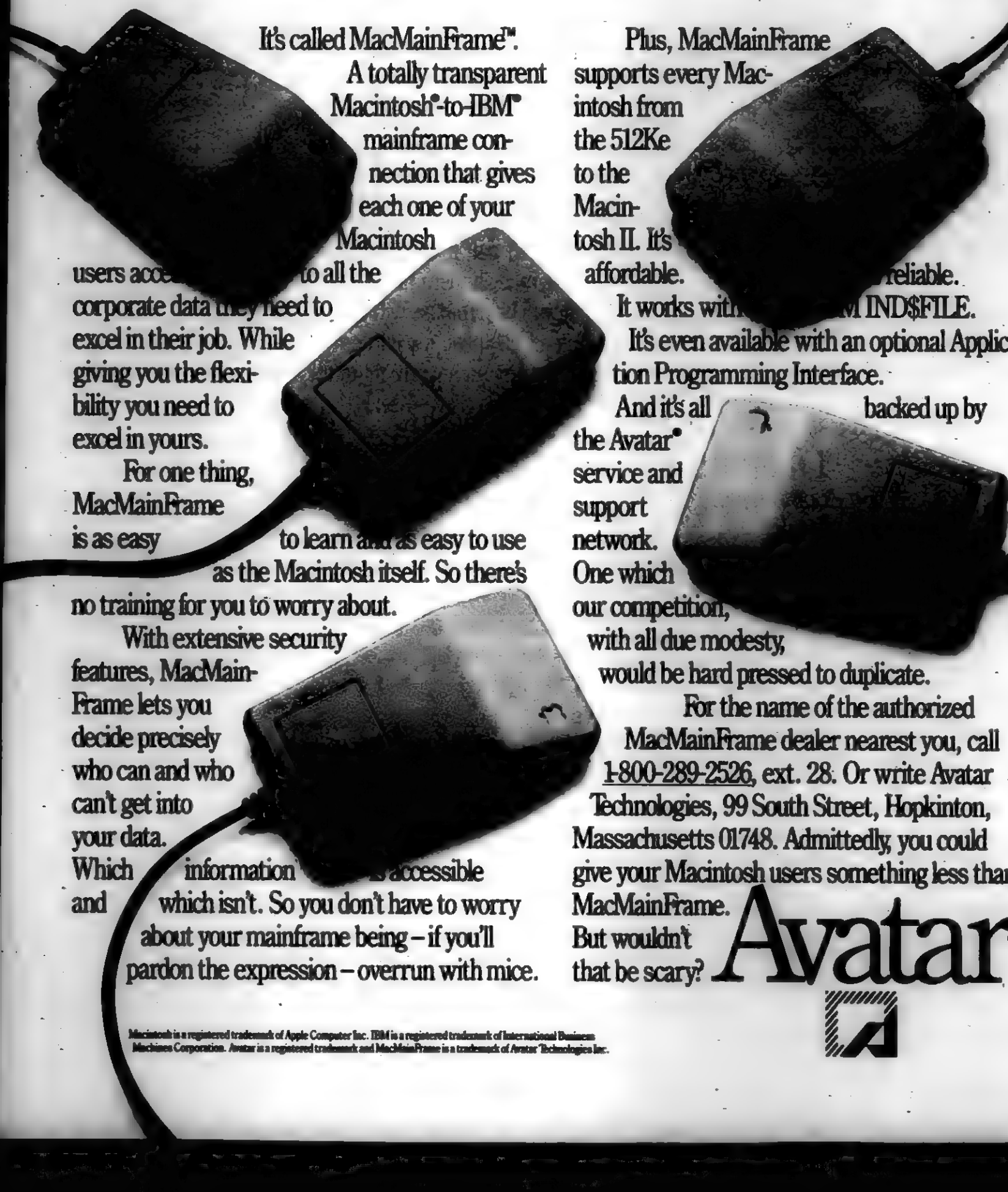

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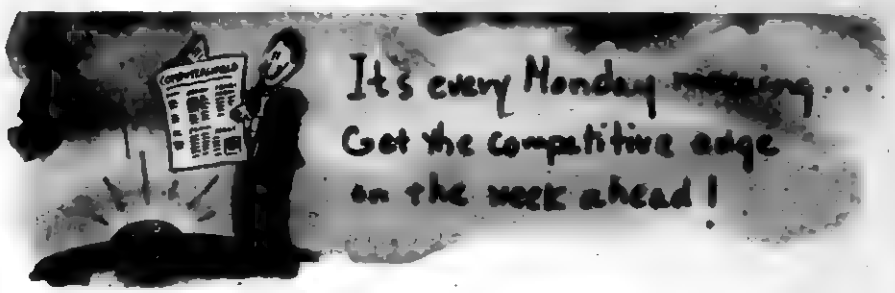

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MICRO BITS

Douglas Barney

IBM tunes in Micro Channel

The big bad Micro Channel. Many users and IBM competitors have wondered just what is so great about IBM's Micro Channel architecture. In fact, many skipped the wondering part and jumped right into the lambasting stage. It has been extraordinarily easy to criticize the Micro Channel, because its benefits have so far been elusive. There are simply no boards yet that take specific advantage of it.

A recent conversation with an IBMer shone some light on this still-controversal subject. According to Dick Kamerer, users can do things with a Micro Channel that are just impossible with the older IBM Personal Computer and PC AT buses. Kamerer, who serves as senior planner on IBM's OS/2 Extended Edition, should know.

This gets a mite technical, so close your eyes and go with it. You can run two asynchronous sessions on a PC bus, but eight on the Micro Channel. You can run only one IBM Synchronous Data Link Control (SDLC) session on a PC bus, but two on a Micro Channel. You cannot mix and match asynchronous com-

Continued on page 38

New-wave engine gearing up

Multics architect approaches relational with an unconventional twist

BY DOUGLAS BARNEY
CW STAFF

SANTA MONICA, Calif. — Later this year, the first in what may be a torrent of products based on a radically new data base engine technology from Nucleus International Corp. will ship.

The vision for the technology is attributable to Edward L. Glaser, a computer architect who wrote the original Multics operating system for Honeywell Bull, Inc. mainframes. For his complex development work, Glaser, who is blind, uses an elaborate speech synthesis system that dictates the code.

Lockheed Corp. was so impressed with Glaser's ideas that it kicked in approximately $8 million to get the product to market. Lockheed may use the software on chips for military applications, such as a fighter plane data acquisition and analysis system, according to Derek McLeish, president of Nucleus.

The engine will inevitably butt heads with a variety of players, including IBM, Sybase, Inc., Lotus Development Corp. and Oracle Corp.

All of these vendors use somewhat conventional approaches to building engines and are largely differentiated by performance, the particular dialect of their SQL, front-end tools and networking support. So far, however, only Oracle is delivering a micro-based data base engine.

With most engines still in development, it could be anybody's ballgame. "We are a dark horse in this whole relational engine race," McLeish said. The Nucleus product has been in development since 1983.

The SQL-based software departs from conventional SQL systems, which store data in rows and columns, often storing the same piece of data many times.

Nucleus has a different approach. It stores data as vectors or pointers to domains of data. As a result, the data values appear in just one location.

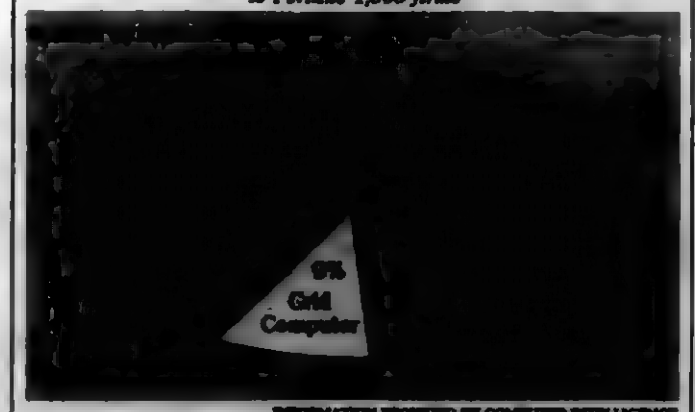
This approach offers several benefits, Nucleus officials and observers claimed. The system

Continued on page 38

Data View

Toshiba tops laptops

The Japanese manufacturer is the biggest supplier of laptop machines to Fortune 1,000 firms



INFORMATION PROVIDED BY COMPUTER INTELLIGENCE
CW CHART

Progress adds SQL support

BY ED SCANNELL
CW STAFF

BEDFORD, Mass. — Progress Software Corp. recently said it plans to incorporate support for SQL within the upcoming release of its fourth-generation language and data base management system this fall.

The company said it has structured the product to accept SQL and Progress statements in the same procedure. Developers can use pure SQL syntax, regu-

Continued on page 36

Framework reborn as net package

TORRANCE, Calif. — After almost 2½ years, Ashton-Tate Corp. has followed up Framework II with a version that includes electronic mail capabilities and support for networking and full-color screens.

Ashton-Tate has admitted to repositioning the program from its first release as a panacea to a decision support package. Changes were based on customer feedback.

In addition to touting decision support, Ashton-Tate is pushing Framework III as a network package. The network version supports up to five users, comes bundled with E-mail and offers file locking and printer sharing.

Improvements made to the word processing module include more complete text formatting, editing and printing features, such as multiple-column capability and newspaper-style text layouts.

The single-user version costs $695 and is slated to be available in July. Framework III LAN costs $995 and is scheduled to be shipped in October.

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SMALL TALK

Rich Finkelstein

Beauty's but skin-deep

Not too long ago, some friends of mine purchased a house built on filled land. The house was dazzling, and they were sure their investment and future were secured.

Unfortunately, within a couple of years the house began to sink. They had forgotten to check the foundation.

When planning our future, we often get so mesmerized by superficial beauty that we forget about foundation. In this period of major transition in microcomputing, ignoring the basics can lead to similar trouble.

Data base servers and SQL will certainly play a role in most organizations' futures, but they only take care of back-end requirements. What about connectivity to front-end user applications?

To address this need, Lotus has announced Blueprint, a written specification and tool kit that allows any data base management system vendors to plug into Lotus's 1-2-3 family of software. Simply put, Blueprint permits end users and application developers to mix and match Lotus front-end tools with back-end DBMSs in the manner that best suits their needs. In Lotus's initial announcement, the firm promised Blueprint support for its entire family of 1-2-3 products, including 1-2-3 Release 3.0, 1-2-3/G, 1-2-3/M

Continued on page 36

Dbase creator Ratliff in hot pursuit of repeat stellar performance

Data base management systems are in Wayne Ratliff's blood. As the creator of Ashton-Tate Corp.'s industry-standard Dbase program, Ratliff has earned himself at least a footnote in the annals of personal computer software history. Today, Ratliff is trying to repeat the stellar performance of Dbase with a new DBMS developed by his company, La Crescenta, Calif.-based Ratliff Software Productions, Inc.

Teamed with the marketing muscle of Migent Software, Inc., Ratliff is ready to make a run at his old employer and other software big leaguers. But the product, called Emerald Bay, was hit with problems even before its delayed release in March. Not only did Ashton-Tate try to stop its development with charges of trade-secret violations, but the product has yet to offer what many consider an all-important SQL implementation.

Ratliff is underwhelmed by Ashton-Tate's Dbase program

Ratliff discussed Emerald Bay, his former employer and the DBMS market with *Computerworld* West Coast correspondent Stephen Jones.

How do you think Ashton-Tate has treated your baby, Dbase, since you left the company in 1986?

They've developed it rather slowly, but that's part of the reason I left Ashton-Tate. I'm not particularly pleased with how they've handled it. They paid too much attention early on to the Framework-like user interface, and I think they didn't pay much attention to the fundamental base technology.

Did your legal battle with Ashton-Tate have any effect on the development of Emerald Bay — either in delays or the content of the product?

The process of dealing with lawyers during that time delayed my development by about three months, and it chewed up a considerable amount of other members of the development team's and Migent's time. I can't talk about the content of the product, other than that Emerald Bay is the product I always wanted it to be. I don't feel that it's been crippled in any way.

Some have said the first version of Emerald Bay is lacking a lot of the features needed to make it truly relational. Is this true?

I don't think that's true at all. Relational is a difficult concept that doesn't really make much of a difference to real people. Emerald Bay can be relational, but it is not constrained to be only relational. It depends on the surface; when we put an SQL surface on top of it, it's going to have the appearance of being extremely relational. The engine itself is not dictating that it has to be purely relational. In fact, the engine does not natively perform a lot of the functions that are associated with a relational data base. It does, however, provide all the functionality required for a relational-type surface to do rela-

Continued on page 38

MIS Adventists handling growth, foreign currencies

BY ALAN J. RYAN
CW STAFF

WASHINGTON, D.C. — With organizations located in 190 countries, the MIS leaders of the Seventh-day Adventist Church have more to contend with than religion.

As in any business, the MIS department is concerned with such critical issues as support, training and hardware and software compatibility. For their diverse user base, the Adventists had to find an accounting package on which they could standardize. The nature of the business required that the package allow users to work in their native languages; it also required the ability to handle currency conversions.

"Our treasurers developed an internal accounting manual to standardize the accounting systems that would be used in all of our organizations all over the world," said Michael Haney, the church's associate director of MIS. "MIS was charged to im-

Continued on page 38

Top sellers

Software: May 23-27

INFORMATION PROVIDED BY CORPORATE SOFTWARE, INC.
CW CHART

SOFT TIPS

Sorting made simple

You can do three-key sorts in Lotus Development Corp.'s 1-2-3 using a double-sort method. First, decide which are your first, second and third columns for the sort. Select the second column as the primary sort key and the third as the secondary sort key.

Next, create a new column and use the /DATA FILL command to fill it with numbers, beginning with 1 and going to the bottom of the column. This column can be anywhere within the column you are sorting.

Finally, sort again, using the first column as the primary sort key and the number column as the secondary key. You must expand the sort range to include the column of numbers you have created. When you are finished sorting, you can simply erase or delete the column of numbers you created.

Information provided by Corporate Software, Inc., a Westwood, Mass.-based software reseller.

D fosters ABCs of relational DBMS

BY JAMES A. MARTIN
CW STAFF

DALLAS — Mainframe data base capabilities on a microcomputer? Users of Caltex Software, Inc.'s D the Data Language said recently that the package running on a personal computer comes as close as any data base package to offering the power and flexibility of a host-based data base application on a micro.

According to Caltex, D is a relational data base management system and application development tool; a fourth-generation language that enables users to more flexibly create reports. The product was under development for more than two years

and is just now being actively marketed.

The goal of D is, in the words of the company, to "put the thinnest layer possible between the user and the data," while providing a fully integrated environment for managers, developers, programmers and any end user in need of manipulating data for reports.

With a few exceptions, D has accomplished all of the above, users reported.

"It's an easy language to learn; you can start working with it almost immediately," said Chip Keen, owner of Hansville Repair, an automobile repair shop in Hansville, Wash. "But to really get it to do what you want, it takes several months of working with it. The more you think about it, the more you realize what the program can do, so the temptation leads you into more complicated and powerful procedures."

Keen switched to D after de-

Continued on page 38

Tool kits simplify Hypercard use

BY JULIE PITTA
CW STAFF

HUNTINGTON, Conn. — Softworks, Inc. has introduced two tool kits for Hypercard, the personal data base manager for Apple Computer, Inc.'s Macintosh.

Called Hypertools 1 and 2, the products were designed to simplify the use of Hypercard, which is currently bundled with every new Mac purchased. Hypertools 1 is a set of utilities aimed at developers of Hypercard "stacks."

Hypertools 2 is a set of utilities targeted at Macintosh users and Hypercard stack developers, extending Hypercard's display and data entry functionality.

Both products were designed to be integrated into user-created and commercially developed stacks.

Hypercard, which allows Mac users to integrate text, graphics and video to create personalized data bases, is made up of three disks and a backup. Each disk, in turn, is made up of a number of stacks.

Apple officials have said the product is based on an index card concept. Users store information on "cards" as they would jot notes on an index card. The software allows users to organize information by linking cards, which are then organized into stacks.

Although Apple officials had hoped Hypercard would create a new third-party industry around stack development, such a market has been slow to develop. Industry observers have said that users have not taken advantage of Hypercard's capabilities because it is either too time consuming or too complex for the average Macintosh user.

Compounding the problem has been the shortage of memory components. For optimal use, Hypercard requires at least 2M bytes of random-access memory. Because of the scarcity of dynamic RAM chips, few Macintoshes are being shipped with more than 1M byte of RAM.

According to officials, Hypertools was designed to solve one of those problems — the complexity of using and developing stacks for Hypercard. Hypertools 1 features 12 tools for designing and using Hypercard stacks, including an icon editor, allowing users to create and modify icons directly in Hypercard using its painting facilities; and information tools for displaying, printing and exporting cross-reference listings.

Hypertools 2 allows users to add features to a stack without programming. For example, all of Hypercard's visual effects can be samples on a single card and can be attached to any other card without programming.

Each product is priced at $99.95 and will be sold through Mac distributor Bonsu Corp. or Softworks.

Finkelstein

FROM PAGE 35

and 1-2-3/Mac. Lotus also announced it will build Blueprint drivers to link 1-2-3 to Lotus DBMS, Ashton-Tate's Dbase and IBM's DB2.

Other vendors have announced their own Blueprint drivers. Synex announced a Blueprint driver for Microsoft's SQL Server. Must, with Nomad, Relational, with Ingres, and Oracle have all pledged Blueprint support. Users of 1-2-3 will be able to access any or all of these DBMSs either locally on single-user workstations or remotely on multiuser networks.

For the ultimate in transparency, organizations may want to implement a distributed data base architecture linking Lotus products to all corporate data.

But this is just the beginning. Lotus has only announced support for its 1-2-3 family so far, but we can look forward to future announcements that will bring other Lotus products such as Agenda, Notes and Freelance into the Blueprint fold. Together, these products form a powerful base for developing advanced application solutions that will merge graphics, images and audio processing.

To make this scenario a reality, developers need a language that can blend hypermedia functions into a seamless application using high-level, object-oriented instructions. Lotus realized this and developed Lotus Extended Application Facility (LEAF), which combines the strengths of traditional development languages with the additional capability of accessing 1-2-3's statistical and graphical functions. Direct access to 1-2-3 functionality is a boon to developers.

Future releases of LEAF may extend its capabilities even further so that developers have access to any number of rich, object-oriented capabilities that may exist in Agenda, Freelance, Notes or other yet-to-be-announced Lotus products.

Get the picture?

There are many types of applications that can be greatly enhanced by images, graphics and audio. Real estate, catalog shopping, inventory control, computer-assisted instruction, computer-aided design and manufacturing and desktop publishing are some examples. Storing image, audio and graphic data types in a data base requires specialized relational DBMSs, such as those offered by Empress Software and Interbase. These DBMSs can use their SQL capabilities to link into the Blueprint environment and provide back-end data base support for hypermedia types of applications.

Without Blueprint it would be time-consuming and prohibitively expensive for each vendor to design its own interfaces to front-end applications. Blueprint allows DBMS vendors to concentrate on solving the back-end issues, leaving the front end to Lotus.

Blueprint is an evolving specification. Currently, it has full relational capabilities that are a superset of standard SQL. It can directly support standard SQL commands, and it can also support nonstandard SQL extensions such as the outer join. DBMS vendors can choose to use a subset of the Blueprint specification in order to access nonrelational DBMSs such as IBM's IMS, Information Builders' Focus and SAS Institute products. Connectivity products such as Lotus's The Application Connection, Network Innovation's CL/I and Gupta Technologies' SQLnet can be used with Blueprint to link data bases in heterogeneous DBMS environments.

Is everything right with Blueprint? Unfortunately not. It is only open at the back end. While any DBMS vendor is free to participate on the back end, only Lotus can provide front-end application software. The user community will therefore be dependent on Lotus to build products that can make full use of Blueprint's potential. This may change in the future. Lotus may enter into partnerships with other third-party developers, or other vendors may choose to compete directly against Blueprint with alternative specifications open on both ends.

Blueprint presents exciting possibilities. Developers will be able to build applications that were previously out of reach while end users will benefit from better user interfaces, increased productivity and greater flexibility. Current 1-2-3 users are assured of a migration path into this next generation of application solutions.

Lotus has laid out an architecture that should be of interest to anyone who believes that foresight and a solid foundation are essential to maximizing the benefits of microcomputer automation.

Finkelstein is president of Performance Computing, Inc., a company specializing in relational data base technology.

Compulink hits integration market with optical system

BY J. A. SAVAGE
CW STAFF

TORRANCE, Calif. — Compulink Management Center, Inc. recently made its debut in the systems integration market by putting together several increasingly popular storage and retrieval technologies: optical scanners, laser printers and write-once read-many (WORM) optical storage.

The Laserfiche 3060 series is based on an Intel Corp. 80386 32-bit processor running at 20 MHz. It has 2M bytes of main memory and 340M bytes of hard disk space, with another 800M bytes in WORM optical disk storage and 60M bytes of cartridge streaming-tape drive. The system, which also includes an optical character recognition scanner and a desktop laser printer, lists for $39,900.

Individual parts in the system, such as the central 386 processor, may come from any number of manufacturers, depending on the preference of the user, according to a Compulink spokesman. The operating system is Microsoft Corp.'s MS-DOS 3.3.

The system allows hard copy to be entered into storage via the optical scanner, which recognizes eight- to 24-point type at 40 char./sec., according to Compulink.

Search and retrieval is performed by scanning all documents in the data base with the same three or more letters in the title. Once a document is located, two simultaneous searches for unrelated words or phrases may be made in a block of text as small as 10 lines or anywhere within a single document.

Data may also be input through modems and facsimile boards or mainframe interface systems, such as Digital Equipment Corp.'s Decnet or IBM's Systems Network Architecture.

Laserfiche is currently available.

Recovery package bows

CUPERTINO, Calif. — Symantec Corp.'s Turner Hall Publishing division last week unveiled a data recovery package based on Micro Analyst, Inc.'s Macrap. Earlier this year, Symantec agreed to jointly create an enhanced version of the program.

The enhanced product is called Symantec Utilities for the Macintosh (Sum) and will feature an easier to use recovery procedure for storing crashed disks, "deinitializing" hard disks and recovering files that were accidentally deleted.

Other features include disk partitioning and optimization, faster floppy disk duplication and file and disk viewing and editing.

Sum provides utilities for recovering from almost any type of disk crash, a spokesman said. Data can be recovered onto floppy disks or onto another hard disk drive. One of the program's more advanced features is called Guardian and can be preinstalled on any disk.

Guardian allows users to recover from any type of disk disaster in minutes, the company claimed. Guardian also has a module that prevents any computer virus from attacking the system.

Sum requires a Apple Computer, Inc. Macintosh 512KE, a Mac Plus, a Macintosh SE or a Mac II. Macintosh System Version 4.1 and Finder 5.3 or higher are also required.

The program carries a suggested retail price of $99.95 and has a 30-day money-back guarantee.

Progress

FROM PAGE 31

lar Progress syntax or mix and match both types in a single procedure.

By combining SQL syntax with Progress's screen and report formatter, developers can code standard SQL statements while simultaneously accessing Progress presentation display capabilities, according to Chip Ziering, the company's vice-president of development.

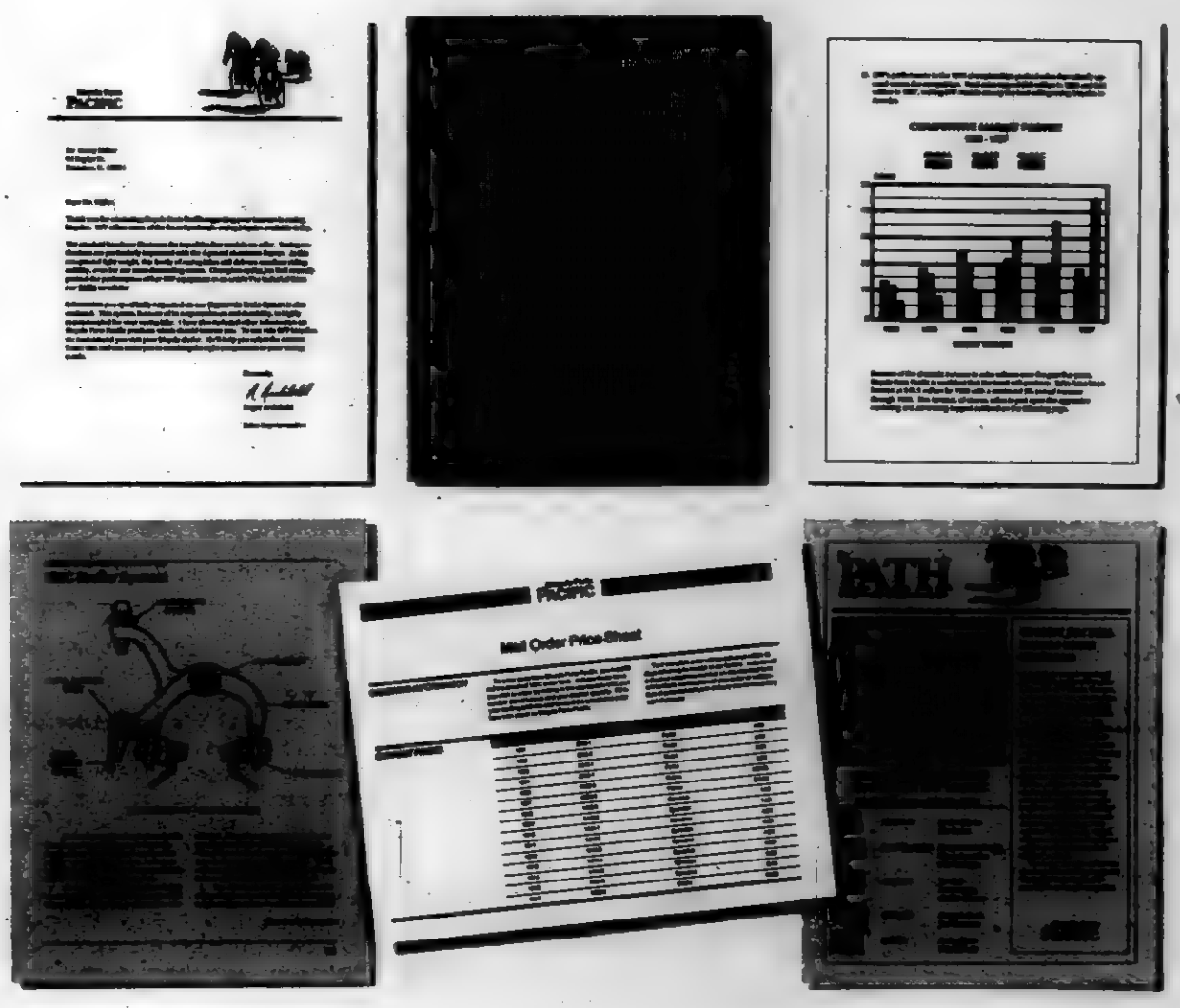
Progress has sent to customers the first review copies of the program with SQL support. Along with SQL support, the firm will add other enhancements to the program, but it declined to say what those would be.

Progress's version of SQL will conform to ANSI standards, according to Chad Carpenter, the company's vice-president of sales.

"Our SQL offering reinforces our commitment to enhance the program's application development capabilities by incorporating industry standards," he said.

Progress can be ported to multiple software environments, including Digital Equipment Corp.'s Ultrix and VAX/VMS, Microsoft Corp. MS-DOS, Unix, Xenix and CTOS/BTOS operating systems, as well as local-area networks.

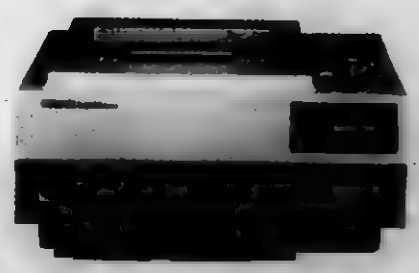
How to look good from start...



...we never stop asking ***What if...***

to finish.

The HP LaserJet Series II Printer.



Nothing brings your ideas to life like the HP LaserJet Series II Printer—from office memos to forms to newsletters. As the leading laser printer, it works with all popular PCs and PC software packages. And, with a wide range of fonts, you get more options to create superior looking documents.

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Print samples were created using Microsoft Word, Microsoft Excel, and Aldus PageMaker.

Barney

FROM PAGE 31

munications and SDLC on a PC bus without an expensive adapter; you can on a Micro Channel.

For certain I/O tasks, the Micro Channel may be just the ticket. On the older PCs, "If I get control of a bus and issue a start I/O, absolutely nothing else happens until I relinquish the bus. With a Micro Channel, I can have up to 255 start I/Os," Kamerer says. Why should we care? "This really comes into play if you are running a print job and communications together," Kamerer explains.

Another crack at 1-2-3. With Borland and Microsoft already going after the spreadsheet leader, Ashton-Tate must feel a bit left out. That at least may be the reason that the don of micro data bases is hatching plans to infiltrate the integrated spreadsheet market. Under the auspices of a new business unit, Ashton-Tate is at work on a spreadsheet that uses technology pioneered by Framework and also plans to enter the low-end integrated market pioneered by Software Publishing.

Just say no to Presentation Manager. That is what Lotus founder and former employee Mitch Kapor did in a speech recently that surprised users and Lotus officials. According to Kapor, some of the things he and others may pioneer will make the Presentation Manager obsolete. But just what Kapor has cooking is still unclear.

Risky patent business. IBM's plans to collect patent fees from firms attempting to license the function of its Personal System/2 raised some interesting and unexplored issues.

Ironically, IBM is not collecting royalties on PS/2 patents but rather is licensing what the lawyers call trade secrets. IBM hasn't received its patents on the PS/2; it has simply applied for them.

IBM must tread lightly when pressing its patent case. There are several possible pitfalls in the form of esoteric legal doctrines. One doctrine is a bit complex but may come into play. Here is the scenario: Let's say IBM has a patent and knows that someone is infringing but fails to take action. Then there is a confrontation, and the infringer openly tells IBM it is going to proceed. IBM counters by saying, "You are infringing" but again fails to act. Then IBM will have lost its patent rights.

Another doctrine says that if IBM knows people are infringing but fails to act against them within six years, it loses its rights. Only time will tell whether any cloners will be protected by these doctrines.

Perhaps the more critical issue involves unfair competition or discriminatory licensing. If, for example, IBM is forcing people to get a second group of patents because IBM feels it needs a license on the first group, this could be antitrust or a patent misuse problem, one patent attorney says.

Barney is a Computerworld senior editor, microcomputing.

ABCs

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veloping an inventory management data base on a CP/M program. Frustrated by the lack of CP/M support and the inability to expand the data base, he chose D over big-name competitors such as Ashton-Tate Corp.'s Dbase for its speed and flexibility.

Not all smooth
There have been a few minor glitches along the way, according to Keen. However, overall, he said, Caltex has corrected most shortcomings in periodic updates.

"I was an early user, and I called up to tell someone what the problem was, and if it was a lack in the language itself, in every case they came up with an interim fix and would incorporate that fix into the next release," Keen said.

Walter J. Walvick, a partner in the Washington, D.C.-based law firm of Dickstein, Shapiro & Morin, said D offers flexibility in determining how the information in a data base is stored and retrieved.

"For years I was looking for a PC data base that would come close to a mainframe system," he said. With D, he added, "You can do what you want to do and are not set into predefined ideas about the way the data should look and be grouped."

Improving
Walvick, also an early user of D, said the program has become more sophisticated in the last year. "It was rough in the beginning, because there weren't many bells and whistles. But it has improved enormously," he said.

Walvick maintained that an end user should have fairly strong PC experience to fully use the data base and complained that the program itself could use a good end-user, menu-driven interface.

"There probably are simpler data bases out there somewhere," Keen concluded, "but they're not going to offer what this package does."

Adventists

FROM PAGE 35

plement that in an automated fashion."

Finding an accounting package is easy, but finding one that could work as well in a remote location with low-cost IBM Personal Computer compatibles as it could in London on a PC running under Unix was a challenge.

"There was quite a difference in the technical level of people and equipment to consider," Haney said. So he solicited the user groups for suggestions.

What worked, he said, was Systems Union Ltd.'s Sun Account package. The London-based company's package was in use at a Seventh-day Adventist Church installation in the Ivory Coast in Africa, and after seeing it, Haney found it met many of the Adventists' needs.

The multicurrency issue was a critical one, Haney said. Seventh-day Adventist Church organizations worldwide send debit and credit vouchers and funds back and forth to headquarters and to each other, he explained.

Another critical issue was the package's flexibility regarding hardware and software. "We're producing one set of code, making any changes that we need from here, and having it run on different environments around the world," Haney said.

The environments include IBM PCs and compatibles running DOS, Unix or variations of Unix; networked environments; and some minicomputer environments, Haney said. "It has to be compiled with the program's run-time module," he said. "The way Systems Union put it together with their kernels in the program, 99% stays intact. Everything is there to run on every system and you're just activating it to run accordingly."

Working with Systems Union was tricky at the start, but problems were quickly resolved, Haney said. "In the initial phases, it seemed like it would be teams of lawyers talking to each other, but it wound up being myself and one of their directors."

The two sides reached a special source agreement that allows the Adventists to make some changes to Sun Account. "They treat us like a master distributor, which has special programming rights," Haney said. The church can distribute the program only to its own organizations and plans to provide 500 copies to locations worldwide, Haney said.

Some of those locations include churches and related groups; hospitals; publishing houses; food service organizations; the Adventist Disaster Agency; and the largest Protestant school system in the world, which includes kindergarten through 12th-grade as well as universities, Haney said.

With the church growing rapidly, the accounting package is more a necessity than a luxury, Haney said. This year alone, he said, the 140-year-old, five-million-member church will sign on about one million new members.

Training on the system will take place in Washington for the church's divisional MIS leaders, who will then continue the training at other levels, Haney said.

Approximately 50 Adventist groups are currently using the system, and the primary launch will be held in July.

Ratliff

FROM PAGE 35

tional types of things.

Why is the initial version missing an SQL implementation?
SQL turns out to be a lot harder than we ever expected it to be. The [SQL] development started in late September 1986, and I was told at that time that we would have a prototype by January 1987, and then it was June '87, and then it was October, November, December.

Then it was by March 15 of this year, and now it's still several months away. We're making progress, it's just that it's an elusive goal.

So you're close to acquiring an SQL product?
Yes. It's an SQL processor with source code that we can adapt in a variety of different ways. . . . An engine is one of the ways we're going to adapt it. The SQL engine will be an additive alternate to the existing Emerald Bay engine.

What is your view of SQL?
It's an interesting alternative, but I think it's been pushed a little too hard. Thirty percent of all data base activity ultimately may become SQL. SQL has an important place, but it's not going to be 100% of everything. Very few of our customers are waiting for SQL. People want to know that SQL is coming — they don't want to use it today, they just want to know that it's coming in the future. It's much like OS/2. Nobody wants to switch over to OS/2 today, but they want to make damn sure that it is going to be in your product future.

Why does the world need another data base?
The world really needs a good network-oriented data base system, and Emerald Bay has been developed with networks in mind since day one. With Dbase it was kind of Band-Aided on the back end at the last minute. And it's a very poor solution in my mind. Emerald Bay is essentially multilingual in that you can write a variety of user interfaces that can still use the data base.

Who is using Emerald Bay, and what do they think about the product?
It's been kind of a surprise. We thought it would be third-party developers, real end-user application developers. But there's been a much higher level of attention given by corporate developers than we ever expected, and Migent is starting to shift their marketing focus to look more toward the corporate world.

What is your opinion of Dbase IV?
It looks like an enormously huge product, and that is exactly what I tried to avoid with Emerald Bay. Dbase IV has a lot of glitter, but again, I suspect that they've spent more time on user interface than they have on the technology foundation. But I've seen only about 15 seconds of it. I told the guy who was trying to show it to me, "No, I really don't want to see it — I'd rather stay a virgin."

Engine

FROM PAGE 31

can store more data in less space, and the tricky problems of referential integrity — making sure data updates are recognized by all related files or tables — are easier to solve, according to one user familiar with the firm.

The technology is scheduled to debut in the form of a data base engine later this year and will run on the IBM Personal Computer AT. It will come standard with a coprocessor board for caching capability. Rather than sell the product directly to users, Nucleus will rely on OEMs to resell the system.

So far, no OEM deals have been announced. "We are in discussions with two large companies that may become strategic partners," McLeish said.

But Nucleus will not rely entirely on OEMs to build front ends for its product. The firm will ship Nucleus Builder, an environment for C programmers that can be configured to look like a variety of word processors or spreadsheets. In addition, users can configure the system to their own specifications.

Nucleus Builder also serves as an interactive SQL facility that can create data bases that are modified on-line.

In addition to the AT version, Nucleus is planning to ship versions for Digital Equipment Corp.'s VAX/VMS and Unix. The firm also said it plans to develop an IBM MVS version later this year and will also target Unix on mainframes.

If you can see the difference, you must be looking at the price.

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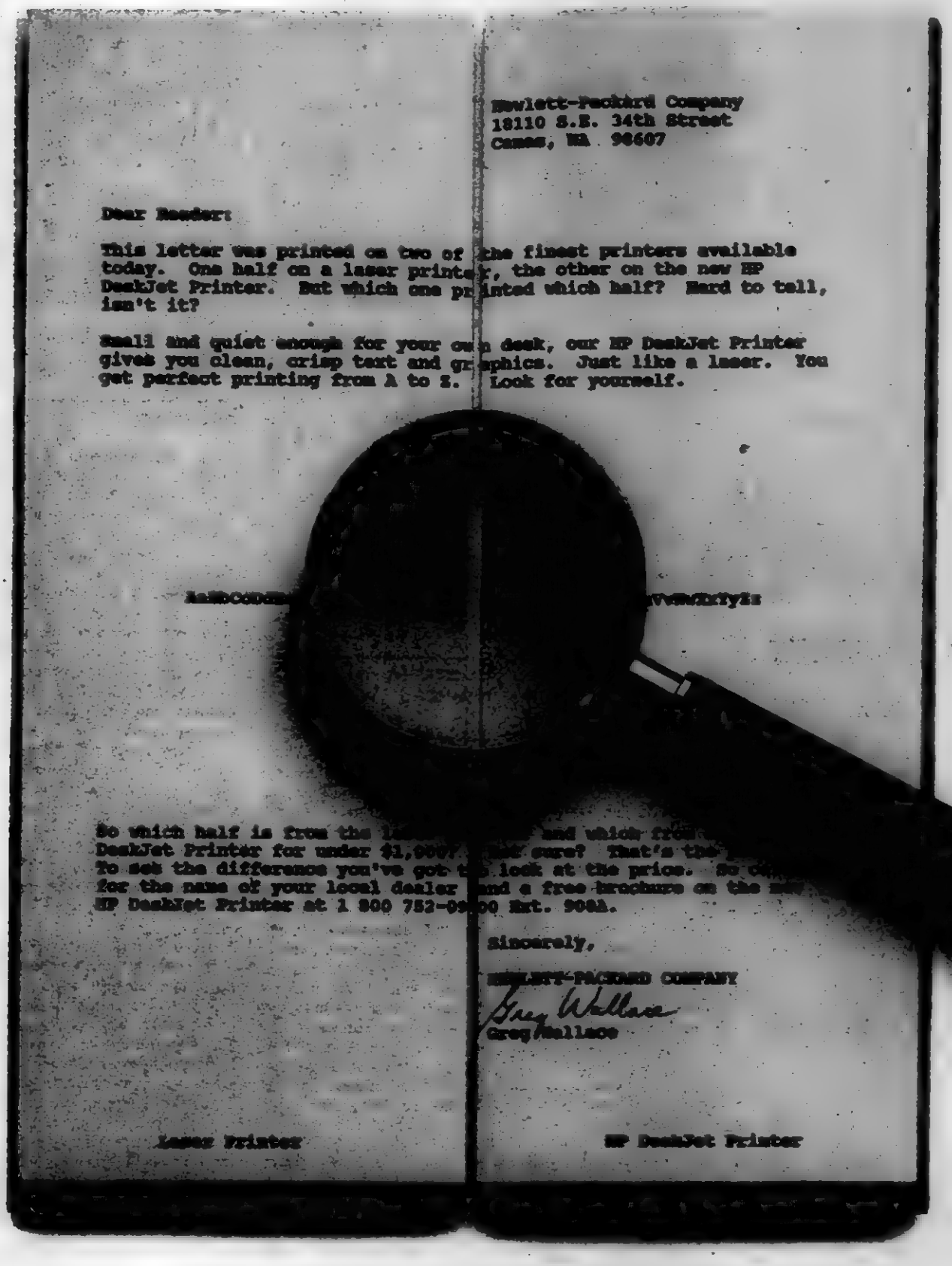

The New HP DeskJet Printer. Laser-Quality Output for Under $1000.

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NEW PRODUCTS

Systems

Zenith Data Systems has introduced two Intel Corp. 80286-based desktop personal computers.

Called the **Z-248/12** and the **Z-286 LP**, both systems have 1M byte of random-access memory and include 256K bytes of Lotus/Intel/Microsoft Expanded Memory Specification for addressing memory above 640K bytes.

The Z-286 LP reportedly weighs 17 pounds and measures 3.9 by 14 by 15 in. The system is available with a 40M-byte hard drive and a 1.44M-byte floppy drive. The chassis has a cover lock to guard against tampering inside the computer. The Z-286 LP costs $3,999.

The Z-248/12 is available with a 40M-, 80M- or 160M-byte hard drive and a 1.44M-byte 3½-in. floppy drive. A single-floppy drive version with either the 3½-in. drive or a 1.2M-byte 5¼-in. drive is also offered. The 35-pound system costs from $2,999 to $6,799, depending on memory configuration.

Zenith Data Systems, 1000 Milwaukee Ave., Glenview, Ill. 60025. 800-842-9000

Software applications packages

Micromath Scientific Software has announced **Minuq 2.3** for nonlinear curve fitting and model development.

The enhanced version comes with an expanded and largely rewritten manual, and the graphics capability now includes Adobe Systems, Inc. Postscript plot descriptions. Linear parameters are identified algebraically and are solved during the model fitting process by default. The interactive graphics section provides facilities for annotating with text, lines and arrows.

The product requires 512K bytes of memory, two floppy drives and a high-resolution monochrome graphics adapter or an IBM Color Graphics Adapter and Enhanced Graphics Adapter card.

Minuq 2.3 costs $179.

Micromath Scientific Software, 2034 E. Fort Union Blvd., Salt Lake City, Utah 84121. 801-943-0290.

Sitok Systems, Inc. has enhanced its microcomputer-based computer-aided design package, **Drawbase. Version 105** has been updated to include three-dimensional shading capabilities that allow the user to fill 3-D planes and show the effect of a light source on the model.

Other modules include an integrated text editor, an enhanced DXF import/export capability and an expanded Sitok Drawbase programming language. Hardware supported has been expanded to include the IBM Personal System/2 8514A controller and the Genoa SuperEGA controller in a video graphics array mode. The product also supports the Hewlett-Packard Co. Series 747 pen plotters.

The Drawbase modules cost from $495 to $4,995.

Sitok Systems, 222 3rd St., Cambridge, Mass. 02142. 800-225-7565.

A software program designed to process surveys and questionnaires has been released by **Masterware.**

Survey Master allows up to 75 questions per survey and accommodates up to 10 user-defined multiple-choice answers for each question. Bar graphs and pie charts are generated for response analysis.

The menu-driven system requires 286K bytes, two disk drives and IBM PC-DOS 2.1 or higher. It will run on any PC-DOS or Microsoft Corp. MS-DOS machine as well as on IBM Personal System/2 computers.

Survey Master costs $34.95.

Masterware, Suite 177, 3213 W. Wheeler, Seattle, Wash. 98199. 206-284-1762.

Development tools

A tool designed to assist C programmers in object-oriented software engineering has been announced by **CNS, Inc.**

C-Talk is an object-oriented programming environment that extends the C language by adding encapsulation, inheritance and a messaging mechanism. Engineers work within the object-oriented paradigm. The product operates on IBM Personal Computers or compatibles with a minimum of 512K bytes of memory.

C-Talk costs $149.95.

CNS, 7090 Shady Oak Road, Eden Prairie, Minn. 55344. 612-944-0170.

Gold Hill Computers will port its **Goldworks** expert system building tool to Sun Microsystems, Inc.'s 386I series workstations.

The menu-driven system has a knowledge-based inference engine that uses forward, backward and goal-directed forward chaining to reach conclusions. Goldworks has an on-line tutorial and Help system.

Goldworks runs on top of Sun Common LISP. It will be offered on the Sun 386I for $4,995 for quantities of three or more.

Goldworks cost $7,500 per single copy.

Gold Hill Computers, 26 Landadowne St., Cambridge, Mass. 02139. 617-621-3300.

Data storage

Rodime, Inc. has announced mounting hardware that will allow its **RX series** of internal hard drives to operate with either the Apple Computer, Inc. Macintosh SE or Macintosh II. The RX series now contains drives and mounting hardware for the 5¼-in. 60M-, 100M- and 140M-byte drives.

Rodime's *RX drives*

Dealers will receive two different sets of mounting frames and cables with each RX series disk purchased. Upon request, Rodime will upgrade drives purchased before the enhancement.

The Rodime 600 RX, 1000 RX and 1400 RX have respective list prices of $1,795, $2,195 and $2,495.

Rodime, 901 Broken Sound Pkwy N.W., Boca Raton, Fla. 33431. 305-994-6200.

Emerald Systems Corp. has introduced two 5¼-in. **half-height cartridge tape drives,** available in 60M- and 150M-byte capacities.

The drives reportedly can be configured on local-area networks, DOS and Xenix systems.

The half-height drives incorporate all Emerald Systems proprietary tape functions, including Asp software in DOS and LAN configurations, which allows unattended backup.

The 60M-byte internal drive costs $1,295, and the 150M-byte drive costs $2,095.

Emerald Systems, 4757 Morena Blvd., San Diego, Calif. 92117. 619-270-1994.

Printers/Plotters/Peripherals

A series of 35mm film scanners supporting both the IBM Personal Computer and Apple Computer, Inc. Macintosh II environments has been announced by **Howtek, Inc.**

The **Scanmaster/35** scans and digitizes 35mm film for display and storage on an image-capturing computer. Input film can be in the form of positives or negatives and in mounted or strip form. The Scanmaster/35 has a resolution of 2,000 by 2,000 dot/in. and 180 degree rotation capability.

The **Scanmaster/35 II,** with resolution of 2,000 by 3,000 dot/in., was designed for medical imaging and high-quality retouching. **Scan-It/35** software is available with each device and allows user preview and subset selection capabilities.

List price for the Scanmaster/35 or Scanmaster/35 II with Scan-It/35 software is $8,195. Hardware costs $6,995.

Howtek, 21 Park Ave., Hudson, N.H. 03051. 603-882-5200.

AST Canistown Digital Division has introduced the **AST Turbolaser/PS-Plus 3,** an 8 page/min. laser printer with a resident Adobe Systems, Inc. Postscript controller and an optional board for Digital Equipment Corp. LN03, Diablo 630 ECS and Hewlett-Packard Co. Laserjet Plus emulation. The printer will produce both text and graphics.

The product includes 35 fonts and an RS-432/Appletalk port, which makes it compatible with Apple Computer, Inc. as well as IBM and DEC environments. The 12.5-MHz controller board incorporates a Motorola, Inc. 68000 microprocessor, 3M bytes of random-access memory and 1M byte of read-only memory.

The AST Turbolaser/PS-Plus 3 costs $5,495.

AST, 2121 Alton Ave., Irvine, Calif. 92714. 714-553-0247.

Board-level devices

Ariel Corp. has entered into a licensing agreement with AT&T Bell Laboratories that allows the former to market **Syaid,** an acoustic measurement system for IBM Personal Computers and compatibles.

Syaid can measure two independent channels simultaneously, making impedance and ratiometric measurements possible.

The system can be used for transducer testing and analysis, room acoustics, vibration analysis, auditory research and a variety of other applications. Syaid is composed of an Ariel DSP-16 single-card Data Acquisition Products, Inc. processor and Syaid software.

Syaid costs $2,995.

Ariel, Suite 404, 110 Greene St., New York, N.Y. 10012. 212-925-4156.

Quadram Corp. has extended the memory capabilities of the **Quadboard PS/Q** and the **Quadmeg PS/Q.** Both products now support up to 4M bytes of memory and provide compatibility with IBM and Microsoft Corp.'s OS/2 extended memory.

The enhancement boards can be configured from 512K to 4M bytes per board and have switch-selectable IBM Micro Channel identification to prevent conflict with other boards installed on the computer. Both run on IBM Personal System/2 Models 50 and 60.

The Quadmeg PS/Q costs from $395; the Quadboard PS/Q costs from $595.

Quadram, One Quad Way, Norcross, Ga. 30093. 404-923-6666.

A 24-MHz Intel Corp. 80386 system board for IBM Personal Computer AT-class machines is now available from **American Micronics, Inc.**

The **Elephant 386** is offered in three configurations: 16, 20 and 24 MHz. All are reportedly capable of zero-wait state operation.

The board has sockets for 2M bytes of random-access memory, expandable to 10M bytes.

The 16-MHz version will cost $1,949; the 20-MHz version, $2,592; and the 24-MHz board, $3,120.

American Micronics, Suite A, 18005 Sky Park Circle, Irvine, Calif. 92714. 714-261-0693.

Services

Lotus Development Corp. has updated Signal, a personal computer-based financial information service for independent investors that reportedly provides current real-time market information.

Signal 2.0 adds mutual fund and money market data, the Midamerica exchange and the Chicago Board of Trade Market Profile service. Comprehensive coverage of the American Stock Exchange and NASDAQ indexes is also provided.

Current users may upgrade for $55. The suggested retail price is $595 for the FM receiver and Signal software; the monthly Lotus subscription fee is $80.

Lotus, 55 Cambridge Pkwy., Cambridge, Mass. 02142. 617-577-8500.

Ziff Communications Co. has announced a personal computer-based information product that will be delivered to subscribers on a monthly basis in compact disk/read-only memory format.

The **Computer Library** was developed in conjunction with Lotus Development Corp. to be used as a reference and analysis tool. The service will provide the most recent 12 months of 10 leading computer industry journals in full text, as well as computer-related articles from 120 computer, communications, electronics and business periodicals. An IBM Personal Computer, PC XT, AT or compatible with a hard disk and IBM PC-DOS or Microsoft Corp. MS-DOS 3.1 or higher is required.

The Computer Library costs $695 for a one-year subscription.

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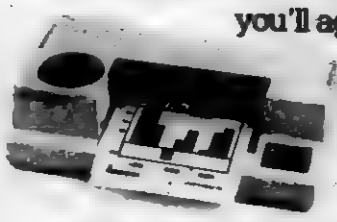

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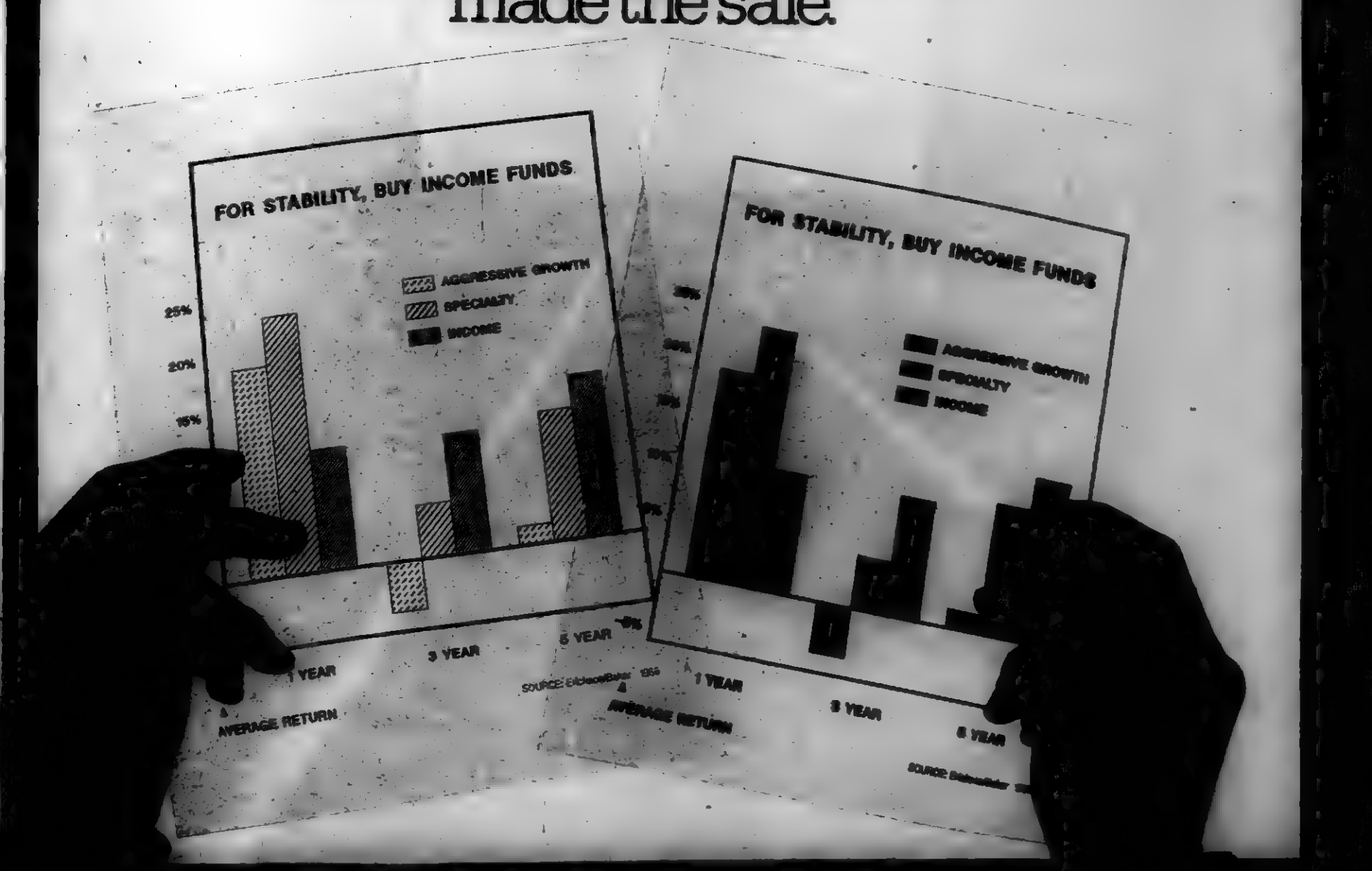

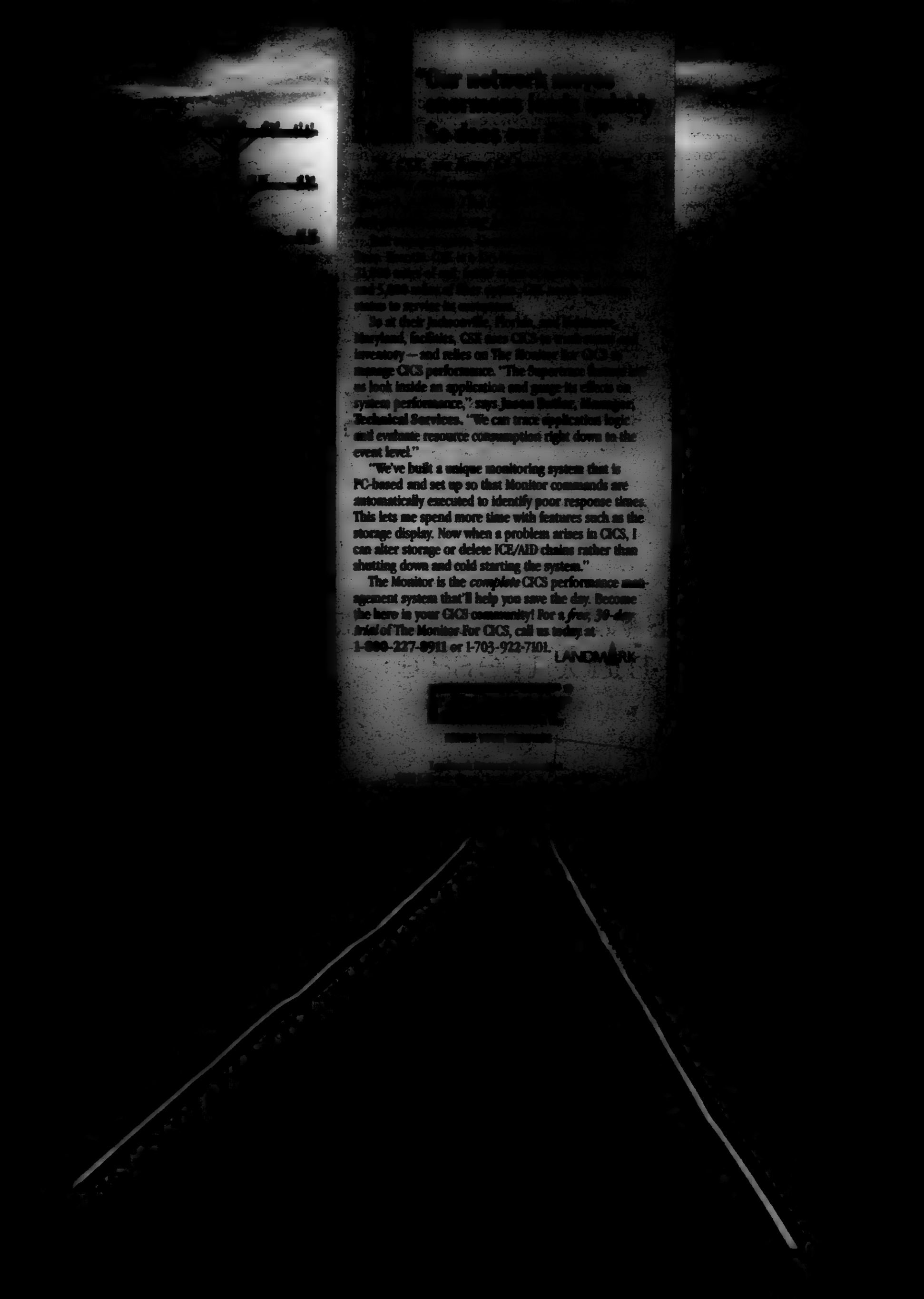
"Our network averages
over
So does our
CICS
LANDMARK

DATA STREAM

Thomas White

Is Apple a serious player?

First of a two-part look at Apple's connectivity strategy

When Apple Computer, Inc. first introduced the Macintosh, one of the unheralded features of the system was the network interface card built into each machine. This feature was later scorned by many because of its low speed. However, users then discovered they could print documents on a laser printer over this network quite nicely. In fact, with the introduction of Aldus's Pagemaker, they could indeed perform desktop publishing.

Early Mac users were soon printing their documents over this low-speed, easy-to-install network in great numbers, but they were not network users. Eventually, they moved on to do other things common to network users, such as file transfer and print spooling. So last year, Apple took the next step and offered a file server-based network system, Appleshare.

With the possibility of local networking now ensured, is Apple a player in the bigger world of connecting these work group networks to other non-Apple

Continued on page 47

Deere reaps MAP, CIM benefits

Investment of $2.5M in broadband cable adds speed, cuts overhead

BY JEAN S. BOZMAN
CW STAFF

MOLINE, Ill. — Deere & Co., which has been shaping steel into plowshares, combines and tractors for 150 years, has used the Manufacturing Automation Protocol (MAP) to streamline its operations here.

Since 1985, Deere has invested $2.5 million in placing MAP broadband cable at six Midwestern plants, including the 75-year-old Harvester Works.

MAP has succeeded in reducing time-to-market from five to two years, said Paul F. Ohman, vice-president of engineering, information and technology at Deere.

"Now we're able to react more quickly to changes in the market," Ohman said. "Design changes that used to take several months can be made in one day. Retooling takes less time, and fewer employees are required to do a given job."

Perhaps more important, by using MAP together with computer-integrated manufacturing (CIM), Deere was able to reduce its Harvester Works overhead to just 35% of sales, Ohman said. That amounts to a 50% reduction in the break-even point compared with 10 years ago.

"We realized massive savings in tooling and setup," Ohman said. Those savings helped Deere turn its business around. Faced with a shrinking farm market, Deere said it can leverage its technology to regain profitability this year. Last year, the company lost $99 million on $4.1 billion in sales.

Deere has also discovered that the MAP-CIM combination shrinks space and time requirements. Where 10 machines had been used for metal-stamping component parts in 1984, today just two machines do the job, said Jerry Van de Voorde, manager of sheet metal engineering at the Harvester Works.

"We've consolidated our metal cutting, which used to require five to six operators," he said. Future plans call for just one system operator for every two metal cutting machines.

MAP 2.1, first installed at the Harvester Works in October 1986, is the protocol used to route the stamping instructions from a set of engineering workstations off the shop floor.

"Today, we can cut more parts on the same sheet of metal through the use of CAD/CAM and numerical control opera-

Continued on page 44

Users urged to integrate.

BY PATRICIA KEEFE
CW STAFF

If you think MAP/TOP is just for the factory floor, guess again.

The rewards of the Manufacturing Automation Protocol/Technical and Office Protocol suite are best reaped when harvested on an enterprisewide level, according to "MAP/TOP: A Business View," a study on business issues prepared by the Business Case Special Interest

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Inside

- Microsoft, IBM skirt OS/2 controversy. Page 44.
- Microsoft's OS/2 LAN Manager goes into beta test. Page 45.

Data View

Novell leads net software pack

Vendors' 1987 market share figures are based on the number of personal computers linked to nets running a particular network operating system

INFORMATION PROVIDED BY DATAQUEST, INC.
CW CHART

Sifting Chicago telco ashes

MIS ponders security measures as smoke clears

BY JEAN S. BOZMAN
CW STAFF

ANALYSIS

CHICAGO — In 1871, it was Mrs. O'Leary's cow that caused a fire disaster that affected nearly everyone who lived in Chicago. Now, 117 years later, another fire in the Windy City that few felt or even knew about managed to destroy something else — a sense of security about our nation's telephone networks.

When fire broke out on the afternoon of Sunday, May 8, there was no one at the Illinois Bell switching station in Hinsdale, about 20 miles west of downtown Chicago. As the station is unattended on weekends, the fire went unobserved for half an hour — until a console operator in the state capital 150 miles away noticed a fire alarm.

By the time local firemen ar-

Continued on page 46

Can Your Unix DBMS Guarantee Data Integrity?

Data integrity is essential for any commercial application. Unfortunately, no Unix-based DBMS product is able to provide absolute data integrity without sacrificing performance or forcing the use of complicated raw devices. Except the ORACLE® RDBMS.

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OS/2 LAN Manager out for testing

BY JAMES DALY
CW STAFF

REDMOND, Wash. — Beta-test versions of Microsoft Corp.'s OS/2 LAN Manager recently began trickling out to more than 4,000 owners of its Software Development Kit (SDK).

The SDK version of the OS/2 LAN Manager runs with both MS OS/2 Version 1.0 and the prerelease version of MS OS/2 Version 1.1, which was shipped to SDK owners in April. The LAN Manager begins shipping to OEMs later this month, Microsoft said.

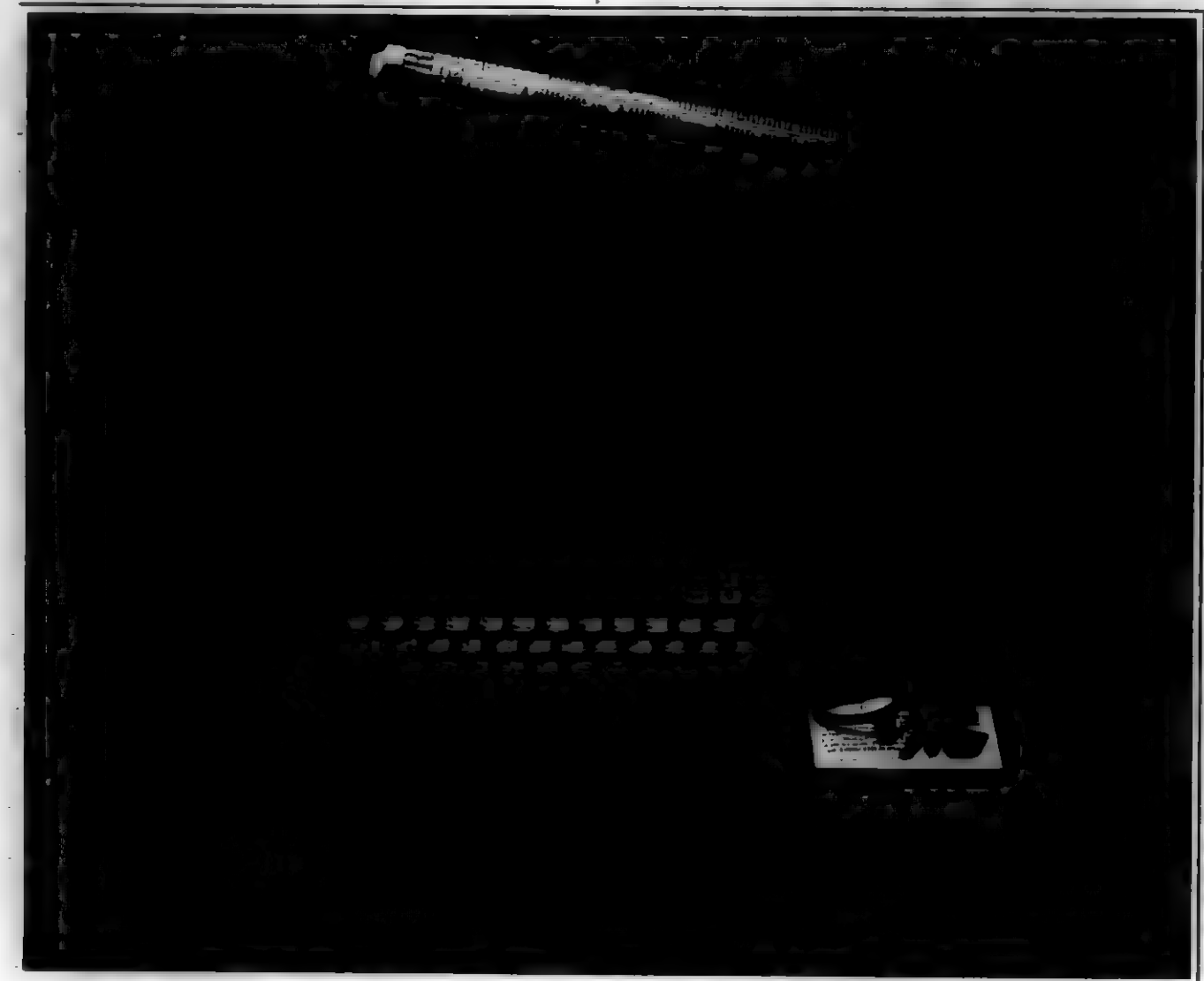
Although the only LAN Manager-specific application — Microsoft's SQL Server back-end data base — is not due to ship until the second half of the year, many of the more than 60 OS/2 applications that IBM claims are currently shipping, as well as any Microsoft MS-DOS-based applications, will run on the beta-test version of the LAN Manager, a Microsoft spokeswoman said.

More applications should be forthcoming, as LAN Manager code has been made available to more than 70 software developers, she added.

"MS OS/2 LAN Manager is currently installed and operating at more than 100 OEM and independent software vendors' sites, providing SDK owners with well-tested, stable code," claimed Steve Ballmer, Microsoft's vice-president of systems software.

This release of the MS OS/2 SDK is the fourth update since the first shipment of the SDK in June 1987, but the company plans to ship more updates to the kit before the final October release of MS OS/2 Version 1.1.

Beta-test versions of the LAN Manager will also be included in the MS OS/2 LAN Manager Developer Pack that will be given to attendees of Microsoft's second series of Advanced Network Developer conferences.



TI's new TravelMate™ LT220.
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Texas Instruments introduces the LT220 lap-top terminal — the next best thing to being there when you need remote access to your company's VAX.

The LT220 provides full VT220 emulation in a 4.8-lb. package, without sacrificing functionality. It features a 25-line screen that's easy to read. It even has a full-function keyboard like the one on a VT220.

The terminal communicates at 1,200 or 2,400 bps through one of its optional internal modems. For hard copy, just slide the LT220 into one of its optional cradles to add an ink-jet or thermal printer.

New credit-card-sized memory cards let you create, update and store files. They're also handy for programming the LT220 to your specific application.

Like its Silent 700™ predecessors, the LT220 sets new standards for portability, durability and reliability. All of which makes it the perfect tool for anyone who's ever wished for a VAX in their briefcase. In short, this may be the best little terminal in the world.

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Deere

FROM PAGE 43

tions," Van de Voorde said. Deere's Tech Services Group helped develop JD/Nest, a for-sale program that allows a company to nest multiple parts on the same sheet.

Cost-conscious

Harvester Works has 1km worth of broadband cable, according to David C. Scott, a manager at the Tech Services Group.

However, not all layers of MAP have been implemented at Deere. "Our concept is that we will use the technology to satisfy our applications, but we're always looking at what the costs are," one senior manager explained.

Although Deere does not yet use state-of-the-art MAP 3.0, some MAP 3.0 functions can be added later through carrierband technology. The single-channel, data-only carrierband cable will allow MAP 3.0 messages to reach assembly lines and robots throughout the plant, Scott said.

Harvester Works sprawls out across more than four million square feet and houses 13 miles of broadband cable. Deere planners have placed one cable tap for every four shop-floor bays in anticipation of future MAP applications.

So far, MAP applications have included sending manufacturing messages, broadcasting television signals from remote video monitors and transmitting voice signals as part of the plant security system.

The planned addition of network management software will allow Deere to manage all shop-floor networks from a single location, Scott said. Directory services provided through software will guide users around the MAP network.

Multiple devices supported on the MAP network include one Digital Equipment Corp. VAX-11/750, multiple Computervision Corp. computer-aided design systems, network interface units from Concord Data Systems, Inc. in Marlboro, Mass., and various machine tools.

Chicago ashes

CONTINUED FROM PAGE 43

rived, the damage had already been done — 118,000 long-distance fiber-optic phone lines had melted, fused together by intense flames. Another 36,000 data lines were dead, destined to be out of service for more than two weeks. Local service over 35,000 voice lines was completely out, halting the normal traffic of 3½ million calls per day [CW, May 6 and May 23]. Even three weeks later, at the end of the month, normal service had not been restored.

Area MIS managers tried to cope with the crisis by, for instance, rerouting vital links between terminals and mainframes. A handful of firms found their way to disaster recovery sites, while others tried to patch things together with cellular phones, microwave links and portable earth stations.

It did not take long for nagging questions to form in the minds of MIS directors and telecommunications managers suffering through the fire's aftershock.

Many are seriously considering the expense of connecting their systems to two separate central office switches. Still others are looking into ways to bypass Illinois Bell via microwave links to MCI Communications Corp.'s national network, for example.

Silver lining

The saving grace of this disaster is that it served to expose the Achilles' heel of modern telecommunications: Illinois Bell had put all its eggs in one basket.

Building on voice-only networks, Illinois Bell slowly added computer-age technology to the 1962 vintage switching station. Few noticed the metamorphosis or saw the need for computer room safeguards.

Now, according to James Eibel, Illinois Bell's vice-president of operations, in hindsight, the old standards — which stood since the last major Illinois Bell fire in 1947 — will have to be re-examined. "We'll be looking at having 24-hour security," he said, noting that remote operations had become standard in the last 15 years.

Halon fire-suppression systems were never seriously considered, Eibel said, because it was thought they were not needed. Another reason, he said, was size. Central switches are generally large enough to fill a room. Even so, fire alarms were not allowed to ring through to the local fire department. Why? Because Illinois Bell technicians feared Hinsdale firemen would inflict water damage.

It is worth noting that a large number of the regional Bell holding companies also do not use Halon systems.

Whatever the cause — or the cure — the ability of the nation's telephone networks to weather a major disruption must be addressed. In the case of the Hinsdale station — and four more like it in the Chicago area — there was only 25% redundancy in the network, Eibel said. In contrast, Chicago's downtown switches have 50% redundancy. "We can build more redundancy into our system," he said. "It's just money."

Meanwhile, MIS executives are growling about how Illinois Bell really should pay for the damage the fire inflicted. Some of the damage in lost business cannot even be quantified, they claim. Perhaps there will be no payback for all the damage; after all, Illinois Bell is a utility that cannot be put out of business.

But now is the time for MIS managers throughout the country to take another look at their disaster recovery plans — as well as the backup policies of their local telephone companies — in light of what has already happened in Chicago.

DEC deals anchor phone strategy

BY PATRICIA KEEFE
CW STAFF

In the last several months, Digital Equipment Corp. has been busily inking separate pacts with a variety of telecommunications suppliers, forming the basis for a new marketing strategy targeting the local telephone companies and regional Bell holding companies.

DEC has so far signed approximately 14 such agreements with service providers and vendors such as Siemens Data Switching Systems, Inc., Digital Switch, Bellsouth Corp., Telco Research Corp. and Pacific Bell.

The minicomputer maker is hoping to generate new revenue by taking advantage of two trends in the carrier industry: computerization and the loosening of the reins governing divestiture, said Daniel Latham, director of DEC's Telecommunications Industry Marketing Group. This strategy is expected to indirectly impact DEC's commercial users in the form of a wider array of cheaper telecommunications services, he said.

Trust me

In 1984, DEC made the decision not to enter the private branch exchange or Centrex markets. "We are in a position of trust because we aren't competing with them," Latham said, suggesting the same is not true of IBM, which bought Rolm Corp. and owns a stake in MCI Communications Corp.

As a result, DEC claimed it has been able to work out "memoranda of understandings" with a number of telecommunications suppliers involving an exchange of technology information and efforts to jointly provide products to the telecommunications industry.

The move toward computerizing central offices and integrating voice and data communications enables the telecommunications companies to cut costs, thereby cutting prices. "The telcos have gone through a period of maintaining resources and manual record-keeping to a period of automation, where today they have disparate islands of support systems with little sharing of information," said Harry Tankin, a manager at the Telecom Systems Group.

Faced with the threat of bypass, the trend today is for the telecommunications companies to build integrated network management systems capable of providing a global view of their systems, Tankin said.

And as the telecommunications companies and regionals move toward providing Integrated Services Digital Network, Open Network Architecture and intelligent network offerings, DEC's strategy is to be a major player in delivering related computing needs to the providers, Latham said.

Use EDI or lose, council says

BY PATRICIA KEEFE
CW STAFF

SCOTTSDALE, Ariz. — Last month's semiannual meeting of the Uniform Code Council (UCC), which sets electronic data interchange (EDI) standards for the retail industry, was a study in contrast with other recent EDI seminars, most of which attracted hordes of the uninitiated.

Veteran users attending the May 12-13 conference were the ones most likely to tell everyone they had better jump on the EDI bandwagon, or else.

One user said his company told trading partners to provide a plan by year's end detailing a switch to EDI or to expect the relationship "not to prosper," said Thomas Nolle, a consultant and president of CIMI Corp. in Haddonfield, N.J.

The implied threat, he added, was that without an EDI link, hapless partners would find themselves doing business elsewhere by 1989.

Nolle, who attended the UCC meeting, said the approximately 370 attendees averaged three to five years' experience with EDI and represented as much as two-thirds of current EDI volume.

Many attendees conduct almost 100% of their purchase ordering and a significant percent of their invoice activity over EDI, Nolle claimed.

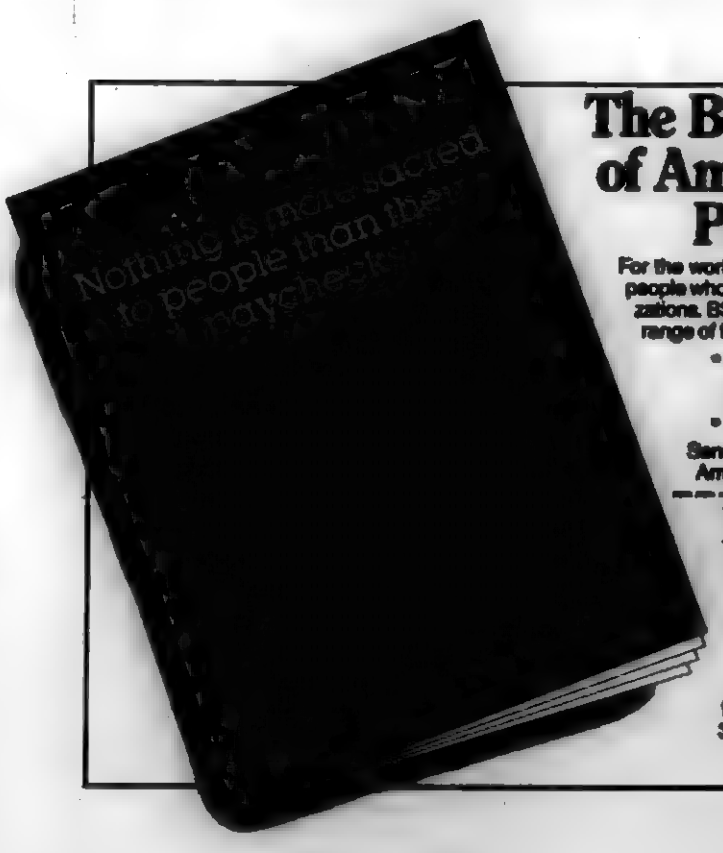
"In the perspective of these people, EDI is a proven financial success in the applications to which it was originally applied," Nolle said. Most are in expansion and consolidation phases.

George Klima, director of accounting systems at Super Valu Stores, Inc. in Eden Prairie, Minn., said his firm is processing 30% of its total invoices via EDI. He said he expects that figure to jump to 80% by this time next year.

The hot news at the meeting was the release of a draft standard for Direct Store Delivery (DSD).

DSD is supposed to reduce "information float" in commercial transactions, similar to check float in a banking system. Today, many buyers and sellers are operating out of sync as invoices, cancellations and orders bypass each other.

DSD allows trading partners to compare quantities and terms at the time the transfer of goods takes place so that problems can be resolved up-front and adversarial relationships avoided, Nolle said.



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Users

FROM PAGE 43

Group (SIG) of the MAP/TOP Users Group.

But it is incumbent on users seeking to benefit from MAP/TOP to push their suppliers in that direction and carefully plan a workable strategy.

Integration of different business systems is key to MAP/TOP, even more significant than network connectivity or expandability, in the view of the report's authors. Enterprisewide integration permits greater control and flexibility of the business's operation, in part because standards let managers better control use of information technology to achieve corporate objectives, the report added.

> "OSI, as implemented by MAP/TOP, is a reality."
>
> MAP/TOP USERS GROUP

Competitive pressures are now forcing companies to integrate disparate applications so networks can share information; yet the barriers to integration are significant.

The report suggests that "we are currently constrained by the web that vendors have woven. . . . The fabric of our business communications networks is of a pattern proprietary to our suppliers, [which] therefore influence our business decisions."

Not surprisingly, users are warned against turning to vendors positioning their own products as de facto standards.

"These are actually proprietary communication systems that only work on the vendors' own equipment. This approach is not a solution at all; it only aggravates the problem," the report said, adding, "the benefits of standardization are lost if everyone follows different standards."

Yet users who wish to take charge of their own destinies will have to face up to the responsibility of telling vendors what they want. The users group SIG maintains that vendors are in fact trying to satisfy their customers but have received little or mixed direction from users as to their intentions for using MAP/TOP. Noting that adopting new standards is expensive and can greatly alter the business strategies of vendors, the report scolded users, saying "vendors require that guidance from their customers."

Instead, the SIG backs international standards, particularly the International Standards Organization's Open Systems Interconnect (OSI) model. It stresses that communications technologies based on international standards are beginning to bridge these islands of information and can also allow for lower network costs and consistent communications techniques throughout a company's business environment.

While the users group maintains that "OSI, as implemented by MAP/TOP, is a reality," it does offer one caveat about other competing international standards. "International standards alone are not adequate, since they each have a variety of options and don't all interact."

Regardless of the route a company chooses to take, the white paper emphasized that MAP/TOP products are available now and made the following recommendations to users:

- Upper level management must actively pursue the implementation of MAP/TOP throughout the company.
- Study the impact of adopting a communications strategy based on MAP/TOP capabilities.
- Become involved in the MAP/TOP Users Group to track and influence the direction of the specification and products.
- Start pilots to get exposure to the technology and validate specific uses. The report noted that data about the actual business impact resulting from MAP/TOP implementations is currently limited. But it later said firms that have implemented MAP/TOP have realized numerous benefits, including cost savings, flexibility and ease of communications between machines.
- Protect existing investments while providing a migration path.
- Educate and train development and support staff.

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Dbase III plugs into System/38

TORRANCE, Calif. — Ashton-Tate Corp. extended its ability to tap into the IBM mainframe environment with the announcement last week of connectivity software said to plug its Dbase III Plus microcomputer data base management system into data residing on the IBM System/38.

With Dbase Direct/38, users can view, select, sort, display and print data from within System/38 files as if they were Dbase files. Dbase Direct/38 also lets users join up to 32 System/38 files, the company claimed.

The package allows the automatic conversion of System/38 data into Dbase III Plus's .DBF format for use within Dbase programs, making Dbase Direct/38 an application gateway for other personal computer products that support .DBF, the firm said.

Dbase Direct/38 also builds on the Dbase programming language by providing a set of query tools said to allow users to interactively manipulate, display or list details from System/38 files on a field-by-field or record-by-record basis.

Copy capability

The tools also allow users to copy System/38 files and their structures to a Dbase III Plus file, call for selected System/38 data from within Dbase III Plus applications and upload data files to the System/38.

Dbase Direct/38 resides entirely on PCs and works with the System/38-resident PC Support/38, an IBM-supplied utility that connects micros to the System/38.

Dbase Direct/38 is priced at $2,995 per System/38 CPU.

White

CONTINUED FROM PAGE 43

work group local- and wide-area networks? Apple's response to this, of course, is a resounding yes. In fact, Apple Chairman John Sculley has declared 1988 Apple's "Year of Communications." Indeed, Apple has announced some key technology possibilities that are virtually unknown in the user community. Along with other companies, some of which are partially funded by Apple, the possibility of connecting Appletalk to the standard internetworking environments will soon exist.

Interconnectivity

To understand Apple's strategy, we must first look at the world of interconnectivity. There are two types of standards in this area: vendor and user. De facto standards occur when a proprietary product becomes a standard based on the strength of the vendor's market position. IBM's Systems Network Architecture, or LU6.2, is an example.

Another type of vendor standard is one developed by a committee — for example, the International Standards Organization's Open Systems Interconnect (OSI) model. Much confusion has arisen about this standard, primarily because it is not yet complete.

For a number of years, OSI has been pegged as *the* emerging standard. While many observers predicted that large groups of users will rush to purchase products based on it, this has not been the case. This is primarily because of the incompleteness of the OSI standard and the fact that another internetworking scheme — Transmission Control Protocol/Internet Protocol (TCP/IP) — was already in place and working.

TCP/IP, a user standard, was originally developed in the 1970s by the federal government to address the need to connect dissimilar computers and networks.

The standard made its way into the scientific and university communities because it became a part of Unix. Recently, we have seen a dramatic increase in the number of TCP/IP users in the commercial sector, in which corporate users face the same need to link disparate networks. Although TCP/IP may be supplanted by OSI in the future, it is here and it works, hence its adoption.

Given the background information, we can consider how Apple is addressing interfacing with these interconnection standards. In the IBM world, after a number of false starts, Apple introduced MacAPPC. Slated to be available this summer, the product links Macintoshes through a Macintosh II gateway to other systems using IBM's Advanced Program-to-Program Communications (APPC).

Since MacAPPC was released in the form of a developer's tool kit, Apple is dependent on third-party developers to fulfill user needs through new products. So now the questions are, Will we see immediate products, and what types of products will they be?

The answer to the first question is that we will probably not see user products until next year. While APPC is a very important strategic protocol for IBM, there are very few workstation-based applications that currently take advantage of APPC. This is primarily because third-party software vendors do not understand how to take advantage of the capability for connecting to other systems in the peer-to-peer fashion that is provided by APPC.

In your community

The first place APPC-based applications are likely to appear is in the corporate community. Corporate programmers are becoming very active in the area of homegrown connectivity applications for personal computers.

Particularly as we move into the world of IBM and Microsoft's OS/2, corporate technicians are displaying a tremendous interest in writing their own applications. For the first time, these developers seem to feel there are adequate software platforms and tools to help them provide acceptable services to their users.

The first types of APPC-based solutions will be in the data base area. Developers will be taking advantage of connectivity capabilities to IBM mainframes in a cooperative processing fashion. This capability is especially important since more than 50% of corporate information is stored on IBM mainframes.

White is president and chief executive officer of Infonetics, Inc., a market research firm based in Santa Clara, Calif.

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It has always been the tough compromise: adding security to your VTAM network meant making it harder to use. Making the network easier to use meant making it less secure.

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Secure the network with password security at the VTAM level and allow access to only authorized applications.

Simplify the network by offering a menu in the user's terms and then automate the logon to establish the session and the signon to the application with a single keystroke.

THE SECURITY SIDE	THE SIMPLICITY SIDE
▶ Userid/Password validation at the VTAM level. ▶ Only authorized applications offered to the user based on user, terminal, and time-of-day. ▶ On-line and historical audit trails of network access. ▶ Extended user authentication support. ▶ Inactivation of terminal/port after security violation. ▶ Userids only valid from specific terminals/ports. ▶ Security announcements for dialup ports. ▶ Interfaces to: ACF2, RACF, Top Secret and VM Directory.	▶ Single-point signon. ▶ Custom menus in user's terminology. ▶ Automated session establishment. ▶ Automated application signon. ▶ Automated application status display. ▶ On-line Bulletin Board and Help Screens. ▶ Common message/broadcast facility. ▶ Automatic task initiation within TP systems. ▶ Signon interfaces to: CICS, CMS, Com-plete, IDMS/DC, IMS/DC, NCCF, Netview, Model204, ROSCOE, TPX and TSO.

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Think of it. . . enhance security and simplicity in one easy step. Free trials available and installation is fast. Available for MVS, VM/GCS and VSE. Call today at 206/882-2600 or mail the coupon below for more information.

☐ I'm interested in a trial of THE NETWORK DIRECTOR
☐ Please have one of your specialists give me a call
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COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

NEW PRODUCTS

Local-area network hardware

An add-in board for personal computers that reportedly combines graphics capabilities with a port for a Apple Computer, Inc. Appletalk network has been developed by **Hercules Computer Technology, Inc.**

The monochrome **Network Card Plus** is said to allow users to network PCs, Apple Macintoshes and Sun Microsystems, Inc. Unix-based systems running Digital Equipment Corp.'s TOPS. The card includes all the standard graphic and text capabilities of the Hercules Graphic Card Plus and permits network sharing of laser printers and hard-disk storage devices.

Network Card Plus costs $369 and comes with a two-year warranty.

Hercules, 921 Parker St., Berkeley, Calif. 94710. 800-532-0600.

TCL, Inc. has announced a high-speed data networking package composed of the **Model 2012 Adapter Card** and **Model 3002 TCP-NET** software.

The package connects IBM Personal Computer, PC XT, AT and compatible systems to large computer networks running under Transmission Control Protocol/Internet Protocol by way of 10M bit/sec. Ethernet and IEEE 802.3 local-area networks.

Operation with Ethernet Version 1 or 2 and 802.3 networks is user-selectable via a jumper. The adapter card is a single full-size card with 16K bytes of static random-access memory.

The Model 2012 Adapter Card costs $399. The Model 3002 TCP-NET software costs $400.

TCL, 47621 Westinghouse Drive, Fremont, Calif. 94539. 415-657-3800.

Local-area network software

Wordtech Systems, Inc. has begun shipping **Networker Plus**, its work group productivity tool for local-area networks.

The product offers distributed processing, task sending and message and screen transmission to IBM Netbios-compatible LAN users. Available in both memory-resident and batch mode, Networker Plus can also be built into Ashton-Tate Corp. Dbase applications by using Quicksilver, Wordtech's Ashton-Tate Dbase III Plus compiler.

The package requires an IBM PC-DOS 3.1 LAN with Netbios or Netbios emulation. Depending on individual application requirements, between 40K and 100K bytes of free memory are needed per workstation.

Networker Plus costs $295 per file server.

Wordtech, P.O. Box 1747, Orinda, Calif. 94563. 415-254-0900.

A local-area network version of Officewriter has been introduced by **Office Solutions, Inc.**

Officewriter/LAN 2.0 is said to provide printer support for laser and Adobe Systems, Inc. Postscript printers and will allow the user to customize library settings and format line print options. Document protection capabilities are also included. The product is compatible with 3Com Corp., Novell, Inc. and IBM LANs.

Officewriter/LAN 2.0 costs $995.

Office Solutions, 2802 Coho St., Madison, Wis. 53713. 608-274-5047.

Network management

Azure Technologies has added a **3270 Response Time Analyzer** to **Coaxscope**, its personal computer board and software combination for converting an IBM Personal Computer, PC XT, AT or compatible into a data scope for monitoring Type A coaxial protocols.

The Response Time Analyzer allows network response time statistics to be derived from the vendor's 3270-Coax link. The product was designed as a tool for developers, network managers and support personnel, particularly in multivendor environments.

The base price of Coaxscope is $2,995.

Azure Technologies, 38 Pond St., Franklin, Mass. 02038. 617-520-3800.

Modems/Multiplexers

Several high-speed modems and related products have recently been introduced by **Universal Data Systems, Inc.**

The **V.32 Data Pump** is a full-duplex, 9.6K bit/sec. OEM modem module that offers compatibility with CCITT V.32 and V.32 communication standards. The product is targeted at OEMs and systems integrators. The V.32 Data Pump costs $695 in single-unit quantities.

The **Sync-Up T9628B** is a combination 9.6K bit/sec. modem and protocol converter on a single IBM Personal Computer-compatible module. The modem transmits synchronous, half-duplex data at 9.6K bit/sec. over the public switched telephone network utilizing trellis coding. The Sync-Up T9628B costs from $1,540.

The **9648T** is a combination 9.6K and 4.8K bit/sec. modem that incorporates several data transmission standards and provides trellis-coded error protection. The 9648T costs $1,695.

Universal Data Systems, 5000 Bradford Drive, Huntsville, Ala. 35805. 205-721-8000.

Why We're Betting a Million Lines of Code on the SAS/C™ Compiler.

At SAS Institute Inc., we've invested more than 10 years of research—and over a million lines of code—in the SAS® System, the world's leading data analysis software. So you can bet we left nothing to chance when we chose the C language for the next generation of our software.

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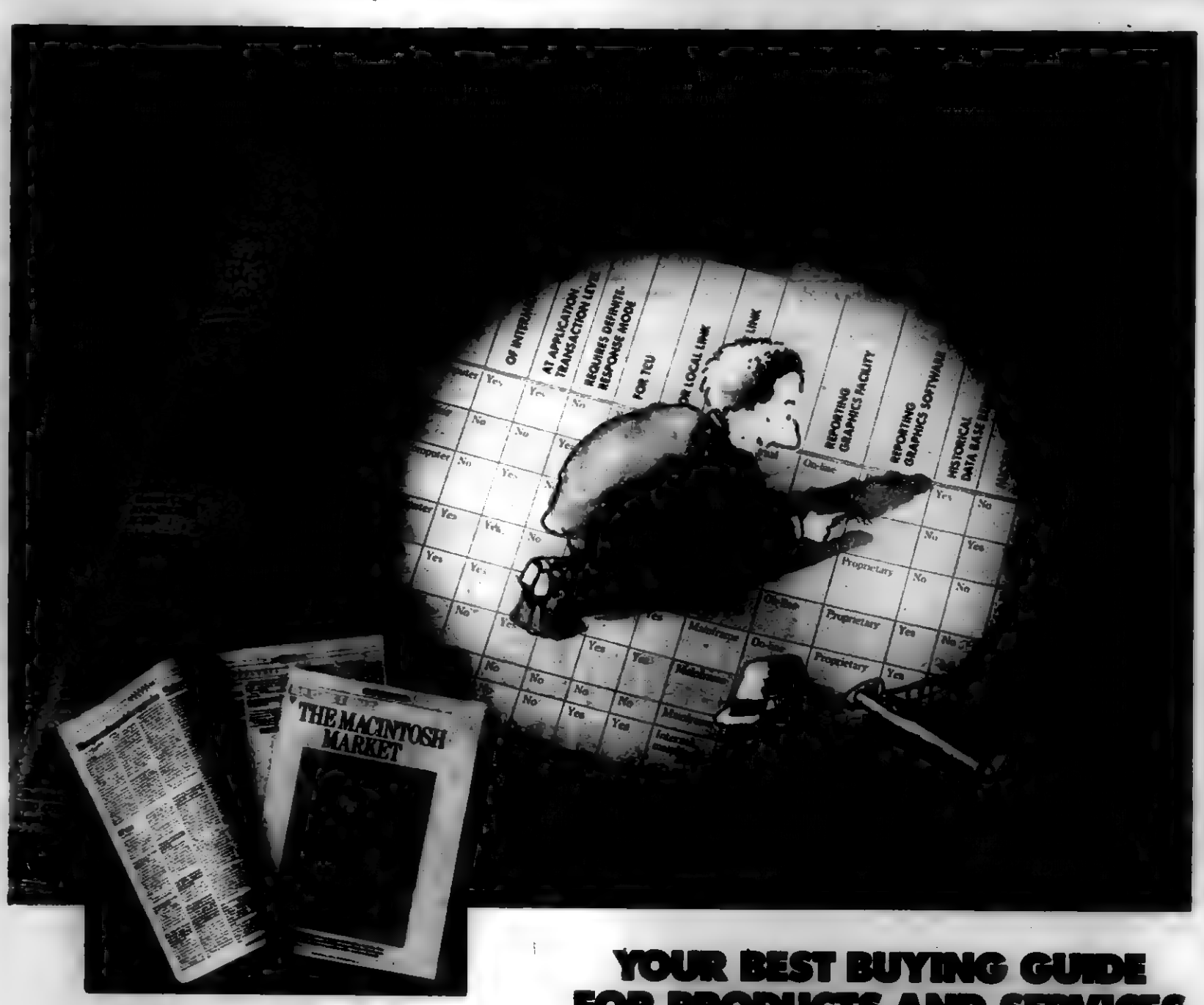

1988 Computerworld SPOTLIGHT Sections

Issue Date	Spotlight Topic	Ad Closing	Trade Show Distribution
Jan. 11	Terminals & Terminal Emulation Products	Dec. 24	
Jan. 25	LANs	Jan. 8	Communication Networks
Feb. 8	DEC-compatible Software	Jan. 21	Uniforum
Feb. 29	Performance Management/ Capacity Planning	Feb. 12	
Mar. 14	DBMS	Feb. 26	
Mar. 28	Micro-to-Host Links	Mar. 11	WCC/Interface
Apr. 11	PCs (IBM-compatible)/ Portables/Laptops	Mar. 25	
Apr. 25	Electronic Publishing	Apr. 8	
May 9	Printers	Apr. 22	Comdex Spring
May 23	Data Communications	May 6	
June 6	CASE	May 20	
June 20	The SNA Market	June 3	PC Expo
July 11	Disaster Prevention & Recovery Products & Services	June 24	
July 25	Productivity Software	July 8	
Aug. 8	TBA	July 22	
Aug. 29	DB2 Market	Aug. 12	
Sept. 19	Hardware Roundup: Large, Medium Scale & Special Purpose Systems	Sept. 2	
Sept. 26	Hardware Roundup: Small Scale Systems	Sept. 9	TCA
Oct. 3	Hardware Roundup: Personal Computers & Workstations	Sept. 16	
Oct. 17	AI/Expert Systems	Sept. 30	Depco West
Oct. 31	Unix	Oct. 14	
Nov. 14	TBA	Oct. 28	Comdex Fall
Dec. 5	LANs	Nov. 18	
Dec. 19	IBM-compatible PCs/PS2 Market Products/Monitors	Dec. 2	

YOUR BEST BUYING GUIDE FOR PRODUCTS AND SERVICES IS RIGHT HERE.

IN COMPUTERWORLD SPOTLIGHT

Evaluating and specifying products and services for purchase is no easy task. And it's even more difficult when new products and vendors are frequently entering the market. But *Computerworld* makes the buying process easier for you with *Computerworld* Spotlight.

Spotlight is a series of pullout sections within *Computerworld*, each focusing on one product category. With 24 Spotlight sections in 1988, you'll get the purchasing specifics you need for PCs, LANs, printers and productivity software — to name just a few. Each Spotlight contains quick reference specification charts that compare products on a feature-for-feature and dollar-for-dollar basis. Plus related editorial on real-life applications, interviews, vendor viewpoints and market trends. And since it's a pullout section, you'll be able to save and refer to this information as you need it.

If you're involved in buying products, *Computerworld* Spotlight is the section you'll be turning to throughout 1988. And if you're marketing computer products in any of the Spotlight categories covered, you should be putting your message where your market is. Our schedule of 1988 Spotlight topics is listed at the left for your reference.

COMPUTERWORLD

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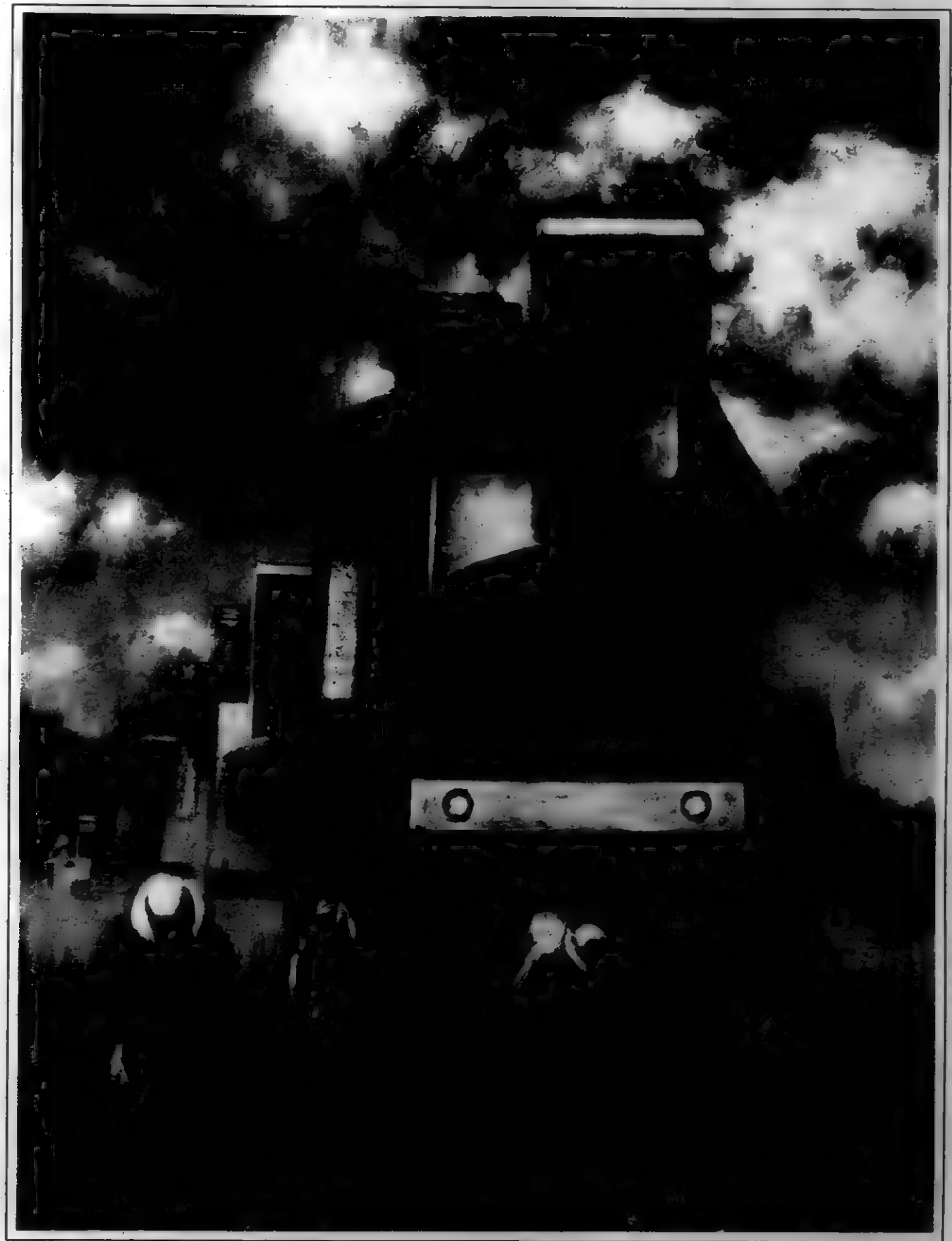
SPOTLIGHT

CASE PRODUCTS



Automation is becoming a reality for both analysts and programmers as more fully equipped CASE tools roll onto the market.

For years, we believed that 4GLs should run only on a mainframe. Now we're divided on the issue.

For hundreds of thousands of mainframe users, NOMAD's relational design, rich language, and windowed user interface have set new standards in 4GL productivity and performance.

Now, with recent advances in PC technology, we're separating ourselves from the competition in another way. With versions of NOMAD for your mainframes, minicomputers, and PCs that deliver on the promise of true cooperative processing.

Instead of simply transferring files between mainframe and PC, NOMAD now shares the actual processing in a dialogue between your machines.

For example, by distributing tasks like menu and window management, data validation and report generation to the PC while conserving mainframe power for simultaneously processing transactions against a shared database, NOMAD reduces its use of mainframe resources by as much as 75 percent.

Impressive as that sounds, it's but one of the innovations responsible for widening the technical gap between NOMAD and other 4GLs. We're also the first to develop a common windowing capability and implement referential integrity across multiple hardware environments.

So if you're looking for a 4GL that will boost user productivity, offload your mainframe, and handle your toughest applications, keep in mind that the best decision is a split decision. NOMAD. From Must.

MUST SOFTWARE INTERNATIONAL

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CASES

The Computer-Aided Software Engineering Symposium

Dr. Carma McClure
Symposium Chairman

Special Real-Time Track
featuring Dr. Paul Ward*

Distinguished Faculty

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- Glover T. Ferguson, Jr.
- Chris Gane
- Derek J. Hatley*
- Capers Jones
- John Manley*
- Ronald G. Ross
- Byron D. Miller
- Ken Orr

Washington, DC, Sept. 12–14, 1988
Chicago, Oct. 12–14, 1988
San Francisco, Nov. 29–Dec. 1, 1988

**Special Real-Time Faculty*

Product Education Sessions by:

The following companies will be presenting their CASE tools in *HANDS ON* product education sessions.

ADPAC COMPUTING LANGUAGES CORP.
AGS MANAGEMENT SYSTEMS
AMERICAN MANAGEMENT SYSTEMS
ANAYST INTERNATIONAL
ARTHUR ANDERSEN & CO.
ARTHUR YOUNG & CO.
ASYST TECHNOLOGIES, INC.
BACHMAN INFORMATION SYSTEMS, INC.
THE CADWARE GROUP, LTD.
CATALYST
CGI SYSTEMS, INC.
CHEN & ASSOCIATES
COMPUTER SCIENCE CORP.
CORTEX CORP.
DIGITAL EQUIPMENT CORP.
HOLLAND SYSTEMS CORP./DELOITTE, HASKINS & SELLS
I-LOGIX .
INDEX TECHNOLOGY CORP.
INTEGRATED SYSTEMS, INC.
INTERACTIVE DEVELOPMENT ENVIRONMENT, INC.
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COMPUTER-AIDED SOFTWARE ENGINEERING SYMPOSIUM

Washington, D.C. Chicago San Francisco

September 12-14, 1988 October 12-14, 1988 November 29-December 1, 1988

CASE Is Software Automation

CASE technology is perhaps the most profound change to ever hit the software community. CASE is the automation of automation. It offers a very practical answer to twenty-five-year-old software productivity problems. As for other forms of manufacturing, the best way to improve productivity and quality is through automation. CASE proves this is true for software tools.

CASE Tools and Techniques

CASE is a combination of techniques and tools aimed at building and maintaining software systems of all types - large and small, commercial and scientific, on-line and real-time embedded. CASE tools provide full coverage of the software life cycle by providing auto analysis, design, implementation and maintenance as well as project management of software systems. Many CASE tools include powerful graphics editors to improve the user interface and to transform software development into a visual process . With the use of workstations, PCs, local area networks and PC-based tools, for the first time the software developer can work from a highly responsive, dedicated development environment. Examples of CASE tools are diagramming tools, screen and report painters, code generators, documentation generators, restructuring and reverse-engineering tools. Different CASE tools focus on particular aspects of system development and different types of software systems including COBOL, Fortran, C, Ada, and embedded applications. CASE promotes new techniques like information engineering, rapid prototyping and JAD sessions with end users as well as supports traditional structured techniques like structured design. CASE tools make structured techniques practical to use by automating structured diagramming and documentation production.

CASE Changes to Software Development and Maintenance

CASE changes and improves the software life cycle. With CASE, the system developer can focus more on analysis and design and less on coding and testing. Manual program coding is replaced by code generators that automatically produce code from design specifications. Design specifications take the form of structured diagrams (like data flow diagrams and entity relationship diagrams) and prototype models. As the specifications are entered into the CASE repository, they are automatically checked for correctness and cross-referenced with other system information. All system information is stored in the CASE repository where it can be automatically managed and shared.

With the aid of CASE tools, rapid prototyping replaces paper-based methods for defining system requirements. And, CASE greatly reduces the software testing effort. Automatic analysis and checking of the design specification eliminates many errors arising from inconsistent and incomplete specifications. Automatic code generators eliminate errors arising from the misuse of programming languages. Finally, CASE addresses serious and costly software maintenance problems with CASE tools that automatically document, analyze, and restructure existing software programs.

Major CASE Technology Issues

A couple of years ago, hardly any software developer had heard the term CASE. Now it is the center of attention - the latest and greatest answer to software problems. The CASE tools market has one of the highest growth rates of any segment of the computer industry. As the market grows, the definition of CASE and the impact of CASE issues continue to change. In 1988, the following are the major issues that must be addressed to make CASE work and really deliver software productivity and quality improvements in practice.

- CASE tool integration for full life cycle support
- Standards for CASE tool interfaces and connectivity
- Structured methodologies support
- CASE support for project management
- CASE support for existing systems
- CASE repository architectures

Why Attend the CASE Symposium?

All this rapid growth has brought excitement and hope but also confusion for CASE users. What is the CASE technology? What are CASE tools? How can CASE be successfully implemented in any organization? What are the current CASE issues and trends. Find out by attending the CASE Symposium. It is the first and the best attended conference on CASE. The CASE Symposium (CASES) will define the key concepts and terminology of Computer-Aided Software Engineering and discuss the current CASE issues. In three intensive days, you will be able to evaluate, compare and contrast various CASE approaches and learn how to incorporate this new technology into your organization.

Day One. Seminar Outline

1. Overview of Computer-Aided Software Engineering (CASE)

2. CASE Technology
   a. What is CASE technology?
   b. Automation of automation
   c. Automation of software life cycle
   d. Linking design automation and program automation
   e. Total solution to software crisis
   f. Evolution of CASE technology
   g. Current CASE issues

3. Characteristics of CASE Systems
   a. New software development environment
   b. Graphic design capabilities
   c. Central information repository
   d. Tightly integrated tool sets
   e. Full life cycle coverage
   f. Prototyping support
   g. Automatic code generation
   h. Automatic correctness and consistency checking

i. Key CASE system concepts
j. CASE system comparison criteria

4. **Review of Vendor Products:**
   A discussion of how to categorize CASE products
   a. CASE toolkits
   b. CASE workbenches
   c. CASE methodology companions
   d. Review of CASE market, major vendor players and growth predictions

5. **CASE Hardware Platforms**
   a. PC workstations
   b. Mainframe
   c. PC-mainframe link
   d. One, two, and three tiered architectures

6. **Changes to the Software Life Cycle**
   a. Front end loading
   b. Object-oriented program design
   c. Minimizing manual implementation tasks
   d. Rapid iterative prototyping
   e. Minimizing the need for testing
   f. Merging development and maintenance strategies

7. **CASE Productivity Benefits**
   a. Increasing productivity by a factor of 20
   b. Getting more from each developer
   c. Reducing the change and maintenance effort
   d. Case studies on CASE
   e. Short/long term benefits
   f. Ways to implement CASE

8. **Related Technologies**
   a. CASE's dominant role
   b. Software reusability as a development methodology
   c. Role of COBOL
   d. Absorption on fourth generation
   e. Incorporation of fifth generation technologies
   f. Emerging issues

9. **Future Trends**
   a. Habitable environment
   b. Intelligent training systems
   c. Intelligent methodology drivers
   d. Software reusability

Symposium Chairman

McClure

DR. CARMA MCCLURE, internationally known author and lecturer, will lead the CASE Symposium overview. Dr. McClure specializes in software methodologies, software law and project management. She is a leading authority on CASE technologies. Her lectures and workings on the subject have reached thousands of software managers and developers worldwide. Since 1974, she has served as a software consultant and has worked with major corporations including Blue Cross/Blue Shield, GTE, Bell Labs, Diebold, TI, DEC, and DuPont. Dr. McClure is a software engineer and has taught software engineering courses at Illinois Institute of Technology (IIT) and Northwestern University. She has served as a National ACM Lecturer and has conducted seminars on software maintenance, structured techniques and project management. Her publishing credits include numerous articles on software and seven books, including four coauthored with James Martin. Her latest book, *CASE is Software Automation*, from Prentice-Hall, is the most comprehensive book on the subject of CASE.

Special Presentation: CASE Products for Real-Time Developers

Although most CASE products support the development of business systems, a substantial and growing number of vendors are also providing for the special needs of real-time developers. Real-time CASE products provide features such as graphic notations to represent timing and synchronization requirements, model execution to analyze time-dependent behavior, and support for DoD 2167 documentation and tracing requirements. A number of the leading real-time CASE vendors will be demonstrating their products at CASES and there is a special educational track for real-time developers as part of the day 1 format.

Special Presentation: Real-Time Seminar by Dr. Paul T. Ward

Ward

Seminar Outline
Concurrent Afternoon Session

1. Vendor Survey: Who are the scientific/engineering CASE tool vendors?
2. Modeling Paradigms by Vendor
3. Life Cycle Coverage by Vendor
4. Depth of Model Analysis by Vendor
5. Code Generation Capabilities by Vendor
6. Project Management/Documentation Support by Vendor
7. Common Work Environment Support by Vendor
8. Delivery Platform by Vendor
9. Product Development Trajectory by Vendor

Dr. Paul T. Ward is President of Software Development Concept and a leading software development consultant, specializing in requirements specification, high-level software design, training of development personnel, and methodology definition of real-time systems development projects. He has experience in systems development in both real-time and business environments. Prior to opening his own consultancy, Mr. Ward was with Yourdon.

PRODUCT PRESENTERS

ADPAC COMPUTING LANGUAGES CORP.

Adpac Computing Languages Corporation develops, markets and services technology support tools for the IBM mainframe operating under MVS. Adpac's CASE tools (DFDP and DESIGN) provide a front-end CAD/CAM diagramming technique that assists analysts in drawing any type of diagram and design analysis with the capability to verify the contents of diagrams.

AGS MANAGEMENT SYSTEMS, INC.

AGS/MS is recognized as the world's leader in systems development methodologies and project management systems. MULTI/CAM, the micro-mainframe CASE system created by AGS/MS, integrates software development tools, software design and production models, project management and any other user selected CASE tools into a unified, automated work environment.

AMERICAN MANAGEMENT SYSTEMS

AMS is a major computer services firm specializing in applications development. AMS's Life cycle Productivity System (LPS) integrates productivity tools from AMS and other vendors for strategic system planning, design, development, maintenance, and project management. LPS produces all deliverable work products required by most methodologies. Major portions of LPS operate on PCs. Implementation, configuration control, and foundation software modules operate on IBM mainframes.

ANALYSTS INTERNATIONAL CORP.

Analysts International Corporation, a professional data processing software and services company, and a leader in the computer industry for over 22 years, introduces CORVET. CORVET is a graphics oriented, PC based, interactive CASE design and development product that generates stand-alone COBOL programs and comprehensive documentation for IBM mainframe environments.

ARTHUR ANDERSEN & CO.

FOUNDATION is a computer-integrated environment for software engineering developed by Arthur Andersen's consulting practice. Covering the entire systems development life cycle, FOUNDATION consists of METHOD/1, an automated systems methodology, DESIGN/1, a PC LAN-based tool for planning and design, and INSTALL/1, an IBM mainframe-based environment for implementation and support of DB2 applications.

ARTHUR YOUNG & CO.

Arthur Young is an international accounting, tax and management consulting firm which is working with KnowledgeWare to develop the Information Engineering Workbench (AY/IEW), and markets KnowledgeWare products internationally and uses the AY/IEW for systems building. Arthur Young will present its experience building systems using the AY/IEW and Information Engineering techniques.

ASYST TECHNOLOGIES, INC.

The DEVELOPER provides a generic, multi-user, automated support for the systems development process, through its repository located either at the PC, at the mainframe (using DB2) or at both sites. The DEVELOPER and its CUSTOMIZER module allow the use of any methodology at all desired levels of compliance and rigor. Repository integrity is maintained through a menu-driven SQL query language and built-in ASYSTants capabilities.

BACHMAN INFORMATION SYSTEMS, INC.

Bachman Information Systems, Inc. is exhibiting a new CASE system, The Bachman Product Set which supports the development of new applications while supporting existing applications. It provides the powerful maintenance, enhancement and migration capabilities MIS departments need to control the largest component of their workload.

CATALYST

CATALYST, an information technology firm of Peat Marwick, will present PATHVU, RETROFIT, ReACT, and DataTEC. PATHVU provides analysis and detailed reporting of program logic and structure. RETROFIT restructures COBOL code. ReACT translates Assembler programs to structured COBOL. DataTEC provides data element analysis, standardization and migration capabilities. These products make up the reengineering baseline necessary to migrate existing systems to advanced technical environments.

CGI SYSTEMS, INC.

PACBASE is a full-cycle CASE product. It integrates: Mainframe and PC based analysis and design workstations for the development and maintenance of application specifications. This is done through active prototypes, a centralized enterprise-wide dictionary that controls and manages all business specifications directly into complete COBOL applications, including all code and documentation.

CHEN & ASSOCIATES, INC.

Chen & Associates provides products, training, and consulting in data-oriented system development. Products (PC-based) to be presented are: ER-Designer, which defines your information requirements in entity-relationship diagrams; SCHEMAGEN, which generates schemas for your database systems (from micro-based to mainframe based); Normalizer, which normalizes data or words.

COMPUTER SCIENCES CORP.

The Technology Activity's Design Generator is an object-oriented, expert system that automatically selects a central transform from a data flow diagram and generates an initial design represented in structure chart notation. The graphic-intensive user interface features intelligent pop-up menus and multi-pane browsers.

CORTEX CORP.

CorVision is an application development system that automates the entire software development cycle for the DEC VAX/VMS environment using a technique called Picture Programming. Picture Programming allows DP professionals to visualize an application by diagramming the design and then automatically generating a production-ready application directly from the pictures.

DIGITAL EQUIPMENT CORPORATION

As a leading computer manufacturer, Digital provides a range of integrated Application Development tools for solutions to business and engineering problems. The unique offerings are workstation based and address all aspects of the Applications Development Life Cycle. They are integrated into the VAX hardware, software and network architecture to provide enterprise wide solutions.

HOLLAND SYSTEMS CORP./DELOITTE HASKINS AND SELLS

Deloitte Haskins & Sells and Holland Systems Corp. have pooled their proven consulting and software product expertise in the IRM area. The result is a line of products that address the entire information resource management process...from business modeling...to database design and analysis...to application development and implementation. The companies will feature the 4Front family of IRM products.

I-LOGIX, INC.

i-Logix, Inc. pioneers system design automation with STATEMATE, the only available tool that models the dynamic behavior of real-time systems as well as system functions and architecture. With STATEMATE, users produce a specification that is compiled allowing its execution to be viewed on screen. STATEMATE includes three graphic languages for modelling; execution and simulation capability; rapid prototyping in Ada; and 2167A documentation.

INDEX TECHNOLOGY

Index Technology markets the Excelerator family of products that automate systems development. Products include PC Prism for systems planning, Excelerator and Excelerator/RTS for analysis and design, plus links to application generators and programming environments. Excelerator and Excelerator/RTS support a variety of techniques and methodologies and can be tailored for each organization's needs.

INFODYNE INTERNATIONAL, INC.

InfoDyne, Inc. markets and distributes MAST-ER, a PC based CASE tool and methodology, based on the E-R (Entity-Relationship) approach to systems planning and design. MAST-ER accommodates numerous approaches to the problem of analysis, design and documentation of all design activities relating to the conceptual, logical and physical model of data and international processes in an information system.

INFOREM PLC

Inforem's Professional Application Generation Environment (PAGE) is a unique CASE offering. A multi-user product, it combines on-screen graphics with a systems encyclopedia and uses a relational database on networked PCs. PAGE is based on the Inforem Method which provides a seamless transition right from analysis to program code both for PC and mainframe systems.

INTEGRATED SYSTEMS, INC.

AutoCode focuses on the needs of Real-Time Software Engineers and addresses all steps from analysis to design, simulation and code generation. The graphical specification environment features engineering block-diagrams, data flow/-control flow, state transition, and process descriptions. Ward-Mellor real-time software methodology with Boeing-Hatley extensions are included in an environment where simulation and analysis can be performed for design verification; and real-time code in C, Ada or Fortran can be generated automatically.

INTERACTIVE DEVELOPMENT ENVIRONMENT (IDE)

IDE's product, Software through Pictures, is a set of integrated graphical editors and error-checking tools supporting structured analysis and design methods. The editors are linked to a Data Dic-

PRODUCT PRESENTERS

tionary supporting definition of names, types, constants and associated text. Users can generate Ada declarations and define process and module templates to generate specifications.

JAMES MARTIN ASSOCIATES

James Martin Associates, an international consulting firm established by James Martin in 1981, is considered the world leader in creating improved systems development methods and CASE tools to support those methods. With more than 250 professionals throughout the world. JMA's teams provide commercial and government clients with technical and management services.

KNOWLEDGEWARE, INC.

Knowledgeware, Inc. provides a complete Integrated Computer-Aided Software Engineering (I-CASE) environment for the planning, analysis, design, construction, and maintenance of computer-based information systems. The Information Engineering Workbench (IEW) provides enterprise modeling, data modeling, process modeling, systems design, and code generation experts. The "Knowledge Coordinator/Encyclopedia" team uses state-of-the-art artificial intelligence technology.

LANGUAGE TECHNOLOGY

Language Technology provides CASE products to the IBM mainframe market. The company's flagship product, RECODER is the leading COBOL structuring tool. RECODER automatically transforms difficult to maintain, unstructured COBOL into structured COBOL in minutes. Language Technology's INSPECTOR is the only quality assurance tool based on scientific measurement of COBOL quality and maintainability.

LBMS-LEARMONTH & BURCHETT MANAGEMENT SYSTEMS, INC.

LBMS will present its PC-based tools, SUPER-MATE and AUTO-MATE PLUS. SUPER-MATE provides a powerful set of automated facilities for strategic planning, including business area/activity analysis, analysis of competitive strategies, the prioritization of applications, and the development of the strategic plan. Results of this plan may be passed to AUTO-MATE PLUS which provides full support for systems analysis, logical design and automatic generation of physical designs and data dictionary syntax for ADABAS, DB2, and other DBMS.

MANAGER SOFTWARE PRODUCTS (MSP)

The MANAGER Family of Products (PC and Mainframe) is dedicated to automating all phases of the systems life cycle, from strategic information planning to the generation of enabled code. MSP will present managerVIEW, the intelligent workstation based graphical information engineering tool driven by the central knowledge base resident on the corporate dictionary. ManagerVIEW is integrated with the mainframe corporate dictionary and also runs on the IBM PC family and PS/2.

McDONNELL DOUGLAS, ISG

McDonnell Douglas Information Systems Group is focused on providing single-source solutions representing a tailored framework for software engineering. ProKit WORKBENCH is a new IBM PC-based information system that automates the application of proven structured techniques to the strategic planning, analysis, and design phases of the system life cycle.

MICHAEL JACKSON SYSTEMS, LTD.

Jackson CASE tools automate the widely acclaimed Michael Jackson methods of system development and program design. SPEED-BUILDER supports the analysis phases of development through powerful graphical and text facilities and automates documentation production. The cooperating Program Development Facility (PDF) generates complete, well-structured program code from jackson structure charts.

MICRO FOCUS

Micro Focus COBOL/2 Workbench puts a mainframe programming and testing environment on a PC platform under MS-DOS or OS/2. It is used by developers of COBOL, CICS DL/I, and IMS DB/DC applications to improve productivity and cut applications development backlogs. Micro Focus COBOL compilers and CASE tools are the choice of IBM, AT&T, Sun Microsystems, Microsoft, and other industry leaders.

NASTEC CORP.

Nastec Corporation develops tools for commercial, government, and engineering software developers. CASE 2000 DesignAid is based upon an interactive, multi-user database with features for process modeling, real- time system modeling and documentation. Operating in the IBM PC and Digital VAX environment, CASE 2000 also includes tools for requirements management, project management and control, and consulting and training in CASE technology.

NETRON INC.

The NETRON/CAP Development Center is a CASE system for building custom, portable COBOL software using a frame-based software engineering process called Bassett Frame Technology. NETRON/CAP unifies the prototyping/development/maintenance life cycle into an automated specification procedure. The open design architecture allows unlimited automation of additional application functionality for IBM mainframes and PCs, VAX systems and Wang VS minis.

OPTIMA, INC. (Formerly known as Ken Orr & Associates)

Optima, Inc. integrates the use of tools and technology with the experience of people. DSSD, (Data Structured Systems Development) the flagship product, is a lifecycle methodology which serves as the base of the product offering. CASE tool products which automate the methodology are Brackets, for the diagramming process, and DesignMachine, for requirements definition and logical data base design.

ON-LINE SOFTWARE INTERNATIONAL

On-Line Software International presents CasePac-Automated Software Development with a powerful DB2 data dictionary. As the foundation for On-Line. Software's CASE platform, CasePac provides a complete, fully active central repository, software engineering facilities including a graphics front end, change management and maintenance facilities.

PANSOPHIC SYSTEMS, INC.

Pansophic Systems, Inc. presents TELON. The TELON application development system captures design specifications to generate COBOL or DL/I applications. TELON assists the transition from analysis to design by providing interfaces to leading front end analysis tools. TELON components include: directory, data administration, screen/report painters, prototyping, specification facilities, automated documentation, generator, and test facility.

POLYTRON CORP.

POLYTRON offers the leading configuration management system for MS/DOSPC and VAX/VMS software development. PVCS maintains versions and revisions of software systems. PolyMake automatically rebuilds any desired version of the system. PolyLibrarian maintains libraries of reusable object modules. The tools work together or independently with ANY language and your existing tools.

POPKIN SOFTWARE & SYSTEMS INC.

Popkin Software & Systems offers SYSTEM ARCHITECT, a PC based CASE tool running under Microsoft Windows. Its comprehensive set of process and data driven methodologies for structured analysis and design include DeMarco/Yourdon, Ganes and Sarson, Ward & Mellor (real-time), structure charts, and entity-relationship diagrams. SYSTEM ARCHITECT's Data Dictionary-Encyclopedia utilizes dBase III file format.

READY SYSTEMS

Ready Systems will present CARDTools, which supports automatic DoD 2167 documentation generation, specific Ada requirements, including object oriented design, packages, information hiding and rendezvous. CARDTools offers real-time performance deadline analysis on multi-tasking architectures, and hardware/software interface specification, including inter-tasking synchronization and communication designs, allowing for design analysis verification prior to actual implementation.

SAGE SOFTWARE, INC.

Sage Software, Inc. develops, markets, and supports a family of CASE tools for developers of IBM-based information systems. The company's product family (known as the APS Development Center) encompasses the software development cycle and supports the physical design, interactive prototyping, coding, testing, and maintenance of COBOL-based applications software.

SOFTLAB, INC.

Softlab, Inc., will present MAESTRO, the integrated Software Engineering Environment. MAESTRO organizes and manages the software cycle through real-time project management, time accounting, and your unique standards. MAESTRO integrates customizable tools for design; coding, testing, documentation, and maintenance, is language independent, and fits in numerous hardware and software environments.

TEKTRONIX

TekCASE is a family of automated software development tools that help software engineers and project managers analyze, design, document, manage, and maintain complex real-time systems. Because they support Digital's complete VAX line and integrate with VAXset - software, TekCASE products are flexible, extensible, and especially well-suited for large projects.

All presenters may not be present in all cities.

PRODUCT PRESENTERS

TEXAS INSTRUMENTS

Texas Instruments' integrated CASE product, The Information Engineering Facility, is designed to automate the complete systems development life-cycle. It consists of a powerful mainframe encyclopedia and PC-based, graphical toolsets to support analysis and design. TI can demonstrate today the major components of this product including: strategic planning, analysis, design, COBOL code generation, and database generation.

THE CADWARE GROUP, LTD.

The CADWARE Group, Ltd. designs, produces and markets rule-based frameworks and modeling tools for development of complex systems. Managers, planners, systems analysts, and designers use these tools to help manage the complexity of defining and evaluating mission-critical business, industrial, and technical systems.

TRANSFORM LOGIC CORP.

Transform addresses the development and maintenance of the entire application life cycle. Using expert system technology, complete COBOL applications are produced for IBM mainframe DBMS's DL/I and DB2. The concepts behind automated development, data driven design architecture, prototyping and maintenance are reviewed with examples of user accomplishments.

VISUAL SOFTWARE, INC.

Visual Software, Inc. markets personal CASE tools for workstation, LAN and mainframe design environments. The base package, vsDesigner, is a methodology-independent workbench supporting shared access to LAN-based information repositories. Several default design syntaxes come with the product, including those for real-time design. Extensive analyses are supported and an optional SQL interface to the design data is available.

YOURDON INC.

The YOURDON Analyst/Designer Toolkit supports both the traditional and real time YOURDON Techniques and allows for the creation of all the diagrams associated with the techniques. The diagramming facilities of the Toolkit are integrated with a powerful project dictionary which features dBase III compatibility. The Toolkit provides error checking to insure the accuracy of diagrams and dictionary entries.

Faculty

Low Impact Implementation Strategies for High Impact Corporate Development Centers by Kevin J. Burns

Burns

Kevin Burns is the President and Chief Executive Officer of Sage Software, Inc., a leading developer and marketer of application development tools for developers using IBM systems. Under his leadership, Sage Software has successfully introduced more than a dozen integrated application development products in its APS Development Center product family. Burns is an authority on application generation technologies, methodologies and implementation strategies.

TOPICS

- The critical success factors required by MIS executives to reduce growing application backlogs
- The generic architecture for the ideal development center - an environment constructed with SAA-based building blocks
- Implementing "best-in-class" products within this SAA environment
- A three-phased implementation plan to transition into the ideal development environment
- How a proven evolutionary approach to building information systems can provide revolutionary productivity results

Technical Services Organization by Glover T. Ferguson, Jr.

Ferguson

Mr. Ferguson is the Director of Development for Arthur Andersen's FOUNDATION product line which provides dictionary integrated CASE support for the complete life cycle of commercial transaction processing applications. Mr. Ferguson has extensive experience in technical architectures and systems engineering serving a broad range of industries. Mr. Ferguson has published articles in *ComputerWorld's In Depth, Infosystems* and *Modern Office Technology*. He is a frequent speaker at conferences and symposia.

TOPICS

- "More Than A Case"
- Before the acronym CASE
- The activities CASE seeks to support
- Current status of CASE in the marketplace
- The future of CASE, 1-3 years
- Arthur Andersen's experience with users and user acceptance

The Impact of Expert System Technology On CASE by Chris Gane

Gane

Chris Gane is President of Rapid System Development, Inc. and co-author of *Structured Systems Analysis: Tools and Techniques* (Prentice-Hall 1979). He has written several other books on system development (most recently *Computer-Aided Software Engineering: The Methodologies, the Products, the Future*, published by Rapid System Development Inc.). He is also Principal Consultant at Bachman Information Systems, working on the development of expert assistant products for systems analysis and design.

TOPICS

- How much expertise can be built into automated aids? Problems of definability, size of knowledge-base, and computing feasibility
- Support in relating business objectives to system objectives
- Real-time suggestions for syntax improvement
- Reverse engineering of source code to logical model
- Forward engineering of database design and code from logical model
- Parsing of natural language requirements statements

Choosing Your CASE Tool: A User's Viewpoint by Derek J. Hatley

Hatley

Derek J. Hatley is a Principal Staff Engineer at Smiths Industries, SLI Avionics Systems Corporation, where he is responsible for all system and software requirements and design methods and tools. He developed the Real-Time Requirements Specification (RTRS) method described in the book *Strategies for Real-Time System Specification*, which he co-authored. He managed the first major application of this method to Flight Management Computer System for the Boeing 737-300.

TOPICS

- CASE tool evaluation experience
- Process, methods, and tools
- Required characteristics of

CASE tools
- Criteria for real-time requirements specification
- Application of the criteria

The Costs and Value of CASE: A Survey of the State of the Art by Capers Jones

Jones

Mr. Jones is Chairman and cofounder of Software Productivity Research, Inc. In addition to developing the line of SPQR estimating models, he is an international private consultant, speaker, seminar leader and author. One of his previous publications for the IEEE, *Programming Productivity: Issues for the Eighties*, remains one of their ten best sellers. He is also author of *Programming Productivity* in McGraw Hill's Software Engineering Series.

TOPICS

- Optimal CASE work stations; on-line documentation
- The CASE management environment
- The CASE technical environment
- Support for reusable designs (blueprints) and reusable code
- Platform tools for handling communication, data base security, and revision control
- Major changes required in the physical and social software environments

CASE For Large Scale Systems in Aerospace, Defense and Engineering by Dr. John Manley

Manley

Dr. Manley is Professor and Director of the Manufacturing Systems Engineering Program at the University of Pittsburgh. He has worked extensively for the DoD in the past, has been an industry executive, and is currently advising NASA's Jet Propulsion Laboratory in the area of engineering large-scale space information systems. His research and consulting interests include the issues and opportunities faced by both buyers and developers of large-scale computing systems.

TOPICS

- Large scale systems - history and future trends
- Complexity and control issues
- Specific CASE related problems
- Some solutions to large-scale problems
- Large scale system CASE opportunities

Multi-Person Projects & CASE by Byron D. Miller

Miller

Mr. Miller is Director of Product Planning for KnowledgeWare, responsible for product architecture and specifications. Prior to joining KnowledgeWare, Mr. Miller worked for E.I. duPont Textile Fibers Division where he served as Architect and Manager for the development of an internal product that was similar in concept, although limited in scope, to a component of KnowledgeWare's products.

TOPICS

- Reviewing past requirements
- Working together - method follows task
- Transaction processing - one strategy that doesn't work
- Cooperating experts - closer to the truth
- Tool support today, tomorrow

Computer-Aided Software Engineering - CASE by Ken Orr

Orr

Ken Orr, Chairman and Chief Scientist, is the founder of Optima. One of the principal developers of the DSSD methodology, he directs the company's research activities. Orr is recognized internationally as a leader in the systems technology "structured revolution," and has held key positions in government administration, management consulting and software development. Orr is a frequent speaker at international conferences and seminars.

TOPICS

- Automating the systems development process
- Matching methods and CASE tools to systems classes
- Experiences with CASE technology
- How do we manage CASE?
- What can CASE learn from other industries (CAD/CAM/CIM)?
- People are the key to CASE

Your CASE Tool and Information Engineering by Ronald G. Ross

Ross

Ronald G. Ross is the editor of the *Data Base Newsletter*, and the founder of Ronald G. Ross Associates. He is one of the world's leading researchers and commentators on data management topics and his books and his monograph on IBM's IMS have been read by thousands of data management professionals worldwide. His newest book, just published, is entitled *Entity Modeling: Techniques and Application*, and covers the ER approach in detail.

TOPICS

- What support does the data driven approach require in your CASE tool?
- The CASE tool and strategic planning
- The CASE tool and analysis
- Why entity - modelling?
- What does the data driven approach suggest for the architecture of your CASE tool?
- The dictionary components
- The integration issue
- Rule based development and behavior modelling

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PCWC

INSIDE

Taking the Plunge
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Rising IQ
AI is bringing a higher level of expertise to CASE products. Page S5.

Ask the Vendor
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The Crossover Effect
CASE doesn't just build systems, it also builds bridges between developers and users. Page S15.

Product Chart
A detailed guide to CASE tool kits and workbenches. Page S6.

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A new generation of tools may make good on the promises of predecessors and free MIS from some pressure to produce

SECOND CHANCE FOR ESCAPE?

BY GORDON SHIELDS

JACQUELINE CHRIST

Being an MIS manager is like living in a fishbowl. You're always on display for people to look at, people never quite understand what it is you do, and every once in a while they give you a new toy, hoping it will improve your disposition. But nothing really does, because each day the fishbowl seems to get shallower as pressure to improve productivity and cut the development backlog is applied more insistently.

Something is on the way that does promise some relief, however. Coincidental with these growing pressures is the resurgence of computer-aided software engineering (CASE) technology. This second generation of CASE promises to alleviate some of the pressure by increasing developer productivity and reducing the maintenance effort.

CASE technology is not a new phenomenon; it has been around for more than four years. When first introduced in 1984, CASE was billed as a technology that would revolutionize the systems development process. It was supposed to shorten development time, increase effectiveness and change the approach to systems development from a back-room process to a user-driven one. While it did accomplish some of these things, most of the claims were premature.

Now, with the appearance of second-generation CASE technology, proponents are once again predicting a revolution. This time, the promises are even grander, as vendors of CASE technology attempt to deliver a product that can be used throughout the entire systems development life cycle, including automatic code generation. While the reality may again fall short of these claims, CASE has shown itself capable of generating something tangible. MIS managers are cautiously re-examining the technology with the belief that they can sell the concept and benefits to senior management.

To understand the advance that second-generation CASE represents and the impact it will have on the MIS department, it is important to review first-generation CASE and the experiences of using it during the past four years.

Shields is a senior consultant with Touche-Ross Consulting in Toronto.

Far, but not far enough

First-generation CASE was a major innovation. It was the first technology designed to address analyst and designer productivity. Its major fault is probably that it did not go far enough.

First-generation CASE was designed to assist systems analysts and designers in increasing productivity, improve the quality of software products and achieve greater management control over the development process. It usually consisted of a combination of personal computer-based hardware and software that captured analysis and design information, allowing users to create diagrams to describe systems and prepare documentation. It was sometimes appropriately referred to as an "analyst and designer workbench," reflecting its focus on the functional specifications and design steps.

One thing it did not do is substantially change the traditional systems development process. Most organizations today still adhere to some variation of the traditional approach to systems

Escape?

FROM PRECEDING PAGE

development. This methodology evolved in the late 1960s and was designed when the mainframe was considered state of the art and the process was strictly manual. It was updated in the 1970s, with the addition of structured techniques to minimize laxity and increase the discipline of systems development.

Linear view

According to this approach, a decision is made to design and implement an application, and then the user's requirements are defined in a user-needs statement and transformed into functional specifications. The application is then broken down into more detail, using techniques such as data flow diagrams.

The actual design of the system and how it is to be implemented is then created using a design technique, such as structure diagrams. The functions to be performed at each juncture of the structure diagram are broken down into detailed "minispecs," which are written in English. Programmers subsequently convert the minispecs and structure diagrams into program code.

This development process is not integrated and requires that specifications for the system be drawn up at least five times, using different techniques and languages. Very little checking is done for consistency and completeness of design, given the impracticality of performing these functions manually. In addition, approximately 65% of the total project effort is allocated to coding and testing. As a result, errors can be detected only after the system has been constructed, at which time it is very expensive to fix them.

The other major drawback of this approach is that program code must be constructed by hand. A recent survey of program code reported 10 to 50 errors per 1,000 lines of code.

Although this linear approach to systems development is inefficient, it continues to be the method for building systems in most MIS departments across North America.

FIRST-generation CASE addressed only a portion of the systems development life cycle.

First-generation CASE addressed some of these inefficiencies by offering functionality to assist the analyst and designer. It allowed time in analysis and design for more iterations and user input. It also required strict adherence to structured techniques and top-down design, forcing analysts and designers to abandon the approach of building systems by osmosis.

But the inescapable fact is that the first generation addressed only a portion of the systems development life cycle and offered little integration of the steps of the traditional approach. These products confined themselves to analysis and design and ignored the remaining steps, such as project management and construction. Furthermore, while the tools provided tremendous assistance for tasks such as diagramming, they were limited in other areas, such as data dictionaries and integration with other development aids.

Even in those areas that it did address, there were several key weaknesses, including the following:

- Limited capacity of the diagrams and the data dictionary.
- Lack of support for multiple users.
- Cumbersome integration of data dictionaries.
- Lack of integration with other tools used by the MIS department.
- The user's lack of control over the appearance of the output, sometimes resulting in cluttered diagrams and charts.

Lucky seven

First-generation CASE consisted of seven components. The main component was the data dictionary, the central repository of data from which all other components fed. It was similar to a data base, in that all data was defined once and made accessible to all other components.

The graphics component was typically the most advanced aspect of the tool and supported various analysis and design techniques, such as Gane & Sarson data flow diagrams and Chen entity-relationship data models.

The report definition component allowed users to specify report design, using data elements defined in the data dictionary. Essentially a word processor, this component allowed the analyst to retrieve data element definitions from the data dictionary and position them on the report.

The dictionary reporter allowed analysts and designers to extract and report information from the data dictionary. It included a query language permitting flexible Search and Format commands.

The quality assurance component detected inconsistencies in the analysis and design specification and identified areas where information was missing.

The specification component was a word processor that provided a free-form slate on which the minispecs were created. Analysts used this component to describe the actions of processes and the contents of data files. With some products, it was also possible to simulate execution so that users could better understand how the end result would appear and operate.

There have been areas in which first-generation CASE has had a positive impact on the systems development process.

These products permitted developers to spend more time thinking about system design and validating their interpretation with users and less time performing mechanics, such as drawing data flow diagrams.

Team members could also

Continued on next page

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There's a time to buy and a time to wait

BY AMY SOMMERFELD FIORE

When should you seriously start investigating computer-aided software engineering (CASE) products? When is your company ready to take that step? And are CASE products ready for you?

Some CASE customers offer the following suggestions for when a purchase decision is appropriate:

- **When a specific product can help you on a specific project.** Don Hann at San Diego Gas & Electric Co. pushed his firm to buy Prokit Analyst from McDonnell Douglas Information Systems Group when he was gearing up to create a new system, Automated Distribution Operations System. Being a prospective user, he was named project engineer.

San Diego Gas's Hann

"When I got involved in the project and had to do data flow diagrams, the first thing I asked was, 'How can I do some of this on the computer?' " Hann says.

Prokit Analyst automates data flow diagrams and ties them to a data dictionary. "We had been spending two or three weeks on a PC, setting up a Lotus spreadsheet to list all the data elements," Hann explains. "Prokit gave me a printout in a few minutes."

- **When your company has a heavy growth period.** "Because we've grown so much and have more employees, there's a certain loss of control" over the in-house methodology, says Hank Childers, manager of advanced software engineering at Cytrol Portable Data Corp. in Edina, Minn. "It doesn't work to do things informally when the group is that size."

Scott's Timchak

Cytrol has a technical staff of 135 that develops custom software for financial services companies, primarily brokerages. "It seemed to me that CASE tools were defining some common set of engineering standards," Childers says. "It's not that the techniques were completely different than what we were doing, but they were more formal. So I thought, 'Why aren't we doing things like that across the board?' "

Cytrol acquired both a methodology, called Stradis, and a workbench tool, Prokit Workbench, as part of an ongoing effort to standardize procedures.

Childers' advice to other potential buyers? "If you are making a project-by-project decision, follow your nose. If a product can't work for you, grab it." But if your group is trying to make a more global decision, he says, "Look at what you're doing first and then look for a good fit in a methodology. It sounds about as revolutionary as motherhood, but it's really true."

- **At least a year before you absolutely have to.** "If you're talking about moving to new technology within an organization, it will take two or three years to adopt CASE," says George Timchak, systems specialist at Scott Paper Co. in Philadelphia. "You've got to be that far ahead."

Scott was originally looking for just an analyst workbench; it ended up with a formal methodology and a full life-cycle CASE product, the Information Engineering Facility from Texas Instruments, Inc.

"If your company is shrinking, then you might not want to invest in CASE, since it will cost you some overhead," Timchak advises. But, he adds, if you are simply pressed for time and are plugging away at the backlog with rapid prototyping, then "invest the time now so you won't have to rebuild those systems in a year or two." If your company is information resource-intensive, he says, "you should have been looking into CASE products a year ago."

From the industry side

Carma McClure, president of Extended Intelligence and a CASE consultant, agrees that MIS needs to break out of a wait-and-see stance this year.

McClure says she sees an information repository as the key to CASE's payoff down the road. Eventually, the repository would contain information on all requirements, specifications and data types for every application. That way, it could be used to build new systems and maintain

Continued on page S16

Fiore is a Computerworld senior editor, features.

Escape?

FROM PRECEDING PAGE

detect design flaws sooner by spending more time validating design in the early stages. James Martin, industry consultant and author, estimates that design errors are 100 times more expensive to fix during systems maintenance than during analysis and design.

There was also a positive effect on communication — between developers and users as well as among developers. Communication with users was enhanced through the use of high-resolution graphics to represent such things as system flow and decomposition. Team members were forced to converse, since they operated on the same dictionary and could quickly determine what others were doing through the dictionary reporter.

Quantifying the efficiency improvements is difficult, but organizations such as Du Pont Co. report that they have become 10 times more productive as a result of CASE and adjustments to the development process. Still, the productivity gains of first-generation CASE could have been even greater if the products supported multiple users.

It was cumbersome to support a large project consisting of many separate workbenches and a central project dictionary. And because of the high cost, few stations were typically available for a project.

All in all, first-generation CASE has not been unsuccessful. It has found a home in many MIS departments in North America — but only in limited numbers and usually through the initiative of the MIS manager. Senior managers look for hard numbers, and MIS managers have been unable to quantify the salutary effects of first-generation CASE.

A new generation

Now, a new generation of CASE technology has burst onto the scene, sporting advanced features, a more expansive architecture and a more comprehensive approach to the systems development life cycle.

The new products support automatic code generation and data-driven techniques, such as information engineering and enhanced graphics capabilities. They offer project management functions or an interface to project management packages, as well as functions addressing strategic planning, estimating, construction and procedures.

A project dictionary on the mainframe that coordinates local dictionaries on the PC comes standard. In addition, the second generation includes a code generator on the mainframe and software on the PC for strategic systems planning.

The most significant automated deliverable is program code, including data base definitions and teleprocessor commands. Some new products are capable of converting a system design — in the form of action diagrams and screen and report definitions — into executable program code. Of all the characteristics of second-generation CASE, this one will have the biggest impact on the development process and the organization of the MIS department.

At present, code generators are not capable of producing code from free-form user requirement documents; consequently, they require very detailed specifications similar to application specifications. By incorporating code generation into the automated development process, the new CASE technology has, in effect, shifted the task of preparing application specifications to the earlier phases of analysis and design.

In the past, a disproportionate amount of the total systems development effort was spent in the coding and testing phases. These tasks have been simplified, allowing more time to get it right in the early phases of the process. This simplification means less risk of fundamental design errors and less expenditure for fixing mistakes, since they are detected and corrected early in the process.

Second-generation CASE will also decrease the cost of maintaining systems because of its capacity for providing information on the impact of changes. For example, an analyst can determine what processes would be affected by a change to a data entity.

Another automated deliverable is system specifications created from an analyst-defined specification. Some CASE products will even paint a screen from the information model. The results of this automation are increased developer efficiency and more current documentation.

CASE now recognizes the benefits of using the processing power of the mainframe, the distributed graphics capabilities of the PC and the inexpensive sharing features of local-area networks. These technologies are now integrated through "seamless" software interfaces available in some CASE tools. For example, users can download portions of the project dictionary from the mainframe, modify it and send it back to the mainframe for use in code generation.

In its new incarnation, CASE has also become methodology and technique specific. This is because code generators require that input contain specific data in a specific format. Although having the products tied to a particular methodology limits flexibility, the techniques supported are more advanced.

Second-generation CASE has improved the precision of detail contained in the system specification component. Where first-generation CASE provided the user with a blank slate to create a minispec, the second generation provides a highly structured set of window prompts into which analysts and designers enter information essential to generating code. The benefit is a more complete specification, since defining what details are required is no longer left to the discretion of the analyst or designer.

The advanced graphics capability of second-generation CASE rival those from computer-aided design and manufacturing (CAD/CAM); in fact, some of the new products have roots in the CAD/CAM world. Features such as panning, zoom and pop-up windows are now standard. Some packages allow users to customize the graphics and create icons in place of the standard symbols.

Another improvement in the user interface, and one that settles a major criticism of first-generation CASE, is the strengthening of the reporting capability. Second-generation CASE allows users to control the appearance of the output and print it using many types of devices, including laser printers. Some of these products also include bridges to desktop publishing packages such as Xerox Corp.'s Ventura Publisher to allow users to create professional documents in which graphics and text reside on the same page.

The human engineering factor has also been improved by replacing menus with Apple Computer, Inc. Macintosh-like windows. In this way, the tool can better emulate the human thought pattern of bouncing from one area of the systems specification to another without having to back out of one subsystem to reach another. CASE is now a tool for analysts, designers *and* users. Involving users in development projects results both in more user satisfaction and more effective systems.

Remaining drawbacks

While the benefits of second-generation CASE will be significant and affect everyone from the MIS manager — responsible for the strategic systems plan — to the maintenance programmer, who is now expected to understand the fundamentals of systems analysis and design, the technology is not without deficiency.

Cost will continue to be the primary stumbling block. One of the major drawbacks of second-generation CASE is the upfront cost of the software and the hardware required for developers. Currently, the cost of CASE for a data processing department of 50 developers can exceed $1 million, excluding the cost of the mainframe usually required to process the project dictionary and code generator.

Furthermore, while most products support the majority of features mentioned — including automatic code generation — not all second-generation CASE products possess all these characteristics. And, for that reason, it is important to analyze each product individually before making a commitment.

In addition, this category suffers from the same bugs associated with any new product. For example, one of our offices was using the clustering function of a second-generation CASE product and had to terminate the process after 40 hours of operation on a mainframe. The vendor subsequently agreed something was wrong and provided a fix that performed the same function on a PC in less than six minutes.

Function processing speed on the PC is, at this juncture, still an issue. While CASE manufacturers have done an exceptional job using what processing power is available with Microsoft Corp. MS- or IBM PC-DOS to drive their sophisticated software, many products still become unacceptably slow when used on medium-size to large projects. It is hoped that the Intel Corp. 80386-based processor and the OS/2 operating system will eventually resolve this problem.

Coverage of the entire systems development life cycle has also not been fully realized. Second-generation CASE goes much further than the analyst and designer workbench, but no one product is commercially available that addresses all phases and steps of the systems development life cycle. This complete coverage is coming, but users will have to be patient and live without it in the short term. As a result, tools or techniques in addition to CASE will be required for any project.

Dangerous overlap

At present, the functions of CASE and the fourth-generation language development environment overlap. Specifically, both include data dictionaries, screen painters and report generators.

Developers will have to make compromises when using the two technologies on the same project. For example, the screen generators of fourth-generation development software are usually more advanced than those found in CASE, so it makes sense to use them on the project. However, to use the screen generator, the fourth-generation language usually requires that the data elements be defined in the data dictionary. Therefore, the developer is forced to duplicate the dictionary.

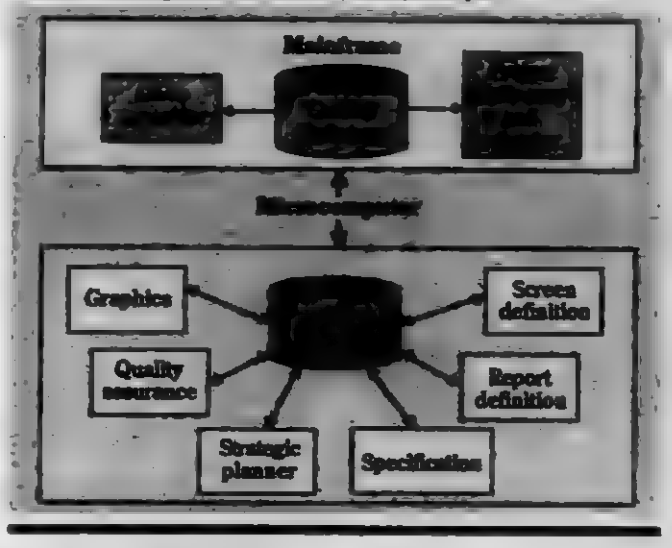
No standard is in place for exchanging information with CASE products, and without standards, users are restricted to one vendor for all their CASE needs. There is some good news in that the National Bureau of Standards is now in the process of developing CASE dictionary

First-generation CASE

Early tools included seven components but addressed only a portion of the systems development life cycle

Second-generation CASE

The latest technology offers advanced features, more comprehensive life cycle coverage and utilization of mainframe power



standards, but, as was the case for data communications, these standards could wait years for industry recognition.

Applying the new

Implementation of second-generation CASE is no trivial matter. It requires the MIS department to make some fundamental changes. Some organizations are buying tools such as CASE and incorrectly assuming these tools include the methods and techniques. Others are buying CASE and assuming it fits with their current methods and techniques. This compatibility is not likely, considering that most companies are still using some variation of the traditional systems development methodology.

Since second-generation CASE comes close to allowing a completely automated approach to systems development, the manual methods and techniques of the traditional development methodology must be revamped to recognize these developments in automation. Otherwise, efficiency and effectiveness gains will be limited.

What is needed is an advanced systems development methodology that offers different methods and techniques for a variety of project environments. In order to be flexible, this advanced methodology should be broken into its different components of methods, techniques and tools, with a separate standards section describing how to tailor the process according to the demands of the specific project environment.

This flexibility, which will also allow organizations to change tools with only minimal modifications — if any — to the methods and techniques employed, is an important factor, considering that new CASE tools will continue to be developed and may be replaced when something better comes along.

The new methodology should also reflect recent developments in technology by assuming an integrated process in which the output of one step is reused and further enhanced to develop the output of the next step. Finally, whereas the traditional development methodology was process-driven, the new methodology must incorporate advanced, data-driven techniques to reflect the importance of data in the organization.

Since not one currently available CASE product can satisfy all project needs, organizations must understand their own technology needs. They must identify the tools that can be used together without cumbersome manual interfaces.

You may have to make some compromises. If, for example, you decide to use your fourth-generation language screen generator during the systems development exercise, there is no advantage in buying a CASE tool that has a built-in screen prototyper. Other technologies that must be compatible include project management software, code generators, data base, third- and fourth-generation languages, teleprocessors and system software on the mainframe.

Human factors

Several human factors related to changing work patterns and roles must also be considered when implementing CASE. Developing systems using CASE technology requires more discipline than using the manual approach.

CASE tools require specific information in a predefined format with no deviation. This requirement has moved systems development closer to an engineering approach from a make-it-up-as-you-go process. Since discipline is seldom seen in systems development, introducing it could result in opposition to the new tools.

Without a new methodology to enforce discipline, the analyst, designer and coder will cling to their old ways of developing systems and attempt to incorporate the tool into this process. This incorporation will actually result in decreased efficiency because of the incompatibilities between the old approach and the new tools. Much time will be wasted creating unnecessary documentation and resolving differences in techniques.

A second human factor consideration relates to changing roles. Because boundaries between analysts, designers and coders have been removed, organizations will need to retrain their existing maintenance programmers.

Today's systems professional is called a developer, but he crosses the boundaries of analysis, design and coding. The job of maintenance programmer used to entail reviewing documentation, reanalyzing systems to understand the impact of the required changes and coding; in a CASE environment, this person is more of an analyst and designer who uses the tool to analyze where changes have to be made and then modifies the design to regenerate the program code. The role and the skill requirements for these individuals are completely different.

There is considerable cost involved in retraining current personnel for the broader responsibilities of a developer and in acquiring PCs for developers, as well as both PC and mainframe software. Because of this, senior management must also be willing to adjust its delivery expectations in recognition of the way that second-generation CASE affects the development life cycle.

In the past, developers commonly rushed into the coding and testing phases, spending little time analyzing and designing the system. The result was that users and managers received some working programs early in the project. CASE technology shifts this time commitment, so that a large percentage of the total systems development effort is spent in the analysis and design phases, with relatively little time committed to coding and maintenance.

Without senior management's understanding of CASE technology, developers will start along with the second time curve, which demands the up-front effort, and be forced to drop down to the first curve because management still expects early results.

Because retraining and reorienting the resources of the MIS department to implement CASE requires an enormous effort, converting the entire systems development function to CASE without a pilot test could be disastrous. The best approach is to identify highly visible or important development projects and test the product with a group of eager developers capable of adapting to new methods, techniques and tools. The benefits of the product will quickly spread by word-of-mouth.

Still to come

CASE will continue to develop with the advent of artificial intelligence, more powerful multiuser microcomputers and data standards for CASE dictionaries.

The biggest challenge left is to further automate the system specification process, allowing developers to generate systems without having to provide as much detail as is currently required. By using AI, CASE will be able to store knowledge about the systems environment for reference on later projects. When this happens, fewer details will be required, and end users will play a large part in systems development by feeding the CASE tool with facts through a high-level language interface.

Retention of knowledge about the systems environment will also enable CASE to perform a number of additional functions, including the following:

- Handling the physical data base design, given the logical design and performance objectives.
- Identifying risk areas in which the system may not achieve business objectives. This process may be too large in scope and require too much processing time in an on-line environment. CASE would not only identify the risk but would suggest alternatives to address the risk.
- Performing automated testing by constructing the different business conditions, including exceptions and exercising the program logic. Future CASE is likely to execute tests in the system model, rather than in the program code, so that testing becomes independent of the language generated.

Dictionary drama

The eventual appearance of CASE data dictionary standards will substantially change the nature of the CASE market. Currently, users of CASE must depend on one vendor for the CASE product and surround it with other tools to meet the total project needs. These other tools are not yet capable of interchanging data with CASE and require rekeying.

When data dictionary standards appear, however, it will be possible to create a hybrid CASE product that best satisfies users' specific needs. For example, a user could buy a CASE data dictionary and "plug in" the best modules for project management, estimating, graphics and code generation.

In addition, screen generators and report generators of the fourth-generation development environment would be able to work from the CASE data dictionary to provide requirements prototyping.

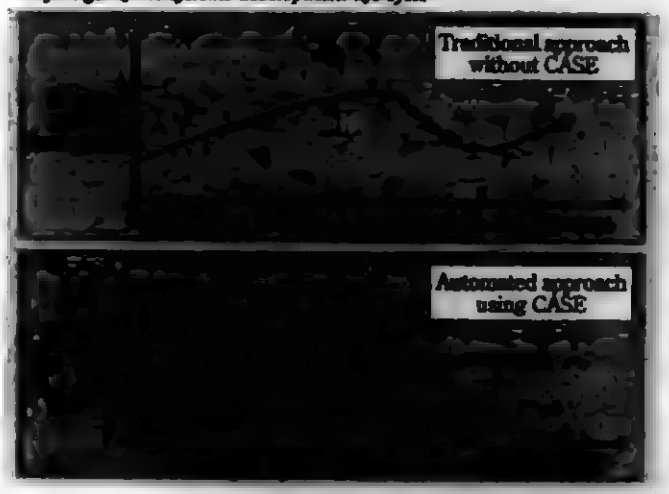
With the capacity to mix different vendor products will come more competition, lower prices and specialization. Vendors will be forced to specialize in one area of CASE, such as graphics.

Furthermore, powerful multiuser microcomputers will help CASE become more cost-effective for smaller data processing departments, conceivably eliminating the need for the mainframe to coordinate multiple users and provide the processing power for code generation.

CASE is still an evolving technology, but its potential is now clear and, given that a successful implementation is usually a gradual one, organizations should make a start in this product generation. ●

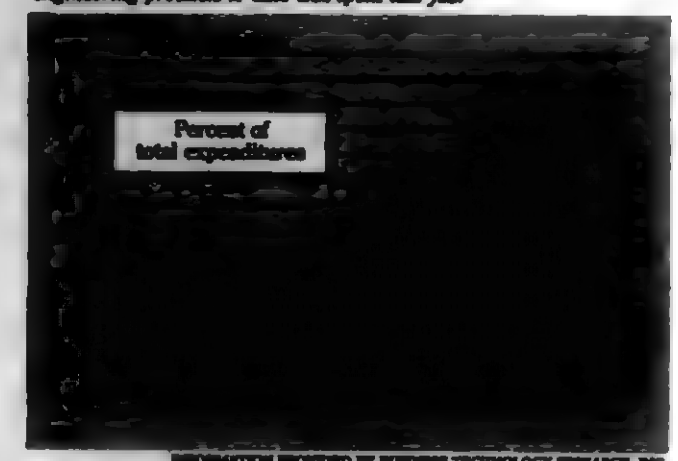
Shifting the load

CASE technology moves the bulk of time and resource commitment to early stages of the systems development life cycle



Picking up the pace

Almost half of the money invested in computer-aided software engineering products to date was spent last year



INFORMATION PROVIDED BY BUSINESS TECHNOLOGY RESEARCH, INC.
CW CHART

WITHOUT a new methodology to enforce discipline, the analyst, designer and coder will cling to their old ways of developing systems.

Prepping for the Turing test

BY STU COLEMAN

Artificial intelligence research is making a significant contribution to computer-aided software engineering (CASE) tools. Vendors are building rule-based languages and object-oriented data base managers into product infrastructures. This adoption of AI-based technologies is helping to assimilate professional expertise into CASE products.

An example of this is AI-based reverse-engineering tools. These tools start with the legacy of existing systems, using their data bases and program code as sources of input to generate more efficient, stable equivalents.

All the leading workstation-based CASE products now use some form of AI technology. They provide varying degrees of expert assistance; support multiple methods, such as data flow diagraming, logical data modeling and matrix processing; and address a broad spectrum of the system life cycle.

In fact, the purview of CASE tools is expanding. Emerging products — management as well as software development tools — do far more than support just software development. Some of them support information system architecture development as well as a strategy to improve an enterprise's overall information resource management capability.

We are witnessing, and in fact are participating in, the evolution of CASE tools from an embryonic focus on software engineering toward a more mature focus on full-spectrum system engineering and — still to come, but visible — information resource management.

WE ARE witnessing the evolution of CASE tools toward a more mature focus on full-spectrum system engineering.

What AI can do for CASE

In the early 1950s, mathematician and computer scientist Alan Turing proposed an intelligence test for machines. Those that passed the test could be said to have intelligence. The test was based on the machine's ability to imitate a human being and was called the Imitation Game.

Turing proposed that if a human subject failed to distinguish between a man imitating a woman via a teletype and a computer imitating a man imitating a woman, then the machine would have won the game. The focus of the test was not on distinguishing the difference between a man's dialogue and a woman's but on the machine's ability to imitate human dialogue in such a manner that real humans would be unable to discern that they were dealing with a machine.

Whether Turing's test could ever be passed by a computer is still a matter of debate, but the Imitation Game does illustrate the nature of our expectations concerning AI machines. It also serves to illustrate the nature of our expectations about the use of AI in future CASE tools.

We are expecting that AI will enable CASE tools to become participants in the information resource management and system engineering and software engineering process.

A lot of ground must be covered before such expectations can be fully realized, but in the next five to 10 years, we are going to see some rather remarkable progress, particularly in the following areas:

- **More expertise.** The drive to add more capability to CASE tools will continue. But the nature of processing will become increasingly rule- and pattern-sensitive. Expanded rule-based processing will foster methodological rigor and produce more complete and consistent results. Improved analytical support will be provided via expanded pattern-matching capabilities.

More management-oriented functionality will appear. AI techniques will improve the ability of CASE tools to address issues permeated with assumptions, interpretations, intuitions, approximations, inferences and deductions — the stuff management is made of.

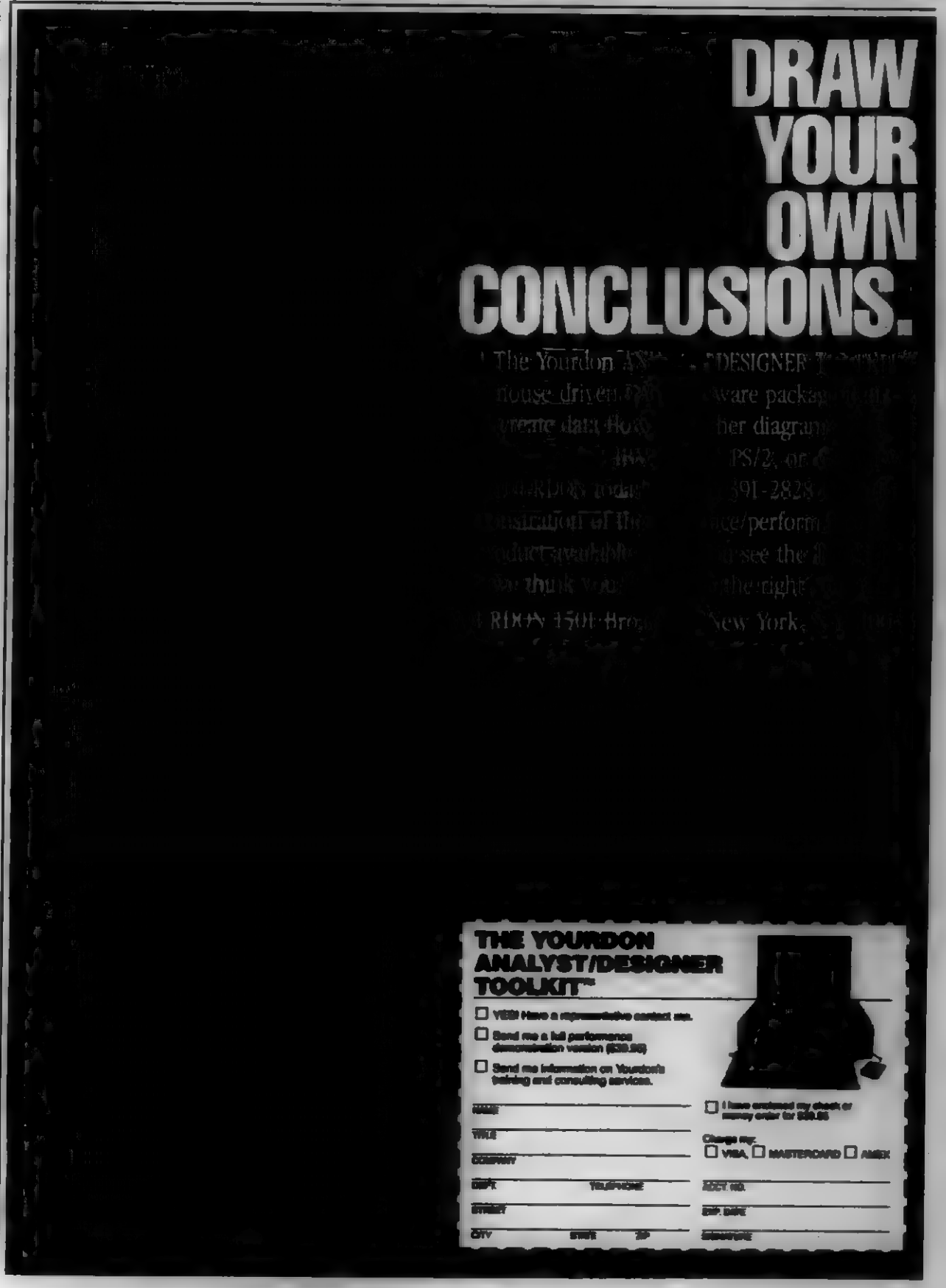
- **More human adaptability.** Most CASE tools are not particularly bright conversationalists, making dialogue somewhat stilted and intellectually dull. Even when limited to specific areas of expertise, today's CASE technologies fail the Turing test miserably.

In the next three to five years, we can expect to see AI advances enable two particular kinds of changes in this area. The first is the CASE tool's ability to extract much of the information it needs from structured, or guided, natural language dialogue with a human subject.

The second is the tool's ability to

Continued on page S16

Coleman is vice-president of Pacific Information Management, Inc. in Santa Monica, Calif., a consulting firm specializing in information resource management. His conclusions are based on the results of recent research conducted for MIT and Texas A&M University.



CASE tool kits/workbenchs

COMPANY	PRODUCT	HARDWARE PLATFORMS	SOFTWARE PLATFORMS	TOOL KIT/WORKBENCH	METHODOLOGIES SUPPORTED	ANALYSIS AND DESIGN TECHNIQUES SUPPORTED	DIAGRAMS CREATED	SCREEN/REPORT PAINTERS	PERMITS SIMULATION OF EXECUTION	AUTOMATIC ON-LINE OR BATCH CODE GENERATION	BUILT-IN PROJECT MANAGEMENT FUNCTIONS	VERSIONING CAPABILITY	SPECIFICATION PROMPTS	INCLUDES MAINFRAME PROJECT DICTIONARY/ DOWNLOAD CAPABILITY	ANALYSIS SUPPORT/METHOD	PRICE
Advanced Technology International, Inc. (818) 847-6795	Supercase	VAX	Ada, C, Fortran, Jovial, Pascal, PL/M	Workbench	Object-oriented design, reverse engineering	PDL, Fusion, Yourdon	Yourdon structure charts, System top-level architecture, package dependencies	Report	No	Both	Project monitoring	No	Yes	No	Yes	$15,000-$27,500
Apollo Computer, Inc. (617) 256-6600	Domain Software Engineering Environment	All Apollo workstations	C++, C, Fortran, Pascal, Common LISP, Ada	Tool kit	NP	NA	NA	NA	NA	NA	Monitor, task management	Yes	Yes	No	Yes	$2,000
Arthurian Management Systems, Inc. (508) 641-0600	Life Cycle Productivity System	IBM PC AT or compatibles, PS/2; workstations; VAX	Cobol, IMS, IDMS, Adabas, VSAM, C	Workbench	Structured analysis, design, (SDM-70, Yourdon)	Yourdon-DeMarco, Constantine, Jackson, Chen, Inmon	Data flow, program structure, entity relationship, data model, hierarchy, pro-cedution	Both	Yes	Both	Tracking, financial management, project estimating	No	Yes	No	Yes	$4,000-$16,000 (PC components); $100,000-$275,000 (mainframe)
Arthurian Technology, Inc. (508) 794-0888	Software Backplane/ Project Workbench	Sun 3 series, VAX/VMS	SCCS, CMS	Workbench	Methodology independent	Software Backplane can interface with any analysis, design tool	NA	NA	NA	NA	Project Software, tracking	Yes	Yes	Software Backplane	Software Backplane	$4,950-$99,500/ $1,150-$20,000
Cadre Technologies, Inc. (401) 351-5151	Teamwork (multi)	Apollo workstations, Sun, IBM PC RT, Workstations, HP 9000	Ada, C, Pascal, Cobol, Fortran	Workbench	Yourdon-DeMarco structured analysis, Boeing-Hatley real-time extensions	Chen information entity/relationship relationship, Constantine-Page-Jones, Hatley-Ada structures	Data flow, entity relationship; state transition, decision, process activation tables; state event matrix; structure charts	No	Yes	Both	System labels	Yes	Yes	No	Yes	$995
Comshare (800) 368-0000	Pathway/ Retrofit	IBM MVS/OS workstations, Wang VS, Unisys A, V & 1100, Honeywell DPS 8/80	None	Tool kit	NP	None	None	No	Yes	NA	None	No	No	No	Yes	$32,900 (Pathway); $60,500 (Retrofit)
Chen & Associates, Inc. (504) 888-9705	ER-Modeler	IBM PC, PC XT, AT or compatibles	IMS, DB2, IDMS, Datacom/DB, Oracle, Ingres, Dbase, Sql	Workbench	Entity relationship, information engineering, relational normalization, reverse data base engineering	Entity relationship, relational normalization	Entity relationship	Both	No	No	None	Yes	Yes	Yes	Yes	$3,495-$5,995 for entire package (modules sold separately)
Clear Software, Inc. (617) 232-9722	Clear	IBM PC, PC XT, AT or compatibles, PS/2	Dbase, Cobol, C	Workbench	NA	NA	Transaction, flow charts	Both	Yes	NA	None	No	No	Yes	Yes	$69.95-$149.95
Cognos Corp. (613) 728-1440	The PowerHouse Link to Bachelor	IBM PC XT, AT, PS/2, 3270 PC, 3270 AT; Compaq 286, Compaq Plus, Port III; HP Vectra; AT&T 6300; compatibles	PowerHouse	Workbench	Methodology independent	Data modeling, process flow	PowerHouse entity, system, plus those created by Bachelor	Both	Yes	Both	As through Bachelor	No	No	Yes	Yes	$1,000

*Data base management systems *Structured data models *Entity relationship application *Lawrence & Bachert's system development method *Data structured systems design

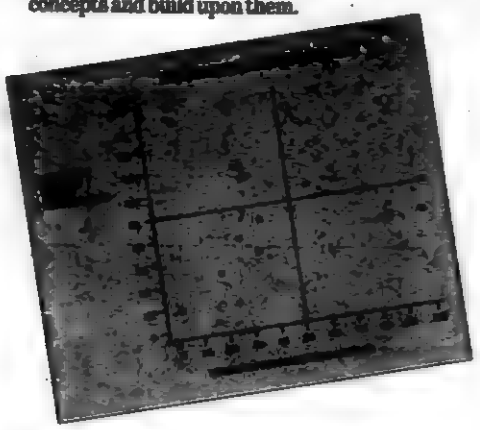
The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. When a vendor is unable to provide specific information about its product, this is designated NP (not provided). When a question does not apply to a vendor's product, this is designated NA (not applicable). Further product information is available from the vendors.

The COBOL systems you want to develop may be the systems you already have.

Take a good look at the new systems development requests piling up in your shop and you'll see something interesting. What many users are really asking for aren't "new" systems; they're enhanced versions of your existing systems.

Why do they ask for these enhancements, rather than substantially new systems? Because existing systems remain crucial to the day-to-day workings of your company, regardless of how error-prone, complex and difficult to maintain they become.

Yet, inside every old program, beneath the patches and bug fixes and layers of chaotic code, well-written elements of the original design wait to be discovered. Imagine how productive your shop would become if you could systematically reach inside, extract those fundamental design concepts and build upon them.



At a glance, the Portfolio Scattergraph can reveal the comparative quality of every system in your software portfolio.

Of course, your maintenance and enhancement work would be simplified. But you could also apply those elements to new systems development, reducing the time, effort and risk involved.

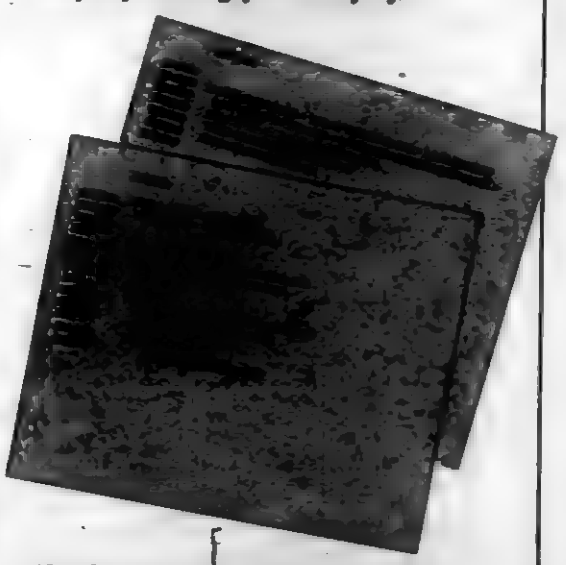
These are the benefits you'll realize with re-engineering tools from Language Technology.

Our products apply the concept of Computer Aided Software Engineering (CASE) to the work that dominates the average day in a mainframe shop: maintaining and enhancing existing systems.

RECODER is the leading re-engineering tool available. It can transform any unstructured program – no matter how complex and hard to comprehend – into a structured version that you can both understand and maintain more easily.

INSPECTOR is the only COBOL quality assurance tool that uses industry standard measurements to objectively evaluate code. You can also customize INSPECTOR to measure any standards you want to create.

At Boeing, Mellon Bank, Shell Oil, The Hartford Group, Ford and other Fortune 500 companies, Language Technology products are boosting programmer productivity and enhancing the quality of existing systems every day.



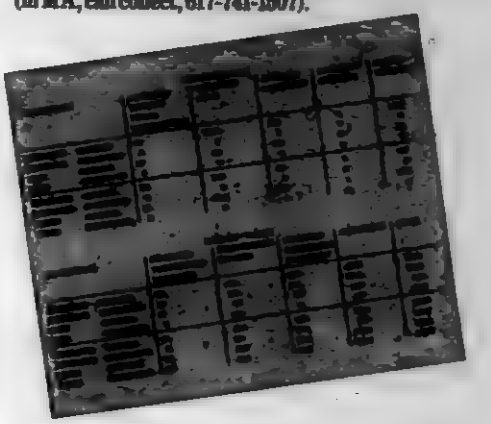
After software re-engineering, users achieve a 20-50% increase in programmer productivity. They also see fundamental design concepts that were previously hidden.

If you spend 50% or more of your programming dollar maintaining and enhancing existing systems, re-engineering tools from Language Technology will be a cost-effective weapon in your CASE tool kit.

And, since our tools improve existing systems, the backbone of corporate operations, every department becomes more efficient and profitable thanks to your efforts.

Our Re-engineering Information Package details the facts and substantial rewards of this comprehensive strategy. Our Software Portfolio Analysis will clearly illustrate specific areas where you'll save time and money by applying re-engineering techniques to your existing COBOL systems. Both are free.

Don't wait for maintenance and enhancement efforts to overwhelm you. Return the coupon or call Language Technology, toll-free, 1-800-RECODER (in MA, call collect, 617-741-1507).



The Program Overview Table helps programming managers target the programs which will benefit most – in terms of enhanced code quality and greater efficiency – from re-engineering.

The CASE for re-engineering

LANGUAGE TECHNOLOGY

Show me how re-engineering will simplify maintenance and enhancement while saving me time and money.

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Company _____

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Language Technology
27 Congress Street
Salem, MA 01970
1-800-RECODER

COMPANY	PRODUCT	HARDWARE PLATFORMS	SOFTWARE PLATFORMS	TOOL KIT/FRAMEWORK	METHODOLOGIES SUPPORTED	ANALYSIS AND DESIGN TECHNIQUES SUPPORTED	DATA DICTIONARY	SCHEMA/SUBSCHEMA PARTITION	PROMPTED SIMULATION OF EXECUTION	AUTOMATIC ON-LINE OR BATCH CODE GENERATION	BUILT-IN PROJECT MANAGEMENT FUNCTIONS	VERSIONING CAPABILITY	ENCRYPTION PROMPTS	ENGLISH PHRASING, PROJECT DICTIONARY/ DOWNLOAD CAPABILITY	RESTRICTS SUBPOENA/SEIZURE	PRICE
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Custom Corp. (817) 000-0000	Corvision	VAX	RMS, RDB	Workbench	Rapid prototype	None	None	Both	Yes	Both	Guidance system	Yes	Yes	No	Yes	$50,000-$200,000
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Data, Inc. (416) 000-0000	Dat	Mac	Ingres, Oracle, RMS, DB2	Workbench	Gane-Sarson, Yourdon, Jackson, Chen, Martin, Jackson	NA	Data flow; entity relationship; program structure; form, report	Both	Yes	Both	None	Yes	Yes	Yes	Yes	$9,000-$250,000
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Design Technologies, Inc. (213) 000-0000	AMS-Team	9370-up to 3000-class IBM or compatibles	Cobol, CICS, VSAM, DB2	Tool kit	Methodology independent	Any process or data centered approach	None	Both	Yes	Both	Task management, budget vs. actual, schedule	No	Yes	Yes	Yes	$150,000-$340,000
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Holland Systems Corp. (213) 000-0000	dVest Strategy	IBM mainframe, PC, PC XT, AT or compatibles	Generic	Tool kit	The Holland Systems Strategic Planning Method	Business function, entity modeling; information systems planning, diagramming	Micro	No	No	NA	Project manager work-bench templates	No	No	Yes	Yes	$97,000
	Design 4 Data	IBM mainframe	Generic	Tool kit	Holland Systems Data Modeling Methods	Data modeling, view synthesis, entity relationship modeling	Output	No	Yes	Both	Methods guided by Project Manager Workbench templates	No	No	Yes	Yes	$40,000
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Index Software Engineering, Inc. (512) 000-0000	Powermade	Mac Plus, SE, II	Any DBMS, language compilers; allow use of any language	Workbench	Dahlstrom, Hatley, Ward-Mellor, Yourdon	Dahlstrom, Hatley, Ward-Mellor, Yourdon	Data, control flow; state transition; state tables; state event matrix; structure charts	Both	No	NA	None	Yes	Yes	Yes	Yes	$4,495
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Index Technology Corp. (617) 000-0000	Excelerator	IBM PC, PC XT, AT, PS/2 or compatibles; Vaxstation; Sun 3 series; Apollo 3000 series	Cobol, PL/1, Oracle	Workbench	Yourdon, SDM/structured information engineering	Gane-Sarson, Yourdon, Jackson, Constantine, Chen, Rochman	Data flow, Structure charts, entity relationship	Both	Yes	No	None	Workstation only	No	No	Yes	$8,400
	Excelerator/ RTS	IBM PC, PC XT, AT, PS/2 or compatibles; Vaxstation; Sun 3 series; Apollo 3000 series	Cobol, PL/1, Oracle	Workbench	Ward-Mellor, Hatley	Hatley, Constantine, Chen, Jackson, Rochman, Yourdon, Gane-Sarson	Transformation, block, matrix graphs; structure charts; entity relationship; state transition; data model	Both	Yes	No	None	Workstation only	No	No	Yes	$8,400
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Integrated Systems, Inc. (408) 000-1000	Autocode	VAX/VMS	C, Pascal, Ada	Workbench	Ward-Mellor, Boeing-Hatley	Block diagrams	Block	Both	Yes	On-line	None	Yes	Yes	No	Yes	$20,000
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Interactive Software Engineering, Inc. (805) 000-1000	ISEd	VAX; Sun; Apollo; IBM PC, PC AT, RT, PS/2 Classic; HP 9000/300, 9000/800 series	Unix, C, Xenix	Workbench	Object-oriented design, programming	Object-oriented analysis	Inheritance, class dependency	Both	No	Both	Automatic documentation	Yes	No	No	Yes	$3,995+
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Learmonth & Burchett Management Systems, Inc. (713) 000-0000	Auto-Mate Plus	IBM PC AT or compatibles, PS/2	IDMS, DB2, Adabas	Workbench	I.S/Net+, Chen	Data flow, on-line dialog design, structured, entity modeling	Flow, structure charts; presentation graphics for IDMS, DB2, Adabas	No	Yes	Both	No	Yes	No	Yes	No	$7,500
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McDonnell Douglas Information Systems Co. (000) 000-1000	Profit Workbench	IBM PC, PC XT, AT, 3270 PC, PS/2 or compatibles	MS-DOS	Workbench	Yourdon, any other life cycle management methodology	Structured analysis; derived, strategic design	Gane-Sarson, Chen, Rochman, Constantine	Both	Yes	No	None	Yes	Yes	No	Yes	$8,500
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On-Line Software Introduces an Old Concept.

The Strateg

Casablanca...President Franklin D. Roosevelt and Prime Minister Winston Churchill find something to chuckle about during their historic meeting. (Credit: Bettmann)

Like it or not—and we do—we all live and work in an IBM world.

You work with IBM.

We work with IBM.

Let's work together.

Sure, there are proponents of minis and micros.

One wishful company even ballyhooed a mid-frame and when that didn't pan out they created a small-frame.

But the undeniable fact is that Big Blue has taken this industry and created it in its own image.

Pardon us if we seem a trifle unadventurous but we think we know a winner when we see one, so where IBM goes, we follow.

We fill their gaps. Plug their holes.

Write programs they don't have time for.

In short, make the whole thing run just a little bit better.

ic Alliance.

■ WE'RE LOOKING FOR A YES MAN.
OR WOMAN.
OR BOTH.

At most companies there are a hundred people who can say no but only a few who have the authority to say yes.

We're looking for those people. A few good men you might say.

And, at the risk of sounding high and mighty, there's something in it for you.

ON-LINE SOFTWARE'S THREE TIERED STRUCTURE

■ A CHANCE TO BE A HERO.

A chance to get ahead.

You see, managing a DP department is no different from most of life's other endeavors. It's not what you know, it's who you know.

Obviously we'd like for you to know us better. To make it easier, we've established special teams exclusively to service national accounts, federal systems, service bureaus and resellers.

Big guns for big hitters, if you'll allow us to mix a metaphor. What's in it for you?

Help.

Help with product evaluations, help with training, help with technical consulting and systems integration, help with applications development, operations and information management.

Sure, it's all available individually from other sources, if you have the time to wait for ten different phone calls from ten different reps.

We're betting you're too busy for that.

We're betting you're ready for an alliance, an understanding between yourself and a company whose charge in life is to take what IBM has created and make it better.

A strategic alliance.

It works in other businesses every day.

It works for politicians.

It works for lovers.

It even works for kids on the playground.

It worked for Roosevelt and Churchill.

It can work for us.

"I WAS AN MIS DIRECTOR FOR 27 YEARS.
I ALLOWED ONE VENDOR LUNCH EVERY TWO MONTHS.
I WAS NOT EASY TO SELL TO.
I WAS WRONG."

A recollection from Howard P. Sorgen, President of On-Line Software

Personal experience. Can't beat it.

Especially if you've made a few mistakes and you've learned from them.

I have.

It wasn't that I was too smart or too powerful or too good to see all the people who had all that software they were trying to sell.

I was too busy.

I had a business to run so I did what all MIS managers do—leave it to my DP people to pick up a piece here and a piece there and make them fit.

It works.

It works great in the short run. And when you're so busy you can't see beyond the next project, that's the most most companies can, or do, hope for.

But take it from a guy who's been doing this for over 30 years.

Stop.

Sit back.

Relax.

Take a break.

Look around.

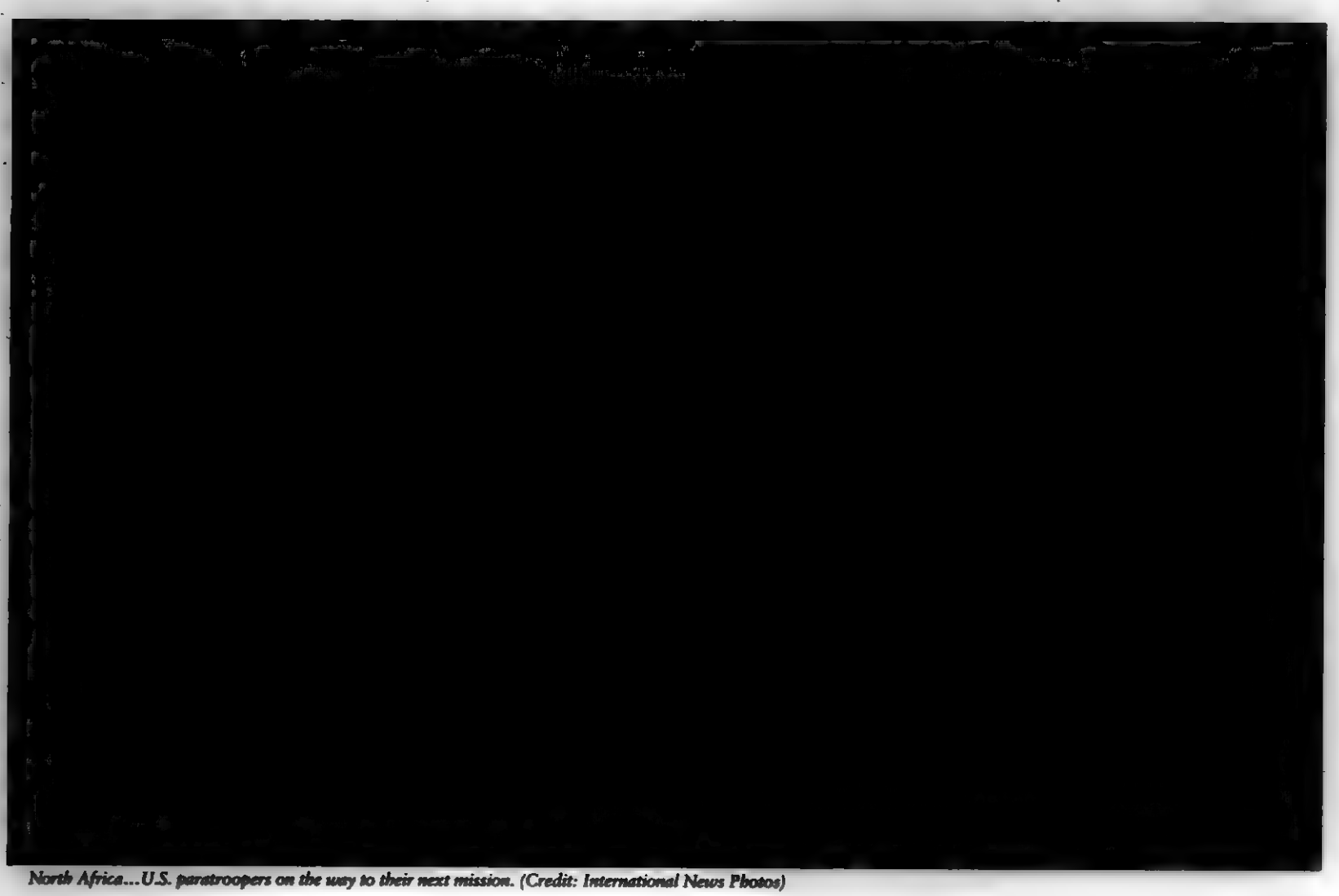
Find someone who has more to offer than just a piece of software. Someone who can help. Someone you can talk to, every day if you need to.

I did. I liked the way it felt, thought other DP managers would feel the same way, and that's why I'm at On-Line Software today.

By the way, my number's (201) 592-0009 and my extension is 2823. Call if I can help.

Howard Sorgen

Before You Buy Another P
Ask Yourself a Simple



North Africa...U.S. paratroopers on the way to their next mission. (Credit: International News Photos)

■ The time has come for the big software rout. Little companies acquire big companies and big companies fight to hold their position against an onslaught of corporate raiders, disenchanted financial advisors and a skeptical Wall Street.

Those brilliant boys who sat in back-rooms and changed the world can no longer afford to bring their product to a more complicated and more expensive market.

What used to be a craft is now a business, and that business is in turmoil. What used to be an innovative, entrepreneurial undertaking has been overwhelmed by a cover-your-butt mentality.

Rightly so.

Where will you be, who will own the software that runs *your* machines when the dust settles?

Systems software purchases are commitments. Commitments that ask *your* people to generate *your* work to satisfy *your* customers, a certain way for a very long time.

Changing that is rarely easy, always expensive.

■ WHAT HAPPENS WHEN YOUR FAVORITE LITTLE SOFTWARE COMPANY GETS EATEN UP BY SOMEONE YOU REALLY DON'T LIKE?

Pick up The Boston Globe, The Wall Street Journal, Business Week and you've got an arm load of software mergers, purges and shake-ups.

Some good. Some bad.

All affect you.

iece of Systems Software, Question. Is it Safe?

With a growth rate as high as 75%, constant new releases and several major acquisitions, On-Line Software started as, and remains, an exploding star.

In that atmosphere any company must work hard, very hard to keep its feet on the ground. Because all too often, asking a business partner to share in your glory carries an unspoken and unintended commitment to ride out your downfall.

It's a hard lesson, a lesson best learned from IBM—who we've mentioned many times before and we'll mention many times again. It's okay to take chances, it's even necessary to take risks, but never, ever pass them on to your customers.

■ BE CAREFUL WHO YOU BUY YOUR PROBLEMS FROM.

Safe. Is it safe? Is it a safe buy?

Safety is where it has always been.

In numbers.

In stability.

In support.

In growth.

In training.

In specialization.

In finding the high ground and holding it.

In an industry too often trying to be all things to all people, On-Line Software passes up many opportunities in order to solidify one position, to be authorities, authorities in IBM systems software.

In an industry whose raison d'etre is to sell more and more product, On-Line Software started by offering consulting, and now trains more people in the intricacies of IBM systems software than most anyone. In an industry in the midst of a shake out, we do the shaking, impervious to hostile takeover.

■ SO HOW DO YOU ELIMINATE THE INHERENT RISKS IN SOFTWARE PURCHASES?

Thirty-day trials help. But if you can feel secure with just a month's experience under your belt, you're better than most.

Look for specialization in IBM, especially in CICS and DB2.

Look for a company with a history of a new release for every product every year.

Look for tech support.

Look for educational offerings not only where the product is sold, but in the field where it is used.

Ask consultants and value added resellers which products they use to make their jobs easier.

Look for a company that asks smart questions.

Look for a company that comes to you.

Most of all, don't jump before you know what's down below.

THE NEW DEAL.

Things change.

In this business that's the name of the game.

So what seemed like a great decision—what was a great decision—a year ago can often turn into a worthless piece of software when your hardware changes or your operating system changes or your business changes or you just change your mind.

Until now all you could do was bite the bullet and wait for next year's budget.

That's all changed.

If you got it from On-Line Software, then just send it back.

Here's how it works.

License any On-Line Software product.

Take maintenance.

Use it.

Then, six months later—or six years later—if you're through with it or just don't need it or just want something else, trade it in, dollar for dollar, for another On-Line Software product.

That's it.

If you're looking for the fine print, there is none.

If it's an idea that sounds right for you, give me a call for the details.

Jack Bardy, Chairman and CEO

P.S. I want to ask a favor—a small one, I hope.

As far as we know right now, no other company offers a guarantee that even comes close. In fact, as far as we know, no other systems software company has any extended guarantee at all.

That too will change. Sooner or later, they'll all have to do it just to keep up.

So the first time you hear some software sales rep going on about his company's great unconditional guarantee, please remember that it all started right here.

Thanks.

The DP Ass

The Homefront...Dedicated workers are the backbone of any modern operation. (Credit: UPI)

■ If you're over 30 you probably remember the ads on the inside of match book covers, "Learn To Be A Key Punch Operator And Enter The Exciting World Of Computers."

Now, with 1990 less than 500 days away, it all sounds so naive, doesn't it?

Well, that's the way a lot of people got started. It beat working in the mill or answering the phone all day. To be fair it still does.

But the glamour's gone.

Today there are 900,000 DP professionals in the United States.

There's only one problem. We need almost 2,000,000 more. We measure backlog not in days or months but in years. Years!

Ten years ago, no one ever thought that computer programming would become a white collar assembly line.

So, the exciting world of computers has come down to one thing—a lot of hard work.

Programmers never seem to get ahead.

They never get caught up.

Their job will never be finished.

There's always more to do.

Sort of like working in the mill.

■ TELL YOUR DP MANAGER SHE JUST NEEDS TO WORK HARDER AND GUESS WHAT SHE'LL SAY.

Put a machine that does its work in milliseconds in the same room with people who are inexorably tied to the cycles of the sun and moon and seasons, and something has to give.

Inevitably, it's the people.

Frustration, anxiety and desperation build until writing an application program, essentially a creative undertaking, turns into a crank-it-out-and-shut-them-up task.

Everyone—except the computer—loses.

There's much more to be gained from making application development easier than just making it

embly Line.

faster. Taking out the drudgery, the rote, the repetition, leaves room for reflection, time for inspired daydreaming—essential activities that are at best fond memories for most programmers.

UFO, VERIFY, InterTest, IntelaGen, DataVantage, and now, most of all, CasePac help bring it back. They buy you time.

Time, we hope, not to do things faster, but to do them better.

■ *HI-TECH INTERCOURSE.*

Applications programmers are much like God, or Dr. Frankenstein, depending on the outcome.

They conceive a program.

It's born.

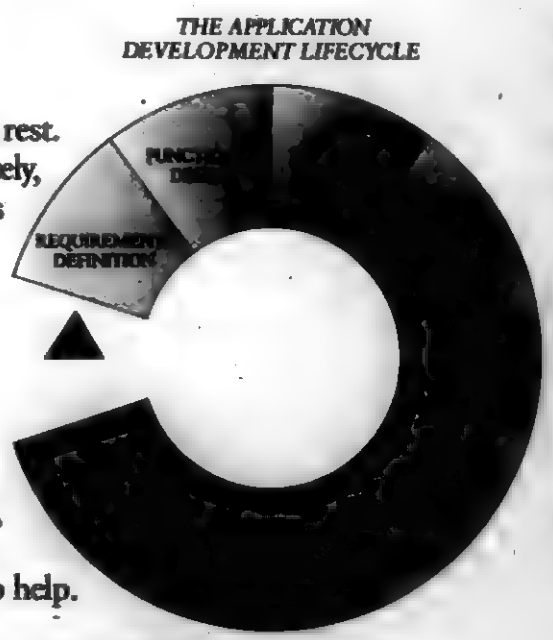
It lives.

It grows.

It ages.

It is laid to rest.

Appropriately, the whole process is called a lifecycle.



No matter where you are in that lifecycle, from the first gleam in your eye to resurrecting a geriatric program, there's an On-Line Software product to help.

■ *CASEPAC.™ THE GENE POOL.*

CasePac.* Automated software development for DB2 with a powerful data dictionary.

CasePac gives you the tools to automate design and modeling functions. But most important, it stores information about your designs, models and data flow diagrams—everything it takes to build an application—in one central place where everyone can get to it. It not only stores information about current projects, it stores information about existing applications, too. So everything is consistent. Everyone works with the same definitions and standards.

Because nothing lasts forever—although some applications programs seem to—CasePac also helps you with that nasty little chore called maintenance.

Once the creator is gone—and most creator-types don't leave good notes—it falls upon the meek who have inherited the mess to figure out how it was put together and keep it going as long as possible.

With CasePac, the records are there. Records that can be used to fix what you've got. Or grow another.

CasePac. For DB2, it's where life begins.

■ *UFO.® THE BREATH OF LIFE.*

Go from prototype to finished application in record time with the most resource-efficient development system on the market. It's the most flexible, too, with full portability across CICS, CMS, TSO—even the 9370.

UFO makes it easy. Many applications can be built using menus alone, with the help of pre-programmed logic and built-in functions. For even more speed, you get automatic data base access—including DB2 and SQL—as well as an active data dictionary that makes maintenance a breeze.

■ *INTELAGEN.™ CHAIN OF COMMAND.*

Instead of writing COBOL or PL/1 code line by line, step by step, let IntelaGen do it for you.

IntelaGen generates stand-alone COBOL or PL/1 code from simple commands that cover all structured programming and computational functions.

It accepts either IntelaGen or COBOL commands, so novices can learn as they go. When they do make a mistake—and they will—an on-line syntax editor tells them right away, making IntelaGen the code generator that's easy to use even if you don't know how.

■ *INTERTEST® AND DATAVANTAGE.™ PHYSICAL FITNESS.*

InterTest is the number one CICS applications debugging and testing tool in the world.

With good reason.

It prevents all application errors known to CICS—and does it with such ease and grace, it makes one of your most grinding jobs seem a snap.

For IMS and DL/1 data bases, DataVantage automatically creates an accurate subset for testing. There's no need for manual coding since DataVantage does all the heavy labor—from query and updating to comparing data bases before and after testing.

■ *VERIFY.® RUNNING THE GAUNTLET.*

VERIFY determines if your program will wimp out when the going gets tough.

It lets you see the real impact of changes you've made to your programs *before* you get production system "surprises." VERIFY is an automated CICS quality assurance tool that handles the full gamut of testing needs. It tells you if your applications will work as expected after changes are made to your program code, CICS releases, operating systems, hardware, or transaction load.

In short, if anything changes, VERIFY can test it.

*CasePac is a joint venture with TATA CONSULTANCY SERVICES.

How Much Trouble Wou
Unplugged Your Mainf

The Pacific...Lucky 13, a Grumman Hellcat, forces commanders and seamen alike to ponder the dilemma of a unit out of commission. (Credit: U.S. Navy Photo)

■ Yes, everyone knows that computers don't go down for a whole day anymore.

Or do they?

Would you admit it if it happened to you?

So let's forget about a day.

How about an hour?

Or, if you're an "average" MIS Department spending an "average" of over $5,000,000 a year which is an "average" of almost $100 a minute, well—you get the point.

■ OPERATIONS IS EVERYTHING.

If you're willing to pay the price there are a few mainframe manufacturers who will sell you two computers instead of one, so if one goes down you've got a backup.

Sort of like carrying a spare set of batteries for your pocket calculator.

Whether or not you need fault tolerant or faultless computers, the simple fact is computers do go down.

Often. Regularly.

Usually during your prime shift, right in the middle of your business day—and these days you don't have a business day if your mainframe isn't on-line. Usually it's a programming or software problem.

Yes, we said it. Believe what you like, but there's

ld You Be In If Someone rame For Just One Day?

no such thing as faultless software. Or faultless people.

There are simply no magic potions or secret formulas or revolutionary programs that will bail your rear end out at 2 a.m. when your batch programmers are fighting with CICS for a file.

There are no answers.

There is help.

■ *STABILIZE® SHELL SHOCK.*

CICS programs are born with the jitters.

STABILIZE is like pumping 25 milligrams of lidocaine into the system every time it gets jumpy.

It prevents crashes and dynamically repairs damage caused by corruption of CICS management modules and storage chains, systems or application loops, and all sorts of systems abends. And with its unique InterTest "handshake", errors won't recur.

■ *TOOLSET-DB2.™ LIBERATE YOURSELF.*

Bogged down in the really boring, repetitious parts of your job?

TOOLSET-DB2 is a complete set of tools that automates and speeds many of your routine tasks such as writing SQL statements.

With TOOLSET-DB2, you won't have to issue complex catalog queries over and over again to determine object definitions and relationships.

You won't have to do special programming to get DB2 data into a physical sequential data set—or spend long hours setting and removing DB2 security.

■ *CICS CENTRAL.™ SEE THE WORLD FROM THE COMFORT OF YOUR CHAIR.*

CICS Central is a powerful data center tool that lets you operate multiple local and remote CICS regions from one central location.

With CICS Central you can anticipate and correct CICS operational problems *before* your users notice them. All CICS and VTAM messages can be filtered, color-coded, and replied to automatically.

How's that for comfort?

■ *OMNIGUARD.® COMPUTER FRAUD? ADMIT IT! IT'S EXCITING!*

How about whoever it was that stole 16 million taxpayer records from Revenue Canada? Hah! Got even with them, didn't he? Our favorite is the disgruntled CFO who held his employer's files hostage and demanded a ransom when he didn't get an expected pay raise.

Love it! Love it! Love it!

Until it happens to you.

Then it hurts. Bad.

OMNIGUARD is the most comprehensive software security system available anywhere at any price.

Need we say more?

■ *DADS.™ WHAT HAPPENS WHEN YOU ASK YOUR MAINFRAME FOR A SIMPLE FAVOR AND IT TELLS YOU TO TAKE A HIKE?*

"Files Not Available." "Datasets In Use."

It's almost dawn. It's not funny.

You need to update your CICS files and some batch programmer has them. Who's in charge here anyway? DADS is a file and application control system for CICS/MVS that performs dynamic allocation/deallocation and automatic enabling/disabling of transactions and programs, thus allowing 24 hour CICS availability.

True, you may not need it right now.

But then again, it's not 4 a.m.

■ *VSUM.™ THREE MILLION DOLLARS FOR A MAINFRAME. FIVE MILLION FOR DISK SPACE. FILL THEM UP, THEN BUY MORE?*

Let's say you need to add 100,000 new customers.

Everything's full so where you gonna put em? Especially since all of your programmers are hiding away a little storage space "just in case they need it".

VSUM can figure out how much space you'll need, when you'll need it, and where to find it—before you're in trouble.

It saves time. It saves disk space.

It could even save the price of a new controller.

■ *FILESAVE.™ SAVE YOUR EMPLOYEES FROM A LIFE OF DRUDGERY.*

If you worked your way up through the ranks, once upon a time you probably had to recreate lost or damaged files. And you probably hadn't done the necessary backup. And you probably got into trouble.

And the same thing is probably going on in your DP department right now.

FILESAVE can keep you out of trouble by reducing your backup frequency, automating the dataset recovery process and providing fast and accurate forward and backward recovery of VSAM datasets. Most of all, it does the jobs no one else wants to do.

How to Turn Data

Location Classified...Six men from an American photo reconnaissance unit sprawl over the French landscape. (Credit: Bettmann/Black Star)

Into Information.

■ Lest we forget, all those impressive numbers, all those binary figures, all those bits and bytes and data bases that you took so much time to collect and spent so many millions of dollars to input and output and sort and store are absolutely worthless to the average branch manager in Poughkeepsie who isn't meeting his or her sales goals.

And you surely remember that meeting one's sales goals, or productivity goals or quality goals is what most businesses are all about.

Not bits.

Not bytes.

Not data.

Business is about information, and information and data are not the same.

■ *THE NEW RAMIS.®*
WHAT YOU DON'T KNOW CAN'T HURT YOU.

Converting data into information is easy, if you know how to access a mainframe and you're not already 3 months behind with all your other work.

There are alternatives.

Take the new RAMIS Information System for example.

According to Rick Holtmeier, our Executive Vice President, pulling a management report with RAMIS is so easy even his secretary learned to do it in 10 minutes.

According to Rick's secretary, it's so easy even he learned to do it in an hour so now she doesn't have to bother.

Okay, let's go back to the guy in Poughkeepsie.

He doesn't know how to access a mainframe —let's face it, you don't want him to know how to *really* access your mainframe. He doesn't know how to write a macro. He doesn't know procedural syntax from his dear Aunt Maude.

He does, however, have a commanding knowledge of the alphabet. With the RAMIS report writer that's all it takes.

For instance, if he wants to know the total revenue for each product purchased by Acme Widget in the fourth quarter of last year, he simply types—using as many or as few fingers as he chooses—Show me the total revenue for each product purchased by Acme Widget in the fourth quarter of last year.

RAMIS then displays a table listing each product and the total revenue from Acme Widget during the fourth quarter of last year. What could be simpler?

Charts and graphs could be simpler.

RAMIS does that too, with only a few additional keystrokes.

For the really inquisitive, RAMIS, RAMIS/PC Workstation™ and RAMIS English™ have pop-up menus and non-procedural syntax that provide external data selection and sequencing options, and let your man in Poughkeepsie manipulate data with summary operators, temporary fields, totals, and basic statistical operations.

It's just that easy or just that hard, depending on how you want to play it.

■ *BULLETIN.™*
WHEN IT ABSOLUTELY, POSITIVELY HAS TO BE THERE AND YOU DON'T HAVE ALL NIGHT.

Which is more unreliable, the U.S. Mail or your own internal routing service? Either way, if you haven't missed an important message in the last month, count your lucky stars. Business *is* communications, and BULLETIN lets you take charge.

With BULLETIN you can automatically send, receive, track and file everything from a hundred page business plan to a top secret dinner invitation to the hunk or hunkette across the hall. You know who has received your memos and who hasn't and who has viewed them and who didn't bother.

Getting people to act on them is a problem we haven't yet solved.

■ *OMNILINK.™*
THE GREAT COMMUNICATOR.

Anybody can make micros and mainframes talk to each other. OMNILINK lets them communicate.

If you've looked at PC to mainframe links, you've probably come away with a few questions.

Like, how do I learn all those computer languages? How do I handle security? How do I control the information flow? How do I talk to other PC users? How do I reformat data? And on and on and on.

Get OMNILINK.

Of course, we could go on and on and on.

Low Tech Solutions to

England...High spirits and camaraderie are vital ingredients in making pilots out of men. (Credit: Reuters/Bettmann)

High Tech Problems.

■ Running 50 or 100 DP departments all over the world is not unlike maintaining a small army. Hardware and supplies. Logistics and communications.

And most of all, of course, people.

If you're one of the very biggest companies in the world and you need a systems integrator, you're probably going to call IBM or EDS or Arthur Andersen. And you'd probably be right to do so.

(So much for the free publicity for our competitors.)

What if you're not one of the biggest? Or, more likely, what if you need help on the departmental level?

What if you need an elite troop who can move in, assess the situation and do the job quick, without carrying around a lot of overhead?

Consider On-Line Software.

Especially if you need technical consulting.

Definitely if you're moving into DB2.

Always if you're CICS.

On-Line Software started as a technical consulting company for CICS in 1969.

Back then CICS was the really "sophisticated" end of the business and On-Line Software ruled the roost.

To some extent it still is and we still do.

But now there are a hundred companies who do it for less. Still, our old customers keep on coming back and new ones walk through the door every day.

Perhaps that's because—as we've said throughout this treatise—things are not as simple as they used to be.

Who needs just a CICS consultant anymore?

Or just a batch consultant?

Or just a DB2 programmer?

Or just a piece of software?

Nowadays, in this business, if you're just anything, you're nothing.

That's why we've expanded our consulting services, integrating them with software and supporting them with education and training so that it's sometimes hard to tell where one begins and the other stops.

However—and this is important—our consultants and educators don't sell software.

Objectivity, especially if you're a consultant, is your life's blood.

Sure, our consultants use our products whenever it serves their needs. And sure, they miss a lot of opportunities to sell a lot of software. But every person who walks through your door is given one directive: do the best job he can with allegiance to no supplier.

It costs a little business.

It keeps a lot of friends.

■ PLANNING A WELL RUN DP OPERATION IS LIKE REHEARSING FOR HAMLET.

Remember your high school play? After you'd learned all your lines—or learnt if you were playing Shakespeare—the coach started talking about plot points.

Those were the important parts, the parts where most of all you couldn't mess up. If you messed up at a plot point then everything else messed up and the audience laughed. It's just the same with DP planning, only if you mess up nobody thinks it's funny. Instead of key plot points, our management consulting people call them "csf's" or critical success factors. In other words, "Those areas where things must go right for business to flourish."

Remove any block and it all falls down.

By analyzing over 150 of these csf's you can predict the chances that your project will be done on time and on budget—or done at all for that matter—before you begin.

Since, according to some industry reports, half of all projects begun are aborted before they're finished, it keeps your business from being just another crapshoot.

CRITICAL SUCCESS FACTORS

■ THE SMARTER THE TROOPS THE SMARTER THE GENERALS.

No one famous said that.

But they should have.

Each year On-Line Software teaches over 13,000 students—your employees—how to write your programs and operate your systems, in 750 classes taught by 32 full time instructors at ongoing offerings in New York, Atlanta, Boston, LA, Chicago, Detroit, Denver, Hartford, Princeton, Cleveland, Washington, Houston, San Francisco, London and various cities throughout Canada and Europe.

If you're somewhere we're not, we'll come to you.

Asked to brag a bit, John Morbach, Senior Vice President of Education, says, "You name 'em, we've trained 98% of 'em."

We train IBM.

We train EDS.

We train McDonnell Douglas.

We've surely trained someone in your own shop.

We offer classes in everything from applications programming to systems internals.

Our most popular courses are CICS Internals and CICS Command Level.

Our hardest class is VTAM, so hard in fact that when we discovered even VTAM professionals were having trouble we softened up and started "Introduction to VTAM".

If DB2 is in your future, we have four classes covering concepts, design, applications programming and systems, and we have them now.

In most cases, the instructors are the same people who developed the class, so students are never stuck with a teacher and a book and little else to go on.

Of course, all products, especially On-Line Software products, are always taught on the latest releases.

WHAT DO YOU DO WITH AN EXTRA $3 BILLION AND NOWHERE TO PUT IT?

Here's the lowdown.

Pennzoil had an extra three billion, cash money. (We won't mention where they got it.)

They needed to get it from New York to Dallas, Fed to Fed.

A number of banks wired the money to Manny Hanny.

Manny Hanny wired it to the Fed in NYC.

NYC wired it to Dallas.

The whole thing came down in less than 12 minutes.

It was the largest transaction in the history of the world.

On-Line Software consultants helped build the systems that did it.

And nobody lost a dime.

■ "WE TRAIN OUR PEOPLE TO BE NICE EVEN WHEN YOU'RE NOT."

Debbie Gregory, Assistant Vice President of Marketing Services

You just can't blame it on the computer anymore, can you?

Even if it's true, people, especially your customers, just don't go for it.

They rant.

They rave.

They scream.

They shout.

They curse your name and hang up and take their business elsewhere, if they can.

So what do you do?

You call us.

You rant.

You rave.

You scream.

You shout.

And you take your business elsewhere if you can.

We understand. And we try to do something about it.

Like having a hot line for all of our products.

Like connecting you with a technician right away.

Like getting you a new tape overnight.

Like answering a bookkeeping question the same day.

Like putting you directly in touch with the vice president in charge.

If that's not enough, call me.

Debra Gregory

IBM is a registered trademark of International Business Machines.
EDS is a registered trademark of Electronic Data Systems.

D-Day.

■ It's not over.

Not yet.

And if you believe the newspapers, the magazines, the trade press, it's about to start all over again.

There's a guy in California with a goatee, a Hawaiian shirt and patent leather shoes working on a process to produce chips more efficiently—there's always a guy in California working on a process to produce chips more efficiently—but this time the fellow says they'll be a thousand times easier to make and ten thousand times more powerful.

The experts say he knows what he's talking about.

He expects to be on the market in 1993.

IBM is in on it. So is everybody who is anybody in the mainframe business.

So, it's not over.

The explosion of growth and innovation and technology that created the PC market and taught the whole world how to process data is about to start all over again.

This time the noise may not seem as loud but the impact will certainly be felt.

This time it's going to hit mainframes.

Hard.

In their corporate message, Big Blue asks you to look at the bigger picture.

We respectfully suggest you be a part of it. A part of a marriage, a partnership, a relationship—a strategic alliance intended to join you not only with IBM but with the systems software it takes to make the whole thing run.

There is no answer. Only help.

Help starts here.

Please send more information about On-Line Software's:

☐ Products _____
☐ Consulting Services — Fill in product name(s)
☐ Educational Services

☐ Please have a representative call.

Name, Title _____

Company _____

Address _____

City, State, Zip _____

Telephone _____

CWASAU8

FOR FASTEST RESPONSE CALL TOLL FREE 1-800-642-0177.

On·Line Software
INTERNATIONAL

AUTHORITIES IN IBM® SOFTWARE

2 EXECUTIVE DRIVE, FORT LEE, NEW JERSEY 07024. 800-642-0177/201-592-0009

BRANCH OFFICES: ATLANTA, BOSTON, CHICAGO, DALLAS, DENVER, HARTFORD, LOS ANGELES, PRINCETON, SAN FRANCISCO, TORONTO, WASHINGTON DC, BRUSSELS, LONDON, MILAN.

COMPANY	PRODUCT	HARDWARE PLATFORMS	SOFTWARE PLATFORMS	TOOLS KIT/WORKBENCH	METHODOLOGIES SUPPORTED	ANALYSIS AND DESIGN TECHNIQUES SUPPORTED	DIAGRAMS CREATED	SCREEN/PROTOTYPE PAINTERS	PROMPTS, SIMULATION OF EXECUTION	AUTOMATIC ON-LINE OR BATCH CODE GENERATION	ON-LINE PROJECT MANAGEMENT FUNCTIONS	VERSIONING CAPABILITY	SPECIFICATION PROMPTS	INTEGRATED DATA DICTIONARY/ REPOSITORY FUNCTIONALITY/ DOMAIN CAPABILITY	ANALYZES EXISTING PROGRAMS	PRICE
Meta Systems, Ltd. (513) 683-0037	Meta Systems Tool Set	IBM VM/MVS, PC, PC XT, AT, 3270 PC or compatibles; VAX (VMS, Ultrix), Vaxstation II, Microvax (VMS); Unisys (OS1100); Gould (UTX/32)	Real-time control, conventional control, Meta Systems proprietary DBMS	Workbench	Methodology independent	Dataforce	Activity flow, picture reports, extended pictures, process chains, function flow data, network, data flow	No	Yes	Batch	MP	With Quick-IT	Yes	Yes	Yes	$1,500-$50,000
MRC, Inc. (212) 799-5660	MRC Query series	IBM System/38	RPG III	Workbench	Martin	Datadrive	Flow charts	Both	Yes	Both	MP	Yes	Yes	Yes	Yes	$10,220
Nastec, Inc. (616) 698-6868	Nastec/Cap Development Center	IBM PC, PC XT, AT, PS/2, 9370, 4300 series, 3000 series; VAX, Microvax, Vaxstation, Wang VS	Cobol, DB2, Teradata, Ingres, Oracle, IDMS, VAX DBMS, VSAM, RMS, DMS, IMS, CICS, MVS/TSO, VM/CMS, DOS/VSE	Workbench	Rapid prototyping; reusable code, design	Joint application	Process tree	Both	Yes	Both	Productivity evaluation utility, Capers Project Session	Yes	Yes	Yes	Yes	$50,000
Optimus, Inc. (513) 548-1688	Structure	IBM PC, PC XT, AT or compatibles	MS	Tool kit	Warnier-Orr, DSSD	Warnier-Orr, DSSD	Warnier-Orr; structure, flow formats	No	No	Both	None	No	Yes	No	No	HP
	DesignVision	Any that supports Microsoft Windows	None	Tool kit	Methodology independent	Depends on methodology	Depends on methodology	No	No	Both	None	Yes	Yes	Yes	No	HP
	Design-Machine	IBM PC AT or compatibles, PS/2	Integrated data base	Workbench	DSSD	DSSD	DSSD entity, functional; flow; logical data structure	No	No	NA	Maintains trace of manual/automated project activities, traces changes, recognizes effect of changes	Yes	Yes	No	No	HP
Pansa Computers, Inc. (408) 943-0433	Application Designer	Pansa Extended Data Processing System	C, SQL, MS-DOS, Microsoft Windows	Tool kit	Methodology independent	NA	NA	Screen	Yes	Both	None	Yes	No	No	Yes	$2,000
Programmed Intelligence Corp. (404) 640-0880	Intelligent Query	IBM PC, AT or compatibles; TI-1200, 1300, 1500, Xenix; Altos Xenix; AT&T (Unix) 3B1, 3B2; NCR Tower; Unisys 5000/20/40/60; NBI 810; VAX/VMS, Unix	Cobol, Dbase II, III, III+, Paradox	Tool kit	Methodology independent	None	None	Report	Yes	No	None	Yes	Yes	No	Yes	$600-$30,000

Looking at CASE tools? Ask these 10 tough questions before you buy.

1 Can we get all the tools we need?

Most CASE tools handle only isolated parts of the development process. These tools can improve productivity to some extent. But as long as other steps must be done manually or you must relay information to move between lifecycle stages, you lose many of the benefits of capturing information with the tool. To get the full advantage of CASE technology, it's best to have tools for every stage of application development.

KnowledgeWare's tool set covers the complete lifecycle – from planning to the generation of executable COBOL code.

2 Can we get just the tools we want?

With some CASE tools, you may be required to buy more capabilities than you need. That's because some vendors have locked together tools for discrete development steps. So if different people do analysis and design, for example, you may be forced to provide everyone with a tool that does both.

KnowledgeWare's CASE solution is modular with separate tools for planning, analysis, design, and code generation that can work together…or alone. KnowledgeWare is unique in its ability to offer both the integration of a one-vendor solution and the flexibility of product modularity. So you aren't forced to buy more than you need.

3 How well are the tools integrated?

Most CASE tool vendors offer tools that aren't well integrated with each other. But if you can't easily pass information from one tool to another, much of the expected increase in productivity and system quality will be lost.

KnowledgeWare's CASE solution is integrated to allow information to flow naturally from planning through detailed design and system construction. Each tool contributes to a growing body of knowledge stored in the Encyclopedia. As information is updated by one tool, the change and its effects are reflected in all other tools that use that information.

4 How are diagrams stored in the tools?

The real value of diagrams in application development is the meaning behind those diagrams. A tool that stores the meaning of diagrams has numerous advantages over one that merely stores pictures of diagrams.

KnowledgeWare tools use artificial intelligence technology to store the *meaning* of diagrams, not just the graphical representation. The Knowledge Coordinator™ translates your diagrams into Encyclopedia information that can drive the system's construction. And the Knowledge Coordinator can take the information from any one diagram and automatically redraw it using a number of other diagramming techniques. This allows you to present diagrams in a form that best communicates ideas to each particular audience. And it saves countless hours of time.

5 Will the tools work with our current methodology?

Many CASE tool sets are tied to a specific methodology. To use them, you have to change your methodology to conform to the requirements of the tools. But you shouldn't have to learn a totally new methodology in order to get the advantages of CASE.

KnowledgeWare's CASE solution is not linked to a specific methodology. Nor should it be thought of as a replacement for your company's existing methodologies and development techniques. KnowledgeWare's tools provide an environment where engineering-like discipline is used to integrate existing approaches. So you can use any of today's popular methodologies, and capitalize on the experience you already have in your shop.

6 Can we introduce the tools at any point in the development cycle?

Some CASE tools require you to follow a rigid development process step by step – even if you wouldn't normally use some of these steps. For example, if you want to do some design before you get into system analysis, these tools may not allow it. Some force you to start using the CASE tool in one stage before you can move on to another.

Each of KnowledgeWare's CASE tools is tied to the others through a common Encyclopedia. And you aren't forced into a strict series of development stages. You can start wherever you like and even work backward through much of the tool set. For example, if you're in the design stage of an application right now, you can enter your current work into our tools at this point. You can work back through analysis if you choose and make use of the information collected in design. Many companies like to be able to "pilot" a particular phase of a development project to demonstrate the value of CASE technology. Our tools allow that.

7 Can the tools help improve system quality?

Some of the tools available today are simply diagramming aids. In order to improve the quality of applications, the tools should be able to check for consistency and correctness.

KnowledgeWare's tools use artificial intelligence technology to provide *real-time* checking of consistency and correctness of diagrams as they are created. This ensures the diagrams you draw represent information systems that can actually be constructed. You can concentrate on system concepts rather than structure details. Plus, it catches errors early in the development process, where they are far less costly to fix.

8 How friendly is the user interface?

The CASE tools you select should communicate ideas as clearly as possible. And the tools should make it easy for users to manipulate and modify these ideas. Unfortunately, most CASE tools have not kept pace with the latest advances in user interface technology.

KnowledgeWare's CASE tools use windows to allow you to view many diagrams and definitions at the same time. And to make it easy to tell diagrams apart at a glance, each can be displayed in a different color. You can zoom in on a particular diagram or nest several on the screen. And if you want to focus on a particular aspect of the application, you can mask out distracting elements in the diagram or highlight the path of information through a number of diagrams. Our tools are mouse-driven and have pull-down menus, making them fun and easy to use.

9 Can we exchange data with other software we already have?

Many CASE tools say you can do this. But most tools only make information from their tool available through specific interfaces to other products. The CASE vendor may not even provide an interface to your particular software. The tools should also let you bring in information captured in other software tools. Many CASE tools cannot support that.

KnowledgeWare products provide flexible import/export capabilities. This type of facility ensures you can exchange information with your existing database management systems, fourth generation languages (4GLs), data dictionaries, etc. Our tools help you take full advantage of all software in your shop.

10 Is there a plan for future advances?

Ask CASE vendors about their future plans. If they can't give you definite answers, there may be problems with expansion of their existing products. They may lack the underlying architecture to meet your demands for better products in the future.

KnowledgeWare has been following a master plan since its beginnings in 1979. We will continue to add even more capabilities to our current tool set. More powerful commands, even more diagramming techniques, and more user customizable features. Work is now under way to take full advantage of emerging technology such as IBM's SAA, OS/2, and Presentation Manager. This will lead to faster and even more powerful tools in the future. Software is our *only* business.

A comprehensive CASE solution is as close as your phone

Naturally there's much more to learn about the extensive capabilities of KnowledgeWare's CASE tool set. For more detailed information, call **1-800-338-4130** toll-free (in Georgia, call 404/231-8575). And if you want to talk to one of our representatives, just ask when you call.

KnowledgeWare

The World's Most Comprehensive CASE Tool Set

KnowledgeWare, Inc.
3340 Peachtree Rd. N.E., Suite 100
Atlanta, Georgia 30026.

COMPANY	PRODUCT	HARDWARE PLATFORMS	SOFTWARE PLATFORMS	TOOL KIT/WORKBENCH	METHODOLOGIES SUPPORTED	ANALYSIS AND DESIGN TECHNIQUES SUPPORTED	DIAGRAMS CREATED	SCREEN/REPORT PAINTING	PROMPTS SIMULATION OF EXECUTION	AUTOMATIC ON-LINE OR BATCH CODE GENERATION	BUILT-IN PROJECT MANAGEMENT FUNCTIONS	WORKSWING CAPABILITY	SPECIFICATION PROMPTS	INCLUDES MAINFRAME PROJECT DICTIONARY/ DOWNLOAD CAPABILITY	MULTIUSER SUPPORT/METHOD	PRICE
[illegible]	[illegible]	VAX/VMS, IBM PC or compatible	Ada, C, Pascal	Toolkit	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	VAX/VMS, IBM PC or compatible	Ada, C, Pascal	Toolkit	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	VAX/VMS, IBM PC or compatible	Ada, C, Pascal	Toolkit	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	VAX/VMS, IBM PC or compatible	Ada, C, Pascal	Toolkit	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Bond Information Systems, Inc. (415) 788-8888	Bond Development	IBM mainframes running MVS	Cobol	Workbench	NA	NA	NA	Screen	Yes	Both	None	Yes	No	Yes	Yes	$115,000
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Ready Systems Corp. (800) 355-1569	Cadmark	VAX 8000, 700 series, Microvax 3000 series, Vaxstation	Language independent	Workbench	Structured analysis, design, programming; object-oriented design; top-down stepwise refinement; functional decomposition; strong data, abstract data typing	Methodology dependent	Control, task map; data, control flow map; PDL, real-time performance verification	Both	No	NA	No	Yes	Yes	Yes	Yes	$10,000-$75,000
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Sage Software, Inc. (800) 289-8999	APS Development Center	IBM mainframes, PC XT, AT or compatibles	VS Cobol, VS Cobol II, IBM Cobol/II, Micro Focus Cobol, IMS/DB, VSAM, IDMS/DB, DB2, ADS, Micro Focus IMS/DB, DL/I, V-ISAM	Tool kit	Methodology independent	Universal import/export capability	NA	Both	Yes	Both	None	Yes	Yes	Yes	Yes	$3,000-$300,000
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Softech, Inc. (412) 687-6170	Maestro	Microvax II; Motorola 6000, 8000; Tandem, Honeywell Bull, Unisys mainframes; IBM PC XT, AT or compatibles	Language independent	Both	Methodology independent	Any	NA	Both	No	Both	Program analysis, evaluation, scheduling, cost control	Yes	No	No	Yes	$300,000 (for 25 users)
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Software Products & Services, Inc. (313) 696-9750	Engineering and Project management-oriented Support System	VAX, Microvax; IBM 370, 4381, PC AT or compatibles; HP Vectra; Intel 8086, 80286; DG/MV series; Apollo workstation; Sun workstation; Prolin Elmar 3300	Ada, Pascal, Fortran, C,	Tool kit	Yourdon-DeMarco, Jackson, Parsons, Petri nets	Graphics-assisted input; comprehensive analysis	Hierarchy, hierarchy control flow, data structures, data flow control flow, flow charts, Nassi-Shneiderman, Petri nets, hardware block circuit, symbolic connections, data relation matrix	Report	No	Both	Scheduling, cost control, responsibility, process outputs	Yes	Yes	Yes	Yes	$8,500-$42,000
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Sun Microsystems, Inc. (800) 821-4643 or (800) 821-4642	Network Software Environment	Sun hardware	C, Pascal, Fortran, Ada, C++	Workbench	Any	Any	Any	Screen	Yes	Both	None	Yes	No	No	Yes	$2,500
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Synergy International, Inc. (313) 356-0091	Microstep	IBM PCs or compatibles	C, Dbase III	Workbench	Specification to executable program	Data flow diagrams, prototyping	Icon based data flow	Both	Yes	Both	None	Yes	Yes	No	No	$5,000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Technology Information Products Corp. (617) 246-9720	TIP Plus	IBM 4300 and up	Cobol	Workbench	Proprietary	Proprietary	Structured charts	No	No	Both	None	No	No	Yes	Yes	$40,000
	TIP Dallas	IBM 4300 and up	TSO, CMS, GDDM	Workbench	Proprietary	Proprietary	Structured charts	No	No	Both	None	No	No	Yes	Yes	$40,000
	TIP Classic	IBM 4300 and up	TSO, CMS, GDDM	Workbench	Proprietary	Proprietary	Structured charts	No	No	Both	None	No	No	Yes	Yes	$40,000
	TIP Rubix	Unisys (Sperry), Honeywell Bull mainframes	TSO, CMS, GDDM	Workbench	Proprietary	Proprietary	Structured charts	No	No	Both	None	No	No	Yes	Yes	$40,000
	TIP Repository	Unisys (Sperry), Honeywell Bull mainframes	Cobol	Workbench	Proprietary	Proprietary	Structured charts	No	No	Both	None	No	No	Yes	Yes	$40,000
	TIP/PC	IBM PC XT, AT	NA	Workbench	Proprietary	Proprietary	Structured charts	No	No	Both	None	No	No	Yes	Yes	$40,000
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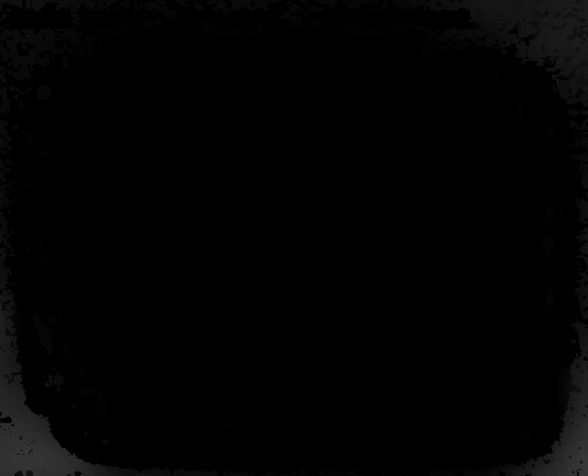
① The CEO wants a completely overhauled customer information system in 9 months.

② marketing needs external research information in their database to keep ahead of the competition.

③ Accounting needs changes to the old system by the next close.



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FOUNDATION

COMPANY	PRODUCT	HARDWARE PLATFORMS	SOFTWARE PLATFORMS	TOOL KIT/FRAMEWORK	METHODOLOGIES SUPPORTED	ANALYSIS AND DESIGN TECHNIQUES SUPPORTED	DIAGRAMS CREATED	SCREEN/FORMS PAINTING	PROMOTES STANDARDIZATION	AUTOMATES FULL OR PARTIAL CODE GENERATION	REVERSE ENGINEERING FUNCTIONS	VERSION/CONFIG CAPABILITY	DOCUMENTATION FACILITY	REPORTING FACILITY/ PROJECT MONITORING/ DOWNGRADE CAPABILITY	RUNTIME SUPPORT/ LICENSING	PRICE
Texas Instruments, Inc. (800) 527-3500	Information Engineering Facility	TI Professional IBM PC/AT/Models 50, 60, 70; PC/AT or compatibles	DOS, MVS/TSO, Cobol II, PL/I, MVS/ISPF	Toolkit	Information engineering	Information strategy planning, entity data modeling	Entity relationship, data flow, functional hierarchy, process dependency, process decomposition, data structure, transformation, data dictionary	No	No	Optional	Some	Yes	No	No	Yes	$50,000
Texas Instruments Learning Center (800) 527-3500	Texas Instruments Developer, Texas Instruments Specialist, Texas Instruments Expert, Texas Instruments ERP, Texas Instruments Basic	IBM PC, mainframes	Cobol, IMS/DB, DB2, VSAM	Workbench	Hoke (proprietary), any standard structured methodology	Structured modeling techniques, Yourdon, Orr, Chen, Martin, Steven	Entity-relationship	Screen	Yes	Both	None	No	Yes	Yes	Yes	$95,000-$95,000
Yahoo Corp. (213) 972-9999	Ally, Magnet, Lite	Unknown	Oracle, Unisys DMSII	Workbench	Methodology independent	Methodology independent	Methodology dependent	Both	Yes	Both	No	Yes	Yes	Yes	Yes	$30,000-$50,000, Magnet, $50,000, Lite; $5,000-$50,000, Ally
Vanalt, Inc. (800) 555-0000	Val Insight	IBM mainframe running MVS, ISPF, JES, IMS, CICS	Cobol	Tool kit	IBM proprietary	NA	NA	NA	Yes	Both	None	No	Yes	Yes	Yes	$60,000
Wallis Systems Corp. (617) 555-1200	Wallis Access Workbench	IBM PC/XT/AT, PS/2 or compatibles	Language independent	Workbench	Yourdon, Dickinson, Gane-Sarson	Any system diagramer	Any system	No	No	No	None	No	Yes	Yes	No	$2,500
Visual Software, Inc. (408) 988-7575	VS Designer	IBM PC AT, PS/2 or compatibles	Language independent	Tool kit	Yourdon, Dickinson	Structured analysis, design; entity relationship, Warnier-Orr diagrams; Ward-Mellor, Boeing-Harley, Visual-RT	Structure charts, entity relationship, action, Booch	Both	Only with third-party add-on	Yes	Yes	Yes	Yes	Yes	Yes	$6,000
Boeing Corp. (617) 555-0722	Graphics-Driven Co-worker	PC/XT, PC/AT	Pascal/77	Toolkit	Proprietary	Basic diagram modeling	Data flow	Both	Yes	Both	None	Yes	No	No	No	$5,000-$15,000
Yourdon, Inc. (212) 551-0800	Analyst/Designer Tool kit	IBM PCs or compatibles	MS-DOS	Tool kit	Yourdon	Diagramming with data dictionary	Data flow, context, entity relationship, state transition, structure charts	Both	No	No	No	No	Yes	No	No	$1,000

Counting the ways CASE helps

BY JAN SNYDER

Users in many types of business are starting to provide quantifiable figures on the positive results achieved since installing computer-aided software engineering (CASE) products.

For instance, Mark Filteau, vice-president of information systems at The BDM Corp. in McLean, Va., reports that user complaints have declined 75% since his organization started to use Index Technology Corp.'s Excelerator analysis and design tool two years ago. "You can play around with a lot of concepts, but what really matters is the number of complaints about the software," he says.

In addition, Filteau says the number of errors in documentation and the number of errors in code at acceptance have been reduced 50%. That's an important reduction, he says, because "if you can avoid errors up front, it's a whole lot better than if you try to fix them at the back end."

According to Filteau, the principal mechanism for avoiding an error is keeping a good consistent design data base and having the ability to feed information from that data base electronically to a desktop publishing system to avoid errors in documentation as well as in code.

Insurance companies have a reputation of being at the forefront of new technologies, such as CASE, and Royal Insurance in Charlotte, N.C., is no exception. According to Karl Kerschner, a research assistant, an opportunity to introduce CASE into Royal arose when the company decided to set up an information management group as a separate organization within the data processing area.

Royal's Kerschner

"The challenge that we faced was a need for an extensive amount of analysis in order to see what we currently had, how we should organize our approach and how we could align ourselves to business goals and objectives," Kerschner says. The Information Engineering Workbench from Knowledgeware, Inc. was installed to facilitate analysis, design and information architecture coordination.

As a result of using the system, Kerschner says, the information management group has been able to standardize corporate reports and unify them in a relational data base. Using the CASE tools saves 30% to 50% in iterative drawings alone.

Another insurance company, First Capitol Life Insurance Co. in La Jolla, Calif., used testing tools to quantify the benefits derived from providing systems analysts and applications programmers with Netron/CAP from Netron of Canada.

According to James Kennedy, vice-president of systems development services, "When we looked at the programming and testing elements in our pilot projects, we were able to complete those parts of the projects four to five times faster, or with one-fourth or one-fifth of the manpower we had traditionally needed." There are also other, less quantifiable but equally convincing benefits for a company with a significant amount of development work to be accomplished and a heavy maintenance load, Kennedy says.

First Capitol's Kennedy

One is that the program both prototypes and generates usable Cobol code. When sitting down in requirements definitions sessions, clients are able to see if the system is what they want in a matter of minutes.

Although Wilmington, Del.-based Hercules Computer Technology, Inc. did not have an actual estimating tool, it was able to document significant benefits from using CGI Systems, Inc.'s Pacbase.

Pat Guidash, director of systems development, was looking for help in the development of systems, with data management his primary interest. He was using IBM's data dictionary, but it did not enforce standard naming conventions he considered important in systems development. Once Pacbase was installed and the standards and procedures on how the company would operate it were in place, Guidash decided all new development would be done with that system. The result, he says, was a productivity increase of about 10% in new development and 25% in maintenance.

Mary Ann Dixon, a systems development manager at Memorial Medical Center in Springfield, Ill., says she can tell how well the CASE tools used there — the Data Structured Systems Development methodology (DSSD) and Design Machine, Brackets and Structures from Optima, Inc. — are working by counting the number of user-requested changes to systems. "Since we've implemented DSSD, we ask the users a lot more questions to get a better understanding of their business and working environment, so that when we modify reports for them, we know that we've covered all of their needs," she says.

CASE benefits can be quantified. What it takes, says Fred Forman, executive vice-president at American Management Systems, Inc., is just deciding what you mean by productivity, establishing a baseline and then setting up a standard and a system for measurement. •

Snyder is a free-lance writer based in Lockport, Ill.

Users start cozying up to systems development

BY PETER SCISCO

When the Constitution Health Network (CHN), a health maintenance organization in North Haven, Conn., began to investigate automating its referral authorization process, it knew it was looking at a minimum development time of one year. But that changed in October 1987, when the company took on a pilot development project using computer-aided software engineering (CASE) technology supplied by American Management Systems, Inc.

The claims authorization process was fully automated in six months, and, as a result, both users and developers of the system are now working more closely together. "We had client intervention from the very beginning," says Albert Mignone, vice-president of planning and development at CHN. At the start of the pilot, Mignone had a supervisor devote about one-third of his time to working directly with systems personnel as the system was developed.

CHN's Mignone

Mignone says the supervisor learned a little about the system's technology, while the systems developers learned about claims processing. Increased exchange between the user community and the software development staff has also been observed at CHN's parent company, Blue Cross & Blue Shield of Connecticut, Inc. in North Haven.

CASE "has been successful in fostering an environment where the walls came down, and people are working in the development area quite well now," says Martin Huyaman, vice-president of information systems.

Meeting development deadlines is one of the benefits departmental end users frequently cite when they talk of their experience with CASE tools. "The CASE technology allows you to get very rapid turnaround," says Margaret Pearce, senior accountant at the East Bay Municipal Utility District (EBMUD) in Oakland. "It seems astounding to me."

EBMUD's materials management information system, created by an independent systems consultant using Corvision from Cortex Corp. came together in 15 months. Before consultant Ross Mitchell brought CASE technology into the picture, it was estimated that the system would take about seven man-years to develop. And that was for a batch system, Mitchell says, not for the on-line system that the utility has now.

Users and developers trace the time-savings generated by CASE to the start of the development process. "It shortens the process and provides a standardization of logic," says Ned Haskins, vice-president of trading systems development at The Chicago Board Options Exchange in Chicago.

User input at the front end saves time by producing a system closer to what the user had in mind at the time of request.

William Johnson, assistant vice-president of systems administration at the exchange, used Design Machine and Brackets from Optima, Inc. to enhance and upgrade the order-routing process that is the trading floor's central nervous system. He says developers must spend a lot of time with users to determine exactly what their business needs are before working toward an automated solution. The key to CASE, he says, is that it can provide a standard language for both parties.

EBMUD's Pearce agrees, explaining that CASE allows a natural interaction between the user and developer. Ideas, questions, problems and observations eventually evolve into a solution — one usually better than that achieved by traditional development methods.

"I have been in the position of explaining in great detail exactly what I wanted to a programmer, who then developed something that was exactly what I said I wanted and, of course, not exactly what I needed," she says.

"[CASE] allows a lot of evolution as you go through the process," the exchange's Haskins says. "You see better ways that things can be done. And you have the ability, up to a certain level, not to cut off that process."

The exchange's Haskins

Pearce says communication between users and developers does increase information access. "We had so much more involvement with all of the people using the system [that] it expanded what we needed to do by quite a lot, because we realized it would be easy to meet a lot of people's needs."

The interaction that CASE fosters increases the scope of systems under development and gives users a sense of ownership by increasing their understanding of the system. "With many of the other systems that I've used, you send a card in and get a report back, with no sense of what goes on in between. Or you try to figure it out, which is sometimes accurate, sometimes not," Pearce adds.

Of course CASE can't make happy collaborators out of all users and all systems developers. Some users are just too removed from the development process to care how systems are built.

"It would be a strange subject to our physicists and other users," says Paul F. Dubois, a computer science team leader at the University of California's Lawrence Livermore National Laboratory in Livermore, Calif. "They know it is physically laborious to make changes," he says, but they are more concerned with their own work than with systems development. •

Scisco is a free-lance writer based in Charlotte, N.C.

ASK THE VENDOR

The following questions were solicited from users and conveyed to the vendors for responses.

In using Chen & Associates' ER-Designer, Normalizer and DDS-Link, we've found that the data model, once completed, is never updated as the physical data bases are modified and, therefore, becomes obsolete. When will Chen & Associates be providing an automated means to update the data models?

Naomi Griffith
The Coca-Cola Co.
Atlanta

CHEN & ASSOCIATES, INC.: We offer a partial solution now with our Autodraw product, which automatically draws entity-relationship diagrams from English keyword statements. What the user needs to do is reflect the changes in physical data base designs in the textual descriptions of entities and relationships and use Autodraw to redraw the diagram. We are currently beta-testing a reverse-engineering product that converts data base schemas into conceptual data models automatically.

When using Cadre Technologies' Teamwork, I noticed that the editor is not consistent from one module to the next, specifically in the use of the Copy and Paste functions. Are there any plans to make it consistent?

Phil Erb
General Electric Co.
Burlington, Vt.

CADRE TECHNOLOGIES, INC.: Cadre is redeveloping its entire Teamwork product line in object-oriented C++. All Teamwork editors have been rewritten in C++, thereby eliminating any inconsistencies. Product shipments will begin later this year or early 1989.

Does Deft plan on providing a proprietary real-time systems methodology?

Bill Hallrich
3M Co.
St. Paul, Minn.

DEFT, INC.: Currently, the only support in Deft for real-time systems methodology is the ability to draw AST's asynchronous system traps in the program structure diagram editor module. In terms of developing a proprietary real-time systems methodology, our strategy has always been to base our product on existing industry standards and then add extensions that address real world problems. •

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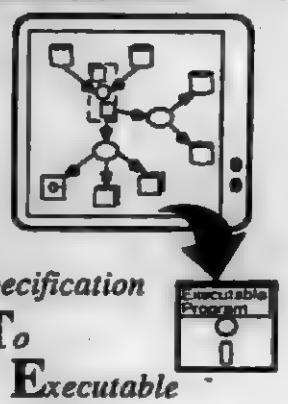

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Time to buy

FROM PAGE S2

old ones. "The sooner you start building up this repository, the sooner you'll benefit from it," she says.

Fast action is a good idea, says Richard Carpenter, president of Index Technology, one of the first CASE vendors. But which action to take depends on your history. "If you haven't used a standard methodology before," he says, "it's best to experiment with CASE in the context of structured analysis."

If you have not previously used structured techniques, plan on six to eight months of piloting before informal dissemination and institutionalization, Carpenter says. "Only a handful of companies are in the institutional stage. Thirty percent to 40% of companies are still just thinking about CASE," he says.

A company should move only when it is fully committed to change, advises Clark Keller, director of industry marketing at Nastec Corp. Becoming shelfware is a particular problem for CASE tools, he notes. "People are buying the promise of a better way. But the transition is often more than they bargained for."

Is it time?

How do you know when you need CASE? "It's a management realization," says Shirley Ann Stern, information systems product marketing specialist at Digital Equipment Corp. "The realization is that application development takes too long and costs too much. You get to the point where you've got to figure out other ways to use people."

According to Stern, "some tools create problems in the work group because the group may have to change, and there's some loss of control. People naturally shy away from less control." She recommends that a company get into CASE "when the highest manager can say, 'I support this' — with money and time to implement the products."

Getting approval does not have to be hard, adds Mike Watters, manager of advanced information management at TI. "You can easily put together a return on investment [for these tools]," he says, "so it becomes just a business decision." •

Prepping

FROM PAGE S5

recognize and adapt to the level of expertise exhibited by the human subject and to collaborate on a level that is pleasing.

• **More flexibility.** There are three fundamentally different philosophies in the architectures of contemporary CASE tools. At one extreme are believers in the pure tool kit approach. Their tools are collections of individually automated methods — expert systems — and they leave it to the CASE consumer to determine the conditions under which any of the capability is to be used and how to integrate the artifacts produced.

At the other extreme are those who think there is only one way to do things. Each tool adheres to a single methodology and rigidly directs the CASE user from one step to the next. The tool is expected to be used in the same manner to address all problems, and artifact integration and consistency is "guaranteed."

The third group is composed of those who believe in tailoring the solution to fit the problem. These tools allow the CASE user to determine which of the tool's capabilities to use and under what conditions. This category will dominate the market within the next three to five years, and AI will be used extensively to tailor the tool's capability without diminishing its rigor, consistency and integrity of results.

• **More creativity.** Two components of CASE suffer from serious gaps in collaborative capability: project planning and system design. Many of the thought processes in both areas appear to be quite similar. In both cases, a high degree of creativity is required to transform ambiguity into specifics. Creativity is one of the more difficult areas being addressed by AI researchers. Today's CASE tools assist in the capture of plans and designs but do little to help conceive them.

It is probable that within the next five to seven years, AI research will make it practical to assimilate extensive creative processing in CASE tools and that a great deal of capability will be aimed at addressing the design gap.

As powerful as today's CASE tools are, there is room for substantial improvement. The era of the fully collaborative CASE machine is probably outside the reach of the next decade.

But many of the prototypes in today's laboratories that mature into commercially viable tools in the next two to three years will bear witness to progress in that direction. •

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Mark Potenzone is National Sales Manager for Westinghouse Management Systems Software. This group within Westinghouse markets IBM mainframe productivity enhancement software and operating systems software.

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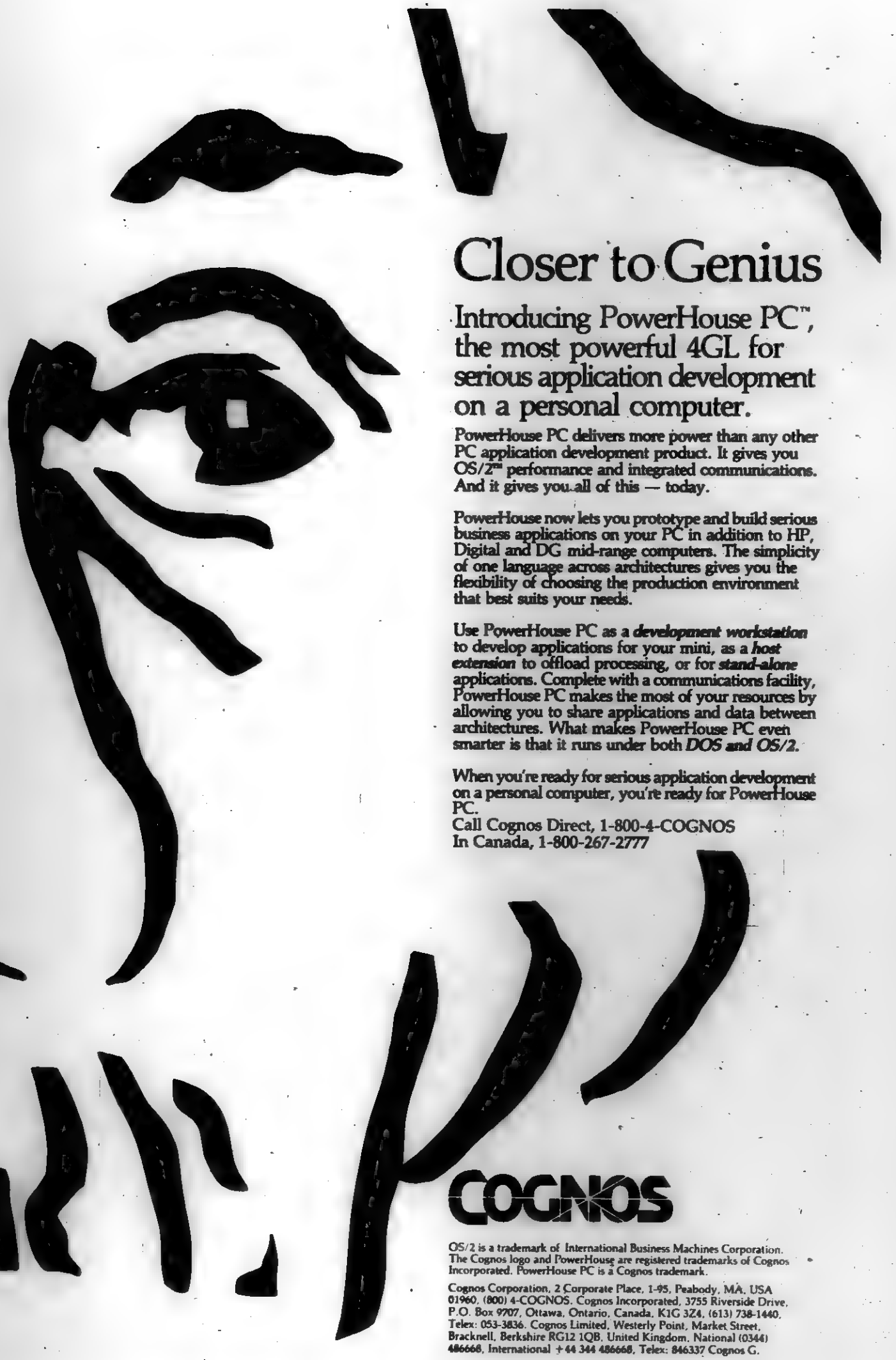

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SYSTEMS & PERIPHERALS

HARD TALK

Nell Margolis

New wrinkle for blue suits

If you assimilate change quickly enough that the image of Reagan in Red Square no longer brings out the old "Say *what?*" try this one: Suits at the DECUS symposium. With pencils in their pockets. Loving every minute of it.

Say *what?*

Whatever it said on your desk calendar or astrological chart, the message for May seemed to be "Detente is a two-way street." And while the president's version might have been the more newsworthy, the first occurred mid-month in Cincinnati, where reporters were invited for the first time ever to attend a day's worth of the week-long semiannual Digital Equipment Computer Users Society (DECUS) symposium — no mean example of techno-*glasnost*, considering that DEC's love for the press has tended to rival Richard Nixon's.

There the reporters saw DEC users mingling with the old and the die-hard techies side-by-side with the new-wave techno-marketeers — and couldn't tell the difference.

The blurring of the lines be-

Continued on page 55

Buyers eager for Microvax 3000

Users report that the DEC series fills an array of company requirements

BY STANLEY GIBSON
CW STAFF

Early users of Digital Equipment Corp.'s Microvax 3000 series of processors, which began shipping in January, report that thus far, the series is meeting their expectations for a powerful office environment system.

William Marshall, vice-president and director of information systems at Baring America Asset Management Co. in Boston, took delivery of a Microvax 3600 in February and is in the process of installing a company-wide data base on the system.

Baring America is a financial services firm with $1.5 billion in assets that specializes in endowment and pension management. The firm also runs a Hewlett-Packard Co. 9000 system.

Marshall said he was looking to add a system last fall, when he saw the Microvax 3000 series debut at Decworld in Boston. He said he was interested in hardware that would run Sybase, Inc.'s Sybase data base package. However, there was no version that ran on HP systems, and although the Microvax II could run Sybase, it was not powerful enough to handle the demands Marshall envisioned.

Marshall also required an office environment system that would not require a computer room.

All in all, the Microvax 3000 series filled a number of Baring America's requirements. The company's goal is to connect 30 Microsoft Corp. MS-DOS-based personal computers to the Microvax 3600 using DEC's VAX/VMS Services for MS-DOS to tie the microcomputers to the host.

Most users will run Lotus Development Corp.'s 1-2-3 package, which will be stored on the host. In addition to Sybase, Marshall said he will use a package

Continued on page 54

Data View

Pressing on

Sales of non-desktop electronic publishing equipment expected to peak by 1990, while desktop systems will continue steady increase

INFORMATION PROVIDED BY INTERCONSULT, INC.
CW CHART

EMC propels Falcon XP

BY STANLEY GIBSON
CW STAFF

HOPKINTON, Mass. — In an effort to boost performance of its Hewlett-Packard Co. 3000-compatible disk drives, EMC Corp. recently announced an addition to its Falcon series of disk subsystems that includes write-once cache.

The 625M-byte Falcon XP has 64K bytes of write-once cache memory in addition to the 4M bytes of read cache available on previous Falcon models.

The write-once cache allows the Falcon to store any size read

Continued on page 55

U.S. grants spur gains in imaging

BY J. A. SAVAGE
CW STAFF

The old professorial adage "publish or perish" may become "visualise or perish" if government funding sustains the current growth of visualization in scientific computing.

And though imaging began in the academic arena in the early 1960s, long before industry adopted it, its largest market lies in industrial and pharmaceutical research and design.

In the last few years, however, ivory-tower scientists have been commanding a growing share of the market because funding for imaging hardware has become increasingly available through the National Institutes of Health (NIH).

Funding increase definite

No hard figures are available that break out the increase in computer funding from NIH's total of $4.4 billion in academic

Continued on page 55

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HARDWARE NOTES

Exide wins Air Force bid

Exide Electronics Corp. in Raleigh, N.C., recently won what it claimed is the largest contract ever awarded for computer power protection and support, worth $621.8 million. The company said the deal calls for Exide to supply its uninterruptible power supply (UPS) systems to the U.S. Air Force Logistics Center.

The UPS systems will be used with computers in command, control, communications and intelligence, air traffic control and satellite and long-haul communications networks. Most of the systems will be installed in the U.S., with some being deployed overseas, according to Exide.

The UPS systems will cover a wide range of capacity. Included in the contract are installation, spare parts and service, the vendor said.

Arix Corp. in San Jose, Calif., recently reached an OEM agreement with **Orion Associates Ltd.** in Monte Carlo, Monaco.

Under the terms of the deal, which is valued at $30 million during the next three years, the Arix 800 line of multiprocessor, Unix-based systems will be remarketed under the Orion Formula label.

Orion has a network of 22 distributors in 25 countries and an installed base of more than 11,000 Unix systems in Europe and Southeast Asia, according to Arix.

Mike Lambert, Arix's vice-president of marketing and sales, said Orion's library of software applications is being ported to Arix hardware.

Also on the OEM front, **Sun Microsystems, Inc.** and **Digital Matrix Services, Inc.** recently announced an agreement said to be worth approximately $3 million.

Under terms of the agreement, Digital Matrix Services will sell Infocad, a civil engineering computer-aided design package for use on the Sun 386I, Sun-3 and Sun-4 workstations.

Sun has also signed an OEM agreement with **Integrated Computer Graphics, Inc.**, which is said to be worth more than $10 million during the next 18 months.

Integrated Computer Graphics, which supplies technology and services for the home building industry, said it will use the Sun workstations as servers for its Computer Integrated Building solutions.

Charles River Data Systems, Inc. in Framingham, Mass., recently announced it has reached a distribution and investment agreement with **Kawasaki Steel Corp.** in Japan.

Charles River Data Systems will supply Kawasaki Steel with its Universe family of Motorola, Inc. VMEbus-based 32-bit super microcomputers and UNOS, the company's real-time operating system based on AT&T's Unix.

Kawasaki Steel will sell Charles River's systems exclusively in Japan. Shipments to Kawasaki were slated to begin last month. Charles River Data Systems' Universe family of systems was designed for laboratory and industrial control applications.

Kawasaki Steel, with annual revenue of more than $6 billion, has been diversifying in the computer industry since 1983.

Alpharel, Inc. in Camarillo, Calif., has agreed to buy $10 million in optical disk products during the next two years from **Eastman Kodak Co.'s Mass Memory Division.**

The agreement covers Kodak Optical Disk System 6800 products, including disk drives, media, controllers and automated disk libraries.

Alpharel plans to integrate Kodak's write-once read-many drives into its Digital Documentation, Transmission and Management System, an optical imaging system that Alpharel tailors to each customer.

Each Kodak 14-in. optical disk stores 6.8G bytes of data. Kodak also offers an automated disk jukebox containing 150 disks, which can be retrieved in 4.5 sec., Kodak said.

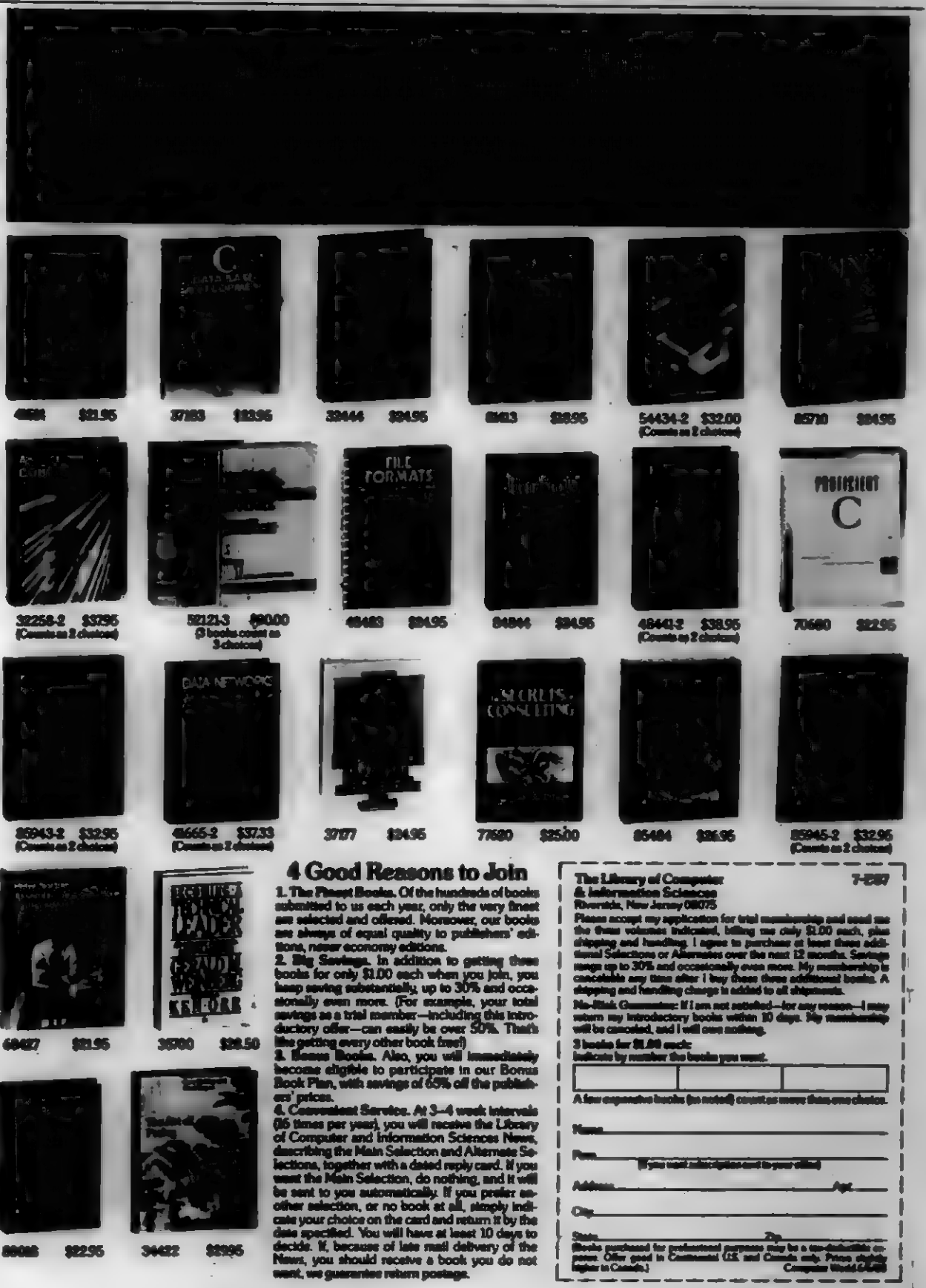
Digital Programming Services, Inc. (DPS) in Waltham, Mass., recently announced it will resell Honeywell Bull, Inc.'s XPS-100, DPS 6 Plus and personal computer product lines, porting its applications from Wang Laboratories, Inc. systems.

DPS sells point-of-sale, order entry, inventory control, accounting and sales analysis applications. DPS applications originally written for the Wang 2200 system will be migrated to the Honeywell Bull XPS-100.

DPS's other applications, which run on the Wang VS product line, will be ported to the DPS 6 Plus.

Digital Equipment Corp., Fisher Controls International, Inc. and **Monsanto Chemical Co.** will join forces in a computer-integrated manufacturing project at Monsanto's Pensacola, Fla., plant.

The firms will identify and evaluate how energy is generated and used in the manufacturing process. The ultimate goal is to integrate energy generation and manufacturing, DEC said.



East Coast start-up touts low-cost parallel system

NEW BEDFORD, Mass. — International Parallel Machines, Inc. recently unveiled a low-cost parallel processing system that is priced at $1,500 per million floating-point operations per second (MFLOPS).

The start-up company based here introduced the IP-1 computer at the Second World Supercomputer Exhibition in Boston.

Running the AT&T Unix System V operating system, the parallel machine is sold with Fortran and C compilers to optimize existing programs to run in parallel. Each processor in the system performs vectorization as well, the vendor claimed.

Running the 64-bit Linpack benchmark, a single-processor system can perform 8 MFLOPS and a nine-processor version can perform 55 MFLOPS, according to the vendor, with a price per MFLOPS of $4,000.

The system was designed for seismic analysis, aerospace simulation, computational fluid dynamics, chemical modeling, structural analysis and data bases too large to be handled by mainframes.

"All processors can access a shared memory simultaneously without arbitration," said International Parallel President Robin Chang, claiming the company's parallel system is the first with such a capability.

A single-processor IP-1 with 8M bytes of memory, a 170M-byte disk drive, an operating system and a C compiler is priced at $49,000.

A nine-processor system with 72M bytes of memory, a 170M-byte disk drive, an operating system and a C compiler is priced at $220,000.

The processor is currently being run at beta-test sites and is available for customer shipments, Chang said.

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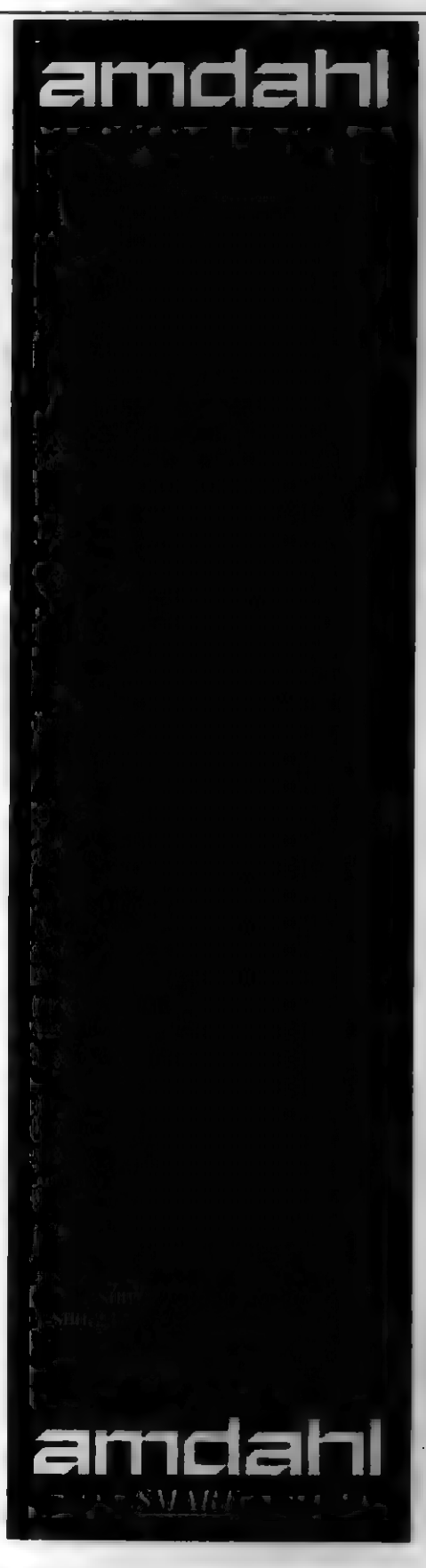

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Microvax

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called Multiplex from Cupertino, Calif.-based Network Innovations Corp., a firm acquired by Apple Computer, Inc. in March. Running on the PCs, Multiplex will serve as an interface to Sybase for PC users and offers them access to Sybase data using 1-2-3-type interfaces.

"With Multiplex and Sybase, it was a normal fit for our users," Marshall said. Having seen a similar configuration at another Boston financial services firm, he said he was convinced the system would work.

The Microvax 3600, running VMS Version 4.7, is configured with one RA 81 and one RA 82 disk drive and stores approximately 1G byte of data, according to Marshall.

Marshall said he plans to connect both the HP 9000 and Microvax 3600 on an Ethernet network.

Baring America ordered its 3600 in November and received it in February, a lead time consistent with DEC's current backlog of 60 days on Microvax 3600 systems. Duncan Anderson, DEC's Microvax systems marketing manager, said in addition to the 3600 backlog, his firm has a backlog of 90 to 120 days for the 3500 and 90 days for the 3200.

Lower license fee

Marty Lindner, senior systems programmer at the University of Pittsburgh, is using a Microvax 3600 as a network management server on a very large Ethernet. The processor contains the data base for the university's Decnet and Transmission Control Protocol/Internet Protocol configurations. In that installation, the Microvax 3600 replaced an 8000 series VAX, Lindner said. He noted that one benefit of the more compact processor is a lower license fee for software.

DEC's Anderson reported that a very large order for Microvax 3000 systems was placed recently by a systems integrator for the U.S. Department of Defense. The contract, which will computerize some 750 hospitals, will include approximately 1,000 Microvax 3000 processors, he said.

Anderson also said that Chicago Title & Trust Co. is in the process of installing 150 Microvax 3000s.

By the end of June, DEC will have shipped more than 5,000 Microvax IIIs, according to Anderson. He predicted that Microvax 3000 sales will grow faster than sales of Microvax II during the first years of that product's life. He also predicted that by 1990, the total installed base of all Microvaxes, including Vaxstations, will amount to more than 200,000.

At a recent DEC product rollout, DEC President and Chief Executive Officer Ken Olsen said his company is faced with a very stiff demand for systems using the CMOS Microvax III microprocessors — a demand that is straining the vendor's ability to produce the chips in sufficient quantity.

DEC recently announced its 6200 series of symmetrical multiprocessing systems and real-time versions of those systems, all of which use the Microvax III chip.

The Microvax 3000 systems are assembled in DEC's Westfield, Mass., manufacturing plant, and the CMOS microprocessors are made in DEC's Hudson, Mass., semiconductor facility.

U.S. grants

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grants. "But there's no question that it's increased," said Joe Brackett, chief of NIH's report section.

Brackett estimated that half of the grant money goes to medical research, the largest academic consumer of graphics computers.

NSF support

Support for graphics computing is also coming from the National Science Foundation (NSF), which last year commissioned a joint academic/vendor report on visualization in scientific computing.

The NSF report describes technical and academic barriers blocking greater use of graphics computers and calls for further government funding — 1% of what industry is spending on visualization, or about $2.5 billion in the early 1990s.

"Every scientist and engineer should have a personal workstation, just as people who must drive for a living need access to cars," the report said.

Thus far, the NSF has spent $130 million for five academic supercomputer centers and has budgeted another $108 million for the next two years.

That amount, according to NSF Comptroller Sandra Toye, is matched with state and industry funding, totaling approximately $500 million for supercomputer centers by the end of 1990.

But after the centers were established, they were not given the funding to develop the necessary software, according to Maxine Brown, associate director of electronic visualization at the University of Illinois at Chicago.

The NSF report, which Brown edited, is aimed at increasing the awareness of the role visualization plays in scientific computing and, thus, is expected to step up funding for its development.

"People started asking for funds [for development], and the NSF said, 'We already gave you money,'" said James Clark, chairman of Silicon Graphics, Inc., who was on the NSF panel.

There is no information yet on whether the report, packaged with its own videotape, has loosened government purse strings.

However, graphics computer vendors said they see the academic market getting stronger. Academic computing will double its 12% share of Mountain View, Calif.-based Silicon Graphics' business in the next couple of years, according to Clark.

Driving the academic market will be the decreasing cost of graphics computers.

"It's difficult to justify [to funding agencies] spending $200,000 for a research computer for a couple of grad students vs. setting up a lab with 20 or 30 workstations and software for the same money," Clark said. Silicon Graphics has said it plans to introduce a $15,000 graphics workstation by the end of this year.

> "EVERY scientist and engineer should have a personal workstation, just as people who must drive for a living need access to cars."
>
> NATIONAL SCIENCE FOUNDATION REPORT

Market still there

But that does not necessarily mean that the market for high-end graphics supercomputers is on a downswing.

A spokesman for Sunnyvale, Calif.-based Ardent Computer Corp., whose Titan supercomputer starts at about $100,000, said he expects the academic market to account for approximately one-third of Ardent's sales this year — the first year of its availability.

While more scientists are using supercomputers and graphics workstations, academic traditions have not adapted to the graphics computer age.

"People in academia get rewarded based on the number of papers published in technical journals," Brown said, suggesting that giving professors credit for submitting videotapes of visualization experiments might be justified as well.

Margolis

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tween what used to be two irreconcilable computer industry cultures with bastions based in Armonk, N.Y., and Maynard, Mass., has, of course, been noted. However, the drift has always seemed to be in one direction: DEC goes after the commercial market, VAXs infiltrate Wall Street, VAXs make their mark in banking. It isn't just for techies anymore.

Last month's DECUS event, on the other hand, showcased the two-way nature of the equation behind the new DEC and the evolving technology market. Sure, we've seen DEC guys wearing suits and ties and even spouting a fairly respectable marketing line. But here was the reverse: Users not only from the commercial sector but, in some cases, relatively new to computing — the Suits and the Short Pants — wonking it up at an event that is to nerds what Disneyland is to kids.

And, I repeat, eating it up.

"I need to expand my knowledge, and this is a wonderful opportunity," gushed a young, recently appointed technical support professional. The selection — more than 1,000 hours of seminars and technical sessions crammed into six days — and the very length of the colloquium were enticing to him.

"If I leave my office for one day to go to a technical seminar, I get limited information and I can't always take it in fully because of all the work I have to make up as soon as I get back," he said. "But with DECUS, I get a much broader information exchange. And I'm out of the office for five days, so I get to delegate my work load, which gives me some time to digest it all."

Casing the joint

An IBM employee traveling incognito in shirt-sleeves, complete with pencils in pocket and Styrofoam coffee cup in hand, confessed that his DECUS membership gave him an incomparable opportunity to case DEC directions for his own company. "More and more, our customers expect us to be making a lot of technological progress — and now, not tomorrow. One of the best places to learn how to do that is here," he said.

Statistics, DECUS public relations folks and attendees all tell the same tale: DECUS is evolving with DEC, and what was once a pure technological preserve is taking on a distinctly commercial flavor.

But just as Moscow is now getting a chance to be as charmed by the Reagans as Washington was by the Gorbachevs, the exchange in the technology industry is turning out to be just that — not only the commercialization of DEC but the technification of the commercial.

Whether or not the IBMers and their ilk come to the DECUS symposium to laugh, a goodly number are surely remaining to pray.

Margolis is a Computerworld senior writer.

EMC

FROM PAGE 51

or write to the disk drive. The feature can improve performance by 7% to 20% over the previous model, according to the vendor.

Hewlett-Packard's Eagle drives contain 4K bytes of write cache and 2M bytes of read cache, according to an HP spokesman. EMC's other Falcon systems do not contain write cache, an EMC spokesman said.

In addition to this new feature, the Falcon XP contains the same capabilities of the previous model, including EMC's proprietary caching algorithm, which gives users the ability to adjust cache sizes to fit their applications.

The Falcon XP's controller is manufactured by EMC, and the disk itself is made by NEC Corp.

Currently shipping in volume, the Falcon XP is priced at $17,450.

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NEW PRODUCTS

Terminals

Aydin Controls has expanded its line of Patriot monitors with the addition of the **VGA/20.**

The 20-in. monitor is compatible with all modes of the IBM Video Graphics Array (VGA) graphics standard, including the 8514/A, and provides resolution of up to 1,024 by 768 pixels with 256 colors. The product offers automatic picture sizing, which provides full-screen displays in all VGA modes without manual adjustment. The VGA/20 is available in a plastic cabinet for business settings and a metal chassis for the engineering and factory floor environments.

The VGA/20 costs $2,545.

Aydin Controls, 414 Commerce Drive, Fort Washington, Pa. 19034. 800-366-8889.

Power supplies

Clary Corp. has enhanced its personal computer uninterruptible power supply (UPS) series for microcomputers and local-area networks with the addition of an RS-232 signal-level interface for the **Onguard PC-1240 and PC-2400.**

The Onguard PC-1240 supports two IBM Personal Computer ATs or compatibles and reportedly provides 360VA UPS power and 480VA filtered power for peripherals. The unit costs $890.

The Onguard PC-2400 supports two LAN file servers with a reported 12 to 24 minutes of backup power, depending on configuration. The unit delivers 750VA UPS and 480VA power to peripherals and costs $1,490.

Clary, 320 W. Clary Ave., San Gabriel, Calif. 91776. 818-287-6111.

A surge suppressor that protects microcomputers, high-fidelity audio systems and other sensitive electronic systems from voltage spikes and surges on an AC power line is available from **Volta Diagnostic Systems, Inc.**

The product features a three-stage suppression circuit that incorporates silicon-transient voltage suppressors, metal-oxide varistors and gas-discharge tubes. All three of those circuits clamp both common- and transverse-mode voltage spikes. A noise filter for the AC power line is also included.

The surge suppressor costs $299.95 and comes with a one-year warranty.

Volta Diagnostic Systems, 421 Woodland Place, Leonia, N.J. 07605. 201-944-3540.

Components

Symbolics, Inc. and **Event Technologies, Inc.** have jointly announced a high-speed interconnect between the Symbolics 3600 series and the industry-standard VMEbus.

Called LVI, the connection product reportedly transfers data between a Symbolics system and VMEbus-based hardware at burst rates approaching 40M byte/sec.

In addition, 128K bytes of dual-ported memory for sharing control and status information between the Symbolics system and VMEbus-based computers are included.

The product consists of a module that plugs in to the Symbolics backplane and a double-height VMEbus board, both of which are connected by way of shielded cable.

LVI costs $9,995.

Event Technologies, 200 5th Ave., Waltham, Mass. 02154. 617-890-2440.

Robotics

Hudson Robotics, Inc. recently announced an adhesive dispensing robot system that was manufactured by CRS Plus in Canada.

The core of the system is the **Model SRS-M1A** robot, which can be combined with one of three different kits to dispense low-viscosity, high-viscosity or two-part adhesives.

The Model SRS-M1A robot was also designed for conformal coating, solder masking and a variety of sealant applications.

The product can be programmed using RAPL operating software.

The SRS-M1A is priced at less than $24,000.

Hudson Robotics, 120 Morris Ave., Springfield, N.J. 07081. 201-376-7400.

Maintenance equipment

The Data Precision Division of Analogic Corp. has announced its **Model 660-1 Plug-In,** a testing device for use with the vendor's Data 6100 mainframe computer.

The unit was designed for a variety of applications, including transient capture, nuclear magnetic resonance and ultrasonic testing.

In a one-channel ping-pong configuration, the product reportedly samples rates up to 250 megasamples per second at a bandwidth of 125 MHz and an acquisition length of 128K data points.

Inputs to the unit can be handled as two single-ended inputs or as a true differential pair.

The Model 660-1 Plug-In costs $7,995.

Analogic, 8 Centennial Drive, Peabody, Mass. 01961. 617-246-0300.

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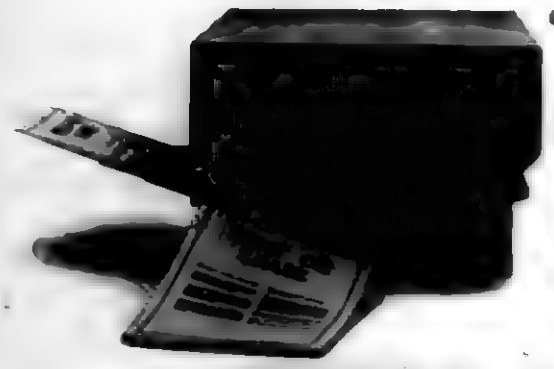

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ISDN: What's here now

Action you can take — today — toward integrated network services

BY MICHAEL FINNERAN

Integrated Services Digital Network (ISDN) is the biggest idea the telephone business has hatched for the last 100 years. But with ISDN industry standards still not set and customer skepticism running high, the major ISDN carriers hesitate to throw their full weight behind ISDN.

The one point on which there seems to be no balking is that the development of ISDN will be a participative effort. There are five major groups that will have a hand in the development of ISDN — equipment suppliers, common carriers, end users, computer systems manufacturers and regulators.

None of these parties can make ISDN happen without at least some participation from the others. Instead, what ISDN will mean in the long term will evolve from the interaction of these market players.

Equipment suppliers

The force driving ISDN is the central office equipment suppliers, primarily AT&T Network Systems, Northern Telecom, Inc. and, increasingly, Siemens AG. These suppliers' participation is critical because they make the components carriers will use to build ISDNs. They have invested most heavily in developing ISDN capabilities for their systems, realizing that its acceptance will have a major impact on their future revenue.

To that end, the central office equipment suppliers are underwriting much of the cost of the ISDN trials. While the results of current trials have been encouraging thus far, only the ISDN subscriber interface is being tried — and it is not being tested with the American National Standards Institute (ANSI) specification that will eventually be used with the real ISDN.

Furthermore, products such as Datapath from Northern Telecom already provide data terminal connection through a digital switching matrix without using ISDN. This capability has existed in the private branch exchange (PBX) area for several years.

The more interesting trials are slated to occur this summer, when the network signaling and intervendor tests between AT&T and Northern Telecom are conducted. Also, we hope to know by then whether ISDN services will cost more to provide than the present mix of network services.

The other equipment suppliers, those involved in customer premise equipment (CPE), are also announcing ISDN station equipment or PBX interfaces that implement the ISDN-defined subscriber interfaces. However, the cost of the station equipment remains higher than the price range for mass market penetration.

ISDN station equipment typically costs between $600 to $1,000 per set (that is, the TE 1 and NT 1 hardware components necessary to support a Basic Rate Interface).

For now, that price matches the per-line cost for a PBX system. But the ISDN price is predicted to decline dramatically with competition and volume manufacture. Within two years, a rudimentary ISDN station set will probably cost less than $150 — including the NT 1. This price level already exists in the smaller, noncompetitive market for PBX digital station sets.

A number of vendors have announced intentions to manufacture ISDN subscriber interface components, including AT&T, Northern Telecom, Fujitsu America, Inc., Hayes Microcomputer Products, Inc. and NCR Comten. Once equipment becomes available, the question then becomes one of cost and utility. One factor that does seem to be hindering the market for ISDN CPE is the lack of a universally endorsed standard for the ISDN subscriber interface. ANSI is due to publish the first version of the basic-service features for an ISDN subscriber line this year, after which more vendors may plunge into the market.

Common carriers

The common-carrier community still sends out mixed signals on ISDN. Certainly their advertising indicates a true commitment, but the telephone company personnel, who will be building the ISDN, seem decidedly unconvinced. The trouble is that the telephone companies have

BLAIR THORNLEY

Finneran is president of Dhm Associates, Inc., a data base consultancy in Woodmere, N.Y.

- **Consumer skepticism runs high**
- **ISDN as a participative effort**
- **How much will it end up costing you?**

become essentially one-product companies: They sell dial tone. ISDN will require new thinking.

Fortunately, ISDN may be a low risk for telephone companies. The major technologies proposed for ISDN — digital transmission, digital switching and common channel signaling — have already proven their value in the public network during the last 25 years (see story page 61).

ISDN essentially defines standards for how these technologies can be implemented and extends their scope from the carriers network down to the subscriber level.

If the technology bet is right, then the investment in ISDN might be justified simply by reducing the cost of providing basic dial tone service. Results from Bell Communications Research Corp.'s research project "ISDN Economic Evaluation" indicate that ISDN development costs in central office equipment might be more than offset by savings in other areas, particularly in loop technology and service provisioning. ("ISDN Strategies" July 1987.)

If the investment is justified simply on operations cost savings in the network, then we are getting all the potential benefits of ISDN for free.

Taking all into account

Unfortunately, the current ISDN trials are unable to substantiate any of these claims. Not being aired are such all-important cost factors as the percentage of existing subscriber loops that will support the transmission interface described for Basic Rate access; the amount of craft time required for provisioning an ISDN line vs. a "plain old telephone service" line; and central office processor capacity requirements for servicing ISDN subscribers.

If some of the information from the current trials makes its way into the public domain, it could go a long way toward silencing the ISDN nay-sayers.

It remains to be seen whether the management of telephone companies will be able to lead that same work force that has been able to provide reliable, affordable dial tone service into an entirely new type of service business and whether we can develop a regulatory structure that will allow it to happen.

Getting carriers committed is key in ISDN development, but the carriers are, in turn, looking for commitments from their large business customers. The first real market for ISDN services appears to be among medium-size to large business Centrex users.

Some of those customers have made commitments to ISDN — 3M Co. and Tenneco, Inc. are among the most recent and most notable — but by and large these firms are already pledged to Centrex service. Their stamp of approval is simply an acknowledgement that ISDN represents a new set of services that will be available on Centrex.

The local telephone companies, which

Continued on page 61

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What is ISDN?

ISDN is an internationally endorsed plan to migrate the public telephone network to the standard use of digital technology. The Consultative Committee on International Telephone and Telegraph, whose job it is to devise standards for its implementation, defines ISDN as:

"... a network in general, evolving from the telephone Integrated Digital Network (IDN) that provides end-to-end digital connectivity to support a wide range of services, including voice and nonvoice services, to which users have access by a limited set of standard multipurpose customer interfaces."

The goal of ISDN is to provide a more functional network to transport all types of digital information, regardless of its source. ISDN incorporates many of the standards and technologies pioneered for IDN, such as pulse code modulation and standard bit rates. This means that with enhancements made possible by the use of computer-controlled switching systems, ISDN can provide the same basic service we have today, such as switched voice and private line.

More important, ISDN allows for other types of service not currently available, such as higher transmission rates and part-time private line service.

The key to ISDN's flexibility lies in its multipurpose subscriber interface. The interfaces will be digital, and each will carry a number of "bearer" or B channels that operate at 64K bit/sec. and carry user traffic as well as a D channel that carries signaling messages.

Currently, two subscriber interfaces have been defined for North American ISDNs. They are Basic Rate Interface (two B channels and one 16K bit/sec. D channel) and Primary Rate Interface (either 23 B channels and one 64K bit/sec. D channel or 24 B channels).

MICHAEL FINNERAN

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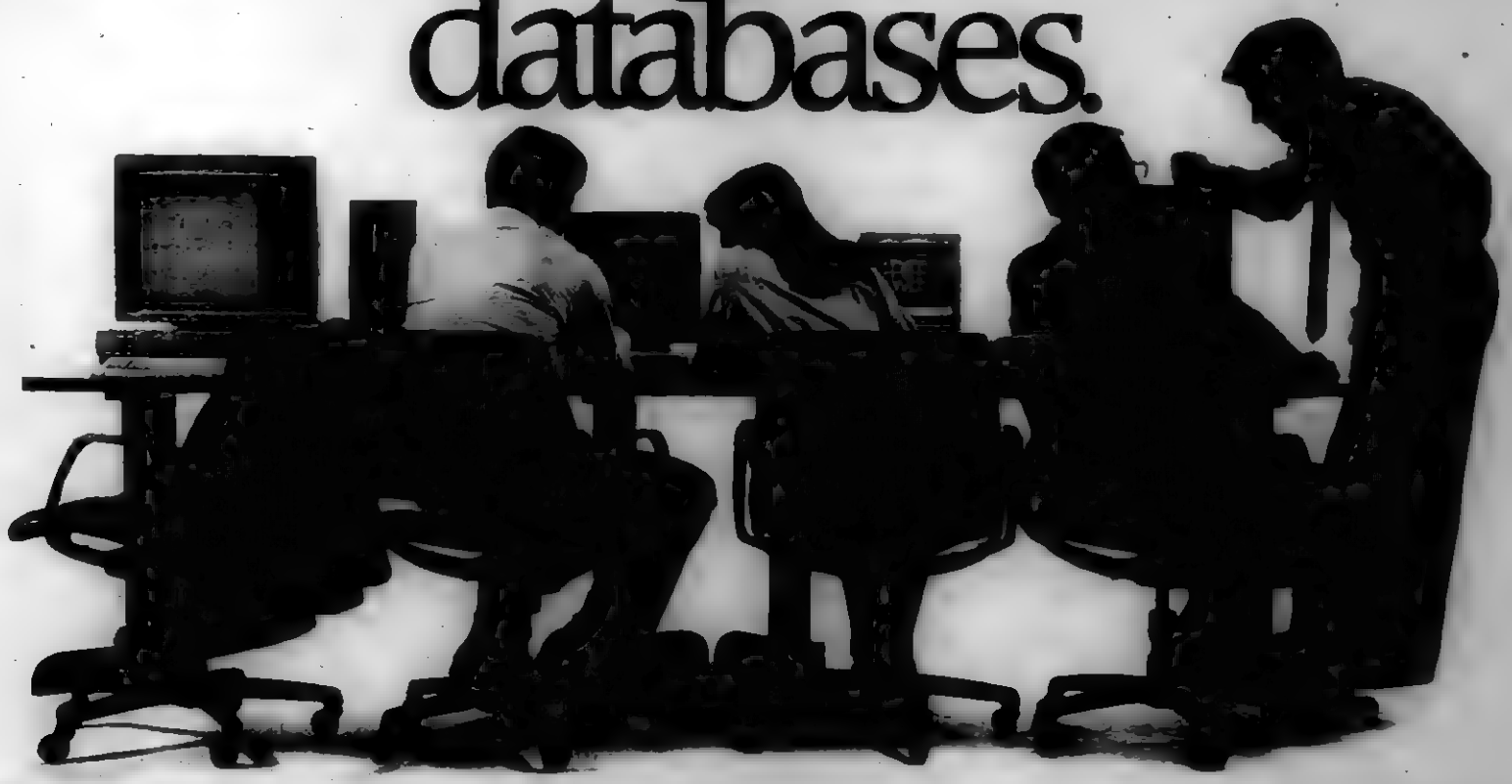

Stratus and SYBASE,* two masters of on-line transaction processing, worked hand-in-hand to develop SQL/2000 for the Stratus XA™2000 architecture. Result: The first distributed RDBMS that surmounts the demands of OLTP and meshes with workstations of your choice.

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3. PRESERVE YOUR STRATUS INVESTMENT. You might have expected SQL/2000 to offer full data integrity. Distributed processing. Easy, modular growth. But maybe you didn't expect that your current Stratus files are easily integrated into SQL/2000 without any conversions. That's because SQL/2000 and VOS share the same query language and interface, making SQL/2000 the most productive environment for programmers.

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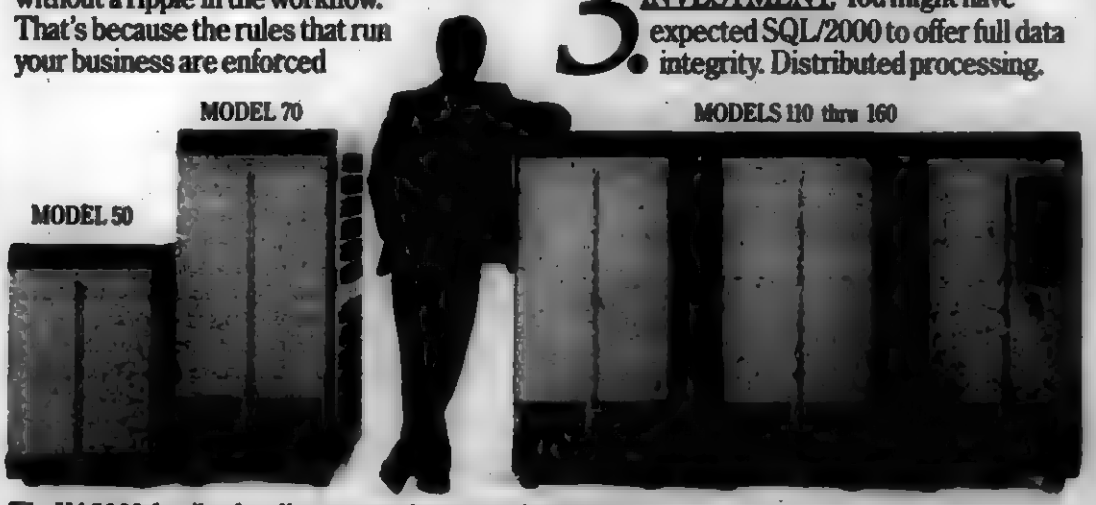

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ISDN: Lore and legend abound

Misconceptions about Integrated Services Digital Network (ISDN) abound, particularly because people try to gauge the potential impact of ISDN based on its individual components or features. Looking at its benefits in a piecemeal fashion belies its overall importance and results in misconceptions about its true capabilities.

Myth 1: "ISDN is a voice technology. It's not going to have any effect on data networks; we use private lines."

The ISDN trials primarily focus on voice, but data services can definitely be provided. ISDN can transmit any type of information, including digitized voice, digital data, facsimile, telemetry or low bit-rate digital video and private line service.

Replacing a private line-based network with cheaper and more flexible ISDN-based switched services could potentially represent a major cost savings. The catch is that the computer systems manufacturer must develop the capabilities to use ISDN as a functional communication alternative.

Myth 2: "The 64K bit/sec. data rate provided on ISDN is too slow; we transmit information on local-area networks at well over 1M bit/sec."

The ISDN standards define rate adaption algorithms to support data rates from 50 to 64K bit/sec. on a B channel, but the standards also define H0 and H11 rate connections operating at 384K bit/sec., for example, six B channels. The standards also support a 1.536M bit/sec. — for example, 24 B channels — rate for North American ISDNs. Beyond those rates, standards committees are starting work on a broadband ISDN where the basic data rate will be approximately 50M bit/sec.

In addition, ISDN is an interpremise as well as an intrapremise solution. We will typically use a lower speed and a modified protocol when we connect LANs together over external facilities.

ISDN services and LANs will likely coexist, since ISDN can certainly support the same type of connections offered by LANs as well as provide other options for interLAN connectivity.

Myth 3: "If ISDN planners were serious about data communications, they would have built ISDN around packet switching, not circuit switching."

ISDN recommendations provide for both circuit- and packet-switched services. The network provider — not the ISDN planners — decides whether or not to provide packet switching. Also, standards activity seems to indicate that the broadband ISDN might be based primarily on a form of packet technology.

Myth 4: "It's not worth worrying about ISDN now because committees have not even finished the standards."

True, the ISDN standards remain unfinished. But we know the structure and the variety of ways that call-processing tasks can be accomplished using ISDN recommendations. What remains is to define which of those functions will be provided initially and the exact sequence of signaling messages that will be used to access them. The American National Standards Institute's standard for ISDN basic subscriber services is due in the middle of this year, and the standard for supplementary services — such as call waiting and call forwarding — is expected by the end of the year.

Myth 5: "ISDN service will be significantly more expensive than current network service."

In the short term, yes; in the long term, maybe. While prices for an ISDN telephone are currently around $1,000, including the NT 1, the cost should drop to the $100 to $150 range of basic private branch exchange (PBX) digital sets, like IBM/Rolm Corp.'s "Rolmphone 120," within the next two to three years.

At the moment, telephone companies are pricing ISDN Basic Rate subscriber lines at about 1½ to two times the price of a standard analog business line. However, using ISDN digital technology in the network can significantly reduce engineering and operations costs.

Myth 6: "We can already do everything ISDN promises on a digital PBX."

Some ISDN features are "old hat" in the PBX business: digital telephone sets with single-button access to features and out-of-band signaling; simultaneous voice and data service on shared wire pair facilities; and the use of a single switching network for both voice and digital data calls. However, there are some major differences in the implementation of these same capabilities in an ISDN.

First, those PBX functions can only be provided in locations served by a PBX — typically locations with more than 100 telephones to serve. ISDN will be a public network service available to everyone.

Second, the PBX features are provided using a proprietary vendor interface. ISDN interfaces are standardized so the user can buy station devices such as telephone sets, data terminal interfaces and personal computer communication boards from a mix of suppliers.

It remains to be seen how ISDN will be used in conjunction with PBXs, T1 multiplexers, diagnostic systems and other current network devices. What is certain, however, is that the ISDN structure provides a portable manufacturing standard.

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ISDN

CONTINUED FROM PAGE 58

provide the Centrex service, are hoping that an ISDN-Centrex venture will provide additional functionality and reverse the trend toward premise-based PBX systems that has been eroding the Centrex base since the mid-1970s.

According to a survey conducted by The Market Information Center, Inc. in Marlboro, Mass., the percentage of business locations served by Centrex systems, as opposed to PBX, has stayed in the 20% range for the last four years.

The business customer is clearly taking a wait-and-see attitude — weighing ISDN in terms of cost and how its capabilities stack up against those of the competition's.

ISDN's simultaneous voice/data communications can be provided by a digital PBX system, which also offers many of the same loop-efficiency techniques described for ISDN.

Data networking capabilities can be built into existing data processing systems, front-end processors or packet switches.

Large business users are already building integrated voice/data transmission networks using DS-1 and DS-3 rate transmission services provided by a carrier and customer premise-based multiplexing equipment.

To attract customers to ISDN, service providers have two options. They can outdo current offerings by providing higher transmission rates and extending a common channel signaling system to the subscriber over the D channel. Or they can provide PBX capabilities at a lower price.

Theodore Irmer, director general of the Consultative Committee on International Telephone and Telegraph, cautioned carriers not to overprice ISDN services at an IBM forum on ISDN development held in November 1987 in Research Triangle Park, N.C.

Selecting ISDN-based services over other alternatives is essentially a business decision. If business customers do not see a price or function advantage to be gained from ISDN, they will not buy it.

Clouding any potential purchasing decisions is the end-user trade press, which has gone out of its way to raise questions as to whether ISDN is a flawed technology.

The general tactic is to pick out one ISDN feature, such as 64K bit/sec. circuit-switched service, and argue against that alone (see story page 60).

The general effect is that of doubt, and doubt is a reason to defer any real commitment. This is particularly maddening because these petty technical spats miss the point entirely. The important thing about ISDN is that it provides a structure in which to implement new technologies in the network.

Systems manufacturers

Support for ISDN among computer systems manufacturers up to this point can be summarized as lip service. Vendor participation is critical, because the communication software they develop and support will define the communication options available.

The decision to support ISDN, and the functionality that is provided through it by the DECs and IBMs of the world, will determine how useful ISDN will be in serving our data networking requirements.

There are some obvious advantages to ISDN, particularly when compared with current service offerings in the public network. Examples include support for switched connections at higher data rates, better error performance through end-to-end digital service and the provision of new services such as a part-time private line.

All of the announcements from computer vendors say they are "fully committed to the concept of ISDN," which is the same as saying they are fully committed to the concept of gravity.

I'm glad we don't have to worry about their equipment floating away, but I would like some more assurances when it comes to their support of ISDN.

Such endorsements do not appear to be forthcoming. To date, the only DP commitment I'm seeing is to use ISDN as a replacement for modems.

Whether or not we use ISDN to provide cheaper or more flexible data communication services will be determined by the degree to which computer manufacturers internalize the ISDN interfaces into their products and make the network service a part of their basic communication structure.

Based on the Open Systems Interconnect Reference Model, ISDN defines a fairly low level of compatibility. A B channel connection on ISDN is effectively a Layer 1 (physical layer) interface while D channel connections define Layers 1 through 3 (physical, data link and network). Once the physical link is in place, the data terminals must also establish a session and parameters for higher layer protocols.

In current data communication systems, the session establishment procedure occurs over the physical interface once the physical link is in place (the data

Costing you less in three areas

ISDN's initial offerings will likely cost more than their analog equivalents. But ISDN may ultimately result in a cost reduction of basic telephone service on top of providing new services.

ISDN relies on three technological components, each of which was originally proposed to generate cost savings. Customers should notice an impact in three primary areas:

Digital transmission/digital switching. The original idea for bringing digital technology to the network was to provide better quality at a lower cost. The T1 Carrier and digital central office switches went part of the way.

ISDN can go further by attacking engineering and operations costs. Given that digital components are generally more reliable than analog electronics, maintenance costs are reduced. Also, the use of digital transmission systems for voice can greatly simplify the process of transmission engineering.

Common channel signaling. Common channel signaling defines the use of a data network that overlays and controls services on the voice network. The ISDN Signaling System Number 7 standard describes the use of common channel signaling not only in the network — the scope of the original AT&T Common Channel Interoffice Signaling (CCIS) plan — but also in the interface to the subscriber.

The advantage of the network part of the common channel signaling system is the same as for AT&T's CCIS: better trunk utilization by avoiding blind alleys, more flexibility to adapt the network to changing traffic conditions, faster call set-up, less opportunity for toll fraud and the capability to provide different services.

The use of common channel signaling on the subscriber interface, however, is new to the public network with ISDN and is key to the inherent flexibility of an ISDN.

Now, the subscriber can ask for different types of connections for the B channels over the interface simply by sending different signaling messages. In a large telephone system, costs can be reduced by eliminating the requirement to maintain separate trunk groups for each service being used.

Further, a new network service can be made available to an ISDN subscriber by defining the D channel signaling messages that must be sent to access the service. In effect, new network services could be defined by software rather than hardware.

Loop efficiencies. The other obvious area for savings through ISDN is in better utilization of the subscriber plant. The subscriber plant is the telephone company term for those masses of copper wire facilities that connect subscribers to the public network. The subscriber plant represents an expensive and troublesome part of the provision of local service.

Today, a single pair of copper wires is normally used to provide a one-subscriber line connection to the network. When used with an ISDN Basic Rate Interface, that same pair of wires can carry two revenue-producing B channels and possibly one or more revenue-producing services on the D channel.

A Primary Rate Interface that operates at 1.544M byte/sec. can be delivered on two pairs of copper wire and provides either 23 or 24 B channels.

The telephone company can wring a lot more use out of the existing subscriber cable plant. However, it remains unclear how much more, so exact savings cannot be pinned down yet.

MICHAEL FINNERAN

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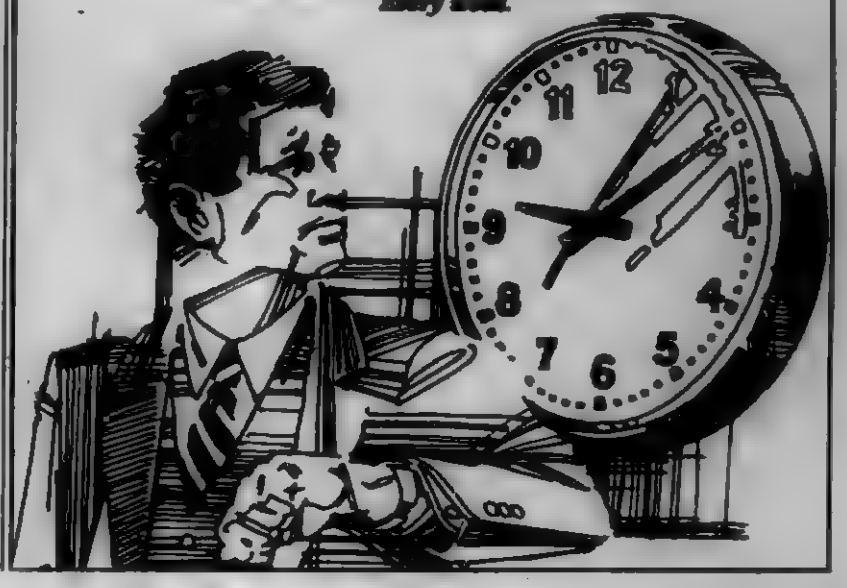

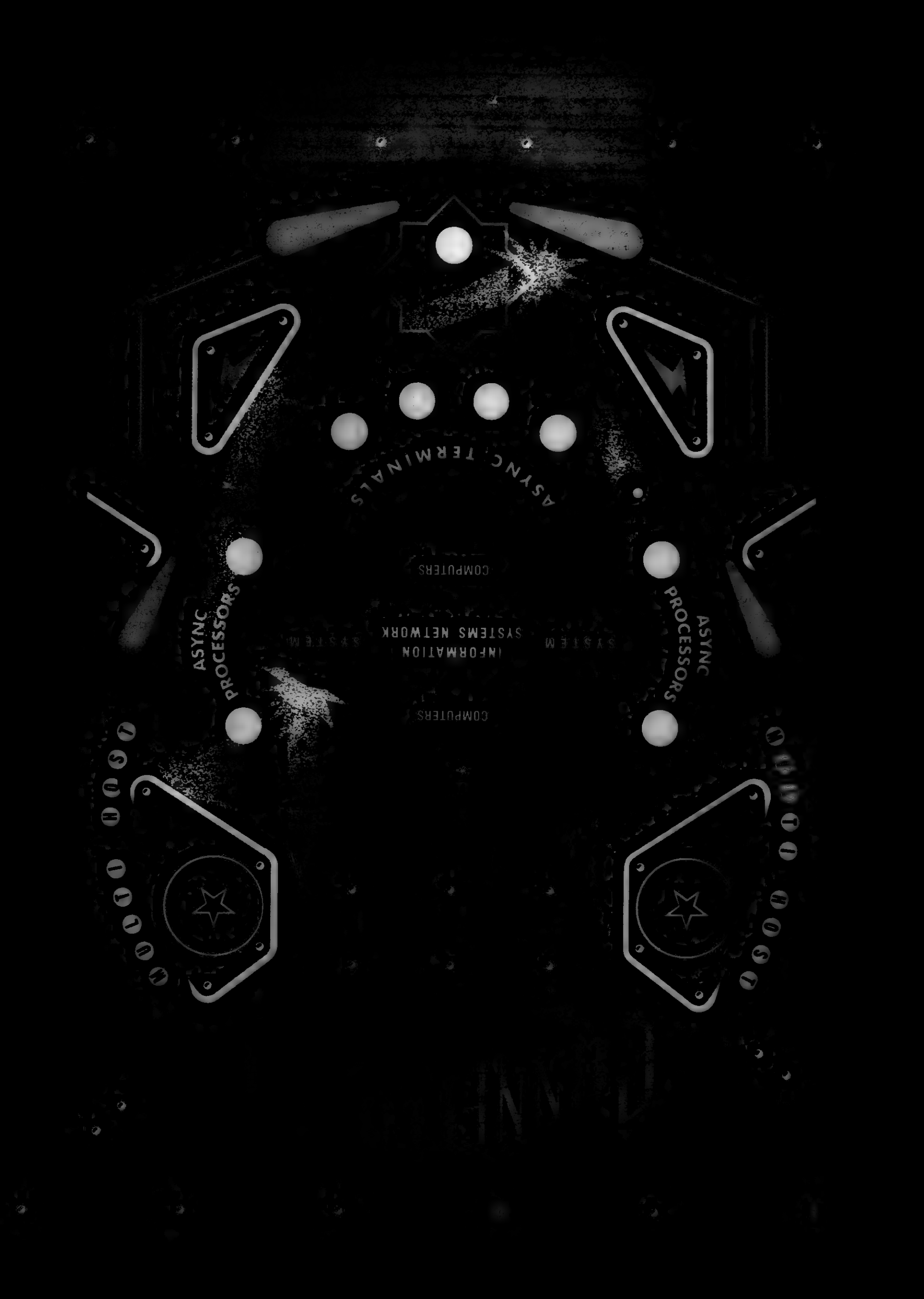
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If your 3270 system can make the right connections, you win. If not, you lose. Only it's not a game.

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- Ability to add up to 32 synchronous devices, including PCs, displays, printer controllers, and printers.
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- Multi-host, multi-tasking windows. Users can bring data from multiple hosts (or multiple sessions with the same host) into four multi-tasking windows – all regardless of the type of host accessed.
- A choice from nine different types of displays. (Four are plug compatible with IBM 3270 controllers.)
- Cable and wiring flexibility. Host devices can be connected to the 6500 System through inexpensive twisted-pair wiring–or you can use coax.

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Computer technology is changing every day. And tomorrow's corporate workgroups will be even more diverse and decentralized. Forward-thinking MIS managers can protect their investments and plan for the future with the AT&T 6500 Multifunction Communication System. Its flexibility, transparency, and expandability will prepare you for anything the future has to offer.

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communications equivalent of in-band signaling).

In an ISDN environment, the information requirements for those higher layer protocols might be carried in D channel signaling messages.

For example, data session parameters might be carried in user information message types on the D channel. The logical session could be built along with the physical connection in ISDN.

This type of integration could greatly reduce the cost of supporting remote data terminals. By allowing those devices to operate on measured rate switched services, rather than on dedicated lines, we could reduce the cost of providing the communication service and increase the host resources a terminal has access to.

All this could be achieved with no degradation in response times and no change in the user's operating procedures.

To achieve seamless interface between a data processing system and ISDN, we would have to build the capability for the host or terminal device to exchange signaling messages directly with the ISDN Exchange.

Tandem Computers, Inc. recently announced its intent to support both ISDN Basic and Primary Rate Interfaces on its computer systems so that ISDN services can be used in place of dedicated facilities to serve transaction terminals like automated teller machines and point-of-sale devices.

IBM's recent announcements in the ISDN area also allude to this type of integration, but we have yet to see it in any deliverable products.

With the ISDN interface integrated in the communications software, ISDN could do a lot more than provide a simple modem interface.

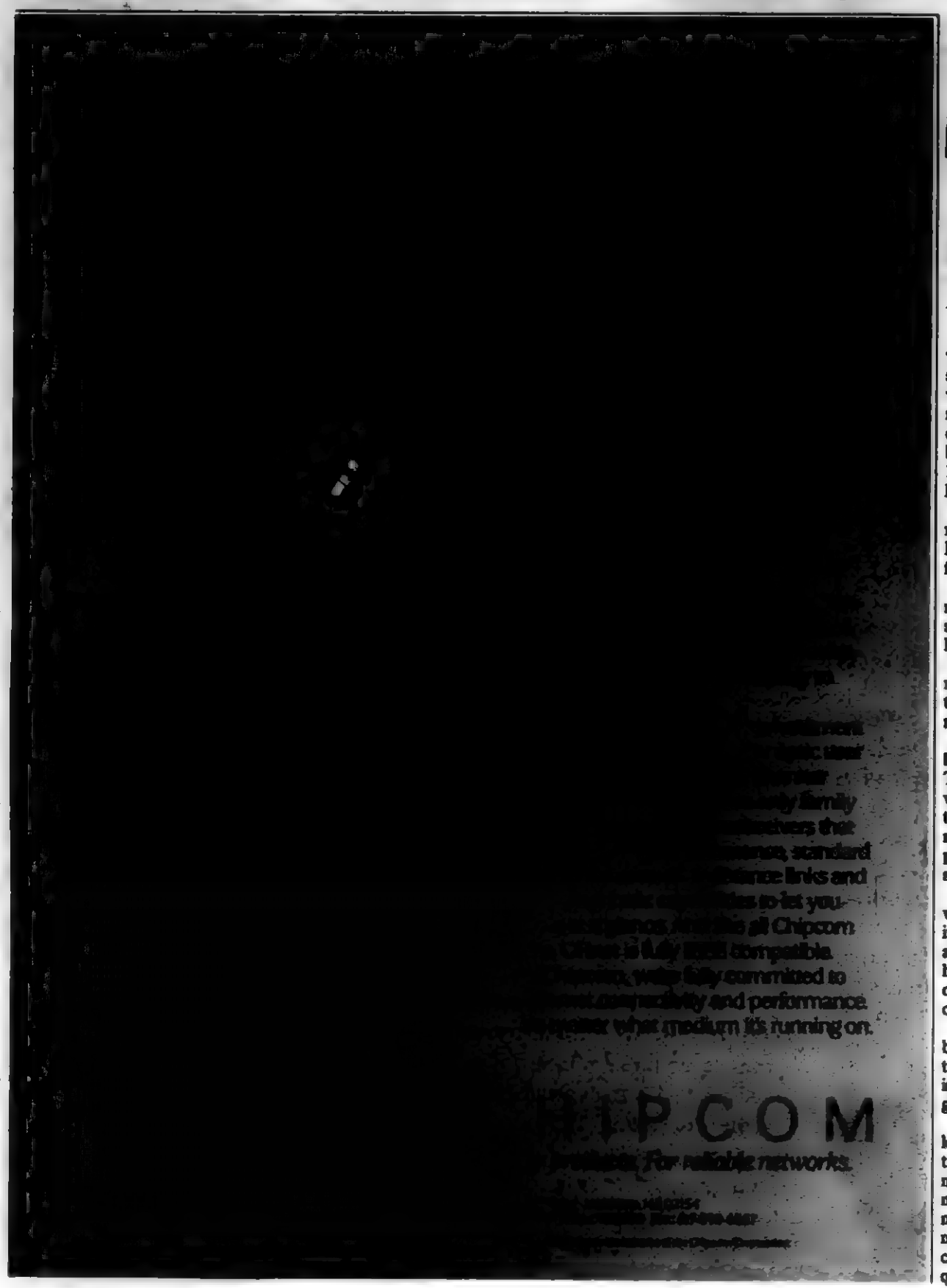
Regulators

ISDN could change the basic economics of providing telecommunications services. For that reason, the Federal Communications Commission and the Public Service and Public Utilities commissions will be involved in tariffing ISDN services. Because of its potential global impact, the U.S. Department of Justice and the U.S. Congress will also undoubtedly have a say in ISDN regulatory structure.

Telecommunications regulation is based on the premise that phone companies are essentially one-product businesses and that dial tone is a tangible good. Given the existing allowable rate-of-return basis for establishing tariffs, if the cost of providing basic service in an ISDN environment is less, its price will be lower and revenue will decline. Quite literally, if telephone companies do the job better, they make less money.

The solution is a structure that provides telephone companies with a financial incentive to deliver the benefits of the technology. One option would be to allow them to sell additional revenue-producing services under the ISDN umbrella and price them like the custom calling packages currently available on electronic switching systems.

Another possibility is the rate cap plan the FCC is discussing for AT&T. But tailoring this structure to the local operating companies will take careful crafting to ensure a justifiable rate for basic service.



THE GREAT promise of ISDN is that it provides a structure and standards in which to implement digital technology in the network.

One can finally begin to see the proof that telecommunication systems have a societal impact. When the FCC proposed waiving access charges on value-added networks — a move that may have increased the cost of using those networks by $4 an hour — the FCC received 10,000 pieces of mail and a threat of legislation.

Also, the issue of privacy in being raised in connection with the New Jersey Bell trial services that include Caller ID for a small number of subscribers.

Caller ID, which displays the phone number of the calling party to the called subscriber, is one of the major service enhancements ISDN will provide.

The American Civil Liberties Union is raising the issue of whether it is a good thing to take away the anonymity users now have when making a phone call.

Living example

The great promise of ISDN is that it provides a structure and standards in which to implement digital technology in the network. The public telephone network is probably the best living example of the successful use of standards.

The great mystery that confronts us with ISDN is, Why should somebody buy it? The impetus to buy might be as simple as the capability to provide two lines and a hold button on a standard telephone line or a cost-effective replacement for a dedicated data communications facility.

The buying decision could also be based on a fresh idea from outside the telecommunications industry. The point is that no one will ever find out unless they give it a try.

The local telephone companies and the long-haul carriers are going to have to bet the ranch on ISDN. But telephone companies have to make the first move. That move is going to take a leap of faith, with no guarantees of success. Once the commitment is made, customers can feel secure in helping fund the development required. •

MANAGEMENT

TAKING CHARGE

Les Gilliam

Looking out for No. 1

Was it baseball player Satchel Paige who was credited with the adage, "Don't look back — something may be gaining on you"?

In Paige's case, it was Mother Nature and Father Time, trying to end a baseball career. But who is closing in on the MIS manager these days?

In most companies there is only one MIS organization, and, I suspect, the manager rarely thinks about competitors. To him, the competition is a company in the same business.

But that is not so. The information systems manager has his own set of competitors — some of whom may be gaining on him.

One of the greatest dangers to the career of the MIS manager is complacency, a state that results from the false sense of being indispensable. The wise manager knows that company executives could replace him — as well as his entire organization.

Who are these competitors?

The first is the personal computer. A common question among MIS managers today is how to control the widespread purchase of microcomputers. Some companies have developed strict policies, only to find the policies ignored or circumvented.

Some of the best programmers today have titles such as engineer, accountant or attor-

Continued on page 69

Seafirst's motivator

Turnpaugh emphasizes personal interaction

BY STEPHEN JONES
CW STAFF

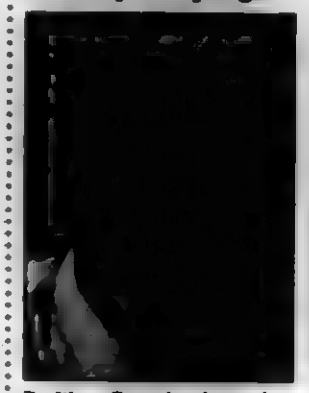
SEATTLE — The staff at Seafirst Bank's data center braced itself for trouble. The bank's chief of MIS and a gaggle of top information officers made their way through the center recently, stopping to cluster around each employee. With so many executives hovering about, something had to be wrong.

But instead of handing out reprimands or pink slips, Timothy Turnpaugh, executive vice-president of Seafirst's operations group, was delivering $100 checks to the data center employees. Turnpaugh and his lieutenants repeated the visit during the two other data center shifts later that day.

The reason? For one, Turnpaugh says he believes that personal interaction with employees — on both positive and negative issues — is crucial in sparking productivity and efficiency. In this particular case, rewards

Continued on page 70

PROFILE
Timothy Turnpaugh

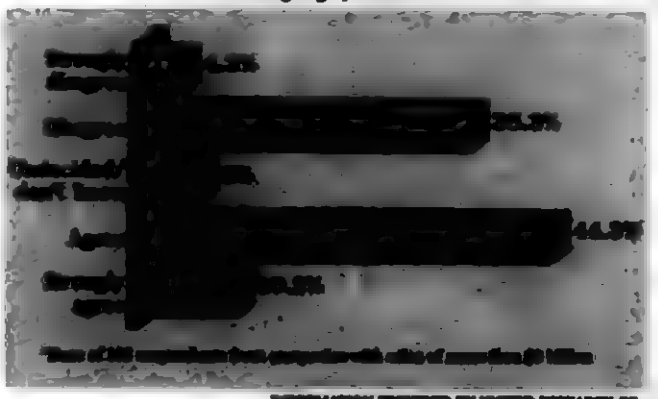


Positions: *Executive vice-president, operations, Seafirst Bank.*
Situation: *Keeping Seafirst's MIS staff connected to the rest of the bank via learning programs, integration.*

Data View

State-of-the-art distractions

The majority of executives surveyed agree that their information systems groups need to focus more on actual systems than on leading-edge features*



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CW CHART

DP CERTIFICATION

A look at certificates: What are they worth?

BY NANCY BLUMENSTALK MINGUS
SPECIAL TO CW

In 1962, the Data Processing Management Association (DPMA) introduced certification to the data processing profession. That same year, 570 DP pros became Certified Data Processors (CDP). Since then, more than 40,000 people have been certified by one DP certifying organization. Yet the value of certification still remains in question.

Steve Jolie, vice-president of Source EDP in Paramus, N.J., says that "in 15 years, very rarely, if ever, have I had a manager ask if a person has a certificate." Marc Blessing, director of Compusearch in Cleveland, agrees. "I have never had a manager request someone with a certificate."

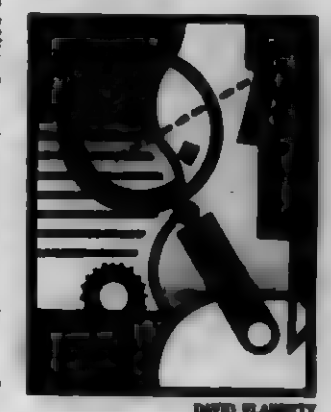
Why then, have 40,000 DP professionals gone through the trouble of certification?

What is certification?

Today, the Institute for Certification of Computer Professionals (ICCP) grants approximately 85% of all DP certificates, according to George Eggert, executive director. The ICCP was formed in 1973 by eight DP associations to further the certification effort started by the DPMA. There are now 14 national and international organizations involved.

The DP professional has four choices for certification from the ICCP: CDP, Certified Computer Programmer, Certified Systems Professional and Associate Computer Professional (ACP).

To gain any of these certificates, candidates must pass a comprehensive test consisting of 225 to 300 questions. An individual has four opportunities to pass all the sections of a given examination.



DAVID FLANERTY

According to Eggert, of the 4,000 DP professionals applying for certification each year, roughly 35% pass. He adds that about a third of ICCP certificate holders are DP consultants, a third are in insurance and another third are in data processing shops.

But the ICCP is not the only body certifying data processors. Nonmember organizations offer certifications for their DP niches. For example, Certified Information Systems Auditor covers certification for auditors, the Internation-

Continued on page 68

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Hancock joins Pacific Bell

Will help fine-tune network integration plan

BY KATHY CHIN LEONG
CW STAFF

SAN RAMON, Calif. — Pacific Bell has pulled former Wells Fargo Bank NA MIS Director Jack Hancock out of retirement to oversee a newly crafted information systems plan designed to drive the telephone company competitively into the year 2000.

Hancock, 57, the new vice-president of information systems, replaces Steve Welch, who has taken an MIS position as vice-president of support services. Two steps removed from the Pacific Bell president, Hancock reports to Executive Vice-President of Operations Marty Kaplan.

A former major general in the U.S. Army, Hancock retired from Wells Fargo last September with initial plans of writing a book on managing information systems and a historical account of computers in the military.

"At first I wasn't interested in the position at all," Hancock said. "Then I realized that there is a tremendous opportunity to help the company tackle new businesses and new products."

Sources within Pacific Bell said Hancock was tapped after Pacific Bell executives saw how quickly and efficiently Hancock consolidated the information systems operations when Wells Fargo acquired Crocker Bank in May 1986.

Condensing work force

A critical element of Hancock's new position is to consolidate at least four divisions within information systems: planning, development, data processing and administration.

Information systems professionals scattered throughout Pacific Bell in departments such as billing and network software will eventually be merged into the organization, bringing the total number of employees up around 7,000. At Wells Fargo, Hancock's MIS department staff numbered more than 2,000.

Hancock is responsible for the bigger picture of servicing eight million customers, however. Last month, he and a team of Pacific Bell MIS executives put the final touches on a plan called Nesys, designed to carry the firm through the year 2000. The strategy must now be approved by parent company Pacific Telesis Co.

"The plan is an architectural approach to our network and systems," he said. Originally conceived at least five years ago, the Nesys plan calls for integration of voice networks and computer systems. This will require a reorganization of both people and resources.

As he described it, Nesys is an architectural platform using a variety of industry standards that encompass communications, networking and DP. The company has 15 data centers scattered throughout the state and uses a variety of equipment from Hewlett-Packard Co., IBM, Digital Equipment Corp., Tandem Computers, Inc. and others.

"We will continue to operate in a multivendor environment," Hancock said. "But as the plan gets under way, we will have to evaluate each piece of hardware we have to see if it can fit under our new strategy. We don't want to throw what we have away."

While the plan needs to be circulated among other senior executives throughout the organization, Hancock said he would like to see other telephone companies adopt Nesys as a means of bringing standardization to the industry.

"I don't think it would have the magnitude of what General Motors is doing with Manufacturing Automation Protocol," Hancock said, "but you could say it would be similar. Pacific Bell would require vendors to adhere to the specifications of our seven-layer architecture."

According to Hancock, Nesys would integrate voice and data networks under one uniform platform and support Integrated Services Digital Network services along with future Open Network Architecture services.

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Measuring information systems' value

BY DAVID A. LUDLUM
CW STAFF

WASHINGTON, D.C. — Michael Thorsen, corporate director of MIS at Datacard Corp. in Minneapolis, wants to head up an effort to establish a means of measuring the value of company investments.

"Too much of the approach in the past was 'warm and fuzzy,' " Thorsen said. "If everybody felt good about it, you did it."

Thorsen was among nearly 100 executives who attended a conference here recently, titled "Measuring the Business Value of Information Technologies." The conference was sponsored by the International Center for Information Technologies (ICIT), a research, education and consulting firm launched by MCI Communications Corp. two years ago.

While Thorsen hopes to be a leader at his maturing firm, many attendees who represented large companies said they aim to develop measures for information systems comparable to ones the companies use for more conventional investments.

"It's becoming more and more of an issue as expenditures continue to grow," said Robert E. Toone, a senior consultant with the information systems department of Du Pont Co. in Wilmington, Del. "It's getting to be a sizable part of the company's expenditures. And it's not just the MIS department; there are outside expenditures as well."

The conference incorporated a half dozen presentations conveying a diversity of approaches to the subject. Peter G. W. Keen, executive director of ICIT, suggested managers select an approach and pursue it diligently rather than worrying about which one is best.

Measuring management

Paul A. Strassmann, an independent consultant based in New Canaan, Conn., presented his method for determining the value of information technologies whose costs are added to overhead expenses. Since these systems are aimed at improving the management of a business, they should be measured by changes in "return on management" rather than by traditional measures such as return on investment, he said.

Strassmann said he considers all administrative activities as management and determines the return they generate by dividing the value they add to a firm by their cost.

On a more empirical level, Charles McCaig, senior vice-president of Mutual Benefit Life Insurance Co. in Newark, N.J., described how he convinced the company's top managers to drop plans to cut his department's budget by 20%.

McCaig said the volume of processing, coding and end-user computing supported by the department was growing quicker than its spending, indicating that the spending was helping to build a corporate asset.

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Certificates

FROM PAGE 65

al Association for Computer Systems Security grants certificates for systems security personnel and the Office Automation Society International handles office automation.

To add to the confusion, several training schools and colleges issue DP certificates.

All this complexity bewilders managers and DP professionals.

Pacific Mutual's Roberts

Employees wonder which certificate to get, and managers wonder if any are reliable. "Today," says William A. Roberts, vice-president of information systems at Pacific Mutual Life Insurance Corp., "a certificate does not play a major part in the hiring or promotion process, [mainly because] I don't see what a certificate is supposed to tell me.

"If it could tell me my people were state-of-the-art, [I might] reconsider," Roberts adds.

"You're not dealing with the same type of vehicle as a CPA," Jolie says. "With a CPA, there is a definable knowledge, and there are skills involved in balancing numbers." There are no such standards within the DP profession, so a certificate does not guarantee someone can perform the job.

What a certificate does show, however, is a commitment to the profession. According to Bob Clark, corporate manager of technical education at Computer Task Group, a Buffalo, N.Y.-based computer consulting company, certification "doesn't really say you're an expert, but the fact that you have one shows you look at DP as a career, not just a job."

"It's certainly an indication of a person's commitment to continuing career development," Compusearch's Blessing adds.

Recognizing certification

The continuing education aspect is actually part of what's selling certification to DP management. Companies are starting to recognize certification in several ways. At a minimum, companies that support certification will pay for the exam. Other companies will pay for textbooks and refresher courses, just as they do for any continuing education. A few organizations formally recognize those who have passed. At 3M Co., for instance, according to lead analyst James Ritchel, "Those who pass get companywide recognition for their accomplishment."

The highest form of recognition comes from companies such as Merchants Insurance in Buffalo, which gives bonuses to employees who pass.

Nick Boccolucci, Merchants' assistant vice-president of human resources, says, "We [motivate] our employees with a bonus of $150. We also have what is known as 'The Wall of Fame,' where designations [such as CDP] are posted on the wall, with the certificate holders' names listed below." The wall is in the main lobby of the firm's headquarters. Boccolucci adds, "It's the visibility and employee recognition that we're after."

Support for the continuing education aspect of certification is becoming more important, because all the certificates issued by ICCP, and many others, require recertification. That is, every three years, a certificate holder must become recertified by showing proof of a certain level of continuing education courses, seminars, meetings and so on.

If they do not, they must retake the certification exam or forfeit the right to use the certificate designation. Critics of certification in the past have complained that in the continually developing field, certificate holders were stagnating. Ironically, critics now question the high number of hours required to recertify.

Merchants Insurance's Boccolucci

The future of certification

The past 26 years have been stormy ones for certification advocates, and the future doesn't look much brighter. But there are some positive signs. Probably the biggest boon to the certification movement came in January, when the American Council on Education (ACE) came out with the recommendation of awarding college credit to some certificate holders. According to ACE's guidelines, up to 36 credit hours can be awarded to those who received a CDP after 1982 and 24 credits to ACP holders who pass with 68% or higher.

It's up to an individual school to award credits based on recommendations, but if the majority of them do, the number of people requesting certification could increase substantially.

Another driving force behind certification is the end-user computing revolution. As a growing number of users start listing DP skills on their resumes, managers may need better ways for differentiating them from DP professionals. ICCP's Eggert says, "There's going to be some pressure for proof when you say you can do a job for a company."

The future of certification will also depend on acceptance by employees and managers. Source EDP's Jolie predicts limited success. "I don't see people caring that much about it today, and I don't see much of a change for tomorrow." However, Pacific Mutual's Roberts says, "If a case could be made that certification would work to the advantage of Pacific Mutual, I am open to reconsideration."

Blessing views certification differently. "It's not an indication of what type of contribution a person can ultimately make to an organization, but it is a positive thing. I would encourage someone to get one."

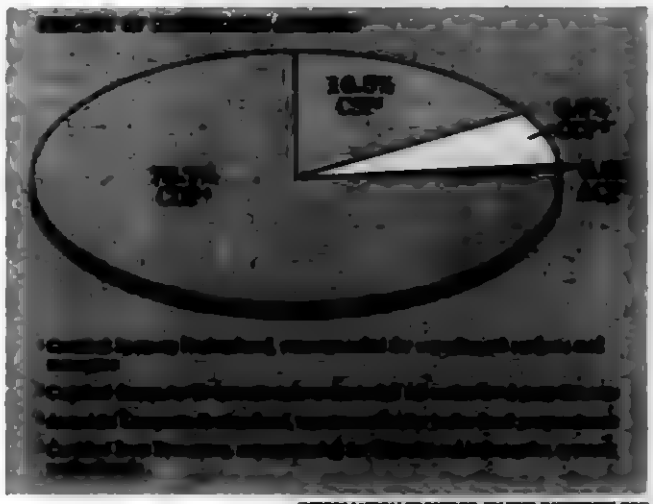
Compusearch's Blessing

The several thousand DP professionals applying for certification each year obviously agree. But only time will tell if certification can become the hallmark for DP, as it has for accounting. Until then, as Computer Task Group's Clark points out, "At a minimum, it's a marketing tool."

Shawnatalk Mingus is a free-lance writer based in Buffalo, N.Y.

Certifiably professional

The Institute for Certification of Computer Professionals has awarded approximately 43,600 data processing certificates since its inception in 1962



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CALENDAR

International Symposium on MCAD Server Products Success (Breaking the Cost of Engineering Change). Boston, June 13-14 — Contact: "CAD/CIM Alert," 804 Boylston St., Chestnut Hill, Mass. 02167.

Computers in Marketing Conference. Chicago, June 13-15 — Contact: Conference Department, American Marketing Association, 250 S. Wacker Drive, Chicago, Ill. 60606.

Digital Technology Spanning the Universe. Philadelphia, June 13-15 — Contact: IEEE Office, Moore School of Electrical Engineering, Room 200, University of Pennsylvania, Philadelphia, Pa. 19104

VM Software Annual User Conference. Washington, D.C., June 13-15 — Contact: VM Software, Inc., 1800 Alexander Bell Drive, Reston, Va. 22091.

ACM/IEEE Design Automation Conference. Anaheim, Calif., June 13-16 — Contact: Design Automation Conference, Suite 102, 7490 Clubhouse Road, Boulder, Colo. 80301.

Chicom, Chicom's International User Conference. Cincinnati, June 13-16 — Contact: Chicom Systems, Inc., 2300 Montana Ave., Cincinnati, Ohio 45211.

Government Management Information Sciences Conference. Reno, Nev., June 13-16 — Contact: Ron Wolf, Director, Management Information Services, P.O. Box 11130, Reno, Nev. 89510.

Key/Monitor Users Conference. Norwalk, Conn., June 13-16 — Contact: Steve Rosa, TSI International, 295 Westport Ave., Norwalk, Conn. 06856.

North American Pandrol Users' Conference. White Plains, N.Y., June 13-16 — Contact: Linda Rose, CGI Systems, Inc., One Blue Hill Plaza, Pearl River, New York. 10965.

CAP International's 1988 European Electronic Printing Industry Conference. Amsterdam, June 13-15 — Contact: Jean O'Toole, Conference Manager, CAP International, Inc., One Snow Road, Marshfield, Mass. 02050.

Conference of The Association of Human Resource Systems Professionals (HRSP), "Human Resource Systems...The Strategic Advantage." San Francisco, June 13-15 — Contact: HRSP, Inc., P.O. Box 8040-A380, Walnut Creek, Calif. 94596.

Datapoint Display Terminal/Graphics and Imaging Conference. Monterey, Calif., June 13-15 — Contact: Datapoint, Inc., 1290 Ridder Park Drive, San Jose, Calif. 95131.

DB2 Tools Symposium. Los Angeles, June 13-15 — Contact: Digital Consulting, Inc., 6 Windsor St., Andover, Mass. 01810.

IBM/SEC Computer Security Conference. Washington, D.C., June 13-15 — Contact: Phyllis St. Martin, Computer Security Institute, 300 Church St., Northboro, Mass. 01532.

Systems Forum '88. San Francisco, June 13-15 — Contact: PC Tech Journal, Systems Forum, 10480 Little Patuxent Pkwy., Columbia, Md. 21044.

International Conference on Testing Computer Software. Washington, D.C., June 13-16 — Contact: Conference Staff, U.S. Professional Development Institute, 1734 Elton Road, Silver Spring, Md. 20903.

MUMPS Users' Group 17th Annual Meeting. New Orleans, June 13-17 — Contact: Maria Lourdes Garcia, Director of Marketing, MUMPS Users' Group, Suite 510, 4321 Hartwick Road, College Park, Md. 20740.

Electronic Data Interchange and Bar Coding in The Textile/Apparel Industry. Raleigh, N.C., June 14-15 — Contact: Automatic Identification Manufacturers, Inc., 1326 Prospect Road, Pittsburgh, Pa. 15238.

Volex '88 Conference & Exposition. Dallas, June 14-16 — Contact: Information Publishing Corp., P.O. Box 42375, Houston, Texas 77242.

Rochester Forth Conference on Programming Environments. Rochester, N.Y., June 14-18 — Contact: Lawrence P. Forsley, Conference Chairman, Institute for Applied Forth Research, Inc., 70 Elmwood Ave., Rochester, N.Y. 14611.

Planning and Selecting a State-of-the-Art Financial Information System. Hartford, Conn., June 15 — Contact: Laura Manning, Boston University, Metropolitan College, 755 Commonwealth Ave., Boston, Mass. 02215.

Workgroup Computing — Current Status & Outlook. New York, June 15-16 — Contact: Brandon Managing Information Programs, 1775 Broadway, New York, N.Y. 10019.

Telex Research Annual Forum '88. Nashville, June 15-17 — Contact: Telex Research, 1207 17th Ave. S., Nashville, Tenn. 37212.

Gilliam

CONTINUED FROM PAGE 65

ney. Budgets often include sizable sums to buy PCs under such categories as office equipment or laboratory instruments.

The second competitor is the service bureau industry. Many service bureaus provide quality service. The service bureau alternative may seem appealing when the in-house computing environment is one of continual controversy, cost increases and user dissatisfaction. It certainly is simpler for an executive to manage a contract than to manage an MIS organization.

Every MIS manager should, from time to time, repeat the words "facilities management." There are many such organizations out there that can convince executives that DP headaches would be gone under a facilities management contract. Those offering facilities management services include some large MIS departments spun off as separate corporations and challenged to produce a profit, sometimes through management of other companies' information systems.

Does the user have a choice as to who does his application system development work? If the quality, responsiveness and cost of such services are unsatisfactory, the MIS manager can expect changes or much discomfort. One of the alternatives users are pursuing is to do their own programming, on either the mainframe or their PCs.

Wrap it up, I'll take it

Similarly, more and more users seek the packaged software alternative. The user may see the package listed in a catalog or advertised in a publication. For larger applications, it may be a package that was created by a company in the same industry. Immediate access to a package, even if it is less than what is desired, is often worth the price to the user.

Or the user can contract with a software house to develop a custom package if the product cost, quality and availability are better than the in-house organization can provide. Of course, an alternative to the MIS manager's services is to do the work manually. Users often prefer this if they distrust MIS people and fear losing control of their own work.

The MIS manager has personal competitors also. They include his peers who manage other departments in the company. It is natural for him to be compared with other managers, especially when opportunities for bonuses or promotion arise.

The most feared competitor of the MIS manager is the person who will replace him if his performance is less than acceptable. He should remember that such a person is available and able. Since most companies operate for profit rather than charity, executives will not hesitate to make a change to protect their own reputation, bonus, or chance for advancement.

What can be done to combat these competitors? First, the manager should perform an audit of his personal strengths and weaknesses. He should find out what his superiors see as the areas most needing improvement and place these at the top of the list. A plan to overcome the weaknesses through training, effort or delegation to others with special skills should be developed.

Next, he should determine how the

THE MOST FEARED competitor of the MIS manager is the person who will replace him if his performance is less than acceptable.

MIS department stands with every user department. He should find out what his group is doing well and what is being done poorly. He should make sure every user knows of his goal to improve services. Then, with the involvement of the key people in MIS, a plan should be developed to attack the complaint list.

A frequent mistake is to consider PCs the enemy. Why not just add PCs to the list of alternatives the information systems department has to solve users' needs? After all, PCs are a cost-effective solution to a certain business problems.

Another suggestion is to involve the user more in evaluating the alternatives. Over the past two years, there has been a tremendous improvement in the user's data processing knowledge. The user should be considered a partner, not a computer illiterate or an adversary.

Executives think in terms of the bottom line, and so should the information systems manager and user departments. Every DP service and application should be judged by its effect on the company's success. Saying no is often a very profitable decision.

User problems will not be solved overnight. But starting is half the battle, if the user knows that a priority has been placed on customer satisfaction.

The successful MIS manager treats the user as a customer who has the option of taking his business elsewhere. If the MIS manager does not have this attitude, then he should be aware that there are competitors who may be gaining on him — and are ready to replace him.

Gilliam is president of Gilliam Associates, a computer and management consulting firm based in Paxton City, Okla.

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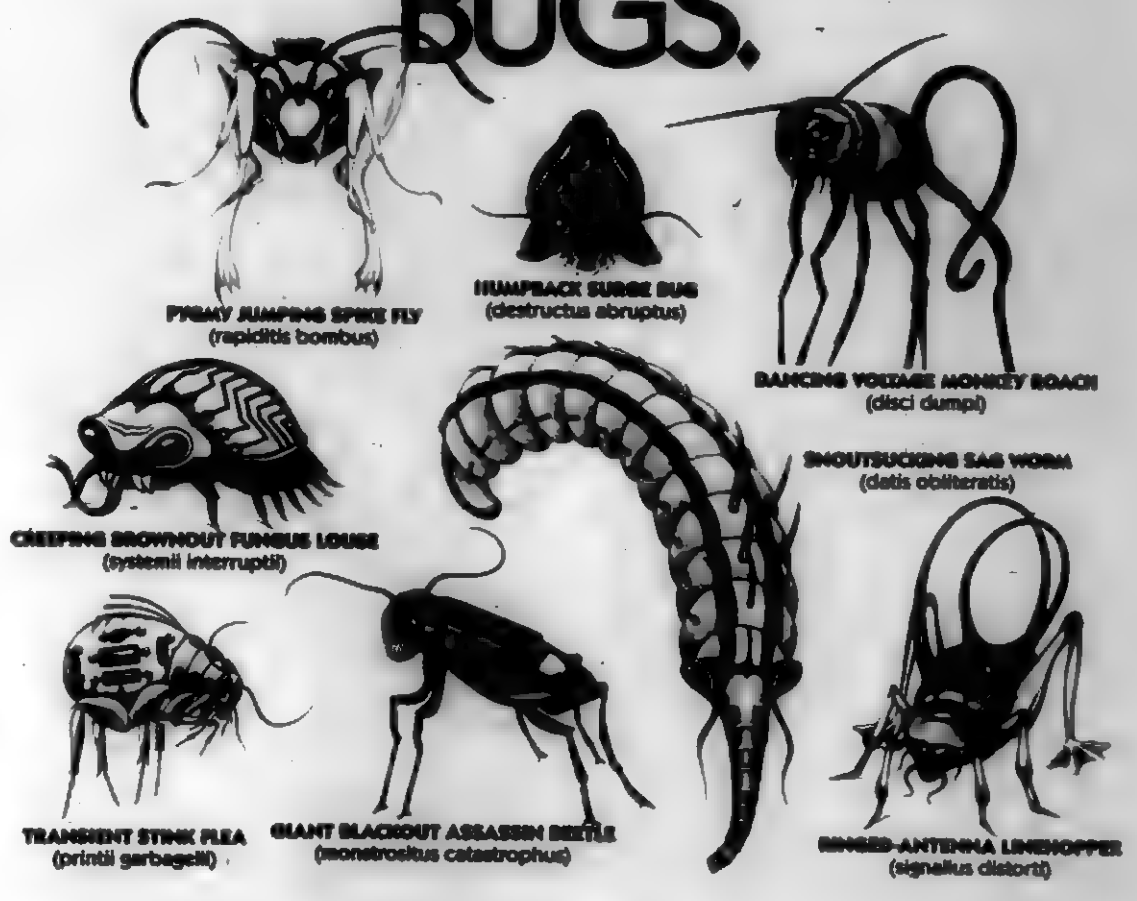

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Seafirst

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were given to employees after the data center delivered 100% of all the overnight information requested from branches and the main office for a month.

"We made a big deal out of it because fulfilling that service is important to the overall operation of the bank," says Turnpaugh, an intense, rangy Midwesterner who came to Seattle in 1984. "Somebody asked, 'What happens if we do this again?' and I said, 'We'll be back with more checks.' "

Keeping Seafirst's MIS staff connected to the rest of the bank is one of Turnpaugh's chief concerns. Instead of having programmers and technicians working in a cloistered data processing environment, Turnpaugh wants them to be intimately aware of the dollars-and-cents business of Washington's largest bank.

To promote that knowledge, Turnpaugh helped implement a plan that requires each MIS employee to understand what happens to a customer's check after it is deposited at a Seafirst branch.

Instilling business sense

"When you get down to the programmer ranks at most companies, the people understand how to back up and recover data, but they don't have the slightest clue about what business their employer is in," Turnpaugh says. "We want people to know how a particular program impacts the total business of the bank and to be proud of that."

The indoctrination process, which Turnpaugh says could be applied to companies in any industry, consists of a 13-week "boot camp" for new employees that covers the bank's structural and procedural operations. Prospective and junior MIS managers take part in the bank's "Management Academy" — a series of courses that cover production and project management, group leadership and accounting. "If you don't understand accounting," Turnpaugh notes, "you don't understand how the bank works."

A clue to why Turnpaugh emphasizes familiarity with the bank's daily business may be found in how he got his start in the information industry. As Turnpaugh tells it, it was an attraction to the fundamentals of banking, not MIS, that ultimately led him to Seafirst.

Turnpaugh had little interest in computing, but he always dreamed of being a banker. "I spent my first two years in the industry running a credit service operation and got into computers almost by accident. I never took a computer course in my life," he says.

But during a 12-year stint at Chicago-based Continental Illinois Corp., Turnpaugh rose to the top of the bank's MIS operations.

Since coming to Seafirst four years ago, Turnpaugh has become chief of the operations group and assumed the executive status that goes along with the job. In addition to overseeing MIS, he is responsible for branch and properties operations, purchasing and payment processing. He reports directly to Seafirst's chairman of the board.

Turnpaugh takes a no-nonsense approach to MIS, and while eager to stroke accomplishment, he says he has little tolerance for failure. With a motion similar to a baseball umpire's "you're out" signal, he condemns any form of wastefulness by throwing a cocked thumb over his shoulder and flatly stating, "It's outta here."

Turnpaugh's intensity tends to rub off on his staff.

"Those people that understand Tim's expectations work well, and those who don't understand those expectations end up not working for him," says William Browne, senior vice-president and manager of the systems services division.

But if Turnpaugh sometimes rules with an iron fist, he is quick to don a velvet glove, too. "He can be impatient in expecting and demanding results, but he does it in such a way that he gets the results he wants. He's a great motivator," says Bill Anderson, senior vice-president of the technical services division.

Staff reduction necessary

Turnpaugh's zealous drive to keep operating costs consistently down has had a positive effect on the bank's bottom line, but controlling expenses has meant firing some MIS workers. The elimination of an entire Honeywell, Inc. computer system, a complete restructuring and an increase in productivity has resulted in a 50% reduction in the work force since Turnpaugh came on board.

As recently as March, 40 workers in systems development were laid off.

Colleagues say Turnpaugh overcomes what can sometimes be a tough-guy exterior by often getting down in the trenches with employees. Turnpaugh makes a point to meet at least once every quarter with each of the 1,350 people who work in the 10 operating divisions he oversees.

"Employees know that he's an executive vice-president who reports to the chairman, but they also know that he's willing to sit and B.S. with them and be one of the guys; he's 'Tim' to everybody," Anderson says.

But Turnpaugh knows that getting too chummy with employees can lead to problems. "This isn't a democracy; I always have the last word," Turnpaugh maintains. "But every person has the unalienable right to ask 'why.' They may not like the answer they get, but at least they know the reason for the decision."

And the more bonus checks that Turnpaugh has to hand out, the more chances workers will have to shoot the breeze with the boss.

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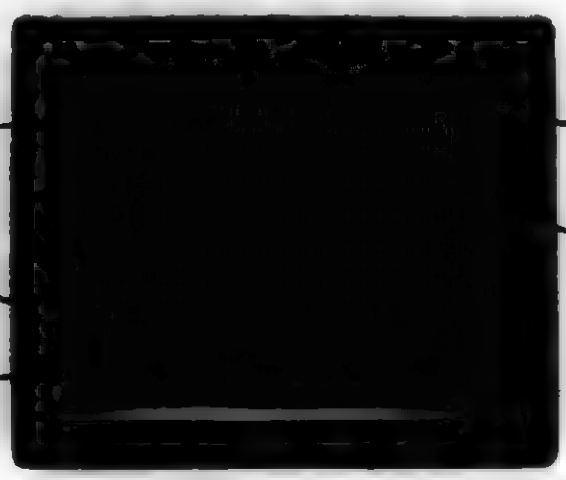

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   23. Dir., Mgr., Supv., Analyst, of Systems
   31. Dir., Mgr., Supv., of Programming
   32. Programmer, Methods Analyst
   35. Dir., Mgr., Supv., OA/WP
   36. Data Comm. Network/Systems Mgt.
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COMPUTER INDUSTRY

INDUSTRY INSIGHT

William Zachmann

Hold that apocalypse

The industry today has become the site of what resembles a truly cosmic struggle. Like the Manichean struggle between the forces of Oramud and Ahriman, vendors are choosing sides between the forces of light and darkness.

Which is which, however, depends very much on whom you ask.

The recent announcement of the founding of the Open Software Foundation (OSF) to promote a Unix standard independent of AT&T is an example. It represents a mixture of good and evil, light and darkness, truth and illusion and a web of alliances the complexity of which hasn't been seen since the days of the Borghias during the Italian Renaissance.

No matter how certain of themselves individuals already committed to the struggle may be, telling the good guys from the bad guys in this one isn't nearly as easy as you might think. That seven of the largest and most powerful vendors are willing to ante up $90 million to fund this thing, however, is an indication of how large the stakes are in this particular struggle.

IBM, DEC, Hewlett-Packard, Apollo, Honeywell Bull, Siemens and Nixdorf have responded to AT&T's recent closer alliance with Sun Microsystems by trying to seize the initiative with regard to future development of Unix standards.

Continued on page 74

'Look-and-feel' decision looms

Copyright Office judgment could clarify Lotus infringement suits

BY TORREY BYLES
SPECIAL TO CW

The U.S. Copyright Office is expected to reach a decision this week that may help resolve the critical distinction between "look-and-feel" screen display protection and source-code copyrights.

At issue is whether a software product may be fully copyrighted with one unitary registration or by parts with multiple registrations. The distinction is critical to software vendors, because many have sought separate protection for screen displays in addition to protection for programming code.

The decision is expected to resolve ambiguities that arose with such cases as Digital Communications Associates, Inc. (DCA) vs. Softklone Distribution Corp. and Lotus Development Corp. vs. Mosaic Software, Inc. and Paperback Software International. The decision will also conclude an industry forum on the issue that began with a public hearing last September in Washington, D.C.

Split opinion

The software industry is mixed on the issue. Thirty-five entities, including vendors and trade associations, responded to the September hearing, and their input was far from unanimous. Participants included such major industry shapers as Lotus, IBM, Apple Computer, Inc., Microsoft Corp., ADAPSO, the Institute of Electrical and Electronics Engineers, Inc. and the Information Industries Association.

Representing the two basic poles of the dispute were Apple and Lotus.

In 1986, Lotus filed for additional copyright registrations of screen displays for both its 1-2-3 and Symphony products. The Copyright Office ultimately denied the registration requests, stating that the displays were already covered by Lotus's earlier registrations of the programs.

This convinced attorneys at Lotus that a single registration was adequate for copyright protection — a view they support today.

"Think if a film producer had to register all the components of the film that are recognized with an Oscar," said Thomas M. Lemberg, vice-president and general counsel of Lotus. "It would be an administrative nightmare."

Apple contends that because there are many authors involved in a single software program — such as screen display designers as well as programmers — there should be many copyrights even for a single software product.

Apple emphasized the multiple-authors point because the firm is currently developing in-

Continued on page 76

Japanese chip firms fly again

BY LORI VALIGRA
IDG NEWS SERVICE

TOKYO — Japanese semiconductor companies are in quite a different position than they were almost a year ago, when the U.S. government imposed 100% duties on laptop computers and other items containing certain Japanese semiconductors.

Government-imposed production limits issued to Japanese chip makers have been eased, capital equipment purchases and production plans are up sharply and Japan is once more on an export drive.

The semiconductor trade dispute with the U.S. has, ironically, turned out to be a blessing in disguise for Japanese manufacturers. Production lim-

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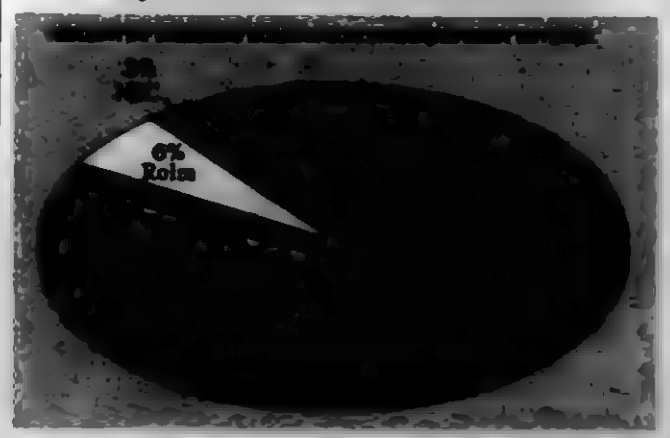
Data View

Leasing big names

AT&T provides the majority of communications equipment leased by Computer Dealers and Lessors Association members



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HP to resell Zenith laptops

BY JAMES A. MARTIN
CW STAFF

For Zenith Data Systems microcomputers, "the quality goes in before the name goes on," according to the famous ad slogan. But for some Zenith laptops, the name that goes on will be Hewlett-Packard Co.

HP and Zenith announced last week an agreement in which HP will act as an OEM for Zenith's Supersport 286 laptop. HP will buy an unspecified amount of Superports, customize them to conform in appearance to HP's Vectra PC line and resell them with the traveling corporate sales force in mind. HP is expected to begin selling the Zenith Superport under an HP label later this year.

Although HP buys products from other vendors on an OEM basis, this is believed to be the first incident in which the Palo Alto, Calif.-headquartered firm has agreed to act as an OEM for another vendor's microcomputer.

"We wanted a 286 laptop for the corporate environment," said Terry Eastham, HP's portables program manager. The Superport fit HP criterion for reliability and quality, the company said.

Currently, HP offers the Portable Plus, which uses read-only memory (ROM)-loaded software

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Success hasn't spoiled Silicon Graphics

BY JULIE PITTA
CW STAFF

MOUNTAIN VIEW, Calif. — To celebrate Chief Scientist Greg Chesson's first birthday as a Silicon Graphics, Inc. employee, his colleagues, led by Chairman James H. Clark, attacked Chesson with water pistols until his clothes were drenched.

That kind of scene is not likely to be repeated at Silicon Graphics. Back in 1982, the dozen or so employees there were a close-knit team working long hours to keep a start-up afloat. Today, the company's payroll totals nearly 700, and the intimacy of the early days is mostly gone.

What has remained, however, is a loose atmosphere that allows creative minds to flourish. "The corporate culture of every company is the product of the seeds planted in the beginning," Chesson explains.

Silicon Graphics is a technology company. And like a number of technology-based companies, its roots are in academia. As a Stanford University professor, Clark had commenced a research project in early 1982 that he hoped would propel him into the private sector.

Roots

Clark's project was to design a geometry engine to power sophisticated graphics — one that could compete with, and even surpass, Japanese technology. To show off the invention, Clark's team built a system

Chairman Clark

around the component that became the forerunner of Silicon Graphics' first product — a graphics workstation that enabled three-dimensional imaging.

By June of that year, Clark had completed a business plan, secured financing and rented a couple of offices not too far from the university. His colleagues on the research project — another professor and four of their students — joined him. The "Stanford Six," as they are known around Silicon Graphics, are still there today.

"Being an academic was a hard thing for me," Clark re-

Continued on page 75

INDUSTRY WEEK IN BRIEF

Another high-level Management Science America, Inc. (MSA) executive left the company last week. Timin Anochaev, a vice-president of strategic planning, left to become chairman of Natural Language, Inc., a Berkeley, Calif.-based developer of natural language front-end software. Anochaev had headed Cosmserv Corp., a manufacturing software vendor acquired by MSA in 1986.

Cipher Data Products, Inc., just days after filing a patent infringement suit against Archive Corp. [CW, May 30], won a similar suit against Wangtek, a division of Rexon, Inc. A U.S. District Court jury in San Francisco ruled that Cipher's quarter-inch cartridge tape drive patent was valid and that Wangtek had infringed on the patent. Wangtek plans to appeal the decision. The case marked the first time San Diego-based Cipher defended a patent in court.

Although a Cipher spokesman said the company believes its suit against Archive is comparable, Costa Mesa, Calif.-based Archive quickly announced that it "does not feel that this jury verdict has materially changed our view of Cipher's patents."

Dell Computer Corp. is ready to go public and has filed a registration statement with the Securities and Exchange Commission for an initial public offering of 3.5 million shares of its common stock. No price range has yet been established for shares of the Austin, Texas-based personal computer maker.

Comdisco, Inc. will expand its disaster recovery business to Europe by acquiring UK-based Recovery Operation Centres Ltd. (ROC) for an undisclosed sum. ROC, formed in 1980, has about 400 disaster recovery clients in England.

Advanced Micro Devices, Inc. will join forces with West Germany's Siemens AG to develop, produce and sell chip sets for Integrated Services Digital Network (ISDN) applications. The two companies have several similar technology-sharing agreements for other semiconductor applications. The 12-year ISDN agreement's first product will be a chip set containing 15 circuits, most of which are contributed by Siemens.

Encore Computer Corp.'s financial woes appear to have eased; the Marlboro, Mass., firm recently reported its third consecutive profitable quarter. Revenue for the parallel processing system maker was $9 million, a 156% increase over the same period in 1987, while net income came in at $640,000, or 3 cents per share, compared with a net loss of $1.7 million, or 8 cents per share, a year ago.

Japan

CONTINUED FROM PAGE 71

its sent demand for certain now-scarce chips — along with their prices — soaring, resulting in a boost in corporate sales and earnings figures.

The phenomenon is not new; restrictions on Japanese exports historically have tended to strengthen the position of Japanese industry.

"This goes back to the 1960s, when Japan first got into bilateral trade disputes," explained Richard C. Hanson, editor and publisher of the *Japan Financial Report*, an independent economic journal published in Tokyo. "It happened with steel exports when the United States wanted Japanese restraints in the 1960s and 1970s. Japan raised prices, and U.S. users ultimately paid the price."

Hanson explained that what happened in the steel industry was re-enacted in the automobile and semiconductor industries. He added that because Japanese semiconductor producers also make electrical equipment and electronic products, they are too big to be hurt by sanctions.

"They may have some setbacks, but ultimately restrictions raise prices and, thus, raise profits," he noted.

According to figures released in February by Japan's Ministry of Finance, chip exports to the U.S. rose 19.2% to $1.56 billion in 1987, while imports were up only 8.3% to $953.8 million. That trade imbalance was up 41.4% from 1986.

The imports leveled off after hitting a peak in last year's April-June quarter, when imported chips accounted for 12.6% of the purchases made by Japanese semiconductor user companies, according to a survey of 63 buyers made by the Japan's Ministry of International Trade and Industry (MITI).

Production is on the rise again, as are investments in plants and equipment. Capital spending will increase an average of 30% at the four big chip makers — Mitsubishi Electric Corp., NEC Corp., Oki Electric Industries Co. Ltd. and Toshiba Corp. MITI projected a 44.1% rise in the output of the 1M-bit dynamic random-access memory chips to 43.6 million units from from the previous quarter and a 28.4% rise to 56 million next quarter.

Swapping bytes for a bite of the action

BY J. A. SAVAGE
CW STAFF

SAN FRANCISCO — The economic burden of data processing can run a fledgling company into shark-infested waters. This inspired OBS Ventures, a subsidiary of On-Line Business Systems, Inc. (OBS), to offer lifeboat computer services in exchange for a chunk of the start-up company's equity.

Since April 1987, 10 companies have swapped equity or other debt instruments in exchange for the use of OBS's two IBM 3081s and Amdahl Corp. 470/V8 mainframe service under the plan.

"The second most common commodity [needed by start-ups] is information services," said Jeffery Stein, OBS's president. Stein said his two criteria are that the company is a good investment target and needs an IBM mainframe. An OBS investor brochure suggests it also helps to have at least $5 million in annual sales.

Stein, whose private company offers remote computing, custom data processing, custom software and vertical data processing services, said the debt-for-services swap is the most promising and profitable of all the services. OBS has been in business for 19 years.

OBS Ventures has come full circle in most of the companies in which it had a stake, Stein said — meaning that OBS Ventures divested itself of the companies in less than a year.

The first firm to swap service for equity was San Francisco-based Tesseract Corp. Gary Durbin, executive vice-president, said Tesseract came up with the idea of the swap in the early 1980s when the company was changing from a development to a product orientation. At that time, Tesseract was spending $35,000 a month on computer services.

OBS Ventures traded $150,000 worth of computer services for equity "when the company really needed working capital," according to Durbin. "That got us part of the way," he said. The next year, he decided he needed $2 million and appealed to the venture capital community, which raised the money and bought out OBS's share of Tesseract. Tesseract still buys computer services from OBS.

In another case, after giving Koch Systems Corp. — a mortgage-backed securities firm — $750,000 in exchange for 1% to 4% of the company, the other venture capitalists in the deal backed out and left OBS to either duck out or acquire the company. Stein said Koch moved into his offices in May and that the acquisition will be complete sometime this month.

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Note: The third annual Computer Press Awards competition was held April 12, 1988, in New York. Co-sponsors of the competition are Citizen America Corp. and Computer Press Association.

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Infotron nixed Memotec buy-out

CHERRY HILL, N.J. — Memotec Data, Inc., a Canadian data communications company, last week disclosed that it was rebuffed in what it called a friendly attempt to acquire Infotron Systems Corp., based here, at a price that would have been substantially above the latter's trading price or book value.

In a filing with the Securities and Exchange Commission, Memotec, which currently owns 6.5% of Infotron, said it is unsure how it will proceed. An Infotron spokeswoman said Infotron wishes to remain independent.

Memotec said it bought 331,100 Infotron shares on the open market between March 8 and May 31 at prices that ranged between $8.82 and $13 per share for a total of $3.2 million. The purchase would have strengthened Memotec's hand in acquisition discussions, the firm said.

Memotec Chairman Eric Baker proposed a negotiated acquisition in a letter dated April 25 to Infotron Chairman Robert Percell, according to the filing. He said Memotec was willing to pay a price which would represent a premium over Infotron's current price, its 18-month high or book value. Infotron shares closed at $10.75 that day; they traded at $4.25 in November 1987.

Laptops

CONTINUED FROM PAGE 71

and no internal disk drive, as well as two Portable Vectra models. All three are based on the Intel Corp. 8086 microprocessor. The Portable Plus was introduced in 1985, the Vectra models in 1987.

Eastham said HP's OEM agreement with Zenith does not preclude any efforts by HP to develop laptops on its own.

A spokesman for Zenith said the Glenview, Ill.-based company sells its microcomputers to a number of OEM customers, including Control Data Corp., and that the HP agreement is nothing unusual. He said HP has provided peripherals and support in the past for major Zenith customers, including the Internal Revenue Service, under cooperative agreements between the two computer makers.

HP has not yet determined what it will call the Superaport under the HP label.

Zachmann

FROM PAGE 71

Proposing themselves as champions of a truly open standard, they aim to preempt AT&T and Sun's efforts to be the leaders of the Unix pack.

Many analysts have been quick to denounce OSF as a mere exercise in spreading fear, uncertainty and doubt over the future of Unix. They view the move as an effort on the part of vendors to defend the semi-monopoly margins they are able to obtain from their proprietary system and operating system architectures of the past.

OSF from this perspective is viewed not merely as a cynical effort to rain on AT&T and Sun's parade but as an effort to muddle matters enough to retard Unix acceptance in general. The operating motto of OSF, according to this view, is "If you can't beat 'em, join 'em — just enough to mess 'em up."

It's hard to entirely discount this perspective. After all, it was only last fall that DEC's vice-president of research, Sam Fuller, denounced Unix as a stupid plot on the part of the U.S. government to reduce the computer industry to the lowest common denominator and thus hand matters over to Japan.

In fact, aside from Apollo, which has long been primarily a Unix vendor, none of the sponsors of OSF has distinguished itself as a particularly warm and sincere supporter of Unix. And Apollo's participation might be dismissed as an effort to oppose anything having to do with archrival Sun.

For real

Still, there is good reason to see this as more than just a "Stop Unix" — or "Stop AT&T and Sun" — move. In the first place, whatever their past reluctance, the other six vendors have all started taking Unix a great deal more seriously.

Under the new organizational structure, IBM's AIX people in Austin, Texas, are clearly making a genuine effort to offer a real IBM Unix product. HP's Spectrum models, offering Unix before HP's own proprietary operating system was ready, have clearly sold far better with Unix than HP expected.

Honeywell Bull, Siemens and Nixdorf have all begun to make Unix a key part of their future strategy. All appear to recognize that they cannot survive on proprietary architectures indefinitely. Even DEC, although still more reluctant than the others, has taken a far more favorable position toward Unix in recent months.

On the other hand, there is no denying that the recent arrangement between AT&T and Sun has an exclusive character that promises a far less level playing field regarding Unix than AT&T has always promised.

In this case, however, the struggle isn't likely to result in an apocalyptic conflict and the end of the world for Unix. On the contrary, there is a good chance that the warring factions will eventually kiss and make up on this one.

The AT&T and Sun deal appears to have been very much the work of Vittorio Cassoni, who has now left AT&T to return to Olivetti. The deal had an aggressiveness that isn't characteristic of AT&T's typically conservative management.

NONE OF THE sponsors of OSF has distinguished itself as a particularly warm and sincere supporter of Unix.

Chances are good that with Cassoni gone, we will see some sort of reconciliation between OSF and AT&T that will amount, in practice, to AT&T backing down on the deal with Sun — however face-saving the appearance might be. AT&T's present management isn't very likely to be as eager as Cassoni to charge off with a youthful companion like Sun down untrodden paths.

Zachmann is vice-president of research at International Data Corp.

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Success

FROM PAGE 71

members. "I'm results oriented. In academia, the product is an idea or a paper about an idea. In the corporate world, it's something that people buy."

The seed Clark sowed at Stanford has borne fruit. Silicon Graphics made an initial public offering in October 1986, selling $18 million worth of common stock. In fiscal 1987, its first year as a public company, it reported net income of $5.6 million, or 45 cents per share, on revenue of $86.3 million.

Recently, Control Data Corp. announced plans to acquire 20% of Silicon Graphics for $68.9 million. CDC will also purchase $150 million worth of Silicon Graphics workstations during three years and will act as an OEM for the products, selling to CDC's own customers. CDC has particular success with customers interested in mechanical engineering applications, such as auto maker Volkswagen.

Silicon Graphics officials say CDC will not participate in the daily operations of their company. However, they concede that a $150 million customer carries significant clout.

"They'll have significant impact in our R&D activities — the same sort of influence that any $150 million customer would have," says Ed McCracken, Silicon Graphics' president, noting that one CDC representative will sit on his firm's six-member board of directors. "I don't think CDC has the intention to become involved with running Silicon Graphics. I think that's the reason they wanted a minority investment."

Three-dimensional graphics is where Silicon Graphics made its mark, and company officials insist they will not lose sight of that. Sophisticated graphics capabilities captured the attention of design-intensive companies like Boeing Co., McDonnell Douglas Corp. and Chrysler Corp. There are about 7,000 Silicon Graphics workstations currently being used by engineers and scientists.

"Our entire company and our entire energy is focused on this 3-D graphics world," McCracken says. "We're the Apple Computer of the 3-D marketplace. We're doing for 3-D graphics what the Macintosh did for two-dimensional graphics. People have fun using the Mac and our Iris workstation."

Leading the pack

So far, Silicon Graphics has enjoyed a lead in its niche. Although others offer graphics workstations, Silicon Graphics has staked its claim at the high end of the market. And the new breed of computer, dubbed the "graphics supercomputer," launched by Ardent Computer Corp. and Stellar Computer, Inc., offers graphics comparable to Silicon Graphics' but at a significantly higher price.

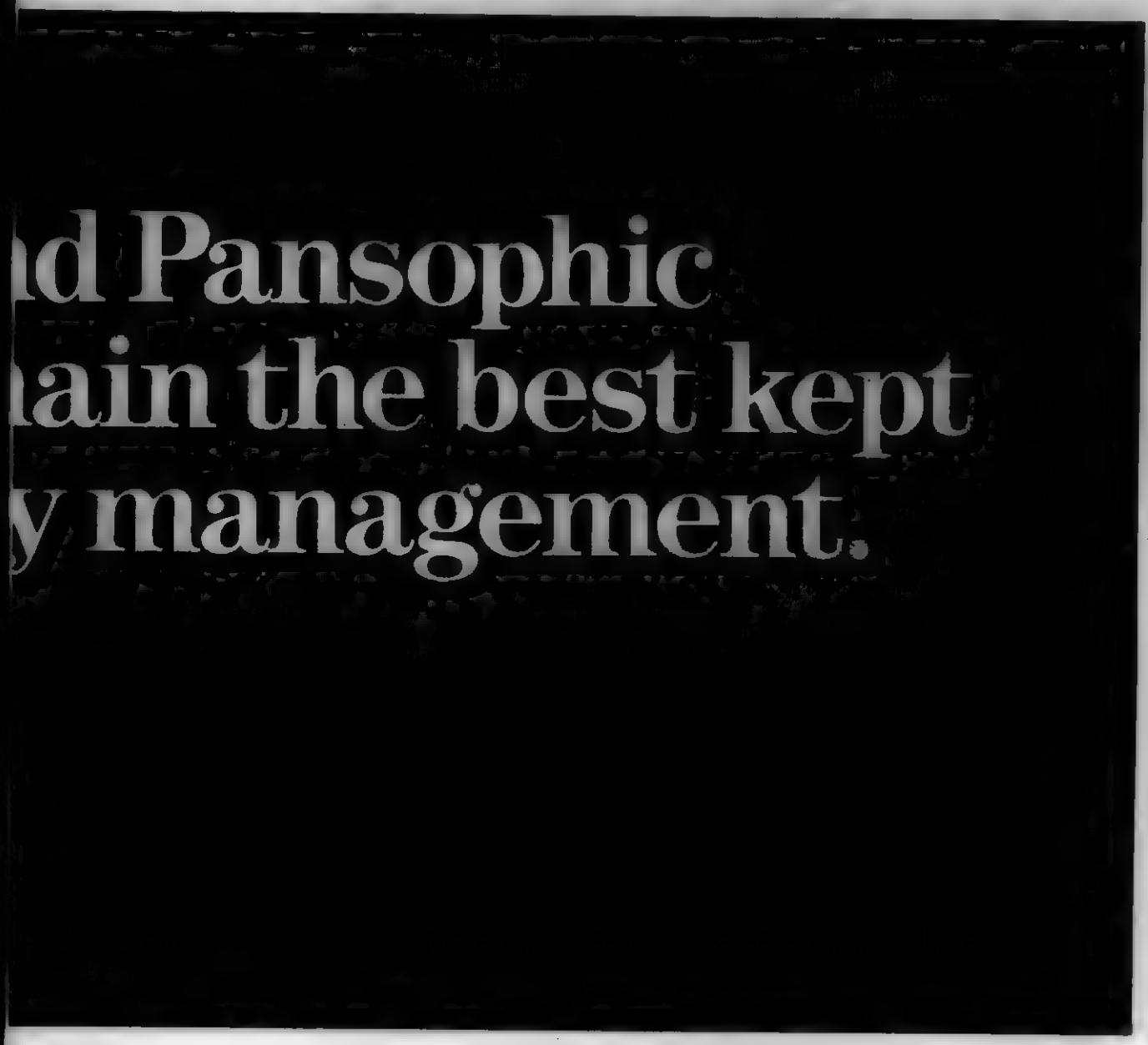
"They've captured the hearts and, more importantly, the pocketbooks of people who really care about high-performance graphics," says Robert Herwick, an industry analyst at Hambrecht & Quist, Inc.

Vic Galea, a project engineering manager at Chrysler, says his firm selected Silicon Graphics' Iris workstation for computer-aided graphics after an exhaustive nine-month search. The Silicon Graphics Iris 4D/60 was chosen over offerings from 23 other vendors.

"They offer the best performance for the price," Galea says. "That's the bottom line. Hewlett-Packard and Apollo were comparable from a graphics point of view, but Silicon Graphics was faster."

Silicon Graphics is looking to expand its niche, moving into the lower priced, $15,000 graphics workstation arena, where it will encounter more competition. Additionally, it is developing a parallel implementation of the reduced instruction set computing chip it buys from Mips Computers, Inc. that will allow it to enhance its computational ability to compete with Ardent's and Stellar's offerings.

Chief scientist Chesson perhaps best articulates Silicon Graphics' philosophy. "I don't need to rule the world," he maintains. "I'd much rather be proud of the things I make and be happy knowing that people are able to use them."



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Decision

FROM PAGE 71

terface designs that make use of sound, animation, graphics and previously copyrighted material — images in compact disk/read-only memory data bases, for example. Such projects bring together the creative efforts of many authors.

Although conceding that multiple registrations would be administratively more difficult than single registrations, Apple's lawyers said the industry has no choice in the matter.

Dissimilar code can produce identical screen displays, according to David L. Hayes, an attorney with Fenwick, Davis and West, a Palo Alto, Calif., law firm that represents Apple.

"Suppose a [software maker] produces an authorised and wholly original computer program that produces screen displays indentical to those copyrighted by [another maker]," Hayes said. "With a policy of single registration, how is the second program to be registered — as a derivative work, or as an original work? To the extent you have independent authors, you must have multiple registration."

Current copyright law provides protection for seven categories of works. Software producers have traditionally sought protection under the literary works category.

When video games came on the scene in the mid-1970s, however, pirates duplicated screen displays with original code. As a defense, video vendors sought additional legal protection for the displays under the audiovisual works category.

Two copyright registrations for a single work was contrary to the policy of the Copyright Office, but for the video game products, the office made an exception.

Then, last year, a court decision involving a company that had two separate registrations for a single product threw the office's policy into confusion. DCA had gained copyrights on both program code and a particular screen display for its Crosstalk data communications software. The Crosstalk display was entirely textual and was registered, as was the program code, under the literary works category.

But the dual registration was granted by a mid-level examiner and was not consistent with official policy, according to Dorothy Schrader, general counsel of the Copyright Office.

Nevertheless, in a suit over alleged copyright infringement by Softklone's Mirror product, DCA won its case based on the screen-display registration.

By suggesting that textual screen displays could gain protection only through an additional registration, this decision, in effect, narrowed the software copyright protection of single registrants. Claimants who had made only single registrations were now at risk.

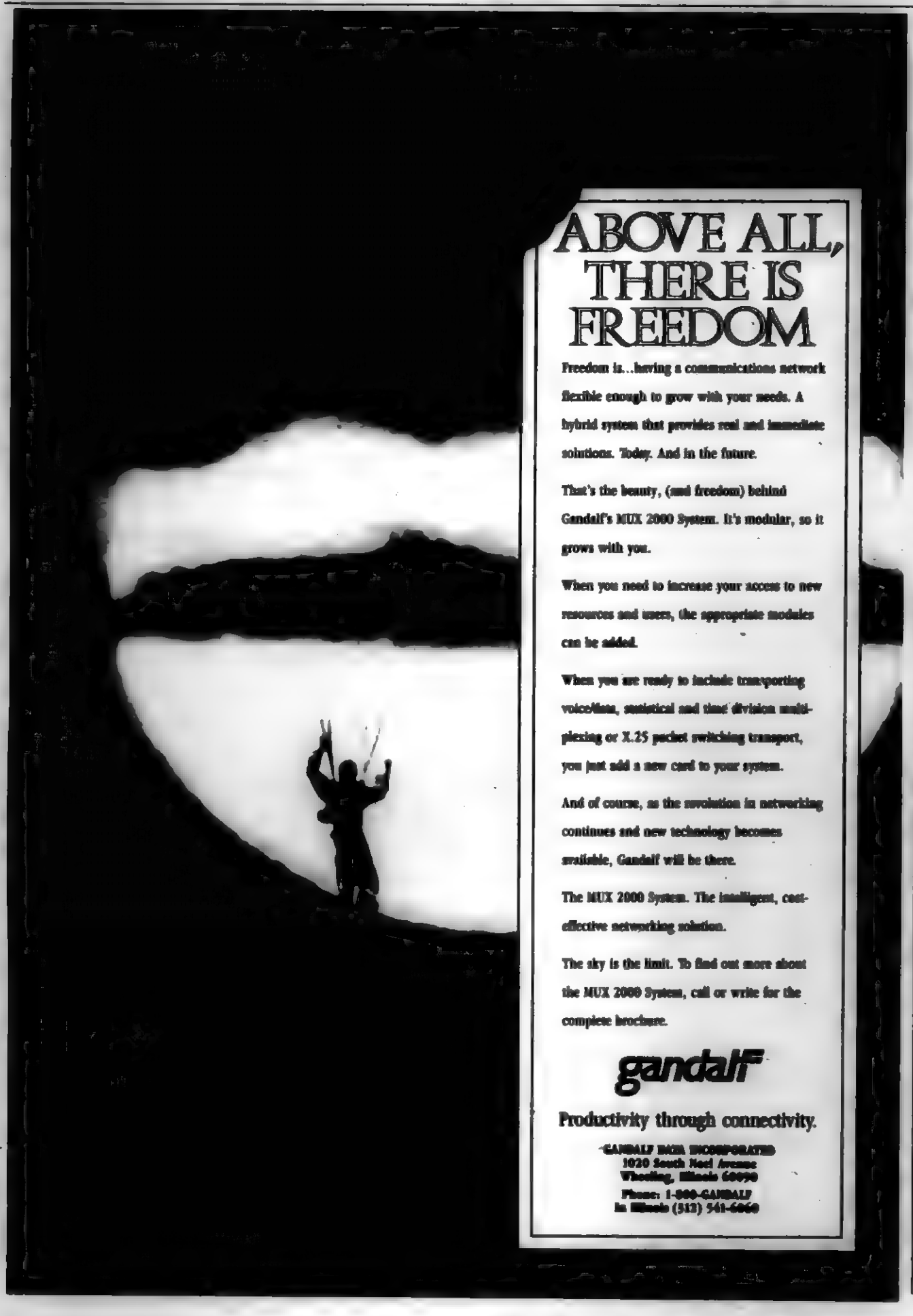
This state of affairs compelled the Copyright Office to re-evaluate its policies on copyright and, ultimately, to hold the public hearing.

Display registry

According to Schrader, the Copyright Office faces four choices in establishing new practices for registration of computer screen displays:

- Unitary registration. Only one registration could be made for computer program or code authorship and any related computer-generated displays.
- Mandatory separate registration. Separate registration would be required for computer program authorship and for any computer-generated screen displays if copyright is claimed in the displays.
- Optional registration. The claimant would have the option to make a single, unitary registration for the computer program and the screen or could register them separately.
- Interface screen registration. The claimant must claim any copyright in user interface screens as part of the claim in the computer program but could elect to register separately any screen displays that are not user interface screens.

Bykes is a Long Beach, Calif.-based information industry journalist and a consultant on Asian markets.



Picking tomorrow's hot fields

A simple technique can guide you through the emerging technologies maze

BY SHERYL KAY
SPECIAL TO CW

Tracking new information systems technologies to identify the ones that will become hot fields can be one key to career planning.

Sifting through the abundance of new technologies to separate the winners from the flashes in the pan may seem an ominous task, but it need not be.

To begin, create a simple planning chart — a table of rows and columns — and label the columns with the names of the technologies you think will come into wide use.

Potential sources

Label the rows for sources of information to monitor: university centers, trade shows, the military, the financial community, research groups and personal tours.

For a preliminary screening of the technologies — before pursuing these sources — track them in reputable technical publications. Those technologies that have received positive coverage for six months or so are the technologies most likely to merit further investigation.

A place to start investigating the technologies that pass this test is in university labs. "Becoming affiliated with two or three key universities, where their projects are developing technologies that will impact businesses you may be interested in, is an excellent investment," says Bruce Wilson, director of advanced technology strategic planning at Seattle-based Boeing Computer Services.

Attending trade shows and conferences, especially those open to many vendors, will further your perspective, Wilson says. "Major producers that have the know-how are at these shows and conferences," he says. "You're now past the 'gee-whiz' stage of the early newsletters and journals and can begin to understand what will happen when the rubber hits the road."

David Rippetoe, a retired U.S. Air Force general who is now an associate at Computer Technology Planning, Inc. in Tampa, Fla., points out how following military expenditures also can be important.

'Our best minds'

"In 1963, the Air Force began a four-month study called Project Forecast One where 300 of our best minds sat down to plan for the new technologies of the next 20 years. A great deal of that study became reality, like advanced radar technology," Rippetoe says.

"Project Forecast Two was just completed last year to take us into the 21st century," he continues. "Most of the study is in the public domain. By monitoring how industry responds to these military technical demands, a technician will see which technologies are the wave of the future."

> "DEVELOP AN attitude to deal with the changes, because even the best predictors may have trouble keeping up with all of the technologies that might be hot in the future."
>
> SANDY GINNIS
> THE TRAVELERS CORP.

Wall Street analysts may not have had the best of times for the past eight months, but when they speak, people still listen.

Market analysts might help you determine which vendors are financially well-positioned for the future as well as which industries are expanding and therefore require more automation.

"We must now be concerned with the total global picture on how financial decisions are made, because the impact on technology is now worldwide," says Bob Malik, a vice-president for corporate technology at The Travelers Corp. in Hartford, Conn., who monitors the financial community.

Another option is to interview those market research firms that follow information technology. Although these firms often sell reports for hefty fees, a representative may be willing to answer specific questions.

The last category may be the most difficult to pursue. If a systems professional has the ability to see some of the technologies in action — or even better, to see how they are being updated — the picture of the future becomes even more fine-tuned. If possible, perhaps through a business acquaintance, try to arrange for tours of companies, seeing both users and vendors.

Every time one of the technologies receives emphatic reviews from one of the information sources, place a check mark in the appropriate space. It soon becomes evident what the authorities think, and a generally positive consensus in any column will be a moderate-to-good indication of a technology that is here to stay.

Words to the wise

A few cautionary words are in order before you change your career path, however. The Travelers' Malik says a systems professional "must have an understanding of where the business plan of the potential employer is going and view the technology in that light."

Don't look at each technology as though it stands alone. "Technology, by itself, driving a business, is just not correct and can be very misleading," according to Malik.

Furthermore, approach the results with a certain tolerance for ambiguity, advises Sandy Ginnis, director of data processing education and development at The Travelers.

"Despite the utilization of all of these sources," Ginnis says, "you must develop an attitude to deal with the changes, because even the best predictors may have trouble keeping up with all of the technologies that might be hot in the future."

Finally, know yourself, Rippetoe advises. "It's very important to look inside yourself," he says. "There may be a lot of new technologies out there, but because of your own skill, only certain ones may be right for you."

Kay is an MIS human resources consultant based in Tampa, Fla.

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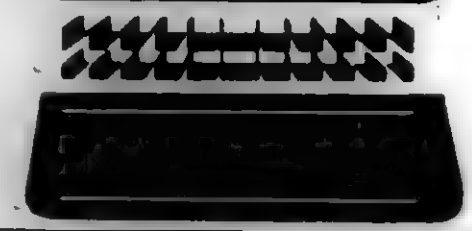

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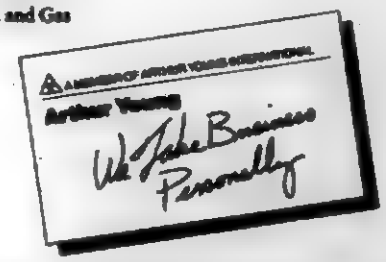

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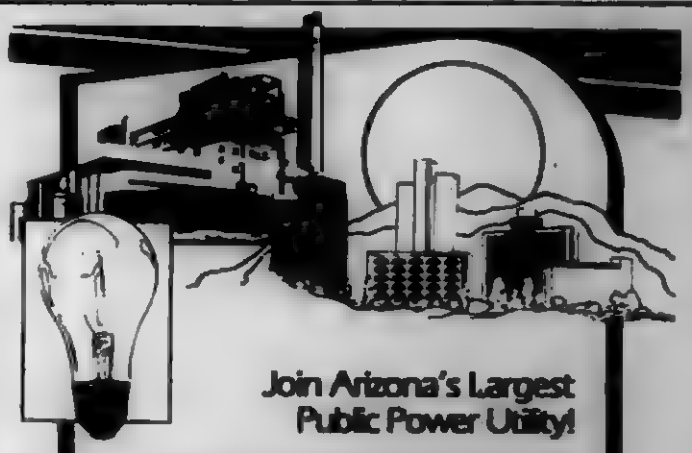

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MIS PROJECT MANAGER

- 10 years related experience
- Excellent interpersonal skills
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PROGRAMMER/ANALYST

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- 5+ years programming/analyst experience
- Strong background in COBOL
- Some supervisory experience
- Telecommunication experience a plus

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- BS Degree in Computer Science
- 2+ years programming experience
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Send resume and salary history (required) to:

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ATTN: Personnel
P.O. Box 2041
San Angelo, Texas 76902

COMPUTER SCIENCE SECTION CHIEF
MANAGEMENT INFORMATION SUPERVISOR 7
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Call or write for Special Application and Examination Materials: Justin Lorman (608) 266-8566; DNR Personnel, P.O. Box 7921; Madison, WI 53707. Deadline date for receipt of completed application and examination in our office is JULY 8, 1988.

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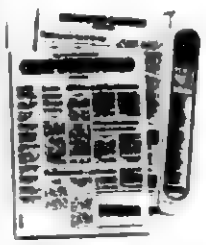

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MARKETPLACE

Steady trading dominates

Compaq users choose to upgrade within line; IBM PC demand met

BY CAMERON HALL
BOSTON COMPUTER EXCHANGE CORP.

The secondary market was active during the week ending May 27, with most systems maintaining price levels in steady trading.

The IBM Personal Computer AT Model 339 and the Compaq Computer Corp. Deskpro 386 were readily available after suffering shortages in recent weeks, but the IBM Personal System/2 Model 80 and the Apple Computer, Inc. Macintosh II continued in short supply.

The IBM market slowed from the trading frenzy of recent weeks as demand for PC- and AT-based machines was met with a ready supply of equipment. Large quantities of these machines are becoming available, with many inquiries about summer delivery of machines being outplaced by corporations upgrading to PS/2 machines.

Up, up and away

Increased interest in the PS/2 models raised prices, with the Model 50 trading at May 20's higher price of $2,400 and the PS/2 Model 60 up $50 to close at $2,650.

The PC XT Model 089 and the AT Model 339 were both down after the highs of recent weeks and were readily available at $1,525 and $3,400, respectively. The most common configuration for the AT available for sale on the Boston Computer Exchange is now an IBM Enhanced Graphics Adapter color system rather than the monochrome system of the past.

In the Compaq market, prices on the popular Deskpro 286 and 386 machines held their own in active trading after dropping in price the week prior. Sellers in this market were upgrading to faster machines within the Compaq line rather than selling, because they had no use or were switching to other manufacturers' models.

> DEMAND from summer session students heated up a generally slow market for the Macintosh 512E, with all sellers satisfied at the closing price of $925.

Buyers experienced savings of up to $1,000 over new discounted prices, with the Deskpro 286 with 40M-byte drive trading at $2,550 against prices of up to $3,600 for new systems, and the Deskpro 386 with 40M-byte drive closing at $3,975 for systems selling discounted new at $4,900.

Demand was off considerably for the early Compaq Portable and Plus machines, with the Portable I losing its place as the most actively traded to the Macintosh Plus.

Ripe market

The Apple market was the most active this week, with most trading in the Mac Plus and 512E lines. The Plus was the machine of the week, as the previous week's drop in price to $1,075 increased the quantity of machines traded and prices remained unchanged this week.

The 20M-byte Plus systems finally yielded to the downward price pressure of recent weeks and fell $150 to $1,600, a more realistic price compared with the price of the floppy disk-based Plus.

Demand from summer session students heated up a generally slow market for the Macintosh 512E, with all sellers satisfied at the closing price of $925. Supply of the Mac SE models is still not able to meet demand.

Computer systems configured with 1M byte or more of random-access memory are beginning to command premium prices.

The BoCoEx Index

Closing prices report for the week ending May 27, 1988

	Closing price	Week's High	Week's low
IBM PC Model 078	$825	$850	$550
XT Model 086	$1,150	$1,200	$875
XT Model 089	$1,525	$1,550	$1,100
AT Model 099	$2,300	$2,425	$1,750
AT Model 239	$2,600	$2,650	$2,125
AT Model 339	$3,400	$3,500	$2,625
PS/2 Model 50	$2,400	$2,500	$2,225
PS/2 Model 60	$2,650	$2,650	$2,475
Compaq Portable I	$800	$825	$525
Portable II	$2,375	$2,375	$1,650
Portable III	$2,775	$2,775	$2,300
Portable 286	$2,175	$2,250	$1,675
Plus	$1,100	$1,150	$750
Deskpro 20-MHz	$1,500	$1,525	$975
Deskpro 286	$2,500	$2,625	$1,525
Deskpro 386	$3,975	$4,000	$3,675
Apple Macintosh 512	$700	$750	$575
512E	$925	$1,025	$650
Plus	$1,075	$1,100	$810
Plus 20-MHz	$1,600	$1,650	$1,350
SE	$1,925	$2,100	$1,600
SE 20-MHz	$2,400	$2,500	$2,050
II	$4,025	$4,325	$3,500
NEC PinWriter P6	$1,050	$1,100	$750
Toshiba T1100+	$1,050	$1,125	$800
Toshiba T5100	$4,000	$4,000	$4,750

INFORMATION PROVIDED BY THE BOSTON COMPUTER EXCHANGE CORP.

The BoCoEx Index prices are based on configurations of complete systems with a monochrome monitor and adapter, but less the value of any software or other peripherals. The Boston Computer Exchange can be reached at 1-800-262-6399.

'Silverlake syndrome' affects 5360 prices

BY TONY MEMBRINO
IDC FINANCIAL SERVICES CORP.

General industry belief has June pegged as the anticipated month in which IBM will announce its long awaited System/36 and 38 follow-on, widely known as Silverlake.

As the impending Silverlake unveiling approaches, it appears that many System/36 users are taking a wait-and-see attitude. Thus, activity on the System/36 used market has slowed down.

Overall, it appears that System/36 users are aware that Silverlake will be based on a different architecture, and thus they are somewhat cynical of what this machine will truly offer.

Factors such as software conversion costs, performance and pricing are significant issues to be resolved before they will make any Silverlake acquisition decisions.

From November 1987 through April 1988, System/36 processors such as the IBM 5360 B models have seen a significant decline in value. In November, a B23 Stage 1 model retailed at 50% of list price, or $20,300. By April, the B23 had fallen to 33%, or $13,398.

Long lead times

The primary reason for this decline was the long lead time on IBM's $6,000 Model B to D upgrade. As a result of these lengthy lead times, users began swapping out their Model Bs and purchasing Model Ds outright.

This led to an oversupply of Model Bs on the secondary market, and used values fell.

IDC Financial Services Corp. research indicates that since April, Model B values have begun to stabilize. Currently, the B23 Stage 1 retails at 33% of list price, and the B24 Stage 1 is trading at 44%.

IBM System/36 processors

Current retail fair market value

	Date shipped	IBM base list price	Percent of list price
5360 B23 Stage 1	July 1983	$40,400	33%
5360 B24 Stage 1	July 1983	$30,100	44%
5362 F10	October 1987	$10,800	*
5363	October 1987	$ 12,500	*

* Currently not available on the secondary market

INFORMATION PROVIDED BY IDC FINANCIAL SERVICES CORP.
CW CHART

Stabilization

Third-party contacts say a combination of factors has contributed to the stabilization of B values. These include the following:

- B users have retained their machines in anticipation of prices dropping on higher end System/36 models after Silverlake is announced.
- Dealers have acquired Model B machines for the 200M-byte drive, thus drying up supply.
- The realization by System/34 users that 5360 B models have become bargain machines on the secondary market.

IDC Financial Services has also heard speculation that lead times on IBM Model B to D upgrades are shortening. If this is the case, some users will hold on to their 5360 B machines and upgrade to D models, thus contributing to the decreasing supply of B models. This action could also result in D machines reaching the used market prematurely and causing D values to drop.

While System/36 activity has been slowing on the used market, the 5363 has added new life to the System/36 line.

Since its announcement in October 1987, demand has gone unabated. While lead times of up to eight weeks are not unheard of from IBM, third-party dealers are able to obtain these machines for users in a more timely fashion. In addition, a user can expect to get these machines new from third-party dealers at 10% to 15% off of list price.

Some of the attributes that make the 5363 so successful include its low entry price, wide selection of software, low maintenance costs and ease of use.

According to third-party contacts, most of the users who have acquired 5363 models are not new users but past IBM 5362, 5364 or 5360 A model users. System/34 users are also finding this box an attractive buy.

For more information, contact IDC Financial Services' Terri LeBlanc at 617-872-8200.

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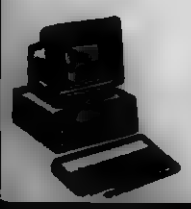

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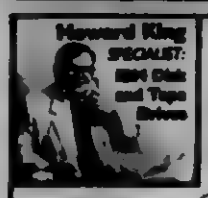

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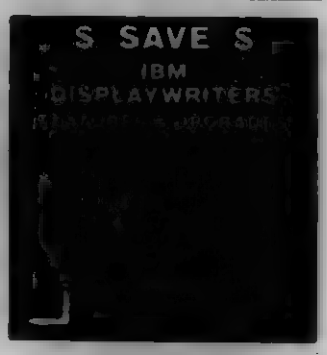

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Copies of the RFP will be available for distribution on May 24, 1988, in Rm. 610, 250 Broadway, New York, N.Y. 10007. Proposals must be submitted to the Authority in the form specified in the RFP, by 4:00 P.M. on June 21, 1988.

Inquiries should be directed to Mr. Robert Dunn, Esq., Deputy General Counsel, Rm. 623, 250 Broadway, New York, New York 10007, (212) 566-4356.

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A proposers' conference will be held at 10:30 A.M. on Monday, June 20, 1988, in the 6th floor conference room, at 250 Church Street, New York, N.Y.

Proposals will be received by New York City Human Resources Administration/Department of Social Services until 5 P.M. on Monday, July 25, 1988.

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Training

Companies tuning in training

Internal and commercial networks add PC training to their lineups

BY SHARON BAKER
CW STAFF

A television network is one means of providing employees with education, training and information. Recently, some satisfied companies have broadened their use of TV networks, using the facilities to provide personal computer training.

PC training is being provided by commercial networks operated by universities or other parties, which typically broadcast academic courses in advanced technologies, as well as by private, internal networks operated by large corporations.

The University of Southern California's 16-year-old Instructional Television Network is an example of the approach many universities have embarked on to provide graduate-level computer science and engineering programs to busy professionals.

The network beams courses for USC master's degree programs via microwave to corporate subscribers within 70 miles of the Los Angeles campus and to four public classroom facilities.

Also, the network carries non-credit courses on technical and management topics ranging from Ada programming to stress reduction.

The network acquires some of the non-credit programs from commercial training vendors or other universities and produces some itself, according to program coordinator Raymond Fujioka.

Courses save travel

The chief advantage of televised education and training is the convenience of avoiding travel, according to Mary Ehrlich, manager of human resource development at Aerojet Electro Systems, Inc. in Azusa, Calif., which is a major user of USC's network.

The university charges students its regular tuition fees for courses taken for degree credit, plus a $75 surcharge that covers delivery of homework. Non-credit courses, ranging from one to 23 sessions, can be free or cost as much as $300 per student. Company discounts are available.

The USC network rebroadcasts academic classes for students who miss them and queries users to identify topics for non-credit classes, Ehrlich says.

"They feel out the organizations and watch those critiques and know what the hot subjects are," she says.

During the past year, organizations such as Aerojet began expressing an interest in software training for personal computers, Fujioka says.

As a result, the network offered courses on Microsoft Corp.'s MS-DOS, Ashton-Tate Corp.'s Dbase III Plus and Lotus Development Corp.'s 1-2-3. The programs used by USC were designed by New York-based Microvideo Learning Systems.

The televised PC training is for passive viewing; students do not work at a keyboard as they watch, Ehrlich says. But the students find the overviews valuable, she adds.

Lack of interaction between students and instructor is a commonly cited drawback of much televised training.

"If a student does not understand the lecture, he can't ask the instructor what he was talking about," Fujioka says.

To offset that drawback, the internal satellite television network operated by Eastman Kodak Co. includes a telephone link that allows those on the receiving end to call in with questions.

Last November, for the first time, the company used the network to carry PC training — a live, two-hour program providing new users an overview of the PC.

> "I THINK televised training is a very effective way to get a message out to a large number of people that is consistent."
>
> BILL EDWARDS
> EASTMAN KODAK CO.

"Kodak uses this [network] almost daily for updating their sales and service and marketing people throughout the U.S.," says Bill Edwards, coordinator of end-user and personal computing at Kodak.

The PC program, broadcast from Kodak's Rochester, N.Y. studio to 60 remote sites nationwide, was conducted by Logical Operations, Inc., a PC training firm also based in Rochester that provides training services for about 150 companies.

Harvey Feldstein, director of sales and marketing at Logical Operations, says he knows of only one other corporation that provides PC training through an internal television network. "I would say it's quite innovative," he says of Kodak's approach.

The human touch

Feldstein admits that even a live instructor with a call-in feature has its drawbacks.

"We think that people learn best with a live, warm human person, not only to answer their technical needs but also address their human needs," Feldstein says. "That becomes difficult in this kind of training because the instructor can't see the students — he can't see them responding to this type of training."

But Kodak offered the PC program via satellite to provide interaction between the instructor and students while ensuring consistency in its training. With 60 sites around the country, it is often difficult to be consistent when relying on local vendors, Edwards says. "I think it's a very effective way to get a message out to a large number of people that is consistent."

Edwards acknowledges that an internal network, which might cost several million dollars to build, is a viable option only for large organizations.

"You'd have to have a very large critical mass to make that work," he says.

Baker is a Computerworld copy editor.

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July 11	Disaster Prevention & Recovery Products & Services	June 24
July 25	Productivity Software	July 8
Aug. 8	IBM Midrange Software (System 3/X)	July 22
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Sept. 19	Hardware Roundup: Large, Medium Scale and Special Purpose Systems	Sept. 2
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Oct. 3	Hardware Roundup: Personal Computers and Workstations	Sept. 16
Oct. 17	AI/Expert Systems	Sept. 30
Oct. 31	Unix	Oct. 14
Nov. 14	TBA	Oct. 28

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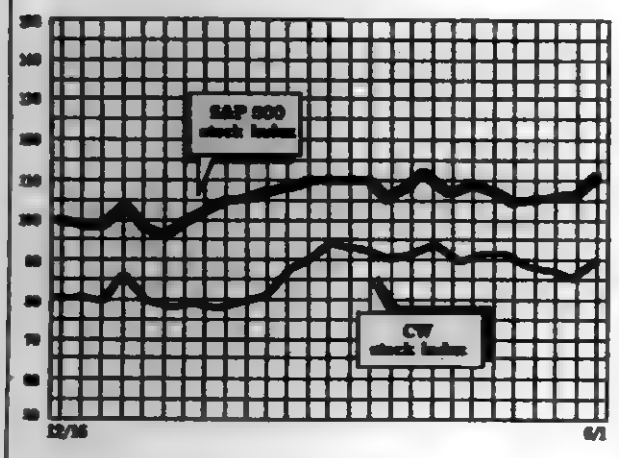
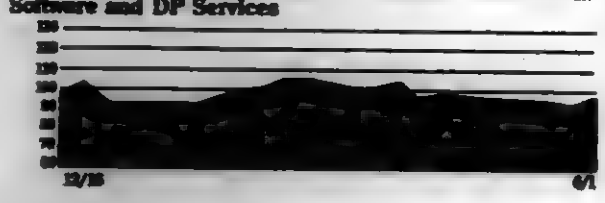


Indexes	Last Week	This Week
Communications	93.9	97.9
Computer Systems	97.1	100.3
Software & DP Services	93.6	98.0
Semiconductors	59.2	69.1
Peripherals & Subsystems	79.6	82.4
Leasing Companies	120.7	126.2
Composite Index	85.6	90.8
S&P 500 Index	106.0	111.5

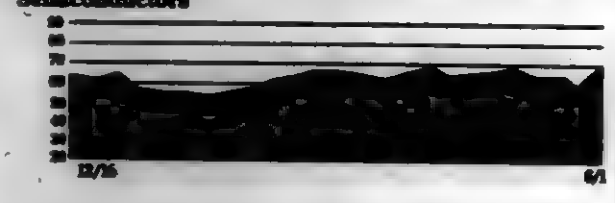
Communications

Computer Systems

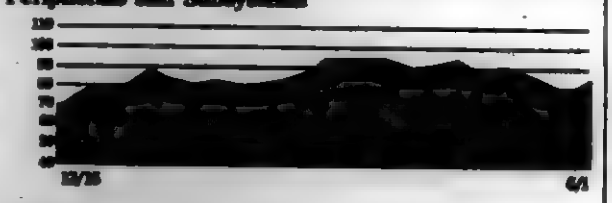
Software and DP Services



Semiconductors



Peripherals and Subsystems



Leasing Companies

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JUNE 1, 1988

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JUNE 1 1988	WEEK NET CHANGE	WEEK PCT CHANGE
	Communications and Network Services					
N	AMERICAN INFO TECHN CORP	100	74	91.88	4.1	4.7
O	ANDREW CORP	18	11	15.50	0.5	3.4
O	ARTEL COMM CORP	3	1	2.13	0.6	41.7
N	AT&T	36	20	27.75	1.3	4.7
O	AVANT GARDE COMP INC	3	2	2.00	-0.1	-4.8
O	AVANTEK INC	17	8	8.88	-0.3	-3.5
N	AYDIN CORP	35	18	19.50	-0.5	-1.9
N	BELL ATLANTIC CORP	89	61	72.88	4.4	6.4
N	BELLSOUTH CORP	44	29	41.88	2.3	5.7
O	COMPRESSION LABS INC	6	2	3.75	-0.1	-3.2
O	COMPUTER NETWORK TECH	5	1	1.31	0.0	-2.3
O	CONTEL CORP	49	28	32.25	1.3	4.9
O	DATA SWITCH CORP	10	4	7.38	0.8	12.0
O	DIGITAL COMM ASSOC	49	20	32.63	0.5	1.6
O	DYNATECH CORP	33	14	20.25	0.5	2.5
O	FIBRONICS INTERNATIONAL INC	7	2	3.50	0.4	12.8
O	GANDALF TECHNOLOGIES	10	5	7.25	0.2	2.8
O	GENERAL DATACOMM INDS	13	3	3.63	0.0	0.0
N	GTE CORP	45	28	37.75	2.4	6.7
O	INFOTRON SYS CORP	14	5	12.50	-0.5	-3.8
N	ITT CORP	48	42	46.38	2.5	5.4
O	M A COM INC	16	7	10.63	0.5	5.0
O	MCI COMMUNICATIONS CORP	15	8	14.00	0.5	3.7
O	MICOM SYS INC	17	7	15.50	0.3	1.9
O	NETWORK EQUIPMENT TECH INC	20	12	16.00	0.5	4.3
O	NETWORK SYS CORP	13	7	9.75	0.3	2.6
O	NORTHERN TELECOM LTD	24	14	17.00	1.0	6.0
O	NOVELL INC	30	12	23.75	0.9	3.9
O	NYNEX CORP	78	58	68.13	3.8	5.7
O	PACIFIC TELESIS GROUP	34	23	30.50	1.4	4.7
O	PARADYNE CORP	9	4	4.38	0.0	0.0
O	PENRIL CORP	5	1	4.38	-0.3	-6.4
N	PLESSEY PLC	36	23	26.75	-0.8	-2.9
O	SCIENTIFIC ATLANTA INC	20	8	13.88	1.5	12.1
N	SOUTHWESTERN BELL CORP	48	32	38.13	1.9	5.2
N	3 COM CORP	28	12	18.88	-1.0	-5.0
O	UNGERMANN BASS INC	15	6	12.25	0.0	0.0
N	US WEST INC	59	43	55.13	2.4	4.5
	Computer Systems					
O	ALLIANT COMPUTER SYS	33	5	5.75	-0.3	-4.2
O	ALPHA MICROSYSTEMS	6	3	6.00	0.3	4.3
O	AMDAHL CORP	15	6	8.63	0.0	0.0
N	APOLLO COMPUTER INC	35	15	48.00	3.1	7.0
O	APPLE COMPUTER INC	26	9	15.63	1.3	8.7
N	BOLT BERANEK & NEWMAN	39	28	42.50	2.5	6.3
O	BRYTON LEE INC	25	12	16.25	0.3	1.9
N	COMPAQ COMPUTER CORP	4	1	2.00	-0.1	-3.1
O	COMPUTER AUTOMATION INC	70	34	52.00	2.1	4.2
O	COMPUTER CONSOLES INC	16	6	8.75	-0.4	-4.5
O	CONCURRENT COMP CORP	10	2	7.38	0.1	1.7
O	CONTROL DATA CORP DEL	24	11	17.00	0.0	0.0
N	CONVERGENT TECH	28	16	26.38	0.5	2.0
O	CONVEX COMPUTER CORP	9	3	3.19	-0.1	-1.9
O	CRAY RESH INC	15	6	8.00	0.5	6.7
N	DAISY SYS CORP	118	47	78.13	4.0	5.3
O	DATA GEN CORP	11	5	10.25	1.1	12.1
N	DATAPOINT CORP	37	18	22.00	0.5	2.5
O	DIGITAL EQUIP CORP	9	3	5.63	-0.1	-2.2
N	FLOATING POINT SYS INC	280	90	105.88	3.5	3.4
N	GOULD INC	12	2	2.75	-0.3	-9.3
N	HARRIS CORP	34	8	14.38	0.3	1.8
N	HEWLETT PACKARD CO	41	22	38.00	0.1	0.4
N	HONEYWELL INC	74	38	68.00	2.1	3.2
N	IBM	91	48	70.50	2.8	4.1
O	INFORMATION INTL INC	178	102	113.13	2.3	2.5
O	IPL SYS INC	15	9	12.88	0.1	0.1
O	MASS COMPUTER CORP	3	1	1.75	0.0	0.0
N	MATSUSHITA ELEC INDL LTD	14	4	4.25	-0.1	-2.9
O	MEGADATA CORP	229	102	205.00	-3.0	-1.4
O	MENTOR GRAPHICS CORP	5	3	3.13	0.0	0.0
N	NBI INC	36	14	31.25	2.8	9.8
N	NCR CORP	14	4	4.88	-0.1	-2.1
N	PRIME COMPUTER INC	57	42	61.38	1.3	2.1
O	PYRAMID TECHNOLOGY	31	12	16.50	0.5	4.9
O	STRATUS COMPUTER	14	8	12.00	0.5	4.7
O	SUN MICROSYSTEMS INC	40	15	28.25	1.5	5.6
O	SYMBOLICS INC	45	14	24.25	1.5	6.6
O	SEQUENT COMPUTER SYS INC	5	1	1.44	0.0	0.0
N	TANDEM COMPUTERS INC	33	9	18.00	0.4	2.1
N	TANDY CORP	37	16	16.13	0.5	2.8
N	ULTIMATE CORP	57	28	47.13	2.5	5.6
N	UNISYS CORP	37	12	13.00	-0.1	-1.0
A	WANG LABS INC	48	28	34.88	1.0	2.5
A	WANG LABS INC	19	10	10.00	0.3	3.4
	Software & DP Services					
O	ADVANCED COMP TECH	6	1	1.13	-0.1	-10.0
N	AGS COMPUTERS INC	20	11	22.50	1.0	4.7
O	AMERICAN MGMT SYS INC	20	8	16.50	1.5	10.0
O	AMERICAN SOFTWARE INC	10	6	13.38	0.4	2.8
O	AMACOMP INC	11	4	10.25	0.5	5.1
O	ANALYSTS INTL CORP	10	4	7.88	-0.4	-4.8
N	ASHTON TATE	33	13	27.50	2.0	12.2
O	ASK COMPUTER SYS INC	16	6	14.00	0.5	4.7
O	AUTODESK INC	30	12	28.00	2.5	9.4
N	AUTO DATA PROCESSING	58	36	42.00	2.4	6.3
O	BOOLE & BABBAGE INC	12	5	9.38	0.3	2.8
O	COMPUTER ASSOC INTL INC	37	15	27.38	2.1	8.3
O	COMPUTER HORIZONS CORP	15	7	9.88	0.8	8.2
O	COMPUTER SCIENCES CORP	73	36	41.88	1.3	3.1
N	COMPUTER TASK GROUP INC	17	9	10.63	0.4	3.7
O	COSMOS INC	17	4	6.00	0.0	0.0
O	COMSHARE INC	20	12	16.13	0.5	3.0
O	CULLINET SOFTWARE INC	15	4	7.75	0.4	5.1
O	DUQUESNE SYS INC	30	10	19.75	1.0	5.3
A	DATA ARCHITECTS INC	16	7	13.75	0.5	3.8
N	GENERAL MTRS (CLS E)	51	30	42.63	1.5	3.6
O	MORGAN SYS INC	10	4	4.38	0.1	2.1
O	SYCOMAN CORP	21	12	18.50	1.3	7.2
O	INTELLICORP INC	11	2	2.75	0.0	0.0
O	MCAFEE INC	16	6	11.50	0.0	0.0
O	LOTUS DEV CORP	40	19	22.75	1.3	6.0
O	MANAGEMENT SCI AMER	15	6	8.75	0.1	0.1
O	MICRO FRD INTL CORP	7	3	2.88	-0.1	-3.9
N	MICROSOFT CORP	72	37	59.25	2.5	4.4
O	MORINO ASSOCIATES INC	12	7	10	0.1	1.0
O	NATIONAL DATA CORP	26	20	24.75	2.5	12.1
O	ON LINE SOFTWARE INTL INC	13	6	8.88	0.1	1.4
O	ORACLE SYS CORP	19	6	17.13	1.5	9.6
O	PANSOPHIC SYS INC	28	11	14.50	0.5	3.6
O	POLICY MGMT SYS CORP	30	15	24.50	0.5	2.1
O	PROGRAMMING & SYS INC	14	7	11.75	0.3	2.2
N	REYNOLDS & REYNOLDS CO	36	14	17.75	0.5	2.9
N	SEI CORP	19	10	17.88	0.5	2.9
O	SHARED MED SYS CORP	35	19	22.88	1.3	6.0
O	SAGE SOFTWARE INC	10	3	3.75	0.0	0.0
O	SOFTWARE PUBS CORP	18	6	17.13	0.1	0.7
A	STERLING SOFTWARE INC	12	6	7.13	-1.0	-14.0
O	SUNGARD DATA SYS INC	30	16	16.75	-0.3	-1.5
O	SYSTEMATICS INC	33	19	31.25	-0.5	-1.6
N	SYS. SOFT INC.	24	7	14	-0.3	-1.7
O	VM SOFTWARE INC	30	7	13.25	-0.3	-1.9
	Semiconductors					
N	ADV MICRO DEVICES INC	25	8	15.00	1.1	7.9
N	ANALOG DEVICES INC	20	8	15.13	1.4	10.0
O	ANALOGIC CORP	13	5	6.63	0.0	0.0
O	INTEL CORP	42	19	31.25	1.8	6.5
O	LSI LOGIC CORP	15	7	12.00	1.0	9.1
N	MOTOROLA INC	74	28	48.25	1.1	2.4
N	NATL SEMICONDUCTOR	22	10	14.00	1.1	8.7
N	TEXAS INSTRS INC	85	36	46.88	2.5	5.6
A	WESTERN DIGITAL CORP	20	11	15.38	0.6	4.2
	Peripherals					
O	ALLOY COMP	13	3	3.00	0.0	0.0
N	AM INTL INC	9	3	4.00	0.3	8.7
O	ART RESH INC	21	6	12.75	-0.3	-1.9
O	AUTO TROL TECH CORP	7	3	4.63	-0.1	-2.6
O	DIMETEC INC	15	5	7.88	-0.1	-1.6
O	CIPHER DATA PRODS INC	13	4	8.88	1.0	12.7
O	COGNITRONICS CORP	5	2	2.63	-0.1	-4.5
N	COMPUGRAPHIC CORP	28	19	27.00	0.4	1.4
O	DATAPRODUCTS CORP	24	7	8.50	0.1	1.2
O	DATARAM CORP	9	5	6.88	0.1	1.5
N	EASTMAN KODAK CO	71	38	43.00	1.9	4.6
O	E M C CORP MASS	20	8	6.50	0.1	2.0
O	EMULEX CORP	9	4	7.38	0.0	0.0
O	EVANS & SUTHERLAND	35	17	17.00	0.3	1.5
O	IDOT CORP	8	3	3.25	0.1	4.8
O	INTERLEAF INC	24	11	15.75	1.8	11.5
N	IOMEGA CORP	4	1	3.63	0.8	28.8
O	LEE DATA CORP	6	3	3.75	0.8	26.0
O	MASSTOR SYS CORP	6	1	2.88	0.0	0.0
O	MAXTOR CORP	31	8	11.63	-0.3	-2.1
O	MICROPOLIS CORP	42	13	23.50	2.3	10.8
N	MINISCRIBE CORP	17	5	10.88	0.1	1.2
N	MINNESOTA MINS & MFG CO	89	46	82.63	4.1	7.1
A	MSI DATA CORP	19	8	13.75	0.5	3.8
O	PERSONAL COMPUTER PRODUCTS INC	7	4	5.63	0.1	1.1
O	PRIAM CORP	6	1	1.88	0.0	0.0
O	PRINTRONIX INC	13	7	9.63	0.3	2.7
O	QMS INC	27	8	8.38	0.0	0.0
O	QUANTUM CORP	23	8	10.75	1.0	10.3
O	ARMTEK CORP	6	1	1.44	0.1	4.8
O	RECOGNITION EQUIP INC	22	7	7.25	0.6	9.4
O	SEAGATE	11	4	4.13	-2.9	-41.1
O	SCAN TRON CORP	17	7	14.88	0.4	2.8
O	SEAGATE TECHNOLOGY	44	10	17.63	0.9	5.2
O	STORAGE TECH CORP	5	1	1.69	0.0	0.0
O	TANDON CORP	7	1	2.31	0.2	8.8
O	TEC INC	7	3	4.13	0.0	0.0
N	TEKTRONIX INC	41	21	26.13	-0.1	-0.5
O	TELEVIDEO SYS INC	3	1	1.31	0.1	8.0
N	TELEX CORP	69	30	47.88	-1.0	-2.0
O	WYSE TECH	49	11	18.38	0.5	2.8
N	XEROX CORP	86	60	82.38	1.0	1.9
O	XIDEX CORP	15	6	8.00	0.3	4.9
	Leasing Companies					
O	CAPITAL ASSOCIATES INTER-NATIONAL INC	11	4	5.88	0.3	4.4
N	COMDISCO INC	37	12	21.13	1.4	7.0
N	CONTINENTAL INFO SYS	14	5	7.00	0.0	0.0
O	PHOENIX AMERN INC	6	2	3.00	-0.1	-2.1
O	SELECTRON INC	6	3	5.38	0.4	7.7

EXCH: N—NEW YORK; A—AMERICAN; O—NASDAQ; O—OVER-THE-COUNTER; S—SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. EST LAST WED.
(1) TO NEAREST DOLLAR

Crackle, pop

DEC arrives for breakfast, Compaq readjusts after slide

The dosing market of the past two weeks suddenly arose and headed toward the stars last week as the Dow Jones industrial average posted a 107-point midweek rally, mapping major computer issues out of their recent lethargy.

In a week shortened by the Memorial Day weekend, Digital Equipment Corp. posted the largest gain, shooting up 5½ points from a week earlier to close Thursday at 105⅛. Compaq Computer Corp. also ended a recent slide — with the help of a Salomon Brothers, Inc. report that raised its earnings forecast on the firm — and rose 4⅜ points for the three days of trading to 52¼.

In other action, IBM leapt 4⅛ points to 112⅝; Cray Research, Inc. rose 4 points to 78⅛; Microsoft Corp. gained 3½ points to 59; Ashton-Tate Corp. rose 2⅝ points to 26⅝; Amdahl Corp. was up 2⅜ points to 47⅛; and Software Publishing Corp. rose 2⅛ points to 19⅛. On a sour note, however, SHL Systemhouse, Inc. fell 3 points to a 52-week low of 10⅛ after Hambrecht & Quist, Inc. forecast a shortfall in revenue growth in the firm's government sector and lowered its recommendation.

JAMES DALY

HP augments 10M Ethernet line

BY PATRICIA KEEFE
CW STAFF

ROSEVILLE, Calif. — Hewlett-Packard Co. recently sweetened its previously announced 10M bit/sec. Ethernet offering with the introduction of HP Starlan 10 PC Link, a network adapter card said to cut costs by directly linking users to the unshielded telephone wire-based technology.

But it may not be enough to stave off even cheaper, more generic 10M-bit Starlan adapter cards from Micom-Interlan, Inc., TRW, Inc. and Kinetics Corp.

HP's initial approach consisted of a more expensive external device called the Medium Attachment Unit (MAU), which is used to link personal computers on a network to a wiring closet. It costs an additional $295 beyond the cost of the network adapter and software. Ungermann-Bass, Inc., 3Com Corp. and Digital Equipment Corp. all offer or have announced external MAU products as well.

The PC Link card is said to be compatible with Microsoft Corp. MS-Net-based software.

Micom-Interlan, TRW and Kinetics have all embedded 10M bit/sec. Ethernet technology from Synoptics Communications, Inc. in their Ethernet boards. In addition, those cards all come with software drivers supporting a host of network operating systems. The bundled product costs $495. PC Link comes with HP's Officeshare network software and costs $695.

"HP's card has a $200 premium in the market and is a proprietary card," said Michael Claire, Synoptics' vice-president of marketing and sales.

However, HP users can separately purchase Novell, Inc.'s Netware or 3Com's 3+ network software for use with the PC Link card, said Becky Magtanoka, a product line manager with HP.

As for the pricing issue, Magtanoka said PC Link's $695 list price "does not reflect the decoupling of Officeshare." She suggested the card, separately purchased, might cost somewhere between $395 and $595.

Perot

FROM PAGE 1

time expired Wednesday, and Perot unveiled Perot Systems Corp. Thursday at a Washington press conference.

Aiming high

The new company has an ambitious business plan to reach $100 million in annual profits within 10 years, according to McClellan. "To do that, it will take a lot of government megacontracts," he said. "I expect there will be heavy recruiting from EDS."

Six of the eight EDS executives at Perot Systems are from EDS's federal division, including Perot Systems President Patrick Horner, the division's top marketing manager.

In addition, Perot recruited three EDS corporate executives: Ross Reeves, vice-president of information processing; DeSoto Jordan, vice-president of corporate affairs; and Bruce Heath, vice-president of EDS operations at GM's Truck and Bus unit.

The Postal Service contract calls for a three-month study to determine potential DP cost savings, then a potential 10-year period for Perot Systems to implement systems. The profit will come from a unconventional shared savings plan with the Postal Service through a yet-to-be-determined formula.

Thursday's announcement caused heavy selling of EDS stock, which is traded as GM Class E. Shares dropped 2¾ points to 39⅛ on the New York Stock Exchange.

Delusion

FROM PAGE 1

Washington, D.C.

That is not what the founding fathers of IRM intended when they drafted the Paperwork Reduction Act of 1980, which was a mixture of IRM and paperwork control initiatives. The IRM philosophy views information as a valuable resource that must be managed from the beginning to the end of its life cycle, whether in electronic or paper form.

For example, this means keeping close tabs on the cost of information — from the design of a statistical survey to the time the final report is stashed on a dusty government shelf.

If frogs had wings . . .

Because it shifts attention from technology to the information itself, the IRM philosophy is supposed to bring together, under one management structure, such disparate areas as data processing, communications, libraries and records management.

But the theory, which some say was 15 years ahead of its time, has run smack into reality. Caudle's survey — the first ever done on IRM — reached the following conclusions:

- IRM is not well known or understood in most departments or bureaus. Managers are more comfortable with technology management than with information management.
- Most managers still consider information a "free good."
- Half of the IRM managers lack control over library services, and nearly one-third do not have control over records management or voice communications. Such non-DP functions are still considered to be administrative services or overhead.

The Commerce Department's Phillips

A 1986 report by the U.S. Congress's Office of Technology Assessment (OTA) came to similar conclusions. The researchers found that federal managers view the IRM concept as either an umbrella term meaning virtually the same thing as DP or as "an interesting and worthwhile concept, but much too broad to have substantial impact on down-to-earth problems."

In the latter category is Head, the former Agriculture Department official and now a consultant in Stafford, Va. It is fine to view information as a valuable resource, he said, but the real world requires specialists to manage computers and specialists to manage paperwork.

When the Agriculture Department's Office of Information Systems was transformed into the Office of Information Resources Management, Head recalled thinking: "Yesterday, you were a computer specialist. Today, you're an information resource manager. What are you going to do different today from what you did yesterday? The honest answer is, nothing."

A dissenter

At the other end of the spectrum is a strong supporter of IRM, Reed Phillips Jr., director of IRM at the U.S. Department of Commerce. He built the government's first IRM office when he was at the U.S. Department of the Interior and has watched in frustration as it has been dismantled [CW, Oct. 5, 1987]. The Reagan administration viewed IRM as a product of Democrats and thus paid it mere lip service, Phillips said. "I don't think this administration ever really supported the IRM concept."

The Reagan administration's position, as stated by the president's Office of Management and Budget (OMB), is that IRM "is simply a means to perform agency missions and is not an end in and of itself."

The U.S. General Accounting Office reported last year that agencies devote most of their energies to implementing the specific requirements of the Paperwork Reduction Act, such as naming a senior IRM official and conducting a systems inventory,

The Center for Information Technology's Keen

rather than on the broad objectives of the act.

The act also requires five-year IRM plans and triennial IRM reviews, with oversight by the General Services Administration (GSA) and the OMB. The result is that federal IRM is more closely identified with red tape than with information management, the Caudle survey said.

The major incentive to comply with IRM directives is a "hammer" incentive: the rules must be followed in order to buy hardware and software, the report said. Consequently, managers at the bureau level consider IRM "a world of rules and restrictions, a maze to be gone through to obtain vital tools."

The good news is that the IRM program has improved strategic planning in the agencies, several experts agreed. "In large information-intensive agencies, IRM is part of the agency's strategic plan. In small information-intensive agencies, it *is* the agency's strategic plan," said Frank J. Carr, GSA's commissioner of IRM services.

As a practical matter, the IRM strategic plan serves the purpose of floating IRM programs up to superiors for approval and giving IRM visibility with top management, according to the Caudle report.

Furthermore, IRM experts said the convergence of computer and communications technology is helping break down the barriers to IRM. But full-scale adoption of IRM principles may require a new generation of managers who are not steeped in the old data processing traditions.

The IRM concept is still valid, according to Peter G. W. Keen, executive director of the International Center for Information Technologies, a Washington research center, but DP managers put in the role of IRM managers need to learn new analytical skills to understand the flow of information in an enterprise.

"It's the same thing with CIO. We've raised the DP manager in the hierarchy, but we haven't changed the thinking," Keen said. "We constantly relabel the status quo."

Donald A. Marchand, dean of the School of Information Studies at Syracuse University and one of the original gurus of IRM, said people should realize that IRM is evolutionary and will take more time to be fully realized.

Federal IRM managers must also cope with problems such as budget cuts, bureaucratic inertia and internal and external politics, the OTA noted: "As is probably true with any new (or relatively new) concept, as the concept moves from its guiding principles through the various stages of implementation, the broad philosophy becomes more and more distant."

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TRENDS

EGA vs. VGA

Upcoming VGA standard to capture graphics booty

REVENUE IN MILLIONS

Every three years comes a new IBM Personal Computer graphics standard. In 1981, with the unveiling of the PC, there was the Color Graphics Adapter (CGA), with 640- by 200-pixel resolution and a maximum of 16 colors available.

The Enhanced Graphics Adapter (EGA) was released in 1984. Offering 640- by 350-pixel resolution for 16 colors, it quickly became the industry standard. Many PC-compatible vendors expanded EGA beyond IBM's standard, such as NEC Corp. with its Multisync monitor technology.

Video Graphics Array (VGA), the current standard, was released with the introduction of the Personal System/2 family in April 1987 and improved on the EGA standard with 640- by 480-pixel 16-color resolution. VGA also tops its predecessors with more high-performance modes, such as the Multicolor Graphics Adapter mode of 320- by 200-pixel resolution with 256 colors.

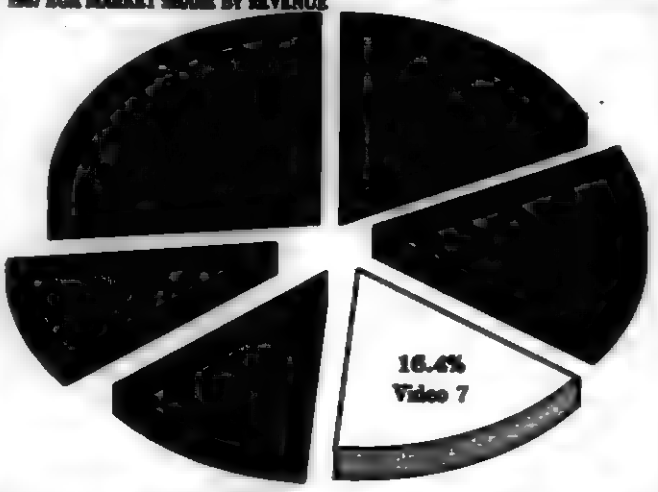
Because IBM has decreed VGA a standard — and because it offers more colors and modes and uses the less expensive analog monitor technology — the VGA aftermarket is expected to boom during the next several years.

VGA add-in boards for PCs and compatibles will greatly eclipse EGA in worldwide sales and shipments, increasing from a shipment level of 467,000 boards this year to 3.2 million in 1991, according to Jean-Carol Brigham, manager of graphics research at market research firm International Data Corp. in Framingham, Mass.

JAMES A. MARTIN

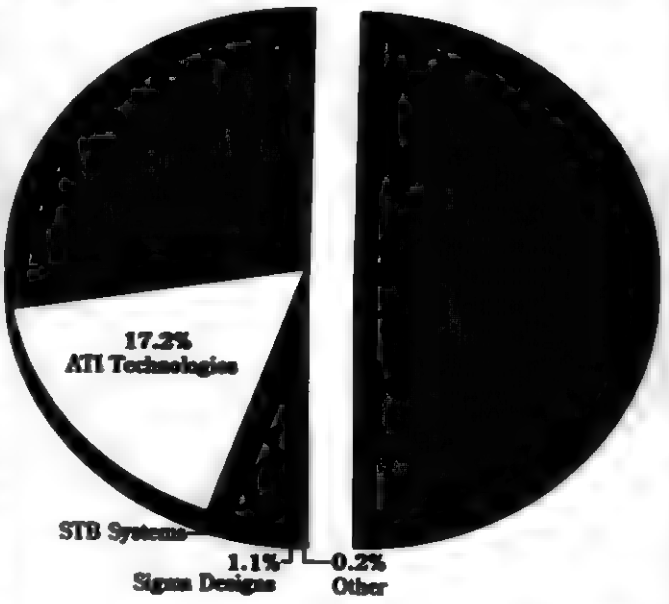
Current EGA treasure split several ways

1987 EGA MARKET SHARE BY REVENUE



IBM well poised to profit from VGA storm

1987 VGA MARKET SHARE BY REVENUE



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CW CHARTS

INSIDE LINES

Dancing with the devil? Look for a communications-related announcement by Stratus Computer and IBM tomorrow. One industry consultant speculated that the announcement could involve tighter links for the IBM System/88 within IBM's Systems Network Architecture. Those systems are repackaged and relabeled versions of the Stratus XA 2000 processors. IBM's sales force reportedly affectionately refers to the 88 as the "Tandem-Killer" because Tandem machines are most frequently bid against that system. Meanwhile, the connection is becoming increasingly important for Stratus: IBM's resales accounted for 15% of Stratus's 1986 sales and for 25% in 1987; unconfirmed estimates put the current IBM portion much higher.

If at first you don't succeed . . . Wordtech Systems, which sold its SQL technology to Ashton-Tate and thus gave up all rights to the technology, has apparently hit the drawing board again. In a couple of weeks, the firm will announce versions of its DBXL, an Ashton-Tate Dbase workalike, and Quicksilver, its Dbase compiler; both support SQL. Meanwhile, Ashton-Tate continues to struggle to make the stuff it bought from Wordtech work. In a recent company newsletter, Wordtech argued that the technology it sold to Ashton-Tate took the wrong approach, so Wordtech was really better off dumping it anyhow.

They sometimes comment on unannounced products. IBM, like most vendors, will be spending some time with Intel's soon-to-be-announced P9 80386 chip. "We will look at it and find a way to utilize it," said Nick Donofrio, vice-president of development for IBM's Entry Systems Division. The chip will have a 16-bit bus rather than the faster 32-bit bus of the current 386.

Ultimate Multimate? It looks like Ashton-Tate is trying to gather steam in the still-profitable word processing software market. The firm, which acquired market-leading Multimate as it apparently peaked, hopes for a boost with a summer beta test of Multimate Advantage III. Ashton-Tate's goal is the same as most other word processing vendors': to add features that eliminate the need for separate desktop publishing packages. Wonder if Ashton-Tate is worried about eliminating the need for Byline — its own desktop publishing software?

May the force be with them. A slew of third-party Appletalk and Macintosh developers reportedly will attend tomorrow's unveiling of the long-overdue version of Novell's Netware network operating system for the Macintosh environment. Sharing the podium will be Apple Chairman and Chief Executive Officer John Sculley. But don't look for the industry's most prominent developer of Macintosh applications, Microsoft, whose OS/2 LAN Manager rivals Novell's OS/2 strategy, is not expected to show. Ironically, the announcement will feature Novell demonstrating connectivity with OS/2 from a Mac — a long time before Apple enthusiasts and LAN Manager co-developer 3Com are expected to deliver the same capability, notes one industry wag.

Only the lawyers know for sure. Principals from the estranged suitors Network Equipment Technologies (NET) and Excelan met at least once last week in an effort to find what appears to be a quickly dying ardor to consummate their plans to merge. It doesn't look good, according to one analyst who spoke with both companies following their attempt to salvage the relationship. "My indications [from those conversations] are that despite a sense of urgency, the meeting hasn't moved the two any closer to a resolution," he said, adding that it was further suggested that "another meeting would not be necessary if the first one went in one [negative] direction." The analyst also characterized as "without substance" NET's charges that Excelan breached the merger agreement.

For the last 12 months, an IBM task force has been studying renaming its data base languages. No word yet on poetic justice, but the hot line is more than ready to collect suggestions. Feed your most appropriate candidates to News Editor Pete Bartolik at 800-343-6474 or 617-879-0700.

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Study refires VDT safety debate

Shows link between heavy use and miscarriages; does not pinpoint cause

BY J. A. SAVAGE
CW STAFF

OAKLAND, Calif. — Combatants on both sides of a long-smoldering VDT safety debate reacted strongly to a study released last week indicating a radically higher risk of miscarriage for women who work at computer terminals 20 hours per week or more than for non-VDT users.

Specifically, the study by The Kaiser Permanente Medical Group, Inc. showed that the ratio of miscarriages to live births was 80% higher for heavy users of VDTs than for nonusers.

The authors of the study, however, were quick to say that they cannot determine whether the abnormally high miscarriage rate was caused by the VDTs themselves or by other work-related factors.

"It's too early to give advice," said Robert Hiatt, a senior epidemiologist at Kaiser Permanente. "I don't think women should be alarmed, but it justifies further studies."

The four-year study of 1,600 women in California's Silicon Valley showed that women in support and administrative jobs had the highest correlation between VDT exposure and miscarriage — more than triple that of non-VDT users.

The study, the largest in the U.S. to date, also documented a greater risk of birth defects among heavy and moderate VDT users. But researchers said the study population was too

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Pregnancies at risk?

A Kaiser Permanente study documented an increased miscarriage rate for women using VDTs for more than 20 hours per week

INFORMATION PROVIDED BY THE KAISER PERMANENTE MEDICAL GROUP, INC.
CW CHART

Steep cuts for 9370 software

BY ROSEMARY HAMILTON
CW STAFF

IBM chopped prices last week on dozens of software programs for its 9370, a move observers said is a long-overdue attempt to draw users to the lackluster mid-range processors.

IBM cut prices an average of 25% on 150 software programs for its Group 10 processors, to which the 9370 Models 20 and 40 belong.

The firm also created a new processor category, Group 15, to which the 9370 Model 60 now belongs. Group 15 pricing comes in lower — in some cases as much as 42% lower — than the previous Model 60 category, Group 20.

The high-end 9370 Model 90 remains in the Group 20 category and is not affected by the price cuts.

Follow the leader?

Third-party software houses, many of which followed IBM's lead last year and instituted their own graduated pricing structures, said they are evaluating the latest cuts. At least two companies — Software AG of North America, Inc. and Cullinet Software, Inc. — said they do not intend to cut prices on Group 10 software licenses.

"This is just making way for new processors. We anticipate an announcement like that very shortly," said Lin Pearce, chief operating officer of Software AG. Pearce said his firm created a Group 15 processor category three months ago to offer more reasonable pricing for the 9370 Model 60.

"In my mind, the new [pricing] category is an attempt to straighten out their mid-range," commented Jeffrey Papows, vice-president of marketing at Cullinet. "We won't be reacting to these cuts, at least not at this time."

A spokesman at Applied Data Research, Inc., which offers two pricing categories for 9370s, said the company was reviewing IBM's revisions and had not decided if it would add another category in its pricing structure to

Continued on page 145

1-2-3 repels spreadsheet challenges

BY STEPHEN JONES
CW STAFF

Despite criticisms of upgrade delays for 1-2-3 and stagnant technology, Lotus Development Corp. is staring down some strong competition in the latest spreadsheet war skirmish.

The challenges aimed at Lotus's spreadsheet dominance have thus far proven to be little more than an occasional potshot aimed at taking away some of 1-2-3's expansive installed base. Market research shows that Microsoft Corp.'s Excel and Borland International's Quattro, while successful in their own right, have not taken much of a bite out of sales of Lotus's bread-and-butter DOS program.

Early figures show only limited interest in the two challengers — interest that may have already peaked among many DOS users. Cupertino, Calif.-based Infocorp estimated that Microsoft will ship about 120,000 copies of Excel this year and that Borland will ship 150,000 copies of Quattro.

In sharp contrast, Lotus is expected to ship roughly 100,000 copies of 1-2-3 *each month* this year — a total of more than one million copies for the year and a market share of about 70%, according to Infocorp.

Such news is a boost for Lotus, which, for the first time in the history of 1-2-3, has had to fight to keep users from defect-

Continued on page 144

See no evil: Municipal MIS works around S. Africa bans

BY J. A. SAVAGE
and JEAN S. BOZMAN
CW STAFF

In nearly every U.S. city that has enacted laws prohibiting purchases from companies that do business with South Africa, the ordinances contain loopholes big enough to drive a mainframe through. In a recent sampling of MIS directors in those cities, only one said the ban will affect purchasing plans; others said such bans pose only a slight inconvenience, if any at all, to business as usual.

The municipal restrictions have been ineffective at best. "I sometimes joke that if the government of South Africa came in with a low bid, we would take it," said Sharon Stenen, an MIS administrative assistant for the City of Los Angeles.

Los Angeles' procurement ban mandates consideration of a South Africa connection in projects that cost less than $25,000. "We're careful with smaller awards," said Stenen, adding that the city continues to make awards to IBM and bought a new 3090 Model 400 mainframe last year after the ban was in place.

The computer connection has been a primary target of anti-apartheid activity be-

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"It is an accomplishment just to get MIS to agree to put VAXs and IBM in the same room."

LARRY DEBOEVER
DEBOEVER & ASSOCIATES, INC.

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Unisys, NCR flirting?

Rumors arise that offer was made and rebuffed

BY ALAN ALPER
CW STAFF

NEW YORK — For the third time in the last year, reports reverberated throughout Wall Street suggesting that Unisys Corp. had made recent overtures to acquire NCR Corp. Spokesmen for both firms declined to comment.

Industry analysts, however, said word of Unisys's interest in NCR percolated throughout both companies during the last few weeks. One source inside Unisys, who requested anonymity, said internal speculation is that NCR rebuffed a Unisys acquisition offer in hopes of receiving sweeter terms. "There could be something going on, but no one is talking," the source said.

Frank Drubek, president of Communications Network Architects, Inc., a Washington, D.C., consultancy, said sources within NCR suggested that the Dayton, Ohio-based company rejected Unisys's entreaties, but talks are said to be continuing. "It appears that the topic is open for discussion," he said.

Complementary outfits

The two companies would make a good strategic fit, some analysts suggested. NCR would strengthen Unisys's thrust in the Unix marketplace by virtue of the large installed base of its Tower family. Its Comten subsidiary would add luster to Unisys's Networks unit, which currently consists primarily of recently acquired Timeplex, Inc. NCR also has a successful semiconductor operation and builds its own microcomputers, which would help Unisys lower its cost structure.

In addition, the two firms would create a powerful force in the banking systems business and would enable Unisys to diversify into retailing systems, an area in which NCR is considered a leader. Moreover, a merger of the two firms would create a $16 billion company, giving Unisys Chairman W. Michael Blumenthal a better chance of accomplishing his often-stated goal of building a $20 billion company by the early 1990s.

Not everyone agrees that an acquisition is in the offing, however. Michael Geran, an analyst at The Nikko Securities Co., said talk of Unisys's interest in NCR is "irrational." While acknowledging that Blumenthal needs a large acquisition to meet his objectives, timing is a key ingredient in any purchase decision.

NCR would be difficult to acquire at this time because its balance sheet commands a premium price, and Chairman Charles Exley is believed to favor an independent course. Unisys has other priorities, Geran noted, such as ensuring the successful launch of new mid-range and high-end mainframe products.

If Unisys is indeed interested in acquiring NCR, it most likely would have to make a friendly offer because of the stiff anti-takeover measures adopted last year by the Dayton firm.

"A pooling-of-interest deal — a merger for stock — would probably not interest NCR since it is hard to demonstrate shareholder value of the combined stock," noted Louis Giglio, an analyst at Bear Stearns & Co.

Cullinet pays for overhaul

BY NELL MARGOLIS
CW STAFF

WESTWOOD, Mass. — Cullinet Software, Inc. is still predicting record revenue for its fourth quarter ended April 30; on the profit side, however, the forecast issued late last week was a preview of coming subtractions.

The anticipated operational loss is principally due to the higher than expected costs of the company's recent major corporate reorganization and product rollout, said Jeffrey P. Papows, executive vice-president of marketing.

Earlier estimates pegged the bill for the corporate overhaul, which included a massive restructuring of internal functions and the layoff of some 400 employees, at approximately $8 million. The final figure, Papows said, will be approximately $12 million to $15 million.

No cataclysmic event fueled the escalation in cost, according to Papows.

Rather, the increases were attributable to such factors as the unanticipated expenses of conducting business internationally and legal and other administrative expenses involved in the divestiture of two companies.

In addition, he said, higher commission expenses and the cost of increased travel and training associated with Cullinet's [illegible] — in particular, the April debut of the IDMS/SQL data base — as well as head count, expenses, which resulted when budgeted attrition did not occur, factored into the final figure.

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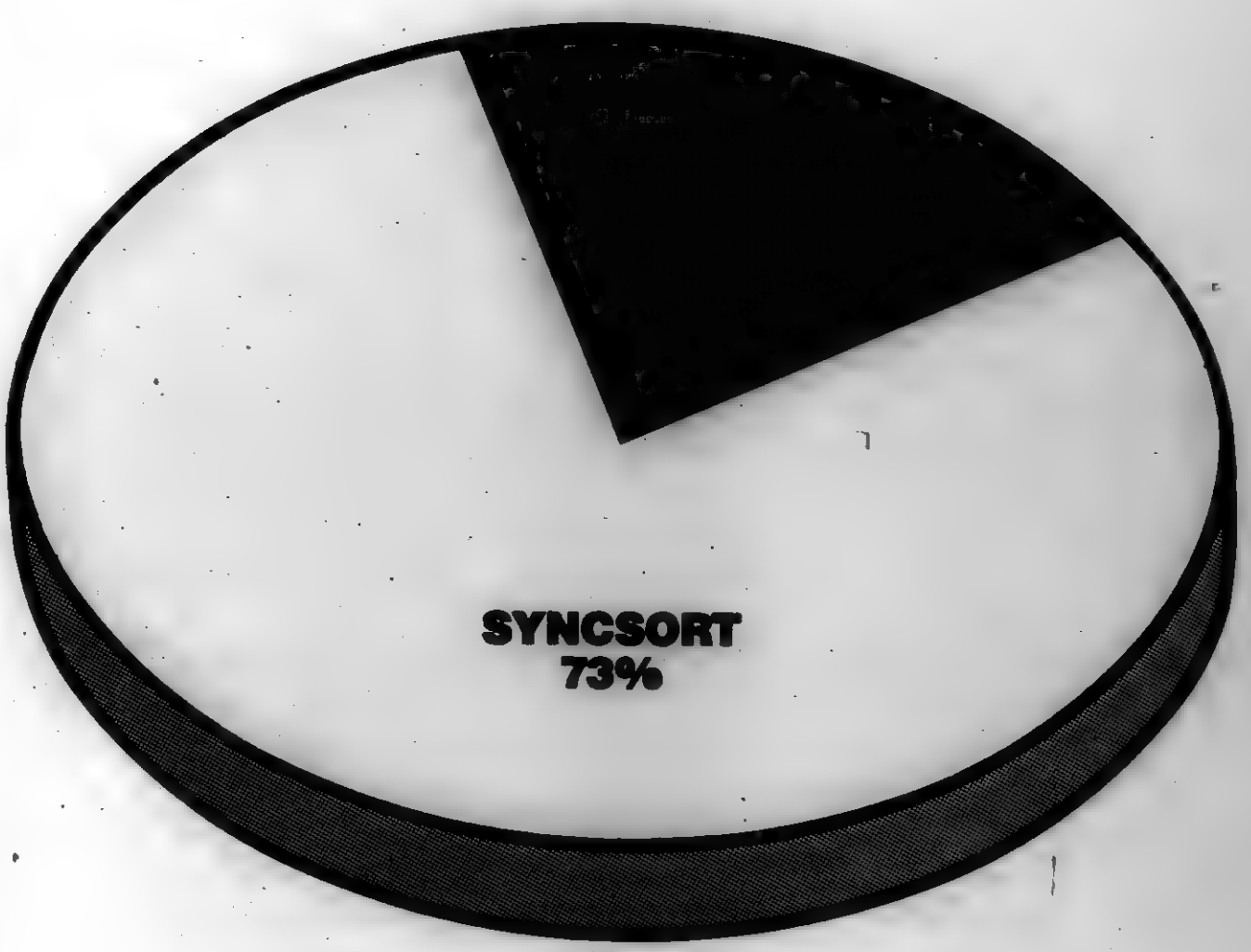

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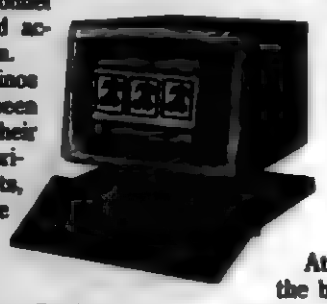
Casinos fight plan for computer access

BY MITCH BETTS
CW STAFF

ATLANTIC CITY — In a major dispute over government access to corporate computers, 11 Atlantic City casinos are fighting a proposal by the New Jersey Division of Gaming Enforcement (DGE) to obtain direct access to casino computers for investigations.

Unfettered computer access is necessary to fully investigate and regulate casino operations, DGE officials said. The prosecutorial agency, created in 1978 to keep the casinos free of organized crime, is especially interested in getting access to credit files and transaction data, complimentary services, player ratings, personnel systems and accounting data.



The casinos have been joined in their battle by privacy experts, who said the proposal would set a dangerous precedent by allowing government agents to go on secret "fishing expeditions" through business computers. Public comments on the proposal are due this week.

Eliminate duplication

The DGE, however, noted that it already has access to paper records, and the proposal for computer access would obviate the need for casinos to keep duplicate files in paper and electronic form.

The DGE is entitled to the computerized information but should create a due-process system allowing the casinos and employees to object to particular inquiries, said Peter Sheridan, vice-president of legal affairs for the Casino Association of New Jersey.

If the New Jersey casino regulation is approved, Sheridan said it would set a bad precedent for other heavily regulated or state-licensed industries.

The proposed regulation, published last month and pending before the state's Casino Control Commission, would require the licensed casinos to provide DGE investigators with inquiry-only access to all computer records.

Proposed rules

The requirement would have the following conditions:

- The New Jersey casinos must provide the DGE with an on-site terminal and the capability to make printouts.
- DGE personnel must be given "reasonable privacy in which to conduct such inquiries."
- Casinos may not track or monitor the DGE inquiries, and casino computers must be programmed to preclude any such tracking.
- Casinos may request a log of DGE inquiries that shows the general category of information examined and the time of the inquiry.
- Each casino must train DGE personnel in the use of its computer system.

The state DGE sought the same powers four years ago, but a protest by Harrah's Atlantic City, Inc. resulted in a 1985 court order that required the casino commission to hold an extensive hearing regarding the matter.

The DGE has now switched to a new regulatory proceeding to obtain access to the casino computers.

In an April 7 filing by 11 of the 12 Atlantic City casinos, the businesses raised numerous objections and argued that the new proceeding defies the 1985 court order.

Why the secrecy?

For example, the casinos objected to the secret, or "witnessless," search requirements in the proposal.

"The division has never been able to explain why its inquiries must be shielded from view, destroying the accountability of the agency," the casinos said.

In addition, the requirement that casinos turn off their tracking programs could jeopardize computer security, Sheridan said.

The resulting gaps in the computer audit trails will make it impossible to trace whether data was improperly obtained by a DGE agent or another party, he said.

Alan F. Westin, a privacy-law expert at Columbia University, and Advanced Information Management, Inc., a Woodbridge, Va.-based computer-security consulting firm, have been retained by the casinos to help fight the regulation.

Robert P. Campbell, president of Advanced Information, expressed concern that the proposal would allow state authorities to browse through the casino computers and view sensitive records on employees and hotel guests as well as casino profiles of "high rollers" describing their preferences in entertainment, liquor and food.

DEC raises memory prices

BY STANLEY GIBSON
CW STAFF

MAYNARD, Mass. — Digital Equipment Corp. last week raised prices on computer systems and add-on memory, effective immediately.

DEC boosted prices on systems with embedded memory by an average of 3.5% and hiked prices for add-on memory products by an average of 35%. A DEC spokesman said the price increases are because of the high costs of dynamic random-access memory chips.

Add-on memory for VAXBI bus systems will see stiffer increases than those for Q-bus systems. Costs for the 256K-bit chips used on Q-bus boards have risen at a lower rate than costs for 1M-bit chips used on VAXBI-bus boards, the spokesman said.

Low-end add-on memory products are expected to rise approximately 15% higher than the current prices, while memory products for high-end systems will rise approximately 50% higher.

Others to follow?

"I think you'll see a lot of companies following suit now," offered Steve Widen, a DEC analyst at International Data Corp. in Framingham, Mass.

EMC Corp. in Hopkinton, Mass., said it will boost memory prices for DEC systems on July 1 by as-yet undetermined amounts.

Microvax 2000 system prices will increase by 12%, the spokesman said, while other Microvax prices will go up by lesser amounts ranging down to 4% increases.

Mid-range VAX systems will increase in price by 3% to 5%. High-end systems will go up by 1% to 3%.

Trade bill back to Senate

WASHINGTON, D.C. — The U.S. Congress, with lobbying support from the computer industry, began work on a second omnibus trade bill last week after the Senate failed to override President Reagan's veto of the original bill.

The Computer and Business Equipment Manufacturers Association (CBEMA) urged Congress to pass the omnibus trade bill again, but without the plant-closing provision opposed by the president [CW, May 9].

"Our industry needs positive trade legislation this year," said William A. Maxwell, CBEMA's director of international issues, in a prepared statement. The industry supports provisions that liberalize export controls, seek access to foreign telecommunications markets and strengthen intellectual property rights.

The Senate voted 61-37, falling four votes short of the two-thirds majority required to override the president's veto.

MITCH BETTS

Round 1 goes to Duquesne

BY CLINTON WILDER
CW STAFF

FAIRFAX, Va. — A Virginia judge last week denied most of Computer Associates International, Inc.'s request to prevent two Duquesne Systems, Inc. employees from competing against Computer Associates in the systems software market.

Computer Associates won one small victory, however, as the two former Uccel Corp. employees were ordered not to sell Duquesne's Dasdmon storage management software to the federal government. But the company itself was not restricted from selling Dasdmon, which competes with Computer Associates' FastDASD.

Computer Associates filed a $5 million suit against Duquesne and sales employees James Holland and Kenneth Smartt earlier this year, claiming they had taken proprietary Uccel documents with them when they left Uccel's McLean, Va. office to work for Duquesne's office selling to federal government agencies from Vienna, Va. [CW, April 4]. The suit followed a search of Duquesne's office and seizure of the Uccel documents in March [CW, March 21].

Last week, Fairfax County Circuit Court Judge Johanna L. Fitzpatrick ordered Holland and Smartt to turn over to the court any Computer Associates or Uccel documents that they obtained while working for Uccel. The documents will be examined by attorneys for both sides in discovery proceedings before the Oct. 3 trial date.

Turning the documents over to the court will not prejudice the defendants' claims that they were not confidential, according to the judge's order.

"We are pleased that Duquesne prevailed on almost all of the issues at this stage," said Sandy Ferguson, an attorney for Pittsburgh-based Duquesne.

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Few takers for OS/2 Extended

BY DOUGLAS BARNEY
CW STAFF

IBM's proprietary data base management system and communications extensions to the OS/2 operating system, set to ship next month, have so far gathered scant user commitment.

Much of the user holdup is based on an increasing array of similar offerings, the inability to fully evaluate the unshipped IBM product, questions about OS/2's role in general and the expected absence of key features in the initial release of OS/2 Extended Edition.

The initial DBMS component is single-user, a market already ruled by Ashton-Tate Corp.'s Dbase, Microrim, Inc.'s R:Base and Borland International's Paradox. Meanwhile, most potential users are looking to implement a more sophisticated client/server version slated for mid-1989.

Another stumbling block is the continuing evaluation of OS/2, which still lacks the critical graphical user interface and suffers from a dearth of key applications. "We have not completed our analysis of the basic version. We don't know how to use the added features of [the] extended version, but we are looking at it in great depth," said Joe Selman, a spokesman for American Airlines. According to Selman, American has not yet decided how it will use the standard version of OS/2.

While declining to fully commit to the product, Extended Edition fans see a key potential role. "For a site like ours, it means standardization and ease of installation. We already use DB2 and SQL/DS. From what we have seen, it's a real nice fit," said Howard Foedick, project leader for relational data bases at Amoco Corp.

"What could be nicer in a big IBM shop than PCs directly connected to the mainframe? With the Communications Manager and the Data Manager, we could communicate, download data bases from DB2 and put them on PCs in a nice, easy, seamless fashion," Foedick said.

Despite Foedick's positive view, it would take the agreement of all groups within Amoco to make Extended Edition a standard.

Like Foedick, The Travelers Corp. is optimistic but remains a breath away from a full commitment. "I would expect that we will use it for sure," said Joe Correira, director of software development at Travelers. Correira breaks Extended Edition into four components: Communications Manager, Data Manager, LAN Server and Presentation Manager. "We have plans at each of those levels," he said.

By combining the DBMS and communications pieces, Travelers hopes to seamlessly share data between personal computers and host computers. Meanwhile, the Presentation Manager will offer users a more intuitive interface, and the LAN Server will boost the functionality of the firm's local-area networks.

Even though it is initially a single-user product, Correira said he sees the possibility of using OS/2 Extended Edition as a front end to LAN-based products from companies such as Borland and Gupta Technologies, Inc.

Plans sketchy

While all users contacted by *Computerworld* were familiar with Extended Edition's features, those with definite plans are few and far between.

"You hear about it, you read about it, you get announcements from IBM, but I don't know of any plans to bring it in," said Ted Rock, manager of software support at Harris Bankcorp.

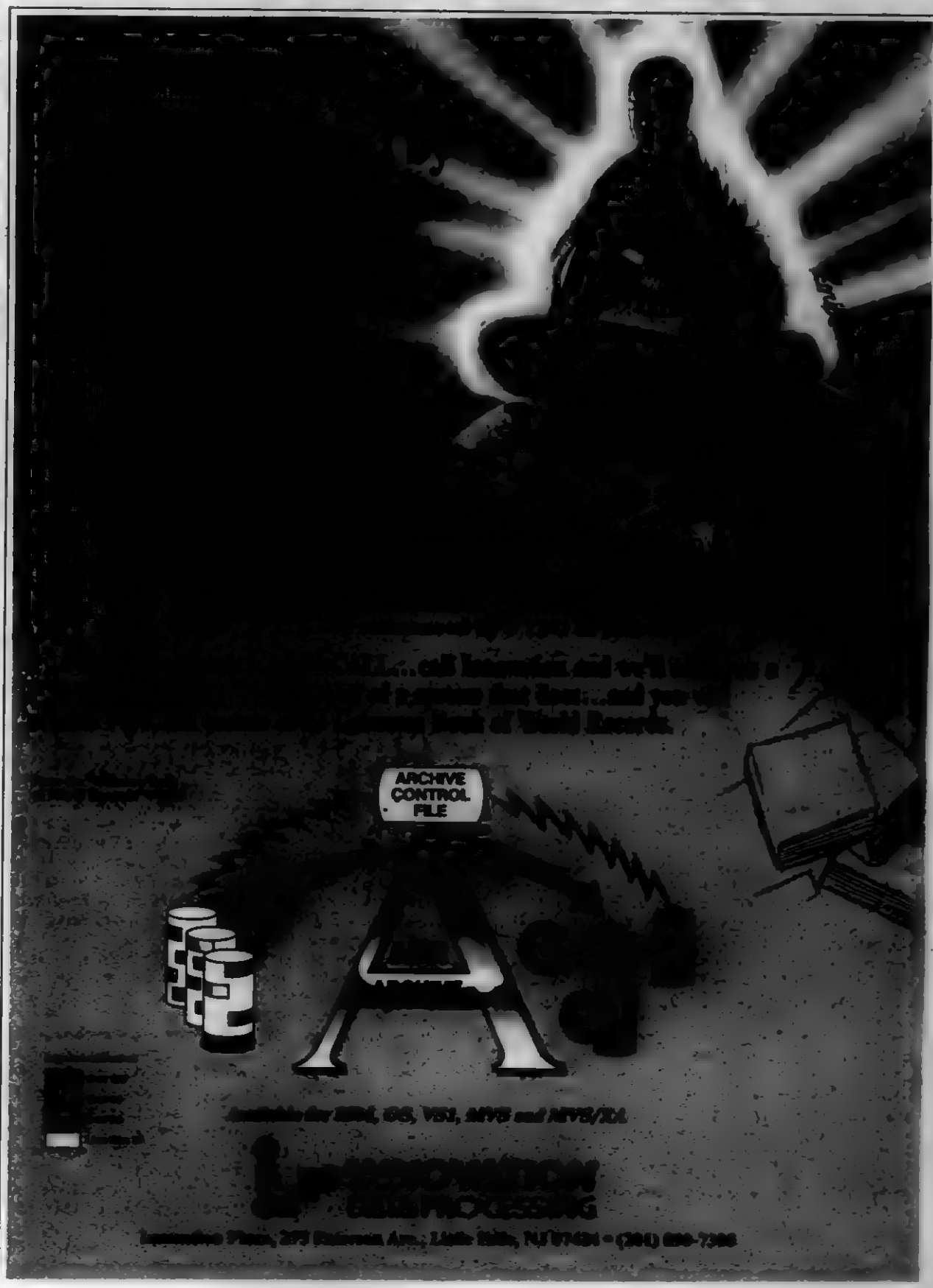
Some users remain confused, some are apathetic and some have an aversion to the product's requirements of 3M to 6M bytes of random-access memory and 30M bytes of hard disk.

IBM remains resolute

IBM says it is in the OS/2 Extended Edition game for the long haul and that the product will evolve in several ways over time:

- By mid-1989, it will be a full data base server under OS/2. And through an upgrade called Enhanced Communications Facility, it will act as a gateway to IBM's DB2 on the mainframe and the data on the System/36 and 38 family.
- By late 1989 or early 1990, the query manager will take full advantage of the OS/2 Presentation Manager interface.
- By 1990, Extended Edition and host data bases will communicate, allowing DB2 to extract data from Extended Edition. Transaction management will be handled by the data base queried, to ensure data integrity.
- After 1990, multisite joins and two-phase commits for data security will become available. Also planned is the ability to have individual data base tables fragmented and located on different machines.

DOUGLAS BARNEY



MAP, OSI make the grade at ENE

Message to users is 'buy' — despite high cost — as vendors gauge interest

BY PATRICIA KEEFE
CW STAFF

BALTIMORE — Demonstrations of the Manufacturing Automation Protocol (MAP) and Open Systems Interconnect (OSI) standards were put to the test last week and passed with flying colors. But in a classic standoff, vendors remained unconvinced of customer interest in MAP products, and target customers said they will not buy until costs come down to a reasonable level.

A third, less visible irritant in the MAP ointment is its insistence on broadband, or IEEE 802.4, media. In this era of open systems and interoperability, media dependence just will not play on many a factory floor.

These issues will begin to abate by the end of the year, participants and attendees at last week's Enterprise Networking Event (ENE) predicted. And they will totally disappear within the next 12 to 18 months, added Bruce Richardson, an analyst at Advanced Manufacturing Research, Inc. (AMR) in Salem, Mass.

Specifically, MAP costs are expected to drop by one-third to one-half while the MAP/TOP Users Group moves quietly toward media independence for MAP.

ENE, held last week at the Baltimore Convention Center, achieved its primary goal — to demonstrate that products based on MAP, Technical and Office Protocol (TOP) and other OSI-standard specifications, for example, Message Handling System and ANSI's X.400, do exist and work today, attendees said.

The combined conference and exposition drew just less than 10,000 users, mostly at the management level, according to the MAP/TOP Users Group. "This much interest indicates that MAP/TOP is real," said a user from an aerospace company who declined to be named.

But interest alone will not translate into sales, Richardson warned.

Ultimatum

So the underlying message to users, who thus far have bought MAP- and TOP-based products in limited numbers, was loud and clear: It is time to put up or shut up.

Users need to start buying products in order to provide tangible proof that continued investment in OSI and MAP/TOP development is warranted and to let vendors begin to recoup substantial investments in MAP and other OSI standards, said Marc Warshaw, a product line manager at Xerox Corp.

Warshaw estimated that he has spent a year and a half working on the ENE project.

"I've spent a lot of [Xerox's] money [on MAP], and it's time to start giving something back," Warshaw said.

"A lot of vendors feel that way," agreed Robert Metcalfe, the newly appointed chairman of the Corporation for Open Systems.

Vendors have already been burned once. The announcement of MAP 3.0, which is incompatible with MAP 2.1, at the November 1985 Autofact show scuttled many MAP 2.1 sales, virtually killing the market in 1986.

GM's Kaminski

Particularly hard hit were vendors committed to MAP 2.1, such as Industrial Networking, Inc. — formerly a joint venture between Ungermann-Bass, Inc. and General Electric Co. — and Concord Communications, Inc., AMR's Richardson said. Both firms have since moved to reposition themselves as OSI providers.

"It's a very fair thing for vendors to ask," said Daniel Koenalski, manager of computer-integrated manufacturing at Merit Systems, Inc. in Troy, Mich., a software developer and users group member.

Nonetheless, vendors may have to bite the bullet and slash prices in order to stimulate sales, Richardson said. "They'll have to hope to make up the difference in volume," he added. Otherwise, cost will continue to be a major impediment to MAP installations.

"Although many users have indicated they are willing to pay a premium for MAP, many [find] present prices to be exorbitant," said a recent report from Venture Development Corp., a Natick, Mass.-based market researcher.

MAP proponents and users, including General Motors Corp., The Boeing Co., Deere & Co. and Aluminum Company of America, or Alcoa, were closely quizzed on costs at a two-hour press conference Monday. GM's Michael Kaminski, who could be considered the godfather of MAP, ticked off the following predictions for skeptics:

- Broadband links, now centered at about $2,500, will drop to about $1,200 during the next year.
- Carrierband costs per node will drop from as much as $1,500 to $500 or $600 during the same period.

And despite the high cost of MAP, several users were able to demonstrate considerable savings following MAP installations. GM, for example, said it was able to cut a proprietary network cost per node from $3,580 to $2,930 using MAP, and Deere said it has reduced new-product development cycles by as much as 50%.

Also troublesome is MAP's insistence on broadband media. AMR surveys have consistently logged resistance to media dependence, citing the varied extremes of factory needs. Some users are even holding out for MAP over fiber.

GM throws over MAP leadership

After spending millions of dollars promoting factory automation and suffering accusations of dictatorial behavior in return, General Motors Corp. has called it quits as the leading proponent of the Manufacturing Automation Protocol (MAP).

"We are not dictators," said Michael Kaminski, General Motors' Advanced Engineering staff manager. "We had tremendous resources applied [to MAP] to push it because we were in a hurry. [Otherwise], it could have taken another five to six years."

GM and others stressed that while the company is distancing itself as a MAP spokesman, its commitment as a user remains unwavering. "What they want to say is, 'Hey, we've done our part, the standard is stable, now we want to see some products,'" said Bruce Richardson, an analyst at Salem, Mass.-based Advanced Manufacturing Research, Inc.

As MAP becomes less identifiable as a GM technology, it is expected that competitors such as Ford Motor Co. and Chrysler Motors Corp. will move more aggressively toward MAP. Ford, for example, is said to be planning a MAP 2.1 implementation for the first quarter of 1989. In addition to a number of executives, the auto maker reportedly flew an astounding number of technical staff members — 32 in all — to last week's Enterprise Networking Event.

With its most notable member shying away from the limelight, the MAP/TOP Users Group has taken steps to become fully independent by Jan. 1, 1989, detailing plans last week for incorporation, a dedicated staff, annual dues and other revenue generation from the sale of educational products and increased membership. The revamped organization will change its name to the North American MAP/TOP Users Group, composed of both the U.S. and Canadian organizations.

In addition, the National Center for Manufacturing Science (NCMS) said it will assume responsibility for future MAP research, development and testing. Much of this activity and cost had previously been borne by GM, Eastman Kodak Co., the Society of Manufacturing Engineers and the Industrial Technology Institute.

NCMS described itself as a cooperative consortium of some 100 U.S. companies "freed from antitrust inhibitions" that engages in manufacturing research. The board of directors includes representatives from GM, AT&T, Ford, General Electric Co. and Pratt & Whitney.

"GM is trying to hand MAP over to the NCMS," said one MAP analyst, suggesting NCMS is not exactly welcoming the idea with open arms. He added that GM has 35 full-time people — representing a total of about $2 million in salary — dedicated to MAP.

PATRICIA KEEFE

Government presses GOSIP as standard

BY MITCH BETTS
CW STAFF

BALTIMORE — The federal government, weighing in at the Enterprise Networking Event (ENE) with its $17 billion information systems budget, announced that beginning in the summer of 1990, it will require new data networks to comply with the Government Open Systems Interconnect Profile, or GOSIP.

Kevin L. Mills, chief of the systems and network architecture division at the National Bureau of Standards, said GOSIP will become a federal information processing standard within the next two months and will become mandatory for all new contracts two years after that time period.

GOSIP 1.0, which is closely aligned with the Manufacturing Automation Protocol and Technical and Office Protocol (MAP/TOP), was developed by the bureau and other federal agencies to help them assert control over their multivendor distributed systems.

"In many agencies, computer networking is already out of control," Mills said.

Migration confusion

But federal managers said they are confused about how to migrate from existing Transmission Control Protocol/Internet Protocol networks to GOSIP during the two-year transition period.

"To date, I haven't seen anything that's an easy or straightforward way to do it," said Allen Chesley, integration project manager of the Air Force Systems Command at Andrews Air Force Base in Maryland.

While touring the ENE exhibition, Chesley commented, "There are some OSI gateways, but our problem is the sheer size of the installed base." Chesley explained that U.S. Department of Defense networks have thousands of computers based on them and hundreds of thousands of users.

Nevertheless, many federal agencies have already specified GOSIP compliance in recent requests for proposals, vendors said.

The federal agencies are seeking not only open systems interconnection but also software portability via the IEEE Posix standard, noted John F. Leahy III, operations manager at Sun Microsystems Federal, Inc. in Vienna, Va.

"Posix and GOSIP have got to be two standards that don't sit on the shelf," said Dunne Fagit, program manager for network management and security at the Naval Data Automation Command in Washington, D.C.

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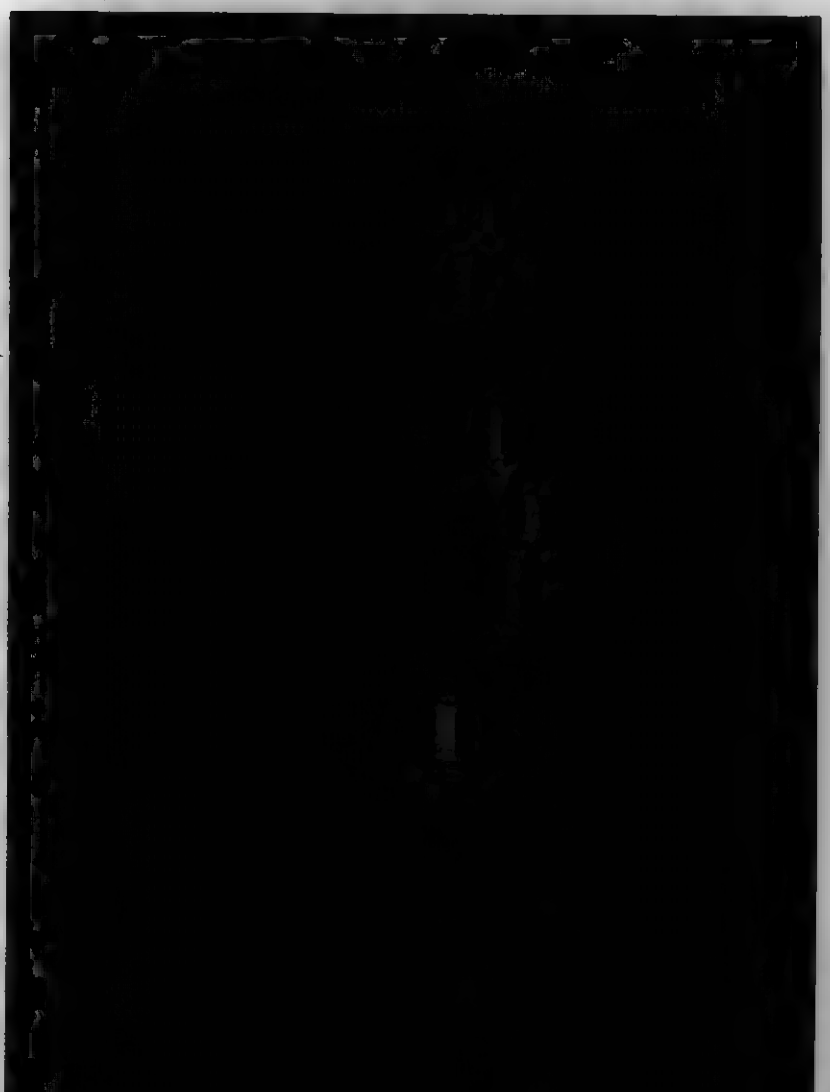

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Copyrights protect whole programs, not individual screens, ruling says

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — In a mild defeat for Apple Computer, Inc., the U.S. Copyright Office ruled last week that a computer program is fully protected by a single copyright and that individual screen displays do not need separate copyright registration.

In legal circles, the decision was seen as a victory for Lotus Development Corp., because the Copyright Office agreed with Lotus that a computer program is an integrated unit. Apple's position — that individual screen displays should be registered for copyrights as well — was rejected.

The ruling came at a time when both Lotus and Apple are suing other companies for alleged infringement of the "look and feel" of certain of their screen interfaces.

Nonetheless, John Sculley, Apple's chairman and chief executive officer, called the decision "a very positive precedent." Apple is currently waging a legal battle with Microsoft Corp. and Hewlett-Packard Co., claiming that screen displays in Microsoft's Windows 2.0 and HP's derivative, New Wave, infringe on Apple copyrights.

The ruling "adds further validity to copyright protection where the expression of ideas is concerned," Sculley said. "As far as the suit goes, that's up to the judge and the jury. But this is obviously a very positive piece of information."

The Copyright Office, part of the Library of Congress, upheld its basic policy of one registration per work, ruling that "our registration practices should discourage piecemeal registration of parts of works." Multiple registrations of parts of works would confuse the public, trigger complex litigation and complicate the administrative process, the ruling said.

Esther Roditti Schachter, a computer law expert and editor of the "Computer Law & Tax Report" newsletter in New York, said the decision will have a positive effect on the software industry because it retains the simplicity of current procedures. "This is a very sound, conservative decision. There was an enormous worry that registration was going to be made unbelievably complex," she said.

The decision resolves some of the confusion that resulted from a hodgepodge of court rulings on the look-and-feel issue, some of which cast doubt on whether unregistered screen displays are protected by the program's copyright [CW, June 6].

Dramatics don't work

The Copyright Office was not swayed by a dramatic audiovisual presentation Apple made at the September 1987 public hearings, in which Apple showed that different code can generate the same display screen and that visual displays are sometimes created by more than one author or company.

"This does not alter the fact that the computer program code and screen displays are integrally related and ordinarily form a single work," the office said.

Obliquely addressing the look-and-feel issue, the Copyright Office said it has a longstanding practice of refusing to register copyright claims for the format of text or images, because ideas and concepts are not copyrightable.

However, if the screen display images consist of original, creative pictorial expressions, then separate copyright may be claimed for the pictures, the agency said. The courts will decide whether copyright is appropriate in these cases, it added.

Yogen Dalal, research and development vice-president at Apple subsidiary Claris Corp., focused on that pictorial aspect. "If someone puts a trash can on the screen, it shouldn't look just like the Mac's trash can, but you should be able to use a trash can."

Thomas M. Lemberg, vice-president, general counsel and secretary for Lotus, said the company is delighted by the decision but characterized it as a procedural issue that "was never meant to deal substantially with what is a copyright."

Microsoft also downplayed the Copyright Office's decision as a "procedural" ruling on how copyrights are filed. "The ruling has no effect on the current litigation with Apple, and it doesn't say anything about a particular program's visual displays," said William Pope, senior corporate attorney for Microsoft.

VDT safety

FROM PAGE 1

small for the results to be "statistically significant."

The increase in pregnancy complications, the researchers said, could not be explained by age, education, occupation, cigarette smoking, alcohol consumption or a number of other factors.

"This is a very important kind of new fact that puts everything else into perspective," said Louis Slesin, editor of New York-based "VDT News." "Before this paper, there were six other studies. In each case, something was found. In each case, researchers said, 'It can't be.' [This study] is the first to say, 'This is what we found. Like it or not, we found it.' "

Dangerous evidence

Reaction to the study was swift, if not predictable.

"Here we have a solid piece of epidemiological evidence, which, while not conclusive, is at the very least a serious presumption of danger," said David Eisen, health and safety director at The Newspaper Guild. About half of the guild's 34,000 members use VDTs.

While The Newspaper Guild suggests that manufacturers provide shielding, both new and retroactive, others suggest changing ergonomics and granting time off for computer operators.

The Computer and Business Equipment Manufacturers Association (CBEMA), a Washington, D.C.-based trade group, labeled the report "alarmist."

"We're not technically concerned about it," CBEMA spokeswoman Charlotte LeGates said. "We are concerned about proving the [technology] guilty without foundation in fact."

LeGates discounted concern about low levels of radiation exposure, saying, "There is more ionizing radiation coming from your wall than your VDT, and so much nonionizing [electromagnetic] radiation from other sources since the invention of electricity."

> "HERE WE have a solid piece of epidemiological evidence, which, while not conclusive, is at the very least a serious presumption of danger."
>
> DAVID EISEN
> THE NEWSPAPER GUILD

"A report like this may very well get OSHA to consider promulgating a standard" for VDT use, said Gebe Gillotti, assistant regional administrator for technical services at the U.S. Occupational Health and Safety Administration (OSHA) in California. He said OSHA is still in the early stages of getting into the issue, "largely because of the lack of studies."

Varied results

The debate over VDT health effects has stagnated in the last few years; only five studies have been released, all of which were inconclusive. Two of those studies claimed no correlation, and one claimed a statistically significant association between VDT use and birth defects but could not separate out other variables such as smoking and stress.

Two studies claimed to have found increases in miscarriages, but one study attributed the finding to stress and the other to a bias in recalling events by its study group.

Past research has indicated that the electromagnetic field and radiation produced by VDTs are too low to affect reproduction, according to the researchers.

But with the results of the Kaiser Permanente study, they questioned that conclusion and called for further investigation, primarily in the area of electromagnetic effects.

Big surprise

"This is a 100% about-face as to what all the other studies have said," said Beth O'Neill, director of Washington, D.C.-based Center for Office Technology, a coalition of users and manufacturers of VDTs.

"Our reaction is surprise," a spokeswoman at Pacific Bell said. "There was nothing previous to this that would cause us concern. But we asked Kaiser for more details to determine whether we should study it further."

The spokeswoman said the health issue had been raised several years ago, but at the time, Pacific Bell was unable to find anything to support the claims of a health hazard.

"It's another example to indicate the debate is still open," said Laura Stock, coordinator of the Labor Occupational Health and Safety Program at the University of California.

Certification service tested

Trial period for COS stamp of approval

BY PATRICIA KEEFE
CW STAFF

BALTIMORE — The Corporation for Open Systems (COS), a consortium of 65 users and vendors that supports the Open Systems Interconnect (OSI) standard, quietly launched a pilot last month to test plans for a product-certification and user-mediation service.

"There's a trial [seal of approval] program being launched now, one aspect of which is a mediation service," new COS Chairman Robert Metcalfe confirmed in an interview here last week at the Enterprise Networking Event (ENE).

Metcalfe, founder of 3Com Corp. and general manager of that company's Distributed Systems Division, said the pilot involves four or five vendors and a few users who will be running some experiments.

Testing products is not the same as certifying them, Metcalfe said. A certification service would provide users with a measure of confidence that a product works and has received a stamp of approval. Test results would be filed and available for users' inspection.

It is unclear whether vendors with certified products will opt to put the COS logo on their product literature. Many COS vendors were "nervous" about the idea, Metcalfe said.

The mediation service comes into play in cases where two COS-certified products will not work together.

However, COS is "reluctant to dive into liability too deeply," Metcalfe said. Issues still to be worked out include who will do the mediation, who will pay for it and how much it will cost.

In particular, Metcalfe said he is hoping the MAP/TOP Users Group will choose the COS test suites, which test a product's conformance to specific sections of the OSI standard, as its official standard for conformance testing. "Post-ENE, they are ready to set up testing and certification facilities," he said.

COS's Robert Metcalfe

Metcalfe also said he wants to build or strengthen ties with other OSI standards-oriented groups such as the Standards Promotion and Applications Group, a European consortium similar to COS; the Japanese Conference for Promotion of OSI; and the MAP/TOP Users Group. He said he wants the groups to endorse similar implementations. "You don't want to have to test an OSI product multiple times," he said.

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Kroger heads Intel, Siemens venture

BY KATHY CHIN LEONG
CW STAFF

SANTA CLARA, Calif. — Intel Corp. and Siemens AG have announced that they are forming an international computer systems company — dubbed Bïin — to address the "mission-critical" computer applications market.

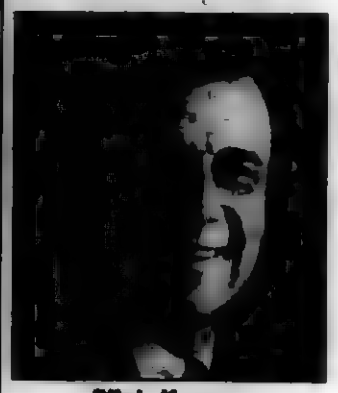
Joseph Kroger, former president and chief executive officer of Sperry Corp. and former vice-chairman of Unisys Corp., has been tapped as president. No other officers have been named at this time.

Analysts eyeing the market said that Kroger, 53, is the best candidate for the position. With more than 25 years of experience, Kroger left Unisys last December and made it clear he would be returning to the industry. "Picking Kroger was a smart move because he has an excellent track record," noted Sandy Gant, an analyst at Infocorp in Cupertino, Calif. Kroger was not available for comment.

Bïin spokesman Mike Cox said the company was a natural outcome of a joint four-year computer project. While the two companies worked very closely on the software and hardware architecture, Cox said, Intel had a stronger influence over the very large-scale integration design, and Siemens played a bigger role in software development.

Bïin's systems will compete against IBM, Digital Equipment Corp. and Tandem Computers, Inc., Cox said.

Analyst Adam Cuhney of Kidder, Peabody & Co. speculated that the systems will use the 80960 chip set, a 32-bit chip that Intel announced in April. The 80960 was designed for embedded applications in computer



Bïin's Kroger

products and robotic systems.

According to Cuhney, an entry-level computer will start at 20 million instructions per second (MIPS). Future superminicomputers will include systems running more than 100 MIPS. He predicted that Siemens will supply the proprietary operating system written in Ada and that a Unix shell will be used to support a variety of applications.

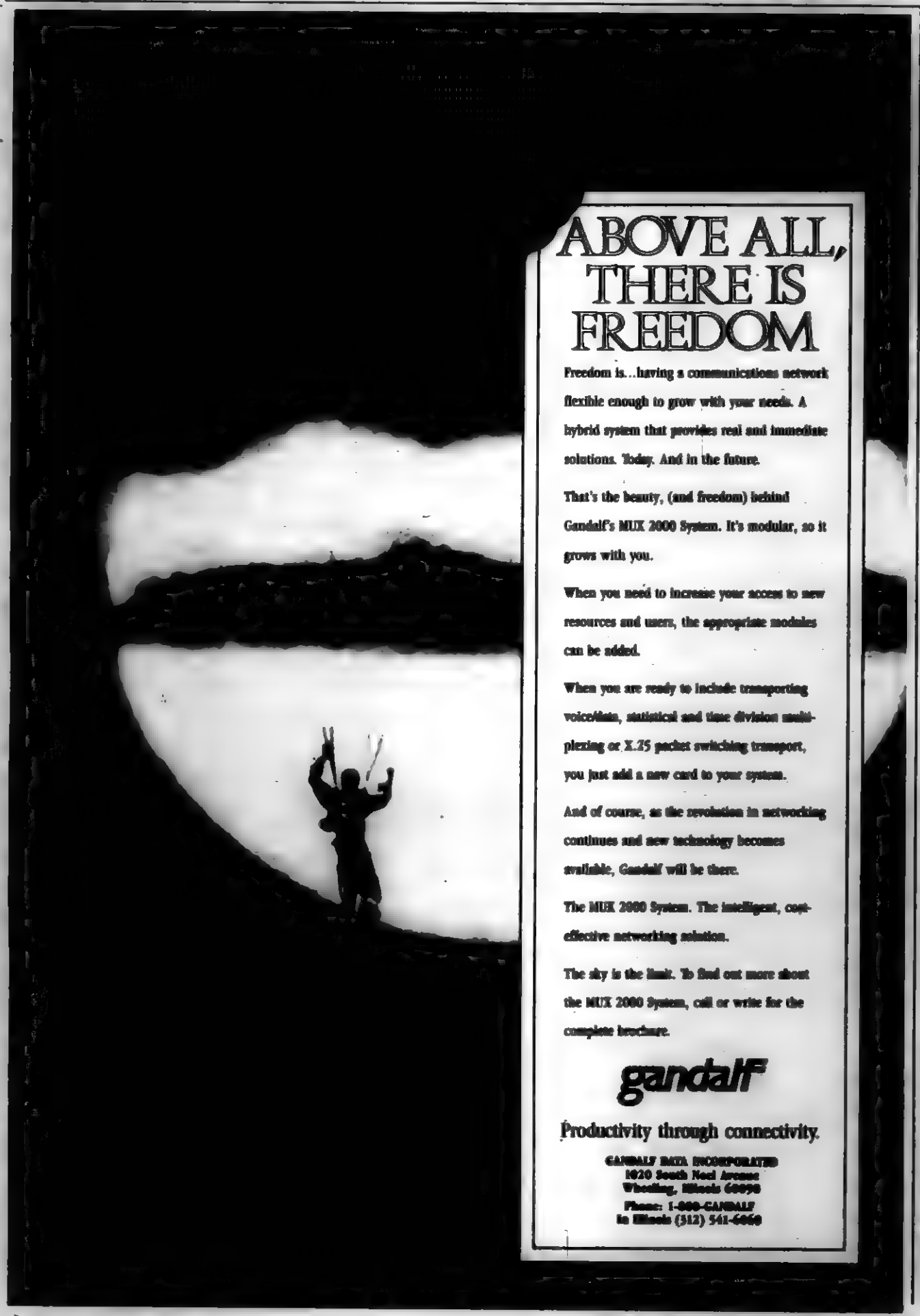
Currently, Intel produces a 32-bit parallel processing supercomputer and Siemens resells IBM-compatible mainframes. Bïin's future products will include computers that support mission-critical computing applications in areas such as on-line transaction processing and computer-integrated manufacturing, an Intel spokeswoman said.

Production plans

Bïin will be based in Hillsboro, Ore., where the Intel Systems Division is located. The company will have European headquarters in Nuremburg, West Germany. Product production in both locations is scheduled to begin before the end of the year. The company will have 200 employees in the U.S. and West Germany.

"Both companies needed something like this," Cuhney said. "Intel needed the expertise of an international computer systems company, and Siemens needed the market presence in the U.S." He added that Intel's intent is to stabilize the company's cyclical semiconductor earnings by becoming a formidable systems supplier.

According to Cuhney, the fault-tolerant system will compete with Tandem, Stratus Computer, Inc. and Sequent Computer Systems, Inc. and will initially be sold through value-added resellers.



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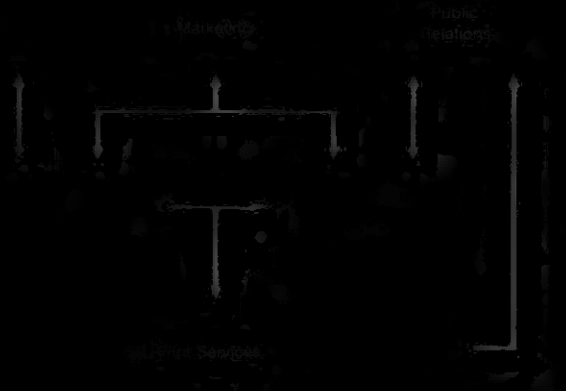

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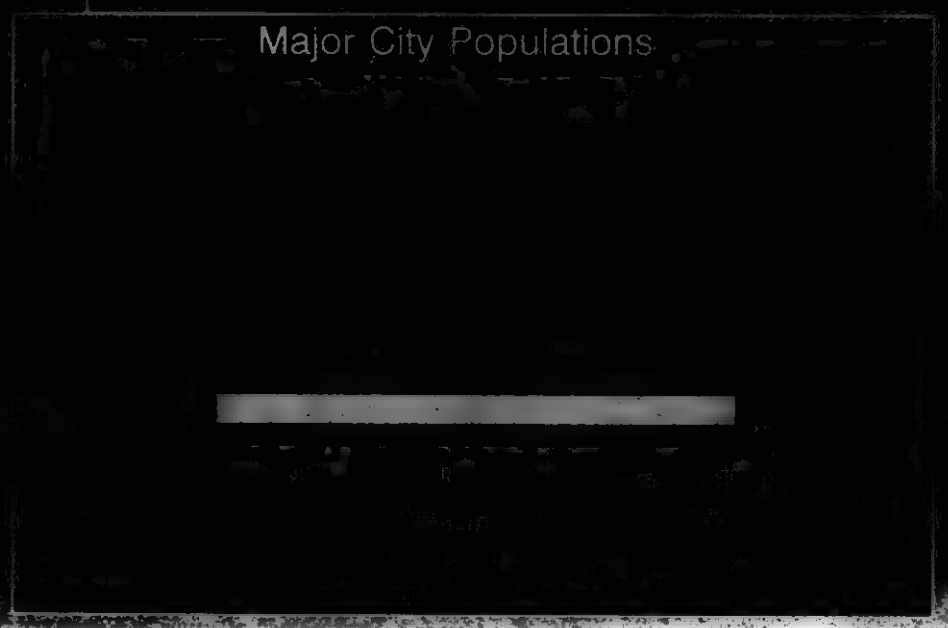

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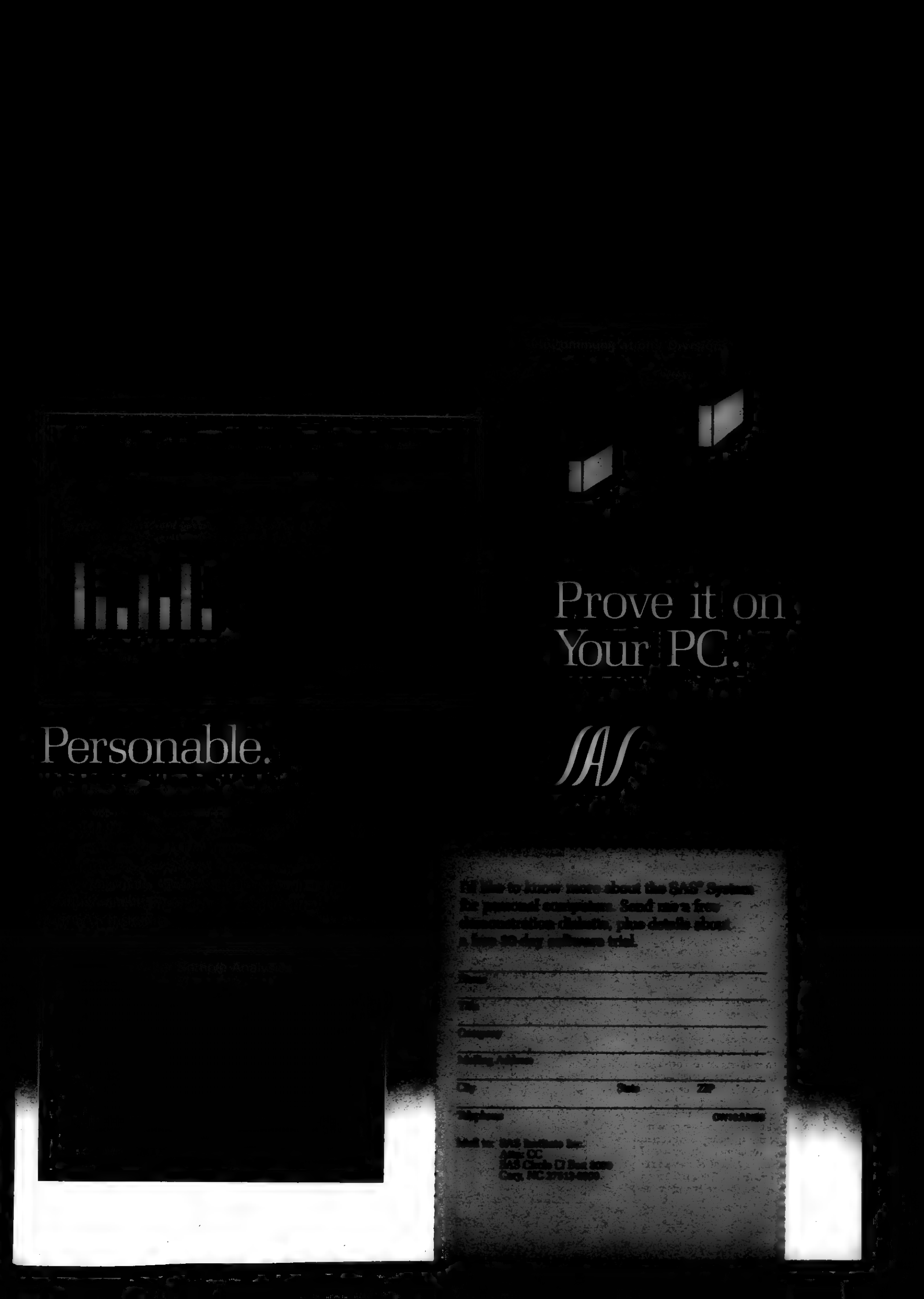
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Apple planting seeds in IBM orchard

BY JULIE PITTA
CW STAFF

ANALYSIS

CUPERTINO, Calif. — With a sense of urgency, Apple Computer, Inc. is seeking to forge the necessary links to tie its Macintosh line into the IBM world and thereby exploit the lucrative corporate market.

As an ongoing effort with Digital Equipment Corp., Apple is taking a two-pronged approach to penetrate the IBM world, promoting those third-party solutions it deems worthy and developing its own connectivity products. DEC and Apple are currently working to develop products that will ease the connection of Macintoshes to DEC's VAX minicomputers. Additionally, Apple has acquired Network Innovations Corp., a developer of Mac-to-VAX tools.

On the IBM front, Novell, Inc. last week unveiled its long-awaited Netware for the Macintosh personal computer, allowing Mac-based local-area networks to communicate with Microsoft Corp. MS-DOS-based LANs. Additionally, Apple announced the acquisition of Orion Network Systems, Inc., a leading developer of software applications that are compatible with IBM's Systems Network Architecture.

"We begin to now address the IBM world with the same enthusiasm that we have been addressing the Digital world," Apple Chairman and Chief Executive John Sculley said last week.

IBM connections key

Sculley ushered in 1988 as the year of networking for Apple. Apple's liaison with DEC was a natural for both companies, since each has enjoyed success with engineering and scientific users. If Apple is to be successful in its push to penetrate Fortune 1,000 accounts, it must offer easy connections to IBM mainframes, the hub of most corporate MIS departments.

Observers pointed out that this year has seen Apple adopt a more proactive stance toward connectivity. In the past, Apple has relied heavily on its third parties to develop solutions, showing a reluctance to embrace one vendor's solution over another's.

"Apple has lacked a cohesive and complete networking package," said Tim Becker, an industry analyst at Lanquest, Inc. "It's left customers shopping around."

Corporate customers have been apprehensive to make large-scale purchases from small, less-established vendors. Products offering slightly different approaches to the same problems leave users hesitant to commit to one product over another.

Apple's endorsements of certain third-party solutions and its own development efforts are encouraging to its corporate customers. However, Apple must bolster its slate of Mac connectivity products before convincing the dedicated IBM customer to take a chance on the Macintosh.

"Apple has to move from being a workstation company to being a corporate computing company," commented Thomas White, president of market research firm Infonetics. "They still have a distance to go. But they're moving in the right direction."

On users' wish lists are a Macintosh version of IBM's Token-Ring network and products that allow the Mac to retain its user interface when connected to IBM mainframes and allow efficient file transfers between the Mac and the host system.

Earlier this year, Apple introduced Macworkstation, a software tool that allows the Mac to retain its user-friendly interface. However, Macworkstation requires adjustments to the host software to be effective, necessitating an investment of programmers' time. Most users said they are investigating Macworkstation's possibilities but have yet to create applications for it.

"What I'd like for Christmas are tools that extend the Mac look-and-feel so that the user doesn't know or doesn't care what he's talking to," said Timothy Turnpaugh, executive vice-president of the operations group at Seafirst Bank, a Bankamerica Corp. subsidiary. "Can you imagine how that could bring down my training costs?"

Like other customers, Seafirst is experimenting with Macworkstation. "The thing that hangs me up is you're talking about rewriting code on the mainframe," Turnpaugh said. "I'd rather have the Mac driving the mainframe."

Turnpaugh said he is pleased with Apple's participation in the networking market. "The advantage Apple brings to the table is consistency," he explained. "It's easier to deal with them. I'm glad that they're getting deeper into it."

Michael Cromar, director of information resources at American President Companies Ltd., said his company is also developing on the Macworkstation, a product he said is desirable, but not essential.

"There are a thousand things to do on a personal computer, one of them being connecting to a mainframe," Cromar explained. "The mainframe is not the center of the universe as it once was."

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Novell opens PC door for Macintosh

DOS link provided through much-anticipated Netware for Mac, Appletalk adoption

BY JULIE PITTA
CW STAFF

SAN JOSE, Calif. — Novell, Inc. last week announced its long-awaited Netware local-area network software for Apple Computer, Inc.'s Macintosh personal computer at a joint press event here.

The announcement was one of two indicating Apple's intent to provide more connectivity solutions enabling Macintoshes to be integrated into IBM environments. In some cases, Apple will offer its own products; in others, it will bless third-party solutions like Novell's.

Also last week, Apple said it had acquired Orion Network Systems, Inc., a Berkeley, Calif., developer of applications software compatible with IBM's Systems Network Architecture (see story page 14).

"It gives us an entry point into the MS-DOS and OS/2 worlds with integrated solutions including a token-ring gateway," said Apple Chairman and Chief Executive Officer John Sculley. An estimated 220,000 Netware operating systems have been installed worldwide.

Appletalk key

Key to Novell receiving Apple's blessing is its adoption of the Appletalk filing protocols. "Apple is sending the message that it will bless companies that don't mess with its screen and environment," said Brad Baldwin, an industry analyst at Dataquest, Inc. "In essence, they're saying, 'You better come out with products that allow us to retain our identity or we'll do it ourselves or look elsewhere.' "

Netware for the Mac allows full compatibility between Netware LANs, Macintoshes and the Appletalk network system, Novell claimed. Using Netware for the Mac and Netware Version 2.15, Appleshare and Netware file servers can reportedly coexist, sharing network management and security, data files and other Netware services.

A number of third-party developers, including Ashton-Tate Corp., Lotus Development Corp. and Odesta Corp., said they will support Netware for the Macintosh and the new Version 2.15.

Netware for the Mac and Netware 2.15 will be available through Novell-authorized resellers.

Apple juices Mac operating system with speed, tools

CUPERTINO, Calif. — Apple Computer, Inc. announced Version 6.0 of its Apple Macintosh System Software last week, injected with new capabilities such as increased speed.

With this most recent version, users are able to automate repetitive tasks that previously required several steps or movements with a program called Macromaker. Macros can be created to be local or global. Recorded macros can be viewed by name, assigned keystroke or information.

Enhanced multitasking Multifinder capabilities were added as well. Under Multifinder, application documents can be opened directly from the user's desk top.

The software's notification manager was updated with more alerts to notify users that background tasks may require attention, Apple said.

Magnified screen

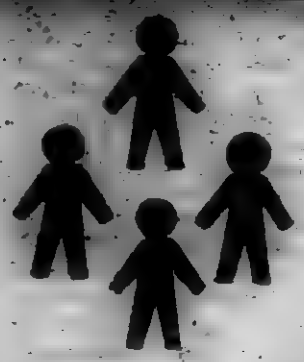
Other additions include Closeview, a screen utility that allows users to magnify the Macintosh screen display from two to 16 times its normal size, and a utility called Map that enables users to determine the time and distance between locations worldwide.

Version 6.0 will sell for a price of $49. Updates are available through Apple dealers, users groups and electronic distribution services.

The new version is compatible with Macintoshes having at least 1M byte of memory, the company said.

System Software 6.0 and a Hypercard 1.2 personal tool kit will now be bundled in the box with every Macintosh sold, according to Apple.

S PACBASE



Teamwork

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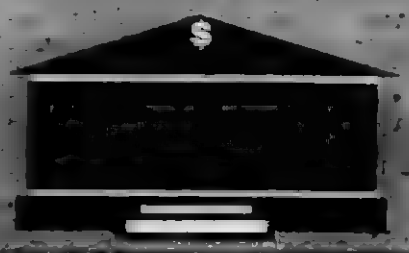

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Diskless units on the rise

BY ALAN J. RYAN
CW STAFF

IBM did not announce a diskless version of its low-end Personal System/2 Model 25 this month, as many had predicted it would. But it appears more than willing to consider filling special orders in the embryonic market of stripped-down personal computers intended mainly for network use.

"If a customer came to us with a serious proposal, I'm sure we would consider it — on a special basis," IBM spokesman Scott Brooks said. The company has reportedly produced diskless PS/2 Model 50s for some of its large accounts [CW, Feb. 1]. Earlier this month, IBM announced a version of its Model 25 that incorporates an IBM Token-Ring card for network uses, but the unit still contains a floppy drive.

Currently, the diskless workstation, or processing terminal, market is in its infancy, said Greg Blatnik, director of terminal services at Dataquest, Inc. However, "we consider it to be one of the emerging growth areas," he added.

The market for diskless units has been confined primarily to niche product offerings tied into applications, said Clare Fleig, an analyst at International Technology Group in Los Altos, Calif.

Users at companies moving to diskless technology said cost is a motivating factor and that features such as security are an added incentive for moving to the networked units. That is why these cousins of desktop computers will grow in the marketplace at a rate of more than 100% annually, according to Dataquest.

For Tim Crowell, vice-president responsible for the trust department's local-area network at the First Republicbank Dallas NA, saving money was the reason he began buying medialess 3Stations from 3Com Corp.

Previously, Crowell said, "as our network grew, it grew slowly because the cost of adding new stations on was fairly expensive." He found out, however, that "we could get a couple of 3Stations at the same price we could get on a stand-alone station with a floppy in it."

A user at a New York-based insurance company, who declined to be identified, said cost was the motivating factor for his company as well.

"We were saving on the order of $500 to $1,000 per PC," he said. The units were placed on desks of high-level clerical workers within the company.

A secondary reason most companies interested in diskless units look at them is for security. One user at a large New York financial institution said that with a large influx of seasonal temporary help, it was important that users at the company not be able to print out classified information onto floppies.

Market heating up

Companies that have gambled on diskless workstations say the market is rapidly shaping up and that more players are quickly joining in. Most of these new players offer products based on Intel Corp.'s 80286 microprocessor.

Vern Yates, vice-president and general manager of NCR Corp.'s PC division, said NCR moved to the network node market in 1986. The company offers a diskless unit but also offers floppy- and hard-disk versions of the products that are called the 3390 and 3392.

"You get cost-effective by taking as much out of what you would call a typical PC as you can," Yates said. These more compact workstations run with a smaller cabinet and power supply and do not need the expansion capabilities that increase price and size. The units are dependent on a communications interconnect and can not perform functions without being connected.

Yates estimated the market will be less than $1 billion in 1987 but could grow as high as $8 billion or $9 billion by 1991.

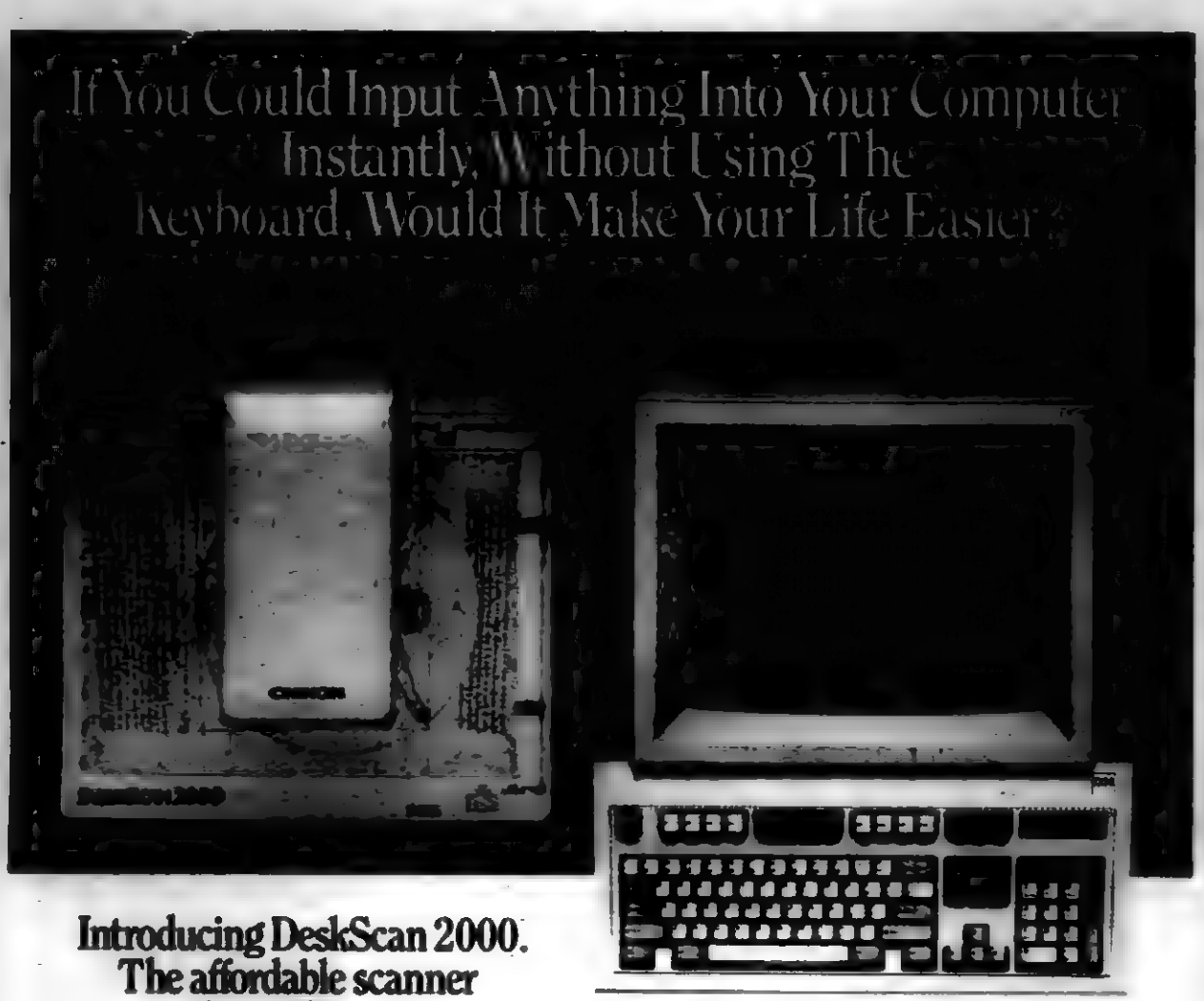
IBM to bundle Microsoft Works

REDMOND, Wash. — Microsoft Corp. and IBM are teaming up once again, this time to jointly promote IBM's low-end Personal System/2 Model 25 microcomputer and Microsoft Works.

According to the companies, individuals who purchase a PS/2 Model 25 through an IBM dealer can obtain a free copy of Microsoft Works. The software program, which retails for $195, combines a word processor, a spreadsheet with charting and a data base with reporting and communications capabilities. It is targeted mainly for small-office, school or home use.

Priced at $2,139, the Model 25 is IBM's entry-level PS/2 machine and does not have the company's proprietary Micro Channel architecture. It has an Intel Corp. 8086 microprocessor; a 3½-in., 720K-byte disk drive; a 512K-byte system board memory; and two expansion slots. IBM recently announced the availability of a 20M-byte hard-disk version.

Microsoft Works requires a PS/2 or compatible with at least 384K bytes of memory and two 360K-byte disk drives, one 720K-byte disk drive or a hard disk drive.



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*NetView is a product of IBM, Armonk, NY.

AutoMate/MVS integrates with other Duquesne Systems products to bring information quickly and easily to one single point of control.

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Apple buys Orion, aims to mine SNA

Acquisition seen to be essential step as Apple wedges foot in corporate America's door

BY JULIE PITTA
CW STAFF

CUPERTINO, Calif. — Apple Computer, Inc. last week acquired a developer of IBM Systems Network Architecture (SNA) software in an effort to broaden its strategy for penetrating IBM-dominated Fortune 1,000 accounts.

The acquisition — for an undisclosed sum — of Orion Network Systems, Inc., a Berkeley, Calif.-based software developer, adds a much-needed component to Apple's networking strategy, observers said.

Apple has lacked its own solutions for integrating its Macintosh microcomputers into IBM environments, observers also said. "What Orion brings Apple is practical applications," said Thomas White, president of market research firm Infonetics. "It means products rather than tool kits."

Apple must be able to connect its Macintosh personal computers to IBM mainframes if it hopes to build large corporate accounts, industry analysts said.

"We spent the first half of the year concentrating on products allowing us to connect to the Digital world," Apple Chairman and Chief Executive Officer John Sculley said. "We obviously want to be able to connect to the IBM world."

In January, Apple announced a joint development agreement with Digital Equipment Corp. that would give birth to co-developed products as well as foster third-party solutions enabling the connection of Macintoshes to DEC's VAX line of minicomputers.

Four-year proof

After purchasing Orion's software for the last four years, Apple concluded that it was a key technology that should be brought in-house.

Apple and Orion cooperated on the development of MacAPPC, a software implementation of SNA protocols LU6.2 and PU2.1, allowing Mac applications to communicate with hardware from IBM and other vendors.

Discussions between the two companies commenced six months ago.

Other Orion customers include Apollo Computer, Inc., AT&T, Ing. C. Olivetti & Co. and Prime Computer, Inc. Both Sculley and Orion President Paul Rampel said Orion will continue to service its existing OEM customers and will aggressively pursue new business.

Orion will operate as a wholly owned subsidiary of Apple, with its management team remaining intact. Three Apple representatives will be added to Orion's board. Jean-Louis Gassee, Apple senior vice-president of research and development, has been appointed chairman of the board.

IBM combines product data into on-line service

BY JAMES DALY
CW STAFF

ORLANDO, Fla. — IBM users puzzled about the whys and wherefores of their machines' operation now have an alternative to scratching their heads.

With the introduction of IBMlink, users seeking product specifics can tap into an on-line electronic service that provides access to a library of IBM hardware and software product overviews, specifications, functions, prices, schedules and delivery dates.

At IBM's recent three-day Executive Forum, Vice-President Edward Lucente downplayed the notion that the service will compromise the user-vendor connection. "IBMlink isn't a replacement for human interaction," he said. "Our goal is to provide customers with the information they need to ask the right questions. At the same time, it will give our people more time to work with customers."

Single source

IBMlink essentially boils down more than 30 different on-line sources of product, technical and billing information that the firm has previously provided. Through the service, customers at remote locations can tap into the one motherlode of information through the worldwide IBM Information Network by dialing a phone number or connecting through a host mainframe to the services.

Although there is no separate charge for IBMlink, a potential user must first subscribe to the IBM Information Network, which costs $1,800 a month and includes a variety of additional services.

IBMlink is set to be available on a limited basis next month and to be accessible through most IBM computer terminals attached to mainframes.

What do we call an organization that insists on hard network comparisons and live evaluations before buying?

Complexity of battle software would doom SDI in actual war

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — President Reagan's proposed Strategic Defense Initiative (SDI) would probably be doomed to "catastrophic failure" in its first real war because of inevitable errors in the extremely complex battle management software, according to the U.S. Congress Office of Technology Assessment (OTA).

The big problem lies in the difficulty of testing the software using only simulations. Large fault-tolerant software systems — such as the public telephone network — become dependable only after extensive operational use and debugging, the OTA warned in a major study released last week.

"In the OTA's judgment, there would be a significant probability (that is, one large enough to take seriously) that the first (and presumably only) time the ballistic missile defense system were used in a real war, it would suffer a catastrophic failure," the study concluded.

The proposed satellite-based defense system would be the most complex computer system ever developed. The battle management system would have to track hundreds of thousands of objects and decide how and when to attack a multitude of targets with little or no human intervention, the OTA said.

Not even in peacetime

In fact, SDI software may not be able to pass even peacetime tests because of its complexity, the changing nature of system requirements and the novelty of the new technology to be controlled, the OTA said.

For example, the OTA noted that large, complex systems that undergo continuous change sometimes reach states in which new software changes introduce errors at a greater rate than they remove them.

The Pentagon's SDI Organization, however, said it sees software problems as challenges to be overcome rather than as insurmountable obstacles. The group is supporting some research in software engineering, but the OTA said the SDI Organization's budget for software research is minuscule.

In a snapshot of the $276 million budget for battle management in 1987, the OTA found that only 2% of the budget is spent on software verification, 1% on fault tolerance and 1% on software engineering technology development.

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For production, IMS shown to still top DB2

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — Surveys by two of the nation's largest DB2 users groups disclosed last week that only a small number of DB2 users in Chicago and New York rely on the IBM relational data base management system for their transaction processing applications. IBM's IMS product is still outpacing DB2 as a production DBMS, the surveys showed.

"A large group is not yet using DB2 as a production engine," said Howard Fosdick, president of the Midwest DB2 Users Group and a DB2 data base manager at Amoco Corp. "The vast majority are still using IMS as their primary DBMS and using DB2 as a query system or a development system."

The Midwest DB2 Users Group, which surveyed 350 users, and the Knauer DB2 Users Group in New York, which surveyed 115 users, reached similar conclusions, Fosdick said. The results were presented to the Midwest users group last week.

The New York survey showed that 50% were using DB2 in development projects, while 40% were using it for production. Another 10% in the New York survey used DB2 for pilot projects.

Of users running DB2 production systems, the Chicago survey showed the following:

- 65% used DB2 for end-user query.
- 53% were installing transaction-oriented systems.
- 35% were downloading IMS data to DB2.
- 28% planned to replace IMS with DB2.

Surveyed users reported that DB2 application response times seemed reasonable but that DB2 housekeeping was time consuming, said Linda Garcia-Rose, coordinator for the Knauer DB2 Users Group. One New York installation needed 299 CPU minutes (543 real-time minutes) to load a 15 million-row DB2 table and index. Another table with 2.5 million rows required 30 CPU minutes (80 real-time minutes) to load the index.

Reorganization of DB2 tables can take hours, users said. One New York user found that it took three hours to Reorg a 2.3 million-row table under DB2.

EDITORIAL

Better to be safe

LIKE IT OR NOT, the evidence pointing to a connection between health hazards and working on VDTs is mounting.

This is not to say or even suggest that VDTs themselves are to blame. But for employers, manufacturers and workers to not be at least concerned about the possible health hazards linked to prolonged VDT use is irresponsible and foolhardy.

The most convincing piece of research into a possible link between VDT use and health problems (see story page 1) found that women working on VDTs 20 hours per week or more had an 80% higher risk of having a miscarriage than nonusers.

Researchers were quick to point out that while the size of the study holds some statistical significance, other factors in the workplace or in clerical workers' modus operandi could have caused the abnormal rate of miscarriages.

Several things are needed — and needed immediately. One is a broad-based commitment to embark on more intense, in-depth research to confirm the study results. If these studies prove conclusive, then further research should be hatched to determine the cause of the abnormal miscarriage rate.

In addition, employers should take it upon themselves to recognize that a potential problem exists for the nearly eight million female VDT workers of child-bearing age.

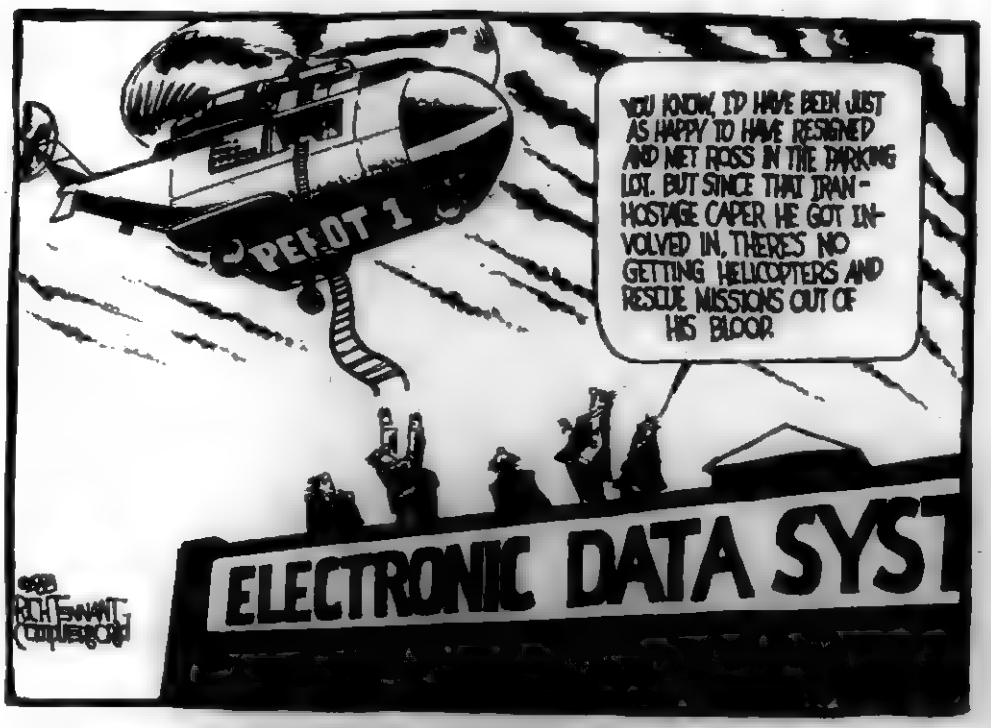
Given the number of workers we are talking about, prophylactic action in the workplace seems logical and can take many forms, including improvements in working conditions, lighting and seating, as well as making proper shielding available for those who ask for it. Ironically, radiation emitting from computer terminals is not high on the list of suspected culprits as the cause of a host of possible work-related maladies, except in VDT-dense environments.

Unfortunately, response to the recent study from both sides of the VDT health issue has been predictably irresponsible. Women's groups referred to the study as "damaging *evidence.*" Perhaps they know something even the researchers do not.

On the other side of the issue, a spokeswoman for the Computer and Business Equipment Manufacturers Association called the report "alarmist." That sounds more like a response from the tobacco industry to another one of those peaky studies linking smoking to heart disease.

Instead of beating an issue of great importance into uselessness with such irresponsible yelps, all concerned parties need to get behind a unified effort to thoroughly research the matter. Each group should contribute to a general fund to conduct research, calling for matching funds from the U.S. government. Perhaps the issue could be explored on an international front.

In this way, everyone puts aside their self-interests and does something right for millions of women and their future children.



LETTERS TO THE EDITOR

Still struggling

Great editorial "For Shame" [CW, April 25]. The struggle between compatibility and competitive advantage goes on. Poor standards community. Poor users.

Herbert R. J. Grosch
President
Association for Computing Machinery
Switzerland

Stands by 80286

I am writing regarding a statement made by Alan Radding in "Edging toward power machines" [CW, April 11]. Addison-Wesley Publishing Co. is not "squarely in the 80386 world." We agree that, in the long run, Intel Corp.'s 80386 is likely to be a more strategic product than its 80286. Nevertheless, Addison-Wesley's user services configuration recommendations have uniformly been for the less expensive IBM 80286-based Personal System/2 Models 50 and 60 rather than the 80386-based PS/2 Model 80.

Robert E. Petersen
User Services Manager
Addison-Wesley Publishing Co.
Reading, Mass.

The ideal world

Bravo! Congratulations on the first of hopefully many visionary trips into the world of software development seen in the article "From anarchy to architecture" [CW, April 25].

Fred Viskovich had his finger on the issues that must be resolved if businesses are to survive rather than eventually choke to death on today's software development techniques. And, if the techniques that produce poor-quality software are not fatal, then business will surely drown in computer code.

In the ideal environment, systems developers will spend their time dealing with business problems rather than data processing problems. As developers arrive at a consensus on requirements, the development system will be creating the application. Developers will arrive quickly at conclusions, test them by running the system and return either to make corrections or continue development. The requirement to produce endless diagrams, write piles of specifications and develop systems on a foreign language will be gone forever.

John E. Lee
Executive Vice-President
Exsys, Inc.
New York

Not alone

The article on telecommuting [CW, May 2] was an excellent report on California's rationale and plans for its telecommuting pilot for state government employees. It clearly showed that telecommuting has moved beyond the novelty stage and is an accepted workplace option.

I would like to correct an impression that may have been left by my comments. While many California employers and their employees have benefited from work-at-home programs, I have seen evidence that this is not just a West Coast phenomenon. The smog and traffic for which parts of California are known are also present, unfortunately, elsewhere in the country.

Gil E. Gordon
Editor
"Telecommuting Review"
Monmouth Junction, N.J.

A believer

Your attack on AT&T and Sun Microsystems, Inc. [CW, April 18] as partners in establishing a graphical interface to be included in the Unix standard shows narrow-mindedness and a lack of common sense.

For the time being, and probably for the near future, AT&T will continue to define Unix. This product has grown immensely under its direction and achieved sufficient status and recognition to convert followers. I am unaware that these converts were promised equal voting rights in determining product development.

I am glad AT&T went forth on a graphical interface instead of becoming involved in the time-consuming and probably impossible task of allowing the direction of Unix to be determined by popular vote. It is unlikely, given the huge following, that any more companies would end up any happier.

The bottom line is that a graphical user interface was needed now, not after two years or so of haggling. AT&T found one that would suffice and went with it. I am sure that the reputation of Sun gave the company the same warm feeling it gave me in knowing that the interface would continue to evolve.

Randall K. Cullinan
President
Risc, Inc.
Richmond, Va.

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.*

Unearthing MIS matrix roots

Throwing theory aside, in the end it all comes back to centralization

JOHN KIRKLEY

For some time, conventional wisdom has decreed that as MIS organizations mature, they move from a centralized to a decentralized structure. This seemingly inevitable evolution has been discussed at length in the trade press and backed by studies from various research houses.

One recently issued report from John Diebold & Associates admitted to uncertainty about how MIS would evolve. The researchers extrapolated that the function of central MIS would reflect the drift of computing power out to the end-user community. MIS would wind up managing telecommunications, supporting the corporate offices, establishing standards and procedures, maintaining the corporate data base and spending a good deal of time developing a new role as facilitator and consultant to end users.

It all sounds reasonable. You can probably think of organizations undergoing this metamorphosis. Certainly the pressures brought about by increasingly friendly applications development languages, the horsepower of personal computers and workstations, the widespread use of PC LANs, the first stirrings of real distributed data bases and the generally recognized need for MIS to drop its overly territorial attitude are all contributing to decentralization.

And so clarity seems to have been attained. MIS's course is clearly charted.

But wait.

Just when you thought it was all sorted out, a group of researchers at the selfsame Diebold, including Senior Vice-President Mark Klein, unearthed a major anomaly.

Klein and his colleagues analyzed the results of a survey of the evolution of the MIS function in more than 50 gas and electric utilities. In the as-yet unpublished report, they classified these companies as to their level of MIS maturation.

Although the Diebold researchers did not make this analogy, their categorization of MIS functions as immature, maturing and mature sounds suspiciously like the cycle we humans go through. The comparison is even more apt in view of their comment that the level of maturity does not depend on the organization's age but rather on its behavior.

Maturation criteria ranged from the MIS executive's place in the corporate hierarchy to how MIS costs are handled — as overhead (immature), allocation based on formula (maturing) or full chargeback (mature).

When the Diebold folks analyzed the data, the thesis that organizations inevitably move toward decentralization suddenly came a cropper.

The researchers found that as the MIS function moves from immaturity to the maturing stage, decentralization takes hold. But decentralization seems to be an interim condition, perhaps brought on by the user's dissatisfaction with the immature or adolescent behavior of the still-developing MIS function. As MIS organizations move into their mature phase, they tend to become highly centralized.

The implications are intriguing. Decentralization, at least in the gas and electric business, seems to be a passing state. MIS does not, in the long haul, have to give away the shop piece by piece until only an elite group of consultants remains.

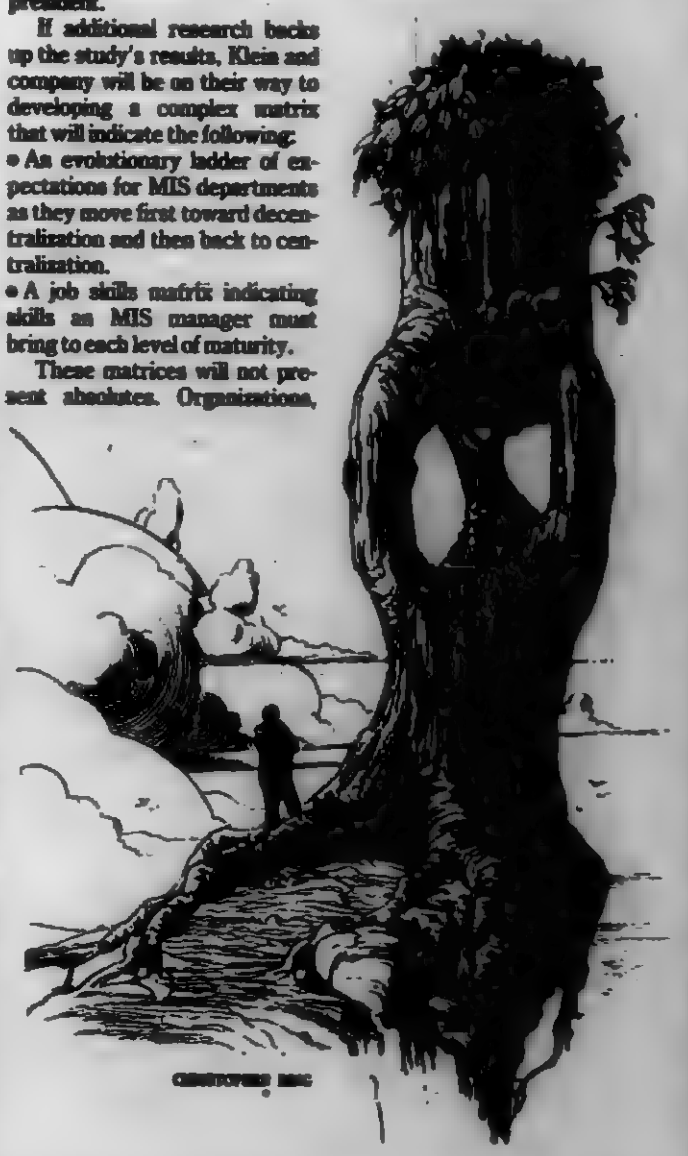
If Klein's findings hold true for other industries, it appears that MIS organizations undergo a series of complex transformations. At each stage, the function must be managed differently. Naturally, MIS managers must be prepared to learn new skills and management methods along the way.

For example, in an immature organization, MIS will not manage the telecommunications function. But when the department has reached maturity, it handles both voice and data communications. In this state, the MIS executive becomes an officer of the company and reports to the chief executive officer or president.

If additional research backs up the study's results, Klein and company will be on their way to developing a complex matrix that will indicate the following:

- An evolutionary ladder of expectations for MIS departments as they move first toward decentralization and then back to centralization.
- A job skills matrix indicating skills an MIS manager must bring to each level of maturity.

These matrices will not present absolutes. Organizations, like people, are a complicated mix of mature and immature characteristics. On a case-by-case basis, both burst the bounds of their statistical niches.



CHRISTOPHER HUGO

Kirkley is a computer industry writer, editor and consultant based in Warwick, N.Y.

Truly distributed DBMS hard to develop — even for IBM

SHAKU ATRE

Two features the market has repeatedly asked from IBM pertaining to DB2 are referential integrity and an active integrated data dictionary and directory.

Referential integrity was announced in April as a major feature of DB2 Version 2. With this feature, it is possible to implement business rules. For example, a business rule for a bank may be to not delete a customer record from the customer table if an outstanding account record remains for the same customer in the account table.

Of course, business rules must also be conveyed to DB2. Before the Version 2 announcement, application programmers had to code business rules in each of the programs. Now the data base administrator implements these rules in DB2's data dictionary, called the DB2 Catalog. Each program now validates the rules against the catalog.

The specific business rules regarding customer and account tables will be stored in DB2's catalog and acted on by DB2 whenever a program attempts to delete a customer with an outstanding account. This ensures data integrity.

Now that the one shoe of referential integrity has dropped, the question remains of the other — Repository. This is supposed to play the role of data dictionary, not only for one licensed copy of DB2 or for multiple copies but possibly for other systems as well.

Repository should set the stage for IBM Systems Application Architecture (SAA), which, in turn, is supposed to provide portability between IBM's disparate hardware and operating systems. SAA supposedly will connect the three hardware platforms of 370-based systems, System/36 and 38, the soon to be announced Silverlake and Personal System/2s.

Repository is supposed to be the glue to stick everything together, including the supported languages, application generator programs, system management tools and performance monitoring facilities. Application programs can be developed by using fewer lines of code than in Cobol programs.

Repository should provide the application program interface for connecting Silverlake programs with Silverlake's operating system or PS/2 programs with the aid of OS/2 Extended Edition programs. The language connecting all software will be SQL. The DB2 programs on the 3090 Model E mainframes will be connected with System/36 and 38 and/or PS/2 programs.

IBM desperately needs that connection capability in order to boost mainframe sales. It had hoped that a majority of the installed 20 million microcomputers would be connected to 3090s, but that hasn't happened. Microcomputer sales are increasing at the rate of 20% per year, mid-ranges at 10% and mainframes by only 4%.

Repository will store data for just about everything under the sun for a particular installation and will use DB2 for its implementation, boosting DB2 sales. The feature may support multiple catalogs of the many DB2 copies as well as data dictionaries implemented for IMS.

This means Repository is not really a DB2 announcement but an SAA announcement. It will connect the three hardware platforms of 370, System/36 and 38 and PS/2 with the operating systems MVS/ESA, Silverlake's operating system and OS/2.

What about VM/XA, another SAA operating system? An announcement for SQL/DS, which runs under VM/XA, is expected by the end of the year. An announcement for referential integrity for SQL/DS might be in order as well.

Now what about ESA for DB2? The Version 2 announcement of DB2 spent so much of its arsenal on referential integrity and operational enhancements that ESA was not even mentioned for improvement in performance with its use of High Performance Space.

Use of Hiperspace could be the feature of DB2 that will make the independent DBMS software vendors scramble for some characteristics to stand out. These features could be their active data dictionary and directory, fourth-generation language and application-enabling computer-aided software engineering tools where IBM still lags.

With the announcement to connect the disparate hardware of 370, Silverlake and PS/2, the announcement of providing a single system image is not too far behind. A single system image is the main theme of the distributed data base environment R Star. It is the prototype IBM has been working on for years.

A distributed data base management system is a tough nut to crack — even for IBM. The necessary features to make a DBMS truly distributed will be announced piecemeal in the next three to four releases of DB2/MVS and "DB2/VM."

Atre is president of Atre/Computer Assistance in Rye, N.Y., a consulting and training company specializing in relational data base management systems.

BOOK REVIEWS

IBM's SAA — at a more intimate level

The Making of the Common View
By Michael Killen

The idea of peeking in on secret IBM management committee meetings to see what goes on there is a compelling one for anyone in this industry. Like a Russian peasant glimpsing the czar in his pajamas through an open window, we are all taken with curiosity if given the chance.

Michael Killen's book purports to open the window for us and hold back the curtain. *The Making of the Common View* describes in colorful detail how IBM's many executives put together the concept and the content of Systems Application Architecture (SAA). Since SAA is intended to plug some pretty embarrassing gaps in IBM's soup-to-nuts product offerings, Killen has chosen an interesting set of meetings to look in on.

But the book may disappoint the knowledgeable voyeur. Its 22 imaginatively titled chapters detail the entire strategy behind SAA and the many problems it will solve. The information is solid and clearly explained, but a seasoned MIS veteran may not read anything he doesn't already have tucked away in some corner of his mind.

Killen skillfully weaves personalities into each chapter, giving readers a sense of the great variety of people who make up IBM's family. The book reads quickly, building toward the climactic management committee meeting at the end.

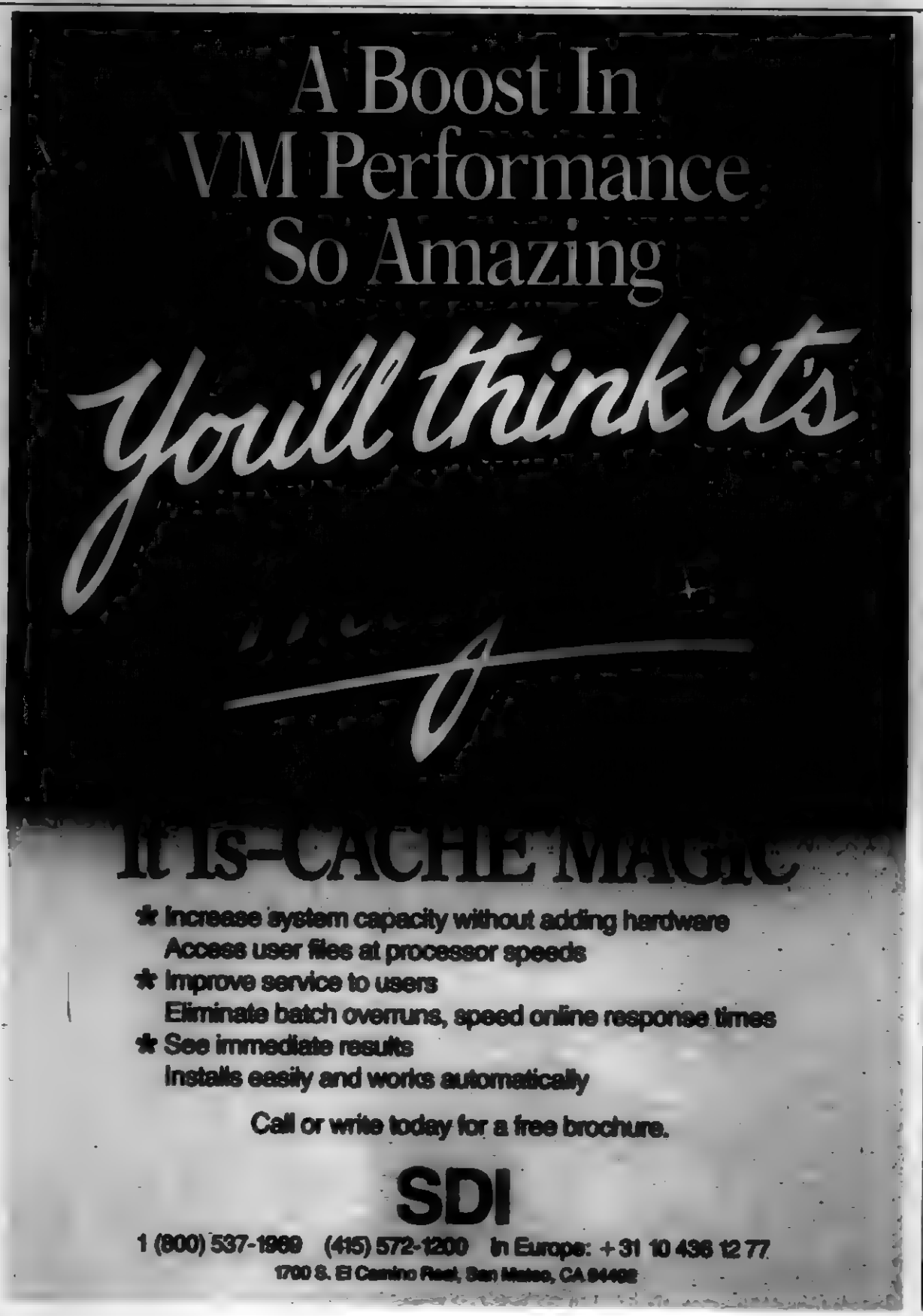
The author sprinkles in the kind of details that give you a sense of being there — the kind of details you read in a thriller like *The Day of the Jackal*: "February 17, 7:45 p.m. Carl Crawford arrived at La Guardia, walked to the baggage area and touched a button that dialed the Connecticut Limousine Service. Fifteen minutes later, a blue stretch limo whisked him north...."

Killen obviously did extensive research, and it pays off in the vivid images of each chapter. But of course he couldn't actually be present at the meetings and record John Akers' words as he questioned a tentative manager in the board room. That much the author had to fill in himself, which is what will frustrate the curious among us who want to peek in and see what Akers sounds like in action.

In all, *The Making of the Common View* is recommended reading for anyone new to the field, anyone needing a solid background in the need SAA fills, or anyone who has a rainy weekend afternoon and a little curiosity.

Hardcover, $17.95, 304 pages, ISBN 0-15-143480-8, by Harcourt Brace Jovanovich, Boston, Mass.

AMY SOMMERFELD FIORE



BOOKS IN BRIEF

The Workstation Data Link
By Merv Adrian

Analysis of the manager's role in data exchange, as well as technical insight into varying methods of transferring files between PCs and mainframes.

Paperback, $24.95, 240 pages, ISBN 0-07-000474-9, by McGraw-Hill Book Co., New York.

Building a Secure Computer System
By Morrie Gasser

A detailed reference book for the day-to-day security issues often faced by computer professionals.

Hardcover, $34.95, 288 pages, ISBN 0-442-23022-2, by Van Nostrand Reinhold Co., New York.

Data Base
By Shaku Atre

The second edition of this source of techniques for designing data bases.

Hardcover, $39.95, 430 pages, ISBN 0-471-85251-1, by John Wiley & Sons, Inc., New York.

Infomap
By Cornelius Burk Jr. and Forest Horton Jr.

Here is a map to discovering the information resources within your company; also presented are the means for pulling the resources together so that information systems plays more than just a support role in your organization.

Hardcover, $34.95, 254 pages, ISBN 0-13-464447-6, by Prentice Hall, Englewood Cliffs, N.J.

Handbook of Communications Systems Management
Edited by James Conard

Help for the MIS manager who finds himself increasingly called on to sort out his company's communications problems. Topics range from LANs, modems and SNA to bypass options, ISDN and voice-data integration.

Hardcover, $86, 992 pages, ISBN 0-7913-0091-9, by Auerbach Publishers Inc., a Warren, Gorham & Lamont Co., Boston.

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SOFTWARE & SERVICES

SOFT TALK

Charles Babcock

Benchmark criteria sought

The spate of relational data base management system benchmark tests during the last three months should tell us more than it does. All used the ET-1 debit/credit benchmark or a derivative of it, TP-1. Nevertheless, it is almost impossible to make any comparisons based on the results.

As noted in a May 9 *Computerworld* report, the circumstances under which the vendors conducted their tests varied widely, and in many cases the vendors slanted the results in the direction that would make their product look best. No one should be terribly surprised by this. Bigger and more reputable companies have been known to do the same thing, but customers might still hope for more meaningful results than figures that ranged from more than 100 for Relational Technology's Ingres to 13.4 for Cullinet's IDMS/SQL.

One voice of indignation raised in response to these results was Oracle Chairman Larry Ellison's, who wrote the following to his sales force: "Oracle could cheat on benchmarks, too. But wouldn't it be more interesting and fun if we could beat their bogus benchmark results without resorting to cheating?" We recommend the nearest oxygen tent for those who hold their breath on the basis of that statement. In

Continued on page 29

MUMPS spreads to more users

Specialized hospital language working for nonmedical programmers

BY ROSEMARY HAMILTON
CW STAFF

Long considered a specialized programming language for the medical community, the Massachusetts General Hospital Utility Multi-Programming System, better known as MUMPS, is breaking out of its niche.

Developed in 1966 at the Boston hospital for which it is named, MUMPS has recently shown up in such diverse situations as the source of an automated telemarketing system, the backbone of the data base management system at the National Institute on Aging and the programming environment at a sound-system manufacturer in Barrington, Ill.

In its 22 years of existence MUMPS has never had a high profile and will likely never become a widely used programming language. But its users say it will continue to enjoy quiet success.

Users say the language is easy to use, requires little programming experience, has a built-in data base facility and, as an ANSI-standard language, is portable across various hardware platforms.

One other telling sign that indicates it is far from dead was the announcement late last year by IBM that MUMPS would be available under the VM mainframe operating system.

Mad about MUMPS

"It's been branded as a medical language, so people shy away from it. But we are committed to it. We only use MUMPS," said James Wischmeyer, president of Modular Sound Systems, Inc. in Barrington.

Wischmeyer said he launched a project four years ago to automate his company's accounting department. Without any programming experience, he sought the advice of a friend who happened to be a MUMPS programmer. The friend recommended the language, and Wischmeyer took the gamble. He purchased a complete system, including the accounting applications.

The MUMPS system also came with a programmer's tool kit, which Wischmeyer put to work. He pointed out that he cannot compare MUMPS with other programming languages but that it was so easy to use that he was writing programs within a few weeks of installing the tool kit.

Users with programming experience also said MUMPS is easy to use. Rick Horwitz, president of Idleman Technology, the computer-services arm of Idleman Telemarketing, Inc. in Omaha, said MUMPS has many advantages over other procedural languages such as Cobol or Fortran. Horwitz opted for MUMPS when Idleman decided to automate its telemarketing process.

Horwitz said he likes the package MUMPS provides with its integrated data base component. While acknowledging that it is not as advanced as a true data base management system like IMS, Horwitz said the language provides a flexible environment that does not have to be defined up front.

"It lets us insert and delete textual information very quickly," he said.

DG speeds relational DBMS

BY CHARLES BABCOCK
CW STAFF

WESTBORO, Mass. — Data General Corp. said it has improved the performance of its 4-year-old relational data base management system, DG/SQL, doubling throughput to 17 transaction/sec.

The peak sustained rate was achieved while running an ET-1 debit/credit benchmark with Version 4.0 of DG/SQL on a DG Eclipse MV/20000 Model 2 with 64M bytes of memory. The average response time was less than two seconds. When the results were measured with a 95% average response time less than one second, as specified by the standards for ET-1 set by Tandem Computers, Inc. last year, the throughput rate dropped to 15 transaction/sec.

The DG benchmark met such standards as scaling, in which the number of bank branches, tellers

Continued on page 26

Data View

Big appetite for development tools

Computer-aided software engineering revenues nearly doubled between 1986 and 1987, and the trend is expected to continue through the balance of the decade

INFORMATION PROVIDED BY BUSINESS TECHNOLOGY RESEARCH, INC.
CW CHART

File transfer software eases System/36 data download

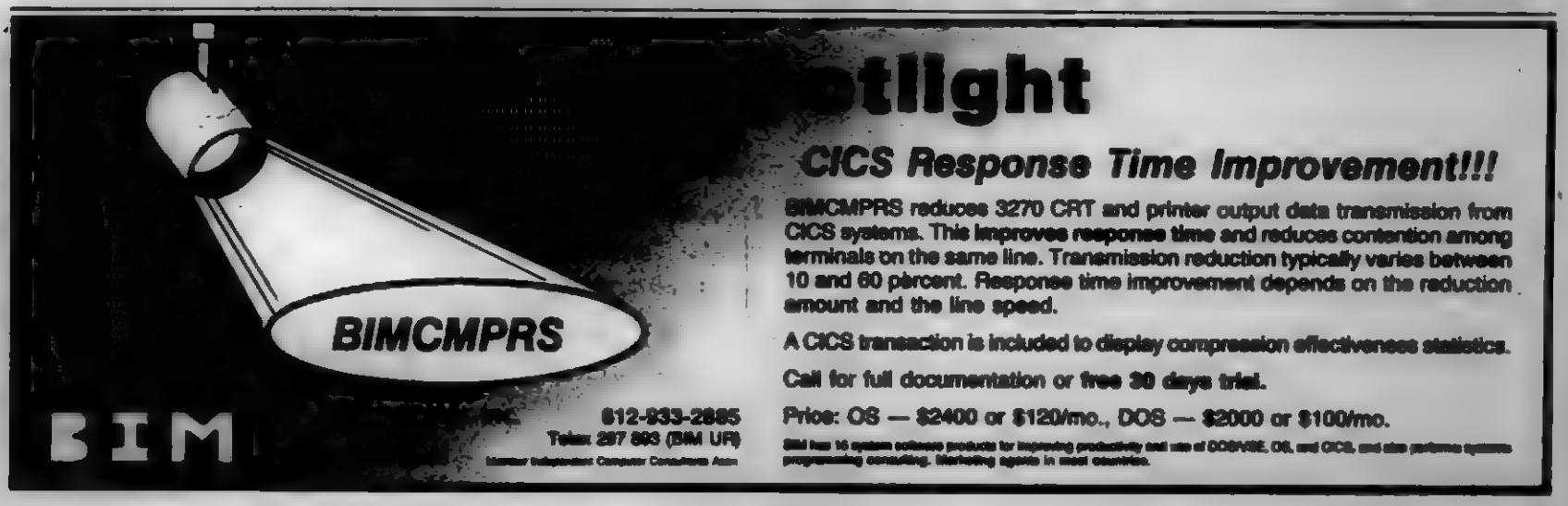
SANTA ANA, Calif. — Laguna Laboratories, Inc. recently released a file transfer system that it said enables IBM System/36 users to download data to a personal computer.

DBA/36 works with any System/36 application and reformats data into seven different PC formats, according to company spokeswoman Lynn Collins.

DBA/36 is made up of two component: a System/36 facili-

Continued on page 29

- Comparison offers fill-in-the-blanks support. Page 20.
- Vendors back 3-D graphics interface. Page 28.
- CDC adds Power Series for DBC systems. Page 30.



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Compushare heeds users, cranks up All-In-1 support for accounting line

LUBBOCK, Texas — Compushare, Inc. recently announced that its VAS accounting software line now supports Digital Equipment Corp.'s All-In-1 office automation package.

Current users of Compushare's VAX-based software, who number approximately 600, have been requesting an interface to All-In-1, according to Stephen Sargent, Compushare's marketing director.

For Microvax users, Compushare also engineered an interface to DEC's A-to-Z Microvax-based office automation package.

With the interface, Sargent said, output from any of Compushare's VAS modules, which include all standard accounting functions, can be stored in All-In-1 file folders. The Compushare data is then treated like any All-In-1 folder, he said.

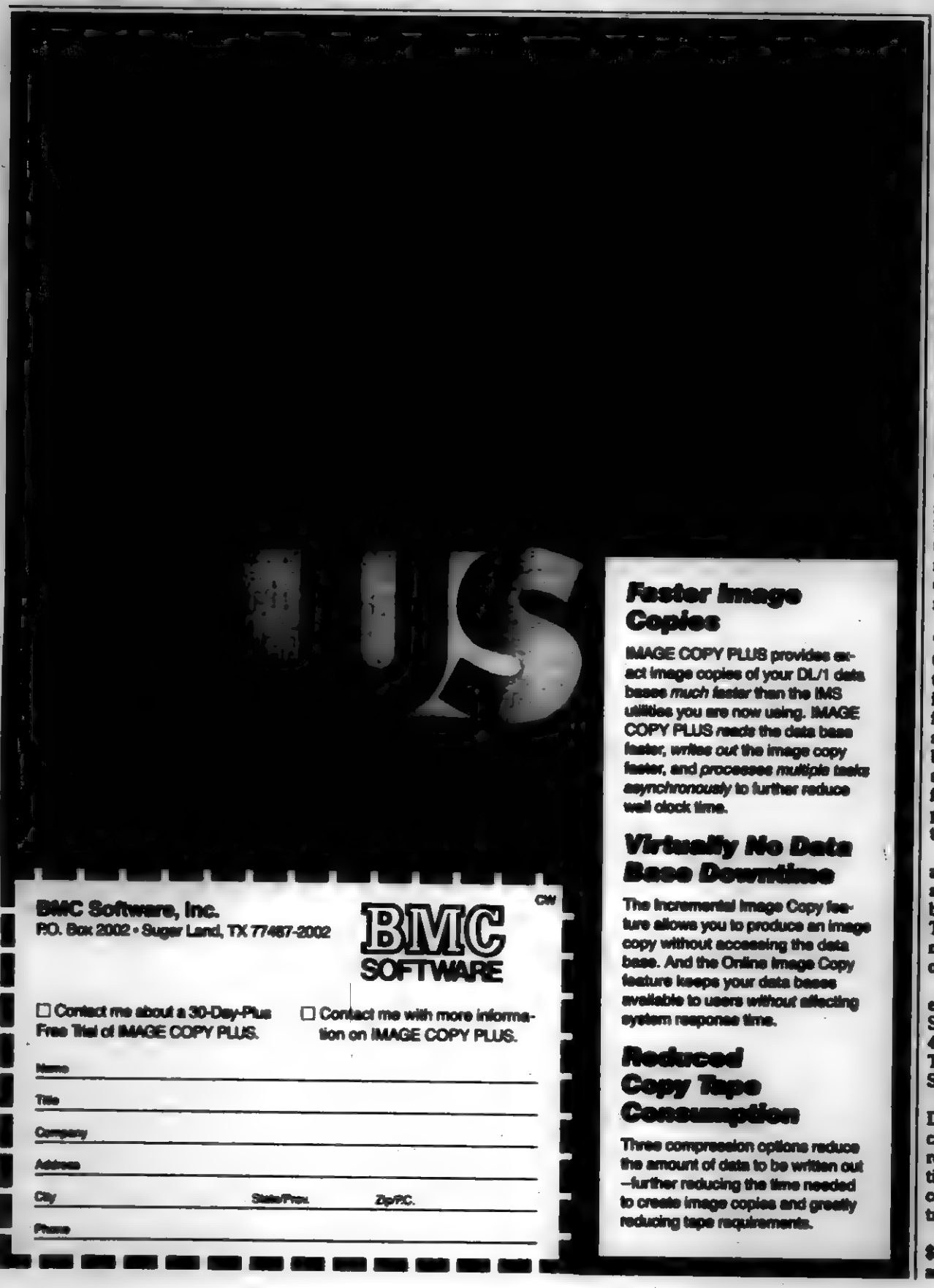
Combining files

For example, Compushare said, a user can wrap a financial statement into a word processing report or mail an aged accounts receivable report for customers in a given sales territory to that territory's sales representative.

Alternately, a user can send financial information down to an Access Technology, Inc. 20/20 spreadsheet for modeling and then forward the results to an appropriate part, Sargent said.

The All-In-1 calculator can be called from within any Compushare screen form, and any Compushare screen can be printed on the All-In-1 scratch pad.

Available immediately, the All-In-1 interface sells for $3,000. Like other Compushare products, it is covered by the company's guarantee, which ensures a response to a user call within one hour, resolution of the problem within 24 hours or double the service fee back.



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Candle adds VM reporting utility

LOS ANGELES — Candle Corp. recently began shipping its first reporting utility for the IBM VM operating system.

Epilog 1000 provides users with reports on use of direct-access storage devices, channel resources, CPUs, storage and paging.

The utility also provides historical reports that sum up system-wide use or usage broken down by individual work loads, according to Candle spokesmen.

The system reporting utility will be available for the various versions of VM, including VM/SP, VM/SP High Performance Option and VM/XA.

A trend feature can be used that allows users to spot bottlenecks and more easily plan system use, the company said.

According to Candle, the software is based on an easy-to-use command structure that requires no programming experience.

Candle sells a series of reporting and analysis utilities for other IBM environments such as MVS, CICS and IMS. Epilog 1000 is Candle's first reporting software for VM. It is priced from $2,000 to $5,000, depending on the version of the operating system, the company said.

DG speeds

CONTINUED FROM PAGE 25

and accounts matches an estimated number of transactions per second; logging two mirror images of transactions to memory devices and establishing a 90-day history file, according to DG documentation.

'More complete' attempt

Omri Serlin, president of Itom International Co., a market research and consulting firm in Los Altos, Calif., and one of the few industry figures trying to define a standard minicomputer-relational data base management system benchmark, said he has reviewed the DG results and found them to be "one of the more complete" attempts to implement an ET-1 test.

The benchmark was not independently audited, as was the Tandem benchmark and some more recent benchmarks by Sybase, Inc. and Relational Technology, Inc. The latter two tests were TP-1 benchmarks, which is a more simplified version of ET-1.

Version 4.0 of DG/SQL includes referential integrity and uses ANSI-standard SQL, as did the previous version. Version 4.0 is supported by the DG AOS/VS Transaction Processing Management System.

Gary Davis, product manager for DG/SQL, said the results of the test indicated the DG relational product was ready for transaction processing production uses, much as IBM claimed DB2 could be moved into production use as its transaction processing improved.

DG/SQL is sold as two components: a $2,900 to $17,400 development license and a $960 to $7,315 runtime license.

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An SSI complex supports up to 33 processors.	IBM's ISF is limited to four CPUs.
SSI dynamically switches virtual machines from one processor to another to satisfy user requirements. This means a user's terminal and virtual machine can be on different CPUs. As a result, duplicate software licensing and maintenance charges can be reduced or eliminated.	IBM's ISF offers no switching capability.
SSI balances the user load automatically.	IBM's ISF doesn't do load balancing.
You can use IUCV and VMCF to communicate between programs across processor boundaries in an SSI complex.	With IBM's ISF, you can't use IUCV and VMCF across processor boundaries.
SSI supports FBA and Count/Key/Data devices.	IBM's ISF inter-system link and spool facilities do not support FBA devices.
SSI doesn't require extended storage support.	IBM's ISF does.
SSI has been available since 1980.	IBM's ISF has been available since last year.

SSI allows multiple VM-based CPUs to communicate with each other in order to present a single system image to the users. SSI is the only current alternative to CPU upgrades that can keep user communities whole when the exhaustion of resources fragments those users onto multiple CPUs.

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Renderman standard earns support

SAN RAFAEL, Calif. — Thirteen firms have thrown their weight behind a standard for photo-realistic image synthesis for graphics workstations and supercomputers, pushing Renderman, a three-dimensional interface, as the de facto industry standard.

Renderman was developed by Pixar Co. as a language to encapsulate specification of scene information so that there is a single fixed point of contact with rendering systems, according to the company. It is a formal specification of the interface between modeling tools and software rendering systems.

Renderman has three parts: a set of geometric primitives for specifying the shape of objects; a shading language for identifying complexity in surfaces and atmospheric and lighting conditions; and mechanisms for attaching surface attributes to shapes.

The language is supported by Apollo Computer, Inc., Ardent Computer Corp., Digital Equipment Corp., Mips Computer Systems, Inc., Stellar Computer, Inc. and Sun Microsystems, Inc., among others.

No reinvented wheel

A spokesman for Ardent, which packages Renderman under its dynamic object rendering environment software, said Ardent was backing the new interface because there is no reason for it to "reinvent the wheel."

The companies backing the de facto interface standard said they will not seek the blessing of a standards committee.

Graphics computer companies "avoid standards committees like the plague," an Ardent spokesman said.

SOFTWARE NOTES

Spreadsheet now available in Spanish

Minitplan/36, a cosmopolitan spreadsheet and financial modeling package for the IBM System/36, is now available in Spanish. Developed by **Business Model Systems**, Inc. in Westmont, Ill., it will be marketed in Venezuela, Argentina and Spain. It follows versions in German, French, Finnish, Italian, Japanese, Norwegian and Swedish.

Price Waterhouse has agreed to offer consulting services to **Computer Associates International, Inc.** financial and banking customers. Price Waterhouse has installed two Computer Associates software packages, the Masterpiece series and the CA-Infopoint Banking series, at its Applied Technology Center in Tampa, Fla., where consultants will be trained.

Interactive Development Environments, Inc., a computer-aided software engineering vendor in San Francisco, recently received $4 million in venture capital, its first funding outside the company, from Thomson-CSF Ventures in Paris and Mayfield Fund in Menlo Park, Calif.

Another recipient of venture funding was **Frame Technology Corp.** in San Jose, Calif. Frame, which sells Framemaker, a document-processing package, received $3.1 million in equity financing from Menlo Ventures in Menlo Park, Calif., and Hambrecht & Quist, Inc.

Sybase, Inc. has changed the names of the Sybase system components to reflect its adherence to standards and to capitalise on the growing popularity of SQL. The Data Toolset is now called the Sybase SQL Toolset, and the Dataserver is now the Sybase SQL Server.

Digital Equipment Corp. has signed a deal with **Pentamation Enterprises, Inc.** in Bethlehem, Pa. to cooperatively market DEC-based systems to the educational market.

SQL
Performance
for OLTP.

Tandem
challenges
anyone.

Babcock

FROM PAGE 25

fact, the problem here is as much the ambiguities surrounding ET-1 as it is cheating.

ET-1 first achieved its status as a budding benchmark when a group of industry figures took a Bank of America request for proposals for an on-line transaction processing system and attempted to translate it into a set of criteria for measuring transaction processing systems. The criteria were described in an April 1985 *Datamation* article by Anon et al.; Jim Gray of Tandem was part of the group.

Tandem further defined the criteria and used them in its ET-1 benchmark of VLX Nonstop SQL in March 1987, and that test has served as the model on which the others have patterned themselves.

Well, almost. TP-1 is a derivative of ET-1 that is less expensive to set up and less costly to run. It concentrates on the data base manager's performance, while Tandem's ET-1 concentrated on the total price/performance of a hardware and software system. TP-1 also fires transactions at the data base manager.

Omri Serlin, president of Itom International in Los Altos, Calif., has attempted to label a full ET-1 as a Class I debit/credit benchmark and TP-1 as a Class II debit/credit benchmark. He offers criteria governing both. He is preparing a report on how well the benchmarks have complied with one or the other.

In using these criteria, Serlin looked at a competitive-analysis document issued by Unify in January 1987 that compared results of Unify with those of Informix and Oracle. The results listed Unify as capable of 12 transaction/sec. compared with four for Informix and two for Oracle.

But Serlin noted that the test had used only 100,000 account records when it should have used one million, and it did not specify which processors, disk drives or operating system were used in the test.

"Despite the inclusion of complete listings from all three cases, there are several other ambiguities and contradictions in the Unify document. The validity of the results is therefore in grave doubt," he warned.

If Serlin and other fair-minded observers can minimize the ambiguities in a Class II TP-1 benchmark, we may yet have a way to compare Oracle, Ingres, Sybase, Unify and the other relational DBMS products.

Babcock is *Computerworld*'s senior editor, software & services.

System/36

FROM PAGE 25

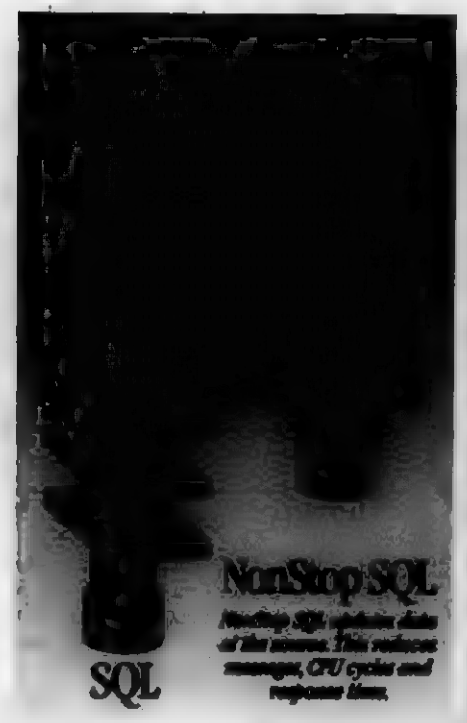
ty and a PC program. The System/36 component sends files to the PC component, which reformats the file in the PC format selected by the user, Collins said.

Common formats

The seven PC format choices include formats for commonly used programs such as Lotus Development Corp.'s 1-2-3, Ashton-Tate Corp.'s Dbase and standard Cobol files.

Collins said the software is menu-driven, thus enabling users to walk through the process of downloading files.

The DBA/36 package, which is currently available, is licensed for the System/36 only. Unlimited PCs may be used with DBA/36. Licenses range in price from $478 to $1,195, depending on the processor model.



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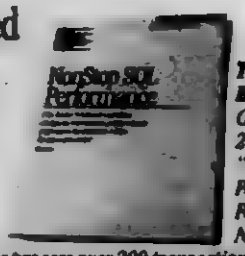

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NEW PRODUCTS

Systems software

Graphic Software Systems, Inc. will ship a free upgrade of its Direct Graphics Interface Standard (DGIS) firmware to graphics board companies that have licensed DGIS for their TMS34010-based graphics boards.

The vendor claimed the firmware allows Microsoft Corp. Windows 2.0 and other software to run at substantially higher speeds than were previously possible.

DGIS is the board-level software interface between a graphics processor and numerous application packages. These applications include software based on Windows 2.0, Autodesk, Inc.'s Autocad ADI and the IBM Graphics Development Toolkit.

Graphic Software Systems, P.O. Box 4900, Beaverton, Ore. 97005. 503-641-2200.

Applications packages

Trajectory Software, Inc. has announced **Lex PDQ**, a word processing and data base system for Unix, Xenix, DOS, and other operating system environments. The product is an upgrade of the Lex word processing and data base system.

The system incorporates a 130,000-word spelling dictionary, a mass-mailing system and macro capabilities. Enhancements include support for multiple fonts, expanded Help screens, horizontal scrolling and keyboard function keys.

Lex PDQ costs from $495 to $10,000, depending on operating environment.

Trajectory Software, 555 Goffle Road, Ridgewood, N.J. 07450. 201-447-5200.

CRI, Inc. has upgraded its project management software for Hewlett-Packard Co. computers.

Projectalert 2.0 will run on the HP 900 series Spectrum systems and retain the original support offered for HP 3000 series minicomputers.

The release has been repackaged to include color graphics, project management reports, micro-scheduling and optional precedence notation or activity-on-arrow scheduling.

Projectalert 2.0 costs $7,500 to $37,500 depending on hardware options selected.

CRI, P.O. Box 58004, Santa Clara, Calif. 95052. 408-980-9898.

Utilities

A conversion tool for translating Datapoint Corp. RPG-II batch source code to Databus source code has been introduced by **Diversified Data Services, Inc.**

Called **Go-Between**, the software tool allows compilation and execution of RPG-II programs in Microsoft Corp. MS-DOS, Digital Equipment Corp. RMS or Unix environments, according to the company.

The program also removes the shared-file restriction of RPG-II, thereby providing access to programs that would previously have been locked out during RPG-II application transactions.

Go-Between costs from $4,200 to $6,000.

Diversified Data Services, 1035 Branch Ave., Providence, R.I. 02904. 401-421-8500.

Services

Control Data Corp. has expanded its service offerings with the addition of system performance and monitoring tools for Digital Equipment Corp. systems. The company's **Proact Service** consists of two components, **Proact 1000** and **Proact 2000.**

Both components reportedly offer programmable thresholds, which allow system managers to select parameters for system operation, and an interface to Dectalk.

In addition, software supplied under Proact 1000 includes continuous system monitoring, Decnet monitoring and a security system. Software under Proact 2000 allows users to conduct VMS performance and monitoring functions and includes comparative analysis reporting.

Prices for the Proact 1000 and Proact 2000 Services vary between 5% and 15% of the basic monthly maintenance charge.

CDC, 1101 E. 78th St., Bloomington, Minn. 55420. 800-345-9903.

Development tools

A graphical modeling system that reportedly offers unrestricted binding capabilities has been announced by **Sherrill-Lubinski.** SL-GMS allows developers to create screens, displays or custom graphical interfaces and offers more than 80,000 lines of source code.

The product is hierarchical and written in straight C code. Transparent interfaces to standard Pascal and Fortran are available in the SL-GMS library. SL-GMS runs on all versions of Unix, as well as in the Digital Equipment Corp. VMS environment. It works with windowing systems from Sun Microsystems, Inc., DEC and Silicon Graphics, Inc.

SL-GMS costs $9,500 to $12,500, with application or runtime configurations starting at $2,400.

Sherrill-Lubinski, Suite 255, Hunt Plaza, 240 Tamal Vista Blvd., Corte Madera, Calif. 94925. 415-927-1724.

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MICROCOMPUTING

MICRO BITS

Douglas Barney

Stop pulling punches

Only the weak pick fights? In hockey, it is not often that a wimp picks a fight with a bully. Given the nature of the sport, the wimp would be pulverized every time. Of course, the tough guys love to fight because they usually win.

But in some marketing texts, picking a fight with your rival is a sign of weakness. This precept has kept Lotus from lashing out at competitors that have slammed it at every turn. And it is a precept that Lotus President Jim Manzi has vowed to uphold.

In light of recent developments, it may be time for Lotus to rethink that approach and fight fire with fire. Sometimes when you turn the other cheek you get kicked in the behind. And there are some within the company who happen to agree.

So far both Borland and Microsoft have been giving Lotus a few swift boots, and the company has merely grumbled. Under their breath (and not for attribution), the Lotus folks are steamed at Borland's performance claims, which they say are wrong. But Lotus won't re-

Continued on page 47

Filemaker strings up the Mac

BY JULIE PITTA
CW STAFF

FOSTER CITY, Calif. — Nashoba Systems, Inc. has introduced a new version of its data manager for Apple Computer, Inc.'s Macintosh, adding multiuser capabilities via local-area network support.

Called Filemaker 4, the product is an enhancement of Filemaker Plus, a single-user data manager for the Mac. According to Infocorp, a Cupertino, Calif., market research firm, 50,000 copies of Filemaker Plus and its predecessor, Filemaker, also for the Mac, have been shipped since those products debuted.

Bill Higgs, a software industry analyst at Infocorp, said that adding multiuser capabilities to Filemaker was a "marketing checkpoint" for Nashoba. "Companies that are installing Macintoshes are increasingly using them in networks," Higgs said. "End users are asking if a package has multiuser capabilities. It may not be terribly important to selling the product today, but it will be in the future."

Infocorp classifies Filemaker 4 and earlier versions as flat filers rather than as true data base managers. Higgs said the distinction lies in the relational abilities of a data base manager. "The data is not stored in a matrix or table," he explained.

The leading product in the flat-filer category is Microsoft Corp.'s File, although Filemaker Plus is currently selling more briskly than that product, according to Infocorp.

Nashoba's new version attempts to bridge the gap between entry-level flat filers such as File and more complex data base managers such as Fourth Dimension, a package for the Macintosh from Acius, Inc., Higgs said.

Filemaker 4 can run on Macintosh networks with or without a dedicated file server. It adds standard multiuser features such as record locking and password protection. Other upgrades include enhanced graphics for creating forms and reports.

The price of Filemaker 4 is $299.99. A four-user pack, including four sets of software, manuals and support materials, is priced at $599.99.

An upgrade kit for Filemaker Plus is priced at $50 for a single-user version and $200 for the four-user pack.

Keeping tabs on where the bears roam

BY ALAN J. RYAN
CW STAFF

INUVIK, Northwest Territories — In the wilderness of Canada's Northwest Territories, wildlife biologists have stopped physically chasing after paw prints and hoofprints. Instead, they use the less fatiguing method of satellite collars, personal computers and phone lines to track the home ranges of various animals.

By closely tracking the animals, the biologists find out exactly where polar bears and other animal populations reside within the Canadian arctic.

Continued on page 46

Data View

Mainframe sites step up high-end PS/2 plans

Users are turning to faster IBM Personal System/2s that are better equipped for OS/2

INFORMATION PROVIDED BY FOCUS RESEARCH SYSTEMS, INC.
CW CHART

UK Peat Marwick moves toward Excel standardizing

BY PAUL SAUNDERS
IDG NEWS SERVICE

LONDON — The world's largest accounting firm, Peat Marwick McLintock, will standardize on Microsoft Corp.'s Excel spreadsheet and phase out Lotus Development Corp.'s 1-2-3 and Supercalc. The move follows a decision in April by the auditing group of the second largest accounting firm, Arthur Andersen & Co., to ditch 1-2-3 worldwide in favor of Microsoft's offering.

Peat Marwick McLintock, which has approximately 500 Compaq Computer Corp. Deskpro 286 machines and AST Research, Inc. personal comput-

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Inside

- Reviews of Total Word, Quick C, Pagesperfect. Page 36.
- A rewritten Manuscript. Page 46.
- Let your computer do the dialing. Page 46.

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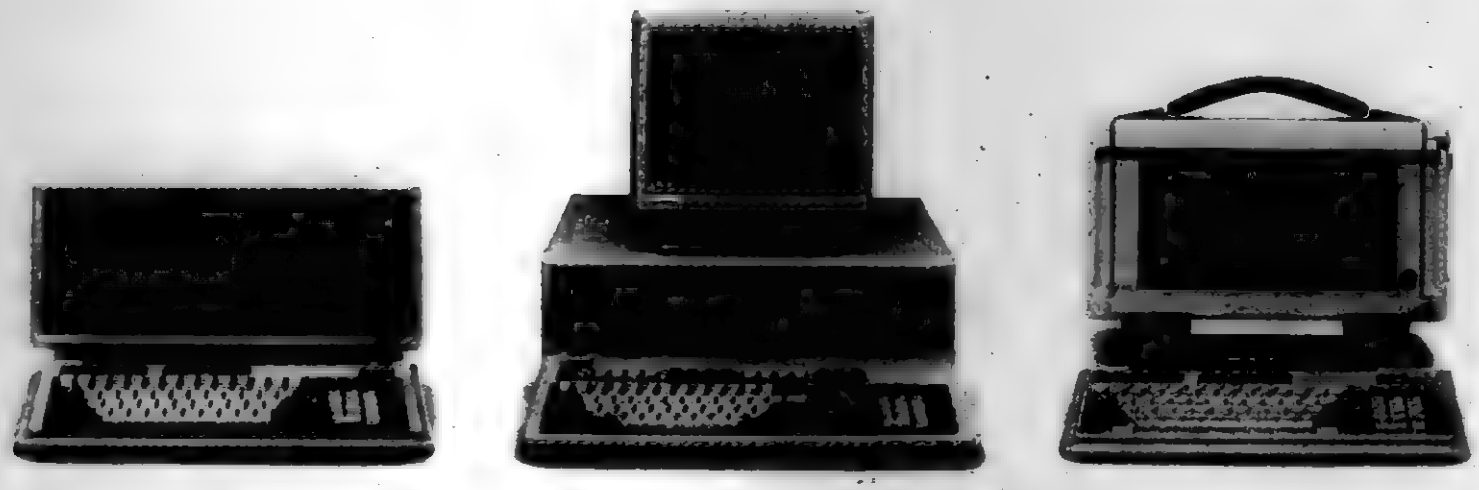

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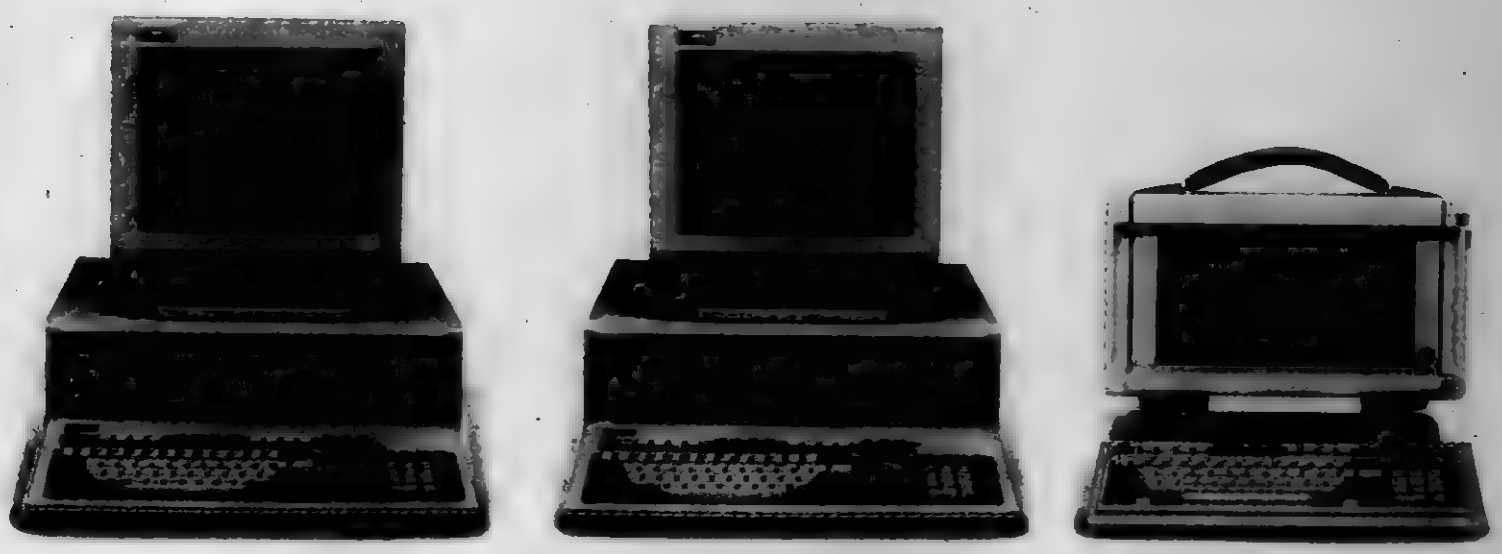

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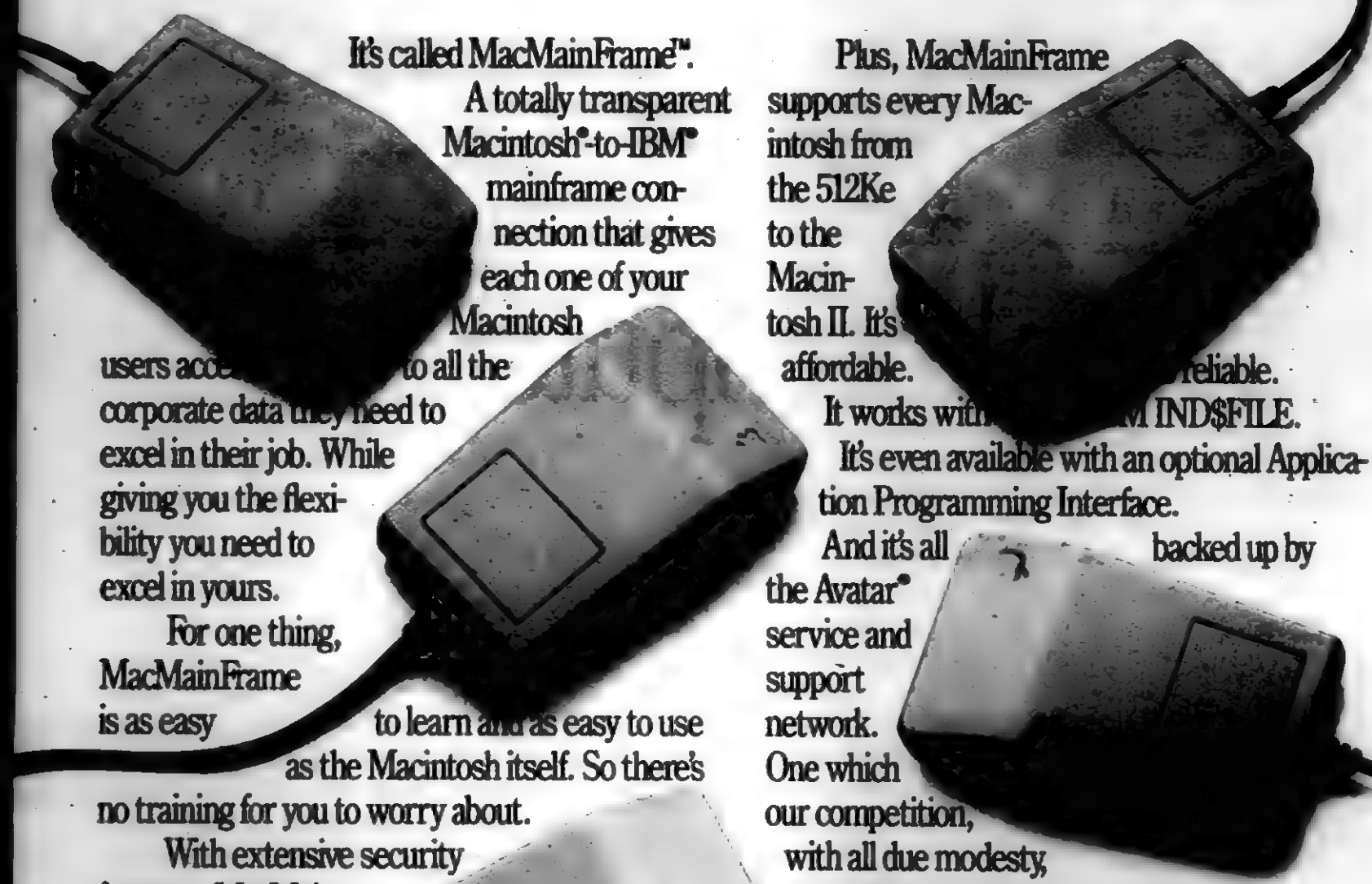

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REVIEWS/NEW PRODUCTS

The last word on Lifetree's Total Word

Total Word, the latest Volkswriter incarnation from Lifetree Software, Inc., employs the traditional Volkswriter user interface and maintains a dedication to ease of use. It offers a reasonable alternative to more elaborate professional programs such as Micropro International Corp.'s Wordstar 2000 Plus Release 3 or Microsoft Corp.'s Word 4.

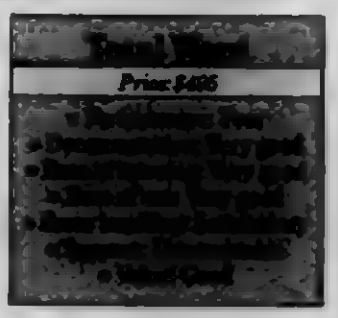
Features: Total Word offers most of what we have come to expect in the most powerful office/professional word processing programs. It includes all regular editing commands for cursor moves, cut and paste and similar functions.

It also permits the inclusion of nonprinting comments for tracking revisions and editing changes. Directory management has been improved. Footnotes or end notes can be included, and there is a formula-processing system that uses alternate keyboards. The keyboards also provide access to foreign language and special character sets.

Other features include indexing, table of contents, redline/strikeout, macros, forms management, mail merge and a screen-capture graphics import facility.

Total Word's handling of page layout, style sheets and laser printer fonts is based on the use of style sheets containing the specifications for appearance characteristics. It permits the use of up to 250 layouts or sets of appearance specifications in a single document. A Times Roman soft font that can be used immediately with Hewlett-Packard Co. Laserjet-compatible printers is included. File transfer utilities are primitive; Total Word accepts only Volkswriter and straight ASCII files.

Total Word welcomes the user aboard.



Performance: Poor. Total Word's editing capabilities make full use of special graphics cards and color. Unfortunately, the product performs slower than average office and professional word processors. Its Undo command helps recover from accidental deletions but does not recover block deletions.

Total Word's math function is easy to use, but the simple line-sorting function permits only one sort field and requires sort fields to be arranged in columns. Also, the graphics screen-grabbing program captured most screen images we tried, but we could not find any way to remove Snapshot from memory. Total Word lacks support for uneven columns, paragraph or outline numbering and cannot handle both footnotes and end notes in the same document. However, there are some pluses: The spelling checker and thesaurus perform well, and on-line automatic hyphenation is effective.

Documentation: Very good. Total Word has good, clear documentation, including a printer manual and a quick-reference guide. We discovered some inconsistencies between what the manual describes as being on the screen and what actually appears, but the special printer manual does a reasonable job of explaining how to use features of the laser printers.

Ease of learning: Very good. Total Word is one of the easiest high-power word processors to learn to use. Its ready-made style sheets and installed soft fonts get a novice up and running in a reasonable amount of time.

Ease of use: Very good. As Total Word users gain experience, the function keys and other facilities make it possible to work quickly and effectively.

Error handling: Satisfactory. Total Word crashed several times when performing rather routine functions such as deleting a printer driver. But, despite numerous annoying bugs, we lost no data, and error messages were clear and acceptable.

Support: Unacceptable. The company offers an unlimited — but not toll-free — customer support line from 8 a.m. to 3 p.m. Pacific time. We called the technical support number provided on the documentation 10 times and received nothing but busy signals. Support policies include bug fixes of Total Word, notice of all improvements and upgrades and a free subscription to the company's newsletter, "Newsline." There is also a 60-day money-back guarantee.

Value: Good. Somewhat less powerful and less flexible than the best of the high-power word processing programs, Total Word nonetheless excels in ease of learning. With features sufficient for all but the most demanding office requirements or sophisticated document preparation, we believe this program is especially suitable for users who need an easy-to-learn and useful word processor with strong laser printer support and effective soft-font control.

Users win Quick C, Turbo C face-off

Once again, Borland International and Microsoft Corp. meet head-on in the war of the languages — and once again the users benefit. Microsoft's Quick C, while ideal for novices, also offers a complete, integrated programming environment for professional programmers.

Features: Quick C implements the full ANSI C standard and provides access to extensions you can turn on or off at will. It uses the full Microsoft C Version 5.0 function libraries and compiles any program that 5.0 compiles except those that use the huge memory model. It is even compatible with Xenix C.

Quick C provides not only an editor but also a compiler, a debugger, a program list manager and libraries. Moreover, Quick C's built-in Help function is like having a set of quick-reference cards at your fingertips.

Quick C also provides for constant folding and automatic generation of Intel Corp. 80286 instructions. Finally, programs written using Quick C can be compiled unchanged under Version 5.0.

Quick C is not an interpreter, but its compile times are really fast — Microsoft says 10,000 lines per minute. The built-in source-level debugger is a subset of Codeview; you can use Codeview to debug the programs. In the editor, you can trace program execution, set watch points and variables, view output and set breakpoints.

The libraries and linker provided with Quick C are capable and flexible. You can tailor libraries to your space needs and link object modules created under Quick C to object modules from other programming languages. Quick C also includes a comprehensive library of graphics functions.

The editor includes automatic matching of braces, brackets and parentheses and has full search-and-replace capabilities. It does not provide syntax checking and capitalization of key words as you type. Quick C is compatible with Microsoft's Windows/386.

Performance: Good. Compiling inside the Quick C environment was fast under all conditions, and we had no trouble modifying files intended for use with the Version 5.0 C compiler. We ran into a few minor problems; we solved most of the screen problems under Windows/386 by installing the Vega Video 7, Inc. IBM Video Graphics Array device driver, but then the cursor in the Quick C programming screen sometimes disappeared. That did not happen under Windows/386, only under DOS on our 386 system. Microsoft's support staff sug-

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IMSI's desktop Pageperfect not quite up to perfection

Although International Microcomputer Software, Inc.'s (IMSI) Pageperfect sports many promising features, its attempt to provide integrated desktop publishing falls short of the ideal to which it aspires.

Features: Pageperfect consists of a file management shell and a word processor that has page composition features. It is bundled with IMSI's $195 graphics package, Desktop Publisher's Graphics.

The file management shell allows for DOS operations, such as selecting and creating directories and subdirectories, as well as file functions, such as copying, renaming or deleting files. The word processor functions in two modes: text and layout. The text mode includes several standard word processing features, such as an 87,000-word dictionary, a limited thesaurus and search-and-replace and text copy-move functions. There are also partial emulations of the Multimate International Corp. Multimate and Micropro International Corp. Wordstar command sets.

In the layout mode, you can create and size picture blocks, then place into them pictures from the Picture Librarian. You can vary the width and line weight of borders for the blocks, select and size margins and gutters and change the texture and gray-level intensity of any block. You can also create captions.

Pageperfect includes 12 style sheets, each of which contains page size, page layout and caption styles for business documents. Additional style sheets and a design guide are available.

The Picture Librarian allows

Continued on page 39

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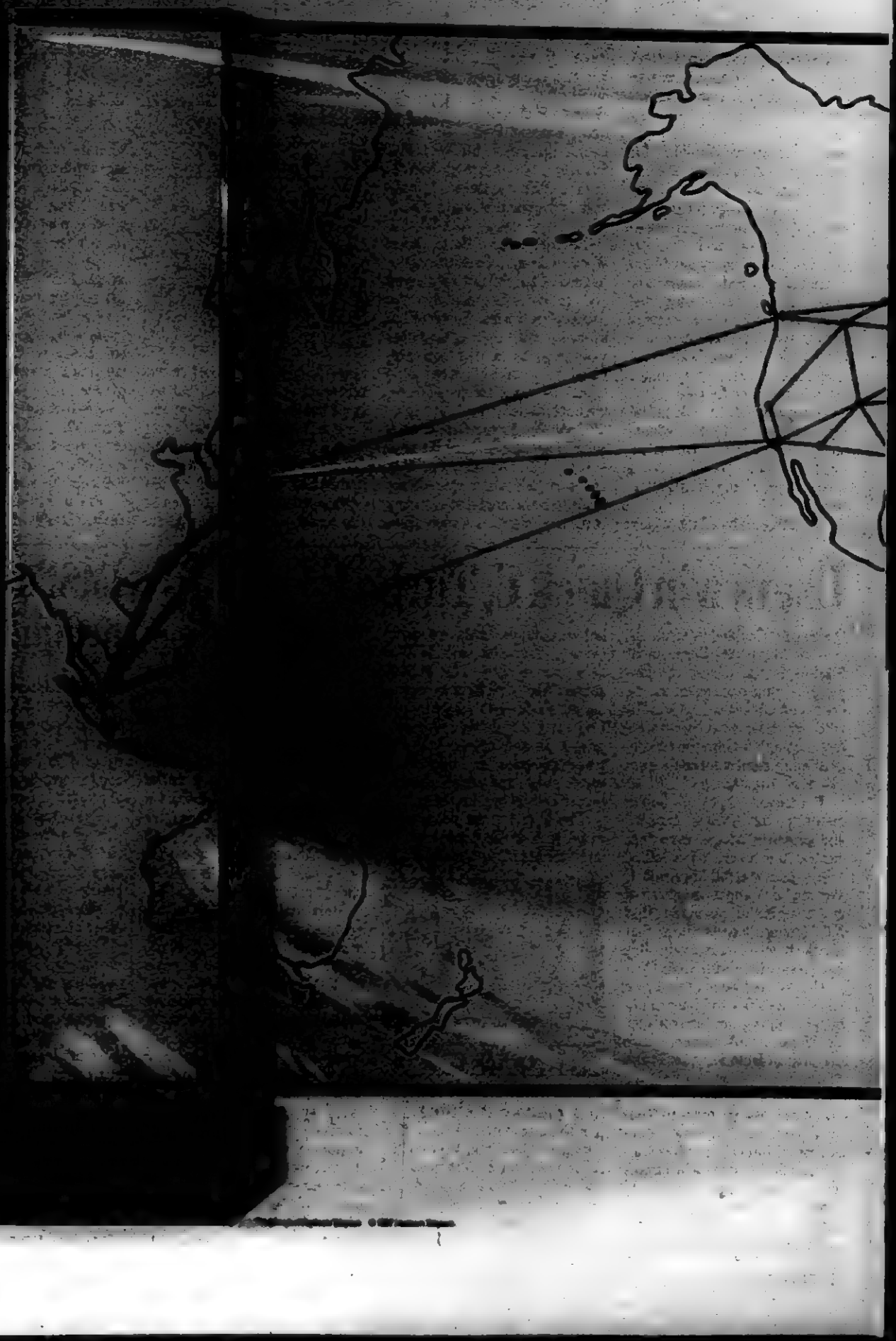


NETWORKING

Pageperfect

FROM PAGE 35

you to create and store pictures. Also, if you are using the Desktop Publisher's Graphics program, you can change pictures stored in a file.

Performance: Satisfactory. Pageperfect works. Its word processor is reasonably robust, its layout features are suitable for the demands of everyday desktop publishing and its graphics program is useful. But with use, what stands out are the product's irritations. For instance, since the Multimate emulation is neither complete nor exact, it is very confusing to use. And although Pageperfect supports both a keyboard and a mouse, its mouse handling will drive any experienced mouse user mad.

Pageperfect's word processing performance is slow, and although it touts a full what-you-see-is-what-you-get screen display, the resolution at a 150% zoom level was less than satisfactory. To its credit, Pageperfect comes with nine levels of zoom for viewing the page on the screen.

We ran into one serious reproducible bug. We created a drawing using Desktop Publisher's Graphics and saved it in Pageperfect's Picture Librarian. Pageperfect performs a conversion function on the picture before storing it in the Picture Librarian.

On the IBM Personal Computer AT, this conversion process scrambled the picture image enough to make it unreadable. IMSI claims to have fixed this problem in current shipments of Pageperfect.

Documentation: Very Good. The tutorials in both the Pageperfect package and the accompanying Desktop Publisher's Graphics package are exemplary. The reference guide is also quite good. Most subjects were clearly explained, although the index suffered from omissions of key topics such as tabs and function keys.

Ease of Learning: Satisfactory. It took several hours to reach a moderate comfort level with the product, a process complicated by the variations and inconsistencies in the way functions are selected and by the constant need to refer to the manual. The tutorial is a saving grace, as are the abundant Help screens.

Ease of use: Satisfactory. Pageperfect lacks intuitive operation. The function key-driven style limits flexibility and forces you to remember commands or look for them in the manual. The poor implementation of the mouse, limitations in the word processing emulations and other quirks are a further hindrance. The file management shell, on the other hand, is wonderfully simple to understand; it helps keep you oriented and organized.

Error handling: Good. When you are using Pageperfect, error conditions are brought to your attention by a combination of audible tones and displayed messages, which are short but to the point. The Undo feature works well in most instances, and Help screens are abundant and clearly explain some error-related information. Additionally, each time you save a document, Pageperfect automatically backs up the previous version.

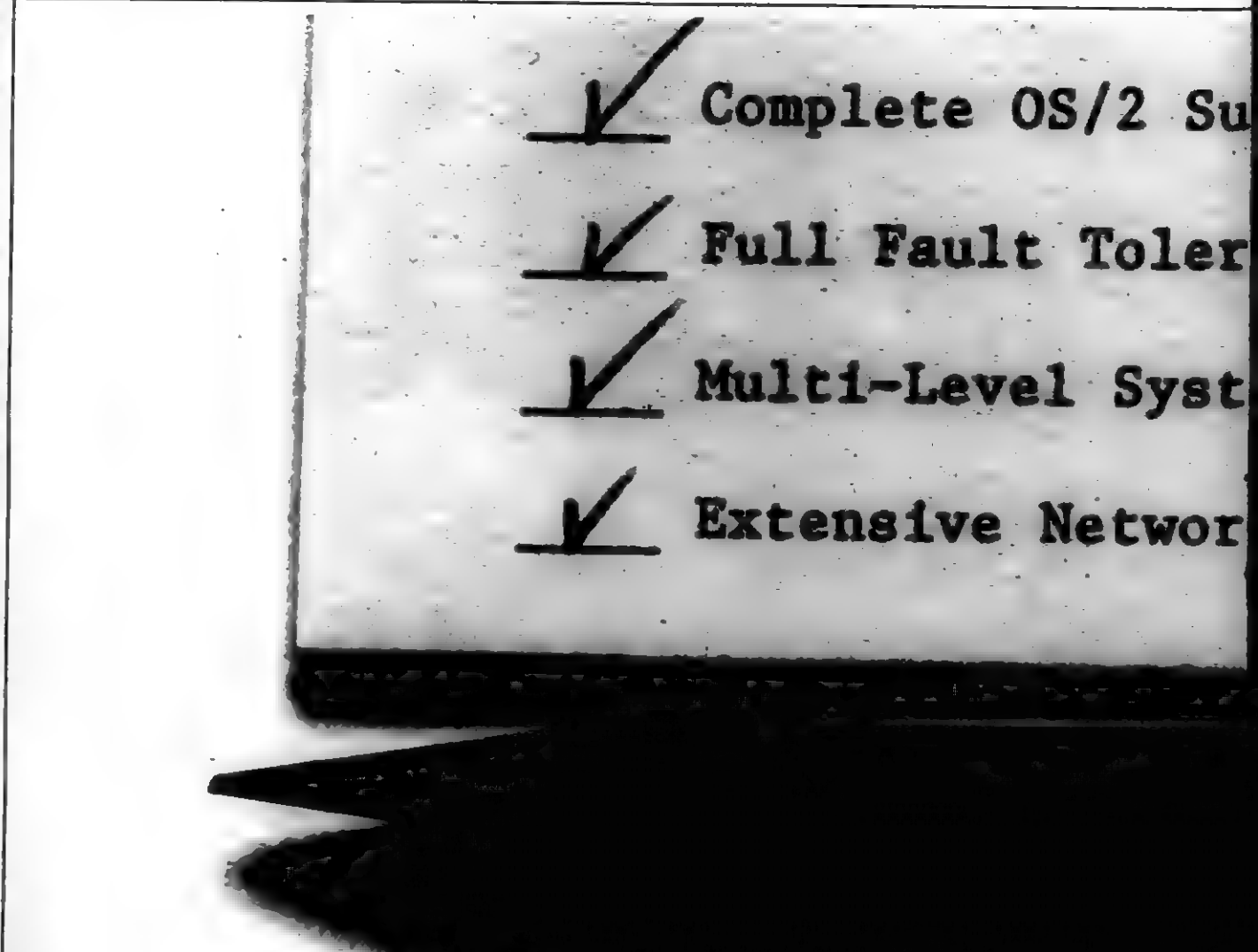
Support: Very good. Pageperfect comes with a 30-day money-back guarantee. IMSI offers free telephone support for a 45-day period starting with your first call, which must come within six months of purchasing Pageperfect.

An extended support plan is available for $95.

The IMSI technical support staff is top-notch. Both knowledgeable and courteous, it exhaustively researched problems and kept us informed. We never had to wait more than five minutes for a return call.

Value: Satisfactory. Pageperfect, while not perfect, does integrate basic word processing and graphics-layout capabilities in one turnkey system at a fair price.

However, problems with performance and ease of use mean that the serious word processor user or desktop publisher will still have to look to nonintegrated desktop publishing solutions for now.



SFT NetWare v2.1

MIS-conceptions about

Traditionally, the MIS world has viewed PC-based local area networks with a healthy dose of skepticism. A "prove it to me" attitude. And in an arena ruled by powerful mainframes, that approach has given rise to a few misconceptions and doubts about LAN performance.

Well, doubt no more. Because with the industry standard SFT NetWare v2.1, Novell offers the LAN software powerful enough to convince even the toughest MIS skeptic.

SFT NetWare v2.1 gives you the features and functionality of mini/mainframe systems at a fraction of the cost. With extensive fault tolerance, security and LAN-to-mainframe connectivity, it makes LANs advanced enough for major corporate, government and education installations.

No other LAN software even approaches the level of fault protection and data security built into SFT NetWare v2.1. Novell has pioneered LAN fault tolerance, and provides protection from failures in server hardware. In addition, enhanced security locks and passwords give you complete control of the information stored on your LAN.

©1988 Novell Inc., World Headquarters, 122 East 1700 South, Provo, Utah 84601 (801)379-5900

NEW PRODUCTS

Systems

An eight-port supermicrocomputer, based on AT&T Unix System V, Release 3, has been announced by **Cubix Corp.**

According to the vendor, the multiuser system is positioned to compete directly against the Compaq Computer Corp. Deskpro 386 and the IBM Personal System/2 Model 80.

Dubbed the **QB2 386**, the product includes 2M bytes of random-access memory, which is expandable to 8M bytes, and employs surface-mount technology. Also included with the multiuser system is an 80M-byte Winchester drive, a 60M-byte tape drive, a 5¼-in. floppy disk drive and an uninterruptible power supply, according to the vendor.

The QB2 386 has a price tag of $8,995.

Cubix, 2800 Lockheed Way, Carson City, Nev. 89706. 702-883-7611.

Cordata Technologies, Inc. has announced an IBM-compatible personal computer that reportedly runs both IBM and Apple Computer, Inc. software.

Called the **Cordata WPC Bridge**, the system was designed with a built-in 12-in. monochrome monitor and comes with 512K bytes of random-access memory, which can be expanded to 768K bytes. Also included are two 360K-byte 5¼-in. disk drives, three expansion slots and an Apple nine-pin Game Port for joysticks.

Support is offered for IBM-compatible 3½-in. drives, external Apple drives and IBM Color Graphics Adapter monitors. An IBM Personal Computer AT-style board comes standard with the system.

The Cordata WPC Bridge costs $1,695.

Cordata Technologies, 1055 W. Victoria St., Compton, Calif. 90220. 213-603-2901.

Software applications packages

Micropro International Corp. has announced **Wordstar Professional Release 5**, an updated version of its original Wordstar word processing program for the IBM Personal Computer, PC XT, AT and compatibles.

Enhancements include newspaper-style column creation, telecommunication functions, outlining and mail list management. Other additions include windows for simultaneous editing of two documents and a speller and thesaurus with definitions.

Wordstar Professional Release 5 costs $495. Upgrades are available for $119.

Micropro International, 33 San Pable Ave., San Rafael, Calif. 94903. 415-499-1200.

A memory manager package that reportedly provides complete control of all memory-resident programs has been introduced by **Delta Technology International.**

Extra allows users to create their own menus and will access any other memory-resident program. The package can run up to 26 memory-resident programs while using the random-access memory of only one.

System requirements include the following: an IBM Personal Computer, PC XT, PC AT, Personal System/2 or compatible with 256K bytes of RAM. A hard disk is also required.

The program runs on Microsoft Corp. MS- or IBM PC-DOS 2.0 or higher.

Extra costs $99.

Delta Technology, 1621 Westgate Road, Eau Claire, Wis. 54703. 800-242-6368.

An electronic mail system for the Apple Computer, Inc. Macintosh computer has been announced by **CE Software.**

The product provides real-time conferencing among two or more people and has both audio- and visual-timed repeat-message notification.

Quickmail can automatically generate a transcript of conferences, which can be saved as text or copied to a clipboard. A

Continued on page 42

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ant Capabilities

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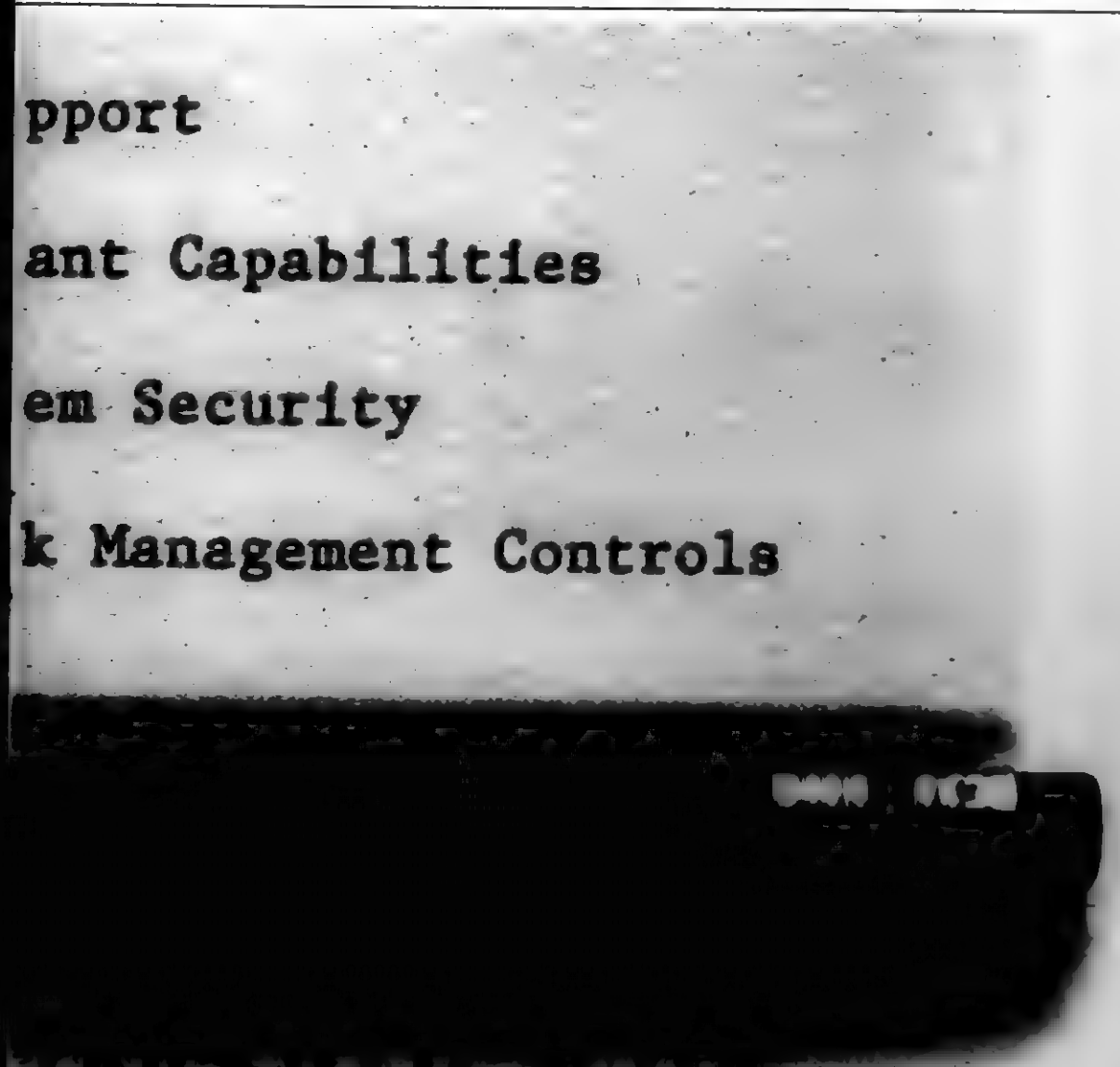

pals to test the
LAN performance.

SFT NetWare v2.1 simplifies network management with menu-driven utilities that let you control the network from any workstation. Advanced accounting features allow you to audit and account for users or departments utilizing network resources. Available communications links give you unsurpassed connectivity with mini/mainframe systems and other LANs. And SFT NetWare v2.1 supports OS/2 as well as DOS workstations.

To get LAN performance that raises your MIS standards, get the LAN system with no doubts about it—SFT NetWare v2.1. See your Gold Authorized Novell Reseller, or call 1-800-LANKIND.

For more information, call from your modem 1-800-444-4472 (8 bit, no parity, 1 stop bit) and enter the access code NV217.

For network solutions, you should be seeing red.

ETHERNET
UNIX 3270
3270 BISYNC

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Continued from page 39
public bulletin board is also included. The package works with fonts, boxes, icons and other graphic elements.

Quickmail costs $300 per 10 users.

CE Software, 1854 Fuller Road, West Des Moines, Iowa 50265. 515-224-1995.

Security software for IBM Personal Computers, Personal System/2s and compatibles is now offered by **Foundationware.** The six-module package, called **Vaccine,** detects variations in software caused by power surges, brownouts and static electricity.

The product ensures that programs meet original factory specifications, and it catches hard disk drive and controller failures before any data is harmed. Vaccine protects a system from intentional and unintentional erasure of data and software and requires a hard disk and 384K bytes of system memory.

Suggested list price for Vaccine is $189.

Foundationware, 2135 Renrock Road, Cleveland, Ohio 44118. 216-932-7717.

Lattice, Inc. has released **Secret Disk II,** a data security and encryption package for Microsoft Corp. MS-DOS systems.

Menu-driven software creates hidden system files on floppy or hard disks, on which the data and programs are then automatically encrypted. Protection can be turned on or off at any time without rebooting the system.

Password-protected access to files is provided through an MS-DOS device driver, and encryption algorithms can vary at different levels.

Secret Disk II costs $79.

Lattice, 2500 S. Highland Ave., Lombard, Ill. 60148. 312-916-1600.

Software utilities

Softcraft, Inc., manufacturer of fonts and font utilities for desktop publishing software and word processors, has released a bit-map font package for personal computer users with either Aldus Corp.'s Pagemaker, Xerox Corp.'s Ventura Publisher or Microsoft Corp.'s Windows.

The Font Solution Pack can reportedly create fonts, symbols, characters and logos and install them with matching screen fonts for a what-you-see-is-what-you-get display.

Users can create logos that measure up to 2 2/3 by 2 in. and generate typefoundry-quality fonts in sizes ranging from 3 to 120 points.

The Font Solution Pack costs $595.

Softcraft, Suite 500, 16 N. Carroll St., Madison, Wis. 53703. 608-257-3300.

A macro processor for Apple Computer, Inc. Macintosh computers is currently being shipped by **Affinity Microsystems Ltd.**

Tempo II Version 1.0 allows Macintosh users to quickly create automatic routines in order to speed repetitive tasks, according to the vendor.

The created macros may be used by typing the macro's name, or a portion of it, in a pop-up dialogue box.

Macros may also be made universal to come into play in any application, and a single macro may involve any number of applications.

The system requires a minimum 1M byte of memory.

Affinity Microsystems, Suite 425, 1050 Walnut St., Boulder, Colo. 80302. 800-367-6771.

Development tools

A programming environment designed to work with IBM and Microsoft Corp.'s OS/2 has been announced by **Logitech, Inc.**

The software tools in **Modula-OS/2** operate in dual-mode, which reportedly aids in porting applications between Microsoft MS-DOS and OS/2. The product also allows application development under protected mode, real mode or both. The software is built around the Logitech Modula-2 compiler and includes a real-mode and a dual-mode version of the standard V 3.0 library.

Modula-OS/2 costs $349.

Logitech, 6505 Kaiser Drive, Fremont, Calif. 94555. 415-795-8500.

Software enhancements

System Network Architects, Inc. has revised its utilities package for users of Xerox Corp.'s Ventura Publisher. **VPtoolbox 2.0** is a stand-alone program that includes utilities for managing and documenting Ventura files and style sheets.

File management functions enable the user to view and manipulate files, including printouts of text, line art and image files. The package will run on systems that support Ventura Publisher.

VPtoolbox will be distributed through Xerox Ventura Publisher dealers and will cost $99.

System Network Architects, P.O. Box 3662, Princeton, N.J. 08543. 609-683-1237.

Data storage

A series of erasable optical disk drives has recently been announced by **Maxtor Corp.**

The 5¼-in. **Tahiti I** reportedly provides one formatted gigabyte of total storage and a seek time of 30 msec. The drive can also accept a 600M-byte removable ANSI-standard cartridge. Sector size may be set at 1K or 512K bytes, with 25K bit/in. and 16.9K track/in.

Volume OEM pricing on the Tahiti I will be approximately $2,500 per unit.

The **Fiji I** is a 160M-byte 3½-in. drive that is said to have an average access time of 100 msec. Designed to provide low-cost storage, the product can be used as a floppy drive replacement and for backup applications. The drive will cost less than $1,000 on volume purchases.

Both drives use removable media and include a small computer systems interface.

Maxtor, 211 River Oaks Pkwy., San Jose, Calif. 95134. 408-432-1700.

Micropolis Corp. has announced a line of hard-disk kits that reportedly provide integration capabilities of up to 337M bytes of storage for the IBM Personal System/2 Models 60 and 80 and the IBM Personal Computer XT, PC AT and compatible systems.

The **Performance Advantage Kits (PAK)** include 5¼-in. hard disk drives with formatted memory storage capacities ranging from 44M to 337M bytes. The kits also provide all cables and mounting hardware, DOS partitioning software and software drives for Novell, Inc. Netware 2.0 and 2.1 and The Santa Cruz Operation, Inc. SCO Xenix 2.2.

The PAKs cost $920 and up, depending on the microcomputer and memory configuration used.

Micropolis, 21211 Nordhoff St., Chatsworth, Calif. 91311. 818-709-3300.

Printers/Plotters/ Peripherals

A color Adobe Systems, Inc. Postscript printer developed for graphics design and electronic publishing applications has been introduced by **QMS, Inc.**

The **Colorscript 100** includes a proprietary external controller with RS-232, Apple Computer, Inc. RS-422/Appletalk and Centronics Data Computer Corp. parallel interfacing. A 300 by 300 dot/in. Mitsubishi Electronics America, Inc. G650 color thermal transfer print engine is also standard.

The product generates seven primary colors, and users can print from black, three-color or four-color thermal ink films. The Colorscript 100 costs $24,995.

QMS, One Magnum Pass, Mobile, Ala. 36618. 205-633-4300.

Grafpoint, Inc. has added Tektronix, Inc. software emulation products for the Macintosh II. **Tgraf-07** emulates the Tektronix 4107 terminal and supports the Apple Computer, Inc. Macintosh color graphics board.

The software permits up to 16 colors with a display resolution of 640 by 480 pixels. Tgraf-15LR, Tektronix 4115 emulation software, has the same resolution but can display up to 256 colors simultaneously.

Tgraf-07 costs $995, and Tgraf-15LR costs $1495.

Grafpoint, 1485 Saratoga Ave., San Jose, Calif. 95129. 408-446-1919.

A screen star is born.

Introducing Ultrasync. The high-resolution, autosynchronous color monitor that's PC and PS/2 series compatible.

Ultrasync, with its exceptionally fine (.28mm) dot pitch, creates a picture of incomparable clarity. Capable of displaying infinite shades of brilliant color with striking contrast and dimension.

But the real beauty of Ultrasync is its versatility. It has the greatest autosynchronizing frequency range combination available with 45Hz to 120Hz vertical scan range (NEC's Multisync starts at 50Hz and peaks out at 75Hz) and 15KHz to 35KHz horizontal scan.

Plug Ultrasync into any IBM PC/PS series, Apple Mac II, or practically any computer system and it will adjust automatically to the standard you are using. There's no fiddling with switches or knobs. Our automatic picture sizing feature prevents display distortion and shrinkage. A simple built-in text switch is provided for your convenience. What's more, you'll enjoy the ease and comfort of Ultrasync's ergonomically advanced design.

Nobody but Princeton Graphic Systems could bring you an image with such star quality at a suggested retail price that's remarkably affordable. $849. After all, we've been doing it all along.

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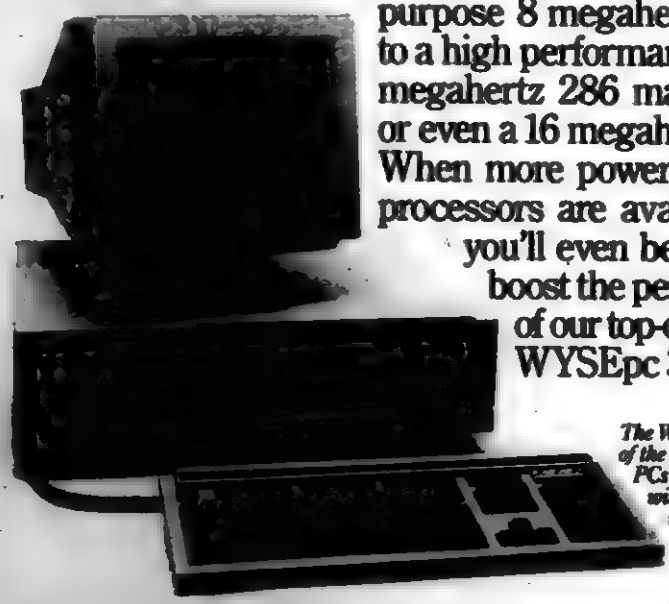
The big idea behind the PC system you can't outgrow.

It's so simple: a building block approach that makes upgrading our new computers a snap. Literally. It's the PC design for the '80s. *And* the '90s. Because it protects your PC investment against obsolescence. Wyse calls it Modular Systems Architecture.™

We've incorporated all computing functions—including the heart of the computer, the CPU and its microprocessor—on plug-in boards. So as your computing needs grow, you can upgrade our general purpose 8 megahertz model to a high performance 12.5 megahertz 286 machine—or even a 16 megahertz 386. When more powerful microprocessors are available, you'll even be able to boost the performance of our top-of-the-line WYSEpc 386.



The WYSEpc 386, one of the most powerful PCs in the business, with exceptional memory speed as well as processing speed.

Introducing SystemWyse.™ Our new PCs are themselves building blocks. Of SystemWyse—a comprehensive system for creating solutions. They link effortlessly with our terminals, monitors, and expansion boards in applications from desktop publishing and engineering workstations, to 16-station multi-user systems. SystemWyse uses industry standard operating systems, such as MS-DOS, OS/2, and Xenix. And it's backed by the company that produces more terminals than anyone but IBM, with over one million sold.

It's this easy to upgrade the CPU—and boost the power—of a SystemWyse PC.

The big idea behind SystemWyse, above all, is to adapt more readily than any other PC system to change. Because when survival belongs to the fittest, the only true survivors are those who remain fittest, longest. Call for more information. **1-800-GET-WYSE**

WYSE

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Rewritten Lotus Manuscript targets complex documents

BY DOUGLAS BARNEY
CW STAFF

CAMBRIDGE, Mass. — Lotus Development Corp. has written a new Manuscript — word processing software, that is.

Lotus introduced Manuscript, written by 1-2-3 co-author Jon Sachs, in 1986 and positioned the product as a technical word processor. The firm encountered relatively sluggish sales for the $495 feature-rich product and is now aiming at the larger market of users who generate complex documents.

Target uses include legal and government documents, financial reports, product specifications and documentation and proposals.

The product is already packed with a bevy of features for combining text and graphics; Lotus has kicked in a few more. Manuscript 2.0 now includes a facility for the dynamic linking of spreadsheet data to Manuscript documents and keyboard macros, which helped push the firm's 1-2-3 to the top of the spreadsheet heap.

Manuscript also comes equipped with a 220,000-word thesaurus, on-screen Help and menu-driven markers to assist users in plugging graphics, data or equations into documents.

To boost the output side, Bitstream, Inc. last week announced the availability of the Fontware Installation Kit for Manuscript 2.0. With this kit, users can reportedly download as many as 40 different fonts that are available in virtually any point size.

Quick C

CONTINUED FROM PAGE 35

gested we use Quick C with a "plain vanilla" system.

Also, our evaluation copy came with 5¼-in. disks, and the installation program made us go through some gymnastics to load Quick C onto 3½-in. disks.

Documentation: Excellent. For both novices and experienced programmers, Quick C's documentation is a marvel of comprehensiveness and clarity. The language reference manual provides complete documentation of the Standard C language and Microsoft's optional extensions.

Ease of learning: Very good. Novices who want to use this package to learn programming in C should already have a nodding acquaintance with general programming concepts.

The integrated Help function is focused on the language itself, and although you do not actually need a mouse to use the system, Microsoft's mouse eases using and learning Quick C.

Ease of use: Very good. Quick C is powerful, versatile and consistent enough to provide immediately useful tools for the most proficient C programmers. The options for customizing Quick C are simple and work well. The number of options and the need to decide what types of programs you will be writing make installation somewhat of a challenge. But once it is in place and customized, the integrated environment provides one of the easiest ways we have seen to develop programs in C.

Error handling: Good. The error messages displayed in the pop-up window at the bottom of the Quick C screen are usually informative enough that you need not refer to the manual. The manuals contain appendixes with additional documentation on error messages.

Support: Excellent. Microsoft's technical support staff is responsive, helpful and knowledgeable. It is available by phone from 8 a.m. until 5 p.m. weekdays through a menu system that gets you to the right person very quickly.

Value: Excellent. In both price and features, Quick C is directly comparable to Borland International's Turbo C. The increased productivity possible through Quick C provides a substantial return on the $99 investment.

Uptime

Provide 24 Hour CICS Service
IBM gave dynamic allocation to CICS... but you need Netec's CAFC to make non-stop CICS a reality. CAFC allows a single command to OPEN or CLOSE 5 or 50 files. CAFC establishes two way communication between your CICS regions and your batch jobs. Your batch jobs will always have the files they need for processing without operator intervention.

Browse and Archive CICS 1.7 Dumps
The CICS Dump Display Facility gives your support staff instant on-line and hardcopy access to CICS transaction and system dumps. You may view and print any dump without disturbing CICS. CDDF archives your dumps for after-the-fact analysis. You may route dumps to remote locations.

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P.O. Box 190549 - Dallas, Texas 75219
Telex 314419 TELECOM UD (214) 343-8744

Lotus 1-2-3 for $299. Plus a free Value Pack. Plus a free Print Settings. Plus a free SeeMORE, SQZ! Plus, or SIDEWAYS
1-800-426-7779

Moose

FROM PAGE 31

"There are little pockets of bears that stay in the same general area. We want to get a better idea of those areas so we can manage those populations as best we can scientifically," said Gordon Stenhouse, a wildlife biologist with the Government of the Northwest Territories' Department of Renewable Resources.

The biologists tag bears, moose, caribou and Dall's sheep with special collars called platform terminal transmitters that emit radio waves. The transmitters, originally designed to mark buoys in shipping lanes, send up signals to a polar-orbiting satellite, which passes the information to a receiving station in Toulouse, France.

From France, the information is sent to a ground receiving station in Alaska and one in Washington, D.C. "We dial up the computer in France, key in our password and entry parameters, and it tells us where the animals are located in latitude and longitude and gives us an idea of the temperature of the air around the animal," Stenhouse said.

He noted that it is difficult to keep tabs on many polar bears even with automated methods because of the physical makeup of the adult males. These bears have cone-shaped heads and are unable to wear the collars. Fortunately, biologists are able to put collars on the adult females.

The collars are powerful enough to emit waves even when the bear is in a den several feet below the snow or ice. The ability to locate bear dens also allows biologists to protect those areas.

Using computer tracking, the biologists are able to more concisely create zones in which the bear and other populations can be found, Stenhouse said.

The tracking takes place on IBM compatibles, mostly Hewlett-Packard Co. Vectra systems. The biologists are using Cary, N.C.-based SAS Institute, Inc.'s SAS software to crunch the data and manage the data base and SAS Graph to graph the movements. "Sometimes we get five locations for the same animal in one day. The computer can handle that," he said.

At the end of the hunting season, the government group sends out letters to inform the hunters on how their kill related to the average for the season. By monitoring the harvesting, the biologists can be sure that quotas for animals taken from any zone are not being abused.

On-line yellow pages let keys do the walking

Disk-based system holds toll-free, local numbers

BY ALAN J. RYAN
CW STAFF

NORCROSS, Ga. — If Digital Publications, Inc. has its way, users will let their fingers do the walking on the keyboard and their computers do the dialing. And most of the calls will not cost a thing.

The small company has introduced the PC Yellow Pages, a data base of 10,000 businesses with toll-free telephone numbers. The data base also lists 5,000 local business numbers for each area code in the U.S.

The disk-based product for Microsoft Corp. MS-DOS-based personal computers is not an electronic version of the Nynex Yellow Pages, cautioned John M. Rapp, the company's marketing director.

Instead, Rapp said, it incorporates Digital Publications' own main data base of 5,000 entries in categories like hotels, insurance companies, conglomerates and banks. Additionally, Digital Publications has arrangements with other information providers to include various other company names and numbers, according to Rapp.

The program features pop-up windowing, color and graphics and keeps all category indexes in memory, Rapp said. It features automatic telephone dialing from Hayes Microcomputer Products, Inc. and compatible modems to either individual businesses or to all listings in a given category. Because of the dialing feature, the program could be used as a telemarketing tool, Rapp noted.

BUSINESS travelers can make hotel arrangements in distant cities without having to call directory assistance for hotel listings.

The company said it sees little use for PC Yellow Pages in the home market, Rapp said, adding that it is targeted mainly at businesses. For example, he said, business travelers can make hotel arrangements without having to call directory assistance for hotel listings.

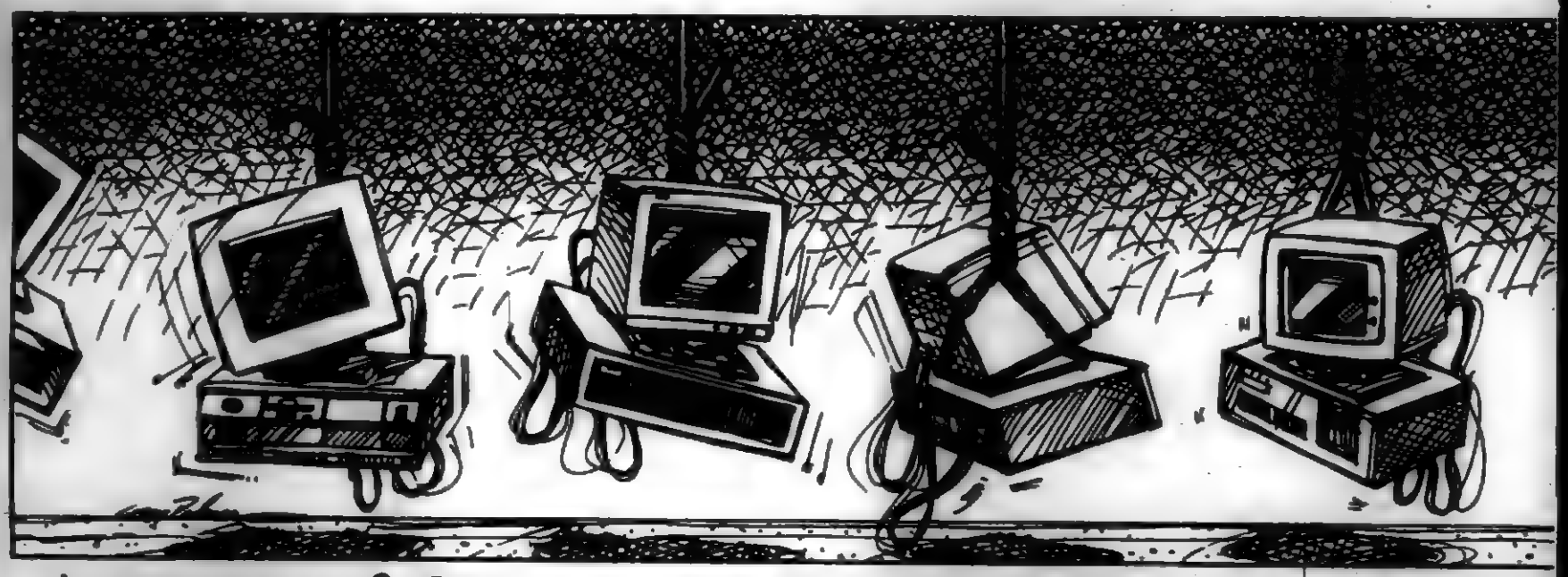
Easier than dialing

To access the data base, the user selects either the local or the 800-number listing. An alphabetical topic index will appear, allowing the user to search for a selected topic. Once in the topic, the file can be paged through or searched for a particular name or city.

Furthermore, the program produces mailing labels and Rolodex-type cards and can export data to the customer's word processing program and to data management programs.

The package, which can be stored in less than 1M byte on a hard disk, costs $99.99 for listings under one area code plus the 10,000 800-number listings.

Also included is a catalog of more than 50 vertical market Information Paks under categories like architectural firms or computer magazine publishers. The Information Paks will sell for $39.



ARBITER.® BECAUSE SUPPORTING A PC/

Picture your PC/host network. Now imagine it ten, fifty, a hundred times larger, with thousands of users tying up the network and burdening the CPU with their demands. Imagine a network strangled by its own size and connections.

Imagine the biggest ulcer in MIS/DP history.

Fortunately, you don't have to imagine the solution. It exists. And it's called Arbiter.®

Arbiter is the IBM® SNA-compatible VTAM subsystem that puts the emphasis on PC/host cooperation, not mere connection. With Arbiter, literally thousands of PCs can gracefully use the resources of a VM or MVS mainframe because Arbiter enables the PC and the host to share processing duties according to their own abilities. And Arbiter permits this regardless of the PC/host connection.

A NETWORK TIED TOGETHER, NOT TIED UP

Through a single, flexible communication interface, Arbiter creates a centrally administered and controlled environment where the fast, powerful PC is treated as a peer, not a slave. Tasks are allocated according to the strengths of the host and PC by a link that uses little host overhead while achieving transfer rates unmatched by TSO, CICS and CMS-based links.

Through virtual disks or direct access to the host's files, Arbiter delivers fast, responsive PC/host data transfer as required, either by the megabyte-sized file or by the exact subsetted transaction.

Arbiter empowers PC users with peer-to-peer communication between their PC and APPC (LU 6.2) environments like CICS, S/3x, and token-ring LANs.

Barney

FROM PAGE 31

lease its own benchmarks.

And the company is more than a bit ticked at Microsoft, which is offering a money-back guarantee. Meanwhile, Lotus quietly scoffs at Excel, which requires top-of-the-line PC equipment and fails to translate a great many Lotus macros.

But still it refuses to get pulled into the muck. At the same time, though, some customers view Lotus's nonresponse as an admission that its competitors' claims are true.

If some Lotus folks have their way, the firm will take the gloves off pronto and start to slug. But if Manzi, who calls the shots, holds firm, the best we journalists can expect is the usual off-the-record bad-mouthing of competitors.

DOS to deliver? IBM has apparently been polishing PC-DOS 3.4, which it can then license back to Microsoft for sales to IBM competitors.

PC-DOS 3.4 adds expanded-memory capabilities and includes easy-to-use features, eliminating many of the cryptic commands that PC-DOS currently relies on to manipulate files. So instead of the nonaesthetic "A>," users will be greeted with fancy (for DOS, that is) pull-down menus.

The operating system seems ready to go, according to one user with a beta-test version. Based on the documentation that comes with the new PC-DOS, IBM is planning to ship memory boards that take advantage of the expanded-memory support. The source was uncertain when IBM would announce the new operating system. With OS/2 still languishing from a lack of breakthrough applications, the need to extend PC-DOS has become critical. Hopefully, PC-DOS 3.4 will be the ticket.

Lappers. During a recent trip to IBM, we asked what users were looking for in the way of new hardware. Besides things like a desktop 386 and faster Model 50s with palatable hard drives (things IBM had just happened to announce), users are asking for portable computers, an IBM executive said.

When asked whether these would be equipped with the Micro Channel architecture, he hinted that users want to be able to run OS/2 on the things. Although IBM has been pushing the Micro Channel as optimized for OS/2, we'll let you jump to your own conclusions.

Still waiting for them co-processors. Some have postulated that IBM will move toward realization of the Micro Channel by announcing a variety of coprocessor boards. IBM officials and reliable sources have tossed around the idea of communications and data base coprocessors aimed at enhancing IBM's OS/2 Extended Edition.

But others see more and confidently predict both Series/1 and System/36 coprocessor boards to ship later this year. There may be a couple of uses for these. One is to develop host applications on less expensive micros, a popular pastime in many an MIS shop. Also, small work groups that can't afford the real thing could use a Personal System/2 to run applications used by the rest of the firm.

Thanks for the memory sales. Some managers are getting ready for Lotus's 1-2-3 Release 3.0 by advising individual end users to stock up on memory. The way the theory goes is that, despite Lotus's best efforts, it will never again duplicate the 400K bytes of worksheet space available under Release 2.01. In fact, none of its key competitors have either.

So if users want to run the same large models, they had best get more memory. And for the hardy souls who will run it under OS/2, best get 2M to 3M bytes.

We'd hate to bug you. Recent reports of bugs in Borland's Quattro have scared off a few customers who haven't evaluated the program for themselves. We've heard a couple of different stories. Some say it is too buggy to buy. Others, including a large software reseller, say the problems are no worse than any other piece of software.

So we decided to go to the horse's mouth and ended up with two slightly different answers. Borland founder Philippe Kahn said the rumors are bogwash. "There is no problem. Those bugs were fixed," he said.

But Borland spokeswoman Robin Shephard offered a slightly different version. "We already addressed those bugs [that were reported] with either work-arounds or a commitment that they are already fixed and will be available in the next version." Hmmm. So some fixes are still on the way?

Barney is a Computerworld senior editor, microcomputing.

Peat

FROM PAGE 31

ers, has recently bought a similar number of Apple Computer, Inc. Macintosh SEs with 20M-byte hard disks. It has equipped each Mac with a copy of Excel and is slowly phasing in the PCs at a total software cost of $475,000.

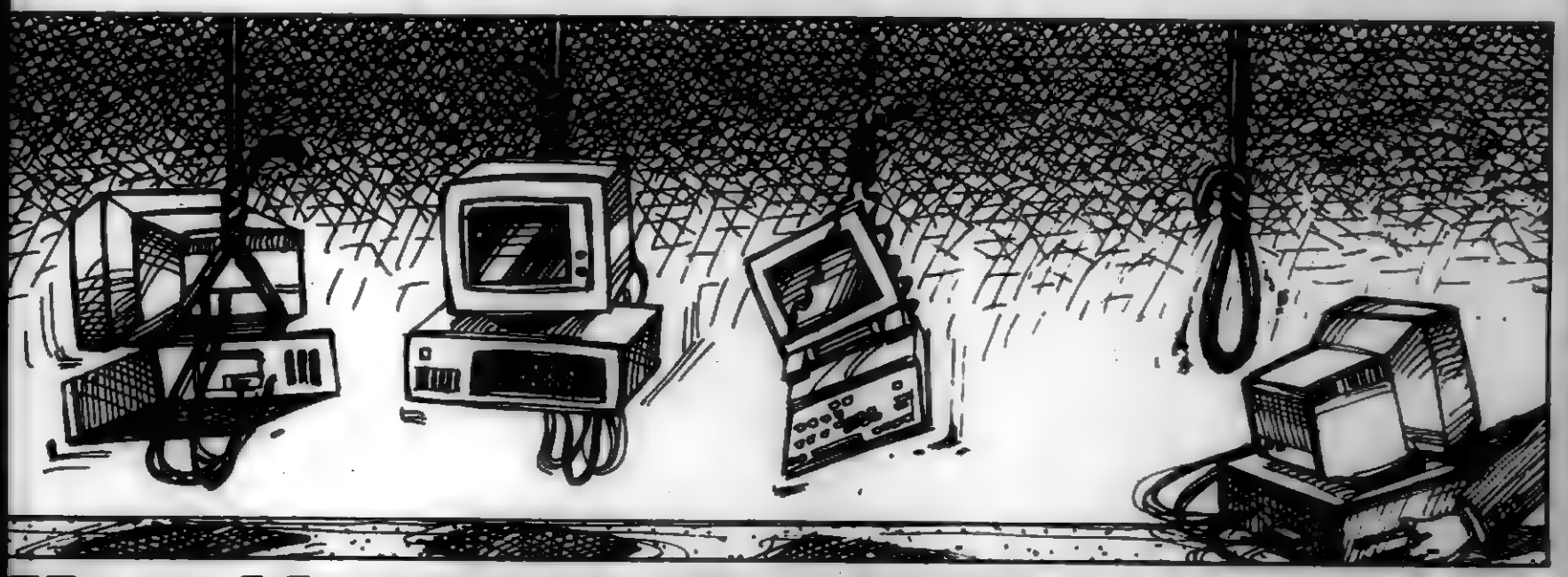
Geoff Russell-Grant, a Peat Marwick partner responsible for office automation, said Excel was chosen because it is offered under both DOS and the Macintosh operating system and allows standardization on one package.

Seeking strategy

"We want to have strategic products. Excel is from a reputable company, it's one of the latest spreadsheets and it runs in both environments," Russell-Grant said.

Simon Rogers, UK marketing director of Lotus, said the company would be concerned if firms were going over to Excel completely but that he found it was often just departments changing spreadsheets.

"The latest figures we've got show that Excel has managed to achieve 6% of the spreadsheet market. Lotus sales have continued to grow since May last year," he said.



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NETWORKING

DATA STREAM

Thomas White

Connectivity at Apple's core

Last of a two-part series looking at Apple's connectivity strategy

The protocol of the future, the ISO's Open Systems Interconnect (OSI), has attracted a great deal of interest from both the commercial and government communities.

Rather than develop its own products, Apple Computer, Inc. has chosen to make a strategic investment in OSI vendor Touch Communications, which offers products that support the lower levels of the OSI model. This allows the interested user to begin to use the functionality of OSI while resting assured that upgrading to a fuller set of OSI capabilities will be reasonably painless.

With the popularization of Transmission Control Protocol/Internet Protocol (TCP/IP), it has become a strategically important internetworking environment. In fact, the number of vendors offering TCP/IP products has increased by 100% in the last year. Research firm Infonetics estimates that this will be a $959 million market by 1991.

Although Apple has not officially announced plans to support TCP/IP, it is well known that the vendor has contracted with Ungermann-Bass to provide this support. If the method that Apple has used to support IBM's Advanced Program-to-

Continued on page 64

Users, vendors pin high hopes on fiber standard

BY KATHY CHIN LEONG
CW STAFF

American Express Co. is waiting. So is Stanford University and Eastman Kodak Co. Even companies not currently using the technology say they can only benefit by keeping an eye on its development.

Everyone is talking about Fiber Distributed Data Interface, or FDDI. "It will cause you to rethink the way you do business," said Douglas Taylor, a network manager at Hughes Aircraft Co. in Long Beach, Calif.

This yet-to-be-approved fiber interface standard is bringing vendors such as IBM, Digital Equipment Corp., Sun Microsystems, Inc. and Apollo Computer, Inc. under one roof to hammer out a universal standard for device connectivity.

When the FDDI standard is complete — which some say will happen by the end of this year — users may well be pounding at the door for products. While many of today's network managers are using Ethernet protocols over fiber, these same people are anxious to see FDDI products available because they promise to provide faster speed and transparent interoperability among different vendors' machines.

The good news is that FDDI is expected to bring both higher network speeds and cost savings, since users ideally will be able to keep their existing investments.

FDDI is an emerging local-area network standard that is moving quickly beyond the draft stage and will be adopted by the American National Standards Institute when completed. FDDI calls for 100M bit/sec. bandwidth and supports a token-passing protocol in a ring topology. It allows users to link up to 500 workstations along a 100km length of fiber. When completed, FDDI will allow users to link high-end hardware to other

Continued on page 62

3Com execs talk merger

Carrico, Estrin: Brief tenure not a sign of trouble

In a surprise announcement May 26, 3Com Corp. President and Chief Operating Officer William Carrico and Bridge Communications, Inc. Division General Manager Judith Estrin both said they would resign, effective June 30, to pursue a new, as-yet-unspecified venture.

Carrico and Estrin

Caught off guard, a number of industry analysts expressed concern about a resulting loss of momentum or "brain drain" from Bridge and also questioned the impact of the merger on 3Com and Bridge sales efforts.

Dismissing some of those fears, Carrico and Estrin talked last week with *Computerworld* Senior Editor Patricia Keefe. The former Bridge executives also talked about how mergers are actually much harder than they look.

Why are you both leaving 3Com after only eight months?

Estrin: We made a personal decision based on what we want to do. If 3Com wasn't in good shape we wouldn't feel comfortable [about leaving]. We have a lot of time, energy and stock invested in the company. There's been a lot of progress in integrating 3Com and Bridge, and that, coupled with the beginning of the fiscal year [June 1], creates a good time for transition.

Carrico: Judy captured the essence. The company is in good shape; business is good, our prospects are good, products are rolling out and we're on track fiscally. That, plus our desire to go out and do something new, made it happen.

How much of a factor was the difference in manage-

Continued on page 57

Data View

Traffic picks up on private nets

Although both voice and data transmissions are projected to increase, voice should grow faster while data levels off

INFORMATION PROVIDED BY FORRESTER RESEARCH INC.
CW CHART

Apollo joins net parade

BY PATRICIA KEEFE
CW STAFF

CHELMSFORD, Mass. — Apollo Computer, Inc. last week strengthened its entry into the nascent vendor-sponsored network design and consulting services market by announcing two related service programs.

The Network Services Program reportedly assists Apollo Domain token-ring and IEEE 802.3 Ethernet customers with network planning, design, installation and management.

The Professional Services Program targets users of Apollo's Domain System workstation-based network environment with software consulting, applications design and systems

Continued on page 56

Inside

- Domino's wave pizza network to get larger slice of market pie. Page 52.
- Network General adds Laptop Sniffer. Page 62.
- Kinetics gives AUX support to Ethernet II. Page 67.

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	Model 70 386			Model 50 Z
Available models	8570-E01	8570-121	8570-A21	8550-031 8550-061
Microprocessor	80386 16 MHz 0 wait-states	80386 20 MHz 0 wait-states	80386 25 MHz 64KB memory cache (28ns)	80286 10 MHz 0 wait-states
Optional Math Co-Processor	80387 16 MHz	80387 20 MHz	80387 25 MHz	80287 10 MHz
Memory (RAM) Standard	1Mb (100ns)	2Mb (80ns)	2Mb (80ns)	1Mb (80ns)
Maximum on system board	8Mb	8Mb	8Mb	2Mb
System maximum	16Mb	16Mb	16Mb	16Mb
System expansion	Three option slots (two 32 bit, one 16 bit)			Three option slots
Storage 1.44Mb 3.5 inch diskette drives Standard	1	1	1	1
Maximum	2	2	2	2
Fixed disk Standard Mb	60 (27ms)	120 (23ms)	120 (23ms)	30 (28ms) 60 (27ms) 8550-031 8550-061
Operating Systems	DOS 3.30, IBM OS/2, AIX™ Personal System/2			DOS 3.30, IBM OS/2
Built-in features	Video Graphics Array (VGA) and display port, diskette controller, serial, parallel, keyboard and pointing device ports, clock/calendar.			

available, thanks to advanced features such as high-speed memory caching and a scorching 25 MHz 386 processor. In fact, it's up to 25% faster than the competition.*

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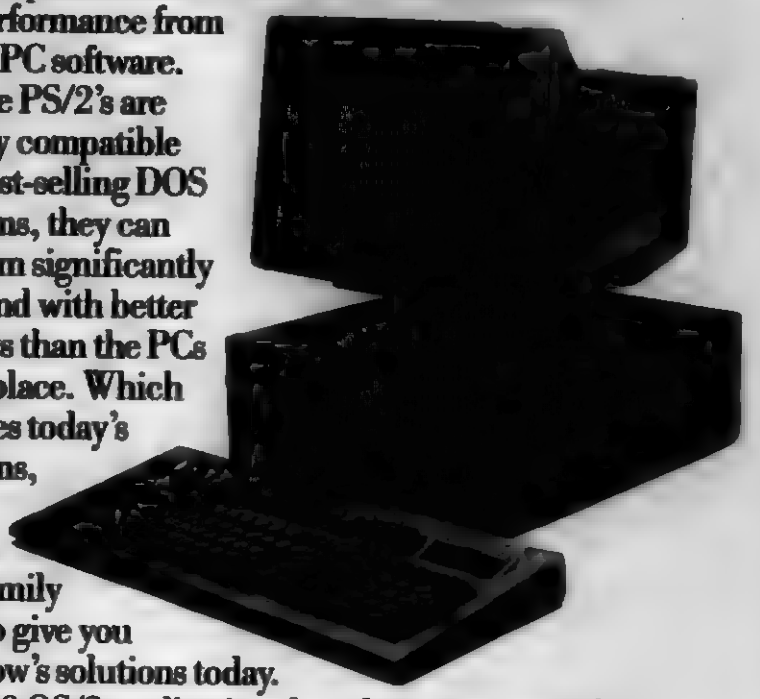

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*Based on performance data developed by NSTL for IBM in May, 1988, using seven popular applications. Test results showed that depending on the application, the IBM PS/2 Model 70 A21 ran up to 29% faster than a leading 20 MHz 386 PC with memory cache. The Model 50 Z ran up to 35% faster than the original Model 50. Actual results may vary. IBM, Personal System/2, PS/2, Operating System/2, OS/2 are registered trademarks, Micro Channel and AIX are trademarks, of IBM Corporation. © IBM 1988

Network delivers for Domino's

BY KATHY CHIN LEONG
CW STAFF

ANN ARBOR, Mich. — Does your pizza stick to the box lid by the time it arrives at the door? Worse yet, does it ever get delivered to the wrong address?

Domino's Pizza, Inc., in a creative plan to sweeten customer service, has created an automated ordering service designed to deliver the popular delicacy in 23 minutes or less. For the first time, Domino's is using technology as a way to obtain a larger slice of the market pie.

The ordering service consists of a nationwide proprietary network of NCR Corp. mid-range computers featuring customized ordering software. The software was developed internally in order to support the peculiarities of the business. It keeps track of the number of pizzas sold in one day, the most popular pizzas, the names and addresses of each customer and the time of orders.

"We saw this as a way to expand our business and control costs," said Tom Pecott, Domino's national director of information services. Pecott runs the project with eight MIS staff members.

"We are always working on reducing delivery time," he said, adding that so far, the new system has achieved a 5% cut.

While the initial NCR prototype was locally implemented in 1985, the project has gained significant momentum in the past year. There are 120 stores currently using the network, and by the end of the year, the company will have deployed the minicomputer technology in 400 of its 1,200 corporate-owned outlets. The company also has another 3,300 franchised stores that will have to decide whether they want to implement the same system.

At the heart of the system is a network of NCR 9300, 9400 and 9500 mid-range computers. The NCR proprietary wide-area network consists of dedicated leased lines linking eight cities, which span the country from Columbus, Ohio to Miami. One NCR computer is deployed at each of the eight nationwide order centers, and an NCR Tower is located at each outlet.

One number fits all

The system saves customers the hassle of searching the phone book for the number nearest their homes. Domino's advertises just one phone number for a region and has situated the calling centers so that every order is a local call. At these centers, Domino's employees enter the telephone orders and transmit them to the closest store.

Orders are processed through an NCR Tower and sent to a printer at the pizza outlet. A printout serves both as a customer receipt and order record. Before automation, each store answered its own phones, and employees scribbled orders on tickets.

So far, the company has invested less than $5 million in the turnkey system. NCR hardware was selected for its price, nationwide service presence and durability. "A pizza store is not exactly the best place for a computer. There is always a lot of flour in the air, and the heat is extreme. We had a lot of environmental factors to consider," Pecott said.

The company started the project as an experiment. "We just wanted to see if the concept of automated ordering and computerized record keeping would make sense," he said.

Eventually, Pecott said, the company would like to link up its independent ordering network into its main data processing operations, which are based on an IBM 4381 located at its Ann Arbor headquarters.

Currently, the stores do not upload data collected daily in the central mainframe. Such a linkup would require Domino's to develop a custom interface. However, the effort would give the company an opportunity to see how well the individual stores do on a daily basis.

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Net parade

FROM PAGE 49

integration services.

A host of communications resellers, systems integrators and consultants have long aided users struggling with networking concerns, but the vendor community has only recently begun to make a strong push in that direction. And although some vendors have provided some of these services, they have rarely been organized under a formal program.

IF USERS cannot get what they need from their vendors, some of them are prepared to build it themselves, using generic tools.

There are at least two factors driving the trend toward vendor-packaged network design services: the demand for and growth of network management systems and the movement toward open systems.

At the same time that customers are trying to become more self-reliant, vendors are looking to make a buck in other areas, according to Jeffrey M. Kaplan, director of network and professional services at The Ledgeway Group, Inc., a consulting firm in Lexington, Mass.

Service first

In addition to Apollo, Hewlett-Packard Co. and Northern Telecom, Inc. have also recently launched a joint venture — Corporate Networks Operation — said to provide network consulting, design and custom integration services.

Also, Sun Microsystems, Inc. offers similar workstation-based capabilities via Sunchess and Sunguard. The Sun products are offered by Infinet, Network Equipment Technologies, Inc. and Timeplex, Inc. BBN Communications Corp. is a customer of Apollo, Kaplan said.

Sun and Apollo have both taken a two-pronged approach. Each serves as a supplier to other vendors seeking to support their proprietary systems and also targets end users with stand-alone network management-type systems, Kaplan said.

The two companies "offer the user the workstation as a tool to enable network configuration without worrying about what kind of equipment is involved," he said.

Conversely, communications companies are finding themselves at a crossroads. While they are obligated to help their customers better configure their networks and must provide the tools to do so, they do not want to give users the weapons to become more independent.

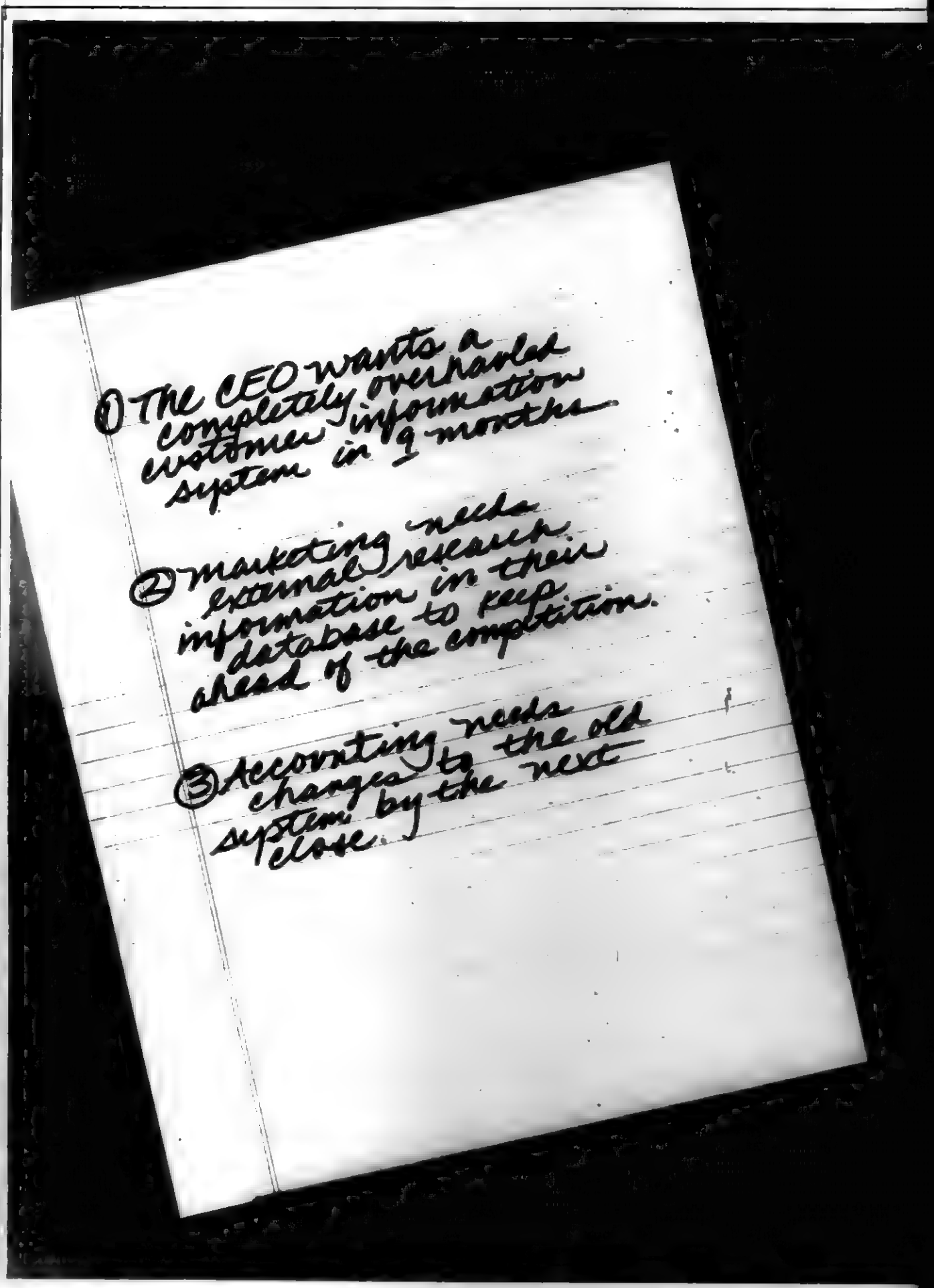
But as the barriers between proprietary systems begin to tumble, these same vendors are seeking alternative sources of revenue. Also, in an open systems-oriented market, if competitors offer the same or similar standards-based equipment, helping users lay the groundwork for their network strategies may provide vendors with an in and a much-needed leg up in the battle for market share.

Also playing a role here is the slowdown in network equipment sales, according to Kaplan. "The buying and procurement cycles have really slowed down. Users are adding to their networks but with incremental purchases," he said.

The reason goes back to the need for network management: Many users have put further network expansion on hold until they succeed in gaining control of what is already installed. And if they cannot get what they need from their vendors, some of them are prepared to build it themselves, using generic tools.

While vendors that offer network design and management services are, of course, hoping to sell their own equipment, savvy users can still use this assistance to solve, or at least better address, some of their network problems — even if they do not end up buying from the particular vendor.

"Nine times out of 10, [the Corporate Networks Operation] will come up with an HP-Northern Telecom solution," Kaplan said.



3Com execs

FROM PAGE 49

ment style between Bill and Bill Krause?

Carrico: There's no question about the differences in style. I'm more on the pragmatic side. I have been described as quick to take action and detail-oriented. Bill [Krause] is more principle- and process-oriented.

But I don't think these differences materially affected the decision to leave. I was in a situation where I had been the general manager and CEO [of Bridge], and overnight we doubled the size of the company. I was then required to operate through six levels of general managers. I missed some of the more hands-on capability of a smaller company.

Estrin: For me, it was more of the inverse. I went from being second [in command] to being division manager of a larger company. I missed the breadth [of my responsibilities] before the merger. None of these issues are particular so much to 3Com and Bridge, it's just something that happens when you go through a merger.

You are both perceived as the heart of Bridge. How do you think your departure will affect the company?

Carrico: Certainly there's concern about maintaining Bridge's momentum. Toward that end, [3Com cofounder] Howard Charney, an outstanding people manager, will be Bridge's general manager.

Estrin: I talked to a fair number of large accounts during the last week, and the overriding theme was that while they enjoyed their business relationship with us, they believed that 3Com was a professional organization committed to continuing the support they were accustomed to from Bridge.

How about a report card on the merger — what is the most substantial payoff to date?

Carrico: Mergers are harder than you think. Bridge's direct sales force is already selling something like six times as many 3Com products as they were premerger.

Plus, there's a lot of product synergy in process. One of the biggest successes is the combination of the international sales forces, to the extent that 33% of the combined sales today are international.

Is 3Com dragging its feet on utilizing a direct sales force?

Carrico: I think we've gone more direct. Clearly we are trying to sell to larger accounts. We've started to achieve that, but you don't make the shift overnight. We're still encouraging large accounts to choose [equipment delivery] through resellers.

Estrin: Selling through the direct sales force has definitely made large accounts more comfortable about buying 3Com. With these accounts, it's not how they buy, it's how they are supported.

What are some other issues facing the two companies during the next 12 months?

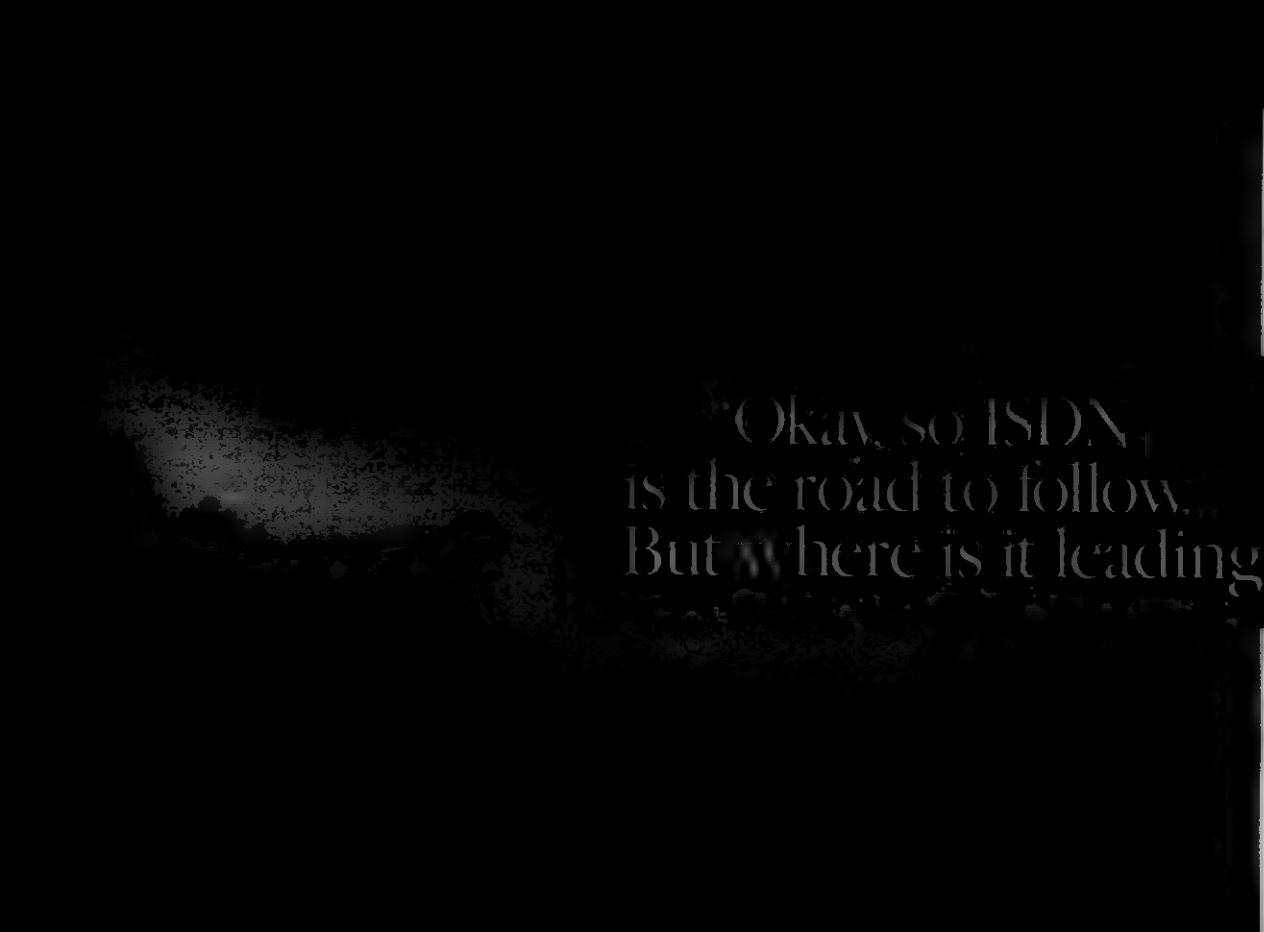
Estrin: It's very important to be thought of not as two, but as one company with the full breadth of solutions and systems for customers. Bridge can be thought of as a product line.

Carrico: We have to bring 3+Open out in volume. On the Bridge side, we are anxious to bring out internetworking bridge products.

You'll continue to see more announcements in the PC-to-host arena, as well as some [IBM Personal System/2 Micro Channel architecture] announcements and a big push to get Ethernet over twisted-pair cable out in volume.

In hindsight, would you go through it again?

Carrico: Absolutely. You can see the evidence around you, the reasons we chose to do the merger. We felt inevitably there had to be consolidation, but we wanted to pick who we consolidated with. In order to be significant players [in a maturing product market] in the long run, you've got to have critical mass to survive.



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The right choice.

3Com backs up Netview

BY JAMES DALY
CW STAFF

SANTA CLARA, Calif. — 3Com Corp. has thrown its support behind IBM's Netview host-based network management system with an integration strategy, promising the release of Netview-based products by year's end.

3Com's Network Control Server (NCS) will spearhead the company's attack and serve as the foundation for a centralized network management system for Ethernet or token-ring networks.

NCS will collect alarm information and audit trails of network performance statistics from 3Com devices and, in turn, will pass the information via the Netview/PC interface to the Netview operating system in the IBM host.

Software support pending

The firm said the NCS-to-Netview bridge will be completed in November or December, at which time it plans to release a pair of software links that will facilitate the collection of alarm and audit trail data from the network.

These releases will include Alert Monitor, a Microsoft Corp. LAN Manager application that monitors work group alerts through standard OS/2 LAN Manager application programming interfaces and forwards them to a Netview/PC node on the LAN, and Alert Forwarder, which forwards alerts coming from Alert Monitor to Netview on the host.

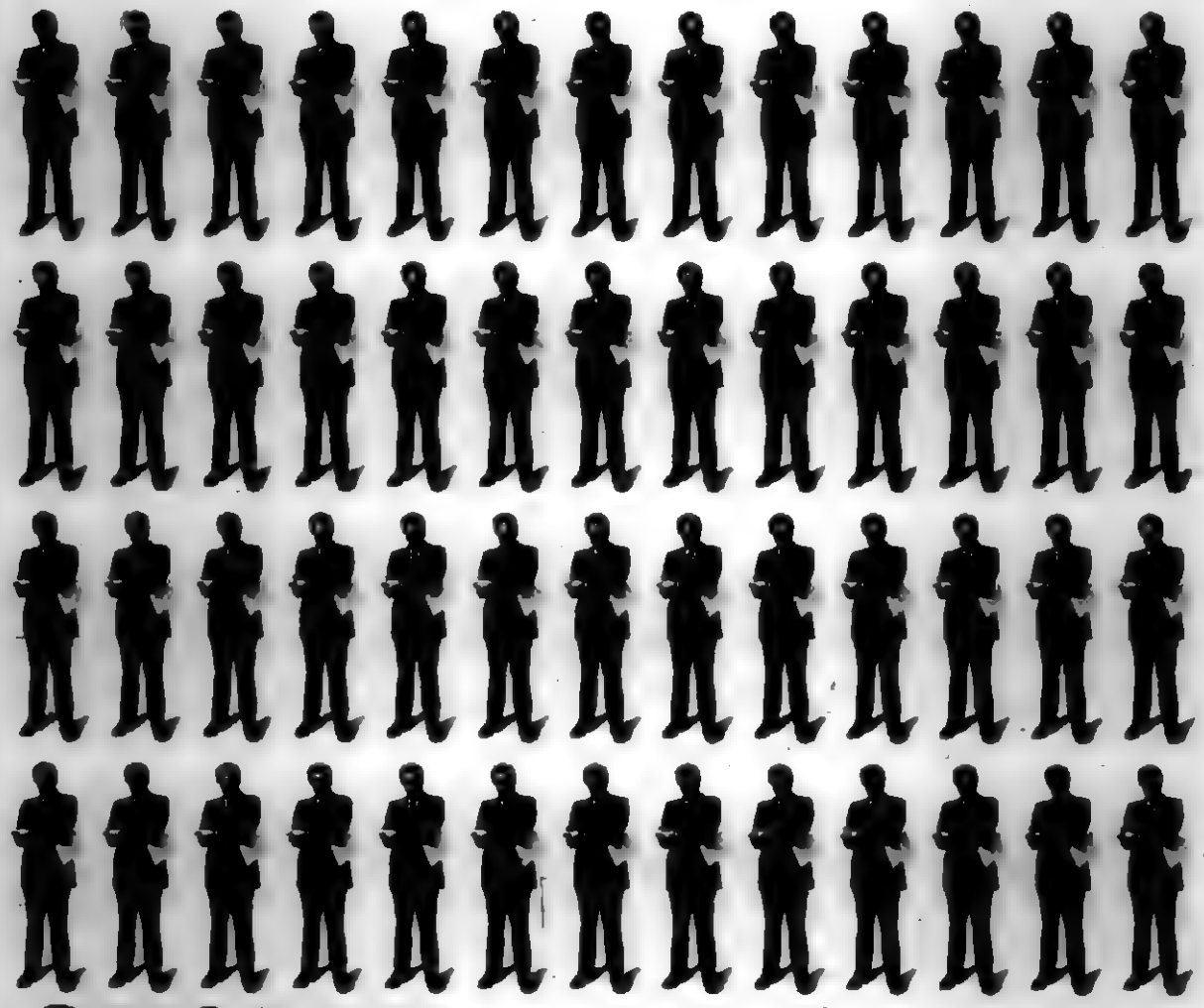
One kink in the strategy is that 3Com indicated it would release the Alert Monitor and Alert Forwarder when IBM offers a version of Netview/PC that runs under OS/2. However, IBM has not yet said when such a product will be released.

Phased implementation

Initial implementations of the 3Com products will support communication of alerts to the mainframe over a serial line. Later releases will support the transmission of commands from Netview to NCS.

In its planned integration of OS/2-based work group networks into the Netview environment, 3Com said it will concentrate on evolving its work group server operating system to the OS/2 LAN manager as part of its 3+ Open product line and as part of IBM's plans to move Netview/PC into the OS/2 environment.

3Com added that it will further its integration base early next year when it unveils network management tools for Transmission Control Protocol/Internet Protocol (TCP/IP) and Open Systems Interconnect networks. An early version of its TCP/IP network management software will be shown at the TCP/IP Interoperability Conference this September in Santa Clara.



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Driven by a powerful Network Control Language, NETMASTER not only helps decrease downtime, it helps cut costs at Northwestern Mutual. As VTAM Specialist George MacDonald points out, the system's multiple sessions capabilities have allowed his company to delay hardware purchases and, in many cases, hardware upgrades as well as improve productivity. "I wouldn't want to have to manage a network like ours without something as high quality as NETMASTER," said MacDonald, whose company also utilizes SUPRA™ and MANTIS® from Cincom. "There's just no way in the world to do it."

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BIT BLAST

Rockwell in new format

Rockwell International Corp. in Richardson, Texas, has consolidated its telecommunications, data communications and semiconductor businesses into a single entity named **Rockwell Communication Systems.** The new firm will focus on networking applications and transmission and customer-premise data communications equipment. It will have three divisions: Network Transmission Systems, Switching Systems and Semiconductor.

Last week, Rockwell International agreed to acquire **Communications Machinery Corp. (CMC)** in Santa Barbara, Calif. CMC makes Digital Equipment Corp.-compatible hardware- and software-based communications products. Rockwell said it expects to complete the merger by July, at which time CMC will become a subsidiary of Rockwell Communication Systems.

Integrated Network Corp. has announced that **U.S. West** will purchase Integrated Network's Universal Switched Data Capability high-speed data transmission system and deploy it in six states. Integrated Network also said it has raised $11.6 million in additional funding, increasing total investment in the firm to $17.3 million.

Ralston Purina Co., the world's largest animal-feed manufacturer, has contracted with **McDonnell Douglas Information Systems Group** to handle its data and information processing. The pact also gives Purina usage rights to McDonnell Douglas's commercial communications network, several business support applications packages and Ontyme electronic mail.

Tellabs Communications Canada Ltd. has signed a contract for an estimated $2.5 million in U.S. funds to supply statistical and packet-switching multiplexers to **Bell Canada.**

Digital Equipment Corp. and **Pilot Executive Software** have announced a cooperative agreement to market a comprehensive interface that will link Pilot's Executive Information Systems product to DEC's All-In-1 office automation system.

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*[illegible]

Sniffer net gets on track

BY KATHY CHIN LEONG
CW STAFF

MOUNTAIN VIEW, Calif. — Network General Corp., maker of the Sniffer network protocol analyzer, has introduced a laptop version for the Ethernet market.

Laptop Sniffer is said to be geared toward users who need a single networking architecture.

The laptop version is a protocol analyzer based on a Toshiba Corp. T3200, which is an IBM Personal Computer AT compatible. It reportedly works with a variety of Ethernet protocol suites, software and implementations, including Transmission Control Protocol/Internet Protocol, Digital Equipment Corp.'s Decnet, Xerox Corp.'s Xerox Network Systems, Sun Microsystems, Inc.'s Network File System, IBM's Nethios and Novell, Inc.'s Netware.

The $15,000 analyzer gives users a graphical display of network activity, featuring remote monitoring capability via a separate personal computer and telephone line.

While the software monitors basic network functions such as cabling disorders, it also keeps track of data activity while packets are sent between devices and pinpoints bottlenecks.

The original Sniffer allows users to select up to two network architectures ranging from token-ring to Arcnet, Ethernet and Starlan. Laptop Sniffer will support other network types in the future, said Harry Saal, president of Network General.

Look out, Lanalyzer

Laptop Sniffer is aimed at competitor Excelan, Inc.'s Lanalyzer, a product that also tracks Ethernet protocols.

Stanford Medical Center in California is currently beta-testing the product. According to Phil Fernandez, the center's network systems manager, Laptop Sniffer is significantly faster than the original Sniffer and, further, has a cleaner, simpler user interface.

"So far, so good," he said. "We are able to take advantage of the capabilities to address real networking problems."

Meanwhile, Saal hinted that the original Sniffer will gain support for Apple Computer, Inc.'s Appletalk network and Banyan Systems, Inc.'s Virtual Networking Software, or Vines, later this year.

Hopes

FROM PAGE 49

high-end devices, LAN to LAN and workstation to workstation. According to proponents, FDDI is the first attempt at standardizing an interface for devices that will ride on a fiber-optic local-area network. Today, users must opt for a variety of proprietary methods, none of which make it easy for them to just plug in a device after opening the box.

Gives it credit

American Express Vice-President of Communications Al Crawford said his company is already laying down plans to implement FDDI, even though the protocol specifications have not been finalized.

"We are proactive in the FDDI standards committee. It will be a cost-effective way of building large networks," Crawford said. "We are hoping that we can start implementing some pilots in 1989."

If all goes well in the standards committee, Crawford's dream might come true. Pieces of the FDDI standard include the Media Access Control layer, the Physical layer, the Physical Media Device layer and Station Management. Of the four components, Station Management — the parameters that specify how a station should pass a token around the network, for example — is the least developed.

Alan Chase, Eastman Kodak's manager of network engineering, said Kodak is embracing FDDI "all the way. Even though it is an emerging protocol, we see it as fundamental in the way we tie together our LANs here. It is a key component to our architecture."

Although Kodak operates proprietary backbone fiber networks that run at 400M bit/sec. on its campus, Chase said the 100M-bit FDDI network would be integrated as subnetworks alongside the backbone fiber. Kodak is expected to implement FDDI in 1992, Chase said.

Aside from corporations, universities are also waiting for FDDI to come to fruition. Stanford University in Palo Alto, Calif., runs an extensive fiber network across its campus for voice and data.

Learned a lesson

"We definitely need it," said Bill Yundt, Stanford's director of networks and communication systems. "We are using Ethernet over fiber right now, and the the 10M-bit speed is not fast enough for us. We need to create new paths for data transmission." FDDI applications for Stanford would include using high-speed interfaces into mainframes, he said.

When FDDI is complete, the vendor world will peddle wares such as super-performance file servers for improved file access. Some workstations, for example Sun's Sun-4, will be able to crunch numbers at faster speeds across network boundaries.

Companies like Proteon, Inc. also say they will be offering an FDDI migration path for their own network products. According to Proteon Chief Scientist and Chairman Howard Salwen, the Proteon Pronet-80 fiber LAN is very similar to the FDDI network specification, so that migrating its products over to the final FDDI protocol will be relatively easy.

Network vendor Communications Machinery Corp. and chip maker Advanced Micro Devices, Inc. (AMD) have joined together to develop and market FDDI VMEbus processors. Under the contract, Communications Machinery will use the AMD five-chip set to create boards that will also integrate Transmission Control Protocol/Internet Protocol and International Standards Organization software protocols.

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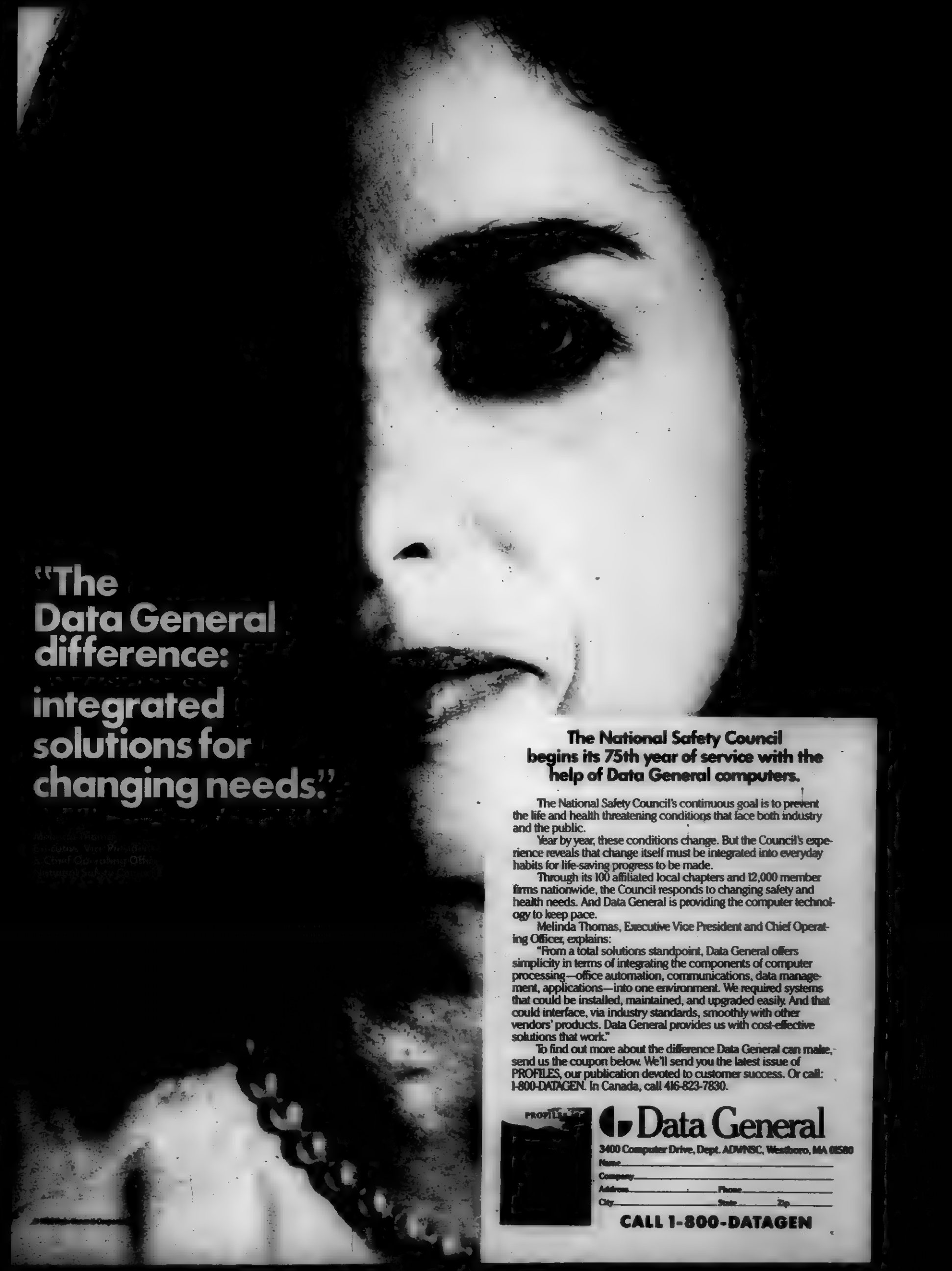

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FROM PAGE 49

Program Communications is any guide, it would be reasonable to believe that Apple would support TCP/IP in the same fashion — by having a Macintosh II serve as a gateway server between Appletalk and TCP/IP nets.

Apple's twist

Finally, Apple has added its own twist to the interconnectivity equation. It believes Appletalk is an appropriate interconnectivity technology and should be supported by the rest of the world.

There are several problems with this thinking. In the first place, there are still perceptual problems about what Appletalk is. Many users and developers still believe that the Appletalk protocols exist only as they are implemented in Apple's Localtalk wiring scheme. While Apple has been doing a valiant job trying to educate these communities about the qualities of its networking scheme, much more work needs to be done.

Appletalk has many appealing characteristics and, in fact, is becoming an alternative standard for entry-level networks. But the world is simply not going to accept another internetworking standard.

IBM can impose one because of its size, but even DEC realizes it is better to try to work within industry standards and, toward that end, has implemented portions of OSI within Decnet.

Another question that must be raised is whether Apple's networking strategy is viable and/or adequate.

For a strategy to be viable, developers and users have to be able to understand the strategy and how it is important to them; Apple has done a poor job in this area. Most users queried by Infonetics are unaware of Apple's possibilities. Even the third-party development community is confused about Apple's program.

How will this confusion and lack of knowledge hurt Apple? First, the corporate user lacks confidence that Apple understands its global communications needs. Second, because of this concern, Apple will not be able to garner the fullest market share possible from that market. In turn, traditional IBM large-system third-party developers are not moving to support the Macintosh.

It appears these three problems will cause Apple serious concern in the future. Although Apple has enjoyed a surge in acceptance by the corporate buyer, the honeymoon can end as soon as it began if Apple does not change its image from a workstation company to a corporate computing company.

Since Apple is not likely to be selling minicomputers and mainframes, its only method to achieve this objective is through its communications strategy.

Apple needs to take the same leadership role in corporate connectivity that it has with easy-to-use workstations. Apple must innovate within the world of communications standards. One of the most powerful ways is to develop applications that demonstrate Apple's capabilities. It may be too late for Apple to wait for third-party developers to do the job.

This approach would be no different from when Apple introduced the first Mac. At that time, Apple also offered several application programs designed to show users the power of the product. This same type of demonstrative capability is required in networking.

Also important in Apple's strategy is the support of the corporate development community, something Microsoft has recognized in its attempt to market the OS/2 LAN Manager. However, Apple has all but ignored these people. Look at IBM's and DEC's success with controlling corporate connectivity, and you will see strong support for the corporate developer.

With all this said, does Apple provide effective ways to interconnect networks? The answer is: Maybe.

White is president and CEO of Infonetics, Inc., a market research firm based in Santa Clara, Calif.

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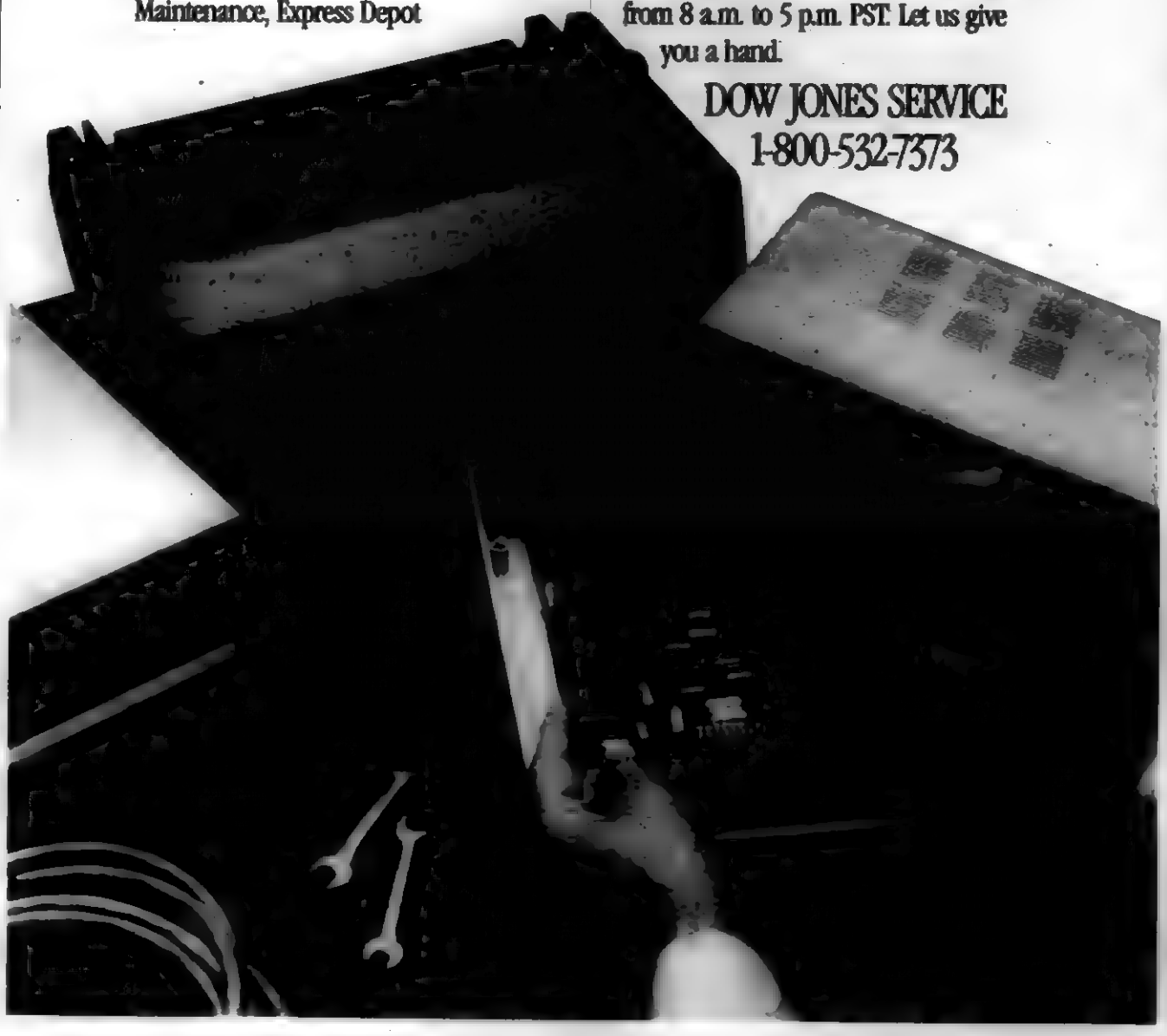

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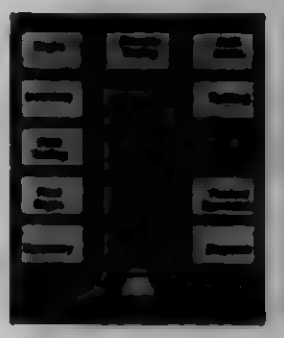

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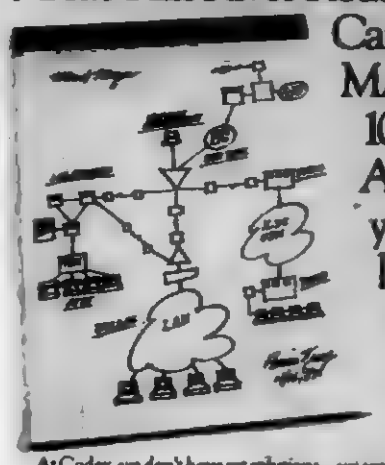

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NEW PRODUCTS

Local-area network hardware

A network board for IBM Personal Computers, PC XTs and PC ATs has been announced by PC Office, Inc. The Netboard II plugs into any half-card slot on IBM and compatible computers and operates at speeds of up to 4M bit/sec.

The product uses a proprietary signaling technology for increased transmission efficiency. A modified version of carrier-sense multiple access with collision detection is incorporated to provide throughput and error checking. Diagnostic test software is included with each Netboard II.

Dealer prices for Netboard II are $139 for the 2.5M bit/sec. version in quantities of 10 and $169 for the 4M bit/sec. version.

PC Office, 4631 Viewridge Ave., San Diego, Calif. 92123. 619-268-3235.

Raycom Systems, Inc. has announced its 5300 series, a line of fiber-optic and copper Ethernet products for connecting microcomputer, minicomputer and mainframes as well as peripheral devices. All conform to IEEE 802.3 standards.

Product offerings include fiber-optic transceivers and repeaters, a six- or 12-port hub, a fan-out unit, a six-port terminal server, a fiber-optic multiport repeater, a Thin Ethernet multiport repeater and a copper repeater and transceiver.

The products were designed to provide hybrid-media network solutions, including local-area networks that offer extensive geographic coverage as well as individual segments tailored to specific applications.

Prices range from $295 to $8,100, depending on quantities and configurations ordered.

Raycom Systems, 6395 Gunpark Drive, Boulder, Colo. 80301. 800-288-1620.

Local-area network software

FTP Software, Inc. has begun shipping Netbios for its PC/TCP network software. FTP claims its Netbios is fully compliant with the accepted IBM Netbios standard for Transmission Control Protocol/Internet Protocol (TCP/IP) specified in Request for Comments 1001 and 1002, which contain the formal TCP/IP protocol specifications.

Netbios for PC/TCP runs over PC/TCP 2.0, the vendor's TCP/IP software for personal computers running under DOS. PC/TCP allows PC users to transfer files, transmit electronic mail and access minicomputers and mainframes. PC/TCP is available for most Ethernet, token-ring and Starlan boards.

Netbios for PC/TCP costs $80 per copy.

FTP Software, 501 Cambridge St., Cambridge, Mass. 02141. 617-868-4878.

Easynet Systems, Inc. has announced Version Two of its local-area network product line for IBM Personal Computers and compatibles. The software is said to be 30% faster than previous Easynet products.

Version Two supports all IBM Netbios functions, including modem and facsimile sharing, and is designed for small to mid-size network requirements.

The product line includes Easynet 116, which incorporates a network card and software that permit peer-to-peer communications at 1.5M bit/sec. over twisted-pair cable. Also offered is a zero-slot LAN called Easynet II that allows two PCs or compatibles to share resources such as printers and hard drives.

Easynet 116 costs $695. Easynet II costs $169.

Easynet Systems, 4283 Village Center Court, Mississauga, Ont., Canada L4Z 1S2. 800-387-3207.

Links

Kinetics, Inc. has announced AUX support for the Etherport II, the company's Ethernet adapter card for the Apple Computer, Inc. Macintosh II.

The card provides support for Transmission Control Protocol/Internet Protocol, Digital Equipment Corp.'s Decnet, Open Systems Interconnect and Apple's Appletalk network protocols running under Macintosh OS.

The AUX software reportedly will give systems running AUX direct connection to an Ethernet network.

Etherport II, including Macintosh OS and AUX driver software, costs $795.

Kinetics, 2540 Camino Diablo, Walnut Creek, Calif. 94596. 415-947-0998.

Modems/ Multiplexers

A 2,400 bit/sec. Microcom Networking Protocol Level 5 internal half-card modem for IBM Personal Computers and compatibles has been announced by ATI Technologies, Inc.

The 2400 ETC has a 16- and 32-bit digital signal processor with adaptive equalization. It is said to be compatible with the Bell 103 and 212A and CCITT V.22 and V.22 bisynchronous standards.

The 2400 ETC costs $239.

ATI Technologies, 3761 Victoria Park Ave., Scarborough, Ont., Canada M1W 3S2. 416-756-0711.

A fault-tolerant, 19.2K bit/sec. modem has been introduced by Fujitsu America, Inc.

Called the M1928LFT, the synchronous, leased-line unit features monitoring and restoral capabilities.

By using a proprietary algorithm, the product can continually analyze a telephone line and detect impairments based on signal-to-noise ratio, carrier detect and signal quality.

The modem is Trellis-coded and will reportedly change its transmission facility to either a dial line or alternate leased line, depending on conditions.

The M1928LFT costs $5,295.

Fujitsu America, 3055 Orchard Drive, San Jose, Calif. 95134-2017. 408-432-1300.

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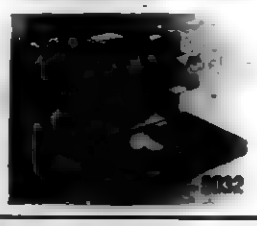

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SYSTEMS & PERIPHERALS

HARD TALK

Stanley Gibson

New minis tap old ways

How to attain success in the computer industry: Start users out with an easy-to-use system with much upward growth potential. Keep adding more power and operating system functionality while preserving users' investments in application software.

We have seen DEC succeed spectacularly with this method. It could be that IBM is about to repeat the formula with Silverlake — possibly with similar results.

Of course, IBM pioneered the practice with its 360 series in the mid-1960s. Then it added the closely related 370 series and subsequent mainframes that have protected users' software investments.

End of trend

IBM's divergence from this formula with an assortment of mid-range architectures, each of them successful in varying degrees, is well documented. Silverlake is a turning point that will reverse that trend.

Silverlake will fill the need for greater capacity among System/36 and 38 users. These users will also be able to migrate to an operating system with greater functionality, or at least IBM Systems Application Architecture compliance, which is potentially a great advantage.

A System/36 user will never be faced with a complicated conversion to a System/38, and difficult communications between the two systems will be eliminated. Users have testified to some of the benefits they expect to see from Silverlake. [CW, June 6].

Mirror image

All signs point to the fact that Silverlake will mirror IBM's traditionally successful approach toward mainframe customers, in which the vendor leads them down a path of ever increasing power and operating system enhancements while preserving their fundamental investment in software.

Leading customers step-by-step to greater capabilities

Continued on page 78

Security firm finds IBM power

Switch to IBM from Decsystem-20s fills Chicago company's growth needs

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — In 1986, Security APL, Inc. had reached the end of the road. The small security-portfolio tracking firm, based here, needed more power than its aging Digital Equipment Corp. Decsystem-20s could provide. However, in 1983, DEC had announced it would stop enhancing the system and reportedly killed off the follow-on product, a 36-bit machine code-named Jupiter.

With its VAX architecture, DEC has reaped the benefits of a single operating system and hardware architecture. In the case of Security APL, though, DEC paid the price of having different architectures.

"The fact that we lost the migration path became a crisis," recalled Security APL President Jay N. Whipple III. To stave off a shortfall in processing power, Whipple purchased several used Decsystem-20s, bringing the firm's total to four machines.

System overload

Meanwhile, Security APL's growing caseload, boosted by booming New York accounts, was slowing down nightly batch processing of portfolio reports. The systems also supported daytime on-line queries.

"While we continued to live with our operating problems, we had to cut jobs in half in order to get them done on the Decsystem-20s," Whipple said.

The challenge, said Security APL Vice-President James K. Waller, was to provide better service to money managers in small to medium-size investment management firms.

Whipple, who founded Security APL in 1978, wrote the application that is the backbone of the company in the APL language, from which the firm derives its name. The program, which consists of 75,000 lines of code, includes an inverted-file data base and is used by 75 client brokerage firms to manage about 20,000 customer accounts. Security APL operates with a staff of 20 and reports $2.5 million in annual revenue.

As the work load mounted, Whipple said he realized that migrating to DEC's VAX would be as difficult as migrating to another system such as an IBM VM-based machine. "We began to look at the DEC and IBM machines as equal alternatives," Whipple said.

Despite the company's small size, both DEC and IBM were keenly interested in the Security APL account. Both offered their own solutions to the capacity problem. DEC's answer was to migrate to a Microvax II under the VMS operating system. IBM proposed a plan to install APL on an IBM 9370 under the VM operating system. Both the 9370 and the Microvax II support the APL language.

That was when IBM and DEC went toe-to-toe for the Security

Continued on page 78

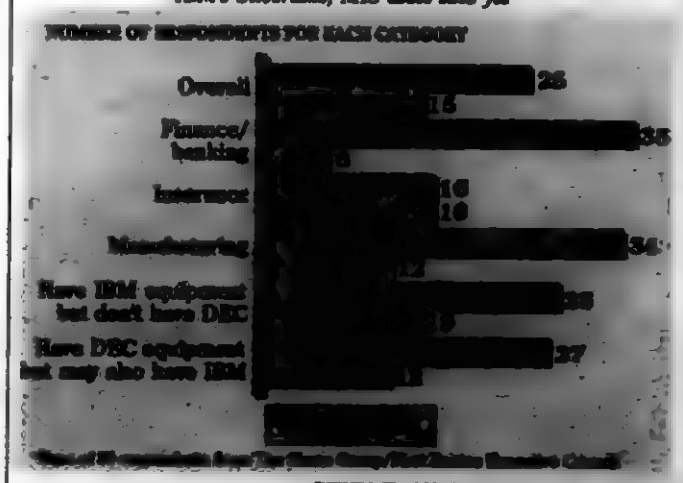
Inside

- McDonnell Douglas helps in highway project. Page 72.
- Emulex brings disk, tape controllers to Microvax computers. Page 76.
- Arnet expansion boards transform IBM PCs into multiuser computers. Page 82.

Data View

DEC's multiprocessors up ante for Silverlake

*When asked if DEC's latest VAXs will set new standards for evaluating IBM's Silverlake, MIS execs said yes**



INFORMATION PROVIDED BY THE SIERRA GROUP
CW CHART

Rewind speeds subsystem

LOUISVILLE, Colo. — Storage Technology Corp. has boosted the performance of its 4480 Cartridge Subsystem, adding a faster rewind feature and 4.5M byte/sec. channel support.

The rewind feature, called the Velocity Option, reduces rewind time from 48 sec. to 32 sec. The high-speed search facility used by storage management software gains from the faster cartridge speed, Storage Technology said.

The 4.5M byte/sec. support allows the system to connect to 4.5M-byte channels on large CPUs, reducing channel management overhead and channel-busy status when multiple control units are on the same channel, according to Storage Technology.

Also, controller cache capability has been increased from 1M to 4M bytes.

The Velocity Option version of the subsystem and the 4.5M byte/sec. channel feature are slated to be available in the third quarter.

Each four-transport cartridge-drive Velocity Option is priced at $750. The 4.5M-byte channel support will cost $875 for each control unit.

Expanded cache will be incorporated into 4480 subsystems at the end of the year at no additional charge.

Avalon board shares memory to split VAX jobs

BY J. A. SAVAGE
CW STAFF

GLENDALE, Calif. — Avalon Computer Systems recently unveiled a processor board that shares memory with its host Digital Equipment Corp. VAX system. By sharing memory, the processor can execute portions of programs in parallel with the VAX system, according to the vendor.

Using the Vaccelerator board can speed processing by two to three times more than that of a VAX-11/780, the company claimed.

The Vaccelerator was designed for Q-bus- and Unibus-based VAX systems running compute-intensive applications. By offloading applications, it runs at many times the speed of the host, with the optional Weitek Corp. Floating Point Accelerator returning 95% of the VAX power to other users, Avalon claimed.

"The shared memory allows a user to divide a program into several sections," an Avalon spokesman said. "For instance, if you are charting wind flow over four different sections of an aircraft, [information from one section] is shared by the next board to perform the next calculation."

Based on an Intel Corp. 80386 processor, the Vaccelerator is aimed at compute-intensive applications like simulation, molecular orbital calculations and finite element calculations, according to the vendor.

'Perfect application'

"Star Wars [simulation] is a perfect application," the spokesman explained. "You don't have to build the [missiles] to see how they will react."

The Q-bus Vaccelerator comes standard with 4M bytes of memory, 64K bytes of cache memory and a Weitek 1167 Floating Point Accelerator and is priced at $11,900.

The Unibus model starts at 4M bytes of memory for $13,900, 8M bytes of memory for $16,300 and 12M bytes of memory for $18,700.

Applications may be ported to the Vaccelerator by recompiling existing Fortran, C or Pascal programs with compilers provided by Avalon. According to the company, those applications will execute transparently to the user.

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HARD BITS

Massachusetts signs on McDonnell Douglas

The state of Massachusetts is gearing up for work on a major federally funded construction project in Boston: The $3.1 billion depression of the Central Artery and the construction of a third Boston Harbor tunnel.

And the project, of course, will not be done without computers.

McDonnell Douglas Corp. recently announced that it had signed a five-year agreement to provide Massachusetts with the former's computer-aided design and drafting (CADD) software along with hardware and services.

Expected to take 10 years, the aim of the project is to lower a major highway underground and dig a third automobile tunnel under Boston Harbor, connecting Boston's downtown area with Logan International Airport.

The state Department of Public Works reportedly will buy the McDonnell Douglas Graphics Design System (GDS). GDS is a CADD software package that combines intelligent graphics with Oracle Corp.'s Oracle relational data base.

McDonnell Douglas, acting as the prime contractor, reportedly has subcontracted with **Digital Equipment Corp.** to provide the hardware necessary to operate GDS.

DEC said it will provide color Vaxstation 2000 workstations operating in local-area Vaxclusters in conjunction with the company's Microvax 3600 computers running DEC's VMS operating system.

The state said it will buy its first GDS package next month for $800,000. The package will be used by Bechtel/Pacona Brickerhoff, the management consultants overseeing the project.

Tandem Computers, Inc. recently announced a contract of a different kind with the Liquor Barn of Northern California, Inc.

The San Leandro, Calif., retailer purchased a Tandem Nonstop EXT10 system with software from PBL Associates in Point Richmond, Calif., to perform on-line inventory control, distribution and financial control.

"We carry more than 12,000 different products, including beer, wine, liquor and grocery items in 100 stores," said C. Giles Clarke, chairman of Liquor Barn. The Tandem-PBL system will keep track of each item and how well it is selling, according to Clarke.

Vanderbilt University in Nashville recently took delivery of a **Scientific Computer Systems Corp.** (SCS) SCS-40 system.

The processor, which San Diego, Calif.-based SCS calls a supercomputer, will be used in the university's chemistry department to run the CADPAC program, a chemistry application developed at the University of Cambridge in England.

"Price/performance was a major factor in our selection, as well as the SCS system's Cray compatibility," said B. Andes Hess Jr., professor and chairman of the chemistry department at Vanderbilt. He said the system will run the COS operating system.

Fujitsu Systems of America, based in San Diego, last week announced a $4 million order with Strawbridge & Clothier in which Fujitsu will provide the retailer with point-of-sale systems.

Based in Philadelphia, Strawbridge & Clothier operates 34 department and discount stores, which sell general merchandise in New Jersey, Delaware and southeastern Pennsylvania.

The system, which will connect users to a host on-line, includes Fujitsu's 7770 terminal, 7112 terminal-support processor and a number of 40M-byte disk drives.

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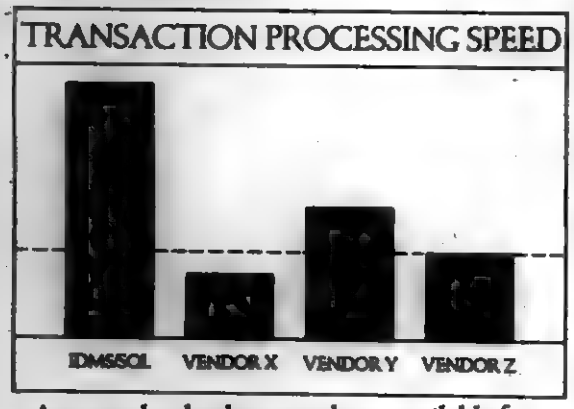

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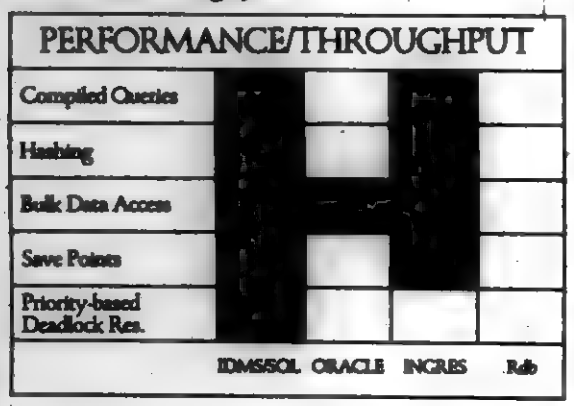

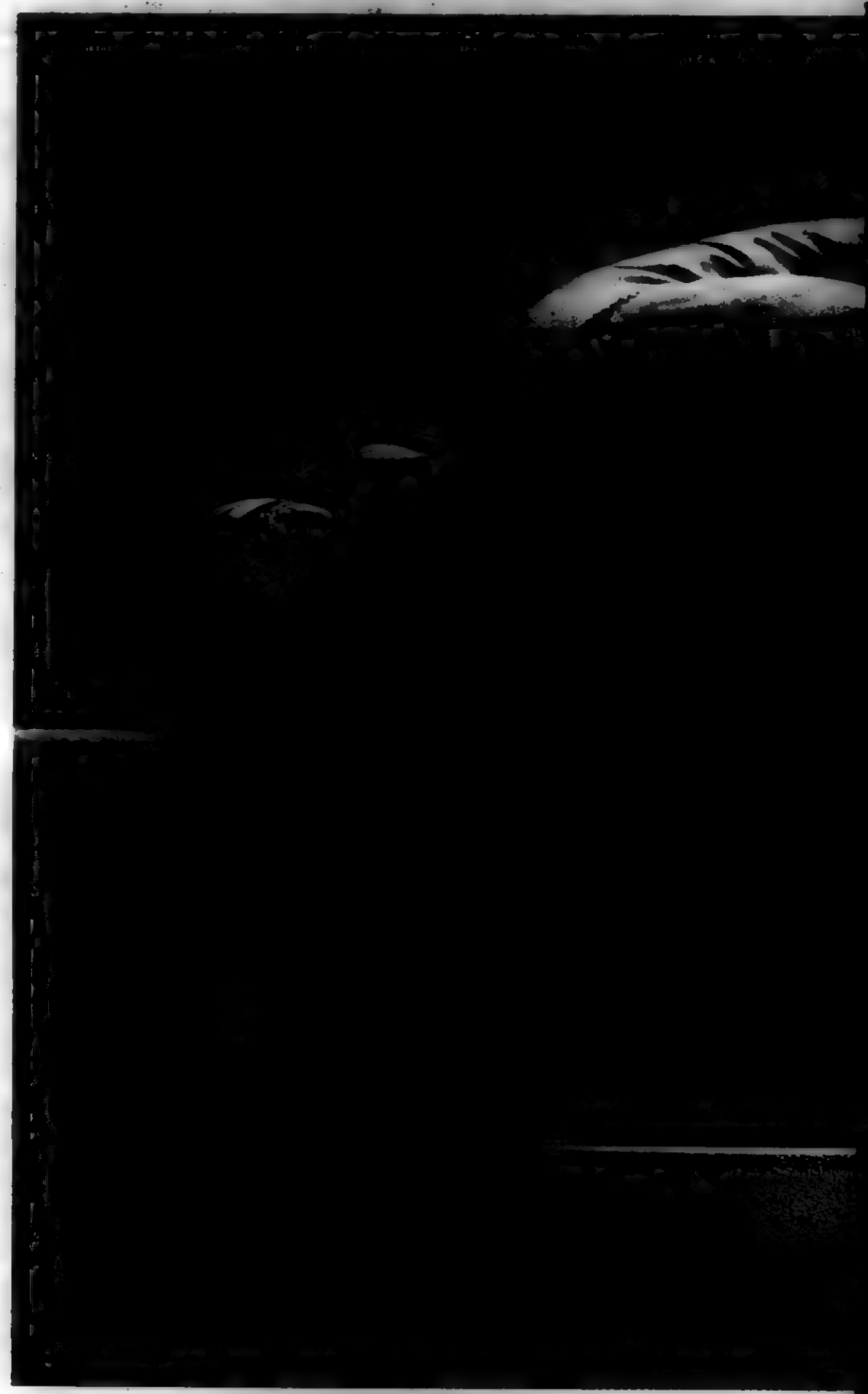

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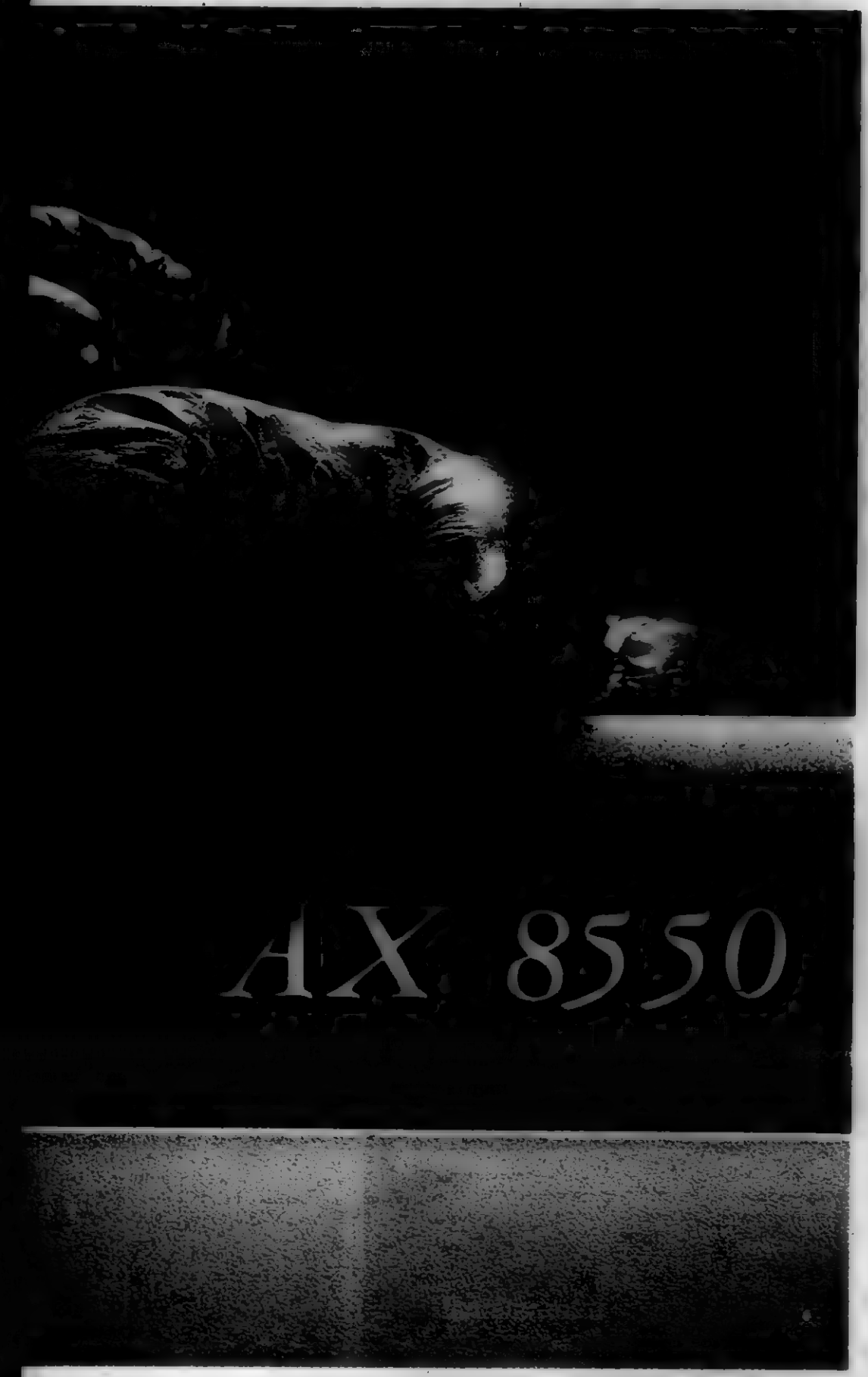

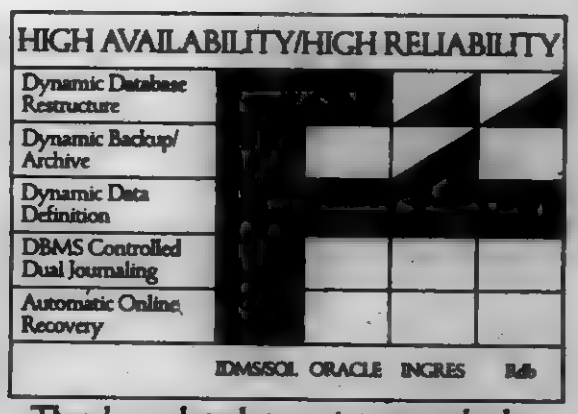

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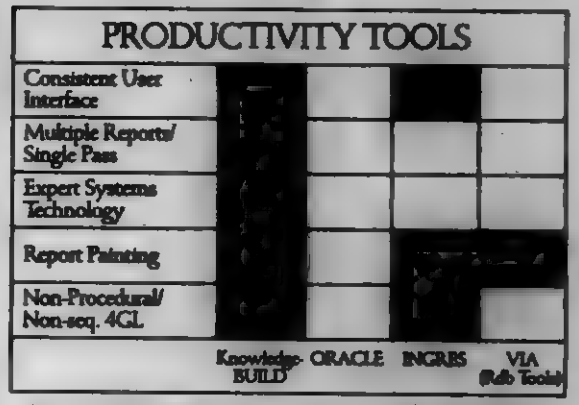

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Integrated Solutions revises CPU board

SAN JOSE, Calif. — Speeding up CPU performance, Integrated Solutions, Inc. recently announced a 25-MHz CPU board for its Optimum series of workstations.

The Optimum series, based on AT&T's Unix operating system, is intended to run with Integrated Solutions' proprietary real-time operating environment, Uniworks. The CPUs used in the Optimum line incorporate the Motorola, Inc. 68020 microprocessor. The new CPU board speeds processing from the 16.7-MHz 68020 chip that was previously offered.

The VME-68225 board can perform the Whetstone and Dhrystone benchmarks 30% to 50% faster than the previous CPU boards, the firm claimed.

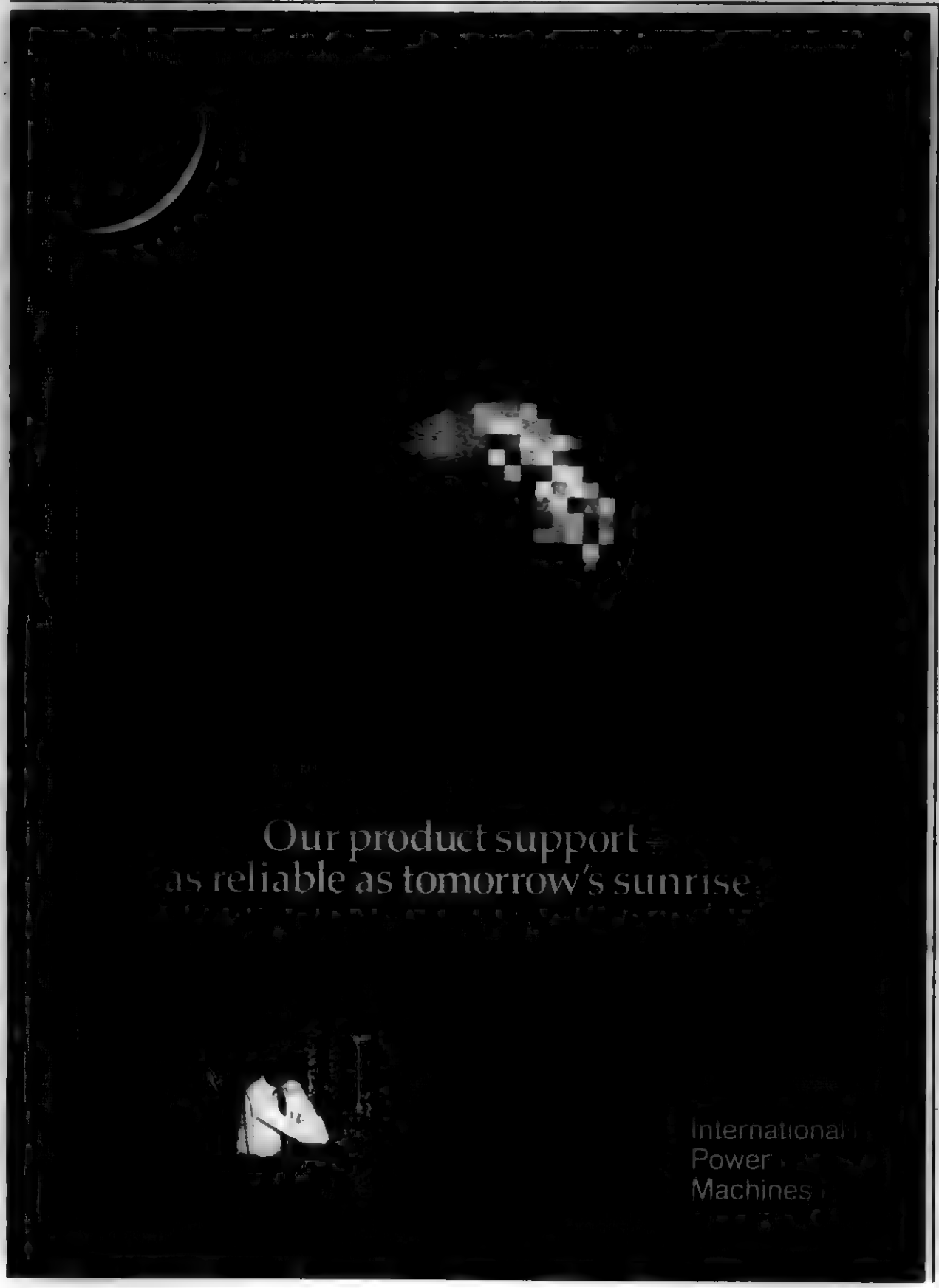
The CPU can access up to 32M bytes of random-access memory, more than double the Optimum series' previous limit of 14M bytes. The larger memory capacity will permit a system to support larger programs or more users.

The VME-68225 plugs into a standard VMEbus and runs Integrated Solutions' Dual Universe Unix, incorporating the University of California at Berkeley's Unix 4.3 and AT&T's Unix System V, Release 3.

The CPU also supports such networking protocols as Sun Microsystems, Inc.'s Network File System and Transmission Control Protocol/Internet Protocol, both of which are supported in Integrated Solutions' version of Unix, the vendor said.

Sold separately, the microprocessor is priced at $3,900. It is also available in bundled configurations as part of the Optimum series. Integrated Solutions sells direct to users as well as through OEMs and value-added resellers.

The CPU will run all software currently running on Optimum series systems, the vendor claimed.



Emulex plugs tape, disk controllers

BY STANLEY GIBSON
CW STAFF

COSTA MESA, Calif. — Emulex Corp. recently brought out disk and tape controllers for Digital Equipment Corp.'s Microvax 3500 and 3600 computers.

The Q-bus controller boards include the QD34 controller, which supports the System Module Device/Enhanced (SMD/E) interface, the QD24 disk controller, which supports the enhanced small device interface (ESDI), and the QT14 tape controller, performing TSV05 and Tape Mass Storage Control Protocol emulations.

The controllers conform with the revised Q-bus packaging used by DEC in the Microvax 3500 and 3600, according to the vendor.

Fill performance gap

Ron Browning, director of storage and communications product marketing at Emulex, claimed the controllers fill a performance gap. While DEC has increased the performance of Q-bus-based systems with the Microvax 3500 and 3600 models, it has not similarly enhanced its disk and tape offerings, according to Browning.

The QD34 and QD24 microprocessor-based disk controllers emulate DEC's Mass Storage Control Protocol. Incorporating Emulex's very large-scale integration logic, the controllers optimize the performance of the Microvax 3500 and 3600 systems through firmware and hardware, Emulex claimed.

The QD34 operates at a 3M byte/sec. disk transfer rate, allowing users to connect up to four SMD/E disk drives to the controller. By using the largest SMD/E disk drives available, one QD34 can provide 4G bytes of storage capacity, the vendor said.

The QD24 is intended for users requiring a small package. The QD24 supports up to four 5¼-in. ESDI disk drives with transfer rates up to 15M bit/sec. A QD24 can expand storage capacity to more than 2.4G bytes using the 760M-byte ESDI drives that are now on the market.

The QT14 is a microprocessor-based tape controller that connects a Pertec Computer Corp. streaming tape drive or a start-stop tape drive to a Microvax 3500 or 3600.

The QT14 supports a variety of typically used tape formats at speeds from 12.5 to 140 in./sec. The QT14 handles data transfer rates up to 1M byte/sec. and has a 64K-byte data buffer for efficient streaming operation, according to the vendor.

All of the controllers will be available early this summer, according to Emulex. The QD34 is priced at $2,495; the QD24 lists for $1,795; and the QT14 is priced at $1,395.

The controllers are also offered as part of subsystem configurations.

A typical subsystem configuration combines a QD34 controller with an 850M-byte Control Data Corp. 9720-850 disk drive.

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Security

CONTINUED FROM PAGE 69

APL account, Whipple said. Both DEC and IBM loaned the firm their proposed machines for several months so that Security APL's three programmers could prototype their applications on both computers.

The primary question on Whipple's mind was which architecture could best support his APL programs, he said. APL, which dates back to the 1960s, is a mathematically oriented language that allows complex equations to be stated in concise and elegant code. Whipple estimates that using APL allows him to reduce program lengths by 80%.

In bringing Whipple's APL application to the 9370, IBM had its five APL specialists in its Santa Teresa, Calif., software development facility write special calls to the 9370's VM Version 5.0 operating system. "They took us out to Santa Teresa," Whipple recalled.

Software solution found

Even so, Whipple was not initially satisfied with APL's performance on the 9370. Later additions to Security APL's custom code reduced several processing bottlenecks, and use of an IBM 4381 Model 14 speeded runtime, according to Whipple.

But the software additions were not made by IBM — they were made by a six-person Atlanta firm called Interprocess Systems, Inc.

Gordon Chamberlain, president of Interprocess, said his 11-year-old firm also installed a new file system that is more compatible with the VM operating system.

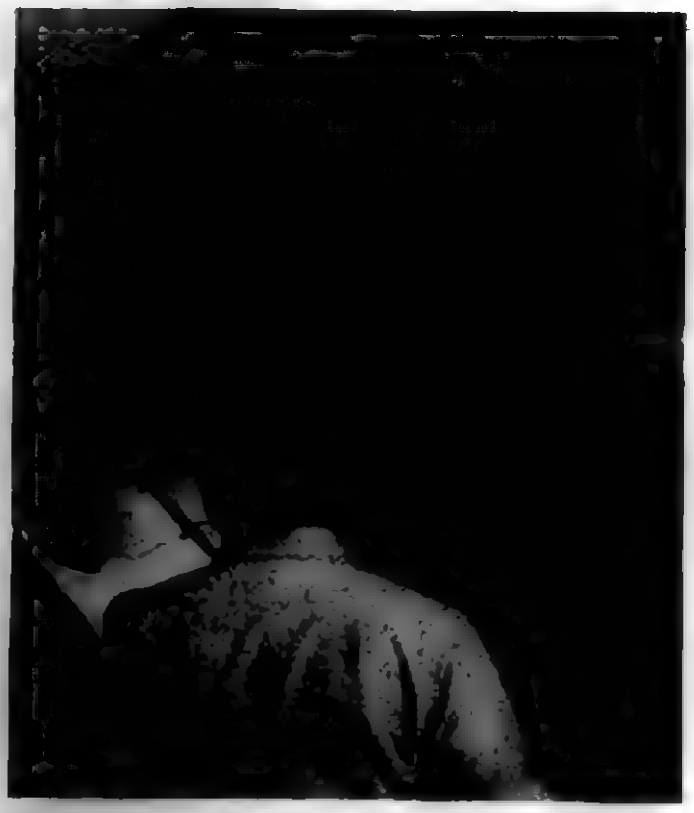
"What we do is to emulate the Decsystem facilities," Chamberlain said. "We provide similar functions under the IBM environments of VM/CMS and MVS/XA." Interprocess has handled similar conversions of APL applications from Decsystems to IBM mainframes, he said.

Security APL also bought a new IBM 3380 Model J disk drive with 2.5G bytes of memory, several IBM 3174 controllers and an IBM 7171 protocol converter.

The 4381 was installed last October, and the four Decsystem-20s are slated for removal this summer. A remnant of Security APL's DEC days will remain in the dozens of DEC VT100 terminals at the firm's client sites. These DEC terminals will continue to be supported by the 7171 protocol converter.

"IBM opens a whole new world for us," concluded Whipple, who has been programming in APL on a variety of systems since he was a teenager in the 1970s — and is not ready to stop.

Whipple said he is looking forward to exploring new horizons that VM will open up, including entry into the world of IBM's DB2 relational data base management system, IBM's SQL/DS query language and use of IBM's Interactive System Productivity Facility, a screen-formatting aid.



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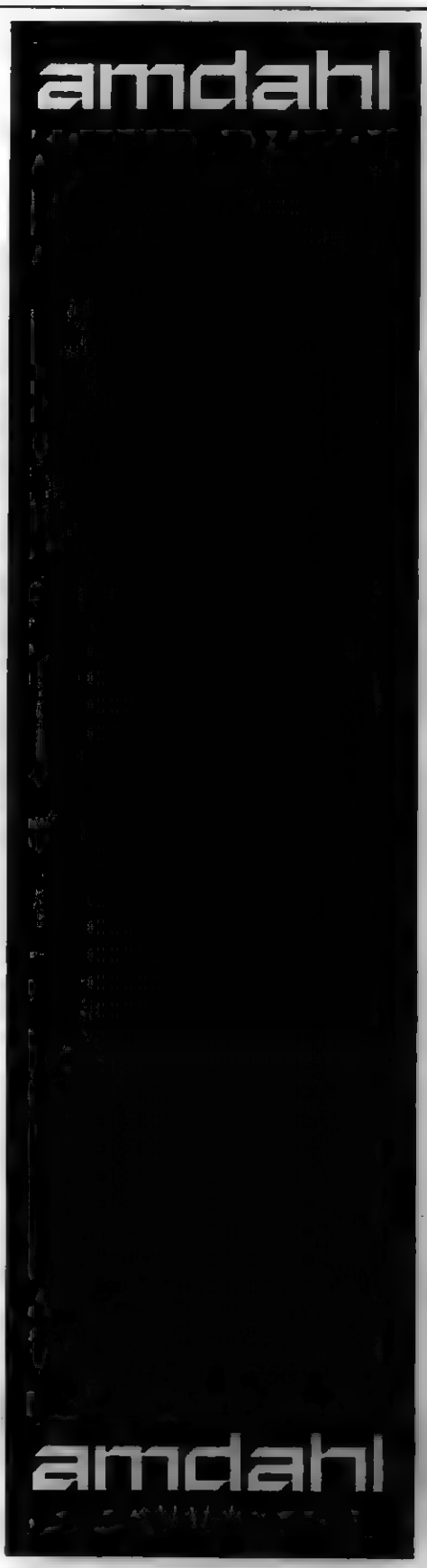

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CONTINUED FROM PAGE 69

makes them feel secure in thinking that a solution to tomorrow's needs is waiting in the wings.

On the contrary, few things aggravate customers more than a forced migration to another architecture. By eliminating that need, Silverlake will go far.

Bigger is easier

In computing, users almost always want more power. Has there ever been a user who wanted less? With the 9370, IBM has shown that it is harder to shrink a system than it is to expand it. Many mainframe applications were built for large systems with the assumption that their power would continue to increase.

IN COMPUTING, users almost always want more power. Has there ever been a user who wanted less?

One industry observer commented that the 9370 reminded him of Detroit automobile companies trying to make small cars in the mid-1970s. They started with large cars and tried to make smaller versions of them, but it didn't work too well.

But IBM, far from being ungainly in the small systems market, is, remember, the most successful maker of microcomputers in the world and is highly successful in making small multiuser systems as well. Its problems had simply been growth limitations and cross-system incompatibilities. Silverlake is supposed to eliminate those problems.

It is too early to tell for certain, but the responses of users and developers who have glimpsed the issues involved in Silverlake migrations show that the trek probably won't present insurmountable obstacles.

Silverlake should fare differently from the 9370, because IBM will be taking two successful small and mid-range systems and adding more functionality and power.

Silverlake's success is not unconditionally guaranteed, but, from here, it seems to have the right pedigree. It is taking a proven path to success.

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NEW PRODUCTS

Turnkey systems

IBC/Integrated Business Computers has revealed an in-house engineering research and development project to incorporate fiber optics into Intel Corp. 80386-based computer technology. The vendor said it will add fiber-optic communications capabilities to its IBC multiuser general-business computer and provide a high-resolution color graphics monitor for each user that requires graphics capabilities.

An IBC multiuser business system with eight terminals and two monitors will sell for approximately $12,000.

Integrated Business Computers, 21621 Nordoff St., Chatsworth, Calif. 91311. 818-882-9007.

Processors

Arnet Corp. has introduced two expansion boards for transforming IBM and compatible personal computers into multiuser computers.

The Modular Multiport board is for use in IBM Personal Computer XTs, ATs, Intel Corp. 80386-based machines and compatibles. The product uses industry-standard RJ-11 connectors in lieu of 25-pin connectors to attach terminals and other peripherals to the processor. The board costs $595.

The Smartport board provides four or eight ports driven by an Intel 80186 processor and is said to function as a communications controller in handling data transmission to and from terminals and printers. A Smartport board with eight ports costs $1,295.

Arnet, 618 Grassmere Park Drive, Nashville, Tenn. 37211. 800-366-8844.

Data Translation has announced the DT1492 series of analog and digital I/O boards for use with Sun Microsystems, Inc. workstations and other Motorola, Inc. VMEbus computers. The products feature analog I/O operations simultaneously on a single board, with up to 16 bits of analog or digital resolution, the vendor said.

The series operates at a speed of 750 KHz and is specifically suited for data acquisition applications such as vibration analysis and speech processing.

The DT1492 series costs from $2,195 to $3,695.

Data Translation, 100 Locke Drive, Marlboro, Mass. 01752. 617-481-3700.

Printers/Plotters

Datasouth Computer Corp. has announced its entry into the Digital Equipment Corp.-compatible printer market with a 400 char./sec. printer that is said to emulate the LA 120 Decwriter.

Called the DS 400, the printer offers draft text at 400 char./sec., memo-quality text at 120 char./sec. and near-letter-quality text at 60 char./sec. Dot-addressable graphics, bar codes and optical-character recognition are also provided.

Datasouth, P.O. Box 240947, Charlotte, N.C. 28224. 704-523-8500.

Power supplies

Topaz, Inc. has extended its existing line of Powermaker E/S uninterruptible power supply (UPS) systems.

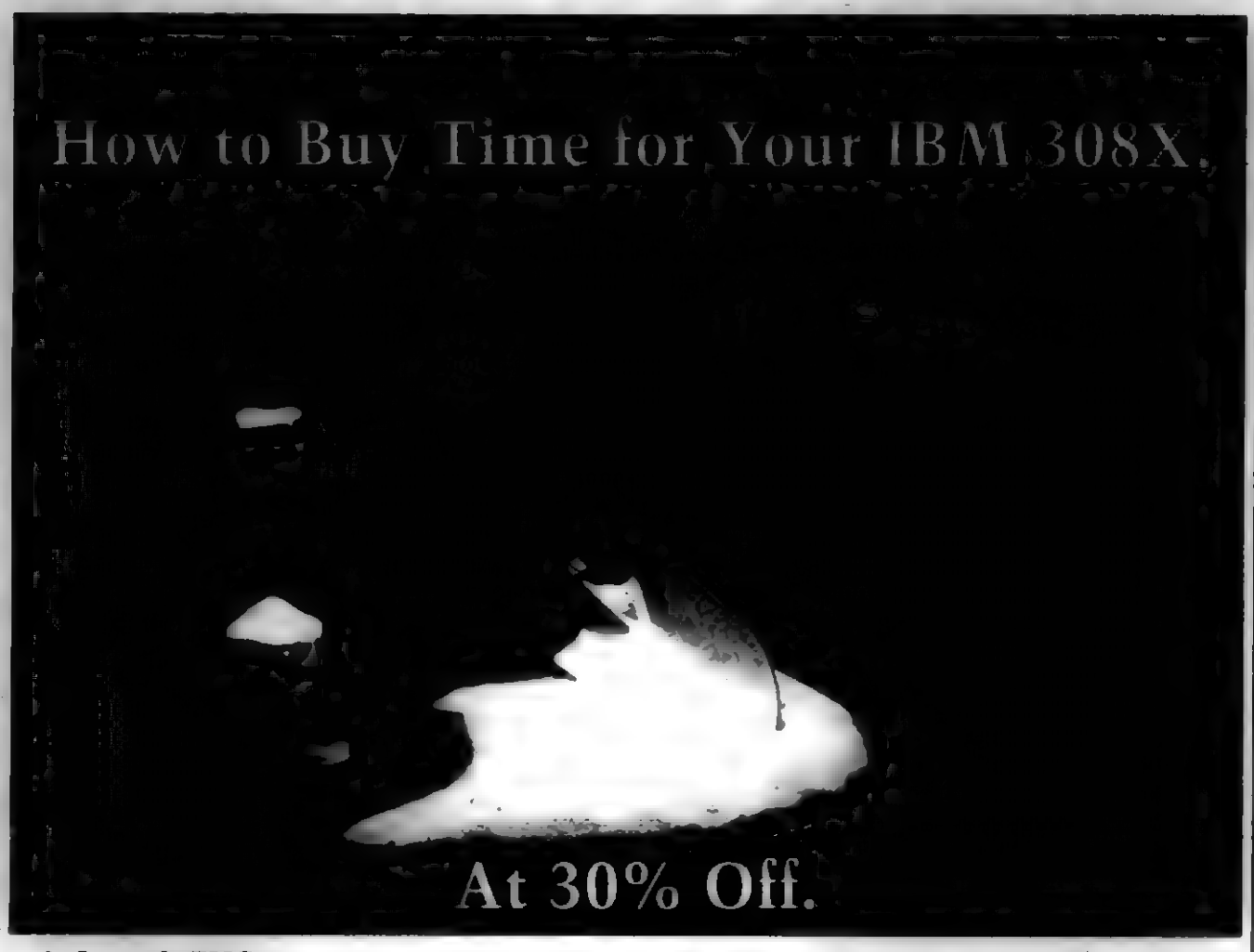
The vendor is now offering 10-, 15- and 25-kVA three-phase I/O microprocessor-controlled systems that were designed for minicomputers, superminicomputers and small mainframe computers.

The vendor said products are continuous-duty, on-line systems that provide continuous AC power to critical electronic equipment.

The series is equipped with four internal microcomputers that reportedly allow the UPS to adapt itself to specific AC power requirements.

The Powermaker E/S series starts at $20,825 for the 10-kVA version.

Topaz, 9192 Topaz Way, San Diego, Calif. 92123. 619-279-0111.



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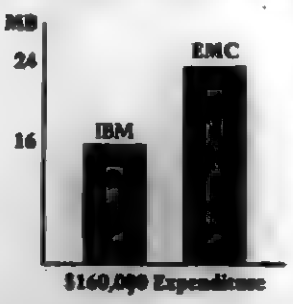
2. Maximize Your Savings.

EMC uses state-of-the-art technology and production methods to offer our 308X upgrade at 30% lower cost than IBM. A 16MB upgrade from IBM is priced at $160,000. For that same price you could buy 24MB of EMC main storage. That's an additional 8MB of main storage or a savings of $50,000. Either way you save with EMC. EMC also features coterminous leases and trade-up credits so the return on your investment continues after your purchase.



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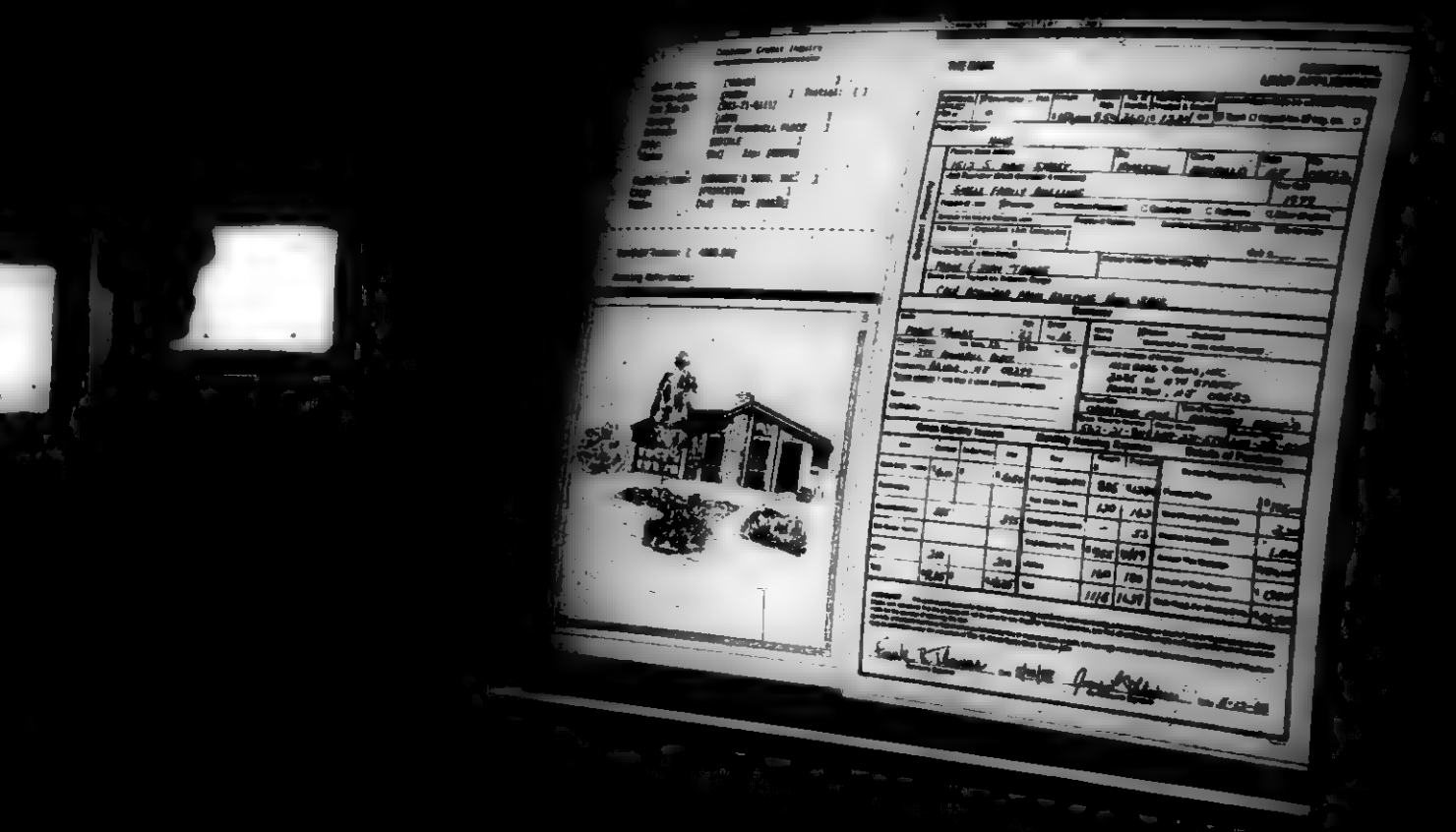

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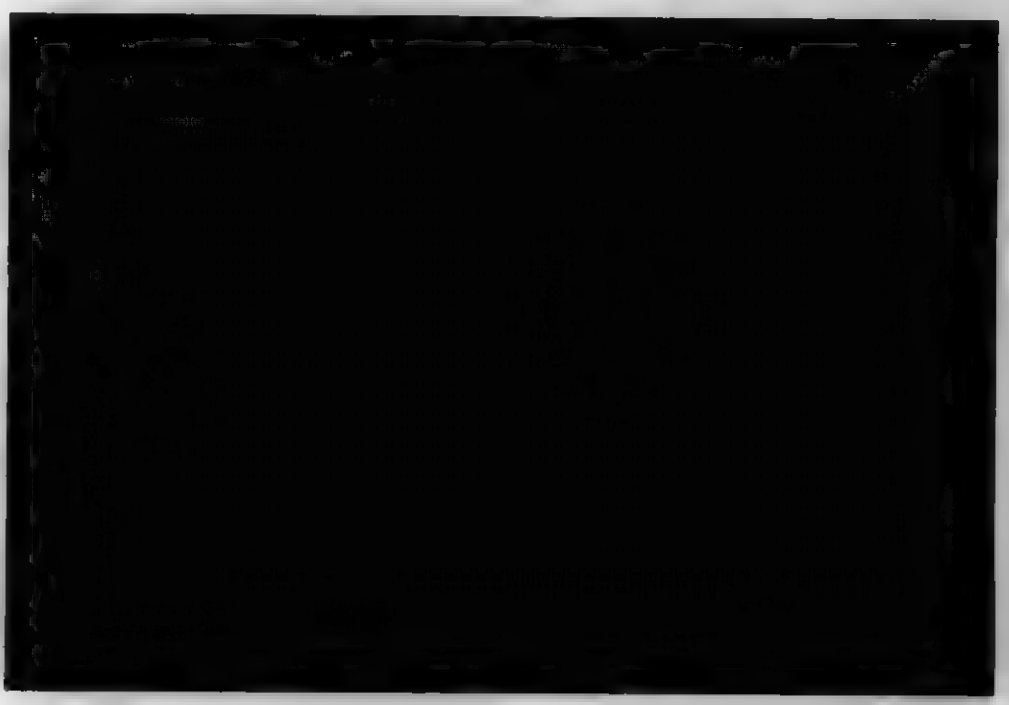
Connecting DEC and IBM without ruffling feathers

BY GLENN RIFKIN



STEVE EDDINS

After more than 100 years of ringing America's doorbells, Avon Products, Inc., the $3 billion cosmetics giant, discovered that the cosmetics industry had grown mature and gone flat. A face-lift was in order: diversify. By 1986, Avon had acquired the prestigious jeweler Tiffany & Co. and medical supply company Mallinckrout, and later sold both ventures and got into the home health care business, nursing homes, catalog clothing sales and retail cosmetics.

The diversification created a complex computing environment for Avon, which had grown used to an IBM batch processing world. The company, during the past dozen years, had brought in Digital Equipment Corp. machines for shipping and warehouse management, but the two environments had little need for interaction. According to Frank Giannantonio, Avon's director of corporate MIS, an order that came in through the IBM system would be teleprocessed to a DEC VAX in shipping, and the VAX would ensure that the order got processed and shipped within 24 hours.

Other than that connection, the DEC and IBM worlds were separate islands within the company. But that division of labor has changed dramatically. Avon restructured its MIS department in 1986, creating technical bridges between IBM and DEC.

The latest trend

Avon's DEC-IBM integration simply reflects the latest trend. The integration of both vendors is in various stages of implementation in other Fortune 1,000 companies around the country, and the task has raised many questions for MIS.

DEC's growth during the past decade has brought the Maynard, Mass.-based computer maker into a variety of Fortune 1,000 environments in which IBM has long been the master. As DEC's departmental VAX solution — a seamless connection across the entire product line — fueled stunning growth in the last three years, MIS managers began to hear a cry to tie DEC into the IBM mainframe in the data center. The IBM Personal Computer on the desk top also begged to be tied into this three-tiered model of host, departmental and desktop solutions.

For many MIS managers, the merging of the two environments opens a Pandora's box of issues:

- Are there clean, implementable, technical solutions to the integration question?
- Are there in-house experts available to address those technical questions or should a systems integrator be brought in?
- Both vendors claim a commitment to emerging Open Systems Interconnect (OSI) standards, but can a company afford to wait for both DEC and IBM to reach all seven layers of the model?
- In many cases, an interim solution to a connection problem has been implemented. Should companies now wait for OSI or put in a second interim solution?
- How do firms effectively merge the two very different cultures without ruffling feathers and losing good people?
- Should organizations stick primarily with DEC and IBM or work with third-party vendors for their solutions?
- How will the clamor over Unix affect everything a company is doing?

The list goes on, and MIS heads pound as users demand transparent hooks between DEC and IBM at a variety of levels. Most of all, hype must be separated from reality.

"Most companies have to take a very practical look at why they are integrating their data," says Irv Shapiro, president of Irv Shapiro & Associates, Ltd., a systems integrator in Skokie, Ill. "Not all data needs to be integrated, and not all data needs to be accessible from every terminal. There's a fine line between

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Rifkin is a *Computerworld* senior editor.

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Connecting

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need and desire. And MIS needs to make good, clear business decisions about when it is something you desire because you read about it and when it's something you need because it's going to help your organization. This puts MIS under enormous pressure," Shapiro adds.

The business need

At Avon, the business need for integration was clear. In 1982, Avon chose DEC's All-In-1 package for office automation, and DEC crossed over into the corporate side of the picture. When the company's changing business focus caused the 1986 restructuring, MIS became a corporate function with a small 17-member staff and responsibility for decentralized data centers in the company's divisions. Suddenly, what had been a heavily service-oriented function became a significant business function. The group started with a clean slate and a mission: to provide leadership, innovation and a business attitude to MIS.

In an unusual move, Avon chose DEC rather than IBM as its main vendor for the corporate MIS function. Running a stepped-up IBM system would have required more people than running a DEC shop, and Avon wanted to keep the group lean. Giannantonio saw that integrating the IBM and DEC worlds was essential to the plan's success.

Today, Avon uses DEC Vaxclusters tied together by thin-wire Ethernet local-area networks, along with its IBM mainframes, to run the business. Corporatewide links were necessary to make the system work. In addition, Giannantonio is building an executive information system in corporate headquarters based on the VAX.

In order to link to the IBM world, Avon employed SNA Gateways from DEC and a bevy of third-party software offerings from Oracle Corp., Pilot Executive Software and others. Giannantonio was not intimidated by the task of integrating IBM and DEC technically. The harder task, he says, was to find the right people to run the show. "The staffing profile in a multivendor shop is different than in an all-Big Blue shop," Giannantonio says. Consulting skills were also paramount in order to make clear the corporate MIS mission.

Giannantonio realizes the complexities of the environment he has created. But he says it was a road well taken. Relying on more than one vendor increases flexibility, provides a wider range of computing solutions and develops a top-notch staff. "You come to appreciate the value of both vendors," he says. "The benefits far outweigh the risks."

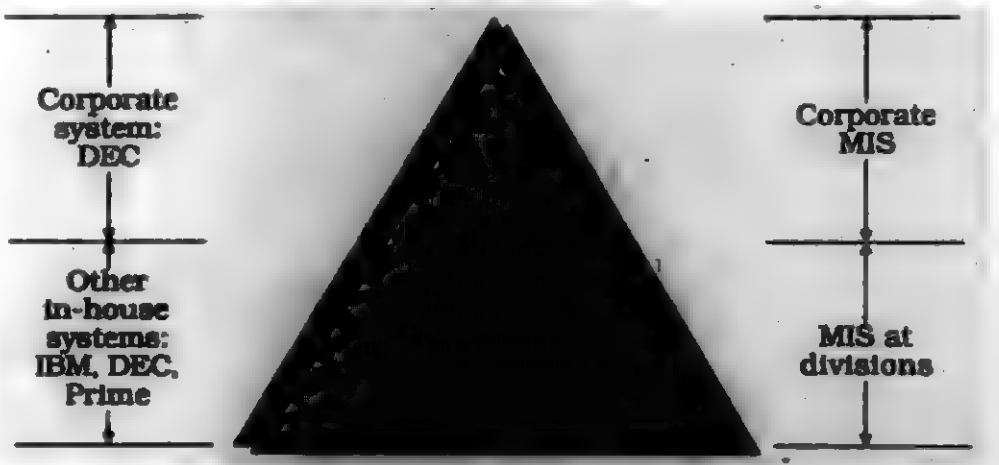
Who's on first?

As MIS wades into the integration waters, the risks become more apparent. Knowing whom to believe is the first risk. DEC claims it has been bringing out IBM interconnect tools for the past 20 years. IBM traditionally declined to participate in the interconnect game, believing itself to be the sun in the computing solar system and that it was up to the other planets to figure out ways to hook to it. But after a few years of tough times,

Continued on page 90

Multivendor computing at Avon

When Avon restructured its corporate MIS department in 1986, it chose DEC to provide the corporate system with a mandate to hook to all other in-house systems



INFORMATION PROVIDED BY AVON PRODUCTS, INC.

Walking the tightrope between DEC and IBM

BY MARTY GRUHN

If attempting to integrate hardware and software from one computer supplier is hazardous, integrating systems from two or more major suppliers is worthy of battle pay. This is the conclusion reached based on recent surveys conducted by The Sierra Group of more than 2,100 MIS companies regarding their computer-related purchasing plans and issues that will reach critical proportions this year.

According to MIS managers, those attempting to interconnect systems from the industry's most prominent suppliers — IBM and Digital Equipment Corp. — face a doubly hard task. In these environments, MIS must balance between the short- and long-term agendas of two industry giants planning to do battle on the user's turf. MIS is challenged to interconnect a diverse range of systems and technologies that expands every month. Equally important, MIS must keep a watchful eye on the differing — and often conflicting — long-term directions of IBM and DEC.

Although the objectives of DEC and IBM users are strikingly similar when viewed as a whole (see chart below), companies that use equipment from both suppliers appear to have strikingly different priorities, if not unique problems and challenges. For these hardy pioneers, the challenge lies less in physically connecting DEC and IBM products than in making the systems useful to end users. Those on the battle lines report the following key issues and needs:

• **Improve after-installation support.** According to MIS managers who've been through it, interconnecting DEC and IBM systems places even more pressure on the quality and availability of after-sales support provided by all suppliers involved. The most commonly cited need was to improve the availability of personnel to answer technical questions.

• **Deliver systems more quickly.** Although delivery is a sore spot for most technology managers, this issue reaches critical proportions when companies attempt to interconnect large installed bases of systems. One user put it succinctly: "Real deliveries instead of vaporware and 18-month lead times." This desire was echoed by others who cited the need to improve responsiveness by delivering systems on a timely basis and meeting delivery commitments already made. Reading between the lines, the frustration of managers is clear. Long-term grandiose strategies may provide customers with a sense of the future, but glossy brochures do little to interconnect users.

• **Agree on standards.** While the catch phrase "industry standards" is in vogue, companies that interconnect DEC and IBM equipment appear to be less interested in whether or not these suppliers adhere to long-term evolutionary standards; they would appreciate it if both companies would agree on any deliverable standards at all.

• **Establish a common user interface.** Another hot issue is the common user interface. For those attempting to integrate IBM and DEC equipment, the need for a common interface represents a key component of their strategies to create a multivendor environment. While many would settle for DEC and IBM to each deliver an interface common to their own systems, many are looking beyond this toward interfaces that meld seamlessly with other vendors' interfaces.

• **Price software for real budgets.** Along with the battle cry for a common user interface comes the need for industry giants to price software so it can be purchased easily, preferably on a site or corporate basis. One MIS manager suggested the need for "site licenses — not site rip-offs." Others were more charitable in their quest for solutions to high software costs.

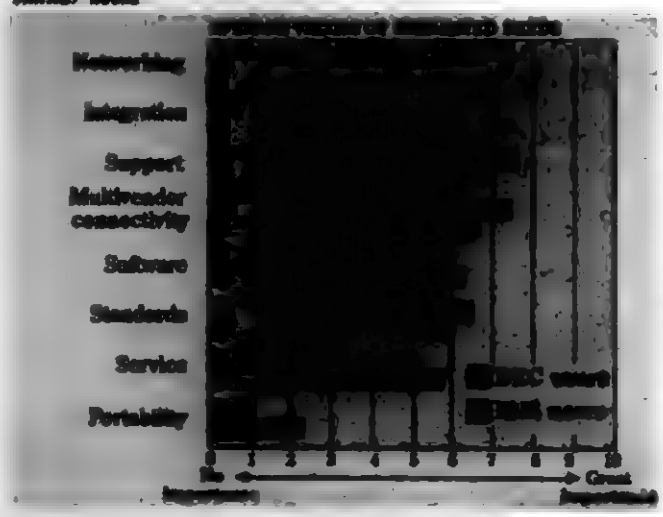
• **Solve the network management dilemma.** With the integration of multiple suppliers comes the problem of managing diverse networks and the desire to control this process through a single point. Most comments suggested vendors address network management issues in a multivendor environment rather than take the easier path of asking users to manage networks on a distributed basis. In fact, the need to improve networking was a common theme.

• **Quit fooling around with the personal computer.** Finally, a common theme of all users was the need for vendors to solve the incompatibility problems created by the advent of IBM's Personal System/2 and to make the integration of these systems a priority. While the disruptive effect of OS/2 and its derivatives on computing is obvious — one manager commented, "Quit fooling around with PC operating systems" — a more subtle, but equally important irritant surfaced: Incompatibilities between 3½- and 5¼-in. diskette drives are driving management and users crazy. •

Gruhn is vice-president of The Sierra Group, a consulting firm based in Tempe, Ariz.

What IBM and DEC users want

Despite different views of the world, DEC and IBM users have similar needs



INFORMATION PROVIDED BY THE SIERRA GROUP
CW CHART

Speaking out on connectivity

Not in the same room . . . but on the same page

The DEC and IBM spokesmen declined to speak with each other, so interviews were conducted separately.

Michael Gayowski is one of the few people at Digital Equipment Corp. with IBM on his business card. He is the company's IBM interconnect marketing manager, based in Merrimack, N.H., and he recently spoke with Senior Editor Glenn Rifkin about DEC-IBM integration.

Three years ago, the line that fueled DEC's growth was "DEC hooks into IBM better than IBM does." Does that still hold true?
It's true, due to the fact that a lot of IBM's announcements have just been directional statements. So a lot of what end users are dealing with has really not changed from a product-set standpoint. There have been [IBM] product announcements that have been three years in deliverability. From the standpoint of connecting into IBM, Digital connects very well in terms of cross-

BRUCE GILDE

DEC's Gayowski

product consistency, scaling and protection of investment in users' existing data processing equipment.

From a personal computer integration standpoint, we can make IBM products full members of a Digital environment in which the PC goes through any of our transports and connects back into IBM through DOS VSE, MVS or VM. We have a consistent user interface as well as a consistent programming interface, plus the ability to have cross communications with other remote systems. Digital, in fact, takes it for granted. We probably need to articulate it more.

IBM has started to play up Systems Application Architecture [SAA] as an answer to what DEC has been doing. Will SAA blunt DEC's advantage?
Digital has an advantage in that we addressed this cross-product consistency years ago. We are now taking data processing into its next level of distributed processing. Users now have the opportunity of taking advantage of applications that are based on network resources, such as our Decnet Systems Services, which make the system the network. That's the next level. It all goes back to the basic philosophies when the companies introduced their architectures — [IBM's] was hierarchical; ours was peer-to-peer.

The sense is that IBM is starting to get its act together, and users are saying, "Maybe we'll wait and see." What is your reaction?
The product sets we have in place already offer the same functionality. If you look at it from the standpoint of the problems SAA is trying to address, they were never problems Digital had. There are not multiple architectures. There are no problems based on programming interfaces. Decnet is consistent across each of the packages. From the standpoint of the user interface, Digital has worked closely with X Windows out of MIT's Project Athena, and out of that is our superset that builds on top of X Windows, called DEC Windows. A lot of users are saying, "We need our competitive edge now, we need to maintain the edge in our industry today." They can't afford to wait and see. There's also a lot of proprietaryness wrapped in SAA.

But there is a lot that is proprietary about your solutions as well.
Yes, if you look at us up to Decnet Phase Four in 1982, that was the case. Decnet Phase Five is actually referred to as Decnet/OSI just to show that what we are going to be doing is not just building gateways to an Open Systems Interconnect [OSI] arena but making Decnet OSI-compliant. Right now, we are compliant to Layer Four, and we have a module that runs on Layer Seven that we call X.400 mail services.

Last month, Ken Olsen shared a stage with John Akers and other industry leaders creating a controversial challenge on the Unix issue. How does that fit into your message?
Within a Decnet environment, we have Decnet Ultrix, which allows an Ultrix system on a local-area network to take advantage of resources that the LAN has. Off the LAN, we have VAX systems and Microvaxes, and we also have Ultrix systems. As our users start requesting more and more services to be built onto the Ultrix platform, we are constantly aware of what our customers' needs are. If that need should actually force us to bring additional access routines, they will have that same level of opportunity.

Does this interest in Unix potentially negate your advantage?
What separates the vendors is the added value they bring to a network.

What about users in other environments?
There are a lot of environments that use TCP/IP. End users do ask, "Should I develop my applications for an interim step or should I plan for OSI?" That's the question. Because in some environments they are saying, "I don't want to

Continued on page 88

Bob Anderson is manager of telecommunications software product management in IBM's U.S. marketing and services group, based in White Plains, N.Y. Anderson recently spoke with Senior Editor Glenn Rifkin about IBM's view of the world of IBM-DEC integration. Anderson declined to speak specifically about Digital Equipment Corp. but addressed IBM's views of a multivendor environment in general.

In sites where IBM equipment coexists with DEC, what requirements are you hearing most from your customers in terms of connectivity?
We regard multivendor connectivity as one of our top customer requirements. That has a number of facets, depending on the particular application. We've announced and made available Transmission Control Protocol/Internet Protocol [TCP/IP] with VM, and I expect there will be additional requirements for expanded support for TCP/IP. We have a product called the 8232 protocol converter that provides that kind of support for TCP/IP for Ethernet connections.

We also have a formal marketing arrangement — IMAP [Industry Marketing Assistance Program] — and relationships with several companies from the outside that have fairly intensive offerings in the area of multivendor connectivity.

What that means is our marketing teams, when a customer comes to them with a problem with multivendor connectivity, if necessary can call these folks in and work with them on the customer's problem.

BRUCE GILDE

IBM's Anderson

Is there some sense, though, that for these customers, third-party solutions tend to be interim solutions and the customers are looking more for standards?
Absolutely. There is a great deal of hope and excitement on a lot of our customers' parts for the promise Open Systems Interconnect [OSI] brings as a standard way of connecting a variety of vendors' products together. OSI is clearly IBM's strategic direction for interoperability among our systems and others. However, the rollout of products in that area across all the vendors will take time.

We have customers who have connectivity problems today. For those people, a TCP/IP solution, an IMAP solution and an IBM product like the 8232 or the 3708 protocol converter are solutions available today.

For the customer who can afford to wait for the availability of the strategic solutions of the future, OSI is certainly the direction IBM is taking.

Your enthusiasm for OSI somewhat surprises me, since some people in the industry think IBM is lukewarm on OSI and it's not going to happen anytime soon.
We have made and are making substantial investments in OSI. We have several products announced and available in Europe; we have had several different demonstrations with other vendors at the Hannover Industrial Faire and the Enterprise Networking Event this month — we were a part of an extended interoperability demonstration at that event. Frankly, the demand for our product in the U.S. has not been as great as in Europe. I should say that we're seeing that demand increasing, and we intend to respond to that.

Is that X.400, for example?
X.400 is the predominant one.

That is not being sold in the U.S. today?
No.

When will that be sold here, do you think?
I really don't want to comment on our product plans, but we plan to have OSI solutions available in a timely manner. When the demand is sufficient, we'll bring it to the U.S. marketplace.

IBM is extremely committed to Systems Network Architecture [SNA]. How does this fit in with the OSI direction?
There are two points that I think are important to make. The first one is in the area of multivendor connectivity. We have opened up over a period of years many of our SNA architectural connection points — LU6.2, PU2.1 being the obvious examples — and many vendors have responded to that. There are in excess of 20 vendors in the U.S. today that have, for example, announced support for LU6.2. We also provide a test facility where a vendor or customer who is implementing connectivity into our systems using LU6.2 can test their systems against the same set of tests we use internally for our product.

The second part of that is the position of SNA and our OSI plans. OSI will be the strategic vehicle we will settle on for multivendor connectivity. SNA will continue to be the connectivity solution of choice for communications among IBM systems.

DEC has offered several key products in terms of SNA gate-

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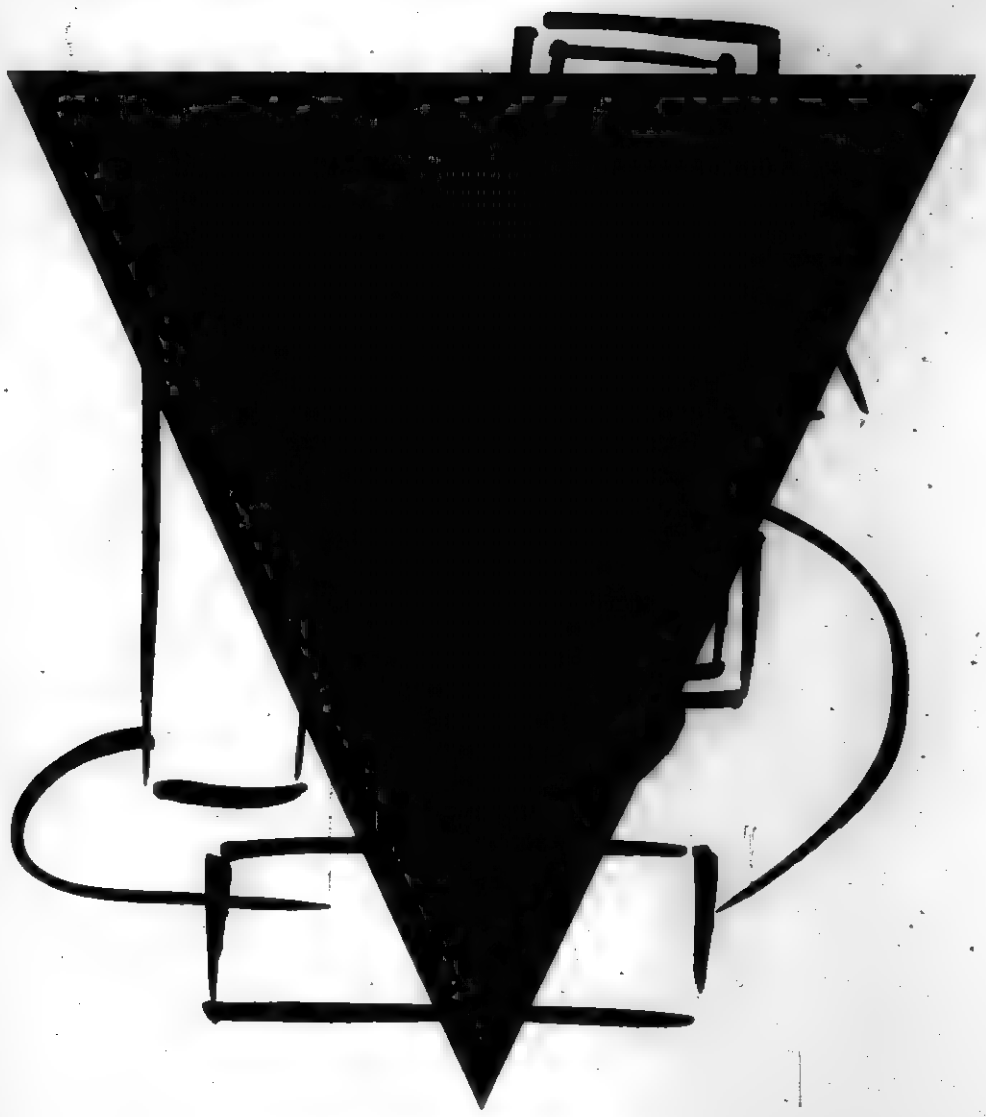

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DEC

CONTINUED FROM PAGE 85

go with a proprietary architecture, I don't want to write all my applications under an SNA or SAA umbrella. Presentation services should be done by X Windows or an international standard at the presentation layer, not built around a proprietary architecture that reflects a hardware investment in order to maintain that user interface. Right now, users need to be reaffirmed that OSI is real, and OSI is here.

When you talk to customers, what type of integration are they asking for the most?
From an IBM interconnect standpoint, they were looking for connectivity back in '82. We had built our IBM Decnet/SNA Gateway, and we did offer them terminal emulation. As we moved further, in 1984 came the support of IBM's Disoss. Digital was the first vendor to add the next level, which we referred to as interoperability; the ability to access information reliably from another environment.

So somebody, for example, in a DEC All-In-1 environment can create a word processing document, send that document over to the IBM mainframe where it then becomes the network that provides the translations from Digital's format into IBM's format, which is Document Content Architecture. It also handles the rules and regulations to get it up there, which IBM refers to as LU6.2.

And IBM offers nothing for DEC users in that vein?
Right. They rely on third parties. Maybe that will change.

What about electronic mail?
Our recent Mailbus offering allows for mail to [originate] on a Digital machine within multiple IBM environments without end users on any of the other systems having to relearn another mail environment.

What are you finding that customers want, their big need, that you have not yet provided?
A lot of our end users would like to stop making DP decisions on nonstandard networking topologies. A lot of companies are in business, not for purchasing DP equipment but for meeting their own bottom line. The bottom line has been the focus of this last economic turn since back in October. They've really focused their DP budgets to be more cognizant of what is being spent. So we are being asked continually to look at nonstrategic IBM interconnect solutions, where IBM has stated that they would not be taking that product set into SAA. And then users ask us to provide solutions for that market segment.

What about DEC's lack of a PC? Why does that keep coming up?
In most business decisions, sometimes you are asked to have a single vendor for total DP needs. It's in the area of PCs that users are still asking Digital to provide that added value, taking a PC platform and making it a Digital-supplied product. As the end user looks at requests of workstation platforms, especially where added value is dependent on the uniqueness of that workstation, there will be users who will request that that device take advantage of Digital's networking philosophy or OSI migration.

Is this where the third parties will be able to thrive?
Yes. From the standpoint of workstation connectivity, third parties will be able to offer solutions outside of what Digital offers today. Workstation connectivity is very strong from a Digital into an IBM host side. Coming from the IBM side back onto the VAX side is where people want more solutions.

One suggestion about how to deal with IBM-DEC integration is get an IBM sales representative and a DEC sales rep in the same room and work this out together. Is DEC willing to sit in a room with IBM and an MIS manager?
I've never been in an environment where they brought both players to the table at the same time. I would have no fear of trying to sit down and work with a DP firm based on a multivendor environment. I've got the battle wounds of trying to address a multivendor environment.

The bloom seems to be falling off the rose for DEC, especially now that IBM seems to be coming around saying, "We didn't do it right the first time, but we're going to do it right now." What's your biggest challenge?
I don't think the petals have fallen off the rose. We don't have to make any architectural changes to polish that rose. Everything has been put in place today to allow us to grow into an enterprise network and be an enterprise network provider. But how are we going to polish up the rose and make Digital shine again? From a hardware architecture standpoint and from VMS, we've been doing very well. I don't think that portion of Digital needs to be shined. From the standpoint of internetworking communications, we told the world at Decworld last September that we would be taking out the proprietary architecture and opening it up and making it nonproprietary. From the standpoint of IBM interconnection, we are constantly providing the services and needs that our end users have been requesting, and in the next round, it will be in the area of transports. We will be providing faster and higher throughput connections. ●

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IBM

FROM PAGE 85

ways and commitments to LU6.2 and PU2.1 to try to bridge that gap. Has IBM done anything to go in the other direction specifically in that way?
The 8232 protocol converter and our 9370 support for Ethernet are certainly a couple of key examples of places where we've offered that kind of support. We have — and some people don't notice it — a very extensive array of X.25 support in our product line. Most of our products have native X.25 adapters available on them.

We offer for our SNA network two important products — the Network Packet-Switching Interface, which allows an SNA application to use an X.25 network for communications or to deal with an X.25 DCE on the other end of the connection. We also offer a product that is well accepted and very exciting to our customers, and that's the SNA X.25 interconnect product, which we announced the program product version of in January.

This product will allow our customers to use their SNA networks as a backbone for X.25. For instance, a customer could take a network of other vendors' equipment that supports X.25 today, run that on an IBM SNA backbone network that they've invested in and support and manage that under the control of Netview, our network management tool.

One of the things DEC has been making a nice living off of in the last few years is the claim that they hook into IBM better than IBM does. Do you have a response to customers who ask about that?
First off, I want to say categorically that no one connects to IBM better than IBM does. Second, I believe that we have a range of multivendor connectivity offerings available for our customers that are as rich as anyone in the industry.

Can you elaborate on that?
We have integration capability with our complex systems group, and we will go in and look at and work with the customer and with other vendors on any particular connectivity problems when necessary.

We have, to support our sales force, a connectivity lab in Raleigh, N.C., where if there is a particular situation where they need to test out or demonstrate that a certain type of connectivity with those products works, that helps us solve the customer's problem.

How will Systems Application Architecture (SAA) fit in all of this?
SAA will certainly need to deal with the multivendor environment.

Doesn't this add another level of confusion for the customer?
The requirements for SAA in the area of multivendor connectivity are also being considered.

At a recent conference, a customer said, "DEC is easy to get out of but hard to get into; IBM is easy to get into but hard to get out of." How do you respond to that?
As evidenced by a number of the product offerings I've covered with you, we are working very hard to solve customer problems of connecting our systems to others. Today we have a very healthy array of solutions, and I expect you will see us continue to focus on that.

TCP/IP is a 20-year-old technology. Does it surprise you that it retains this popularity and that IBM is relying on it so heavily at this point?
The reason we're responding to our customers in the area of TCP/IP is that the long-term strategic solution, OSI, is still a ways away. TCP/IP has a very wide following in government and the academic community, and we're seeing increasing interest in it from those customers who need solutions today in the commercial environment. That's the reason we're responding in that area. ●

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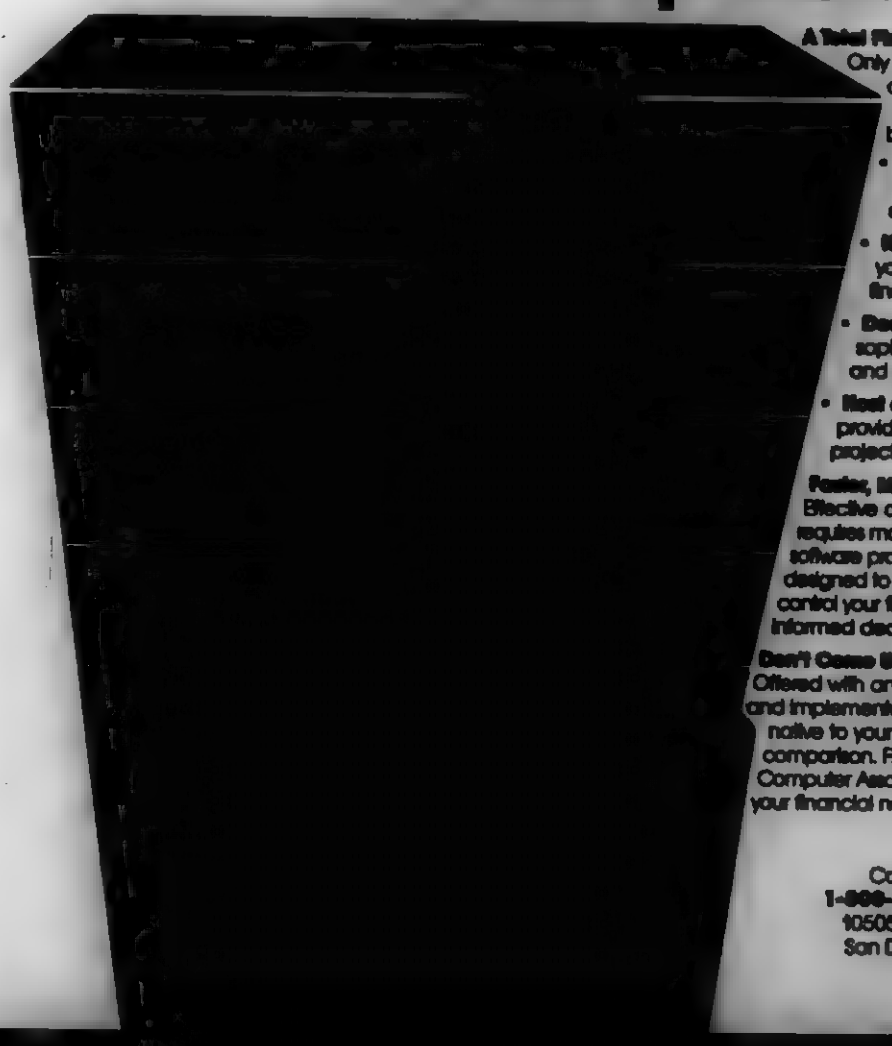

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Connecting

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brought on principally by DEC's success in hooking into IBM and offering a cohesive architecture, IBM has softened a bit.

While DEC pushes hard toward OSI standards, IBM moves more slowly in that direction. It is content to retain and build on its Systems Network Architecture (SNA) model and add such wrinkles as Systems Application Architecture (SAA) and OS/2 to the picture. Competitors have no choice but to find ways into

Chemical Bank's Baer

the IBM universe via open standards interconnects, proprietary connections and third-party software offerings.

Adding to the confusion is the presence of Transmission Control Protocol/Internet Protocol (TCP/IP), the protocol from the U.S. Department of Defense that connects an estimated 20,000 computers at government research laboratories and universities throughout the U.S. and encompasses thousands of networks here and abroad. This connection protocol is growing in popularity as the wait for OSI continues, and IBM has put its imprimatur on TCP/IP as an interim solution, according to Bob Anderson, manager of telecommunications software product management in IBM's U.S. marketing and services group.

Integrating DEC and IBM environments, therefore, is a complex problem. Connections can be made on a variety of levels, depending on the user need and application desired, but a fully integrated, seamless melding of the two environments is virtually unattainable except by the most sophisticated and well-financed companies.

For example . . .

Du Pont Co. in Wilmington, Del., and Chemical Bank in New York have implemented innovative and successful integration plans. Jay Wertman, an MIS senior specialist at Du Pont's Charlotte, N.C., facility, explains that the company has an electronic mail network that hooks together more than 30,000 DEC users and 12,000 IBM Professional Office System (Profs) users in Du Pont facilities nationwide.

With the second largest Decnet network — only DEC itself has a larger one — Du Pont has furnished E-mail interconnects using third-party offerings from Joiner Associates, Inc., Interlink Computer Sciences, Inc. and Soft-Switch, Inc. The company also worked closely with DEC to create the network. "It's very seamless. A Profs user addresses a DEC user exactly as if it were a Profs user," Wertman says. The system, however, was costly and technically difficult to install, requiring a lot of homegrown code to customize the connections. Du Pont has also used DEC's Decnet/SNA Gateway product to support terminal emulation sessions going from VAX to IBM applications running under CICS, TSO and IMS.

Chemical Bank's Rosemary Verrechio Baer, vice-president of on-line systems planning, points out that the retail side of the bank has a large DEC-to-IBM interconnect project under way in which two Ethernet networks are clustered with two VAX 8550s to create a single LAN with 400 intelligent workstations hooked into it. "As far as LAN interconnects to IBM environments are concerned, we probably have one of the largest, if not the largest, in the marketplace," Baer says.

The VAXs are running datastream code that maintains LU2 3270-type sessions going out through gateways into the IBM environment. The unique aspect of this setup is that users at the workstations do not have to flip out of the mode of intelligent workstation and into a dumb terminal mode to acquire IBM-based data. To the user, it is irrelevent whether the data is on the workstation, LAN or host.

Baer says the design and development was done with DEC's help and New Software Corp.'s Prism software. "It's a matter of creating a management environment that allows you to proceed," Baer says. Chemical's forays into DEC-to-IBM connections "have given us a technological growth platform that is fairly unlimited and puts us about three to five years ahead of other people in the industry."

But not every MIS shop is given the support for such ambitious projects. And many who have tried question the feasibility and necessity for transparency. "The most common trend is that people want the integration to be completely transparent to end users, and they are surprised to find the tools aren't there yet," Shapiro says. "This is a nontrivial technical problem."

"The whole business of transparency and seamlessness is garbage," adds Frank Dzubeck, president of Communications Network Architects, a consulting firm in Washington, D.C. "I've never seen one that is 100% clean. There's always a ripple someplace you've got to take care of."

The integration problem has received various treatments, depending on the corporate environment. In most shops, according to Larry DeBoever, president of DeBoever & Associates, Inc. in Acton, Mass., "It is an accomplishment just to get MIS to agree to put VAXs and IBM in the same room."

Traditional IBM MIS shops are not thrilled with the DEC

Stacking up against OSI

The future version of DEC's Digital Network Architecture, currently complete through Level 4, will adhere more closely to the ISO's OSI model than does DNA Phase IV or IBM's SNA

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Data flow control	5. Session layer	Decnet session control	OSI session
Transmission control			
Path control	4. Transport layer	Common transport interface Decnet transport	OSI transport
	3. Network layer	• ISO connectionless service • ISO connection-oriented service (over CCITT X.25) • ISO routing protocol	
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insurgence, and this clash of cultures is among the biggest obstacles to the successful integration of the two vendors. DeBoever describes what a customer once told him: "Both sides — DEC and IBM systems professionals — are like different sects of Shi'ite Muslims. They are each convinced they are right and don't want to talk about it."

Avon's Giannantonio points out that the professional biases run deep. During Avon's move to DEC in the corporate MIS department, a top systems software programmer came to Giannantonio asking for a change of venue so he could stop a two-hour daily commute to Avon's Rye, N.Y., data center. "We'd love to have you," Giannantonio told him. "But you'll need to learn the DEC system."

"No way," the programmer replied. "I don't want to lose my technical edge."

More daring MIS professionals are embracing rather than rejecting the new challenge. Those who master both DEC and IBM possess extremely valuable resumes, according to systems integrators.

Like beauty, integration is often in the eye of the beholder. There are, according to DeBoever, nine levels of DEC-IBM integration that an MIS shop needs to consider, ranging from the mundane to the nearly impossible. In a recent survey of MIS managers and third-party suppliers, DeBoever found that the following requirements must be met to fulfill true and total integration:

Communications Network's Dasbach

- Cross-system terminal access — VAX to IBM. The most common form of DEC-IBM connections.
- Cross-system terminal access — IBM to DEC. Only a few shops are doing this kind of integration, simply because there are only a few tools available.
- File transfer between systems. DEC offers Decnet-DOS access from IBM PCs into a Decnet network. Third-party offerings are also available.
- High-speed bulk file transfer. For those with serious throughput needs, basic file transfer is not adequate, so there is urgency for this requirement today.
- Data base extraction and subset transfer. DeBoever predicts this to be a hot topic in 1989. Currently, there are few tools available to allow for data base extraction and transfer.
- Distributed data base management. Few shops are doing this now. Oracle, Relational Technology, Inc. and Cullinet Software, Inc. — at the VAX level — have products in this area, and more are coming.
- Peripheral device sharing. Users say, "I don't want to buy DEC storage devices, I want to access my IBM disk drive from my VAX."
- E-mail and document interchange. The requirement with the highest urgency among those surveyed. "This is user-driven," DeBoever says. DEC is committed to the OSI X.400 standard in the long run. IBM is only selling X.400 in Europe, claiming there is not enough demand in the U.S.
- Distributed application development. There aren't many options in this area; TCP is the only reliable option now.

Even the most sophisticated MIS shops have not solved all of the integration requirements as of yet. And those that have done the most have utilized a variety of solutions from different sources. Third-party vendors align themselves like pilot fish to the big whales through Cooperative Marketing Partner agreements with DEC and Industry Marketing Assistance Program agreements with IBM. Joiner Associates provides software for network job-entry applications between DEC and IBM environments. "We find our business coming from existing stand-alone systems and, more frequently, existing networks where these networks have just been passing like ships in the night. But those networks are growing bigger and thus colliding, and all of a sudden, consciousness is raised that they need to be attached together," says Stephen Arnold, Joiner's product manager.

> "A CUSTOMER ONCE told me that both sides — DEC and IBM systems professionals — are like different sects of Shi'ite Muslims. They are each convinced they are right and don't want to talk about it."
>
> LARRY DEBOEVER
> DEBOEVER & ASSOCIATES, INC.

In the long run, many users prefer the uncomplicated life of dealing with as few vendors as possible. "We've used third-party products when nothing else was available, but our preferred route is to use the primary vendor's product," says one MIS manager at a large corporate shop. "As DEC and IBM bring out products that suit our needs, we will convert to them."

For most MIS shops facing the question of how to tie DEC and IBM together, the task is to puzzle out whether a custom solution with the help of outside consultants, third-party suppliers and systems

Continued on page 94

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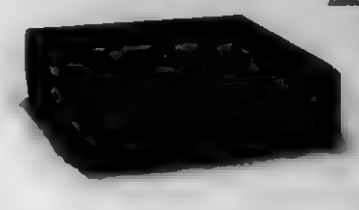

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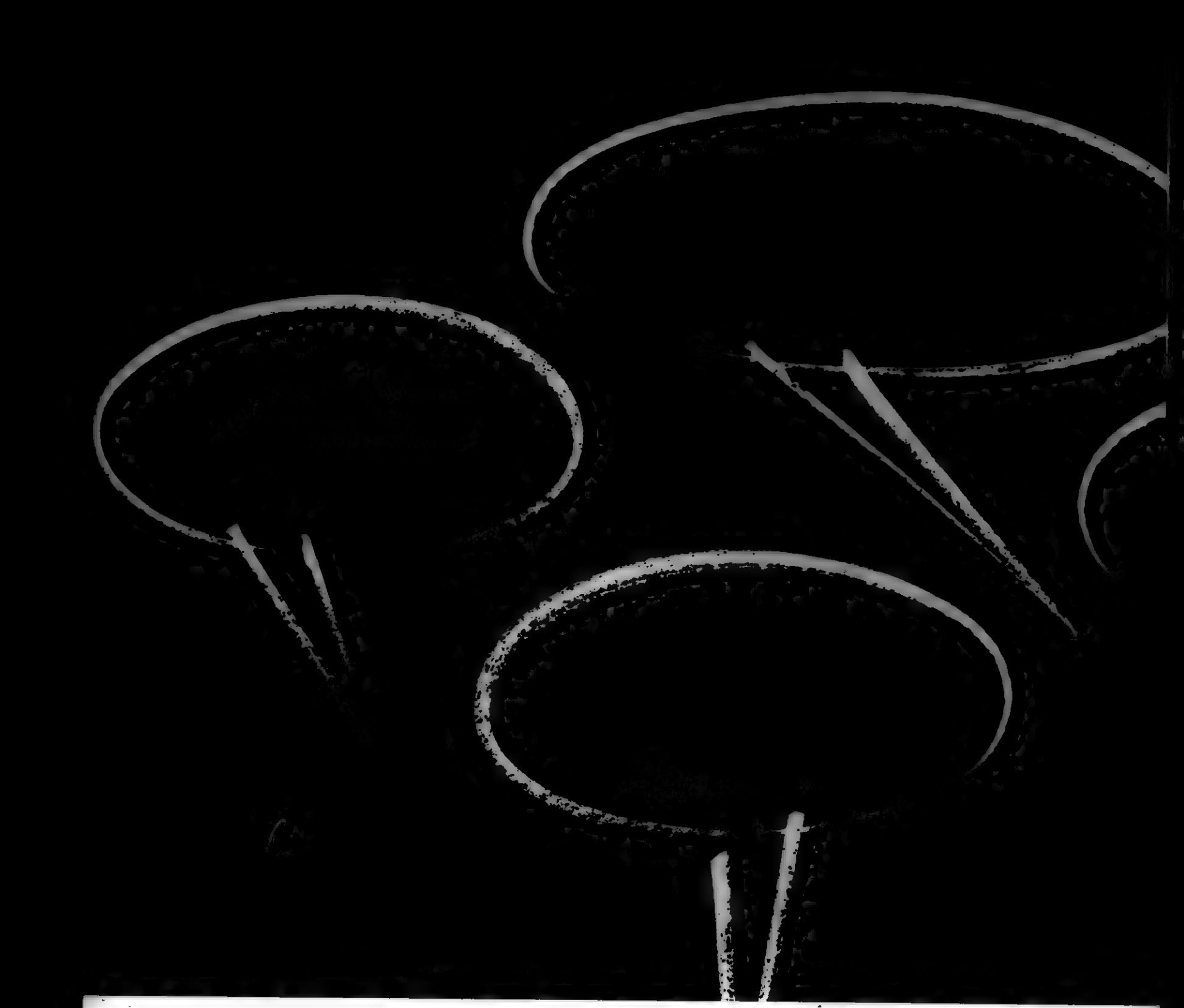

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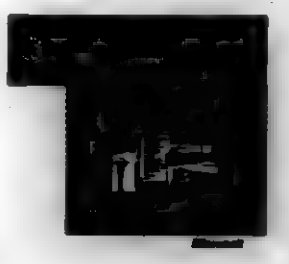

Microsoft Windows Software Development Kit.

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Connecting

CONTINUED FROM PAGE 91

integrators is worth the high price. Or is it better to wait for DEC and IBM to come to some standards agreements?

The answer to the latter question is an unequivocal no in MIS shops that are being pushed today to provide a competitive edge for the company. Waiting for an unknown development in an unstated time frame by an industry as volatile and competitive as computing is tantamount to a death wish. MIS shops watch in wonder as the leading vendors cry for standards and then seemingly do everything possible to obstruct them. The recent confrontation between warring Unix factions — AT&T-Sun Microsystems, Inc. vs. IBM-DEC-Hewlett-Packard Co. and others — illustrates the distance between marketing hype and reality in the reach for standards. IBM prefers to acknowledge TCP/IP, though that support is lukewarm, according to analysts. DEC is not anxious to support TCP/IP, preferring to go directly to OSI. The MIS manager can only scratch his head and wait.

Adding to the confusion is the sheer size and power of IBM in this scenario. For instance, IBM announced its SAA plan last year as a common application protocol for IBM products to talk over networks, and suddenly the rest of the industry had to stop and take notice of the implications of SAA. Under the architecture, IBM hopes to deliver a common communications facility, user-access method, programming interface and a set of common applications across three strategic processor families.

This influence makes it difficult for other vendors and MIS managers to commit to certain standards. Until IBM embraces a concept, it barely breathes.

"IBM talks a lot about OSI and then implements their SNA proprietary architecture," consultant Shapiro says. "It will be a long time before you see real OSI functionality from IBM. DEC is aggressively pursuing OSI, but there's a lot of code to be written. It's a good two years away in the DEC space also.

"What people fail to realize in the integration process is that data communica-

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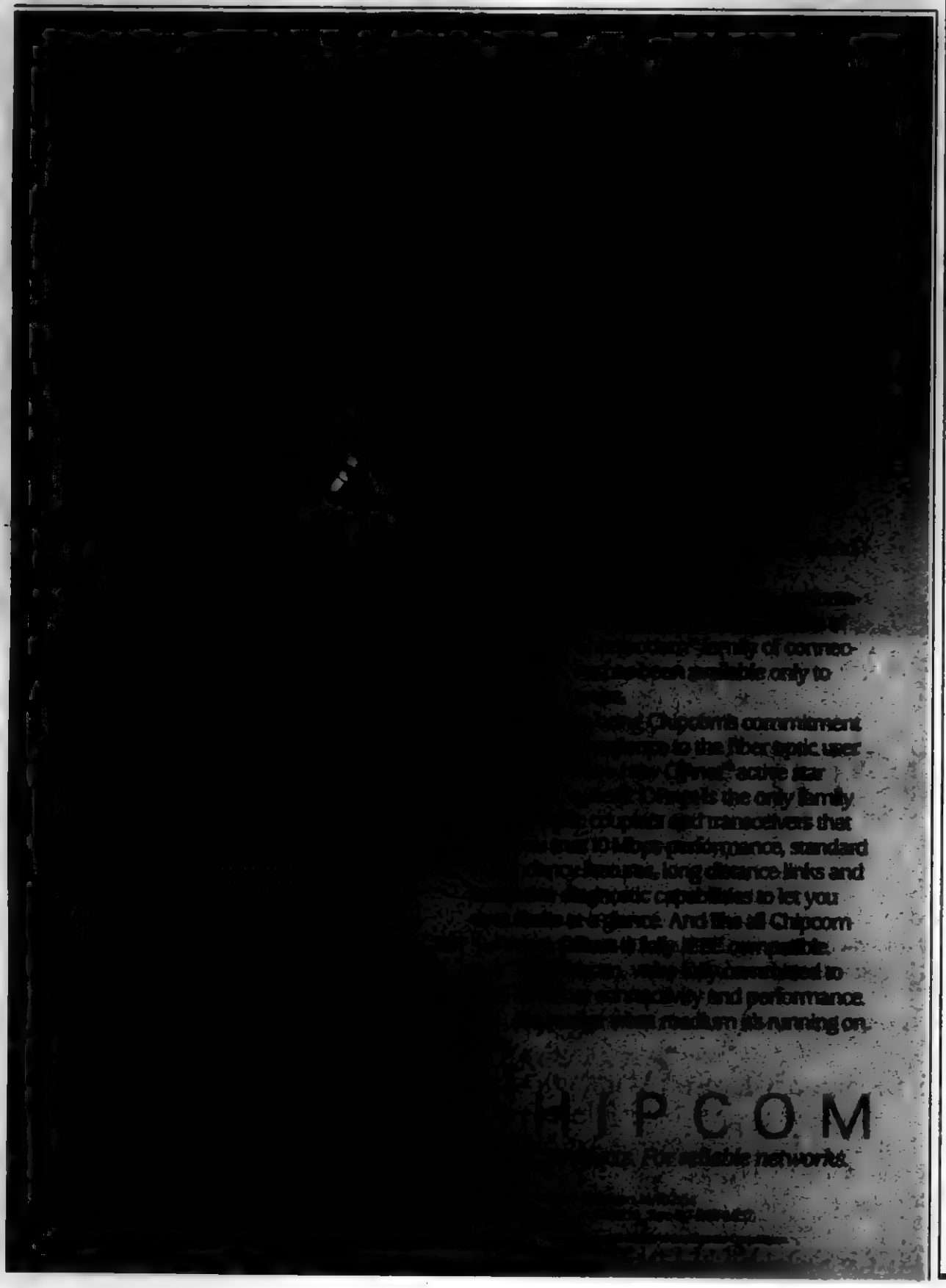

Third-party market

Dozens of third-party hardware and software vendors have jumped into the DEC-IBM integration market with a variety of offerings. The following is a sample of the many companies and their products:

New Software Corp., North Attleboro, Mass.: Prism, software applications package that controls the integration of data elements or work units between Digital Equipment Corp. and IBM.

Joiner Associates, Inc., Madison, Wis.: Jnet, software package that provides network job-entry system creating links from DEC's VAX into IBM.

Mitek Systems Corp., Carrollton, Texas: Product group that allows IBM to communicate with DEC and other vendors via an Ethernet or Decnet Transmission Control Protocol/Internet Protocol (TCP/IP) network.

Informix Software, Inc., Menlo Park, Calif.: Decnet-DOS, relational data base management system product for hooking IBM Personal Computers to the VAX.

Interlink Computer Sciences, Inc., Fremont, Calif.: Variety of VAX-to-IBM communications packages, including a DEC Microvax-based channel-attached gateway linking IBM mainframes and Decnet networks.

DB/Access, Inc., Cupertino, Calif.: Access/Star, an integrated, multivendor distributed data extract and delivery system for end users and application developers.

Communications Research Group, Inc., Baton Rouge, La.: Blast, a file-transfer software link that uses standard dial-up phones and networks. Provides data transfer using a Synchronous Data Link Control-like full-duplex protocol.

Flexlink International Corp., Renton, Wash.: Flexlink, software that links dissimilar operating systems and computers using a variety of I/O interconnect hardware.

Advanced Computer Communications, Santa Barbara, Calif.: Access/MVS, implements the TCP/IP protocol suite for IBM mainframes, allowing VAX-to-IBM connectivity.

Soft-Switch, Inc., Wayne, Pa.: Offers distributed gateway software for transparent interconnection of multivendor electronic mail systems.

Connecting

CONTINUING FROM PAGE 94

tions is a very small piece of it," he adds. "Data integration is a bigger piece, and that causes a lot of problems."

And while DEC may be more innovative in providing links to IBM than virtually any other major vendor, it is not operating in an altruistic mode either. Ken Olsen's open criticism of such standards attempts as Manufacturing Automation Protocol and Unix makes it clear that DEC hopes to perpetuate its proprietary VAX/VMS world as long as it can.

Unlike IBM, which can let the world beat a path to its door, DEC recognized early on that connecting to IBM was critical. According to an International Data Corp. report on DEC networking, "The DEC game plan is to provide the industry's best IBM interconnection in an attempt to bait customers [if not already hooked] into the Decnet hemisphere. DEC is confident that if its Decnet networking implementation is laid side by side next to IBM's SNA, in the long run customers will eventually migrate to DEC."

UNLIKE IBM, which can let the world beat a path to its door, DEC recognized early on that connecting to IBM was critical.

The key offering from DEC in this regard is its Decnet/SNA Gateway, unveiled in 1982. Decnet/SNA is an Ethernet-based software and hardware solution that allows Decnet users to exchange information with users and applications on SNA-based systems. It is a network-to-network product as opposed to a single-function emulation between computers.

Gateways from DEC and third parties provide links between DEC's Digital Network Architecture into SNA, but gateways between protocols are not the true test; gateways between applications are crucial. Vendors are addressing this issue, but as the applications become more complex, the links are more difficult to achieve. For example, as OSI matures in the next few years, the integration of the mini and micro worlds will become relatively easy. But the mini- and micro-to-mainframe world is a tougher nut to crack and will, according to Shapiro, be gateway driven for "a long, long time."

Possible side effects

Consultants such as Doubeck point out the drawbacks of gateways. He says he believes the key issue in DEC-IBM integration is throughput and that any approach requiring a Decnet-to-SNA gateway is "architectural disembowelment."

"What happens is that in the process of tearing things apart and then putting them back together, you get throughput degradation — in the first implementation of the Decnet/SNA Gateway, you actually had a ratio that the best you could get out of a 56K-byte line was 9.6K bytes on the other side. That's pretty sad," he says. Doubeck points out that one antidote to the problem is putting channel connections on the IBM mainframe itself, but a lot of users are hesitant to put foreign devices on an IBM channel.

"The issue for the user is the different implementation approaches," Shapiro explains. "Somebody familiar with programming in an IBM network environment has a significantly different thought process than someone doing programming in a DEC environment. Therefore, when we go to integrate these two environments, we have to integrate the hardware, the software and the people. And it's integrating the people that sometimes is as complex as anything else."

For example, in an IBM environment today, it is very difficult to do program-to-program communications over the network. Yet, it is relatively easy to implement very restrictive security systems for terminal access. In the DEC world, conversely, it is easy to do program-to-program communications, but securing the network is more difficult, Shapiro says. Thus, trade-offs are necessary. DEC users typically take a lot for granted and are perplexed at the complexity of the IBM environment.

"DEC users think that it is too much work. 'Why should I have to regen my front end just to add another line?' they ask. The IBM person tells the DEC person, 'I'll schedule that for you next month.' The DEC person gets frustrated, and the IBM person can't understand the impertinence. And you have continued friction," Shapiro says.

Because of tradition, many companies have kept the DEC and IBM environments separated. When integration is initiated, often at the behest of end users, the two factions frequently are left to hash it out themselves. But the two serfdoms have no predisposition to cooperate; there has usually been little cross traffic between environments.

In the long run, cooperation is inevitable, whether willing or forced, simply because end users are demanding it and MIS is under the gun to produce. Large users such as Du Pont have realized the inevitability of the merging of the two worlds. "Among the Du Pont MIS people, there is widespread acceptance of DEC as a major player," Wertman says. "I can't speak for the IBM sales reps, but the Du Pont-IBM people are providing a great deal of cooperation. They know DEC is not going away." ●

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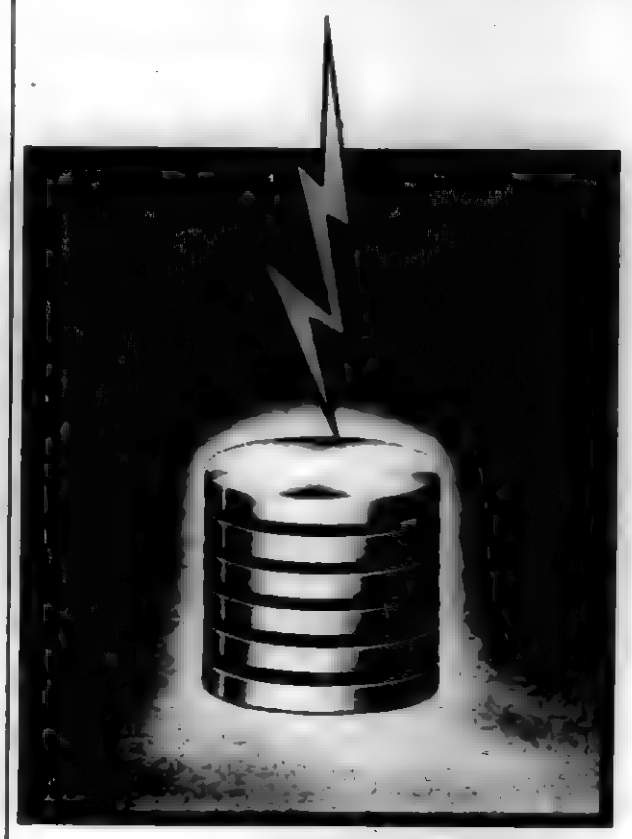

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Systems integrators help bridge gap

Successful IBM-DEC integration efforts require that somebody be put in charge, a communicator from within MIS who can negotiate a lasting peace. But often, because of the wall between the Digital Equipment Corp. and IBM camps, an outside consultant or systems integrator is also required.

"You bridge the gap by being a good negotiator, by listening to both sides, by understanding their positions and by translating them," says Irv Shapiro, a systems integrator and president of Irv Shapiro & Associates, Ltd. in Skokie, Ill. "In essence, you are like a simultaneous translator working in the United Nations. As a systems integrator, your technical skills are important, but your communications skills are more important."

Systems integrators bring an objectivity to the complex DEC-IBM integration issue that is often impossible to achieve by MIS and departmental groups.

Going this route is mandated in many cases because companies simply are not willing to wait for DEC and IBM to come together in a world of open standards. And third-party vendors do not often have the resources to provide full support.

"Companies are not waiting. They've got requirements to meet today," says James Bernstein, a consultant at Arthur Andersen & Co. in Los Angeles. "Until all seven layers of OSI are fully functional, you are going to have to do some programming to support the communications. There's no way around it."

According to Bernstein, systems integrators do not come cheap. Large-scale implementation of DEC and IBM connections can cost into the millions of dollars.

But a systems integrator can address three key aspects of the job — an ability that is sometimes lacking in-house.

"You need to develop your application," Bernstein says, "which requires a knowledge of the business, the operating environment and the business problems you want information technology to address. Then, you've got to have people who understand the OSI and MAP proto-

Arthur Andersen's Bernstein

cols to develop a communications environment to support the user requirements. And third, you need the project management expertise. You can't just hire different groups to solve the different problems; you need someone who is full service, someone who can provide all the skills to make it happen," he adds.

Patrick Farrell, senior principal at American Management Systems, Inc., a systems integrator in Arlington, Va., adds, "You must intelligently pick the right tools, get the right suite of products, because they are not as all-encompassing as people expect. And you have to decide who is primary and who is secondary when you are setting up an LU6.2 link. And that becomes a political issue because of SNA's tradition of 'I'm the mainframe, and you're not.' "

Consultants agree that the issues seem to be getting more, not less, complex. The return on investment for a systems integrator lies in the simple fact that he cuts down the risk. But Shapiro points out that for a project to succeed, the company must assume a visible stance.

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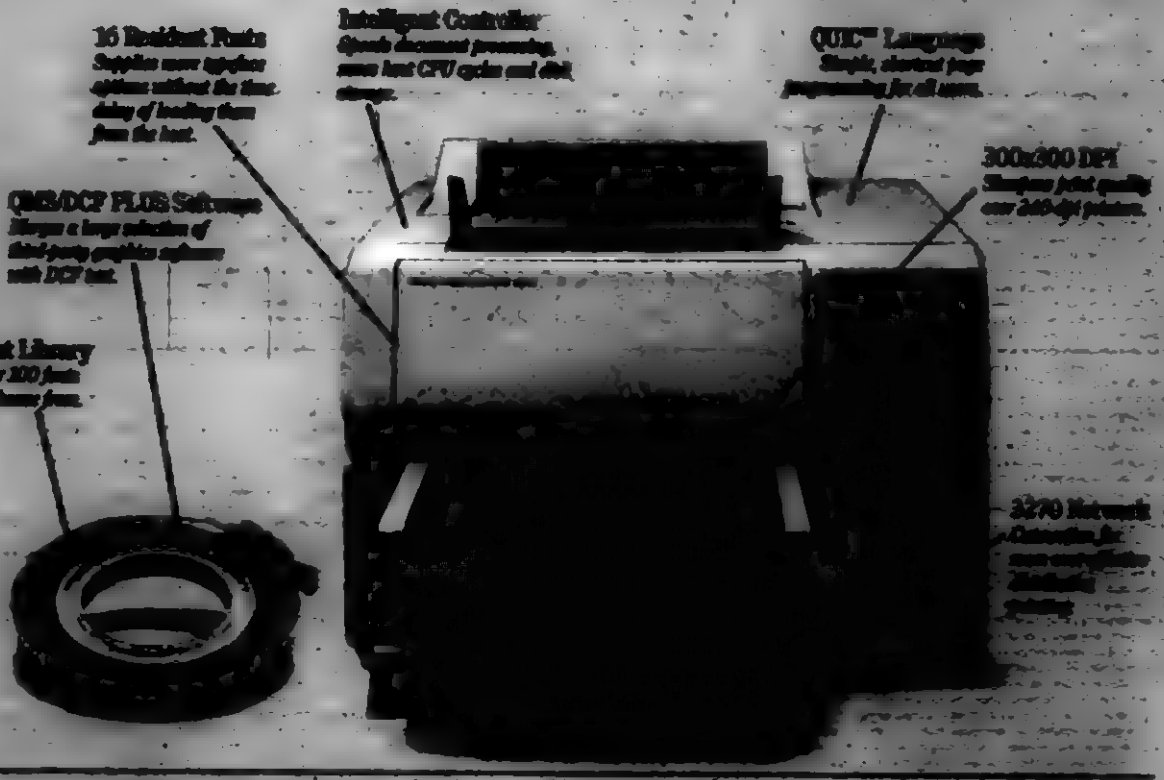

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SQL: Bane or boon?

The time to make the standard fit is now — before it gets too well established

BANE

BY JON ROLAND

Much has been said in favor of SQL and so-called relational data base systems. There has been some mention of resistance to SQL as a standard, but this has usually been dismissed as stubborn devotion to older, less advanced approaches to data base management.

But in fact, most such resistance comes from those who regard Structured Query Language as primitive, inadequate and poorly designed. I contend that SQL is a YABDIP — yet-another-brain-damaged-IBM-product — that must be rejected before it becomes too well established.

Many of SQL's advocates acknowledge its shortcomings but argue that support from IBM has made it the standard, whether we like it or not. They say we must, therefore, acquiesce and learn to make the best of it, just as we have with the Qwerty keyboard and such IBM gems as PC-DOS, the PCjr, Series/1 computers and EBCDIC.

But contrary to the mainframe mentality of many of its proponents, SQL is less established as a standard than Ashton-Tate Corp.'s Dbase is, as many will discover when mainframe programming ranks are filled by people who learned on micros. It is time for more users to stand up and say that SQL is snake oil.

Rigid syntax

Advocates of SQL admit it is neither structured nor a language and argue that SQL is only an "access language" that provides a standard way for users and programmers with different backgrounds to do simple queries, reports and updates us-

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Roland is president of the Starwood Corp. a consulting and software development firm in San Antonio. He is the principal author of a family of accounting and management applications for commercial, local government and academic organizations.

CHRISTOPHER BING

BOON

BY RICHARD FINKELSTEIN

To be pro-SQL is to be pro-technology. But SQL's mercuric rise in popularity makes it the target of a lot of criticism.

The problem is, the issues surrounding Structured Query Language are clouded by many nonissues that keep surfacing and serve only to divert attention away from the crucial question: How do we make SQL more usable?

Here are some of the more common nonissues — or myths — that have circulated in the past year.

Myth 1: "SQL cannot be used to develop full applications."

Of course not. It was never meant to replace procedural languages. SQL is a data base sublanguage that gives users a standardized way to access data stored in relational data bases. It can be used interactively by end users, or it can be used within programs by application developers.

It is not a full application development language; it is not a report writer; it is not a screen or form generator; it is not an end-user query tool. But it can and should be the basis for all of these functions.

I can further argue that Cobol, Pascal and Ashton-Tate Corp.'s Dbase are not complete development languages either. To turn them into development environments, procedural languages are always supplemented with report writers, screen generators, debuggers and the like. This does not make procedural languages useless.

SQL products, such as Relational Technology, Inc.'s Ingres and Informix Software, Inc.'s Informix include language interfaces that permit developers to embed SQL in procedural languages such as C. Programmers can

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Finkelstein is president of Performance Computing, Inc. in Chicago and is publisher of the "SQL Review" newsletter.

- **Fit for programmers vs. end users**
- **SQL as an applications language**
- **How standard is standard?**

Bane

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ing a variety of data base management systems. Supporters laud SQL's rigid syntax and restricted set of command primitives because they make it almost impossible to do anything that is not correct — even if they make it difficult to do anything at all.

There is no harm in vendors offering a standard access language as an adjunct to their main data base applications language. But to support SQL, they must too often kludge their products, and SQL is so difficult for most people to learn and so inefficient in its use of computer resources that one is compelled to ask if there is not a better alternative.

Furthermore, too many people are trying to build complete development languages as supersets of SQL. When they find that SQL does not make a very good foundation for an applications language, instead of admitting this approach does not work, they often try to sell the result as Holy Writ.

Credit where it's due

SQL has often been praised for things that are not attributes of SQL proper but rather attributes of the underlying DBMS that uses it. SQL is not a DBMS. It is simply a command interface to the user.

Most users I know hate SQL, not because they are resistant to change but because it is not well designed for most of the purposes important to end users and programmers. What SQL is good for is that it forces users to buy larger, faster and more expensive hardware than they really need.

A well-designed access language can carry the weight of a standard if it is strong in two main areas:

- It should permit any nonprogrammer who knows how to manually manipulate the data in an application to express that knowledge in simple English-like commands to the computer. People manipulate data manually one record at a time, and no access language like SQL that does not support record-at-a-time commands will do this well.
- It should permit any nonprogrammer to easily import data from and export it to external files and other application programs and DBMSs, not just for one-time data conversions but on an ongoing basis. SQL does not address this purpose very well. Standard import and export commands and a few standard external data formats would serve that intent better.

But such a standard access language should also satisfy one other condition: It should be a proper subset of a complete data base applications language that is well designed to support a full range of applications without having to resort to a host language or a mixed bag of tools.

It should not be necessary to distort the design of the language as a whole to accommodate the standard subset, as it is when that subset is SQL. Rather, the subset should be designed to support the complete language in a seamless manner, with a simple, elegant and consistent syntax and a set of primitives that is neither more nor less rich than it needs to be for nonprogrammers to learn and use easily.

At the same time, it should provide an easy upward migration path for the programmer as he grows from novice to professional and give that programmer as much control as he wants and can use at each skill level.

SQL is so rigid and restrictive that it resembles a kind of high-level assembly language that is missing part of the complete instruction set. We need to focus on the design of a complete data

Continued on page 100

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Alternatives to SQL

Two current data base products that outshine SQL products are Progress from Progress Software Corp. for Unix, Digital Equipment Corp. VMS and Microsoft Corp. MS-DOS machines; and Ideal from Applied Data Research, Inc. for IBM mainframes. These products are remarkably similar in their syntax, although developed independently.

The products differ in that Ideal is a fourth-generation language for Applied Data Research, Inc.'s Datacomm/DB and also generates SQL for use with IBM's DB2. Progress is a stand-alone product that combines a fourth-generation language, DBMS and a complete development environment.

As fourth-generation languages, Progress and Ideal are not based on SQL and do not quite conform to the standards set by E. F. Codd for relational data base products [CW, Oct. 14, 1985]. They are, however, much more useful than most other products for developing applications, and much of that utility arises precisely from the ways in which they depart from SQL and Codd's standards.

JON ROLAND

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A critic's look at data models

What is the importance of a theory or data model to data base and applications development tools? Is it possible to write a single theory that every tool must conform to before any tool is realised or tested?

Is that theory relational theory, and is that data model E. F. Codd's? Or should theoretical models be tested against the practical needs of users and programmers and discarded in favor of better ones if they are inadequate?

Three models. Data base tools are often said to be based on one of three models: "network," "hierarchical" and "relational," suggesting they are both exhaustive and mutually exclusive. But reality is not that simple.

Dissatisfaction with the network and hierarchical models stems from previously inadequate theoretical treatment of them and from some rather poor realisations of those models. A hierarchical product like IBM's IMS is a kludge, although it performs well for some applications. But a product like MDBS III from Micro Data Base Systems, Inc. does a far better job of exploiting the potential of the network model than anything done to date on mainframes.

When it becomes available on mainframes, it is likely to greatly alter the common perception of the network model's potential, and it is accompanied by a theoretical treatment that is far more advanced than relational theory.

Graphs. The most general model for representing information is the finite-directed graph, which can be visualised as a network of nodes connected by arrows. It is the basis for the network data base model. Graph theory has been developed to answer some of the mathematical questions associated with the model, but there is a need for a great deal more work toward better knowledge representation and data base management. Still, many products based on a restricted version of this model are in widespread use. They are called spreadsheets.

Trees. A more restricted model is the tree — a finite-directed graph with only one path between any two nodes. Ostensibly, this is the data model for hierarchical data base tools. However, there is a dramatic contrast between older hierarchical products and a language called Nial. This language is based on array theory, which, in turn, is based on the concept of the nested array, each element of which may be a data item of any of several types, including another array.

Anyone who thinks the relational model is sacred should try using Nial for a project sometime. It can give users an entirely new perspective on the issues involved. To the extent that an application can be represented by a nested array, the tractability problems of networks can often be avoided.

Relations. Even more restricted is the relational model, ostensibly based on the mathematical concept of the "relation," defined as a subset of a set of objects we may call "n-tuples" — well-ordered sets of objects, each of which is selected from a component set. Set theory's concept of the relation applies to data base management in that most business transactions generate data that can be organized into similarly structured records composed of fields that can be collected into files. It is natural to represent records as rows in a two-dimensional table of data, in which the fields correspond to the columns. The rows can then be treated as the n-tuples of a relation and the columns as the components or attributes.

Relation theory has two main branches, relational algebra and relational calculus. The theory is useful, but the lack of structure in the concept of a relation deprives the theory of usefulness beyond a certain point.

It may be possible in principle to represent all of the data in a situation as values in tables. But if in practice that means a large number of small tables with a small number of records — or perhaps only one — in many of them, then most of the real action may be in the data dictionary or meta-schema, which may or may not be represented as a table, or in the programs of the query and manipulation language.

If too much information resides in the data dictionary or programs relative to the data tables, or if there is too much information in the mechanisms that attempt to maintain referential integrity, then it is likely that complex data dependencies are the reason.

In that case, the programmer winds up using a relational product to realise what is a hierarchical or network model at the application level. This is why spreadsheets are so popular for many business applications. They often provide better support.

JON ROLAND

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Bane

CONTINUED FROM PAGE 98

base language, not just on a restricted access language.

In arguing against SQL, I am not against treating its functionality as a point of departure for further development. But I am against the rigidity of its syntax, some of its keywords and most of its restrictions.

Valuable, but . . .

The ideas SQL attempts to realise are valuable. But to standardise on it at this point is like trying to design an ideal keyboard with the restriction that the first six keys on the top row be Q, W, E, R, T and Y. Adopting SQL will have a similar effect, distorting the design of anything built around it.

Standards can do at least as much harm as good. For example, I consider the term "relational" to be inappropriate, at least as the way it has come to be used. It is not just abused in the ways E. F. Codd complains about but also in the ways he uses it. Is a data base tool relational if it supports all the operations and objects of relation theory — and perhaps others as well — or only if it is confined to those operations and objects, requiring no other theory to describe it?

Codd is inconsistent because he uses relational both ways. What we need is a new term — one that has no other meaning — that conveys the notion of "best design for a data base tool to develop and support business applications." Since we are starting to name computer languages after women and since such a tool is likely to be some kind of language, I propose the hypothetical ideal language Carol, for canonical record-oriented language.

For a tool to approach that ideal is to become "carolic."

At this point, Carol is not a particular language. We are all free to debate about what Carol's specifications should be. It may or may not be confined to the relational model. Codd could write his own 12 specifications for a carolic data base tool, and we could debate the choice and adequacy of each of them.

Eventually, a new, more adequate and more coherent theory of data base tool design may emerge and become established as various theories are tested in practice. Only then will it be appropriate to settle on some kind of standard language for query, data definition, data manipulation and reporting.

To get the debate rolling, I submit some specifications of my own for Carol. These specs are not intended to be complete or authoritative; the reader should judge them on their own merits.

Spec 1: To be carolic, a tool should maximise all the software metrics and submetrics (see story page 101) both for itself and for the applications one develops with it. This is a broad specification and open to interpretation, but it serves to put the entire subject in perspective.

Spec 2: All information pertinent to an application can be represented as values in arrays, which can be nested. This includes the data dictionary or meta-schema. It also includes the application programs. Spec 2 goes beyond Codd's Rule 1, which requires only data base information to be kept in tables. Spec 2 requires that everything can be treated as data at some level.

Spec 3: All operations operate consistently on all arrays, and all yield arrays as their result. The results of any such operation are bindable to a name, which can be used in further operations, making the language extensible. The syntax used for

Continued on page 101

Product metrics

The following are concrete values that software or software development projects can demonstrate to varying degrees. Properly weighted, they can yield an overall measure of the value of software for a particular purpose.

Fertility:

- Programmer skills — Does it help improve them?
- Team effectiveness — Does it help improve it?
- Personnel satisfaction — Does it make the workers happy?
- Reusability — Can it be used in future projects?
- Serendipity — Does it produce unanticipated products or benefits?
- Knowledge — Does it help users discover something useful?

Performance:

- Correctness — Does it give correct results for all input values?
- Speed — Is it fast enough or as fast as it can be?
- Efficiency — How well does it use system resources?
- Reliability — Does it fail under normal operating conditions?
- Tractability — How fast does the computational effort increase in relation to an increase in the size of the problem?
- Criticalness — How important is it to the larger system of which it is a part?

Usability:

- Trainability — How easy is it to learn?
- Flexibility — Can it be used in ways not specifically anticipated?
- Operability — Can it be used rapidly, easily and with little operator error?
- Compatibility — How easy is it to use with other systems and products?

Supportability:

- Simplicity — How easy is it to understand?
- Testability — How easy is it to find out whether it will work?
- Maintainability — How easy is it to find and correct bugs?
- Portability — How easy is it to move to other machines or environments?
- Interoperability — How easy is it to make it work with other systems and products?
- Expandability — How easy will it be to add capabilities without having to redo what has been done?

Integrity:

- Fault tolerance — Does it crash too easily if a fault condition occurs?
- Impenetrability — How difficult is it to crack?
- Recoverability — If a crash occurs, how easy is it to recover, and how well does it recover?
- Auditability — Can results be traced back to their sources?

JON ROLAND

Bane

CONTINUED FROM PAGE 100

data definition must be the same used for query and manipulation at any level.

This means that unlike SQL, there would not be different commands for tables and records. A table would be a record in a higher table. There might be, of course, one supreme table of tables, fields and indexes — the meta-schema.

Spec 4: All functions, including query, manipulation, definition, integrity, report writing and security, are implemented as a single, coherent functional language with a consistent, ergonomic syntax that supports all aspects of development through complete accounting and management applications, but that does not distinguish between arrays except by name. All tables are treated alike, using the same syntax, even the meta-schema tables. No standard sublanguage is supported that does not meet this specification. No patched-up kludges. No SQL.

Spec 5: The data base tool supports programmer productivity without depriving the programmer of control. This means that while it should support nonprocedural multiple-record-at-a-time syntax if that contributes to productivity and other metrics, it should also permit procedural single-record-at-a-time operations if the programmer needs them.

Multiple-record-at-a-time syntax should be regarded primarily as a productivity feature, not as something sacred or essential for avoiding incorrectness. Single-record-at-a-time programs can be validated, too. Correctness and ease of validation are important, but they must be balanced against other metrics. In the real world, there are too many situations in which what must be done with one record depends on the outcome of what was done with the previous one, and where it is better to store dependent variables as field values than to recalculate them whenever they are needed.

Spec 6: It supports indefinite chains of indirect addressing of data values through nested JOINs and by support of the use of array or table names, as values in any array. It should have operations that can address an array value not only directly by its table name, primary

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key value and column name but also indirectly — by the table name, primary key and column name of fields that contain the name of the table, primary key and column name of that referenced item. Indirect addressing should be extendable to any depth.

This capability can provide some of the advantages of a network or tree model while preserving the advantages of the relational model.

Spec 7: It supports the use of named indexes to control the order in which functions execute. It is not very practical to have to, in effect, redefine an index every time one wants to get something done in a certain order. Indexes should be built during data entry, not whenever a query or report is invoked, as SQL does.

> IT IS NOT practical to have to redefine an index to get something done. Indexes should be built during data entry, not when a query or report is invoked.

The language should try to select the best index for a given job if none is named, with the ultimate default index being the primary index. But the programmer must sometimes be able to control the order of execution, and naming an index for an operation is the best way to do that. SQL, however, doesn't permit this.

Moreover, storage representations and access methods are often important to an application in ways the programmer must control, and the exercise of that control is information that is to be represented as data in tables. If a consistent syntax is to be used for all data, then the language must support control of storage representation and access methods.

It might be nice for the product to support these functions without intervention by the programmer, but it is not practical. This is a rejection of Codd's Rule 8.

Spec 8: It supports control of whether an array or the result of an operation on arrays is stored on disk, kept in memory or shared with other operations or users. It also supports control of the timing of execution and the binding of values to their variables.

This covers the subject of views, memory variables and other issues as well. It contemplates the ability of a program to reduce an array operation algebraically without having to evaluate it or holding evaluation in abeyance until it is needed.

Spec 9: Each data type has a null, a fault and a default value, and the programmer has control over whether the default value gets substituted for a null or fault value when one occurs.

The programmer should also be able to control whether null and fault values are sorted ahead of or behind all regular values and whether any operation is to act on null or fault values, propagate the results as further nulls or faults or ignore them. He should also be able to dictate the exception action to be taken if either is encountered.

A fault value is distinguished from a null in that it is the result of an illegal operation, such as overflow or division by zero. For some purposes, it makes more sense to enter a fault value than to terminate execution with an error message. The default value is the value supplied when no value is entered. This also means that the primary index field, if there is only one, can contain at most one instance of each, to preserve uniqueness.

Spec 10: A default primary index is automatically defined if the user does not define another one. The default could be a sequential record number, a hash code that preserves the order of creation or an index on all fields in ascending order.

Spec 11: All operations that result in output to a peripheral should support default output formats appropriate to the peripheral. The formats should be well laid out without the user having to specify format details, but it should support such formatting conveniently if the programmer wants to depart from

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Most people know BST as the change control specialists. Our competitors would like to keep it that way. Because when you compare library management facilities, theirs just don't measure up to ours. And there's a good reason why.

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the default. In other words, the default formats should support rapid prototyping.

Spec 12: It supports authorization control of program execution, read and write privileges at the file, or table, and field levels and create and delete privileges at the record level. It also permits the definition of classes of users, some of whom can only run certain programs and others who can also access the data dictionary and develop applications.

Spec 13: It supports both system and transaction recovery, but the programmer retains control over which block of code constitutes a transaction and what conditions require that a transaction be undone.

Spec 14: Terminal displays support multiple frames or windows, scrolling and terminal attributes like highlighting, underscoring, reverse video, blinking, color and line graphics at a minimum. Printer output should support full printer control using some standard page description language.

Spec 15: It supports such functions as the ability to time-stamp records from the system's real-time clock, a rich set of audit functions and the ability to roll back the data base to previous states.

Spec 16: It supports standard commands for importing and exporting data to and from a variety of devices, interprocess pipes or streams, other running programs and files using a variety of file formats. It should support calls to external programs.

Spec 17: It supports date, time, dollar and other user-defined data types in a variety of formats and a full set of time and date arithmetic functions. It supports masks for character and numeric types as well as range and other validation tests at both the meta-schema and program level.

Spec 18: It supports a user-programmable, context-sensitive Help facility, the ability to define functions on function keys and the ability to respond to single keystrokes.

Spec 19: It supports recursion, user-definable operations that extend the language — named stacks — and multiple simultaneous calls to the same file, using views or buffers.

Spec 20: It is accompanied by its own syntax-checking editor that supports multiple windows and files and a debugger that clearly identifies bugs, gives easily understood error messages and suggests corrective actions.

Spec 21: It supports compilation into stand-alone applications that do not need a runtime interpreter. It also supports an incremental memory compiler for prototyping.

Spec 22: The compiler should support either nested include files with parameter passing or the ability to treat any fragment of executable code as a data value to facilitate the skeletonizing of program code and the writing of program generators.

THERE IS enough well-founded dissatisfaction with SQL that attempts to get it adopted as a standard are neither justified nor likely to succeed.

Run a reality check

Needless to say, no existing product satisfies all these specifications. Some may turn out not to be good ideas or they might not combine well into the same product. The only way to find out is to create a product that embodies them and try the result.

There is enough well-founded dissatisfaction with SQL and related products that attempts to get it adopted as a standard are neither justified nor likely to succeed. Standards have their place, but specifications for as-yet-unrealized products should be considered prototype design objectives, not standards.

Ultimately, we do indeed need a standard — but a standard for a complete Carol, not just for a small subset of one, such as SQL. We need to design the ideal data base tool, and we should realize and test our designs before trying to establish any of them as standards. ●

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CONTINUED FROM PAGE 97

use powerful relational operations to access data. Applications are also insulated from physical and logical data base changes and are inherently more flexible and easier to maintain. In other words, SQL does not replace procedural languages; it makes them a bit more bearable.

Myth 2: "We don't need a standard. We've been doing just fine."

Consider a standard operating system such as DOS or Unix and how it defines a large target-user base for vendors. Suppose vendors had to develop software for a dozen or even a half-dozen operating systems. Vendors would be so busy porting from one operating system to another that the quality of the applications would suffer.

Standard SQL interfaces decrease costs to vendors and consumers. They also open up the possibility of a whole new set of applications that communicate between themselves and a variety of local and remote data bases. You could argue — with some merit — that standards suppress creativity to a certain extent.

But every environment has limited resources and must direct them to areas that will yield the most economic benefit.

Using SQL and data base server engines, vendors can concentrate their creative efforts on opening up new vistas instead of reinventing the wheel.

Myth 3: "There is no SQL standard."

There is some truth to this myth. The official standard, ANSI SQL, is highly diluted and not very reasonable. With no provision for creating indexes, dropping tables, indexes and views or altering table definitions, ANSI SQL is unforgiving.

Most SQL data base vendors support the more complete IBM version of SQL as defined by IBM's Systems Application Architecture. The fact that there is no single concurrence at this time — though ANSI and IBM SQL will probably converge during the next few years — does not diminish the usefulness of SQL. Yet, it would be appropriate for third-party vendors and users to consider the cost of living with the current confusion and make their feelings known to ANSI committee members, many of whom are data base management systems vendors and very responsive to the desires of impatient users.

Myth 4: "Because SQL has many different dialects, it cannot be used for standard communication."

Tell that to Apple Computer, Inc., Micro Decisionware, Inc., Must Software International, Gupta Technologies, Inc. and Lotus Development Corp. — all of which developed standardized links between data bases using SQL.

All languages, including English, fall into dialects. This does not mean that a certain baseline cannot be established to make communicating feasible.

It is true that eliminating dialects would save vendors development resources and bring application solutions to the market faster. But considering the free market system and the desire of SQL DBMS vendors to differentiate themselves, there will always be dialects.

Proof positive of SQL's usefulness as a standard lies in the fact that many products, including Network Innovations Corp.'s CL/I, Micro Decisionware's PC/SQLink, Must Software's Nomad, Natural Language, Inc.'s Datatalker and Oracle Corp.'s SQL Net, all take advantage of the SQL language to communicate with different SQL DBMSs. Some vendors have even put extra intelligence into their products to take advantage of extensions to IBM's SQL. Nomad can support the SQL UNION command directly or it can generate the equivalent function for an SQL system that does not support UNION.

SQL DOES NOT replace procedural languages; it makes them a bit more bearable.

Myth 5: "SQL is not useful because it is new and evolving."

A corollary of the dialect argument, this claim also does not stand up to scrutiny. The truth is that standards can evolve but still have great worth as long as there is some common baseline. SQL will be refined, but the underlying architecture will remain stable.

Users who wish to wait for a final version of SQL may spin their wheels for a very long time. I suggest you begin using SQL today. If you choose to use nonstandard SQL extensions, be aware that in the future, the standard may take a different path, and count the cost of the ramifications.

Myth 6: "SQL is useless to application developers since it does not support record-at-a-time processing."

The fact is, almost all SQL DBMS vendors support some sort of embedded SQL interface that allows record-at-a-time processing in procedural languages. Record-at-a-time processing is usually supported via a working storage area that stores the result of an SQL query, which can then be processed one record at a time.

But the question remains: Is record-at-a-time processing the best way of manipulating relational data bases? We have at our disposal powerful relational operators, including SELECT, PROJECT, JOIN, PRODUCT, UNION, RELATIONAL DIVISION, INTERSECT and DIFFERENCE commands. Instead of using

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these operators, we read all the data in a working area and process it as if those relational operators did not even exist. This may not be expeditious.

Rather than trying to support awkward interfaces to procedural languages that were never meant to process sets of data, it would be far more advantageous to use nonprocedural application development tools specifically designed to work on multiple records at a time.

The new application development tools must be architected to take maximum advantage of relational operations, or else they will be functionally deficient. Most of the innovative products in this realm come from the micro and mini worlds; over time they will migrate up to mainframes. A good example of things to come is Gupta's SQLWindows, which is based on event points that trigger SQL commands or other object-oriented functions. Rhodinius, Inc.'s Empress, Ingres and Oracle also use similar approaches.

Myth 7: "SQL cannot be used by end users."

"Cannot" and "should not" are two different arguments. I have trained hundreds of end users in SQL, and they have not experienced any trauma. Examples abound in journals and newspapers of how much simpler SQL is than other query languages developed in an ad hoc manner without regard to the relational operations.

SQL is concise and uses a consistent syntax, which makes it easier to learn. True, many questions do translate into complex SQL queries. On the other hand, most of these queries either cannot be done in other languages or require a substantial amount of procedural coding. Given the alternatives, I would not hesitate to choose SQL as an end-user query vehicle.

Furthermore, command SQL is not a user-only choice. Stored queries is another: DB2 uses stored queries in Query Management Facility. Prompted queries is a third: IBM's OS/2 Extended Edition Database Manager will include a prompted SQL that asks questions of the end user, allows the end user to select potential tables and fields from lists presented in windows and then constructs the SQL statement.

Other users may want to use a query-by-example approach. Users can check off items and specify conditions in a tabular representation of the tables. The system can then construct SQL statements from these instructions. In the future, we will see more advanced interfaces: Natural language front ends such as Datatalker can translate English questions into SQL. In a nutshell, end-user alternatives abound.

Myth 8: "SQL is not important to end users."

Probably not. What is important is the cost savings, time savings, flexibility and ensured growth path associated with relational data bases and SQL.

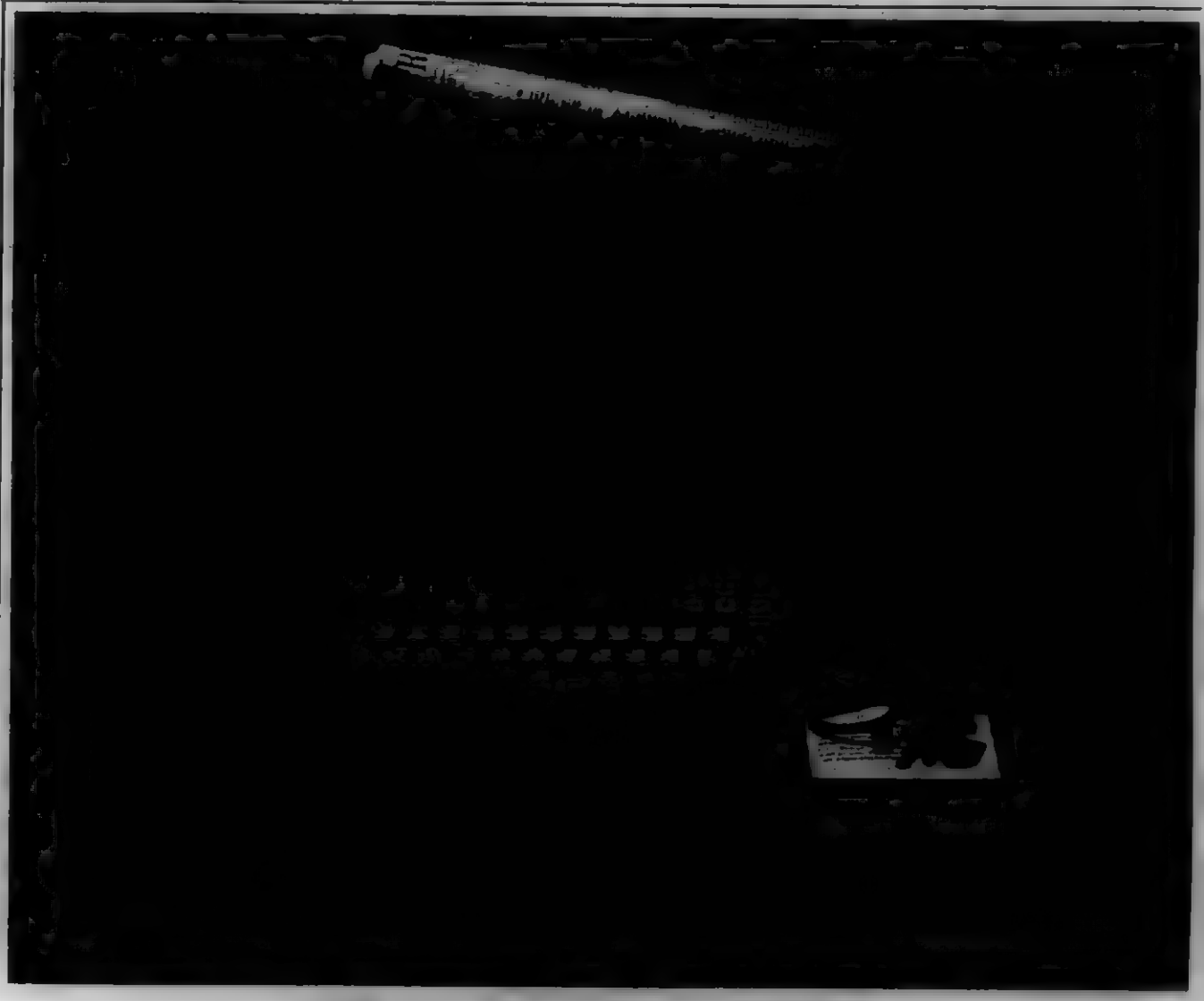
SQL also means end users will be able to take full advantage of future applications and advanced front-end tools. They will be able to share data bases and access information quickly and cheaply to meet immediate and changing requirements. All this is important to users. All of these benefits may not be available immediately, but SQL provides the path.

> **GIVEN THE present alternatives, I would not hesitate to choose SQL as an end-user query vehicle.**

Myth 9: "SQL is only important in mainframe environments or large PC LAN-to-host networks."

True, one of the most important uses of SQL is to provide a common means of data interchange between heterogeneous hardware platforms and data base managers. SQL also provides a common means of accessing data in a centralized data base from a variety of end-user tools.

The centralized data base could exist on a network or mainframe, but either way, the vast majority of organizations — even small ones — will have one.



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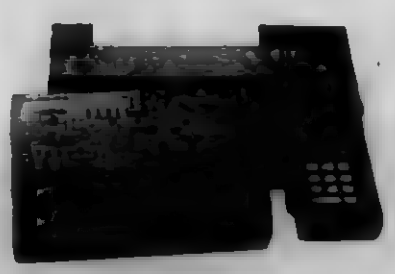

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and MIS must provide convenient access to it. Even in a stand-alone environment, end users need to access a central repository of information using a variety of tools.

By using tools based on SQL, end users will be able to choose a variety of vendors' applications, all of which can access a local data base. Chances are that on the personal computer, IBM's Data Manager will become one of these stand-alone data bases that will encourage third-party vendor support.

Myth 10: "SQL is important only because the press is promoting it and IBM wants to sell hardware."

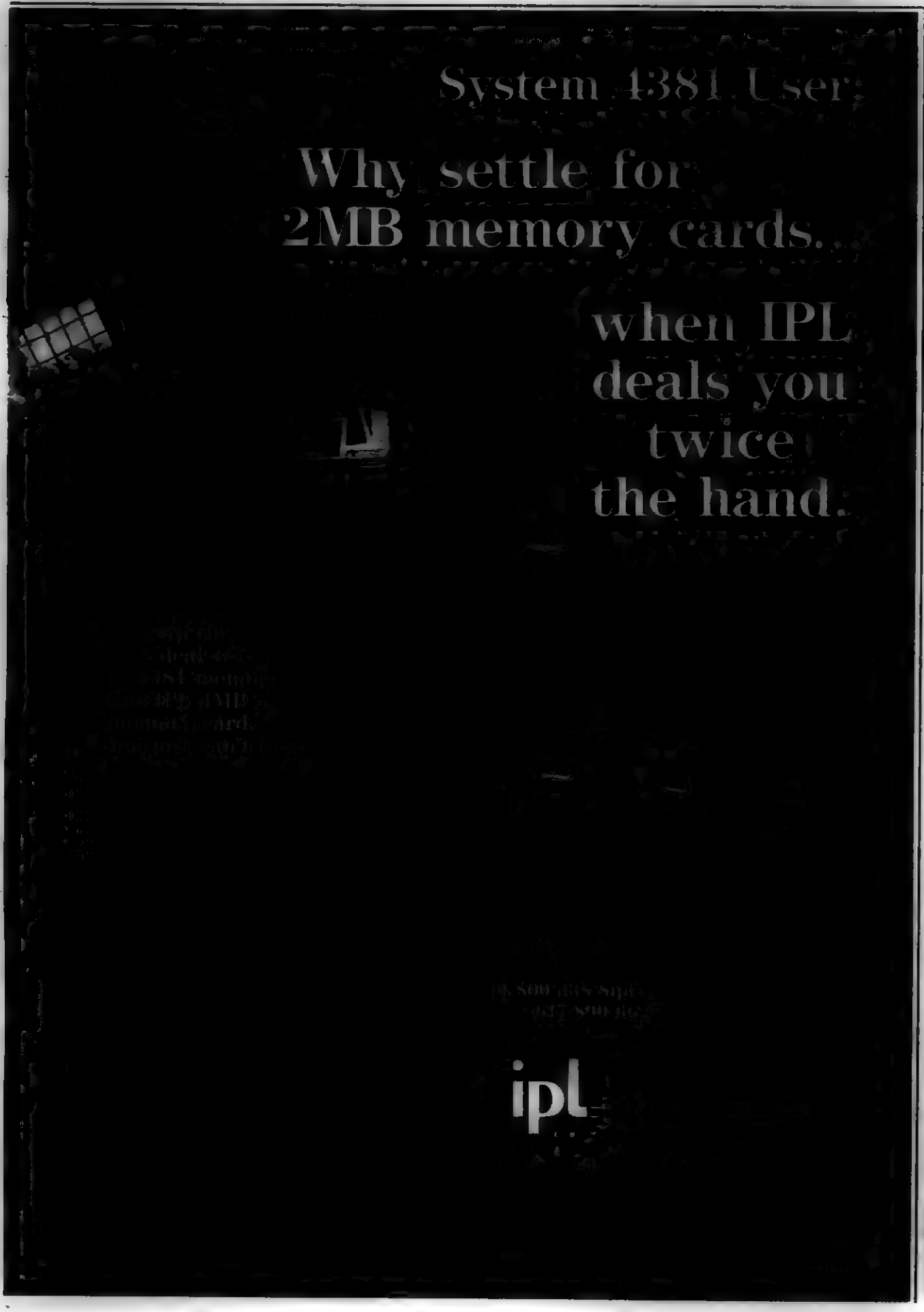
The first part of the argument is as simplistic as saying *Rambo* was a big hit because movie critics Gene Siskel and Roger Ebert liked it. SQL satisfies important user needs and was actually in heavy use on minicomputers before it became a major press item.

The second part of the argument is equally fallacious. IBM's support was certainly a major factor in SQL becoming the standard in place of other relational languages, such as Relational's Quel. On the other hand, even IBM does not have the power to enforce solutions that are not economically beneficial.

In fact, DB2's and SQL's popularity is probably as much a surprise to IBM as anyone else. IBM for a long time ignored the relational model in favor of its hierarchical model, IMS. If anything, IBM probably delayed the introduction of relational technology and SQL to the workplace.

Myth 11: "SQL has poor performance."

This is the last bastion when all other arguments fail. As it turns out, SQL consistently performs brilliantly on micro, mini and even mainframe computers. Benchmarks of products, such as XDB Systems, Inc.'s XDB and Gupta's SQLbase on micros, Sybase, Inc.'s Sybase and Ingres on minis, and Tandem Computers, Inc. machines and DB2 on the high end, show that relational data bases in general, and SQL specifically, perform faster and



SQL satisfies important user needs and was actually in heavy use on minicomputers before it became a major press item.

faster — and we are still in the embryonic stage of relational DBMS development.

Myth 12: "There are alternatives."

Opponents of SQL, or vendors who just pay lip service to the standard, have not offered any alternative. If one accepts the argument that standards are beneficial and that information exchange is crucial, then there must be some language to support these needs.

At one time, there were several alternatives. E. F. Codd at Codd and Date Consulting Group proposed his Alpha language 15 years ago with the idea of merging DBMSs and inferential systems (now called expert systems) — a magnificent idea that, had it been adopted, would have accelerated our use of relational data bases and artificial intelligence. Relational also offered Quel, which many feel is more concise and easier to use than SQL.

Neither of these languages ever received the widespread recognition that a standard needs, and unfortunately neither will likely become relational data base language standards. This leaves us with SQL. To my knowledge, there is no other potential alternative at this time.

Finally, SQL is not a panacea for all our problems. SQL promotes a communication and data interchange. This is the essential goal of information technology and something everyone involved in data processing should work toward. To the extent that SQL succeeds in this, it should be used. To the extent it hinders or fails, it should be altered.

SQL has moved us a long way toward greater freedom in information exchange. Could it have been done better? Almost certainly. Should it be disregarded because it didn't? Definitely not. •

MANAGEMENT

TAKING CHARGE

James Connolly

MIS not an island

Reality can hit in two ways. The first is the bucket-of-ice-water-in-the-face method. It wakes up the sleepiest dreamer — immediately. The second method is more like Chinese water torture. It's not so bad now, but wait a while and it will get your attention.

The reality of the Oct. 19 stock market crash has struck the MIS world with both styles of torture.

The companies that took the ice water in the kisser first were those in the financial world that saw their systems severely tested by the massive trade volumes. The MIS groups in those companies learned within hours just how well-prepared they were for a trading blitz, with a few admitting later that they weren't prepared at all.

MIS is some of those same organizations and others that lost money Oct. 19 suffered another icy awakening within weeks, when it became apparent how much money the companies had lost. Budgets and jobs were slashed.

Almost eight months have passed since the crash of '87, and the water torture's drip, drip, drip on the corporate forehead is convincing the MIS manager that October was more than a passing curiosity. It was a reality that managers will have to deal with for several years.

Continued on page 114

Airlines' profits soar on wing of booking fees

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The major airlines' computerized reservation systems are extremely profitable investments, even though federal regulators have outlawed any bias in the reservation system displays, according to a revealing study by the U.S. Department of Transportation (DOT).

Since 1984, when the government banned the practice of favoring reservation system flights with the most prominent display, the systems vendors have still profited by charging high booking fees to other airlines participating in the system, the report said.

The DOT estimated that American Airlines parent AMR Corp.'s Sabre system made a profit of $178.1 million in 1986, achieving a 76% rate of return on its investment. Similarly, United Airlines parent Allegis Corp.'s Apollo system made a profit of $136.5 million, achieving a 52% rate of return on investment.

"The evidence . . . suggests that Sabre and Apollo have been, and almost certainly remain, extremely remunerative investments for their airline owners," concluded the DOT report, which analyzed confidential data obtained from the airlines.

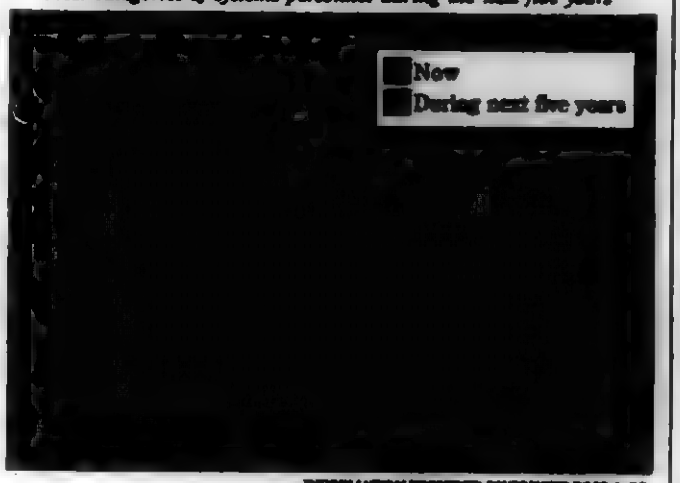
The reservation systems were developed in the late 1970s as marketing tools that put the computerized reservation systems vendors' flights at the top of system displays used by travel agents. But in 1984, the Civil Aeronautics Board outlawed dis-

Continued on page 110

Data View

Fewer staff changes ahead

*Chief information officers surveyed expect job turnover to slow for most categories of systems personnel during the next five years**



INFORMATION PROVIDED BY TOUCHE ROSS & CO.
CW CHART

Learning by doing

Hancock's Boudreau 'humbled' by value of MIS

BY JAMES CONNOLLY
CW STAFF

It is a tough job moving from a nontechnical position such as treasurer to chief of an information systems group under the best conditions, and it is challenging when the company is in transition. But the challenge becomes frightening when the transfer is an emergency move to fill the job of a friend killed in a hunting accident.

It was frightening for Edward J. Boudreau Jr. in late 1986 when he took the place of his friend and, ironically, occasional hunting partner H. Alfred Colby as senior vice-president for information services at John Hancock Mutual Life Insurance Co. in Boston. Boudreau worked long hours to help employees deal with the loss of a respected executive, carry out decentralization, learn computer technology and cope with staff cuts.

But Boudreau sits in his office today showing a sense of accomplishment and also noting that the 70-hour workweeks in MIS are not as long as the 90-hour weeks he worked as treasurer during the company's cash-flow crisis several years ago. The long hours mean he does not get to see his 16-year-old daughter and 11-year-old son as often as he would like, but a personal computer at home provides him with some scheduling flexibility.

New perspective

Looking at his shift to MIS, 43-year-old Boudreau says, "What this assignment is doing for me is changing the way I look at business. I found out that finance isn't the only field that touches everyone. Technology touches everyone all the time.

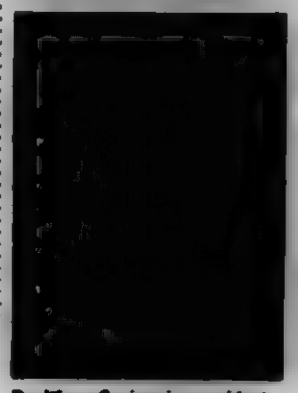
"I started in this job with the idea of trying to understand technology as if I was still in the treasurer's or a chief financial officer's job, and that was how information technology impacts the bottom line," he says. "If you had asked me where our assets were, I could have taken you down to New York and opened a vault to show you cash. But our assets are basically the bits and bytes stored in our computers around the world. Learning that was a humbling experience."

Hancock's assets, he explains, are things such as the names of policyholders rather than just cash on hand.

The move to the information systems group, at which he is responsible for the MIS infrastructure, user support and telecommunications, has made Boudreau look at new career goals.

Continued on page 116

PROFILE
Edward J. Boudreau



Position: *Senior vice-president for information services, John Hancock Mutual Life Insurance Co.*

Mission: *To install and maintain a business sense and understanding of Hancock's corporate goals within the information systems group.*

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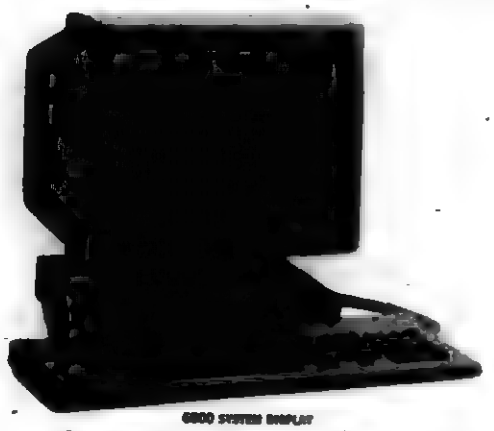

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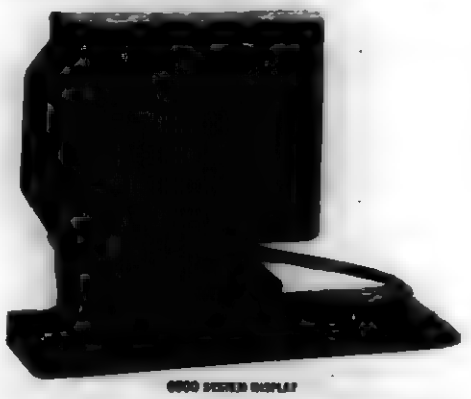

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Computer grads reap rewards

BY JAMES DALY
CW STAFF

BOSTON — If you are just getting out of college with a computer science degree and are looking to make some money, skip Horace Greeley's outdated advice about heading west. There are plenty of big bucks to be made in the Northeast.

At least that is the consensus of a report issued recently by the U.S. Bureau of Labor Statistics (BLS) in Boston, in which computer-oriented job seekers scored highly in both employment potential and earning power in a job market that observers say survived the October stock market crash virtually unscathed.

The report, produced by the regional BLS office, focused on graduates of New England colleges. BLS officials in several other regions reported that they have considered similar studies but have not yet undertaken them.

While the employment outlook for some 200,000 New England students graduating this spring is brighter than it has been in recent years, the demand for technical majors remains particularly keen, noted Anthony J. Ferrara, regional commissioner of the bureau.

But Ferrara said that although starting salaries for technical majors have remained high, they have not increased as dramatically as other professions because of defense cutbacks and some softening of demand in the high-tech market.

However, computer science graduates in New England should have no problem finding employment and can expect to earn $28,000 in their first year on the job. Only the $29,500 yearly paycheck for engineering majors outdistanced that of the computer science grad.

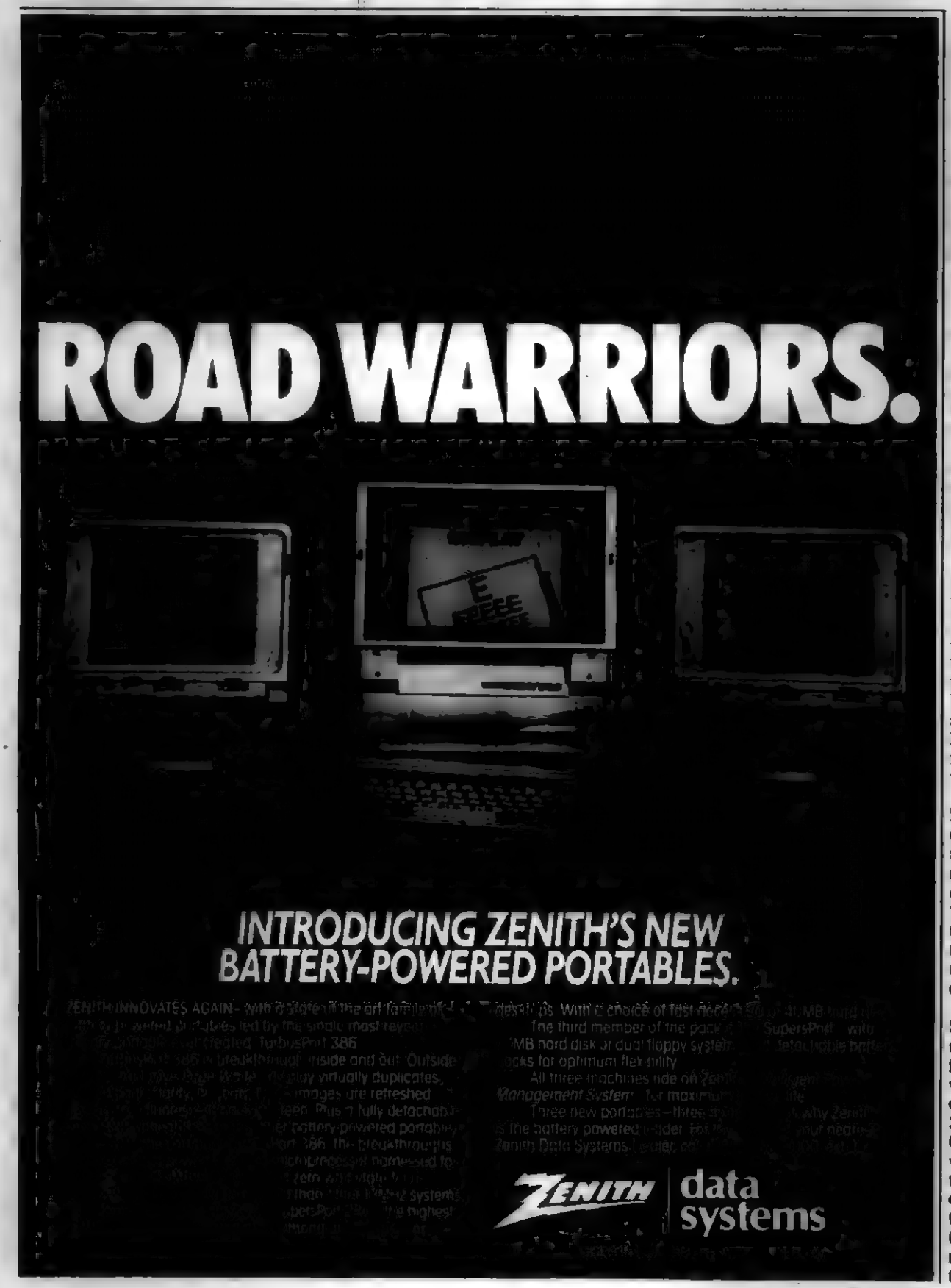
Placement plays part

There is, however, a great discrepancy in earnings power depending on where you land in the corporation; systems analysts nearly topped the list of the starting salaries of selected professional occupations at $31,600, and programmers were near the bottom at $22,600 per year.

And the good news promises to continue. The number of jobs for computer systems analysts is expected to grow 75.6% between now and the year 2000, according to the survey.

Compared with the nation as a whole, however, New England's greenhorn programmers are getting shortchanged while their systems analyst counterparts have caught the gravy train, according to another report.

A recent report issued by the Bethlehem, Pa.-based College Placement Council said the average national starting salary offer for a computer programmer is just short of $26,000 and a typical yearly salary for a computer analyst is a little more than $27,000.



Airlines' profits

CONTINUED FROM PAGE 107

play bias, transforming the industry.

The airlines responded by turning their reservation systems operations into separate profit-center subsidiaries that charge high fees to other participating airlines, the DOT report indicated. It said that Sabre, Apollo and Texas Air Corp.'s System One require participating airlines to pay booking fees that are roughly twice the cost of providing the service.

For example, in 1986, Sabre charged airlines $1.84 per reservation, but the service cost only 79 cents per reservation. On the other hand, the airlines recoup only about 80% to 85% of their costs for providing the systems to travel agents, the DOT analysts said.

"In sum, it appears that if [computerized reservation system] vendors are exercising market power to exact above-normal profits, they appear to be doing so by targeting participating airlines rather than subscribers," the DOT report said.

Power trip

The study, released late last month, has political and antitrust repercussions because critics have charged that the reservation systems give the airlines too much power over the travel industry and should be divested [CW, Dec. 14, 1987]. The study was requested by congressional leaders to determine the profitability of reservation systems operations and whether the booking fees are excessive.

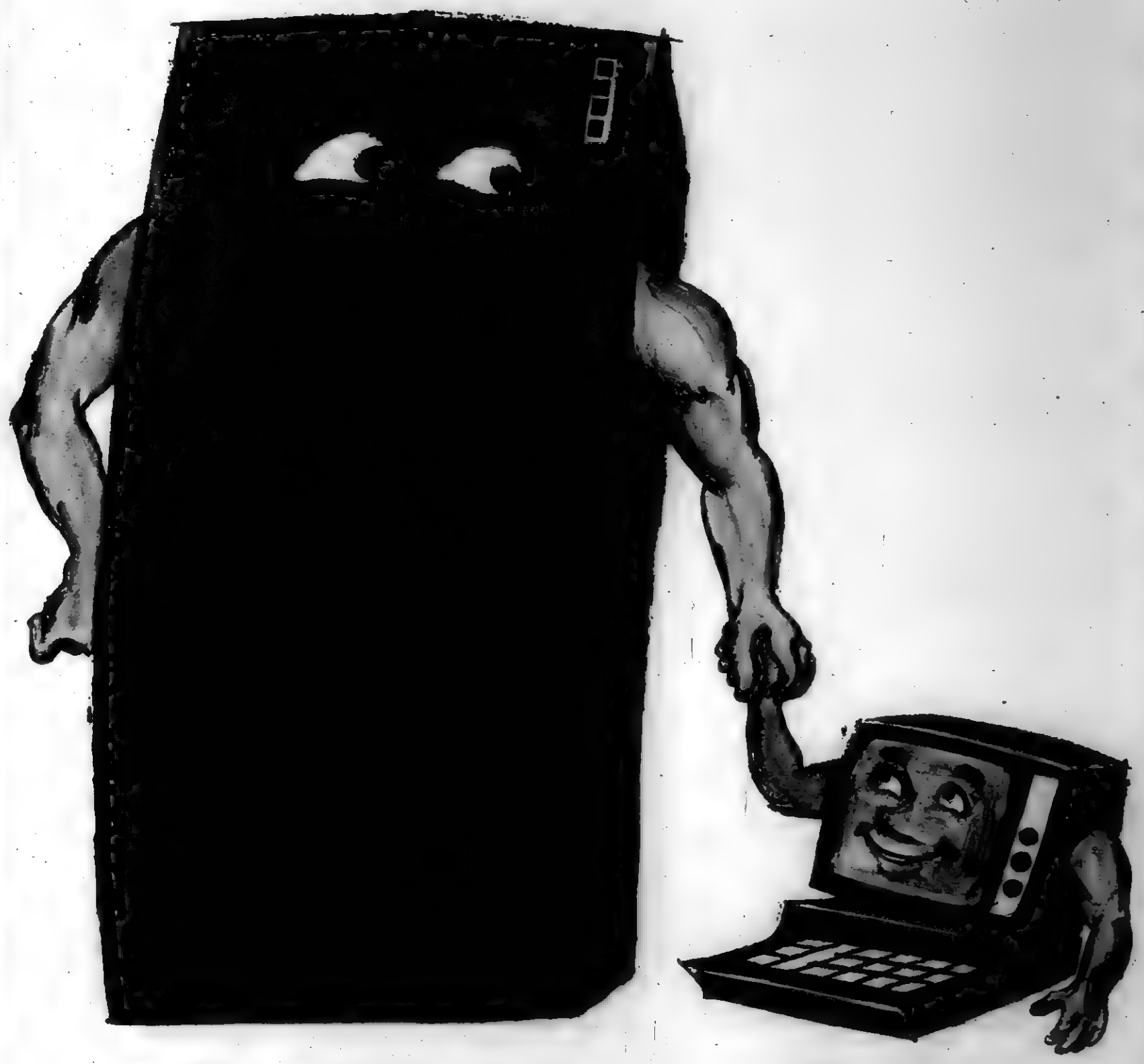
The DOT report also reached the following conclusions:

- Even though display bias was banned, travel agents still give preferential treatment to the airline that provides the reservation service, a situation called the "halo effect." The halo effect results from the continuing business relationship between the travel agency and the reservation system vendor, including financial inducements called override commissions.

In a calculation of the halo effect for the Sabre system, for example, travel agents using Sabre generate 40% more revenue for American Airlines than would otherwise be expected.

- Sabre has the highest market share — 35% of travel agencies — but System One has been leading a successful "conversion war" to convert travel agencies to its system.
- Several computerized reservation systems vendors are revising their systems to work with IBM's Personal System/2 microcomputers instead of with dumb terminals.

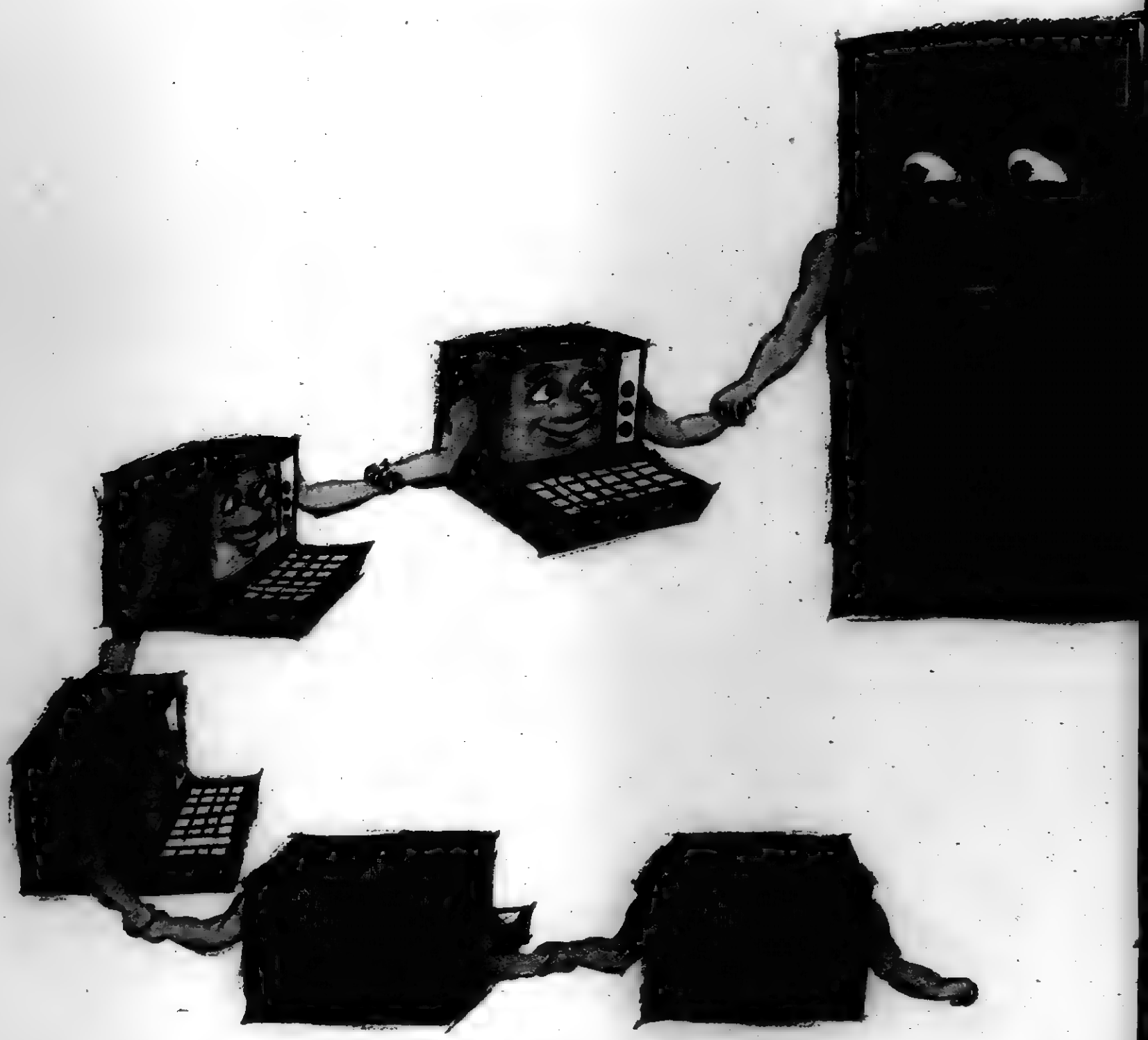
The PC war is over.



The mainframe.

The PC.

PC Integration: the world of



Hottest topic in computers.

The PC war is over, and the computer professionals have won.

Almost overnight, the market for personal computers has changed. The individual user no longer runs out and buys whatever strikes his or her fancy.

PC's have grown up, and MIS has taken over responsibility for their role in the corporate information system. "During the past three years, everything has become integration," says Leon Jackson, senior research analyst at Arthur D. Little. "The only computer force that can provide integration is MIS."

The standalone personal computer has become part of a network. And MIS departments are working to set PC standards so that their organizations can benefit from sharing of information, including databases and software.

The stakes are huge. This year, companies will spend more dollars buying PC's than they will spend on mainframes.

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Connolly

FROM PAGE 107

The results of straw polls and formal studies seem to have a common undercurrent: Most companies survived Oct. 19, but there is an element of concern, and the results are tighter reins on corporate spending and long-term systems development, plus an empty feeling in some managers' wallets.

Almost anyone who has attended computer-related conferences and read business publications in recent months knows that plenty of companies are rethinking systems plans. MIS managers ask how they can increase production while spending less. Consultants respond with solutions: Focus on new systems and cut out the maintenance-hungry older applications, or cut out the new systems and focus on what you have.

Effect on the wallet

Take a look at salary survey numbers recently released by Edward Perlin Associates, a compensation management firm. The figures show that MIS managers' salaries and bonuses just aren't growing the way they were a year ago.

New York-based Perlin found that nearly one-third of the companies it surveyed experienced salary freezes or staff cutbacks in their computer operations, with the sharpest cuts coming in the financial sector.

But MIS managers' bonuses and salaries, like those of other employees, are tied to corporate profitability, and the combination of Oct. 19 and the generally intensified competition within various industries has hurt MIS executives' incomes.

Perlin found that average salary increases for top MIS executives dropped from 7.9% in 1987 to 3.6% in 1988. Average bonuses as a percentage of base pay dropped from 33% to 27%.

A Perlin executive notes that bonuses are a flexible method of compensation and can be reduced or withheld to cut costs. Last year they were.

All this does not mean that MIS managers are heading for the breadlines. Rather, the figures should serve as one more warning that MIS cannot consider itself an island within the corporation, exempt from budget cuts by executives who don't understand computers and would rather give MIS what it wants than deal with it. MIS has to strengthen its ties to the business units — that has been said before — and, more than ever, has to keep an eye on how appropriate use of computers can contribute to the bottom line and how inappropriate use can hurt.

Connolly is Computerworld's senior editor, management.

CALENDAR

[redacted]

Unix Conference and Trade Show for users of Texas Instruments computers. San Jose, Calif., June 19-22 — Contact: Rosemary Colgrove, Tinix Users Group, 512-250-7151.

World Computing Services Industry Congress. Paris, June 19-22 — Contact: Adapso, Suite 300, 1300 North 17th St., Arlington, Va. 22209.

Digital Optical Media Applications Conference. Monterey, Calif., June 20-22 — Contact: The Institute for Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

Current Issues in Managing Information Technology Enabling Organizational Change. Cambridge, Mass., June 20-23 — Contact: Center for Information Systems Research, MIT, E40-193, 77 Massachusetts Ave., Cambridge, Mass. 02139.

Expert Systems Conference. New York, June 20-23 — Contact: New Science Associates, Inc., 16 S. Main St., South Norwalk, Conn. 06854.

ACM Sigplan '88, Conference on Programming Language Design and Implementation. Atlanta, June 20-24 — Contact: David Wise, Indiana University, 101 Lindley Hall, Bloomington, Ind. 47405.

Usenix Association Technical Conference and Exhibition. San Francisco, June 20-24 — Contact: Usenix Conference Office, P.O. Box 385, Sunset Beach, Calif. 90742.

"Telecom at 150" Conference Celebrating the 150th Anniversary of the Telegraph. Princeton, N.J., June 21-22 — Contact: Mauro DiDomenico, Committee Chairman, Telecom at 150, 426 South St., Room 2A-154, Morristown, N.J. 07960.

PC EXPO. New York, June 21-23 — Contact: PC Expo, 333 Sylvan Avenue, Englewood Cliffs, N.J. 07632.

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Force Field Analysis combats change resistance

BY JAMES CONNOLLY
CW STAFF

COLORADO SPRINGS — Implementing change in the face of resistance remains a challenge for the MIS organization, but there may be a way to cope with resistance in areas such as end-user computing, according to a Colorado Springs-based consultant and researcher.

"In an industry whose very nature is change-oriented, the theme is familiar: demand for change opposed by resistance to change. However, certain characteristics of the end-user computing challenge make it more pernicious than most other problems MIS has faced," Robert A. Zawacki said.

Zawacki, president of Zawacki & Associates and a professor at the University of Colorado at Colorado Springs, recently presented his arguments in favor of using Force Field Analysis technique on end-user computing projects.

Testing analysis model

Zawacki said that several companies, including several insurance firms that he declined to identify, are about nine months into the use of Force Field Analysis.

"We identify the driving and restraining forces. . . . What we are doing is pulling them out from under the rug and finally surfacing them and dealing with them," said Zawacki, who, with co-researcher Scott C. McIntyre, is conducting follow-up research on his initial Force Field Analysis by surveying MIS executives for their reaction to the program.

Zawacki promotes use of a Force Field Analysis model developed by psychologist Kurt Lewin more than 50 years ago to quantify the driving forces such as benefits and needs relating to a project and the restraining forces such as fears and lack of resources.

Robert A. Zawacki

Zawacki, who has organized the Force Field Analysis efforts at his client companies, advocates the formation of a team of 15 to 20 information systems employees and 15 to 20 end users to look at the implementation of a specific project.

During two days of work, the team determines the strengths of the various opposing forces and assigns each a length on a line scale. For example, in one analysis, resistance by middle management and supervisors is opposed equally by the driving force of changing U.S. and world economics.

Stuck in the middle

Zawacki noted that the greatest resistance tends to come from middle management.

"What they are seeing is that all these systems, both hardware and software, are being put in the financial group or service group, and they give you this argument about whether they are compatible and how much money they are spending out there, and they say we are reinventing the wheel and it's coming out square. That's what middle management and MIS is saying," he noted.

Zawacki said that once the opposing forces are identified, the team and the action officer whose job it is to carry out the project can attack a few key items — represented by the longest lines on the scale — and then focus their energies on those items.

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Learning

CONTINUED FROM PAGE 107

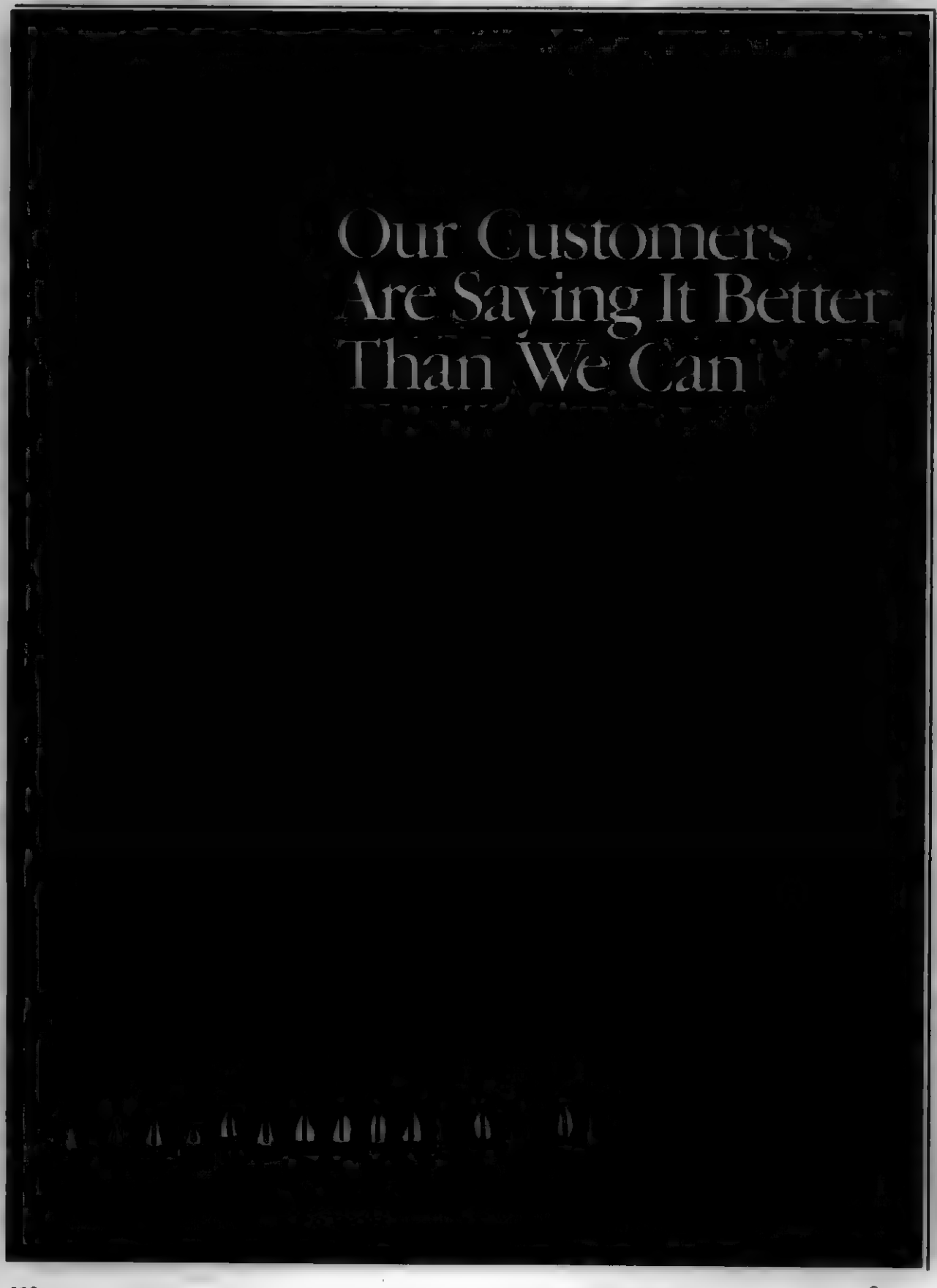
"I had always thought of myself as a CFO candidate; I had never thought of myself as anything but a financial officer. Since I have come here, I can legitimately see myself running a company," he says, encouraging anyone with aspirations for a senior management job to spend time in information systems early in their career.

In addition to running the information services group, Boudreau wears a second hat as chairman of Hancock's banking subsidiary, First Signature Bank & Trust Co. in Portsmouth, N.H. That was one of three positions — the others being a marketing post and head of a special project — he was slated to assume when he was being rotated out of the treasurer's job in 1986. But the marketing and special project posts were taken away when the management committee had to replace Colby.

One of Boudreau's first priorities was to complete an application development decentralization launched by Colby. That effort involved assigning 500 programmers, analysts and managers to business units. Within those units, a sector information officer oversees application development and reports directly to the sector president, who for the first time is assured of getting an MIS viewpoint on decisions. Boudreau also mandated postimplementation audits for information technology projects. He smoothed the transfer of the 500 workers by showing that opportunities to excel are greater in the business community.

While the decentralization progressed, corporate austerity moves, such as an early retirement program, further reduced the central information systems group from 600 people to the current level of 400. Boudreau, discussing his on-the-job education in computers, notes that company officials put the MIS staff at ease by explaining that the neophyte MIS director could draw on the 100 years of experience of his top five assistants. Months later, three of those five accepted early retirement.

But he says the departure of those "good people" helped him implement policies and bring in aides who more readily questioned why things were the way they were. Boudreau's own question — "Why do we have IDMS here?" — led to a lengthy review of the benefits and costs of Cullinet Software, Inc.'s data base management system. The review ended with a decision to continue support of IDMS for a few more years and to standardize on IBM's DB2. It was the first of a series of standardizations designed to cut costs and maintain compatibility among systems.



Stop, look, listen

One assistant recalls how the former treasurer learned about computers through conversation, reading and seminars. "Ed is very good at sizing people up, and he's a very quick study," says Andrea Mercier, Hancock's director/executive information system project officer. "He made a point of doing things like going to conferences. Now he always asks people for their opinions, but he doesn't necessarily adopt them. He has his own viewpoint now."

Mercier lauds her boss as a "people person" and a flexible manager who gives employees room to grow. She says one of his accomplishments has been to unite the people in Hancock's MIS community and give them a sense of the business world.

Boudreau says one reason he was brought in from the user community was to bring that business sense and an understanding of Hancock's corporate goals into MIS. But when asked to list his achievements, Boudreau turns to people issues and says, "I can name at least two dozen people who play a major role in this company, not for their rank, but for what they have accomplished, and I had some measure of responsibility in identifying or developing them."

He emphasizes teamwork and risk-taking in his management philosophy and draws some of that philosophy from sports heroes. He credits the daredevil baseball great Pete Rose for the risk-taking element and basketball executive Red Auerbach of the Boston Celtics as a preacher of teamwork.

Boudreau's energetic conversation is filled with references to finance, computers, sports and dieting. He is an avid golfer, a permanent dieter who recently lost 20 pounds and a sports fan who points out a photograph of his brother, an assistant coach with football's New Orleans Saints. His coffee table is covered with computer industry and banking publications.

He also credits Colby, who like Boudreau moved into MIS from the user community, for his accomplishments.

Comparing his entry into MIS with that of someone who replaced an executive who quit, Boudreau observes, "In some respects it was more difficult for me because Al and I were good friends outside the office. If you sit in a goose blind with someone for seven years, you get to know him pretty well."

Boudreau says he has found himself thinking, "What would Al be doing differently in this situation?" He has also had to deal with an undercurrent of complaining, particularly on his early decisions in MIS.

"They didn't know that I knew what they were saying, but a lot of people were equating my decisions with throwing dirt on Al's grave," he says. "But they didn't know about my personal relationship with him. The foundation he provided here has allowed me to do what I've been able to do in the past year and a half. An important factor in my keeping the faith of our friendship has been making sure that he got credit for what he did."

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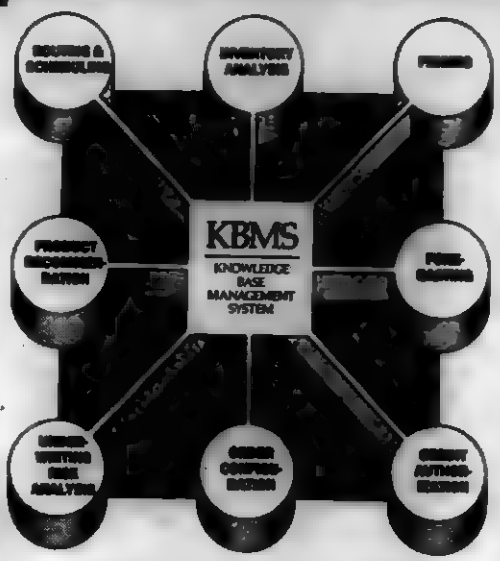

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INDUSTRY INSIGHT

Kathy Chin Leong

Promises, promises

Vaporware is the stuff that gets preannounced and never gets shipped. "Hypeware" is the stuff that finally gets shipped but was so overrated from the start that users are in for a giant letdown.

Let's face it: Hypeware is everywhere and gets users nowhere.

Sure, the industry has to market its products, but there's got to be a certain amount of openness about what a product can and cannot do.

Magic pill

I guess people in the industry can't help themselves. Imagine sweating over a project for more than a year. With tunnel vision firmly entrenched, the promise of what the product can potentially do seems to take on a life of its own. Product X is suddenly a panacea for every ill you can think of.

Take IBM's Netview, for example. Prior to Netview, users were relegated to the IBM Network Control Program, a key software program that helped users keep track of network devices. Users were frustrated by the fact that it was complicated to use and did not track anything besides IBM products.

So IBM responded. In May 1986, it announced Netview, a program designed to take care of the dilemma of what to do with other vendors' equipment.

But when the mainframe component finally shipped the following year, it was more of a diagnostic tool than a true network management product. As one observer put it, "It was really a repackaging of IBM's products from before. Users really wanted a full-function product that would help them find ways to troubleshoot and correct problems on-line."

As in the traditional vendor prose, added features are promised in the "next release" of Netview. This onion theory of product delivery has been a mainstay of IBM's product approach and that of many other companies. With the first layer of

Continued on page 123

Sun chairman scorches OSF

McNealy claims group is running scared, calls Unix stronger than ever

In the wake of last month's creation of the Open Software Foundation (OSF), Scott McNealy, chairman of Sun Microsystems, Inc., remains more optimistic than ever about his company's Unix strategy. In an exclusive interview in Paris earlier this month with Gerard Bidal of IDG Communications' French publication *Le Monde Informatique*, McNealy attacked OSF as an IBM-dominated scheme to bring confusion and vaporware to the Unix marketplace.

What is your reaction to the creation of the OSF?

We are very happy. Seriously. This is an opportunity to take advantage of. Unix began to be successful without the support of IBM or DEC. IBM and DEC are now strongly involved in the Unix movement, having announced their support publicly. We will use this argument, believe me. For example, we'll say to software companies, "Don't develop anymore for VMS, the Mac, OS/2 or any other operating system. Write for Unix. Because that's the direction everybody is taking."

Sun's McNealy

But wasn't OSF created to stand in your way?

Of course. It's a counterattack. But it also provides us with weapons. Imagine IBM, DEC and Hewlett-Packard all behind Unix. The fact that we have made them nervous, so that they are working together, is just unbelievable. That said, I don't think IBM and DEC really wish Unix to be successful. At least for the moment. They hope, above all, to create confusion.

But on which side is the confusion? There's not the least confusion about Unix System V running on Sparc, with NFS, News, X-11 and Open Look. Neither our specifications nor our plans for future products nor our sales forecasts have changed.

The confusion is around OSF. It still isn't a product and doesn't even have specifications. To be in competition with it is to be in a comfortable position.

How can OSF justify making you pay not only for a Unix license, but also royalties — perhaps as much as 30% to 40% — to IBM for AIX? Isn't there a risk of paying two or three times more for a license? There are probably answers to these questions, but nobody knows them at the moment.

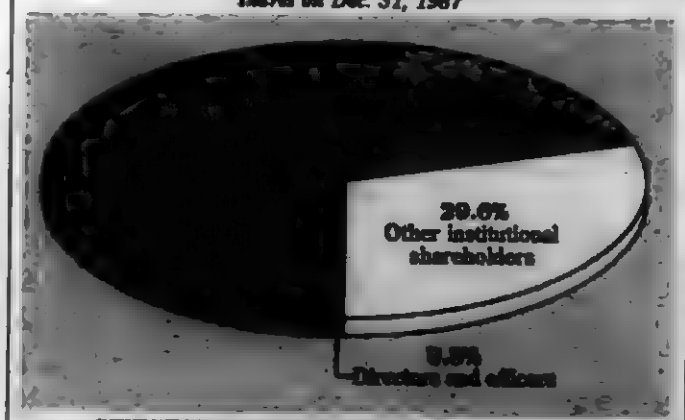
But once it exists, OSF's Unix could boast it is independent of all hardware architectures, whereas

Continued on page 126

Data View

Who owns IBM?

Institutional investors owned 47% of IBM's 603 million outstanding shares on Dec. 31, 1987



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CW CHART

IBM loosens third-party parts policy

BY CLINTON WILDER
CW STAFF

Users who perform their own maintenance of IBM equipment and independent maintenance vendors will have greater access to IBM parts as a result of an IBM policy change late last month.

In a significant hatchet-burying with the third-party service industry, IBM rescinded an 8-month-old restrictive parts availability policy and agreed to reopen six parts centers. In addition, IBM agreed to provide 24-hour parts delivery to independent maintainers from its parts depot in Memphis.

The changes came after months of negotiations among IBM industry relations executives and the two largest trade groups representing third-party brokers and lessors of IBM equipment, some of whom also

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Inside

- IBM to sell education publishing unit. Page 120.
- France's Cap Gemini Sogeti plans further acquisitions. Page 121.

Tokyo chip negotiations hit impasse

BY JAMES A. MARTIN
CW STAFF

U.S. and Japanese chip makers recently proved they still cannot settle some of their trade differences.

Talks between the two countries in Tokyo reached an impasse over how to measure foreign access to the Japanese semiconductor market.

It had been hoped that the two countries could work out their disagreements without again getting the government involved. After the breakdown in talks, however, observers said U.S. chip makers may have to seek the Reagan administration's aid in implementing more punitive measures against their Asian counterparts.

The U.S., represented by the Semiconductor Industry Association (SIA), contended that market share is the most appropriate measurement of how well Japan is adhering to its agreement to buy American-made chips. The Electronic Industries Association of Japan, however, rejected the U.S. proposal, thus bringing the two countries' talks to a standstill.

At issue is the question of Japan's willingness to uphold the agreements it signed in September 1986 with the U.S.

In those agreements, Japan promised to cease its alleged dumping of dynamic random-access memory chips into the U.S. at below-cost prices and to buy more chips from U.S. manufacturers.

Although the dumping has stopped, the U.S. still has only about a 10% share of the Japanese chip market when, according to the SIA, it should be 12% to 14%.

Shared goal shrouded

American chip makers are "incredulous and astonished at the refusal of the Japanese electronics trade group to even acknowledge the well-publicized shared goal to increase foreign participation in the Japanese market," said Jon Cornell, a leader of the U.S. delegation in the talks and executive vice-president of Harris Corp.'s semiconductor sector.

"The only way to measure progress toward gaining access in the Japanese market," Cornell added, "is by steadily increasing market share commensurate with levels achieved in other major electronics markets worldwide, where ultimate success is fully determined by competitiveness."

The U.S., the SIA contended, has increased its commitment to supplying chips to Japan by expanding its Japanese manufacturing and design plants, increasing employment there by 27% and upping technical support personnel by 20%.

Japanese chip makers argue that American vendors do not manufacture the consumer electronics components that Japan needs and cannot meet production deadlines or quality requirements.

INDUSTRY WEEK IN BRIEF

Who says you only go around once? Alcatel N.V. completed the sale of its Qume Corp. printer subsidiary back to Qume's original founder, David S. Lee, for $20 million. Lee said his current company, Data Technology Corp., will change its name to Qume and relocate to Qume's headquarters in Milpitas, Calif. Lee founded Qume in 1973 and sold the company to ITT Corp. in 1978. Alcatel acquired the subsidiary as part of its multibillion dollar purchase of ITT assets in 1987.

The financially strapped Vermont Research Corp. may be on the verge of going under. Management of the drum- and disk-memory maker said that if recent employee cutbacks and efforts to achieve more funding or a merge partner do not dig the North Springfield, Vt., firm out of its hole within 60 days, it will consider liquidating.

Cullinet Software, Inc. named Vice-President of Technology Jon Nacherud to its board of directors. Nacherud returned to Cullinet in 1987 after a seven-year absence in which he founded Relational Technology, Inc. and served as its president, chief executive officer and chairman. Nacherud fills the vacancy created by the resignation of former Chairman David Chapman.

Control Data Corp.'s second-ranking executive, Deputy Chairman Norbert R. Berg, announced he will retire June 30. Berg, 56, is a 29-year CDC veteran. Berg will continue to serve as vice-chairman of the board of directors.

AST Research, Inc. is folding its data communications product group into its systems product group, it said last week. The move is part of AST's efforts to streamline and, thus, cut expenses. AST, which used to be known mainly as a board company, said 75% of its revenue now comes from personal computer systems sales. No layoffs will result from the merger, AST said. Separately, AST announced a major distribution agreement with Computerland Corp. that will put AST's Intel Corp. 80386- and 80286-based PCs on shelves in Computerland's 800 retail stores.

Egghead Discount Software announced a $61.2 million initial public offering of its common stock at $17 per share. The Bothell, Wash.-based firm is the U.S.'s largest software-only computer retail chain.

Western Digital Corp. announced the proposed acquisition of graphics controller board maker Verticom, Inc. for $12 million in Western Digital stock. The merger has been approved by both boards of directors and is pending shareholder approval.

IBM sells publishing unit to London firm

Maxwell Communications plans to continue to develop SRA educational courses

BY ALAN ALPER
CW STAFF

ARMONK, N.Y. — IBM reached an agreement last week to sell its Science Research Associates (SRA) education publishing unit to Maxwell Communication Corp. for approximately $150 million.

SRA publishes educational materials and vocational tests and provides training courses for IBM hardware and software users.

In the educational market, the SRA sale will enable IBM to focus on areas more strategic to its information-handling business, the company said.

Service via hardware

Stephen T. Vehslage, vice-president of education for IBM United States, said IBM can better serve the educational market through its core businesses of computer hardware and associated software.

The Chicago-based SRA subsidiary is profitable, IBM said. It employs about 500 people. The acquisition also includes SRA subsidiaries in Australia, Canada and the UK.

SRA is a good fit for Maxwell Communications, a London-based publishing concern, because of its emphasis on educational publishing, IBM said.

Maxwell Communications will continue to develop training courses for IBM users and data processing professionals through SRA's Information Systems Education Division.

The companies expect to close the deal within the next 30 days, an IBM spokeswoman said.

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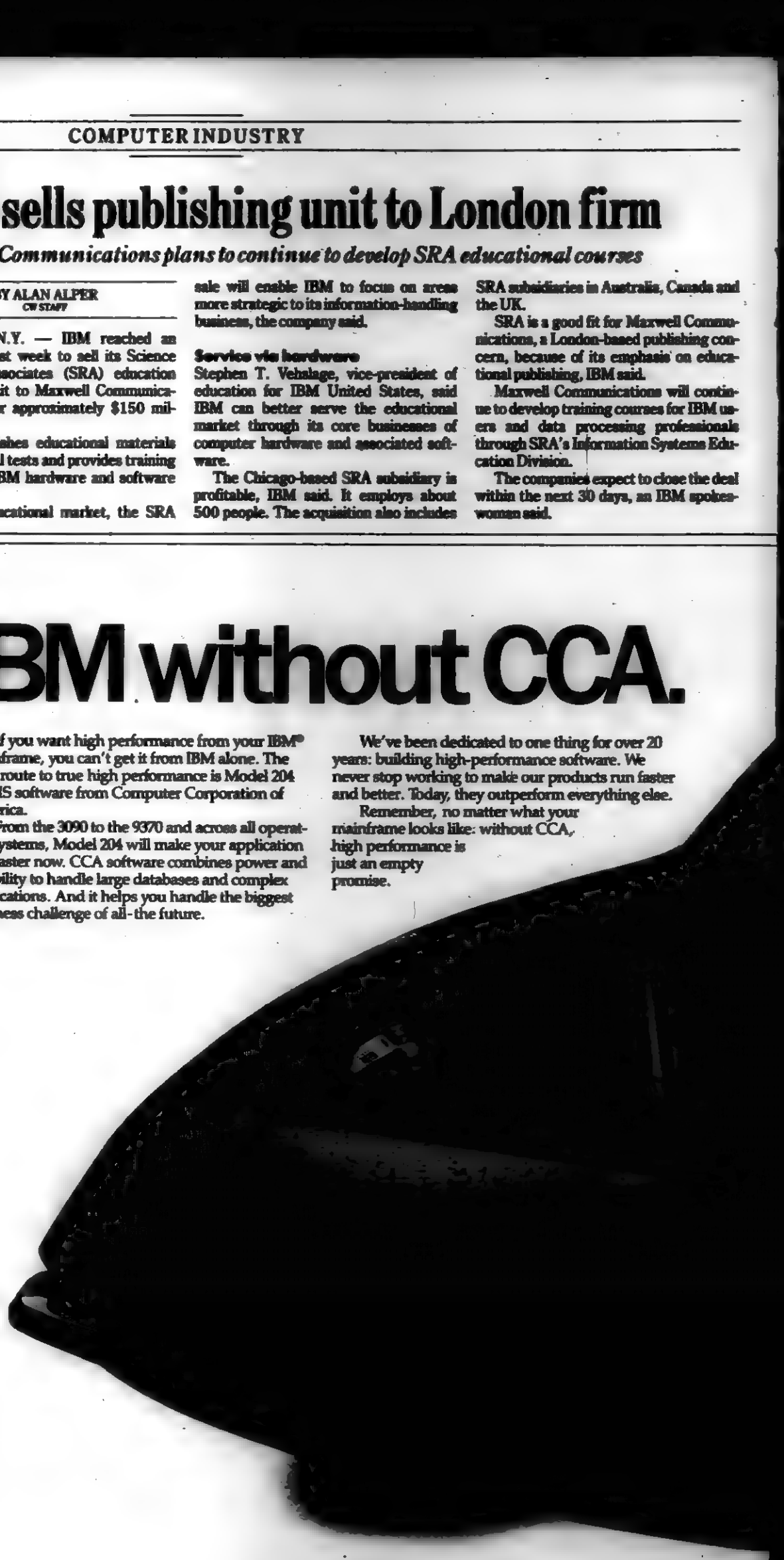

Cap Gemini Sogeti denies raider rap

BY GERARD BIDAL
IDG NEWS SERVICE

PARIS — "We are not raiders."

So said Serge Kampf, chairman of Cap Gemini Sogeti SA, the French software and services giant. He argued that the company's recently acquired 29% share holding in the UK's Cap Group PLC is not indicative of a new turn in company strategy.

Speaking at a recent press conference to present Cap Gemini's financial results, Kampf claimed the firm has "not changed anything in our strategy. For 15 years, we have always been following the same line: We take minority positions in other companies without any assurances that we can become majority shareholders."

According to Kampf, launching a public takeover bid against the British software group had been considered by Cap Gemini officials for some time. But, he said, "We are not in a hurry. We will try to have a good relationship. If it's not possible, we will sell back." But he said Cap intends to hold its ground for the time being.

Kampf announced that Cap Gemini registered $706 million in revenue for 1987, a 43% growth from the previous year. Net profit grew by more than 45%, reaching $48 million, compared with $33 million in 1986.

Growth was partially due to the acquisition last year of French software and telecommunications company Sesa. For the last five months of 1987, Sesa contributed $97 million to Cap Gemini revenue and $4.7 million to profit.

Growth spurt?

But Cap Gemini, whose objective is to be among the top players worldwide, says it is not satisfied with the results. Even if a recent string of acquisitions in France and elsewhere have nearly exhausted the "war treasury," Kampf said, he does not want to put an end to the company's external growth strategy.

"Our loan capacity is huge," he said. "And we do not believe we have reached a critical size. We will continue to seize opportunities as they come."

Kampf did not deny having ambitions for the British software and services market, where Cap Gemini's presence is still modest.

Two-thirds of the firm's revenue last year came from outside France. European revenues grew to account for 41% of total revenues, compared with 34% in 1986. The share of business coming from the U.S. decreased slightly from 38% in 1986 to 36% last year.

IBM loosens

CONTINUED FROM PAGE 119

offer maintenance. A "document of understanding" among IBM, the Computer Dealers and Lessors Association (CDLA) and the American Society of Computer Dealers (ASCD) contained the following highlights:

- IBM will reopen the parts depots it closed last fall in Phoenix, Tampa, Fla., New Orleans, Milwaukee, Miami and Jericho, N.Y.
- IBM will distribute to third-party maintenance companies specifications of engineering changes it makes to improve IBM equipment.
- Third parties may obtain the diagnostic equipment and other tools that IBM provides to its own field service engineers.
- IBM will provide lists of recommended spare parts, which theoretically can now be obtained from third parties.
- IBM agreed to first consult the CDLA and ASCD before making any future changes to any of its parts availability policies.

Big Brother is watching

In addition, IBM agreed to more closely police disparaging remarks made by its sales representatives regarding independent maintenance providers. That was significant, said CDLA Chairman Robert Gulko, because the parts availability issue was more a problem of perception than of substance.

"There was a perceived change, and that's what counts," Gulko said. "Users thought their maintenance companies wouldn't have access to parts, and, therefore, they might suffer."

Both Gulko and ASCD President Joseph Marion praised IBM for the agreement, particularly citing the opening of the Memphis warehouse to independent servicers for the first time.

"This is better availability than we've ever had before from IBM," Marion said. "Virtually any part will be available in 24 hours."

The new parts policy represents IBM's second revision of the aggressive policy changes that sparked a furor at the CDLA's fall meeting in Bermuda [CW, Nov. 9, 1987]. Earlier this year, IBM liberalized its terms for warranty service qualification for relocated and reinstalled CPUs.

"I think IBM realized that it created a monster for itself," Marion said. "By consulting [the third-party industry] ahead of time, it could have avoided a lot of problems on both sides."

Board bags Datapoint buy-out

Edelman's offer of $6 per share 'inadequate'

BY NELL MARGOLIS
CW STAFF

SAN ANTONIO — A group of Datapoint Corp. managers and investors led by Chairman Asher B. Edelman returned to the drawing board last week after their second attempt to take the company private in a leveraged buy-out was rejected by a special committee of the board of directors.

Pegged at $6 per share, or a total of approximately $60 million, the buy-out offer was turned down as "inadequate" in the wake of a fairness opinion issued by Prudential-Bache Securities, Inc.

Datapoint's director of investor relations, Gordon Cardigan, was unable to specify the shortfall between the offered amount and that which the directors in question might have deemed adequate.

However, he said, "the investment bank did carry on an extensive study of Datapoint's operations both here and abroad" before issuing its opinion.

The board's decision on the leveraged buy-out proposal is not yet final, and the proponents are considering other options, he said. Whether these options include an increase in the offering price or a withdrawal of the offer is not known.

Vacillation

Edelman followed his 1985 hostile takeover of Datapoint with an identical $6-per-share leveraged buy-out offer, which at that time totaled some $100 million because of a greater number of outstanding shares.

Several months later, however, he withdrew the offer, citing the troubled networking and communications firm's imminent return to the black side of the balance sheet.

Datapoint did emerge from the red two years later. Its fiscal 1988 third quarter, ended April 30, was its fifth consecutive profitable quarter, although profits dropped 39% from the year-earlier period.

Datapoint earned $2.7 million, or 2 cents per share, on revenue that rose 12% from year-earlier levels to a total of $88 million.

Service, stability outsells 'hot tech'

BY CLINTON WILDER
CW STAFF

OAK BROOK, Ill. — The minisupercomputer and high-performance workstation market has entered a new phase in which state-of-the-art technology no longer sells machines, vendors and analysts said last week.

Instead, a vendor's corporate credibility and ability to meet specific commercial customers' needs will determine its financial success, said panelists at Technologic Partners' Advanced Computer Systems conference in this Chicago suburb.

"The bar is moving up in terms of market requirements," said Gerald V. Butler, vice-president of engineering and scientific products at Prime Computer, Inc. "It's not enough to have a hot box. The customer base is changing from early adopters who wanted high performance to production environment users who want a vendor with worldwide service and financial solidity."

Most panelists agreed that the next two years pose a significant challenge to Convex Computer Corp., Alliant Computer Systems Corp., Sequent Computer Systems, Inc. and newer entries like Ardent Computer Corp. and Stellar Computer, Inc.

With early scientific and technical markets saturated, vendors are pushing into commercial applications in manufacturing and finance — just when IBM and Digital Equipment Corp. are planning to enter the fray more aggressively with advanced parallel processing technologies and vector facilities.

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> CASEY POWELL
> SEQUENT COMPUTER SYSTEMS, INC.

"Your ability to tell your company's story in the early days is the most important thing you can have," Sequent President Casey Powell said.

Marc Schulman, director of research at Salomon Brothers, Inc., outlined an aggressive DEC product strategy in the next two years to compete with high-end minisupers and low-end workstations. He said each uniprocessor unveiled by DEC will feature multiprocessor versions. The four-CPU version of the Argonaut, scheduled for a March 1989 release, will offer 45 million to 50 million instructions per second (MIPS), and the four-CPU version of the Aquarius, scheduled for December 1989, will reach 80 to 85 MIPS, Schulman said.

Similarly, IBM will target the market with an enhanced vector facility on its next-generation Summit mainframe in 1990, said John B. Jones Jr., senior analyst at Montgomery Securities. Jones also noted IBM's recent series of university computing grants, its strategic agreement with Los Alamos National Laboratory and its investment in former Cray Research, Inc. designer Steve Chen's supercomputer start-up.

"IBM has begun to use its marketing muscle to get shares in this area," Jones said.

Convex President Robert Paluck, however, said that new DEC products will be easier to

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sell against than current customer expectations of those products.

"We've only touched 10% of our potential buyers," he said. "DEC salesmen will unleash the rest of that base, and if your product is five to 10 times better, you can get that business."

Saving application

Many vendors complained that a dearth of third-party applications software to run on their CPUs is hindering their growth. Several venture capitalists at the conference, acknowledging their strong financial backing for hardware companies, said software must focus on vertical, and thus smaller, potential markets.

"The PC had Visicalc and 1-2-3, and the workstations had electronic computer-aided design software. But our market hasn't seen that breakout application yet," Alliant President Ron Gruner said.

But graphics has been the key force behind software so far, said Richard Edwards, an analyst at Robertson, Colman & Stephens. He noted an increasing number of alliances between systems vendors and graphics developers, including Alliant's acquisition of Raster Technologies, Inc. and DEC's codevelopment with Evans & Sutherland.

NICKELS & DIMES

Encore Computer Corp.'s financial woes appear to have eased; the firm recently reported its third consecutive profitable quarter. Revenue for the parallel processing system maker was $9 million, a 156% increase over the same period in 1987, and net income came in at $649,000, or 3 cents per share, compared with a net loss one year ago of $1.7 million, or 8 cents per share.

The shortage of dynamic random-access memory chips and their resultant price increases hit **Televideo Systems, Inc.** in the pocketbook last quarter, as the company coupled a slim increase in revenue with a hefty loss in net income. The microcomputer and terminal maker announced quarterly revenue of $25.6 million, a 7% rise over results recorded a year earlier, and posted a net loss of $6 million, or 13 cents a share.

Borland International announced revenue for the year ended March 31 of $81.6 million, compared with $38.1 million in the previous year. Profits were $1.8 million, or 3 cents per share, compared with $1.3 million, or 2 cents per share, in the same period a year ago.

Novell, Inc. announced revenue for the second quarter ended April 30 of $68.4 million, compared with $42.3 million one year earlier. Profits were $8.5 million, or 31 cents per share, compared with $4.5 million, or 18 cents per share, in the corresponding period a year ago.

Intelogic Trace, Inc. reported revenue for the third quarter ended April 30 of $34.9 million, compared with $33.4 million last year. Profits were $4.5 million, or 30 cents per share, compared with $2.5 million, or 17 cents per share, in the like quarter a year ago.

Fujitsu America, Inc. announced that its revenue for fiscal 1987, which ended March 31, exceeded $1 billion dollars for the first time in its 12-year history. The company's total revenue, which includes its seven subsidiaries and one joint venture company, was approximately $1.21 billion, compared with total revenue of $822 million for the previous fiscal year — a 47% increase.

Leong

FROM PAGE 119

the onion, users get a certain number of features, and they have to keep buying additional layers before getting the entire onion. Before long, they have spent thousands of dollars for a product they expected would fulfill expectations with the first release — and probably shed a few tears in the process.

Ask any user of networking hardware and software, and you will hear horror stories about products that were delivered and didn't offer the things on the fine-print label.

Hypeware takes on many shapes and forms.

A word processing package promises to support many users and thousands of printer configurations. Unfortunately, the ad doesn't tell you that you need 1M byte of random-access memory on your personal computer to make this work.

This happened to one user at a major aerospace company: "I really liked the package, but it turned out that I was the only one in my department with 1M byte of RAM. I like to have my word processing files read by others in the group. It didn't make sense for everyone else to upgrade. It turned out to be a write-off for the company."

A T1 multiplexer is touted as offering dynamic routing and automatic backup. Yet to realize the full potential of these features, users have to have a full-time network manager on board just to implement these capabilities. Said one user at Hughes Aircraft, "It was humanly impossible to implement the features it was talking about in the brochure. We wound up not using some of the bells and whistles."

Unfortunately, there isn't a solution to Hypeware any time soon. It is still in the user's court to take the initiative. You will still have to investigate the supplier's financial viability and the product's ability to work.

Users who haven't done so yet should have their company invest the money in a technology testing lab. Several companies, such as Pacific Bell and Atlantic Richfield, have made great strides in doing so.

Hypeware is everywhere. But there is no reason to succumb. Ask the penetrating questions. Talk to other users. Set up a pilot. Then, and only then, pick up the phone.

Leong is Computerworld's West Coast Bureau Chief.

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Chairman

CONTINUED FROM PAGE 119

with the binary portability that is behind the Application Binary Interface [ABI], Sparc seems favored.

Sparc is only one of the ABI's architectures. The open architecture that we support includes Open Look, X-11 and News, NFS and RFS with Unix V. They run on several instruction sets, including Sparc, the Intel 80386, the Motorola 68000 and others.

Compare that with DEC, for example, which offers a single instruction set, the VAX. But above we find VMS, Ultrix and soon, if I have understood correctly, an AIX derivative. Like it or not, that makes three architectures. Where's the simplicity and where's the confusion?

I really believe there is an opportunity for us to attack Hewlett-Packard or DEC

> "IT WILL be several years before OSF applications will be available, unless OSF turns out to be System V."
>
> SCOTT MCNEALY
> SUN MICROSYSTEMS, INC.

sites that might be troubled by a situation in which they're being offered several architectures. One is proprietary, the second is something like Ultrix or HP-UX — which are made obsolete by the OSF announcement — and the third is pure vaporware.

Has the idea of a unique Unix disappeared?

Taking into account the competition and the evolution of technology, the presence of a single Unix system everywhere and for everyone was highly improbable. So let's just say that we are at the center of a major standard.

The difference is that System V exists, that NFS, Sparc, X-11 and News are being shipped, and Open Look — already well defined — will be shipped this year. And all of this is open — not open in the sense of a committee, but in a multivendor sense. And that is what counts. All true standards were introduced in this way before being ratified and controlled by committees.

But doesn't that mean the kind of closed approach for which AT&T and Sun have been criticized?

[That is] an unjustified reproach. Openness was clear, and marketing conditions were perfectly defined, known by all and identical for everyone.

Can as much be said about OSF? To which machines will OSF products first be ported? They cannot be ported to all machines simultaneously. In fact, it's obvious that the first to be ported will be those from IBM. AIX currently runs on all IBM product lines. All applications and technology run under AIX.

What will DEC and Hewlett-Packard do? And the others? And [Honeywell] Bull? How could they decide that it was more secure to chase IBM rather than chase us? It's ridiculous, because System V will remain a standard. It was adopted first, it can offer more applications and currently has support from major companies like AT&T, Xerox, Unisys and ICL.

Will OSF members say to their clients, "Now we will follow IBM" and explain to them that they will have products two years after IBM?

That isn't exactly what they're saying.

But it's what their clients have understood. If IBM frightens them enough, simply by its strength on the marketplace, into adopting AIX, then it will be in a position to define OSF orientation — making the other vendors adopt its user interface, for example, and a good portion of Systems Network Architecture. And on top of that, IBM will get royalties.

You seem disappointed by the attitude of Hewlett-Packard and the Europeans. How do you explain it?

I can't explain it. Maybe there was a very strong belief that a committee could create open specifications rapidly and effectively. But this seems a bit naive. This has only happened very rarely and, in any case, very slowly.

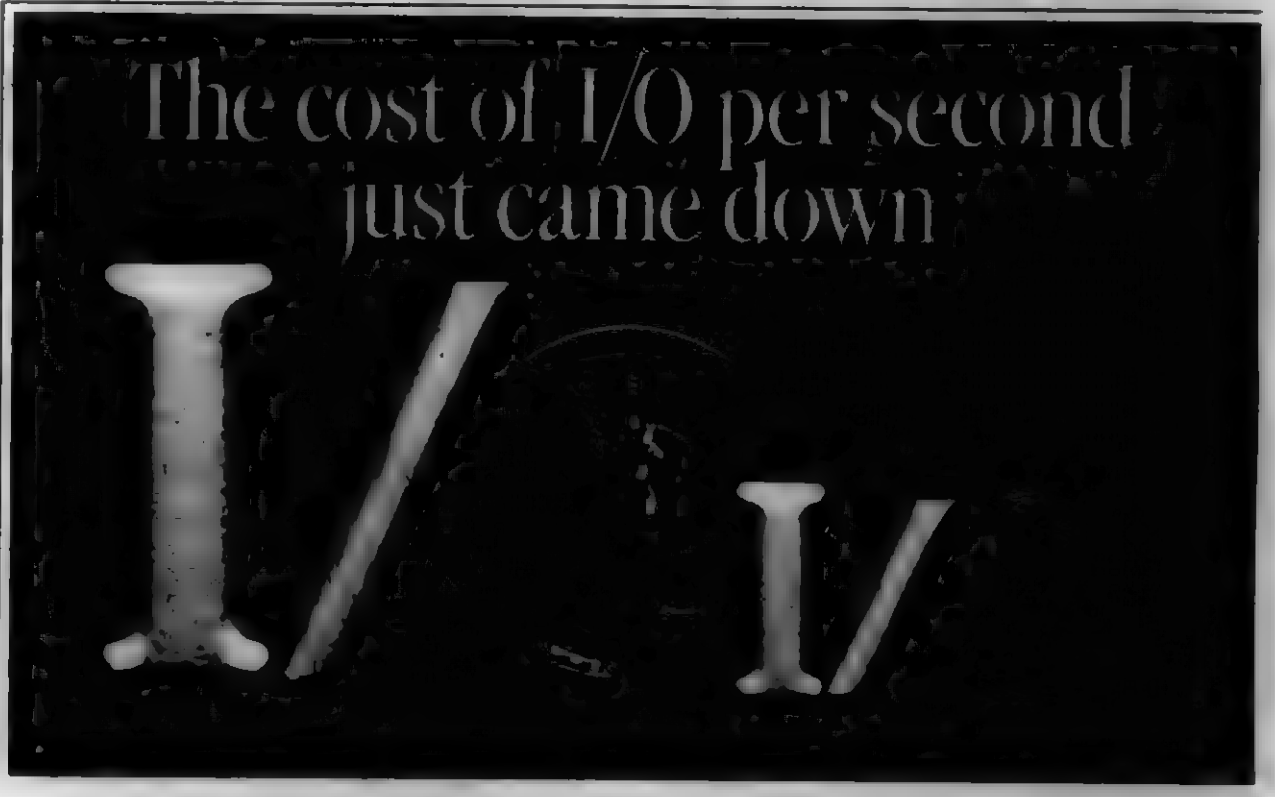
Is the situation blocked? ICL and Unisys seem to have left their doors open with a wait-and-see attitude.

It seems that way to us, too. If OSF beats us on the Unix market with better products and more applications than run on System V, we will rally to it. We believe that we are capable of developing the best products, even under OSF. We immodestly believe we understand Unix and the Windows environment better than most of our competitors.

In reality, the situation will probably be the opposite. No one can say when the first application will run under OSF, because OSF doesn't exist.

It will be several years before OSF applications will be available, unless OSF turns out to be System V. Don't forget that AIX is an implementation of System V. It will be difficult for OSF to distance itself from our implementation of System V.

Even if I'm wrong, OSF will require five years before it gets to the level currently offered by System V.



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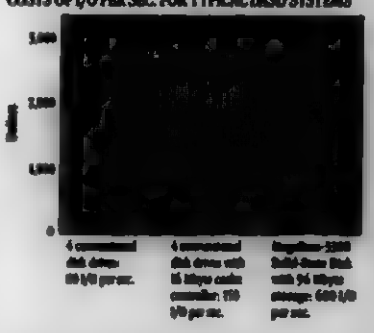

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IBM offers growth, to a point

Although hiring is off, the firm's people-oriented culture remains intact

BY KATY GURLEY
SPECIAL TO CW

Ex-IBM employees agree: IBM is a great place to get career experience and to work with job security for 30 years. It is not a great place for restless entrepreneurial people who want to be company presidents. And it is probably not the best place to look for a mid-life career change.

IBM offers training, experience, mid-management promotions and job security, former IBM executives say. It has good benefits, bright people and smart management.

However, with members of its huge work force competing with one another, the company does not offer a lot of opportunity to reach positions at its policy-making level.

Six of one . . .

In short, IBM offers more than enough for some — and not nearly enough for others.

The kind of people who do best at IBM in the long run are those that consultant Brian Jeffrey, managing director of International Technology Group in Los Altos, Calif., calls "aggressive conformists" — people who want to get ahead but remain team players.

Other former employees reflect similar views. "When you reach 40, you're at a critical path there, because if you're a first-line manager, that's probably where you're going to stay," says Bob McGrath, a consultant to Northern Telecom, Inc. in Dallas and an IBM sales and marketing executive from 1953 until 1969.

McGrath, the founder of Ex-IBM Corp. in Dallas, which publishes a directory of former IBM executives, says the reason he left the company was that he believed he could not do anything to affect it.

'On-the-job retirement'

Similarly, Geri Riegger, who worked in training, marketing support and product development at IBM from 1961 to 1969 and 1973 to 1977, says that at a certain point, "you sort of retire on the job, which I did not want to do.

"I think they try to pick people to move along an accelerated career path, and if you perceive they are not doing that for you, you move on," says Riegger, who is currently vice-president of computing and networking operations at Empire Blue Cross/Blue Shield in New York.

But Riegger says her experience at IBM was wonderful. "IBM is very good at developing personnel," she emphasizes. "They took a young and inexperienced person and gave me a lot of training."

> **"IBM IS VERY good at developing personnel. They took a young and inexperienced person and gave me a lot of training."**
>
> GERI RIEGGER
> EMPIRE BLUE CROSS/BLUE SHIELD

McGrath says the situation he left can be attractive for others. "If you want to do the same thing for 20 years, that's fine. I'm not knocking it," McGrath says. "If you like a large company, then you're at the best."

One former IBM employee who is now a senior executive says he felt little in the way of constraints while with the company.

You can go your own way

"A lot of people say IBM accuses its people of being too entrepreneurial. But I don't remember getting nailed for that," says Robert Erwin, who managed data processing operations at several locations while with IBM between 1950 and 1979.

"A lot of people just didn't test the boundaries. I never felt restricted in my job," says Erwin, who left IBM for a videodisk venture partly owned by IBM and is now president of software developer Datalex, Inc. in San Francisco.

In general, IBM is not currently in a hiring mode, company spokesmen say. Aware of middle-management fat, IBM trimmed about 13,000 employees from its roster in 1986 and 1987 through a retirement incentive program. At the end of last year, it employed about 228,000 people in the U.S., of whom 32,632 were in management, a spokesman says.

Jobs still plentiful

But even in a period of slack recruitment, IBM has hired about 5,400 professionals annually in recent years, according to the spokesman.

Of these, about 3,700, or two-thirds, are recent college graduates, and the rest what the company calls "experienced professionals."

The majority of professionals hired in recent years have been placed in engineering, programming, customer relations, sales and marketing.

Very few people are now hired in other areas, including information systems.

IBM emphasizes recruitment of women and hires them in equal numbers with men, a spokesman says. Currently, 30% of the company's employees are women. Last year, 6,202 of them were managers and 600 ranked as executives. Two women are vice-presidents.

Employee orientation

Several former IBM employees emphasize the company's regard for its employees. One illustration of that regard is the practice of granting employees personal leaves of up to a year.

The leaves are granted for needs such as care of children or elderly relatives but might also be approved for activities such as writing a book.

IBM spokesmen say that the company's corporate culture is fostered by three central principles: respect for the individual, the pursuit of excellence and service as a way of life.

Despite belt-tightening, corporate reorganizations and some disappointing new products in recent years, this culture has remained in place.

And that is why IBM veterans say that despite the drawbacks, the company is still one of the best to work for.

Gurley is a free-lance writer based in Wellesley, Mass.

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We're Changing The Way People Communicate. Be Part Of The Process.

Progress. High technology. Career growth. That's what you'll find at Contel Corporation. As a $3-billion telecommunications and information services leader, we are currently in need of Data Processing Professionals who can keep pace with our rapid growth in Atlanta. Current openings include:

Technical Support/ Data Administration

Technical Services Manager

You will handle the planning, implementation, and technical support of computer operating systems software—including IBM MVS/XA, Digital VAX/VMS, Honeywell GCOS. Managing the technical support staff, developing and maintaining software documentation, presenting systems proposals, and administering a quality assurance program will also be included. Position requires a degree in Systems Engineering, Computer Science, Electrical Engineering or Mathematics; and 6-10 years' experience in information systems such as systems programming, data center operations, software development, or equivalent. Experience in the telephone industry a plus. Excellent communication skills are vital.

Data Analysts

You will develop and maintain data models which contain information requirements of all business functions within Contel Telephone Operations. This will include data definition, data dictionary maintenance, data modeling and logistical data base design. In addition to an undergraduate degree, you need 3 years' experience in data processing with at least 1 year of data administration. Knowledge of relational data base concepts is desirable.

Data Base Analysts

You will perform physical data base design and implement complex data bases to include JCL, access methods, access time, device allocation, validation checks, protection and security, and documentation. You should have an undergraduate degree and at least 2 years' data base management experience using IMS DB/DC.

IBM MVS/XA Systems Programmers

Requires 3 years' experience in MVS/XA operating systems support, capacity planning/performance monitoring, or on-line systems support (CICS).

Applications Development

Project Leaders

Requires 6-7 years' experience plus supervisory skills in the design and implementation of business and financial systems. Experience in IBM MVS systems using on-line or data base technologies and/or DEC VAX systems preferred.

Sr. Systems Analysts

Requires 4 years of data processing experience emphasizing large-scale applications systems development in an IBM MVS COBOL environment under IMS DB/DC. Supervisory skills are desirable.

Programmer/Analysts

Requires 3 years' of applications programming and analysis utilizing IBM MVS or DEC VAX systems, and programming proficiency in COBOL or FORTRAN.

If you're looking for a growth-oriented position with a leader, you'll find it here. In addition to excellent salaries and benefits. Send your resume and salary history, indicating position of interest, to: Contel Corporation, Dept. IGM-CW, P.O. Box 468354, Atlanta, GA 30346. We will respond to candidates of interest within 10 days. An Equal Opportunity Employer m/f/h/v.

CONTEL Corporation

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DEJA-VU

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- CDC/FORTRAN
- HP 3000/COBOL
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We offer you the recognition for jobs well done, not only through top pay and comprehensive benefits but with long-term career opportunities. If you are an American citizen or permanent resident alien, please submit your resume to **Rick Spicer, Director of Recruiting.** Relocation assistance available. Equal Opportunity Employer.

RST

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We've picked up a lot of power in the last few years.

Since becoming part of Ralston Purina, Eveready Battery Company, Inc. has tightened its leadership position more than ever. And that also means great career opportunities for the same kind of entrepreneurial professionals. We have five newly created positions in our Systems Planning Department.

Senior Analyst/Programmer

We have three openings available. To qualify, you must have strong analysis skills, along with 3-5 years' design and COBOL programming experience in a DEC VAX environment. A relevant BS or equivalent is also required. Experience with 4th G/L, database management, DEC Utilities or DEC productivity tools is a plus.

Analyst/Programmer

These two positions require a minimum of 2 years' COBOL programming and analysis experience in a DEC VAX environment. One position requires DEC All-In-One programming experience. A relevant BS or equivalent is also required. Experience with 4th G/L, database management, or DEC Utilities is a plus.

All five positions involve heavy end-user interaction as well as heavy coding, testing and debugging.

This career opportunity is available at the world headquarters in St. Louis, Missouri. The St. Louis of today is a vibrant city filled with interesting social and cultural activities, including affordable housing.

Eveready Battery Company, Inc. offers an excellent salary and benefits package, along with outstanding career advancement potential. Qualified candidates should send resume and salary history to: RALSTON PURINA COMPANY; Corporate Employee Relations; Department JH-3; Checkerboard Square; St. Louis, MO 63164. An Equal Opportunity Employer.

Ralston Purina Company

You can always expect the best.

Computer software development company needs Senior Software Engineer who will have primary responsibility for high-level architectural design of an object-oriented data management system for personal computer applications. Enhance data model defined for laboratory data management system for use in commercial environments. Develop system and documentation of comprehensive object-oriented method and application development language consistent with data model. Language constructs must provide full support for application development including report generation. Design object management subsystem using commercial relational database management system. Publish the results of research and development as an aid to product marketing. Prepare technical documentation for all work performed. Job requires Master's Degree in Computer Science and one year's experience as a Systems Analyst or Software Engineer. Experience must include developing application software. Must have at least one graduate level course in each of the following: Programming Languages; Assemblers and Compilers; Operating Systems; Automata and Formal Grammars; Analysis of Algorithms; and Logic and Program Verification. Educational background must include hands-on experience with VAX/VMS and VAX/UNIX and use of Pascal programming language. 40 hr/wk, $36,000 per year. Qualified applicants send resumes with social security number to the Indiana State Employment & Training Services, 10 N. Senate Avenue, Indianapolis, Indiana 46204, Attention: W. F. Shepherd; I.D. 3088987.

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ACP/TPF PROGRAMMER ANALYST

ACP/TPF PROGRAMMER ANALYST - PROJECT LEADER required. Analyze, code, test and implement program lines and enhancements for the ACP/TPF airport processing system. Projects will include design, development and implementation of seat selection program for domestic and international flights and will extend to room and car selection for hotel and car rental reservations systems. Will provide functional software support, trace problems, debug dumps and provide overall system integrity. Will supervise a team of 2 to 12 other analysts as group project leader.

Applicant required to have B.S. Degree in Computer Science, Math or Engineering plus 2 years experience in ACP/TPF Airline Control Programming. Education and experience will be found acceptable if applicant has a combination of work experience and professional development courses found to be equivalent to a B.S. Degree in Computers in addition to 2 years of ACP/TPF Airline Control Programming experience.

Salary will be $900.00 per week for a 40 hour work week.

Interested applicants apply at the Texas Employment Commission, Dallas, Texas, or send resume to the Texas Employment Commission, TEC Building, Austin, TX 78778-0001 J.O. #8138172. This advertisement was paid by an Equal Opportunity Employment Employer.

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To put the new Computer Careers Network to work for you - regionally or nationally - call the sales office nearest you. Or contact John Corrigan, Recruitment Advertising Director, at 617-879-0700. And if you hurry, you can still get in on the special low introductory offer.

Sales Offices

John Corrigan, Recruitment Advertising Sales Director, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171; 617-879-0700.

BOSTON: 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171, Al DeMille, Regional Manager, Nancy Percival, Account Executive; 800-343-6474. (in Massachusetts, 617-879-0700).

NEW YORK: Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652; Warren Kolber, Regional Manager, 201-967-1350; Jay Novack, Account Executive 800-343-6474.

WASHINGTON, D.C.: 3022 Javier Road, Suite 210, Fairfax, VA 22031; Katie Kress, Regional Manager, 703-573-4115; Pauline Smith, Account Executive 800-343-6474.

CHICAGO: 10400 West Higgins Road, Suite 300, Rosemont, IL 60018; Patricia Powers, Regional Manager, 312-827-4433; Ellen Casey, Account Exective 800-343-6474.

LOS ANGELES: 18004 Sky Park Circle, Suite 100, Irvine, CA 92714; Barbara Murphy, Regional Manager, 714-250-0164; Chris Glenn, Account Executive, 800-343-6474.

SAN FRANCISCO: 18004 Sky Park Circle, Suite 100, Irvine, CA 92714; Barbara Murphy, Regional Manager, 714-250-0164; Chris Glenn, Account Executive, 800-343-6474.

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As the industry grows, so will COMPUTERWORLD. This is not a phrase we took lightly. We will continue to offer the high quality news coverage and editorial content that has attracted our readers since our beginning. But we also must continue to grow. What does that mean to you, our advertisers? Good news...in the form of wide exposure. We offer a feature topic to each weeks Recruitment ads. This allows for us to target your specific market. In addition to the attractive format, it is easy to read. We offer a variety of topics which we have listed below:

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So, as a nationwide publication, we give you the exposure you want. As a weekly publication, we give you the immediacy your advertisements need.

COMPUTERWORLD publishes every Monday with an ad deadline of 10 days prior to each issue date. You may send in copy to be pubset or camera-ready material (velox or negative) via the mail. We provide telecopier service and will also take ads over the phone. We now have an answering machine which will take your calls/reservations even after business hours on the east coast. Please call either number listed below and indicate you would like Classified Advertising and you will be immediately connected to the machine. It's as easy as that!

BA

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Your outstanding CICS expertise and excellent interpersonal skills will be aptly utilized. This is an opportunity to introduce new technology and put your good ideas to work. Qualified individuals must have demonstrated success in all aspects of CICS systems programming including environment design, CICS release implementation and maintenance, problem determination, tool selection and implementation, and consultation.

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The qualified candidates can expect a competitive salary and benefits package plus relocation assistance to the San Francisco Bay Area. If unable to phone, please send your resume to: Paul Burenin, Bank of America, BASE Staffing CW-30333, Dept. 3228-PB, P.O. Box 37000, San Francisco, CA 94137. Bank of America is an equal opportunity employer.

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Opportunities are now available for professionals with at least 2 years experience in any of the following.

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Ideal position for an individual looking to move into first line management. Requirements include 4+ years of IMS Technical Support, good supervisory skills, and any exposure to CICS or MVS is a plus. Subsidiary of a Fortune 500 company with an excellent existing management staff. Client is eager to move. Mid-west location. Salary mid $40's.

EXCEPTIONAL UNIX PROGRAMMER ANALYST OPPORTUNITY

One of the most unusual and challenging positions you can obtain. Will need to call to obtain specific details. Requirements include excellent knowledge of UNIX and COBOL, software with exposure to INFORMIX a plus. Need to have been involved with complete system cycle including design, implementation and modification of the system. Client will only consider individuals that are the best and do it right. Salary $50K to $60K. Mid-west location.

For immediate consideration please contact or send resume to:

MSA

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(316) 832-9160

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There's an outstanding difference between solving a problem on paper and applying that solution where it is utilized. For the skilled technical professional for installing new applications as well as quite enough. At Hamilton/IBS you are installing your talents utilizing some of the most advanced hardware, software and systems in the industry. We currently have openings in the following:

Our Environments: MVS/XA, TSO, CICS, IDMS, VM/CMS, SSP

NETWORK SOFTWARE ANALYSTS:

The candidate will be a network professional with hands-on capability and the ability to effectively cooperate with others. The ideal candidate should possess 3-5 years of current experience in data communications, have excellent problem determination and interpersonal skills, be self-motivated and capable of independent, multi-tasking, and diligent in all areas of network communications software. To qualify for our MVS/XA environment, your background must include experience with VTAM, CICS, SSP/E, NSP, NPSI, and Solution. Experience in LU6.2, SNEC gateways and token/ethernet communication is a definite plus.

CAPACITY PLANNER

Will be responsible for the Capacity Planning/Forecasting function of the IBM 3090s, the IBM 4381, and System 88 computers and associated peripherals. Play a critical role in developing and maintaining all of MBS's internal and external reporting; identify current and future processing improvements, and review utilization efficiency.

MICS ADMINISTRATOR

Responsible for administration of MICS and associated facilities to enable the collection and analysis of performance statistics essential to the planning, scheduling, and monitoring activities on the IBM mainframe and peripherals. Provide support for Hamilton standards system.

Candidate should be well-versed with System programming, 3 years of which should have been in an IBM MVS/XA operating environment in an IBM 3090/400. Specific knowledge must include: Network Control Program and Advanced Communications Facility, a basic working knowledge of [illegible] data, and the ability to provide help desk [illegible] as required. In addition candidate must be [illegible] of which should include software upgrade.

[illegible] and provide technical support. Must possess solid [illegible] with strong [illegible] skills. Must be able to work [illegible] and apply [illegible] to support [illegible] software upgrade.

[illegible] U.S. citizenship required for [illegible]

[illegible]
[illegible] Systems Division
[illegible] Systems Group

SYSTEMS ANALYST

An excellent opportunity is available with a $170+ million manufacturer/distributor of medical products. Due to expansion, we are seeking a Systems Analyst with good communication and technical skills. This position requires 2-5 years experience in manufacturing development. HP3000, FORTRAN, MRP, 4th generation language and JIT background are all pluses; degree preferred.

We offer a competitive salary and excellent benefits package. Send resume and salary history, in confidence, to:

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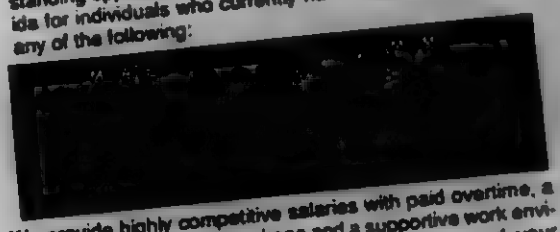

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S/38

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"...We're trying to reach MIS and data communications professionals. And Computerworld effectively delivers both."

— Cesar Namba
Imperial Corporation of America

Cesar Namba is Assistant Vice President for MIS Recruitment at Imperial Corporation of America (ICA) in San Diego, California. ICA is a financial services organization that has savings and mortgage institutions in 20 states.

For Cesar, filling important MIS/DP positions is the name of the game. Recently, ICA embarked upon a change in part of its corporate technology, and that meant that Cesar had to go to work finding qualified personnel. And for reaching the best possible candidates, he turned to *Computerworld.*

"Our goal in recruitment advertising is to do several things. Naturally, we want to fill vacant positions, and if we do it right away, that's great. But there's much more to it. We want our ads to create awareness of ICA as a company that hires MIS/DP professionals and we want to make contacts for future positions.

*"*Computerworld *addresses all that we want our advertising to accomplish. First of all, it's such a well-read publication; everyone I deal with in the world of MIS reads it.* Computerworld *is our top choice for reaching qualified candidates — in fact, we initially felt it would work even better for us than local newspapers.*

"We were right. Computerworld *does an excellent job of getting our image across to people — and getting them interested in our company. Maybe we'll hire someone right from the ad, which we do. Or maybe we'll impress upon quality people that we're regularly hiring in their fields, which is just as important to us. The bottom line is that* Computerworld *is the right vehicle for our target audience.*

"One of the great things about Computerworld *is that it's almost always kept around for reference. That means our ads stay around longer. Plus, we can expect to attract more experienced people through* Computerworld."

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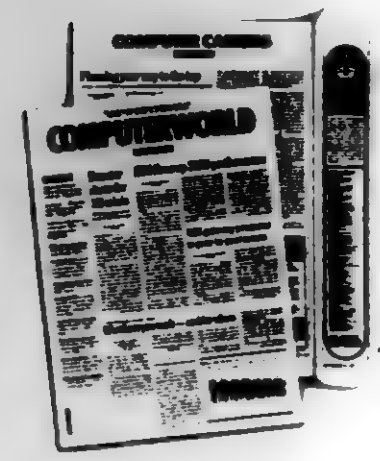

COMPUTERWORLD

The weekly newspaper of record for computer professionals.

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An IDG Communications Publication

SYSTEMS ANALYSTS
PROGRAMMER ANALYSTS

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Manufacturing Applications

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PROGRAMMER ANALYSTS:
Financial Applications

Programmer analyst positions require 3-5 years experience in financial programming applications utilizing VSAM, COBOL, MVS, CICS or ADS/O with background in payroll/personnel systems. Experience in IDMS, PAR/ALLET, or related areas, SYSB, MSC/1 and other financial applications such as general ledger, accounts payable/receivable a plus.

Northrop provides highly competitive starting salaries and comprehensive benefits programs. Relocation assistance will be provided for selected candidates. Please submit resume with salary requirements to: Professional Staffing Dept. 2240, Northrop Corporation, Electronic Systems Division, 600 Hicks Road, Rolling Meadows, IL 60008. An equal opportunity employer M/F/H/V. Job relationship sought and for available positions.

NORTHROP

Defense Systems Division
Electronic Systems Group

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Applicant required to have B.S. Degree in Computer Science, Math or Engineering plus 2 years experience in VMS Operating Environment as Engineer or Systems Analyst. Experience must include prior use of one or more fourth generation programming languages.

Salary will be $57,000.00 per year for a 40 hour work week.

Interested applicants apply at the Texas Employment Commission, Dallas, Texas, or send resume to the Texas Employment Commission, TEC Building, Austin, TX 78778-0001 J.O. #5158176. This advertisement was paid by an Equal Opportunity Employment Employer.

"Computerworld is our top choice..."

Cesar Nambo is Vice President for MIS Recruitment at Imperial Corporation of America (ICA), a financial services organization based in San Diego, California. For Cesar, filling important MIS/DP positions is the name of the game.

"Computerworld does an excellent job of getting our image across to people - and getting them interested in our company. It's the right vehicle for reaching our target audience."

For all the facts, call John Corrigan, Recruitment Advertising Sales Director, at (800) 343-6474, today.

Arthur Young is only interested in Information Systems Professionals who see their positions a bit differently.

DATA PROCESSING

Arthur Young is one of the most successful management consulting firms in the U.S. and we currently have openings in our Information Technology Group nationwide.

The ideal candidates will be highly qualified and experienced Information Systems Professionals with 5 to 5 years plus experience in an IBM systems building environment.

Related experience should include:

Database	Language	Other
IMS	COBOL	CICS
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DB2	BAL	Information Engineering
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Manufacturing		Programmers & PAs
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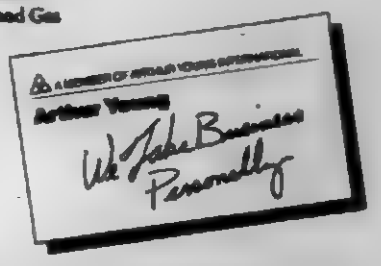

SOUTHWEST – Dallas, Houston, St. Louis, Kansas City and other SW locations: Richard Bell, 2121 San Jacinto, Dallas, TX 75201 (214) 969-8297.
MIDWEST – Chicago, Minneapolis, Detroit, Columbus and other MW locations: Jim McCormick, One IBM Plaza, Chicago, IL 60611 (312) 645-3035.
NORTHEAST – Boston, Washington, D.C., Richmond, Philadelphia and other NE locations: Larry Glassman, 3000 K. Street NW, Washington, D.C. 20007.
SOUTHEAST – Tampa, Charlotte, Birmingham, Atlanta and other SE locations: Dana Milner, 235 Peachtree Street NE, 2100 Gas Light Tower, Atlanta, GA 30043 (404) 581-1300.
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(617) 237-6110

Data Processing

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In this position you will be involved in the continuing development of a MVS/XA system. A minimum of 3 years IBM software installation and maintenance experience is required. Experience with CADAM is a definite plus.

Our current environment consists of MVS/XA, VM/XA, CICS, VTAM and IMS running on a 4381 Processor.

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- ***PROGRAMMERS/PROGRAMMER ANALYSTS***

Candidate must possess two years plus experience in COBOL programming. Good communication skills are essential as individual will work with a team developing, installing and supporting information systems. Exposure to IDMS, or any formal DBMS, CICS, ADS/O or TSO/ISPF preferred.

Futures or options knowledge would be a plus. If you'd like to work in a dynamic, fast-paced, state-of-the-art environment where skills are recognized and rewarded, let us consider you for one of our openings by forwarding your resume to:

Bernadette Matthews, Personnel Administrator

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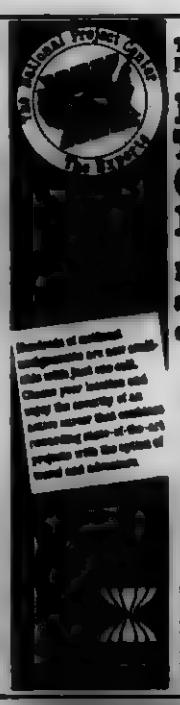

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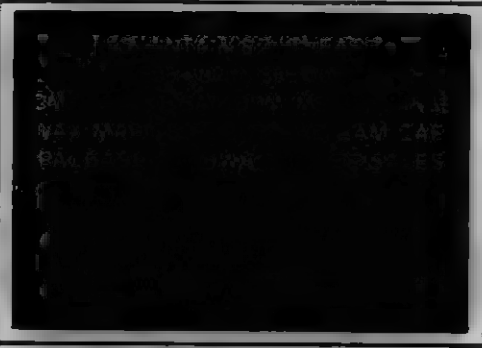

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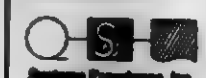

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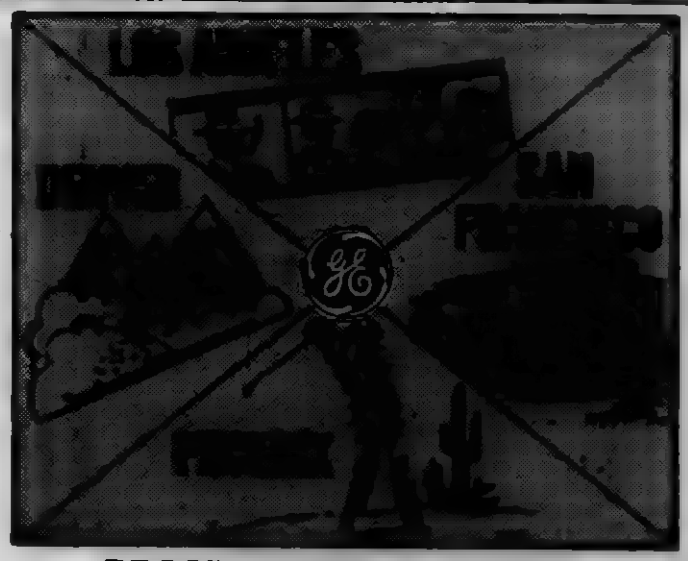

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MARKETPLACE

Graduates help market supply

Students unload Mac Pluses, driving prices up and down in Mac market

BY CAMERON HALL
BOSTON COMPUTER EXCHANGE CORP.

There is usually a wave of computer trading in late spring, and this year is no exception. This season, the student sell-off special has been the Apple Computer, Inc. Macintosh Plus. The result for the Mac market is lower Macintosh 512 prices, steady Mac Plus trades, rising Mac SE values and scarce Mac IIs.

The Mac SE with two floppy drives was up $25 to $1,950, and the hard-drive model experienced an increase in demand and a new high of $2,425.

The Mac Plus was quite active in constant trading and was steady all week at $1,075. The 20M-byte Mac Plus was also selling at last week's close. The Mac 512 sold down $75, at $850. The Mac IIE had a new midweek high of $775 but closed off $25 at $750.

Demand for the IBM Personal Computer and PC AT was met with steady supply, with prices moving up $50 for the PC AT Model 099 and Model 239. Volume block trades were slow as the market apparently awaited IBM's impending announcement of new Personal/System 2 computers.

This announcement fueled inquiries about how to outplace large blocks of PCs and PC ATs from firms planning to buy PS/2s. It is a good time to look for deals in block lots of IBM PC AT-era hardware.

Prices for Compaq Computer Corp.'s Portable 286 and Deskpro 286 and 386 machines were steady in active trading after dropping in recent weeks.

The Compaq line traded at the previous week's prices, with only the Portable III down, losing $75 to close at $2,700. A steady supply of the original Compaq Portable was available at $900.

The Boston Computer Exchange can be reached at 800-BOCOEXX or 617-542-4414 in Massachusetts.

The BoCoEx Index

Closing prices report for the week ending June 3, 1988

	Closing price	Recent high	Recent low
IBM PC Model 070	$800	$850	$800
AT Model 099	$2,350	$2,425	$1,750
AT Model 239	$2,650	$2,650	$2,125
AT Model 339	$3,400	$3,500	$2,625
PS/2 Model 60	$2,650	$2,650	$2,475
Compaq Portable III	$2,700	$2,775	$2,500
Portable 286	$2,175	$2,250	$1,675
Deskpro 286	$2,550	$2,625	$1,925
Deskpro 386	$3,975	$4,000	$3,675
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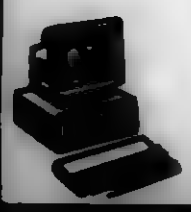

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ADDRESSES: For those who intend to submit a proposal on this project, copies of the request for proposals can be obtained without charge from: Department of Administration, Division of Finance, P.O. Box C, Juneau, AK 99811-0204, or telephone (907) 465-2340. Additional data is available for inspection at: Department of Administration, Division of Finance, State Office Building, Juneau.

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PREPROPOSAL CONFERENCE will be held in the Commissioner's Conference Room, Department of Administration, State Office Building, Juneau, at 9 a.m., July 7, 1988.

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Nov. 14	TBA	Oct. 28

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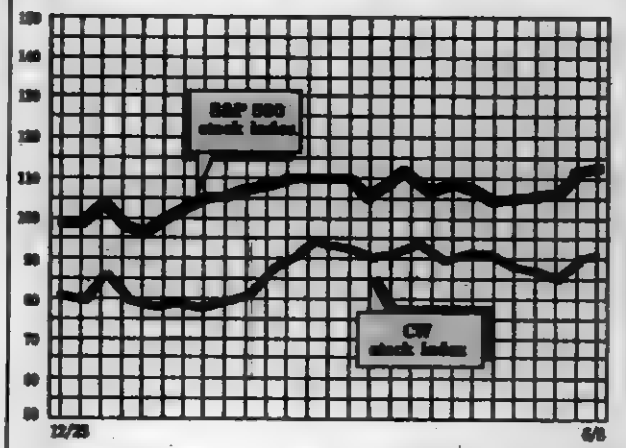

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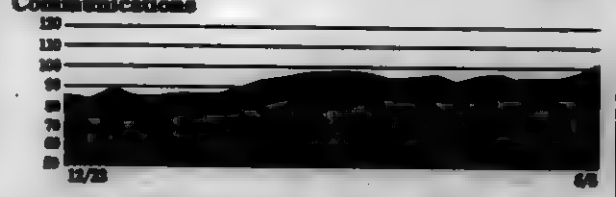
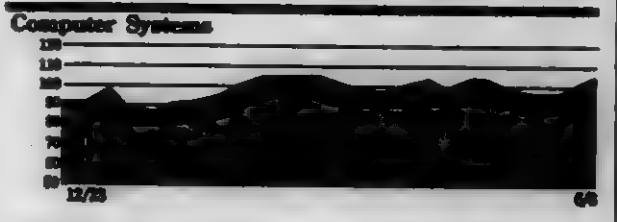
Semiconductors	69.1	73.1
Peripherals & Subsystems	82.4	84.2
Leasing Companies	126.2	125.0
Composite Index	90.8	91.7
S&P 500 Index	111.5	113.5

Communications



Computer Systems



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Semiconductors

Peripherals and Subsystems

Leasing Companies

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JUNE 8, 1988

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JUNE 8 1988	WEEK NET CHANGE	WEEK PCT CHANGE
	Communications and Network Services					
N	AMERICAN INFO TECHS CORP	103	74	88.63	.15	.19
N	ANDREW CORP	18	11	15.38	.63	1.7
O	ARTEL COMM CORP	3	1	2.13	.00	.00
N	AT&T	36	26	27.25	-.63	-.15
O	AVANT GARDE COMP INC	3	2	2.88	.00	.00
O	AVANTEK INC	17	6	7.25	.13	1.8
N	AYDIN CORP	26	16	19.75	.25	1.3
N	BELL ATLANTIC CORP	85	61	73.38	.63	.87
N	BELLSOUTH CORP	44	30	42.75	.88	2.1
O	COMPRESSION LABS INC	3	2	3.75	.00	.00
O	COMPUTER NETWORK TECH	3	1	1.38	-.00	-.24
O	CONTEL CORP	40	26	39.25	.75	1.1
O	DATA SWITCH CORP	10	4	7.88	.13	1.7
O	DIGITAL COMM ASSOC	40	20	34.63	.75	2.1
O	DYNATECH CORP	28	14	20.75	.63	3.1
O	FERRONICS INTERNATIONAL INC	7	2	3.88	.04	10.7
O	GANDALF TECHNOLOGIES	10	6	7.50	.03	.14
O	GENERAL DATACOMM INDS	12	3	3.25	-.44	-10.3
N	GTE CORP	45	36	37.75	.00	.00
O	INFOTRON SYS CORP	15	6	12.88	.44	3.5
N	ITT CORP	62	42	50.50	2.1	4.4
O	M A COM INC	16	7	10.13	-.05	-4.7
O	MCI COMMUNICATIONS CORP	15	6	14.63	.06	.45
O	MICOM SYS INC	17	7	15.88	.04	.24
O	NETWORK EQUIPMENT TECH INC	20	12	19.13	1.1	6.2
O	NETWORK SYS CORP	13	7	10.63	.06	.95
O	NORTHERN TELECOM LTD	23	14	18.00	.04	.21
O	NOVELL INC	30	12	27.75	4.9	18.8
O	NYNEX CORP	76	58	68.50	.04	.06
N	PACIFIC TELESIS GROUP	31	25	30.38	-.01	-.04
O	PARADYNE CORP	6	4	5.38	1.1	26.5
O	PENRIL CORP	5	1	5.00	.06	1.43
N	PLESSEY PLC	36	28	29.00	.03	.09
O	SCIENTIFIC ATLANTA INC	30	8	14.25	.04	.27
N	SOUTHWESTERN BELL CORP	49	32	38.63	.05	.13
O	3 COM CORP	28	12	21.50	2.6	13.9
N	UNDERMANN BASS INC	15	6	12.25	.06	.06
N	U S WEST INC	60	48	58.00	-.01	-.02
	Computer Systems					
O	ALLIANT COMPUTER SYS	21	6	6.25	.05	.87
O	ALPHA MICROSYSTEMS	6	3	6.00	.00	.00
O	ALTOS COMPUTER SYS	15	9	9.75	1.1	13.0
O	AMDAHL CORP	31	19	30.63	2.8	5.5
O	APOLLO COMPUTER INC	24	8	16.00	.04	.24
O	APPLE COMPUTER INC	60	36	45.00	2.5	5.9
O	BOLT BERANEK & NEWMAN	23	12	16.75	.05	.31
O	BRITTON LEE INC	4	1	2.38	.04	10.8
N	COMPAQ COMPUTER CORP	79	36	56.88	1.9	7.5
O	COMPUTER AUTOMATION INC	15	6	9.13	1.1	14.1
O	COMPUTER CONSOLES INC	10	2	8.50	1.1	15.3
O	CONCURRENT COMP CORP	24	11	14.75	-.63	-1.5
O	CONTROL DATA CORP DEL	38	18	27.25	1.9	7.4
O	CONVERGENT TECH	9	3	3.38	.02	.59
O	CONVEX COMPUTER CORP	16	6	9.13	1.1	14.1
N	CRAY RESH INC	119	47	84.38	4.3	5.4
O	DAISY SYS CORP	12	9	11.00	.08	.73
N	DATA GEN CORP	37	16	22.13	.01	.05
N	DATAPOINT CORP	9	3	5.50	-.01	-.22
N	DIGITAL EQUIP CORP	200	89	112.00	.01	.01
N	FLOATING POINT SYS INC	12	3	3.13	.01	1.26
N	GOULD INC	26	8	16.00	.06	.43
N	HARRIS CORP	41	22	28.63	.13	.51
N	NEWLETT PACKARD CO	74	38	58.63	.06	.11
N	HONEYWELL INC	91	48	73.50	3.0	4.3
N	IBM	178	103	116.63	3.5	3.1
O	INFORMATION INTL INC	16	9	12.81	.02	.15
O	IPL SYS INC	3	1	1.88	.01	7.1
O	MASS COMPUTER CORP	14	4	4.38	.00	.00
N	MATSUSHITA ELEC IND LTD	228	103	208.25	-1.8	-.09
O	MEGADATA CORP	6	3	3.13	.00	.00
N	MENTOR GRAPHICS CORP	28	14	20.75	.25	.80
N	NBI INC	13	4	4.25	-.06	-1.28
N	NCR CORP	87	60	63.63	2.3	3.7
N	PRIME COMPUTER INC	31	12	17.25	.08	.45
O	PYRAMID TECHNOLOGY	14	6	13.50	1.0	8.3
O	STRATUS COMPUTER	40	15	30.75	1.5	5.1
O	SUN MICROSYSTEMS INC	46	14	38.25	4.0	11.7
O	SYMBOLICS INC	5	1	1.31	-.01	-.87
O	SEQUENT COMPUTER SYS INC	28	9	18.50	.00	.00
N	TANDEM COMPUTERS INC	37	16	18.75	.06	.34
N	TANDY CORP	57	38	47.38	.03	.06
N	ULTIMATE CORP	27	12	13.00	.00	.00
N	UNISYS CORP	48	34	36.13	1.6	4.7
A	WANG LABS INC	19	10	11.38	.08	7.1
	Software & DP Services					
O	ADVANCED COMPTECH	6	1	1.13	.00	.00
N	ADS COMPUTERS INC	30	11	26.75	2.3	9.6
O	AMERICAN MGMT SYS INC	26	9	16.63	.06	.39
O	AMERICAN SOFTWARE INC	16	6	16.25	1.9	14.0
N	AMACOMP INC	11	4	10.75	.05	.49
O	ANALYSTS INTL CORP	16	4	7.75	-.01	-.13
O	ASHTON TATE	28	13	27.50	.00	.00
O	ASK COMPUTER SYS INC	16	6	13.63	-.04	-.27
O	AUTODESK INC	34	12	30.75	.13	.00
N	AUTO DATA PROCESSING	56	36	41.25	.13	.31
O	BOOLE & BABBAGE INC	12	6	9.25	.00	.00
N	COMPUTER ASSOC INTL INC	37	15	29.13	.13	.45
O	COMPUTER HORIZONS CORP	15	7	11.00	.11	1.4
N	COMPUTER SCIENCES CORP	73	36	42.75	.13	.30
N	COMPUTER TASK GROUP INC	16	9	10.75	.01	.13
O	COGNOS INC	17	4	6.38	-.01	-.15
O	COMSHARE INC	28	12	16.75	.06	.39
N	CULLINET SOFTWARE INC	14	4	8.63	.09	11.3
O	DUQUESNE SYS INC	28	16	20.00	.03	.13
A	DATA ARCHITECTS INC	16	7	13.75	.06	.00
N	GENERAL MTRS (CLS E)	51	36	40.75	-.19	-.44
O	HOGAN SYS INC	16	4	4.50	.01	.29
O	INFORMIX CORP	21	12	20.50	2.0	10.8
O	INTELLICORP INC	10	2	2.88	.01	.45
O	KEANE INC	16	6	10.50	-.16	-.87
O	LOTUS DEV CORP	40	19	23.50	.06	.23
O	MANAGEMENT SCI AMER	18	6	6.38	-.04	-.87
O	MICRO PRO INTL CORP	7	3	3.88	.03	12.2
O	MICROSOFT CORP	79	37	62.00	2.8	4.6
O	MORINO ASSOCIATES INC	21	7	17	1.3	7.9
O	NATIONAL DATA CORP	34	28	34.13	-.06	-.26
O	ON LINE SOFTWARE INTL INC	22	9	9.88	.00	.00
O	ORACLE SYS CORP	19	8	18.38	1.3	7.3
N	PANSOPHIC SYS INC	28	11	14.75	.03	.17
O	POLICY MGMT SYS CORP	30	16	24.75	.06	.31
O	PROGRAMMING & SYS INC	14	7	11.50	-.03	-.21
N	REYNOLDS & REYNOLDS CO	36	14	17.75	.00	.00
O	SEI CORP	18	10	18.50	.06	.00
O	SHARED MED SYS CORP	30	19	22.38	.04	.17
O	SAGE SOFTWARE INC	10	6	8.88	.01	.22
O	SOFTWARE PUBS CORP	20	8	19.25	2.1	12.4
A	STERLING SOFTWARE INC	12	6	7.00	-.01	-.19
O	SUNGARD DATA SYS INC	20	16	17.25	.06	.36
O	SYSTEMATICS INC	26	19	20.50	.25	1.2
O	SYS. SOFT INC	24	7	16	.25	1.6
O	VMI SOFTWARE INC	27	7	12.75	.06	.48
	Semiconductors					
N	ADV MICRO DEVICES INC	28	6	15.50	.25	1.6
N	ANALOG DEVICES INC	24	6	15.88	.25	1.6
O	ANALOGIC CORP	13	6	6.38	.13	2.0
O	INTEL CORP	42	19	34.13	.25	.74
N	LSI LOGIC CORP	13	7	13.13	.13	1.0
N	MOTOROLA INC	74	38	51.38	1.1	2.2
N	NATL SEMICONDUCTOR	22	10	14.75	.25	1.7
N	TEXAS INSTRS INC	68	38	48.38	.25	.52
N	WESTERN DIGITAL CORP	26	11	16.88	.63	4.1
	Peripherals					
O	ALLOY COMP.	16	3	3.50	.25	7.7
O	AM INTL INC	6	3	3.75	.25	7.1
O	AST RESH INC	21	6	15.63	.25	1.6
O	AUTO TROL TECH COMP	7	3	4.63	.00	.00
O	BANCTEC INC	16	6	8.50	.00	.00
O	CIPHER DATA PRODS INC	15	4	6.88	.00	.00
O	COGNITRONICS CORP	6	2	2.88	.00	.00
O	COMPUGRAPHIC CORP	28	10	26.88	.00	.00
O	DATAPRODUCTS CORP	16	7	8.50	.00	.00
O	DATARAM CORP	8	5	6.63	.00	.00
N	EASTMAN KODAK CO	71	36	44.88	.00	.00
O	E M C CORP MASS	28	6	7.50	.00	.00
O	EMULEX CORP	9	4	7.25	.13	1.7
N	EVANS & SUTHERLAND	26	17	17.75	.75	4.4
O	GOT CORP	6	3	3.50	.25	7.7
O	INTERLEAF INC	24	11	16.88	.00	.00
O	IOMEGA CORP	4	1	3.81	.00	.00
O	LEE DATA CORP	6	3	3.63	.00	.00
O	MAGSTOR SYS CORP	6	1	2.38	.13	1.9
O	MAXTOR CORP	24	6	12.00	.00	.00
O	MICROPOLIS CORP	42	15	24.50	.00	.00
O	MINISCRIBE CORP	17	6	11.75	.00	.00
N	MINNESOTA MINS & MFG CO	84	48	64.00	.13	.20
O	MSI DATA CORP	19	8	12.50	.25	1.8
O	PERSONAL COMPUTER PRODUCTS INC	7	4	5.63	.00	.00
O	PRIAM CORP	6	1	2.50	.13	1.7
O	PRINTRONIX INC	15	7	10.13	.00	.00
O	QMS INC	27	6	10.25	.25	2.5
O	QUANTUM CORP	20	6	11.50	.00	.00
O	RAMTEK CORP	6	1	1.31	.01	.47
O	RECOGNITION EQUIP INC	22	7	8.63	.00	.00
N	REXON INC	11	4	4.50	.01	.21
O	SCAN TRON CORP	17	7	14.88	.00	.00
O	SEAGATE TECHNOLOGY	42	10	10.25	.25	2.5
O	STORAGE TECH CORP	5	1	1.75	.01	.77
O	TANDON CORP	9	1	2.38	.06	.27
O	TEC INC	7	3	4.25	.00	.00
N	TEKTRONIX INC	41	21	25.63	.00	.00
N	TELEVIDEO SYS INC	3	1	1.31	.00	.00
N	TELEX CORP	50	30	48.75	.75	1.5
O	WYSE TECH	43	11	30.00	.25	.84
N	XEROX CORP	84	60	83.75	1.1	1.3
O	ZIDEX CORP	15	8	8.88	.00	.00
	Leasing Companies					
O	CAPITAL ASSOCIATED INTER-NATIONAL INC	11	4	5.88	.03	.51
N	COMDISCO INC	37	12	22.50	1.4	6.6
N	CONTINENTAL INFO SYS	13	6	6.75	-.03	-.35
O	PHOENIX AMERN INC	5	2	3.00	.00	.00
O	SELECTERM INC	8	3	4.88	-.04	-.71

EXCH: N—NEW YORK; A—AMERICAN; O—NATIONAL; O—OVER-THE-COUNTER; S—SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Green thumb

Sun shines bright on high tech; DEC, Cray take blue ribbons

The Dow Jones industrial average followed its biggest single-week point gain with another winner last week as the sun shone on Wall Street and computer issues were sprouting.

The big controversy concerned the on-again, off-again rumors that Unisys Corp. was considering a takeover bid for NCR Corp. Although the firms remained tight-lipped, both benefited from the whispering: NCR jumped 3¾ points higher than a week earlier to finish Thursday at 64¼, and Unisys gained 2⅜ points to close at 36¼.

Other big winners for the four days of trading included Cray Research, Inc., which continued its recent upswing, gaining 5⅛ points to 83⅛; Digital Equipment Corp., up 5 points to 110¾; Amdahl Corp., which jumped 4 points to 51½; Sun Microsystems, Inc., up 3 points to 37¾; 3Com Corp., up 2¾ points to 21¼; and Compaq Computer Corp., which gained 2½ points to 56½. Microsoft Corp. gained 2¼ points to 61¾; Computer Associates, Inc. rose 2¼ points to 28⅝; Hewlett-Packard Co. rose 2⅛ points to 58⅛; IBM was up 2⅛ points to 115⅛; and Novell, Inc. gained 2 points to 27⅛.

JAMES DALY

1-2-3

FROM PAGE 1

ing to major alternative spreadsheets.

Microsoft launched its assault about 10 months ago with a DOS version of its popular graphics-oriented Apple Computer, Inc. Macintosh Excel program amid gushing reviews and wide user interest.

Borland followed suit in late 1987 with a work-alike program that performance-hungry users could customize to look and feel like 1-2-3.

"Lotus isn't in any trouble in the DOS market," said Bill Higgs, director of software research at Infocorp. "They're going to lose a certain amount of market share, but it's not going to be like what 1-2-3 did to Visicalc."

Lotus is enjoying an even stronger position in corporate America, which represents a bellwether for spreadsheet sales success. Despite a few examples of big 1-2-3 users switching to Excel or Quattro, most Fortune 1,000 users are sticking with the tried-and-true industry standard.

"If you've invested a lot of dollars and bodies in building applications on 1-2-3 and supporting it, you're going to stick with 1-2-3," said Mort Rosenthal, chairman and chief executive of Corporate Software, Inc. in Westwood, Mass.

Rosenthal estimated that 1-2-3 currently accounts for more than 90% of Corporate Software's spreadsheet sales to Fortune 1,000 customers. He expects those numbers to remain constant now that the novelty of the two challengers has begun to wear off.

Uphill battle

Excel and Quattro are both working against history in their efforts to nibble away at 1-2-3. As with any firmly entrenched industry standard, such as Ashton-Tate Corp.'s Dbase, users are reluctant to give up what they are familiar with even if the alternative offers better performance or a lower price.

Yet there have been users who have recently cut their long-standing ties to 1-2-3. Most notably, some of the country's Big Eight accounting firms — including Arthur Young Co., Deloitte, Haskins & Sells and a group within Arthur Andersen & Co. — have adopted Excel.

Arthur Andersen, which dumped 4,000 copies of 1-2-3 in favor of Excel last March because of its ease of use, said it has no regrets.

"The more we use the product, the more we like it. It's really paying off," said Jack Dreiss, director of development in Arthur Andersen's advanced computer audit techniques group, which made the switch.

Other users have flocked to Excel because of its advanced graphical user interface and graphics capabilities. "When I was a 1-2-3 user, I took for granted that you had to have poor graphics and leave your program to do a chart," said Hy Levy, a systems assistant manager at TRW, Inc. in Redondo Beach, Calif., who switched to Excel.

> "LOTUS isn't in any trouble in the DOS market."
>
> BILL HIGGS
> INFOCORP

In addition to the standard barrier, Microsoft has to overcome the fact that widespread implementation of Excel means opening up a thick wallet. System requirements include advanced Intel Corp. 80286- and 80386-based personal computers, added memory and graphics cards.

And although Borland claims that many new Quattro users are 1-2-3 defectors, Quattro is viewed by some as a short-term answer to more serious 1-2-3 deficiencies.

Not done yet

While Lotus's stranglehold on the DOS market shows no signs of waning, the company is expected to face its greatest challenge in the upcoming IBM OS/2 Presentation Manager market. Having all but conceded a serious stake in the DOS market, Microsoft is poised to attack Lotus on advanced 80386-based platforms.

With Lotus staying quiet on a ship date for 1-2-3/G, its entry in the graphics-based Presentation Manager field, Microsoft is already talking victory.

"I don't think anyone in this business thought 1-2-3 was going to stop selling on the old-generation machines it was designed for," said Jeff Raikes, director of applications marketing at Microsoft. "But Excel is positioned for a new generation of graphical user interface and high-performance platforms, and that's where the future is."

But if its steadfast performance and cadre of users in the DOS world are any indication, 1-2-3 will not go down quietly in any environment.

Nynex buys AGS branch

WHITE PLAINS, N.Y. — Nynex Corp. agreed late last week to acquire the professional services and software businesses of AGS Computers, Inc. for approximately $273 million, or $21 per share.

Nynex will acquire all of AGS's outstanding shares, then spin AGS's Microamerica microcomputer distribution business back to AGS shareholders. Nynex will operate AGS as a subsidiary under current Chairman Lawrence Schoenberg, while current Microamerica management is expected to remain the same.

The deal marks the entrance of a large new player into the systems consulting and integration business, which is hotly competitive.

"AGS realized it was no longer competing only with $200 million companies like Computer Task Group," commented Charles Federman, a partner with acquisition specialists Broadview Associates. "Access to capital is more important than ever."

CLINTON WILDER

S. Africa

FROM PAGE 1

cause of the South African government's ability to impose its racist system with the help of computers that document nonwhites for police information. "Computers are key because they are so strategic," explained Donna Katzin, director of South Africa programs at the Interfaith Center on Corporate Responsibility in New York. "They make it possible to track people through their passbooks and their records. And control is the No. 1 feature of apartheid."

Lowering

Pressure on vendors, including Unisys Corp. and IBM, has taken two forms: forming shareholders' resolutions at annual corporate meetings and lobbying municipalities to impose restrictive buying legislation targeted at the vendors.

Of the approximately 15 cities and counties across the nation that have purchasing ordinances, only one MIS director, in Boston — Massachusetts is the only state with a policy — said the ban will have a direct effect on computer operations.

"If it forces us to be a lot more shrewd in the way we go about purchasing, we will," said Allan Stern, director of MIS for the City of Boston. In the next three weeks, Stern said, the city will buy an IBM 3090-class computer, and because IBM does business through a subsidiary in South Africa, Boston will evaluate plug-compatible manufacturers' (PCM) wares and may resort to buying a used IBM machine from a company with no direct ties to South Africa.

It would be difficult to stay in an IBM environment and not do business with companies whose products are available in South Africa. Products from PCMs are generally available in South Africa through subsidiaries or distributors. Additionally, both National Advanced Systems and Amdahl Corp. — the two major PCMs — have close relationships with Japanese companies that maintain active South African operations.

"We're in a bit of a fix," said Charles Yancey, a Boston City Councilman. "We are quite serious about promoting economic sanctions against South Africa." If that means scrapping the IBM environment for a new system that is inherently more costly because of the massive changes needed to support it, Yancey is prepared to proceed.

The price, however, is important in other municipalities. In San Francisco, the operative words are "fiduciary duties." "If heretofore we were doing business with a 'dirty' company, if it costs too much money to change, we don't have to," said Henry Nanjo, MIS director for the city. Nanjo said San Francisco has stopped buying IBM Personal Computers and instead purchases Compaq Computer Corp. microcomputers; nevertheless, the city continues to support its IBM 3084 Model Q.

Boston's Stern

Some other municipalities with selective purchasing ordinances include Chicago; Harrisburg, Pa.; Houston; Madison, Wis.; New Orleans; and New York.

Effect questioned

Some dismissed the apartheid effect of computers. In a memorandum obtained through the Freedom of Information Act by the American Friends Service Committee, an unnamed IBM official said, "We feel that the fact that it is being done with computers hasn't any appreciable overall effects on the apartheid situation. This pass system could be done in many other ways besides computers."

In countering the criticisms by the College Teachers Retirement Fund, a major Unisys shareholder, Chief Executive Officer W. Michael Blumenthal said last April, "We [the former Sperry Corp. and Burroughs Corp.] have been there since 1930, and we have built up a small but loyal group of employees who depend on us."

But according to a study by Richard Leonard, a New York consultant on U.S. corporate policy in South Africa, that small group included only 78 blacks as of 1986, or about 10% of the work force. "It's really a distortion to say that they're staying to help their black employees when most of their employees are white," Leonard said.

Unisys said it spent $2 million in South Africa last year for social change, including $680,000 for the education of nonwhite students. According to Leonard, the company is deriving about $140 million from South African sales — some of them to Atlantic Diesel Engine, which makes armored military vehicles.

Not only do computers keep extensive files for the South African police, the computer connection remains sensitive to American anti-apartheid activists because the computers are largely supplied by U.S. companies. "Efforts to stimulate the electronics industry in South Africa have included a government policy of price preferences of up to 25% for local content," said T G Alast, South Africa's Deputy Minister of Economic Affairs and Technology, at South Africa's first national computer technology conference last year.

Unisys and IBM executives both acknowledged that they cannot control the resale of their computers to the South African military apparatus. "It is possible that some company that purchases one of our computers may provide services to the [South African government]," Blumenthal conceded.

Still selling

Unisys continues direct sales in South Africa but cannot sell machines to military organizations. IBM has withdrawn from South Africa but continues to distribute its products through a South African firm called International Services Management.

Despite the limitations and loopholes surrounding the bans, they seem to prod more U.S. corporate withdrawals than shareholder resolutions do, according to Richard Knight, a senior research associate with the American Committee on Africa in New York. "One way to [isolate the South African government] is to get U.S. companies to stop doing business with them."

The ban loopholes are, in some cases, unavoidable, Knight said. He credited such bans with leading to the withdrawal from South Africa of Bell & Howell Co., Westin Hotel Co. and Ashland Oil, Inc. He said Ashland withdrew after intense pressure from the City of Los Angeles.

IBM stays support ax

DB2 1.2 users not ready, get 90-day extension

BY CHARLES BABCOCK
CW STAFF

IBM last week put on hold for 90 days its plan to drop support for Release 1.2 of DB2 after it became clear that a sizable minority of its customers would not be able to update their release before the June 30 deadline.

An estimated 2,000 DB2 licenses have been sold, and both IBM officials and DB2 users group spokesmen said that 12% to 15% are still on Release 1.2, which became available in March 1986.

IBM notified customers of its intent to drop support a year ago with the announcement of Release 1.3. Earlier this year, the firm announced Version 2.0 and made it clear that users would not be able to migrate to the new version, which has referential integrity, without first upgrading to Release 1.3.

Hanging tough

Nevertheless, a minority of customers have stayed with Release 1.2. Russell Donovan, IBM's data base products marketing manager in Santa Teresa, Calif., said Release 1.2 is currently stable and the source of "near zero" bug complaints. A customer who continues to use it beyond June 30, however, will run the risk of finding a new problem and having no one at IBM able to respond.

If 12% to 15% of DB2 users are still running Release 1.2 at the end of the month, "they could go on running it a number of months," Donovan acknowledged.

A minority of DB2 customers were taken aback by the imminent end of 1.2 support.

"We knew support would be dropped. But when our staff members mentioned it to several members of the DB2 users group, they were surprised," noted Edward Knauer, principal of Knauer Consulting, Inc. and organizer of the Knauer DB2 User Group in New York.

"People are frustrated with support being dropped for 1.2," said Martin Hubel, vice-president of DBview, Inc. in Waltham, Mass. Hubel taught a DB2 course for his firm in New York last week and was surprised to find that eight of 11 attendees were still using Release 1.2.

A survey by the Chicago-based Midwest DB2 Users Group in April showed that only 14% were still on 1.2, said Howard Fosdick, president of the group.

Midnight oil

"Everybody has been working feverishly to meet the June 30 deadline," Fosdick noted. Nevertheless, he said he expects that "a small but significant number of sites may have a problem."

Prior to announcing the extension of support, IBM officials nervously asserted that users had been given fair warning of the June 30 deadline. "We don't think there's going to be many customers with a problem at the end of the month," Donovan said on Thursday. "If there's a problem, we will take some action to solve it."

The next day, he announced the extension of support through September.

Donovan said the picture was complicated for some customers by the fact that they must implement a major IBM MVS subsystem upgrade in order to install DB2's current release. Release 1.3 will work only with Release 1.7 of IBM's CICS, and some DB2 users are still on Release 1.6 of the teleprocessing monitor.

The new release of CICS was announced more than a year ago, but some sites have not upgraded yet. In addition, customers may need to upgrade their releases of IMS or Data Facility Product to work with DB2 1.3, and they may be waiting until they can do so, Donovan added.

At the same time, DB2 developments have proceeded at such a rapid pace that some customers appear to have simply lost track. "We will move to Version 2.0 as soon as it becomes available [in October]," said one Release 1.2 user, even though the Version 2.0 announcement made it clear that customers must migrate to 1.3 before attempting to run their applications under 2.0.

Vince Hilly, manager of data base administration at Depository Trust Co. in New York, said the upgrades are relatively easy for a trained DB2 user to execute. "We're just in the process now, and it's not a significant effort," he said. Two staff members working part-time were able to execute the migration in a month.

"There's no need to load or unload data from tables or rebind applications," Donovan said.

Although IBM has said Release 1.7 of CICS is required for Release 1.3 of DB2, DBview President Robert B. Ashton said DB2's CICS Attach facility will work with CICS 1.6 or 1.6.1, contrary to IBM's recommendation.

IBM buys new firm's technology

BY CHARLES BABCOCK
CW STAFF

IBM announced last week it has licensed the technology of Scottsdale, Ariz., start-up Transform Logic Corp. to add function to its own application development system, Cross System Product (CSP).

While the nature of the potential fit remains undisclosed, IBM officials said the intent is to use Transform Logic's development system to make CSP into more of an end user-oriented fourth-generation language.

IBM will use the system, known as Transform, "to dramatically improve the productivity of customers' programmer community . . . and to broaden the programmer community to include business professionals," said Martha R. Rivera, CSP product manager.

Combining the Cobol-generating capabilities of Transform with CSP "will create a new class of product," said Vaughan P. Merlyn, president of CASE Research, Inc. in Bellevue, Wash.

A graft of Transform technology onto CSP would allow rapid development of application prototypes with end-user involvement, he predicted. As it stands today, CSP is not a good prototyping system, he said.

Only a few dozen copies of the $300,000 to $350,000 system have been sold by Transform Logic. It is an application development system that can generate Cobol from specifications set early in the development cycle, according to knowledgeable observers.

"A user fills in the blanks on about 25 screens as to what he wants his system to look like and Transform generates the code. You don't have to learn a new programming language," said Roger Philips, former president of Transform Logic and now president of consulting firm Philips Associates in Scottsdale.

CSP is currently a programmer's development system that requires users to learn its syntax, which one user described as a combination of Cobol and Basic.

Merlyn described Transform as "very highly regarded by its customers" but "not very well marketed." One of the main benefits of its ability to convert specifications into code is that it allows modifications to a system at the design and specification level, he said.

Adding functions

Rivera said IBM does not plan to simply fuse the two products. Rather, it will use the underlying technology in Transform to add to CSP capabilities.

IBM has labeled CSP a strategic product and urged customers to develop applications for DB2 with it. A CSP application can run under IBM's CICS or TSO with its MVS operating system, under CMS with VM or under IBM's PC-DOS or the Personal System/2 operating system. That operating system portability was a major reason why CSP was included in IBM's Systems Application Architecture.

Ronald J. Davis, president of Transform Logic, said an active data dictionary enables Transform to convert data relationships and function logic into applications.

9370

FROM PAGE 1

match the Group 15 category.

Along with the price cuts, IBM instituted graduated pricing charges for three software programs, including its Expert System Environment for VM, which previously had a single license fee regardless of processor size.

"This is a step in the right direction," said Marty Gruhn, vice-president of The Sierra Group in Tempe, Ariz. "It's certainly the eleventh hour for them, but it's not too late."

Other analysts, however, were not so optimistic, claiming that the price cuts will have a minimal effect on a product line that has a questionable future.

John McCarthy, an analyst with Forrester Research, Inc. in Cambridge, Mass., said he believes the price cuts are an attempt to lessen the beating the 9370s are going to take from IBM's other mid-range offering, the soon-to-be-announced System/36 and 38 follow-on known as Silverlake.

"Cutting prices for the 9370 is like rearranging deck chairs on the Titanic as it's going down," said John Logan, vice-president of the Aberdeen Group, Inc., a Boston-based research firm.

According to IBM, the price cuts were instituted because "we sought to have a better hardware and software pricing balance, and we are responding to customer requirements."

Prior to IBM's announcement, The Sierra Group had completed a report on the cost of ownership of a mid-range system in which the 9370 was ranked as the most expensive of seven vendors' systems in most configurations, Gruhn said.

Last week, The Sierra Group incorporated IBM's price cuts; it will release a new report this week.

The software programs affected by the cuts are primarily system software, including operating systems, utilities, communications facilities and data base management systems, for the VM and VSE environments. Applications packages were barely represented on the list of cuts, although IBM's Professional Office System (Profs), Cadam and a few others were included.

The price cuts are wide ranging. For instance, a new Group 10 license for VM/IS, the operating system tailored for the 9370, is $22,895, nearly $6,000 less than the old price. A $2,175 savings is available with a Group 10 license for IBM's relational DBMS for VM, SQL/DS. IBM's security system for VM, RACF/VM, has been reduced by $2,085 and can now be licensed for $6,255.

Upgrades to new releases have also been cut. For example, the license fee to upgrade from Profs Release 1 to Release 2 is now $625.

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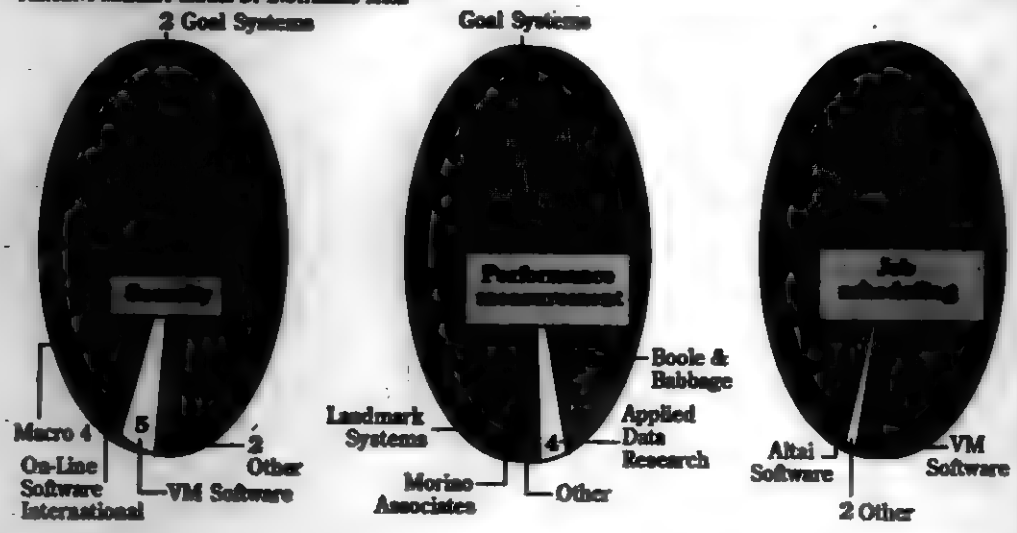
TRENDS

Software utilities

Variety of vendors divvy up growing markets for major utilities

PERCENT MARKET SHARE BY INSTALLED BASE



The primary system utilities, such as security, performance measurement or job scheduling, have not shown the dynamic growth of spreadsheets or relational data base management systems, but they continue to chip away at the sites at which they have yet to be installed.

Five years ago, for example, 93% of IBM or plug-compatible mainframe sites polled by La Jolla, Calif.-based Computer Intelligence said they operated without job-scheduling software, even though that utility can make a regular contribution to efficient mainframe use.

Among other things, a job-scheduling package determines that computer tasks run in their proper sequence, ensuring that an application that needs results from another application will run only after those results become available. By 1985, the percentage of sites not using job scheduling had contracted to 85%, and by the end of 1987, the figure was down to 74%.

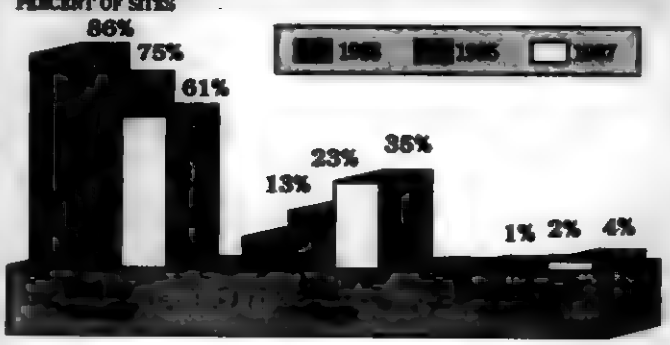
In the same vein, the number of sites going without performance monitors or security software has decreased during the last five years. The source of the utilities going into the sites is frequently a third-party supplier's package, with in-house development accounting for a small percentage of the performance monitors.

The market for commercial packages has allowed several small firms to grow and prosper. At the same time, Computer Associates International, Inc., the industry's largest independent supplier, has benefited from the appetite for system utilities.

CHARLES BABCOCK

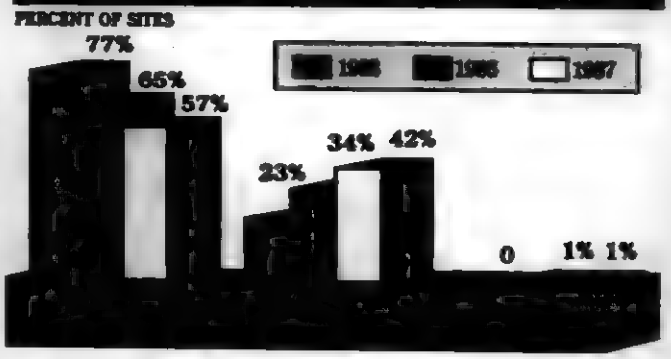
Commercial security package use rising

PERCENT OF SITES



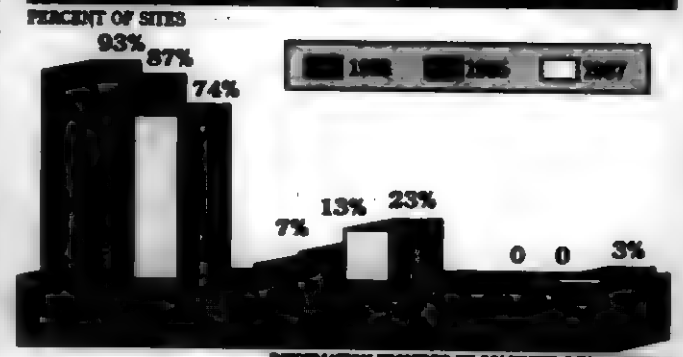
Performance measurement gaining, too

PERCENT OF SITES



Job scheduling echos optimistic outlook

PERCENT OF SITES



INFORMATION PROVIDED BY COMPUTER INTELLIGENCE
CW CHARTS

INSIDE LINES

The lines (and lawyers) are burning. The Chicago-area telephone disaster is finally over; a month after a May 8 fire ripped through an unattended switching station and ruined one of Illinois Bell's five Chicago-area gateways, full service returned early June 5. Now all that remains to be cleaned up is a pile of lawsuits from Chicago companies that claim they lost millions of dollars of business during the outage. "Various companies have filed suit," said Illinois Bell spokesman Tim Bannon, "but we have no comment about it." While the Ameritech subsidiary prepares itself for court appearances, it is conducting an investigation of the outage. The investigation report, due in three to six months, is expected to recommend new security and fire-safety procedures.

Iran was a breeze compared with Congress. H. Ross Perot is a man of action, but his new company's contract to review and revamp the Postal Service's computer operations came a little too quickly for one congressman's liking. Indiana Democrat Francis X. McCloskey, chairman of the House Postal Service subcommittee, has asked the General Accounting Office to investigate the reason that the Perot Systems contract was not opened to competitive bidding. The Postal Service will initially pay $500,000 for Perot Systems to evaluate its operations, but the contract potentially covers 10 years for the vendor to implement its recommendations.

Now that's an early warning system. A published report last week about Lotus readying 1-2-3 Release 2.5 caught the rest of us napping — and apparently Lotus execs were napping a few logs themselves. According to a key Lotus source, the idea of an upgrade to be positioned between the current 1-2-3 Release 2.01 and the upcoming Release 3 has been kicked around, but it's still in the dream stage and there has been no development effort. Were it that easy to move from concept to reality, there'd already be a lot more Lotus products on the market.

Lots of people counting on that Intel chip. NEC Information Systems apparently loves the P9 and is planning a mid-summer introduction of two systems based on the still-unannounced Intel chip. One system will be a desktop unit; another will be a portable. The P9 is a 32-bit 80386 processor that uses a 16-bit data path, making it a cheap and easy swap for the 80286.

Open systems disintegration. Boeing Computer Services is said to be quite upset over the decision by compatriot General Motors to pull back as a leading spokesman for MAP. Boeing fulfills the same role for TOP. "It's kind of like my talking you into running the Boston Marathon, and then two days before the race, I drop out, leaving you to run the race on your own," one source said. GM's vanishing act puts a tremendous burden on Boeing, which still has basic issues under TOP to resolve, the source claimed. GM's leadership of the MAP specification, while at first welcomed, later became suspect as other users feared supporting a competitor's technology needs during this era of strategic information systems.

The Young and the restless. The battle between Big Eight audit firm Arthur Young and some of its fired former consultants cranked up a notch last week as the new firm formed by the expatriates offered to buy Arthur Young's systems integration consulting business for $50 million. Arthur Young isn't interested in selling, but it *is* interested in suing. It will continue two lawsuits against five principals of the new firm, Chicago-based Technology Solutions Co., for allegedly breaching their employment contracts by trying to solicit new business and employees while still with Arthur Young.

Lots of fingers are pointing to NCR as the source of rumors about the Unisys romance. Two Unisys headquarters — in Detroit and Blue Bell, Pa. — was a surprise, but three would really be stretching it. So, is somebody hoping to drive down Dayton real estate prices and buy cheap, or what? Depressed homeowners can call the CW hot line at 800-343-6474 or 617-879-0700 and tip off News Editor Pete Bartolik.

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COMPUTERWORLD

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Compaq calls, raises 386 ante

BY JULIE PITTA
CW STAFF

HOUSTON — Compaq Computer Corp. is set to match IBM's short-lived speed advantage in the personal computer market this week with its fastest 80386-based PC and a second line of 386-based systems using technology that should be more affordable to users.

Tomorrow, the company is scheduled to introduce the Deskpro 386/25, an Intel Corp. 80386-based system with a 25-MHz clock speed. In addition, it will roll out the Deskpro 386S — a lower cost version of the 386 operating at 16 MHz that will be the first system based on Intel's 386SX chip set.

Battle for supremacy

Compaq this week goes head-to-head with IBM by offering a desktop personal computer utilizing the 25-MHz Intel 80386

Processor	Intel 80386	Intel 80386
Clock speed	25 MHz	25 MHz
Memory	1M to 16M bytes	2M to 16M bytes
Hard-disk storage	110M or 300M bytes	120M bytes
Slots	Six	Three
Base price	$10,299 to $13,299	$11,295

CW CHART

Speed racers

Until recently, Compaq was considered the front-runner in 80386 technology, having been the first vendor to offer a 386-based PC in 1986. However, IBM's recent introduction of the 25-MHz Personal System/2 Model 70 put that firm ahead in the race to offer the most powerful microcomputer.

The Deskpro 386/25 will reportedly be offered in two versions: an entry-level system with a 110M-byte hard disk drive,

Continued on page 6

Retreat? Sun softens OSF stance

BY JULIE PITTA
CW STAFF

MOUNTAIN VIEW, Calif. — One month after the announcement of the Open Software Foundation, Sun Microsystems, Inc.'s alliance with AT&T appears to stand on shaky ground.

Sun is scrambling to answer a powerful challenge to its efforts to control the Unix operating system. A Sun executive last week said the firm is evaluating signing on with OSF and conceded difficulties in working with AT&T on the now controversial Unix System V, Release 4.

The addition of Sun to OSF's membership would contradict the harsh criticism the firm's executives have leveled at OSF. Recently, Sun Chairman and Chief Executive Officer Scott McNealy characterized OSF as a transparent attempt by its most prominent members, IBM and Digital Equipment Corp., to hinder Sun by creating confusion in the Unix market.

Continued on page 14

LAN gateways slow to open

Technical questions chill user acceptance

BY PATRICIA KEEFE
CW STAFF

User resistance has emerged as the biggest stumbling block to explosive growth for gateways between PC LANs and IBM Systems Network Architecture networks, bursting ballooning sales estimates — much to the dismay of frustrated suppliers.

In fact, what was first perceived several years ago as a hot market is only now beginning to thaw, observers said recently. Demand for these gateways, which run the gamut from multisession host access cards for personal computers to local-area network-to-IBM 3174 links to SNA subsystems, will probably not catch fire for another year or so.

Frosting user interest are strategic and practical issues, including uncertainty over IBM's direction with Distributed Data Management and Systems Application Architecture, the network impact of leading-edge technology and a lack of applications addressing both desktop and host environments.

There are also users who are either too gun-shy from previous gateway disasters or are still embroiled in the early stages of LAN implementations and simply have yet to address host access. "The number of PCs linked to LANs has been to some extent overestimated," said John Carosella, a consultant at Net-

Continued on page 101

IN DEPTH: MIS STRATEGIES

Penney cashes in on leading edge

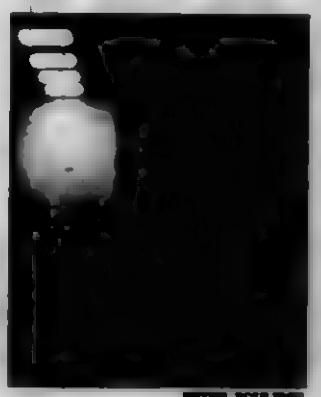
BY ALAN ALPER
and JAMES DALY
CW STAFF

The golden rule of retailing used to be that success is determined by three factors: location, location and location.

But while it is still important where a store hangs its shingle, that is no longer the sole guarantor of success. The strategic use of information systems has become just as important.

J. C. Penney Co. is one retailer that has used information technology in merchandising, inventory control and decision support to gain a competitive edge. Without accurate and relevant customer information, a retailer is hard-pressed to either take advantage of hot-selling merchandise or minimize its "dogs."

David Evans, Penney's vice-president of systems and data processing, puts it bluntly: "We will never let ourselves be in a position where the competition can get goods on the floor with fewer people and less technology than we can."



PETER FOULDES
Penney's *David Evans*

Penney stands at the forefront in redefining retailing's rules. The 86-year-old firm, named after founder James Cash Penney Jr., spent 15 years forging an information technology infrastructure that is now the envy of rivals and helps the firm deliver on its credo: Always give the customer a fair break.

Penney realized early in the 1970s that it needed to make a substantial investment in information technology if it was to excel in the cutthroat retailing industry. That decision led to a pair of critical changes in its information gathering process:

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"We wanted the focus to be that the boxes make the people more productive, not just 'everyone else has got a computer, so I want one, too,'"

GERRY MONDAY
J.C. PENNEY CO.

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Modern Jazz stifled

Lotus changes tune, focuses on 1-2-3 for the Mac

BY DOUGLAS BARNEY
CW STAFF

CAMBRIDGE, Mass. — Last Tuesday was Flag Day, a celebration of our country's many freedoms. But for Lotus Development Corp.'s Modern Jazz, it was the day the music died.

Lotus announced the cancellation of the project, citing "a shift in focus to 1-2-3 for the Macintosh." Code-named 1-2-3/Mac, the product is part of a strategy of providing 1-2-3 for everyone, no matter what machine is used.

After Microsoft Corp.'s Excel ran roughshod over Lotus's Jazz in the Macintosh spreadsheet market, Lotus devised Modern Jazz, originally code-named Galaxy. As the Modern Jazz project ran into a series of delays, Microsoft continued to sew up the market with Excel.

Last month, when *Computerworld* learned of the most recent delay [CW, May 16], Lotus officials asserted that they were still committed to the product. The officials could not, however, provide a new release date.

But for Lotus, that delay, combined with a changing market, spelled the end for Modern Jazz, the product announced in March 1987 and originally scheduled to ship last summer.

"There were a significant number of bugs," admitted Frank King, senior vice-president of Lotus's Software Products Group, who added that "it was not canceled because of development reasons."

Out of tune

King said Modern Jazz no longer fit into the firm's strategy of providing one version of 1-2-3 that runs on multiple platforms.

The 1-2-3/Mac products are also meant to take advantage of Lotus's proprietary spreadsheet programming language and a communications interface that ties 1-2-3 to many data base management system products.

All members of the Modern Jazz development team have been asked to join the group working on a version of 1-2-3 for the Mac, which will add some Macintosh features to what will essentially be a personal computer-style product.

While most users had not been beating on Lotus's door to ship the product, they were interested in evaluating Modern Jazz — and in some cases switching to it if it proved worthy.

Jazz 1A will remain on the market and will continue to be supported by Lotus.

Cullinet's bottom line at low point

BY NELL MARGOLIS
CW STAFF

WESTWOOD, Mass. — Despite record revenues, Cullinet Software, Inc. — coming off a year marked by corporate shifts, financial readjustments and costly product rollouts — last week posted a $24 million loss for its 1987 fourth quarter.

The tumultuous year's closing quarter ended April 30 was Cullinet's eighth consecutive quarter in the red. The $24 million deficit — the largest quarterly loss ever for Cullinet — contributed significantly to the company's $47 million year-end loss figure.

In happier news, Cullinet netted year-end revenues of $216.7 million — also a record — and a 24% jump from last year's $174.9 million revenue figure. Fourth-quarter revenue increased 5% over last year's comparable period, from $61.1 million to $64.3 million.

Expenses reflected in both the annual and fourth-quarter loss figures included not only the $14.8 million price tag for Cullinet's recent structural reorganization and new product rollout, but also the costs of marking down or writing off selected notes, accounts receivable and acquired assets.

"It was our definite intent that no extra baggage be carried into 1989," said President and Chief Operating Officer George Tamke. "We have set the stage in the best way we possibly can for 1988 to be the year in which sustained profitability can be accomplished."

"This is kind of the final scene, if you will, in our two-year effort to redefine our markets and reposition ourself as a player," said Cullinet Executive Vice-President of Marketing Jeffrey P. Papows. "No one's going to tell you that the restructuring wasn't painful — but it was necessary."

Increased penetration of the international market, now accountable for 33% of Cullinet's worldwide sales as opposed to 24% a year ago, and a healthy growth in license fees and services — up to $124 million for fiscal 1987, from $85,000 at the end of fiscal 1986 — were significant factors behind the company's strong revenue figures, Tamke said.

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High-end Windows going corporate with graphics, multitasking abilities

BY STEPHEN JONES
CW STAFF

REDMOND, Wash. — Microsoft Corp. is set to release a new version of its Windows operating environment in an attempt to win more corporate users and position the product as a serious multitasking system for high-end personal computers.

Microsoft will unveil Windows 2.1 at a systems software forum it is sponsoring at the end of this month in New York, sources close to the company said last week. The software will come in two versions: one for Intel Corp. 80286-based computers and one for 80386-based machines.

Windows 2.1 provides an additional 60K bytes of random-access memory for all Windows applications. This is because the upgrade was designed to take advantage of a segment in the extended- or expanded-memory addressing region of 80286- and 80386-based PCs, sources said. The extra 60K bytes of RAM could make a significant difference for users with memory-hungry graphics applications or large data sets.

The two versions of Windows 2.1 will be called Windows/286 and Windows/386 to drive home to users their high-end orientation, according to sources familiar with the products.

New image

Although Windows 2.1 offers only limited performance enhancements, Microsoft said it hopes to change the product's less-than-celebrated image by placing a greater distance between it and the low-end Intel 8088-based machines it was first designed to run on.

Observers said Windows sales have been lackluster, in part because 8088-based computers are short on memory and run too slowly to churn out the crisp graphics images that Windows is meant to provide.

As a result, many corporate users have cast a skeptical eye on Windows and opted to wait for the upcoming OS/2 Presentation Manager from IBM, which promises sharp graphics on high-performance computers.

Microsoft, however, is not abandoning the low end. Windows/286 will also run on 8088-based PCs, although without the advantage of additional memory.

Microsoft would not comment on the enhanced product.

The package also improves on the difficult installation program of its predecessors with an improved setup plan.

There are no changes to the system's user interface, but performance increases and enhanced memory management have been added, according to sources close to the development effort.

Windows 2.1 is expected to ship in July with a price of less than $200.

County law requires VDT use program

PATCHOGUE, N.Y. — A VDT safety measure cited by supporters as ground-breaking and by opponents as antibusiness became law last week when the Suffolk County Legislature voted to override a county executive's veto.

The law, seen as the most stringent in the nation, requires businesses with 20 or more terminals to provide ergonomic furniture, lighting and terminals for workers who regularly use VDTs. The legislation, affecting the eastern portion of Long Island, N.Y., calls for employers to pick up the cost of annual employee eye examinations and related prescriptions and to provide educational programs on VDT safety.

The law does not address the pregnancy-related issues raised in recent medical research showing high miscarriage rates for VDT users.

Cincom joining VAX, Unix parades

BY CHARLES BABCOCK
CW STAFF

CINCINNATI — Cincom Systems, Inc. will move its mainframe relational data base management system, Supra, to the Digital Equipment Corp. VAX and bring out a version of its fourth-generation language, Mantis, for the IBM Personal Computer before the end of the year, members of the Cincom users group were told last week.

Cincom also announced it had reached an agreement with AT&T to integrate its IBM Systems Network Architecture (SNA) network management package, Net/Master, into AT&T's Unified Network Management Architecture. The agreement pairs Cincom, whose product is competing head-to-head with IBM's Netview, with the supplier of the network beyond an SNA gate.

Cincom will also move its product line to Unix, "the fastest growing area of computer technology," according to Thomas McLean, vice-president of marketing. However, no time frame for that step was immediately established.

Cincom is enjoying rapidly expanding revenue from its relational DBMS at a time when other mainframe DBMS vendors are backing away from competing with IBM's DB2.

Supra is expected to account for $49.2 million in revenue this year, compared with $28.9 million last year and $12.5 million the year before, Cincom officials said. A total of 432 licenses have been issued since Supra's launch in 1986.

While initially many of the licenses represented free upgrades of Total or an intermediate follow-up product, TIS, McLean said more than 75% of the licenses issued in 1987 were to new customers purchasing $300,000 to $350,000 worth of software per deal.

Open arms

Cincom customers said they welcomed the moves as diversifications that keep Cincom competitive with IBM and move it away from depending on what was once the company's mainstay, the outdated Total DBMS.

Cincom is launching its first computer-aided software engineering (CASE) tools, including Entity Transformer, which among other things can take a screen design generated by Index Technology Corp.'s Excelerator and change it into a file design for Mantis.

The company also plans to move into office automation and information resource management with such products as electronic mail and an active data dictionary.

Cincom customers also made it known that they believe the Cincinnati-based software organization has moved slowly on bringing SQL to its relational data base products. They said they are impatient for Release 1.3 of Supra, which is currently in controlled release, to achieve general availability status.

One new product touted by Cincom in a 20th anniversary celebration set of announcements meant that some Cincom customers would finally get what they wanted — a chance to use Mantis with DB2.

"We're really sold on Mantis," said Russ McMann, a software developer with the U.S. Information Agency in Washington, D.C. Cincom announced an SQL interface between Mantis and DB2 at the outset of its 20th anniversary conference. "As a result," McMann said, "our division chief said we're going to buy DB2."

Cincom officials acknowledged that there was a risk in producing the interface but said they did not want to stop a tradition of making Mantis programs useful with other vendors' data base systems.

Supra for the VAX is likely to overshadow Ultra, the product Cincom already markets to DEC customers. A spokesman at a beta-test site for the product said Supra was able to process transactions at a 40% faster rate than Ultra.

A potential user, Marlin Brueberg, data base administrator at Rockwell International Corp. in Golden, Colo., said Supra will bring mainframe functionality to the VAX. For example, he said his copy of Ultra lacks good utilities for moving a developed set of files used in a test to a production system. Supra, on the other hand, handles the task easily.

Privately held Cincom, with a controlling share of the company owned by Chairman Thomas Nies, is coming out of a transition that saw the company shift its revenue stream from established products to five new product lines in the last four years.

Out with the old

Cincom has turned over its product line in the last five years; new products now account for almost 80% of the company's revenue

Gross revenue	$91,500	$95,400	$95,600	$132,500	$163,100
New product revenue[1]	$25,000	$28,400	$48,300	$86,900	$129,600
Percent of total	27.4%	29.8%	50.6%	65.6%	79.5%

[1] Includes Supra, Ultra, Mantis, Net/Master and Control Manufacturing
[2] Estimated

INFORMATION PROVIDED BY CINCOM SYSTEMS, INC.
CW CHART

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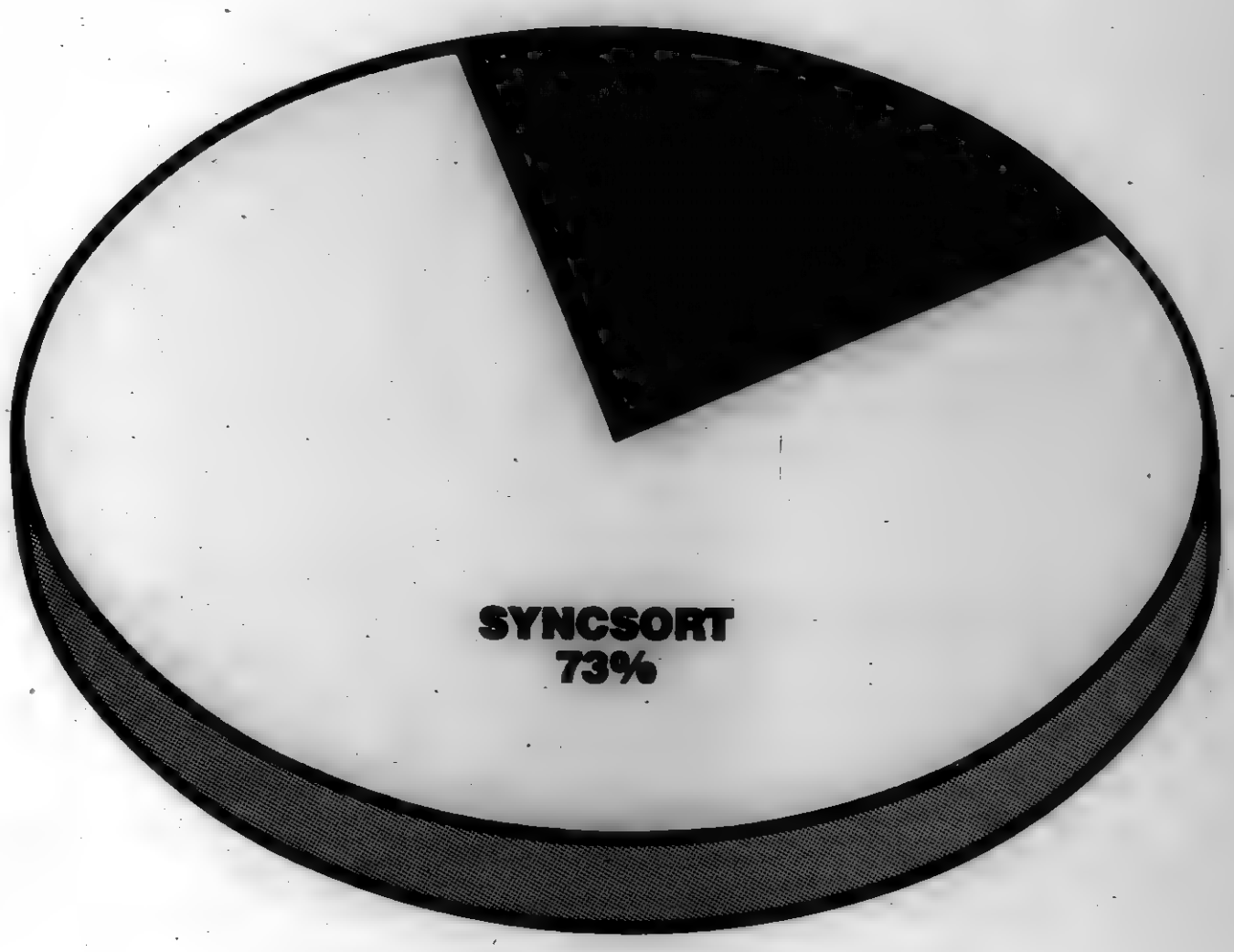

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Compaq

FROM PAGE 1

priced at $10,299, and a higher end model with a 300M-byte hard drive, priced at $13,299. Both will offer six expansion slots.

In contrast, IBM's Model 70 costs $11,295 with a 120M-byte hard drive and three expansion slots. Like most members of the PS/2 line, it sports the Micro Channel architecture, which IBM said offers improved speed and coprocessor support. Compaq's systems feature its Flex Architecture, based on the IBM Personal Computer AT bus.

In addition to meeting IBM with the Deskpro 386/25, Compaq said it hopes to build an image as a low-cost 80386 provider with the Deskpro 386S. Based on the 386SX chip set, which was commonly known before its introduction last week as the P9, the 386S can run software designed for 32-bit machines — but at slower rates, because it uses a 16-bit data path.

Although the price for the 386SX chip set is expected to be comparable to that of a standard 386 set, design costs are lower. Industry analysts predicted that the new chip set will eventually allow 80386-based systems to be priced comparably to the less powerful Intel 80286 microprocessors. Forecasts said systems based on this technology could cost less than $2,500.

Compaq's *25-MHz 386/25*

Compaq will offer three versions of the Deskpro 386S, ranging in price from $3,799 for an entry-level version to $5,199 for a high-end model. A mid-range 386S will cost $4,499. Michael Swavely, Compaq's marketing vice-president, said he expects the 386S system to lure current 80286-based micro users who desire more power but are reluctant to migrate to 80386 technology because of price.

"We are . . . moving the 386 more into the mainstream, making it affordable for those who would otherwise buy a 286 machine," he said.

Swavely said he believes 80386-based microcomputers will compose more than 50% of the market by the end of 1990.

Price cut

Compaq also dropped the price on its best-selling Deskpro 286 Model 40, a 12-MHz, 80286-based system with a 40M-byte hard disk drive, to $4,199 from the original $4,499. That product is still the most expensive in Compaq's 286-based line. The price for IBM's comparable PS/2 Model 50 Z, a 10-MHz, 286-based system introduced three weeks ago, ranges from $3,995 to $4,595.

Despite the low price of products like the 386S, market research firm Dataquest, Inc. said the market for 80286-based PCs will remain strong through 1992. "There will be enough of a price difference between 286s and any 386 that the 286 will remain attractive to a lot of people," Dataquest analyst Bill Lempesis said.

However, Lempesis said he expects products based on the 386SX chip set to become staples in most product lines, with debuts of these systems gaining momentum.

Current Compaq users appear pleased with the new offerings. Lee Youngblood, workstation program manager at Alexander & Alexander Services, Inc., an insurance brokerage in Towson, Md., said he hopes to use the Deskpro 386/25 as a server in a local-area network. He envisioned the Deskpro 386S systems as workstations — faster than the current 80286-based PCs he uses on the network.

"Both would allow us to speed up OS/2," Youngblood said. "It sounds promising if we can do it at a good cost."

Senior Editor Douglas Barney contributed to this report.

Best of both worlds?

Compaq uses Intel's 80386SX to offer 32-bit processing on a 16-bit bus system at a relatively low price

Compaq Deskpro 386S

Processor: Intel 80386SX
Clock speed: 16 MHz
Memory: 1M to 13M bytes
Storage:
5¼-in. 1.2M-byte disk,
20M-byte fixed disk (Model 20) and
40M-byte fixed disk (Model 40)
Base price: $3,799, $4,499 and $5,119, respectively

Sample options:
Intel 80387SX coprocessor — $799
1M-byte memory board — $699
2M-byte memory module — $649
4M-byte memory board — $2,699
4M-byte memory module — $2,599
MS-DOS 3.3 and Basic — $129
OS/2 Version 1.0 — $325
Monitor — $365 to $999

CW CHART

NAS beats IBM to fiber-optic mainframe

BY J. A. SAVAGE
CW STAFF

SANTA CLARA, Calif. — National Advanced Systems (NAS) said last week it will offer fiber-optic channels on its mainframes next year, leapfrogging a feature that many anticipated to be included by IBM in its next mainframe upgrade.

Fiber-optic channels will permit data to be flashed at the speed of light between processors and storage devices located as much as 2 km away while using only 3% of the space taken by current channels, the company said. The firm also announced a remote control monitoring facility for a "lights-out," or automated, computer room and three partitionable models of its AS/XL series mainframe.

NAS is the first U.S. company to offer the option of fiber-optic channels, which are expected to be available at the beginning of next year on its AS/XL and AS/VL mainframes. But NAS's hardware supplier, Hitachi Ltd., has had fiber-optic channels available in Japan since January.

The NAS channels will move data at 3M and 6M byte/sec., the firm said. Channel lengths can be measured at 1 km when connecting mainframes to NAS's high-performance disk drives and IBM-compatible peripherals and at 2 km when connecting the mainframe to NAS's solid-state storage device, printers or magnetic tape. Current technology is limited to about 400 ft, a major restriction in crowded data centers.

"It may seem pedestrian, but a real concern of a lot of users as application demands increase and the need for equipment increases is, Where do you put it?" said Jeffry Beeler, an analyst at San Jose, Calif.-based Dataquest, Inc. "This creates an opportunity for users to move DASD out to other locations. It's even possible to move high-frequency [frequently used] data to another floor with no performance drop."

A new posture

The NAS announcement continues the move by plug-compatible manufacturers (PCM) into an active rather than reactive posture relative to IBM and signaled what may be the end of the IBM leads, PCMs follow tradition.

Last month, the other U.S.-based IBM PCM, Amdahl Corp., jumped ahead of IBM's announcement of the F series by unveiling its own 100-plus million instructions per second (MIPS) machine.

Fiber-optic channels may facilitate a backup computer center without slow data transfer rates, according to Carl Claunch, director of market planning at NAS, so users do not have to endure slow speeds for operation security. Claunch estimated that 10% of NAS customers will use fiber-optic channels, which will be priced at $272,000 per four-channel group. Up to 48 channels on NAS's AS/XL Model 100 can be optical channels, and four channels on all AS/VL models can be optical.

The longer distance capability of the new channels is attractive, said Scott Abbey, MIS managing director at Morgan Stanley Group, Inc. Despite moving to a more spacious data center in New York, Abbey said he may still consider fiber optics to connect peripherals long-distance.

"There may be some benefit in [using the channels] in a complex of buildings so you can pump data underground to them instead of over phone lines," said Mike Heschel, vice-president of information resources at Baxter Healthcare Corp. in Chicago.

The lights-out feature is a hardware and software package designed to automate data centers. One AS Control Facility will control one NAS mainframe via telephone wire to any personal computer or standard terminal.

An NAS spokesman said the remote control monitoring facility will be available for beta testing in September and will cost between $20,000 and $25,000, excluding the PC.

The partitioning function will be most useful in facilitating migration to IBM's Enterprise Systems Architecture. During migration, one-third or one-half of the CPU can run an application while programmers work on converting the system.

The partitioning models — the AS/XL Model 50, AS/XL Model 60 and AS/XL Model 70, with roughly 33, 46 and 61 MIPS, respectively — will be available the last quarter of 1989, NAS said. The computers will be partitioned two or three ways. The Model 50 will be priced at $6.8 million, the Model 60 will cost $8.8 million, and the Model 70 will cost $9.6 million, according to NAS. Although the machines will be partitionable, users will have to pay only one license fee, NAS said.

386SX taps older bus

BY JAMES A. MARTIN
CW STAFF

SANTA CLARA, Calif. — Intel Corp. last week unveiled the anticipated hybrid microprocessor — popularly termed the "P9" in recent press reports — that will reportedly run software developed for its 80386 chip while using lower cost components designed for the 80286 architecture.

Like the 386, the 80386SX is a 32-bit microprocessor, but it uses a 16-bit external data bus, as does the 286. The 16-bit bus is more cost-effective because of its reduced component count and board-space requirements, according to Claude Leglise, marketing manager at Intel's Microcomputer Division.

The 16-MHz 386SX is expected to bring 386 costs down in line with 286 systems, analysts said. The chip is said to further propel the 386 architecture as the standard computing platform while partially eroding the 286 and 8086 markets. However, software designed for the 386 will still have to contend with the 386SX's 16-bit data-path bottleneck. As a result, 386SX-based micros will be attractive to end users more interested in price/performance than in the fastest speeds.

Compaq Computer Corp. last week was the first to embrace the chip (see story above). Intel said about 50 micro vendors are committed to the 386SX chip, but it would not elaborate. It has been widely speculated that IBM also plans to introduce a 386SX-based Personal System/2 model later this year. Neither IBM nor Intel would comment.

"There is a new generation of software development targeted at the 386," said Bruce Schechter, Intel's 386SX product manager. "But users in the 286 class don't have access to such software as Windows 386 and Unix System V/386, and MIS managers have been concerned that if they buy a mid-range PC, it could be outmoded by new software."

The 386SX has already begun high-volume production shipments at Intel's Livermore, Calif., manufacturing plant, according to Schechter. The company would not release production-level information.

Hacker accesses DOD network

Classified data untouched, but security questioned as culprit uses own name for password

BY KATHY CHIN LEONG
CW STAFF

PASADENA, CALIF. - The National Aeronautics and Space Administration Jet Propulsion Laboratory (JPL) confirmed last week that the FBI is investigating a security breach of the Department of Defense's computer network. The JPL said a hacker gained access into the network last month.

According to JPL spokesman Jim Doyle, the incident, which occurred on the evening of May 16, did not affect any of the data on Arpanet, a national network used by scientists, federal agencies and universities. There was nothing classified on the network, he added.

The hacker did not tap information on any of JPL's internal data bases but was able to browse through an active microelectronics training application.

Doyle said the culprit entered JPL's Digital Equipment Corp. minicomputer by entering his own name as the password. That name was the same password used by a JPL employee.

"Employees are cautioned not to use their names for security reasons," he said. "It didn't take a genius to get into this."

After logging on as a JPL employee, the hacker also gained access to a computer at the Patuxent River, Md., Naval Air Station.

Technical details regarding the model of the computer and the exact method by which JPL detected the intruder were not available at press time.

There were no suspects as of last week, Doyle said. "Everything is in the FBI's hands now."

The incident also occurred at least one time last year when the Chaos Computer Club in Hamburg, West Germany, admitted to breaking into the system.

In the meantime, JPL will be tightening the security features of the system and changing the computers' operating system in case a virus was left behind.

Doyle said the laboratory was compelled to hold a press conference after local reporters learned of the incident.

> "IT DIDN'T take a genius to get into this."
>
> JIM DOYLE
> NASA JET PROPULSION LABORATORY

Ashton-Tate replaces users' defective disks

BY STEPHEN JONES
CW STAFF

TORRANCE, Calif. — Ashton-Tate Corp. is replacing an undisclosed number of defective Dbase III Plus and Multimate Advantage II packages that have been frustrating users trying to install the programs.

The packages contain an incorrect error message that reads "insufficient memory" whenever a user attempts to load the program onto a personal computer. The misleading message is caused by incorrect serial number assignments made to the programs during manufacturing.

Ashton-Tate first realized there was a problem with the packages about four weeks ago, when the number of complaints about defective disks rose dramatically, according to Richard DiGiovanni, the firm's vice-president of support services.

Instead of the average 10 calls per week, Ashton-Tate said it was receiving about 40 complaints about Multimate and 30 about Dbase. The high rate of calls has continued.

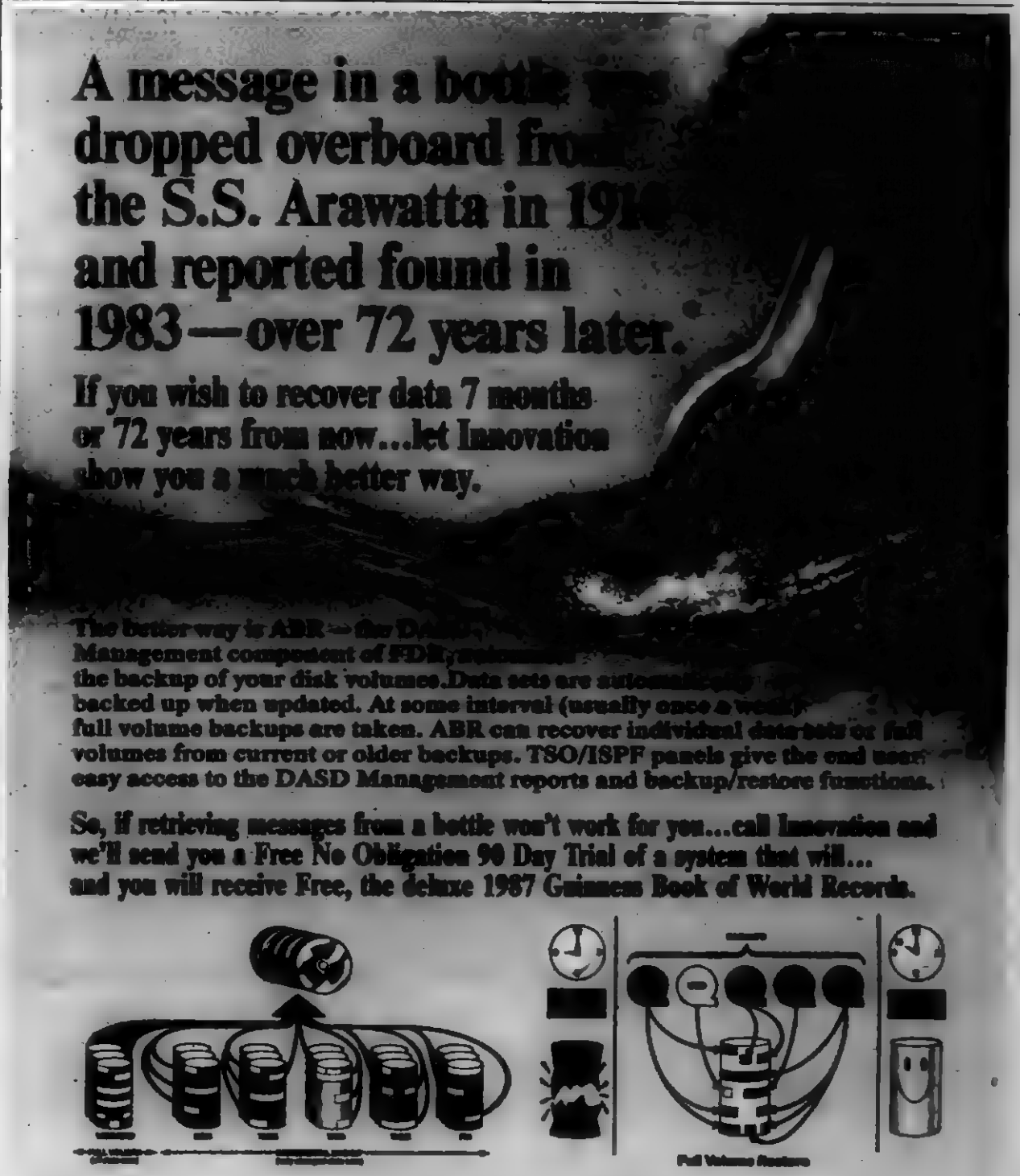
The problem was traced back to a single disk-duplicating machine last week after that device was found to have been churning out potentially defective disks for three straight weeks. DiGiovanni said the error message was placed randomly on the disks and that he could not determine the number of disks that were affected.

No problem

Ashton-Tate would not disclose the cost of the disk replacement effort and downplayed its impact.

"I don't think it's going to take a significant amount of money to run the program," DiGiovanni said.

Users with packages that were produced in certain serial number ranges can receive a replacement free of charge by contacting Ashton-Tate's service department.



Silverlake not an easy solution?

BY STANLEY GIBSON
and CHARLES BABCOCK
CW STAFF

IBM is scheduled to announce its Silverlake processors tomorrow, and customers who want an SAA-compliant system are likely to be disappointed at the software compromises that brought them to market.

Although it is likely to be touted as IBM's first Systems Application Architecture (SAA) machine, Silverlake is not expected to feature all SAA languages. Rather, IBM is likely to add RPG, the language most popular with the System/36 and 38 programming communities, to SAA in order to make Silverlake both acceptable to its customer base and minimally compliant with IBM's standards for software portability.

In another compromise, the data base management system will reportedly remain embedded in the operating system, much as it is in the System/38's Control Program Facility (CPF), but RPG will be given the ability to use some SQL calls. The initial Silverlake SQL version is unlikely to be fully compatible with the SQL used with IBM's DB2 relational mainframe system, key software sources indicated. "It will not support all the data types available for DB2. It's still the old [System/38] DBMS underneath," one source said.

"I keep thinking the thing is a bigger, better System/38," said W. W. D. Dowdell, director of research at McCormack & Dodge Corp. in Natick, Mass., which offers System/36 and 38 products.

At the same time, Silverlake is emerging as a machine with the potential to rival IBM's low-end 3090s and eventually grow into its own mainframe line. That growth path would give mid-range customers a seemingly open, upward migration path for the first time.

Inside info

IBM began briefing consultants and analysts on the new machines last week in Rochester, Minn., where Silverlake was developed. Conversations with these analysts and other parties privy to the series yielded the following description:

- The processors will sport a new operating system, called AS/400, that will look very similar to the System/38's CPF. It will share the same 48-bit address word — which is used in no other IBM operating system — and will offer similar system management, security and command language.
- RPG II and III, the favorite programming languages of the System/36 and 38 communities, will both run on Silverlake, with a third version of the language expected to be offered for inclusion under SAA, the IBM collection of software slated to operate at three hardware levels.

Silverlake will need RPG II source code to run System/36 applications, but the programs will apparently have to be recompiled for execution on the new machines. It will run RPG III programs as they are. The new version of RPG, rather than being a dramatic advance, is expected to represent a machine-independent version of RPG II with an SQL interface added to meet SAA requirements for portability.

- The main alternative to RPG expected to surface with the announcement is Cobol 85. The System/38 already runs many Cobol applications at larger user sites, and IBM will accomplish its goal of SAA portability by making Cobol 85 available early on the Silverlake, several sources indicated.

The portable C programming language is not expected to be available on Silverlake on introduction, although it remains a prime candidate for addition at a later date. IBM reportedly saw little need, given its other tasks, to try to add C at the outset when System/36 and 38 users express little interest in the languages; likewise for Fortran. But two non-SAA languages, Pascal and PL/I, are expected to be available.

Option plays

Despite its compromises and initial limitations, Silverlake will offer a number of long-range options. The System/38 was designed to isolate its operating system from hardware dependencies. It can be rigged to emulate another processor more easily than any other processor. At the same time, its 48-bit addressing gives it mainframe-size virtual memory capabilities that have yet to be fully exploited in current incarnations, the sources said.

"One of the points here is that IBM is trying to create demand in the mid-range," said Frederic Withington, an independent consultant in New York.

Withington said the consolidation of product lines is an urgent strategic need for IBM in order to reduce the overhead costs associated with maintaining several incompatible and sometimes overlapping product lines.

Sneak peek at system specs

Initially, the IBM Silverlake line is expected to be composed of six processors. Two will resemble the IBM System/36 5363s introduced in October 1987 and four will wear 9380 designations, positioning them above the low end of IBM's 370 line, the 9370s.

A variety of sources, several of them briefed last week by IBM, offered the following specifications:

- The largest Silverlake machines will have 96M bytes of main memory, or three times the amount of the largest current System/38 processor, and will be capable of addressing up to 27.6G bytes of direct-access storage device memory. The largest Silverlake would thus be roughly comparable in memory capacity to an IBM 3090 Model 300E.
- The machines are expected to operate with a number of currently available System/36, 38 and 9370 peripherals.
- IBM is claiming the processor will be capable of 2,000 to 40,000 transactions per hour, based on the company's Ramp C benchmark. The sources indicated that the high-end model will perform at 1.7 times the power of a System/38 Model 700.
- Pricing is expected to range from $20,000 for a low-end system to $700,000 for a fully configured high-end system.
- The high-end processor will be capable of 6 to 7 million instructions per second (MIPS), a level that would overlap all but the most powerful model of the IBM 4381 systems.

Dale Kutnick, an independent consultant in Redding, Conn., estimated that IBM will ship 10,000 Silverlake units this year and 20,000 units in 1989. By 1991, the processor should be boosted to 12 MIPS, he predicted.

STANLEY GIBSON
and CHARLES BABCOCK

RPG comes to PS/2

BY ROSEMARY HAMILTON
CW STAFF

IBM is planning to release late this year a version of its mid-range RPG programming language for its Personal System/2 platform, sources said last week.

California Software Products, Inc. in Santa Ana, Calif., is developing an RPG II compiler that will allow IBM System/36 programs to run on PS/2s. IBM will market the California Software product, which had been tentatively scheduled for introduction this week but may be rescheduled for introduction this fall, sources said.

An IBM spokesman said he would not speculate on future products.

A California Software spokesman said he could not comment on the company's relationship with IBM but said it is planning to market a version of its Baby/36 product for Microsoft Corp.'s MS OS/2. Baby/36 provides System/36 emulation on the personal computer platform.

The California Software product will be available for any microcomputer running the OS/2 operating system, according to the company. The IBM product is reportedly for use with the PS/2 only.

The IBM product will be another step in its Systems Application Architecture strategy of providing a computing environment in which tools and applications can be moved from one hardware platform to another.

It will also provide a multiuser environment on the PS/2 platform as well as open up a new market to System/36 developers.

One System/36 developer, who requested anonymity, said his firm is testing an early version of the compiler.

He said response time was slow and that "they'll have to work out the problem with speed for the terminals attached to it.

"But," he added, "it really works. It's a true multiuser capability on OS/2."

CORRECTION

The In Depth article "Rating the vendors: Whose DBMS runs the fastest?" [CW, May 9] by William Inmon was accompanied by two bar charts, on pages 82 and 83, that were misleading.

Specifically, the combination of transactions per second and data base requests per second on the same charts yielded an incorrect picture of data base management systems' relative performance.

The charts at right represent the information in its correct form.

Before publication of the article, *Computerworld*'s editors and the author of the story concurred that combining the two performance measures would be acceptable.

After publication, the misleading nature of the charts became evident.

As the text of the article pointed out, the most accurate graphical comparison between DBMSs can be made by comparing just the transactions per second.

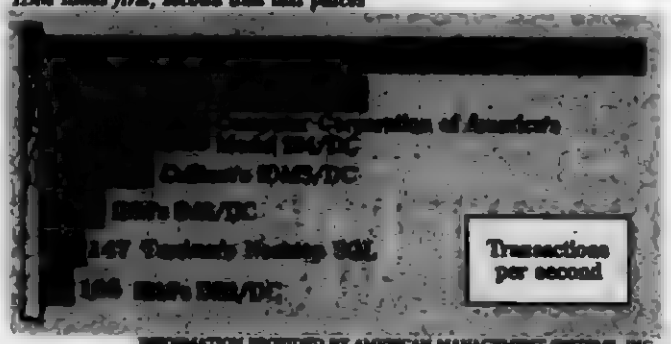
Performance: CICS-based DBMS

Datacom/DB edges out Adabas for top spot

INFORMATION PROVIDED BY AMERICAN MANAGEMENT SYSTEMS, INC.
CW CHART

Performance: Non-CICS DBMS

IBM takes first, second and last places



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CW CHART

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	Pittsburgh	Jul 26
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DBMS/WORLD

Oracle invades Ashton-Tate PC heartland

BY DOUGLAS BARNEY
CW STAFF

BELMONT, Calif. — Oracle Corp. swaggered into Ashton-Tate Corp.'s key market last week, announcing a Dbase clone that also includes an SQL engine and at the same time sparking a war of words between the longtime antagonists.

For years Oracle has yearned for Ashton-Tate's huge base of personal computer users, and Ashton-Tate has longed for Oracle's lucrative host-oriented markets. Rather than wait for a clash in the middle, Oracle is again taking the fight to the heart of Ashton-Tate's PC base, a battle it has lost before. "We want to make Oracle accessible to millions of PC users," said Gene Shklar, director of marketing for Oracle's PC product line.

The two products, Oracle DBXL and Oracle Quicksilver, were developed by Wordtech Systems, Inc., the same firm that sold Ashton-Tate the SQL used in Dbase IV and provided the key members that form Ashton-Tate's SQL development squad. Oracle will add its data base management system engine to the Wordtech products. Oracle licenses the products and owns exclusive marketing rights.

To its arsenal of DBMS products, Oracle claimed it will add full Dbase language support and a compiler that can run against Oracle data bases. Like Dbase IV, the products are expected this fall. Pricing was not disclosed, although it is expected to be similar to the current price of Wordtech's existing products — Quicksilver at $599 and DBXL at $199.

The products should also help plug weaknesses in Oracle's PC DBMS line, which has suffered from carrying the baggage of a minicomputer heritage. If successful, the Oracle products will do everything Dbase does and will add access to a hefty line of distributed DBMS packages.

Meanwhile, Ashton-Tate is arming itself with Dbase IV, which includes SQL language support but retains the Dbase engine, and SQL Server, a multiuser relational engine from Sybase, Inc. that works with Dbase IV.

While these concepts sound simple, they raise a confusing question: Who has the best PC DBMS strategy? That question was just the opening needed for both vendors to start blasting.

Oracle's Shklar called into question Ashton-Tate's entire approach to SQL, particularly the attempt to translate SQL queries into Dbase and run the queries against a non-SQL Dbase engine, technology Ashton-Tate acquired from Wordtech. "It is like turning gold into lead," Shklar remarked.

Ashton-Tate scoffed at Oracle's attempt to plunder its Dbase market. In fact, Roy Folk, executive vice-president and general manager of Ashton-Tate's Software Products Division, argued that the products will provide a way for Oracle users to migrate to Dbase — just the opposite of what Oracle has in mind.

A persistent problem for Oracle has been the perception that its DBMS is difficult for PC users to operate. Oracle recently tackled that problem with a Lotus Development Corp. 1-2-3 interface that shields users from Oracle's inherent complexity.

"You can have it both ways," said Earl Mott, manager of Advanced Manufacturing and Engineering Systems at Haworth, Inc., referring to the 1-2-3 interface. "They have a facility that helps create the SQL statement via menus. But if you know SQL, you can use it."

While most Dbase users seem content with stand-alone systems and have scant interest in SQL, others are itching to break with Dbase tradition. "I would like to move our Dbase users to Oracle. Then we could move them from PCs to a VAX as their needs grow," Mott said.

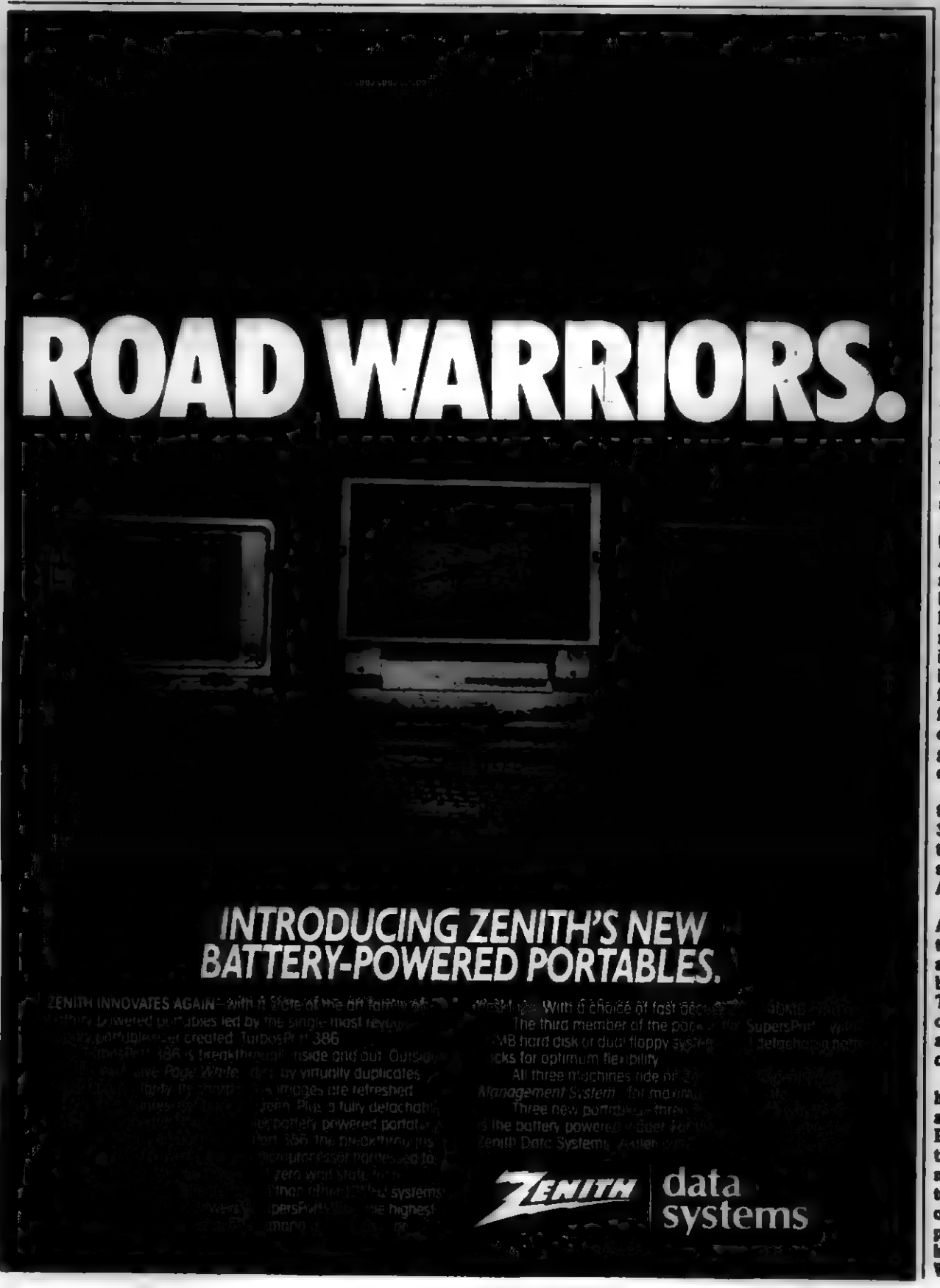
Room for everyone

Another user sees room for both companies. Howard Foedick, relational data base project leader at Amoco Corp., said he believes Dbase may continue to dominate single-user and local-area network installations. However, he added, it will lose accounts where accessing mainframes is a hot issue. Many users will opt for products such as IBM's OS/2 Extended Edition, which will offer a relational engine and a broad range of communications capabilities, according to Foedick.

Ashton-Tate's stock got trounced after the Oracle news hit the street, falling 3¾ points from its Monday level of 27¼ to a Thursday low of 23½. Some analysts said that Oracle, nearly twice the size of Ashton-Tate, is tough competition.

"This is probably very bad news for Ashton-Tate. They are offering a relatively tight connection between Dbase IV and SQL server, but users have a choice between that and Oracle," said Jeffrey Tarter, publisher of "Soft-Letter." "Oracle with Dbase is a lot more open. There are more hardware and operating system choices."

In an ironic twist to the story, Oracle has apparently insulated itself from legal action by Ashton-Tate over selling a Dbase clone. Wordtech received immunity from such a suit as part of the agreement covering its sale of SQL technology to Ashton-Tate. The indemnity "carries over. There are restrictions on selling our product [to another vendor], but not marketing," claimed Bart Van Voorhis, Wordtech executive vice-president.



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Retreat?

CONTINUED FROM PAGE 1

Bill Woo, director of strategic marketing for Sun, conceded that Sun's partnership with AT&T has been less than harmonious as Sun pressures AT&T to accelerate its schedule for Release 4.

"The two companies have vastly different corporate cultures," Woo said. "With that kind of situation, there's always a tendency toward some rough spots, but we're working through them."

Hustling

Woo said that Sun is attempting to speed up schedules for Release 4. He added, however, that AT&T "owns" the schedule. Release 4 is currently scheduled to ship in mid-1989. "It's our goal to get this product out as soon as possible," he explained. "We'd like to ship it next week if we could. There is a sense of urgency now."

Complicating the relationship is a change in management at AT&T's Data Systems Group. Robert Kavner recently replaced Vittorio Cassoni as president of this group. Woo said the change caused some expected ripples but that Kavner is committed to the joint Unix development effort.

AT&T has denied any difficulties in its relationship with Sun. A spokesman said that AT&T has no interest in joining OSF and that there have been no discussions between AT&T and any of OSF's members. He declined to comment on Sun's attempt to commence discussions with the group.

Kavner said aspects of OSF's Unix alternative will be incorporated into Release 4 if they are deemed worthy.

OSF, which includes IBM, DEC, Hewlett-Packard Co. and Apollo Computer, Inc., may eventually cause a rift between Sun and AT&T, industry observers said. Woo admitted that Sun requested a membership application from OSF, but he stopped short of saying that Sun will join the group.

"We're evaluating it," he said. "We need to ask a lot of questions before we make any decisions. But certainly, we'd like to open discussions with OSF."

Among those questions are: What will be the porting base for OSF's version of Unix, and how will it incorporate existing Unix technology?

Questions like these may be less important than Sun's need to ally itself with a winner in the Unix fray. Industry observers said that Sun's relationship with AT&T — while it affords Sun the most influence over Unix development — may eventually harm Sun.

"The last thing Sun would want to do is find itself isolated with AT&T against everyone else," said Maury Domengeaux, a Unix analyst at Framingham, Mass.-based International Data Corp. "They need to join for competitive reasons."

Last fall, AT&T said it would join forces with Sun to develop the latest version of Unix. AT&T became one of the first licensees of Sun's Scalable Processor Architecture (Sparc).

Up in arms

The duality of the relationship stirred the Unix community to rebellion. Despite assurances to the contrary from AT&T, members of what would later become OSF complained that Sun would receive an unfair advantage because of its relationship with AT&T. They feared that Unix would be optimized for Sparc and that Sun, as part of the development effort, could bring products more quickly to market than its competitors.

Part of the reason for Sun's disenchantment with AT&T may stem from frustration. "On one hand, you have Sun — this dynamic, fast-growing, yuppie company — and on the other hand, you have AT&T — the ultimate in bureaucracy outside of the federal government," said Brad Smith, Unix industry analyst at Dataquest, Inc. "AT&T is their biggest liability."

Woo conceded that both Sun and AT&T were, in part, responsible for inciting the rebellion. "Everybody has to accept some degree of blame," he maintained. "Sun may have been to blame in that we were aggressive in our hype about Sparc and driving the Unix standard. We were not being sensitive to normal marketing conduct, and we generated an undue, harsh response."

Sun emulates IBM terminals

MOUNTAIN VIEW, Calif. — Sun Microsystems, Inc. last week introduced a software product allowing Sun workstations to emulate an IBM 3179G graphics display terminal when connected to an IBM mainframe.

Among the features offered on the Sunlink CG3270 is display support for host color graphics, dynamic scaling of displayed images and multiple terminal sessions. Other capabilities include laser printer image compatibility and local display manipulation.

The price for Sunlink CG3270 is $950 per terminal session. It is scheduled for availability in the third quarter.

Brian Craig, product marketing manager for Sunlink CG3270, said the product is "more of a checkoff" in Sun's strategy to offer desktop systems with multiple uses.

"We want to offer users a single desktop system that allows them to use it for everything, regardless of whether the application is performed locally or elsewhere at the mainframe level," Craig explained.

Craig said the product is an enhancement to Sun's line of products that are compatible with IBM's Systems Application Architecture. It uses Sun's News Release 1.1.

JULIE PITTA

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Arthur Young squabble heats up

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — Whose practice is it, anyway?

When a sizable chunk of Arthur Young & Co.'s Midwest software consulting practice broke away from the New York-based certified public accounting (CPA) firm late last month, Arthur Young filed a suit against the five partners who left and took 27 employees with them. Last week, the controversy over the partners' right to set up shop here as Technology Solutions Co. heated up as the breakaway group filed a $15 million countersuit.

The countersuit, filed in New York State Supreme Court, alleges that Arthur Young tried to prevent venture capitalists from bankrolling Technology Solutions into a national software firm that would offer custom and off-the-shelf applications for manufacturing, insurance and consumer applications.

It also charges that Arthur Young tried to convince a major corporate client not to move its account from Arthur Young to Technology Solutions. Of the $15 million claimed, $14 million would be for damages; $1 million would be for capital and compensation withheld from the former partners.

Breach of contract?

For its part, Arthur Young said it believes the two partners it fired — Albert Beedie Jr., now president of Technology Solutions, and Joyce Bennis — are breaching their partnership agreement.

"We have no objection to their starting a new business," said Arthur Young Vice-Chairman John Schornack, who is also the Midwest regional managing partner. "But they all signed a covenant not to take our clients or to take our people." That covenant, he said, prevents former partners from soliciting Arthur Young's clients for two years.

Undaunted by the suit, Technology Solutions is unpacking furniture in a new 3,500-sq-ft space on North Michigan Ave. The desks are uncluttered, partly because the partners' business papers and files have been impounded at Arthur Young.

Still, Beedie and others said they are using their telephones to line up new business and new clients.

"We haven't broken the law at all," Beedie said. "And I don't think their litigation will affect our ability to build our business at all."

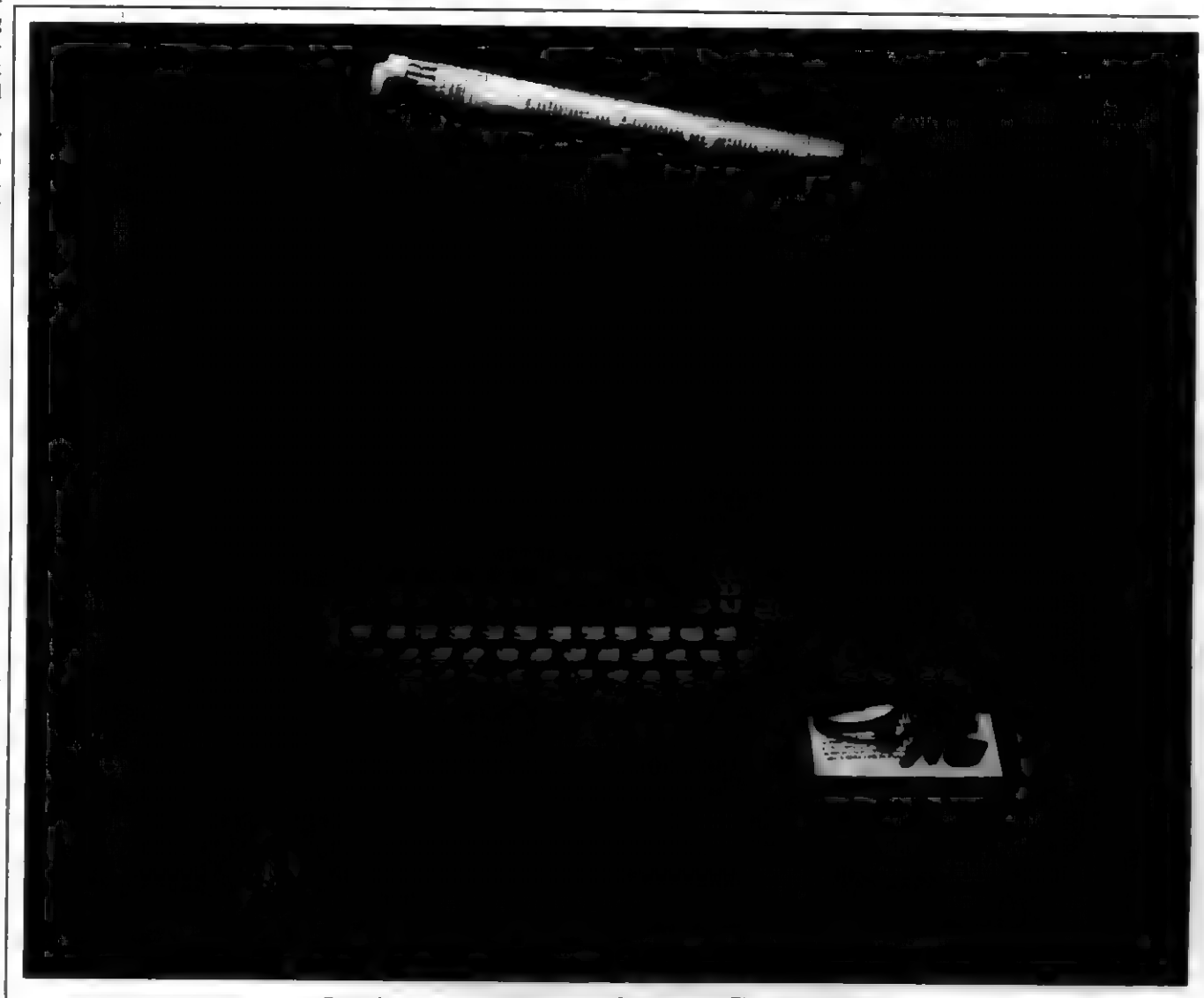
Technology Solutions plans to have 100 people on board by fall and 300 to 400 on staff by 1991.

But the legal dispute lingers on, casting shadows on the fledgling software firm. On June 9, Technology Solutions offered to buy the Midwest Management Consulting Group for $50 million — an offer Schornack labeled "absurd and preposterous."

That strategy proved offensive to Arthur Young's upper management, which plans to retain its Midwest consulting practice. "We feel they're taking something that doesn't belong to them," Schornack said.

But Technology Solutions painted a different picture of what happened. After Beedie and Bennis were fired May 25, another three Midwest consulting partners resigned, and 27 more decided to leave Arthur Young to join the new venture. Technology Solutions claimed that none of its employees were asked to leave Arthur Young. Instead, they reportedly took the initiative to call Beedie and others, asking to come along.

"It's a single, cohesive group that left Arthur Young," maintained Michael Meyers, now vice-president of consumer product systems at Technology Solutions. Meyers said the Midwest consultants were forced to confront the CPA firm's management over the issue of independence. "We were a systems culture trying to act within the context of an accounting culture."



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Natural carried out to operating systems

BY NELL MARGOLIS
CW STAFF

RESTON, Va. — Taking a step toward the computer center automation it plans to kick off this fall, Software AG of North America, Inc. today unveiled a software package that gives users fourth-generation language access to IBM mainframe operating system data.

The tool, called Natural Process, is an extension of Software AG's Natural fourth-generation application development language. It will enable users to access, process, update and manipulate operating system information from within other Natural applications, according to product manager of Natural technology, Jon Ebert.

While such data is culled from a variety of sources, he said, it is presented to the user as if it were present in a data base file.

"Natural Process looks like Adabas [Software AG's data base] to Natural," said Bill O'Cain, systems programmer at South Carolina's Department of Health & Environmental Control, a Natural Process beta-test site in Columbia.

Instead of engaging in multistep, multifile procedures that mandate familiarity with multiple languages, often including the unwieldy job control language with which systems programmers and operators often work, "the end user doesn't even have to use a utility — just Natural," O'Cain said.

In addition to giving Natural users entry into the operating system, Ebert said, Natural Process will let developers build direct operating system interfaces into applications.

Such an application, for instance, is under way at beta-test site Gold Bond Building Products in Charlotte, N.C., where Natural Process is enabling users to keep tabs on the status of jobs sent to the printer — and to do it on-line. Before Software AG stepped in, the number of job status requests phoned in to the Gold Bond DP help desk were up to 30 per day.

Business first

The Software AG product is particularly welcome at Gold Bond, said senior data base analyst Dan Burger, in view of the company's preference for hiring business mavens rather than technology experts as programmers. "It's easier to teach programming to people who can understand our business than the other way around," Burger said. However, he added, that philosophy used to hit a wall when it came to getting MBAs to invest large amounts of time in complex programmer utilities.

Natural Process, Burger said, scaled the wall. "For example, all I have to do is write a simple program in Natural, built right into our application processing application, and a user can determine if the data base is running and know not to start a backup procedure — which used to require a utility."

At South Carolina's department of health, O'Cain and crew are using Natural Process to capture JCL listings and program output and archive it to Adabas, from which it can be easily retrieved and reviewed on-line. Before Natural Process, O'Cain said, JCL output — which contains patient records and financial information that the agency is required to save for up to seven years — was printed out; storing it consumed valuable space, and rewriting lost reports consumed valuable systems analyst time.

Opening opportunities

In its first release, according to Roel Pieper, Software AG's vice-president of product technology, Natural Process makes about 50 IBM mainframe operating system functions available, with more slated to follow in subsequent implementations.

Embedded in Natural, Natural Process works with a host of other Software AG offerings, including a data transfer facility that lets microcomputers and mainframes share data, a facility that turns out reports in graphical form, a report generator that also maintains end-user data files and a networking software product that gives the user call access on remotely located data.

Available immediately for IBM's MVS and MVS/XA operating systems with any teleprocessing system supported by Natural—including Complete from Software AG as well as IBM's CICS, IMS/DC, TSO and VM/CMS — Natural Process prices for users of Adabas and Natural range from $19,200 to $24,000. A stand-alone version slated for fourth-quarter delivery will be priced from $38,000 to $48,000.

PC Expo rollout door open

BY DOUGLAS BARNEY
CW STAFF

NEW YORK — When the PC Expo show opens here tomorrow, users will not be greeted by blockbuster new products. But if they are interested in laser printers, laptops and versatile workstations, the show might just whet their appetites.

• Altos Computer Systems, Inc. is set to introduce an IBM Personal Computer AT compatible that comes bundled with an Ethernet-based Unix server connectivity board. The system, dubbed the WS 100, uses the Altos Application Executive (Apex), a windowing, icon-based interface that integrates Unix and Microsoft Corp. MS-DOS applications. Users will actually combine Apex with Microsoft Windows to run DOS and Unix applications at the same time. The system will start at $1,795.

• For laser printer aficionados, BDT Products, Inc. will reportedly unveil its Ergoprint 610, a laser printer station aimed at departmental use. To handle the needs of multiple users, the printer comes with 10 output trays and seven input trays. The system is said to produce up to 25,000 envelopes and sheets each month. Pricing has not yet been announced.

• Datacopy Corp. should trumpet a new version of its PC Image, image-processing software that can reproduce gray-scaled images, providing more sharpness than other approaches. The firm is also expected to announce that its entire family of scanner and facsimile boards have been redesigned to work with the IBM Personal System/2.

• To keep data safe and secure, Fifth Generation Systems, Inc. is expected to show off Counterpart, an automatic backup product that includes an add-in board and software. With Counterpart, users add an extra hard disk drive, which continually mirrors what is stored on the primary drive. No price has been announced for the system.

• Instead of an extra hard disk drive, Emerald Systems Corp. said it will pitch its new 5¼-in. half-height cartridge tape drives. The systems run on local-area networks, as well as on Xenix and MS-DOS systems, and come in 60- or 150M-byte versions. The 60M-byte version sells for $1,295, while the 150M-byte version goes for $2,095.

• Graphics card maker Genoa Systems Corp. is scheduled to announce a $199 Superspectrum card that emulates Hercules Computer Technology, Inc.'s Hercules Graphics and IBM's Monochrome Display Adapter and Color Graphics Adapter.

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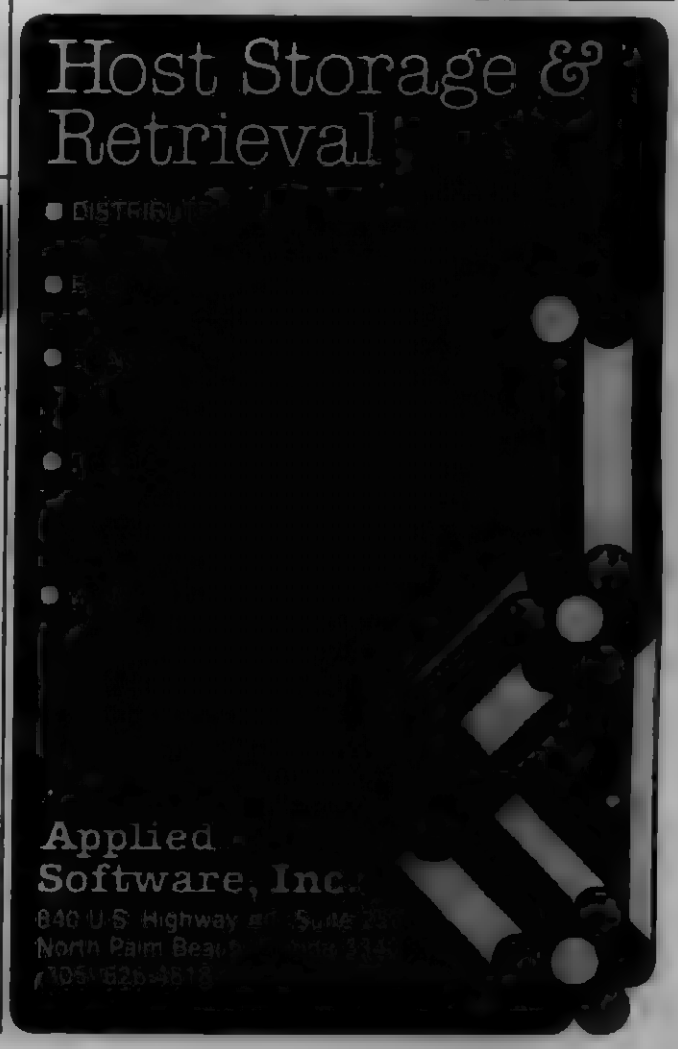


EDITORIAL

Morals over $$$

For as long as anyone at *Computerworld* can remember, IBM's annual meeting has been punctuated by a proxy item calling for an end to its doing business in South Africa.

The same call went out at scores of other computer companies during the past decade. In fact, a large number of firms have stopped doing business in that overtly racist and oppressive country, although the largest firms by and large continue with business pretty much as usual.

Even presidential candidate George Bush has nailed a small, anti-South Africa plank onto his platform, labeling the country's policies as "racist."

But as a CW article pointed out last week, there can be a wide gulf between intent and execution of even the most altruistic of ambitions. In particular, the article demonstrated the toothlessness of municipal ordinances prohibiting doing business with companies still trading in South Africa.

The problem with complying with the laws — and laws are exactly what they are — is rooted in the now aging budget dilemma municipalities face. If company A can save a city $50,000 on a computer procurement over company B, company A is going to get the job, its business dealings abroad notwithstanding.

In essence, thrift wins out over morality.

This is not to chide those cities that are finding creative ways to get around their own ordinances. The same people who so vociferously push for South Africa bans might be the biggest advocates of paring every nickel possible from municipal tax rolls.

If anyone or any group — individuals, cities, companies or entire nations — are serious about answering a distant call for help from a scarred land and scarred people, it is a simple fact that doing so carries a price, literally. Computer companies continue doing business in South Africa because they would incur some loss in revenue, profit or market share by *not* doing so. The same applies to individuals, whether they are acting on their own or collectively.

But there is another truth: Nothing works better or faster, especially in today's world, than multilateral economic sanctions against a repressive regime. We have seen proof of this in South America, Central America and the Pacific Basin.

Corporations must serve the interests of stockholders, and government is responsible for spending tax dollars wisely. But neither party should apply a double standard to the South African regime by condemning its excesses while supporting its economy at the same time. Organizations, be they buyers or sellers, should be commended when they agree to take the hit on their bottom lines in the name of shutting off the spigot to South Africa. Conversely, those who won't make such sacrifices should own up to what they are really doing: supporting a government whose policies are increasingly being recognized as indefensible.

LETTERS TO THE EDITOR

A neutron bomb

President Reagan was fully justified in vetoing the omnibus trade bill [CW, May 9] because it contained a plant closing section. The computer industry needs healthy customers to purchase its products more than it needed that bill. The provision would have been costly in terms of money, jobs and productivity.

Many financially troubled employers are fighting for survival. They may not know six days in advance, let alone 60, whether they will be forced to close or require layoffs. In addition, the public announcement of a pending layoff may jeopardize continuing attempts to attract the new capital or contracts that could keep a plant in business.

Sixty-day notifications have a tendency to be self-defeating. Once companies declare their intentions, suppliers stop supplying, banks withhold credit and 60-day notifications become six-day notifications. European companies have responded to European plant closing laws by building plants in the U.S. The proposed trade bill would have chased those jobs away.

Most major European countries have had such laws since 1975. In that period, Europe has created virtually no new jobs. Europe's average unemployment rate has risen from 4% to more than 10%.

In contrast, since 1975, the U.S. has created more than 26 million jobs. This is, in part, a reflection of the fact that the U.S. has also created or started more than six million new businesses since 1975. All of Europe has created fewer than 500,000 in the same period.

Clearly, the need for plant closing legislation is lacking, and the harm it can do to entrepreneurs who create the most jobs is self-evident. This legislation was an economic neutron bomb, destroying businesses and jobs and leaving people standing in the unemployment line.

Daniel John Sobieski
Chicago

Successful team

My wife and I truly enjoyed reading "True compatibility" [CW, May 2].

We launched our careers in the office automation industry 10 years ago in completely opposite scenarios; mine was in distribution of microcomputer hardware, software and ancillary products and my wife's was in the micrographics and then the microcomputer industries.

We joined forces five years ago, discovering we had mutual business practices that were cohesive and goal achieving.

We also found that with a mutual interest affecting our life as a whole, we exude a strong dedication for success. To rely on our many strengths while buffering each other's shortcomings has resulted in a well-oiled partnership with dedication, loyalty, respect and the ability to interact in an efficient, productive manner.

Even so, people still shake their heads when hearing about mates who work together.

Our main notoriety is our working relationship and team leadership abilities. Our unique capability to communicate our ideas and the ability to enact our concepts is so well received that any desire to quit consulting and get a "real job" keeps being put off.

Alan and Madeline Weisberg
Canoga Park, Calif.

A little of both

We believe a major omission was made in "Your choice: Public or private electronic mail" [CW, April 18], because there was no discussion on how to achieve the best of both worlds.

Computer Application Services, Inc.'s Electronic Mail System (EMS) has been providing an environment in which companies may establish their own private EMS networks. When information needs to extend beyond the scope of those networks, EMS will coordinate the delivery of messages to and from most of the common carrier networks.

In fact, in one example mentioned in the article, the software that runs on Continental Holding Co.'s IBM mainframe and handles inbound and outbound Easylink traffic — from Western Union Corp. — is EMS. That system is used for in-house communications and for communicating with suppliers and public storage warehouses. In some cases, messages are computer-generated orders designated for delivery through Computer Application's Easylink gateway to a supplier or warehouse asking for product shipment to another location. This can make communication very much a hands-off process.

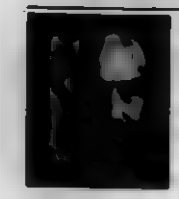
Randy Bendersman
Vice-President
Computer Application Services, Inc.
Irvine, Calif.

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

Dashing for high-tech mastery?

It seems the computer generation race has slowed to a tortoise's pace

CHARLES P. LECHT



Reliable computer manufacturers issue model numbers to variations in new products for four basic reasons:

- They don't want to lose the advertising momentum built up over time and at great cost to identify their product.
- They don't want their product to suffer premature obsolescence.
- They wish to convey the message that they are always improving the product — in other words, undergoing change while at the same time remaining virtually the same.
- They wish to inform customers that they are perpetually broadening the product into a line of machines of the same family, so that in whatever direction customers wish to move, they can do so easily.

We are still facing a blizzard of product announcements in the late 1980s. But you may have noticed that people speak less frequently now about generations of technology. The accelerating waves of technology and economic change have so battered vendors that mounting a next-generation advertising campaign could consume more time than the generation endures.

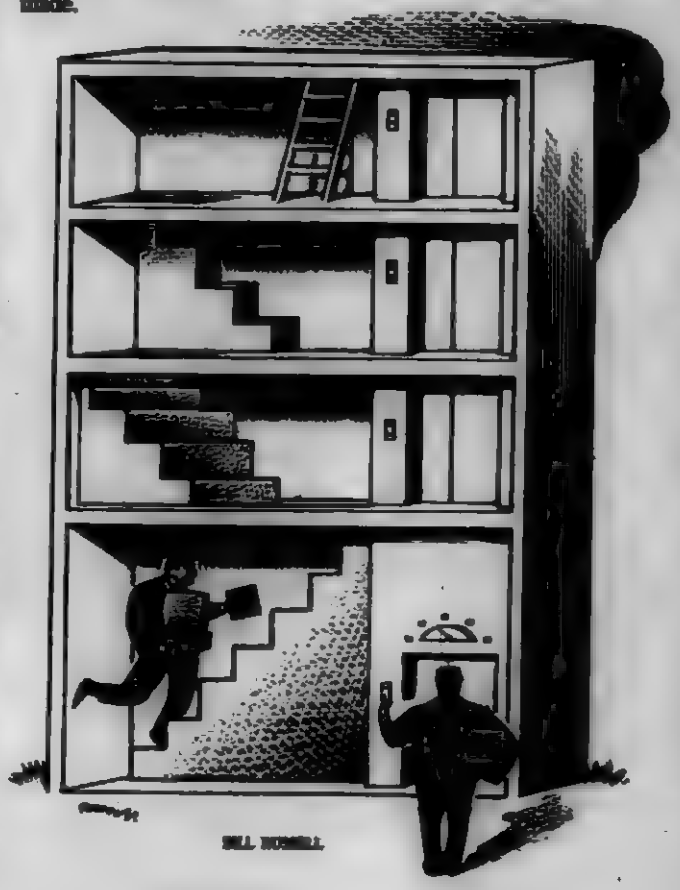
The last major generation proclamation may have occurred around 1982. The Japanese announced that academia, business and government were joining forces to create a fifth generation of computer systems — as if we all knew what the first four generations were.

Computer scientists throughout the world took note of this proclamation. It promised a machine that would embody anything anyone could ever dream possible in computer technology. This machine would be the ideal artificial intelligence engine capable of inductive and deductive learning and would be able to apply its knowledge better than a human could.

The objectives of this fifth-generation dream machine were nothing new in the realm of computer science yearnings and, to one degree or another, had already been achieved. What was new was the promise that the machine would be created to meet its objectives in a way that surpassed anything previously made.

Reaction to the announcement outside Japan can be described as hysterical. Was the U.S. about to be surpassed by Japan in the world race for supercomputer supremacy?

Those who remained level-headed may have suspected other motives were being served rather than just point out that American computer technology might be falling behind.



BILL RUSSELL

For example, was the fifth-generation effort being portrayed as a *kowtu se* (Japanese for "really") hair-raising threat in order to raise public funds for research by American governmental defense agencies? If this sounds unlikely, consider that the initial funding for Japan's fifth-generation project — estimated to span five years — equaled roughly what just one U.S. research agency would spend in one year on the same topic.

The hype over the fifth-generation computer has vanished. Gone are the days that governmental conferences were held to thwart the threat that the Japanese archipelago represented to American supremacy in computer technology. Now, industry spokesmen in both the U.S. and Japan have decided that the generation game is a losing one. Their technologies are so interdependent that much more is to be gained by cooperating than competing.

That no one is talking about the sixth generation may well signify that the fifth-generation stuff we've now abandoned is the last generation we'll hear about. The notion of computer generations may have been laid to rest. Users can relax and enjoy the benefits of computer center evolution instead of revolution.

Lecht is an IDG News Service correspondent based in Tokyo.

Take a load off and join the departmental support club

NAOMI KARTEN

Most information centers support vast numbers of end users, all of whom have individual needs, time frames and agenda. One way to help information center staff avoid becoming overwhelmed is to provide services that focus on departmental rather than individual support.

When centers respond to individual requests, they are subject to several syndromes:

- The "demand-driven" syndrome: The phone rings nonstop, and every call is of the gotta-have-it-now variety.
- The "it-was-a-good-break-from-work" syndrome: Users attend training courses and then don't use what they learned.
- The "neglected-to-do-list" syndrome: Staff members plan a day's work and then fall hopelessly behind because of 200 interruptions before their first cup of coffee gets cold.
- The "that's-what-you're-here-for" syndrome. Some user managers view end-user computing as the information center's job, not their own.
- The "learning-curve-ain't-what-it-used-to-be" syndrome. Teaching an intro to this and an intro to that is easy. But supporting users who are all over the learning curve isn't.
- The "so-what-have-you-done-lately?" syndrome. Management keeps requiring the information center to justify its existence.
- The "make-do-with-what-you-have" syndrome. Even when there is a compelling need for additional staff, convincing management to add any is difficult.

Departmental support addresses the causes of these syndromes. Like the MIS approach to systems development, it acknowledges that departments have different computing needs and recognizes the value of fitting services to these needs.

Most important, it accepts the center as a finite resource that can't do everything for everybody. Departmental support means that the center provides service in accordance with an agreement with the division head regarding his group's computing needs, problems and goals. Services are based on departmental priorities, jointly determined support levels and clearly defined information center and user responsibilities in attaining those levels.

Departmental support hinges on developing a relationship with division heads. At least quarterly, center and end user representatives should meet to review the department's needs and the status of its computing environment. Each meeting includes a review of the center's effectiveness and an assessment of its achievements.

The result is a service-level agreement that delineates the department's needs and priorities during a specified period, how the center will address those needs and what the center and the department must do to ensure that needs are satisfied.

For example, an agreement with the Department of Financial Wizardry (Finwiz) might include the following items:

Several employees will need introductory training. The center will identify relevant courses, and end users will be enrolled in classes closest in time to the scheduled arrival of their PCs.

Finwiz needs small data bases. The center will schedule a class that will revolve around the development of a data base, which the department will then use. The division head will designate someone to be the department's data base specialist.

The center will respond to problems within four business hours. But first, the caller must collect the specified diagnostic information. Urgent problems may be called in at any time by a designated Finwiz person. Quarterly meetings will review the center's responsiveness and the steps to take to reach faster resolution of problems.

The center will support Finwiz's top priority — the 1989 budget — ahead of any other request. The department will inform the center as priorities change.

How can this department orientation eliminate the syndromes noted above?

- **The demand-driven syndrome.** Through agreements negotiated quarterly, information center staff can gain some control over what they do at what time and for whom.
- **The it-was-a-good-break-from-work syndrome.** Students can enroll in center classes on a need-to-know basis. Classes can be geared to specific departments and oriented toward their identified needs.
- **The neglected-to-do-list syndrome.** There's no such thing as unchanging priorities, but the activities of center staff can be less dictated by the hourly whims and nonstop demands of the five, 17 or 123 individual members of a department.
- **The that's-what-you're-here-for syndrome.** User managers can become more conversant with their computer responsibilities and more articulate about their computer needs so they can meet their end of the service agreement.
- **The learning-curve-ain't-what-it-used-to-be syndrome.** By having user managers specify their training priorities, the center can place emphasis where each department needs it most.
- **The so-what-have-you-done-for-me-lately? syndrome.** The center and the departments it supports can jointly document achievements and ensure that management stays informed about accomplishments.
- **The make-do-with-what-you-have syndrome.** The center's ability (or inability) to meet service-level standards can help signal the need for additional staffing. The center can get help from all those users who've said, "You're doing a great job, but we need more of you."

Karten, president of Karten Associates in Randolph, Mass., is a consultant, trainer and lecturer in the management of end-user computing. She is editor of the monthly publication "Managing End-User Computing," published by Auerbach Publishers, Inc.

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SOFT TALK

Diane Hickey

Ada nips Cobol in MIS test

An experiment conducted by the Ada Laboratory of Grumman Data Systems (GDS) in Bethpage, N.Y., suggests that with some added routines, Ada may surpass Cobol in regard to economy and reliability in MIS applications.

The 1987 experiment, a conversion of a small Cobol accounting program into Ada, is reported in a GDS study entitled, "A Comparison of Ada and Cobol in a Business Application."

GDS is the division at Grumman Corp. responsible for internal, commercial and defense computer systems development and integration. The Ada Laboratory studies the potential of Ada and writes software programs for GDS research projects.

"The military is starting to apply Ada to business systems," reports John Litke, a GDS deputy director of technology. "The Army already requires that Ada be used in MIS systems as well as in mission-critical systems.

"That is one of our reasons for studying Ada's commercial potential. Another reason is that we believe Ada will eventually allow us to build more economical and more reliable commercial software programs for the computer systems we devel-

Continued on page 28

Shell merits praise

Early users give thumbs up to Alcorp's KBMS

BY NELL MARGOLIS
CW STAFF

On the eve of the commercial rollout of the Knowledge Based Management System (KBMS), the IBM mainframe-based expert systems shell from Waltham, Mass.-based Alcorp, Inc. — formerly Artificial Intelligence Corp. — early users voiced general satisfaction with the software's performance, enthusiasm about its progress and excitement about its potential.

KBMS debuted in February as an expert systems builder able to integrate knowledge-based processing with existing corporate data bases on either an embedded or stand-alone basis.

Targeted at large companies for use in large-scale production applications, the software — written in C and touted as being able to access IBM's DB2 and SQL/DS relational data bases — was developed in close coordination with several Alcorp users, collectively designated The KBMS Consortium.

"When we first heard about KBMS, we thought it had a lot of promise," said Michael Mushet, manager of technology research for the information services department at Southern California Edison Co., a consortium member. "After working with it for a while, we know it's got a lot of promise."

A $5.4 billion company whose 17,000 employees serve 3.8 million accounts across 50,000 square miles, Edison used KBMS to create a prototype load-forecasting application to predict electricity demand.

"We need this kind of tool,"

Continued on page 24

Cook shares recipe for revamped VM Software

At its annual user conference, held in Washington, D.C., last week, VM Software, Inc. presented itself as an entirely new company from what it was last year. Talk of the IBM 9370 and VM Software's core product line — VM utility software — took a backseat to new strategies.

If VM Software has its way, it will emerge by 1990 as a systems software supplier for multiple hardware platforms on corporate networks. VM plans to announce the acquisition of a network management product within a week. This follows the acquisition of Systems Center, Inc., an Irving, Texas, firm that sells the Network Data Mover.

In an interview last week with *Computerworld* senior writer Rosemary Hamilton, VM Software Chairman Bob Cook outlined the plans designed to change the company.

VM Software's Cook

Why is VM Software moving beyond its traditional business?

It was a problem of scale for us. The VM market has a com-

Continued on page 28

Data View

Ada compiler supply grows

The Ada market is expanding, as witnessed by the escalating number of compilers approved by the National Bureau of Standards

* Derived compilers are documented by the vendor as being based on a previously approved base compiler and then ported to a different processor

INFORMATION PROVIDED BY ADA INFORMATION CLEARINGHOUSE
CW CHART

IBM talks distributed data bases

BY ALAN ALPER
CW STAFF

NEW YORK — IBM shops contemplating distributed data base management systems should start planning now if they intend to fully implement such architectures early in the next decade.

That was the advice offered by Jean Dash, IBM's manager of data systems strategy — the industry giant's self-proclaimed "longest living DB2 planner" — at a recent meeting of the Data Administration Management Association here.

Dash enumerated several a priori requirements for success-

Continued on page 24

Inside
• A Unix-based integrator from Hitachi. Page 20.
• Waterhouse encourages managers to Workcenter. Page 20.

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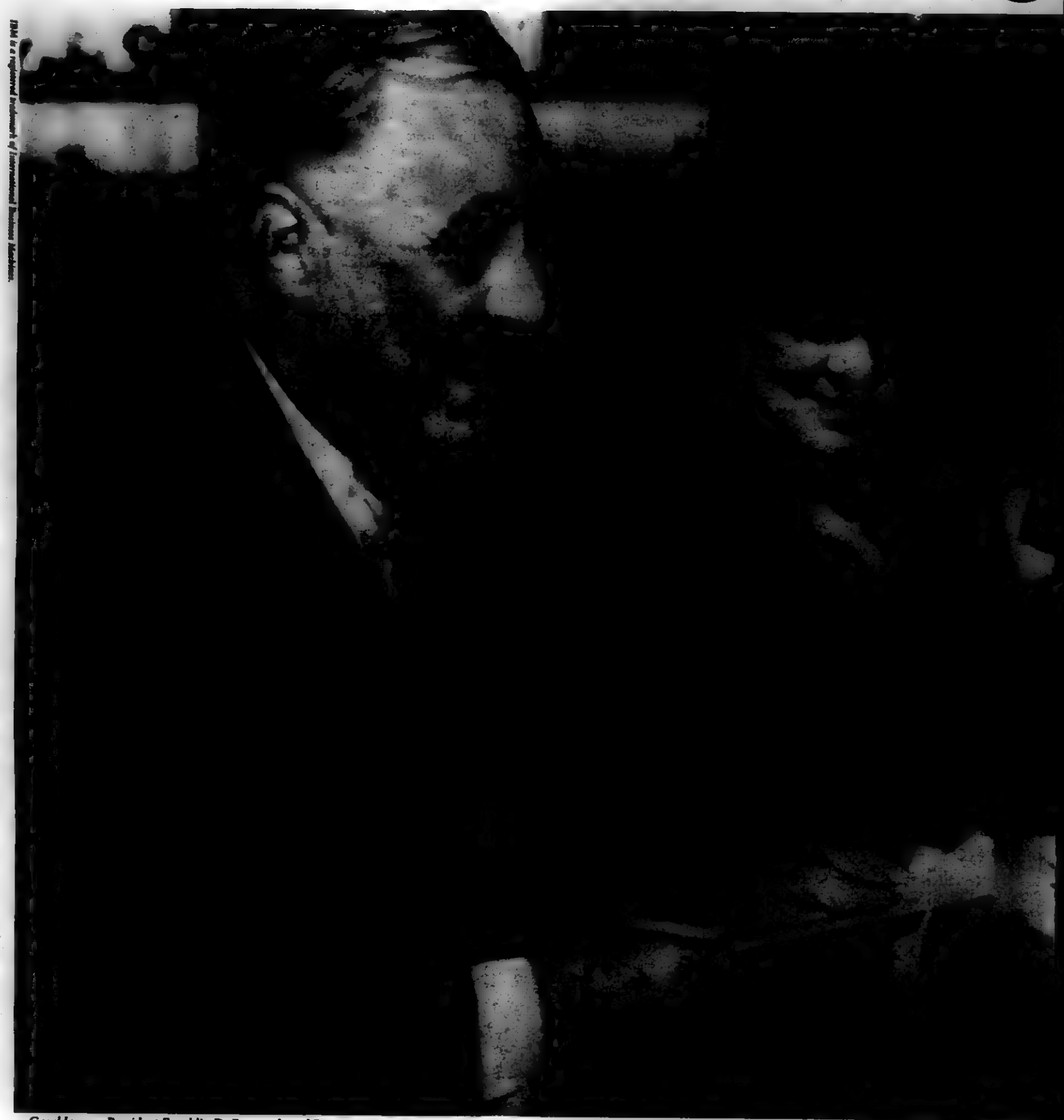

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Casablanca...President Franklin D. Roosevelt and Prime Minister Winston Churchill find something to chuckle about during their historic meeting. (Credit: Bettmann)

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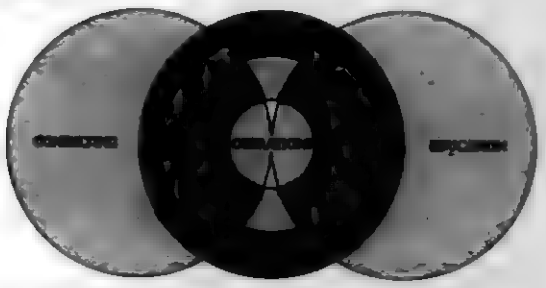

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Shell merits

CONTINUED FROM PAGE 21

Mushet said. "If you look at the whole big world of business problems we have, only a small portion are clear-cut and unambiguous; these we can handle with procedural applications."

Applications such as load forecasting, however, "are based on the laws of nature, not the laws of man, and are constantly changing." In such instances, Mushet said, the flexibility inherent in KBMS's use of both backward- and forward-chaining reasoning methods, as well as the ease of use afforded by a particularly sophisticated intelligent editor, has served to ingratiate the Alcorp product with its first Edison users.

KBMS won similar kudos at Transamerica Insurance Co. in Los Angeles, where its consortium assignment was a prototype expert personal automobile underwriting system — a critical application for the $1.5 billion property and casualty insurance company.

"Thanks to KBMS's built-in editor and its ease of creating external tables, it appears the maintenance of our existing [mainframe-based] applications will be drastically reduced," said Transamerica systems administrator Larry Strong. "KBMS will take some of the updates out of the system. That's a big relief right there."

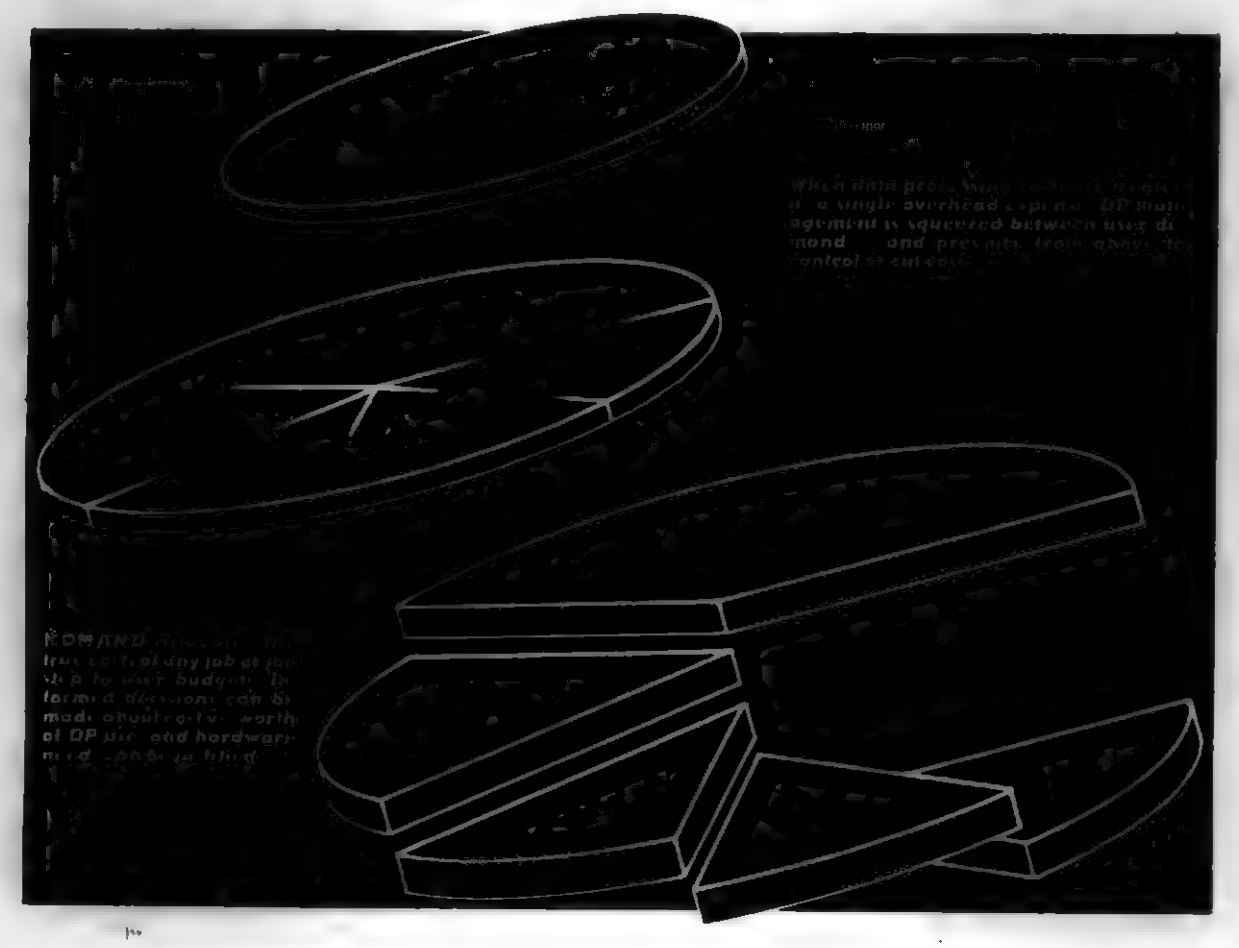
Along with Strong and Mushet, Mike Goliebersuch, information systems consultant at Boston-based consortium member Liberty Mutual Insurance Co., also hailed the tight integration of KBMS and Alcorp's flagship product, the Intellect natural language interface, as a signal benefit to developers working in the traditional large corporate environment.

Both Strong and Mushet conceded, however, that KBMS's real stress tests lie ahead — at Transamerica, when what is now a prototype, basically batch application is mobilized into the company's 4,000-employee nationwide field, and at Edison, when the region's summer weather brings on the threat of air-conditioner overload.

"We don't know yet how KBMS will respond to large numbers of simultaneous users," said Don Prado, applications development manager at Transamerica. "And if it can handle them, we don't know at what cost in overall computer resources."

Nevertheless, the consensus of consortium users seemed to be that KBMS's strengths are desirable enough to make its weaknesses worth overlooking.

KBMS is not as sophisticated as some shells, but it has the advantage of being "more tightly integrated into the traditional DP environment," Goliebersuch said. His department is using the Alcorp offering to create an embedded expert system that will first screen out all automobile insurance applications that require an underwriter's detailed attention for approval and then go on to advise the underwriter.



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IBM talks

CONTINUED FROM PAGE 21

ful distributed data base implementation, including relational data base technology in the form of DB2; a common SQL implementation across systems; Systems Application Architecture to provide a common programming interface; and LU6.2, because of its robust session manager.

Without providing specific dates, Dash reiterated IBM's often-stated strategy of phasing in distributed data base capability in the next few years. IBM's strategy begins with distributed access to centralized data. "The objectives are very simple," Dash said. "What we'd like to do is provide location transparency in stages because of the complexities involved." The process picks up steam next month, when IBM is expected to release OS/2 Extended Edition 1.0.

Dash spoke of distributed requests for data as IBM's first objective. "Am I talking about distributed data? No. I'm talking about data that is centralized. But we're opening up the door for remote access," he said.

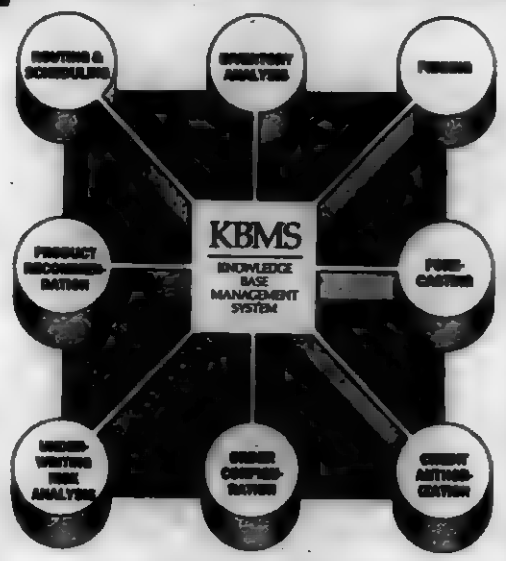
Users are already able to invoke a rudimentary approach under DB2 that IBM calls user-assisted distribution. This approach permits users to extract and load data from remote systems. "This is fine for infrequent users," Dash said but, he added, not sophisticated enough for heavy use.

A more robust implementation is slated to come early in the next decade with the maturing of technology currently under development at IBM's Santa Teresa Laboratory in San Jose, Calif., as part of its R Star program. One approach, Snapshot, would provide a system-controlled method for making multiple copies of tables that could be extracted and viewed from remote systems.

Before establishing a distributed DBMS plan, IBM shops should look at both existing and projected data and decide whether they require distributed access or distributed data, Dash said. Firms should also evaluate communications costs involved with distributed data bases, which are orders of magnitude higher than they might expect.

Data integrity, user authentication, transaction consistency and predictability of performance will have to be guaranteed before IBM releases distributed data capabilities, Dash said. Many shops may want distributed data base management, he said, but most realize it will be a long time before they will be able to contend with all of the complexities involved.

How KBMS solves a new class of applications.



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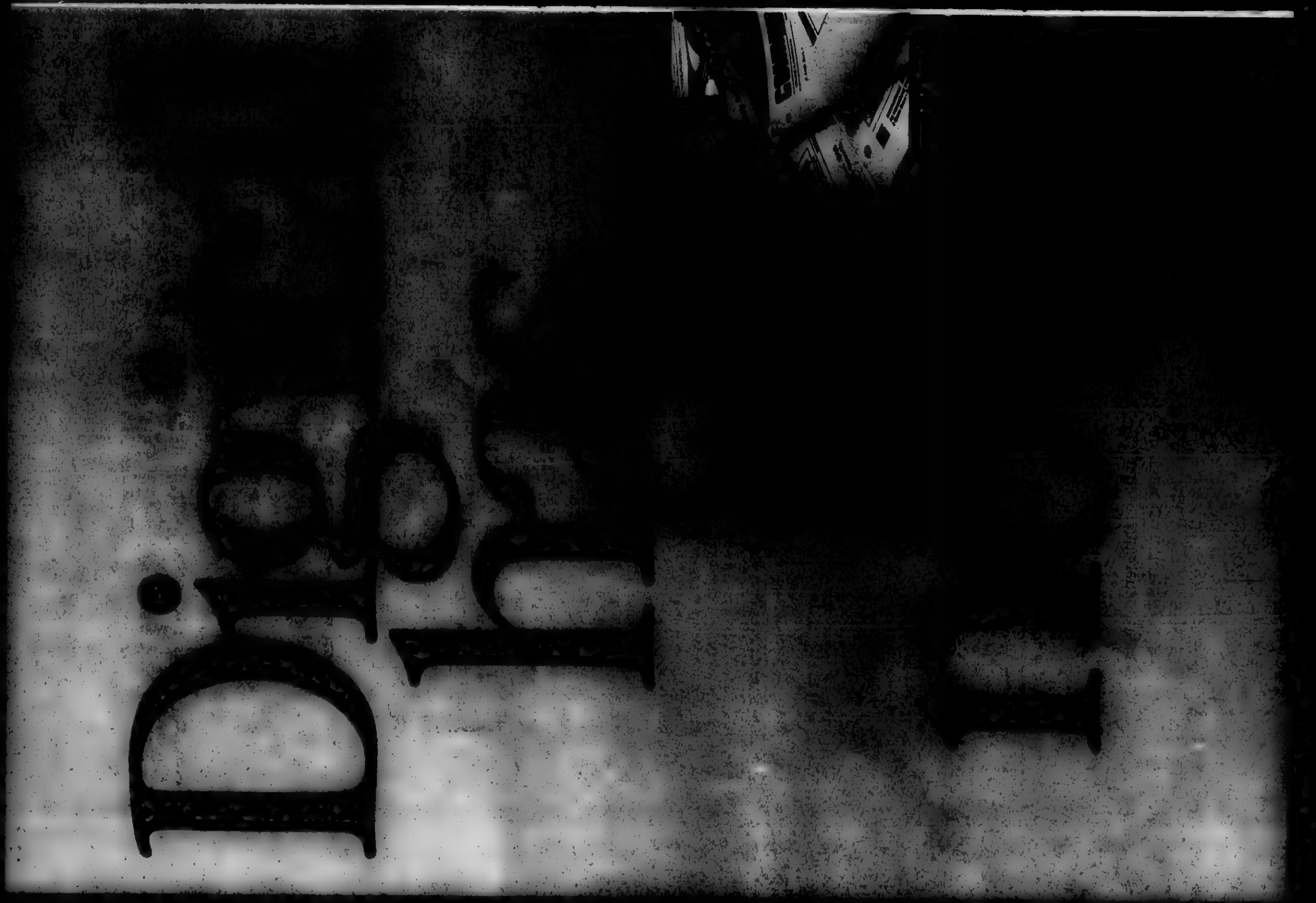

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Cook's recipe

CONTINUED FROM PAGE 21

pounded growth rate of 20% to 25% a year. But take a look at Computer Associates. They can spend about $50 million a year in promotions. We tend to get lost in that. We need to be larger than we are to survive in the long term.

We hope to be $50 million this year and $100 million in 1989. We can do that through acquisitions. That's the way we have to go.

How do your customers feel about your intentions to move beyond the VM systems software market?

I think some of them are real VM bigots, and they don't like it. They're afraid we'll confuse our efforts. But the reality is we have to talk to a number of different platforms that exist on today's networks. We'll keep stressing our commitment to VM. But even if they don't like [our plans], it is where we are going.

What other hardware platforms will you port the company's utility software to?

Well, there are more VAXs around than most other systems. Prime and Tandem are two other obvious choices. In the next year, we don't plan to move to more than one other platform. We'll grow with that, and if we've overstepped, then we'll slow [production] down.

What technologies will you acquire?

We're interested in network management. It's a new area, and IBM hasn't really fleshed out Netview yet. We're also interested in the lights-out operations area.

Are you concerned that the company is taking on too many projects and may end up spreading itself too thin?

We worry about that all the time. But we will continue with a narrow focus — systems software for multiple hardware platforms.

What is the acquisition you will be announcing in a few weeks?

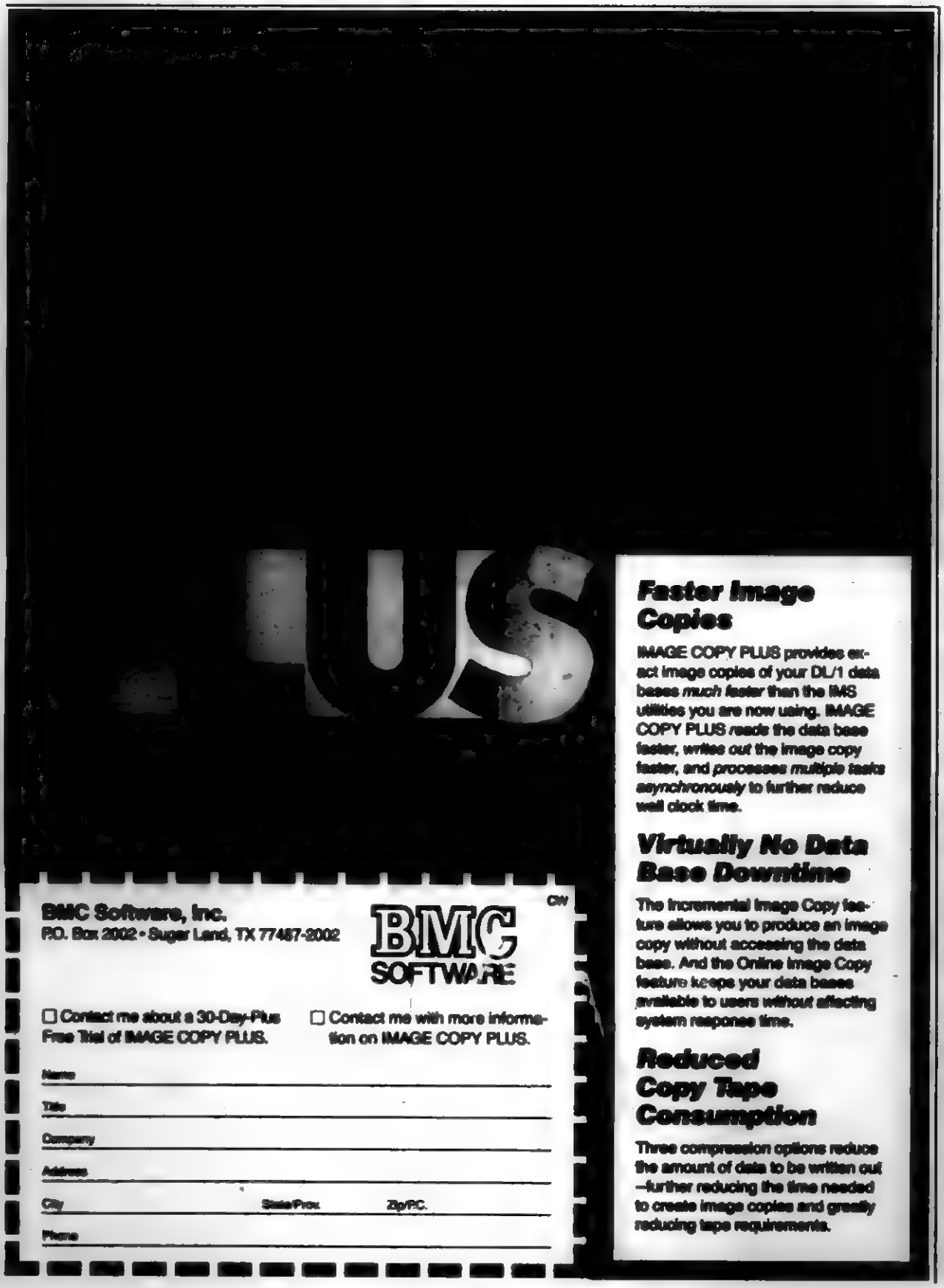
It's an extension of the telecommunications area. That's all I can say now. We're talking to a number of companies.

Do you plan to follow IBM's lead in price cutting for low-end 9370s as well as the creation of a new pricing category?

We've always followed them, but we're still looking at that.

Have sales picked up for VMCenter II to 9370 customers?

There's interest, but there's not a lot of 9370s out there. When more communications software comes out for it in October, then the 9370s should get moving. I'd say by the first quarter of 1989. I think they'll sell 50,000 of them within five years.



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Hickey

CONTINUED FROM PAGE 21

op and integrate."

Among the user benefits that favor Ada over Cobol in the conversion experiment were the following:

- Ada program units can be compiled separately, with a compiler checking for errors across the units, thereby preventing interface errors.
- Ada's exception-handling capabilities allow recovery from more types of errors than Cobol.
- Ada's block structures make possible the design of a more modular program.

The test

The business application selected at Grumman for conversion to Ada is a Cobol transaction register program, which includes a reporting routine. The accounting program in Ada provides report item editing capabilities similar to Cobol's.

The accounting program reads a customer transaction file and performs calculations using numeric input — transactions and credit amounts — to produce a monthly transaction report, an invalid-data report and a listing of run statistics.

The Ada and Cobol programs were developed on different systems. The 1974 ANSI-standard Cobol program was developed on a DEC VAX-11/782. The 1983 ANSI-standard Ada program was developed on a Data General MV8000 and ported to a VAX-11/780.

In order to successfully perform the experiment, a package was written in Ada with a function that provided one of Cobol's features: the ability to edit report time.

In the course of the experiment, the similarities and differences between the two languages were noted in regard to design purpose, structured language, portability, separate compilation and coding style.

At a more detailed level, note was made of comparative program design methodologies, file handling, program units, data and its description, operators, executable statements, structures and exception handling. In all of these categories, Ada was found to be as capable as, or more capable than, Cobol.

The study reporting the experiment noted that in some Cobol-to-Ada conversions, the amount of code was dramatically reduced.

Hickey is a systems analyst at Grumman Data Systems. She specializes in software methodologies and tools.

NEW PRODUCTS

Systems software

A Unix-based package that was developed to integrate production, engineering and management systems has been announced by **Hilco Technologies.**

According to the vendor, **Monitrol** is a menu-driven, user-configurable system that will interface with intelligent plant floor and plant host systems to form a plantwide manufacturing information facility. The software runs exclusively on Hewlett-Packard Co.'s 9000 series of computers and includes a real-time data base that incorporates process graphics, alarm logging and statistical control charting.

Monitrol costs approximately $20,000. Requisite HP hardware costs from $40,000 to $50,000.

Hilco, 3015 S. Brentwood St., St. Louis, Mo. 63144. 314-961-2160.

Applications packages

Weyerhaeuser Information Systems has announced several enhancements and a new platform for **Worksmart**, its maintenance management software designed to decrease maintenance costs in manufacturing operations.

The system reportedly tracks equipment records, work orders, preventive maintenance scheduling and inventory records. An integrated graphics system module, designed for the Hewlett-Packard Co. HP 3000 minicomputer series, and a bar-code data entry module have been added, and a version of Worksmart for the IBM System/38 is available.

The graphics and bar-code software modules cost $5,000 each. Worksmart for the IBM System/38 costs $35,000.

Weyerhaeuser, Mail stop CCB-3C, Tacoma, Wash. 98477. 800-654-9347.

A graphics software package for Cray Research, Inc. machines has been released by **Precision Visuals, Inc.**

The **DI-3000 XPM** program reportedly allows application developers to build and manipulate objects using a world coordinate graphics data manager.

The package provides simulation, modeling and design capabilities in a device-independent environment. Users can create an application on a workstation, transfer control to the Cray processor for number crunching and then bring the results back down to the workstation for viewing.

The Cray version of DI-3000 XPM is tailored specifically for the Cray Unicos operating system, and the product supports the ANSI-standard Computer Graphics Metafile format.

DI-3000 XPM costs from $3,300 to $57,000.

Precision Visuals, 6260 Lookout Road, Boulder, Colo. 80301. 303-530-9000.

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Middlesex, England... The Government has announced that 40,000 additional men will be needed by the Royal Air Force—most of them in the next 18 months—on top of the present strength of 70,000. Pictured here is a line of smart recruits being transformed into well-drilled, confident soldiers. (Credit: Bettmann)

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MICRO BITS

Douglas Barney

Giants war on bus front

Users win. This is the kind of battle users love to see. It is a clash of giants, each trying to put the most powerful workstation on users' desk tops.

The participants, IBM and Compaq, are pushing Intel microprocessors and high-speed random-access memory to their outer limits. Each now has a 25-MHz desktop announced or shipped, and that's just the beginning. As Intel ups its chip speed, IBM and Compaq will quickly plug 'em into systems.

But the key difference in artillery will be on the bus front. Some from IBM say the Micro Channel will give that firm the eventual title of "king of the desktop speed wars." If IBM is right, it will help settle the Micro Channel issue.

As holder of the industry-standard torch, Compaq says the old bus, with some polishing, will do just fine. Just in case it doesn't, Compaq is continuing to evaluate other high-performance buses, such as the Micro Channel, Nubus and some alternative 32-bit buses.

So fight on, in the name of faster PCs.

Continued on page 40

Micros on move in IBM future

Company's move from PCs will fire demand for mainframes, study says

BY ALAN J. RYAN
CW STAFF

LOS ALTOS, Calif. — During the next four years, IBM will continue its migration to new micro-based systems in an effort to generate demand for its mainframe computers. At least that is the theory put forth in an upcoming report from the International Technology Group (ITG), based here.

According to the study's author, ITG managing director Brian Jeffery, the Personal System/2s of 1992 will bear little resemblance to the company's 1988 offerings. Jeffery said IBM's OS/2 and proprietary Micro Channel architecture are also interim offerings.

OS/2 will lead users to a new operating system that will run on microcomputers, minicomputers and mainframes, Jeffery said. "It will no longer be just a discrete system on the PC."

A look ahead

The study, slated for release in early August, is based on an analysis of IBM product plans, positioning and research and development activities affecting the company's workstation product lines, according to ITG.

The PS/2 is the result of an internal IBM program that began in 1983, ITG said. That program abandoned the original concept of the stand-alone, personal-user personal computer.

Development for the PS/2 has been closely coordinated with IBM development activities for other systems, which will lead to new product lines in 1992, ITG predicted.

The new lines will include intelligent ASCII workstations, which will be made by merging the current PS/2 Models 25 and 30 with IBM's 3160 and 3150 lines of ASCII terminals to form inexpensive, mass-produced commodity products.

Also in the lines will be intelligent 3270 workstations. Jeffery said the PS/2 Models 50 and 70 will merge with IBM's 3190 dumb terminal line. OS/2 Extended Edition and the Micro Channel architecture will evolve into an environment designed primarily for host coprocessing, the report predicted.

Additionally, the high-end PS/2 Models 60 and 80 will evolve into 370, System/36 and 38 and other IBM mid-range systems. The high-end PS/2 models will then form a bridge between the OS/2 environment and the 9370 and upcoming Silverlake environments, Jeffery predicted. The PS/2 Model 80, for example, will become the low end of both the 9370 and Silverlake, running the VM and System/36 and 38 operating systems, respectively.

"IBM is effectively out of the personal computer business and is no longer interested in stand-alone PCs," Jeffery said.

Data View

Desktop presentations see colorful future

Color hard copy should be fastest growing segment, taking its biggest bite out of monochrome printers

INFORMATION PROVIDED BY CAP INTERNATIONAL, INC.
CW CHART

Microrim readies compiler

BY DOUGLAS BARNEY
CW STAFF

NEW YORK — While Ashton-Tate Corp. has so far declined to unveil a true compiler for its market-leading Dbase III, its competitors have fewer qualms.

Sources reported recently that Borland International is readying a compiler for its Paradox data base management system. But Microrim, Inc. will beat Borland and Ashton-Tate to market with an announcement next week in New York of its $1,000 R:Base Compiler.

The product is scheduled to ship this fall.

According to Microrim, the compiler offers several advantages for developers. In addition to the product's improved speed, developers can produce secure code through the creation of stand-alone .EXE files. Data access is about twice as fast as with

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Inside

- Kapor stays busy with On Technology. Page 33.
- I'll buy that: Amway adds PCs to arsenal. Page 33.
- Fortron rolls out 386-based systems. Page 41.

Micro Focus COBOL for Mission Critical Programming

Success in the growing Electronic Data Interchange (EDI) software market depends on good business sense and a top-level product. Supply Tech, a leading EDI software vendor, decided that good sense and Micro Focus COBOL products go together for PC applications.

Supply Tech President Gail Jackson chose Micro Focus COBOL. "We built our PC applications from a base of mainframe COBOL code and expertise. Micro Focus COBOL supports the mainframe commands we need. And Micro Focus run time routines let us do things from COBOL that we would have had to do in assembler on the mainframe," she says.

"Our mainframe-trained programmers love debugging with the Micro Focus ANIMATOR because it's so easy to use and lets us really see what's going on inside the program."

Supply Tech also likes Micro Focus COBOL portability. "We're looking hard at OS/2 as a platform for further market expansion. When we make that move, we'll do it knowing that Micro Focus COBOL will be there."

Join professional developers like Gail Jackson and find out about the Micro Focus "Better Way of Programming." And do it before your critical mission becomes your mission impossible.

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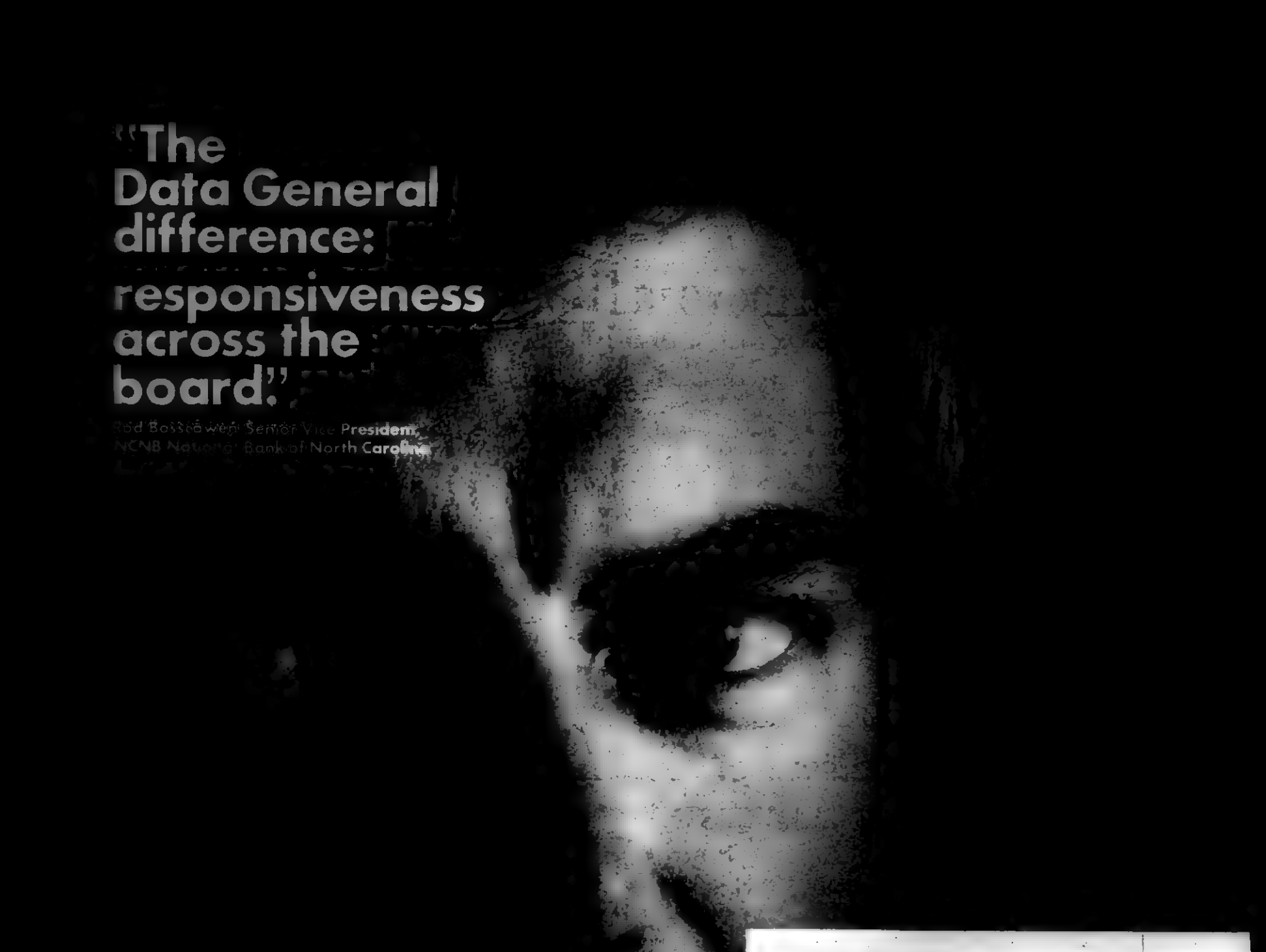

In less than 30 days from date of order, Data General computers were processing 10,000 loans for NCNB National Bank of North Carolina.

With nearly 600 branch offices, NCNB National Bank of North Carolina is one of the largest banks in the southeast, and among the top 20 in the country.

Recently, NCNB felt an urgent need to upgrade its loan processing system to better serve its customers.

NCNB chose Data General to help set up the system. And Data General responded.

Within one month of order, Data General had an MV/Family system for over 60 people up and running. (Others had estimated 6 months to do the same job.)

The NCNB system was so user-friendly, it required only a minimum of training for the bank's personnel to operate it proficiently.

In no time, they were servicing loans, processing payments and receivables in a way that exceeded all expectations.

Says Rod Bosscawen, Senior Vice President at NCNB:

"Data General's ability to respond quickly and provide support on a broad-based front helped NCNB establish a loan-processing operation in record time. Without their commitment and performance, the accomplishment of this would have never been possible. We are extremely impressed."

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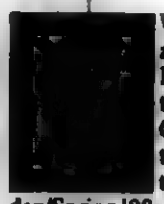
SMALL TALK

William Zachmann

IBM bus up the creek?



With all the talk about IBM's Personal System/2 Micro Channel architecture prior to the Comdex/Spring '88 show in Atlanta early in May, you'd have thought we'd be awash in PS/2 clones by now. Obviously, nothing of the sort has happened.

Sure, Tandy announced an Intel 386-based system with five Micro Channel slots that is supposed to be available in Radio Shack stores shortly. And Dell Computer announced 286 and 386 Micro Channel compatibles too, but these aren't due for months yet. A couple of other vendors that hardly anybody has heard of have also announced intended products, but these are even further in the vapor zone.

The flood of Micro Channel clones that all the makers of compatibility-chip sets were beating the drums about in March and April are nowhere to be seen. In fact, the hottest topic this week (and biggest real threat to IBM) is Compaq's new personal computers based on the "industry standard" AT bus, which blow away IBM's Micro Channel-based PS/2s on performance.

Understanding the reasons why PS/2 Micro Channel clones are proving to be so elusive can tell us a lot about what is going on in the market for PCs today. It also provides important insight both into IBM's overall strategy and into the extent of IBM's problems. Despite all the hype about how many million

Continued on page 35

Kapor hopes start-up buds will blossom; slams faults of today's technology

Mitch Kapor does not have to do a thing. As founder and former chairman of Lotus Development Corp., he is worth many millions. While that kind of nest egg would lead most folks to take it easy, Kapor has been busier than ever, flying regularly to the West Coast to look in on Go Corp., a start-up he is helping to fund that is cranking out a suite of mysterious productivity applications.

Lotus founder Kapor remains active in industry

But Kapor's real baby is On Technology, an East Coast start-up with visions of changing the way people access information via computers. Like Go, what On is up to remains a mystery. All we know is that the technology will be a set of system software building blocks for others to create applications on, will run initially on Apple Computer, Inc.'s Macintosh and will not be available until sometime around 1990.

Computerworld Senior Editor Douglas Barney recently spoke with Kapor about why he hopped back into the computer business, what is wrong with today's technology and what is in store from On.

Why did you get back into the computer industry?
There were some opportunities to try to achieve some goals that I found motivating. Also, this is what I know how to do; I enjoy exercising my craft.

The position that I was in 10 years ago was, "Look at all this marvelous technology. It is not marvelous for its own sake; it is marvelous in terms of the human end to which it can be put." The opportunity was marrying technology to people's needs.

A decade later, I looked around, and the same thing was still true.

Despite the fact that there have been lot of impressive successes that meant more widespread adoption of computers by ordinary people, they are still frustratingly difficult to use. And there are still lots of things to do with computers that can't be done yet.

What is missing from today's technology?
There is a vast amount of potential for computers as part of a new medium of communication and information — as an actual communication medium.

Today's on-line services and E-mail systems are just the barest beginning of a whole new medium that ultimately will become as important as the printing press and the book.

How do we achieve that?
Some of the most important ideas are not new ideas at all, but in computer terms are very old. They represent a tradition of people who talked about using the computer as a tool to support collaborative work, work in groups and hypertext and hypermedia systems. Those ideas have been around for 30 years or so, but we are just starting to get the technology to let us do some of those things.

So the hardware has gotten better? What will you do with the great new hardware?
Yes. What we are trying to do specifically is create a system software-level platform that would facilitate the creation of groupware and hypermedia applications.

And you are building on technology that is already in existence?
It is building on the results of re-

Continued on page 35

Amway PC gold rush sends sales force out to the streets

BY JULIE PITTA
CW STAFF

ADA, Mich. — Armed with health- and home-care products and a heap of confidence, Amway Corp. "volunteer" salespeople have hit the streets in the hopes of striking it rich. Now, the Amway sales force has added personal computers to its arsenal of selling weapons.

Under an agreement signed last fall, Amway's sales agents are being supplied with personal computers and accessories from Tandy Corp. The arrangement allows Amway to purchase the systems and resell them at a significant discount to its Amway salespeople, called distributors.

To learn how to use the systems, Amway distributors receive training from the nearest Radio Shack retail outlet. With the purchase of a Tandy machine, the Amway distributor receives a copy of Amware, a communications software package that enables the distributor to transmit orders directly to Amway headquarters here. Amware works with any of Tandy's Microsoft Corp. MS-DOS-based microcomputers.

So far, Amway has supplied its distributors with about 1,500 Tandy systems. Jim Stover, director of product marketing at Amway, said sales of the systems are meeting projections.

"The last thing we want to do is encourage everyone to get a PC," Stover said. "The typical distributor just getting started doesn't need one. It's meant to be a business aid for the higher volume distributors."

The typical Amway distributor sells the company's line of cosmetics, detergents and household cleaners and other domestic products in his spare time. Rather than go door-to-door, many sell to friends, family and acquaintances. Amway has 750,000 independent distributors in North America.

Distributors are recruited in what has become a familiar process to many. "They first get to know and believe in the products and want to share them with their friends," Stover said. "If you're a distributor, then you want to share this opportunity with others."

Through the use of computers, Amway hopes to beef up its already healthy $1.5 billion yearly revenue by making selling more efficient.

SOFT TIPS

What's Best is better

What's Best, from General Optimization, Inc., is a Lotus Development Corp. 1-2-3 add-in that provides linear programming capability to determine optimum solutions to mixing factors.

But with 1-2-3 and What's Best already loaded, random-access memory-resident programs may be just too much for your system to handle. Here is how you can tell.

If you receive the message "unable to load OPTIMIZE.EXE" when you try to optimize, you probably do not have enough RAM available. Unload any RAM-resident programs and try again. You can free additional memory by loading 1-2-3 directly rather than through the access menu.

Information provided by Corporate Software, Inc., a Westwood, Mass.-based software reseller.

Slowness blocks Acius's DBMS path

BY JULIE PITTA
CW STAFF

CUPERTINO, Calif. — Performance issues may slow Fourth Dimension's struggle to become the leading data base product for Apple Computer, Inc.'s Macintosh.

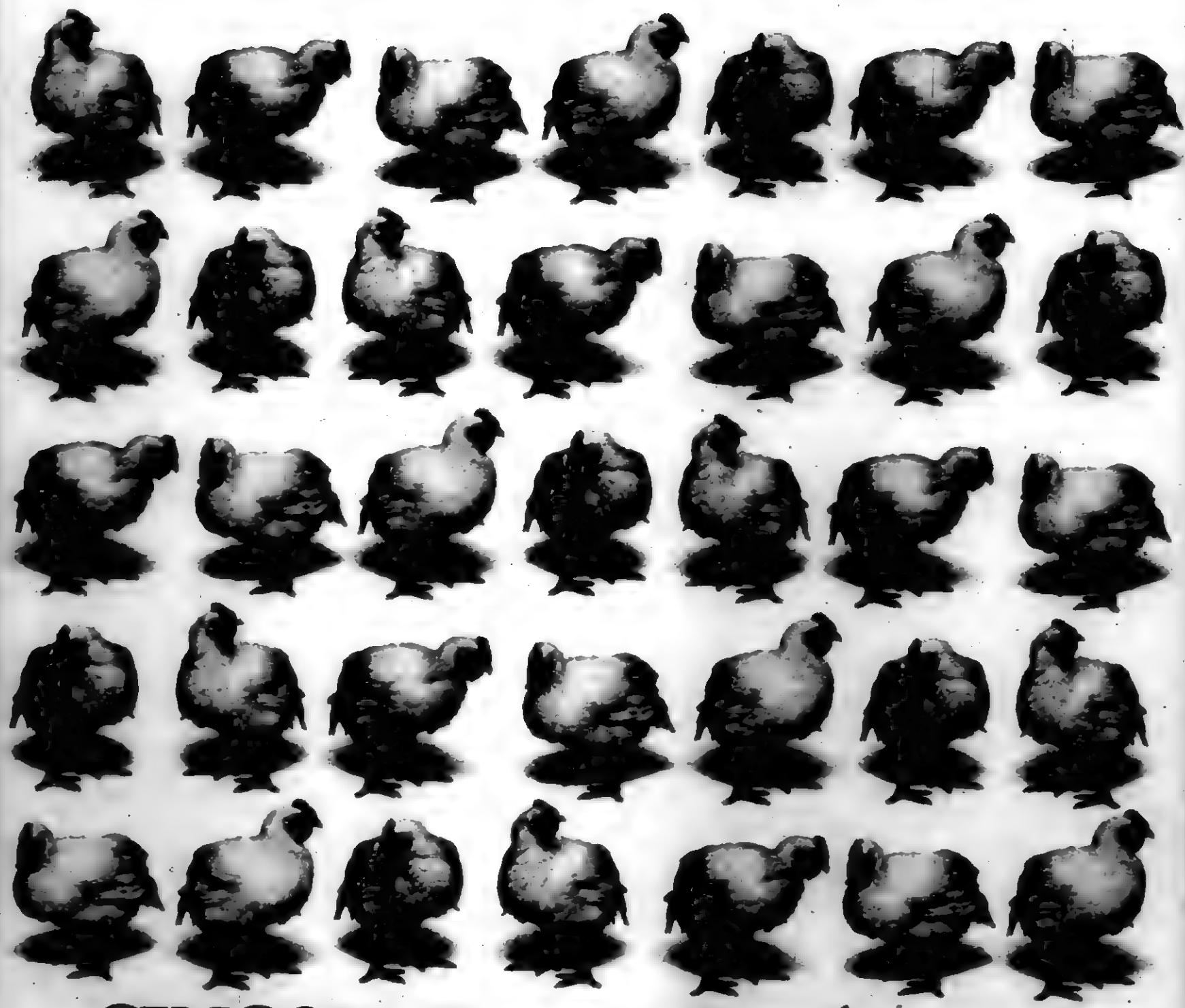
"It runs too slow unless you use it on a Mac II or a Mac SE with an accelerator board," said Jim Hayes, microcomputer manager at Seafirst Corp., a Bankamerica Corp. subsidiary. Apple's Mac II is based on a Motorola, Inc. 68020 microprocessor running at 16 MHz. Hayes added that Fourth Dimension is a large

program that requires 1M byte or more of random-access memory, while many of Seafirst's Macintoshes possess only 512K bytes of RAM.

After assessing the Acius, Inc. data base manager, Seafirst opted to stick with Blyth Software, Inc.'s Omnis 3Plus, a version of a data base management package available since 1985. "Fourth Dimension can't do anything that Omnis can't," Hayes maintained. "And the performance on Omnis is good."

Fourth Dimension will be fighting it out in a marketplace that is becoming increasingly crowded. In addition to the Omnis product — the first of its kind for the Mac — other entrants include Odesta Corp. with its Helix family, Ashton-Tate Corp.'s Dbase Mac and Borland International's Reflex Plus.

Continued on page 35



CINCOM Boosts Production At Holly Farms.

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"MANTIS was ideal for us because you don't need 2-3 years of experience to use it," explained Bill Clontz, Director of Computer Services at Holly Farms. "It lets us take new graduates, quickly train them and, in a matter of weeks, turn them into valuable programmers."

As a result, programmer productivity at Holly Farms has reached an all-time high. "We've seen substantial improvement ratios," Clontz said. "In the time a programmer might turn out one CICS command-level program, he can turn out from six to eight programs on MANTIS."

Most of the 500-plus MANTIS applications now in production at Holly Farms are aimed at streamlining costs. For example, Data Processing used MANTIS to develop a model of how chickens consume feed over the course of their lives, allowing Holly Farms to cut production at one of its feed mills by 1½ days a week.

"We've got key users who are picking up on the term 'MANTIS,'" Clontz noted. "Around here, MANTIS has become a synonym for 'get it done quickly.'"

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Zachmann

CONTINUED FROM PAGE 33

PS/2s have been sold, IBM's proprietary Micro Channel architecture, and thereby IBM's PS/2 strategy, is in trouble.

There are two main reasons for the scarcity of Micro Channel clones. For one, IBM intended to make it difficult and economically unattractive for other vendors to clone the Micro Channel and has largely succeeded. The second is that the Micro Channel doesn't really provide any significant advantages over the AT bus. Let's look at these in more detail.

No proof

Despite all the hype, despite all the carefully crafted benchmarks commissioned by IBM to show the PS/2 in the most favorable way possible, the Micro Channel offers absolutely no performance advantages over standard architectures built around the AT bus.

True performance of IBM's Micro Channel machines is no better than that of nearly every other vendor's systems with comparable clock speeds and comparable disk drives.

Nearly every other vendor's 286-based systems offer faster (in some cases much faster) clock speeds and disk drives than IBM's PS/2 Models 50, 50Z and 60. As a result, these IBM models, based on only a 10-MHz 286, are significantly slower than the 12-, 16- and even 20-MHz models available from competitors at lower prices.

IBM's Intel 386-based models at least offer clock speeds and disk speeds comparable to those of competitors. Still, despite the Micro Channel, lots of "industry standard" competitors outperform IBM's models quite handily. Compaq's Deskpro 386/20 easily outperforms IBM's 20-MHz versions of the PS/2 Model 70 and 80. Chances are good that Compaq's new 25-MHz, 386-based system will not only run faster than IBM's recently announced high-end Model 70, but will be available sooner to boot.

What's more, claims that the Micro Channel will offer significant advantages for running OS/2 are absolute drivel. The bottom line is that it offers no real performance advantages for any software, present or future.

The only real functional advantage that can be claimed for the Micro Channel is the self-configuring feature that recognizes a card-type identifier, making dip switches unnecessary. Even this is of dubious benefit. Confusion over card identifiers and attendant problems have actually made this an irritating annoyance for some users. Some card makers have actually added dip switches to make it possible to change the card ID.

The Micro Channel doesn't do anything for anybody but IBM. What it does for IBM is to make it legally difficult and more expensive for everybody else to build Micro Channel clones. IBM's patent licensing fees of up to 5% of vendor revenues, combined with the premium price the semiconductor specialty vendors are charging for PS/2 chip sets, mean that a Micro Channel clone could cost a third-party vendor 25% to 35% more to build than an AT-bus system with the same performance.

Since the Micro Channel does absolutely nothing for the user anyway, it isn't surprising that few are interested in paying a premium for a Micro Channel-bus machine. Those who don't mind spending more for something that does nothing for them are probably willing to pay a little extra for the IBM label anyway.

Zachmann is vice-president of research at International Data Corp.

Digital Research adds DOS system

MONTEREY, Calif. — Who said DOS was dead? Digital Research, Inc. thinks enough of the operating environment to offer a DOS-compatible system aimed at original equipment manufacturers who want a low-cost alternative to Microsoft Corp.'s MS-DOS.

Ironically, earlier this decade, Digital Research missed an opportunity to develop PC-DOS for IBM, a contract that went to Microsoft instead.

DR DOS is a proprietary DOS clone that runs with disk-based systems or can be executable from read-only memory for laptop, portable and diskless personal computers.

The system is reportedly fully compatible with IBM PC-DOS and MS-DOS, supports DOS 3.0 and higher file-level and byte-level record locking and can run most standard DOS applications.

Claiming to go beyond the constraints of MS-DOS, Digital Research said the system supports multiple hard disk partitions extended from 32M bytes to 512M bytes and password protection for files and subdirectories.

Digital Research would not disclose pricing for DR DOS because it varies according to the type and volume of each OEM's use.

Digital Research also announced a graphics version of its Concurrent DOS 386 system that melds multiuser, multitasking capabilities with high-resolution, bit-mapped graphics. The Multiuser Graphics Edition can run multiple copies of both DOS and Concurrent DOS applications. It costs $995 and reportedly will be available in August.

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Acius

CONTINUED FROM PAGE 33

Omnis is the clear leader in shipments, with an installed base of 49,470 at the end of 1987, according to Dataquest, Inc. Dbase Mac is second with an installed base of 15,520, and Odesta's Helix runs close behind with 13,580.

Fourth Dimension and Borland's Reflex Plus are tied with an estimated installed base of 8,730, Dataquest said.

Dataquest analyst Randy Sutherland said Omnis 3Plus and Fourth Dimension are full-featured data base managers targeted at applications developers and large MIS organizations that do their own development work.

Borland's Reflex Plus is "designed for the business user who hasn't written thousands of lines of code," Sutherland said, while Dbase Mac is an attempt to straddle the two. Helix VMX, a special version of Helix, is optimized for the Macintosh to Digital Equipment Corp. VAX minicomputer connection.

Fourth Dimension's appeal lies in its ability to allow developers to create applications with more Mac "look-and-feel" qualities. "It's easier to write Mac-ish applications with Fourth Dimension once you've learned it," Sutherland said. "Using it, you can create applications that conform to the Mac community's standards for Mac applications."

That ability may be traced to Acius's close relationship with Apple. Fourth Dimension — originally called Silver Surfer — was developed by a French software company. Apple had thoughts of marketing the product itself until it encountered resistance from its third-party software developers, who had grown sensitive to Apple's participation in their market.

Instead, Apple's Director of Software Evangelism, Guy Kawasaki, left Apple to become the president of Acius, the American spin-off of the French firm. Acius resides next door to the Apple campus.

Despite its somewhat slow performance, Fourth Dimension has its fans. Jeff Ehrlich, manager of product technology at General Electric Co., said, "It's a full-blown data base manager with a programming language and everything you need."

Kapor

CONTINUED FROM PAGE 33

search that has not yet been successfully commercialized. The components of this thing are going to come from the disciplines of object-oriented programming and object-oriented data bases, knowledge representation, user interface management systems and so on.

Would we be closer to this type of technology if customers made more demands of their vendors?
No. Customers didn't demand the automobile. Once it starts to take off, once there are a few of the key products out there, then the customer demand will become the key critical factor. But until the first few examples of the new genre are there, it is unrealistic to expect customers to play the role of product inventors.

How close do the Macintosh interface and the Presentation Manager get us to some of these goals?
I think that it is a stepping stone, but those components are just a user interface. There are a lot of other components that are necessary to build the new applications on the data base side, the language side, knowledge representation and so on.

To achieve what you want to achieve, you need the help of who?
Ultimately, platforms get established because they have the support from the critical constituencies — hardware vendors, applications developers and end users. We are going to need all of those.

As software gets better, hardware requirements, and thus expense, go up. Will there be a type of software ghetto?
It may not be a function of the ability to afford it. Today it is often the company that makes the purchase decision, not the individual. If they have standardized on an architecture that is insufficiently powerful to run these kinds of applications, they could end up consigning their users to a kind of a software ghetto.

But I think the 10G workstation of today will cost 30% less next year, and the year after. I am not so much concerned with the hardware being too expensive and, therefore, people being shut out of it. I am concerned with the fact that the 20 million or so DOS machines represent a pretty large immovable object. Innovation represents an irresistible force, and when irresistible forces meet immovable objects, the results are quite unpredictable. It will be interesting.

Are you architecting for a move to OS/2?
Yes. We anticipate that if we are successful, we will want to come over to the 386, and we are certainly bearing that in mind as we design.

What are the true innovations?
My short list is Dan Bricklin's invention of the spreadsheet and the Macintosh interface.

Does Hypercard or your Agenda information manager fit in?
It would be fair to add Hypercard. I would love to add Agenda, but I'll only do that if it's commercially successful.

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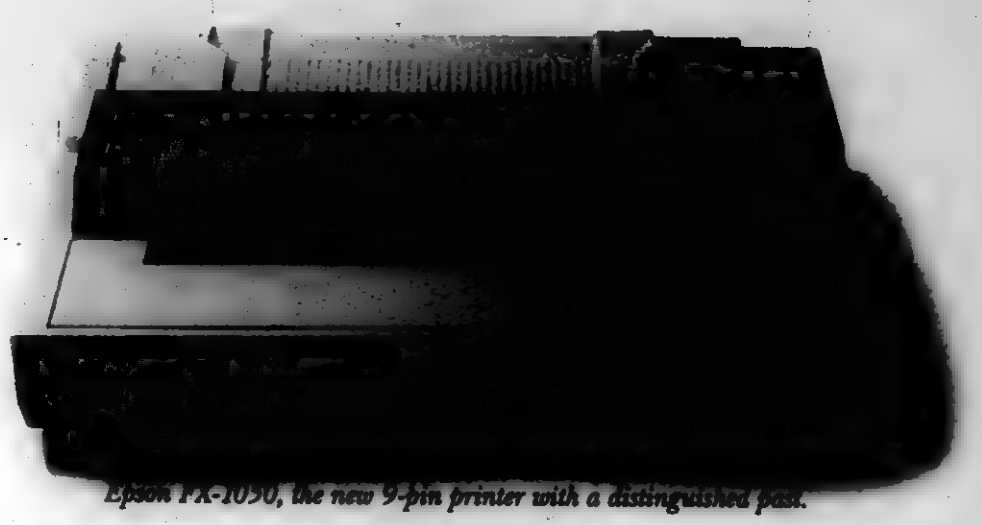

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Barney

FROM PAGE 31

Pick on us all you want: We're rich! It's tough to forget that Ashton-Tate rules the micro data base management system market. If it didn't, why else would its competitors take so many potshots?

The rarely abrasive Microrim got a few jabs in with a recent ad for its R:Base system. Alluding to Dbase IV missing its July ship date, the ad blares, "Sorry, but the next-generation data base won't ship in July." According to Microrim, it is shipping now, and it's called R:Base.

That kind of stuff is pretty mild. Oracle, which has had an adversarial posture toward Ashton-Tate almost since time began, continues trying to rub salt in the Dbase developer's eyes. It still runs the ads portraying Dbase as a plane from the early part of this century going down in flames.

But now, its product announcements are digging at Ashton-Tate's side. Called Dbase Liberator, they include an SQL-compatible Dbase clone and compiler from Wordtech that Oracle will market. These are meant to ease the transition of Dbase users to SQL.

Ashton-Tate folks see things a mite different. According to them, Oracle's one-size-fits-all strategy hasn't worked, and the announcements show that Oracle users want Dbase. They thank Oracle and Wordtech for giving those users a migration path to the Ashton-Tate product line.

Modern Jazz dead. But didn't you just say . . . About a month ago, we heard a report that Lotus was going to kill its Modern Jazz project — a total revamp of the ill-fated Jazz package for the Macintosh — which had already seen a couple of major delays. We called Lotus and asked them about the report. The answer was something like, "Modern Jazz lives; it is just delayed and will ship when it ships." It smelled a little fishy, but that seemed to be the story.

About a week later at Lotus Week, we saw an elaborate demo and forced the demonstrator to push the product to see if it really worked. Despite our best efforts, we couldn't get Modern Jazz to falter. But apparently Lotus quality-assurance people can — and have, repeatedly.

In trying to unravel this tale of software woe, we have come to understand the following: At about the time of our original call concerning the death of Jazz, the development team was selling management for one more month, just one more month, to get some of the tricky data base problems worked out. A month later, the team sought still more time, so Frank King, Lotus's highly efficient new head of software, drew the line. With no finished product in hand, King pulled the plug on Modern Jazz.

One reason to kill the work in progress is a changing marketplace. The market for integrated Mac products is pretty well sewn up by Microsoft's Excel. So Lotus will focus on developing a version of 1-2-3 for the Macintosh. This product will support Lotus's new development language and data sharing protocol. Perhaps more importantly, 1-2-3/Mac will help Lotus become the Oracle of spreadsheets. Distributed spreadsheets, anyone?

Barney is a Computerworld senior editor, microcomputing.

Microrim

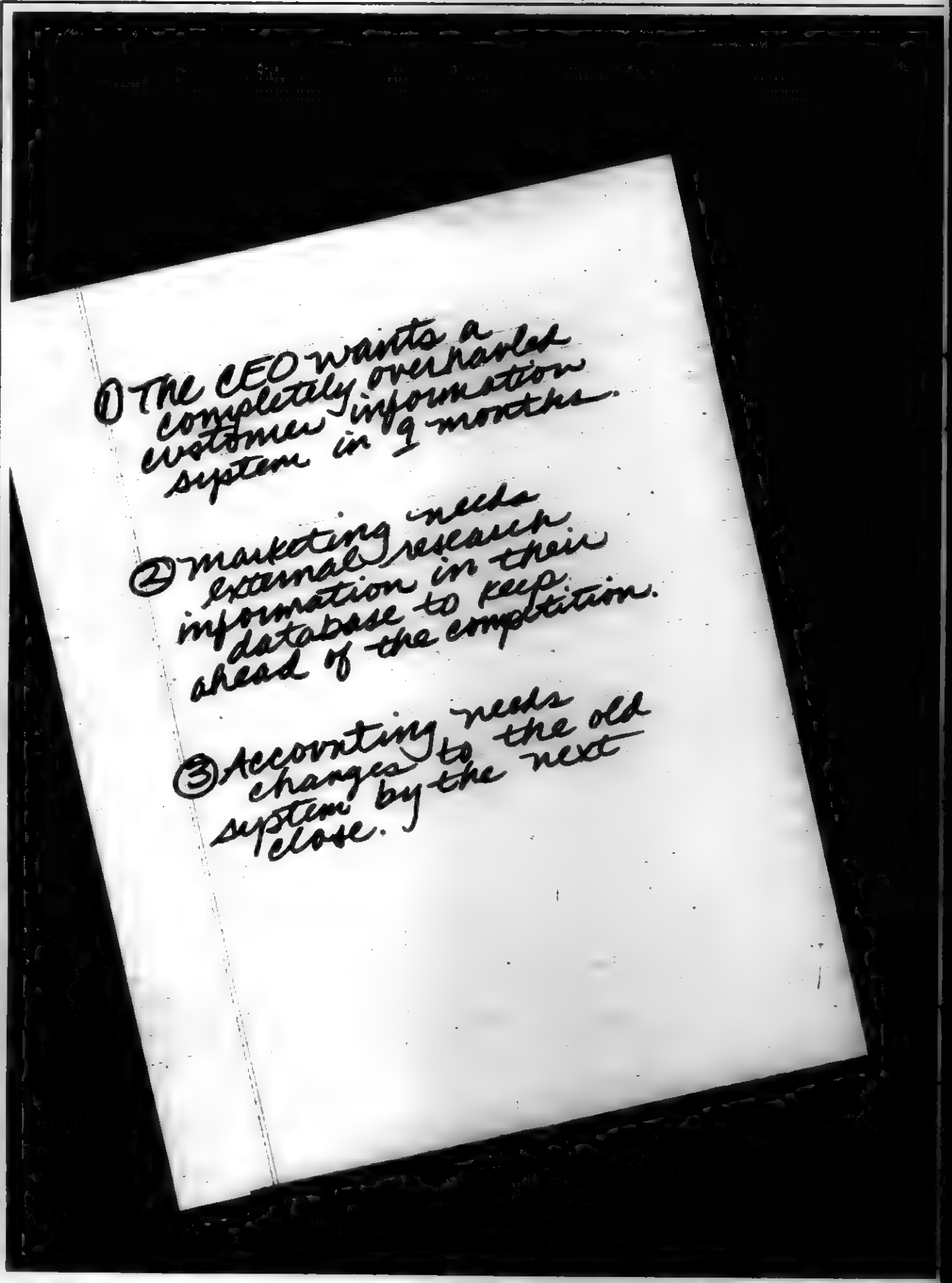
FROM PAGE 31

uncompiled applications, and most statements can execute 10 to 15 times compared with the interpreted mode of the regular R:Base line.

Microrim also took the opportunity to extend the R:Base language. Part of the enhancements involved simply removing limits on the number of conditions in If statements, Where clauses and While and If nesting.

In addition, application developers can write subroutines, procedures and functions that can accept parameters and return values.

Microrim will also provide a debugger that works with the compiler.



NEW PRODUCTS

Systems

Fortron Corp. has expanded its product line with the addition of two 20-MHz Intel Corp. 80386 systems. Both computers have sockets for either the Intel 80287 or 80387 math coprocessor. The Fortron 386-20 was designed for single-user applications and is delivered with 1M byte of 80-nsec static column random-access memory, the vendor said.

Also included are a 40M-byte hard disk, a 1.2M-byte floppy drive, one parallel port, two serial ports and an IBM Enhanced Graphics Adapter monitor and card. The Fortron 386-20 costs $3,500.

The Fortron 386-20 Plus is said to be targeted at server applications in multiuser systems and is delivered with 1M byte of 100-nsec dynamic RAM and 64K bytes of 25-nsec cache RAM. It includes the same storage and graphics configurations as the 386-20. The Fortron 386-20 Plus costs $3,950.

Both systems are compatible with IBM's OS/2.

The company also announced a 16-MHz Intel 80286-based personal computer reportedly compatible with all Microsoft Corp. MS-DOS and IBM PC-DOS software.

Called the 286-16, the PC is keyboard-switchable for operation at 8, 10, 12 or 16 MHz. The system also includes two serial ports, one parallel port and an on-board floppy disk controller for 360K-, 720K-, 1.2M- and 1.44M-byte drives. The basic 286-16 system, with 1M byte of RAM, costs $1,995.

Fortron, Suite F, 2380 Qume Drive, San Jose, Calif. 95131. 800-821-9771.

1-800-458-8851

FOUNDATION

Software applications packages

Information Technology Laboratory, Inc. has announced its first IBM-compatible Japanese-language word processing software.

Called EW Plus, the program requires no additional hardware and can be run with IBM Personal Computer ATs and compatibles, all IBM Personal System/2 models and Toshiba Corp. T3100 laptop computers. Document size is unlimited, and ASCII file formats can be used to merge other software programs into EW Plus. Character conversion is done on a word-by-word basis or by phrase.

EW Plus costs $850 per set.

Information Technology, 4th Floor, 280 Park Ave., New York, N.Y. 10017. 212-557-0177.

A data base management program for the Apple Computer, Inc. Macintosh series of computers has been introduced by Fox Software, Inc.

Foxbase+ Plus/Mac includes language extensions to allow programmers to customize their applications. Commands to control large display screens and full color on the Mac II are also provided, and the software is compatible with Ashton-Tate Corp.'s Dbase III Plus.

The package runs on Macintosh Plus, Mac SE and Mac II computers with a minimum of 1M-byte of random-access memory.

Fox, 118 W. South Boundary, Perrysburg, Ohio 43551. 419-874-0162.

A text retrieval system that reportedly supports up to 7,500 files and 30 million characters has been announced by Group L Corp.

Memory Lane 2.0 runs on IBM Personal Computers and compatibles with Microsoft Corp. MS-DOS or IBM PC-DOS and performs word, phrase and proximity searching, with or without indexing. The system tracks dynamic file activity automatically. A hard disk and 90K bytes of random-access memory are required.

Memory Lane 2.0 costs $149.

Group L, 481 Carlisle Drive, Herndon, Va. 22070. 703-471-0030.

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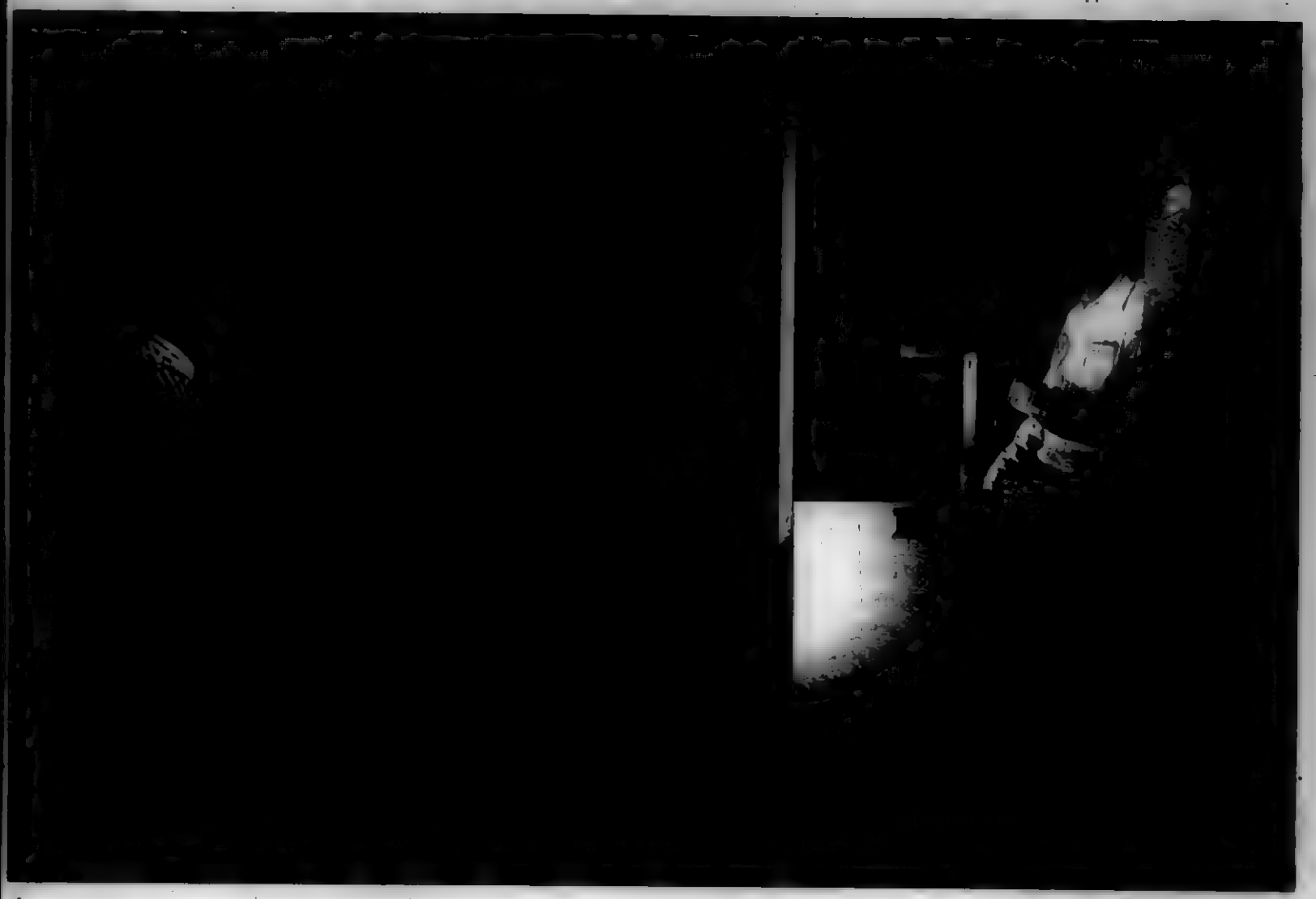

The efficient, cost-effective way to operate the multiple MVS environments of today is by sharing DASD, tape devices, and consoles. In fact, a majority of all data centers share resources to unify operations, provide backup, and defer hardware costs.

But sharing resources without protection or control dramatically increases your chances for deadlock conditions and data corruption. And physically separating or manually tending to your DASD and tape devices can cut deeply into your shop's productivity, and your budget as well.

Thousands of financial, manufacturing, retail, government and non-profit organizations, large and small, have decided they want increased productivity without risking the loss of data integrity. They operate their data centers with shared resource management products from Duquesne Systems.

Now there's a better reason than ever to eliminate risk and increase productivity in your data center. **Multi-image Manager** combines the performance of SIS* and the functionality of SDM into one new superset product.

Multi-image Manager offers all the benefits you need for a data center that runs more smoothly, efficiently, and with greater reliability. And that means greater peace of mind for you.

Here's how Multi-image Manager simplifies, protects and controls your operation:

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- By offering the opportunity to reduce costs by eliminating redundant hardware. *Safe sharing of resources between images or* CPUs *means that you can operate more effectively with less hardware.*

Multi-image Manager installs quickly without the need to IPL, incurs little overhead, and quietly guards against accidental destruction without interruption.

More than 1,200 Duquesne Systems customers successfully use SIS and SDM. Now *you* can enjoy the combined benefits of SIS and SDM in Multi-image Manager to simplify, control and protect your data center to its fullest. Call your local Duquesne Systems office, or call toll-free **800-323-2600 (In Pennsylvania 412-323-2600).**

*SIS (Single Image Software) and SDM (Shared Device Management) are two Duquesne Systems products combined and enhanced to form one new superset product, Multi-image Manager.

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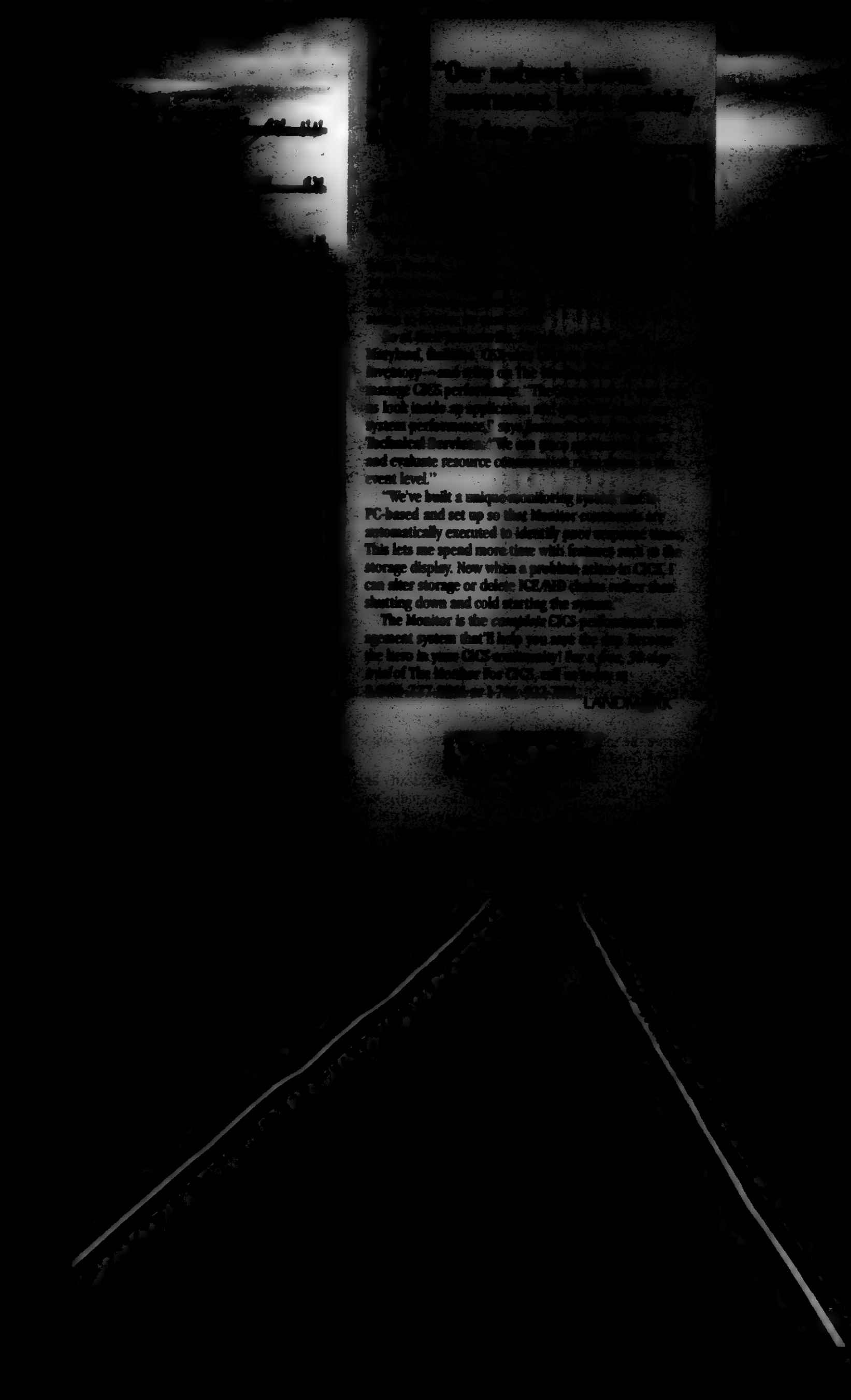
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Keeping track
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DATA STREAM

Jeffrey M. Kaplan

Who's helping whom?

Network management is the current hot button in the communications industry. It's been the unofficial theme of every major related trade show so far this year — Comnet, Interface '88 and ICA.

Yet for all the attention paid network management, how close have users really come to effective network management? And how far are vendors likely to go in order to provide the tools users need to get the job done?

Network management is one of those terms that can relate to everything from up-front network design and planning to network diagnostics and restoral. It can mean relatively simple station message detail recorder and call accounting, or sophisticated IBM Netview-compatible architectures.

Actually, all of these functions are a part of network management. Managing a network entails a number of tasks and requires a variety of tools to ensure the proper flow of information throughout an organization.

Network management has become the focus of the information-processing industry because of the push/pull of user and vendor forces. On the user side, organizations have recognized the strategic importance of information and the value of their

Continued on page 51

REPORTER'S NOTEBOOK

Vendor investments hit jackpot at network show

Participating vendors, users and sponsors invested an estimated $50 million to $60 million in the Enterprise Networking Event (ENE), held in Baltimore two weeks ago. The results pleased the Society of Manufacturing Engineers and the MAP/TOP Users Group no end.

It's really real. The message is it's real, it's happening today and it's solving real live applications in customer environments, Digital Equipment Corp. spokesman Lee Sudan said. Daniel Kosmalski, manager of computer-integrated manufacturing at Merit Systems, Inc. in Troy, Mich., added, "Where else [could] you buy a product that [had] been interoperability-tested by 58 vendors?"

Not to be a downer, but. "Anyone who thinks they can walk in [here] and buy a [MAP] system and not need the capability or knowledge of communications" is not being realistic, General Motors Corp.'s Manufacturing Automation Protocol (MAP) guru Mike Kaminsky said. "Users have to get involved with their systems."

We are the network. Participating vendors and ENE sponsors marveled often at the level of cooperation between those involved in the huge, nine-booth demo of interoperability. A Xerox Corp. spokesman recalled how one technician asked another if he could test his system. When asked who he was with, the man smoothly blurted, "Wang — no, I mean DEC."

Fading slowly; definitely not forgotten. Transmission Con-

Continued on page 50

OSI tools flood ENE

FTAM, MMS implementations at forefront

BY PATRICIA KEEFE
CW STAFF

BALTIMORE — While short on ready-to-ship products, the Enterprise Networking Event (ENE) featured a plethora of product announcements.

The nine-booth demonstration featured 23 suppliers showing Manufacturing Automation Protocol (MAP) systems, 21 suppliers featuring Technical and Office Protocol (TOP) products and another 12 exhibiting other Open Systems Interconnect (OSI) offerings.

In all, 17 suppliers exhibited implementations of both the File Transfer Access and Management (FTAM) and Manufacturing Messaging Service (MMS) protocols, 15 vendors demonstrated Message Handling Service (MHS) capabilities and eight showcased router and bridge products.

Among the products exhibited were the following:

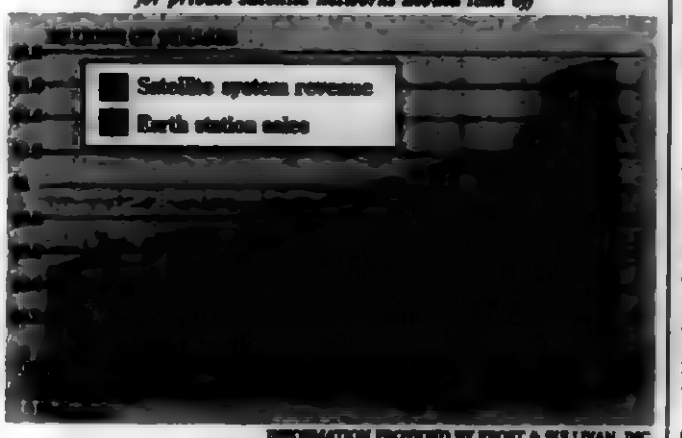
- Motorola Microcomputer Division in Tempe, Ariz., unveiled Micromap 3.0, an implementation of the MAP 3.0 specification for the vendor's MVME372 and MVME372A Advanced MAP network adapter; Microtop 3.0, an implementation of the TOP 3.0 specification for the MVME374 Ethernet Controller board; and Minimap 3.0, a three-layer collapsed architecture of the MAP 3.0 spec optimized for real-time applications. Motorola also added MAP, TOP, Minimap and X.25 capabilities to its 68030-based VME Data Series system platforms.
- Siemens Corp. in Peabody, Mass., said it will offer a MAP 3.0 communications interface that will enable users to link its line of Simatic programmable controllers directly to a MAP 3.0 carrierband network. It is set to be out in first-quarter 1989.

Continued on page 51

Data View

Satellite nets scope out stellar future

As businesses seek cost-effective transmission methods, the market for private satellite networks should take off



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CW CHART

Micom bares OSI, OS/2 net strategies

BY PATRICIA KEEFE
CW STAFF

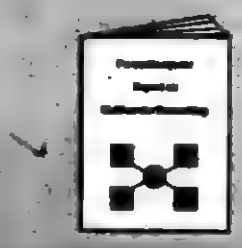
BOXBORO, Mass. — Micom-Interlan, Inc. has introduced a battery of products said to offer a choice of either Open Systems Interconnect (OSI) or Transmission Control Protocol/Internet Protocol (TCP/IP) with an IBM Nethios interface.

Like many networking vendors today, Micom's strategy is to provide a migration path from TCP/IP to OSI. The firm predicted that OSI will hit critical mass in about two years. The primary motivators behind the push are the U.S. government and the European community. Also, U.S. firms that must communicate with overseas offices and customers will need OSI.

Micom will create an OSI foundation using subnet access building blocks while supporting current applications through Nethios. Higher level OSI ser-

Continued on page 49

Advice on Integrating IBM, DEC, HP, & Unisys Networks



Forest Computer Report on Multivendor Networking

This report published by Forest Computer discusses networking solutions for multiple vendor environments. In it you will learn about:

- Strategic reasons for developing a multivendor network.
- Methods for using a multivendor network to reduce networking and computer costs.
- Each vendor's network architecture and connectivity solutions.
- Total solutions for developing a multivendor network.

In addition, the report contains a 200 word glossary of IBM, DEC, Hewlett-Packard, and Unisys networking terms.

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Forest Computer designs, develops, markets, and supports multivendor networking solutions for organizations with IBM, DEC, Hewlett-Packard, and Unisys networks. Its seven years of experience in providing major corporations with superior networking solutions contributed to the development of this report.

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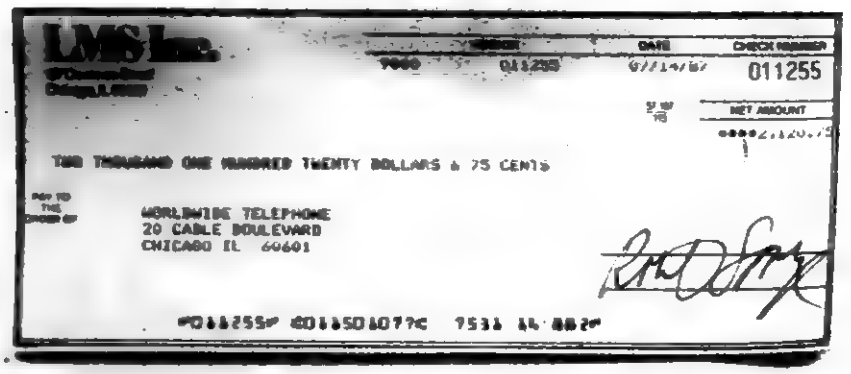
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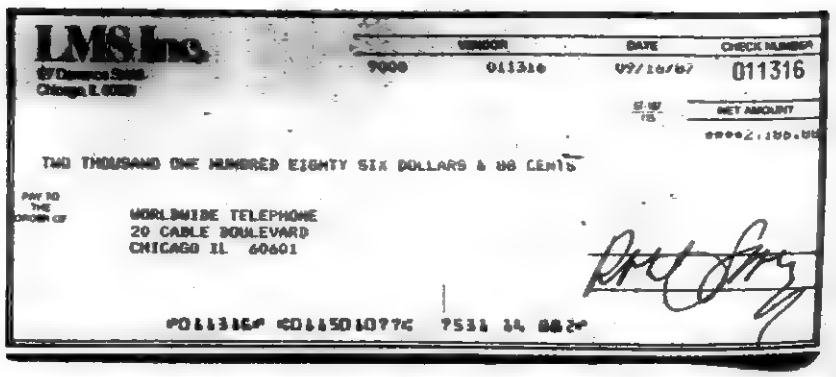
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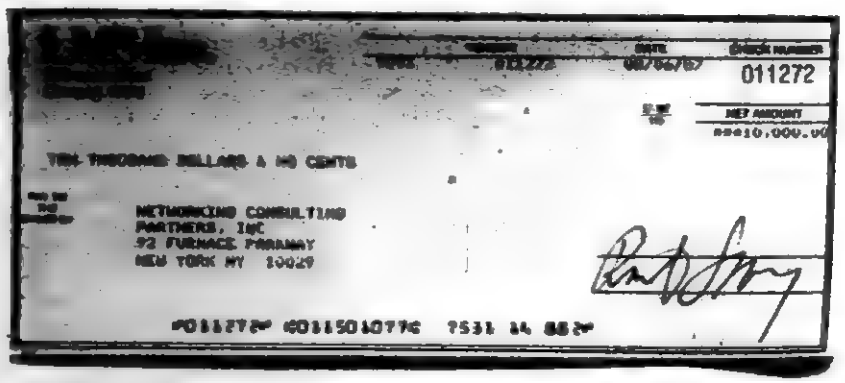
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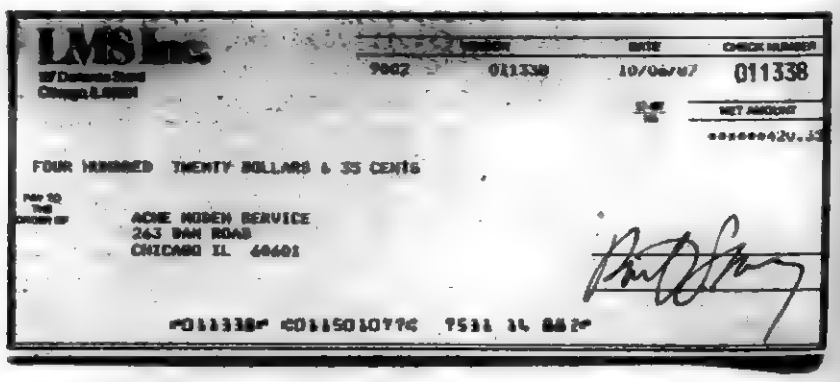
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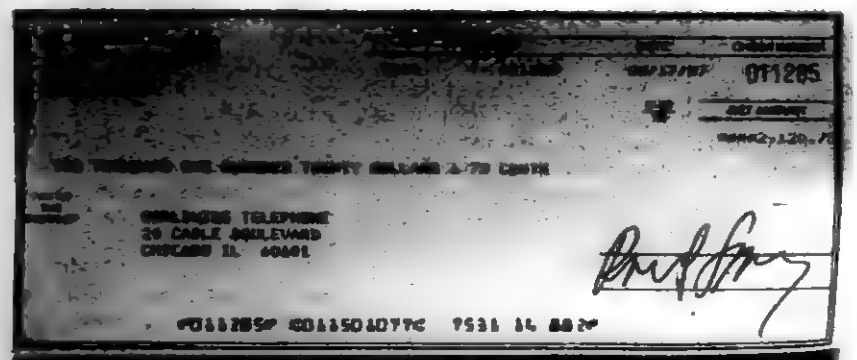
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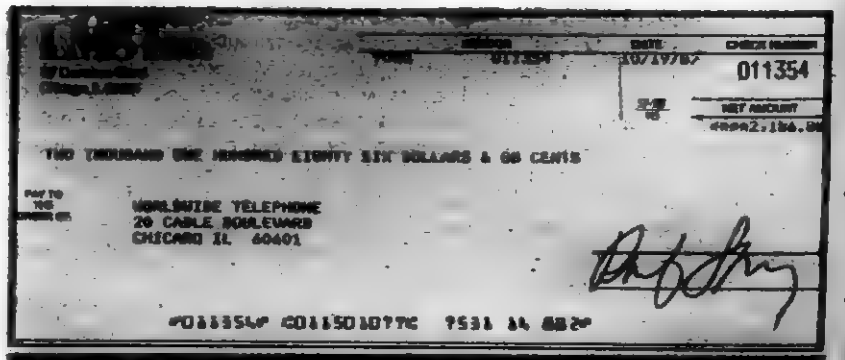
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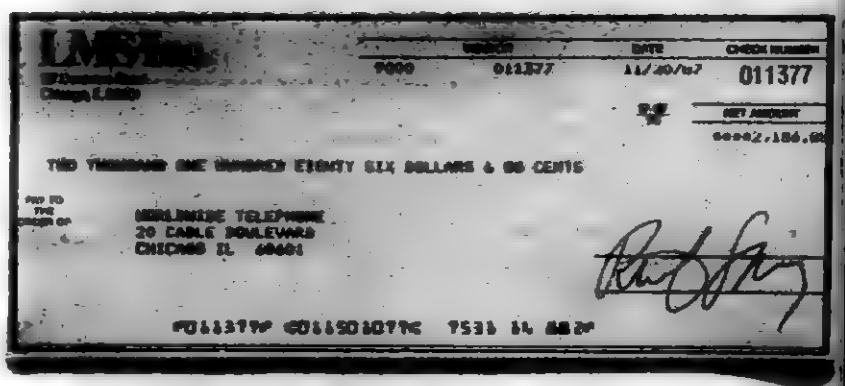
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Ungermann-Bass talks OSI

BY PATRICIA KEEFE
CW STAFF

SANTA CLARA, Calif. — Ungermann-Bass, Inc., a subsidiary of Tandem Computers, Inc., has announced plans to support Versions 3.0 of Manufacturing Automation Protocol and Technical Office Protocol (TOP) as well as domestic and some international versions of the Government Open Systems Interconnect Profile.

The company will continue to market and support products based on the Transmission Control Protocol/Internet Protocol (TCP/IP) and Xerox Network Services (XNS).

Despite the hoopla surrounding user intentions to migrate to Open Systems Interconnect (OSI), users are not beating down the door for related products, said Paul DePond, Ungermann-Bass's director of system software marketing.

The overwhelming majority of Ungermann-Bass's new orders are TCP/IP-based, and 90% of its installed base is XNS, DePond said.

"But Fortune 500 companies are looking for a [local-area network] vendor to partner with for the long term," he commented.

So as demand increases for OSI products, Ungermann-Bass said, the firm will provide a migration path between the old and the new via "value-added extensions" in the form of both user and programmable interfaces.

OSI will be implemented through Net/One OSI, a repackaged and enhanced version of the former Industrial Networking, Inc.'s product line. Absorbed into Ungermann-Bass in November 1987, Industrial Networking produced MAP 2.0 and 2.1 products.

'New and improved'

"They are basically putting a 'new and improved' label on the [Industrial Networking] line while adding 3.0, increasing memory and optimizing the software," said Bruce Richardson, an analyst with Advanced Manufacturing Research (AMR) in Salem, Mass.

"[Ungermann-Bass'] current strategy is a sound response to user networking demands — support of the OSI protocol stack (including MAP application protocols) for all [IEEE] 802 LAN-access methods," according to the May issue of "The AMR Report."

Net/One OSI ultimately will include interfaces for Ungermann-Bass' Map/One OSI for Token Bus; Net/One XNS for Carrier Sense Multiple Access/Collision Detection (CSMA/CD) and IBM's Token-Ring network; Net/One TCP, TCP/IP for CSMA/CD and Token-Ring network; and X.25 products.

By year's end, Ungermann-Bass said it will release three Early Start development kits offering the full MAP 3.0 protocol stack (board resident) and Manufacturing Messaging Service (MMS) software.

Micom

CONTINUED FROM PAGE 45

vices will be added as needed, such as File Transfer and Access Management (FTAM), CCITT X.400 and Virtual Terminal Protocol (VTP). TCP/IP will be available on the same system.

During a four-phase rollout, users will be provided with a choice of network protocols, hardware environments, physical media and network services.

In a flurry of product and strategy announcements, the following were unveiled:

- OSI for Microsoft Corp.'s OS/2 LAN Manager. The NP638 is a turnkey controller using the first four layers of the OSI model, a Nethios interface and Micom's protocol processor board. Featuring an Intel Corp. 82586 coprocessor and a choice of thick or thin Ethernet or unshielded twisted-pair cable, it costs $995.

Micom-Interlan currently resells Novell, Inc.'s Netware and said that Netware and the LAN Manager will coexist in much the same fashion as TCP/IP and OSI. However, it appears that the LAN Manager will be Micom's choice for OS/2 networking.

- A series of six protocol processors and data link controllers supporting Nethios for DOS environments. Users have a choice of either the personal computer bus or IBM's Micro Channel bus architectures, board- or host-based processing and TCP/IP or OSI protocols. The products are used in workstations and servers running applications under either Microsoft's MS-Net or IBM's PC-Net. Pricing ranges from $725 to $1,295.
- OSI networking for DOS, Unix and OS/2 featuring carrier-sense multiple access with collision detection subnetwork access. In the next 12 months, the following access and services will be provided, according to Micom-Interlan: FTAM and X.400 by October; VTP in two phases in November and February; directory services and Manufacturing Automation Protocol 3.0 network management functionality in February; IBM Token-Ring subnet access in November; and FTAM command line interface in December.

The trend in workstations is toward Unix, said Bruce MacAloney, director of product marketing. "We can give them TCP/IP, OSI and Decnet," he said.

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Investments

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trol Protocol/Internet Protocol (TCP/IP) and, more specifically, TCP/IP-to-Open Systems Interconnect (OSI) migration, was the topic of many conversations at ENE. Maybe it's not the wave of the future, but it is a critical factor influencing the stroll toward OSI today. Ungermann-Bass, Inc., for example, reported that 80% of its new business is TCP/IP-based. Estimated time period before OSI eclipses TCP/IP? Five to 10 years.

True colors. Despite rumors to the contrary, IBM announced nothing. It did have a booth, featuring an incredibly loud Token-Ring demo, a Systems Network Architecture (SNA)-to-OSI bridge via Token-Ring and a huge chart detailing IBM's OSI product strategy. But missing was one key piece of information: IBM's OSI scenarios and products are only available in Europe and Canada. You had to ask to find out.

But take heart. Ellen Hancock, president of IBM's Communications Products Division, reportedly dropped in on the show for a day. She told analysts earlier this year that her division would be researching SNA-to-OSI links.

Under the cost iceberg. According to Ungermann-Bass, Aluminum Company of America, or Alcoa, which has already launched one MAP 2.1 installation, has decided to go with MAP 3.0 in its remaining two plants. Alcoa plans to scrap its MAP 2.1 investment, having determined from a maintenance and support standpoint that it is more cost-effective — if not easier — to support one version of MAP.

It's COSt a lot. It would seem that 3Com Corp. either likes the Corporation for Open Systems (COS) a lot or just likes to do things in threes. Actually, 3Com's penchant for joining COS — you guessed it, three times to date — is tied into a tangle of attempted and actual mergers, according to 3Com founder and COS Chairman Robert Metcalfe.

3Com first sent a check for $125,000 to COS on behalf of Convergent Technologies, Inc. when the two were walking down the aisle. After that merger was tripped up at the altar, 3Com sent COS another $50,000 to cover a 3Com membership.

More recently, 3Com cinched the knot with Bridge Communications, Inc., triggering another $200,000 check that added Bridge to the COS roster. That $400,000 total is a "substantial fraction of our profits," noted Metcalfe, adding that 3Com has paid as much in membership fees as has significantly bigger competitor IBM.

Mr. Smith joins COS. On the surface, Metcalfe may look like an odd choice to head up COS. The principal inventor of Ethernet, he has been a vocal critic of the MAP standard's dependency on broadband media — "bad judgment" — and its use of token-bus technology. The decision to not provide 2.1 compatibility with Map 3.0 was a "major botch for MAP," Metcalfe claimed. Will he temper those comments now that he is COS chairman? No, but few seemed to mind. A number of COS members echoed Xerox's support for Metcalfe as a trusted man with a lot of integrity.

Multilingual support. Doubt no more that OSI is big overseas. One-third of the nearly 10,000 attendees came from the international sector, according to the SME. In 1992, the European community will require OSI: By law, if you want to do business, you'll have to have it.

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C

E-mail links to SNA systems

TORONTO — An electronic mail package built directly onto IBM's Systems Network Architecture Distribution Services (SNADS) that reportedly can be linked to IBM mainframes without proprietary hardware or software has been unveiled by Emissary Systems Ltd.

Herald Mail reportedly gives users of IBM and Microsoft Corp. DOS and OS/2-based local-area networks the ability to exchange documents and messages with users of IBM's Distributed Office Support System (Disoss) and other office systems based on IBM's SNA. No additional mainframe or minicomputer software is needed to establish the link.

Herald is identified as another SNADS node, enabling personal computer users on a LAN, or on several LANs, to be integrated with host Disoss users and vice versa, according to Emissary Vice-President Gregory Sokoloff.

The system is made up of three components: the Herald Mail Application, a standard file server and the Herald Mail Server, which is a dedicated micro running either DOS or OS/2 that operates as a SNADS node using a standard IBM Synchronous Data Link Control communications card.

The package uses a Lotus Development Corp. 1-2-3-style interface said to allow users to select network addresses from a Mail Directory, which shows both individual users and distribution lists.

The DOS version of Herald Mail is available at $6,995 for any number of users on a single LAN. An OS/2 version is set to be released in the third quarter.

Kaplan

CONTINUED FROM PAGE 45

networks as corporate assets. On the vendor side, manufacturers have identified network management equipment as a weapon in their product portfolios.

But as the network management market heats up, these capabilities are becoming less of a differentiating feature for vendors and more of a minimum requirement. Users have made network management a prerequisite for consideration in almost every request for proposals. And vendors must offer network management systems to keep the installed base from turning to alternate suppliers.

Many vendors admit to uncertainty about the potential profits in network management. They have been pulled reluctantly into battle by users demanding added tools to help them operate their networks. Yet users surveyed by The Ledgeway Group are undecided about which network management functions are worth paying extra for.

A number of vendors have introduced network design and planning systems during the last three months. BBN Communications, Network Equipment Technologies and Timeplex have unveiled systems that reportedly will help their customers configure networks and estimate costs.

These systems go a long way toward addressing problems. However, none go far enough. First of all, none are available as marketable products. Instead, they are positioned as network support tools operated by the vendor to remotely assist users in designing networks. One reason for this is that vendors are unsure whether users will spend money for these devices. But as they are currently packaged, it is unlikely that users would be willing to shell out hard cash.

Second, all are proprietary systems. Users see right through this inherent weakness and question the true value of these systems. They want to look at all their options, not just one vendor's approach, as they determine how to grow their networks.

These are examples of what's wrong with the network management market. The users we talk to are thirsty for the kinds of network management features being offered today, minus the product bias. So vendors are caught in a dilemma. They are hesitant to offer tools that enable users to view all of their options because they're afraid of providing the ammunition to go elsewhere.

As a result, vendors are really using network management as a way to control their customers, rather than to help customers control their networks. And the latest round of network design systems appear to be designed to help vendors sell more equipment rather than to help users design better networks.

Kaplan is director of Network and Professional Services at The Ledgeway Group, Inc., a consulting firm in Lexington, Mass.

OSI tools

CONTINUED FROM PAGE 45

GE Fanuc Automation North America, Inc. in Schenectady, N.Y., introduced a MAP 3.0 card set for its Series Six programmable controller. The same hardware reportedly will be able to accommodate seven-layer MAP 3.0 software when it becomes available later this year.

• Burr-Brown in Tucson, Ariz., demonstrated a MAP 3.0 data collection factory network server said to provide distributed access to and control of a variety of the vendor's factory data collection devices. Available now, it supports up to 64 Burr-Brown compact microterminals and features MMS applications interface software, OSI connectivity and both carrierband and broadband interfaces.

Among the vendors demonstrating previously announced X.400 capabilities were NCR Corp., Digital Equipment Corp. and Xerox Corp.

• Softswitch, Inc. in Wayne, Pa., unveiled Gateway/X.400, which reportedly links electronic mail networks implementing IBM's Systems Network Architecture Distribution Services protocol to X.400-compliant MHS and to all Softswitch-supported systems. The product is scheduled to be available in the fourth quarter.

• Telenet Communications Corp. in Reston, Va., announced the availability of an X.400 E-mail network for aerospace and related government agencies.

Government Open Systems Interconnect Profile (GOSIP) products were also in force at the show. One of the major booths was the U.S. Air Force's Aerospace Manufacturing Laboratory, which joined with contractors to demonstrate how MAP/TOP can be used to exchange product data among design, manufacturing and publishing systems.

Small OSI technology vendors such as Retix Corp. in Santa Monica, Calif., and Netwise, Inc. in Boulder, Colo., said they plan to tap the federal market by working with systems integrators. Netwise, for example, expanded its line of code generation tools to include support for OSI distributed applications. Also, the OSI version of RPC Tools is intended to help applications developers migrate software from TCP/IP to OSI and GOSIP networks without changing the original application code, Netwise said.

The product costs $1,750 in a microcomputer version, $27,000 in a minicomputer version and $64,800 in a supercomputer version.

Washington correspondent Mitch Betts contributed to this report.

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NEW PRODUCTS

Local-area network hardware

Local Data, Inc., has announced a series of multiple access units (MAU) that reportedly allow users to connect terminals and personal computers to the IBM Token-Ring.

The units are available in two types: the **Active MAU Series 8220** and the **Regenerative MAU Series 8228**, which are four- and eight-port models, respectively. Both provide distances of up to 500 ft between MAUs and 300 ft between a MAU and a personal computer.

Pass-through and looping capabilities are also provided. The models are said to be fully compatible with the IBM 8228 MAU.

The Active MAU series costs from $395 to $595, and the Regenerative MAU series costs from $595 to $795.

Local Data, 2771 Plaza Del Amo, Torrance, Calif. 90503. 213-320-7126.

Micom Systems, Inc. has added a local-area network bridge expansion to its Digital Wideband Exchange T1 products.

The DX-LBE permits Micom T1 networks to support voice, data, video and LAN communications within a single network environment.

In addition to providing LAN bridging for Ethernet 802.3 LANs within the Digital Wideband Exchange T1 network, the product extends network management reporting and control to each interfaced LAN. The network manager reportedly can tune each bridge circuit according to the individual needs of LAN users.

The DX-LBE costs $6,975.

Micom, 4100 Los Angeles Ave., Simi Valley, Calif. 93062. 805-583-8600.

A single-circuit board that reportedly reduces the costs of distributed network management services has been announced by **Hughes Network Systems, Inc.**, a subsidiary of Hughes Aircraft Co.

The vendor claimed that the Mini Auxiliary Service Processor (MASP) lowers the distributed network services costs of Hughes' Integrated Packet Network from $25,000 to $10,000 per MASP-equipped packet exchange. According to Hughes, the product is ideally suited to wide-area network topologies with packet exchanges far removed from the Network Control Processor, such as private multinational corporate networks.

Hughes Network Systems, 11717 Exploration Lane, Germantown, Md. 20874. 301-428-5887.

Local-area network software

Network Research Corp. has added a number of features and performance enhancements to its **Fusion Network Software Version 3.2** for Microsoft Corp. MS-DOS systems.

The latest release will be included in Fusion And, a new package with bundled Fusion software and Western Digital Corp.'s Ethercard Plus LAN Adapter. Version 3.2 will also be available separately for other network controller support.

Enhancements reportedly include a simplified installation procedure, subnetting, Digital Equipment Corp. VT100 terminal emulation and program development support for Microsoft's C Compiler Version 5.0.

Fusion Network Software 3.2 for MS-DOS costs $300.

Network Research, 2380 N. Rose Ave., Oxnard, Calif. 93030. 805-485-2700.

General Computer Corp. is now shipping PLP Share, an Apple Computer, Inc. Appletalk networking adapter for the Personal Laserprinter and the Personal Laserprinter Plus.

PLP Share is said to allow all Apple Macintosh users on an Appletalk network to access the output devices. The product is available in 75, 150 and 300 dot/in. draft modes. The software includes a spooler that transmits image documentation in background, allowing the user to continue working on the Macintosh while a document is printing.

PLP Share costs $999 and includes all fonts available for the Personal Laserprinter.

General Computer, 580 Winter St., Waltham, Mass. 02154. 617-890-0880.

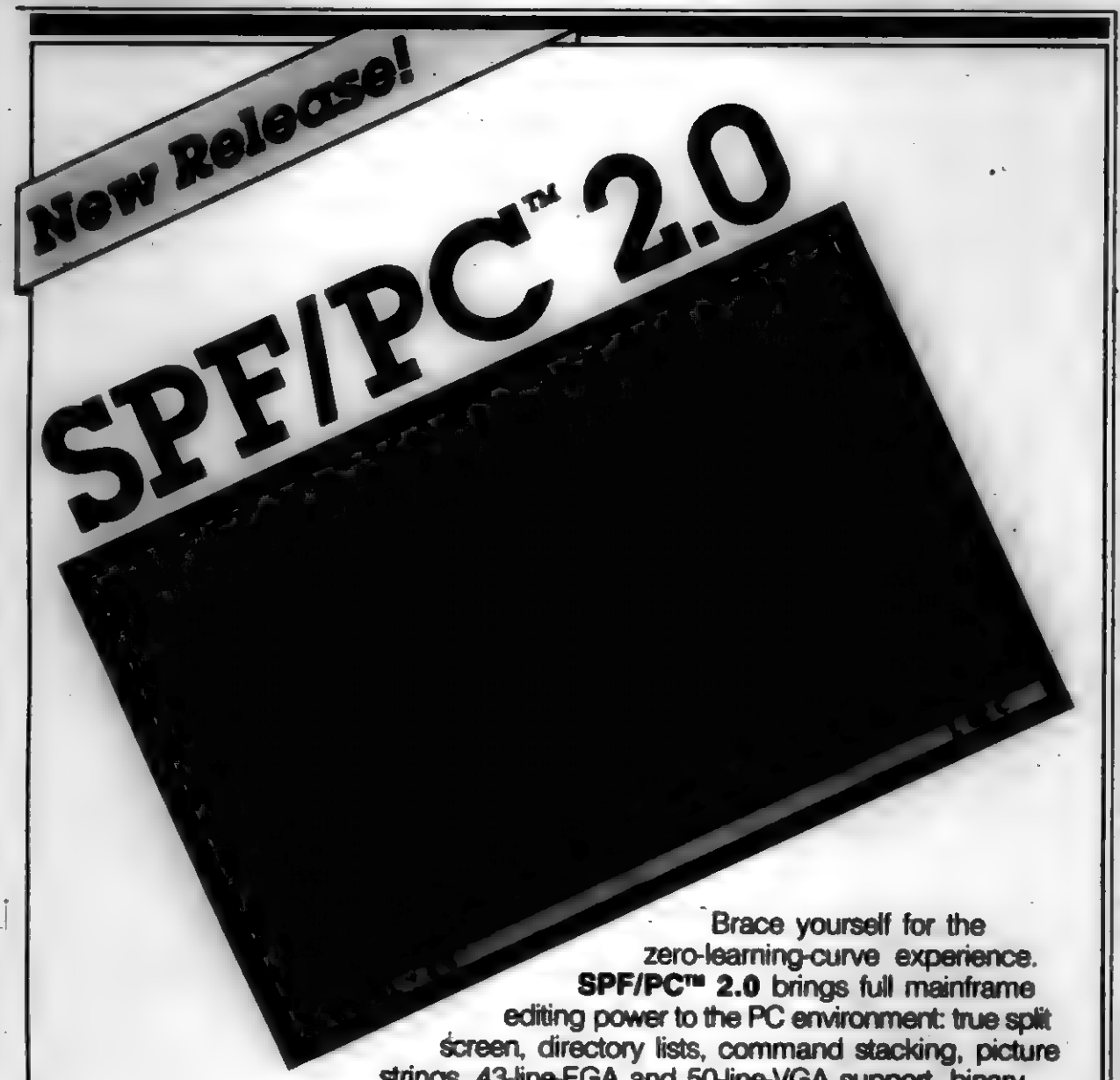
Computer Associates International, Inc. has released **Accpac BPI Accounting Lanpak**, a program that provides for accounting system growth by allowing multiple users to share accounting resources, the vendor said.

The system was designed for small to medium-size businesses with general accounting needs. Up to eight users can use the software modules and data simultaneously. Users can reportedly access, edit or view account, customer or vendor information simultaneously as well as share printers and storage devices.

The system runs on Novell, Inc.'s Advanced Netware and Novell ELS, 3Com Corp.'s 3+ and IBM Personal Computer local-area networks.

Accpac BPI Accounting Lanpak costs $395.

Computer Associates, 1240 McKay Drive, San Jose, Calif. 95131. 408-432-1727.



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You can use any processors in Group 10, 20, 30, or 40 in an SSI complex.	IBM's ISF does not support Group 10 and 20 processors. In Group 30, ISF only supports 4381's with 16 megabytes or more, and 3083's. In Group 40, ISF does not support the 3081 D16 processor.
An SSI complex supports up to 33 processors.	IBM's ISF is limited to four CPUs.
SSI dynamically switches virtual machines from one processor to another to satisfy user requirements. This means a user's terminal and virtual machine can be on different CPUs. As a result, duplicate software licensing and maintenance charges can be reduced or eliminated.	IBM's ISF offers no switching capability.
SSI balances the user load automatically.	IBM's ISF doesn't do load balancing.
You can use IUCV and VMCF to communicate between programs across processor boundaries in an SSI complex.	With IBM's ISF, you can't use IUCV and VMCF across processor boundaries.
SSI supports FBA and Count/Key/Data devices.	IBM's ISF inter-system link and spool facilities do not support FBA devices.
SSI doesn't require extended storage support.	IBM's ISF does.
SSI has been available since 1980.	IBM's ISF has been available since last year.

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Change Management
As corporate connectivity requirements change and grow, so grows SNA. IBM's challenge is to reconcile old and new, staying one step ahead of today's needs. Page S4.

Glasnost
SNA-X.25 integration can offer IBM users connectivity options. Page S6.

More than a Token
IBM's Token-Ring offers SNA users a flexible, high-speed transport solution. Page S7.

Ask the Vendor
Vendors answer questions about keyboard mapping modification, gateway diagnostics and more. Page S8.

Mix and Match
No single third-party vendor could or would cover the spectrum of SNA protocols. Page S9.

Product Chart
A detailed guide to LAN-to-SNA gateways. Page S10.

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Organizations can envision uses for LU6.2, but few are ready to move ahead without a commercial base

CROWD AWAITS ALL CLEAR ON LU6.2

BY MICHAEL HURWICZ

CHRIS DEMAREST

LU6.2, IBM's program-to-program SNA protocol, is still an item on many organizations' "to do tomorrow" lists, even in those that seem like ideal candidates for its deployment.

Arco Products Co. in Los Angeles is a case in point. It will probably be at least a year before the company, the petroleum refining and marketing unit of Atlantic Richfield Co., gets around to implementing the protocol, even though it fits the LU6.2 profile perfectly.

LU6.2 is intended to provide a common connectivity scheme for dissimilar systems such as microcomputers, local-area networks, minicomputers and mainframes. With more than a half-dozen IBM Token-Ring networks supporting some 250 workstations, five IBM mainframes and more than 3,000 terminals or IBM Personal Computers emulating IBM terminals, Arco has plenty of dissimilar systems.

Because LU6.2 is IBM's strategic protocol for integrating intelligent processors on Systems Network Architecture (SNA) networks, it is particularly attractive to companies committed to IBM and SNA. Given its predominant reliance on IBM and SNA, Arco falls into that category.

Arco is interested in LU6.2, explains Chris Broome, a senior technical consultant at the firm, but, like many other companies, Arco is deferring action until more application software emerges.

"We would like to do something more than just plain terminal emulation or file transfer," Broome says. "For example, we would be very interested in having a PC user be able to formulate a query and receive an answer from the mainframe without having to go through the multistep process of terminal emulation, downloading data to the PC and using a PC software package to analyze that data."

However, Broome adds, "We are not in the business of writing application programs, so one thing we are looking for is delivery of products such as intelligent data base managers on the PC that take advantage of LU6.2."

Even when those applications are available, Broome says, adoption will take time. "One question is when the facility will be delivered by the vendors in an acceptable form. Another is how long it will take us to start using it. After you take something out of the wrapper, it takes quite a while to get used to it. I doubt that LU6.2 will be seriously integrated into our system within the next 12 months."

One of the national television broadcasting companies is also evaluating LU6.2. But the protocol is regarded only as a "long-range possibility." It may be something the company will get to next year, its telecommunications manager says, "depending on what demands arise for PC communications."

Currently, the broadcasting company's efforts are concentrated on managing the rapid growth of its network. This network connects 1,200 terminals or PCs emulating terminals scattered throughout several states to two 3090 mainframes via SNA. In addition, several departments have installed or are installing IBM System/36 and 38 minicomputers. While it uses a variety of micro-to-mainframe products from Novell, Inc.,

Hurwicz is president of The MTI Group, a data communications consulting firm in Nashville.

LU6.2

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the company is definitely a committed SNA shop.

The telecommunications manager says he may be able to turn his attention to higher level protocols such as LU6.2 when network expansion slows. He maintains such higher level protocols would be helpful in situations in which information under the control of one application needs to be included in a report or screen of another.

That time may come within the next year, the manager predicts, hastened by the growing number of departmental System/36s and 38s.

Because they can support PU2.1, the minicomputers will be able to run multiple LU6.2 sessions simultaneously and set up sessions without the mediation of a host. This, he says, makes the systems appropriate central management points for clusters of intelligent nodes.

Using minis in that manner is still just a possibility, though. The broadcast company currently operates a hierarchical, terminal-to-host network.

Despite a seemingly fertile field for LU6.2, it appears it will be some time before the protocol is solidly implanted in corporate data processing application environments.

"Adoption of LU6.2 will be extremely slow, extremely limited," says Lee Doyle, senior PC analyst at International Data Corp. (IDC) in Framingham, Mass. "There are a number of well-publicized cases where companies are actually writing applications for LU6.2. Their numbers are increasing, but they are on the 'bleeding edge' of the technology."

Applications on the edge

An example of an early LU6.2 implementation, started as a pilot project in 1984, is the network that supports the Apollo airline reservation system operated by the Covia Partnership.

The network, which made headlines in May when four European airlines bought more than 38% of it from United Airlines, is devoted to the Apollo system, the second largest airline reservation system in the world.

The Covia system has grown rapidly since 1983, when it carried 400 messages per second, to today's level of 1,100 messages per second. The system is expected to continue to grow at 100% per decade, according to Mark Teflian, vice-president of technical planning and systems engineering for the partnership.

That 100% growth in traffic will be accompanied by a 1,000% growth in the complexity of applications. Simply quoting the lowest fare is complicated, Teflian says.

Answering queries that do not ask for the lowest fare only or that integrate schedules and fares, such as "Show me all flights for tomorrow that cost less than $200," is still more complex. To support this complexity, United Airlines decided to use LU6.2.

Three varieties of LU6.2 were required. One variety is implemented on a 4381 mainframe running IBM MVS/CICS and building passenger name records. Other reservation functions are implemented on IBM mainframes running IBM's Transaction Processing Facility (TPF). These two implementations make up the central reservation data base located in Denver.

> "ADOPTION of LU6.2 will be extremely slow, extremely limited."
>
> LEE DOYLE
> INTERNATIONAL
> DATA CORP.

On the microcomputer side, the system uses the Token-Ring network hardware and LU6.2 software from Communications Solutions, Inc. in San Jose, Calif. United Airlines and Covia tailored Communications Solutions' code to work with Covia's proprietary software.

After the pilot project in 1985, migration to LU6.2 as a global session-level interface began in 1986 and should be completed within three to five years.

"The migration is well under way," Teflian says. "We will fulfill our long-range business automation and capacity requirements through the early 1990s by distributing transaction processing using LU6.2. We see LU6.2 as the best session-level platform for connectivity."

However, he explains, applications on the network do not use the LU6.2 interface directly.

Indirect service

Instead, proprietary software, the Covia Open Systems Manager, provides services to applications, while protocols such as IBM's NetBios provide session- and datagram-level LAN interfaces. LU6.2 is used only to connect LAN application nodes to wide-area network application nodes.

Covia would like to bring LU6.2 down to the LAN workstations. "We would prefer to have the same session-level interface everywhere," Teflian says, "on the local-area network and on the wide-area network."

But Covia has not yet found a way to do that while retaining reasonable price/performance and management. IBM's OS/2 may provide that, Teflian adds.

The Apollo system's current LAN-based software runs under DOS 3.3, using the IBM PC LAN Program and proprietary Covia programs.

However, Covia plans to implement Microsoft Corp.'s LAN Manager architecture, for which it is considering a number of products, such as IBM's OS/2 Extended Edition, 3Com Corp.'s 3+Open and Novell's Netware products for OS/2.

Teflian says Covia has found LU6.2 to be "very practical" and more directly applicable to transaction processing, a function for which it was designed, than other available protocols.

LU6.2 also allows Covia to completely insulate the session interface from lower layers. "The rate of change at the lower layers is so rapid, yet the migration process is so lengthy, that we have to support multiple transports, both for existing nondistributed and for new distributed applications," Teflian says.

Teflian says he also hopes LU6.2 will integrate well with the Open Systems Interconnect (OSI) session-level protocols currently under development. Ideally, he says, he would like to see OSI protocols that are "verb-to-verb semantically and functionally compatible" with LU6.2 at the session level.

BOA's Kimball

Teflian says he questions whether that will happen, however. The current proposed OSI protocols are running into trouble in various committees, he says, precisely because they resemble LU6.2 too closely, and OSI developers may want to avoid using an existing de facto standard. He hopes that, at the very least, developers will come up with something functionally the same as LU6.2 so that the translation process will be relatively painless.

Another user aggressively implementing LU6.2 is Bank of America, headquartered in San Francisco.

The bank started making plans to use LU6.2 in 1984, when it set a strategic goal of unifying 66 separate networks, each with hard-wired terminals and a separate mainframe data base, into one Global Data Network.

Bank of America first decided to base its implementation plans on IBM's strategic direction, centered around LU6.2, because it operated numerous IBM mainframes, says Gregory Kimball,

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SNA terms and definitions

APPC: IBM's Advanced Program-to-Program Communications, another name for LU6.2.

APPN: IBM's Advanced Peer-to-Peer Networking, a feature of its System/36 communications functions.

CPMSU: Control Point Management Services Unit, a new data type to carry network management data in IBM's Systems Network Architecture (SNA).

IBM 3720, 3725, 3745: Front-end communications processors in ascending order of size.

LEN: Low-Entry Networking, another name for direct PU2.1-to-2.1 communications.

Logical Units (LU): Entities that provide SNA access to end users and are represented by terminals and applications in an SNA network. All user logons are represented internally in SNA as LU-to-LU sessions.

Various LU types exist to accommodate different device types. LU1 and LU3 are for batch-type sessions, LU2 for interactive devices and sessions and LU6.2 for program-to-program communications.

NCP: Network Control Program, control software for IBM front-end processors.

Netview: IBM's network management software that runs in the host to provide network control center functions.

Also used as a generic prefix with network management such as Netview Performance Monitor and Netview/PC.

NMVT: Network Management Vector Transport, one of several architected record types to carry network management data in SNA.

Path Control Network: Official name for the SNA transport network defined by the lowest three layers of SNA. The transport or backbone in SNA consists of interconnected subarea nodes, hosts (VTAM) and NCPs.

The primary control header involved is the Transmission Header with format identifier FID 4 TH.

Physical Units (PU): Distributed control elements in SNA such as front-end processors and cluster controllers. The term "physical unit" does not represent a physical entity — it may be implemented in hardware, software or a combination. In SNA, all terminals must be attached to the physical units that control them.

Physical unit functions and the terminal can be within the same device. Various types of physical units are defined in SNA; the term "node type" is used synonymously with PU type.

PU5 is a part of VTAM in the host and provides central directory services and route management functions. PU4, associated with the front end and NCP, provides functions of a major network congestion, recovery and so on.

For small mainframes with no front ends, such as the IBM 4361s and 9370s, NCP or PU4 functions are provided by VTAM directly. PU4 and 5 are also referred to as the subarea nodes.

PU2 and 2.1 are associated with network stations, including dumb terminals, personal computers and minis, and provide local addressing and control for these devices. These nodes do not understand protocols used among subarea nodes and do not participate in the backbone network functions. Such nodes are also known as peripheral nodes.

RECFMS and RECMS: Record Formatted Maintenance Statistics and Record Maintenance Statistics, two of several record types to carry network management data in SNA.

Subarea nodes: Another name for PU4 and 5 host and front-end nodes that jointly form the transport in SNA.

SSCP: System Services Control Point, SNA component responsible for the overall control, management and monitoring of the network; one of the most significant elements in SNA.

SSCP resides in the Advanced Communications Function for VTAM in an IBM mainframe.

Transmission Header: Level 3 header in SNA. It carries addresses, route identification, network priority and other transport protocol flags.

VTAM: Host software that provides most significant SNA functions in the host and contains SSCP and PU5.

ATUL KAPOOR

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vice-president and senior systems manager at the bank's Base Technology Operations group.

Further study revealed that TPF would provide the best base for a high-transaction-volume LU6.2 environment. Accordingly, about 2½ years ago, Bank of America entered into a joint development effort with IBM to develop LU6.2 for TPF.

The first LU6.2 transaction occurred in April 1987.

Keep it simple

LU6.2 allows programmers to modify programs more efficiently, Kimball says. "It removes the need for an application programmer to be intimately aware of underlying session control for the network."

Instead, he says, programmers use the LU6.2 verb set, which is independent of lower layers. "We don't have any very hard figures yet," Kimball adds, "but we are confident that we will realize productivity gains between 20% and 25% because of the simplified programming interface."

Bank of America is currently running three applications under LU6.2: a teller application, a customer on-line information network (COIN) application and a change management system.

The teller application allows bank personnel to use IBM Personal System/2 Model 50s on IBM Token-Ring networks to perform their duties.

Kimball says the application, which is deployed in only one branch so far, has proven worthwhile in several ways.

"First of all, we can use the emerging features of both hardware and software platforms to enhance the basic presentation without modifying the host application," Kimball explains.

Nipping errors in the bud

Network availability and response time have also improved. Kimball attributes this largely to improved network control achieved through Netview and LU6.2. Because the teller application uses LU6.2, it can easily send alerts to the mainframe through Netview. Thus, incipient problems are detected and corrected more quickly.

In addition, because the applications on both ends of the LU6.2 program-to-program conversation, known as partner programs, are designed to detect and recover from errors, fewer error-checking and recovery functions are required at the systems level. This lightens the mainframe's load considerably.

"We don't have to try to come up with one recovery method that works for every application we might have," Kimball says. "With LU6.2, the two partner transaction programs know which one is in control at any given point, and they're best suited to determine what type of error has occurred and how to recover from it."

The bank's second LU6.2 application, COIN, is used in service centers that handle customer inquiries about account balances or Bank of America products and services. There are 43 such service centers in California. Four have been converted to LU6.2, with the remainder scheduled for migration by the end of the year, according to Kimball.

The bank's change management system uses LU6.2 to manage alterations in the network, particularly in network applications.

> "WE LOOK FORWARD to the day when all the back-end processors will speak LU6.2."
>
> GREGORY KIMBALL
> BANK OF AMERICA

The system was necessitated by the introduction of intelligent workstations running applications. "Change management within just a host mainframe environment has always been a complicated process that required an exorbitant amount of control and synchronization," Kimball notes. "Instead of four or five mainframes, we now had to exercise that control over more than 22,000 micros in 1,200 different locations."

The basic plan for the application is to send changes from the mainframe to a single node — called the software distribution node — on each Token-Ring network.

When changes arrive, software indicators are set. PCs on the LAN check those indicators and recognize the need to load the new software. LU6.2 transports information from the mainframe to the software distribution node and also provides communications between nodes on the LAN.

In general, the bank is extremely happy with LU6.2 so far, Kimball says. The thorniest problems involve timing.

Kimball says it is difficult from a management perspective to time implementations of particular functions to coincide with the availability of the technology to handle those functions.

For example, Bank of America currently runs LU6.2 under TPF and CICS and has to go through protocol conversion

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Life on the SNA fast track

BY ATUL KAPOOR

After starting as a primitive single-host architecture, IBM's Systems Network Architecture (SNA) has established itself as the most widely used architecture for private data networks. Lately, it has also entered the shared public network arena.

While SNA's success is indisputable, both IBM and its network architecture now face significant challenges. One is to convince customers to continue using a vendor proprietary architecture, even as domestic interest in international standards is rising and Open Systems Interconnect (OSI) and CCITT's X.25-compatible products are emerging from major vendors such as AT&T and Digital Equipment Corp.

IBM is emphatic about its intent to support international standards as each becomes extensively implemented. However, the quality of support is in the eye of the beholder. For example, users of IBM's NCP Packet-Switching Interface, which permits an IBM front-end processor to appear as an X.25 terminal, say they would like easier implementation and better support.

Support for higher OSI layers is still not available in the U.S. According to IBM, this is because the demand isn't there. But, in fact, it is difficult to imagine IBM providing as efficient a support for OSI and X.25 as it does for SNA interfaces.

The long-range effects of Integrated Services Digital Network (ISDN) are difficult to predict. In the short run, ISDN will probably stimulate new applications rather than replace SNA in existing networks. It will be interesting to see how long it takes for ISDN to take switching functions over from SNA.

What lies ahead?

A second and broader challenge is to enhance without disruption. IBM has identified a number of requirements that it sees for SNA in the future. The company wants to lift all addressing limitations in SNA. It would also like to provide more flexibility in implementing routing tables and allow incorporation of network topology changes without the need for a system generation.

IBM has also indicated its awareness that interconnections between local-area networks and SNA networks are becoming more important and that the need for high-capacity gateways to and from LANs is increasing.

Other trends and requirements include the following:

• **Distributed processing.** The LU6.2 programming interface, also referred to as the open LU6.2, will probably be used mostly by software houses to develop turnkey applications. Since LU6.2 provides only a foundation architecture for generalized distributed processing, the availability of application-specific packages is a pre-condition for its success.

Early LU6.2 applications will apparently be for system-type functions such as software and document distribution.

Users can probably also expect to see increasing availability of off-the-shelf LU6.2 applications for various machines and computing environments.

> THE introduction of SAA does not imply a total revamping of SNA products and interfaces. A number of its features already exist in various IBM products.

A distributed version of IBM's DB2 is reportedly in the works as well. In addition, LU6.2 has been proposed for adoption by the International Standards Organization as a standard for transaction services and could be adopted with some modifications.

Right now, Low-Entry Networking using PU2.1 to support sessions between logical units that are not host-resident requires either a separate network or a host to process the session initiation. Neither solution seems optimum, and, given the current System Services Control Point in the host, IBM will find allowing truly host-independent sessions difficult. In addition, the company has not made a statement about whether Advanced Peer-to-Peer Networking will be incorporated into SNA.

• **Systems Applications Architecture (SAA).** The introduction of SAA does not imply a total revamping of IBM SNA products and interfaces. A large number of its features already exist in various IBM products. However, users should remember that there is no such thing as absolute portability, and it will likely be a few years before even basic portability is available.

• **Transport.** To anticipate some of the changes in the transport network, understanding the distinction between the network access architecture and the transport internal architecture is important.

While PU2 and 2.1 define access protocols, subarea nodes — VTAM and NCP — define internal transport architectures. IBM is making public only the access protocols; internal transport protocols are available only to IBM product license holders or under nondisclosure agreements. While many users will not care what transport architecture is used internally, this gap will create problems for vendors that want to build SNA backbone-compatible products.

What users do care about are factors such as ease of implementation, administration and management, and, right now, SNA routing structures are fairly complex to administer. SNA's Path Control Network currently provides up to eight end-to-end virtual routes between any pair of network nodes. While route failures are communicated automatically, network nodes do not automatically learn about changes in the network.

Logical switching, such as that provided by the Path Control Network, would become less important as a more intelligent physical layer is provided by T1 bandwidth management systems or ISDN. This layer could make physical link failures and their recovery transparent to SNA, in effect providing perfect SNA virtual routes that never break down or become congested.

IBM will start to offer more in high-bandwidth systems, starting with its Token-Ring as well as products such as its new front-end processor, the 3745, and host-to-host connections via IBM 3737 over T1 links.

• **Network management.** IBM network management is provided through its host-based Netview, which has consolidated and enhanced a number of earlier products. Recent enhancements in ease of operation, systems management and remote operation have been impressive, but other features such as IBM's Command List Language could be improved for ease of use.

To accommodate non-SNA and non-IBM network management systems, IBM offers Netview/PC, which provides a foundation for a gateway to transform non-SNA network management information into a form compatible with the host Netview. Netview/PC is fine as a concept, but it is cumbersome and frustrating to operate, and today's IBM PC-DOS-based environment is just not powerful enough to support it. Users will have to wait and see how much relief OS/2 brings.

SNA Management Services, the architectural foundation for Netview and Netview/PC, appear to be a compendium of existing capabilities with some extensions, with no flow control for management data. The architecture is incomplete and requires more definition before IBM can provide capabilities.

Right now, Netview's only direct competition is from Cincom Systems, Inc.'s Netmaster. However, as AT&T starts rolling out its well defined and comprehensive Unified Network Management Architecture, there should be more excitement.

SNA has changed significantly since its inception, and if anything, the pace of change has accelerated in the last two years. IBM appears well aware of SNA's limitations and deficiencies. How quickly it overcomes them remains to be seen. •

Kapoor is vice-president and a principal at Kaptronix, Inc., an SNA consulting firm in Howarth, N.J.

Systems Network Architecture: A chronology

1974 Announcement of SNA for single-host tree-oriented networks under DOS; no locally (channel) attached devices, no support for switched lines offered; IBM 3600 the only SNA device

1975 SNA (VTAM) support for MVS available; point-of-sale terminals included under SNA

1976 Primitive multihost support; addition of support for switched lines

1977 Multihost Advanced Communications Function products available that allow interconnection of single trees; CCITT X.25 adapters announced in Canada and France

1978 Introduction of first SNA network management application, Network Communication Control Facility; LU6.0 announced

1979 Parallel LU-to-LU sessions for CICS and IMS (LU6.1); Network Terminal Option, Network Problem Determination Application introduced

1980 Multiple routes, parallel links, network-level priority and congestion management and fully meshed transport available; distinction between local and remote Network Control Program (NCP) software disappears

1981 NCP Packet Switching Interface (NPSI), SNA-to-X.25 gateway become available

1982 LU6.2 and Document Interchange Architecture introduced; LU6.2 available only on CICS

1983 Multiple network connectivity via SNA Network Interconnection provided and PU2.1 introduced; VTAM Extended functions incorporated in VTAM; new front-end processor 3725 announced

1984 Enhanced Network Addressing for larger networks; Network Logical Data Manager, Systems Network Architecture Distribution Services and IBM Cabling System announced; direct SNA support available under VM

1985 John Akers takes over as IBM chief executive officer; Token-Ring announced

1986 Ellen Hancock takes over as president of IBM Communication Products Division; enhanced network management available — Netview announced, Token-Ring support available under Netview; IBM 9370, Advanced Peer-to-Peer Networking and small front-end 3720 announced; IBM announces agreement with Network Equipment Technologies to market the latter's Integrated Digital Network Exchange T1 management system

1987 Systems Application Architecture announced; expanded networking capabilities — switched and multipoint subarea links — announced; Netview enhanced to include operating system management; Netview/PC announced; IBM 3737 announced for remote channel-to-channel connections over T1; IBM's participation in Integrated Services Digital Network trials in Europe

1988 High bandwidth support — 3745 announced, 3737 enhanced; PU2.1 support under subarea nodes offered, NPSI enhanced

CW CHART

LU6.2

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when accessing its IBM IMS system. "We look forward to the day when all the back-end processors will speak LU6.2," Kimball explains.

IDC's Doyle says there are three reasons why LU6.2 is still far from mainstream implementation. First, he says, IBM has not yet sufficiently shown and marketed the advantages of LU6.2. Second, customers have had implementation problems and insufficient help from IBM.

"IBM doesn't have any good guidelines for how people should split their applications [running part of an application on a mainframe and part on a PC]. It is telling people that they should do this," he says. "But [splitting applications] involves not only writing new PC applications but also rewriting mainframe applications. How should that be done? What's efficient? We haven't even gotten to a prototype stage there."

UCLA's Gerber

According to Bernd Harzog, senior product manager of LAN communications at Digital Communications Associates, Inc., IBM's developers' conferences for OS/2 Extended Edition prove Doyle's point.

These conferences include instruction on writing applications to IBM's Advanced Program-to-Program Communications (APPC), Harzog says, but they do not fully address design issues such as what part of the application to put on workstations and what segment to leave in the mainframe.

It will probably take 10 years, Harzog adds, before the typical in-house programmer has a good understanding of that particular issue.

Over the long-term, Doyle regards LANs as the most likely arena for LU6.2 applications.

Currently, there is a hitch in deploying LU6.2 in this environment — IBM's APPC/PC, the best-known LU6.2 product, does not leave enough memory to enable applications to be written on top of it, causing many users to avoid using it altogether.

Third-party vendors have recently come out with products that require less memory, but these are still too new to determine what their influence will be.

Currently, the LAN arena is still dominated by protocols such as Netbios and Xerox Network Systems, among others.

OS/2 will solve the memory problem, Doyle says, but it is still not likely to produce an immediate stampede toward LU6.2. "We don't expect that people are going to be jumping on OS/2 very quickly," he says.

Alternative route

An alternative lies in LU6.2 gateways that run on LANs and concentrate most of the LU6.2 code in the gateway, greatly reducing the amount of memory required in each workstation.

Eicon Technology Corp. already offers such a gateway that uses the CCITT X.25 standard, and a number of other vendors, including Novell, Apple Computer, Inc. and Communications Solutions, will release products soon.

The Social Sciences Computing Group at the University of California at Los Angeles (UCLA) has been beta-testing one such gateway, Netware LU6.2 from Novell, and plans to use it in the future for LAN-to-mainframe communications, according to Barry Gerber, administrative director of the group.

The main use of LU6.2 at the university, however, will probably be for various kinds of statistical analysis on mainframes, minis and micros. Jobs might be assigned to particular machines based on the suitability of the machine for the job and the current load on various processors.

The UCLA group manages 18 Netware LANs and also operates an IBM 4381 mainframe with 150 hard-wire terminals. All 600 Netware workstations can also access the mainframe using terminal emulation, which is based on Novell LAN-to-mainframe products. An IBM 3090 mainframe, operated by UCLA's Office of Academic Computing, is also accessible from the LANs.

UCLA has not used LU6.2 for LAN-to-mainframe communications up to this point, Gerber says, because mainframe support for LU6.2 is dependent on CICS and the Academic Computing office is not CICS-oriented. The office is waiting for the new release of VTAM, expected this fall, which will support LU6.2 outside the CICS environment.

"So far," Gerber says, "we are just testing a little bit, using PCs. It certainly works. In some ways, it is overkill. We don't need LU6.2 to get a PC to talk to a PC on the network. Novell provides protocols such as IPX and SPX that work just as well for PC-to-PC communications. We don't see turning to LU6.2 for that in the near future."

Gerber also does not foresee using LU6.2 for PC-to-PC communications under OS/2. "The key for us is to have a way to run OS/2 in the networking environment, and Novell now gives us that," he says.

However, micro-to-micro communication via LU6.2 may be appropriate in at least one instance, Gerber says — connecting Apple Macintoshes to IBM PC networks. The Macintoshes are a special case, because UCLA currently has no way to allow Macintoshes to use Netware disks or exchange mail with Netware users.

Gerber says he hopes to test a Netware-to-Mac link that Novell is currently developing and to try connecting Netware workstations with Macintoshes using Apple's MacAPPC and Netware LU6.2.

Not for us?

It is also possible that LU6.2 may not be necessary at UCLA, depending on what other facilities Novell provides with the Netware-to-Mac link. However, LU6.2 is one of the few factors common to both the Mac and DOS environments.

Another company starting to experiment with LU6.2 on LANs is Aetna Life & Casualty in Hartford, Conn.

Aetna maintains a heavy investment in LANs, according to Rick Segal, a technical adviser in Aetna's Commercial Insurance Division Systems department. Aetna has IBM mainframes but few terminals.

Instead, the standard means for accessing mainframes is through LAN gateways. The LAN possibilities are numerous, with 30 file servers in the home office and approximately 125 in 50 field offices. Segal estimates the number of PCs in Aetna's offices nationwide at 1,500.

Aetna has at least two things in common with UCLA. It is using Netware LU6.2 and it has no production applications yet.

Segal would like to see LU6.2 applications in three areas. The first would provide connectivity to Digital Equipment Corp. Microvaxes and VAXs over Ethernet from Netware LANs and other LU6.2-compatible environments. The second would provide connectivity from Netware LANs to IBM hosts. The third is for PC-to-PC connectivity.

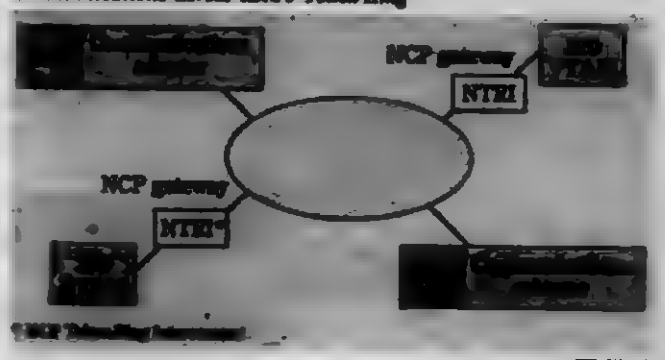
LU6.2 could be cost-effective as a means of implementing workstation-to-workstation disk sharing, file transfer and messaging, Segal says. Because Netware LU6.2 does not require any gateway hardware for workstation-to-workstation communication and Novell will bundle Netware LU6.2 with Netware, there will be no hardware or software costs.

Segal does not find LU6.2 particularly complicated or hard to work with. "You don't need a degree in computer science," he says, "as long as you have good sample code and documentation."

Segal prefers LU6.2 to alternative protocols as it is an industry standard supported by IBM and other vendors. "I like to be comfortable," he explains. ●

Subarea gateways

The latest release of IBM's Network Control Program, announced for December availability, will enable host-to-host 'cross-domain' communications across IBM's Token-Ring



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Truce declared with X.25

BY STEVE JACKOWSKI

Since the early 1980s, fierce verbal battles have been waged over whether IBM's Systems Network Architecture (SNA) or CCITT's X.25 is the superior networking architecture. This debate has always been pointless, since it attempts to compare two unlike things — SNA, which is a complete seven-layer network architecture, and X.25, which is not a network architecture at all, but a recommendation describing a standard method of connecting to public packet-switching networks.

What is even worse, however, is the fact that this pointless wrangling has cut IBM users off from the benefits that can now be derived from the integration of SNA and X.25.

In spite of the fact that advances such as the introduction of LU6.2 have facilitated peer-to-peer connections in SNA networks, use of Synchronous Data Link Control (SDLC) as the basic link protocol between nodes has forced hierarchical topologies on most SNA networks. Its half-duplex, polled, master-slave features have created performance problems in multipoint and satellite communications, restricted use of dial-up connections and forced users to lease dedicated circuits that might have been unnecessary in non-SNA networks.

Using X.25 in SNA environments can solve such communications problems and offer connectivity options not normally considered in IBM shops.

In the last two years, IBM has announced support of X.25 connections for virtually all of its machines, from large mainframes and associated communication cluster controllers to System/36 and 38 systems. X.25 gateways exist for local-area networks, and X.25 is a fundamental part of OS/2 Extended Edition.

Unfortunately, IBM's marketing force has little training in the use of packet-switching networks and no expertise in the non-packet-switching uses of X.25.

Benefits of packet switching

Most public packet-switching networks offer leveraged communications facilities. That is, they lease high-speed backbone circuits and, through multiplexing and concentration, can then make data transmission cost-effective to their users.

Since public networks charge by the amount of data sent, not by the distance it travels, use of public packet-switching networks is most effective in dial-up environments in which there are numerous locations with limited volumes of data. Private packet networks are effective when diverse types of systems using different protocols need to share a common network. Packet-switching networks can provide reliable transmission in areas where line quality suffers.

Use of packet-switching networks does not require X.25. But because X.25 connections are full-duplex, nonpolled and cost-effective in connection to networks, many vendors have developed PADs to convert non-X.25 protocols to X.25. These PADs now allow asynchronous, binary synchronous communications, SDLC and other types of devices to access packet-switching networks while still using X.25 connections.

In a pure SNA environment, there is no technical risk in using packet-switching networks. SNA support across packet-switching networks is straightforward for virtually all IBM systems. Qualified Logical Link Control (QLLC), a packet assembler/disassembler (PAD) protocol, is used to place SDLC frames in X.25 packets, allowing transmission of SDLC

Continued on page S12

Jackowski is lead consultant at Synapse Communications, Inc. in Santa Valley, Calif.

A combined effort

CCITT X.25 provides efficient use of network bandwidth and can result in better response time in a terminal-to-host link

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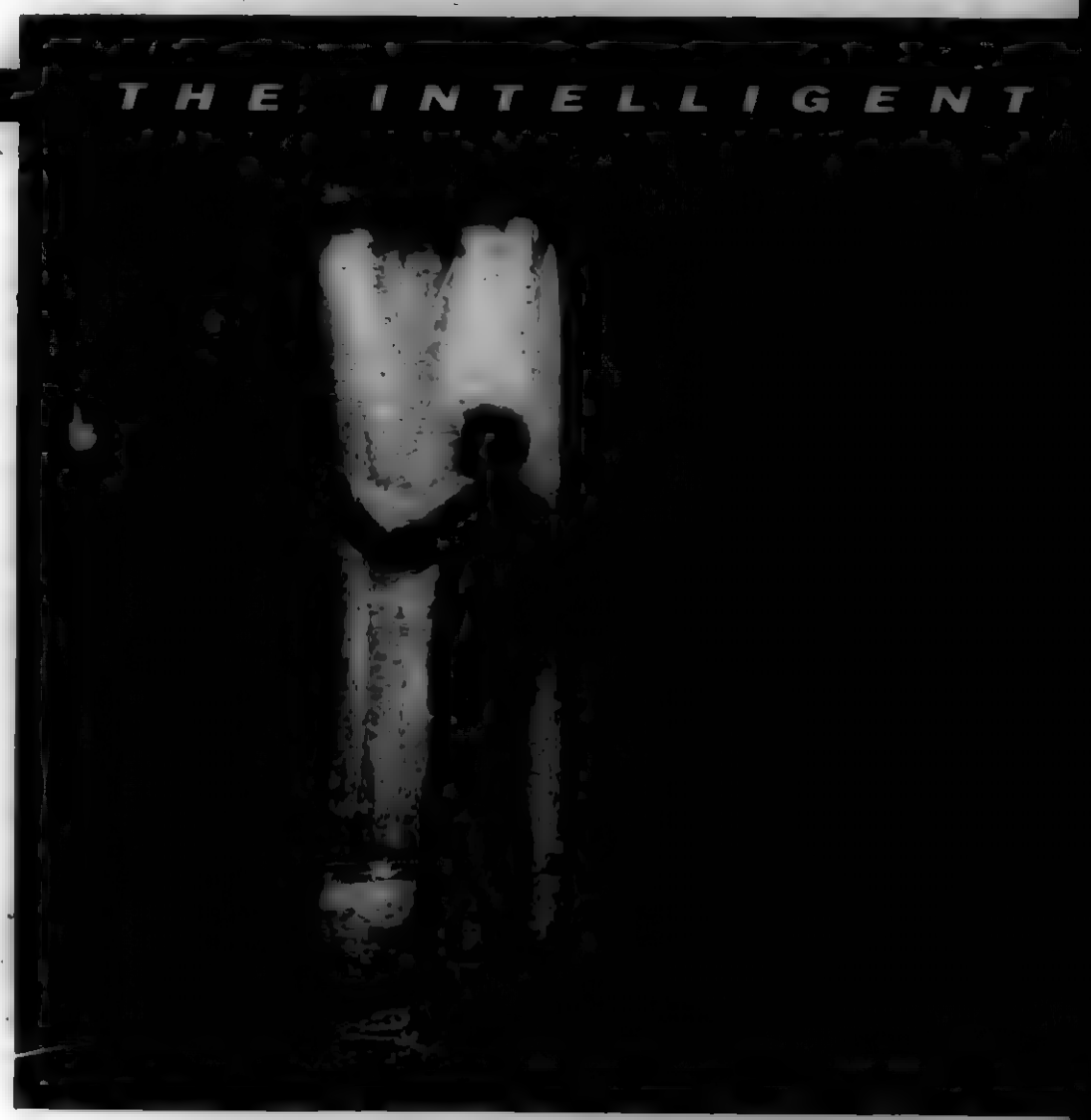

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Token-Ring protocol is SNA's best booster

BY KEVIN TOLLY

IBM's high-speed Token-Ring local-area network protocol is so well suited to SNA applications that it could justifiably be called SNA's newest transport medium.

Until its advent, two transport media were available in the Systems Network Architecture (SNA) world — Synchronous Data Link Control (SDLC) and IBM 370 channel connections. Both suffer from significant limitations. Lack of speed is the difficulty with SDLC links, which normally range from 9.6K to 25.6K bit/sec. The 370 channels, on the other hand, can carry data at speeds of 3 million byte/sec. but limit the number of device types, such as CPUs, front-end processors (FEP) and 3174 cluster controllers, eligible for channel connections. Without special channel extenders, these devices must be located in the same room.

The Token-Ring, however, delivers the high-speed performance of the 370 channel connections with the flexibility of device connectivity associated with SNA-SDLC communications links. Furthermore, the Token-Ring does this at distances substantially greater than those commonly attainable with 370 channels.

When the Token-Ring network is used, it is not only possible to channel-connect scattered FEPs, CPUs and 3174 cluster controllers without extenders but also to attach devices such as IBM Personal Computers to the host at channel speeds.

When Token-Ring networks began arriving in corporations several years ago, their purpose was almost always to provide transport services for file- and print-server functions.

Misunderstood protocol

Although early use concentrated in these areas because they were the first end-user functions offered by IBM or any other vendor, this initial specialization caused many to falsely conclude that the Token-Ring was equal to file server. This mistaken impression has led most mainframe communications managers to overlook the Token-Ring's important role as SNA's third transport medium.

What these managers do not realize is that the Token-Ring is a very low-level function designed to shuttle packets of information from ring station to ring station in a fast and efficient manner. It is not concerned with the contents or high-level protocols of the user information it carries. It also does not care whether the ring station with which it communicates is a PC, System/36, 3174 or FEP. Since all those devices must conform to Token-Ring standards, they are native devices on the network.

THE TOKEN-RING delivers the high-speed performance of the 370 channel connections with the flexibility of device connectivity associated with SNA-SDLC communications links.

In order for the SNA protocol to be used across LANs, IBM needed to modify the SNA Path Control layer to interface with the IEEE Logical Link Control 802.2 standard. Doing this allowed the functions provided by the upper layers to be made available to users via high-speed LANs.

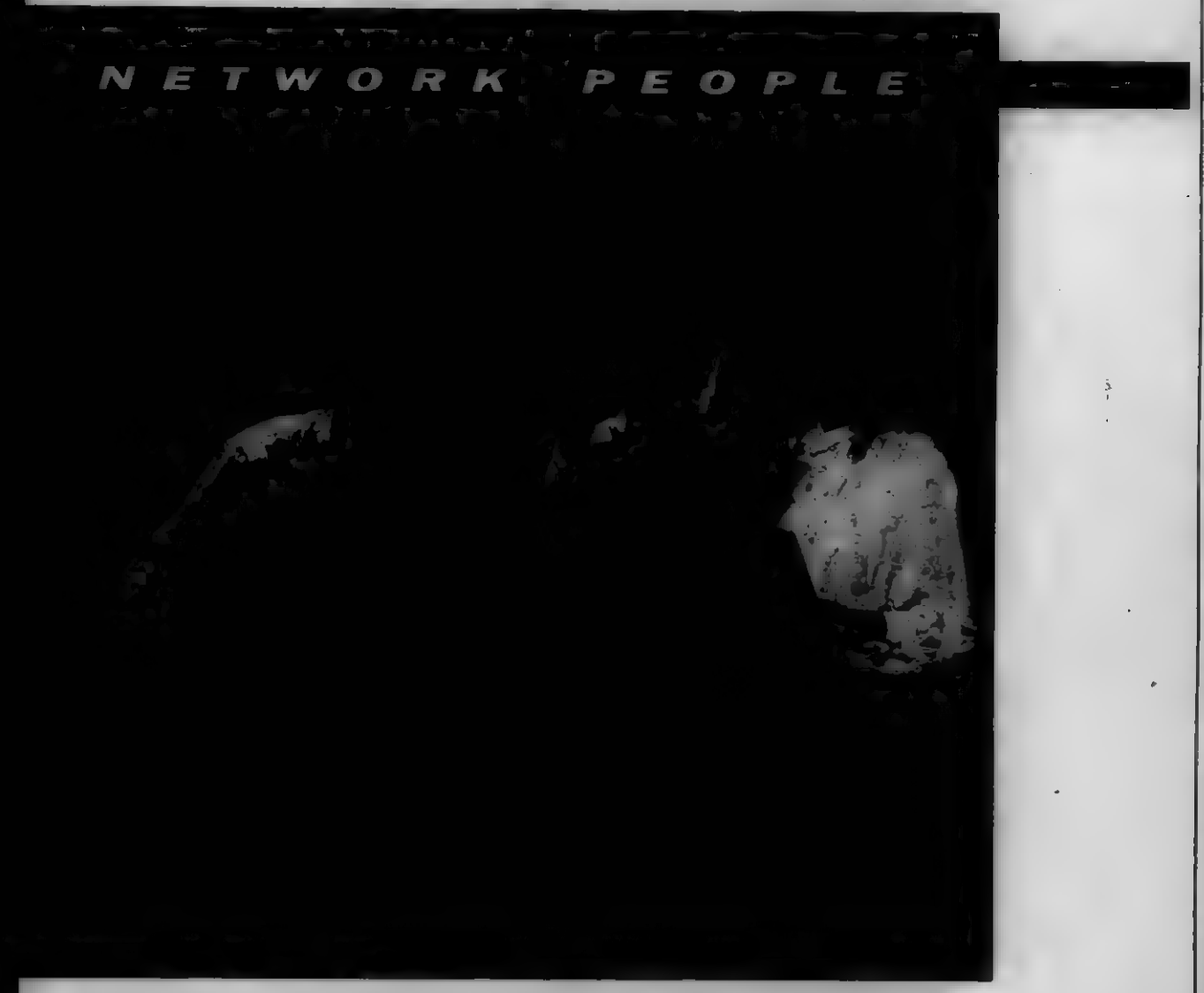
In 1987 and early this year, IBM broadened both the range of SNA devices that can attach to the Token-Ring and the functions they can perform. The existing connectivity options are the following:

- **Host gateways.** IBM currently offers a Token-Ring gateway as an option on current models of its FEP line, certain models of both local and remote 3174 cluster controllers and the 9370 Information System. In much the same way that a FEP repackages data carried via SDLC links and then passes it to the host through a 370 channel, the Token-Ring gateway performs this function for Token-Ring-to-SNA host communications.
- **Communicating with cluster controllers across the Token-Ring.** Any computer that can both attach to the Token-Ring and emulate an SNA PU2 cluster controller can access SNA hosts via a Token-Ring gateway across the ring. This type of communication is by far the most prevalent in SNA networks.

A number of types of cluster controller sessions are supported across the Token-Ring. For instance, PCs running programs like IBM's 3270 Emulation Program and LU6.2 applications such as

Continued on page S12

Tolly, a consultant specializing in IBM connectivity, is manager of telecommunications and office systems at BMW of North America in Montvale, N.J.



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ASK THE VENDOR

The following questions were solicited from users and conveyed to the vendors for responses.

Will Attachmate's local-area network gateway support a direct IBM Token-Ring connection to a 3174 control unit?

Stan Podkulski
General Electric Co.
Schenectady, N.Y.

ATTACHMATE CORP.: Yes. Release 1.2 of the Gateway Option for Extra! Connectivity Software, which will be available this summer, will support direct Token-Ring connections to a 3174 control unit, 3725 or 3745 communications processor or to a 9370 and transmission speeds of 4M bit/sec., resulting in much faster data transfer than is possible with conventional synchronous data link control links. The release is scheduled to be available this summer.

For users who have both direct-connect 3270 devices and the Microgate emulator, are there any plans to modify the keyboard mapping so that the Enter key can be used for cursor positioning and an alternate key or two-key sequence, such as Alt-Enter, would indicate the Enter process? If so, when will this be available?

John Nugent
Rail, Inc.
Washington, D.C.

MICROGATE CORP.: Keyboard mapping, added to our 3270/Systems Network Architecture emulator as a result of customer input, allows the user to remap the entire keyboard if desired. The KBDMAP command is described in the current users' guide. Updates are available for anyone with an early version of the emulator.

Is it possible to use the Bluelynx 5250 Gateway in an IBM Personal System/2 Model 80 concurrently with the IBM 3270 Gateway? In addition, will this product support autodial commands in the future?

Bill Dyla
Algemene Bank Nederland
New York

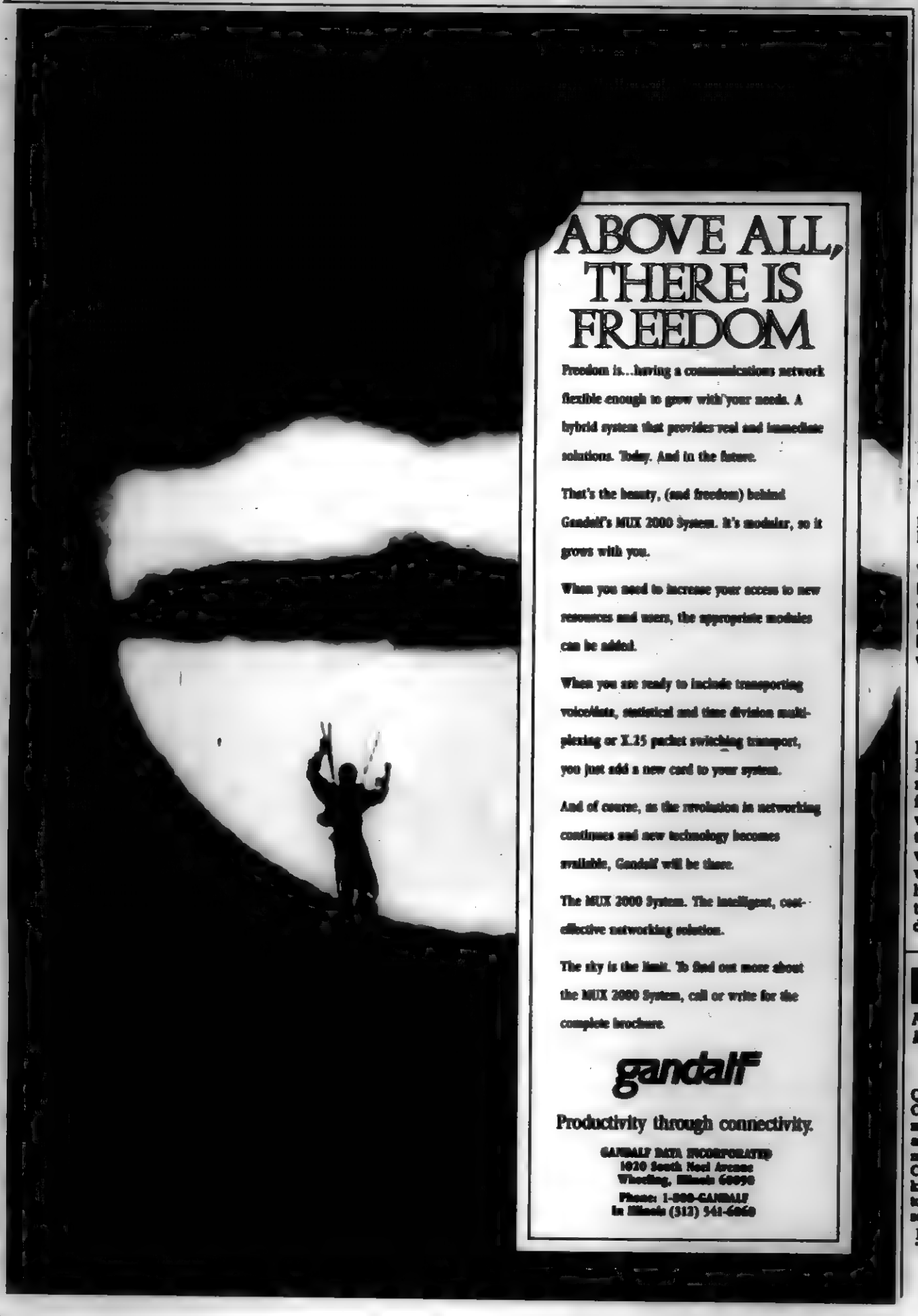
BLUELYNX: With Bluelynx gateways, a 5250 and a 3270 Gateway can be used in the same PS/2 Model 80. These gateways can be any combination, either local or remote, allowing 5250 and 3270 sessions to reside on the same machine simultaneously. Users can actually switch between host systems with the touch of a key.

Autodial capabilities are planned; some products already have this support.

Will Rabbit Software's Rabbitgate be coming out with diagnostic/administrator functions that can be accessed from a network workstation?

Rick Hopfer
Shearson Lehman
Commercial Paper, Inc.
New York

RABBIT SOFTWARE CORP.: Yes. Rabbit will offer a logical unit monitor that can be accessed from either the gateway or a network workstation. The first of these functions will be available with Rabbitgate Release 4.0, which is due out in the second half of this year. Additional functions will be added as the market demands. ●



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More than one way to follow the leader

BY ANNETTE NEKORANIK

Many third-party vendors support IBM's Systems Network Architecture (SNA), but not all support the same SNA protocols. Which SNA protocols these vendors choose to support depends on three factors: the size of the current market for devices using that protocol, the protocol's strategic importance and the difficulty of implementing it.

The majority of vendors today support IBM's SNA 3270 environment. Emulation of this environment is a practical solution to micro-to-mainframe communications, and the 3270 interface accounts for more than 90% of all micro-to-mainframe connections.

Third-party vendors are also attracted to program-to-program communications, best known by its LU6.2 designation. Most have announced support for LU6.2 because of its importance in IBM's communications strategy, but the demand for LU6.2 products is still relatively small.

SNA is anything but a simple communications environment. SNA devices are identified by its combination of physical units (PU), which manage the local hardware connection environment; and logical units (LU), which represent points at which a user interacts with the network.

SNA currently defines six classes of LUs, the most important of which is LU2, representative of the IBM 3270 Information Display System. Independent communications vendors that support LU2 on the IBM Personal Computer include Novell, Inc. and Digital Communications Associates, Inc. (DCA). Among the minicomputer vendors that support LU2 emulation are Digital Equipment Corp., Data General Corp. and AT&T.

IBM is stressing several features of the 3270 environment. One is the 3270 Distributed Function Terminal (DFT) mode, a method of 3270 coaxial connection that offers up to five concurrent sessions on one cable. Novell and DCA offer DFT-mode local-area network gateways, and DFT mode is supported on coaxially attached products from almost all micro-to-mainframe link vendors.

IBM also stresses its Enhanced Connectivity Facility, which is mechanized via the Server Requester Programming Interface (SRPI).

SRPI requests and responses are exchanged between host applications and PC or minicomputer programs. IBM's 3270 emulation products support SRPI, but most third-party products offer no special SRPI support.

LU6, another important LU class, includes LU6.2. IBM's relatively inexpensive Advanced Program-to-Program Communications/PC has made the market for LU6.2 on the PC less attractive to third-party vendors, but nearly all minicomputer and mainframe vendors are at some stages of developing an LU6.2 strategy.

Like SRPI, LU6.2 supports communications between applications but in a form not restricted by 3270 device considerations. LU6.2 supports multiple unidirectional sessions between programs and, as such, may replace SRPI where applications communications are needed.

As a connection technology, however, LU6.2 is uneconomical because each LU6.2 partner must provide a serial communication connection to a cluster controller, an expensive option for companies with many PCs.

> SNA IS anything but a simple communications environment.

No host needed

Accompanying LU6.2 is PU2.1, a member of the more general PU2 class, which represents cluster controller nodes such as the 3270 cluster controller workstation.

PU2.1 is an element of IBM's Low-Entry Networking (LEN) environment, in which SNA communication can occur without an SNA host. With PU2.1, PCs and minicomputers can communicate in SNA environments that do not contain a host and can communicate without host intervention in host-based SNA environments. Most minicomputer vendors can emulate a PU2.1 node but have yet to provide all the features of LEN.

In addition to PU2, SNA defines PU1, 4 and 5. A PU1 device is a single, nonclustered tool that functions as an end-point in an SNA network. Communications controllers or subarea controllers in an SNA ntwork are PU4 nodes. They have no LUs and are associated only with the routing of data and front-end connection and concentration for the SNA host.

PU5 refers to the System Service Control Point (SSCP), which represents an SNA host. IBM implements SSCP features fully in its VTAM software. No other vendor implements SSCP features fully, although some offer limited host emulation. No discussion of SNA is complete without a mention of IBM's Systems Application Architecture (SAA). SAA specifies LU6.2 and SRPI as interconnection protocols. But, as even IBM admits, it will probably not be in place before the early 1990s. For the near future, ordinary 3270 will remain the dominant SNA protocol environment. ●

Nekoranik is senior editor at Faulkner Technical Reports in Pennsauken, N.J.

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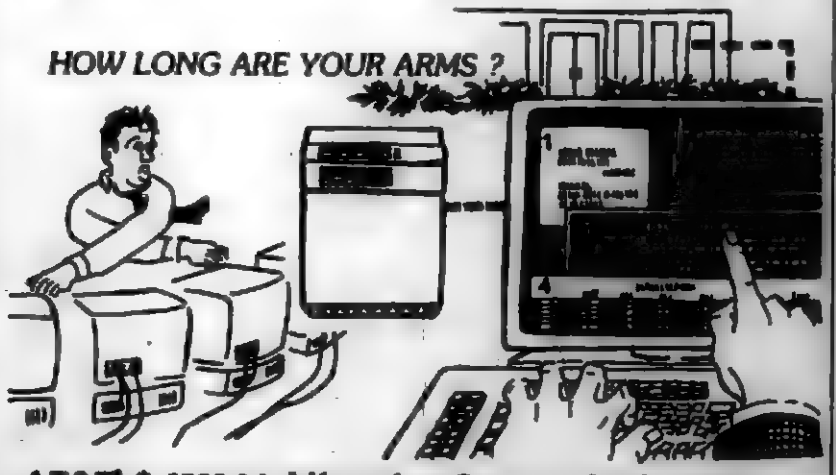

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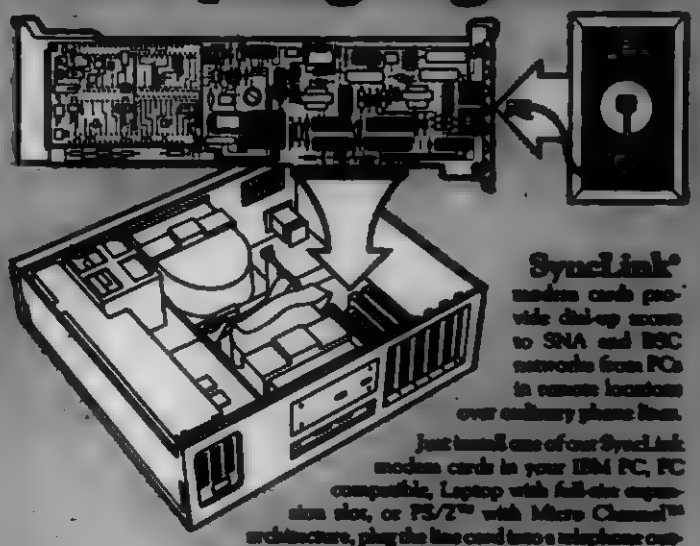

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Advanced Computer Communications (800) 345-6443	ACC8E/MVS software with ACS 8510 hardware	Multiple 68000/ Proprietary	NA	No	Channel attached	TCP/IP[1] over Ethernet 802.3	LU0, 1	NA	160+	Dynamic	NA	NA	Bidirectional	On-line	No	Yes	No	$17,400 (software); $29,000 (hardware)
Apollo Computer, Inc. (617) 256-6600	Domain 3270 Emulation	Domain Gateway Node/Domain operating system	Aegis, Berkeley Unix 4.2, Unix System V	Yes	SDLC[2]	Domain Network Services	LU2	Two	64	NA	Two	Neither	Bidirectional	Both	No	Yes	Yes	$1,800
	Domain 3770 Emulation	Domain Gateway Node/Domain operating system	Aegis, Berkeley Unix 4.2, Unix System V	Yes	SDLC	Domain Network Services	LU1, 3	Two	12	NA	Two	Neither	Bidirectional	Both	No	Yes	Yes	$1,800
	Domain LU6.2	Domain Gateway Node/Domain operating system	Aegis, Berkeley Unix 4.2, Unix System V	Yes	SDLC	Domain Network Services	LU6.2	Two	255	NA	Two	Neither	Bidirectional	Both	No	Yes	Yes	$6,600
Applitek Corp. (617) 246-0200	3600 Gateway	68000/THOS	CICS, VTAM	Yes	SDLC	Gateak	LU1, 2, 3	One	32	Both	NA	Neither	No	On-line	No	No	NP	$15,000
AST Research, Inc. (714) 863-1333	AST-SNA Gateway	Xing 200/ PC-DOS	PC-DOS	No	SDLC	Netkon	LU2, 3	One	16	Both	One display, two printers	CUT[3]	Bidirectional	On-line	No	Yes	No	$1,295
AT&T (201) 889-7870	AT&Gateway Single Board Solution	32-bit, 8-MHz 32000	MS-DOS	Yes	SDLC	Netkon	LU1, 2, 3	One	32	Dynamic	Five printers or displays	Neither	Bidirectional	Both	No	Yes	No	$2,995-$5,295
Attachmate Corp. (206) 644-4010	Extra, connectivity software with gateway option	NA/DOS	DOS 3.0 or higher	Yes	SDLC, Token-Ring	Netkon	LU1, 2, 3	One	128	Both	Four (one printer)	DFT[4]	Bidirectional	Both	Yes	Yes	No	$475
Banyan Systems, Inc. (617) 898-1000	Vines	68000, 80386 or 80486/ Proprietary	MS-DOS	Yes	SDLC, BSC[5]	Netkon, TCP/IP, Vines	LU1, 2, 3	Three	96	Dynamic	Two displays, two printers	Neither	Bidirectional	Both	No	Yes	No	$1,995-$4,995
Blockyne (800) 833-6696	Blockyne/ 8251-11 Gateway	Xing 200/DOS	DOS	Yes	SDLC	Netkon	LU4, 7	Seven	49	Both	Any combination of displays, printers	Neither	Bidirectional	Both	No	Yes	No	$1,995
	Blockyne/ 5250 Gateway Remote	Xyplex 8030 SCC/DOS	DOS	Yes	SDLC	Netkon	LU4, 7	Nine	61	Both	Any combination of displays, printers	Neither	Bidirectional	Both	No	Yes	No	$1,995
Blue Software (800) 356-2583; (800) 430-2583 in Ill.	PC LAN-3270 SNA	68000 expansion/VRTX	DOS (68000, 80386)	No	SDLC, BSC	Netkon	LU2, 3	One	32	Dynamic	One printer, one display	CUT	Bidirectional	On-line	No	Yes	No	$1,995
Communications Solutions, Inc. (408) 980-1110	Micom SNA Gateway	Chip/DOS	DOS	Yes	SDLC	Netkon	LU1, 2, 3, 6.2	One	32	Both	NA	Neither	Bidirectional	Both	No	Yes	Yes	$4,995
Concurrent Computer Corp. (800) 631-8324	SNA Gateways	NA/OSX and one or Xelos Unix System 5	NA	Yes	SNA, SDLC, BSC, X.25	OSI	LU0, 1, 2, 3	256	16,320	Both	32 printers or displays, etc. per communications	Neither	Bidirectional	Both	No	Yes	No	$980-$4,500
Convergent Technologies, Inc. (408) 434-2846	SNA Network Gateway	CTIX (Unix)	Proprietary	Yes	SDLC	Proprietary	LU1, 2, 3, 6.2	Four	128	Static	Four	CUT	No	Both	No	No	No	NP
Corvus Systems, Inc. (800) 325-4500	Omniplex SNA 3270	Proprietary	PC-DOS	Yes	SDLC	Netkon	LU0, 1, 2, 3, 6.2	32	256	Both	Nine	DFT	Bidirectional	Both	No	No	Yes	$2,500
Data Interface Systems Corp. (800) 351-4344	DIS370	NA/DOS	Netware Version 2.0 and up	Yes	SDLC, BSC	Novell IPX, Netkon	LU2, 3	One	254	Both	Four displays or printers	Both	Bidirectional	Both	No	Yes	No	$1,695 (eight LUs); $4,495 (256 LUs)
Datapoint Corp. (512) 699-7000	Token-Gate SNA Gateway	Intel 80286, 80386/ MS-DOS	Datapoint ARC, MS-DOS	No	SDLC, QLLC[6] 2.1[8]	Datapoint ARC	LU0, 1, 2, 3, 6.2	One	16	Both	Static user configuration such as 3278, 3287, 3777 or Ethernet[9] token-oriented, fully symbiotic	CUT	Bidirectional	Both	No	Yes	No	NP
Digital Equipment Corp. Contact local sales office	Decnet/SNA	Proprietary	VMS	Yes	SDLC	Decnet	LU0, 1, 2, 3, 6.2	Two	64	Both	Unlimited	CUT	Bidirectional	Both	Yes	Yes	Yes	NP
	VMS/SNA	Proprietary	VMS	Yes	SDLC	Decnet	LU0, 1, 2, 3, 6.2	One	16	Both	Unlimited	CUT	Bidirectional	Both	Yes	Yes	No	NP
Digital Communications Associates, Inc. (404) 442-4000	Irmalan SDLC Gateway	HP	DOS	Yes	SDLC	Netkon	LU1, 2, 3	One	32	Both	Four displays, one printer	DFT	Bidirectional	Both	Yes	Yes	No	$5,200
DSC Master Systems, Inc. (800) 433-6333	NEXCOM SNA Communications Gateway	Intel 80286/ Proprietary	PC-DOS 3.0 or higher/ NEXOS shell	Yes	SDLC	Netkon	LU2, 3	Nine	32	Both	Nine host sessions per PC	DFT	Bidirectional	Both	No	Yes	No	$4,995
Eicon Technology Corp. (514) 631-2592	Aconet/SDLC, Aconet/QLLC	68000/ Multitasking	DOS	Yes	SDLC, X.25, Token-Ring	Netkon	LU0, 1, 2, 3, 4, 6.2, 7	28	256	Both	Nine printers or displays	DFT	Bidirectional	Both	Yes	Yes	Yes	$4,000-$6,000
Gateway Communications, Inc. (714) 553-1555	G/SNA Gateway	Intel 80186	DOS	Yes	SDLC	Netware	LU1, 2, 3	NP	32	Both	Three consoles, two printers	DFT	Bidirectional	Both	No	Yes	No	$2,500 (one-eight LUs)
Gandalf Data, Inc. (800) GANDALF	Netserver with LAN[10] software, VTAM 3270 Emulation	80286/ Proprietary	MS	Yes	SDLC, BSC	OSI	LU1, 2, 3	16	16	Static	One display, one printer	CUT	No	NA	No	No	No	$2,000

[1]Transmission Control Protocol/Internet Protocol [2]IBM's Synchronous Data Link Control [3]IBM's Systems Network Architecture [4]Control Unit Terminal [5]Display Function Terminal [6]Binary Synchronous Communication [7]Open Systems Interconnect [8]Internetwork Packet Exchange [9]Qualified Logical Link Control [10]IBM's Distributed Office Support System [11]Local-area network [12]Advanced Program-to-Program Communications [13]Remote job entry

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. When a vendor is unable to provide specific information about its product, this is designated NP (not provided). When a question does not apply to a vendor's product, this is designated NA (not applicable). Further product information is available from the vendors.

COMPANY	PRODUCT	GATEWAY MICROPROCESSOR/ OPERATING SYSTEM	WORKSTATION OPERATING SYSTEMS SUPPORTED	SUPPORTS MULTIPLE HOSTS	LINK-LEVEL INTERFACE TO HOST SUPPORTED	PROTOCOL USED ON LAN	SNA LU TYPES SUPPORTED	MAX. NO. SIMULTANEOUS PU SESSIONS PER GATEWAY	MAX. NO. SIMULTANEOUS LU SESSIONS PER GATEWAY	STATIC OR DYNAMIC ALLOCATION OF LOGICAL UNITS	NO./TYPE SIMULTANEOUS PU SESSIONS PER WORKSTATION	DFT OR CUT	FILE TRANSFER SUPPORTED	BATCH OR ON-LINE	ALL-POINTS-ADDRESSABLE GRAPHICS	APPLICATION PROGRAMMING INTERFACES AVAILABLE	SUPPORTS APPC/PC	PRICE
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Honeywell Bull, Inc. (603) 881-4000	LUC1013	68020/Proprietary	MS-DOS, others optional via DNS or TCP/IP	No	SDLC	DNS, TCP/IP	LU1, 3	One	40	Both	Eight sessions per display, one per printer	CUT	Bidirectional	On-line	No	Yes	No	$12,000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Ist Network Systems Division (800) 343-6815	Advanced Netpath SNA-3270 IBM	8088/DOS	DOS	No	SDLC	NA	IBM*	One	8x	Both	NA	NA	Bidirectional	Batch	No	No	No	$5,350
	Compute 3PT	DP8344/DOS	DOS	No	SDLC, Channel	Modem	LU1, 2, 3	One	40	Both	Five LUs	DFT	Bidirectional	On-line	No	Yes	No	$1,995 (five LUs); $3,990 (40 LUs)
	Advanced Netpath SNA 3270	8088/DOS	DOS	No	SDLC	Modem	LU1, 2, 3	One	128	Both	Five LUs	NA	Bidirectional	On-line	No	Yes	No	$2,595 (eight LUs); $6,590 (128 LUs)
	Basic Netpath SNA-3270/X.25	8088/DOS	DOS	No	X.25	Modem	LU1, 2, 3	One	32	Both	Two displays, one printer	NA	Bidirectional	On-line	No	Yes	No	$1,995 (eight LUs); $3,990 (32 LUs)
	Basic Netpath SNA 3270/SDLC	8088/DOS	DOS	No	SDLC	Modem	LU1, 2, 3	One	32	Both	Two displays, one printer	NA	Bidirectional	On-line	No	Yes	No	$1,995 (eight LUs); $3,990 (32 LUs)
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Information Technologies, Inc. (800) 950-1003	Linkup 3270 Coax 10-Slot Concentrator	8344/DOS	DOS	Yes	SDLC, BSC	DCA 10-Net	LU0, 1, 2, 3	One	32	Both	32 displays, four printers	Both	Bidirectional	Both	No	Yes	No	$13,395 for gateway, 32 sessions
	Linkup 3270 Remote 10-Net Concentrator	Motorola MC 68000/DOS	DOS	Yes	SDLC, BSC	DCA 10-Net	LU0, 1, 2, 3	One	32	Both	32 displays, four printers	Neither	Bidirectional	Both	No	Yes	No	$2,995 for gateway, 32 sessions
	Linkup 3270 Remote Concentrator	Motorola MC 68000/DOS	DOS	Yes	SDLC, BSC	Modem	LU0, 1, 2, 3	One	32	Both	32 displays, four printers	Neither	Bidirectional	Both	No	Yes	No	$2,995 for gateway, 32 sessions
	Linkup 3270 Coax Concentrator	8344/DOS	DOS	Yes	SDLC, BSC	Modem	LU0, 1, 2, 3	One	32	Both	32 displays, four printers	Both	Bidirectional	Both	No	Yes	No	$1,395 for gateway, 32 sessions
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Local Data, Inc. (212) 220-5130	Datalynx/3174	Intel 80186/ Proprietary multitasking	DOS, OS/2	Yes	SDLC, SNA, BSC	Works with any LAN that provides RS-232	LU1, 2, 3	Two	32	Both	One display, one printer	CUT	Bidirectional	On-line	No	Yes	No	$3,000-$10,000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Morning Star Technologies, Inc. (619) 451-1600	Morning Star SNA 3270	Any microprocessor running Unix	Unix	Yes	SDLC	HP	LU1, 2, 3	One	32	Both	One	HP	Neither	On-line	No	No	No	$2,750-$3,995
	Morning Star SNA 3770	Any microprocessor running Unix	Unix	Yes	SDLC	HP	LU1	32	32	HP	32 printers or terminals	HP	Bidirectional	Batch	No	No	No	$2,750-$2,995
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Netlink, Inc. (619) 970-9012	SNA Hub 3723	Intel 8088, 80186/ Proprietary	DOS, OS/2	Yes	SDLC	IEEE 802.3/802.5	LU0, 1, 2, 3, 6.2	64	200	Both	Depends on SNA application, workstation	DFT	Bidirectional	Both	NA	Yes	Yes	$15,495
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Rabbit Software Corp. (800) RABBITC	Rabbitgate	80186/MS-DOS	MS-DOS	Yes	SDLC, BSC	Modem, SPX	LU1, 2, 3	One	64	Both	Eight displays, two printers	Both	Bidirectional	On-line	Yes	Yes	No	$2,995
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
TDT Group, Inc. (206) 372-0822	SDX/25	8088/MS-DOS	MS-DOS	Yes	QLLC	Modem	LU1, 2, 3	32	32	Static	Six physical units, mix of screen, printer or [illegible] sessions	Neither	Bidirectional	Both	No	Yes	Yes	$1,500 per gateway, $349 per network workstation

COMPANY	PRODUCT	GATEWAY MICROPROCESSOR/ OPERATING SYSTEM	WORKSTATION OPERATING SYSTEMS SUPPORTED	SUPPORTS MULTIPLE HOSTS	LINK-LEVEL INTERFACE TO HOST SUPPORTED	PROTOCOL USED ON LAN	SNA LU TYPES SUPPORTED	MAX. NO. SIMULTANEOUS PU SESSIONS PER GATEWAY	MAX. NO. SIMULTANEOUS LU SESSIONS PER GATEWAY	STATIC OR DYNAMIC ALLOCATION OF LOGICAL UNITS	NO./TYPE SIMULTANEOUS PU SESSIONS PER WORKSTATION	DFT OR CUT	FILE TRANSFER SUPPORTED	LU-LU OR ON-LINE	ALL-POINTS-ADDRESSABLE GRAPHICS	APPLICATION PROGRAMMING INTERFACES AVAILABLE	SUPPORTS APPC/PC	PRICE
[illegible]	[illegible]	[illegible]	DOS	Yes	SDLC	TCP/IP	LU1, 2, 3	One	256	Both	[illegible]	CUT	[illegible]	On-line	No	Yes	No	[illegible]
	[illegible]	[illegible]	DOS	Yes	SDLC	TCP/IP	LU1, 2, 3	Two	500	Both	One logical unit	CUT	[illegible]	On-line	No	Yes	No	[illegible]
3Com Corp. (800) NETCOM	3+/SNA	NP/DOS	DOS	No	SDLC	Multiple	LU1, 2, 3	One	32	Both	Eight	CUT	Bidirectional	On-line	No	Yes	No	$4,995
[illegible]	[illegible]	Proprietary	[illegible]	Yes	SNA, SDLC, BSC	Bus Ardwork, SNA, BSC, Token	LU0,3	16	16	Both	[illegible]	CUT	[illegible]	Both	No	No	Yes	[illegible]
Telesystems Corp. (800) 853-6038	TCXchange Gateway	Intel 80,186, 286, 386/i45- DOS, CDOS, OS/2	MS-DOS, CDOS, OS/2, asynchronous	Yes	SDLC, BSC, Token-Ring, DFT	Multiple	LU0, 1, 2, 4, 6.2, 7	One	128	Both	NA	Both	Bidirectional	Both	Yes	Yes	No	$2,100 (eight nodes)
[illegible]	Intelligent Communications Unit 3270	IBM CUT, DFT	Yes	SNA, SDLC, Ether, BSC	CSMA/CD	LU0,2	30	30	Both	NA	Both	Bidirectional	On-line	Yes	Yes	No	[illegible] per port
	Advanced Communications Unit 3270	Motorola 68000/Unix-based	IBM CUT, DFT	Yes	SNA, SDLC, Ether, BSC	IEEE 802.3 TCP/IP	LU2,3	30	30	Both	NA	Both	Bidirectional	On-line	Yes	Yes	No	[illegible] per port
Dataproducts Corp. (800) 421-6111	MiniOne	80186/ proprietary	DOS	No	Coaxial	Multiple	LU1, 2, 3	One	80	Both	Four displays, one printer	Both	Bidirectional	Both	No	Yes	No	$6,000
[illegible]	Network Coprocessor	[illegible]	[illegible]	No	Ethernet, Token-Ring	Multiple	NA	64	64	NA	NA	Neither	No	On-line	Yes	No	No	[illegible]
Wellfleet Communications Corp. (415) 796-1160	Token SDLC	Motorola 68010/68A	NA	Yes	SDLC	Protocol independent	NA	32	Unlimited	Neither	32	Both	Bidirectional	Both	Yes	No	No	$11,000
[illegible]	[illegible]	[illegible]	[illegible]	Yes	SDLC, BSC	Multiple	LU0,3	Two	64	Both	10 printers or displays	DFT	[illegible]	Both	No	Yes	No	$1,995
Wang Laboratories, Inc. (617) 459-5000	Banyan 3270 Release 3.0	Intel 80386/Vines, Unix V.2	DOS	Yes	SDLC	Multiple, XNS	LU1, 2, 3	Three	96	Both	32 LUs	NP	Bidirectional	On-line	No	No	Yes	$3,000-$7,000
[illegible]	3270 Communication Server	Intel/[illegible]	DOS	Yes	SDLC, DFT	Port	LU2	One	32	Dynamic	Four displays, one printer	DFT	[illegible]	On-line	No	Yes	No	$1,595
	3270 Server	Proprietary	DOS	Yes	SDLC	Port	Two	One	32	Dynamic	Four displays, one printer	DFT	[illegible]	On-line	No	Yes	No	$3,195 (eight LUs); $5,295 (32 LUs)

X.25

FROM PAGE S6

across packet-switching networks. Packet switching is not the only reason for using X.25. Its efficiency and simplicity as well as the availability of ports for X.25 on most major computers manufactured today have led to the development of additional non-packet-switching uses.

Use of direct X.25 connections and QLLC PADs in SNA networks can eliminate many of the performance problems associated with SDLC interfaces and alleviate the problems that virtually all IBM systems have with dial-up connections.

In the mainframe environment, X.25 should be considered for all satellite communication connections. X.25 will improve performance and overall throughput of the link. For international multipoint circuits, response time problems can be eliminated through the use of well-placed PADs with X.25 as the backbone link.

Replacement of multiplexers with X.25 PADs can facilitate cost-effective topologies, since deregulation has adversely affected the cost of multipoint circuits. At the same time, replacement can improve efficiency and throughput of backbone circuits because X.25 actually concentrates data and operates in a full-duplex, nonpolled mode.

In the System/38 environment, X.25 is the most CPU-efficient form of communications and should be used for all CPU-to-CPU communications. Use of QLLC PADs can provide additional communication ports for leased or dial-up circuits. When X.25 is used in this manner, response time is actually improved over standard multiline communications adapters normally dedicated to SDLC connections.

Unfortunately, transporting SDLC across packet-switching networks through PAD protocols such as QLLC does not offer these other advantages of X.25.

Users of machines like the System/38 have to live with the limitations imposed by QLLC, but mainframe users do not. IBM's NCP Packet-Switching Interface (NPSI) offers IBM mainframes access to X.25 capabilities.

IBM has not made integration particularly easy. Since VTAM has become the standard method for mainframe communications, and since VTAM is tightly coupled with SNA, use of NPSI forces applications to establish SNA logical unit (LU)-to-LU sessions with NPSI. A LU-to-LU session must be set up for each X.25 link and each session controlled by an application.

NPSI offers five basic types of X.25 connections called Logical Link Control types. These range from custom PAD interfaces to X.28 and X.29 PADs that support connection of asynchronous ASCII devices.

While the complexity in dealing with development of custom interfaces can be a burden to inexperienced NSPI users, the performance and cost advantages for SNA networks are significant.

Into the future

Because all major public packet-switching networks have announced SNA support, IBM customers can realize the advantages that the ASCII world has seen for more than a decade.

In addition, the proliferation of new PADs offer private networking options. It is worth the required personnel training to realize the benefits of more efficient communications and more flexible network topologies available through X.25 interfaces.

To fully accomplish this, SNA users must put their biases behind them and become familiar with X.25. Integration of SNA and X.25 can provide a competitive networking edge today and facilitate migration to future technologies. •

Token-Ring

FROM PAGE S7

Distributed Data Management/PC and IBM's OS/2 Extended Edition 1.1 Communications Manager can reach the host SNA via the Token-Ring. This capability provides powerful SNA connections to the host network and very high-speed connections to the SNA host when a gateway is used.

In addition, versions of the 3174 are available that attach to the ring as Token-Ring downstream users, not as a host gateway. The downstream 3174 does not support any native SNA transport services — either 370 channel or SDLC — and must use the services of a host gateway. This implementation offers advantages as a means of providing high-speed host connectivity for terminal clusters scattered throughout a facility and as a cost-effective replacement for current SDLC connections in these environments.

System/36 machines also offer a wide range of host connectivity possibilities, such as 3270 emulation, multisession RJE and Host Command Facility. Since the System/36 appears to the SNA host as a PU2 cluster controller, the System/36-to-host connection can also use the Token-Ring and host gateway to access the host SNA network. This provides a flexible, high-speed path between the System/36 and the SNA host.

• **Host-to-host communications across the Token-Ring.** The expected release of Network Control Program Version 5 Release 2.1 in December will make possible cross-domain communications across the Token-Ring. Both FEPs and 9370s connected to the Token-Ring will be able to support multi-CPU, cross-domain or subarea connections. In other words, the FEP and 9370 Token-Ring gateways will now support PU4 and 5 connections in addition to PU2. IBM's projected upgrade of the Token-Ring speed from 4M to 16M bit/sec. makes host-to-host connectivity over the Token-Ring even more attractive.

In many organizations, the strategic importance of the Token-Ring as an SNA transport medium will cause MIS management to move the responsibility for overall corporate LAN directions away from the information center and into corporate telecommunications. Any firm that has committed to SNA as an overall architecture would do well to consider switching to the Token-Ring, thereby combining the power of the Token-Ring and the SNA environment. •

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HARD TALK

Stanley Gibson

IBM-Stratus link tenuous?

The recent announcement affirming the partnership between Stratus and IBM seemingly puts to rest questions about the long-term stability of the deal. But even though all may be smooth on the surface, fundamental forces could threaten the relationship.

Stratus and IBM renewed their agreement, originally signed in 1985, under which IBM resells Stratus fault-tolerant processors as its System/88. The two firms also agreed that Stratus will resell IBM's Systems Network Architecture software.

Thus far, the arrangement appears to have been beneficial for both companies: In accounts in which Stratus would have had no chance because of an existing relationship with IBM, the company has been able to have one of its systems installed.

Likewise, in bids in which IBM was faced with a fault-tolerant requirement and risked losing the sale to Tandem, IBM was able to pull the System/88 out of its holster as a "Tandem killer" and gain some profit from the sale — and, more important,

Continued on page 57

GE splitting costs, not atoms

Company trims MIS for nuclear unit as industry growth throttles down

BY J. A. SAVAGE
CW STAFF

SAN JOSE, Calif. — As cost overruns and safety concerns increasingly drive nuclear power plants into disfavor and disuse, the computers that run them face the ever-sharpening scrutiny of budget-cutters.

Cutting expenses is the mandate of Robert Carpenter, manager of computation and information systems operation at General Electric Co.'s Nuclear Energy Operations here. "Our in-house budget will be decreased by the end of this year by 40%," Carpenter said.

Streamlining hardware is one way Carpenter is cutting costs. GE Nuclear's hardware currently includes three different brands of mainframes, three different networks and 1,500 personal computers of various brands.

"I ask myself, 'Do I really need DEC, Honeywell and IBM [mainframes]? We have two Ethernets — why?' " he said.

Carpenter's systems are used mainly to design software for turnkey systems that help to run GE Nuclear's plants and handle the firm's finance and accounting needs. The systems support 59 GE Nuclear power plants in the U.S., Europe and Asia.

GE's Carpenter

Continued on page 56

Data View

IBM 3090 series holds lead in installed value

Ousting its sister Model 200, the 3090 Model 400 captures the top rank

INFORMATION PROVIDED BY COMPUTER INTELLIGENCE
CW CHART

Apollo gives users look at $21K workstation

CHELMSFORD, Mass. — Apollo Computer, Inc. gave attendees of last week's Design Automation Conference a first look at the top of its Series 4000 Personal Super Workstation line.

The Series 4000 2-D graphics configuration is a $20,990-and-up entry that offers users a variety of graphics enhancements, including a dedicated graphics processor that dramatically increases overall performance, according to Apollo.

The workstation is part of a family that was recently repriced to let Apollo lay claim to a 4 million instructions per second workstation costing less than $9,000.

The system comes with a 1,280- by 1,024-pixel 19-in. monitor. In addition to a new high-end mark, the Series 4000 will get a floating point accelerator (FPA) that, the company claimed, will increase processing speeds by as much as 300%.

Also announced at the conference was the fact that the FPA will be based on the Weitek, Inc. 3164 floating-point chip.

Aimed at the mechanical computer-aided design and electronic design automation markets, in which simulation, finite element analysis and modeling are key, the Series 4000 FPA will be priced at $3,500. Both the FPA and the Series 4000 2-D are slated to be out in the third quarter.

- Large, [illegible]. Higher-volume [illegible] ter. Page 58.
- Lowell [illegible] merger. Page 58.

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For more information, call 1-[illegible] (in Michigan, 313/769-5800). Or write.

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GE Nuclear

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The computers are also being used to design new Advanced Boiling Water Reactors likely to be sold outside the U.S. These reactor designs are smaller than previous ones, starting at 400MW, and are modular so they can be pieced together as demand for electricity grows.

First, the ax

Carpenter axed a Hewlett-Packard Co. 3000 last year. He said he plans to remove another of the five systems that remain — three Digital Equipment Corp. VAXs, a Honeywell, Inc. DPS90/91 and an IBM 3083 Model EX1.

Other moves include buying transmission time on networks and computing time on mainframes, buying cheaper, non-IBM micros and leasing equipment as needed.

While nuclear power plants are still a big business — Carpenter estimated GE's business at $500 million per year — the base is shrinking; GE's last order for a new reactor was 11 years ago. Also, its maintenance contracts disappear when established plants are shut down. For example, New York's Shoreham nuclear plant, built by GE, was sold to the state for $1 last month, having been run only for low-level testing and never to run again.

GE's nuclear power plant business is now subsisting on contracts for fuel reloading and maintenance, which includes its computer-related products for electric utilities. Those products include software for an emergency response system. "It would give a menu of things to do in case of an accident," Carpenter said. "If there is an accident, it wouldn't be a Chernobyl — maybe a Three Mile Island, but not a Chernobyl."

Trimming the fat

Carpenter, who was transferred from General Electric Information Systems Co. 13 months ago, been not only been streamlining hardware but cutting personnel costs as well. In the first two weeks on the job, he saw that pink slips were delivered to 20% of the work force and has cut another 10% in the year since then.

He also changed the structure of operations. "Before, it was back room-focused. Now it's refocused to be client-oriented," he said. Most clients are in-house users, while a few are users of turnkey systems.

Carpenter's first six months were spent helping the MIS staff define requirements put on the systems and how those requirements could be served better with less hardware.

"The systems were built application by application," he said. Now, the approach is to adopt the systems for all applications. With that approach, Carpenter said he would get rid of one of his mainframes and is leaning toward axing the IBM. "IBM is now the exception rather than the rule, where before it was the rule rather than the exception."

However, he said that certain software products have to be delivered on IBM because that is what the customer ordered. Carpenter said he could write those on an IBM system in another section of GE.

Carpenter also brought in non-IBM PCs. Although still predominantly IBM, 30% of the 1,500 micros at GE Nuclear are either from Packard Bell Electronics, Inc., Compaq Computer Corp. or Apple Computer, Inc. "IBM was not cost-effective. I could buy two [of the other brands' products] for every one IBM," he said.

Carpenter's preferred vendor is, not surprisingly, GE, although he said that cost is the bottom line and GE does not always deliver at the lowest cost. For example, he buys time on GE Information Systems' wide-area network for a user service.

The service, instituted in April, allows GE users worldwide to have on-line access to "product experience reports." Any engineering experience, such as a malfunction, is reported to the network and immediately disseminated to users. Other projects include developing an ordering, shipping and billing system to be used in-house. "It's very modular so it will be able to adapt to constant [office] restructuring," Carpenter said.

Why ADR an
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secret in librar

Most people know BST as the change control specialists. Our competitors would like to keep it that way. Because when you compare library management facilities, theirs just don't measure up to ours. And there's a good reason why.

To effectively implement change control, you first need to manage your source code—not just COBOL card images, but all the components of your applications. This means vendor-supplied code, fourth-generation languages, data base definitions, CASE statements, JCL, parameter libraries as well as all host program languages of any size.

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BST has redefined library management to provide:

- Full management of all source, regardless of size or form, using standard IBM structures and access methods
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Gibson

FROM PAGE 53

retain control over the account by keeping Tandem out.

At Stratus rollouts, William Foster, the firm's president, has usually been queried about the status of the IBM deal. The answer is usually that things are going fine and that IBM is selling more and more System/88s as its sales force becomes more acquainted with the products.

IBM's sales of the System/88 in 1987 were 25% of Stratus's total revenue, according to a Stratus spokesman. This percentage would appear pleasing to either party. It is a very small part of total IBM sales and is not so large a slice of Stratus's sales pie that the Marlboro, Mass., firm couldn't adapt to life without the IBM mothership — a thought that must always lurk somewhere in the backs of the minds of Stratus officials.

In all probability, the partnership has a time limit, after which it will cease to be useful to both parties.

IBM has said it bids a System/88 only when fault tolerance is a requirement. And although Stratus began life touting fault tolerance as the major attraction of its products, Foster has repeatedly said in recent years that he considers Stratus a vendor of on-line transaction processing (OLTP) systems, not just fault-tolerant ones.

Foster has said he increasingly views fault tolerance as a requirement of all kinds of computing rather than as a narrow niche requirement.

It is this divergence of opinion on the Stratus processor's role that will be the root of any future rift between the firms.

As Stratus gets larger, it will find itself selling its systems for OLTP applications in which IBM is bidding a computer other than the System/88. If Stratus continues its steady rate of growth and Tandem continues to prosper as well, IBM will feel pressure to introduce a fault-tolerant system of its own.

IN ALL probability, the partnership has a time limit, after which it will cease to be useful to either party.

Within the past year, rumors have surfaced that Silverlake, the IBM System/36 and 38 follow-on processor, will be introduced in a fault-tolerant version. Reportedly, Stratus heard these rumors and gained reassurance from IBM that such a processor was not in the offing.

Nonetheless, that rumor has not been entirely dispelled. One consultant says Silverlake will be introduced in a dual-ported version, providing redundant storage. Another says the 9370 with an improved IBM CICS under VM will be IBM's strategic transaction-processing minicomputer.

If Stratus computers continue to be niche products, Stratus will be frustrated, but IBM will be happy. If Stratus products are appealing to a wider audience, Stratus will be happy, but IBM will grow concerned.

Clearly, if Foster's vision of the future — that all systems will offer fault tolerance — is correct, then IBM obviously will have to offer fault tolerance.

The looming conflict could be resolved by IBM's acquiring Stratus. However, Wall Street analysts say there is little reason to think this will happen. IBM is through with meddling with other companies, one says. Another thinks Stratus's stock price is too high.

So when will the honeymoon end?

Perhaps it won't end suddenly. After all, IBM has invested in an on-line support center for the System/88 that is like the one Stratus maintains for its systems. It is more likely that fault tolerance or near-fault tolerance would be introduced as a flavor in different IBM systems. If demand for these systems is strong, IBM will stress them and downplay the System/88.

Gibson is Computerworld's senior editor, systems & peripherals.

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NEW PRODUCTS

Graphics systems

Large-screen, full-color display of computer data is now available on a superprojector recently introduced by **Hughes Aircraft Co.'s Industrial Products Division.**

The **Model 1000** uses xenon arc lamps combined with a proprietary liquid crystal light valve to produce high-resolution displays of graphic and alphanumeric images. Light output is reported to be 1,000 lumens, and resolution is said to be in excess of 1,000 TV lines. The projector setup is controlled via an RS-232 computer bus, the vendor said.

The Model 1000 costs $160,000.

Hughes Industrial Products, 6155 El Camino Real, Carlsbad, Calif. 92009. 619-931-3619.

Data storage

A Desktop CD-ROM Development/Publishing System and a compact disk/read-only memory drive for Sun Microsystems, Inc. workstations running Sun Unix V Release 4.0 have been announced by **Laser Optical Technology.**

The publishing system incorporates **WORM-800**, a write-once read-many drive from the vendor that uses an 800M-byte removable cartridge and offers a reported shelf life of 30 years. The CD-ROM drive is said to have an average access time of 280 msec and can read 600M bytes of data and play 70 min of audio or a combination of both.

The WORM-800 drive costs $5,900. The CD-ROM drive costs $1,095. Quantity discounts are available for both products.

Laser Optical Technology, Suite E, 3004 Mission St., Santa Cruz, Calif. 95060. 408-426-7171.

Terminals

Alcatel Information Systems has announced a family of IBM 3270-type intelligent workstations. The workstations can be attached to 3270, asynchronous, IBM Token-Ring and Ethernet networks and were designed to support single-user network applications.

The product line consists of two separate desktop solutions: **Courier Processing Terminals**, for users requiring complete 3270 display capabilities, and **Courier Communicating Workstations**, which provide a desktop microcomputer system with a built-in network connection.

The processing terminals offer multiple logical units with windowing and host all-points-addressable graphics capability. The system is display-compatible with the IBM 3192G and offers Digital Equipment Corp. VT220 emulation. The Courier Processing Terminals cost from $1,895 to $2,795, depending on configuration.

The communicating workstations are preconfigured with networking hardware and software to comply with individual user specifications. A single-session version enables concurrent operation of one IBM mainframe session and one local DOS application. The multisession version permits simultaneous operation of up to four IBM mainframe sessions and one local DOS application. Pricing for the Courier Communication Workstations starts at $2,355.

Alcatel, P.O. Box 29039, Phoenix, Ariz. 85038. 602-894-7000.

Intelligent Information Systems, Inc. has introduced a product for the IBM System/36 and 38 family called the **IS-353 Remote Access Model.**

The unit reportedly enables a twin-axial remote-site printer or terminal to communicate with a System/36 or 38 over dial-up or leased lines with a data transfer rate up to 9.6K bit/sec. The product accommodates IBM 5250s or compatible terminals and printers.

The IS-353 costs $1,995.

Intelligent Information Systems, 92 Kanas St., Hackensack, N.J. 07601. 800-524-2837.

A terminal that reportedly offers full graphics compatibility with the Digital Equipment Corp. VT330 display unit has been announced by **Lasper Technologies, Inc.**

Features of the **Max 331** include polygon fill and interactive-mode cursor enhancements. The terminal offers 800-by 500-pixel resolution as well as upload capabilities that permit a set-up library to be stored by the host system.

Max 331 costs $1,195.

Lasper, 35 Riviera Drive, Markham, Ont., Canada L3R 8N4. 416-475-9123.

Power supplies

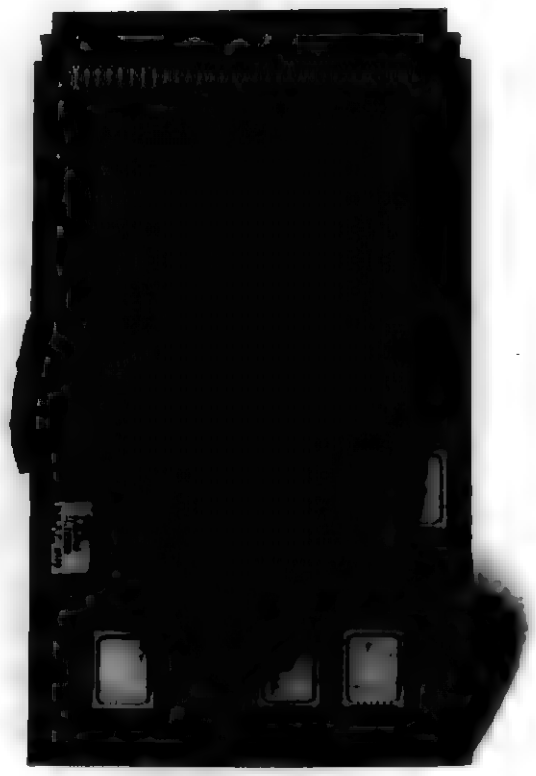
A surge protector that suppresses voltage surges and spikes and also provides noise filtering has been introduced by **Lowell Corp.**

The **Emerson Surge Protector** features a master-control socket that can accommodate six devices, five of which reportedly can be controlled by switching a single device.

Equipped with a normal voltage LED indicator, the product's input rating is 120V AC, 60Hz; output is 1,200W; and the circuit breaker is 10A.

The Emerson Surge Protector costs $149.

Lowell, P.O. Box 158, Worcester, Mass. 01613. 617-756-5103.



V.32

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ONE EUROCARD is all it takes to accommodate the fully featured V.32 data pump from Universal Data Systems.

The device is a *true* V.32. It is fully compliant with the CCITT standard for 9600 bps, full-duplex data communications. It operates on dial-up, two-wire private or four-wire private circuits. It handles synchronous or asynchronous data. It offers auto dialing through the AT command set, auto answer and adaptive line equalization. To preserve data integrity under degraded line conditions, it even has a trellis coded mode. An impressive set of diagnostics is also on board.

While the data pump is functionally identical to the industry standard UDS V.32 modem, it has been stripped of its on-board power supply and DAA. These functions can be easily imported via the VME connector.

For the bare facts about technical details and quantity pricing, contact Universal Data Systems, 5000 Bradford Drive, Huntsville, AL 35802. Telephone 205/721-8000; Telex 752802 UDS HTV.

TELEPHONE 800/451-2369

Universal Data Systems

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What CASE can't do yet

Loopholes, rough spots and just plain missing pieces

BY TONY PERCY

In a Ashton-Tate Corp.'s recent announcement delaying Dbase IV Version 1.0, Chairman Ed Esber was reported as saying, "Theoretically, there are thousands of bugs that we have not found that, through additional testing, would be brought down." Such a comment reflects the sorry state of software development and engineering.

Enter computer-aided software engineering (CASE) technology, whose second-generation tools may well answer MIS prayers for greater productivity. CASE tools promise full coverage of the software life cycle and the ability to build and maintain software systems of all types.

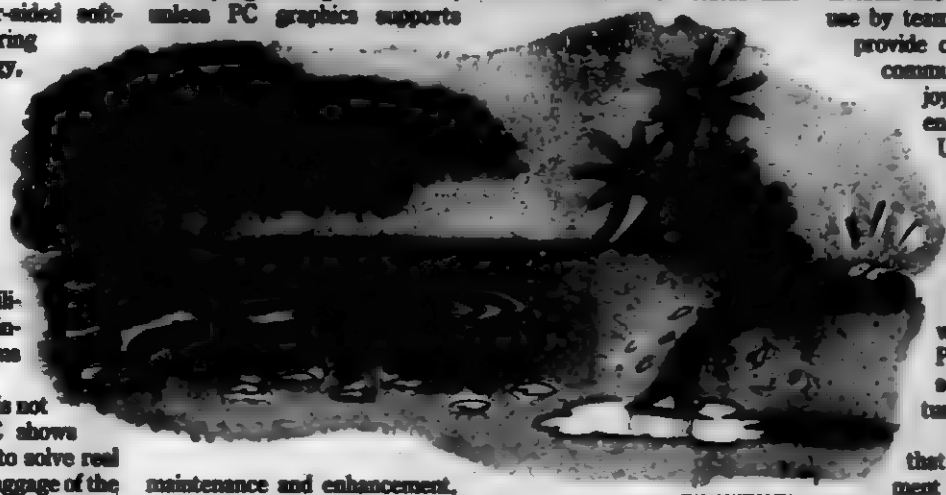
But the promise is not yet fulfilled. CASE shows signs of being able to solve real problems, but the baggage of the past continues to get in its way. MIS needs to recognize not just what CASE can do, but what it cannot do yet.

New projects. CASE is good at starting from scratch. Most CASE tools accept input only from the workstation in graphical or textual form.

Some of the tools available even go beyond the analysis and design stage, showing how brand new data bases, and even parts of applications, can be generated automatically from such high-level constructs.

Unfortunately, most MIS shops, unless they are making a key decision about a new data base management system, for example, do not spend much time on completely new projects. Analysts and programmers spend up to 80% of their time maintaining and enhancing existing systems.

These tasks must be addressed by personal computer graphics technology. And that is a difficult job — especially when dealing with complex navigational data base access and unstructured program logic. However, unless PC graphics supports maintenance and enhancement, it is a novelty and only intermittently useful.



HAL MAYFORTH

Also, no mechanisms currently exist by which data and logic constructs can be transformed into graphical objects, reorganized and extended by an analyst, checked for integrity and then resubmitted to the host dictionary and library environments.

So MIS will resist CASE until it can help more extensively with existing systems or until MIS has an additional incentive for building new application systems.

Methodology. CASE, by its name, denotes software engineering. Software engineering implies discipline, yet most MIS shops do not follow methodologies rigorously — partly because of the immature and constantly changing nature of the field.

Those MIS shops may have mixed and matched pieces from different methodologies to create their own customized approach, but even these methods are not employed with fidelity.

MIS's attempts at discipline are further confused by a continued lack of information or by misinformation. A well-known rule of automation states that you should only automate what is well organized and understood in the first place.

The little that is actually written about software engineering pays inadequate homage to the role of data — especially relational data base — in the design and implementation of cost-effective systems.

Some CASE tools that espouse a "cradle-to-grave" methodology have enjoyed great success in those few installations whose champions are strongly committed to that particular discipline.

But maybe the world at large is not ready to take software and information engineering quite that seriously.

The point is, neither mix-and-match flexibility in a CASE tool nor strict methodology can be sacrificed. Requiring flexibility in a CASE tool is understandable and defensible if your demand is for the ability to select different methodologies and techniques. But the ins and outs of CASE tools should not delay or thwart the necessary decision to impose discipline on the process.

Shared capabilities. Those CASE tools that are limited to individual use — or consecutive use by team members — may provide certain benefits for communication but will enjoy restricted influence and exposure. Unless the ability to manage shared activities is provided and the integrity of the models and diagrams on which a project team is working is ensured, PC-based CASE software will rapidly turn into shelfware.

The CASE tools that will gain commitment and success from end users are those that have an active, central dictionary to control the check-in/check-out of modules and information and those that can easily integrate updates to that repository of business rules and processes.

Neither feature necessarily requires a mainframe solution.

Other configurations, such as a local-area network or a minicomputer, can be used successfully.

Mainframe integration. Most complex applications developed using CASE will end up running on a mainframe.

By mainframe, I mean IBM 3270-based on-line transaction processing — in the IBM world — and not just batch processing.

You could argue that 3270-

Percy is vice-president of strategy for Applied Data Research, Inc. in Princeton, N.J.

- **Warning: New projects only**
- **CASE as a strict disciplinarian**
- **Still a wait for truly automatic programming**

based systems will be replaced by systems where the intelligent workstation is the medium of access, and that is, in fact, IBM's goal with its Systems Application Architecture. But the truth is that for some years yet, we shall still be building applications for dumb terminals.

Thus the target for the delivery of CASE systems is a completely different environment as far as devices, standards, data format, interfaces and procedures are concerned.

Until there is an easier convergence of the two worlds and a more facile management of traffic between the two environments, CASE likewise runs the risk of remaining experimental. It can learn much from the techniques implicit in many fourth-generation technologies, such as active data dictionaries, in administering and managing complex data bases and in application environments.

THE CASE TOOLS that will gain commitment and success from end users are those that can easily integrate updates.

State of the art. CASE is still an evolving technology. Many users are gaining valuable experience and benefits from its new methods of communicating.

But there remains much to learn about the new levels of abstraction by which we might define objects of interest to our businesses and the processes that pertain to those objects.

Researchers are exploring how to represent, in conventional hardware and software architectures, the constructs and semantic rules that govern the important entities in business. How can we simplify our concepts without reducing the infinite variety of choices and colorings implicit in our business applications to a complex range of defaults? When will the innovations surrounding object-oriented data base and programming systems consolidate on a recognizably sound platform like the relational model?

The fact is, we are fairly well advanced in representing the data side of the equation — and all its mutual relationships — in graphical form, with some establishment of a rule-base underneath.

But the process side is less well understood. Process, far less stable than data, is affected more by transient issues such as telecommunications speeds and output devices. The day when MIS can generate complex applications without some procedural code is not yet here.

Standards. CASE is innovative; standards are conservative. Innovation is glitzy and exciting; standards are dull and slow moving. The industry wavers between the two, since users are unsure of the degree of standardization they want and are wary of staying in a backwater if they behave too cautiously. In the wake of SQL, end users seem to be demanding greater interchangeability between heterogeneous platforms or products.

Standardization efforts, such as the ANSI X3H4 committee's debate between its IRDS standard and the International Standards Organization standard, are extremely well intentioned. The Information Resource Dictionary System (IRDS), under development since 1983, is a fully extensible dictionary to define and manage information objects and resources used by software developers during the application development process.

Another effort, the electronic design interchange — commonly known as EDI — format, is being championed as a proven standard in the computer-assisted engineering area for exchanging information between different CASE products.

We should attempt to standardise only what we understand well. So the CASE market may remain slow until such standards are articulated, reviewed and understood by the vendor and end-user communities.

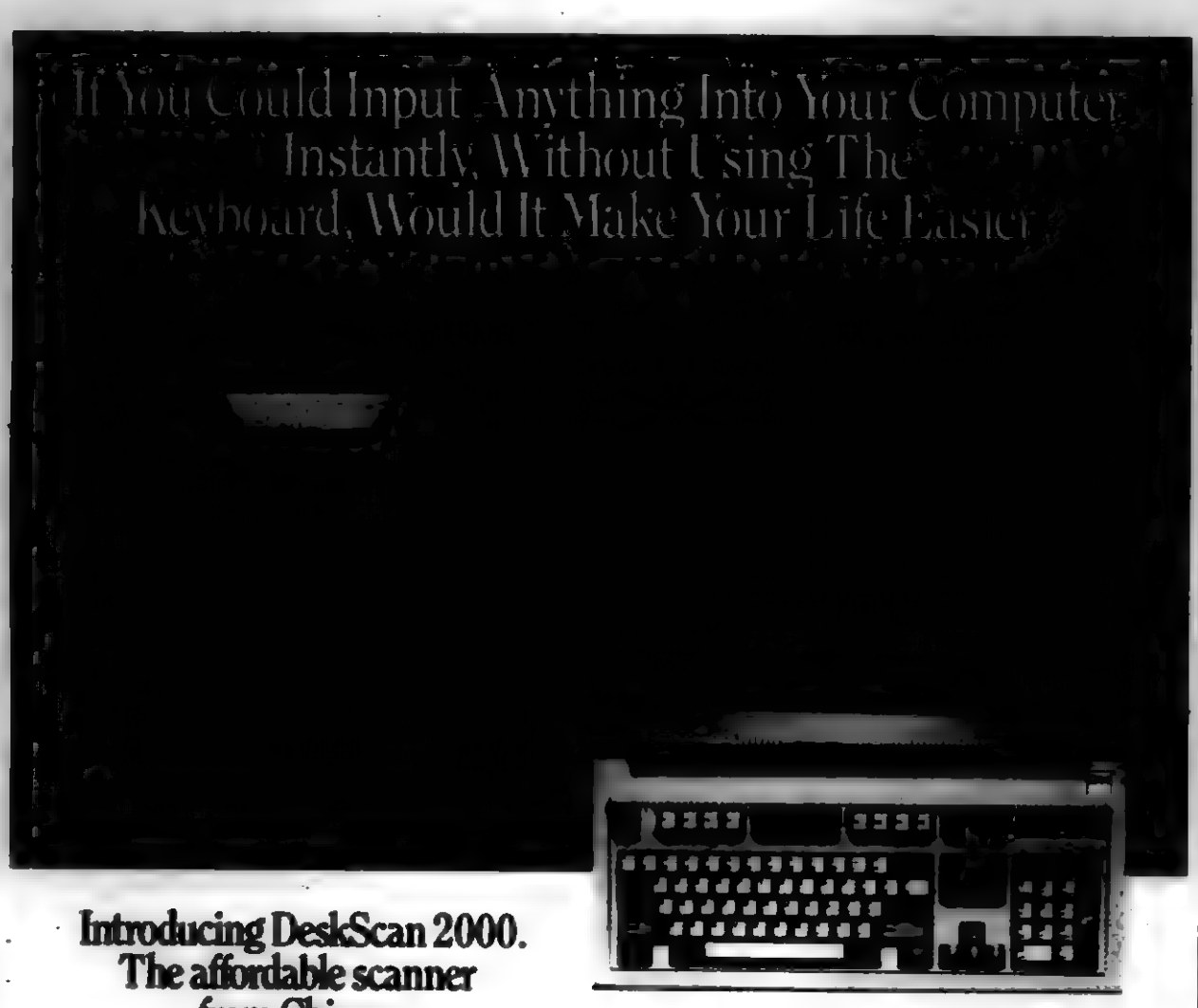
Timing is everything

CASE has started quickly, as far as placement of relatively cheap units are concerned, and its long-term success is certain. The timing of this greater commitment seems to be dependent on some other stimuli, such as a breakthrough in technology.

Maybe CASE needs more success stories from the methodologically purer organizations that regularly deliver and maintain major applications. Success stories of simple systems where complete code has been generated from design constructs would be welcome as well. Maybe CASE needs another market shaker to encourage the development of a new set of applications with necessarily new techniques. That shaker could well be relational data base for complex systems.

The success of IBM's DB2 and other SQL-based systems in the IBM arena suggest that now is the time for organizations to make a break from the clutter of the past. Users are moving to radically new ways of analyzing the meaning of data, defining it according to relational rules and accessing it at abstract, set-oriented, value-driven levels.

The commitment to making shared relational data base happen will require cultural, organizational and methodological changes in corporations. CASE and SQL could become excellent partners in forcing MIS departments to face up to that change and thus effectuate a further stage of maturity in information resource management. ●



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Penney

FROM PAGE 1

the replacement of cash registers with point-of-sale (POS) systems and the construction of one of the most extensive IBM Systems Network Architecture (SNA) networks in operation. This information artery carries credit authorization, POS data and catalog sales transactions for some 180,000 employees.

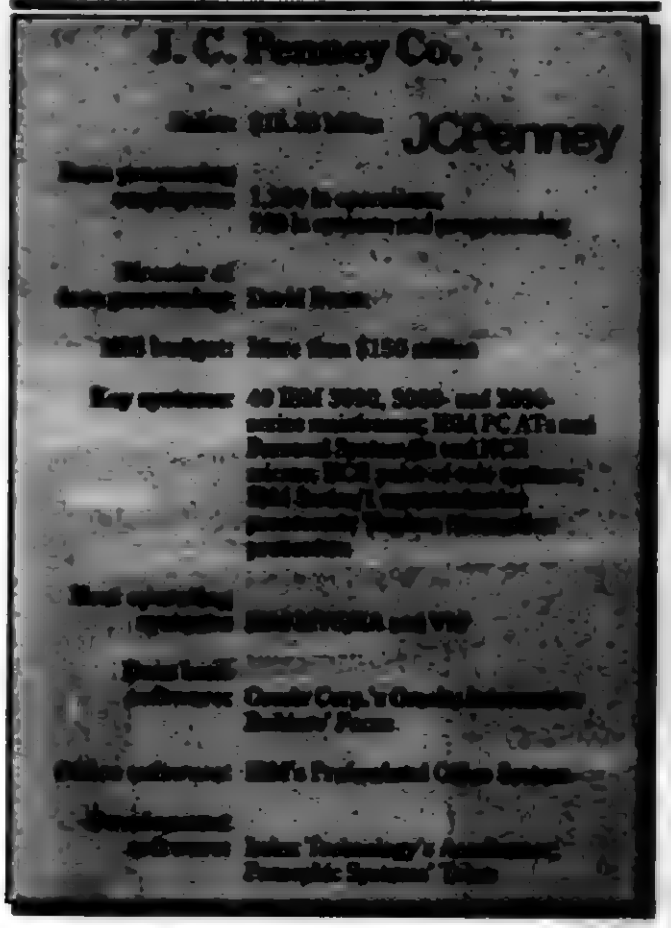
But the nation's fourth largest retailer was not content to stop there. For example, J. C. Penney is a trendsetter in electronic document interchange (EDI) and merchandising via satellite broadcasting.

"When you talk about retail companies on the leading edge of technology, you have to start with J. C. Penney," says Nicholas Gallapo, a partner at Arthur Andersen & Co.

Penney's use of technology clearly reflects its corporate culture. In the last 20 years, a succession of insightful chairmen have carefully translated technological innovation into competitive advantage, according to outside and inside observers. "Over the years, management provided the leadership — and the dollar investment — to make [technology] work," stresses Robert Capone, who headed the company's MIS function for 19 years before retiring in April. "It was considered a search for excellence."

The company says it believes it can hold up tangible proof of technology's contribution to the bottom line. From 1974 through 1984, J. C. Penney invested heavily in its POS and credit authorization system. As investment in technology increased, so did sales per employee, Evans says. "You can't just credit technology, but it had an impact," he maintains.

At A Glance



CW CHART

Except for a dip during a sales slowdown in 1984 and 1985, Penney has shown steadily increasing net profits in recent years, climbing from $467 million in 1983 to $608 million in 1987. In the Forbes 500 listing, J. C. Penney ranks second among department stores in sales per employee.

Moreover, Penney's commitment to technology has enabled it to build a quality MIS staff. It promotes heavily from within and assigns innovative and challenging projects to its people, Evans asserts. Penney is consistently listed among the 100 best companies to work for in America, and its corporate MIS staff reflects this — most have been with the company for two decades. Continuity breeds success, J. C. Penney's MIS executives contend.

Yet the company's success is more the result of executing fundamentals than anything else. "We give end users the tools to go to bat with. All we do is keep up with their requirements," Evans declares.

All end-user departments' five-year plans not only include revenue and profit projections but emphasize systems requirements. "At one time, systems told us what we needed, but now we tell them what we need," says Rod Birkins, president of Penney's catalog division. "It makes for a compatible relationship that effectively contributes to our growth."

Former MIS chief Capone

MIS representatives provide technical backup for end users when project funding is requested and also participates in steering committee meetings with users to define a project's scope and calculate costs and benefits. MIS then schedules quarterly meetings to keep tabs on projects.

Leaner and meaner is the rule in the systems department, which has reduced its head count from 2,300 to 1,900 during the last few years as it automated operations functions. Moreover, it is dropping 19 of its 45 IBM mainframes. Twenty-four older Model 3033s and 4381s, which do not support IBM's MVS/XA operating system, are being phased out; five will be replaced by larger IBM machines.

Reducing the number of mainframes will not only save money but will provide greater processing capacity because of the upgrades, Evans claims. The upgrades also position Penney to take advantage of the increased memory addressability of IBM's MVS/ESA when it becomes available this summer, he adds.

J. C. Penney has further honed its information strategy in several ways, including the following:

The network. Perhaps no company better illustrates the adage that "the network is the computer." J. C. Penney was one of the earliest adopters of a full-fledged SNA backbone network and remains a staunch believer in distributed processing. "Our strategy is to locate your department wherever you want, and we'll provide the computer services from where it makes the most sense," notes John Dratch, director of DP and technical support.

Penney's SNA network connects 2,000 facilities with seven regional data centers. It is the pipeline that carries credit authorization requests for the company's 1,800 stores; moves data collected on POS systems and from catalog orders to and from the data centers; and provides access to a variety of corporate information and services ranging from stock quote data and IBM's Professional Office System office automation software — which has 35,000 users — to development tools.

The network was conceived to operate as a utility, Dratch recalls; plug in a terminal or microcomputer at any point on the network, turn it on and go. "It's like flipping a switch and the light goes on," he says.

The company's three larger

Manhattan-worn Penney heads west

BY SHARON BAKER
CW STAFF

Once J. C. Penney Co. made up its mind, there was no stopping it.

Although moving its headquarters from the Big Apple to the Lone Star State cost the company most of its nonmanagement employees and half of its management staff, company officials say leaving the skyrocketing prices of Manhattan for the Dallas suburb of Plano, Texas, should save between $60 million and $70 million a year. The move began in January and should be completed by the end of this month.

David Evans, vice-president of systems and data processing, says he sees the move as a "50-year decision," in part because it let the company replace outdated information technology.

Even a company of Penney's size and reputation — it was listed in *The 100 Best Companies to Work for in America* — must work hard to entice employees to follow it halfway across the country. How does it do that? And what does it do about those unwilling to leave familiar surroundings?

After Penney announced its intention to move, its 3,800 New York employees were forced to re-evaluate their career plans. J. C. Penney officials claim that roughly 50% of its 2,200 management employees followed the company to Plano, where Penney has maintained a data center since the early 1980s. About 90% of the corporate MIS staff moved, as did about half the 75 systems development group employees.

Two top managers who stayed behind for personal reasons are William Friel, vice-president and director of systems and data processing, and Evans' predecessor Robert Capone.

Penney officials said most positions left empty by those unwilling to make the move are now filled. The Dallas area is ripe with workers left jobless by the oil glut.

The company also relied on ties with local colleges to fill entry-level positions and start rebuilding a loyal work force.

Although the move did not significantly affect J. C. Penney's MIS operations — that department had relocated to Texas around 1980 — the company took the opportunity to do some housecleaning. Typewriters and a melange of disparate word processors were thrown out and replaced with personal computers, and buildings were connected by IBM Token-Ring networks and fiber-optic links.

The relocation "gave us a unique opportunity to go in and redo our headquarters physically and in terms of operations," Evans says.

To prepare employees for the move south, the company set up a Texas Information Center in its New York offices. The center served as a communications vehicle for those interested in learning about life in Texas, according to Gerry Montgomery, J. C. Penney's director of personnel administration.

"There was information [at the center] on almost almost every conceivable personal activity relating to the move, including schools, churches and housing," Montgomery says.

Employees who chose to leave Penney and remain in New York were not neglected. The company conducted seminars on how to prepare resumes, write cover letters and perform in job interviews.

Staff members who moved to Texas face still another move within Plano in about five years, when construction on a campus-style company complex, now in the design phase, is completed.

Bilker is a *Computerworld* copy editor.

data centers — located in Reno, Nev., Lenexa, Kan., and Columbus, Ohio — handle credit authorization, catalog and store processing. Data centers in Milwaukee and Atlanta support catalog distribution centers, while the data center in Dallas is used for systems development and other corporate processing purposes, such as personnel and accounting. A data center in Westerville, Ohio, handles processing for an insurance subsidiary.

A 56K bit/sec. land line connects all the data centers, but the company leases satellite circuits for backup. Each data center is equipped with IBM front-end communications processors. Each store attaches to the network via an IBM Series/1 minicomputer.

The network handles 350 million credit authorization transactions a year — 186 per second during peak times — as 52% of the purchases made at J. C. Penney involve charge cards. It also handles some 300 million transactions a year generated by outside concerns through subsidiary J. C. Penney Systems Services, Inc., Dratch says.

Thirteen Tandem Computers, Inc. TXP-class systems operate in each of Penney's three credit authorization data centers and act as gateways to credit card company and bank data centers to authorize credit or charge purchases, Dratch says.

The MIS department developed security software to guard access to the network and built a menu-driven user interface — replete with access to stock quote data — to help novice and sophisticated users alike navigate their way through the network, Dratch says.

POS systems. Since 1981, J. C. Penney has kept a close tab on every tie and tool on the shelves of each store with the use of optical character recognition scanners.

Before an item is displayed, a tag is affixed that contains machine-readable information with details ranging from its price and the store in which it was sold to its color and size. During checkout, the sales clerk runs a wand scanner attached to an NCR Corp. cash register over the tag to pick up the information, which is then forwarded to a Series/1.

At the end of each day, the information is compiled and transmitted over the network to the closest of the three major data centers. The information is compiled overnight on IBM host processors, and records of each store's sales are returned within 24 hours of when the files are received. The figures can be interpolated to unearth local and regional sales trends.

"It really smooths the product purchasing decision-making process," says Gerry Monday, manager of corporate services, systems and data processing. "We can spot danger merchandise and hot sellers and react to both a lot faster — by either liquidating or reordering.

"Lag time is critical. If you let it run too long before you reorder, you lose. It doesn't do much good to get a hot-selling swimming suit in late August," he adds. The system also allows the redistribution of merchandise at the warehouse level. For example, shipments of air conditioners bound for a chilly New England can quickly be reassigned to a steamy Atlanta.

EDI. J. C. Penney relies heavily on EDI technology to maintain a flow of merchandise and keep costs down. Roughly 200 of the company's largest suppliers dial into its system each night and access orders.

As a trailblazer in the field, J. C. Penney devised its own EDI approach in the early 1980s. Penney still hands out its EDI manual to suppliers, although the company vows to adopt an upcoming ANSI standard. "It will allow us to get more suppliers on the automated system," Evans says.

Although Evans will not pin down how much money is saved through EDI, he points to the elimination of certain manual tasks, such as relaying order data, stuffing envelopes and postage, as areas where tremendous time and money is saved.

J. C. Penney also looks forward to adding upcoming EDI functionality, such as electronic payment, as standards emerge. EDI is a cornerstone of the firm's information strategy. "We've learned how to network within our own company over the last 10 years. Now it's time to learn how to network between companies," Evans quips.

Corporate TV. J. C. Penney keeps open the lines of communication between its corporate and store buyers with what may be the largest business television network of any U.S. retailer.

Several months before seasonal fashions reach the racks, corporate buyers fan out into the marketplace to select their lines. Once warehouses are stocked, corporate buyers book time at one of the firm's three studios in Dallas for a satellite-based broadcast of their selections to store buyers at 300 sites.

"It's a typical live-action TV broadcast running anywhere from a few hours to the whole day," Dratch explains. "The corporate buyers describe and demonstrate their selections to the store merchandisers, who are ultimately responsible for what items will be carried and in what quantities in each store."

The store buyers use a computer program to select the merchandise they want in their store and enter their order, and companywide tabulations for each item are made.

Although buyers take up the lion's share of the network's time — they average 160 broadcast days a year — the network is also used for training and companywide announcements.

Strategic applications. J. C. Penney is testing bar-code technology in inventory control. Under a joint experiment, about 80% of merchandise supplied by Levi Strauss & Co. comes in boxes containing detailed information on premarked labels. The labels are scanned on receipt, and the data is stored in a dedicated system. This automates invoicing and helps the catalog division monitor inventory and sales trends, Evans says.

MIS is evaluating expert systems technology, although managers remain skeptical. "It's still viewed as a solution in a search of a problem," Evans adds.

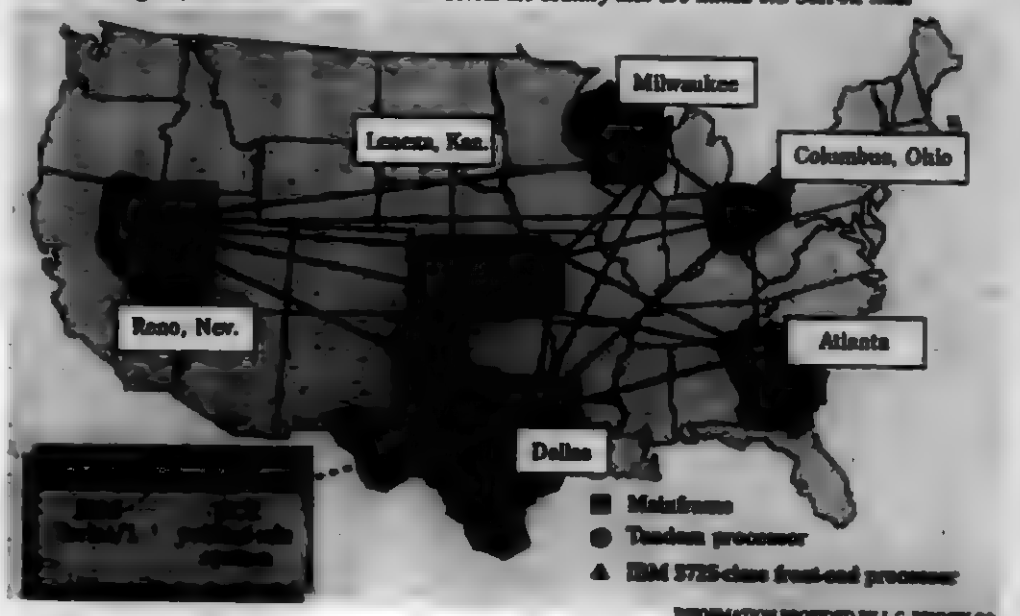
One application where an expert system could come in handy is in the catalog telemarketing sector. The company employs 4,000 telemarketing operators at 14 centers throughout the country, and peak telephone traffic is frenetic. An expert system could be used to direct calls coming in on 800 numbers from busy operators to inactive operators based on caller Zip codes.

Software development. MIS is modifying what Evans calls its earlier "moon-launch" application development methodology — an allusion to the U.S.'s spare-no-expense effort to put a man on the moon during the 1960s — in favor of a flexible approach that allows developers to tailor their efforts to the project. For example, MIS will do prototyping only where it makes sense, such as in large projects, but accelerate programming where full documentation is not needed, says Dick Skinner, systems and programming director.

"We found that our method-

Nationwide net helps J. C. Penney earn dollars

Stores exchange information with data centers across the country that are linked via 56K-bit lines



INFORMATION PROVIDED BY J. C. PENNEY CO.
CW CHART: AMY J. SWANSON

Dick Skinner, *Penney's systems and programming director*

Another Penney

J. C. Penney Co. may be best known as a retailer, but during the last few years, the company has also become one of the world's largest suppliers of computing services.

In 1983, the company established J. C. Penney Systems Services, Inc. to sell credit card authorization and other processing services to outside companies. The idea was to capitalize on an expected boom in the computing services business by leveraging the investment made in its IBM Systems Network Architecture.

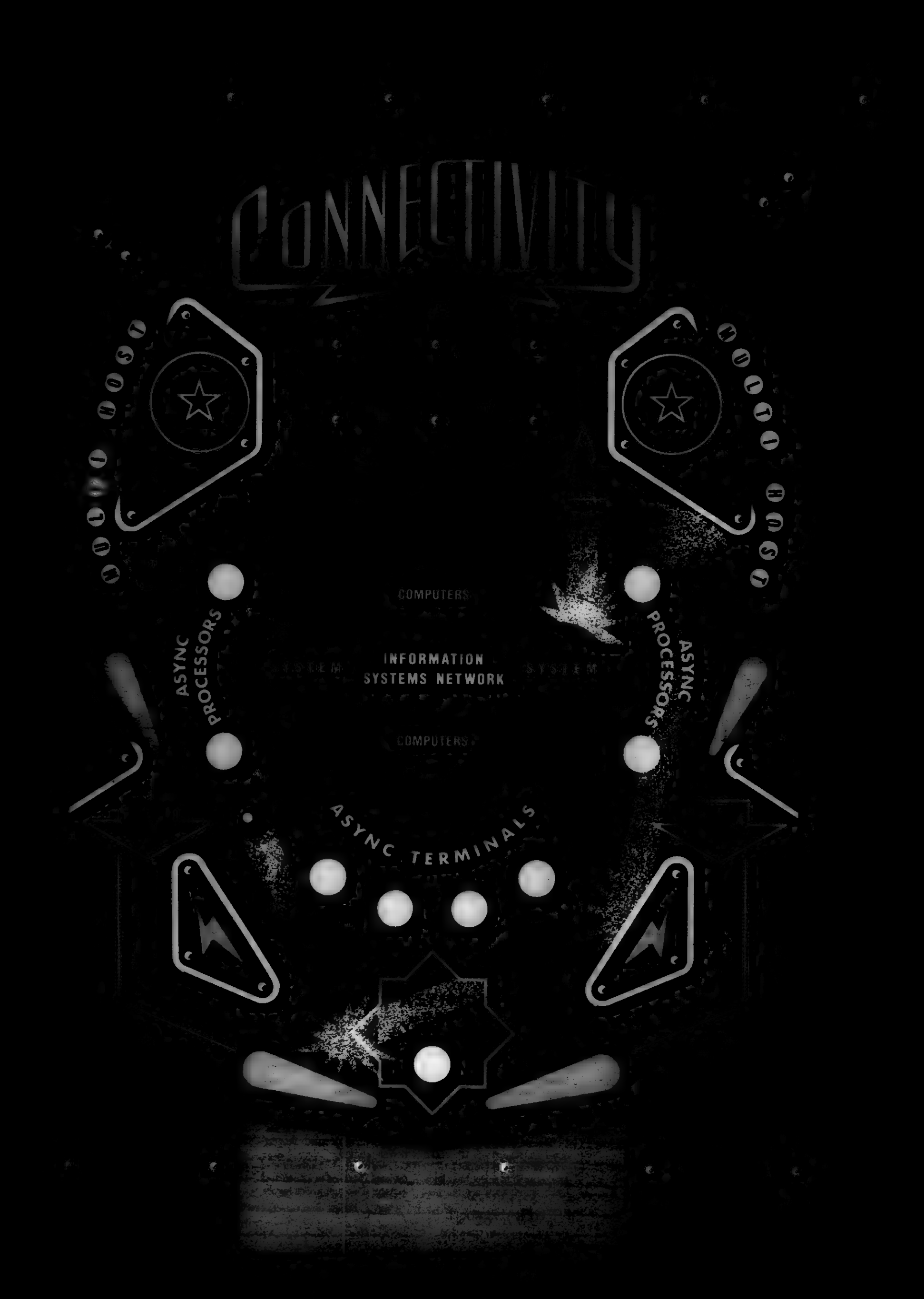
The operation's growth has met projections, according to Robert Mooney, the subsidiary's president. Major customers include petroleum companies Shell Oil Co. and Mobil Oil Corp., Zale Corp., First Security Bank in Salt Lake City and Zions First National Bank, also in Salt Lake City.

The functions Penney Systems Services provides include authorization for customers' proprietary credit cards plus Visa, Mastercard, American Express Co., debit cards and checks. Some corporate customers also rely on Penney Systems Services for more extensive work, such as bill processing and electronic messaging services.

Customers access the network by dialing in or by installing a dedicated line to an IBM Series/1 processor at a Penney store nearest to them. The Series/1 relays the request to one of three data centers that handle geographically specific credit authorization on the network.

After collecting transaction data on its own computers, the subsidiary transmits it either to a bank for settlement or to the customer's credit card processing center via Tandem Computers, Inc. processors.

ALAN ALPER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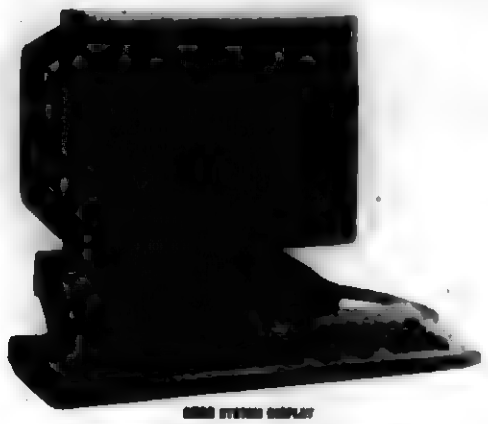

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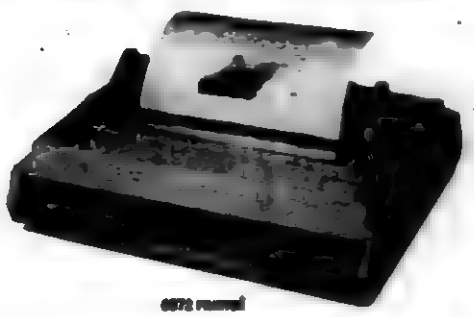

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AT&T
The right choice.

ology was good for larger systems but required too much overhead for smaller projects," Skinner explains. Penney's prototyping has minimized development goofs. Former MIS director Capone, however, remembers an employee-record data base optimized for on-line transactions that had to be scrapped a few years ago because it could not operate efficiently during overnight batch processing. "It had the wrong emphasis, so we had to go back to the drawing board," he recalls. "We never had a systems fiasco, though, where we spent millions of dollars and had to scrap the project."

The department is doing more programming on PCs and less on IBM 3270-type terminals. For large projects, the department is experimenting with front-end computer-aided software engineering tools, such as Index Technology Corp.'s Excelerator. On the back end, Pansophic Systems, Inc.'s Telon is sometimes used to automate code generation, Skinner adds.

The department keeps up with programming demands because it only develops "mission-critical" systems. Less complicated projects are done by end users with off-the-shelf tools. MIS provides SAS Institute, Inc.'s statistical analysis programs and Information Builders, Inc.'s fourth-generation language, Focus, to let end users build applications, make queries and create reports from the data base in Dallas, which resides on an IBM 3090 running IBM VM.

Skinner says some departments are developing their own applications while others are just catching on. "Our controller generates his own reports, and the credit department does all its own analytic work in making changes in credit policy. Other departments need to do more work," he says.

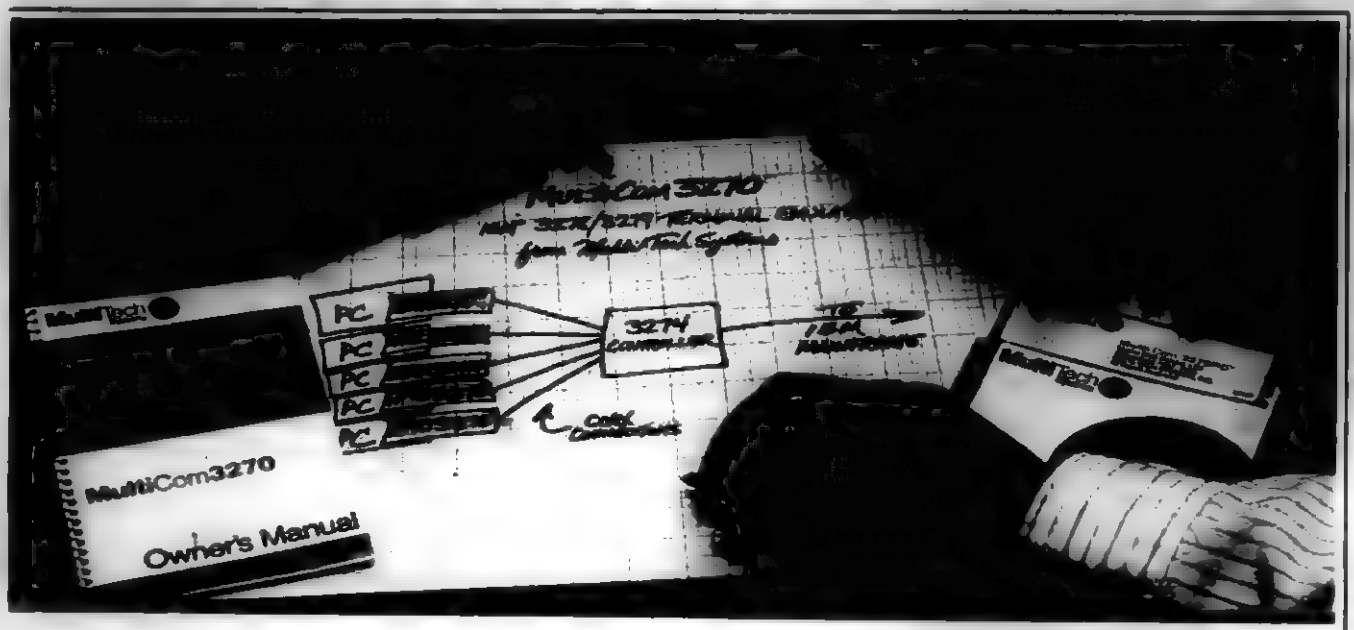
Productivity Center. J. C. Penney wants to cultivate a user base that is as sophisticated as its systems. The MIS department has set up a room that serves as a problem solving center for confused PC users and a place where employees can tinker with new machines and packages. "It's basically a walk-in computer store," Evans says. "We've got six or eight PCs running in there, and we encourage people to simply come in and experiment."

> THE Productivity Center "is basically a walk-in computer store. We encourage people to simply come in and experiment."
>
> DAVID EVANS
> J. C. PENNEY CO.

Staffers assist employees in trying out new packages or updated versions of old favorites. The company's productivity credo dictates that it is the results that count, not the road you take to get there.

"Our employees can use any kind of PC they want," Evans adds. "We don't even care what software packages they use. We've got a corporate license for Supercalc, Supercalc IV and Wordperfect, but if they're comfortable with another, that's fine."

Penney also tried to circumvent possible PC phobia by switching the room's name from the Information Center to the Productivity Center. "We wanted the focus to be that the boxes make the people more productive, not just 'everyone else has got a computer, so I want one, too,' " Monday concludes. •



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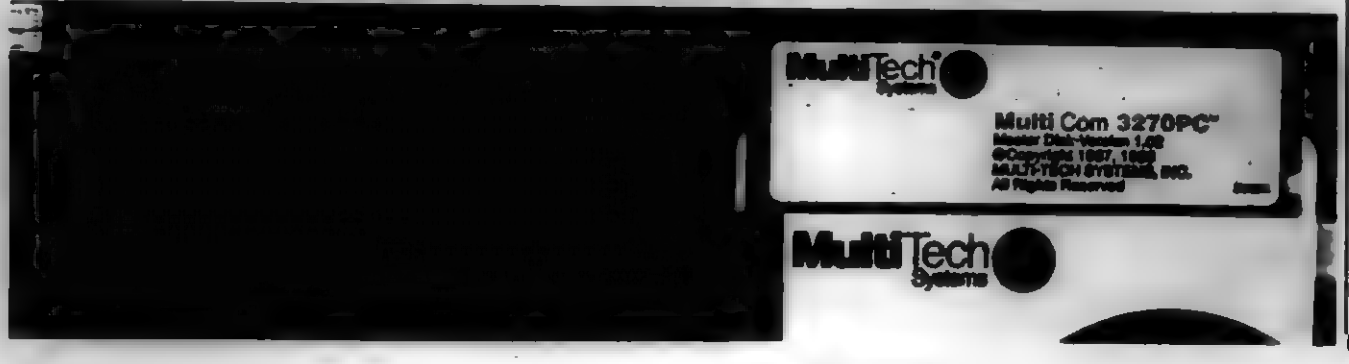

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TAKING CHARGE

William S. Galkin

Untangling owner's rights

Who owns the software developed by a consultant — the consultant or the company hiring the consultant?

The answer is uncertain, and consultants and companies hiring them need to be aware of such uncertainties to establish and protect their ownership rights.

The determination of software ownership lies in the murky waters of the work-for-hire doctrine of the Copyright Act of 1976. The doctrine states that if consultants are employees of a company, then the software they develop is automatically owned by the company.

However, if consultants are not employees, then they will own the software, unless they sign a work-for-hire agreement containing special language and the software falls into one of these work-for-hire categories: A contribution to a collective work, a part of a motion picture or other audiovisual work, a translation, a supplementary work, a compilation, an instructional text, a test, answer material for a test or an atlas.

There are two causes of uncertainty under the Copyright

Continued on page 70

Texaco tests lights-out data center operations

BY JEAN S. BOZMAN
CW STAFF

HOUSTON — With the belief that much of its IBM 3090 operations can be automated, Texaco, Inc. is moving toward lights-out operations at twin data processing centers here and in Tulsa, Okla.

An automation system called OPS/MVS from MVS Software, Inc., a start-up firm helped by Texaco, will be tested on weekends beginning this month. During the trials, Tulsa and Houston will take turns running both centers' IBM 3090 systems. The goals are to make such weekend remote operations routine and to spread the use of OPS/MVS to other Texaco 3090 mainframe centers in Toronto and London, with some operators being moved into other functions.

"The majority of normal activities associated with keeping our systems up and running would be handled automatically by stored procedures," said Ed McDonald, division manager of information processing at Texaco. Under OPS/MVS, the current operators have stored "rules" explaining what they would do when confronted with specific messages. The rules have been blended with OPS/MVS code that filters the IBM MVS messages requiring human intervention.

Automating MVS operations does not mean the elimination of

Continued on page 71

Data View

It's a risky business for CIOs

A survey of 346 chief information officers shows they face a greater risk of dismissal than other MIS staff, especially during mergers

INFORMATION PROVIDED BY TOUCHE ROSS & CO.
CW CHART

Uniting DEC, IBM

Nuclear site MIS chiefs wired for fusion effort

BY CHARLES BABCOCK
CW STAFF

AIKEN, S.C. — The Savannah River Plant of the U.S. Department of Energy is a sprawling, 300-square-mile facility with a research laboratory, plutonium and tritium processing facilities, two active nuclear reactors and 5,000 white-collar information workers among its 16,000-member work force.

As such, it presents special challenges to an MIS staff, particularly for the integration of Digital Equipment Corp. and IBM hardware. That integration is being driven by grass-roots user demands to tie workstations into centralized computers via Ethernet networks.

Three IBM mainframes form the backbone of data processing at the site, but they are supplemented by 100 DEC VAXs and Microvaxes, 1,400 IBM 3270 terminals, 2,000 IBM Personal Computers and 1,500 Apple Computer, Inc. Macintoshes. The plant also has a Scientific Computer Systems Corp. supercomputer that will be upgraded later this year for special scientific applications.

Tying in

The task of linking this mixed hardware together has fallen to the 50-member Computer Projects Department, created in 1985 when the site was limited to the three mainframes, 1,000 PCs and a few dozen VAXs. The two people most frequently mentioned as originators of the network are the department's chief technologist, Andrew J. Johnson, 42, and its superintendent, Gerald P. Thompson, 45. Neither arrived in Aiken prepared for the job.

As a matter of fact, as Johnson set up the first Ethernet network in the Savannah River Laboratory and then began setting up nine other Ethernet LANs and linking them together, the site became a regular stopover for DEC and its prime Ethernet prospects. "What we were doing hadn't been done anywhere else before. There just wasn't a market for 300-square-mile networking solutions," Johnson says with his wry humor.

"Right now, much of the data is in Adabas on the mainframe," Thompson says, referring to the

Continued on page 72

PROFILE

Gerald P. Thompson

Position: Superintendent, Computer Projects Department, U.S. DOE Savannah River Plant.

Mission: To bridge the worlds of IBM and DEC for more than 5,000 computer users.

System failings hit bottom lines

BY ALAN ALPER
CW STAFF

NEW YORK — Despite heightened awareness of computer security, a significant percentage of organizations are experiencing financial losses due to poor contingency planning and practices, according to a recent survey.

The survey, conducted by consulting firm Ernst & Whinney, revealed that one-third of the 390 organizations polled have suffered some financial loss during the last two years. Twenty-two percent of the firms reporting financial losses cited breaches of computer security; 47% and 31%, respectively, blamed system failures and downtime or fraud and embezzlement.

Of firms that reported losses due to security deficiencies and fraud, 18% reported losses of less than $50,000, 11% claimed losses of $50,000 to $1 million and 2% acknowledged losses in excess of $1 million.

Twenty-six percent blamed losses of $50,000 or less on system failures, and 9% estimated losses at between $50,000 and $1 million. While financial losses related to system failure or downtime reflect deficient business continuity planning, only 20% of those polled said such planning is done regularly and thoroughly tested for all organizational units. Forty percent said this kind of planning is limited to critical services, such as data processing, and another 40% said the procedure is limited to DP, is irregular or is done only on a best-effort basis.

Ernst & Whinney pointed out that computer security is an issue that should not be limited to DP managers or departments, but should be handled as any topic of concern to general management.

Half the respondents — representing a nationwide cross-section of commercial and government DP professionals — said security risks have accelerated during the last five years; one-third said risks have decreased. Many said risks accelerated in proportion to increased amounts of computing. One-fourth said risks were rising at a faster rate than increases in computing, but a similar number said the opposite.

Worries

Corporate DP respondents cited competitors as a major concern, while government organizations pointed accusatory fingers at foreign governments. Respondents reiterated statements made in past surveys that protecting data from their own employees is also a chief concern.

More than half the respondents said all data is classified by written agreement or that classification covers specific applications and media. Many organizations, however, only use data classification on an ad hoc basis or not at all, the report noted. More than half the respondents claimed to use data encryption on a selected or experimental basis. Very few said all confidential data is encrypted, while, to the chagrin of Ernst & Whinney officials, many were not aware of secret coding at all.

Overall, the survey results suggested that internal practices for protecting computer data continue to improve as organizations adopt more consistent policies and procedures. Unfortunately, security methods that employ one-time passwords supported by see-through architectures and smart cards — as well as data encryption and codes — are only beginning to be effectively used, the Ernst & Whinney report concluded.

HOW TO XL IN BUSINESS.

It's simple. Get acquainted with NEC's powerful new Astra® XL family. The Astra MicroXL, XL/8, XL/16 and XL/32 series. Each of these multiuser systems, using the UNIX® System V operating system, offers true compatibility and upgradability.

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Or write: NEC Information Systems, Dept. 1610, 1414 Massachusetts Ave., Boxborough, MA 01719.

MANAGEMENT BRIEFS

Common to tackle insurance issues

Common, the users group made up of IBM minicomputer users, recently launched a project to address insurance industry issues. The project, which is headed by Sandra S. Nelson of Harden & Co. in Concord, Calif., will focus on trends in areas such as computer output and source-document microfiche, electronic filing with the Internal Revenue Service and laser printer forms.

The Association for Systems Management has announced its 1988-89 professional education calendar, which features a new hands-on expert systems program. Other seminars focus on basic systems analysis, advanced systems analysis, computer-assisted software engineering and desktop publishing. The multiday sessions will be presented throughout the U.S. and Canada between now and mid-1989.

The Computer and Business Equipment Manufacturers Association, or CBEMA, recently released a guide to the standards for human-factors engineering in VDT workstations. The CBEMA guide outlines voluntary specifications for VDTs, furniture and environmental factors such as lighting.

Consulting firm Nolan, Norton & Co. has announced the Nolan Norton Institute, which is intended to help companies understand the use and management of information technology as a competitive tool. The institute will organize centers for industries, technology management and international studies, with an initial focus on the banking, finance, health care, insurance and manufacturing arenas.

Computer Channel, Inc., a Floral Park, N.Y., company that plans computer-related educational telecasts, recently signed agreements with the Gartner Group, Inc. and Dataquest, Inc. market research firms and *Network World* newspaper to jointly produce programming for a fall debut.

Calls for papers have been issued for various conferences. Papers for the **Association for Computing Machinery** (ACM) 1989 Sigmetrics and Performance conference May 23-26 in Berkeley, Calif., can be sent to Alan Jay Smith, Computer Science Division, University of California, Berkeley, Calif. 94720.

ACM and the **IEEE Computer Society** are seeking industry-oriented papers for the Symposium on Computer Architecture, which will be held May 28-June 1, 1989 in Jerusalem. Authors can write to Arvind, Laboratory for Computer Science, MIT, 545 Technology Square, Cambridge, Mass. 02139.

The **Association for Systems Management** is soliciting papers for its annual Information Systems Conference, scheduled for May 7-10, 1989 in Dallas. Inquiries can be sent to Richard McCaffrey, assistant executive director, ASM, 24587 Bagley Road, Cleveland, Ohio 44138.

LOCAL HAPPENINGS

NORTHEAST

Newton, Mass. June 28. Association for Women in Computing Greater Boston Chapter. Planning 1988-89. Days Inn. Contact: Sandra Mitchell, 18 Reynolds Ave., Natick, Mass. 01760.

WEST

San Francisco. July 6. Association for Women in Computing Bay Area Chapter. "Unix." Stagecoach Restaurant. Contact: Association for Women in Computing, Suite 1044, 41 Sutter St., San Francisco, Calif. 94104.

Phoenix. July 12. Independent Computer Consultants Association Phoenix Chapter. "WORM Disk Laser Technology." Phoenix Sheraton, First St. and Adams. Contact: ICCA, PO Box 22115, Phoenix, Ariz. 85064.

San Diego. Nov. 17-18. California Educational Computing Consortium Western Educational Computing Conference. Contact: Judah Rosenwald, Extended Education, HAD 153, San Francisco State University, 1600 Holloway, San Francisco, Calif. 94132.

MIDWEST

Grand Rapids, Mich. Sept. 11-13. Midwest Data Base and Data Communications User Group annual conference. Amway Grand Plaza Hotel. Contact: Theodore F. Rock, Harris Trust and Savings Bank, P.O. Box 755, Chicago, Ill. 60690.

SOUTHEAST

Atlanta. Sept. 12-14. Southeastern Telecommunications Association: Positioning for Success. Marriott Marquis. Contact: Carlisle Reames, SETA Public Relations, P.O. Box 210155, Columbia, S.C. 29221

MID-ATLANTIC

Bethesda, Md. June 28. Capital PC User Group AT&T PC6300 Special Interest Group. Lippett Auditorium, National Institutes of Health. Contact: Capital PC User Group, Inc., 51 Monroe St., Plaza East Two, Rockville, Md. 20850.

Tysons Corner, Va. June 27-30. Washington Ada Symposium. Sheraton Premiere Hotel. Contact: Helen Gill, Mitre Corp., 7525 Colshire Dr., McLean, Va. 22102.

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Galkin

CONTINUED FROM PAGE 67

Act concerning who owns software developed by a consultant. The first is that the courts disagree on who is an "employee" under the Copyright Act. The second is that it is unclear whether software falls into one of the work-for-hire categories.

Nevertheless, there is one certainty: If consultants decide to abandon their independence in favor of working 9 to 5 as a traditional employee, the software they develop will be owned lock, stock and barrel by the company hiring them. However, the ownership issues become murky when we confront a consultant who is not a traditional employee.

The following are two leading theories of who is considered an employee under the Copyright Act; each poses its own problems for consultants and the companies hiring them:

• The Control Theory. Under the theory set forth in 1984 in *Aldon Accessories Ltd. v. Spiegel, Inc.*, if a company exercises sufficient control and supervision over a consultant during the development of software, then the consultant is an employee and the software is owned by the company. However, if the company does not exercise sufficient control and supervision, then the consultant owns the software, unless the consultant signs a work-for-hire agreement and the software falls into one of the work-for-hire categories. Unfortunately, the court guidelines are vague as to how much is sufficient actual control.

• The Agent Theory. Under the theory set forth last year in *Easter Seal Society for Crippled Children and Adults v. Playboy Enterprises*, if a consultant is a company's "agent," then the consultant is an employee and the work is automatically owned by the company. Otherwise, the work is owned by the consultant, unless he signs a work-for-hire agreement and the software falls into one of the work-for-hire categories.

In practice, the Agent Theory is complicated and, therefore, difficult for a consultant and company to apply to assess their ownership rights. The complications arise because there are numerous criteria necessary to determine whether a consultant is a company's agent.

The principal criteria a court will look for are the following: whether a company has the right, though not actually exercised, to control and supervise a consultant; a consultant's level of skill; who supplies the materials; and the method of payment, such as by time spent or by the job.

Work-for-hire categories

Currently, there is little judicial guidance on whether software falls within one of the work-for-hire categories. Legal authorities agree that if the software does not, such an agreement will have no effect and a consultant will own the software regardless of the signed agreement. Conceivably, software may be a contribution to a collective work, a translation, a supplementary work or a compilation. However, the inclusion of software within these categories is far from certain.

IF CONSULTANTS decide to abandon their independence in favor of working 9 to 5 as a traditional employee, the software they develop will be owned lock, stock and barrel by the company hiring them.

If software does not fall into one of these categories, how can a company be certain it will own the software? One computer-law expert recommends that consultants sign an agreement specifying that if the work-for-hire agreement does not work, then the consultant also assigns all rights to the software to the company.

If the assignment of the consultant's rights is held to be enforceable, then the company will receive fewer rights than it would have received under an enforceable work-for-hire agreement. For example, the term of the copyright may be shorter. But fewer rights under an assignment agreement are certainly better than no right under an unenforceable work-for-hire agreement.

The bottom line

Where do we end up? A company that wants to own the software should have consultants sign work-for-hire agreements that also provide for an assignment of rights. Consultants who want to own the software should enter into a written agreement with the company reserving their rights.

If there is no written agreement between a consultant and a company defining ownership rights, then the consultant and company will be cast deep into the murky waters of the work-for-hire doctrine.

In that case, the advice is to establish as many of the necessary criteria as possible under the Control and Agent Theories and hope for the best — or, to put it another way, in a world of legal uncertainties, the best you can do is improve your odds.

Galkin practices computer law in Baltimore with the law firm of Frank, Bernstein, Conaway & Goldman.

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Texaco

FROM PAGE 67

all computer operators, McDonald said. Texaco is making the effort to not only reassure the operators that they will not be terminated but also train them on handling end-user queries at the center's help desks.

Typically, there are four to five operators per shift at each site, but during the weekend trials, only one center will be fully staffed. The remote site will still have one or two people to mount tapes and answer phones.

Ten-year plan

Texaco's move toward automation, planned since the mid-1980s (see chart below), is expected to turn the current operations staff into workers with higher skill levels. A 10-year strategy, spanning 1983 to 1993, calls for computer operators with high school degrees to move into positions that now require a college degree in computer science.

"The concept is that it's a job enrichment program," McDonald said. "The jobs are richer jobs. The operators will not be as involved in vigilance as they once were." Since 1984, new hires have been expected to have better academic credentials, and Texaco plans to retrain older workers as help desk consultants and supervisors of automated systems.

"This is not so much a replacement of people as it is a redirection of people," explained Dennis Samoska, assistant manager of computer operations at the Tulsa center. "We want our people to work in a proactive mode, rather than in a reactive mode. We want them to be able to watch a problem develop on screen and to call a user to notify him — even before the user notices the problem."

Texaco's underlying concern is that MVS operations have grown in complexity, requiring operators to watch as many as five consoles at once. "The way it is now, you don't know which terminal to look at first," McDonald said. "Over the years, the number of systems messages has increased almost exponentially. That makes it difficult for operators to determine which messages require action."

Almost human

The OPS/MVS code can do nearly everything a human operator can do, including system IPL, job restart and error detection. Each 3090 has two attached IBM Personal Computer ATs that enable operators to take over the remote 3090 system. Also, cables linking the PC AT's backplane to four separate IBM 3090 consoles give remote operators the feel of standing next to the machine.

The ATs are attached to four 3090 consoles, including an IBM 3092 hardware console, an MVS console, an IBM 3174 controller and a console displaying IBM's Netview, a TSO or an IBM IMS monitor. In addition, Texaco plans to display data from its on-site environmental monitoring systems.

"Unless you're recovering from a power outage, there's no need to mount tapes in order to restart the system," Samoska said. Just in case, there are beepers to alert remote managers in case of emergency.

Still, the task of automating Texaco's large computer rooms is a sizable one. The Houston center houses a 3090 Model 600E and a 3090 Model 200, while the Tulsa center houses a 3090 Model 600E and a 3090 Model 400. Each computer room has 28,000 square feet of raised floor and holds at least 100 disk drives with capacities of 2.5G bytes or more.

"Texaco runs its sites in a way that is absolutely symmetric," said MVS Software Vice-President Jim Woodhill. "They have the same machines running the same software in the same networking configuration so that each site can back up the other." OPS/MVS will take advantage of that symmetry, since operators at both data centers can follow the same procedures to run the remote systems.

Because Texaco computer rooms were a working laboratory for OPS/MVS, Texaco feels it will have an inside edge on lights-out technology. "We've been aware of OPS/MVS for two years now," said Bill Stevens, manager of operations at the Tulsa center. "We were the first test sites, and we gave them some machine time and office space to develop the product."

Apprehension

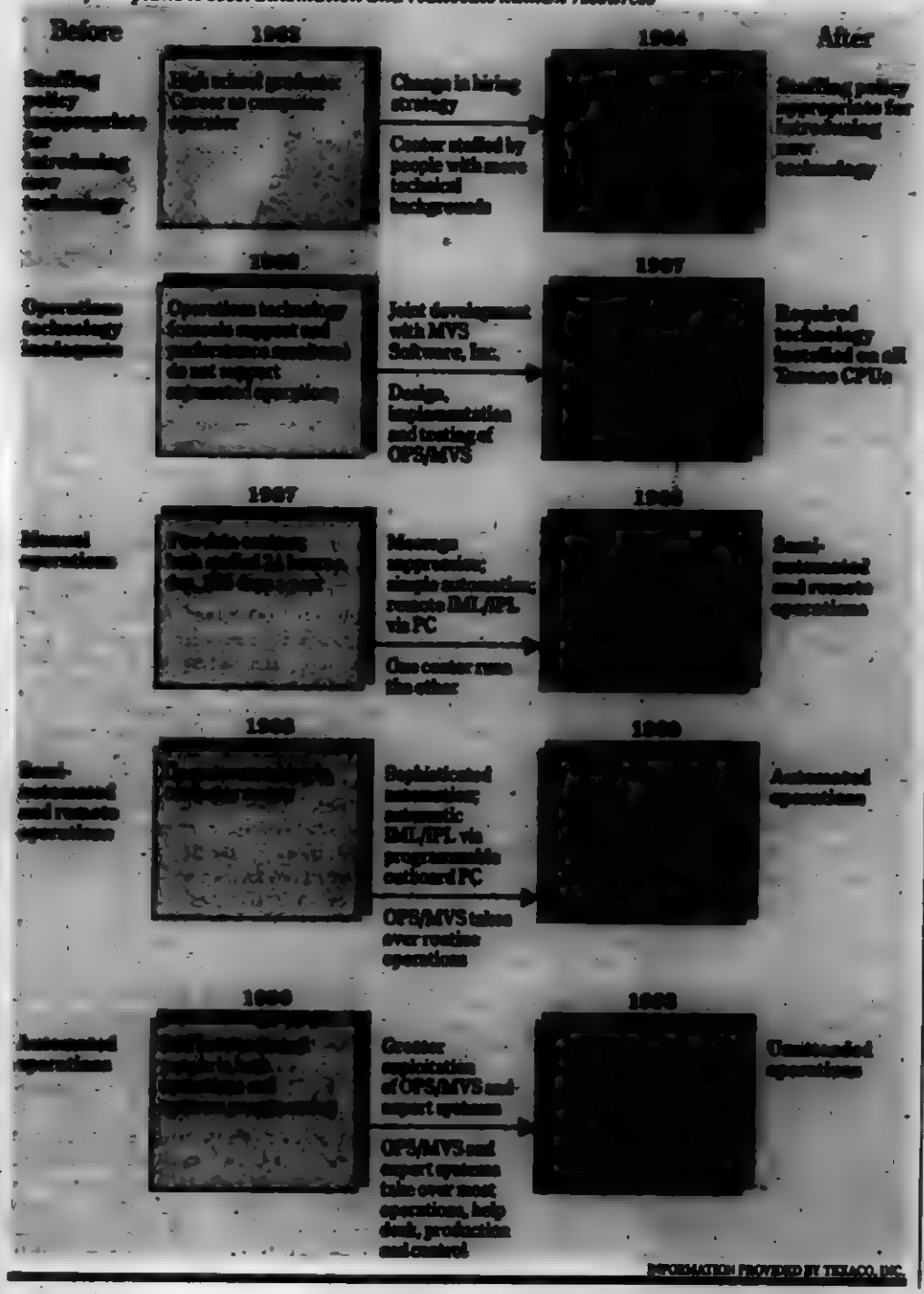
McDonald emphasized that the push to automate preceded Texaco's learning about OPS/MVS. He said the product fit with Texaco's long-term plans but that the plan may someday include other products.

So far, OPS/MVS has yet to be installed widely. The only other large site that has installed it is New York's Chemical Bank, which plans to use the system at multiple sites.

Admittedly, Texaco's operators have been concerned about the move to automated MVS operations. "There's been apprehension, of course, when something comes into the shop that looks like it's going to be able to do their job," Samoska said. "But we tried to put the point across that all we're doing is changing the tools available to the operators."

Texaco outlines its 10-year operations strategy

The oil firm plans to boost automation and reallocate human resources



INFORMATION PROVIDED BY TEXACO, INC.

CALENDAR

[illegible]

IFIP Users' Association National meeting. Chicago, June 26-30 — Contact: Execucom Systems Corp., 9442 Capital of Texas Highway N., Arboretum Plaza One, Austin, Texas 78759.

Data Management Division of the Securities Industry Association, presentation on Master Limited Partnerships. New York, June 27 — Contact: Sal N. Cocco, DMD Luncheon Committee Chairman, c/o First Manhattan Co., 42 Broadway, 17th Floor, New York, N.Y. 10004.

Assessing Advanced Applications of Diagnostic Expert Systems in Aerospace & Defense Electronics. Los Angeles, June 27-28 — Contact: Conference Administrator, Technology Division, Institute for International Research, 331 Madison Ave., Sixth Floor, New York, N.Y. 10017.

Information Gateways: BOCs, Open Networks and Competition. Washington, D.C., June 27-28 — Contact: Telecom Publishing Group, Attn: Conference Registrar, P.O. Box 1455, Alexandria, Va. 22313-2055.

Symposium XVI. New York, June 27-30 — Contact: Association of Information Systems Professionals, 104 Wilmot Road, Suite 201, Deerfield, Ill. 60015-5195.

Information Services '88. Atlanta, June 28-29 — Contact: Third Millennium, Inc., 119 Pinebridge Road, Mount Kisco, N.Y. 10549.

Engineering Workstations Conference. Boston, June 28-30 — Contact: Corporate Expositions, Inc., Box 3737, Santa Monica, Calif. 90403.

Network Management Solutions. Boston, June 28-30 — Contact: Dorothy Ferriter, International Data Group Conference Management Group, P.O. Box 9171, Framingham, Mass. 01701.

Beyond SNA: 3-5 Year Implementation Strategies. Hilton Head, S.C., June 29-30 — Contact: Digital Consulting, Inc., 8 Winsor St., Andover, Mass. 01810.

[illegible]

Technology in Education: Expanding Teacher Effectiveness. Eugene, Ore., July 7-8 — Contact: Technology in Education Conference, University of Oregon Continuation Center, 1253 Mass St., Eugene, Ore. 97403.

[illegible]

International Cost Engineering Congress. New York, July 10-13 — Contact: American Association of Cost Engineers, 308 Monongahela Building, Morgantown, W. Va. 26505-5468.

Commercial Image Processing '88. Boston, July 11-12 — Contact: Frost & Sullivan, 106 Fulton St., New York, N.Y. 10038-2788.

Fault Tolerant Computing. Santa Cruz, Calif., July 11-13 — Contact: Karin Fobian, University of California Extension, Santa Cruz, Calif. 95064.

National Financial Computer & Automation Conference. New York, July 11-13 — Contact: National Forum, 333 Sylvan Ave., P.O. Box 1151, Englewood Cliffs, N.J. 07632-0151.

Case '88 International Workshop on Computer-Aided Software Engineering. Cambridge, Mass., July 12-15 — Contact: Pamela Mayer, Index Technology Corp., One Main St., Cambridge, Mass. 02142.

Advanced Computer Networking Solutions. Boston, July 13-15 — Contact: Advanced Computer Networking Solutions, Suite 777, 627 7th St., Fairview, N.J. 07022.

Uniting

CONTINUED FROM PAGE 67

Software AG of North America, Inc. data base management system. "Our charter is to make it as easy as possible for people who need it to get it, to bridge those two worlds."

Bridging the PCs and VAXs to the mainframe has led to lower level staff workers freely communicating with each other via electronic mail across departments. In the past, a laborious process was followed, with memos climbing the chain of command in one department and going down the chain in another.

"We're changing the culture of the site," Johnson says enthusiastically.

It all began in 1982 when Johnson installed the first Ethernet LAN in the laboratory and put DEC's All-In-1 office automation package on it. He had previously tied PCs to DEC PDP-11 minicomputers because laboratory workers who had their experiments on-line also wanted their office PCs on-line to monitor the experiment, Johnson recalls.

"It was strictly grass-roots type of work. Upper management did not know about or encourage this project," he says.

Learning the needs

At the time this unsanctioned pilot was underway, a data processing visionary, Bruce Ferguson, the first department chief who has since left the plant, advocated a study of the information processing needs of the site. The study would eventually conclude that a computer network would make 5,000 information workers 5% to 10% more effective. "The estimated payback was tremendous," Johnson says; the Computer Projects Department was founded with a $100 million budget for a nine-year period.

Thompson, who became department head after Ferguson left, had trouble finding the skilled people he needed to rapidly expand the unit. He had difficulty attracting people to backcountry South Caroline and started out using contract workers who offered their skills for a fixed period rather than agreeing to hire on. Eventually, that practice evolved into hiring contract people who agreed to become Du Pont Co. employees (Du Pont operates the plant), and the challenge of the job has been sufficient to keep many of them in the department, he says.

Meanwhile, Johnson, who had arrived at the plant in 1982 to write meteorological Fortran programs, was on the leading edge of Ethernet. As users asked to be included on the network, he found that wiring the sprawling, low-slung buildings around the site strained Ethernet to its maximum 2,800-meter distance. Just as demand outstripped that limitation, he found repeaters coming onto the market, enabling him to extend Ethernet. And as more and more Ethernet networks were established, bridges came onto the market, allowing him to link them together into one network.

On a local scale, Johnson had already worked out the DEC VT100 and VT200 terminal emulation that would allow a PC to connect to a VAX and the 3270 terminal emulation that would enable VAXs to communicate with IBM mainframes.

Savannah River Plant's Johnson

The Ethernet networks were joined across the site by making use of a broadband cable television network that had previously been installed for TV surveillance. The cable network speeded the network-building process and enabled an Ethernet user at one end of the site to easily communicate with another 18 miles away, Johnson says.

Thompson's six-person development staff has customized All-In-1, allowing high-priority messages "to bubble up to the top" and saving busy users from catching up on every message when they come back from an absence, he says.

Thompson says the staff wants to expand the users' capability to perform document transfers among the 1,500 Macintoshes, 2,000 IBM PCs and 100 VAXs on the site. He also continues to add about 100 users a month as the network reaches out farther and farther from the plant's central offices.

Thompson and Johnson say they are laying the basic information pipelines that will automate the site far into the future and have little doubt it will be a long-lived accomplishment. At the same time, they admit to occasionally being baffled by all they have wrought.

One Ethernet network persistently went down between 4:30 p.m. and 5 p.m., and neither official could determine the cause. Then, one day, Johnson tracked the offending node to a trailer outside a building, where a maid daily unplugged the bridge connector for a half-hour as she plugged in her vacuum cleaner to work in the temporary office.

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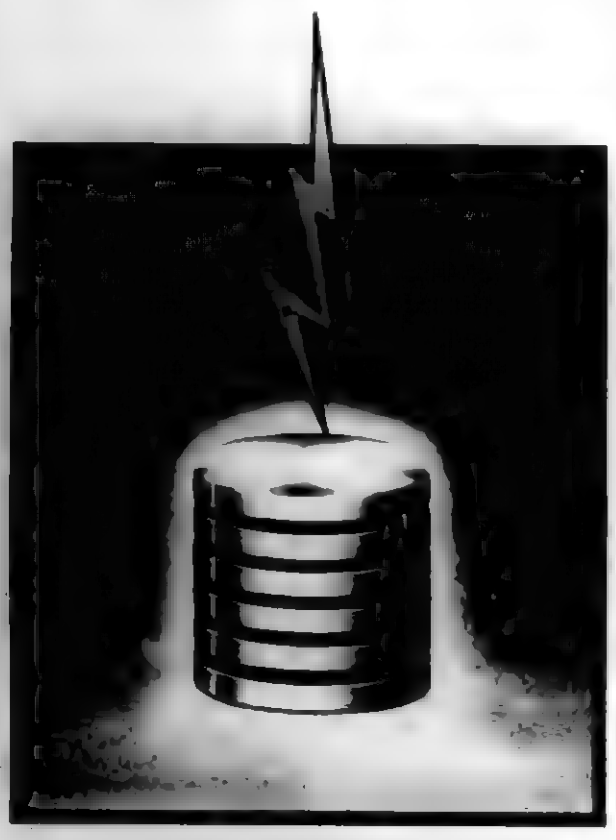

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Clinton Wilder

Services skirmishes

As in a news dispatch from a Third World border conflict, skirmishes have broken out on three different fronts in the increasingly competitive — and fascinating — professional computer services business.

As noted in this space three weeks ago, the Battle of the Big Eight continues to rage, with fired and former Arthur Young consultants jumping ship to their newly formed competitor, Technology Solutions, and Arthur Andersen decommissioning the head of its consulting practice for suspicion of planning a similar gambit.

Ten days ago, Mountainside, N.J. witnessed not so much a skirmish as the appearance of a potentially powerful new army in professional services: Nynex.

The regional Bell holding company's $273 million acquisition of AGS Computers' software and services businesses makes sense for both parties for a host of reasons.

AGS is no stranger to the telecommunications field, as it grew up by designing software and systems for AT&T's huge operations across the Garden State. For Nynex, the deal bolsters its move into professional

Continued on page 74

Qume seeking happy ending

Founder Lee regains control of offspring, hopes to challenge HP, Apple

BY ALAN ALPER
CW STAFF

SANTA CLARA, Calif. — Silicon Valley abounds with soap opera-like stories of entrepreneurs who could or couldn't, but never before has an episode aired that ends with the founding father reacquiring the company he sold a decade earlier for one-eighth the price. This installment is called "Qume Redux."

Our story begins with David S. Lee, patriarch of the daisywheel printer business. He cofounded Diablo Corp., the company that pioneered daisywheel printing, in 1969. That company was sold to Xerox Corp. in 1972.

Lee then established Qume Corp. in 1973. He built Qume into the leading daisywheel printer maker and sold the firm to ITT Corp. in 1978 for $164 million. Nine years later, ITT sold Qume to Alcatel N.V. in the Netherlands as part of a multi-billion dollar sale of its computer and telecommunications assets.

Qume's Lee

But earlier this month, Lee, now chairman of storage controller maker Data Technology, Inc., reacquired Qume from Alcatel for $20 million [CW, June 13].

The plot line for follow-on installments to "Qume Redux" gets a little hazy, industry watchers said, but one thing is certain: Qume is a ghost of its former self. Its annual revenue is at the same $70 million it reached in 1978. Before Lee sold Qume, its revenue was doubling every year. But in recent years, revenue has shrunk 50% annually, and profitability has receded far into history. Perhaps, industry observers suggested, that explains Qume's fire-sale price tag.

Lee said he is unswayed by skeptics who think he has reacquired more trouble than Qume is worth. The 51-year-old executive said he feels Qume's name and well-entrenched worldwide distribution channels make the company a bargain at almost any price.

Moreover, he said he intends to change Data Technology's name to Qume, a name that printer and controller customers can better identify.

"I always tell people, I'm very lucky," the enthusiastic Lee said of the acquisition. "Now I tell them I'm lucky again to acquire Qume."

Lee's administrative skill and business acumen will play a larger role than luck in making this acquisition work, observers said. He has already trimmed fat by reducing Qume's 800-member work force by 100 and is rene-

Continued on page 77

Data View

On the right track

The U.S. slashed its worldwide electronics trade deficit by 32% in the first quarter compared with year-earlier results but made no headway against Japan

INFORMATION PROVIDED BY THE AMERICAN ELECTRONICS ASSOCIATION
CW CHART

DOD freeze may chill computer firms' income

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — A temporary spending freeze by the U.S. Department of Defense (DOD) has defense computer vendors worried that it will affect their bottom lines if the freeze drags out to the end of the fiscal year.

Computer vendors are "holding their breath" as they wait to hear whether the freeze will last beyond June 30, while DOD computer managers are scurrying to see if they can get an exemption by justifying their purchases as mission-critical, said Eben Townes, a procurement analyst at International Data Corp.'s Washington division.

The freeze was imposed May 20 by Deputy Secretary of Defense William H. Taft IV because Pentagon spending was outpacing its budget under the Gramm-Rudman-Hollings budget law. Taft said DOD spending was $2.5 billion ahead of plan.

John A. Young, chairman and president of Hewlett-Packard Co., said at a New York security analysts meeting last week that if the spending freeze continues

Continued on page 75

Pansophic lays off 47; crash trims profits

BY JEAN S. BOZMAN
CW STAFF

OAK BROOK, Ill. — Pansophic Systems, Inc. announced last week that it has cut 47 jobs from its 1,400-member work force to trim administrative costs.

"The company has grown very rapidly," said Pansophic Chief Executive Officer David J. Eskra, "and sometimes you have to cut back a little to make sure your priorities are in line." Of the 47 jobs eliminated, 19 came through resignation or attrition and 28 were layoffs announced to the affected employees on Wednesday.

Whenever Pansophic resumes hiring, Eskra said, those 47 positions would not be replaced. The layoffs will not affect field service or product development, he added.

The layoffs do not include the June 6 resignation of Pansophic Treasurer Michael Bappert, 33, who had been with the company for eight years. Bappert resigned soon after an audit revealed he had not included a $6.3 million loss from stock market investments in the company's second-quarter report.

Pansophic had a $50 million portfolio of stock and securities that rapidly lost value during the October 1987 stock market crash. As a direct result, the company's fiscal 1988 net profits dipped below year-earlier levels by 6% to $15.7 million.

"It was supposed to be a fully hedged strategy that would buy us a better spread than Treasury [bonds]," Eskra said of the stock market investment plan, which dated back to 1983. "What happened was that mismanagement of the portfolio left us naked in the face of the Oct. 19 crash. But the loss itself is not as severe as the fact that the loss was not stated in our financial report."

A June audit brought the loss to light, but Eskra said that he could not escape some measure of blame for the error.

"The things we had depended on to control situations within the company broke down," he said. He added that Pansophic has already moved to shift its cash investments into lower-risk securities.

The stock loss caused earnings per share for the year ended April 30 to be cut from $1.09 to 84 cents per share, Eskra said. In contrast, earnings per share for Pansophic's last fiscal year were 95 cents.

Pansophic's revenue for the year was $165.3 million, an increase of 44% from last year's $114.6 million. Operating income before the stock market loss was $24.4 million, a healthy increase of 21%.

Pansophic, founded in 1969, has just finished a binge of buying up small software firms. Next year, Eskra said, Pansophic will begin to introduce software that will integrate these separate products into a seamless end-user environment. The company hopes to offer a single Telon report generator for multiple computers, including the IBM mainframe, the System/38, and the Digital Equipment Corp. VAX by 1990.

"Our goal is platform independence for our customers," Eskra said. He said he expects Pansophic's System/38 software to be able to run without change on IBM's Silverlake computer, which is set to debut tomorrow.

Eventually, Eskra said, Pansophic and other software vendors may have to tune their programs to optimize performance on Silverlake.

TV chips seen crucial to U.S.

BY JAMES A. MARTIN
CW STAFF

Television, and not trade balance talks, could provide the setting for the next major battle between U.S. and Japanese semiconductor makers.

In order to gain a foothold in the world consumer electronics market — and thus in the world semiconductor market in general — it is imperative that U.S. companies develop chips for the expected boom in High Definition Television (HDTV), analysts and trade groups said at a recent forum sponsored by the American Electronics Association (AEA).

An HDTV task force was formed at the meeting, consisting of representatives from Hewlett-Packard Co., IBM, Apple Computer, Inc. and AT&T Information Systems as well as chip makers Motorola, Inc. and National Semiconductor Corp.

"Nonparticipation in this market by the U.S. electronics industry will mean loss of our leading-edge research and, in turn, our ability to compete in the emerging global marketplace," warned Pat Hill Hubbard, AEA vice-president.

HDTV is a new generation of television, with motion picture-quality images and compact-disk-quality sound, that is already available in Japan. Observers say the chip market for HDTV could be several billion dollars a year by the mid-1990s, and that the U.S. semiconductor industry must start working now to ensure that it obtains a strong share of the HDTV market and, thus, regains its worldwide competitive edge.

The participation by computer makers such as HP and IBM in the consumer electronics marketplace is minimal at best, analysts say. But interest is growing in regard to the potentially lucrative HDTV market.

"We follow many technologies that are not directly related to our businesses," explained Barry Bronson, manager of technology communications at HP's Palo Alto, Calif., laboratories. "There is some general interest in seeing where the technology is going and what opportunities may be available to us."

HDTV technology could bring breakthroughs in engineering and graphics workstation displays, Bronson added. "We are always trying to take advantage of the best technologies available, and HDTV represents a leading-edge display that could help to drive workstation display technology."

Bronson would not comment on HP's level of interest in entering the consumer electronics market.

HDTV is an opportunity not only to strengthen the American semiconductor industry but to increase the export levels to Japan, according to Drew Peck, a computer industry analyst for Donaldson, Lufkin & Jenrette, Inc. in New York.

Wilder

CONTINUED FROM PAGE 73

services, which began last year with the acquisition of Business Intelligence Services in the UK.

But the third current battlefront may be the most explosive of all. Electronic Data Systems founder H. Ross Perot, no stranger to real Third World skirmishes himself, fired a salvo directly at the heart of EDS's federal government business with the formation of Perot Systems Corp. [CW, June 6].

EDS moved quickly to defend its flank last week, giving its Government Systems Group its own head, EDS Senior Vice-President Stuart Reeves. The group has shared its leader, Senior Vice-President Paul Chiapparone, with EDS's General Motors business — clearly a handful in and of itself — since November.

An EDS spokesman admitted that the formation of Perot Systems, and its hiring of some 20 former EDS government systems employees, spurred EDS's executive appointments in Government Systems. "I think it probably speeded the decision," he said.

Meanwhile, Nynex certainly represents the proverbial deep-pocketed parent. And professional services — consulting, systems integration, custom software development — may well turn out to be the hottest market for the big players of the 1990s.

Companies like AGS, Computer Task Group and a slew of smaller colleagues were once scorned as "body shops" for hired-gun application development. Now all of those firms could represent significant acquisition value to large companies scrambling to jump aboard the systems consulting bandwagon.

Nynex clearly wants to play in the big leagues in the next several years, when large corporate MIS organizations appear willing to pay for outside help in designing strategic, mission-critical systems for competitive advantage. With those big bucks at stake, some key consultants at both Arthur Young and Arthur Andersen are also getting antsy about getting a piece of that action for themselves.

And exactly one day after his 18-month noncompete pact with General Motors ended, Ross Perot let the services industry know that it wouldn't have a real battle on its hands unless he was in there somewhere.

Wilder is Computerworld's senior editor, computer industry.

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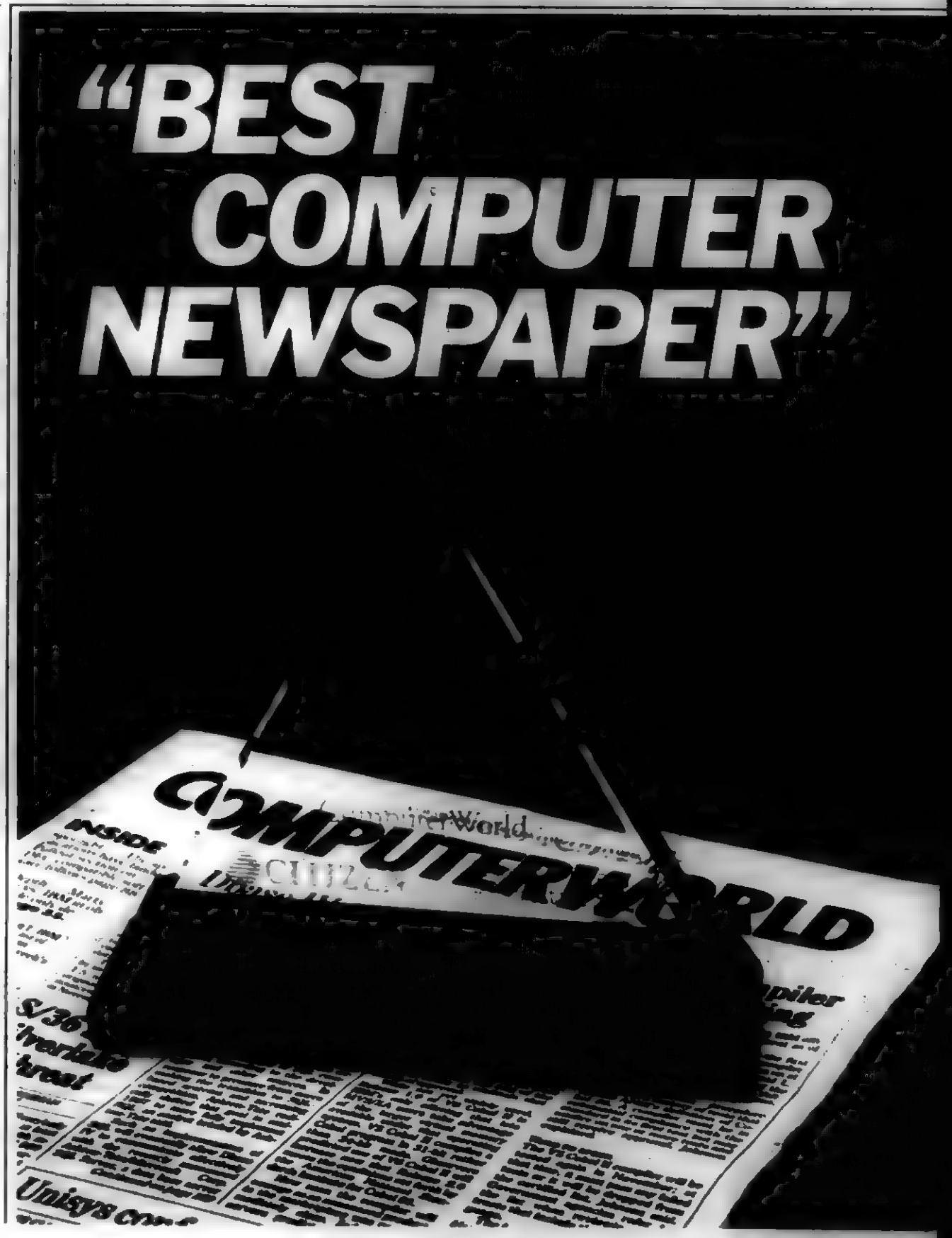

HP says Spectrum financial payoff delayed

BY ALAN ALPER
CW STAFF

NEW YORK — Recent enhancements to Hewlett-Packard Co.'s Spectrum family of reduced instruction set computing (RISC)-based systems are not expected to pay dividends until later in the year, when Version 1.1 of the MPE XL operating system is adopted by a large percentage of the company's installed base.

That pronouncement, made by HP executives at a semiannual meeting with security analysts here last week, was the corporate explanation for soft second-quarter demand for the key product family. Anticipation of new Spectrum family members, which are said to offer dramatic price-performance advantages over comparable Digital Equipment Corp. and IBM machines [CW, April 11], may have caused resellers and end users to delay purchases, said Douglas Chance, HP's executive vice-president of business systems.

HP customers may have also delayed hardware purchases in anticipation of MPE XL Version 1.1, which started shipping to key accounts and software vendors earlier this month and is said to offer major bug fixes and drastic performance improvements over the previous release. Since most users will not be exposed to the new version until the firm's user conference in Orlando, Fla., in August, Chance does not expect orders for RISC-based systems in the HP 3000 series to pick up until the fourth quarter ending Oct. 31.

"We expect big orders then, excluding economic factors," he noted after the meeting.

HP's commercial marketing efforts for Spectrum focus on converting the company's installed base to its Precision Architecture and generating interest among software developers and systems integrators, noted John Young, HP's chairman. "We have a number of big deals that we're in the middle of," he said. "The momentum is building."

HP, which has spent some $500 million on Spectrum over the last five years, is counting on the family to keep its customers in the fold and eventually dislodge business from DEC and IBM. Spectrum, though, has been plagued by hardware and software delays and customer reluctance to invest time and energy in converting applications from HP's standard computing architecture to RISC.

Results lauded

Excluding Spectrum, Young and other HP executives provided analysts with a glowing assessment of the Palo Alto, Calif., firm's first-half results. HP's international business was stronger than domestic results during the period because of the decline in the value of the dollar. Overseas sales now comprise 50% of the company's revenue, Young said.

European demand for Unix-based systems and microcomputers was strong during the period, Young noted. HP is now the third largest microcomputer vendor in Europe, ahead of Compaq Computer Corp., and the second largest in France, behind Apple Computer, Inc., he added.

Young remains optimistic regarding business prospects for the second half of the year. His upbeat assessment comes despite a continuing memory-chip shortage that forced the company to postpone for four to six months delivery of its latest Intel Corp. 80386-based machine, and a recent action by the U.S. Department of Defense to freeze all purchases until at least July 1.

Freeze

CONTINUED FROM PAGE 73

to Sept. 30, "it could have a significant impact on our business."

In addition to reducing HP sales to DOD, Young said, an extended freeze could harm the aerospace and defense contractors that are significant HP customers. He said 8% of HP's revenues came from the federal government in fiscal 1987.

Fred Bedard, manager of hardware products at Data General Corp.'s Federal Systems Division, said DOD computer managers are frustrated by the uncertainty and the need to defer their purchases.

The spending freeze will hurt vendors if it extends to Sept. 30, Bedard pointed out, because agencies typically spend a large part of their budgets at the end of the year.

The Taft memo said the freeze covers, among other things, personal computers, software development, office automation and other forms of information technology. Payments under existing contracts are not affected.

L. Douglas Lee, a defense analyst at the Washington Analysis Corp., said the freeze is likely to be extended beyond June 30 because the DOD budget problem will not "magically disappear" and may get worse.

The DOD is under intense pressure to meet its budget target so it can avoid being hit with across-the-board budget cuts mandated by the Gramm-Rudman-Hollings spending law.

Mid-Atlantic correspondent Alexi Alper contributed to this story.

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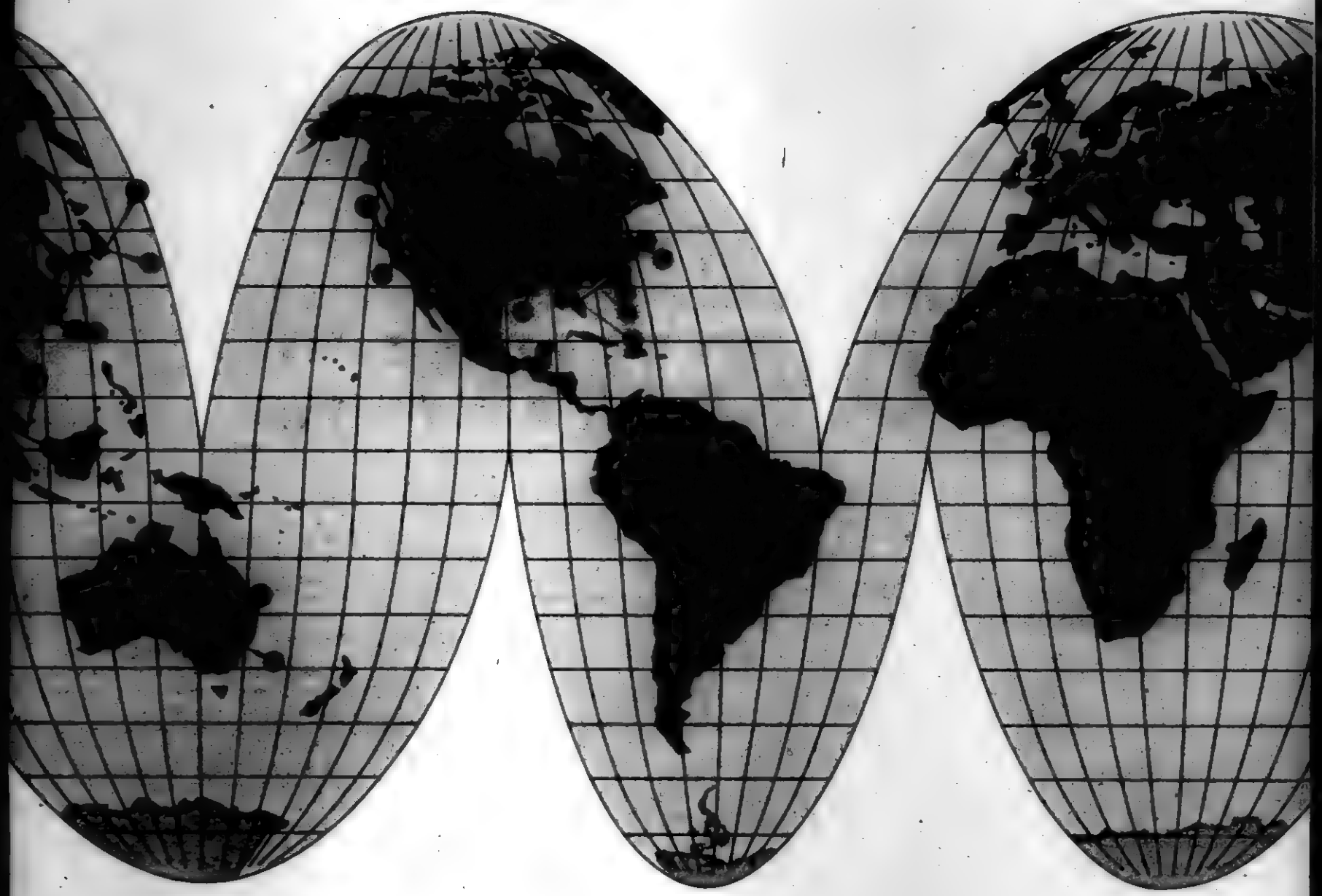

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INDUSTRY WEEK IN BRIEF

A new home and a new name are likely in the offing for Honeywell Bull next year. The mainframe and mid-range systems maker said last week it will move its corporate headquarters from Minneapolis to Billerica, Mass. If Honeywell, Inc. exercises its option at the end of the year to reduce its ownership to 19%, as expected, Honeywell Bull will likely remove "Honeywell" from the name, a spokeswoman said.

Gartner Group, Inc. is seeking a potential buyer. The Stamford, Conn.-based market research and consulting firm, founded in 1979, had revenues of about $40 million in its last fiscal year. British advertising and consulting firm Saatchi & Saatchi Co. has been referred to be a potential suitor, although Gartner declined specific comment.

Shares of Phoenix Technologies Ltd. have gone on the market for an initial public offering price of $15 per share. More than three million shares of the Norwood, Mass., software compatibility products developer will be available in the offering.

Microcomputer mail-order house Logic Soft, Inc. in Farmingdale, N.Y., has filed for Chapter 11 bankruptcy protection. Among its listed creditors are Ashton-Tate Corp., Lotus Development Corp. and Kraft Data Systems.

Atari Corp. announced an out-of-court settlement of its lawsuit against memory chip maker Micron Technology, Inc. Terms were not disclosed. Atari had accused Micron of breaking contracts by raising memory chip prices.

Possibly fueling speculation about a potential acquisition of NCR Corp. (CW, June 13), Unisys Corp. announced that it intends to raise $300 million through a debt offering of 10-year notes.

Sun Microsystems, Inc. has been awarded more than $1 million in damages in its suit against memory board maker LCF International, Inc. and Custom Memory Systems, Inc. on charges of misappropriation of trade secrets. Mountain View, Calif.-based Sun claimed a confidential memorandum of agreement it signed in 1986 with LCF was illegally copied for the purpose of designing and manufacturing a Sun-compatible memory board.

The major financial backers of the ailing Information Science Systems, Inc. have given the company at least a two-month moratorium on repaying several loans. The Mountain View, Calif.-based storage device maker recently reported a quarterly net loss of $6.3 million on $4.9 million in revenues. The backers to call the creditors.

Qume

CONTINUED FROM PAGE 73

seeing Qume's continuation as a supplier of various types of printers and terminals.

Lee said Qume will emphasize laser printers and de-emphasize daisywheels, the product on which it built its reputation. Analysts say such a strategy could pay off — other than captive supplier Apple Computer, Inc. and market leader Hewlett-Packard Co., no other firm has emerged as a formidable competitor.

A niche to be filled

"No one else has done anything significant except those two companies," said Bill Frank, an analyst at Infocorp in Cupertino, Calif. "There's an opening for another player, but to succeed, you have to do something unique."

One advantage Qume has is the fact that it manufactures its own printer controllers. Packaging Data Technology's controllers and low-cost Casio Ltd. print engines under the Qume name will give his company not only a price advantage but also the name recognition the company needs to compete, Lee said.

Lee is game for the challenge. He has already revitalized Data Technology, which was the No. 5 storage controller supplier when he took over 2½ years ago and is now No. 2, Lee claimed. The 8-year-old company did $100 million in business last year, twice what it chalked up in 1986.

Lee is also reassessing Qume's participation in the terminals business. The one-time No. 2 ASCII terminals vendor has sunk to the second tier, Lee said, and a retrenchment may be near.

"People know us as a printer company, and with a company like Wyse dominating the [terminals] business, it's hard to do much," he said.

An energetic, bubbling executive, Lee has always attracted a good management team wherever he worked. Observers contended that Lee will have to lure a new cast of managers if he is to succeed in resuscitating Qume.

"It's the leader is him, the man with a vision, that will make all this work," said Bhanu Bhattacali, an analyst at Dataquest, Inc. in San Jose, Calif.

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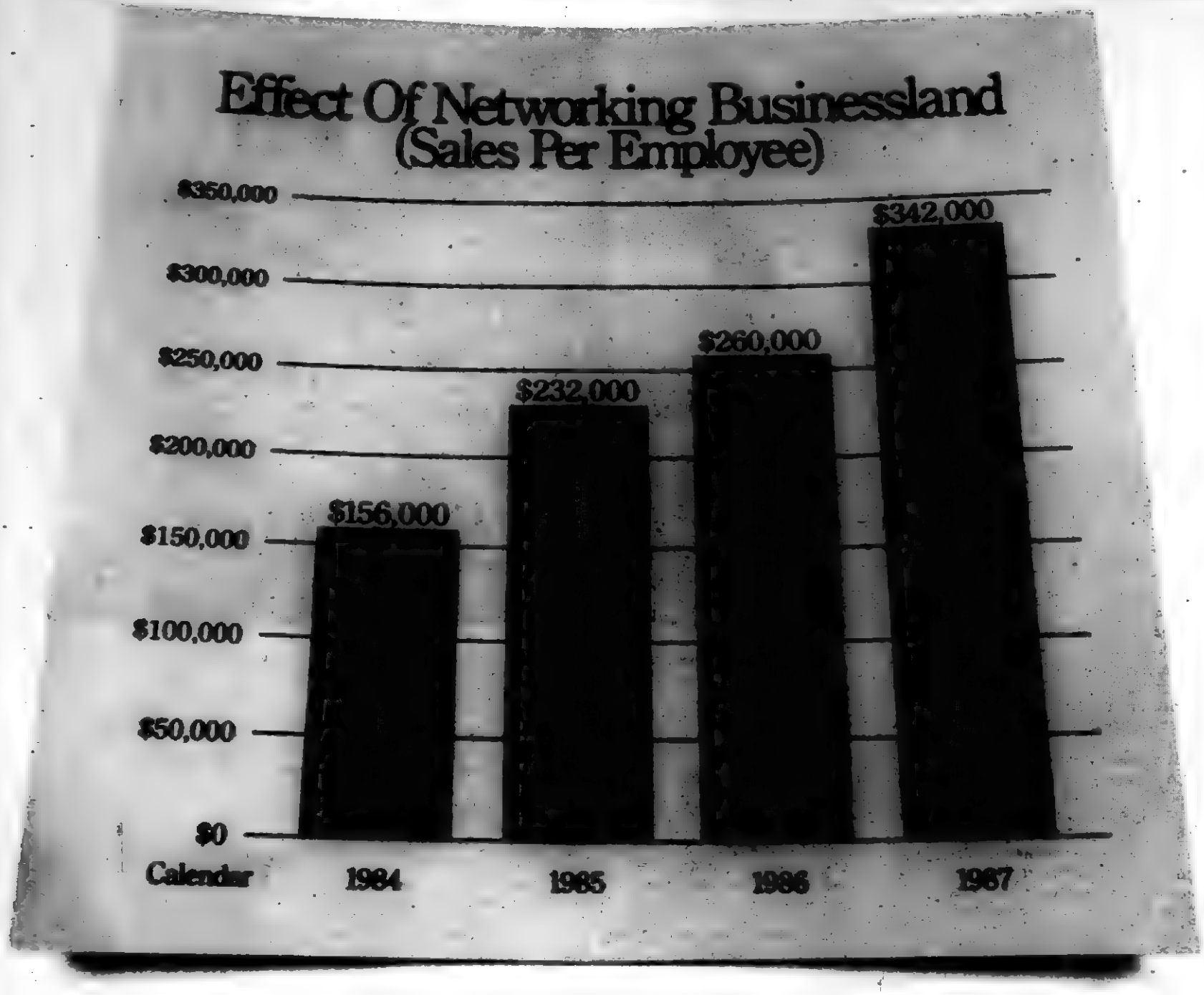

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COMPUTER CAREERS

Contract work: Risk vs. reward

Independents' earnings can be impressive but irregular

BY DAVID A. LUDLUM
CW STAFF

The party is over for those with a casual urge to be an independent computer programmer or data processing consultant. Tax law changes that took effect last year have eliminated opportunities for technical professionals to take on their own contract jobs without assuming the risk or overhead of running a business.

But for those willing to face that risk, to keep books and to sell clients on their services, it is still possible to work as an independent programmer or consultant. For others, the option of working for a technical services firm offers some of the attractions — and some of the drawbacks — of independence.

Section 1706 of the Tax Reform Act of 1986 drastically restricted opportunities for an individual to sell technical services as a contractor instead of facing the commitment and withholding taxes of an employee.

Section 1706 denies technical professionals the "safe harbor" that currently shields most other contractors from the common law standards that the IRS uses to classify taxpayers as employees or contractors. That means that in fields such as computer programming and DP consulting, an individual or company reporting income as a contractor is required to operate as a truly independent business — serving various clients, assuming risk and controlling the work.

Many former contractors who failed to meet Section 1706's new standards have become employees of technical services firms.

Skills and bodies

Companies generally use independent contractors or technical service firms on software development projects to secure skills that the permanent staff lacks or when they must build up the staff for a limited time. A contractor's assignment typically lasts three to six months, although they may range from less than a month to more than a year.

Market research firm International Data Corp. (IDC) in Framingham, Mass. expects the demand for contract systems development services to increase about 20% a year in the next five years. Much of the demand will stem from a growing willingness of companies to contract out complex chores such as system design and project management in conjunction with systems integration projects, according to Karen Kugel, IDC's program manager for computer services.

The two big attractions of working in contract jobs are the prospect of making more money than a comparable employee might earn and the ability to broaden one's horizons by moving among workplaces.

An independent contractor has the potential to make more than twice as much as a similarly knowledgeable salaried worker employed by his client, depending on the demand for his specific skills, according to Bill Ek, an independent contractor based in Los Angeles.

But the fatter paychecks reflect the reality that income might not be steady, both for independents and employees of technical services firms.

"It is a risk-oriented position in that nothing is guaranteed," said Daniel Sierra, director of contracts at Kenda Systems, Inc. in Salem, N.H., which does DP contract work with employees and also places independents in contract projects. "You could be out of work one or two months of the year. If you're not a good financial planner, you could be caught in a bind," he added.

Furthermore, independent contractors do not receive benefits such as disability and health insurance. Some technical services firms hire and provide workers with full benefits, while others treat workers as temporary employees and provide few extras beyond basic pay.

The savvy independent who does well financially still faces a host of other challenges. He must take care of administrative chores and market his services. "Anyone who is shy or reluctant to use personal contacts to get business is not going to make it," Ek said. "You can't be shy about getting someone on the horn and chatting about 'what I can do for your company.' "

Personality counts

Even salaried workers taking on contract jobs need some of this gift of gab to move from project to project, Sierra said. "Some people do not have the polish or a sterling ability to interview," he said.

Contract work can also mean being treated as an outsider. "You're a little bit isolated from the peers you work with," said Harry Tate, senior systems engineer working for technical services firm Computer Task Group, Inc. in Atlanta. "There are some things you don't have access to that a normal employee would — social activities, the softball league, company picnics," Tate said.

Sierra also noted that contract workers must get up to speed on a project quickly and that they lack a career path.

Ludlum is a Computerworld senior writer.

Contract expansion

Worldwide revenue for contract systems design and programming by U.S. professional services vendors is projected to grow 20% annually*

*Includes services for system development and implementation and data processing; excluding custom or contract software projects represent the major portion of the revenue.

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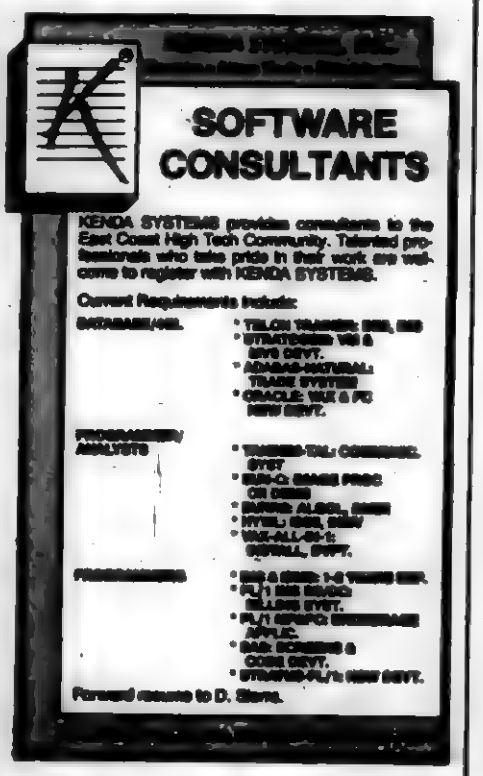

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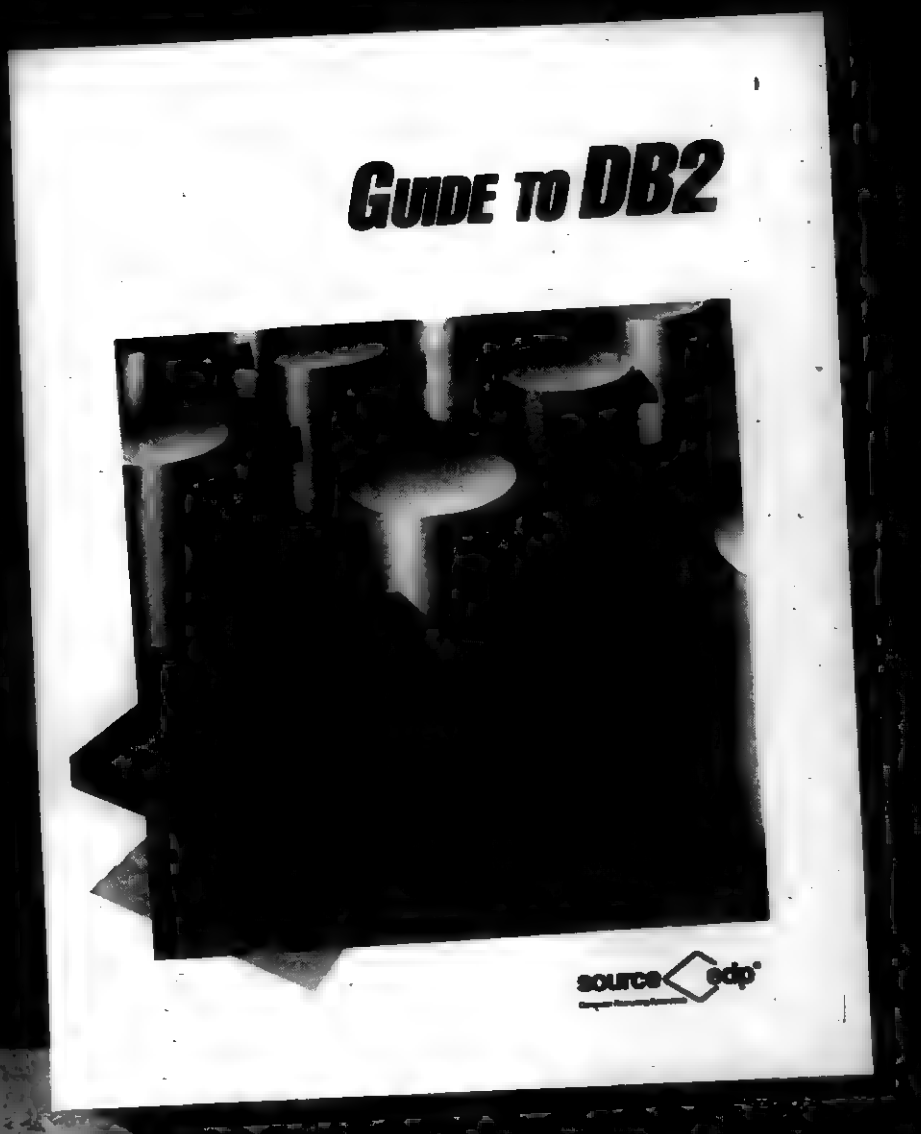

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Our data processing organization plays an integral role in our worldwide scope, and our current openings for IS professionals provide the opportunity to make important contributions to complex projects.

We have a few senior-level positions available that require eight or more years data processing experience. For two positions, prefer one plus year of marketing or sales experience. Additionally, candidates must possess the following qualifications:

- Bachelor's degree
- Experience in design, planning, management and implementation of information systems
- Extensive experience in the development of computer applications and the evaluation/selection of software packages
- Knowledge of various systems analysis techniques and familiarity with various programming languages, especially COBOL and Fourth Generation languages
- Track record of success in system design and project management
- Strong management/supervisory, planning and analytical skills
- Excellent oral and written communication skills

For confidential consideration, please send resume with salary requirements to: Corporate Headquarters/Employment, The Coca-Cola Company, P.O. Drawer 1734, Atlanta, GA 30301. An Equal Opportunity Employer.

SOFTWARE OPPORTUNITIES

CORNELL UNIVERSITY NATIONAL SUPERCOMPUTER FACILITY

Professional Opportunities in Advanced Scientific and Research Computing

The CORNELL THEORY CENTER, a major multidisciplinary research center devoted to the advancement of large-scale computing and a leader in parallel processing, is seeking computing professionals to fill positions in its SUPERCOMPUTER FACILITY (CNSF). Minimum requirements are: BS degree, MS preferred, 3-5 years mainframe programming experience including IBM VM/CMS and FORTRAN, scientific computing. Positions include:

- Parallel Systems Software Engineer
- Scientific Applications Analyst
- Workstation Support Specialist
- Technical Consultants/User Support
- Scientific Software Analyst
- Graphics Consultants

Additional consideration will be given to candidates who possess the following:

- advanced degree in a scientific discipline
- familiarity with parallel processing environments
- UNIX, C experience
- knowledge of numerical techniques and computational science
- workstation/mainframe graphics experience

Please submit cover letters and resumes to: Judith Baker, Staffing Services, Dept. TC-CW, CORNELL UNIVERSITY, 160 Day Hall, Ithaca, NY 14853.

CORNELL THEORY CENTER

Applicants must meet employment eligibility requirements in accordance with the Immigration Reform and Control Act of 1986.

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$2 BILLION IN SALES. AND THAT'S JUST THE BEGINNING.

(Opportunities in Phoenix)

Built on the established strengths of Honeywell Information Systems, joined in a unique transnational partnership with the expertise of France's Compagnie des Machines Bull and NEC Corporation of Japan. An important, dynamic presence in the national and international marketplaces: Honeywell Bull.

Yes, we've established a record of success. But now we're pledged to creating even more effective systems solutions. Even stronger leadership. An even more exciting environment for motivated professionals like you.

Experience the exhilaration of a computer start-up that's off and running. Begin working with Honeywell Bull in Phoenix.

Principal Engineers

Four positions are currently available. Successful candidates for two will assume responsibility for technical support, quality resolutions and improvement recommendations regarding manufacturing systems, in addition to product development and marketing. Experience with the maintenance of large development production program libraries, as well as TSS, GCOS8, IDS/II, DMIV-TP/TP8, and COBOL 74 are required, as are excellent communication skills and strong documentation experience. Exposure to *UNIX*® and "C" is desirable.

As a Principal Engineer in one of the remaining positions, you will be responsible for analyzing, designing, programming and testing on a major software application project, including quality and design performance, and some technical and functional leadership. Background of 5 years' IDS/II or similar database as well as DMIV-TP is required. A minimum of 3 years' experience in software development and state-of-the-art system design is necessary. Some leadership experience is preferred.

Manager Applications Development

Direct, administer and review our major application system design and development organization. The systems involve highly complex functions applied to discreet manufacturing needs, designed in response to our customers' functional requirements. You will be accountable for contributing to the planning and implementation of future system design and development. To qualify, you will need experience in several of the following areas: shop floor control, factory data collection, time and attendance, and work-in-process, and a minimum of 5 years' experience managing large applications development projects. Additionally, we require 5+ years' experience in state-of-the-art design and development techniques including 3-5 years' with DPS6 and MOD 400 operating systems and applications, structured design, *UNIX*, "C", and fourth-generation reporting languages.

Senior Software Engineer

Responsibilities include analyzing, designing, programming and testing with some technical leadership, for a major software development project. This involves conformance to requirements and satisfaction of established schedules. Position requires 5 years' IDS/II or similar database, TDS (DPS7) or DMIV/TP as well as 2 years' experience in software development related to manufacturing.

Senior Software Engineer

Document, program and test applications on a large-scale MRP II system solution, with responsibility for producing quality software in compliance with design requirements. To qualify, you must have 3-5 years' experience with COBOL 74, IDS/II, DMIV-TP and/or TP8 in developing, maintaining, and converting applications systems. "TSM" and a background in structured design is preferred.

Project Leader Large-Scale

Contribute to the development and maintenance of large-scale manufacturing operations by providing detailed knowledge, support, and consultation to application developers as well as assisting in the certification of all applications on DPS7 and DPS8 software and hardware. You will also identify, develop, and acquire tools to facilitate application development and maintenance. To succeed, you will need a strong working knowledge of GCOS8, IDS/II, DMIV-TP or TP8, and 8-10 years in software and applications development, integrity control and testing. Strong knowledge of manufacturing operations is required.

Call Us 24 Hours a Day
1-800-[illegible]
for Recorded Information

Or, send your resume and salary history, in confidence, to: Mark Iorio, MS 39-517, Honeywell Bull, 200 Smith Street, Waltham, MA 02154. An Equal Opportunity Employer.

UNIX is a registered trademark of AT&T Bell Laboratories.

Honeywell Bull

System Analysts

Boeing Computer Services, a division of Boeing, is working on some of today's most exciting leading-edge concepts in high technology and major information systems.

And we need the best and the brightest people to help us chart the future with imagination, innovation and new ideas.

Right now, we have outstanding opportunities for analysts with the experience to meet our requirements.

Here's What It Takes

These positions require 2+ years of capacity and/or performance tuning capabilities.

Analyst: MVS/XA, TSO and JES3 experience with RMF and SMF and working knowledge of tuning parameters and performance related OS commands required. IMS, DB2, CICS, CADAM, CATIA, GTF data, Omegamon, DASDOM, IMS commands with workload analysis and configuration planning experience is desired.

Analyst: With VMMAP and SMART required with workload analysis and capacity planning desired.

Here Are The Benefits

Because we are an industry leader, we can offer you the right salary, comprehensive benefits and challenging assignments within a unique climate for achievement.

And we can offer you something else, too — a lifestyle in the Puget Sound area of the Pacific Northwest — near Seattle — that's hard, if not impossible to beat.

Write Today

If your talent and our requirements are a match, please send your resume, with present and expected salary, to *Boeing Employment Office, P.O. Box 3707-PMX, Seattle, WA 98124.* No agencies, please.

We are an equal opportunity employer.

Boeing hires only U.S. citizens and lawfully authorized alien workers. You'll be required to provide proof of identity and authorization to work in the U.S.

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Cleveland, OH 216-771-6822	**Manchester, NH** 603-647-0200	**Raleigh, NC** 919-878-4454	**Wayne, PA** 215-687-6107
Columbus, OH 614-221-7077	**Memphis, TN** 901-685-8300	**Richmond, VA** 804-644-0196	**Wellesley Hills, MA** 617-239-0900
Costa Mesa, CA 714-850-0788	**Milford, CT** 203-877-7545	**Rochester, NY** 716-232-4610	**Wilmington, DE** 302-658-6181
			Winston-Salem, NC 919-725-1993

ROMAC

All Romac offices are independently owned and operated.

SENIOR ACP/TPF

APPLICATIONS ENGINEER

Senior ACP/TPF Applications Engineer required. Will manage a project team in the development of reservisional systems and upgrade of existing computer systems to handle airline, hotel, car rental and reservations products. Responsible for project team output of all analysis design, coding, testing, documentation, implementation and supporting of various application development efforts. Develop project team members by identifying training needs and conducting periodic performance management system reviews. Interface with marketing in a professional and tactful manner to determine customer needs and provide timely and efficient products to meet those needs. Supervise group of 10-15 analysts.

Applicant required to have B.S. Degree in Computer Science, Math or Engineering plus 4 years experience as an ACP/TPF Systems Analysts. Education and experience will be found acceptable if applicant has a combination of education and experience found to be equivalent to a B.S. Degree including at least 4 years experience as an ACP/TPF Systems Analyst.

Salary will be $48,000.00/year for a 40 hour work week.

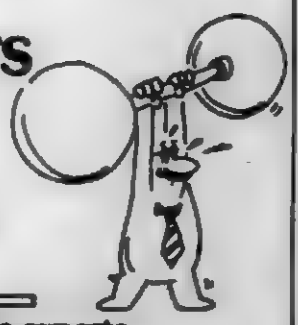
Interested applicants apply at the Texas Employment Commission, Dallas, Texas, or send resume to the Texas Employment Commission, TEC Building, Austin, Texas 78778-0001. J.O. number 6188174. An Field by an Equal Employment Opportunity Employer.

RESEARCH STAFF MEMBER (Westchester Cty, NY): Conduct research on design & implement of new-generation of computer algebra systems which adopt & dvlp modern programming language technology to solve long standing problems in computer algebra. Design & dvlp compiler for an abstract data type language, to interact w/ end-ext application of such a system to mathematicians, physicists & engr's, in design, implementation, & testing of algorithms for parallel construction computer algebraic techs & in design & implementation of interpreters & user-interfaces for computer algebra. PhD in Comp Sci + 1 yr in job or 1 yr as resch/dvlpng asst in computer algebra techs reqd. 1 yr dvlp must incl design of algorithms for computer algebra, computer algebra system design, compiler design-abstract data types & language design. Must have published on relevant topics. Resch/dvlpng emp may be obtained at grad or post-doc level. 40 hrs/wk; 8:30 - 5:13pm; $59,500/yr; EOE. Send res of letter only to: PI, dvlpng qualifications to: PI/R #388, Rm 601, 1 Main St, Elmpt, NY 11201.

Data Processing Consulting

GREAT CONSULTANTS ARE MADE NOT BORN!

HERE'S HOW WE DO IT!



SEI builds experts. We build them by:

- Having them work alongside senior SEI consultants, nationally recognized authorities in such areas as Data Base Management, Distributed Processing, Industrial Automation and Robotics, Networking, Communications, and Hardware and System Software Development.
- Assigning them to demanding, challenging projects that cover the range of planning and development activities for system and application software on mainframes, minis, and micros. SEI builds the basic product delivery systems through which our clients conduct their businesses.
- Providing opportunities to represent SEI on technical and standards committees that set directions for the industry.

Talent is Required, Of Course!

There are some important abilities you need to start with. SEI's consultants are characterized by general good sense, good technical backgrounds, and an attitude that the next challenge could be even better than the current one.

We look for people who work hard, are eager to learn, are serious about their careers, and who enjoy the variety and challenge of Project-Oriented Consulting. (For more about Project-Oriented Consulting, see our message on the previous page.)

Interested? If YOU'VE got what it takes to become a STAR, send a resume and salary history to:

SEI Information Technology
Attn: Phyllis Appel, Recruiting Coordinator
450 East Ohio Street
Chicago, Illinois 60611

SEI information technology
THE BUSINESS OF TECHNOLOGY

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(Continued on Next Page)

PERMANENT AND/OR CONSULTING POSITIONS

DEC

- Programmers–VAX, VMS, BASIC, banking experience a +

IBM

- Prog'rs-FOCUS experience necessary
- Comtrun Spec.-CICS, TCAM

HONEYWELL

- Prog'rs-GMAP, GCOS, 3 or 8

Please call 212-594-3660
Or Submit Resume To:

HANK WALSH ASSOCIATES
475 Fifth Ave, NY, NY 10017

1000 DP Opportunities

Corporate Personnel Consultants

Florida Informanagement Services, Inc., a leading financial data processing center, is currently accepting applications for the following positions:

PROGRAMMER/ANALYST
Loan Applications

Loan experience, preferably in secondary mortgage market, and 4 plus years COBOL experience in a large mainframe environment, especially UNISYS is preferred, along with the ability to set high quality standards in your work.

SYSTEMS ANALYST
Loans

4 plus years experience in analysis design or programming in the financial industry required. Project management skills and specialized knowledge of mortgage banking and investor accounting a plus. Knowledge of loan concepts is required.

Four year degree in computer science or related field is preferred.

We offer competitive salaries including 401(K) profit sharing; excellent benefits package with vision, dental, and fully paid dependent medical. Send resume and salary history in confidence to:

FLORIDA

FLORIDA INFORMANAGEMENT SERVICES, INC.
Attn: Human Resources
P.O. Box 1547
Orlando, FL 32802

INFORMANAGEMENT SERVICES, INC

Equal Opportunity Employer M/F/H

SCIENTIFIC PROGRAMMER ANALYST

This position requires a BS in Computer Science or in a scientific discipline with 3 to 6 years experience as a programmer analyst using Fortran in a laboratory environment. Experience with XP1600 (RTEA, CALS) IBM PC, IBM 3081 and Focus highly desired.

We are a Johnson & Johnson Company and a leading manufacturer of over-the-counter pharmaceuticals. Our modern facility is conveniently located in a pleasant Philadelphia suburb and we provide a competitive salary and benefit package as well as potential for continued professional growth. For prompt consideration, forward your resume with salary history and requirements, in confidence, to Joe Cohn, Sr. Personnel Administrator.

McNEIL CONSUMER PRODUCTS COMPANY
Camp Hill Road
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UNISYS

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Manage a staff of 75-100 operations personnel in state-of-the-art env. Req'd is 5 + yrs strong mgmt skills, 3 + yrs network mgmt plus IBM bkgd and exp in on-line. Exceptional sr. level position with central Conn client. Full relo: + bonus will make 1st yr earnings $80-100K. Base salary $65-$80,000.

DATA BASE ADMINISTRATOR
Manage the start-up of a new DB area. Eval, select and manage the install of new DB software. This is a sr level pos'n. Req'd is exp with 4GL DB (ORACLE, DB2) or strong bkgd with IMS/VSMS/ADR. Excell growth potential. Paid relo. Salary $48-$53,000.

MANUFACTURING SYST. CONSULTANT
Join growing M.E. data center as a sr level consultant. Install new software products in DEC/VAX environ. Process are ASK/MANMAN, APICS exp with MRP, shop floor control, quality control, order mgmt systems -- financial bkgd. Salary+ bon fac. Salary $42-$50,000. +

BUFFALO, NY 14202 (716) 842-6601
420 Main Street, 7112 Liberty Building

RPG III ANALYST PROGRAMMER
Fast paced upstate New York manufacturing firm needs senior analyst programmer for growing S/38 department. Prefer minimum 2 years experience plus knowledge of manufacturing. Outstanding career growth in stable company. To $35,000.

D.P. MANAGER
Large process manufacturer in a scenic, small Western New York community needs a D.P. Mgr for their DOS/VSE COBOL/RPG dept. Manage department of 10. Requires BA/BS degree + shirt-sleeve technical orientation. Very stable company offers career opportunity in excellent living area. To $50,000.

CHARLOTTE, NC 28244 (704) 358-0000
1305 Charlotte Plaza

ADABAS/NATURAL
Fortune 500 co. seeks sup'd prog/anal with 2 + yrs ADABAS exp in an IBM env. State-of-the-art shop. Will work on dev of on-line (CICS) DB systems fin'l, sales, marketing or distribution appl'ns exp a plus. Many benefits. Salary to $37,000.

LOUISVILLE, KY 40205 (502) 459-4283
9300 Shelbyville Lane

SYSTEMS PROGRAMMER
Excellent Kentucky company seeking professional with 3 + yrs system programming experience in an IBM Main-frame, MVS environment. Salary to $38,000.

PROGRAMMER ANALYST
Local company looking for individual with 3 + years on-line IBM Main-frame programming and Database background a plus. Salary to $35,000.

ROBERT HALF
DATA PROCESSING
PERSONNEL SPECIALISTS

Contact Manager at office listed above. Client Companies Assume All Fees.

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Talent is more than natural ability. It is a combination of inherent aptitude, motivation, discipline and follow through. It is an attitude.

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A DIVISION OF MANAGEMENT SCIENCES

Engineers:

Our environment enhances craftsmanship

At Allen-Bradley, our success depends on the quality craftsmanship that goes into our breakthrough industrial communications products.

Allen-Bradley offers a progressive environment featuring state-of-the-art equipment, career development opportunities and the respect and recognition committed professionals deserve. Right now, we have a variety of engineering positions available.

We are looking for hardware and software engineers with a BSEE or BSCS and 1 to 5 years' experience. Backgrounds in the 68000 family, Ethernet, 802.3, 802.4, MAP, Intel 8086/8088, LAN, IBM PC, MS-DOS, OS/2, VAX/VMS, "C" and assembler languages, data communications, realtime communication applications, a strong microprocessor base and communication networking are preferred.

Several senior and staff level engineer openings exist in the areas of:

Computer Interface Products
Bridges, Routers and Gateways
Terminal & Work Stations
Network Management Systems
Industrial Interface Development

We can offer competitive compensation and benefits including an excellent relocation program. Our work atmosphere allows you to organize your own time and set your own goals. For consideration, please send your resume to: Linda Sachs, Allen-Bradley Communication Division, Dept. CW620, 555 Briarwood Circle, Ann Arbor, MI 48108.

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AB ALLEN-BRADLEY
A ROCKWELL INTERNATIONAL COMPANY

VAX LEAD COVERAGE SYSTEMS ANALYST

VAX LEAD COVERAGE SYSTEMS ANALYST required. Responsible for development, installation, monitoring and analysis of SABRE System including communications software and protocols to provide connectivity to outside data processing systems and to interface with public and private networks. Monitors and tailors operating system parameters in VMS environment. Functions as a project leader and/or technical leader as necessary for group of 3-5 VAX analysts. Provides technical training and guidance to less senior systems analysts and programmers in the group. Provides technical expertise in the area of VMS/VAX communications software.

Applicant required to have B.S. Degree in Computer Science, Math or Engineering plus 2 years experience in VMS Operating Environment as Engineer or Systems Analyst. Experience must include prior use of one or more fourth generation programming languages.

Salary will be $57,600.00 per year for a 40 hour work week.

Interested applicants apply at the Texas Employment Commission, Dallas, Texas, or send resume to the Texas Employment Commission, TEC Building, Austin, TX 78778-0001 J.O. #5135178. This advertisement was paid by an Equal Opportunity Employment Employer.

SOFTWARE DEVELOPER: Full-time position to work for MIS development firm located in Central Ohio. Work Schedule: 8:00 A.M. to 5:00 P.M. Position involves design, development, and testing of conversion software to enable portability of BASIS on selected operating systems and hardware. Qualified individual must have an M.S. in CIS or electrical and computer engineering or electrical engineering. Must also have a minimum of six months of experience in position offered or related occupation (software developer). Must have successfully completed a conversion of a text information management system, including development of directory sections, in a multi-lingual environment. Must have written 7500 lines of CYBIL on NOS/VE. Must have taken 60 graduate-level course(s) requiring software development projects in connection with an aggregate of at least three different operating systems. Must have written 1500 lines of FORTRAN. Must have proficiency in file manipulation by successfully completing a graduate-level course in computer system design requiring completion of a file manipulation project. Above requirements may have been gained concurrently and/or as part of one position. Salary $34,517 to $37,100 per year based on qualifications. Send Resume to R. Lasher, JO# 3046979, Ohio Bureau of Employment Services, P.O. Box 1618, Columbus, Ohio 43216.

AN EQUAL OPPORTUNITY EMPLOYER

POSITIONS AVAILABLE

U.S. Department of Energy - The ADP Services Staff of the Energy Information Administration (EIA) has two computer specialists positions available.

Computer Specialist (Systems Programmer), Announcement 88-EI-169. A seasoned systems programmer is needed to direct the activities of a team that is responsible for the operating system software that supports EIA's mainframes. Candidates must have recent experience installing and maintaining operating system software on a large IBM mainframe. Both MVS and VM software experience are desired and experience in the area of electronic publishing is a definite plus. Strong written and oral communications skills are also required as well as the ability to work with users of the computer facility. Salary ranges from $39,301 to $61,364.

Computer Specialist (Data Communications Systems Programmer), Announcement 88-EI-068. An experienced data communications systems programmer is needed to direct the activities of a team that is responsible for the software and hardware that supports EIA's Data Communications Network. Candidates must have recent experience installing and maintaining communications system software, and a good understanding of communications hardware, for large IBM mainframes and IBM 3725 Communications Controllers.

VTAM, STAM, NCP, and EP software experience is desired, as well as X.25 and LAN experience. Strong written and oral communications skills are also required as well as the ability to work with users of the computer facility. Salary ranges from $39,301 to $61,364.

To apply, prepare and submit an Application for Federal Employment-SF-171 to: Joyce Gilbert, Announcement 88-EI-169 or 88-EI-068, U.S. Department of Energy, Office of Personnel, Room 4F-063, 1000 Independence Avenue, SW, Washington, DC 20585. U.S. Citizenship is required. For additional information call (202) 586-6982. Applications must be received by close of business, July 15, 1988.

Consulting Opportunities

Programmers, Designers, Analysts, DBA's, Technical Writers, System Analysts, Administrators, Engineers sought for per diem and permanent positions:

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■ CICS	■ UNIX (Appl. & Int'ls)	■ DEC VAX/VMS
■ IMS	■ ORACLE	■ PC's
■ COBOL	■ C	■ [illegible]
■ PLI	■ SYBASE	■ SOFTWARE ENGR'S
■ RDBMS	■ INFORMIX	■ HARDWARE ENGR'S
■ NOMAD	■ VAX/VMS	■ MECHANICAL ENGR'S

Other positions also available. Please call or send resumes to:—

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Two Penn Plaza, Suite 1540, New York, NY 10121
1-800-727-1133

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Portland, ME 04112
(207)773-4746

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The west coast's fastest growing computer consulting firm, IQ Systems, Inc. has openings for experienced analysts and programmers at several LIS locations. Full time employee and consulting positions available for sharp, energetic professionals looking for a challenge.

Full benefits, training and bonus program offered. Opportunities exist in Los Angeles, San Francisco, Austin, Dallas, Boston, Atlanta and other project locations.

Send resume to:

IQ Systems Headquarters
[illegible]
Los Angeles, CA 90010
(213) [illegible]

Computer Software Engineer: All hrs perwk. 8 am to 4 pm. $28,000/yr. The job involves in design & development of real-time digital radiographic system. The duties include: Protocol design for image extraction, integration, display & storage; software structure design, code development of interfaces with aquisition system, display processor & operating system. MS degree required in Comp. Sci. The job requires graduate courses in computer graphics, digital radiography, computer design & simulation language. The applicant must have design & implemented software projects on RMX (Real-Time Multi Tasking Executive) VAX (Virtual Address Extension)/VMS (Virtual Memory System) operating systems, by using 80286 assembler, C, & TLM (program language for micro processor) languages. At least 1 yr programming exp. in real-time image processing & interrupt handler is required. Applicants send resume to: Illinois Dept. of Employment Security, 401 S. State St. 3S, Chicago, IL 60605. Attn: Robert S. Felton. Ref.# VIL7948-F. An Employer Paid Ad.

SYSTEMS SOFTWARE DEVELOPER

Worldwide vendor of database performance monitor software has opening for experienced IBM assembler language programmer at headquarters in the Seattle, Washington area. Excellent compensation and benefits. Dynamic, informal atmosphere.

Develop new releases of ADABAS and DB2 performance monitors. Design, documentation, coding, and testing as part of a small, skill-directed, development team.

Requirements: Excellent skills in coding and maintaining IBM BAL. Familiarity with ADABAS and/or DB2 a strong plus. CICS or IMS/DC experience desirable. Project management experience helpful.

Send resume to: Candlewood Valley Group, Inc., P.O. Box 4129, Federal Way, WA 98063

RESEARCH TRIANGLE OPPORTUNITIES

[illegible]

CONSULTANTS

Unique position exists with a highly prestigious St. Louis-based firm for a 4+ year systems analyst seeking a dynamic career opportunity. Emphasis in an IBM mainframe, COBOL, CICS environment would be a definite plus. This position will provide tremendous promotional potential and an opportunity to utilize your strong communication skills. Outstanding opportunity! Salary to $40,000.

EMPLOYMENT SERVICE
DATA PROCESSING
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St. Louis, MO 63105
(314) 727-1535

SYSTEMS ENGINEER

Responsibilities include: Analyzing the output that is received when each new Office Dependent Data (ODD) load is released and associated with the "CHKODD" tool that is to translate Hexadecimal form in ODD to decimals using Mathematics prior to correction and population; Writing Immediate Modification Requests (IMRs) for the errors found with the relations in the ODD; Planning and configuring the jobs in which the ODD's are used for future generation (SES and SSR) based on the feature requirements received. No experience necessary, but must have a Bachelor Degree in Computer Science. Course of study must include 24 semester hours in Mathematics. Resume with transcript to verify course study. Offered salary $31,000 per year, 40 hrs. per week, 8:00 a.m. to 5:00 p.m., M-F. Send resumes to Illinois Department of Employment Security, 401 S. State St., 3-South, Chicago, IL 60605. Attn: Robert S. Felton, Ref. V-6, 8881-F. An Employer Paid Ad.

PROGRAMMERS

Jr to Sr level programmers with 1+ yrs exp in IBM & other languages (PASCAL, "C," ASSEMBLER, PL-1, etc.) Contract assignments 12 mos + $25-35/hr + benefits package. Air conditioned, overlook Mt Madonna, CSC.

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Los Angeles, CA 90045
(213) 215-[illegible]
(818) 645-[illegible]

Software Engineer for firm in NE Ohio to be responsible for development & integration of factory automation systems; design & develop 3-dimensional computer models of mechanical/moving parts; make mathematical & mechanical images of machinery parts & robotics by applying standard engineering rules on computer; create initial design & all subsequent changes & representations. Requires minimum M.S. in Computer Science or any field of engineering & 5 yrs experience in computer software analysis including 1 yr experience in UNIX, C, Ethernet & X.25 systems & processing languages, & in image processing, pattern recognition, artificial intelligence & graph theory; experience may have been gained while working toward degree. 40 hrs/wk, 8am-5pm. $35,000/yr. Qualified applicants only. SEND RESUME to R. Lasher, JO# 1002660, Ohio Bureau of Employment Services, P.O. Box 1618, Columbus, Ohio 43216.

SYSTEMS ENGINEER

Responsibilities include: Analyzing the output that is received when each new Office Dependent Data (ODD) load is released and associated with the "CHKODD" tool that is to translate Hexadecimal form in ODD to decimals using Mathematics prior to correction and population; Writing Immediate Modification Requests (IMRs) for the errors found with the relations in the ODD; Planning and configuring the jobs in which the ODD's are used for future generation (SES and SSR) based on the feature requirements received. No experience necessary, but must have a Bachelor Degree in Computer Science. Course of study must include 24 semester hours in Mathematics. Resume with transcript to verify course study. Offered salary $31,000 per year, 40 hrs. per week, 8:00 a.m. to 5:00 p.m., M-F. Send resumes to Illinois Department of Employment Security, 401 S. State St., 3-South, Chicago, IL 60605. Attn: Robert S. Felton, Ref. V-6, 8881-F. An Employer Paid Ad.

Senior ADF/VMS Programmer Analyst to create symbolic statement of problem using flowcharts and models. Confers with project leader and team members to resolve technical questions. Designs, tests and maintains software programs using BAL. Works in Airline Control Program (ACP/TPF) Passenger Airline Reservations (PARS). Provides technical guidance to users and programming staff. Must have min. B.S. in Math or Science + one year exp. in ACP/PARS & BAL. Hrs: Mon - Fri 8:00 A.M. - 5:00 P.M. Salary: $2,040 - $4,139 mo. as per exp. Submit resume only to Job Service of Florida, 701 E.W. 27th Avenue, Miami, FL 33135. Ref. Job Order #FL 0555165.

COMPUTER SCIENTIST/RESEARCHER: Conduct research and development of special-purpose theorem proving systems for each of the following domains:

- Designing and building a state-of-the-art theorem prover for general equalities and linear sums of quantities taken from an arbitrary ring of integers or modular ring of integers, with emphasis on speed and proving power;
- Designing and building a theorem prover for reasoning about procedures and causality amongst concurrent non-atomic operations, then designing and building a synthesizer that takes such specifications about these relations and produces a concurrent computational structure which computes the specified output;
- Designing and building a theorem prover incorporating a decision procedure for reasoning with Convex and Union-of-Convex Time Intervals, and building an incremental truth maintenance system for sets of atomic interval formulas;
- Designing and building a theorem prover to accomplish automatic verification of correctness of automated transformations of specifications to code in a special-purpose software engineering domain; and
- Designing and building a theorem prover for an existing very-high-level software development language involving existing data types including sets, formal arithmetic, and modular arithmetic.

Incorporate all theorem provers above into an existing very-high-level software development prototype, placing special emphasis on modularization, systems integration, usability, and well-designed maintainable systems code. Supervise research conducted by Stanford University Ph.D. students.

Minimum requirements:
- Ph.D. in Computer Science in the area of Automated Theorem Proving;
- 2 years experience in computer science research, evidenced by a sub-stantial research record in Automatic Theorem Proving, Decision Procedures, Domain-Dependent Inference, and Symbolic Computation or Computational Mathematics, including refereed publications in accepted major forums in the field of Automated Theorem Proving;
- Substantial research record (including refereed publications) in providing theoretical solutions to open problems in a sub-domain of Automatic Theorem Proving, and carrying these theories through to implementation in a working system;
- 3 years employment - or Ph.D. research-related experience in theoretical and practical aspects of major, mature computer theorem proving systems, machine reasoning with equalities, finite set theory, and in the domain of integers and modular rings and their arithmetic;
- Coursework or experience in Algebraic Computation, Formal Arithmetic, Formal Logic, Computational Logic, Expert Systems Design and Use, Natural Language Specifications, and Transformation of Natural Language Specs into Executable Code;
- Employment-related experience in designing and programming software systems functions such as concurrency controllers and version managers.

Salary: $3,750/mo., 40 hrs. per week. Job site: Palo Alto, CA. Please forward resume to: Job No. MLU 4302, P.O. Box 9068, Sacramento, CA 95824-0068, not later than July 5th, 1988.

Systems Programmer

The Cleveland Clinic Foundation, internationally recognized as a leader in quality patient care, education and research, is currently seeking a Systems Programmer in its Information Services Division.

The successful candidate will have extensive experience in systems programming concepts and design, knowledge of operating system software and associated utilities. Also knowledge of communications concepts, protocols and techniques, and basic electronic principles used in data processing. Knowledge of IBM-MVS/XA, CICS, TSO/PDF, DFHSM, COBOL and ASSEMBLER languages is required.

Qualified candidates should submit a resume to **Beth Paolella, Staffing Manager - Staffing Department, The Cleveland Clinic Foundation, One Clinic Center, 9500 Euclid Avenue, Cleveland, Ohio 44195.**

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SEI/Los Angeles is seeking programmer/analysts, with 2-6 years of experience in any of:
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- Networking: Ethernet, GM MAP, X.25
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SEI/Phoenix is seeking applications and system software programmers, with 2-6 years of experience in:
- Networking: Ethernet, GM MAP, X.25

SEI/New York is seeking application designers and programmers, with 2-4 years of experience in:
- Mainframe systems and applications, especially information delivery systems
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Interested?
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SEI Information Technology
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Software Engineers

ComputerPeople Consulting Services is expanding its professional staff in our Columbus, Ohio office. We have immediate needs for experienced specialists in software development, telephony, and real-time.

We require a BS degree in computer science or electrical engineering and at least one year of professional experience. An MS degree is a plus, but not required. Environment is CUNIX in a state-of-the-art system. Applicable skills include:

- Real-time experience
- C and UNIX with BAL
- Networking software
- C++/VMS
- Device driver experience
- Kernel programming
- Experience in entire software project life cycle
- Factory automation
- Compiler design
- Stored program systems and communication networks
- Database (ORACLE, INGRES)

For immediate consideration please send your resume with information as to GPA, Visa status and/or citizenship to Mr. Jeff Miller, ComputerPeople Consulting Services, 50 Northwoods Blvd., Worthington, Ohio 43085. An equal opportunity employer

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Sr. Systems Engineer - Responsible for project level activities such as design planning, programming, installation, tuning and systems management: Measure, XRAY, TMF, COBOL, SCOBOL & TAL.

Software Engineer - Design and programming in an on-line environment: COBOL, SCOBOL, DDL, TMF, ENFORM, C, SQL; UNIX is a plus.

We provide an excellent compensation and benefits package. For more information call collect (312) 575-7600 or mail/fax your resume in confidence to:

Tony Fabiola or
Jim Whitehead
MERIT SYSTEMS, INC.
National Headquarters
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FAX (312) 575-0979

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Continued growth at SCI Systems, Inc., conversion to MVS/XA operating system, upgrade in mainframe, and relocation to a new facility have created numerous openings in financial and manufacturing applications programming. If the following describes your abilities, we invite you to consider our employment opportunities.

- 2+ years Cobol programming experience.
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SCI runs state-of-the-art financial/manufacturing systems. Located at the Corporate Headquarters in Huntsville, Alabama, the positions described above will become part of an ever expanding highly motivated team of MIS professionals.

SCI Systems, Inc. is a vertically integrated electronics manufacturer whose products and systems are supplied to a variety of aerospace, industrial and commercial customers.

Please send resume with salary history in confidence to:

Steve Peters
Professional Staffing Administrator
P.O. Box 1000
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SCI SYSTEMS, INC.

WTW
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We offer to the successful candidate excellent compensation (salary with benefits or hourly rates), relocation assistance, 401K plan and much more. If you are interested in keeping up with the leading edge of technology and enjoy challenging opportunities send your resume to:

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SYSTEMS SOFTWARE ANALYST

Black Hawk County has an immediate opening for a Systems Software Analyst in our Data Processing Department. Must have experience in system generation for VM/SP, DOS VSE, CICS, VTAM and SNA/SDLC, IBM System 4381. Considerable knowledge of VSAM and SQL/DS file structure. Prefer at least 2 years system programming experience. We offer full fringe benefits including family health and dental insurance, life insurance, paid holidays, sick days and other fringe benefits. Send resume with salary history to:

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Product Support Specialist for international license division of computer software vendor in SW Ohio. Consult with customers and South American agents in the areas of product installation, education & product support including: (1) Providing technical assistance for the installation of TOTAL, TIS & ENVIRON/I software products; (2) Analyzing customer needs to design software enhancements or software/hardware interfaces for TOTAL, TIS, and Communications Monitor (ENVIRON/I) software products; (3) Providing technical support & debugging assistance for TOTAL, TIS and Communications Monitor (ENVIRON/I) software products; (4) Conducting data installation classes & customer software training classes for systems programmers, systems analysts and application programmers. Requires an associate degree in Computer Science, Data Processing or Systems Engineering or an equivalent degree from a foreign college or university in the areas of systems engineering, computer science or data processing, or 2 years of a college which must have included the following courses: 12 hours in programming software languages; 9 hours in software architecture and/or structure design; 3 hours in software operating systems; and 3 hours in telecommunications. It also requires 2½ years of experience either in the job described or as an Information Systems Programmer. Two of the 2½ years of experience as an Information Systems Programmer must have been with ASSEMBLER, COBOL & PL/I languages; DOS/VSE, MVS & VAX/VMS operating systems. Installations, debugging, development of software/hardware interfaces, and tailoring of data base/data communications software systems to meet specific needs; & experience in the training of technical staff. Also requires verbal & written proficiency in English, Portuguese & Spanish. Must also be able to travel approximately 25% of each calendar year to the South American countries of: Argentina, Brazil, Chile, Colombia, Ecuador, Guatemala, Peru, Uruguay, & Venezuela. 37½ hrs./wk., 8:30 a.m. - 5:00 p.m., $31,360/yr. Qualified applicants reply immediately with resume to A. MacLean, JOB #888888, Ohio Bureau of Employment Services, P.O. Box 1618, Columbus, Ohio 43216.

Recruit qualified computer and communications professionals with the IDG Communications Computer Careers Network of eight leading computer newspapers.

Call Lisa McGrath at:
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It's easy to place your recruitment ad in Computerworld!

All the information you need is right here. Just call Lisa McGrath at 800-343-6474 (in MA, 617-879-0700). Or, if you want, you can send us the form below via mail or to our FAX machine. You can reach our FAX at ext. 739 or 740 at either of the above numbers.

The following information will help you determine the size ad you'd like to run and when you'd like to run it.

CLOSING DATES: To reserve space, you need to call us by 5PM (all continental U.S. time zones), 7 days prior to the Monday issue date. We need your ad materials (camera-ready mechanical or copy for pub-set ad) by 5PM, 6 days prior to the weekly issue.

AD COPY: We'll typeset your ad at no extra charge. You can give us copy via phone, U.S. mail, or FAX. To typeset an ad for you, we need clean, typewritten copy. Figure about 30 words to the column inch, not including headlines. (There are seven columns on each page.)

LOGOS AND SPECIAL ARTWORK: Any logos or special artwork should be enclosed with your ad copy. For best reproduction, please send us either a stat of your logo or a clean sample on white bond paper.

COLUMN WIDTHS AND MINIMUM DEPTHS: Your ad can be one of seven different widths. There is a minimum depth requirement for each width. You can also run larger ads in half-inch increments. The chart below can serve as a reference.

NUMBER OF COLUMNS	WIDTH	MINIMUM DEPTH
1 column	1-1/4"	2"
2 columns	2-5/8"	2"
3 columns	4-1/16"	3"
4 columns	5-9/16"	4"
5 columns	6-15/16"	5"
6 columns	8-3/8"	6"
7 columns	9-3/4"	7"

RATES: Your rate will depend on the size of your ad and whether you choose to run regionally or nationally. The national rate is $12.60 per line or $176.40 per column inch. The regional rate (Eastern, Midwestern or Western editions) is $8.00 per line or $112 per column inch. You can run your ad in any two regions for $10.60 per line or $148.40 per column inch. In all cases, you can earn volume discounts.

The minimum ad size is two column inches (1-1/4" wide by 2" deep) and costs $352.80 if run nationally. A sample of this size appears below. You can run larger ads in half-inch increments at $88.20 per half inch. Box numbers are available and cost $25 per insertion ($50 if foreign).

Programmer Analyst

This is a sample ad for Computerworld's Computer Careers section. It will help you decide what size ad you'd like to run. Remember that you can run your ad either regionally or nationally in our recruitment section and that the minimum ad size is one column (1-4/16 inches wide) by two inches deep (like this sample). This ad would cost $352.80 in our national edition, $224.00 in the Eastern, Midwestern, or Western Edition, and $336.80 in two regions; volume discounts apply.

SAMPLE AD SIZES AND PRICES: To assist you in planning your recruitment advertising, the following shows common ad sizes and their respective costs.

	One Region (East, Midwest or West)	Two Regions (East/West, East/Midwest, Midwest/West)	National Edition
1 column x 2"	$ 224.00	$ 296.80	$ 352.80
2 columns x 2"	$ 448.00	$ 593.60	$ 705.60
3 columns x 3"	$1,008.00	$1,335.60	$1,587.60
4 columns x 5"	$2,240.00	$2,968.00	$3,528.00
5 columns x 7"	$3,920.00	$5,194.00	$6,174.00

PAYMENT: If you're a first-time advertiser or if you haven't established an account with us, we need your payment in advance (or with your ad) or a purchase order number. Once you have established an account with us, we'll bill you for any ads you run as long as your payment record is good.

COMPUTER CAREERS NETWORK BUYS: You can take advantage of special rates that let you run your ad in *Computerworld* and *Computerworld*'s sister newspapers at special rates. Choose from *Network World*, *InfoWorld*, *Digital News*, *Federal Computer Week*, and *Computer Currents*. Call for details.

Computerworld Recruitment Advertising Order Form

Ad Size:_____ columns wide by _____ inches deep

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Company: _____

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Telephone: _____

Region: ☐ East ☐ Midwest ☐ West **National:** ☐
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This individual will develop and administer a comprehensive inter-relational data base interfacing manufacturing and engineering. A BS in Computer Science or Mathematics as well as 5-7 years current experience are required. This candidate must be familiar with HP 3000 and IMAGE.

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To teach UTS at our Sunnyvale headquarters, you'll need a systems background that includes extensive C and Shell programming experience. You can use your UNIX systems programming background and your desire to acquire and share new systems-level knowledge to become versed in UTS internals and platform/presentation techniques. Strong interpersonal communications skills are necessary; 370/XA architecture skills and UNIX internals are a definite plus. An advanced degree in a relevant field is desirable.

Instructor positions are also available for UNIX systems programmers whose backgrounds include development-level communications experience, using SNA, RFS/NFS, x.25, BX25, or TCP/IP. An advanced degree in a relevant field is highly desirable.

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Systems Programmers who attend our MVS and VM courses consistently rate them highest in providing technical education which is practical, detailed and stimulating. Our systems software courses are even favored by customers of other 370/XA compatible vendors.

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YOU CAN join the excitement of creating the computer systems of the future, while enjoying the benefits and competitive salary you would expect from an industry leader.

YOU CAN contact Susan Rankin at (800) 538-8460, extension 6191, or send your resume to her at Amdahl Corporation, Employment Department 6-29, P.O. Box 3470, M/S 300, Sunnyvale, California 94088-3470.

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You must have a minimum of 3-5 years data base experience. The ability to design data base systems is necessary, as is knowledge of IMS DB/DC and DB2. Knowledge of CICS is a plus. Requires a BS or the equivalent in Computer Science.

Ryder offers a competitive salary and comprehensive benefits. Candidates will be required to pass a pre-employment drug test. For consideration, send your resume to:

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Miami, FL 33166

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S/38

CTG is seeking PROGRAMMERS/ANALYSTS with 1+ yrs. experience in SYS. 36 RPG programming for ATLANTA area. Excellent salary/benefits. CALL or RUSH resume to: COMPUTER TASK GROUP, 100 Colony Square, Atlanta, GA 30361. (404) 881-6152.

CTG

[redacted]

We provide Fortune 500 companies with consulting and programming services. We have immediate positions available for PIA and IMS System Programmers in Kentucky, Ohio, Indiana, and Tennessee with one of the following skills:

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- PL1
- CICS
- Burroughs
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- IDEAL DATACOM/DB

Send resume or call:

Computer Programs Corp.
6134 New LaGrange Road
Louisville, KY 40222
(502) 426-6133

RESEARCH SYSTEMS ANALYST

The Minnesota Higher Education Coordinating Board is a state agency responsible for policy development, research, program coordination and information services for public and private post-secondary education. The Information Management unit currently has an opening for a research systems analyst. Applicant will assist in the design and implementation of a comprehensive, longitudinal student database; provide analysis, programming, and database administration support of research and evaluation projects for the agency.

Qualifications include a college degree or equivalent, preferably in computer science, with three to five years experience in programming and analysis. Candidates must be experienced in database management systems. Communication skills, both oral and written, are important. Experience with VAX/VMS, a statistical package, COBOL, personal computers and networking, and office automation systems is desirable.

Salary range: $27,600 - $34,656 plus excellent benefits. Submit a letter of application with current resume by July 5, 1988 to:

Personnel Officer
Minnesota Higher Education Coordinating Board
400 Capitol Square Building
550 Cedar Street
Saint Paul, Minnesota 55101

SENIOR PROGRAMMER

The Taylor Wine Company, a division of Vintners International Company, Inc., and a highly regarded leader in the production of premium table wines, dessert wines, champagnes and vermouths, is seeking a Senior Programmer to join its MIS staff.

Qualified applicants should have at least 5 years of solid experience with COBOL and RPGII.

Successful candidate will participate in the planning and installation of a new financial and manufacturing system on a large IBM System/36.

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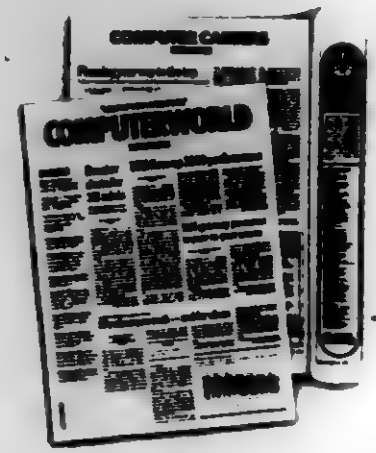

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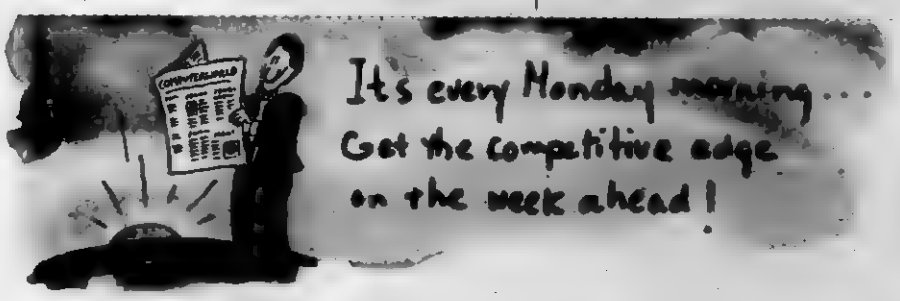

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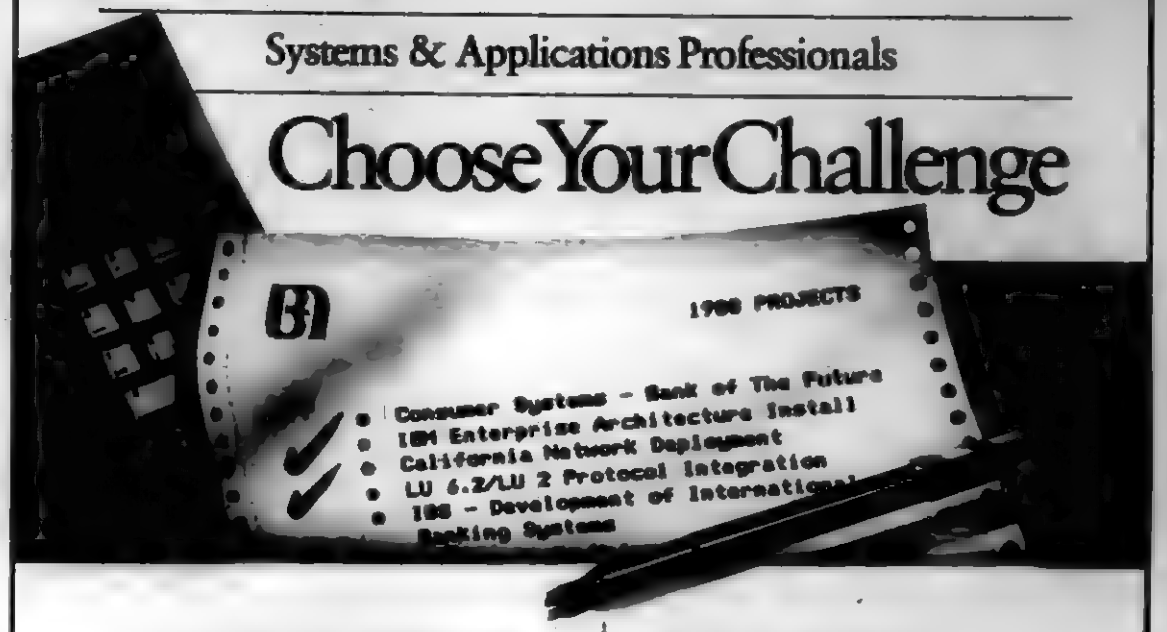

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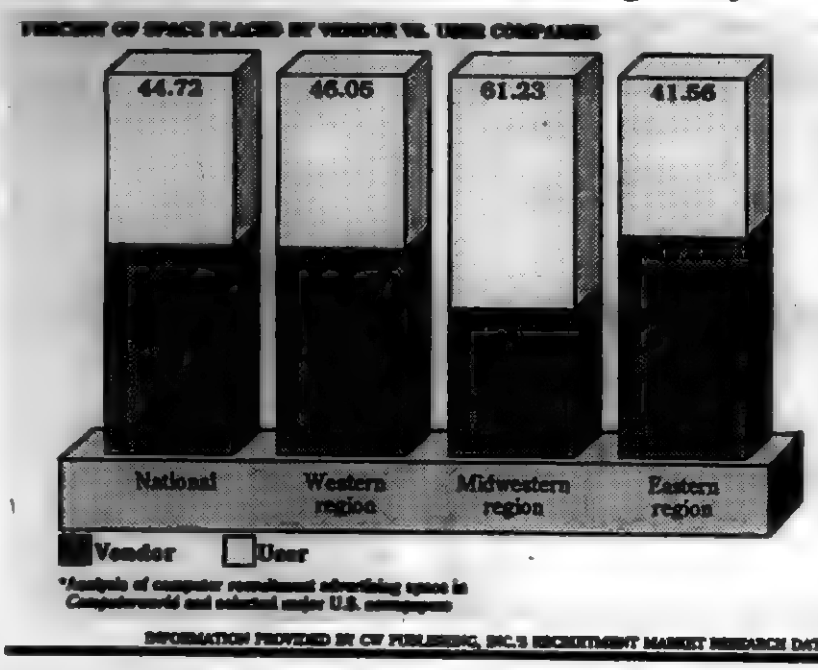

*Analysis of computer recruitment advertising space in Computerworld and selected major U.S. newspapers

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MARKETPLACE

Shortage of 4381s continues

In February, IDC Financial Services Corp. reported there were delays in shipments of IBM 4381-21, 22, 23 and 24 upgrades. IBM claimed that demand for upgrades to the 4381-20 series was more than anticipated and that the firm would do its best to alleviate the situation.

But the shortage continues. Customers placing orders to upgrade to a 4381-20 series machine are being told they may have to wait six months.

Of course, there are customers who have already received their upgrades. But the majority of the 4381 upgrades that IBM shipped were to customers who participated in the 4381 special installation offering that the company unveiled in May 1987.

Now the problem is with customers looking to upgrade from an installed 4381 to a 20 series machine this year. Secondary market dealers claim that customers with growth plans to the 20 line must notify IBM immediately to ensure that they receive a 4381-21, 22, 23 or 24 by the end of the year.

The following is a comparison of the cost of a 4381-P23 purchased from IBM with a machine purchased on the secondary market.

The list price of a new 4381-P23 from IBM is $530,000. The cost of a P13 on the used market is $192,000. The cost to upgrade from a P13 to a P23 is $140,000. An estimated cost for an upgraded P23 is $332,000.

Thus the difference between purchasing a 4381-P23 from IBM and obtaining a used P13 and upgrading to a P23 is $198,000 — a large discount for a machine that just started shipping in the first quarter.

This may be the real reason for the delay in upgrade deliveries. IBM does not want to see its year-old machines trading for approximately 60% of list price while they are still in the early stages of production.

The secondary market for the older 4381 models is still active. However, values continue to fall for the 4381 Models 1, 2 and 3, primarily because:

- The only upgrade route available is to the 20 series, which is very expensive.
- The Models 1, 2 and 3 have been effectively replaced by both the 10 and 20 series.

Prices for the 4381-1 have dropped 59% since February, and 4381-2 prices have dropped 39%. This trend will continue as these models near the end of their economic life.

Current fair market values for the 4381 Models 12, 13 and 14 have stabilized recently. These machines offer a more attractive upgrade route to the 4381-20 series and are trading at very attractive prices on the secondary market.

Because of the long lead time of 20 series upgrades, 4381 users have looked for alternatives to meet their performance needs. Some 4381 users are purchasing an additional 12, 13 or 14 and running it alongside their existing 4381.

There are also a number of 4381-14 users who are swapping out their air-cooled machines to purchase low-end IBM 3090s or 3080 series machines. The jump from air- to water-cooled is an expensive one, but it offers more immediate growth potential than the 4381-24.

IBM mainframes — 4381s

Current fair market value

	Date shipped	MIPS*	List price	Current fair market value
[illegible]	[illegible]	2.3	[illegible]	[illegible]
[illegible]	[illegible]	2.3	[illegible]	[illegible]
[illegible]	[illegible]	2.7	[illegible]	[illegible]
[illegible]	[illegible]	3.7	[illegible]	[illegible]
[illegible]	[illegible]	4.3	[illegible]	[illegible]

* Millions of instructions per second

INFORMATION PROVIDED BY IDC FINANCIAL SERVICES CORP.
CW CHART

The BoCoEx Index

Closing prices on the Boston Computer Exchange for the week ending June 10, 1988

IBM PC Model 068	$900	$850	$650
XT Model 086	$1,150	$1,200	$875
XT Model 089	$1,525	$1,550	$1,100
AT Model 099	$2,300	$2,425	$1,750
AT Model 239	$2,600	$2,650	$2,125
AT Model 339	$3,350	$3,700	$2,625
PS/2 Model 30 20-MHz	$1,600	$1,800	$1,450
PS/2 Model 50 20-MHz	$2,450	$2,500	$2,150
PS/2 Model 60 40-MHz	$2,650	$2,650	$2,475
[illegible]	[illegible]	[illegible]	[illegible]
Macintosh 512	$625	$700	$575
512E	$650	$625	$650
Plus	$1,075	$1,100	$810
Plus 20-MHz	$1,600	$1,650	$1,350
SE	$1,950	$2,100	$1,625
SE 20-MHz	$2,450	$2,475	$2,050
II	$4,025	$4,325	$3,500
[illegible]	[illegible]	[illegible]	[illegible]
DEC Rainbow 100	$900	$900	$775
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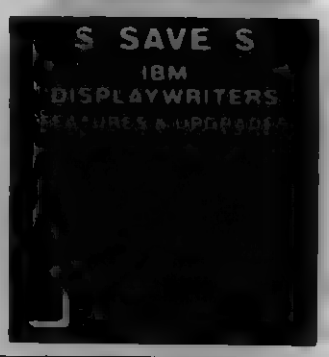

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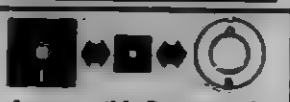

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ADDRESSES: For those who intend to submit a proposal on this project, copies of the request for proposals can be obtained without charge from: Department of Administration, Division of Finance, P.O. Box C, Juneau, AK 99811-0204, or telephone (907) 465-2340. Additional data is available for inspection at: Department of Administration, Division of Finance, State Office Building, Juneau.

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Training

Trainers: Look before leaping

Asking the right questions can save trouble in searching for a vendor

BY NAOMI KARTEN
SPECIAL TO CW

Demand for training in the use of personal computers and fourth-generation languages is growing as end-user computing spreads and the range of products broadens.

Thus, it is not surprising that many companies are seeking the services of outside training firms to supplement in-house staffs that are stretched thin. As a result, the number of training vendors is growing.

Training vendors run the gamut from PC whiz-kids who are open for business until something better comes along to organizations with plush facilities, the latest computer and audiovisual equipment and a staff of 20 or more experienced trainers.

Selection criteria

If you are responsible for providing or facilitating training, the following criteria can help to guide your selection of training vendors:

Stability: How long has the vendor been in the training field? A start-up company may be very capable — or it may learn how to train and how to run a training company at your expense.

Expertise: Does the vendor understand your business? Can it adequately shape courses to address the unique needs of your company? Is the vendor willing to customize training material to meet those needs? What will it require from you in order to do so? These days, everyone is a computer user, so be sure the trainer is able to work with individuals from all organizational levels and all functional areas of your company.

Curriculum: For each course offered, can the vendor provide a statement of objectives, the prerequisites, an outline and a description of course material? In other words, do the courses really exist and have they been carefully thought out? Verify that courses are available for both novice and advanced students.

Instructors: How many are available? Do they work full time or are they hired on a contract basis? If contract trainers are used, make sure they are previously screened and selected and not just rounded up quickly when the vendor lands a big contract.

What are the trainers' credentials? What is their mix of educational, business and computer skills? How do they maintain expertise in their selected areas? Have they used the products or techniques for which they provide training? Determine if you have the option to use specific trainers on an ongoing basis.

Format: What percentage of the instruction is devoted to lecture, discussion and workshop? Can the mix of formats be varied to meet the needs of different groups? What is the typical ratio of students to instructor? How many students are assigned to each terminal or personal computer?

Materials: Review training materials carefully; if possible, have users also look through them. Are the materials high-quality? Are they easy to read and follow?

Are students given sufficient written material to permit post-training reviews? What does the training vendor supply in the way of training aids, guidelines, tips and techniques, cheat sheets and so on? Do students receive their own copies of all such material?

Location: Where is training provided? If it is at the vendor's workplace, can students conveniently reach it? Is the vendor willing to provide training at your company? If so, make sure you know the kinds of classroom facilities and audiovisual equipment the vendor expects you to provide, and be clear about who will supply the hardware and software.

Scheduling: Is training offered on a convenient schedule? If training is provided at your site, is the vendor willing to accommodate your scheduling needs and constraints?

Follow-up: Does the vendor provide post-training support for students? If so, what is the scope of this support? Under what conditions is it available?

Cost: What does training cost per student, per course? Is a volume discount or a discount for a long-term contract available? Are you liable for the trainer's travel expenses?

Will you incur extra charges if you need to cancel or reschedule a class? What will it cost to have training customized to your particular needs? Are any other costs involved?

To protect yourself from unexpected price increases, ensure that course fees are fixed for a specific period of time.

Assessment: What forms of measurement are provided to enable you to gauge the adequacy of the course? How does the vendor assess the effectiveness of the presented material? Course evaluations are helpful in gauging students' reaction to a course but are not a good indicator of long-term retention of instructional material.

References: What is the vendor's reputation? Does it offer references in your area? Are you satisfied with this feedback? Can you locate other references through professional associations, users groups, industry contacts or peers at neighboring companies?

Nothing speaks so well for a training vendor as a happy customer; on the other hand, excessive customer complaints or your inability to locate satisfied customers are the best clues to look elsewhere.

TRAINING vendors run the gamut from PC whiz-kids to organizations with plush facilities, the latest computer and audiovisual equipment and a staff of 20 or more experienced trainers.

Karten is president of Karten Associates in Randolph, Mass.

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8/1	Training and management's expectations
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— Mark Potenzone
Westinghouse Management
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Mark Potenzone is National Sales Manager for Westinghouse Management Systems Software. This group within Westinghouse markets IBM mainframe productivity enhancement software and operating systems software.

Westinghouse has taken advantage of three advertising opportunities that *Computerworld* offers, much to Mark's — and the company's — satisfaction.

"We've done mostly image advertising in order to create awareness of this group. The name 'Westinghouse' is certainly recognizable, but not as a major software supplier, even though we've been in the software business for nearly 20 years.

"We chose Computerworld *partly because of personal experience. As a software professional, I've read it for as many years as I've been in the business, and so has everyone I've worked with. In fact, I can't imagine a computer professional NOT reading* Computerworld.

"We advertised in Computerworld, Computerworld's SPOTLIGHT *section and* Computerworld's Card Decks. *And the results from all three were excellent. We've seen what advertising in* Computerworld *can do, so there was no surprise there.* SPOTLIGHT *also delivered very pleasing results. Because it is a special pull-out section devoted to one subject, it makes sense that when we advertised in their Network Software issue, we were reaching our customers and potential customers — exclusively.*

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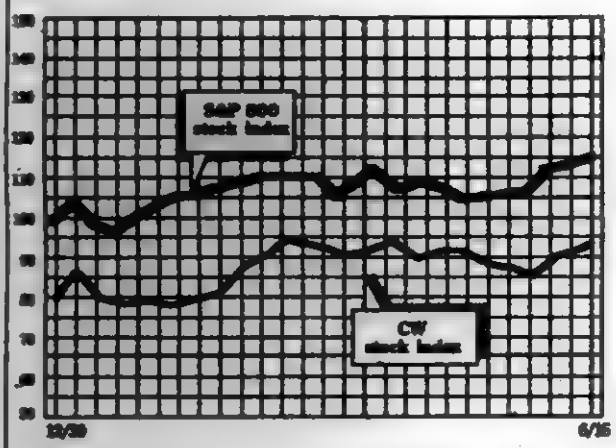

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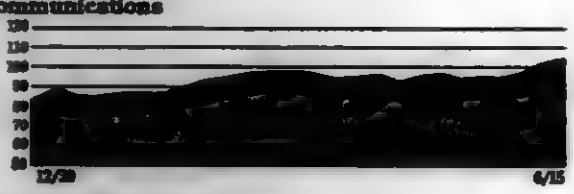

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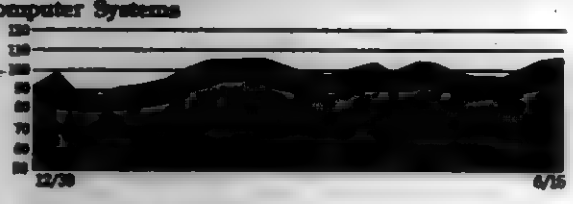

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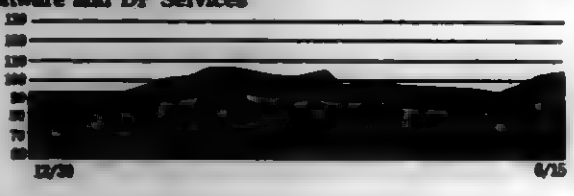

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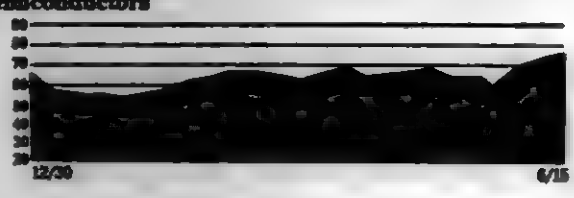
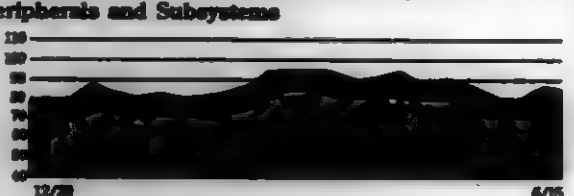
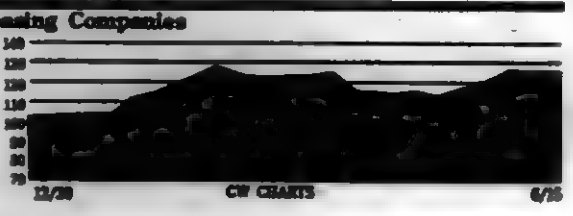


Peripherals and Subsystems



Leasing Companies



CW CHARTS

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JUNE 15, 1988

EXCH

	52-WEEK RANGE (1)		PRICE CLOSE JUNE 15 1988	WEEK NET CHANGE	WEEK PCT CHANGE
Communications and Network Services					
N AMERICAN INFO TECHN CORP	100	74	92.75	-0.5	-0.5
O ANDREW CORP	19	11	16.75	1.5	9.8
O ARTEL COMM CORP	3	1	2.38	0.3	11.8
N AT&T	38	30	37.25	0.0	0.0
O AVANT GARDE COMP INC	6	2	2.13	0.1	5.1
O AVANTEK INC	17	6	7.00	-0.3	-4.1
N AYDIN CORP	35	14	20.50	0.5	2.5
N BELL ATLANTIC CORP	80	61	73.00	-0.4	-0.5
N BELLSOUTH CORP	44	29	43.13	0.4	0.9
O COMPRESSION LABS INC	6	2	5.00	1.3	32.3
O COMPUTER NETWORK TECH	5	1	1.34	0.1	4.6
O CONTEL CORP	40	26	33.75	0.5	1.5
O DATA SWITCH CORP	10	4	8.13	0.3	3.2
O DIGITAL COMM ASSOC	46	20	38.13	1.5	4.1
O DYNATECH CORP	35	14	20.50	-0.3	-1.2
O FIBRONICS INTERNATIONAL INC	7	2	3.50	-0.4	-9.7
O GANDALF TECHNOLOGIES	9	5	7.38	-0.1	-1.7
O GENERAL DATACOMM INDS	11	3	3.50	0.3	7.7
N GTE CORP	45	39	38.38	0.6	1.7
N INFOTRON SYS CORP	14	5	12.75	-0.1	-1.0
N ITT CORP	66	42	51.13	0.6	1.3
N M A COM INC	16	7	10.25	0.1	1.2
O MCI COMMUNICATIONS CORP	15	7	15.00	0.4	2.6
O MICOM SYS INC	17	7	15.38	-0.5	-3.1
O NETWORK EQUIPMENT TECH INC	26	12	18.25	-0.9	-4.8
O NETWORK SYS CORP	13	7	11.13	0.5	4.7
O NORTHERN TELECOM LTD	24	14	19.13	1.1	6.3
O NOVELL INC	30	12	26.38	-1.4	-5.0
N NYNEX CORP	78	58	68.50	0.0	0.0
N PACIFIC TELESIS GROUP	34	23	30.63	0.3	0.8
N PARADYNE CORP	9	4	5.50	0.1	2.3
A PENRIL CORP	8	1	4.88	-0.1	-2.5
N PLESSEY PLC	36	23	29.13	0.1	0.4
N SCIENTIFIC ATLANTA INC	23	8	14.50	0.3	1.8
N SOUTHWESTERN BELL CORP	48	32	38.88	0.3	0.8
O 3 COM CORP	28	12	19.75	-1.8	-8.1
O UNISEARCH INDS INC	15	6	12.31	0.1	0.5
N U S WEST INC	60	43	58.00	1.0	1.8
Computer Systems					
O ALLIANT COMPUTER SYS	22	8	8.75	0.5	6.0
O ALPHA MICROSYSTEMS	6	3	5.00	0.0	0.0
O ALTOS COMPUTER SYS	15	6	6.25	-0.5	-4.1
A AMDAHL CORP	58	19	54.00	3.4	6.7
O APOLLO COMPUTER INC	23	9	15.00	-1.0	-6.3
O APPLE COMPUTER INC	60	28	46.75	0.8	1.7
N BOLT BERANEK & NEWMAN	25	12	17.00	0.2	1.5
O BRITTON LEE INC	4	1	2.88	0.5	21.1
N COMPAQ COMPUTER CORP	73	34	57.38	1.5	2.7
O COMPUTER AUTOMATION INC	15	6	7.63	-0.4	-4.7
A COMPUTER CONSOLES INC	10	2	8.88	0.4	4.4
O CONCURRENT COMP CORP	24	11	16.75	0.0	0.0
N CONTROL DATA CORP DEL	38	18	27.25	0.0	0.0
O CONVERGENT TECH	9	3	3.06	-0.3	-8.2
O CONVEX COMPUTER CORP	18	6	8.88	-0.3	-2.7
N CRAY RESH INC	119	47	66.63	1.3	1.5
O DAISY SYS CORP	12	5	10.63	-0.4	-3.4
N DATA GEN CORP	37	16	21.88	-0.3	-1.1
N DATAPOINT CORP	9	3	5.50	0.0	0.0
N DIGITAL EQUIP CORP	220	99	112.88	0.8	0.8
N FLOATING POINT SYS INC	12	3	3.00	-0.1	-4.0
N GOULD INC	24	9	15.50	0.5	3.3
N HARRIS CORP	41	22	29.75	0.1	0.4
N HEWLETT PACKARD CO	74	38	53.38	-5.3	-9.0
N HONEYWELL INC	91	69	75.88	2.4	3.2
N IBM	176	122	118.88	2.3	1.9
O INFORMATION INTL INC	15	9	13.75	0.9	7.3
O IPL SYS INC	3	1	2.13	0.3	13.3
O MASSI COMPUTER CORP	14	4	6.25	0.0	0.0
N MATSUSHITA ELEC INDL LTD	226	108	207.50	4.3	2.1
O MEGADATA CORP	6	3	2.88	-0.3	-8.0
O MENTOR GRAPHICS CORP	30	14	24.00	0.3	0.7
N NBI INC	14	4	4.38	0.1	2.9
N NCR CORP	87	30	69.63	0.0	0.1
N PRIME COMPUTER INC	31	12	16.50	-0.8	-4.3
O PYRAMID TECHNOLOGY	14	5	13.75	0.8	5.8
O STRATUS COMPUTER	40	15	28.50	-2.3	-7.3
O SUN MICROSYSTEMS INC	45	14	26.13	-2.1	-8.6
O SYMBOLICS INC	5	1	1.25	-0.1	-4.8
O SEQUENT COMPUTER SYS INC	22	9	18.38	-0.1	-0.7
N TANDEM COMPUTERS INC	37	16	20.00	1.3	6.7
N TANDY CORP	57	28	47.38	0.0	0.0
N ULTIMATE CORP	37	13	13.13	0.1	1.0
N UNISYS CORP	48	24	37.00	0.9	2.4
A WANG LABS INC	19	10	10.75	-0.6	-5.5
Software & DP Services					
O ADVANCED COMP TECH	6	1	1.13	0.0	0.0
N AGS COMPUTERS INC	30	11	27.50	1.8	6.9
O AMERICAN MGMT SYS INC	20	9	16.50	-0.1	-0.6
O AMERICAN SOFTWARE INC	19	9	16.00	-0.2	-1.8
N AMACOMP INC	11	4	10.50	-0.3	-2.3
O ANALYSTS INTL CORP	10	4	8.00	0.2	3.2
O ASHTON-TATE CORP.	23	13	24.25	-3.5	-11.8
O ASK COMPUTER SYS INC	15	6	14.25	0.6	4.6
O AUTODESK INC	34	12	26.75	-2.0	-6.5
N AUTO DATA PROCESSING	55	16	40.50	-0.8	-1.9
O BOOLE & BABBAGE INC	12	5	9.13	-0.1	-1.4
O COMPUTER ASSOC INTL INC	37	15	28.75	0.6	2.1
O COMPUTER HORIZONS CORP	15	7	11.13	0.1	1.1
N COMPUTER SCIENCES CORP	73	38	42.75	0.0	0.0
N COMPUTER TASK GROUP INC	16	9	12.50	1.8	16.3
O COGNOS INC	17	4	6.25	-0.1	-2.0
O COMSHARE INC	27	12	18.25	1.5	9.0
O CULLINET SOFTWARE INC	14	4	8.50	-0.1	-1.4
O DUQUESNE SYS INC	28	19	19.63	-0.4	-1.9
A DATA ARCHITECTS INC	16	7	13.75	0.0	0.0
N GENERAL MTRS (CLS E)	61	30	38.50	-2.3	-5.6
O HOGAN SYS INC	15	4	4.25	-0.3	-6.8
O INFORMIX CORP	31	12	22.75	2.3	11.0
O INTELLICORP INC	10	2	3.38	0.5	17.4
O KEANE INC	16	6	11.25	0.8	7.1
O LOTUS DEV CORP	43	19	22.00	-1.9	-8.4
O MANAGEMENT SCI AMER	14	6	8.00	-0.3	-3.0
O MICRO PRO INTL CORP	7	3	2.88	-0.2	-6.5
O MICROSOFT CORP	78	37	64.00	2.0	3.2
O MORINO ASSOCIATES INC	21	7	10	-0.8	-4.4
O NATIONAL DATA CORP	38	20	33.50	-0.8	-2.6
O ON LINE SOFTWARE INTL INC	22	9	8.88	0.0	0.0
O ORACLE SYS CORP	30	8	16.75	0.4	2.6
N PANSOPHIC SYS INC	28	11	15.13	0.4	2.5
O POLICY MGMT SYS CORP	30	15	24.75	0.0	0.0
O PROGRAMMING & SYS INC	14	7	11.75	0.3	2.2
O REYNOLDS & REYNOLDS CO	38	14	16.25	0.5	2.8
O SEI CORP	15	10	10.88	0.4	2.6
O SHARED MED SYS CORP	30	19	21.75	-0.8	-2.8
O SAGE SOFTWARE INC.	10	8	8.88	0.0	0.0
O SOFTWARE PUBG CORP	21	8	21.00	1.8	9.1
A STERLING SOFTWARE INC	12	6	6.63	-0.4	-5.4
O SUNGARD DATA SYS INC	20	10	18.50	1.3	7.2
O SYSTEMATICS INC	20	10	31.75	-0.3	-0.8
N SYS. SOFT INC	34	7	10	2.3	15.4
O VM SOFTWARE INC	27	7	13.75	1.0	7.8
Semiconductors					
N ADV MICRO DEVICES INC	25	8	16.00	-0.4	-2.3
N ANALOG DEVICES INC	34	8	15.75	-0.1	-0.8
O ANALOGIC CORP	13	6	7.38	1.0	15.7
O INTEL CORP	42	18	35.13	1.0	2.9
O LSI LOGIC CORP	15	7	13.00	-0.1	-1.0
N MOTOROLA INC	74	35	51.50	0.1	0.2
N NATL SEMICONDUCTOR	22	10	14.50	-0.3	-1.7
N TEXAS INSTRS INC	80	38	48.75	0.8	1.6
A WESTERN DIGITAL CORP	20	11	15.63	-0.4	-2.5
Peripherals					
O ALLOY COMP	13	2	2.80	-0.5	-15.7
O AMI INTL INC	9	3	3.75	0.0	0.0
O AST RESH INC	21	8	15.50	-0.1	-0.8
O AUTO TROL TECH CORP	7	3	4.63	0.0	0.0
O BANCTEC INC	14	5	8.00	0.0	0.0
O CIPHER DATA PRODS INC	12	4	8.38	0.5	6.8
O COGNITRONICS CORP	5	2	3.13	0.4	14.3
N COMPUGRAPHIC CORP	28	10	28.88	0.0	0.0
A DATAPRODUCTS CORP	24	7	8.88	0.4	3.9
O DATARAM CORP	9	5	8.75	0.1	1.9
N EASTMAN KODAK CO	71	39	46.00	0.1	0.2
O E M C CORP MASS	20	6	7.88	0.4	5.0
O EMULEX CORP	9	4	8.75	0.5	4.9
O EVANS & SUTHERLAND	35	17	17.00	0.8	4.2
O IDOT CORP	5	3	3.00	0.0	0.0
O INTERLEAF INC	24	11	12.75	-3.9	-23.2
O IOMEGA CORP	4	1	3.94	0.1	3.3
O LEE DATA CORP	6	3	3.50	-0.1	-2.4
O MASSTOR SYS CORP	6	1	2.44	-0.1	-4.9
O MAXTOR CORP	22	6	11.13	-0.9	-7.5
O MICROPOLIS CORP	40	13	17.75	-8.0	-37.8
O MINSCRIBE CORP	17	6	11.00	-0.5	-4.4
N MINNESOTA MNG & MFG CO	84	46	84.50	0.5	0.5
A MSI DATA CORP	19	6	15.13	1.8	12.0
O PERSONAL COMPUTER PRODUCTS INC	7	4	5.50	0.1	1.1
O PRIAM CORP	6	1	1.75	-0.2	-12.5
O PRINTRONIX INC	13	7	10.25	0.1	1.2
O QMS INC	27	8	9.75	-0.5	-4.9
O QUANTUM CORP	22	6	11.00	0.0	0.0
O RAMTEX CORP	6	1	1.13	-0.2	-14.3
N RECOGNITION EQUIP INC	22	6	7.13	0.5	7.5
O REXON INC	11	4	6.88	2.4	32.9
O SCAN TRON CORP	17	7	15.50	0.6	4.2
O SEAGATE TECHNOLOGY	40	10	17.50	-0.8	-4.1
O STORAGE TECH CORP	8	1	1.63	-0.1	-7.1
O TANDON CORP	6	1	2.25	-0.1	-4.3
A TEC INC	7	3	4.50	0.3	8.9
N TEKTRONIX INC	41	21	25.75	0.1	0.5
O TELEVIDEO SYS INC	3	1	1.19	-0.1	-8.5
O TELEX CORP	77	30	48.25	0.5	1.0
O WYSE TECH	20	11	19.88	-0.1	-0.8
N XEROX CORP	88	60	85.38	1.8	3.0
O XIDEX CORP	15	5	5.50	0.0	0.0
Leasing Companies					
O CAPITAL ASSOCIATES INTERNATIONAL INC	8	3	4.88	0.0	0.0
N COMDISCO INC	11	4	5.88	0.0	-0.1
N CONTINENTAL INFO SYS	37	12	22.38	0.9	3.9
O PHOENIX AMERN INC	13	6	6.50	-0.3	-4.7
O SELECTRAN INC	6	2	2.94	-0.1	-2.1

EXCH: N—NEW YORK; A—AMERICAN; O—NATIONAL; O—OVER-THE-COUNTER; S—SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. ON LAST TRD

(1) TO NEAREST DOLLAR

Ups 'n downs

Stocks take a cool dip after last week's heat

The Dow Jones Industrial Average went down last week nearly as fast as it went up, and computer issues took the bruises. After hitting two consecutive postcrash highs midweek, the Dow tailed off, as the specter of Friday's "triple witching hour" — the simultaneous expiration of stock-index futures, index options and options on individual stocks — unnerved some late-week investors.

Hewlett-Packard Co. became the victim of reduced estimates after analysts left the firm's investor meeting with a bad taste in their mouths (see story page 75); HP stock plunged 4⅝ points from a week earlier to finish at Thursday's close at 52⅜. Other sinkers included Ashton-Tate Corp., down 3¾ points to 23½; On-Line Software International, Inc., which fell 2½ points to 6⅜ after indicating an expected $6 million quarterly loss; Stratus Computer, Inc., off 2⅛ points to 28⅛; and Digital Equipment Corp., which gained early in the week on the heels of its decision to raise prices to offset rising memory-chip costs but ended down a half point to 110⅝. Winners included NCR Corp., up 4⅜ points to 69⅛ as takeover rumors persisted, and IBM, up 1⅛ points to 117⅛.

JAMES DALY

MIS programs marketing game

BY KATHY CHIN LEONG
CW STAFF

At one time, shoppers got free chicken at the local Lucky Stores, Inc. supermarket if they paid for groceries using the new EZ Checkout automated teller machine network.

At *Avis*, Inc., the one millionth customer returning his car via the Rapid Return computer kiosk won a new automobile.

Free poultry will not double market share, but the rash of corporate advertising and clever giveaways underscores corporate America's enterprising efforts to sharpen the MIS competitive blade.

Banking on the frustrations of an impatient public spoiled by instant food and instant pictures, big business is touting its computer services to consumers who want something and want it now. The techniques seem to be working.

Variety of media

MIS promotions have included running print and television campaigns, issuing press releases, giving away free disks and mailing brochures en masse to consumers.

Few companies have tried using television, the most expensive advertising medium. But for the last two years, Deerfield, Ill.-based Walgreen Co., a 1,400-site drugstore chain, has been running commercials on small stations around the country.

The campaign centers on the nationwide on-line Walgreen Intercom IBM Systems Network Architecture network, which tracks customer prescriptions. If customers are on vacation, they can get a prescription refill at a local Walgreen. And if the customers need a printout of how much they have spent on medication for insurance purposes, they can obtain one from the druggist's IBM Personal System/2 Model 30.

The theme of the advertisements is uniform. Consumers can save time and money using Company X's computer network. The focus is on the result, not the technology.

According to one advertising account executive, "You've got to make the message relevant to the customer."

People who travel can relate to the anxiety of dropping off a rental car in time to catch a flight. That is why *Avis*, based in Garden City, N.Y., has been running nationwide print ads for Roving Rapid Return.

This service lets the customer drop off the car in the rental lot and flee to the airport runway. Dutiful attendants wait nearby with a custom hand-held computer to log the time the car is returned, the name of the driver and the total amount of the bill.

A recent ad reads: "With *Avis*' Roving Rapid Return, it's as easy as 1, 2, 3. With Hertz, it's as easy as 1, 2, 3, 4, 5, 6 . . ."

"We are using technology to our advantage, and we want people to know," said Robert Cardillo, vice-president of marketing at *Avis*.

Reaping the benefits

Meanwhile, what does MIS think of all the hullabaloo? MIS managers are basking in the limelight. All the attention given to the services their shops produce creates drive and boosts morale.

"I get a lot of pride knowing that the general public sees what we do here," said Peter Tittler, vice-president of data communications at *Avis*.

Gary Praderelli, Walgreen's vice-president of information systems, agreed. "Every time I see a commercial, I know that the public has great expectations of us. That gives us tremendous drive to do a good job."

LAN gateways

FROM PAGE 1

work Strategies, Inc. in Fairfax, Va.

These hurdles have humbled enthusiastic market estimates for SNA gateway sales. Kenn T. Dahl, vice-president of strategic planning at ICOT Corp. in San Jose, Calif., a supplier of SNA links, compared those figures with the endless predictions of "The Year of the LAN."

Dahl said analysts predicted that 30,000 SNA connectivity products would be sold last year but said that 1987 sales reached only 25% of that figure; he forecast sales of 19,000 remote and coaxial board connections by the end of this year.

"Sales were substantially below [vendors'] expectations," he said, adding that many researchers have since revised their figures.

"It's true that the numbers have been off," said Leslie Lord, a senior analyst for IBM 3270 connectivity at International Data Corp. (IDC) in Framingham, Mass., particularly for LAN-to-host gateways.

That approach accounts for a mere 11% of the current terminal emulation market, with the remaining 89% entrenched in PC-to-mainframe links, according to IDC. "Corporate America just hasn't accepted that LAN-to-mainframe links are the way to go," Lord said, citing technical problems. But many suppliers are beginning to offer diagnostic tools that should help overcome system management and other troubleshooting problems, she added.

The simplest and, historically, most popular approach to SNA host access is terminal emulation via add-in boards and coaxial connection. It is simple and clean. "It's easier and less expensive for file transfer," said Edward Hodgson, manager of computers and communications at Westinghouse Elevator Co. Some Westinghouse users who tried using a shared device for host access soon tired of waiting their turn, preferring to use private host links.

On the rise

Nonetheless, the up-and-coming technology, according to analysts, is LAN-to-host, which offers an intelligent connection and the ability to link numerous users via one gateway to the host. It can also cut costs by eliminating the need to run cable between individual workstations and the host.

In his firm's case, "it doesn't make sense to take 400 PCs hooked into a network and do double cabling" for direct host connect, said Rick Hopfer, a vice-president at Shearson Lehman Commerical Paper in New York.

Other Fortune 1,000 companies are beginning to test LAN-to-mainframe gateways via pilots, IDC's Lord said. One such example is Travelers Insurance Co. in Hartford, Conn. It is one of the largest customers of Digital Communications Associates, Inc.'s Irma card.

However, in an interview earlier this year, Travelers executives said they planned to stop buying Irma as of this month. By the end of the year, they predicted, they will have switched 300 Irma users over to the firm's IBM Token-Ring network, which is tied into its SNA host environment.

But the axiom that LANs are best suited to peripheral sharing dies hard. "Users are just not ready to deal" with LAN-to-mainframe gateways, Hodgson said. "The problem lies both in controlling the LAN and getting people to accept LANs." Also at issue is the additional strain imposed when MIS tries to track down problems arising from such a connection.

"LAN-to-host is the architect of the future; it's wonderful," said Roy Davis, manager of systems operations labor with communications data processing at Hughes Aircraft Co. in Long Beach, Calif. "But before that can happen, people need to start trusting LANs. They get used to having control over their PC and their Irma card, and they don't want to give it up." Once users reach critical mass with LAN participation, it becomes economical to use LANs for host access, he added.

A little of both

Meanwhile, Hughes, like most other users, relies on a mixed approach. First National Bank of Chicago uses Irma cards, Token-Ring connections via a 3174 and SNA gateways off of Tandem Computers, Inc. systems.

Hughes' enormous installation encompasses 400 Digital Equipment Corp. VAXs, about 100 Hewlett-Packard Co. computers and about a dozen SNA host computers utilizing a multitude of approaches to tie DEC into SNA hosts and vice versa. There are 40 to 60 LANs, most of which are connected to the SNA hosts.

Other LAN-related obstacles include applications and the new IBM Personal System/2 architectures. "People have a tendency to presume that their host and PC applications will function together," Network Strategies' Caronelis said. "People are rolling their own LANs, and unless you are very careful, you won't get the functionality that you are looking for." The PS/2s, he added, will force users through yet another learning curve.

The next two years are seen as a watershed for links into the SNA environment. IBM's Distributed Data Management, VTAM Release 2.0 and LU6.2, or Advanced Program-to-Program Communications, are expected to ease file transfer and information exchange across the different computing tiers. But that will not happen until programmers change their mind-set — which, observers agreed, will not be easy.

"We're really talking about changing the perspective of applications development of the host. We're not used to an intelligent process coming in and creating a complex collection of activity to manage," Caronelis said.

There are few if any applications written for program-to-program communications, and beyond LU6.2, there are few standards to guide that process. And LU6.2 consumes too much of a PC's overhead, but that will change with IBM's OS/2.

Access priorities

LAN-to-mainframe software is rapidly gaining stature as an alternative to individual PC add-in boards

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CW CHART

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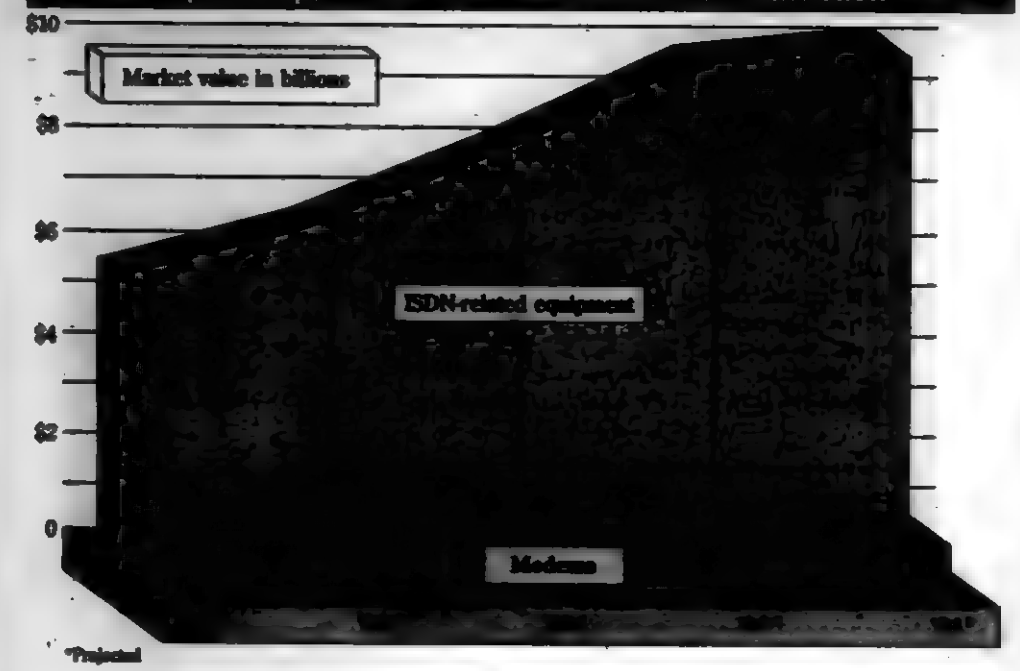
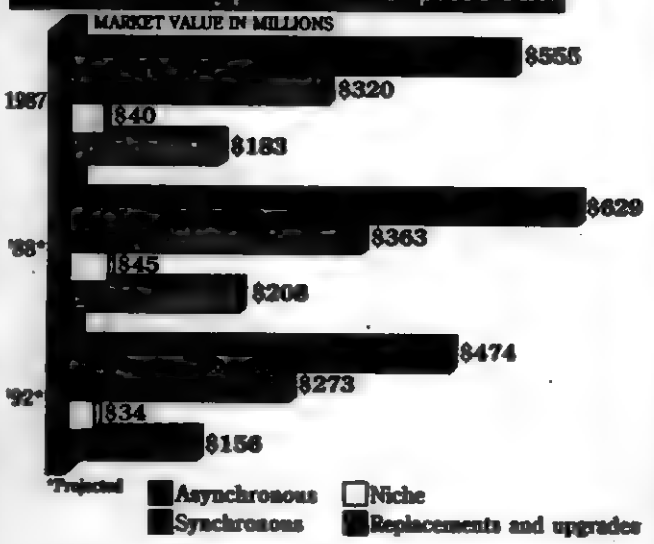
TRENDS

Modems

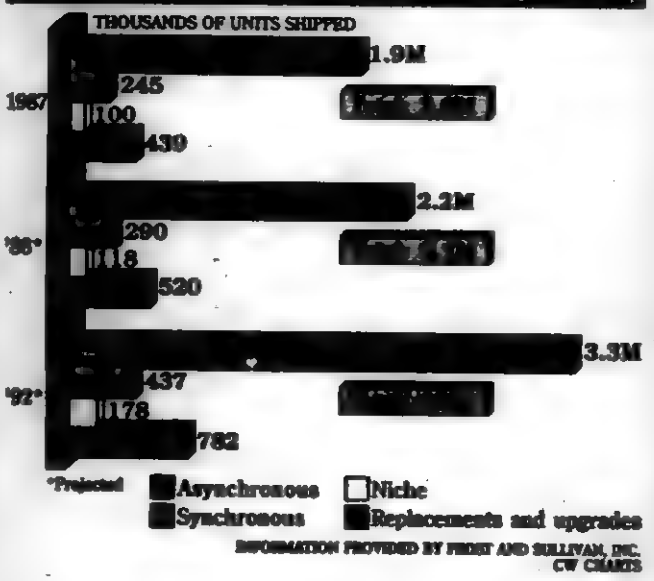
As ISDN picks up, modem revenue will start to fall back



All modem types will feel price cuts



Robust shipments try to counter price dip



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The modem is often pictured as if it is on death row awaiting the arrival of its executioner, the Integrated Services Digital Network (ISDN). But while the advent of ISDN may eventually take a bite out of modem sales, the old modem still has a lot of life left in it, according to a report recently issued by the Frost & Sullivan, Inc. research house.

Modems translate a computer's digital signals into analog so computers can communicate over analog telephone lines. Since the ISDN plan would transform the U.S. telephone system from analog to digital, it seemed like modems could go the way of the 5-cent cigar.

Not so, according to the study. Unit sales of modems are forecast to grow from approximately 2.6 million units sold in 1987 to nearly 4.7 million units shipped in 1992, the report said. But, this increase in shipments will not be enough to offset the price cuts ISDN will necessitate. The dollar value of modems sold last year hit $1.1 billion and is expected to peak next year at $1.3 billion. But the dollars will get scarcer, and sales will decrease to $937 million in 1992.

While the mid-1990s may eventually fulfill the prophecies of modem doomsayers, full conversion of analog phone lines into all-digital networks may never happen, leaving modem makers with a thin slice of the communications pie.

JAMES DALY

INSIDE LINES

Queuing up? The multiuser version of OS/2 that IBM has long talked about is in the alpha-test stage at IBM, sources reported last week. IBM appears to be shooting for a second-quarter release for the product, which should make OS/2 Extended Edition Data Base Manager more than just a personal computer product.

You won't read about Compaq laptops here . . . but you will hear about the mobile plans of AST Research. The Irvine, Calif.-based firm has significantly branched out, changing from an add-in board company to a systems vendor and will go one step further later this year with the introduction of a portable. The system is said to be a (formerly) top-secret project that will feature a black-and-white LCD screen and a high-speed Intel 80386 processor. Look for a product introduction in the fourth quarter.

Take a picture. Advanced Graphic Applications in New York will demonstrate Wednesday what it claims is the first microcomputer-based erasable optical disk subsystem. At PC Expo this week, the company will show its universal Microsoft MS-DOS driver software — which can also be used with write-once read-many, compact disk/read-only memory and magnetic storage devices — storing, retrieving and deleting application data on erasable optical disks created with Lotus's 1-2-3 and Wordperfect's Wordperfect. The demonstration will use erasable optical media made by 3M. Fall availability of the subsystem is expected.

Opening up. IBM is getting specific about how it will deliver on its promise to make Open Systems Interconnect (OSI) part of the Systems Application Architecture. The vendor's Common Programming Interface for Communications (CPI/C), a set of commands that is supposed to make it easier for developers to write applications to IBM's LU6.2 peer-to-peer protocol, will also support the OSI transaction protocol, IBM spokesman James Cypher told us recently. That means applications written for CPI/C wil be portable not only across IBM systems supporting LU6.2 but also non-IBM systems supporting the OSI protocol. Delivery date — unspecified.

Trailing edge. Word has it that DEC is set for a major Transmission Control Protocol/Internet Protocol (TCP/IP) announcement. No word on what it is, but DEC systems supported NBS's electronic mail gateway between X.400 and TCP/IP E-mail protocol Simple Mail Transfer Protocol at the Enterprise Networking Event. The company is clearly bowing to pressure to support TCP/IP. On another front, next week DEC will announce a new product for PC communications into IBM environments.

But will they also take my PCjr? At PC Expo tomorrow, IBM is expected to announce a trade-in plan under which users can give back IBM PC XTs and ATs in return for discounts on its PS/2s. No word yet on the extent of the discounts or what will happen with the old machines. Also on Tuesday, Symantec is expected to be joined by IBM for the introduction of an OS/2 version of Q&A, a popular flat file manager and word processor.

Back to school. Wang Laboratories is taking extreme measures to win a microcomputer contract at one of its most loyal customers, Johnson and Wales College in Providence, R.I. Wang, which recently broke out a separate microsystems division in an effort to boost PC market penetration [CW, May 23], reportedly has offered to donate some 50 IBM PC-compatible machines to the college to ensure a recent contract proposal. Wang watchers, however, are wondering how the company can justify giving away PCs when it has yet to discover a way to build them at a cost low enough to ensure respectable profit margins.

***Silly season on Wall Street.** While NCR stock continues to climb, one financier last week said the real Unisys target is CDC and another voice reckoned on Cullinet. And maybe Unisys Chief Mike Blumenthal has a bridge for sale in Brooklyn to pay for it all. If you know better, call the hotline at 800-343-6474 or 617-879-0700 and put news editor Pete Bartolik on the right track.*

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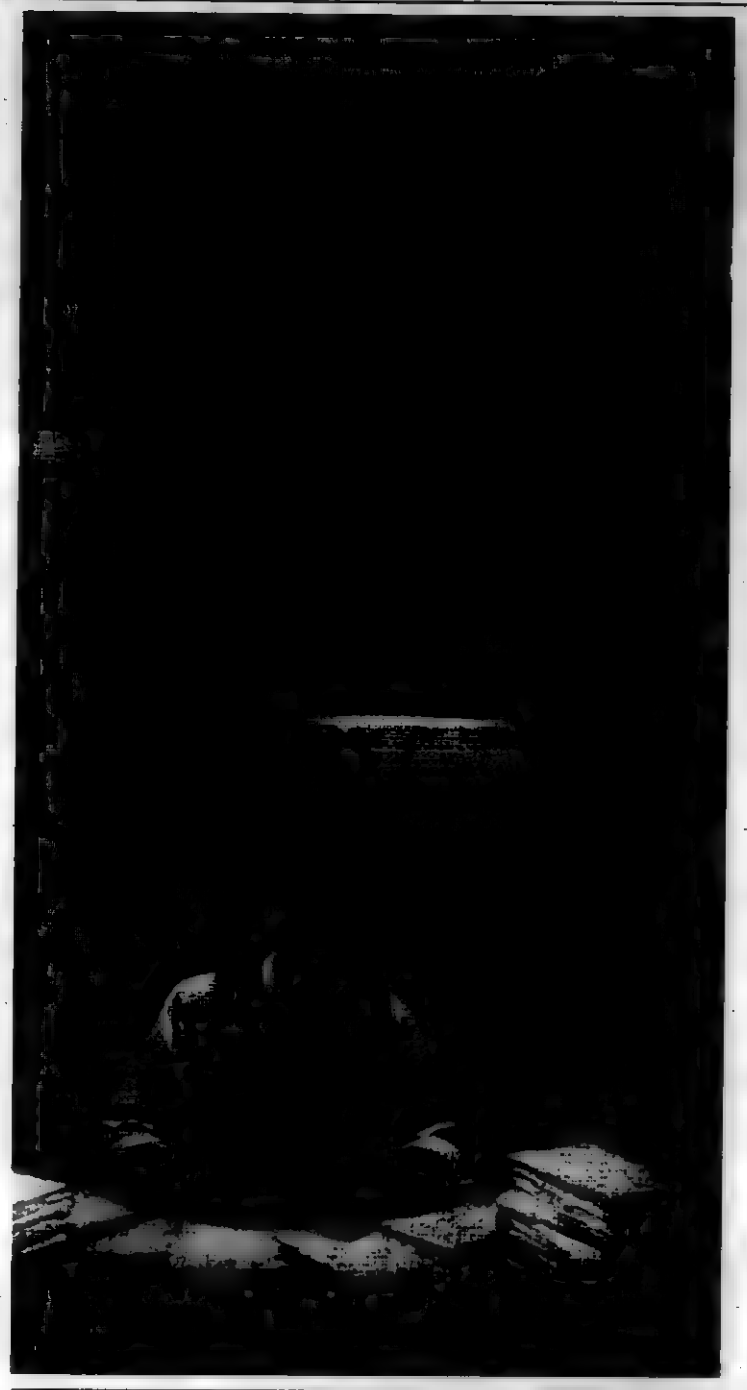

PRODUCTIVITY

THE WORD "productivity" competes only with "strategic" as the most frequently misapplied label for defending the purchase of computers. It is invoked by MIS to answer the demand that all capital investments deliver quantifiable value.

But any numerical tally of output by white-collar workers is only a fragmentary representation of what they do. We should give up counting the irrelevant, even if it is easy to.

MIS managers play this counting game to legitimize their budget

Continued on page 11

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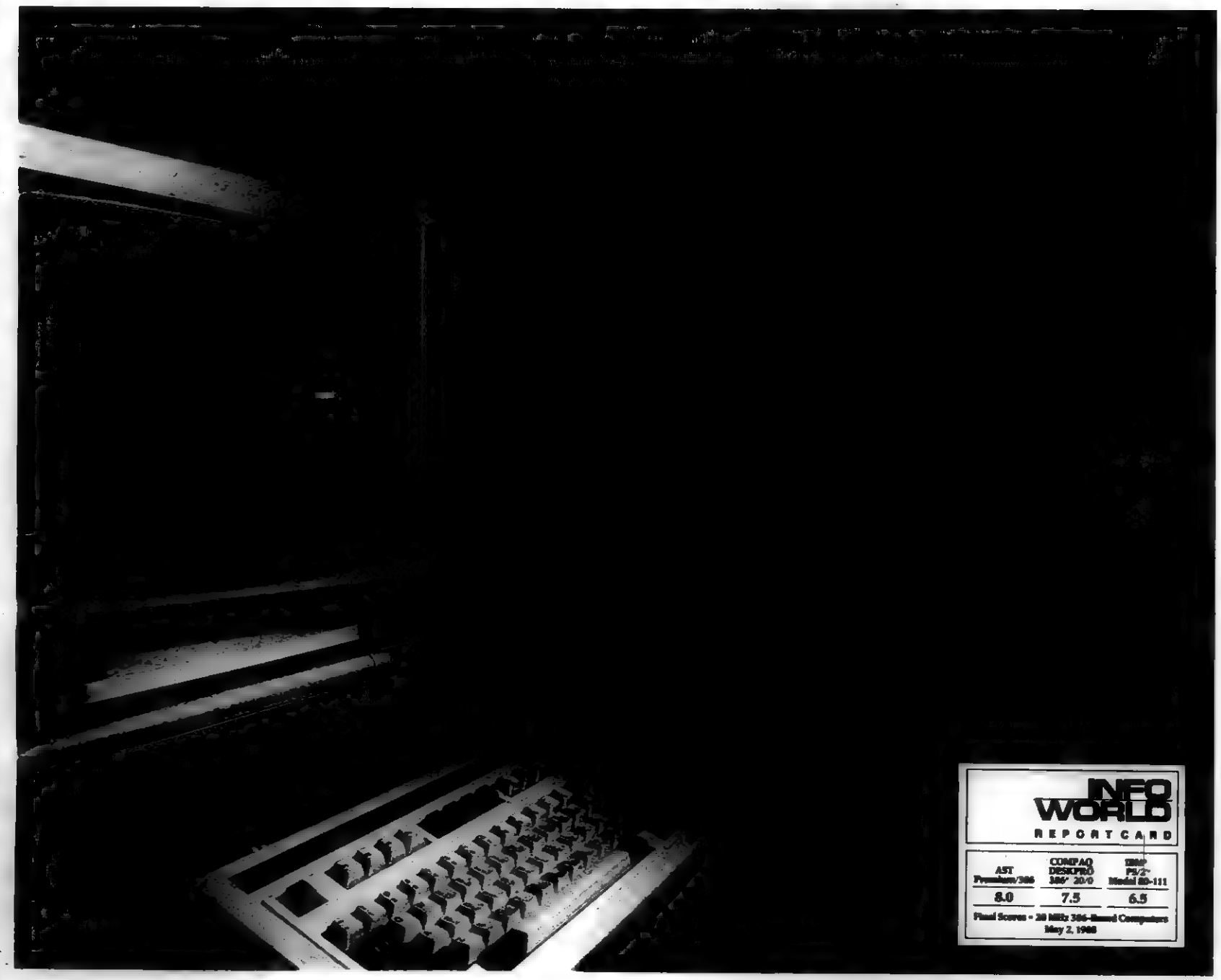

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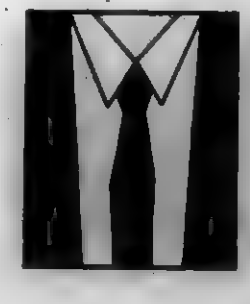

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ENTER

Productively speaking

By Russell Kay

This decade of computing is reflected in a set of buzzwords, and they're all in the name of productivity. Few articles or speeches for an MIS audience lack the jargon, showing how savvy managers improve productivity — or at least how much they talk about it.

For those MIS professionals who want to speak the language or need to spruce up their reports to management, here is a buzzword starter kit:

Backlog: A to-do list that gets longer with each productivity improvement. It used to be that only MIS had a backlog. Now information centers also have backlogs, in the form of users to train, hardware to install and software to evaluate.

And since so many end users now operate personal computers, they have their own backlogs. Backlog has become a handy measuring device: The longer it gets, the harder the company is trying to improve productivity.

Information technology: When mainframes reigned supreme, computer professionals called the field "data processing." When personal computers came along, DP people started losing control, so they called themselves MIS and renamed the field "information technology." This name hints at complexity and conveys that MIS is in charge of the really important stuff. Watch for programmers to be reclassified as information engineers.

Innovative: In the age of data processing, improving productivity was simply a matter of automating manual tasks. But in the age of information technology, it is important for a vendor to seek innovative solutions.

The word "innovative" means it has never been tried before, it's too complicated to implement, it's too expensive to support, and it will probably embroil the company in a look-and-feel lawsuit.

MARK CASEY

Leadership: This is what MIS is often told it lacks, and what it is supposed to assert in order to move successfully into the 1990s. Counts for less if the followers are out in front of the leaders.

Leverage: Leveraging your resources means that now that you've spent a fortune on productivity tools, you'd better spend another chunk on training so people will know what to do with the stuff. Can't improve productivity, after all, if the "on" switch doesn't get exercised now and then.

At budget time, when you risk losing positions that aren't filled, leverage becomes the inverse of Parkinson's Law: The number of people expands to fill the work available.

Management support: As in "I want management support." Usually what MIS means is "Give me budget, staffing, facilities, equipment, authority, influence and clout — and then get out of my way and leave me alone."

To hear MIS tell it, management support is No. 1 in importance and at the bottom of the heap in delivery.

Partnership: There's a lot of talk these days about the need for a partnership between MIS and end users. When MIS people mention this partnership, they often mean "Let's you and I agree to do it my way." This buzzword is new. When MIS absolutely ruled the whole computer roost, there was no talk of partnerships.

Proactive: Used in contrast to reactive, which means responding to users who are bombarding you with unreasonable demands. (Some in MIS consider "unreasonable demands" to be a redundant phrase.) To avoid this reactive stance, MIS professionals are being urged to become more proactive, which means doing things before anyone is interested.

At that stage, management support is nonexistent (see "management support"), there is no money in the budget, and your idea is put off until "later." Eventually, end users start asking for the project, which immediately makes you reactive.

Proliferation: A politically tainted MIS word. It means they (end users) have PCs, and we (MIS) don't like it.

Productivity: Doing things wrong faster than ever before.

Productivity gain: Being able to use the time you saved to do work that doesn't need to be done in the first place.

Productivity improvement: The ways in which things are better as a result of using a productivity tool. For example, as the ads indicate, if you implement any four productivity tools, you can cut your work load to zero or less.

Productivity tool: A tool that, if it works at all, primarily acts to create more work for the already overworked. You know it's a productivity tool if it solves some of today's problems and creates a whole new set for tomorrow.

Strategic: Often talked about with a great deal of hoopla, as in, "Now you, too, can use information as a strategic tool." If recent speeches and articles are any indication, only a handful of organizations have ever done anything strategic with information. And lately, some of these companies are being kicked in the strategic teeth and raked over the strategic coals. Strategic was definitely "in" in 1987, but be careful — it may be out by 1989.

Succeeding at buzzword use

If you really want to learn how to use these terms fluently, study the publications that cross your desk. The buzzwords are easy to find, and once you spot one of them, the rest are sure to follow.

Carefully review how these words are used by experts — experts at using them, that is. Listen attentively when you sneak off to conferences at fun-in-the-sun locations. Some speakers are buzzword pros. Back in the privacy of your office, practice using these words in context. Try saying, "Today I think I'll do something strategic."

Note that buzzwords can be used in numerous combinations. "Proactive productivity" and "innovative partnership" work just as well as "proactive partnership" and "innovative productivity." It doesn't much matter.

Stand in front of your mirror and say these words with a straight face. Keep trying; it's not easy.

And ignore the fact that these words are overused. No one else seems to notice.

Buzzwords can be used in combinations. "Proactive productivity" and "innovative partnership" work as well as "proactive partnership" or "innovative productivity."

Kay, president of Kay-tee Associates in Randolph, Mass., is a trainer, consultant and lecturer in the management of end-user computing. She is author of *Surely You Must... and Other Words on End-User Computing*, published by TEJ Publications.

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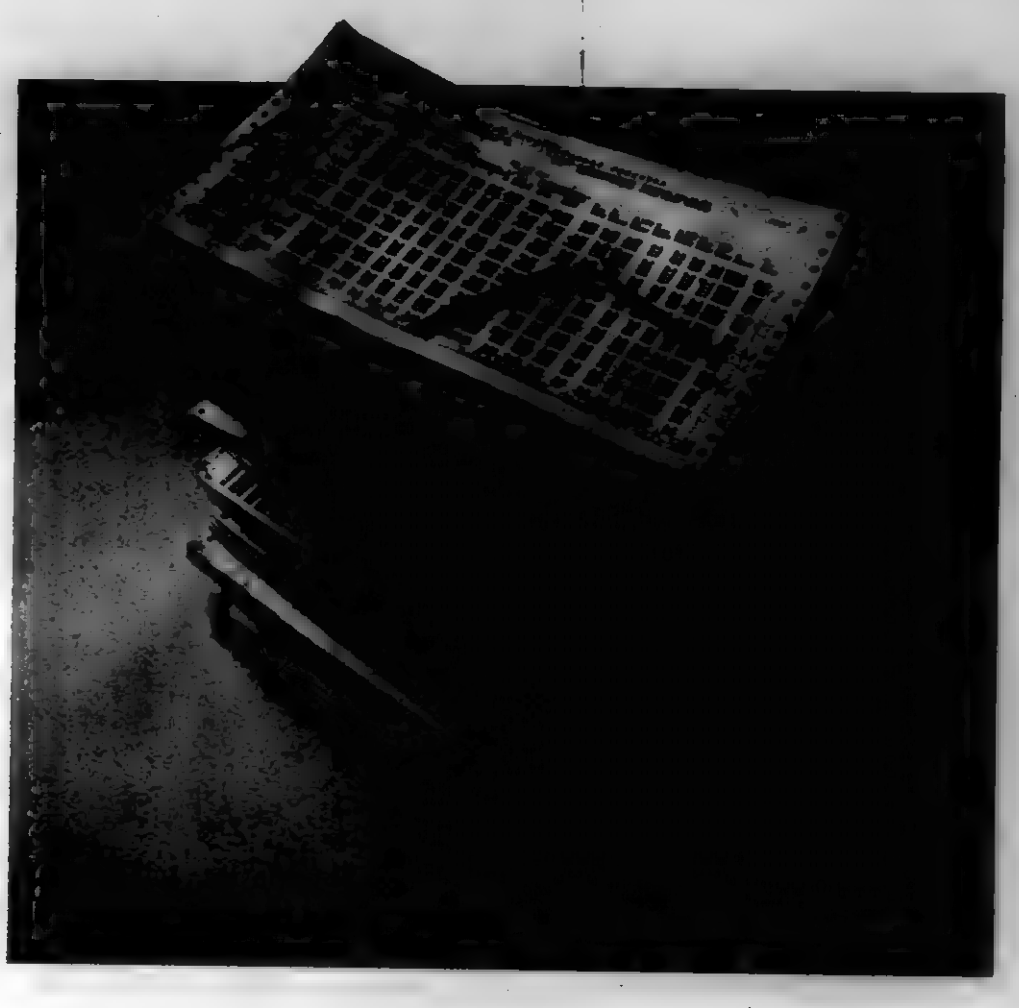

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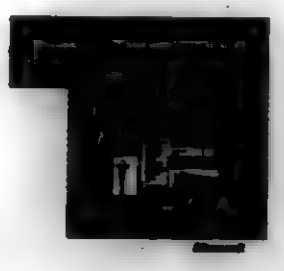

Microsoft Windows Software Development Kit.

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INTERVIEW

Stephen Roach: Stop rolling the dice on technology spending

Stephen Roach, a senior economist and principal at Morgan Stanley & Co. in New York, studies the relationship between investment in information technology and productivity in various industries. His controversial conclusion: America's technology "buying binge" in the 1980s has brought no apparent productivity gains to the white-collar service sector. He was interviewed by *Computerworld Extra* Editor George Harrar.

You found that service-sector businesses spent 2½ times as much on information technology in the mid-1980s as in 1970. What was the effect on productivity?
Productivity growth in the service sector has averaged about a half a point per year in the present decade. That compares with about 4% average gains that we're now seeing in manufacturing over the last five years.

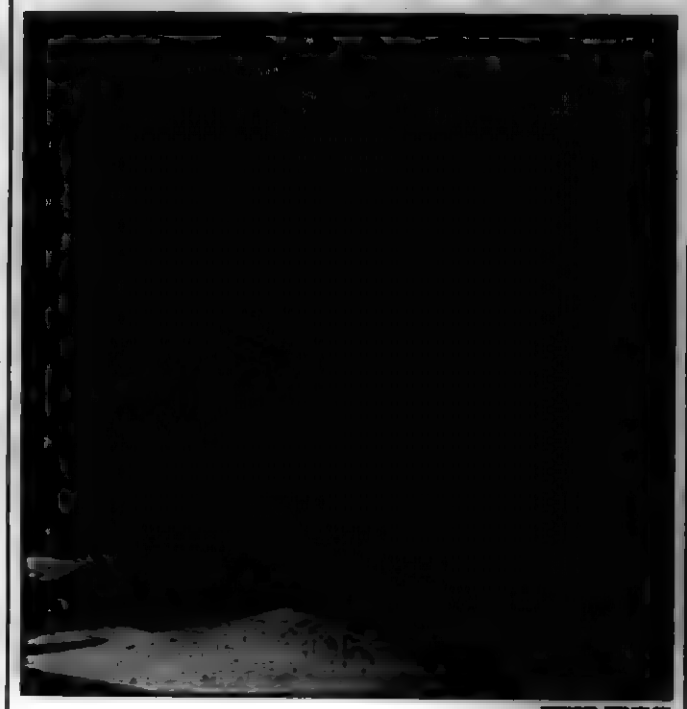
Can you quantify the investment in dollars?
For the first quarter of this year, business at large was spending at about a $160 billion annual rate in constant 1982 dollars. Of that amount, the service sector is probably spending about $120 billion, roughly 80% of the total.

If this huge investment is not bringing measurable gains in productivity, why are so many service-sector businesses still spending so heavily?
That's the $64,000 question here. We don't have a precise answer. There is the presumption that technology is good for business; that technology which can enhance computational speed is a necessity to compete in an increasingly cost-conscious and highly competitive global marketplace.

Do you dispute that presumption?
I dispute the idea that we need ever-increasing computational power to get work done by white-collar workers in our service sector. I think the myth of computational efficiency does not satisfy productivity criteria for companies or the economy at large.

American business managers are hooked on technology. Machines that appear to be compact, that historically fit in with technology acquisition, tend to be addictive.

In addition, there are a lot of hidden costs that ultimately impede productivity but are not fully assessed when the technology expenditure is initially considered. Here I am talking about MIS staffs, incompatible systems across division lines and information overload as it begins to overwhelm many corporate and managerial structures.



TYRONE HINKLEY

Is MIS hiding some of the costs, or are they just not being measured?
A lot of it is a measurement problem. We simply do not have internal counting systems that allow us to fully cost out all of the expenses associated with running information technology. MIS is part of that problem.

Can you give an example of information overload?
In my own area — the finance services industry — we have an infinite stream of information produced by our computers and telecommunications equipment. Thousands and thousands of pages of electronic news are available at any given moment. Salesmen, traders, analysts, managers don't know where to turn when they are faced with this overwhelming onslaught of electronic information.

Would you be able to do your analysis of this information problem without relying on what you describe as an overwhelming information stream?
Look, information technology is essential, it's just a question of degree. I think we have over-MIP'd ourselves.

Why are chief executive officers, who generally have not grown up in technical areas and don't have any inherent bias toward computerization, standing for such spending if MIS cannot prove to them productivity gains?
I don't think they are, which is why high-tech demand in America over the last three years has really gone through a major shakeout. We have had a recession in computer and related industries vis-a-vis historical performance, and part of that is due to the productivity disappointments that are now becoming apparent to CEOs.

Second, I would simply point out that many managers are a function of the corporate structure that they inherit. When a manager comes into a company that has historically built ever-larger portions of its capital outlays dedicated toward the acquisition of information technology, it's hard to turn that around overnight. The inertia of those purchases becomes self-perpetuating, especially since the technology cycle has immediate obsolescence.

In the latest quarter, IBM showed strong sales of mainframes. The company is still selling large-MIPS machines.
That comes after how many quarters — a year and a half — of extreme disappointment? IBM, as its stock price indicates, has really suffered a significant deterioration in the whole tone of its business.

I would be very cautious in saying that the first-quarter results mean there is still a strong underlying demand for technology. It's an improvement, to be sure, an encouraging one at that, but leaves the company well below historical growth trends.

Should we really be talking about productivity as the main justification for spending on computers and office machinery, or should we be looking at some other values — such as strategic or competitive performance — to justify investment?
Productivity to me from the standpoint of the overall macroeconomy is the ultimate benchmark by which we can gauge the success of any investment, whether high-tech or low-tech, white-collar or blue-collar. I am the first to admit it is very difficult to measure productivity, especially for industries that produce services rather than product goods.

All that implies to me — and I'm certainly not taking this need lightly — is that we certainly have to place emphasis on better measuring productivity in the service-producing economy. Ultimately, if we fail to judge high technology against some semblance of productivity criteria, then we stand the potential of misplacing a lot of resources in our economy.

And you think we have already done that?
I think it has been an important reason behind the productivity disappointments of the present decade for the U.S. economy.

You have written that money spent on information systems in many cases, for example, service-sector companies might not be spending on such things as buildings. Is money being diverted from other essential areas of the budget to information systems?
I don't know that for certain. It's hard to look at our numbers and say that if information technology was a smaller slice of the capital budget, that would free up funds that might go elsewhere.

We do know that as of early this year, information technology products accounted for about 42% of corporate America's total outlays on capital equipment — 42%. That's the single largest line item in the capital spending budgets for the economy at large as of the first quarter. That's for manufacturing and services combined — nongovernment.

But isn't a large part of that figure for communications? [illegible] telephone systems, fax machines.
About 50% is computers of office machinery; 10.5% is communications. The balance is photocopiers, scientific instruments and the like. So easily 60% of the information processing outlay goes for computers and computational pieces of office equipment.

Is the investment disappointing on the communications side?
There's no way I can pin the productivity disappointment on a specific type of investment. I simply point out the following: The productivity disappointments that we have seen as a country have been concentrated in that segment of the economy that has two very important characteristics. One, two thirds of jobs are in the white-collar occupational categories; and two, the bulk of capital stock is held in the form of information technology items.

What we conclude is that white-collar workers are not making effective use of information technology to generate the productivity gains that are required to support the economy's standard of living.

Whether it's due to telecommunications equipment or computers . . . my conclusion is that because computers are the much larger component, that's where the blame lies. However, I can't say how much is due to what piece.

Instead of focusing on productivity, why not look at the bottom-line profitability of a company or industry?
Over time, profitability and productivity do move hand in hand. Profitability is certainly an acceptable alternative.

Have you done the correlations between spending on information technology and profitability?
The service sector in some areas has done quite well in profitability, but in general has been very disappointing this decade. Over the decade, roughly two-thirds of the profitability increase we can impute to manufacturing and financial industries, which largely benefit from interest rate swings. The service sector has shown steady increase in profitability but is not the driving force behind the earnings growth of the present decade.

What industries are spending the most for computers and office machinery?
The finance sector is clearly spending a disproportionate share of its outlays on computers. Finance/insurance accounted for about 35% of total business outlays in 1985 — $46 billion. In 1986, the figure increased to 43%.

And are they consistently getting the least in return?
The answer has to be yes. The productivity disappointments have been very acute, and this is the industry that has dramatically increased its reliance on technology over this period.

How about other industries?
The service sector in the narrow sense, which would include business and personal services, hotels, health care, recreation, accounts for about 12% of spending on computers and related technology. That's an area that has had a disappointing experience with respect to productivity growth over the last seven or eight years.

Continued on following page

COMPUTER AND OFFICE MACHINERY EXPENDITURES
Percent of total capital spent in U.S., by industry*

Business Sector	1950s	1960s	1970s	1986
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Rail	1.8	1	0.4	0.1
Naval	8	5.8	3.1	1.1
Air	1.7	1.4	0.9	0.4
Trucking	1.7	1.7	0.3	0.1
Other	4.6	2.8	1.9	0.6
Telephone/telegraph	2.1	1.7	1.7	1
Broadcasting	0.5	0.6	0.2	0.1
Electric	1	0.9	0.2	0.2
Gas/other	0.6	0.9	0.6	0.9
Wholesale	0.2	8.2	11.9	15.7
Retail	4.1	4.1	2.3	1.4
Finance/insurance	16.1	19.9	26.5	43
Banks (excludes Federal Reserve)	3.4	5.4	9.7	16.7
Credit agencies	2.7	4.1	6.3	8.3
Securities brokers	0.3	0.6	1	1.7
Insurance carriers	3.4	3.7	4.6	11.9
Insurance agents	3.7	4.2	1.9	0.6
Investment holding companies	2.6	2	2.1	4
Real estate	3.2	3.9	3.9	1.3
Hotels/lodging	0.2	0.4	0.4	0.6
Personal	0.3	0.4	0.2	0.1
Business	2.9	5.9	8.6	7.1
Auto repair	1	1.1	0.4	0.5
Miscellaneous repair	0.1	0.2	0.2	0.1
Motion pictures	0.2	0.2	0.2	0.3
Amusement/recreation	0.6	0.5	0.3	0.4
Health	1.1	1.1	0.8	0.6
Legal	0.8	1.4	1.2	0.8
Educational	1.6	1.8	1.1	0.5
Other	1.7	1.6	1.2	0.8

* Figures are rounded averages over designated time periods derived from U.S. Department of Commerce data

SOURCE: [illegible] PROVIDED BY MORGAN STANLEY & CO.
CW CHART

COMMENT

John Young
President and CEO
Hewlett-Packard Co.

Competitiveness has, surprisingly, become somewhat of a buzzword in public- and private-sector circles alike. It is the ability of a nation or a firm to produce goods and services that can win in the international marketplace and at the same time earn high wages.

By that definition, the U.S. shows a declining ability to compete, because real wages today are lower than they were a decade ago.

Government and industry share the responsibility for competitiveness. With its oversight of trade, fiscal and monetary policies, the government creates the environment within which industry competes. But government can't legislate success in world markets, so industry does the real competing.

What should the private sector put on its own competitiveness agenda? My studies and conversations with business leaders convince me that using information more effectively is perhaps the single most important source of competitive differentiation that companies can and should develop.

During the past decade, businesses have applied technology on the factory floor and in the office. Results, however, have been mixed.

Automation of the factory floor can drive up output and push down costs while improving quality. The results are real and tangible, and business leaders can see a rapid return on investment.

Parallel success in the office — or at least tangible evidence of that success — has been more elusive. In fact, according to research done by Morgan Stanley Group, Inc., white-collar worker productivity has declined about 7% during the past decade, compared with a 17% increase in production worker productivity.

Hewlett-Packard's results are better — 5% and 17% growth in productivity for white-collar and production work forces, respectively. However, our results show a similar disparity between office and production environments.

These results raise serious questions about the billions of dollars that businesses, government and other enterprises invest in information resources, presumably to improve white-collar productivity: What's standing in the way of our progress?

I believe the answer falls into two categories: technical and management barriers.

Today, many progressive computer companies are committed to addressing technical barriers in many ways:

- By adopting industry standards for operating systems, languages and data base access technologies in order to foster multivendor environments as an alternative to incompatible proprietary environments.
- By creating peer-to-peer networks based on Open Systems Interconnect standards as an alternative to hierarchical proprietary networks that can impede organizational teamwork and create overhead inefficiencies.
- By providing an intuitive, easy-to-learn user interface that is consistent across applications, allows easy and frequent switching between different applications and can provide access to information across the enterprise.

While computer manufacturers overcome these technical barriers — and they are falling rapidly — companies that use information systems must solve the managerial barriers that can be found in many enterprises.

Information systems managers often view success as the implementation of an application. Operations managers, on the other hand, measure how information systems contribute to the implementation of strategy, increases in revenue and improvements in productivity. Information systems and operations managers must view goals and measure success the same way.

Management must take responsibility for developing a common view of how to respond to competitive challenges and for determining the role that information systems will play in those responses.

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You call productivity payback in many instances "a shot in the dark." And therefore the problem falls squarely in the laps of U.S. managers.

Yes, because the way the process works, the technology acquisition has been made first and the productivity evaluation is made second.

Isn't that just because it's very difficult to understand the possible productivity benefits?

Yes, but you might wonder — even though it's difficult to understand — is that really a wise strategy to follow here, of getting the equipment because you feel competitive pressures, and then trying to justify it on the basis of performance? I would think business managers might be more concerned about evaluating their needs from the standpoint of productivity as well as internal organizational requirements and then trying to purchase the machinery that is compatible with those objectives.

"If you're going to justify technology as something you got to have because if you don't, you may miss something — that's where you're getting into trouble."

I would also add that that's where the replacement cycle can get in the way, because it's not clear to me that you must meet those productivity needs by updating your stock of technology with the latest model as it comes off the assembly line.

Some information systems executives are trying to create an enabling environment, saying that information systems can't foresee how computers will be used in many cases by end users, that some of the best uses will come by seeding the company with systems. In this case, there is no way to measure beforehand the productivity, no way even to foresee the use.

That's what I mean by rolling the dice. If you're going to justify technology as something you got to have because if you don't have it, there's a chance you may miss something — that's where you're getting into trouble.

I stress the point I made earlier: Information technology is now 42% of corporate America's budget on total capital equipment.

There's got to be more to capital accumulation than just taking a chance on missed opportunities. That is a reality that is starting to question the wisdom of open-ended technology acquisition. It's a very expensive endeavor. It was one thing when the outlays were 15% to 20% of the total, as they were a decade ago. But when it's 42% and climbing near half of industry's total capital expenditures, that's when you have to question the wisdom of that strategy for the economy at large.

What can MIS managers do to be proactive here?

There's a lot they can do. To a large extent, the hidden MIS costs are now coming out of the closet. Corporate managers are starting to become highly sensitized to that fact that MIS is that portion of the iceberg that is right below the surface here, and that the hardware is just the tip of the iceberg.

MIS can make a real effort to deal with architectural incompatibilities between different systems with a company, which is a very common problem, and get a handle on the information overload aspect of the output of this information technology. Finally, MIS managers can do their best to keep their costs in line with computational needs and labor costs. The labor cost of MIS staffs is enormous relative to the hardware cost.

Switching to the manufacturing sector, I assume you would say companies here are spending on information systems more in proportion to other expenditures and getting more value out of it. Why do you think that's the case — because machines exist in time and space, where their performance can be seen more easily?

Manufacturing has a tradition of predicating planning and budgeting in a way that is compatible with the production of a tangible good. Most business managers came out of the business schools of the 1950s and '60s, which taught them a lot about productivity management on the factory floor.

The problem is that service managers have come out of the same environment, which was largely a manufacturing heritage. The problem we are finding is that many business managers are treating their service-based enterprises similarly to factory-sector companies. But the productivity-based management system does not translate easily into a company that is employing white-collar workers to make

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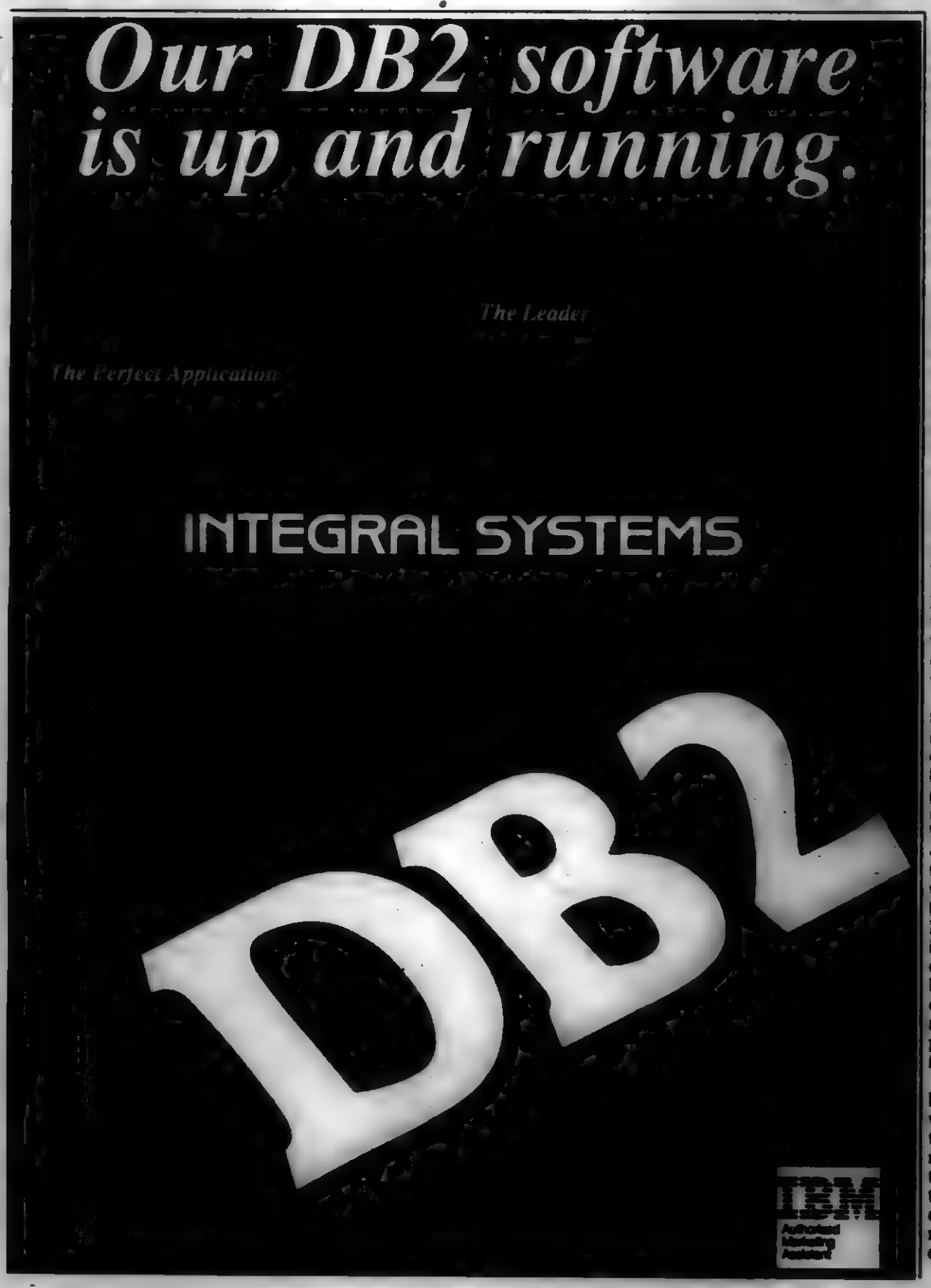

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19	39	59	79	99	119	139	159	179	199
20	40	60	80	100	120	140	160	180	200

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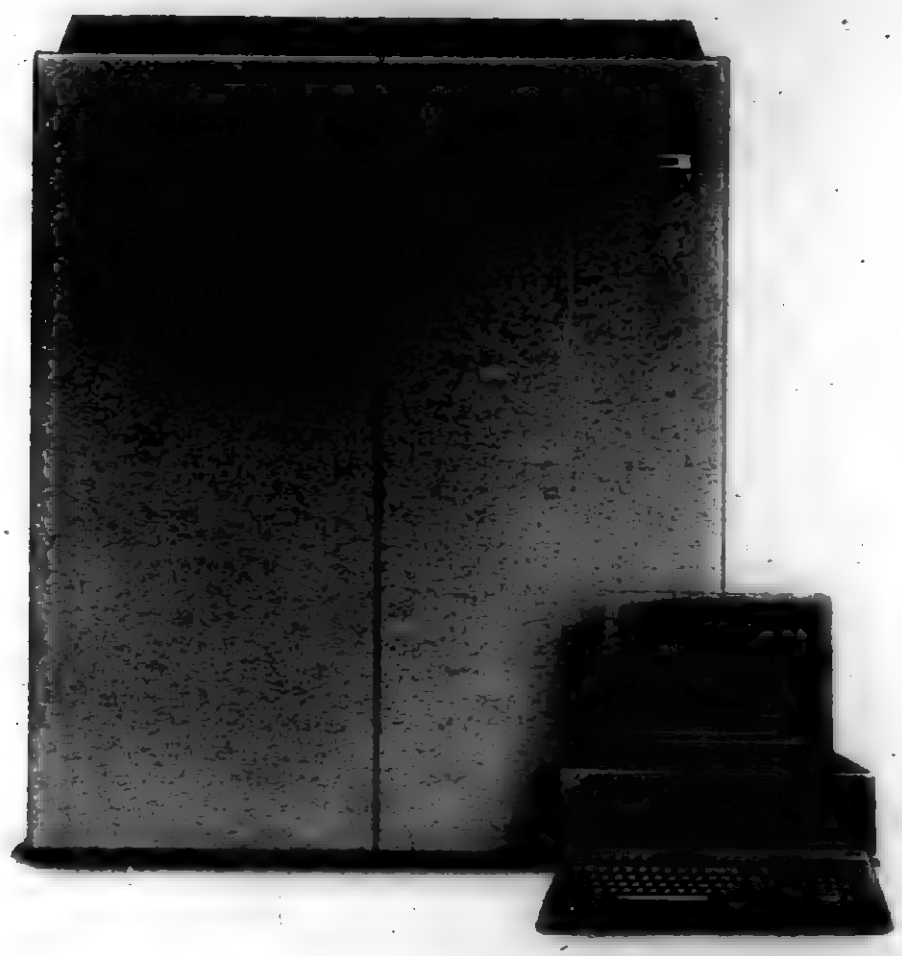

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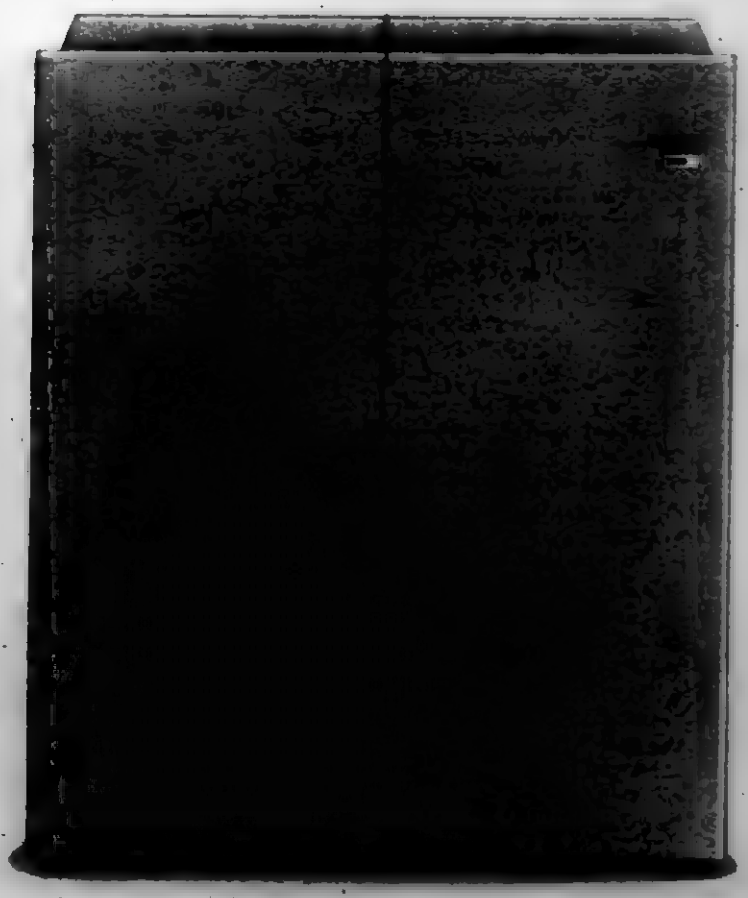

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Circle Reader Service Number 4

Continued from page 8
an intangible product called services.

So manufacturing is doing better in part because managers are better at managing the use of computers there?
We've been far more selective in technology acquisition.

But the manufacturing productivity paybacks have come from hard, old-fashioned ways of cost-cutting — closing inefficient plants, reducing work forces. The computer has been a marginal or secondary player in that practice.

How have computer and communications vendors reacted to your findings?
They don't like them at all — it's a threat to the justification of the product as an essential ingredient in the growth of their industry. I can certainly understand the displeasure with these findings, but I think it should be viewed as a challenge to make information technology work, not as someone who is critical of the product itself.

> **"Productivity paybacks have come from hard, old-fashioned cost cutting."**

You do not dispute that information technology is essential to the functioning of a corporation?
I think history will judge the Information Age as being a period of structural change comparable to the Industrial Revolution, the advent of the factory assembly line, the development of a nationwide railroad system. It will go down as a singular event in the economic history of the United States.

But just as in all of those earlier periods, the U.S. economy has to make an effort to understand, digest and learn to work with a new technological breakthrough. We cannot take for granted that computers, telecommunications equipment and other high-tech machinery will automatically give us a payback. We have to work very hard to understand the technology and better incorporate it into the work effort of the U.S. economy.

If information technology is by far the largest part of capital expenditures in the service sector, and if the service sector is the largest part of the U.S. economy, and we know the economy is suffering from a tremendous productivity problem right now, is information technology — specifically computers and office machinery — the major problem with American productivity and the economy?
The key players in the U.S. economy, whether it's policy makers or business leaders, have made a major bet that an information-based service economy is in fact the essence of the economic growth and prosperity in the latter part of this century and probably well into the 21st century.

To the extent that information technology is the single most important tool at the disposal of the workers in this segment of the economy, that is where the pressure will be to realize ever greater gains in productivity, profitability and income-generating prosperity for the economy at large. That's the only answer.

We're well ahead of our major industrial competitors in shifting to a service-based information technology economy. Yet we're also lagging the pack in terms of productivity gains. That's not meant as an indictment of computers and information technology. It's saying that this is the stuff that is the key to our next competitive challenge. That's why I say it's appropriate to characterize the productivity problems in the service sector as America's real or hidden competitive challenge.

COMMENT

Jim Manzi
President, Lotus Development Corp.

White-collar productivity is under fire these days, and the personal computer is bearing the brunt of the criticism.

Corporations are questioning their multimillion dollar investment in computer technology — including 15 million PCs, hundreds of thousands of which made it onto the desktops of professional workers without going through the corporate appropriations cycle.

Business publications, Wall Street economists and industry watchers — whom I dub the Productivity Police — fuel these concerns, asking, "Where's the beef?"

While the PC industry definitely needs to come up with sound illustrations of improved white-collar productivity, I wonder sometimes how outputs like leadership, motivation, teamwork or the birth of new ideas can be measured.

These are the intended goals of white-collar productivity — not the ability to generate more information, better and faster. The goals are to use strategically the masses of information available today, to make better decisions and to think.

Improved white-collar productivity — what we call "the New Productivity" — will be realized by those companies that take their PC investments beyond people and process automation. New Productivity companies look for ways to use technology to restructure current business processes and, ultimately, to transform their businesses. Their PC investments are driven by a strategic business vision, not by a technology vision. Here is where return on investment soars.

In a study we undertook last spring with 13 of our largest customers and the management consulting firm of Nolan Norton & Co., we learned some of the steps firms are taking toward the New Productivity.

The PC revolution, by putting raw processing power and analytical tools into the hands of individual workers, was a start. It created a nation of workers whose power and performance were boosted by their ability to access and use information.

Today, the needs of these highly computer-literate end users, coupled with corporate pressures, are driving the evolution of the PC software industry by demanding products that serve identified purposes and enhance decision making. Technology for technology's sake is no longer accepted.

Categories of products that address these demands include software tools, as opposed to "solutions"; applications that act as integrators; compact disk/read-only memory (CD-ROM) technology; and work group computing.

The traditional PC-user relationship consisted of the PC application sitting between DOS and the peripherals and the user. The new software environment puts the operating system in the basement with a multistory building of tools on top — including commercial software for compound documents, which integrates text, graphics and data seamlessly; user interface tools; applications; and various development languages.

PC applications will also increasingly be asked to serve as integrators in multivendor environments — preserving existing investments by means of forward and backward compatibility, software bridges from one platform to another and familiar user interfaces. Portability, connectivity, usability and extensibility are the key criteria for the new generation of PC applications.

Meaningful access
The New Productivity — adding value to transform data into information, knowledge and, finally, strategic decisions — will be enhanced by applications that connect resources, data and people. Examples are powerful data base servers and front ends that give meaningful access to corporate data bases.

CD-ROM technology will also make a profound impact on the New Productivity. A logical extension of the trend toward concentrating more data on compact media, CD-ROMs bring more global information directly to the end user. To gauge the growth in CD-ROMs, look at electronic data base publishing, whose 1986 industry-wide revenue of $4.5 billion will swell to more than $11.2 billion by 1991 — a compound annual growth rate of 20%, according to "Electronic Information Industry Forecast/North America, 1986-1991."

The real benefit of CD-ROM will lie in applications software that can add value and meaning to the information. For example, commercial data bases coupled with analytic software on CD-ROMs could allow trend information to be drawn directly into a customized spreadsheet program, so that users could compare corporate performance against industry norms.

Think again
The bottom line of the New Productivity is a company's ability to capitalize on a good idea or strategic vision technology makes possible. Real productivity will accrue to firms that organize to take advantage of technology's strategic benefits. For most companies, that means a fundamental change in the way they function.

Work group computing is an important outgrowth of this change. Today's information-based companies are evolving into organizations peopled by true knowledge workers — that is, workers whose level of specialization is so high that they no longer require layers of middle managers.

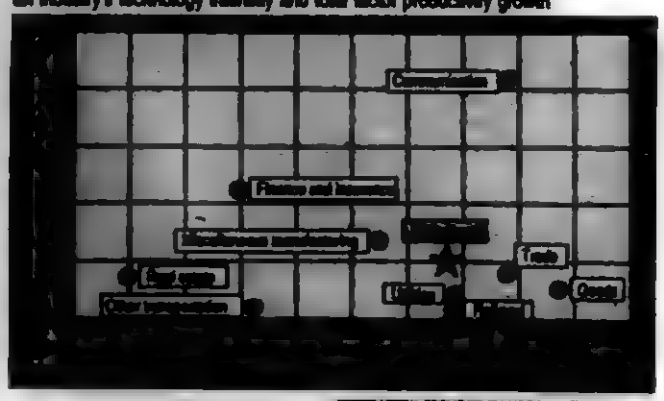
In these organizations, information is likely to be shared more laterally and decisions are likely to be made by task-focused teams, which work synchronously, rather than sequentially. A global economy and better communications hardware mean that such work groups stretch across disciplines, departments, divisions and time zones.

At Lotus, we recently previewed our first tool designed for work groups. Notes will allow groups to share text and graphics, to convene a meeting and to maintain centrally accessible records of events and source materials related to a project. It will make it easier for people to capture ideas, analyze information, communicate decisions, present results and share resources.

As heretical as it may sound, the New Productivity will result from people spending less time in front of their computers and more time thinking. PC applications that can free time for creative thought will deliver real productivity and profoundly affect the way the world does business.

ILLUSTRATION BY JUDITH HOWE

TECHNOLOGY INTENSITY AND PRODUCTIVITY
For the years 1979 to 1986, there is no discernible relationship between an industry's technology intensity and total factor productivity growth



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Productivity

By Paul Strassmann

Continued from cover

increases. After all, everyone — from the president down to local businessmen — suggests that we suffer from a national productivity problem that must be solved, preferably through advanced computer technology.

The generally accepted definition of productivity is the ratio of output to input. It is usually expressed in terms such as tons per employee, checks per hour, pages per secretary or revenue per salesman. If these measures can be directly attributed to profits — as is the case with most direct costs — then the conventional approach to productivity gives useful results. But I estimate that less than 35% of wages and salaries in the U.S. can account for their productivity in this way.

What about the other 65%? One cannot define productivity for most professional activities — meetings, consultations, accounting, programming or research — by applying the quantity-based I/O ratio.

- Automating the production of useless manuals cannot be counted as a productivity gain, even though numerical calculations can "prove" it.
- More lines of code do not necessarily result in useful code.
- Speeding up committee meetings or doubling their frequency avoids the question, Why are the meetings taking place at all?

Productivity gains from generic managerial applications such as electronic mail cannot be detected by any known industrial engineering method. For activities requiring professional know-how, I propose using measures that embody both value and risk as the indicators of merit.

Truth before

I keep a bulging file of productivity claims that seek to justify the purchase of information technology. For example, one large federal agency based its purchase of personal computers on the fact that the PCs would cut back by 50% the time required for acknowledging people's inquiries. With the new equipment, the agency achieved its target response time of 10 days.

What the numbers did not reveal was the steady deterioration in how long it took to actually resolve the problems for which the inquiries were made. Problem resolution was the responsibility of a different section. The cost-benefit analysis only reported the speed with which standard computer-generated acknowledgments could be mailed out. Furthermore, the rapid initial responses actually increased taxpayer dissatisfaction — they intensified people's anticipation of a response to their questions.

Then there is the case of the high-technology division of a reputable computer-aided design (CAD) firm. The company managed to reduce drafting manpower just enough to offset the considerable costs of CAD workstations. It then claimed 68% productivity gains, based on the engineers' ability to produce a much larger number of engineering change orders with a shorter lead time and with higher quality, as rated by the engineers.

What the numbers did not show was a simultaneous downturn in the firm's profitability. Poor results were attributable to a change in competitive conditions that now called for a much smaller number of change orders. The costly and highly promoted CAD investment could not deliver expected gains.

There is a computer manufacturer that trains its sales force to make presentations to customers on how to calculate the productivity of any data center. The customer is advised to count as savings the cost of people not hired to do the job using pencils, hand-held calculators and paper. These synthetic gains are obtained using an elaborate spreadsheet program, which usually yields more than 1,000% gains.

Beat the budget

On many occasions, I have reviewed budget proposals calling for a customary 15% annual cost increase in information technology expenses, even though profits were down five years in a row.

The increase is touted as a good deal, since it already reflects the benefits of a 20% productivity gain from lower computer prices as measured in thousands of dollars per MIPS. But the real issue is how to increase profits, not how to lower data center costs.

What these stories share is an almost universal tendency of organizations to apply measures of productivity that fit the narrow scope defined by the budget.

In large, multilayer, hierarchical organizations, the most important event of the year is budget time. The budget of production people — in other words, direct costs — flexes with revenue. Their productivity can be evaluated within the narrow confines of a production unit.

But knowledge-based work is different. It is funded as a fixed cost. Each unit must pass through the budgetary inquisition and defend its claims for scarce funds. Personnel asks for its share, and so do the legal, government liaison, accounting and systems planning departments.

This process imposes on everyone a compulsion to generate productivity indicators, regardless of whether these notches bear any relation to the value added to the organization.

No wonder thoughtful managers despair about playing this annual charade — they come to realize that knowledge work is a systematic phenomenon that cannot be isolated in the same way as stamping out gaskets or drilling holes.

Put it into context

The effects of useful professional work remain largely outside of artificially constructed intra-organizational charters. Even a small malfunction in a department such as market research, legal or planning may bring catastrophe to the cash flow of an entire institution. The value of knowledge work must therefore be observed and measured first in the context of how the whole enterprise performs.

You can discover whether knowledge-based work is productive or not if you measure the overall results delivered by the entire management team. Individual contributions make sense only if you can connect them to the overall effectiveness of information handling — which is my definition of what management and management information systems are all about.

The health of the organization is like the health of the body. Highly productive kidneys don't amount to much during a heart attack.

Live margin

At present, measuring overall organizational performance usually boils down to return on assets or related ratios, such as return on investment and return on equity.

These ratios measure the productivity of capital. But how efficiently you use capital no longer determines the success of a knowledge-based organization. Superior management is the magic element that separates excellence from mediocrity.

The productivity of management should be measured directly, not by a poor surrogate such as its capital-use proxies. I therefore advocate the concept of return on management.

Just as return on assets is cal-

Continued on following page

Strassmann consults on justification, budgeting and planning methods for profitable investment in information technology. He is retired as chief information systems executive at Xerox Corp. and is based in New Canaan, Conn.

USER VIEW

Raymond Perry
Vice-President of MIS
Avon Products, Inc.

Productivity is a wonderful word. It calls for all the best that management and technical people can create. Everyone is in favor of it, and as a national goal, it is right up there with motherhood and apple pie.

Unfortunately, unlike motherhood and apple pie, it is very difficult to recognize or create.

Generally, we think of productivity as generating a known output or product while reducing the input or resource expenditure. Although this is a comfortable way to view the equation, the definition is difficult to use for two main reasons..

First of all, while we commonly choose dollars, man-hours or some other easily defined measure of input, the measurement of output presents a problem. If output is expressed in constant units, we can understand the productivity improvement as we reduce the resource input.

However, new technology typically creates a dramatically different output. For example, a computer supported order-entry system doesn't just take orders faster and at less expense. It also allows the customer to immediately know that the item requested is out of stock and allows an alternative to be selected. The added function is difficult to quantify and measure when we ask how much the output has increased.

Second, companies seldom care just about making the same product with fewer resources. What they really want is new, expanded, different and more valuable products for the same or marginally greater resource expenditures.

To put it another way, sometimes being the low-cost producer — the result of the same output for reduced input — isn't enough. What really provides corporate growth and sells the chief executive officer is new product function.

In information systems, we deliver productivity primarily by delivering new business functions to other departments in the organization.

At Avon, we have been working on a way to identify our customers by name and address so we can more closely track their needs and be sure they continue to receive our products whenever a representative moves to a new territory.

Although there is a cost to maintain and track each of these customers, the productivity is clear in terms of improved service to our customers and increased business for the company.

Any actual measured productivity gained through technology is difficult to specify. The classical measures — such as sales per employee or time to handle a customer order — fall short of effective measurement because they fail to assess the full value of the output.

For example, in the order entry case cited above, the customer is more satisfied receiving an alternative product than an apology for an out-of-stock item.

This greater customer satisfaction, however, has been achieved at the expense of an increase in the time needed to handle the customer's order.

In examining how the information systems contribution is viewed in most information organizations, the two key measures of performance are service and impact.

Service means keeping systems operating correctly and effectively. If the computer doesn't run or the invoices aren't correct, the information organization becomes a target of frustration and anger.

When service is provided to the expected level, the organization can then serve as an agent of change and begin to improve the way the business operates.

Productivity is relevant to the information systems organization because business improvements must be linked to the technology investments and must be tracked with a positive return. At Avon, we review this step each quarter and make new investment decisions based within this perspective.

The continuing challenge for the information systems executive will be to define the impact of technology and show how the resulting changes positively affect business productivity and performance.

Continued from preceding page

culated by dividing the residual value by assets, so return on management can be derived by dividing the residual value attributable to management (that is, what is left after everyone has been paid) by the total costs of management, including secretaries, headquarters buildings, bonuses, entertainment and, yes, personal computers.

The simplicity of this method places inescapable limits on individual productivity claims, since the total of each productivity contribution can never exceed the aggregate. In this way, return on management can distinguish productivity enhancers from productivity detractors.

Risk of knowledge work

There are snake bites and there are insect bites. You better know the difference.

All information-rich professional work carries high levels of risk. Information work is a gamble because it is so easy to overlook the unexpected coming from an unanticipated direction. Manufacturing is much more predictable, since it usually consists of tangible situations that are confined in time, in space and in use.

Computers have not reduced the risks inherent in knowledge work. One can easily argue that rapidly evolving information technology further destabilized the jobs of information workers, who already represent 57% of the U.S. work force.

Therefore, one cannot speak about measuring the productivity of information work without also giving weight to its risks. One should, for example, consider a less perilous medium-gain productivity enhancement, instead of an extravagantly venturesome one offering enormous gains.

But how does one discriminate between lesser gains and extravagant expectations whose payoffs are either medium or enormous?

Perhaps the best way to illustrate this proposition is to recall the 1972 flight of an Eastern Airlines L-1011, which crashed in Florida, killing 100 people. When a light that indicates whether the landing gear is down didn't illuminate, all three pilots in the cockpit became engrossed in solving the problem (a "critical success factor," therefore one must pay attention to it). It turned out to be a faulty light bulb.

Meanwhile, as the recording of the cockpit conversation showed, no one noticed that the plane had begun a gradual descent that finally led to its crash. In my view, the captain could not discriminate between the potential problem with faulty landing gear and the risk of crashing.

I collect stories about failures of major MIS projects. Almost everything can go wrong — and frequently does.

- Everyone took shots at Price Waterhouse consultants for misjudging the efficiency of a new data base package, even though the New Jersey Division of Motor Vehicles was initially enthusiastic about the proposed solution as a cost-saving short-cut.
- When Bankamerica Corp. was going to spend $5 billion on integrated MIS operations, everybody applauded the firm's far-sightedness. Then MIS Chief Louis Mertes left the company in the wake of the failure of an $80 million accounting package.
- Congressional committees looking for revenue supported the Internal Revenue Service in a $300 million reprogramming project until the Auditor General found problems with conversions to Cobol.
- Blue Cross/Blue Shield of Wisconsin apparently lost records during an all-out effort to realize large operating savings.

What do these cases have in common? They can be traced to a disregard for making explicit, formal risk assessments at the launch of a major program. The original sponsors of computerization projects become so engrossed in their greed to pocket theoretical gains that they disregard an old gambler's rule: All large productivity gains are a bet and all extraordinary productivity gains are a hazard.

Computer project sponsors, vendors and MIS managers forget that the U.S. achieved its current economic standard with less than a 4% steady annual productivity gain over a 100-year

80% of new consumer products won't survive one year in the marketplace.

UN

period. Why, then, is there the compulsion to quote 50% to 1,000% productivity gains for computer projects?

For instance, a recent popular book, *The Information Edge*, details 63 case studies with annual productivity gains averaging 1,000% and up to a spectacular 100,000% gain per annum.

Why are so many of us willing to commit to foolish promises? The fact is that making promises is so easy. In contrast, quantifying the betting odds of the proposed venture is not seen as a desirable agenda item when selling a "strategic" system.

Bogus productivity claims — like lottery advertising — are rarely based on an obvious misrepresentation of facts. I usually find them embedded within elaborate feasibility studies.

I recently examined a very pretty 121-page proposal for spending $25 million on an innovative customer service support system. The spreadsheet tabulations filled 82 pages and contained, down to cabling length, specified program projections until 1994. The wealth of detail and the supporting time schedules, diagrams and systems charts were impressive.

The intrinsic fallacy of this study, as in many others, is found in which columns are added up in what way. For example, cash outflows in the next six months are subtracted from the expected cash inflows in the next five years. Easily verifiable detailed cash expenditures for equipment and telecommunications are subtracted from costs and savings. But there were other line items added or multiplied indiscriminately on the spreadsheet that I judged as ambiguous, borderline, doubtful, muddled, precarious, suspect or blind faith.

Even though, on average, the proposal offered very attractive returns, it hid the fact that, by my reckoning, the way the benefits are back-loaded, there is at least a 10% likelihood that substantial losses could result.

Try outlawsetting

All forecasts are risky and all projects involving computers are unpredictable, especially when one estimates long-term benefits. I therefore advocate that productivity estimates — including computations of return on management — explicitly show the confidence limits one places on each significant element of cost and benefit.

In statistical terms, each cell on the spreadsheet should be defined as a probability, not a certainty. That is not the same as biasing the numbers so that results are acceptable. The sum of biased numbers yields an unreliable number. In contrast, the sum of probabilities from each cell reveals the underlying risk profile. It represents all interactions between known and unreliable estimates, which is something management should know.

Remember that productivity is not intangible. It is a measurable attribute of an organization as it manages risk-discounted cash flows. Vendors will not take intangibles as payment for equipment. Programmers don't get compensation expressed in units of competitive advantage.

Out there exists a cruel world that deals in terms of risky cash outflows and even more chancy cash inflows. Cash-based productivity measures are inherently simple — and badly needed to clear up the current confusion about how to figure out what productivity level to shoot for.

When you try to measure the output of information work, value — not quantity — is decisive. Since value in a knowledge-based organization is created by management and not by capital, the productivity of management should be computed by finding out what value it adds.

How you manage investment risks is the decisive factor of large productivity gains from information technology. Computer project proposals should reveal not only the expected outcome but also the best and worst probable outcomes.

How, then, can you tell what is real productivity? All you have to do is to compute the risk-adjusted cash flow of your management's value added. It might affect your outlook and even change what you do.

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How to handle any executive attitude

By Cyrus Gibson and Robert Braley

It's hardly worth buying a stylish Maserati if you leave it in the garage or only use it for a slow commute on crowded streets.

Yet most businesses do the equivalent — invest heavily in the visible manifestations of information technology and then use them to only a fraction of their potential.

For example, a retail bank took an early lead in automated teller machines (ATM). Ten years later, however, it found itself seriously behind.

The bank lagged in linking to the networks of other banks. It lost the leadership of its ATM champion when he switched jobs. And needed enhancements to the ATM system fell victim to cost controls.

In another instance, Roger Smith, chairman of General Motors Corp., espoused a widely publicized vision of information technology in the early 1980s. Uniform data bases and common systems would underlie the paperless office. Robotics would reduce the cost of manufacturing. Microprocessor technology used in assembling GM's future Saturn cars would win back market share from the Japanese.

Today, GM's investments are widely criticized as either underused or misused. Smith held the vision, but it appears GM's senior management underestimated how much change would be necessary to implement it.

As these examples demonstrate, the buck stops at the top. MIS managers often get caught between what they and their end users see as the promise of information systems and upper management's technological myopia.

Top executives' attitudes on information systems fall into five categories:

- Technology is a disease.
- Technology is a cost.
- Technology is a tool.
- Technology is a means.
- Technology is a catalyst.

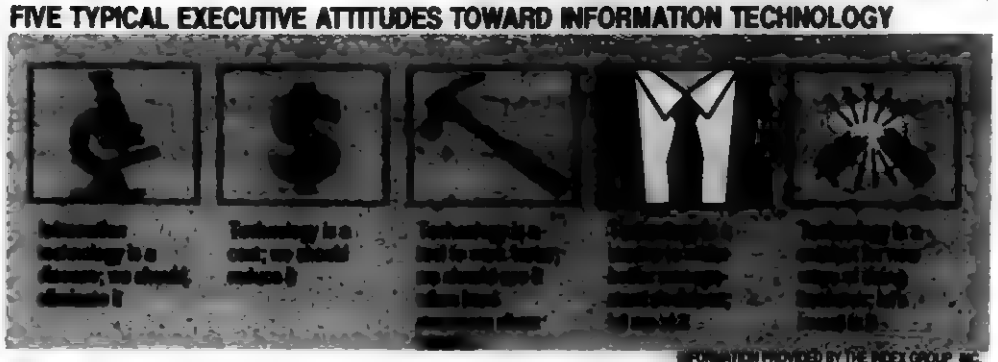
You can recognize executives who regard information technology as a disease: They take a negative attitude toward virtually any system. Although members of this category are probably the rarest, these information-age Luddites are most likely more common than most people realize.

The impact of the disease attitude on the organization is extremely inhibiting, and there is little chance that the executive will directly approve or participate in the expansion of technology.

Of the five attitudes, the dis-

Gibson is a senior vice-president and Braley a senior associate at Index Group, Inc. in Cambridge, Mass.

FIVE TYPICAL EXECUTIVE ATTITUDES TOWARD INFORMATION TECHNOLOGY



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USER VIEW

Gerald Simonson
Project manager
Martin Marietta Astronautics

As part of a three-year project completed in 1986, a group of 42 engineers at Martin Marietta Astronautics in Denver showed substantial gains from using personal computers.

The engineers reported a 24% savings in labor hours, a 62% rise in quality, a 28% increase in creativity, a 52% gain in quality of work life and a 35% improvement in efficiency.

The engineers were among about 200 white-collar professionals conducting technical studies and preparing technical proposals. Midway through, they participated in a study by accounting and consulting firm Peat, Marwick, Main & Co. on the value of using Apple Computer, Inc. Macintosh computers. I believe that the measurement techniques used are applicable to office professionals in many industries, and the results there might be just as dramatic.

My interest in measuring the productivity of personal computers began three years ago when, as manager of technical and management information systems, I was charged with identifying methods for improving productivity.

Intuitively I believed PCs offered the most potential. Earlier, during beta-testing of Apple Lisa computers, I had learned to appreciate the importance of graphics to engineers.

Engineers think and express themselves with graphics. In addition, they use graphics to explain concepts to their peers, superiors and customers. The Apple Macintosh and LaserWriter produced block diagrams, schematics, tables and descriptions of configurations and design concepts faster and better than any of our older tools.

The 90,000 view-graphs we produced in the first two years of our project testify to the importance of graphics to engineers.

By the end of the first year of our project, we had acquired approximately 70 Macintoshes and 30 IBM Personal Computer XTs. Although the engineers believed their productivity had improved, we weren't able to quantify it.

Tallying it up

The Peat Marwick team began with interviews of the project vice-president and directors to identify business concerns and objectives. The team then interviewed technical managers to learn about work flow and methodologies.

The third phase involved the organization of focus groups — six to eight engineers with similar work responsibilities and experience using micros.

Each person in a focus group assessed the impact of personal computers on each of his activities: How many hours did the task take before using personal computers? How many hours after? The focus groups also rated impacts on quality, quality of work life, competitiveness and overall effectiveness.

Several weeks later, we circulated attitude surveys designed to quantify other aspects of productivity and to verify information collected in the focus groups. The surveys confirmed the focus group results.

The average labor savings reported for the first year were dramatic enough; however, a more thorough analysis of the results revealed that productivity increased in the second and third years as users gained experience, learned new application programs, increased their use and acquired better and faster hardware and software tools.

White-collar office work tends to expand to fill the budget available. When engineers are given new tools to reduce labor costs, their budgets must be reduced or the savings will be frittered away.

ease view is the most difficult to change directly. The best strategies may be to wait for some crisis, or to influence the executive through his peers outside the company, perhaps through another chief executive with whom he is acquainted.

If you can create channels of approval and decision-making for technology that avoid the confrontation, you may be able to move ahead. But in the long run, given the power of most senior executives, those with the disease attitude are inevitably going to hamper the competitiveness of their organizations.

Control the cost

Perhaps the most prevalent executive attitude is the cost view of technology, which is seen in the continuous directive from above to control or reduce the cost of information systems. To a large extent, this view is propagated by what those executives see in reports — the cost of development and operations.

There are two typical outcomes in the organization dominated by the cost-oriented chief executive officer. First, technology generally is severely underused. The portfolio of applications is typically traditional and nonstrategic in nature. Often — especially in financial services — it also suffers from aging, with inadequate updates and maintenance.

The second symptom is the conflict between end users and MIS. Charged to control costs in the era of easy end-user access to distributed and stand-alone technology, the central MIS manager is caught between the Scylla of control and the Charybdis of demand.

Changing the attitude of the executive oriented to cost control is difficult but feasible. A key is to recognize that cost control is, in fact, an important attribute.

Help the executive build on that outlook to encompass a view of benefits as well. A major attack on the cost structure of MIS is an appropriate action for many organizations today. And recommending such an approach to a cost-conscious executive can instill in him a new level of confidence in you as well as an expanded view.

Automate and measure

The third executive perspective is almost as prevalent as the cost view. The view of technology as a tool differs, however, in that it is more balanced in respecting the benefits of savings. Executives in this category were frequently party to the automation projects of the 1960s and '70s.

Unfortunately, their attitude is suspended in that era, when systems automated processes and work without changing the nature of the work. The resulting "bolt it on" mentality saved labor or capital by substituting technology — but then, it also encrusted old processes.

The organizational effects are similar to those of the cost-view executive — large investments in old systems and avoidance of using technology to its potential for competitive advantage.

The efficiency-oriented executive can often be brought to see the expanded scope of benefits through presentations and seminars. Not suffering from a phobic inhibition or a one-sided view of the cost-benefit equation, this executive may be swayed by illustrations of how some companies and industries are using systems for new customer relationships or as the basis for new services or products. Where there is an interest, executives with this level of thinking can be introduced to hands-on use, an experience that can serve to broaden their thinking about technology.

The MIS view

The flow of batch reports and the availability of personal computers gave rise to a significant number of executives fixated on technology as a means to make better management decisions — the fourth common attitude.

A growing number of executives make quite effective use of executive support systems, and many more see the physical presence of a terminal or PC as evidence of the use of the leading edge of technology.

Like the automate attitude, this focus is not so much wrong as

The visionary view is about as rare as the disease view.

it is incomplete. It can also be wasteful: Companies run the risk of implementing executive information systems just to satisfy top executives' infatuation with an easy fix of management information.

The need, of course, is for those systems to be backed up with the capability of changing the way decisions are made, not just automating them.

The means view of technology can be broadened through workshops that focus on personal workstations as tools for customer systems, factory systems and the like, with no management information component.

The visionary

By far the most sophisticated executive view is the fifth one: Technology as a catalyst. This is the attitude of the visionary and leader, who sees information technology internally as a means for change and externally as a new opportunity.

The proclivity in this category, unlike the others, is to think in longer terms and to see spending for information technology as an investment rather than a cost, a project for measurable payback or a means to obtain management information.

Unfortunately, the visionary view is about as rare as the disease view. It tends to be held either by executives who grew up with extensive experience in technology or by those who have undergone a conversion — in some cases, one that is forced by crisis.

An example of the former is John Reed of Citibank NA; an example of the latter, Smith of GM.

While the visionary offers the best environment for exploiting technology, experience indicates that without combining vision with other views, it can lead to misuse and underuse as well.

Still, the visionary is typically the easiest to further educate. His or her attitude may be ephemeral and dangerously out of touch with what it takes to implement technology — such as drawing other managers into the process — but there is receptivity to the investment required and a willingness to hear the lessons of mistaken investment.

The most important lesson to be learned by these managers is that of involvement of other senior managers in the investment and implementation process. Without that involvement, the management of projects and change in processes and business as the technology is introduced, the outcomes can be the most wasteful and embarrassing.

In combination

Clearly, no one of these attitudes toward technology is enough. The disease view itself is to be avoided like the plague and wiped out whenever possible. The other four views are all needed at one time or another among senior executives. Although only a very few executives, in our experience, combine all four, there are a few executive teams in which all the views are shared.

For the MIS manager and the growing number of middle- and upper-level executives with broadened views, the limited attitudes at the top have become a source of concern, inhibition and frustration. Changing and expanding top executive attitudes, through education and exposure of all kinds, should be a top priority of these managers.

Dramatic productivity gains — not only of the measurable kind but of the strategic kind — can be achieved with information technology from here forward only when the executive mind-set is reset and appropriate actions follow.

To get the most out of the Maserati, the MIS manager must bring about new attitudes in the executives who increasingly control their fate. It is they who can rebuild the roads, change the route of the commute, and even drive the car to achieve its full promise.

COMMENT

Fred Wang
President, Wang Laboratories, Inc.

The 1980s have been good for vendors of information processing systems. U.S.-based businesses, nonprofit organizations and government agencies have invested hundreds of billions of dollars in the systems we make and sell.

But for buyers, the '80s were frustrating years. In spite of their investment in office technology, many enterprises did not achieve dramatic improvements in white-collar productivity.

Experts cite many reasons for this discrepancy, including lack of training, vendor-to-vendor compatibility problems, improper application of systems to business needs and slow development of software. I'm sure all these reasons play a part, but there is an even larger constraint on productivity, one that we tend to overlook because it is so familiar.

According to a 1987 Coopers & Lybrand study, computers handle only 5% of the information used in businesses, government and nonprofit institutions. The other 95% is still on paper — and generally inaccessible to existing office computer systems.

For example, a contracts management group in my company receives about 150 letters per week, in which customers report equipment moves and other changes that affect the status of their maintenance contracts with Wang. The 100,000 contracts on file is that group were produced by our internal computer systems, and the incoming letters were probably produced on the customers' systems.

Scaling the mountain

However, in spite of all the office technology used to produce the contracts and the incoming letters, the letters themselves become a paper-based problem for two reasons. First, every incoming letter needs to be matched up with the proper contract; second, the matching must be done by filing the hard copies.

This is just one small example of the "paper mountain" — the 95% of all business information that stubbornly defies integration into the sophisticated computer systems now in use. Computer vendors need to do something about that percentage if we want to help our customers achieve substantial productivity gains among their knowledge workers.

The paper mountain is growing — U.S. businesses are creating 930 million additional pages every day. But sheer volume is only part of the paper problem.

Thanks to office technology, it now costs only 25 cents to create a one-page paper document. But it costs $1.25 to retrieve a page once it has been filed. And if one page is misfiled or somehow misplaced, it can cost up to $120 to find or recreate it.

As a result of the widening customer demand for image-based systems, researchers now predict an explosion in imaging technology as it becomes integrated into existing information systems. For example, a composite industry estimate from the Association for Information and Image Management puts the imaging market at more than $2 billion by 1990. Eastman Kodak Co. estimates a $60 billion market by 1995.

The proposal

In order to be successful in the 1990s, enterprises must be able to access all useful information, no matter what form it may take — data, text, voice or image; no matter where it resides — in corporate mainframes, departmental minicomputers, workstations, personal computers, recorded telephone messages or on paper; and no matter whose equipment is involved — from Unix-based workstations to mainframes.

In the decade ahead, we will progress from stand-alone imaging systems with rudimentary applications to sophisticated networks that allow images to be productively shared and integrated applications that allow the knowledge worker to access DP, word processing and image files from a single integrated workstation.

Right now, we're carrying off the small stones. During the 1990s, I believe the industry will move the mountain.

ILLUSTRATION BY JUSTIN KERR

Dust, thunder and justifying more PCs

By Avery Jenkins

With some companies having spent $5 million or more to equip employees with desktop computers, top management is beginning to wonder whether the expense has been worth it.

But whether or not a microcomputer is worth its cost is a tricky question to answer.

Take, for example, the airplane engine manufacturer that recently equipped some of its senior mechanics with microcomputers. One mechanic began downloading data from several different mainframe data bases, combining the information into a single data base.

Using Ashton-Tate Corp.'s Dbase to manipulate this combination of data, the engineer discovered that he could predict the lifetime before failure of a particular engine to within 18 hours.

"He probably has made that corporation $500 million over the next few years," says Marty Gruhn, vice-president of the Sierra Group, a Tempe, Ariz., consulting firm. "What, then, is the value of that PC?"

Gruhn tells this story to illustrate the point that it is extremely difficult to quantify the payback from PCs. With postpurchase audits and studies, "you can raise a lot of dust and thunder, but it's not clear to me that you achieve anything," she says.

Ted Preiser, president of consulting firm John Diebold and Associates in New York, says "Most companies do not accurately measure the productivity gain from PCs." But, he adds, "One of the real questions is, Should they?"

Measuring the benefits

The question is being asked more often now because the PC has been put to work in areas in which immediate productivity gains are less clear than before.

Some would argue that productivity gains in these areas are impossible. Neil Larson, president of software development firm Manthink, Inc., says that the computer is nothing more than a tool to "speed up trivial processes," adding that only 30% of the activities in an office lend themselves to computation.

But in some applications, such as the word processing pool and accounting, productivity gains are more easily seen and often do not require a formal audit. Prepurchase justifications — such as a reduction in overtime — are easily compared with the bottom-line reality a year later.

"I don't think anyone is doing postaudits," says Don Smith, a partner with the microcomputer services practice of accounting and consulting firm Price Waterhouse in Chicago.

He cites his own company, which has equipped all of its secretaries with PCs. No one has formally studied whether the company has saved money by investing in the equipment. But, Smith says, "We are getting by — I think — on fewer typists than we did in the past."

However, the PC has moved out of those production-oriented areas and into applications, where "the benefits are very soft," Diebold's Preiser says.

Marketing departments are using them for presentation graphics and desktop publishing as well as for market analysis. Managers are increasingly using PCs as budgeting, decision-support and communications tools.

And the benefits are difficult to measure.

The secret, the Sierra Group's Gruhn says, is to recognize that you cannot measure a middle manager's productivity, but you can measure his or her effectiveness.

A PC will not allow a manager who makes two decisions in the course of a normal day to increase that to 10 decisions, but it may allow him or her to make better decisions.

"In some cases, micro-based solutions can take longer," notes John Casselia at accounting and consulting firm Coopers & Lybrand in Boston. But the benefit comes in the quality of the information available to the manager. So while a manager may spend more time making his or her decisions, they might be better decisions. Thus, the company benefits, Casselia says.

Studies, including one by Shoshana Zuboff at the Harvard Business School, have shown that increased use of PCs, particularly networked ones, is beginning to "flatten" firms, eliminating some middle management jobs just as previous automation diminished the numbers of clerical and support staffs.

The chief function of many middle managers is to transmit information between levels of the corporation. The networked PC can fill that function, and the elimination of middle management positions is one way a company can measure the effectiveness of its computers.

But Gruhn warns against

Jenkins is a free-lance journalist based in Newtonville, Mass., specializing in technology and social issues.

corporate America's tendency to follow a trend to its extreme. "The key is not to go out and buy PCs and then ax-murder middle management," she says.

The costs

If determining the benefits is difficult, when it comes to digging out the cost, "what you have is chaos," says Steve Stanton, a managing associate at consulting firm Index Group, Inc. in Cambridge, Mass. The cost of PCs is difficult to dig out of departmental and divisional budgets, he says, and use is almost impossible to measure.

In ones and twos, PCs are a low-cost item, easily hidden under a variety of headings in the departmental or divisional budget. Applications software, which is critical for determining the PC's benefits, can readily be purchased with petty cash. Thus, MIS departments are now accountable for justifying expenses they were not previously responsible for, Stanton says.

Many companies, however, have long instituted central purchasing plans, both to capitalize on volume purchasing agreements and to keep track of the number of microcomputers in the corporation.

Central management of the installed base will increase a company's return on the PC investment, according to Coopers & Lybrand's Cancilla. This arrangement will foster some economies of scale, he says, through central development of applications and by providing a clearinghouse in which items such as spreadsheet templates developed in one department may be shared with others.

Index Group's Stanton identifies three levels of cost associated with PC use.

The first level consists of fixed costs, including those for communications lines, disk space and CPU time if the desktop computer is connected to a mini, mainframe or local-area network.

> **"Most companies do not accurately measure the productivity gain from PCs. Should they?"**
>
> *Ted Freiser*
> *John Diebold and Associates*

Stanton calls the second level platform costs. These include the computer itself, printer time and application software.

On top of these two expenses are the variable costs associated with use. They include the time and manpower the user spends developing applications, including those that do not work.

In addition to these costs, Price Waterhouse's Smith says, some accountants include training in the overall cost of PCs.

Some companies have been horrified at the rapid growth in support staff required by the influx of PCs, which has sometimes mushroomed, Smith says.

But he disagrees with the notion of including this expense as part of the individual computer's cost. Instead, companies should fold it into the other training classes offered by a company for its employees, he says.

The cost of a PC must also be compared with the cost of the alternatives, he adds. For example, if a company wants to automate a task or area, the PC is often the cheapest alternative.

Smith says he has found that a PC LAN usually costs half what a minicomputer with terminals running equivalent software costs. Most of that savings comes on the software side.

Diebold's Freiser cites the hidden cost associated with bringing in PCs. "What we have found," he says, "is that as the PC goes in, the previous support to the individual, the older systems, has not stopped."

Some measurement tools

In spite of the inherent difficulties of quantifying the effectiveness of a manager or the quality of an analyst's reports, there are some ways a firm can estimate the return on its investment.

On the prepurchase side, Smith recommends a rule of thumb comparing the annualized cost of a PC with an employee's salary. He says that on average, this figure comes out to about $2,000 per year, or 5% of the salary of an employee making $40,000 per year.

To justify the 5%, a firm only has to show that the computer will increase the employee's value by the same amount, Smith says.

Stanton also suggests a methodology for measuring the success of PC implementations after the fact. This method begins, simply enough, with finding out what senior management wants, whether it is a gut feeling that there is value, hard numbers or an impact on corporate strategy.

Most often, Stanton says, the question that management is really asking is whether the company is targeting end-user computing at critical areas.

This question is best answered by surveying a statistically representative sample of the user population, Stanton says. Investigators can then audit the most productive implementations — the top 5% or 10%. The top 5% "invariably provide enough demonstrable benefits to justify the entire expense" of end-user computing, Stanton adds.

Other experts agree that a companywide, intensive audit of the existing PC installation would be more trouble than it is worth. "I doubt whether we would want to determine how many minutes a day [each PC] is being used," Freiser says.

"The way not to do it is try to measure every single person," Gruhn says. "That's not terribly popular . . . most people get tired of being measured."

Like others, Gruhn compares the PC with the calculator, typewriter and telephone. For many jobs, it is a necessary tool, and she finds it curious that so much attention would be directed at the PC while equally expensive items are taken for granted.

"If companies knew what they were paying out for a telephone, they would turn blue," she says. But while a PC may not cost much more than a telephone, not everybody needs one.

"The conventional wisdom says everyone should have one on their desk," Smith says. "I think that's baloney."

PETER PENEY

USER VIEW

Timothy Turnpaugh
Executive vice-president, operations group, Seafirst Corp.

We measure productivity in the classic manner: the relationship between outputs and inputs. Since we are bankers, it is no surprise that we use dollars and cents to determine the cost of producing a product (input) and the value of the product (output).

The ratio between inputs and outputs at any point in time is not terribly interesting. We are much more interested in how the ratio changes over time. In plain English, are you producing more with less today than you were yesterday?

There is no doubt that technology has helped make us more productive. For example, in our main computer complex, we process more checks and charge-card transactions at less cost per item than ever before. Without the technology, we could not employ enough people to handle our current volumes.

In the network arena, we have implemented technology to transport more data and voice volume while driving down overall telecommunications costs.

In the workstation area, we are also starting to see productivity gains. Personal computers have been implemented to drive down costs and/or handle higher volumes.

These productivity increases are achieved by what we call "riding the technology curve." It means that we have substituted new, lower cost equipment to displace older, less efficient equipment; substituted technology for labor; and restructured our work force to employ fewer people who are highly skilled and paid more while reducing the overall personnel expense. In all three cases, it means doing more with less.

The implementation of technology has helped us improve the ratio of non-interest expense to revenue, a fundamental measure of productivity in a bank. However, are we really more productive in all cases? We can document the benefit in the main computer complex and the network, but the yield in the workstation environment is less clear.

What is the benefit of using a microcomputer to create a report more quickly and economically if the report does not add to customer service or increased profitability? We now have word processing programs to produce large, good-looking documents with proper spelling, grammar and style. But are they of any value? Or are we grading on weight?

How about the spreadsheet that calculates a return on investment to four decimal places, when everyone knows that the benefit yield cannot possibly be reinvested at the imputed rate? Or the desktop publishing efforts that are highly efficient but have nothing to say?

At Seafirst, we have two simple guidelines for investments in any form of technology: The investment must pay out fully in two years, and it must show a positive impact on earnings in the first year of its five-year life — not to mention the other four years. When we implemented this rule, some people said it would eliminate many projects or worthwhile "strategic" efforts. Quite the contrary; we still have plenty of projects bidding for resources, near-term and strategic.

Once management realizes that it can do more with less, it naturally chooses ventures that yield the highest payback. In short, productivity can really be measured in dollars and cents if there is sufficient discipline to do so. It speaks well of the purveyors of technology that their business segment has matured enough to understand the meaning of return on investment, just like those who deal with other forms of capital investment.

So the real answer to statements about widely heralded increases in productivity is simple: "What have you added to the bottom line? Have you increased your service to your customers, which also adds to the bottom line? Are you handling more volume with fewer people?"

Amazingly enough, these questions really are not tough to answer. Measuring the exact benefit exclusively attributable to a technology can be difficult, but it is fairly easy to see whether you are getting better or worse.

Don't stand in the way of the LAN revolution

By Anthony Ottavio

To enhance knowledge worker productivity, business has deployed more than 15 million personal computers at a cost of more than $100 billion. This broad-based investment was spearheaded not by the MIS department, but largely by knowledge workers themselves.

The widespread use of PCs is the latest phase in the quest for increased human productivity. The first stage was the industrial revolution, which targeted physical labor. The second, the computer revolution, addressed the collection, codification, structuring and retrieval of data through the use of mainframe computer systems.

The current phase, the PC revolution, has further extended productivity by delivering computational power directly to the individual desk top. We are now about to embark upon a fourth phase of productivity enhancement, which will be driven by local-area network technology.

The reason LANs offer great potential for productivity enhancement is that they provide a foundation that draws on the investment already made in PC hardware and computer literacy for accessing data, integrating technologies and distributing information to end users.

• **Accessing data.** LANs provide the knowledge worker access to data that resides on mainframes, minicomputers, PCs or other sources almost anywhere in the world. In the pre-LAN era, when knowledge workers obtained data from the MIS department, it would usually be in hard-copy form and therefore not easily usable. LAN tools such as file transfers and downloads obtain data in machine-usable form from any source and deliver it directly to the knowledge worker's desktop PC.

• **Integration across technologies.** LAN-based knowledge workers using PCs can now access a wide range of technology tools, such as text processors, graphics packages and image-handling systems. In many organizations, these capabilities are located in stand-alone departments and are not easy to bring together.

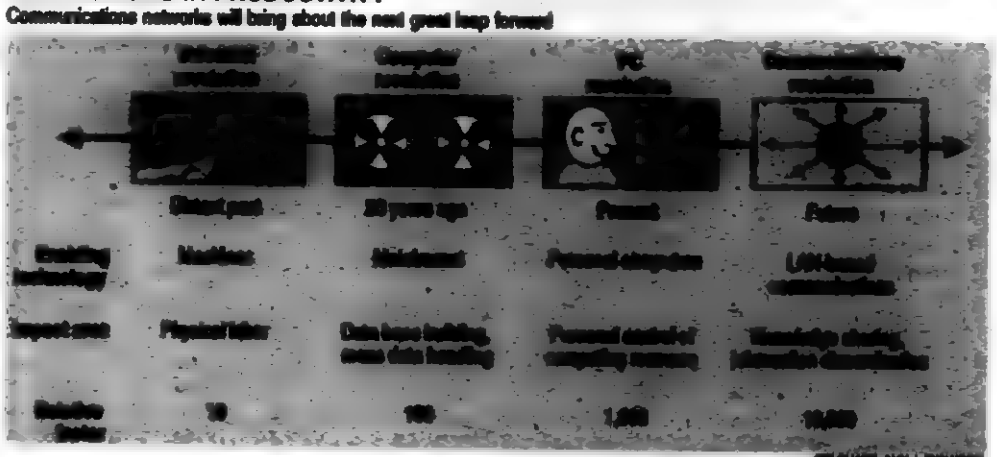
Because LANs can bridge PC-based work groups, they can be used to integrate the work product of various departments into a single unit and then either create hard copy or transmit the results in electronic form. In a LAN environment, the individual knowledge worker can control this integration.

• **Dissemination to end users.** A key area to be enhanced by LANs is that of dissemination and distribution of knowledge to end users. Compiled information is currently delivered to its final destination primarily via delivery sytems such as courier, postal service, facsimile machine

Ottavio is MIS director at McKinsey & Co. in New York.

REVOLUTIONS IN PRODUCTIVITY

Communications networks will bring about the next great leap forward



CW CHART: AMY J. BRANSON

USER VIEW

William Eaton

Chief information officer
Levi Strauss & Co.

Over the long run, productivity determines when one company will displace another in the marketplace, when functions will shift between departments and when new technology will displace older technology.

At Levi Strauss, we are well aware of the need to maintain and improve productivity in all facets of our business.

The challenge for the information resource function is to provide the infrastructure and architecture that allow processing of daily business transactions and downloading of information to end-user workstations.

This function provides the platform for the increased productivity available from the flatter, more empowered organizational structure that ultimately will characterize the Information Age, replacing the highly hierarchical organization associated with the Industrial Age.

Within information resources, we are focusing on an integrated development environment and an integrated applications architecture.

The development environment is aimed at an information engineering approach that provides capabilities like application development tools; security; and data base, hardware and systems software environments.

The integrated applications architecture, which we call Levi Advanced Business Systems, is focused on ensuring that we continue to build a system that works throughout Levi Strauss. We hope to increase productivity by ensuring that systems meet business needs and fit with one another.

As part of the development environment, we are prototyping products that provide a standard environment for mainframes, minicomputers and micros. In addition, we are implementing a tailored development methodology appropriate for the times and pursuing the integration of computer-aided software engineering tools and equipment for improving application programmer productivity, such as workbenches. We have implemented a quality-enhancement process with the objective of "Doing It Right the First Time."

Information technology is also being used in a number of ways to improve overall company productivity. Levi Strauss is rapidly rolling out electronic data interchange (EDI) with its trading partners. Service to these customers can be maximized by adjusting our production to meet their retail sales.

The use of an integrated systems architecture at the broader company level will reduce the need for information reconciliation and re-entering. We are also addressing company productivity through the use of end-user computing tools integrated with the total development environment and the information-engineering infrastructure, allowing delivery of relevant information to end-user workstations for decision support.

or electronic mail.

While the latter methods are electronic, they can modify the internal data structures, making further computer processing by the receiver difficult, if not impossible.

LAN communications facilities, on the other hand, can transmit all types of data with internal structure preserved to allow immediate processing by the receiver. LANs provide this value-added functionality because they are technologically consistent from end to end.

The major obstacle

There are a number of obvious impediments to the more pervasive use of LANs, such as the newness of the technology, the lack of industry standards and the small but growing number of LAN-based, multiuser applications. However, one of the major obstacles to the wider use of LANs is that MIS departments have, until now, not come out and strongly supported this technology.

Until the PC made its appearance, MIS had been operating more or less the same way for almost 20 years.

This problem has its roots in the advent of the PC some years ago. Until the PC made its appearance, corporate MIS departments had been operating in more or less the same way for almost 20 years. They implemented and extended the computer revolution based mainly on large, complex, central electronic data processing installations connected to their clientele via dumb terminals.

Over the years, hundreds of billions of dollars of largely immobile systems architecture has been implemented based upon this scheme and reinforced by highly specialised technicians trained to solve information problems primarily through the use of bigger and bigger mainframes.

Politics

Attempts by users to implement their own local solutions were usually diverted by MIS department hostility in the form of formidable corporate justification procedures.

In many cases, MIS understood the message of autonomy being sent from the ranks, but was powerless to respond in a timely fashion because the mainframe-based system and technical skills were not structured to address the new information needs. It was not solely a case of MIS reluctance to distribute the status quo. Rather, MIS simply couldn't switch gears fast enough.

In this context, it is easy to see why the MIS department was blindsided by the PC and largely failed to participate in the PC revolution at the grass roots level. In fact, it never did recover and get fully behind the personal computer. However, because micros were so cheap, users were largely able to bypass MIS to satisfy their pent-up demands for increased personal control over their data.

Just as end users seized upon the PC and pioneered its use in the corporation, they are again taking the lead in implementing LANs, which they view as a natural extension of their PC activity.

Central review of acquisitions will again be bypassed as computer-literate users are quick to implement local solutions that bring them direct, visible benefits. The MIS department, meanwhile, is again lagging behind on these initiatives.

Impact on productivity

This situation could bode ill for corporate productivity enhancement efforts. The reason is simple.

Significant industrywide productivity gains were achieved in the microcomputer revolution largely because a de facto industry standard was established by IBM and Microsoft Corp. and was adhered to by more than 95% of the installed base. Productivity gains were accelerated because knowledge and experience could easily be shared among users, as there was a common foundation.

If the industry is to obtain the benefits promised by LAN-based networks, a high degree of compatibility and consistency will be required in LAN architecture. Because a generally accepted industry standard, such as that which guided personal computer acquisitions, does not exist today in the area of LANs, some leadership and direction-setting will be required to rationalise this area.

Industry was exposed to a limited risk in the PC revolution because technology choices were limited and users could, as a practical matter, only move in one direction. This will not happen in the LAN area, as choices and options are almost unlimited.

The probability, therefore, of achieving a consistent corporatewide LAN architecture using only bottom-up, local initiatives is practically zero. The results, both economically and in terms of productivity, could be quite disappointing for the business entity expecting high returns from investments in LAN technology.

The corporate MIS group now has a renewed opportunity to play a key role in shaping the direction of the communications revolution and in increasing productivity within the corporation. In order to do this, however, the MIS group must first achieve the following:

- Change orientation. MIS must change from a centrally oriented, big-system, "one-size-fits-all" mind-set to a more user-oriented approach to business. This does not mean that MIS must now customise applications for each user. However, it must become a proactive facilitator and supporter of end-user, LAN-based computing.

MIS must enthusiastically provide LAN facilities and applications and actively assist knowledge workers in extending their individual knowledge development capabilities.

In addition, MIS must accept the reality that in the future, end users will provide an increasing portion of new technology ideas to the corporation. MIS managers must be positioned and disposed to accept this input and leverage it for the benefit of the corporation.

- Build interfaces. MIS must ensure that standard interfaces and tools that facilitate end-user access to data are put in to place and that an end-to-end LAN-based network is made available for internal communications and for the distribution of corporate information products.
- Establish a standard. MIS must take the lead in establishing an enterprisewide LAN technology architecture. The MIS group is well-suited to this role, as it has historically had responsibility for implementing corporate-level technology functions.

Additionally, MIS is ideally situated to address the issue from the "big picture" direction, something the local user usually cannot do. The desired standard must be tight enough to ensure end-to-end, seamless connectivity but open enough to provide substantial opportunities for experimentation and innovation by computer-literate users.

Ready to go

In summary, businesses are now poised for a major boost in knowledge-worker productivity. The vehicle for this gain is LAN technology as it leverages the investments already made in PCs and also provides additional synergies via greatly enhanced communications and data integration facilities.

There is no issue as to whether LANs will become pervasive. The issue is who will take the lead. End users, flush with victory on the PC front, will eagerly go forward with LANs as they clearly perceive the benefits.

The danger in letting the end user unilaterally make architectural decisions that could potentially affect the entire organisation is that there is simply no guarantee that solutions that are optimal on a local basis will produce similar results at the corporate level.

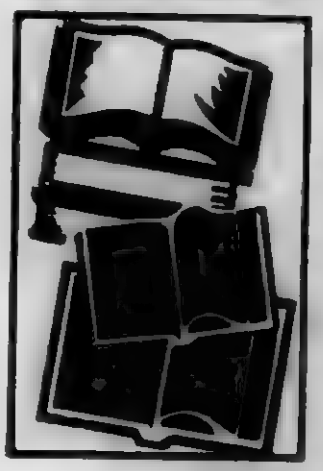
Reading right

By David Black

You, like many in business, are faced with the constant demand to assimilate more and more information faster and better to maintain your competitive edge.

MIS professionals, in particular, face an enormous requirement, with more than 30% of your business time spent reading. Yet more than 80% of you claim you cannot keep up with the required reading to remain current in your field. You're not alone.

In the typical office, "in" baskets are piled high, and stacks of magazines, days-old newspapers, trade journals and various newsletters wait



CHRIS HOLLEY

on credenzas to be read. Some documents need more thorough reading than others, but all of the material *should* be read — that's why it is saved. Even seemingly trivial material still needs to be skimmed, if only to determine its worth.

Few of us on the receiving end of this print deluge would question the value of a more efficient means of dealing with it. The ideal would be to read the material more quickly, without any loss of comprehension. But how?

The capability is in us to improve dramatically; we simply lack knowledge of the techniques. As a result, most of us are struggling along with reading habits we learned in elementary school. Here is a business activity that consumes three hours or more a day, and yet little, if anything, has been done to enhance this skill since childhood. It's no mystery, therefore, why most professionals still read at a grade-school level, despite having learned a larger vocabulary.

The main problem lies in the makeup of language itself — words. Words have little meaning until they are strung together into phrases, sentences and paragraphs. Then these basic elements of language emerge as the concepts or images that the author is trying to communicate.

Unfortunately, however, the untrained person does not read in groups of words. He struggles along, reading one word at a time, often regressing to reread words or passages and sometimes mouthing each word (mentally, if not physically) as he goes. The end result is fatigue, frustration, loss of concentration and poor comprehension, as the brain wrestles with the problem of extracting meaning from the badly organised, disjointed message it receives.

Why haven't we done something to improve? Maybe because we don't know the need exists. Reading is an activity we take for granted. We think we're doing fine, but what's "fine"? Without standards, we don't know.

Most feel they are average readers, and they probably are. Unfortunately, the average reader operates at less than 25% of his ability. Is this situation acceptable? The average golfer scores around 100 — a far cry from par and totally unable to compete on the PGA tour. Your situation is similar. The difference is, you are playing in the major leagues of business, and being just average isn't good enough to compete successfully.

Without proper guidance and instruction, it is very difficult to break slow reading habits. Why? Because the act of reading is solitary. Since no one can see what you are doing, including yourself, most people never learn what their problems are.

An advanced reading skills program — not a speed-reading course — will greatly improve your overall performance. It teaches you to discriminate. You could learn a flexible reading strategy to handle both the volume and variety of reading requirements. It puts you in control.

No matter what your reading ability is now, you can easily be twice as good. Imagine the benefits: an extra hour a day, better decision-making capabilities and an increased capacity to learn. In short, you'll feel better, think better and operate better.

Black is president of Improved Reading Centers in Old Lyme, Conn.

After automation: What now?

By Carl Thor

More than half the U.S. work force is now classified as white collar, according to the Bureau of Labor Statistics. Nine of 10 new jobs created through the mid-1990s are predicted to come in such heavily white-collar fields as communications, trade, finance, insurance, real estate and government.

It is these burgeoning service-sector businesses, in which

Automated garbage is even more dangerous than manual garbage.

two-thirds of all workers are white collar, that have turned in the sorriest productivity performance in recent years.

The American Productivity Center's analysis of labor statistics shows that for the past decade, there has been no growth at all in the service sector. We estimate that labor productivity in the nonfarm/nonmanufacturing sector actually declined — on average, 0.2% per year.

Thor is president of the Houston-based American Productivity Center, a nonprofit research and education organization dedicated to improving productivity and quality within companies.

The manufacturing sector has done better. Productivity grew 2.9% per year on average in the past decade — about the historical average.

Evidently, the service sector's sizable investments in computers have not helped. Stephen Roach, an economist at Morgan Stanley & Co., last year issued an ominous report on the failure of massive infusions of high technology to improve the productivity of so-called information workers.

"We have, in essence, isolated America's productivity shortfall and shown it to be concentrated in that portion of the economy that is the largest employer of white-collar workers and the most heavily endowed with high-tech capital," Roach wrote. The industries most lacking productivity were finance and insurance, retail and wholesale trade, transportation, business services, legal services and real estate.

Automation by rote

One reason computers are not boosting white-collar productivity may be that they are too often installed just to automate manual processes. This point was made by several chief executive officers who participated in a survey conducted in 1986 by the American Productivity Center and the consulting firm of Cresap, McCormick and Paget. The CEOs voiced concern about procedures being put on computers and then becoming institutionalized without first being examined and improved.

The executives also complained about the capacity of computers to churn out huge volumes of information. One CEO mentioned a four-inch-thick computer report that was circulated to his division heads. When he questioned them, he discovered that only 15 of its pages were of any use to anyone.

Proper settings

That's not to say there aren't white-collar settings in which automation can be critical — a prime example is the back-office operations of banks, where transaction processing speed is of utmost importance.

But most white-collar settings are more complex than that. The output of accountants, researchers and lawyers is much harder to quantify than that of assembly-line workers. The "products" of staff professionals are likely to be services delivered internally to other departments within the company.

And white-collar workers clearly make more discretionary decisions on the job than do production workers. Even in situations in which speeding up transaction processing is worth doing, there are larger issues to be addressed.

The American Productivity

TOTAL FACTOR PRODUCTIVITY PERFORMANCE FOR SERVICE INDUSTRIES*

INFORMATION PROVIDED BY THE AMERICAN PRODUCTIVITY CENTER
CW CHART

USER VIEW

Lemuel Lanier
Manager, information resources
Gillette Co.

We concentrate on three areas for improving productivity — technology, systems and people. You must have a balance of these elements. Under the right circumstances, any one element will increase productivity, but not to the maximum level.

On the technology front, we at Gillette have a well-balanced mix of personal computers, software tools, local-area networks and seamless links to mainframe computers. We make the best use of our people's time by putting the right technology in the hands of the end users. We have stand-alone micros for high-power analysis, LANs for work group reporting and an executive support system for easy data retrieval and analysis.

Systems are the glue holding technology and people together. It is rare that people and technology productively mix without appropriate systems. For example, you can provide PCs and spreadsheet software to assist users in performing their duties and they will complete their assignments — but at what cost?

We give people the right technology with proper training, appropriate links to data sources, customized applications and links to other systems. As we automate production lines, let us also automate our professional staffs.

Don't overlook the importance of creating and maintaining documentation to enhance productivity. Documentation reduces learning time for end users and programmers and accelerates future system changes.

People are the most important element in gaining productivity, and they too must be managed. You can't give people today's tools and let them operate in yesterday's mode and expect substantial productivity gains. As you plan and manage hardware and software upgrades, you must also plan and manage the change in the way people work.

Occasionally, you get a major system that greatly improves productivity. For example, by strengthening the monitoring of our business, our executive support system hastened the elimination of an entire financial forecast cycle.

Everyone seems captivated by the concept of productivity, and for good reason. The thing I like about the concept of productivity is that increased productivity means greater competitiveness.

Center has developed a participatively managed approach to white-collar productivity improvement, called Impact. In the past few years, it has been used successfully in over 25 firms. In the Impact process, groups of white-collar employees, typically at the department level, examine their work to discover its most important products or services. They then identify the customers for their products — inside or outside the firm — so they can collaborate with them in improving the quality of service.

The white-collar employees then develop measures to track the timeliness, quality and efficiency of production. They chart work flow in the department to identify elements that can be eliminated or modified without reducing quality.

Finally, they identify technological improvements that could enhance efficiency, quality or timeliness.

The focus is a dual one: efficiency and effectiveness. In contrast to many traditional approaches to productivity, Impact does not focus exclusively on efficiency. It targets effectiveness as well. Efficiency cannot be left out of any performance equation, but especially for white-collar groups, the question of whether the right "products" are being produced is critical. Automating a manual process may speed things up, but if the process was inappropriate or unnecessary in the first place, nothing is gained. Automated garbage is even more dangerous than manual garbage.

A critical distinction

There are two critical concepts in Impact. One is a distinction between activities and services.

Activities are discrete: running a tape on a mainframe or logging an employment application. Anyone's work can usually be broken down to the level of activities, and the purely efficiency-oriented approach to boosting productivity tends to concentrate here.

Services, by comparison, are major outcomes of work: producing an accurate financial report or publishing an employee newsletter or perfecting the design of a new jet engine.

A vital difference between an activity and a service is that in and of itself, an activity has no value to a customer. The department trying to hire a new training instructor isn't interested in how many employment applications the personnel function has reviewed if a good new training instructor never crosses its doorstep.

Activities are building blocks toward services, and services are the typical output of white-collar groups.

A good way to evaluate a service, then, is to examine its utility to a customer. The four-inch-thick report is a classic example of a service being produced that is of little use to anyone. So keeping a solid customer orientation is the second critical concept.

Putting the ideas to work

The circulation services department of Official Airline Guides (OAG) provides a good example of a group that streamlined routine activities through new technology and developed a new sense of its services and customers.

OAG, a Dun & Bradstreet Corp. company, publishes travel planning aids such as airline and passenger-ship schedules and fares. Employees of the circulation services department, located in Oak Brook, Ill., process new subscriptions, update subscribers' addresses, generate mailing lists and handle customer complaints. This is the kind of work classically thought of in terms of transactions per hour.

When the department examined its work to identify its chief products and services, it declared customer relations as its primary function — all the activities the group carried on supported customer relations.

This insight changed the way circulation services does business. Managers computerized much of the time-consuming routine work, such as updating mailing labels, thus freeing employees to do a better job of customer service.

For example, previously if a customer did not receive a publication, the department would simply mail another copy. If the second one didn't arrive, a third would go in the mail. After going through the Impact process, the circulation service representatives would work with a customer to find out why a package didn't arrive. For example, it's easy for a piece of mail to get lost in the corridors of a large corporation. Often just adding an office or floor number to a subscriber's address will speed up or ensure delivery.

The department also began tracking mailings by ZIP code to see whether a delivery error was the post office's fault rather than OAG's.

Transactions per hour is still a legitimate productivity measure at OAG; promptly filling orders will always be important. But other measures of service quality have been added, related to complaints logged in and the number of guides re-sent because subscribers didn't receive them.

Internal "customers"

But many white-collar departments serve only internal customers. Few external customers ever see the "products" of human resources departments, for example.

One such department at the McDonnell Douglas Astronautics Co. had its entire Huntington Beach, Calif., division as a customer. The mission was to "support the objectives of the division by providing for the acquisition and placement of employees while maintaining a competitive position within the labor market through effective organization, compensation and benefit programs."

Through surveys and interviews, the human resources staff identified a need: improving communication about the status of job applications. The division was bumping up against several obstacles in the hiring process:

- Administration and management were not consistently notified of offer acceptances, start dates, changes or delays.
- Information about applicants was often inadequate or misinterpreted.
- The employment staff could not immediately access original applications because the paper files were often taken out by other people.

To remedy the situation, the group redesigned its hiring procedure and created an automated system to track applicant information, generate acknowledgment letters and store records for the employee referral program, the job posting program, contract labor, transfers and promotions and classified advertising.

At another unit of McDonnell Douglas — this one in St. Louis — the personnel department gave other departments access to the nonconfidential personnel records of employees. A department could, for example, enter a change in an employee's shift schedule without going through the personnel group. The company documented savings of $1 million through use of this system.

Streamlining

At TRW's Space Park complex in Redondo Beach, Calif., two groups working to develop software for a military satellite used an old standby — word processing — to dramatically streamline paperwork.

The groups consisted of technical people designing the software and business people charged with reporting financial data to senior management and the Pentagon. One of the major products the groups provided was variance analysis reports, which are required by the Pentagon to explain why work is going over or under budget.

Before streamlining, the two groups sat in endless meetings — one per variance report, or about 40 per month — to work out a complete definition of why a variance had occurred and to make sure all the i's were dotted and t's crossed.

Then TRW simplified the process. The report form is stored in a word processing system so changes and corrections can be made readily. The groups reduced their meetings to once a week and signed off on a week's worth of variances at a time.

And the new process meant a dramatic improvement in the quality of variance analysis reports. Before, 50% of the reports produced had been rejected by senior management, usually because of inadequate explanations or missing information. With the new procedures in place, the rejection rate fell to 12.5% and the turnaround time after a report was rejected fell to one day — down from two weeks under the old procedure.

Ending turf wars

Information systems departments can also put the principles of productivity to good effect. For example, the MIS department at Atlantic Richfield Co.'s Los Angeles headquarters had been split into an applications group, which did projects for clients on the company's mainframes, and a microcomputer group, which bought and installed personal computers and software. The two groups often fought turf battles.

As it scrutinized its methods, the department decided to restructure itself into generic client-service teams that combine many functions formerly split between the mainframe specialists and the PC specialists. The group became far more service-oriented and now provides much more training and other support for clients.

As these examples illustrate, technology can enhance the productivity of white-collar workers. But to assume that just computerizing the usual work done in a department will automatically accomplish that goal is to remain naive.

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Circle Reader Service Number 6

Manufacturing rebounds

By Brian Kaufman

Eight years ago, Dowty Decoto, Inc. confronted the high cost of improving productivity.

The maker of aircraft hydraulics started replacing its shop floor machines with computer numerical controller (CNC) technology. Two years later, with the addition of a manufacturing resource planning (MRP) system, it could measure shop floor productivity. Output per worker had started to soar, but so had the costs of creating and entering the extra information the controllers gobbled up. To hit pay dirt with the improvements, the company would have to cut its support overhead by 50%.

Dowty's case is just one example of the problems, decisions and surprises that often arise when organizations try to improve manufacturing productivity in the age of information systems. How does a manufacturer realize the full benefits of information and control technology — without giving up more than it gains?

"One car company which robotized 93% of its welds on one assembly line now admits that almost 20% of this work is not cost-effective," points out Paul Clermont, a principal at Nolan, Norton & Co., based in in Lexington, Mass. "That's a case of being too driven by 'Let's have robots' rather than 'What does it take to make things work best?' "

Companies that had rallied to the "Let's automate this factory" call have now taken up the "Let's run this factory right" mandate, according to Clermont. "Hardware and software is a necessary but not sufficient condition," he points out. "It all has to be integrated with how people work."

Charles Savage, a computer-integrated manufacturing (CIM) consultant at Digital Equipment Corp., puts it this way: "CIM is 20% technical and 80% organizational."

With the robot revolution having failed to deliver anticipated benefits — or even to materialize at all — companies must take a hard look at their structure if they want to achieve the full gains promised by expensive automation systems.

Companies must take a hard look at their structure if they want to achieve the full gains promised by expensive automation systems.

Upskilling Inventory

This problem was faced by Tektronix, Inc., a Beaverton, Ore., maker of oscilloscopes and electronic testing and service instruments, when the company extended its automation systems stage by stage.

"It wasn't easy to put it all in and get it working," Tektronix spokesman Fletcher Chamberlin recalls. "There had to be a whole mind-set change from the management standpoint. Management had to struggle, and that can be traumatic. But today the change is dramatic."

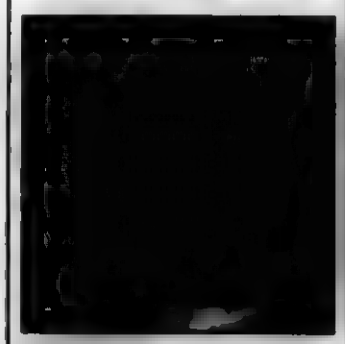
In the mid-1980s, Japanese competitors began underpricing Tektronix's low-end oscilloscopes by 25%. The company turned to manufacturing information systems to streamline operations. It also imposed a 10% cut on the size of its work force, which now numbers 17,000 worldwide.

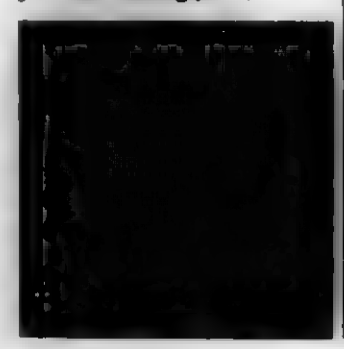
To thwart the threat, Tektronix also took the following steps:

- Smoothed out its computer-aided design and engineering (CAD/CAM) systems, adding circuit board design software as well as its own design simulation package.
- Combined its data for electronic and mechanical designs into a machine control package to drive its board-insertion machines and to collect information from them to downgrade inventory.
- Brought in new MRP systems.
- Honed in on quality, giving floor workers more control and encouraging them to shut down the production line whenever necessary — "doing it right the first time, rather than trying to 'inspect in' quality later," as Chamberlin puts it.
- Established manual just-in-time inventory management, doubling inventory turnover, which had been stable for 20 years. "It's a very simple system," Chamberlin says. "No computer control — it's visually looking to see if a bin is empty."

Between 1983 and 1987, Tektronix cut its manufacturing cost of sales by close to 13%, while its sales per employee jumped from $53,716 to $76,802.

Information systems did contribute to streamlining the factory floors — but that means a limited impact on productivity. "They were mostly due to improvements in manufacturing where labor has been greatly re-





Kaufman was a senior producer for the Public Television science series *Nova*, for which he produced the episode "The Robot Revolution?" He is currently an independent media consultant and producer in Cambridge, Mass.

duced," Chamberlin says.

"It's easy to replace welders with robots," comments Nolan Norton's Clermont. "Blue-collar productivity growth is fine; however, when it's down to 5% to 10% of the product cost, its impact is limited. Overall in the United States, productivity still stinks."

Mike Baldridge, Tektronix's informations systems manager, sums up productivity this way: "It's difficult to assess productivity gains due to information systems, because computers are necessary in this work — they're a requirement to do business today."

"In the overall picture," says Stephen Rosenthal, professor of operations management at Boston University, "technological capabilities are generally ahead of the practice of using them. It's an organizational barrier.

"Management and technical people have to change their thinking and be committed even when they hit bumps on the road."

Computer-aided planning

Bumps on the road jarred Yakima, Wash.-based Dowty Decoto as it drove to use CNC and extend MRP.

The company wasn't ready for CNC. While manufacturing productivity shot up, so did support costs. To reap the benefits of changes, Dowty had to reorganize the way the operation was managed.

It needed to cut the time between the design of a product and its production as well as the number of people involved in planning. The company invested in an integrated system that uses computer-aided process planning (CAPP) to link CAD/CAM and created a common data base as the centerpiece of a CIM strategy. The four-year installation began in 1985.

The CAPP system is aimed at cutting out a host of manually prepared lists and documents and communicating directly with the other systems. The company installed CAPP at the same time as the CAD system so that designs could address the constraints of the manufacturing process. The CAM system includes numerical control programs, tool design and MRP.

The network includes a McDonnell Douglas Computer Systems Co. Unigraphics II CAD system running on a Data General Corp. MV 400 minicomputer. The CAPP system is from Logan Associates in Milford, Mass., and runs on a Prime Computer, Inc. 50 series computer that was already holding a Heuristics MRP package.

The integrated system has cost Dowty Decoto close to $750,000, but managers feel that through integration and organizational changes they will be getting the most out of the new technology, which they expect to pay for itself in five years.

Among the benefits is a good retrieval library, according to Bill Wheeler, the company's president. "We won't have to design something a second time because we forgot that we once did it."

The payoff

Dowty Decoto says it is well on its way to acheiving its goal of cutting support overhead by 50% with completion of the integrated system. "We're satisfied. We're evolving it incrementally and have seen each increment pay off," Wheeler says.

But for every case in which

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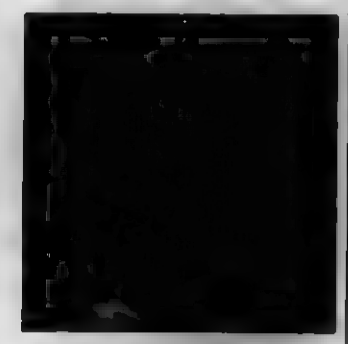

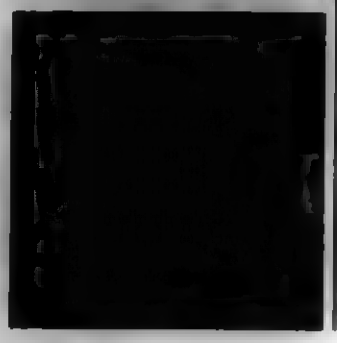

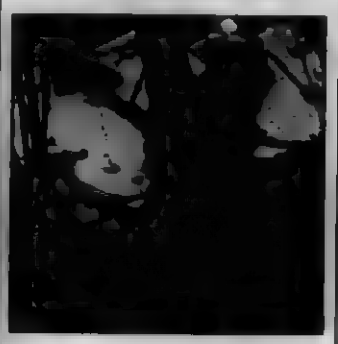

COMMENT

Joe Henson
President and CEO
Prime Computer, Inc.

Not long ago, *The New York Times* ran an article on designing for assembly lines. The story said, "Until recently, industrial designers and manufacturing engineers did not have much to do with each other. 'We'd wrap the plans around a rock and toss it over the wall into manufacturing,' explained one design engineer who works for a large corporation. 'If it didn't come flying back in a few days, we'd assume they could build it.' "

This story is a paradigm of manufacturing today and one reason, I believe, that the U.S. lost its edge in productivity.

Just 30 years ago, the U.S. led the world in manufacturing capability, productivity and technological innovation, largely because of its collective efforts in World War II. Unfortunately, this is no longer the case.

Instead, we've seen other countries, particularly those in the Far East, master our production techniques, anticipate customer needs and adopt emerging technology skillfully and more quickly than we have.

But I do not believe, as others do, that U.S. manufacturers might as well concede the race for industrial supremacy to Japan or South Korea. Nor do I believe that the U.S. should supplant its manufacturing-based economy with one based on services. There is no way services alone can fuel the engines of a $4.5 trillion economy.

Instead, U.S. manufacturing companies must learn that if they want to survive, they can't throw rocks over the wall anymore. In fact, they must get rid of the walls — from a human perspective and from a technological one. We must work together in ways that we never before envisioned.

Perhaps the ability of the Japanese to work more cooperatively than we do is a lesson learned during many centuries of living close together on a few small islands. It is a lesson from which we could profit greatly.

Some of the critical issues that directly affect increased U.S. productivity include setting and adhering to standards, adopting technology to meet customer needs and, finally, developing strong alliances within and outside our own industry.

Stuck at a bottleneck

First, we need standards. Complex applications like solid modeling and animation are geared to one overriding imperative: to get products to market faster. Yet for all the progress we're seeing in some areas of the manufacturing process, there are stubborn bottlenecks. One reason is that we have yet to agree on the standards we will use for operating systems, data communications and data management.

Some of the largest companies have imposed their own standards, including General Motors Corp. with the Manufacturing Automation Protocol (MAP) and Boeing Co. with the Technical and Office Protocol (TOP). Any company wishing to do business with these firms or their thousands of suppliers must adhere to their standards.

For the manufacturing company hoping to connect and port applications across a variety of platforms from different vendors, emerging standards represent a ray of hope. For the computer vendor, the ability to implement standards and fit into such an environment becomes another differentiating factor.

But none of this is easy or inexpensive. Today, about 50% of the information systems installed in the U.S. support business operations. By 1990, that proportion will drop to about 33%; the proportion used to support design, manufacturing, engineering, production and resource management will rise to 60%. Clearly these operations must be more closely linked. Standards are an important part of the linkage.

Reality check

Second, 20 years ago, many people in the computer industry believed the day would come when companies would be run from top to bottom by so-called management information systems. From a terminal at his or her desk, the plant manager or even the CEO would be able to call up any information, cross-reference it with any other information, make a decision and communicate that decision to the people responsible for implementing it.

That's not what happened.

In reality, the way organizations work is much more complex than the visionaries understood. Other examples of these collective visions include the "checkless society" and the "paperless office." With all these visions, we embraced those parts that suited our purposes, adapted others and ignored the rest.

The lesson here is that any effort to computerize a task brings us face to face with the deficiencies in our understanding of it. Developers must learn to compare what they have developed with end users' real-world experience.

No company is an island

Finally, it's no surprise that mergers and partnerships are occurring at one of the highest rates in U.S. history. Largely because of increasing global competition and declining venture capital, such partnerships have many goals: technology exchange, increased market share and expanded sales channels among them. No company can do everything alone. The smart ones don't try.

What's next for American manufacturing? Is the answer to operate more like the Japanese, who seem to simplify a process first and then automate it — not expecting the technological solution to substitute for, or compensate for, the organizational one?

Or is the answer to buy more technology?

Long view

The solution is both. We know that advanced manufacturing techniques are never quick fixes. If a manufacturing operation is not already running efficiently, no amount of computerization will make it run efficiently.

In addition, firms concentrating on short-term profitability are less likely to purchase computer-integrated manufacturing solutions than are those interested in long-range growth, because advanced manufacturing techniques may not pay off immediately.

Appropriate technology is only part of the answer. The other parts are the intelligence, the listening skills, the imagination, the flexibility and the eagerness to explore that come with competitively — yet cooperatively — pursuing a common goal.

ILLUSTRATION BY JUDITH HOWAT

automation and information systems are integrated to reap maximum benefits, there are dozens in which they are not. "In most shops, there are terminals and printouts," Clermont asserts. "But if you really want to know what the hell's going on, you have to go ask Frank, and that doesn't fly in a well-run factory. What Frank knows and what the system knows must be one and the same.

"It's bigger than the typical MIS director's job," he adds. "The problem isn't the choice of hardware and software, but how it's used. MIS people must be in the picture and be real hardnosed in getting other people in the organization to make things work." Those steps include establishing standard data definitions and a clean baseline of data. "If you just take your old junk and throw it into the new system without checking, validating and laundering it, you can just blow yourself up," Clermont says.

DEC's Savage also emphasizes the need for standards. "It's definitions — and that's a people problem," he says. "There needs to be one definition of a delivery date or a bill of materials."

Upgrading to MRP II

DEC opened a $33.6 million manufacturing plant in Augusta, Maine, in 1979 and within several years faced the prospect of shutting it down. Sales of the plant's major output — network and communications products — were stagnant. Because of poor production planning and scheduling, the manufacturing lead times were too long in a field that demanded quick turnaround.

In 1984, the plant was given a second chance. Aiming for predictability in the quality and timing of work, it decided to pursue CIM by upgrading to an MRP II system, which integrates systems, data and people across manufacturing functions.

The move involved a major cultural change for the organization. It spent $1,000 per employee on training and established standard data definitions and a stable, accurate data base. "Integrated common data is the glue that holds everything together," plant manager Beth Routhe says.

Today the plant lists among its achievements a 45% jump in output, an 18% cut in inventory, 50% less overtime, 50% fewer production defects and a 20% increase in productivity. Fewer employees control work in progress, and data-entry clerks are being retrained.

"These benefits could not have been achieved through hardware and software alone," Clermont says. "There was a major organizational change where the old managerial functional barriers were broken down."

In companies at which a critical mass of automation is already in place, many experts focus on management changes as the springboard for the next stage of overall productivity gain. They see hierarchical management broken down into a cross-functional teamwork approach, which goes hand in hand with integrating information systems throughout the company.

Getting tight on systems

Two years ago, Whistler, Inc., a Westford, Mass. manufacturer of radar detectors now with 185 employees, had to make a decision: Either turn productivity around or move production to South Korea.

Whistler managers knew what their problems were: inefficient use of manufacturing space, proliferation of inspection points, rework rates of 25% to 30%, collection of unnecessary data and excessive amounts of materials sitting in inventory.

The managers gave themselves two years to see what they could do. What they did not do was to turn to computers. They closed one of the two plants and reorganized the other to run with fewer manufacturing steps and employees.

"We had an MRP system, but we've made it simpler and easier to use," says Manufacturing Vice-President Richard Packer. The company eliminated modules — for monitoring work orders against products, monitoring the movement of products from one process to another and collecting data for analysis and categorization — that was never used.

Today, as at Tektronix, Whistler's just-in-time system is manual, and its line operators monitor production, catching defects earlier and doing away with most of its inspectors. It continues to use its Hewlett-Packard Co. minicomputers and microcomputers on the shop floor for tracking information on quality.

"The changes were gut-wrenching," says Packer, "but direct labor is down from 346 to 130 and supervisory staff from 30 to 10. Today we produce the same amount as a year ago with only half the direct labor. We've cut production costs by 35%. Rework is down to 5%, and we've slashed the production cycle from 22 days to three — without automation.

"We're information-systems-light here," he says.

In the early '80s, says Boston University's Rosenthal, "the groundswell of automation excitement swept up companies which didn't have the total dedication, resource and sophistication to do it properly — that includes General Motors — and it didn't work. But automation can be done successfully in one fell swoop if you're big and sophisticated and totally committed and know what you're doing."

Some of the showcases of automation are well known — there is IBM in Lexington, Ky.; Deere & Co. in Waterloo, Iowa; General Electric Corp. in Schenectady, N.Y.; and others. How are they faring today?

Intelligent manufacturing

Everything about the GE Steam Turbine generator plant in Schenectady is big. The products, the plant, the 1,200-member work force, the sales organization and the CIM network itself.

It was difficult to install the CIM system and get it running, according to Charles Herman,

Continued on page 26

USER VIEW

Michael Hallman
President
Boeing Computer Services

Webster's Seventh Collegiate Dictionary defines "productive" as "contributing to effect production" and "productivity" as "the quality of being productive." In simple terms, productivity is producing the highest quality product or service at the lowest possible price.

Webster's, however, also defines "productive" as "having the power to produce in abundance," and I think that's where many information systems departments misunderstand their contribution to productivity.

Too often, a productivity solution is to automate everything in sight. The automation of a wasteful manual process only allows the process to continue being wasteful, but now at electronic speed.

Boeing Computer Services' role in increasing the productivity of The Boeing Co. begins with participation in corporate strategic planning. Many information systems issues deal with how we're going to run our business and the most basic activities associated with designing, building, maintaining and supporting products.

You often hear that a particular business is too volatile for a strategic planning process. Volatility makes planning all the more critical. For instance, although we can't predict our product mix in 1992 at Boeing, I'm willing to bet that we will be producing high-tech products. And we're going to have to design those products, bend metal, fabricate things, support logistics and so forth. To the degree there's volatility in our product mix, we've got to build flexibility and adaptability into our information systems.

How much flexibility do we want in manufacturing? Do we really want the ability to build any product at any factory based on changing business mixes and relative costs? If so, we would need an entirely different set of information systems to support that strategy.

The strategic planning process helps identify common information systems that will generate benefits across multiple organizations and also recognize the uniqueness of those organizations. That leads to the integration question: "How do we get multiple, potentially disparate systems of separate organizations to work together?" We're driving toward a single electronic representation of the things Boeing builds.

Through the planning process, we can develop the justification for designing a system, but not just in the classical sense of cutting three parts out of an assembly or reducing the engineering head count by three people.

We believe we need to tie our planning activity into the overall business plans and financial objectives of each Boeing division.

For example, we need to understand each division's costs associated with scrap, rework and engineering changes and the value of taking 90 days or six months out of a development cycle.

Working against those numbers and issues, we can begin the structure of the overall systems plan. Such planning crosses disciplines and organizational lines and identifies major leverage points. That's how we can determine justification and affordability, which can then be spread over the years it may take to develop a system.

An artificial intelligence project operating in the manufacturing area of Boeing Electronics is a good example. This system, called Connector Assembly Specification Expert, aids shop workers in the assembly of electrical and electronic connectors.

Before this system existed, shop workers searched hundreds of pages of documentation each time they assembled a connector. Today, they can consult the AI program. The program has reduced the time it takes to locate a specification from an average of 45 minutes to two or three minutes. When fully implemented, it is expected to save millions of dollars each year.

The importance of planning cannot be overstated, because the investments required to implement advanced technologies are very large. Information productivity decisions must be made methodically, with a clear sense of purpose and with specific end goals in mind.

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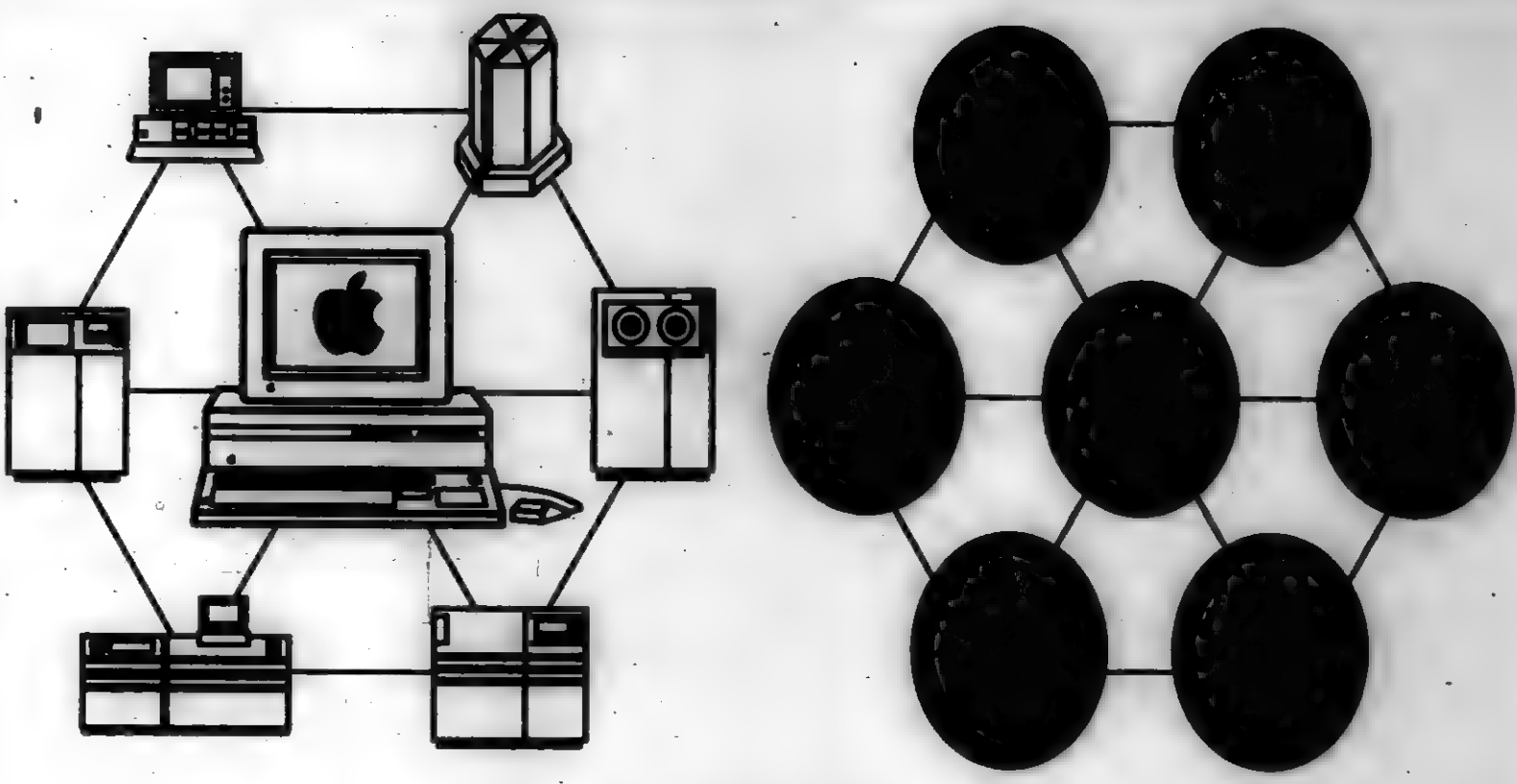

Vision of world change.

The two networks above are the same. The one on the left is how most IS professionals would design a network. The one on the right is how the IS&T (Information Systems & Technology) group at Apple envisions a network.

The difference? Apple's focus is on building a system with truly transparent access to information. An enterprise that could grow dynamically, instead of in discrete stages. One that seamlessly links employees, customers, and vendors worldwide. Regardless if the user is working with a micro, mini, mainframe, or even supercomputer. Distributed, parallel, or cooperative processing.

Now think of what such an enterprise could mean to the corporation. Growth and reorganization would occur without disrupting the vital flow of information. The corporation becomes highly flexible, responsive. The people in the corporation become energized by change and challenge. Both become successful.

Our vision might strike you as very ambitious. It is. But it was not created lightly. It is the result of intense discussion, analysis, and financial commitment at the very highest levels of the corporation.

The corporation is Apple. The vision is that of our Information Systems & Technology group (IS&T). And you could be one of the people.

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Operations

DEC VAX
System 38
IBM 30XX

Software Engineers

"C," Pascal, MACAP, MPW, Connectivity, and Interoperability

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Continued from page 24

manager of automated process planning. "All the possible problems arose, but we were backed by upper management, and that was important because we needed to make changes in middle management to implement the new systems," he says. "Of course, any new hardware system you bring in — a PC or mainframe — suffers a culture shock when it arrives, so you have to work on it. But up time is very good now, 90% to 95%."

The GE Steam Turbine Generator CIM network might begin in Italy or India. Each of GE's Steam Turbine Generator sales offices around the world is linked through GE's Information Services communications network to a Honeywell, Inc. DPS88 mainframe in Schenectady, which holds most of the business systems and various design, engineering and manufacturing data bases.

GE is planning to replace its own business software with an MRP II system that will run on an IBM mainframe.

Directing traffic

As part of the overall CIM strategy at Schenectady, GE set up a process planning system to automatically route parts through manufacturing shops. The process combines GE's Part Recognition Code (PRC) on the Honeywell mainframe and a CAPP system from Logan Associates running on a Data General Corp. 10000 series minicomputer.

The key element is the PRC, which replaces traditional drawings by capturing all pertinent product definitions in a digital form, making possible distributed numerical control (DNC) — a numerical control process that is integrated with CAD and CAM systems. The system assembles a package of routing, materials and machine instructions. The machine operator calls this package up on the shop floor terminal, sets up the job and pushes a button to make a part.

"We're putting the intelligence into the manufacturing plant automatically," Herman says. "For the first time, the shop floor is getting consistent and accurate information."

From 45 planners and 36 drafters in 1981, GE Steam Turbine is now down to 10 and two, respectively.

"An order which comes in before noon can be on the shop floor at 7:00 the next morning, totally without paper," says Lalci Kontronis, manager of advanced manufacturing systems. "Productivity is up 10% to 15% for both direct and indirect labor since 1984. There's 30% less inventory in the shops, and cycle time is down. What was an eight-week engineering-to-shop cycle can now, in a priority run, be down to 4½ hours, though a more standard reduction is from eight or 16 weeks down to one."

The total system cost $30 million and pays for itself every one to 1½ years, Herman says. "It's been a pleasant surprise."

GE seems to have cut through the support problem for its shop floor by using information integration and DNC. Compare this approach with a firm that installs glossy new CAD but is still in the steam-engine age when it comes to moving the data through the organization.

Automation showplaces represent only a fraction of all U.S. manufacturing.

Buried in paperwork

Situations like that worry Jerry Arcuri of consulting firm Datapro Research Corp. in Delran, N.J., who has written extensively on the subject of information systems and productivity. "If there's no integration, productivity suffers," he says. "Great designs don't get themselves out of the door. You need to link CAD to CAM and the shop floor."

Typically, engineering drawings need 17 signatures before approval. In some large companies, there are horror stories of the complexities of managing drawings — of areas buried in paper, instruction sheets mixed up and paper delivered to the wrong place or at the wrong time.

In U.S. industry as a whole, Arcuri still sees very little linkage between CAD and MRP planning. "The flow of materials isn't automatically generated so inventory control and financial planning and shop-floor scheduling are improved," he says. "Even when they have the software, they don't make full use of it. Users of MRP don't take advantage of all its capabilities. Different departments use different systems. Upper management must make the commitment — and that, in general, is lacking.

"Larger companies, generally, are more effective, while mid-sized companies are not doing much with MRP," Arcuri adds. "Integration can cost half a million dollars for a small company."

Nevertheless, between 1981 and 1987, productivity growth in U.S. manufacturing averaged 4.2% per year, well ahead of the 1.3% rate between 1973 and 1981 and far greater than the service sector's 0.3% rise from 1981 to 1987.

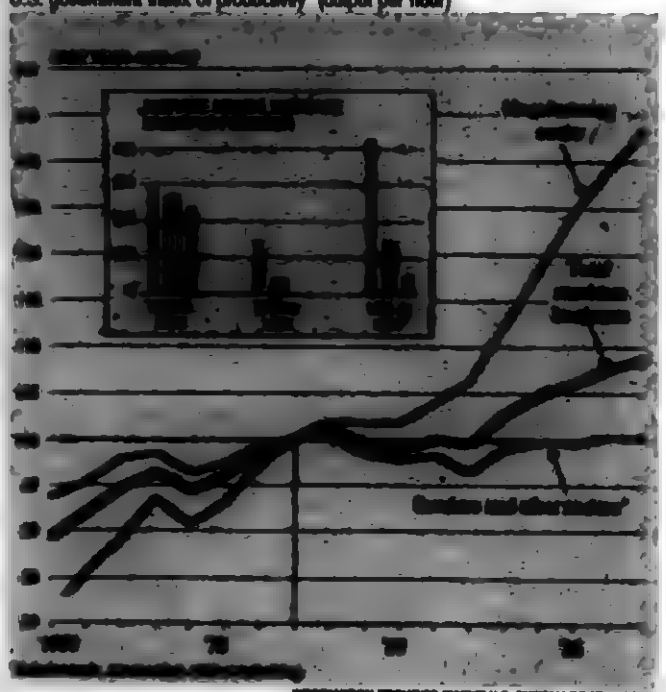
The well-known automation showplaces still represent only a fraction of U.S. manufacturing. Yet the message is clear: The problem is in management and organizational inertia. The tools are at hand. Will the determination to use them follow?

DEC's Savage foresees a time when management changes will free creative people to help their firms realize the benefits of the automation technology that is already here. "The '90s will be the decade of the data in creating reference architecture so that different functions can work off the same models rather than interfacing a plethora of applications that have different definitions of the same items," he says.

Information systems and automation have helped American manufacturers increase their productivity in the last decade; but the changes have yet to be widespread or comprehensive enough to outstrip the gains in other countries.

MANUFACTURING RISES; SERVICES STUMBLE

U.S. government index of productivity (output per hour)



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COMMENT

W. Michael Blumenthal
Chairman, Unisys

If the computer industry is to maintain its historic growth, it must transform today's software development mind-set to one in line with the 21st century.

Application development backlogs have become serious drags on the productivity of all industries — manufacturing, distribution, steel, automotive and finance, to name just a few. To manage change effectively and to gain competitive advantage, companies need to continually improve their overall productivity as well as gain the flexibility to develop unique, value-added products and services in a timely way. Today, many MIS establishments can scarcely keep up with maintaining old applications, thus making it impossible to deliver new applications on budget and on time.

The major source of bottlenecks — as well as a lack of flexibility — in MIS organizations is the rigid, slow-moving process of programming with third-generation languages.

Given continuing and rapid change in the economic environment, the relatively static nature of the third-generation language programming art becomes more of a burden. Most surveys show that just 10 or 15 years ago, hardware costs accounted for 60% to 75% of a typical system, with software taking up the rest. Today the reverse is becoming true.

Furthermore, our industry and its users are challenged to keep pace with the exponential growth of hardware performance in two other critical areas of information management.

One is openness and interoperability, meaning the ready portability of solutions that users need to run their businesses. Another is networking, the ability organizations need to manage the flow of information.

These are areas in which technological innovation lags, and they are all related to software, not hardware. Information systems suppliers, like all companies, must respond to this pressing requirement by taking a hard look at their traditional assumptions and approaches. In fact, a new productivity mind-set is called for — one that is willing to question the status quo and, where appropriate, reject it.

For example, it is time to attack the software bottleneck issue by reaching beyond the third-generation language world to a higher level approach that is, in a sense, independent of hardware and architecture. That's where computers start becoming what they should be: transparent to the user. Users need a powerful environment built to provide maximum productivity and flexibility.

This higher level environment must go beyond the popular computer-aided software engineering tools and so-called fourth-generation language development systems. What is needed is a complete information system environment that runs across multiple architectures, including Unix.

However, this comprehensive capability requires a basic change of mind-set for programmers and MIS managers whose training and experience are rooted in the slower third-generation language programming techniques.

So the real challenge in breaking the software bottleneck is not a technological one. It is the more difficult issue of rejecting the status quo and opening up to a new mind-set. The ultimate industry-wide break with the old world has vast implications for computing and for the world economy, just as the break with earlier technologies produced today's information processing industry.

The Information Age is here. It will not be slowed or thwarted by old approaches or by the politics of computing. Software productivity and flexibility, real system openness and total solutions in which technical complexity is transparent to end users are driving the information systems industry. They are the basis of a new and compelling economics of computing in which the MIS contribution to a company's success will be measured in terms of the flexibility and control it gives management in managing change for competitive advantage.

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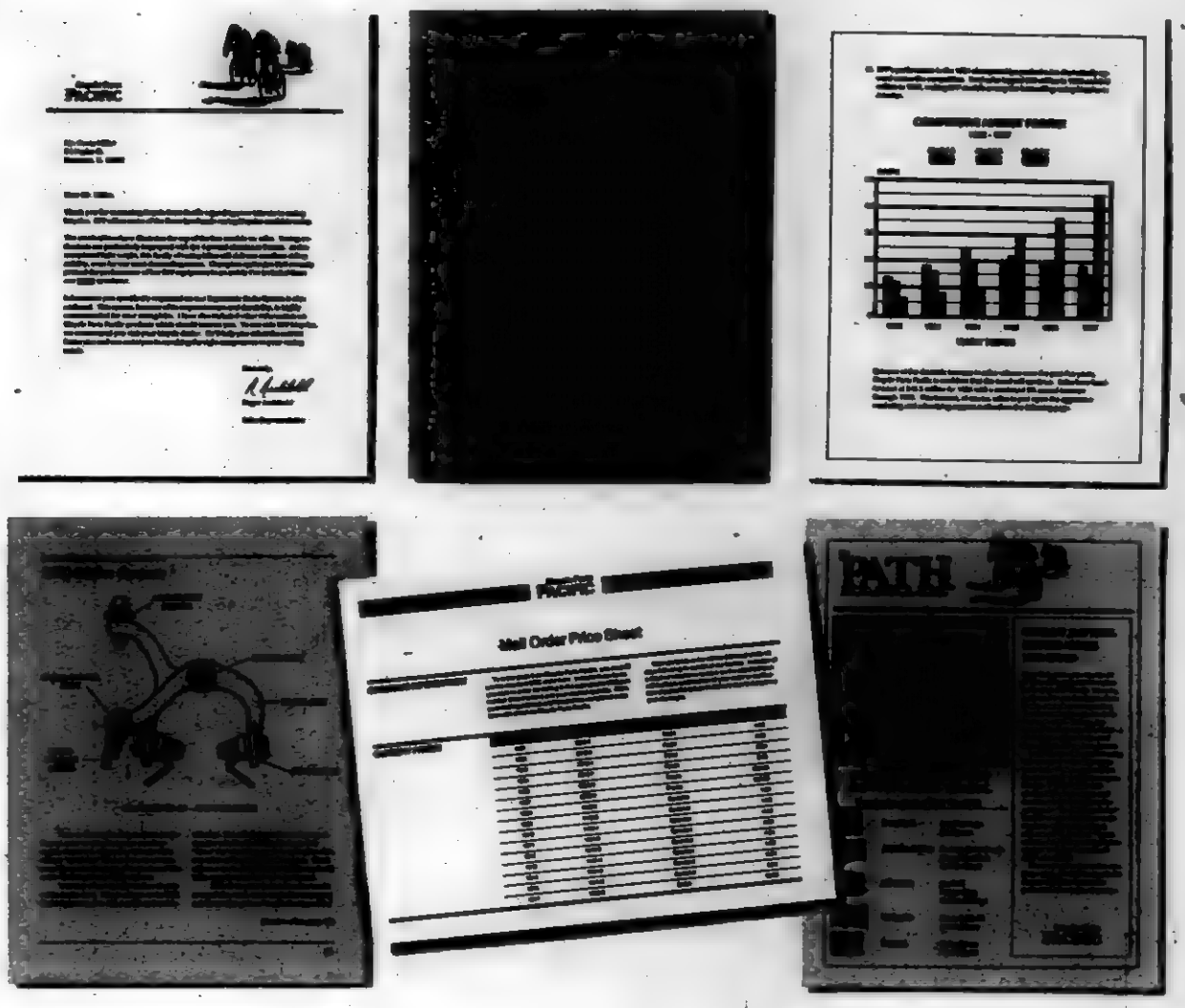

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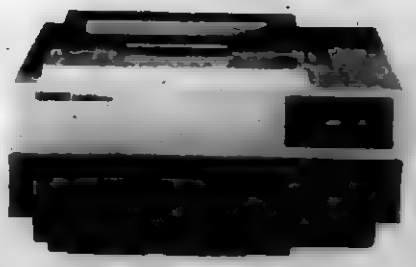

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Circle Reader Service Number 9

Report the good news to your CEO

By M. Victor Jannielle

During a major cost-reduction program, the chief information officer (CIO) of a large service organization was asked by the president of his company to prepare a presentation on how the data processing function helped the company meet its productivity needs. "I do not want to have a presentation on the acronyms you are working on," the president said. "You will only have 10 minutes to summarize the contribution of your function."

Fortunately, the CIO had just implemented his own EIS and developed an MIS Performance Report that he could use to communicate with management. Without this tool, he would not have been able to present his case.

We all understand the importance of doing an excellent job. Unfortunately, too often we do not also understand the importance of communicating to senior management what we have accomplished and at what cost. The success or failure of an MIS executive is often measured by how others perceive the job that he and his group are doing. For this reason, we must explain our successes as well as our failures. The adage that "no news is good news" no longer applies.

The missed opportunity

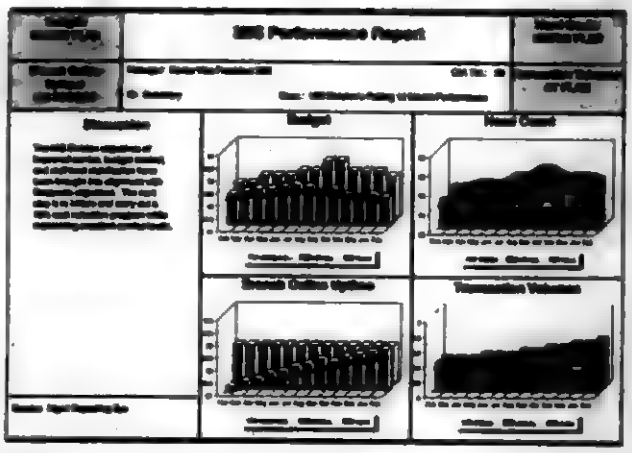
Many companies have not focused on productivity but on cost reduction and cost containment. Often, people will look at computer-integrated manufacturing (CIM) and only see the cost associated with the recapitalization of the plant, the write-off of undepreciated assets and the use of key management outside day-to-day operations.

The view of this effort should be on the additional capabilities CIM brings to organizations. These capabilities could include improved product quality, ease of retooling and reduced direct-labor costs.

Computer and communication goods and services are the new manufactured products of the information revolution. DP is the factory that produces them. DP takes raw material — data — and processes, engineers and combines it to produce both internal and external products and services.

Managing this factory requires the same types of tools needed by any manufacturing facility of comparable size and complexity. The dilemma is that we have spent the last 30 years building computer and communication capacity and have ignored the building of management control processes to efficiently and effectively run the DP factory.

Typically, the management tools in place are chargeback and/or project status systems.



The reports from these tools are provided to users and management. They, in turn, are expected to understand how well DP is being managed by interpreting the reports.

However, it is a rare DP organization that has appropriate tools to measure the factory's success in meeting its "soft goals," particularly doing so using terms the line business executives can understand.

The problem

All too often, the careers of information systems executives are abruptly altered because their corporation's management is not pleased with the way the MIS function is being handled. Behind each of these upheavals are stories of computer projects that have failed; MIS costs that were out of control; users who were not pleased; poor service levels; or deadlines that were missed, extended and missed again.

In this environment, it is not surprising that MIS executives tend to have short careers.

I have identified an almost universal characteristic of organizations in which MIS executives are successful. It is that the chief executive officer and MIS executives have developed ways to objectively measure the performance and productivity of DP. Factory management data exists and is communicated as well.

In failing organizations, the CEOs tend to have only subjective feelings about DP. They evaluate the performance of MIS based on their relationship with the top MIS executive. When the CEO likes him, things go well. When he does not, things go badly.

Empire-building

An element that too many MIS executives overlook is the nature of their own department's operation. As it has grown, MIS has become, for all practical purposes, a business within a business. It provides distinct services — custom software development, data center operations and telecommunications capabilities — to a specific group of customers: the corporation's decision makers.

To change things, the MIS manager needs to make a transition from senior technician for the corporation to, in effect, CEO of his own business. Among other things, the transition requires the development of a management information system to report MIS and corporate productivity.

The success or failure of an MIS executive is often measured by how others perceive the job he and his group are doing.

The system and associated processes must provide a balance between the planning activities that have been emphasized in the past and the control and execution functions that have been neglected. To achieve this balance, the system should first provide accurate information, in appropriate business terms, about what productivity is. For example, it should report on capacity using the number of invoices processed or dollar volume of business as the unit of measure, instead of the number of CPU processing units or accounting units charged back.

A financial services CIO developed one reporting system. In cooperation with the executive management team, he defined the critical success factors (CSF) of his function and then used this tool to communicate results to the rest of the management team.

The organization was focusing on overall productivity. Therefore, his CSFs were service level, processing capacity, cost and head-count control. Best of all, the report was only one page, used graphics to depict trends and had a limited discussion.

Understanding

The process for measuring productivity should define and manage expectations, which necessitates understanding the conceptual framework for management of the business.

In any organization, planning and control take place at different levels. The management activities within each level cover a specific time period and have a specific purpose. Three levels are traditionally considered: the control level (on a daily, weekly or monthly basis), the tactical level (covering a one- to two-year period) and the strategic level (covering a five-year period or longer).

The productivity measurement process should serve all three of these levels. At each one, it should provide the information that allows managers to quickly and efficiently find out whether the organization is executing its plans and reaching its objectives.

A distinction should be made between operational and managerial information. Operational information is typically transactional or statistical, as represented by listings of activities, problems or events. Generally, there are large quantities of operational information within organizations.

Managerial information is far less common. It is comparative, not subjective, and relates management's planning, the corporate history and competitive position.

The objectives of a productivity measurement process are the following:

- Performance. Comparative performance should be measured in business terms against some planned activity, level, event or standard. These measurements should be nontechnical enough to be included in the corporate annual report and understood by the general public.
- Quantitative. Objective criteria should be discrete and measurable.
- Accountability. Specific individuals or groups responsible for the performance should not only be identified and charged with that responsibility but also given the resources and authority to affect the performance. When management says, "Let's cut the budget by 10%," the DP executive should not just cut the budget. He should tell senior management what will not get done. If he does not, he will be held accountable when things are not completed.
- Auditability. The reporting system to support the process should be consistent and supported by detailed information. There is nothing worse than shooting from the hip on performance. Perception is reality, and if the detail is not presented, the individual with the strongest political clout will win. I know many DP executives who were right but were fired because they were caught in emotional decision making.
- Simplicity. All good ideas can be presented on a single sheet of paper. The DP executive who presents a pair of 3-in. binders to tell a user that his department is providing a 97% service level is doomed to failure. Detail is needed as a backup, but don't drown the user in useless data.
- Comprehensive. The management reporting process should be complete in scope and reflect the organization's actual activities. Most DP organizations possess excellent project management tools to tell them how they are doing on new systems development, but these tools ignore the other 80% of the business.

It is time to bring the same discipline to the information systems organization that is expected elsewhere in the corporation. This effort begins with the establishment of a comprehensive productivity reporting system that focuses on agreed-upon metrics. Such a system essentially manages expectations and perceptions.

Jannielle is founder and CEO of Positive Support Review, Inc., a Los Angeles-based management consulting firm specializing in helping Fortune 500 corporations manage technology and change.

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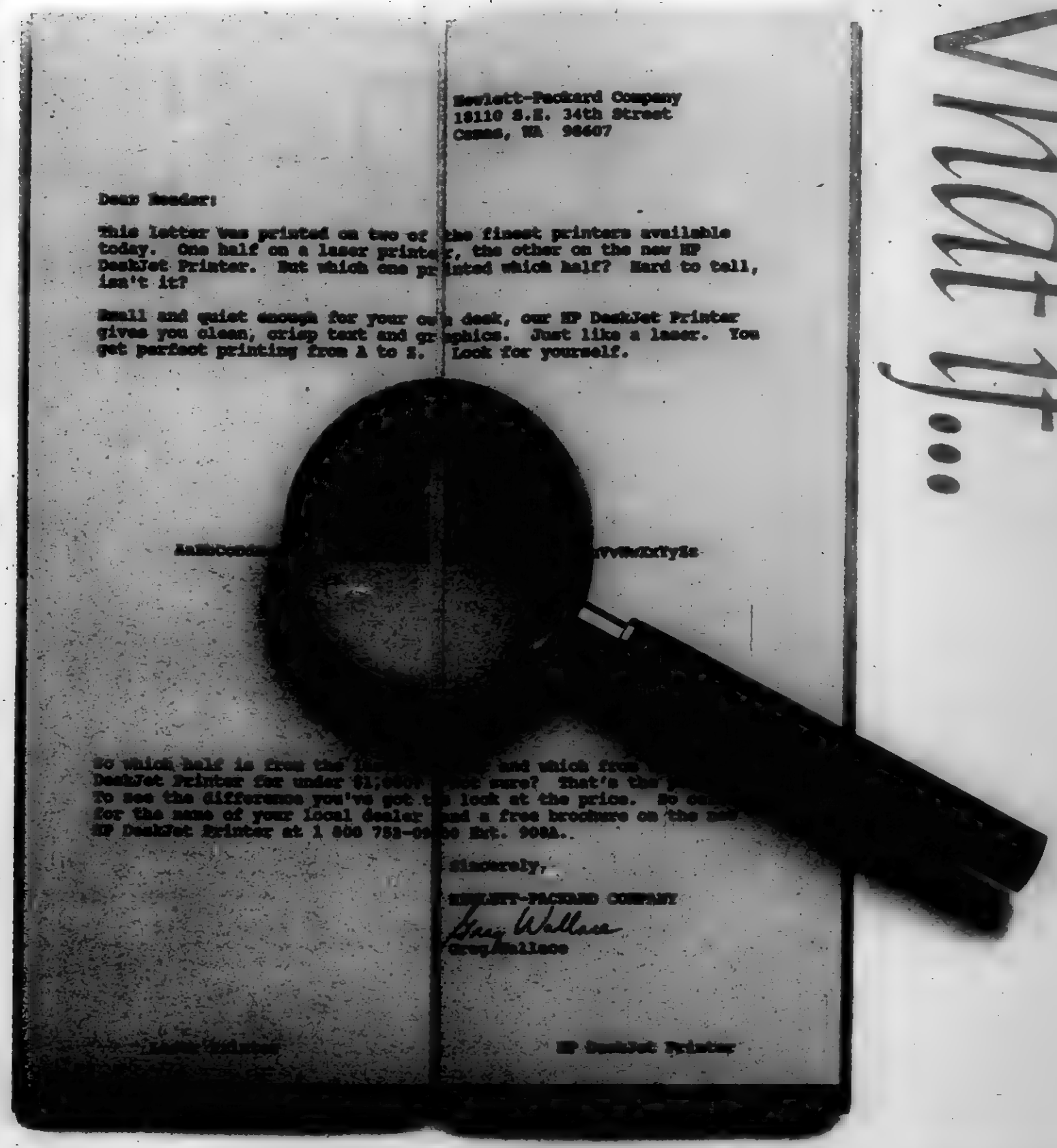

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Circle Reader Service Number 10

Computers: Lost without them and sometimes losing with them

By Donald Sandler

An information age paradox: Without computers, we simply cannot attain dramatic productivity gains; yet with them, we seem to be losing ground.

The productivity curve in U.S. industry showed that as computerization climbed, productivity fell. The problem may not be the computers themselves. In many cases, they're doing the job they were purchased to do. Instead, information systems are suffering from a cultural problem — one common to advanced technologies.

Picture this: An Olympic runner is poised at the starting line, all set to run a 3:48 mile — only there is no track. There are no other racers, no timekeeper and no audience. The capability for a 3:48 mile is present in that runner, but not in his surrounding conditions.

When they were originally introduced, information systems were designed for very specific chores and performed them well, demonstrating impressive speed in processing the payroll, for instance. The benefits of computers came to be thought of as universal and easy to transfer to the bottom line. Organizations did not greatly change to incorporate the new technology — in fact, they planned to stay the same, if they could.

But actually, computers demand a significant adjustment in work culture. In many cases, people are simply unaware of the specific changes needed. And when they become aware, they cannot conceive of how the changes might be brought about.

The culture of tasks

In general, the American work culture is oriented toward individual tasks or task groups, rather than the unified job of an organization, which is the production of a product or service. Managers emphasize the tasks without much questioning their value, the way they are being performed or their relation to all the other tasks involved in producing the final product or service.

This fracturing permeates the information flow at most companies. To accomplish individual tasks, many managers think employees need only know what is necessary for that single purpose.

But information from manufacturing, finance, purchasing and even marketing might be helpful to the designer at work on a new product. Without that information, the design engineer's vision is circumscribed by his immediate tasks and his part in the overall process. Without knowing it, the other departments are also circumscribed, and they are not able to fully support the designer, just as the designer is relatively unable to support their departmental goals.

Systems offer a perfect answer to breaking down autonomous task barriers, but they have not generally been designed or used that way. Instead, the way companies use computers reflects the culture of tasks. The computing paradigm for many years has revolved around applications: The more applications, the more islands of automation.

Data specialists

This syndrome is not at all strange, considering how information systems are designed and selected. They are built by data specialists, who, in most cases, do not have the end user's corporate need directly in view. The specialists solve interesting technical problems.

In the local task-oriented user organization, data professionals are hired to manage all of this computerization. They, like the manufacturers' specialists, can only solve the problems they recognize and that are brought to them — and only in the terms in which the problem is posed.

Management should supply the corporate philosophy or focus, which is the single vision of needs and goals. Management does not do this, because it is locked into the mentality of individual tasks and need-to-know information flows.

Meanwhile, systems proliferate, productivity slides and everyone concerned looks on quizzically, saying: "Wasn't this supposed to be the answer?"

Lacks critical mass

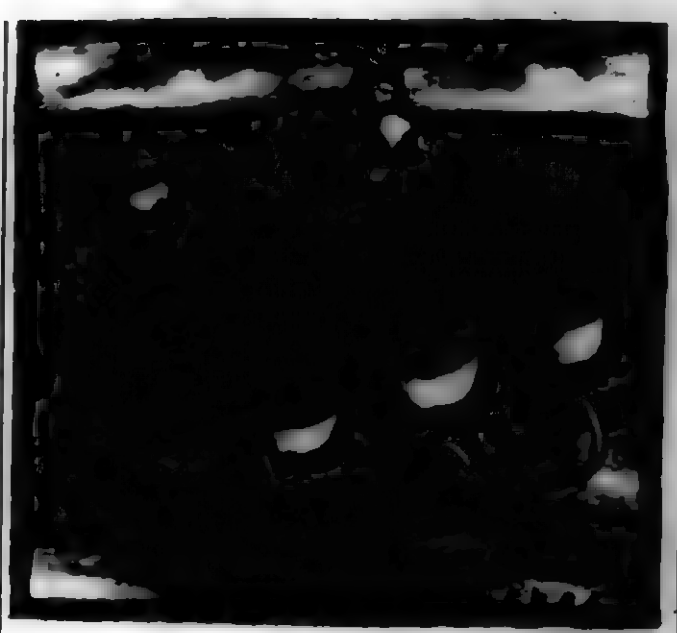
We may all possess more computers than we need, but probably not more computer power than can be usefully deployed in the battle for productivity. The problem is, our computer power is disorganized, broken into islands and, thus, often fails to reach the critical mass.

In reality, tasks are not as sharply defined or delimited as we make them seem. By artificially setting their borders, we place limits that interfere with getting the job done.

Consider a new product development project in a company. One group's task is generating plans, another reviews and alters the plans, a third reviews the plans of the second group and so on. This interdependent work proceeds sequentially in a process of iteration that strives for a final, approved design.

Because computer specialists still do not take iteration sufficiently into account, the process usually requires passing paper documents back and forth. Preparing and distributing the documents introduces delay and possible error; further delay and error are inherent in each group's review and alteration process.

This development process is slowed purely for technical reasons: Computers are not prepared for iteration. Even if they were, the different parties in the project might not run interoperable systems. One group likes IBM, the other Digital Equipment Corp. There goes your productivity.



WARREN GOLDEY

Technology requires a culture that can give it maximum implementation.

Fingers in the pie

Consider other groups in the company not directly involved in the development task but vitally interested in it. Manufacturing is concerned with how adaptable the design is to existing production methods vs. the potential need for new methods. Finance is concerned with costs. Purchasing is concerned with supplies and marketing with product acceptance and pricing. Even sales promotion is interested in the new product's competitive features.

The best conceivable result would be achieved if all groups were considered from the start as part of the development task and gave direct input into the project as needed, while it unfolded.

Today, even subgroups within a design group inadequately communicate. They find out only during the drawn-out iterative process — or even later — whether or not they are working at cross-purposes with other groups.

For adequate communication within and among groups, MIS needs to put two new elements into place. One, in large measure, already exists but has not been properly used, which is an on-line real-time interactive information system with a shared data base. The other is the dedication to exploit this resource.

The man in the loop

It is management's job to open up the boundaries of tasks and put interactive information systems to maximum use.

Continued on page 32

Sandler is senior vice-president at Grumman Data Systems in Woodbury, New York.

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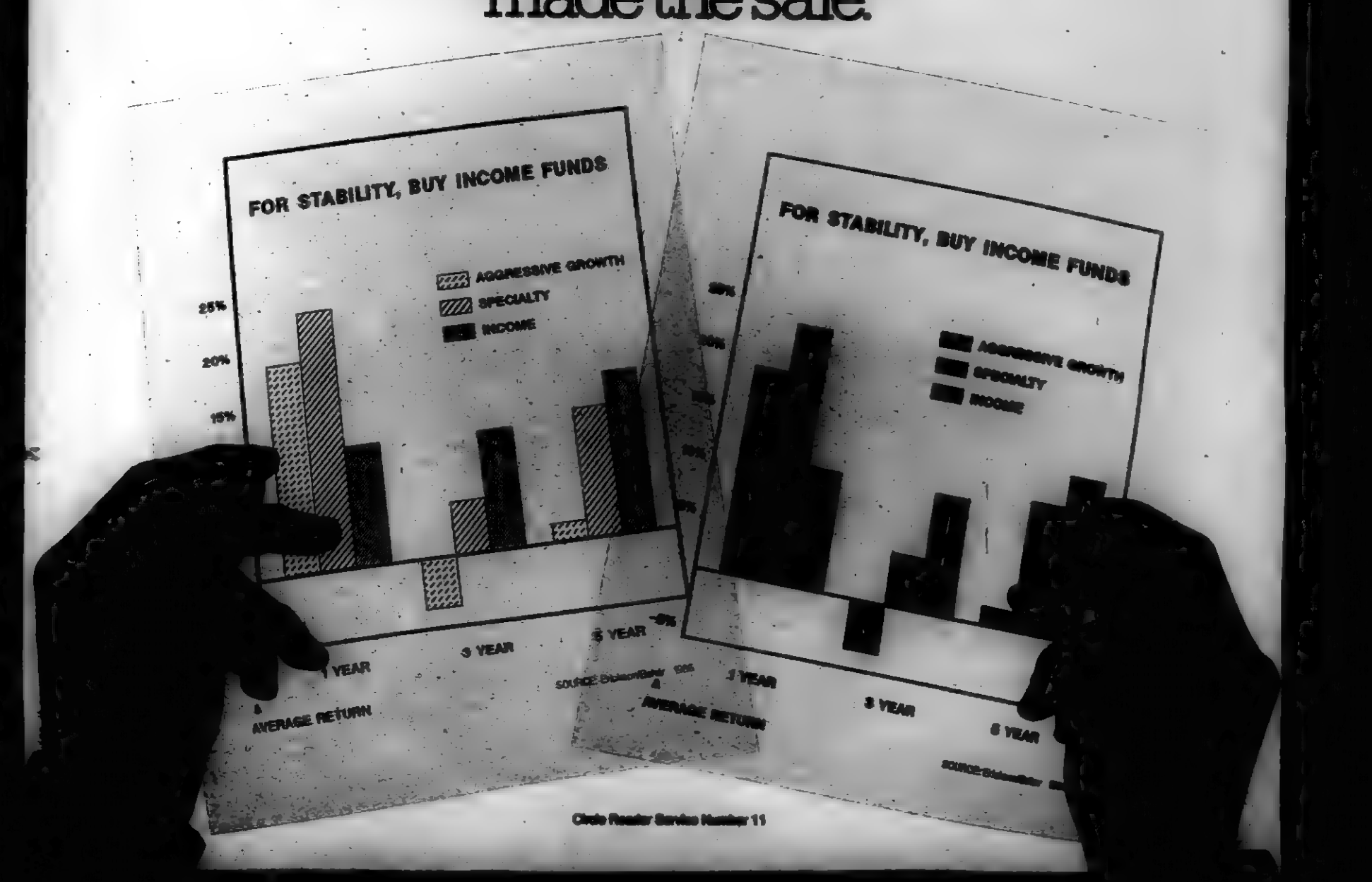

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Continued from page 30

In the past, cooperating groups could get some of the information they needed via meetings, paper documents or the phone. All of these methods take time, and the person requesting the data can still be confronted by the old need-to-know question: "Why are you asking?" It's a sure sign that that turf is being protected.

Interactive information systems speed up the process, establish the right to access useful information and require no "fishing" among possible information sources — no day-to-day breaking down of barriers to the information flow. The old barriers might have made sense in a time when it was difficult or costly to bring everyone on a project up to high knowledge levels.

In the interactive model, the user is surrounded by a supportive information environment and is more able to be an effective "man in the loop." Computers are thus freed to do what they do best — process and move information, which becomes a key factor in improved productivity.

New managers

Most task team managers are more experienced in management as a process than they are in the details of the tasks they manage. However, this focus is no longer sufficient when interactive information systems are used to increase efficiency. Each manager must now take on some knowledge from all the members of his teams, and he must also share his own knowledge with them.

The manager is now charged with knowing not only more about his own group's activity, but also about the activities of the other interested departmental groups. He helps determine the distribution of this input to his group and the output to other groups.

Management's job in this model is similar to its past function although more extensive, both horizontally and vertically. Its function is dynamically located at the critical juncture of teams, tasks and information systems.

In controlling the task process, the manager relates horizontally to top management. The manager relates both horizontally and vertically to his task teams and to cooperating task teams, which are now interactively connected.

The operating task team — for example, development engineers using a computer-aided engineering tool — would now work interactively with computer-integrated manufacturing, computer-aided logistics support and computer-aided financial management.

Getting involved

Through departmental management, top executives also step more directly into the process. Top management can make a crucial contribution: encouraging growth and use of the entire system.

The new manager must be a leader with a participatory style. He is something like a battle commander — not an expert in every area, but knowledgeable in all areas and dedicated to leadership.

> **Even today, computers are still seen as merely faster hands.**

The members of the task teams now share, interactively, management's thinking and the thinking of other groups. The direct results can be twofold: teams give better input to a task in progress, and teams identify more strongly with tasks and the overall goal of tasks — the profits of the organization.

Task team members are immediately elevated by their new role. They now share, interactively, management's thinking and play a role that is operational and decision-making at the same time. In addition, they have more scope and responsibility, which enhances their role in their own eyes and in the eyes of the organization.

Payoffs

The real boost to productivity comes in the work processes themselves. Waiting is drastically reduced by the speedy exchange of data. The work process is faster, and products are developed more quickly and potentially at a lower cost.

Team input means the final product contains the highest quality-to-cost ratio — an unbeatable combination for competitiveness.

For example, long before the product is ready, manufacturing is aware of the specific production needs it will entail and has input manufacturing parameters for consideration in the design loop.

Manufacturing time can be reduced, because the manufacturing process can be ready much closer to the completion of product development.

Technology is critical for growth. But technology is not fully useful if it is best in ways for which it was not designed.

Even today, computers are still seen as merely faster hands. Managers need to start seeing them for what they actually are: information tools producing data that must be spread far and wide for them to have an effect.

By bending information systems the way they were designed to go — not just processing information, but *moving* it — we can begin to rescue productivity from the slough into which our task-oriented culture has pushed it.

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Circle Reader Service Number 12

Optimizing the system by maximizing the people

By Joanne Kelleher

There are many paths leading to improved efficiency in system development. Oscar Jones Jr., development center manager at Ashland Oil Co. in Lexington, Ky., knows one reliable approach. First you select the right kind of people, he says; then you steer them into an environment that permits undiluted concentration.

John Miller, chief information officer at the Williams Companies in Tulsa, Okla., takes a different route, using a fourth-generation language and related tools in conjunction with a host of internally developed data bases and program shells and following the users' lead.

Jack Crawford and Bill Baldwin at the Hartford Insurance Group suggest using a broader approach, one that encompasses maintenance programming as well as development.

Boosting the efficiency of software development and maintenance is a common goal these days. "Even people who didn't see it as a critical issue before are starting to wake up," says Chris Kemerer, assistant professor of management science at the MIT Sloan School of Management in Cambridge, Mass.

There is no single starting point or established course for this kind of effort. Organizations are finding entry points at all stages of the system development life cycle and utilizing a wide variety of techniques to push their development groups in the direction of productivity.

If there is a common thread among the campaigns now being waged, however, it is that they do not typically begin or end with tool sets, Kemerer says.

Times change

"One thing that I have noticed is that many of these attempts involve some kind of organizational change," Kemerer says. Most commonly, that change takes the form of a newly created staff function to handle tasks such as technology research, pilot testing of tools, metrics collection and quality assurance. But in fact, a number of organizations are going far beyond that level of alteration.

Ashland Oil, for example, not only organized its system development support activities into a formal development center two years ago but also added some novel extras to its version, which it calls "Development Center Plus."

In addition to staffers who recommend methods and techniques, provide training and serve as consultants, the center employs five individuals in less traditional roles — three technical writers, a librarian and a support clerk. These people, Jones says, perform tasks that the programmers and analysts were once required to do. "What we are trying to do," he explains, "is to optimize our use of programmer and analyst expertise by allowing them to concentrate on what they do best and what we hired them to do."

Ashland Oil's *Jones* — DOUGLAS FOWLEY

The development center librarian, who is professionally trained for that job, oversees a multimedia library, maintains all program documentation, performs on-line searches to locate information about new tools or productivity aids and publishes three newsletters, including a digest of relevant articles.

The support clerk maintains all the remote printers. He also delivers the output, along with the mail, to the programmers and analysts at their desks.

This isn't empty coddling, Jones says, but a verifiably effective way of improving productivity. "We have a project accounting system that estimates and tracks time spent on documentation, so we know that in that area alone, we have been able to cut the time expenditure in half.

"Besides," he adds, "in that reduced amount of time, we are producing better and more consistent documentation."

The payback from the services of the librarian and the support clerk are a little tougher to quantify, Jones admits, although he is sure that they are now picking up information on development tools that would have been missed or overlooked before.

Then, too, there are such important immeasurables as job satisfaction and motivation. There is absolutely no way of figuring out how much the Plus part of the Development Center Plus has to do with it — as opposed to technical support, new tools and techniques or just the quality of the development staff members themselves. But clearly, some combination of things has caused output rates to double over the past two years. "Two years ago we were producing at around one function point per 18 hours," says Jones. "Now we are around one every nine hours."

> **The state of software development represents a significant obstacle to effective use of data.**

In other cases, the structural changes that system development organizations are undertaking have more to do with cutting the distance between themselves and the business organizations they are supporting.

Kemerer has observed that there is a strong correlation between belief in the strategic importance of information systems and active efforts to improve system life cycle productivity. Once you have accepted the validity of that concept, he says, it doesn't

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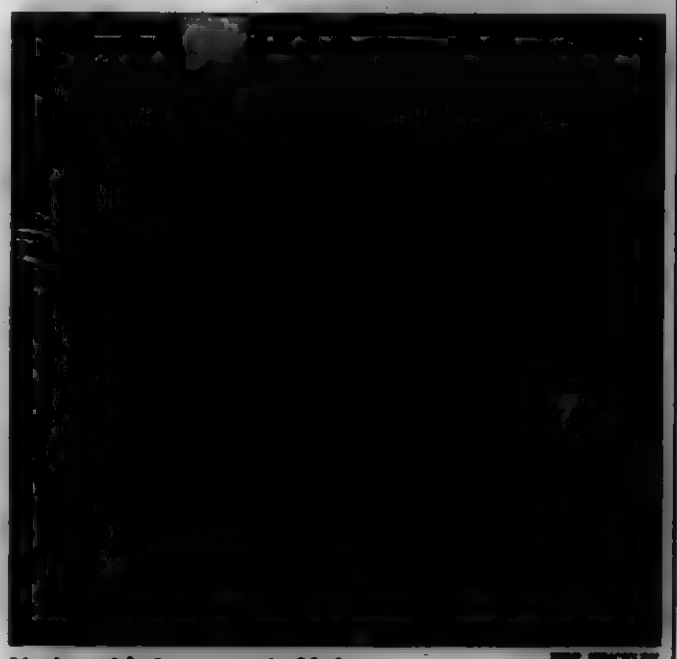

Nationwide Insurance's *Meeks* — JEFF MACKLEY

Kelleher is a *Computerworld* senior editor.

Continued from preceding page

take long to realize that the current state of software development represents a significant obstacle to effective utilization of corporate data.

It's commonplace

At Pacific Bell, the idea of reorganizing the information systems community so that applications are developed more directly out of business plans hardly seems new at all. "It's not exactly a radical idea anymore," says Mac Patrick, staff manager in the Systems Development Maintenance Environment within Information Systems Planning. "Two or three years ago, it was still just a concept here, but these days, people are making it work. We are building new infrastructures to support the effort, and our organizations are changing to support that."

Patrick says the information systems structure has been rearranged to conform to changes in business applications.

Groups have been formed to develop information models and create data bases from business plans and to assess the viability of business planning ideas in terms of existing technologies and applications architectures. In fact, Patrick's own group is an outgrowth of this change process.

> **"I don't believe in getting into extensive documentation or design specs."**
>
> *John Miller*
> *The Williams Companies*

"Our job," he says, "is to deal with these issues in the context of development and maintenance environments across the organization." What that means is developing baseline standards and guidelines for system development, project management and quality assurance that can be adapted and applied by individual systems departments.

Because one of the corporate goals is to foster decentralization and grass-roots independence within the information systems organization, the mandate of the Systems Development Maintenance Environment staff is to support developers with recommendations and resources rather than to implement or enforce changes within departments.

Patrick says a number of development projects that were in serious trouble for a time were eventually turned around through the incorporation of recommended practices, such as quality assurance planning and walk-throughs.

Hustle reversed

Miller of the Williams Companies has hard numbers to define the success of a sweeping reorganization within his firm's information services organization, which has been achieved during the past four years.

To begin with, he says, the ratio of development to maintenance has been drastically altered. "In 1984, only 25% of our activity was in development, and 75% was in maintenance. Now, 85% of what we do is development and 15% is maintenance."

Miller says this reversal of the traditional pattern was absolutely necessary in order to keep the information services organization aligned with the corporate business units.

Since the beginning of the decade, he explains, the Williams Companies has undergone a radical transformation. During that time, the $2 billion corporation has jettisoned four of its companies, adjusted to industry changes caused by deregulation and diversified out of its traditional field of transportation, moving into telecommunications as a fiber-optic private-line carrier.

Just keeping pace with what had happened in the traditional lines of business meant either drastically modifying or rewriting a store of applications that represented an investment of $25 million to $35 million. Added to that was the necessity of creating an entirely new support structure for the new fiber-optics company.

Miller says the information services organization has managed to accommodate all of this, including a total rewrite of all the traditional applications when it decided that course would be more cost-effective than modifying spaghetti code.

It used a suite of development tools from Applied Data Resources, Inc. in conjunction with an internally developed constellation of tools and techniques that ranged from object-based programming shells to a progressive prototyping procedure. What's more, it has managed what amounts to roughly a ninefold increase in development with only double its original number of developers.

Impressive as those numbers are on their own, they do not fully reflect the resource efficiency that has been achieved. What the numbers don't take into account is the fact that by using ADR's Ideal fourth-generation language in conjunction with programming shells, the Williams Companies' information services organization has given itself the flexibility to hire new personnel straight out of college and count on turning them into productive developers after only 10 days of training.

Of course, other companies hire programmers straight out of college without using either fourth-generation languages or special, easy-to-use programming shells. At Ashland Oil, for example, where the majority of programming is done in PL/1 and Cobol, many of the newly hired

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are also recent college graduates because, as Jones explains, "we are more interested in the ability to grasp concepts quickly than we are in experience with a particular tool or environment."

The difference, however, is that Ashland and most other companies that take the same course are not facing the same imperative for fast ramp-up to volume production or trying to combine the programming and analyst functions, as is the case at Williams.

Title distinctions such as programmer and analyst become irrelevant when you do away with extensive design specifications and documentation, Miller says. If development is approached as a process of quick and repetitive prototyping with full user involvement, the phases of design and programming become one operation.

The aim of accelerated design is to foster user involvement in projects and eliminate mid-process changes.

"It is probably a personal quirk of mine," he says, "but I don't believe in getting into extensive documentation or design specs. I think that the biggest reason there is such extensive documentation in so many places is that information systems people want to be able to protect themselves — want to be able to go back to the users and point a finger and say, 'You see, it's your fault.' "

Such an adversarial relationship is antithetical to the systems development approach at Williams. There, users head up all project teams, which typically consist of an even mix of users and developers. Most of the organization's six development teams are actually based in user, or "client," departments. "We operate as a profit center, charging back all costs to the users," Miller says, "so they really own the projects, and we function as facilitators, or subcontractors."

Instead of hefty documentation, Williams relies on fast and, if necessary, iterative prototyping based on its own version of group techniques for rapid development. Many companies have already introduced some such element into the front end of the development process and many more report that they are considering such a move.

There are a number of proprietary accelerated-design techniques now on the market, the oldest and best known being JAD from IBM. There are differences of style and approach among these products.

The goals, however, are the same for all: to foster user involvement in and ownership of the development project, define the requirements and the scope of projects at the very beginning of the cycle and eliminate avoidable mid-process changes.

Clearing the way

BHP Petroleum America, Inc. in Houston has been using JAD for about six months, according to Will Morse, the firm's manager of production systems. Although it is still a little early to tell, he says, his impression is that the major benefit of the technique is not so much the help it provides in development as the way it smoothes implementation. "If users have a chance to formally participate, it helps with acceptance of the product. No product is ever perfect, but people who have had a chance to develop some ownership are more willing to work around what you can't cover."

CINDY CHARLES

Pacific Bell's *Patrick*

Others might have more need for the access to user information that accelerated design methodologies can provide, Morse notes. At BHP, that part of the process has already been addressed through structural changes that bring developers into close and continuing contact with users and their needs.

Some time ago, BHP reorganized its information systems departments to function as support groups for specific business units. That arrangement, Morse says, has allowed programmers and analysts both to get to know users on a long-term basis and to develop a thorough acquaintance with the environments for which they are creating applications.

At Nationwide Insurance in Columbus, Ohio, direct contact with users is not easily achievable, which is one reason that Paul Meeks, manager of technology research, is anxious to bring in JAD and some kind of front-end computer-aided software engineering tool. "We have real difficulty in

Continued on following page

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our organization really talking to people who actually perform the functions and getting those initial specifications nailed down," he says.

By formalizing the contact process, JAD could, Meeks believes, both lessen the time involved in extracting information and help to filter input. "Too much of the time, now," he says, "we are working through the back door — through some kind of user representative or management official — and don't get the right information."

Front-end analysis and design tools are high-interest items, Meeks adds, because without them analysts are forced to work in what amounts to an antiquated environment, and the result is insufficient data di-

PC development tools "support a graphics capability that would drag a mainframe to its knees if many people tried to use it."

Paul Meeks
Nationwide Insurance

agramming and data flow modeling.

"Up-front analysis tools would make the whole process easier," he says. "I'm talking about things like Excelerator [from Index Systems in Cambridge, Mass.] and some of those design tools that allow you to sit down and mechanically define systems and make quick and easy changes."

One tool that is already in place at Nationwide and having a positive impact on system development efficiency, according to Meeks, is a project management tool called Project Management Workbench (PMW) from Applied Business Technologies. Before this tool was brought in to help with planning and tracking of project schedules, he says, projects were often done without benefit of any schedule updating after the initial planning phase.

"In the past," Meeks comments, "project people would draw up very extensive plans and very detailed Gantt charts at the outset of a project without knowing whether the schedules they were using were really valid or whether they could be coordinated with other projects going on in the organization in terms of resource demand. Two weeks later, they would be out of date and of no more use to them."

PMW allows developers to update their schedule dynamically, he says, and in the event of changes in variables — such as sudden illness or an unforeseen conflict with another project — to play what-if games in search of secondary options.

"I can't give you any hard figures on what it saves us," he says, "but I know that if you looked at the dollar impact of missed deadlines and delays of product to market, you would be getting into some big numbers."

Tightening support

Nationwide is also in the mainstream of another trend in system development, which is the pulling together of a central full-service support organization to meet the needs of increasingly distributed application developers.

Roughly a year and a half ago, the company folded up its existing Application Development Center and replaced it with an enhanced structure that is made up of four divisions reporting to the director of technology research. The four divisions are Meeks' own research group and others for development, deployment and support of systems.

The territory that these service types have to cover is also starting to expand. According to Meeks, the company is planning to migrate the application development process to personal computers and local-area networks in the near future. Several pilot projects are already under way in that environment.

"We are looking at establishing a development platform based on the Token-Ring and the workstation and all the supporting software," says Meeks. "We are also working on figuring out the most efficient way of transferring data and source code back and forth from the central host. IBM 3270 emulation has not been the speediest, which is why we are looking at Token-Ring attachments and supporting software that allows you to do data extracts and download packed data easily."

Some developers are already working on PC workstations, using development tools such as Excelerator from Index Systems, Inc. in Cambridge, Mass., and VS Cobol Workbench from Micro Focus, Inc. in Palo Alto, Calif.

Their experience so far has been positive enough to convince Meeks that PC development tools are superior. "They support a graphics capability that would drag a mainframe to its knees if very many people tried to use it."

'More consistent'

But graphics is not the only benefit Meeks expects to realize from widespread use of networked PCs for development work. "We expect that it will give us a more consistent response time, eliminate downtime that extends over many programmers and provide us with an incremental growth ca-

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pability," he says.

Even in organizations that have no intention of moving into a LAN environment, sharing plays a significant role in efforts to enhance development productivity.

At BHP Petroleum, Morse uses Core, a product from American Management Systems, Inc. that is essentially a set of screen and VSAM file-access routines to create a fund of shared code, thereby eliminating a significant amount of redundant programming of common routines and call.

"What we wind up writing is only the unique code," Morse says, "things like the edit checking or the combination of calculations. Core will copy in all the common code, which can amount to an enormous number of routines and calls."

Just browsing

And at Ashland Oil, the development center group recently organized existing modules of reusable code into a library system that uses a relational data base management system. "We've had reusable modules in the shop for quite a while," says Jones, "but they weren't used that much because nobody had ever really emphasized their use, even though they represented an excellent productivity advantage."

Now, he says, both the idea and the code are very visible. "All the programmers have to do is query the tables and find out what modules are available to do what functions in what language," Jones comments.

The maintenance phase of the system development life cycle represents another obvious — but infrequently addressed — productivity improvement opportunity. Most companies are aware that maintenance consumes a disproportionate amount of information system resources and that its share is growing by the year. However, few firms have yet attempted to tackle it directly.

The long haul

The Hartford Insurance Group is an exception. Starting at the end of 1984, with a proposal that maintenance productivity be addressed before it took over the entire operation, the organization moved ahead to create an Application Maintenance Center (AMC) that boasts a support staff of 45.

The aims of the AMC were to set up a baseline measurement and tracking system, provide an ongoing quality check on existing Cobol code and set up processes and tool sets that could be used for both cleaning up and rehabilitating substandard programs.

These efforts, according to Crawford, vice-president of information management, and Baldwin, a system consultant for the AMC, have allowed the company to halt and, to a large extent, reverse the process of deterioration in existing code. In addition, he says, they have provided the means for catching inefficiencies in both newly created programs and external packages that are being considered for purchase.

The effort is far from complete. On the basis of their scores when subjected to static analysis, 11,000 existing programs were targeted for some level of what the company calls "renovation," and approximately 4,000 have actually gone through the cleanup process. Even at this point, however, the benefits are starting to show.

Crawford estimates that even minor, or "quick-trip," renovation of a program produces a 10% gain in maintenance efficiency, while more extensive restructuring, such as module splitting and renaming, may often result in as much as a 25% improvement.

On an immediate basis, Crawford says, these measurement and standardization activities have "allowed us to gain control over our data." Longer term, he says, what is being built is a proper platform for reverse engineering and the creation of a corporate repository of design data for re-engineering applications.

At the Hartford, a variety of tools including both internally developed aids and commercial ones such as Language Technology, Inc.'s Recoder are integral to the productivity enhancement effort. Here, as at other organizations, however, the emphasis is on generic concepts of measurement and process, rather than specific development aids.

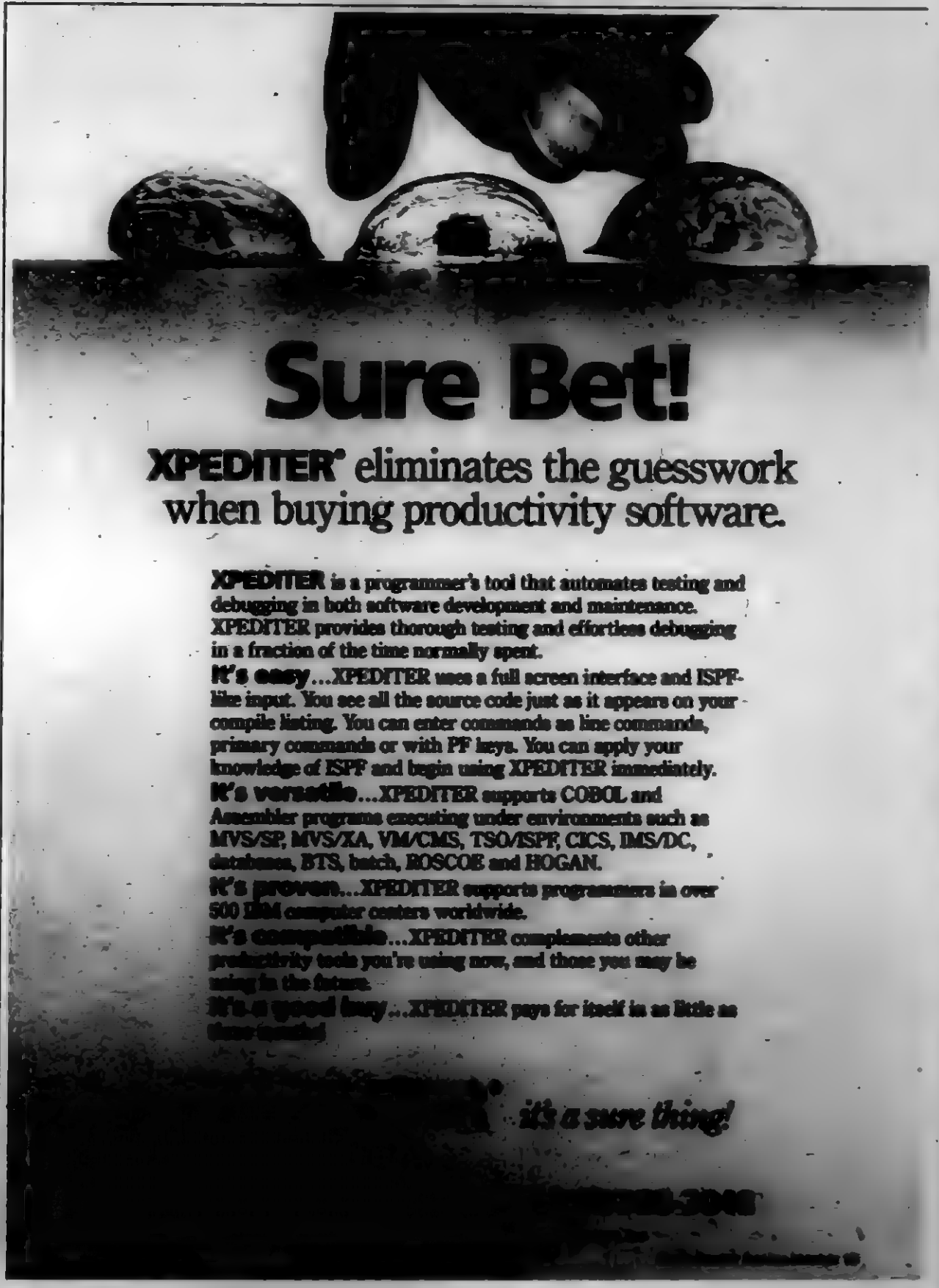
In fact, the vocabulary and theories that many organizations are applying to productivity efforts in system development are drawn directly from the tradition of manufacturing quality control.

The power of quality

At Unisys Corp., for example, Dean Lee, director of quality and productivity for the firm's Systems Support Group in McLean, Va., based his organization's Quality/Productivity Improvement Process on the system that has been advocated by quality expert Philip Crosby, which includes rigorous definition of requirements and an educational effort designed to break down the belief system that says errors or defects are inevitable.

For measurement, Lee chose not to use narrowly defined standards such as lines of code produced or errors per line of code but to work instead with a system called The Objectives Matrix, which he found at the Oregon State University Productivity Center and adapted for use in a system development setting.

"It is a good tool in any environment," he says, "and particularly well-suited to a service organization, which is what system development really is."



Building a better metric

By Capers Jones

Most MIS producers are less than 75% efficient: End users find 25% or more of all bugs.

Imagine yourself as a runner out on a track training for the Summer Olympics in South Korea. What would you think if your coach said, "You're going to have to train hard to get faster. Of course, I'm not sure how fast you have been running, since I don't use a stopwatch."

Sound a little strange? Your coach continues: "You'll be competing in events from the 100-meter dash up to the 5,000-meter run, but I don't believe in measurements, so I'm not sure exactly how long that is on this track."

He concludes: "I want you to practice until you improve by 20%, but I'm not sure how fast that is. It should be an easy goal to reach, though, because I bought you new track shoes that the salesman says will improve your speed by 50%."

Such a conversation could never happen in real life, because no track coach could succeed without measuring his team's performance. Yet project managers expect to do just that every day in software development departments.

The traditional "lines of code" metrics were so imperfect and paradoxical that they simply could not be used for serious economic studies.

What's more, without a reliable metric for determining the output of software projects, many companies also did not bother to keep accurate records of staffing, schedules or effort expended. In project tracking systems used by major corporations, errors and omissions of 30% to more than 50% have been the norm. Unpaid overtime, user costs, project redirections, managerial effort, support costs and overhead activities such as integration are typically not tracked.

Out of the dark ages

In 1979, the software measurement situation began to improve. IBM's A. J. Albrecht introduced Function Point metrics, and for the first time, the economics of MIS projects could be measured precisely.

Function Points are artificial metrics similar in concept to the Dow Jones industrial average. The Function Point total for a project is derived by a weighted formula that includes five items:

- The number of inputs to the application (forms, screens).
- The number of outputs from the application (reports, screens).
- The number of inquiries end users can make.
- The number of logical data files updated by the application.
- The number of interfaces to other applications.

To measure a program, the software developer counts these five items and multiplies the total by weighting factors that adjust for complexity. The Adjusted Function Point total then becomes the economic unit of measure for that application.

The advantage that Function Points bring to a software project is that they are mathematically consistent — they do not behave in strange ways, as the lines of code metrics do. The old metrics were mathematically perverse in that they sometimes moved in the opposite direction of real economic productivity. And in fourth-generation languages, query languages and nonprocedural applications such as spreadsheets, there may not be any lines of code to count.

The older metrics also focused attention on coding, which is no longer the dominant activity of software developers. Large MIS projects often devote a higher percentage of resources to requirements and design paperwork, meetings, discussions and defect removal than to coding.

Setting measurable goals

Function Points are not the only elements that should be measured or targeted, of course, but they are the heart of a modern software measurement system for MIS.

The following goals stem from observations of what leading-edge companies are actually able to accomplish in 1988. If your company's output matches or surpasses these goals, then you have achieved considerable success and can be justifiably proud of your performance.

There are four key areas in which setting measurable goals is most important: quality, development productivity, maintenance productivity and morale, or the work environment.

Software quality is important not only because of the need for reliable systems but because defect removal is sometimes the most expensive part of building software. There are four major software quality goals; if your enterprise exceeds them, you are doing very well indeed.

Fewer than five user-reported defects per 100 Function Points per year. Achieving this goal would place you in the top 1% of U.S. companies. A "defect" here refers to a bug that causes the application to either stop or produce incorrect results. Ordinary and trailing-edge firms report closer to 15 or more user-reported defects per 100 Function Points per year.

High "excellent" rating. Not only do leading-edge enterprises carry out annual user satisfaction surveys, but when they do, their end users give critical applications 90% or more "excellent" votes.

More than 95% cumulative efficiency in defect removal. "Efficiency" in this case is defined as follows: In the course of developing software, your staff will find a certain number of bugs. In the first year of production, your end users will find a certain number of bugs. When you add these two bug totals together, your staff should have found 95% or more of all bugs, leaving 5% or fewer for the end users to find. Achieving this rate will place you in the top 1% of U.S. companies. Most MIS producers are less than 75% efficient: End users find 25% or more of all bugs.

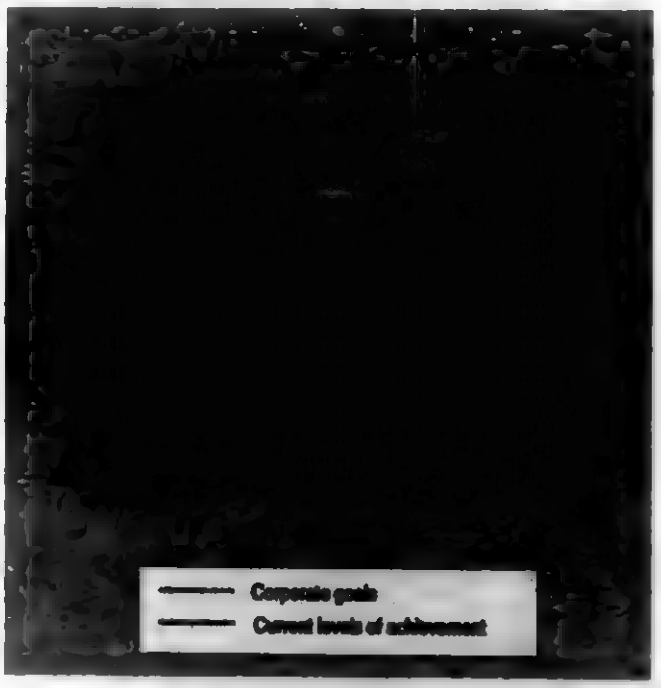
No error-prone modules in any production system. Bugs are not randomly distributed through the code of large systems. They tend to clump in a very small number of places, called error-prone modules. Your goal should be to eliminate all error-prone modules — modules that contain more than 25 bugs per 100 Function Points — in your current applications and to prevent them from occurring in the future. This goal can be achieved: It means conducting full design and code inspections.

The enterprise lag

Productivity can be measured at both the project and enterprise levels. It normally registers much higher at the project level, be-

CLOSING IN ON THE GOAL

A Kiviat graph can clearly show progress among multiple parameters of a software development project



INFORMATION PROVIDED BY SOFTWARE PRODUCTIVITY RESEARCH INC.

Jones is chairman of Software Productivity Research, Inc. in Cambridge, Mass.

cause at the enterprise level, factors such as canceled projects and indirect staff must be considered. Again, observations of U.S. MIS departments lead to the following goals:

An average of more than 15 Function Points per staff-month on major projects. Ordinary Cobol applications produced using traditional methods and unsophisticated tools seldom achieve productivity rates greater than five Function Points per staff-month. If you churn out more than 15 Function Points per staff-month on major projects — those greater than 500 Function Points in size — you are doing very well indeed. The staff included in the measure should be all workers on the project: analysts, programmers, technical writers, quality assurance workers and first-line management.

More than five Function Points per staff-month in net annual software productivity. Each year, your organization will deliver a certain number of Function Points to your end users. Large enterprises may deliver more than 10,000 Function Points annually. If you divide your total delivery by your entire staff (all direct personnel, management and indirect staff), what is your annual rate?

Typically, this rate will be only about one-third as high as the rate for individual projects, because it includes time spent in training, slack time between jobs, vacation time and time spent on projects that are not delivered.

Fewer than 5% canceled projects. Canceled projects are a source of negative productivity. Effort is expended, but nothing is delivered. Some companies may cancel as many as 25% of their major systems.

Keeping up on upkeep

More than half of the programmers in the U.S. are working to maintain and enhance existing applications. Therefore, maintenance goals rank right up with development goals in importance. Here are some specific goals:

More than 1,500 Function Points per maintenance staff member per year as the average assignment. If you divide the size of your production library of current applications by the size of your maintenance staff, you will create an interesting metric called the "maintenance assignment scope." This figure is the volume of current software for which an ordinary maintenance programmer is responsible for handling defect repairs and minor enhancements.

If you have a library of aging, unstructured applications with high complexity, the maintenance assignment scope may be less than 500 Function Points. If your assignment scope is greater than 1,500 Function Points, the implication is that you are moving in the right direction — toward structuring your programs soundly.

More than 10 Function Points per staff-month as the average rate of productivity on major enhancements. Productivity rates on enhancement projects are normally lower than rates on the same size development project, so a different goal is needed. Enhancement productivity is related to the structure and stability of existing software.

"Bad fix" rate lower than 2.5%. Each time an existing application is updated, there is a chance of introducing a bug. If the bug is the result of fixing a previous bug, then it is termed a "bad fix." You should aim for less than 2.5% bad fix injection for your applications. Companies that are working with aging and unstructured Cobol sometimes find that their bad fix rate exceeds 15%.

Personnel questions

In terms of employee morale and environmental targets, software is a human activity, and enterprises that have the greatest respect for employees usually come out on top in productivity, quality and other tangible matters. Here are three key metrics for morale:

More than 10 training days per staff member per year. Companies that provide 10 days of training per staff-year show higher annual rates for software productivity than companies that provide no training.

More than 90 square feet of private office space per staff member. Studies agree that more than 90 square feet per professional staff member is optimal for the highest productivity rates. If your staff averages less than 45 square feet, expect low productivity.

More than 90% evaluations of "good" or higher on annual surveys. Companies that take the best care of their people have the highest productivity. Companies that get more than 90% "good" marks on annual opinion surveys demonstrate higher productivity than companies that don't perform opinion surveys, or that do perform them but score low marks.

Once you have established productivity and quality goals for your enterprise, it is important that all management and staff members be apprised of your progress in achieving them. The normal reporting frequency follows the pattern of corporate financial accounting — quarterly reports and a major annual report.

When dealing with multiple simultaneous goals, Kiviat graphs (see chart page 38) provide one of the best ways of visually representing progress. They are beginning to be used in software development because they can display movement toward all goals on one graph, making progress — or the lack of it — very clear.

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Developing reusable software

By Howard Yudkin

Software engineering is beginning to emerge from its infancy.

This growth is spurred in part by the maturation and dissemination of basic, so-called modern programming practices. The practices are variants of structured analysis for definition of requirements or high-level design decomposition and methodologies for organized management and documentation.

The practices also reflect the evolution of programming languages with improved syntax and stronger consistency properties.

Software tools automate some features of these modern practices, facilitating their use and proliferation.

The progress that has taken place in the software engineering profession during the last 10 years means it is now possible to develop better and more maintainable software systems than in the past.

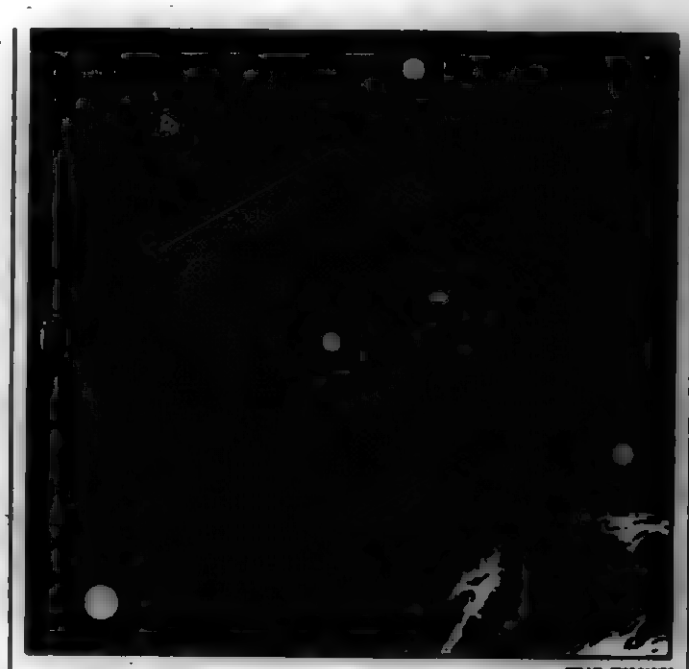
Demand soars

At the same time that the profession has progressed, the demand for larger and more complex software systems continues to grow. The size and complexity of projects such as the Advanced Technology Fighter or the space station dwarf any software development imaginable just a few years ago.

This explosion of demand has precipitated what many have described as a software crisis. The nation is confronted with a growing mismatch between the government's demand and the ability of the software engineering industry to meet it, even with modern programming practices.

This supply-demand gap is spurring the Software Productivity Consortium and other organizations to develop new software engineering approaches that emulate practices in more traditional engineering disciplines.

Among these approaches are techniques to identify and resolve implementation risks earlier in the development cycle and techniques to develop designs of software systems based on systematic use of standard parts. The former are referred to, perhaps inappropriately, as prototyping. Breadboarding may be a better analogy. Building software from standard parts is a form of software reuse.



READ HAGANS

In practice, prototyping and reuse are two sides of the same coin. Standard parts allow rapid assembly of prototypes, which provide the basis for developing final systems.

The use of these techniques represents a departure from the basic "waterfall" development methods embodied in modern programming practices. But their use does not imply abandonment of the benefits of these programming practices or the tools that have emerged to implement them.

The newer engineering processes are generalizations of the older ones, but better suited to larger, more complex systems. They offer many opportunities for the development of standards to ease their journey into widespread practice. Two obvious areas in which standards are needed are the standard parts themselves and the development environments that would support their use.

The nation is confronted with a growing mismatch between the government's demand and the ability of the software engineering industry to meet it.

Standard parts. Design based on standard parts is a regular practice in all traditional engineering fields. The use of standard parts for most systems allows designers to concentrate new effort on those areas that have novel requirements or constraints. These areas may be a small fraction — perhaps 10% to 20% — of the "modules" of the assembled systems.

To be a true standard, a part should be characterized by a "black-box" specification. The details of the part's construction should be opaque to the user; its external specification should be sufficient to characterize it.

Given such a black-box approach, it would then be possible to catalog parts based on an identification system keyed to these specifications. Software parts catalogs would be analogous to catalogs of hardware parts.

Standards would be necessary to accommodate widespread use of the forms of specification and the parts identification systems. It is these "standards" that would make the parts standard.

Without a great deal of cunning, true entrepreneurs in this marketplace can envision an industry in which suppliers build and provide the standard software parts. These providers should be able to certify their product. That is, they should be able to guarantee that the part does indeed perform as its specification states. Standard means of testing for compliance are needed for certification. This scenario also parallels that of the traditional hardware areas.

To be useful, families of standard parts should evolve. It should be possible to expand these families and break them into subsets as use demands. Thus, standards for definitions of useful families are also needed. The idea of families is not at all a new one. One need go no further than the neighborhood hardware store, where there are standard parts catalogs for every nail and screw.

There is a more relevant example in computer hardware families. The idea matured with the IBM 360 series and continues with today's reuse of processor chips.

The family concept already exists in software, too. The well-known Software Cost Reduction Method developed at the Naval Research Laboratory led to a particular set of families of specifications for software modules.

Adoption of design using standard parts would require that software engineers give up their assertion that software is inherently more complex than hardware. The complexity of software parts grows exponentially with the time span of the part's execution. Most, if not all, hardware parts have a continuum of values in any time frame.

The practice of approximating this continuum with finite families of standard hardware parts is equally applicable to software.

Prototyping. Standard software parts should have standard interface properties. These properties would permit the parts to be readily assembled and integrated into prototypes, or even deployable systems. This practice would lead to realization of the true potential of the phrase "rapid prototyping," used today as a way to describe rapid generation of user screens for management information systems.

If the interface properties of parts are standardized, it may be possible to adapt or tune standard parts to change their individual performance without disrupting their integration properties.

Much of the desired revolu-

Yudkin is president and chief executive officer of the Software Productivity Consortium, an alliance of defense contractors based in Reston, Va.

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tion in software engineering could be achieved through ready access to standard parts. Early studies have demonstrated that improvement in system development costs of 2½ to three times are feasible in assembling single system versions using standard parts.

These factors account for the excess cost of developing a standard part and assume very modest levels of reuse. Given higher levels of reuse, plus the reduced number of versions required to get an acceptable final product, major improvements in software productivity will certainly be possible.

Making it happen

Engineering standards for parts will make these improvements possible. Much of the technology needed for creating standard parts already exists. Ada packages might be a source of good standard parts. Ada's generics feature permits a ready definition of families.

The separation of specification and implementation abets the desirable adaptation feature and also provides a mechanism for building collections of standard parts from previously existing software routines. In addition, the strong typing feature assists in standardizing interface properties.

The Ada package also poses an interesting technical challenge in terms of defining the right size for standard parts. A few lines, or even a single line, of Ada source code could be a standard part, but the overhead required to maintain such a small package would kill efficiency.

On the other hand, too large a package would imply a part too complex for ready reuse. Thus, some middle range of size yet to be defined is needed.

Process

Prototyping and reuse are complicated processes whose use requires application of automated tools. Furthermore, these tools must communicate with each other in integrated environments.

Of particular importance is the integration of project status and planning-tool data with technical description-tool data if the prototyping process is to be controlled in a way that enhances — not hinders — project productivity.

Configuration management or version control of the life-cycle object in the prototyping process is also crucial. Engineers need an array of tools and a set of standards for the data outputs these tools generate.

Standard bearers

Since it is unlikely that all the tools in a development environment will come from a single source, standards for tool interfaces, data structures and other elements in development environments must emerge.

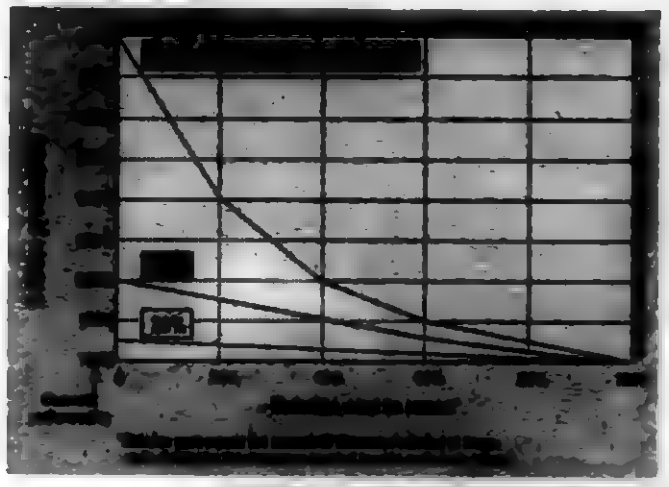
Standard software parts should have standard interface properties.

In essence, a software development environment is simply an application to which design using standard parts applies. The tools in the environment could be constructed with standard parts that ensure adherence to the environment interface standards. Again, a major opportunity for development of software engineering standards is present.

Software prototyping and reuse are processes that not only seem reasonable, but work. Organizations are building tools that convert these ideas into practical and productive means for developing large-scale software systems.

MEASURING THE BENEFITS OF REUSED CODE

A high proportion of reused code, coupled with a low relative cost, results in the greatest productivity



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Manufactured programming

By Robert Kendall

Software reusability has been one recent focus of the quest for improved programming productivity. With millions of man-years of programming efforts now invested in software, clearly some of it can be recaptured and used again.

Research is directed at reuse in all phases of the software development life cycle, beginning with requirements and specifications and extending through top-level and detail designs to the code itself. At the specifications level, there are special languages and facilities, pioneered by Daniel Teichroew's problem statement language and problem statement analyzer. At the design level, there are reusable templates for guidance; at the code level, there are packages of Ada or Productivity Products International, Inc.'s Objective-C.

The packages consist of objects — usually data — swathed in methods or procedures that can be applied to them. Such packages exist in source language and are bound at compile or execution time to their specific uses.

Another approach, one being followed by IBM Canada's Information Systems staff, is to use object code modules, connecting them with the aid of a special development facility. This practice produces programs composed entirely of existing parts and assemblies, or components, that the staff calls co-routines. The method, started more than 15 years ago by Paul Morrison, is still experimental, but experience gained with it is encouraging.

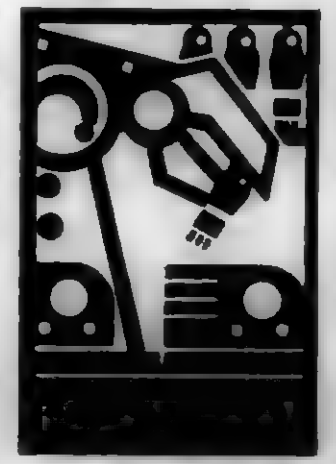
Perhaps a key feature of the new method is that programs are composed exclusively of existing parts or modules. These are assembled in a process akin to manufacturing, in which one would not stop the line to engineer a new part.

Programmers in this environment are either module builders or module users. The programming process is made exactly analogous to computer hardware development, with its chip builders and chip users.

In this, the method is similar to that of Objective-C builder Brad Cox, who speaks of software-ICs, or integrated circuits. The method differs, however, in that machine object code modules are connected and executed. The result is a program that could be described in manufacturing terms as a bill of material.

In these early stages, not every program is assembled from off-the-shelf components. Some components must be specially coded for a project, but they can be reused within the project. The effect is measurable as a percentage of delivered function.

A figure of merit is developed by dividing the number of modules coded — programmers' work — by the total number of co-routine appearances — program functions delivered. In a half-dozen projects, the percentage of specially coded modules ranged from 25% to only 1%, averaging just less than 20%.



CHRIS STOLLER

The bill of material rendering does not address the connections or process sequences any more than a manufacturing bill of material tells how to build an item. In fact, the connections use a data flow concept regarded as key to the method's success. The bill of material is valuable, however, in telling what components are involved and where. If defective parts are discovered at a later time, they are easily located and replaced by corrected parts. Similarly, where units are found to receive heavy use, special attention can be given to improving their performance or reducing their size.

Benefits

Practical experience with the method has proven to be of substantial value. Anticipated benefits often focus on the process itself, but this limited view results in an understatement of value that may slow acceptance. Actual experience shines a light on real benefits achieved in a broader scope — among users and maintainers as well as developers of the programs.

Among these benefits is the improved programming productivity that was sought. Other improvements occur at the specification and design levels, at which work is performed in the context of the available parts and assemblies. This is similar to computer development, in which use of chip supplier "bug books" is made to select off-the-shelf chips.

Surprisingly, performance benefits were realized in several cases. Many researchers apologize in advance for reusability performance; everyone knows that the generalization needed for reusability leads to performance penalties.

In fact, that is not always true. Given the increased value resulting from reuse, one can afford to spend more on development — the added costs are spread over wider applications.

An aid to improved performance is the special scheduler that provides the operating environment for the reusable co-routines at IBM Canada. This approach can result in increased CPU intensity while reducing elapsed execution time, which should not be altogether dismaying to a computer vendor.

Program readability and user understanding have improved as the method has produced a mapping that is more logical and closer to application function. Also, program testing is greatly simplified, a reflection of the reduced complexity. Existing catalogued modules do not need unit testing; that has been done. One need only test the connections between modules to assure their proper use.

A full review of benefits is beyond the scope of this article, but one very important one is the improved robustness and reliability of the resulting programs. In reusable functions, one can include more type checking and other data-validity safeguards than is usual in application programs, especially in simple ones. Thus, the real benefit, over and above productivity and long-run performance, is the boost to quality.

What is developing in IBM Canada is just a beginning that is only now beyond the talking stage. Nonetheless, it is encouraging that some real experience with a "parts and assembly" manufacturing approach to programming has begun.

Kendall is a research fellow at Software Productivity Research, Inc. in Cambridge, Mass., and a consultant in programming productivity and measurement.

The neglected wasteland

By Roger Phillips

If software development productivity looks unimpressive, then maintenance productivity looks positively dismal. Only 10 to 15 lines of fully debugged code produced per man-day in a third-generation language is the national average for new programs. But for maintenance, the numbers are only about one-tenth as good: one or two lines of changed or added code, fully debugged, per man-day.

You can argue about the merits of using lines of code as a productivity measure, but the comparison still stands. And unfortunately, maintenance absorbs 70% to 80% of every software dollar, which means we are taking it on the chin in the largest area of software investment. The federal government alone spends more than $5 billion a year on software maintenance.

Our industrial society attacks productivity problems with automation. Yet you could probably count on your fingers the number of truly useful automated maintenance products available. While vitally important, the maintenance side of software has been a wasteland, relatively neglected in the quest for improved productivity.

And things may get worse before they get better. A recent study by the Gartner Group, Inc. in Stamford, Conn., projects maintenance to grow to 95% of the programming budget by 1990. Meanwhile, the old code gets older, more complex, more brittle and, correspondingly, more difficult to maintain.

Why the neglect?

How did software maintenance become such a wasteland? Is there some pervasive prejudice against devoting resources to it?

Hari Notowidigdo, vice-president of information systems at Wendy's International, Inc., gives three reasons:

- Managers prefer to deal with state-of-the-art technologies — associated with new systems — to bolster their careers.
- Managers too often yield to constant vendor pressure to implement new technologies.
- MIS culture tends not to reward achievement in maintenance. Ask yourself, Who ever got promoted for excellence in maintenance? Promotions go to leaders of major, successful development projects.

Through the years, this negative attitude about maintenance has eroded any infrastructure that might have helped build a base of productivity. For example, you can probably think of half a dozen systems development methodologies currently in use, but can you think of even one maintenance methodology?

By the same token, there is little training targeted at maintenance. An informal survey I took of 130 systems professionals at a productivity conference in January showed that virtually all their organizations provided classroom training for systems development. But while those surveyed agreed that maintenance consumed the majority of their programming resources, only three said their companies had instituted any training for it. Even then, a How to Read Dumps course was about as far as the training went.

There is a continuing problem of freeing resources for maintenance. "It is viewed as a necessary evil rather than an opportunity to manage change and planned improvement," says Vaughan Merlyn, a consultant and chairman of CASE Research Co. in Bellevue, Wash. Merlyn says companies do not allocate large budgets for maintenance products and services because management does not take it seriously. "It isn't that there is a shortage of technology," he says, "but there's an excess of inertia."

Can you think of even one maintenance methodology?

Indeed, there is a shortage of good programming aids. "The vast majority of software tools are for new development," says Steve Drummond, a project manager at Hallmark Cards, Inc. in Kansas City, Mo. "The maintenance world needs tools, too."

Merlyn contends that "the potential is all too obvious" for automated maintenance tools. "The few tools out there are good, like Via/Insight from Vinsoft, Inc. and Recoder from Language Technology, Inc. — both of which the users believe to be effective."

BRAD HAMANN

Vinsoft President Kent Petzold adds that it is not just programming tasks but management and administrative tasks that could be addressed. Configuration management, for example, is a common problem quite susceptible to computer-aided solutions. Tools could help keep source, load and object modules in sync, coordinate screen maps and data base views and compare internal and external documentation.

Rays of hope

Despite the gloom, there are four promising developments on the horizon; each may boost maintenance productivity just in time:

- Maintenance centers.
- Targeted tools.
- Programming workstations.
- Reverse engineering.

Maintenance centers are just now coming into being. And why not? End users have their information centers. Software developers rely on development centers. Maintenance programmers could use resources and an organization of their own.

At The Hartford Insurance Group, for example, there are about 1,000 programmers, 70% of whom work full time in maintenance. Since establishing an application maintenance center, which promotes the use of such products as Recoder, Hartford experienced a 25% increase in maintenance productivity, as measured by its ability to reduce or redeploy maintenance staff.

As MIS increasingly recognizes the importance of maintenance, these centers will become as common as development centers are now.

Hallmark has taken a more deliberate approach to software maintenance than many firms. Jim Johnson, data center director at the company, implemented a tracking system that reports how many lines of code and how many function points are developed and maintained per year and per man-year.

Johnson built a history of productivity measures, which shows a slow but steady increase in the number of code lines and function points a programmer can keep under maintenance. In 1987, for example, the maintenance group was able to support 170,000 lines of code per person, up 23% from the previous year. This increase he attributes to "good testing tools and good response time."

Riding the cycle

Another promising area consists of tools that are consciously targeted at the most fertile areas of maintenance. Too many of the tools today are aimed, as Jeff Governan of the Gartner Group puts it, "at some ethereal problem rather than on where maintainers spend their time."

Just as there is a recognized software development cycle, there is a maintenance cycle. According to a study of 25 IBM installations conducted by George DiNardo, executive vice-presi-

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Phillips is president of Phillips Associates, a Scottsdale, Ariz.-based firm that consults in the planning, management, marketing and development of computer-related products and organizations.

dent of Mellon Bank NA in Pittsburgh., adaptive maintenance makes up 70% of all maintenance, corrective 17% and perfective 13%.

Clearly, adaptive maintenance is the highest payoff area for automation.

Research gathered by IBM's Robert Fjeldstad and William Hamlen in 1979 indicates where time is spent during adaptive maintenance: About 40% of a programmer's time is split between understanding the change and tracing the program's logic; another 28% in testing and debugging the change. Time is also spent reviewing and updating documentation.

Obviously, the best automation targets are testing, debugging and logic analysis. It is time to refocus our attention on this kind of "computer-aided software maintenance," or CASM (see story below).

Get smart

Another major development that will positively affect maintenance programming is the advent of intelligent programmers' workstations.

Mainframe-compatible compilers, data base management systems and transaction processing software for PCs from such companies as Microfocus and Oracle give programmers a private, well-controlled and highly responsive environment in which to work.

One of the most significant developments for automating maintenance is reverse engineering. Unlike re-engineering, reverse engineering means extracting the specifications of the application by processing the existing code.

The result is made available to programmers and designers in a high-level format, which allows them to better understand and, ultimately, more easily make changes to the system. They use the high-level format expressions to make the changes — either by hand or using a code generator that can be driven from the specifications.

Just as there is a recognized software development cycle, there is a maintenance cycle.

Re-engineering, on the other hand, is aimed at making existing code more maintainable. Examples of these products are restructurers, formatters and beautifiers.

Tony Scott, development center manager at Indiana Bell, says that since "most systems today are not well designed or well documented, reverse engineering is the best hope of the future."

But according to Mehru Thacre, assistant vice-president at Mellon Bank, the focus in maintenance is shifting to re-engineering. Extending the life cycle by a couple of years has become the programming department's goal, he says.

Limits of logic

Reverse engineering is not yet a commercially proven technology, although several companies have announced products. There is disagreement among the developers as to how far reverse engineering can proceed. Bill Engle, president of Language Technology, who is devoting the lion's share of his firm's research and development resources to it, feels that the process can be fully automated.

The most difficult part is dealing with program logic. Language Technology's approach to that is to recognize programming paradigms, of which there are only a limited number.

Charles Bachman, founder of Bachman Information Systems, disagrees. "Totally automated reverse engineering is impossible," he says, claiming there is not enough information embedded in the code. "The question is, on a continuum from zero to 100%, where will you be?"

Bachman's approach, therefore, is to create "expert advisers," or "co-pilots," to assist professionals in completing the reverse engineering task. These products will "help people do what they already know how to do," he claims.

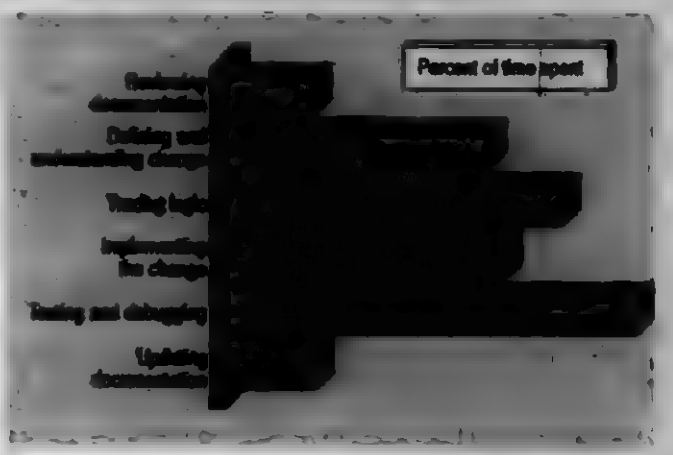
Transform Logic Corp. in Scottsdale, Ariz., is developing an expert system-based reverse-engineering product that is expected to reduce any program or set of programs to a single logical expression. From that point, specifications will be displayed graphically to aid in program understanding. Transform Logic's approach will feature simulation of proposed changes as well as regeneration of changed code.

According to Bachman, the managers most willing to invest in automating maintenance today are in financial services. "They recognize that they are really in the information products business," he says.

Mellon Bank, for example, has gone to great lengths to tailor its own programmers' workbench using a Wang VS front end from Wang Laboratories, Inc. The workbench integrates various maintenance tools while helping enforce standards.

As other industry participants begin to feel the pinch of lost competitiveness because of aging and brittle application software, they too will begin to respond to the imperative of automating maintenance.

WHERE TIME IS SPENT IN MAINTENANCE



INFORMATION PROVIDED BY IBM CW Chart

Rating the maintenance tools

By Roger Phillips

Which computer-aided software maintenance products should you implement? Ask the practitioner.

Twenty-four mainframe Cobol programmers and managers from maintenance groups at American Express Co., Associated Grocers, Inc., the U.S. General Services Administration and other organizations each rated the following product categories from 1 to 17, with 1 as the most desirable and 17 the least.

Some categories represent commercially available offerings, and some are still on the drawing board.

On-line products, in the order they appeared on the questionnaire, were rated as follows:

- Program tester/debugger (Ranking: 1). Permits programmer interaction with a running program during test. Supports programmer-defined traps and traces and intercepts Abends.
- Syntax-directed editor (Ranking: 10). When programs are being edited on-line, package checks language syntax, data usage and field definitions as each program line is added or modified.
- Program analyzer (Ranking: 4). Interactively traces program logic paths, both forward and backward. Reveals data usage, data relationships and dead code. Isolates and displays program components by statement type or category. Intended to help programmers understand programs and show the effect of program changes.
- Program analyzer/debugger (Ranking: 2). Performs all functions of the program analyzer above and allows on-line program editing and modification without leaving the product.
- System analyzer (Ranking: 11). Performs all functions of the program analyzer above, but at the system or library level, using not only program code but screen and data base definition information as input.
- Programmer's toolbox (Ranking: 7). An integrated system of means by which the programmer can automatically invoke compiles, links, tests or any of the following tools; file, data base and print utilities; utilities for job control language tailoring; optimal blocksize calculation; hex and decimal calculator function; electronic mail; and telephone directories.
- Testing/debugging expert system (Ranking: 8). Diagnoses software problem types and suggests further diagnostic or corrective actions in an interactive dialogue with the programmer.

Batch products were rated as follows:

- Test data generator (Ranking: 5). Creates test data files and data bases using random data whose format is determined by the program source or data dictionary. Saves programmer time in creating or extracting test data.
- Path test data generator (Ranking: 3). Performs the functions of the test data generator above but, in addition, automatically tailors data to exercise all possible program paths, or optionally, only newly created paths.
- Test data extractor (Ranking: 6). Under programmer control, extracts applicable test files and data bases from existing files and data bases.
- On-line regression tester (Ranking: 9). Captures on-line transactions for later batch-testing use. Results of the subsequent tests — in form of screens and files — are automatically compared with original, and any discrepancies reported.
- Program standards monitor (Ranking: 16). Reports on and summarizes violations of installation coding standards for programs, systems or libraries.
- Program quality analyzer (Ranking: 15). Reports on and summarizes various industry-standard measures of complexity and maintainability for programs, systems or libraries.
- Code restructurer (Ranking: 12). Automatically recodes programs without changing function, making them conform to standards of structure and syntax. Objective is to make complex programs easier to maintain.
- Source code comparer (Ranking: 14). Compares two program versions and reports all differences.
- Source logic comparer (Ranking: 13). Compares two program versions and reports all logic path differences.
- Program structure charter (Ranking: 17). Draws hierarchical structure charts of program control flow.

Not surprisingly, maintenance programmers and their managers disagreed somewhat on priorities. Programmers strongly favored testing and debugging products, while their managers liked program analyzers.

The most inconsistency showed up on opinions regarding restructurers. Survey respondents either loved them or hated them, with little middle ground.

Quality assurance-related products were rated consistently at the bottom of the heap.

Lose fat while sleeping and deliver systems six months early!

By Tom DeMarco and Timothy Lister

Historians long ago formed different theories of value. The Spanish Theory, for one, held that only a fixed amount of value existed on earth, and, therefore, the path to the accumulation of wealth was to learn to extract it more efficiently from the soil or from people's backs.

Then there was the English Theory, which held that value could be created through ingenuity and technology. So the English created an Industrial Revolution, while the Spanish spun their wheels trying to exploit the land and the Indians in the New World. They moved huge quantities of gold across the ocean, and all they got for their effort was enormous inflation — too much gold money chasing too few usable goods.

The Spanish Theory of value is alive and well among managers everywhere. You see it whenever they talk about productivity. Productivity ought to mean achieving more in an hour of work, but all too often it has come to mean extracting more for an hour of pay. There is a large difference.

Spanish Theory managers dream of attaining new productivity levels through the simple mechanism of unpaid overtime. They divide whatever work is done in a week by 40 hours, not by the 80 or 90 hours that the worker actually puts in.

That's not exactly productivity — it's more like fraud — but it's the state of the art for many American managers. They bully and cajole their people into long hours. They impress upon them how important the delivery date is, even though it may be arbitrary. They shame people into sacrificing all and everything to meet The Deadline.

Winning and losing

Next time you hear someone talking about productivity, listen carefully to hear if the speaker ever uses the word "turnover." Chances are that he or she will not. What sense can it possibly make to discuss one without the other? Consider some of the things that organizations typically do to improve productivity:

- Pressure people to put in more hours.
- Mechanize the process of product development.
- Compromise the quality of the product.

Any of these measures can potentially make the work less enjoyable and less satisfying. Hence, the process of improving productivity risks worsening a company's rate of turnover. That doesn't say you can't improve productivity without paying a turnover price. It only says you need to take turnover into account whenever you set out to attain higher productivity. Otherwise, you may achieve an "improvement" that is more than offset by the loss of key people.

Most organizations don't even keep statistics on turnover. Virtually none can tell you what replacement of an experienced worker costs. Productivity is considered as though turnover were nonexistent or cost-free.

All too often, productivity means extracting more for an hour of pay.

The Eagle project at Data General Corp. is a case in point. The project was a Spanish Theory triumph: Workaholic project members put in uncounted unpaid overtime hours to push productivity to unheard-of levels. At the end of the project, virtually the entire development staff quit. What was the cost of that?

Productivity has to be defined as benefit divided by cost. The benefit is observed dollar savings and revenue from the work performed; cost is the total cost, including replacement of any workers used up by the effort.

We observed one recent project that was proceeding so smoothly that the project manager knew she would deliver the product on schedule. She was summoned in front of the management committee and asked for a progress report.

She said she could guarantee that her product would be ready by the deadline of March 1, exactly on time according to the original estimate. The top managers chewed over that piece of unexpected good news and then called her in again the next day. Since she was on time for March 1, they explained, the deadline had been moved up to January 15.

Productive sleep

One day, in a moment of silliness, we started clipping ads for products that claimed to boost productivity by 100% or more. Within a very short time, we had quite a pile. The amazing thing was the diversity of the means being advertised to yield big productivity gains. There were seminars, packaged programs, methodologies, books, scheduling boards, hardware monitors, computing languages and newsletters.

Going uptown on the subway that night, we spotted one final ad on the back of the *New York Post*. It read, "Lose fat while sleeping." It seemed to fit right in with the others.

We're all under a lot of pressure to improve productivity. The problem is no longer susceptible to easy solutions, because all the easy solutions were thought of and applied long ago. Yet some organizations are doing a lot better than others. And those who do better are not using any particularly advanced technology. Their better performance can be explained by their more effective ways of handling people and modifying the workplace and corporate culture.

Sweat or head?

Suppose there were a foolproof productivity measurement tool and it was being applied to your people's work this very moment. Suppose the measurers came in to tell you that your productivity was in the top 5% for organizations doing your kind of work. You'd be pleased. You'd wander around the halls with a secret smile, thinking warm thoughts about your people: "I suspected they were pretty good, but this is

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BRAD HAMANN

terrific news."

Oops. The measurers have just come back to tell you that they must have been holding the graph upside down when they gave you the first report. You're actually in the bottom 5%.

Now your day is ruined. You find yourself thinking, "I might have known it all along. Who could expect to get any work done with turkeys like these on the staff?"

In the one case, you're ecstatic; in the other, despondent. But in neither case are you particularly surprised. You're not likely to be surprised no matter what the news is, because you haven't the foggiest idea what your productivity is.

You can't afford to remain ignorant of where you stand. Your competition may be 10 times more effective than you are, doing the same work. If you don't know it, you can't begin to do something about it. Only the market will understand. It will take steps of its own to rectify the situation — steps that do not bode well for you.

Motives

Work measurement can be a useful tool for improving methods and motivation as well as enhancing job satisfaction, but it is almost never used for these purposes. Measurement schemes tend to become threatening and burdensome.

All the easy solutions were thought of and applied long ago.

To make the concept deliver on its potential, management must be perceptive and secure enough to cut itself out of the loop. That means the data on individuals is not passed up to management, and everybody in the organization knows it. Data collected on the individual's performance must be used only to benefit that individual.

The measurement scheme is an exercise in self-assessment, and only the sanitized averages are made available to the boss.

This concept is a hard one to swallow for many managers. They reason that they could use the data to do some aspects of their work more effectively — precision promotion, for example, or even precision firing. Their company has paid to have the data collected, so why shouldn't it be made available to them?

But collection of this very sensitive data on the individual can only be effected with the active cooperation of the individual. If ever its confidentiality is compromised, if ever the data is used against even one individual, the entire data collection scheme will break down.

Furthermore, individuals are inclined to do exactly the same things with the data that the manager would do. They will try to improve the things they do less well or try to specialize in the areas where they already excel.

In the extreme case, an individual may even "fire" himself in order to stop depending on skills that have been found to be deficient. The manager doesn't really need the individual data in order to benefit from it.

Bureaucracy

A study conducted by Capers Jones in the late 1970s reported on systems development costs by work category. One category was "paperwork." What Jones calls paperwork is more or less mindless paper pushing, since the thinking time necessary to decide what to put on the paper is categorized as some other activity, such as analysis, design or test planning. In other words, his "paperwork" category is pure bureaucracy.

Jones concluded that paperwork is the second largest category of systems development work, accounting for more than 30% of the cost of producing a given product.

There is a depressing modern trend to make development workers more and more into bureaucrats. We know of companies in which the development groups look and feel like a bureaucratic nightmare by Kafka, and other companies in which the paperwork burden is minuscule.

Mindless paper pushing is a waste. It ought to be attacked because it keeps people from working. But our point here is a slightly different one. It is that bureaucracy hurts team formation.

The team needs to believe in whatever goal it forms around. That goal can be arbitrary, but at least it has to exist. There has to be some evidence that management believes in it.

Just telling your people that the goal matters won't be enough if you also have to tell them they should spend a third of their time pushing paper. Paper pushers can't get past the function of a SWAT team. They can't see themselves as hell-bent on success.

Quality-reduced

People don't really talk about quality-reduced products. What they talk about is cost-reduced products. But it usually boils down to the same thing.

The typical steps we take to deliver a product in less time result in lower quality. Often the product's end user consents to this trade-off (less quality for earlier, cheaper delivery).

Continued on following page

False hopes included

By Tom DeMarco and Timothy Lister

The relative inefficacy of technology may be a bit discouraging, at least in the short run, because the kinds of modifications to corporate culture we advocate are hard to apply and slow to take effect.

What seems far preferable is the coupon you cut out of the back pages of a magazine to send in with a few thousand bucks, so that some marvelous productivity gimmick will come back to you in the mail. Of course, it may not do much for you, but then easy nonsolutions are often more attractive than hard solutions.

The false hopes engendered by easy technological nonsolutions are like those Sirens that tempted poor Odysseus. Here are the seven Sirens, or false hopes, of software management:

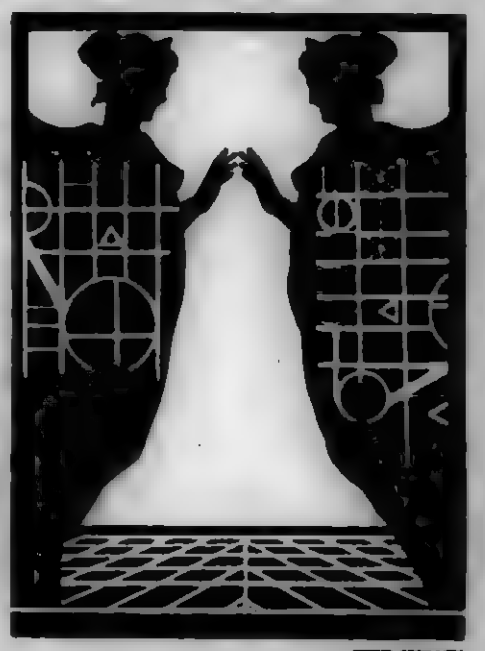
There is some new trick you have missed that could send productivity soaring.

Response: You are simply not dumb enough to have missed something so fundamental. You are continually investigating new approaches and trying out the ones that make the most sense. None of the measures you've taken or are likely to take can actually make productivity soar.

What they do, though, is keep everybody healthy: People like to keep their minds engaged, to learn and improve. The line that there is some magical innovation out there that you have missed is a fear tactic; it is employed by those with a vested interest in selling it.

Other managers are getting gains of 100% or 200% or more.

Response: Forget it. The typical magical tool that's touted to you is focused on the coding and testing part of the life cycle. But even if coding and testing went away entirely, you couldn't expect a gain of 100%. There is still all the analysis, negotiation, specification, training, acceptance testing, conversion and cutover to be done.



CHRIS STELLER

Technology is moving so swiftly that you're being passed by.

Response: Yes, technology is moving swiftly, but — and here's the high-tech illusion — most of what you're doing is not truly high-tech work.

While the machines have changed enormously, the business of software development has been rather static. Cobol and Fortran, now more than three decades old, are still viable languages. Integrated data bases are still a hot topic, just as they were 25 years ago. Productivity within the software industry has improved by 3% to 5% a year, only marginally better than the steel and automobile industries.

Changing languages will give you huge gains.

Response: Languages are important because they affect the way you think about a problem, but, again, they can affect only the implementation part of the project.

Most of what you're doing is not truly high-tech work.

Because of their exaggerated claims, some of the fourth-generation languages qualify as the ultimate technical lectrile. Using a fourth-generation language package for a given application is probably better than writing it in Cobol, but even before fourth-generation languages, most of us were clever enough to use something better than Cobol for report generation and for other ideal fourth-generation applications.

Such products are targeted at a narrow domain of applications and, hence, are not really "languages" in the general sense. That doesn't imply they aren't good products. By all means, use one if it fits the kind of work you're doing. If you get a 15% overall productivity gain, be pleased. But don't expect much more.

Because of the backlog, you need to double productivity immediately.

Response: The much talked-about software backlog is a myth. We all know that projects cost a lot more at the end than what we expected them to cost at the beginning. So the cost of a system that didn't get built this year (because we didn't have the capacity for it) is optimistically assumed to be half of what it would actually cost to build — or less.

The typical project that's stuck in the mythical backlog is there because it has barely enough benefit to justify building it, even with the most optimistic cost assumptions. If we knew its real cost, we'd see that project for what it is: an economic loser. It shouldn't be in the backlog; it should be in the reject pile.

You automate everything else — isn't it about time you automated away your software development staff?

Response: This issue is another variation of the high-tech illusion: the belief that software developers perform easily automatable work. In fact, their principal work is human communication to organize the end users' expressions of needs into formal procedure. That work will be necessary no matter how we change the life cycle. And it's not likely to be automated.

Your people will work better if you put them under a lot of pressure.

Response: They won't — they'll just enjoy it less.

But such concessions can be very painful for the developers. Their self-esteem and enjoyment are undermined by the necessity of building a product of clearly lower quality than what they are capable of.

An early casualty of quality reduction is whatever sense of team identification the group has been able to build. Co-workers who are developing a shoddy product don't even want to look each other in the eye.

There is no joint sense of accomplishment in store for them. They know that there will be a general sense of relief when they can stop doing what they're doing. At the end of the project, they'll make every effort to sep-

Every defect the team found was one that the customers wouldn't find. The team was a success.

arate themselves from other members of the group and get on to better things.

The Black Team

Once there was a company in upper New York state that made large blue computers. The company also made software to run on these computers. Customers of this company were nice enough folks, but just between you and I, the customers could be awfully poor sports about software that was delivered with bugs.

For a while, the company put its efforts into training the customers to be more tolerant of bugs. But this approach didn't work out, so they bit the bullet and decided to get rid of the bugs instead.

The easy and obvious approach was to have the programmers remove all bugs prior to delivery. For some reason, this approach didn't work too well either.

It seems that the programmers were rather too inclined to believe the best of their programs. Try as they might, they couldn't find the last remaining bugs, so they often declared the software to be done prematurely when there were still lots of bugs.

Finding the last bug was hard, but some testers were better than others. The company formed a group of these particularly talented testers and gave them the charter to do final testing on critical software before it was sent to customers. Thus was born the legendary Black Team.

The Black Team was initially made up of the people who had proved themselves to be slightly better at testing than their peers. They were slightly more motivated.

Objectivity

They also were testing code that had been written by someone else, so they were free of the cognitive dissonance that hampers developers when they are testing their own programs.

All in all, those who formed the team might have expected it to achieve at least a modest improvement in product quality, but they didn't expect more than that. What they got was much more than that.

The most surprising thing about the Black Team was not how good it was at the beginning, but how much it improved during the next year.

Some magic was happening: The team was forming a personality of its own. This personality was being shaped by an adversary philosophy of testing that evolved among group members, a philosophy that they had to want and expect to find defects.

They weren't rooting for the developers at all; in fact, it was quite the opposite. They were delighting in submitting the program — and the programmer — to a sequence that was not just a test but an ordeal.

Bringing your program in for Black Team testing was like appearing before Ming the Merciless.

At first it was simply a joke

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that the tests they ran were nasty and that the team members actually loved to make your code fail.

No laughing matter
Then it wasn't a joke at all. Team members began to cultivate an image of destroyers. What they destroyed was not only your code but your whole day.

An early casualty of quality reduction is whatever sense of team identification the group has been able to build.

They did monstrously unfair things to elicit failure, overloading the buffers, comparing empty files and keying in outrageous input sequences. Grown men and women were reduced to tears by watching their programs misbehave under the demented handling of these fiends. The worse they made you feel, the more they enjoyed it.

To enhance the growing image of nastiness, team members began to dress in black — hence the name Black Team. They took to cackling horribly whenever a program failed. Some of the members grew long mustaches that they could twirl in Simon Legree fashion. They'd get together and work out ever more awful testing ploys.

Programmers began to snicker about the diseased minds of the Black Team members.

Needless to say, the company was delighted. Every defect the team found was one that the customers wouldn't find. The team was a success.

Team spirit
The Black Team succeeded as a test group, but more important for our purposes here, it succeeded as a social unit. People who were on the team got such a kick out of what they were doing that colleagues outside the team were positively jealous.

The black outfits and the silly exaggerated behavior were part of the fun, but there was something much more fundamental going on. The chemistry within the group had become an end in itself.

Over time, of course, members of the team moved on one at a time to other things. Since the team function was extremely important to the company, departing members were replaced immediately.

This change continued until finally there wasn't a single member left of the original group. But there was still a Black Team. The team survived the loss of all its original staff, and it emerged with its energy and its personality intact.

Thinking on the job
Years ago at Bell Laboratories, we worked in two-person offices. They were spacious and quiet, and the phone calls could be diverted. I shared my office with Wendl Thomis, who went on to build a small empire as an electronic toy maker.

In those days, Thomis was working on the ESS fault dictionary. The dictionary scheme relied on the notion of n-space proximity — a concept that was hairy enough to challenge even Wendl's considerable powers of concentration.

One afternoon, Thomis was staring into space, his feet propped up on the desk. The boss came in and asked, "Wendl! What are you doing?" Wendl said, "I'm thinking." The boss said, "Can't you do that at home?"

The difference between that Bell Labs environment and a typical modern-day office plan is that in those quiet offices, one at least had the option of thinking on the job. In most of the office space we encounter today, there is enough noise and interruption to make any serious thinking virtually impossible.

More's the shame: Your people bring their brains with them every morning. They could put them to work for you at no additional cost if only there were a small measure of peace and quiet in the workplace.

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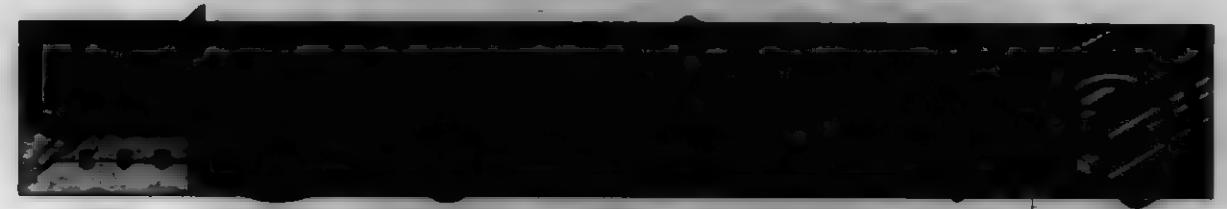

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Beyond productivity

By John Burress

The great British economist, John Maynard Keynes, once pointed out that "practical men, who believe themselves to be quite exempt from any intellectual influences, are usually the slaves of some defunct economist."

He meant, of course, that ideas have a way of making their way out of the realm of theory and into the real world — usually shaking off a lot of the warnings, caveats and provisos that were once attached to them.

Productivity was originally an economist's idea, sort of an equivalent to the engineer's idea of efficiency: desired output divided by scarce or costly input. Around 1900, the first generation of managers to have gone to college and taken economics brought the idea into the business world.

It didn't take very long for the general idea of productivity, which had been applied to any input, to get focused on the one input that was usually the bottleneck: labor.

In the context of the assembly line, the billing office or the complaint-handling department, productivity made a lot of sense. How many gadgets got built, or bills sent, or complaints resolved, per person-hour? Push the number up and the company made more money; let it sink and the company lost money.

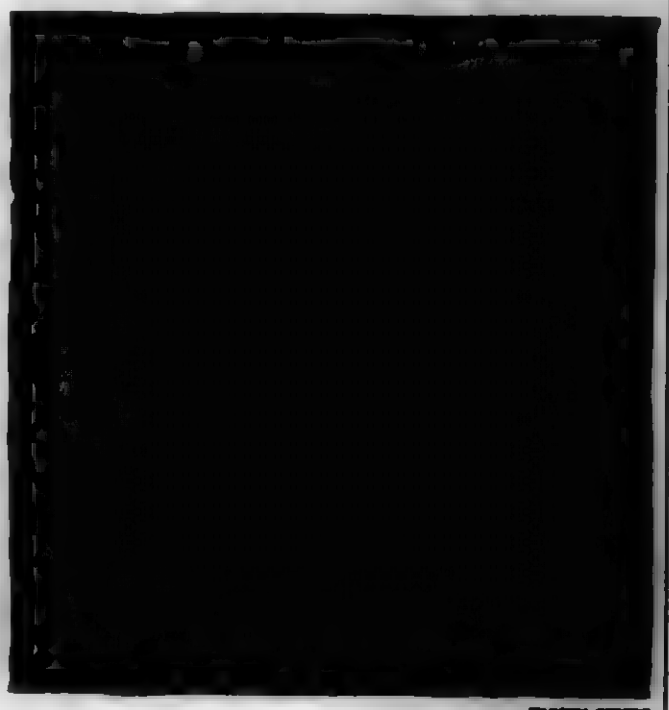
But ideas are tools, as Keynes said, and productivity isn't the only tool in the box.

For example, modern Japanese auto plants, with their extensive robotization, certainly have much higher productivity than the hand-manufacturing setups at Rolls-Royce or Ferrari — but which would you rather own, a Rolls or a Honda Civic?

Form and function

Go to any anthropological museum and one of the first things you notice is how many things — cooking pots, tools, clothing — are carefully, painstakingly decorated. Anthropologists often observe that it took more time to decorate the object than to make it, and of course there is no material gain from the decoration. An undecorated shovel digs as well as a beautifully adorned one.

From a pure productivity standpoint, all that extra labor is an absurd waste. Yet we "practical" modern people live surrounded by ugly-but-functional things, and our "primitive" counterparts surrounded themselves with art that we think good enough to put in museums.



WARREN GINSBURG

Everyone complains of the lack of craftsmanship in present-day goods, yet obviously the less work that goes into any one unit, the more of them can be made in a given time. Higher productivity and lower craftsmanship go together perfectly.

However, productivity is only one of many good things in the world, and we don't figure success only in terms of productivity any more than we try to subsist entirely on ice cream. In fact, if you check back into the economic background of the concept, productivity used to be called "productivity with quality held constant."

What if we put the idea of quality back into it? For generations, economists and businessmen have treated quality as something you can point to but not define or measure. Quality was something that a product acquired when someone with a lot of skill put a lot of time into it. But knowing how you got it didn't mean you knew what it was.

Perhaps the information industry can now supply an answer. I suggest that the quality of a product is directly related to the amount of information that goes into it. The skills of the builder, the design of the plan, the rigor of the concept — these are all measures of information.

And that, I think, is where your impact will finally be most revolutionary: Not in productivity itself — though that is important, and great gains have been made in that area — but in the creation of the first high-productivity, high-quality economic system.

Primitive systems are low in productivity, but because labor is almost free, they tend to be high in quality.

The modern system has traded shoes that fit perfectly for ones that almost fit, individual design and tailoring for mass production of clothing in a few colors and sizes, and tools that fit your hand for tools that fit that mythical "average" person's hand. In short, the policy has been that everything has been dramatically lowered in quality so that it can be cheaper and more plentiful. Productivity has soared while quality has plunged.

In the next 10 to 50 years, that relationship will reverse. Desktop publishing will make it possible for every designer of almost any product to put out a catalog. Computer-aided design will allow any design to be modified to meet individual needs and tastes.

And — most important of all — computer-aided manufacturing systems will allow a manufacturer to change specifications for every individual unit made, if need be. Thus, it will cost no more to make units for each individual than to make a one-size-fits-all product; the issue of decision for the buyer will be much less one of price and much more one of quality.

One size fits all?

Consider: Your forearm is probably not the same length as the forearm of the person who sits next to you. Yet if both of you go to the hardware store to buy hammers, chances are you will get identical ones.

Further, for every forearm length, there is a right place for the balance point on a tool — a place that maximizes applied force and minimizes elbow strain. It is very unlikely that an off-the-shelf hammer will fit your arm properly — and flatly impossible that it will fit both you and your neighbor.

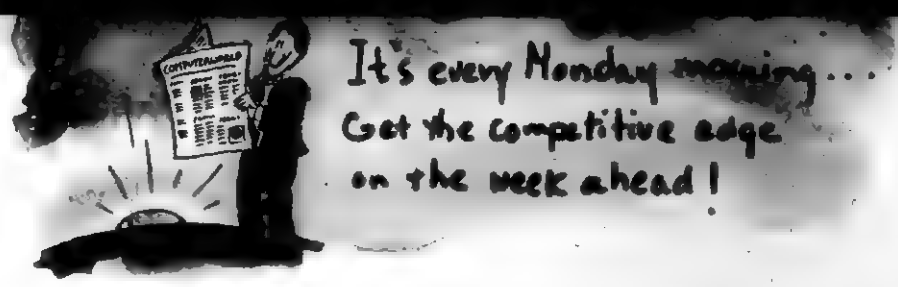
For most of your life, you have been voting with your dollars in the market for higher productivity at the expense of lower quality. You accepted a little more damage to your elbow so that the hammer would be cheaper.

But it could be different — it is going to be different in the future. You will go to the hardware store — or perhaps to a sort of generic "fitting store" — and pick out a basic design, perhaps asking generally for a claw hammer, but potentially specifying any combination of head and shaft materials in any shape.

A technician will carefully measure your arm and take down your credit card number. You'll go home, and a few days later, the right hammer will arrive by parcel post or UPS.

It's even possible that the hammer will get there before the bill does.

Burress is the Pacific Northwest area manager for ADG, a high-tech marketing organization based in San Pedro, Calif. His second novel is *Sins of Origin*, published by Congdon & Weed.



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IBM, Fujitsu

Lack of unity endangers the promise of DAT

BY JAMES A. MARTIN
CW STAFF

Although digital audio tape (DAT) is not available yet in the U.S. consumer marketplace, the new media is generating interest ... high-capacity data storage

DAT, or Data DAT (DDAT), as industry insiders call it, promises capacity of up to 1.2G bytes and storage rates of up to 10M byte/min. This represents an improvement over current standard quarter-in. tape cartridge systems with 150M-byte capaci... storage rates of 6M to

7M byte/...

R D
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...Bozman

Unisys adds 1100/90 models

Product line...

BY STANLEY ...
CW ST...

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...lower prices, less in maintenance costs

...were advised of t... ...by the Unis... ...Brady.

Storage Tech boosts solid-state...ance:

...ible to the Hitachi ... convers...

BY JAMES CONNOLLY
CW STAFF

LOUISVILLE, Colo. — ...logy Corp. last ... pacity and ... ...

AT&T spells out net control

BY ALAN ALPER and ELISABETH HORWITT
CW STAFF

NEW YORK — AT&T last week announced plans for a unified network management architecture that potentially would allow ...

The architecture is expected to evolve during the next couple of years, AT&T said. The company intends to publish initial NMP specifications within the next few months.

By publishing the ... AT&...

T1 networking ... AT&T ... chair as to which ... ...'s existing ... network ... ...

...ge strategy

Codex reveals net manage...

...grated line of communications ...

DB2 advantages require hard...

Development benefits over IMS seen ...

...DE BARCOCK

...bank's Ready T... IMS Fast Path, ...complex DB2 ...

Wang takes Ethernet plunge

VS host links are first step on ...

BY ELISABETH HORWITT
CW STAFF

LOWELL, Mass. — ... to user demand ... connectivity ...

...ndor networking

...ide multivendor com... ...through the ISO ...stems Interconnect ... declined.

NEC releases hard-disk Multispeed lapt...

WOOD DALE, Ill. — A hard-disk-drive ... of its Multispeed IBM-compatible ... week by NEC ...

electroluminescent supertwist LCD screen ... No slots ...

640K bytes of nonexpandable ... cess memory and uses a NEC ... that runs at either 4.77 ...

...announce... ...sts disap... ...manage... 125.

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SOFTWARE NOTES

Broker workstation tools

Can put the entire VS family on Ethernet."

Wang's decision to implement 802.3 on the VS acknowledges growing support for 802.3 as an industry standard as well as user demand for cost-efficient connectivity between VS systems and other vendors' computers.

...tive Software, Inc. is ..., will provide software ... series of intelligent ...stations to be produced ... ADP Financial Information Services, Inc., a ... of Automatic Data ..., Inc. The ...

...tions will be designed to replace ...quote machines with systems ... that can provide client information, portfolio analysis and ...ading options.

Hewlett-Packard ...

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Hot future for DP pros

...minums pres... ...rate software ... groups. Lotus ... Corp. is preparing ...

MAP users group lays down law

BY KATHY CHIN
CW STAFF

...ability gets blown out o... ...ter," said Michael Kolowich, vice-president of corporate marketing and information services ...

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COMPUTERWORLD

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Hewlett-Packard cuts PC prices to meet IBM's PS/2 head to head. Page 16.

Executive support systems can be deadly for MIS developers unskilled in corporate politics. Page 93.

Splash! IBM mid-range users in one pool

AS/400 seen as relief valve but no 'VAX killer'

BY STANLEY GIBSON
CW STAFF

NEW YORK — IBM glued together two large chunks of its fragmented mid-range processor line last week when it announced the Application System/400 series, which had carried the code name of Silverlake. In doing so, IBM climaxed one of the most speculated about and least secret product developments in its history.

The merger of its System/36 and 38 lines into a unified architecture represents a giant step by IBM to improve its competitive position against Digital Equipment Corp. and other mid-range system vendors.

Most analysts agreed the system offers competitive price/performance and is especially attractive when included in new single-price packages offering maintenance, software and support.

No killer instinct

But analysts were quick to point out that the AS/400 is far from being a "VAX killer" and mainly plugs some of the gaping holes in IBM's mid-range strategy, on which smaller competitors have been capitalizing.

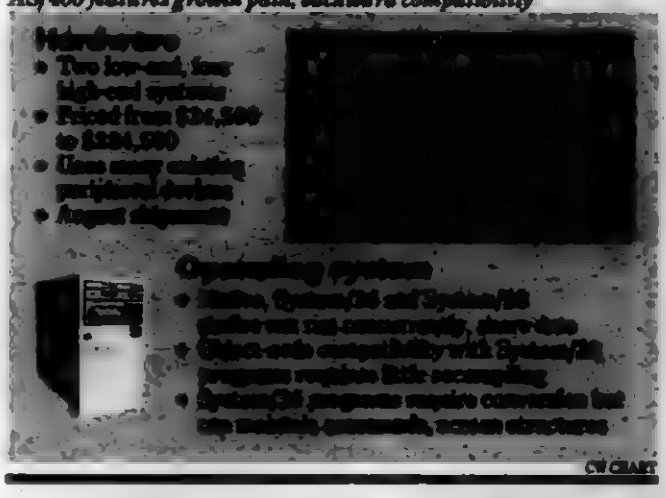
"It fixed things that were broken in the IBM product line," said Marty Gruhn, an analyst at The Sierra Group in Tempe, Ariz. Gruhn said that in offering ease of use and a broad power range, the system addresses areas that had been DEC advantages.

"It's not a VAX killer. DEC is too strong to be put out of business by this," said David Andrews, president of ADM, Inc. in Cheshire, Conn.

IBM also answered DEC strengths with other moves,

Continued on page 8

Silverlake floodgates open
AS/400 features growth path, backward compatibility



AS/400

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A machine they call their own

BY JEAN S. BOZMAN
CW STAFF

After years of arguing with IBM executives over System/36 and 38 specifications, users are crowing about their input in the design process of the AS/400.

"What impressed me most was that IBM listened to the customers," said Dennis Chapman, MIS manager at Georgia-Pacific Corp.'s Portland, Ore., operations. "I think that's the first time they did it." In the past, Chapman said, most user ideas were discarded.

Instead of placing a machine on the market and revising it later, IBM brought users into the AS/400 design process.

"The folks at the Rochester lab really, really listened," said James Dinwiddie, director of information resources management at the U.S. Department of Agriculture, which owns more than 2,500 System/36 machines.

Dinwiddie should know: As one of 50 members of an IBM

Continued on page 141

Net firms hike prices, cite chips

BY PATRICIA KEEFE
CW STAFF

Two major suppliers of Ethernet networks — Excelan, Inc. and 3Com Corp. — last week announced plans to raise prices for some products incorporating scarce dynamic random-access memory chips effective July 1.

Excelan said it will impose a temporary 5% surcharge on all hardware products that incorporate DRAM chips. "Chips that used to cost $2 now cost $8 to $9," said Robert Davis, Excelan's product line manager for host products.

3Com is absorbing the price increase on its intelligent adapter cards for now but will be raising prices on three products: The 3Station diskless workstation will increase by $250, or 13%; the 3Server3/200 will jump $500, or 6%; and the 3Server3/400 will climb $500, an increase of roughly 4%.

Other network vendors expressed concern about rising DRAM costs, and some said users should expect further price increases if the shortage continues.

Bill Scull, director of product

Continued on page 6

Microsoft scrambles to fix cracks in Windows support

BY STEPHEN JONES
CW STAFF

NEW YORK — Microsoft Corp. is expected to join a group of its most loyal Windows advocates this week in what could be a last-gasp effort to earn widespread acceptance for the operating environment.

The joint marketing effort, combined with an apparent shift in the Windows marketing strategy, is aimed at bolstering sagging interest in Windows as the de facto link between existing personal computers and the OS/2 operating system. Some observers, however, questioned whether the moves are too little, too late for Windows.

The Windows/Presentation Manager Association consists of top Windows developers, hardware OEMs, corporate developers and end users, all of whom will try to improve Windows' image. The association is surfacing at a critical time for Windows. Recently, Microsoft has quietly backtracked on its Windows positioning in a bid to prove that the software is not simply a stopping point on the road to OS/2.

In the past, Windows was portrayed as the environment that would give users a graphical user interface today and provide a bridge that would link users and their applications to IBM and Microsoft's Presentation Manager in the future. The scenario seemed to spell certain death for Windows once the Presentation Manager hit the scene.

Now, Microsoft is emphasizing a coexistence strategy, in which PCs running Microsoft MS-DOS and Windows will be able to run on the same Microsoft LAN Manager network with OS/2-based PCs. Microsoft said it expects that type of implemen-

Continued on page 4

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Engine tune-up. Novell takes the wraps off its long-anticipated SQL engine, which is geared toward the company's Netware network operating system. A half-dozen developers, including Lotus, ooh and ahh and pledge undying support. Page 17.

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Quotable

"Many users said: 'Your objective is right, your implementation is right, and, by the way, you have more work to do.'"

RON RETTUS
IBM

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User disdain may erase data digital audio tape

BY JAMES A. MARTIN
CW STAFF

After years of talk and anticipation, digital audio tape (DAT) as a data storage device will finally become available to the U.S. consumer market beginning next month. But the fledgling technology faces sizable obstacles — high prices, a lack of standards, sluggish data access rates and potentially strong competition from other up-and-coming storage formats, such as erasable optical disks.

If that's not enough, DAT must also square off with MIS. Users interviewed recently by *Computerworld* said that in just about all cases, ¼-in. streaming tape adequately fulfills the back-up and archiving needs of micro, minicomputer and workstation users, functions DAT is hoping to replace or at least augment.

"There's not a lot of faith in the user community right now about DAT," said Kevin Farrell, manager of microcomputing and management services at Firestone Tire & Rubber Co. in Chicago. "Erasable optical disks would be of more interest, because DAT does not use a random-access technique like erasable optical will."

Nonetheless, Gigatape, Inc., the Carlsbad, Calif.-based research and development and marketing arm of Munich, West Germany-based parent company Gigatape GMBH, will begin shipping in July the first DAT system designed as a data storage device for the U.S. market.

Meanwhile, Hewlett-Packard Co., through a joint venture with Sony Corp., is planning to launch its first DAT storage devices later this year, and models from vendors such as Hitachi Ltd., Wangdat, Inc. and California Peripherals Corp. are also expected to emerge within the next six months.

Proponents say data DAT systems have great potential as a backup and archiving medium for a variety of CPUs, especially data-intensive engineering workstations. In addition, data DAT can also be used as an on-line device in certain vertical market applications.

"In the medical imaging world, data DAT could do well as an on-line device because of the tremendous amount of data to be analyzed," said Dennis Waid, organizer of the data DAT standards committee and executive vice-president of Peripheral Strategies, a storage consulting firm in Santa Barbara, Calif. A data DAT system will offer a data access rate of about 20 sec., far longer than most standard storage media today. But, Waid said, "in a medical imaging situation, the data transfer rates don't always need to be high."

Industry watchers said they have high hopes for DAT. Freeman Associates, a management consulting firm in Santa Barbara, Calif., has predicted shipments of data DAT to grow by 296% in the next five years, increasing from 600 units shipped worldwide this year to 585,000 units in 1993. Within the U.S., Freeman said it expects some 500 data DAT units to be shipped this year and 351,000 in 1993.

Data DAT, compared with the industry-standard ¼-in. tape drive for data backup, will offer "four times the price but with eight times the capacity and three times the transfer rate," said Lee Elizer, executive vice-president of Gigatape's California operations.

Gigatape's market entry, the rack-mounted Giga 1200, will offer 1.2G bytes of data storage capacity and a data transfer rate of 192K byte/sec. at an initial cost to end users of $6,500. In comparison, a typical rack-mounted ¼-in. tape drive today offers 320M bytes of storage capacity and data transfer rates of 240K byte/sec. and costs the end user anywhere from $1,500 to $2,500.

Prices shrinking

Elizer and data DAT analysts said end-user prices will drop significantly as manufacturing volumes increase in early 1989, giving data DAT a pricing edge over streaming-tape drives. While DAT has been available for some time to Japanese consumers, its acceptance in the U.S. has been stymied by the music recording industry, which fears loss of royalties because of DAT's high-quality dubbing capabilities.

The HP-Sony venture is developing its data DAT products independently to sell to end users and license to OEM vendors. To date, according to an HP spokesman, HP and Sony have jointly licensed their technology to Archive Corp., Wangtek, Inc. and its offshoot Wangdat, Inc. and Exabyte Corp.

The HP spokesman would not elaborate on the company's licensing and data DAT plans.

Data DAT vendors have a big selling job ahead if they want to convince MIS of their products' merits. "We use floppy disks and streaming-tape drives for back-up, and it's adequate for our needs," said Mike Canfield, a senior systems analyst at Airborne Freight Corp. in Seattle. "We have no strong need at this time for something that gives us 1G byte of storage."

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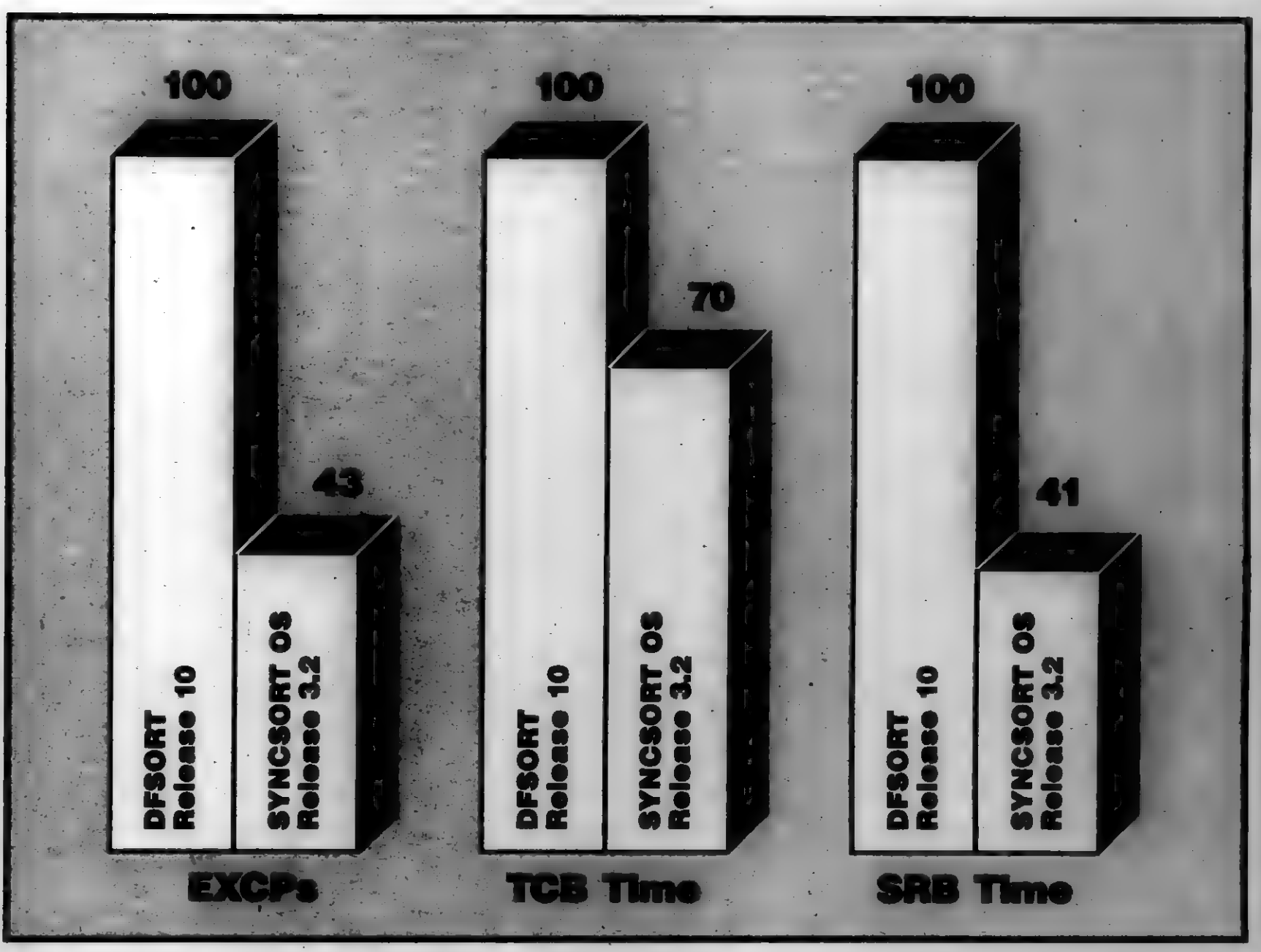

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OS/2 users hedging on graphics interface

BY ALAN J. RYAN
CW STAFF

NEW YORK — Companies making the move to IBM's OS/2 said the concept of a graphical user interface for the operating system intrigues them, but it is not likely that its sidekick, the Presentation Manager, will become an overnight success.

In an informal poll taken by *Computerworld* at last week's PC Expo here, several vendors interviewed said their DOS users are not particularly enamored with the Presentation Manager or any other graphical interface. Although such an interface eases learning the operating system, those who understand DOS and are just getting used to OS/2 said this user-friendly perk is just one more thing to learn.

"Trying to show the Macintosh to our DOS users is difficult," said Joanne DiPietro, a senior systems analyst at Johnson & Johnson in New Brunswick, N.J. "They don't even want to use a mouse."

With an interface similar to Apple Computer, Inc.'s Macintosh, the Presentation Manager could become a hit among new users, and companies adopting it will not have to move from their comfortable IBM and Microsoft Corp. technology. The Presentation Manager will be available in OS/2 Standard Edition 1.1 in October, according to IBM.

"The Presentation Manager will make things easier for novice users, and because of the superiority of OS/2, it will enable power users to do more," said Lorie Mouklas, a senior data analyst at The Singer Co.'s Electronic Systems Division in Wayne, N.J.

"With the Presentation Manager, [users] wouldn't lose DOS and they stick with the IBM family," said Frank Kinghiner, a programmer in the publishing systems group of Dow Jones & Co. in New Brunswick.

Some companies have already started gearing up for OS/2 and its companions.

Hilly Fuchs, director of the information center at Continental Grain in New York, said that the move to the Presentation Manager will likely be a 1989 decision and that it will most certainly be application-specific rather than companywide.

PC Expo

Novell starts SQL engine; IBM details PC return policy.
Page 17.

"Maybe over the next five years it will become a standard," he said.

At Aetna Life and Casualty Co. in Hartford, Conn., the Presentation Manager is one of many aspects of OS/2 currently being looked at, according to Bob Maio, a systems manager. "We're not really planning for [the Presentation Manager] yet," he said, but "we're looking at it because we have to get into OS/2."

Maio said that some of the company's power users will be very interested in the Presentation Manager and OS/2, "but generally, we will have to introduce it slowly. We have to understand it ourselves and show the benefits to the users first."

While the upgrade to the Presentation Manager will be free for current OS/2 users, users who want to move to both OS/2 and the Presentation Manager will find expenses to be high.

Teradata claims lead

Says data base 2.7 times faster than DB2

BY CHARLES BABCOCK
CW STAFF

LOS ANGELES — Teradata Corp. jumped into the benchmark quagmire last week, claiming its relational data base machine can process transactions at a rate 2.7 times faster than IBM's latest version of DB2.

Teradata released a benchmark of its DBC/1012, which it claims duplicates the credit-authorization transaction used by IBM in benchmarking DB2.

The results of the benchmark indicated that the DBC/1012, configured with 191 parallel processors — which is equal to roughly 191 million instructions per second — was capable of executing 1,176 transaction/sec. When DB2 Version 2 was announced recently, IBM cited 438 transaction/sec. as the maximum achievable rate.

Neither Teradata's nor IBM's benchmarks have been certified by independent auditors as meeting a stated set of criteria.

Other vendors, including Sybase, Inc., Relational Technology, Inc., Cullinet Software, Inc., Informix Software, Inc. and Tandem Computers, Inc., have attempted to execute their own versions of a debit-credit benchmark — a more complex test than those conducted by IBM and Teradata — under varying conditions and with widely varying results.

Industry observers said the benchmarks have been done so inconsistently that it is impossible to compare results.

Omri Serlin, president of Itom International and publisher of "FT Systems," a Los Altos, Calif.-based newsletter that frequently addresses the muddled benchmark issues, called the Teradata benchmark results "an impressive number."

"There's IBM huffing and puffing, giving DB2 every benefit in the book" and coming up with a figure that is less than half the Teradata data base machine's performance, he noted.

At the same time, Serlin said, Teradata cannot be positive that it is running the same test as IBM because the latter company has not published its benchmark criteria.

Serlin noted that Teradata did not state a precise price/performance advantage over IBM other than to say the Teradata system was about two-thirds its price. The Teradata system is a specialized, fixed-purpose piece of hardware, while DB2 and the IBM 3090 Model 600E, on which it was tested, represent a more flexible, general-purpose system.

Charge it

Daniel F. Holle, Teradata headquarters systems engineer, said the benchmark used a transaction that mimics a simple credit card number check against a table of 200,000 lost or stolen credit cards. The benchmark allows for 10 million credit card numbers, so there is only a 2% chance of a hit on a lost or stolen card number match.

In that event, the transaction requires the creation of a record for the source of the authorization check.

Very high performance figures are attainable with such a simple transaction. The whole lost or stolen table, for example, is likely to be resident in system memory after the benchmark has been allowed to run for a given amount of time.

Once fully loaded, it no longer requires I/Os to read data from a data base on disk. The elimination of time-consuming I/Os enhances the results of any benchmark.

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Windows

FROM PAGE 1

tation to extend Windows' life span by six years.

"We never meant to say that Windows would end when Presentation Manager began, but some people interpreted it that way," said Russ Werner, general manager of Microsoft's DOS and Windows group.

Founding companies in the WPMA include such longtime Windows boosters as Palantir Software, Symantec Corp., Da Vinci Systems and Zsoft Corp. But conspicuously absent from the group's roster are such major developers as Ashton-Tate Corp. and Lotus Development Corp., neither of which has nibbled at the Windows bait.

"It doesn't seem that the group will add much momentum to Windows if there aren't any new companies participating," said Bill Higgs, director of software research at Cupertino, Calif.-based Infocorp.

Monkey wrenches

While Microsoft contends that Windows is shipping at a clip of 50,000 copies per month, a number of unrelated factors have recently converged to work against it:

- Costs associated with the memory needed to run Windows are climbing rapidly because of the shortage of dynamic random-access memory chips.
- The Presentation Manager threatens to supplant its Windows parent and dash users' investments in the software.
- Intel Corp. 8086- and 8088-based machines, which do not have enough horsepower to adequately support the graphics-based system, continue to dominate the corporate landscape.
- Many users of advanced, high-performance Intel 80286- and 80386-based PCs are saving their money for OS/2.

The difficulties are apparent in user acceptance of Windows; Infocorp estimates that only 8% of DOS business users run Windows on their PCs in 1987.

Microsoft responded last week by releasing Windows 2.1, which is available in versions tailored to 80286- and 80386-based PCs. The Redmond, Wash., developer continues to downplay Windows as an environment for 8088-based computers and pump it as a high-end system for corporate America.

The firm has also changed its stance on Windows' role with the Presentation Manager.

Regardless of Microsoft's specific strategy, Windows has succeeded on one major point: acceptance of Chairman Bill Gates' graphical user interface brainchild. Boasting an interface similar to the Presentation Manager, Windows helped earn support for that program from the industry's biggest players, including IBM.

That interface — for Windows and the Presentation Manager — could have some problems of its own. With the graphics-intensive system demanding so much memory, users may back off from jumping on the bandwagon until chip prices drop to earlier levels.

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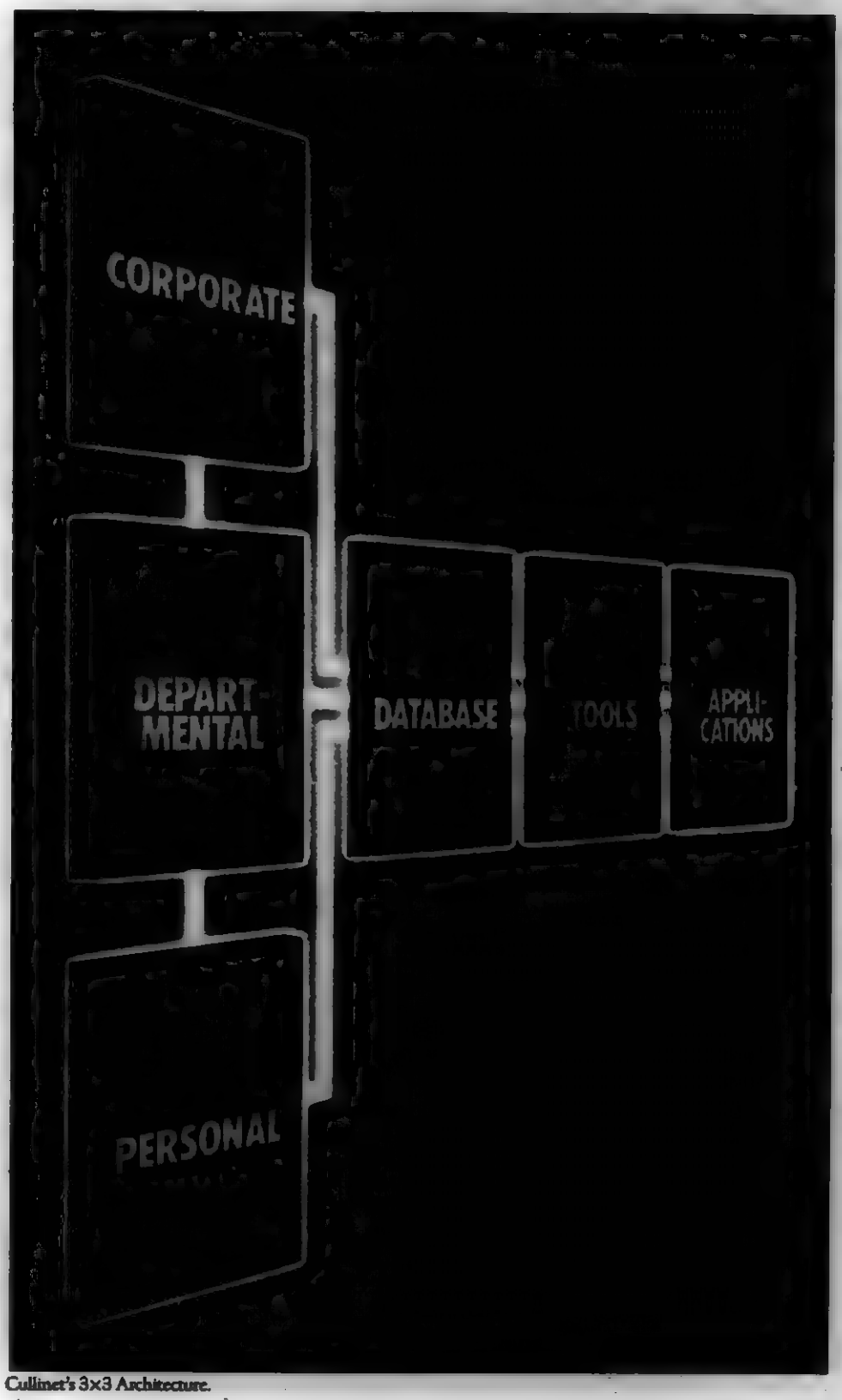

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NAS doubles DASD storage

SANTA CLARA, Calif. — National Advanced Systems (NAS) introduced a version of its disk storage subsystem "J" last week that doubles the storage per drive for a 37% premium.

NAS's 7380 DASD Model JX fits between Models J and K in storage capacity and offers up to 10G bytes per unit. NAS doubled its capacity by recording tracks on the entire surface of the 9½-in. platter for the Model JX instead of on only half of the surface used on the Model J, according to Minh Le, NAS's worldwide marketing manager. The Model K has 15G bytes, achieved by laying down the tracks with a higher density.

Each head disk assembly for the JX has 1.26M bytes of storage. There are eight assemblies in each frame.

Fully configured, a 7380 DASD farm could contain up to 60G bytes and can be reached in 2.5G-byte increments, according to the company. As the first Model JX box in a string of direct-access storage devices (DASD), it costs $107,350, with subsequent boxes at $85,500.

Net firms

FROM PAGE 1

marketing at Ungermann-Bass, Inc., said his company is contemplating a surcharge similar to Excelan's and will announce a decision within the next 30 to 60 days.

If more local-area network and communications hardware suppliers hike their prices because of quadrupling DRAM prices — and to a lesser degree, static RAM chip shortages — users can expect to see the thus-far steady downward pricing trend in LAN components screech slowly to a halt.

"It will absolutely reverse the trend," said Michael Barker, president of Micom-Interlan, Inc. Excelan's Davis agreed.

Even if this comes to pass, user resistance is not anticipated, according to vendors and a few industry analysts. Digital Equipment Corp. has already set a precedent in the workstation market by attributing price increases on system and memory products announced two weeks ago to the DRAM shortage.

"DEC's move has created an umbrella for all," said Patrick Cortin, president of Proteon, Inc., a supplier of token-ring cards. "I wouldn't be surprised if in the next four weeks a number of network vendors raise their prices," said Joseph Seidler, an analyst at Infonetics, Inc.

There is some likelihood that "resellers may be forced to pick up the slack if users resist, so a 5% increase might translate into a 2% to 3% increase for the user," Seidler added.

Also considering DRAM-related price hikes are Proteon, Gateway Communications, Inc., NCR Corp. and Sytek, Inc.

"We are under some cost pressure, but it hasn't translated into a pricing increase yet," said Gateway Communications President Walter Schramm. "Ultimately, we see increased prices," said John Day, Sytek's director of materials.

Not everyone is overly concerned, however. Micom-Interlan has no intention of raising prices because of DRAM costs, according to Barker.

Because most of its DRAM-based servers are built overseas, pricing is less of an issue for Novell, Inc. "It's having zero impact on us," a spokesman said. Quadram Corp. said it is absorbing any impact on two DRAM-based cards and expects the shortage to ease shortly.

Users scratch heads over OSF's impact

BY JULIE PITTA
CW STAFF

SAN FRANCISCO — The Open Software Foundation (OSF) made its pitch directly to Unix users last week and left them befuddled.

"The biggest reaction is clear: It's confusion," said Alan Nemeth, president of Usenix, a users group that hosted an OSF briefing at its annual meeting here. "The bulk of our membership and the Unix community doesn't understand what the effect of OSF will really be."

Clouding the picture for Unix users are the two competing efforts for control of that operating system: the alliance of AT&T and Sun Microsystems, Inc. on one side and OSF heavyweights IBM, Digital Equipment Corp. and Hewlett-Packard Co. on the other.

The OSF's message to users was an open Unix. Within weeks, the foundation is slated to issue a request for technology, asking members and nonmembers to submit their user interface technologies for consideration.

OSF officials emphasized that technologies from outsiders, including AT&T's Open Look, would compete equally with user interfaces from sponsor companies.

The OSF is planning a technical conference within a couple of months, after which it is scheduled to choose a single-user interface.

The OSF will develop its version of Unix, based on IBM's AIX, for a number of as-yet unselected hardware platforms that will be chosen based on technical merit, officials said. Sun's Scalable Processor Architecture, commonly known as Sparc, will be considered, they said.

"We are interested in proving portability, not endorsing an architecture," said John Paul, the OSF's director of development. Paul is on sabbatical from Nixdorf Computer Engineering, Inc.

Despite the OSF's attempts to go public, it will likely take some time before the Unix community is converted.

Unix buyers steer clear of AT&T

More than half of survey respondents look for IBM endorsement

When it comes to considering future Unix purchases, MIS managers are more likely to go with industry heavyweights IBM, Digital Equipment Corp. and Sun Microsystems, Inc. rather than the operating system's originator, AT&T.

This lack of support for AT&T was one of the conclusions reached by a recent *Computerworld* survey of 295 MIS managers' opinions of the Unix marketplace.

More than half of those surveyed who said they intend to make a Unix purchase said they would consider Sun as their vendor. Almost 41% said they would consider DEC, and 38% would consider IBM. AT&T won votes from 28.8% of the group.

Apollo Computer, Inc., longtime workstation rival to Sun, got a nod from 26.9% of the group. Unisys Corp. would be considered by 21.2% of respondents.

IBM was strongly favored in the survey. When respondents were asked if an IBM endorsement of a Unix version would influence their Unix purchasing decision, 52.3% said they would more likely purchase the IBM-endorsed version.

Nothing to brag about

Other survey results, however, suggested that IBM and other favored computer companies have nothing to gloat about. The majority of respondents expressed no serious commitment to Unix. Of those surveyed, nearly 61% said Unix was not an important part of their company's future.

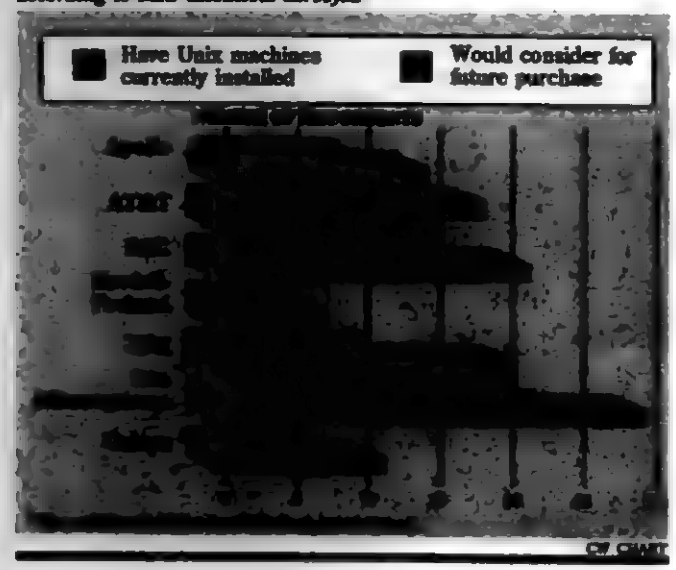
Almost 77% said they did not currently have a Unix-based system installed, and nearly 79% said they did not have plans to make a first-time purchase or additional system purchases in the next 12 months.

The respondents were a sampling of CW readers who hold managerial posts in MIS departments.

ROSEMARY HAMILTON

Leading lights

Sun and DEC are most likely to benefit from future Unix purchases, according to MIS executives surveyed



CW CHART

Hands off !

More than half of the MIS execs polled said they are greatly concerned with Unix portability but not with an individual vendor's enhancements

CW CHART

Cancel that order

The Open Software Foundation's proposed alternative Unix could delay purchase plans of one-quarter of the MIS professionals surveyed

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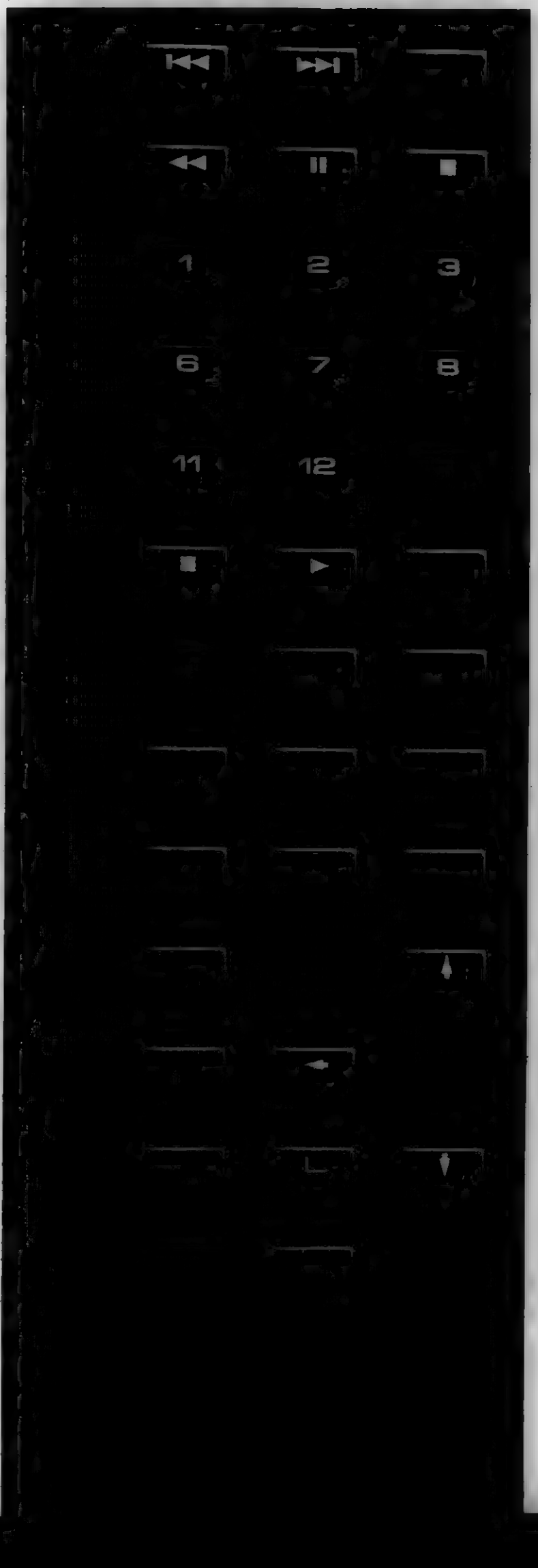

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Facts and figures

The AS/400 closely resembles IBM's System/38 architecturally, using 48-bit addressing and 32-bit processing. Its operating system, called OS/400, is closely related to the System/38's CPF operating system and includes a similar relational data base feature.

Consisting of six models ranging from $24,500 to $284,500 in price, the AS/400 processors are scheduled to be generally available in August and feature the following:

- Low-end models, the B10 and B20, housed in tower-type cabinets and not upgradable to the more powerful Models B30, B40, B50 and B60. The larger systems are rack-mounted in cabinets similar to those of the 9370 processors.
- Use of the 9332 and 9335 disk drives, which are also used with the 9370. They do not use 3370-type disks, which are widely used with the System/38.
- OS/400 loaded prior to delivery.

The machines effectively replace all System/36s and 38s except the low-end System/36 Model 5363, introduced in October 1987. However, IBM will continue to sell all models of the System/36 and 38. IBM cut prices on the latter but not on the System/36.

IBM reduced the price of the System/38 Model 700 by $25,000 and cut model upgrades within the line by amounts ranging from $5,000 to $25,000. But IBM did increase one upgrade price; the cost of going from the Model 8 to the Model 400 or 600 rose $7,750.

STANLEY GIBSON

The new lineup

IBM's AS/400, the much anticipated Silverlake project, features six processors

B10	0.5	4M to 8M	Four to 12	945M	$24,500[3]	Microvax 3000
B20	0.7	4M to 16M	Eight to 20	945M	$44,000[3]	8350, Microvax II
B30	0.8	4M to 36M	12 to 30	6.8G	$48,500	8350, Microvax 3800
B40	1.3	8M to 40M	24 to 48	6.8G	$87,500	Microvax 3600
B50	2	16M to 48M	36 to 80	13.6G	$171,500	6220, Microvax 3600
B60	3	32M to 96M	64 to 150	27.2G	$284,500	6220, 8550

[1] Millions of instructions per second and VAX comparisons are estimated by International Data Corp.
[2] Includes operating system.
[3] Includes disk and tape.

INFORMATION PROVIDED BY IBM
CW CHART

AS/400

FROM PAGE 1

such as promoting third-party applications and offering a one-year warranty on the AS/400 (see story above).

But most important for the more than 200,000 System/36 and 38 users, many of whose processors have reached the limits of their computing power, more capacity is now available without a costly and difficult migration to another architecture. The consolidation of the System/36 and 38 also eliminates communication problems faced by users who had both systems installed.

The Sierra Group's Gruhn predicted that smaller mid-range vendors, such as Data General Corp., Wang Laboratories, Inc. and Hewlett-Packard Co., will be hurt more than DEC. "They'll get clobbered, because they target the medium and small companies," she said.

"Unisys, Wang and NCR should be concerned about this," said Charles T. Casale, president of the Aberdeen Group in Boston, seconding Gruhn's assessment that smaller competitors in the small business market will be hurt the most by IBM's announcement.

Although IBM clearly intends the machine to be used by small businesses, IBM Vice-President and assistant group executive for mid-range systems Larry Ford included departments of large corporations as target users. As such, the processor could take away from IBM 9370 sales. Ford reiterated IBM's stated purpose for the 9370 as a distributed processor for companies committed to the 370 architecture. He said the 9370 will also be stressed for computer-aided design and manufacturing, numeric computing and Unix-based processing.

But, Casale said, "Silverlake is the 9370 killer. They finally introduced the machine the 9370 was a marker for."

Not bowled over

Although analysts praised the machines as well-positioned for their target users, the technology itself was not greeted with awe. "The technology is a real snooze. There's no multiprocessing and no Unix," Gruhn said. "This is not a technical machine, this is a small business machine," Casale observed.

However, IBM told analysts that clustering, multiprocessing and reduced instruction set computing are being considered as enhancements. "Clustering and multiprocessing are definitely coming, but not until 1990, for engineering reasons," Andrews said.

Andrews said what he called the superior architecture of the AS/400, which borrows heavily from the often-overlooked System/38, will cast 370-type systems in an unfavorable light.

An advantage the AS/400 has over other machines, according to Andrews, is the relational data base included in the OS/400 operating system, which is similar to that of the System/38's CPF operating system. "If you want those benefits on other machines, you lose performance and have to pay a lot," he said.

But Phil Varney, senior manager of distributed systems at McCormack & Dodge Corp. in Natick, Mass., said that both the System/38's CPF operating system and DEC's VMS are very easy to use and offer similar levels of programmer productivity.

Varney said the clustering feature offered on VAXs is a plus but that IBM's Advanced Program-to-Program Communications on the AS/400 can accomplish some of the benefits of clustering, such as accessing a file on a different processor.

Gary Hoppe, manager of U.S. sales consultants at DEC, claimed System/36 users will face a conversion of some difficulty in moving to the new system. He claimed that the cost of moving from a System/36 to either the AS/400 or a VAX would be comparable.

Lease plan ring sounds familiar

BY CLINTON WILDER
CW STAFF

It might be called "Back to the Future." To veteran IBM customers and observers, IBM Credit Corp.'s Total System Lease announced last week for the AS/400 hearkened back to the days when IBM 370 mainframes were rented as bundled packages that included maintenance and peripherals — with software bundled in for free.

The aggressively priced Total System Lease will provide users with one monthly invoice for their hardware, operating system software and maintenance financing. In addition, customers can lock in today's maintenance prices for up to five years as part of the deal.

In essence, AS/400 customers considering leasing must weigh the advantages of the bundled deal against the flexibility they could keep by leasing or buying the CPU only. The Total System Lease "could be attractive because of the convenience," said Pete Samsel, manager of financial services at Aetna Life and Casualty Co. in Hartford, Conn. "But it might hamper the savings you could get from competition if, for example, you wanted third-party maintenance."

Mixed bag

IBM Credit, which has become more aggressive than ever in competing with third-party lessors on mainframe deals, will now assault the mid-range. Lessors of System/36s and 38s were mixed on how successful the lease will be.

"It's a good move, much as I hate to say it," said Mark Giannini, vice-president of marketing at mid-range lessor Grammco National of Tennessee, Inc. in Memphis. "It will be very hard for a third party to offer the maintenance, at least initially."

Comdisco, Inc., the world's largest third-party lessor, was more skeptical about the Total System Lease. "We don't feel it's a big threat," said Jack O'Connell, Comdisco's marketing vice-president in charge of System/36 and 38 leasing.

But the lease may be directed more at the less sophisticated small businesses, according to Bob Djurdjevic, president of Annex Research in Phoenix. "The entry-level customer gets the best deal," he said, referring to lease terms on the AS/400 B10 and B20 models. "IBM has made it easy for him to sign once on the dotted line."

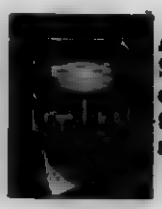
Talk of the town

"Much of what is the good news of this announcement was learned from the mistakes of the 9370 announcement. . . . The 9370 is a major issue. Will the AS/400 product line become too successful for IBM's own good? Unless IBM enhances the 9370, the AS/400 will eat into it."

Bob Djurdjevic, president, Annex Research

"The inroads DEC has made in the mid-range are because IBM didn't have an easy-to-use alternative until the AS/400. I see this as one of the most important product lines IBM has produced in a long time."

David Tory, executive vice-president, Computer Associates International, Inc.



AS/400 "seems like where a lot of the mid-range SAA architecture is going to rest. There are aspects of it that make its PC-to-midrange-to-mainframe file transfer a lot more clean than the current VM or VSE strategies."

Mario Morino, chairman, Morino Associates

"To my mind, the AS/400 does not have a major niche in corporate environments that are dominated by two-tier PC and mainframe strategies. AS/400's strength in peer-to-peer networking fits in for companies with satellite operations with requirements to communicate to the corporate headquarters."

John Pickens, senior communications architect, Communications Solutions, Inc.

"It was interesting to see integrated utilities on it, such as backup security and SNA. Other than that, it was pretty much what I expected. I'm glad that the 9370 can get on with its business, now that the other shoe has finally dropped."

Robert Cook, chairman, VM Software

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COMPUTERWORLD

Users applaud low-cost Compaq 386

BY ALAN ALPER
CW STAFF

NEW YORK — Compaq Computer Corp.'s Deskpro 386S — its new 16-/32-bit microcomputer — received strong endorsements from PC Expo attendees last week who are seeking affordable machines running 32-bit software.

The system, which was introduced here last week alongside faster Intel Corp. 80386-based microcomputers [CW, June 20], is expected to speed the shift away from Intel 8088- and 8086-based machines to higher performance microcomputers.

Designed around Intel's hybrid 16-MHz 80386SX chip, the Deskpro 386S offers 32-bit processing and 16-bit addressing, providing roughly 85% of the performance of Intel 386-based machines. Yet because of lower production costs, the new system is priced in the same range as 286-based micros.

Compaq Marketing Vice-President Michael Swavely said the Deskpro 386S — which accepts all 8- and 16-bit add-in boards and peripherals — runs 20% faster than IBM's Personal System/2 Model 50Z, which uses a zero-wait-state Intel 80286 processor and requires IBM Micro Channel-compatible add-in devices.

"We view [the 386S] as an alternative to 286 PCs," Swavely said. "We see it as the fundamental workstation for basic business professionals."

Potential customers at PC Expo said they were impressed with the machine's price points, which ranged from $3,799 to $5,199, and small footprint — a radical departure from Compaq's usual oversized desktop designs.

Delighted users

Moreover, personal computer users delighted at the 386S's video quality — gained by virtue of a newly designed IBM Video Graphics Array (VGA) controller said to offer 50% better performance than other VGA controllers — and configuration flexibility that allows for the use of up to four different types of internal mass-storage devices, including both 5¼- and 3½-in. fixed and flexible disk drives and ¼-in. tape drives.

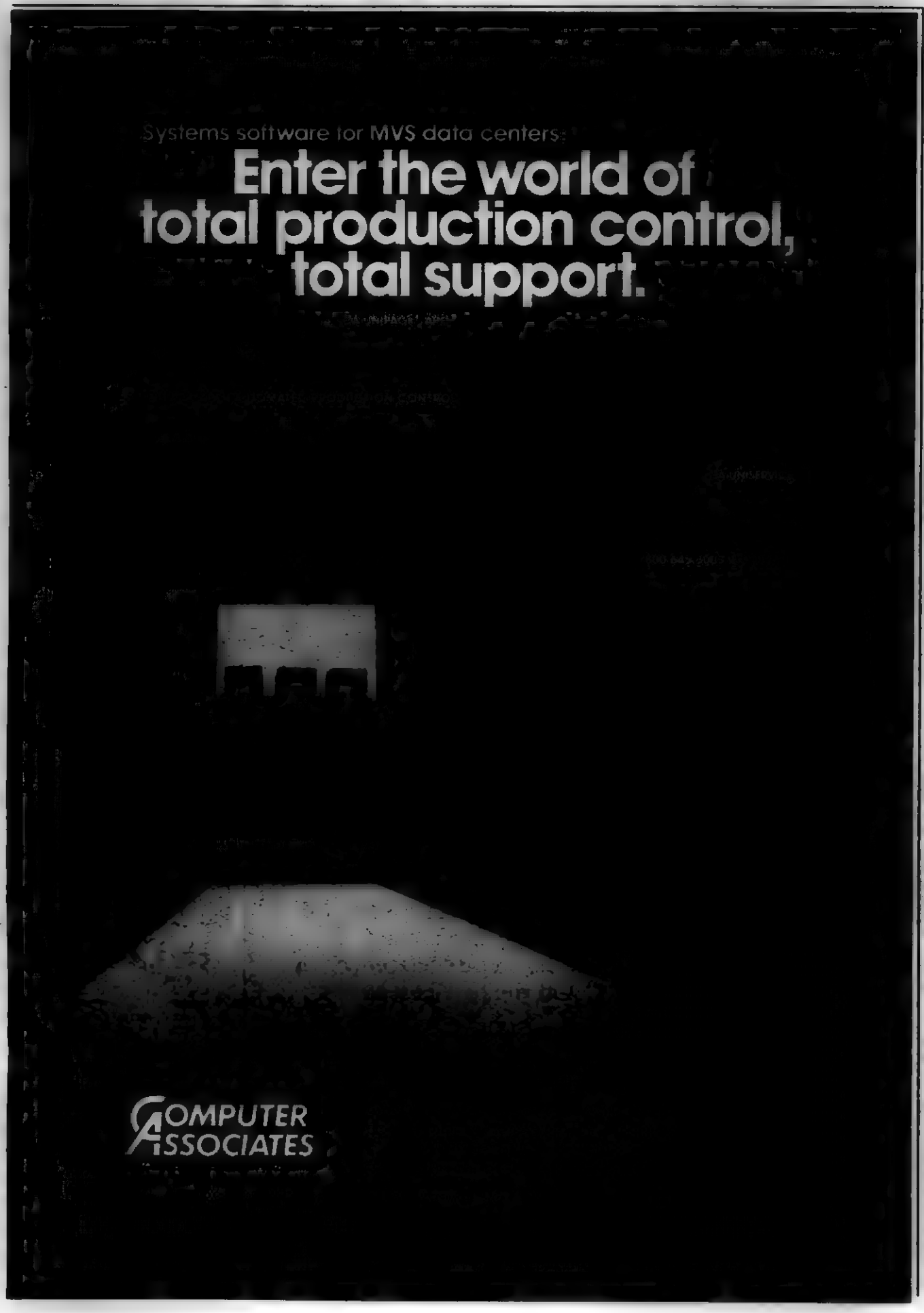
Richard Hellmann, manager of emerging technologies at Chubb & Son, Inc., a Warren, N.J., insurance company, said the Compaq machine could fit well into his firm's purchase plans. "It's about the same price as 286s and uses the same boards that we already have in stock," he said. "I like it versus other Deskpros because it's much smaller, and desk space at our company is at a premium."

Robert Fosina, an assistant systems analyst at General Foods Corp.'s meals division in White Plains, N.Y., said the 386S would be the perfect platform for power-hungry users still using 8088 and 8086 machines.

One potential problem with the 386S, Fosina pointed out, would be if Compaq does not provide a means of upgrading to a faster hybrid or a full 32-bit microprocessor. A Compaq engineer said there are currently no upgrade plans, but because the 80386SX resides on a smaller board, it is unlikely an upgrade to a full 32-bit processor could be accomplished.

The 386S does not seem to appeal to systems developers and Micro Channel devotees, however. "We need the power up front, unlike end users," said Bill Talpey, a senior software programmer at Crum and Forster, Inc., a Morristown, N.J., insurance company. "When you're doing development with OS/2, the additional power of true 386 micros is extremely important."

John Harner, a partner with the tax division at Arthur Andersen & Co. in Chicago, said his company is committed to the Micro Channel-compatible micros for desktop requirements. He said he firmly believes IBM will soon reveal why the Micro Channel will make a difference in optimizing applications developed to run under OS/2.



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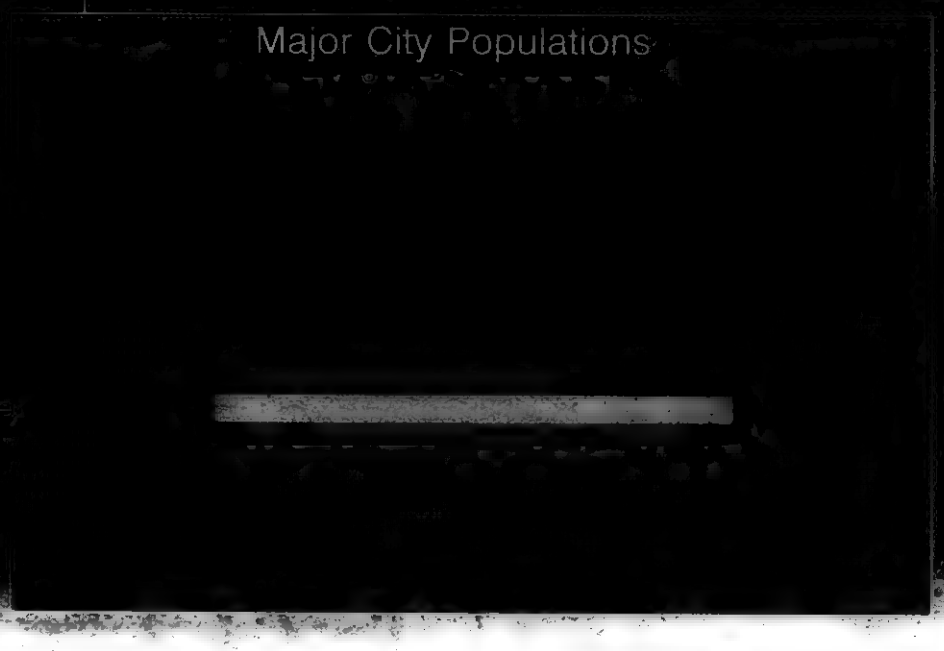

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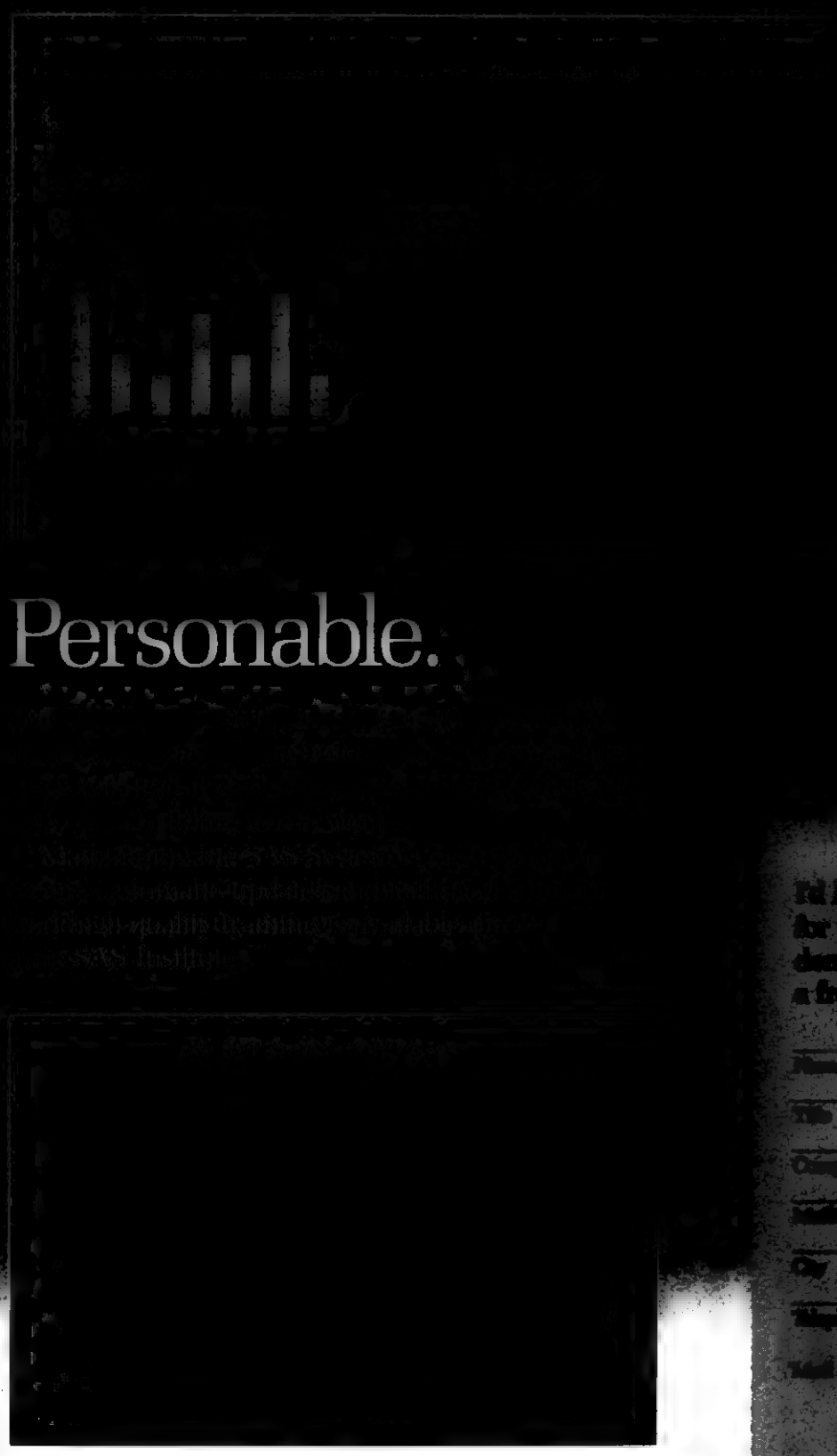

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Group gains control of Zenith stock

BY ALAN J. RYAN
CW STAFF

NEW YORK — A group of investors here last week said it has become the single largest shareholder in the financially struggling Zenith Electronics Corp. The group said it intends to encourage management to enhance stockholder values, a financial euphemism often meaning the breakup and sale of large parts of firms for prices greater than the stock value.

Brookhurst Partners Limited Partnership has made a filing to the Securities and Exchange Commission reporting beneficial ownership of 1.85 million shares, or 7.1% of the common stock of Zenith.

Zenith's major lines of business include personal computers, computer components and consumer electronics products such as television sets and videocassette recorders.

According to published reports, the partnership "does not consider itself a passive investor." The group said it may continue to acquire additional shares of Zenith stock.

Furthermore, the partnership said it will continuously monitor Zenith's actions, particularly the possibility that it may sell its consumer electronics group, which has had flat sales since 1983.

The Brookhurst group also said it might possibly "make a proposal with respect to a business combination with Zenith" at some future date. The partnership began acquiring Zenith stock in March.

For the past three years, Zenith has reported a decline in income and a decline in earnings per share. In 1987, the company had sales of $2.3 billion and losses of $19.1 million, or 78 cents per share.

Gateway ties into SNADS

BY PATRICIA KEEFE
CW STAFF

SAN LEANDRO, Calif. — A software gateway said to use IBM's Systems Network Architecture Distribution Services (SNADS) protocol is now available to link Conetic Systems, Inc.'s Higgins electronic mail package with major host office systems, such as IBM's Distributed Office Support System (Disoss).

Called Softswitch SNADS Gateway/Higgins, the gateway features an LU6.2 interface.

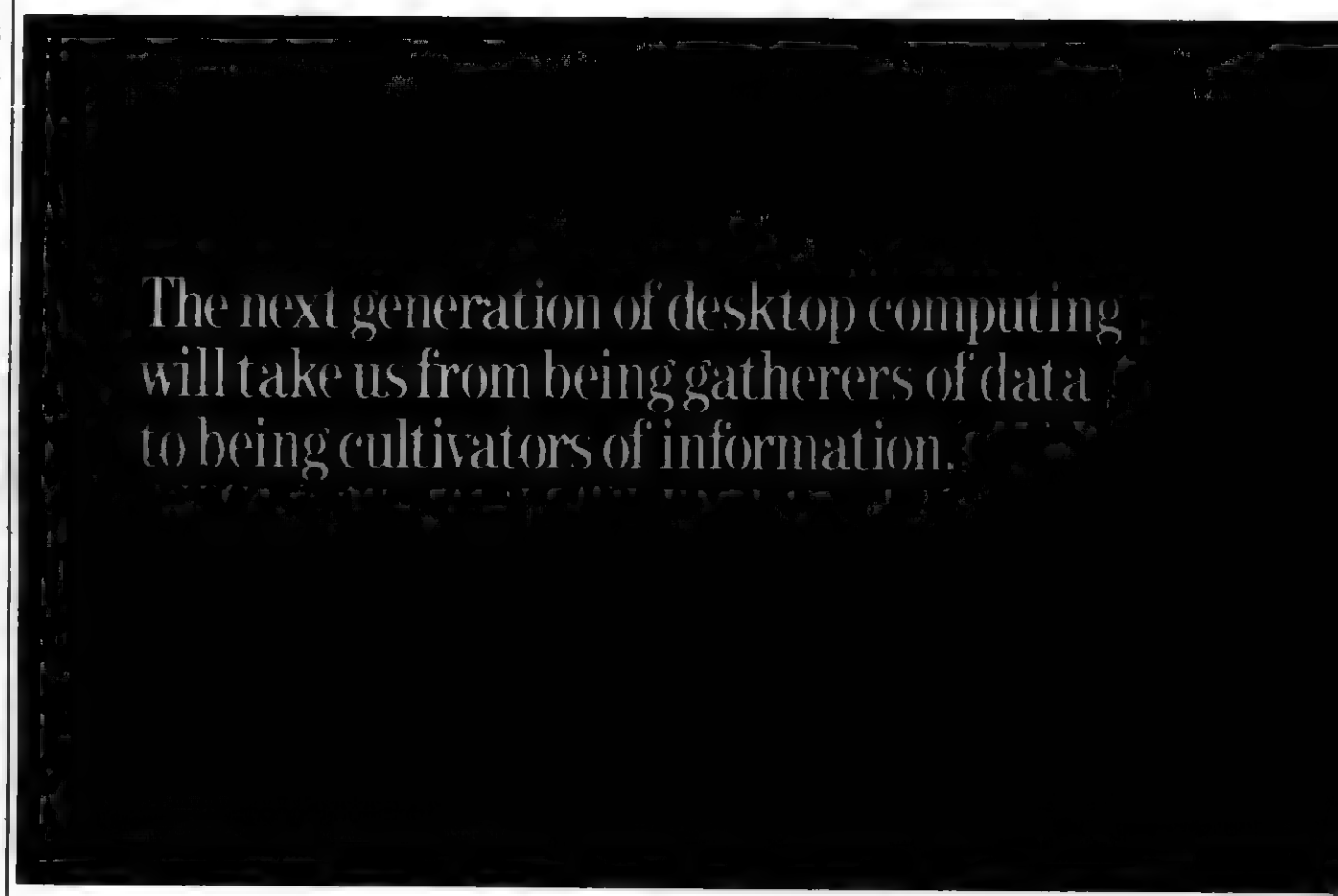
The products were co-developed by Conetic and Softswitch, Inc. in Wayne, Pa., using the Higgins Mail applications programming interface, which was announced in October 1987. With availability slated for the end of this month, pricing starts at $5,000 to support a minimum of three local-area networks.

Higgins is an integrated office system consisting of E-mail, scheduling and project tracking functions for work groups on LANs. Softswitch is a supplier of mainframe gateway products.

The strong presence of IBM's SNA within major corporations has resulted in increasing use of SNADS to link E-mail packages, prompting Conetic to add SNADS to Higgins, according to Marketing Vice-President Howard Case.

Hence what appears to be a burgeoning trend among mail packages adding SNADS support. Two weeks ago, Emissary Systems Ltd. in Toronto unveiled a mail package built on the SNADS protocol.

Within an SNA environment, SNADS performs the delivery functions of an E-mail network. SNADS Gateway/Higgins reportedly will translate messages, documents and files from Disoss- or Softswitch-supported mail systems into formats that can be read by Higgins and vice versa. By converting one system's name service to another, the gateway avoids extra overhead when sending mail between systems.



ETA supers to get AT&T Unix

BY J. A. SAVAGE
CW STAFF

SAN FRANCISCO — In a dual effort to increase buyer appeal for its supercomputers and to throw its welterweight behind AT&T's Unix — which is now being rivaled by the Open Software Foundation (OSF) — ETA Systems, Inc. announced last week that AT&T's Unix operating system would be available late this year on its entire line of supercomputers.

St. Paul, Minn.-based ETA's primary competition, Cray Research, Inc., flew to its own defense in the supercomputer world against young upstart ETA.

Based on AT&T's Unix System V, Release 3, ETA's System V will have 40 applications by the end of the year, according to the company. However, at three beta-test sites at which ETA's System V is currently being tested, there are only six applications.

ETA chose to base its operating system on the earlier Release 3 instead of Release 4 because "we don't feel like being a guinea pig" for the latest release, said Chris Torkileson, manager of ETA's Unix group.

Backing AT&T's Unix as an industry standard, Torkileson called the rival Unix organization, OSF, which is backed by IBM and Digital Equipment Corp., "divisive."

ETA's supercomputers range from a 375 million floating-point operations per second system for $850,000 to a 10.6 billion floating-point operations per second system priced at $25 million. The latter supercomputer is currently in the production stages. The low end is air-cooled, and the high end requires liquid nitrogen.

ETA is "a profound underdog" in the supercomputing market, according to company President Carl Ledbetter. By offering a native Unix operating system, the company aims to enter shops that formerly had to spend long periods of time porting an application to a proprietary operating system.

Supercomputer users will be able to develop applications on standard Unix workstations and then compile and run the applications on the supercomputers, according to Ledbetter.

He directly referred to long-established supercomputer manufacturer Cray, pointing out that although it has a Unix operating system, it is a proprietary one with kernels of AT&T's and the University of California at Berkeley's Unix.

On the defensive

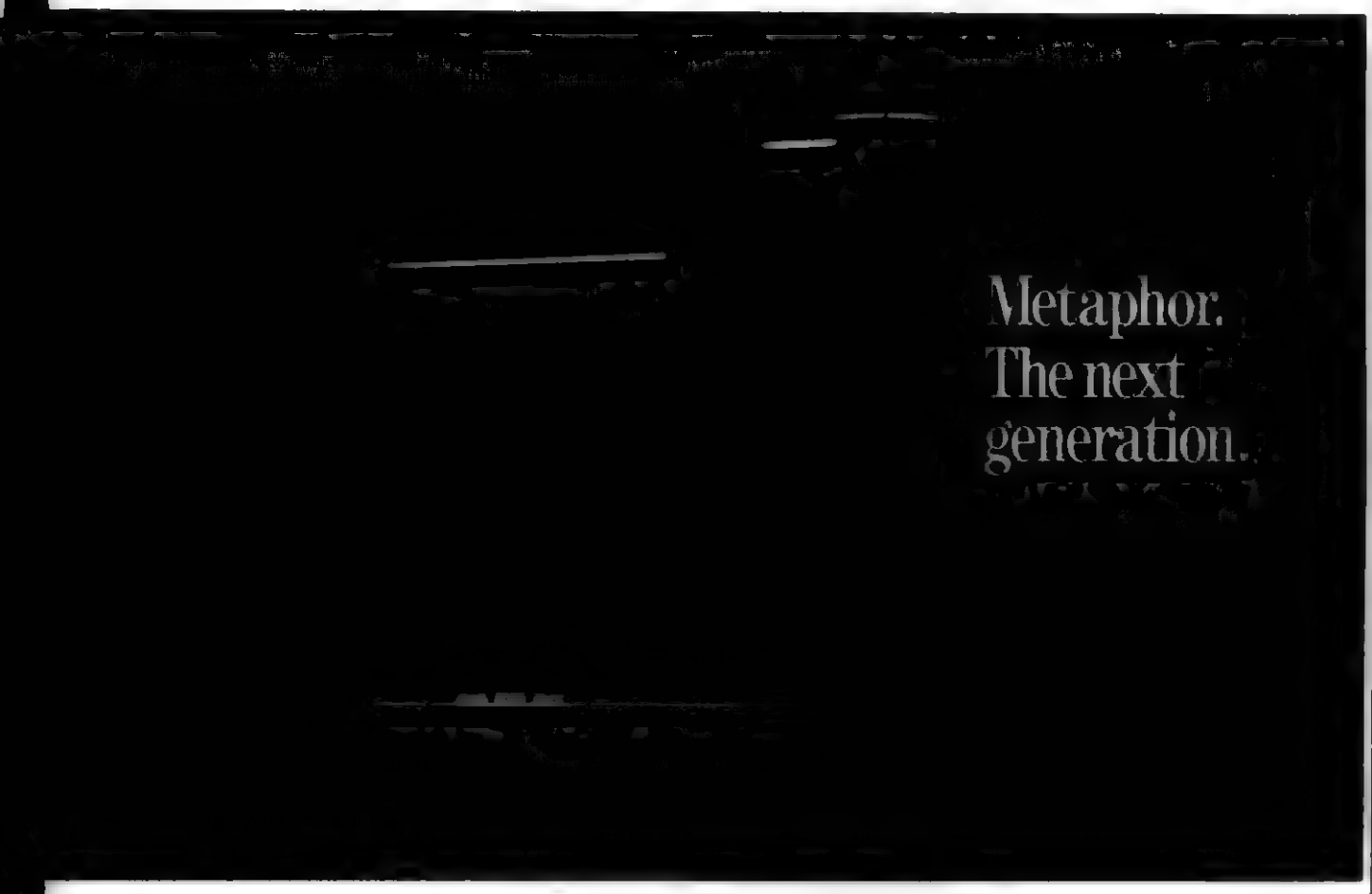
Cray immediately ran to its own defense, claiming that its Unix operating system, Unicos, performs "better than pure Unix," according to John Swenson, a Cray spokesman.

ETA's Ledbetter also said that although Cray has 300 supercomputers installed, "fewer than 20 run [Unicos]." Cray is unaccustomed to such direct competition in the intense number-crunching area of the scientific world. "That's a gross lie. We have 40 systems, and there will be 50 by the end of the year," Swenson shot back.

ETA has installed 11 supercomputers in its one year of operation and said it expects to install 29 more by the end of this year — 80% of which will run Unix. A subsidiary of Control Data Corp., ETA has shown $100 million in sales this year.

"ETA is CDC's new shining star," said Bonnie Digrius, an analyst at Cupertino, Calif.-based Infocorp. "A couple of years ago, CDC had several quarters in the red — this could be one of its saving graces. Still, it's hard to think that a division that brings in $100 million a year can support a $3 billion company."

The announcement was made amid Unix-mania at the Usenix Association Summer Conference here last week, at which ETA set up its lowest end supercomputer running with several different Unix workstations.



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Oracle airs OLTP benchmarks

BY NELL MARGOLIS
CW STAFF

BELMONT, Calif. — Oracle Corp. is taking its customers for a ride.

Last week, the company set a date — July 18 — for the long-awaited, much-postponed official announcement of the on-line transaction processing (OLTP) version of its Oracle relational data base and also named the place for the announcement: aboard the British Airways Concorde.

The 100 customers, industry analysts and members of the press who are slated to take off on the Mach 2 charter flight next month will receive either the published audit report or an in-person verification from the auditor of what Oracle already claims will be impressive benchmarks for the new system, according to Vice-President of Marketing Peter Tierney.

Benchmarks on several machines, Tierney claimed, are yielding numbers likely to propel Oracle to the front ranks of the OLTP race now in progress among the several leading relational data base players. Running the TP1 benchmark on a large, IBM MVS-based Amdahl Corp. mainframe, he said, the Oracle OLTP-strength data base, provisionally dubbed TPS, logged approximately 200 transaction/sec.

Moreover, Tierney said, a TP1 benchmark of TPS on a Digital Equipment Corp. VAX 8800 yielded more than 36 transaction/sec. — the highest transaction rate yet demonstrated on a VAX platform, according to Oracle.

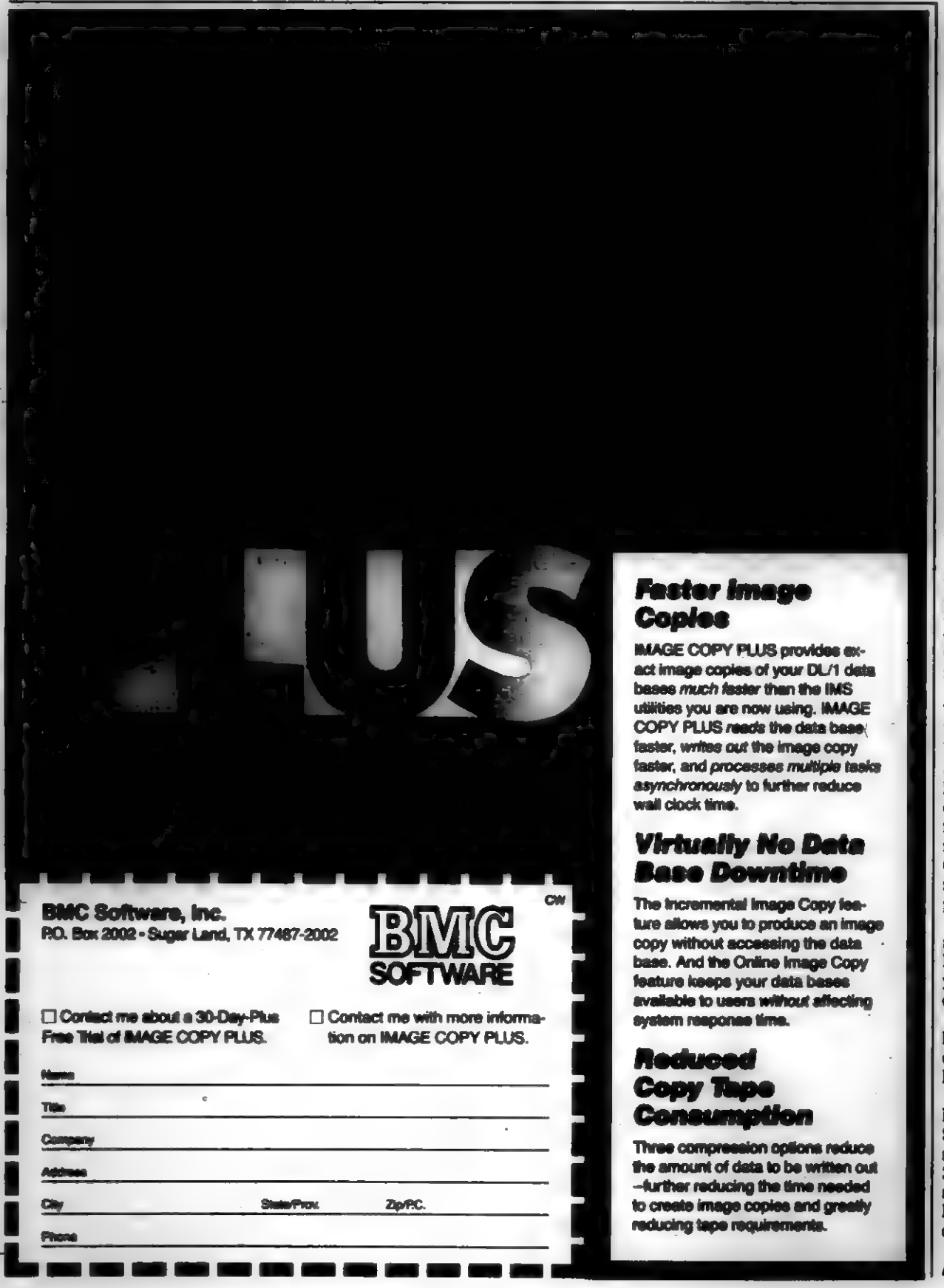
Start your engines

"This is going to be Oracle's response to Relational Technology and Sybase," said Robert Anderson, an analyst at Sutro & Co. in San Francisco. Both Relational Technology, Inc. and Sybase, Inc. have fielded recent OLTP data base offerings, claiming breakthrough benchmark performances. Cullinet Software, Inc., newly arrived in the relational data base market in April, also entered with benchmark flags flying.

However, Anderson noted, these arch-competitors "are benchmarking on different platforms, in different configurations, using different benchmarks."

In addition, Anderson said, the benchmark confusion, if not intentional, is nonetheless welcomed by the competing companies because it is impossible to designate a winner.

Delays that have bounced the announcement from a fourth-quarter 1987 original target date to late June to late July, Tierney said, resulted from a panoply of factors, including Oracle's underestimation of the time it would take to build OLTP muscle into a relational data base management system.



HP price cuts pit Vectras, PS/2s

BY KATHY CHIN LEONG
CW STAFF

PALO ALTO, Calif. — Hewlett-Packard Co. said it will reduce prices Friday on its HP Vectra ES and HP Vectra RS personal computers by up to 18%. The move pits HP squarely against IBM in price/performance for the Personal System/2 line.

HP's move came three weeks after IBM dropped the prices of its existing PS/2 Model 60s and 80s. Two weeks ago, Compaq Computer Corp. cut the price tag of its Intel Corp. 80286-based Deskpro 286 Model 40 by $300 to make way for its new systems. No other major microcomputer vendors have followed in IBM's or Compaq's footsteps; Tandy Corp. and Dell Computer Corp. said they do not plan to drop prices.

Because of the dynamic random-access memory chip shortage, most vendors have been forced to drive prices up. Last month, Wyse Technology said it would increase its PC prices by 6%, and Apple Computer, Inc. raised the prices of its memory expansion kits [CW, May 16].

Temperature rises, prices drop

The new HP pricing scheme affects 13 Vectra models, which include Intel 80386- and 80286-based machines. "We had been anticipating that IBM would be dropping its prices for the summer time frame," said Bill Johnson, HP's group manager for PC products. "We thought Compaq would be dropping prices on more machines, but they didn't, so that puts us in a better competitive position."

According to Johnson, the company is able to offer lower prices because HP's PC sales have doubled during the past year. HP's manufacturing costs have dropped since volume has skyrocketed.

Although chip prices are going up, HP has offset those increases by hiking memory board costs on its Vectra ES and RS lines, Johnson added.

The 386-based HP Vectra RS/20 Model 300 has dropped in price from $11,995 to $10,495. The Model 300 is now $1,500 less than the PS/2 Model 80-3100. The HP Vectra ES/12 Model 46, now at $3,995, costs the same as the PS/2 Model 50 but has 10 more megabytes of drive capacity.

West Coast senior correspondent Julie Pitta contributed to this report.

Flurry of MHS deals

A who's spotlight showed on its Netware SQL subset, Novell, Inc. announced the endorsement of 13 independent developers — including Addison-Tate Corp., British Telecom and Wordperfect Corp. — that said they will incorporate the store-and-forward technology of Novell's Netware Message Handling Service (MHS) into their software.

Also unveiled was an agreement with British Telecom to develop an X.400 electronic messaging technology for Netware.

Novell is trying to position the MHS set of application programming interfaces, which it jointly developed with Action Technologies, Inc., as a standard for message handling between local-area networks.

Other firms participating in the alliance will include Action Technologies, Inc., Alcom, Inc., CE-Mail, Inc., Comp-tel Systems, Inc., Compuserve, Inc., Infoworks Software, Inc., Network Technology, Inc., Pinnacle Publishing, Inc., Quinnetrack Office Systems and Softwrigh, Inc.

Netware MHS is available now with Netware Version 2.1 and higher. Other Netware customers will be charged $100 per file server. MHS for DOS stand-alone machines, Microsoft Corp.'s Networks and Banyan Systems, Inc.'s Virtual Networking Software, or Vines, network operating system, is available from Action Technologies for $100.

Under the agreement with British Telecom, the two firms will integrate MHS with British Telecom's Telemail, an electronic-mail software program based on the X.400 standard. The move marks Novell's first commitment to ISO Open Systems Interconnection standards.

JAMES DALY

Novell fires up SQL engine

Optimized for Netware, tool gains instant vendor support

BY JAMES DALY
CW STAFF

NEW YORK — Novell, Inc. finally took the mystery out of its anticipated SQL data base strategy last week, unveiling an SQL engine optimized for its Netware network operating system.

The Provo, Utah-based vendor also announced immediate product support from a half-dozen front-end developers — including Lotus Development Corp. and Borland International — that promised to support the Netware SQL data base management product as a back end to their business applications.

Netware SQL builds on the technology of Btrieve — a record manager developed by Novell subsidiary Softcraft, Inc. — and provides Novell with a needed entry into the rapidly expanding SQL market.

Dual function

The offering counters SQL server capabilities offered by IBM and the tandem of Microsoft Corp., Sybase, Inc. and Ashton-Tate Corp. and also lays down a welcome mat for SQL developers.

"Applications are continually being developed to send messages or requests to an SQL back end or server, so we need to provide that capability in the operating system," said Nancy Woodward, president of the company's development products division and former president of Softcraft.

Since a back-end engine merely holds data, responds to queries and sends off data, Netware SQL will afford users the opportunity to select the front-end applications — report generation and input generation, for instance — with which they are comfortable, Woodward added.

"It's a strong product that marks an extremely important development in personal computer technology," said Rich Finkelstein, a senior consultant with the Codd & Date Consulting Group. "It's important that Novell has signed up these vendors, because they have guaranteed developers known tools to develop large-scale systems without having to resort to procedural languages."

Added capabilities

Netware SQL will also offer application programming interface support for software developers through the use of XQL, an SQL interface for standard languages such as Basic, C, Cobol and Pascal introduced by Softcraft last year. Previous versions of Btrieve lacked these SQL capabilities.

Netware SQL will be moving into a ready-made market via Novell's large installed base. Dataquest, Inc. has estimated 50% of the personal computer local-area network market to be in Novell's court, and the company boasts more than 220,000 operating systems installed worldwide.

The initial release of Netware SQL will support DOS and OS/2 environments; future releases will extend Netware SQL support to other Netware environments. Netware SQL is set to be available in the fourth quarter as a Netware option and will be priced at $595 per server.

Looking to swap your IBM PC for a racier model?

BY ALAN J. RYAN
CW STAFF

Users of IBM Personal Computers will receive the option of trading them in toward the purchase of Personal System/2s beginning Friday.

Through the program, sponsored by IBM, dealers have been authorized to buy back PCs, PC XTs and ATs, PC Portables and PCjrs. The dealer will decide how much to allow the customer for the unit, and prices will likely range from $100 to $1,000, according to IBM spokesman Scott Brooks. IBM has set maximum prices in each category of computer.

Dealers will then have the option of selling the used computers at whatever price they choose, Brooks said. Dealers will also be able to send the machine back to IBM, with IBM picking up all handling and freight charges. The machines must be in working condition.

"We expect the larger number will be kept by dealers for resale," Brooks said. Machines returned to IBM will be resold to other dealers or to used computer brokers, Brooks said. "We will not sell them to end users," he added.

Brooks said the trade-in program is convenient for those who wish to upgrade but that some people will find they can get a better price for their used equipment by selling it on their own. He added that for some firms, particularly those that cannot easily sell equipment because they are publicly held, the trade-in might provide a workable alternative while allowing the purchase of new equipment.

The promotion is scheduled to run through Aug. 31.

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EDITORIAL

At last

IT WAS THE BEST of times, it was the worst of times. . . .

Indeed, it was the tale of two companies: one that tried to lead its customers with bluster and another that determined where its customers wanted to go and figured out how best to get them there.

But both companies are part of a larger company, in fact, part of the largest computer firm in the world: IBM.

The worst of times for this giant was undoubtedly the negative backlash to its 9370 line, a series of processors designed to bring the 370 architecture to the mid-range level. If this line had been positioned as a downward extension of the 4381 family — a low-cost subset of IBM's mainframe array — the world by now would probably view it as moderately successful.

Unfortunately for the company — and analysts and publications that swallowed the hook — the immediate need at IBM was to counter the success of DEC's VAX family and the erosion of the mid-range prowess that had been built up by successful IBM minicomputers.

So IBM fired a marketing broadside to position the 9370 as the answer to everyone's prayers. It was to be a great distributed processor, an easy-to-install stand-alone host and departmental machine that could meet any end user's needs. And, of course, it was not to be. The system has found its place in niche applications and as a development station for 370 architecture programming, but it simply could not make the 370 accessible to the nontechnological masses that today's corporation has to automate.

Now comes the best of times. IBM has apparently done its homework well in bringing out the AS/400 line, the so-called Silverlake project.

The company has seemingly pulled off what most people thought it incapable of or disinclined to do: It has brought the incompatible System/36 and 38 processors into a wedded architecture that, by all appearances, will be allowed to grow into a viable alternative to the 370. It has suited the office environment characteristics of the System/36 to the sophisticated technology of the System/38. It will seemingly allow businesses to build an information processing hierarchy that requires a minimum of "glass house" support and promises to work hand-in-hand with third parties to provide the general office automation functions they are begging for.

Most important, IBM seems to have taken to heart the key marketing concept of the premier upstart, DEC, by telling its customers they can have it now rather than buying a shell to be filled out later.

Those within IBM intent on providing true applications systems do indeed represent a company apart from those making up the high priesthood of the 370. So long as they accept the need for common meeting grounds, IBM will finally be in a position to offer its customers what works best for them, rather than trying to push growing companies into an architecture designed for highly centralized, tightly controlled operations.

LETTERS TO THE EDITOR

Speaking out on DBMS measurement

I applaud *Computerworld* and William Inmon for tackling the tricky subject of performance comparison. However, in Inmon's "Rating the vendors: Whose DBMS runs the fastest?" [CW, May 9], several pieces of data in the tables appeared to be in error. Since the tables were used to produce charts, the charts were also in error.

My experience with mainframe users suggests that IBM's TPF and Cullinet Software, Inc.'s IDMS/DC data base request rates in those tables were unrealistically high.

Adding transactions per second to data base requests per second, as was done in the charts, does not accurately reflect the true demands on a system's performance. Transactions per second should be weighted over data base requests in this measurement. Also, a distinction should be made between data base accesses, which only involve reads, and the more costly change-oriented accesses — updates.

David W. Dempsey
Manager of Product Marketing
Tandem Computers, Inc.
Cupertino, Calif.

After reading William Inmon's diatribe against set-at-a-time processing and his pseudo-research on data base management system performance, I hope readers balanced his advice with more credible information.

The essence of Inmon's analysis of set-at-a-time processing is: The more records you process, the longer it takes. I think most application developers already realize that point, and we realize it applies to IBM's VSAM and IMS as well as to DB2.

Inmon seemed to miss the point that most sets defined in backbone business applications contain a small number of records and that the power of relational algebra is that it simplifies the developer's statement of what data should be accessed. Whereas a hierarchical or network DBMS requires the developer to define and use explicit navigational links, the relational model lets developers express the same target data based solely on content. In organizations with dynamic application development, applications are not held up while waiting for the DBMS manager to add another link.

Inmon dragged out an old argument against the relational model — the data will not all be in one place on the disk. Of course, it is obvious that the data cannot be clustered for more than one retrieval pattern regardless of the DBMS used. But more important, the relational model does not specify anything about where data is stored: In fact, physical data independence is one of the main principles of the relational model.

Inmon propagated the misconception that DB2 conforms to the relational model. DB2, even Version 2, fails to incorporate several important relational concepts, and the DB2 approach to storage is not relevant to its fidelity to the relational model.

Paul Conte
President
Future Systems Software
Eugene, Ore.

After the publication of my In Depth article, it has been brought to my attention that IBM's IMS Fast Path benchmark did approximately 5,310 data base requests per second at peak period, including terminal I/O, and 2,137 physical I/Os per second at peak period, including terminal I/O.

William Inmon
American Management
Systems, Inc.
Lakewood, Colo.

Free market

Concerning the article "When the headhunters call" [CW, May 2], the whole dialogue is an indication of free market system, where we — recruiters, employers and employees — are all working to maximize our utility.

Recruiters are providing required information to both employees and employers and are getting paid for their services. It is the duty of employers to see that priority is given to employee satisfaction in their organization if quality employees want to be maintained.

In the same token, an employee who changes jobs like clothes will not have a good track record to attain a strategic or managerial position in a respectable organization.

Oladipo Omole
Programmer
Peter J. Schmitt, Inc.
Buffalo, N.Y.

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor, Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.*

Obstacles to computer progress

Squabbling vendors tie up the industry into a technological square knot

HARVEY NEWQUIST

While exploring emerging technologies, it's easy to overlook the other side of the coin — the obstacles to technological advancement and use. Sometimes we don't see them, even though they're staring at us from the pages of computer magazines. While looking us straight in the eyes, they're shackling technological developments behind our backs.

• The Unix consortium. Also known by the misnomer Open Software Foundation (OSF), this is a group of 10 companies that don't like the fact that Unix is in the hands of AT&T and that Sun is sweeping the Unix floor with its competitors.

So these companies have opted to form another Unix camp, thereby creating confusion and giving users migraine headaches for the next couple of years.

Just as the various Unix groups appeared to be headed in a similar direction and started formalising a unified environment for users to work in, the OSF bullies decided to muck things up. Their reason? "We had no choice" was the official reply. No choice? Isn't it a bit suspicious that Apollo — Sun archcompetitor — is at the forefront of this group?

And why are DEC and IBM involved? They care as much about Unix as they do about public domain software.

The fact that OSF was thrown together in about the time it takes to make a three-minute egg is also not very reassuring. Didn't most of these vendors recently agree that data communication standards should be set by the International Standards Organization? How many sides of one mouth can a group of corporations talk out of?

• Apple vs. Microsoft and Hewlett-Packard. Apple is obviously stalling for time against the onset of Microsoft's OS/2 Presentation Manager and, in the process, doing everything it can to create hard feelings.

But why is it doing this? Apple has made an incredible return to the mainstream computer business with the Macintosh II on the strength of its marketing. However, as the graphics-oriented competition has heated up, the company brought in its legal beagles. Nothing fouls up a good marketing company like lawyers, and this case will be no exception.

When is Xerox going to get into the act and shut down all of this nonsense for good? Anyone who saw the original Xerox Star terminal knows where that nice screen interface originated, anyway. Now customers face the option of buying IBM Personal System/2s with no appealing screen interface.

• Lotus. How long can you keep customers on a string by baiting them with the next big technological development and leave them hanging with nothing to show for it? The company ought to introduce products under the "new and improved Vaporware Series."

Lotus has very quietly dropped its software protection policy, which required buyers to promise almost everything — excluding pounds of flesh — to avoid persecution from the 1-2-3 shock troops. Now, for a mere $15, you can buy a utility that eliminates the pesky copy protection feature.

Lotus has barely mentioned this software it sells, after all these years of belittling users for stealing so much money from the company coffers. Maybe Jim Manzi's recently publicized personal earnings of $26 million last year helped him to forgive the software pirates.

• IBM vs. clone makers. IBM's actions are almost like entrapment, to my mind. It's very much like letting a family pet sleep on the living room sofa for two years and then, without warning, whacking it for being there in the first place.

Ultimately, any fines meted out by IBM are not going to come directly from the offending companies' pockets. Clone makers will just price their products higher. Apparently IBM isn't content with the market chaos stirred up by its PS/2.

• Viruses. Anyone who puts a virus on a piece of software, a bulletin board or any other publicly accessible computer component should be held accountable by any user whose system is disrupted.

Putting a virus on software is wrong; they are an invasion of property and privacy. As such, perpetrators should be dealt with in a manner similar to those who are guilty of breaking and entering.

Well, there they are — today's newsmakers who have thwarted the advancement of technology in our business and home lives.

If so many companies weren't so concerned with beating each others' brains in and focused instead on serving the marketplace, there naturally would be more computers and software installed and, thus, more active buyers to be sold to.

The current guerrilla infighting is doing nothing to help anyone — except maybe the lawyers.

If Shakespeare were alive today, he might be tempted to change his famous line from "Kill all the lawyers" to "Kill all the computer vendors who are causing needless distress in the computer marketplace. . . . Then kill all the lawyers."

ROB NANCE

IF SO MANY companies weren't so concerned with beating each others' brains in, there naturally would be more computers and software installed and, thus, more active buyers to be sold to.

Newquist writes and consults on artificial intelligence and other advanced high-technology topics from his office in Scottsdale, Ariz.

The latest essential: The text processor

JOHN BARNES

I don't know about other people who review software, but for me, there's no bigger excitement than discovering a solution in search of a problem; that is, a new product that does new things without much indication of what, if anything, these new things might be good for.

These products stretch the reviewer, tend to be where some of the best programming talent works and, most of all, often point the way the industry is heading.

When several companies enter the field at the same time with similar solutions in search of a problem, chances are you're looking at a genuine frontier.

In the last few months, I've seen several new products called text processors that do about the same thing. I venture a prediction: Text processors, like data bases, word processors and spreadsheets, will emerge as essential tools for much of the user population within five to 10 years.

What does a text processor do? It takes text documents or sets of documents and performs various user-specified search algorithms for keywords. It reports out an index in forms that range from structured outlines to screens full of excerpts, showing where the thing searched for occurs in the document or set of documents.

Most text processors also allow you to save search specifications and their results and to mark the document in some fashion that preserves the information created by the search — for example, by highlighting keywords.

If you find it strange to talk about a search procedure creating information, then you've just run up against some of the really astonishing potential that is implicit in text processors.

The wonder machine

The selling of text processors reflects earlier software revolutions. Word processors started out as "typing on your computer" and spreadsheets as "an easy-to-use programming language for business."

Within a few years, we were hearing of the word processor as "adding a third dimension to the writing process," "multiplying the capabilities of your mind manyfold" and "the greatest change in written communication since the alphabet."

The spreadsheet suddenly

Continued on page 22

Barnes is the Pacific Northwest area manager for ADG, a high-tech marketing organization based in San Pedro, Calif. His second novel is *Sins of Origin*, published by Congdon & Weed.

How can pollution cops fight without the proper arms?

J. A. SAVAGE

Northern California's pollution cops, the San Francisco Bay Regional Water Quality Control Board, can't track pollution caused by Silicon Valley computer companies because the agency cannot get enough computers.

It is such a problem for the agency's engineers who monitor hazardous waste cleanup efforts that a couple of the targeted companies even offered them PCs. Government-employed engineers had to reluctantly decline on their lawyers' advice.

The engineers aren't looking for anything fancy. They don't need to crunch numbers; they just need to process words for the myriad reports necessary in the monitoring process. The state expects the engineers to write reports out longhand and then give them to a typist.

Lawrence Kolb, principal engineer in the Water Quality agency, has crusaded for five years to get his 60 engineers PCs. But the lumbering bureaucracy still resists him. "The state has the view that engineers shouldn't type," he says.

In the meantime, 25 engineers, including Kolb, have spent their own money for computers. "I argued with my wife about giving up carpeting the stairway to buy a computer," Kolb says. The stairs lost out to an IBM Personal Computer AT-compatible clone.

Part of the problem lies in sexual stereotypes in state management. In an essay he wrote to bureaucrats, Kolb cites "categorical opposition by the State

Continued on page 22

Savage is a *Computerworld* West Coast correspondent.

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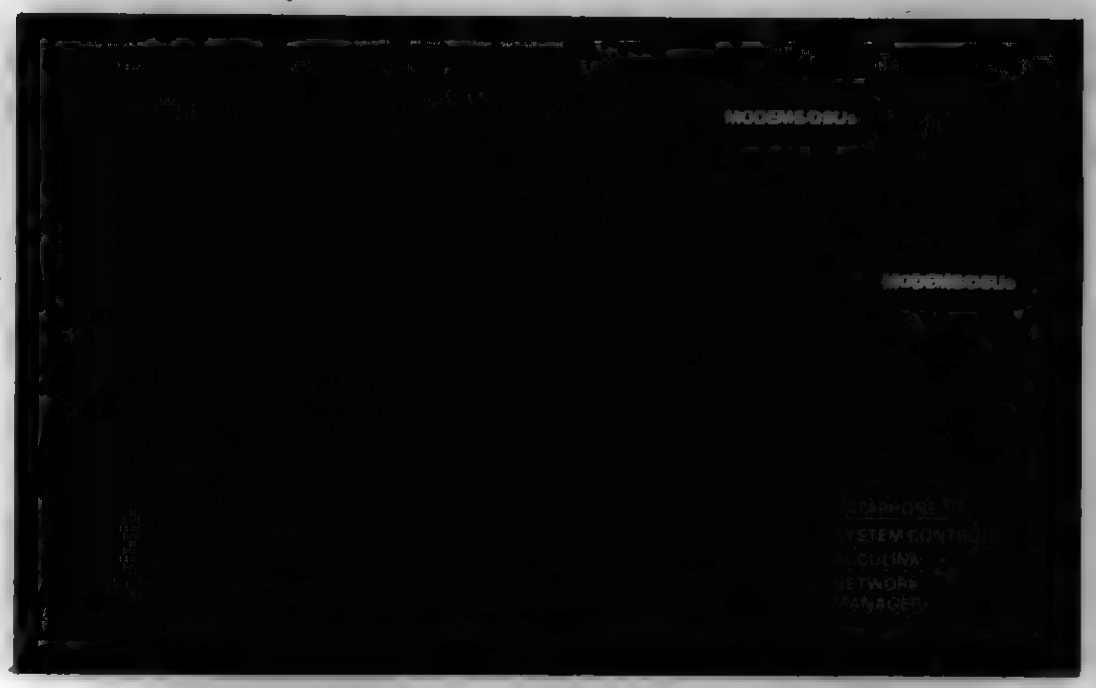

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The essential

CONTINUED FROM PAGE 19

became "the basic tool for failure-proof business decisions," "the machine-equivalent to a roomful of MBAs" and "a new, essential extension of the human brain." These quotes are all drawn from computer journalism — not from ads.

The truth, most of us finally discovered, was that although word processing and spreadsheets were not magical, they were something much more than a computerized version of something familiar. They really did change the way people worked, even if they didn't eliminate work itself.

Right now, many see text processors as just an extension of the familiar search process, with the addition of "fuzzy searching" — looking for words that share roots with the specified keywords — logical operators — keywords ANDed, ORed and NOTed together — and hierarchical indexing — outline structures: In other words, a search function that can be told to do more. The difference is this: To use the search feature of an ordinary word processor effectively, you must know what is in the document, approximately where it is and what its content is.

In looking for an exact text you know is in the file, a search procedure uses what you already know. A text processor finds a way to fit the document you are examining onto a concept you specify. The result of that, which specifies a relation between what you already know and what is in the document, is new knowledge.

Suppose, as a manager or consultant, you wanted to study how the company handles reprimands. You pull the past three years of correspondence on disk and scan it with your text processor, pulling out all written reprimands grouped in such categories as reductions (search by "bonus" or "promotion," for instance), penalties that might be imposed (fuzzy search on "terminate" and "reassign") and what the employee has been asked to change ("attitude" AND "performance," "attitude" AND NOT "performance" and so forth). What you will get back is the structure you had in mind, imposed on the raw information. You can quickly see how well your mental picture fits what is in the raw documents.

Do managers more commonly threaten termination for attitude problems than for failure to perform? When they talk about performance do they have specific complaints? And how many threats of whatever kind do they follow through on for what offenses?

Shortcut

In the responses to these questions, you get the answer to the most important one: Is my idea of what is going on here supported by the data?

Following an ordinary paper trail, you would have to read through a dozen fat file folders. Using a search procedure, you would sort through the documents individually. It might take weeks to construct the same information. Or, you might never construct it at all. Chances are you would jump to some conclusion just to have an answer on time.

The text processor is the gateway to much more effective reading, reading as we've never known it before, in the same way the word processor gave us better editing and the spreadsheet gave us better "what-if" estimating.

The potential user of text processing is anyone who needs to test generalizations about large masses of unorganized written material. Investigative reporters looking through government documents, research physicians looking at clinical case histories, lawyers looking for precedents, secretaries who have to find a 5-year-old letter in three minutes — they are all possible users.

But the word processor did not lead to better writing or the spreadsheet to better calculating, per se. In the same way, someone still has to have the concept to fit with the information, and people with better concepts will do better work.

That, in fact, is the real strength of the text processor: If you have a good concept of what is really going on in a body of text, it makes the rewards bigger and delivers them faster.

In an age in which other computer tools are making it easier for more people to bombard us with text, it's an idea whose time has come.

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Pollution cops

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Office of Information Technology to microcomputer use by technical staffs in report preparation."

Kolb has tried to insert PCs into the annual budget. He says he has offered to hold down salaries in return for computers. He has tried to cut back on purchasing the sophisticated engineering hardware used in monitoring pollution sites in order to buy PCs. Despite how reasonable his arguments sound, he hasn't been able to convince the bureaucrats.

"Taxpayers should see that the slowness of the state [to respond] is a scandal," he says, brandishing a simple chart showing that the increased efficiency derived from using computers would pay for 10 PCs in one year.

Scandalous, perhaps. At the very least, it is a disgraceful waste of public money when professionals are forced to monitor polluters with pencil and paper while the stench of pollutants foule California's precious groundwater. I'm sure the polluters will monitor themselves while the state catches up with the paperwork.

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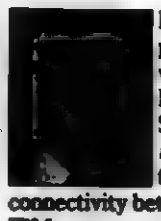
SOFTWARE & SERVICES

SOFT TALK

Charles Babcock

They linked IBM, DEC



In a June 20 profile on the Savannah River Plant in Aiken, S.C., *Computerworld* cited the high level of connectivity between DEC and IBM processors at the U.S. Department of Energy's nuclear materials processing site.

This was where tying VAXs to mainframes was accomplished at an early date, and it might be worthwhile to review the specific solutions that helped provide these links at a huge federal facility.

The network found its incubation in the need to tie on-line experiments being monitored by laboratory DEC PDP-11s into the experimenters' personal computers. Later, the need arose to tie local-area networks of PCs and VAXs into mainframes, but in both instances, the network's expansion was driven by end-user demand, which eventually was codified and organized into a networking plan for the site and given to the Computer Projects Department to execute.

"We have a manager who accuses us of doing what we know," says Andrew Johnson, the chief technology officer in

Continued on page 28

Nies: a survivor of DBMS wars

Cincom head thrives in tough market, anticipates competing with IBM

Twenty years ago, Cincom Systems, Inc. founder Thomas Nies, 52, was the project manager on one of the first on-line installations of an IBM 360. The experience shifted his attention from hardware to software, and he soon left IBM to found his Cincinnati-based software firm.

Nies still holds a controlling share — *the* controlling share, company insiders say, as if there were no other major investors — an unusual position in a maturing industry and in a company whose revenue is expected to reach $165 million this year. During the firm's 20th anniversary and users group conference recently, Nies paused to speak with *Computerworld* Senior

Cincom's Nies

Editor Charles Babcock about some of the changes he has seen as head of a large systems software house.

How do you see Cincom competing with IBM and DB2?

We will deliver a product line [Supra] to the marketplace which, at the top end, is more functional, more efficient, more advanced in design and comes with a broader array of support technologies than IBM's. It will be for the IBM MVS, VM and DOS environments. . . . Supra for the DEC VAX will be very close to the IBM product [Supra on the mainframe]. Even if a guy has got IBM tattoos all over his back, we will support him and allow him to move into the interactive world of the VAX.

Why are you able to compete in the mainframe relational data base management system wars when other vendors are backing away?

It's a function of timing. Our vision six years ago was better than those other guys. We made the investments where they had to be made. In 1985, we scooped the industry with the introduction of Supra with IBM endorsing the [relational] approach. The companies that now say they are not counting on data

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Inside

- Cincom launches CASE alliance. Page 26.
- Intersystems develops SQL-, MUMPS-based data base manager. Page 27.
- Digital Pioneers rolls out Unix version of Easytrack. Page 36.

Data View

AIX leapfrogs other Unix systems

AIX shipments are expected to boom as IBM pushes its proprietary version of Unix into business offices

INFORMATION PROVIDED BY INTERNATIONAL TECHNOLOGY GROUP
CW CHART

Package allows customized monitoring of VMS systems

BY NELL MARGOLIS
CW STAFF

MINNEAPOLIS — A two-pronged tool set aimed at helping system managers monitor integrity, increase security and supply data for performance analysis with regard to Digital Equipment Corp. VAX/VMS systems was introduced recently by Control Data Corp.

Called Proact 1000 and Proact 2000, the two software packages are the opening shots in a planned CDC series of VAX/VMS system management tools. Both will be available next month, the vendor said.

A core group of features that will characterize the Proact series as it emerges, a CDC spokeswoman said, will enable a user to define the standards by which the software itself will monitor the system. Included are programmable thresholds, command procedure activation and an interface to Decalk that keeps the user abreast of system events as they occur.

In addition to such core features, the spokeswoman said,

Continued on page 26

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Cincom, friends forge CASE alliance

BY NELL MARGOLIS
CW STAFF

CINCINNATI — Cincom Systems, Inc. recently announced a four-way marketing and development alliance that will target commercial as well as scientific and technical users with a cradle-to-grave computer-aided software engineering (CASE) tool set, according to company spokesmen.

Cincom formed the alliance after asking itself what it needed to do to play catch-up in entering the CASE market, said Thomas McLean, vice-president of marketing and product planning.

To attain its goal, Cincom, with offerings spanning relational data base management, manufacturing applications, application development tools, office automation tools and network management software, joined forces with Index Technology Corp., Appleton Co. and Aion Corp.

The announcement marked the second time in two years that Cincom has deployed a "combine and conquer" philosophy to assault a software citadel. In spring 1987, it spearheaded the CIM Alliance, a six-company combination aimed at software for the factory floor.

Cincom spokesman Ronald R. Hank credited that effort's success with a doubling of the company's Digital Equipment Corp. VAX-based revenue in the past fiscal year.

Stake your CASE

On the CASE front, Cincom is contributing the foundation application development, information management and network management software, prominently including its mainframe Supra relational data base management system and Mantis application development system.

Index Technology, based in Cambridge, Mass., brings its personal computer-based Excelerator front-end CASE planning, analysis and design tools.

Manhattan Beach, Calif.-based Appleton Co. offers planning and implementation methodologies through which the user can identify organization-wide data requirements and business rules, describe the functions in a proposed software system and generate data base design, according to David Schoeff, the company's senior vice-president of marketing and sales. Appleton's application design facility is available on both IBM and DEC platforms.

A strategic thrust toward corporate MIS users, as well as the scientific and technical developers often identified with CASE, was a key reason for drafting Palo Alto, Calif.-based Aion as the fourth ally, Cincom's McLean said. According to an Aion spokeswoman, the firm is one of few companies currently offering expert system-based tools for the development of IBM Personal Computer- and mainframe-based applications.

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VMS systems

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Proact 1000 will use data generated by Decnet and collected, analyzed and documented by the CDC system to provide nonstop monitoring services. Those services will alert the user to incipient hardware deterioration as well as attempts to breach system security.

Proact 2000 allows users to gather information on system performance, memory utilization and I/O and CPU resources on a networkwide basis as well as from the CPU, according to the spokeswoman. In addition, the software can group multiple systems or nodes by department or special interest for reporting purposes.

All Proact packages will be able to serve on a stand-alone basis or with multiple VAXs in either Vaxclusters or networks, according to CDC. The Proact 1000 and 2000 will both be available as enhancements to CDC's VAX/VMS hardware maintenance offering, the vendor added.

System melds MUMPS, SQL

CAMBRIDGE, Mass. — Intersystems Corp. recently released a data base manager and application development system based on two ANSI-standard programming environments, SQL and MUMPS.

M/SQL blends the nonprocedural SQL environment with the procedural MUMPS world, according to Intersystems President Terry Ragon. The software allows users to pick the more appropriate programming approach for a particular application, he said.

An ad hoc query application would be best served by SQL, Ragon said, while a more structured billing application is suited for the MUMPS environment. Users can either program in MUMPS or SQL. They can also embed SQL statements in a MUMPS program, Ragon added.

When they log on to M/SQL, users answer a series of questions describing the data base and can query it in SQL. If they have an existing MUMPS data base, they can map that to the SQL environment and make SQL calls to it, the company added.

The M/SQL package is made up of six components. It is available at no cost to current Intersystems users. For new customers, licenses range in price from $1,500 for small minicomputers to $119,900 for IBM's high-end mainframe.

Two options, M/Windows and a report writer, M/Pact, are available with M/SQL. Prices start at $1,900.

Cincom adds RMC to software line

CINCINNATI — Cincom Systems, Inc. expanded its manufacturing software line to the repetitive manufacturing market earlier this month with the announcement of Repetitive Manufacturing Control (RMC).

RMC will be offered as an optional module to Cincom's Control:Manufacturing software. Cincom said it will be available for the Digital Equipment Corp. VAX platform immediately; versions for the IBM MVS and VSE operating systems are scheduled for release in August.

The new module includes four facilities: Product/Process Definition, Production Schedule Management, Material Pull Support and Simplified Production Reporting.

Product/Process Definition uses Control:Manufacturing's bill of material and routings component to define the product and process used for making all items. Production Schedule Management allows users to identify items that are controlled by discrete work orders and items that are not made for specific orders.

RMC is available immediately and is priced from $20,000 to $80,000.

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Babcock

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the Computer Projects Department at the site; it is an accusation with which he readily agrees. In some cases, there were no solutions for a problem the group confronted in 1982 or 1983, but one has since emerged in the marketplace and has been incorporated into the network.

Seeking answers

Here are some of the solutions that Johnson and his department chief, Gerald P. Thompson, chose for their network:

Ethernet coaxial cable segments provide the basic network in a given plant area or building. But once the Ethernet LAN was installed, the obstacle between VAXs and PCs had to be overcome. Johnson, who spends about 25% of his time talking to vendors or visiting other sites, reviewed a number of connector products and decided to standardize on PClink from Pacer Software in La Jolla, Calif. PClink allows a PC to emulate a DEC VT100 or VT200 terminal.

The PC may then be tied into the office automation package, DEC's All-In-1, on the VAX. PClink also provides for the creation of soft keys or the assignment of special office automation function to existing keys on the PC that mimic the functionality of All-In-1 on a VT100.

Ethernet provides ties between PCs and VAXs in a given area, but Johnson soon outstripped the 2,800-meter distance limit associated with Ethernet and searched the marketplace for Ethernet extenders.

The answer, he found, was fiber-optic cable repeaters and bridging devices for direct connection of two Ethernets. The bridges have been programmed to listen for messages that are directed to devices on the LAN they connect, and they collect and pass along those messages, Johnson said.

Since the Savannah River Plant maintains much of its operations data on a mainframe copy of Software AG's Adabas, many PC and VAX users wanted access to the host, and Johnson added the following ties to the network:

A terminal's or PC's VT100-style message can be piped through a Decserver 200 terminal server and into an IBM 7171 protocol converter, which translates it into IBM 3270 terminal format. The 3270 emulation can access either the IBM 3081 or 3090 host and issue a call to the data base, downloading the response.

In addition, the Savannah River Plant network has provided for direct file transfer between host and Ethernet nodes by installing an Interlink Computer Sciences gateway, which uses a DEC MicroPDP-11 attached to the Ethernet LAN and a high-speed communications channel to the 3081 host.

> THE LAB'S INITIAL Ethernet installation "had a lot of problems. You put eight users on it and it died."
>
> ANDREW JOHNSON
> SAVANNAH RIVER PLANT

File transfers can be initiated from either the VAX or the mainframe at the rate of 100K bit/sec., Johnson says.

Johnson says his initial Ethernet installation in the laboratory of the plant, powered by a VAX-11/750, "had a lot of problems. You put eight users on it and it died." The first effort was a lot like "throwing out the first pancake," he recounts.

Now the definition of an Ethernet has expanded, and there is no area of the 300-square mile Savannah River Plant that the network can't reach, he says.

Babcock is Computerworld's senior editor, software & services.

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Most people know BST as the change control specialists. Our competitors would like to keep it that way. Because when you compare library management facilities, theirs just don't measure up to ours. And there's a good reason why.

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Nies

FROM PAGE 25

base management system revenues are correct. Delivering [a relational mainframe product] in the 1992 to 1993 time frame is a lost cause.

Tremendous resources are being made available to DB2, such as the new ESA operating system. Will you be able to keep up?

We believe we can make the investment in data base because we are not determined to force our product up to the biggest processor. . . . The bigger resources are more expensive resources. ESA was designed for DB2; DB2 was designed for ESA. Bigger may be better for IBM, but smaller is smarter for the customer — more functionality, less equipment. We offered full referential integrity, entity integrity and user-defined integrity. The data base gurus call it three levels of integrity. We're betting more users will operate more rationally and less recklessly. We believe we can give a 6-to-1 cost per transaction benefit over IBM. This is what we must deliver to be competitive.

In what other ways has your company changed to adjust to the marketplace?

We call 1984 to 1988 the transition years, when Cincom went from a small to large software company. The year 1986 was an important one. Revenues were flat but revenues from new product lines grew from 12% to 14% [three years earlier] to over 50%. We moved all resources away from the old product lines. If you visualize us in 1984 as a $25 million company with five products, we have grown to a $130 million company [with the same five products] in 1988. We anticipate total revenues of $165 million to $170 million in 1988 and over $200 million in 1989. We've done this all through internally generated growth. Cincom is not an acquisition-oriented company.

Haven't you been a year or two behind in supplying SQL in your new product line?

We didn't believe we could do well selling a similar system to IBM's. So we implemented a superior language for Supra, Spectra. We are a little premature in appealing to the rational buyers. We've decided to offer SQL support. In effect, we're backing away from a better product. The users can have SQL support — it's imminent — for all IBM environments, the VAX and Unix. One might say we're a little late, but what we have is far superior to what anyone else offers.

Why are we seeing an alliance between DEC, IBM and others to offer an "open software" flavor of Unix?

There was increased aggressiveness on the part of AT&T and Sun Microsystems. IBM and Digital wanted to present an answer to Unix. It's a chess game being played.

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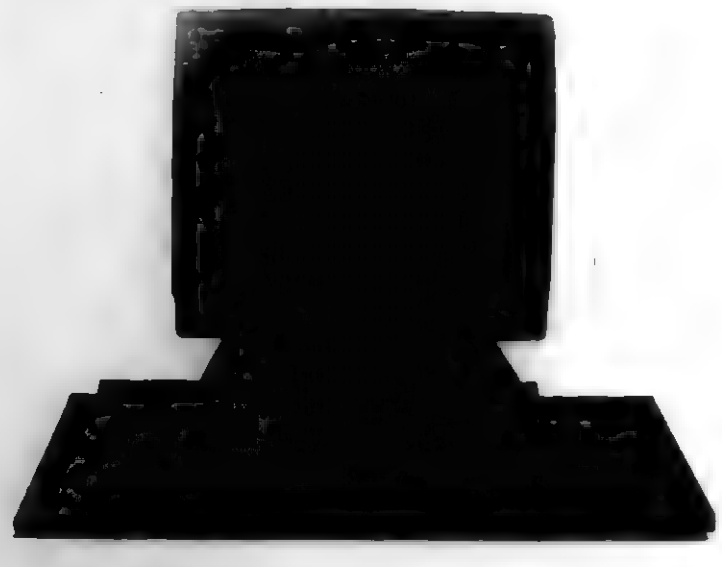
Interfaces tie SAS, VAX

HOUSTON — Software Interfaces, Inc. recently released an upgraded version of a utility that it said links the SAS Institute, Inc. statistical analysis package to three relational data base management systems for the Digital Equipment Corp. VAX platform.

The interfaces, called Oatat, Istat and Ratat, work with DEC's RDB, Oracle Corp.'s Oracle and Relational Technology, Inc.'s Ingres.

They allow bidirectional transfer of data between the SAS environment and the relational DBMS, the company said. A SAS user can extract data from a DBMS while in the SAS environment; knowledge of the SQL language is not required.

The upgraded versions of the interfaces are said to include a method of defining a data dictionary that would help map the characteristics of a DBMS column to a SAS variable. The interfaces range in price from $2,500 to $7,500, depending on the VAX configuration.



If You Develop Software Applications On IBM,

SOFTWARE & SERVICES

A Unix-based on-line transaction processing system has been developed by VI Systems, Inc. To be marketed under the name VIS/TPS, the product is said to provide Unix users with on-line business transaction applications and is capable of supporting distributed hardware configurations.

The program also provides and manages all interfaces between the operating system and the applications and requires Unix System V, Release 2 or above.

The VIS/TPS system on a Unix mainframe costs $50,000.

VI Systems, 11910 Greenville Ave., Dallas, Texas 75243. 214-907-8080.

A series of accounting and distribution packages for Unix-based systems, including NCR Corp.'s NCR Tower and Unisys Corp.'s Unisys 5000 series, have been announced by MCBA, Inc.

The packages include Accounts Payable, Accounts Receivable, General Ledger, Payroll and Inventory Management.

Each will reportedly run in either a stand-alone environment or as part of an integrated system. The software will run on systems based on the Motorola, Inc. 68000 family of microchips.

The vendor said versions for Intel 80086 series-based machines will be available later this year.

The packages cost from $1,500 to $6,000 depending on the package and computer in use.

MCBA, 425 W. Broadway, Glendale, Calif. 91204. 818-242-9600.

Goal Systems International, Inc. has upgraded its security software package for the IBM VM operating system.

Alert/VM 2.03 reportedly eliminates the need to update both the VM directory and the Alert/VM security file when altering individual access authorities or when adding additional users to the system.

Directory management functions include automatic integrity checking, mass update capabilities and on-line changes to the active directory. Alert/VM works on IBM systems with 370 architecture, and the IBM 9370 series under IBM's VM/SP and VM/HPO Release 3 and above.

Alert/VM 2.03 costs $16,500.

Goal Systems, 7965 N. High St., Columbus, Ohio 43235. 800-848-4640.

Languages

Compuserve Data Technologies has released Version 7 of its System 1032, a fourth-generation language and data base management system for Digital Equipment Corp. VAX/VMS environments.

The latest release includes fourth-generation language and screen forms capabilities for application development that reportedly respond to and control end-user activity. An interactive forms editor is also included. First copy licenses for a basic system range from $3,000 for a Vaxstation to $120,000 for a VAX 8800.

Compuserve Data Technologies, 1000 Massachusetts Ave., Cambridge, Mass. 02138. 617-661-9440.

NEW PRODUCTS

Systems software

A Unix version of the Easytrak project management software system has been announced by Digital Planners, Inc. Previously, Easytrak had operated solely in Digital Equipment Corp.'s VAX/VMS environment.

The product is a full-function multiuser project management system aimed at aerospace and defense contractors, the vendor said. Its facilities include a specialized module for government reporting and a relational data base management system with fourth-generation language capabilities.

Easytrak will reportedly operate on any system running Unix System V.

Easytrak is priced from $30,000, depending on configuration and machine size.

Digital Planners, Suite 800, 4400 MacArthur Blvd., Newport Beach, Calif. 92660. 714-476-1020.

Ranco Rabbit Software has enhanced its Rabbit-2 VMS Know-It-All system management package that runs in Digital Equipment Corp.'s VAX environment.

Version 4.0 reportedly aids in system performance analysis by revealing system load, thereby allowing users to examine and correct bottlenecks and abnormalities. The system also incorporates project allocation reporting, decision confirmation, trend analysis and capacity planning functions.

Rabbit-2 VMS Know-It-All Version 4.0 is priced from $1,995 to $4,995.

Ranco Rabbit, 2440 Research Blvd., Rockville, Md. 20850. 301-258-2620.

Applications packages

CCC/Software, a division of The Computer Consulting Center, Inc., has announced LOTS/36 Release 2, an update of its Loan Origination and Tracking System for the IBM System/36.

The package reportedly allows banks, mortgage brokers and mortgage bankers to market, track and automate documents required for the mortgage loan process. The system includes an enhanced on-line calculator and an integrated IBM Displaywrite/36 word processing interface. Variable loan-tracking steps may be defined by the user.

LOTS/36 Release 2 costs $25,000 for operation on the IBM 5363 and $30,000 for use on the IBM 5360.

CCC/Software, 575 8th Ave., New York, N.Y. 10018. 212-564-9088.

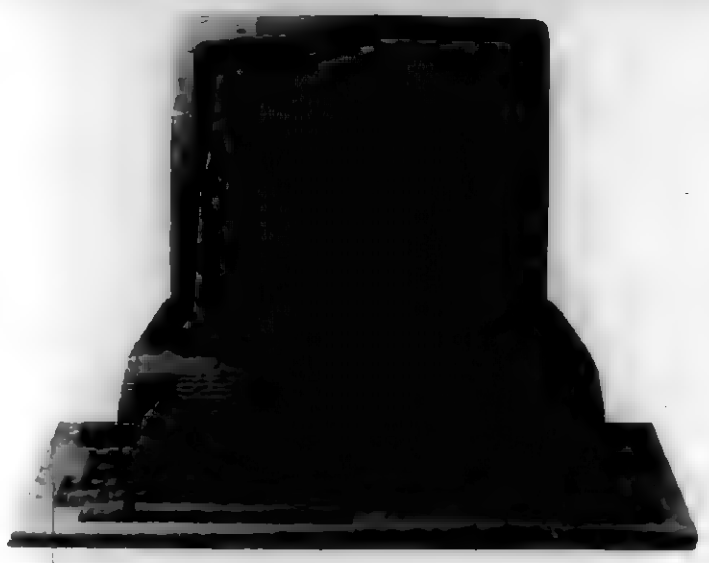
A software package for simulation and verification of numerical control tool paths has been announced by Computer Graphics Technology.

Called Vericut, the product reportedly permits a user to observe the metal removal process on a computer graphics screen as opposed to a milling machine.

The input into the software is a solid model of the stock and a tool path from any computer-aided design and manufacturing vendor. The program will interactively remove stock. Written in C, the software currently runs on Sun Microsystems, Inc. workstations.

Vericut costs $2,995.

Computer Graphics, Suite 310, 22706 Aspen St., El Toro, Calif. 92630. 714-380-8022.



Or VAX,

identification of applications using excess resources and resolution of time-response problems.

Insight/DB2 costs $30,000 in the U.S. A free 30-day evaluation of the product is available.

Database Utility Group, P.O. Box 4129, Federal Way, Wash. 98063. 206-878-1001.

Inset Systems, Inc. has extended its graphics utility packages to include support for Microsoft Corp. and IBM's OS/2.

Hijaak and Inset, designed to resolve graphics file compatibility problems and perform compound document creation on the IBM Personal Computer, will now operate under the OS/2 operating system.

Hijaak and Inset for OS/2 cost $99 each. A bundled version of the two packages costs $149.

Inset Systems, 12 Mill Plain Road, Danbury, Conn. 06811. 203-794-0396.

A system-managed storage software for IBM OS/MVS operating systems is now available from **Sterling Software.**

Sterling has bundled its DMS/OS and three of its VAM products together into a system called **Storagepak.** DMS/OS performs archiving, backup, restore and recover, predefined custom reporting and numerous other functions.

Storagepak costs $39,500.

Sterling Software, Systems Software Marketing Division, No. 100, 11050 White Rock Road, Rancho Cordova, Calif. 95670. 916-635-5535.

A program that was developed to generate complete RPG II programs for the IBM System/36 has been announced by **Britz Publishing, Inc.**

Called **RPG/GEN**, the product generates complete RPG II source code for file maintenance programs, the vendor said. The generated code is automatically compiled, and procedure code for running the generated programs is also automatically generated. RPG/GEN is written in RPG II, and complete source code is included.

RPG/GEN costs $199.

Britz, 1814 Capital Towers, Jackson, Miss. 39201. 601-354-8882.

American International Communications Corp. has expanded its Network Navigator series with the addition of **Network Navigator-VTAM.**

The product reportedly provides a management-oriented store-and-forward file-transfer system that operates as an IBM VTAM application.

A Network Navigator PC can now communicate with the VTAM, TSO or CMS versions of the Navigator product line interchangeably. The systems are compatible with IBM 3270 Personal Computers and other communications environments.

Network Navigator-VTAM costs $30,000 for the host component. Network Navigator PC licenses cost from $195.

American International Communications, 4760 Walnut St., Boulder, Colo. 80301. 303-444-6675.

Or Both,

Progress Software Corp. and **Harris Corp.'s Computer Systems Division** have announced a version of **Progress**, a fourth-generation language and data base management system that will run on the **Harris HCX** series of Unix-based superminicomputers.

The Harris HCX series consists of 32-bit minicomputers designed for throughput applications such as data base management, software development and enhancement, office automation and network processing.

A full application development copy of Progress for the entire Harris HCX family of superminis ranges is price from $30,000.

Harris, Computer Systems Division, 2101 W. Cypress Creek Road, Ft. Lauderdale, Fla. 33309. 305-973-5125.

An IBM ISPF-based system for generating correct MVS JCL code for production or test environments has been announced by **Technical Support Group, Inc.**

Called **J-Base**, the system reportedly allows users to generate jobs from high-level panels. According to the vendor, the system acts as a fourth-generation language for operational information by providing an operations interface for system developers, production operations and end users.

J-Base costs $28,500 in the IBM 3090 environment, less when used on smaller CPUs.

Technical Support Group, Suite 2715, 150 N. Michigan Ave., Chicago, Ill. 60601. 312-781-2800.

Utilities

A productivity tool that reportedly allows application programmers to resolve any CICS transaction dump is now available from **On-Line Software International, Inc.**

Called **Syndump**, the software was designed to complement Intertest, the company's CICS test and debugging program.

Syndump gives applications programmers the option of selecting specified parts of the memory dump for viewing. The program automatically maps dumps symbolically into the source code, permitting users to see the offending statement in context and debug the problem interactively. The system also offers batch printouts of selected dumps and on-line dump file management capabilities.

Syndump costs $6,250 per CPU for Intertest users and $12,500 with a first-time purchase of Intertest.

On-Line Software, Fort Lee Executive Park, 2 Executive Drive, Fort Lee, N.J. 07024. 201-592-0009.

A real-time performance monitor for IBM's DB2 data base management system is now available from **Database Utility Group, Inc.**

Called **Insight/DB2**, the software reportedly can capture and display performance statistics on overall system performance for all of DB2's resource managers. This includes thread connection, buffer management, logging and volume SQL activity. System exception reports provide warning messages when certain thresholds are exceeded.

In addition, the vendor maintains that Insight/DB2 is capable of capturing comprehensive trace data from DB2, which has previously been available only from batch reporting systems. The ability to deliver this data on demand in real-time allows Insight/DB2 to provide a selective trace and summarization facility.

The product's output can be used for

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- By offering the opportunity to reduce costs by eliminating redundant hardware. *Safe sharing of resources between images or* CPUs *means that you can operate more effectively with less hardware.*

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*SIS (Single Image Software) and SDM (Shared Device Management) are two Duquesne Systems products combined and enhanced to form one new superset product, Multi-image Manager.

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Pittsburgh, PA 15212
Telephone 412-323-2600

Data base management systems

A software system that reportedly allows users of IBM's DB2 to execute batch programs independently of TSO has been announced by Softbase Systems.

Called Database Attach, the system uses the Call Attach Facility of DB2 to communicate with the data base, thereby eliminating the need for TSO to execute batch functions. The product runs in the IBM MVS/DB2 environment.

Database Attach has an initial license fee of $3,400.

Softbase Systems, 2241 Sagamore Road, Charlotte, N.C. 28209. 704-529-0414.

Intex Solutions, Inc. has introduced SQL:Verify, a companion product for IBM's DB2 data base management system.

SQL:Verify is for MVS environments and reportedly allows users to check an entire data base or specific subset to verify data consistency and record accuracy. The program can also validate business rules and will run in both interactive and batch modes.

The software is distributed on a nine-track 1,600 bit/in. tape.

License fees for SQL:Verify range from $2,200 to $5,500 per month, depending on which IBM group is used, according to the vendor.

Intex Solutions, 568 Washington St., Wellesley, Mass. 02181. 617-431-1063.

A family of automated data base conversion tools for porting Ashton Tate Corp.'s Dbase III Plus and compatible files to fourth-generation language environments such as IBM's DB2 has been announced by Cygnus Research, Inc.

DB-SQL Bridge reportedly offers user control over the entire conversion process via pull-down menus. The software generates portable SQL code for microcomputer-, minicomputer- and mainframe-based applications.

System requirements include an IBM Personal Computer, PC XT, PC AT, Personal System/2 and most compatibles, 640K bytes of random-access memory and a 10M-byte or greater fixed disk.

Microsoft Corp. MS-DOS or IBM PC-DOS 2.1 or higher is also necessary to run the system.

DB-SQL Bridge has a price tag of $495.

Cygnus Research, 8 Belmar Ave., Oceanport, N.J. 07757. 201-229-1301.

Development tools

A requirements management facility for Digital Equipment Corp. VAX/VMS systems has been announced by Nastec Corp.

Called Rtrace, the product is said to be especially suited for the U.S. Department of Defense STD 2167A. It also operates with any life cycle methodology currently found in government, civilian or private-industry development. The Rtrace data base offers cluster support, and users can enter requirement documents on the system via optical character recognition, data entry or magnetic tape. The product can maintain several separate projects simultaneously.

Rtrace costs $30,000 for a single copy.

Nastec, 24681 Northwestern Highway, Southfield, Mich. 48075. 313-353-3300.

A combination programming language and software development environment for building expert systems has been announced by Symbolics, Inc.

Called Joshua, the product is said to offer full LISP capabilities embedded in an artificial intelligence development environment. Rule-based programs reportedly run in Joshua at more than 200 rule/sec. The software was designed to run on all Symbolics processors and has networking capabilities to most mainstream computing platforms.

Joshua costs $15,000 for a single-CPU site license and $60,000 for a subnet license.

Symbolics, 11 Cambridge Center, Cambridge, Mass. 02142. 617-621-7500.

A front-end computer-aided software engineering tool that functions as a structure chart editor is available from James Barry Software, Inc.

Arrange is personal computer-based menu-driven software that reportedly automates the creation, maintenance and display of structure charts. Each chart can contain up to 768 boxes, and colors are used to identify subsystems or common functions. Charts can be printed on a line printer in various scales and in all box, line and box-text positions.

Arrange costs $1,495.

James Barry Software, 1212 N.W. 6th St., Grants Pass, Ore. 97526. 503-474-3888.

Integrated Software Systems, Inc. has announced a computer-aided software engineering (CASE) workbench that reportedly combines automatic code generation, simulation and a graphics environment to achieve design, prototyping and simulation of real-time embedded systems.

Called Autocode, the product's automatic source-code generator develops lines of code from block diagram specifications, and the graphic programming environment is consistent with Ward/Mellor and Hatley/Boeing real-time design methodologies.

Autocode costs from $29,000.

Integrated Software Systems, 2500 Mission College Blvd., Santa Clara, Calif. 95054. 408-980-1500.

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Douglas Barney

Fussin' and feudin'

Let the squabbling commence! Ashton-Tate and Oracle probably never liked each other. Sure, they're competitors — they aren't supposed to. But there seems to be something else that makes them really grate on each other's nerves.

Things heated up recently when Oracle announced an Ashton-Tate Dbase clone that includes an Oracle engine and talked to other Oracle data base management system products. The words flew from both sides, and it wasn't pretty.

Gene Shklar, who heads up marketing for Oracle's microcomputer products, started some of it. Shklar had a few choice words for SQL Server, developed by Sybase and Microsoft and set to be distributed through retailers by Ashton-Tate. For starters, unlike Oracle, SQL Server is not expected to access mainframe data dynamically. Instead, the data must be downloaded, worked with and uploaded, Shklar claimed.

He also claimed that users may have difficulty when they outgrow a single SQL Server due to PC storage limitations.

Continued on page 41

Migration woes for Excel users

Most porting easy, but switching complex macros from 1-2-3 impossible

BY DOUGLAS BARNEY
CW STAFF

REDMOND, Wash. — Users switching from Lotus Development Corp.'s 1-2-3 to Microsoft Corp.'s Excel for the PC have reported no problems moving over work sheets and formulas. But some with complicated macros have learned that many simply do not translate.

Work sheets themselves are apparently a piece of cake. "The 1-2-3 work sheet translation function worked well. Dollars, cents and formulas all moved over with no problem," said Frank Diasparra, vice-president of technology services at Fidelity Investments in Boston.

Macros, however, are another story. Although Microsoft has called the macro translator 90% compatible with 1-2-3, the firm never expected Excel to work with all macros, said Pete Higgins, group product manager for spreadsheets at Microsoft.

Higgins emphasized, however that he has heard of very few cases in which there have been problems with the translator.

Microsoft advertisements still pitch 1-2-3 macro compatibility. One of the latest ads touts Excel's ability to produce high-quality spreadsheets and charts and to "do all this with files and macros created in Lotus 1-2-3."

Just make sure the macros do not do command-line editing, in which the macro edits a formula, or use self-modifying code — the two approaches that baffle the translator.

"The Excel conversion utility doesn't like what we do with macros," commented G. Jeffrey Knepper, director of advanced technology-tax at Touche Ross & Co.

For users with complex macros, Excel will translate what it can. When it cannot translate a portion of the macros, "we leave those commands in italics so users can go back later and fix them," Higgins explained.

Some don't give a boot about translation. "The Excel macro language provides more capability," said Jim Collinsworth, a manager in the advanced computer-audit techniques group at Arthur Andersen & Co.

Microsoft, HP shrug off Apple suit

BY STEPHEN JONES
CW STAFF

PALO ALTO, Calif. — Microsoft Corp. and Hewlett-Packard Co. thumbed their collective nose at Apple Computer, Inc. last week, announcing that Microsoft's Excel spreadsheet will be tailored to run under HP's New Wave operating environment.

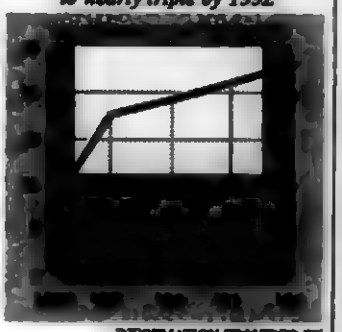
New Wave is currently at the heart of an ongoing legal battle in which Apple alleges that both Microsoft and HP infringed on copyrighted Macintosh technology. New Wave is based on the

Continued on page 43

Data View

Disk shipments drive upward

The market for 3-1/2 in. hard and floppy disk drives is projected to nearly triple by 1992



INFORMATION PROVIDED BY VENTURE DEVELOPMENT CORP.
CW CHART

Mac II passes entrance exam at Carnegie-Mellon

BY ALAN J. RYAN
CW STAFF

PITTSBURGH — Chalk up another convert to the Macintosh II.

Carnegie-Mellon University said last week that Apple Computer, Inc.'s big-ticket, high-resolution workstation will be one of two standard personal computers used on campus. The university said it expects to choose IBM as its other standard vendor.

Additionally, the university and Apple set up a joint development effort that will enable the Macintosh II to run applications developed for Carnegie-Mellon's Unix-based environment, called Andrew. A large body of Unix software developed at Carnegie-Mellon will be converted to run on the Mac II.

Initially, the Macintosh IIs will be used in the university's College of Humanities and Social Sciences beginning in the fall. The computers will be installed in clusters for student use, and the college will also provide systems for faculty members. Macintosh-based academic software will be introduced in many of the college's core courses. Students and faculty will then be able to share information and communicate with each other on the campuswide network.

"For several years, we have

Continued on page 42

Inside
• Intel eyes on new 386SX chip. Page 37.
• Chris upgrades Macdraw. Page 38.
• Ogivar rolls out 286-based portable. Page 44.

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SMALL TALK

Mort Rosenthal

Info centers' time to shine

If you're an information center manager, it's time to make some tough choices about what you should be doing now, 12 months from now and beyond.

As companies try to become more efficient, some are severely constraining the personnel resources in the information center, largely because these functions are viewed as overhead. You've got to decide whether you want to be simply an overhead function — just helping people use their personal computers — or play a more value-added role, enabling people to integrate PCs into mainline business functions.

It's no secret that the dreaded backlog you face in dealing with everyday problems can be be hazardous to your reputation. Little things like printer support can kill you in terms of resources, and they add almost no intrinsic value to your organization. When you personally handle that kind of support, it's almost impossible to investigate or develop new applications — the PC-based order-entry system for your boss, the industrial distributor or the PC- and mainframe-based cash management systems for your boss, the banker.

These more critical functions can potentially give your company the edge over your

Continued on page 39

Intel execs hold forth on 386SX chip's impact on vendors, 286 and 386 markets

Intel Corp. has finally unveiled the low-cost version of its 80386 microprocessor, which is popularly tagged the "P9," in a move it hopes will popularize 386 computing for a broader range of users. The 386SX, which is the chip's proper name, will reportedly uphold the software growth path available to 386 users — but in a system priced closer to 80286-based micros. The 386SX is a 32-bit microprocessor, like the 80386, but uses the less expensive 16-bit external data bus, as does the 286.

Market reaction has been swift. Compaq Computer Corp. and NCR Corp. have already announced systems based on the 386SX, and IBM is reported to be readying a Personal System/2 with the chip by year's end.

Leglise *sees big things in little chip's future*

Claude Leglise, marketing manager of Intel's Microcomputer Division in Santa Clara, Calif., and Bruce Schechter, 386SX product manager, recently talked with *Computerworld* West Coast correspondent James A. Martin about how the 386SX and systems built around it will be positioned in the microcomputer market.

Why did Intel develop another 80386 chip?

Leglise: The 386 has been successful in the high end of the office PC market and in the low end of the workstation market. The idea behind the new product is to bring 32-bit software capability to the mid-range PC business. The fundamental thought is that there are good pieces of 32-bit software available and a lot more coming. So we wanted to make it possible to build PCs that would essentially offer a different price point yet execute all the 386 code.

What are the trade-offs, then, to the user who has a 386SX system?

Schechter: From a software execution standpoint, the 386SX runs all the same software as the 386. But the 386SX will only be 16 MHz, whereas we have 386 chips that go up to 25 MHz now. So there will be some performance trade-offs, but at a lower price point.

Will there only be a 16-MHz 386SX?

Schechter: For the foreseeable future, that is correct. I can't comment on what will happen later.

How will the 386SX affect the 80286 and 80386 markets? Will it take away from the 286 and force prices down? Or will it have a greater impact on the 386 market?

Schechter: There is a new generation of software being developed for the 386, and there are people in the mid-range PC mar-

Continued on page 41

A DBMS for the masses

BY STEPHEN JONES
CW STAFF

SCOTTS VALLEY, Calif. — Borland International's Paradox is earning a niche as a kind of working man's data base management system — easy to use but without a lot of frills.

The DBMS has spawned a handful of versions tailored to specific environments, but each of the programs has one important common link: a user interface believed to be friendlier than most.

Users consistently cite the interface as the most compelling reason to buy the product. It relies on a Query-by-Example access method that does not require complicated programming.

Since it acquired Paradox developer Ansa Software in Belmont, Calif., last year, Borland has tried to leverage the user in-

Continued on page 42

Paradox

Price: Paradox 386: $895
Paradox 2.0: $725
Paradox OS/2: $725

- Query-by-Example access method
- Multiuser viewing, editing, querying of tables at same time
- Automatic table and record locking

Hanes takes a run at laptop switch

BY JULIE PITTA
CW STAFF

WINSTON-SALEM, N.C. — The Hanes Co.'s hosiery sales force will soon trade order books for laptop computers.

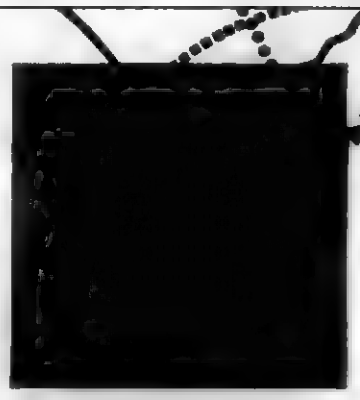
During the next several months, 185 of the company's nearly 300 sales agents will receive Grid Systems Corp. 1520 laptops.

Replacing antiquated terminals with portable systems and appropriate software amounts to nearly a $1.2 million project for Hanes. Despite the cost, Steve Jolley, MIS systems manager for Hanes' field sales, said it is a must for remaining competitive.

"It will allow us to get orders in-house quicker and get the merchandise out to our retailers faster," Jolley said. "We keep our retailers in supply and don't lose sales because they are out of supply."

The laptops will include an Intel Corp. 80286 microprocessor, a 20M-byte hard disk, a 1.44M-byte floppy disk, a 2,400 bit/sec. modem and a backlit LCD. Hardware costs make up two-thirds of the $1.2 million that the company will pay for the project, with software accounting for the rest.

Continued on page 38



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Claris effort gains steam; upgraded Macdraw ships

BY JULIE PITTA
CW STAFF

MOUNTAIN VIEW, Calif. — Claris Corp., Apple Computer, Inc.'s software subsidiary, recently began shipping an upgraded version of its Macdraw package for Apple's Macintosh.

Macdraw II is currently available through authorized Apple dealers at a price of $395. Current users can upgrade for $100. The product is based on new code. It adds object and text rotation, increased speed and color capabilities and is targeted at business users, graphic artists, desktop publishers, engineers and architects.

Recently, The Associated Press said it intends to standardize on Macdraw II to create the graphics it sends to its news service subscribers.

Macdraw is one of four packages Apple created for the Macintosh. When it was formed slightly more than one year ago, Claris inherited those products, which it has opted to update and repackage under the Claris label.

Treading carefully

Software developers had become sensitive to Apple's participation in their market. Apple officials reasoned that the formation of Claris would remove the Apple logo from the marketplace — and the criticism that Apple had an unfair advantage in selling Mac software — without forcing Apple to abandon its software business.

APPLE'S DECISION to spin off its applications software business was the result of criticism from its third-party software developers.

First on Claris's agenda was the upgrade of Apple's software products, which account for $50 million in yearly sales. Macdraw II is the last of the existing Mac software packages to ship. Macwrite Release 5.0, Macpaint 2.0 and Macproject II all began shipping earlier this year.

Earlier this year, Claris introduced its first software products, Smartform Designer and Smartform.

Apple's decision to spin off its applications software business was the result of criticism it received from its third-party software developers. Much of Apple's success with the Macintosh II and Macintosh SE personal computers has been attributed to support from third-party developers, which have created a wide variety of products for those two platforms.

Hanes

CONTINUED FROM PAGE 37

Among the applications to which the sales force will have access are order entry, account information and general office tasks.

The works

With a Grid laptop, each sales representative will receive Lotus Development Corp.'s 1-2-3 spreadsheet, a Micropro International Corp. Easy Extra word processing package and Salesmate, a customized sales package from Waltham, Mass.-based Envoy Systems Corp.

Salesmate includes a personal secretary with a calendar and a phone directory, a sales file for notes on current and prospective accounts and an order entry function.

It also includes terminal emulation capabilities so that sales personnel can access an IBM mainframe at Hanes's Winston-Salem headquarters, an inquiry function that allows sales representatives to request information from the home office in batch mode and electronic mail.

Two of Hanes's leading competitors have begun similar projects; Jockey and Round-the-Clock are both currently pilot-testing systems using laptop computers. After a brief trial run with selected sales offices, Grid systems and accompanying software will be sent to Hanes's four regional and 20 district sales offices.

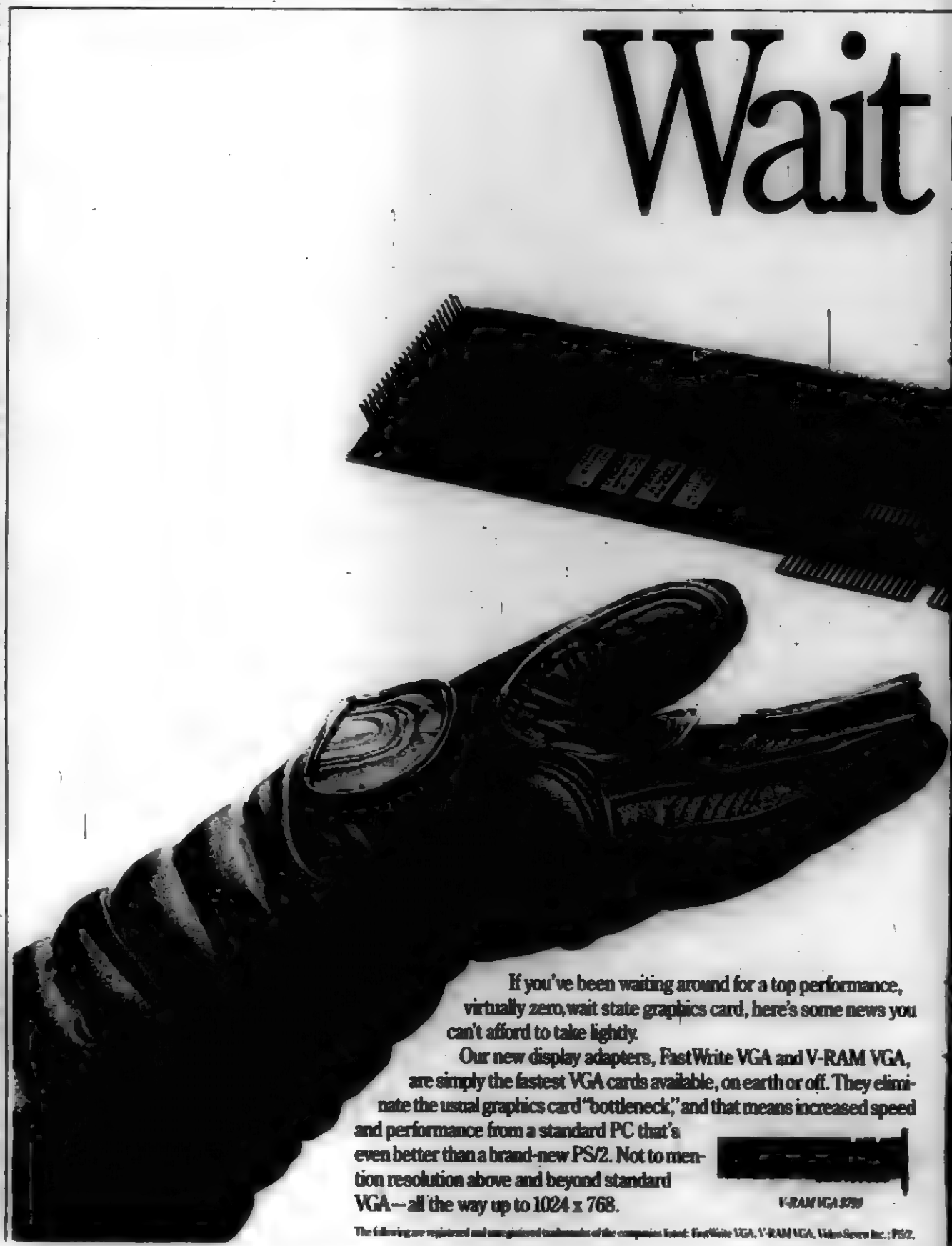
Long time coming

Hanes spent four years considering the investment and during that time evaluated almost every laptop computer on the market before making a decision last fall. "We were really waiting for the hardware to get to the right place," Jolley said. "Up until recently, screen quality was bad, the weight was too heavy, there was no hard-disk capability, and prices were high."

Among the systems to receive heavy consideration were laptops from Zenith Data Systems and Toshiba America, Inc. While Zenith boasted the best screen, Grid won because it offered a 2,400 bit/sec. modem and was lighter.

"There's no one machine that's the perfect solution," Jolley said. "You have to pick that compromise."

Wait



If you've been waiting around for a top performance, virtually zero wait state graphics card, here's some news you can't afford to take lightly.

Our new display adapters, FastWrite VGA and V-RAM VGA, are simply the fastest VGA cards available, on earth or off. They eliminate the usual graphics card "bottleneck," and that means increased speed and performance from a standard PC that's even better than a brand-new PS/2. Not to mention resolution above and beyond standard VGA—all the way up to 1024 x 768.

V-RAM VGA $299

The following are registered and unregistered trademarks of the companies listed: FastWrite VGA, V-RAM VGA, Video Seven Inc.; PS/2,

Rosenthal

CONTINUED FROM PAGE 37

competition but not if you're weighted down by the anchor of today's problems.

Information center managers and micro support personnel are uniquely qualified to make a difference in a company: You know the business of your company, you know the computing environment of your company, and you can significantly add value by helping users develop systems they need in order to be more competitive.

What all this really boils down to is playing a role in the development of strategic applications. Now don't panic; I know you probably think of this as something like a black hole to pour resources into, one that takes too much work and time. But ultimately, someone's got to help users develop applications, and it stands to reason that it will be the information center manager.

If you turn users away, someone else in the organization is going to step up to the plate, and they are going to become very important.

As an info center manager, you must strive to achieve an understanding of your users' problems and help them better understand and define their applications. You have to provide users with the tools they need to develop applications and do a certain amount of hand-holding.

The good news is that new tools are emerging that enable you to build applications that are proprietary to your business.

Just look at the spreadsheet market. One of the big areas of competition these days is the ability to do applications development on a spreadsheet and then back-end the spreadsheet into other corporate data.

You've got to use your knowledge and the tools available to be the facilitator in getting the applications developed. This does not mean you have to do the applications development, but you do have to direct traffic to internal or external resources that can make it happen.

The information center has also got to take the lead in monitoring critical emerging technology. There's a lot of excitement on the horizon for PCs with new operating environments that make it possible to tie them into the total MIS organization as a friendly front end to corporate data.

Load, don't follow

All of this is great, but in order to make it happen, you've got to take the lead in understanding and implementing new technology without taking a huge risk. And unfortunately, today's problems aren't going away. You also need to become more efficient in delivering support today, so you can rise to the challenge and help users develop their systems for tomorrow.

When it comes to support — probably the most mundane aspect of your job today — ask everybody you come into contact with on the outside what resources they have to help you better support your end users. Whenever you realize that a task does not add value internally — if it doesn't require that unique understanding of the company's business that you have — you have to figure out whether you should be doing it at all or delegating it to an external resource.

And remember, you're not being asked to solve all the problems of the corporation — just to orchestrate the solutions. You have a unique understanding of computing and of the company's business. Focus on things that address that combination.

Rosenthal is chairman and chief executive officer of Corporate Software, Inc., a value-added reseller of software and peripherals based in Westwood, Mass.

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You don't have to wait for complete compatibility, either. Not only are both FastWrite VGA and V-RAM VGA 100% register level compatible but they're the only VGA cards that are form-factor compatible. They have the same daughter card connectors as the IBM PS/2 Display Adapter to accommodate hardware add-ons in the future.

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Display Adapter: International Business Machines Corporation; Variable frequency monitor required for greater than 640 x 350 resolution. Video Seven reserves the right to change specifications without notice.

NCR to offer 386SX micros

DAYTON, Ohio — NCR Corp. last week became the second personal computer maker to announce plans to offer board- and system-level products based on Intel Corp.'s newly introduced 386SX microprocessor.

The 386SX, which reduces costs by using the Intel 80386's 32-bit internal instruction set but only a 16-bit external data bus, was introduced two weeks ago and was immediately adopted by Compaq Computer Corp. for a line of new micros. NCR is one of a small group of manufacturers receiving the 32-bit 386SX chips.

NCR said it will ship a 386SX processor board with 1M byte of memory on an IBM Personal Computer AT-size plug-in card. Systems with NCR'S 386SX processor board will be compatible with 386-based software and operating systems, including Microsoft Corp.'s MS-DOS, Microsoft and IBM's OS/2 and Unix, NCR company said. The products will be available later this year, the company added.

Because of its split-board architecture, which places the components that would have been on a motherboard on AT-sized cards, NCR can replace the Intel 80286 board with the 386SX, the firm said.

The 386SX processor board will be offered to NCR customers as an upgrade for its 80286-based PC710 and PC810 personal computers and the 3390 and 3392 workstations. It will also be available as a 386SX processor platform for OEMs and systems integrators. The board will cost $1,595.

Middlesex, England... The Government has announced that 40,000 additional men will be needed by the Royal Air Force—most of them in the next 18 months—on top of the present strength of 70,000. Pictured here is a line of smart recruits being transformed into well-drilled, confident soldiers. (Credit: Bettmann)

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Barney

FROM PAGE 35

According to Shklar's claims, multiple SQL Servers on a single local-area network cannot talk to each other and cannot provide key features, such as the ability to join tables from two different servers. Of course, Oracle's products can, Shklar noted.

We're sure Sybase has some words about Oracle, and if the firm gives us a call, we'll be more than glad to relay them.

No longer content to shrug off a barrage of cheap shots, Ashton-Tate took off its gloves and threw a flurry Oracle's way. Roy Folk, executive vice-president at Ashton-Tate, called Oracle's Dbase clone, licensed from Worldtech, "not fully compatible" and characterized the product as "old and tired." He also said that Oracle's embrace of the Dbase language is both a repudiation of Oracle's "one size fits all" strategy and an acknowledgement that Dbase is the PC DBMS king.

As if that weren't enough, Folk tossed in a bit of skepticism that Oracle can get the product, which transparently translates Dbase into SQL, to market in a timely fashion. Folk pointed out some tough technical hurdles that his firm has come to grips with — and that Oracle must also overcome.

King is in charge. Canning the Modern Jazz software project for Apple's Macintosh must have been a bitter pill for Lotus, and particularly for that development team, to swallow. But something good may well come out of the bad.

Killing a product that could have been completed, and that impressed many, is the epitome of bold decision making. "It may work, it may be great, but it just don't fit in with more important goals," is the theory, and Senior Vice-President for Software Frank King was the theorist.

Some may disagree with King. Others may see a product doomed to failure anyway — and early euthanasia as the painless way out. But there are those within Lotus who see it simply as Frank King being in charge, doing what is best for Lotus without waffling and without making excuses. And that, they say, is just what the company needs if it is to ship an array of important and interrelated products that will form the next generation of Lotus software.

Quattro bugs squashed. Recently, an item appeared in this space discussing some of the reports of bugs in Borland's Quattro spreadsheet that were scaring away some squeamish customers. We looked into the problem and found that customers were worrying about what was essentialy a small problem in the world of software. We reported, based on interviews with users and a software reseller's support chief, that there were some minor bugs, but no more than in comparably equipped products.

At the same time, we reported the responses of two different Borland officials: One said emphatically that the problems were already solved, and another said that the fixes had been made and will ship in the next release.

That item prompted a quick status report from Borland. According to the officials, Quattro bugs have been fixed and are available as work-arounds on Compuserve — and are also on the way in the next release. If that doesn't suit you, you can call and get them from Borland. As far as Borland and this column are concerned, Borland bugs are basically dead.

Barney is a *Computerworld* senior editor, microcomputing.

Intel

FROM PAGE 37

hot, the 286 users, who don't have access to that software — Windows 386, Unix System V/386, etc. We want to provide those customers with what they are interested in. So I don't think the 386SX will have much effect on the 386 market. We expect the 286 to continue to grow for two or three more years.

Then will it affect the 8086 market?

Leglise: Bill Lowe at IBM said he expected his entire product line to move to the 386 in the not-too-distant future and that the PS/2 Model 25 and 30 would move to the 286. I think there's a trend there.

Why is the chip called the 386SX when everyone called it the P9 before it was announced?

Leglise: We'd rather not confuse anyone with that mythical product. We never had a product named the P9, and we never will. There is no ongoing project called the P9 at Intel.

Will the 386SX encourage or discourage software developers in writing to the 386 chip?

Schechter: Software developers are more encouraged to write for a chip when there is a large installed base, and the 386SX will contribute to a drastic increase in the 386 32-bit architecture. Whatever software they write for the 386, it will be transparent on the 386SX, so this is simply an encouragement for them to write to the 386, period.

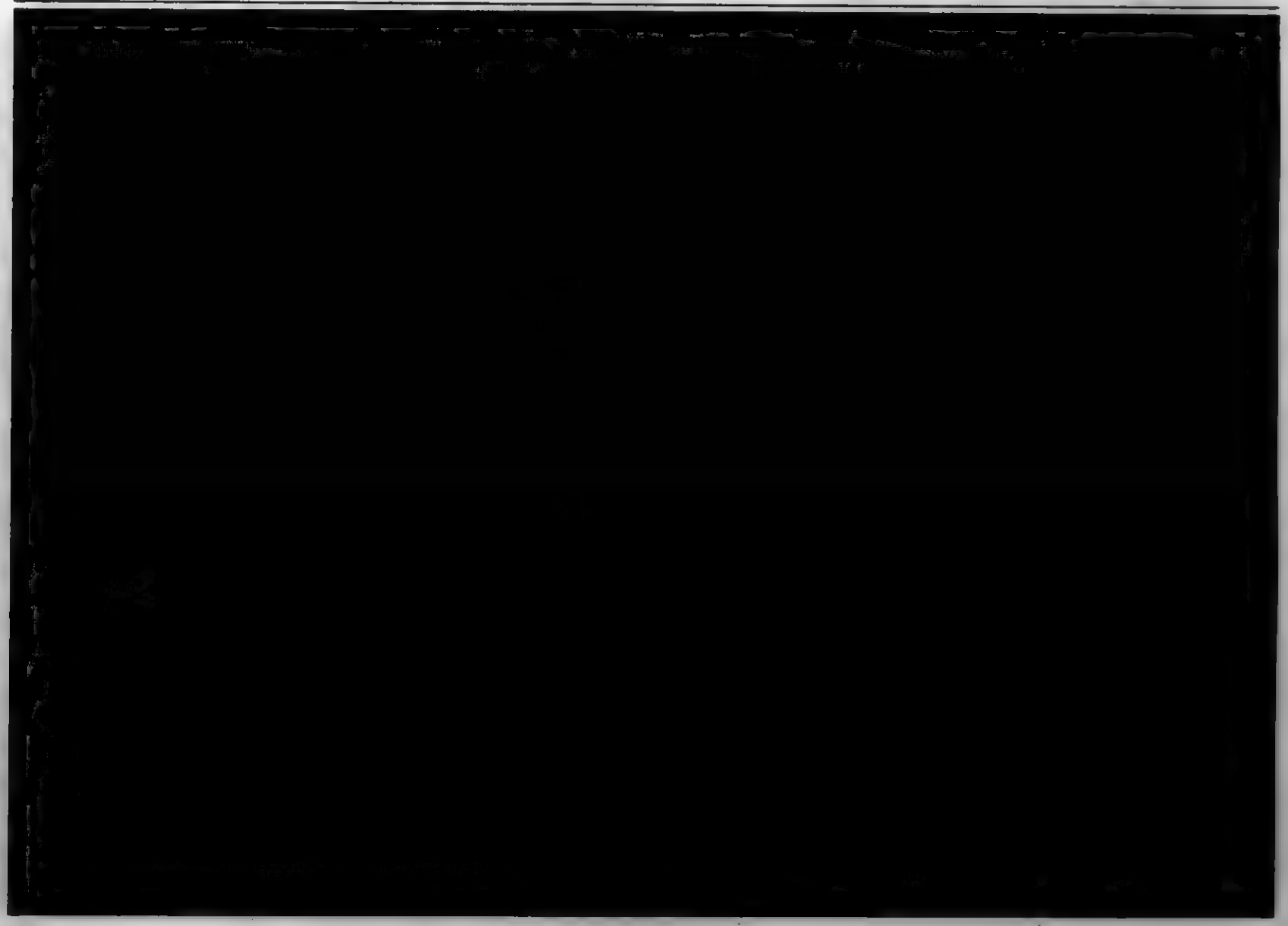
What kind of firm commitments do you have from vendors for the 386SX?

Schechter: About 50 vendors are commited to the design now. I can't name them, though. We have already begun production shipments to several trendsetting customers, and it won't be long before you can go into a computer store and see a system based on the 386SX.

What is the life span of the 386, and when can we expect the 486?

Leglise: The expectation is that the 386 architecture will be around for some time.

As for the 486, it will be the same architecture as the 386, and it won't make that much difference to the software development community. If you like the 386 software, you'll like the 486. It should be out by 1990.



DBMS

FROM PAGE 37

terface to lure away users of Ashton-Tate Corp.'s industry-leading Dbase III Plus. Dbase's rather stark interface has often been a sore point among end users who have had to develop some programming expertise in order to write the lines of command code needed to fetch chunks of data.

Changing minds

Borland's strategy has worked with some users. Marketing Performance Innovation, a Marina Del Rey, Calif., firm that manages United Airlines' Frequent Flyer program, is one Dbase defector.

Marketing Performance's MIS group determined that it could spend less time training and supporting end users by switching to Paradox. The firm uses both Paradox 2.0 and Paradox 386.

"With a bit of training, users were able to generate ad hoc reports and queries without the need for MIS. It took a big load off of us," said Brett Morris, manager of the firm's information center. "Users can do a lot of things by themselves that they wouldn't have had a chance at doing with Dbase."

Morris said Paradox also surpassed Dbase in its ability to display tables and join files.

A unit of Yoplait USA was also attracted to Paradox because of the interface. The company's warehouse in Carson, Calif., needed an inventory control system that users could operate while piloting a crane that retrieves and stores orders on 1,400 high-rise palettes.

Meeting needs

"We needed a system that had minimal keystrokes and was very user-friendly," said Wayne Clive, manager of operations control at the warehouse. "I don't have any computer background, but I haven't had any problems working with Paradox."

Clive said it takes less than six hours to fully train a user on Paradox, with little follow-up needed.

The Yoplait warehouse currently uses Paradox 2.0, but Clive said he will soon move to Paradox 386 to take advantage of that product's speed enhancements. "It takes seven to nine seconds to store something now, but I want it done in two seconds," he said.

Clive said Paradox 2.0 will crash if the program runs for hours on end without interruption. After keeping Paradox up for 72 hours, the system shut off and Yoplait lost 27M bytes of hard-disk storage. When Clive asked Borland for help, the company told him the only way to avoid further crashes was to turn off Paradox for about 10 seconds every eight hours.

While Paradox has found its way into the hearts of some Dbase users, market research shows that the program has a long way to go before it poses much of a threat to Ashton-Tate. In the short term, its biggest battles may be fought with the likes of Microrim, Inc., Dataease International, Inc. and Information Builders, Inc., all of which beat out Borland last year in total revenue share of the $282 million stand-alone Microsoft Corp. MS-DOS data base market.

Dataquest, Inc., a San Jose, Calif., market research firm, estimated that Borland finished a distant sixth in total data base revenues for 1987, with just 3% of the market.

Borland said those figures will increase as Paradox is aimed more intensely at Fortune 1,000 companies. With more of corporate America running high-end personal computers, Borland is releasing upgrades such as Paradox 386 to take advantage of specific high-performance platforms. The most recent entry is Paradox OS/2, an enhanced version of Paradox 2.0 designed to take advantage of IBM OS/2 Standard Edition 1.0's multitasking and increased memory capabilities.

Image problem?

But the product's blue-collar image could slow its placement on some companies' listings for preferred industry-standard products. Another potential drawback is the program's Paradox Application Language, which some expert developers have characterised as being low-level and limited.

Borland is hoping to carry the popularity of the Paradox interface over to advanced versions of the OS/2 operating system in the future, even though the look of the program is guaranteed to change in the graphics-based Presentation Manager environment.

But that does not mean the company will lose its friendly interface edge. Richard Schwartz, Borland's vice-president of data base technologies, said the Presentation Manager version of the product will have full data compatibility and an interface "as familiar as possible for previous Paradox users."

Mac

FROM PAGE 35

been looking for personal computers which we can recommend students and faculty to buy," said William Arms, vice-president for academic services at the university.

The transition to standardise PCs at Carnegie-Mellon will extend over two academic years. During the 1988-'89 year, the College of Humanities and Social Sciences will install approximately 120 Mac IIs for faculty and student use in laboratories and classrooms. Faculty will be encouraged to develop course-related computing materials.

"Our goal is to make computers as integral to our academic mission as textbooks are today," said Stephen Fienberg, dean of humanities and social sciences.

Fienberg said the Macintosh II "provides a rich environment for working with sophisticated graphics technologies — including computer animation, interactive video disks and" compact disk/read-only memory.

For the Unix project, dubbed Macmach, Apple will provide the financial support; Carnegie-Mellon will develop Macmach and make it available to other universities free of charge.

If you're trying to make your LANs run real-time communications to your mainframe, the solution is RabbitGATE.™ Because the brains behind RabbitGATE—an on-board intelligent processor—does all of the communications processing. This means it runs the gateway software without dedicating the PC as a gateway server.

And at 56Kbs, no one outruns RabbitGATE. Or out performs it. With its 80186 processor and 512k of RAM, you'll get more speed and performance than any other 3270 remote host connection for NETBIOS LANs.

What's more, RabbitGATE's combination of intelligence and speed enables each workstation to run up to eight host sessions—plus DOS and a note pad—at the same time. It gives you built-in windowing capability. A line monitor that you can use to analyze and recreate conversations. And LANs with multiple RabbitGATEs provide access to

VP-Planner gets upgrade

Paperback forges ahead despite Lotus suit

BERKELEY, Calif. — Pending copyright litigation by Lotus Development Corp. has not stopped Paperback Software International from moving ahead with an upgrade of its VP-Planner Plus spreadsheet.

The company released VP-Planner Version 2, a package it has openly promoted as being 100% compatible with Lotus's 1-2-3. That kind of similarity has proved too close for Lotus, which has a suit pending against Paperback alleging that VP-Planner is a blatant copycat of 1-2-3's "look and feel."

VP-Planner Version 2 retains the controversial user interface but improves on the core package by employing a "background priority recalculation" feature that allows users to enter new commands and entries as the program crunches a recalculation in the background.

The upgrade includes an incremental Undo/Redo capability that reportedly allows users to back out of changes made to a work sheet and to reverse incorrect commands. The program's import capabilities have been enhanced to include a file-import parse command that allows data from fixed-field ASCII files — including data base and mainframe data — to be read directly into a work sheet.

The spreadsheet runs on IBM Personal Computers and compatibles and requires a minimum of 384K bytes of random-access memory. VP-Planner also allows users to create external macro libraries and record keystrokes into a disk file that can be executed to recreate the same sequence into another work sheet.

The package sells for $179.95, with an upgrade price of $30 for registered users of VP-Planner Plus Version 1.

Microsoft, HP

FROM PAGE 35

Windows 2.0 technology that Apple claims Microsoft illegally took from the Mac.

Apparently that does not bother Microsoft, which has consistently said that the Apple lawsuit will not interfere with the company's application development plans. While a Microsoft representative would not comment on future New Wave developments, the Excel announcement is expected to open the door for additional New Wave ports of Microsoft applications.

The new Excel program will be designed to give users access to New Wave's object-management facilities and an "agent" facility that automates system-wide tasks.

With the object-management facility, users can develop permanent links between Excel and other applications running under New Wave, the firms said. Compound documents can be created by merging pieces, or objects, of Excel data with objects of information from other applications in the New Wave system.

Microsoft said the modifications needed to run with New Wave will be folded into the standard Excel product. A special version will not be required.

The New Wave enhancements will be integrated into a standard update of Excel and reportedly will be available in mid-1989. The two companies said they will also tie New Wave into future Excel versions for OS/2 Presentation Manager.

Microsoft program to include all

BY STEPHEN JONES
CW STAFF

REDMOND, Wash. — Microsoft Corp. plans to launch an electronic product support system designed to have something for everyone — from professional software developers to low-end personal users.

The program should help Microsoft stay cozy with an ever-expanding customer base that is demanding more technical support, service and information concerning a variety of products and development tools.

Independent software vendors, professional developers and OEMs can get answers to programming questions by using Microsoft Online, a fee-based electronic support service that allows users to ask Microsoft engineers questions and receive answers via electronic mail. With access to the system, users can share information on an electronic bulletin board, download files from a software support library and tap into a data base containing answers to other users' questions.

The program is set to start July 1 and to cost $495 for 10 hours of access, with each additional hour priced at $25. The fee includes a subscription to "Microsoft Systems Journal," the company's technical newsletter.

Microsoft has also teamed up with the GE Network for Information Exchange (GENIE) personal computer information service to offer end users support and technical advice on retail products.

In addition to standard telephone support, GENIE subscribers can take part in a "Roundtable" bulletin board that lists product announcements, press releases and user notes on such programs as Microsoft's Excel, Word and Works. The board allows users to communicate with each other by posting questions and concerns for public view.

As an enrollment incentive, users can dial up the GENIE service for six months without paying the standard $29.95 sign-up fee. Service charges during prime-time hours are $35 per hour each for the Roundtable and data base. The service is slated to be available in August.

Brains and baud.

different hosts for any user on the LAN. In either BSC or SNA. Best of all, installation is so easy many people don't even open the user guide.

And as your needs change, you can upgrade software on the workstation and on the gateway without reinvesting in new hardware.

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NEW PRODUCTS

Systems

Ogivar Technologies, Inc. of Canada has introduced its second-generation Intel Corp. 80286-based portable microcomputer system.

The **286 Portable** reportedly has a processing speed of 12 MHz and will operate in Microsoft Corp. MS-DOS and OS/2 environments.

The unit comes standard with a 40M-byte hard disk drive, a 720K-byte 3½-in. floppy disk drive and 640K bytes of random-access memory on the motherboard. A 10-in. diagonal IBM Enhanced Graphics Adapter (EGA)-compatible gas plasma screen offers 640- by 400-pixel resolution. An external EGA color monitor may be connected. The computer weighs 14 pounds and measures 13 by 14 by 4 in.

The 286 Portable costs $4,995.

Ogivar Technologies, 7200 Route Transcanadienne, Ville Saint-Laurent, Quebec. H4T 1A3. 800-361-3694.

Amiga, Inc. has expanded its line of portable computers with the announcement of the **Microscribe 700 series**. The units reportedly weigh 3½ lbs and were specifically designed for operation in harsh environments or remote locations.

An outgrowth of the Microscribe 600 series of handheld computers, the systems feature a full 80 col. by eight lines of display windowing on a 24-line page and up to 1M byte of random-access memory.

Also included are twin communications ports for RS-232 and serial devices that enable information to be downloaded at rates up to 9.6K bit/sec. The units run under Digital Research, Inc.'s CP/M operating system.

The Microscribe 700 series costs from $2,875.

Amiga, 97 Thornwood Road, Stamford, Conn. 06903. 203-322-1913.

A 1-lb. handheld microcomputer that reportedly combines a 16-bit microprocessor and as much as 1M byte of random-access memory storage has been introduced by **Tehnon Corp.**

Called the **PTC-720**, the battery-powered unit includes a two-line by 16-char. backlit display with adjustable contrast. It has a variety of options, including a 45-key, no-shift alphanumeric keyboard, pencil wand or laser scanner and two-way communications. The micro will also interface with Tehnon impact printers, including the IP-24, a single-copy unit that attaches to the PTC-720.

The company has also introduced the **PTC-720ES**, a similar unit designed specifically for use in freezers or outdoor environments. The case is said to permit operation in temperatures ranging from subzero to tropical.

The PTC-720 and PTC-720ES are priced from $1,200.

Tehnon, 3330 W. Market St., Akron, Ohio. 44313. 800-321-2424.

Software applications packages

Expert-Ease Systems, Inc. has enhanced its intelligent graphics package for IBM Personal Computer ATs and Intel Corp. 80386 machines.

Called **Easeplus 2.5**, the product includes customizable design, icon graphics, a data base management system and plotting capabilities.

Expert systems and simulation models can be accessed directly from the graphics model for diagnostic testing of complex, integrated electronics systems and equipment configurator programs. Data can be acquired on-line from external data sources.

Easeplus 2.5 costs $685 for a user system and $3,800 for the full-development system.

Expert-Ease Systems, 1301 Shoreway Road, Belmont, Calif. 94002. 415-593-3200.

Bass Institute, Inc., has released a selection of statistical procedures to enhance the existing Bass System.

With **Basestat**, the system provides 25 preprogrammed statistical and manipulation procedures. Cross-tabulation methods include Chisquare, Cramer's V, Fisher's Exact Test, Lamba and others.

The system operates on the IBM Personal Computer, PC XT, AT and clones running IBM PC- or Microsoft Corp. MS-DOS 2.0 or higher, with a minimum of 384K bytes of random-access memory. Site licenses are available.

The Bass System costs $399, with an introductory price of $299 through Aug. 31.

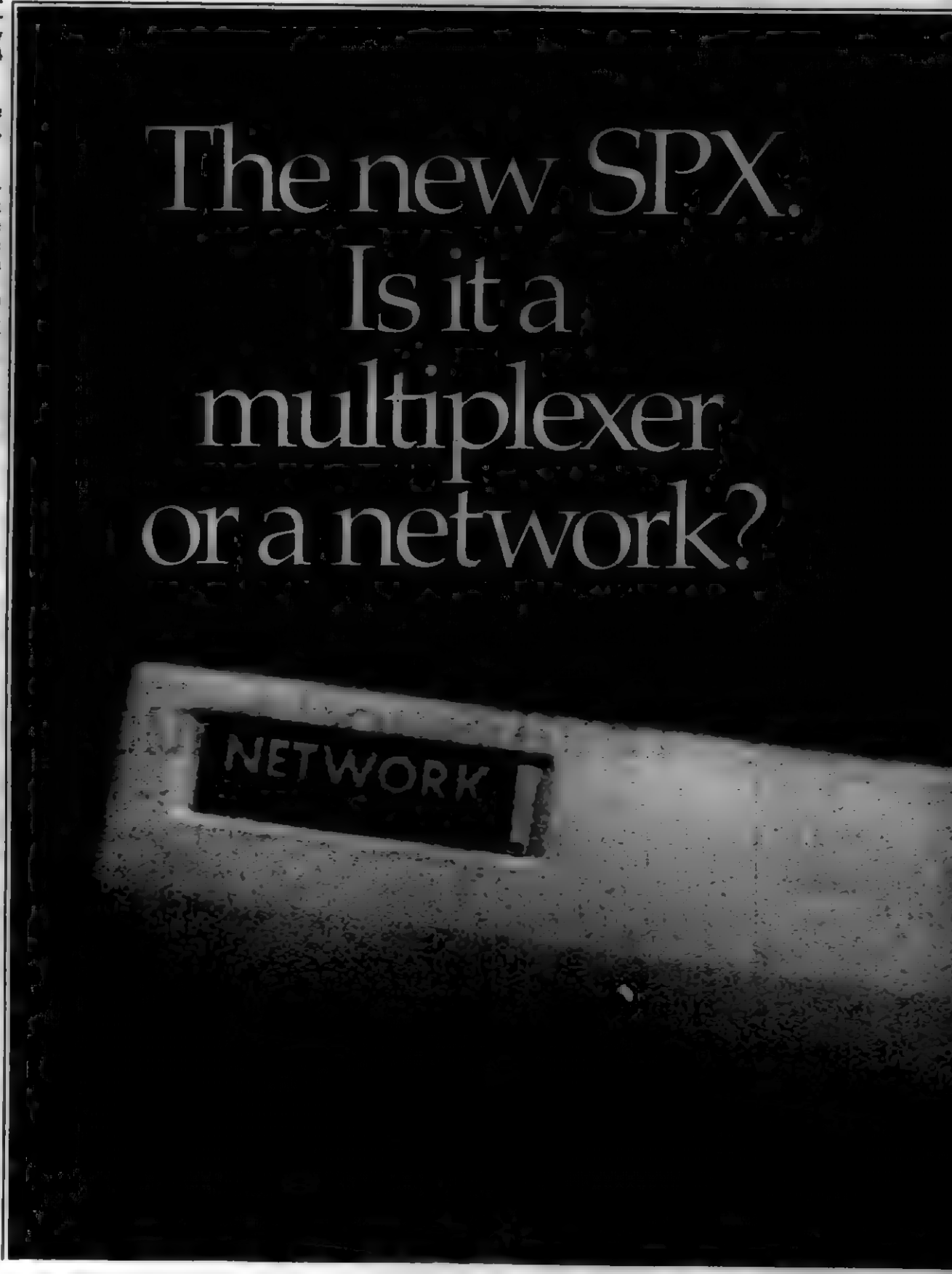
Bass Institute, P.O. Box 394, Chapel Hill, N.C. 27514. 919-489-0729.

Addison-Wesley Publishing Co. has introduced **Wordbench**, a software program initially available for the IBM Personal Computer and compatibles, along with Apple Computer, Inc.'s Apple IIe, IIc and IIGS microcomputers.

Wordbench is structured into six primary components and is geared primarily for business projects, professional writers and students. The IBM PC version requires 256K bytes and one or two 3½-in. drives and operates on IBM PC- or Microsoft Corp. MS-DOS 2.0 or higher. The IBM PC configuration costs $189.

A version for the Apple micro requires a minimum of 128K bytes and is priced at $149.

Addison-Wesley, Reading, Mass. 01867. 617-944-3700.



Paperback Software International has enhanced its spreadsheet software program for IBM Personal Computers and compatibles.

The VP-Planner Plus Version 2 enhancement includes background priority recalculation.

An Autokey Transcript command allows keystrokes to be recorded into a disk file, which can later be executed to repeat command sequences in other worksheets or recover data after power failures. The program requires 384K bytes of random-access memory and Microsoft Corp. MS-DOS 2.0 or higher.

VP-Planner Plus Version 2 costs $30 to registered users of VP-Planner Plus.

Paperback Software, 2830 9th St., Berkeley, Calif. 94710. 415-644-2116.

Industry-standard Wang Laboratories, Inc. VS 2110 terminal emulation and file transfer software for the Apple Computer, Inc. Macintosh is now available from M/H Group.

VScom/Macintosh gives full VS 2110 terminal emulation, including quick screen response, access to Wang function keys and support of Wang word processing and graphics characters. The program gives the Mac a local or remote connection to any host Wang VS system. It supports autodialing, macro keys and Digital Equipment Corp. VT100 emulation.

VScom/Macintosh costs $395 for terminal emulation and file transfer and $195 for terminal emulation only.

M/H Group, 222 W. Adams, Chicago, Ill. 60606. 312-443-1222.

A prospect management and sales support software system has been released from **Scherrer Resources, Inc.** Designed for sales professionals, the product reportedly includes a data base manager and word processor and is said to have automatic calling capabilities.

Dubbed **Sales Ally**, the menu-driven package also includes a calendar and calculator and is available in networked or single-user versions. The software runs on IBM Personal Computers and Personal System/2s and compatibles and requires Microsoft Corp. MS-DOS 2.0 or higher and 384K bytes of memory. A Hayes Microcomputer Products, Inc. 1,200 bit/sec. modem is recommended.

Sales Ally costs $395 for the single-user version, and it costs $995 for the networked package.

Scherrer Resources, 8100 Cherokee St., Philadelphia, Pa. 19118. 215-242-8751.

Software languages

Informix Software, Inc. has released Smartware under Xenix System V for microcomputers based on Intel Corp.'s 80386 chip.

Smart for Xenix 386 includes a proprietary application development language and provides bit-mapped graphics support. For Xenix multiuser operation, multiport serial cards are installed on a host computer, which allows personal computers or inexpensive dumb terminals to function as workstations on the system.

Smart for Xenix 386 costs $1,595.

Informix Software, 16011 College Blvd., Lenexa, Kan. 66219. 913-492-3800.

Software utilities

A text storage and retrieval management system developed for retrieval of text and image files has been introduced by **Lanier Business Systems**, a division of **Harris Corp.**

Called **Searchexpress**, the product is part of the Lanier Onestop Solution for document processing applications. It reportedly allows users to search text, image, desktop publishing or computer-aided design and manufacturing files to locate words, phrases or images.

The software runs on Lanier 286 and 386 Onestop personal workstations and IBM and compatible personal computers under Microsoft Corp. MS-DOS 3.2 or higher.

Searchexpress costs $349 for use on a stand-alone PC.

Lanier Business Systems, 1700 Chantilly Drive N.E., Atlanta, Ga. 30324. 404-329-8000.

Development tools

A personal computer local-area network-based fourth-generation language has been introduced by **Applied Data Research, Inc.**

Ideal-Escort Version 1.2 includes an integrated multiuser relational data base management system and an active dictionary with a full-screen multiwindow editor. It was designed for sophisticated applications developers and is not intended as an end-user tool, the vendor said.

Version 1.2 will reportedly allow up to 32 users to be simultaneously logged onto an Ideal-Escort data base in a LAN environment and will also offer IBM OS/2-protected mode support.

Ideal-Escort supports two versions: a development version that costs $1,000 and an execution-only version priced at $195. Both versions are available at quantity discounts.

Applied Data Research, CN-8, Route 206 and Orchard Road, Princeton, N.J. 08543-0008. 201-874-9000.

A software package designed to make the application of artificial intelligence technology easier has been announced by **Gold Hill Computers, Inc.**

Gold Works Axle will reportedly guide a developer through the development cycle by demonstrating four expert systems. The diagnostics applications

Continued on page 46

Yes.

It's a powerful new multiplexer *and* a next-generation network processor.

Designed for users having multiple locations and various connectivity requirements. For the user who must accommodate different applications, speeds, protocols and transmission media. For the user who also looks to future change and growth.

All with maximum control and minimum costs. How does the SPX™ do it?

The SPX is a new multiplexer with a highly versatile hardware engine.

The new architecture delivers larger capacity, more processing power, higher speeds, greater available bandwidth, and new standards of modularity.

It serves sites as small as eight channels or as large as 1,500 channels and 40 concentrated links. And by ordering the SPX in increments of eight channels, or four links, you never buy capacity you don't need.

Plus, it delivers channel speeds up to 19.2Kbps and link speeds up to 64Kbps.

The SPX is a sophisticated new network processor.

It connects multiple devices and sites into a single efficient network. With intelligent switching, dynamic routing, support for synchronous channels and a network management package.

It features a software driven architecture with a floppy disk drive—a foundation for change and growth in your data applications.

You benefit from lower operating and transmission costs, increased user productivity and equipment utilization, and substantial savings as your network needs change.

The SPX is a part of N.E.T.'s total solution to your multiplexer and network needs.

With the SPX, you can build a network that best meets your strategic requirements. A network of all SPXs. A network integrating N.E.T.'s most advanced wide-area Transmission Resource Managers, the IDNX® line. Or a network that incorporates N.E.T.'s entry-level networking multiplexers, the Series 2000 line.

The SPX also comes with something you won't find with competitive products: N.E.T.™ service and support.

N.E.T. specializes in building custom communication networks that best serve your application needs. And building an ongoing relationship with you, the client, to assure the continuing success of your applications.

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NETWORK EQUIPMENT TECHNOLOGIES

ConDesign Data Communications Group

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Continued from page 45

show a sample expert system for manufacturing and a real expert system developed for aerospace.

The system runs on IBM Personal Computer ATs and Personal System/2s, Compaq Computer Corp. machines based on the Intel Corp. 80386 chip and compatibles.

The product will also operate with AI Architects, Inc.'s 386 Hummingboard, a 386-based plug-in board with 24M bytes of memory that was designed for IBM PC XTs and ATs.

Gold Works Axle has a price tag of $1,995.

Gold Hill Computers, 26 Landsdowne St., Cambridge, Mass., 02139. 617-621-3300.

Data storage

Mass Micro Data Systems has announced a drive that can store 44.5M bytes of Macintosh data on removable cartridges.

The **Datapak** drives reportedly have unlimited storage and access times of 16 msec on the Apple Computer, Inc. Macintosh II, 25 msec on the Macintosh SE. Each Datapak includes two small computer systems interface ports and two surge-protected and switched AC outlets.

The Datapak drives are available in six configurations, and pricing starts at $1,775.

Mass Micro, 550 Del Rey Ave., Sunnyvale, Calif. 94086. 408-522-1200.

Printers/Plotters/Peripherals

An autotracking monitor with a 33-in. screen is currently available from **Mitsubishi Electronics America, Inc.**

The **XC-3310** monitor is suited for applications demanding large screen images, including presentation graphics, teleconferencing, computer-aided design and manufacturing and industrial process control. The product has a resolution of 800 by 600 pixels and is compatible with IBM's Video Graphics Array, Enhanced Graphics Adapter and Color Graphics Adapter. The XC-3310 runs on the IBM Personal Computer, XT, AT, Personal System/2 and compatibles and the Apple Computer, Inc. Macintosh II.

The XC-3310 costs $5,495.

Mitsubishi, Computer Peripherals Division, 991 Knox St., Torrance, Calif. 90502. 213-515-3993.

A color monitor for the Apple Computer, Inc. Macintosh II has been announced by **Intecolor.** The **Megatrend/2 20** is designed for training and education, desktop publishing and computer-aided design, manufacturing and engineering applications. It offers 640- by 480-pixel resolution.

The monitor plugs directly into the Macintosh II color video card with an optional pin adapter. It is also available in versions for IBM Personal System/2 and Video Graphics Array systems. The product also includes an autoranging power supply that provides protection from power surges, brownouts and brief power interruptions.

The Megatrend/2 costs $1,995. The Macintosh adapter pin costs $29.

Intecolor, 225 Scientific Drive, Technology Park, Atlanta, Ga. 30092. 404-449-5961.

A video display subsystem that reportedly allows the IBM Personal System/2 to display two full pages of text and graphics on a 20-in. screen is now available from **Ventek Corp.**

The **PS 2000** is said to be Video Graphics Array-compatible and is capable of displaying 1,280 by 1,024 pixels. The system is especially suited for a desktop publishing environment. Drivers are supplied for various software packages, including Microsoft Corp.'s MS Windows and Ventura Publisher.

In addition to the monitor, the system includes a P/2 Micro Channel adapter card, necessary software utilities and drivers and interface cabling.

The PS 2000 costs $2,495 and comes with a six-month warranty.

Ventek, 31336 Via Colinas, Suite 102, Westlake Village, Calif. 91362. 818-991-3868.

Board-level devices

An enhanced version of its document processor for IBM Personal Computer AT and compatibles has been announced by **Kofax Image Products, Inc.** The **KF-8200** occupies a single slot within the system and now offers 4M or 8M bytes of expanded or extended memory. The processor reportedly allows the AT to process engineering drawings and provide higher resolution business documents.

The product is compatible with scanners from Bell & Howell Co., Canon USA, Inc., Fujitsu America, Inc. and Hewlett-Packard Co. The KF-8200 with 4M bytes of memory costs $4,050. The 8M-byte configuration costs $6,700.

An image retrieval engine for IBM PCs running on document image-processing networks has also been announced.

The KF-8500 Image Retrieval Engine is said to be a high-resolution IBM PC display controller with CCITT image decompression capabilities. The product allows networked PC users to retrieve compressed document images from a shared data base for display on their systems. The product consists of a single board that occupies 1½ slots and is compatible with all DOS software.

The KF-8500 costs $1,950.

Kofax, 2691 Richter Ave., Suite 108, Irvine, Calif. 92714. 714-474-1933.

Save Your Staff from a Life of Drudgery.

If you worked your way up through the ranks, once upon a time you probably had to recreate lost or damaged files.

And you probably hadn't done the necessary backup.

And you probably got in trouble.

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FILESAVE™ can keep you out of trouble, help you if you get into trouble, and save you from a whole lot of grunt work in the meantime.

FILESAVE is a fully integrated recovery and management program for CICS and batch journals that reduces your auxiliary DASD requirements.

It keeps track of all backups and journals created by batch jobs, or by CICS, and stores them for later use in the recovery process.

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With FILESAVE, your entire recovery takes less time than you'd need to just figure out what to do if you didn't have FILESAVE.

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DATA STREAM

Elisabeth Horwitt

Two SAA questions

While IBM's AS/400 announcement last week may turn out to be hot stuff in the mid-range processor arena, it only disappointed those of us who were hoping for some major breakthroughs in IBM's distributed networking strategy.

IBM surprised no one by announcing that the AS/400, previously code-named Silverlake, will support Distributed Data Management (DDM) and Advanced Peer-to-Peer Networking (APPN), which are key networking protocols for System/36 and, in DDM's case, System/38 as well.

Still up in the air, however, is how — and whether — DDM and APPN will be translated into pivotal components of IBM's distributed networking scheme as defined by its Systems Application Architecture (SAA).

DDM is already officially part of SAA. APPN is not, but like DDM, it is based on SAA peer-to-peer networking protocols, PU2.1 and LU6.2. And both APPN and DDM already contain important functions for distributed networking.

APPN is a group of software elements that allow users to access data and applications across a cluster of networked IBM computers. While APPN is not part of SAA, IBM spokesmen have indicated that some of its

Continued on page 50

Networks connect at PC Expo

DEC nods to IBM, uniting DOS, Ultrix; Novell floats into SQL parade

BY JAMES DALY
CW STAFF

NEW YORK — The big guns of the networking industry peppered last week's PC Expo with major new product salvos, proving just how symbiotic the two industries have become.

One of the biggest communications announcements came from Digital Equipment Corp., which moved toward greater IBM connectivity with a pair of software packages said to integrate DOS-based personal computers and DEC Ultrix-based workstations within the same network.

Decnet users in an Open Systems Interconnect (OSI) environment reportedly will be able to access IBM mainframe-based applications via the Decnet/SNA gateway with the newly released Decnet/SNA MS-DOS 3270 Terminal Emulator or Decnet/SNA Ultrix 3270 Terminal Emulator.

Previously, DOS- or Ultrix-based users were required to access the Decnet-OSI gateway via a log-in to a VAX/VMS system.

The Decnet/SNA MS-DOS 3270 Terminal Emulator is priced at $199, and the Ultrix version is priced from $250 to $3,600, depending on processor type, DEC said.

SQL releases

In a battery of other announcements, Novell, Inc. unveiled its anticipated entry into the SQL data base product parade [CW, May 9]. Netware SQL is a back-end SQL engine tightly integrated with the Netware network operating system.

Novell, along with Oracle Corp. and Excelan, Inc., also announced data base, networking and communications software said to provide distributed data base functionality to local-area networks.

In addition, Novell announced an agreement with British Telecom International to jointly develop CCITT X.400 electronic messaging for Netware. The two firms will integrate Novell's Message Handling Service with British Telecom's PC400, an electronic mail package based on X.400.

Other introductions included the following:

• 3Com Corp. released a pair of Personal Communications Systems (PCS) software packages said to allow 3Com nets to tap into resources on Transmission Control Protocol/Internet Protocol (TCP/IP)- and Xerox Corp. Xerox Network Systems (XNS)-based LANs.

The PCS/XNS and PCS/TCP provide host access via terminal emulation and file transfer services. They are fully compatible with 3Com's current 3+ network operating system and will support 3+ Open, an OS/2-based version of 3+.

Single-user versions of PCS/

Continued on page 53

Data View

Federal telecom budgets stumble and rise

Recent pressure to reduce agency spending is expected to cause a slight dip in expenditures before they move upward

INFORMATION PROVIDED BY FROST & SULLIVAN, INC.
CW CHART

DCA tightens LAN security

BY JAMES DALY
CW STAFF

ALPHARETTA, Ga. — Digital Communications Associates, Inc. (DCA) has tightened the lid on its local-area network security with the release of a software-based system said to tailor information access to the individual user rather than the physical port number.

The User Service Facility (USF) requires users to enter both a user identification and a

Continued on page 11

ISDN users get show on the road

BY JAMES DALY
CW STAFF

ATLANTIC CITY — The forces promoting Integrated Services Digital Network (ISDN) rallied recently, as chief proponents of the service ran their flag up the pole at the first ISDN users' workshop while a major ISDN implementation got under way in the Midwest.

Considering that ISDN's chief critics still regard it as a gamble, it was ironic that the four-month-old North American ISDN Users Forum's first workshop convened just steps away from the Showboat Hotel's casino.

The two-day session, which was held as an adjunct to an Association of Data Communications Users, Inc. conference, drew nearly 200 attendees who immediately began the work of standardizing ISDN applications, Chairman Edward Hodgson said.

"We're a user-oriented group, and as such, our mission is very simple: to foster the development of ISDN applications that allow complete interoperability," he said. "And we'd like to do it as fast as possible with as little bureaucracy as possible."

The group said it will also

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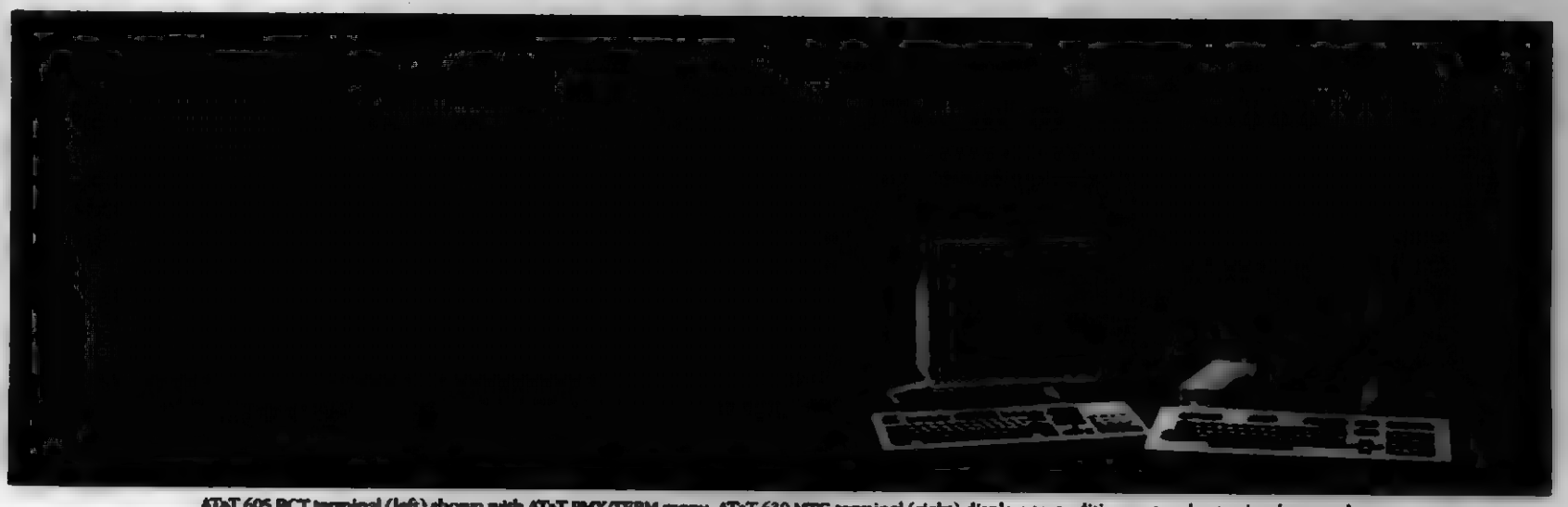
Inside

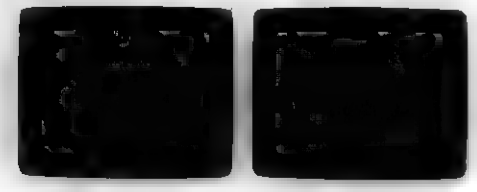
• DEC unveils FDDI strategy. Page 52.
• Sytek begins trek to OSI. Page 52.
• Sinnet releases Q-bus-compatible interfaces. Page 54.



AT&T 605 BCT terminal (left) shown with AT&T PMX/TERM menu. AT&T 630 MTG terminal (right) displays text editing on two hosts, simultaneously.

The secret is the AT&T 600 Series Display Terminal family.

If you've ever been forced to live with two CRTs on your desk just to get the information you need, or have struggled to connect your terminal to a second computer, you'll appreciate the power and simplicity of the AT&T 600 Series Terminals—the first terminals that take full advantage of the UNIX® operating system invented by AT&T.



AT&T 620 MTG terminal (left) supports common business graphics interfaces. AT&T 615 MT (right) is the recommended multitasking UNIX System Administration terminal.

AT&T's windowing technology, built into the 600 Series, provides a seamless link to UNIX System V's multitasking capability and gives the terminals unprecedented windowing power. The result is that one 600 Series Terminal can do the work of several ordinary ones, saving you time, money and space, and improving productivity.

Now you can send data back and forth among PCs, minicomputers, and mainframes in just seconds. You can use the powerful multihost, multitasking windowing system built into the 600 Series Terminals to preview data from up to seven different sources, both local and remote, at the same time. You can run multiple live applications concurrently.

AT&T's terminals allow you to display up to seven windows simultaneously, putting the world truly at your fingertips.

Each window behaves as if it were a stand-alone terminal with its own host connection, and up to seven windows can be displayed per host. Plus you get full bit-mapped graphics, local processing, and a large, easy-to-read screen.

Total UNIX System compatibility.

Most importantly, the windowing and other advanced features of the 600 Series Terminals work instantly with your system software; there's also no need to modify existing applications software. And the 600 Series works seamlessly with AT&T's powerful 6386 WorkGroup System and 3B Computer products.

AT&T 630 MTG terminal: Provides dual-host access and down-loadable applications (left); provides high resolution display of engineering or business graphics (right).

In addition, the AT&T 600 Series Terminals offer full PC terminal capability in the UNIX System environment so you can unleash the power of both UNIX System V and MS-DOS® applications for your remote terminal users.

Whether you're a small business using PCs for order entry and inventory control, or a large company with multiple databases for telemarketing, credit reporting and customer account histories, the 600 Series Terminals from AT&T can help improve your productivity. You can also run a variety of general office applications: word processing, electronic mail and spreadsheets.

The 600 Series is the premier general purpose and software development terminal series for programmers. Since each window is simultaneously active, you can concurrently edit, compile, and debug the same program in separate windows.

To get more information or take a closer look at these terminals, contact your AT&T Account Executive, Authorized AT&T Reseller or call 1 800 247-1212.

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AT&T
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Horwitt

FROM PAGE 47

functions — in particular, a directory that keeps track of files and other resources across a distributed network — are being evaluated as future SAA elements.

DDM's purpose is to "provide data interchange between different kinds of systems," including data management, file exchange and file access, according to IBM's "DDM Implementation Planner's Guide."

DDM is already part of SAA. Ellen Hancock, general manager of IBM's Communications Systems Division, re-emphasized DDM's key role in the vendor's long-term communications strategy at last week's AS/400 announcement.

Narrow path

But the problem is that both DDM and APPN currently implement full functionality only on the System/36 and 38 (and now the AS/400), allowing such machines to access data from and supply it to other IBM systems. A 370 machine can use DDM to supply data but not to request it.

Both APPN and DDM allow IBM Personal Computers and Personal System/2s to request data from another system but do not provide a way for these systems to act as data and application servers on a network. Even IBM admits that writing PC-DOS applications to DDM/PC is difficult, because DDM does not support PC-DOS's byte stream-oriented interface.

DDM is already defined by IBM as an architecture, not a product. Architectures specify how certain functions should be implemented across various IBM — and potentially non-IBM — products. DDM provides blueprints for data access and transport across a distributed network of IBM systems.

But before DDM can fulfill its promise as an SAA architecture, it needs to extend its full functionality and interface support to 370s, PCs and PS/2s and to non-IBM systems.

A likely scenario is that there will be two versions of DDM: a more fully defined, operating system-specific DDM for just System/36s, 38s and AS/400s , and a data stream architecture like the 3270 and IBM's printer stream. This would work across IBM's major computer lines under SAA, according to Frank Daubeck, president of Communications Architects, Inc.

"Under SAA, DDM will define the envelope, the nomenclature and the syntax structures [for transferring data]," Daubeck says. The file transfer mechanism will be handled by other SAA elements such as Enhanced Connectivity Facility as well as by LU6.2 and PU2.1, he says.

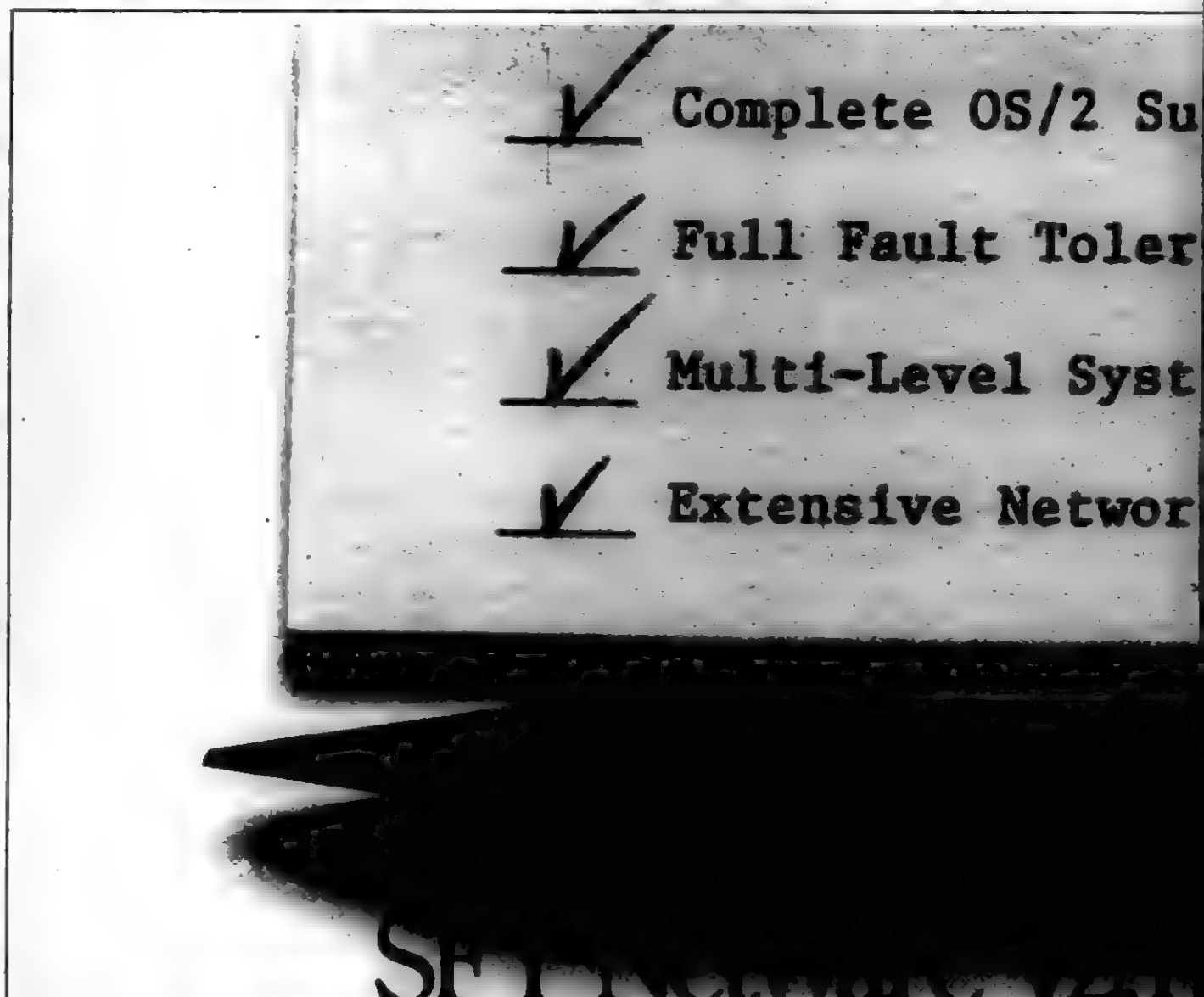
Unfortunately, the fate of DDM and APPN remains in doubt as IBM slowly gets its distributed networking act together. The need for a common directory across all configurations is one of the biggest hurdles to be cleared, according to John Pickens, Communications Solutions, Inc.'s (CSI) senior communications architect. "DDM needs [the directory] to find files, SNADS to find users and APPC to find transactions and programs," Pickens says.

A functional SAA directory — with or without APPN components — that would keep track of distributed networking resources could be years away, IBM sources say.

In the meantime, IBM has found one use for DDM — incorporating it into Netview/PC as the standard way for networking devices to send network management information to Netview. CSI and Systems Strategies, Inc. recently announced DDM tools that initially target vendors that want to link their devices to Netview. There is little interest yet in DDM as a general distributed networking tool, CSI's Pickens admits.

Frankly, developing DDM or APPN products right now seems like a risky venture at best; who knows when the offerings may suffer a change to something new, strange and possibly incompatible?

Horwitt is a *Computerworld* senior editor, networking.



SFT NetWare v2.1

MIS-conceptions about

Traditionally, the MIS world has viewed PC-based local area networks with a healthy dose of skepticism. A "prove it to me" attitude. And in an arena ruled by powerful mainframes, that approach has given rise to a few misconceptions and doubts about LAN performance.

Well, doubt no more. Because with the industry standard SFT NetWare v2.1, Novell offers the LAN software powerful enough to convince even the toughest MIS skeptic.

SFT NetWare v2.1 gives you the features and functionality of mini/mainframe systems at a fraction of the cost. With extensive fault tolerance, security and LAN-to-mainframe connectivity, it makes LANs advanced enough for major corporate, government and education installations.

No other LAN software even approaches the level of fault protection and data security built into SFT NetWare v2.1. Novell has pioneered LAN fault tolerance, and provides protection from failures in server hardware. In addition, enhanced security locks and passwords give you complete control of the information stored on your LAN.

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ISDN

FROM PAGE 47

attempt to defuse the fears of potential users who shy away from the ISDN plan to provide high-speed voice, data and, eventually, video transmission over one telephone line.

"A lot of the concern stems from people who look at ISDN as a replacement for plain old telephone service," Hodgson added. "It's not. But the increased bandwidth ISDN will afford is going to reduce process time, cycle time and save service money."

User slant

Although the group has not ruled out working with standards bodies like the Corporation for Open Systems, its focus will remain user-oriented rather than vendor-oriented.

"We're not trying to be policemen or enforcers," said group member Richard Stephenson. "We just want the developers to know what the user's requirements are."

Meanwhile, in St. Louis, a digital congratulations went out over the wires from the offices of Southwestern Bell Telephone and Telegraph Co. to the Houston office of Allen T. McInnes, executive vice-president of Tenneco, Inc.

Selectivity

When McInnes received the number at which the call originated on his computer screen before even picking up the telephone receiver, he had tapped into ISDN's selective call-screening feature.

Southwestern Bell will install more than 1,100 ISDN lines for Tenneco by the end of this month and 2,400 by the end of August.

During the next six months, Southwestern Bell will begin ISDN service for Shell Oil Co., 3M Co., AT&T Network Systems and AT&T Technologies, Inc.

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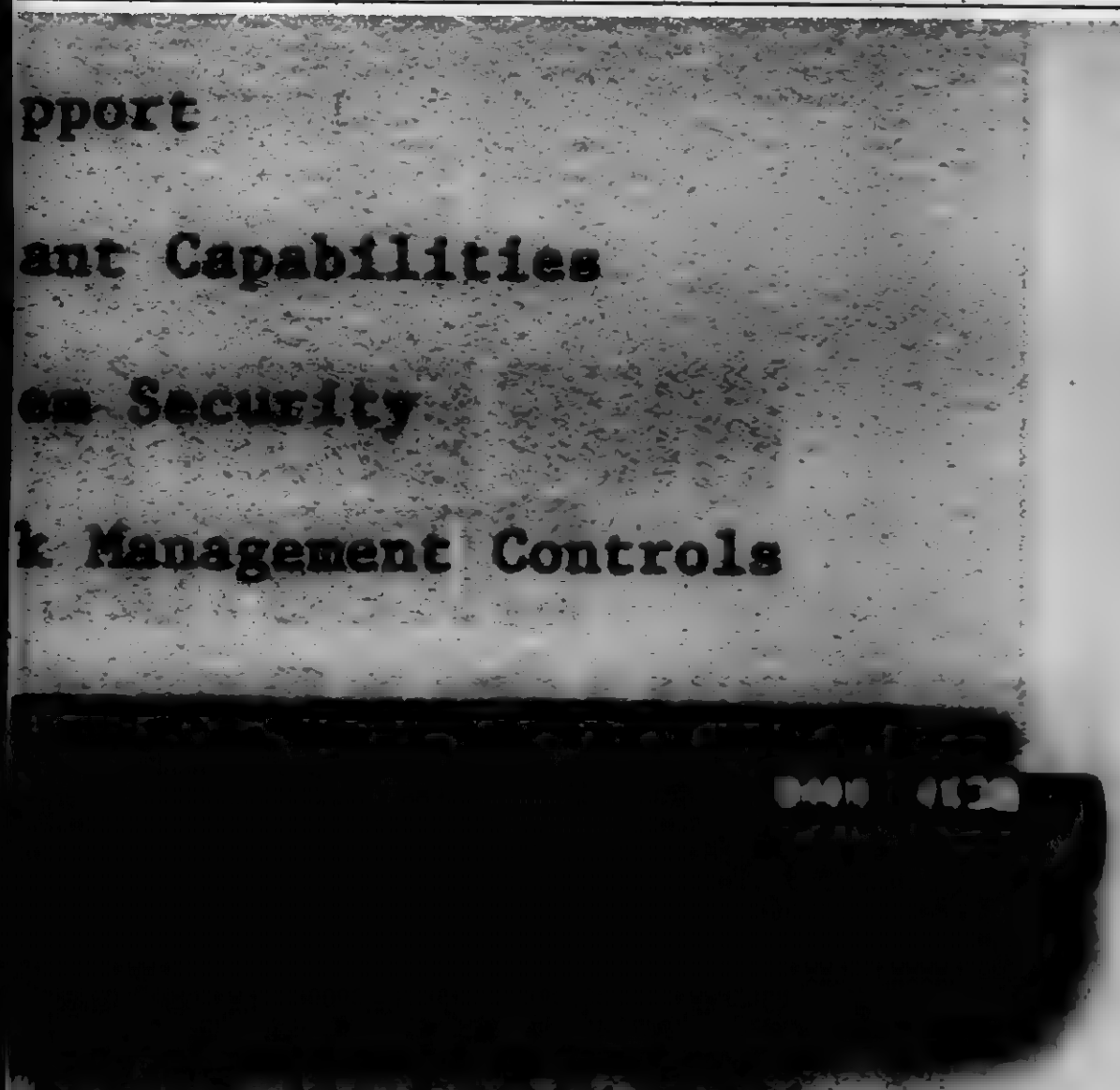

LAN performance.

SFT NetWare v2.1 simplifies network management with menu-driven utilities that let you control the network from any workstation. Advanced accounting features allow you to audit and account for users or departments utilizing network resources. Available communications links give you unsurpassed connectivity with mini/mainframe systems and other LANs. And SFT NetWare v2.1 supports OS/2 as well as DOS workstations.

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For more information, call from your modem 1-800-444-4472 (8 bit, no parity, 1 stop bit) and enter the access code NV217.

For network solutions, you should be seeing red.

LAN security

FROM PAGE 47

password of up to 15 characters before connecting to any network destination or accessing any menu, DCA product manager Marty Grubin said.

USF then matches the user's identification with a data base of user profiles and their access-authorization level before providing entry.

Users can also access the host computer from any location, eliminating the need for network security based on access to physical terminals.

The system uses a menu-driven administration facility to define user profiles for network access, as well as the configuration of all destinations and functions, DCA said.

USF also provides a time-accounting program that provides an activity record to determine the level of network use and security breaches.

The system resides on any Digital Equipment Corp. VAX/VMS computer connected to a DCA Series 300 LAN Net network bridge using DCA's network operating software Version 4.10 or higher.

USF is currently being used in networks utilizing electronic data interchange, Grubin said.

DCA also plans to offer a version of USF in the first quarter of next year that can be incorporated into their Open Systems Interconnect-based Open Network Management System running in a Unix environment, the company said.

USF is priced from $15,000 to $25,000, depending upon the number of users.

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BIT BLAST

DEC plans FDDI, Decconnect integration

Digital Equipment Corp. recently unveiled its strategy for supporting the Fiber Distributed Data Interface (FDDI) standard. DEC said it plans to integrate FDDI into its Decconnect system, bridging "anyone's" Ethernet subnet to an FDDI backbone. DEC also said it expects remaining FDDI issues to be resolved within the next three to six months.

Network Software Associates, Inc. in Laguna Hills, Calif., has packaged its full line of IBM Systems Network Architecture (SNA) protocols into one bundle, claiming a 40% cost savings. CompleteSNA, which runs on IBM Personal Computers and Personal System/2s, includes IBM 3270, IBM 3770/RJE, LU6.2, LU0 and Synchronous Data Link Control. It costs $1,495. Buying each of the vendor's SNA packages separately would reportedly cost more than $2,500.

Cylink Corp. in Sunnyvale, Calif., has signed a contract to provide customized encryption modules for Master Card's Banknet network to make increased security available to the credit card service's customers. Installation is slated to begin in the first quarter of next year.

Also by the first quarter, **Ungermann-Bass, Inc.** said it will have ported the Manufacturing Automation Protocol (MAP) 3.0 stack onto the PC-bus, the PC-bus interfaces for the IBM 7552 industrial computer, DEC's Q-bus, Intel Corp.'s Multibus and Motorola, Inc.'s VMEbus. During the remainder of 1989, Ungermann-Bass said it will release network management for its Net/One Open Systems Interconnect, MAP 3.0 for the Token Bus, Message Management System support for DEC VMS and IBM OS/2 and FTAM services for DOS.

Four architectures will continue to dominate the factory floor, according to **Advanced Manufacturing Research Corp.**: IBM's SNA (Token-Ring), Digital Equipment Corp.'s Decnet, Transmission Control Protocol/Internet Protocol and Open Systems Interconnect (OSI). As for OSI, one industry pundit recently pegged government and international sectors as its two major markets.

Santa Monica, Calif.-based **Retix** has won a $10 million order from Ing. C. Olivetti & Co. Under the two-year deal, Retix will provide its OSI Starlan Ethernet controllers and routers for use with Olivetti Unix-based servers and personal computers.

BNR, a subsidiary of Northern Telecom, Inc., recently claimed to have completed the world's first telephone call using the Basic Rate access standard of Integrated Services Digital Network over a single fiber-optic strand.

AT&T recently filed a tariff to increase the price of analog private-line circuits less than 500 miles in length, which would result in a net increase of $33 million in private-line revenue, the carrier said. The short-haul intercity links, which are the most expensive to provide, would experience the greatest increase, AT&T said. In addition, the one-time charge for central office connection will increase from $134.65 to $196.

Flexlink International Corp. and **DB/Access, Inc.** have announced a joint development pact to integrate Flexlink's connectivity software with DB/Access's data extraction and data sharing capabilities. The two firms are reportedly working with a major aerospace company to link dissimilar data bases on IBM/MVS, IBM/VM and Digital Equipment Corp. VAX/VMS systems.

Compuserve, Inc. has signed a deal with **Packet/PC, Inc.** that allows Compuserve to market the Packet/3270 micro-to-mainframe link to customers of its proprietary public data network.

Financial services provider **Goldome FSB** has selected **Safecom**, a joint venture of Timeplex, Inc. and Comsat General, Inc., to provide satellite transmission services for its voice and data network. Safecom's SafeT-1 service will link Goldome's New York and Seattle mortgage offices with a full T1 circuit at a more competitive cost than three 56K circuits, Safecom claimed.

Because of "regulatory and judicial uncertainties," **Pacific Bell** recently announced it will stop work on its Project Victoria technology and will instead license the technology to others in the telecommunications industry for completion. Project Victoria is a proprietary multiplexing technology said to divide an ordinary telephone line into seven channels capable of simultaneous digital voice and data transmission.

Rabbit Software Corp. in Malvern, Pa., said it has completed its effort to merge with **CTI Data, Inc.** in Raleigh, N.C. Rabbit acquired CTI Data for a total of 333,333 shares of Rabbit common stock, representing about 2.5% of the shares outstanding after the merger, Rabbit said.

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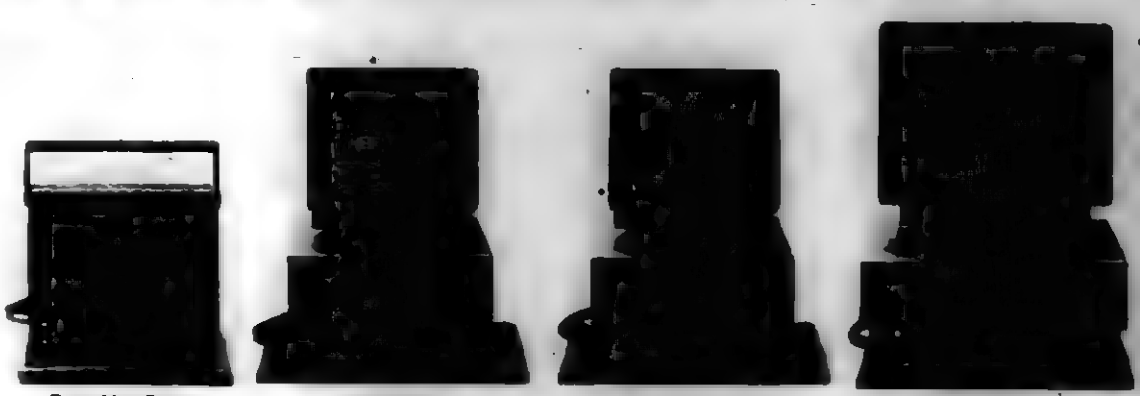

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Software compliments of: Autodesk, Inc., Microsoft Corporation, RasterWorld Corporation, Software Publishing Corporation, Three D Graphics, Inc., and Ventura Software, Inc.

CoC

Net manager goes to work

Sytek monitors TCP/IP-based Ethernet implementations

BY KATHY CHIN LEONG
CW STAFF

MOUNTAIN VIEW, Calif. — Pledging support for open standards, Sytek, Inc. last week announced a network management system said to monitor its Transmission Control Protocol/Internet Protocol (TCP/IP)-based Ethernet networks.

The system is the first in a series of management offerings that will eventually migrate the vendor's product line to the Open Systems Interconnect (OSI) standard, according to Peter Filice, Sytek's director of product development.

Since the company's inception more than seven years ago, Sytek has promoted a proprietary network known as LocalNet. Yielding to increasing market pressure during the past three years, the company began rolling out products supporting Ethernet, token-ring and a variety of cabling schemes.

The company is supporting TCP/IP "because it is the standard in the market that is usable today," Filice said. "When OSI networks are ready, we will migrate."

The Sytek 9100 Network Management Center is based on a Sun Microsystems, Inc. Sun-3/50 workstation and is said to support thousands of TCP/IP nodes.

The network software, priced at $9,000, reportedly takes advantage of Sun's windowing user interface. It also features a Unify Corp. relational SQL data base, performance management, configuration capabilities and fault isolation through device polling.

Missing element

What the Sytek 9100 Network Management Center does not yet provide, however, is a pictorial view of the network, a feature readily available under US West Network Systems, Inc.'s Netcenter offering.

In order to take advantage of the graphical interface, users can obtain a real-time bar graph of packet traffic on the network, according to Filice.

Although it is available today, the software does not yet support IBM's Netview/PC or the Unified Network Management Architecture (UNMA) espoused by AT&T. However, Filice claimed that support for Netview/PC is scheduled for 1989.

"We are still taking a look at UNMA," he said.

Sytek said the Sytek 9100 Network Management Center is portable across all Sun-3 machines. In addition, the vendor is considering supporting the software on IBM's Personal System/2 platform as well as on other workstations in the future, according to Filice.

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NEC Information Systems, Inc., Dept. 1610, 1414 Massachusetts Ave., Boxborough, MA 01719.

PC Expo

CONTINUED FROM PAGE 47

XNS and PCS/TCP are $175 and $300, respectively, while server-based versions cost $875 and $1,525, respectively.

• Excelan unwrapped a series of products, including a software upgrade for its Lanalyzer, an IBM Micro Channel architecture Ethernet controller, an intelligent Ethernet card and enhancements to its LAN Workplace for DOS. The latter upgrade provides users with direct IBM host access over Ethernet, links to Novell's Advanced Netware 2.11 and 2.15 servers and supports a number of third-party terminal emulators.

• Gateway Communications, Inc. announced a high-speed G/Ethernet 16-bit LAN adapter card for IBM Personal Computer ATs and compatibles. The vendor claimed the card performs at data transfer rates faster than 1M bit/sec.

The product features 64K bytes of onboard random-access memory with 16-bit data transfer to PCs. G/Ethernet will also be available in an 8-bit and Micro Channel version. The unit will be priced at $525.

• 10Net Communications unwrapped a 10M bit/sec. fiber-optic LAN card said to link up to 392 PCs over 6 km. Bundled with the 10Net operating system, it is scheduled to be available in August for $1,295.

• Digital Communications Associates, Inc. (DCA) announced two Irmalan gateway products. The Irmalan 802.2 Gateway allows PC users on non-IBM or IBM NetBios-compatible LANs to access an IBM mainframe via its Token-Ring network; it will cost $595 when it becomes available later this summer, DCA said.

The Irmalan SDLC Gateway 2 reportedly enables PCs on a LAN to emulate an IBM 3274 or 3276 controller. This gateway transmits data three times faster than the current Irmalan Gateway, which it replaces. The SDLC Gateway 2 will cost $1,195 with upgrades available for $395 to current users and is scheduled to be available this fall.

• Waterloo Microsystems, Inc. said it acquired two gateways from Crowntek Information Systems, Inc., which will connect its Port network operating system to IBM mainframes. The 3270 Cutserver runs on a PC through an Irma board, and the SNA/Synchronous Data Link Control Gateway lets PCs on a Port LAN link with an IBM host at more than 19K bit/sec.

NEW PRODUCTS

Local-area network hardware

A line of Q-bus-compatible data communications interfaces for Digital Equipment Corp.'s Microvax 3500 and 3600 computers are now available from Simpact Associates, Inc.

The platform for the new interfaces is the ICP1622T, a functionally equivalent repackaging of the ICP1622S communications front-end processor. Introduced with the processor were a host of distribution panels, shielded cables and a stand-alone distribution box that is said to support up to 16 independent communications lines.

A Microvax III-compatible 12-port expansion module is also offered. Software protocol packages that execute on the ICP1622T include high-level data link control, Synchronous Data Link Control and CCITT X.25.

The ICP1622T costs $4,500.

Simpact Associates, 9210 Sky Park Court, San Diego, Calif. 92123. 619-565-1865.

An Ethernet fiber-optic local-area network concentrator is now available from Versitron, Inc.

Called Fiber Star Hub, the concentrator collects data from each workstation for retransmission to all other workstations. At each station, the product converts optical signals to electrical signals and also performs collision detection. The electrical signals are said to be compatible with most Ethernet network interface controllers, including those from 3Com Corp., Novell, Inc., Ungermann-Bass, Inc. and Western Digital Corp.

The Fiber Star Hub costs $350. For each pair of workstations, there must be a Fiber Star Transceiver, priced at $595, in the concentrator.

Versitron, 9005 Junction Drive, Annapolis Junction, Md. 20701. 301-497-8600.

Network services

A terminal session manager for IBM MVS/VTAM networks is now available from Blueline Software, Inc.

Multiterm/MVS is said to give network users on VTAM-connected terminals menu-driven access to specified network applications. It also includes full messaging capabilities and a help desk function.

Multiterm/MVS is priced at $17,000 for a site license.

Blueline, Suite 340, 1500 S. Lilac Drive, Minneapolis, Minn. 55416. 612-826-0313.

Customer-premise equipment

A line of digital key telecommunications systems designed for businesses with up to 100 telephone sets has been announced by Northern Telecom, Inc.

The Meridian Norstar includes LCDs that function as user prompts and has bilingual programming capability. The system includes a personal computer interface circuit board and software that allows users to access computer power through the twisted-pair wiring of the telephone system.

The Meridian Norstar will cost approximately $400 per station.

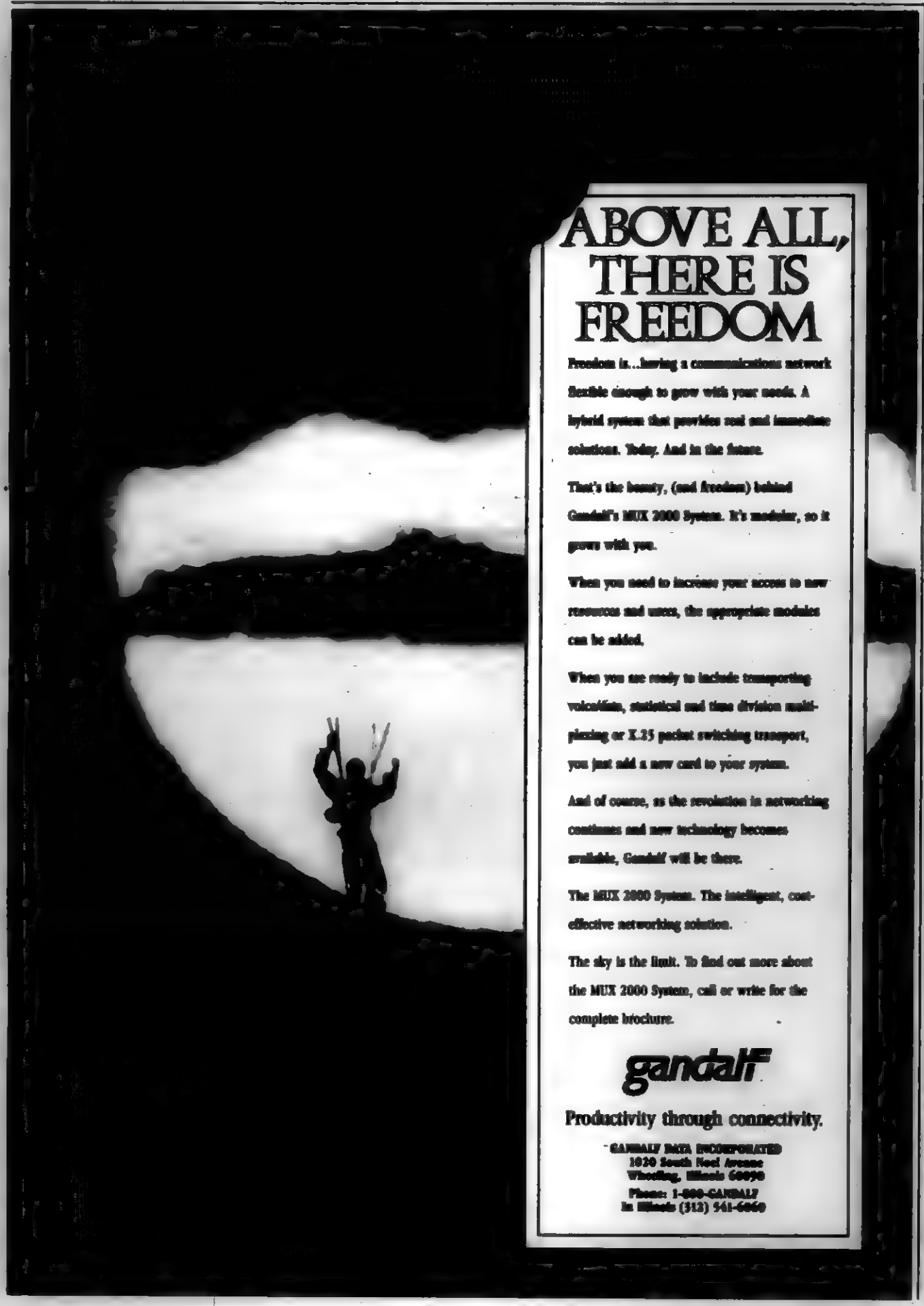
Northern Telecom, 200 Athens Way, Nashville, Tenn. 37228. 615-734-4000.

Harris Corp.'s Digital Telephone Systems Division has reportedly added Automatic Call Distribution (ACD) facilities to its Harris 20-20 private branch exchange system.

According to the vendor, the latest version of ACD software incorporates sophisticated queuing and routing techniques and will accommodate up to 128 agents, divided into a maximum of 16 agent groups. The software permits up to 32 designated support numbers.

Depending on configuration and hardware, the Harris 20-20 ACD software costs from $7,000 to $10,000.

Harris Digital Telephone Systems, P.O. Box 1188, Novato, Calif. 94948. 415-382-5000.



Links

A Synchronous Data Link Control communications board for the IBM Personal Computer, XT, AT and Personal System/2 Model 30 and compatibles has been announced by **Network Software Associates, Inc.**

Called the **Adaptcom Model C**, the half-slot board is designed for personal computer-to-host and PC-to-PC communications using the company's AdaptSNA software packages and is said to communicate at speeds of up to 19.2K bit/sec.

The product supports remote PC-to-host links via any of four IBM Systems Network Architecture protocols: interactive 3270, LU6.2 Advanced Program-to-Program Communications, batch-oriented 3770 Remote Job Entry and program-to-program LU0.

Adaptcom Model C costs $245. AdaptSNA software costs from $285 to $785.

Network Software Associates, 22982 Mill Creek, Laguna Hills, Calif. 92653. 714-768-4013.

Must Software International has revised its micro-to-mainframe package, **PC Nomad.**

Version 2 is said to allow IBM Personal Computer-to-PC, PC-to-IBM 9370 and PC-to-IBM 370 communications. Information processing can be supported between PCs and between PCs and IBM VM-based machines via an asynchronous connection. Mainframe data that is accessed for read and write processing can be in Nomad, IBM's SQL/DS and DB2 or Teradata Corp. format. The product runs on the IBM PC XT, AT or compatibles with IBM PC-DOS or Microsoft Corp. MS-DOS 3.0 or higher.

PC Nomad2 costs $795. Runtime versions cost from $50 to $100 per copy, depending on volume.

Must Software, 101 Merritt 7, Norwalk, Conn. 06856. 203-845-5000.

Modems/Multiplexers

A 9.6K bit/sec. CCITT desktop modem has been announced by **Multi-Tech Systems, Inc.**

The **Multimodem V32** offers dial-up asynchronous, full-duplex operation over public switched telephone networks. The modem operates at 9.6K, 2,400, 1,200 and 300 bit/sec. and is IBM Personal Computer AT-compatible. Communications can be synchronous or asynchronous and full-duplex over two-wire dial-up or leased lines. Two RJ11 telephone jacks are included.

Multimodem V32 costs $1,495.

The company also announced two modems for the IBM Personal System/2. The **Multimodem224PS** is an internal board modem providing 300, 1,200 and 2,400 bit/sec. transmission. The **Multimodem224ES** internal modem includes error detection and retransmission in addition to data compression. Both modems install in IBM PS/2 Models 50, 60 and 80 and are compatible with IBM's Micro Channel architecture and OS/2.

The Multimodem224PS costs $499 and the Multimodem224ES costs $549.

Multi-Tech Systems, 82 Second Ave. SE, New Brighton, Minn. 55112. 612-631-3550.

Everex Systems, Inc. has introduced a facsimile modem that reportedly permits microcomputer users to exchange documents with any Group III facsimile machine.

The **EF-12/48** will also function as a Hayes Microcomputer Products, Inc.-compatible 1,200 bit/sec. modem. The product includes communications software for storing up to 400 phone numbers and a directory for autodialing support. The modem requires an IBM Personal Computer, PC XT, AT or compatible; 512K bytes of memory; a hard disk drive; and a serial port. A video graphics adapter is required for viewing facsimile documents.

The EF-12/48 costs $495.

Everex Systems, 48431 Milmont Drive, Fremont, Calif. 94538. 415-498-1111.

Diagnostic equipment

A performance analyzer for CCITT X.25 packet networks has been announced by **Questronics, Inc.**

The **X.25 Analyzer** features performance-level statistics for user-level transaction data and Level 3 decoding of the X.25 line. According to the vendor, the product captures and reports frame information on the link level, packet information on the X.25 level and transaction data at the user level. The analyzer operates in a stand-alone environment and can be rack-mounted.

The X.25 Analyzer costs $5,950.

Questronics, 3570 S.W. Temple, Salt Lake City, Utah 84115. 801-262-9923.

Data/Ware Development, Inc. has announced the **DW345**, a monitor for IBM or plug-compatible mainframe I/O channels with data streaming transfer rates up to 4.5M byte/sec.

The product was designed to continually monitor Channel Command Words and data transfers of the I/O channels and record channel events in trace buffer memory until detection of user-specified trigger conditions. User-selected areas of trace buffer memory can be displayed on a personal computer screen in either a time chart or a 0 to 1 format for analysis of recorded channel control sequences.

The DW345 costs $14,495.

Data/Ware Development, 4204 Sorrento Valley Blvd., San Diego, Calif. 92121. 619-453-7660.

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KMW batch protocol converters allow high speed (up to 56 Kbps), high volume batch processing without operator interaction. 3770, HASP, and 2780/3780 emulation allows connection to a variety of printers, plotters, minis, micros, and KMW graphic element processors. Features include auto sign-on, menu-driven setup, on-board diagnostics, and V.35 or RS-232 host interfaces.

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3274 SNA and 3271 BSC cluster controller emulation allows up to eight CRTs, computers, and printers remote access to your mainframe. For maximum productivity, printer pass-through allows you to send one set of data to your printer while you work on a different set of data on your terminal or micro. Other features include 25th status line, color, graphics support and APL.

Twinax protocol converters.

KMW also manufactures protocol converters for use with IBM System 34/36/38 computers. KMW's Twinax converter lets you make the most of your System/3X, by allowing communication with ASCII printers, CRTs, PCs, and Macintoshes.

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SYSTEMS & PERIPHERALS

HARD TALK

Stanley Gibson

Benchmark smoke screen

A week before the announcement of IBM's Silverlake, Digital Equipment Corp. trooped around to the press and consultants in an anti-Ramp C benchmark campaign. Word having gotten out that IBM would be touting Silverlake's Ramp C performance at the rollout of its long-awaited mid-range machine, the alarm bells sounded in Maynard.

You'd think they would have gone off sooner. For more than a year, IBM has been distributing a glossy brochure showing the results of Ramp C tests of the System/36 and 38, 9370 and 4381. Various VAXs were also tested. The IBM systems came out looking good.

Shortly after the brochure came out, consultants began to clamor for some response from DEC. For years, the performance of a VAX-11/780 had been considered equivalent to one million instructions per second (MIPS). According to the IBM results, which were designed to measure commercial performance rather than mathematical performance, it started to look as if one VAX MIPS equaled half an IBM MIPS.

No formal response by DEC was apparent, by my count, for 15 months — until a week before the Silverlake announcement. And then the response was half-baked.

Almost a year ago, *Compu-*

Continued on page 61

HP sliding back in the groove

Spectrum touted, but industry giant hits mark with software, support

BY JAMES A. MARTIN
CW STAFF

Boasting its Spectrum series of minicomputers, Hewlett-Packard Co. is grooming itself as a resurgent force in the computer industry. But whereas HP is making progress with users, it is not doing so by dazzling them with the RISC-based Spectrum but by giving them old-fashioned performance, software and support.

"Our primary concerns when we went shopping for a new system were the software capabilities," said Ken Facer, executive vice-president of California's San Bernardino County Credit Union. The credit union is in the process of converting from a Digital Equipment Corp. VAX 7085 to an HP 3000 Model 950.

The 950 is one of HP's Precision Architecture machines — also known as the Spectrum series — and is based on a reduced instruction set computing (RISC) architecture.

"Once we chose the best software systems, we started looking at the hardware," Facer said. An independent consultant was called in to help the company decide between a DEC VAX 8700 and the 950. The 950 won out, Facer said, because the software system offered by Summit Software, Inc. in Columbus, Ohio, appeared to be the most efficient.

Also, the 950 offered monthly maintenance costs that were about half of DEC's, a smaller footprint and the advantages of the RISC environment, according to Facer.

HP's Precision Architecture is an important selling point because of its efficient performance, flexibility and upgrade path, Facer said. But it played only a supporting role in the company's decision to convert from DEC to HP.

After a one-year delay, the Spectrum series began rolling out on a limited basis late last year and is now in general release. Although HP does not discuss specific shipments, analysts said the majority of systems shipped to date have been to HP's installed base of customers, who have been waiting to upgrade from the previous high-end machine, the HP 3000 Model 70.

Now that Spectrum is out — there were systems introduced last April as well — HP has embarked on a "get tough" campaign not seen before from this previously mild-mannered computer maker. A recent full-page newspaper advertisement boldly exclaimed: "Every day, Hewlett-Packard helps IBM, DEC and Sun realize their true potential," a reference to HP's vigorous support of industry standards.

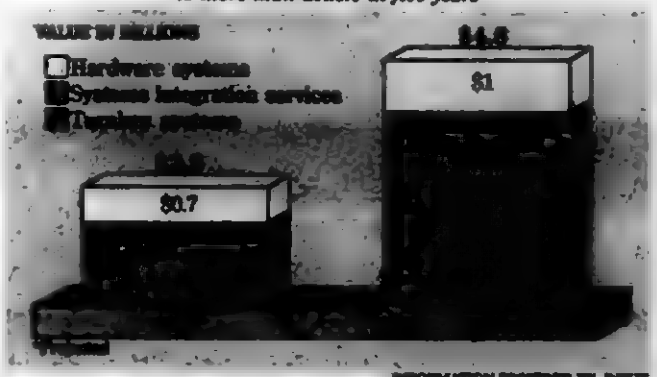
"When you have a few clouds over your product line," said HP President and Chief Executive Officer John Young at the com-

Continued on page 60

Data View

Federal systems integration market forecast

With a government focus on upgrading in-house information resources, demand for integrated and turnkey systems is expected to more than double in five years



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CW CHART

Vaxstations' power grows

BY NELL MARGOLIS
CW STAFF

MAYNARD, Mass. — Quantum leaps in color and memory will mark six Vaxstation 2000 models debuting next month from Digital Equipment Corp.

The system is aimed at users involved in heavy computational, graphics-oriented work: mechanical and electrical computer-aided design, software engineering and financial trading applications. The latest additions

Continued on page 60

Graphics VDTs on the outs

BY J. A. SAVAGE
CW STAFF

MONTEREY, Calif. — Users are demanding workstations with integrated computing and graphics capabilities; meanwhile, user interest in display terminals is dwindling, Dataquest, Inc. said at its 1988 Graphics and Imaging Conference held here recently.

Dataquest's findings support the reasoning behind start-up vendors Stellar Computer, Inc.'s and Ardent Computer Corp.'s decisions to build powerful single-user graphics and computing systems.

Established vendors such as Apollo Computer, Inc. and Silicon Graphics, Inc. have responded as well. Apollo has announced a competing high-end workstation, and Silicon Graphics has said it will offer a similar system by year's end.

"Graphics are no longer an option; they've become an integral part of the operating system," said Mike Tyler, Dataquest's director of graphics and imaging. "Graphics will become the way computers think."

U.S. workstation sales are expected to increase 70% by the

Continued on page 59

Inside

- EMC ships solid-state disk for Prime. Page 58.
- Unisys moves Burroughs drive to Sperry systems. Page 61.
- CIE considers budgets with entry-level systems debut. Page 62.

Qualogy casts WORM drive for DEC

SAN JOSE, Calif. — Qualogy, Inc. is offering a 12-in. write-once read-many (WORM) optical drive subsystem for Digital Equipment Corp. VAX- and PDP-11-based workstations using the Q-bus.

The subsystem can be used for remote data collection and can be swapped for or added to tape drives with no change in software, according to the vendor.

Although the latest optical drive announcements have been smaller in form size — either 5¼- or 3½-in. — Qualogy's marketing manager, Darrell Heinemann, said the company is staying with a 12-in. form because "it is the most stable of optical drives."

DEC announced a 12-in. WORM subsystem in April.

Jukebox support is planned for fall, Heinemann said, but the current configuration is one platter per read-write head.

The subsystem, called QLC-5000, operates with any DEC operating system that supports DEC's tape drive standard without any modifications to software.

The drives are supplied by either Optimem Co. — the Model 1000 — or Laser Magnetic Storage Company International — the Model CDD 1200 — Heinemann said, with Qualogy supplying the boards. Laser Magnetic supplies the WORM drive sold in DEC's 12-in. product.

Each platter is capable of storing 2.4G bytes with file-access rates as low as 300 msec, according to Qualogy.

"Using a standard DEC driver in the subsystem ensures that the data stored on it will be accessible to future systems," said Heinemann, who added that the driver will keep the system from being rendered obsolete as DEC operating systems for directory and data management systems change.

Single-unit price is $19,000, including drive cable and controller.

EMC sports disk device for Prime

BY STANLEY GIBSON
CW STAFF

HOPKINTON, Mass. — EMC Corp. recently began to ship a solid-state disk device for Prime Computer, Inc. systems called the Allegro Expanded Storage System. The device can be configured with 16M to 512M bytes of random-access memory.

EMC claimed the major benefit of the device is that it can increase the number of I/Os per second on a Prime system by four times. EMC senior product manager Rick Gauntlett claimed that the Allegro can perform as many as 300 I/Os per second on a Prime 9955II model.

The Allegro includes the Allegro Storage Controller, a 24-MHz disk interface card that transfers data at a rate of 3M byte/sec. EMC said it tranfers data faster to and from a solid-state device than a Prime 4005 or 4006 controller.

EMC is also offering an optional battery backup with the solid-state device to protect data in the event of a power failure. The backup system, called Datasave, has three options: Datasave I has only a battery backup, Datasave II includes a battery backup and a Winchester disk drive, and Datasave III is a battery backup and a dual-disk drive.

Prices range from $27,500 for a 16.2M-byte version to $513,000 for a 528.7M-byte model. Monthly maintenance fees run from $150 to $400. The Datasave battery options range in price from $9,000 to $24,000.

EMC said it will offer free evaluations of Allegro to Prime users until the end of this month.

Proteus adds 386 systems

HASBROUCK HEIGHTS, N.J. — A Unix-based multiuser system including software and a 15-month maintenance service package was recently added to Proteus Technology Corp.'s line of multiuser systems. Users need only insert applications software to complete the system, according to the company.

Users may order the system with an operating system other than Unix, the vendor said.

The system, called System 3400M, is based on Intel Corp.'s 80386 microprocessor. It has clock times of 20 or 25 MHz and hard disks ranging from 72M to 1G byte operating with access times as low as 0.5 msec, according to the company. The System 3400M can support up to 64 terminals.

Standard features include 2M bytes of 32-bit random-access memory, four serial ports, a 60M-byte streaming-tape drive, a loaded operating system, a video graphics controller, a monitor and 15 months of on-site maintenance.

The System 3400M, available now, is offered at a base price of $6,499.

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On the outs

CONTINUED FROM PAGE 57

end of this year over 1986 levels, and their cost will continue to decrease, accounting for only a 40% increase in revenue for computer vendors in the same time frame, according to Dataquest.

Meanwhile, U.S. demand for graphics terminals, as distinguished from alphanumeric terminals, grew at less than 17% over 1986 levels. At the same time, revenue declined almost 13%.

Tyler predicted good news for those who continue to buy terminals — a continuing decline in their price but at a slower rate than in the last few years. "In the last five years, there has been a 51% drop in cost, with more low-end products being offered," he said. "Dynamic random-access memory chips will put brakes on the declining cost. While it will continue, it will only be 3% to 5%."

New order

Meanwhile, workstation users will see order emerging from chaos with the proliferation of standards such as X Windows, Renderman and Unix. "Companies are temporarily putting aside mutual mistrust to develop things that are mutually beneficial," Tyler said.

Companies will form coalitions to iron out standards instead of relying on standards committees, he said. "How viable would the photo business be if it took five to seven years to develop film?" Tyler said. "That's what we have today in the current standards process. It's better suited to thread standards for machine screws than computers."

And while graphics applications standards may be perfected, users should not expect any concrete improvement in performance standards such as millions of instructions per second and millions of floating-point operations per second.

Tyler likened the situation to creationists vs. evolutionists. "In the creationist camp, measurements would be taken in vectors per second or pixels per second," he said. "In the evolutionist camp, measurements would mimic applications, like CAD/CAM or desktop publishing.

"There will be a standard," he continued. "But I'm afraid it will be similar to mileage estimates on new autos — something that's there but no one believes it."

Emerson tacks on mid-range UPS

SANTA ANA, Calif. — Emerson Computer Power recently filled out its line of uninterruptible power supply (UPS) systems with a product designed for offices as well as computer rooms.

The Emerson AP130 is a compact system that runs quietly and is intended to be operated by non-computer professionals, according to the vendor. The UPS is rated at 3kVA and can provide 10 minutes of backup.

A fully on-line system, the AP130 acts as a power conditioner, providing the attached system with clean power. It offers complete frequency and voltage regulation, allowing the computer to run at optimum efficiency and reducing downtime and maintenance costs, Emerson said.

The AP130 is priced at $6,190.

Daisy CAD/CAE tools bloom for Sun systems

MOUNTAIN VIEW, Calif. — Daisy Systems Corp. is wrapping the latest Sun Microsystems, Inc. workstations with a broad range of homegrown and third-party software for computer-aided design and engineering (CAD/CAE) users.

Daisy recently announced the Advansys series of CAD/CAE systems based on Sun's 386I Intel Corp. 80386-based workstations or Daisy's own 386-based machines.

The line consists of eight turnkey CAD/CAE systems, which are targeted at large design teams performing various applications.

Daisy is the first vendor to incorporate Sun's 386I, introduced this past April, which runs both the Unix and Microsoft Corp. MS-DOS operating systems.

The Sun 386I system supports simultaneous Unix and MS-DOS Windows, allowing the user to cut and paste between applications, according to a Daisy spokesman.

Prices start at $23,000 for an entry-level design system based on a 20-MHz Sun 386I with 8M bytes of random-access memory, a 155M-byte hard disk drive and a 19-in. monochrome monitor.

At the high-end of the line is a digital design system, priced at $62,000, based on a 25-MHz Sun 386I, offering 8M bytes of RAM, a 327M-byte hard disk and a 19-in. color monitor.

Standard system-level software for the Advansys series includes Sun's SunOS operating system, Transmission Control Protocol/Internet Protocol communications software and Sun's Open Network Computing and Network File System, the spokesman said.

Shipments of Advansys systems based on the Sun 386I are slated to start in September. Advansys systems based on Daisy's Logician workstations are scheduled to start after the expected late-fall release of Sun's X11/News graphics and windowing software, according to Daisy.

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HP sliding

CONTINUED FROM PAGE 57

pany's annual users group conference last fall, "it's hard to go out there and sell aggressively. We're going to be much more aggressive in the marketplace."

The delay of Spectrum caused HP's standing in the minicomputer market to dip for several years, analysts said. The company's 1984 market share of 6.3% declined to 6% in 1986 but should climb to 6.6% by 1989, according to Shao Wang, a computer industry analyst at Smith Barney, Harris Upham & Co. in New York. Infocorp estimated HP's 1982 market share at 7.1%, dropping to 5.4% in 1986 but edging back up to 5.7% in 1987.

Although Infocorp said it expects HP's market share to climb further this year and in 1989, a spokesman for the firm would not give any specific projections.

Analysts said HP's new aggressiveness, its RISC-based architecture systems and its good reputation for customer support should help the firm chip away at minicomputer rival IBM, whose users are still waiting to see what AS/400, previously code-named Silverlake, is all about. In addition, some observers said HP is beginning to steal a little of DEC's thunder.

"There has been some erosion in DEC's market share recently, in part due to a slowdown in buying because of the October stock market crash," said Lawrence Harris, a computer industry analyst at Bateman, Eichler, Hill Richards, Inc., an investment banking firm in Los Angeles. "We also believe, in part, that DEC is losing some market share because of HP," he added, although he did not cite any specific figures.

Doug Spreng, general manager of HP's Commercial Systems Group, said HP is "very close to announcing the winning of several large, significant new customers," particularly in the manufacturing and financial services area.

Spreng did not elaborate on the identity of the customers but attributed their defection to HP to their interest in Precision Architecture as well as New Wave, a PC-based graphical interface, HP's Unix-based workstations and its Advancenet networking software.

Still, HP users contacted by *Computerworld* said they based buying decisions on traditional criteria rather than flashy ad campaigns and new architectures.

Practical matters

At Envirex, Inc., a Waukesha, Wis.-based water-treatment equipment manufacturer, Precision Architecture was only an "indirect" factor in the company's decision to convert from a remote IBM 3081 to an HP site.

Envirex acquired an HP 3000 Series 70 based on traditional complex architecture rather than beginning with RISC. "We wanted to start out on a small scale and then exponentially increase, and the conventional architecture was appropriate," said Dave Krohn, manager of business systems and services. Envirex has an option to upgrade to Precision Architecture in its contract with HP, he said. "Precision Architecture appears to offer some advantages, but we are not committed to it at this point."

Neither is the Metropolitan School District of Warren Township in Indianapolis. The school system is set to convert from an IBM 371 batch processing mainframe and a Wang Laboratories, Inc. VS 80 to an HP 3000 Series 70 in August.

"HP just happened to be the least expensive vendor we could have chosen to run the software we needed," said Jon Stock, director of data processing.

All in all, users and analysts said they do not expect HP to run away with the minicomputer market anytime soon. But, San Bernardino County Credit Union's Facer said, Precision Architecture "does give them a certain edge."

Vaxstations

CONTINUED FROM PAGE 57

to DEC's desktop workstation line feature an eight-plane graphics coprocessor — double the current capacity — that draws on more than 16 million colors to offer 256 simultaneous on-screen color choices, a DEC spokesman said.

In addition, the spokesman said, a 12M-byte memory expansion module boosts total system memory capacity to 14M bytes — more than twice the current 6M-byte limit.

Available under either DEC's VMS or Ultrix, the Vaxstations include the Microvax II CPU and floating-point unit and supply the user with a keyboard, a mouse, an Ethernet controller and a choice of a 15- or 19-in. color monitor.

And it does windows: All Ultrix-based Vaxstation 2000s include X Windows Version X10.4 as well as the Network File System and C, Fortran and Pascal compilers. All of the new Vaxstation configurations, a DEC spokesman said, are wholly compatible with applications developed for other DEC workstations.

The July wave of Vaxstations will give DEC an entry competitive with, for instance, Sun Microsystems, Inc.'s Sun-3/60 and the DN3000 and DN4000 from Apollo Computer, Inc., DEC said.

A diskless Vaxstation 2000 system featuring an eight-plane coprocessor, 6M bytes of memory and a 15-in. color monitor will cost $13,830; configured with 14M bytes of memory, the system will sell for $18,530.

Local storage or backup is available via 42M-, 71M- and 159M-byte disks, a 96M-byte streaming tape and a 1.2M-byte floppy disk.

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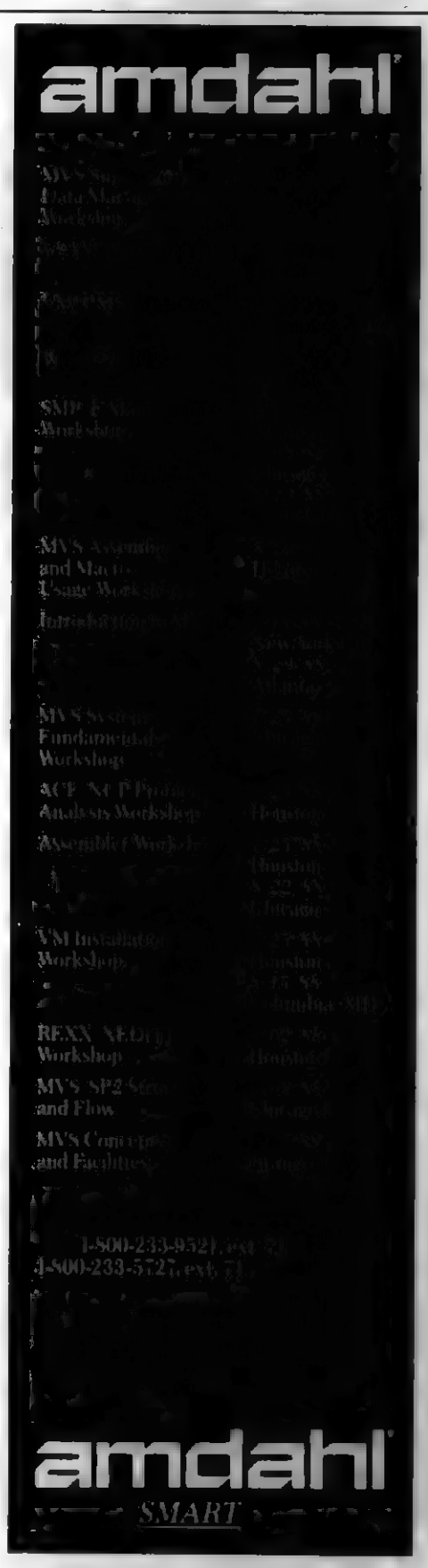

Unisys links former firms' components

BY STANLEY GIBSON
CW STAFF

BLUE BELL, Pa. — Accomplishing much sought synergy between former Burroughs Corp. and Sperry Corp. lines, Unisys Corp. recently announced that disk drives intended for Burroughs-type computers will be available on Sperry-type mainframes.

Unisys said it succeeded in adapting the B 9494-24 disk subsystem to its 1100/90 and 2200/400 mainframe models. The B 9494-24 double-density thin-film disk subsystem was previously announced in June 1987 for use with Unisys A, V and B 7900 mainframes, which are former Burroughs models.

Offered on former Sperry mainframes, the subsystem, including the controller, is called the 9399-S/B 9494-24 Disk Subsystem. It offers more than 1½ times the capacity and 1.7 times the transfer rate of the previous Unisys Model 8481 disk drives at a reduced price per megabyte, according to Unisys.

In the course of five years, the drive can save users 40% to 70% in cost per megabyte compared with equivalent configurations of Model 8470, 8480 and 8481 subsystems including maintenance. Power consumption and heat dissipation are one-third less than on Model 8480 systems. The subsystem can also use up to 52% less floor space compared with previous configurations, the vendor claimed.

Faster seek

The B 9494-24 features an average seek time of 17 msec and a block multiplexer channel transfer rate of 3M byte/sec., which are improvements compared with previous subsystems, Unisys said.

The drive brings to fruition the benefits promised by the merger of Sperry and Burroughs two years ago, said Clive R. Taylor, vice-president and general manager of peripherals and attachments.

The B 9494-24 subsystem is scheduled to be available in September for volume shipments to 1100/90 users. Deliveries of subsystems to 2200/400 users is slated for June 1989.

A minimum configuration of 5G bytes consists of a 5057-42/43 dual-storage controller, a 9399-S dual-string controller and a built-in B 9494-24 disk drive.

The price of a 5057-42/43 dual-storage controller is $80,000. The 9399-S dual-string controller with 5G bytes of unformatted built-in disk costs $99,400, and the cost of the B 9494-24 5G-byte dual-spindle disk drive module is $70,000.

Gibson

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Network World began making requests to DEC to respond publicly to IBM's claims. After going back and forth with nothing concrete for almost a year, finally an unsatisfying white paper comes out.

As part of DEC's effort to set the record straight, the company is advocating the debit-credit benchmark. It will have results in about six to eight weeks, we are told, which would bring us to the time frame of its announcement of Decintact, a transaction processing package that is supposed to boost VAX transaction performance. There is no point in talking benchmarking unless the discussion makes you look good.

With no actual benchmarks to discuss at this point, DEC is merely trying to debunk Ramp C with a series of arguments, including the following:

- DEC claimed IBM tested its VAXs with phone line connections, which slowed them down compared with IBM systems with faster phone line connections. DEC said its VAXs are most often connected to Ethernet networks, not phone lines.

That may be true in most DEC installations. But for the kind of commercial transactions under discussion, phone line connections are most often used, according to one leading consultant.

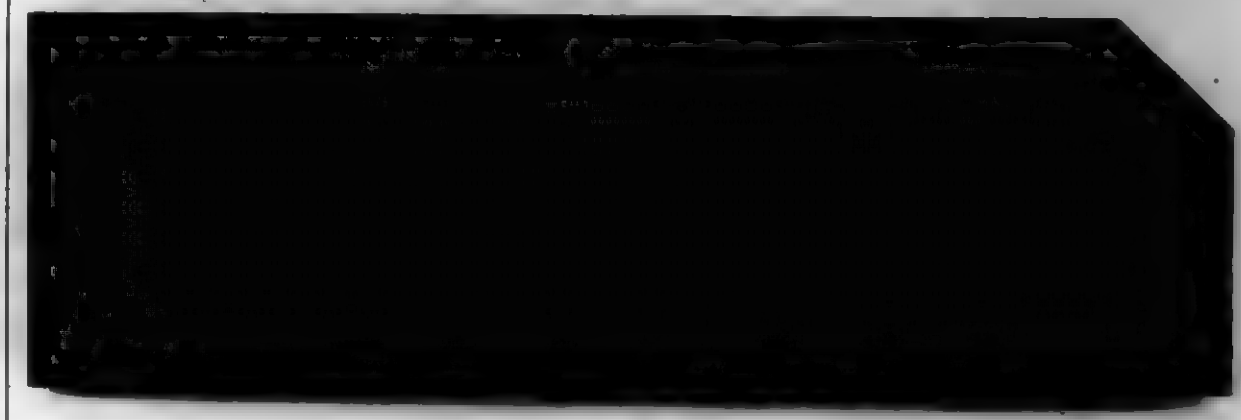
- DEC also claimed that IBM's tests do not measure cost per transaction, considering such variables as how many computer operators and programmers are required on average to run the system.

This is a highly variable measurement, depending on the company, the competency of employees, the number of machines purchased and the application. And DEC uses a survey that shows that it takes fewer people to run a DEC system than it does an IBM system. In short, DEC hasn't returned IBM's serve yet; it has just bought a tennis racket.

To be fair, IBM's initial shot was questionable. Its Ramp C discussion was not scientific in that complete data was not furnished. Further, IBM has said it will not publish the specifications of the proprietary Ramp C.

If the discussion so far has been inadequate, there is a bright side. DEC is promising to make all details of its tests public. Then, the ball will be back in IBM's court. And it will be very interesting to see how the industry giant responds.

Gibson is *Computerworld's* senior editor, systems & peripherals.



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NEW PRODUCTS

Processors

CIE Systems, Inc. has added two entry-level systems to its current product line. Both are aimed at smaller companies that have a variety of computing needs but are limited by budget constraints, the vendor said.

The **680/45** and **680/55** come standard with 1M to 8M bytes of memory, eight to 16 direct ports and four multibus slots. The 680/45 has a Motorola, Inc. 68000 CPU and is said to have a clock speed of 10 MHz. The Model 680/55 is based on an Intel Corp. 68020 CPU and has a clock speed of 16.7 MHz.

Both systems support Winchester disk drives in 53M- to 170M-byte capacities. A ¼-in. streamer tape is optional.

The 680/45 costs $9,995, and the 680/55 costs $14,310.

The company has also introduced the **680/175**, reportedly designed for businesses that require high-level computing capabilities, and the **680/275**, also a high-end system. According to the vendor, both units have clock speeds of 16.7 MHz and are based on a 68020 CPU that supports 2M to 8M bytes of memory. The 680/175 has an enhanced small device interface, eight to 32 direct ports and nine multibus slots. A ¼-in. streamer tape is included with the system. The unit costs $27,995.

The 680/275 has a storage module device interface and 16 to 128 direct ports. There are reportedly 15 multibus slots. A ¼-in. streaming tape drive is optional. The system costs $55,995.

CIE Systems, 2515 McCabe Way, Irvine, Calif. 92714. 714-852-1313.

Data storage

A reusable tape cartridge shell that allows recovery of data stored on damaged IBM 3480 tape cartridges has been introduced by 3M Co.

Called the **3480 Tape Recovery Cartridge**, the product was designed for use in data centers and conforms to all specifications for the 3480 drive subsystem. The cartridge is capable of performing 50 or more recovery routines and will be available through authorized dealers of 3M magnetic media products.

The 3480 Tape Recovery Cartridge costs $39.95.

3M/Data Products, 8200 Highwood Drive, Minneapolis, Minn. 55438. 800-888-1889.

Terminals

Data Decision Computer Corp. has announced the **3497-01/21 Workstation**, a 15-in. monochrome-display intelligent workstation with dual-session capabilities.

The product offers a 12- by 18-cell matrix in 80-col. mode, and the user may select either a green or amber screen. Three interchangeable keyboards are available in 122-, 102- or 83-key configurations.

The terminal also offers simultaneous IBM 5291 or 3197 terminal emulation and was designed for use with the IBM System/34, 36 or 38 computers.

The 3497-01/21 Workstation costs $1,495.

Decision Data, 400 Horsham Road, Horsham, Pa. 19044. 215-825-7600.

A color terminal said to operate in most ASCII environments has been announced by **Televideo Systems, Inc.**

The **Televideo 900C** includes a 64-color library that can reportedly display a virtually unlimited number of eight-color palettes and can emulate the Televideo 905, 910, 920, 925 and Wyse Technology WY-50 and WY-350 terminals.

The 14-in. monitor can display data in either an 80- or 132-col. format with 24 rows. Optional status and message/function key label lines may also be used. The keyboard includes 32 user-programmable function keys and 256K bytes of nonvolatile key memory.

The Televideo 900C has a price of $1,095.

Televideo, P.O. Box 3568, Sunnyvale, Calif. 94088-3568. 408-745-7760.

Printers/Plotters

Two printer-sharing products have been introduced by **Extended Systems, Inc.** The **Sharespool Model ESI-2098A** and the **Multispool Model ESI-2398A** were designed for graphics and desktop publishing applications. Both products include parallel Centronics Data Computer Corp. interfaces and memory buffers that range from 1M to 4M bytes.

The Sharespool ESI-2098A provides four input ports and one compatible parallel output port. All four input ports can simultaneously transmit data at rates up to 20K byte/sec. The printer is reportedly user-transparent and costs from $1,395 with 1M byte of buffer memory.

The Multispool ESI-2398A was designed for printer-sharing environments that require multiple printers and transmit large amounts of graphical data. The printer features four parallel input and two parallel output ports, as well as one RS-232 serial output. The ESI-2398A is priced from $1,695 with 1M byte of buffer memory.

Cabling options are available for both models.

Extended Systems, P.O. Box 4937, Boise, Idaho. 83711. 208-322-7163.

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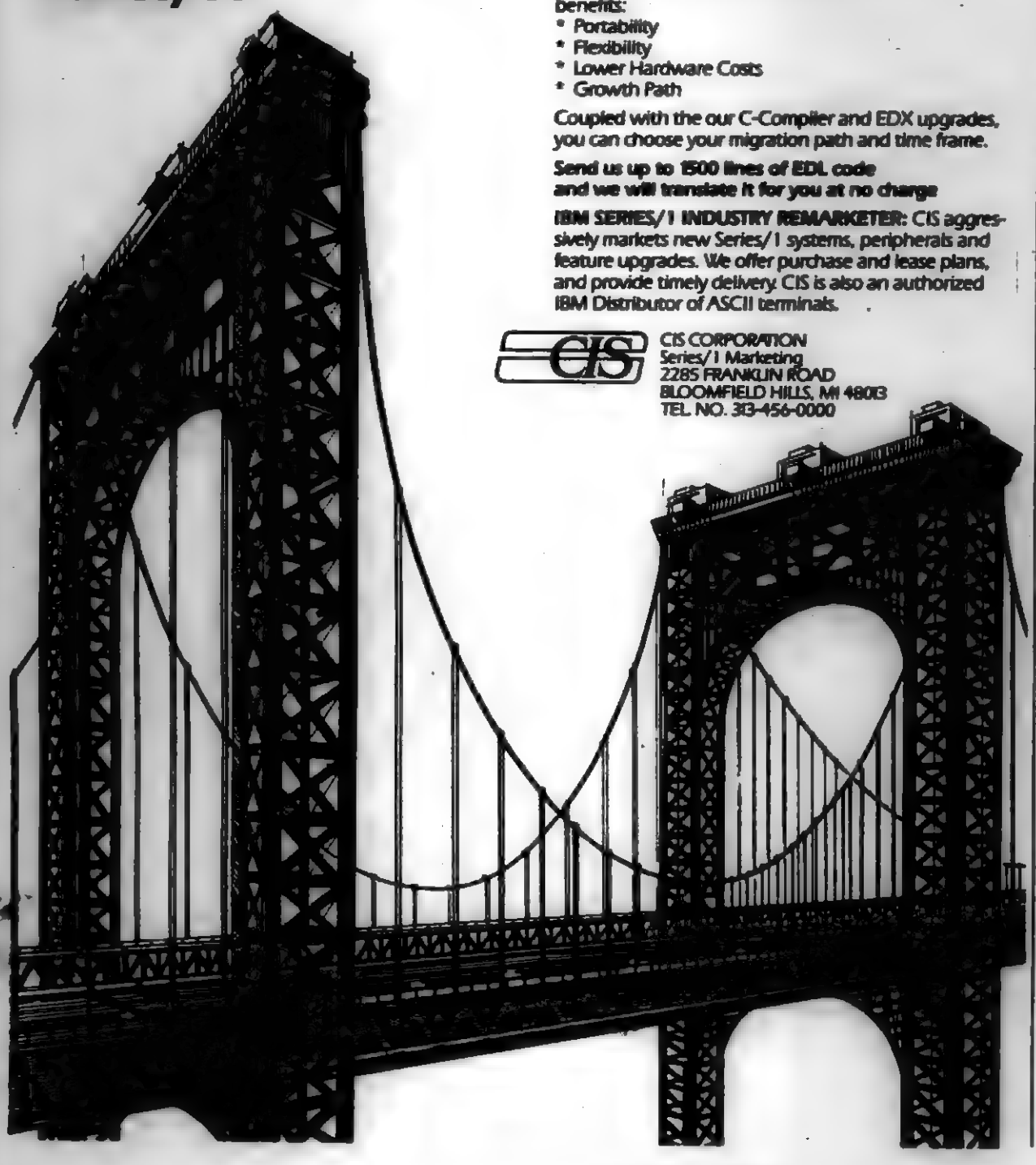

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Try a systems model for large PC net launches

BY JAMES BRYCE

The days of departmental-size local-area networks are quickly fading.

For many large organizations, the past half-dozen years have been a time of experimentation, of buying a handful of nodes from various vendors for pilot personal computer networks. Special projects or internal politics sometimes dictated more extensive use and resulted in permanent, departmental LANs, but for the most part, PC networks did not penetrate very far into the corporate computing structure.

But now, all that is changing. Organizations are contemplating, and implementing, networks of PCs that may range up to several hundred PCs in a single building, span a score of more buildings and transparently communicate with LANs of similar size throughout the world.

GTE North, Inc. in Westfield, Ind., provides one example of the new shape PC networks are taking. Three years ago, the company undertook the creation of a 2,500-node PC network, encompassing 13 geographically separate locations. "Our single biggest physical network is 700 nodes that are all PCs," says Dan Lively, manager of special projects.

While GTE North was an early adopter of the large-scale model for PC networks, there are definite indications that the idea is taking root in many other organizations. One such signal is the recent upsurge in the market for "network span" devices such as repeaters, bridges, routers and gateways.

According to Forrester Research, Inc. in Cambridge, Mass., this market, which amounted to $98 million in 1987, is likely to surpass $1.2 billion in 1991, specifically because of rising interest in company-wide networks.

DAVE JOLY

Bryce lectures, conducts seminars and writes on computing, high technology and the effects of technology on society.

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LANs don't have to pose a security threat
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Although networks fitting that description are not yet feasible, PC network installations have already reached levels of size and sophistication that make the ad hoc approach to the planning and installation of earlier LANs inappropriate.

Early efforts concentrated on the mechanics — the cables and cards — of physical installation. Often, the network was viewed as a cable system with special hardware attached. In particular, early LANs lacked cohesive software and systems planning to protect users from their own mistakes and safeguard information stored on the networks from destruction.

Not surprisingly, given the lack of organized planning and control, experienced MIS professionals regarded PC LANs in much the same way they viewed PCs themselves — as

Net launches

FROM PREVIOUS PAGE

interesting sidelights that were essentially irrelevant to serious computing.

During the last couple of years, however, the technology has grown sophisticated enough to support large, cohesive networks of PCs that equal or surpass minis and mainframes in both total horsepower and the number of users and applications supported. Planning and implementation decisions have also become more critical, demanding big dollars and thousands of hours of time.

Today's large-scale LANs must fit into the broader context of organizational information systems. Pilot networks that became permanent departmental units must be integrated.

Connections among the disparate parts must be created and maintained. In fact, in terms of expense, complexity and the sensitivity of the information handled, construction of today's large PC networks has more in common with building a major software application than with the rapid deployment of small LANs.

For that reason, it may be helpful to transfer some soft-

GTE North's Lively

ware development concepts used for creation of large-scale systems to the task of planning and installing these networks.

Software design requires a complete listing of the input and output expected and desired. In a network, this is roughly analogous to determining and reconciling user wants and organizational needs.

In systems development, it is also customary to consider any assumptions that form the basis for use of the program. Similarly, the organization's plan and anticipated growth must be factored into network planning assumptions.

Construction of data structures in system design corresponds roughly to the formulation of the functional specifications for a network.

Finally, in the context of a large systems project, the broad scope of the program operation is defined in the main module of control code followed by descriptions of the steps necessary to carry out the desired functions under this control.

Translated to network design, these phases encompass decisions concerning standards requirements and network architecture, the actual selection of network hardware and software and provisions for network management and security.

Although they may not have thought of it in that way, some early implementers of large PC networks have applied several of these systems development techniques in their own planning

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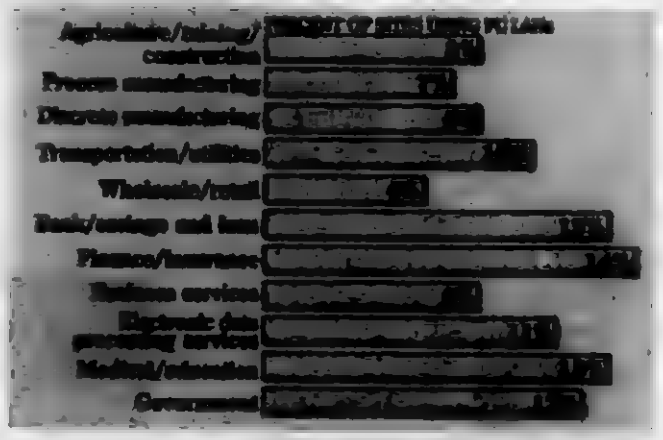
Financial services lead the way

Penetration of personal computer LANs within each industry group was determined from interviews at 35,000 sites having medium or large-scale host-based systems



INFORMATION PROVIDED BY COMPUTER INTELLIGENCE
CW CHART

Learning to program for network consumption

BY FRANK PAOLINO

A multiuser environment, such as a personal computer local-area network, requires a different approach to software development than individual applications. Both design considerations and programming techniques change radically once MIS enters the realm of networks. What follows are suggestions on how to evaluate user requirements and adjust design and management procedures to serve the general interest.

• **Look for usage patterns.** It is important to be familiar with the work group for which you are designing applications, studying not only what tasks are performed but also how the work group functions as a unit.

Special attention should be given to areas of high demand for particular records or files. If users continually need access to certain information that is locked by one user, response time will degrade far beyond the desirable one-second response or even the three-second limit that most users will wait.

• **Anticipate access requirements.** On PC networks, everyone should have access to the same files. Therefore, the programmer must tell the software to open files in shared mode. Otherwise, all subsequent accesses to the file will be prevented, which means that users will be locked out of the files and unable to continue processing. This is one of the first surprises programmers encounter.

It is also important to make sure that access decisions are realistic. Most programmers assign themselves total rights and test the program under these circumstances. The user, however, may not have access to critical files or directories. If he tries to access such files, the network returns to the program with "file not found" errors, dumping the user to the operating system. It is good practice to log in as a certain user and test the program to ensure that he has access when appropriate.

• **Prevent conflict.** One of the most difficult areas of adjustment is dealing with contention among many users.

File and record contention can drive users crazy. Many former single-user programmers allow a user to make changes to the data base and then attempt to lock the record to replace the changed data. If he cannot get a record lock, the user either has to continue retrying or abandon his changes.

An even worse complication can arise from faulty record-locking procedure when users want to simultaneously update two records in two different data bases. In such cases, users should be instructed to lock both records before proceeding. If they cannot get them both locked, they should not begin the update operation and should unlock the one record they locked. Otherwise, a second user may lock one of the records, while the first has the other locked, and they both might remain in an infinite loop trying to get both records.

This situation is known as the deadly embrace. It is solved by prompting users to attempt to lock before beginning the operation. If they are unsuccessful, return them to the menu.

• **Use locks judiciously.** Decisions about record-locking procedures can have a major impact on network efficiency and must take into account patterns of access demand and human factors.

High-demand records such as inventory containing on-hand quantity need the "lock/write/unlock" approach to record writing. For work groups that need access to thousands of records, such as policyholders of an insurance company, the method of "lock and wait" will suffice since the chance of 10 or 20 users conflicting is minimal. If they do, however, users can always escape to the menu and work on another record.

Any record writes need a lock when multiple users might have access. But only allow users to attempt to lock a record once. If a record is in use by someone else, display an error message and return the user to a menu.

A different type of lock that anyone programming for a network should know and cherish is the semaphore lock. As opposed to file and record locks, semaphore locks can be used to lock just about anything. They provide a warning flag on a network that tells others that the file or function is in use. They are also handy to allow certain functions to be done by only one person at a time. A semaphore lock will prevent two users from performing identical operations simultaneously. For example, to prevent two users from updating the same word processing file on disk, place a semaphore lock on the file name, "My Doc." This is now a network flag called My Doc that users can check. If it is not locked, the semaphore function will place a lock on it. If it is locked, the user knows that someone has the file in use.

• **Detour around common disruptions.** Single-user programming allows updates to the data base indiscriminately. In a multiuser environment, the program must make data base replaces in sections and with a record lock. But if there are too many sections, the record will be locked too frequently, with consequent delays in the program. Do not allow users to make updates in one field at a time. Instead, provide the ability to update in blocks.

Programmers can also save themselves and network users some trouble by preventing them from updating files while printing. If another user has part of the file locked, the printing program cannot proceed or must skip that record, making the printout incomplete. In addition, if the printer resides in a different office or building, users may not know a printer has jammed. The printed message will falsely tell the program and the user that the record has been printed.

The best method of selective printing is printing a batch of items based on a range of dates that identifies the records they want to print and prints them.

Keep in mind, too, that there are third-party software libraries available that allow spooling to any network printer. Using those, you can then write an "n" or "1" — for network and local — function that lets users decide where to send printed output. Once they decide, they can change the default printer, sending all output to that device.

• **Prevent corruption of critical files.** It is advisable to place all maintenance functions in a utility program separate from the main program and accessible only by the network supervisor systems administrator. Certain maintenance functions can only be performed when the file is opened in exclusive mode. If two people try to rebuild an index, it will become corrupted.

If users wish to create temporary indexes or data files, they must be required to give those files a unique name or put them in a private subdirectory.

Proper program design, along with an understanding of work group information-handling patterns, will enable the programmer/analyst to design a system that is open enough to keep most users happy but controlled enough to both protect information and prevent bottlenecks in the work flow. •

Paolino is a project manager at Mayflower Consulting Group, a management information consultancy in Burlington, Mass.

Macintosh connects.

Net launches

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and design projects. GTE North's Lively, for example, expended considerable thought on input and output, or needs and wants, before settling on a network plan for his company. His methods were not formal, but one of the first things Lively did was assess end-user requirements.

Although there was no actual survey of each individual user, Lively and his group did investigate departments that had installed prototype PC LANs to find out how those networks were being used. That research, Lively says, led to the conclusion that electronic mail and the ability to share information were the biggest benefits a PC LAN could offer GTE North. Since those were determined to be the major uses, Lively knew the network had to be more than a system of wires for pushing data packets around.

The network was viewed as a complete package offering end-user services. A network operating system with file sharing and E-mail fulfilled such needs. In this case, however, an organizational assumption — a marketing department goal of reselling as well as using whatever network was selected — added an extra complication.

In addition to an internal need for a large transparent system capable of handling the applications mentioned, Lively and his group had to factor in requirements of potential customers.

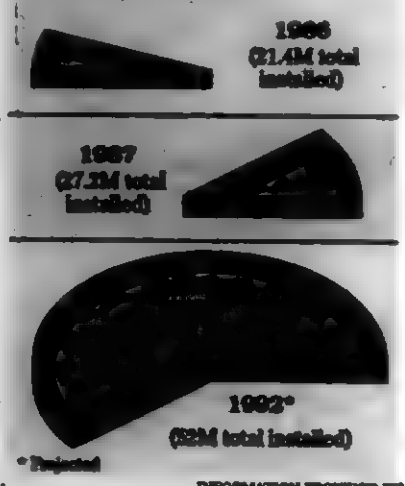
At Los Alamos National Laboratory in Los Alamos, N.M., which employs between 7,000 and 8,000 people at 60 sites scattered over a 30-mile area, both user desires and work flow considerations led to the decision to downsize from a minicomputer to a PC network environment.

According to David McNeese, the computing coordinator in charge of moving applications from Digital Equipment Corp. VAXs and Hewlett-Packard Co. HP 1000s to PC LANs, response time problems, return on investment and user convenience all factored into the conclusion. "We were pouring more and more money into older hardware with questionable results," he says, "and we had poor user front ends."

By providing applications such as computer-aided design and manufacturing, desktop publishing, virtual disk service, printer sharing, E-mail and connection to remote networks from a PC network, McNeese says, "we sought to be more responsive to user needs. The system was to provide a good, easy-to-use and reliable front end with minimal concern by the users over data integrity issues. The PC network gave us what we wanted."

PCs get hooked

Personal computer LAN links are beginning to make up a much larger portion of the total PC installed base



Functional specifications

After determining user and organizational requirements and evaluating these elements, the network planner is ready to provide the main module, a functional specification.

Paccar, Inc. in Bellevue, Wash., is a truck manufacturer that employs 10,000 people in 15 locations and produces Kenworth Truck Co. and Peterbilt Motors Co. trucks. At Paccar, nine basic goals provided the functional specification for a proposed PC network. According to Wayne Balsiger, senior research analyst, these goals were the following:

- Efficiency in the individual employee's workstation.
- Effective organizational interface at all levels.
- Mainframe access with multiple sessions, including data look-up and downloading.
- Fully operational PCs for analysis, word processing, communications and presentation graphics.
- On-line sharing of data files, spreadsheet analyses and manuals.
- Sharing peripheral devices such as printers, plotters and asynchronous dial-out modems.
- Hardware systems that will not become obsolete when a new operating system comes out.
- Minimum rekeying of data.
- Communications among all departments, divisions and selected outside suppliers.

These nine goals provided that "functional specification" for Paccar. They tell prospective vendors what the system is supposed to do but not how to do it.

Determination of what the network is to do is the first concern of Liz Bross, office automation manager at Southland Corp. in Dallas.

Southland is best known for its 7-Eleven convenience stores, and many of its approximately 50,000 employees are directly involved with such outlets.

Southland has 15 of Novell, Inc.'s "S" systems and two token-ring Novell networks. Each

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Reality check

What users say they want and what they actually need for personal computer local-area networks may differ greatly. The following is a list of questions that may be used to help determine user wants vs. user needs.

✔ How many users groups or communities of interest are there? Where are they located geographically and/or physically? How many of these groups need to communicate with any other group or groups? Are there any special characteristics associated with any of the groups required for communications?

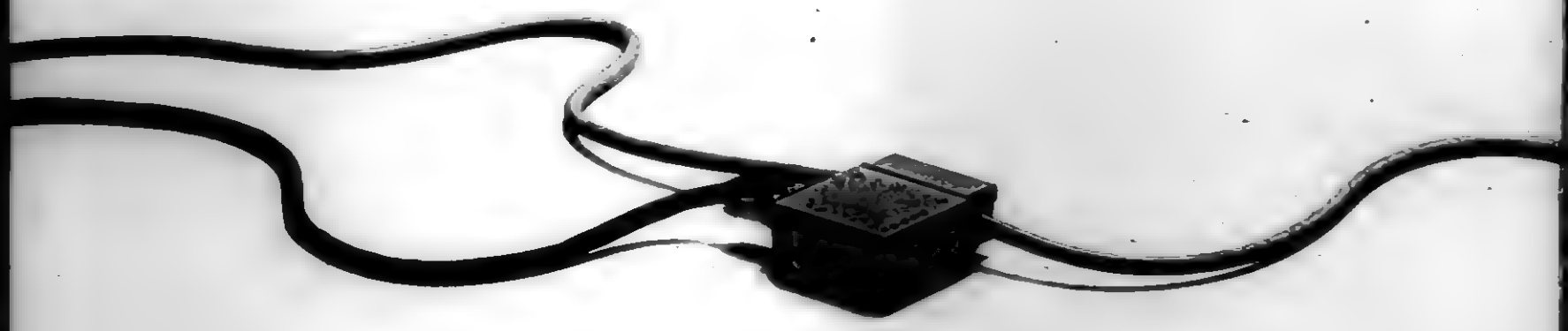
✔ What kind of data exchanges are taking place both within and between groups? Classify them according to activities such as file transfer, interactive, remote job entry, electronic mail and so on. What are the best traffic estimates for each type of activity within and between groups? Can the interchange volume be classified as low, medium or high?

✔ Characterize each user group in terms of its activities and any forecast changes. For instance, are activities in support of a centralized approach that the company plans to decentralize in the near future?

✔ Are there new activities that one or more groups plan on implementing that will have network impacts? For instance, are they planning on computerizing the preparation of manuals or technical materials using, for example, desktop publishing as opposed to regular word processing? Is the engineering department planning on purchasing intelligent computer-aided design and manufacturing workstations in the future? Capture all future impacts on network capacity, number of logical and physical connections, gateways and so on.

✔ Will you need a system of distributing costs and billing back to your users groups? These issues can have a large impact on network administration and support functions.

Excerpted and adapted from *Implementing Local-Area Networks* by Gene White, published by Network Management Services in Murray, Utah.



EXECUTIVE REPORT

Will a net fly with radio transport?

BY AMY SOMMERFELD FIORE

Are you sick of waiting for the International Standards Organization to finish its Open Systems Interconnect protocol? Too impatient to wait for Integrated Systems Digital Network (ISDN)? Frustrated personal computer network managers have one inexpensive alternative they can turn to now: a radio-area network.

"It offers instant gratification," says David Levin, president of Netcomm, a New York-based network consultancy.

A radio-area network is based on modems with built-in radio transmitters and receivers. The end user sends a message or file to an address, and the modem uses packet-burst techniques to send it to another radio-based modem at frequencies in the VHF/UHF land-mobile range — the same range police and fire departments use. Although they do not support network operating systems, radio networks offer inexpensive asynchronous 9.6K bit/sec. rates — so-called "thin-route" transmission — in a 10- to 15-mile radius.

Advantages

Aside from a quick fix, radio boasts three basic benefits: it's less expensive than leased lines; it can be run where telephone lines are of poor quality or unavailable; and network terminals can be relocated without dropping more cable.

"I know some companies are looking at implementing radio on a large scale," Levin says. "Connecting a lot of single-terminal locations makes leased lines very expensive."

One radio network vendor, Dataradio Corp. in Atlanta, describes two scenarios in which radio is an attractive alternative:

Fixed systems. A radio network replaces leased lines between terminals and a host — either point-to-point or multipoint connections — to save monthly line or toll charges, decrease dependency on phone lines or avoid laying cable.

Mobile systems. A radio network provides data access in vehicles, on shop floors or across rural landscapes — areas where it is impossible or impractical to make physical connections.

"The problem with most other mobile data systems is the large start-up cost," says Steve Beeferman, vice-president of marketing. "Because everything must be custom-designed, it can cost users $50,000 or $100,000 to get started."

Dataradio claims a broad range of current applications including: connection of point-of-sale terminals in instances where multidrop lines are not feasible; local distribution of data carried long-haul on packet-switching networks through connection of the radio modem to a CCITT X.25 pad; and in-plant telemetry for manufacturing process control.

Radio-area networks can also come in handy in areas where telephone service is poor. For example, when Texas Air extended its System One airline reservation system to travel agents in the Caribbean, Puerto Rico and the Dominican Republic, it found itself faced with problems of erratic line quality and long waits for new line installations. The solution: Agents use a radio network to access long-distance circuits in hub cities like Santo Domingo, from which they can access the System One host in Houston.

In another instance, an Indiana newspaper publisher uses a radio network to link its two daily papers, located 18 air miles apart. The company supports two host computers — one for business data, the other a publishing system — and users were competing for access time over two 1,200 bit/sec. leased lines. As the need for data began to impinge on the lines' availability for voice traffic, the publisher replaced one line with a radio network, saving roughly $500 per month and leaving the voice line dedicated for voice.

> RADIO networks are "a technocrat's dream in terms of sexy technology."
>
> DAVID LEVIN
> NETCOMM

A close competitor to Dataradio is Commercial Resources Communications Corp. in Naperville, Ill. The company's Freedom Modem uses X.25 packet-burst technology to provide 9.6K bit/sec. transmission for up to 255 users. Running on the 72-MHz VHF radio frequency, the modems can transmit cleanly over a 10-mile distance. Additional units can be used as digital repeaters to gain even more distance. Each modem costs $1,850.

Ten Commercial Resources' modems are being tried out in handheld terminals on the trading floor of the Chicago Mercantile Exchange. Eventually, all 700-odd traders may be equipped with them. In addition, Compaq Computer Corp. installed the radio modems in its manufacturing facility on test equipment that rotates, which makes wire connections awkward.

Other applications include telephone bypass, remote data acquisition and a direct interface to programmable controllers for industrial control monitoring.

To implement a radio-area network, companies must get a

Federal Communications Commission license and an FCC-assigned frequency of their own and put up an antenna at the optimal height for their area and application.

Netcomm's Levin calls radio networks "a technocrat's dream in terms of sexy technology," but he warns potential customers of real weaknesses in the devices. For one thing, he says, "Any physical connection is more reliable than something propagating through the atmosphere." He disagrees with radio network vendors about how susceptible packet-radio transmissions are to sunspots and weather conditions. "I work with radios a lot, and they are marvelous, but I wouldn't want to depend on it daily for data transmission," he says.

The vendors, meanwhile, tout reliability as one of the benefits of radio. Commercial Resources relies on the carrier-sense multiple-access technology to manage network traffic and uses a 16-bit cyclic redundancy check for error detection and correction. Dataradio, using its own error detection and correction, claims a bit error rate of one in 10 to the minus 11th, which Beeferman calls "essentially error free."

Security hazard

Levin also points to data security as a major barrier for some potential users, particularly if their transmissions include sensitive financial data. "You are broadcasting your data," Levin says. "Anyone can intercept it and even rebroadcast it — without your knowing." Levin says this is not in any way illegal under current case law nor is it restricted by the FCC. Dataradio reports some of its users encrypt their data before transmission for this reason.

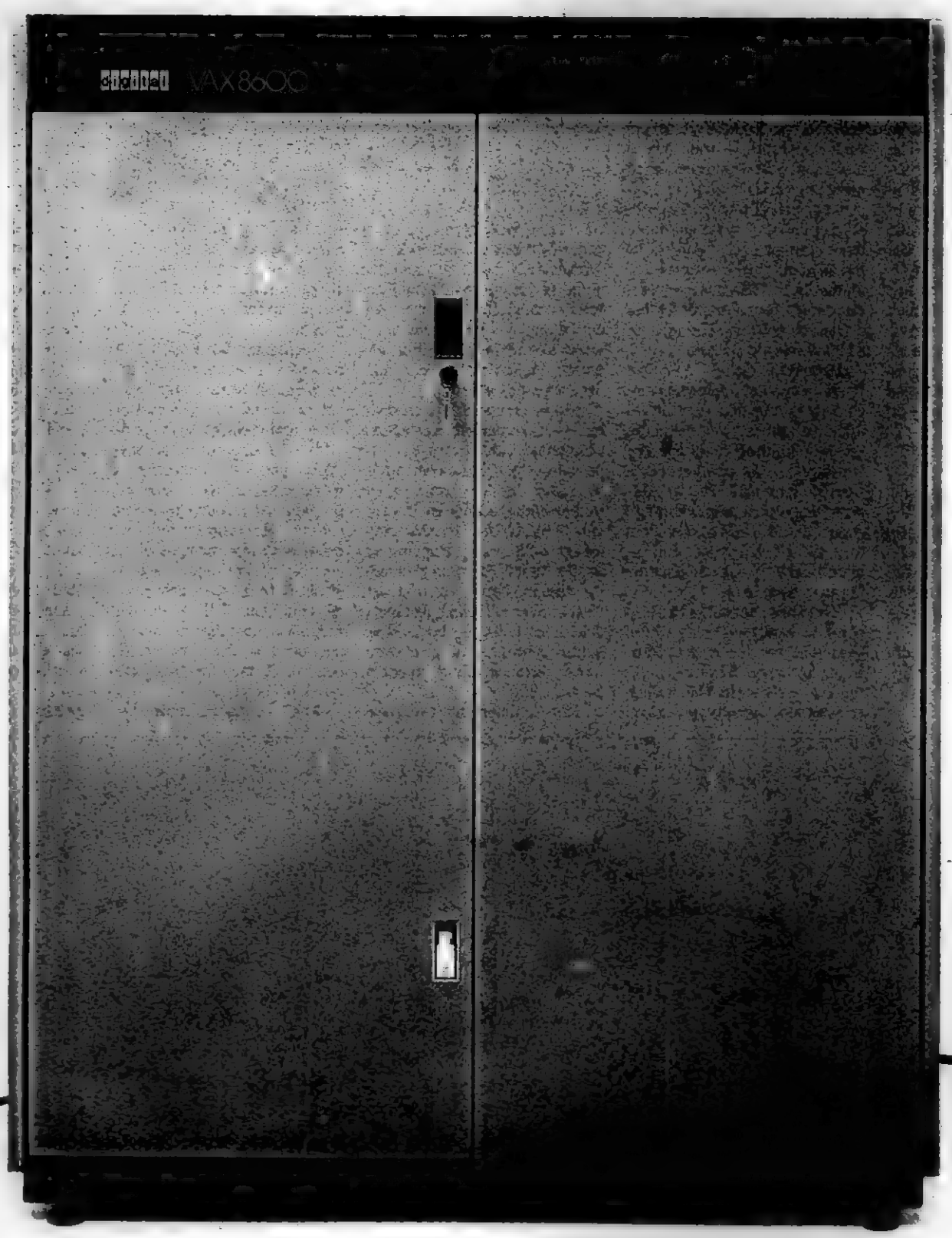
Last, Levin notes some environmental concerns. "Anything that transmits radio frequencies has the potential to exceed FCC guidelines, and that can cause real problems" to the health of anyone working in the area, particularly pregnant women. "It's the same as putting microwaves inside," he says.

One thing everyone seems to agree on is the relatively narrow window this market has to prosper. L. J. Giaramita, Commercial Resources' communications officer, will not make predictions beyond five years, and Dataradio's Beeferman admits ISDN may remove radio's cost advantages.

Levin says it is a "temporary aberration in the market" that makes radio networks cost justifiable and attractive today. "It's viable," he says, "but if bandwidth continues to get less expensive, I question its prospects." •

Fiore is a *Computerworld* senior editor, features.

Macintosh connects with Digital.



Net launches

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is installed as a single-server network for a department. The company uses the networks primarily for printer and file sharing within departments. E-mail is handled by IBM's Distributed Office Support System on the mainframe.

"Eventually, we may integrate some of the networks to optimize server disk space use but not for information exchanges between departments," Bross explains.

First things first

To determine functional specifications, Bross says, "First, we go into a department and conduct feasibility and productivity studies. In this case, our primary justification for the network was sharing high-quality laser printers and setting up a common user interface — we were not necessarily looking for increased productivity."

Southland's determination that all PC LAN use would be restricted to connections within departments and that no communications would flow among departments on the network was pivotal in the selection of a network operating system.

The company's selection of Novell is based on departmental servers rather than organizationwide connections. Interdepartmental communication exists through the mainframe, not the PC LAN. Bross emphasizes the continued importance of the mainframe in providing organizational communications through E-mail, explaining, "We use Irmalan as a gateway to the mainframe on some of our LANs. The gateway maximizes ports on the controller. We like the gateway now over the use of Forte boards."

Paccar's Balsiger echoes Bross's view of the advantages and economics of mainframe connection through a gateway on the LAN. "We have gateways to the 3270 giving us shared resources using the networks," Balsiger explains. "I can have 64 logical units with two sessions per PC and will have four sessions under software we are installing now."

Money in the bank

According to Balsiger, a cost comparison showed that it was more than $100,000 less expensive to install a Banyan Systems, Inc. network with three servers, physical connection to the host and software to maintain four simultaneous sessions to the host on each PC than it was to install host terminals capable of four sessions alone.

"If we want to have more sessions," Balsiger says, "we can add increments of 32 logical units at a cost of about $4,000 for the software, modems and gateway card for a server."

Paccar is using 802.5, the IEEE token-ring standard, with twisted-pair wire as the basis of its system. The main location has one Banyan BNS server and three Banyan DTS servers for a current total of 50 workstations.

Balsiger points out that the servers may be expected to support several times that number of workstations.

At Paccar, the selection of Banyan's Virtual Networking Software operating system, better known as Vines, was made on the basis of ease of upgradability and network administration, Balsiger says. "Adding a

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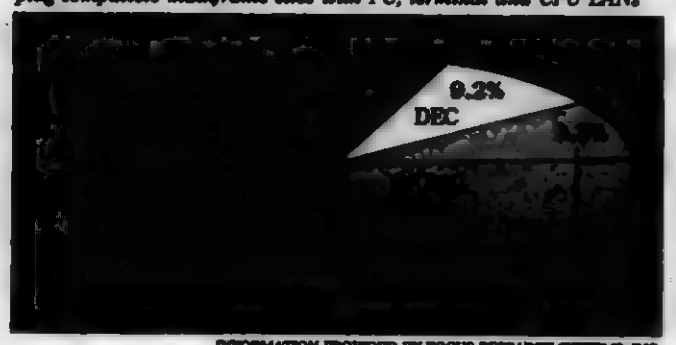
"WE SOUGHT to be more responsive to user needs. . . . The PC network gave us what we wanted."

DAVID MCNEESE
LOS ALAMOS NATIONAL LABORATORY

IBM, Novell hold lion's share of LAN market

Vendor market share figures taken from a sample of 7,500 IBM and plug-compatible mainframe sites with PC, terminal and CPU LANs



INFORMATION PROVIDED BY FOCUS RESEARCH SYSTEMS, INC.
CW CHART

A glossary

The following is a guide to selected network terms provided by Digital Consulting, Inc., a networking consultancy in Andover, Mass.

Access methods: One of two techniques used to enter a shared communications system or gain access to the network for transmission: Carrier sense multiple access/collision detection (CSMA/CD) is an access method where contention is resolved by collision detection; if two stations have transmitted at the same time, they will both stop and send jamming signals to tell everyone a collision has occurred. Token passing is an access method in which a workstation is allowed to transmit only when holding a token.

Amplifier: A device spaced at intervals throughout a network to boost the strength of electronic signals that weaken as they pass through the cable network.

Baseband: A transmission technique or signal in which data from different users are combined in a serial stream for transmission along one common path. In a baseband network, the signals are not modulated, so only one kind of data can be transmitted.

Bridge: A device that permits communication between two local-area networks that have similar protocols. Unlike gateways, bridges do not perform protocol conversion.

Broadband: A transmission technique or signal that allows multiple users to simultaneously share a path. Also permits a variety of information to be transmitted.

Fiber Distributed Data Interface (FDDI): An American National Standards Institute standard for high-speed, fiber-optic LANs. Particularly suited to networks that transmit enormous amounts of data.

Gateway: A device that uses protocol conversion to connect dissimilar communications systems. Provides the translation from one set of protocols to another.

Repeater: A network component that extends or regenerates digital signals, thereby extending the length or interconnectivity of the communications medium.

802.3: A bus-structured LAN (often referred to as Ethernet) based on the CSMA/CD access method. 802.3 LANs have been installed worldwide.

802.4: A bus-structured LAN based on the token-passing access method. Suitable for industrial applications.

802.5: A ring-structured LAN based on the token-passing access method and developed largely from work done by IBM.

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user takes only three minutes. When you update the software on Banyan, you don't have to go to each machine and update the paths like [you do with] Novell.

"Installation of new Banyan software is done by answering four [performance] questions. 3Com took 50 questions and four hours. Novell took about two hours," he says.

Another functional standard that ranks high for many organizations is easy connection, and, in most instances, this means looking for the most generic solution possible. Movement to new, all-encompassing operating systems, especially OS/2 and its attendant, Microsoft Corp.'s LAN Manager or IBM's LAN Server, is still an open question in most organizations. But adoption of established standards is clearly encouraged.

"Make sure you have the standards and don't deviate from them," says Rick Booth, supervisor of end-user computer services for North American corporate banking at the The Bank of Nova Scotia in Toronto.

The bank is a $71 billion — Canadian dollars — institution with more than 1,000 offices in more than 40 countries. "If you accept as a requirement universal corporate connectivity, then you have to have one, and only one, standard. If this is not possible, there will be an excluded area or an eventual throwaway of the nonstandard," Booth says. "You have to design networks for use over a period of time. You're not going to throw out the network. You're looking for a strategy that is more universal in nature than departmentalized. The network is the fundamental building block."

Emphasis on standards also provides greater variety in selection of products and even encourages vendors to actively promote interconnection.

An important area to explore is the need for communications among work groups, departments, divisions and other layers of the organization that might have physically distinct network systems. The goal is determination of both gateway and network operating system needs.

"We were most impressed by their commitment to standards," says Tim Crowell, vice-president of the trust department's LAN group at First Republicbank Dallas NA, explaining why the statewide banking corporation chose 3Com Corp. as a corporate standard. "We liked the idea that they wanted to stay generic. We wanted one workstation to be able to get to anything — mainframes, minis, micros. We have Amdahl, Wang, Prime and Microdata. The trust department was growing so rapidly that

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"OUR primary justification for the network was sharing high-quality laser printers and setting up a common user interface."

LIZ BROSS
SOUTHLAND CORP.

Growth potential depends on operating systems

Familiarity with the ins and outs of various vendors' local-area network operating software is vitally important for a network planner. At the moment, achieving that goal is not out of the question because only three companies — 3Com Corp., Novell, Inc. and Banyan Systems, Inc. — dominate any discussion of large personal computer LAN operating system software. Other companies are beginning to enter the fray, however, and it may be helpful to isolate a single key point of difference, such as how objects are tracked within the network, for examination.

The method a network operating system uses to keep track of the objects — users, physical devices and files — attached to it is particularly pertinent to a discussion of PC network growth, because it is this method that determines whether an operating system is capable of managing a large and diverse population. Smaller PC networks can keep up with all their object components simply by describing where they are and by tracking according to pathways.

When networks grow to a certain size, however, this method becomes extremely complex and another kind of system is needed. The most workable methods are based on the "clearinghouse" concept developed a decade ago at Xerox Corp.'s Palo Alto Research Center.

One of the current big three companies, Westboro, Mass.-based Banyan, has specifically designed its products for the larger, corporatewide system. The most important feature offered in assuring Banyan's position is its software, Virtual Networking Software, better known as Vines. Vines Version 3.0 is currently available.

Vines keeps track of objects — physical devices, users and information — in the network through Streetalk, a naming system based on Xerox's clearinghouse concept.

By any other name

Every object in the network is known by a name. The physical location of each object is maintained within a file system — the name server or clearinghouse are generic descriptions for such a file system. Every device on the network queries the clearinghouse for the location of the object. What makes the Banyan Streetalk version distinct from the original Xerox model is its distribution across a number of devices on the network.

In a classic clearinghouse system, the failure of the clearinghouse server would bring down the network because there would be no way to find objects. But Vines distributes the service over many servers and thus avoids such failure.

In contrast to Banyan's emphasis on the total organization, 3Com in Santa Clara, Calif., emphasizes the work group as the center of PC LAN design. 3Com also bases the identity of objects on a clearinghouse; 3Com's term is name server, but current versions of the software, 3+Name, must be located on a single machine in each physically distinct 3Com network, otherwise naming ambiguities and conflicts may appear. Thus, the failure of the single name server on a 3Com 3+ network brings everything to a halt because no objects can be found.

3Com representatives say the company is currently working on a solution to this single point of failure problem and expects to deliver a fix soon.

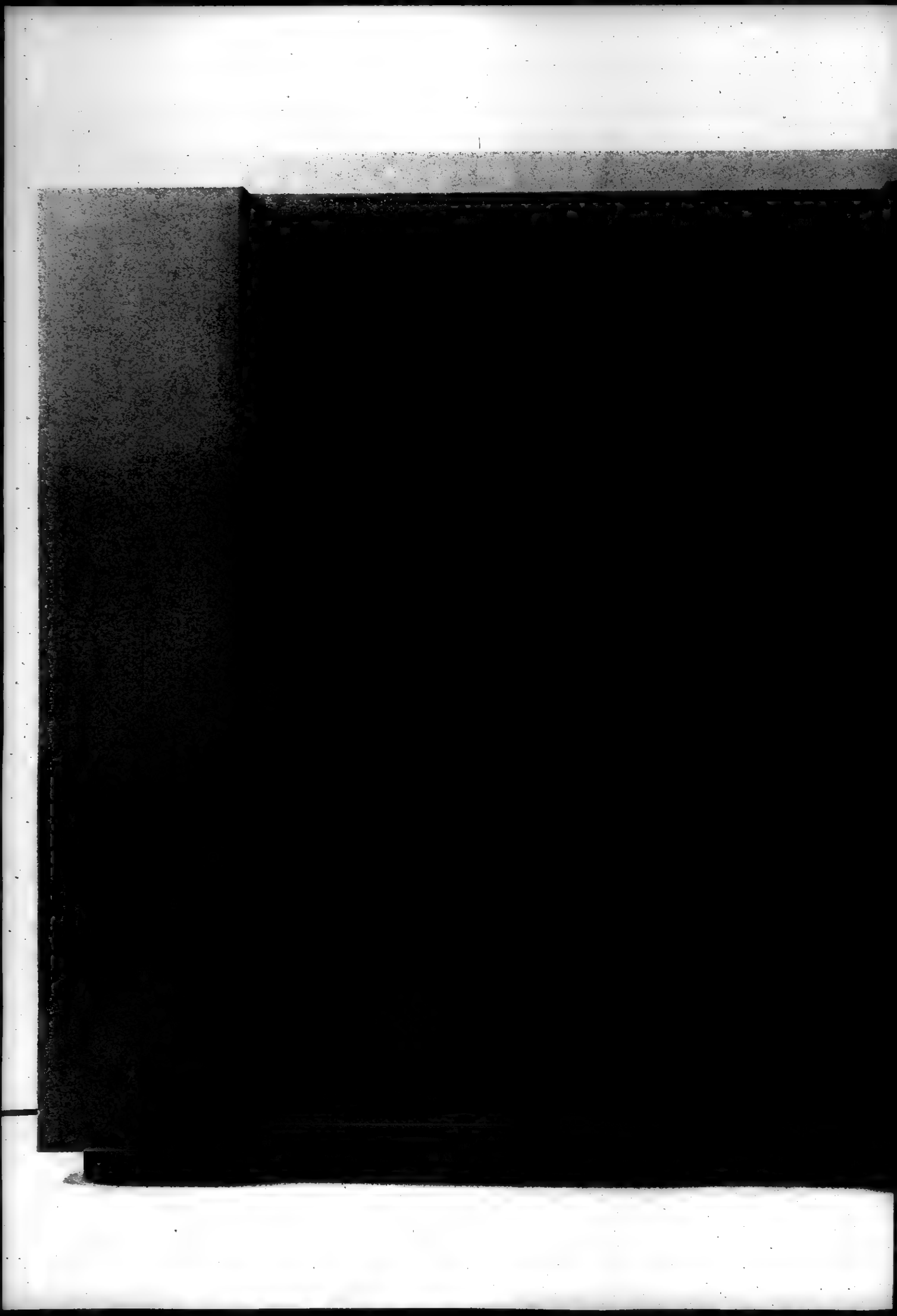
The remaining member of the current ruling triumvirate is Orem, Utah-based Novell, which also happens to be the leader in fault tolerance for PC LAN equipment. Novell's primary offering is Advanced Netware/286 Version 2.1. Its major marketing advantage has been the promise of maximum performance together with finely graded access rights from file servers. System fault tolerance (SFT) is one more major feature important for large networks.

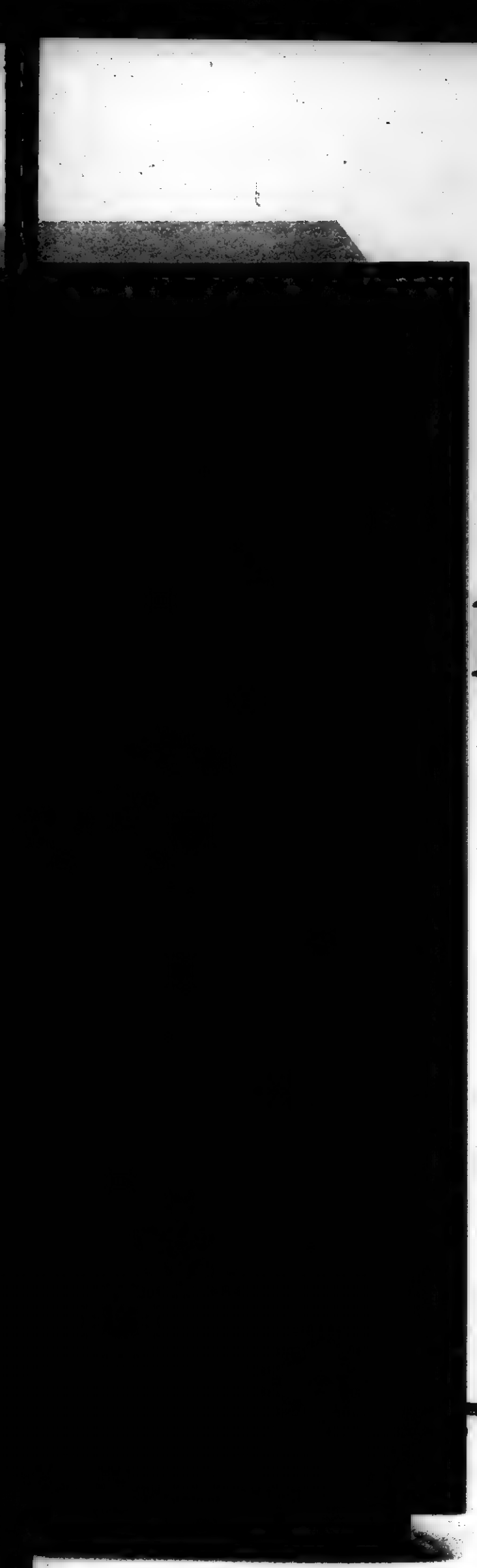
SFT is being offered in three stages. Level 1 examines a server disk during operation, detects failing blocks, copies information stored there to a better area and spares the failing blocks. Level 2 uses two disk drives on a server to mirror one another with one taking over for the other in the event of failure. Level 3, which has not yet been delivered, will provide mirrored file servers.

Although its emphasis on fault tolerance is likely to appeal to large network users, Novell also has one primary weakness in terms of meeting the expectations of that same user group. Novell's software is essentially tied to each file server. The identity of physical devices, users or information within the network is described by pathways unique to each server. This means that even a simple change in resources on the network — the transfer of a few files from one server to another or a shift in printer connection — could require the reconfiguration of countless programs containing the physical pathways to the objects. Informal conversations with company representatives indicate that Novell is considering providing a universal naming system based either on the clearinghouse naming structure or the Open Systems Interconnect X.500 protocol.

JAMES BRYCE

Macintosh connects with personal computers.





Macintosh connects with not-so-personal computers.

Net launches

FROM PAGE 70

everyone had to pull cable to new locations. The network replaced all the terminals in addition to performing the usual PC applications. When Bridge Communications [now merged with 3Com] showed us they could connect to all the other machines, that was the key that really sold us."

At Los Alamos National Laboratory, however, McNeese made the decision that higher performance was more critical than adherence to an industry standard. McNeese, who selected Proteon, Inc.'s Pro-Net 10, a 10M-bit token-passing ring, says he based his selection of Banyan operating system software largely on the laboratory's need for enterprisewide connection and communications.

Given the input and output of users, the laboratory researched the specifications of available products along with emerging standards for the physical protocol for communications. The token ring was chosen, but performance weighed against the existing 4M-bit standard. "The statistics presented at a DEC show demonstrated the 10M-bit 802.3 [Ethernet-like] network would outperform a 4M-bit token ring [the 802.5 standard] anytime. But a 10M-bit ring with high network loading will outperform both," McNeese says.

Los Alamos has 300 nodes with a half-dozen heavily used data bases. Connection between departmental networks is through a broadband system. An RS-232 port is established on a Banyan server; this is connected to a black box RS-232-to-RS-422 converter and then to a radio frequency modem that attaches to the general laboratory broadband network. The cable is shared with video and other signals. Since most of the communications are within departmental networks, and Banyan servers acting as bridges are intelligent — they send traffic to the backbone only when stations are addressed outside the immediate network — broadband traffic is minimal.

Network physical structure — whether it should be Ethernet-like or a token ring — has

"END USERS can't get the effectiveness and efficiency they want if they follow mainframe rules."

RICK BOOTH
THE BANK OF NOVA SCOTIA

been the subject of countless articles, debates and sleepless nights. Ironically, this choice is probably not as critical as many have thought. Planners in large installations have selected either one or the other, and each is perceived to perform well.

At GTE North, for example, the primary network consists of PCs using 3Com Etherlink network cards and various versions of 3Server. Cabling is "thin Ethernet" coaxial, which is a small, light, flexible cable rather than the heavy, inflexible ones in the original 802.3 design specifications. The other 12 locations have a total of 1,800 PCs on similar networks using a total of 106 servers and terminals.

There is a cable segment for each department with a backbone connecting it all. Repeaters connect the segments, but there are no intelligent gateways physically separating any portions of the network.

According to Lively, that means all packet traffic appears throughout the network all the time, so the installation works like a "worst-case" example of a carrier sense multiple access/collision detection network.

Still, he says, performance is excellent. "We have not had a diagnostic device installed, but we have not observed any slowdown from traffic," he says.

After wants, needs and assumptions have been translated into functional specifications and matters such as standards, operating system and physical architecture have been resolved, there are still two major control issues remaining: network management and security.

Even a small LAN will not run itself, and larger PC networks are complex systems that require people dedicated to maintaining their usefulness.

Establishing training, policy and effective management for an on-going network are continual processes. First Republicbank's Crowell is creating an elaborate management system for the organization's three-building network. One element of the management system is a policy that mandates removal of any data files that have been on a server for more than two months without being opened. Crowell's staff uses a diagnostic tool to find those in violation and requests their removal.

So far, he says, users have cooperated in this housekeeping chore. "We have not forced removal," Crowell says. "Most of this is education."

Other accountability measures include employment of a resource utilization tracking program created in-house to audit network activity as well as shell programs that overlay the logon process and force people to change their passwords on schedule (see story page 78).

Probably the most difficult balancing act in the whole process of planning, installing and

First Republicbank's Crowell

managing a PC network is finding an equilibrium between users' desires to access all the organization's information and the organization's need for security.

"Before [exploring] the possibility of connecting a mainframe to a PC network," says Booth from The Bank of Novia Scotia, "management tended to view PCs and PC nets in the same way — as a never-never land, not a grave risk. People in the mainframe environment have taken great steps to protect the mainframes. Then they attempt to apply the same protection to the PC world. This restricts the users on PCs more than they are used to. Resolution of this is still up in the air. The end users can't get the effectiveness and efficiency they want if they follow mainframe rules."

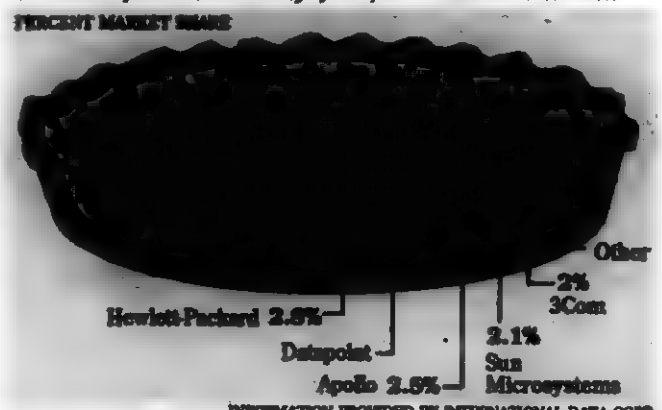
Initially, the most critical decisions facing any large organization looking for a comprehensive, enterprisewide PC LAN solution are selection of the network media access technique together with its attendant cable system and the network operating system.

These define the bank's fundamental building blocks discussed earlier. Once these initial blocks are in place, users' applications must be considered, and ongoing management of the network as a technological system and a collection of people communicating begins — and never ends.

Early adaptation of the techniques of approach honed in large systems development will substantially increase effectiveness and decrease costs. •

Apple's pie

Estimated vendor market share for non-IBM-compatible PC LANs was derived from a 1987 survey of 169,395 installations worldwide



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CW CHART: AMY J. SWANSON

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Macintosh, of course, is already conversant with the human race. People love (yes, "love," a term you won't find in the MS-DOS glossary) its graphic, intuitive and consistent way of working.

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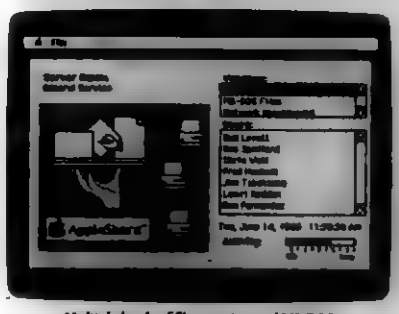

Multiple levels of file security and MS-DOS interoperability are just two of the many virtues of an AppleShare File Server.

MacAPPC makes Macintosh a true peer in an IBM SNA/LU 6.2 environment. And makes an IBM mainframe a true friend in a human environment.

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Add AppleShare PC software to your MS-DOS PCs and they fit right in. Because AppleShare lets Macintosh and MS-DOS PCs swap information almost as easily as Macintosh and Macintosh.

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So your local area network isn't just local. It's neighborly.

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But not too neighborly. Because AppleShare has powerful access controls. To let the owner of a file decide who, if anyone, may read it or change it.

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Make security a priority at start of LAN installation

Creates protected, as well as productive, network

BY SANFORD SHERIZEN

LAN may mean local-area network to communications and data processing professionals, but "limitless access nationwide" is what it typically stands for among those people concerned with protecting information.

LANs do not have to be a security liability. The fact that they often are is not because of any inherent characteristic of the network but rather because serious consideration of security is often postponed until long after installation.

By that time, so many essential network decisions have been made that security almost inevitably becomes an inadequate add-on.

An organization establishing a LAN should not leave itself unprotected. Security must be considered from the outset, even though it will add to the various complexities of installation.

The planning stage

In planning the installation of a LAN, it is wise for a company to start by taking the broadest possible view of security management.

Instead of focusing on individual safeguards such as password protections, call-back modems and individual encryption devices, attention should be concentrated on the larger issues of how to regulate a distributed network system with centralized management controls.

The key elements of network security are identification and control of information flow. Network security must ensure that all of those participating in a transaction have been correctly identified, and all data being transmitted from one system to another must be controlled to restrict modification, disclosure, replay or loss in the network.

Main objectives

The essential security management tasks, which should be performed in conjunction with the LAN planning and installation process, include the following:

• **Establish access rules.** Network access security is the prevention of unauthorised people gaining access to the network and its data. Unauthorised access can occur through another computer system attached to the LAN via a gateway or by a remote personal computer dialing in via a modem.

Access rules determine who the authorised users are as well as what activities they are and are not authorised to perform. Decisions about access authorization are usually based on a variety of managerial considerations.

Often, these issues are political in nature. For instance, some department managers feel that all their employees should have open access to the network, but that kind of sweeping authorization can undercut security and cut off individuals whose needs are more legitimate.

Managers must learn to make hard decisions as to who really needs what type of access. Managers should also be held responsible for any security breaches and violations if they do occur in their individual departments.

One rule of thumb is that the greater the access allowed by managers, the greater the number of technical restrictions that will have to be imposed by a company in order to keep outsiders out and authorised users within the established bounds.

• **Decide where to place controls.** Making this decision entails analyzing all the risks and vulnerabilities that could affect the network. Both passive and active attacks should be considered.

Passive attacks can involve people simply watching network traffic, monitoring how often the system is in use and how many people are using the system and reading various messages. Passive security breaches are dangerous because the network manager does not know they are happening.

Active attacks are actual attempts to gain access to the network to commit an unauthorised act, such as manipulating or copying data. Once the points of possible vulnerability have been established, the next step is specifying which nodes or files can and should be accessed by which users.

Every point of entry must have an access control label that identifies its security class and method of access. Auditability must be assured by user identification and authorization levels as well as access attempts.

TESTING, IN ORDER to be effective, requires thinking like a wrongdoer and exploring all conceivable ways that a LAN could be misused.

• **Assign security responsibilities.** Someone must be actively responsible for ongoing monitoring of network use and detection of unauthorised activities.

Network security falls under the purview of many people. While all employees using and administering the LAN should shoulder responsibility for security in their own individual ways, MIS usually takes charge. The telecommunications manager may want to be involved, too.

Because of the potential battle for control, the best way to handle assigning security responsibility is to take a team approach. Involve MIS, telecommunications, computer security and auditing staff. Most important, never allow just one person to be in charge — that is the kiss of death for any security system.

NEVER ALLOW just one person to be in charge of security — that is the kiss of death for any security system.

The designated team should be able to strike a balance between production and protection — you want not only a productive LAN but a protected one as well.

In addition, the company's security staff should periodically do risk-analysis reports and security-impact statements so that network security is not static but rather is a constantly changing as well as improving setup.

End users should also be charged with a certain degree of security responsibility. MIS and other network security personnel should impress upon users the importance of keeping passwords to themselves and logging off their computers at lunch time and also at the end of the workday.

The installation stage

The perfect time for network or computer criminals to gain control over a network is during installation.

With the rush to come in on schedule and the anticipation of completing the project, this is a time when security can be quite loose.

Therefore, during installation, a company should carefully protect equipment, documentation and sites. Keep all unauthorised people off the system and away from the installation area.

In addition, there are several specific security steps to take during installation:

• **Check security functions.** Does the network being installed have essential access control and security monitoring features such as automatic audit trail creation; preconnection authorization checks; transmission confirmation and validation facilities; data classification according to levels of sensitivity or source; and preventive controls over theft or physical damage?

These features are built into some LAN equipment but not all. Many systems come with security options, but there may be additional programming work to be done by in-house staff.

Be sure to check with vendors as to what the level and cost is of their built-in security features.

Also, if equipment does contain security features, don't rob yourself of their value by turning them off for convenience during installation and forgetting to turn them back on when the network is up and running.

• **Coordinate communications and security controls.** Wherever possible, network security controls should be integrated into network communication controls.

Make sure there is integration of encryption and message authentication for data security in addition to any communication error detection and correction.

Review the adequacy of authorization and access controls available to determine whether or not an individual, once allowed access to the network, is authorised to access particular network resources.

This includes access-handling systems such as volume and record locking. If any of these features are not built in to the system, find out how to add them.

A couple of important controls, typically not built into network equipment, are call-back routines and terminal identification. These techniques are used to determine if a user requesting access through a dial-up port is authorised.

• **Balance ease of use with security controls.** Security measures must be designed in a way that will encourage user compliance.

Specific access control safeguards such as logon security, passwords, physical access controls — terminal lock and key, card-reading devices or biometrics — and terminal identification are of no help if they are ignored or circumvented.

It is important, therefore, to strike a balance between absolute impregnability and user convenience.

With passwords, for example, this means making the construction complex enough to frustrate guessing by outsiders but not so cumbersome that users will be tempted to write their passwords down.

Testing

The job isn't over for a company until the strength of the security system has been tested in a fully installed setting. Testing, in order to be effective, requires thinking like a wrongdoer and exploring all conceivable ways that a LAN could be misused.

Possibilities for testing include: trying to gain access above an approved level; trying to use an unauthorised device on the system without detection; and trying to replay a previous data transmission such as a money transfer without detection.

In addition to these system tests, several other checks of security procedures are advisable. One example would be to review public bulletin boards to see whether the company's access codes and telephone numbers are listed or whether the type of LAN you have installed is being analyzed in any of these forums from a hacker's point of view.

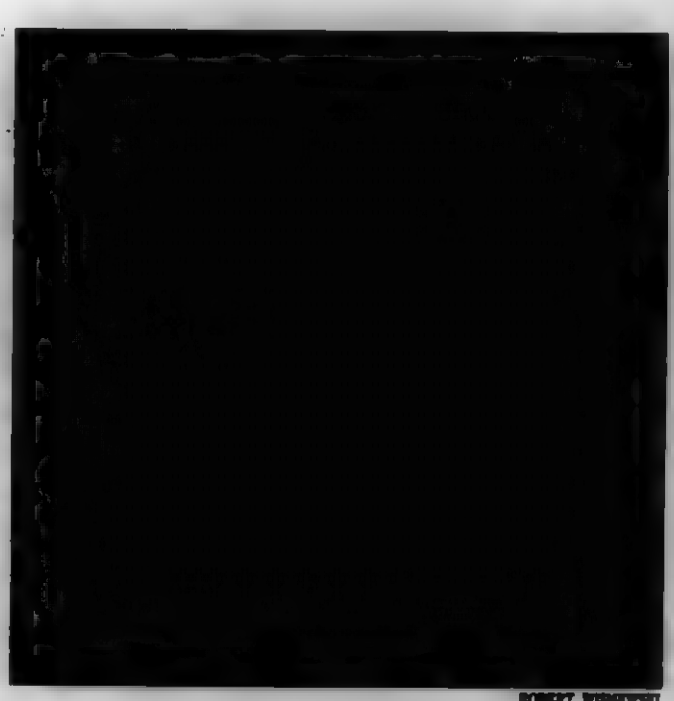
LAN planning, installation and testing are complex activities. Security only makes it more complex. Nevertheless, if these minimal security considerations are raised prior to and during installation of the network, "NET" could stand for "not easy target." •

Sherizen is president of Data Security Systems, a computer security consulting and training firm in Natick, Mass.

PC productivity labeled 'good enough' by end users

Vendors' extravagant claims were — in some cases — literally justified by their products

BY ALAN RADDING



ROBERT WEDEMEYER

How well do personal computer software packages stand up to their own productivity claims? Can PC users point to specific gains from the applications they buy? And do they need to in order to cost-justify their purchases?

Computerworld asked 10 end users to judge different PC packages against the vendors' productivity claims. Could the applications stand up to their own advertising rhetoric? And if they delivered some productivity improvement, how did it benefit the end users?

In general, the users questioned felt they did gain significant productivity help from their software purchase, although many could not quantify the benefits. Since these products are typically inexpensive, users were not pushed to justify the expense with a detailed cost-benefit analysis.

R&R Relational Report Writer is marketed by Concentric Data Systems, Inc. in Westboro, Mass., for use with Ashton-Tate Corp.'s Dbase. Advertisements for R&R promise users can "create Dbase reports in half the time without programming, or your money back." That promise, says Barry Gerken, Concentric Data's vice-president of marketing, is based on surveys of users and reviews in the computer trade press, which reported speedups of up to 10 times. "Depending on the complexity of the report, you can save hours or days," Gerken says.

One user's experience confirms it. "R&R lets you generate reports in a fraction of the time it would take using Dbase III Plus," says Cary Prague, assistant director of finance at The Travelers Corp. in Hartford, Conn. "R&R requires much less knowledge of programming."

Prague's department owns 20 copies of the package. He did a study to determine productivity and found that "what took me six hours using Dbase, I did in one hour with R&R."

Sidekick Plus. "There are stacks of productivity software you can buy for your PC. But to work smart, you only need one — Sidekick Plus," says the advertisement for Borland International's eight-function desktop management program. But Borland does not specify exactly what productivity gains Sidekick produces, except to note that "to add all the productivity applications in Sidekick Plus separately, you'd spend hundreds of dollars." Sidekick Plus retails for $199.95.

Steve Mann, now a business software evangelist at Apple Computer, Inc. in Cupertino, Calif., started using Sidekick as a free-lance computer consultant. He bought the program primarily for its calendar function. "Before I used Sidekick, I did scheduling on paper — a pocket organizer with a section for phone numbers," he says. The automated solution, by comparison, is faster, more convenient and more comprehensive. "I go to it every 15 minutes. It runs my professional life," he says.

"I save 10 seconds or more every time I make a call, and I probably make 40 calls a day," Mann estimates. While that savings does not free enough extra time for a round of golf, he says, it makes his workday easier.

About the only drawback Mann finds, when compared with the paper method, is that Sidekick is not portable in the way a pocket organizer is. "I'll be sitting in a meeting and someone will want to schedule another meeting, but I don't have my calendar in front of me," he says.

Multifinder is Apple's answer to users' complaints about the single-task limitation of the Macintosh. The program, available as an operating system upgrade, allows Mac users to switch between applications without having to close one program and boot up another.

Multifinder also allows some programs to run in background when the user is working on another. According to product literature, Multifinder "extends the power of the Macintosh."

"One of the biggest things I do with it is print something in background while I am working on other things," says Phil Ressler, a field service representative at Nantucket, Inc. Otherwise, he says, "The only way around [waiting] would be to spend $2,000 on a spooler for a laser printer."

Ressler says he will invest more money in his Mac now that he has Multifinder, upgrading the memory so he can keep more programs on-line at once. Currently, he jumps between two or three applications. "I'm able to do about 25% more than before. When I have more memory and

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Radding is a Boston-based author specializing in business and technology.

- **10 products; 10 end users**
- **A vague impression of better productivity**
- **Sidekick, Multifinder, report writers tested**

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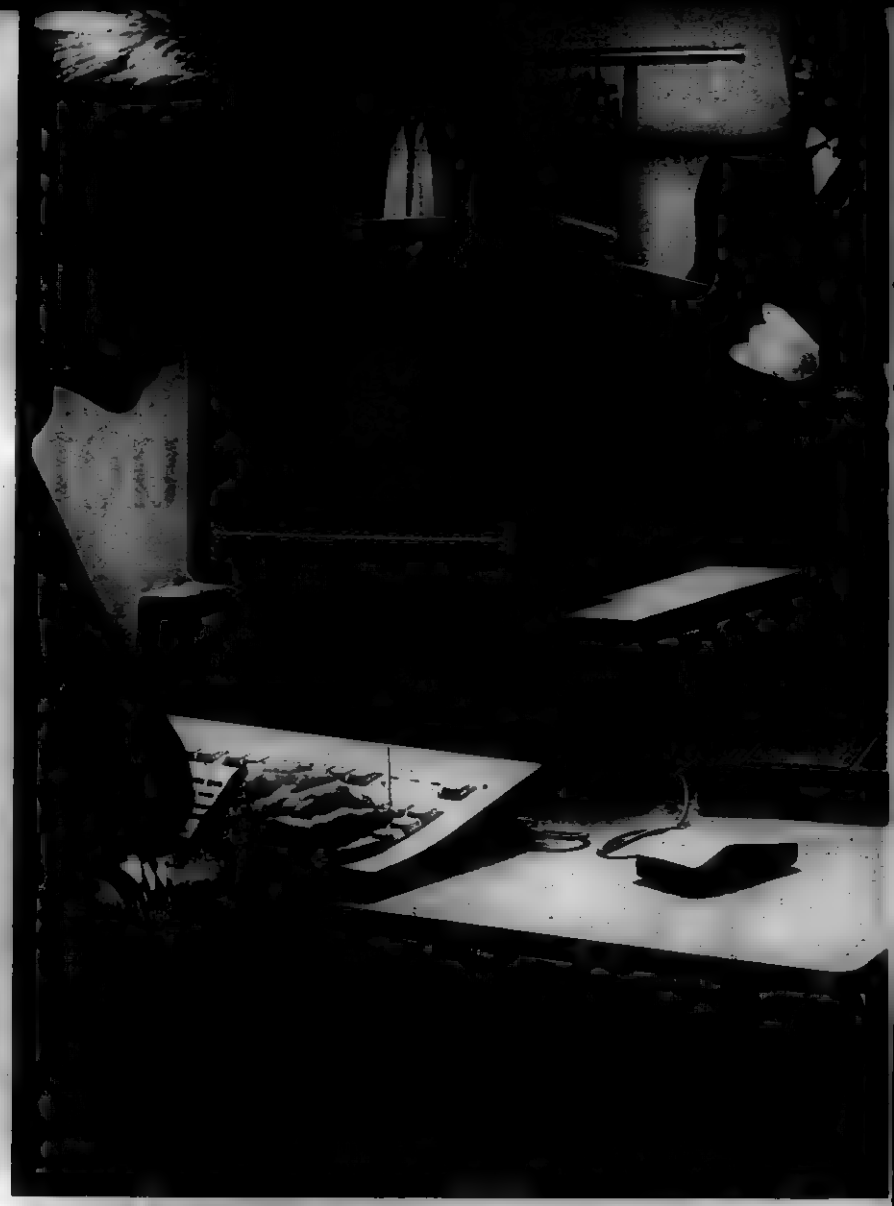

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more applications that support background printing, I figure I'll be able to double what I do," he says. The time he is saving is put back into doing more and better work. As Ressler says, "It gives me more time to think about what I'm doing."

Worksheet Utilities from Funk Software, Inc. in Cambridge, Mass., offers extra functions for use with Lotus Development Corp.'s 1-2-3. The program plugs itself as a productivity tool because it "saves time for the average 1-2-3 user," says Jim Kinlen, marketing director. He is cautious about predicting specific productivity gains because so much depends on the user's degree of expertise with Lotus. The more extensively one uses Lotus, the bigger the potential gains, he says.

Hugh McLaughlin, assistant professor of finance at Bentley College in Waltham, Mass., is particularly pleased with the work sheet identification function of Worksheet Utilities. "The eight-digit DOS name is not sufficient" to identify a spreadsheet file in a directory, he says.

McLaughlin, who teaches spreadsheet methodology for financial analysis, is buried in hundreds of 1-2-3 files spread over dozens of disks. With the Funk program, he can "peek quickly at a spreadsheet," he explains, and see enough to know whether it is the one he wants.

Prior to using the program, McLaughlin says, his volume of files overwhelmed the directory and subdirectory system he used. He spent up to an hour trying to find the right file. With Worksheet Utilities, if McLaughlin can identify the disk, he can find the right spreadsheet in moments.

Formworx is a product of Formworx Corp., also in Waltham. The company's advertisements promise "two ways to streamline your forms processing. Save time. Save money." Without elaborating, Formworx claims the product is "the fastest and easiest forms generator on the market."

Formworx President Ming Lee cites published reports that claim corporations spend $20 million or more per year on form filling and retrieving, saying this figure illustrates the scope of potential savings.

Ed Mead, senior systems analyst at the Massachusetts Department of Mental Health in Boston, installed Formworx about a year ago. "A state agency gets delirious over anything that creates forms," he says.

Before buying Formworx, the agency created forms manually — cutting, pasting and typing. Today, the agency owns six copies of Formworx and has dropped manual forms creation completely. Mead has not measured actual savings, but says, "We are getting better forms.

FORMWORX CORP. claims its product is "the fastest and easiest forms generator on the market."

They look nicer. They're harder to fill out wrong." People in the department are trying out Formworx on new applications, Mead reports. "I guess we could live without Formworx, but not happily," he says.

Lettermaster from Research Development Systems, Inc. in Arlington, Texas, promises to "beat the clock" in the assembling, sorting, merging, purging and printing of mailing lists. According to advertisements, "About the only thing it doesn't do is lick the envelopes." The ad shows a complete mailing being assembled and printed in 30 minutes before a deadline.

"I can get out 1,000 form letters with four key strokes," says Bob Dilg, company president, although he would need a very fast printer to complete such a mailing in the half-hour example shown in the ad.

At Chrina Corp. in Dallas, Lettermaster is not aimed at mass mailings but is used as a complete client tracking system, reports Jeff Farris, senior vice-president. Chrina is a local-area network provider. Farris and his colleagues use Lettermaster to

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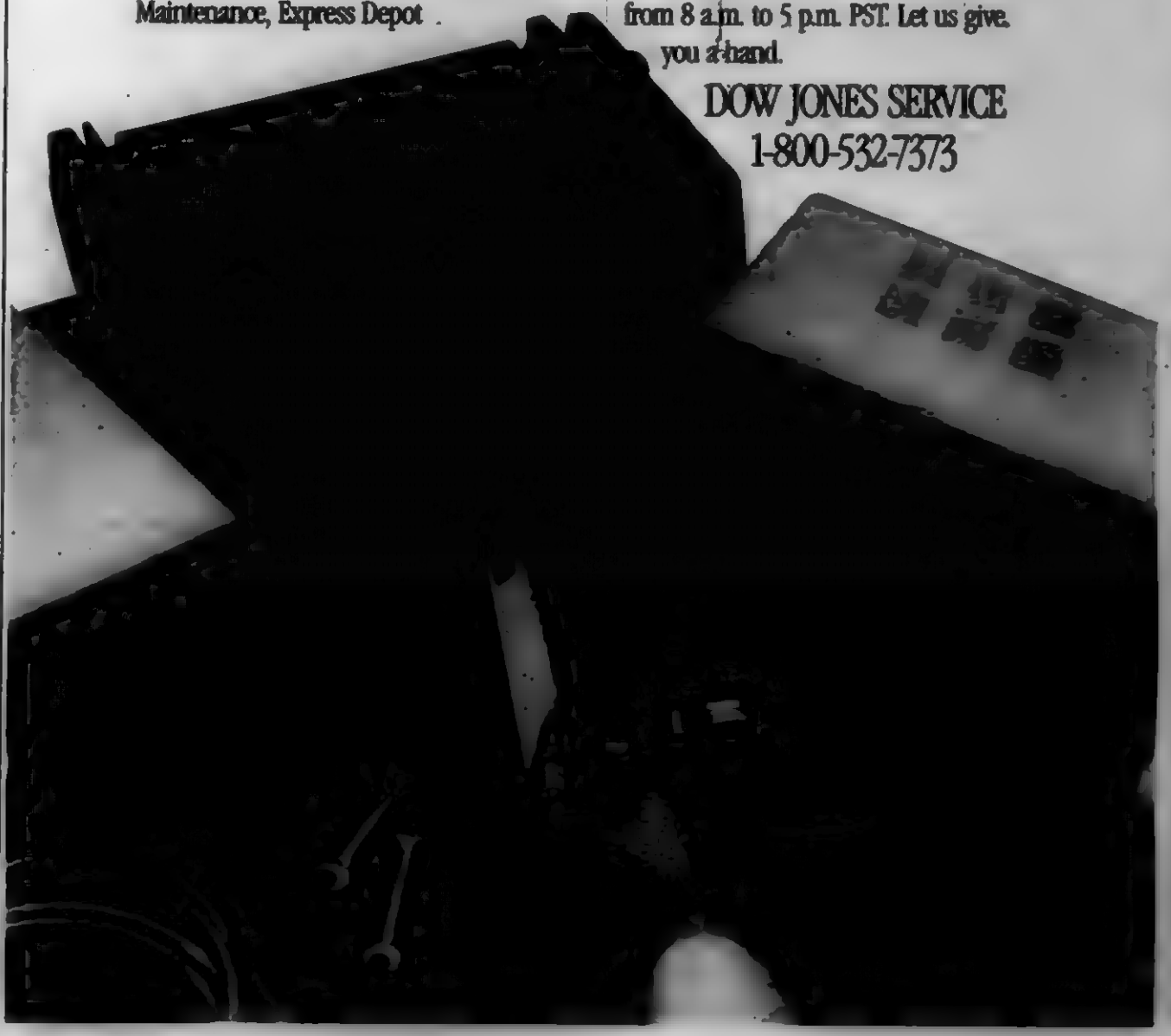

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keep track of all contacts they make and to schedule follow-ups, particularly for sales. The program is a "repository of every conversation," Farris says.

Farris says he now has better information at hand when making and taking calls. He says follow-up is more organized, and no contact is falling through the cracks — a major accomplishment in itself.

C-A-T from Chang Laboratories, Inc. in San Jose, Calif., is a sales-call tracking system for the Macintosh. Advertising for

> "THE CHOICE is to be overwhelmed and swamped or get a handle on the job" with the help of C-A-T.
>
> JIM LOMBARDO
> MCLAUGHLIN, PIVEN, VOGEL, INC.

C-A-T — an acronym for contacts, activities and time — claims it will double users' productivity. "If handling twice as many contacts would double your success, then you need C-A-T," it says.

The company would not provide any statistical basis for that claim. Instead, Vice-President Joseph Ng simply says C-A-T users "find it addictive. They use it six to eight hours a day."

Jim Lombardo, vice-president at New York-based McLaughlin, Piven, Vogel, Inc., is a constant user of C-A-T. "I use the program thoughout the day," he says. Before using the program, Lombardo says he kept four 3-in. thick spiral-bound notebooks on his desk to track the status of every person he contacted.

Lombardo talks to dozens of clients and prospective clients each day. "While I was on the phone, I would be shuffling books around and flipping through the pages," he recalls. Lombardo maintains 100 very active accounts and makes 1,000 new contacts a year, he estimates. After four years, he found himself juggling almost 4,000 contacts, using note cards and the notebook system.

With C-A-T, he has weaned himself off the notebooks and keeps all the information close at hand on his mouse-based PC.

While he hasn't calculated the direct productivity payback, Lombardo is convinced he is way ahead. "The choice is to be overwhelmed and swamped or get a handle on the job," he says.

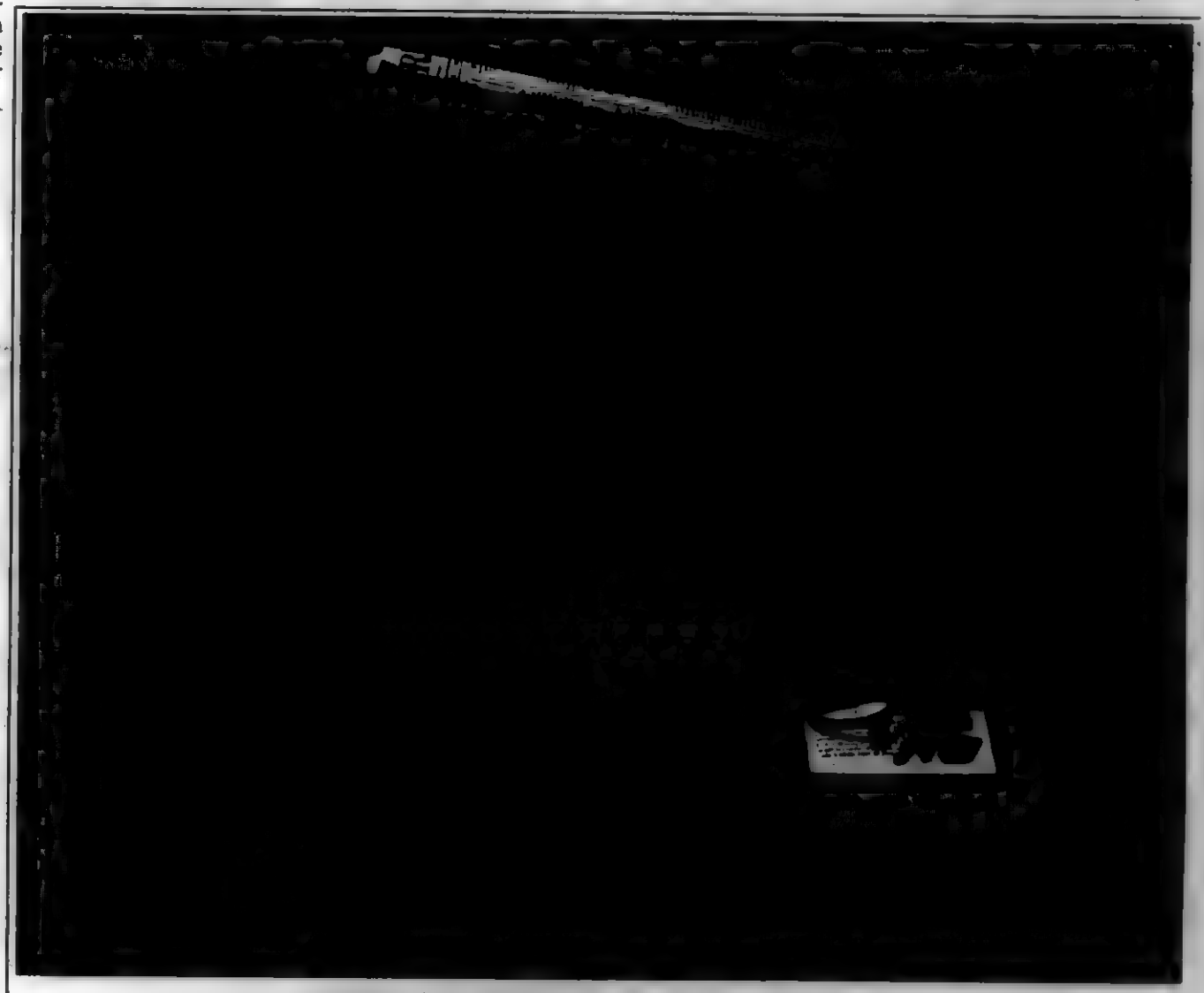
Disk Optimizer from Softlogic Solutions in Manchester, N.H., attacks a productivity issue by correcting a DOS file-management problem. According to Disk Optimizer advertisements, "DOS is constantly slowing your hard disk down . . . because your hard disk has to chase all around to read and write different pieces of your file." Disk Optimizer rearranges files on the disk so that each file is contiguous, leading to faster operation of the hard disk and greater user productivity.

The company also advertises its Analyzer program, which tells users how efficient their hard disk is running in the first place. But how much productivity do users gain from faster disk operations?

Ted Magida, managing partner at Staller Associates in Needham, Mass., ran Analyzer on his 20M-byte hard disk and found the disk operated below 70% efficiency. He then ran Disk Optimizer, which took 25 minutes, and he experienced a "dramatic speedup in operation," he says. According to Analyzer, the disk was running at virtually 100% efficiency.

The savings for each operation are measured in seconds each time files are loaded or saved, Magida says. So even if his staff performs hundreds of disk save-and-load operations each day, the actual gain is relatively small.

But there is a second benefit — perhaps a greater one. The program can prevent cross-linkage problems when file segments are scattered throughout the hard disk. "With DOS, the longer you let it go, the greater number of cross-linkage mistakes occur. Eventually, you'll have serious problems with a file," Magida says. Thus, the productivity gain is not so much added speed as disaster preven-



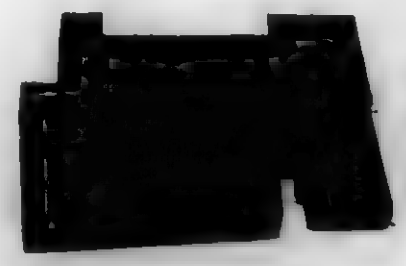
TI's new TravelMate™ LT220.
It's the closest thing to carrying a VAX™ in your briefcase.

Texas Instruments introduces the LT220 lap-top terminal — the next best thing to being there when you need remote access to your company's VAX.

The LT220 provides full VT220 emulation in a 4.8-lb. package, without sacrificing functionality. It features a 25-line screen that's easy to read. It even has a full-function keyboard like the one on a VT220.

The terminal communicates at 1,200 or 2,400 bps through one of its optional internal modems. For hard copy, just slide the LT220 into one of its optional cradles to add an ink-jet or thermal printer.

New credit-card-sized memory cards



let you create, update and store files. They're also handy for programming the LT220 to your specific application.

Like its Silent 700™ predecessors, the LT220 sets new standards for portability, durability and reliability. All of which makes it the perfect tool for anyone who's ever wished for a VAX in their briefcase. In short, this may be the best little terminal in the world.

So go ahead. Take the first step toward improving your productivity today. Call Texas Instruments for more information or to arrange a demonstration of the LT220. Phone toll-free, 1-800-527-3500.

TEXAS INSTRUMENTS

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tion. Now Magida runs Analyzer, which takes less than a minute, once a month on all his firm's hard disks. When a disk drops below the 80% efficiency level, he runs Disk Optimizer.

The Documentor, from Wallsoft in New York, promises to increase productivity by eliminating the tedious, time-consuming task of documentation so users can concentrate on applications writing. "We asked users if they had good documentation for Dbase, and we got zero response. They didn't have any documentation because of the amount of time that went into producing it," says Martin Rinehart, a Wallsoft spokesman.

Mark Mania, a senior electronic data processing auditor at New York's Manufacturers Hanover Bank, has been using The Documentor for about a year. Before that, "We did very limited documentation" — or none at all, in some cases, Mania says. "It was too time consuming."

With The Documentor, Mania not only produces the basic documentation but develops flowcharts that are used in preparing user documentation. Three people in the department use the program on a monthly basis unless there is extensive rewriting going on.

Shoebox 1 from R+R Associates in Mount Vernon, N.Y., is "a modest program that can produce significant productivity gains," Vice-President Roland Joffe says. "The program is essentially an appointment calendar, but it is really a time management package." The program can also become a time and billing tool.

Ron Abler, a senior associate at United Information Systems, Inc. in Silver Spring, Md., needed a package to manage time more efficiently. With 10 users accessing the package on a LAN, Abler says Shoebox 1 is one of the handiest utilities he runs. For instance, when a meeting is being set up with a client, Shoebox 1 will search the calendars of all the participating users to find an available time slot. Before he had Shoebox 1; Abler and his associates could not make firm appointments with clients on the spot.

QUANTIFYING the return on investment for these products is less important than feeling that an annoying situation has been resolved.

Abler has not quantified the productivity gains generated by Shoebox 1 but says his office is running more smoothly. Client meetings are scheduled instantly, without much running around and rescheduling. Abler admits he does not like meetings, but Shoebox 1 at least takes some of the pain out of arranging them. There is one possible drawback: If scheduling a meeting is easier, more meetings might be scheduled. "That better not become a problem," he says.

End result

By and large, the end-users in the survey were not looking for stupendous advances in raw productivity. Rather, they were trying to make specific tasks more manageable and solve particular problems. Quantifying the exact return on investment for these inexpensive products is less important to them than feeling that an annoying, chronic situation has been satisfactorily resolved. Increased convenience alone is often enough of a productivity justification.

For the same reason, product vendors are not held accountable by users for specific, documented productivity claims. It is not a question of whether a product, for instance, saves the user 15 seconds or 30 seconds per phone call. What matters is that the product effectively solves the specific problem or makes a particular chore easier.

In addition, the productivity gains generally did not result in dramatic changes in the users' work lives. The time and effort users saved were simply applied to other tasks. And often the productivity gains amounted to increased convenience rather than substantial savings of time. ●

SCIENCE/SCOPE®

A new air traffic control system for the Federal Aviation Administration will play a key role in helping to meet the growing demand for passenger air travel by making it vastly more efficient. The system is currently under competitive development by a team consisting of Hughes Aircraft Company; Sanders Associates, a unit of Lockheed; and Unisys. The system, called the Advanced Automation System (AAS), promises to be one of the largest real-time computer-controlled systems ever developed. Twenty-three regional air route traffic centers around the nation will receive new equipment, and new computers and automated displays will be installed in nearly 300 airport control towers. AAS will be capable of meeting air traffic control requirements well into the 21st century.

Hughes has earned the 1987 Herschel Award for improving the sensitivity and producibility of infrared detector arrays. The technological breakthrough was achieved by using and adapting a process of liquid phase epitaxy developed by Hughes. Detector arrays make infrared imaging possible for applications such as satellite-generated weather and remote Earth sensing information, and night vision systems for military vehicles. The award is the highest yearly accolade given to an organization by the Infrared Information Symposia Specialty Group on Infrared Detectors.

A Hughes-built probe descending through Jupiter's atmosphere will provide never-before-gathered data on its chemical composition, temperature, and density. The Galileo Mission, to be launched in 1989, will arrive in the Jovian system in 1995 for a two-year tour, after traveling a lengthy route including Earth and Venus fly-bys. The Galileo orbiter will release the onboard Hughes probe into Jupiter's atmosphere. It will descend by parachute, sending its scientific findings to the orbiter which will then relay them back to Earth. The orbiter will continue on its tour and pass within 600 miles of Io, the most volcanic body in the solar system, which pumps more than a ton of ash into space every second.

A high-performance instrumentation radar establishes state-of-the-art fast and sensitive microwave and millimeter-wave measurements. Developed by Hughes, the fully programmable, broadband, frequency- and polarization-agile radar provides the flexibility to make radar cross section and antenna pattern measurements, EW simulation testing, and more. Utilizing Inverse Synthetic Aperture Radar imaging, modular design, and automatic diagnostics, the radar achieves reliable, accurate measurements from 100 MHz to more than 100 GHz. The system can be tailored for indoor or outdoor ranges or in natural environments for measurements of ships at sea or aircraft in flight.

Hughes Ground Systems Group is applying its airspace management experience to the exciting challenges of worldwide air traffic control. These systems will be designed to ensure service 24 hours a day, 7 days a week. They will support distribution of processing among multiple computers linked via local area networks. The many challenges include design and development of hardware and software to support advanced display and man-machine interface technology, and using satellite technologies for future ATC applications. To help design the next generation of air traffic control systems, send your resume to Hughes Ground Systems Group, Employment Dept. S3, P.O. Box 4275, Fullerton, CA 92634. Equal opportunity employer. U.S. citizenship required.

For more information write to: P.O. Box 45066, Los Angeles, CA 90045-0066

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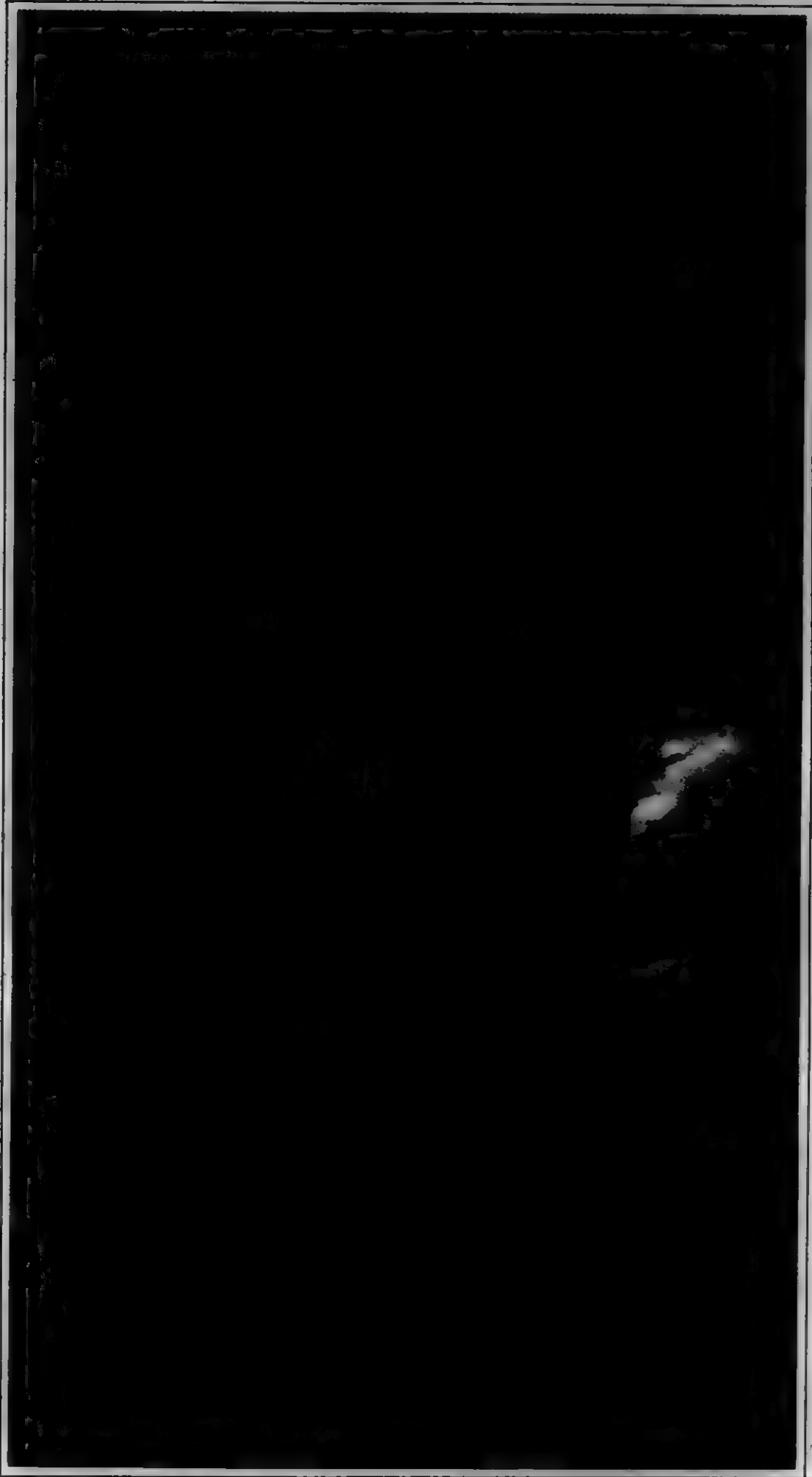


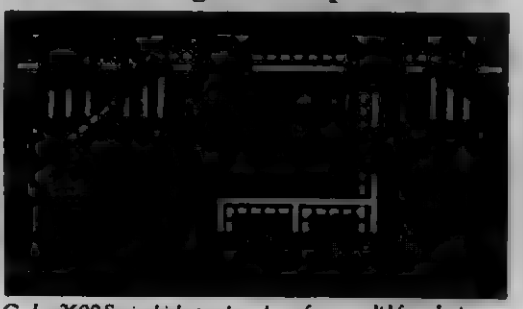
Codex high speed modems lay the groundwork your network needs to withstand the test of time.

At Codex, we believe the way to build a flexible network is to start on solid ground. Beginning with our 2600 Series high speed modems. Because above and beyond their proven strength for reliability and performance at speeds up to 192 kbps, they can support all the resources your communications network needs to stand tall over time.

Which means you can grow with them. Starting right now. With integral options like Dual Dial Restoral (DDR) and encryption to protect your business data. And an X.25 PAD to connect you to public data networks all over the world.

The Codex 2600's even offer a special Communications Test Equipment (CTE) option, plus full Codex Integrated Network Management System (INS) compatibility. So you can reduce the cost of isolating network problems and optimize productivity from a single point.

Which is the kind of performance you'd expect from the networking company with over 25 years of experience and the #1 reputation for high speed modems among datacom professionals.*



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CHAPTER ONE

THE BLACKEST HOUR IS MIDNIGHT

It was not a night fit for man or beast what with the sky being as black as ink and it starting to rain like cats and dogs. As if things weren't bad enough Jeffrey Whipple had to climb all the way up to the top of Bald Eagle hill in his snakeskin boots so new their smell reminded him of a car he once leased in Flagstaff, Arizona just to check things out because earlier in the day a message had gotten through that there was going to be trouble this night so he was feeling ominous as the dry wind whipped up the dust around his feet and wondering if he should go on or go back to camp when suddenly, he heard a twig crack behind him or thought he did but as he turned he didn't see anything except the black bleakness of the landscape.

Somewhere on the other side of Bald Eagle hill a dog started to bark and there were other noises which Jeffrey couldn't quite decipher but he decided that it was time to move on so he hitched up his courage and started the trek upwards again stepping over fallen [illegible] and rocks that impeded his path and made the

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TAKING CHARGE

Mark Klein

Making MIS a partner

To facilitate conceptualizing the information systems organization, executives usually adopt one of three traditional business paradigms — the utility, manufacturing or service company — even though the paradigm may differ from the company's model. Unfortunately, each of these traditional paradigms has serious drawbacks that may constrain the information systems organization.

An information systems organization operating according to a utility paradigm has a central organization with monopoly control over information systems activities. As such, information systems thinks it knows its clients' needs, and because it thinks clients are equally important, it has difficulty prioritizing among them without a committee's help. The utility-model information systems organization usually discourages complexity. Its drawback is that it doesn't encourage innovation or appreciation of information's strategic impact.

In contrast, an information systems organization modeled after a manufacturing company decentralizes information systems activities down to the individual department, with or without central information systems coordination. Complexity is common. Different locations use different hardware and

Continued on page 109

Ryder's team driver

Operations chief at rental firm reaches out

BY DOUGLAS BARNEY
CW STAFF

Twenty years ago, George Perara worked for Ryder Truck Rental, Inc. as a keypunch operator to put himself through college. Now, as Ryder's director of operations technology and administration, Cuban-born Perara remains true to his humble beginnings with a management style that seeks the advice of workers at every level of MIS.

The style, which Perara has dubbed "participatory management," is thoroughly shared by Dennis Klinger, Ryder's vice-president of MIS and Perara's boss.

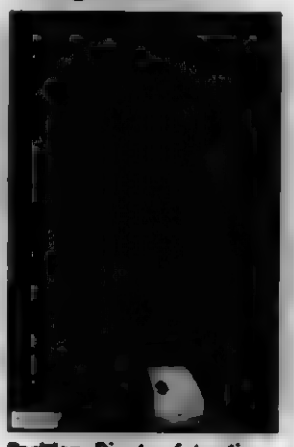
"We don't talk to him like he's the boss and we are the subordinates. He is kind of one of the group," Perara says of Klinger.

That is the very same approach Perara has established with those who report to him. "I know I can be creative and it will be respected," notes George A. Simmons, operations support manager at Ryder.

According to Perara, simply

Continued on page 103

PROFILE
George Perara



Position: *Director of operations technology and administration, Ryder Truck Rental, Inc.*
Mission: *To use participatory management to give all employees something to strive for.*

EXECUTIVE SUPPORT SYSTEMS

Serving top execs: Politics can be deadly

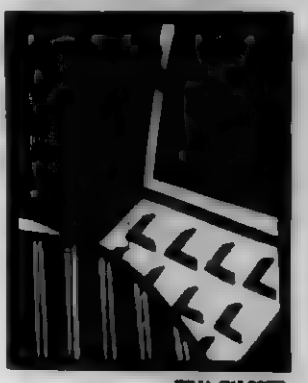
BY DAVID DE LONG
SPECIAL TO CW

Executive support systems (ESS) are an emerging applications area, but building such computer systems for senior management can create a rash of challenging organizational and political issues for developers in MIS. "If you aren't aware of the politics," says Ken Soha, director of corporate executive and office information systems at Xerox Corp. in Stamford, Conn., "you're dead."

ESS — also known as executive information systems — can bring major changes to information flows and communications patterns as top managers use the technology to gain more direct access to information about the firm's performance and communicate via electronic mail outside the normal chain of command.

Fears about the implications of these changes, however, often create substantial resistance among subordinate line-management and staff groups. Anticipating and

Continued on page 106



JULIA TALCOTT

Insurance firms wage high-tech war

BY JAMES CONNOLLY
CW STAFF

America's insurance industry giants have moved into the field to engage in their newest computer-based battles.

Asked two years ago about the key strategies in their field, MIS executives talked about downsizing. Two years before that, they spoke of installing personal computers in their organizations. Now, an informal poll of a dozen insurance industry officials reveals a common thread running from company to company: a level of agency-based information processing well beyond the basic agency automation that began in the early 1980s.

"The major difference right now is the telecommunications aspect," says Ray Scutro, a senior consultant at Arthur D. Little, Inc. in Cambridge, Mass. "It used to be just rating information that the agent could get. Now they are getting right into client files."

Insurance companies are building links between host systems and agents, developing marketing packages and experimenting with expert systems in their competition for shares of the business of 45,000 independent agents in the U.S. or, in the case of insurance carriers that run their own sales forces, to maintain the loyalty of those proprietary agents.

The Travelers' Bacon

Competitive spirit

The competition rages in a market in which a carrier that wins a 2% share in any line of insurance is an exceptional success. The competing insurers also acknowledge that they very seldom will be able — or want — to lock up an independent's business the way airlines wanted to capture travel agents a decade ago.

"We recognize that the agent is our customer. From a data

Continued on page 102

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Now more than ever, if you need creative solutions, the IBM Personal System/2 family has the tools to match your imagination.

The extraordinary new desktop PS/2 Model 70 386 delivers the highest PS/2 performance available.

	Model 70 386			Model 50 Z
Available models	8570-051	8570-121	8570-A21	8550-031 8550-061
Microprocessor	80386 16 MHz 0 wait-states	80386 20 MHz 0 wait-states	80386 25 MHz 64KB memory cache (0 wait)	80286 10 MHz 0 wait-states
Optional Math Co-Processor	80387 16 MHz	80387 20 MHz	80387 25 MHz	80287 10 MHz
Memory (RAM) Standard Maximum on system board System maximum	1Mb (1Mb) 8Mb 16Mb	2Mb (2Mb) 8Mb 16Mb	2Mb (2Mb) 8Mb 16Mb	1Mb (2Mb) 2Mb 16Mb
System expansion	Three option slots (two 32 bit, one 16 bit)			Three option slots
Storage 1.44Mb 3.5 inch diskette drives Standard Maximum	1 2	1 2	1 2	1 2
Fixed disk Standard bits	60 (27ms)	120 (23ms)	120 (23ms)	20 (28ms) 60 (27ms) 8550-031 8550-061
Operating Systems	DOS 3.30, IBM OS/2, AIX™ Personal System/2			DOS 3.30, IBM OS/2
Built-in features	Video Graphics Array (VGA) and display port, diskette controller, serial, parallel, keyboard and pointing device ports, clock/calendar.			

Thanks to advanced features such as high-speed memory caching and a scorching 25 MHz 386 processor, it's lightning-quick.

If you want a high-performance desktop system for large spreadsheet, computer aided design, data base or publishing applications, fasten your seat belt. Then test drive the new PS/2 Model 70 386.

Introducing the faster Model 50.

If you want the power of a 286 desktop as well as breakneck speed, a new Model 50 offers new levels of performance.

Presenting the Model 50 Z.

The "Z" stands for zero-wait-state computing. Put simply, this PS/2's high-speed memory keeps pace with its high-performance processor. In addition, the Model 50 Z has new larger capacity fixed disks with faster access to data.

The result is a performance improvement of up to 35%.*

We've even given the smallest PS/2 bigger storage. The Model 25 now has a 20-megabyte fixed disk option.

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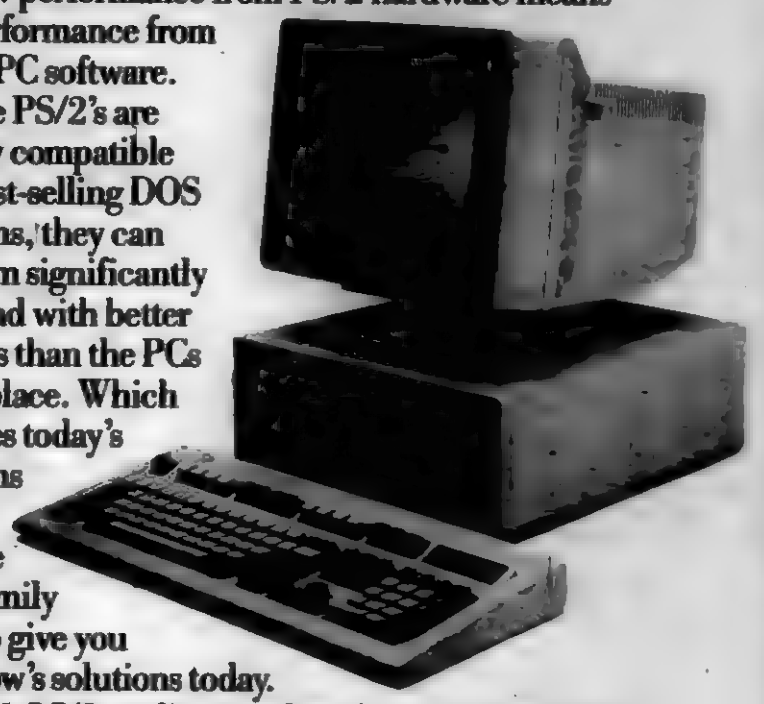
The PS/2's are not only compatible with best-selling DOS programs, they can run them significantly faster and with better graphics than the PCs they replace. Which improves today's programs today.



The PS/2 family will also give you tomorrow's solutions today. Over 300 OS/2 applications have been announced to date, and more are on the way. They offer exciting new ways to harness the power of the 286 and 386 based PS/2's and their unique Micro Channel architecture.

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CALENDAR

JUNE

Technology in Education: Expanding Teacher Effectiveness. Eugene, Ore., July 7-8 — Contact: Technology in Education Conference, University of Oregon Continuation Center, 1553 Moss St., Eugene, Ore. 97403.

JULY

International Cost Engineering Congress. New York, July 10-13 — Contact: American Association of Cost Engineers, 308 Monongahela Building, Morgantown, W. Va. 26505.

Commercial Image Processing '88. Boston, July 11-12 — Contact: Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

Fault Tolerant Computing. Santa Clara, Calif., July 11-13 — Contact: Kaoru Polden, University of California Extension, Santa Cruz, Calif. 95064.

National Financial Computer & Automation Conference. New York, July 11-13 — Contact: National Financom, P.O. Box 1151, 333 Sylvan Ave., Englewood Cliffs, N.J. 07632.

F1 Expo '88. Washington, D.C., July 11-13 — Contact: Telestrategies, Inc., 1356 Beverly Road, McLean, Va. 22101.

Case '88 International Workshop on Computer-Aided Software Engineering. Cambridge, Mass., July 13-15 — Contact: Pamela Meyer, Index Technology Corp., One Main St., Cambridge, Mass. 02142.

Planning and Selecting a State of the Art Financial Information System. Cambridge, Mass., July 13 — Contact: Laura Manning, Seminar Coordinator, Boston University Metropolitan College, 755 Commonwealth Ave., Boston, Mass. 02215.

IBM Summit Conference. New York, July 13-14 — Contact: The Yankee Group, Seminar Division, 200 Portland St., Boston, Mass. 02114.

Advanced Computer Networking Solutions. Boston, July 13-15 — Contact: Advanced Computer Networking Solutions, Suite 777, 427 7th St., Fairview, N.J. 07022.

Annual Spaulsbury Conference. Chicago, July 13-15 — Contact: Spaulsbury Computing Corp., 222 W. Adams St., Chicago, Ill. 60606.

National Office Machine Dealers Association's (NOMDA) Convention '88. Las Vegas, July 13-16 — Contact: NOMDA, 13411 Wornall Road, Kansas City, Mo. 64145.

JULY 17-22

Guide 71. Chicago, July 17-22 — Contact: Guide International Corp., 111 E. Wacker Drive, Chicago, Ill. 60601.

AM/FM International Executive Conference. Snowmass, Colo., July 18-19 — Contact: AM/FM International, Suite 820, 5775 E. Orchard Road, Englewood, Colo. 80111.

Optical Drive and Media Manufacturing Conference. San Francisco, July 19-21 — Contact: Rothchild Consultants, 256 Laguna Honda Blvd., San Francisco, Calif. 94116.

Parallel Programming: Experience with Applications Languages and Systems. New Haven, Conn., July 19-21 — Contact: Judy Terrell, Yale University, Department of Computer Science, P.O. Box 2158, Yale Station, 51 Prospect St., New Haven, Conn. 06520.

Computer Software: Protecting and Marketing Seminar. New York, July 21-22 — Contact: Practicing Law Institute, 810 Seventh Ave., New York, N.Y. 10019.

JULY 24-30

IEEE 1988 International Conference on Neural Networks. San Diego, July 24-27 — Contact: Naomi Feldman, Conference Coordinator, 3770 Tansy St., San Diego, Calif. 92121.

Navy Micro/OA '88 Conference. San Diego, July 25-28 — Contact: Code 31.4, Nardac San Diego, NAS North Island, Building 1482, San Diego, Calif. 92135.

Summer Computer Simulation Conference. Seattle, July 25-28 — Contact: Society for Computer Simulation, P.O. Box 17900, San Diego, Calif. 92117.

National Systems Programmers Association Conference. Milwaukee, July 27-28 — Contact: Nasps, P.O. Box 21526, Milwaukee, Wis. 53221.

Optical Storage Solutions: Strategic Applications in the MIS Environment. Colorado Springs, July 27-28 — Contact: The Yankee Group, Consulting Division, 200 Portland St., Boston, Mass. 02114.

IBM Interweave Conference. San Francisco, July 28-29 — Contact: Input, 1280 Villa St., Mountain View, Calif. 94041.

JULY 31-AUG. 6

Computers in Engineering Conference. San Francisco, July 31-August 3 — Contact: American Society of Mechanical Engineers, 345 E. 47th St., New York, N.Y. 10017.

Siggraph '88, The 15th Annual Conference on Computer Graphics and Interactive Techniques. Atlanta, Aug. 1-5 — Contact: Siggraph '88 Conference Management, Smith Bucklin and Associates, Inc., 111 E. Wacker Drive, Suite 600, Chicago, Ill. 60601.

Uniforum/DC. Washington, D.C., Aug. 2-4 — Contact: Uniforum/DC, Suite 205, 2400 E. Devon Ave., Des Plaines, Ill. 60018.

AUG. 7-13

Annual Information Systems Conference: Mapping the Future. Los Angeles, Aug. 7-11 — Contact: Tom Palmerlee, Executive Director, Urban and Regional Information Systems Association, 319 C St. SE, Washington, D.C. 20003.

National Association for State Information Systems Annual Meeting. Arlington Heights, Ill., Aug. 7-11 — Contact: National Association for State Information Systems, Inc., P.O. Box 11910, Lexington, Ky. 40578.

Interex, North American Hewlett-Packard Business Users Conference. Orlando, Fla., Aug. 7-12 — Contact: Interex, Conference Department, 680 Almanor Ave., Sunnyvale, Calif. 94086.

World Congress III, Computer-Assisted Valuation and Land Information Systems. Cambridge, Mass., Aug. 7-12 — Contact: Sarah J. Zabriskie, Lincoln Institute of Land Policy, 1000 Massachusetts Ave., Cambridge, Mass. 02138.

Unix Users Group Meeting. Cambridge, Mass., Aug. 8-9 — Contact: Interex Solutions, Inc., 868 Washington St., Wellesley, Mass. 02181.

Structured Development Forum X. San Francisco, Aug. 8-11 — Contact: Ted Michels, LLNL, P.O. Box 808, L-308, Livermore, Calif. 94550.

Macroworld Expo. Boston, Aug. 11-13 — Contact: Mitch Hall Associates, P.O. Box 880, Norwood, Mass. 02062.

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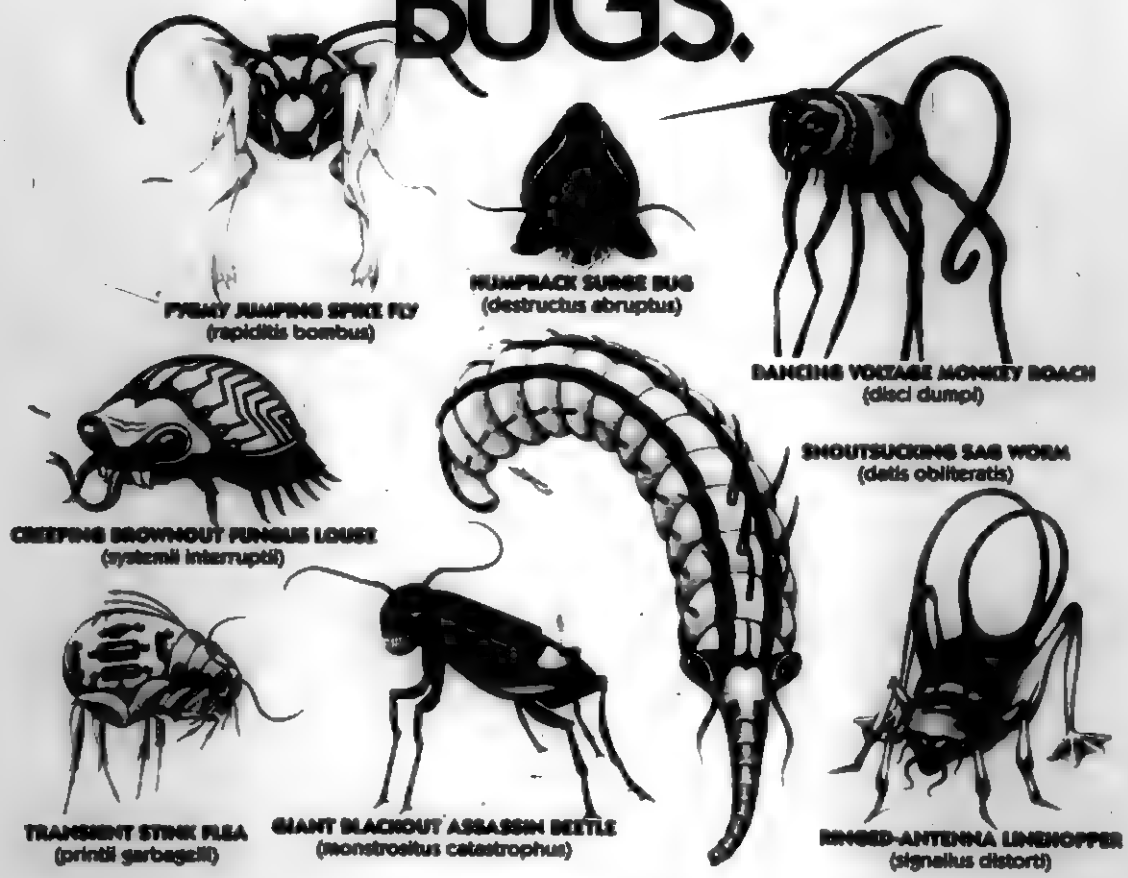

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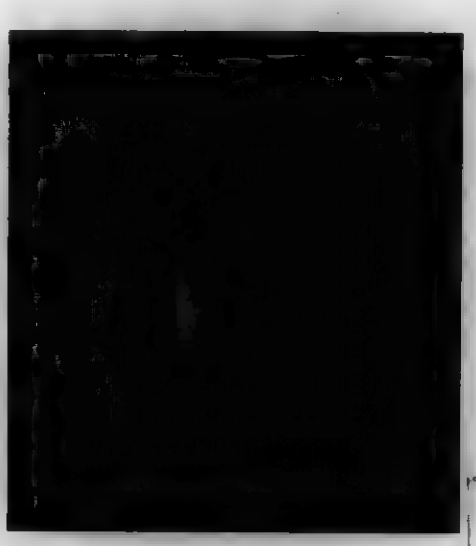

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An IDG Communications Publication

Think twice when hiring temps

BY JAMES CONNOLLY
CW STAFF

CHICAGO — The extensive use of temporary MIS workers can have a string of negative impacts that a company should guard against, including additional costs, erosion of technical skills, declining employee morale and loss of proprietary information.

Those were among the conclusions of a recent study by Chicago-based management consulting firm A. T. Kearney, Inc. However, Kearney officials said there are benefits to using temporary MIS workers, primarily on a short-term, limited basis. "Although using contracted employees in information systems departments has long been a widely accepted practice throughout corporate America, our study shows that companies using these temporary employees should carefully think through their overall information systems staffing strategies and the long-term implications of their use," said Ron Dykstra, a principal at Kearney, in his report.

Kearney based its findings on interviews with MIS executives and representatives of 40 large companies that use or supply temporary employees. The consulting firm focused its attention on temporary programmers and analysts and the companies that supply them, including brokers, contract programming houses and value-added development houses. The survey generally excluded facilities-management companies, systems integrators and management consultants.

Reasoning examined

Looking first at the reasons for hiring temporary workers, Kearney cited the flexibility that use of temporary workers gives a company, which may want to terminate the employees after a short period of time. But Kearney found that many such leased employees move fairly quickly into critical roles and become more difficult to dismiss. Dykstra noted that some companies take on temporary MIS employees in anticipation of economic downturns. But, he said, such downturns do not mean computing needs will diminish, so they are better off hiring permanent employees. He said having full-time employees becomes particularly important in light of signs that the pool of available talent is shrinking.

Dykstra said that when the number of leased employees is more than 10% of the MIS staff for extended periods of time, a company risks losing MIS skills when the temporary worker leaves, losing proprietary information to competitors and experiencing declining morale among regular MIS employees who perceive the temporary workers as overpaid and, sometimes, as a competitor for management positions.

Dykstra said the temporary worker takes home no more money than full-time workers and perhaps less when full-time employee benefits are considered.

"Contracting to acquire technology, contracting whole projects out, short-term contracting to smooth out true peak loads and contracting of routine clerical and operational activities can be sound management choices for most companies," Dykstra said.

MANAGERS ON THE MOVE

RPS names Bloom director

RPS's Bloom

Gordon Bloom, formerly director of operations planning at Roadway Package System, Inc. (RPS), has been promoted to director of information systems at RPS. Bloom will be responsible for the overall daily computer operations, including software development and long-term resource planning. He joined the Pittsburgh-based business-to-business small package ground carrier in 1984 and was promoted to director of operations in 1985. Previously, he was manager of operations planning for American Natural Resources in Detroit.

The *Journal Star* of Peoria, Ill., has named Lynn Kavelman manager of information systems. Kavelman, 46, joined the newspaper in 1968 as operations supervisor and became the company's first data processing manager in 1972. In his new position, he remains in charge of DP as well as taking responsibility for other information systems. He previously worked as DP manager at Lehn & Fink Co.

Massachusetts Gov. Michael S. Dukakis has appointed John W. Beveridge to a special commission on computer crime. Beveridge, deputy auditor of management information systems/electronic data processing audit in the state auditor's office, is one of nine appointees named to review the state's current laws defining crimes involving the use of computers. As deputy auditor, Beveridge oversees the auditor's office's computer capabilities. He is the executive vice-president of the New England Chapter of the EDP Auditor's Association.

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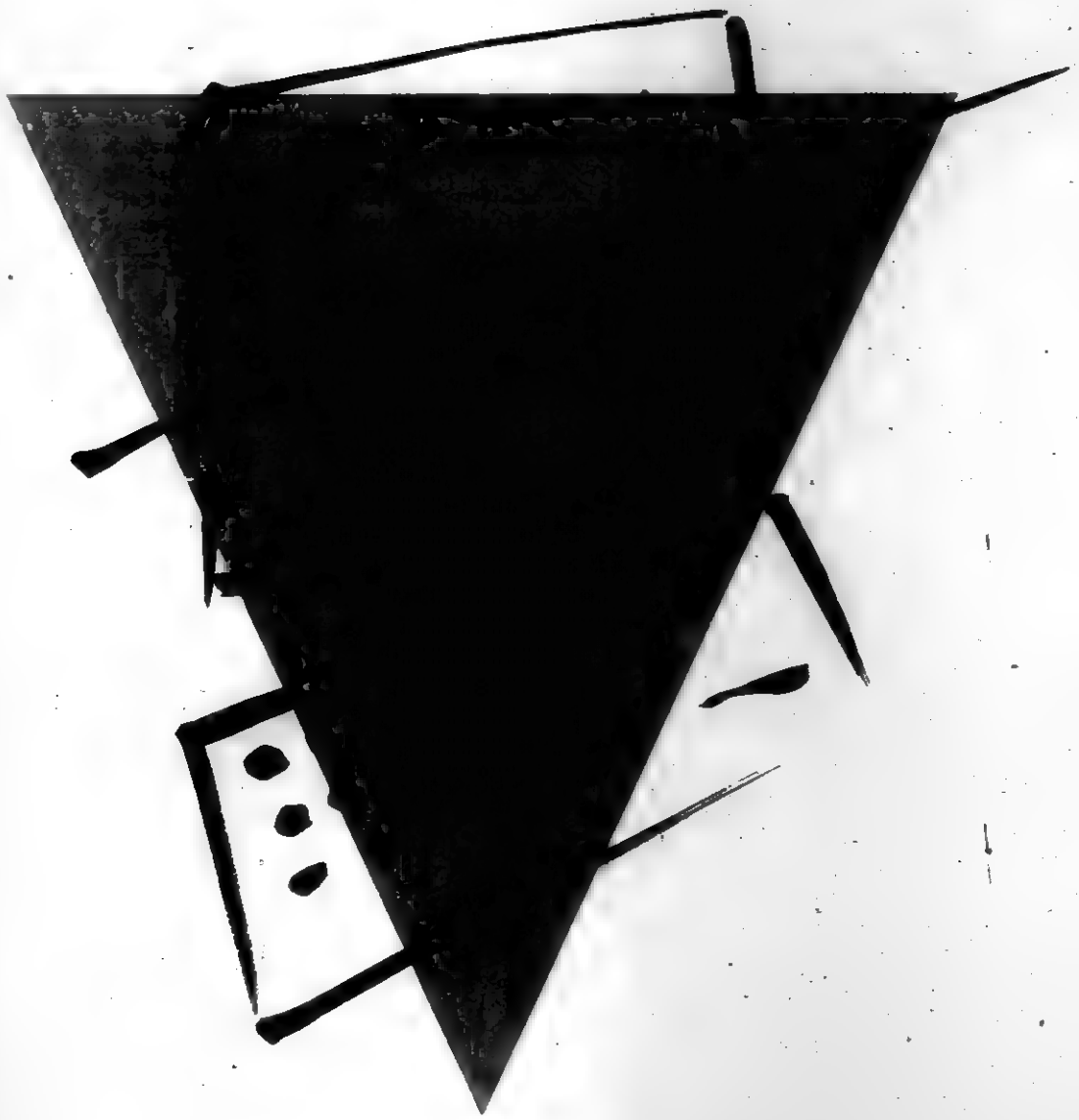

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Insurance firms

CONTINUED FROM PAGE 93

processing standpoint, he is the one we have to serve," said Davis Keyes, second vice-president of marketing and technology at Protective Life Corp. in Birmingham, Ala.

Keyes notes that Protective Life has distributed a PC-based universal life proposal system to about 1,000 agents for several years. But the company recently converted the system from Basic to C, which resulted in a faster and more flexible system with features such as the capacity for agents to process loans and withdrawals.

Keyes noted that Protective is one of the growing number of companies providing agents with some remote access to a mainframe, such as daytime dial-in access to IBM CICS files for status reports on individual policies and claims.

Building on knowledge

"Traditionally, application systems were built to do what was already being done manually. Now we are building management information systems," said Lawrence E. Bacon, senior vice-president of data processing and telecommunications at The Travelers Corp. in Hartford, Conn.

"We've done what I would call relatively easy things. We've automated accounts receivable and payable and other back-office functions. We could do some simple things like quotes on policies with PCs. But now we are at the threshold of seeing whether we can make the technology pay for itself, and the industry knows it has to do some hard work," he added.

The Travelers is one of many insurance companies that have established or become partial owners of agency automation vendors that sell PC- and minicomputer-based systems to agents. Now the insurers and those vendors are turning their attention toward agency applications that work in conjunction with the host mainframes, such as printing binders in the agency office.

"In the past, there was very little connectivity between the agency and the company," Arthur D. Little's Scutro said. "But that is expanding, and in some instances the agency minicomputer or [local-area network] has become a middle tier in the company's three-tier computer strategy."

One of the driving forces in agency automation is the overall pattern of change in the insurance industry.

"Product lines are now more complex, and you need automation to explain them to the customer and to sell them," said Ann Parr, manager of information systems and processing at the Atlanta-based industry organization Life Office Management Association (LOMA). "Ten or 12 years ago, it was a major job to run a proposal, and you could show a customer very few alternatives. Now you can run multiple scenarios."

In addition to displaying the alternatives in a complex product line, a system can improve the agent's ability to cross-sell products. That assistence can be as basic as the use of corporate data base information regarding a homeowner or life-insurance policy to remind the agent when a policyholder's child turns 16 and is a prospect for an automobile policy.

Pilot projects

One of several companies running pilot projects with expert systems targeting complex product offerings is John Hancock Mutual Life Insurance Co. in Boston, which sells primarily through agents.

The financial planning expert system was developed in conjunction with Applied Expert Systems, Inc. in Cambridge and is used at nine agencies. Data about a customer's financial situation is entered on an agent's PC and uploaded to a Digital Equipment Corp. VAX 8650 for batch processing. The resulting report outlines general types of insurance and investment products that customers need to meet their goals and makes recommendations to the agent on which specific products and funding plans match customer needs.

The system goes a step beyond a modular needs-based personal financial analysis tool in use at John Hancock since early this year and uses the knowledge of experienced agents.

"This system will help to broaden an agent's knowledge. Normally, an agent might be familiar with one or two products. This way, they are exposed to all of the available products," said John Santa Barbara, project manager in the marketing systems group.

More research needed

Daniel L. Ouellette, general director of marketing systems at John Hancock, said the expert system has been useful thus far, but he warns that deeper analysis of its benefits is needed.

Noting that sales increases cannot yet be directly linked to use of the system, Ouellette says the average premium for agents using the system is $1,700 per case, which is almost double the $900 average insurance sale.

All insurance companies must take a close look at the benefits and related costs of agency automation projects, Scutro warned.

"One of the benefits for the company is that the system cost-effectively off-loads some of your work to the agent while encouraging the agent to do work with you," he said. "However, the cost-benefit of hooking up agents remains unproven."

However, Scutro added, sometimes the benefit for the company might be eliminating "the unease of seeing everyone else doing it."

Ryder's driver

CONTINUED FROM PAGE 93

asking for employees' advice can be a powerful motivator. The way it works is simple. "I don't follow a lot of the traditional organizational lines. It is not unusual for me to stop in the computer room at 7:00 at night, talk to the printing operator, and ask, 'What do you think if we did this?' "

In another case, Perara had the job of redesigning Ryder's complex network command center. "It was a terror in the way the cables were laid out. I wondered if I really understood what was under the floor," he says. So Perara did something that seemed obvious to him, but which some managers questioned. He brought in the people who had been under the floor and asked their advice.

The payoff was almost instant. "I got back the most detailed plan I had ever seen," he says. "Those individuals volunteered to come in at midnight to make the thing work. They worked the entire weekend, and by Monday it was done."

Besides adding perspective to Ryder MIS decisions, participatory management gives all employees something to strive for and, perhaps rise, like Perara, toward the top of the MIS heap. "I believe that promotions from within work," Perara explains.

Although growth is always a bit difficult as workers near the top, MIS employees at Ryder appear to have clear possibilities. "The growth path is very evident at lower levels," Simmons explains. For Perara, a one-time Cuban political exile, the ground floor was as good a place as any to start.

The Klinger/Perara management style does place particular demands on employees. The key requirement for success is to be a team player. "That is a requirement to work for George Perara. You must be a team player," Perara says.

For those who do not catch on, there is coaching and counseling on how to be more cooperative. If these lessons fail to sink in, the person may be left behind as the team marches on.

However, the Ryder MIS style is not as freewheeling as it may appear. Another element of Perara's approach is what he calls "management by objective." This approach consists of weekly and monthly reports that state and track the company's objectives as well as detailed reports of specific projects.

Beyond seeking opinions from all relevant layers of MIS, Perara also ferrets out the views of the people whose jobs are directly affected by automation. In that respect, Perara, as well as the rest of Ryder's MIS management team, is a businessman.

Road warriors

This means that Perara must talk to the accounting staff, the marketing departments and the purchasing groups. And being with a nationwide truck rental firm, Perara must also keep in touch with Ryder's field operations. "We get involved where the rubber meets the road," he notes.

Perara points to a variety of successful MIS strategies influenced by customers or departments within Ryder. One is a billing system that can flexibly serve customers' needs with daily, weekly or monthly billing over a variety of geographical ranges.

While Ryder's billing system is moving to a plethora of IBM System/36-type processors, possibly including the Silverlake model announced last week, much has been done based solely on operational changes. "This only requires changes in the way the operations activities are run at night," Perara explains.

Another example is a "just in time" parts delivery system that will ensure that parts from key suppliers such as Toyota, Ford and General Motors are obtained as quickly as possible, eliminating costly inventory. The system is being put together using PCs, local-area networks and Oracle Corp.'s Oracle data base management system software.

There is more to life than just MIS for Perara. Although his biggest hobby is his family, he loves to travel and knows a number of languages, including Italian, French, Spanish, Portugese and Cobol.

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LOCAL HAPPENINGS

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San Francisco, July 6. Association for Women in Computing, Bay Area Chapter. "Unix." Stagecoach Restaurant. Contact: Association for Women in Computing, Suite 1044, 41 Sutter St., San Francisco, Calif. 94104.

Phoenix, July 12. Independent Computer Consultants Association, Phoenix Chapter. "WORM Disk Laser Technology." Phoenix Sheraton, First St. and Adams. Contact: ICCA, PO Box 22115, Phoenix, Ariz. 85064.

San Diego, Nov. 17-18. California Educational Computing Consortium Western Educational Computing Conference. Contact: Judah Rosenwald, Extended Education, NAD 153, San Francisco State University, 1600 Holloway, San Francisco, Calif. 94132.

MIDWEST

Grand Rapids, Mich., Sept. 11-13. Midwest Data Base and Data Communications User Group annual conference. Amway Grand Plaza Hotel. Contact: Theodore P. Rock, Harris Trust and Savings Bank, P.O. Box 755, Chicago, Ill. 60690.

SOUTHEAST

Atlanta, Sept. 12-14. Southeastern Telecommunications Association. "Positioning for Success." Marriott Marquis. Contact: Carlisle Reames, SETA Public Relations, P.O. Box 210155, Columbia, S.C. 29221

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FROM PAGE 93

managing this resistance is a critical factor in determining the ultimate success of any computer system for top management.

Resistance to change is inevitable, but the MIS developer is often surprised by unexpected stonewalling and lack of cooperation from line and staff groups throughout the company that must provide data for the executive system. "Initially, we were very naive," says the ESS project manager at a West Coast manufacturer. "One of our early techniques was to get the executive sponsor to bang people over the head with a two-by-four to get them to provide information, but that failed miserably."

"IF YOU aren't aware of the politics, you're dead."

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Joking aside, the sensitive nature of resistance to ESS is evident in the fact that the above ESS expert and several other MIS managers agreed to speak only on the basis that their companies not be mentioned.

Learning by doing

When installing an ESS, MIS managers learn how subtle organizational resistance can be and how difficult it is to overcome. In one Midwestern consumer products company, ESS developers got used to hearing staff groups that would have to supply data argue, "We don't have time to get involved in this" and "This data is too sensitive to put on a system where our department can't control access."

At the West Coast manufacturer, the financial staff saw ESS developers as subtly usurping their role of carrying information to top management, the project manager says. "A lot of their resistance was not outwardly defiant. They would simply put up barriers to access, like saying they can't release the data until they have had a chance to review the numbers."

Often, resistance to an ESS is very sensible behavior, contends Lynne Markus at the University of California at Los Angeles's Anderson Graduate School of Management. It represents an individual's realistic assessment of how he will fare with the system. "They look at the situation, and they think they will lose power," she says.

Therefore, since at least some resistance to a new ESS is likely, developers in MIS must create a strategy for dealing with line and staff groups whose cooperation is needed to make the system valuable for top management. The heart of this strategy involves cultivating relationships with both the executive sponsor and those in the organization who must provide data to the ESS.

Index Group's Gulden

Virtually every experienced ESS developer recognizes the critical role the system's executive sponsor, or most senior user, must play in the process. "With an ESS, you will cross more departmental boundaries than almost any other kind of system," says Lloyd Belcher, coordinator of executive information systems at Conoco, Inc. in Houston. "You are running across the grain of the organization, and to penetrate those departments, you must have the executive's support."

But more than just having support from top company management, the ESS manager must know how to use the sponsor to build support for the system throughout the rest of the organization.

First, the project manager must convince the sponsor not to delegate responsibility for getting politically sensitive information on the system. "There is a tendency to try to shield the executive from organizational resistance and to try to deal with it yourself," says Gary Gulden, senior vice-president of The Index Group in Cambridge, Mass. "But the boss has to do his own dirty work."

Often, however, ESS managers find their executive sponsors unaware that resistance is a problem in developing the system. In one large insurance company, the developer had to confront his chief executive officer when he could not get information from the controller. The executive could not understand what the problem was until he reluctantly met with the controller in a carefully orchestrated meeting. Only then did the CEO realize the controller's confusion about the objectives of the system.

Courting data suppliers

While cultivating support from the system's executive sponsor, the ESS manager must also build relationships with those who will be supplying data to the system. "If you don't get the staff groups to buy in," Conoco's Belcher says, "then you won't get the quality of information you want."

Building organizational support for an ESS means meeting with data-supplying staff and line management groups to clarify the purpose of the system, explore how subordinates' roles might change once the system is fully installed and build credibility so information suppliers realize MIS is not trying to take away their control over the quality of the information.

"People knew this was coming, but it was very foggy," says the ESS manager in the consumer products company. "Resistance arose because they didn't understand that the system was just a different way of communicating information. It wasn't going to take away their power."

In the process of discussions and demonstrations with information systems suppliers, politically sensitive ESS developers often look for ways to minimize the additional work the system will create for staff and line managers. They also look for ways to build benefits into the system for those who must provide data.

One common approach is to include the name and phone number of the data supplier on each screen the executive views. This helps maintain a sense of ownership and visibility for subordinates while enabling the executive to quickly follow up if he has questions about information in the system.

INDIVIDUALS "look at the situation and they think they will lose power."

LYNNE MARKUS
UCLA'S GRADUATE SCHOOL OF MANAGEMENT

Organizational support

Overall, the strategy for managing resistance in ESS development means working both ends of the information pipeline. "I play every angle I can come up with," insists one politically savvy ESS manager. Aside from asking for a direct executive order to supply data, which in many corporate cultures is not feasible, there are three common tactics used by ESS project managers to build organizational support for their systems.

One approach, according to consultant Gulden, is a principle-setting meeting in which executives and data suppliers meet to formulate ground rules about how an ESS will be used. In one manufacturing firm, financial analysts were concerned that executives would overestimate the accuracy of a modeling application built into the ESS. Both sides met and agreed that executives would use the model only for exploring options, while the staff would continue to do the complex calculations on which final decisions would be made.

Another common tactic is to use existing management processes to build support for the system. As in the other cases, this approach requires the strong backing of an executive sponsor.

In one corporation, where the culture breeds strong-willed managers, the ESS developer avoids going head-to-head with resisters. Instead, he looks for ways to gain leverage through normal management processes — such as staff meetings involving the sponsor — where he can subtly put resisters on the spot, forcing them to take a public position for or against the system.

"That only happened a couple of times before the managers saw which way the wind was blowing. The resistance melted real quick," he says.

Another effective tactic is demonstrated by the ESS manager who confided that on several occasions, he planted a couple of incomplete reports on the executive's system when he was only able to negotiate access to a limited amount of information from reluctant senior staff members.

Reviewing the system a month later with the executive, the developer pointed out the new reports and asked if it would be more helpful to add the missing information. When asked why the rest of the data wasn't there, the ESS manager simply suggested some reluctance to release it and then let the senior manager decide how to get the information into the system.

Organizational resistance to an ESS is inevitable, because information flows and communications patterns reflect existing power relationships and computer systems for top management threaten to change these. "We're not just talking about the implementation of a piece of software here," one veteran ESS developer says. "It takes time to get quality data and build the infrastructure needed to support an ESS."

Xerox's Soha concludes, "Just having a strategy isn't enough. You've got to have the executive sponsor's support, and he's got to understand that there's resistance out there. The whole process must be managed very, very carefully."

De Long is a research associate at Harvard Business School and co-author, with J. F. Rockart, of Executive Support Systems: The Emergence of Top Management Computer Use.

The resisters

The causes and sources of resistance to executive support systems (ESS) are complex and varied. But identifying the groups that resist ESS implementation can help in managing the resistance — and that can be crucial to a successful system. The four potential sources of resistance are as follows:

Staff personnel who fear the loss of control over information used by executives.

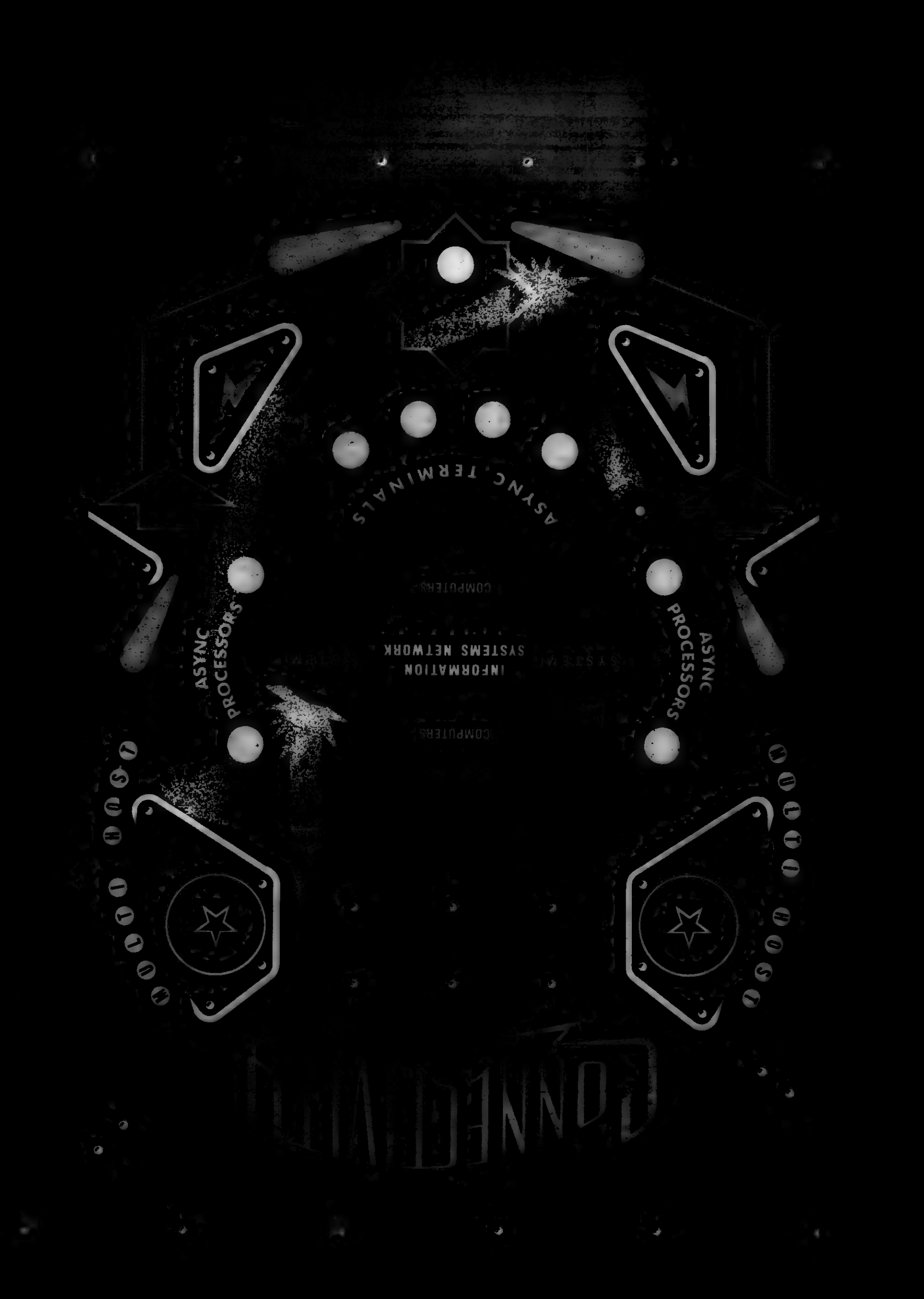
Subordinate line managers who fear giving top management too much visibility into their operations.

Either staff or line managers who provide legitimate resistance created by one of three legitimate perspectives:

- "The business is doing fine, why change things?"
- "This system represents all costs and no benefits for my group."
- "Even if we send up the data they want, our executives won't have the context to understand it."

Executives who for any number of reasons do not want to use the technology themselves. Their reasons may include the feeling that the system provides inadequate functions or information; the fact that the user interface does not suit them — perhaps they are not comfortable at a keyboard; or the conclusion that the ESS is too difficult to use when compared with the benefits it provides.

Adapted from Executive Support Systems *by J. F. Rockart and D. W. De Long, Dow Jones-Irwin, 1988.*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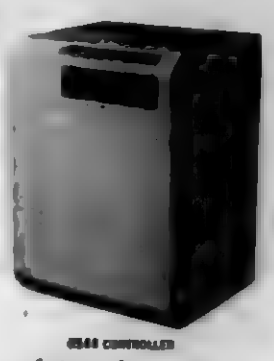

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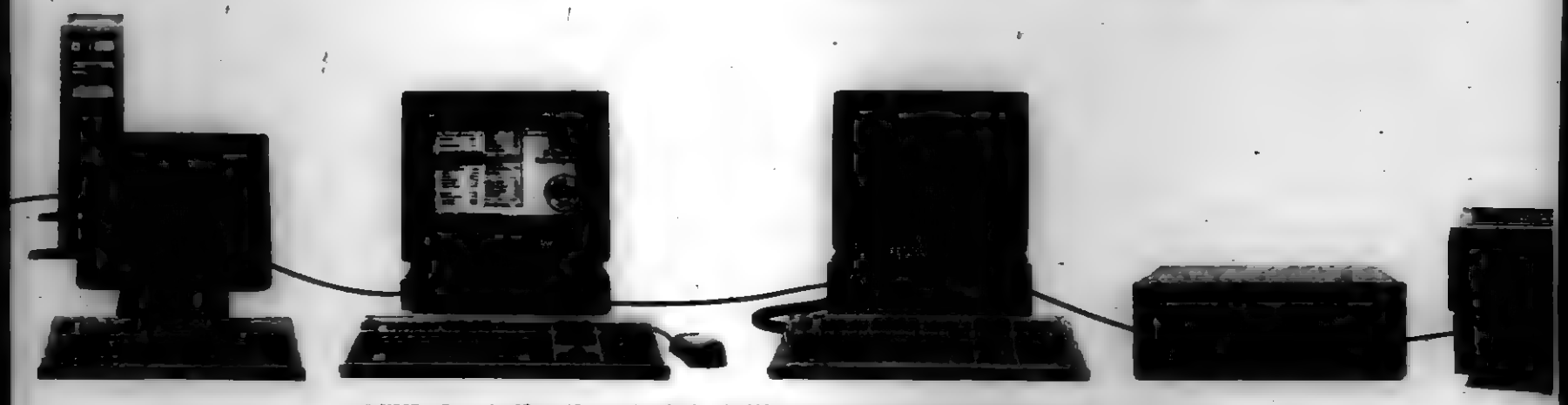

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Klein

CONTINUED FROM PAGE 93

software vendors, superimposing corporate needs on this diversity. The relative importance of different clients is usually clearly defined, and the level of service to them varies considerably. The manufacturing model is constrained by strict cost/benefit analysis guidelines, which hamper justifying strategic information systems infrastructure investments.

An information systems organization that follows the service company paradigm usually coordinates information systems activities centrally because of the need to interface. Standards permit one to three major architectures to coexist. Clients who provide service, marketing and delivery functions get priority over support functions. Its emphasis on the short term fosters instability in information systems activities and neglect of personnel development.

A MONG ITS OWN staff, an entrepreneurial organization encourages diversity and experimentation and fosters participatory management.

Turn entrepreneur

By changing the adopted paradigm to an entrepreneurial one, the executive can make information systems a more effective management partner of the company.

In its client relationships, the entrepreneurial information systems organization is a facilitator, not the sole provider of information systems activities. Its client relationships are genuine partnerships based on mutual respect. Clients routinely lead information systems development projects. They also share responsibility for technology. This involves more task-oriented teams, more fluid matrix relationships, improved networking of people and skills, diverse technical approaches, experimentation and prototyping.

An entrepreneurial organization encourages cooperation and communication among all the information technology players and ensures quality without stifling innovation and creativity. It does this by developing standards for documentation, security, performance and maintenance. But in place of rigid technical standards, it devises an information infrastructure.

Among its own staff, an entrepreneurial organization encourages diversity and experimentation and fosters participatory management.

Information systems capitalizes on human resources by providing the information needed to push decision making down in the organization and expanding human intelligence. It carefully selects and monitors new employees and invests in education, training and productivity tools. The result is motivated people who are committed to the organization's goals. They trust their management and feel they're involved in key decisions and recognized for their accomplishments.

The entrepreneurial information systems organization has an equal voice in management councils involving other support areas and helps address issues that aren't its direct responsibility. Planning — continuous and closely tied to business planning — provides a broad strategic information systems direction to channel diversity, decentralization and innovation.

Information systems focuses on delivering high-quality service rather than containing costs. An entrepreneurial organization recognizes that it can improve quality only if it establishes measures to report on quality and systematically improve its performance.

It approaches innovation by taking small steps rather than striving for a risky breakthrough. As a result, the distinction between new systems development and maintenance diminishes and design methods facilitate continual change during a system's lifetime. An entrepreneurial information systems organization stays close to the leading edge of the technology curve, at least experimenting with new technology, if not putting it into production. It does not use obsolescent technology to save money.

What can an information systems executive do with this idea? Compare it with the existing paradigm to assess whether the information systems organization's growth and effectiveness are being constrained. Use it to look at relationships with staff, clients and management. Begin to implement the entrepreneurial paradigm. Set a career goal of getting the company to adopt it.

How do you plant such an organization? A certain degree of compatibility between information systems and the company's culture is required. Usually that is determined by the leader. The chief executive officer is the most common source of entrepreneurship. The information systems executive can also introduce entrepreneurship, starting internally and then planting like-minded information systems people in client departments. A third source — external agents of change, such as executives from another company and consultants — can tilt the balance in a corporation if employed at the right time.

Klein is senior vice-president at John Diebold & Associates.

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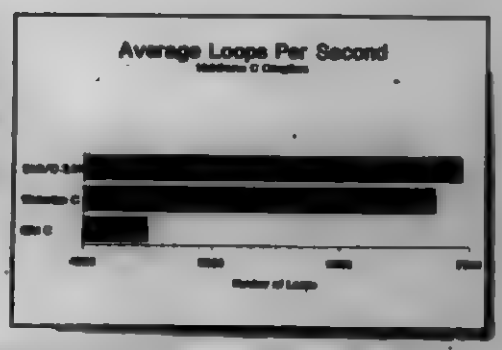

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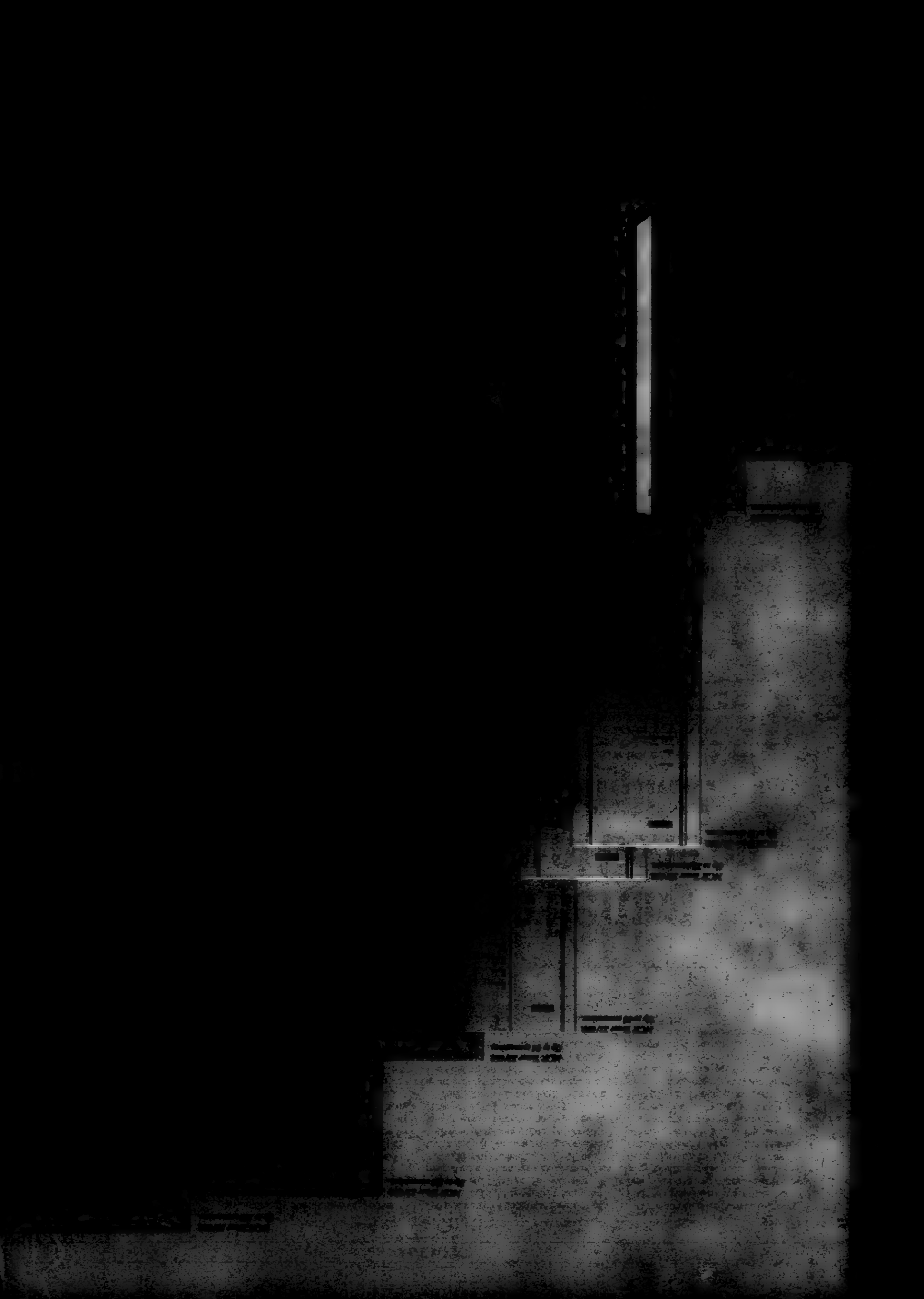

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COMPUTER INDUSTRY

INDUSTRY INSIGHT

Roger Grant

Maintain the maintainers

Once thought of as an industry of high growth and profit margins, the third-party maintenance industry is exactly the opposite today. Both margins and volume are shrinking — and this should be of concern to customers.

I say this because I believe that the maintainers are directly responsible for the improvements in both service price and quality that some users are experiencing from no less than IBM.

A relatively short time ago, the third-party maintenance business was relatively simple. The major manufacturers, such as IBM, treated third parties with a casual disregard. In addition, vendors looked on their maintenance customer base as a cash cow that, if properly manipulated, would provide sizable profits and a ready market for new generations of equipment.

If a major manufacturer wanted to drive the customer to buy new equipment, it needed only raise the price of maintenance and reduce the level of support for the older hardware.

Continued on page 117

Crucial year for Honeywell Bull

Systems vendor breaks loose from Honeywell, will charge market in 1989

BY CLINTON WILDER
CW STAFF

Like either Michael Dukakis or George Bush, Honeywell Bull, Inc. will face a critical year in 1989.

On the surface, the Minneapolis-based systems vendor will be moving its home to the Boston area and most likely renaming itself without the moniker of its U.S. progenitor and part-owner, Honeywell, Inc. But more importantly, 1989 is put-up-or-shut-up time for Honeywell Bull's market success, according to President and Chief Executive Officer Jerome J. Meyer.

Jerome J. Meyer

"I see the company's progress in three phases," Meyer said earlier this month. "The first was breaking away from Honeywell; the second was doing what needed to be done in the organization. The third, next year, will be attacking the market."

Meyer has already earned high marks from industry watchers for his decision late last year to cut 1,600 U.S. jobs and move all of Honeywell Bull's Phoenix manufacturing to Massachusetts [CW, Nov. 16, 1987]. "What needed to be done was so obvi-

Continued on page 116

Data View

Low-end service maintains lead

Despite more large firms offering CPU service, PCs, terminals and peripherals still accounted for the lion's share of the third-party maintenance business last year

INFORMATION PROVIDED BY FROST & SULLIVAN, INC.
CW CHART

Excelan-NET wedding off

BY PATRICIA KEEFE
CW STAFF

The attempted acquisition of Excelan, Inc. by Network Equipment Technologies, Inc. (NET) is officially dead, thanks mainly to resistance from some large Excelan shareholders and NET's angry reaction to their bid to hike the sale price.

"Both sides have agreed the merger is essentially dead," an Excelan source said recently, adding that lawyers are trying to cleanly extricate both companies from the agreement. The

Continued on page 114

EDS, others protest Perot postal deal

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — H. Ross Perot's splashy re-entry into the computer services market with a U.S. Postal Service contract has triggered legal protests from two competitors, Electronic Data Systems Corp. (EDS) and Planning Research Corp.

The competitors argued that the sole-source contract between Perot Systems Corp. and the Postal Service violates government procurement rules because it was not awarded through a competitive bidding process.

EDS and Planning Research filed official protests earlier this month at the General Services Administration's Board of Contract Appeals, asking that the contract be halted.

The contract raised similar concerns on Capitol Hill. U.S. Rep. Frank McCloskey (D-Ind.),

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Inside

- Wang execs move up a notch. Page 114.
- Unisys data recovery center, alleges licensing end-run. Page 115.
- 3Com frets over Novell-Apple tryst. Page 116.

Compucom fired up by acquisitions

BY ALAN J. RYAN
CW STAFF

CHERRY HILL, N.J. — Building off a solid backbone of former IBMers and hammering out its outbound sales philosophy, Compucom Systems, Inc. is hoping to make its competition in the computer dealer field sit up and take notice.

While the microcomputer distribution and retailing industry is in a postboom period of retrenchment, Compucom is content to buck the trend. Its latest growth surge came with its June 9 acquisition of financially struggling Compushop, Inc., the 16-store retail computer subsidiary of Bell Atlantic Corp., for $24 million.

The architect of the deal was Compucom Chairman Ira Lubert, who began his career on the fast track in the IBM sales force. In nine years at IBM, Lubert was named the company's salesman of the year in 1975 and manager of the year in 1981. He then worked at ITT Systems, Inc. for two years, where, at age 31, he was named vice-president of North American sales.

Industry analysts have predicted that publicly held Compucom will reach $160 million in sales this year and will have earnings of approximately $3 million. The company reported sales of $23.6 million for its first quarter this year with earnings of $480,000, or 2 cents per share.

While Compucom's profits are not substantial, the year-old company, which sells primarily to Fortune 2,000 and government clients, has seen much worse. And its corporate customers believe its growth has strengthened its service.

When Hyundai Motor America was looking for laser printers in 1986, Richard Hernandez, the firm's information systems administrator, saw a Kyocera Unison, Inc. printer at a Comdex show and became interested. "We asked Compucom to get us an evaluation unit," he said. "They did that, and they ended up becoming a Kyocera dealer. And we ended up buying the product."

Hernandez added that Hyundai is growing rapidly and has added more regional offices since it started dealing with Compucom. "Since they've grown, they're able to meet all of our service needs nationwide," he said.

That growth has lead Compucom to become a major mover of microcomputers.

In an agreement with Compaq Computer Corp., Compucom was awarded U.S. 1 status in November, making it one of two dealers to receive that designation in 1987. The status authorized Compucom to purchase Compaq personal computers at a high-volume discount.

Compucom also sells micros from IBM, Hewlett-Packard Co., AST Research, Inc., Epson America, Inc., Toshiba Corp. and Zenith Data Systems as well as software, peripherals and local-area networks from leading vendors.

Just one year ago, the Compucom story was one of financial losses. The company was created by majority shareholder Safeguard Scientifics, Inc., a King of Prussia, Pa.-based high-tech holding company, through the

Continued on page 115

Up & Coming: *Compucom*

Headquarters: Cherry Hill, N.J.
Founded: 1987
Chairman: Ira Lubert
Sales force: 52
Business: Outbound and retail sales of microcomputers
Of note: Growth by acquisitions, such as 16-store Compushop chain

Wedding off

CONTINUED FROM PAGE 113

companies thought they had reached an equitable deal two weeks ago, but it fell apart, he added.

Both communications vendors want to execute a clean break as quickly as possible. "There's no sense in flogging a dead horse. It's time to finish this business and move on," the Excelan source said.

NET spokesman Stan DeVaughn, however, declined to confirm that the termination of the deal has been finalized. "I can't comment, other than to say that there are no new facts. I would add that each day can bring new facts," he said.

Once NET separates itself from Excelan, observers have speculated, it will go after Micom-Interlan, Inc., another Ethernet and Transmission Control Protocol/Internet Protocol vendor rumored to be on the block. As for Excelan, officials have claimed it is not looking to be sold.

The attempted merger, first announced in April, was bedeviled almost from the start — the stock market dropped 100 points the day the pact was announced. Also, Excelan officials underestimated shareholder reaction to a negotiated sale price of roughly $12 per share. After Excelan shareholder discontent surfaced, NET sweetened its offer slightly but to no avail.

According to a source close to both firms, NET's May 13 press release, which accused Excelan of breach of contract while threatening to exercise stock option rights, steamed Excelan executives.

To salvage the merger, Excelan would have had to give NET a graceful way out of that press release, and NET would have been forced to give Excelan shareholders a better deal, the source added. At least one meeting between the principals and board members of both companies failed to resolve any issues.

The specifics of the cancellation negotiations revolve around liability issues, most notably the question of which firm, if either, breached the merger agreement.

The issue of breach is "the crux of the whole negotiations. They gave us a laundry list, but they never proved there was a breach," the source said.

INDUSTRY WEEK IN BRIEF

Wang Laboratories, Inc. has sued several former Vice-Presidents, Treasurer and Corporate Controller Regina Hahn to the position of chief financial officer. In addition, Vice-President of Worldwide Field Operations Ian Diery has been promoted to executive vice-president, worldwide field operations, and Senior Vice-President and Chief Development Officer Steven Tsiang has been appointed executive vice-president and chief development officer.

Microtek Computer, Inc. has agreed to pay Quantum Corp. an undisclosed amount and discontinue the manufacture and sale of its Drivecard hard-disk product line. This comes as a result of a patent infringement suit brought against the company by Quantum and its subsidiary Plus Development Corp. Milpitas, Calif.-based Quantum and Plus filed a similar suit against Western Digital Corp. last month.

Italy's Ing. C. Olivetti & Co. has sold its 8.5% stake in Stratus Computer, Inc. Olivetti said the approximately $62 million raised from the sale will be used for other corporate purposes. Olivetti said it will continue to resell Stratus computers on an OEM basis.

Oracle Corp. became the newest entrant in the systems integration business by forming Oracle Complex Systems Corp. Robert B. Lawrence, former president of SHL Systemhouse, Inc. subsidiary Systemhouse, Federal Systems, Inc., will head the Washington, D.C.-based organization.

NEC Corp. plans to start test-marketing its 4M-bit dynamic random-access memory chips in Japan by the end of this year, which will likely make it the first Japanese chip maker to do so. NEC will then take a wait-and-see approach to assess how the parts are received by its Japanese customers before determining production goals.

[illegible] summer, but chilly winds still blow in Canada. Ottawa-based SHL Systemhouse, Inc. is pulling down and dirty in its bid to acquire Canada's Computerland Corp. output. Computer Innovations Distribution, Inc. (CIDI), Systemhouse has begun to send letters to CIDI shareholders that offer to purchase all of the company's outstanding shares. Systemhouse is offering $8.40 Canadian, or $6.62 American, for each of CIDI's 20.4 million shares — approximately $133.2 million Canadian, or $105 million American. Systemhouse also said last week it has purchased 673,000 shares, about [illegible] percent, of Ottawa-based CIDI. Chairman of the board Frederick M. Hayden is also chairman and chief executive officer of Systemhouse.

Unretouched Screen Images

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Unisys Canada slaps $500K lawsuit on firm

BY PAUL BARKER
IDG NEWS SERVICE

TORONTO — Unisys Corp.'s Canadian subsidiary has launched a $500,000 lawsuit — $410,000 American — against the owner of a disaster recovery center, claiming the third-party organization used Unisys software without obtaining the proper licensing.

Defendant Brian Keenan, president of Toronto-based Bekeen Computer, said the lawsuit calls into question the traditional right of an owner to use licensed software on another system for backup testing. "Some of these issues have been brewing for quite some time, and in many ways it is good to see the pot finally come to a full boil," he said.

Bekeen operates a hot-site disaster recovery center for Unisys 1100 users and installed Unisys hardware at the center without the aid or involvement of Unisys, Keenan said. "Unisys contends that we must have used illegal documentation and software to complete the installation. We did not license any control or other software from Unisys for use on the recovery machines. It is their contention that we must do so," he said.

A statement of claim filed in the Ontario Supreme Court against Bekeen by Unisys Canada and its U.S. parent seeks a mandatory order requiring the defendant to delete proprietary software from all computer systems in its "possession, power, custody or control."

"We are not suggesting that Bekeen has improperly permitted licensed users of Unisys software to use that software for testing the Bekeen backup recovery system," Unisys spokesman Enrique Garcia said. "Our concern lies in the fact that Bekeen itself has obtained and is using Unisys proprietary software without a license."

Bekeen, which also sells secondhand Unisys computers, has in turn filed a statement of defense and counterclaim asking that the suit be dropped and that legal costs be paid by the plaintiff.

The equipment named in the suit includes Unisys's 1100/70 and 1100/80 and the DCP 40 communications system. The software applicable to each includes the 1100/70 and 1100/80 System Control Software and DCP 40 Telecom Operating System. Unisys said the software and other documentation are made available to users of Unisys hardware only pursuant to license agreements.

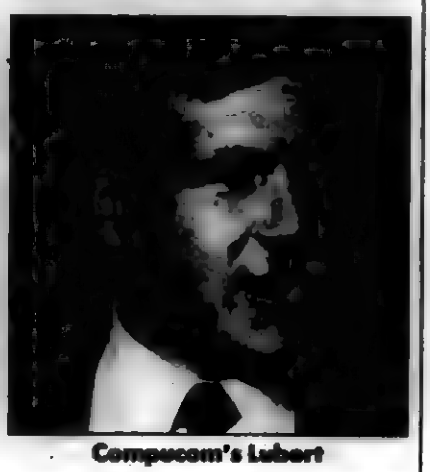
In the statement of defense and counterclaim, Bekeen denied that the equipment was confidential or secret and claimed that "software and documentation have been widely disseminated by the plaintiffs."

Compucom

CONTINUED FROM PAGE 113

restructuring of Machine Vision International Corp., a vendor of computer-aided vision equipment, lost $13.6 million on sales of just $2.9 million in 1986.

With Machine Vision's star tumbling, Safeguard's funding allowed it to acquire Tristar Data Systems, Inc. and Office Automation Systems, Inc. in July 1987.



Compucom's Lubert

Lubert, vice-president of acquisitions at Safeguard, was brought in to be president of Compucom, the by-product of the three merged companies.

On the heels of Compucom's formation came the acquisition of three MBI Business Centers retail outlets. In October, more stores were purchased, this time from Compushop in the Los Angeles and San Francisco areas. In December, additional stores in Nashville and Totowa, N.J., were brought into the Compucom chain. And before year's end, the company announced it would acquire outlets in Charlotte, N.C., Boston and Tampa, Fla.

With the Compushop acquisition, James W. Dixon, president of that chain, has become Compucom president, and Lubert has become chairman. Dixon is also an IBM alumnus, having spent 13 years on that firm's payroll.

Compucom customer Matthew Meldon, microcomputer manager at Del-Webb's Claridge Casino and Hotel in Atlantic City, said he has been working with Compucom for five years, beginning the relationship at a previous job and carrying it to Del-Webb's.

Meldon said Compucom's advanced products group recently earned his respect when it came to his shop, set up a desktop publishing system and "showed us everything we could possibly want to see before we made our decision."

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3Com frets over Mac Netware

BY PATRICIA KEEFE
CW STAFF

ANALYSIS

The recent materialization of Novell, Inc.'s vaporous Netware for the Macintosh [CW, June 13] drew especially close scrutiny from archrival 3Com Corp.

3Com, long a supporter of Apple Computer, Inc.'s Macintosh and Appletalk network environments — so much so that it is occasionally the subject of an Apple buy-out rumor — had good reason to fret over the Novell announcement.

Unlike those from 3Com and Tops, now a subsidiary of Sun Microsystems, Inc., Novell's Mac offering supports Apple's prized Appletalk File Protocol (AFP) — hence 3Com's fear that Apple would be so overcome with appreciation that it might break its own ironclad rule of treating all third-party products equally.

Although a long time in coming, the Novell product is more important to Apple than it is to Novell, which is more concerned with the IBM and Digital Equipment Corp. environments. But while Apple needs access to IBM machines which it already has, thanks to 3Com, Tops and a number of other suppliers, it also wants conformance with AFP.

"Apple doesn't like [the fact that] 3Com's implementation does not conform to the AFP," one analyst said. AFP support from network vendors is important because Apple has directed its applications developers to write to it. Novell may be late into the Apple market, but the firm "did it right" by conforming to AFP as Apple wants, the analyst added.

Appletalk is seen as one of four networking standards, along with IBM's Token-Ring, Ethernet and Starlan. So it is interesting that 3Com, which bills itself as a staunch supporter of standards and knocks Novell for its Lone Ranger approach, doesn't support AFP.

Party crasher?

But there are arguments for both approaches. According to 3Com President Bill Krause, the last thing many large corporate users want or need today is yet another proprietary protocol — such as AFP. In this day of multivendor environments and open systems hype, he may have a point. You could say that Apple is a little late to the network standards party.

"Novell's support of AFP is consistent with its strategy to sell to smaller companies," Krause claimed. Given market research that consistently documents Novell's dominance in Fortune 1,000 departmental networking, that statement is not entirely accurate.

Which may have something to do with why 3Com appeared torn between dismissing Apple's presence at Novell's unveiling and casting threatening words in the direction of Cupertino.

3Com founder Robert Metcalfe told *Computerworld* he would have been very angry had Apple anointed Novell's Mac offering, especially given 3Com's and Tops' longtime support of Apple.

One story making the rounds claimed that Krause expressed similar sentiments to Apple Chief Executive Officer and Chairman John Sculley about endorsing Novell's product. "There's no truth whatsoever to that," snapped Krause, who stressed, "I'm delighted with our relationship with Apple."

However, he also said, "Apple has done dumb things before, and we didn't get upset about it." When asked to be specific, he said, "Showing up to attend a press conference held by Novell is not one of [Apple's] greatest moves."

But then again, Krause conceded that Apple's attendence at the Novell briefing is no different than its appearances at other developers' introductions.

While Krause's reaction flip-flopped, Sculley, who lavished praise on Novell's AFP support, clearly has taken pains to soothe any ruffled feathers at 3Com, according to a source.

Sculley reportedly was quick to assure 3Com executives that he did not demean 3Com's Mac offering as "inferior" and at one point dropped by to take a look at 3Com's Mac projects, the source said.

Actually, while Sculley did stop short of endorsing Novell, his comments were pretty strong, several analysts who attended the press briefing said. "John went a long way to say what a wonderful thing [Netware for the Mac] was for Apple," said one, adding that Sculley did mention 3Com and Tops, but only in passing.

Also interesting was that Sculley went so far as to stress the similarity of the relationships between the technical departments at Novell and Apple to a similar deal between Apple and DEC. And Apple claims to be pretty tight with DEC.

Honeywell Bull

CONTINUED FROM PAGE 113

ous, but doing it was difficult," said Meyer, who headed Honeywell's U.S. information systems business before Honeywell Bull was officially formed 15 months ago.

Honeywell is expected to reduce its 42.5% ownership of Honeywell Bull to approximately 20% at the end of this year, which will make France's Groupe Bull the majority owner at 65% — with Japan's NEC Corp. maintaining its 15% stake. But Meyer dismissed the notion that the ownership change will alter Groupe Bull's commitment to selling the Honeywell computer line in the U.S.

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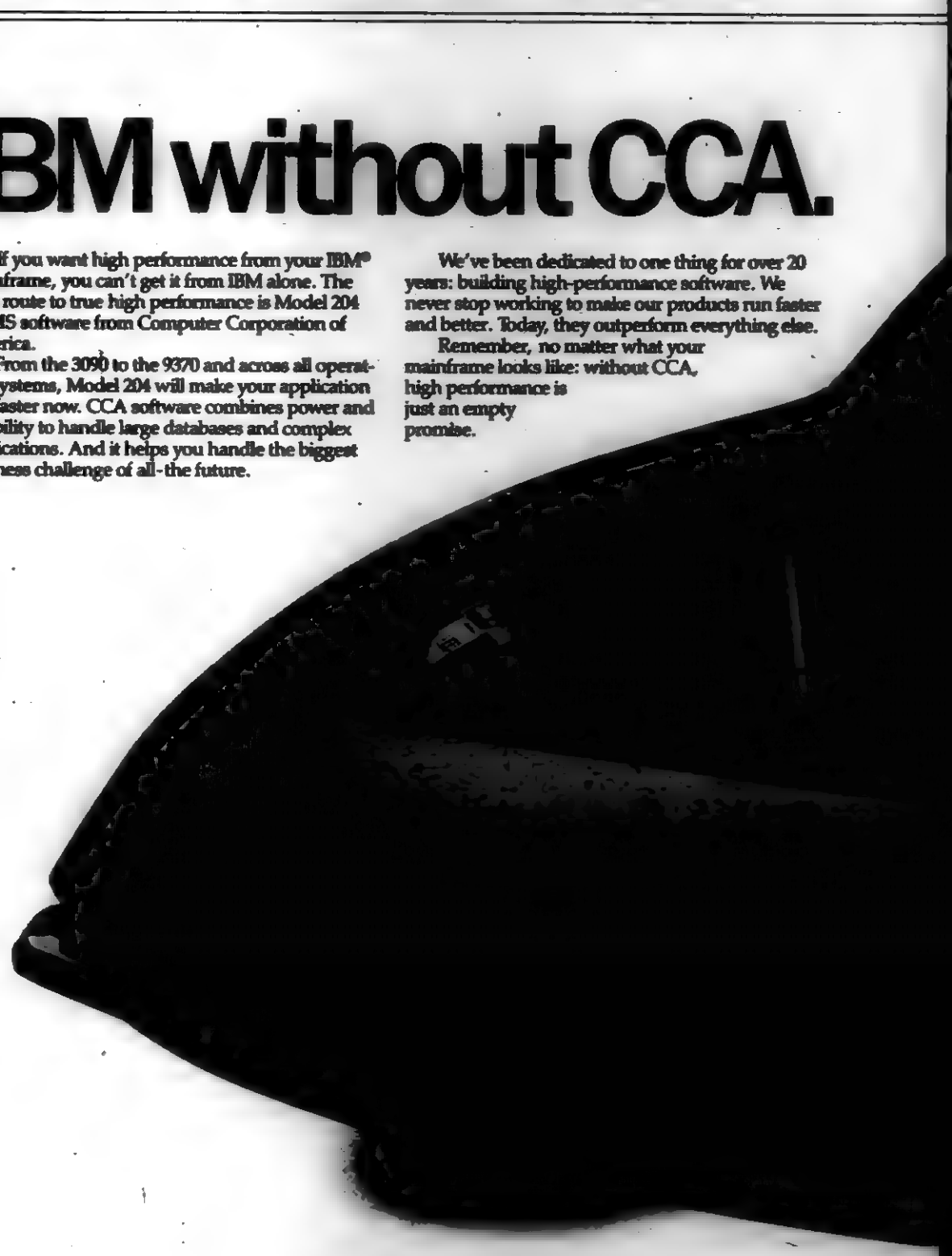


the French absolutely agree."

Meyer said he believes Honeywell Bull has pretty much achieved its initial goal of slowing the exodus of Honeywell's U.S. installed base — the exodus that spurred Honeywell to sell the computer business to Honeywell Bull at what many considered a fire-sale price. Key customer accounts such as General Electric Co., which sold its own computer business to Honeywell in the 1970s, have been reassured, Meyer said.

"They were rightfully skeptical [about the international triventure] at first," Meyer said. "But I had lunch with [GE Chairman] Jack Welch recently, and I think they're believers."

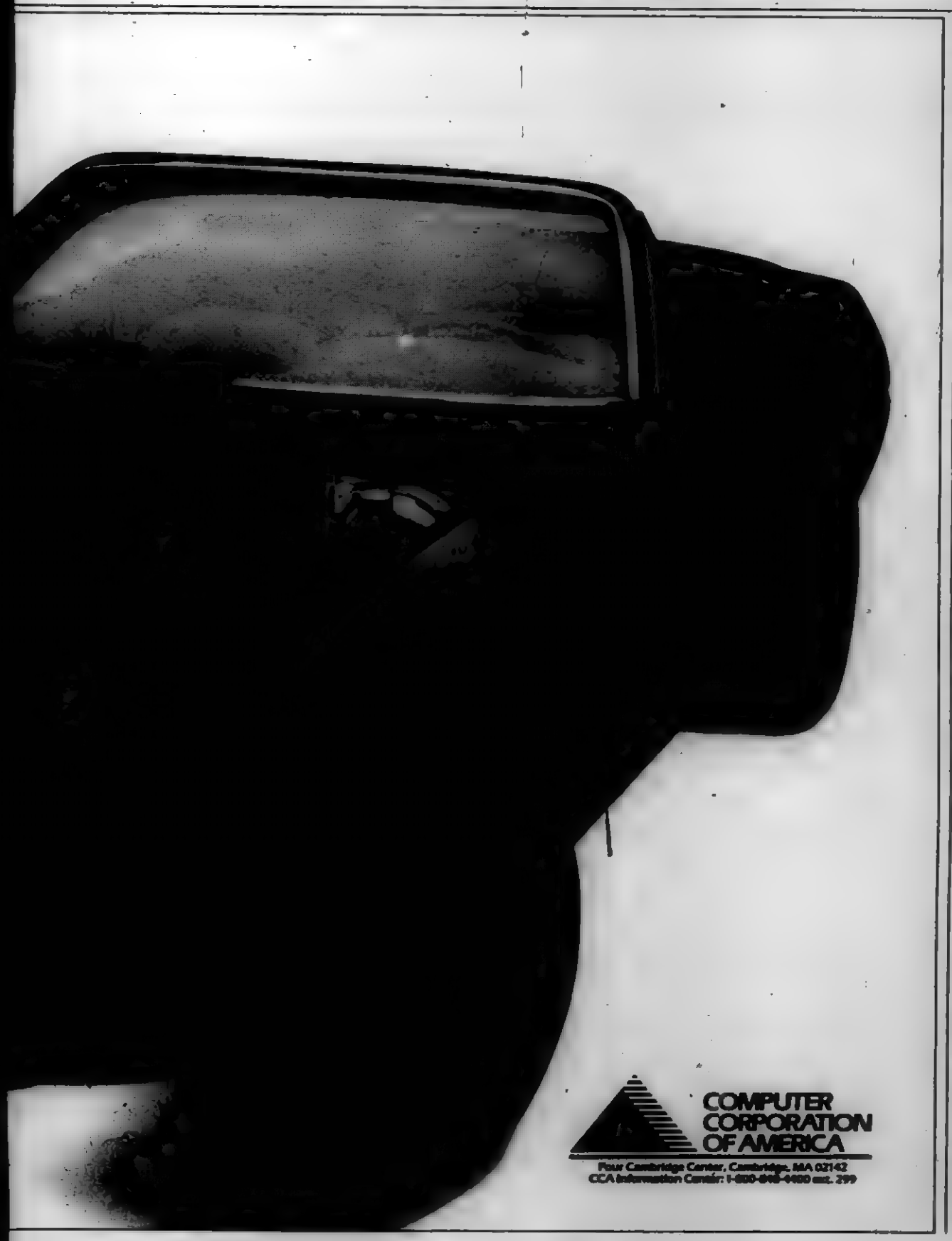
Keeping traditional customers like GE on board required a lot of patience. Now, as Honeywell Bull looks toward 1989 and expanding its U.S. installed base, Meyer said, "I'm ready to get impatient again."

In order to more aggressively attack the U.S. market, Meyer preaches a similar gospel to IBM and many other vendors: the solution sell. Following strategy already practiced by Honeywell Bull in countries such as the UK and Australia, the company will hook up with more value-added distributors in vertical markets such as banking and telecommunications. Honeywell Bull's sales force has integrated service with products in an effort to win larger contracts for complete system offerings.

"If you ask me who will we most look like when this [repositioning] is completed, I'd say a combination of DEC and EDS," Meyer said, referring to Digital Equipment Corp. and Electronic Data Systems Corp. "We want to provide much more than the hardware — the network design, systems design and program management services."

Although its net profit margin was less than 1%, Honeywell Bull did finish in the black in 1987, which was an improvement over Honeywell Information Systems in 1986. Honeywell Bull earned $17.4 million on revenue of $2.06 billion. But Meyer said profitability is a secondary goal to strong cash flow.

Groupe Bull, a major Unix player, recently joined the Open Software Foundation (OSF). Meyer said the OSF's goals are worthy but that he is worried about warring Unix standards.



Grant

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Obviously, this attitude led to inconsistent quality and high prices.

In addition, the major manufacturers refused to service any equipment but their own. This forced customers to either stay away from other manufacturers' equipment or face the likely possibility of finger-pointing in times of trouble. To a large extent, these practices led to the creation of third-party maintainers.

From the customer's point of view, these firms offered three very important benefits. First, they would service a variety of equipment; thus the customer needed to dial only one telephone number to solve a service problem. Second, they saved money, since the pricing was usually 15% to 25% below the manufacturer's. Finally, for the first time, the customer had an alternative and could, therefore, have some degree of influence on the manufacturer.

Today, due in large part to the drastic change in the attitudes and practices of the major manufacturers, the service industry has become extremely complex and difficult. These changes in attitudes and practices are evident to both the third parties and the customers in different ways.

The customers have suddenly witnessed — and hopefully benefited from — price concessions, such as IBM's Corporate Service Amendment and Mid-range System Amendment; new service offerings, such as 24-hour, seven-day-a-week on-site service; and a new willingness to service other manufacturers' equipment.

The third-party maintainers now find major manufacturers much less cooperative than they were in the past. This makes it extremely difficult, and in some cases impossible, for the maintainers to provide quality service at a competitive price.

This situation is similar to a good news, bad news story. In the short term, from the customer's point of view, the news is good. The manufacturers should continue to aggressively improve their service offerings, and customers will see greater flexibility and cooperation.

The bad news is that if the third-party maintenance industry is allowed to be driven down or totally eliminated, the manufacturers will probably return to their old ways.

I believe this can be prevented and that the customers are the key.

Whether or not you ever plan to use a third party to maintain your equipment, ask your equipment vendor if they are available. Ask about the manufacturer's policy toward self-maintenance — another possible casualty. If enough customers ask, the sales force will carry back the message.

If customers use these points as part of their decision-making criteria and don't purchase from manufacturers that have no alternative service, I guarantee that the manufacturers will respond. In that way, you can assure yourself that healthy competition will exist and that you will continue to receive the benefits.

Grant, the former vice-president of marketing and sales at Intelogic Trace, Inc., is president of the San Antonio-based Business Development Group, which offers sales productivity training and consulting to computer industry vendors.

EXECUTIVE CORNER

Norbert R. Berg, deputy chairman of the board at Control Data Corp., announced his intention to retire effective June 30 to pursue his varied personal interests after 29 years of service to the company. Berg, 56, will continue to be a member of the board at CDC, serving as vice-chairman.

Data Three Computer Corp. announced that **John (Jack) E. Harvey** has been named president and chief operating officer of the company. Harvey will be responsible for day-to-day operations with special emphasis on sales and marketing. Harvey joins Data Three after spending five years with IBM, five years with Intel Corp. and, most recently, seven years with Econocom-USA, Inc., at which he served as vice-president of sales, executive vice-president and director of marketing.

Novell, Inc. announced that **Lewis C. Cole**, executive vice-president of the Novell Software Group, resigned earlier this month. Cole was formerly president of CXI, Inc., the data communications software developer that was acquired by Novell in March 1987. The announcement was made by Ray Noorda, president and chief executive officer of Novell. Noorda will serve as acting vice-president of the Software Group. Cole will continue to act as a consultant for Novell.

Harris Corp. has announced the appointment of **Phillip W. Farmer** to the position of senior vice-president, sector executive in charge of the company's Government Systems Sector. He succeeds **Frank J. Lewis**, who has been appointed to the new position of senior vice-president, special assistant to the chairman and CEO.

Unisys Corp.'s board of directors has elected **Andrew D. Hendry** vice-president and general counsel and **Stefan C. Riesenfeld** vice-president, corporate development. Riesenfeld leads corporate development activities for Unisys with responsibility for evaluating and negotiating acquisitions, divestitures, joint ventures and related strategic initiatives. He was treasurer at System Development Corp. when it was acquired by Burroughs Corp. in 1981.

Western Digital Corp. announced the appointment of **A. Keith Plant** to the newly created position of vice-president, corporate development.

Tandon Corp. announced the appointment of **James C. Goetz** to the new position of vice-president of operations, planning and control. Reporting to Charles I. Peddle, executive vice-president and chief operating officer, Goetz is responsible for the financial, computer and administrative functions of Tandon's multinational design, manufacturing and marketing activities.

Goetz joins Tandon with 12 years of financial and operations experience in the computer industry — most recently with Datapoint Corp., at which he served as a division controller and, earlier, as the division's financial planning manager.

Jerry S. Sullivan has been appointed vice-president and program director for the computer-aided design program at Microelectronics and Computer Technology Corp. (MCC). Sullivan comes to MCC from Tektronix, Inc. in Beaverton, Ore., at which he served in several business planning and management capacities.

Efraim Arazi, chairman, president and CEO of Scitex Corp. Ltd., announced the appointment of **Arie Rosenfeld** as president and CEO of the company, transferring the responsibility for overall management of the company to Rosenfeld. Arazi continues as chairman of the board of directors and will contribute to the company in strategic planning and new product and business development. Rosenfeld has been with Scitex 20 years, where he began his career as research and development engineer.

Postal deal

CONTINUED FROM PAGE 113

chairman of the House of Representatives' Subcommittee on Postal Personnel and Modernization, questioned "the decision to enter potentially long-term multimillion dollar contracts without a bidding process or competitive evaluation."

McCloskey's subcommittee plans to hold an oversight hearing and has requested a review by the General Accounting Office.

Computer Sciences Corp., a systems integrator with a strong presence in the federal market, supports the congressional scrutiny of this "unique business arrangement," a spokesman said.

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Perot, a Texas billionaire who founded EDS about 20 years ago, recently announced the formation of the new computer services firm and the hiring of at least eight EDS executives [CW, June 6]. Perot Systems, based in Vienna, Va., referred inquiries to Perot's office in Dallas, but he could not be reached for comment.

Postmaster General Anthony M. Frank issued a statement saying that the Postal Service welcomes the congressional review of the unusual contract and is studying the protests by EDS and Planning Research.

The complex contract initially calls for studies of postal operations to determine methods of making them more efficient, such as using a nationwide computer network to improve the mail transportation system. The three-month study phase has a fixed price of $500,000.

Afterward, the Postal Service anticipates approving the suggested projects and awarding the implementation business to Perot Systems. Each project will continue for at least 10 years.

The implementation phase will be a shared-savings contract whereby Perot Systems will earn a yet-to-be-determined percentage of the cost savings attributed to the project. The contract also states that Perot Systems has the exclusive right, for the next five years, to implement its recommendations.

Congressional sources said it appeared as though the contract had been written by Perot's attorneys.

"This $500,000 contract is nothing. It's what it's going to lead to that may be very profitable for Perot," said James F. Kerrigan, director of Input, Inc.'s federal market research program in Vienna. The Postal Service reportedly is seeking savings of up to $4 billion a year under the Perot Systems contract.

'Serious problems'

Kerrigan said there seems to be little justification for the sole-source nature of the contract, since there are many companies that could provide the same services. "I would think that the Postal Service would have very serious problems with that contract in the event of a protest," he said.

EDS and Planning Research argued that the contract gives Perot Systems a virtual lock on Postal Service computer contracts for at least 10 years, contrary to the Brooks Act requirements for competitive bidding for computer services.

EDS also complained that the contract does not use the term "computer services" although it undoubtedly involves them. Furthermore, EDS said, the fact that the shared-savings contract will use Perot Systems' own calculations represents a conflict of interest.

Lynn Bateman, president of Government Counselling Ltd., a Springfield, Va.-based procurement consulting firm, defended the shared-savings contract as a good deal for the government. "The government has been doing its own work inefficiently for too long, and it's about time we started looking at new ways to do things."

MERGERS & ACQUISITIONS

Autodesk, Inc. announced that it has acquired a majority interest in American Information Exchange Corp. in Palo Alto, Calif.

American Information Exchange develops software that facilitates information sharing within and between organizations. It will operate as an independent entity, with Autodesk representation on its three-member board of directors.

Bechtel Group, Inc. announced the acquisition of Technology Applications, Inc. Headquartered in Jacksonville, Fla., Technology Applications specializes in advanced computing technology for the power, process petrochemical and computer science industries. Financial terms of the acquisition were not disclosed.

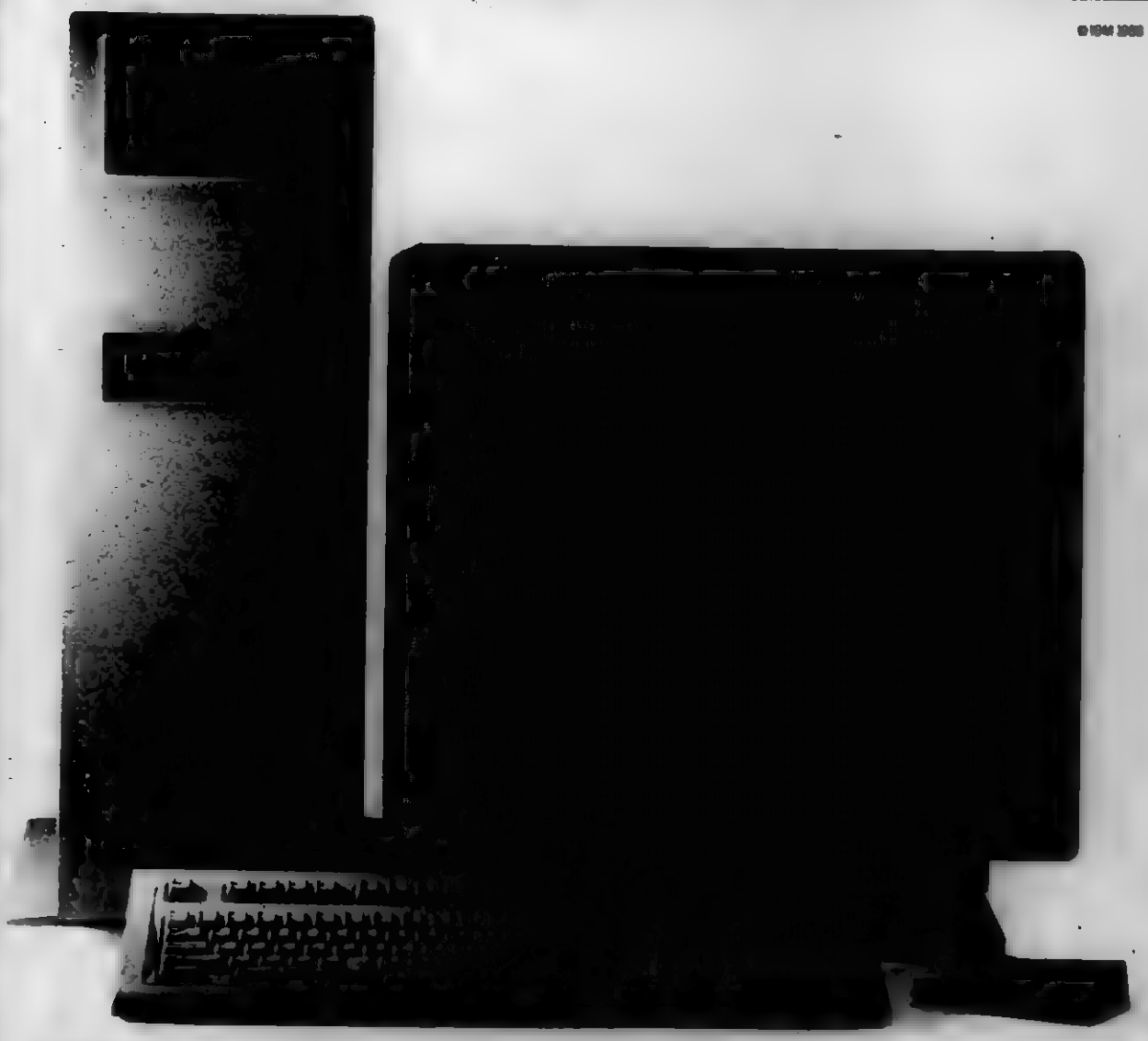
Computer Horizons Corp. has completed the acquisition of Technical Resources Group, Inc. (TRG), a Philadelphia-area software professional services consulting company, for an undisclosed amount of cash.

TRG's software development activities have been primarily performed in IBM and Digital Equipment Corp. environments and in markets consisting of major chemical, financial services and pharmaceutical companies.

Sungard Data Systems, Inc. has acquired EDP Security, Inc. a leading provider of software for developing and maintaining computer-center disaster recovery plans. More than 1,300 customers worldwide have purchased Disaster Plan 80, EDP's principal product. Based in Littleton, Mass., EDP has been developing multiple versions of its disaster-recovery planning software for more than eight years.

Intelogic Trace, Inc. announced that its computer leasing subsidiary, Tencom, Inc., has acquired all of the substantial assets of Southwest Computer Sales, Inc., a San Antonio-based lessor and remarketer of IBM mid-range computer systems with sales offices in Denver and Salt Lake City. Southwest Computer Sales employs 25 people and has 1,200 customers nationwide.

MAI Basic Four, Inc. has acquired the assets of T & E Systems, Inc. T & E Systems is best known for its wholesale electrical/electronic distribution management software system. It is headquartered in Walpole, Mass.



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IBM The Bigger Picture

Insurance hiring is slack

Industry traditionally pays well for MIS, but it's a buyer's market now

BY ALAN RADDING
SPECIAL TO CW

Headlines in the past six months suggest that the insurance industry is in trouble. Insurers whose profits were already under pressure from growing competition are feeling more heat from developments such as the October stock market crash, limits on auto policy premiums and the high cost of health care.

The difficulties have thwarted the growth of MIS employment in the insurance industry and prompted many companies to trim their staffs. However, some companies continue to replace departing workers by hiring candidates with precisely defined skills.

In Hartford, Conn., the insurance industry's capital, companies are trying to slim down by trimming staffs; hiring for data processing is the slowest it has been in 10 years, according to Bob Hefner, managing director of recruitment firm Source EDP.

Cover all the bases

With talk of a possible recession in 1989, even companies that have not experienced specific problems are "anticipating a dip" in business and cutting back, Hefner says.

Burt Israel, manager of data processing placement at Robert Half International, Inc. in Hartford, confirms the slowdown but sees openings for senior people working in advanced technologies such as telecommunications, networking, voice/data integration and fourth-generation languages.

The jobs that Source EDP's Hefner is being called upon to fill are replacement positions. For instance, Hefner might be requested to find a payroll analyst with a minimum of seven years in the insurance industry using a certain software package. Demand, he says, is "faint, but alive."

On the upswing

Boston insurers, which tend to offer a wider array of coverage than the life insurance-oriented firms in Hartford, have experienced a downswing but are coming out of it, according to Steve McMahan, Source EDP managing director in Boston.

"Boston hit the skids a year ago and is already rebounding," McMahan says. "They are looking for specialists — very specific applications-oriented people," McMahan says. "They do not want the middle management person who has generalised skills."

Massachusetts Mutual Life Insurance Co. in Springfield, Mass., has avoided the belt-tightening common among bigger players in Boston and Hartford.

Massachusetts Mutual currently has 20 MIS openings, a typical number, reports Chris DeSaulniers, associate director of employment at the company. The openings are generally replacement positions, half of them applications oriented and half in technical systems and networks, DeSaulniers says.

The insurance industry remains an IBM bastion, although it is seeing increased use of Digital Equipment Corp. machines. The standard recruit, Hefner says, is an IBM programmer with experience in COBOL, CICS, DB2, and MVS. But, while those recruits were being snapped up six months ago, they are now being bypassed for candidates with more specialised skills.

As hiring has gone slack, salaries have stayed generally flat. In Boston, salaries for experienced MIS professionals start at around $35,000, McMahan reports, although someone with specialised skills can make much more. Hefner reports a similar salary base in Hartford and expects pay to rise 5% to 6% in the coming year.

At Massachusetts Mutual, experienced people can start at as low as $25,000 a year, although project managers can make twice that, Desaulniers says.

McMahan says that a lot of MIS executives jumped from insurance to banking in pursuit of better earnings opportunities in the past year.

Insurance income

Salaries for selected positions in the insurance industry tend to be higher than the averages across all industries

INFORMATION PROVIDED BY A *COMPUTERWORLD*/ DATA PROCESSING MANAGEMENT ASSOCIATION 1987 SALARY SURVEY
CW CHART

Future prospects good

The recruiters expect hiring to pick up later in the year because the insurance companies have managed the cutbacks mainly by delaying development, some of which cannot be postponed indefinitely. "If nothing else, there are statutory changes in 50 different states which have to be made," Hefner says.

In the long run, employment prospects look healthy. The U.S. Department of Labor expects the financial services industry, which includes insurance, to see a 70% boost in demand for systems analysts and DP professionals by the end of the century; demand for programmers is expected to jump about 57%.

McMahan cautions MIS professionals about reading too much into the current slump. "Don't base your career on headlines. Insurance will always be around," he says.

Radding is a Boston-based author specializing in business and technology.

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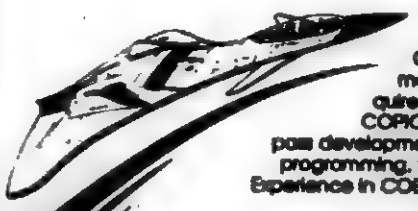

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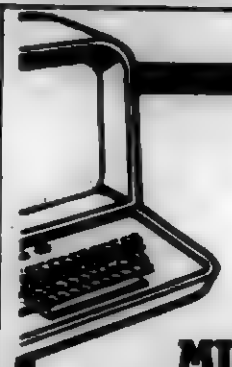

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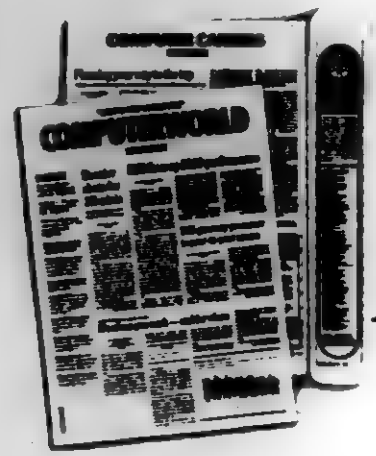

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Data Processing

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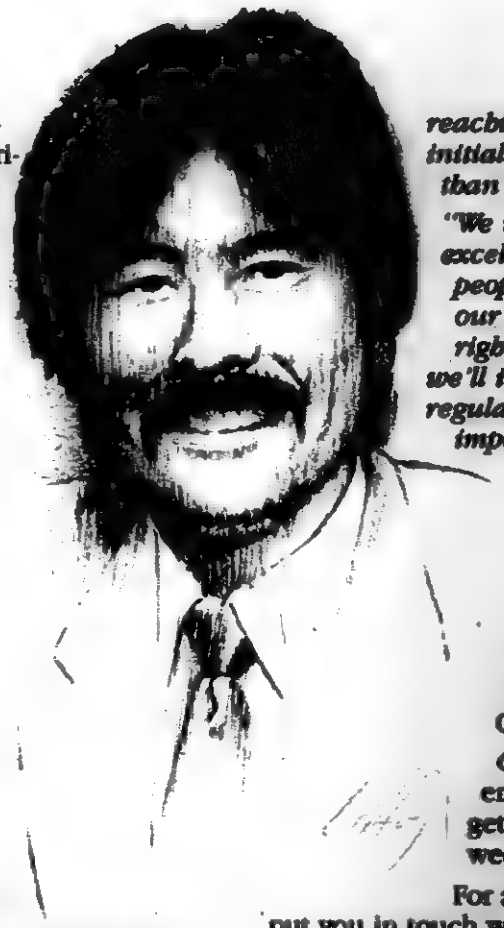

Cesar Namba is Assistant Vice President for MIS Recruitment at Imperial Corporation of America (ICA) in San Diego, California. ICA is a financial services organization that has savings and mortgage institutions in 20 states.

For Cesar, filling important MIS/DP positions is the name of the game. Recently, ICA embarked upon a change in part of its corporate technology, and that meant that Cesar had to go to work finding qualified personnel. And for reaching the best possible candidates, he turned to *Computerworld.*

"Our goal in recruitment advertising is to do several things. Naturally, we want to fill vacant positions, and if we do it right away, that's great. But there's much more to it. We want our ads to create awareness of ICA as a company that hires MIS/DP professionals and we want to make contacts for future positions.

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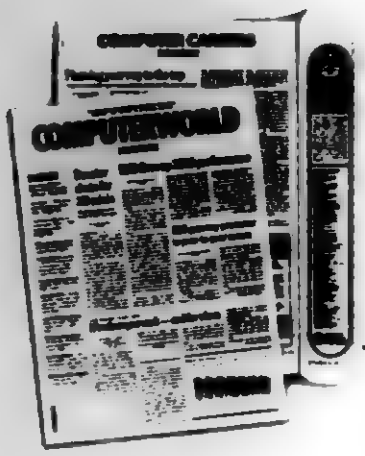

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Dave Grinnell is Vice President and Advertising Director at Source Services Corporation, the parent company of Source Edp, the world's largest recruiting firm that specializes in the computer profession. Source Edp has been an advertiser in Computerworld — almost from inception of the publication. Here's why:

"With its fantastic pass-along circulation, Computerworld not only reaches executives in computer management, but programmers, systems analysts and other individual contributors that are in particular demand by our client firms. It helps us reach the heart of our candidate base efficiently."

"Not only does Computerworld reach our market, but it reaches a market that's actively interested in computing and fostering their career growth. Conservatively, over the years, we have helped many thousands of Computerworld readers find new positions within the computer profession; many times more than those readers of other technology or trade publications. How do we know? We have an elaborate tracking system that helps us verify from which media respondents see our ads. Typically, Computerworld generates over four times more respondents who eventually are placed in new positions by Source than the next nearest computer industry publication."

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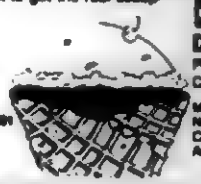

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Computer Specialist (Systems Programmer), Announcement 88-EI-103. A seasoned systems programmer is needed to direct the activities of a team that is responsible for the operating system software that supports EIA's mainframes. Candidates must have recent experience installing and maintaining operating system software on a large IBM mainframe. Both MVS and VM software experiences are desired and experience in the area of electronic publishing is a definite plus. Strong written and oral communications skills are also required as well as the ability to work with users of the computer facility. Salary ranges from $39,801 to $51,354.

Computer Specialist (Data Communications Systems Programmer), Announcement 88-EI-088. An experienced data communications systems programmer is needed to direct the activities of a team that is responsible for the software and hardware that supports EIA's Data Communications Network. Candidates must have recent experience installing and maintaining communications system software, and a good understanding of communications equipment, for large IBM mainframes and IBM 3725 Communications Controllers.

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To apply, prepare and submit an Application for Federal Employment-SF-171 to: Joyce Gilbert, Announcement 88-EI-103 or 88-EI-088, U.S. Department of Energy, Office of Personnel, Room 4F-068, 1000 Independence Avenue, SW, Washington, DC 20585. U.S. Citizenship is required. For additional information call (202) 586-8082. Applications must be received by close of business, July 15, 1988.

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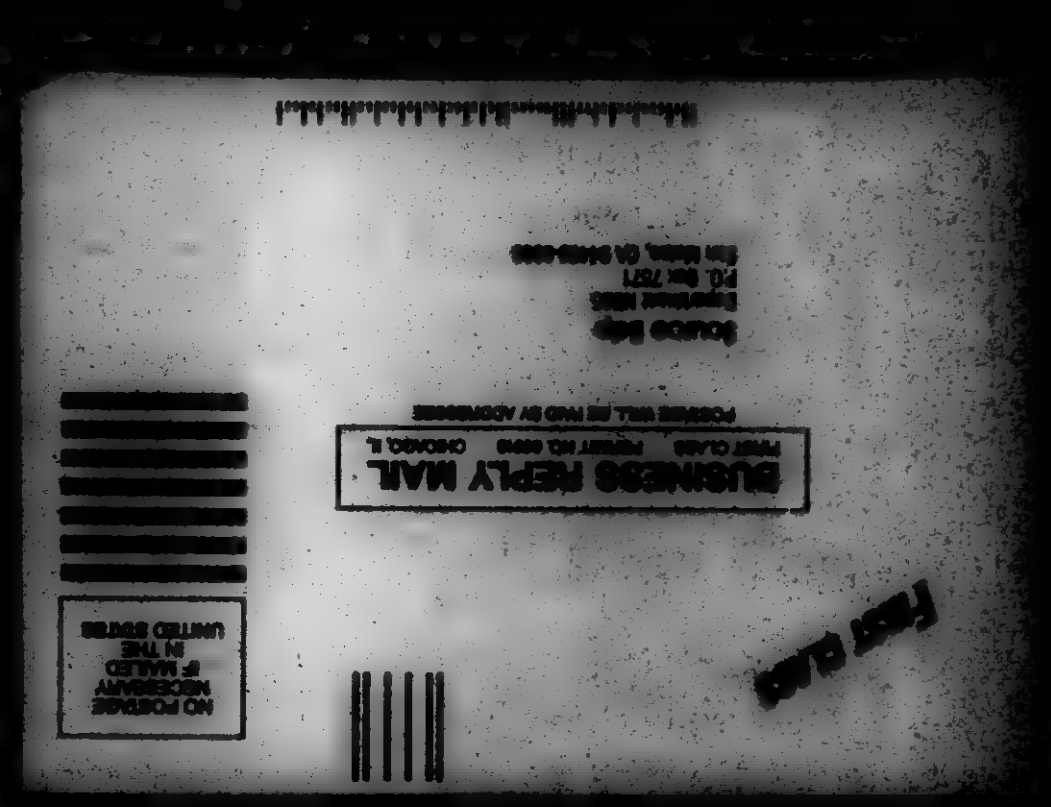
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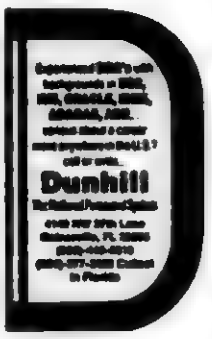

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- Proficiency in COBOL, VSAM, CICS and OS/JCL

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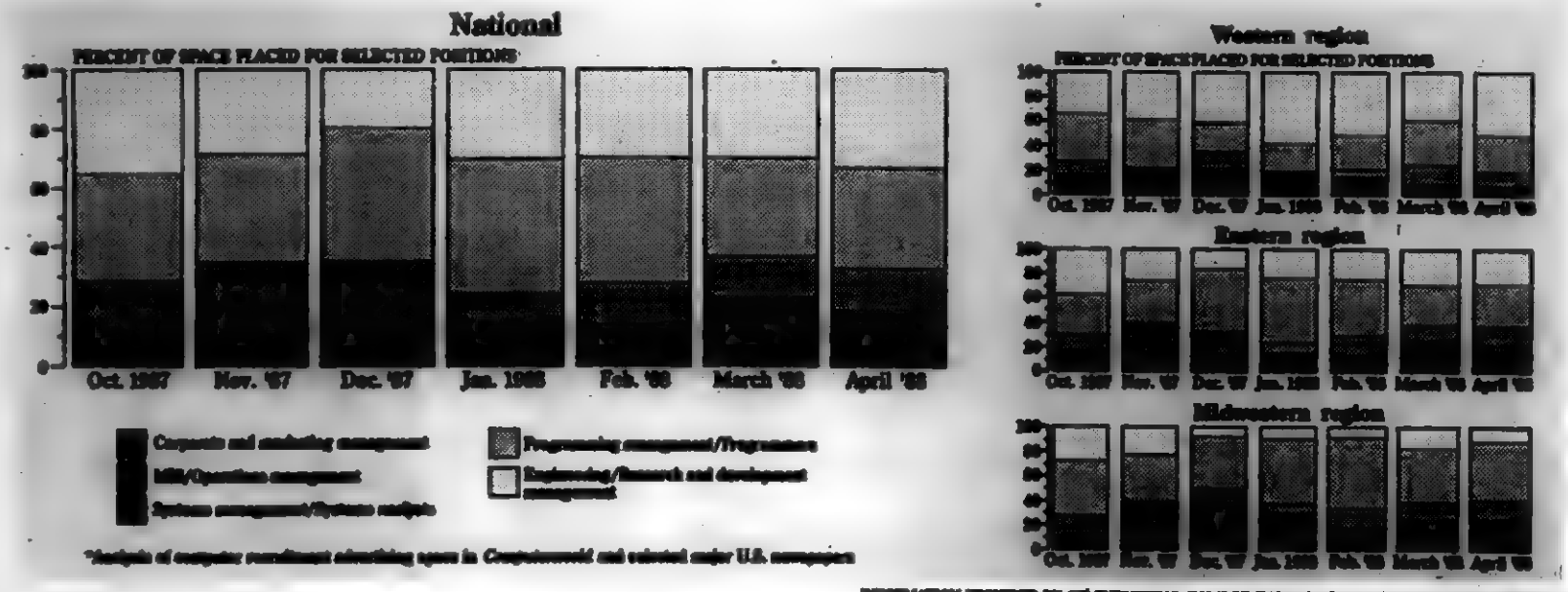

*Analysis of computer recruitment advertising space in Computerworld and selected major U.S. newspapers

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CW CHART

Memory prices upwardly mobile

High cost of DRAM chips also holds up PC values in secondary market

BY DAVID A. LUDLUM
CW STAFF

The short supply of dynamic random-access memory (DRAM) chips is making itself felt in the market for used computer equipment, where the surging cost of the DRAM chips is boosting prices of memory expansion boards and holding up values of personal computers.

Upward pressure on the prices of used gear is coming from a general recognition of the increased value of memory chips, particularly the 256K-bit DRAM, as well as price hikes some manufacturers have imposed on new equipment as a result of the scarcity of such chips.

Prices of 256K-bit DRAMs on the spot market — where transactions are usually in quantities of 100 or less — have ballooned from less than $2 per chip a year ago to more than $10 currently [CW, May 16].

The most visible impact of the chip shortage on new equipment prices came June 10, when Digital Equipment Corp., citing the high cost of DRAM chips, raised the prices of its processors an average of 3.5% and those of add-on memory products an average of 35%.

Potential users may be able to turn to the used marketplace for memory boards that are not immediately available from DEC or may find the prices of used boards more attractive than usual for equipment DEC has subjected to a relatively large markup, according to Dennis Lynch, president of Merida Trading Group, a dealer of used DEC equipment in Woburn, Mass.

"A 35% increase on some of these boards really has to make you wake up and smell the coffee," Lynch said. DEC imposed relatively large price increases on memory boards for newer processors, such as Microvaxes and the VAX 9000 series, and boards with capacities of 4M to 32M bytes, he said.

Side effects

Prices of used DEC memory boards have risen about 15% to 35% in the last month, according to Ray Marcoux, purchasing manager at Merida. Those increases also tend to be higher for newer and larger boards. But Lynch noted that the availability of new boards or increases in their prices can affect the used market in unpredictable ways.

"We're opportunists here. A used board could go up in price 100%," he said.

Lynch said users might be able to sell their used high-end memory boards for more than they paid under the best circumstances, such as when the user acquired the boards at a discount and a buyer needs them right away. But in general, the chip shortage stands only to bring users selling their boards a few more dollars. The user "won't take a beating as he has in the past," Lynch said.

Lynch noted that prices of used DEC-compatible memory boards have increased in value substantially, prompting his firm to hold onto them rather than resell those it acquires at a minimal markup, as it usually does.

Price increases in the used equipment market have not been limited to the DEC environment, however. The DRAM shortage pushed up the cost of 512K-byte memory boards for Wang Laboratories, Inc. PCs 25% to 40% from March to April, according to David Tanny, a financial consultant at Norcomex Ltd. in Concord, Ontario, a dealer of used Wang equipment. The price of one board rose from $450 to $575, Tanny said.

Prices of chips and boards have fluctuated significantly at a historically high level, Tanny added. "People don't know at which price they should be selling their equipment," he said. "You're pricing them on a daily basis."

Tanny also noted that when manufacturers raise prices on their memory expansion kits for equipment — as Apple Computer, Inc. recently did — the action drives up prices of comparable used equipment already containing the expanded memory.

> "PRICES HAVE BEEN much more stable lately due to the chip situation rather than drifting down."
>
> CAMERON HALL
> BOSTON COMPUTER EXCHANGE CORP.

That phenomenon, along with a general recognition of the increased value of memory boards on the part of buyers and sellers, has held up prices of used PCs bought and sold through the Boston Computer Exchange Corp., according to officials of the exchange, which serves as a broker for used PCs and other equipment.

"Prices have been much more stable lately due to the chip situation rather than drifting down," said Cameron Hall, vice-president of the Boston Computer Exchange. "It's keeping prices up because the RAM has value. Users are aware of it."

Hall cited the hypothetical example of an IBM PC AT with 2M bytes of RAM. That calls for eight 256K-byte memory banks with nine chips per bank — including one parity chip — for a total of 72 256K-bit chips. A price increase of $9 per chip — from $3 to $12 — in the last six months translates to a rise in value during that time of $648.

During the past two or three months, Hall said, prices have been steady for many used PCs, particularly those with expanded memory, and she attributed the trend largely to the increased value of memory chips.

What's it worth?

The shortage has also prompted calls to the Boston Computer Exchange from individuals offering to sell memory boards they previously considered to be of negligible value, Hall said.

Norcomex's Tanny said some dealers of memory expansion boards are concerned with a deterioration in quality of memory chips from specific, generally reliable suppliers, which the dealers associate with the memory chip shortage.

"We have had what I consider to be a high number of bad boards that we've had to have repairs on," he said. "People are concerned about the quality of the chips coming through. Chips are being priced on the basis of who they're coming from and where."

Ludlum is a Computerworld senior writer.

The BoCoEx Index

Closing prices report for the week ending June 17, 1988

	Closing price	Recent high	Recent low
IBM PC Model 076	$825	$850	$650
XT Model 086	$1,200	$1,200	$875
XT Model 089	$1,525	$1,550	$1,100
AT Model 099	$2,300	$2,450	$1,800
AT Model 239	$2,650	$2,750	$2,125
AT Model 339	$3,375	$3,700	$2,625
PS/2 Model 30	$1,600	$1,600	$1,450
PS/2 Model 60	$2,750	$3,100	$2,450
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Apple Macintosh 512	$625	$700	$575
512E	$850	$925	$650
II	$3,225	$3,925	$3,100

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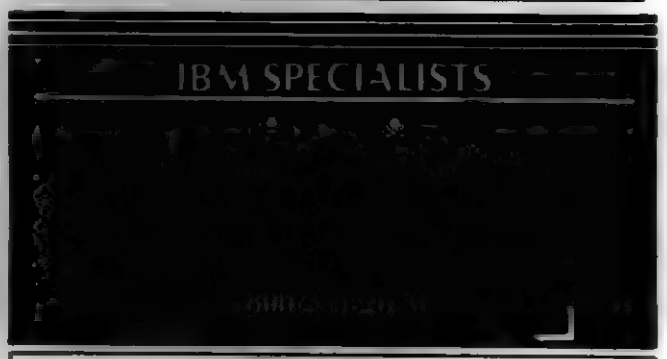

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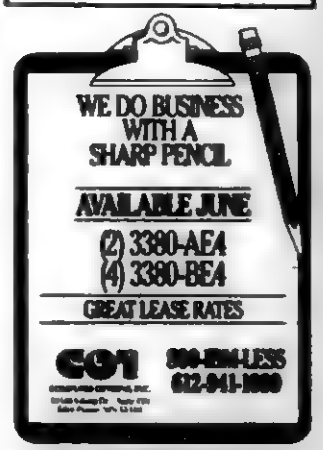

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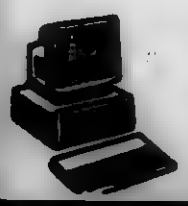

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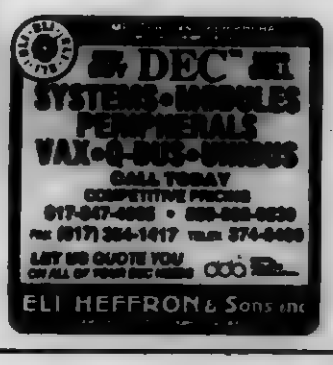

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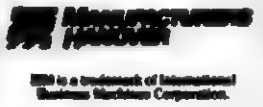

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Vendors are invited to submit proposals on any or all of the following three areas (singly or in combination): (a) hardware, (b) customized software and operating systems, and/or (c) off-the-shelf software.

Copies of this RFP may be obtained by contacting: Paul Reposnik, Director, Bureau of Operations Research, FDNY, 250 Livingston Street, Brooklyn, NY 11201. Phone: 718/403-1758/1788. A non-refundable fee of twenty five ($25.00) dollars in cash or certified check is required.

The Pre-proposal Conference will take place on Monday, July 18, 1988 at 10:00 A.M. in the Commissioner's Conference Room, 250 Livingston St. - 7th floor, Brooklyn, NY. Proposals must be received no later than 4:00 PM, 8/1/88.

The City of New York Financial Information Services Agency is seeking proposals for a software data communications compression package to work with IBM/DC.

All parties interested in receiving a copy of the request for proposal which contains the specifications should contact:

Ms. Marlene Duran-Chiron
Financial Information Services Agency
111 Eighth Avenue, 13th Floor
NEW YORK, NY 10011
212-206-3062

STATE OF ALASKA DEPARTMENT OF ADMINISTRATION DIVISION OF FINANCE REQUEST FOR PROPOSALS

PROJECT: ADPS 88-0048, State Automated Payroll System

Sealed proposals will be received at the Department of Administration, Division of Finance, State Office Building, Juneau, until 3 p.m. prevailing time, August 1, 1988.

DESCRIPTION OF WORK: Provide all effort necessary to purchase, modify, and install a payroll software package that supports a minimum of 15,000 employees, meets the State's defined needs, and provides flexibility for future growth.

Addendum/ae: For those who intend to submit a proposal on this project, copies of the request for proposals can be obtained without charge from: Department of Administration, Division of Finance, P.O. Box C, Juneau, AK 99811-0204, or telephone (907) 465-2340. Additional data is available for inspection at: Department of Administration, Division of Finance, State Office Building, Juneau.

BONDING: $10,000 Bid Bond, 100% Performance Bond required.

PREPROPOSAL CONFERENCE will be held in the Commissioner's Conference Room, Department of Administration, State Office Building, Juneau, at 9 a.m., July 7, 1988.

DEPARTMENT OF SOCIAL SERVICES ATTENTION: CICS TESTING & DEBUGGING SOFTWARE VENDORS

The New York City Human Resources Administration Office of Data Processing is seeking proposals for permanent acquisition of a CICS testing and debugging mainframe software product for use with its CICS on-line inquiry network.

This product must have the capability for: test and debug programs written in MACRO ASSEMBLER CICS language; test and debug programs written in CICS COMMAND LEVEL COBOL; monitor programs written in CICS/OMS 1.41 with on-line APS features; locate field contents by referencing COBOL or ASSEMBLER language labels and names.

Software must run on IBM 4381 P/P14 and future upgrades support MVS/XP with capability to interface in future with MVS/SA, VM/SP, VM/CMS & VM/XA.

Proposals will be received by Human Resources Administration/Office of Data Processing until 5:00 pm., July 15, 1988.

Requests for proposals may be obtained from Della King, Telephone no., (212) 268-3748/3707.

MISSISSIPPI CENTRAL DATA PROCESSING AUTHORITY

Sealed proposals will be received by the CDPA, 301 N. Lamar St., 301 Building, Suite 508, Jackson, MS 39201 for the following equipment and services:

Request for Proposal No. 1383, due Wednesday, July 13, 1988 at 3:30 p.m. for the acquisition of 30 MS/DOS-based microcomputer workstations for MISSISSIPPI STATE UNIVERSITY. Charge $10.00

Detailed specifications may be obtained free of charge from the CDPA office or at the specified cost by submitting a written request accompanied by the appropriate payment. NOTE: Valid forms of payment are corporate check on a Mississippi bank, certified check or POSTAL money order. NO CASH OR OUT-OF-STATE CHECKS. The CDPA reserves the right to reject any and all bids and proposals and to waive informalities.

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9370-60	0.3	8 to 16
4331-2	0.50	1 to 4
9/36-300	0.59	8 to 8
9/36-400	0.75	8 to 8
9375-60	0.75	8 to 16
4341-1	0.88	2 to 4
9/36-500	0.95	8 to 16
9/36-700	1.1	16 to 32
4381-11	1.4	4 to 16
4381-1	1.45	2 to 12
4341-2	1.5	2 to 16
9377-80	1.6	8 to 16
4341-12	1.85	2 to 16
†4381-21	2.1	8 to 16
4381-1	2.1	4 to 16
4381-2	2.7	4 to 32
4381-12	2.7	8 to 32
†4381-22	3.1	16 to 32
4381-13	3.6	8 to 32
3083EX	4.4	8 to 32
4381-3	4.5	8 to 32
†4381-23	4.7	16 to 32

SYSTEMS	MIPS (Millions of Instructions Processed Per Second)	MEGABYTES
†4381-21E	4.7	16 to 64
3033UP	5.0	4 to 24
4381-14	5.0	16 to 32
3083BX	5.0	8 to 32
4/2000-120E	5.0	32 to 64
†4381-24	5.0	16 to 64
†4381-22E	7.0	32 to 64
3083JX	8.0	16 to 32
3090-120	8.0	32 to 64
3081K	9.0	16 to 64
3090-120E	10.0	32 to 64
3081D	11.0	16 to 64
3090-150	11.0	32 to 64
3083JX	11.0	16 to 64
3090-150E	13.0	32 to 64
3090-180E	31.0	64 to 128
3090-200E	44.0	64 to 128
3090-400E	50.0	128 to 256
3090-500E	57.0	128 to 256
3090-600E	76.0	128 to 256

*1st Installation 11/88
#1st Installation 3Q/88
@1st Installation 2Q/88
†1st Installation 1Q/89

SYSTEMS	MIPS	MEGABYTES
9840	0.5	4 to 128
5850	1.0	8 to 128
9860	2.0	16 to 128
5867	3.0	24 to 128
5868	4.0	32 to 256
5870	5.1	32 to 128
5880	12.0	32 to 256
5880-180E	22.0	64 to 256
5880-200E	31.0	64 to 256
5880-300E	40.0	64 to 256
5880-400E	38.0	128 to 512
5880-600E	67.0	128 to 512

NATIONAL ADVANCED SYSTEMS

SYSTEMS	MIPS	MEGABYTES
AS/VL-50	7.5	32 to 128
AS/VL-60	10.0	32 to 128
AS8000	11.0	16 to 64
ASXL-50	15.0	32 to 64
AS8870	16.0	16 to 64
AS/VL-80	17.1	32 to 256
AS8000	28.0	16 to 64
ASXL-60	28.0	64 to 256
ASXL-80	38.0	64 to 256
ASXL-90	57.0	128 to 512
ASXL-100	69.0	128 to 512

The above information is intended as a guideline for computer users on relative computer systems instruction cycle times. All data have been derived from published documentation and represent reasonable estimates of average MIPS ratings. However, Randolph is not responsible for the accuracy of the MIPS data. Cycle times will vary based on hardware/software configurations, and system manufacturers continually modify computer models as design improvements in hardware and software arise.

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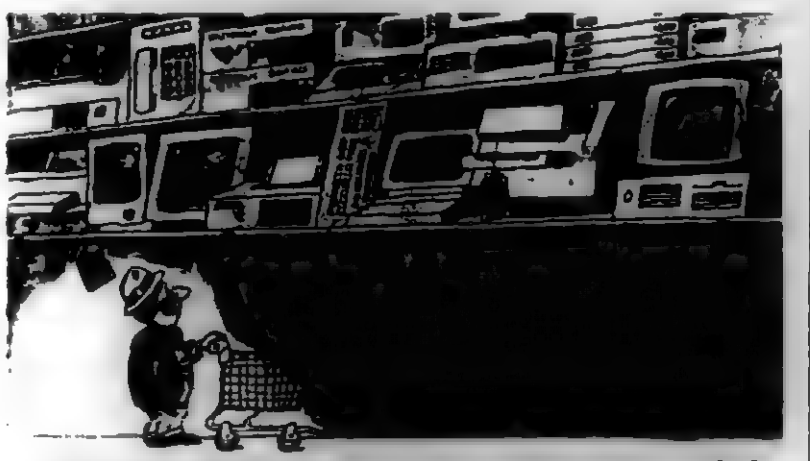

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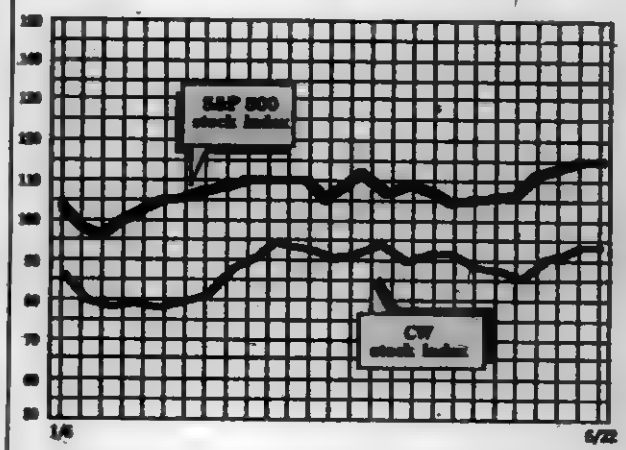

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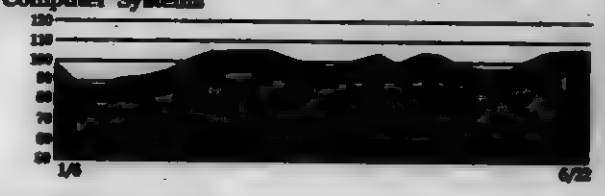
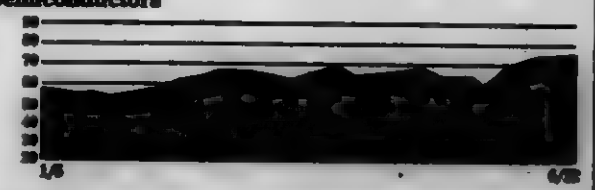


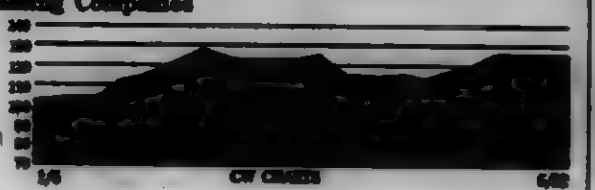
Software and DP Services

Semiconductors



Peripherals and Subsystems

Leasing Companies



Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JUNE 22, 1988

		52-WEEK RANGE (1)		PRICE CLOSE JUNE 22 1988	WEEK NET CHANGE	WEEK PCT CHANGE
Communications and Network Services						
N	AMERICAN INFO TECHS CORP	100	74	94.38	1.5	1.6
N	ANDREW CORP	15	11	14.75	0	0
O	ARTEL COMM CORP	3	1	3	0.5	20.5
N	AT&T	32	27	27.5	0.5	0.6
O	AVANT GARDE COMP INC	3	2	2	0.1	4.8
O	AWANTEK INC	2	2	2	0	0
O	AYDIN CORP	15	6	7	0	0
N	BELL ATLANTIC CORP	93	69	73.38	0.5	0.7
N	BELLSOUTH CORP	44	32	43.5	0.4	0.9
O	COMPRESSION LABS INC	3	2	4.75	0.5	4
O	COMPUTER NETWORK TECH	3	1	1.22	0.1	0.3
N	COMTEL CORP	40	25	34.13	0.4	1.1
O	DATA SWITCH CORP	10	4	8	0.1	1.5
O	DIGITAL COMM ASSOC	25	20	25.38	0.5	2.1
O	DYNATECH CORP	22	14	21.5	1	4.9
O	FIBRONICS INTERNATIONAL INC					
O	GANDALF TECHNOLOGIES	7	3	3.75	0.2	7.1
N	GENERAL DATACOMM INDS	10	3	7.38	0.1	1.7
N	GTE CORP	45	29	3.38	0.1	1.8
O	INFOTRON SYS CORP	14	5	38.88	0.5	1.3
N	ITT CORP	85	62	12.75	0	0
N	M A COM INC	15	7	83	1.9	2.7
O	MCI COMMUNICATIONS CORP	15	7	10.63	0.4	3.7
O	MICOM SYS INC	17	7	14.38	0.5	3.6
O	NETWORK EQUIPMENT TECH INC					
N	NETWORK SYS CORP	28	12	19	0.5	4.1
N	NORTHERN TELECOM LTD	33	7	11.63	0.5	4.5
O	NOVELL INC	25	14	19.13	0	0
N	NYNEX CORP	12	12	27.88	1.5	5.7
N	PACIFIC TELESIS GROUP	47	28	28.13	1.5	2.4
O	PARADYNE CORP	9	4	5.88	0.4	6.8
O	PENRIL CORP	5	1	4.75	0.1	2.6
N	PLESSEY PLC	28	22	26.75	0.4	1.3
N	SCIENTIFIC ATLANTA INC	28	7	13.88	0.6	4.5
N	SOUTHWESTERN BELL CORP	48	32	38.88	1	2.5
O	3 COM CORP	28	13	19.88	0.1	0.5
O	UNGERMANN BASS INC	15	5	12.31	0	0
N	US WEST INC	60	45	58.75	0.5	1.3
Computer Systems						
O	ALLIANT COMPUTER SYS	22	8	7	0.3	3.7
O	ALPHA MICROSYSTEMS	6	3	5.88	0.1	2.1
O	ALTOS COMPUTER SYS	15	6	9.13	0.1	1.4
A	AMDAHL CORP	35	15	54	0	0
O	APOLLO COMPUTER INC	35	14	14.88	0.1	0.8
O	APPLE COMPUTER INC	38	24	46.88	0.1	0.3
N	BOLT BERANEK & NEWMAN	25	12	17.25	0.3	1.8
N	BRITTON LEE INC	4	1	2.88	0.2	6.5
O	COMPAQ COMPUTER CORP	74	34	62.5	0.1	0.2
O	COMPUTER AUTOMATION INC	15	6	7.5	0.1	1.6
O	COMPUTER CONSOLES INC	3	2	0.88	0	0
O	CONCURRENT COMP CORP	25	11	17	0.3	1.8
N	CONTROL DATA CORP DEL	55	35	38.13	1.1	4.1
O	CONVERGENT TECH	9	3	3.06	0	0
O	CONVEX COMPUTER CORP	17	6	8.75	0.1	1.4
O	CRAY RESH INC	119	47	57.5	1.9	3.2
O	DAISY SYS CORP	12	5	10.88	0.3	2.4
O	DATA GEN CORP	37	14	22.38	0.5	2.2
N	DATAPOINT CORP	9	3	5.38	0.1	2.2
N	DIGITAL EQUIP CORP	209	85	112.38	0.5	0.4
N	FLOATING POINT SYS INC	12	3	2.75	0.3	9.8
N	GOULD INC	34	8	14.63	0.5	3.5
N	HARRIS CORP	41	22	29.88	0.1	0.3
N	HEWLETT PACKARD CO	74	38	51.88	1.5	2.8
N	HONEYWELL INC	91	69	70.63	0.5	0.7
N	IBM	176	108	120	0.1	0.1
O	INFORMATION INTL INC	15	9	14	0.1	1.5
O	IRI SYS INC	3	1	2.06	0.1	2.5
O	MASS COMPUTER CORP	14	4	4	0.3	8.1
N	MATSUSHITA ELEC INDL LTD	226	108	197.88	0.1	0.1
O	MEGADATA CORP	3	2	2.75	0.1	3.8
O	MENTOR GRAPHICS CORP	28	14	26.25	1.3	5.7
N	NBI INC	14	4	4.13	0.2	4.7
N	NCR CORP	87	58	68.88	1.1	1.6
N	PRIME COMPUTER INC	21	12	15.88	0.6	3.8
O	PYRAMID TECHNOLOGY	18	8	15.25	1.5	10.9
O	STRATUS COMPUTER	38	15	26.75	0.5	1.9
O	SUN MICROSYSTEMS INC	45	14	26.25	2.1	8.9
O	SYMBOLICS INC	6	1	1.25	0	0
O	SEQUENT COMPUTER SYS INC					
N	TANDEM COMPUTERS INC	30	9	10.13	0.3	1.4
N	TANDY CORP	37	26	30.38	0.1	1.6
N	ULTIMATE CORP	27	12	12.88	0.3	1.9
N	UNISYS CORP	48	26	37.13	0.1	0.3
A	WANG LABS INC	19	10	10.63	0.1	1.2
Software & DP Services						
O	ADVANCED COMP TECH	6	1	1.19	0.1	5.6
O	AGS COMPUTERS INC	20	11	26.13	1.4	5
O	AMERICAN MGMT SYS INC	20	9	16.75	0.3	1.8
O	AMERICAN SOFTWARE INC	10	6	14	1	4.7
O	ANACOMP INC	11	4	10.5	0	0
O	ANALYSTS INTL CORP	10	4	7.88	0.1	1.5
O	ASHTON TATE	30	13	27	2.8	11.3
O	ASK COMPUTER SYS INC	15	6	14.13	0.1	0.9
O	AUTODESK INC	34	12	30.25	1.5	5.2
O	AUTO DATA PROCESSING	55	35	40.13	0.4	0.9
O	BDOLE & BABBAGE INC	12	5	8.38	0.1	1.4
O	COMPUTER ASSOC INTL INC	37	15	30.75	1	3.4
O	COMPUTER HORIZONS CORP	15	7	10.88	0.3	2.2
O	COMPUTER SCIENCES CORP	71	36	43.25	0.5	1.2
O	COMPUTER TASK GROUP INC	18	9	12.75	0.3	2
O	COGNOS INC	17	4	8	0.3	4
O	COMSHARE INC	27	12	18.75	0.5	2.7
O	CULLINET SOFTWARE INC	14	4	8.13	0.4	4.4
O	DUQUESNE SYS INC	24	10	19.25	0.4	1.9
O	DATA ARCHITECTS INC	14	7	13.75	0	0
O	GENERAL MTRS (CLS E)	51	30	37.75	0.5	1.3
O	HOGAN SYS INC	15	3	3.38	0.5	20.8
O	INFORMIX CORP	31	12	22	0.3	1.1
O	INTELLICORP INC	15	2	2.75	0.5	10.5
O	MSAFE INC	16	6	11.25	0	0
O	LOTUS DEV CORP	43	16	21.88	0.4	1.7
O	MANAGEMENT SCIENCES	14	6	8	0	0
O	MICRO FOCUS INTL CORP	7	2	2.44	0.3	8.3
O	MICROSOFT CORP	70	31	57	2	4.7
O	MORINO ASSOCIATES INC	21	7	16	0	0
O	NATIONAL DATA CORP	24	20	22.38	0.1	0.5
O	ON LINE SOFTWARE INTL INC	12	6	6.5	2.4	36.9
O	ORACLE SYS CORP	26	8	18.75	0	0
O	PANSOPHIC SYS INC	16	11	14.63	0.5	3.5
O	POLICY MGMT SYS CORP	28	15	22.25	1.5	6.1
O	PROGRAMMING & SYS INC	14	7	11.75	0	0
O	REYNOLDS & REYNOLDS CO	28	14	16.38	0	0
O	SEI CORP	20	10	20	1.1	6
O	SHARED MED SYS CORP	30	18	21.5	0.3	1.1
O	SAGE SOFTWARE INC	15	6	8.13	0.3	3.8
O	SOFTWARE PUBG CORP	28	8	22.38	1.4	6.6
O	STERLING SOFTWARE INC	12	6	8.88	0	0
O	STANDARD DIGITAL SYS INC	22	16	16	0.5	2.7
O	SYSTEMHOUSE INC	28	10	22.5	0.5	2.4
O	SYS. SOFT INC	24	7	10	0.25	2.7
O	VM SOFTWARE INC	17	7	12.38	0.5	2.5
Semiconductors						
N	ADV MICRO DEVICES INC	24	8	12.5	0.5	4.2
N	ANALOG DEVICES INC	24	8	15.5	0.5	3.3
O	ANALOGIC CORP	13	6	7.38	0	0
O	INTEL CORP	42	16	30.63	1.5	5.1
O	LSI LOGIC CORP	15	7	13	0.5	4.1
N	MOTOROLA INC	74	38	53.88	1.5	2.9
O	NATL SEMICONDUCTOR	22	10	14.88	0.5	3.5
N	TEXAS INSTRS INC	100	38	58	0.13	0.2
A	WESTERN DIGITAL CORP	20	11	15.13	0.13	0.8
Peripherals						
O	ALLOY COMP	13	2	2.5	0	0
O	AM INTL INC	6	3	3	0	0
O	AST RESH INC	21	6	15.5	0.5	3.3
O	AUTO TROL TECH CORP	7	3	5.38	0	0
O	BANCTEC INC	14	3	4	0	0
O	CIPHER DATA PRODS INC	12	4	9.13	0.5	5.2
O	COGNITRONICS CORP	6	2	2.75	0	0
O	COMPUGRAPHIC CORP	28	15	26.88	0.5	1.8
O	DATAPRODUCTS CORP	24	7	15	0.5	3.4
O	DATARAM CORP	9	3	7.5	0	0
N	EASTMAN KODAK CO	71	38	45.88	0.5	1.1
O	E M C CORP MASS	20	4	6	0.5	9.1
O	EMULEX CORP	9	4	6.5	0.5	8.3
O	EVANS & SUTHERLAND	26	14	15	0.5	3.4
O	ICOT CORP	9	3	5	0.5	11.1
N	INTERLEAF INC	24	11	12.38	0.5	4.2
O	IOMEGA CORP	4	1	4.13	0.5	13.8
O	LEE DATA CORP	7	3	3.5	0	0
O	MASSTOR SYS CORP	4	2	2.25	0	0
O	MAXTOR CORP	20	8	12.88	1.5	13.2
O	MICROPOLIS CORP	10	4	7.5	0.5	7.1
O	MINISCRIBE CORP	17	6	11.5	0.5	4.5
N	MINNESOTA MING & MFG CO	91	62	88.38	0.5	0.5
A	MSI DATA CORP	10	6	8	0.5	6.2
O	PERSONAL COMPUTER PRODUCTS INC	7	4	5.88	0.5	9.3
O	PRIAM CORP	3	1	1.88	0.5	21.1
O	PRINTRONIX INC	13	7	10.13	0.5	4.7
O	QMS INC	27	8	9.63	0.1	1.3
O	QUANTUM CORP	15	8	11	0.5	4.7
O	WANGTEK CORP	3	1	1.13	0.1	9.6
O	RECOGNITION EQUIP INC	21	4	7.38	0.5	7.3
O	REXON INC	11	4	6.88	0.5	7.8
O	SCAN TRON CORP	17	7	16.5	0.5	3.1
O	SEAGATE TECHNOLOGY	30	10	17.38	0.5	2.8
O	STORAGE TECH CORP	4	1	1.75	0.1	7.7
O	TANDON CORP	4	1	2.13	0.1	4.5
O	TEC INC	3	1	2.75	0.1	3.7
O	TEKTRONIX INC	44	21	28.38	0.5	1.7
O	TELEVIDEO SYS INC	3	1	1.13	0.1	8.1
O	TELEX CORP	15	3	8.38	0.13	1.5
O	WYSE TECH	28	11	19.38	0.5	2.5
O	XEROX CORP	68	41	54.38	0.5	0.9
O	XIDEX CORP	15	6	6.88	0.1	2.8
Leasing Companies						
O	CAPITAL ASSOCIATES INTERN.					
N	NATIONAL INC	6	3	4.88	0.5	9.3
N	COMDISCO INC	15	4	5	0.13	2.5
N	CONTINENTAL INFO SYS	37	12	23.63	0.63	2.1
O	PHOENIX AMERN INC	12	6	6.25	0.25	4.2
O	SELECTRON INC	6	2	2.88	0.06	2.9

EXCH: N—NEW YORK; A—AMERICAN; O—NATIONAL; O—OVER-THE-COUNTER; S—SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Ride the tide

Favorable interest rates, strong dollar lead to upswing

After wavering the previous week, the Dow Jones industrial average rebounded on the tide of a soaring dollar and favorable interest reports last week and hit a post-crash high of 2152.20 on Wednesday, which sent several computer issues soaring. IBM headed a long list of gainers after Tuesday's announcement of its long-awaited AS/400 mid-range line, formerly code-named Silverlake, and jumped 8¼ points from a week earlier to finish Thursday at 125⅝.

Other gainers for the week included Compaq Computer Corp., which rose 3¼ points to 61⅝ after the Goldman, Sachs & Co. investment house raised its earnings estimate on the personal computer maker; Digital Equipment Corp., which gained 2¾ points to 114¼; Cray Research, Inc., which notched 2¾ points to 86⅜; Sun Microsystems, Inc., up 2½ points to 38; Ashton-Tate Corp., which gained 2¼ points to 26⅝; and Amdahl Corp., up 2 points to 54¼.

Some firms, however, failed to share in the rally. Prime Computer, Inc. dropped ½ of a point to 15⅜; Control Data Corp. slipped ⅛ of a point to 26; and Hewlett-Packard Co. eased ⅛ of a point to 52⅜.

JAMES DALY

Smooth sailing for migration

Series' tools make process easy for System/36, 38 users

BY ROSEMARY HAMILTON
CW STAFF

NEW YORK — With the introduction of the AS/400, IBM has kept at least one very important promise: Current System/36 and 38 users will have a straightforward and relatively easy migration to the new platform.

Developers and users contacted last week who have converted programs noted a few snags in migrations. For instance, Cobol programs do not convert as cleanly as RPG programs. Certain code, such as assembler, that is not supported on the AS/400 will require complete rewrites, and System/36 programs will require more upfront preparation than System/38 programs.

But overall, the migration process went smoothly because of the tools IBM is offering with the new system, programmers said. "I haven't been involved in a migration that's been more simple than this one," said Mark Wasilko, senior vice-president of marketing in the applications products division at Computer Associates International, Inc., which plans to offer its Masterpiece series on the AS/400.

The AS/400 supports three operating modes: a native mode, a System/36 mode and a System/38 mode. The three environments can run concurrently and share data, according to IBM. The System/36 and 38 modes are not achieved through emulation, according to David Schleicher, director of IBM's Rochester Programming Center. Instead, extentions have been built into the new operating system to accommodate the System/36 and 38 programs.

For example, in the case of a System/36 program, the application is running under the OS/400 operating system. But to the user, it appears to be a System/36 environment because the System/36 commands and screen structures are maintained.

Easiest conversion

Moving to the System/38 mode appears to be the easiest of the three possible conversions because System/38 programs are object code-compatible with the new operating environment.

The IBM migration tools can can be thought of as two major facilities: an export tool and an import tool, Schleicher said. The export tools are officially called the AS/400 System/36 and System/38 Migration Offerings. The System/36 offering has a license charge of $1,000, and the System/38 version can be licensed for $2,000. The tools perform such tasks as scanning a program and flagging any aspects that will either require a change or cause a problem in conversion. The Migration Offerings can be licensed now to prepare for an AS/400, which is scheduled to begin shipping in August.

The import function takes place on the AS/400 side and is part of the OS/400 environment. For AS/400 or System/36 environment migration, this import function completes a series of tasks, including recompiling, redefining data as AS/400 data base objects and setting up parameters.

The Marcam Corp., a software developer based in Needham, Mass., recently moved its System/38-based manufacturing software, Prism, to the native AS/400 environment and to the System/38 environment on the new platform.

"Native mode was pretty easy for us, and 36 mode was really just bringing the software over," said Tom Ebling, senior vice-president of product development and support.

Ebling said the move to native mode required manual changes to be made because of the syntax Marcam's programmers used with the System/38 Control Language. He estimated that the entire process took "one to two person-weeks, not working full time."

Schleicher recommended that users spend two to four weeks planning and preparing for a conversion. The actual move to the AS/400 should take less than a week, and at least one week of parallel operations should be maintained.

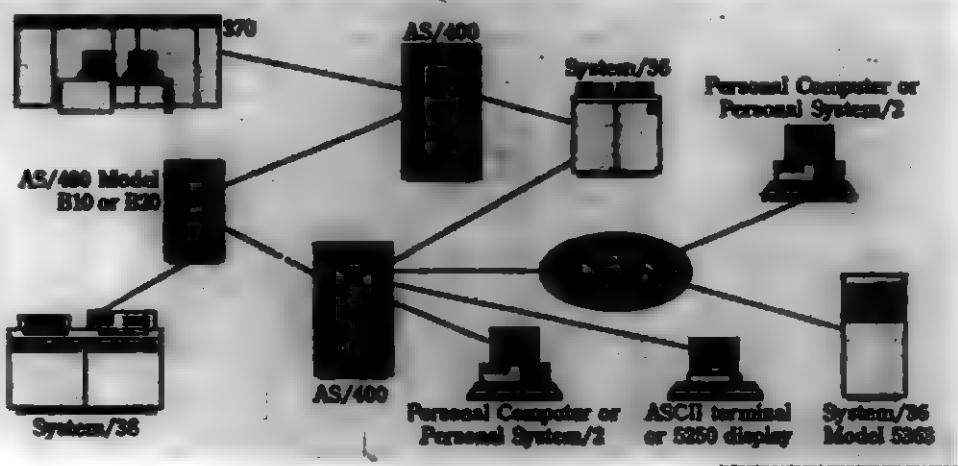
At Ryder System, Inc. in Miami, programmers have ported 1.2 million lines of System/36 code to System/36 mode on an AS/400 Model 60. Dennis Klinger, vice-president of MIS, said the process has had "some bumps, but I'm comfortable with it."

The conversion, which began in late April, was not entirely smooth because "we are not a vanilla RPG shop," added Lyndsay Wells, a senior systems consultant at Ryder. According to Wells, 702 programs were submitted to be recompiled to System/36 mode on the AS/400. Of that group, 450 were written in Cobol 74 and 252 in RPG-II. Wells estimated that the actual recompilation took 11 hours. When completed, 40 programs were not successfully recompiled: only three of that group were RPG-II programs.

Wells said the 40 failures resulted from some glitches in the IBM compiler, which have been fixed by IBM. But the bulk of the errors came about because the Cobol programs were written in the older Cobol, which he called a "much less stringent implementation than the AS/400 Cobol."

Something for everyone

IBM promises that its AS/400 will hook up to mainframes, LANs, PCs and its existing minicomputers



INFORMATION PROVIDED BY IBM
CW CHART

Applications abound

BY ALAN ALPER
CW STAFF

NEW YORK — IBM appears to have learned a lesson from its 9370 debacle.

At the debut of the 9370 21 months ago, IBM provided little in the way of tailored applications for its mid-range processor series. In contrast, the AS/400 family arrived last week with word that some 1,000 applications can already run on the new hardware environment.

In the months preceding the introduction of the AS/400 — previously code-named Silverlake — IBM worked with more than 130 software developers and value-added resellers (VAR) to migrate System/36 and 38 applications to the new platform. Moreover, IBM's Application Systems Division in Atlanta converted 67 System/36 and 38 applications to the new environment.

When IBM introduced the 9370, it said all programs written for its 370 architecture would operate on the machine. Users, however, have said that existing applications run inefficiently on the smaller 9370s, because they were written for larger processors.

The lack of optimized applications is believed to be a major sales inhibitor for the 9370.

The vertical applications offered by VARs are considered key to the AS/400's strategy because IBM expects about 85% of AS/400 sales to be handled by VARs, the firm told analysts at a special meeting last week.

"The success of this product hinges on how well IBM supports its VARs," noted Bart Stuck, president of Probe Research, Inc. "Historically, it's not been IBM's strong point."

IBM helped Delta Airlines convert its travel agency office automation system, originally written to operate on the System/36, to run on the AS/400. "We ported approximately 250 applications in about two days," noted Michael Thurmon, a marketing representative within the airline's automation products division. "It required a little recompiling and tweaking, but it went very smoothly."

OS/400: Beyond tradition

The new AS/400 operating system marks a major departure in operating system philosophy for IBM. OS/400 takes a supermarket approach to operating systems, including in the basic package a large set of diverse functions that are typically sold as separate software programs.

Beyond the traditional system overseer role that an operating system plays, OS/400 provides security; data base and communications support, including network management; application development facilities; and access to customer service and education. License fees for OS/400 range from $5,500 to $55,000.

"To get a comparable environment in the 370 world, you'd have to buy MVS, CICS, DB2, VSAM, Netview and other products," said David Andrews, president of ADM, Inc.

The operating environment supports more than 20 languages, which will be offered as separate program products. RPG-III, the System/38 programming language, has been dubbed a Systems Application Architecture language and will operate under OS/400. A subset of SQL will also run on the AS/400 platform. Other languages include RPG-II, Cobol 85, Cobol 74, C, Basic and Pascal.

Basic elements for application development are included in the operating system, and a separate program product, AS/400 Application Development Tools, offers more advanced tools.

Access to AS/400 customer support and online education are two other standard operating system features.

The customer support service provides users with electronic access to either AS/400 marketing or technical information at IBM. The system also includes locally available functions, such as problem management facilities and question and answer support.

The system's security features govern user access to the field and record levels, but users have the option of working in nonsecured mode.

The operating system relies on an object-oriented architecture, with all resources treated as system objects. It provides single-level storage, treating all storage as one directly addressable space. As a result, users need not know where data is stored when accessing it.

OS/400 has 48-bit addressability, allowing users to write programs of almost limitless size.

ROSEMARY HAMILTON

AS/400 offers SNA protocols, eases net use

BY ELISABETH HORWITT
CW STAFF

Networking and network management capabilities that are optional on IBM's System/36 and 38 are built into the AS/400's operating system, making it potentially easier and less expensive to configure on a network, industry sources said last week.

"It fits in with IBM's claim of greater ease of installation and operation, which the 9370 really lacks," said David Passmore, a principal at Network Strategies, Inc.

The AS/400, previously code-named Silverlake, is an IBM PU2.1 device — the equivalent of an IBM cluster controller. The 9370, as a PU5, or full Systems Network Architecture (SNA) subarea, "requires a lot of work building VTAM lists and routing tables," Passmore said.

Peer networking

Built into the AS/400's operating system, OS/400 is a full set of protocols and programs that enables it to communicate with System/36s and other AS/400s on an SNA peer-to-peer network. The peer-to-peer SNA protocols include LU6.2, PU2.1, Systems Network Architecture Distribution Services, Distributed Data Management (DDM) and Advanced Peer-to-Peer Networking (APPN). Most communications features are set to be available in either late August or late November.

APPN "provides peer networking capabilities for AS/400s and System/36s," said Robert Tunstall, IBM program manager of the Communications Systems Division. APPN, which was not included in previous System/38 offerings, also plays an important role in making it easier for IBM Personal Computers — and eventually Personal System/2s — to access files and peripherals across a distributed network of System/36s and AS/400s, Tunstall said.

APPN keeps track of where users, devices and files are on the network and automatically determines the best route for sending data or queries across intermediate System/36 and AS/400 nodes, Tunstall added. System/38s can also be attached as end nodes to the network.

Enhancements in the AS/400's version of APPN will allow users to give one type of data traffic priority over another — interactive over batch, for example — and will allow users to control how data is routed.

DDM addresses the need for PC and PS/2 users to access resources — in this case, files — across a network of System/36s and AS/400s; System/38s and 370s can also be accessed as DDM hosts. IBM officially made DDM part of its Systems Application Architecture (SAA) in the AS/400 announcement.

AS/400 add-in features include the following:

- AS/400 PC Support Software, another System/36 hand-me-up, turns the AS/400 into a network server that provides shared files and peripherals to PC and PS/2 users, IBM said. One of the program's drawbacks, according to Passmore, is that it does not support IBM's NetBios, and the AS/400's server functions will be out of many users' reach until the advent of OS/2 Extended Edition with built-in LU6.2.
- The AS/400 Communications Utilities program lets AS/400s send batch jobs to a 370 host and to exchange documents with VM hosts using IBM's Professional Office System. Prices for options range from $2,500 to $15,000, with availability scheduled for Nov. 25.
- OS/400 also includes an enhanced version of the System/36's network management functions. The AS/400 can act as a local network management device or as a focal point that collects alerts and other information and passes it on to an IBM 370 host running Netview.

The AS/400 offers some communications features that are missing from the System/36, including a built-in IBM Token-Ring adapter that supports up to 128 devices on AS/400 Models B10 and B20.

IBM subscribes to big-bang theory

It was the best product rollout that money could buy.

From the *Wheel of Fortune* glitz of the IBM worldwide videoconference to the stage shows in cities from Chicago to Portland, Ore., the AS/400 introduction outshone any other IBM announcement in memory.

Setting the stage is *IBM VP Larry Ford*

Why did IBM executives spend the millions needed to do it? "They're market-driven," one Southern MIS manager observed. "They're no dummies."

The June 21 videoconference was beamed to 100,000 customers, prospective customers and IBM business partners worldwide, said Mike Braun, Northeastern area manager for IBM's marketing group.

IBM broadcast the New York press conference simultaneously to 200 U.S. cities and transmitted it on a delayed basis to thousands of international sites.

Rhythm-and-blues combos appeared at five AS/400 introductions coast to coast. On stage at the Civic Opera House in Chicago, a cast of eight IBM marketing representatives warmed up the audience with a parody of the 1960s song "I Heard it through the Grapevine."

The singing IBMers belted out jarring lines like: "I bet you're wondering how I knew/'Bout your plans for Big Blue. Some of those guys in the press/Tell me all . . . You make me guess." The singers waved copies of *Computerworld*, relabeled "CPU and You," as they sang and danced.

JEAN BOZMAN

Their own

FROM PAGE 1

user advisory council, he was present at many design review meetings in Rochester, Minn., last year. "Some of the users were really outspoken about what they didn't like on the AS/400," he said, "and I know that some of their suggested features were incorporated into the final design."

Ron Rettus, director of advanced planning at IBM's Rochester laboratory, confirmed the give-and-take process. "Many users said: 'Your objective [for the AS/400 design] is right, your implementation is right, and, by the way, you have more work to do.' "

But the final specifications seemed to please most System/36 and 38 users who learned of them last week. "We've had an AS/400 machine installed for several months, and so far our technical people are happy," said Dennis Klinger, vice-president of MIS at Ryder Truck Rental, Inc. in Miami. Ryder reportedly plans to install more than 100 AS/400s at its district administrative centers by this time next year.

Ryder's planned installation of AS/400s replaces an earlier scheme for remote System/36s at its regional offices throughout the U.S. and Canada. "My only concern is not about the hardware platform, but about how long it's going to take for our organization to absorb the new systems," Klinger said.

Divisions of large corporations were busy reviewing the AS/400's specifications and financing plans last week. General Electric Co.'s Consumer Electronics Business Operations division in Plainville, Conn., is exploring the possibility of installing multiple AS/400s to replace five aging System/38 Model 700s. "We might buy them soon if all the numbers come out right," said division MIS director Harry David.

Price is right

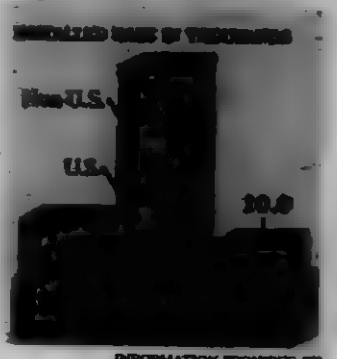
David was referring to his evaluation of IBM's new all-in-one leasing plan and revised maintenance schedule for the System/36 and 38 replacement (see related story page 8). "Price/performance is very attractive," David said, "because it looks like it will be about 30% less than it was for the older machines."

Even small customers — the most targeted market for the System/36 and 38 replacement — seemed pleased with the AS/400. "It doesn't make any sense to sink more money into a System/36 upgrade," said Earl Cunningham, the financial controller and MIS manager at Eklind Tool Co., a 65-person hey manufacturer that recently went through a $16,000 upgrade to its IBM 5362. The entry-level AS/400 B10 and B20 models cost just more than $20,000 for an entire system, Cunningham noted.

Some customers questioned at the Chicago announcement of the AS/400 said they believe IBM's close coupling of the AS/400 with mainframe products like IBM's DB2 relational data base management system, may eventually nudge some Digital Equipment Corp. VAXs out of IBM shops. Any such movement is more likely to be gradual than immediate, users cautioned. "We're not going to run out and swap out all our VAXs," said Fred Baker, an MIS manager at Illinois Bell.

'Come to mama!'

The installed base of IBM System/34, 36 and 38 machines represents a potentially lucrative target for IBM's AS/400 line



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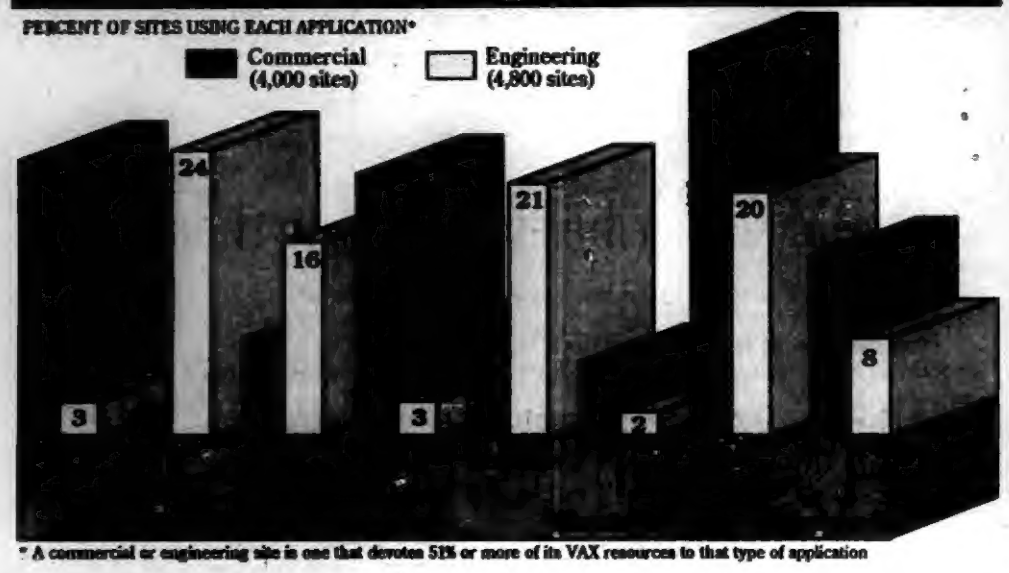
TRENDS

VAX application software

Few tools are a hit with both engineers and commercial users



* A commercial or engineering site is one that devotes 51% or more of its VAX resources to that type of application

The applications used at Digital Equipment Corp. VAX sites show a distinct split, according to a survey of 4,800 scientific and engineering sites and 4,000 commercial sites by Computer Intelligence.

The VAX and its predecessors, the PDP-11s, were quickly established in what became DEC's traditional stronghold — scientific and engineering computing.

The applications that dominate at those sites are among the earliest uses of the VAX, including computer-aided design and manufacturing, data analysis and computer graphics.

For several years, however, the VAX has been successfully invading business offices and serving as a general-purpose commercial processor. At those sites, the applications that predominate are accounts payable, general ledger and payroll.

In a few cases, such as DEC's All-In-1 office automation package or financial analysis applications, the software is broadly used at both types of sites.

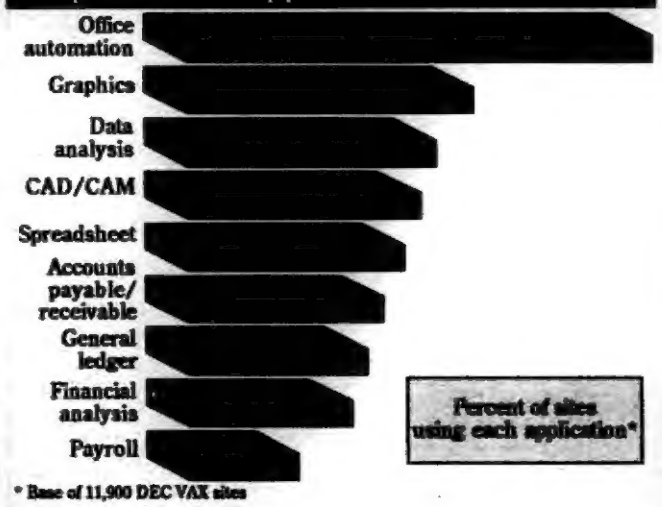
In addition, the practice of buying commercially packaged applications is growing at VAX sites overall.

During the 18-month period between January 1987 and June 1988, the percentage of sites relying on in-house developed software for general ledger declined by 10%. "In-house" includes custom-developed software, whether it was developed internally or by an outside firm.

In-house-developed personnel and purchasing applications likewise declined by 25% and 15%, respectively.

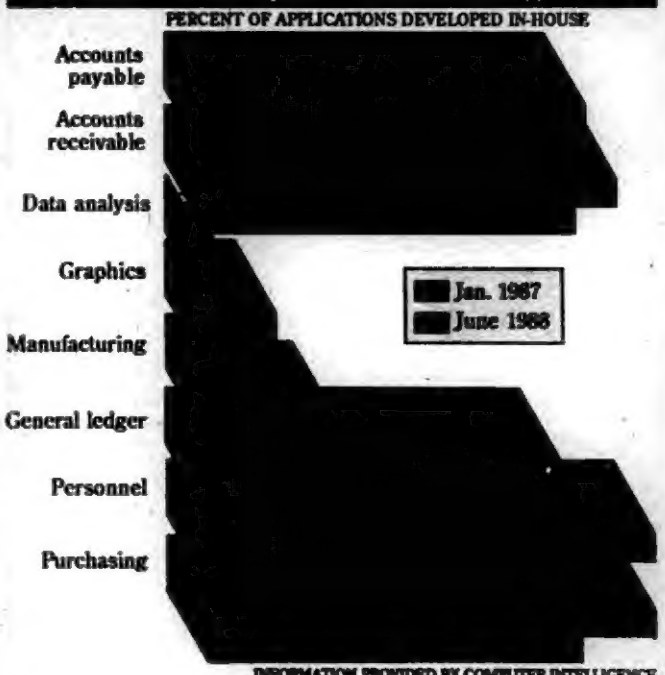
CHARLES BABCOCK

Departmental applications are favorites



* Base of 11,900 DEC VAX sites

In-house development is declining



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CW CHARTS

INSIDE LINES

The more things change . . . IBM sales reps will be offering AS/400 Total System Lease deals themselves rather than referring potential lessees to IBM Credit Corp. The goal is to expedite the deals for both sides. The lease contracts will reportedly be simple, two- to three-page documents. This arrangement reminded one analyst of the days when IBM's typewriter and copier salesmen handled similar deals. When he mentioned this to IBM mid-range honcho Steve Schwartz, Schwartz laughed and replied, "We got the idea from a former copier salesman."

"Lies, Damned Lies, and Benchmarks." That's the title on an extract submitted to *Computerworld* from an upcoming independent report on how strictly such vendors as Sybase, Relational Technology and Tandem complied with an emerging industry standard, the debit-credit benchmark. Tom Sawyer, a consultant at Codd and Date Consulting Group, and Omri Serlin, president of Itom International, teamed up to provide a comparison of transaction processing among DBMS products. The report also outlines ambiguities in the benchmark and ways they are exploited.

Smokin' out NCR's position. NCR is expected to announce a smoking limitation policy this week. Cigar-chomping Chairman Charles Exley is reportedly lighting up less frequently in preparation for the policy, which will restrict tobacco intake to certain portions of the Dayton, Ohio, firm's facilities. Still smoking, however, are rumors of Unisys's interest in acquiring a hot computer or communications company. Although NCR's name is still being mentioned as a possibility, another company circulating through the rumor mill is Minneapolis-based Network Systems Corp., purveyor of the Hyperchannel.

Don't let these guys in the door. The most recent round of rumors concerning Unisys's acquisition interest in NCR had its genesis in a June 6 visit by some Unisys executives attempting to sound out the Dayton firm on its Open Software Foundation stance. Unisys has aligned itself with AT&T and Sun, while NCR has remained uncommitted. NCR's stock climbed more than three points that day as word of the visit spread throughout the company to Wall Street and eventually to the media.

Those lazy, hazy days of summer. The release date of 3Com's OS/2-compatible generation of its 3+Open network operating system has slipped a few weeks, a spokeswoman confirmed. "Full betas" were originally slated to ship this month, but 3Com is now looking at a mid-July release date. After scrapping plans to do so at PC Expo, 3Com now says it will announce release dates and pricing for the software next month. Also changing on the quiet is the name of 3Com's Bridge Communications subsidiary, now called the Enterprise Systems Division. For the time being, Bridge products will retain that moniker.

Static in the atmosphere. It's not just products with dynamic random-access memory chips that face rising costs because of short supplies. There's a static RAM, or SRAM, shortage ramping up as well. SRAM chip prices have increased from $6 to $10, according to Gateway Communications President Walter Schramm. On the DRAM side, vendors say supplies are holding steady, but prices are going through the roof. Excelan, for example, purchases 50,000 DRAMs a month. At premium prices, it is forced to pay an extra $3,000 to $4,000 more for the components, a spokesman says. Anyone who says they are not skittish is probably lying, a 3Com spokeswoman adds. But in six months, "you will probably be reading about price drops," predicts Mike Barker, president of Micom-Interlan.

Let's de-tinker a little, the U.S. chip industry says. To increase the supply and, yes, decrease the price of DRAM chips from Japan, a semiconductor association wants to drop antidumping duties for particular chips that no U.S. vendors currently produce or have future plans to. If anybody remembers the good old days of free trade, call 617-879-0700 or 800-343-6474 and give News Editor Pete Bartolik some good examples of how politics and greed have messed up the computer business.

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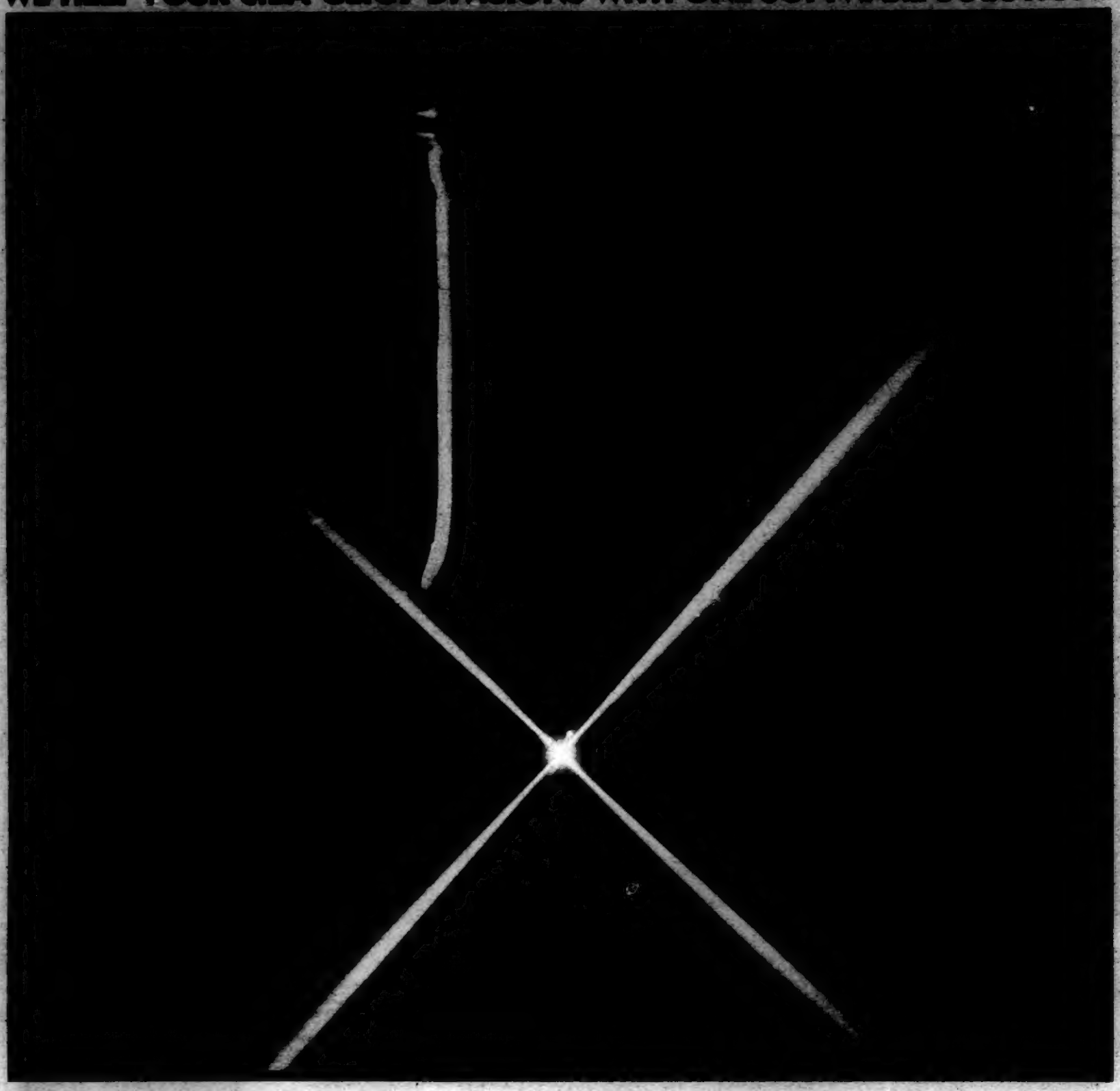

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"MSA has developed software that's flexible enough to adapt to the diverse needs of a company such as ours. So, even though our product lines are extremely different, all share the same software," reports Julie Zepf, Manager of Manufacturing Systems for CIBA-GEIGY.

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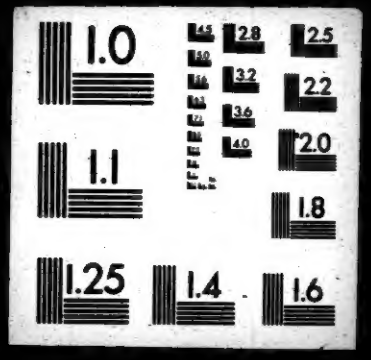
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